WEST VIRGINIA DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

STANDARD DETAILS BOOK
VOLUME 3
BRIDGES AND MISCELLANEOUS STRUCTURES

ISSUE DATE: AUGUST 1, 1999

INCLUDES ADDENDUM 1, 2, 3 AND ERRATA

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				

BR–1	SUPERSTRUCTURE PLAN–NORMAL CROSSING
BR–1	SUPERSTRUCTURE PLAN–LEFT FORWAD SKEW
BR–1	SUPERSTRUCTURE PLAN–RIGHT FORWARD SKEW
BR–1A	SUPERSTRUCTURE PLAN ON PILING NORMAL CROSSING
BR–1A	SUPERSTRUCTURE PLAN ON LEFT FORWARD SKEW
BR–1A	SUPERSTRUCTURE PLAN ON PILING RIGHT FORWARD SKEW
BR–2A	GENERAL NOTES
BR–2B	GENERAL NOTES
BR–7S	CONCRETE ABUTMENT BRIDGE SEAT DETAILS–LT. FORWARD SKEW
BR–7S	CONCRETE ABUTMENT BRIDGE SEAT DETAILS–RT. FORWARD SKEW
BR–10	STEEL BEAM STRINGERS AND TIMBER DECK
BR–10A	DOWEL LAMINATED TIMBER DECK
BR–11	STEEL BEAM STRINGERS AND STEEL GRID DECK
BR–11M	MODIFIED STEEL GRID DETAILS–OPEN TYPE
BR–12	SHOE ASSEMBLY DETAILS–SPAN 60′–0″ OR LESS
BR–12L	SHOE ASSEMBLY DETAILS
BR–13	CONCRETE ABUTMENT LAYOUT
BR–P13	CONCRETE ABUTMENT ON PILING
BR–P14	CONCRETE ABUTMENT ON PILING–REINFORCING STEEL DETAILS
BR–P15	CONCRETE ABUTMENT ON PILING–LEFT WINGWALL DETAILS
BR–P16	CONCRETE ABUTMENT ON PILING–RIGHT WINGWALL DETAILS
BR–P17	CONCRETE ABUTMENT ON PILING–RANGE 1, 2, & 3
BR–P17	CONCRETE ABUTMENT ON PILING–RANGE 4 & 5
BR–14	REINFORCED CONCRETE ABUTMENT–REINFORCING STEEL DETAILS
BR–14S	BRIDGE SEAT DETAILS–LEFT FORWARD SKEW
BR–14S	BRIDGE SEAT DETAILS–RIGHT FORWARD SKEW
BR–15	LEFT WINGWALL DETAILS
BR–16	RIGHT WINGWALL DETAILS
BR–17	ABUTMENT FOOTING–RANGE 1, 2, & 3
BR–17	ABUTMENT FOOTING–RANGE 4 & 5
BR–17A	ABUTMENT FOOTING
BR–S12A	12″ PRESTRESSED PLANK BEAM DESIGN AND ASSEMBLY DETAILS
BR–S12B	DESIGN TABLE FOR 12″ PRESTRESSED PLANK BEAM
BR–B17A	17″ PRESTRESSED BOX BEAM DESIGN AND ASSEMBLY DETAILS
BR–B17B	DESIGN TABLE FOR 17″ PRESTRESSED BOX BEAM
BR–B21A	21″ PRESTRESSED BOX BEAM DESIGN AND ASSEMBLY DETAILS
BR–B21B	DESIGN TABLE FOR 21″ PRESTRESSED BOX BEAM
BR–B27A	27″ PRESTRESSED BOX BEAM DESIGN AND ASSEMBLY DETAILS
BR–B27B	DESIGN TABLE FOR 27″ PRESTRESSED BOX BEAM
BR–B33A	33″ PRESTRESSED BOX BEAM DESIGN AND ASSEMBLY DETAILS
BR–B33B	DESIGN TABLE FOR 33″ PRESTRESSED BOX BEAM
BR–B39A	39″ PRESTRESSED BOX BEAM DESIGN AND ASSEMBLY DETAILS
BR–B39B	DESIGN TABLE FOR 39″ PRESTRESSED BOX BEAM
BR–B42A	42″ PRESTRESSED BOX BEAM DESIGN AND ASSEMBLY DETAILS
BR–B42B	DESIGN TABLE FOR 42″ PRESTRESSED BOX BEAM
BR–B100	PRESTRESSED BOX BEAM DESIGN AND ASSEMBLY DETAILS
BR–B101	PRESTRESSED BOX BEAM DESIGN AND ASSEMBLY DETAILS
BR–B102A	PRESTRESSED BOX BEAM DESIGN AND ASSEMBLY DETAILS
BR–B102B	PRESTRESSED BOX BEAM DESIGN AND ASSEMBLY DETAILS
BR–B103	PRESTRESSED BOX BEAM TRANSVERSE POST–TENSIONING DESIGN AND ASSEMBLY DETAILS
BR–B104	PRESTRESSED BOX BEAM DESIGN AND ASSEMBLY DETAILS
BR–B105A	PRESTRESSED CONCRETE BEAM DESIGN AND ASSEMBLY NOTES
BR–B105B	PRESTRESSED CONCRETE BEAM DESIGN AND ASSEMBLY NOTES
BR–B106	PRESTRESSED CONCRETE BEAM SKEWED END REINFORCING MISC. DESIGN AND ASSEMBLY DETAILS
BR–T1	GLULAM TIMBER SUPERSTRUCTURE PLAN–NORMAL CROSSING
BR–T1	GLULAM TIMBER SUPERSTRUCTURE PLAN–RIGHT FORWARD SKEW
BR–T1	GLULAM TIMBER SUPERSTRUCTURE PLAN–LEFT FORWARD SKEW
BR–T2	GLULAM TIMBER SUPERSTRUCTURE PLAN–GENERAL NOTES
BR–T3	GLULAM TIMBER SUPERSTRUCTURE DECK FASTENING DETAILS
BR–T4	GLULAM TIMBER SUPERSTRUCTURE DIAPHRAGM DETAILS
BR–T5	GLULAM TIMBER SUPERSTRUCTURE–GUARDRAIL POST DETAILS
BR–T6	GLULAM TIMBER SUPERSTRUCTURE–GIRDER ANCHORAGE DETAILS
BR–PP2	REINFORCED CONCRETE PIER ON PILES LAYOUT
BR–PP3	REINFORCED CONCRETE PIER STEM DETAILS (SQUARE NOSE)
BR–PS1	REINFORCED CONCRETE PIER STEM DETAILS (ROUND NOSE)
BR–PS2	REINFORCED CONCRETE PIER FOOTING ON PILING
BR–PS3	REINFORCED CONCRETE PIER LAYOUT
BR–DD1	***DECK DRAIN DETAILS FOR AASHTO TYPE IV PRECAST PC BEAM SUPERSTRUCTURE***
BR–DD2	***DECK DRAIN DETAILS FOR AASHTO TYPE IV MODIFIED PRECAST PC BEAM SUPERSTRUCTURE***
BR–DD3	***DECK DRAIN DETAILS FOR PRECAST PC BOX BEAM SUPERSTRUCTURE***
BR–DD4	***DECK DRAIN DETAILS FOR STEEL SUPERSTRUCTURE***
BRD–B 17X36	17″X36″ P.C. SPREAD BOX BEAM
BRD–B 21X36	21″X36″ P.C. SPREAD BOX BEAM
BRD–B 27X36	27″X36″ P.C. SPREAD BOX BEAM
BRD–B 33X36	33″X36″ P.C. SPREAD BOX BEAM
BRD–B 39X36	39″X36″ P.C. SPREAD BOX BEAM
BRD–B 42X36	42″X36″ P.C. SPREAD BOX BEAM
BRD–B17X48	***17″X48″ P.C. SPREAD BOX BEAM***
BRD–B21X48	***21″X48″ P.C. SPREAD BOX BEAM***
BRD–B27X48	***27″X48″ P.C. SPREAD BOX BEAM***
BRD–B33X48	***33″X48″ P.C. SPREAD BOX BEAM***
BRD–B39X48	***39″X48″ P.C. SPREAD BOX BEAM***
BRD–B42X48	***42″X48″ P.C. SPREAD BOX BEAM***
BRD–II 36X12	AASHTO TYPE II 36″ PRECAST CONCRETE BEAM
BRD–III 45X16	AASHTO TYPE III 45″ PRECAST CONCRETE BEAM
BRD–IV 54X20	AASHTO TYPE IV 54″ PRECAST CONCRETE BEAM
BRD–IVJ 60X37	AASHTO TYPE IV–J PC BEAM 60″ DEEP, 37″ TOP FLANGE
BRD–IVJ 60X43	AASHTO TYPE IV–J PC BEAM 60″ DEEP, 43″ TOP FLANGE
BRD–IVJ 60X49	AASHTO TYPE IV–J PC BEAM 60″ DEEP, 49″ TOP FLANGE
BRD–IVJ 60X61	AASHTO TYPE IV–J PC BEAM 60″ DEEP, 61″ TOP FLANGE
BRD–IVJ 66X37	AASHTO TYPE IV–J PC BEAM 66″ DEEP, 37″ TOP FLANGE
BRD–IVJ 66X43	AASHTO TYPE IV–J PC BEAM 66″ DEEP, 49″ TOP FLANGE
BRD–IVJ 66X49	AASHTO TYPE IV–J PC BEAM 66″ DEEP, 49″ TOP FLANGE
BRD–IVJ 66X61	AASHTO TYPE IV–J PC BEAM 66″ DEEP, 61″ TOP FLANGE
BRD–IVJ 72X37	AASHTO TYPE IV–J PC BEAM 72″ DEEP, 37″ TOP FLANGE
BRD–IVJ 72X43	AASHTO TYPE IV–J PC BEAM 72″ DEEP, 43″ TOP FLANGE
BRD–IVJ 72X49	AASHTO TYPE IV–J PC BEAM 72″ DEEP, 49″ TOP FLANGE
BRD–IVJ 72X61	AASHTO TYPE IV–J PC BEAM 72″ DEEP, 61″ TOP FLANGE
BRD–IVJ 78X37	AASHTO TYPE IV–J PC BEAM 78″ DEEP, 37″ TOP FLANGE
BRD–IVJ 78X43	AASHTO TYPE IV–J PC BEAM 78″ DEEP, 43″ TOP FLANGE
BRD–IVJ 78X49	AASHTO TYPE IV–J PC BEAM 78″ DEEP, 49″ TOP FLANGE
BRD–IVJ 78X61	AASHTO TYPE IV–J PC BEAM 78″ DEEP, 61″ TOP FLANGE
BRD–IVJ 84X37	AASHTO TYPE IV–J PC BEAM 84″ DEEP, 37″ TOP FLANGE
BRD–IVJ 84X43	AASHTO TYPE IV–J PC BEAM 84″ DEEP, 43″ TOP FLANGE
BRD–IVJ 84X49	AASHTO TYPE IV–J PC BEAM 84″ DEEP, 49″ TOP FLANGE
BRD–IVJ 84X61	AASHTO TYPE IV–J PC BEAM 84″ DEEP, 61″ TOP FLANGE
BRD–IVM 60X36	AASHTO TYPE IV MODIFIED 60″ PRECAST CONCRETE BEAM
BRD–IVM 66X36	AASHTO TYPE IV MODIFIED 66″ PRECAST CONCRETE BEAM
BRD–IVM 72X36	AASHTO TYPE IV MODIFIED 72″ PRECAST CONCRETE BEAM
BRD–IVM 78X36	AASHTO TYPE IV MODIFIED 78″ PRECAST CONCRETE BEAM
BRD–IVM 84X36	AASHTO TYPE IV MODIFIED 84″ PRECAST CONCRETE BEAM

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

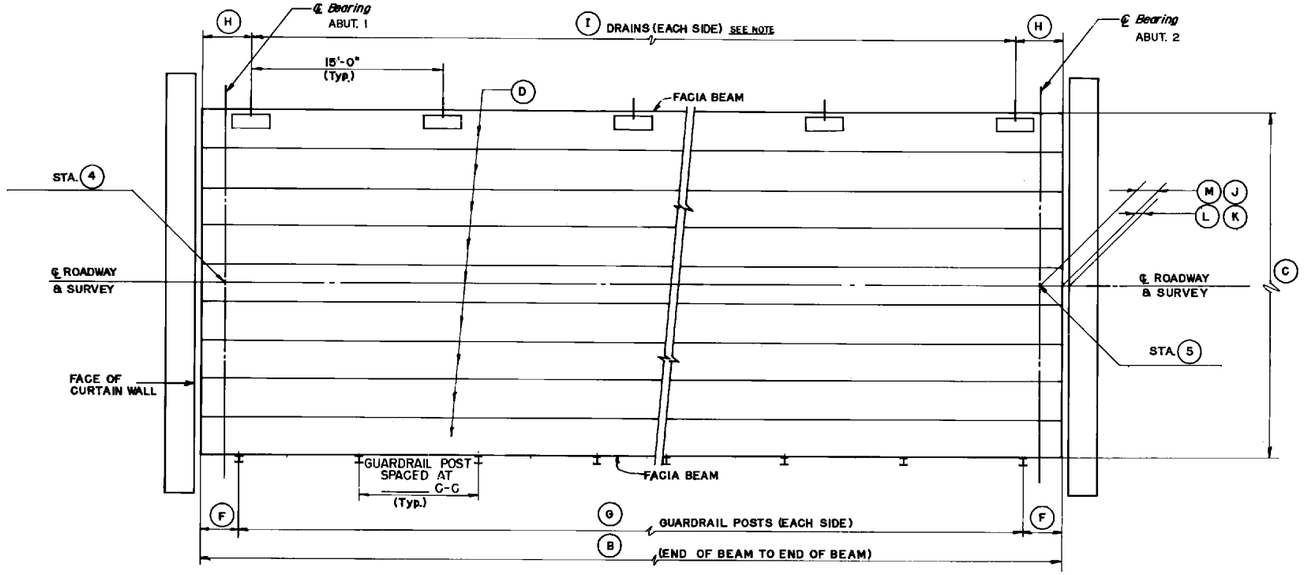
APPROVED Gregory A. Bailey DATE 09/22/08
DIRECTOR ENGINEERING DIVISION

DESIGNED	DATE 12/5/06
DRAWN	
CHECKED	
REVIEWED	

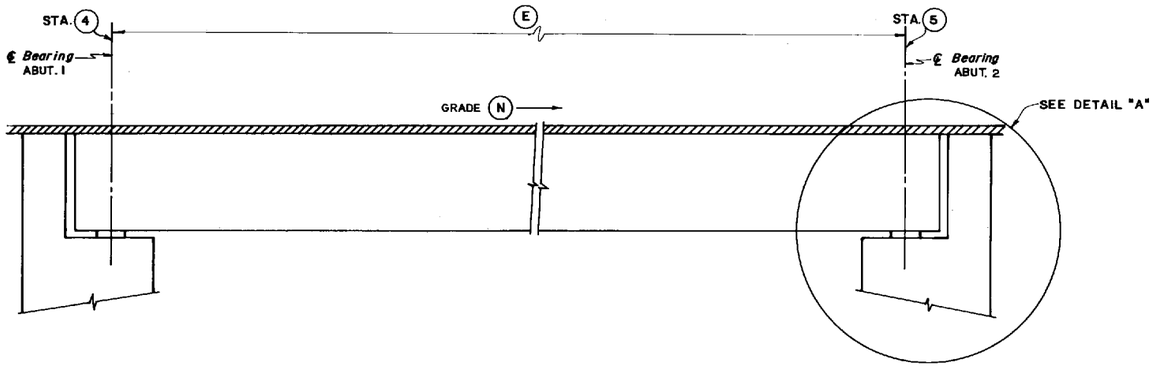
SHEET OF
BRIDGE NO.

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W. VA.					

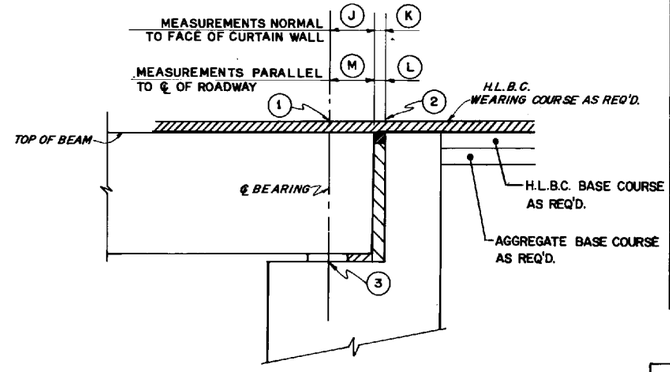
NOTE: DRAINS ARE REQUIRED ONLY IF CURBS ARE SPECIFIED.



SUPERSTRUCTURE LAYOUT PLAN



SUPERSTRUCTURE ELEVATION ALONG ℄ ROADWAY



CONTROL ELEVATIONS & BEARING DIMENSIONS ALONG ℄ ROADWAY

DETAIL "A"

CONTROL ELEVATIONS ESTABLISHED FROM:

CONTROL ELEVATIONS

CODE	ABUTMENT 1	ABUTMENT 2
1*		
2*		
3		

*IF WEARING SURFACE IS DELETED, AFFECTED ELEVATIONS SHALL BE TAKEN AT THE TOP SURFACE OF THE BEAM AND CURTAIN WALL.

CONTROL STATIONING ESTABLISHED FROM:

CONTROL STATIONING

CODE	LOCATION	STATION VALUE ABUT. 1	STATION VALUE ABUT. 2
4	℄ BRIDGE AT ℄ BEARING		——
5	℄ BRIDGE AT ℄ BEARING	——	

CONTROL DIMENSIONS

DIMENSION	CODE	VALUE
NORMAL CROSSING	A	——
LENGTH OF BEAMS, OUT-TO-OUT	B	
DECK WIDTH, OUT-TO-OUT	C	
NUMBER OF BEAMS	D	
SPAN LENGTH, ℄ BEARING TO ℄ BEARING	E	
DISTANCE FROM END OF BEAM TO FIRST GUARDRAIL POST	F	
NUMBER OF GUARDRAIL POSTS, EACH SIDE	G	
DISTANCE FROM END OF BEAM TO ℄ OF DRAIN (IF REQUIRED)	H	
NUMBER OF DRAINS, EACH SIDE (IF REQUIRED)	I	
PERPENDICULAR DISTANCE FROM ℄ BEARING TO END OF BEAM	J	
PERPENDICULAR WIDTH OF EXPANSION OPENING	K	
WIDTH OF EXPANSION OPENING PARALLEL TO ℄ OF ROADWAY	L	
DISTANCE FROM ℄ BEARING TO END OF BEAM (PARALLEL TO ℄ ROAD)	M	
GRADE	N	

ESTIMATE OF QUANTITIES

ITEM		DESCRIPTION	UNIT	QUANTITY
603-1		PRESTRESSED CONCRETE BEAMS	L.F.	
401-1(I)		H.L.B.C. BASE COURSE	TON	
307-1		CLASS I AGGREGATE BASE COURSE	C.Y.	
401-2(II)	P	HOT-LAID BITUMINOUS CONCRETE WEARING COURSE (STONE OR GRAVEL AGGREGATE)	TON	
401-2(III)	A	HOT-LAID BITUMINOUS CONCRETE WEARING COURSE (SLAG AGGREGATE)	TON	

W.VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS
PRECAST, PRESTRESSED, OR POST-TENSIONED CONCRETE BEAMS
SUPERSTRUCTURE PLAN-NORMAL CROSSING
STANDARD SHEET B R-1

PREPARED	
7-73	
REVISED	
11-91	

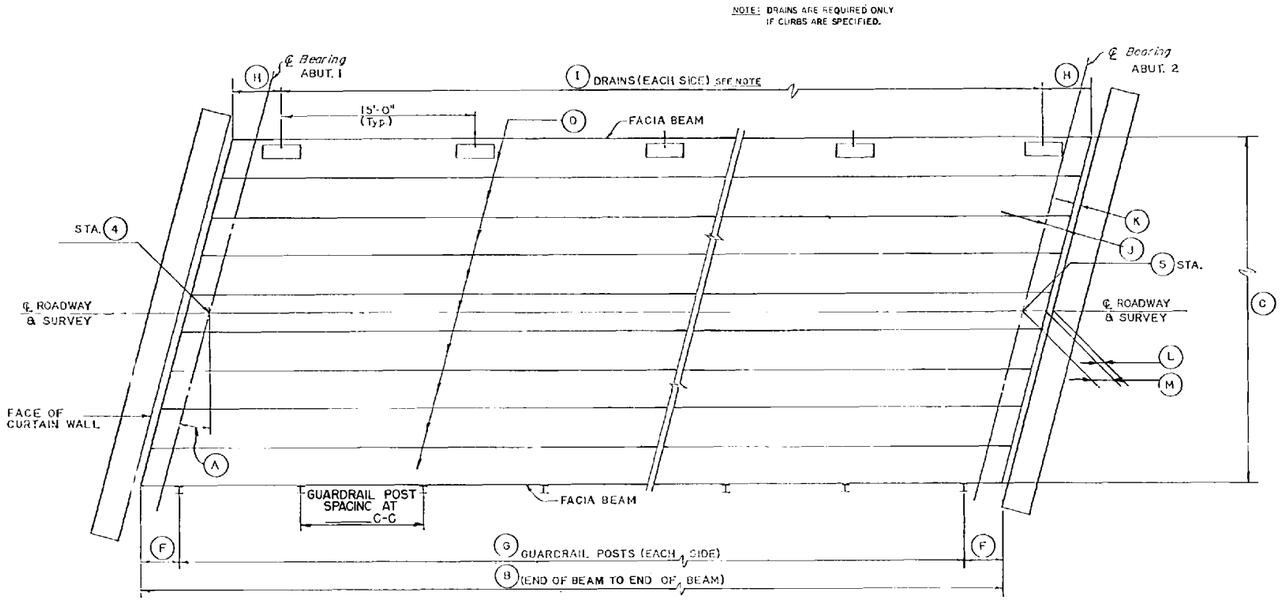
THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

SUPERSTRUCTURE PLAN

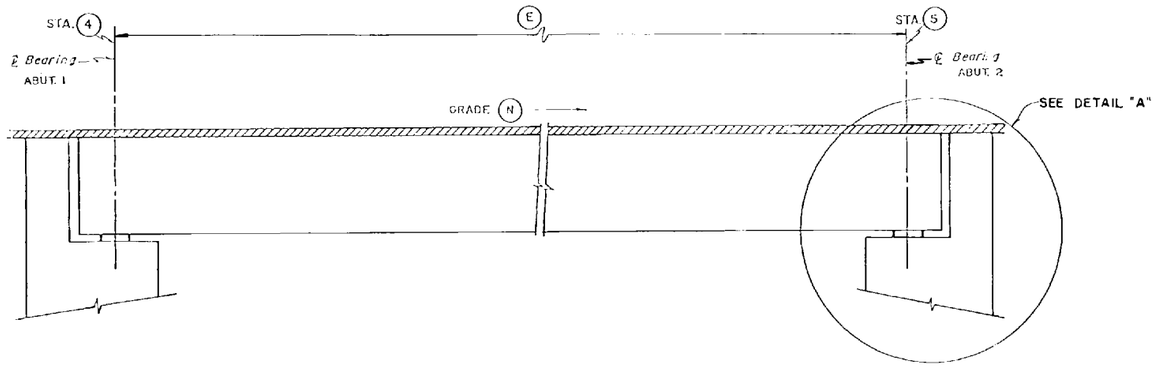
DESIGNED BY:
DRAWN BY:
CHECKED BY:
REVIEWED BY:
DATE:
SCALE: NONE
SHEET OF
BRIDGE NUMBER

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS

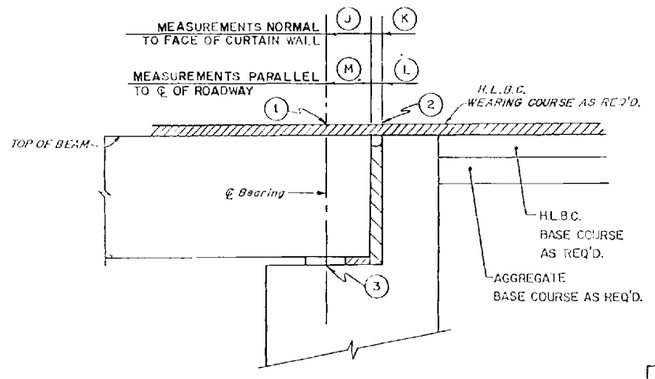
NOTE: DRAINS ARE REQUIRED ONLY IF CURBS ARE SPECIFIED.



SUPERSTRUCTURE LAYOUT PLAN



SUPERSTRUCTURE ELEVATION ALONG ℄ ROADWAY



CONTROL ELEVATIONS & BEARING DIMENSIONS ALONG ℄ ROADWAY

DETAIL "A"

CONTROL ELEVATIONS ESTABLISHED FROM:

CONTROL ELEVATIONS

CODE	ABUTMENT 1	ABUTMENT 2
1*		
2*		
3		

* IF WEARING SURFACE IS DELETED, AFFECTED ELEVATIONS SHALL BE TAKEN AT THE TOP SURFACE OF THE BEAM AND CURTAIN WALL.

CONTROL STATIONING ESTABLISHED FROM:

CONTROL STATIONING

CODE	LOCATION	STATION VALUE	
		ABUT. 1	ABUT. 2
4	℄ BRIDGE AT ℄ BEARING		
5	℄ BRIDGE AT ℄ BEARING		

CONTROL DIMENSIONS

DIMENSION	CODE	VALUE
LEFT FORWARD SKEW	A	
LENGTH OF BEAMS, OUT-TO-OUT	B	
DECK WIDTH, OUT-TO-OUT	C	
NUMBER OF BEAMS	D	
SPAN LENGTH, ℄ BEARING TO ℄ BEARING	E	
DISTANCE FROM END OF BEAM TO FIRST GUARDRAIL POST	F	
NUMBER OF GUARDRAIL POSTS, EACH SIDE	G	
DISTANCE FROM END OF BEAM TO ℄ OF DRAIN (IF REQUIRED)	H	
NUMBER OF DRAINS, EACH SIDE (IF REQUIRED)	I	
PERPENDICULAR DISTANCE FROM ℄ BEARING TO END OF BEAM	J	
PERPENDICULAR WIDTH OF EXPANSION OPENING	K	
WIDTH OF EXPANSION OPENING PARALLEL TO ℄ OF ROADWAY	L	
DISTANCE FROM ℄ BEARING TO END OF BEAM (PARALLEL TO ℄ ROAD)	M	
GRADE	N	

ESTIMATE OF QUANTITIES

ITEM		DESCRIPTION	UNIT	QUANTITY
603-1		PRESTRESSED CONCRETE BEAMS	L.F.	
401-1(I)		H.L.B.C. BASE COURSE	TON	
307-1		CLASS 1 AGGREGATE BASE COURSE	C.Y.	
401-2(II)	P	HOT-LAID BITUMINOUS CONCRETE WEARING COURSE (STONE OR GRAVEL AGGREGATE)	TON	
401-2(II)	A	HOT-LAID BITUMINOUS CONCRETE WEARING COURSE (SLAG AGGREGATE)	TON	

W.VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS
PRESTRESSED, OR POST-TENSIONED CONCRETE BEAMS
SUPERSTRUCTURE PLAN-LT. FORWARD SKEW
STANDARD SHEET B R-1

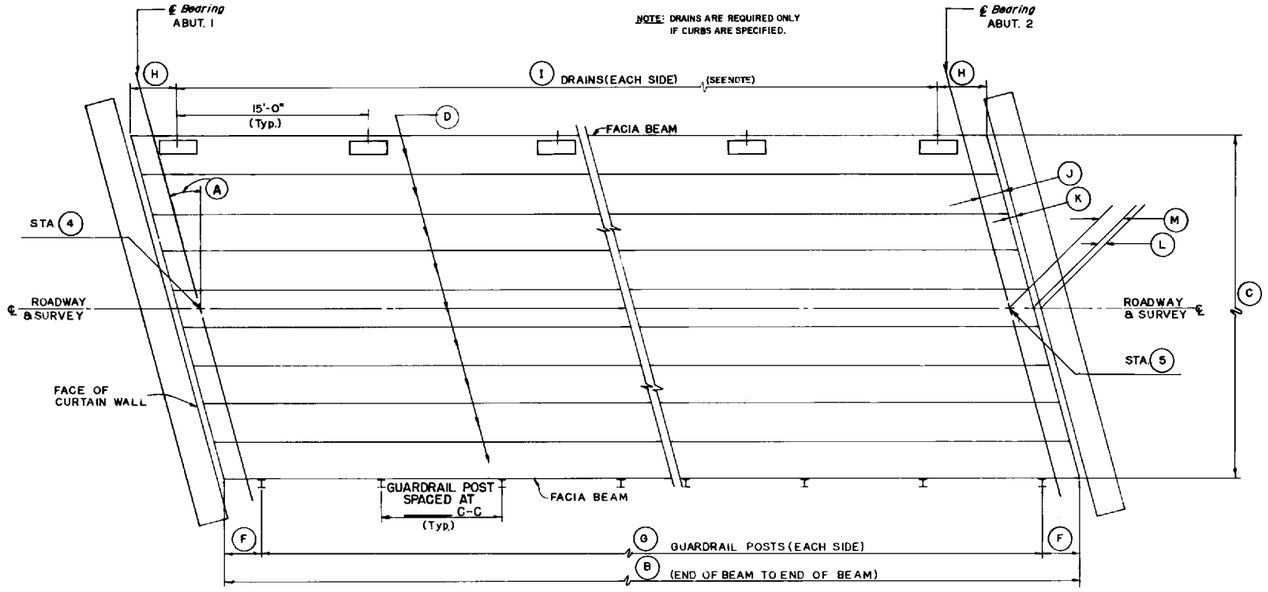
	7-73
REVISED	
2-75	1-78
10-75	3-81
3-77	9-85
3-77	11-91

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

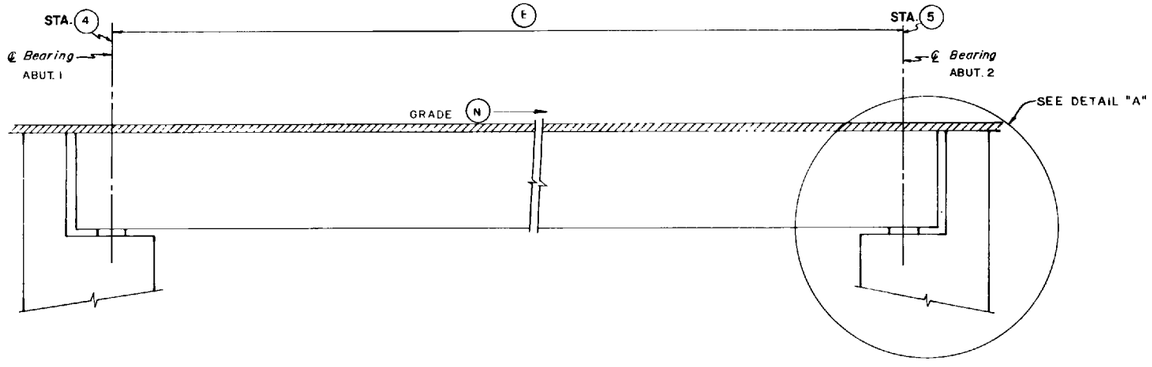
DESIGNED BY:
DRAWN BY:
CHECKED BY:
CHECKED BY:
DATE:
SCALE: NONE
SHEET OF
BRIDGE NUMBER

SUPERSTRUCTURE PLAN

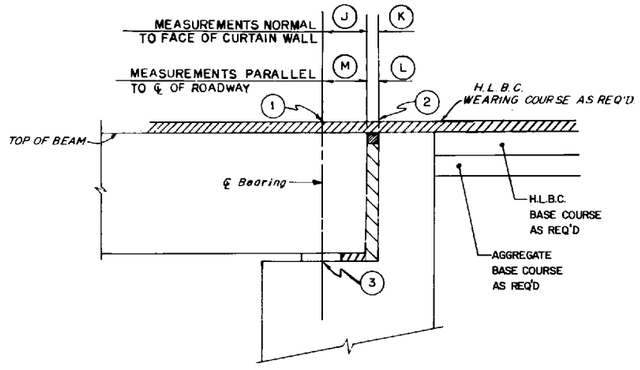
PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.VA.					



SUPERSTRUCTURE LAYOUT PLAN



SUPERSTRUCTURE ELEVATION ALONG ℄ ROADWAY



CONTROL ELEVATIONS & BEARING DIMENSIONS ALONG ℄ ROADWAY DETAIL "A"

CONTROL ELEVATIONS

CONTROL ELEVATIONS ESTABLISHED FROM:

CODE	ABUTMENT 1	ABUTMENT 2
1*		
2*		
3		

* IF WEARING SURFACE IS DELETED, AFFECTED ELEVATIONS SHALL BE TAKEN AT THE TOP SURFACE OF THE BEAM AND CURTAIN WALL.

CONTROL STATIONING

CONTROL STATIONING ESTABLISHED FROM:

CODE	LOCATION	STATION VALUE ABUT. 1	STATION VALUE ABUT. 2
4	℄ BRIDGE AT ℄ BEARING		——
5	℄ BRIDGE AT ℄ BEARING	——	

CONTROL DIMENSIONS

DIMENSION	CODE	VALUE
RIGHT FORWARD SKEW	A	
LENGTH OF BEAMS, OUT-TO-OUT	B	
DECK WIDTH, OUT-TO-OUT	C	
NUMBER OF BEAMS	D	
SPAN LENGTH, ℄ BEARING TO ℄ BEARING	E	
DISTANCE FROM END OF BEAM TO FIRST GUARDRAIL POST	F	
NUMBER OF GUARDRAIL POSTS, EACH SIDE	G	
DISTANCE FROM END OF BEAM TO ℄ OF DRAIN (IF REQUIRED)	H	
NUMBER OF DRAINS, EACH SIDE (IF REQUIRED)	I	
PERPENDICULAR DISTANCE FROM ℄ BEARING TO END OF BEAM	J	
PERPENDICULAR WIDTH OF EXPANSION OPENING	K	
WIDTH OF EXPANSION OPENING PARALLEL TO ℄ OF ROADWAY	L	
DISTANCE FROM ℄ BEARING TO END OF BEAM (PARALLEL TO ℄ ROAD)	M	
GRADE	N	

ESTIMATE OF QUANTITIES

ITEM		DESCRIPTION	UNIT	QUANTITY
603-1		PRESTRESSED CONCRETE BEAMS	L.F.	
401-1(I)		H.L.B.C BASE COURSE	TON	
307-1		CLASS 1 AGGREGATE BASE COURSE	C.Y.	
401-2(II)	P	HOT-LAID BITUMINOUS CONCRETE WEARING COURSE (STONE OR GRAVEL AGGREGATE)	TON	
401-2(II)	A	HOT-LAID BITUMINOUS CONCRETE WEARING COURSE (SLAG AGGREGATE)	TON	

W.VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS
PRESTRESSED, OR POST-TENSIONED CONCRETE BEAMS
SUPERSTRUCTURE PLAN-RT. FORWARD SKEW
STANDARD SHEET B R-1

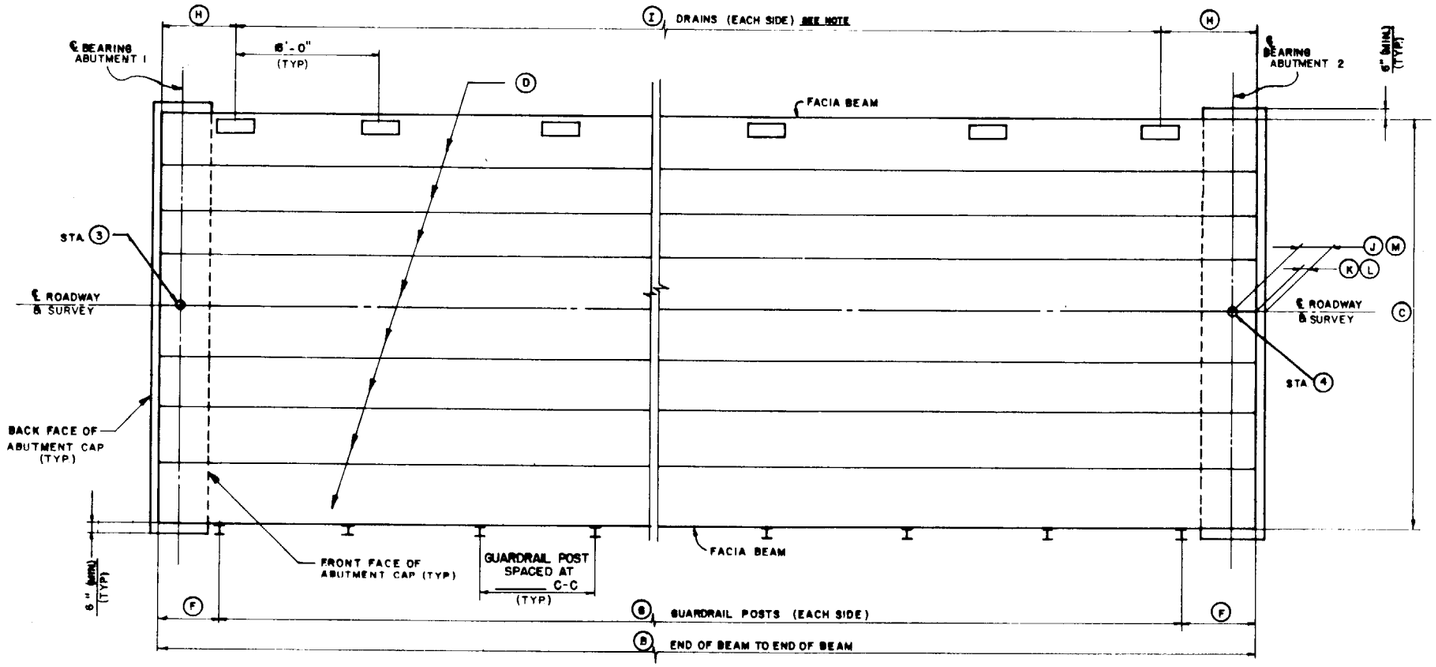
PREPARED	
7-73	
REVISED	
2-75	1-78
10-75	3-81
3-77	9-88
4-77	11-91

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

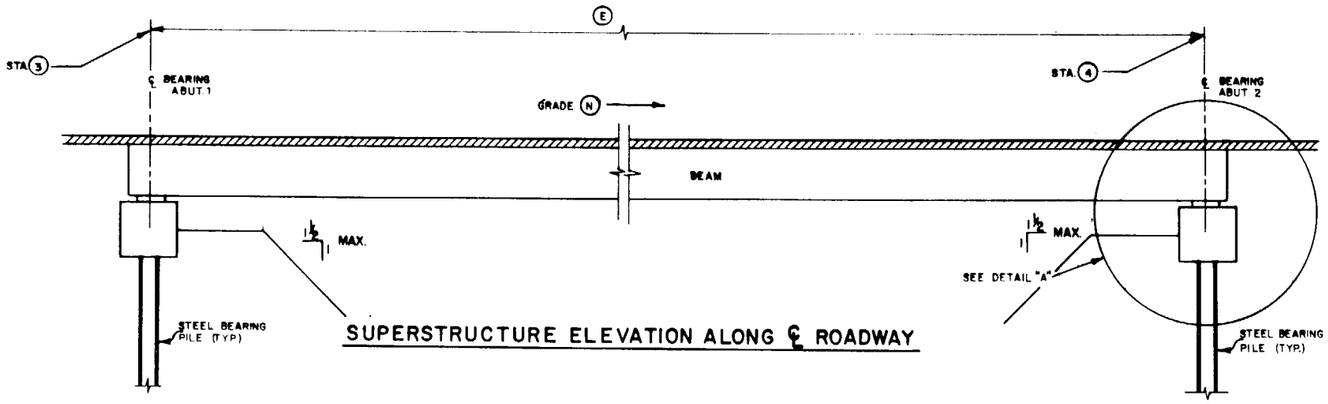
SUPERSTRUCTURE PLAN

DESIGNED BY:
DRAWN BY:
CHECKED BY:
REVIEWED BY:
DATE:
SCALE: NONE
SHEET OF
BRIDGE NUMBER

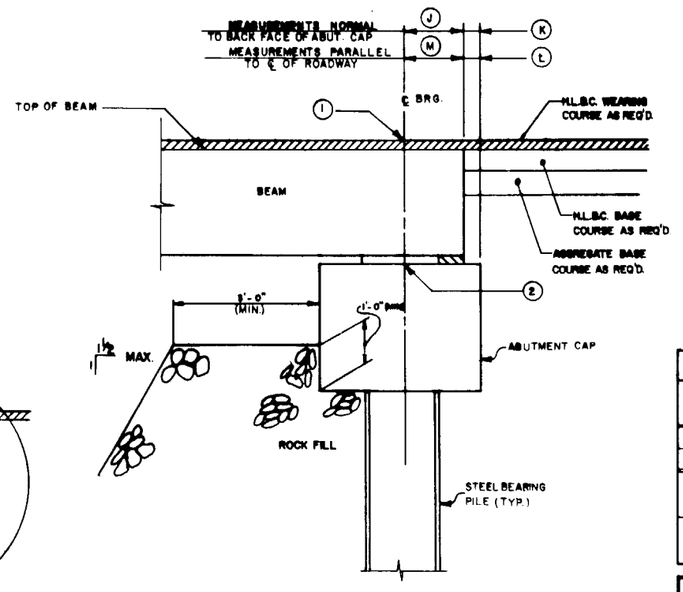
NOTE: DRAINS ARE REQUIRED ONLY IF CURBS ARE SPECIFIED.



SUPERSTRUCTURE LAYOUT PLAN



SUPERSTRUCTURE ELEVATION ALONG ℄ ROADWAY



CONTROL ELEVATIONS & BEARING DIMENSIONS ALONG ℄ ROADWAY

DETAIL "A"

* IF WEARING SURFACE IS DELETED, AFFECTED ELEVATIONS SHALL BE TAKEN AT THE TOP SURFACE OF THE BEAM.

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.VA.					

CONTROL ELEVATIONS

CONTROL ELEVATIONS ESTABLISHED FROM:

CODE	ABUTMENT 1	ABUTMENT 2
1 *		
2		

CONTROL STATIONING

CONTROL STATIONING ESTABLISHED FROM:

CODE	LOCATION	STATION VALUE	
		ABUT. 1	ABUT. 2
3	℄ BRIDGE AT ℄ BEARING		—
4	℄ BRIDGE AT ℄ BEARING	—	

CONTROL DIMENSIONS

DIMENSION	CODE	VALUE
NORMAL CROSSING	A	—
LENGTH OF BEAMS, OUT-TO-OUT	B	
DECK WIDTH, OUT-TO-OUT	C	
NUMBER OF BEAMS	D	
SPAN LENGTH, ℄ BEARING TO ℄ BEARING	E	
DISTANCE FROM END OF BEAM TO FIRST GUARDRAIL POST	F	
NUMBER OF GUARDRAIL POSTS, EACH SIDE	G	
DISTANCE FROM END OF BEAM TO ℄ OF DRAIN (IF REQUIRED)	H	
NUMBER OF DRAINS, EACH SIDE (IF REQUIRED)	I	
PERPENDICULAR DISTANCE FROM ℄ BEARING TO END OF BEAM	J	
PERPENDICULAR DISTANCE FROM BEAM END TO BACK FACE OF ABUTMENT CAP	K	
DISTANCE FROM BEAM END TO BACK FACE OF ABUTMENT CAP (PARALLEL TO ℄ ROAD)	L	
DISTANCE FROM ℄ BEARING TO END OF BEAM (PARALLEL TO ℄ ROAD)	M	
GRADE	N	

ESTIMATE OF QUANTITIES

ITEM		DESCRIPTION	UNIT	QUANTITY
603-1		PRESTRESSED CONCRETE BEAMS	L.F	
401-1(1)		H.L.B.C. BASE COURSE	TON	
307-1		CLASS 1 AGGREGATE BASE COURSE	C.Y.	
401-2(11)	P	HOT-LAID BITUMINOUS CONCRETE WEARING COURSE (STONE OR GRAVEL AGGREGATE)	TON	
401-2(11)	A	HOT-LAID BITUMINOUS CONCRETE WEARING COURSE (SLAG AGGREGATE)	TON	

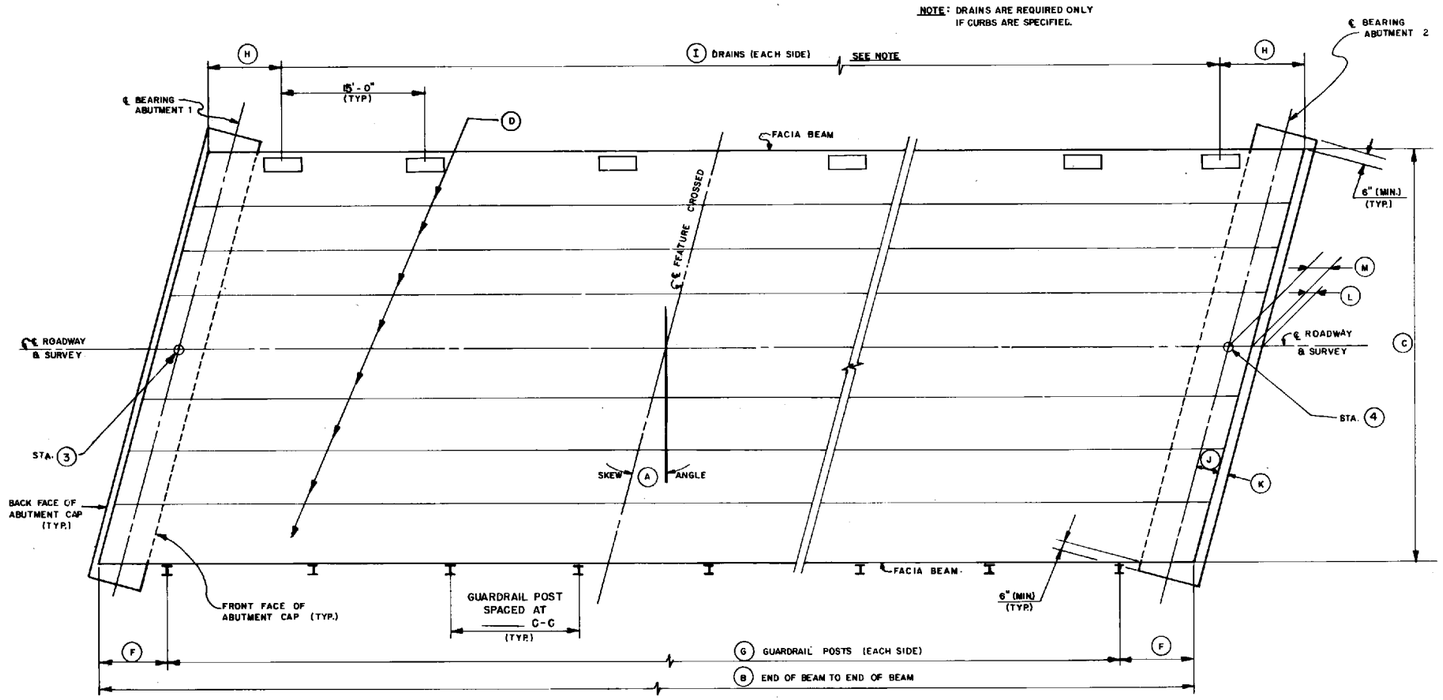
THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

DESIGNED BY:	
DRAWN BY:	
CHECKED BY:	
REVIEWED BY:	
DATE:	
SCALE:	NONE
SHEET	OF
	BRIDGE NUMBER

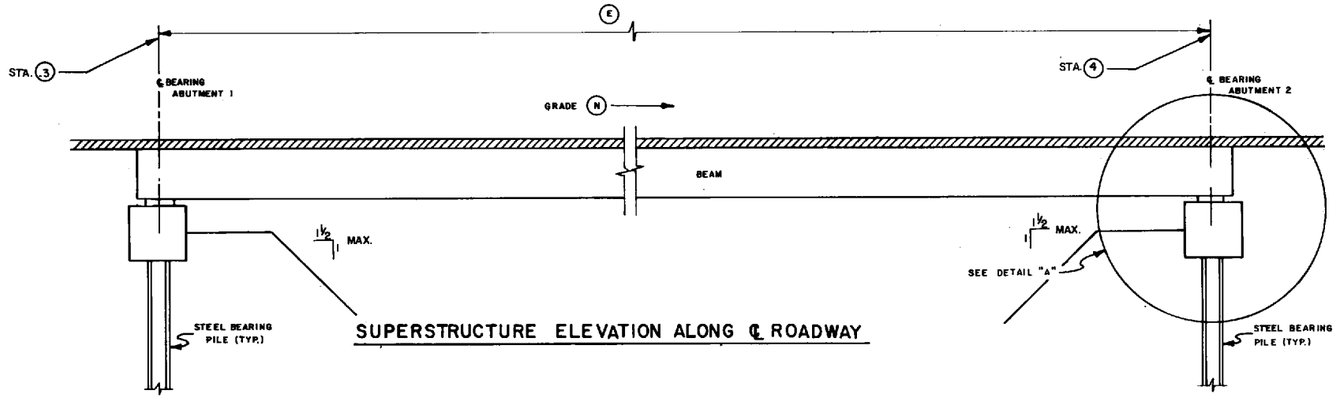
SUPERSTRUCTURE PLAN

W.VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS
PRESTRESSED OR POST-TENSIONED CONCRETE BEAMS
SUPERSTRUCTURE PLAN-NORMAL CROSSING
STANDARD SHEET BR-1A

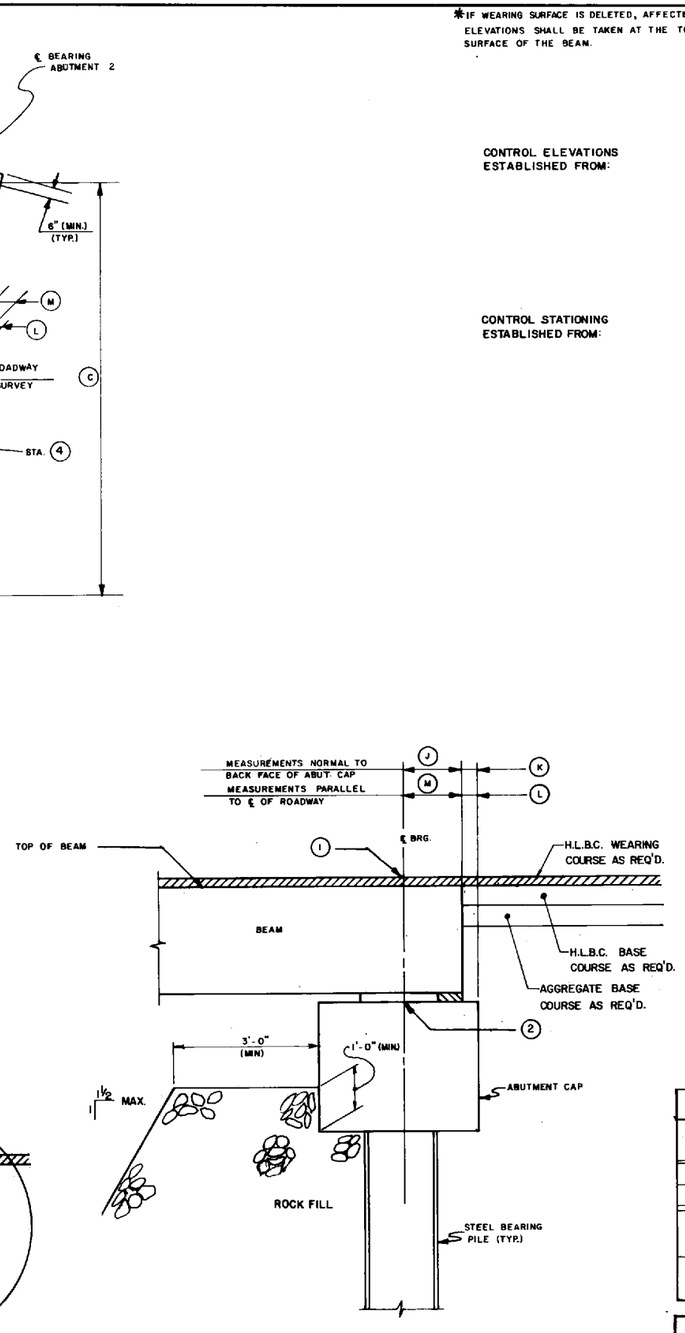
PREPARED	9-75
REVISED	11-91



SUPERSTRUCTURE LAYOUT PLAN



SUPERSTRUCTURE ELEVATION ALONG ℄ ROADWAY



CONTROL ELEVATIONS & BEARING DIMENSIONS ALONG ℄ ROADWAY

DETAIL "A"

*IF WEARING SURFACE IS DELETED, AFFECTED ELEVATIONS SHALL BE TAKEN AT THE TOP SURFACE OF THE BEAM.

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.VA.					

CONTROL ELEVATIONS

CONTROL ELEVATIONS ESTABLISHED FROM:

CODE	ABUTMENT 1	ABUTMENT 2
1*		
2		

CONTROL STATIONING

CONTROL STATIONING ESTABLISHED FROM:

CODE	LOCATION	STATION VALUE ABUT. 1	STATION VALUE ABUT. 2
3	℄ BRIDGE AT ℄ BEARING		—
4	℄ BRIDGE AT ℄ BEARING	—	

CONTROL DIMENSIONS

DIMENSION	CODE	VALUE
ANGLE SKEW, (LT. FORWARD)	A	
LENGTH OF BEAMS, OUT-TO-OUT	B	
DECK WIDTH, OUT-TO-OUT	C	
NUMBER OF BEAMS	D	
SPAN LENGTH, ℄ BEARING TO ℄ BEARING	E	
DISTANCE FROM END OF BEAM TO FIRST GUARDRAIL POST	F	
NUMBER OF GUARDRAIL POSTS, EACH SIDE	G	
DISTANCE FROM END OF BEAM TO ℄ OF DRAIN (IF REQUIRED)	H	
NUMBER OF DRAINS, EACH SIDE (IF REQUIRED)	I	
PERPENDICULAR DISTANCE FROM ℄ BEARING TO END OF BEAM	J	
PERPENDICULAR DISTANCE FROM BEAM END TO BACK FACE OF ABUTMENT CAP	K	
DISTANCE FROM BEAM END TO BACK FACE OF ABUTMENT CAP (PARALLEL TO ℄ ROAD)	L	
DISTANCE FROM ℄ BEARING TO END OF BEAM (PARALLEL TO ℄ ROAD)	M	
GRADE	N	

ESTIMATE OF QUANTITIES

ITEM		DESCRIPTION	UNIT	QUANTITY
603-1		PRESTRESSED CONCRETE BEAMS	L.F.	
401-1(I)		H.L.B.C. BASE COURSE	TON	
307-1		CLASS 1 AGGREGATE BASE COURSE	C.Y.	
401-2 (II)	P	HOT-LAID BITUMINOUS CONCRETE WEARING COURSE (STONE OR GRAVEL AGGREGATE)	TON	
401-2 (II)	A	HOT-LAID BITUMINOUS CONCRETE WEARING COURSE (SLAG AGGREGATE)	TON	

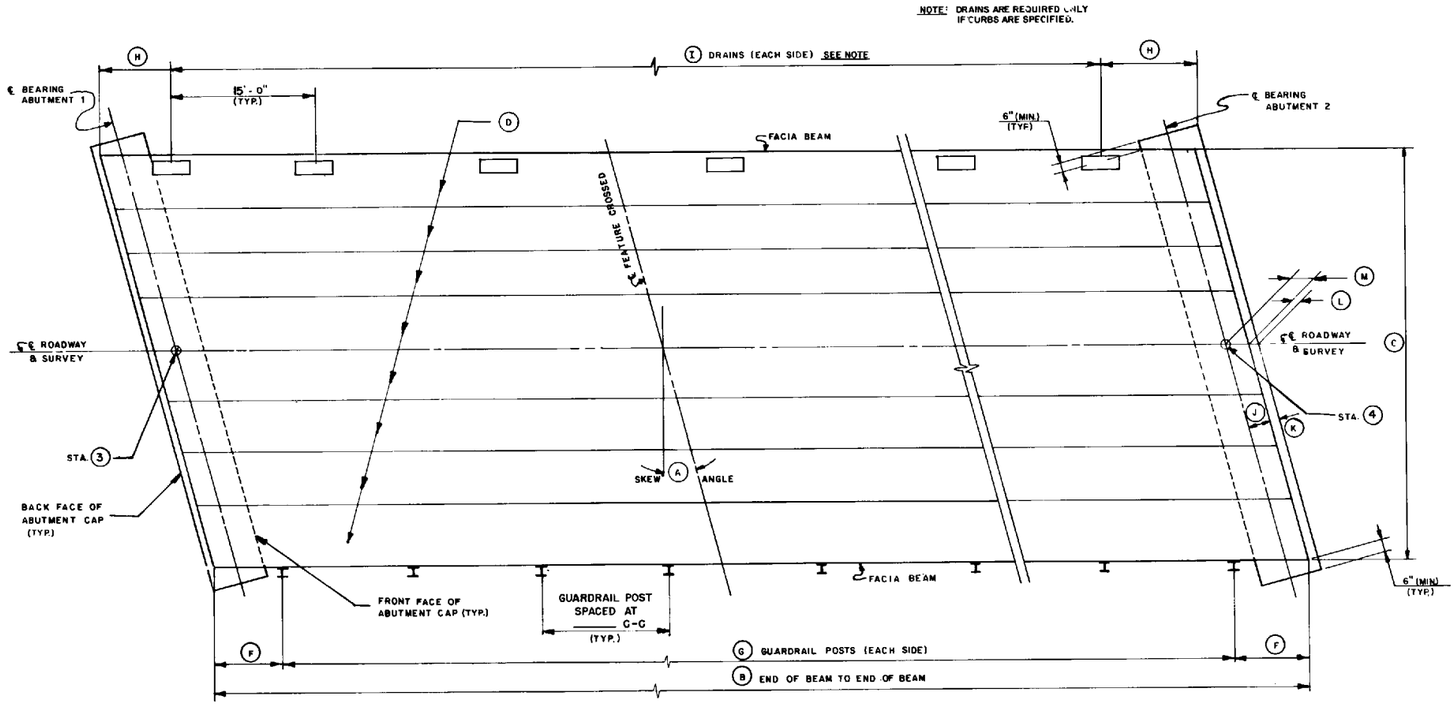
THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

W.VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS
PRESTRESSED OR POST-TENSIONED CONCRETE BEAMS
SUPERSTRUCTURE PLAN - LT. FORWARD SKEW
STANDARD SHEET BR-1A

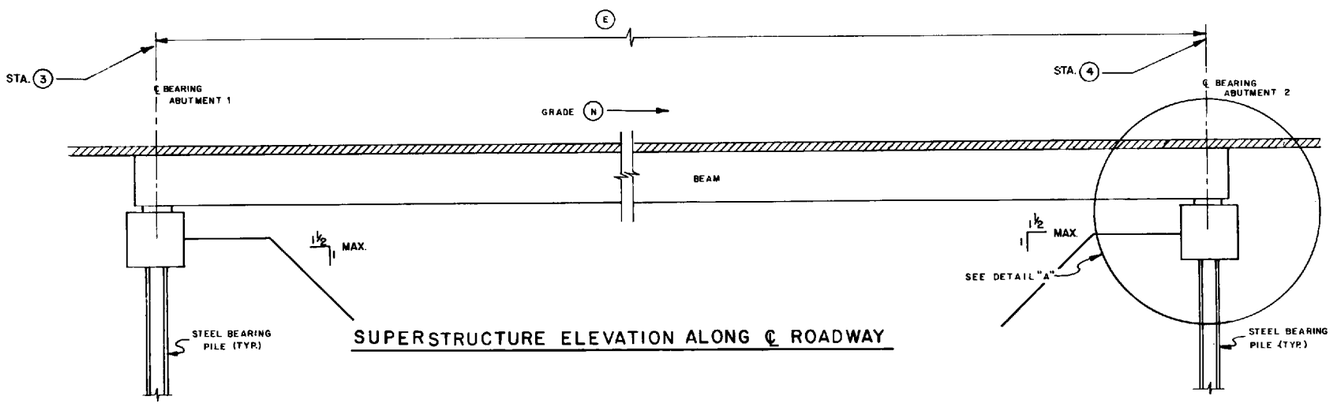
PREPARED: 9-75
REVISED: 11-91

DESIGNED BY:
DRAWN BY: TRT
CHECKED BY:
REVIEWED BY:
DATE:
SCALE: NONE
SHEET OF BRIDGE NUMBER

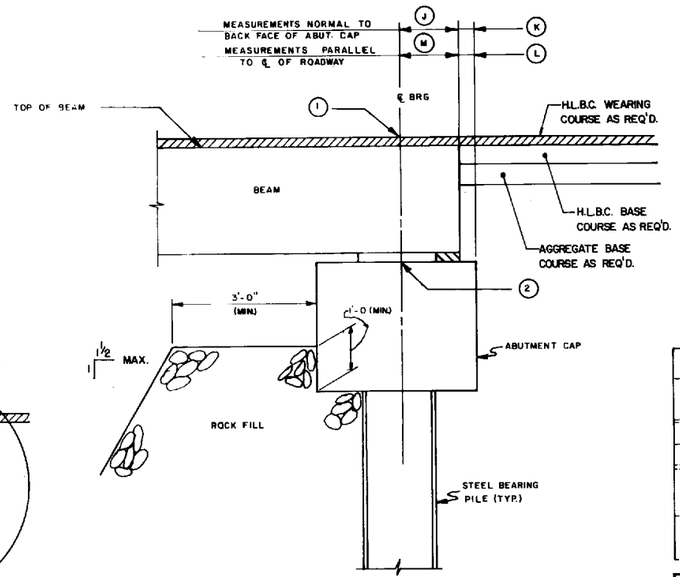
SUPERSTRUCTURE PLAN



SUPERSTRUCTURE LAYOUT PLAN



SUPERSTRUCTURE ELEVATION ALONG ℄ ROADWAY



CONTROL ELEVATIONS & BEARING DIMENSIONS ALONG ℄ ROADWAY

DETAIL "A"

*IF WEARING SURFACE IS DELETED, AFFECTED ELEVATIONS SHALL BE TAKEN AT THE TOP SURFACE OF THE BEAM.

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.V.D.H.					

CONTROL ELEVATIONS

CONTROL ELEVATION ESTABLISHED FROM:

CODE	ABUTMENT 1	ABUTMENT 2
1 *		
2		

CONTROL STATIONING

CONTROL STATIONING ESTABLISHED FROM:

CODE	LOCATION	STATION VALUE ABUT. 1	STATION VALUE ABUT. 2
3	℄ BRIDGE AT ℄ BEARING		——
4	℄ BRIDGE AT ℄ BEARING	——	

CONTROL DIMENSIONS

DIMENSION	CODE	VALUE
ANGLE SKEW (RT. FORWARD)	A	
LENGTH OF BEAMS, OUT-TO-OUT	B	
DECK WIDTH, OUT-TO-OUT	C	
NUMBER OF BEAMS	D	
SPAN LENGTH, ℄ BEARING TO ℄ BEARING	E	
DISTANCE FROM END OF BEAM TO FIRST GUARDRAIL POST	F	
NUMBER OF GUARDRAIL POSTS, EACH SIDE	G	
DISTANCE FROM END OF BEAM TO ℄ OF DRAIN (IF REQUIRED)	H	
NUMBER OF DRAINS, EACH SIDE (IF REQUIRED)	I	
PERPENDICULAR DISTANCE FROM ℄ BEARING TO END OF BEAM	J	
PERPENDICULAR DISTANCE FROM BEAM END TO BACK FACE OF ABUTMENT CAP	K	
DISTANCE FROM BEAM END TO BACK FACE OF ABUTMENT CAP (PARALLEL TO ℄ ROAD)	L	
DISTANCE FROM ℄ BEARING TO END OF BEAM (PARALLEL TO ℄ ROAD)	M	
GRADE	N	

ESTIMATE OF QUANTITIES

ITEM		DESCRIPTION	UNIT	QUANTITY
603-1		PRESTRESSED CONCRETE BEAMS	L.F.	
401-1(I)		H.L.B.C. BASE COURSE	TON	
307-1		CLASS 1 AGGREGATE BASE COURSE	C.Y.	
401-2 (II)	P	HOT-LAID BITUMINOUS CONCRETE WEARING COURSE (STONE OR GRAVEL AGGREGATE)	TON	
401-2 (II)	A	HOT-LAID BITUMINOUS CONCRETE WEARING COURSE (SLAG AGGREGATE)	TON	

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

W.VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS
PRESTRESSED OR POST-TENSIONED CONCRETE BEAMS
SUPERSTRUCTURE PLAN-RT. FORWARD SKEW
STANDARD SHEET BR-1A

PREPARED: 9-75
REVISED: 11-91

DESIGNED BY:
DRAWN BY: TRT
CHECKED BY:
REVIEWED BY:
DATE:
SCALE: NONE
SHEET OF BRIDGE NUMBER

SUPERSTRUCTURE PLAN

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.VA.					

GOVERNING SPECIFICATIONS

The governing provisions applicable to this project are the West Virginia Department of Highways Standard Specifications, Roads and Bridges, adopted 1993, as amended by the current* Supplemental Specifications of the West Virginia Department of Highways, the contract plans and the contract documents.

*Current Supplemental Specifications shall be the Specifications in effect on the first day of project advertisement for letting to contract.

DESIGN-NEW STRUCTURES (1)

This bridge is designed for an HS-25 live load capacity, as well as for a 25 p.s.f. wearing surface.
Design Unit Stresses:

Reinforcing Steel-f_s=	20,000 p.s.i.	Class B Concrete-f'_c=	3,000 p.s.i.
Structural Steel (A36)-f_s=	20,000 p.s.i.	Class B Concrete-f_c=	1,200 p.s.i.
Structural Steel (A588)-f_s=	27,000 p.s.i.	Class B Concrete-n =	10

DESIGN-REHABILITAION AND STRENGTHENING (2)

This bridge is strengthened for a live load capacity of (A). Strengthening steel design stress-f_s=(B) p.s.i. All structural steel shall be ASTM A36 unless otherwise designated on the construction plans.

CONCRETE (CAST-IN-PLACE) (3)

Concrete shall be cured in accordance with Subsection 601.12 of the Standard Specifications. If used, polyethylene coated burlap shall conform to the requirements of Subsection 707.5 of the Standard Specifications.

The minimum covering, measured from the surface of the concrete to the face of any reinforcing steel bar, shall be 3 inches if the concrete is in contact with the ground surface and 2 inches otherwise, except as specified differently on the plans.

SUBSTRUCTURE CONCRETE (CAST-IN-PLACE) (4)

All concrete in the substructure shall be Class B, air entrained.

Chamfer all exposed edges of the substructure concrete 1 inch, except for the abutment curbs, which shall be chamfered 3/4 inch.

The exposed surface of the substructure shall be Class 1, Ordinary Surface Finish, in accordance with Subsection 601.11.1 of the Standard Specifications, except for the abutment curbs and wingwalls, which shall be Class 2, Rubbed Finish, in accordance with Subsection 601.11.2 of the Standard Specifications.

The abutment curtain wall shall not be poured until after the superstructure is in place.

For footings embedded in rock, the top of the abutment footing shall be maintained at the elevations shown on the plans. The footings shall be carried a minimum of 1 foot into solid rock and poured against the face of the rock without forms, except where the rock excavation is not the entire depth of the footing.

The abutment bearing seat, upon which the shoes or other bearing devices will be set, shall be finished to true elevations as shown on the plans.

Fill anchor bolt holes with non-shrink grout after anchor bolts are set. The non-shrink grout shall consist of 1 part regular portland cement, 1 part silica sand and 1 part non-shrink admixture. The cost of the non-shrink grout shall be included in Pay Item 601-2, "Class B Concrete".

SUPERSTRUCTURE CONCRETE (CAST-IN-PLACE) (5)

All concrete in the superstructure shall be Class K, air entrained. All concrete for decks, curbs, parapets or medians shall be Class K, air entrained, containing 7 bags of cement per cubic yard.

Chamfer all exposed edges of the curbs, parapets or medians 3/4". The exposed surfaces of the curbs shall be Class 2, Rubbed Finish, in accordance with Subsection 601.11.2 of the Standard Specifications. Bridge decks shall be finished in accordance with Subsection 601.11.4 of the Standard Specifications.

REINFORCING STEEL BARS (6)

All reinforcing steel bars shall be intermediate grade billet steel, Grade 40 or 60 in accordance with Subsection 709.1 of the Standard Specifications . The requirements of Section 602 of the Standard Specifications shall be followed.

The minimum splice length or dowel bar embedment shall be 30 bar diameters.

Reinforcement under the shoes or other bearing device shall be so placed so as to avoid interference with drilling of anchor bolt holes.

The inspector shall select random bars from the reinforcing bar list for test bars. He shall cut 5'-0" from the bars chosen, rebars have been detailed to allow a 30 bar diameter splice at each end. One rebar for each 10 tons or fraction thereof, of each size has been included in the bill of steel and will be paid for under Item 602-1. In the event all bars of any one size are not sent in one shipment, the supplier shall, at his expense, furnish one bar for each 10 tons or fraction thereof, for each extra shipment.

In the event that any shipment of material has been pre-tested and has been identified in accordance with Materials Control, Soil and Testing Division's Informatiional Memorandum Number 17(IM-17),the shipment may be accepted without further testing subject to record sampling procedures.

STRUCTURE EXCAVATION (FOOTINGS FOUNDED IN ROCK) (7)

Structure excavation quantities through earth fill shall be measured from the top of rock to the original ground line, 18 inches outside the neat lines of the footings. No excavation will be classified as wet or rock excavation. Rock shall be excavated and paid for as structure excavation to the neat lines of the footings only. Rock shall be excavated until a level surface is provided with the entire footing resting on hard rock.

STEEL TOUGHNESS REQUIREMENT (8)

The provisions of the AASHTO Specifications in accordance with Article 615.4.9 of the Standard Specifications shall apply to those items of structural steel as shown and/or designated by these plans.

PAINTING (NEW STRUCTURES) (9)

Shop and field painting shall be in accordance with Section 615 of the current Standard Specifications and/or Special Provisions.

OPTION: (9A)

Paint system shall consist of one shop prime coat, one field prime coat and two field finish coats.

Shop Prime Coat: One complete coat of vinyl shop primer conforming to the requirements of Subsection 711.7 of the Standard Specifications. This will replace the shop paint specified in Subsection 615.6.3. Dry film thickness shall be a minimum of two (2) mils.

Field Prime Coat: One complete coat of linseed/alkyd primer conforming to the requirements of Subsection 711.8 of the Standard Specifications. Dry film thickness shall be a minimum of two (2) mils.

First Finish Coat: One complete pigmented finish coat conforming to the requirements of Subsection 711.10 of the Standard Specifications. The color shall be (D) in accordance with Federal Standard 595, number (E). Dry film thickness shall be a minimum of two (2) mils.

Top Finish Coat: One complete pigmented finish coat conforming to the requirements of Subsection 711.11 of the Standard Specifications. The color shall be (D) in accordance with Federal Standard 595, number (F). Dry film thickness shall be a minimum of two (2) mils.

OPTION: (9B)

Paint system shall consist of shop prime coat, intermediate field fogcoat and finish topcoat. Field painting shall also include touch-up and repair of shop paint. Paint system shall be the inorganic zinc rich system meeting the requirements of Section 711.20 of the Standard Specifications.

Shop Prime Coat: Shall conform to the requirements of Subsection 711.20.2 of the Standard Specifications. Dry film thickness shall be minimum three (3) mils.

Intermediate Field Coat: Shall conform to the requirements of Subsection 711.20.3 of the Standard Specifications.

Topcoat: Shall conform to the requirements of Subsection 711.20.4 of the Standard Specifications. The color shall be (D) in accordance with Federal Standard 595, number (F). Dry film thickness of the total paint system shall be a minimum of seven (7) mils.

OPTION: (9C)

Paint system shall consist of application of shop prime coat and field touch-up and repair of shop coat. Paint system shall be the inorganic zinc rich primer meeting the requirements of Subsection 711.20.2 of the Standard Specifications. Dry film thickness shall be a minimum three (3) mils.

CLEANING AND PAINTING (EXISTING STRUCTURES) (10)

Field cleaning and painting shall be in accordance with either OPTION (10A) or (10B) and shall also conform to all applicable requirements of Section 620 of the current Standard Specifications and/or Special Provisions. When it is determined that the structure contains an enviromentally hazardous existing paint system then option (10C) shall also apply.

OPTION: (10A)

Cleaning: The portions of the structure listed in the special notes and quantity sheet, which is approximately (C) per cent, shall be cleaned in accordance with Subsection 620.6.1 of the Standard Specifications.

The remaining portions of the structure not specified, shall be cleaned in accordance with Subsection 620.6.2.

It is not intended that sound, adherent old paint be removed unless it is excessively thick or inflexible.

Attention is called to the requirements of paragraph 2 of Section 620.6 which requires that edges of paint be properly feathered to produce a smooth apperance.

In the event that there is a difference of opinion as to which areas must be sandblasted or hand cleaned or to the extent of surface cleaning or surface preparation, the decision of the Engineer shall be final.

Spot Painting: All steel surfaces cleaned to bare metal shall receive one coat of linseed/alykd primer conforming to the requirements of Section 711.8 of the Standard Specifications. This coat shall be tinted with a tinting agent, type as recommended by the paint manufacturer and approved by the Engineer.

Prime Coat: One complete coat of linseed/alkyd primer shall be applied to the entire structure upon completion of the spot painting. The primer shall conform to the requirements of Section 711.8 of the Standard Specifications. Dry film thickness shall be a minimum of two (2) mils.

Intermediate Field Coat: Upon completion of application of the prime coat, the entire structure shall receive a minimum of one complete color undercoat conforming to the requirements of Section 711.10 of the Standard Specifications. Dry film thickness shall be a minimum two (2) mils. The color shall be (D) in accordance with Federal Standard 595, number (E).

Top Coat-Pigmented Finish Coat: Upon completion of applicaton of the intermediate coat, the entire structure shall receive a minimum of one complete pigmented finish coat conforming to the requirements of Section 711.11 of the Standard Specifications. Dry film thickness shall be a minimum two (2) mils. The color shall be (F) in accordance with Federal Standard 595, number (G).

OPTION: (10B)

Cleaning: All surfaces to be painted shall be cleaned and prepared in accordance with Section 620.5 of the Standard Specifications to a "white metal" or "near white metal" condition. The paint system shall be as follows:

Field Prime Coat: All bare surfaces shall be primed with an organic zinc rich primer conforming to the requirements of SSPC Specification Number 20, Type 2. Dry film thickness of the primer shall be a minimum of four (4) mils.

Field Intermediate Coat: The field intermediate coat shall conform to the requirements of Article 711.20.3 of the Standard Specifications.

Field Top Coat: The field top coat shall conform to the requirements of Article 711.20.4 of the Standard Specifications. The color shall be (F) in accordance with Federal Standard 595, number (G). Dry film thickness of the total paint system shall be a minimum seven (7) mils.

OPTION: (10C)

Environmental Protection: All portions of the structure shall be cleaned in accordance with the Special Provision for 620-Cleaning and Painting Existing Steel Bridges, Sub-articles 620.1, 620.9, 620.10, 620.11, and 620.12 as contained in these plans.

STRUCTURE EXCAVATION (FOOTINGS FOUNDED ON PILES) (11)

Structure excavation quantities through earth fill shall be measured from the bottom of the footing to the original ground line, 18 inches outside the neat line of the footings. No excavation will be classified as wet or rock excavation.

PREFORMED ELASTOMERIC JOINT SEALER (12)

The preformed elastomeric joint sealer shall conform to the requirements of Section 624 of the Standard Specifications.

BRIDGE GUARDRAIL (13)

The guardrail, buffer end terminal sections, posts and end anchors shall conform to the requirements as set forth by the West Virginia Department of Highways Standard Details Book (Standard Sheets G.R.1 through G.R.7, as applicable) and Standard Bridge Plan Sheet BR-G1. Blocks are required. End anchorage shall be in accordance with Design Directive DD 16.4. All guardrail mounting hardware will be hot-dip galvanized after fabrication. Threads shall be retapped to ensure proper fit. Guardrail posts may be square or beveled.

STRUCTURAL STEEL (14)

All structural steel shall conform to the requirements of ASTM A36 (f_s=20,000 p.s.i.) unless otherwise noted.

For superstructures utilizing steel grid flooring, structural steel conforming to the requirements of ASTM A588 (f_s=27,000 p.s.i.) may be substituted for ASTM A36 steel. No painting shall be required for ASTM A588 steel.

OPTION: (14A)

All ASTM A36 steel shall be blast cleamed and shop primed in accordance with Section 615 of the Standard Specifications.

STEEL GRID FLOORING (CONCRETE FILLED TYPE) (15)

The steel grid flooring shall conform to all applicable requirements of Section 621 of the current Standard Specifications and/or all Special Provisions of the West Virginia Department of Highways.
The grid shall conform to all applicable requirements as set forth by the Bridge Grid Flooring Manufacturers Association. Size and type shall be as specified on the plans.
The steel grid flooring shall conform to all requirements of ASTM A36, A572 or A588, type as specified on the plans.

Cleaning: All surfaces to be painted shall be cleaned and prepared in accordance with Section 615.6 of the Standard Specifications to a "white metal" or "near white metal" condition. The paint system shall be as follows:

The steel grid flooring and all components shall either be shop painted with an inorganic zinc rich primer meeting Subsection 711.20.2 of the Standard Specifications or hot dipped galvanized meeting requirements of ASTM A123. Type of coating shall be as specified on the plans.

All reinforcing steel shall be number 3 billet steel bars either Grade 40 or 60 in accordance with Subsection 709.1 of the Standard Specifications.

The concrete used to fill the steel grid shall be Class A air entrained. The design stresses for this concrete are f'_c=3,500 psi, f_c=1,400 psi and n=10.

STEEL GRID FLOORING (OPEN TYPE) (16)

The steel grid flooring shall conform to all applicable requirements of Section 621 of the current Standard Specifications and/or all Special Provisions of the West Virginia Department of Highways.
The grid shall conform to all applicable requirements as set forth by the Bridge Grid Flooring Manufacturers Association. Size and type shall be as specified on the plans.
The steel grid flooring shall conform to all requirements of ASTM A36, A572 or A588, type as specified on the plans.

Cleaning: All surfaces to be painted shall be cleaned and prepared in accordance with Section 615.6 of the Standard Specifications to a "white metal" or "near white metal" condition. The paint system shall be as follows:

The steel grid flooring and all components shall either be shop painted with an inorganic zinc rich primer meeting Subsection 711.20.2 of the Standard Specifications or hot dipped galvanized meeting requirements of ASTM A123. Type of coating shall be as specified on the plans.

MAINTAINING TRAFFIC (17)

Traffic shall be maintained in accordance with Section 636 and Subsection 104.5 of the Standard Specifications.

NAIL LAMINATED WOOD DECK (18)

Pine Bridge Lumber all lumber shall be surfaced four sides, pressure treated No. 2 Medium Grain or better Southern Pine as specified by current Grading Rules for Southern Pine Lumber published by the Southern Pine Inspection Bureau, New Orleans, Louisiana.

General Timber Deck Notes:

The allowable bending stress shall not be less than 1,200 p.s.i. and the allowable shearing stress shall not be, less than 125 p.s.i.

All lumber shall be sized by being processed through a hit-or-miss surfacer.

This material shall be subject to random sampling and testing for compliance with the above specifications upon delivery.

Material will be accepted in bundles when the shipment is accompanied by a certificated, issued by a Department of Highways Materials Control, Soil and Testing Division certified inspector, showing that the lumber in the "white" meets the above requirements. When said certificate is not availabe, the material will be inspected by Department of Highways personnel at the delivery site and stacked and struck by the vendor.

Treatment: material for pressure treatment shall be in accordance with Subsection 710.5 of the Standard Specifications. Treatment shall be by either the full cell or empty cell process at 150 to 200 p.s.i. and a minimum retention as specified by the American Wood Preservative Association Standard C-2 shall be obtained.

Material and/or workmanship shall conform to the requirements of Subsection 710.1 of the Standard Specifications.

[*] Delivery: material shall be delivered in minimum shipments of 2,000 board feet or as directed by the Engineer. A maximum of 15 calendar days will be allowed for delivery following notification by the Engineer. The vendor shall notify the Engineer one working day prior to delivery of the material.

[*] General: any deviation from the above requirements may be cause for rejection, by the Engineer, of the entire shipment of lumber.

All non-specified material in any shipment shall be rejected and will be removed from the West Virginia Department of Highways storage area by the vendor prior to acceptance of the suitable material.

Notification shall be made on all receiving documents and/or delivery slips specifying reason(s) for rejection of any portion of a shipment. The signatures of both the Department of Highways and delivering agency representatives shall be affixed to documents on which rejection reason(s) is recorded.

The vendor must furnish to the Engineer a certificate of inspection, certifying that the total order meets the specifications for quality of lumber, preservative and retention required. A certified copy of the certificate of inspection must be attached to the invoice.

Under no circumstances may the vendor ship nor will the Department of Highways accept or pay for quantities of material in excess of the quantity stated on the purchase order, except upon advance approval of the Engineer.

The inspection agencies listed hereinafter may be considered as prequalified. If a vendor desires inspection by responsible agencies other than those listed, advance approval must be obtained from the Director, Materials Control, Soil and Testing Division, 312 Michigan Avenue, Charleston, West Virginia 25305.

Qualified Lumber Inspection Agencies:

McCallum Inspection Company
Norfolk, virginia

Froehling and Robertson, Inc.
Richmond, Virginia

A. W. Williams Inspection Company
Mobile, Alabama

Southern Pines Inspection Bureau
New Orleans, Louisiana

PRESTRESSED CONCRETE SUPERSTRUCTURE (19)

Refor to the appropriate Standard Plan sheet for design stresses, specifications or notes.

Although the plans are detailed for a particular type of prestressed concrete beam, alternate types or shaped prestressed concrete beams may be furnished with the following stipulations:

a) Supplier must submit proposed alternate with design computations for review and approval by the Department of Highways.
b) Contractor must supply revised modified construction plans showing all revisions and modifications as required by the use of the alternate beam for review and approval by the Department of Highways.
c) Completion date of the project will not be extended due to any delay encountered in obtaining alternate beam and revised modified plan approval by the Department of Highways.
d) The project canot be started until the revised modified plans are approved by the Department of Highways.

[*] These items are for Purchase Order Contract only.

NOTE SELECTION TABLE

CODE	YES	NO	CODE	YES	NO
1			10B		
2			10C		
3			11		
4			12		
5			13		
6			14		
7			14A		
8			15		
9			16		
9A			17		
9B			18		
9C			19		
10					
10A					

CONTROL VALUE

CODE	VALUE
A	
B	
C	
D	
E	
F	
G	

APPROVED _ _ _ _ _ _ _ _ _ _ DATE _ _ _
DIRECTOR, STRUCTURES DIVISION

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-STRUCTURES
STANDARD BRIDGE PLANS

GENERAL NOTES
STANDARD SHEET BR-2A

PREPARED: 11-26-90
REVISED: 5-91
8-93

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-STRUCTURES

GENERAL NOTES

DESIGNED BY:	
DRAWN BY:	DWW
CHECKED BY:	
REVIEWED BY:	
DATE:	
SCALE:	NONE
SHEET NO.:	OF
BRIDGE NUMBER	

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.VA.					

DOWEL LAMINATED WOOD DECK (20)

MATERIAL:

A. Oak Bridge Lumber: All lumber shall be surfaced four (4) sides, red or white oak, and shall meet the current requirements as specified by Rules for the Measurements & Inspection of Hardwood and Cypress Lumber, issued by National Hardwood Assoc. for Hardwoods for Construction, Sound Square Edge (Boxed Hearts and Planking).

B. Pine Bridge Lumber: All lumber shAll be surfaced four (4) sides, No. 2 medium grain or better Southern Pine as specified by the current Grading Rules for Southern Pine Lumber published by the Southern Pine Inspection Bureau, New Orleans, Louisiana.

All lumber shall be sized prior to incorporation into the panels and the panels shall be sized by being processed through a hit–or–miss surfacer.

TREATMENT:

Panels shall be pressure treated after laminating. Material for pressure treatment shall be in accordance with Subsection 710.5 of the Standard Specifications. Treatment shall be by either the full cell or empty cell process at 150 to 200 p.s.i. and a minimum retention as specified by the American Wood Preservative Association Standard C–2 shall be obtained.

Material and/or workmanship shall conform to the requirements of Subsection 710.1 of the Standard Specifications.

LAMINATING:

The lumber shall be laminataed with hot dipped galvanized spiral steel dowels as provided by Wadsworth Equipment Company, P.O. Box 6122, Akron, Ohio, or approved equal.

CERTIFICATION:

All lumber and dowels to be utilized in the panels shall be certified by Department of Highways Certified inspectors that they meet the above requirements prior to fabrication. Upon approval and certification the material shall be stockpiled for use in fabrication.

Prior to shipment or installation the panel shall be certified by Department of Highways Certified inspectors as to treatment.

Certifications shall be issued by the Department of Highways Materials Control, Soil and Testing Division certified inspectors.

[*] DELIVERY:

Material shall be delivered as directed by the Engineer. A maximum of fifteen (15) calendar days will be allowed for delivery following notification by the Engineer. The vendor shall notify the Engineer one (1) working day prior to delivery of the material.

[*] GENERAL:

All non–specified material in any shipment shall be rejected and will be removed from the storage area by the vendor prior to acceptance of the suitable material.

Notification shall be made on all receiving documents and/or delivery slips specifying reason(s) for rejection of any portion of a shipment. The signatures of both Department of Highways and delivering agency representatives shall be affixed to documents on which rejection reason(s) are recorded.

The vendor must furnish to the Engineer a certificate of inspection, certifying that the total order meets the specifications for lumber, preservative, retention, dowels and fabrication. A certified copy of the certificate of inspection must be attached to the invoice.

Under no circumstances may the vendor ship nor will the Department of Highways accept or pay for quantities of material in excess of the quantity stated on the purchase order, except upon advance approval of the Engineer.

The inspection agencies listed under "Nail Laminated Wood Deck" shall apply equally to material furnished in Dowel Laminated Decks.

NOTE SELECTION TABLE

CODE	YES	NO	CODE	YES	NO
20					

CONTROL VALUE

CODE	VALUE
A	
B	
C	
D	
E	
F	
G	

[*] These items are for Purchase Order Contract only.

APPROVED _ _ _ _ _ _ _ _ _ _ DATE _ _ _
DIRECTOR, STRUCTURES DIVISION

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS–STRUCTURES
STANDARD BRIDGE PLANS

GENERAL NOTES
STANDARD SHEET BR–2B

PREPARED: 11–26–90
REVISED:

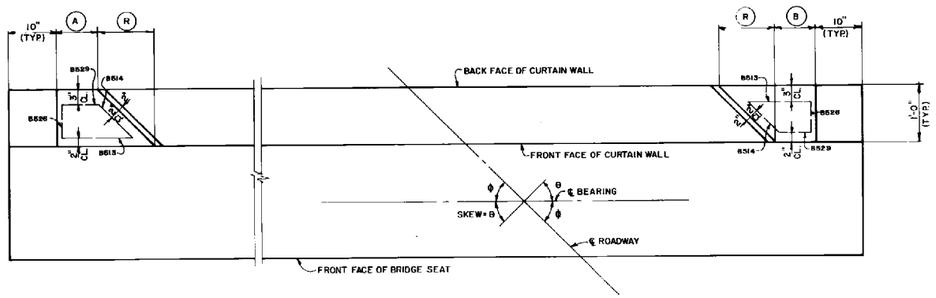
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS–STRUCTURES

DESIGNED BY:
DRAWN BY: DWW
CHECKED BY:
REVIEWED BY:
DATE:
SCALE: NONE
SHEET NO.: OF

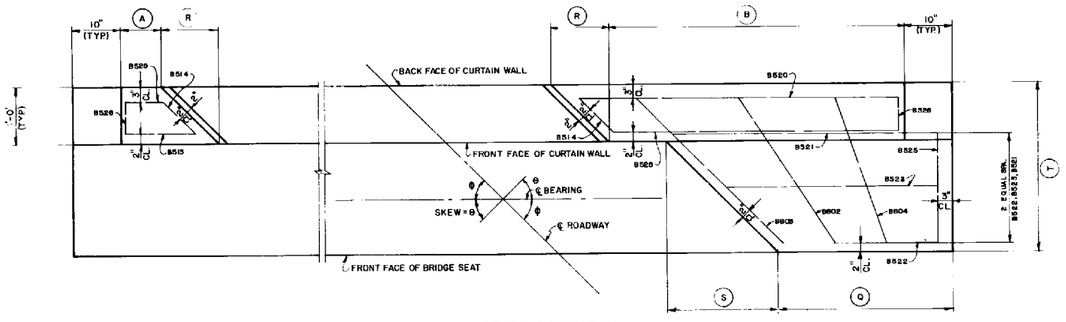
GENERAL NOTES

BRIDGE NUMBER

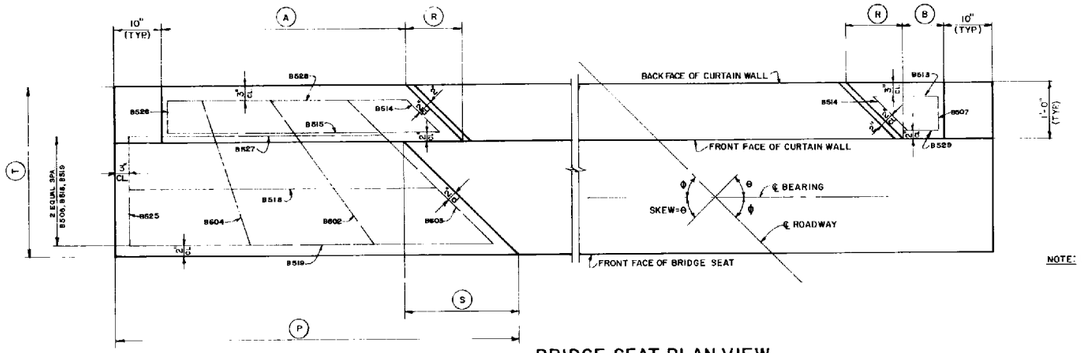
PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.Va.					



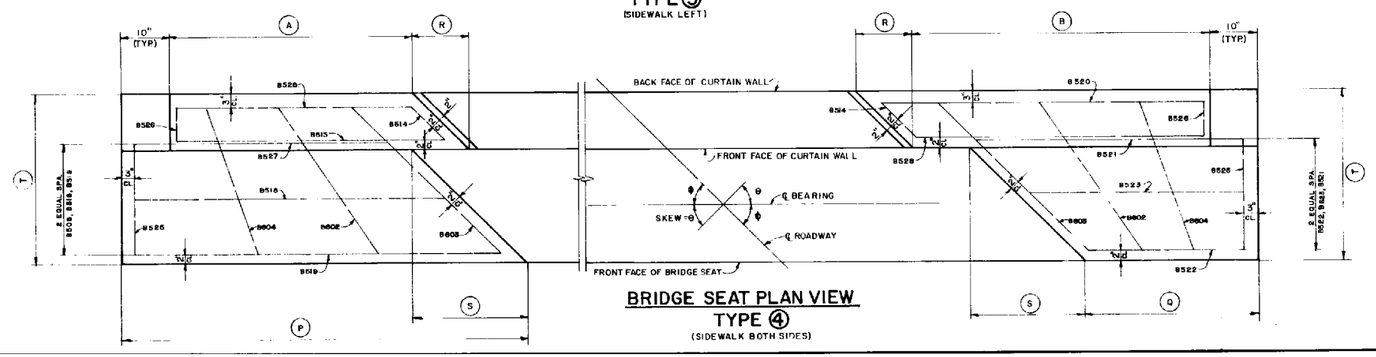
BRIDGE SEAT PLAN VIEW
TYPE ①
(NO SIDEWALK)



BRIDGE SEAT PLAN VIEW
TYPE ②
(SIDEWALK RIGHT)



BRIDGE SEAT PLAN VIEW
TYPE ③
(SIDEWALK LEFT)



BRIDGE SEAT PLAN VIEW
TYPE ④
(SIDEWALK BOTH SIDES)

MARK	TYPE	BRIDGE SEAT TYPE 1	2	3	4	NO. OF BARS ABUT. 1	ABUT. 2	TOTAL NO. OF BARS	LENGTH OF BAR ABUT. 1	LENGTH OF BAR ABUT. 2	TOTAL LENGTH
B524	STR.	—	X	—	—	1	1	2			
B524	"	—	—	X	—	1	1	2			
B524	"	—	—	—	X	2	2	4			
B526	STR.	X	X	X	X	2	2	4			
B527	BENT	—	—	X	—	1	1	2			
B527	"	—	—	—	X	1	1	2			
B604	BENT	—	X	—	—	1	1	2			
B604	"	—	—	X	—	1	1	2			
B604	"	—	—	—	X	2	2	4			
B528	BENT	—	X	—	—	1	1	2			
B528	"	—	—	X	—	1	1	2			
B528	"	—	—	—	X	2	2	4			
B529	BENT	X	—	—	—	2	2	4			
B529	"	—	X	—	—	1	1	2			
B529	"	—	—	X	—	1	1	2			
B513	BENT	X	—	—	—	2	2	4			
B513	"	—	X	—	—	1	1	2			
B513	"	—	—	X	—	1	1	2			
B514	STR.	X	X	X	X	2	2	4			
B515	BENT	—	—	X	—	1	1	2			
B515	"	—	—	—	X	1	1	2			
B602	BENT	—	X	—	—	1	1	2			
B602	"	—	—	X	—	1	1	2			
B602	"	—	—	—	X	2	2	4			
B603	BENT	—	X	—	—	1	1	2			
B603	"	—	—	X	—	1	1	2			
B603	"	—	—	—	X	2	2	4			
B518	BENT	—	—	X	—	1	1	2			
B518	"	—	—	—	X	1	1	2			
B519	BENT	—	—	X	—	1	1	2			
B519	"	—	—	—	X	1	1	2			
B520	BENT	—	X	—	—	1	1	2			
B520	"	—	—	—	X	1	1	2			
B521	BENT	—	X	—	—	1	1	2			
B521	"	—	—	—	X	1	1	2			
B522	BENT	—	X	—	—	1	1	2			
B522	"	—	—	—	X	1	1	2			
B523	BENT	—	X	—	—	1	1	2			
B523	"	—	—	—	X	1	1	2			

NOTE: FOR BAR IDENTIFICATION, CIRCLE MARKS USED.
NOTE: FOR PROPER BRIDGE SEAT, CIRCLE TYPE USED.
NOTE: THE MINIMUM LENGTH OF DIMENSION A OR B IS $8" \div \cos \theta$
NOTE: REINFORCING STEEL SHOWN IS FOR THE TOP FACE OF THE CURBS AND STEP SLABS.
NOTE: INTERCHANGE A & B FOR A" AS NECESSARY. (A=B FOR TYPE 4 PLAN VIEW).

NOTE: DIMENSION A OR B MUST BE SUFFICIENT TO PROVIDE FOR ADEQUATE SUPERSTRUCTURE BEARING.

BAR LENGTH FORMULAE

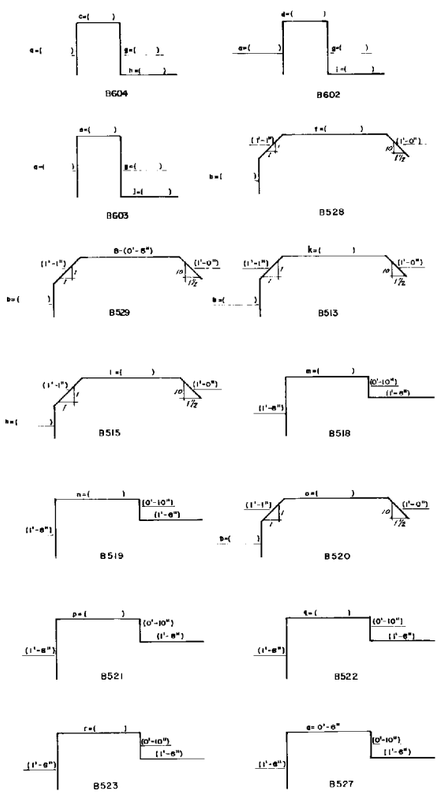
a	$L+(1'-8")$	j	$(J+K)\div\cos\phi$
b	$L-(0'-10")$	k	$R+(0'-8\frac{1}{2}")-\frac{2"+3"\cos\theta}{\sin\phi}$
c	$7"\div\cos\frac{\phi}{2}$	l	$A+R-(\frac{2"+3"\cos\phi}{\sin\phi}+1")$
d	$7"\div\cos\frac{2\phi}{3}$	m	$P-(2"+\frac{V}{2}+\frac{2"\cos\phi+2"}{\sin\phi})$
e	$7"\div\cos\phi$	n	$P-(2"+\frac{2"\cos\phi+2"}{\sin\phi})$
f	$A"-(0'-3")$	o	$B+R-(\frac{2"+3"\cos\phi}{\sin\phi}+1")$
g	$L+(0'-1")$	p	$Q+V+2"(\frac{\sin\phi}{1+\cos\phi})-(2"+\frac{2"\cos\phi+2"}{\sin\phi})$
h	$(J+K)\div\cos\frac{\phi}{3}$	q	$Q+2"(\frac{\sin\phi}{1+\cos\phi})-(2"+\frac{2"\cos\phi+2"}{\sin\phi})$
i	$(J+K)\div\cos\frac{2\phi}{5}$	r	$Q+\frac{V}{2}+2"(\frac{\sin\phi}{1+\cos\phi})-(2"+\frac{2"\cos\phi+2"}{\sin\phi})$

NOTE: LENGTH OF BAR B514 = $7" \div \sin\phi$
LENGTH OF BAR B525 = T-(0'-11")
LENGTH OF BAR B526 = 0'-7"

CONTROL DIMENSIONS

CODE	DESCRIPTION	VALUE ABUT. 1	ABUT. 2
R	BEVEL OF CURB DUE TO SKEW		
S	BEVEL OF STEP SLAB DUE TO SKEW		
T	WIDTH OF BRIDGE SEAT		
θ	SKEW ANGLE		
ϕ	COMPLEMENT OF SKEW ANGLE		

NOTE: FOR CONTROL DIMENSIONS A, B, P, Q, & T REFER TO STANDARD SHEET BR-7 OR BR-13.
NOTE: FOR ESTIMATE OF QUANTITIES FOR BRIDGE SEAT, REFER TO STANDARD SHEET BR-7 WHEN APPLICABLE.



THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

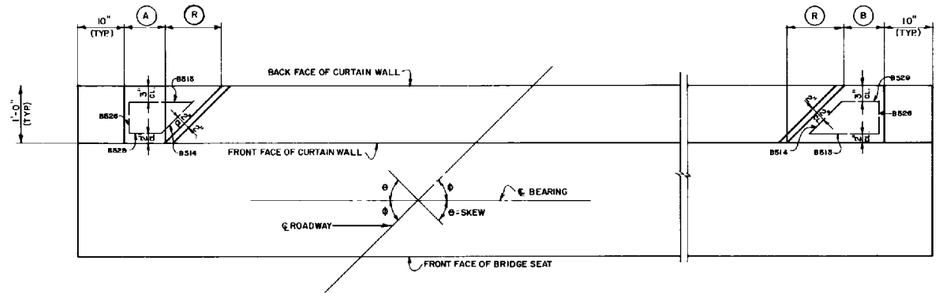
DESIGNED BY:	
DRAWN BY:	wph
CHECKED BY:	
REVIEWED BY	
DATE:	
SCALE:	NONE
SHEET	OF
	BRIDGE NUMBER

W. VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS
CONCRETE ABUTMENT
BRIDGE SEAT DETAILS
LEFT FORWARD SKEW

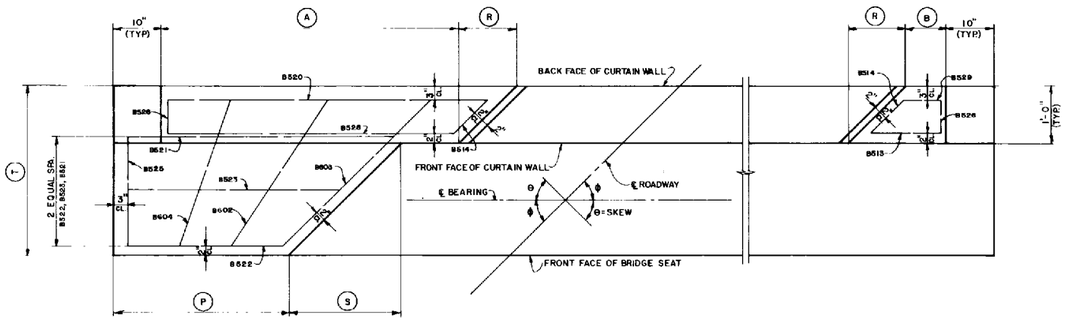
STANDARD SHEET BR-7S

PREPARED:	4-75
REVISED:	6-75
	7-75
	8-75
	12-75
	9-88
	11-91

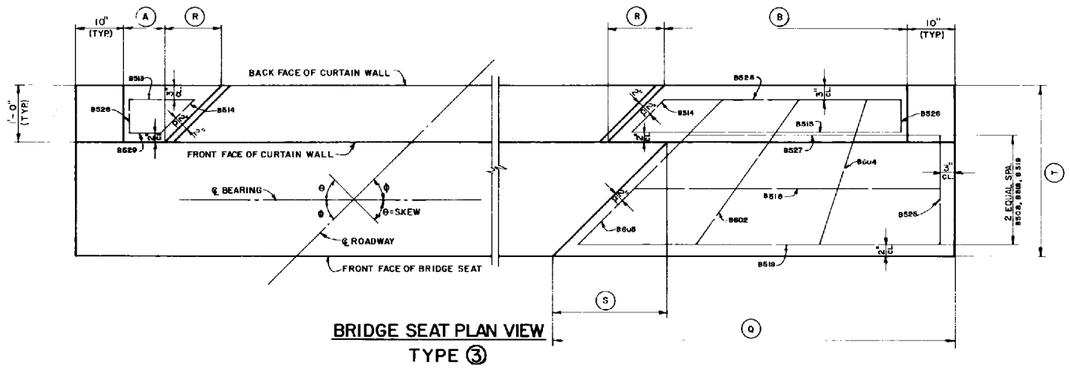
BRIDGE SEAT DETAILS



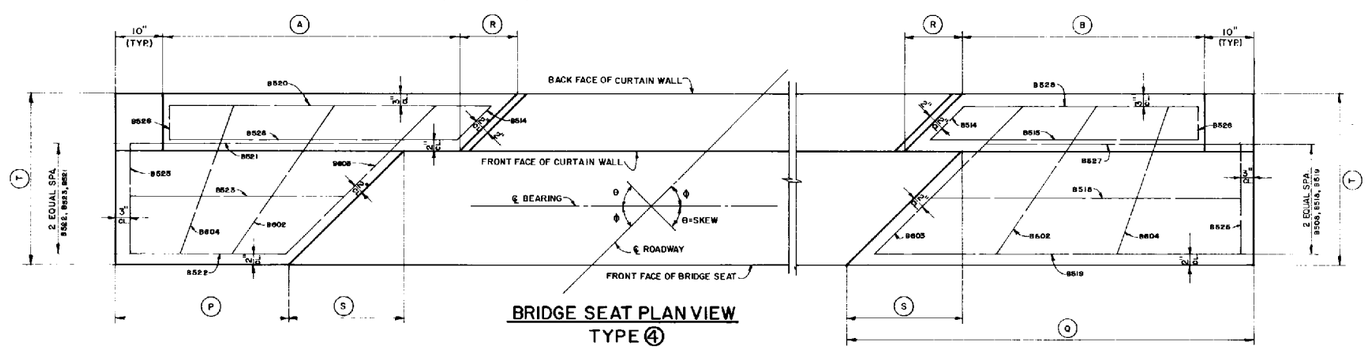
BRIDGE SEAT PLAN VIEW
TYPE ①
(NO SIDEWALK)



BRIDGE SEAT PLAN VIEW
TYPE ②
(SIDEWALK LEFT)



BRIDGE SEAT PLAN VIEW
TYPE ③
(SIDEWALK RIGHT)



BRIDGE SEAT PLAN VIEW
TYPE ④
(SIDEWALK BOTH SIDES)

BILL OF REINFORCING STEEL

MARK	TYPE	BRIDGE SEAT TYPE 1	2	3	4	NO. OF BARS ABUT. 1	ABUT. 2	TOTAL NO. OF BARS	LENGTH OF BAR ABUT. 1	LENGTH OF BAR ABUT. 2	TOTAL LENGTH
B525	STR.	—	X	—	—	1	1	2			
B525	"	—	—	X	—	1	1	2			
B525	"	—	—	—	X	2	2	4			
B526	STR.	X	X	X	X	2	2	4			
B527	BENT	—	—	X	—	1	1	2			
B527	"	—	—	—	X	1	1	2			
B604	BENT	—	X	—	—	1	1	2			
B604	"		—	X	—	1	1	2			
B604	"	—	—	—	X	2	2	4			
B528	BENT	—	X	—	—	1	1	2			
B528	"	—	—	X	—	1	1	2			
B528	"	—	—	—	X	2	2	4			
B529	BENT	X	—	—	—	2	2	4			
B529	"	—	X	—	—	2	2	4			
B529	"	—	—	X	—	2	2	4			
B513	BENT	X	—	—	—	2	2	4			
B513	"	—	X	—	—	1	1	2			
B513	"	—	—	X	—	1	1	2			
B514	STR.	X	X	X	X	2	2	4			
B515	BENT	—	—	X	—	1	1	2			
B515	"	—	—	—	X	1	1	2			
B602	BENT	—	X	—	—	1	1	2			
B602	"	—	—	X	—	1	1	2			
B602	"	—	—	—	X	2	2	4			
B603	BENT	—	X	—	—	1	1	2			
B603	"	—	—	X	—	1	1	2			
B603	"	—	—	—	X	2	2	4			
B518	BENT	—	—	X	—	1	1	2			
B518	"	—	—	—	X	1	1	2			
B519	BENT	—	—	X	—	1	1	2			
B519	"	—	—	—	X	1	1	2			
B520	BENT	—	X	—	—	1	1	2			
B520	"	—	—	—	X	1	1	2			
B521	BENT	—	X	—	—	1	1	2			
B521	"	—	—	—	X	1	1	2			
B522	BENT	—	X	—	—	1	1	2			
B522	"	—	—	—	X	1	1	2			
B523	BENT	—	X	—	—	1	1	2			
B523	"	—	—	—	X	1	1	2			

NOTE: FOR BAR IDENTIFICATION, CIRCLE MARKS USED.
NOTE: FOR PROPER BRIDGE SEAT, CIRCLE TYPE USED.
NOTE: THE MINIMUM LENGTH OF DIMENSION A OR B IS 8" ÷ Cos θ
NOTE: REINFORCING STEEL SHOWN IS FOR THE TOP FACE OF THE CURBS AND STEPSLABS.
NOTE: INTERCHANGE A & B AS NECESSARY. (A=B FOR TYPE 4 PLAN VIEW).

NOTE: DIMENSION A OR B MUST BE SUFFICIENT TO PROVIDE FOR ADEQUATE SUPERSTRUCTURE BEARING.

BAR LENGTH FORMULAE

a	L+(1'-4")	j	(J+K)÷ cosϕ
b	L-(0'-10")	k	$A^B+(1'-3")-\frac{2"+3"\cos\phi}{\sin\phi}$
c	T"÷ cos $\frac{\phi}{2}$	l	$B+R-(\frac{2"+3"\cos\phi}{\sin\phi}+1")$
d	T"÷ cos $\frac{2\phi}{3}$	m	$Q-(2"+\frac{\phi}{2}+\frac{2"\cos\phi+2"}{\sin\phi})$
e	T"÷ cosϕ	n	$Q-(2"+\frac{2"\cos\phi+2"}{\sin\phi})$
f	$A^B-(1'-3")$	o	$A+R-(\frac{2"+3"\cos\phi}{\sin\phi}+1")$
g	L+(1'-1")	p	$P+S+2"(\frac{\sin\phi}{1+\cos\phi})-(2"+\frac{2"\cos\phi+2"}{\sin\phi})$
h	(J+K)÷ cos $\frac{\phi}{2}$	q	$P+2"(\frac{\sin\phi}{1+\cos\phi})-(2"+\frac{2"\cos\phi+2"}{\sin\phi})$
i	(J+K)÷ cos $\frac{2\phi}{3}$	r	$P+\frac{S}{2}+2"(\frac{\sin\phi}{1+\cos\phi})-(2"+\frac{2"\cos\phi+2"}{\sin\phi})$

NOTE: LENGTH OF BAR B514 = $\frac{T}{2}$ sinϕ
LENGTH OF BAR B525 = T-(0'-11")
LENGTH OF BAR B526 = 0'-7"

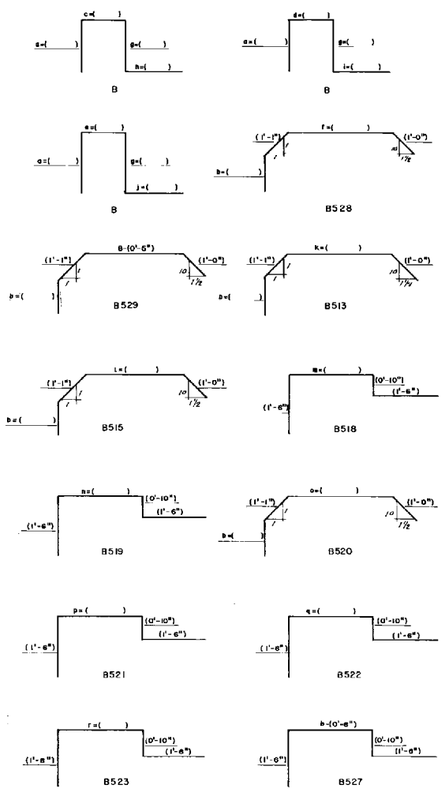
PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.Va.					

CONTROL DIMENSIONS

CODE	DESCRIPTION	VALUE ABUT. 1	ABUT 2
R	BEVEL OF CURB DUE TO SKEW		
S	BEVEL OF STEP SLAB DUE TO SKEW		
T	WIDTH OF BRIDGE SEAT		
θ	SKEW ANGLE		
ϕ	COMPLEMENT OF SKEW ANGLE		

NOTE: FOR CONTROL DIMENSIONS A, B, P, Q, & T REFER TO STANDARD SHEET BR-7 OR BR-13.

NOTE: FOR ESTIMATE OF QUANTITIES FOR BRIDGE SEAT, REFER TO STANDARD SHEET BR-7 WHEN APPLICABLE.



THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

DESIGNED BY:	
DRAWN BY:	w.f.h.
CHECKED BY:	
REVIEWED BY:	
DATE:	
SCALE:	NONE
SHEET	OF BRIDGE NUMBER

BRIDGE SEAT DETAILS

W. VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS
CONCRETE ABUTMENT
BRIDGE SEAT DETAILS
RIGHT FORWARD SKEW

STANDARD SHEET BR-7S

PREPARED:	4-75
REVISED:	6-75
	7-75
	8-75
	12-75
	9-88
	11-91

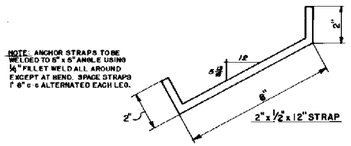
FOR FRAMING PLAN SEE SHEET NO.____

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.VA.					

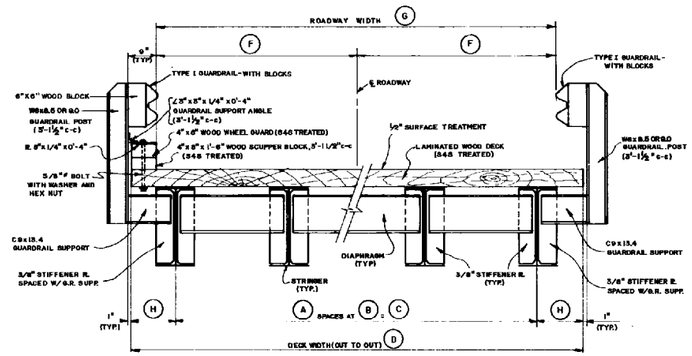
OPTION TYPE	OPTION SELECTED	
WHEEL GUARD	DETAIL NUMBER	
CONNECTION	DETAIL NUMBER	
EXPANSION DAM	DETAIL NUMBER	

CONTROL DIMENSIONS

CODE	DESCRIPTION	VALUE
A	NUMBER OF SPACES BETWEEN STRINGERS	
B	SPACING OF STRINGERS	
C	DISTANCE CENTER-TO-CENTER BETWEEN OUTSIDE STRINGERS	
D	DECK WIDTH (OUT-TO-OUT)	
E	DISTANCE FROM FACE OF WHEEL GUARD TO ℄ ROADWAY	
F	DISTANCE FROM FACE OF GUARDRAIL TO ℄ ROADWAY	
G	ROADWAY WIDTH	
H	DISTANCE ℄ EXTERIOR STRINGER TO EDGE OF DECK	



ANCHOR STRAP DETAILS



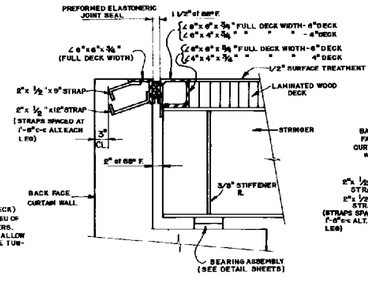
WITH WHEEL GUARD '1'

WITHOUT WHEEL GUARD '2'

TYPICAL DECK SECTION

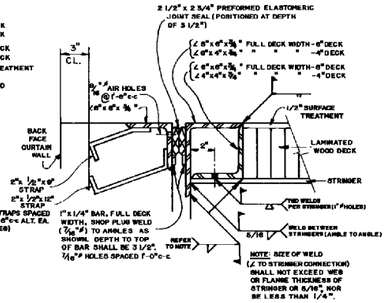
OPTION 5 NOTE

6"x6"x⅜" (6"x6"DECK) OR 4"x4"x½" (4"DECK) STRUCTURAL TUBING MAY BE USED IN LIEU OF ANGLE COMBINATION AT END OF STRINGERS. TUBING SHALL BE MOVED AHEAD 1/8" TO ALLOW FOR FILLET WELDING BOTH SIDES OF THE TUBING TO THE STRINGER PL ANGES.



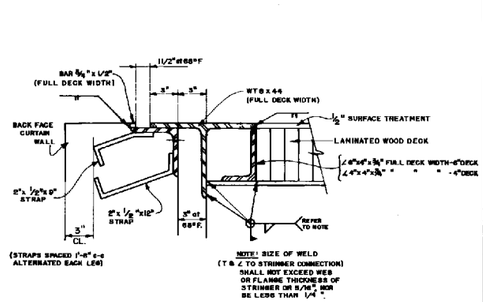
SEALED EXPANSION DAM VIEW '5'

(SEE DETAILS)



SEALED EXPANSION DAM DETAILS '5'

(EXPANSION & FIXED ENDS)

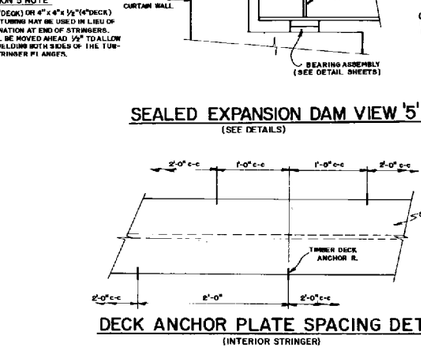


EXPANSION DAM DETAILS-OPTIONAL '6'

(EXPANSION & FIXED ENDS)

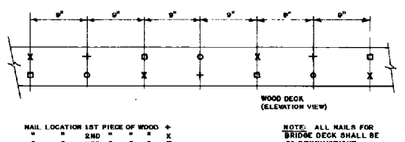
MATERIALS REQUIRED

MATERIAL	SIZE OR DIMEN.	NO.	TOTAL LGTH.	TOTAL WEIGHT
STRINGER				
INTERMEDIATE DIAPHRAGMS				
3/8" STIFFENER PLATE				
3/8" ℄ DIAPHRAGM CONNECTOR				
ABUTMENT DIAPHRAGMS				
W6x8.5 OR 9.0 GUARDRAIL POSTS				
TYPE I GUARDRAIL				
C9x13.4 POST SUPPORT				
∠3"x3"x¼" POST SUPPORT ANGLE	0'-4"			
∠8"x6"x¾" "EXPANSION DAM ANGLE				
∠6"x6"x¾" " " "				
∠6"x4"x¾" " " "				
∠5"x5"x¾" " " "				
∠4"x4"x¾" " " "				
1" x 1/4" EXPANSION DAM BAR				
¾" x 1/2" " " "				
WT 8 x 44 STRUCTURAL TEE				
6"x6"x1/2" 4"x4"x1/2" STRUCTURAL TUBING (CIRCLE)				
5/8" ℄ BOLT W/ WASHERS AND HEX NUT (A307)				
3/4" ℄ HIGH STRENGTH BOLT WITH NUT (A325)				
2"x4" LAMINATED WOOD DECK				
2"x6" " " "				
4"x8" WOOD WHEEL GUARD				
4"x8" WOOD SCUPPER BLOCK	1'-6"			
DECK ANCHOR PLATES				
PREFORMED ELASTOMERIC JOINT SEAL @ ½"x2¾"				
20 PENNYWEIGHT NAILS				
2"x½"x9" ANCHOR STRAPS				
2"x½"x12" ANCHOR STRAPS				
SURFACE TREATMENT			TOTAL S.Y.	

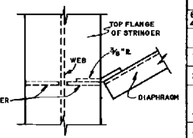


DECK ANCHOR PLATE SPACING DETAIL ✱

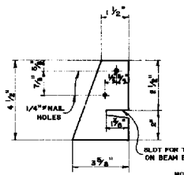
(INTERIOR STRINGER)



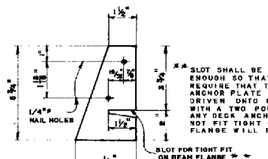
TIMBER DECK NAILING DIAGRAM ✱



SKEW DETAIL



FOR 2"x4"



FOR 2"x6"

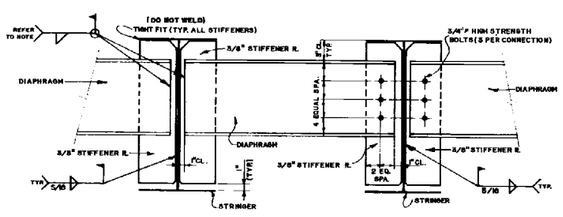
NOTE: THICKNESS OF ANCHOR PLATES 11 GAGE (MIN.) AND 10 GAGE (MAX.). STEEL FOR ANCHOR PLATES SHALL BE A 588, A36 OR A570.

DECK ANCHOR PLATES ARE TO BE GALVANIZED IN ACCORDANCE WITH ASTM A-153 @ OZ. PER SQ FT. COATING OF GALVANIZING SPELTER (MIN.)

DECK ANCHOR PLATE DETAILS ✱

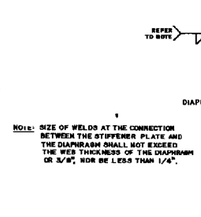
✱ FOR DOWEL LAMINATED WOOD DECK

GUARDRAIL BLOCKOUT REQUIRED (YES OR NO)	
GUARDRAIL POSTS BEVELED (YES OR NO)	
OPTIONAL DOWEL LAMINATED DECK (YES OR NO) SEE BR-10A	
OPTIONAL NAIL LAMINATED (YES OR NO)	



WELDED CONNECTION '3'

(TYPICAL)

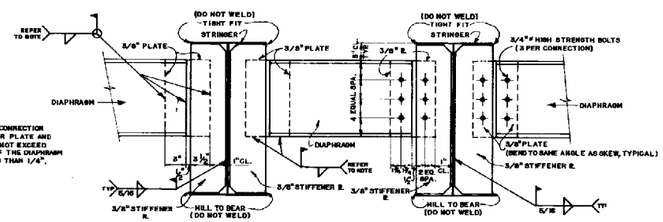


BOLTED CONNECTION '4'

(TYPICAL)

INTERMEDIATE DIAPHRAGM DETAILS

NOTE: SIZE OF WELDS AT THE CONNECTION BETWEEN THE STIFFENER PLATE AND THE DIAPHRAGM SHALL NOT EXCEED THE WEB THICKNESS OF THE DIAPHRAGM OR 3/8", NOR BE LESS THAN 1/4".



WELDED CONNECTION '3'

(TYPICAL)

BOLTED CONNECTION '4'

(TYPICAL)

ABUTMENT DIAPHRAGM DETAILS

W. VA. DEPT. OF HIGHWAYS STANDARD BRIDGE PLANS	PREPARED:	8-74
	REVISED:	8-82
		10-83
		2-87
SUPERSTRUCTURE PLANS		9-88
STEEL BEAM STRINGERS & TIMBER DECK		
STANDARD SHEET B R-10		

DIRECTOR, STRUCTURES DIVISION

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS

STRUCTURES DIVISION

DESIGNED BY:	
DRAWN BY:	w.j.p.h.
CHECKED BY:	
REVIEWED BY:	
DATE:	
SCALE:	NONE
SHEET	OF
BRIDGE NUMBER	

STEEL BEAM STRINGERS & TIMBER DECK

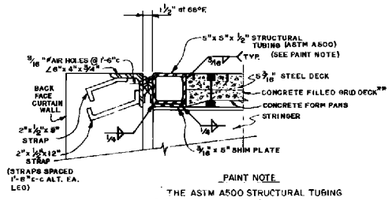
PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.VA.					

GRID DECK OPTIONS

(TO BE FURNISHED BY GRID MANUFACTURER)

MATERIAL	SIZE OR DIMEN.	NO.	TOTAL LGTH.	TOTAL WEIGHT
C15 x 33.9 CURB (ASTM A 588)				
5/16" x 3/4" END TRIM BAR				
∠ 8" x 4" x 3/4" END TRIM ANGLE				
1/4" x 1" BAR				
1/2" x 1" ANCHOR STRAPS				
3/16" x * x L DRAIN PLATES				
5" x 5" x 1/2" STRUCTURAL TUBING (ASTM A500)				
3/16" x 5" SHIM PLATE				

16" OR 18" DEPENDING ON GRID SUPPLIED.

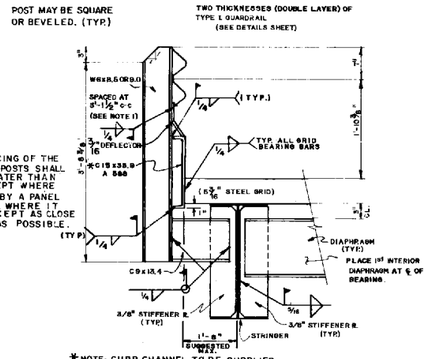


PAINT NOTE

THE ASTM A500 STRUCTURAL TUBING SHALL RECEIVE ONE (1) SHOP COAT OF PRIMER, ONE (1) FIELD COAT OF PRIMER ON ALL EXPOSED SURFACES NOT IN CONTACT WITH CONCRETE FILL AND TWO (2) FIELD COATS OF FINISH ON ALL EXPOSED SURFACES.

SEALED EXPANSION DAM DETAILS

(CONCRETE FILLED GRID DECK- NO WEARING SURFACE)

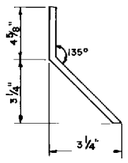


NOTE 1: SPACING OF THE GUARDRAIL POSTS SHALL NOT BE GREATER THAN 3'-1 1/2" EXCEPT WHERE RESTRICTED BY A PANEL CONNECTION, WHERE IT SHALL BE KEPT AS CLOSE TO 3'-1 1/2" AS POSSIBLE.

*NOTE: CURB CHANNEL TO BE SUPPLIED BY GRID MFGR. (OPTIONAL)

GUARDRAIL SUPPORT & CURB DETAIL

(WELDED CONNECTION; STEEL GRID DECK)



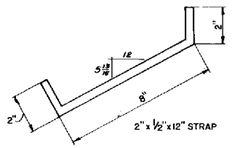
DEFLECTOR PLATE DETAIL
NOTE: DEFLECTOR PLATES NOT REQUIRED ON OPEN GRID DECKS

NOTE: WOOD BLOCKS SHALL BE USED WHEN CURBS ARE INSTALLED AND SHALL BE USED ON ALL NEW STRUCTURES WITH OR WITHOUT CURBS.

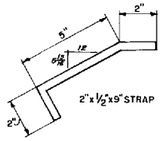
OPTION TYPE		OPTION SELECTED	
GUARDRAIL POSTS BEVELED(YES/NO)			
CONNECTION		DETAIL NUMBER	
GRID DECK	ASTM A-588 STEEL	DETAIL NUMBER	
	ASTM A-36 STEEL	DETAIL NUMBER	

CONTROL DIMENSIONS

CODE	DESCRIPTION	VALUE
A	NUMBER OF SPACES BETWEEN STRINGERS	
B	SPACING OF STRINGERS	
C	DISTANCE CENTER-TO-CENTER BETWEEN OUTSIDE STRINGERS	
D	DECK WIDTH (OUT-TO-OUT)	
E	DISTANCE FROM FACE OF WHEEL GUARD TO ℄ ROADWAY	
G	ROADWAY WIDTH	
H	DISTANCE FROM ℄ EXTERIOR STRINGER TO EDGE OF DECK	
I	THICKNESS OF WEARING COURSE AT ℄ ROADWAY	
J	THICKNESS OF WEARING COURSE AT FACE OF CURB	

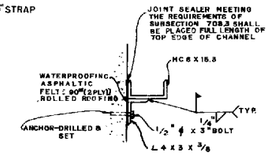


NOTE: ANCHOR STRAPS TO BE WELDED TO 6" x 6" ANGLE USING 1/4" FILLET WELD ALL AROUND EXCEPT AT BEND. SPACE STRAPS 1'-6" c-c ALTERNATED EACH LEG.

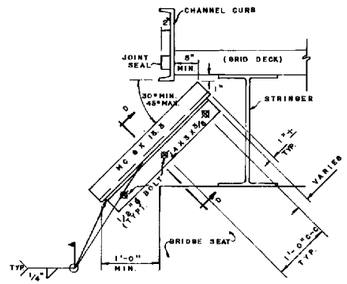


NOTE: GRID MANUFACTURER TO SHOP CAMBER GRID AS REQUIRED TO PROVIDE CROWNED SECTION.

ANCHOR STRAP DETAILS

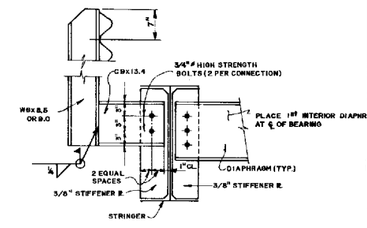


SECTION "D-D"



DRAIN TROUGH INSTALLATION

NOTE: WHERE EXPANSION DAMS ARE BEING INSTALLED IN EXISTING CURTAIN WALL, THE WALL SHALL BE REMOVED TO A MINIMUM DEPTH OF 2'-0" AND THE TOP 2'-0" OF THE CURTAIN WALL SHALL BE INCREASED TO 1'-6" THICKNESS.



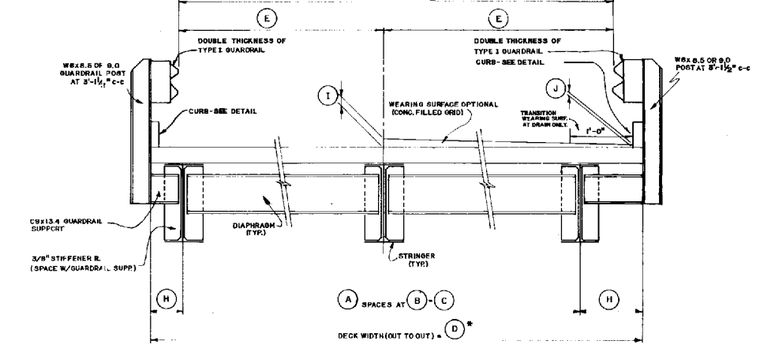
GUARDRAIL SUPPORT DETAIL

(BOLTED CONNECTION OPTION)

MATERIALS REQUIRED

MATERIAL	SIZE OR DIMEN.	NO.	TOTAL LGTH.	TOTAL WEIGHT
STRINGER				
INTERMEDIATE DIAPHRAGMS				
3/8" STIFFENER PLATE				
3/8" PLATE DIAPHRAGM CONNECTION				
ABUTMENT DIAPHRAGMS				
W6 x 8.5 OR 9.0 GUARDRAIL POSTS				
TYPE I GUARDRAIL *				
C9 x 13.4 POST SUPPORT				
R 3/16 x 9 1/2 x 1'-4" DEFLECTOR PLATE				
2" x 1/2" x 9" ANCHOR STRAP				
∠ 6" x 6" x 3/4" EXPANSION DAM (ABUTMENT)				
PREFORMED JOINT SEAL (2 1/2" x 2 3/4")				
CLASS 'A' CONCRETE			TOTAL C.Y.	
CLASS 'B' CONCRETE			TOTAL C.Y.	
5 3/16" STEEL GRID DECK			TOTAL S.Y.	
2" x 1/2" x 12" ANCHOR STRAPS				

* Includes Double Thickness

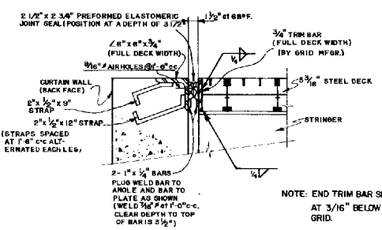


OPEN STEEL GRID (TYPICAL)

CONCRETE FILLED STEEL GRID (TYPICAL)

TYPICAL DECK SECTION

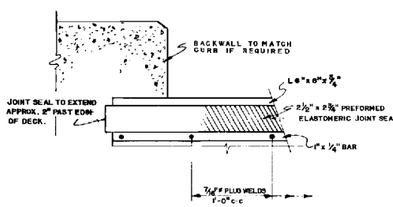
*NOTE: THE GRID DECK SHOULD BE CANTILEVERED SUFFICIENTLY TO PROVIDE ROOM FOR DRAINS BETWEEN THE FACE OF CURB AND THE EDGE OF THE OUTSIDE STRINGER.



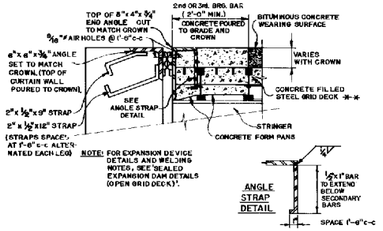
NOTE: END TRIM BAR SHALL BE AT 3/16" BELOW TOP OF GRID.

SEALED EXPANSION DAM DETAILS

(OPEN GRID DECK)

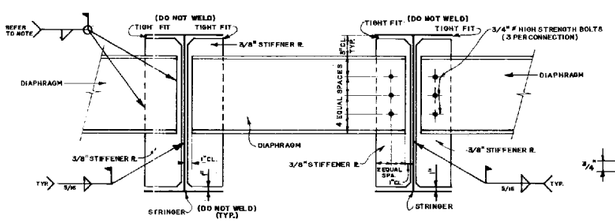


SEALED EXPANSION DAM AT ABUTMENT



SEALED EXPANSION DAM DETAILS

(CONCRETE-FILLED GRID DECK - WITH WEARING SURFACE)

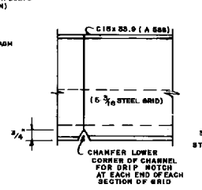


WELDED CONNECTION '1' (TYPICAL)

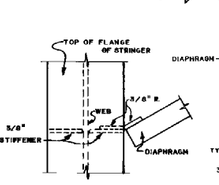
BOLTED CONNECTION '2' (TYPICAL)

INTERMEDIATE DIAPHRAGM DETAILS

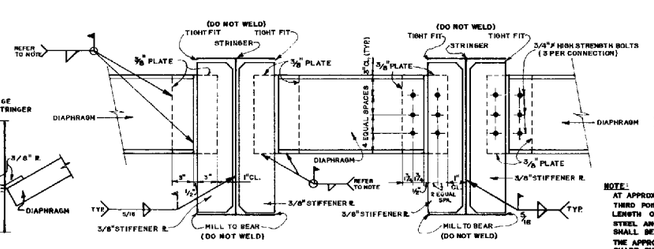
NOTE: SIZE OF WELD AT THE CONNECTION BETWEEN THE STIFFENER PLATE AND THE DIAPHRAGM SHALL NOT EXCEED THE WEB THICKNESS OF THE DIAPHRAGM OR 3/8", NOR SHALL IT BE LESS THAN 1/4".



DRIP NOTCH DETAIL



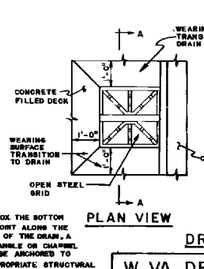
SKEW DETAIL



WELDED CONNECTION '1' (TYPICAL)

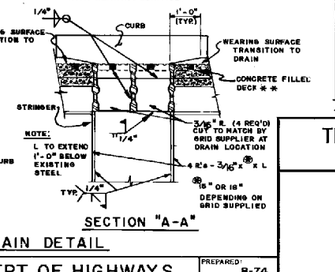
BOLTED CONNECTION '2' (TYPICAL)

ABUTMENT DIAPHRAGM DETAILS



PLAN VIEW

NOTE: AT APPROX. THE BOTTOM THIRD POINT ALONG THE LENGTH OF THE DRAIN, A STEEL ANGLE OR CHANNEL SHALL BE ANCHORED TO THE APPROPRIATE STRUCTURAL SHAPE BY WELDING.



SECTION "A-A"

DRAIN DETAIL

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

DESIGNED BY:	
DRAWN BY:	w.g.h.
CHECKED BY:	
REVIEWED BY:	
DATE:	
SCALE:	NONE
SHEET	OF
	BRIDGE NUMBER

W. VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS

SUPERSTRUCTURE PLANS

STEEL BEAM STRINGERS & STEEL GRID DECK

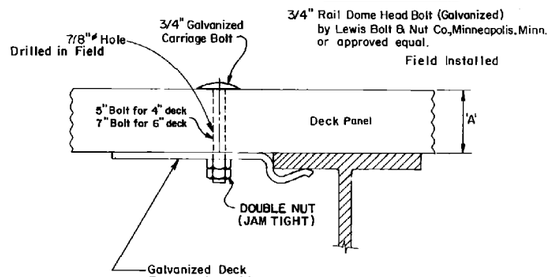
STANDARD SHEET BR-11

PREPARED:	8-74
REVISED:	8-82
	2-87
	9-88
	3-92

STEEL BEAM STRINGERS & STEEL GRID DECK

FED. HWY. ADM.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS.

ALTERNATE BOLT

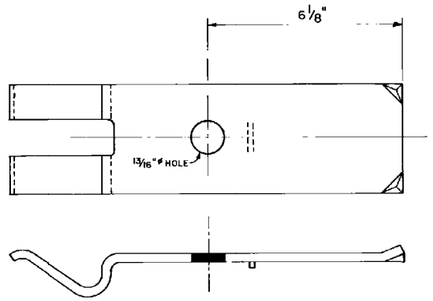


DECK FASTENER ASSEMBLY

(Consists of galvanized anchor clip, galvanized bolt and two galvanized nuts, either regular or heavy hex nuts, or square nuts)

DECK FASTENER ASSEMBLY SCHEDULE (PER BEAM-PER PANEL)		
INTERIOR STRINGER SPACING	FASTENERS	
≤ 1'-6"	1	
>1'-6" ≤ 4'-6"	2	

See Deck Fastener Locations Detail Below



MODIFIED ANCHOR CLIP

GENERAL NOTES

Lumber of the largest practicable size shall be used to fabricate the 4 inch or 6 inch thick deck panels. In no case shall 2inch by 4 inch material be used in the fabrication of 4 inch deck panels.

To minimize warping, deck panels delivered to the job site an appreciable time prior to their installation shall be stacked neatly, by the receiving organization, on timber supports spaced three to four feet apart for the full length of the panels to prevent contact with the ground. Panels should be stacked no higher than five feet and be covered if possible.

Variation in the width (Dimension 'B') of individual 18 inch deck panels shall be not greater than 1/4 inch.

Galvanizing shall be in accordance with ASTM A153.

CONTROL DIMENSIONS

CODE	DESCRIPTION		VALUE
A	DECK PANEL THICKNESS (NOMINAL)		
B	DECK WIDTH (OUT TO OUT)		
E	SKEW ANGLE	RT. FORWARD LT. FORWARD	
F	DECK WIDTH (B) ÷ SINE E		
G	(18" ÷ TAN. E) + 2"		
H	SHORT SPIRAL DOWEL LENGTH (6" x TAN. E) + 6"		

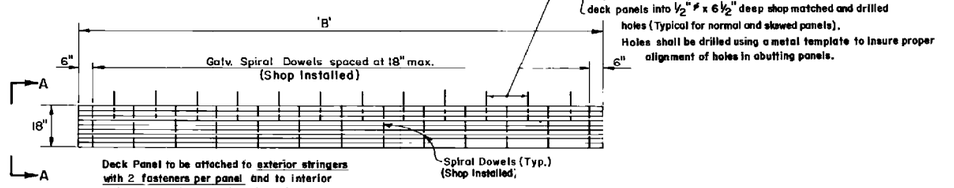
MATERIALS REQUIRED

	MATERIAL	UNIT	QUANT.	TOTAL LENGTH	TOTAL WEIGHT
NOTE 1	4" DOWEL LAMINATED DECK PANEL	Mfbm			
NOTE 2	6" DOWEL LAMINATED DECK PANEL	Mfbm			
	FASTENER ASS'Y. W/ 3/4" x 5" BOLT	Each			
	FASTENER ASS'Y. W/ 3/4" x 7" BOLT	Each			
NOTE 3	1/2"ϕ x 12" ROUND CONNECTOR	Each			

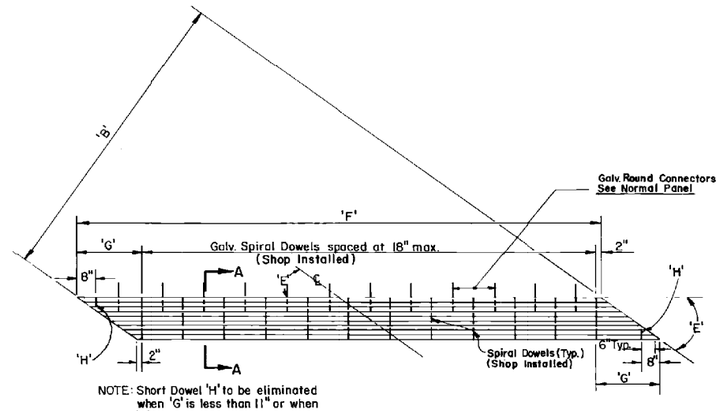
NOTE 1: PANEL SIZE IS 4" x 18" x 8'
NOTE 2: PANEL SIZE IS 6" x 18" x 8'
NOTE 3: FOR FIELD CONNECTION OF PANELS

OPTIONS

- ☐ BOLTS TO BE GALVANIZED CARRIAGE BOLTS ONLY
- ☐ BOLTS TO BE DOME HEAD BOLTS ONLY (GALVANIZED)
- ☐ BOLTS TO BE GALVANIZED CARRIAGE BOLTS OR DOME HEAD BOLTS



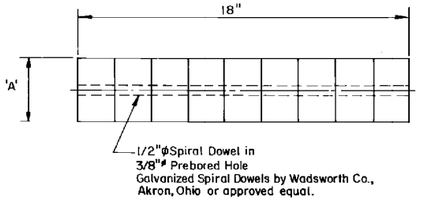
DOWELED DECK PANEL NORMAL



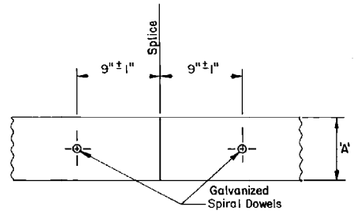
NOTE: Short Dowel 'H' to be eliminated when 'G' is less than 11" or when 'E' is greater than 63°.

DOWELED DECK PANEL SKEWED

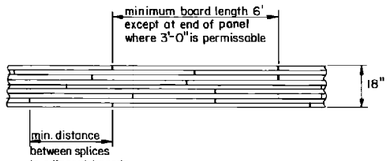
FIELD TREATMENT: All abrasions and cuts made in the field shall be carefully trimmed and given three brush coats of the original treatment solution; holes drilled in the field shall be poured full of the same preservative. Unused holes shall be poured full of preservative and plugged with tight-fitting treated plugs.



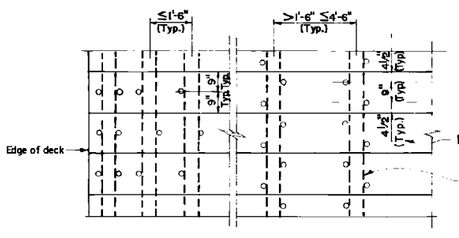
VIEW A-A



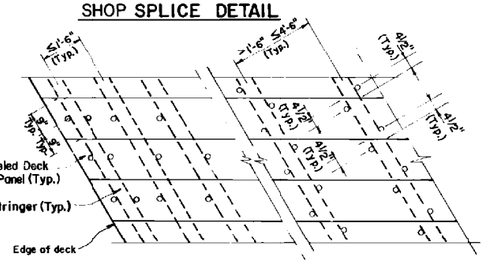
SHOP SPLICE DETAIL



SPLICE SPACING & BOARD LENGTH OF DOWELED DECK PANEL



DECK FASTENER LOCATIONS NORMAL



DECK FASTENER LOCATIONS SKEWED

FRAMING PLAN

Scale: 1" = 1'-0"

NOTE: THIS SHEET TO BE USED WITH STANDARD SHEET BR-2.

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

W. VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS

DOWEL LAMINATED DECK

STANDARD SHEET BR-10A

PREPARED	R&A 6-76
REVISED	8-82
	9-88

DESIGNED BY: RUDE & ASSOCIATES, INC.
DRAWN BY:
CHECKED BY:
REVIEWED BY:
DATE:
SCALE: NONE
SHEET OF
BRIDGE NUMBER

DOWEL LAMINATED TIMBER DECK

PUBLIC ROADS DIV.	STATE DIST NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.V.D.H.					

MODIFIED STEEL GRID FLOORING (OPEN)

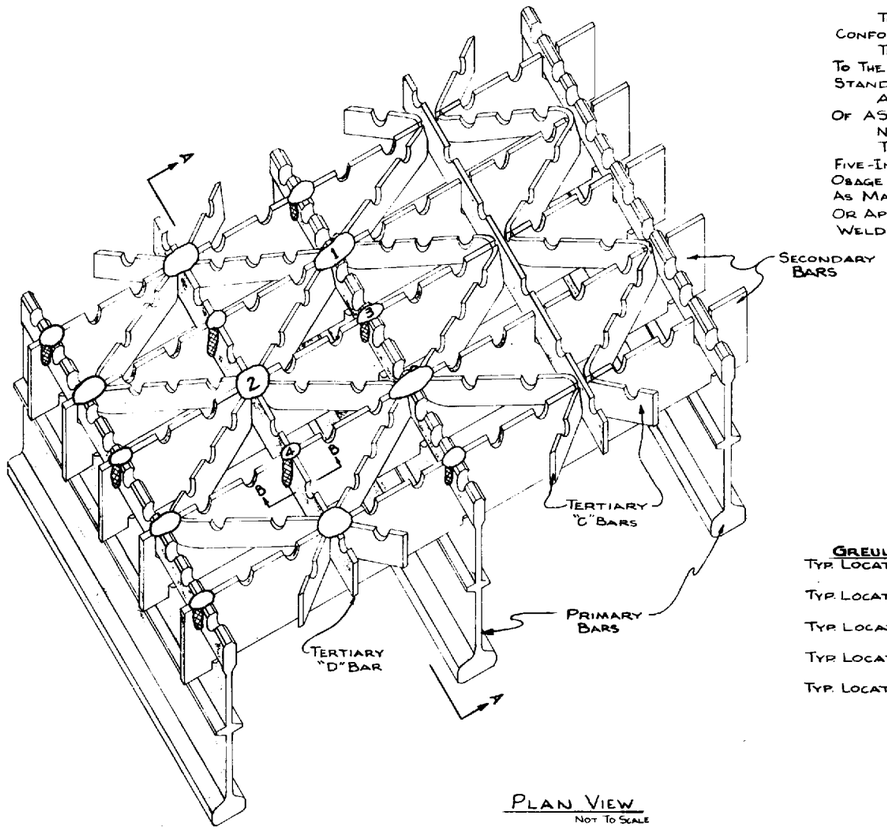
THE MODIFIED STEEL GRID FLOORING, OPEN TYPE SHALL CONFORM TO THE REQUIREMENTS OF ASTM A588 (f_s = 27,000 psi.)

THE MODIFIED STEEL GRID FLOORING SHALL ALSO CONFORM TO THE APPLICABLE REQUIREMENTS OF SECTION 621 OF THE STANDARD SPECIFICATIONS.

ALL GRID TRIM BARS SHALL CONFORM TO THE REQUIREMENTS OF ASTM A588.

NO PAINTING IS REQUIRED FOR ASTM A588 STEEL.

THE MODIFIED STEEL GRID FLOORING SHALL BE GREULICH FIVE-INCH FOUR-WAY STEEL GRID, AS MANUFACTURED BY THE OSAGE COMPANY, OR FIVE-INCH WELDLOCK, TYPE H STEEL GRID AS MANUFACTURED BY THE RELIANCE STEEL PRODUCTS CO. OR APPROVED EQUAL, AND MODIFIED BY THE ADDITIONAL WELDING & NOTCHING AS SHOWN ON THIS SHEET.



PLAN VIEW
NOT TO SCALE

MODIFIED STEEL GRID FLOORING DETAIL

GREULICH

TYP. LOCATION 1: NOTCH TERTIARY "C" BARS AND PUDDLE WELD.

TYP. LOCATION 2: NOTCH TERTIARY "C" BARS AND PUDDLE WELD.

TYP. LOCATION 3: VERTICAL FILLET WELD AS SHOWN ON SECTION A-A PLUS PUDDLE WELD ON TOP.

TYP. LOCATION 4: VERTICAL FILLET WELD FULL DEPTH OF TERTIARY BAR PLUS PUDDLE WELD AS SHOWN ON SECTION B-B.

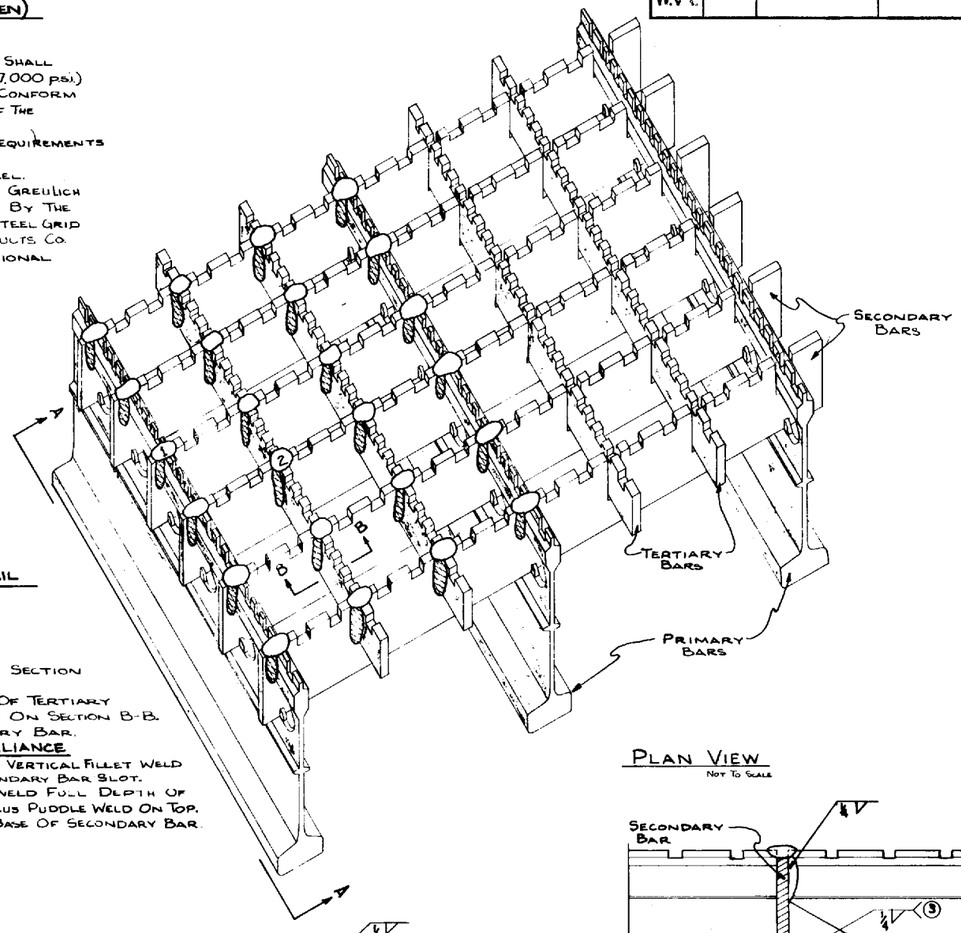
TYP. LOCATION 5: 1/4" FILLET WELD AT BASE OF SECONDARY BAR.

RELIANCE

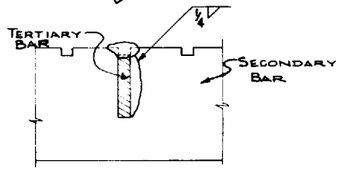
TYP. LOCATION 1: PUDDLE WELD, PLUS VERTICAL FILLET WELD FULL DEPTH OF SECONDARY BAR SLOT.

TYP. LOCATION 2: VERTICAL FILLET WELD FULL DEPTH OF TERTIARY BAR PLUS PUDDLE WELD ON TOP.

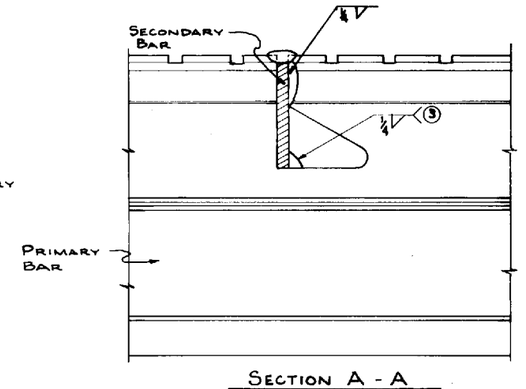
TYP. LOCATION 3: 1/4" FILLET WELD AT BASE OF SECONDARY BAR.



PLAN VIEW
NOT TO SCALE

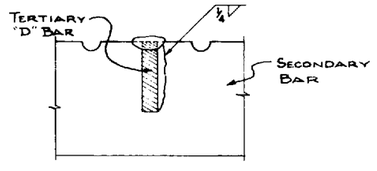


SECTION B-B
NOT TO SCALE

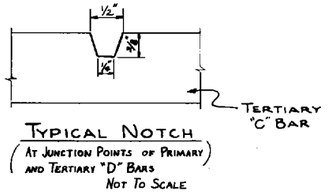


SECTION A-A
NOT TO SCALE

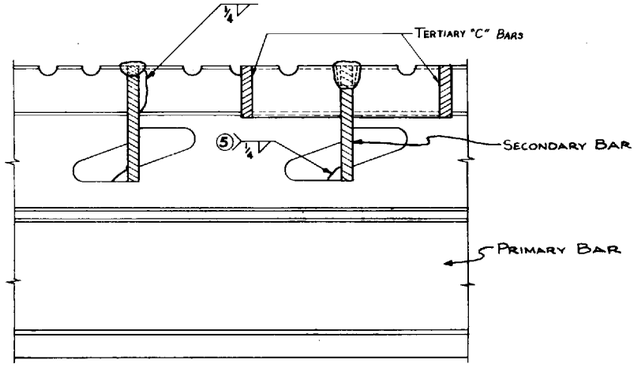
MODIFIED 5" WELDLOCK TYPE H



SECTION B-B
NOT TO SCALE



TYPICAL NOTCH
(AT JUNCTION POINTS OF PRIMARY AND TERTIARY "D" BARS)
NOT TO SCALE



SECTION A-A
NOT TO SCALE

MODIFIED 5" - 4 WAY STEEL GRID

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

DESIGNED BY:	
DRAWN BY: TRT	
CHECKED BY:	
REVIEWED BY:	
DATE:	
SCALE: NONE	
SHEET OF	
BRIDGE NUMBER	

W.VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS

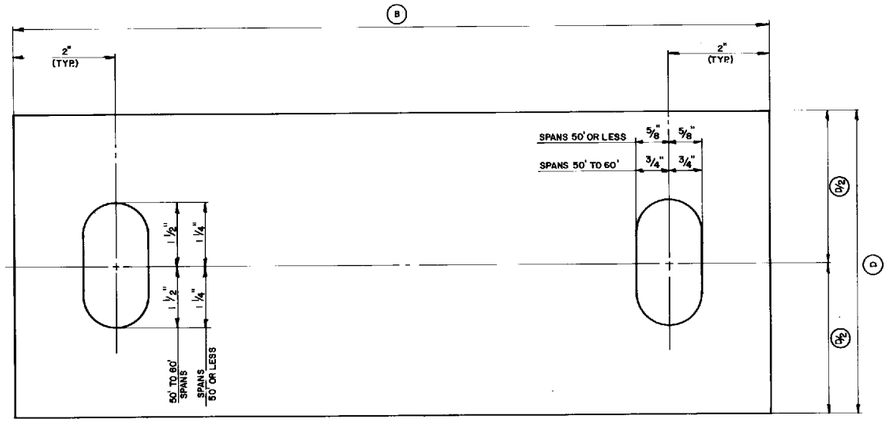
MODIFIED STEEL GRID DETAILS
(OPEN TYPE)

STANDARD SHEET BR-11M

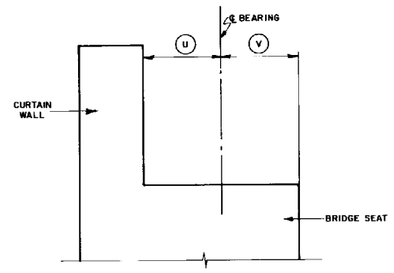
PREPARED	3-77
REVISED	9-88

MODIFIED STEEL GRID DETAILS

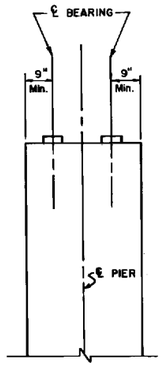
PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.VA.					



MASONRY & SOLE PLATE DETAIL



BRIDGE SEAT ELEVATION



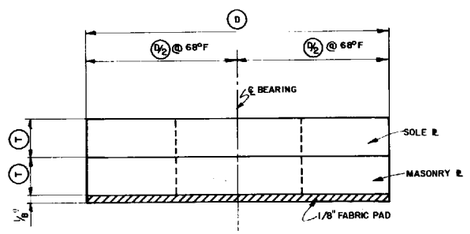
PIER
SIMPLE SPAN

COMPUTATION TABLE

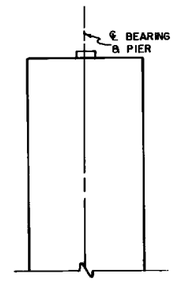
R (KIPS)	D (INCHES)	D/2 (INCHES)	FORMULAE MINIMUM B (INCHES)		B (INCHES)	FORMULA T (INCHES)	T (INCHES)
12.5-50	6	3	F.W.+8"	——		——	3/4
50-84	6	3	F.W.+8"	R÷4.2		0.13455n	
73.5-127	7	3 1/2	F.W.+8"	R÷4.9		0.13455n	

NOTES: R= REACTION
F.W.= FLANGE WIDTH
B SHALL BE THE GREATER VALUE, AS CALCULATED FROM THE TWO MINIMUM FORMULAE, ROUNDED UP TO THE NEAREST DIGIT.

T SHALL BE ROUNDED UP TO THE NEAREST 1/8" (MIN. T= 3/4").



SHOE ASSEMBLY- SIDE ELEVATION VIEW



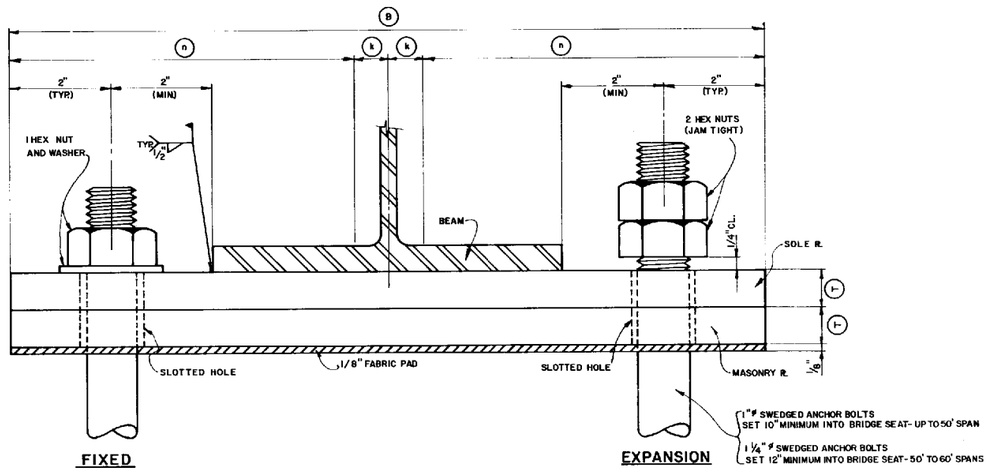
PIER
CONTINUOUS SPAN

CONTROL DIMENSIONS

CODE	DESCRIPTION	VALUE
B	LENGTH OF SHOE ASSEMBLY (SOLE PL., MASONRY PL., AND FABRIC PAD)	
D	WIDTH OF SHOE ASSEMBLY (SOLE PL., MASONRY PL., AND FABRIC PAD)	
k	BEAM PROPERTY VALUE OBTAINED FROM "DIMENSIONS FOR DETAILING" TABLE IN THE LATEST A.I.S.C. MANUAL	
n	B/2 - k (SEE FRONT ELEVATION VIEW)	
T	THICKNESS OF MASONRY PLATE AND SOLE PLATE	
U	DISTANCE FROM FRONT FACE OF CURTAIN WALL TO ℄ BEARING (NORMAL)	
V	DISTANCE FROM FACE OF BRIDGE SEAT TO ℄ BEARING (NORMAL)	

REQUIRED MATERIAL TABLE

MATERIAL	SPEC.	EACH FIXED ASSEMBLY	NO. OF FIXED ASSEMBLIES	EXPANSION ASSEMBLY	NO. OF EXPAN. ASSEMBLIES	TOTAL QUANTITY
FABRIC PAD	715.13	S.F.		S.F.		S.F.
MASONRY PL. SOLE PL.	A-36	LBS.		LBS.		LBS.
BOLTS	A-307	2		2		
HEX NUTS	A-307	2		4		
WASHERS	A-307	2		—	—	
MOLTEN ZINC OR LEAD		LBS.		LBS.		LBS.



SHOE ASSEMBLY- FRONT ELEVATION VIEW

NOTE: FILL SLOTTED HOLES OF BOTH MASONRY AND SOLE PLATES WITH MOLTEN ZINC OR LEAD AT FIXED BEARING.

NOTE: FILL SLOTTED HOLES OF MASONRY PLATES ONLY WITH MOLTEN ZINC OR LEAD AT EXPANSION BEARING.

OPTIONAL GALVANIZING	
OPTION	CHECK OPTION
YES	
NO	

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

W. VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS

SHOE BEARING ASSEMBLY
SPAN 60' OR LESS

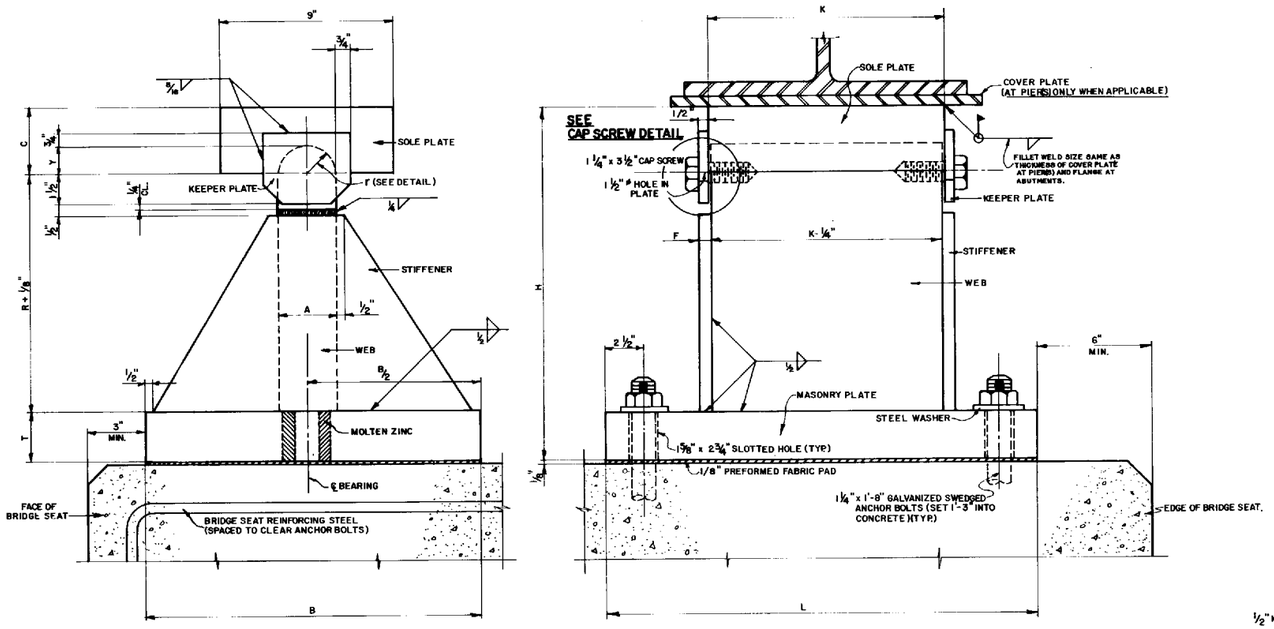
STANDARD SHEET BR-12

PREPARED:	4-74
REVISED:	2-75
	9-88
	11-91

SHOE ASSEMBLY DETAILS

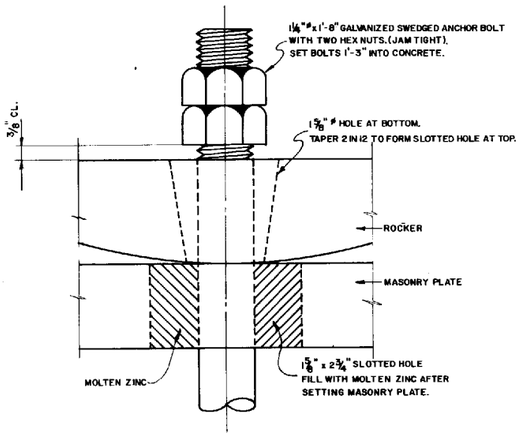
DESIGNED BY:	
DRAWN BY:	arph
CHECKED BY:	
REVIEWED BY:	
DATE:	
SCALE:	NONE
SHEET	OF
BRIDGE NUMBER	

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.VA.					



STRUCTURAL STEEL BOLSTER

(FIXED ASSEMBLY)

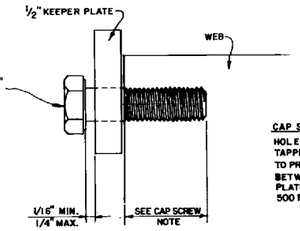


ANCHOR BOLT DETAIL

NOTE: CIRCLE THE APPROPRIATE MAXIMUM LOAD TO INDICATE THE CONTROLLING DIMENSIONS FOR THE ABUTMENTS(AND PIER(S) IF APPLICABLE).

CODE	MAXIMUM LOAD IN KIPS									
	75	100	125	150	175	200	225	250	275	300
A	2 1/2"	2 1/2"	3"	3"	3"	3"	3"	3 1/2"	3 1/2"	3 1/2"
B	8"	10"	11"	12"	14"	16"	17"	18"	19"	20"
C	2 1/2"	2 1/2"	3"	3"	3 1/2"	3 1/2"	3 1/2"	3 1/2"	3 1/2"	3 1/2"
D	1 3/4"	2"	2"	2 1/4"	2 1/2"	2 3/4"	2 3/4"	2 3/4"	3 1/4"	3 1/4"
F	1/2"	1/2"	1/2"	1/2"	1/2"	5/8"	5/8"	3/4"	3/4"	3/4"
G	7"	7 1/2"	8"	8 1/2"	9"	9"	9"	10"	12"	12"
H	9 5/8"	10 5/8"	12 1/8"	13 3/8"	15 1/8"	16 3/8"	16 7/8"	17 5/8"	18 3/8"	19 1/8"
K	9"	9"	10 1/2"	11 1/2"	12"	12"	13"	13"	14"	14"
L	18"	19"	20"	22"	23"	24"	25"	26"	27"	28"
M	16"	17"	18"	19"	20"	21"	22"	23"	24"	25"
R	5 1/2"	6 1/2"	7 1/2"	8 1/2"	9 1/2"	10 1/2"	11"	11 1/2"	12"	12 1/2"
T	1 1/2"	1 1/2"	1 1/2"	1 3/4"	2"	2 1/4"	2 1/4"	2 1/2"	2 3/4"	3"
Y	1 3/16"	1 3/16"	1 3/16"	1 7/16"	1 7/16"	1 7/16"	1 7/16"	1 11/16"	1 11/16"	1 11/16"
BOLSTER WEIGHT	—	225	295	360	455	540	590	695	800	895
ROCKER WEIGHT	205	250	315	400	505	605	665	775	945	1050

NOTE: WEIGHTS GIVEN ARE IN POUNDS, FOR ONE ROCKER OR BOLSTER ASSEMBLY COMPLETE (INCLUDING FABRIC PAD, ANCHOR BOLTS AND WASHERS).



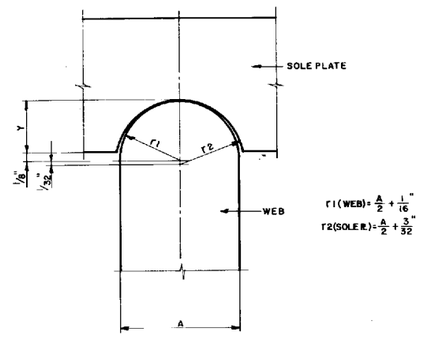
CAP SCREW NOTE

HOLE IN WEB TO BE DRILLED AND TAPPED TO A DEPTH SUFFICIENT TO PROVIDE 1/16" TO 1/4" CLEARANCE BETWEEN BOLT HEAD AND KEEPER PLATE WHEN BOLT IS TORQUED TO 500 FT-LBS.

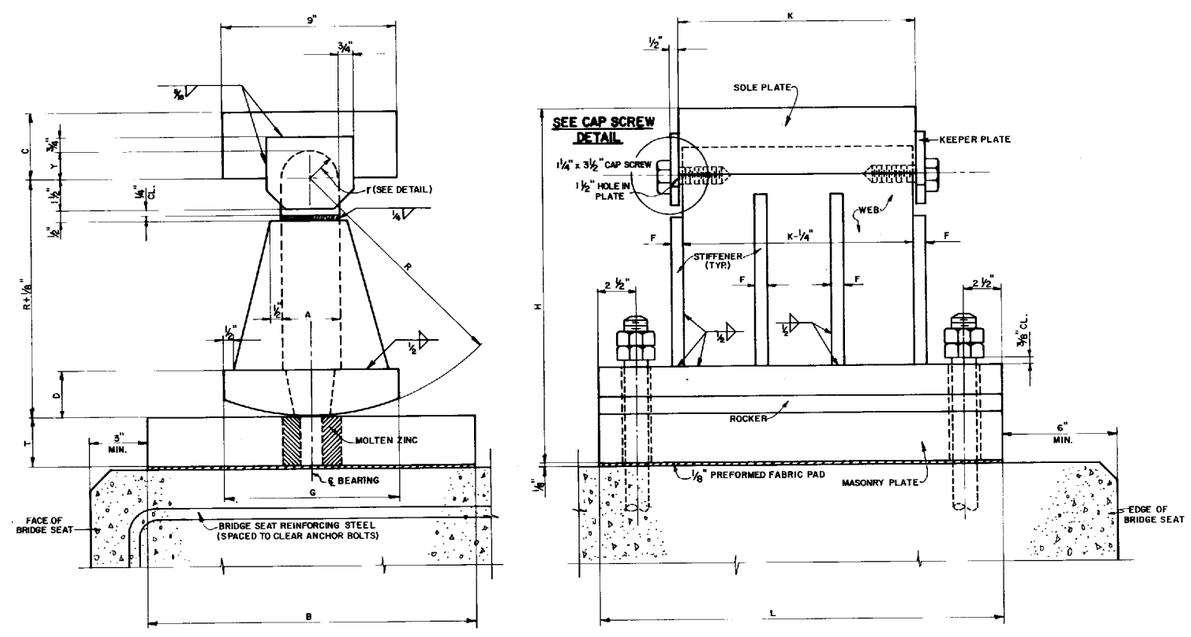
CAP SCREW DETAIL

NOTE: ALL SHOE MATERIALS TO BE GALVANIZED.

MATERIAL	SPEC.	EACH FIXED ASSEMBLY	NO. OF FIXED ASSEMBLIES	EXPANSION ASSEMBLY	NO. OF EXPAN. ASSEMBLIES	TOTAL QUANTITY
FABRIC PAD	715.13	S.F.		S.F.		S.F.
MASONRY PL.	A-36	LBS.		LBS.		LBS.
SOLE PL.	A-36	LBS.		LBS.		LBS.
KEEPER PL.	A-36	LBS.		LBS.		LBS.
EXTERNAL STIFFENERS	A-36	LBS.		LBS.		LBS.
INTERNAL STIFFENERS	A-36	LBS.		LBS.		LBS.
WEB PL.	A-36	LBS.		LBS.		LBS.
HEX NUTS	A-307					
WASHERS	A-307					
ANCHOR BOLTS	A-307					
CAP SCREWS	A-307					
MOLTEN ZINC OR LEAD	—	LBS.		LBS.		LBS.
ROCKER PL.	A-36	—	—	LBS.		LBS.



TOP BEARING DETAIL



STRUCTURAL STEEL ROCKER

(EXPANSION ASSEMBLY)

NOTE: THIS ROCKER AND BOLSTER DESIGN SHALL NOT BE USED WHERE THE ANTICIPATED MOVEMENT IS GREATER THAN 2 INCHES.

W. VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS

SHOE BEARING ASSEMBLY

STANDARD SHEET B R-12 L

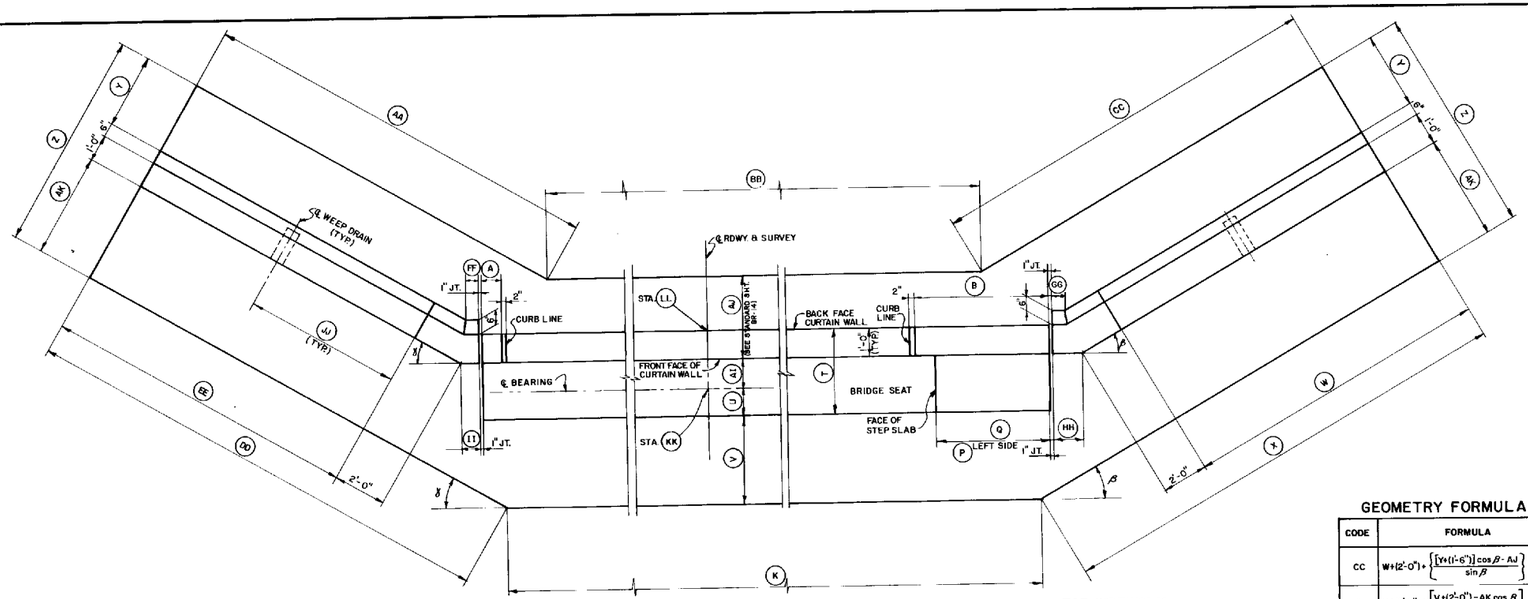
PREPARED:	4-74
REVISED:	2-75
	8-82
	10-83
	9-88

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

SHOE ASSEMBLY DETAILS

DESIGNED BY:	
DRAWN BY:	wgh.
CHECKED BY:	
REVIEWED BY:	
DATE:	
SCALE:	NONE
SHEET	OF
BRIDGE NUMBER	

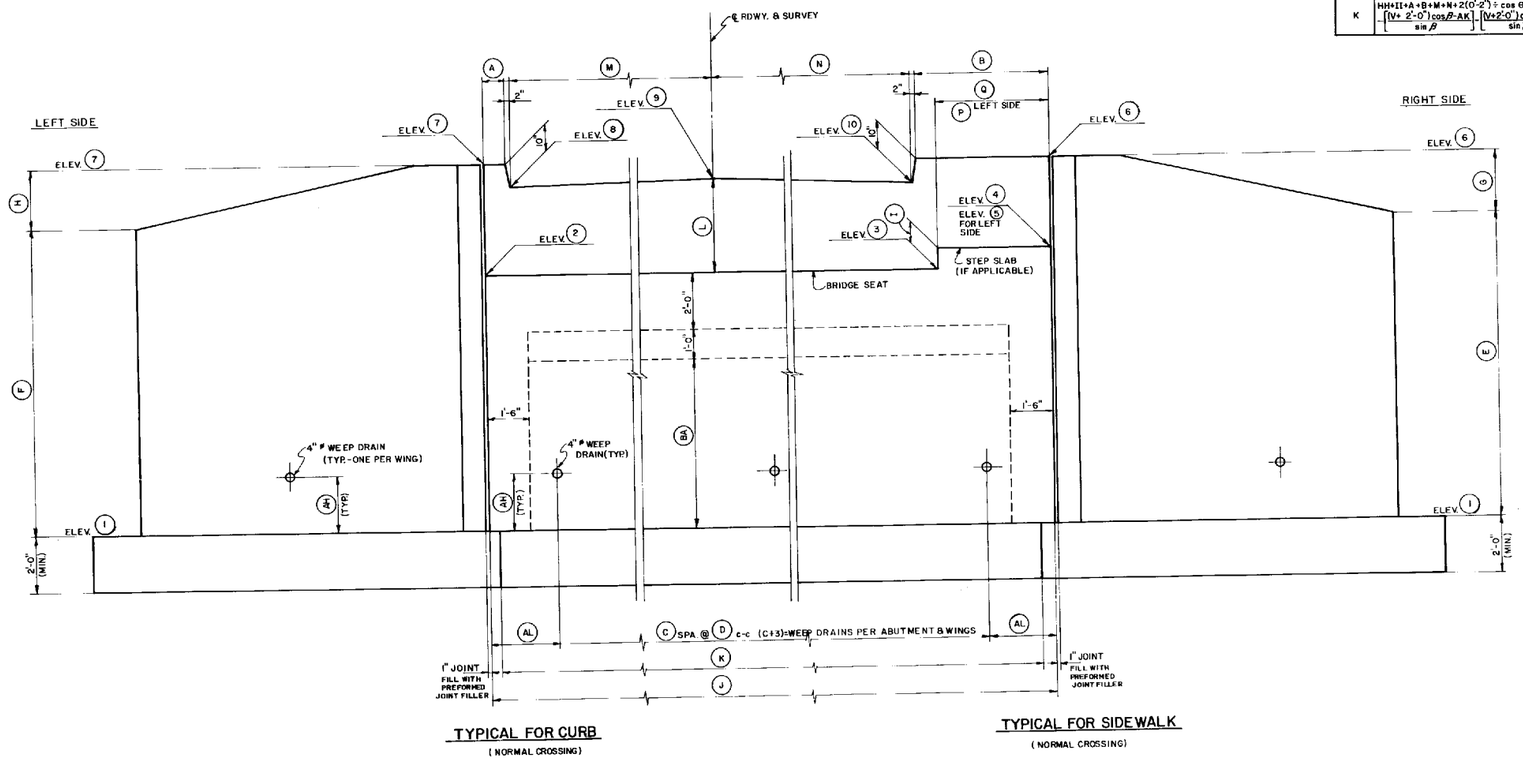
PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.VA.					



TYPICAL FOR CURB
(NORMAL CROSSING)

TYPICAL FOR SIDEWALK
(NORMAL CROSSING)

ABUTMENT PLAN VIEW



TYPICAL FOR CURB
(NORMAL CROSSING)

TYPICAL FOR SIDEWALK
(NORMAL CROSSING)

ABUTMENT FRONT ELEVATION VIEW

GEOMETRY FORMULAE

CODE	FORMULA
CC	$W+(2'-0")+\left\{\frac{[Y+(1'-6")]\cos\beta-AJ}{\sin\beta}\right\}$
X	$W+(2'-0")+\left[\frac{V+(2'-0")-AK\cos\beta}{\sin\beta}\right]$
AA	$EE+(2'-0")+\left\{\frac{[Y+(1'-6")]\cos\delta-AJ}{\sin\delta}\right\}$
DD	$EE+(2'-0")+\left[\frac{V+(2'-0")-AK\cos\delta}{\sin\delta}\right]$
BB	$HH+II+A+B+M+N+2(0'-2")\div\cos\theta+(0'-2")-\left\{\frac{Y+(1'-6")-AJ\cos\beta}{\sin\beta}\right\}-\left\{\frac{Y+(1'-6")-AJ\cos\delta}{\sin\delta}\right\}$
K	$HH+II+A+B+M+N+2(0'-2")\div\cos\theta+(0'-2")-\left\{\frac{[V+2'-0"]\cos\beta-AK}{\sin\beta}\right\}-\left\{\frac{[V+2'-0"]\cos\delta-AK}{\sin\delta}\right\}$

DESIGN TABLE

STEM* HEIGHT	AJ	AK	V	Y	Z**
7'-0" TO 10'-0"	3'-0"	3'-0"	3'-0"	3'-6"	8'-0"
OVER 10'-0" TO 13'-0"	4'-0"	4'-0"	4'-0"	4'-6"	10'-0"
OVER 13'-0" TO 15'-0"	4'-6"	4'-6"	4'-6"	5'-0"	11'-0"
OVER 15'-0" TO 17'-0"	5'-0"	5'-0"	5'-0"	5'-6"	12'-0"
OVER 17'-0" THRU 18'-0"	5'-6"	5'-6"	5'-6"	6'-0"	13'-0"

*STEM HEIGHT IS MEASURED FROM TOP OF FOOTING TO TOP OF CURTAIN WALL AT ℄ RDWY AND SURVEY.

**Z VALUE IS THE SAME FOR ABUTMENT AND WINGWALL FOOTINGS.

NOTE: VALUES IN DESIGN TABLE ARE VALID FOR ANY TYPE OF SUPERSTRUCTURE FOR SPANS UP TO 75'-0" c-c OF BEARING.

*CONTROL ELEVATIONS

CODE	DESCRIPTION	VALUE ABUT. 1	VALUE ABUT. 2
1	ELEVATION AT TOP OF FOOTING		
2	ELEVATION AT END OF BRIDGE SEAT LEFT SIDE		
3	ELEVATION AT END OF BRIDGE SEAT RIGHT SIDE		
4	ELEVATION AT END OF STEP SLAB RIGHT SIDE		
5	ELEVATION AT END OF STEP SLAB LEFT SIDE		
6	ELEVATION AT END OF CURTAIN WALL AND TOP OF WINGWALL RIGHT SIDE		
7	ELEVATION AT END OF CURTAIN WALL AND TOP OF WINGWALL LEFT SIDE		
△8	ELEVATION AT BOTTOM FACE OF CURB LEFT SIDE		
△9	ELEVATION AT TOP OF CURTAIN WALL AT ℄ RDWY.		
△10	ELEVATION AT BOTTOM FACE OF CURB RIGHT SIDE		

△ELEVATIONS 8, 9 AND 10 ARE DESIGNATED AT THE FRONT FACE OF CURTAIN WALL.

**CONTROL STATIONING

CODE	DESCRIPTION	VALUE ABUT.1	VALUE ABUT.2
KK	STATION AT ℄ RDWY. AND ℄ BEARING		
LL	STATION AT ℄ RDWY. AND BACK FACE OF CURTAIN WALL		

CONTROL DIMENSIONS

CODE	DESCRIPTION	VALUE ABUT. 1	VALUE ABUT. 2
A	WIDTH OF CURB OR SIDEWALK TOP FACE LEFT SIDE		
B	WIDTH OF CURB OR SIDEWALK TOP FACE RIGHT SIDE		
C	NO. OF SPA. OF WEEP DRAINS ALONG ABUTMENT		
D	SPACING OF WEEP DRAINS ALONG ABUTMENT		
E	HEIGHT OF WINGWALL STEM END RIGHT SIDE		
F	HEIGHT OF WINGWALL STEM END LEFT SIDE		
G	HEIGHT DIFFERENCE BETWEEN BEGINNING AND END OF WINGWALL STEM RIGHT SIDE		
H	HEIGHT DIFFERENCE BETWEEN BEGINNING AND END OF WINGWALL STEM LEFT SIDE		
I	HEIGHT OF STEP SLAB		
J	LENGTH OF ABUTMENT STEM AND CURTAIN WALL		
K	LENGTH OF ABUTMENT FOOTING FRONT SIDE		
L	HEIGHT OF CURTAIN WALL FROM BRIDGE SEAT TO TOP AT ℄ ROADWAY		
M	DISTANCE FROM CURB LINE TO ℄ RDWY LEFT SIDE		
N	DISTANCE FROM CURB LINE TO ℄ RDWY RIGHT SIDE		
P	WIDTH OF STEP SLAB FRONT FACE LEFT SIDE		
Q	WIDTH OF STEP SLAB FRONT FACE RIGHT SIDE		
T	DISTANCE FROM BACK FACE OF CURTAIN WALL TO FRONT FACE OF BRIDGE SEAT.		
U	DISTANCE FROM ℄ BEARING TO FRONT FACE BRIDGE SEAT		
V	DIST. FROM FR. FACE ABUT. STEM TO FR. FACE FOOTING		
W	LENGTH OF SLOPED PORTION WINGWALL STEM RIGHT SIDE		
X	LENGTH OF WINGWALL FOOTING FRONT FACE RIGHT SIDE		
Y	DIST. BACK FACE WINGWALL STEM TO BACK FACE FOOTING		
Z	WIDTH OF FOOTING - ABUTMENT AND WINGWALL		

CODE	DESCRIPTION	VALUE ABUT. 1	VALUE ABUT. 2
AA	LENGTH OF WINGWALL FOOTING BACK FACE LEFT SIDE		
AH	DISTANCE TOP OF FOOTING TO ℄ WEEP DRAINS		
AI	DISTANCE FRONT FACE OF CURTAIN WALL TO ℄ BEARING		
AJ	DISTANCE FROM BACK FACE OF ABUTMENT STEM TO BACK FACE OF FOOTING		
AK	DISTANCE FROM FRONT FACE OF WINGWALL STEM TO FRONT FACE OF FOOTING		
AL	DISTANCE FROM END OF ABUTMENT STEM TO ℄ OF FIRST ABUTMENT WEEP DRAIN		
BA	DISTANCE FROM TOP OF ABUTMENT FOOTING TO EDGE OF CURTAIN WALL BEVEL (BACK FACE)		
BB	LENGTH OF ABUTMENT FOOTING BACK FACE		
CC	LENGTH OF WINGWALL FOOTING BACK FACE RIGHT SIDE		
DD	LENGTH OF WINGWALL FOOTING FRONT FACE LEFT SIDE		
EE	LENGTH OF SLOPED PORTION WINGWALL STEM LEFT SIDE		
FF	DISTANCE FROM BEGINNING OF WINGWALL STEM TO TURNING POINT BACK FACE LEFT SIDE		
GG	DISTANCE FROM BEGINNING OF WINGWALL STEM TO TURNING POINT BACK FACE RIGHT SIDE		
HH	DISTANCE FROM BEGINNING OF WINGWALL STEM TO TURNING POINT FRONT FACE RIGHT SIDE		
II	DISTANCE FROM BEGINNING OF WINGWALL STEM TO TURNING POINT FRONT FACE LEFT SIDE		
JJ	DISTANCE TO ℄ OF 4"ϕ WEEP DRAIN FROM BEGINNING OF WINGWALL SLOPE		
β	ANGLE RIGHT WINGWALL STEM IS OFFSET FROM ABUTMENT		
δ	ANGLE LEFT WINGWALL STEM IS OFFSET FROM ABUTMENT		

NOTE: HH=GG+(1'-6")tan β/2 NOTE: U+AI=2'-0"
II=FF+(1'-6")tan δ/2

NOTE: FOR SKEWED ABUTMENT, REFER TO STANDARD SHEET BR-14S; DIMENSION A BECOMES A+R FOR RIGHT FORWARD SKEW DIMENSION B BECOMES B+R FOR LEFT FORWARD SKEW 2" DISTANCE AT CURB BECOMES 2" ÷ cos θ.

SKEW TABLE

CROSSING	VALUE ABUT. 1	VALUE ABUT. 2
NORMAL		
LEFT FORWARD SKEW		
RIGHT FORWARD SKEW		

*ELEVATIONS ESTABLISHED FROM:

**STATIONING ESTABLISHED FROM:

NOTE: THIS SHEET TO BE USED WITH STANDARD SHEETS BR-14, BR-15, BR-16, BR-17 AND BR-14S IF APPLICABLE.

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

W. VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS
REINFORCED CONCRETE ABUTMENT
ABUTMENT LAYOUT
STANDARD SHEET BR-13

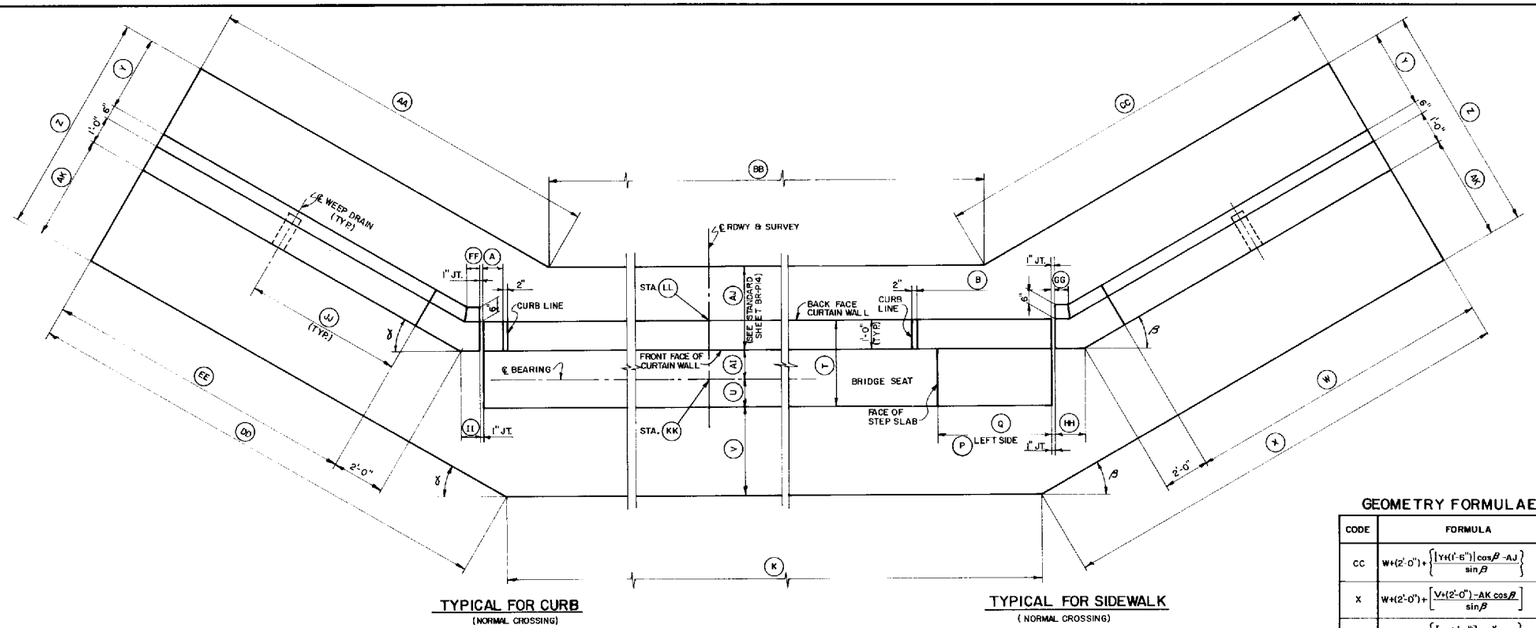
PREPARED:	6-75
REVISED:	7-75
	8-75
	10-75
	9-88

DESIGNED BY:
DRAWN BY: W.P.H.
CHECKED BY:
REVIEWED BY:
DATE:
SCALE: NONE
SHEET OF

CONCRETE ABUTMENT LAYOUT

BRIDGE NUMBER

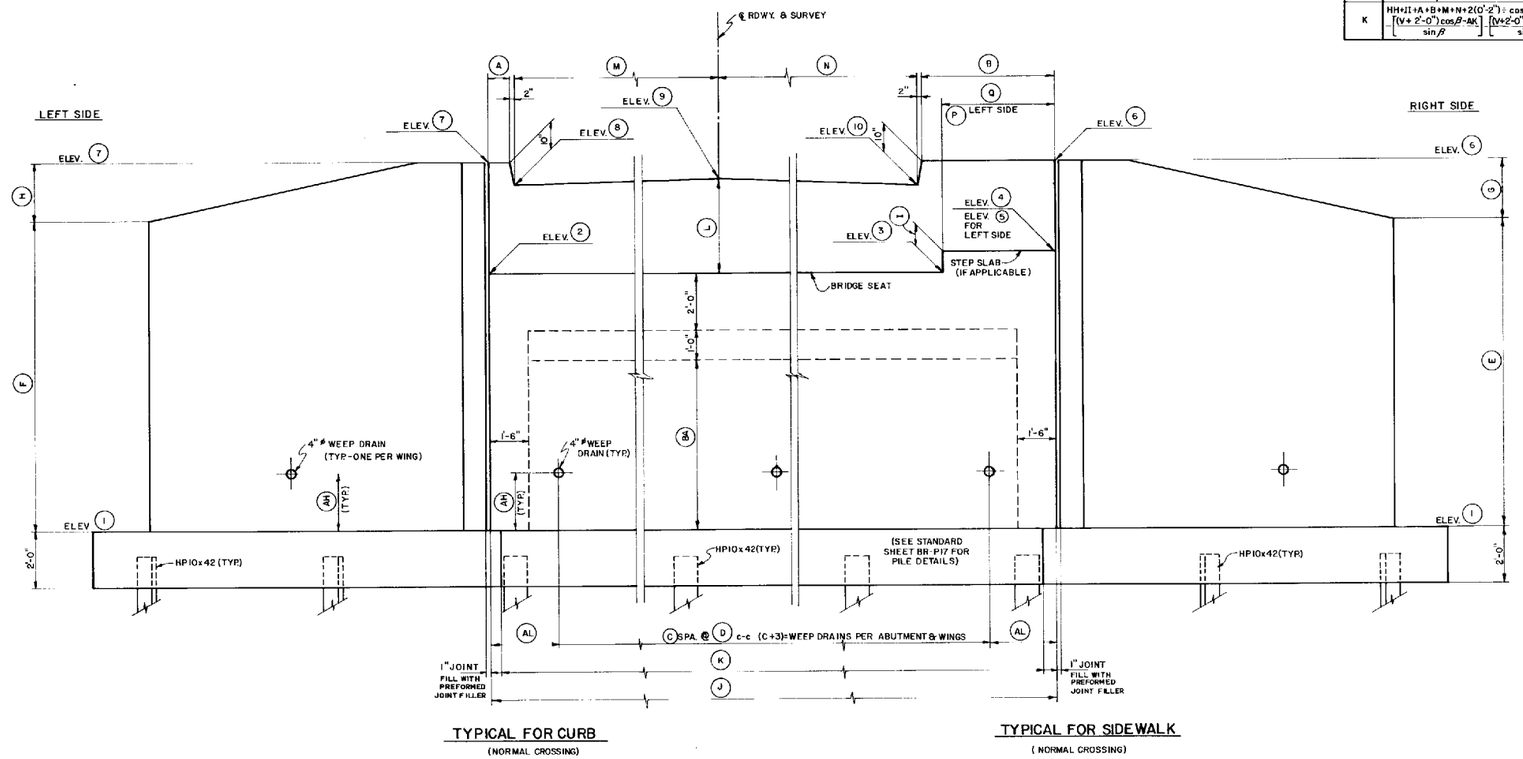
PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W. VA.					



TYPICAL FOR CURB
(NORMAL CROSSING)

TYPICAL FOR SIDEWALK
(NORMAL CROSSING)

ABUTMENT PLAN VIEW



TYPICAL FOR CURB
(NORMAL CROSSING)

TYPICAL FOR SIDEWALK
(NORMAL CROSSING)

ABUTMENT FRONT ELEVATION VIEW

DESIGN TABLE

STEM * HEIGHT	AJ	AK	V	Y	Z**
7'-0" TO 10'-0"	2'-6"	2'-6"	2'-6"	3'-0"	7'-0"
OVER 10'-0" TO 13'-0"	2'-6"	3'-0"	3'-6"	3'-6"	8'-0"
OVER 13'-0" TO 15'-0"	2'-6"	3'-6"	4'-6"	4'-0"	9'-0"
OVER 15'-0" TO 17'-0"	2'-6"	4'-0"	5'-6"	4'-6"	10'-0"
OVER 17'-0" THRU 18'-0"	2'-6"	4'-0"	6'-0"	5'-0"	10'-6"

*STEM HEIGHT IS MEASURED FROM TOP OF FOOTING TO TOP OF CURTAIN WALL AT ℄ RDWY AND SURVEY.

**Z VALUE IS THE SAME FOR ABUTMENT AND WINGWALL FOOTINGS.

NOTE: VALUES IN DESIGN TABLE ARE VALID FOR ANY TYPE OF SUPERSTRUCTURE FOR SPANS UP TO 75'-0" c-c OF BEARING.

GEOMETRY FORMULAE

CODE	FORMULA
CC	$W+(2'-0")+\left\{\frac{[Y+(1'-6")]\cos\beta - AJ}{\sin\beta}\right\}$
X	$W+(2'-0")+\left[\frac{V+(2'-0")-AK\cos\beta}{\sin\beta}\right]$
AA	$EE+(2'-0")+\left\{\frac{[Y+(1'-6")]\cos\delta - AJ}{\sin\delta}\right\}$
DD	$EE+(2'-0")+\left[\frac{V+(2'-0")-AK\cos\delta}{\sin\delta}\right]$
BB	$HH+II+A+B+M+N+2(0'-2")\div\cos\theta+(0'-2")-\left[\frac{(Y+(1'-6")-AJ\cos\beta}{\sin\beta}\right]-\left[\frac{(Y+(1'-6")-AJ\cos\delta}{\sin\delta}\right)$
K	$HH+II+A+B+M+N+2(0'-2")\div\cos\theta+(0'-2")-\left[\frac{(V+2'-0")\cos\beta-AK}{\sin\beta}\right]-\left[\frac{(V+2'-0")\cos\delta-AK}{\sin\delta}\right]$

*CONTROL ELEVATIONS

CODE	DESCRIPTION	VALUE ABUT. 1	VALUE ABUT. 2
1	ELEVATION AT TOP OF FOOTING		
2	ELEVATION AT END OF BRIDGE SEAT LEFT SIDE		
3	ELEVATION AT END OF BRIDGE SEAT RIGHT SIDE		
4	ELEVATION AT END OF STEP SLAB RIGHT SIDE		
5	ELEVATION AT END OF STEP SLAB LEFT SIDE		
6	ELEVATION AT END OF CURTAIN WALL AND TOP OF WINGWALL RIGHT SIDE		
7	ELEVATION AT END OF CURTAIN WALL AND TOP OF WINGWALL LEFT SIDE		
△8	ELEVATION AT BOTTOM FACE OF CURB LEFT SIDE		
△9	ELEVATION AT TOP OF CURTAIN WALL AT ℄ RDWY.		
△10	ELEVATION AT BOTTOM FACE OF CURB RIGHT SIDE		

△ELEVATIONS 8, 9 & 10 ARE DESIGNATED AT THE FRONT FACE OF CURTAIN WALL.

**CONTROL STATIONING

CODE	DESCRIPTION	VALUE ABUT. 1	VALUE ABUT. 2
KK	STATION AT ℄ RDWY. AND ℄ BEARING		
LL	STATION AT ℄ RDWY. AND BACK FACE OF CURTAIN WALL		

CONTROL DIMENSIONS

CODE	DESCRIPTION	VALUE ABUT. 1	VALUE ABUT. 2
A	WIDTH OF CURB OR SIDEWALK TOP FACE LEFT SIDE		
B	WIDTH OF CURB OR SIDEWALK TOP FACE RIGHT SIDE		
C	NO. OF SPA. OF WEEP DRAINS ALONG ABUTMENT		
D	SPACING OF WEEP DRAINS ALONG ABUTMENT		
E	HEIGHT OF WINGWALL STEM END RIGHT SIDE		
F	HEIGHT OF WINGWALL STEM END LEFT SIDE		
G	HEIGHT DIFFERENCE BETWEEN BEGINNING AND END OF WINGWALL STEM RIGHT SIDE		
H	HEIGHT DIFFERENCE BETWEEN BEGINNING AND END OF WINGWALL STEM LEFT SIDE		
I	HEIGHT OF STEP SLAB		
J	LENGTH OF ABUTMENT STEM AND CURTAIN WALL		
K	LENGTH OF ABUTMENT FOOTING FRONT SIDE		
L	HEIGHT OF CURTAIN WALL FROM BRIDGE SEAT TO TOP AT ℄ ROADWAY		
M	DISTANCE FROM CURB LINE TO ℄ RDWY LEFT SIDE		
N	DISTANCE FROM CURB LINE TO ℄ RDWY RIGHT SIDE		
P	WIDTH OF STEP SLAB FRONT FACE LEFT SIDE		
Q	WIDTH OF STEP SLAB FRONT FACE RIGHT SIDE		
T	DISTANCE FROM BACK FACE OF CURTAIN WALL TO FRONT FACE OF BRIDGE SEAT.		
U	DISTANCE FROM ℄ BEARING TO FRONT FACE BRIDGE SEAT		
V	DIST. FROM FR. FACE ABUT. STEM TO FR. FACE FOOTING		
W	LENGTH OF SLOPED PORTION WINGWALL STEM RIGHT SIDE		
X	LENGTH OF WINGWALL FOOTING FRONT FACE RIGHT SIDE		
Y	DIST. BACK FACE WINGWALL STEM TO BACK FACE FOOTING		
Z	WIDTH OF FOOTING - ABUTMENT AND WINGWALL		

CODE	DESCRIPTION	VALUE ABUT. 1	VALUE ABUT. 2
AA	LENGTH OF WINGWALL FOOTING BACK FACE LEFT SIDE		
AH	DISTANCE TOP OF FOOTING TO ℄ WEEP DRAINS		
A1	DISTANCE FRONT FACE OF CURTAIN WALL TO ℄ BEARING		
AJ	DISTANCE FROM BACK FACE OF ABUTMENT STEM TO BACK FACE OF FOOTING		
AK	DISTANCE FROM FRONT FACE OF WINGWALL STEM TO FRONT FACE OF FOOTING		
AL	DISTANCE FROM END OF ABUTMENT STEM TO ℄ OF FIRST ABUTMENT WEEP DRAIN		
BA	DISTANCE FROM TOP OF ABUTMENT FOOTING TO EDGE OF CURTAIN WALL BEVEL (BACK FACE)		
BB	LENGTH OF ABUTMENT FOOTING BACK FACE		
CC	LENGTH OF WINGWALL FOOTING BACK FACE RIGHT SIDE		
DD	LENGTH OF WINGWALL FOOTING FRONT FACE LEFT SIDE		
EE	LENGTH OF SLOPED PORTION WINGWALL STEM LEFT SIDE		
FF	DISTANCE FROM BEGINNING OF WINGWALL STEM TO TURNING POINT BACK FACE LEFT SIDE		
GG	DISTANCE FROM BEGINNING OF WINGWALL STEM TO TURNING POINT BACK FACE RIGHT SIDE		
HH	DISTANCE FROM BEGINNING OF WINGWALL STEM TO TURNING POINT FRONT FACE RIGHT SIDE		
II	DISTANCE FROM BEGINNING OF WINGWALL STEM TO TURNING POINT FRONT FACE LEFT SIDE		
JJ	DISTANCE TO ℄ OF 4" ϕ WEEP DRAIN FROM BEGINNING OF WINGWALL SLOPE		
β	ANGLE RIGHT WINGWALL STEM IS OFFSET FROM ABUTMENT		
δ	ANGLE LEFT WINGWALL STEM IS OFFSET FROM ABUTMENT		

NOTE: HH=GG+(1'-6") tan β/2 NOTE: U+AI=2'-0"
II=FF+(1'-6") tan δ/2

SKEW TABLE

CROSSING	VALUE ABUT. 1	VALUE ABUT. 2
NORMAL		
LEFT FORWARD SKEW		
RIGHT FORWARD SKEW		

NOTE: FOR SKEWED ABUTMENT, REFER TO STANDARD SHEET BR-145;
DIMENSION A BECOMES A+R. RIGHT FORWARD
DIMENSION B BECOMES B+R. LEFT FORWARD
2" DISTANCE AT CURB BECOMES 2"÷cos θ.

*ELEVATIONS ESTABLISHED FROM:

**STATIONING ESTABLISHED FROM:

NOTE: THIS SHEET TO BE USED WITH STANDARD SHEETS BR-P14, BR-P15, BR-P16, BR-P17 AND BR-145 IF APPLICABLE.

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

DESIGNED BY:	
DRAWN BY:	W.P.B.
CHECKED BY:	
REVIEWED BY:	
DATE:	
SCALE:	NONE
SHEET	OF
BRIDGE NUMBER	

CONCRETE ABUTMENT ON PILING

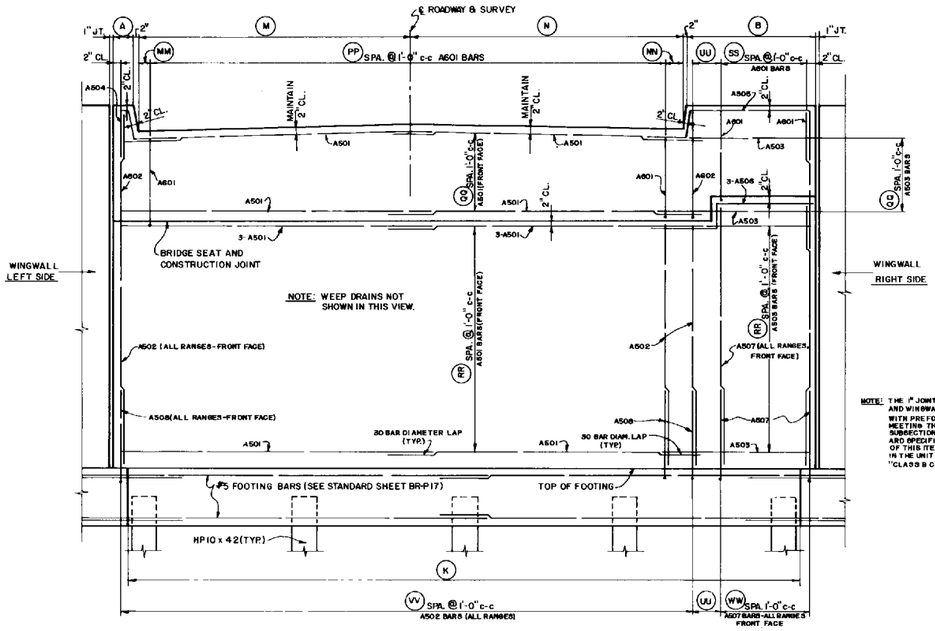
W. VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS
REINFORCED CONCRETE ABUTMENT
ABUTMENT LAYOUT
(ON PILING)

STANDARD SHEET BR-P13

PREPARED:	8-75
REVISED:	10-75
	9-88

NOTE: IN BILL OF REINFORCING STEEL, SIDEWALK NUMBER CATEGORIES MARKED BY (X) INDICATES BARS REQUIRED.
NOTE: CIRCLE APPROPRIATE SIDEWALK NUMBER.

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS

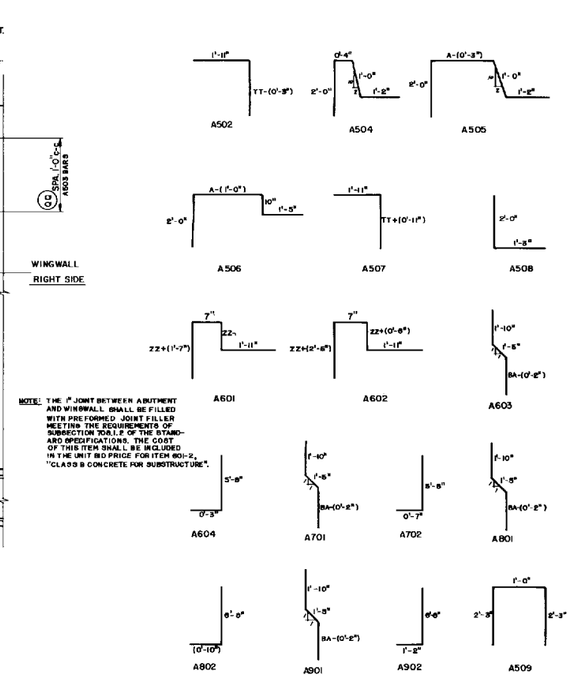


TYPICAL WITH CURB

TYPICAL WITH SIDEWALK

ABUTMENT FRONT ELEVATION

(NORMAL CROSSING)



NOTE: THE 1" JOINT BETWEEN ABUTMENT AND WINGWALL SHALL BE FILLED WITH PREFORMED JOINT FILLER MEETING THE REQUIREMENTS OF SUBSECTION 708.1.2 OF THE STANDARD SPECIFICATIONS. THE COST OF THIS ITEM SHALL BE INCLUDED IN THE UNIT BID PRICE FOR ITEM 601-2, "CLASS B CONCRETE FOR SUBSTRUCTURE".

CONTROL DIMENSIONS

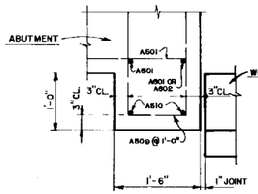
CODE	DESCRIPTION	VALUE ABUT. 1	VALUE ABUT.2
A	WIDTH OF CURB OR SIDEWALK TOP FACE LEFT SIDE		
B	WIDTH OF CURB OR SIDEWALK TOP FACE RIGHT SIDE		
K	LENGTH OF ABUTMENT FOOTING FRONT SIDE		
M	DISTANCE FROM CURB LINE TO ℄ ROADWAY LEFT SIDE		
N	DISTANCE FROM CURB LINE TO ℄ ROADWAY RIGHT SIDE		
V	DIST. FROM FR. FACE ABUT. STEM TO FR. FACE FOOTING		
Z	WIDTH OF FOOTING-ABUTMENT AND WINGWALL		
AH	DISTANCE FROM TOP OF FOOTING TO ℄ WEEP DRAINS		
AI	DISTANCE FRONT FACE OF CURTAIN WALL TO ℄ BEARING		
AJ	DIST. FROM BK. FACE ABUT. STEM TO BK. FACE FOOTING		
BA	DISTANCE FROM TOP OF ABUTMENT FOOTING TO EDGE OF ABUT. STEM BEVEL (BACK FACE)		
MM	HORIZONTAL DISTANCE FROM CURB LINE TO ℄ FIRST A601 BAR ON LEFT ROADWAY SIDE		
NN	HORIZONTAL DISTANCE FROM CURB LINE TO ℄ FIRST A601 BAR ON RIGHT ROADWAY SIDE		
PP	NO. OF SPA. OF A601 BARS IN RDWY. PORTION OF CURT. WALL		
QQ	NUMBER OF SPACES A501 & A503 BARS IN CURTAIN WALL		
RR	NO. SPACES A501 & A503 BARS IN ABUTMENT SHAFT		
SS	NO. SPACES A601 BARS IN SIDEWALK SECTION		
TT	HEIGHT OF ABUTMENT SHAFT		
UU	SPACING BETWEEN A601 & A602 BARS IN SIDEWALK SECTION		
VV	NO. SPA. OF A502, A603, A701, A801, & A901 BARS IN ABUTMENT SHAFT (EXCLUDING SIDEWALK SECTION)		
WW	NO. SPA. OF A604, A702, A802 & A902 BARS (SIDEWALK SECTION)		
XX	NO. SPA. OF A502, A603, A701, A801, A901 BARS (" ")		
YY	NO. SPA. OF A604, A702, A802, & A902 BARS IN ABUTMENT SHAFT (EXCLUDING SIDEWALK SECTION)		
ZZ	HEIGHT OF CURTAIN WALL AT ℄ ROADWAY		
U	DIST. FROM ℄ BRG. TO FRONT FACE OF BRIDGE SEAT		
BB	LENGTH OF ABUTMENT FOOTING BACK FACE		
BR	DISTANCE FROM TOP OF FOOTING TO HORIZONTAL BARS IN SHAFT.		
BQ	DISTANCE FROM BRIDGE SEAT TO HORIZONTAL BARS IN CURTAIN WALL AT ℄ ROADWAY		

NOTE: IF ABUTMENT IS SKEWED, NO. OF A601 BARS = PP+1. DELETE A504, A505 AND A601 BARS IN SIDEWALK(S) AND REPLACE WITH BARS AS SHOWN ON STANDARD SHEET BR-14S.

NOTE: LENGTH OF BAR A501 = $\frac{M+N+2A+4''}{2}$ +10"; LENGTH OF BAR A503 = B+10"; LENGTH OF BAR A510 = TT-3"
NOTE: CIRCLE BAR MARK USED IN BILL OF REINFORCING STEEL.

BILL OF REINFORCING STEEL

MARK	BAR TYPE	SIDEWALK 0	SIDEWALK 1	SIDEWALK 2	RANGE	FORMULA NO. BARS/ABUT.	NO. OF BARS ABUT. 1	NO. OF BARS ABUT. 2	TOTAL LENGTH OF EACH BAR ABUT.1	TOTAL LENGTH OF EACH BAR ABUT.2	TOTAL LENGTH
A501	STR	X	X	X	ALL	4(QQ)+4(RR)+12					
A502	BENT	X	X	X	ALL	(VV)+2					
A503	STR.	—	X	—	ALL	2(QQ)+2					
	"	—	—	X	"	4(QQ)+4					
A504	BENT	X	—	—	ALL	——	4	4			
A504	"	—	X	—	"	——	2	2			
A505	BENT	—	X	—	ALL	——	2	2			
A505	"	—	—	X	"	——	4	4			
A506	BENT	—	X	—	ALL	——	3	3			
A506	"	—	—	X	"	——	6	6			
A507	BENT	—	X	—	ALL	(WW)+1					
A507	"	—	—	X	"	2(WW)+2					
A601	BENT	X	—	—	ALL	(PP)+1					
A601	"	—	X	—	"	(PP)+(SS)+2					
A601	"	—	—	X	"	(PP)+2(SS)+3					
A602	BENT	X	X	X	ALL	——	2	2			
A603	BENT	X	—	—	1&2	(VV)+2					
A603	"	—	X	—	"	(VV)+(XX)+2					
A603	"	—	—	X	"	(VV)+2(XX)+3					
A604	BENT	X	—	—	2	(YY)+(VV)+4					
A604	"	—	X	—	"	(YY)+(WW)+(VV)+(XX)+ 6					
A604	"	—	—	X	"	(YY)+(WW)2+8+(VV)+2(XX)					
A701	BENT	X	—	—	3	(VV)+2					
A701	"	—	X	—	"	(VV)+(XX)+2					
A701	"	—	—	X	"	(VV)+2(XX)+3					
A702	BENT	X	—	—	3	(YY)+4+(VV)					
A702	"	—	X	—	"	(YY)+(WW)+8+(VV)+(XX)					
A702	"	—	—	X	"	(YY)+(WW)2+8+(VV)+2(XX)					
A801	BENT	X	—	—	4	(VV)+2					
A801	"	—	X	—	"	(VV)+(XX)+2					
A801	"	—	—	X	"	(VV)+2(XX)+3					
A802	BENT	X	—	—	4	(YY)+4+(VV)					
A802	"	—	X	—	"	(YY)+(WW)+6+(VV)+(XX)					
A802	"	—	—	X	"	(YY)+(WW)2+8+(VV)+2(XX)					
A901	BENT	X	—	—	5	(VV)+2					
A901	"	—	X	—	"	(VV)+(XX)+2					
A901	"	—	—	X	"	(VV)+2(XX)+3					
A902	BENT	X	—	—	5	(YY)+4+(VV)					
A902	"	—	X	—	"	(YY)+(WW)+6+(VV)+(XX)					
A902	"	—	—	X	"	(YY)+(WW)2+8+(VV)+2(XX)					
A604	BENT	X	—	—	1	(VV)+2					
A604	"	—	X	—	"	(VV)+(XX)+2					
A604	"	—	—	X	"	(VV)+2(XX)+3					
A508	BENT	X	—	—	ALL	(VV)+2					
A508	"	—	X	—	"	(VV)+(WW)+3					
A508	"	—	—	X	"	(VV)+2(WW)+4					
A509	BENT	X	X	X	ALL	2(RR)-2					
A510	STR.	X	X	X	ALL	——	4	4			



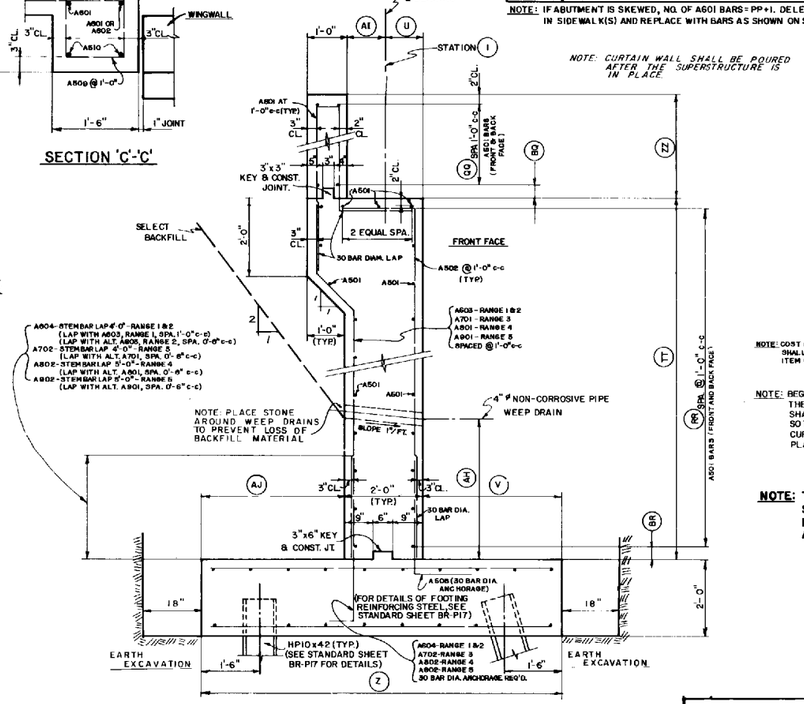
SECTION 'C'-'C'

TYPICAL WITH CURB

ABUTMENT BACK ELEVATION

(ROTATED 180° ABOUT ℄)

TYPICAL WITH SIDEWALK



TYPICAL ABUTMENT SECTION

RANGE TABLE

RANGE	STEM HEIGHT *	SELECTION ABUT. 1	SELECTION ABUT. 2
1	7'-0" TO 10'-0"		
2	OVER 10'-0" TO 13'-0"		
3	OVER 13'-0" TO 15'-0"		
4	OVER 15'-0" TO 17'-0"		
5	OVER 17'-0" THRU 18'-0"		

*STEM HEIGHT IS MEASURED FROM TOP OF FOOTING TO TOP OF CURTAIN WALL AT ℄ ROADWAY.

CONTROL STATIONING

CODE	DESCRIPTION	VALUE ABUT. 1	VALUE ABUT. 2
1	STATION AT ℄ ROADWAY AND ℄ BEARING		

STATIONING ESTABLISHED FROM:

ESTIMATE OF QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY ABUT. 1	QUANTITY ABUT. 2
601-2	CLASS B CONCRETE FOR SUBSTRUCTURE (EXCLUDING WINGWALLS & FOOTING)	C.Y.		
602-1	REINFORCING STEEL BARS (EXCLUDING WINGWALLS & FOOTING)	LB.		
212-1	STRUCTURE EXCAVATION (INCLUDING WINGWALLS)	C.Y.		
212-5	SELECT MATERIAL FOR BACKFILLING (INCLUDING WINGWALLS)	C.Y.		

NOTE: COST OF 4" ϕ NON-CORROSIVE PIPE FOR WEEP DRAIN SHALL BE INCLUDED IN THE UNIT BID PRICE FOR ITEM 601-2, "CLASS B CONCRETE FOR SUBSTRUCTURE".

NOTE: BEGINNING AT THE 1" OPEN JOINT AT EACH END OF THE ABUTMENT PROPER, THE ABUTMENT STEM SHALL BE 3'-0" THICK FOR A DISTANCE OF 1'-6", SO THAT THE BACK FACES OF THE STEM AND CURTAIN WALL SHALL BE IN THE SAME VERTICAL PLANE.

NOTE: THIS SHEET TO BE USED WITH STANDARD SHEETS BR-P13, BR-P15 BR-P16, BR-P17 AND BR-14S IF APPLICABLE.

W. VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS

REINFORCED CONCRETE ABUTMENT ON PILING

REINFORCING STEEL DETAILS

STANDARD SHEET BR-P14

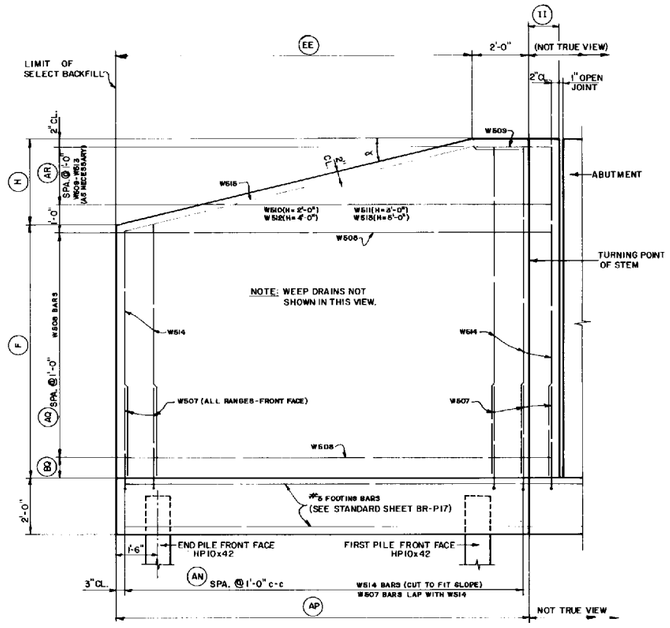
PREPARED:	8-75
REVISED:	10-75
	5-82
	9-88

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

DESIGNED BY:	
DRAWN BY:	w.g.h.
CHECKED BY:	
REVIEWED BY:	
DATE:	
SCALE:	NONE
SHEET	OF
BRIDGE NUMBER	

ABUTMENT DETAILS

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.Va.					



LEFT WINGWALL FRONT ELEVATION VIEW

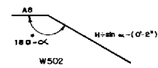
BILL OF REINFORCING STEEL

MARK	TYPE	RANGE	FORMULA NO. OF BARS/ABUT.	NO. OF BARS ABUT. 1	NO. OF BARS ABUT. 2	TOTAL LENGTH EA. BAR ABUT. 1	TOTAL LENGTH EA. BAR ABUT. 2	TOTAL LENGTH
W501	STR.	ALL	AQ+1					
W502	BENT	ALL	1					
W503	STR.	ALL	1					
W504	STR.	ALL	1					
W505	STR.	ALL	1					
W506	STR.	ALL	1					
W507	BENT	ALL	AN+2					
W508	BENT	ALL	AQ+1					
W509	BENT	ALL	1					
W510	BENT	ALL	1					
W511	BENT	ALL	1					
W512	BENT	ALL	1					
W513	BENT	ALL	1					
W514	STR	ALL	AN+2					
W515	BENT	ALL	1					
W601	STR.	1	AN+2					
W602	BENT	1	AN+2					
W701	STR.	2 & 3	AN+2					
W702	BENT	2 & 3	AQ+2					
W901	STR.	4 & 5	AN+2					
W902	BENT	4 & 5	AQ+2.					

NOTE: LENGTH OF STRAIGHT BARS:
W501= EE+AS
W503= EE÷H+AS
W504= 2(EE)÷H+AS
W505= 3(EE)÷H+AS
W506= 4(EE)÷H+AS
W514= F+H-(0'-2")
W601= F+H-(0'-2")
W701= F+H-(0'-2")
W901= F+H-(0'-2")

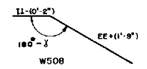
NOTE: CIRCLE BAR MARK USED IN BILL OF REINFORCING STEEL.

NOTE: IF H= 2'-0" DO NOT USE W511, W512, W513
IF H= 3'-0" DO NOT USE W512, W513
IF H= 4'-0" DO NOT USE W513
IF H= 5'-0" USE ALL BARS

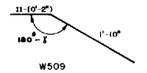


W502

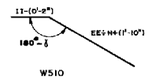
W507



W508



W509



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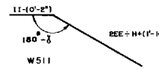
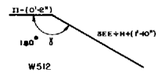


W511



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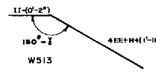
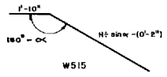


W513

W602

W702



W515

W902

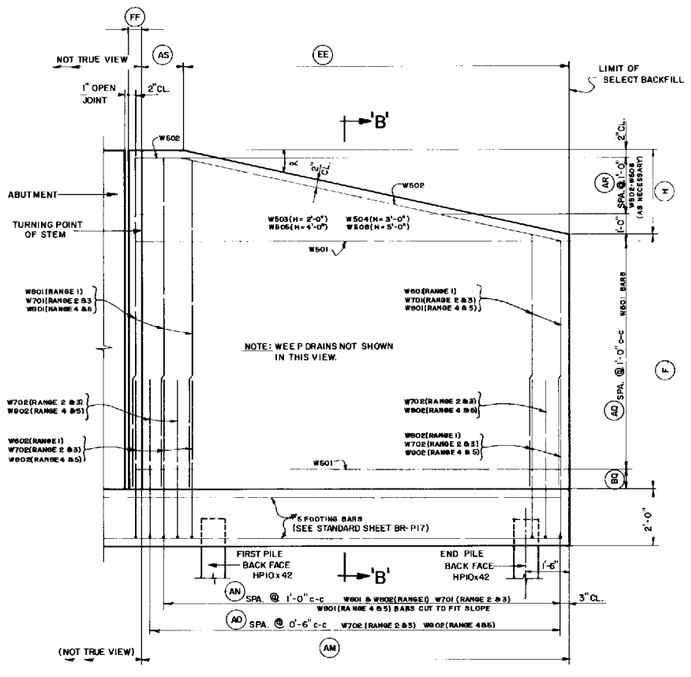
RANGE TABLE

RANGE	STEM HEIGHT *	SELECTION ABUT. 1	SELECTION ABUT. 2
1	8' TO 11'		
2	OVER 11' TO 14'		
3	OVER 14' TO 16'		
4	OVER 16' TO 18'		
5	OVER 18' TO 19'		

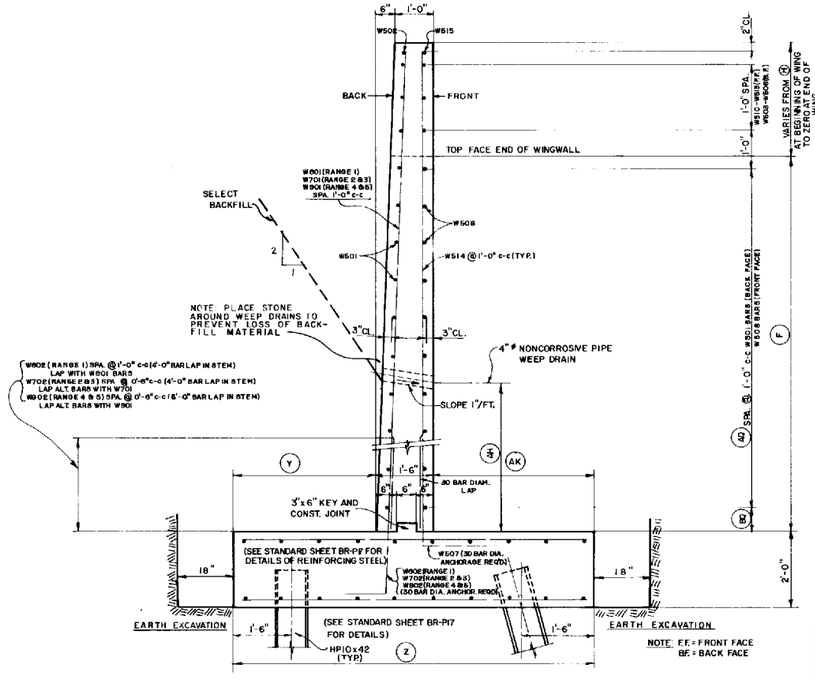
* STEM HEIGHT IS MEASURED FROM TOP OF FOOTING TO TOP OF STEM AT BEGINNING OF WINGWALL.

CONTROL DIMENSIONS

CODE	DESCRIPTION	VALUE ABUT. 1	VALUE ABUT. 2
F	HEIGHT OF WINGWALL STEM		
H	HEIGHT DIFFERENCE BETWEEN BEGINNING AND END OF WINGWALL.		
AH	DISTANCE FROM TOP OF FOOTING TO ℄ WEEP DRAINS		
Y	DISTANCE FROM BACK FACE OF WINGWALL TO BACK FACE OF FOOTING		
Z	WIDTH OF FOOTING		
EE	HORIZONTAL LENGTH OF SLOPED PORTION OF WINGWALL STEM.		
II	DISTANCE FROM BEGINNING OF WINGWALL STEM TO THE TURNING POINT OF WINGWALL STEM AT FRONT FACE		
AK	DISTANCE FROM FRONT FACE OF WINGWALL TO FRONT FACE OF FOOTING		
AM	LENGTH OF WINGWALL FROM TURNING POINT TO END OF WINGWALL AT BACK FACE		
AN	NO. OF SPA. OF W601, W602 (RANGE 1); W701 (RANGE 2 & 3); W901 (RANGE 4 & 5) BACK FACE & W507, W514 FRONT FACE.		
AQ	NO. OF SPA. OF W702 (RANGE 2 & 3), W902 (RANGE 4 & 5) BACK FACE.		
AP	LENGTH OF WINGWALL FROM TURNING POINT TO END OF WINGWALL AT FRONT FACE		
AQ	NO. OF SPA. OF W501 (BACK FACE), W508 (FRONT FACE)		
AR	NO. OF SPA. OF HORIZ. BARS IN SLOPED PORTION OF WINGWALL STEM - POSSIBLE BARS W503-W506 (BACK FACE), W509-W513 (FRONT FACE).		
AS	DISTANCE FROM BEGINNING OF SLOPED PORTION OF WINGWALL STEM TO THE TURNING POINT ON BACK FACE		
∝	ANGLE OF SLOPED PORTION OF WINGWALL		
FF	DISTANCE FROM BEGINNING OF WINGWALL STEM TO TURNING POINT BACK FACE LEFT SIDE		
BQ	DISTANCE FROM TOP OF FOOTING TO HORIZONTAL BARS IN STEM		
ɣ	ANGLE WINGWALL STEM IS OFFSET FROM ABUTMENT (SEE STANDARD SHEET BR-P13)		



LEFT WINGWALL BACK ELEVATION VIEW



SECTION 'B'-'B'

ESTIMATE OF QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY ABUT. 1	QUANTITY ABUT. 2
601-2	CLASS B CONCRETE FOR SUBSTRUCTURE (EXCLUDING FOOTING)	C.Y.		
602-1	REINFORCING STEEL BARS (EXCLUDING FOOTING)	LB.		

NOTE: THIS SHEET TO BE USED WITH STANDARD SHEET BR-P13, BR-P14, BR-P17 AND BR-14S IF APPLICABLE.

A

W. VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS
REINFORCED CONCRETE ABUTMENT ON PILING
LEFT WINGWALL DETAILS

STANDARD SHEET BR-P15

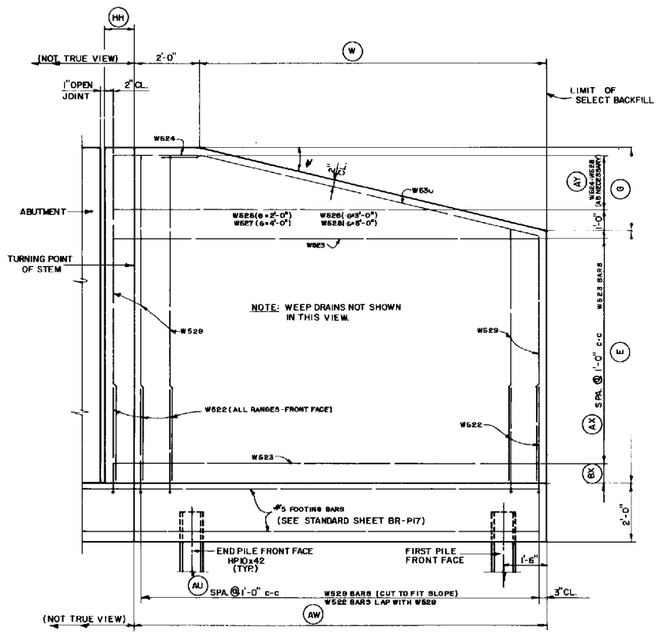
REVISED:	
8-75	
10-75	
12-75	
7-77	
5-82	
9-88	

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

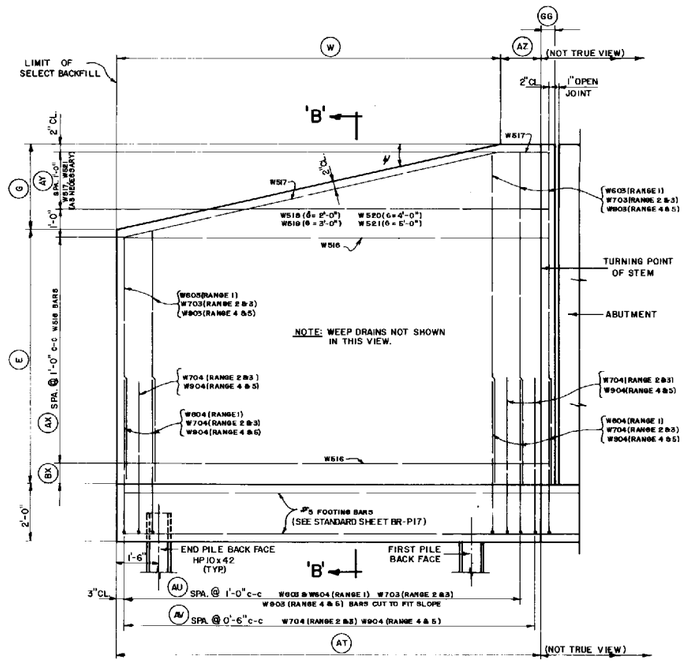
DESIGNED BY:	
DRAWN BY:	w.g.b.
CHECKED BY:	
REVIEWED BY:	
DATE:	
SCALE:	NONE
SHEET	OF
BRIDGE NUMBER	

LEFT WINGWALL DETAILS

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W. Va.					



RIGHT WINGWALL FRONT ELEVATION VIEW



RIGHT WINGWALL BACK ELEVATION VIEW

BILL OF REINFORCING STEEL

MARK	TYPE	RANGE	FORMULA NO. OF BARS/ABUT.	NO. OF BARS ABUT. 1	NO. OF BARS ABUT. 2	TOTAL LENGTH EA. BAR ABUT. 1	TOTAL LENGTH EA. BAR ABUT. 2	TOTAL LENGTH
W516	STR.	ALL	AX+1					
W517	BENT	ALL	1					
W518	STR.	ALL	1					
W519	STR.	ALL	1					
W520	STR.	ALL	1					
W521	STR.	ALL	1					
W522	BENT	ALL	AU+2					
W523	BENT	ALL	AX+1					
W524	BENT	ALL	1					
W525	BENT	ALL	1					
W526	BENT	ALL	1					
W527	BENT	ALL	1					
W528	BENT	ALL	1					
W529	STR.	ALL	AU+2					
W530	BENT	ALL	1					
W603	STR.	1	AU+2					
W604	BENT	1	AU+2					
W703	STR.	2 & 3	AU+2					
W704	BENT	2 & 3	AV+2					
W903	STR.	4 & 5	AU+2					
W904	BENT	4 & 5	AV+2					

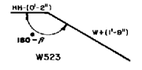
NOTE: LENGTH OF STRAIGHT BARS:
W516 = W + AZ
W518 = W ÷ G + AZ
W519 = 2 W ÷ G + AZ
W520 = 3 W ÷ G + AZ
W521 = 4 W ÷ G + AZ
W529 = E + G - (0'-2")
W603 = E + G - (0'-2")
W703 = E + G - (0'-2")
W903 = E + G - (0'-2")

NOTE: CIRCLE BAR MARK USED ON BILL OF REINFORCING STEEL.

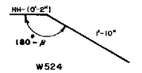
NOTE: IF G = 2'-0" DO NOT USE W526, W527, W528
IF G = 3'-0" DO NOT USE W527, W528
IF G = 4'-0" DO NOT USE W528
IF G = 5'-0" USE ALL BARS

W517

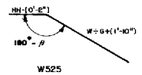
W522



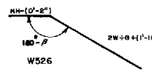
W523



W524



W525



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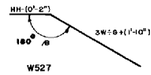
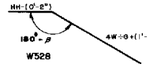


W527



W528

W604

W704

W904

W530

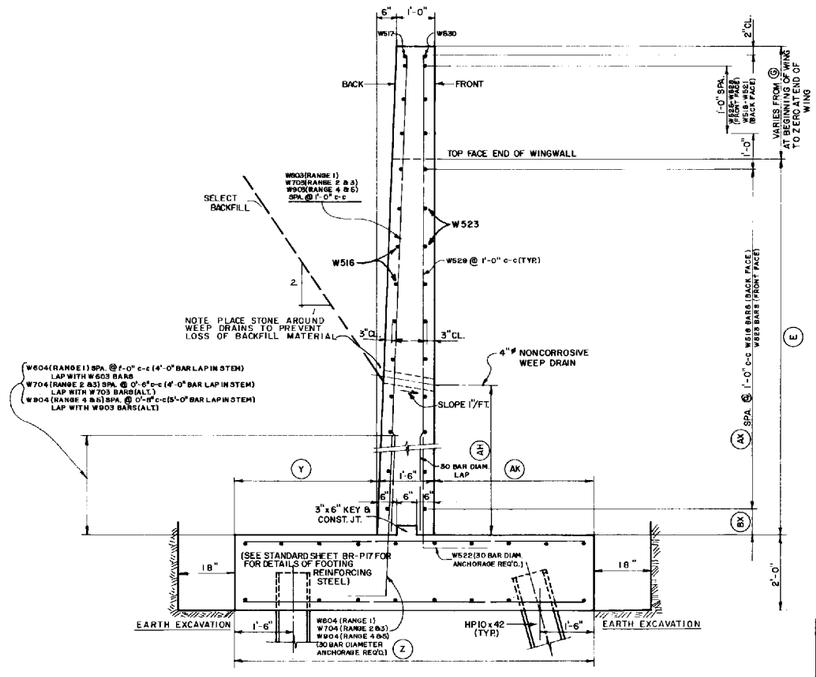
RANGE TABLE

RANGE	STEM HEIGHT*	SELECTION ABUT. 1	SELECTION ABUT. 2
1	8' TO 11'		
2	OVER 11' TO 14'		
3	OVER 14' TO 16'		
4	OVER 16' TO 18'		
5	OVER 18' TO 19'		

* NOTE: STEM HEIGHT IS MEASURED FROM TOP OF FOOTING TO TOP OF STEM AT BEGINNING OF WINGWALL.

CONTROL DIMENSIONS

CODE	DESCRIPTION	VALUE ABUT. 1	VALUE ABUT. 2
E	HEIGHT OF WINGWALL STEM		
G	HEIGHT DIFFERENCE BETWEEN BEGINNING AND END OF WINGWALL.		
AH	DISTANCE FROM TOP OF FOOTING TO ℄ WEEP DRAINS		
Y	DISTANCE FROM BACK FACE OF WINGWALL TO BACK FACE OF FOOTING		
Z	WIDTH OF FOOTING		
W	HORIZONTAL LENGTH OF SLOPED PORTION OF WINGWALL STEM		
HH	DISTANCE FROM BEGINNING OF WINGWALL STEM TO THE TURNING POINT OF WINGWALL STEM AT FRONT FACE		
AK	DISTANCE FROM FRONT FACE OF WINGWALL TO FRONT FACE OF FOOTING		
AT	LENGTH OF WINGWALL FROM TURNING POINT TO END OF WINGWALL AT BACK FACE		
AU	NO. OF SPA. OF W603, W604 (RANGE 1); W703 (RANGE 2 & 3); W903 (RANGE 4 & 5) BACK FACE & W522, W529 FRONT FACE		
AV	NO. OF SPA. OF W704 (RANGE 2 & 3), W904 (RANGE 4 & 5) BACK FACE		
AW	LENGTH OF WINGWALL FROM TURNING POINT TO END OF WINGWALL AT FRONT FACE		
AX	NO. OF SPA. OF W516 (BACK FACE), W523 (FRONT FACE)		
AY	NO. OF SPA. OF HORIZ. BARS IN SLOPED PORTION OF WINGWALL STEM - POSSIBLE BARS W517-W521 (BACK FACE), W524-W528 (FRONT FACE)		
AZ	DISTANCE FROM BEGINNING OF SLOPED PORTION OF WINGWALL STEM TO THE TURNING POINT ON BACK FACE.		
ψ	ANGLE OF SLOPED PORTION OF WINGWALL		
GG	DISTANCE FROM BEGINNING OF WINGWALL STEM TO TURNING POINT BACK FACE RIGHT SIDE		
BX	DISTANCE FROM TOP OF FOOTING TO HORIZONTAL BARS IN STEM		
β	ANGLE WINGWALL STEM IS OFFSET FROM ABUTMENT (SEE STANDARD SHEET BR-P13)		



SECTION 'B'-'B'

ESTIMATE OF QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY ABUT. 1	QUANTITY ABUT. 2
601-2	CLASS B CONCRETE FOR SUBSTRUCTURE (EXCLUDING FOOTING)	C.Y.		
602-1	REINFORCING STEEL BARS (EXCLUDING FOOTING)	LB.		

NOTE: THIS SHEET TO BE USED WITH STANDARD SHEETS BR-P13, BR-P14, BR-P17, AND BR-I4S IF APPLICABLE.

W. VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS

REINFORCED CONCRETE ABUTMENT ON PILING

RIGHT WINGWALL DETAILS

STANDARD SHEET BR-P16

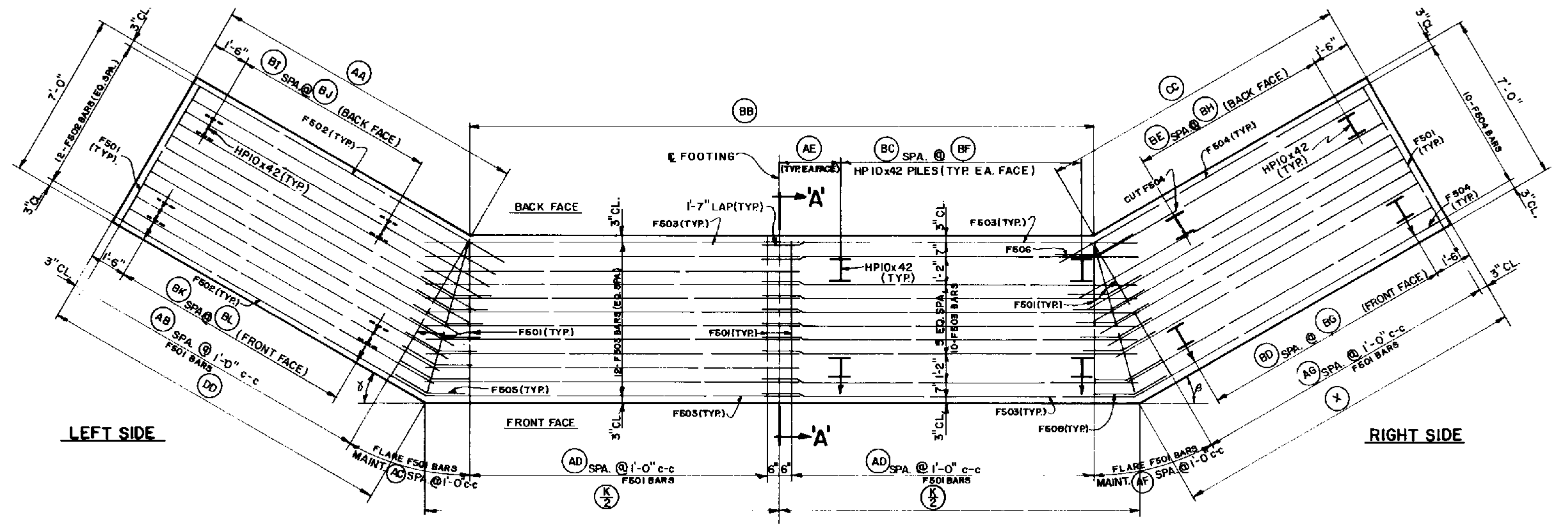
REVISED:	8-75
	10-75
	12-75
	7-77
	5-82
	9-88

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

DESIGNED BY:	
DRAWN BY:	W.F.B.
CHECKED BY:	
REVIEWED BY:	
DATE:	
SCALE:	NONE
SHEET	OF
BRIDGE NUMBER	

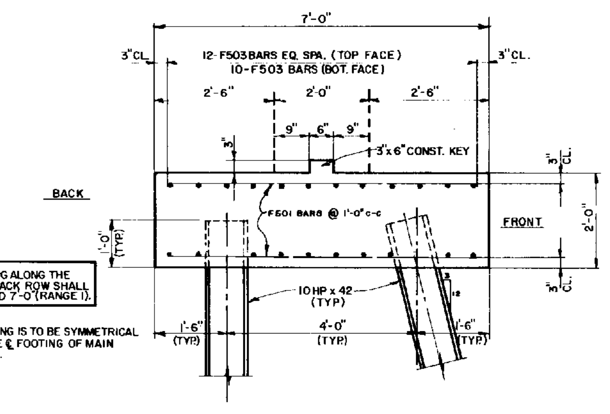
RIGHT WINGWALL DETAILS

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W. VA.					



FOOTING PLAN VIEW

(RANGE 1)



SECTION 'A'-'A'

(RANGE 1)

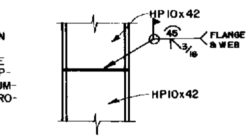
NOTE: PILE SPACING ALONG THE FRONT OR BACK ROW SHALL NOT EXCEED 7'-0" (RANGE 1).

NOTE: PILE SPACING IS TO BE SYMMETRICAL ABOUT THE ℄ FOOTING OF MAIN ABUTMENT.

NOTE: CUT F501 AND F504 BARS AS NECESSARY TO FIT WITH PILING (BOTTOM FACE).

STEEL BEARING PILES

ALL HP10x42 PILING SHALL HAVE A DESIGN LOAD OF 55.8 TONS AND SHALL BE DRIVEN TO REFUSAL INTO THE FOUNDATION STRATA AS INDICATED BY THE ESTIMATED PILE TIP ELEVATIONS. REFUSAL IS DEFINED AS THE EQUIVALENT OF 20 BLOWS FOR ONE INCH OR LESS OF PENETRATION WITH A POWER HAMMER DEVELOPING A MINIMUM CAPACITY OF 15,000 FOOT-POUNDS PER BLOW. IF A LARGER HAMMER IS USED, THE NUMBER OF BLOWS IN THE LAST INCH OF PENETRATION MAY BE REDUCED IN DIRECT PROPORTION TO THE ENERGY RATING OF THE HAMMER, BUT TO NO LESS THAN 12.



TYPICAL PILE SPLICING DETAIL

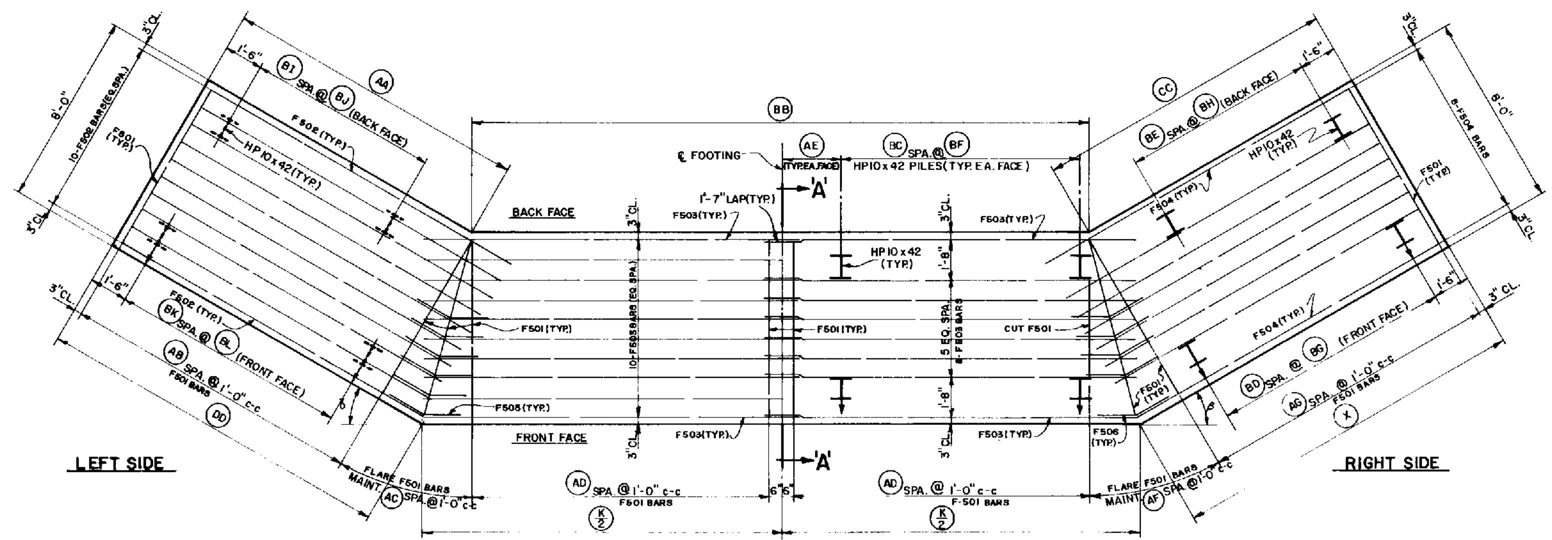
RANGE TABLE

RANGE	STEM HEIGHT*	SELECTION	
		ABUT. 1	ABUT. 2
1	7'-0" TO 10'-0"		
2	OVER 10' TO 13'		
3	OVER 13' TO 15'		

*NOTE: STEM HEIGHT IS MEASURED FROM TOP OF FOOTING TO TOP OF CURTAIN WALL AT ℄ ROADWAY AND SURVEY.

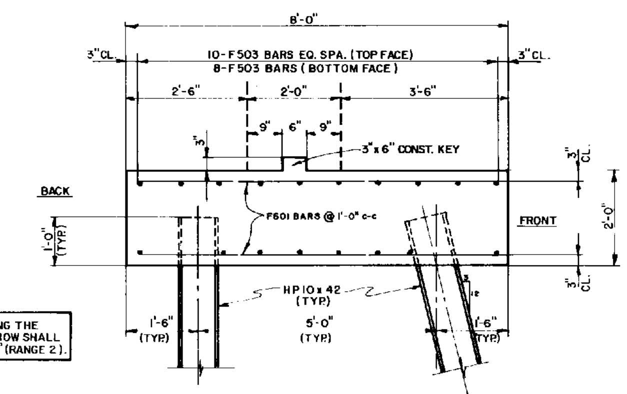
CONTROL DIMENSIONS

CODE	DESCRIPTION	VALUE	
		ABUT. 1	ABUT. 2
BF	SPACING OF H-PILES FOR MAIN ABUTMENT		
BG	SPACING OF H-PILES FOR RIGHT WINGWALL FRONT FACE		
BH	SPACING OF H-PILES FOR RIGHT WINGWALL BACK FACE		
BI	NO. SPA. OF H-PILES FOR LEFT WINGWALL BACK FACE		
BJ	SPACING OF H-PILES FOR LEFT WINGWALL BACK FACE		
BK	NO. SPA. OF H-PILES FOR LEFT WINGWALL FRONT FACE		
BL	SPACING OF H-PILES FOR LEFT WINGWALL FRONT FACE		
AA	LENGTH OF WINGWALL FOOTING BACK FACE LEFT SIDE		
AB	NO. SPA. F501 BARS LEFT WINGWALL FOOTING		
AC	NO. SPA. F501 BARS LEFT FOOTING CORNER		
AD	NO. SPA. F501 BARS MAIN ABUTMENT FOOTING		
AE	DIMENSION FROM ℄ FOOTING TO FIRST ADJACENT PILE		
AF	NO. SPA. F501 BARS RIGHT OF FOOTING CORNER		
AG	NO. SPA. F501 BARS RIGHT WINGWALL FOOTING		
BB	LENGTH OF ABUTMENT BACK FACE		
BC	NO. SPA. H-PILES FOR MAIN ABUTMENT		
BD	NO. SPA. H-PILES FOR RIGHT WINGWALL FRONT FACE		
BE	NO. SPA. H-PILES FOR RIGHT WINGWALL BACK FACE		
CC	LENGTH OF WINGWALL FOOTING BACK FACE RIGHT SIDE		
DD	LENGTH OF WINGWALL FOOTING FRONT FACE LEFT SIDE		
X	LENGTH OF WINGWALL FOOTING FRONT FACE RIGHT SIDE		
K/2	DIMENSION FROM CORNER TO ℄ OF ABUTMENT FOOTING		
β	ANGLE RIGHT WINGWALL FORMS WITH ABUTMENT		
γ	ANGLE LEFT WINGWALL FORMS WITH ABUTMENT		



FOOTING PLAN VIEW

(RANGE 2)



SECTION 'A'-'A'

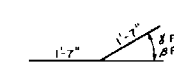
(RANGE 2)

NOTE: PILE SPACING ALONG THE FRONT OR BACK ROW SHALL NOT EXCEED 6'-0" (RANGE 2).

NOTE: PILE SPACING IS TO BE SYMMETRICAL ABOUT THE ℄ FOOTING OF MAIN ABUTMENT.

NOTE: CUT F501 AND F504 BARS AS NECESSARY TO FIT WITH PILING (BOTTOM FACE).

NOTE: THIS SHEET TO BE USED WITH STANDARD SHEETS BR-P13, BR-P14, BR-P15, BR-P16 AND BR-14S IF APPLICABLE.

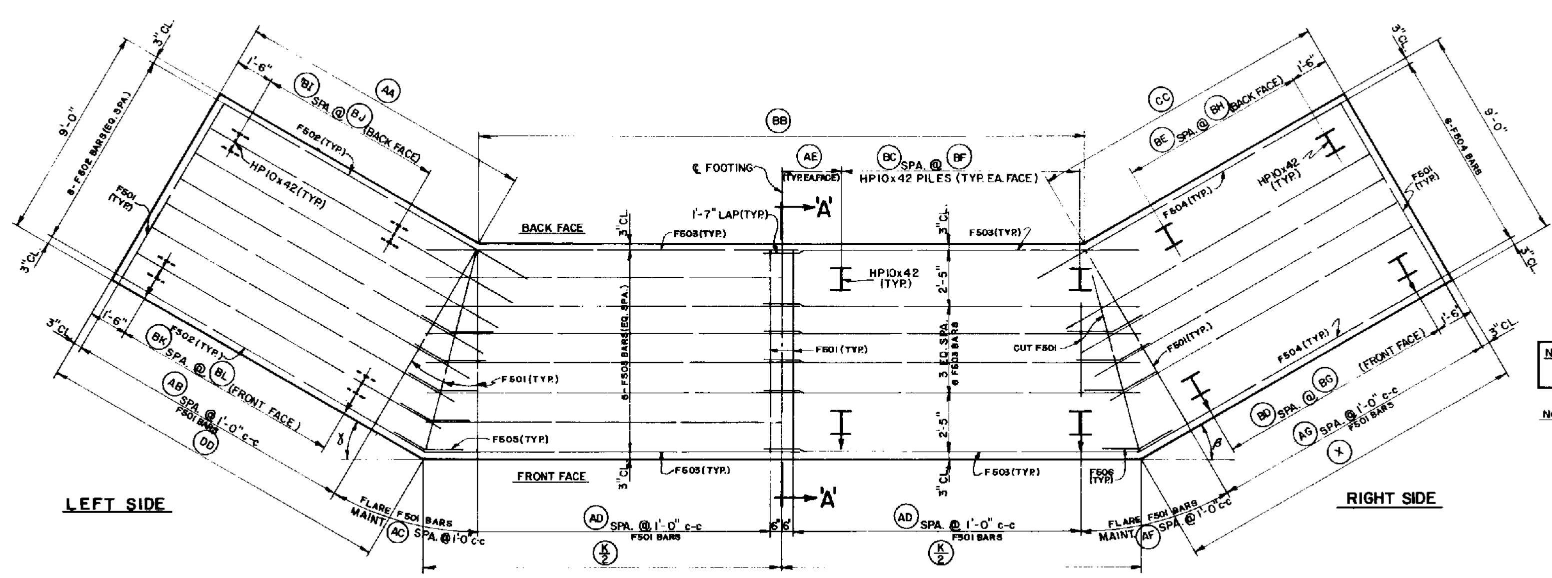


F505 OR F506

BILL OF REINFORCING STEEL

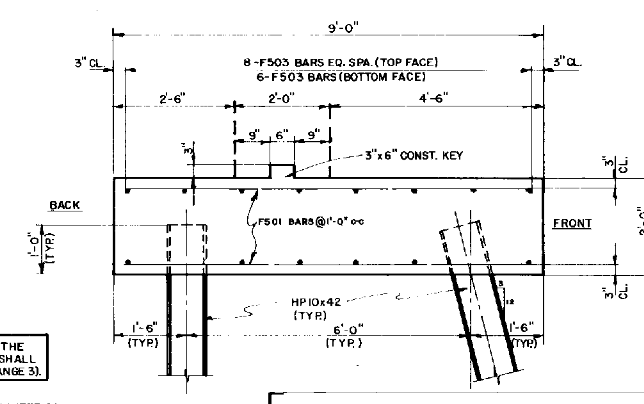
MARK	BAR TYPE	RANGE	FORMULA NO. BARS/ABUT.	NO. BARS		LENGTH OF EACH BAR	TOTAL LENGTH
				ABUT. 1	ABUT. 2		
F501 F501 F501	STR. " "	1 2 3	2(2AD+AB+AC+AF+AG+2)			6'-6" 7'-6" 8'-6"	
F502 F502 F502	STR. " "	1 2 3	22 18 14			AA + (1'-4")	
F503 F503 F503	STR. " "	1 2 3	44 36 28			K/2 + (0'-10")	
F504 F504 F504	STR. " "	1 2 3	22 18 14			X - (0'-4")	
F505 F505 F505	BENT " "	1 2 3	16 11 9			3'-2"	
F506 F506 F506	BENT " "	1 2 3	16 11 9			3'-2"	

NOTE: CIRCLE BAR MARK USED IN BILL OF REINFORCING STEEL.



FOOTING PLAN VIEW

(RANGE 3)



SECTION "A-A"

(RANGE 3)

NOTE: PILE SPACING ALONG THE FRONT OR BACK ROW SHALL NOT EXCEED 5'-0" (RANGE 3).

NOTE: PILE SPACING IS TO BE SYMMETRICAL ABOUT THE ℄ FOOTING OF MAIN ABUTMENT.

NOTE: CUT F501 AND F504 BARS AS NECESSARY TO FIT WITH PILING (BOTTOM FACE).

ESTIMATE OF QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY
601-2	CLASS B CONCRETE FOR SUBSTRUCTURE	C.Y.	
602-1	REINFORCING STEEL BARS	LB.	
616-4	STEEL BEARING PILES, DRIVEN	L.F.	

W. VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS
REINFORCED CONCRETE ABUTMENT
ABUTMENT FOOTING ON PILING
(RANGE 1, 2 & 3)

STANDARD SHEET BR-P17

PREPARED:	8-75
REVISED:	10-75
	5-82
	9-88
	3-91

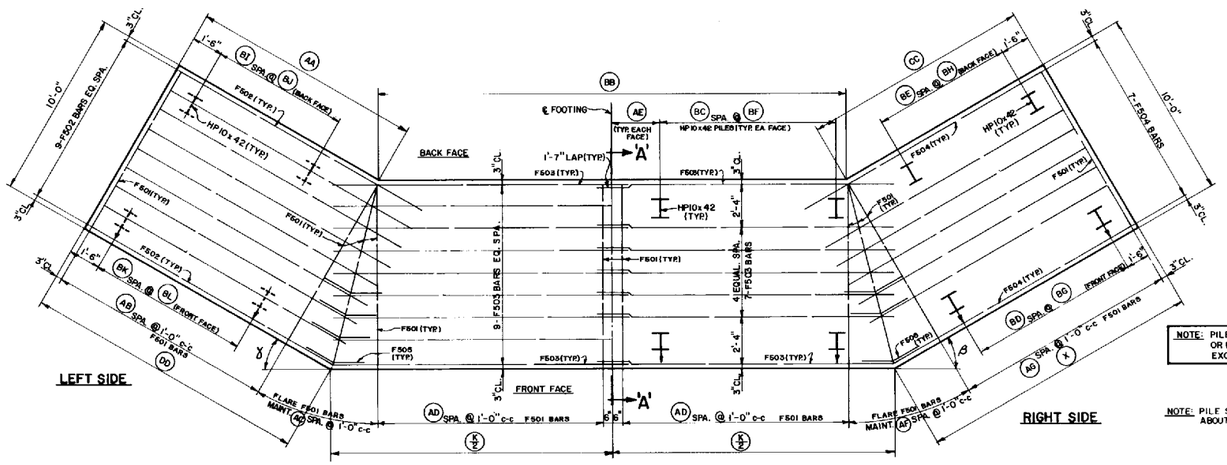
THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

DESIGNED BY:
DRAWN BY: w.g.h.
CHECKED BY:
REVIEWED BY:
DATE:
SCALE: NONE
SHEET OF

ABUTMENT FOOTING ON PILING
(RANGE 1, 2 & 3)

BRIDGE NUMBER

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W. VA.					

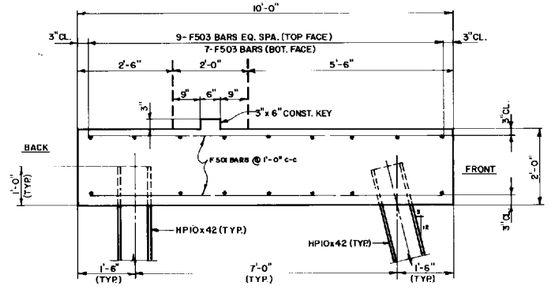


HALF PLAN (TOP)

FOOTING PLAN VIEW

(RANGE 4)

HALF PLAN (BOTTOM)



SECTION 'A'-'A'

(RANGE 4)

NOTE: PILE SPACING ALONG THE FRONT OR BACK ROW SHALL NOT EXCEED 5'-0" (RANGE 4).

NOTE: PILE SPACING IS TO BE SYMMETRICAL ABOUT THE ℄ FOOTING OF MAIN ABUTMENT.

NOTE: CUT F501 AND F504 BARS AS NECESSARY TO FIT WITH PILING. (BOTTOM FACE)

CONTROL DIMENSIONS

CODE	DESCRIPTION	VALUE ABUT. 1	VALUE ABUT. 2
BF	SPACING OF H-PILES FOR MAIN ABUTMENT		
BG	SPACING OF H-PILES FOR RIGHT WINGWALL FRONT FACE		
BH	SPACING OF H-PILES FOR RIGHT WINGWALL BACK FACE		
BI	NO. SPA. OF H-PILES FOR LEFT WINGWALL BACK FACE		
BJ	SPACING OF H-PILES FOR LEFT WINGWALL BACK FACE		
BK	NO. SPA. OF H-PILES FOR LEFT WINGWALL FRONT FACE		
BL	SPACING OF H-PILES FOR LEFT WINGWALL FRONT FACE		
AA	LENGTH OF WINGWALL FOOTING BACK FACE LEFT SIDE		
AB	NO. SPA. F501 BARS LEFT WINGWALL FOOTING		
AC	NO. SPA. F501 BARS LEFT FOOTING CORNER		
AD	NO. SPA. F501 BARS MAIN ABUTMENT FOOTING		
AE	DIMENSION FROM ℄ FOOTING TO FIRST ADJACENT PILE		
AF	NO. SPA. F501 BARS RIGHT FOOTING CORNER		
AG	NO. SPA. F501 BARS RIGHT WINGWALL FOOTING		
BB	LENGTH OF ABUTMENT BACK FACE		
BC	NO. SPA. H-PILES FOR MAIN ABUTMENT		
BD	NO. SPA. H-PILES FOR RIGHT WINGWALL FRONT FACE		
BE	NO. SPA. H-PILES FOR RIGHT WINGWALL BACK FACE		
CC	LENGTH OF WINGWALL FOOTING BACK FACE RIGHT SIDE		
DD	LENGTH OF WINGWALL FOOTING FRONT FACE LEFT SIDE		
X	LENGTH OF WINGWALL FOOTING FRONT FACE RIGHT SIDE		
K/2	DIMENSION FROM CORNER TO ℄ OF ABUTMENT FOOTING		
β	ANGLE RIGHT WINGWALL FORMS WITH ABUTMENT		
γ	ANGLE LEFT WINGWALL FORMS WITH ABUTMENT		

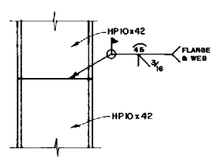
RANGE TABLE

RANGE	STEM HEIGHT *	SELECTION ABUT. 1	SELECTION ABUT. 2
4	OVER 15' TO 17'		
5	OVER 17' TO 18'		

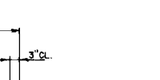
*NOTE: STEM HEIGHT IS MEASURED FROM TOP OF FOOTING TO TOP OF CURTAIN WALL AT ℄ ROADWAY AND SURVEY.

STEEL BEARING PILES

ALL HP10x42 PILING SHALL HAVE A DESIGN LOAD OF 55.8 TONS AND SHALL BE DRIVEN TO REFUSAL INTO THE FOUNDATION STRATA AS INDICATED BY THE ESTIMATED PILE TIP ELEVATIONS. REFUSAL IS DEFINED AS THE EQUIVALENT OF 20 BLOWS FOR ONE INCH OR LESS OF PENETRATION WITH A POWER HAMMER DEVELOPING A MINIMUM CAPACITY OF 15,000 FT-POUNDS PER BLOW. IF A LARGER HAMMER IS USED, THE NUMBER OF BLOWS IN LAST INCH OF PENETRATION MAY BE REDUCED IN DIRECT PROPORTION TO THE ENERGY RATING OF THE HAMMER, BUT TO NO LESS THAN 12.



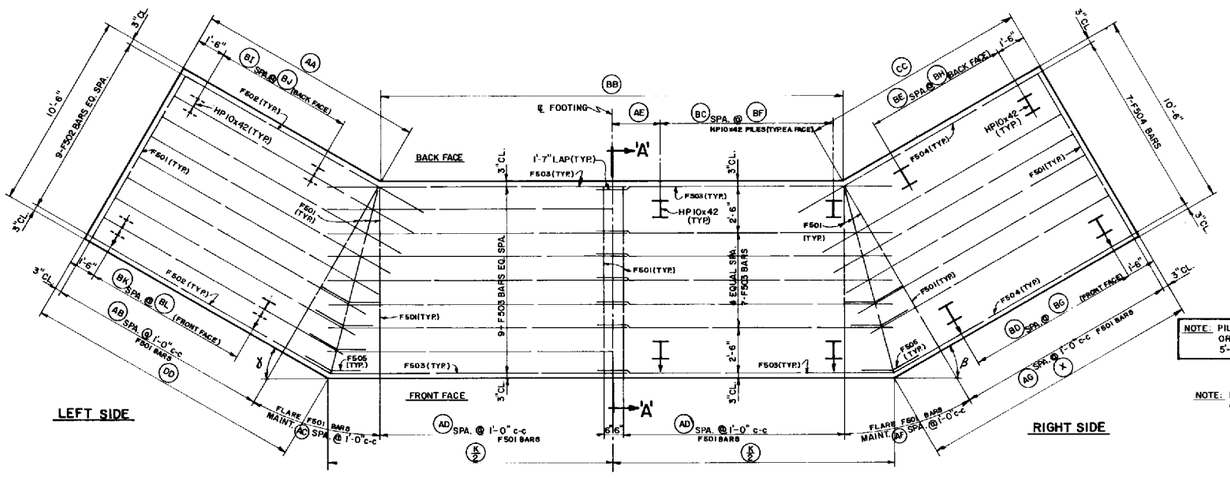
TYPICAL PILE SPLICING DETAIL



BILL OF REINFORCING STEEL

MARK	BAR TYPE	RANGE	FORMULA NO. BARS / ABUT.	NO. BARS ABUT. 1	NO. BARS ABUT. 2	LENGTH OF BAR (EACH)	TOTAL LENGTH
F501	STR.	4	2(2AD+AB+AF+AD +AG+2)			9'-6"	
F501	"	5				10'-0"	
F502	STR.	4	16			AA+(1'-4")	
F502	"	5	16			"	
F503	STR.	4	32			K/2+(0'-10")	
F503	"	5	32			"	
F504	STR.	4	16			X-(0'-4")	
F504	"	5	16			"	
F505	BENT	4	7			3'-2"	
F505	"	5	7			"	
F506	BENT	4	7			3'-2"	
F506	"	5	7			"	

NOTE: CIRCLE BAR MARK USED IN BILL OF REINFORCING STEEL.

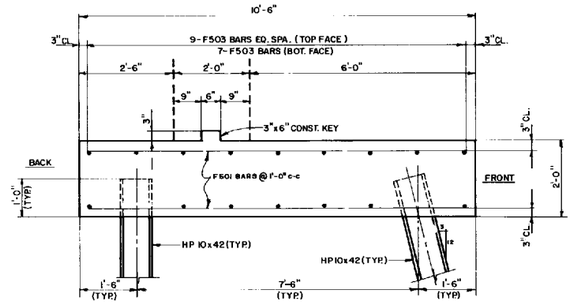


HALF PLAN (TOP)

FOOTING PLAN VIEW

(RANGE 5)

HALF PLAN (BOTTOM)



SECTION 'A'-'A'

(RANGE 5)

NOTE: PILE SPACING ALONG THE FRONT OR BACK ROW SHALL NOT EXCEED 5'-0" (RANGE 5).

NOTE: PILE SPACING IS TO BE SYMMETRICAL ABOUT THE ℄ FOOTING OF MAIN ABUTMENT.

NOTE: CUT F501 AND F504 BARS AS NECESSARY TO FIT WITH PILING. (BOTTOM FACE).

ESTIMATE OF QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY ABUT. 1	QUANTITY ABUT. 2
601-2	CLASS B CONCRETE FOR SUBSTRUCTURE	C.Y.		
602-1	REINFORCING STEEL BARS	LB.		
616-4	STEEL BEARING PILES, DRIVEN	L.F.		

NOTE: THIS SHEET TO BE USED WITH STANDARD SHEETS BR-P13, BR-P14, BR-P15, BR-P16 AND BR-14SIF APPLICABLE.

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

W. VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS

REINFORCED CONCRETE ABUTMENT

ABUTMENT FOOTING ON PILING (RANGE 4 & 5)

STANDARD SHEET BR-P17

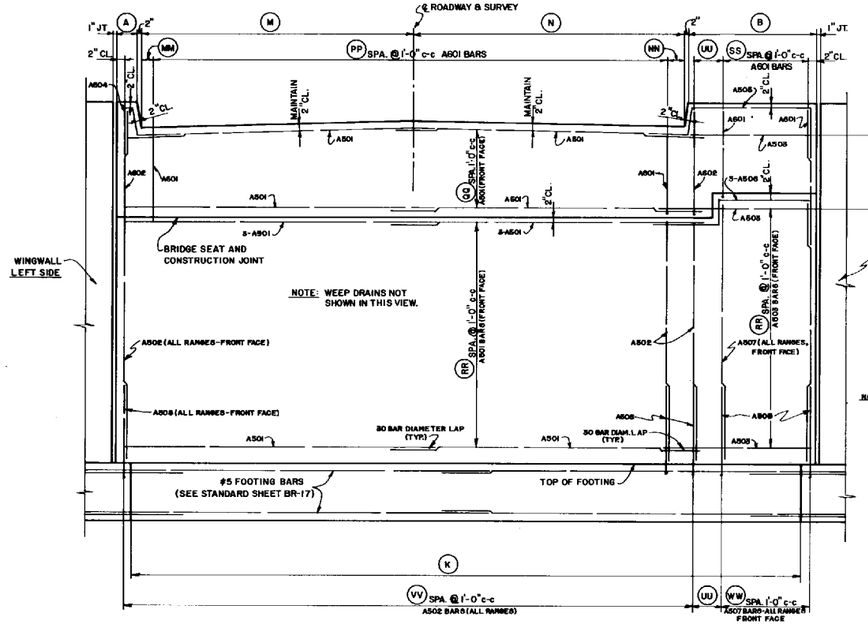
PREPARED:	8-75
REVISED:	10-75
	5-82
	9-88
	3-91

DESIGNED BY:	
DRAWN BY:	wph.
CHECKED BY:	
REVIEWED BY:	
DATE:	
SCALE:	NONE
SHEET	OF
BRIDGE NUMBER	

ABUTMENT FOOTING ON PILING (RANGE 4 & 5)

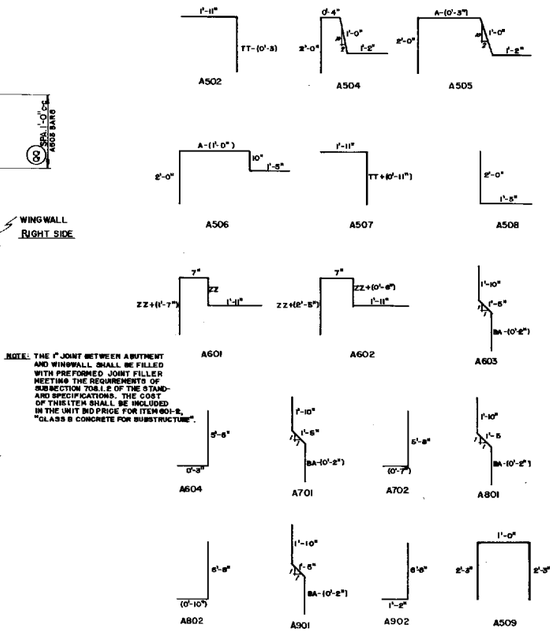
NOTE: IN BILL OF REINFORCING STEEL, SIDEWALK NUMBER CATEGORIES MARKED BY (X) INDICATES BARS REQUIRED.
NOTE: CIRCLE APPROPRIATE SIDEWALK NUMBER.

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.VA.					



TYPICAL WITH CURB — TYPICAL WITH SIDEWALK

ABUTMENT FRONT ELEVATION
(NORMAL CROSSING)



NOTE: THE 1" JOINT BETWEEN ABUTMENT AND WINGWALL SHALL BE FILLED WITH PREFORMED JOINT FILLER MEETING THE REQUIREMENTS OF SUBSECTION 711.1 OF THE STANDARD SPECIFICATIONS. THE COST OF THIS ITEM SHALL BE INCLUDED IN THE UNIT BID PRICE FOR ITEM 601-2, "CLASS B CONCRETE FOR SUBSTRUCTURE".

CONTROL DIMENSIONS

CODE	DESCRIPTION	VALUE ABUT. 1	VALUE ABUT. 2
A	WIDTH OF CURB OR SIDEWALK TOP FACE LEFT SIDE		
B	WIDTH OF CURB OR SIDEWALK TOP FACE RIGHT SIDE		
K	LENGTH OF ABUTMENT FOOTING FRONT SIDE		
M	DISTANCE FROM CURB LINE TO ℄ ROADWAY LEFT SIDE		
N	DISTANCE FROM CURB LINE TO ℄ ROADWAY RIGHT SIDE		
V	DIST. FROM FR. FACE ABUT. STEM TO FR. FACE FOOTING		
Z	WIDTH OF FOOTING - ABUTMENT AND WINGWALL		
AH	DISTANCE FROM TOP OF FOOTING TO ℄ WEEP DRAINS		
AI	DISTANCE FRONT FACE OF CURTAIN WALL TO ℄ BEARING		
AJ	DIST. FROM BK. FACE ABUT. STEM TO BK. FACE FOOTING		
BA	DISTANCE FROM TOP OF ABUTMENT FOOTING TO EDGE OF ABUT. STEM BEVEL (BACK FACE)		
MM	HORIZONTAL DISTANCE FROM CURB LINE TO ℄ FIRST A601 BAR ON LEFT ROADWAY SIDE		
NN	HORIZONTAL DISTANCE FROM CURB LINE TO ℄ FIRST A601 BAR ON RIGHT ROADWAY SIDE		
PP	NO. OF SPA. OF A601 BARS IN RDWY. PORTION OF CURT. WALL		
QQ	NUMBER OF SPACES A501 & A503 BARS IN CURTAIN WALL		
RR	NO. SPACES A501 & A503 BARS IN ABUTMENT SHAFT		
SS	NO. SPACES A601 BARS IN SIDEWALK SECTION		
TT	HEIGHT OF ABUTMENT SHAFT		
UU	SPACING BETWEEN A601 & A602 BARS IN SIDEWALK SECTION		
VV	NO. SPA. OF A502, A503, A701, A801, & A901 BARS IN ABUTMENT SHAFT (EXCLUDING SIDEWALK SECTION)		
WW	NO. SPA. OF A604, A702, A802 & A902 BARS (SIDEWALK SECTION)		
XX	NO. SPA. OF A502, A503, A701, A801, A901 BARS (" ")		
YY	NO. SPA. OF A604, A702, A802, & A902 BARS IN ABUTMENT SHAFT (EXCLUDING SIDEWALK SECTION)		
ZZ	HEIGHT OF CURTAIN WALL AT ℄ ROADWAY		
U	DIST. FROM ℄ BRG. TO FRONT FACE OF BRIDGE SEAT		
BB	LENGTH OF ABUTMENT FOOTING BACK FACE		
BR	DISTANCE FROM TOP OF FOOTING TO HORIZONTAL BARS IN SHAFT.		
BQ	DISTANCE FROM BRIDGE SEAT TO HORIZONTAL BARS IN CURTAIN WALL AT ℄ ROADWAY		

NOTE: IF ABUTMENT IS SKEWED, NO. OF A601 BARS = PP+1. DELETE A504, A505 AND A601 BARS IN SIDEWALK(S) AND REPLACE WITH BARS AS SHOWN ON STANDARD SHEET BR-14S.

NOTE: LENGTH OF BAR A501 = $\frac{M+N+2A+4"}{2}$ +10"; LENGTH OF BAR A503 = B+10"; LENGTH OF BAR A510 = TT-3"
NOTE: CIRCLE BAR MARK USED IN BILL OF REINFORCING STEEL.

BILL OF REINFORCING STEEL

MARK	BAR TYPE	SIDEWALK 0	SIDEWALK 1	SIDEWALK 2	RANGE	FORMULA NO. BARS/ABUT.	NO. OF BARS ABUT. 1	NO. OF BARS ABUT. 2	TOTAL LENGTH OF EACH BAR ABUT.1	TOTAL LENGTH OF EACH BAR ABUT.2	TOTAL LENGTH
A501	STR.	X	X	X	ALL	4(QQ)+4(RR)+12					
A502	BENT	X	X	X	ALL	(VV)+2					
A503	STR.	–	X	–	ALL	2(QQ)+2					
A503	"	–	–	X	"	4(QQ)+4					
A504	BENT	X	–	–	ALL	——	4	4	4'-6"	4'-8"	
A504	"	–	X	–	"	——	2	2			
A505	BENT	–	X	–	ALL	——	2	2			
A505	"	–	–	X	"	——	4	4			
A506	BENT	–	X	–	ALL	——	3	3			
A506	"	–	–	X	"	——	6	6			
A507	BENT	–	X	–	ALL	(WW)+1					
A507	"	–	–	X	"	2(WW)+2					
A601	BENT	X	–	–	ALL	(PP+1					
A601	"	–	X	–	"	(PP)+(SS)+2					
A601	"	–	–	X	"	(PP)+2(SS)+3					
A602	BENT	X	X	X	ALL	——	2	2			
A603	BENT	X	–	–	1&2	(VV)+2					*
A603	"	–	X	–	"	(VV)+(XX)+2					
A603	"	–	–	X	"	(VV)+2(XX)+3					
A604	BENT	X	–	–	2	(YY)+(VV)+4					
A604	"	–	X	–	"	(YY)+(WW)+(VV)+(XX)+6					
A604	"	–	–	X	"	(YY)+(WW)2+8+(VV)+2(XX)					
A701	BENT	X	–	–	3	(VV)+2					
A701	"	–	X	–	"	(VV)+(XX)+2					
A701	"	–	–	X	"	(VV)+2(XX)+3					
A702	BENT	X	–	–	3	(YY)+4+(VV)					
A702	"	–	X	–	"	(YY)+(WW)+6+(VV)+(XX)					
A702	"	–	–	X	"	(YY)+(WW)2+8+(VV)+2(XX)					
A801	BENT	X	–	–	4	(VV)+2					
A801	"	–	X	–	"	(VV)+(XX)+2					
A801	"	–	–	X	"	(VV)+2(XX)+3					
A802	BENT	X	–	–	4	(YY)+4+(VV)					
A802	"	–	X	–	"	(YY)+(WW)+6+(VV)+(XX)					
A802	"	–	–	X	"	(YY)+(WW)2+8+(VV)+2(XX)					
A901	BENT	X	–	–	5	(VV)+2					
A901	"	–	X	–	"	(VV)+(XX)+2					
A901	"	–	–	X	"	(VV)+2(XX)+3					
A902	BENT	X	–	–	5	(YY)+4+(VV)					
A902	"	–	X	–	"	(YY)+(WW)+6+(VV)+(XX)					
A902	"	–	–	X	"	(YY)+(WW)2+8+(VV)+2(XX)					
A604	BENT	X	–	–	1	(VV)+2					
A604	"	–	X	–	"	(VV)+(XX)+2					
A604	"	–	–	X	"	(VV)+2(XX)+3					
A508	BENT	X	–	–	ALL	(VV)+2					
A508	"	–	X	–	"	(VV)+(WW)+3			8'-8"	9'-3"	
A508	"	–	–	X	"	(VV)+2(WW)+4					
A509	BENT	X	X	X	ALL	2(RR)-2			9'-6"	9'-6"	
A510	STR.	X	X	X	ALL	——	4	4			

RANGE TABLE

RANGE	STEM HEIGHT *	SELECTION ABUT. 1	SELECTION ABUT. 2
1	7'-0" TO 10'-0"		
2	OVER 10'-0" TO 13'-0"		
3	OVER 13'-0" TO 15'-0"		
4	OVER 15'-0" TO 17'-0"		
5	OVER 17'-0" THRU 18'-0"		

*STEM HEIGHT IS MEASURED FROM TOP OF FOOTING TO TOP OF CURTAIN WALL AT ℄ ROADWAY

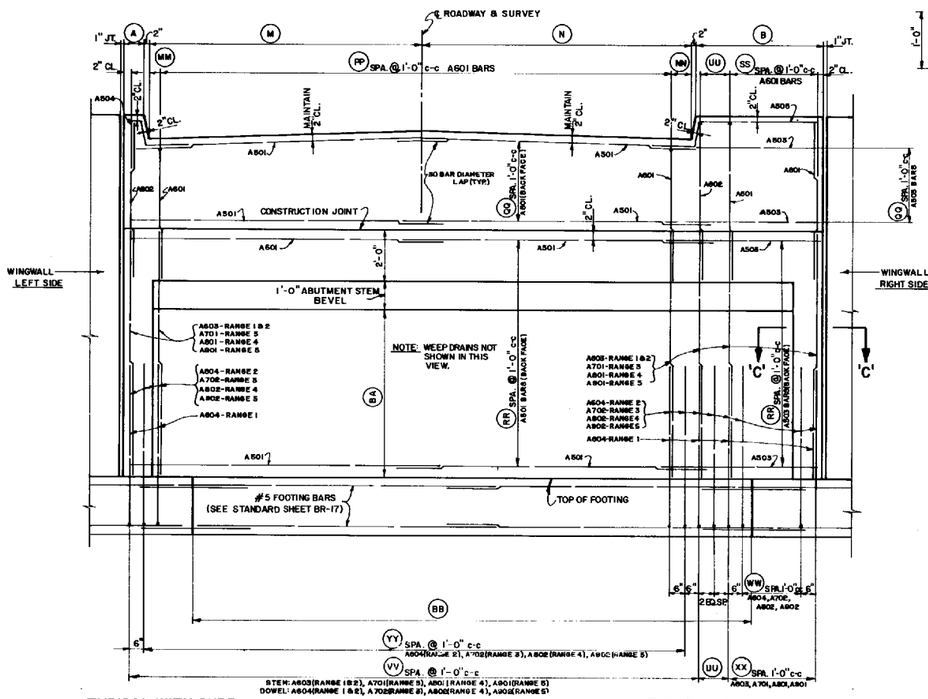
CONTROL STATIONING

CODE	DESCRIPTION	VALUE ABUT. 1	VALUE ABUT. 2
1	STATION AT ℄ ROADWAY AND ℄ BEARING		

STATIONING ESTABLISHED FROM:

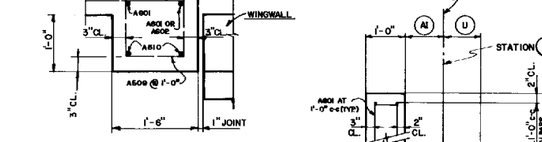
ESTIMATE OF QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY ABUT. 1	QUANTITY ABUT. 2
601-2	CLASS B CONCRETE FOR SUBSTRUCTURE (EXCLUDING WINGWALLS & FOOTING)	C.Y.		
602-1	REINFORCING STEEL BARS (EXCLUDING WINGWALLS & FOOTING)	LB.		
212-1	STRUCTURE EXCAVATION (INCLUDING WINGWALLS)	C.Y.		
212-5	SELECT MATERIAL FOR BACKFILLING (INCLUDING WINGWALLS)	C.Y.		

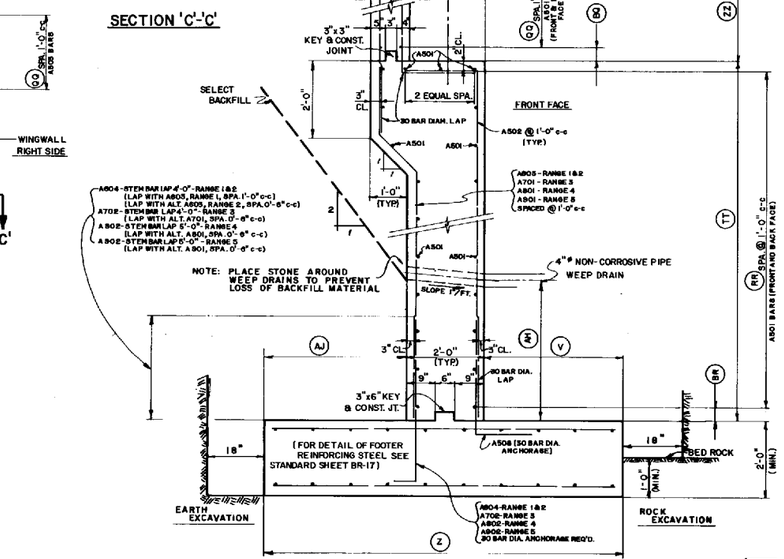


TYPICAL WITH CURB — TYPICAL WITH SIDEWALK

ABUTMENT BACK ELEVATION
(ROTATED 180° ABOUT ℄)



SECTION 'C'-'C'



TYPICAL ABUTMENT SECTION

NOTE: CURTAIN WALL SHALL BE POURED AFTER THE SUPERSTRUCTURE IS IN PLACE.

NOTE: COST OF 4" ø NON-CORROSIVE PIPE FOR WEEP DRAIN SHALL BE INCLUDED IN THE UNIT BID PRICE FOR ITEM 601-2, "CLASS B CONCRETE FOR SUBSTRUCTURE".

NOTE: BEGINNING AT THE 1" OPEN JOINT AT EACH END OF THE ABUTMENT PROPER, THE ABUTMENT STEM SHALL BE 3'-0" THICK FOR A DISTANCE OF 1'-6", SO THAT THE BACK FACES OF THE STEM AND CURTAIN WALL SHALL BE IN THE SAME VERTICAL PLANE.

NOTE: THIS SHEET TO BE USED WITH STANDARD SHEETS BR-13, BR-15, BR-16, BR-17, AND BR-14S IF APPLICABLE.

W. VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS
REINFORCED CONCRETE ABUTMENT
REINFORCING STEEL DETAILS
STANDARD SHEET BR-14

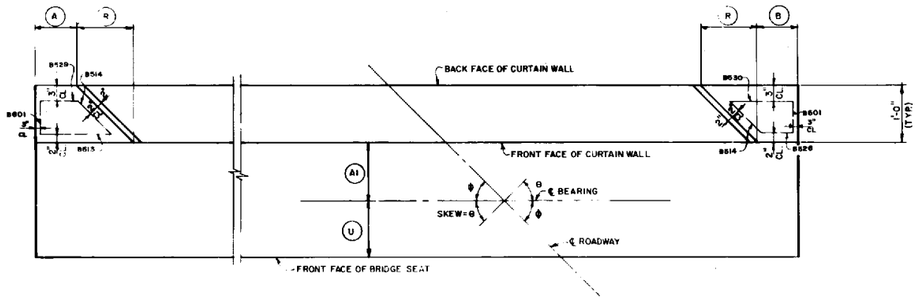
PREPARED:	6-75
REVISED:	7-75
	8-75
	10-75
	5-82
	9-88

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

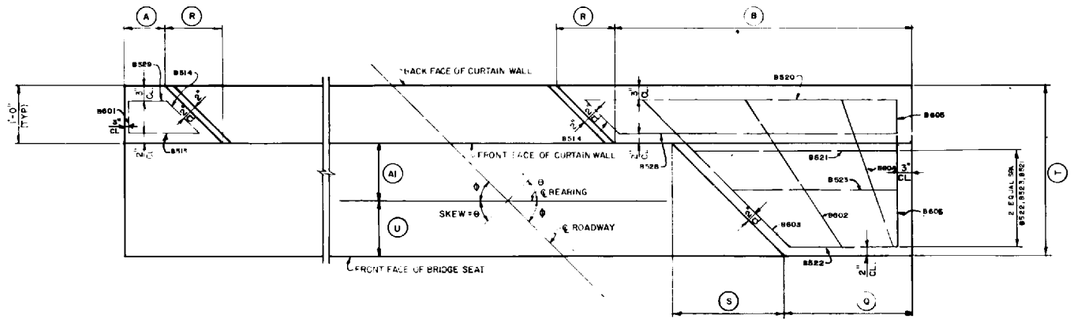
DESIGNED BY:	
DRAWN BY:	w.g.h.
CHECKED BY:	
REVIEWED BY:	
DATE:	
SCALE:	NONE
SHEET	OF
BRIDGE NUMBER	

ABUTMENT DETAILS

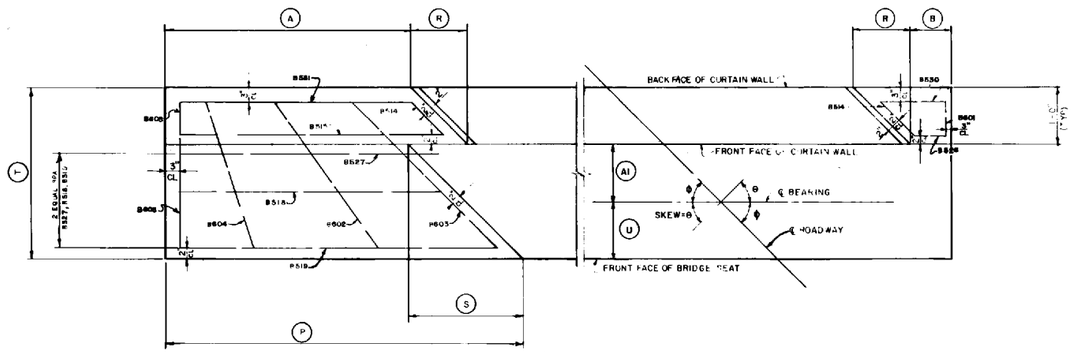
PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS



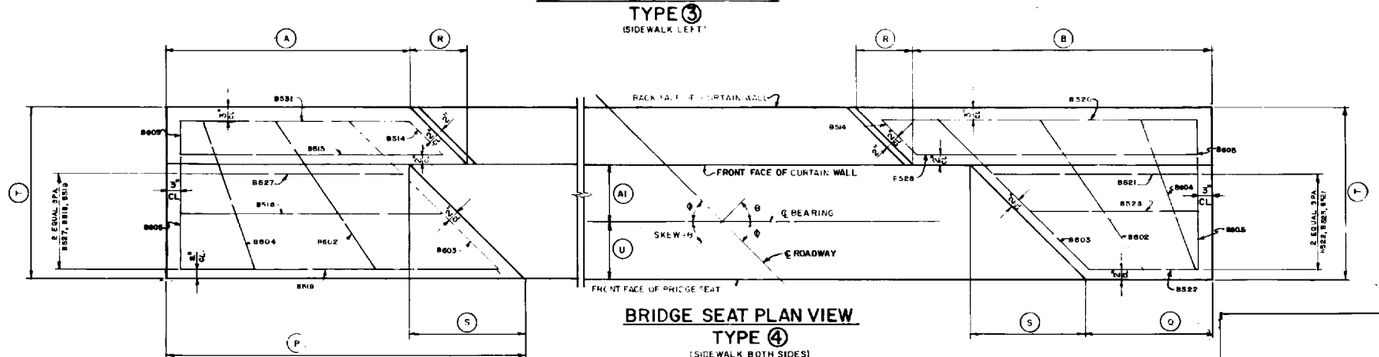
BRIDGE SEAT PLAN VIEW
TYPE ①
(NO SIDEWALK)



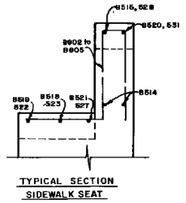
BRIDGE SEAT PLAN VIEW
TYPE ②
(SIDEWALK RIGHT)



BRIDGE SEAT PLAN VIEW
TYPE ③
(SIDEWALK LEFT)



BRIDGE SEAT PLAN VIEW
TYPE ④
(SIDEWALK BOTH SIDES)



MARK	TYPE	BRIDGE SEAT TYPE 1	2	3	4	NO. OF BARS ABUT. 1	ABUT. 2	TOTAL NO. OF BARS	LENGTH OF BAR ABUT. 1	LENGTH OF BAR ABUT. 2	TOTAL LENGTH
B601	BENT	X	—	—	—	2	2	4			
B601	"	—	X	—	—	1	1	2			
B601	"	—	—	X	—	1	1	2			
B605	BENT	—	X	—	—	1	1	2			
B605	"	—	—	X	—	1	1	2			
B605	"	—	—	—	X	2	2	4			
B526	BENT	X	—	—	—	1	1	2			
B526	"	—	—	X	—	1	1	2			
B527	BENT	—	—	X	—	1	1	2			
B527	"	—	—	—	X	1	1	2			
B604	BENT	—	X	—	—	1	1	2			
B604	"	—	—	X	—	1	1	2			
B604	"	—	—	—	X	2	2	4			
B528	BENT	—	X	—	—	1	1	2			
B528	"	—	—	—	X	1	1	2			
B529	BENT	X	—	—	—	1	1	2			
B529	"	—	X	—	—	1	1	2			
B513	BENT	X	—	—	—	1	1	2			
B513	"	—	X	—	—	1	1	2			
B514	STR.	X	X	X	X	2	2	4			
B515	BENT	—	—	X	—	1	1	2			
B515	"	—	—	—	X	1	1	2			
B602	BENT	—	X	—	—	1	1	2			
B602	"	—	—	X	—	1	1	2			
B602	"	—	—	—	X	2	2	4			
B603	BENT	—	X	—	—	1	1	2			
B603	"	—	—	X	—	1	1	2			
B603	"	—	—	—	X	2	2	4			
B518	BENT	—	—	X	—	1	1	2			
B518	"	—	—	—	X	1	1	2			
B531	BENT	—	—	X	—	1	1	2			
B531	"	—	—	—	X	1	1	2			
B519	BENT	—	—	X	—	1	1	2			
B519	"	—	—	—	X	1	1	2			
B520	BENT	—	X	—	—	1	1	2			
B520	"	—	—	—	X	1	1	2			
B521	BENT	—	X	—	—	1	1	2			
B521	"	—	—	—	X	1	1	2			
B522	BENT	—	X	—	—	1	1	2			
B522	"	—	—	—	X	1	1	2			
B530	BENT	X	—	—	—	1	1	2			
B530	"	—	X	—	—	1	1	2			
B523	BENT	—	X	—	—	1	1	2			
B523	"	—	—	—	X	1	1	2			

NOTE: FOR BAR IDENTIFICATION, CIRCLE MARKS USED.
NOTE: FOR PROPER BRIDGE SEAT, CIRCLE TYPE USED.
NOTE: THE MINIMUM LENGTH OF DIMENSION A OR B IS 8"
NOTE: REINFORCING STEEL SHOWN IS FOR THE TOP FACE OF THE CURBS AND STEP SLABS.

NOTE: DIMENSION A OR B MUST BE SUFFICIENT TO PROVIDE FOR ADEQUATE SUPERSTRUCTURE BEARING.

NOTE: THIS SHEET TO BE USED WITH STANDARD SHEETS BR-13, BR-14, BR-15, BR-16 AND BR-17 FOR CONCRETE ABUTMENT.

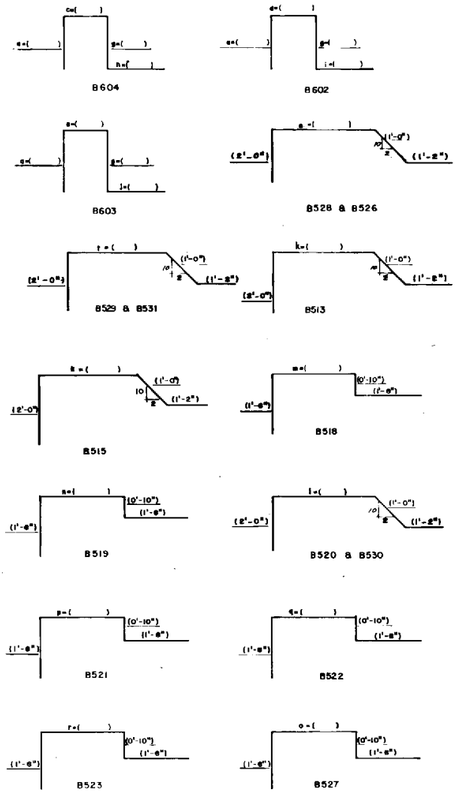
BAR LENGTH FORMULAE

a	$L \div (\cos\frac{\theta}{2})$	j	$(A1+U) \div \cos\theta$
		k	$(A+B)\left(\frac{2''}{\sin\frac{\theta}{2}} + \frac{2''\cos\frac{\theta}{2}}{\sin\frac{\theta}{2}} + 2''\right)$
c	$7'' \div \cos\frac{\theta}{2}$	l	$B+R-(\frac{2''+3''\cos\phi}{\sin\phi}+3'')$
d	$7'' \div \cos\frac{\theta\phi}{2}$	m	$P-(2''+\frac{R}{2}+\frac{2''\cos\theta+2''}{\sin\phi})$
e	$7'' \div \cos\theta$	n	$P-(3''+\frac{2''\cos\phi+2''}{\sin\phi})$
		o	$P-(3''+S+\frac{2''\cos\theta+2''}{\sin\phi})$
g	L	p	$Q+6-(3''+\frac{2''+2''\cos\phi}{\sin\phi})$
h	$(A1+U) \div \cos\frac{\theta}{2}$	q	$Q-(3''+2''\tan\frac{\phi}{2})$
i	$(A1+U) - \cos\frac{2\theta}{3}$	r	$Q+\frac{R}{2}-(3''+2''\tan\frac{\phi}{2})$
f	$A+\frac{R}{4}-\frac{R}{\sin\phi}$	s	$P-(3''+2''\tan\frac{\phi}{2})$

NOTE: LENGTH OF BAR B514 = $7'' \div \sin\phi$

CONTROL DIMENSION

CODE	DESCRIPTION	VALUE ABUT 1	ABUT 2
A	WIDTH OF CURB OR SIDEWALK TOP FACE LEFT SIDE		
B	WIDTH OF CURB OR SIDEWALK TOP FACE RIGHT SIDE		
L	HEIGHT OF CURTAIN WALL FROM BRIDGE SEAT TO TOP AT ℄ ROADWAY		
P	WIDTH OF STEP SLAB FRONT FACE LEFT SIDE		
Q	WIDTH OF STEP SLAB FRONT FACE RIGHT SIDE		
R	BEVEL OF CURB DUE TO SKEW		
S	BEVEL OF STEP SLAB DUE TO SKEW		
T	DISTANCE FROM BACK FACE OF CURTAIN WALL TO FRONT FACE OF BRIDGE SEAT		
U	DISTANCE FROM ℄ BEARING TO FRONT FACE BRIDGE SEAT		
A1	DISTANCE FRONT FACE OF CURTAIN WALL TO ℄ BEARING		
θ	SKEW ANGLE		
ϕ	COMPLEMENT OF SKEW ANGLE		



W. VA. DEPT. OF HIGHWAYS STANDARD BRIDGE PLANS

CONCRETE ABUTMENT
BRIDGE SEAT DETAILS
LEFT FORWARD SKEW

STANDARD SHEET BR-14S

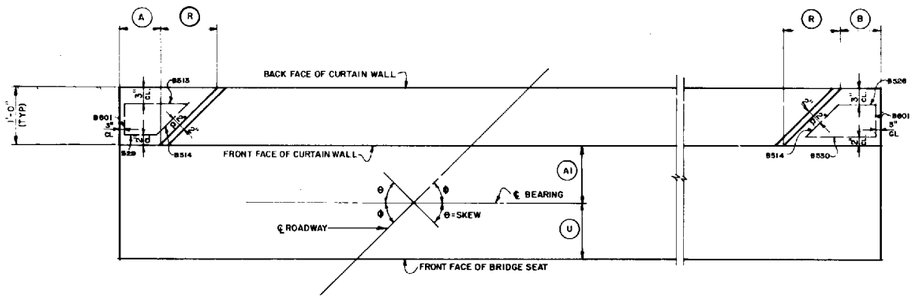
PREPARED	4-76
REVISED	11-76
	10-78
	9-88

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

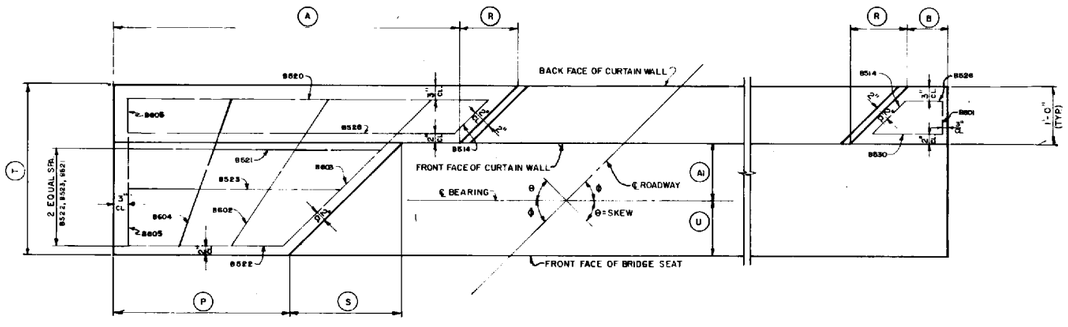
BRIDGE SEAT DETAILS

DESIGNED BY:	
DRAWN BY:	alp/pb
CHECKED BY:	
REVIEWED BY:	
DATE:	
SCALE:	NONE
SHEET	OF
	BRIDGE NUMBER

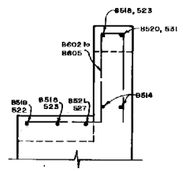
PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.VA.					



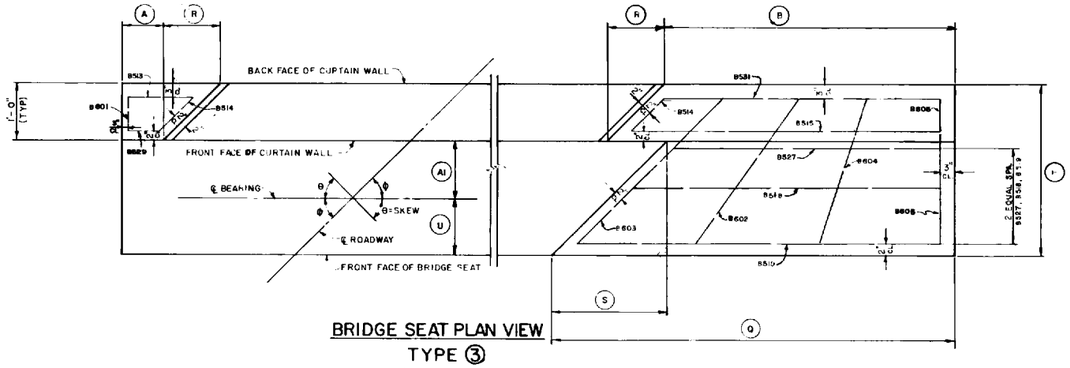
BRIDGE SEAT PLAN VIEW
TYPE ①
(NO SIDEWALK)



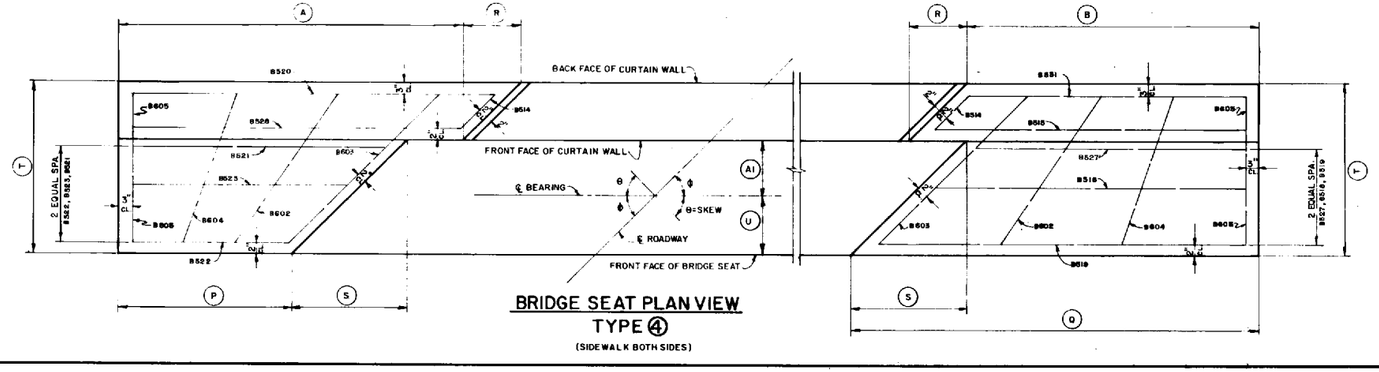
BRIDGE SEAT PLAN VIEW
TYPE ②
(SIDEWALK LEFT)



TYPICAL SECTION
SIDEWALK SEAT



BRIDGE SEAT PLAN VIEW
TYPE ③
(SIDEWALK RIGHT)



BRIDGE SEAT PLAN VIEW
TYPE ④
(SIDEWALK BOTH SIDES)

BILL OF REINFORCING STEEL

MARK	TYPE	BRIDGE SEAT TYPE 1	2	3	4	NO. OF BARS ABUT. 1	ABUT. 2	TOTAL NO. OF BARS	LENGTH OF BAR ABUT. 1	LENGTH OF BAR ABUT. 2	TOTAL LENGTH
B601	BENT	X	—	—	—	2	2	4			
B601	"	—	X	—	—	1	1	2			
B601	"	—	—	X	—	1	1	2			
B605	BENT	—	X	—	—	1	1	2			
B605	"	—	—	X	—	1	1	2			
B605	"	—	—	—	X	2	2	4			
B526	BENT	X	—	—	—	1	1	2			
B526	"	—	X	—	—	1	1	2			
B527	BENT	—	—	X	—	1	1	2			
B527	"	—	—	—	X	1	1	2			
B604	BENT	—	X	—	—	1	1	2			
B604	"	—	—	X	—	1	1	2			
B604	"	—	—	—	X	2	2	4			
B528	BENT	—	X	—	—	1	1	2			
B528	"	—	—	—	X	1	1	2			
B529	BENT	X	—	—	—	1	1	2			
B529	"	—	—	X	—	1	1	2			
B513	BENT	X	—	—	—	1	1	2			
B513	"	—	—	X	—	1	1	2			
B514	STR.	X	X	X	X	2	2	4			
B515	BENT	—	—	X	—	1	1	2			
B515	"	—	—	—	X	1	1	2			
B602	BENT	—	X	—	—	1	1	2			
B602	"	—	—	X	—	1	1	2			
B502	"	—	—	—	X	2	2	4			
B603	BENT	—	X	—	—	1	1	2			
B603	"	—	—	X	—	1	1	2			
B603	"	—	—	—	X	2	2	4			
B518	BENT	—	—	X	—	1	1	2			
B518	"	—	—	—	X	1	1	2			
B530	BENT	X	—	—	—	1	1	2			
B530	"	—	X	—	—	1	1	2			
B519	BENT	—	—	X	—	1	1	2			
B519	"	—	—	—	X	1	1	2			
B520	BENT	—	X	—	—	1	1	2			
B520	"	—	—	—	X	1	1	2			
B531	BENT	—	—	X	—	1	1	2			
B531	"	—	—	—	X	1	1	2			
B521	BENT	—	X	—	—	1	1	2			
B521	"	—	—	—	X	1	1	2			
B522	BENT	—	X	—	—	1	1	2			
B522	"	—	—	—	X	1	1	2			
B523	BENT	—	X	—	—	1	1	2			
B523	"	—	—	—	X	1	1	2			

NOTE: FOR BAR IDENTIFICATION, CIRCLE MARKS USED.
NOTE: FOR PROPER BRIDGE SEAT, CIRCLE TYPE USED.
NOTE: THE MINIMUM LENGTH OF DIMENSION A OR B IS 8"
NOTE: REINFORCING STEEL SHOWN IS FOR THE TOP FACE OF THE CURBS AND STEPS SLABS.

NOTE: DIMENSION A OR B MUST BE SUFFICIENT TO PROVIDE FOR ADEQUATE SUPERSTRUCTURE BEARING

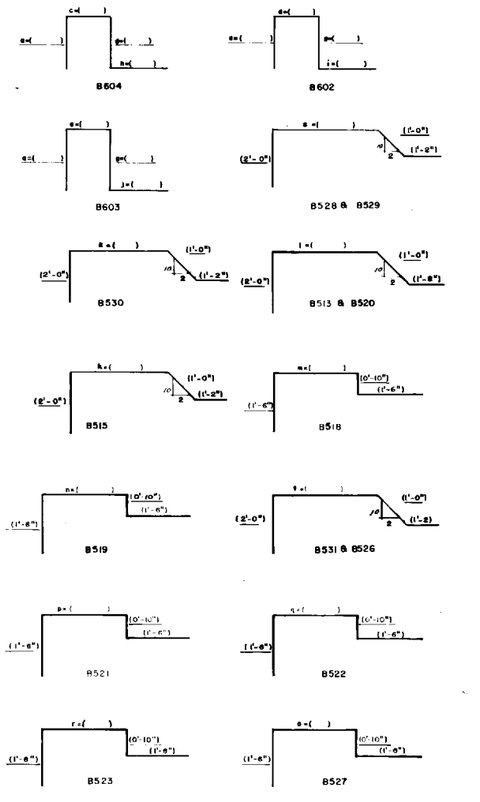
BAR LENGTH FORMULAE

a	L+(0".7")	j	(Al+U)÷cos θ
		k	$B+R-\left(\frac{R^2\tan^2\phi}{\sin\phi}+2^n\right)$
c	7"÷cos ϕ/3	l	$A+R-\left(\frac{3^n+3^n\cos\phi}{\sin\phi}+8^n\right)$
d	i"−cos 2ϕ/3	m	$Q-(3^n+\frac{S}{2}+\frac{2^n\cos\phi+2^n}{\sin\phi})$
e	7"÷cos θ	n	$Q-(3^n+\frac{2^n\cos\phi+2^n}{\sin\phi})$
		o	$Q-(3^n+8+\frac{8^n\cos\phi+8^n}{\sin\phi})$
g	L	p	$P+S-(3^n+\frac{2^n+2^n\cos\phi}{\sin\phi})$
h	(Al+U)÷cos ϕ/3	q	$P-(3^n+2^n\tan\frac{\phi}{2})$
i	(Al+U)÷cos 2ϕ/3	r	$P+\frac{S}{2}-(3^n+2^n\tan\frac{\phi}{2})$
t	$\theta+\frac{R}{4}-\frac{R}{\sin\phi}$	s	$A-(3^n+2^n\tan\frac{\phi}{2})$

NOTE: LENGTH OF BAR B514 = 7" ÷ sin θ

CONTROL DIMENSION

CODE	DESCRIPTION	VALUE ABUT. 1	ABUT. 2
A	WIDTH OF CURB OR SIDEWALK TOP FACE LEFT SIDE		
B	WIDTH OF CURB OR SIDEWALK TOP FACE RIGHT SIDE		
L	HEIGHT OF CURTAIN WALL FROM BRIDGE SEAT TO TOP AT ℄ ROADWAY		
P	WIDTH OF STEP SLAB FRONT FACE LEFT SIDE		
Q	WIDTH OF STEP SLAB FRONT FACE RIGHT SIDE		
R	BEVEL OF CURB DUE TO SKEW		
S	BEVEL OF STEP SLAB DUE TO SKEW		
T	DISTANCE FROM BACK FACE OF CURTAIN WALL TO FRONT FACE OF BRIDGE SEAT		
U	DISTANCE FROM ℄ BEARING TO FRONT FACE BRIDGE		
Al	DISTANCE FRONT FACE OF CURTAIN WALL TO ℄ BEARING		
θ	SKEW ANGLE		
ϕ	COMPLEMENT OF SKEW ANGLE		



NOTE: THIS SHEET TO BE USED WITH STANDARD SHEETS BR-13, BR-14, BR-15, BR-16, AND BR-17 FOR CONCRETE ABUTMENT.

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

W.VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS
CONCRETE ABUTMENT
BRIDGE SEAT DETAILS
RIGHT FORWARD SKEW

STANDARD SHEET BR-14S

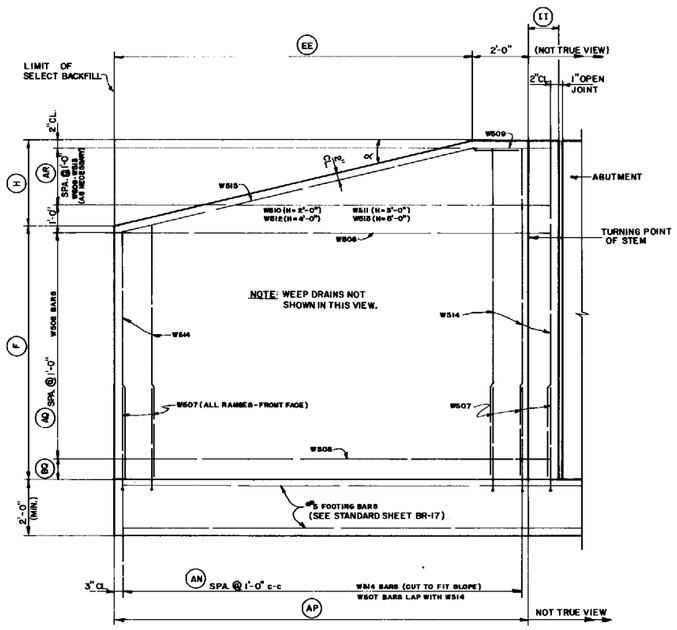
PREPARED:	4-76
REVISED:	11-76
	10-78
	9-88

DESIGNED BY:	
DRAWN BY:	W.T.H.
CHECKED BY:	
REVIEWED BY:	
DATE:	
SCALE:	NONE
SHEET	OF

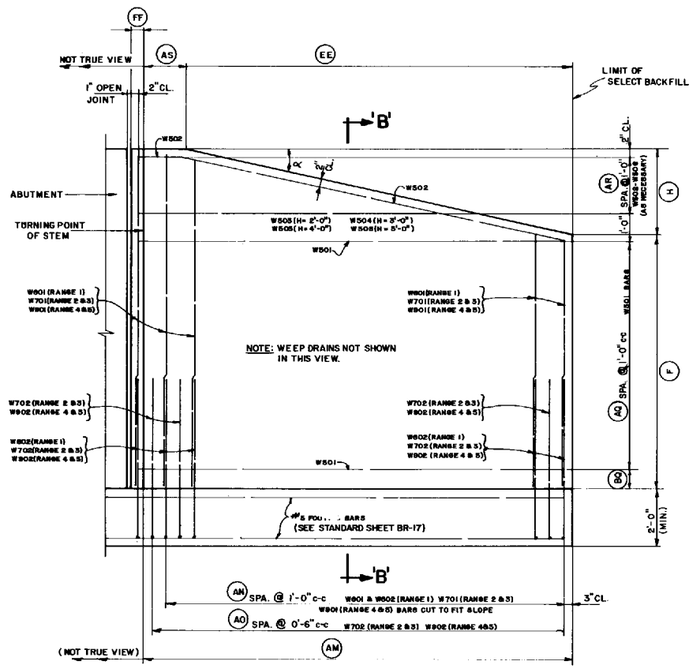
BRIDGE SEAT DETAILS

BRIDGE NUMBER

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.VA.					



LEFT WINGWALL FRONT ELEVATION VIEW



LEFT WINGWALL BACK ELEVATION VIEW

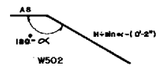
BILL OF REINFORCING STEEL

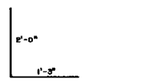
MARK	TYPE	RANGE	FORMULA NO. OF BARS/A BUT	NO. OF BARS ABUT. 1	NO. OF BARS ABUT. 2	TYPL. LENGTH EA. BAR ABUT. 1	TYPL. LENGTH EA. BAR ABUT. 2	TOTAL LENGTH
W501	STR.	ALL	AQ+1					
W502	BENT	ALL	1					
W503	STR.	ALL	1					
W504	STR.	ALL	1					
W505	STR.	ALL	1					
W506	STR.	ALL	1					
W507	BENT	ALL	AN+2					
W508	BENT	ALL	AQ+1					
W509	BENT	ALL	1					
W510	BENT	ALL	1					
W511	BENT	ALL	1					
W512	BENT	ALL	1					
W513	BENT	ALL	1					
W514	STR.	ALL	AN+2					
W515	BENT	ALL	1					
W601	STR.	1	AN+2					
W602	BENT	1	AN+2					
W701	STR	2&3	AN+2					
W702	BENT	2&3	AQ+2					
W901	STR.	4&5	AN+2					
W902	BENT	4&5	AQ+2					

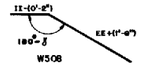
NOTE: LENGTH OF STRAIGHT BARS:
W501 = EE+AS
W503 = EE+H+AS
W504 = 2(EE)+H+AS
W505 = 3(EE)+H+AS
W506 = 4(EE)+H+AS
W514 = F+H-(0'-2")
W601 = F+H-(0'-2")
W701 = F+H-(0'-2")
W901 = F+H-(0'-2")

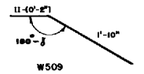
NOTE: CIRCLE BAR MARK USED IN BILL OF REINFORCING STEEL.

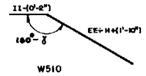
NOTE: IF H=2'-0" DO NOT USE W511, W512, W513
IF H=3'-0" DO NOT USE W512, W513
IF H=4'-0" DO NOT USE W513
IF H=5'-0" USE ALL BARS

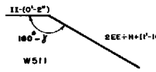


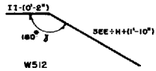


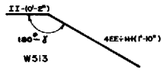


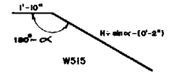












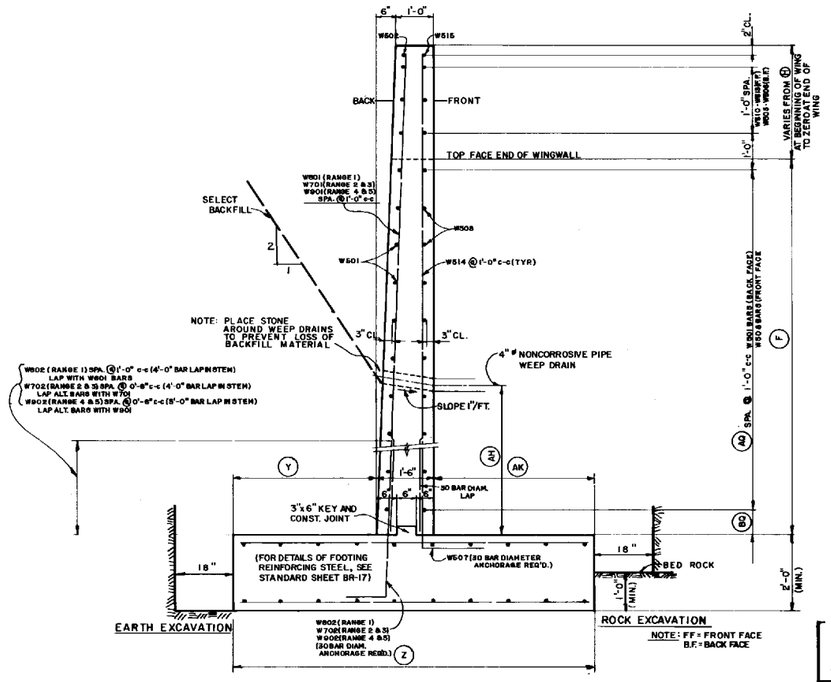
RANGE TABLE

RANGE	STEM HEIGHT*	SELECTION ABUT. 1	SELECTION ABUT. 2
1	8' TO 11'		
2	OVER 11' TO 14'		
3	OVER 14' TO 16'		
4	OVER 16' TO 18'		
5	OVER 18' TO 19'		

* STEM HEIGHT IS MEASURED FROM TOP OF FOOTING TO TOP OF STEM AT BEGINNING OF WINGWALL.

CONTROL DIMENSIONS

CODE	DESCRIPTION	VALUE ABUT. 1	VALUE ABUT. 2
F	HEIGHT OF WINGWALL STEM		
H	HEIGHT DIFFERENCE BETWEEN BEGINNING AND END OF WINGWALL.		
AH	DISTANCE FROM TOP OF FOOTING TO ℄ WEEP DRAINS		
Y	DISTANCE FROM BACK FACE OF WINGWALL TO BACK FACE OF FOOTING		
Z	WIDTH OF FOOTING		
EE	HORIZONTAL LENGTH OF SLOPED PORTION OF WINGWALL STEM		
II	DISTANCE FROM BEGINNING OF WINGWALL STEM TO THE TURNING POINT OF WINGWALL STEM AT FRONT FACE		
AK	DISTANCE FROM FRONT FACE OF WINGWALL TO FRONT FACE OF FOOTING		
AM	LENGTH OF WINGWALL FROM TURNING POINT TO END OF WINGWALL AT BACK FACE		
AN	NO. OF SPA. OF W601, W602 (RANGE 1); W701 (RANGE 2&3); W901 (RANGE 4&5) BACK FACE & W507, W514 FRONT FACE.		
AQ	NO. OF SPA. OF W702 (RANGE 2&3), W902 (RANGE 4&5) BACK FACE		
AP	LENGTH OF WINGWALL FROM TURNING POINT TO END OF WINGWALL AT FRONT FACE		
AQ	NO. OF SPA. OF W501 (BACK FACE), W508 (FRONT FACE)		
AR	NO. OF SPA. OF HORIZ. BARS IN SLOPED PORTION OF WINGWALL STEM - POSSIBLE BARS W503-W506 (BACK FACE), W509-W513 (FRONT FACE)		
AS	DISTANCE FROM BEGINNING OF SLOPED PORTION OF WINGWALL STEM TO THE TURNING POINT ON BACK FACE.		
∝	ANGLE OF SLOPED PORTION OF WINGWALL		
FF	DISTANCE FROM BEGINNING OF WINGWALL STEM TO TURNING POINT BACK FACE LEFT SIDE		
BQ	DISTANCE FROM TOP OF FOOTING TO HORIZONTAL BARS IN STEM		
δ	ANGLE WINGWALL STEM IS OFFSET FROM ABUTMENT (SEE STANDARD SHEET BR-13)		



SECTION 'B'-'B'

ESTIMATE OF QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY ABUT. 1	QUANTITY ABUT. 2
601-2	CLASS B CONCRETE FOR SUBSTRUCTURE (EXCLUDING FOOTING)	C.Y.		
602-1	REINFORCING STEEL BARS (EXCLUDING FOOTING)	LB.		

NOTE: THIS SHEET TO BE USED WITH STANDARD SHEET BR-13, BR-14, BR-17 AND BR-14B IF APPLICABLE.

W. VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS
REINFORCED CONCRETE ABUTMENT
LEFT WINGWALL DETAILS
STANDARD SHEET BR-15

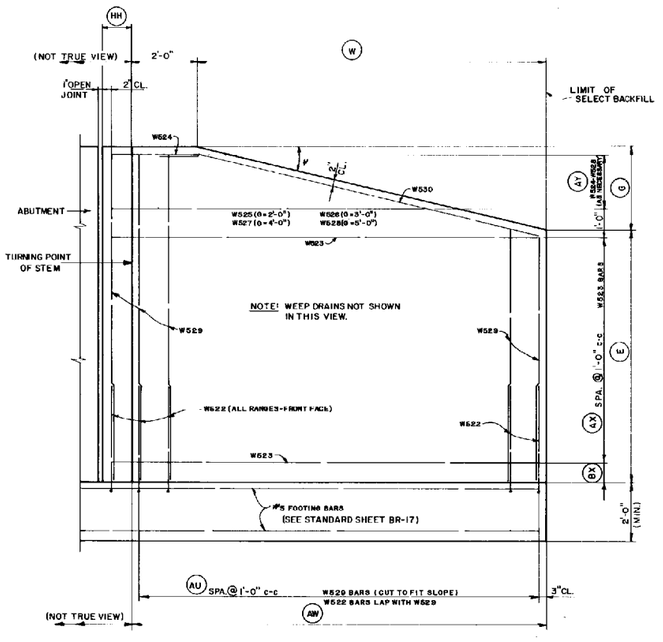
PREPARED:	5-75
REVISED:	7-75
	8-75
	10-75
	7-77
	5-82
	9-88

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

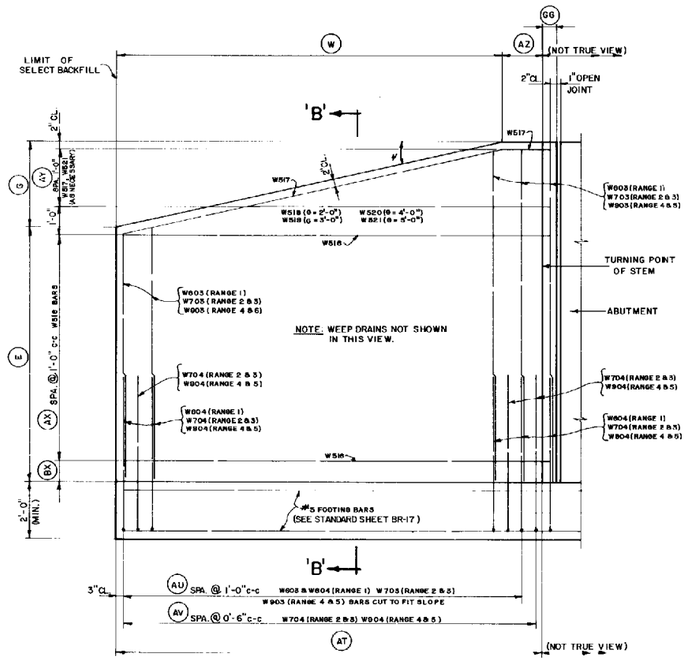
DESIGNED BY:
DRAWN BY: w.g.b.
CHECKED BY:
REVIEWED BY:
DATE:
SCALE: NONE
SHEET OF BRIDGE NUMBER

LEFT WINGWALL DETAILS

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W. VA.					



RIGHT WINGWALL FRONT ELEVATION VIEW



RIGHT WINGWALL BACK ELEVATION VIEW

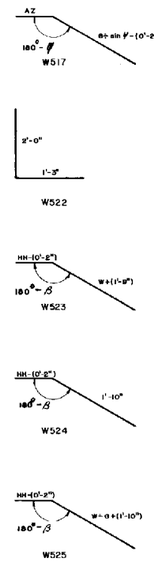
BILL OF REINFORCING STEEL

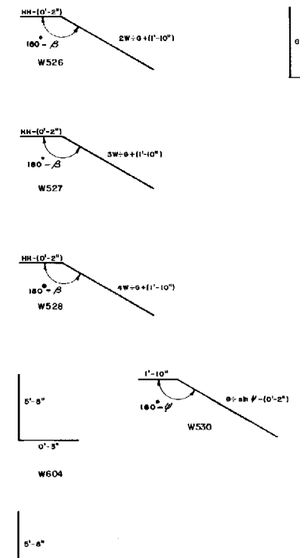
MARK	TYPE	RANGE	FORMULA NO. OF BARS/ABUT.	NO. OF BARS ABUT. 1	NO. OF BARS ABUT. 2	TOTAL LENGTH EA. BAR ABUT. 1	TOTAL LENGTH EA. BAR ABUT. 2	TOTAL LENGTH
W516	STR.	ALL	AX+1					
W517	BENT	ALL	1					
W518	STR.	ALL	1					
W519	STR.	ALL	1					
W520	STR.	ALL	1					
W521	STR.	ALL	1					
W522	BENT	ALL	AU+2					
W523	BENT	ALL	AX+1					
W524	BENT	ALL	1					
W525	BENT	ALL	1					
W526	BENT	ALL	1					
W527	BENT	ALL	1					
W528	BENT	ALL	1					
W529	STR.	ALL	AU+2					
W530	BENT	ALL	1					
W603	STR.	1	AU+2					
W604	BENT	1	AU+2					
W703	STR.	2&3	AU+2					
W704	BENT	2&3	AV+2					
W903	STR.	4&5	AU+2					
W904	BENT	4&5	AV+2					

NOTE: LENGTH OF STRAIGHT BARS:
W516 = W+AZ
W518 = W÷G+AZ
W519 = 2W÷G+AZ
W520 = 3W÷G+AZ
W521 = 4W÷G+AZ
W529 = E+G-(0'-2")
W603 = E+G-(0'-2")
W703 = E+G-(0'-2")
W903 = E+G-(0'-2")

NOTE: CIRCLE BAR MARK USED ON BILL OF REINFORCING STEEL.

NOTE: IF G=2'-0" DO NOT USE W526, W527, W528
IF G=3'-0" DO NOT USE W527, W528
IF G=4'-0" DO NOT USE W528
IF G=5'-0" USE ALL BARS
IF G=2'-0" DO NOT USE W519, W520, W521
IF G=3'-0" DO NOT USE W520, W521
IF G=4'-0" DO NOT USE W521





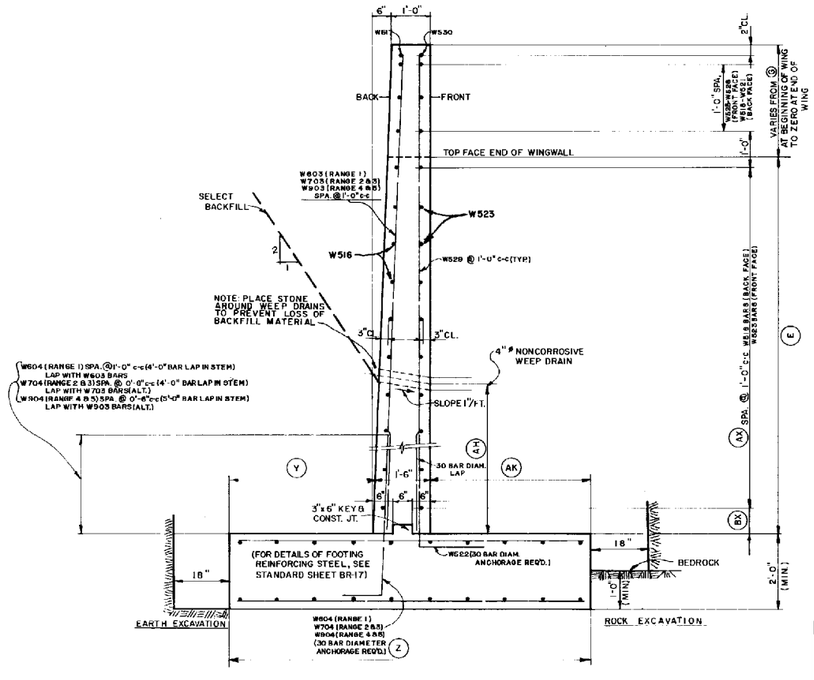
RANGE TABLE

RANGE	STEM HEIGHT*	SELECTION ABUT. 1	SELECTION ABUT. 2
1	8' TO 11'		
2	OVER 11' TO 14'		
3	OVER 14' TO 16'		
4	OVER 16' TO 18'		
5	OVER 18' TO 19'		

*NOTE: STEM HEIGHT IS MEASURED FROM TOP OF FOOTING TO TOP OF STEM AT BEGINNING OF WINGWALL.

CONTROL DIMENSIONS

CODE	DESCRIPTION	VALUE ABUT. 1	VALUE ABUT. 2
E	HEIGHT OF WINGWALL STEM		
G	HEIGHT DIFFERENCE BETWEEN BEGINNING AND END OF WINGWALL.		
AH	DISTANCE FROM TOP OF FOOTING TO ℄ WEEP DRAINS		
Y	DISTANCE FROM BACK FACE OF WINGWALL TO BACK FACE OF FOOTING		
Z	WIDTH OF FOOTING		
W	HORIZONTAL LENGTH OF SLOPED PORTION OF WINGWALL STEM		
HH	DISTANCE FROM BEGINNING OF WINGWALL STEM TO THE TURNING POINT OF WINGWALL STEM AT FRONT FACE		
AK	DISTANCE FROM FRONT FACE OF WINGWALL TO FRONT FACE OF FOOTING		
AT	LENGTH OF WINGWALL FROM TURNING POINT TO END OF WINGWALL AT BACK FACE		
AU	NO. OF SPA. OF W603, W604 (RANGE 1); W705 (RANGE 2&3); W903 (RANGE 4&5) BACK FACE & W522, W529 FRONT FACE		
AV	NO. OF SPA. OF W704 (RANGE 2&3), W904 (RANGE 4&5) BACK FACE		
AW	LENGTH OF WINGWALL FROM TURNING POINT TO END OF WINGWALL AT FRONT FACE		
AX	NO. OF SPA. OF W516 (BACK FACE), W523 (FRONT FACE)		
AY	NO. OF SPA. OF HORIZ. BARS IN SLOPED PORTION OF WINGWALL STEM - POSSIBLE BARS W517-W521 (BACK FACE), W524-W528 (FRONT FACE)		
AZ	DISTANCE FROM BEGINNING OF SLOPED PORTION OF WINGWALL STEM TO THE TURNING POINT ON BACK FACE.		
ψ	ANGLE OF SLOPED PORTION OF WINGWALL		
GG	DISTANCE FROM BEGINNING OF WINGWALL STEM TO TURNING POINT BACK FACE RIGHT SIDE		
BX	DISTANCE FROM TOP OF FOOTING TO HORIZONTAL BARS IN STEM		
β	ANGLE WINGWALL STEM IS OFFSET FROM ABUTMENT. (SEE STANDARD SHEET BR-13)		



SECTION 'B'-'B'

ESTIMATE OF QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY ABUT. 1	QUANTITY ABUT. 2
601-2	CLASS B CONCRETE FOR SUBSTRUCTURE (EXCLUDING FOOTING)	C.Y.		
602-1	REINFORCING STEEL BARS (EXCLUDING FOOTING)	LB.		

NOTE: THIS SHEET TO BE USED WITH STANDARD SHEETS BR-13, BR-14, BR-17 AND BR-14SIF APPLICABLE.

A

W. VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS
REINFORCED CONCRETE ABUTMENT
RIGHT WINGWALL DETAILS
STANDARD SHEET BR-16

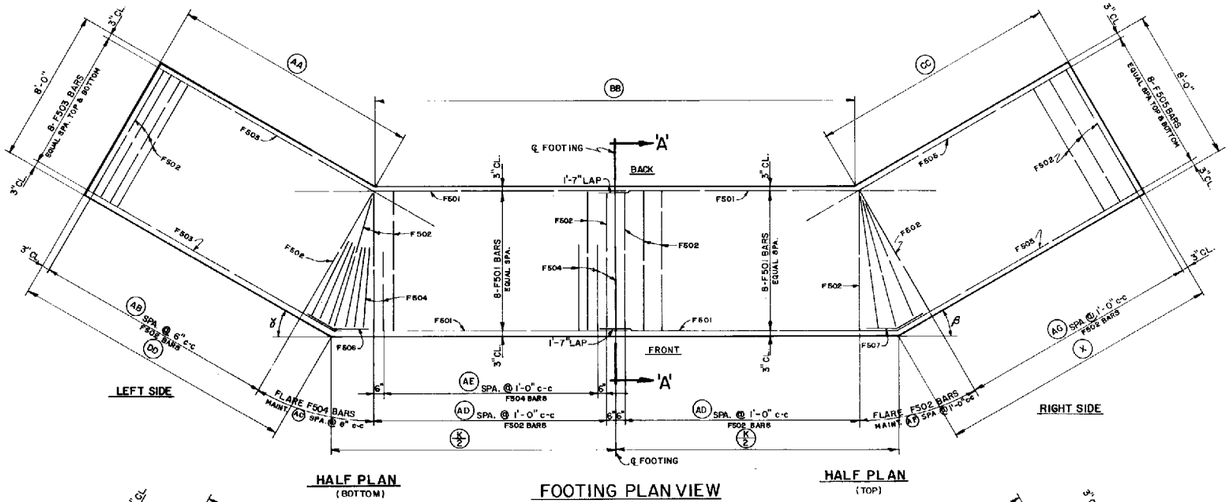
PREPARED:	6-75
REVISED:	7-75
	8-75
	10-75
	7-77
	5-82
	9-88

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

DESIGNED BY:	
DRAWN BY:	wjb.
CHECKED BY:	
REVIEWED BY:	
DATE:	
SCALE:	NONE
SHEET	OF
BRIDGE NUMBER	

RIGHT WINGWALL DETAILS

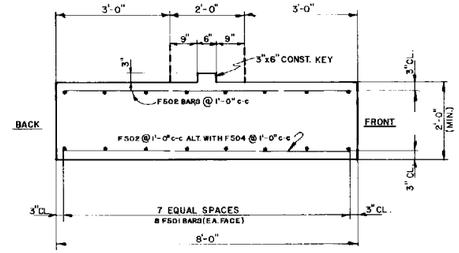
PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.V.A.					



HALF PLAN (BOTTOM)

FOOTING PLAN VIEW (RANGE 1)

HALF PLAN (TOP)



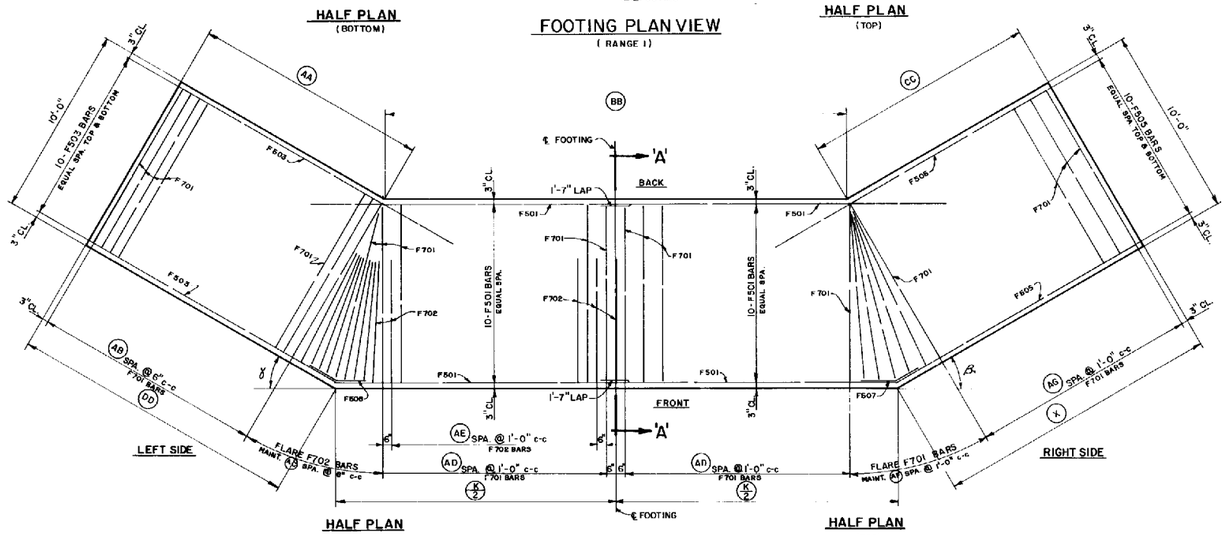
SECTION 'A'-'A' (RANGE 1)

RANGE	STEM HEIGHT*	SELECTION	
		ABUT. 1	ABUT. 2
1	7'-0" TO 10'-0"		
2	OVER 10' TO 13'		
3	OVER 13' TO 15'		

*NOTE: STEM HEIGHT IS MEASURED FROM TOP OF FOOTING TO TOP OF CURTAIN WALL AT ℄ OF ROADWAY.

CONTROL DIMENSIONS

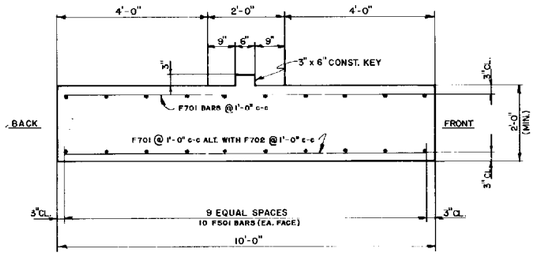
CODE	DESCRIPTION	VALUE	
		ABUT. 1	ABUT. 2
K/2	DIMENSION FROM THE FRONT CORNER TO ℄ OF ABUTMENT FOOTING.		
X	LENGTH OF WINGWALL FOOTING FRONT FACE RIGHT SIDE		
AA	LENGTH OF WINGWALL FOOTING BACK FACE LEFT SIDE		
AB	NO. SPA. OF F502(R-1), F701(R-2), F801(R-3), BOTTOM LEFT WINGWALL FOOTING		
AC	NO. SPA. OF F504(R-1), F702(R-2), F802(R-3), BOTTOM LEFT FOOTING CORNER		
AD	NO. SPA. OF F502(R-1), F701(R-2), F801(R-3), TOP AND BOTTOM FACE OF ABUTMENT FOOTING		
AE	NO. SPA. OF F504(R-1), F702(R-2), F802(R-3), BOTTOM FACE OF ABUTMENT FOOTING		
AF	NO. SPA. OF F502(R-1), F701(R-2), F801(R-3), TOP RIGHT FOOTING CORNER		
AG	NO. SPA. OF F502(R-1), F701(R-2), F801(R-3), TOP RIGHT WINGWALL FOOTING		
BB	LENGTH OF ABUTMENT FOOTING BACK FACE		
CC	LENGTH OF WINGWALL FOOTING BACK FACE RIGHT SIDE		
DD	LENGTH OF WINGWALL FOOTING FRONT FACE LEFT SIDE		
β	ANGLE WINGWALL FORMS WITH ABUTMENT RIGHT SIDE		
γ	ANGLE WINGWALL FORMS WITH ABUTMENT LEFT SIDE		



HALF PLAN (BOTTOM)

FOOTING PLAN VIEW (RANGE 2)

HALF PLAN (TOP)

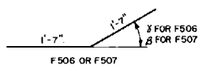


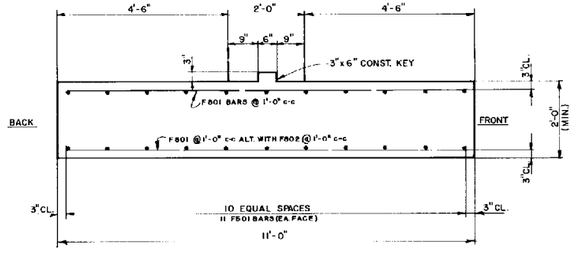
SECTION 'A'-'A' (RANGE 2)

BILL OF REINFORCING STEEL

MARK	BAR TYPE	RANGE	FORMULA NO. BARS=ABUT.	NO. BARS ABUT 1	NO. BARS ABUT 2	LENGTH OF EACH BAR	TOTAL LENGTH
F501	STR.	1	32			K/2 + (0'-10")	
F501	"	2	40				
F501	"	3	44				
F502	STR.	1	4(AD)+1½(AB)+(AF) +3(AB)+AC/2 +12			7'-6"	
F503	STR.	1	16			DD (0' 4")	
F503	"	2	20				
F503	"	3	22				
F504	STR.	1	AC+2(AF)+2(AE)-1			4'-6"	
F505	STR.	1	16			X-(0'-4")	
F505	"	2	20				
F505	"	3	22				
F506	BENT	ALL	2			3'-2"	
F507	BENT	ALL	2			3'-2"	
F701	STR.	2	4(AD)+1½(AB)+(AF) +3(AB)+AC/2 +12			9'-6"	
F702	STR.	2	AC+2(AF)+2(AE)-1			6'-0"	
F801	STR.	3	4(AD)+1½(AB)+(AF) +3(AB)+AC/2 +12			10'-6"	
F802	STR.	3	AC+2(AF)+2(AE)-1			7'-0"	

NOTE: CIRCLE BAR MARK USED IN BILL OF REINFORCING STEEL.





SECTION 'A'-'A' (RANGE 3)

ESTIMATE OF QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY ABUT. 1	QUANTITY ABUT. 2
601-2	CLASS B CONCRETE FOR SUBSTRUCTURE	C.Y.		
602-1	REINFORCING STEEL BARS	LB.		

NOTE: THIS SHEET TO BE USED WITH STANDARD SHEETS BR-13, BR-14, BR-15, BR-16, & BR-14S IF APPLICABLE.

W. VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS
REINFORCED CONCRETE ABUTMENT
ABUTMENT FOOTING
(RANGE 1, 2 & 3)

STANDARD SHEET BR-17

PREPARED:	6-75
REVISED:	10-75
	5-82
	9-88

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

DESIGNED BY:	
DRAWN BY:	w.g.h.
CHECKED BY:	
REVIEWED BY:	
DATE:	
SCALE:	NONE
SHEET	OF
BRIDGE NUMBER	

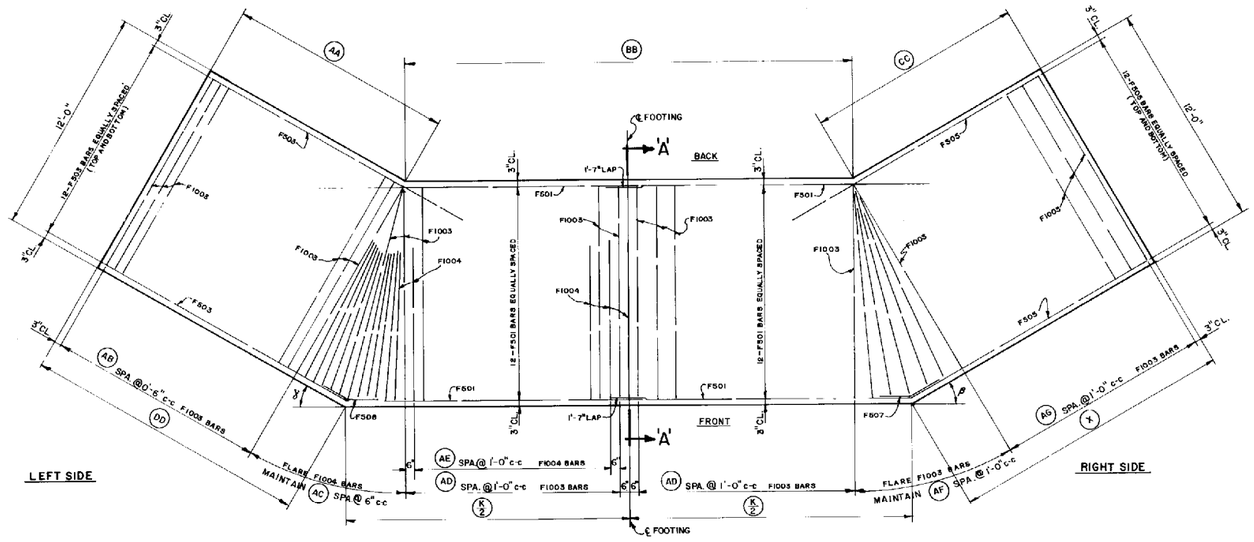
ABUTMENT FOOTING (RANGE 1, 2 & 3)

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W. VA.					

RANGE TABLE

RANGE	STEM HEIGHT*	SELECTION	
		ABUT. 1	ABUT. 2
4	OVER 15' TO 17'		
5	OVER 17' THRU 18'		

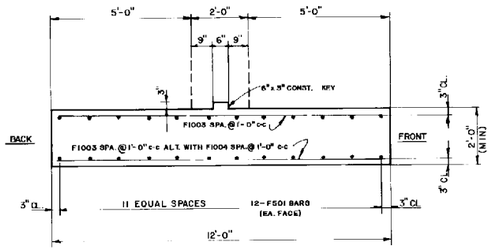
*NOTE: STEM HEIGHT IS MEASURED FROM TOP OF FOOTING TO TOP OF CURTAIN WALL AT ℄ ROADWAY.



HALF PLAN (BOTTOM)

FOOTING PLAN VIEW
(RANGE 4)

HALF PLAN (TOP)



SECTION 'A'-'A'
(RANGE 4)

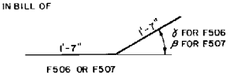
CONTROL DIMENSIONS

CODE	DESCRIPTION	VALUE ABUT. 1	VALUE ABUT. 2
K	DISTANCE FROM FRONT CORNER TO ℄ ABUT. FOOTING		
X	LENGTH OF WINGWALL FOOTING, FRONT FACE, RIGHT SIDE		
AA	LENGTH OF WINGWALL FOOTING, BACK FACE, LEFT SIDE		
BB	LENGTH OF ABUTMENT FOOTING, BACK FACE		
CC	LENGTH OF WINGWALL FOOTING, BACK FACE, RIGHT SIDE		
DD	LENGTH OF WINGWALL FOOTING, FRONT FACE, LEFT SIDE		
AB	NO. SPA. F1001 (RANGE 5), F1003 (RANGE 4) BARS, BOTTOM LEFT WINGWALL FOOTING		
AC	NO. SPA. F1002 (RANGE 5), F1004 (RANGE 4) BARS, BOTTOM LEFT FOOTING CORNER		
AD	NO. SPA. F1001 (RANGE 5), F1003 (RANGE 4) BARS, TOP AND BOTTOM ABUTMENT FOOTING		
AE	NO. SPA. F1002 (RANGE 5), F1004 (RANGE 4) BARS, BOTTOM ABUTMENT FOOTING		
AF	NO. SPA. F1001 (RANGE 5), F1003 (RANGE 4) BARS, TOP RIGHT WINGWALL FOOTING		
AG	NO. SPA. F1001 (RANGE 5), F1003 (RANGE 4) BARS, BOTTOM RIGHT FOOTING CORNER		
β	ANGLE WINGWALL FORMS WITH ABUTMENT, RIGHT SIDE		
γ	ANGLE WINGWALL FORMS WITH ABUTMENT, LEFT SIDE		

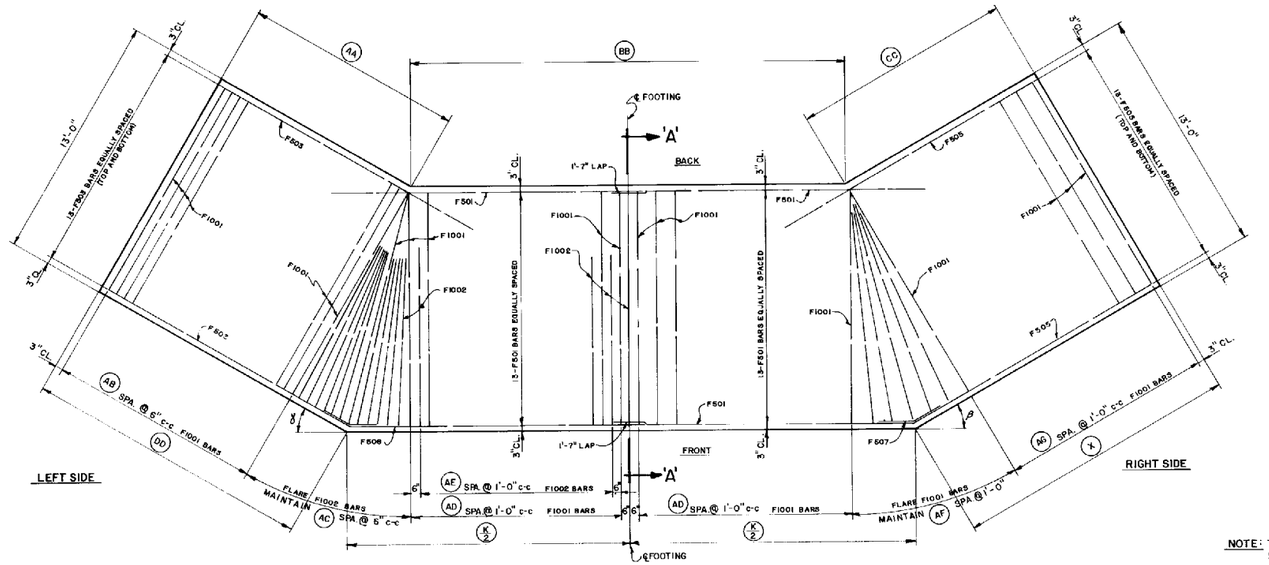
BILL OF REINFORCING STEEL

MARK	BAR TYPE	RANGE	FORMULA NO. BARS / ABUT.	NO. BARS ABUT. 1	NO. BARS ABUT. 2	LENGTH OF EACH BAR	TOTAL LENGTH
F501 F501	STR.	4 5	46 52			(K/2) + (0'-10")	
F505 F503	STR. "	4 5	24 26			(DD) - (0'-4")	
F505 F508	STR. "	4 5	24 28			(X) - (0'-4")	
F508	BENT	ALL	2			8'-2"	
F507	BENT	ALL	2			5'-2"	
F1001	STR.	5	4(AD)+1½(AB)(AF) +8(AB)+AC/2+12			12'-6"	
F1002	STR.	5	AC+2(AE+AF)-1			9'-0"	
F1003	STR.	4	4(AD)+1½(AB)(AF) +8(AB)+AC/2+12			11'-6"	
F1004	STR.	4	AC+2(AE+AF)-1			8'-0"	

NOTE: CIRCLE BAR MARK USED IN BILL OF REINFORCING STEEL.



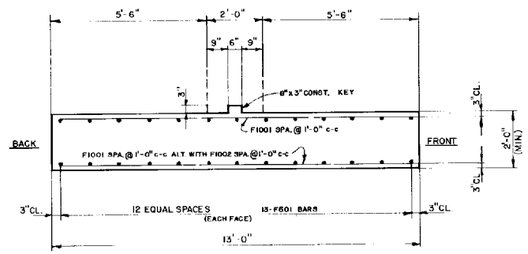
F506 OR F507



HALF PLAN (BOTTOM)

FOOTING PLAN VIEW
(RANGE 5)

HALF PLAN (TOP)



SECTION 'A'-'A'
(RANGE 5)

ESTIMATE OF QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY ABUT. 1	QUANTITY ABUT. 2
601-2	CLASS B CONCRETE FOR SUBSTRUCTURE	C.Y.		
602-1	REINFORCING STEEL BARS	LB.		

NOTE: THIS SHEET TO BE USED WITH STANDARD SHEETS BR-13, 14, 15, 16 AND 14S IF APPLICABLE.

W. VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS
REINFORCED CONCRETE ABUTMENT
ABUTMENT FOOTING
(RANGE 4&5)

STANDARD SHEET BR-17

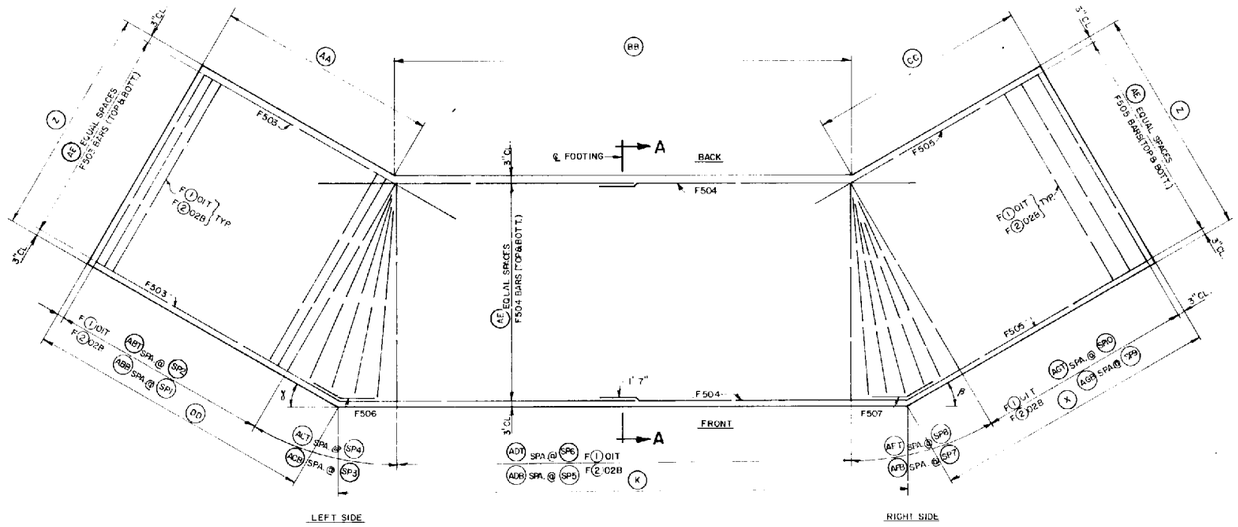
PREPARED	6-75
REVISED	10-75
	5-82
	9-88

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

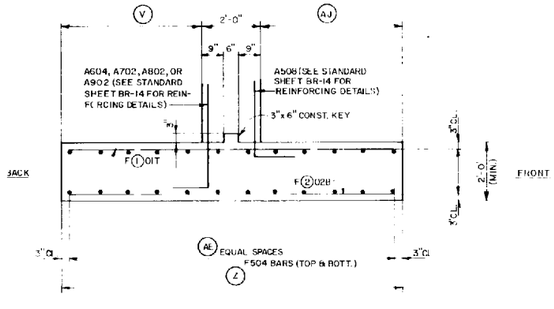
ABUTMENT FOOTING (RANGE 4&5)

DESIGNED BY:	
DRAWN BY:	W.V.D.
CHECKED BY:	
REVIEWED BY:	
DATE:	
SCALE:	NONE
SHEET	OF
	BRIDGE NUMBER

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.V.					



FOOTING PLAN VIEW



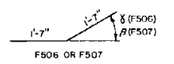
SECTION 'A'-'A'

CONTROL DIMENSIONS

CODE	DESCRIPTION	VALUE ABUT. 1	VALUE ABUT. 2
K	LENGTH OF ABUTMENT FOOTING FRONT SIDE		
V	DISTANCE FROM BACK FACE OF ABUTMENT STEM TO BACK FACE OF FOOTING		
X	LENGTH OF WINGWALL FOOTING FRONT FACE RIGHT SIDE		
Z	WIDTH OF ABUTMENT AND WINGWALL FOOTING		
AA	LENGTH OF WINGWALL FOOTING BACK FACE LEFT SIDE		
AE	NUMBER OF SPACES OF F503, F504, & F505 BARS-TOP & BOTT.		
AJ	DISTANCE FROM FRONT FACE OF ABUTMENT STEM TO FRONT FACE OF FOOTING		
BB	LENGTH OF ABUTMENT FOOTING BACK FACE		
CC	LENGTH OF WINGWALL FOOTING BACK FACE RIGHT SIDE		
DD	LENGTH OF WINGWALL FOOTING FRONT FACE LEFT SIDE		
ABB	NUMBER OF SPACES OF TRANSVERSE STEEL - LEFT WINGWALL FOOTING BOTTOM		
ABT	NUMBER OF SPACES OF TRANSVERSE STEEL - LEFT WINGWALL FOOTING TOP		
ACB	NUMBER OF SPACES OF TRANSVERSE STEEL - LEFT FOOTING CORNER BOTTOM		
ACT	NUMBER OF SPACES OF TRANSVERSE STEEL - LEFT FOOTING CORNER TOP		
ADB	NUMBER OF SPACES OF TRANSVERSE STEEL - ABUTMENT FOOTING BOTTOM		
ADT	NUMBER OF SPACES OF TRANSVERSE STEEL - ABUTMENT FOOTING TOP		
AFB	NUMBER OF SPACES OF TRANSVERSE STEEL - RIGHT FOOTING CORNER BOTTOM		
AFT	NUMBER OF SPACES OF TRANSVERSE STEEL - RIGHT FOOTING CORNER TOP		
AGB	NUMBER OF SPACES OF TRANSVERSE STEEL - RIGHT WINGWALL FOOTING BOTTOM		
AGT	NUMBER OF SPACES OF TRANSVERSE STEEL - RIGHT WINGWALL FOOTING TOP		
SP1	CENTER-TO-CENTER SPACING OF TRANSVERSE STEEL - LEFT WINGWALL FOOTING BOTTOM		
SP2	CENTER-TO-CENTER SPACING OF TRANSVERSE STEEL - LEFT WINGWALL FOOTING TOP		
SP3	CENTER-TO-CENTER SPACING OF TRANSVERSE STEEL - LEFT FOOTING CORNER BOTTOM		
SP4	CENTER-TO-CENTER SPACING OF TRANSVERSE STEEL - LEFT FOOTING CORNER TOP		
SP5	CENTER-TO-CENTER SPACING OF TRANSVERSE STEEL - ABUTMENT FOOTING BOTTOM		
SP6	CENTER-TO-CENTER SPACING OF TRANSVERSE STEEL - ABUTMENT FOOTING TOP		
SP7	CENTER-TO-CENTER SPACING OF TRANSVERSE STEEL - RIGHT FOOTING CORNER BOTTOM		
SP8	CENTER-TO-CENTER SPACING OF TRANSVERSE STEEL - RIGHT FOOTING CORNER TOP		
SP9	CENTER-TO-CENTER SPACING OF TRANSVERSE STEEL - RIGHT WINGWALL FOOTING BOTTOM		
SP10	CENTER-TO-CENTER SPACING OF TRANSVERSE STEEL - RIGHT WINGWALL FOOTING TOP		
℄	ANGLE LEFT WINGWALL IS OFFSET FROM ABUTMENT		
#	ANGLE RIGHT WINGWALL IS OFFSET FROM ABUTMENT		
(1)	BAR SIZE OF TOP TRANSVERSE REINFORCING STEEL		
(2)	BAR SIZE OF BOTTOM TRANSVERSE REINFORCING STEEL		
—	STEM HEIGHT		

BAR FORMULAE

MARK	NO. OF BARS	LENGTH
F503	2(AC)+2	DD-4"
F504	4(AE)+4	K/2+10"
F505	2(AE)+2	X-4"
F(1)01	AB+AC+AD+AF+AG+1	Z-6"
F(2)02	AB+AC+AD+AF+AG+1	Z-6"



F506 OR F507

BILL OF REINFORCING STEEL BARS

MARK	BAR TYPE	NO. OF BARS ABUT. 1	NO. OF BARS ABUT. 2	LGTH. EA. BAR ABUT. 1	LGTH. EA. BAR ABUT. 2	TOT. LENGTH ABUT. 1	TOT. LENGTH ABUT. 2	TOT. WEIGHT ABUT. 1	TOT. WEIGHT ABUT. 2
F503	STR.								
F504	STR.								
F505	STR.								
F506	BENT			3'-2"	3'-2"				
F507	BENT			3'-2"	3'-2"				
F(1)01	STR.								
F(2)02	STR.								

ESTIMATE OF QUANTITIES

ITEM NO.	DESCRIPTION	UNIT	QUANTITY ABUT. 1	QUANTITY ABUT. 2
601-2	CLASS B CONCRETE FOR SUBSTRUCTURE FOOTING	C.Y.		
602-1	REINFORCING STEEL BARS	LB.		

NOTE: THIS SHEET TO BE USED WITH STANDARD SHEETS BR-13, 14, 15, 16 AND 7-S IF APPLICABLE.

W. VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS

REINFORCED CONCRETE ABUTMENT

ABUTMENT FOOTING

STANDARD SHEET BR-17A

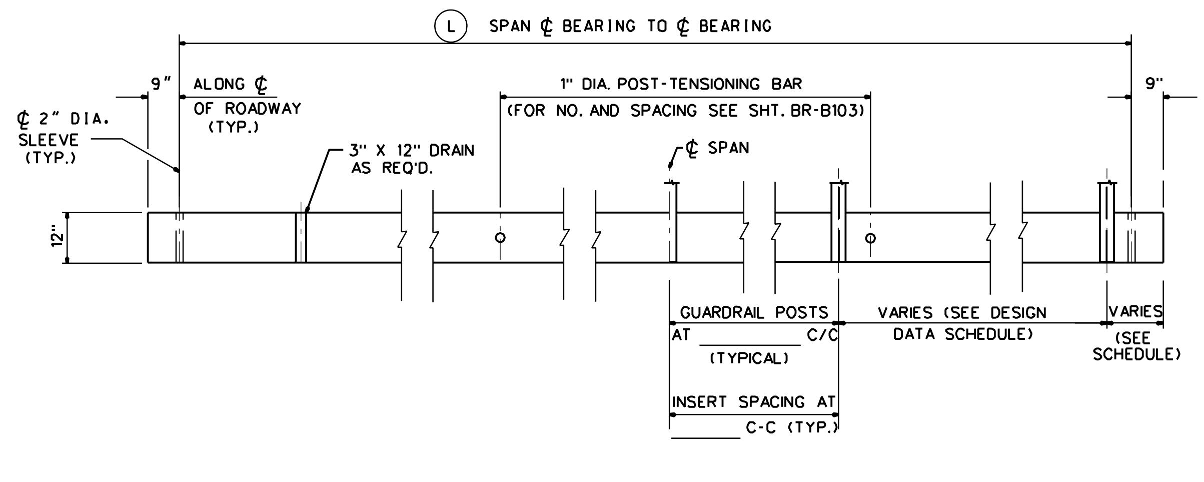
REVISED
5-77
5-82
9-88

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

ABUTMENT FOOTING

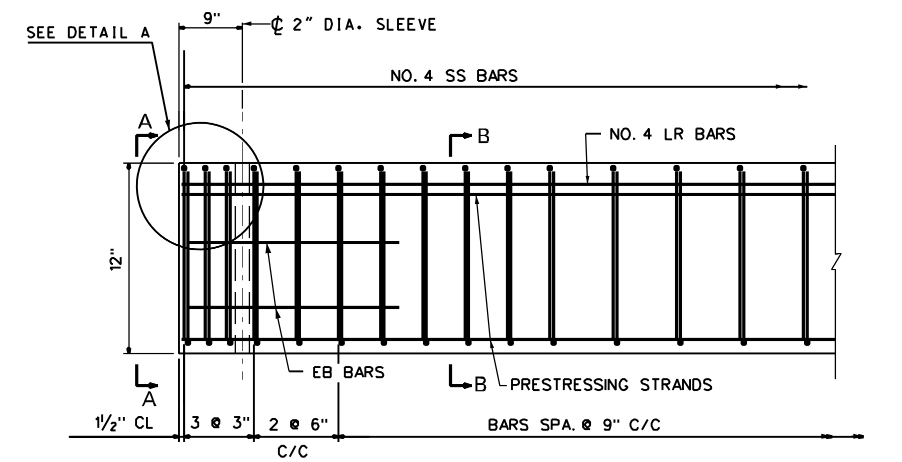
DESIGNED BY:	
DRAWN BY:	wgb.
CHECKED BY:	
REVIEWED BY:	
DATE:	MAY, 1977
SCALE:	NONE
SHEET	OF
	BRIDGE NUMBER

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.VA.					



1/2 LONGITUDINAL SECTION

1/2 ELEVATION

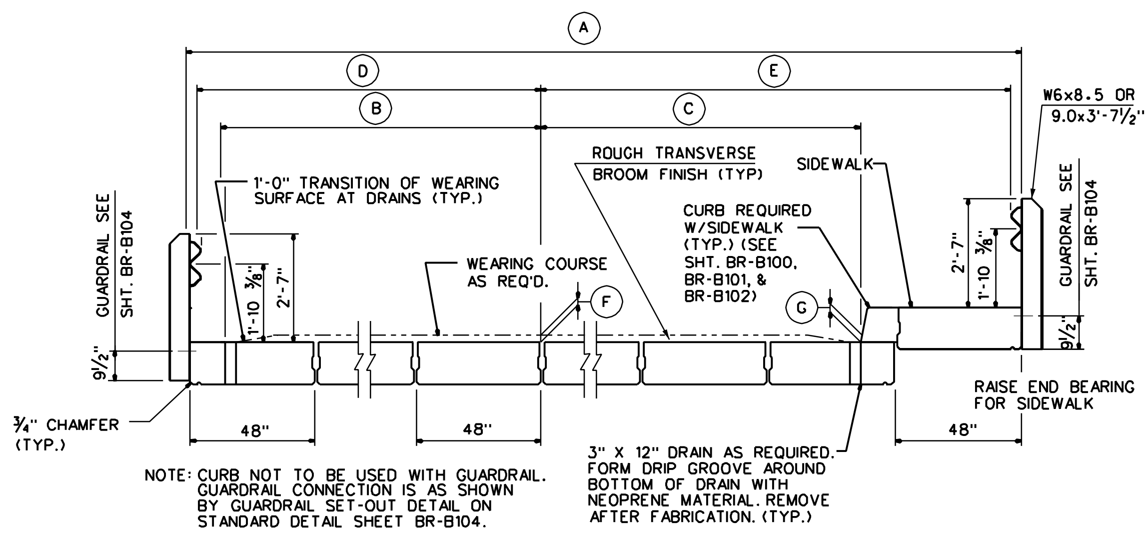


NOTE: SEE SHEET BR-B101 FOR REINFORCING BAR DETAILS AND FOR REINFORCEMENT LAYOUT DETAILS FOR SKEWED BEAMS.

REINFORCING STEEL ELEV. VIEW

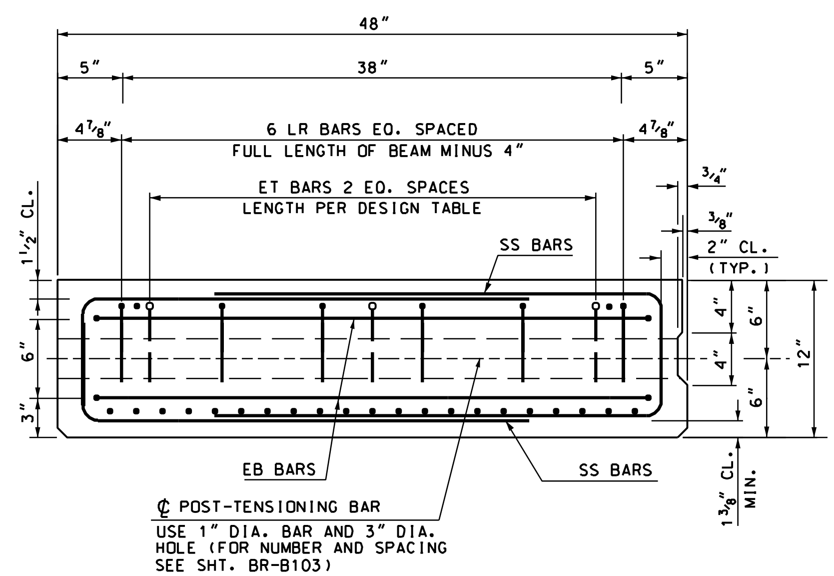
NOTES:

1. ALL NON-PRESTRESSING REINFORCING BARS SHALL BE GRADE 60.
2. ALL LAP SPLICE LENGTHS, EXCEPT WHERE SHOWN, SHALL BE AS IN TABLE ON SHEET BR-B101.
3. ALL REINFORCING STEEL BARS SHALL BE EPOXY COATED.
4. ALL STRANDS SHALL BE ENCLOSED INSIDE STIRRUP CAGE ENTIRE LENGTH OF BEAM.
5. THIS SHEET TO BE USED WITH STANDARD SHEET NUMBERS BR-1 OR BR-1A, BR-S12B, BR-B100, BR-B101, BR-B102, BR-B13, AND BR-B104.
6. WHEN STRAND NO. 23 IS USED, SEE SHEET BR-B101 FOR DETAIL OF 2" DIA. ANCHOR SLEEVE. OPTION NO. 2 IS NOT PERMITTED FOR THIS SECTION.

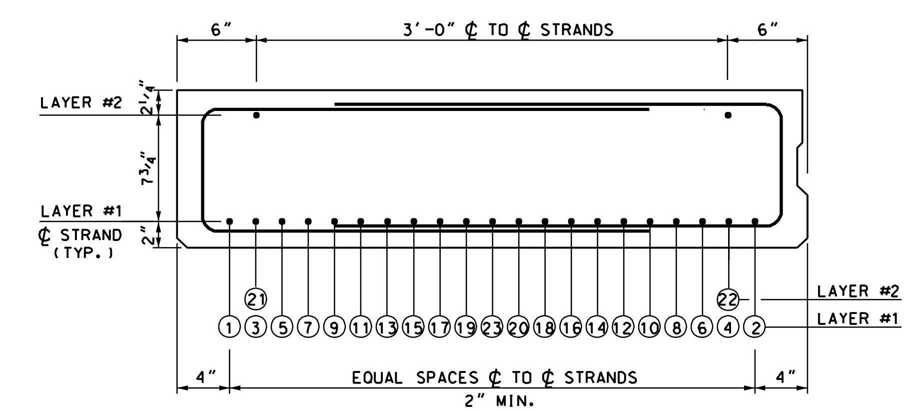


NOTE: CURB NOT TO BE USED WITH GUARDRAIL. GUARDRAIL CONNECTION IS AS SHOWN BY GUARDRAIL SET-OUT DETAIL ON STANDARD DETAIL SHEET BR-B104.

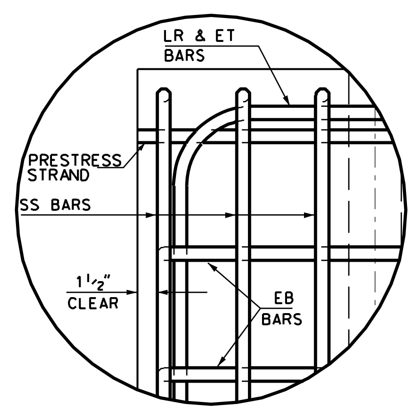
TYPICAL CROSS-SECTION (AT MID-SPAN)



SECTION A-A
TYPICAL BEAM REINFORCEMENT



SECTION B-B
TYPICAL BEAM PRESTRESSING



DETAIL A

CONTROL DIMENSIONS

CODE	DESCRIPTION	VALUE
(A)	DECK WIDTH, OUT TO OUT	
(B)	DISTANCE FROM ℄ ROADWAY TO FACE OF CURB (NO SIDEWALK)	
(C)	DISTANCE FROM ℄ ROADWAY TO FACE OF CURB (WITH SIDEWALK)	
(D)	DISTANCE FROM ℄ ROADWAY TO FACE OF GUARDRAIL (NO SIDEWALK)	
(E)	DISTANCE FROM ℄ ROADWAY TO FACE OF GUARDRAIL (WITH SIDEWALK)	
(F)	THICKNESS OF WEARING COURSE AT ℄ ROADWAY	
(G)	THICKNESS OF WEARING COURSE AT FACE OF CURB	
(L)	SPAN LENGTH, ℄ BEARING TO ℄ BEARING	
OPTIONAL 10" CURB TO BE INCLUDED (YES OR NO)		
OPTIONAL PARAPET TO BE INCLUDED (YES OR NO) (REQUIRES SPECIAL DESIGN)		
TOE PLATE REQUIRED (YES OR NO)		

DESCRIPTION	VALUE
HOT-LAID BITUMINOUS CONCRETE REQUIRED (YES OR NO)	
GUARDRAIL REQUIRED (YES OR NO)	
DRAINS REQUIRED (YES OR NO)	
CURTAIN WALL REQUIRED (YES OR NO)	
GUARDRAIL SETOUT REQUIRED (YES OR NO)	
GUARDRAIL BLOCKOUT REQUIRED (YES OR NO)	

STRANDS ___,___ TO BE MOVED TO ___,___ RESPECTIVELY TO ACCOMODATE DRAIN.

APPROVED _ _ _ DIRECTOR, STRUCTURES DIVISION _ DATE _ _ _

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-STRUCTURES
12"x4'-0" PRESTRESSED CONCRETE PLANK BEAMS
DESIGN & ASSEMBLY DETAILS
STANDARD SHEET BR-S12A

PREPARED: 9-96
REVISED:

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-STRUCTURES

DESIGNED BY: ANK/
DRAWN BY: JRB.DWW
CHECKED BY:
REVIEWED BY:
DATE:
SCALE: NONE
SHEET NO.: OF

12"x4'-0" PRESTRESSED PLANK BEAM DESIGN & ASSEMBLY DETAILS

BRIDGE NUMBER

DD-MMM-YYYY HH:MM
$USERNAME$
$$$$$$$$FILENAME$$$$$$$$
D03R14C90-SS

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.VA.					

MIN. CONCRETE STRENGTH @ DETENSION = 4,000 PSI.
MIN. CONCRETE STRENGTH @ 28 DAYS = 5,000 PSI.
JACKING FORCE /LOW RELAX STRAND = 30,980 LBS.

DESIGN DATA FOR 12" X 4'-0" PLANK BEAM

(L) SPAN LENGTH ℄ TO ℄ BEARING		10'	11'	12'	13'	14'	15'	16'	17'	18'	19'	20'	21'	22'	(4)	(4)	(4)	(4)
OVERALL LENGTH ALONG ℄ ROADWAY		11'-6"	12'-6"	13'-6"	14'-6"	15'-6"	16'-6"	17'-6"	18'-6"	19'-6"	20'-6"	21'-6"	22'-6"	23'-6"				
NO. OF GRADE 270, 1/2" DIA. LOW-RELAX. STRANDS. AREA/STRAND= 0.153 SQ. IN.		7	8	8	8	8	9	9	10	10	11	12	12	13				
STRAND POSITION NUMBER		1,2,11,12, 21,22 & 23	1,2,9,10, 17,18, 21 & 22	1,2,9,10, 17,18 21 & 22	1,2,9,10, 17,18 21 & 22	1,2,9,10, 17,18 21 & 22	1,2,7,8, 15,16, 21,22 & 23	1,2,7,8, 15,16, 21,22 & 23	1,2,7,8, 13,14,19, 20,21 & 22	1,2,5,6, 13,14,19, 20,21 & 22	1,2,7,8, 13,14,19, 20,21, 22 & 23	1,2,5,6, 9,10,13,14, 17,18, 21 & 22	1,2,5,6, 9,10,13,14, 17,18, 21 & 22	1,2,5,6, 9,10,13,14, 17,18, 21,22 & 23				
PRESTRESSING FORCE AT DETENSION (KIPS/BEAM)		212	241	241	241	241	271	271	300	300	329	358	358	386				
FINAL PRESTRESSING FORCE (KIPS/BEAM)		197	223	223	223	223	249	249	274	275	300	324	325	349				
ULTIMATE DESIGN MOMENT (FT-KIPS/BEAM)		123	135	147	160	173	186	199	213	227	241	255	270	285				
ULTIMATE RESISTING MOMENT (FT-KIPS/BEAM)		162	189	189	189	189	215	215	240	240	264	288	288	310				
TOTAL NUMBER OF DEBONDED STRANDS		-	-	-	-	-	-	-	-	-	-	-	-	-				
LAYER 1-DEBONDED STRAND POSITION NUMBER AND LENGTH FROM EACH END		-	-	-	-	-	-	-	-	-	-	-	-	-				
LAYER 2-DEBONDED STRAND POSITION NUMBER AND LENGTH FROM EACH END		-	-	-	-	-	-	-	-	-	-	-	-	-				
END TENSION STEEL EACH END (SIZE & LENGTH)		3-#4 x 3'-0"	3-#4 x 3'-0"	3-#4 x 3'-0"	3-#4 x 3'-0"	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 5'-0"				
CAMBER (3)	DETENSION, INCHES +=UPWARD (in)	0.02	0.04	0.04	0.05	0.05	0.07	0.08	0.11	0.11	0.15	0.19	0.20	0.25				
	ERECTION, INCHES +=UPWARD (in)	0.04	0.07	0.07	0.08	0.08	0.12	0.13	0.18	0.18	0.24	0.31	0.32	0.40				
	FINAL, INCHES +=UPWARD (in)	0.05	0.08	0.09	0.09	0.10	0.15	0.15	0.21	0.21	0.28	0.36	0.36	0.45				
WEIGHT OF TYPICAL BEAM (TONS) (1),(2)		3.4	3.7	4.0	4.3	4.6	4.9	5.2	5.5	5.8	6.1	6.3	6.6	6.9				
NUMBER AND SPACING OF GUARDRAIL INSERTS	NO. OF INSERTS	4	4	5	5	5	6	6	6	7	7	7	8	8				
	END OF BEAM TO ℄ OF FIRST INSERT EACH END	1'-9"	1'-9"	1'-9"	1'-9"	1'-9"	1'-9"	1'-9"	1'-9"	1'-9"	1'-9"	1'-9"	1'-9"	1'-9"				
	℄ OF FIRST INSERT TO ℄ SECOND INSERT EACH END	2'-5 1/4"	2'-11 1/4"	1'-10 1/2"	2'-4 1/2"	2'-10 1/2"	1'-9 3/4"	2'-3 3/4"	2'-9 3/4"	1'-9"	2'-3"	2'-9"	1'-8 1/4"	2'-2 1/4"				

NOTES:

1. BEAM WEIGHTS LISTED IN DESIGN TABLES IS APPROXIMATE AND IS BASED ON ZERO SKEW.
2. FOR STANDARD CURB, ADD 93 LBS. (0.05 TON) PER CURB, PER FOOT OF BEAM.
3. CAMBER VALUES LISTED IN DESIGN TABLE ARE APPROXIMATE AND ARE FOR COMPARISON PURPOSES ONLY. NOT TO BE USED FOR INSPECTION PURPOSES UNLESS PERMITTED BY THE DIRECTOR OF STRUCTURES DIVISION.
4. DATA LISTED IN THE DESIGN TABLE MAY NOT BE VALID FOR SPAN LENGTHS THAT FALL BETWEEN THE SPAN LENGTHS LISTED. IF DIFFERENCES ARE ENCOUNTERED, CALCULATE AND ENTER SPECIFIC DATA FOR BEAM LENGTH REQUIRED IN THIS COLUMN.
5. THIS SHEET TO BE USED WITH STANDARD SHEET NUMBERS BR-1 OR BR-1A, BR-S12A, BR-B100, BR-B101, BR-B102, BR-B103, AND BR-B104.
6. MAXIMUM BEAM SKEW SHALL BE 30 DEGREES.
7. DESIGNER, FABRICATOR AND ERECTOR SHALL BE AWARE THAT SKEWED BEAM ENDS MAY TWIST OR WARP, CAUSING UNEVEN BEAM SEATING AT THE BEARINGS. CONTRACTOR IS REQUIRED TO CORRECT AT THE TIME OF BEAM ERECTION, BEFORE BEAMS ARE SECURED IN PLACE. METHOD OF CORRECTION SHALL PROVIDE EVEN, TOTAL BEARING ON THE PADS AND A LEVEL TOP BEAM SURFACE. METHOD SHALL BE A PRE-APPROVED METHOD BY DIRECTOR OF STRUCTURES DIVISION.
8. BEAM FABRICATOR SHALL NOTIFY CONTRACTOR THAT BEAM ENDS ARE TWISTED PRIOR TO SHIPPING OF BEAMS.
9. DEBONDING OF STRANDS IS NOT PERMITTED FOR THIS BEAM SECTION.

APPROVED _ _ _ DIRECTOR, STRUCTURES DIVISION _ _ DATE _ _ _

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-STRUCTURES
DESIGN TABLE FOR 12" X 4'-0"
PRESTRESSED PLANK BEAM

STANDARD SHEET BR-S12B

PREPARED: 9-96
REVISED:

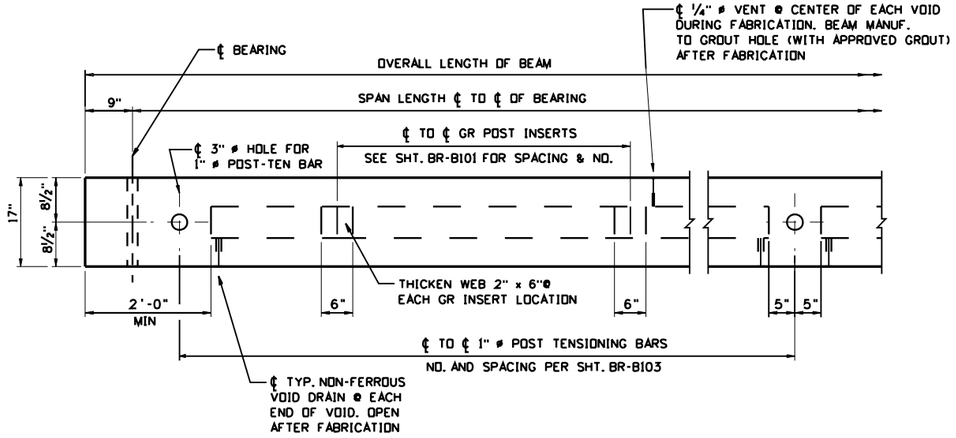
THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS-STRUCTURES

DESIGNED BY: ANK/
DRAWN BY: DWW/
CHECKED BY:
REVIEWED BY:
DATE:
SCALE: NONE
SHEET NO. OF BRIDGE NUMBER

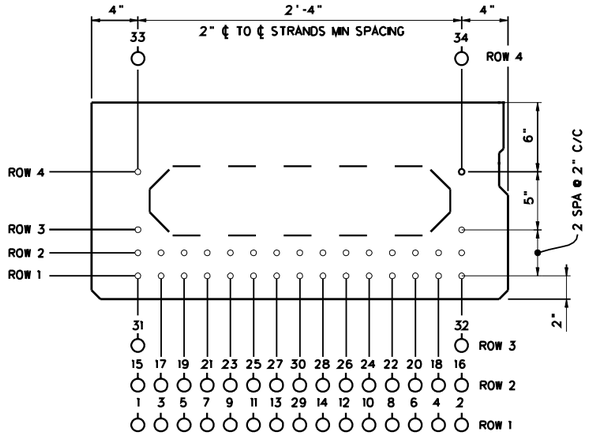
DESIGN TABLE FOR 12" X 4'-0"
PRESTRESSED PLANK BEAM

$$$$$$$$$$FILENAME$$$$$$$$ $USERNAME$ DD-MMM-YYYY HH:MM
D:\SR14\C90\SS

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				

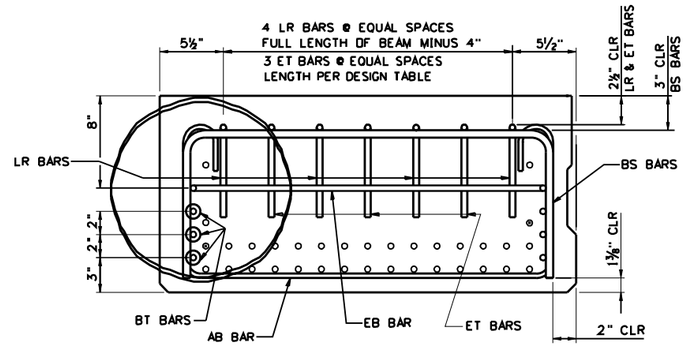


GENERAL ELEVATION VIEW

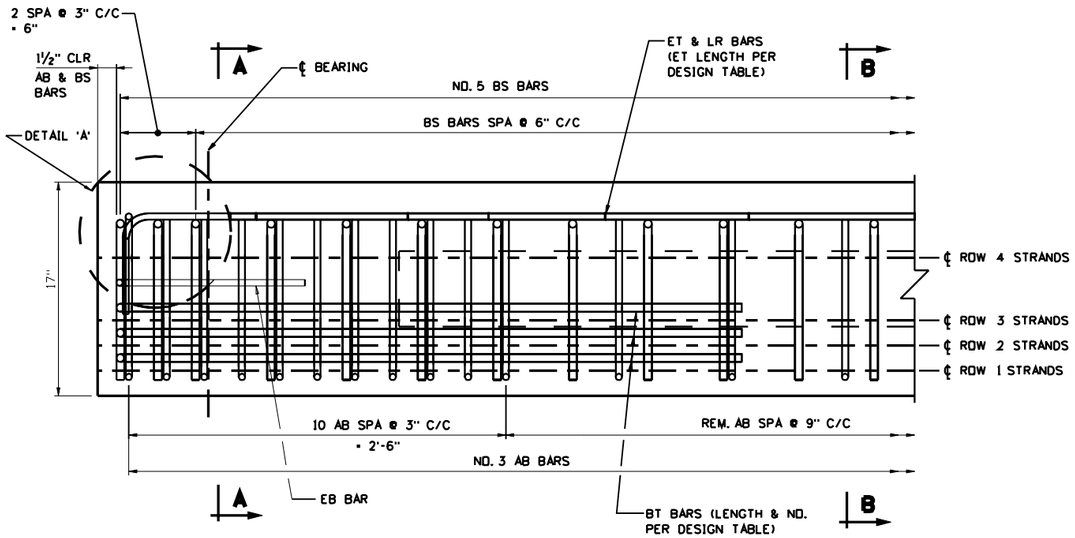


BEAM PRESTRESSING

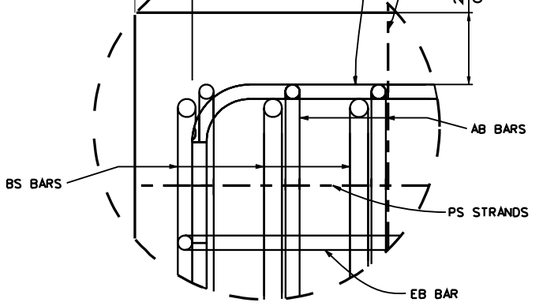
TYPICAL @ BEAM END & MIDSPAN



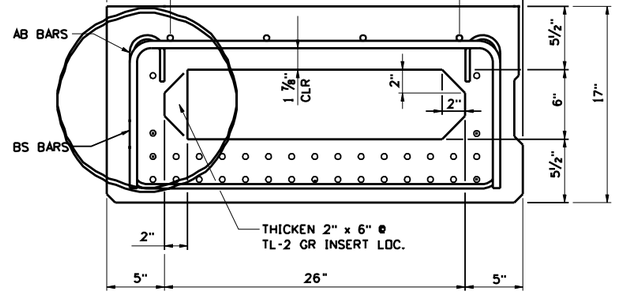
SECTION A-A



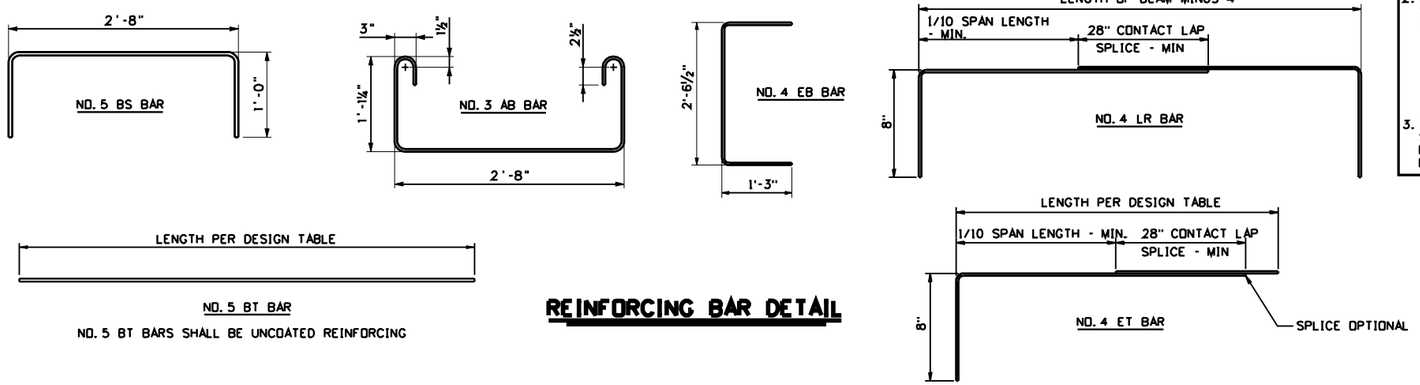
REINFORCING STEEL ELEVATION



DETAIL "A"



SECTION B-B



REINFORCING BAR DETAIL

NOTES:

1. REFER TO SHEET BR-B102A FOR SHEAR KEY DETAILS.
2. 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 _____
3. 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.

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

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

PREPARED: 07-02-07

REVISED:

17" PRESTRESSED CONCRETE BOX BEAMS
DESIGN AND ASSEMBLY DETAILS

STANDARD SHEET BR-B17A

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

17" PRESTRESSED BOX BEAM
DESIGN AND ASSEMBLY DETAILS

DESIGNED BY:	TW/
DRAWN BY:	BH/
CHECKED BY:	THB/
REVIEWED BY:	TW/
DATE:	
SCALE:	
SHEET	OF
BRIDGE NO.	

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS

DESIGN DATA FOR 17" DEPTH ADJACENT BOX BEAM

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"				
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"				
NO. OF 270 KSI, ½" ø LOW-RELAXATION STRANDS, AREA/STRAND = 0.167 SQ. IN.		10	10	10	10	12	12	14	14	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				
	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	17,18,21,22, 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				
PRESTRESSING FORCE IMMEDIATELY AFTER STRAND RELEASE, Ppt, (KIPS/BEAM)		326	326	326	326	389	389	451	451	512	512	513				
EFFECTIVE PRESTRESSING FORCE AFTER ALL LOSSES, Ppe, (KIPS/BEAM)		293	293	294	294	345	346	396	397	443	445	447				
REQUIRED FACTORED MOMENT @ STRENGTH I, Mu (FT-KIPS/BEAM)		204	231	260	289	319	349	382	415	453	491	531				
FACTORED FLEXURAL RESISTANCE, Mr (FT-KIPS/BEAM)		408	408	408	408	496	496	566	566	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"				
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 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	0.62	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				
	@ FINAL	0.27	0.29	0.30	0.30	0.53	0.53	0.71	0.69	1.03	0.99	0.92				
NUMBER & SPACING OF TL-2 GUARDRAIL INSERTS SEE NOTE 6	NO OF INSERTS REQD.															
	END OF BEAM TO ℄ OF FIRST INSERT EA. END															
	℄ OF 1st INSERT TO ℄ 2nd INSERT EA. END															
WEIGHT OF TYPICAL BEAM INCLUDING DIAPHRAGM (TONS)		5.6	6.1	6.6	7.1	7.6	8.1	8.6	9.1	9.6	10.1	10.6				

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.

NOTES

1. 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 DIAPHRAGRMS 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.

2. 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.

3. 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.

4. 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.

5. MAXIMUM BEAM SKEW SHALL BE 30 DEGREES.

6. 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.

7. 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.

8. 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: Gregory 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

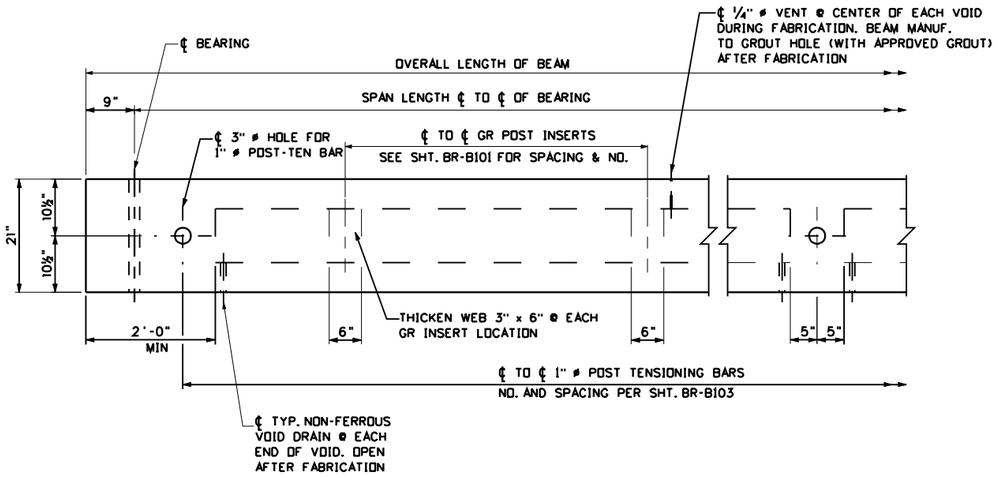
REVISED:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

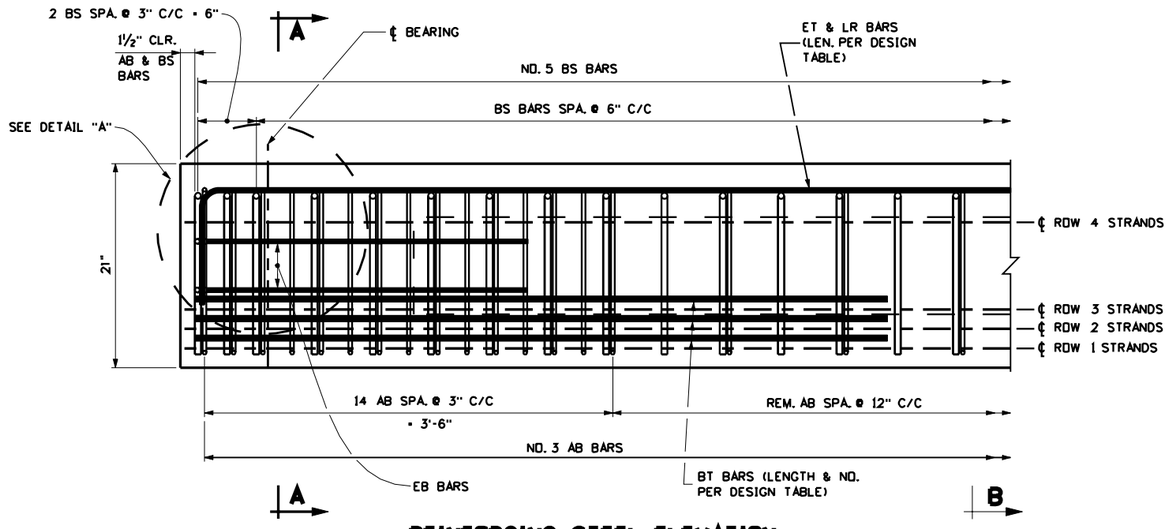
DESIGNED BY: THB/
DRAWN BY: THB/
CHECKED BY: TM/
REVIEWED BY: TW/
DATE:
SCALE:
SHEET NO OF
BRIDGE NUMBER

DESIGN TABLE FOR 17"
PRESTRESSED BOX BEAM

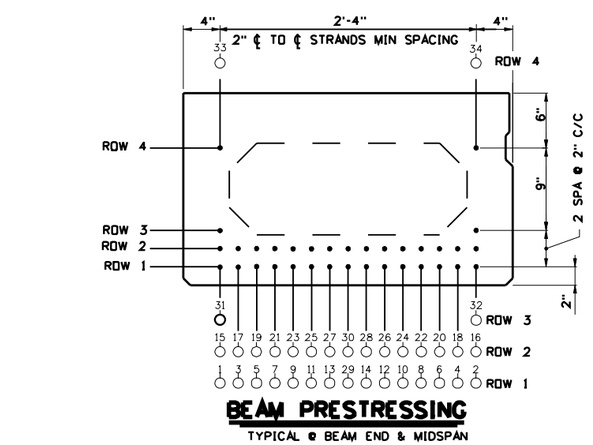
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



GENERAL ELEVATION VIEW

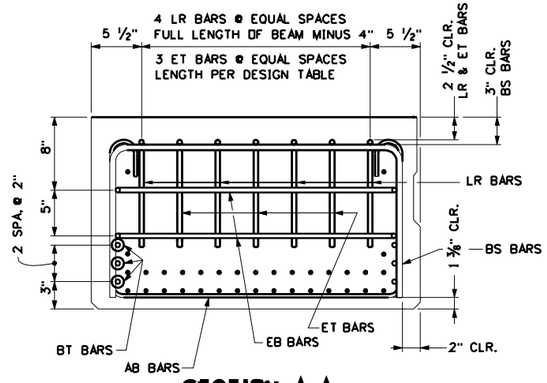


REINFORCING STEEL ELEVATION

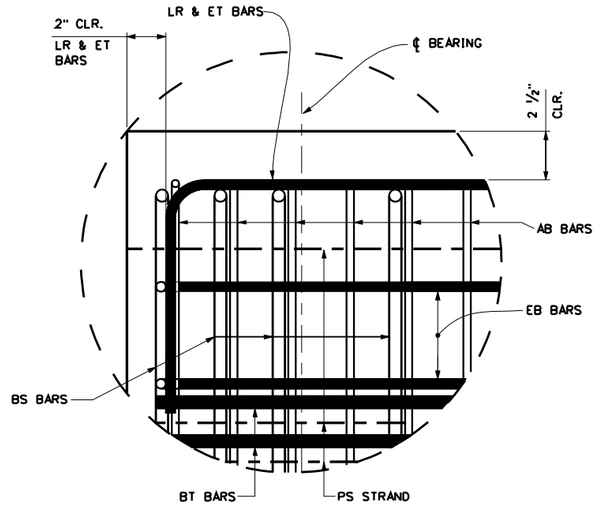


BEAM PRESTRESSING

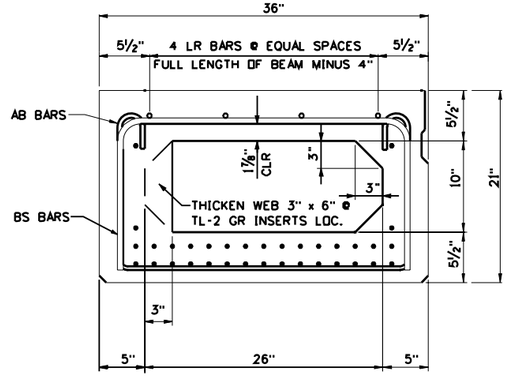
TYPICAL @ BEAM END & MIDSPAN



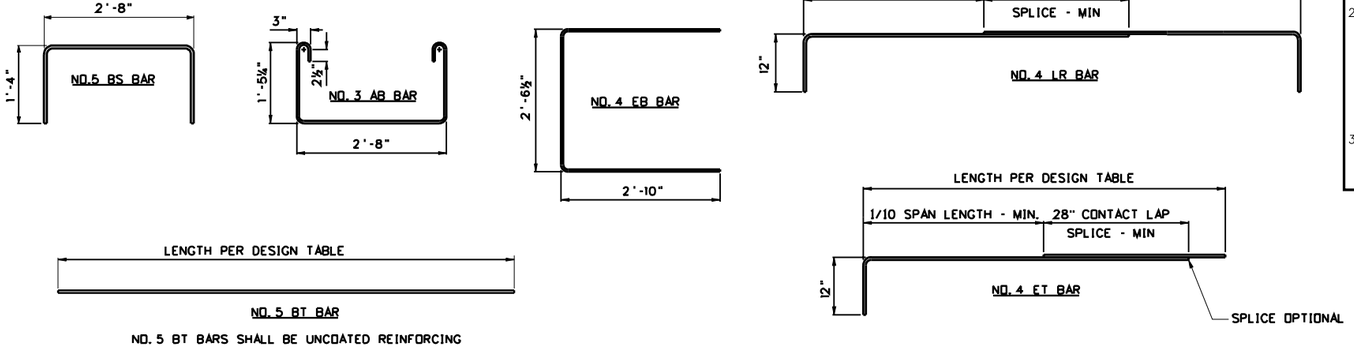
SECTION A-A



DETAIL "A"



SECTION B-B



NO. 5 BT BARS SHALL BE UNCOATED REINFORCING

REINFORCING BAR DETAIL

NOTES:

1. REFER TO SHEET BR-B102A FOR SHEAR KEY DETAILS.
2. 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 ——
3. THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B21B, 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.

APPROVED: Gregory S. Bailey — DIRECTOR, ENGINEERING DIVISION — DATE: 10-25-07

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

21" PRESTRESSED CONCRETE
BOX BEAMS
DESIGN AND ASSEMBLY DETAILS

STANDARD SHEET BR-B21A

PREPARED: 07-02-07

REVISED:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

DESIGNED BY: TW/	
DRAWN BY: BH/	
CHECKED BY: TW/	
REVIEWED BY: THB/	
DATE:	
SCALE:	
SHEET	OF
BRIDGE NO.	

21" PRESTRESSED BOX BEAM
DESIGN AND ASSEMBLY DETAILS

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS

DESIGN DATA FOR 21" DEPTH ADJACENT BOX BEAM

SPAN LENGTH ℄ TO ℄ BEARING		30'-0"	32'-0"	34'-0"	36'-0"	38'-0"	40'-0"	42'-0"	44'-0"	46'-0"	48'-0"	50'-0"				
OVERALL LENGTH OF BEAM		31'-6"	33'-6"	35'-6"	37'-6"	39'-6"	41'-6"	43'-6"	45'-6"	47'-6"	49'-6"	51'-6"				
NO. OF 270 KSI, ½" ø LOW-RELAXATION STRANDS, AREA/STRAND = 0.167 SQ. IN.		10	10	10	12	12	14	14	14	16	16	16				
STRAND POSITION NUMBER	ROW 1	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	1,2,7,8,13,14	1,2,5,6,9,10, 13,14	1,2,5,6,9,10, 13,14	1,2,5,6,9,10, 13,14				
	ROW 2	15,16,25,26	15,16,25,26	15,16,25,26	15,16,27,28	15,16,27,28	15,16,21,22, 27,28	15,16,21,22, 27,28	15,16,21,22, 27,28	15,16,21,22, 27,28	15,16,21,22, 27,28	15,16,21,22, 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				
PRESTRESSING FORCE IMMEDIATELY AFTER STRAND RELEASE, Ppt, (KIPS/BEAM)		327	328	328	391	391	453	454	454	515	516	517				
EFFECTIVE PRESTRESSING FORCE AFTER ALL LOSSES, Ppe, (KIPS/BEAM)		297	298	298	350	352	403	404	406	454	456	458				
REQUIRED FACTORED MOMENT @ STRENGTH I, Mu (FT-KIPS/BEAM)		359	393	427	465	504	545	588	639	693	746	800				
FACTORED FLEXURAL RESISTANCE, Mr (FT-KIPS/BEAM)		527	527	527	644	644	743	743	743	853	853	853				
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 4'-6"	3 - #4 x 4'-6"	3 - #4 x 5'-0"	3 - #4 x 5'-0"	3 - #4 x5'-0"	3 - #4 x 5'-6"	3 - #4 x 5'-6"	3 - #4 x 6'-0"	3 - #4 x 6'-0"	3 - #4 x 6'-0"	3 - #4 x 6'-6"				
NUMBER & LENGTH #5 BT BOTTOM TENSION BARS @ EACH END		2 - #6 x 5'-0"	2 - #5 x 5'-0"	2 - #6 x 6'-0"	2 - #5 x 6'-0"	2 - #5 x 6'-0"	2 - #5 x 6'-0"	2 - #5 x 6'-0"	2 - #5 x 6'-0"	2 - #5 x 6'-0"	2 - #5 x 6'-0"	2 - #5 x 6'-0"				
DESIGN CAMBER + = POSITIVE (UP) (INCHES)	@ RELEASE	0.15	0.15	0.15	0.26	0.27	0.37	0.38	0.38	0.55	0.55	0.54				
	@ ERECTION	0.23	0.23	0.22	0.40	0.39	0.56	0.55	0.52	0.79	0.76	0.71				
	@ FINAL	0.24	0.22	0.18	0.40	0.36	0.55	0.49	0.40	0.70	0.59	0.45				
NUMBER & SPACING OF TL-2 GUARDRAIL INSERTS SEE NOTE 6	NO OF INSERTS REQD.															
	END OF BEAM TO ℄ OF FIRST INSERT EA. END															
	℄ OF 1st INSERT TO ℄ 2nd INSERT EA. END															
WEIGHT OF TYPICAL BEAM INCLUDING DIAPHRAGM (TONS)		9.2	9.8	10.4	10.9	11.5	12.0	12.6	13.1	13.8	14.3	14.9				

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.

NOTES

1. 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 226 LBS/DIAPHRAGM.

   FOR SKEW ADD 21 LBS/DEGREE OF SKEW/END.

   FOR LONGER ENDBLOCK, ADD 271 LBS/LF/END.

2. 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.

3. 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.

4. 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.

5. MAXIMUM BEAM SKEW SHALL BE 30 DEGREES.

6. 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.

7. THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B21A, BR-B100, BR-B101, BR-B102A & B, BR-B103, BR-B104, BR-B105A & B AND BR-B106 AS APPLICABLE.

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

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

DESIGN TABLE FOR 21"
PRESTRESSED BOX BEAM

STANDARD SHEET BR-B21B

PREPARED: 07-02-07

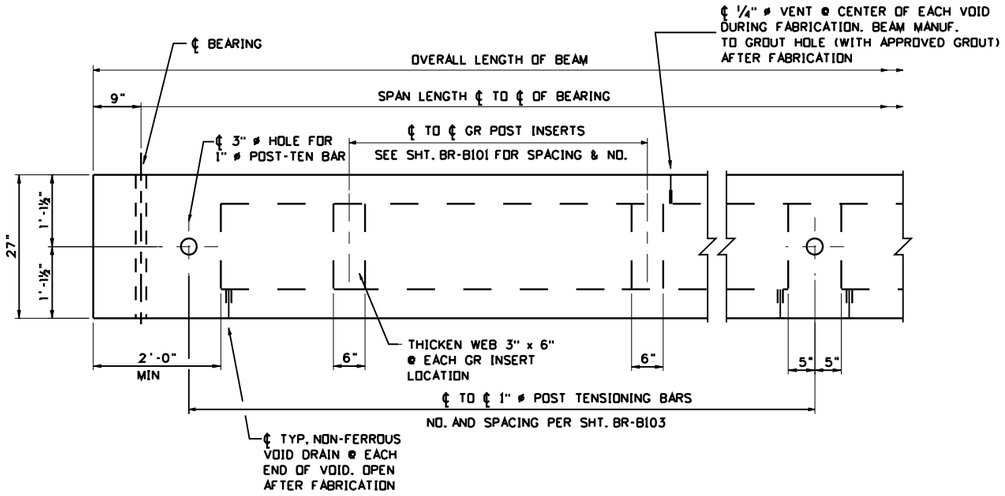
REVISED:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

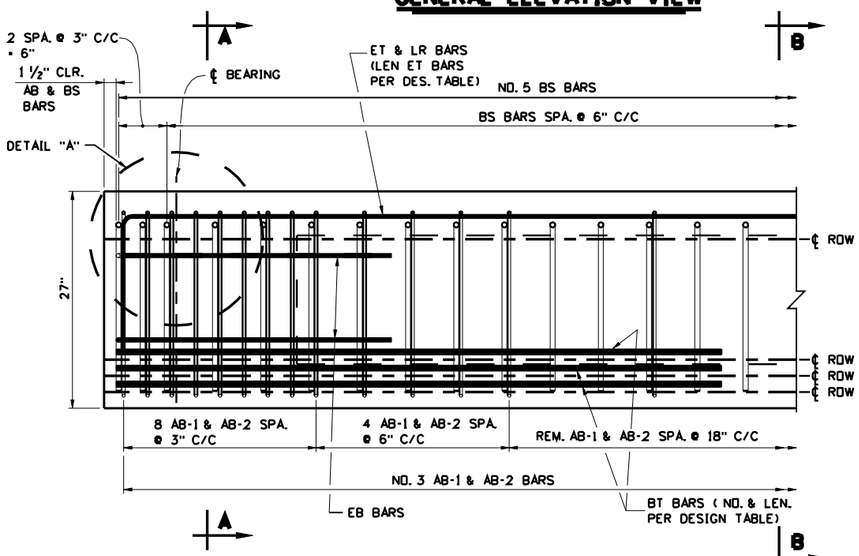
DESIGNED BY: TW/
DRAWN BY: THB/
CHECKED BY: TW/
REVIEWED BY: THB/
DATE:
SCALE:
SHEET NO OF
BRIDGE NUMBER

DESIGN TABLE FOR 21"
PRESTRESSED BOX BEAM

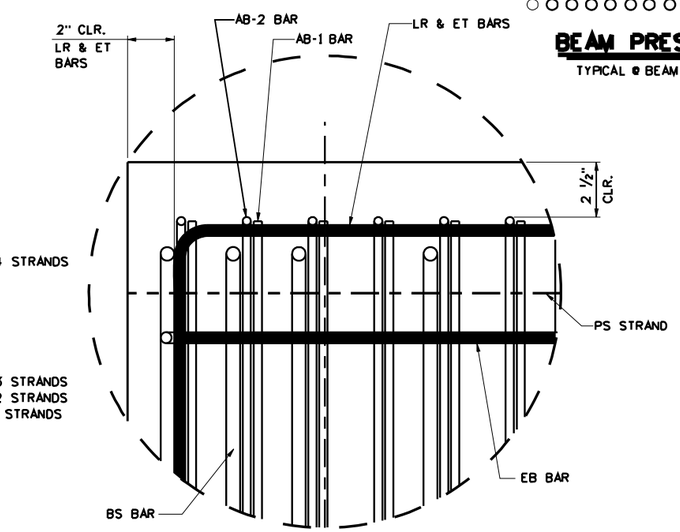
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



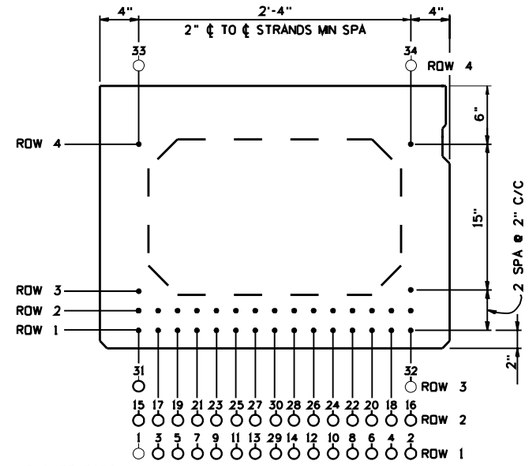
GENERAL ELEVATION VIEW



REINFORCING STEEL ELEVATION

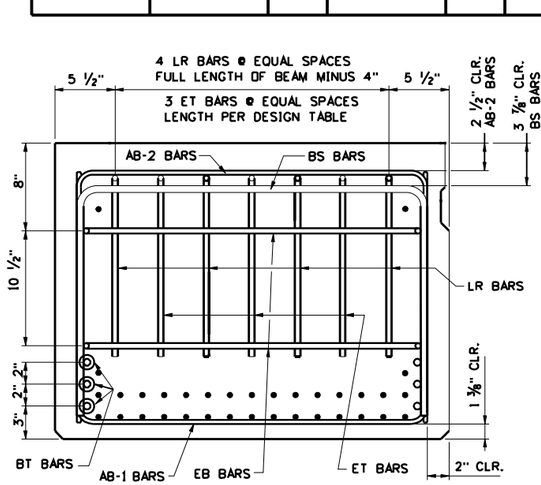


DETAIL "A"

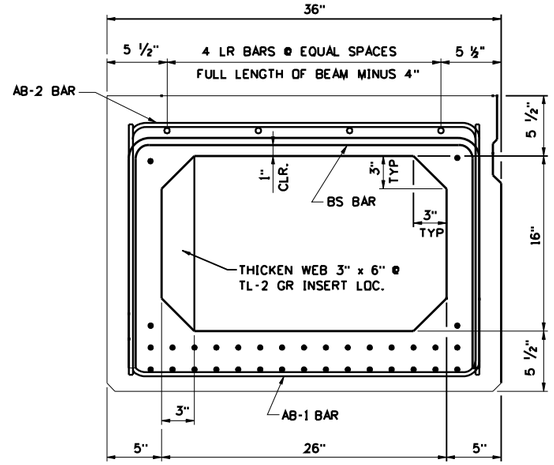


BEAM PRESTRESSING

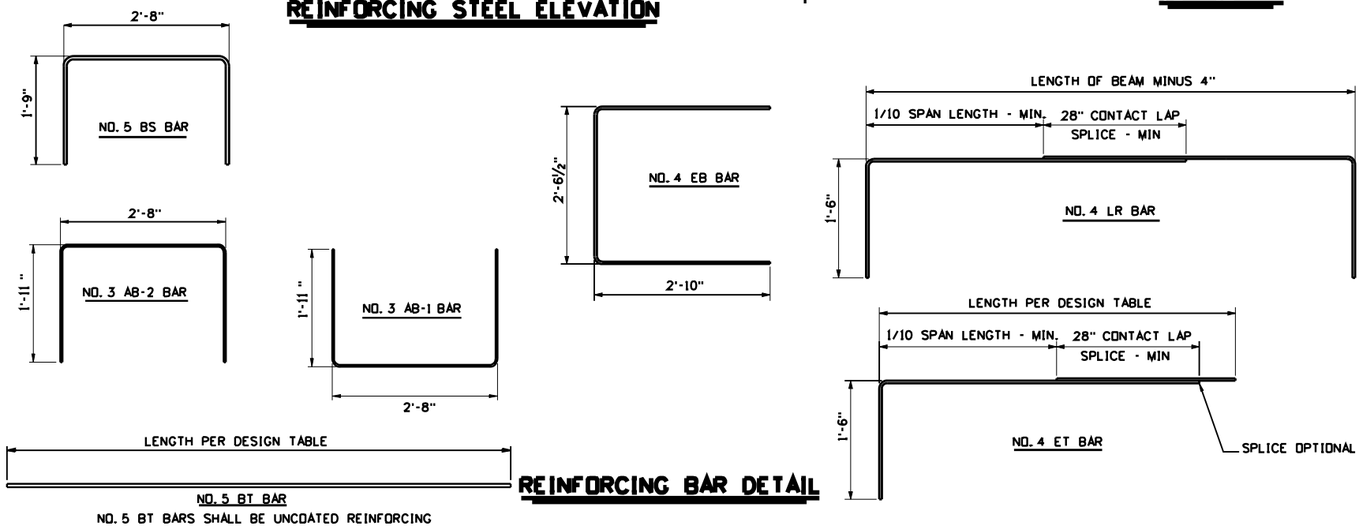
TYPICAL @ BEAM END & MIDSPAN



SECTION A-A



SECTION B-B



NO. 5 BT BARS SHALL BE UNCOATED REINFORCING

REINFORCING BAR DETAIL

NOTES:

1. REFER TO SHEET BR-B102A FOR SHEAR KEY DETAILS.
2. 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 _____
3. THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B27B, 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.

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

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

27" PRESTRESSED CONCRETE BOX BEAMS
DESIGN AND ASSEMBLY DETAILS

STANDARD SHEET BR-B27A

PREPARED: 07-02-07

REVISED:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

DESIGNED BY: TW/	
DRAWN BY: BH/	
CHECKED BY: TW/	
REVIEWED BY: THB/	
DATE:	
SCALE:	
SHEET	OF
BRIDGE NO.	

27" PRESTRESSED BOX BEAM
DESIGN AND ASSEMBLY DETAILS

DESIGN DATA FOR 27" DEPTH ADJACENT BOX BEAM

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS

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		40'-0"	42'-0"	44'-0"	46'-0"	48'-0"	50'-0"	52'-0"	54'-0"	56'-0"	58'-0"	60'-0"				
OVERALL LENGTH OF BEAM		41'-6"	43'-6"	45'-6"	47'-6"	49'-6"	51'-6"	53'-6"	55'-6"	57'-6"	59'-6"	61'-6"				
NO. OF 270 KSI, ½" ø LOW-RELAXATION STRANDS, AREA/STRAND = 0.167 SQ. IN.		10	10	12	12	12	12	14	14	16	16	18				
STRAND POSITION NUMBER	ROW 1	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	1,2,7,8,13,14	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				
	ROW 2	15,16,25,26	15,16,25,26	15,16,27,28	15,16,27,28	15,16,27,28	15,16,27,28	15,16,21,22, 27,28	15,16,21,22, 27,28	15,16,21,22 27,28	15,16,21,22, 27,28	15,16,19,20, 23,24,27,28				
	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				
PRESTRESSING FORCE IMMEDIATELY AFTER STRAND RELEASE, Ppt, (KIPS/BEAM)		329	329	392	393	393	393	456	457	519	519	581				
EFFECTIVE PRESTRESSING FORCE AFTER ALL LOSSES, Ppe, (KIPS/BEAM)		301	302	355	356	357	358	411	413	463	465	514				
REQUIRED FACTORED MOMENT @ STRENGTH I, Mu (FT-KIPS/BEAM)		563	608	660	717	772	829	887	946	1007	1069	1132				
FACTORED FLEXURAL RESISTANCE, Mr (FT-KIPS/BEAM)		706	706	868	868	868	868	1011	1011	1164	1164	1299				
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 5'-6"	3 - #4 x 5'-6"	3 - #4 x 6'-0"	3 - #4 x 6'-0"	3 - #4 x 6'-0"	3 - #4 x 6'-6"	3 - #4 x 6'-6"	3 - #4 x 7'-0"	3 - #4 x 7'-0"	3 - #4 x 7'-0"	3 - #4 x 7'-6"				
NUMBER & LENGTH #5 BT BOTTOM TENSION BARS @ EACH END		6 - #5 x 7'-0"	6 - #5 x 7'-0"	6 - #5 x 7'-0"	6 - #5 x 7'-0"	6 - #5 x 7'-0"	6 - #5 x 7'-0"	6 - #5 x 7'-0"	6 - #5 x 7'-6"	4 - #5 x 7'-6"	4 - #5 x 7'-6"	4 - #5 x 8'-0"				
DESIGN CAMBER + = POSITIVE (UP) (INCHES)	@ RELEASE	0.13	0.13	0.23	0.23	0.22	0.21	0.33	0.32	0.48	0.47	0.62				
	@ ERECTION	0.18	0.15	0.34	0.31	0.28	0.24	0.42	0.37	0.64	0.58	0.82				
	@ FINAL	0.13	0.07	0.14	0.22	0.14	0.04	0.25	0.13	0.44	0.30	0.55				
NUMBER & SPACING OF TL-2 GUARDRAIL INSERTS SEE NOTE 6	NO OF INSERTS REQD.															
	END OF BEAM TO ℄ OF FIRST INSERT EA. END															
	℄ OF 1st INSERT TO ℄ 2nd INSERT EA. END															
WEIGHT OF TYPICAL BEAM INCLUDING DIAPHRAGM (TONS)		13.8	14.4	15.0	15.7	16.3	16.9	17.5	18.1	18.7	19.3	19.9				

NOTES

1. 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 361 LBS/DIAPHRAGM.

   FOR SKEW ADD 27 LBS/DEGREE OF SKEW/END.

   FOR LONGER ENDBLOCK, ADD 433 LBS/LF/END.

2. 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.

3. 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.

4. 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.

5. MAXIMUM BEAM SKEW SHALL BE 30 DEGREES.

6. 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.

7. THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B27A, BR-B100, BR-B101, BR-B102A & B, BR-B103, BR-B104, BR-B105A & B AND BR-B106 AS APPLICABLE.

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

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

DESIGN TABLE FOR 27"
PRESTRESSED BOX BEAM

STANDARD SHEET BR-B27B

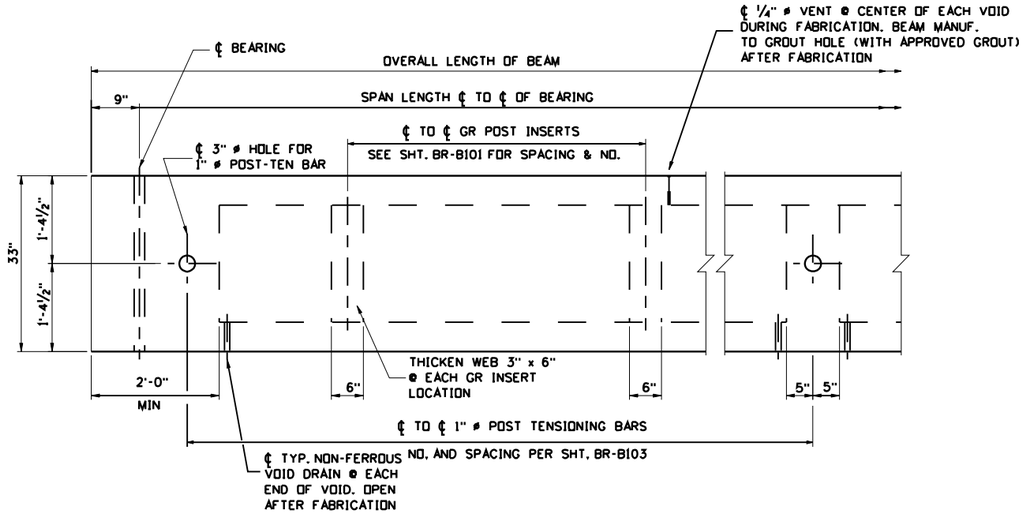
PREPARED: 07-02-07
REVISED:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

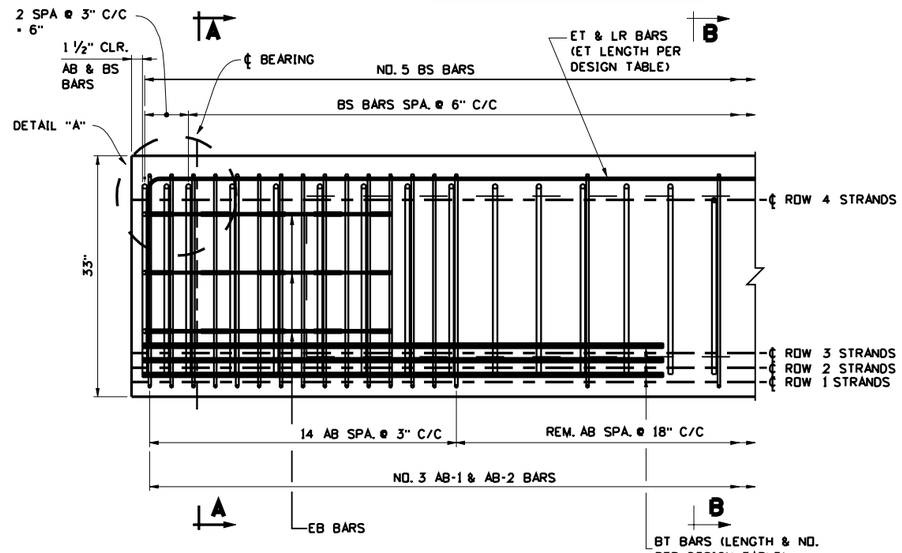
DESIGNED BY: THB/
DRAWN BY: THB/
CHECKED BY: TW/
REVIEWED BY: TW/
DATE:
SCALE:
SHEET NO OF
BRIDGE NUMBER

DESIGN TABLE FOR 27"
PRESTRESSED BOX BEAM

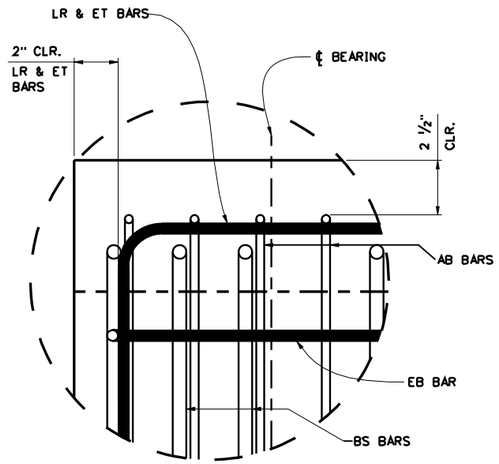
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



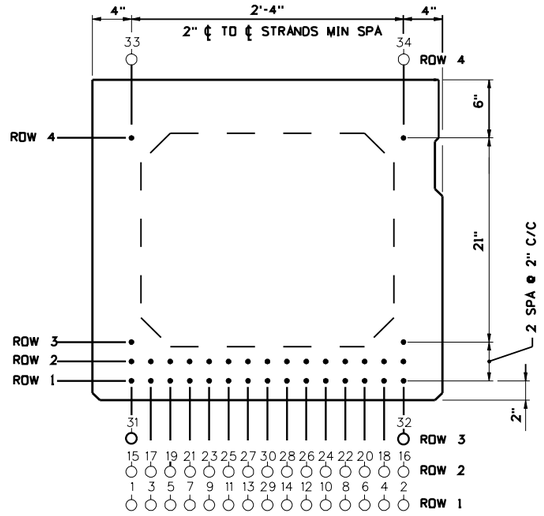
GENERAL ELEVATION VIEW



REINFORCING STEEL ELEVATION

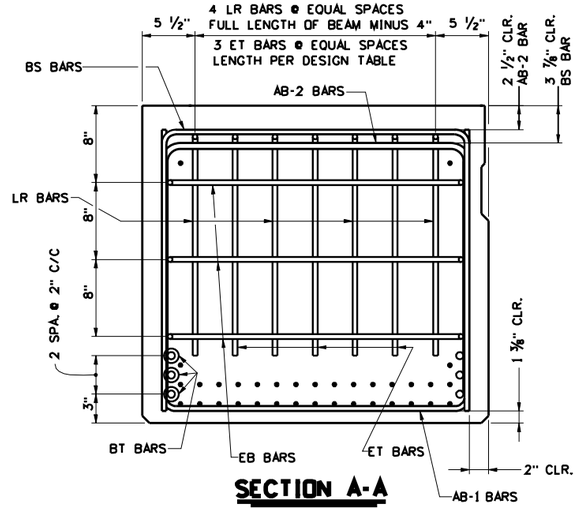


DETAIL "A"

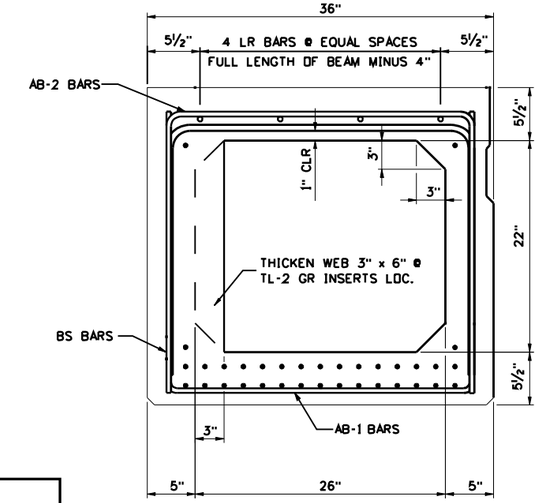


BEAM PRESTRESSING

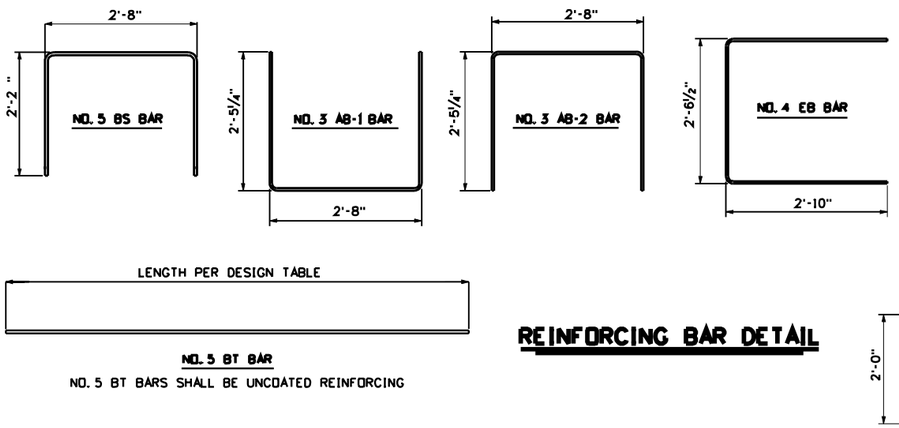
TYPICAL @ BEAM END & MIDSPAN



SECTION A-A



SECTION B-B



REINFORCING BAR DETAIL

NOTES:

1. REFER TO SHEET BR-B102A FOR SHEAR KEY DETAILS.
2. 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 ——
3. THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B33B, 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.

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

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

33" PRESTRESSED CONCRETE BOX BEAMS
DESIGN AND ASSEMBLY DETAILS

STANDARD SHEET BR-B33A

PREPARED: 07-02-07

REVISED:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

33" PRESTRESSED BOX BEAM
DESIGN AND ASSEMBLY DETAILS

DESIGNED BY:	TW/
DRAWN BY:	BH/
CHECKED BY:	TW/
REVIEWED BY:	THB/
DATE:	
SCALE:	
SHEET	OF
BRIDGE NO.	

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS

DESIGN DATA FOR 33" DEPTH ADJACENT BOX BEAM

SPAN LENGTH ℄ TO ℄ BEARING		50'-0"	52'-0"	54'-0"	56'-0"	58'-0"	60'-0"	62'-0"	64'-0"	66'-0"	68'-0"	70'-0"				
OVERALL LENGTH OF BEAM		51'-6"	53'-6"	55'-6"	57'-6"	59'-6"	61'-6"	63'-6"	65'-6"	67'-6"	69'-6"	71'-6"				
NO. OF 270 KSI, ½" ø LOW-RELAXATION STRANDS, AREA/STRAND = 0.167 SQ. IN.		12	12	12	14	14	14	16	16	18	18	18				
STRAND POSITION NUMBER	ROW 1	1,2,7,8,13,14	1,2,7,8,13,14	1,2,7,8,13,14	1,2,7,8,13,14	1,2,7,8,13,14	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	1,2,5,6,9,10, 13,14				
	ROW 2	15,16,27,28	15,16,27,28	15,16,27,28	15,16,21,22, 27,28	15,16,21,22, 27,28	15,16,21,22, 27,28	15,16,21,22 27,28	15,16,21,22, 27,28	15,16,19,20, 23,24,27,28	15,16,19,20, 23,24,27,28	15,16,19,20, 23,24,27,28				
	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				
PRESTRESSING FORCE IMMEDIATELY AFTER STRAND RELEASE, Ppt, (KIPS/BEAM)		394	394	394	457	458	458	521	521	583	584	585				
EFFECTIVE PRESTRESSING FORCE AFTER ALL LOSSES, Ppe, (KIPS/BEAM)		359	360	361	414	416	417	468	470	521	522	524				
REQUIRED FACTORED MOMENT @ STRENGTH I, Mu (FT-KIPS/BEAM)		858	918	979	1042	1107	1173	1244	1312	1383	1454	1527				
FACTORED FLEXURAL RESISTANCE, Mr (FT-KIPS/BEAM)		1092	1092	1092	1280	1280	1280	1478	1478	1656	1656	1656				
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 6'-6"	3 - #4 x 6'-6"	3 - #4 x 7'-0"	3 - #4 x 7'-0"	3 - #4 x 7'-0"	3 - #4 x 7'-6"	3 -#4 x 7'-6"	3 - #4 x 8'-0"	3 - #4 x 8'-0"	3 - #4 x 8'-0"	3 - #4 x 8'-6"				
NUMBER & LENGTH #5 BT BOTTOM TENSION BARS @ EACH END		6 - #6 x 7'-0"	6 - #6 x 6'-0"	6 - #6 x 7'-0"	6 - #6 x 8'-0"	6 - #6 x 8'-0"	6 - #6 x 8'-0"	6 - #5 x 8'-0"	6 - #6 x 8'-0"	4 - #6 x 9'-0"	4 - #6 x 9'-0"	6 - #6 x 9'-0"				
DESIGN CAMBER + = POSITIVE (UP) (INCHES)	@ RELEASE	0.19	0.18	0.17	0.27	0.26	0.25	0.39	0.38	0.51	0.50	0.48				
	@ ERECTION	0.25	0.22	0.19	0.35	0.32	0.27	0.49	0.44	0.66	0.59	0.52				
	@ FINAL	0.17	0.10	0.03	0.21	0.12	0.01	0.27	0.14	0.38	0.23	0.06				
NUMBER & SPACING OF TL-2 GUARDRAIL INSERTS SEE NOTE 6	NO OF INSERTS REQD.															
	END OF BEAM TO ℄ OF FIRST INSERT EA. END															
	℄ OF 1st INSERT TO ℄ 2nd INSERT EA. END															
WEIGHT OF TYPICAL BEAM INCLUDING DIAPHRAGM (TONS)		19.9	20.6	21.3	22.0	22.7	23.4	24.4	25.1	25.8	26.5	27.2				

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.

NOTES

1. 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 497 LBS/DIAPHRAGM.

   FOR SKEW ADD 33 LBS/DEGREE OF SKEW/END.

   FOR LONGER ENDBLOCK, ADD 596 LBS/LF/END.

2. 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.

3. 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.

4. 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.

5. MAXIMUM BEAM SKEW SHALL BE 30 DEGREES.

6. 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.

7. THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B33A, BR-B100, BR-B101, BR-B102A & B, BR-B103, BR-B104, BR-B105A & B AND BR-B106 AS APPLICABLE.

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

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

DESIGN TABLE FOR 33"
PRESTRESSED BOX BEAM

STANDARD SHEET BR-B33B

PREPARED: 07-02-07

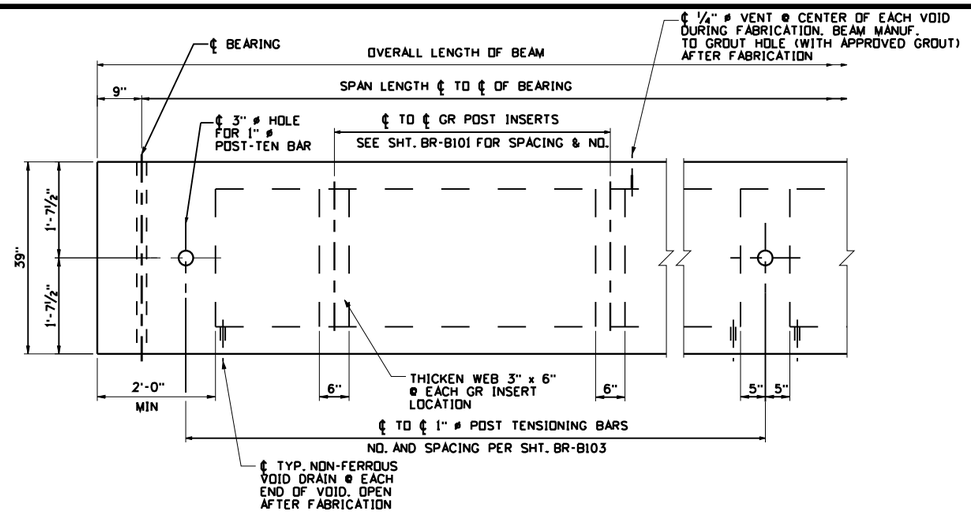
REVISED:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

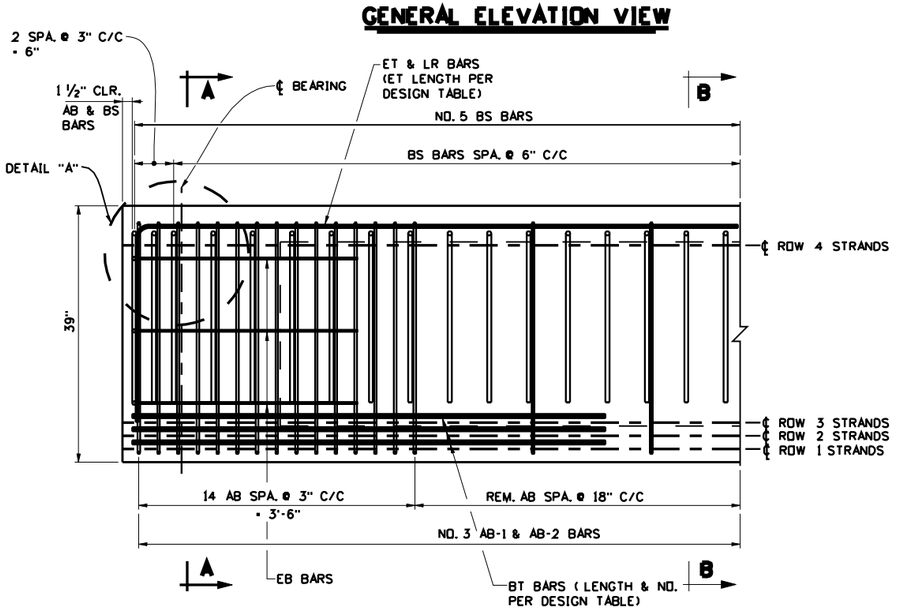
DESIGNED BY: TW/
DRAWN BY: THB/
CHECKED BY: TW/
REVIEWED BY: THB/
DATE:
SCALE:
SHEET NO OF
BRIDGE NUMBER

DESIGN TABLE FOR 33"
PRESTRESSED BOX BEAM

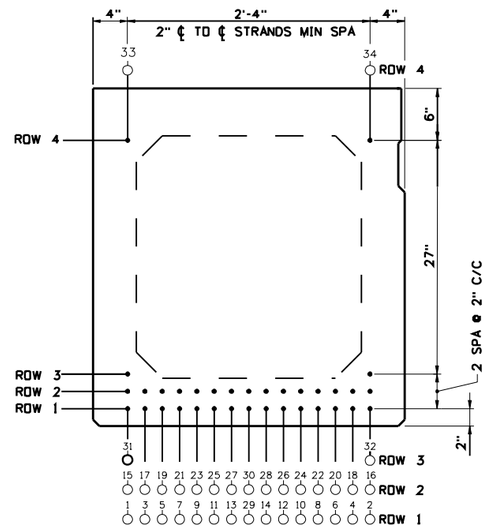
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



GENERAL ELEVATION VIEW

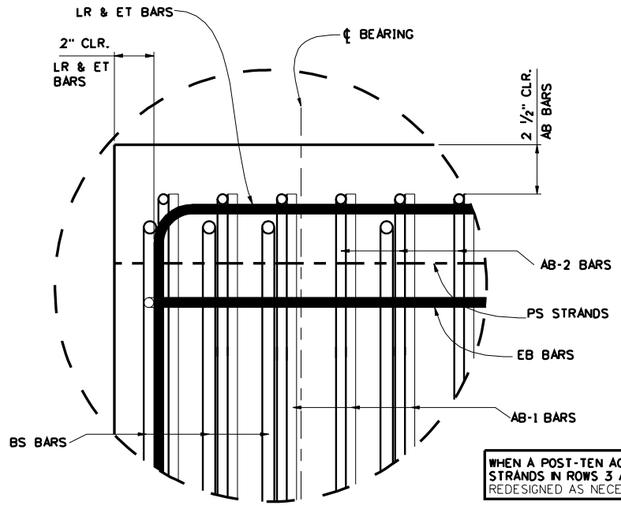


REINFORCING STEEL ELEVATION

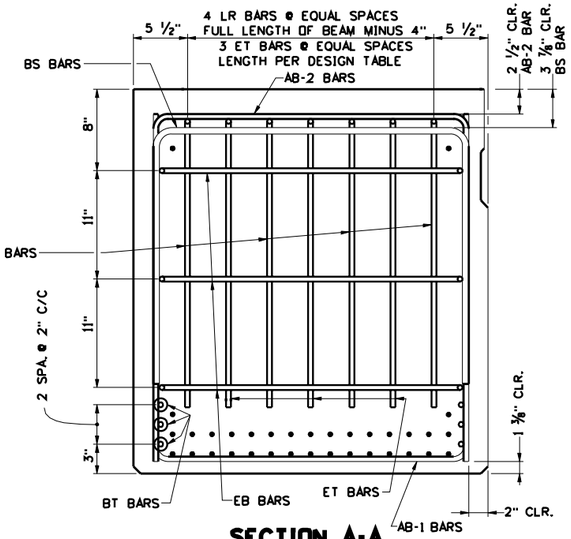


BEAM PRESTRESSING

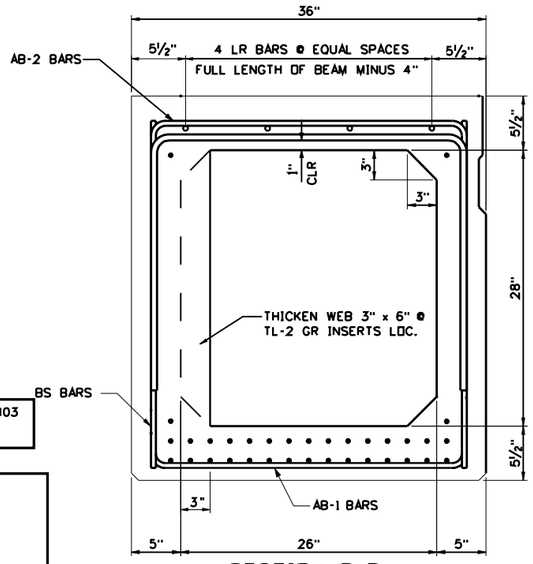
TYPICAL @ BEAM END & MIDSPAN



DETAIL "A"



SECTION A-A

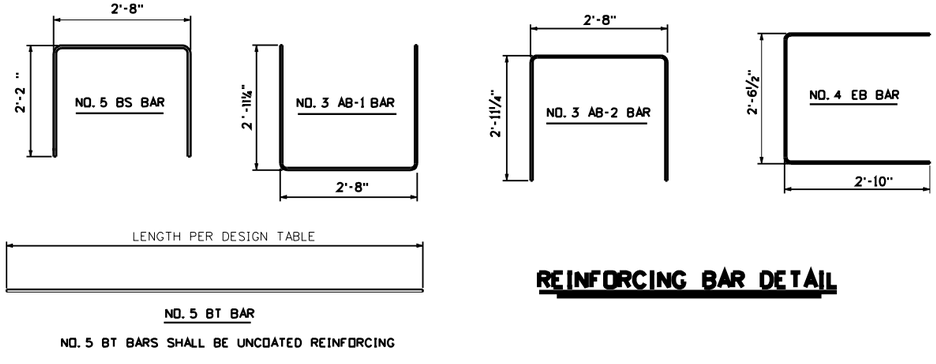


SECTION B-B

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.

NOTES:

1. REFER TO SHEET BR-B102A FOR SHEAR KEY DETAILS.
2. 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 _____
3. 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.



REINFORCING BAR DETAIL

APPROVED: Gregg's Bailey — DIRECTOR, ENGINEERING DIVISION — DATE: 10-25-07

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

39" PRESTRESSED CONCRETE
BOX BEAMS
DESIGN AND ASSEMBLY DETAILS

STANDARD SHEET BR-B39A

PREPARED: 07-02-07

REVISED:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

39" PRESTRESSED BOX BEAM
DESIGN AND ASSEMBLY DETAILS

DESIGNED BY:	THB/
DRAWN BY:	BH/
CHECKED BY:	TW/
REVIEWED BY:	THB/
DATE:	
SCALE:	
SHEET	OF
BRIDGE NO.	

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS

DESIGN DATA FOR 39" DEPTH ADJACENT BOX BEAM

SPAN LENGTH ℄ TO ℄ BEARING		60'-0"	62'-0"	64'-0"	66'-0"	68'-0"	70'-0"	72'-0"	74'-0"	76'-0"	78'-0"	80'-0"				
OVERALL LENGTH OF BEAM		61'-6"	63'-6"	65'-6"	67'-6"	69'-6"	71'-6"	73'-6"	75'-6"	77'-6"	79'-6"	81'-6"				
NO. OF 270 KSI, ½" ø LOW-RELAXATION STRANDS, AREA/STRAND = 0.167 SQ. IN.		14	14	16	16	16	16	18	18	20	20	20				
STRAND POSITION NUMBER	ROW 1	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	1,2,5,6,9,10, 13,14	1,2,5,6,9,10, 13,14	1,2,3,4,7,8, 11,12,13,14	1,2,3,4,7,8, 11,12,13,14	1,2,3,4,7,8, 11,12,13,14				
	ROW 2	15,16,21,22, 27,28	15,16,21,22, 27,28	15,16,21,22, 27,28	15,16,21,22, 27,28	15,16,21,22, 27,28	15,16,21,22, 27,28	15,16,19,20, 23,24,27,28	15,16,19,20, 23,24,27,28	15,16,19,20, 23,24,27,28	15,16,19,20, 23,24,27,28	15,16,19,20, 23,24,27,28				
	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				
PRESTRESSING FORCE IMMEDIATELY AFTER STRAND RELEASE, Ppt, (KIPS/BEAM)		459	459	522	522	523	523	585	586	648	648	649				
EFFECTIVE PRESTRESSING FORCE AFTER ALL LOSSES, Ppe, (KIPS/BEAM)		417	418	471	472	473	475	527	528	578	580	582				
REQUIRED FACTORED MOMENT @ STRENGTH I, Mu (FT-KIPS/BEAM)		1213	1287	1359	1432	1506	1582	1660	1739	1828	1911	1995				
FACTORED FLEXURAL RESISTANCE, Mr (FT-KIPS/BEAM)		1549	1549	1792	1792	1792	1792	2015	2015	2249	2249	2249				
TOTAL NO. DEBONDED STRANDS		———	———	———	———	———	———	———	———	2	2	2				
DEBONDED STRAND POSITION NUMBER & SHIELDING LENGTH FROM EACH END	ROW 1	———	———	———	———	———	———	———	———	7,8 @ 5'-0" EA. END	7,8 @ 5'-0" EA. END	7,8 @ 5'-0" EA. END				
	ROW 2	———	———	———	———	———	———	———	———	———	———	———				
NUMBER & LENGTH #4 ET TOP TENSION BARS @ EACH END		3 - #4 x 7'-6"	3 - #4 x 7'-6"	3 - #4 x 8'-0"	3 - #4 x 8'-0"	3 - #4 x 8'-0"	3 - #4 x 8'-6"	3 - #4 x 8'-6"	3 - #4 x 9'-0"	3 - #4 x 9'-0"	3 - #4 x 9'-0"	3 - #4 x 9'-6"				
NUMBER & LENGTH #5 BT BOTTOM TENSION BARS @ EACH END		4 - #6 x 8'-0"	4 - #6 x 8'-0"	4 - #6 x 8'-6"	6 - #6 x 8'-6"	4 - #6 x 8'-6"	4 - #6 x 9'-0"	4 - #5 x 9'-0"	4 - #5 x 9'-0"	4 - #6 x 10'-0"	4 - #6 x 10'-0"	4 - #6 x 10'-0"				
DESIGN CAMBER + = POSITIVE (UP) (INCHES)	@ RELEASE	0.24	0.23	0.35	0.34	0.33	0.31	0.44	0.42	0.58	0.56	0.53				
	@ ERECTION	0.30	0.26	0.47	0.43	0.38	0.33	0.53	0.47	0.71	0.65	0.56				
	@ FINAL	0.17	0.08	0.32	0.23	0.12	0.00	0.23	0.09	0.35	0.19	0.01				
NUMBER & SPACING OF TL-2 GUARDRAIL INSERTS SEE NOTE 6	NO OF INSERTS REQD.															
	℄ OF BEAM TO ℄ OF FIRST INSERT EA. END															
	℄ OF 1st INSERT TO ℄ 2nd INSERT EA. END															
WEIGHT OF TYPICAL BEAM INCLUDING DIAPHRAGM (TONS)		24.6	25.7	26.4	27.1	27.8	28.6	29.3	30.0	31.0	31.8	32.8				

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.

NOTES

1. 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 632 LBS/DIAPHRAGM.

   FOR SKEW ADD 38 LBS/DEGREE OF SKEW/END.

   FOR LONGER ENDBLOCK, ADD 758 LBS/LF/END.

2. 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.

3. 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.

4. 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.

5. MAXIMUM BEAM SKEW SHALL BE 30 DEGREES.

6. 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.

7. THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B39A, BR-B100, BR-B101, BR-B102A & B, BR-B103, BR-B104, BR-B105A & B AND BR-B106 AS APPLICABLE.

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

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

DESIGN TABLE FOR 39"
PRESTRESSED BOX BEAM

STANDARD SHEET BR-B39B

PREPARED: 07-02-07

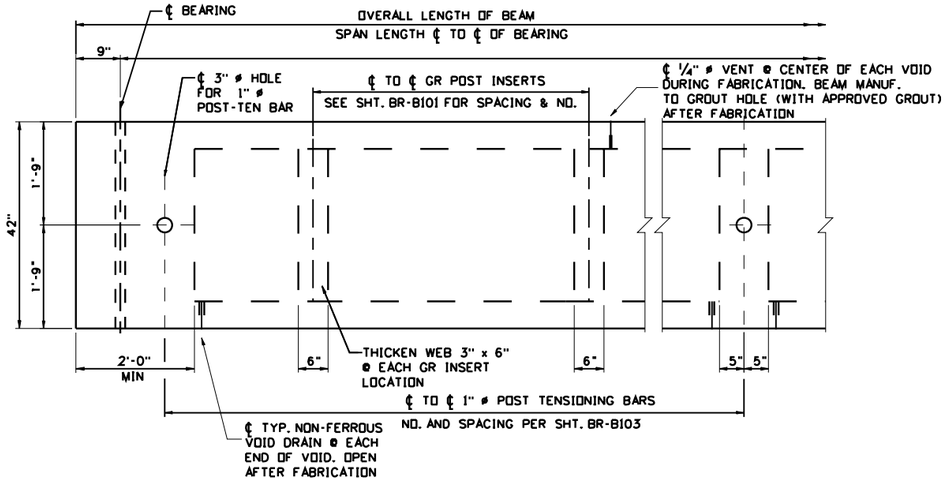
REVISED:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

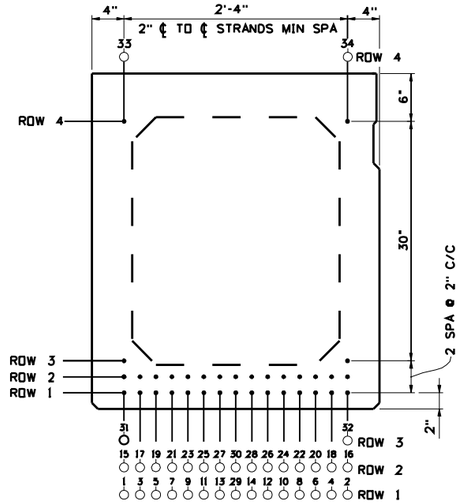
DESIGNED BY: TW/
DRAWN BY: THB/
CHECKED BY: TW/
REVIEWED BY: THB/
DATE:
SCALE:
SHEET NO OF
BRIDGE NUMBER

DESIGN TABLE FOR 39"
PRESTRESSED BOX BEAM

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				

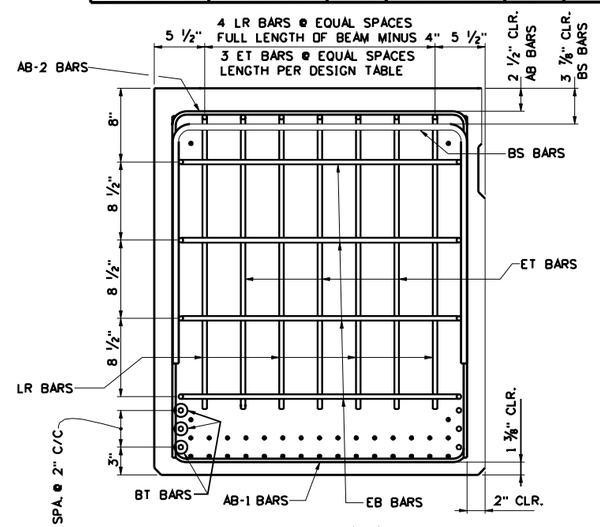


GENERAL ELEVATION VIEW

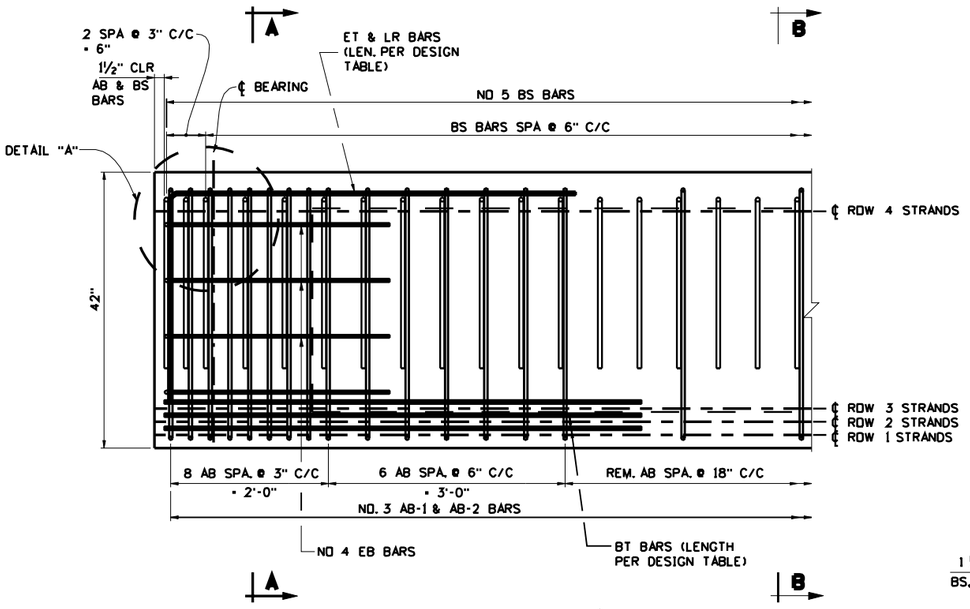


BEAM PRESTRESSING

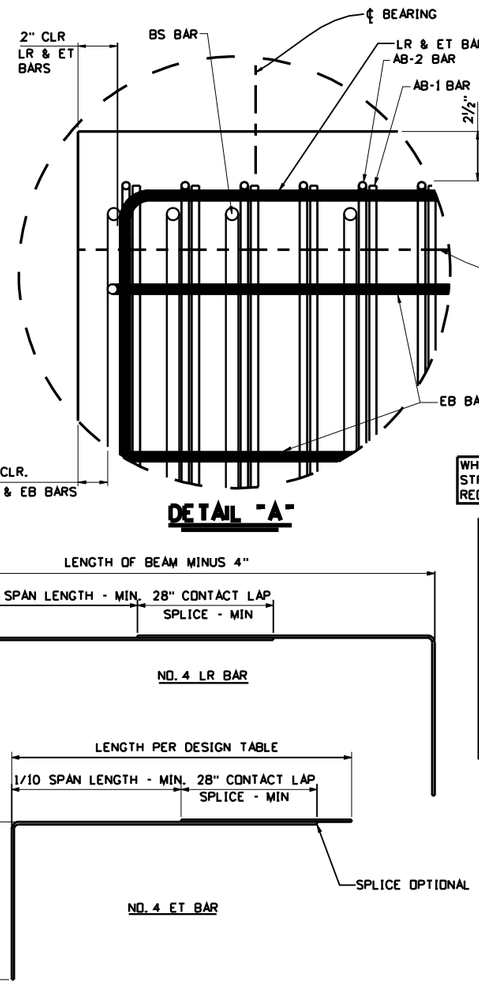
TYPICAL @ BEAM END & MIDSPAN



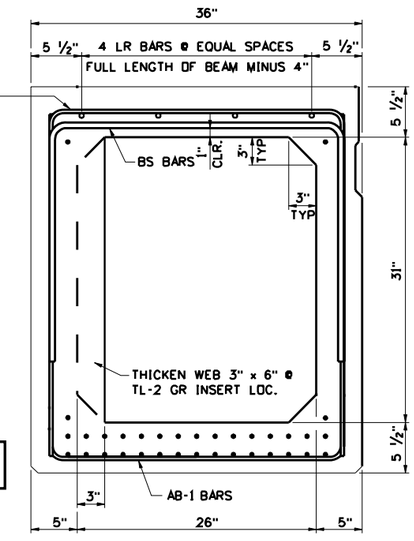
SECTION A-A



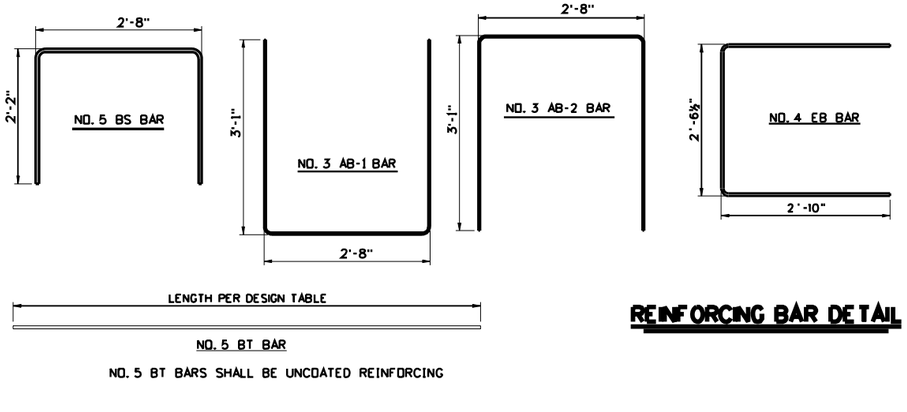
REINFORCING STEEL ELEVATION



DETAIL "A"

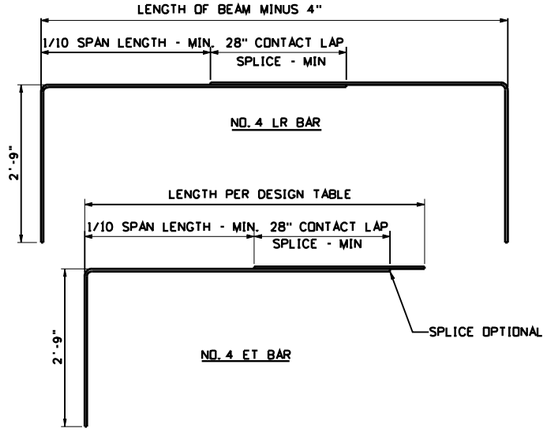


SECTION B-B



NO. 5 BT BARS SHALL BE UNCOATED REINFORCING

REINFORCING BAR DETAIL



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.

NOTES:

1. REFER TO SHEET BR-8102A FOR SHEAR KEY DETAILS.
2. 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 ——
3. THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B428, BR-B100, BR-B101, BR-B102A & B, BR-B103, BR-B104, BR-B105A & B AND BR-B106 AS APPLICABLE.

APPROVED: Gregg's Bailey — DIRECTOR, ENGINEERING DIVISION — DATE: 10-25-07

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

42" PRESTRESSED CONCRETE
BOX BEAMS
DESIGN AND ASSEMBLY DETAILS

STANDARD SHEET BR-B42A

PREPARED: 07-02-07

REVISED:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

42" PRESTRESSED BOX BEAM
DESIGN AND ASSEMBLY DETAILS

DESIGNED BY: THB/	
DRAWN BY: BH/	
CHECKED BY: TM/	
REVIEWED BY: TW/	
DATE:	
SCALE:	
SHEET	OF
BRIDGE NO.	

DESIGN DATA FOR 42" DEPTH ADJACENT BOX BEAM

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS

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		76'-0"	78'-0"	80'-0"	82'-0"	84'-0"	86'-0"	88'-0"	90'-0"	92'-0"	94'-0"	96'-0"	98'-0"	100'-0"			
OVERALL LENGTH OF BEAM		77'-6"	79'-6"	81'-6"	83'-6"	85'-6"	87'-6"	89'-6"	91'-6"	93'-6"	95'-6"	97'-6"	99'-6"	101'-6"			
NO. OF 270 KSI, ½" ø LOW-RELAXATION STRANDS, AREA/STRAND = 0.167 SQ. IN.		18	20	20	22	22	22	24	24	26	26	28	28	30			
STRAND POSITION NUMBER	ROW 1	1,2,5,6,9,10, 13,14	1,2,5,6,9,10, 13,14	1,2,5,6,9,10, 13,14	1,2,3,4,7,8, 11,12,13,14	1,2,3,4,7,8, 11,12,13,14	1,2,3,4,7,8, 11,12,13,14	1,2,3,4,7,8, 11,12,13,14	1,2,3,4,7,8, 11,12,13,14	1,2,3,4,5,6,9, 10,11,12,13,14	1,2,3,4,5,6,9, 10,11,12,13,14	1,2,3,4,5,6,9, 10,11,12,13,14	1,2,3,4,5,6,9, 10,11,12,13,14	1 THRU 14			
	ROW 2	15,16,21,22, 27,28	15,16,19,20, 23,24,27,28	15,16,19,20, 23,24,27,28	15,16,19,20, 23,24,27,28	15,16,19,20, 23,24,27,28	15,16,19,20, 23,24,27,28	15,16,17,18, 21,22,25,26, 27,28	15,16,17,18, 21,22,25,26, 27,28	15,16,17,18, 21,22,25,26, 27,28	15,16,17,18, 21,22,25,26 27,28	15,16,17,18,19, 20,23,24,25, 26,27,28	15,16,17,18, 19,20,23,24, 25,26,27,28	15,16,17,18, 19,20,23,24, 25,26,27,28			
	ROW 3	31,32	31,32	31,32	31,32	31,32	31,32	31,32	31,32	31,32	31,32	31,32	31,32	31,32			
	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, Ppt, (KIPS/BEAM)		587	649	650	711	712	713	774	775	835	836	896	897	956			
EFFECTIVE PRESTRESSING FORCE AFTER ALL LOSSES, Ppe, (KIPS/BEAM)		531	582	584	632	635	637	685	688	734	738	783	787	830			
REQUIRED FACTORED MOMENT @ STRENGTH I, Mu (FT-KIPS/BEAM)		1861	1945	2031	2118	2207	2297	2388	2482	2585	2682	2780	2879	2981			
FACTORED FLEXURAL RESISTANCE, Mr (FT-KIPS/BEAM)		2179	2420	2420	2603	2603	2603	2803	2803	3007	3007	3186	3186	3370			
TOTAL NO. DEBONDED STRANDS		———	2	2	4	4	4	4	4	6	6	6	6	6			
DEBONDED STRAND POSITION NUMBER & SHIELDING LENGTH FROM EACH END	ROW 1	———	5,6 @ 5'-0"	5,6 @ 5'-0"	3,4 @ 5'-0"	3,4 @ 5'-0"	3,4 @ 5'-0"	3,4 @ 5'-0"	3,4 @ 5'-0"	3,4,9,10 @ 5'-0"	3,4,9,10 @ 5'-0"	3,4,9,10 @ 5'-0"	3,4,9,10 @ 5'-0"	3,4,9,10 @ 5'-0"			
	ROW 2	———	———	———	23,24 @ 3'-0"	23,24 @ 3'-0"	23,24 @ 3'-0"	25,26 @ 3'-0"	25,26 @ 3'-0"	25,26 @ 3'-0"	25,26 @ 3'-0"	25,26 @ 3'-0"	25,26 @ 3'-0"	25,26 @ 3'-0"			
NUMBER & LENGTH #4 ET TOP TENSION BARS @ EACH END		3 - #4 x 9'-0"	3 - #4 x 9'-0"	3 - #4 x 9'-6"	3 - #4 x 9'-6"	3 - #4 x 10'-0"	3 - #4 x 10'-0"	3 - #4 x 10'-0"	3 - #4 x 10'-6"	3 - #4 x 10'-6"	3 - #4 x 11'-0"	3 - # 4 x 11'-0"	3 - # 4 x 11'-0"	3 - # 4 x 11'-6"			
NUMBER & LENGTH #5 BT BOTTOM TENSION BARS @ EACH END		4 - #5 x 9'-6"	6 - #5 x 9'-6"	6 - #5 x 10'-0"	6 - #5 x 10'-0"	6 - #5 x 10'-6"	6 - #5 x 10'-6"	4 - #5 x 10'-6"	4 - #5 x 11'-0"	4 - #5 x 11'-0"	4 - #5 x 11'-6"	2 - #5 x 11'-6"	2 - #5 x 11'-6"	2 - # 5 x 12'-0"			
DESIGN CAMBER + = POSITIVE (UP) (INCHES)	@ RELEASE	0.39	0.52	0.50	0.67	0.65	0.62	0.79	0.76	0.96	0.93	0.97	1.16	1.12			
	@ ERECTION	0.42	0.64	0.57	0.84	0.77	0.68	0.94	0.84	1.15	1.04	1.05	1.34	1.20			
	@ FINAL	0.04	0.28	0.12	0.43	0.26	0.06	0.34	0.12	0.43	0.17	0.09	0.38	0.07			
NUMBER & SPACING OF TL-2 GUARDRAIL INSERTS SEE NOTE 6	NO OF INSERTS REQD.																
	END OF BEAM TO ℄ OF FIRST INSERT EA. END																
	℄ OF 1st INSERT TO ℄ 2nd INSERT EA. END																
WEIGHT OF TYPICAL BEAM INCLUDING DIAPHRAGM (TONS)		32.6	33.4	34.1	34.9	35.6	36.4	37.1	37.9	39.0	39.7	40.4	41.1	41.9			

NOTES

1. 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 700 LBS/DIAPHRAGM.

   FOR SKEW ADD 41 LBS/DEGREE OF SKEW/END.

   FOR LONGER ENDBLOCK, ADD 840 LBS/LF/END.

2. 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.

3. 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.

4. 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.

5. MAXIMUM BEAM SKEW SHALL BE 30 DEGREES.

6. 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.

7. THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-B42A, BR-B100, BR-B101, BR-B102A & B, BR-B103, BR-B104, BR-B105A & B AND BR-106 AS APPLICABLE.

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

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

DESIGN TABLE FOR 42"
PRESTRESSED BOX BEAM

STANDARD SHEET BR-B42B

PREPARED: 07-02-07

REVISED:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

DESIGNED BY: THB/
DRAWN BY: THB/
CHECKED BY: TM/
REVIEWED BY: TW/
DATE:
SCALE:
SHEET NO OF
BRIDGE NUMBER

DESIGN TABLE FOR 42"
PRESTRESSED BOX BEAM

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS

GOVERNING SPECIFICATIONS

THE WEST VIRGINIA DEPARTMENT OF TRANSPORTATION, DIVISION OF HIGHWAYS STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES, ADOPTED [redacted] 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:

1. 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.

2. TWO LANE BRIDGE WITH AN OVERALL WIDTH OF 24'-5" (INCL. ¾" GAP BETWEEN ADJ. BEAMS), A CURB-TO-CURB WIDTH OF 22'-1", TRANSVERSE POST-TENSIONING, AND ZERO SKEW.

3. DESIGN STRENGTH AND UNIT STRESSES:

MINIMUM CONCRETE STRENGTH @ STRAND RELEASE	6000 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 III 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

4. 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 ℄ OF THE BEAM.
   SHIELDING OF STRANDS SHALL BE ACCOMPLISHED BY TAPING OR TIGHT FITTING PLASTIC TUBES TAPED AT EACH END.
5. 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.
6. MAXIMUM BEAM SKEW SHALL BE 30 DEGREES.
7. WHEN ALTERNATE DESIGNS OR SITE SPECIFIC DESIGNS ARE PROVIDED, CRITERIA SET FORTH IN THESE STANDARDS SHALL APPLY.
8. NEGATIVE DESIGN CAMBER AFTER ALL LOSSES IS NOT PERMITTED.
9. 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.

LAP SPLICE TABLE				
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-817A & B THRU BR-842A & B, BR-8101, BR-8102A & B, BR-8103, BR-8104, BR-8105A & B AND BR-8106 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 AB 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 ½" ø, GRADE 270, 7 WIRE UNCOATED, LOW-RELAXATION STRAND MEETING THE REQUIREMENTS OF AASHTO M203, SUPPLEMENT SI.
- 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 M111
PLATE		½" x 7"	AASHTO M270, GR 36	AASHTO M111
TUBING		TS 8x4x3/16	ASTM A500, GR B	AASHTO M111
CHANNEL		C7x9.8	AASHTO M270, GR 36	AASHTO M111
FERRULE	TYPE 2A ANCHOR	1¼" ø x 2½" MIN LEN.	ASTM A108 (11L17 STEEL)	AASHTO M232
WIRE		⅜" ø	ASTM A510 (1018 STEEL)	AASHTO M232
STUDS		1¼" ø x 8" LONG	ASTM A108 (1045 C.D. STEEL)	AASHTO M232
NUTS		1¼" ø	AASHTO M291, CLASS C	AASHTO M232
COUPLERS	TYPE 1A ANCHOR	1¼" ø x 5" LONG	ASTM A108 (12L14 STEEL)	AASHTO M232
BOLTS		1¼" ø x 12" LONG	AASHTO M164 (TYPE 1, HH)	AASHTO M232
BOLTS		⅝" ø x ALL LEN.	AASHTO M164 (TYPE 1, HH)	AASHTO M232
NUTS		⅝" ø	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 EMBRITTLEMENT. 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 POURABLE 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-8103.
- TEST PROCEDURE FOR DETERMINING THE COMPRESSIVE STRENGTH OF GROUT SHALL USE CUBE SPECIMENS IN ACCORDANCE WITH ASTM C109, AS MODIFIED BY ASTM C1107. 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.

Gregory 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-8100

PREPARED: 07-02-07

REVISED:

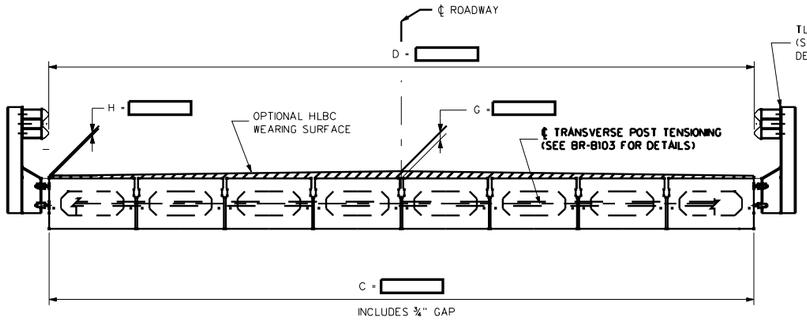
WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

PRESTRESSED CONCRETE BEAM

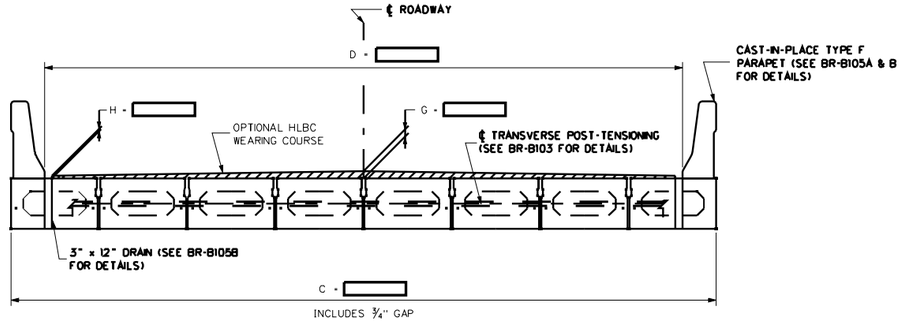
DESIGN & ASSEMBLY NOTES

DESIGNED BY: THB/
DRAWN BY: THB/
CHECKED BY: TM/
REVIEWED BY: TW/
DATE:
SCALE:
SHEET NO OF
BRIDGE NUMBER

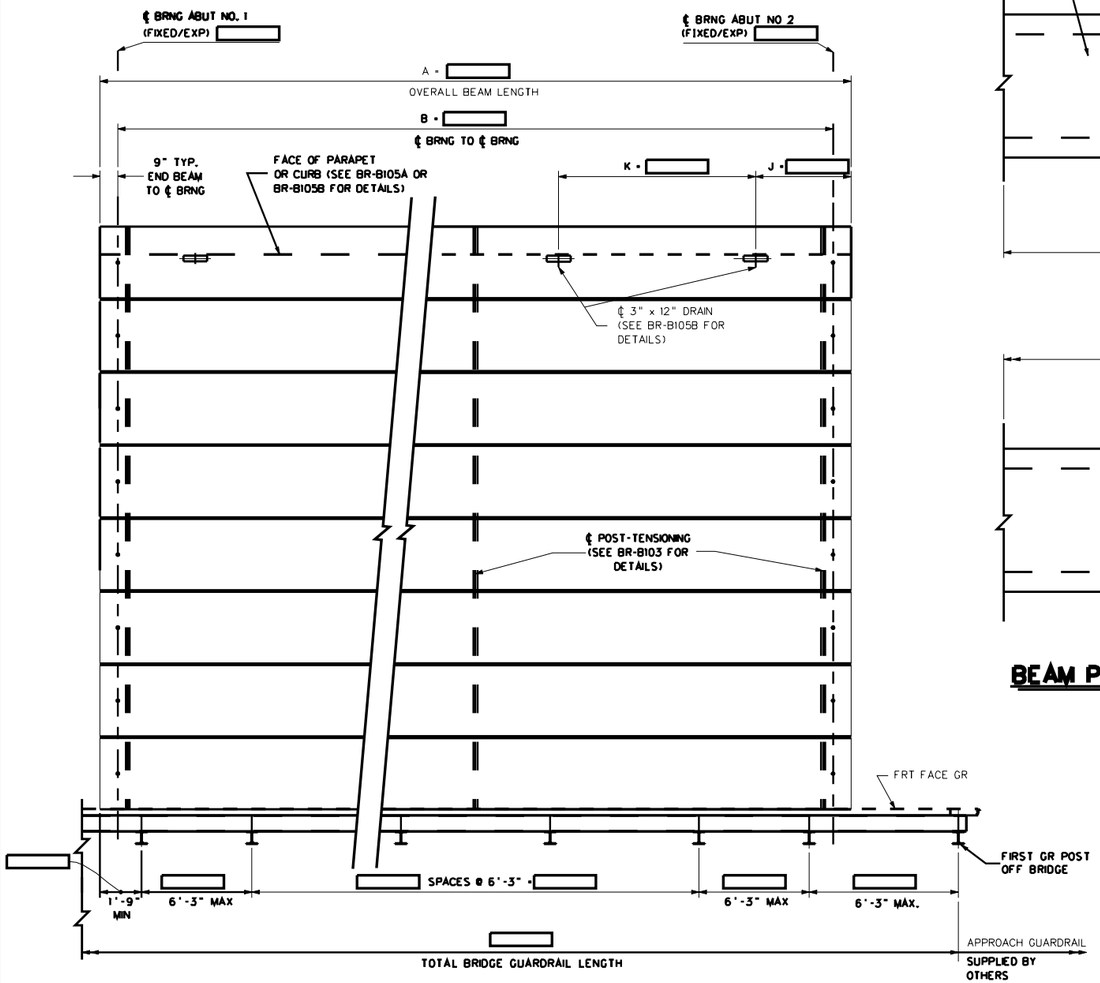
STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS



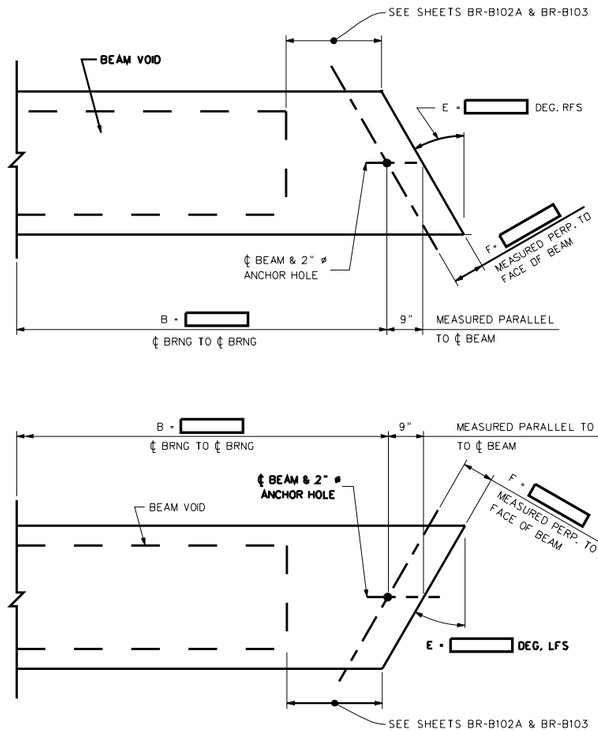
TYPICAL CROSS-SECTION WITH GUARDRAIL



TYPICAL CROSS-SECTION WITH PARAPET OR CURB



DECK PLAN VIEW



BEAM PLAN VIEW - SKEWED ENDS

NOTES:

1. 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."
2. 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.

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

ESTIMATE OF QUANTITIES

ITEM NO.	DESCRIPTION	UNITS	QUANTITY
603016-	PRESTRESSED CONCRETE BOX BEAM	LF	

APPROVED: _____ DIRECTOR, ENGINEERING DIVISION DATE: 10-25-07

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

PRESTRESSED CONCRETE BEAM

DESIGN AND ASSEMBLY NOTES

STANDARD SHEET BR-B101

PREPARED: 07-02-07

REVISION:

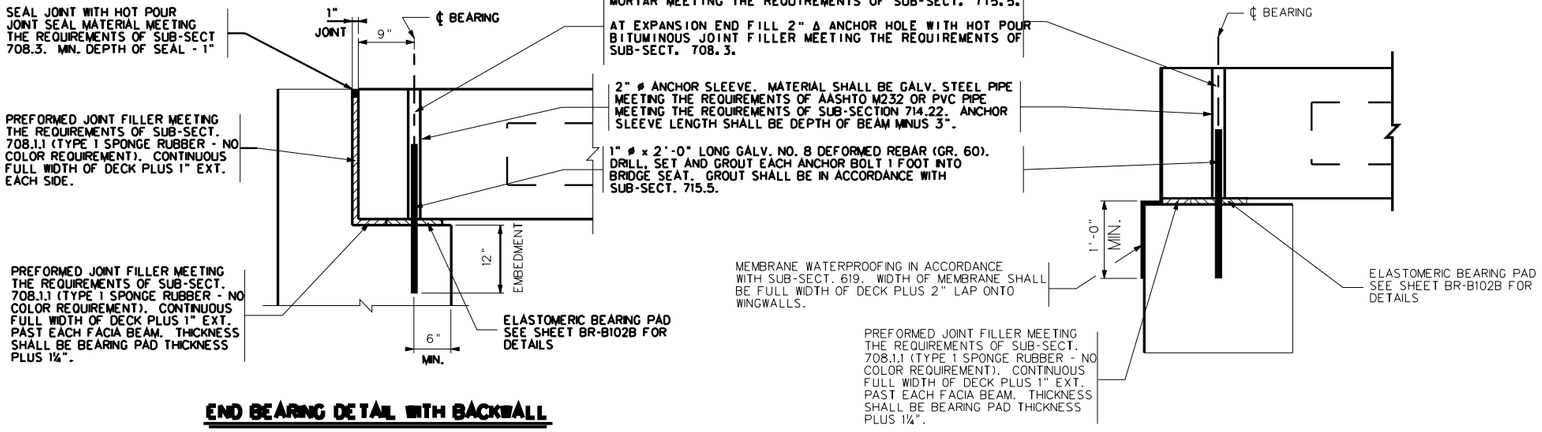
WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

DESIGNED BY: THB/
DRAWN BY: THB/
CHECKED BY: TW/
REVIEWED BY: TW/
DATE:
SCALE:
SHEET NO OF BRIDGE NUMBER

PRESTRESSED CONCRETE BEAM

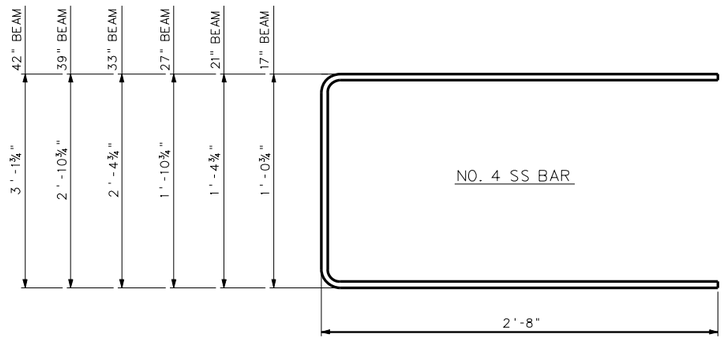
DESIGN & ASSEMBLY NOTES

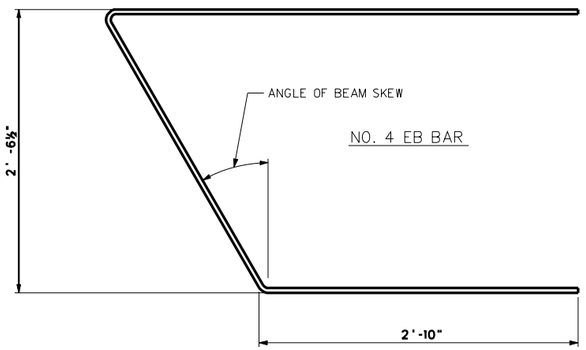
STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS



END BEARING DETAIL WITH BACKWALL

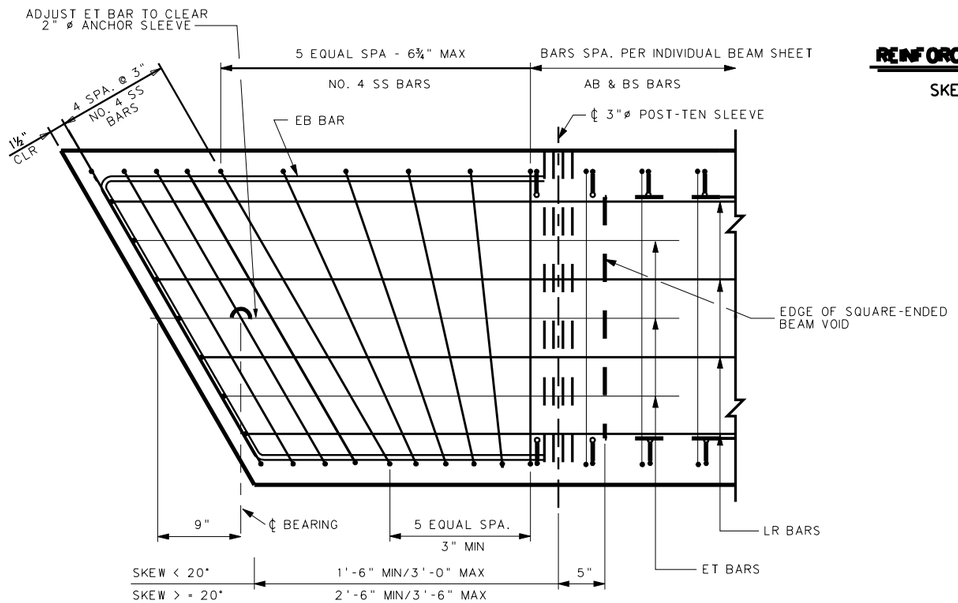
END BEARING DETAIL WITHOUT BACKWALL





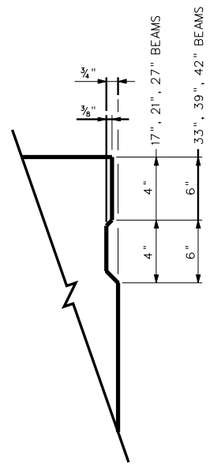
REINFORCING BAR DETAIL

SKEWED BEAMS



END BLOCK DETAIL - SKEWED BEAMS

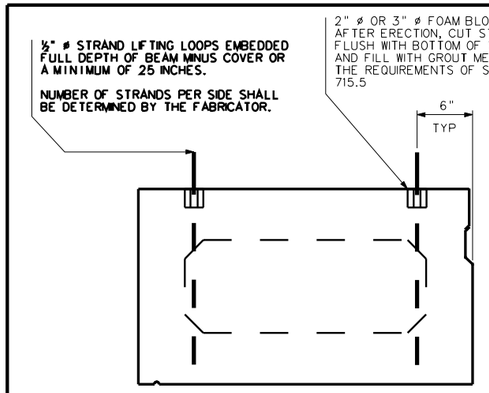
W/O POST-TEN. ACCESS POCKET



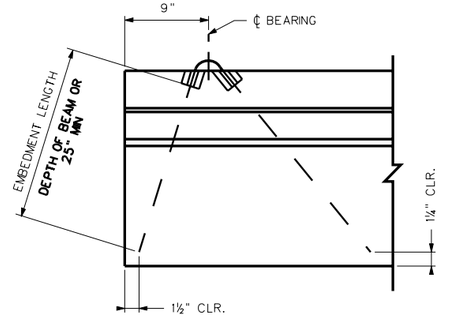
SHEAR KEY DETAIL

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.

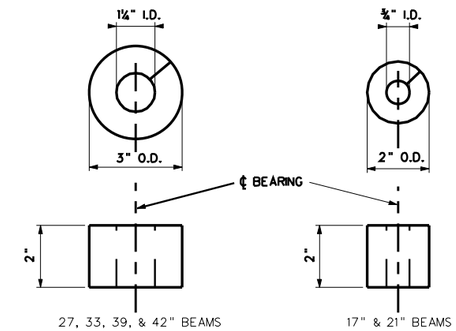
LIFTING DETAILS



END VIEW



SIDE VIEW



BLOCKOUT DETAILS

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

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

PREPARED: 07-02-07

REVISED:

PRESTRESSED CONCRETE BEAM
SKEWED END REINFORCING
MISC.DESIGN AND ASSEMBLY DETAILS

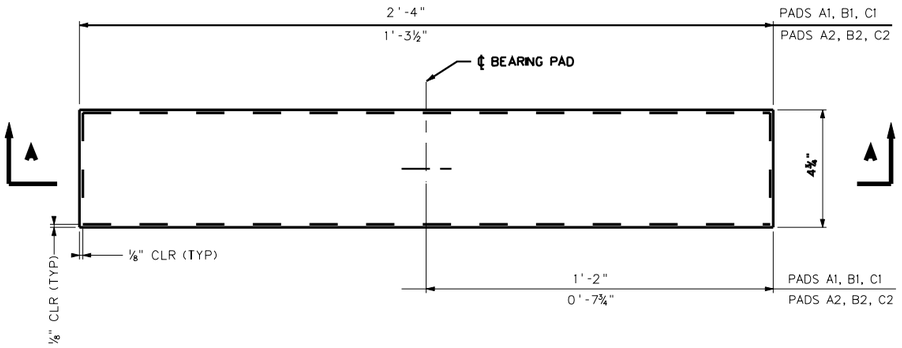
STANDARD SHEET BR-B102A

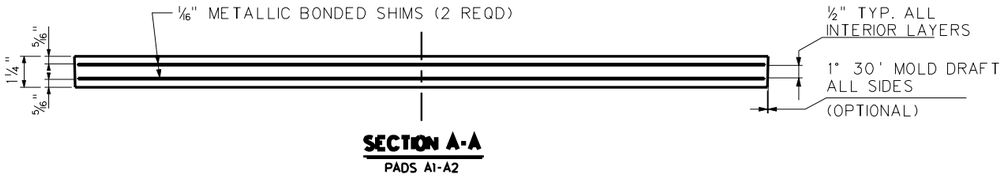
WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

PRESTRESSED CONCRETE BEAM
SKEWED END REINFORCING
MISC.DESIGN AND ASSEMBLY DETAILS

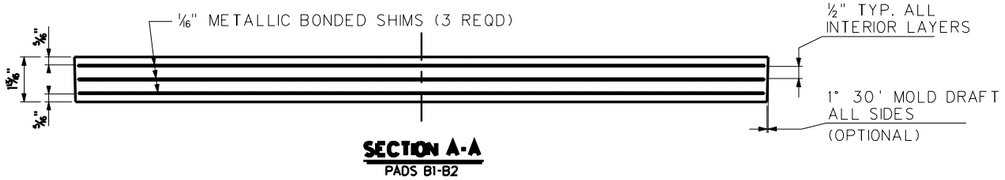
DESIGNED BY: THB/
DRAWN BY: THB/
CHECKED BY: TM/
REVIEWED BY: TW/
DATE:
SCALE:
SHEET OF
BRIDGE NO.

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS

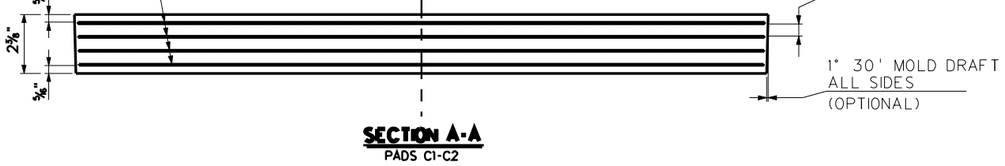




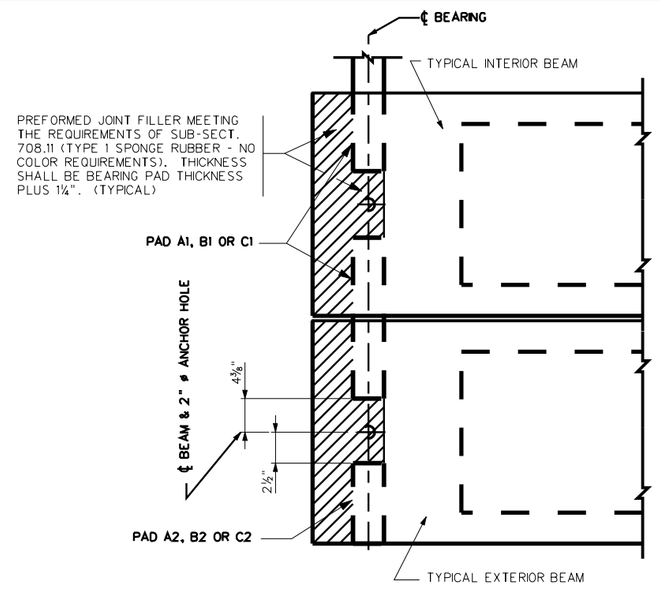
SECTION A-A
PADS A1-A2



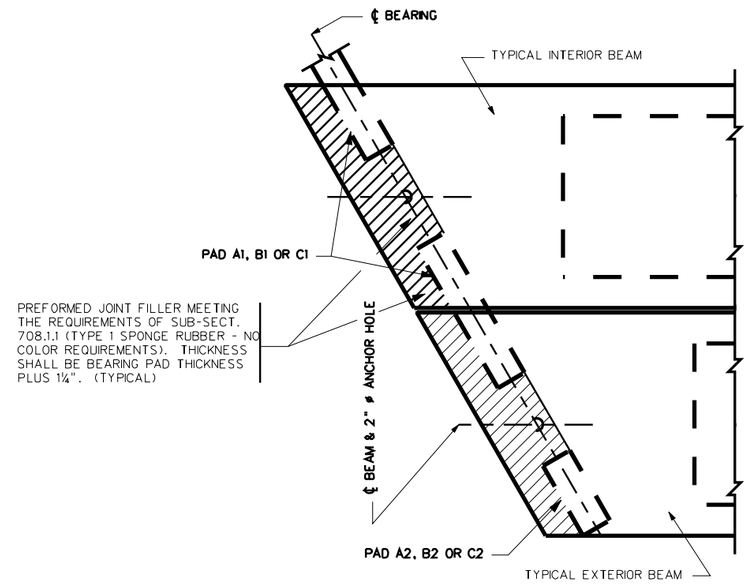
SECTION A-A
PADS B1-B2



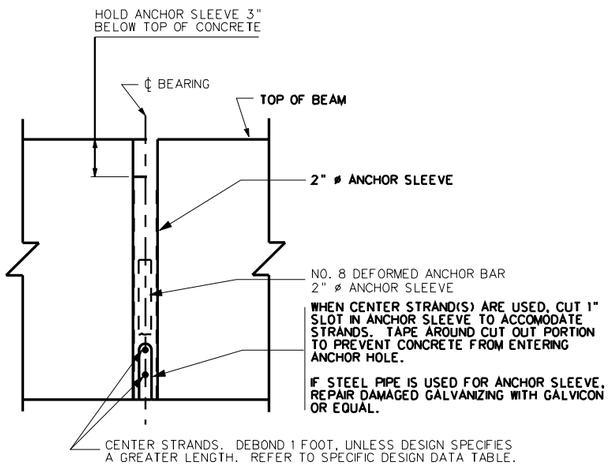
SECTION A-A
PADS C1-C2



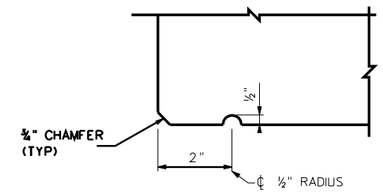
PLAN VIEW - BEARING PLACEMENT
NORMAL BEAMS



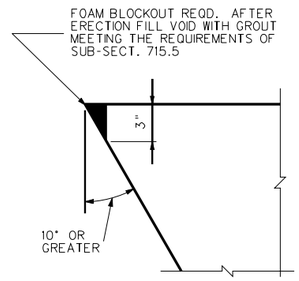
PLAN VIEW - BEARING PLACEMENT



ANCHOR SLEEVE DETAIL



DRIP GROOVE DETAIL
EXTERIOR BEAMS



SKEW BLOCKOUT DETAIL

BOX BEAM BEARING PAD CONTROL DIMENSIONS

PAD	LENGTH	WIDTH	HEIGHT	NO. SHIMS	SHIM SIZE	SPAN RANGES	MAXIMUM REACTION	MAXIMUM MOVEMENT ONE DIRECTION
A1	4¾"	28"	1¼"	2	1/16" x 4½" x 2'-3¾"	20' - 38'	55 KIPS	0.39"
B1	4¾"	28"	1⅜"	3	1/16" x 4½" x 2'-3¾"	40' - 78'	75 KIPS	0.80"
C1	4¾"	28"	2⅜"	4	1/16" x 4½" x 2'-3¾"	80' - 100'	89 KIPS	1.02"
A2	4¾"	15½"	1¼"	2	1/16" x 4½" x 1'-3¾"	20' - 38'	28 KIPS	0.39"
B2	4¾"	15½"	1⅜"	3	1/16" x 4½" x 1'-3¾"	40' - 78'	38 KIPS	0.80"
C2	4¾"	15½"	2⅜"	4	1/16" x 4½" x 1'-3¾"	80' - 100'	45 KIPS	1.02"

NOTES:

1. 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.
2. 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.
3. 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.
4. 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 ± ⅛ INCH. THE FABRICATOR SHALL NOTIFY THE CONTRACTOR AND DESIGNER IF CORRECTIONS ARE REQUIRED PRIOR TO SHIPMENT.
5. FOR BEAMS WITH STEPPED ENDS USE PADS A2, B2, OR C2 ON BOTH SIDES OF EACH BEAM.
6. ELASTOMERIC BEARING PADS SHALL BE INCLUDED IN THE PRICE OF THE BEAMS.
7. THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEETS BR-817A & B THRU BR-842A & B, BR-8100, BR-8101, BR-8102A, BR-8103, BR-8104, BR-8105A & B AND BR-106 AS APPROPRIATE.

PLAN VIEW - BEARING PLACEMENT

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

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

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

STANDARD SHEET BR-B102B

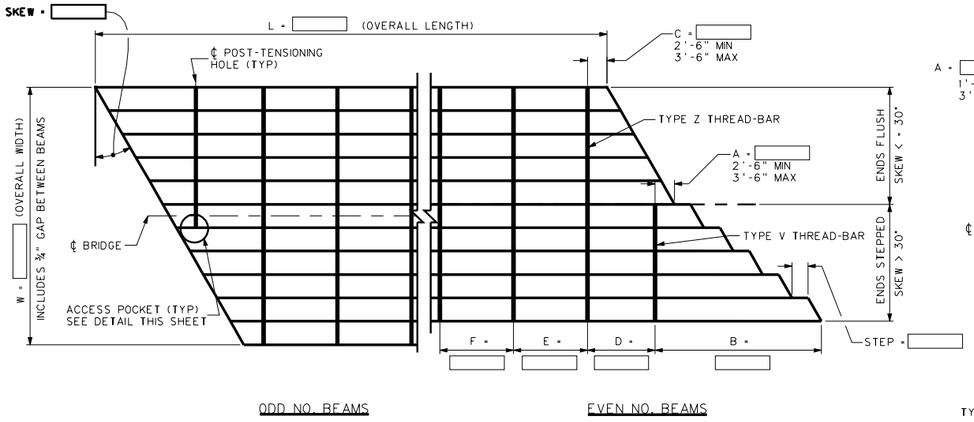
PREPARED: 07-02-07
REVISED:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

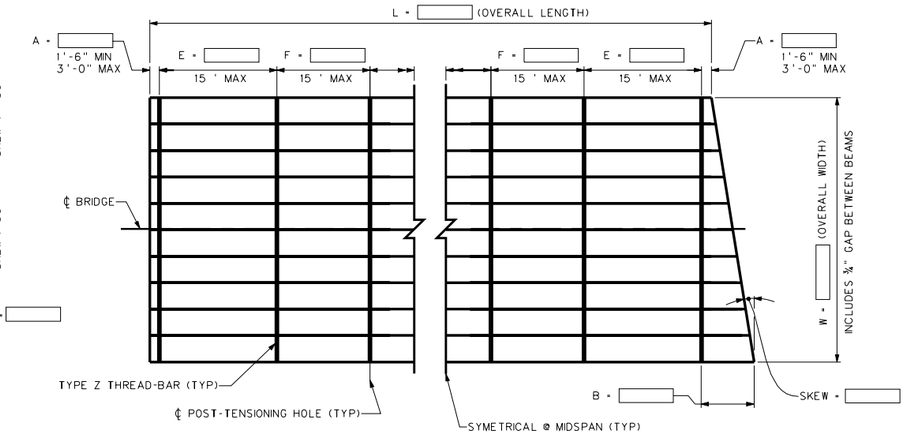
PRESTRESSED CONCRETE BEAM
ELASTOMERIC BEARING PAD DETAILS
MISC. DESIGN AND ASSEMBLY DETAILS

DESIGNED BY: THB/
DRAWN BY: THB/
CHECKED BY: TM/
REVIEWED BY: THB/
DATE:
SCALE:
SHEET OF
BRIDGE NO.

STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS

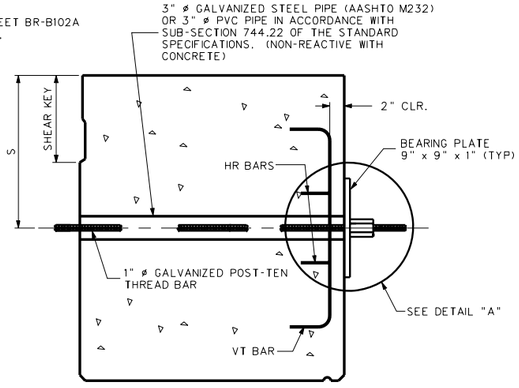


POST-TENSIONING BAR SPACING PLAN
SKEW > = 20°

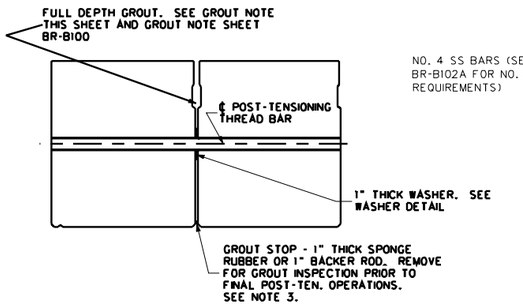


POST-TENSIONING BAR SPACING PLAN
NORMAL OR SKEW < 20°

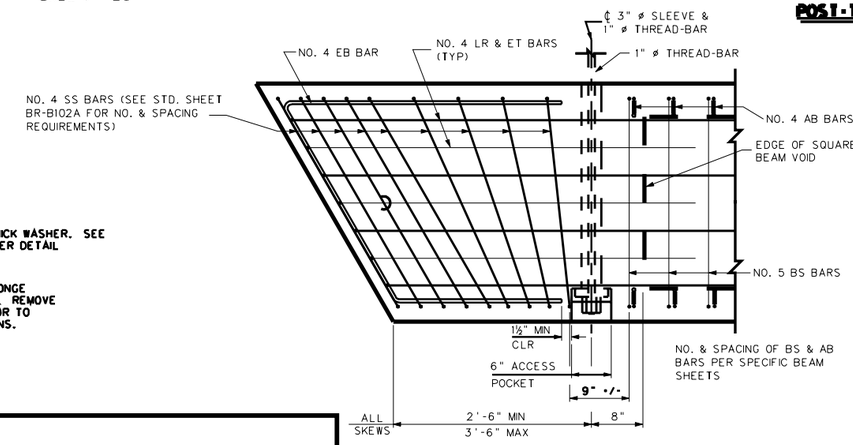
REFER TO STANDARD SHEET BR-B102A FOR SHEAR KEY DETAILS.



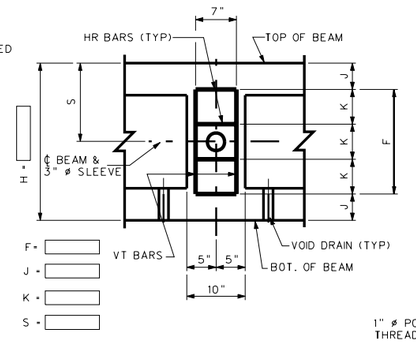
POST-TENSIONING BAR DETAILS



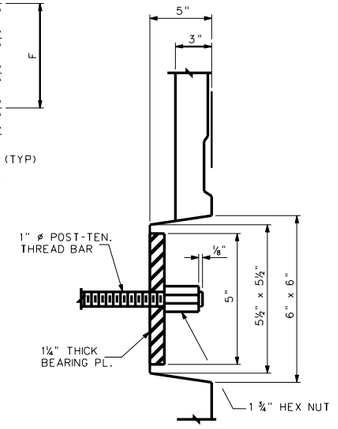
GROUT DETAILS



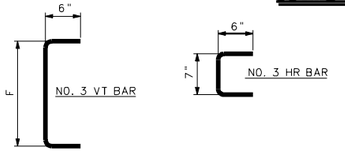
SHEAR REINFORCEMENT DETAIL
BEAMS WITH ACCESS POCKETS



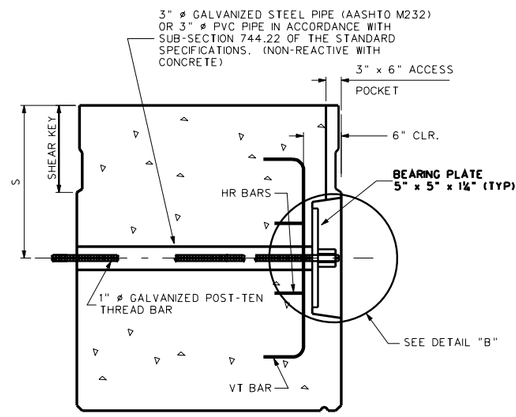
REINFORCING DETAILS @ DIAPHRAGM
EXTERIOR BEAM & POCKETS ONLY



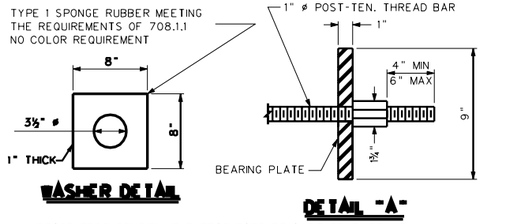
DETAIL "B"



REINFORCING BAR DETAIL
ALL BARS GR 60 - EPOXY COATED



ACCESS POCKET, END POST-TENSIONING BAR



WASHER DETAIL

DETAIL "A"

SPACE POST-TENSIONING THREAD BARS TO AVOID CONFLICT WITH GUARDRAIL INSERTS.

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-B104, BR-B105A & B AND BR-B106.

PROCEDURE NOTES

1. 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.

2. GLUE A ¾" x 2" x 2" PIECE OF PRESSURE TREATED PLYWOOD AT EACH THREAD-BAR LOCATION TO INSURE THAT A ¾" 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 ¾" WITH ALL SWEEP REMOVED. RECORD THE ACTUAL FORCE APPLIED.

3. 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 WVDOH SHALL WITNESS ALL OF THE ACCEPTANCE SAMPLING AND TESTING.

   TEST PROCEDURE SHALL BE ASTM C109 AS MODIFIED BY ASTM C1107. 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.

4. 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.

5. 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.

6. 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 GALVICON OR EQUAL.

7. 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

POST-TENSIONING BAR LAYOUT SCHEDULE

SPAN			
SKEW			
L			
W			
A			
B			
C			
D			
E			
F			
STEP			

DIMENSIONS

BEAM SIZE	REINFORCEMENT DIM	SPACING		BAR DIST
H	F	J	K	S
IN.	IN.	IN.	IN.	IN.
17	12	2½	4	8½
21	12	4½	4	10½
27	18	4½	6	13½
33	24	4½	8	16½
39	30	4½	10	19½
42	33	4½	11	21

GROUT STRENGTH TABLE

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

POST-TENSIONING BAR LENGTH

BAR	FORMULA	LENGTH
V(EVEN)	W-3"	
Z	W-3"	
V(ODD)	W-4'-6"	

ELONGATION (INCHES)

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

CALCULATED ⊗ = W(FT.) / 24.8
CALCULATED Ⓥ = W(FT.) / 99.2

ODD NO. BEAMS
CALCULATED Ⓥ = (W(FT.) - 3') / 99.2

SPECIAL WARNING NOTES

1. DO NOT STAND IN LINE WITH THE POST-TENSIONING BAR DURING TENSIONING PROCEDURES.
2. 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.

Gregg Bailey
DIRECTOR, ENGINEERING DIVISION
DATE: 10-25-07

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

PRESTRESSED CONCRETE BEAM

TRANSVERSE POST-TENSIONING DETAILS

STANDARD SHEET BR-B103

PREPARED: 07-02-07

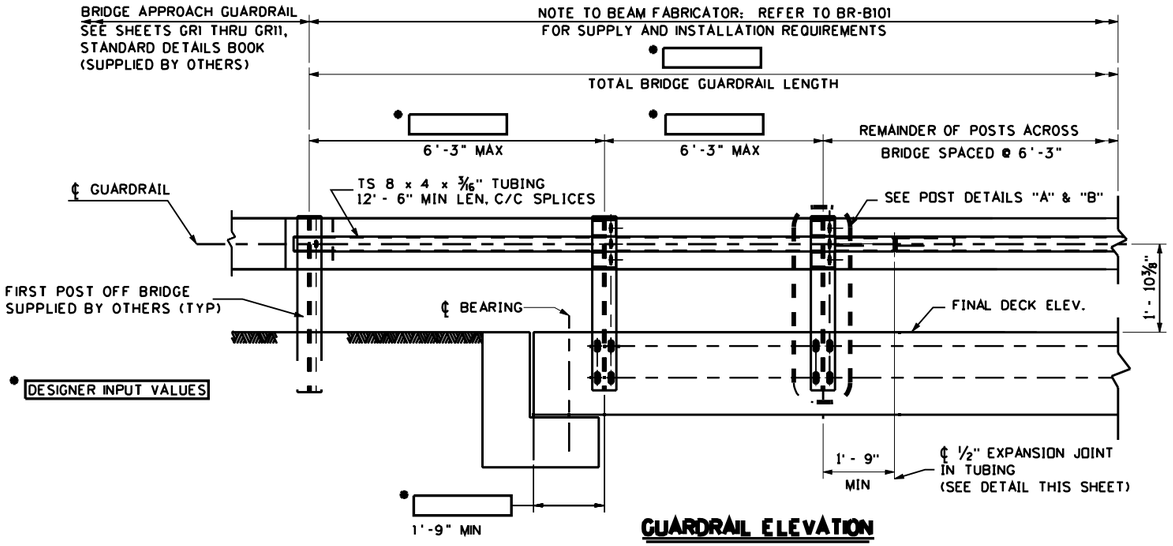
REVISED:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

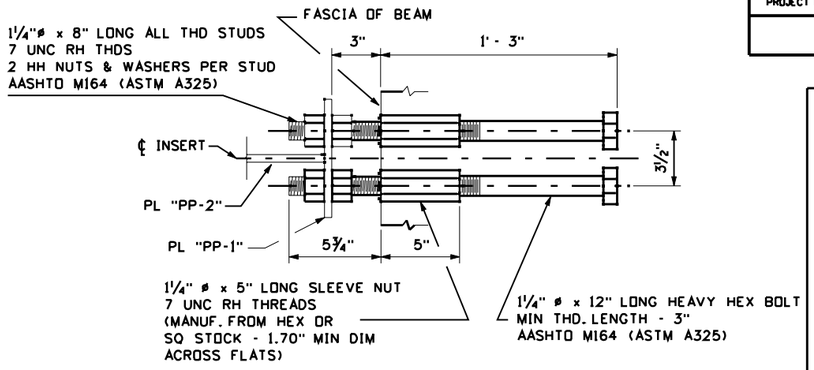
PRESTRESSED CONCRETE BEAM
TRANSVERSE POST-TENSIONING DETAILS

DESIGNED BY: THB/
DRAWN BY: THB/
CHECKED BY: TM/
REVIEWED BY: TW/
DATE:
SCALE:
SHEET NO OF
BRIDGE NUMBER

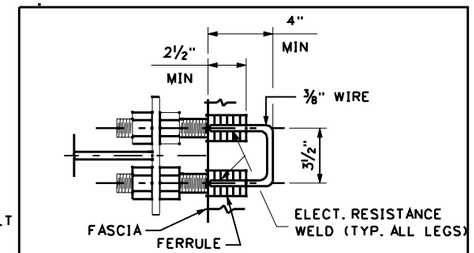
STATE PROJECT NUMBER	FEDERAL PROJECT NUMBER	STATE DIST. NO.	COUNTY	SHEET NO.	TOTAL SHEETS



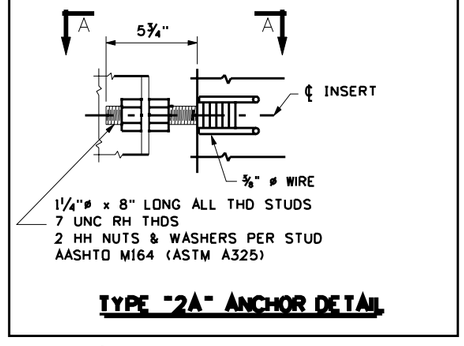
GUARDRAIL ELEVATION



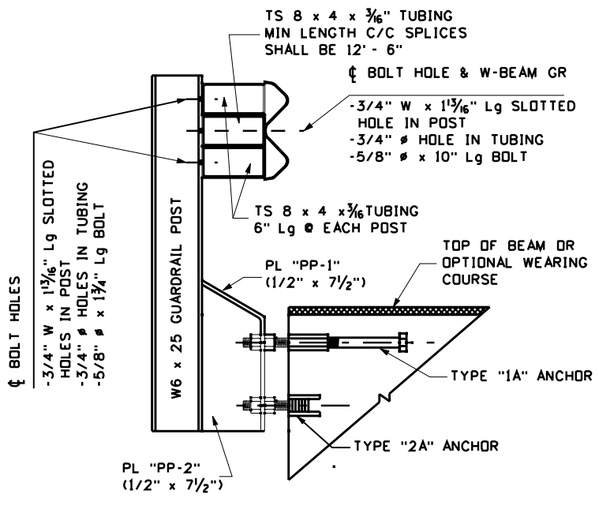
TYPE "1A" ANCHOR DETAIL



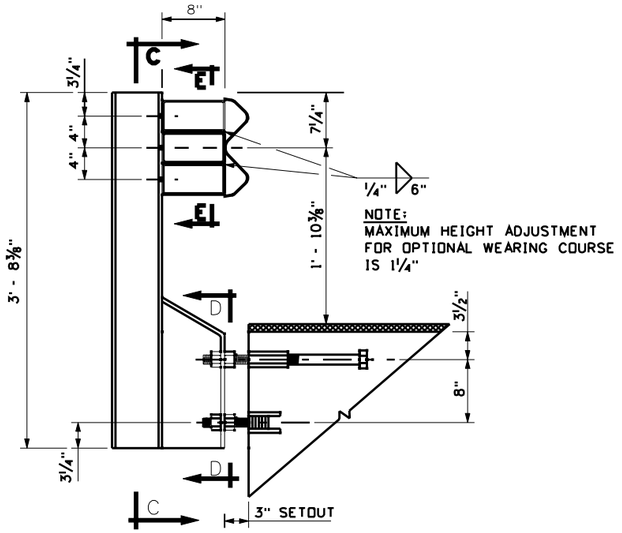
SECTION A-A



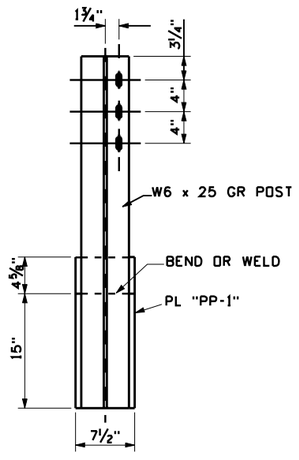
TYPE "2A" ANCHOR DETAIL



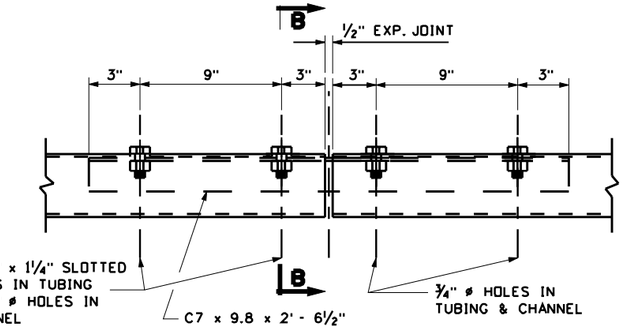
GUARDRAIL POST DETAIL "A"



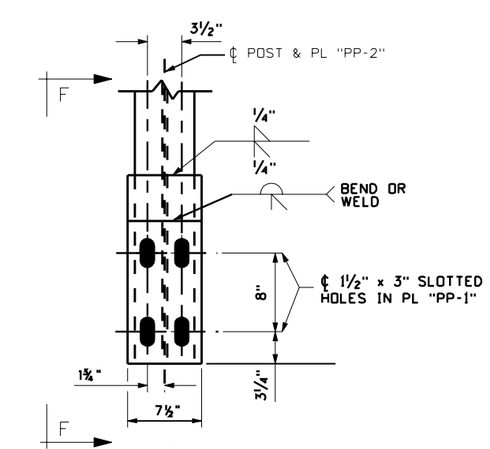
GUARDRAIL POST DETAIL "B"



SECTION C-C



TUBING SPLICE/EXPANSION JOINT DETAIL



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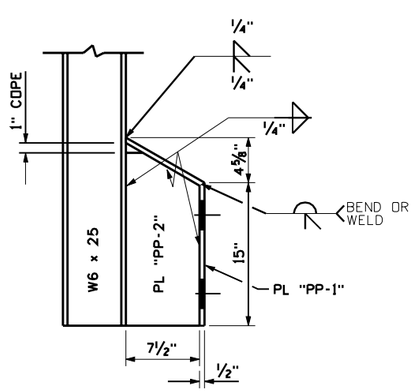

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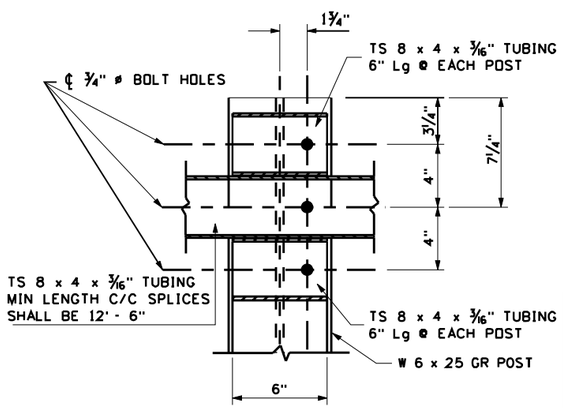

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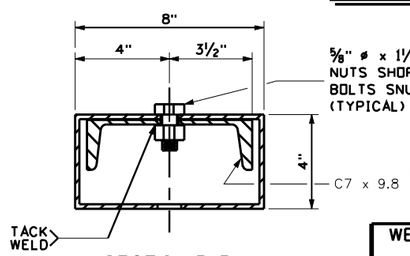


SECTION B-B

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: Gregg's Bailey DIRECTOR, ENGINEERING DIVISION DATE: 10-25-07

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

PRESTRESSED CONCRETE BEAM
TYPE TL-2 GUARDRAIL SYSTEM
DESIGN & ASSEMBLY DETAILS

STANDARD SHEET BR-B104

PREPARED: 1-14-05

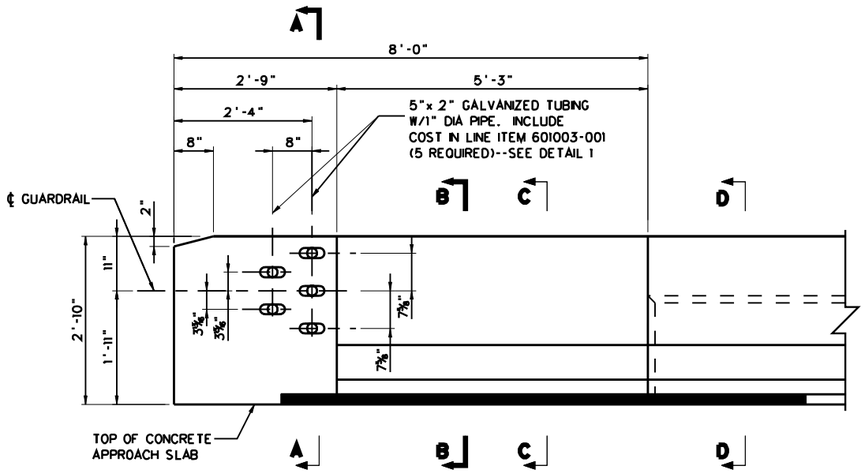
REVISION

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

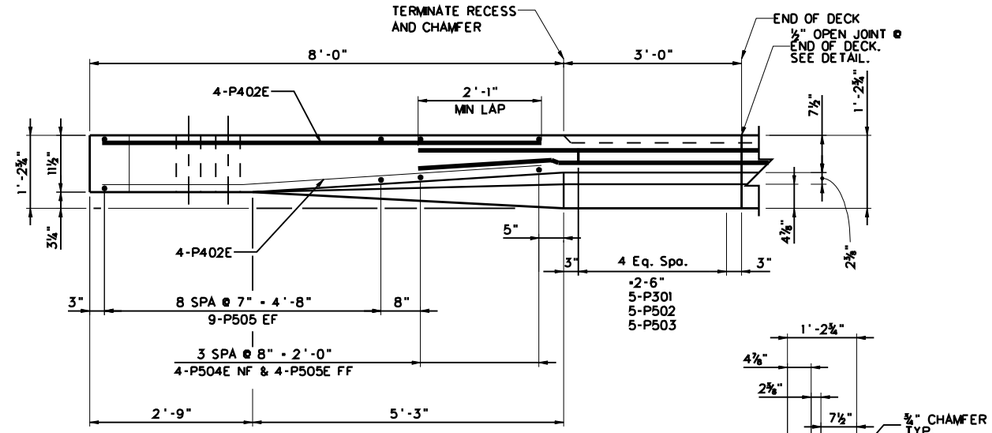
DESIGNED BY: THB/
DRAWN BY: THB/
CHECKED BY: TM/
REVIEWED BY:
DATE:
SCALE:
SHEET NO OF
BRIDGE NUMBER

PRESTRESSED CONCRETE BEAM
TYPE TL-2 GUARDRAIL SYSTEM
DESIGN & ASSEMBLY DETAILS

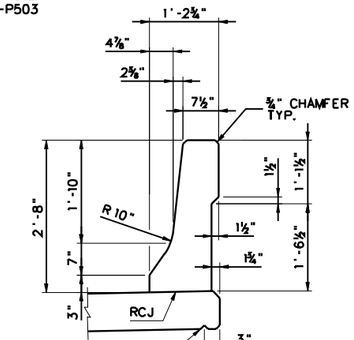
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



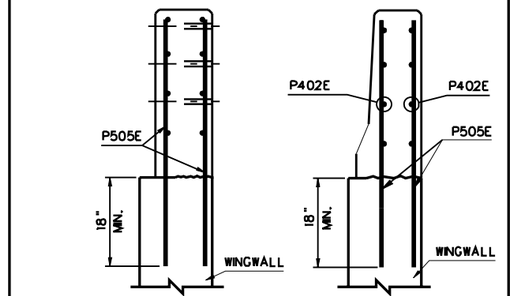
ELEVATION



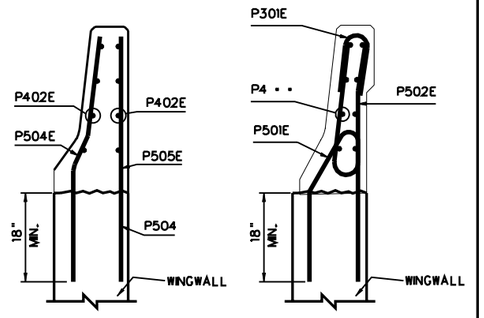
PLAN



BARRIER DETAIL

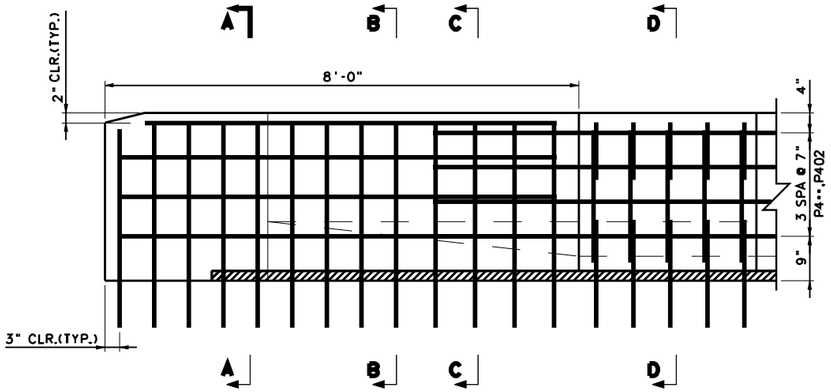


SECTION A"-A" SECTION B"-B"

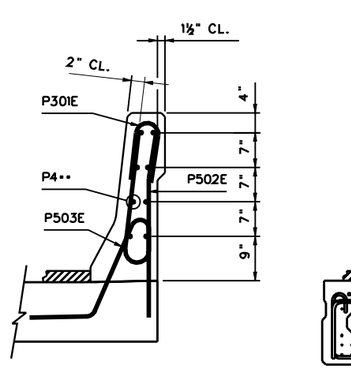


SECTION C"-C" SECTION D"-D"

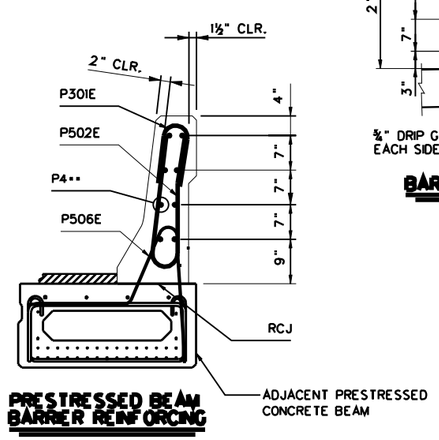
TRANSITION ON TOP OF WINGWALL



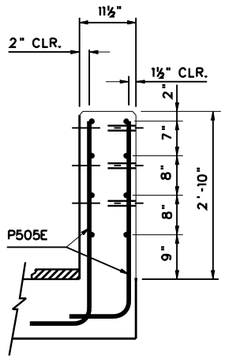
BARRIER REINFORCEMENT ELEVATION



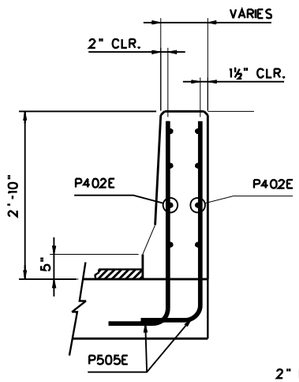
SECTION D-D



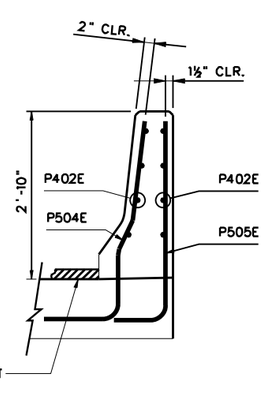
PRESTRESSED BEAM BARRIER REINFORCING



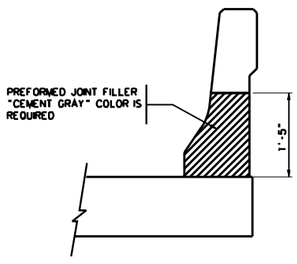
SECTION A-A



SECTION B-B



SECTION C-C



OPEN JOINT DETAIL

SPECIAL REQUIREMENT NOTE:
LENGTH OF VERTICAL LEGS OF PARAPET TO BEAM/SLAB CONNECTION BARS P503,P504, AND P505 IS BASED ON USE OF 2" HMA AT CURB LINE. VARIATION FROM THE 2" THICKNESS WILL REQUIRE ADJUSTMENT OF LEG LENGTH. RELATIVE LCIATION OF BENDS AND POSITION IN BEAMS AND PARAPET SHALL REMAIN CONSTANT.

NOTES:

1. ALL REINFORCING STEEL SHALL BE GRADE 60, EPOXY COATED.
2. FOR W-BEAM AND THRIE BEAM GUARDRAIL BRIDGE TRANSITION AND CONNECTION DETAILS SEE SHEETS GR9 AND GR11, VOLUME 1, STANDARD DETAILS BOOK.
3. THE PARAPET SHALL BE CAST IN PLACE ON TOP OF THE FINISHED DECK. HEIGHT OF THE PARAPET SHALL BE 2'-8" ABOVE THE FINISHED SHOULDER GUTTER LINE. PARAPETS SHALL BE CONTINUOUS.
4. PARAPET CONCRETE SHALL BE CLASS K.
5. 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.BR-B105B, GR9, AND GR11 AS APPROPRIATE.
6. BEAMS SHALL BE CAST WITH PB506E BARS IN PLACE.
7. LENGTH, NUMBER OF AND SEQUENCING OF P4•• BARS IS DEPENDANT ON THE LENGTH OF BEAMS AND PARAPETS.

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

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

PRESTRESSED CONCRETE BEAM
TYPE F BARRIER DETAILS
APPROACH SLAB TRANSITION

STANDARD SHEET BR-B105A

PREPARED: 07-02-07

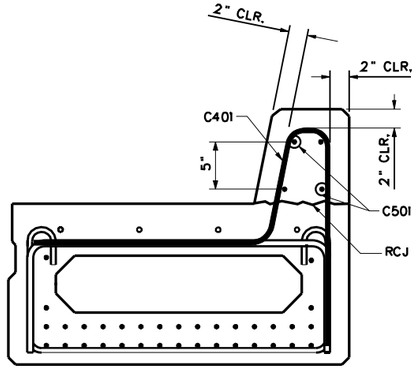
REVISED:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

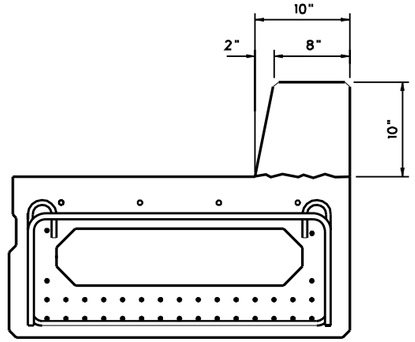
PRESTRESSED CONCRETE BEAM
TYPE F BARRIER DETAILS
APPROACH SLAB TRANSITION

DESIGNED BY: TW/
DRAWN BY: BH/
CHECKED BY: TW/
REVIEWED BY: THB/
DATE:
SCALE:
SHEET OF
BRIDGE NO.

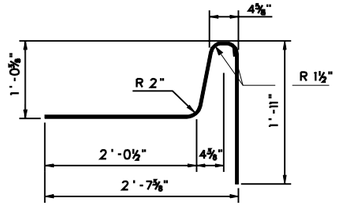
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



SECTION A-A

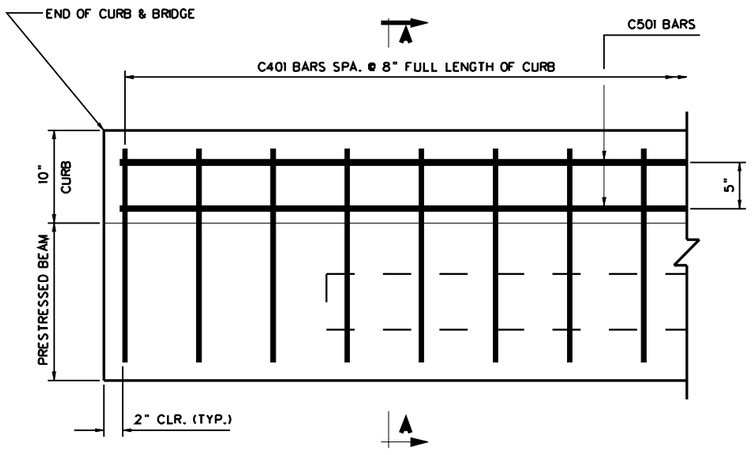


BRIDGE CURB SECTION

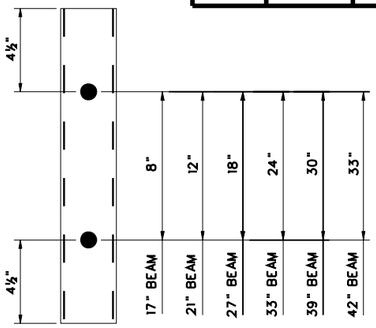


C401

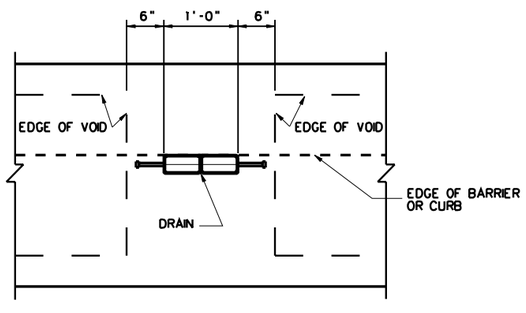
CURB REINFORCING				
MARK	TYPE	NUMBER REQD	LENGTH EACH	TOTAL LENGTH
C401	BENT		10'-5"	
C501	STR	4		



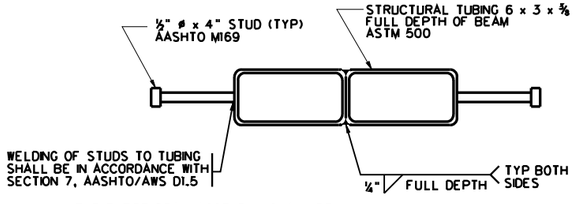
CURB REINFORCEMENT ELEVATION



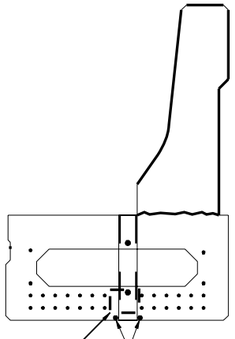
DRAIN DETAIL - ELEVATION VIEW



POSITION OF DRAINS

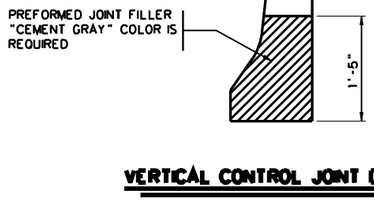


DRAIN DETAIL - PLAN VIEW

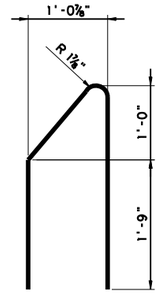


WHEN CONFLICT BETWEEN DRAIN CHUTE AND STRANDS OCCURS, DESIGNER SHALL REPOSITION AFFECTED STRANDS IN A MANNER TO MAINTAIN LATERIAL SYMMETRY OF PATTERN AND IN A MANNER TO LEAST AFFECT ECCENTRICITY OF PATTERN.

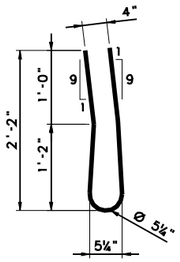
TYPICAL SECTION @ DRAIN



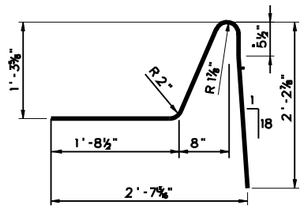
VERTICAL CONTROL JOINT DETAIL



P501



P502



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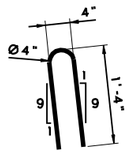
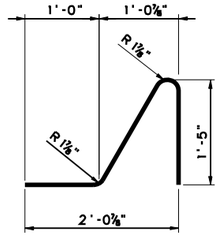


P301



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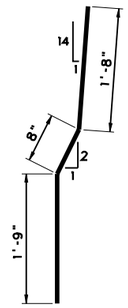


P504

BARRIER REINFORCING				
MARK	TYPE	NUMBER REQD	LENGTH EACH	TOTAL LENGTH
P301	BENT		3'-3"	
P401	STR			
P402	STR			
P501	BENT		4'-4"	
P502	BENT		4'-9"	
P503	BENT		5'-9"	
P504	BENT		4'-2"	
P505	STR		4'-2"	

NOTES:

1. WHEN PARAPETS ARE REQUIRED, THIS SHEET SHALL BE USED IN CONJUNCTION WITH STANDARD SHEET BR-B105A.
2. ALL 10" CURBS SHALL BE CONTINUOUS AND CAST-IN-PLACE.
3. ALL REINFORCING STEEL SHALL BE GRADE 60, EPOXY COATED.
4. CURB CONCRETE SHALL BE CLASS K.
5. USE OF 10" CURB ON PRECAST BOX BEAM STRUCTURES IS PERMITTED ONLY WHEN THE APPROVAL OF THE DIRECTOR OF ENGINEERING DIVISION IS OBTAINED.

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

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

PRESTRESSED CONCRETE BEAM
BRIDGE CURB DETAILS
BARRIER/CURB REINFORCING

STANDARD SHEET BR-B105B

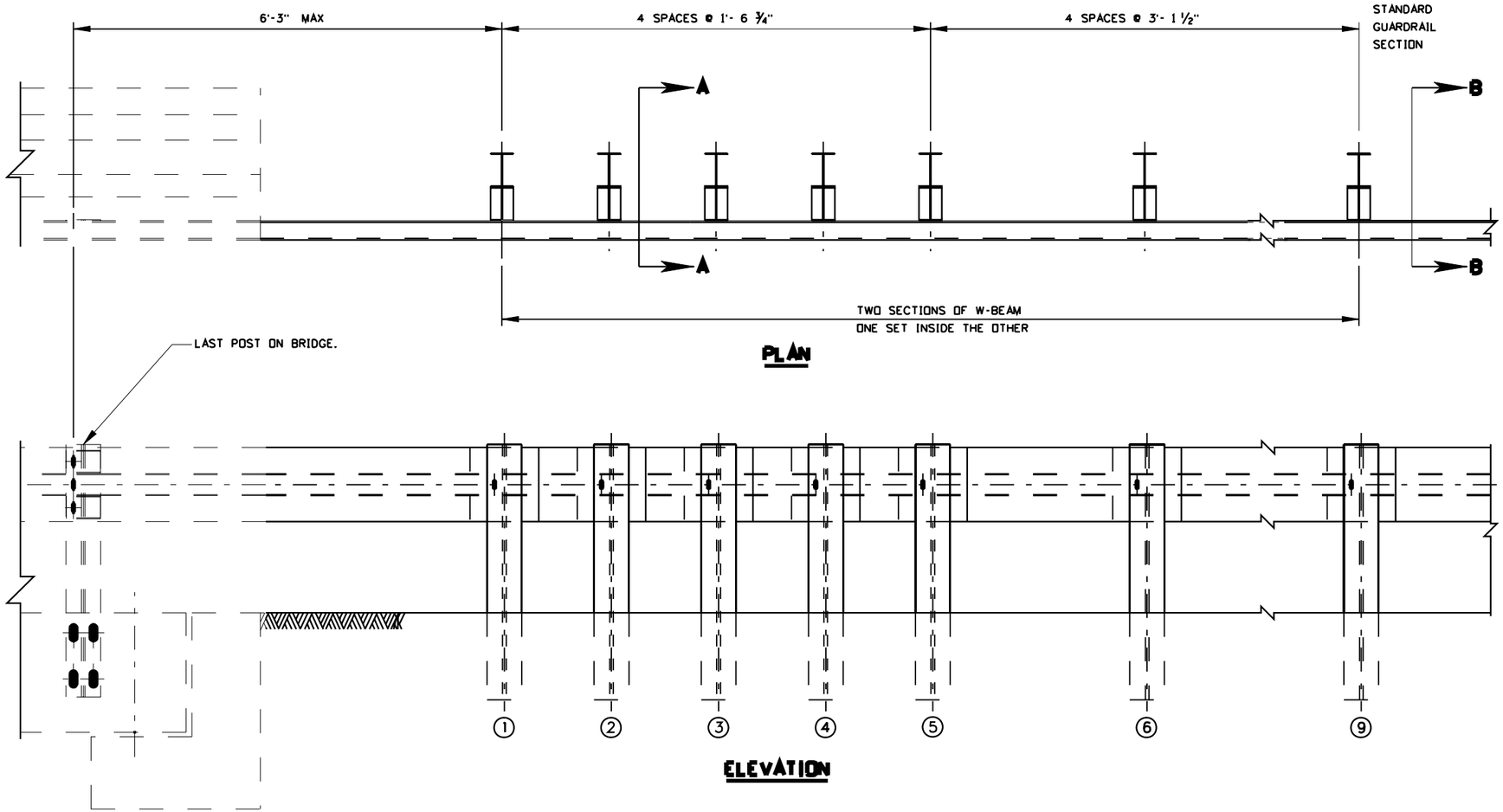
PREPARED: 07-02-07
REVISED:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

PRESTRESSED CONCRETE BEAM
BRIDGE CURB DETAILS
BARRIER/CURB REINFORCING

DESIGNED BY: TW/
DRAWN BY: BH/
CHECKED BY: TW/
REVIEWED BY: THB/
DATE:
SCALE:
SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				

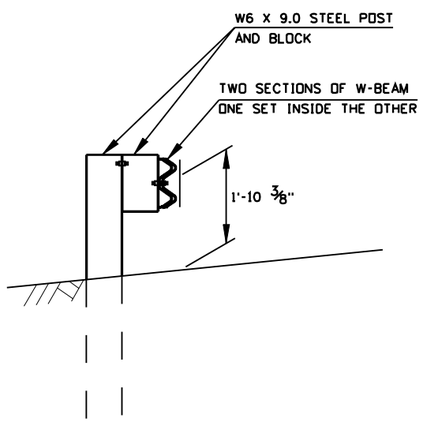


PLAN

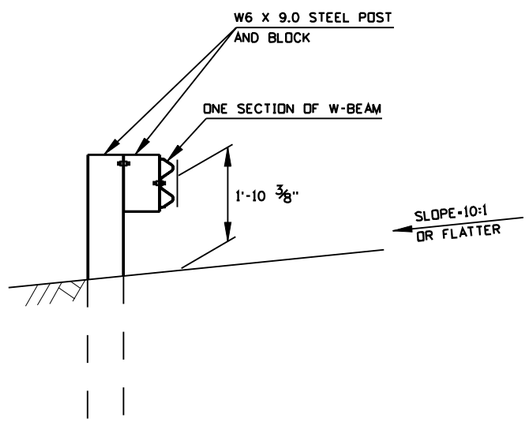
ELEVATION

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.



SECTION A-A



SECTION B-B

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

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

PRESTRESSED CONCRETE BEAM
TYPE TL-2 GUARDRAIL SYSTEMS
DESIGN & ASSEMBLY DETAILS

STANDARD SHEET BR-B106

PREPARED: 07-02-07

REVISED:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

TYPE TL-2 GUARDRAIL TRANSITION

DESIGNED BY: TW/	
DRAWN BY: BH/	
CHECKED BY: TW/	
REVIEWED BY: THB/	
DATE:	
SCALE:	
SHEET	OF
BRIDGE NO.	

* IF BITUMINOUS WEARING SURFACE OR SURFACE TREATMENT IS DELETED, AFFECTED ELEVATIONS SHALL BE TAKEN AT THE TOP SURFACE OF THE DECK.

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.Va.					

CONTROL ELEVATIONS

CODE	ABUTMENT 1	ABUTMENT 2
1*		
2		
3		

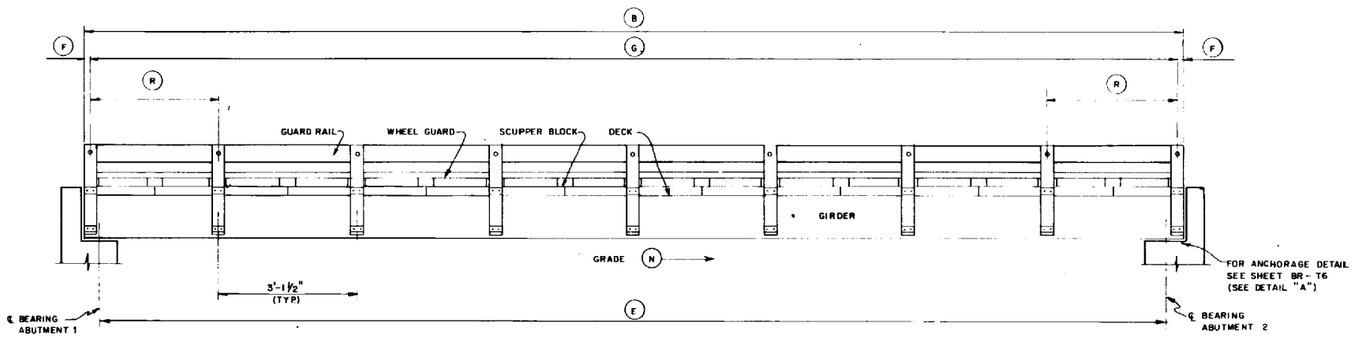
ELEVATIONS ESTABLISHED FROM:

CONTROL STATIONING

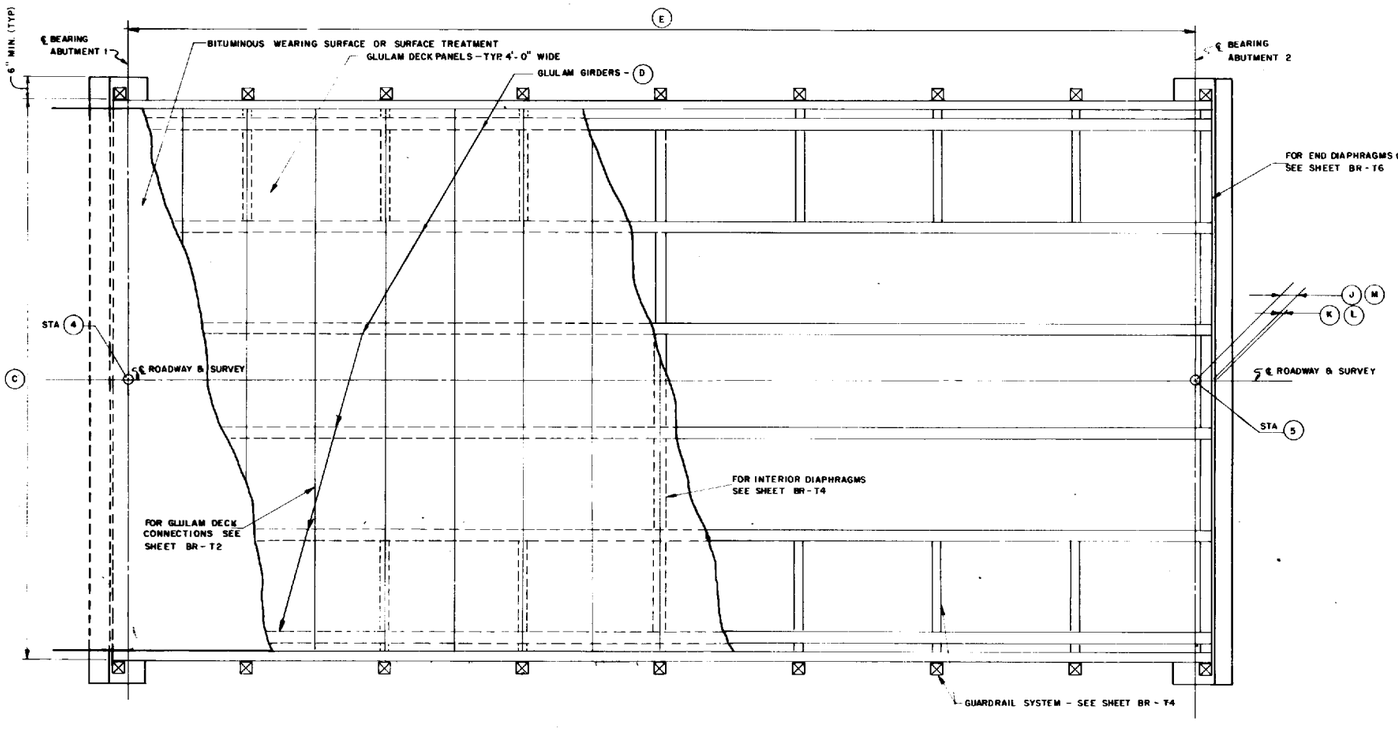
CODE	LOCATION	STATION VALUE ABUT. 1	STATION VALUE ABUT. 2
4	℄ BRIDGE AT ℄ BEARING		—
5	℄ BRIDGE AT ℄ BEARING	—	

STATIONING ESTABLISHED FROM:

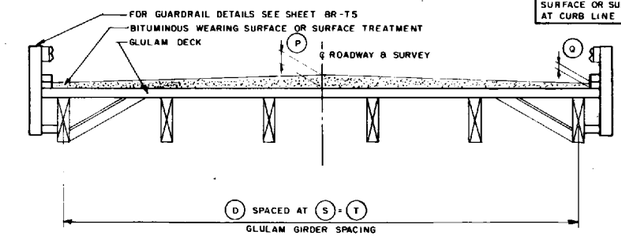
DIMENSION	CODE	VALUE
THICKNESS OF BITUMINOUS WEARING SURFACE OR SURFACE TREATMENT AT ℄ OF ROADWAY	P	
THICKNESS OF BITUMINOUS WEARING SURFACE OR SURFACE TREATMENT AT CURB LINE	Q	



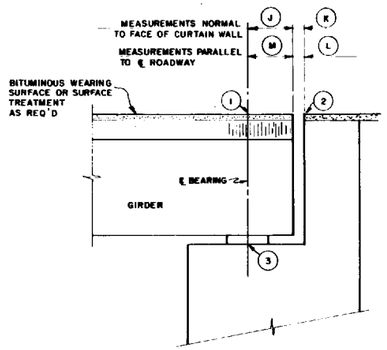
ELEVATION VIEW



PLAN VIEW



TYPICAL SECTION



CONTROL ELEVATION & BEARING DIMENSIONS ALONG ℄ ROADWAY

DETAIL "A"

CONTROL DIMENSIONS

DIMENSION	CODE	VALUE
NORMAL CROSSING	A	
LENGTH OF GIRDERS, OUT-TO-OUT	B	
DECK WIDTH, OUT-TO-OUT	C	
NUMBER OF GIRDERS	D	
SPAN LENGTH, ℄ BEARING TO ℄ BEARING	E	
DISTANCE FROM END OF GIRDER TO ℄ OF FIRST GUARDRAIL POST	F	
NUMBER OF GUARDRAIL POSTS, EACH SIDE	G	
PERPENDICULAR DISTANCE FROM ℄ BEARING TO END OF GIRDER	J	
PERPENDICULAR DISTANCE FROM GIRDER END TO FRONT FACE OF CURTAIN WALL	K	
DISTANCE FROM GIRDER END TO FRONT FACE OF CURTAIN WALL (PARALLEL TO ℄ OF ROADWAY)	L	
DISTANCE FROM ℄ BEARING TO END OF GIRDER (PARALLEL TO ℄ OF ROADWAY)	M	
GRADE	N	
SPACING OF GIRDERS	S	
DISTANCE ℄ TO ℄ OF EXTERIOR GIRDERS	T	
DISTANCE FROM END GUARDRAIL POST TO FIRST INTERIOR GUARDRAIL POST	R	

ESTIMATE OF QUANTITIES

ITEM		DESCRIPTION	UNIT	QUANTITY
405-1		SURFACE TREATMENT AGGREGATE	TON	
405-3		BITUMINOUS MATERIAL	GALLON	
627-1		GLUED LAMINATED TIMBER BRIDGE, COMPLETE	BOARD FEET	
401-2 (11)	P	HOT-LAID BITUMINOUS CONCRETE WEARING COURSE (STONE OR GRAVEL AGGREGATE)	TON	
401-2 (11)	A	HOT-LAID BITUMINOUS CONCRETE WEARING COURSE (SLAG AGGREGATE)	TON	

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

W. VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS

GLUED LAMINATED
TIMBER STRUCTURE

SUPERSTRUCTURE PLAN - NORMAL CROSSING

STANDARD SHEET BR-T1

PREPARED	2-76
REVISED	1-78
	11-79
	9-88

DESIGNED BY:
DRAWN BY: TJP
CHECKED BY:
REVIEWED BY:
DATED:
SCALE: NONE
SHEET OF
BRIDGE NUMBER

SUPERSTRUCTURE PLAN

* IF BITUMINOUS WEARING SURFACE OR SURFACE TREATMENT IS DELETED, AFFECTED ELEVATIONS SHALL BE TAKEN AT THE TOP SURFACE OF THE DECK.

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.V. 604.					

CONTROL ELEVATIONS

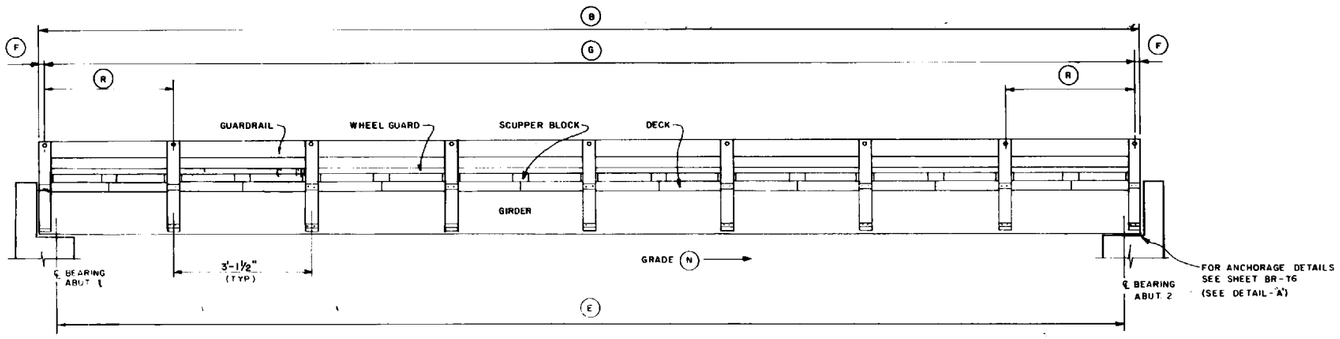
CODE	ABUTMENT 1	ABUTMENT 2
1*		
2		
3		

ELEVATIONS ESTABLISHED FROM:

CONTROL STATIONING

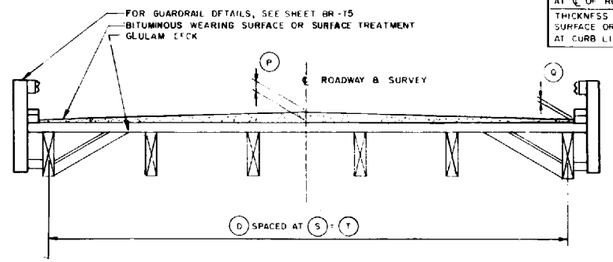
CODE	LOCATION	STATION VALUE	
		ABUT. 1	ABUT. 2
4	℄ BRIDGE AT ℄ BEARING		—
5	℄ BRIDGE AT ℄ BEARING	—	

STATIONING ESTABLISHED FROM:

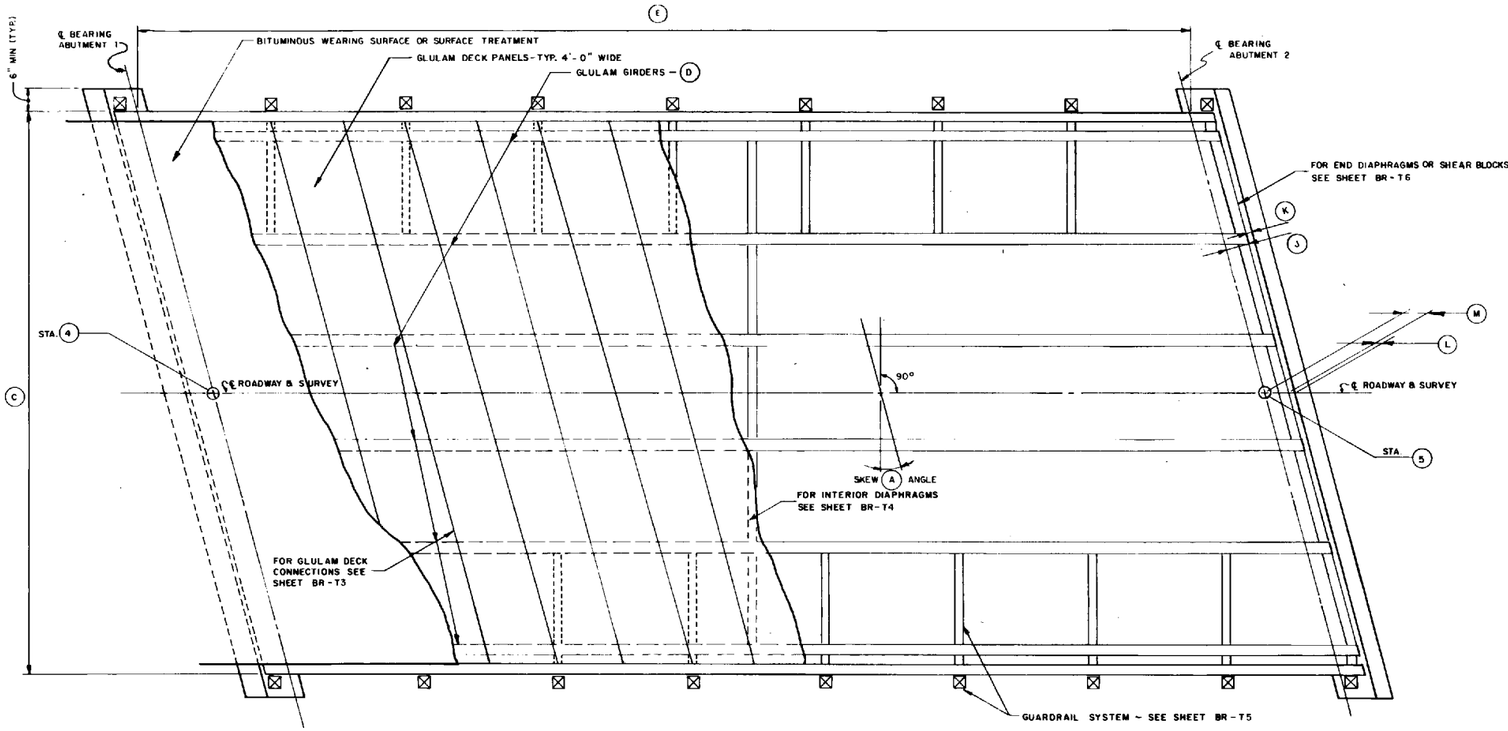


ELEVATION VIEW

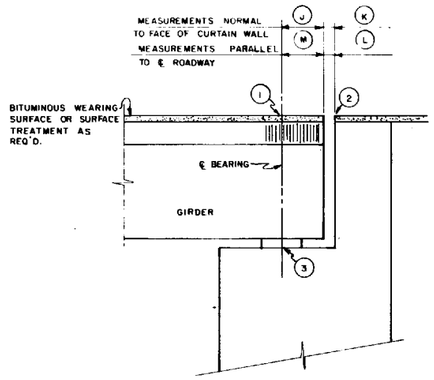
DIMENSION	CODE	VALUE
THICKNESS OF BITUMINOUS WEARING SURFACE OR SURFACE TREATMENT AT ℄ OF ROADWAY	P	
THICKNESS OF BITUMINOUS WEARING SURFACE OR SURFACE TREATMENT AT CURB LINE	Q	



TYPICAL SECTION



PLAN VIEW



CONTROL DIMENSIONS

DIMENSION	CODE	VALUE
RIGHT FORWARD SKEW	A	
LENGTH OF GIRDERS, OUT-TO-OUT	B	
DECK WIDTH, OUT-TO-OUT	C	
NUMBER OF GIRDERS	D	
SPAN LENGTH, ℄ BEARING TO ℄ BEARING	E	
DISTANCE FROM END OF GIRDER TO ℄ OF FIRST GUARDRAIL POST	F	
NUMBER OF GUARDRAIL POSTS, EACH SIDE	G	
PERPENDICULAR DISTANCE FROM ℄ BEARING TO END OF GIRDER	J	
PERPENDICULAR DISTANCE FROM GIRDER END TO FRONT FACE OF CURTAIN WALL	K	
DISTANCE FROM GIRDER END TO FRONT FACE OF CURTAIN WALL (PARALLEL TO ℄ OF ROADWAY)	L	
DISTANCE FROM ℄ BEARING TO END OF GIRDER (PARALLEL TO ℄ OF ROADWAY)	M	
GRADE	N	
SPACING OF GIRDERS	S	
DISTANCE ℄ TO ℄ OF EXTERIOR GIRDERS	:	
DISTANCE FROM END GUARDRAIL POST TO FIRST INTERIOR GUARDRAIL POST	R	

CONTROL ELEVATIONS & BEARING DIMENSIONS ALONG ℄ ROADWAY

DETAIL "A"

ESTIMATE OF QUANTITIES

ITEM		DESCRIPTION	UNIT	QUANTITY
405-1		SURFACE TREATMENT AGGREGATE	TON	
405-3		BITUMINOUS MATERIAL	GALLON	
627-1		GLUED LAMINATED TIMBER BRIDGE, COMPLETE	BOARD FEET	
401-2(II)	P	HOT-LAID BITUMINOUS CONCRETE WEARING SURFACE (STONE OR GRAVEL AGGREGATE)	TON	
401-2(II)	A	HOT-LAID BITUMINOUS CONCRETE WEARING COURSE (SLAG AGGREGATE)	TON	

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

W.VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS

GLUED LAMINATED TIMBER STRUCTURE

SUPERSTRUCTURE PLAN - RIGHT FORWARD SKEW

STANDARD SHEET BR-T1

REVISED	
	2-76
	1-78
	11-79
	9-88

DESIGNED BY:
DRAWN BY: [illegible]
CHECKED BY:
REVIEWED BY:
DATE:
SCALE: NONE
SHEET OF
BRIDGE NUMBER

SUPERSTRUCTURE PLAN

*IF BITUMINOUS WEARING SURFACE OR SURFACE TREATMENT IS DELETED, AFFECTED ELEVATIONS SHALL BE TAKEN AT THE TOP SURFACE OF THE DECK.

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W. VA.					

CONTROL ELEVATIONS

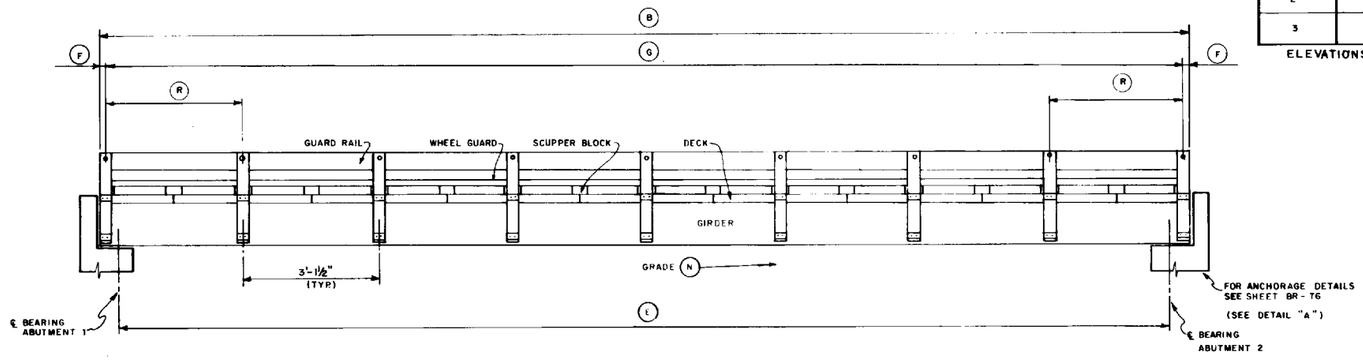
CODE	ABUTMENT 1	ABUTMENT 2
1*		
2		
3		

ELEVATIONS ESTABLISHED FROM:

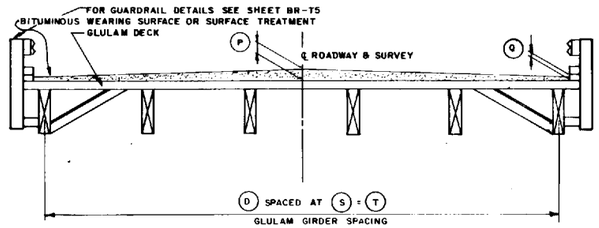
CONTROL STATIONING

CODE	LOCATION	STATION VALUE ABUT. 1	STATION VALUE ABUT. 2
4	℄ BRIDGE AT ℄ BEARING		—
5	℄ BRIDGE AT ℄ BEARING	—	

STATIONING ESTABLISHED FROM:

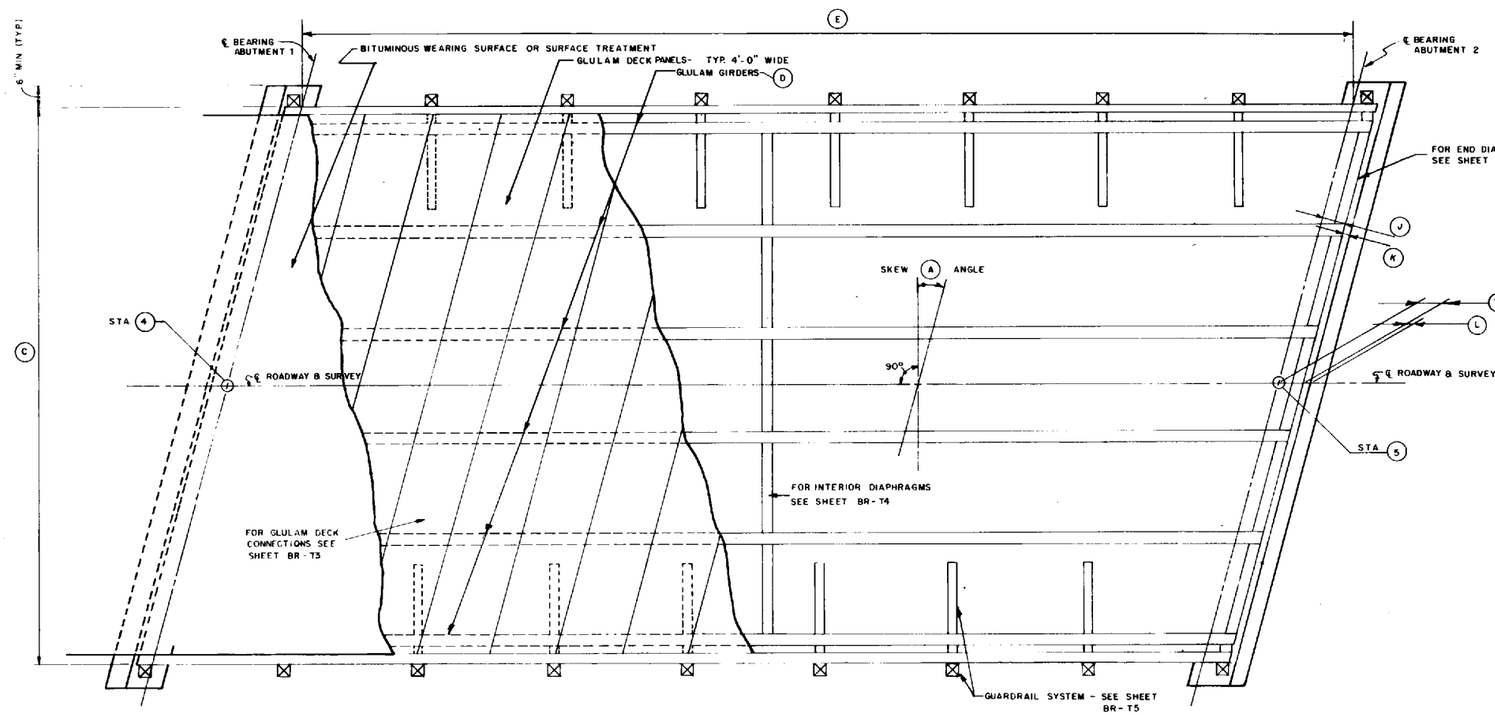


ELEVATION VIEW

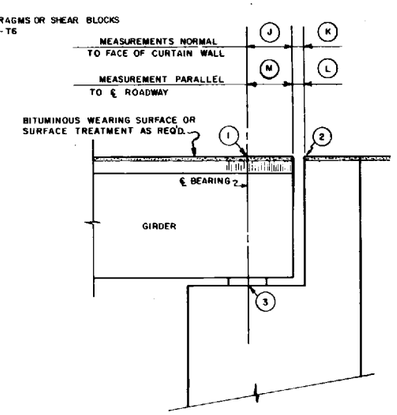


TYPICAL SECTION

DIMENSION	CODE	VALUE
THICKNESS OF BITUMINOUS WEARING SURFACE OR SURFACE TREATMENT AT ℄ OF ROADWAY	P	-
THICKNESS OF BITUMINOUS WEARING SURFACE OR SURFACE TREATMENT AT CURB LINE	Q	



PLAN VIEW



CONTROL ELEVATIONS & BEARING DIMENSIONS ALONG ℄ ROADWAY

DETAIL "A"

CONTROL DIMENSION

DIMENSION	CODE	VALUE
SPACING OF GIRDERS	S	
LEFT FORWARD SKEW	A	
LENGTH OF GIRDERS, OUT-TO-OUT	B	
DECK WIDTH, OUT-TO-OUT	C	
NUMBER OF GIRDERS	D	
SPAN LENGTH, ℄ BEARING TO ℄ BEARING	E	
DISTANCE FROM END OF GIRDER TO ℄ OF FIRST GUARDRAIL POST	F	
NUMBER OF GUARDRAIL POSTS, EACH SIDE	G	
PERPENDICULAR DISTANCE FROM ℄ BEARING TO END OF GIRDER	J	
PERPENDICULAR DISTANCE FROM GIRDER END TO FRONT FACE OF CURTAIN WALL	K	
DISTANCE FROM GIRDER END TO FRONT FACE OF CURTAIN WALL (PARALLEL TO ℄ OF ROADWAY)	L	
DISTANCE FROM ℄ BEARING TO END OF GIRDER (PARALLEL TO ℄ OF ROADWAY)	M	
GRADE	N	
DISTANCE FROM END GUARDRAIL POST TO FIRST INTERIOR GUARDRAIL POST	R	
DISTANCE FROM ℄ TO ℄ EXTERIOR GIRDERS	T	

ESTIMATE OF QUANTITIES

ITEM		DESCRIPTION	UNIT	QUANTITY
405-1		SURFACE TREATMENT AGGREGATE	TON	
405-3		BITUMINOUS MATERIAL	GALLON	
627-1		GLUED LAMINATED TIMBER BRIDGE, COMPLETE	BOARD FEET	
401-2(11)	P	HOT-LAID BITUMINOUS CONCRETE WEARING COURSE (STONE OR GRAVEL AGGREGATE)	TON	
401-2(11)	A	HOT-LAID BITUMINOUS CONCRETE WEARING COURSE (SLAG AGGREGATE)	TON	

W. VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS
GLUED LAMINATED
TIMBER STRUCTURE

SUPERSTRUCTURE PLAN - LEFT FORWARD SKEW

STANDARD SHEET BR-T1

REVISED:	2-76
	1-78
	11-79
	9-88

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

SUPERSTRUCTURE PLAN

DESIGNED BY:	
DRAWN BY:	TBT
CHECKED BY:	
REVIEWED BY:	
DATE:	
SCALE:	NONE
SHEET	OF
	BRIDGE NUMBER

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.Va.					

GENERAL

All structural glued laminated timber shall be furnished as shown detailed on the plans and as specified herein. Complete shop drawings shall be furnished by the fabricator and be approved by the West Virginia Department of Highways prior to fabrication.

DESIGN

Design loads conform to the Standard Specifications for Highway Bridges, adopted by the American Association of State Highway and Transportation Officials (A.A.S.H.T.O.), latest edition. Design loading criteria is as follows:

(A) Structural Glued Laminated Deck Panels:

Structural glued laminated deck panels conform in design procedure to U.S.D.A. Forest Service research paper FPL 210, 1973, "Procedure for Design of Glued Laminated Orthotropic Bridge Decks", as adopted for inclusion in the latest edition of the "Standard Specifications for Highway Bridges", paragraph 1.3.4 (A).

(B) Girders, Bracings, Railings and Miscellaneous Structural Elements:

These elements are designed in conformance with the latest editions of the following standards: "Standard Specifications for Highway Bridges", American Association of State Highway and Transportation Officials; "Timber Construction Manual", American Institute of Timber Construction; and "Manual of Steel Construction", American Institute of Steel Construction.

MANUFACTURE

Manufacture of the structural glued laminated timber shall be in compliance with Voluntary Product Standard PS 56-73, U.S. Department of Commerce, and the American Institute of Timber Construction Standards Series 100.

QUALITY CONTROL

Quality control shall be provided in conformance with Voluntary Product Standard for Structural Glued Laminated Timber, PS 56-73, U.S. Department of Commerce, and the American Institute of Timber Construction Inspection Manual, A.I.T.C. 200-73.

A certificate of conformance to these requirements shall be furnished to the West Virginia Department of Highways.

LUMBER

Laminating lumber shall be kiln dried and stress graded to meet the requirements of Standard Specifications for Structural Glued Laminated Timber, A.I.T.C. 117-71, or Standard Specifications for Hardwood Glued Laminated Timber, A.I.T.C. 119-71, whichever is applicable.

Deck panels shall conform to the grade requirements and corresponding allowable unit stress for No. 2 MG Southern Pine, L-2 Hem-Fir and Douglas Fir, and Symbol E Red Oak or White Oak, wet conditions of use. Symbol E refers to allowable unit stress combinations for Structural Glued Laminated Hardwood Timber, Table 2.11, Timber Construction Manual, A.I.T.C., Second Edition, 1974. This symbol compares to Sound Square Edge (Boxed Hearts and Planking) as specified in Rules for Measurement and Inspection of Hardwood and Cypress Lumber issued by the National Hardwood Lumber Association for Hardwoods for Construction.

Girders shall be Southern Pine, Hem-Fir, Douglas Fir, 24F combination, or Red Oak or White Oak, Symbol E, dry conditions of use, except compression perpendicular to grain shall be designed for wet conditions of use.

ADHESIVES

Adhesives shall be waterproof conforming to Voluntary Product Standard PS 56-73, and Section 4.6.2 of A.S.T.M. D2559-70.

PRESERVATIVES

All preservative treatments for glued laminated members shall be in accordance with A.I.T.C. 109-69, A.A.S.H.T.O. M133, A.W.P.A. C1 and C2 and A.W.P.A. C28-73.

All Southern Pine, Hem-Fir or Douglas Fir decking shall be pressure treated after gluing with (See Table 1). The retention shall be as shown in Table 1.

All Red Oak or White Oak decking shall be pressure treated after gluing with (See Table 2). The retention shall be 8 p.c.f. or refusal for creosote or 0.40 p.c.f. for penta in oil.

All Southern Pine, Hem-Fir or Douglas Fir laminated beams or girders shall be pressure treated with (See Table 1). The retention shall be as shown in Table 1.

All Red Oak or White Oak laminated beams or girders shall be pressure treated with (See Table 2). The retention shall be as shown in Table 2.

In addition, all Douglas Fir beams treated after gluing with creosote or penta in oil shall also have the top three laminations treated prior to gluing with pentachlorophenol in volatile solvents by the Cellon process to 0.4 p.c.f. retention.

APPEARANCE GRADE

Appearance shall be A.I.T.C. Industrial as defined in A.I.T.C. 110-71.

HARDWARE

The Fabricator shall furnish all hardware as specified herein and as shown on the drawings except that which is embedded or partially embedded in concrete or welded to structural steel. Fabricated steel shapes shall conform to A.S.T.M. A588 unless otherwise specified. All fasteners shall be galvanized in accordance with the Specification for Zinc (Hot-Galvanized) Coatings, A.A.S.H.T.O. M111 (A.S.T.M. A123).

HANDLING, STORAGE & INSTALLATION

This item shall be in accordance with A.A.S.H.T.O. Standards Sections 2.20.3, 2.20.4 and 2.20.5.

BITUMINOUS MATERIAL

Bitumastic Super Service Black Coating, as manufactured by Koppers Company, Pittsburgh, Pa., or equal shall be applied to the face of the doweled panel joints before panels are pulled together to form a watertight seal.

This material shall also be used to cover heads of drift pins or lag screw deck connectors to prevent moisture from penetrating deck panels or girders.

Road surfacing shall not be furnished by the Fabricator unless otherwise specified.

DELIVERY

Material shall be delivered as directed by the Engineer. A maximum of 15 calendar days will be allowed for delivery following notification by the Engineer. The vendor shall notify the Engineer one (1) working day prior to delivery of the material.

MISCELLANEOUS

All non-specified material in any shipment shall be rejected and will be removed from the West Virginia Department of Highways storage area by the vendor prior to acceptance of the suitable material.

Notification shall be made on all receiving documents and/or delivery slips specifying reason(s) for rejection of any portion of a shipment. The signatures of both the Department of Highways and delivering agency representatives shall be affixed to the documents on which rejection reason(s) is recorded.

The vendor must furnish to the Engineer a certificate of inspection, certifying that the total order meets the specifications for quality of lumber, preservative and retention required. A certified copy of the certificate of inspection must be attached to the invoice.

Under no circumstances may the vendor ship nor will the Department of Highways accept or pay for quantities of material in access of the quantity stated on the purchase order, except upon advance approval of the Engineer.

LUMBER OPTIONS

SPECIES.	DECK	GIRDERS	DIAPHRAGMS
SOUTHERN PINE			
HEM-FIR			
DOUGLAS FIR			
RED OAK			
WHITE OAK			

TABLE 1
SOFT WOODS

TREATMENT	RETENTION (P.C.F.) ABOVE GROUND	RETENTION (P.C.F.) BELOW GROUND
CREOSOTE (A.W.P.A.-P1)	8	12
PENTA IN OIL (A.W.P.A.-P9)	0.4	0.6
CELLON (A.W.P.A.-P9) TYPE 'B' SOLVENT	0.4	0.6

NOTE: CELLON PROCESS TO BE APPLIED TO GIRDERS ONLY.

TABLE 2
HARD WOODS

TREATMENT	RETENTION (P.C.F.) ABOVE GROUND	RETENTION (P.C.F.) BELOW GROUND
CREOSOTE (A.W.P.A.-P1)	8 OR REFUSAL	REFUSAL
PENTA IN OIL (A.W.P.A.-P9)	0.4	0.6

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

W.VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS

GENERAL NOTES

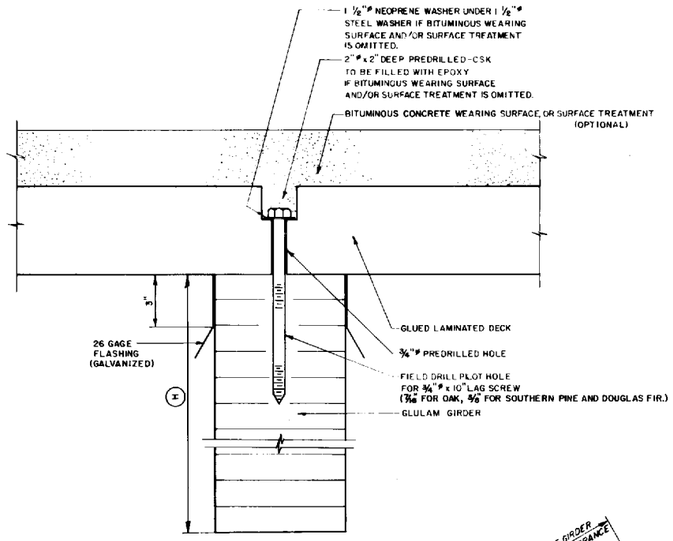
STANDARD SHEET BR-T2

PREPARED 7-76
REVISED 9-88

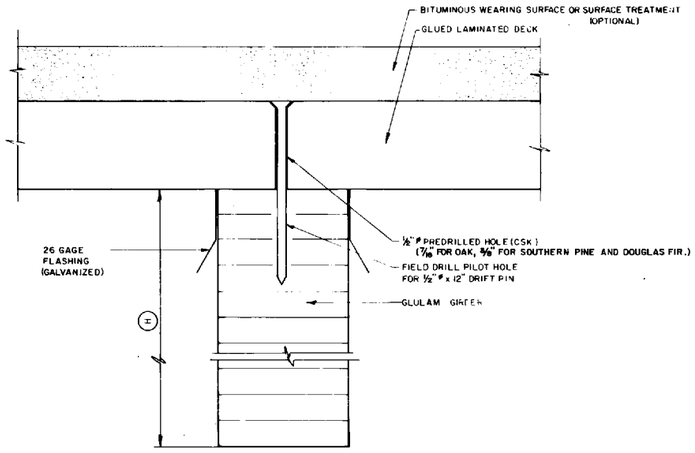
GENERAL NOTES

DESIGNED BY:
DRAWN BY: W.F.H.
CHECKED BY:
REVIEWED BY:
DATE:
SCALE:
SHEET OF
BRIDGE NUMBER

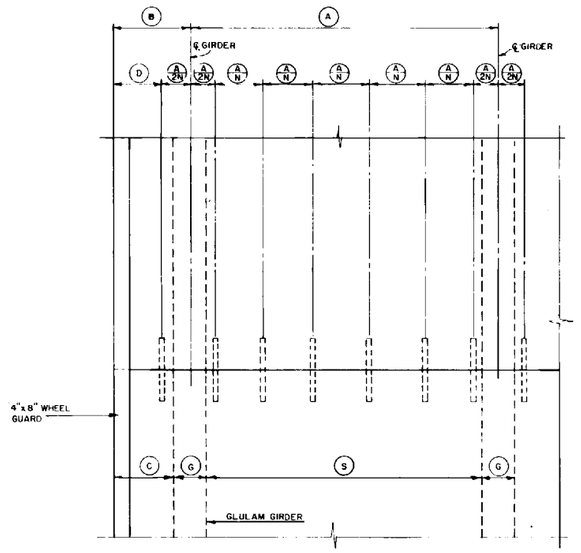
PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.VA.					



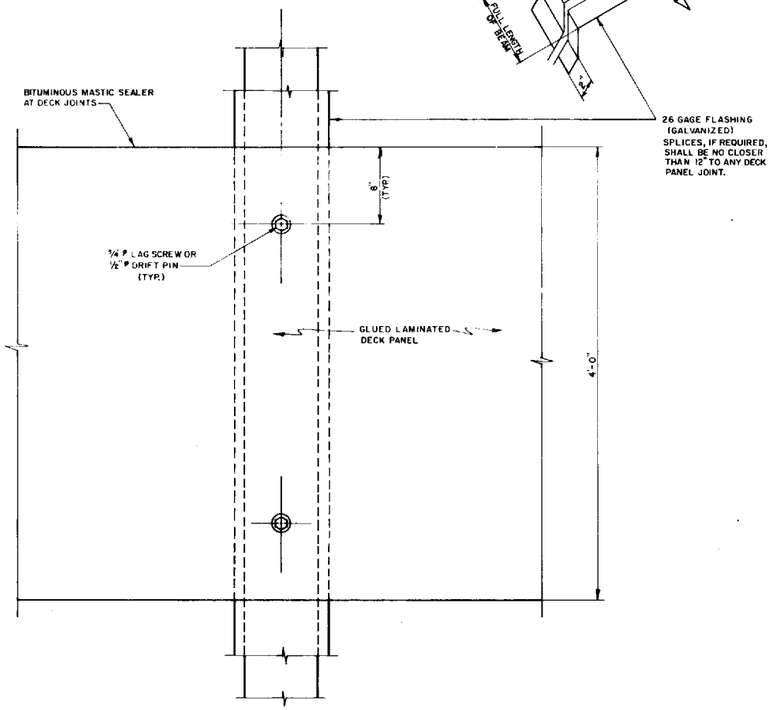
SECTION
LAG SCREW OPTION



SECTION
DRIFT PIN OPTION

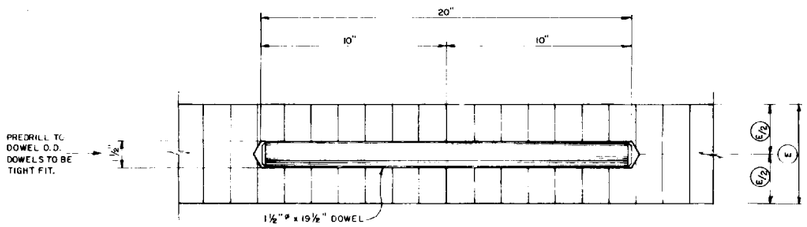


PLAN



PLAN

ANCHORAGE DETAILS FOR DECK



SECTION

DECK JOINT

NOTE: DECK PANELS TO BE DRAWN SNUG TIGHT, AS DIRECTED BY THE ENGINEER, BY MECHANICAL MEANS (COME-ALONG OR OTHER APPROPRIATE SYSTEM) DURING THE DECK INSTALLATION OPERATION. (USE ONE DEVICE PER 5' OR FRACTION THEREOF OF BRIDGE WIDTH).

CONTROL DIMENSIONS

CODE	DESCRIPTION	VALUE
A	GIRDER SPACING	
B	DISTANCE FROM EDGE OF DECK TO ℄ OF EXTERIOR GIRDER	
C	DISTANCE FROM EDGE OF DECK TO EDGE OF EXTERIOR GIRDER	
D	DISTANCE FROM EDGE OF DECK TO ℄ OF FIRST DOWEL	
E	THICKNESS OF DECK	
G	WIDTH OF GIRDER	
H	DEPTH OF GIRDER	
N	NUMBER OF DOWELS PER BAY	
A/N	DISTANCE C-C OF DOWELS	
A/2N	DISTANCE FROM ℄ GIRDER TO ℄ DOWEL	
S	DISTANCE BETWEEN GIRDERS	

ESTIMATE OF QUANTITIES

ITEM	QUANTITY
NUMBER OF 1½"ø x 19½" DOWELS REQUIRED (TOTAL PER STRUCTURE)	
NUMBER OF LINEAL FEET OF FLASHINGS REQUIRED (TOTAL PER STRUCTURE)	
NUMBER OF LAG SCREWS OR DRIFT PINS (TOTAL PER STRUCTURE)	

OPTIONS SELECTED

ITEM	YES OR NO
¾"ø x 10" LAG SCREWS	
½"ø x 12" DRIFT PINS	
HOT-LAID BITUMINOUS WEARING SURFACE	
SURFACE TREATMENT	

DIRECTOR, STRUCTURES DIVISION

W. VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS

GLUED LAMINATED
TIMBER STRUCTURE

STANDARD SHEET BR-T3

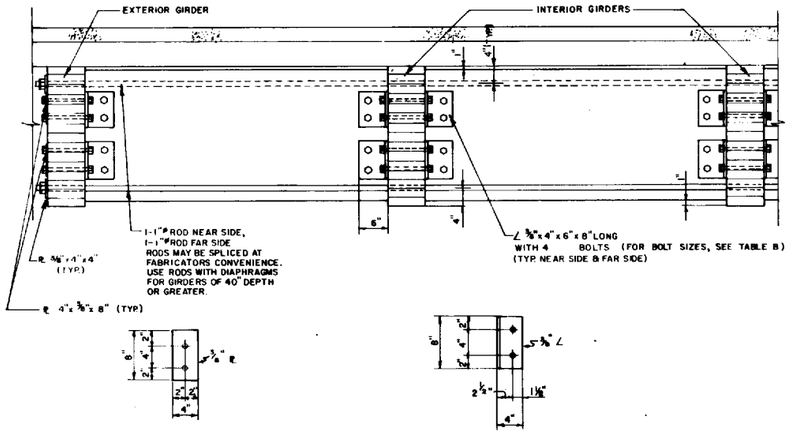
PREPARED 2-76
REVISED 9-88

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

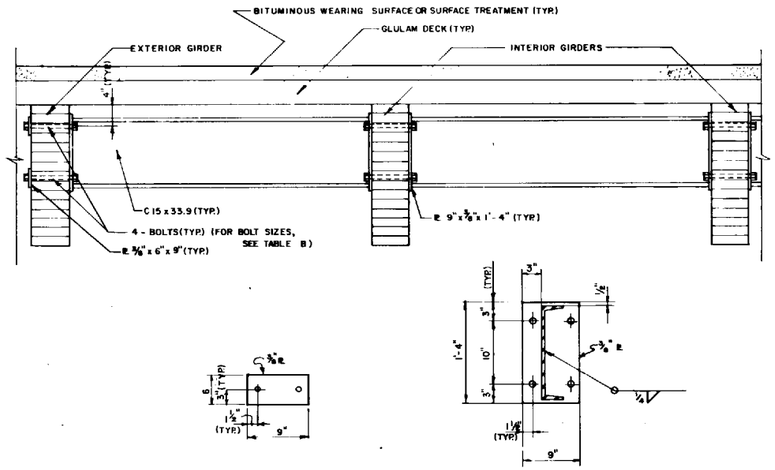
DECK FASTENING DETAILS

DESIGNED BY:
DRAWN BY: W.V.D.
CHECKED BY:
REVIEWED BY:
DATE
SCALE NONE
SHEET OF
BRIDGE NUMBER

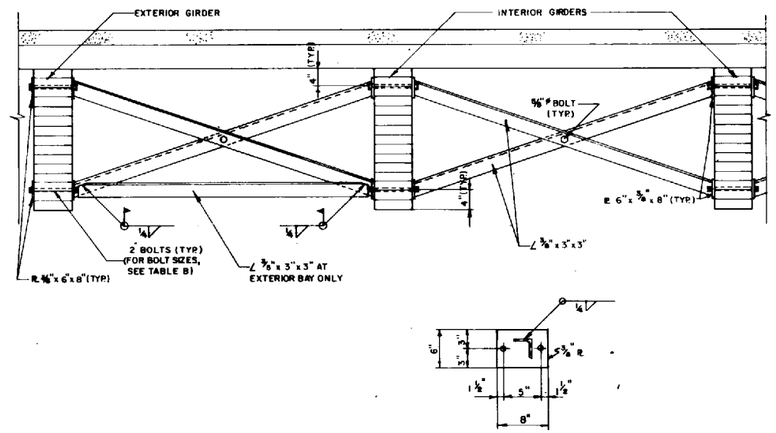
PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W. Va.					



INTERMEDIATE TIMBER DIAPHRAGM SYSTEM



INTERMEDIATE CHANNEL DIAPHRAGM SYSTEM



INTERMEDIATE ANGLE DIAPHRAGM SYSTEM

TABLE A	
BRIDGE LENGTH	INTERMEDIATE DIAPHRAGMS AND SPACING
0'-25'	NONE REQUIRED
25'-50'	TIMBER, CHANNEL OR ANGLES AT CENTERLINE OF SPAN
50'-80'	ANGLES AT 1/3 POINTS OF SPAN

TABLE B	
GIRDER WIDTH	BOLT SIZE
5 1/8"	2 @ 5/8" ø
6 3/4"	2 @ 5/8" ø
8 3/4"	2 @ 5/8" ø
10 3/4"	2 @ 7/8" ø
12 1/8"	2 @ 7/8" ø
14 1/4"	2 @ 7/8" ø

OPTION SELECTED (SEE TABLE A)

SYSTEM	YES OR NO
TIMBER DIAPHRAGMS	
CHANNEL DIAPHRAGMS	
ANGLE DIAPHRAGMS	

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

W. VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS
GLUED LAMINATED
TIMBER STRUCTURE

STANDARD SHEET BR-T4

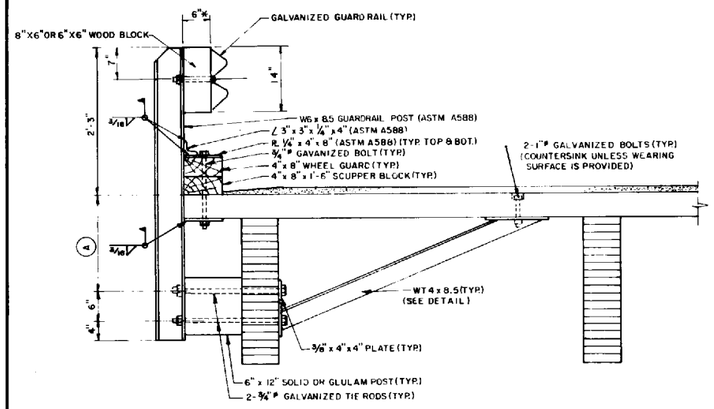
PREPARED:	2-76
REVISED:	9-88

DIAPHRAGM DETAILS

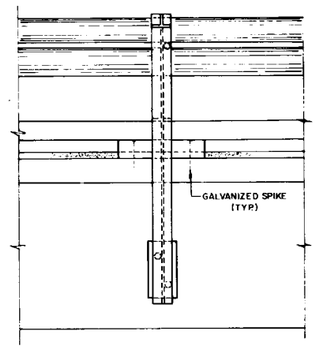
DESIGNED BY:	
DRAWN BY:	w.g.h.
CHECKED BY:	
REVIEWED BY:	
DATE:	
SCALE:	NONE
SHEET	OF
BRIDGE NUMBER	

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS

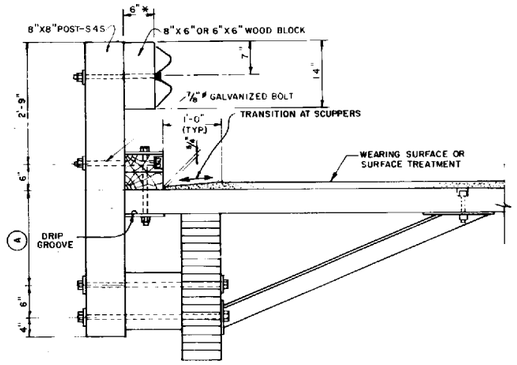
* 8" BLOCKOUT DIMENSION WHEN 8"X 6" WOOD BLOCK IS USED



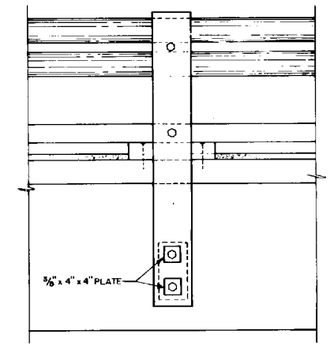
GUARD RAIL POST OPTIONS '1' & '2'
SECTION



ELEVATION

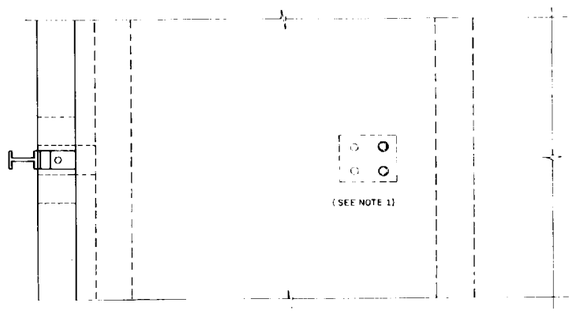


GUARD RAIL POST OPTIONS '3' & '4'
SECTION

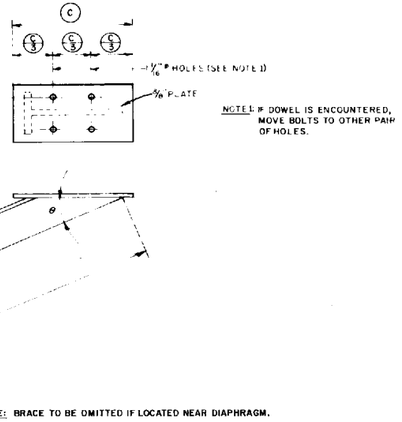


ELEVATION

NOTE: IF GUARDRAIL POST SPACING IS WITHIN 2'-6" OF DIAPHRAGM, POST DIAGONAL BRACE MAY BE OMITTED.



PLAN



NOTE 2. WHEN BRACE IS NOT USED, REPLACE THIS PLATE WITH 5/16" x 4" x 4" PLATE

BRACE DETAIL

CODE	GIRDER DEPTH	
	24'-0" OR LESS	OVER 24'-0"
A	1'-5 3/4"	2'-0"
B	3'-3 3/8"	3'-1 1/8"
C	1'-3 3/4"	1'-0"
1/3	5 1/4"	4"
θ	18°27'	34°35'
ø	71°33'	55°25'

OPTIONS SELECTED		
CODE	OPTION	✓
'1'	STEEL POST WITH BRACE	
'2'	STEEL POST WITHOUT BRACE	
'3'	WOOD POST WITH BRACE	
'4'	WOOD POST WITHOUT BRACE	
GUARDRAIL BLOCKED OUT		
SURFACE TREATMENT		
WEARING SURFACE		

AF

W. VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS

GLUED LAMINATED
TIMBER STRUCTURE

STANDARD SHEET BR-T5

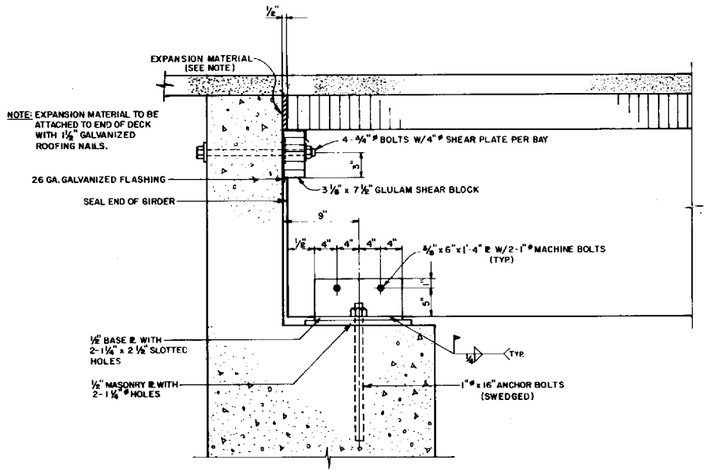
PREPARED: 2-76
REVISED: 11-79
9-88

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

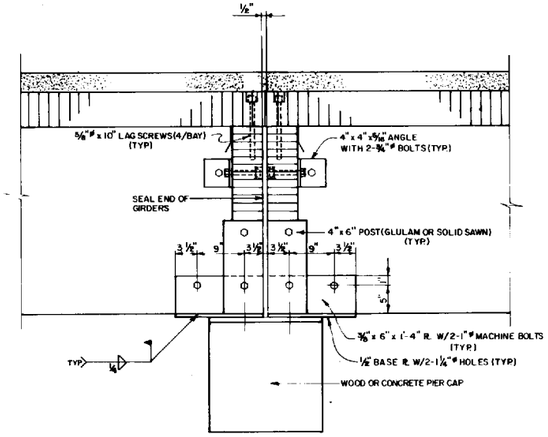
GUARD RAIL POST DETAILS

DESIGNED BY:
DRAWN BY: mph
CHECKED BY:
REVIEWED BY:
DATE:
SCALE: NONE
SHEET OF
BRIDGE NUMBER

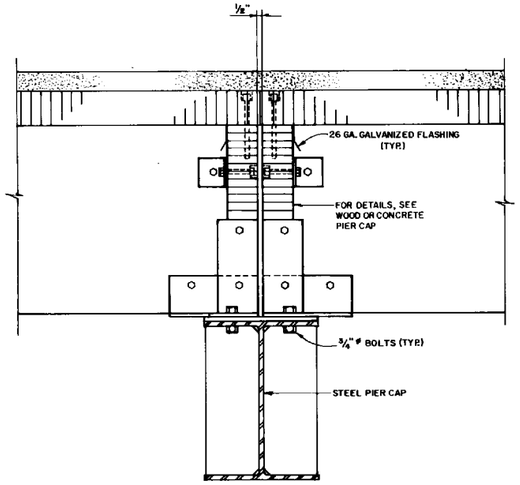
PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W. VA.					



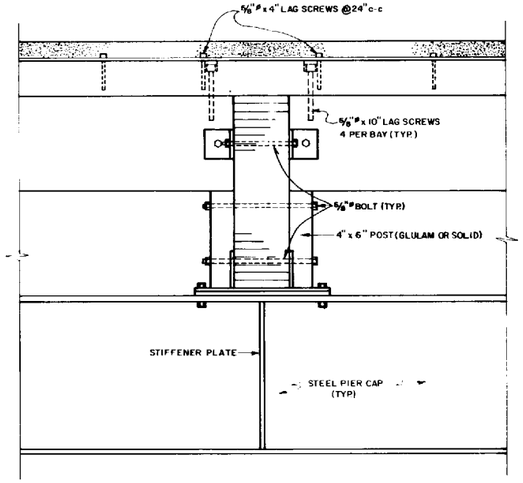
GLULAM GIRDER ON CONCRETE ABUTMENT



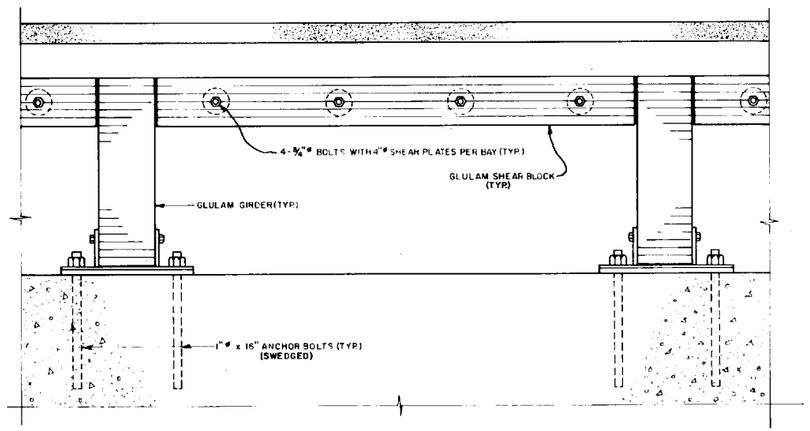
GLULAM GIRDER ON WOOD OR CONCRETE PIER CAP



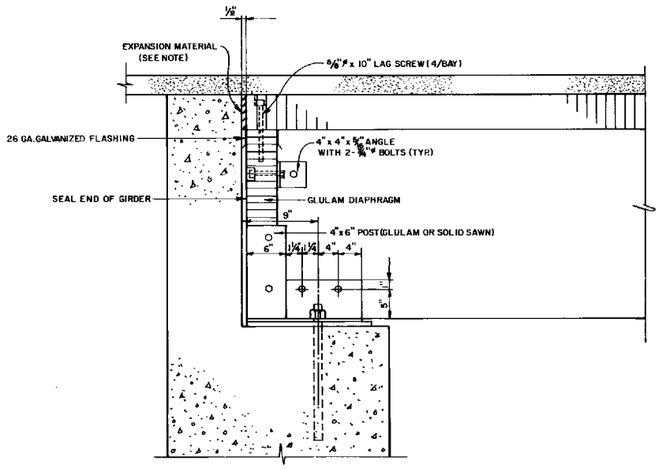
GLULAM GIRDER ON STEEL PIER CAP
ELEVATION



SECTION



ABUTMENT FRONT ELEVATION VIEW



ALTERNATE
GLULAM GIRDER ON CONCRETE ABUTMENT

DIRECTOR, STRUCTURES DIVISION

W. VA. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS

GLUED LAMINATED
TIMBER STRUCTURE

STANDARD SHEET BR-T6

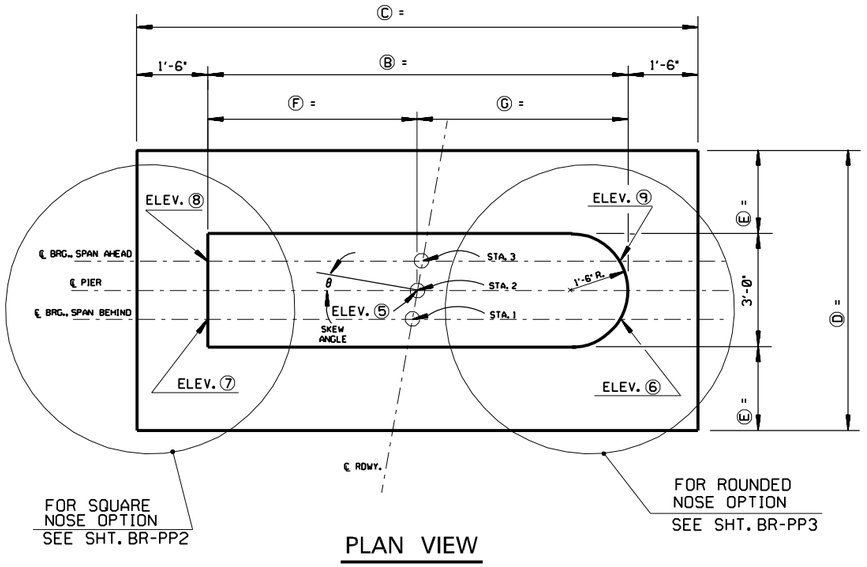
PREPARED: 2-76
REVISED: 9-88

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

DESIGNED BY:
DRAWN BY: w.p.h.
CHECKED BY:
REVIEWED BY:
DATE:
SCALE: NONE
SHEET OF
BRIDGE NUMBER

GIRDER ANCHORAGE DETAILS

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.VA.					



PLAN VIEW

STEM OPTIONS	
OPTION	CHECK OPTION
SQUARE NOSE	
ROUNDED NOSE	

SKEW TABLE		
CROSSING	SELECTION	VALUE
LT. FORWARD		
RT. FORWARD		
NORMAL		

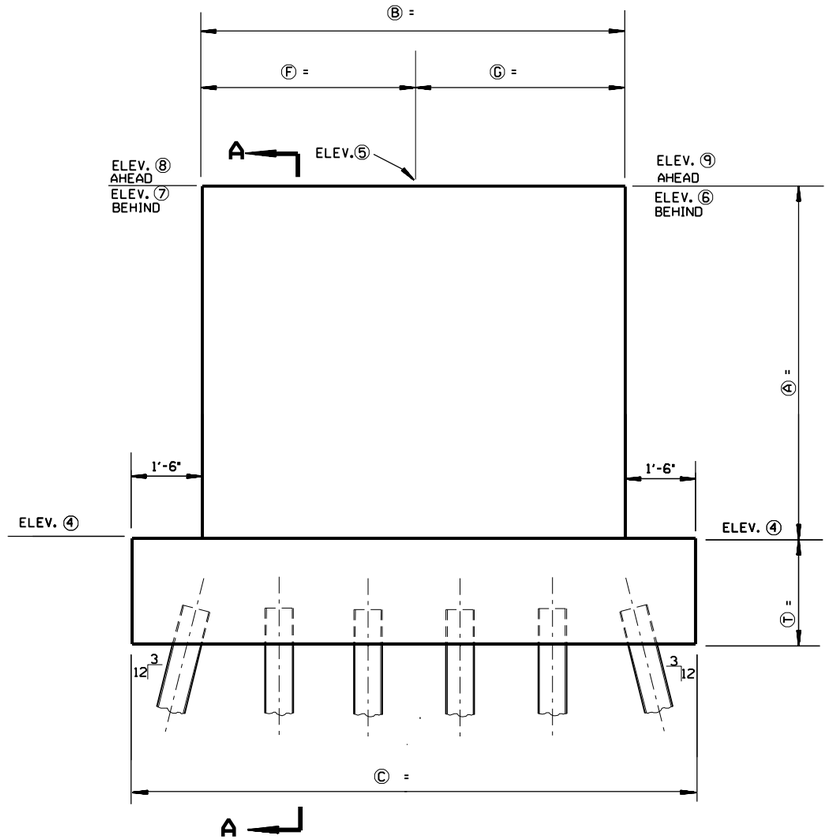
RANGE TABLE			
RANGE	STEM HT.	FTG. WIDTH	SEL.
I	0' TO 10'	6'-0"	
II	>10' TO 20'	8'-0"	
III	>20' TO 30'	10'-0"	

CONTROL STATIONING		
CODE	DESCRIPTION	VALUE
1	STA. AT ℄ OF RDWY & AT ℄ BEARING, SPAN BEHIND	
2	STA. AT ℄ OF RDWY & AT ℄ OF PIER	
3	STA. AT ℄ OF RDWY & AT ℄ BEARING, SPAN AHEAD	

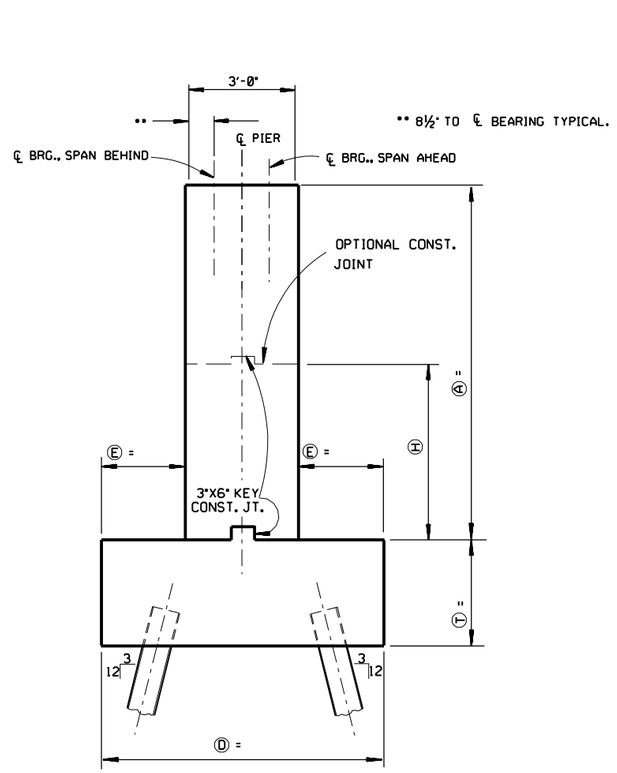
CONTROL ELEVATIONS		
CODE	DESCRIPTION	VALUE
4	ELEVATION AT TOP OF FOOTING	
5	ELEV. AT TOP PIER STEM ℄ RDWY. & ℄ PIER	
6	ELEVATION @ TOP PIER STEM RT. SIDE BEHIND	
7	ELEVATION @ TOP PIER STEM LT. SIDE BEHIND	
8	ELEVATION @ TOP PIER STEM LT. SIDE AHEAD	
9	ELEVATION @ TOP PIER STEM RT. SIDE AHEAD	

CONTROL DIMENSIONS			
CODE	DESCRIPTION	FORMULA	VALUE
A	HT. OF STEM	———	
B	LENGTH OF STEM	*SUPERSTR. WIDTH ROUND. TO NEAREST FT. + 3'-0"	
C	LENGTH OF FOOTING	STEM LEN. + 3'-0"	
D	WIDTH OF FOOTING	SEE RANGE TABLE	
E	DIST. FACE OF PIER TO FACE OF FTG.	ⓓ-3½/2	
F	DIST. EDGE OF PIER TO ℄ RDWY. LT. SIDE	———	
G	DIST. EDGE OF PIER TO ℄ RDWY. RT. SIDE	———	
H	HEIGHT OF CONST. JOINT	———	
T	THICKNESS OF FOOTING	SEE STANDARD SHEET BR-PP4	

* SUPERSTRUCTURE WIDTH=(DISTANCE OUT TO OUT OF BEAMS MEASURED PERPENDICULAR TO ROADWAY)/COS θ (INCLUDES SIDEWALK IF USED)



ELEVATION VIEW



SECTION 'A–A'

NOTE:
THIS SHEET TO BE USED WITH BEAM SIZES 12" THRU 33" ONLY.

NOTE: THIS SHEET TO BE USED WITH STANDARD SHEETS BR-PP2 OR BR-PP3 AND BRPP4.

OPTIONAL CONSTRUCTION JOINT	
OPTION	CHECK OPTION
YES	
NO	

APPROVED _____ DIRECTOR, STRUCTURES DIVISION _____ DATE _____

W.V. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS

REINFORCED CONCRETE PIER ON PILES
PIER LAYOUT
STANDARD SHEET BR-PP1

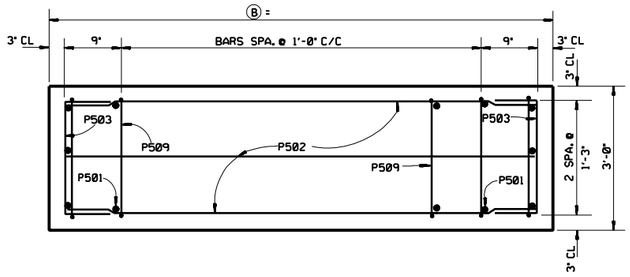
PREPARED: 12-89
REVISED: 9-92
2-94

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

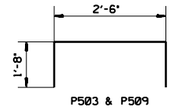
DESIGNED BY:
DRAWN BY: D.W.W.
CHECKED BY:
REVIEWED BY:
DATE:
SCALE: NONE
SHEET NO.: OF BRIDGE NUMBER

REINFORCED CONCRETE PIER ON PILES LAYOUT

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.VA.					



STEM PLAN VIEW



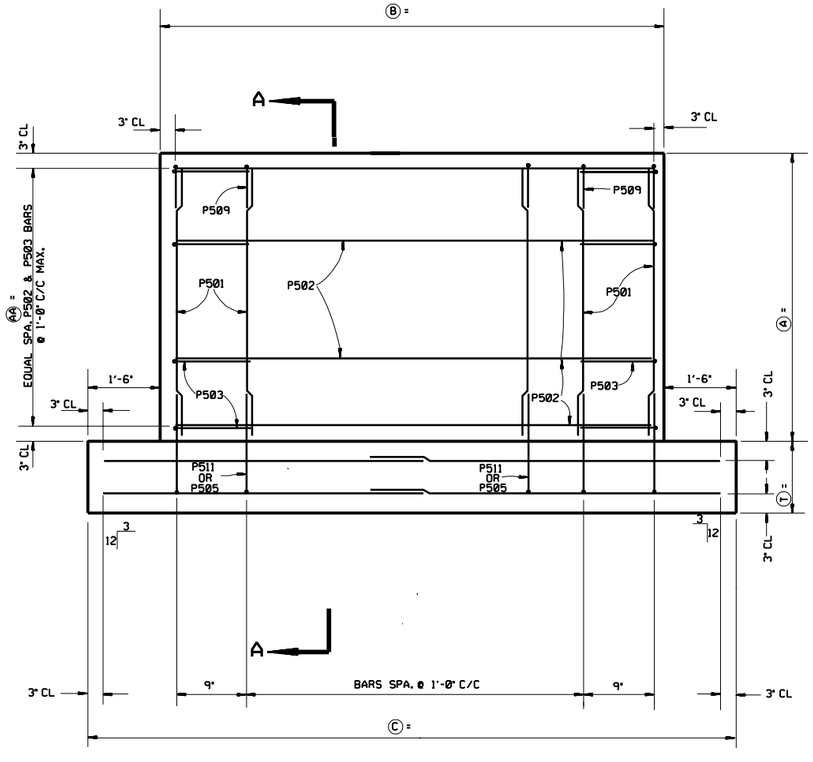
P503 & P509

NOTE: ALL REBAR DIMENSIONS ARE OUT-OUT

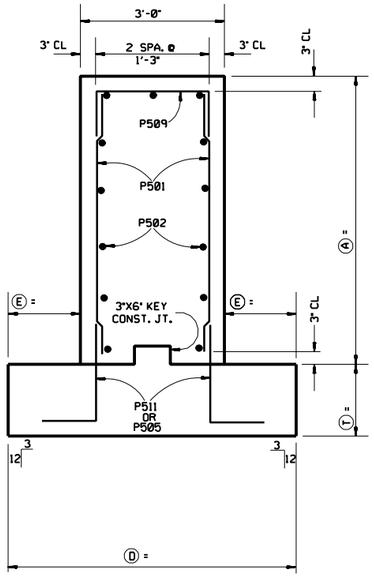
BAR LAP TABLE	
BAR NO.	BAR LAP (MIN.)
#5	1'-7"

CONTROL DIMENSIONS			
CODE	DESCRIPTION	FORMULA	VALUE
A	HT. OF STEM	———	
B	LEN. OF STEM	*SUPERSTR. WID. ROUND. TO NEAREST FT. + 3'-0"	
C	LEN. OF FOOTING	STEM LEN. + 3'-0"	
D	WIDTH OF FOOTING	SEE RANGE TABLE ON BR-PP1	
E	DIST. FACE OF PIER TO FACE OF FOOTING	(D-3)/2	
H	HEIGHT OF CONST. JOINT	———	
AA	NO. SPA. OF P502 BARS & P503 BARS	A-6"	
T	THICKNESS OF FOOTING	SEE STANDARD SHEET BR-PP3	

*SUPERSTRUCTURE WIDTH=(PERPENDICULAR WIDTH OF SUPERSTRUCTURE INCLUDING SIDEWALKS)/COS θ



ELEVATION VIEW



SECTION 'A-A'

NOTE: ALL REBAR LAP SPLICES SHALL BE AS PRESCRIBED IN BAR LAP TABLE

NOTE:
THIS SHEET TO BE USED WITH BEAM SIZES 12" THRU 33" ONLY.

NOTE: THIS SHEET TO BE USED WITH STANDARD SHEETS BR-PP1 AND BR-PP4.

OPTIONAL EPOXY COATING FOR STEM STEEL	
OPTION	CHECK OPTION
YES	
NO	

STEM-BILL OF REINFORCING STEEL						
MARK	BAR TYPE	FORMULA NO. BARS FOR PIER	NO. BARS IN PIER	FORMULA LEN. OF BARS	LENGTH OF BARS	TOTAL LF
P501	STR.	(B*2)+2		A-6"		
P502	STR.	(A+1)*2+1		B-6"		
P503	BENT	(A+1)*2		———	5'-10"	
P509	BENT	B		———	5'-10"	

STEM-ESTIMATE OF QUANTITIES			
ITEM	DESCRIPTION	UNIT	QUANTITY
601-2	CLASS B CONCRETE	CY	
602-1	REINFORCING STEEL BARS	LB	
602-2	EPOXY COATED REINFORCING STEEL BARS	LB	

APPROVED _ _ _ DIRECTOR, STRUCTURES DIVISION _ _ DATE _ _ _

W.V. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS

REINFORCED CONCRETE PIER STEM DETAILS (SQUARE NOSE)

STANDARD SHEET BR-PP2

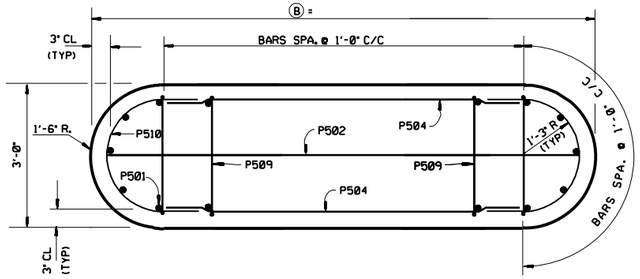
PREPARED: 12-89
REVISED: 9-92
2-94

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

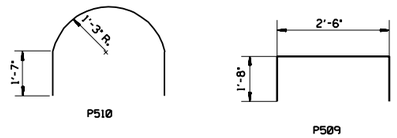
DESIGNED BY:
DRAWN BY: D.W.W.
CHECKED BY:
REVIEWED BY:
DATE:
SCALE: NONE
SHEET NO.: OF BRIDGE NUMBER

REINFORCED CONCRETE PIER ON PILES DETAILS

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.VA.					



STEM PLAN VIEW

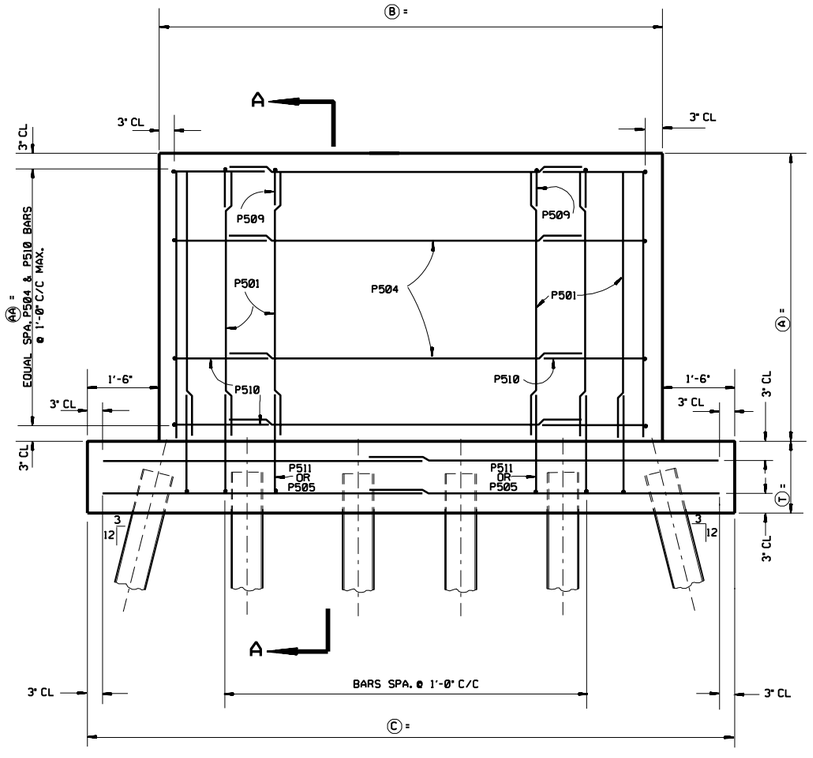


NOTE: ALL REBAR DIMENSIONS ARE OUT-OUT

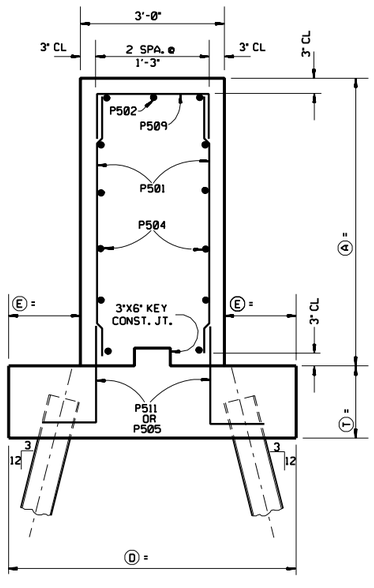
BAR LAP TABLE	
BAR NO.	BAR LAP (MIN.)
#5	1'-7"

CONTROL DIMENSIONS			
CODE	DESCRIPTION	FORMULA	VALUE
A	HT. OF STEM	———	
B	LEN. OF STEM	*SUPERSTR. WID. ROUND. TO NEAREST FT. + 3'-0"	
C	LEN. OF FOOTING	STEM LEN. + 3'-0"	
D	WIDTH OF FOOTING	SEE RANGE TABLE ON BR-PP1	
E	DIST. FACE OF PIER TO FACE OF FOOTING	(D-3)/2	
H	HEIGHT OF CONST. JOINT	———	
AA	NO. SPA. OF P504 BARS & P510 BARS	A-6"	
T	THICKNESS OF FOOTING	SEE STANDARD SHEET BR-PP4	

*SUPERSTRUCTURE WIDTH=(PERPENDICULAR WIDTH OF SUPERSTRUCTURE INCLUDING SIDEWALKS)/COS θ



ELEVATION VIEW



SECTION 'A-A'

NOTE: ALL REBAR LAP SPLICES SHALL BE AS PRESCRIBED IN BAR LAP TABLE

NOTE:
THIS SHEET TO BE USED WITH BEAM SIZES 12" THRU 33" ONLY.

NOTE: THIS SHEET TO BE USED WITH STANDARD SHEETS BR-PP1 AND BR-PP4.

OPTIONAL EPOXY COATING FOR STEM STEEL	
OPTION	CHECK OPTION
YES	
NO	

STEM-BILL OF REINFORCING STEEL						
MARK	BAR TYPE	FORMULA NO. BARS FOR PIER	NO. BARS IN PIER	FORMULA LEN. OF BARS	LENGTH OF BARS	TOTAL LF
P501	STR.	(B+2)+2		A-6"		
P502	STR.	1		B-6"		
P504	STR.	(A+1)+2		B-(3'-0")		
P509	BENT	B-2		———	5'-10"	
P510	BENT	(A+1)+2		———	7'-2"	

STEM-ESTIMATE OF QUANTITIES			
ITEM	DESCRIPTION	UNIT	QUANTITY
601-2	CLASS B CONCRETE	CY	
602-1	REINFORCING STEEL BARS	LB	
602-2	EPOXY COATED REINFORCING STEEL BARS	LB	

APPROVED _ _ _ DIRECTOR, STRUCTURES DIVISION _ _ DATE _ _ _

W.V. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS

REINFORCED CONCRETE PIER STEM DETAILS (ROUNDED NOSE)

STANDARD SHEET BR-PP3

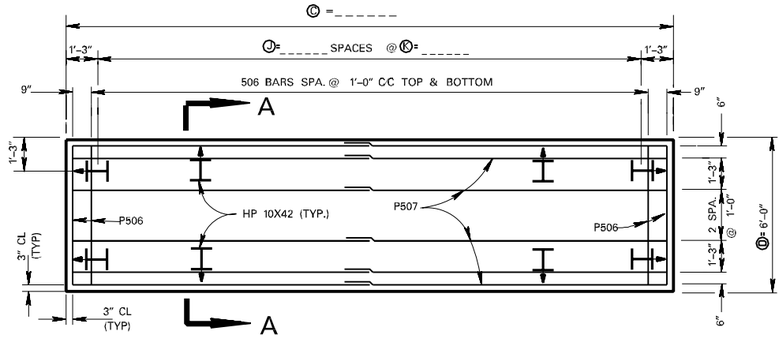
PREPARED: 12-89
REVISED: 9-92, 2-94

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

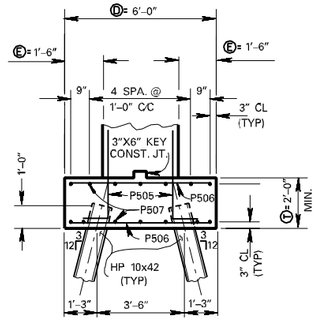
DESIGNED BY:
DRAWN BY: D.W.W.
CHECKED BY:
REVIEWED BY:
DATE:
SCALE: NONE
SHEET NO.: OF BRIDGE NUMBER

REINFORCED CONCRETE PIER ON PILES DETAILS

PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.VA.					



FOOTING PLAN VIEW
(RANGE I)



SECTION 'A–A'
(RANGE I)

NOTES:

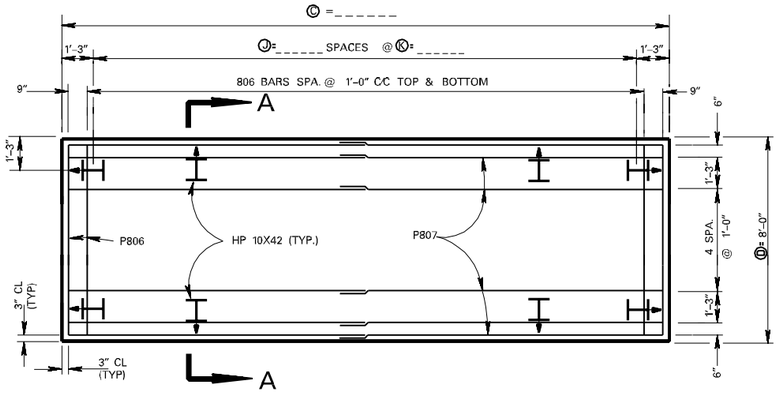
1. MAX. PILE SPACING SHALL NOT EXCEED 7'-6" FOR RANGES I, II AND III.
2. PILE SPACING IS TO BE SYMMETRICAL ABOUT THE ℄ FOOTING.
3. CUT P506, P806, AND P906 BARS AS NECESSARY TO FIT WITH PILING (BOTTOM FACE).
4. IF PILES ARE NOT BATTERED, TWO ADDITIONAL PILES MAY TO BE ADDED AT THE DIRECTION OF THE ENGINEER.
5. THIS SHEET TO BE USED WITH STANDARD SHEET'S BR-PP1 AND BR-PP2 OR PR-PP3.
6. ALL HP10X42 PILING SHALL HAVE A DESIGN LOAD OF 55.8 TONS AND SHALL BE DRIVEN TO REFUSAL INTO THE FOUNDATION STRATA AS INDICATED BY THE ESTIMATED PILE TIP ELEVATIONS. MIN. PILE LENGTH TO BE 10'. REFUSAL IS DEFINED AS THE EQUIVALENT OF 20 BLOWS FOR ONE INCH OR LESS OF PENETRATION WITH A POWER HAMMER DEVELOPING A A MINIMUM CAPACITY OF 15,000 FOOT-POUNDS PER BLOW. IF A LARGER HAMMER IS USED, THE NUMBER OF BLOWS IN THE LAST INCH OF PENETRATION MAY BE REDUCED IN DIRECT PROPORTION TO THE ENERGY RATING OF THE HAMMER, BUT TO NO LESS THAN 12.

CONTROL DIMENSIONS

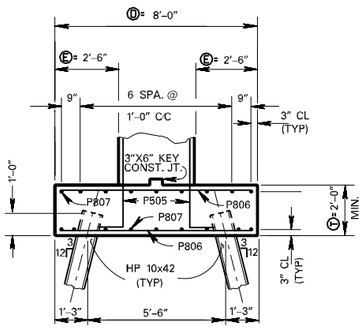
CODE	DESCRIPTION	FORMULA	VALUE
B	LEN. OF STEM	SEE SHT. BR-PP2 OR BR-PP3	
C	LEN. OF FOOTING	STEM LEN. + 3'-0"	
D	WIDTH OF FOOTING	SEE RANGE TABLE ON BR-PP1	
E	DIST. FACE OF PIER TO FACE OF FOOTING	(D-3)/2	
J	NO. OF SPACES BETWEEN PILES PER FACE	NO. PILES PER FACE -1	
K	SPACING OF PILES PER FACE	(C-(2'-6"))/J	
T	THICKNESS OF FOOTING	SEE RANGE ON THIS SHEET	

PILE SUMMARY

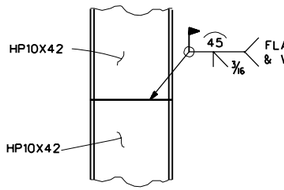
FOOTING LENGTH	SPAN LENGTH	TOTAL NO. PILES
≤26'	<70'	8
	≥70' ≤94'	10
>26' ≤33'	<70'	12
	≥70' ≤94'	14
>33' ≤37'	<70'	14
	≥70' ≤94'	16
>37' ≤45'	<70'	14
	≥70' ≤94'	18



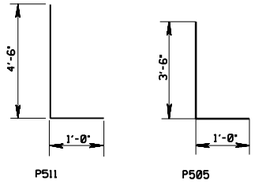
FOOTING PLAN VIEW
(RANGE II)



SECTION 'A–A'
(RANGE II)



TYPICAL PILE SPLICING DETAIL



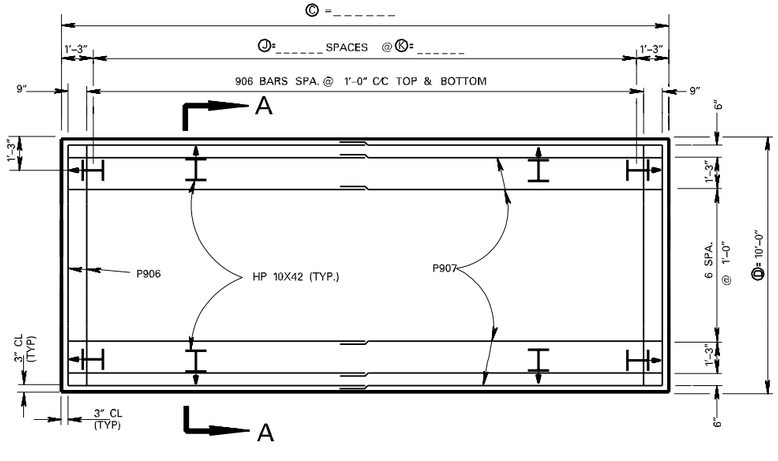
NOTE: ALL REBAR DIMENSIONS ARE OUT-OUT

FOOTING-BILL OF REINFORCING STEEL

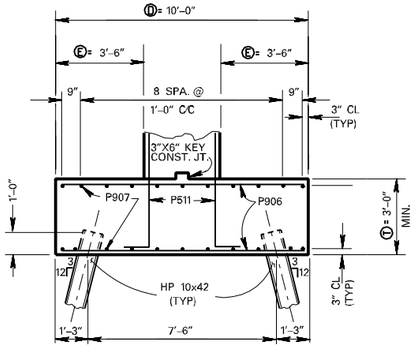
MARK	BAR TYPE	FORMULA NO. BARS FOR PIER	NO. BARS IN PIER	FORMULA LEN. OF BARS	LENGTH OF BARS	TOTAL LF
P505	BENT	(B•2)+2		———	4'-6"	
P506	STR.	(C+1)•2		———	5'-6"	
P507	STR.	———	14	C-6"		
P511	BENT	B•2		———	5'-6"	
P806	STR.	(C+1)•2		———	7'-6"	
P807	STR.	———	18	C-6"		
P906	STR.	(C+1)•2		———	9'-6"	
P907	STR.	———	22	C-6"		

BAR LAP TABLE

BAR NO.	BAR LAP (MIN.)
#5	1'-7"
#8	2'-6"
#9	2'-10"



FOOTING PLAN VIEW
(RANGE III)



SECTION 'A–A'
(RANGE III)

FOOTING-ESTIMATE OF QUANTITIES

ITEM	DESCRIPTION	UNIT	QUANTITY
601-2	CLASS B CONCRETE	CY	
602-1	REINFORCING STEEL BARS	LB	
616-4	STEEL BEARING PILES	LF	

NOTE:
THIS SHEET TO BE USED WITH BEAM SIZES 12" THRU 33" ONLY.

APPROVED _ _ _ DIRECTOR, STRUCTURES DIVISION _ DATE _ _ _

W.V. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS

REINFORCED CONCRETE PIER PIER FOOTING ON PILING STANDARD SHEET BR-PP4

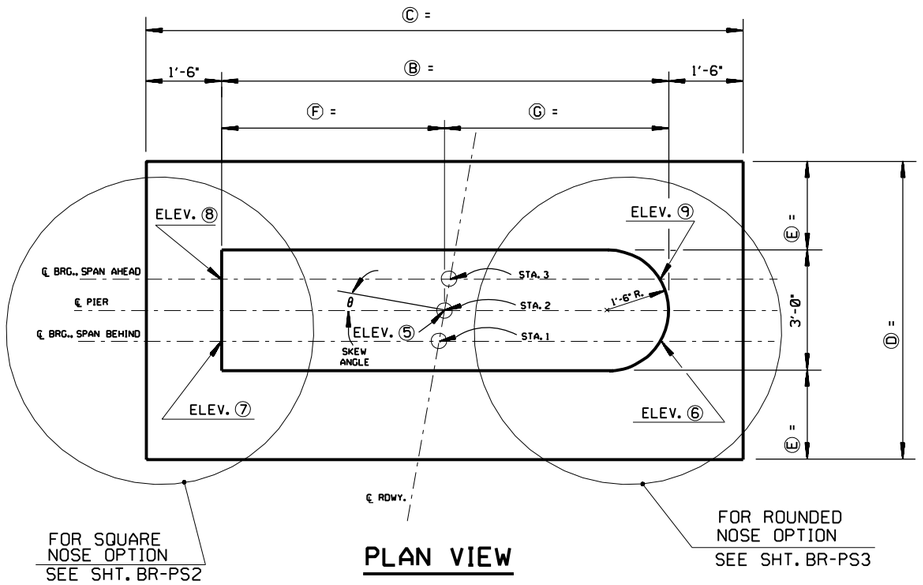
PREPARED: 12-89
REVISED: 9-92
2-94

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

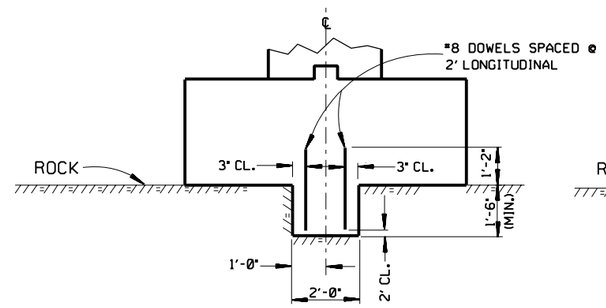
DESIGNED BY:
DRAWN BY: D.W.W.
CHECKED BY:
REVIEWED BY:
DATE:
SCALE: NONE
SHEET NO.
OF
BRIDGE NUMBER

REINFORCED CONCRETE PIER ON PILES DETAILS

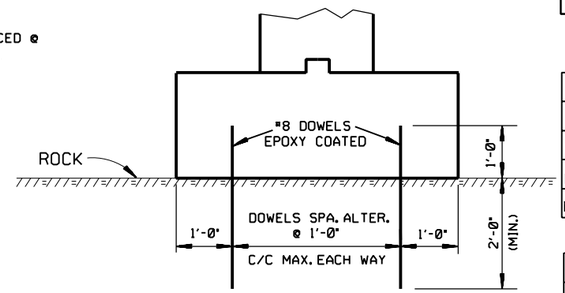
PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.VA.					



PLAN VIEW



KEY INTO ROCK OPTION 1



DOWEL INTO ROCK OPTION 2

NOTE: 2-IN. DIA. HOLES TO BE DRILLED INTO ROCK (2-FT. MIN. DEPTH). NO. 8 DEFORMED REBAR TO BE GROUTED IN ACCORDANCE WITH SUBSECTION 715.5 OF THE STANDARD SPECIFICATIONS.

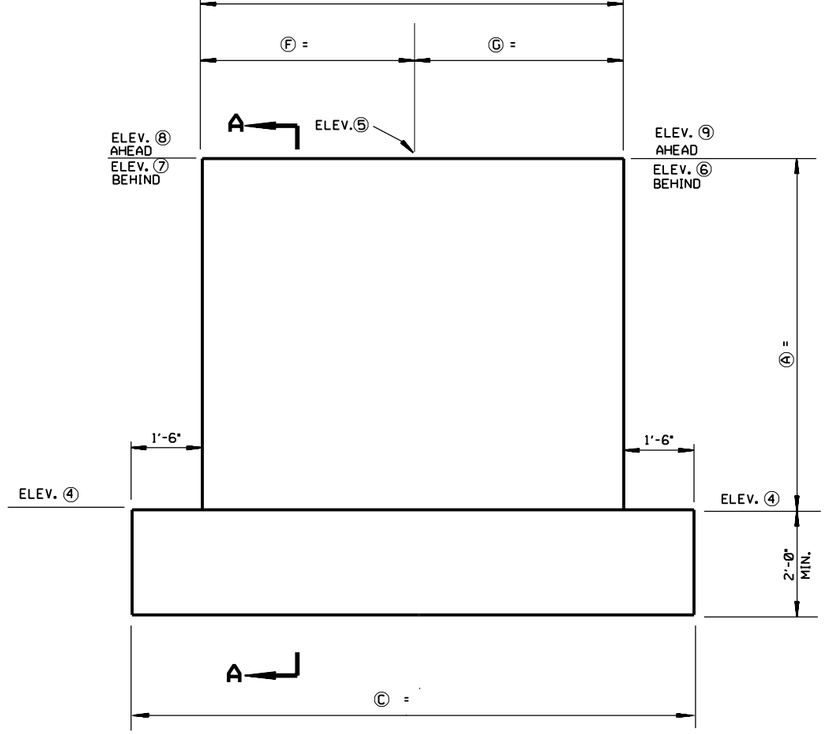
SKEW TABLE		
CROSSING	SELECTION	VALUE
LT. FORWARD		
RT. FORWARD		
NORMAL		

RANGE TABLE			
RANGE	STEM HT.	FTG. WIDTH	SEL.
I	0' TO 10'	6'-0"	
II	>10' TO 20'	8'-0"	
III	>20' TO 30'	10'-0"	

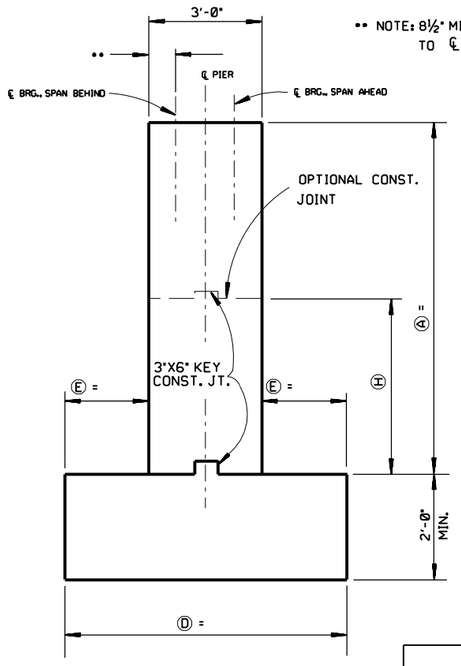
CONTROL STATIONING		
CODE	DESCRIPTION	VALUE
1	STA. AT ℄ OF RDWY & AT ℄ BEARING, SPAN BEHIND	
2	STA. AT ℄ OF RDWY & AT ℄ OF PIER	
3	STA. AT ℄ OF RDWY & AT ℄ BEARING, SPAN AHEAD	

CONTROL ELEVATIONS		
CODE	DESCRIPTION	VALUE
4	ELEVATION AT TOP OF FOOTING	
5	ELEV. AT TOP PIER STEM ℄ RDWY. & ℄ PIER	
6	ELEVATION @ TOP PIER STEM RT. SIDE BEHIND	
7	ELEVATION @ TOP PIER STEM LT. SIDE BEHIND	
8	ELEVATION @ TOP PIER STEM LT. SIDE AHEAD	
9	ELEVATION @ TOP PIER STEM RT. SIDE AHEAD	

STEM OPTIONS	
OPTION	CHECK OPTION
SQUARE NOSE	
ROUNDED NOSE	



ELEVATION VIEW

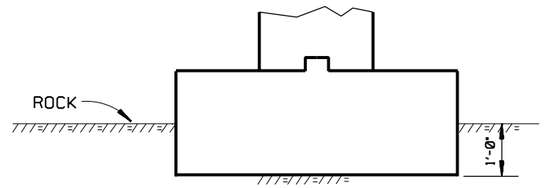


•• NOTE: 8½" MIN. FROM EDGE OF PIER TO ℄ BEARING TYPICAL.

SECTION 'A-A'

NOTE:
THIS SHEET TO BE USED WITH BEAM SIZES 12" THRU 33" ONLY.

OPTIONAL CONSTRUCTION JOINT	
OPTION	CHECK OPTION
YES	
NO	



KEY INTO ROCK OPTION 3

NOTE: THIS SHEET TO BE USED WITH SHEET BR-PS2 OR BR-PS3

FOOTING OPTIONS	
OPTION	CHECK OPTION
KEY INTO ROCK OPTION 1	
DOWEL INTO ROCK OPTION 2	
KEY INTO ROCK OPTION 3	

CONTROL DIMENSIONS			
CODE	DESCRIPTION	FORMULA	VALUE
A	HT. OF STEM	———	
B	LENGTH OF STEM	*SUPERSTR. WIDTH ROUND. TO NEAREST FT. + 3'-0"	
C	LENGTH OF FOOTING	STEM LEN. + 3'-0"	
D	WIDTH OF FOOTING	SEE RANGE TABLE	
E	DIST. FACE OF PIER TO FACE OF FTG.	(D-3½)/2	
F	DIST. EDGE OF PIER TO ℄ RDWY. LT. SIDE	———	
G	DIST. EDGE OF PIER TO ℄ RDWY. RT. SIDE	———	
H	HEIGHT OF CONST. JOINT	———	

* SUPERSTRUCTURE WIDTH=(DISTANCE OUT TO OUT OF BEAMS MEASURED PERPENDICULAR TO ROADWAY)/COS θ (INCLUDES SIDEWALK IF USED)

APPROVED _____ DIRECTOR, STRUCTURES DIVISION _____ DATE _____

W.V. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS

REINFORCED CONCRETE PIER PIER LAYOUT

STANDARD SHEET BR-PS1

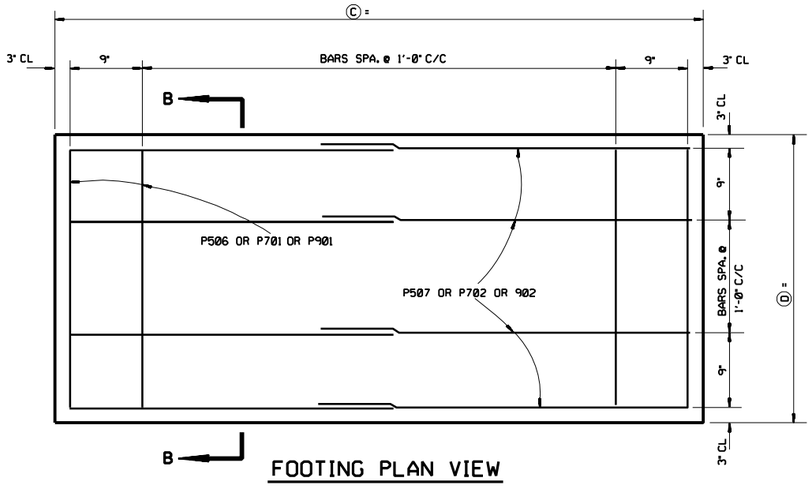
PREPARED:	
12-89	
REVISED: 9-92	
2-94	

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

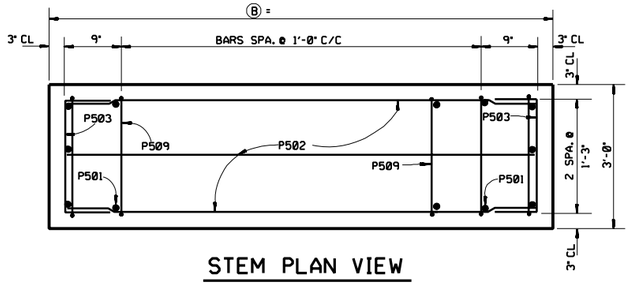
REINFORCED CONCRETE PIER LAYOUT

DESIGNED BY:	
DRAWN BY:	D.W.W.
CHECKED BY:	
REVIEWED BY:	
DATE:	
SCALE:	NONE
SHEET NO.:	OF
BRIDGE NUMBER	

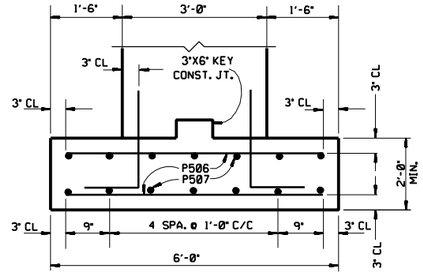
PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.VA.					



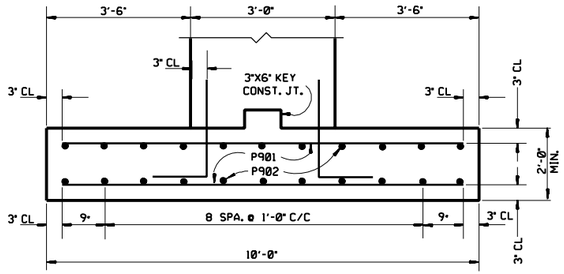
FOOTING PLAN VIEW



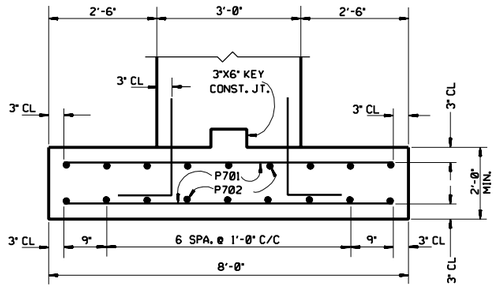
STEM PLAN VIEW



SECTION 'B-B' (RANGE I)



SECTION 'B-B' (RANGE III)



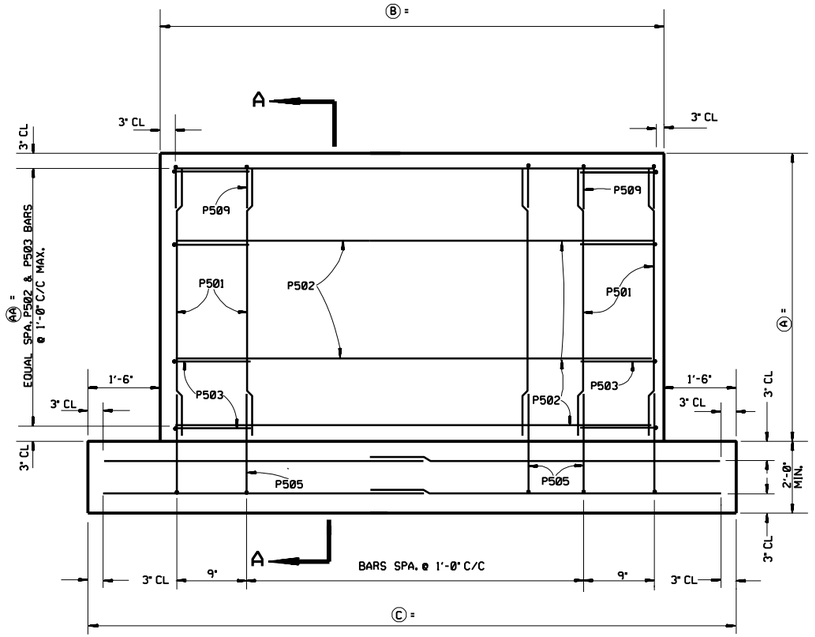
SECTION 'B-B' (RANGE II)

OPTIONAL EPOXY COATING FOR STEM STEEL	
OPTION	CHECK OPTION
YES	
NO	

CONTROL DIMENSIONS			
CODE	DESCRIPTION	FORMULA	VALUE
A	HT. OF STEM	———	
B	LEN. OF STEM	*SUPERSTR. WID. ROUND. TO NEAREST FT. + 3'-0"	
C	LEN. OF FOOTING	STEM LEN. + 3'-0"	
D	WIDTH OF FOOTING	SEE RANGE TABLE ON BR-PS1	
E	DIST. FACE OF PIER TO FACE OF FOOTING	(D-3)/2	
H	HEIGHT OF CONST. JOINT	———	
AA	NO. SPA. OF P502 BARS & P503 BARS	A-6"	

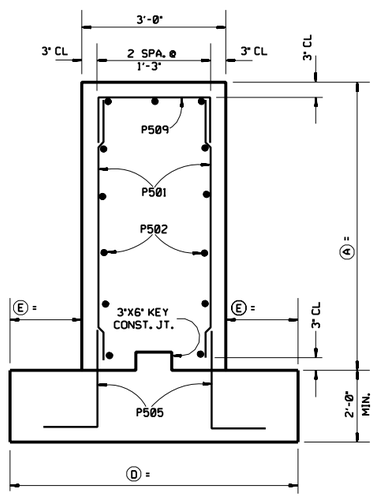
*SUPERSTRUCTURE WIDTH=PERPENDICULAR WIDTH OF SUPERSTRUCTURE INCLUDING SIDEWALKS/COS θ

BILL OF REINFORCING STEEL						
MARK	BAR TYPE	FORMULA NO. BARS FOR PIER	NO. BARS IN PIER	FORMULA LEN. OF BARS	LENGTH OF BARS	TOTAL LF
P501	STR.	(B+2)+2		A-6"		
P502	STR.	(A+1)*2+1		B-6"		
P503	BENT	(A+1)*2		———	5'-10"	
P505	BENT	B+2		———	4'-6"	
P506	STR.	C		———	5'-6"	
P507	STR.	———	14	C-6"		
P509	BENT	B		———	5'-10"	
P701	STR.	C		———	7'-6"	
P702	STR.	———	18	C-6"		
P901	STR.	C		———	9'-6"	
P902	STR.	———	22	C-6"		
EPOXY COAT. NO. 8 DOWEL	STR.	SEE SHEET BR-PS1		———	3'-0"	
NO. 8 DOWEL	STR.	SEE SHEET BR-PS1		———	2'-6"	

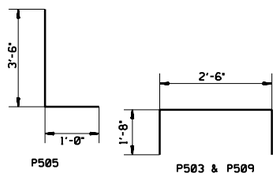


ELEVATION VIEW

NOTE: ALL REBAR LAP SPLICES SHALL BE AS PRESCRIBED IN BAR LAP TABLE



SECTION 'A-A'



NOTE: ALL REBAR DIMENSIONS ARE OUT-OUT

BAR LAP TABLE	
BAR NO.	BAR LAP (MIN.)
#5	1'-7"
#7	2'-3"
#9	2'-10"

NOTE: THIS SHEET TO BE USED WITH SHEET BR-PS1

ESTIMATE OF QUANTITIES			
ITEM	DESCRIPTION	UNIT	QUANTITY
601-2	CLASS B CONCRETE	CY	
602-1	REINFORCING STEEL BARS	LB	
602-2	EPOXY COATED REINFORCING STEEL BARS	LB	

NOTE: THIS SHEET TO BE USED WITH BEAM SIZES 12" THRU 33" ONLY.

APPROVED _____ DIRECTOR, STRUCTURES DIVISION _____ DATE _____

W.V. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS
REINFORCED CONCRETE PIER DETAILS (SQUARE NOSE)
STANDARD SHEET BR-PS2

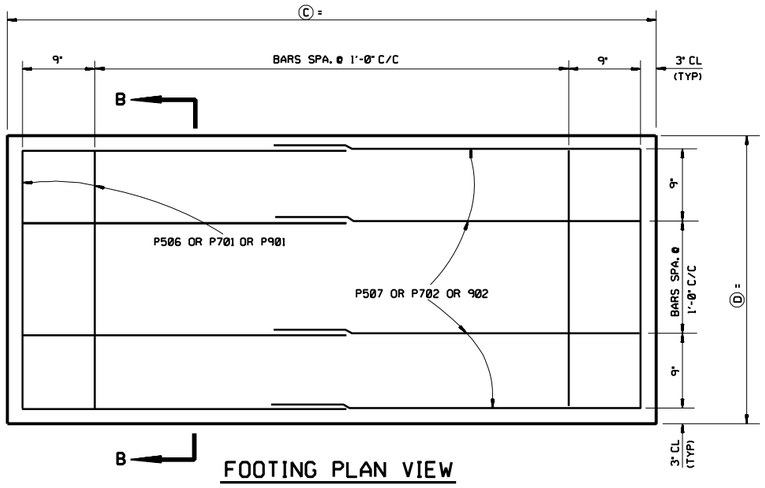
PREPARED: 12-89
REVISED: 9-92
2-94

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

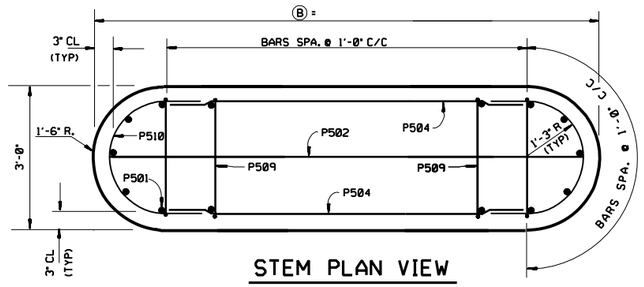
DESIGNED BY:
DRAWN BY: D.W.W.
CHECKED BY:
REVIEWED BY:
DATE:
SCALE: NONE
SHEET NO.:
OF
BRIDGE NUMBER

REINFORCED CONCRETE PIER DETAILS

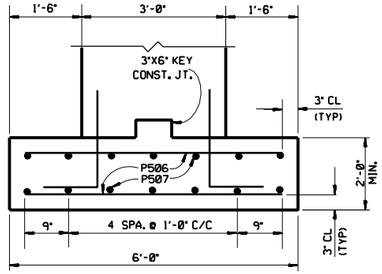
PUBLIC ROADS DIV.	STATE DIST. NO.	PROJECT NUMBER	COUNTY	SHEET NO.	TOTAL SHTS
W.VA.					



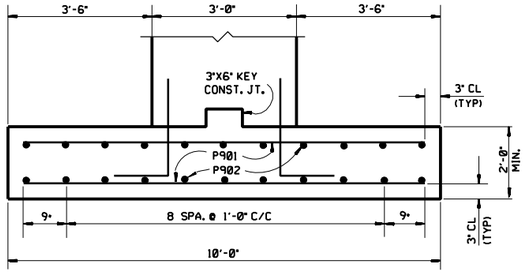
FOOTING PLAN VIEW



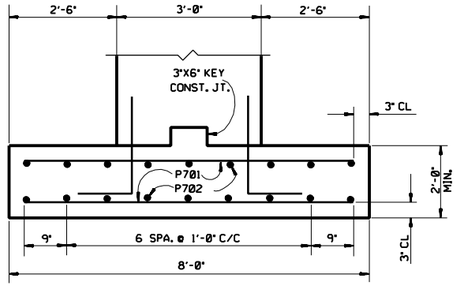
STEM PLAN VIEW



SECTION 'B-B' (RANGE I)



SECTION 'B-B' (RANGE III)



SECTION 'B-B' (RANGE II)

CONTROL DIMENSIONS

CODE	DESCRIPTION	FORMULA	VALUE
A	HT. OF STEM	———	
B	LEN. OF STEM	*SUPERSTR. WID. ROUND. TO NEAREST FT. + 3'-0"	
C	LEN. OF FOOTING	STEM LEN. + 3'-0"	
D	WIDTH OF FOOTING	SEE RANGE TABLE ON BR-PS1	
E	DIST. FACE OF PIER TO FACE OF FOOTING	(D-3)/2	
H	HEIGHT OF CONST. JOINT	———	
AA	NO. SPA. OF P504 BARS & P510 BARS	A-6"	

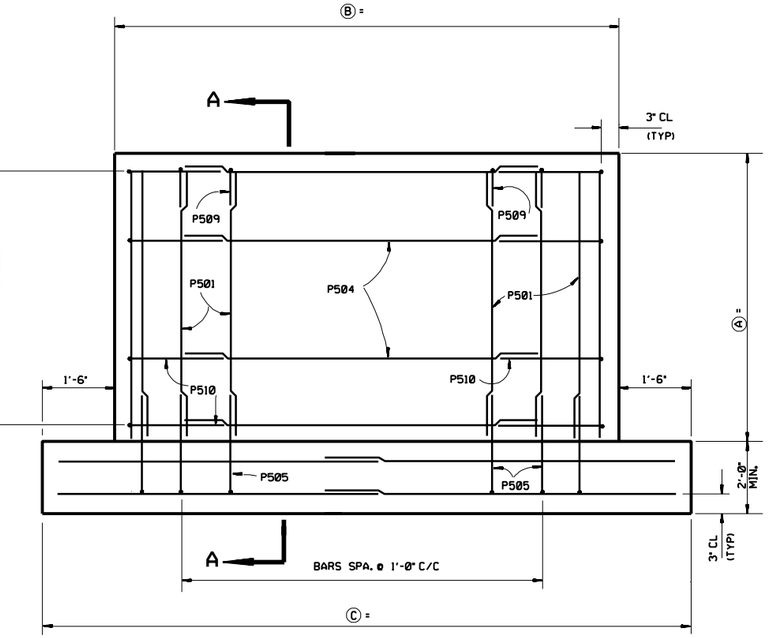
*SUPERSTRUCTURE WIDTH=(PERPENDICULAR WIDTH OF SUPERSTRUCTURE INCLUDING SIDEWALKS)/COS θ

OPTIONAL EPOXY COATING FOR STEM STEEL

OPTION	CHECK OPTION
YES	
NO	

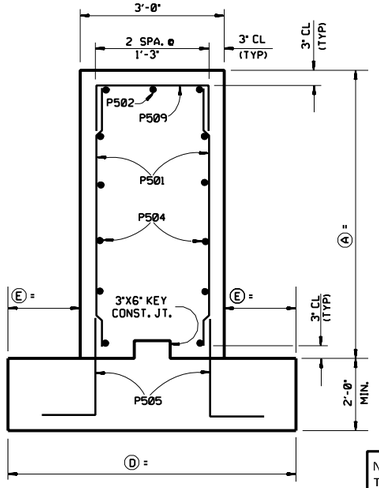
BILL OF REINFORCING STEEL

MARK	BAR TYPE	FORMULA NO. BARS FOR PIER	NO. BARS IN PIER	FORMULA LEN. OF BARS	LENGTH OF BARS	TOTAL LF
P501	STR.	(B+2)+2		A-6"		
P502	STR.	———	1	B-6"		
P504	STR.	(A+1)+2		B-(3'-0")		
P505	BENT	B+2		———	4'-6"	
P506	STR.	C		———	5'-6"	
P507	STR.	———	14	C-6"		
P509	BENT	B-2		———	5'-10"	
P510	BENT	(A+1)+2		———	7'-2"	
P701	STR.	C		———	7'-6"	
P702	STR.	———	18	C-6"		
P901	STR.	C		———	9'-6"	
P902	STR.	———	22	C-6"		
EPOXY COAT. NO. 8 DOWEL	STR.	SEE SHEET BR-PS1		———	3'-0"	
NO. 8 DOWEL	STR.	SEE SHEET BR-PS1		———	2'-6"	



ELEVATION VIEW

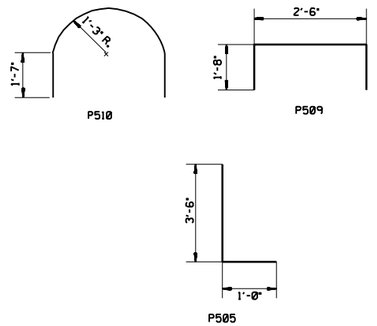
NOTE: ALL REBAR LAP SPLICES SHALL BE AS PRESCRIBED IN BAR LAP TABLE



SECTION 'A-A'

NOTE:
THIS SHEET TO BE USED WITH BEAM SIZES 12" THRU 33" ONLY.

NOTE: THIS SHEET TO BE USED WITH SHEET BR-PS1



NOTE: ALL REBAR DIMENSIONS ARE OUT-OUT

BAR LAP TABLE

BAR NO.	BAR LAP (MIN.)
#5	1'-7"
#7	2'-3"
#9	2'-10"

ESTIMATE OF QUANTITIES

ITEM	DESCRIPTION	UNIT	QUANTITY
601-2	CLASS B CONCRETE	CY	
602-1	REINFORCING STEEL BARS	LB	
602-2	EPOXY COATED REINFORCING STEEL BARS	LB	

APPROVED _ _ _ DIRECTOR, STRUCTURES DIVISION _ _ DATE _ _ _

W.V. DEPT. OF HIGHWAYS
STANDARD BRIDGE PLANS
REINFORCED CONCRETE PIER DETAILS
(ROUNDED NOSE)
STANDARD SHEET BR-PS3

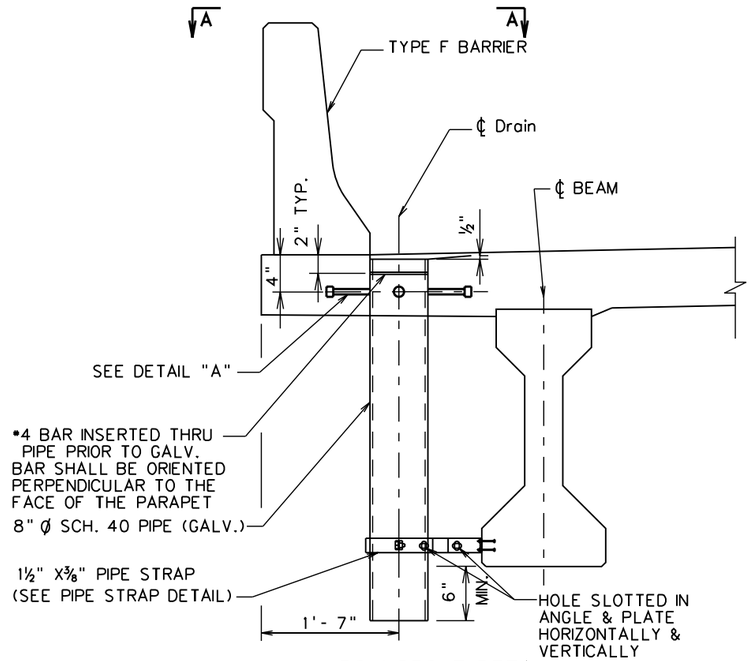
PREPARED: 12-89
REVISED: 7-91, 9-92, 2-94

THE WEST VIRGINIA DEPARTMENT OF HIGHWAYS
STRUCTURES DIVISION

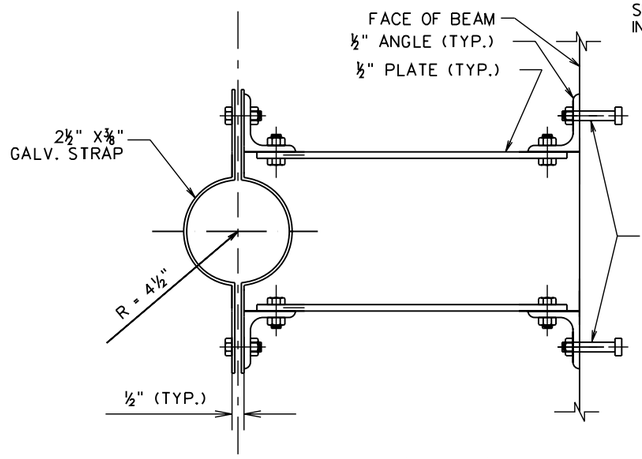
DESIGNED BY:
DRAWN BY: D.W.W.
CHECKED BY:
REVIEWED BY:
DATE:
SCALE: NONE
SHEET NO.: OF
BRIDGE NUMBER

REINFORCED CONCRETE PIER DETAILS

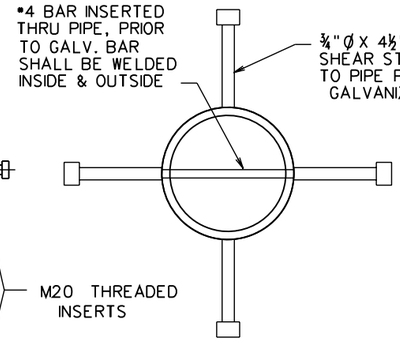
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
				—	



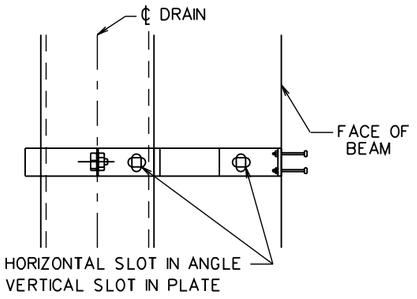
DOWNSPOUT DETAIL
N.T.S.



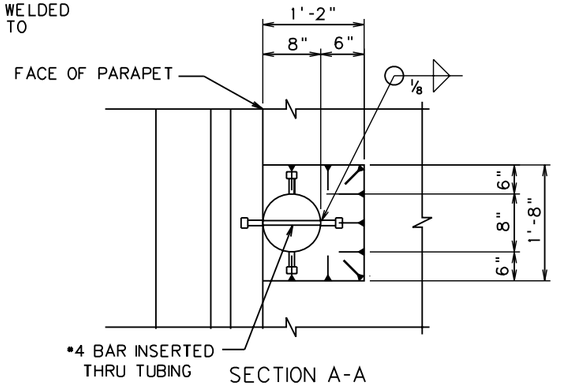
PIPE STRAP DETAIL
N.T.S.



DETAIL "A"
N.T.S.



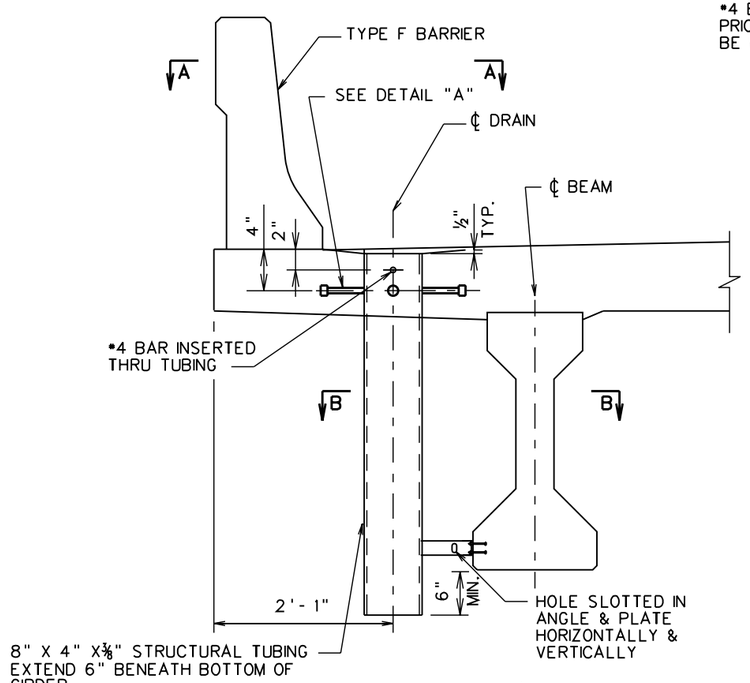
SECTION C-C



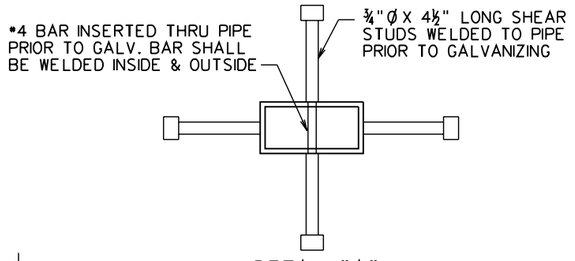
SECTION A-A

1. COSTS FOR THE DRAINAGE SYSTEM, INCLUDING GALVANIZING, PAINTING, FLOOR DRAINS, DOWNSPOUTS AND SUPPORTS ARE INCLUDED IN ITEM 603018-XXX, PRESTRESSED CONCRETE BEAMS.
2. ALL MATERIALS FOR DRAINAGE SHALL BE GALVANIZED AFTER FABRICATION AND THEN PAINTED.
3. NUMBER OF DRAINS REQUIRED:

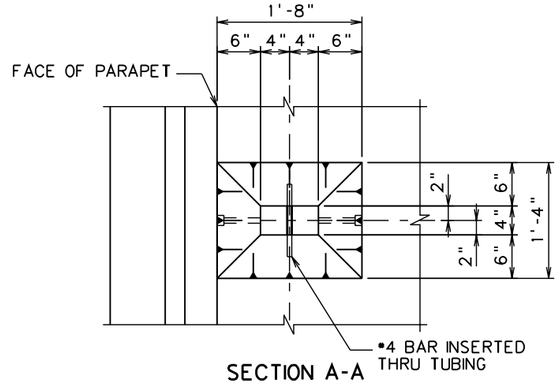
CIRCULAR STEEL PIPE DRAIN



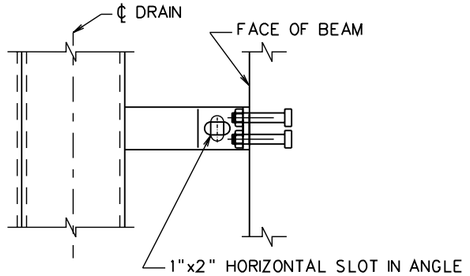
DOWNSPOUT DETAIL
N.T.S.



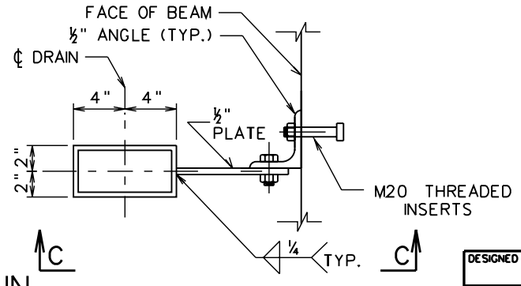
DETAIL "A"
N.T.S.



SECTION A-A



SECTION C-C



SECTION B-B

STRUCTURAL STEEL TUBING DRAIN

NOTE:

STRUCTURAL STEEL TUBING FOR DECK DRAINS SHALL BE 8" X 4" X ⅜" COLD FORMED STEEL IN ACCORDANCE WITH ASTM A500, GRADE B. CONTRACTOR MAY SUBSTITUTE ½" WALL THICKNESS TUBING FOR ⅜" TUBING AT HIS OPTION AND EXPENSE.

THE DRAIN ASSEMBLY SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111, 2 OUNCES.

PAYMENT FOR THE DRAINAGE SYSTEM SHALL BE INCLUDED IN THE LUMP SUM BID ITEM PRICE FOR ITEM 603018-XXX, PRESTRESSED CONCRETE BEAMS.

NUMBER OF DRAINS REQUIRED:

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

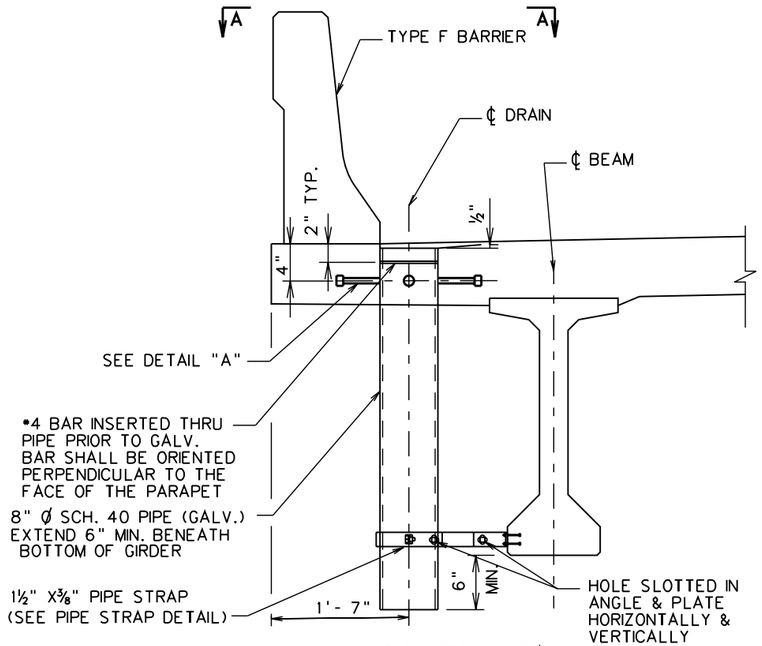
DESIGNED	DATE
DRAWN	
CHECKED	
REVIEWED	

APPROVED Gregory Bailey DIRECTOR ENGINEERING DIVISION DATE 09/22/08

DECK DRAIN DETAILS FOR AASHTO TYPE IV PRECAST PC BEAM SUPERSTRUCTURE
BR-DD1

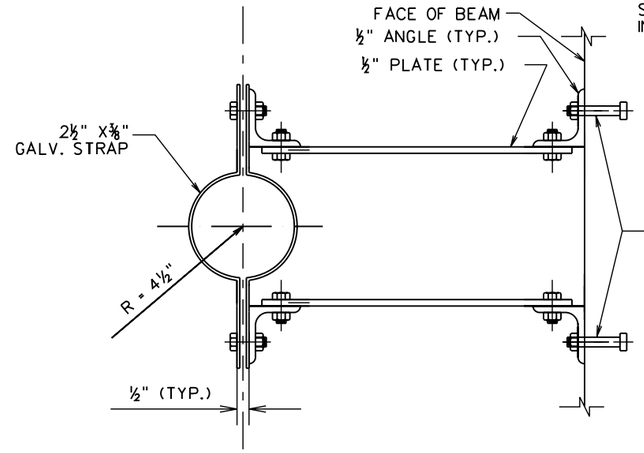
SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
				—	



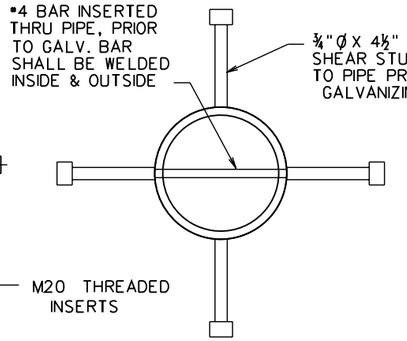
DOWNSPOUT DETAIL

N.T.S.



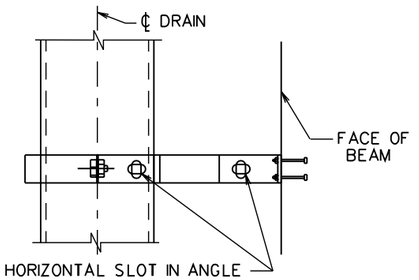
PIPE STRAP DETAIL

N.T.S.

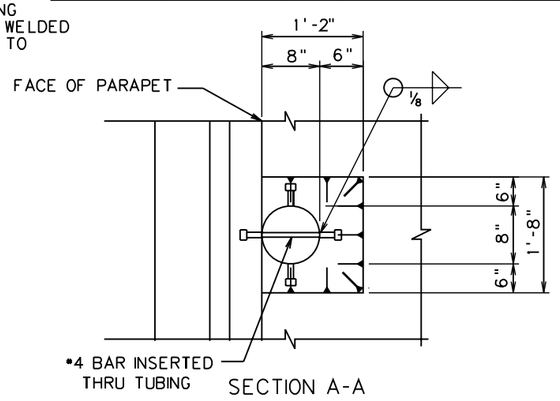


DETAIL "A"

N.T.S.



SECTION C-C

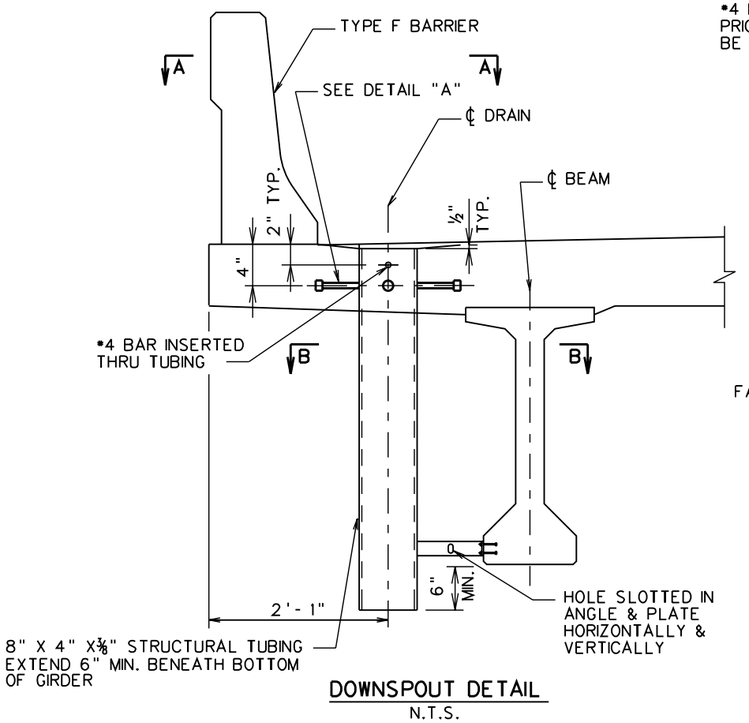


SECTION A-A

NOTE:

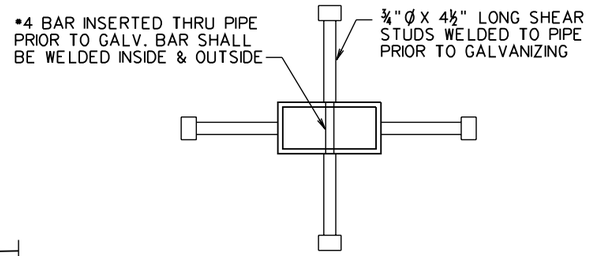
1. COSTS FOR THE DRAINAGE SYSTEM, INCLUDING GALVANIZING, PAINTING, FLOOR DRAINS, DOWNSPOUTS AND SUPPORTS ARE INCLUDED IN ITEM 603018-XXX, PRE-STRESSED CONC. BEAMS.
2. ALL MATERIALS FOR DRAINAGE SHALL BE GALVANIZED AFTER FABRICATION AND THEN PAINTED.
3. NUMBER OF DRAINS REQUIRED:

CIRCULAR STEEL PIPE DRAIN



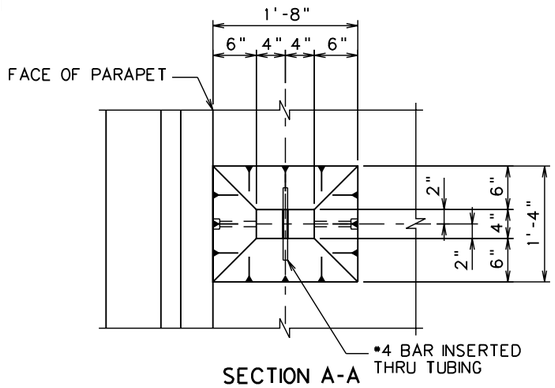
DOWNSPOUT DETAIL

N.T.S.

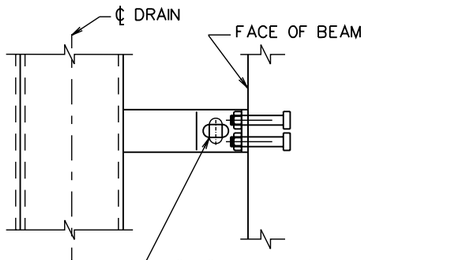


DETAIL "A"

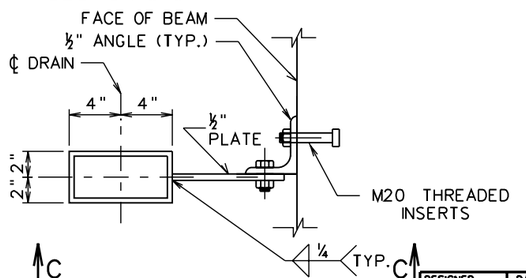
N.T.S.



SECTION A-A



SECTION C-C



SECTION B-B

NOTE:

1. STRUCTURAL STEEL TUBING FOR DECK DRAINS SHALL BE 8" X 4" X ⅜" COLD FORMED STEEL IN ACCORDANCE WITH ASTM A500, GRADE B. CONTRACTOR MAY SUBSTITUTE ½" WALL THICKNESS TUBING FOR ⅜" TUBING AT HIS OPTION AND EXPENSE.
2. THE DRAIN ASSEMBLY SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111, 2 OUNCES.
3. PAYMENT FOR THE DRAINAGE SYSTEM SHALL BE INCLUDED IN THE LUMP SUM BID ITEM PRICE FOR ITEM 603018-XXX, PRESTRESSED CONC. BEAMS.
4. NUMBER OF DRAINS REQUIRED:

STRUCTURAL STEEL TUBING DRAIN

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

DESIGNED	DATE
DRAWN	
CHECKED	
REVIEWED	

APPROVED _____ DIRECTOR ENGINEERING DIVISION — DATE 09/22/08

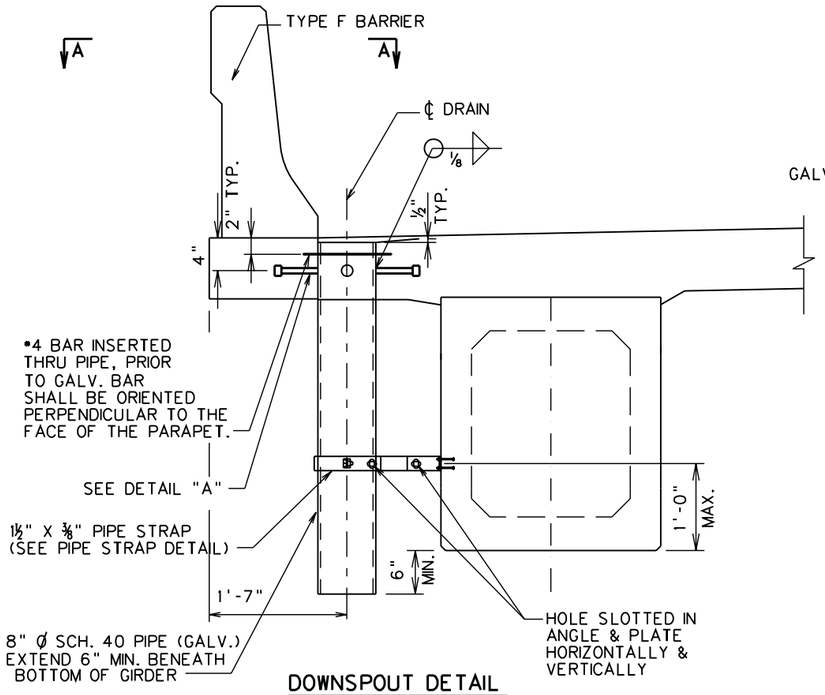
DECK DRAIN DETAILS FOR AASHTO TYPE IV MODIFIED PRECAST PC BEAM SUPERSTRUCTURE

BR-DD2

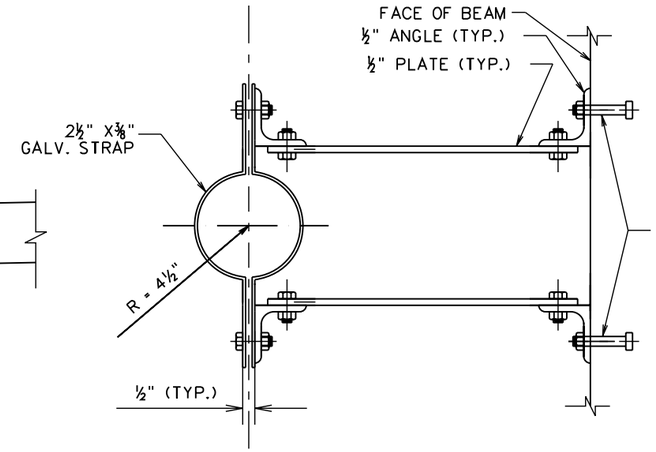
SHEET OF BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
				—	

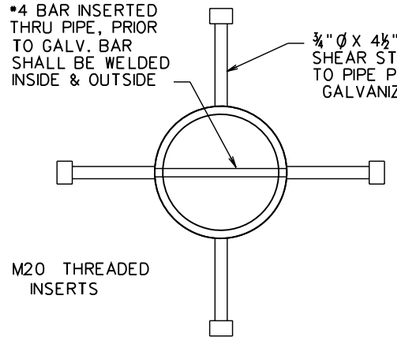
CIRCULAR STEEL PIPE DRAIN



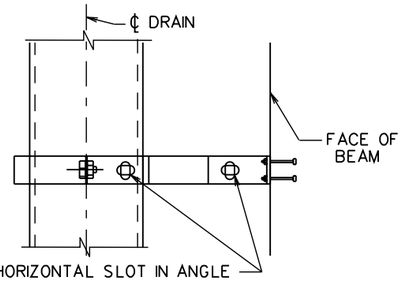
DOWNSPOUT DETAIL
N.T.S.



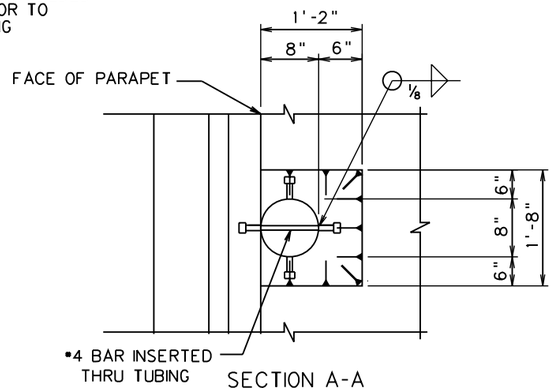
PIPE STRAP DETAIL
N.T.S.



DETAIL "A"
N.T.S.



SECTION C-C

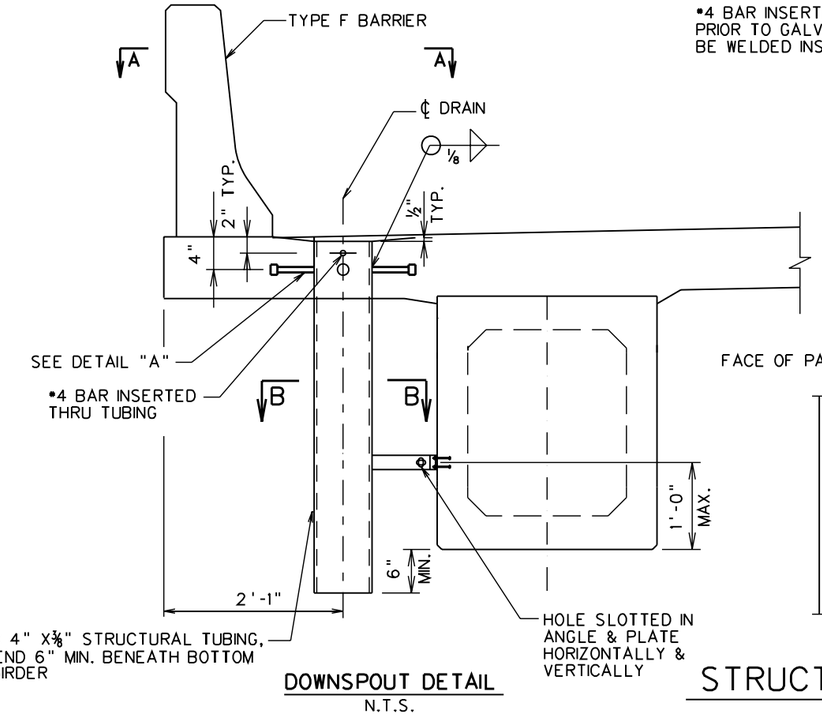


SECTION A-A

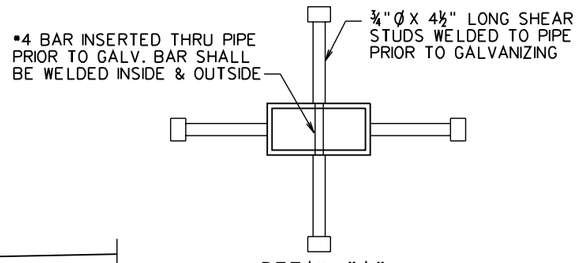
NOTE:

1. COSTS FOR THE DRAINAGE SYSTEM, INCLUDING GALVANIZING, PAINTING, FLOOR DRAINS, DOWNSPOUTS AND SUPPORTS ARE INCLUDED IN ITEM 603016-XXX, PRE-STRESSED CONC. BOX BEAMS.
2. ALL MATERIALS FOR DRAINAGE SHALL BE GALVANIZED AFTER FABRICATION AND THEN PAINTED.
3. NUMBER OF DRAINS REQUIRED:

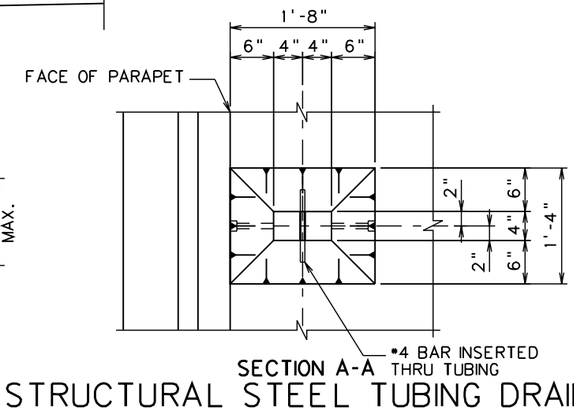
STRUCTURAL STEEL TUBING DRAIN



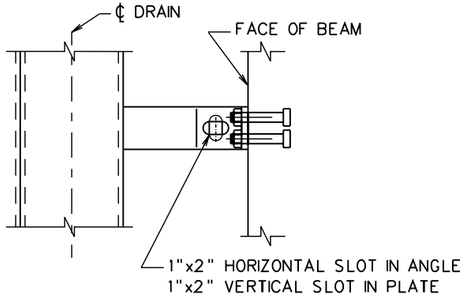
DOWNSPOUT DETAIL
N.T.S.



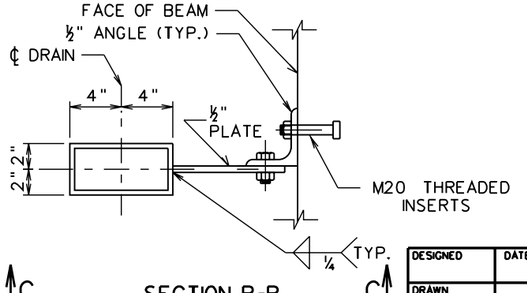
DETAIL "A"
N.T.S.



SECTION A-A



SECTION C-C



SECTION B-B

NOTE:

1. STRUCTURAL STEEL TUBING FOR DECK DRAINS SHALL BE 8" X 4" X ⅜" COLD FORMED STEEL IN ACCORDANCE WITH ASTM A500, GRADE B. CONTRACTOR MAY SUBSTITUTE ½" WALL THICKNESS TUBING FOR ⅜" TUBING AT HIS OPTION AND EXPENSE.
2. THE DRAIN ASSEMBLY SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111, 2 OUNCES.
3. PAYMENT FOR THE DRAINAGE SYSTEM SHALL BE INCLUDED IN THE LUMP SUM BID ITEM PRICE FOR ITEM 603016-XXX, PRESTRESSED CONC. BOX BEAMS.
4. NUMBER OF DRAINS REQUIRED:

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

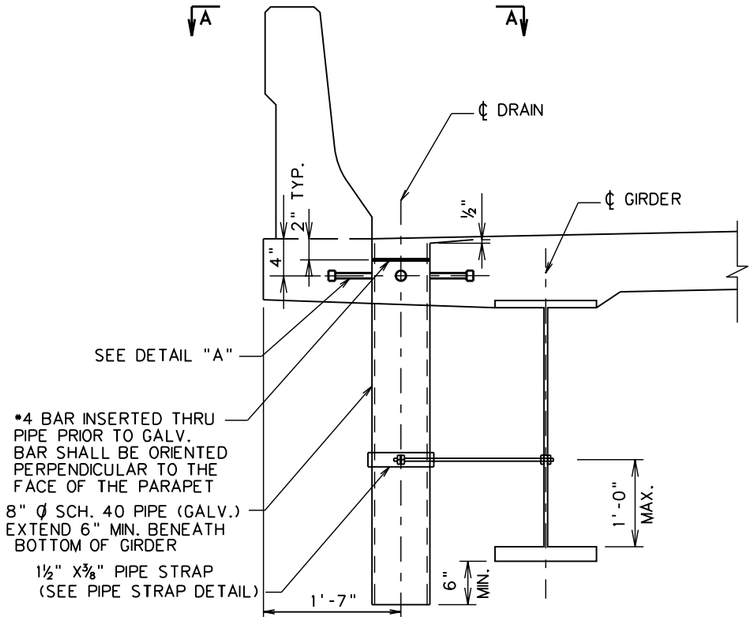
DESIGNED	DATE	
DRAWN		
CHECKED		
REVIEWED		

APPROVED Gregory Bailey DIRECTOR ENGINEERING DIVISION DATE 09/22/08

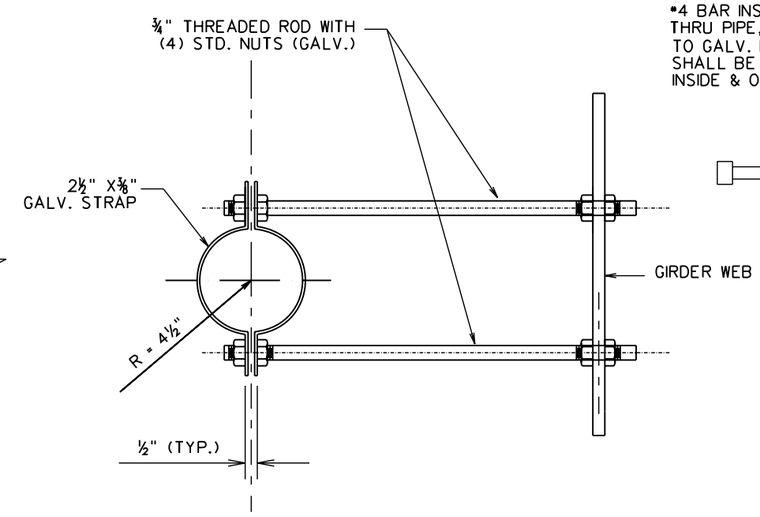
DECK DRAIN DETAILS FOR PRECAST PC BOX BEAM SUPERSTRUCTURE
BR-DD3

SHEET OF
BRIDGE NO.

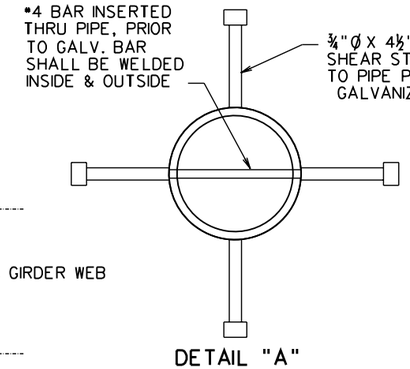
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				
				—	



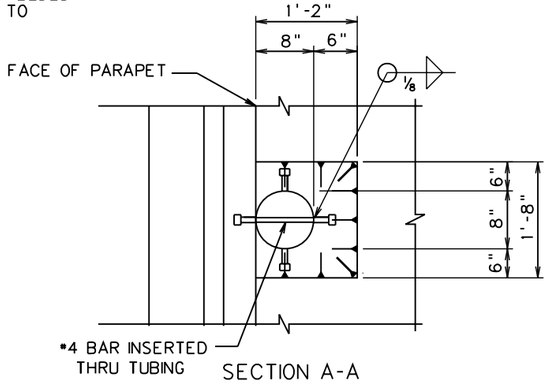
DOWNSPOUT DETAIL
N.T.S.



PIPE STRAP DETAIL
N.T.S.



DETAIL "A"
N.T.S.

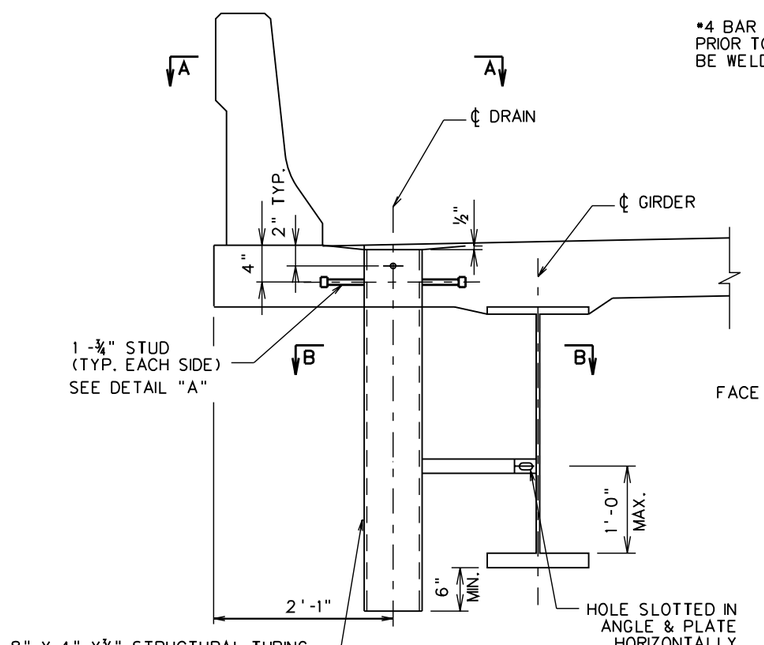


SECTION A-A

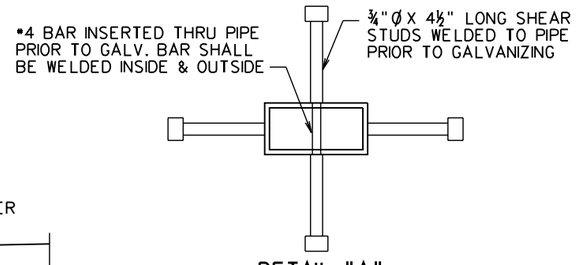
NOTE:

1. COSTS FOR THE DRAINAGE SYSTEM, INCLUDING GALVANIZING, PAINTING, FLOOR DRAINS, DOWNSPOUTS AND SUPPORTS ARE INCLUDED IN ITEM 615001-001, STEEL SUPERSTRUCTURE.
2. ALL MATERIALS FOR DRAINAGE SHALL BE GALVANIZED AFTER FABRICATION AND THEN PAINTED.
3. NUMBER OF DRAINS REQUIRED:

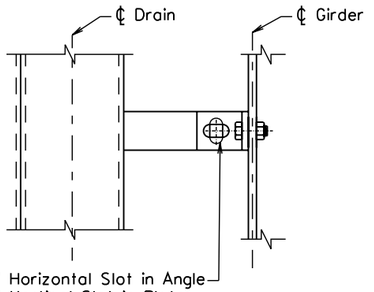
CIRCULAR STEEL PIPE DRAIN



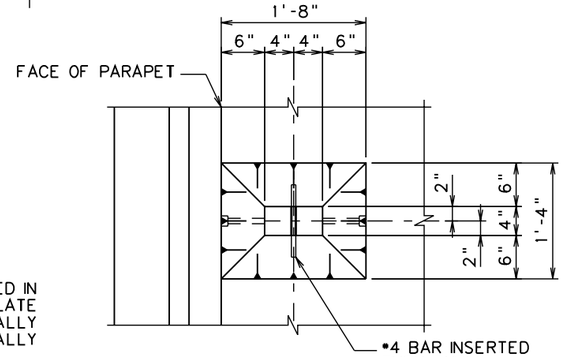
DOWNSPOUT DETAIL
N.T.S.



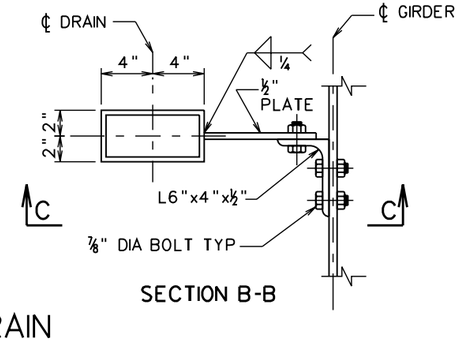
DETAIL "A"
N.T.S.



SECTION C-C



SECTION A-A



SECTION B-B

NOTE:

1. STRUCTURAL STEEL TUBING FOR DECK DRAINS SHALL BE 8" X 4" X ⅜" COLD FORMED STEEL IN ACCORDANCE WITH ASTM A500, GRADE B. CONTRACTOR MAY SUBSTITUTE ½" WALL THICKNESS TUBING FOR ⅜" TUBING AT HIS OPTION AND EXPENSE.
2. THE DRAIN ASSEMBLY SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111, 2 OUNCES.
3. PAYMENT FOR THE DRAINAGE SYSTEM SHALL BE INCLUDED IN THE LUMP SUM BID ITEM PRICE FOR ITEM 615001-001, STEEL SUPERSTRUCTURE.
4. NUMBER OF DRAINS REQUIRED:

STRUCTURAL STEEL TUBING DRAIN

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

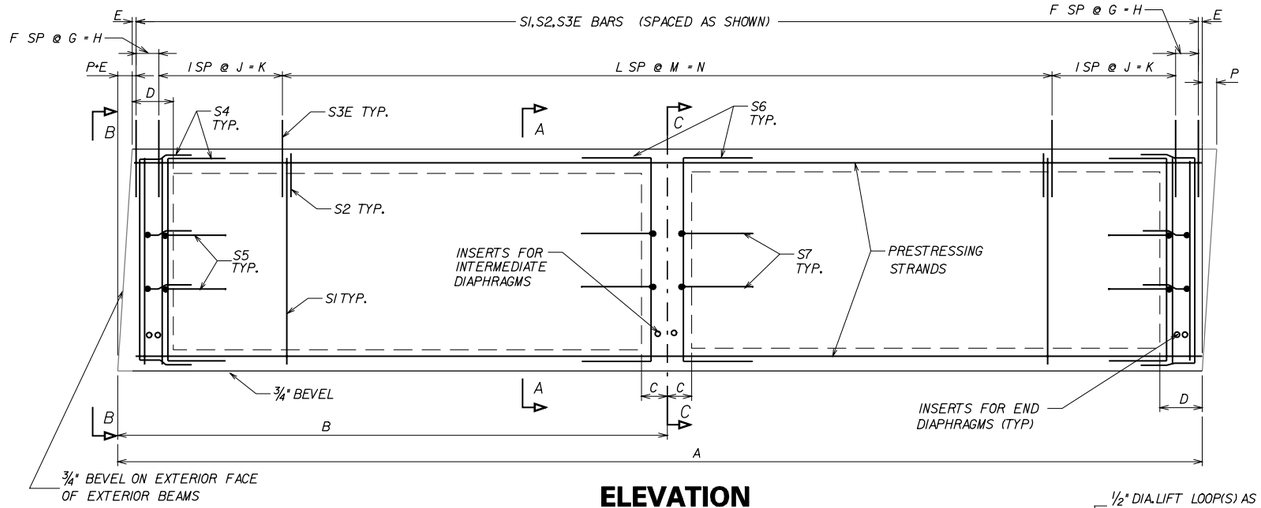
DESIGNED	DATE	
DRAWN		
CHECKED		
REVIEWED		

APPROVED Gregory Bailey DATE 09/22/08
DIRECTOR ENGINEERING DIVISION

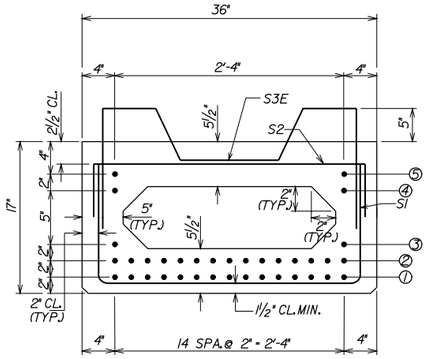
DECK DRAIN DETAILS FOR STEEL SUPERSTRUCTURE
BR-DD4

SHEET OF
BRIDGE NO.

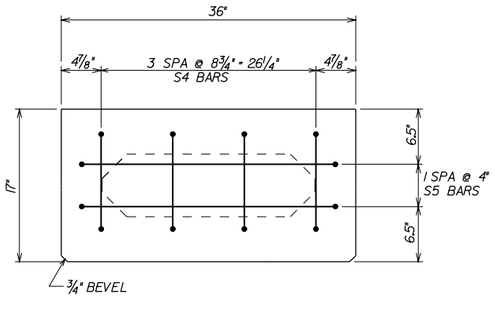
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



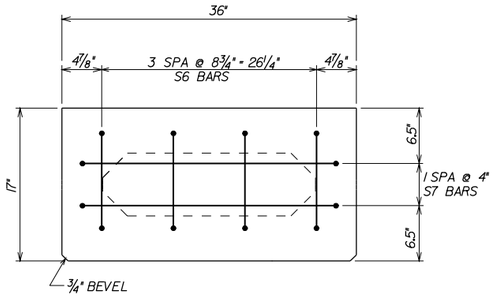
ELEVATION



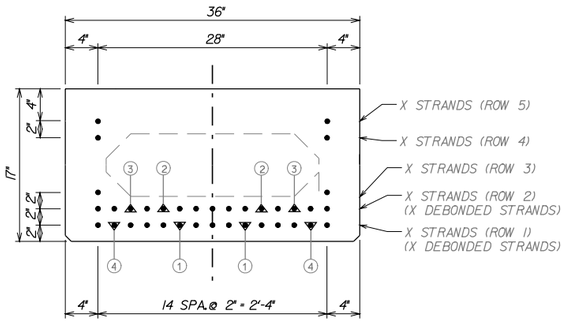
SECTION A–A
TYPICAL BEAM PRESTRESSING



SECTION B–B
TYPICAL BEAM REINFORCEMENT

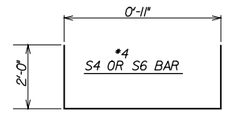


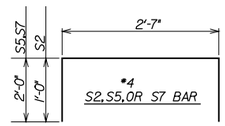
SECTION C–C
TYPICAL BEAM REINFORCEMENT

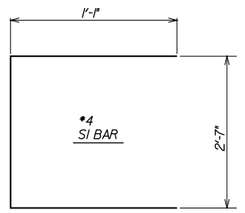


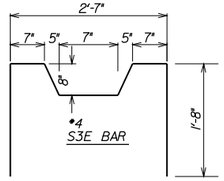
STRAND POSITIONS & DEBONDED STRANDS (ALL BEAMS)

NUMBER OF ½" DIA.-7 WIRE STRANDS IN INDICATED ROW								
MARK	BOTTOM ①	②	TOP ③	④	⑤	TOTAL NO. PER BEAM	CONCRETE STRENGTHS (psi) f'ci	f'c	INITIAL PRESTRESS FORCE/STRAND (lbs)

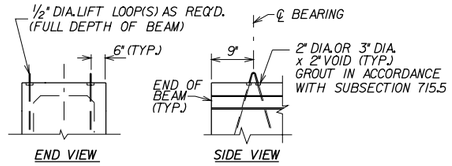






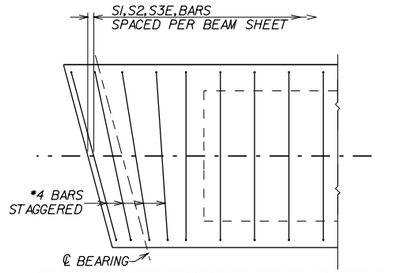


REINFORCING BAR DETAIL



NOTE: LIFTING LOOPS SHALL NOT BE EPOXY COATED. ON SKEWED BEAMS LIFTING DEVICES SHALL BE LOCATED IN A LINE TRANSVERSE TO THE CENTERLINE OF BEAM.

LIFT DETAILS



SHEAR REINFORCEMENT DETAIL SKEWED BEAMS

NOTES:

THE CONCRETE SHALL ATTAIN A COMPRESSIVE STRENGTH OF AT LEAST XXX psi. AS SHOWN BY STANDARD CYLINDERS CURED IDENTICALLY WITH THE BEAMS, BEFORE TRANSFERRING BOND STRESS TO THE CONCRETE; OR BEFORE RELEASING THE END ANCHORS. CYLINDER STRENGTH SHALL BE XXX psi WITHIN 28 DAYS.

PRETENSIONED XXXX P.C. BOX BEAMS SHALL BE USED. APPLY AN INITIAL FORCE OF XXXX lbs TO EACH LOW-RELAXATION STRAND. THE DEPARTMENT WILL REJECT THE BEAMS IF THE FINISHED UNITS CONTAINED HONEYCOMBED CONCRETE TO THE EXTENT THAT THE ENGINEER DETERMINES THE STRENGTH OR DETERIORATION RESISTANCE IS REDUCED. BEAM SHORTENING DUE TO SHRINKING AND ELASTIC CHANGES IS LIMITED TO 0.0005L.

PRESTRESSING STRANDS SHALL BE ½" NOMINAL DIA., GRADE 270, UNCOATED SEVEN WIRE LOW-RELAXATION STRAND IN ACCORDANCE WITH AASHTO M203. THE STRANDS SHALL BE PLACED SYMMETRICALLY IN EACH LAYER. SHOP DRAWINGS SHALL SHOW THE STRAND LOCATIONS AND THE DETENSIONING PLAN BY NUMBERING THE SEQUENCE OF THE STRAND PATTERN. THE SHOP DRAWINGS SHALL ALSO SHOW THE STRAND PATTERN FOR DEBONDED STRANDS.

ROUGHEN THE TOP SURFACE OF EACH BEAM TO AN AMPLITUDE OF APPROXIMATELY ¼" AND MAINTAIN CLEAN AND FREE OF LAITANCE.

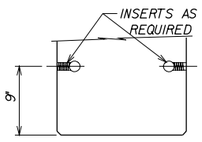
DEFORMED WIRE FABRIC IS PERMITTED INSTEAD OF REINFORCING STEEL BARS PROVIDED AN EQUAL STEEL AREA IS ATTAINED. WIRE FABRIC MUST CONFORM TO THE REQUIREMENTS OF AASHTO SECTION M225.

ALL NON-PRESTRESSING REINFORCING BARS SHALL BE GRADE 60.

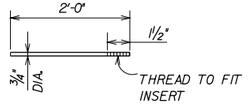
ALL REINFORCING STEEL BARS DESIGNATED "E" SHALL BE EPOXY COATED.

ALL STRANDS SHALL BE ENCLOSED INSIDE STIRRUP CAGE FOR THE ENTIRE LENGTH OF BEAM.

LIFTING DEVICES SHALL BE SHOWN ON SHOP DRAWINGS FOR APPROVAL. LIFTING SHALL BE BY EQUAL LOADS TO EACH DEVICE. INCLUDE PAYMENT IN ITEM 603-01, PRESTRESSED CONCRETE BEAMS, PER FOOT.

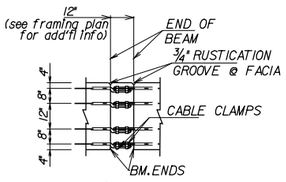


INSERT DETAIL

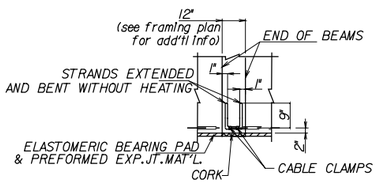


THREADED BAR DETAIL

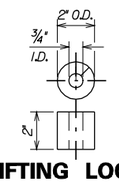
BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)																	
MARK	NO. REQ'D.	DIMENSIONS A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	APPROX. WEIGHT EACH (lbs)



PLAN



ELEVATION
STRAND SPLICING DETAILS



LIFTING LOOP BLOCKOUT DETAILS

DEBONDING OF STRANDS			
GROUP	NUMBER OF STRANDS EA. GROUP	HEIGHT OF STRAND (IN)	SHIELDING LENGTH FROM EA. BM. END (IN)

REINFORCING BAR LIST				
MARK	TYPE	COUNT/BEAM A_1, B_1, C_1	A_2, B_2, C_2	LENGTH
S1	BENT			
S2	BENT			
S3E	BENT			
S4	BENT			
S5	BENT			
S6	BENT			
S7	BENT			

NO.	REVISION	DATE:	BY:

W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

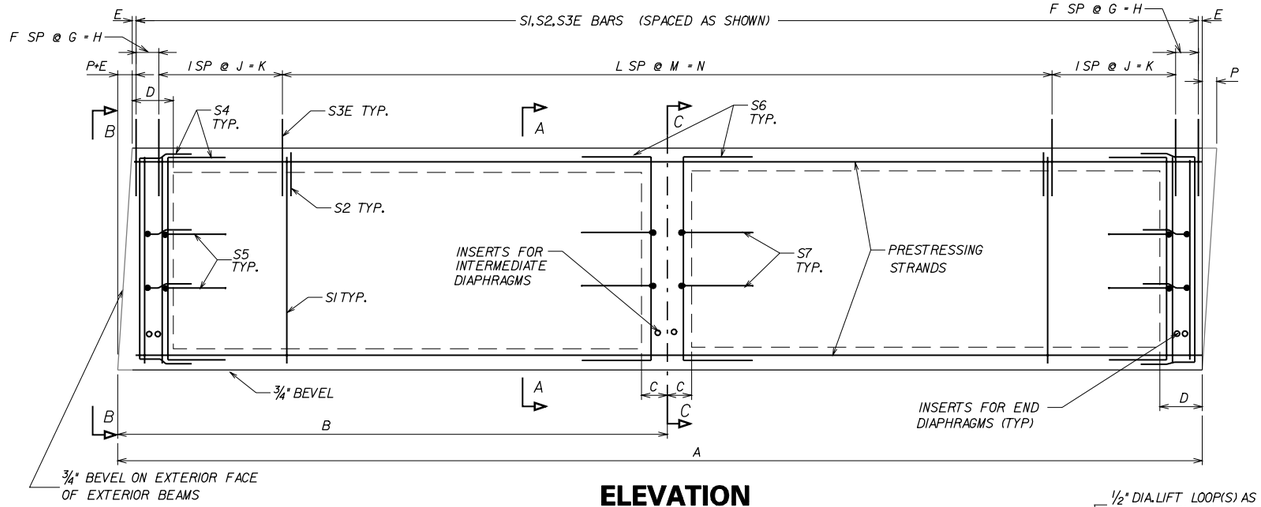
DESIGNED	DATE 12/5/06
DRAWN	
CHECKED	
REVIEWED	

APPROVED Gregory Bailey DATE 12/18/06
DIRECTOR ENGINEERING DIVISION

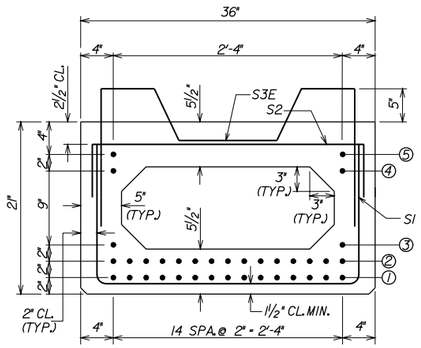
17" P.C. SPREAD BOX BEAM DETAILS
BRD–B 17X36

SHEET OF
BRIDGE NO.

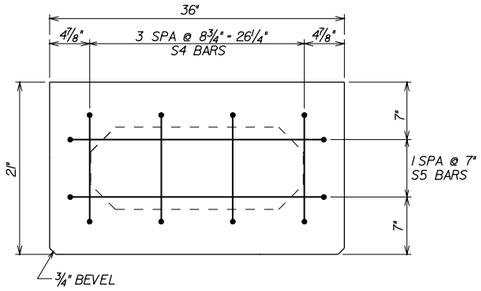
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



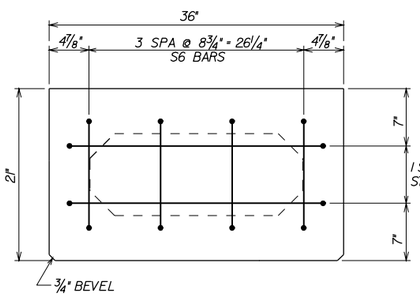
ELEVATION



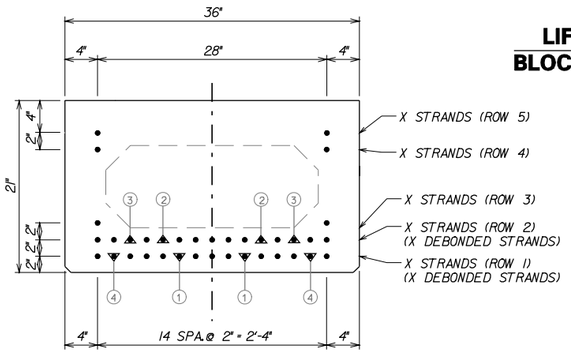
SECTION A–A
TYPICAL BEAM PRESTRESSING



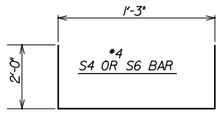
SECTION B–B
TYPICAL BEAM REINFORCEMENT

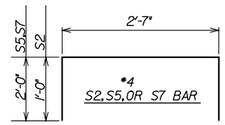


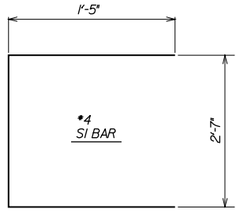
SECTION C–C
TYPICAL BEAM REINFORCEMENT

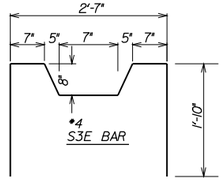


STRAND POSITIONS & DEBONDED STRANDS (ALL BEAMS)

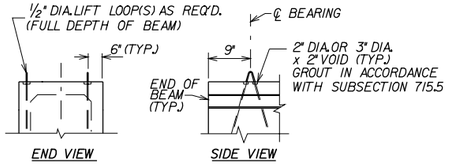






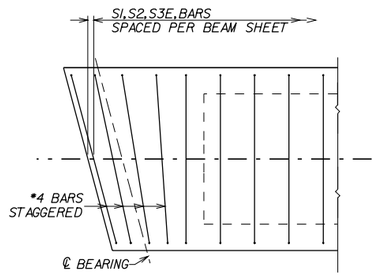


REINFORCING BAR DETAIL

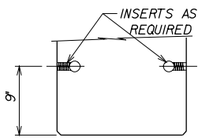


NOTE: LIFTING LOOPS SHALL NOT BE EPOXY COATED. ON SKEWED BEAMS LIFTING DEVICES SHALL BE LOCATED IN A LINE TRANSVERSE TO THE CENTERLINE OF BEAM.

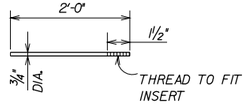
LIFT DETAILS



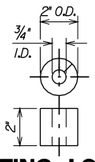
SHEAR REINFORCEMENT DETAIL
SKEWED BEAMS



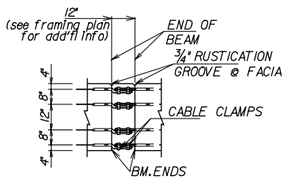
INSERT DETAIL



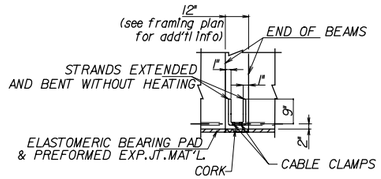
THREADED BAR DETAIL



LIFTING LOOP BLOCKOUT DETAILS



PLAN



ELEVATION
STRAND SPLICING DETAILS

NOTES:

THE CONCRETE SHALL ATTAIN A COMPRESSIVE STRENGTH OF AT LEAST XXX psi, AS SHOWN BY STANDARD CYLINDERS CURED IDENTICALLY WITH THE BEAMS, BEFORE TRANSFERRING BOND STRESS TO THE CONCRETE; OR BEFORE RELEASING THE END ANCHORS. CYLINDER STRENGTH SHALL BE XXX psi WITHIN 28 DAYS.

PRETENSIONED XXXX P.C. BOX BEAMS SHALL BE USED. APPLY AN INITIAL FORCE OF XXXX lbs TO EACH LOW-RELAXATION STRAND. THE DEPARTMENT WILL REJECT THE BEAMS IF THE FINISHED UNITS CONTAINED HONEYCOMBED CONCRETE TO THE EXTENT THAT THE ENGINEER DETERMINES THE STRENGTH OR DETERIORATION RESISTANCE IS REDUCED. BEAM SHORTENING DUE TO SHRINKING AND ELASTIC CHANGES IS LIMITED TO 0.0005L.

PRESTRESSING STRANDS SHALL BE ½" NOMINAL DIA., GRADE 270, UNCOATED SEVEN WIRE LOW-RELAXATION STRAND IN ACCORDANCE WITH AASHTO M203. THE STRANDS SHALL BE PLACED SYMMETRICALLY IN EACH LAYER. SHOP DRAWINGS SHALL SHOW THE STRAND LOCATIONS AND THE DETENSIONING PLAN BY NUMBERING THE SEQUENCE OF THE STRAND PATTERN. THE SHOP DRAWINGS SHALL ALSO SHOW THE STRAND PATTERN FOR DEBONDED STRANDS.

ROUGHEN THE TOP SURFACE OF EACH BEAM TO AN AMPLITUDE OF APPROXIMATELY ¼" AND MAINTAIN CLEAN AND FREE OF LAITANCE.

DEFORMED WIRE FABRIC IS PERMITTED INSTEAD OF REINFORCING STEEL BARS PROVIDED AN EQUAL STEEL AREA IS ATTAINED. WIRE FABRIC MUST CONFORM TO THE REQUIREMENTS OF AASHTO SECTION M225.

ALL NON-PRESTRESSING REINFORCING BARS SHALL BE GRADE 60.

ALL REINFORCING STEEL BARS DESIGNATED "E" SHALL BE EPOXY COATED.

ALL STRANDS SHALL BE ENCLOSED INSIDE STIRRUP CAGE FOR THE ENTIRE LENGTH OF BEAM.

LIFTING DEVICES SHALL BE SHOWN ON SHOP DRAWINGS FOR APPROVAL. LIFTING SHALL BE BY EQUAL LOADS TO EACH DEVICE. INCLUDE PAYMENT IN ITEM 603-01, PRESTRESSED CONCRETE BEAMS, PER FOOT.

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

MARK	NO. REQ'D.	DIMENSIONS															APPROX. WEIGHT EACH (lbs)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	

DEBONDING OF STRANDS

GROUP	NUMBER OF STRANDS EA. GROUP	HEIGHT OF STRAND (IN)	SHIELDING LENGTH FROM EA. BM. END (IN)

REINFORCING BAR LIST

MARK	TYPE	COUNT/BEAM A_1, B_1, C_1	COUNT/BEAM A_2, B_2, C_2	LENGTH
S1	BENT			
S2	BENT			
S3E	BENT			
S4	BENT			
S5	BENT			
S6	BENT			
S7	BENT			

NUMBER OF ½" DIA.-7 WIRE STRANDS IN INDICATED ROW

MARK	BOTTOM ①	②	③	TOP ④	⑤	TOTAL NO. PER BEAM	CONCRETE STRENGTHS (psi) f'ci	f'c	INITIAL PRESTRESS FORCE/STRAND (lbs)

NO.	REVISION	DATE:	BY:

APPROVED Gregory Bailey DIRECTOR ENGINEERING DIVISION DATE 12/18/06

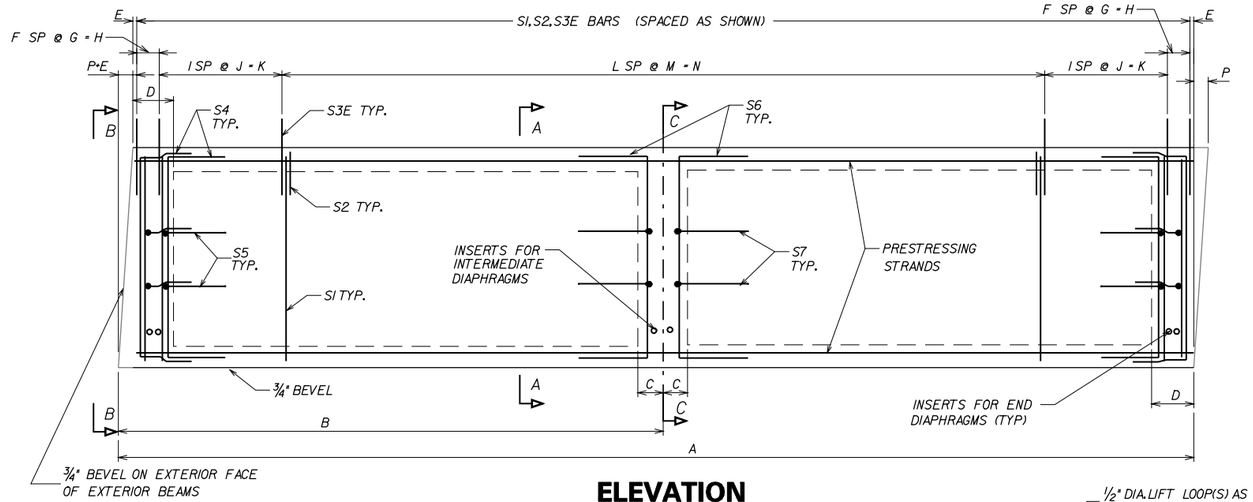
W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

DESIGNED	DATE 12/5/06	
DRAWN		
CHECKED		
REVIEWED		

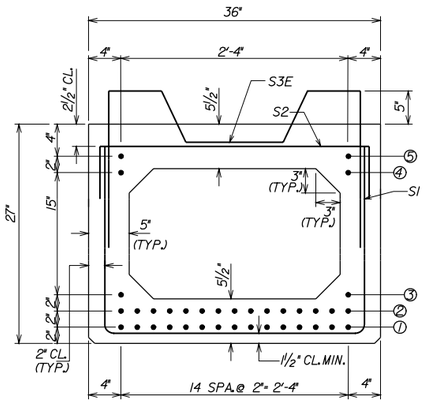
21" P.C. SPREAD BOX BEAM DETAILS
BRD-B 21X36

SHEET OF
BRIDGE NO.

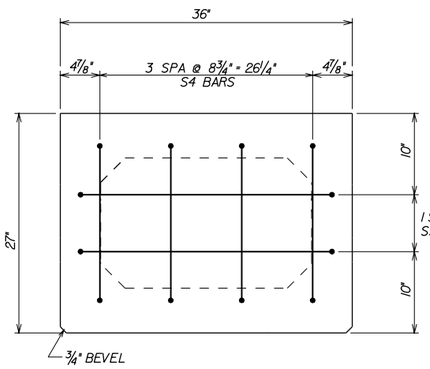
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



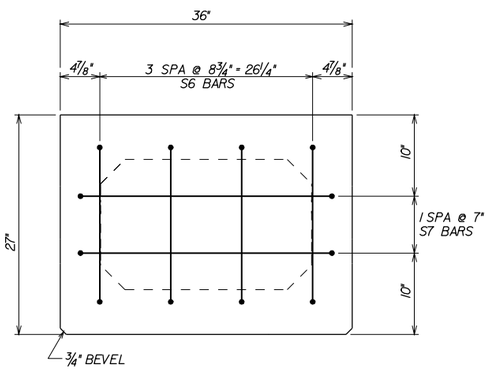
ELEVATION



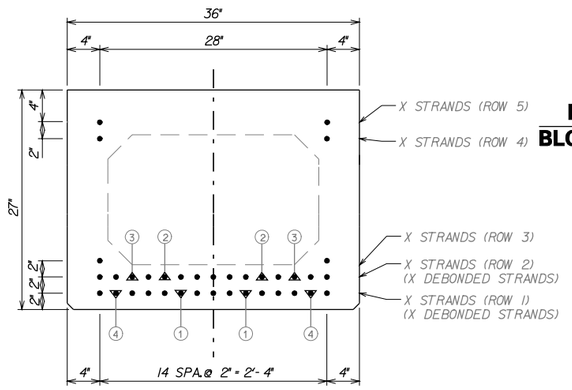
SECTION A–A
TYPICAL BEAM PRESTRESSING



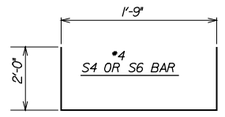
SECTION B–B
TYPICAL BEAM REINFORCEMENT

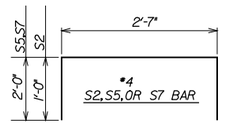


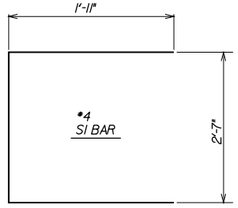
SECTION C–C
TYPICAL BEAM REINFORCEMENT

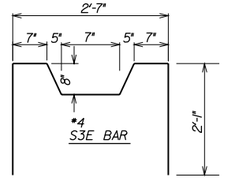


STRAND POSITIONS & DEBONDED STRANDS (ALL BEAMS)

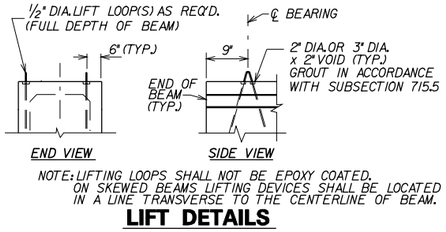






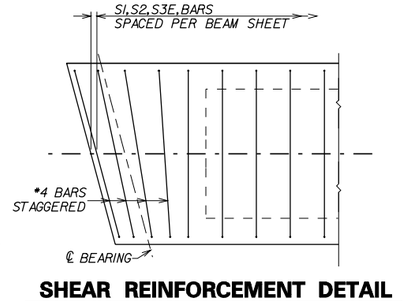


REINFORCING BAR DETAIL



NOTE: LIFTING LOOPS SHALL NOT BE EPOXY COATED. ON SKEWED BEAMS LIFTING DEVICES SHALL BE LOCATED IN A LINE TRANSVERSE TO THE CENTERLINE OF BEAM.

LIFT DETAILS



SHEAR REINFORCEMENT DETAIL
SKEWED BEAMS

NOTES:

THE CONCRETE SHALL ATTAIN A COMPRESSIVE STRENGTH OF AT LEAST XXX psi, AS SHOWN BY STANDARD CYLINDERS CURED IDENTICALLY WITH THE BEAMS, BEFORE TRANSFERRING BOND STRESS TO THE CONCRETE; OR BEFORE RELEASING THE END ANCHORS. CYLINDER STRENGTH SHALL BE XXX psi WITHIN 28 DAYS.

PRETENSIONED XXXX P.C. BOX BEAMS SHALL BE USED. APPLY AN INITIAL FORCE OF XXXX lbs TO EACH LOW-RELAXATION STRAND. THE DEPARTMENT WILL REJECT THE BEAMS IF THE FINISHED UNITS CONTAINED HONEYCOMBED CONCRETE TO THE EXTENT THAT THE ENGINEER DETERMINES THE STRENGTH OR DETERIORATION RESISTANCE IS REDUCED. BEAM SHORTENING DUE TO SHRINKING AND ELASTIC CHANGES IS LIMITED TO 0.0005L.

PRESTRESSING STRANDS SHALL BE ½" NOMINAL DIA., GRADE 270, UNCOATED SEVEN WIRE LOW-RELAXATION STRAND IN ACCORDANCE WITH AASHTO M203. THE STRANDS SHALL BE PLACED SYMMETRICALLY IN EACH LAYER. SHOP DRAWINGS SHALL SHOW THE STRAND LOCATIONS AND THE DETENSIONING PLAN BY NUMBERING THE SEQUENCE OF THE STRAND PATTERN. THE SHOP DRAWINGS SHALL ALSO SHOW THE STRAND PATTERN FOR DEBONDED STRANDS.

ROUGHEN THE TOP SURFACE OF EACH BEAM TO AN AMPLITUDE OF APPROXIMATELY ¼" AND MAINTAIN CLEAN AND FREE OF LAITANCE.

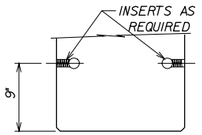
DEFORMED WIRE FABRIC IS PERMITTED INSTEAD OF REINFORCING STEEL BARS PROVIDED AN EQUAL STEEL AREA IS ATTAINED. WIRE FABRIC MUST CONFORM TO THE REQUIREMENTS OF AASHTO SECTION M225.

ALL NON-PRESTRESSING REINFORCING BARS SHALL BE GRADE 60.

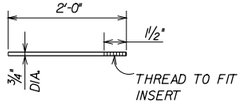
ALL REINFORCING STEEL BARS DESIGNATED "E" SHALL BE EPOXY COATED.

ALL STRANDS SHALL BE ENCLOSED INSIDE STIRRUP CAGE FOR THE ENTIRE LENGTH OF BEAM.

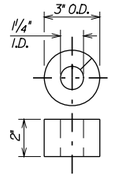
LIFTING DEVICES SHALL BE SHOWN ON SHOP DRAWINGS FOR APPROVAL. LIFTING SHALL BE BY EQUAL LOADS TO EACH DEVICE. INCLUDE PAYMENT IN ITEM 603-01, PRESTRESSED CONCRETE BEAMS, PER FOOT.



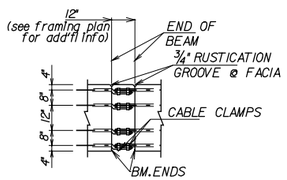
INSERT DETAIL



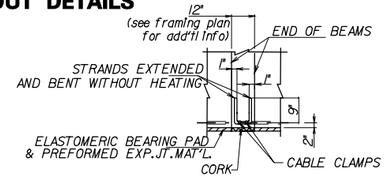
THREADED BAR DETAIL



LIFTING LOOP BLOCKOUT DETAILS



PLAN



ELEVATION
STRAND SPLICING DETAILS

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

MARK	NO. REQ'D.	DIMENSIONS A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	APPROX. WEIGHT EACH (lbs)

DEBONDING OF STRANDS

GROUP	NUMBER OF STRANDS EA. GROUP	HEIGHT OF STRAND (IN)	SHIELDING LENGTH FROM EA. BM. END (IN)

REINFORCING BAR LIST

MARK	TYPE	COUNT/BEAM A_1, B_1, C_1	A_2, B_2, C_2	LENGTH
S1	BENT			
S2	BENT			
S3E	BENT			
S4	BENT			
S5	BENT			
S6	BENT			
S7	BENT			

NUMBER OF ½" DIA.-7 WIRE STRANDS IN INDICATED ROW

MARK	BOTTOM ①	②	③	TOP ④	⑤	TOTAL NO. PER BEAM	CONCRETE STRENGTHS (psi) f'ci	f'c	INITIAL PRESTRESS FORCE/STRAND (lbs)

NO.	REVISION	DATE:	BY:

APPROVED Gregory Bailey DATE 12/18/06
DIRECTOR ENGINEERING DIVISION

DESIGNED	DATE 12/5/06
DRAWN	
CHECKED	
REVIEWED	

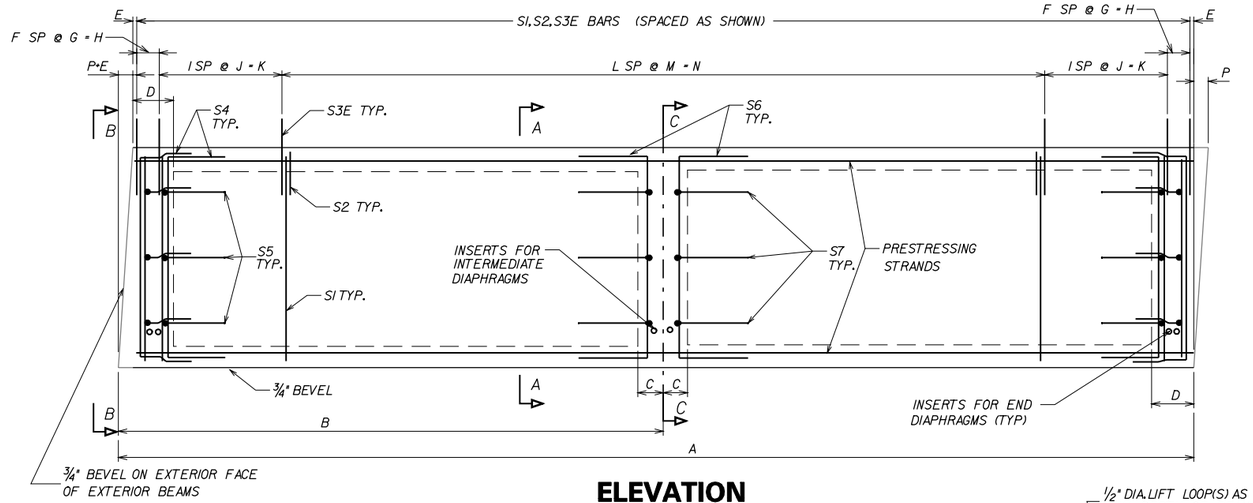
W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

27" P.C. SPREAD BOX BEAM DETAILS

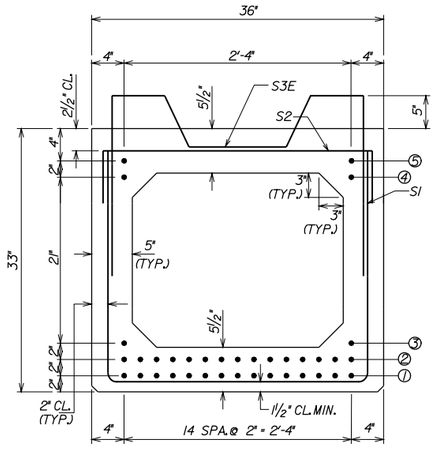
BRD-B 27X36

SHEET OF
BRIDGE NO.

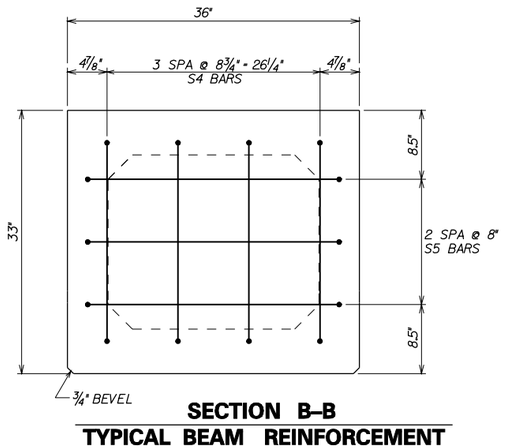
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



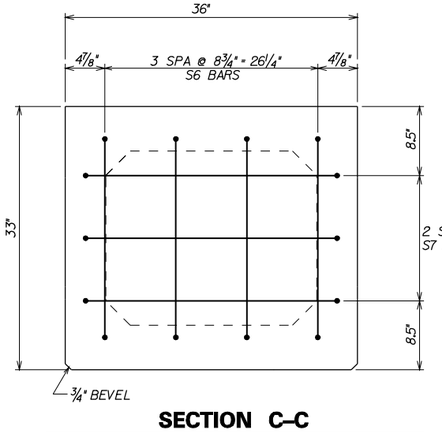
ELEVATION



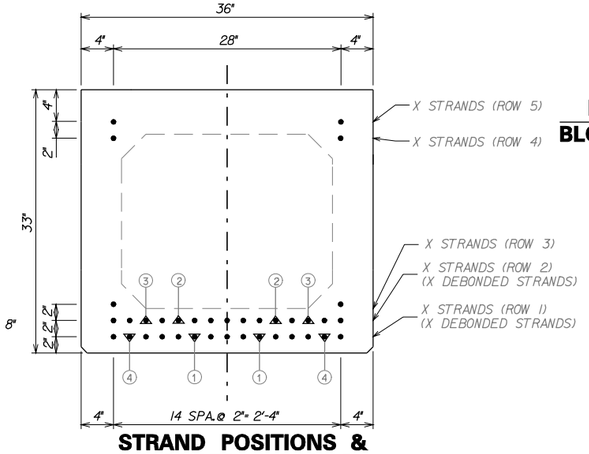
SECTION A–A
TYPICAL BEAM PRESTRESSING



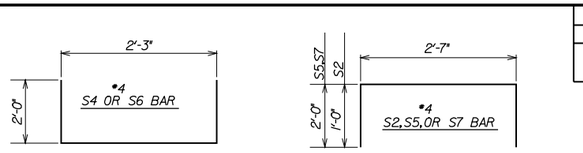
SECTION B–B
TYPICAL BEAM REINFORCEMENT



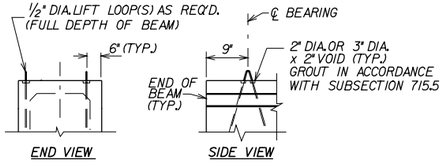
SECTION C–C
TYPICAL BEAM REINFORCEMENT



STRAND POSITIONS & DEBONDED STRANDS (ALL BEAMS)

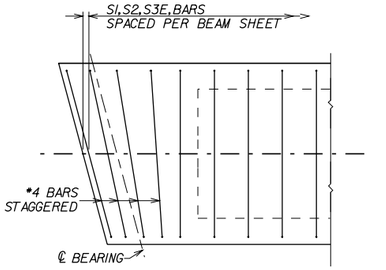


REINFORCING BAR DETAIL



NOTE: LIFTING LOOPS SHALL NOT BE EPOXY COATED. ON SKEWED BEAMS LIFTING DEVICES SHALL BE LOCATED IN A LINE TRANSVERSE TO THE CENTERLINE OF BEAM.

LIFT DETAILS



SHEAR REINFORCEMENT DETAIL
SKEWED BEAMS

NOTES:

THE CONCRETE SHALL ATTAIN A COMPRESSIVE STRENGTH OF AT LEAST XXX psi, AS SHOWN BY STANDARD CYLINDERS CURED IDENTICALLY WITH THE BEAMS, BEFORE TRANSFERRING BOND STRESS TO THE CONCRETE; OR BEFORE RELEASING THE END ANCHORS. CYLINDER STRENGTH SHALL BE XXX psi WITHIN 28 DAYS.

PRETENSIONED XXXX P.C. BOX BEAMS SHALL BE USED. APPLY AN INITIAL FORCE OF XXXX lbs TO EACH LOW-RELAXATION STRAND. THE DEPARTMENT WILL REJECT THE BEAMS IF THE FINISHED UNITS CONTAINED HONEYCOMBED CONCRETE TO THE EXTENT THAT THE ENGINEER DETERMINES THE STRENGTH OR DETERIORATION RESISTANCE IS REDUCED. BEAM SHORTENING DUE TO SHRINKING AND ELASTIC CHANGES IS LIMITED TO 0.0005L.

PRESTRESSING STRANDS SHALL BE ½" NOMINAL DIA., GRADE 270, UNCOATED SEVEN WIRE LOW-RELAXATION STRAND IN ACCORDANCE WITH AASHTO M203. THE STRANDS SHALL BE PLACED SYMMETRICALLY IN EACH LAYER. SHOP DRAWINGS SHALL SHOW THE STRAND LOCATIONS AND THE DETENSIONING PLAN BY NUMBERING THE SEQUENCE OF THE STRAND PATTERN. THE SHOP DRAWINGS SHALL ALSO SHOW THE STRAND PATTERN FOR DEBONDED STRANDS.

ROUGHEN THE TOP SURFACE OF EACH BEAM TO AN AMPLITUDE OF APPROXIMATELY ¼" AND MAINTAIN CLEAN AND FREE OF LAITANCE.

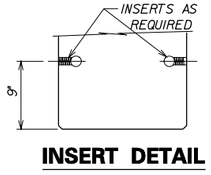
DEFORMED WIRE FABRIC IS PERMITTED INSTEAD OF REINFORCING STEEL BARS PROVIDED AN EQUAL STEEL AREA IS ATTAINED. WIRE FABRIC MUST CONFORM TO THE REQUIREMENTS OF AASHTO SECTION M225.

ALL NON-PRESTRESSING REINFORCING BARS SHALL BE GRADE 60.

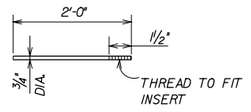
ALL REINFORCING STEEL BARS DESIGNATED "E" SHALL BE EPOXY COATED.

ALL STRANDS SHALL BE ENCLOSED INSIDE STIRRUP CAGE FOR THE ENTIRE LENGTH OF BEAM.

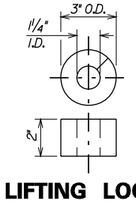
LIFTING DEVICES SHALL BE SHOWN ON SHOP DRAWINGS FOR APPROVAL. LIFTING SHALL BE BY EQUAL LOADS TO EACH DEVICE. INCLUDE PAYMENT IN ITEM 603-01, PRESTRESSED CONCRETE BEAMS, PER FOOT.



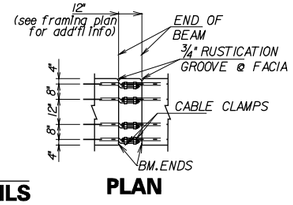
INSERT DETAIL



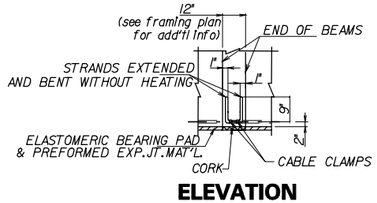
THREADED BAR DETAIL



LIFTING LOOP BLOCKOUT DETAILS



PLAN



ELEVATION
STRAND SPLICING DETAILS

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

MARK	NO. REQ'D.	DIMENSIONS A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	APPROX. WEIGHT EACH (lbs)

DEBONDING OF STRANDS

GROUP	NUMBER OF STRANDS EA. GROUP	HEIGHT OF STRAND (IN)	SHIELDING LENGTH FROM EA. BM. END (IN)

REINFORCING BAR LIST

MARK	TYPE	COUNT/BEAM A_1, B_1, C_1	A_2, B_2, C_2	LENGTH
S1	BENT			
S2	BENT			
S3E	BENT			
S4	BENT			
S5	BENT			
S6	BENT			
S7	BENT			

NUMBER OF ½" DIA.-7 WIRE STRANDS IN INDICATED ROW

MARK	BOTTOM ①	②	③	TOP ④	⑤	TOTAL NO. PER BEAM	CONCRETE STRENGTHS (psi) f'ci	f'c	INITIAL PRESTRESS FORCE/STRAND (lbs)

NO.	REVISION	DATE:	BY:

APPROVED Gregg Bailey DIRECTOR ENGINEERING DIVISION DATE 12/18/06

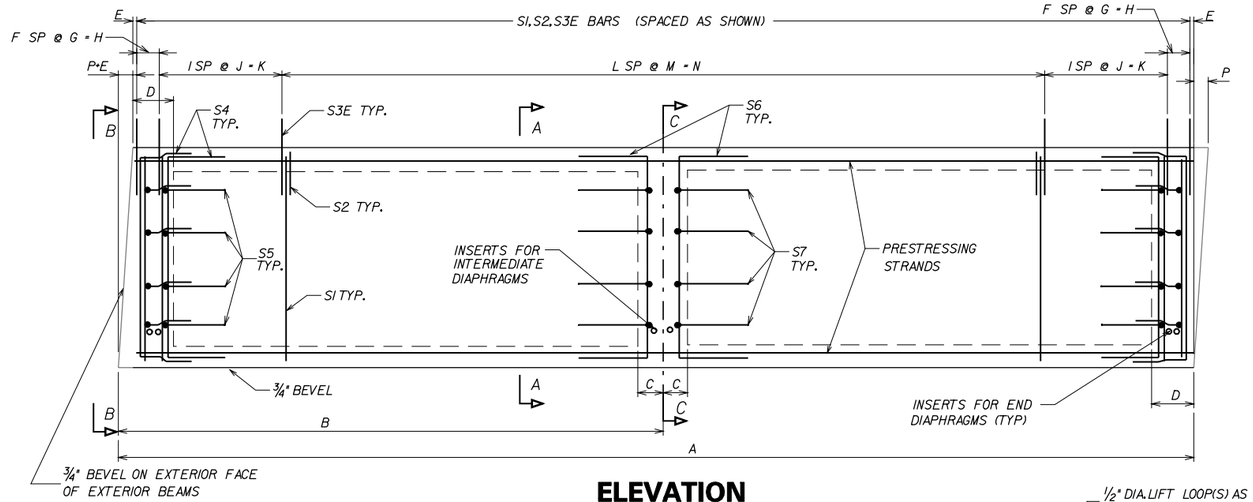
W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

DESIGNED	DATE 12/5/06	
DRAWN		
CHECKED		
REVIEWED		

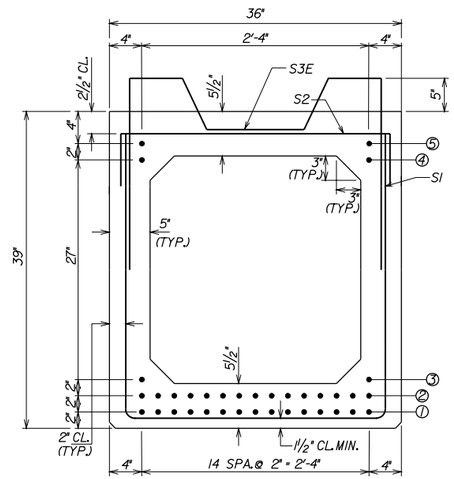
33" P.C. SPREAD BOX BEAM DETAILS
BRD-B 33X36

SHEET OF
BRIDGE NO.

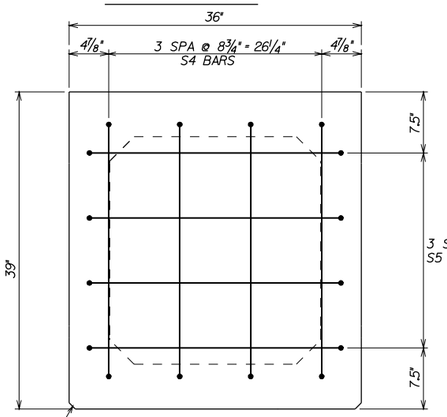
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



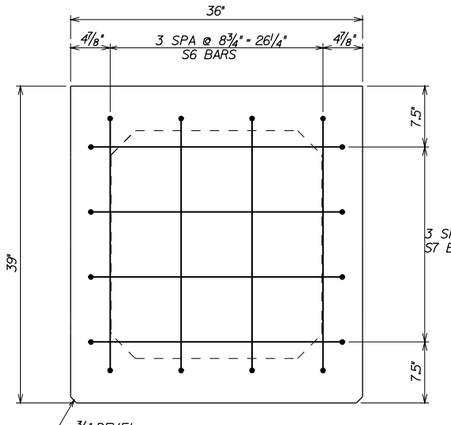
ELEVATION



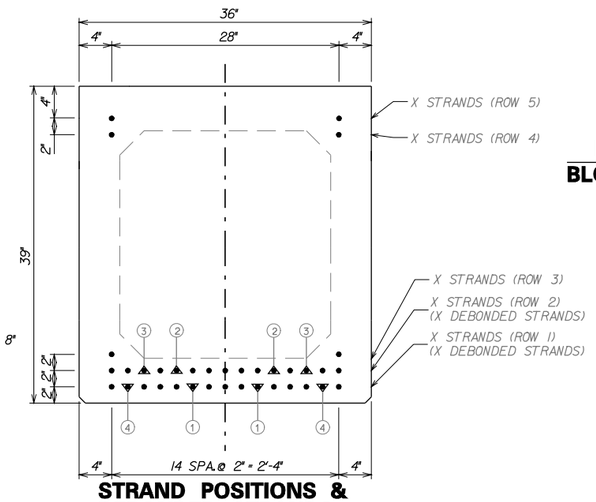
SECTION A–A
TYPICAL BEAM PRESTRESSING



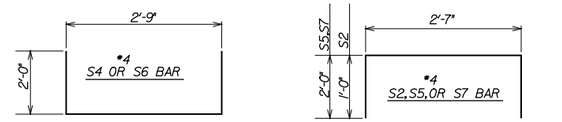
SECTION B–B
TYPICAL BEAM REINFORCEMENT



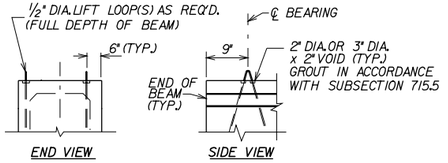
SECTION C–C
TYPICAL BEAM REINFORCEMENT



STRAND POSITIONS & DEBONDED STRANDS (ALL BEAMS)

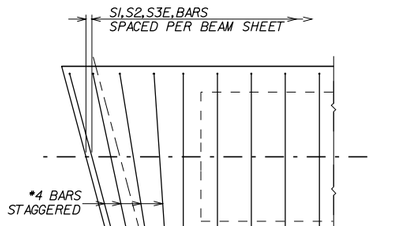


REINFORCING BAR DETAIL



NOTE: LIFTING LOOPS SHALL NOT BE EPOXY COATED. ON SKEWED BEAMS LIFTING DEVICES SHALL BE LOCATED IN A LINE TRANSVERSE TO THE CENTERLINE OF BEAM.

LIFT DETAILS



SHEAR REINFORCEMENT DETAIL
SKEWED BEAMS

NOTES:

THE CONCRETE SHALL ATTAIN A COMPRESSIVE STRENGTH OF AT LEAST XXX psi, AS SHOWN BY STANDARD CYLINDERS CURED IDENTICALLY WITH THE BEAMS, BEFORE TRANSFERRING BOND STRESS TO THE CONCRETE; OR BEFORE RELEASING THE END ANCHORS. CYLINDER STRENGTH SHALL BE XXX psi WITHIN 28 DAYS.

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ROUGHEN THE TOP SURFACE OF EACH BEAM TO AN AMPLITUDE OF APPROXIMATELY ¼" AND MAINTAIN CLEAN AND FREE OF LAITANCE.

DEFORMED WIRE FABRIC IS PERMITTED INSTEAD OF REINFORCING STEEL BARS PROVIDED AN EQUAL STEEL AREA IS ATTAINED. WIRE FABRIC MUST CONFORM TO THE REQUIREMENTS OF AASHTO SECTION M225.

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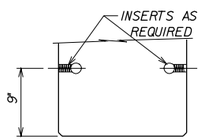
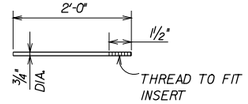
ALL STRANDS SHALL BE ENCLOSED INSIDE STIRRUP CAGE FOR THE ENTIRE LENGTH OF BEAM.

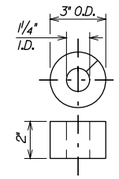
LIFTING DEVICES SHALL BE SHOWN ON SHOP DRAWINGS FOR APPROVAL. LIFTING SHALL BE BY EQUAL LOADS TO EACH DEVICE. INCLUDE PAYMENT IN ITEM 603-01, PRESTRESSED CONCRETE BEAMS, PER FOOT.



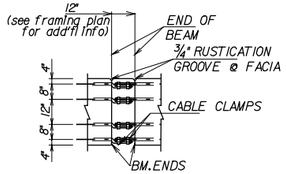
INSERT DETAIL



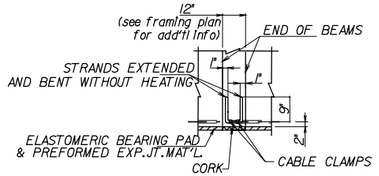
THREADED BAR DETAIL



LIFTING LOOP BLOCKOUT DETAILS



PLAN



ELEVATION
STRAND SPLICING DETAILS

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

MARK	NO. REQ'D.	DIMENSIONS A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	APPROX. WEIGHT EACH (lbs)

DEBONDING OF STRANDS

GROUP	NUMBER OF STRANDS EA. GROUP	HEIGHT OF STRAND (IN)	SHIELDING LENGTH FROM EA. BM. END (IN)

REINFORCING BAR LIST

MARK	TYPE	COUNT/BEAM A_1, B_1, C_1	A_2, B_2, C_2	LENGTH
S1	BENT			
S2	BENT			
S3E	BENT			
S4	BENT			
S5	BENT			
S6	BENT			
S7	BENT			

NUMBER OF ½" DIA.-7 WIRE STRANDS IN INDICATED ROW

MARK	BOTTOM ①	②	③	TOP ④	⑤	TOTAL NO. PER BEAM	CONCRETE STRENGTHS (psi) f'ci	f'c	INITIAL PRESTRESS FORCE/STRAND (lbs)

NO.	REVISION	DATE:	BY:

APPROVED Gregory Bailey DIRECTOR ENGINEERING DIVISION DATE 12/18/06

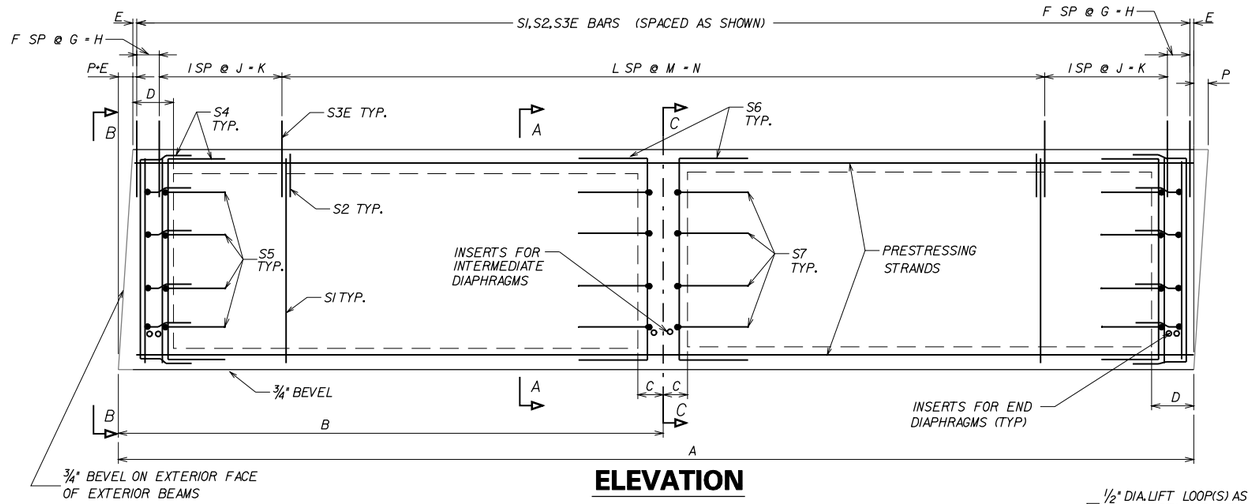
DESIGNED	DATE 12/5/06
DRAWN	
CHECKED	
REVIEWED	

W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

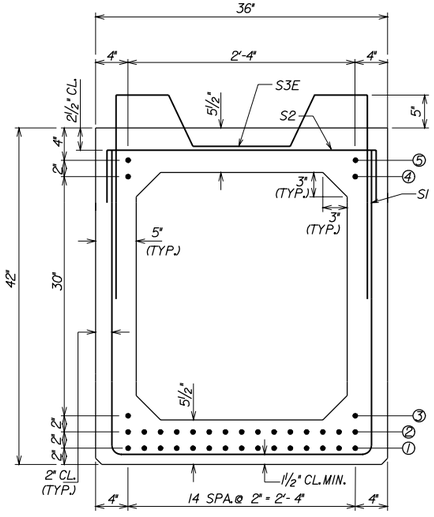
39" P.C. SPREAD BOX BEAM DETAILS
BRD-B 39X36

SHEET OF
BRIDGE NO.

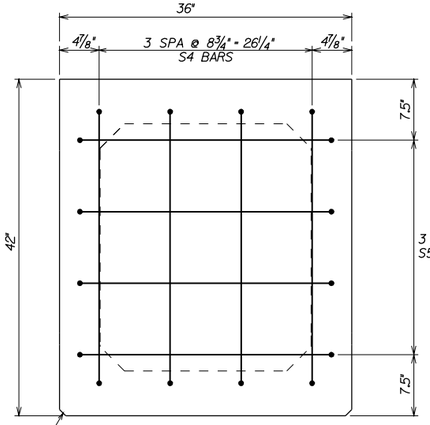
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



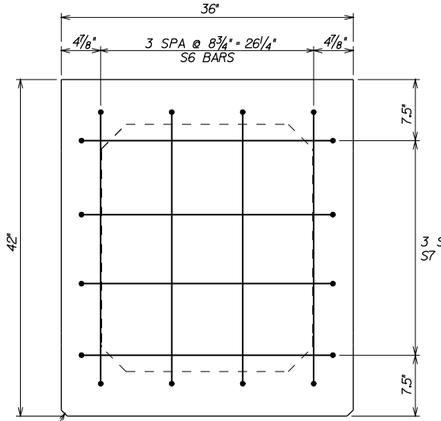
ELEVATION



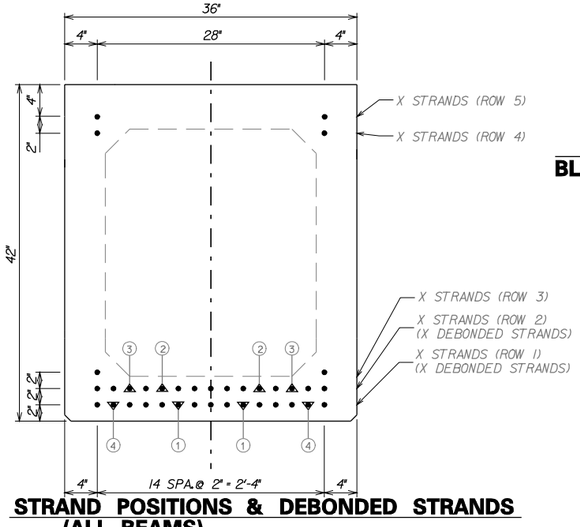
SECTION A–A
TYPICAL BEAM PRESTRESSING



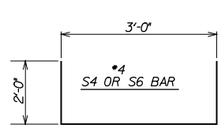
SECTION B–B
TYPICAL BEAM REINFORCEMENT

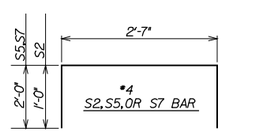


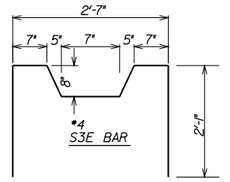
SECTION C–C
TYPICAL BEAM REINFORCEMENT



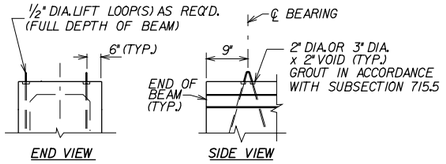
STRAND POSITIONS & DEBONDED STRANDS (ALL BEAMS)





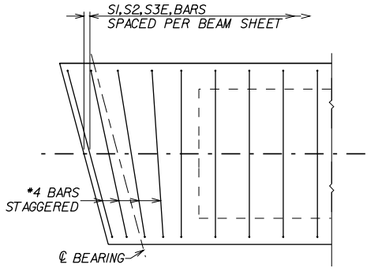


REINFORCING BAR DETAIL

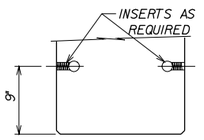


NOTE: LIFTING LOOPS SHALL NOT BE EPOXY COATED. ON SKEWED BEAMS LIFTING DEVICES SHALL BE LOCATED IN A LINE TRANSVERSE TO THE CENTERLINE OF BEAM.

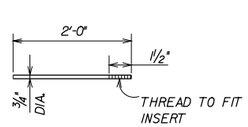
LIFT DETAILS



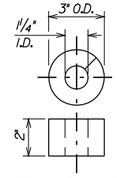
SHEAR REINFORCEMENT DETAIL
SKEWED BEAMS



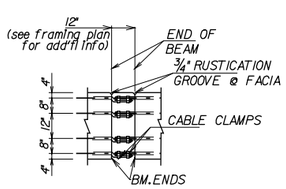
INSERT DETAIL



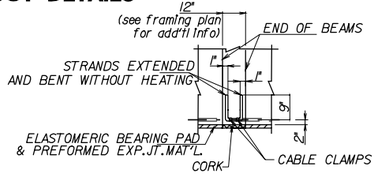
THREADED BAR DETAIL



LIFTING LOOP BLOCKOUT DETAILS



PLAN



ELEVATION
STRAND SPLICING DETAILS

NOTES:

THE CONCRETE SHALL ATTAIN A COMPRESSIVE STRENGTH OF AT LEAST XXX psi, AS SHOWN BY STANDARD CYLINDERS CURED IDENTICALLY WITH THE BEAMS, BEFORE TRANSFERRING BOND STRESS TO THE CONCRETE; OR BEFORE RELEASING THE END ANCHORS. CYLINDER STRENGTH SHALL BE XXX psi WITHIN 28 DAYS.

PRETENSIONED XXXX P.C. BOX BEAMS SHALL BE USED. APPLY AN INITIAL FORCE OF XXXX lbs TO EACH LOW-RELAXATION STRAND. THE DEPARTMENT WILL REJECT THE BEAMS IF THE FINISHED UNITS CONTAINED HONEYCOMBED CONCRETE TO THE EXTENT THAT THE ENGINEER DETERMINES THE STRENGTH OR DETERIORATION RESISTANCE IS REDUCED. BEAM SHORTENING DUE TO SHRINKING AND ELASTIC CHANGES IS LIMITED TO 0.0005L.

PRESTRESSING STRANDS SHALL BE ½" NOMINAL DIA., GRADE 270, UNCOATED SEVEN WIRE LOW-RELAXATION STRAND IN ACCORDANCE WITH AASHTO M203. THE STRANDS SHALL BE PLACED SYMMETRICALLY IN EACH LAYER. SHOP DRAWINGS SHALL SHOW THE STRAND LOCATIONS AND THE DETENSIONING PLAN BY NUMBERING THE SEQUENCE OF THE STRAND PATTERN. THE SHOP DRAWINGS SHALL ALSO SHOW THE STRAND PATTERN FOR DEBONDED STRANDS.

ROUGHEN THE TOP SURFACE OF EACH BEAM TO AN AMPLITUDE OF APPROXIMATELY ¼" AND MAINTAIN CLEAN AND FREE OF LAITANCE.

DEFORMED WIRE FABRIC IS PERMITTED INSTEAD OF REINFORCING STEEL BARS PROVIDED AN EQUAL STEEL AREA IS ATTAINED. WIRE FABRIC MUST CONFORM TO THE REQUIREMENTS OF AASHTO SECTION M225.

ALL NON-PRESTRESSING REINFORCING BARS SHALL BE GRADE 60.

ALL REINFORCING STEEL BARS DESIGNATED "E" SHALL BE EPOXY COATED.

ALL STRANDS SHALL BE ENCLOSED INSIDE STIRRUP CAGE FOR THE ENTIRE LENGTH OF BEAM.

LIFTING DEVICES SHALL BE SHOWN ON SHOP DRAWINGS FOR APPROVAL. LIFTING SHALL BE BY EQUAL LOADS TO EACH DEVICE. INCLUDE PAYMENT IN ITEM 603-01, PRESTRESSED CONCRETE BEAMS, PER FOOT.

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

MARK	NO. REQ'D.	DIMENSIONS A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	APPROX. WEIGHT EACH (lbs)

DEBONDING OF STRANDS

GROUP	NUMBER OF STRANDS EA. GROUP	HEIGHT OF STRAND (IN)	SHIELDING LENGTH FROM EA. BM. END (IN)

REINFORCING BAR LIST

MARK	TYPE	COUNT/BEAM A_1, B_1, C_1	A_2, B_2, C_2	LENGTH
S1	BENT			
S2	BENT			
S3E	BENT			
S4	BENT			
S5	BENT			
S6	BENT			
S7	BENT			

NUMBER OF ½" DIA.-7 WIRE STRANDS IN INDICATED ROW

MARK	BOTTOM ①	②	③	TOP ④	⑤	TOTAL NO. PER BEAM	CONCRETE STRENGTHS (psi) f'ci	f'c	INITIAL PRESTRESS FORCE/STRAND (lbs)

NO.	REVISION	DATE:	BY:

APPROVED _____ DIRECTOR ENGINEERING DIVISION DATE 12/18/06

W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

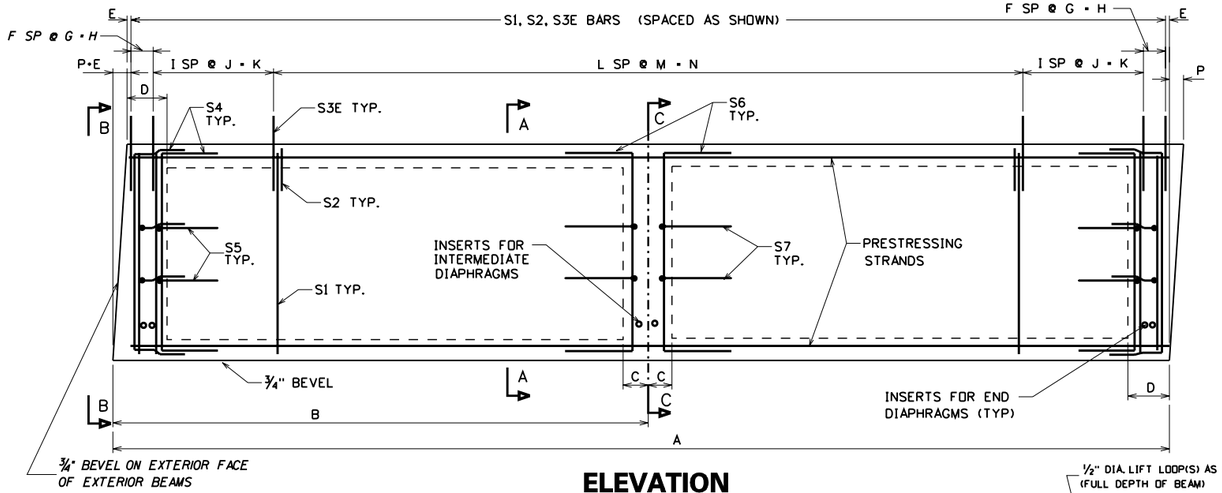
DESIGNED	DATE 12/5/06
DRAWN	
CHECKED	
REVIEWED	

42" P.C. SPREAD BOX BEAM DETAILS

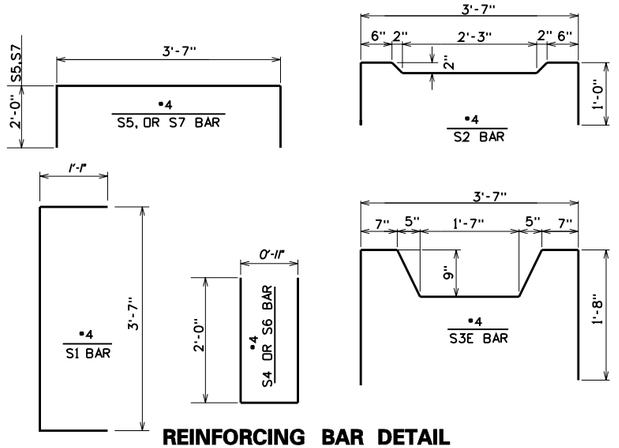
BRD-B 42X36

SHEET OF BRIDGE NO.

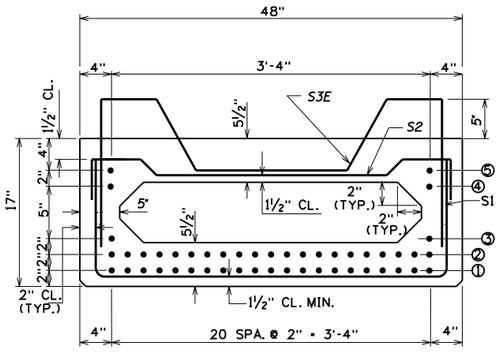
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



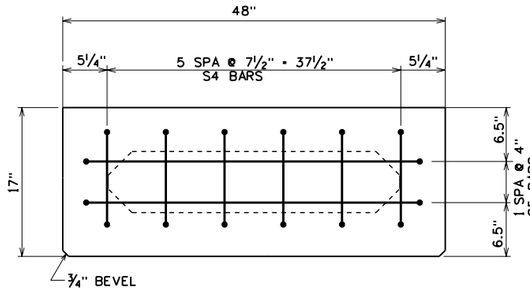
ELEVATION



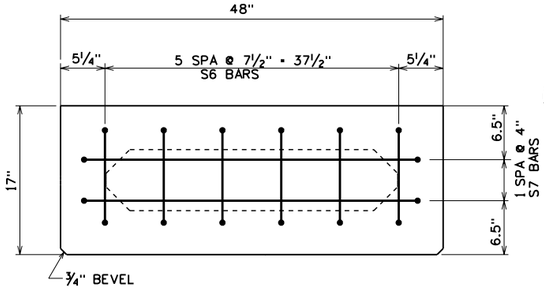
REINFORCING BAR DETAIL



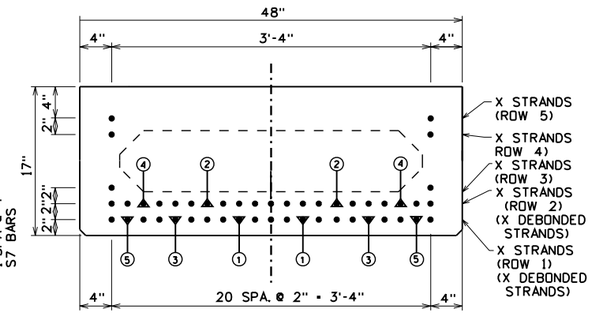
SECTION A-A
TYPICAL BEAM PRESTRESSING



SECTION B-B
TYPICAL BEAM REINFORCEMENT

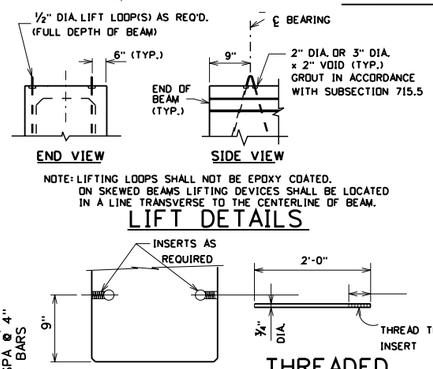


SECTION C-C
TYPICAL BEAM REINFORCEMENT



STRAND POSITIONS & DEBONDED STRANDS (ALL BEAMS)

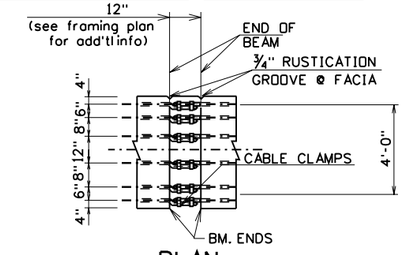
NOTE: DEBONDED STRAND PAIR POSITIONS ARE SUGGESTED AND MAY BE MOVED AS NECESSARY TO MEET DESIGN REQUIREMENTS.



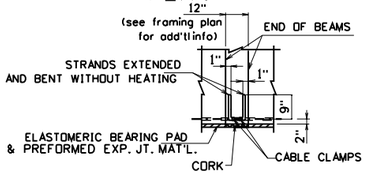
NOTE: LIFTING LOOPS SHALL NOT BE EPOXY COATED. ON SKEWED BEAMS LIFTING DEVICES SHALL BE LOCATED IN A LINE TRANSVERSE TO THE CENTERLINE OF BEAM.

LIFT DETAILS

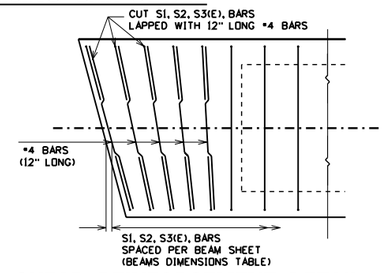
INSERT DETAIL
THREADED BAR DETAIL



PLAN

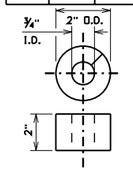


ELEVATION
STRAND SPLICING DETAILS



SHEAR REINFORCEMENT DETAIL

SKEWED BEAMS (15° SKEW OR GREATER)



LIFTING LOOP
BLOCKOUT DETAILS

NOTES:

THE CONCRETE SHALL ATTAIN A COMPRESSIVE STRENGTH OF AT LEAST XXX psi, AS SHOWN BY STANDARD CYLINDERS CURED IDENTICALLY WITH THE BEAMS, BEFORE TRANSFERRING BOND STRESS TO THE CONCRETE; OR BEFORE RELEASING THE END ANCHORS. CYLINDER STRENGTH SHALL BE XXX psi WITHIN 28 DAYS.

PRETENSIONED XXXX P. C. BOX BEAMS SHALL BE USED. APPLY AN INITIAL FORCE OF XXXX lbs TO EACH LOW-RELAXATION STRAND. THE DEPARTMENT WILL REJECT THE BEAMS IF THE FINISHED UNITS CONTAINED HONEYCOMBED CONCRETE TO THE EXTENT THAT THE ENGINEER DETERMINES THE STRENGTH OR DETERIORATION RESISTANCE IS REDUCED. BEAM SHORTENING DUE TO SHRINKING AND ELASTIC CHANGES IS LIMITED TO 0.0005L.

PRESTRESSING STRANDS SHALL BE ½" NOMINAL DIA., GRADE 270, UNCOATED SEVEN WIRE LOW-RELAXATION STRAND IN ACCORDANCE WITH AASHTO M203. THE STRANDS SHALL BE PLACED SYMMETRICALLY IN EACH LAYER. SHOP DRAWINGS SHALL SHOW THE STRAND LOCATIONS AND THE DETENSIONING PLAN BY NUMBERING THE SEQUENCE OF THE STRAND PATTERN. THE SHOP DRAWINGS SHALL ALSO SHOW THE STRAND PATTERN FOR DEBONDED STRANDS.

ROUGHEN THE TOP SURFACE OF EACH BEAM TO AN AMPLITUDE OF APPROXIMATELY ¼" AND MAINTAIN CLEAN AND FREE OF LAITANCE.

DEFORMED WIRE FABRIC IS PERMITTED INSTEAD OF REINFORCING STEEL BARS PROVIDED AN EQUAL STEEL AREA IS ATTAINED. WIRE FABRIC MUST CONFORM TO THE REQUIREMENTS OF AASHTO SECTION M225.

ALL NON-PRESTRESSING REINFORCING BARS SHALL BE GRADE 60.

ALL REINFORCING STEEL BARS DESIGNATED "E" SHALL BE EPOXY COATED.

ALL STRANDS SHALL BE ENCLOSED INSIDE STIRRUP CAGE FOR THE ENTIRE LENGTH OF BEAM.

LIFTING DEVICES SHALL BE SHOWN ON SHOP DRAWINGS FOR APPROVAL. LIFTING SHALL BE BY EQUAL LOADS TO EACH DEVICE. INCLUDE PAYMENT IN ITEM 603-01, PRESTRESSED CONCRETE BEAMS, PER FOOT.

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

MARK	NO. REQ'D.	DIMENSIONS														APPROX. WEIGHT EACH (lbs)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	

DEBONDING OF STRANDS

GROUP	NUMBER OF STRANDS EA. GROUP	HEIGHT OF STRAND (IN)	SHIELDING LENGTH FROM EA. BM. END (IN)

REINFORCING BAR LIST

MARK	TYPE	COUNT/BEAM A_1,B_1,C_1	COUNT/BEAM A_2,B_2,C_2	LENGTH
S1	BENT			
S2	BENT			
S3E	BENT			
S4	BENT			
S5	BENT			
S6	BENT			
S7	BENT			

NUMBER OF ½" DIA. - 7 WIRE STRANDS IN INDICATED ROW

MARK	BOTTOM ①	②	③	TOP ④	⑤	TOTAL NO. PER BEAM	CONCRETE STRENGTHS (psi) f'ci	f'c	INITIAL PRESTRESS FORCE/STRAND (lbs)

NO.	REVISION	DATE:	BY:

$FILENAME$ DD-MMM-YYYY HH:MM

W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

DESIGNED	DATE
DRAWN	
CHECKED	
REVIEWED	

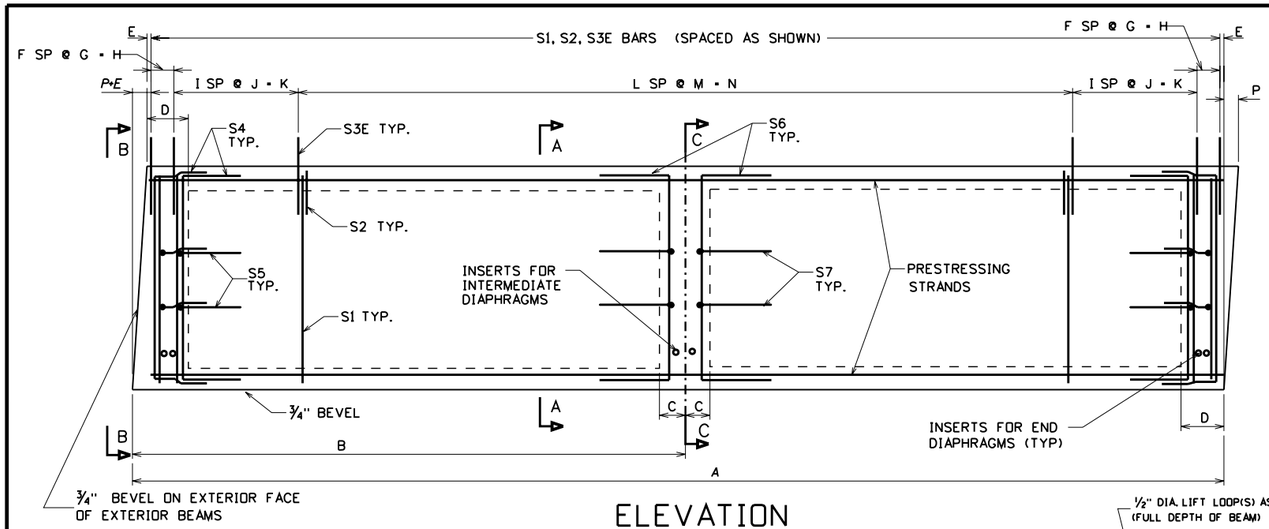
APPROVED _____ DATE _____
DIRECTOR ENGINEERING DIVISION

NOTE: DRAWINGS NOT TO SCALE

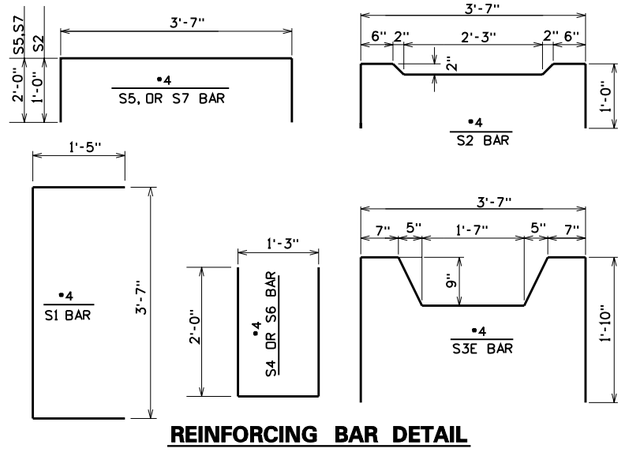
17" X 48" P.C. SPREAD BOX BEAM DETAILS BRD-B 17 X 48

SHEET OF
BRIDGE NO.

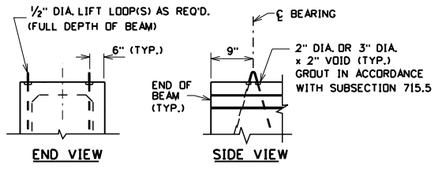
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



ELEVATION

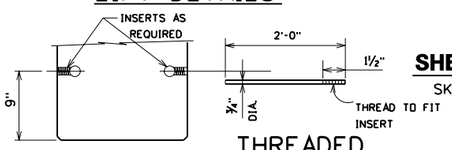


REINFORCING BAR DETAIL



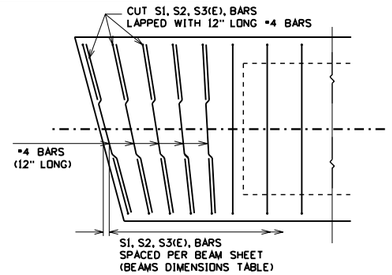
NOTE: LIFTING LOOPS SHALL NOT BE EPOXY COATED. ON SKEWED BEAMS LIFTING DEVICES SHALL BE LOCATED IN A LINE TRANSVERSE TO THE CENTERLINE OF BEAM.

LIFT DETAILS



INSERT DETAIL

THREADED BAR DETAIL



SHEAR REINFORCEMENT DETAIL

SKEWED BEAMS (15° SKEW OR GREATER)

NOTES:

THE CONCRETE SHALL ATTAIN A COMPRESSIVE STRENGTH OF AT LEAST XXX psi, AS SHOWN BY STANDARD CYLINDERS CURED IDENTICALLY WITH THE BEAMS, BEFORE TRANSFERRING BOND STRESS TO THE CONCRETE: OR BEFORE RELEASING THE END ANCHORS. CYLINDER STRENGTH SHALL BE XXX psi WITHIN 28 DAYS.

PRETENSIONED XXXX P. C. BOX BEAMS SHALL BE USED. APPLY AN INITIAL FORCE OF XXXX lbs TO EACH LOW-RELAXATION STRAND. THE DEPARTMENT WILL REJECT THE BEAMS IF THE FINISHED UNITS CONTAINED HONEYCOMBED CONCRETE TO THE EXTENT THAT THE ENGINEER DETERMINES THE STRENGTH OR DETERIORATION RESISTANCE IS REDUCED. BEAM SHORTENING DUE TO SHRINKING AND ELASTIC CHANGES IS LIMITED TO 0.0005L.

PRESTRESSING STRANDS SHALL BE ½" NOMINAL DIA., GRADE 270, UNCOATED SEVEN WIRE LOW-RELAXATION STRAND IN ACCORDANCE WITH AASHTO M203. THE STRANDS SHALL BE PLACED SYMMETRICALLY IN EACH LAYER. SHOP DRAWINGS SHALL SHOW THE STRAND LOCATIONS AND THE DETENSIONING PLAN BY NUMBERING THE SEQUENCE OF THE STRAND PATTERN. THE SHOP DRAWINGS SHALL ALSO SHOW THE STRAND PATTERN FOR DEBONDED STRANDS.

ROUGHEN THE TOP SURFACE OF EACH BEAM TO AN AMPLITUDE OF APPROXIMATELY ¼" AND MAINTAIN CLEAN AND FREE OF LAITANCE.

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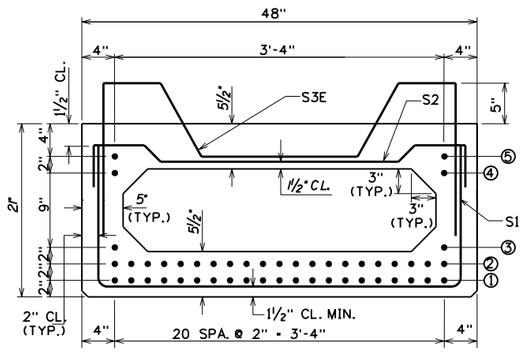
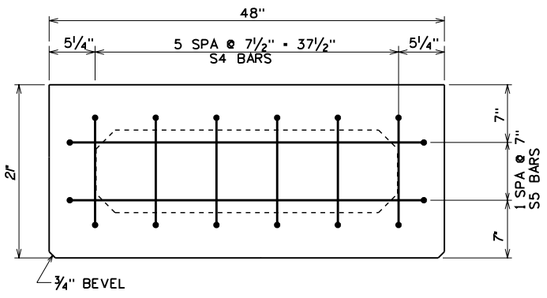
ALL REINFORCING STEEL BARS DESIGNATED "E" SHALL BE EPOXY COATED.

ALL STRANDS SHALL BE ENCLOSED INSIDE STIRRUP CAGE FOR THE ENTIRE LENGTH OF BEAM.

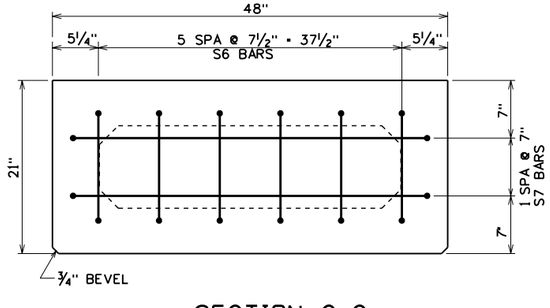
LIFTING DEVICES SHALL BE SHOWN ON SHOP DRAWINGS FOR APPROVAL. LIFTING SHALL BE BY EQUAL LOADS TO EACH DEVICE. INCLUDE PAYMENT IN ITEM 603-01, PRESTRESSED CONCRETE BEAMS, PER FOOT.



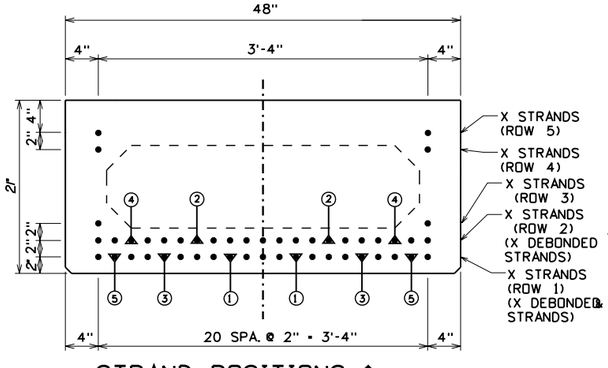
SECTION A-A
TYPICAL BEAM PRESTRESSING



SECTION B-B
TYPICAL BEAM REINFORCEMENT

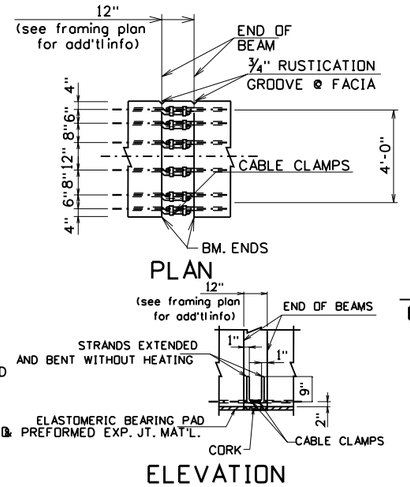


SECTION C-C
TYPICAL BEAM REINFORCEMENT

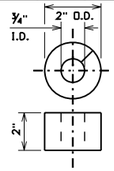


STRAND POSITIONS & DEBONDED STRANDS (ALL BEAMS)

NOTE: DEBONDED STRAND PAIR POSITIONS ARE SUGGESTED AND MAY BE MOVED AS NECESSARY TO MEET DESIGN REQUIREMENTS.



STRAND SPLICING DETAILS



LIFTING LOOP BLOCKOUT DETAILS

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

MARK	NO. REQ'D.	DIMENSIONS A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	APPROX WEIGHT EACH (lbs)

DEBONDING OF STRANDS

GROUP	NUMBER OF STRANDS EA. GROUP	HEIGHT OF STRAND (IN)	SHIELDING LENGTH FROM EA. BM. END (IN)

REINFORCING BAR LIST

MARK	TYPE	COUNT/BEAM A_1,B_1,C_1	COUNT/BEAM A_2,B_2,C_2	LENGTH
S1	BENT			
S2	BENT			
S3E	BENT			
S4	BENT			
S5	BENT			
S6	BENT			
S7	BENT			

NUMBER OF ½" DIA. - 7 WIRE STRANDS IN INDICATED ROW

MARK	BOTTOM ①	②	③	TOP ④	⑤	TOTAL NO. PER BEAM	CONCRETE STRENGTHS (psi) f'ci	f'c	INITIAL PRESTRESS FORCE/STRAND (lbs)

NO.	REVISION	DATE:	BY:

NOTE: DRAWINGS NOT TO SCALE

APPROVED Gregory Bailey DIRECTOR ENGINEERING DIVISION DATE 09/22/08

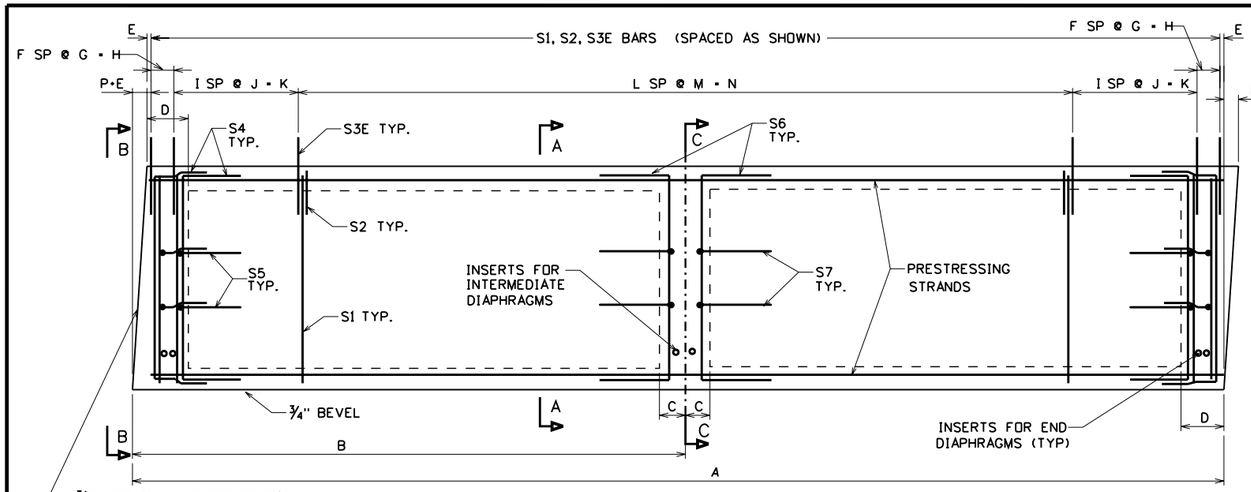
W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

DESIGNED	DATE
DRAWN	
CHECKED	
REVIEWED	

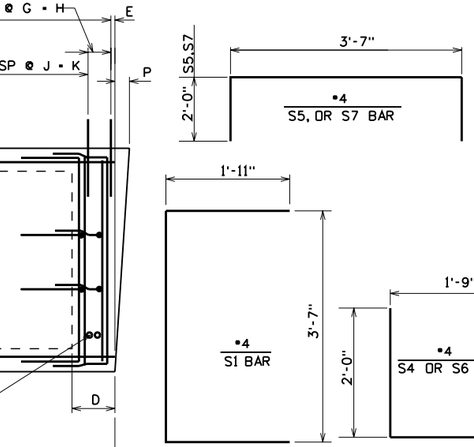
21" X 48" P.C. SPREAD BOX BEAM DETAILS BRD-B 21X48

SHEET OF
BRIDGE NO.

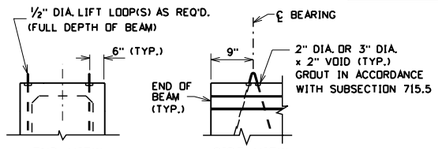
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



ELEVATION

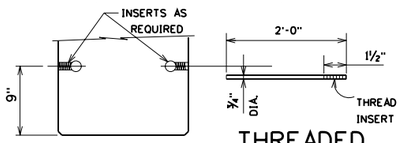


REINFORCING BAR DETAIL



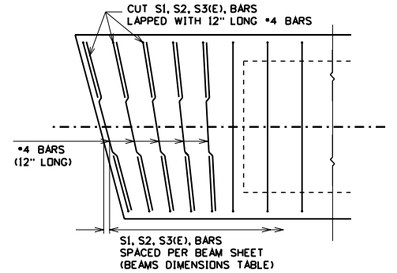
NOTE: LIFTING LOOPS SHALL NOT BE EPOXY COATED. ON SKEWED BEAMS LIFTING DEVICES SHALL BE LOCATED IN A LINE TRANSVERSE TO THE CENTERLINE OF BEAM.

LIFT DETAILS



INSERT DETAIL

THREADED BAR DETAIL



SHEAR REINFORCEMENT DETAIL

SKEWED BEAMS (15° SKEW OR GREATER)

NOTES:

THE CONCRETE SHALL ATTAIN A COMPRESSIVE STRENGTH OF AT LEAST XXX psi, AS SHOWN BY STANDARD CYLINDERS CURED IDENTICALLY WITH THE BEAMS, BEFORE TRANSFERRING BOND STRESS TO THE CONCRETE: OR BEFORE RELEASING THE END ANCHORS. CYLINDER STRENGTH SHALL BE XXX psi WITHIN 28 DAYS.

PRETENSIONED XXXX P. C. BOX BEAMS SHALL BE USED. APPLY AN INITIAL FORCE OF XXXX lbs TO EACH LOW-RELAXATION STRAND. THE DEPARTMENT WILL REJECT THE BEAMS IF THE FINISHED UNITS CONTAINED HONEYCOMBED CONCRETE TO THE EXTENT THAT THE ENGINEER DETERMINES THE STRENGTH OR DETERIORATION RESISTANCE IS REDUCED. BEAM SHORTENING DUE TO SHRINKING AND ELASTIC CHANGES IS LIMITED TO 0.0005L.

PRESTRESSING STRANDS SHALL BE 1/2" NOMINAL DIA., GRADE 270, UNCOATED SEVEN WIRE LOW-RELAXATION STRAND IN ACCORDANCE WITH AASHTO M203. THE STRANDS SHALL BE PLACED SYMMETRICALLY IN EACH LAYER. SHOP DRAWINGS SHALL SHOW THE STRAND LOCATIONS AND THE DETENSIONING PLAN BY NUMBERING THE SEQUENCE OF THE STRAND PATTERN. THE SHOP DRAWINGS SHALL ALSO SHOW THE STRAND PATTERN FOR DEBONDED STRANDS.

ROUGHEN THE TOP SURFACE OF EACH BEAM TO AN AMPLITUDE OF APPROXIMATELY 1/4" AND MAINTAIN CLEAN AND FREE OF LAITANCE.

DEFORMED WIRE FABRIC IS PERMITTED INSTEAD OF REINFORCING STEEL BARS PROVIDED AN EQUAL STEEL AREA IS ATTAINED. WIRE FABRIC MUST CONFORM TO THE REQUIREMENTS OF AASHTO SECTION M225.

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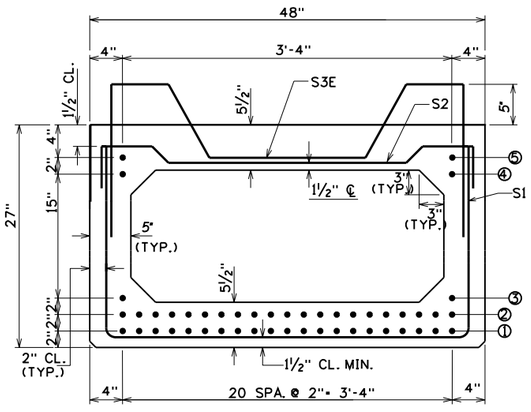
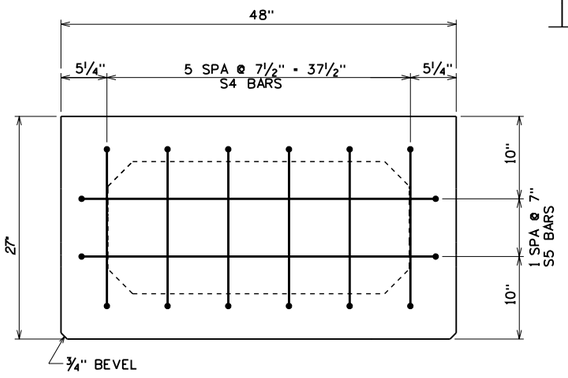
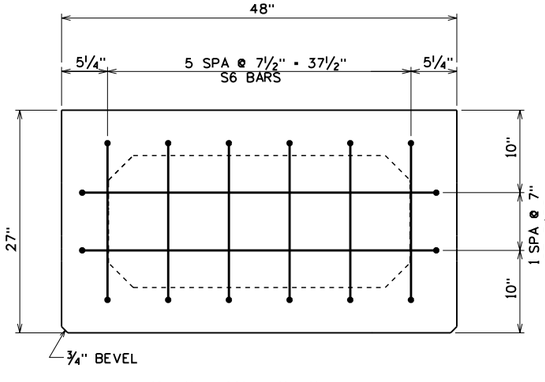


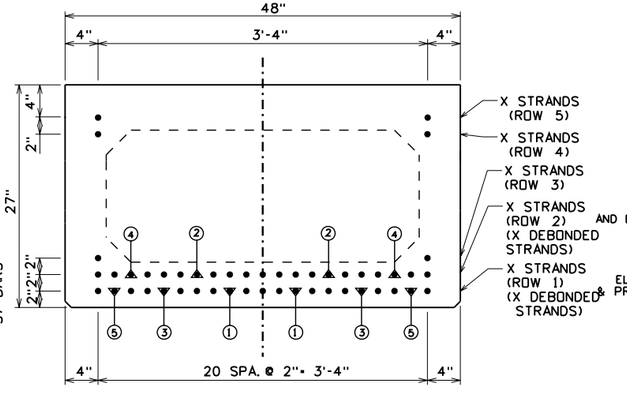
SECTION A-A
TYPICAL BEAM PRESTRESSING



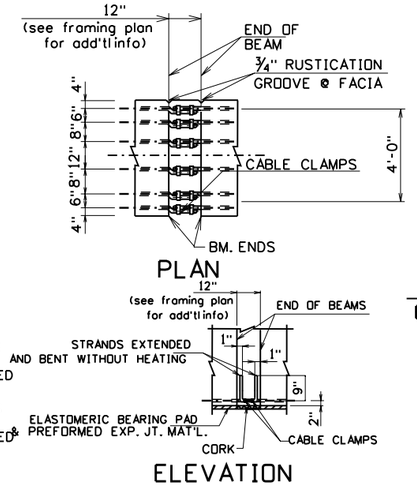
SECTION B-B
TYPICAL BEAM REINFORCEMENT



SECTION C-C
TYPICAL BEAM REINFORCEMENT

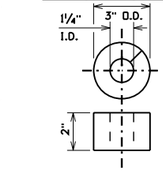


STRAND POSITIONS & DEBONDED STRANDS (ALL BEAMS)



PLAN

ELEVATION
STRAND SPLICING DETAILS



LIFTING LOOP
BLOCKOUT DETAILS

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

MARK	NO. REQ'D.	DIMENSIONS A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	APPROX. WEIGHT EACH (lbs)

DEBONDING OF STRANDS

GROUP	NUMBER OF STRANDS EA. GROUP	HEIGHT OF STRAND (IN)	SHIELDING LENGTH FROM EA. BM. END (IN)

REINFORCING BAR LIST

MARK	TYPE	COUNT/BEAM A_1,B_1,C_1	COUNT/BEAM A_2,B_2,C_2	LENGTH
S1	BENT			
S2	BENT			
S3E	BENT			
S4	BENT			
S5	BENT			
S6	BENT			
S7	BENT			

NUMBER OF 1/2" DIA. - 7 WIRE STRANDS IN INDICATED ROW

MARK	BOTTOM ①	②	③	TOP ④	⑤	TOTAL NO. PER BEAM	CONCRETE STRENGTHS (psi) f'ci	f'c	INITIAL PRESTRESS FORCE/STRAND (lbs)

NO.	REVISION	DATE:	BY:

NOTE: DRAWINGS NOT TO SCALE

NOTE: DEBONDED STRAND PAIR POSITIONS ARE SUGGESTED AND MAY BE MOVED AS NECESSARY TO MEET DESIGN REQUIREMENTS.

APPROVED Gregory Bailey DATE 09/22/08
DIRECTOR ENGINEERING DIVISION

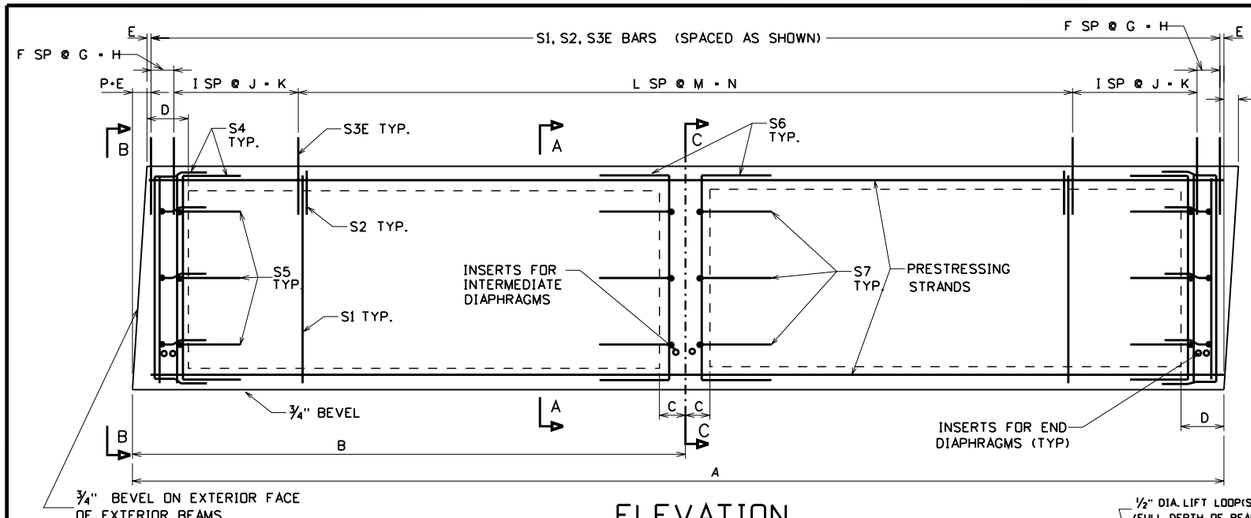
DESIGNED	DATE
DRAWN	
CHECKED	
REVIEWED	

W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

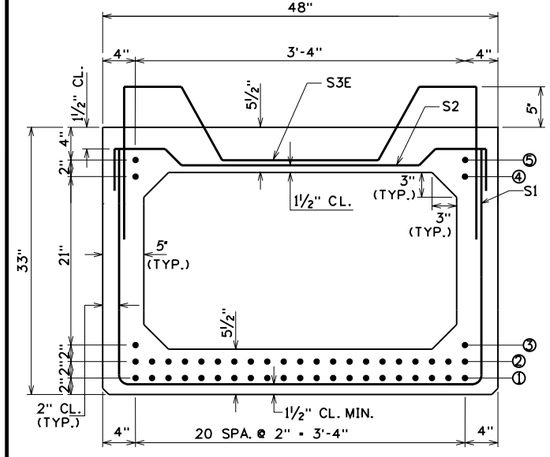
27" X 48" P.C. SPREAD BOX BEAM DETAILS
BRD-B 27X48

SHEET OF
BRIDGE NO.

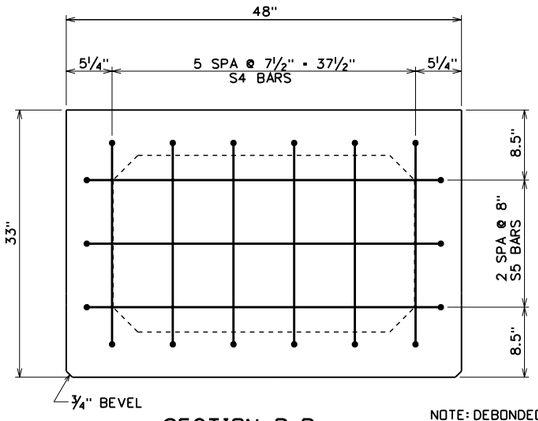
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



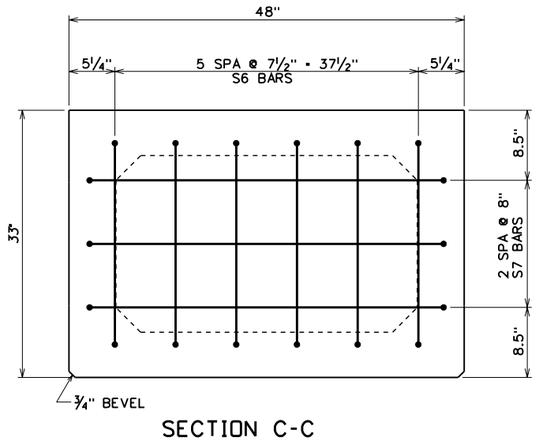
ELEVATION



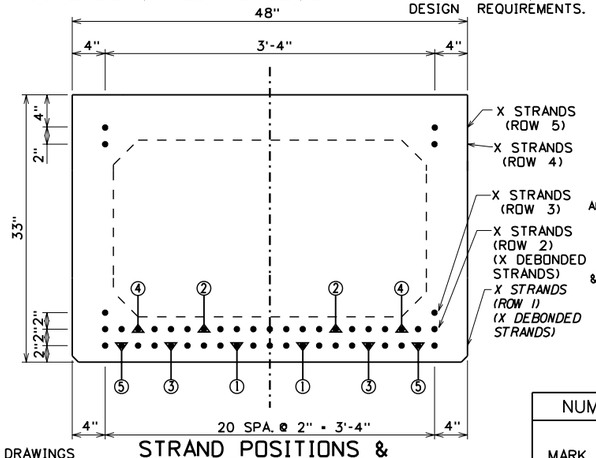
SECTION A-A
TYPICAL BEAM PRESTRESSING



SECTION B-B
TYPICAL BEAM REINFORCEMENT



SECTION C-C
TYPICAL BEAM REINFORCEMENT



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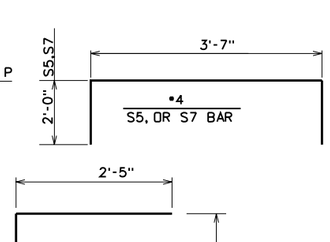
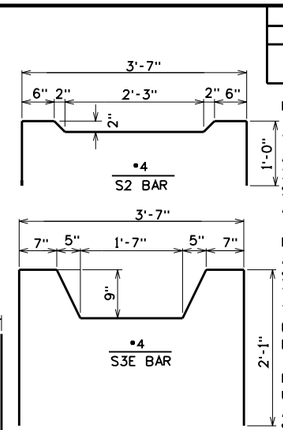
NOTE: DRAWINGS NOT TO SCALE

STRAND POSITIONS & DEBONDED STRANDS (ALL BEAMS)



REINFORCING BAR DETAIL



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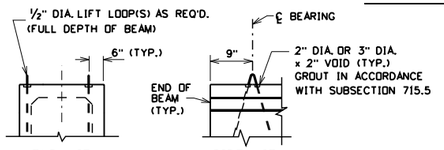
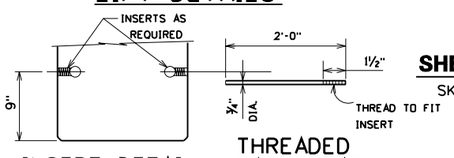
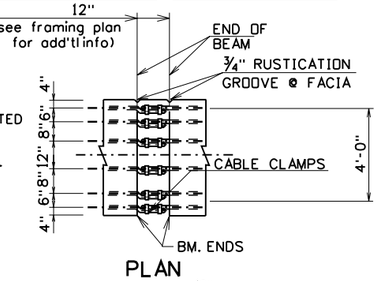


NOTE: LIFTING LOOPS SHALL NOT BE EPOXY COATED. ON SKEWED BEAMS LIFTING DEVICES SHALL BE LOCATED IN A LINE TRANSVERSE TO THE CENTERLINE OF BEAM.

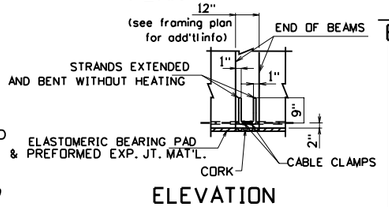
LIFT DETAILS



INSERT DETAIL — THREADED BAR DETAIL

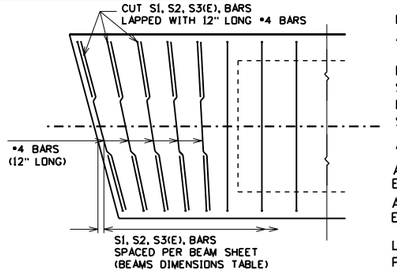


PLAN



ELEVATION

STRAND SPLICING DETAILS

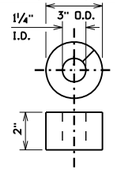


SHEAR REINFORCEMENT DETAIL

SKEWED BEAMS (15° SKEW OR GREATER)

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

MARK	NO. REQ'D.	DIMENSIONS A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	APPROX. WEIGHT EACH (lbs)



LIFTING LOOP BLOCKOUT DETAILS

DEBONDING OF STRANDS

GROUP	NUMBER OF STRANDS EA. GROUP	HEIGHT OF STRAND (IN)	SHIELDING LENGTH FROM EA. BM. END (IN)

REINFORCING BAR LIST

MARK	TYPE	COUNT/BEAM A_1,B_1,C_1	COUNT/BEAM A_2,B_2,C_2	LENGTH
S1	BENT			
S2	BENT			
S3E	BENT			
S4	BENT			
S5	BENT			
S6	BENT			
S7	BENT			

NUMBER OF ½" DIA. - 7 WIRE STRANDS IN INDICATED ROW

MARK	BOTTOM ①	②	③	TOP ④	⑤	TOTAL NO. PER BEAM	CONCRETE STRENGTHS (psi) f'ci	f'c	INITIAL PRESTRESS FORCE/STRAND (lbs)

NO.	REVISION	DATE:	BY:

APPROVED Gregg's Baily DATE 09/22/08
DIRECTOR ENGINEERING DIVISION

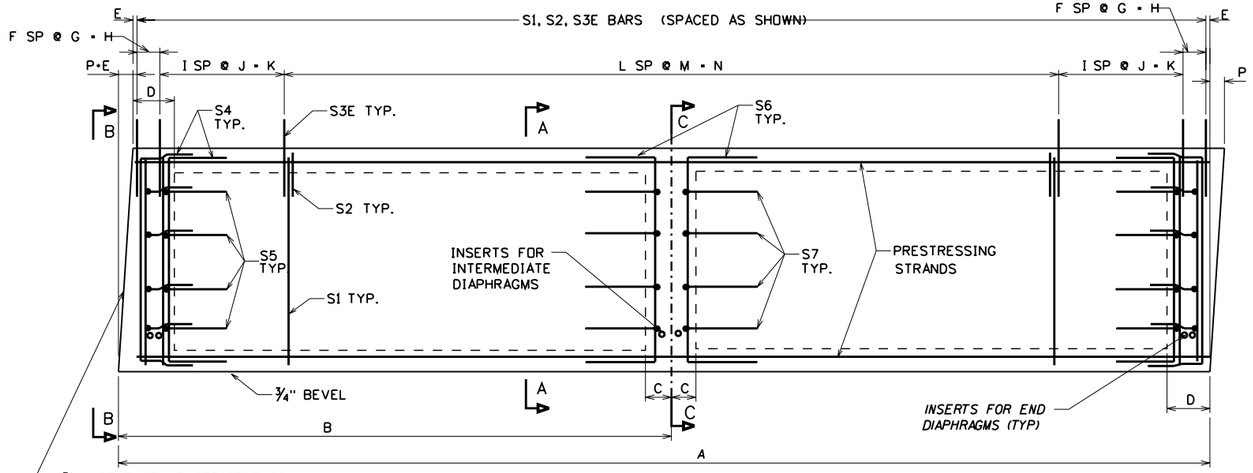
W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

DESIGNED	DATE
DRAWN	
CHECKED	
REVIEWED	

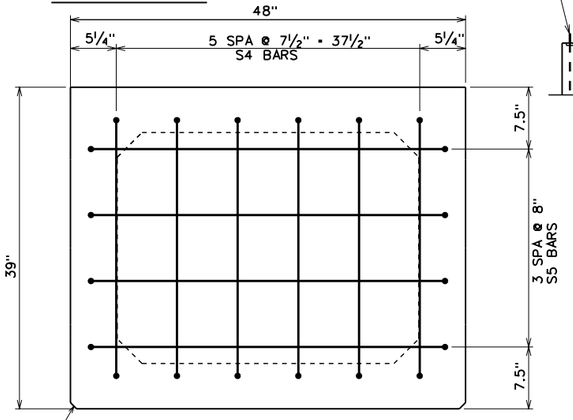
33" X 48" P.C. SPREAD BOX BEAM DETAILS
BRD-B 33X48

SHEET OF
BRIDGE NO.

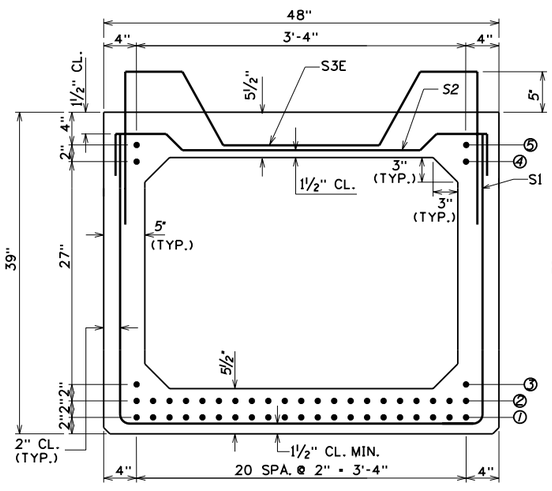
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



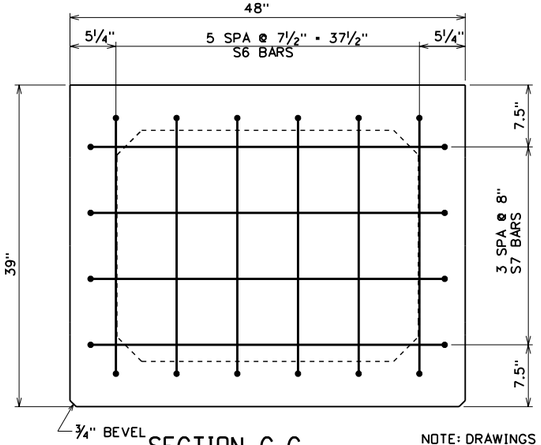
ELEVATION



SECTION B-B
TYPICAL BEAM REINFORCEMENT

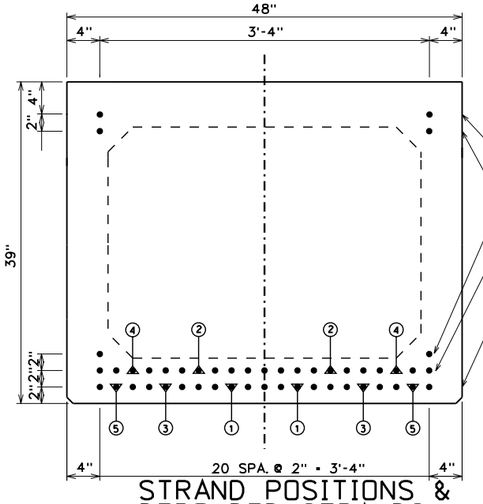


SECTION A-A
TYPICAL BEAM PRESTRESSING



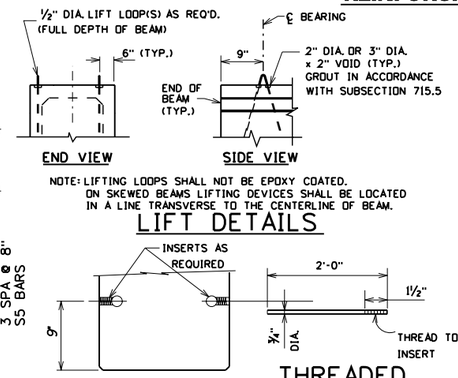
SECTION C-C
TYPICAL BEAM REINFORCEMENT

NOTE: DRAWINGS NOT TO SCALE



STRAND POSITIONS & DEBONDED STRANDS (ALL BEAMS)

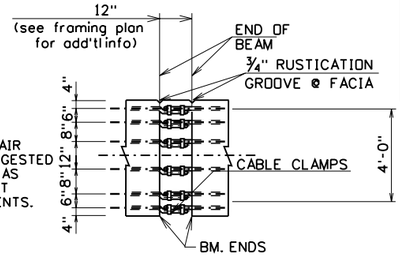
NOTE: DEBONDED STRAND PAIR POSITIONS ARE SUGGESTED AND MAY BE MOVED AS NECESSARY TO MEET DESIGN REQUIREMENTS.



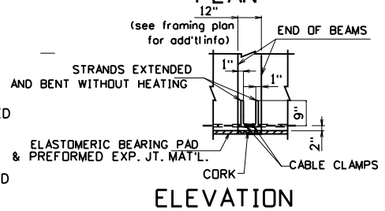
NOTE: LIFTING LOOPS SHALL NOT BE EPOXY COATED. ON SKEWED BEAMS LIFTING DEVICES SHALL BE LOCATED IN A LINE TRANSVERSE TO THE CENTERLINE OF BEAM.

LIFT DETAILS

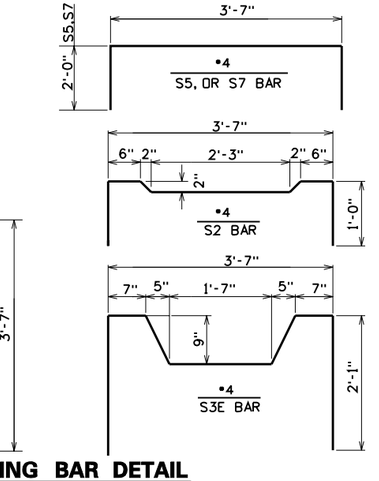
INSERT DETAIL THREADED BAR DETAIL



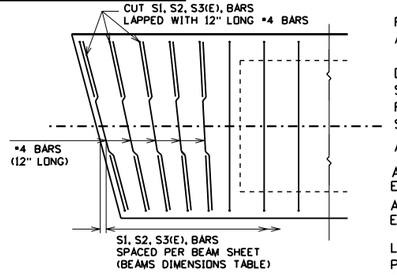
PLAN



ELEVATION
STRAND SPLICING DETAILS



REINFORCING BAR DETAIL



SHEAR REINFORCEMENT DETAIL

SKEWED BEAMS (15° SKEW OR GREATER)

NOTES:

THE CONCRETE SHALL ATTAIN A COMPRESSIVE STRENGTH OF AT LEAST XXX psi, AS SHOWN BY STANDARD CYLINDERS CURED IDENTICALLY WITH THE BEAMS, BEFORE TRANSFERRING BOND STRESS TO THE CONCRETE: OR BEFORE RELEASING THE END ANCHORS. CYLINDER STRENGTH SHALL BE XXX psi WITHIN 28 DAYS.

PRETENSIONED XXXX P. C. BOX BEAMS SHALL BE USED. APPLY AN INITIAL FORCE OF XXXX lbs TO EACH LOW-RELAXATION STRAND. THE DEPARTMENT WILL REJECT THE BEAMS IF THE FINISHED UNITS CONTAINED HONEYCOMBED CONCRETE TO THE EXTENT THAT THE ENGINEER DETERMINES THE STRENGTH OR DETERIORATION RESISTANCE IS REDUCED. BEAM SHORTENING DUE TO SHRINKING AND ELASTIC CHANGES IS LIMITED TO 0.0005L.

PRESTRESSING STRANDS SHALL BE 1/2" NOMINAL DIA., GRADE 270, UNCOATED SEVEN WIRE LOW-RELAXATION STRAND IN ACCORDANCE WITH AASHTO M203. THE STRANDS SHALL BE PLACED SYMMETRICALLY IN EACH LAYER. SHOP DRAWINGS SHALL SHOW THE STRAND LOCATIONS AND THE DETENSIONING PLAN BY NUMBERING THE SEQUENCE OF THE STRAND PATTERN. THE SHOP DRAWINGS SHALL ALSO SHOW THE STRAND PATTERN FOR DEBONDED STRANDS.

ROUGHEN THE TOP SURFACE OF EACH BEAM TO AN AMPLITUDE OF APPROXIMATELY 1/4" AND MAINTAIN CLEAN AND FREE OF LAITANCE.

DEFORMED WIRE FABRIC IS PERMITTED INSTEAD OF REINFORCING STEEL BARS PROVIDED AN EQUAL STEEL AREA IS ATTAINED. WIRE FABRIC MUST CONFORM TO THE REQUIREMENTS OF AASHTO SECTION M225.

ALL NON-PRESTRESSING REINFORCING BARS SHALL BE GRADE 60.

ALL REINFORCING STEEL BARS DESIGNATED "E" SHALL BE EPOXY COATED.

ALL STRANDS SHALL BE ENCLOSED INSIDE STIRRUP CAGE FOR THE ENTIRE LENGTH OF BEAM.

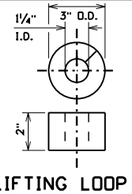
LIFTING DEVICES SHALL BE SHOWN ON SHOP DRAWINGS FOR APPROVAL. LIFTING SHALL BE BY EQUAL LOADS TO EACH DEVICE. INCLUDE PAYMENT IN ITEM 603-01, PRESTRESSED CONCRETE BEAMS, PER FOOT.

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

MARK	NO. REQ'D.	DIMENSIONS A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	APPROX. WEIGHT EACH (lbs)

DEBONDING OF STRANDS

GROUP	NUMBER OF STRANDS EA. GROUP	HEIGHT OF STRAND (IN)	SHIELDING LENGTH FROM EA. BM. END (IN)



LIFTING LOOP BLOCKOUT DETAILS

REINFORCING BAR LIST

MARK	TYPE	COUNT/BEAM A_1,B_1,C_1	COUNT/BEAM A_2,B_2,C_2	LENGTH
S1	BENT			
S2	BENT			
S3E	BENT			
S4	BENT			
S5	BENT			
S6	BENT			
S7	BENT			

NUMBER OF 1/2" DIA. - 7 WIRE STRANDS IN INDICATED ROW

MARK	BOTTOM ①	②	③	TOP ④	⑤	TOTAL NO. PER BEAM	CONCRETE STRENGTHS (psi) f'ci	f'c	INITIAL PRESTRESS FORCE/STRAND (lbs)

APPROVED Gregory Bailey DIRECTOR ENGINEERING DIVISION DATE 09/22/08

NO.	REVISION	DATE:	BY:

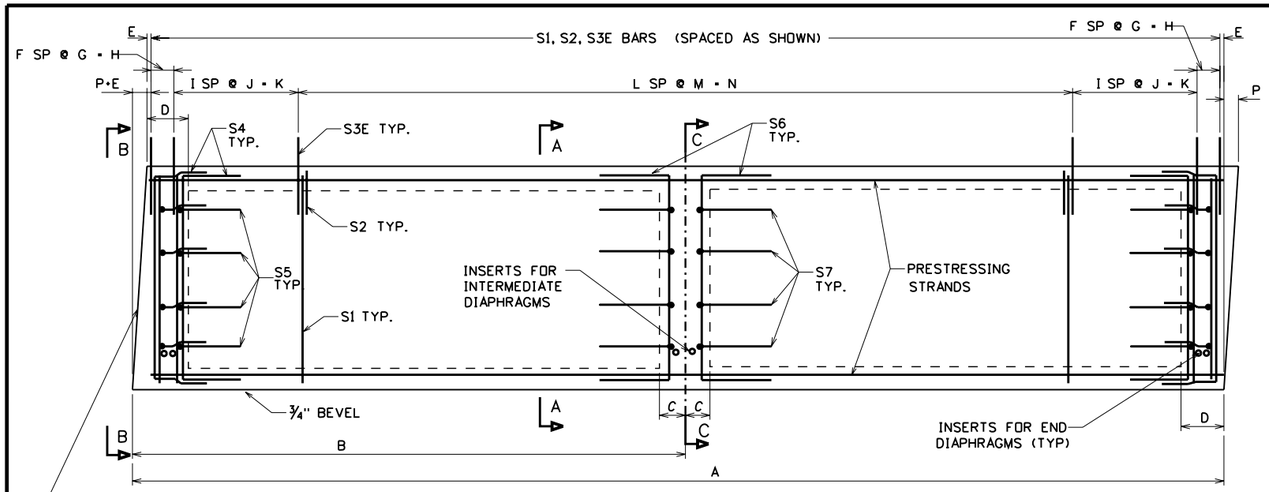
W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

DESIGNED	DATE
DRAWN	
CHECKED	
REVIEWED	

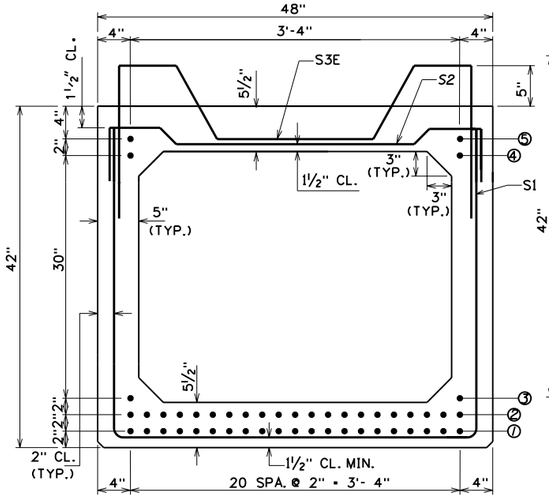
39" X 48" P.C. SPREAD BOX BEAM DETAILS
BRD-B 39X48

SHEET OF
BRIDGE NO.

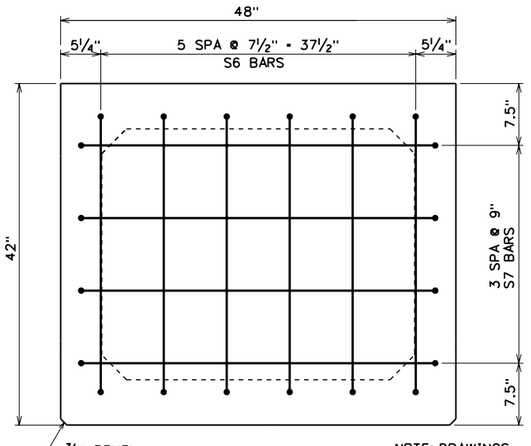
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



ELEVATION

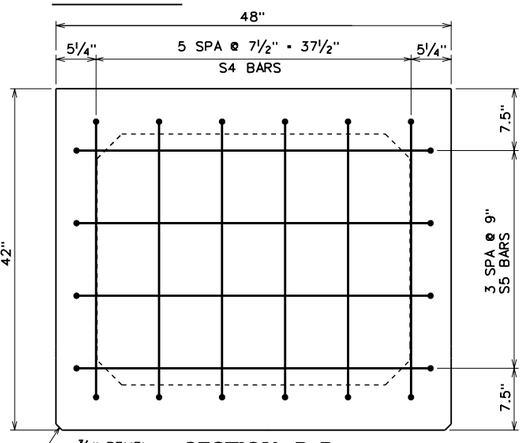


SECTION A–A
TYPICAL BEAM PRESTRESSING

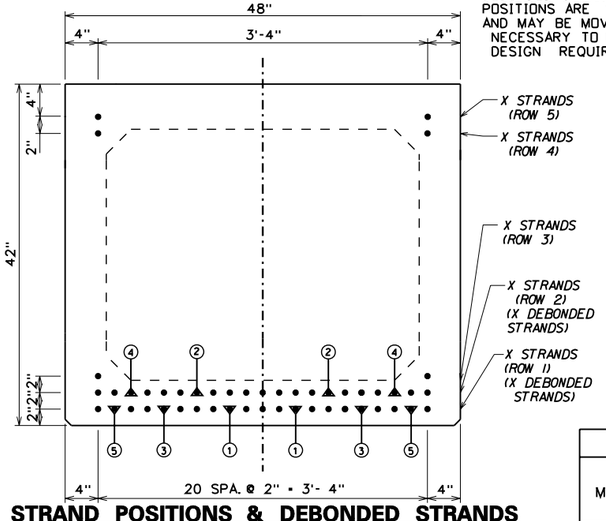


NOTE: DRAWINGS NOT TO SCALE

SECTION C–C
TYPICAL BEAM REINFORCEMENT

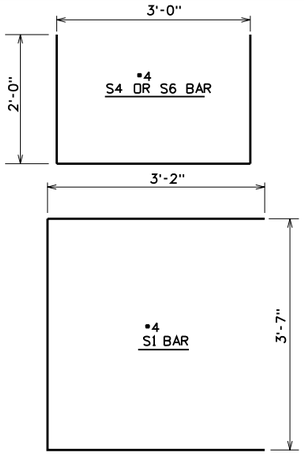


SECTION B–B
TYPICAL BEAM REINFORCEMENT

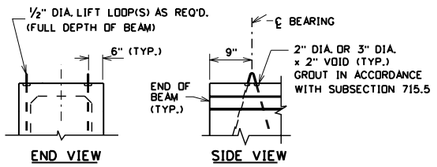


STRAND POSITIONS & DEBONDED STRANDS (ALL BEAMS)

NOTE: DEBONDED STRAND PAIR POSITIONS ARE SUGGESTED AND MAY BE MOVED AS NECESSARY TO MEET DESIGN REQUIREMENTS.

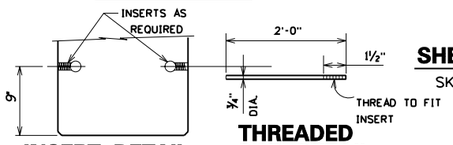


REINFORCING BAR DETAIL

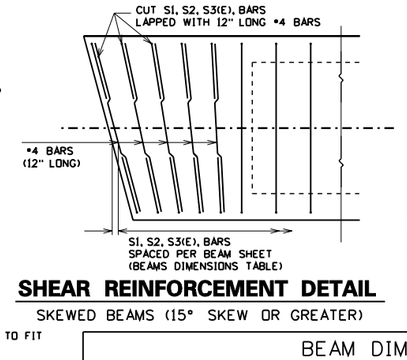


NOTE: LIFTING LOOPS SHALL NOT BE EPOXY COATED. ON SKEWED BEAMS LIFTING DEVICES SHALL BE LOCATED IN A LINE TRANSVERSE TO THE CENTERLINE OF BEAM.

LIFT DETAILS



INSERT DETAIL
THREADED BAR DETAIL



SHEAR REINFORCEMENT DETAIL

SKEWED BEAMS (15° SKEW OR GREATER)

NOTES:

THE CONCRETE SHALL ATTAIN A COMPRESSIVE STRENGTH OF AT LEAST XXX psi, AS SHOWN BY STANDARD CYLINDERS CURED IDENTICALLY WITH THE BEAMS, BEFORE TRANSFERRING BOND STRESS TO THE CONCRETE: OR BEFORE RELEASING THE END ANCHORS. CYLINDER STRENGTH SHALL BE XXX psi WITHIN 28 DAYS.

PRETENSIONED XXXX P. C. BOX BEAMS SHALL BE USED. APPLY AN INITIAL FORCE OF XXXX lbs TO EACH LOW-RELAXATION STRAND. THE DEPARTMENT WILL REJECT THE BEAMS IF THE FINISHED UNITS CONTAINED HONEYCOMBED CONCRETE TO THE EXTENT THAT THE ENGINEER DETERMINES THE STRENGTH OR DETERIORATION RESISTANCE IS REDUCED. BEAM SHORTENING DUE TO SHRINKING AND ELASTIC CHANGES IS LIMITED TO 0.0005L.

PRESTRESSING STRANDS SHALL BE ½" NOMINAL DIA., GRADE 270, UNCOATED SEVEN WIRE LOW-RELAXATION STRAND IN ACCORDANCE WITH AASHTO M203. THE STRANDS SHALL BE PLACED SYMMETRICALLY IN EACH LAYER. SHOP DRAWINGS SHALL SHOW THE STRAND LOCATIONS AND THE DETENSIONING PLAN BY NUMBERING THE SEQUENCE OF THE STRAND PATTERN. THE SHOP DRAWINGS SHALL ALSO SHOW THE STRAND PATTERN FOR DEBONDED STRANDS.

ROUGHEN THE TOP SURFACE OF EACH BEAM TO AN AMPLITUDE OF APPROXIMATELY ¼" AND MAINTAIN CLEAN AND FREE OF LAITANCE.

DEFORMED WIRE FABRIC IS PERMITTED INSTEAD OF REINFORCING STEEL BARS PROVIDED AN EQUAL STEEL AREA IS ATTAINED. WIRE FABRIC MUST CONFORM TO THE REQUIREMENTS OF AASHTO SECTION M225.

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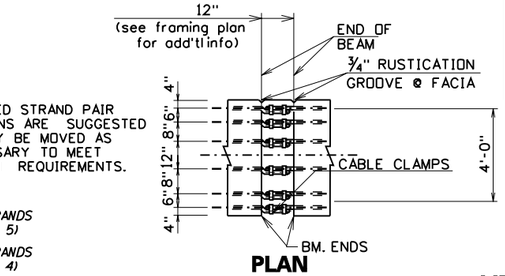
ALL REINFORCING STEEL BARS DESIGNATED "E" SHALL BE EPOXY COATED.

ALL STRANDS SHALL BE ENCLOSED INSIDE STIRRUP CAGE FOR THE ENTIRE LENGTH OF BEAM.

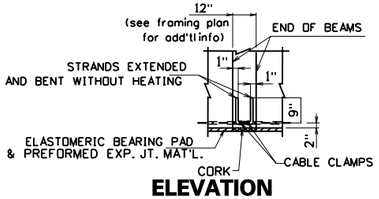
LIFTING DEVICES SHALL BE SHOWN ON SHOP DRAWINGS FOR APPROVAL. LIFTING SHALL BE BY EQUAL LOADS TO EACH DEVICE. INCLUDE PAYMENT IN ITEM 603-01, PRESTRESSED CONCRETE BEAMS, PER FOOT.

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

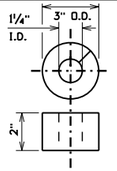
MARK	NO. REQ'D.	DIMENSIONS A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	APPROX. WEIGHT EACH (lbs)



PLAN



ELEVATION
STRAND SPLICING DETAILS



LIFTING LOOP BLOCKOUT DETAILS

DEBONDING OF STRANDS			
GROUP	NUMBER OF STRANDS EA. GROUP	HEIGHT OF STRAND (IN)	SHIELDING LENGTH FROM EA. BM. END (IN)

REINFORCING BAR LIST				
MARK	TYPE	COUNT/BEAM A_1,B_1,C_1	COUNT/BEAM A_2,B_2,C_2	LENGTH
S1	BENT			
S2	BENT			
S3E	BENT			
S4	BENT			
S5	BENT			
S6	BENT			
S7	BENT			

NUMBER OF ½" DIA. - 7 WIRE STRANDS IN INDICATED ROW									
MARK	BOTTOM ①	②	③	TOP ④	⑤	TOTAL NO. PER BEAM	CONCRETE STRENGTHS (psi) f'ci	f'c	INITIAL PRESTRESS FORCE/STRAND (lbs)

NO.	REVISION	DATE:	BY:

APPROVED Gregg's Bailey DIRECTOR ENGINEERING DIVISION DATE 09/22/08

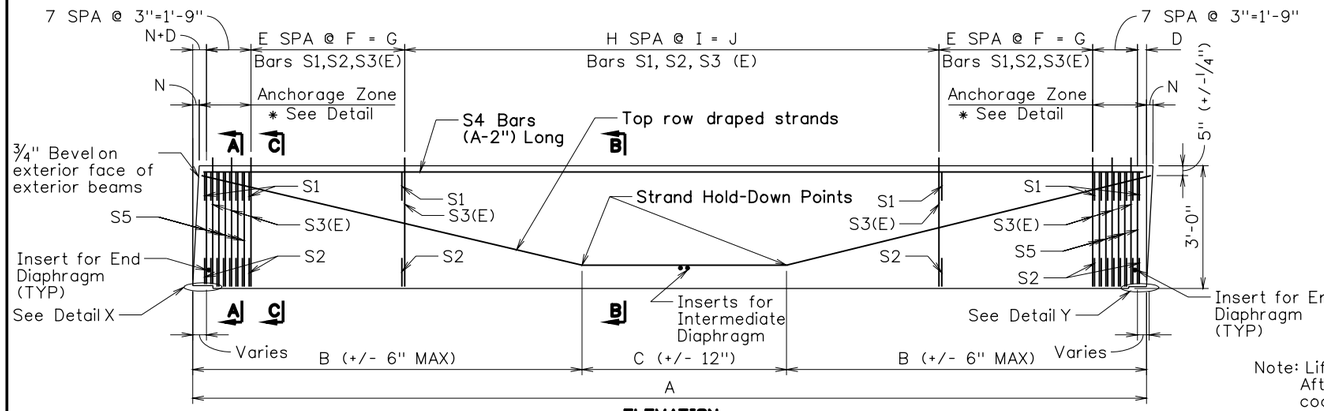
DESIGNED	DATE
DRAWN	
CHECKED	
REVIEWED	

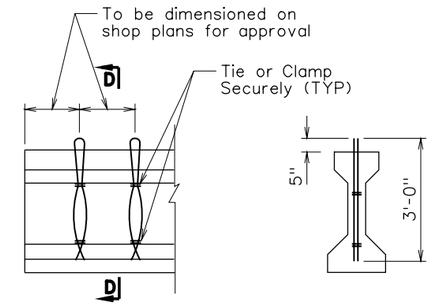
W. VA. DEPARTMENT OF HIGHWAYS
ENGINEERING DIVISION

42" X 48" P.C. SPREAD BOX BEAM DETAILS
BRD–B 42X48

SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				





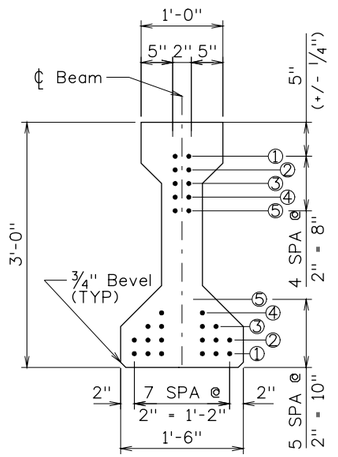
Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.

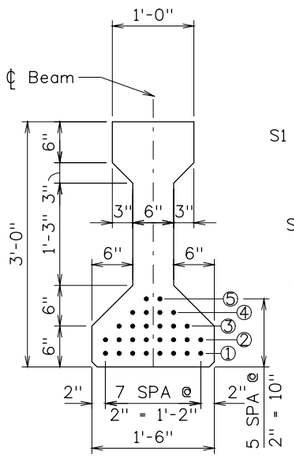
NOTES:

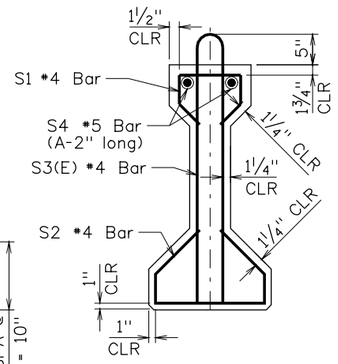
1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
3. Roughen the top surface of each beam to an amplitude of approximately 1/4 inch and maintain clean and free of laitance.
4. Shop drawings shall show the detensioning plan by numbering the sequence of the strand pattern.
5. Prestressing strands shall be stabilized strand (1/2 inch nominal diameter) low relaxation uncoated seven wire strand in accordance with AASHTO M 203 grade 270. An initial stress of 202.5 psi shall be applied to the strand
6. Uncoated seven wire stress relieved strand may be substituted. However, if the Contractor chooses this alternate, he shall provide the design for the stress relieved strand and shall revise the original plans to reflect these changes. This design and plan modification shall be made at the Contractor's expense.
7. Deformed wire fabric is permitted instead of reinforcing steel bars provided an equal steel area is provided. Wire fabric must conform to the requirements of AASHTO Section M225.
8. The Elastomeric bearing pads under the prestressed beams shall conform to AASHTO Division 2, Section 18 Duro 60. Section 18.2.3.2 specifies laminate material to be:

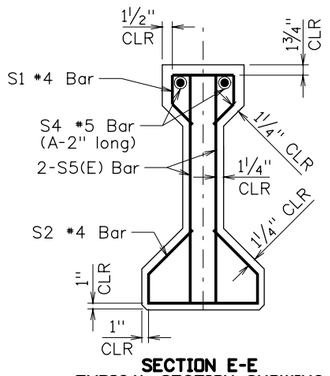
   ASTM A245
   ASTM A570, Grade 36

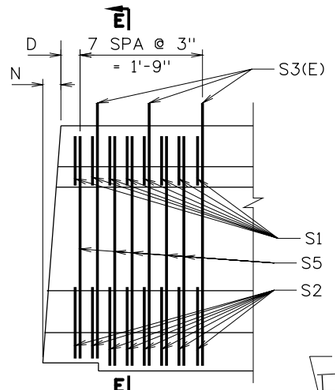
9. Payment for Elastomeric bearing pads and any preformed joint material specified shall be included in Item 603-01. See pier & abutment sheets for details.
10. The threaded inserts shall have a minimum safe work load of 2500 lb in tension. All inserts shall be plugged to prevent concrete intrusion. Omit inserts on exterior face of exterior beams.
11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.

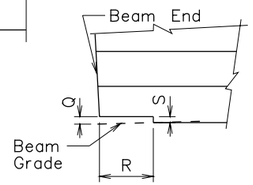


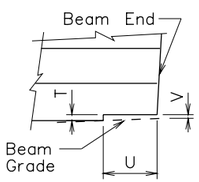












REINFORCING BAR LIST

MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

REINFORCING BAR LIST

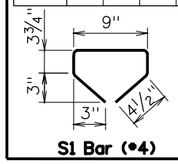
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			

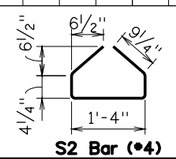
BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

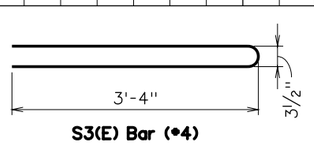
MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	

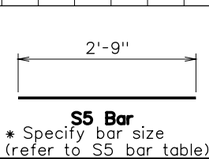
NUMBER OF 1/2" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

MARK	MIDSPAN (SECTION B-B) BOTTOM								END (SECTION A-A) BOTTOM								END (SECTION A-A) TOP								TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧		f'ci	f'c	



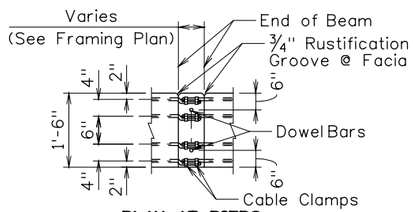


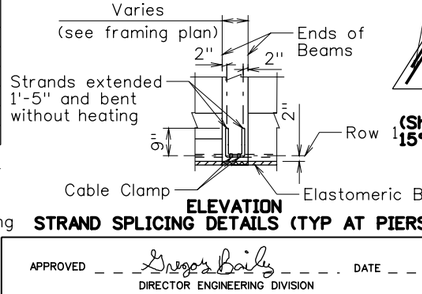


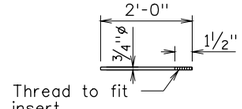


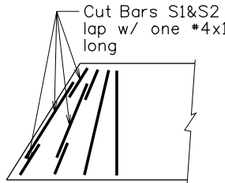
Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

(E) denotes epoxy coated reinforcing steel bars









BEARING PADS

NO.	DESCRIPTION	LOCATION

NO.	REVISION	DATE:	BY:

APPROVED Gregory Bailey DIRECTOR ENGINEERING DIVISION DATE

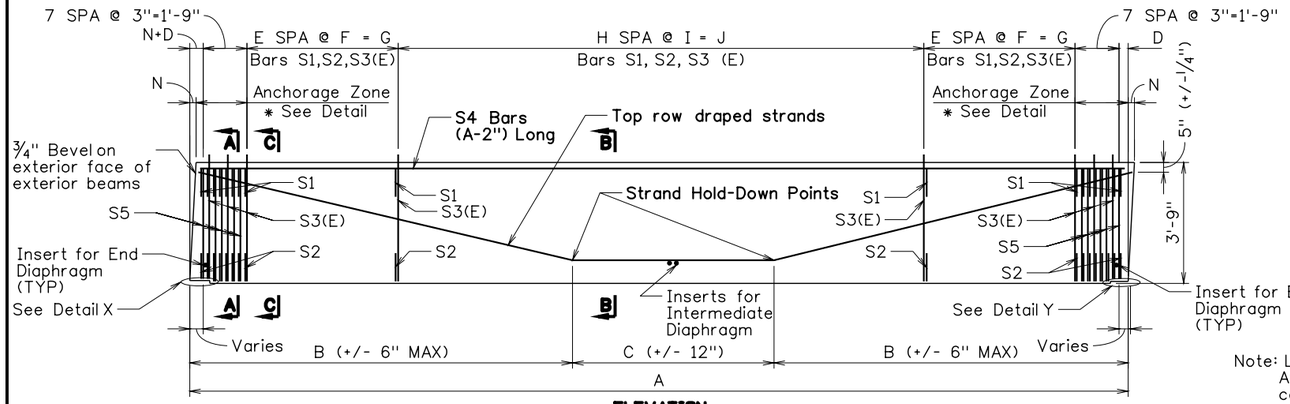
DESIGNED	DATE
DRAWN	
CHECKED	
REVIEWED	

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

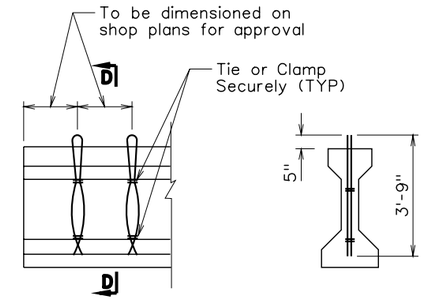
AASHTO TYPE II
36" PRECAST CONC. BEAM
BRD-II 36X12

SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



ELEVATION



LIFTING DEVICE

SECTION D-D

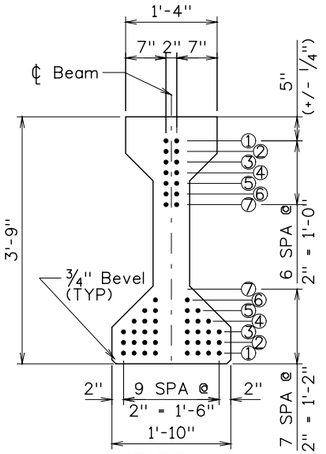
Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.

NOTES:

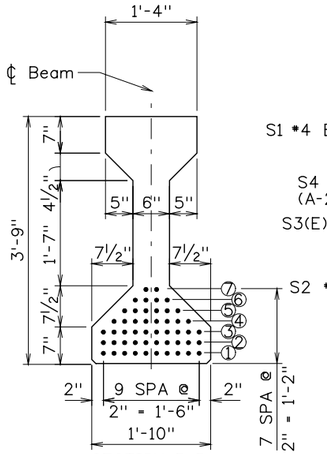
1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
3. Roughen the top surface of each beam to an amplitude of approximately 1/4 inch and maintain clean and free of laitance.
4. Shop drawings shall show the detensioning plan by numbering the sequence of the strand pattern.
5. Prestressing strands shall be stabilized strand (1/2 inch nominal diameter) low relaxation uncoated seven wire strand in accordance with AASHTO M 203 grade 270. An initial stress of 202.5 psi shall be applied to the strand
6. Uncoated seven wire stress relieved strand may be substituted. However, if the Contractor chooses this alternate, he shall provide the design for the stress relieved strand and shall revise the original plans to reflect these changes. This design and plan modification shall be made at the Contractor's expense.
7. Deformed wire fabric is permitted instead of reinforcing steel bars provided an equal steel area is provided. Wire fabric must conform to the requirements of AASHTO Section M225.
8. The Elastomeric bearing pads under the prestressed beams shall conform to AASHTO Division 2, Section 18 Duro 60. Section 18.2.3.2 specifies laminate material to be:

   ASTM A245
   ASTM A570, Grade 36

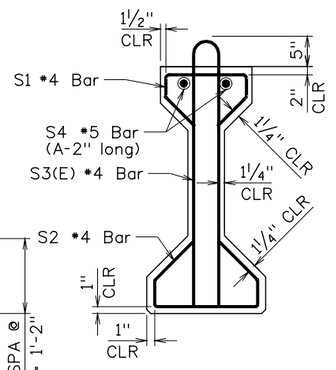
9. Payment for Elastomeric bearing pads and any preformed joint material specified shall be included in Item 603-01. See pier & abutment sheets for details.
10. The threaded inserts shall have a minimum safe work load of 2500 lb in tension. All inserts shall be plugged to prevent concrete intrusion. Omit inserts on exterior face of exterior beams.
11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.



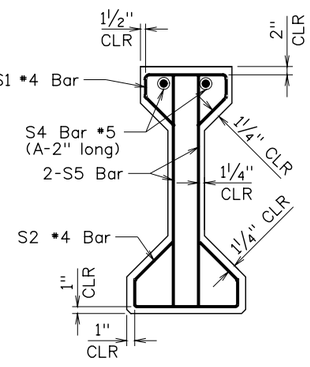
SECTION A-A



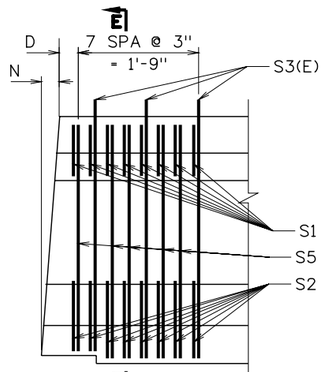
SECTION B-B



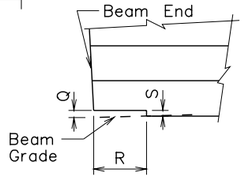
SECTION C-C
TYPICAL SECTION SHOWING STEEL REINFORCEMENT



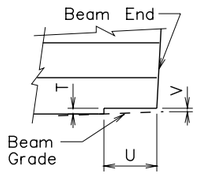
SECTION E-E
TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE



ANCHORAGE REINFORCEMENT



DETAIL "X"

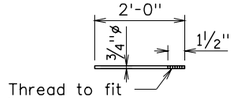


DETAIL "Y"

REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			

INSERT DETAIL



THREADED ANCHOR BAR DETAIL

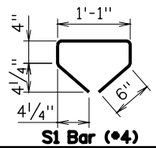
BEARING PADS		
NO.	DESCRIPTION	LOCATION

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

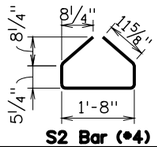
MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V

NUMBER OF 1/2" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

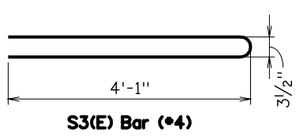
MARK	MIDSPAN (SECTION B-B)								END (SECTION A-A)																TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								BOTTOM								TOP											
	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧		f'ci	f'c	



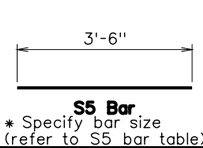
S1 Bar (#4)



S2 Bar (#4)



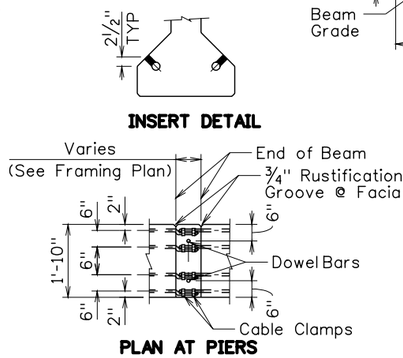
S3(E) Bar (#4)



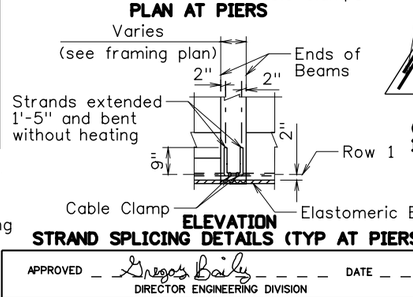
S5 Bar
* Specify bar size (refer to S5 bar table)

Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

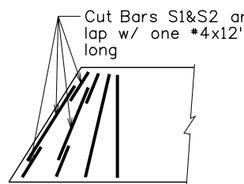
(E) denotes epoxy coated reinforcing steel bars



PLAN AT PIERS



ELEVATION
STRAND SPLICING DETAILS (TYP AT PIERS)



PART PLAN
(Showing skewed end, 15° skew or greater)

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

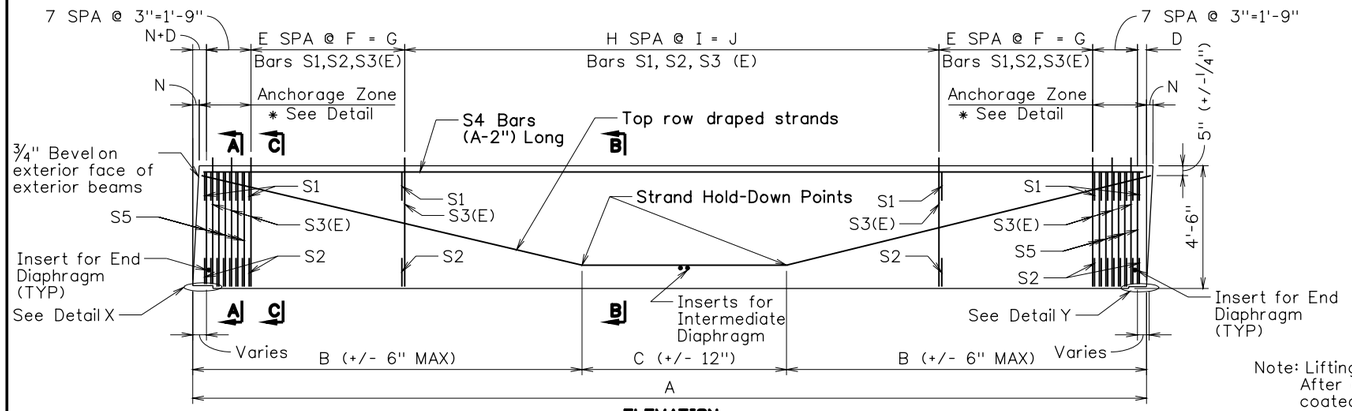
DESIGNED	DATE 12/5/06
DRAWN	
CHECKED	
REVIEWED	

APPROVED _ Gregory Bailey _ DATE _ 12/18/06 _
DIRECTOR ENGINEERING DIVISION

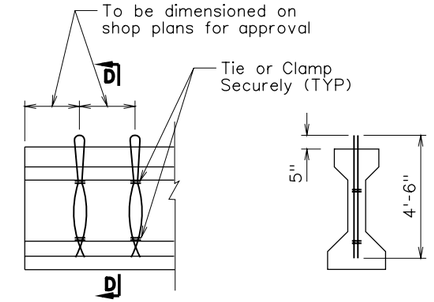
AASHTO TYPE III
45" PRECAST CONC. BEAM
BRD-III 45X16

SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



ELEVATION



LIFTING DEVICE

SECTION D-D

Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.

NOTES:

1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
3. Roughen the top surface of each beam to an amplitude of approximately 1/4 inch and maintain clean and free of laitance.
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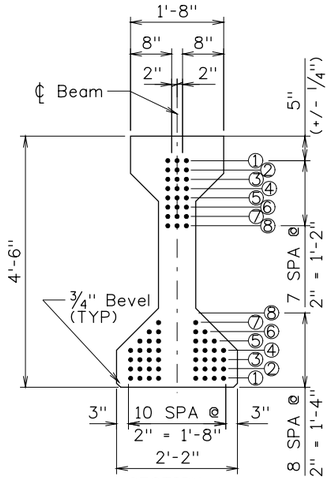
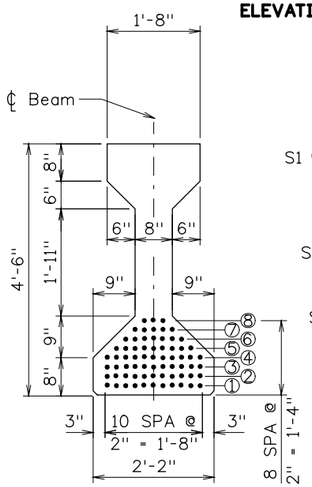
8. The Elastomeric bearing pads under the prestressed beams shall conform to AASHTO Division 2, Section 18 Duro 60. Section 18.2.3.2 specifies laminate material to be:

   ASTM A245
   ASTM A570, Grade 36

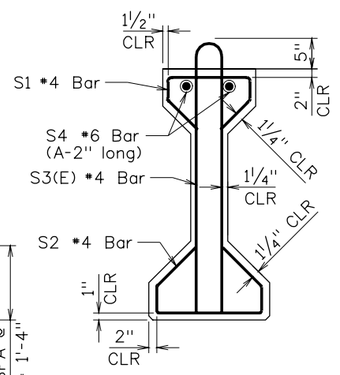
9. Payment for Elastomeric bearing pads and any preformed joint material specified shall be included in Item 603-01. See pier & abutment sheets for details.
10. The threaded inserts shall have a minimum safe work load of 2500 lb in tension. All inserts shall be plugged to prevent concrete intrusion. Omit inserts on exterior face of exterior beams.
11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.



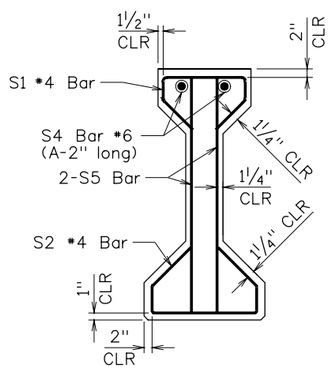
SECTION A-A



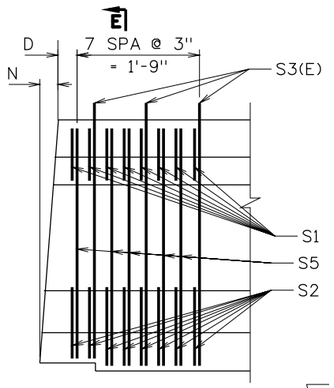
SECTION B-B



SECTION C-C
TYPICAL SECTION SHOWING STEEL REINFORCEMENT

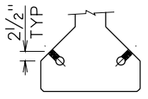


SECTION E-E
TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE

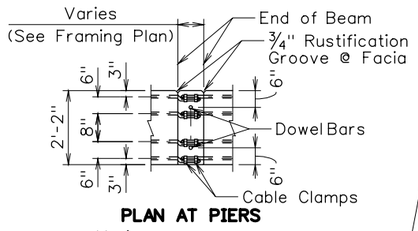


E

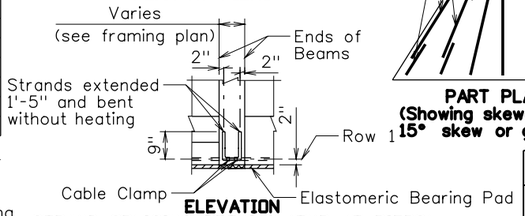
ANCHORAGE REINFORCEMENT



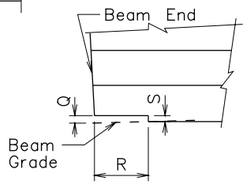
INSERT DETAIL



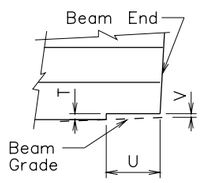
PLAN AT PIERS



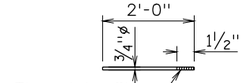
ELEVATION
STRAND SPLICING DETAILS (TYP AT PIERS)



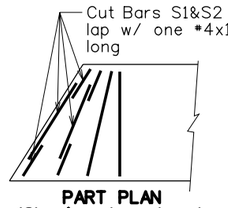
DETAIL "X"



DETAIL "Y"



THREADED ANCHOR BAR DETAIL



PART PLAN
(Showing skewed end, 15° skew or greater)

REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			

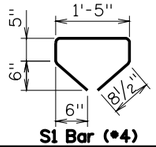
BEARING PADS		
NO.	DESCRIPTION	LOCATION

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

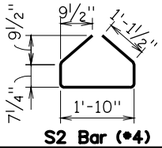
MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	

NUMBER OF 1/2" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

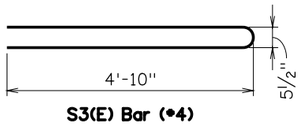
MARK	MIDSPAN (SECTION B-B)								END (SECTION A-A)																TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								BOTTOM								TOP									f'ci	f'c	
	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧				



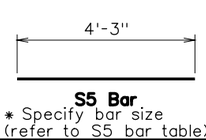
S1 Bar (#4)



S2 Bar (#4)



S3(E) Bar (#4)



S5 Bar.
* Specify bar size (refer to S5 bar table)

Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

(E) denotes epoxy coated reinforcing steel bars

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

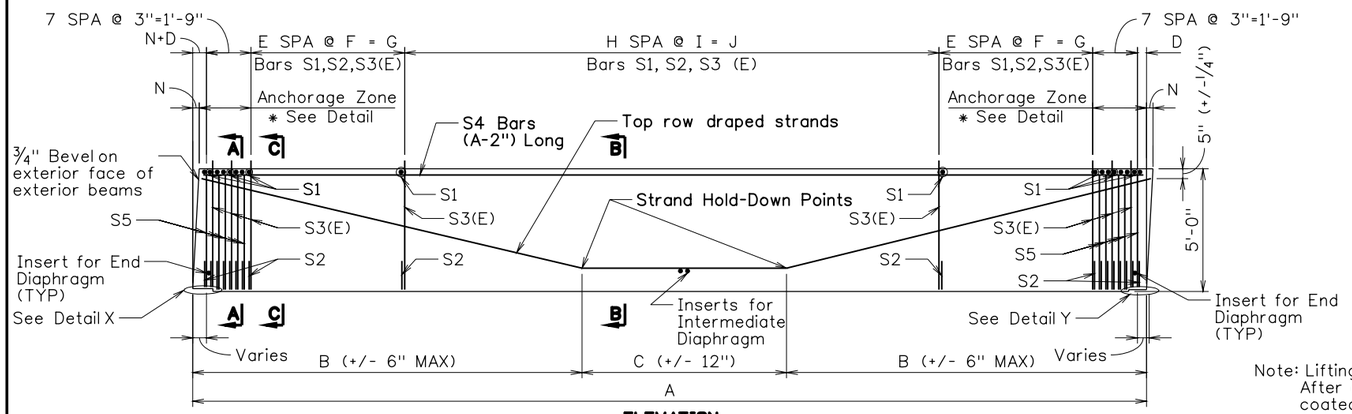
DESIGNED	DATE 12/5/06
DRAWN	
CHECKED	
REVIEWED	

APPROVED _____ DIRECTOR ENGINEERING DIVISION DATE 12/18/06

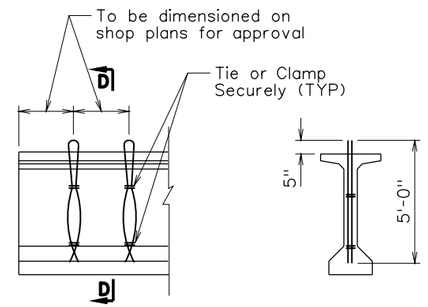
AASHTO TYPE IV
54" PRECAST CONC. BEAM
BRD-IV 54X20

SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



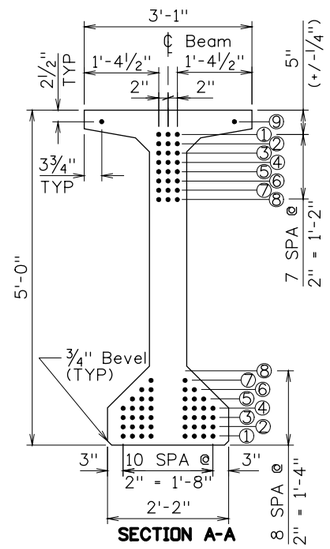
ELEVATION



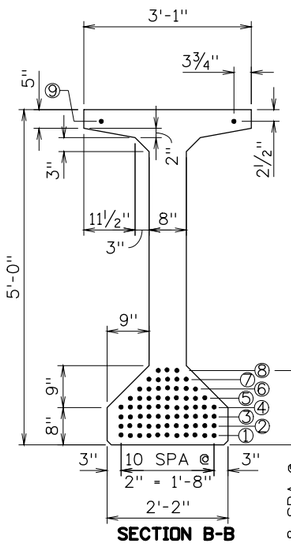
LIFTING DEVICE

SECTION D-D

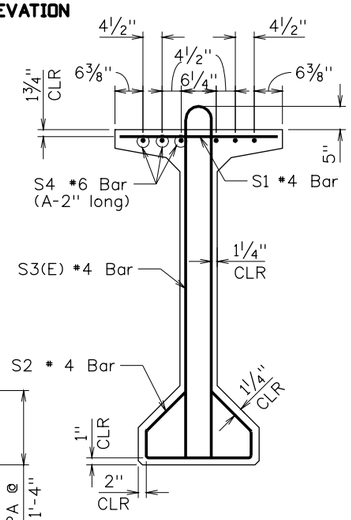
Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.



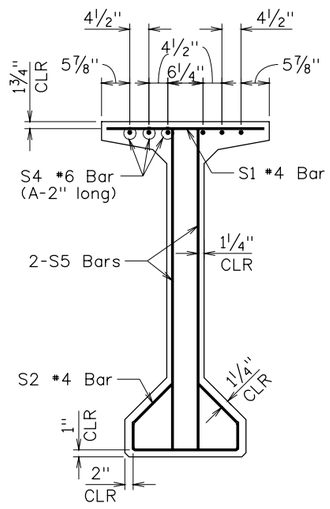
SECTION A-A



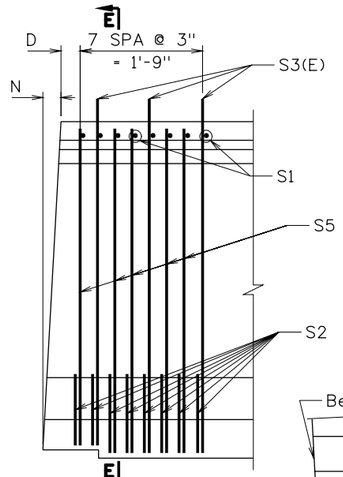
SECTION B-B



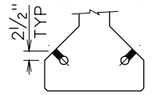
SECTION C-C
TYPICAL SECTION SHOWING STEEL REINFORCEMENT



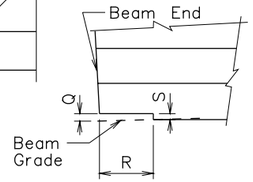
SECTION E-E
TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE



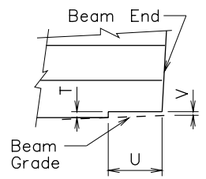
E
ANCHORAGE REINFORCEMENT



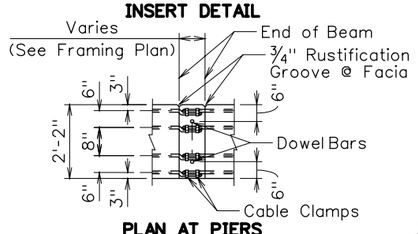
INSERT DETAIL



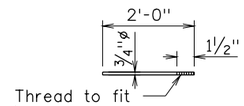
DETAIL "X"



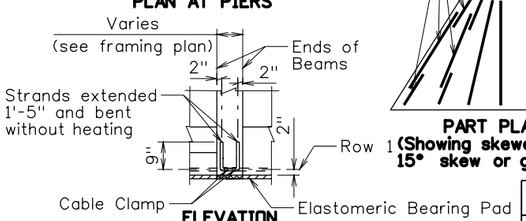
DETAIL "Y"



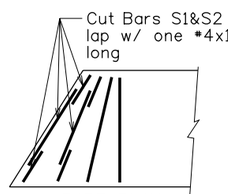
PLAN AT PIERS



THREADED ANCHOR BAR DETAIL



ELEVATION
STRAND SPLICING DETAILS (TYP AT PIERS)



PART PLAN
(Showing skewed end, 15° skew or greater)

NOTES:
1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
3. Roughen the top surface of each beam to an amplitude of approximately 1/4 inch and maintain clean and free of laitance.
4. Shop drawings shall show the detensioning plan by numbering the sequence of the strand pattern.
5. Prestressing strands shall be stabilized strand (1/2 inch nominal diameter) low relaxation uncoated seven wire strand in accordance with AASHTO M 203 grade 270. An initial stress of 202.5 psi shall be applied to the strand
6. Uncoated seven wire stress relieved strand may be substituted. However, if the Contractor chooses this alternate, he shall provide the design for the stress relieved strand and shall revise the original plans to reflect these changes. This design and plan modification shall be made at the Contractor's expense.
7. Deformed wire fabric is permitted instead of reinforcing steel bars provided an equal steel area is provided. Wire fabric must conform to the requirements of AASHTO Section M225.
8. The Elastomeric bearing pads under the prestressed beams shall conform to AASHTO Division 2, Section 18 Duro 60. Section 18.2.3.2 specifies laminate material to be:

   ASTM A245
   ASTM A570, Grade 36

9. Payment for Elastomeric bearing pads and any preformed joint material specified shall be included in Item 603-01. See pier & abutment sheets for details.
10. The threaded inserts shall have a minimum safe work load of 2500 lb in tension. All inserts shall be plugged to prevent concrete intrusion. Omit inserts on exterior face of exterior beams.
11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.

REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			

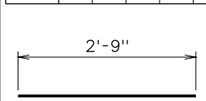
BEARING PADS		
NO.	DESCRIPTION	LOCATION

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

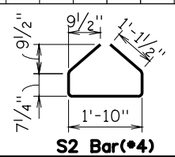
MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	

NUMBER OF 1/2" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

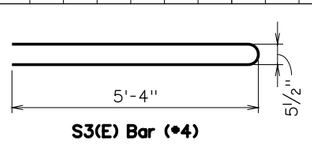
MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)										TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM								TOP					
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨		f'ci	f'c	



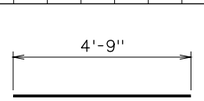
S1 Bar (#4)



S2 Bar(#4)



S3(E) Bar (#4)



S5 Bar
* Specify bar size (refer to S5 bar table)

Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

(E) denotes epoxy coated reinforcing steel bars

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

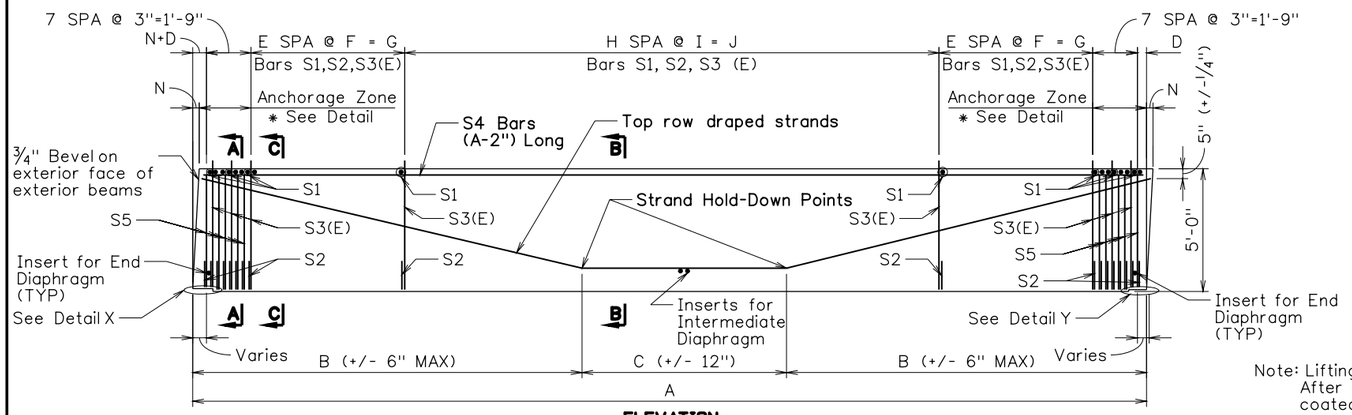
DESIGNED	DATE 12/5/06
DRAWN	
CHECKED	
REVIEWED	

APPROVED Gregory Bailey DIRECTOR ENGINEERING DIVISION DATE 12/18/06

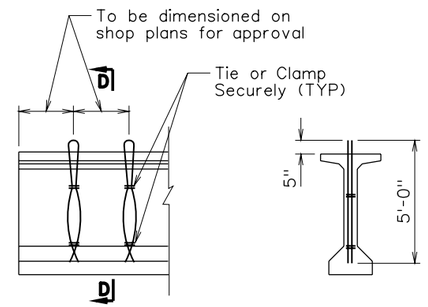
AASHTO TYPE IV – J PC BEAM
60" DEEP, 37" TOP FLANGE
BRD-IVJ 60X37

SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				

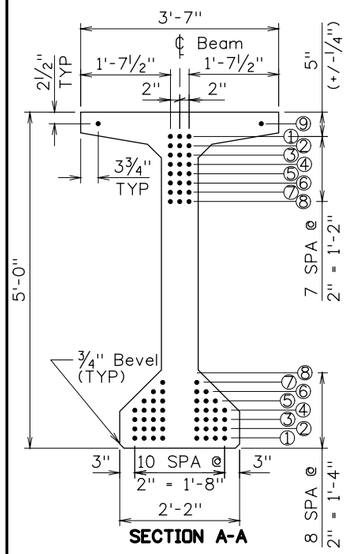


ELEVATION

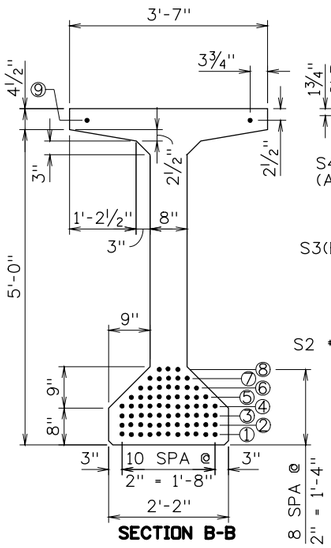


LIFTING DEVICE **SECTION D-D**

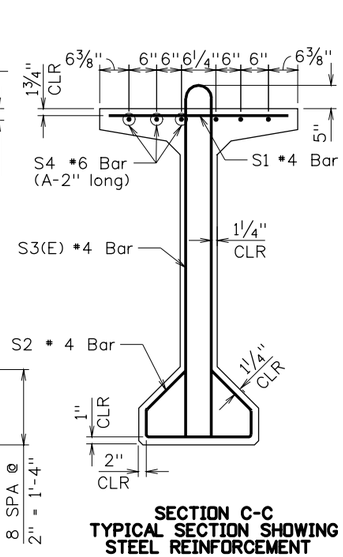
Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.



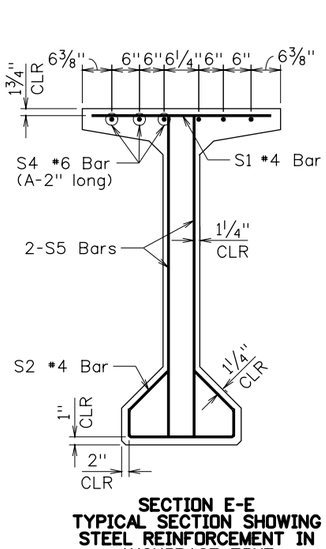
SECTION A-A



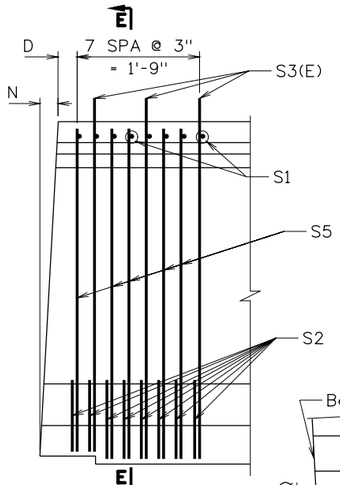
SECTION B-B



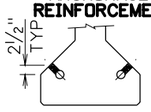
SECTION C-C
TYPICAL SECTION SHOWING STEEL REINFORCEMENT



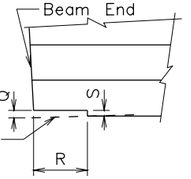
SECTION E-E
TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE



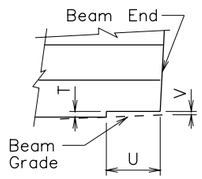
ANCHORAGE REINFORCEMENT



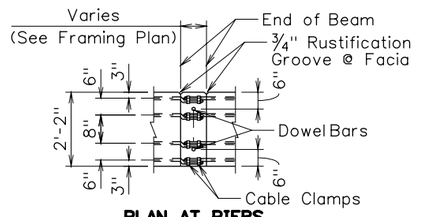
INSERT DETAIL



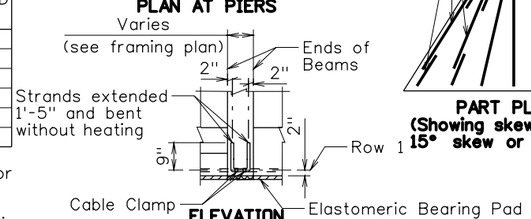
DETAIL "X"



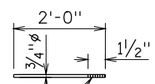
DETAIL "Y"



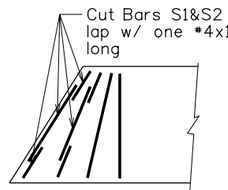
PLAN AT PIERS



ELEVATION
STRAND SPLICING DETAILS (TYP AT PIERS)



THREADED ANCHOR BAR DETAIL



PART PLAN
(Showing skewed end, 15° skew or greater)

NOTES:

1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
3. Roughen the top surface of each beam to an amplitude of approximately 1/4 inch and maintain clean and free of laitance.
4. Shop drawings shall show the detensioning plan by numbering the sequence of the strand pattern.
5. Prestressing strands shall be stabilized strand (1/2 inch nominal diameter) low relaxation uncoated seven wire strand in accordance with AASHTO M 203 grade 270. An initial stress of 202.5 psi shall be applied to the strand
6. Uncoated seven wire stress relieved strand may be substituted. However, if the Contractor chooses this alternate, he shall provide the design for the stress relieved strand and shall revise the original plans to reflect these changes. This design and plan modification shall be made at the Contractor's expense.
7. Deformed wire fabric is permitted instead of reinforcing steel bars provided an equal steel area is provided. Wire fabric must conform to the requirements of AASHTO Section M225.
8. The Elastomeric bearing pads under the prestressed beams shall conform to AASHTO Division 2, Section 18 Duro 60. Section 18.2.3.2 specifies laminate material to be:

   ASTM A245
   ASTM A570, Grade 36

9. Payment for Elastomeric bearing pads and any preformed joint material specified shall be included in Item 603-01. See pier & abutment sheets for details.
10. The threaded inserts shall have a minimum safe work load of 2500 lb in tension. All inserts shall be plugged to prevent concrete intrusion. Omit inserts on exterior face of exterior beams.
11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.

REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			

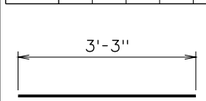
BEARING PADS		
NO.	DESCRIPTION	LOCATION

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

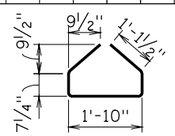
MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V

NUMBER OF 1/2" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

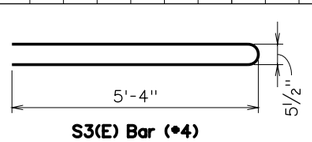
MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)										TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM								TOP					
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨		f'ci	f'c	



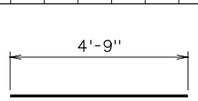
S1 Bar (#4)



S2 Bar(#4)



S3(E) Bar (#4)



S5 Bar
* Specify bar size (refer to S5 bar table)

Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

(E) denotes epoxy coated reinforcing steel bars

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

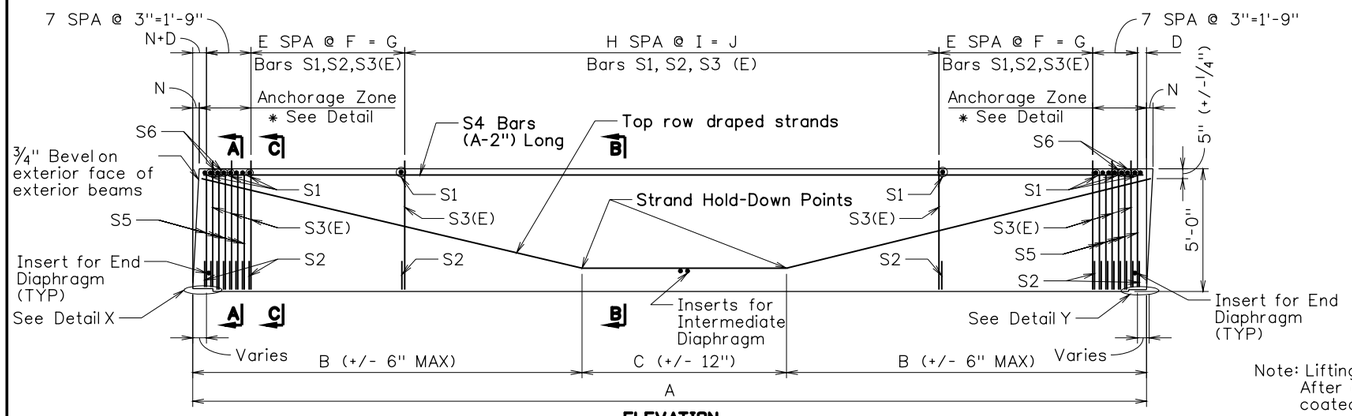
DESIGNED	DATE 12/5/06
DRAWN	
CHECKED	
REVIEWED	

APPROVED Gregory Bailey DIRECTOR ENGINEERING DIVISION DATE 12/18/06

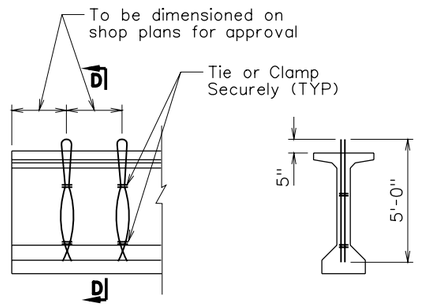
AASHTO TYPE IV – J PC BEAM
60" DEEP, 43" TOP FLANGE
BRD-IVJ 60X43

SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



ELEVATION



LIFTING DEVICE

Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.

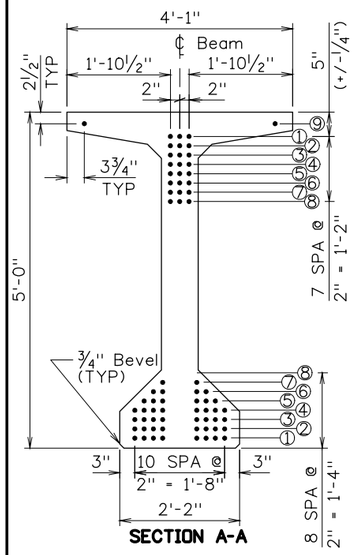
SECTION D-D

NOTES:

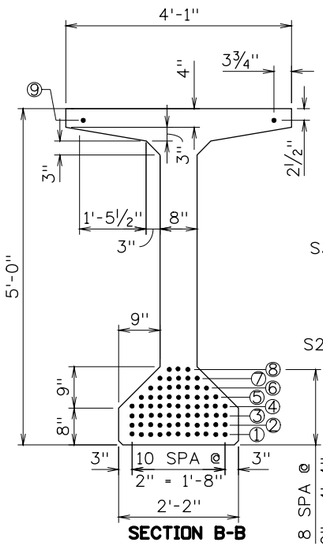
1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
3. Roughen the top surface of each beam to an amplitude of approximately ¼ inch and maintain clean and free of laitance.
4. Shop drawings shall show the detensioning plan by numbering the sequence of the strand pattern.
5. Prestressing strands shall be stabilized strand (1/2 inch nominal diameter) low relaxation uncoated seven wire strand in accordance with AASHTO M 203 grade 270. An initial stress of 202.5 psi shall be applied to the strand
6. Uncoated seven wire stress relieved strand may be substituted. However, if the Contractor chooses this alternate, he shall provide the design for the stress relieved strand and shall revise the original plans to reflect these changes. This design and plan modification shall be made at the Contractor's expense.
7. Deformed wire fabric is permitted instead of reinforcing steel bars provided an equal steel area is provided. Wire fabric must conform to the requirements of AASHTO Section M225.
8. The Elastomeric bearing pads under the prestressed beams shall conform to AASHTO Division 2, Section 18 Duro 60. Section 18.2.3.2 specifies laminate material to be:

   ASTM A245
   ASTM A570, Grade 36

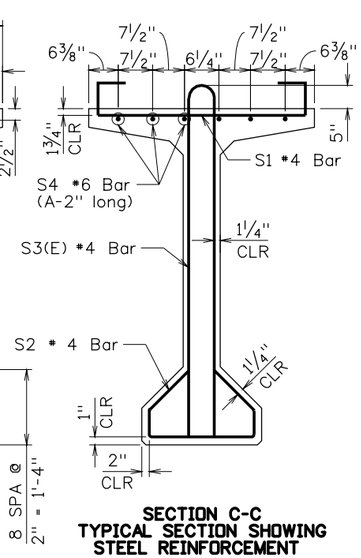
9. Payment for Elastomeric bearing pads and any preformed joint material specified shall be included in Item 603-01. See pier & abutment sheets for details.
10. The threaded inserts shall have a minimum safe work load of 2500 lb in tension. All inserts shall be plugged to prevent concrete intrusion. Omit inserts on exterior face of exterior beams.
11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.



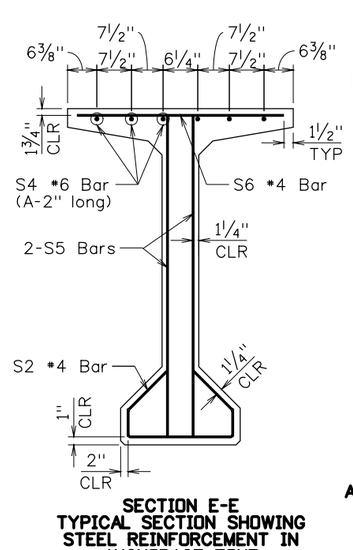
SECTION A-A



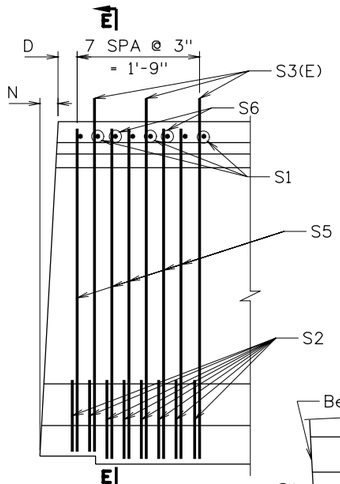
SECTION B-B



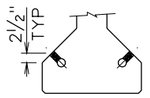
SECTION C-C
TYPICAL SECTION SHOWING STEEL REINFORCEMENT



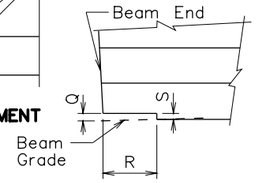
SECTION E-E
TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE



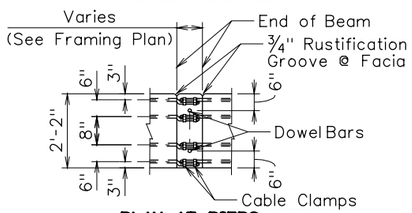
ANCHORAGE REINFORCEMENT



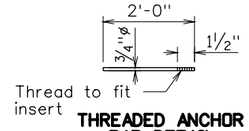
INSERT DETAIL



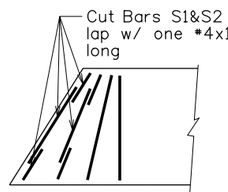
DETAIL "X" **DETAIL "Y"**



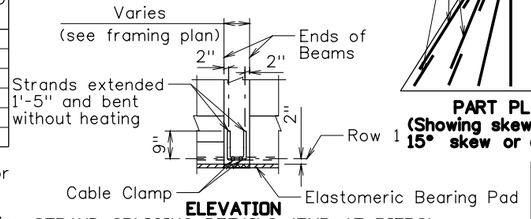
PLAN AT PIERS



THREADED ANCHOR BAR DETAIL



PART PLAN
(Showing skewed end, 15° skew or greater)



ELEVATION
STRAND SPLICING DETAILS (TYP AT PIERS)

REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			
S6			

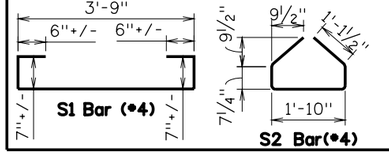
BEARING PADS		
NO.	DESCRIPTION	LOCATION

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	

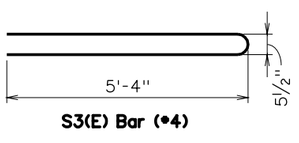
NUMBER OF ½" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)										TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM								TOP					
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨		f'ci	f'c	

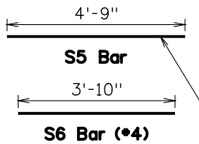


S1 Bar (•4)

S2 Bar(•4)



S3(E) Bar (•4)



S5 Bar
S6 Bar (•4)

Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

(E) denotes epoxy coated reinforcing steel bars.

* Specify bar size (refer to S5 bar table)

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

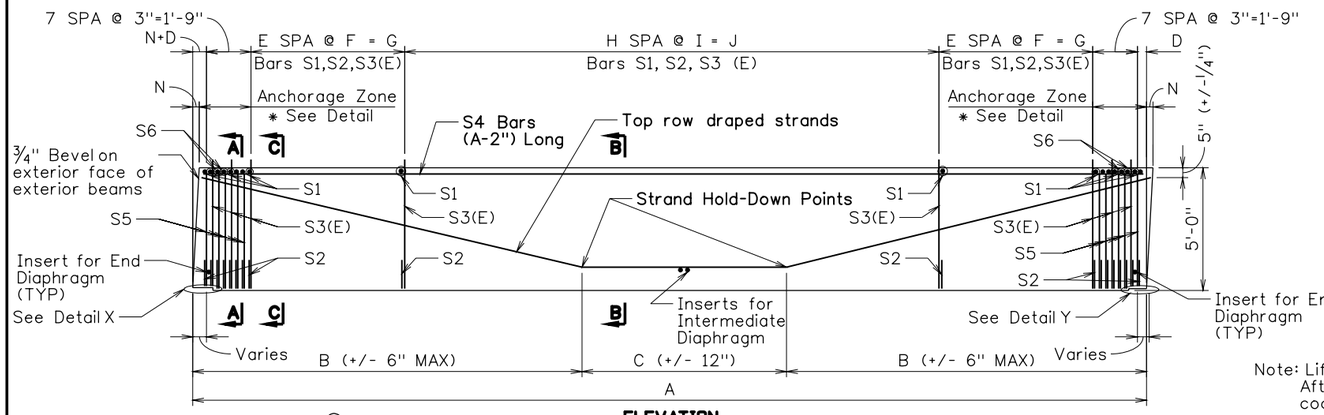
DESIGNED		DATE 12/5/06
DRAWN		
CHECKED		
REVIEWED		

APPROVED Diego's Baily DATE 12/18/06
DIRECTOR ENGINEERING DIVISION

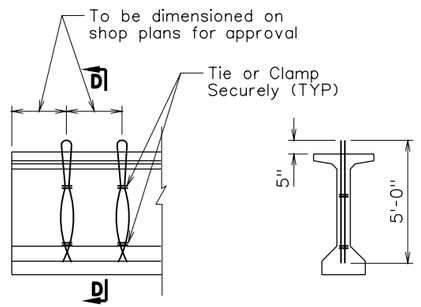
AASHTO TYPE IV – J PC BEAM
60" DEEP, 49" TOP FLANGE
BRD-IVJ 60X49

SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



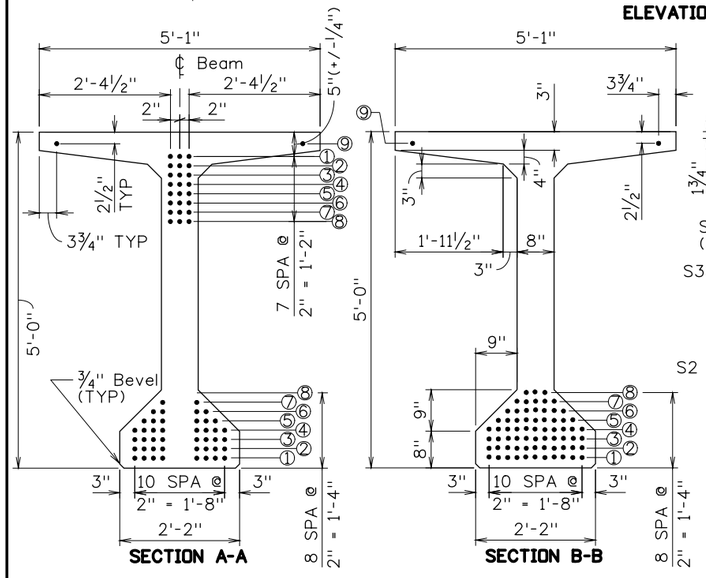
ELEVATION



LIFTING DEVICE

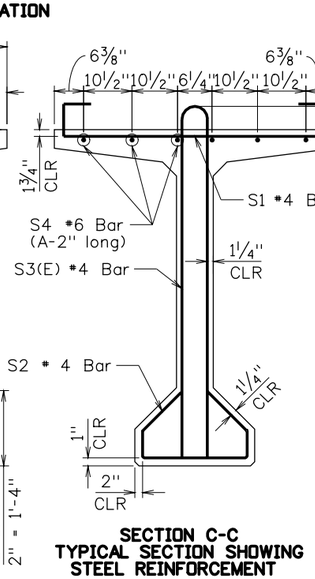
SECTION D-D

Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.

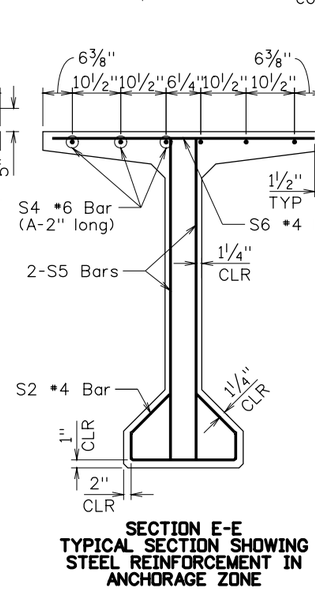


SECTION A-A

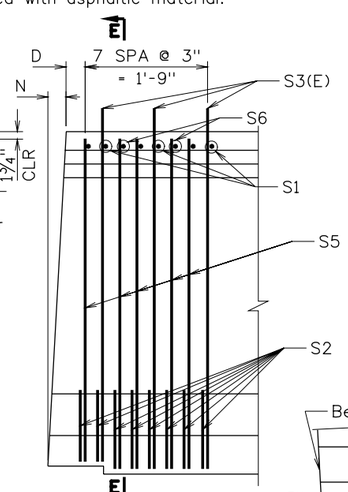
SECTION B-B



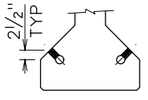
SECTION C-C
TYPICAL SECTION SHOWING STEEL REINFORCEMENT



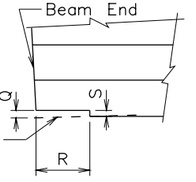
SECTION E-E
TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE



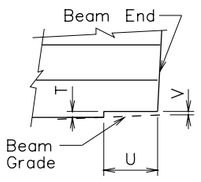
ANCHORAGE REINFORCEMENT



INSERT DETAIL



DETAIL "X"



DETAIL "Y"

NOTES:
1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
3. Roughen the top surface of each beam to an amplitude of approximately ¼ inch and maintain clean and free of laitance.
4. Shop drawings shall show the detensioning plan by numbering the sequence of the strand pattern.
5. Prestressing strands shall be stabilized strand (1/2 inch nominal diameter) low relaxation uncoated seven wire strand in accordance with AASHTO M 203 grade 270. An initial stress of 202.5 psi shall be applied to the strand
6. Uncoated seven wire stress relieved strand may be substituted. However, if the Contractor chooses this alternate, he shall provide the design for the stress relieved strand and shall revise the original plans to reflect these changes. This design and plan modification shall be made at the Contractor's expense.
7. Deformed wire fabric is permitted instead of reinforcing steel bars provided an equal steel area is provided. Wire fabric must conform to the requirements of AASHTO Section M225.
8. The Elastomeric bearing pads under the prestressed beams shall conform to AASHTO Division 2, Section 18 Duro 60. Section 18.2.3.2 specifies laminate material to be:

   ASTM A245
   ASTM A570, Grade 36

9. Payment for Elastomeric bearing pads and any preformed joint material specified shall be included in Item 603-01. See pier & abutment sheets for details.
10. The threaded inserts shall have a minimum safe work load of 2500 lb in tension. All inserts shall be plugged to prevent concrete intrusion. Omit inserts on exterior face of exterior beams.
11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.

REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			
S6			

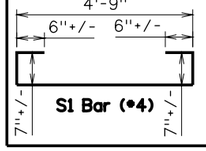
BEARING PADS		
NO.	DESCRIPTION	LOCATION

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

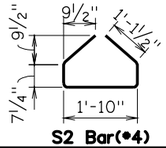
MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	

NUMBER OF ½" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

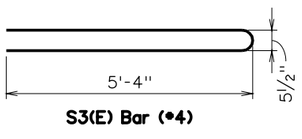
MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)										TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM								TOP					
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨		f'ci	f'c	



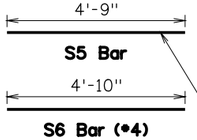
S1 Bar (•4)



S2 Bar(•4)



S3(E) Bar (•4)

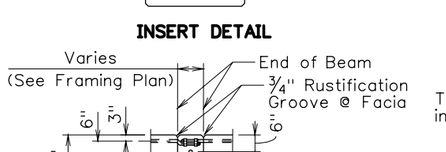


S6 Bar (•4)

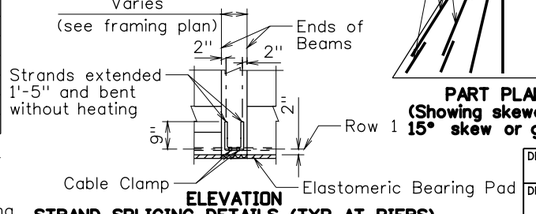
Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

(E) denotes epoxy coated reinforcing steel bars

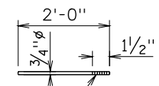
* Specify bar size (refer to S5 bar table)



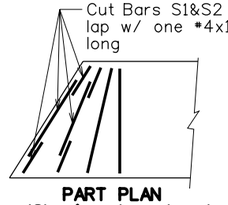
PLAN AT PIERS



ELEVATION
STRAND SPLICING DETAILS (TYP AT PIERS)



THREADED ANCHOR BAR DETAIL



PART PLAN
(Showing skewed end, 15° skew or greater)

NO.	REVISION	DATE:	BY:

C:\Users\V3 Addendum 07\new\BRD-IVJ 60X61_new.dgn 26-JAN-2007 10:37

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

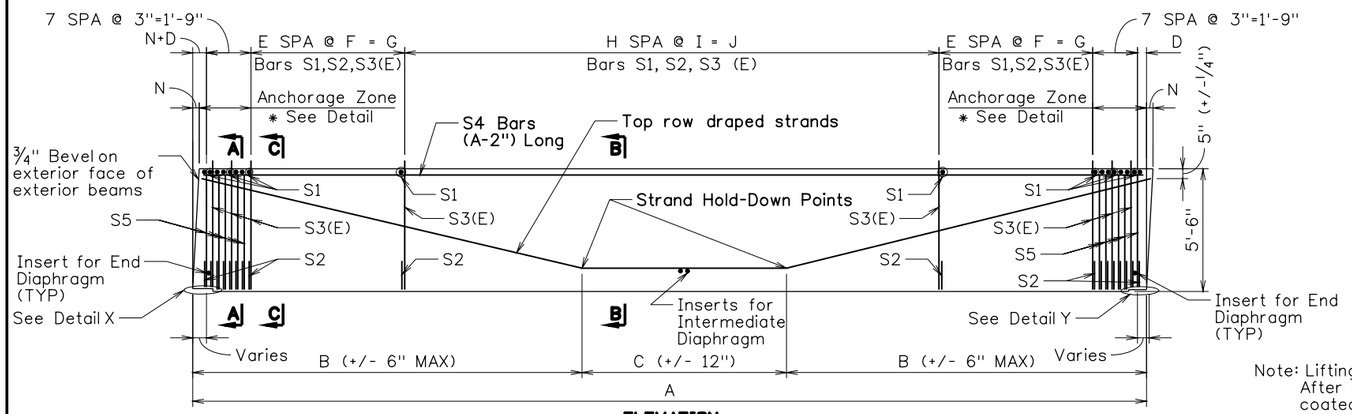
DESIGNED		DATE 12/5/06
DRAWN		
CHECKED		
REVIEWED		

APPROVED Gregory Bailey DATE 12/18/06
DIRECTOR STRUCTURES DIVISION

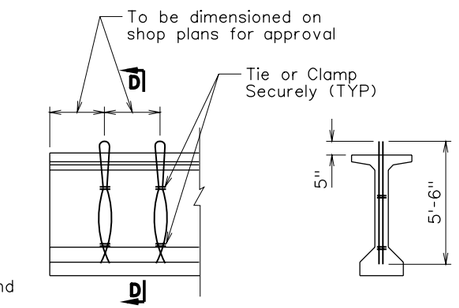
AASHTO TYPE IV - J PC BEAM
60" DEEP, 61" TOP FLANGE
BRD-IVJ 60X61

SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



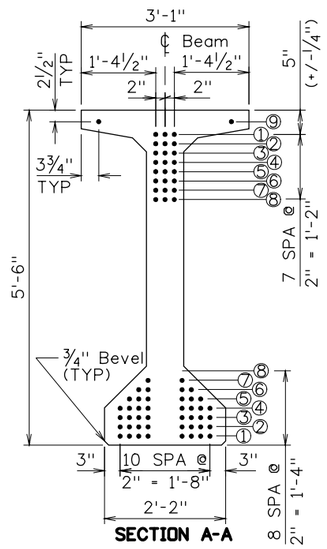
ELEVATION



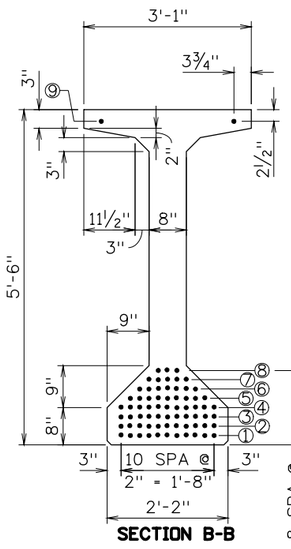
LIFTING DEVICE

SECTION D-D

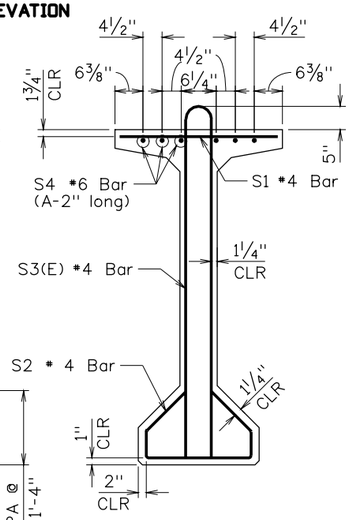
Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.



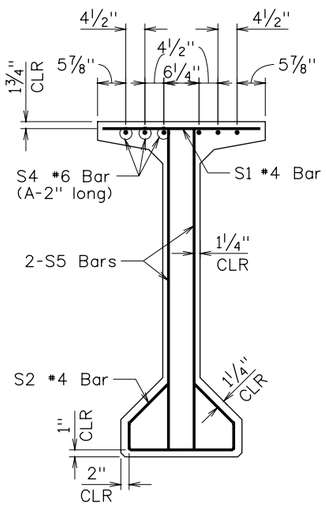
SECTION A-A



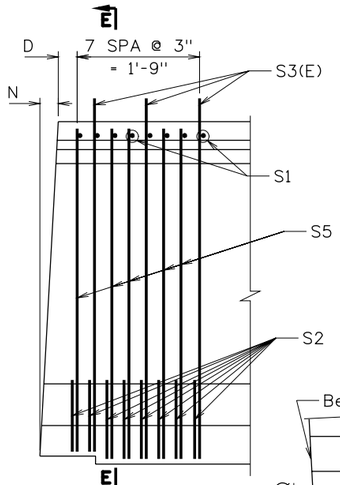
SECTION B-B



SECTION C-C TYPICAL SECTION SHOWING STEEL REINFORCEMENT

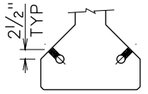


SECTION E-E TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE



E

ANCHORAGE REINFORCEMENT



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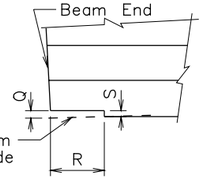
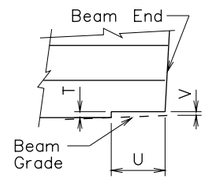
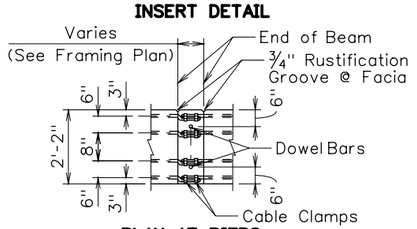


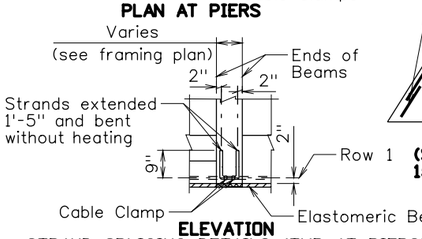
DETAIL "X"



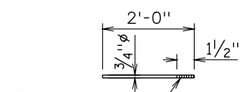
DETAIL "Y"



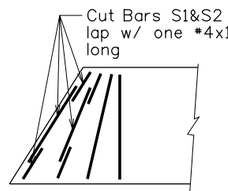
PLAN AT PIERS



ELEVATION
STRAND SPLICING DETAILS (TYP AT PIERS)



THREADED ANCHOR BAR DETAIL



PART PLAN
(Showing skewed end, 15° skew or greater)

NOTES:

1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
3. Roughen the top surface of each beam to an amplitude of approximately 1/4 inch and maintain clean and free of laitance.
4. Shop drawings shall show the detensioning plan by numbering the sequence of the strand pattern.
5. Prestressing strands shall be stabilized strand (1/2 inch nominal diameter) low relaxation uncoated seven wire strand in accordance with AASHTO M 203 grade 270. An initial stress of 202.5 psi shall be applied to the strand
6. Uncoated seven wire stress relieved strand may be substituted. However, if the Contractor chooses this alternate, he shall provide the design for the stress relieved strand and shall revise the original plans to reflect these changes. This design and plan modification shall be made at the Contractor's expense.
7. Deformed wire fabric is permitted instead of reinforcing steel bars provided an equal steel area is provided. Wire fabric must conform to the requirements of AASHTO Section M225.
8. The Elastomeric bearing pads under the prestressed beams shall conform to AASHTO Division 2, Section 18 Duro 60. Section 18.2.3.2 specifies laminate material to be:

   ASTM A245
   ASTM A570, Grade 36

9. Payment for Elastomeric bearing pads and any preformed joint material specified shall be included in Item 603-01. See pier & abutment sheets for details.
10. The threaded inserts shall have a minimum safe work load of 2500 lb in tension. All inserts shall be plugged to prevent concrete intrusion. Omit inserts on exterior face of exterior beams.
11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.

REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			

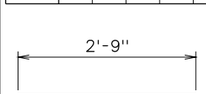
BEARING PADS		
NO.	DESCRIPTION	LOCATION

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

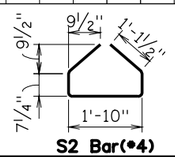
MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	

NUMBER OF 1/2" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

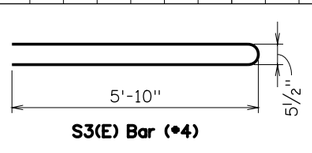
MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)										TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM								TOP					
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨		f'ci	f'c	



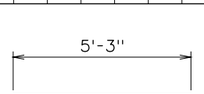
S1 Bar (#4)



S2 Bar(#4)



S3(E) Bar (#4)



S5 Bar
* Specify bar size (refer to S5 bar table)

Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

(E) denotes epoxy coated reinforcing steel bars

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

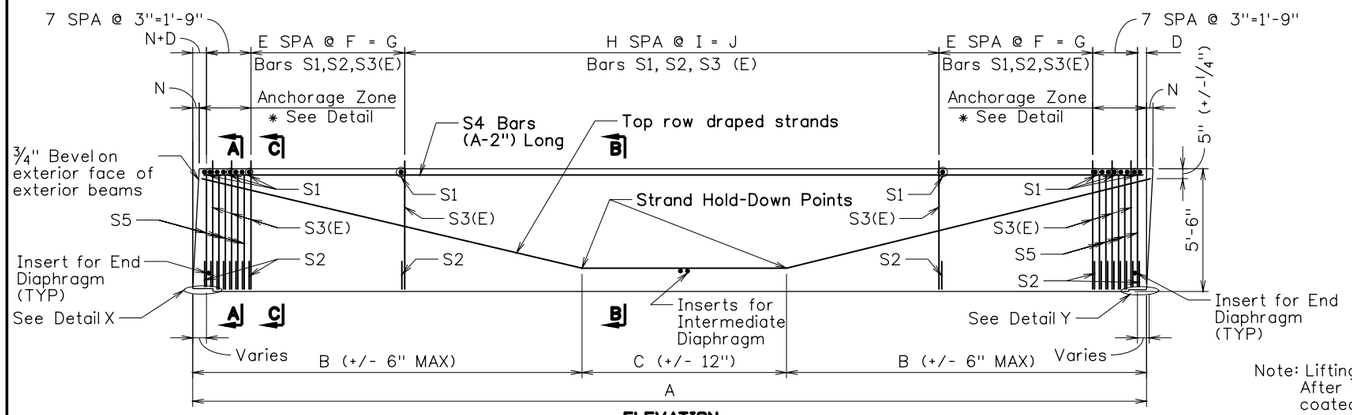
DESIGNED	DATE 12/05/06
DRAWN	
CHECKED	
REVIEWED	

APPROVED Gregory Bailey DIRECTOR ENGINEERING DIVISION DATE 12/18/06

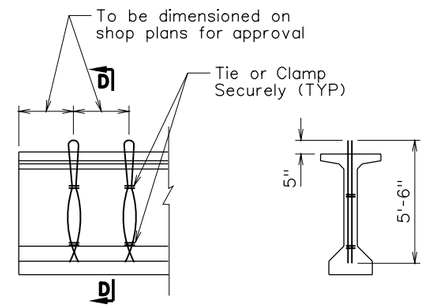
AASHTO TYPE IV – J PC BEAM
66" DEEP, 37" TOP FLANGE
BRD-IVJ 66X37

SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



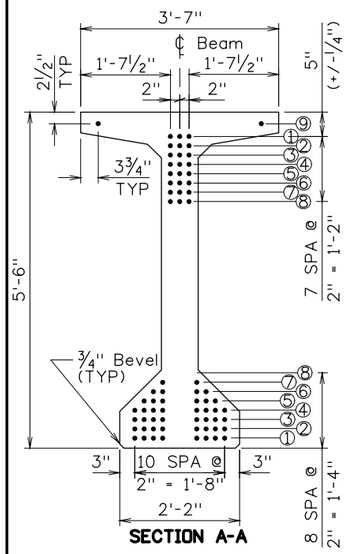
ELEVATION



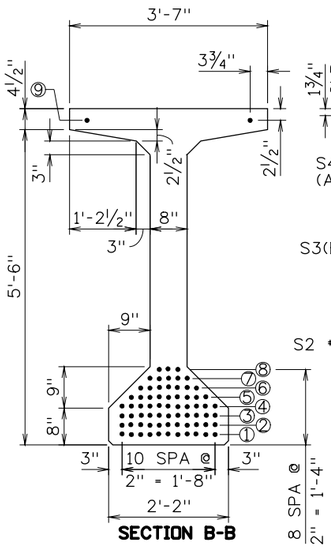
LIFTING DEVICE

SECTION D-D

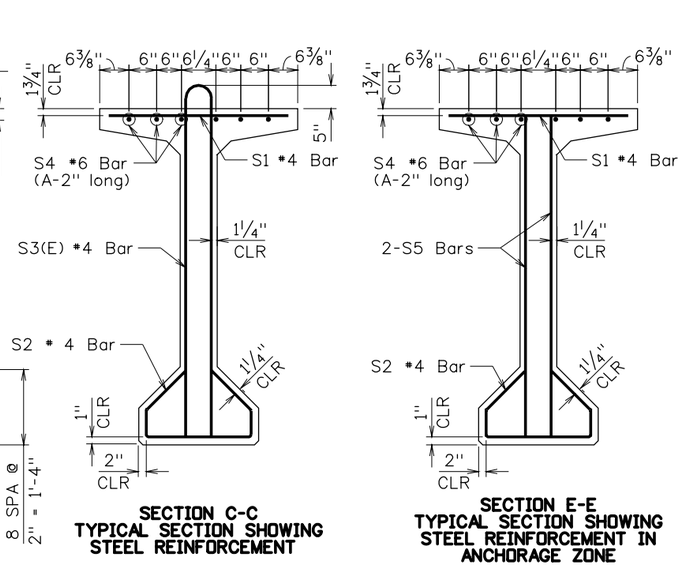
Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.



SECTION A-A

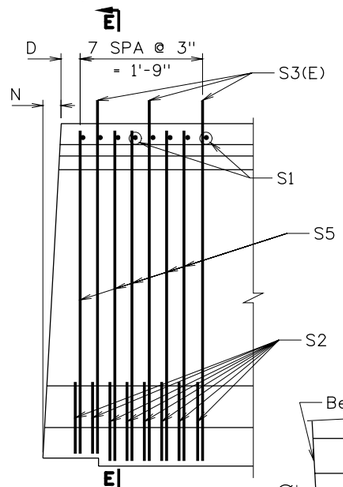


SECTION B-B

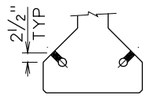


SECTION C-C TYPICAL SECTION SHOWING STEEL REINFORCEMENT

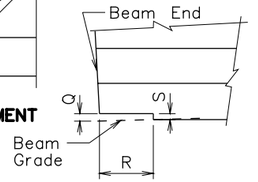
SECTION E-E TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE



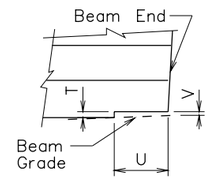
ANCHORAGE REINFORCEMENT



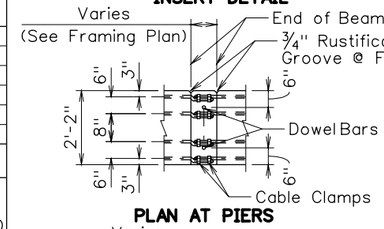
INSERT DETAIL



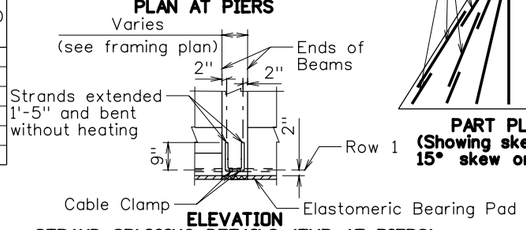
DETAIL "X"



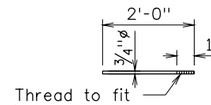
DETAIL "Y"



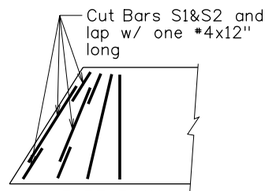
PLAN AT PIERS



ELEVATION STRAND SPLICING DETAILS (TYP AT PIERS)



THREADED ANCHOR BAR DETAIL



PART PLAN (Showing skewed end, 15° skew or greater)

NOTES:

1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
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11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.

REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			

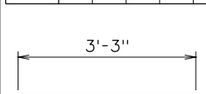
BEARING PADS		
NO.	DESCRIPTION	LOCATION

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

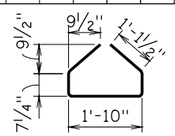
MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	

NUMBER OF 1/2" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

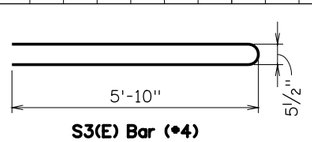
MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)										TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM								TOP					
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨		f'ci	f'c	



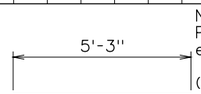
S1 Bar (#4)



S2 Bar(#4)



S3(E) Bar (#4)



S5 Bar
* Specify bar size (refer to S5 bar table)

Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

(E) denotes epoxy coated reinforcing steel bars

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

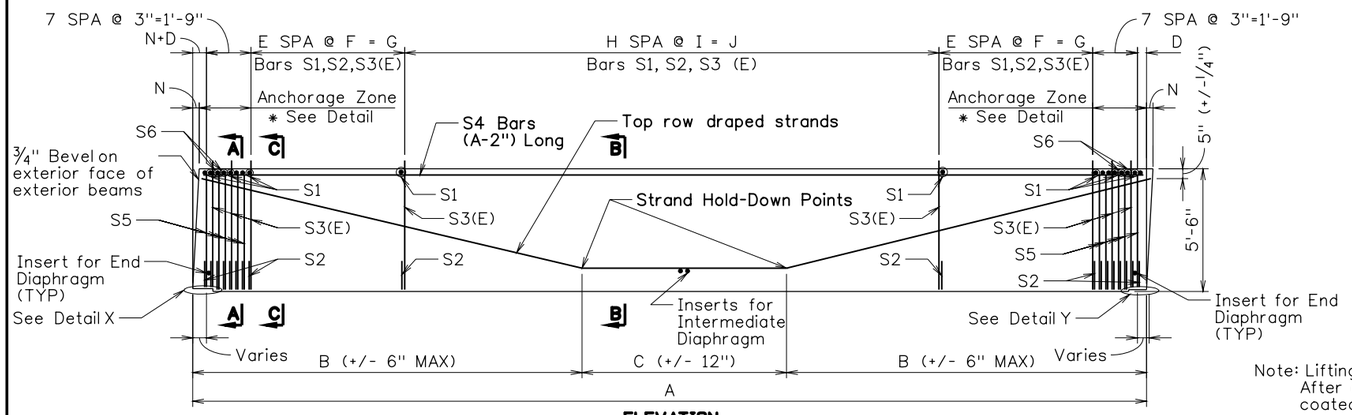
DESIGNED	DATE 12/5/06
DRAWN	
CHECKED	
REVIEWED	

APPROVED Gregory Bailey DIRECTOR ENGINEERING DIVISION DATE 12/18/06

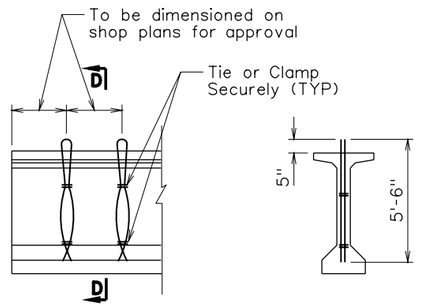
AASHTO TYPE IV – J PC BEAM
66" DEEP, 43" TOP FLANGE
BRD–IVJ 66X43

SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				

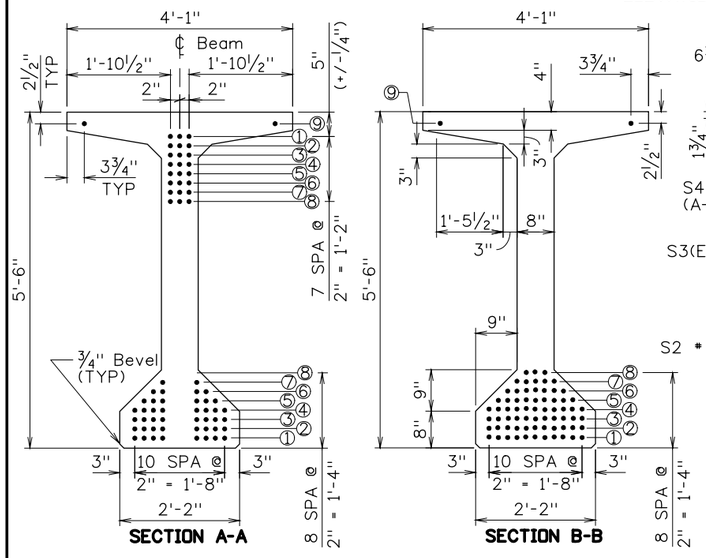


ELEVATION



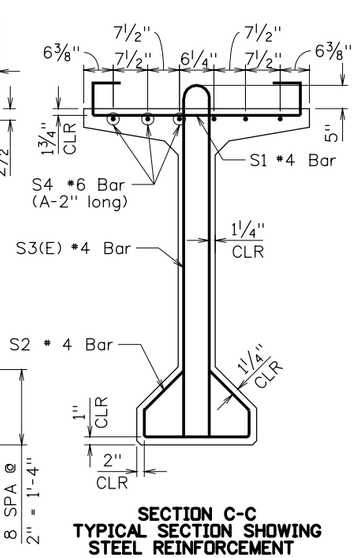
LIFTING DEVICE **SECTION D-D**

Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.

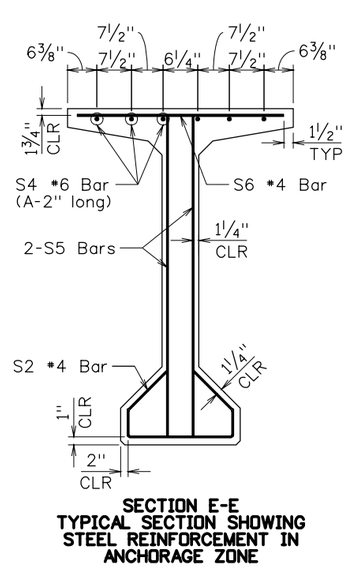


SECTION A-A

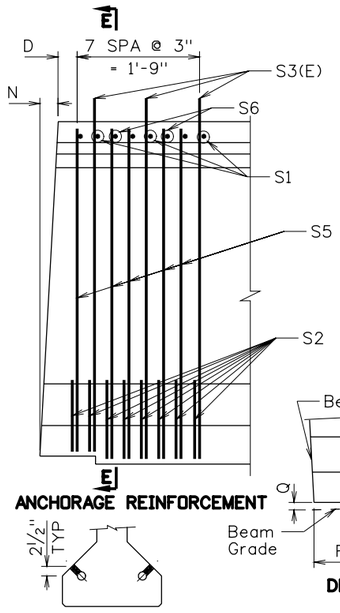
SECTION B-B



SECTION C-C TYPICAL SECTION SHOWING STEEL REINFORCEMENT



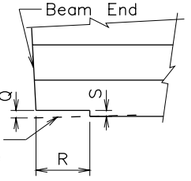
SECTION E-E TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE



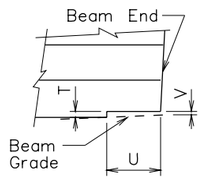
E

ANCHORAGE REINFORCEMENT

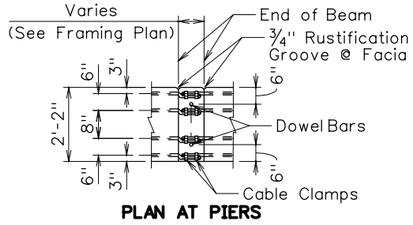
INSERT DETAIL



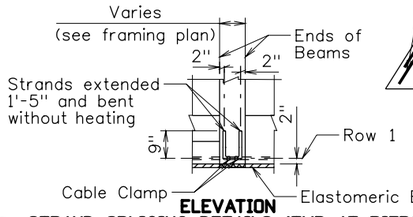
DETAIL "X"



DETAIL "Y"

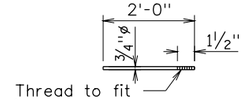


PLAN AT PIERS

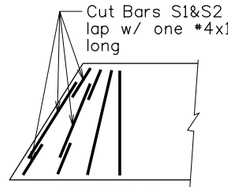


ELEVATION

STRAND SPLICING DETAILS (TYP AT PIERS)



THREADED ANCHOR BAR DETAIL



PART PLAN
(Showing skewed end, 15° skew or greater)

NOTES:

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2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
3. Roughen the top surface of each beam to an amplitude of approximately ¼ inch and maintain clean and free of laitance.
4. Shop drawings shall show the detensioning plan by numbering the sequence of the strand pattern.
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REINFORCING BAR LIST

MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

REINFORCING BAR LIST

MARK	SIZE	COUNT/BEAM	TOTAL
*S5			
S6			

BEARING PADS

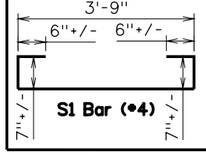
NO.	DESCRIPTION	LOCATION

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

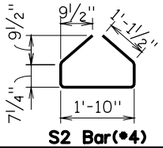
MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V

NUMBER OF ½" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

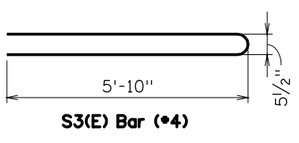
MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)										TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM								TOP					
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨		f'ci	f'c	



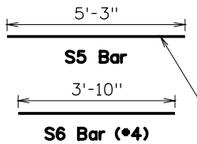
S1 Bar (•4)



S2 Bar(•4)



S3(E) Bar (•4)



S6 Bar (•4)

Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

(E) denotes epoxy coated reinforcing steel bars

* Specify bar size (refer to S5 bar table)

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

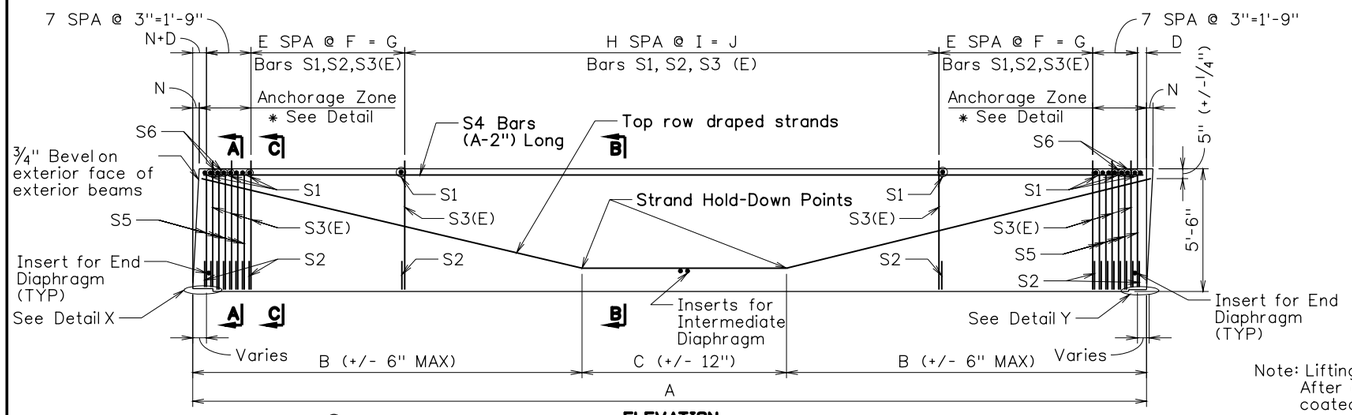
DESIGNED	DATE 12/5/06
DRAWN	
CHECKED	
REVIEWED	

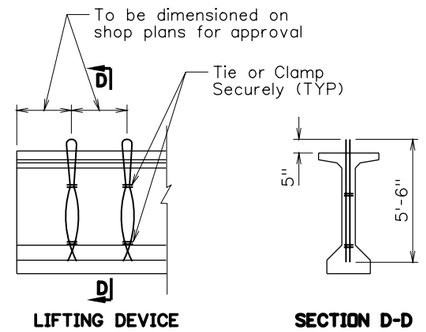
APPROVED Gregory Bailey DATE 12/18/06
DIRECTOR ENGINEERING DIVISION

AASHTO TYPE IV – J PC BEAM
66" DEEP, 49" TOP FLANGE
BRD-IVJ 66X49

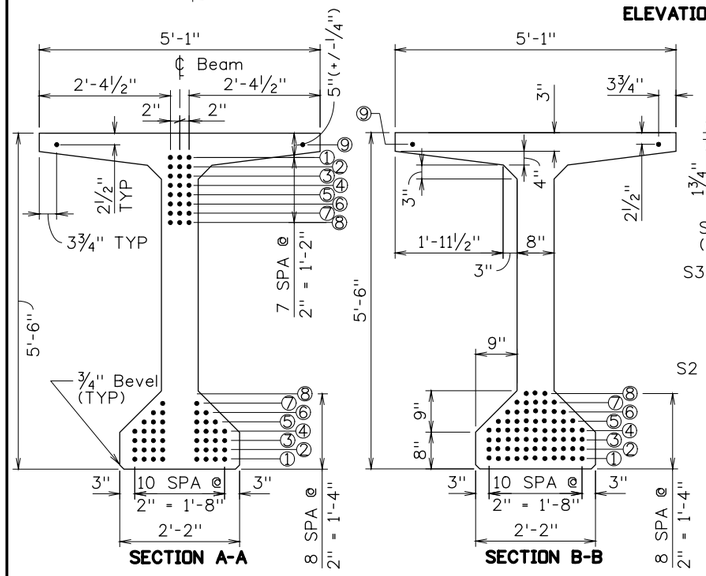
SHEET OF
BRIDGE NO.

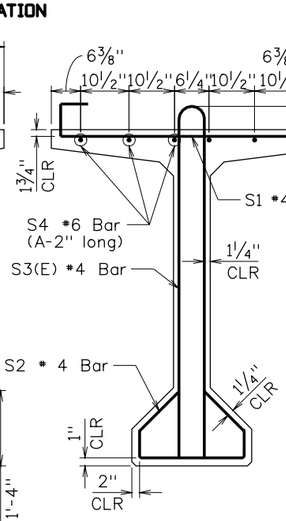
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				

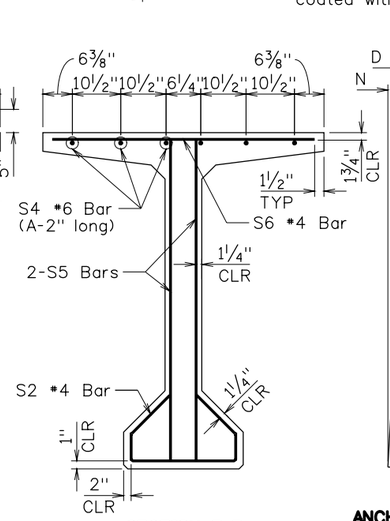


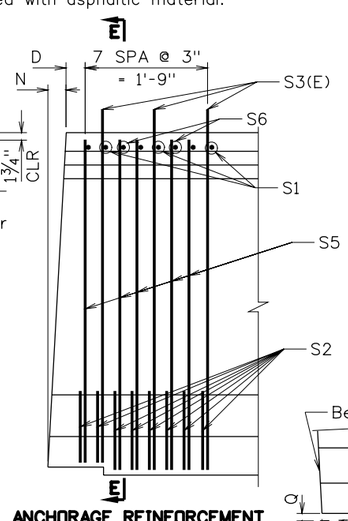


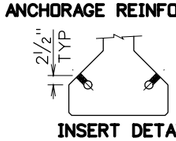
Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.

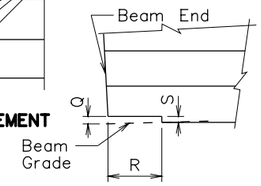












NOTES:

1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
3. Roughen the top surface of each beam to an amplitude of approximately 1/4 inch and maintain clean and free of laitance.
4. Shop drawings shall show the detensioning plan by numbering the sequence of the strand pattern.
5. Prestressing strands shall be stabilized strand (1/2 inch nominal diameter) low relaxation uncoated seven wire strand in accordance with AASHTO M 203 grade 270. An initial stress of 202.5 psi shall be applied to the strand
6. Uncoated seven wire stress relieved strand may be substituted. However, if the Contractor chooses this alternate, he shall provide the design for the stress relieved strand and shall revise the original plans to reflect these changes. This design and plan modification shall be made at the Contractor's expense.
7. Deformed wire fabric is permitted instead of reinforcing steel bars provided an equal steel area is provided. Wire fabric must conform to the requirements of AASHTO Section M225.
8. The Elastomeric bearing pads under the prestressed beams shall conform to AASHTO Division 2, Section 18 Duro 60. Section 18.2.3.2 specifies laminate material to be:

   ASTM A245
   ASTM A570, Grade 36

9. Payment for Elastomeric bearing pads and any preformed joint material specified shall be included in Item 603-01. See pier & abutment sheets for details.
10. The threaded inserts shall have a minimum safe work load of 2500 lb in tension. All inserts shall be plugged to prevent concrete intrusion. Omit inserts on exterior face of exterior beams.
11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.

REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

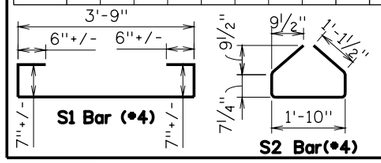
REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			
S6			

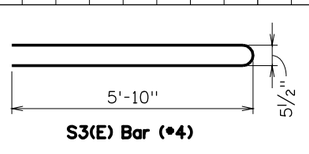
BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

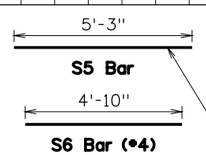
MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V

NUMBER OF 1/2" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)										TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM								TOP					
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨		f'ci	f'c	



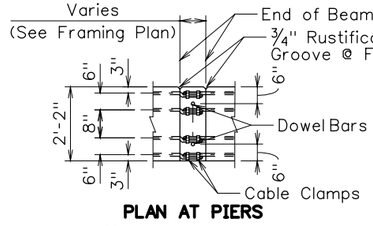


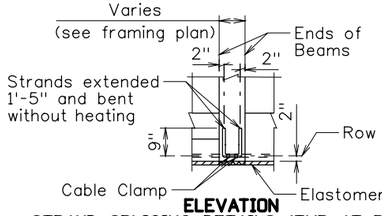


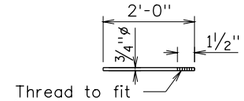
Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

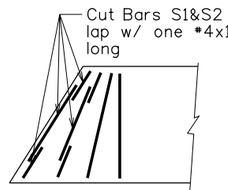
(E) denotes epoxy coated reinforcing steel bars

* Specify bar size (refer to S5 bar table)









BEARING PADS		
NO.	DESCRIPTION	LOCATION

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

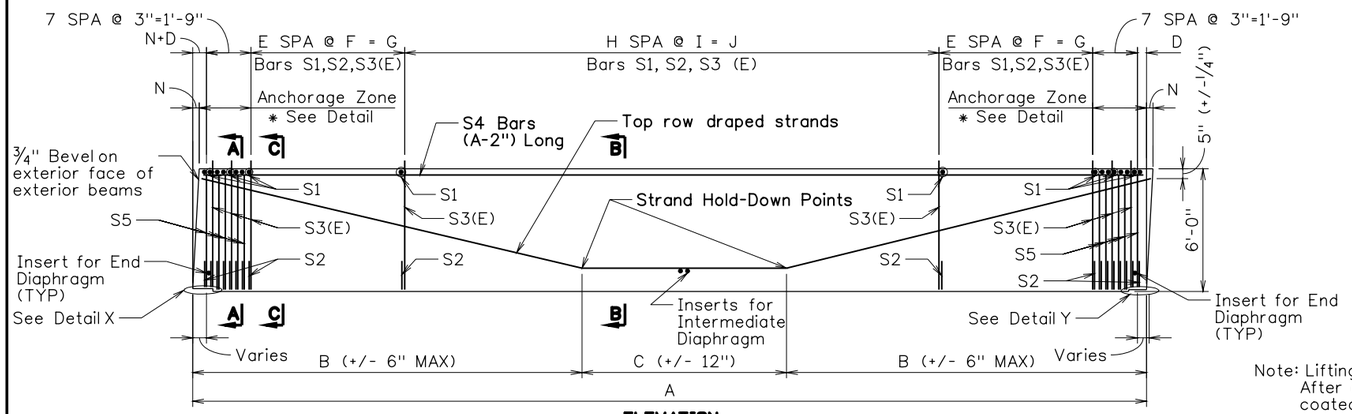
DESIGNED	DATE 12/5/06	
DRAWN		
CHECKED		
REVIEWED		

APPROVED Gregory Bailey DATE 12/18/06
DIRECTOR ENGINEERING DIVISION

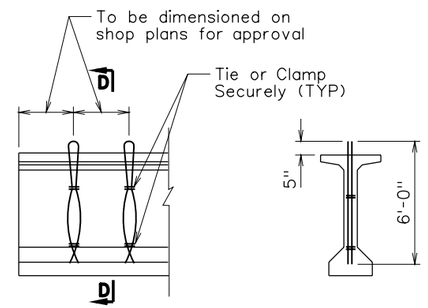
AASHTO TYPE IV – J PC BEAM
66" DEEP, 61" TOP FLANGE
BRD-IVJ 66X61

SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



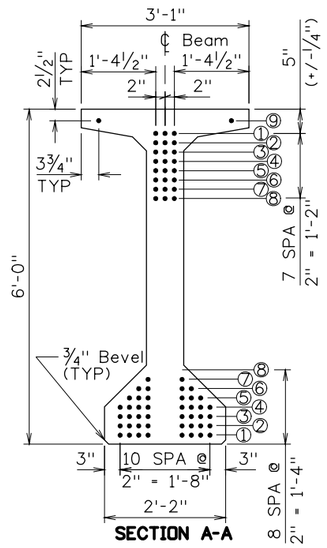
ELEVATION



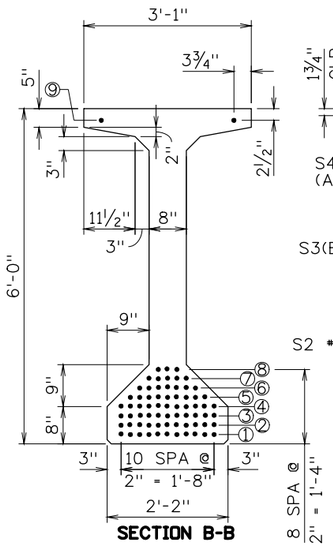
LIFTING DEVICE

SECTION D-D

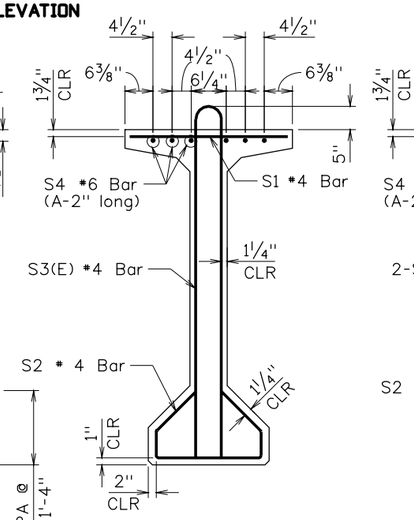
Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.



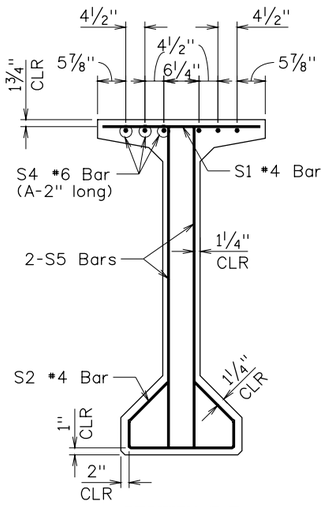
SECTION A-A



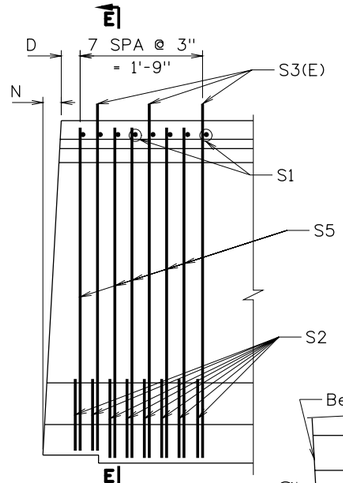
SECTION B-B



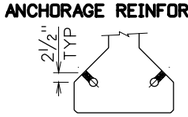
SECTION C-C
TYPICAL SECTION SHOWING STEEL REINFORCEMENT



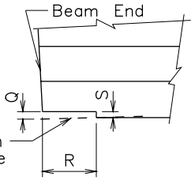
SECTION E-E
TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE



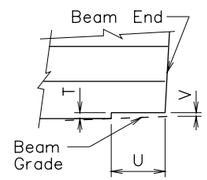
ANCHORAGE REINFORCEMENT



INSERT DETAIL



DETAIL "X"



DETAIL "Y"

NOTES:

1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
3. Roughen the top surface of each beam to an amplitude of approximately 1/4 inch and maintain clean and free of laitance.
4. Shop drawings shall show the detensioning plan by numbering the sequence of the strand pattern.
5. Prestressing strands shall be stabilized strand (1/2 inch nominal diameter) low relaxation uncoated seven wire strand in accordance with AASHTO M 203 grade 270. An initial stress of 202.5 psi shall be applied to the strand
6. Uncoated seven wire stress relieved strand may be substituted. However, if the Contractor chooses this alternate, he shall provide the design for the stress relieved strand and shall revise the original plans to reflect these changes. This design and plan modification shall be made at the Contractor's expense.
7. Deformed wire fabric is permitted instead of reinforcing steel bars provided an equal steel area is provided. Wire fabric must conform to the requirements of AASHTO Section M225.
8. The Elastomeric bearing pads under the prestressed beams shall conform to AASHTO Division 2, Section 18 Duro 60. Section 18.2.3.2 specifies laminate material to be:

   ASTM A245
   ASTM A570, Grade 36

9. Payment for Elastomeric bearing pads and any preformed joint material specified shall be included in Item 603-01. See pier & abutment sheets for details.
10. The threaded inserts shall have a minimum safe work load of 2500 lb in tension. All inserts shall be plugged to prevent concrete intrusion. Omit inserts on exterior face of exterior beams.
11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.

REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			

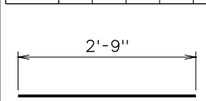
BEARING PADS		
NO.	DESCRIPTION	LOCATION

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

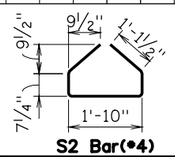
MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	

NUMBER OF 1/2" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

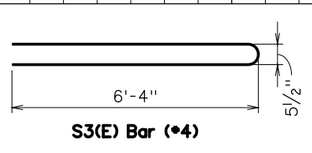
MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)										TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM								TOP					
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨		f'ci	f'c	



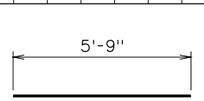
S1 Bar (#4)



S2 Bar(#4)



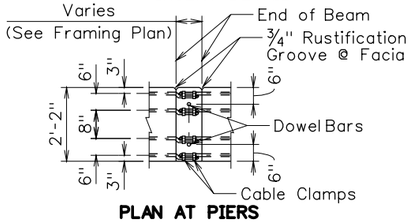
S3(E) Bar (#4)



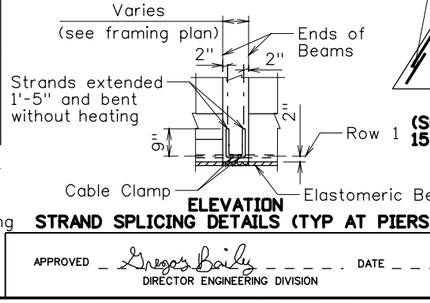
S5 Bar
* Specify bar size (refer to S5 bar table)

Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

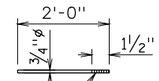
(E) denotes epoxy coated reinforcing steel bars



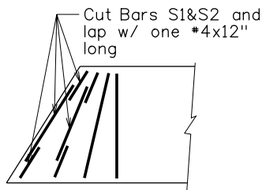
PLAN AT PIERS



ELEVATION
STRAND SPLICING DETAILS (TYP AT PIERS)



THREADED ANCHOR BAR DETAIL



PART PLAN
(Showing skewed end, 15° skew or greater)

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

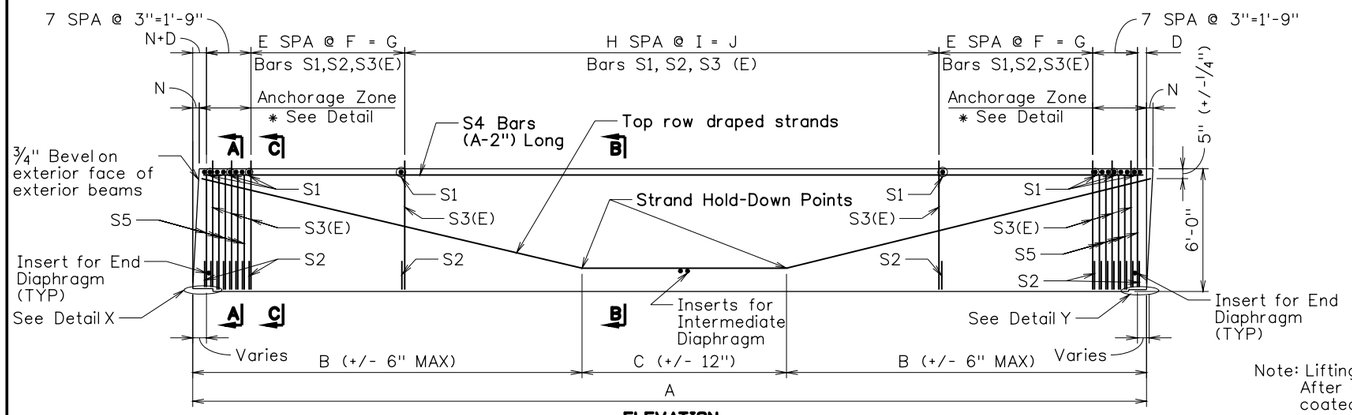
DESIGNED	DATE 12/5/06
DRAWN	
CHECKED	
REVIEWED	

APPROVED Gregory Bailey DATE 12/18/06
DIRECTOR ENGINEERING DIVISION

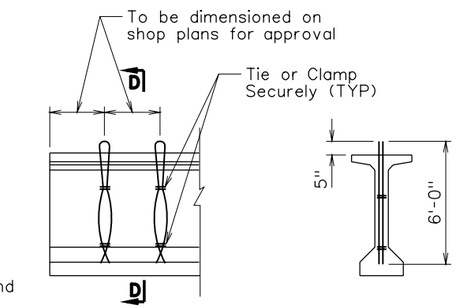
AASHTO TYPE IV – J PC BEAM
72" DEEP, 37" TOP FLANGE
BRD-IVJ 72X37

SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



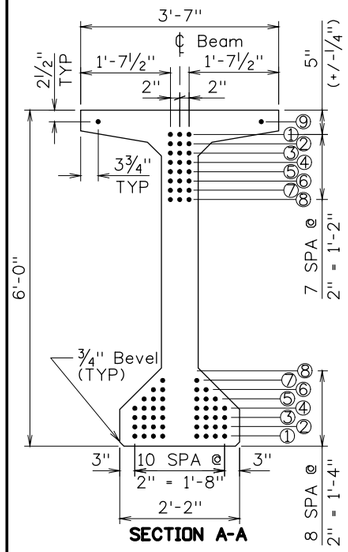
ELEVATION



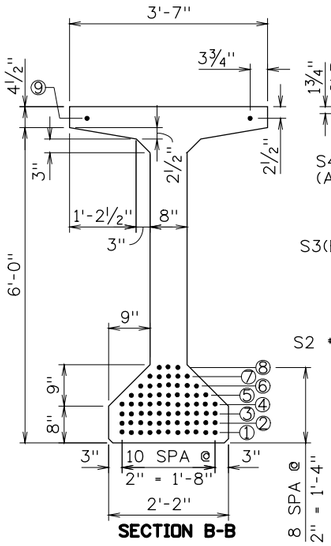
LIFTING DEVICE

SECTION D-D

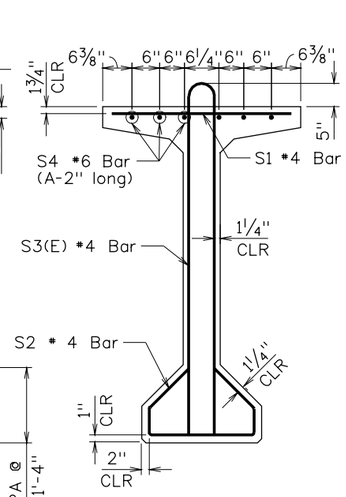
Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.



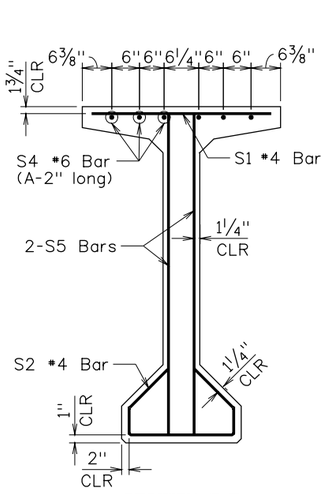
SECTION A-A



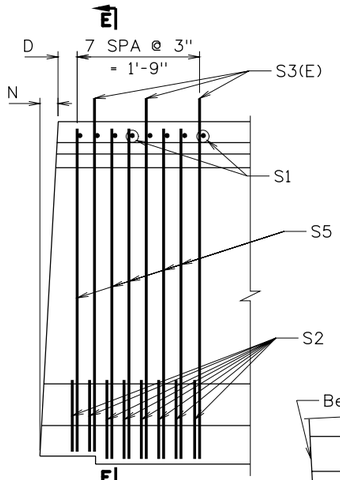
SECTION B-B



SECTION C-C TYPICAL SECTION SHOWING STEEL REINFORCEMENT

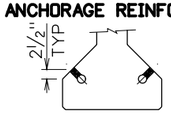


SECTION E-E TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE

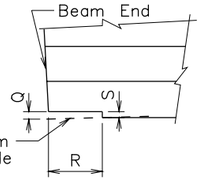


E

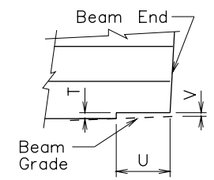
ANCHORAGE REINFORCEMENT



INSERT DETAIL



DETAIL "X"



DETAIL "Y"

NOTES:

1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
3. Roughen the top surface of each beam to an amplitude of approximately 1/4 inch and maintain clean and free of laitance.
4. Shop drawings shall show the detensioning plan by numbering the sequence of the strand pattern.
5. Prestressing strands shall be stabilized strand (1/2 inch nominal diameter) low relaxation uncoated seven wire strand in accordance with AASHTO M 203 grade 270. An initial stress of 202.5 psi shall be applied to the strand
6. Uncoated seven wire stress relieved strand may be substituted. However, if the Contractor chooses this alternate, he shall provide the design for the stress relieved strand and shall revise the original plans to reflect these changes. This design and plan modification shall be made at the Contractor's expense.
7. Deformed wire fabric is permitted instead of reinforcing steel bars provided an equal steel area is provided. Wire fabric must conform to the requirements of AASHTO Section M225.
8. The Elastomeric bearing pads under the prestressed beams shall conform to AASHTO Division 2, Section 18 Duro 60. Section 18.2.3.2 specifies laminate material to be:

   ASTM A245
   ASTM A570, Grade 36

9. Payment for Elastomeric bearing pads and any preformed joint material specified shall be included in Item 603-01. See pier & abutment sheets for details.
10. The threaded inserts shall have a minimum safe work load of 2500 lb in tension. All inserts shall be plugged to prevent concrete intrusion. Omit inserts on exterior face of exterior beams.
11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.

REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

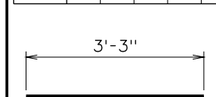
REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

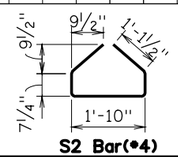
MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	

NUMBER OF 1/2" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

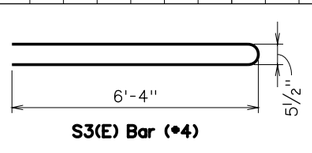
MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)										TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM								TOP					
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨		f'ci	f'c	



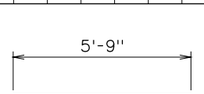
S1 Bar (#4)



S2 Bar(#4)



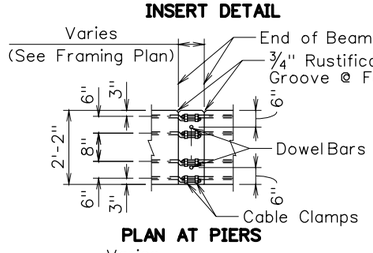
S3(E) Bar (#4)



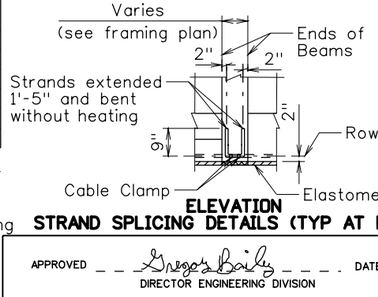
S5 Bar
* Specify bar size (refer to S5 bar table)

Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

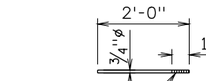
(E) denotes epoxy coated reinforcing steel bars



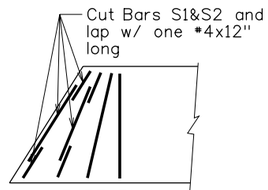
PLAN AT PIERS



ELEVATION
STRAND SPLICING DETAILS (TYP AT PIERS)



THREADED ANCHOR BAR DETAIL



PART PLAN
(Showing skewed end, 15° skew or greater)

BEARING PADS		
NO.	DESCRIPTION	LOCATION

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

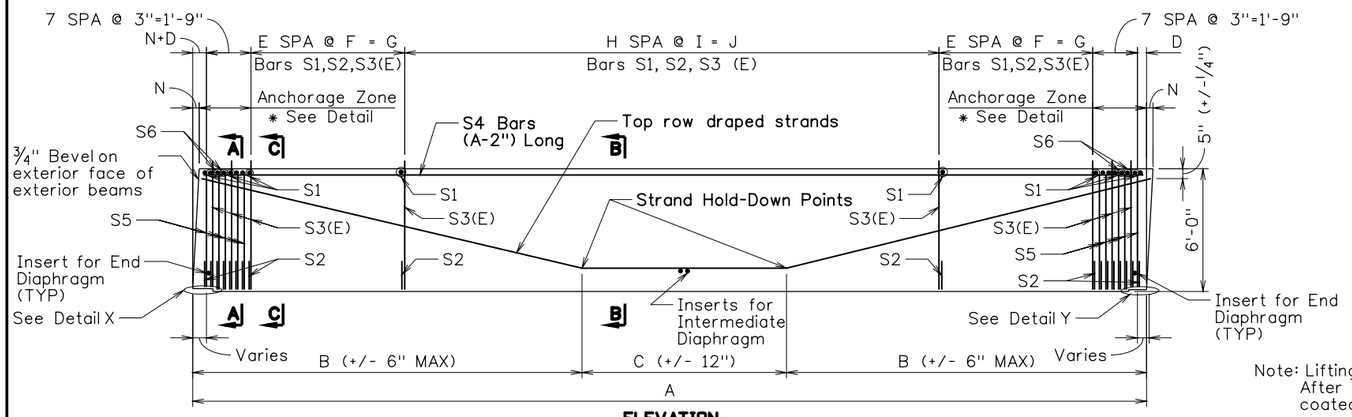
DESIGNED	DATE 12/5/06	
DRAWN		
CHECKED		
REVIEWED		

APPROVED Gregg's Bailey DIRECTOR ENGINEERING DIVISION DATE 12/18/06

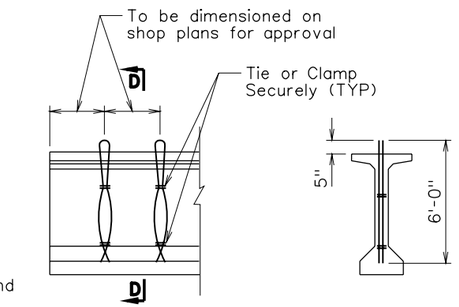
AASHTO TYPE IV - J PC BEAM
72" DEEP, 43" TOP FLANGE
BRD IVJ 72X43

SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



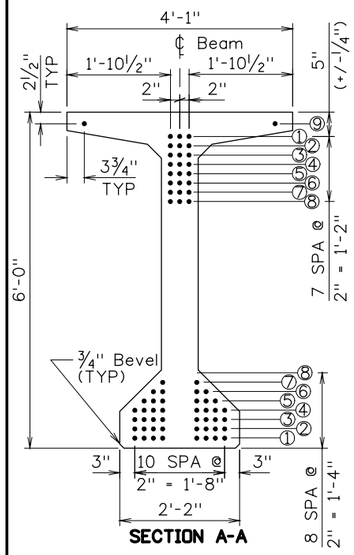
ELEVATION



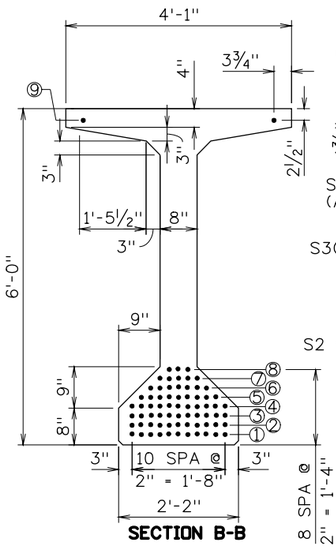
LIFTING DEVICE

SECTION D-D

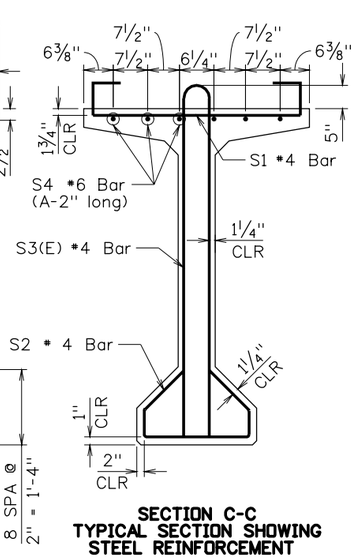
Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.



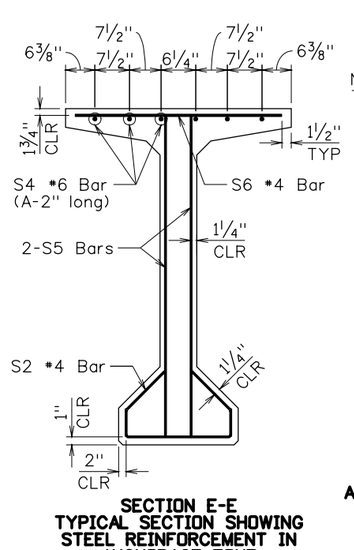
SECTION A-A



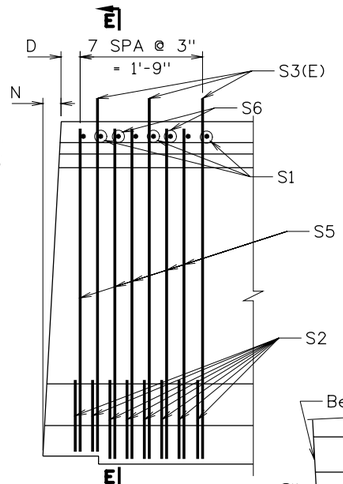
SECTION B-B



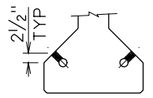
SECTION C-C
TYPICAL SECTION SHOWING STEEL REINFORCEMENT



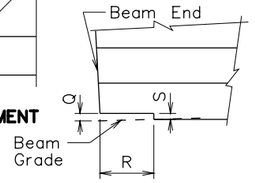
SECTION E-E
TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE



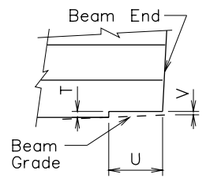
ANCHORAGE REINFORCEMENT



INSERT DETAIL



DETAIL "X"



DETAIL "Y"

NOTES:

1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
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8. The Elastomeric bearing pads under the prestressed beams shall conform to AASHTO Division 2, Section 18 Duro 60. Section 18.2.3.2 specifies laminate material to be:

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   ASTM A570, Grade 36

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10. The threaded inserts shall have a minimum safe work load of 2500 lb in tension. All inserts shall be plugged to prevent concrete intrusion. Omit inserts on exterior face of exterior beams.
11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.

REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			
S6			

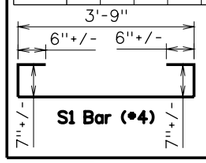
BEARING PADS		
NO.	DESCRIPTION	LOCATION

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

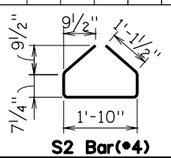
MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V

NUMBER OF 1/2" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

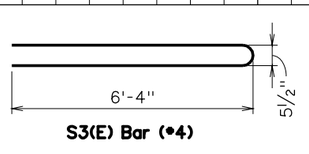
MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)										TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM								TOP					
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨		f'ci	f'c	



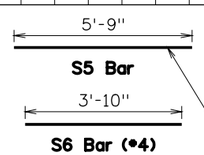
S1 Bar (•4)



S2 Bar(•4)



S3(E) Bar (•4)

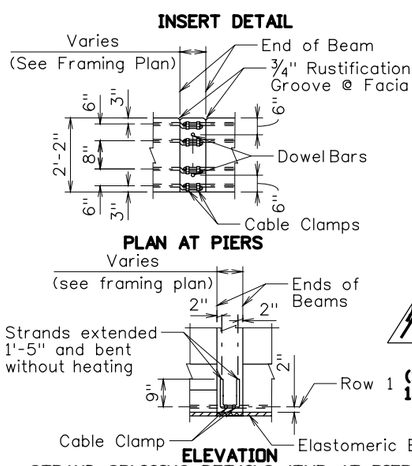


S6 Bar (•4)

Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

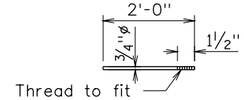
(E) denotes epoxy coated reinforcing steel bars

* Specify bar size (refer to S5 bar table)

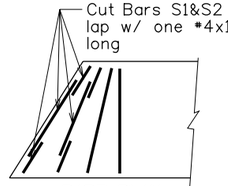


PLAN AT PIERS

ELEVATION
STRAND SPLICING DETAILS (TYP AT PIERS)



THREADED ANCHOR BAR DETAIL



PART PLAN
(Showing skewed end, 15° skew or greater)

NO.	REVISION	DATE:	BY:

C:\Users\V3 Addendum 07\new\BRD-IVJ 72x49_new.dgn 26-JAN-2007 10:37

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

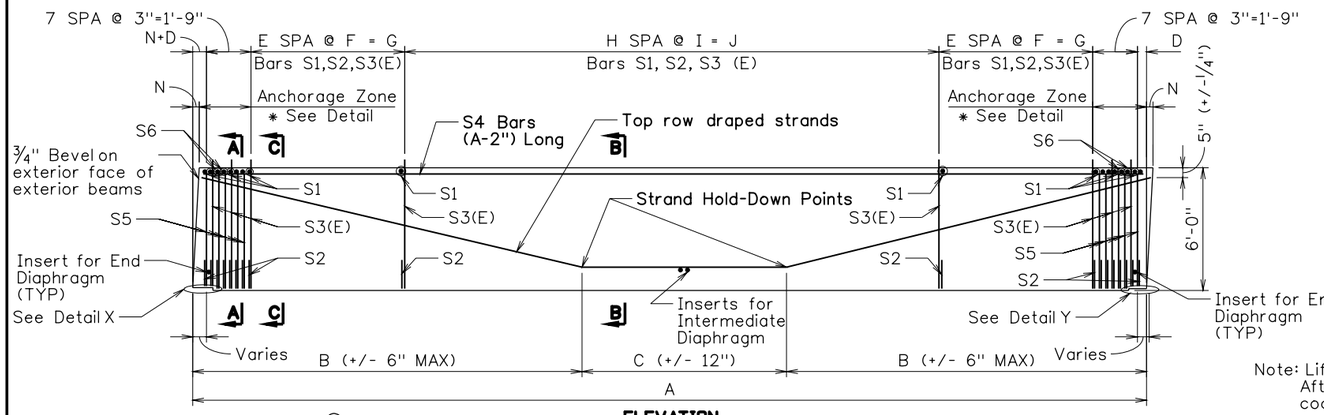
APPROVED Gregg A. Bailey DATE 12/18/06
DIRECTOR ENGINEERING DIVISION

DESIGNED		DATE 12/5/06
DRAWN		
CHECKED		
REVIEWED		

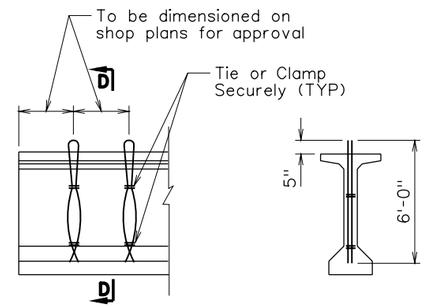
AASHTO TYPE IV – J PC BEAM
72" DEEP, 49" TOP FLANGE
BRD-IVJ 72X49

SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



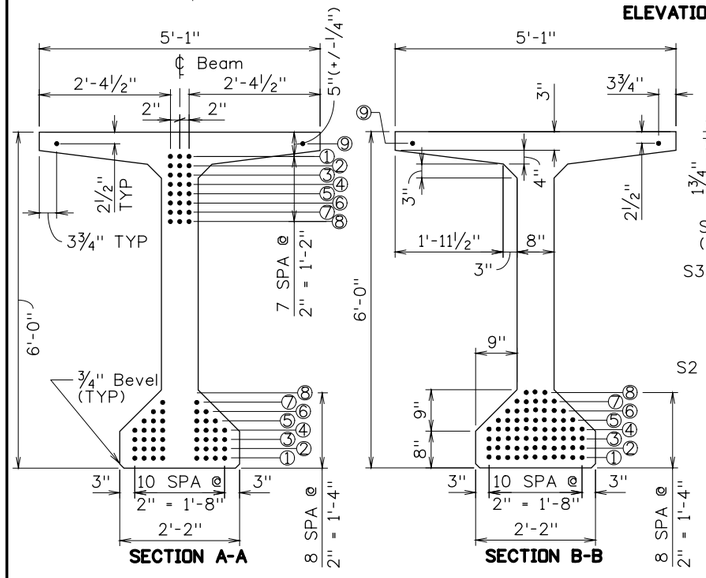
ELEVATION



LIFTING DEVICE

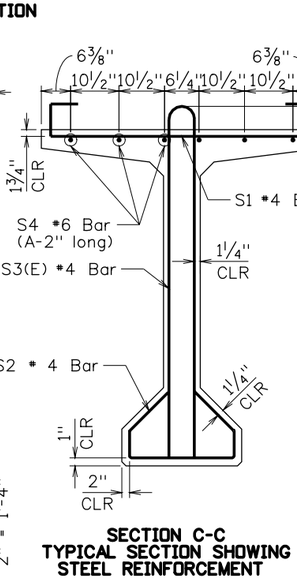
SECTION D-D

Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.

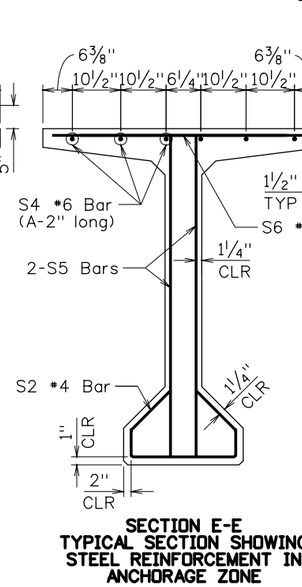


SECTION A-A

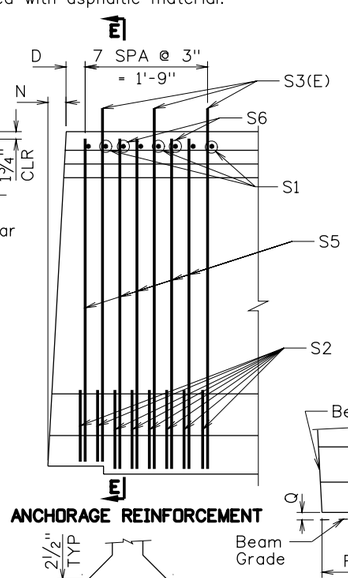
SECTION B-B



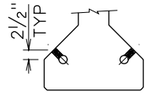
SECTION C-C
TYPICAL SECTION SHOWING STEEL REINFORCEMENT



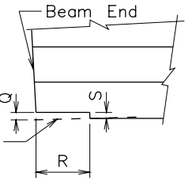
SECTION E-E
TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE



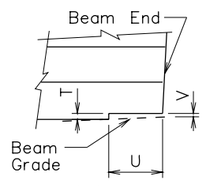
ANCHORAGE REINFORCEMENT



INSERT DETAIL



DETAIL "X"



DETAIL "Y"

NOTES:
1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
3. Roughen the top surface of each beam to an amplitude of approximately 1/4 inch and maintain clean and free of laitance.
4. Shop drawings shall show the detensioning plan by numbering the sequence of the strand pattern.
5. Prestressing strands shall be stabilized strand (1/2 inch nominal diameter) low relaxation uncoated seven wire strand in accordance with AASHTO M 203 grade 270. An initial stress of 202.5 psi shall be applied to the strand
6. Uncoated seven wire stress relieved strand may be substituted. However, if the Contractor chooses this alternate, he shall provide the design for the stress relieved strand and shall revise the original plans to reflect these changes. This design and plan modification shall be made at the Contractor's expense.
7. Deformed wire fabric is permitted instead of reinforcing steel bars provided an equal steel area is provided. Wire fabric must conform to the requirements of AASHTO Section M225.
8. The Elastomeric bearing pads under the prestressed beams shall conform to AASHTO Division 2, Section 18 Duro 60. Section 18.2.3.2 specifies laminate material to be:

   ASTM A245
   ASTM A570, Grade 36

9. Payment for Elastomeric bearing pads and any preformed joint material specified shall be included in Item 603-01. See pier & abutment sheets for details.
10. The threaded inserts shall have a minimum safe work load of 2500 lb in tension. All inserts shall be plugged to prevent concrete intrusion. Omit inserts on exterior face of exterior beams.
11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.

REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			
S6			

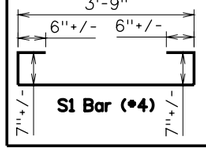
BEARING PADS		
NO.	DESCRIPTION	LOCATION

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

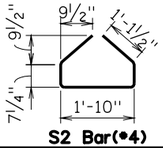
MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	

NUMBER OF 1/2" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

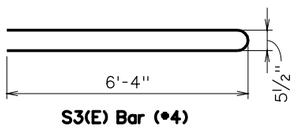
MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)										TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM								TOP					
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨		f'ci	f'c	



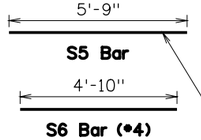
S1 Bar (#4)



S2 Bar(#4)



S3(E) Bar (#4)

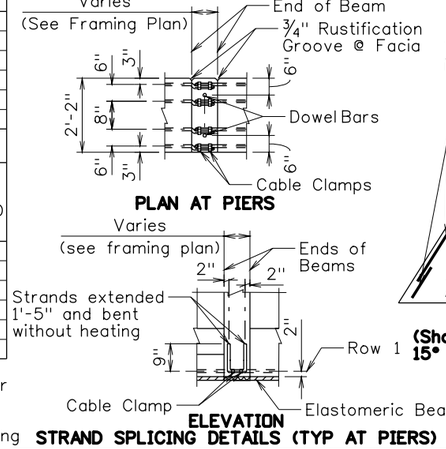


S6 Bar (#4)

Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

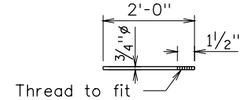
(E) denotes epoxy coated reinforcing steel bars

* Specify bar size (refer to S5 bar table)

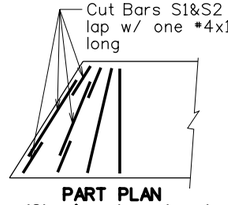


PLAN AT PIERS

ELEVATION
STRAND SPLICING DETAILS (TYP AT PIERS)



THREADED ANCHOR BAR DETAIL



PART PLAN
(Showing skewed end, 15° skew or greater)

NO.	REVISION	DATE:	BY:

C:\Users\V3 Addendum 07\new\BRD-IVJ 72x61_new.dgn 26-JAN-2007 10:37

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

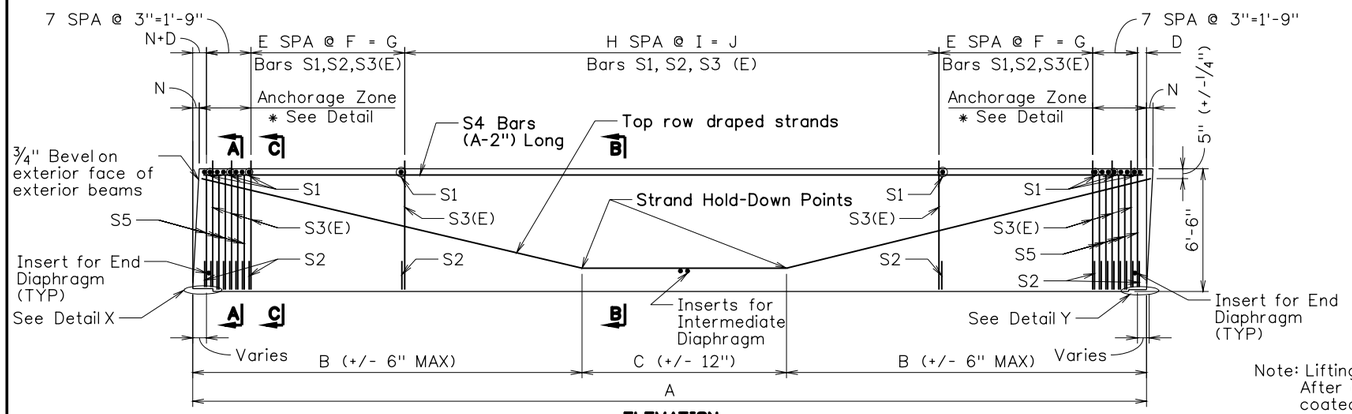
DESIGNED		DATE 12/5/06
DRAWN		
CHECKED		
REVIEWED		

APPROVED _____ DIRECTOR ENGINEERING DIVISION DATE 12/18/06

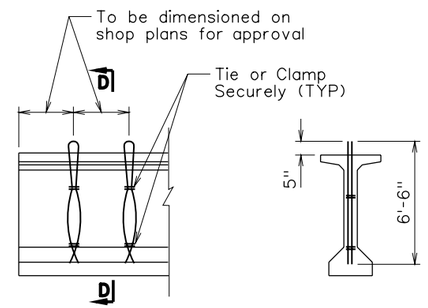
AASHTO TYPE IV – J PC BEAM
72" DEEP, 61" TOP FLANGE
BRD-IVJ 72X61

SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



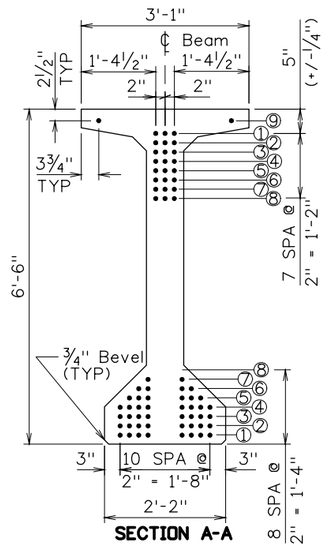
ELEVATION



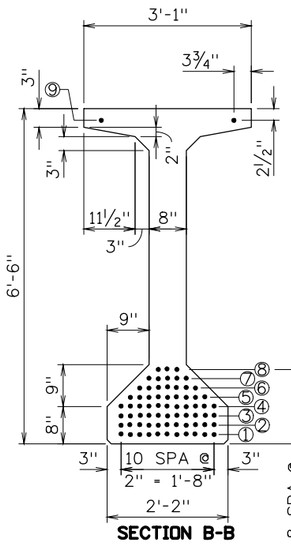
LIFTING DEVICE

SECTION D-D

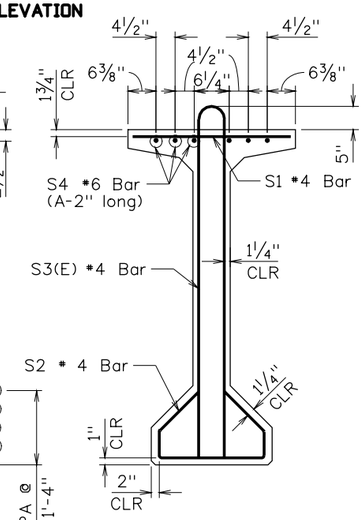
Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.



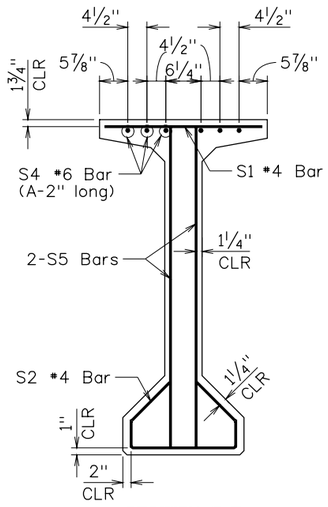
SECTION A-A



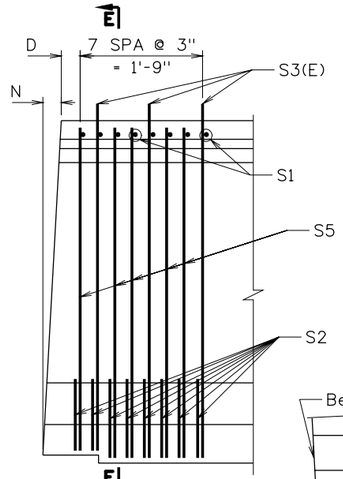
SECTION B-B



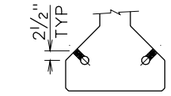
SECTION C-C
TYPICAL SECTION SHOWING STEEL REINFORCEMENT



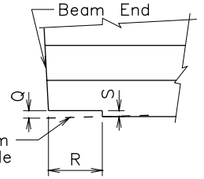
SECTION E-E
TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE



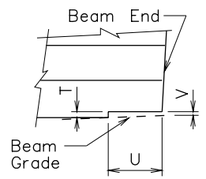
E
ANCHORAGE REINFORCEMENT



INSERT DETAIL



DETAIL "X"



DETAIL "Y"

NOTES:
1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
3. Roughen the top surface of each beam to an amplitude of approximately 1/4 inch and maintain clean and free of laitance.
4. Shop drawings shall show the detensioning plan by numbering the sequence of the strand pattern.
5. Prestressing strands shall be stabilized strand (1/2 inch nominal diameter) low relaxation uncoated seven wire strand in accordance with AASHTO M 203 grade 270. An initial stress of 202.5 psi shall be applied to the strand
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7. Deformed wire fabric is permitted instead of reinforcing steel bars provided an equal steel area is provided. Wire fabric must conform to the requirements of AASHTO Section M225.
8. The Elastomeric bearing pads under the prestressed beams shall conform to AASHTO Division 2, Section 18 Duro 60. Section 18.2.3.2 specifies laminate material to be:

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   ASTM A570, Grade 36

9. Payment for Elastomeric bearing pads and any preformed joint material specified shall be included in Item 603-01. See pier & abutment sheets for details.
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11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.

REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			

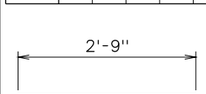
BEARING PADS		
NO.	DESCRIPTION	LOCATION

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

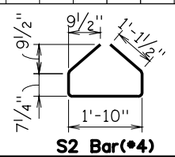
MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	

NUMBER OF 1/2" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

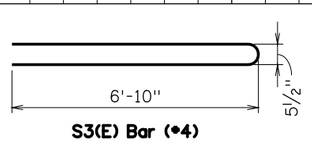
MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)										TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM								TOP					
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨		f'ci	f'c	



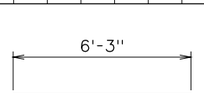
S1 Bar (#4)



S2 Bar(#4)



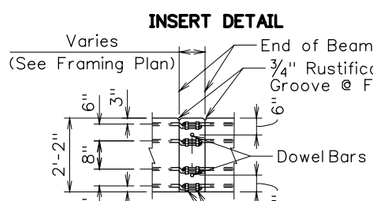
S3(E) Bar (#4)



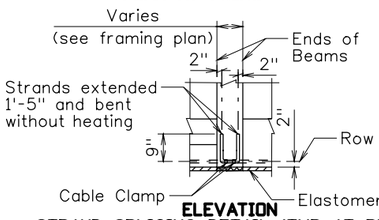
S5 Bar
* Specify bar size (refer to S5 bar table)

Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

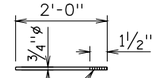
(E) denotes epoxy coated reinforcing steel bars



PLAN AT PIERS

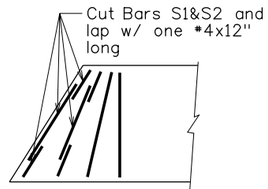


ELEVATION
STRAND SPLICING DETAIL (TYP AT PIERS)



Thread to fit insert

THREADED ANCHOR BAR DETAIL



PART PLAN
(Showing skewed end, 15° skew or greater)

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

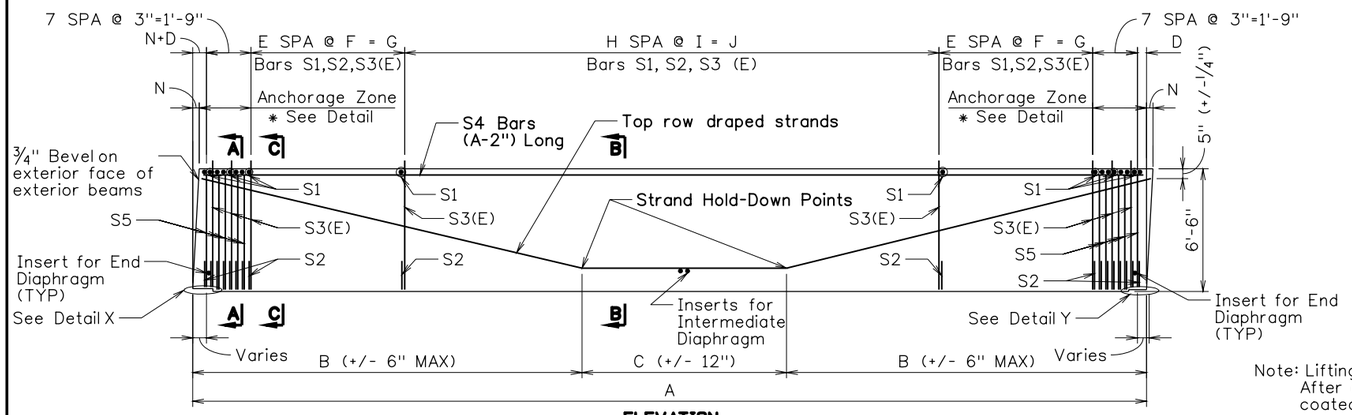
DESIGNED	DATE 12/5/06
DRAWN	
CHECKED	
REVIEWED	

APPROVED Gregg's Bailey DATE 12/18/06
DIRECTOR ENGINEERING DIVISION

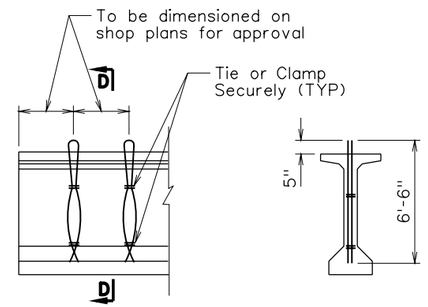
AASHTO TYPE IV - J PC BEAM
78" DEEP, 37" TOP FLANGE
BRD-IVJ 78X37

SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



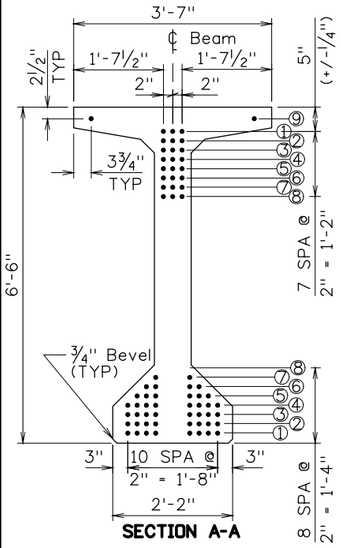
ELEVATION



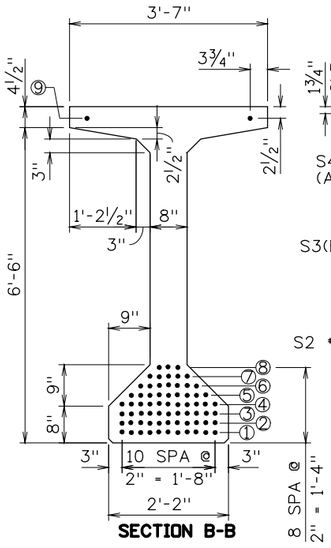
LIFTING DEVICE

SECTION D-D

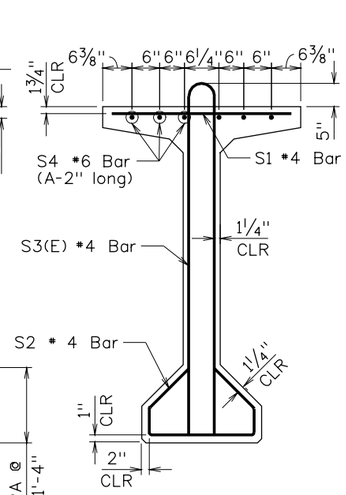
Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.



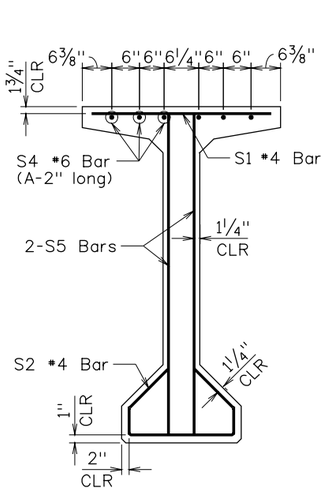
SECTION A-A



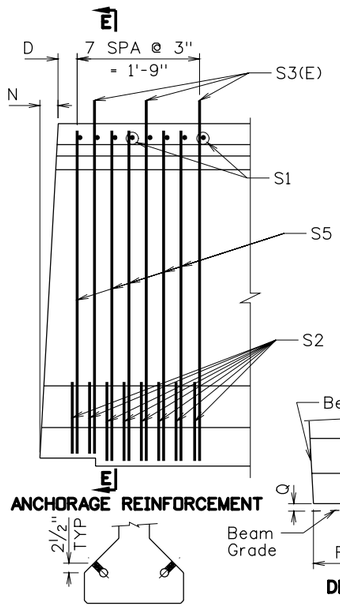
SECTION B-B



SECTION C-C TYPICAL SECTION SHOWING STEEL REINFORCEMENT

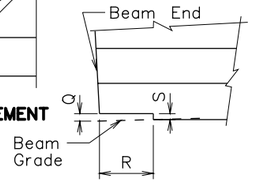


SECTION E-E TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE

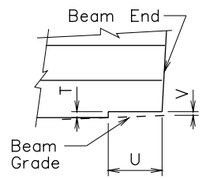


ANCHORAGE REINFORCEMENT

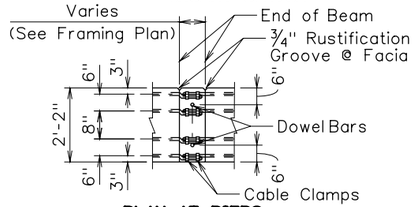
INSERT DETAIL



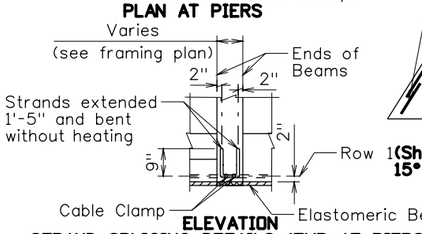
DETAIL "X"



DETAIL "Y"

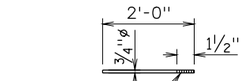


PLAN AT PIERS

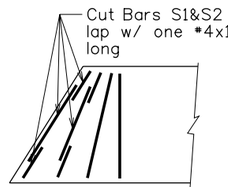


ELEVATION

STRAND SPLICING DETAILS (TYP AT PIERS)



THREADED ANCHOR BAR DETAIL



PART PLAN
(Showing skewed end, 15° skew or greater)

NOTES:

1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
3. Roughen the top surface of each beam to an amplitude of approximately 1/4 inch and maintain clean and free of laitance.
4. Shop drawings shall show the detensioning plan by numbering the sequence of the strand pattern.
5. Prestressing strands shall be stabilized strand (1/2 inch nominal diameter) low relaxation uncoated seven wire strand in accordance with AASHTO M 203 grade 270. An initial stress of 202.5 psi shall be applied to the strand
6. Uncoated seven wire stress relieved strand may be substituted. However, if the Contractor chooses this alternate, he shall provide the design for the stress relieved strand and shall revise the original plans to reflect these changes. This design and plan modification shall be made at the Contractor's expense.
7. Deformed wire fabric is permitted instead of reinforcing steel bars provided an equal steel area is provided. Wire fabric must conform to the requirements of AASHTO Section M225.
8. The Elastomeric bearing pads under the prestressed beams shall conform to AASHTO Division 2, Section 18 Duro 60. Section 18.2.3.2 specifies laminate material to be:

   ASTM A245
   ASTM A570, Grade 36

9. Payment for Elastomeric bearing pads and any preformed joint material specified shall be included in Item 603-01. See pier & abutment sheets for details.
10. The threaded inserts shall have a minimum safe work load of 2500 lb in tension. All inserts shall be plugged to prevent concrete intrusion. Omit inserts on exterior face of exterior beams.
11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.

REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			

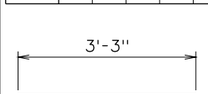
BEARING PADS		
NO.	DESCRIPTION	LOCATION

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

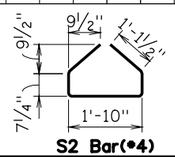
MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	

NUMBER OF 1/2" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

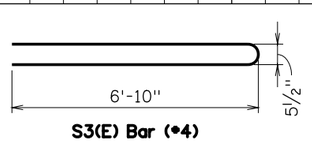
MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)										TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM								TOP					
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨		f'ci	f'c	



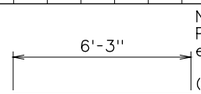
S1 Bar (#4)



S2 Bar(#4)



S3(E) Bar (#4)



S5 Bar
* Specify bar size (refer to S5 bar table)

Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

(E) denotes epoxy coated reinforcing steel bars

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

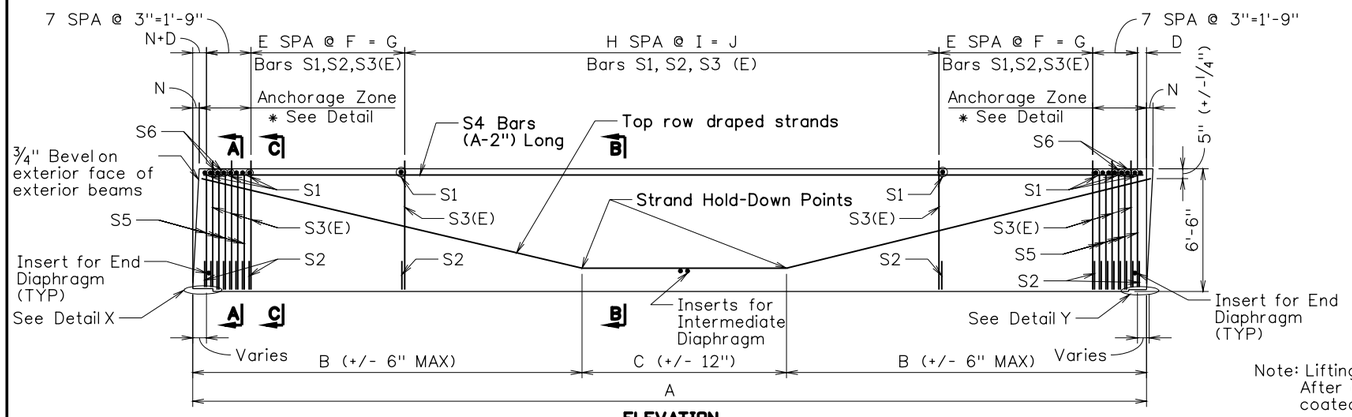
APPROVED Gregg Bailey DIRECTOR ENGINEERING DIVISION DATE 12/18/06

DESIGNED	DATE 12/5/06
DRAWN	
CHECKED	
REVIEWED	

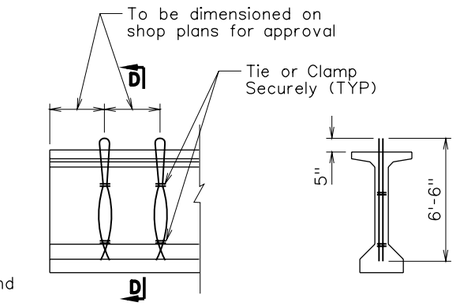
AASHTO TYPE IV – J PC BEAM
78" DEEP, 43" TOP FLANGE
BRD-IVJ 78X43

SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



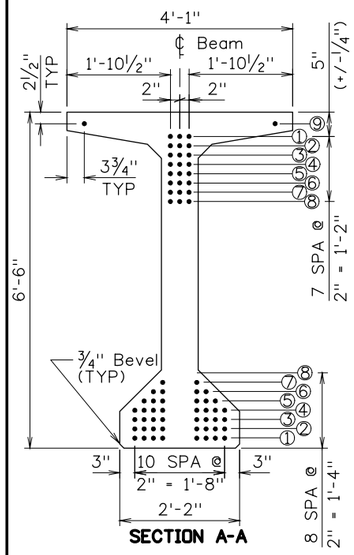
ELEVATION



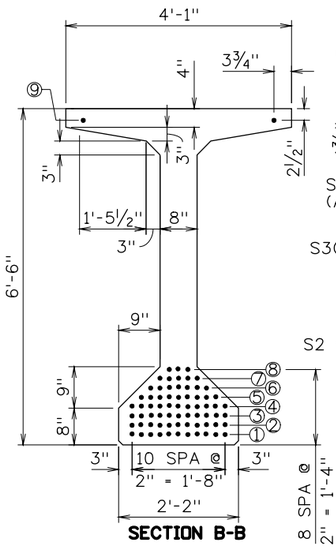
LIFTING DEVICE

SECTION D-D

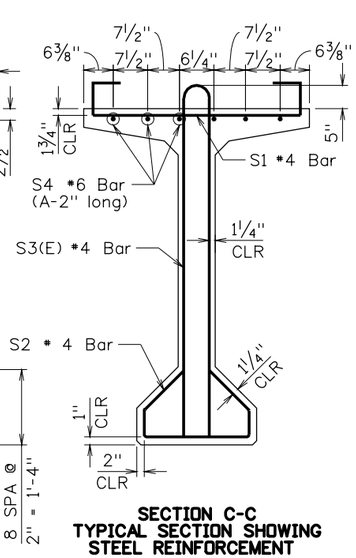
Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.



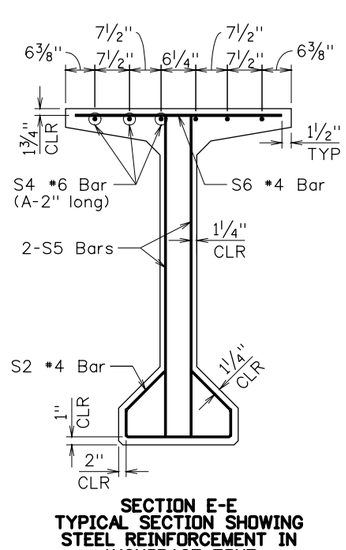
SECTION A-A



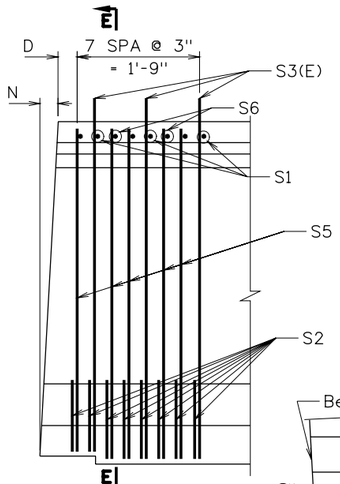
SECTION B-B



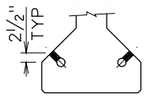
SECTION C-C
TYPICAL SECTION SHOWING STEEL REINFORCEMENT



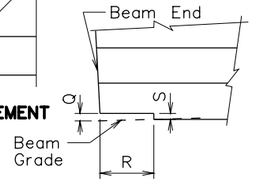
SECTION E-E
TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE



ANCHORAGE REINFORCEMENT



INSERT DETAIL



DETAIL "X" **DETAIL "Y"**

NOTES:
1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
3. Roughen the top surface of each beam to an amplitude of approximately 1/4 inch and maintain clean and free of laitance.
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5. Prestressing strands shall be stabilized strand (1/2 inch nominal diameter) low relaxation uncoated seven wire strand in accordance with AASHTO M 203 grade 270. An initial stress of 202.5 psi shall be applied to the strand
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8. The Elastomeric bearing pads under the prestressed beams shall conform to AASHTO Division 2, Section 18 Duro 60. Section 18.2.3.2 specifies laminate material to be:

   ASTM A245
   ASTM A570, Grade 36

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10. The threaded inserts shall have a minimum safe work load of 2500 lb in tension. All inserts shall be plugged to prevent concrete intrusion. Omit inserts on exterior face of exterior beams.
11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.

REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			
S6			

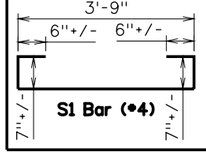
BEARING PADS		
NO.	DESCRIPTION	LOCATION

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

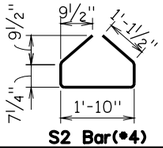
MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	

NUMBER OF 1/2" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)																TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM								TOP									f'ci	f'c	
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨				

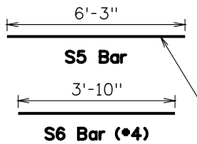


S1 Bar (•4)



S2 Bar(•4)

S3(E) Bar (•4)

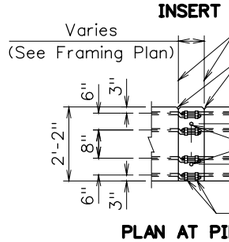


S5 Bar
S6 Bar (•4)

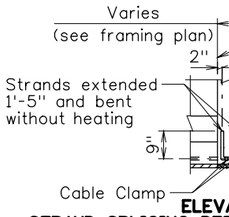
Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

(E) denotes epoxy coated reinforcing steel bars

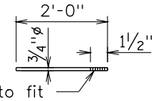
* Specify bar size (refer to S5 bar table)



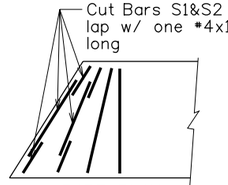
PLAN AT PIERS



ELEVATION
STRAND SPLICING DETAILS (TYP AT PIERS)



THREADED ANCHOR BAR DETAIL



PART PLAN
(Showing skewed end, 15° skew or greater)

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

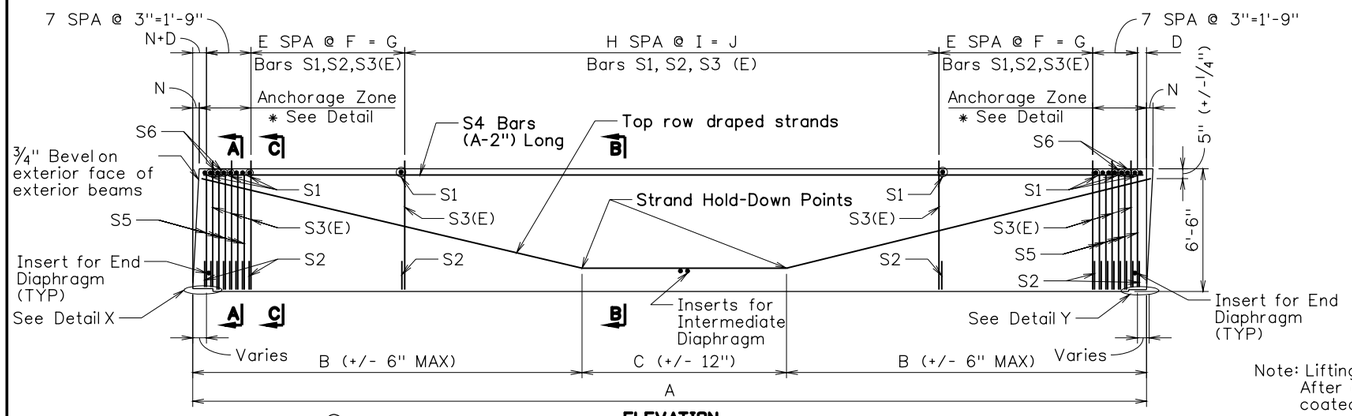
DESIGNED		DATE	12/5/06
DRAWN			
CHECKED			
REVIEWED			

APPROVED _____ DATE 12/18/06
DIRECTOR ENGINEERING DIVISION

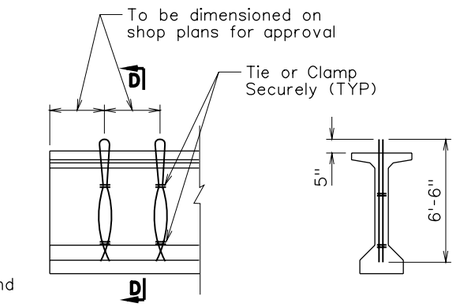
AASHTO TYPE IV – J PC BEAM
78" DEEP, 49" TOP FLANGE
BRD–IVJ 78X49

SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



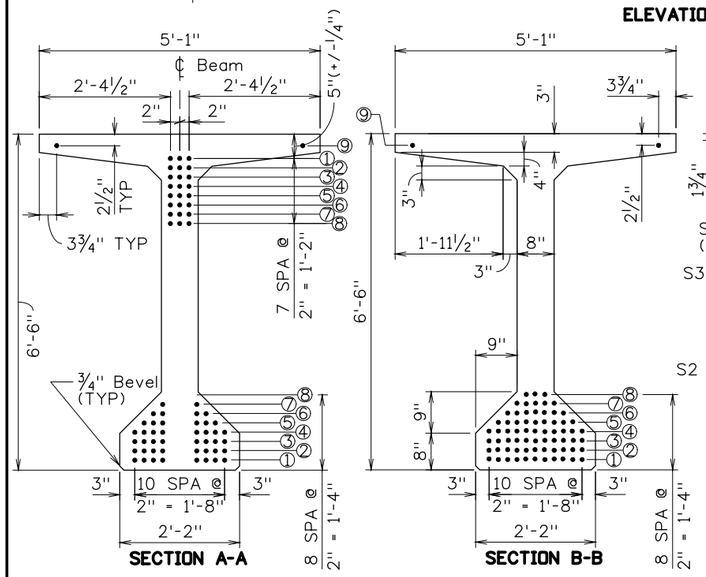
ELEVATION



LIFTING DEVICE

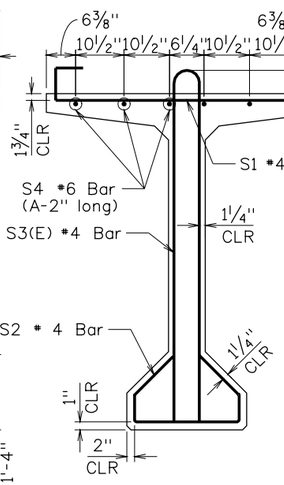
SECTION D-D

Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.

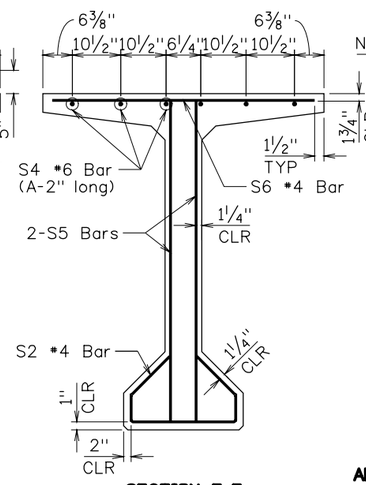


SECTION A-A

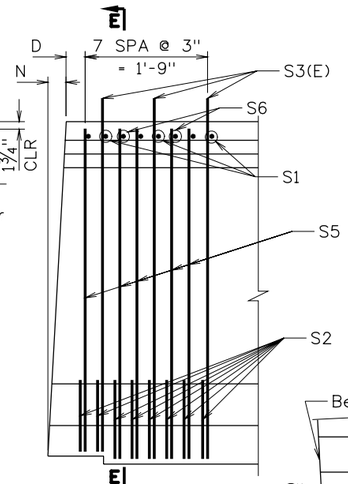
SECTION B-B



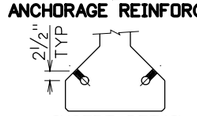
SECTION C-C
TYPICAL SECTION SHOWING STEEL REINFORCEMENT



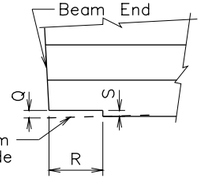
SECTION E-E
TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE



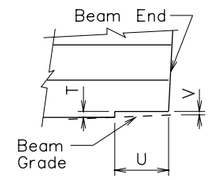
ANCHORAGE REINFORCEMENT



INSERT DETAIL



DETAIL "X"



DETAIL "Y"

NOTES:
1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
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   ASTM A570, Grade 36

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12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.

REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

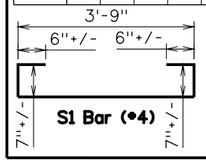
REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			
S6			

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

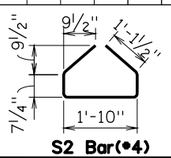
MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	

NUMBER OF 1/2" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

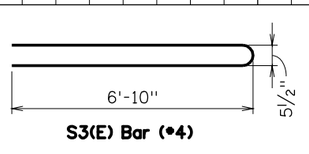
MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)										TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM								TOP					
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨		f'ci	f'c	



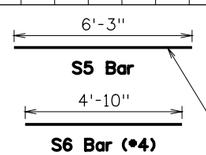
S1 Bar (•4)



S2 Bar(•4)



S3(E) Bar (•4)

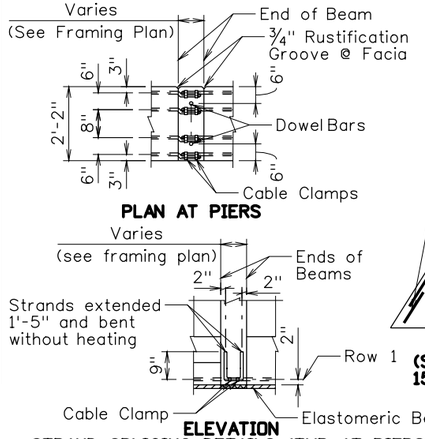


S6 Bar (•4)

Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

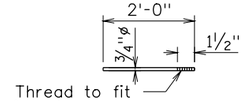
(E) denotes epoxy coated reinforcing steel bars

* Specify bar size (refer to S5 bar table)



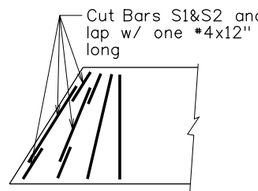
PLAN AT PIERS

ELEVATION
STRAND SPLICING DETAILS (TYP AT PIERS)



THREADED ANCHOR BAR DETAIL

BEARING PADS		
NO.	DESCRIPTION	LOCATION



PART PLAN
(Showing skewed end, 15° skew or greater)

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

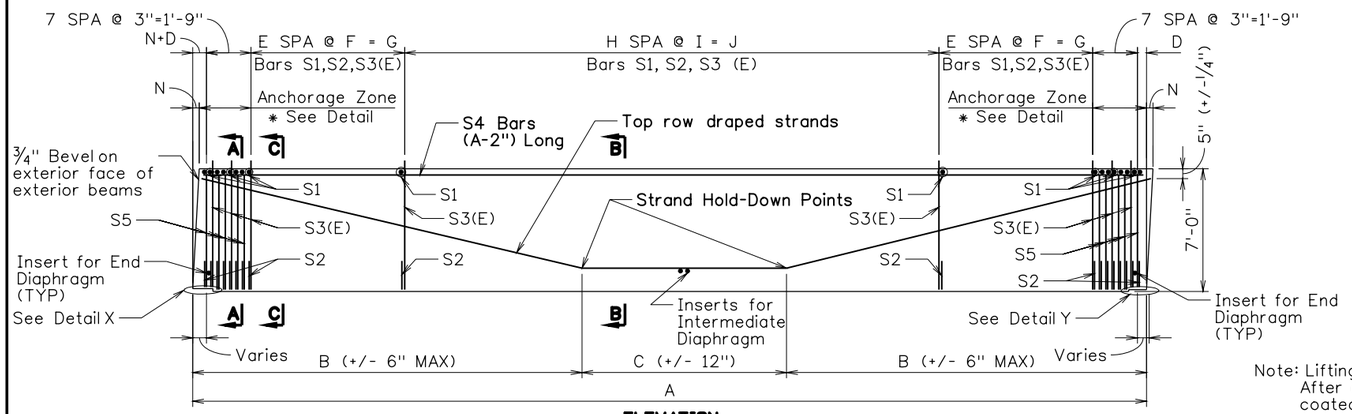
APPROVED _ _ Gregory Bailey _ _ _ _ _ DATE _ _ 12/18/06 _ _
DIRECTOR ENGINEERING DIVISION

DESIGNED	DATE 12/5/06
DRAWN	
CHECKED	
REVIEWED	

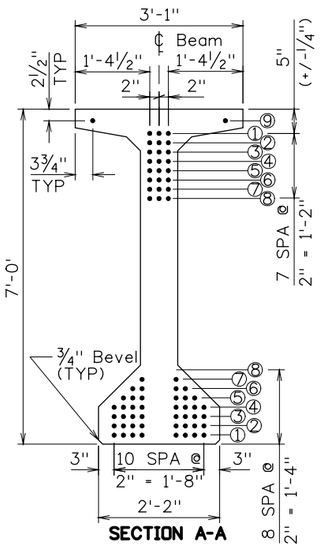
AASHTO TYPE IV – J
78" DEEP, 61" TOP FLANGE
BRD–IVJ 78X61

SHEET OF
BRIDGE NO.

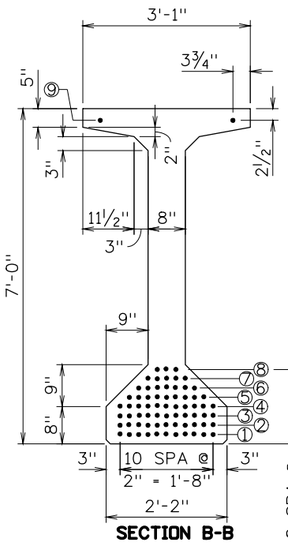
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



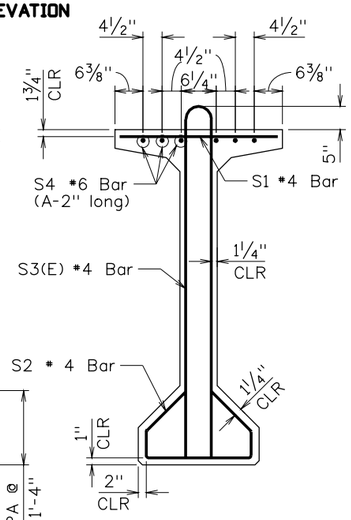
ELEVATION



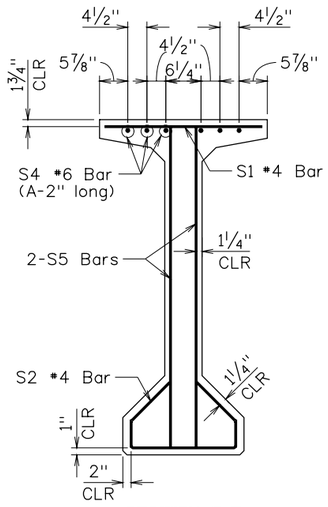
SECTION A-A



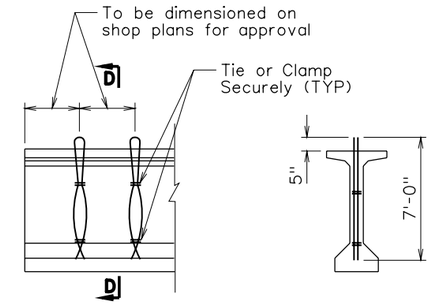
SECTION B-B



SECTION C-C
TYPICAL SECTION SHOWING STEEL REINFORCEMENT



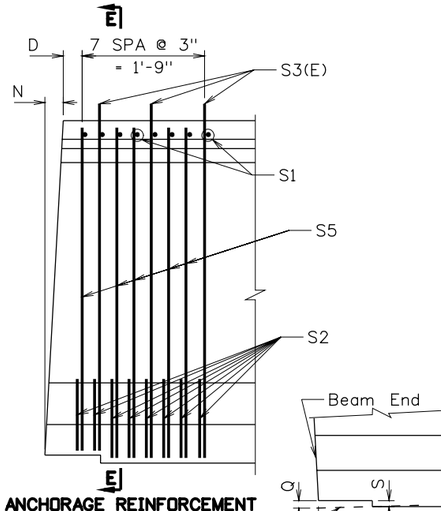
SECTION E-E
TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE



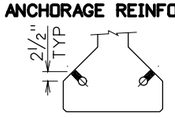
LIFTING DEVICE

SECTION D-D

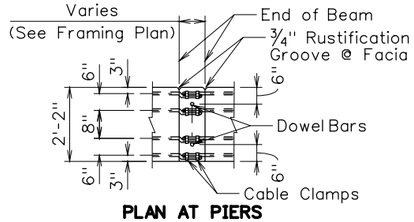
Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.



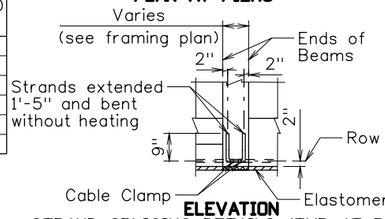
E
ANCHORAGE REINFORCEMENT



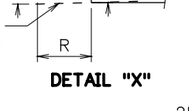
INSERT DETAIL



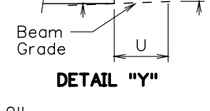
PLAN AT PIERS



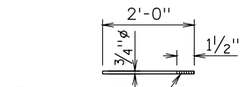
ELEVATION
STRAND SPLICING DETAILS (TYP AT PIERS)



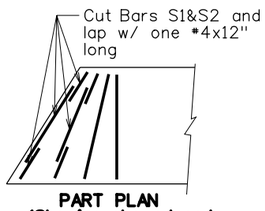
DETAIL "X"



DETAIL "Y"



THREADED ANCHOR BAR DETAIL



PART PLAN
(Showing skewed end, 15° skew or greater)

NOTES:

1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
3. Roughen the top surface of each beam to an amplitude of approximately 1/4 inch and maintain clean and free of laitance.
4. Shop drawings shall show the detensioning plan by numbering the sequence of the strand pattern.
5. Prestressing strands shall be stabilized strand (1/2 inch nominal diameter) low relaxation uncoated seven wire strand in accordance with AASHTO M 203 grade 270. An initial stress of 202.5 psi shall be applied to the strand
6. Uncoated seven wire stress relieved strand may be substituted. However, if the Contractor chooses this alternate, he shall provide the design for the stress relieved strand and shall revise the original plans to reflect these changes. This design and plan modification shall be made at the Contractor's expense.
7. Deformed wire fabric is permitted instead of reinforcing steel bars provided an equal steel area is provided. Wire fabric must conform to the requirements of AASHTO Section M225.
8. The Elastomeric bearing pads under the prestressed beams shall conform to AASHTO Division 2, Section 18 Duro 60. Section 18.2.3.2 specifies laminate material to be:

   ASTM A245
   ASTM A570, Grade 36

9. Payment for Elastomeric bearing pads and any preformed joint material specified shall be included in Item 603-01. See pier & abutment sheets for details.
10. The threaded inserts shall have a minimum safe work load of 2500 lb in tension. All inserts shall be plugged to prevent concrete intrusion. Omit inserts on exterior face of exterior beams.
11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.

REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			

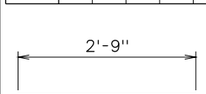
BEARING PADS		
NO.	DESCRIPTION	LOCATION

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

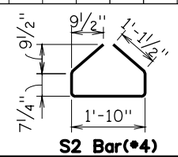
MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	

NUMBER OF 1/2" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

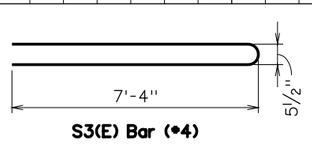
MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)										TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM								TOP					
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨		f'ci	f'c	



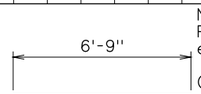
S1 Bar (#4)



S2 Bar(#4)



S3(E) Bar (#4)



S5 Bar
* Specify bar size (refer to S5 bar table)

Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

(E) denotes epoxy coated reinforcing steel bars

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

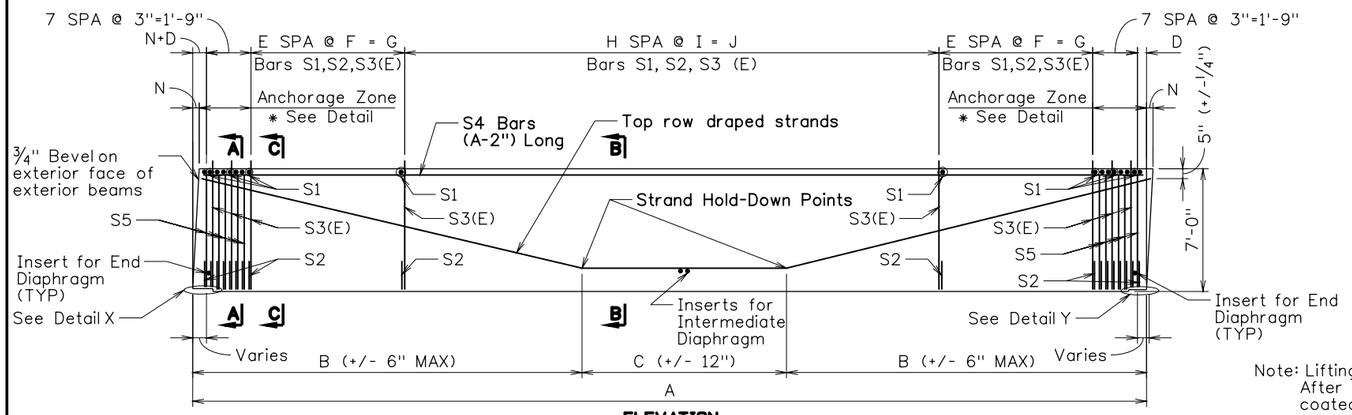
DESIGNED	DATE 12/5/06
DRAWN	
CHECKED	
REVIEWED	

APPROVED _____ DATE 12/18/06
DIRECTOR ENGINEERING DIVISION

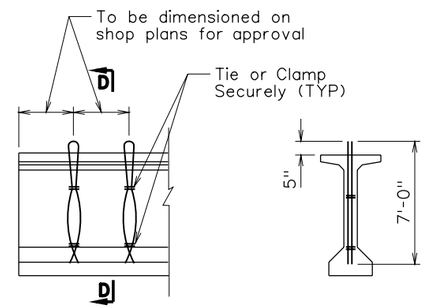
AASHTO TYPE IV - J PC BEAM
84" DEEP, 37" TOP FLANGE
BRD-IVJ 84X37

SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



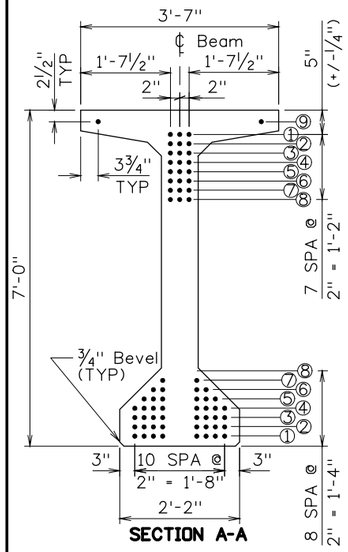
ELEVATION



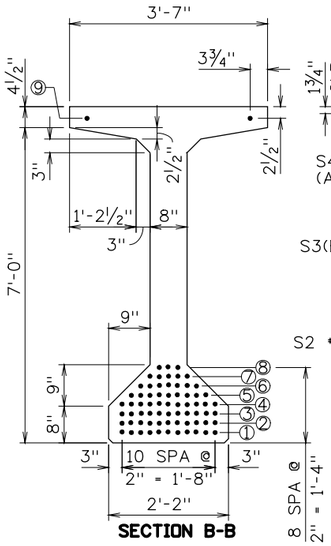
LIFTING DEVICE

SECTION D-D

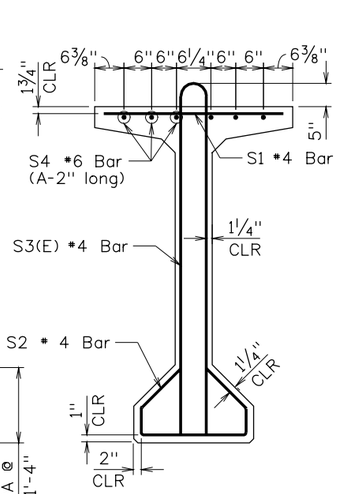
Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.



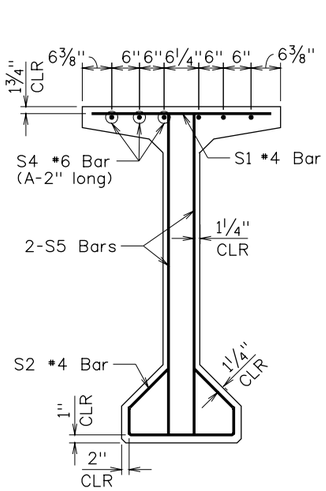
SECTION A-A



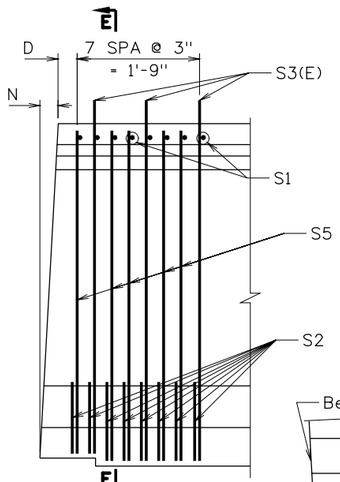
SECTION B-B



SECTION C-C TYPICAL SECTION SHOWING STEEL REINFORCEMENT

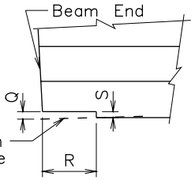


SECTION E-E TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE

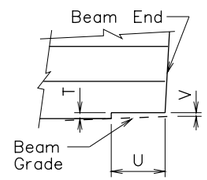


ANCHORAGE REINFORCEMENT

INSERT DETAIL



DETAIL "X"



DETAIL "Y"

NOTES:

1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
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   ASTM A570, Grade 36

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11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.

REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			

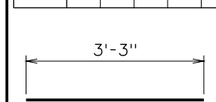
BEARING PADS		
NO.	DESCRIPTION	LOCATION

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

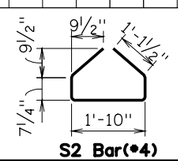
MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	

NUMBER OF 1/2" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

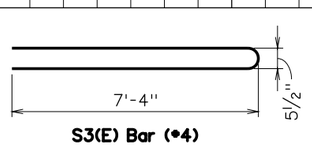
MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)										TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM								TOP					
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨		f'ci	f'c	



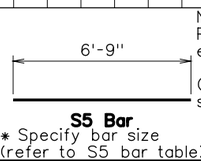
S1 Bar (#4)



S2 Bar(#4)



S3(E) Bar (#4)

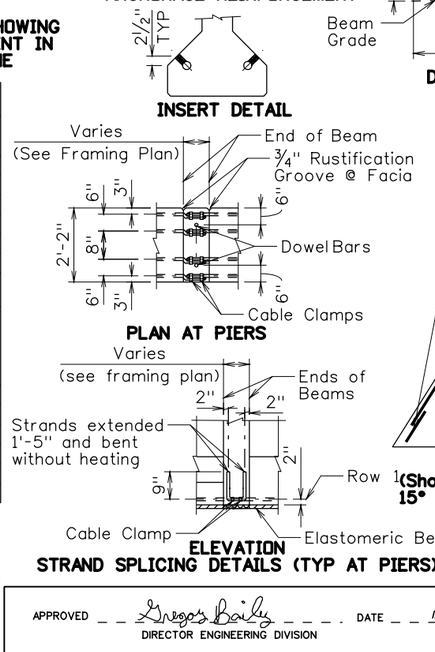


S5 Bar

* Specify bar size (refer to S5 bar table)

Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

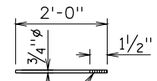
(E) denotes epoxy coated reinforcing steel bars



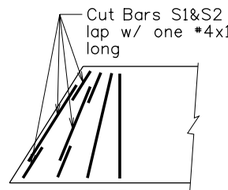
PLAN AT PIERS

ELEVATION

STRAND SPLICING DETAILS (TYP AT PIERS)



THREADED ANCHOR BAR DETAIL



PART PLAN
(Showing skewed end, 15° skew or greater)

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

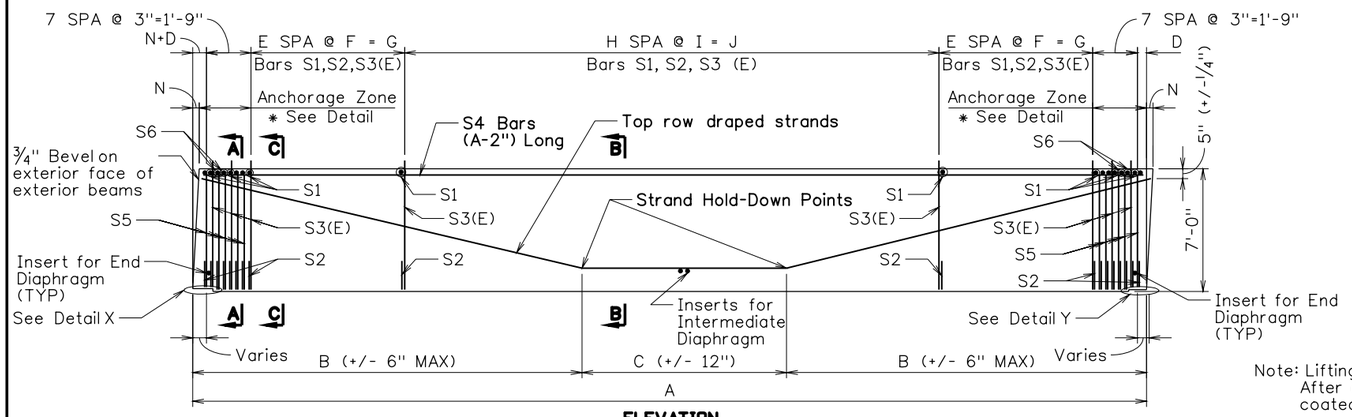
DESIGNED		DATE 12/5/06
DRAWN		
CHECKED		
REVIEWED		

APPROVED Gregory Bailey DIRECTOR ENGINEERING DIVISION DATE 12/18/06

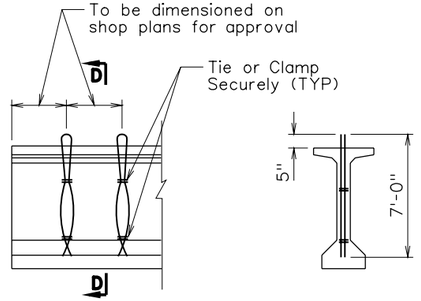
AASHTO TYPE IV - J PC BEAM
84" DEEP, 43" TOP FLANGE
BRD-IVJ 84X43

SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				

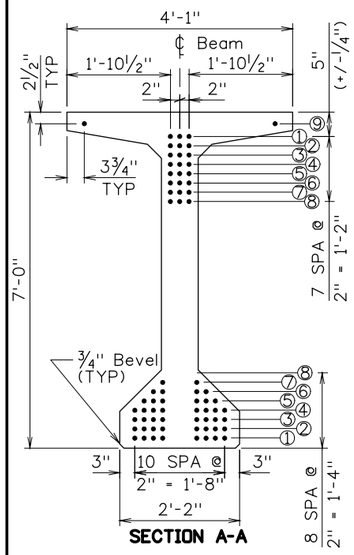


ELEVATION

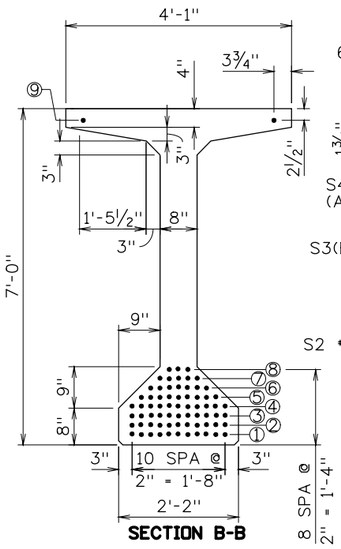


LIFTING DEVICE **SECTION D-D**

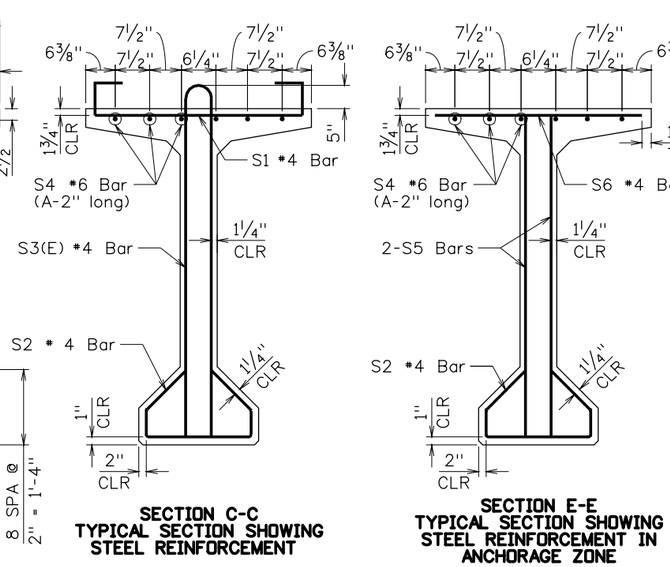
Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.



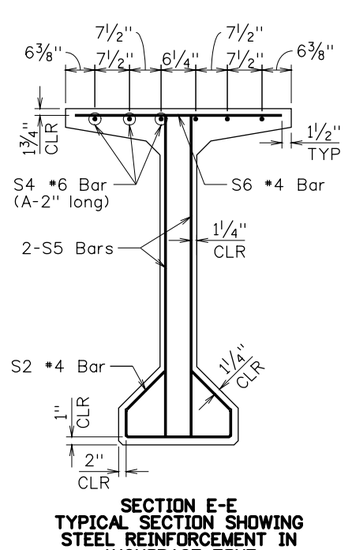
SECTION A-A



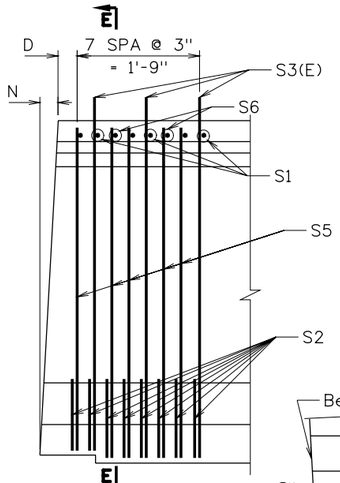
SECTION B-B



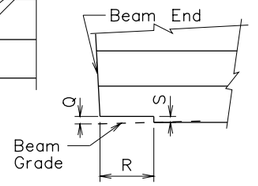
SECTION C-C
TYPICAL SECTION SHOWING STEEL REINFORCEMENT



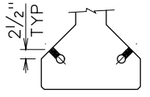
SECTION E-E
TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE



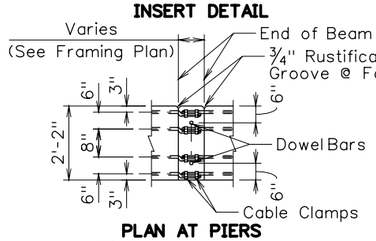
ANCHORAGE REINFORCEMENT



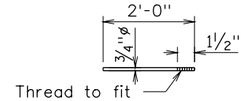
DETAIL "X" **DETAIL "Y"**



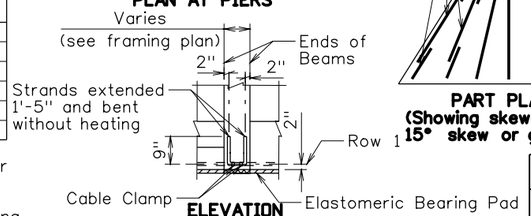
INSERT DETAIL



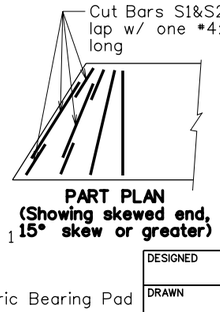
PLAN AT PIERS



THREADED ANCHOR BAR DETAIL



ELEVATION
STRAND SPLICING DETAILS (TYP AT PIERS)



PART PLAN
(Showing skewed end, 15° skew or greater)

NOTES:

1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
3. Roughen the top surface of each beam to an amplitude of approximately ¼ inch and maintain clean and free of laitance.
4. Shop drawings shall show the detensioning plan by numbering the sequence of the strand pattern.
5. Prestressing strands shall be stabilized strand (1/2 inch nominal diameter) low relaxation uncoated seven wire strand in accordance with AASHTO M 203 grade 270. An initial stress of 202.5 psi shall be applied to the strand
6. Uncoated seven wire stress relieved strand may be substituted. However, if the Contractor chooses this alternate, he shall provide the design for the stress relieved strand and shall revise the original plans to reflect these changes. This design and plan modification shall be made at the Contractor's expense.
7. Deformed wire fabric is permitted instead of reinforcing steel bars provided an equal steel area is provided. Wire fabric must conform to the requirements of AASHTO Section M225.
8. The Elastomeric bearing pads under the prestressed beams shall conform to AASHTO Division 2, Section 18 Duro 60. Section 18.2.3.2 specifies laminate material to be:

   ASTM A245
   ASTM A570, Grade 36

9. Payment for Elastomeric bearing pads and any preformed joint material specified shall be included in Item 603-01. See pier & abutment sheets for details.
10. The threaded inserts shall have a minimum safe work load of 2500 lb in tension. All inserts shall be plugged to prevent concrete intrusion. Omit inserts on exterior face of exterior beams.
11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.

REINFORCING BAR LIST

MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

REINFORCING BAR LIST

MARK	SIZE	COUNT/BEAM	TOTAL
*S5			
S6			

BEARING PADS

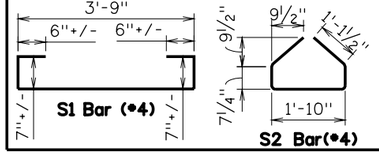
NO.	DESCRIPTION	LOCATION

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	

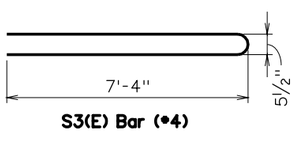
NUMBER OF ½" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)										TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM								TOP					
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨		f'ci	f'c	

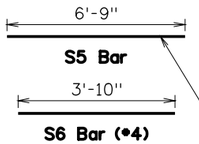


S1 Bar (•4)

S2 Bar(•4)



S3(E) Bar (•4)



S5 Bar
S6 Bar (•4)

Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

(E) denotes epoxy coated reinforcing steel bars

* Specify bar size (refer to S5 bar table)

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

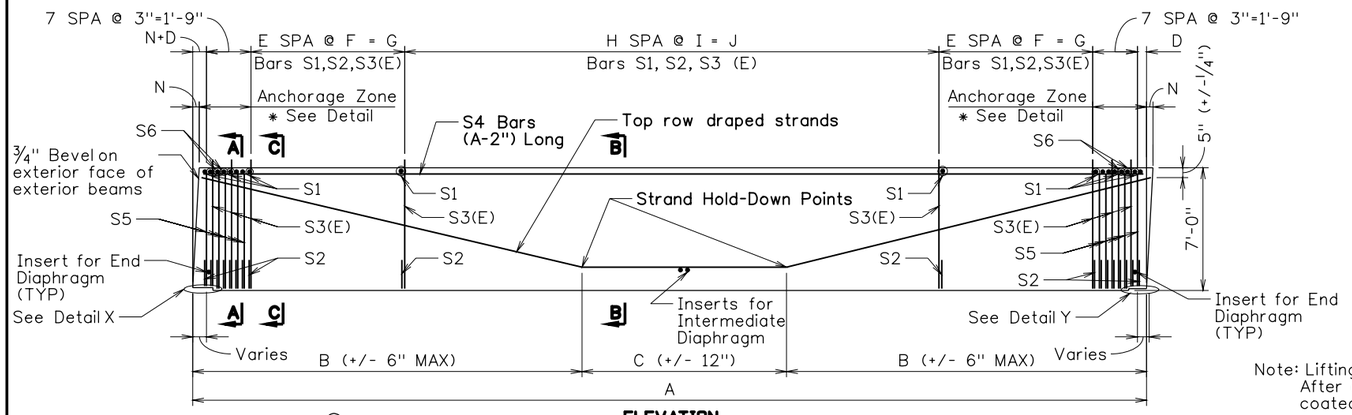
DESIGNED	DATE 12/5/06
DRAWN	
CHECKED	
REVIEWED	

APPROVED _____ DIRECTOR ENGINEERING DIVISION DATE 12/18/06

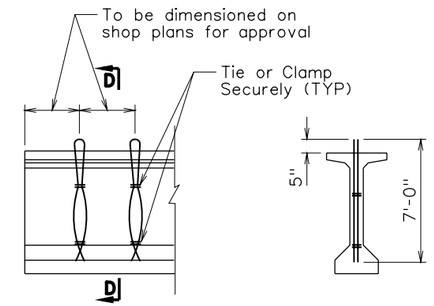
AASHTO TYPE IV – J PC BEAM
84" DEEP, 49" TOP FLANGE
BRD-IVJ 84X49

SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



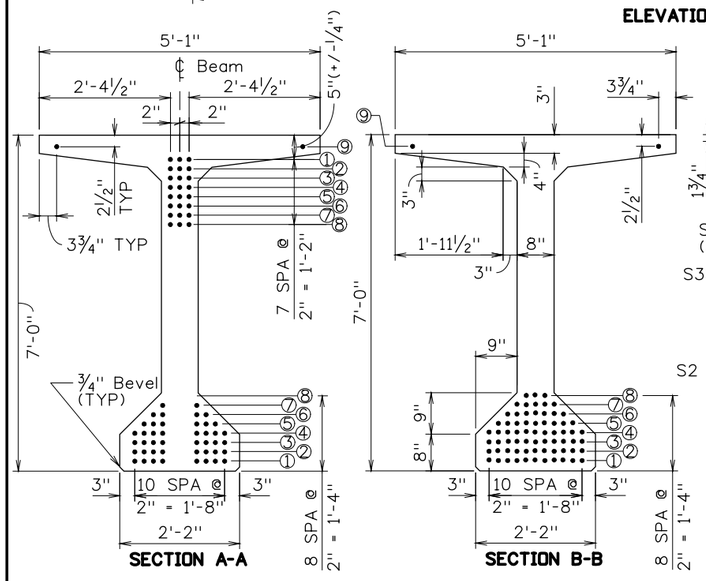
ELEVATION



LIFTING DEVICE

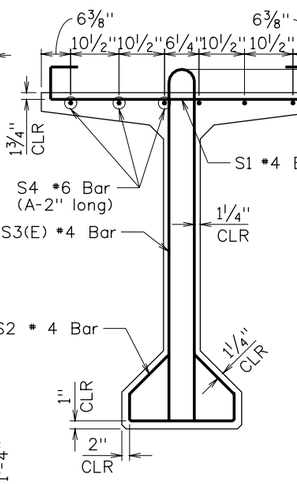
SECTION D-D

Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.

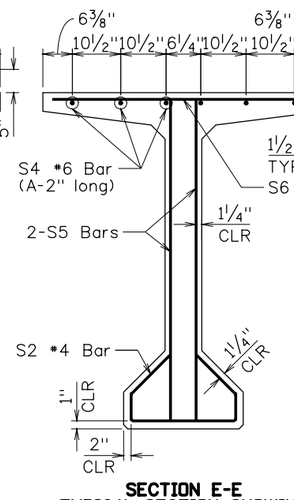


SECTION A-A

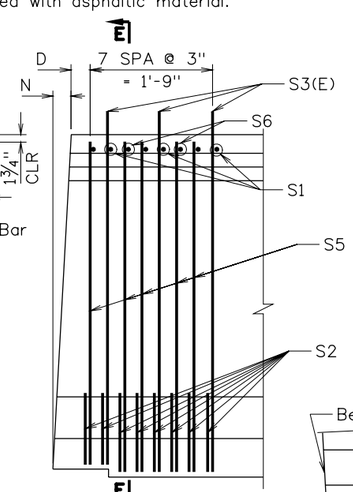
SECTION B-B



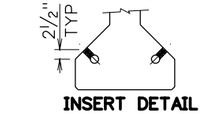
SECTION C-C
TYPICAL SECTION SHOWING STEEL REINFORCEMENT



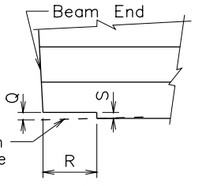
SECTION E-E
TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE



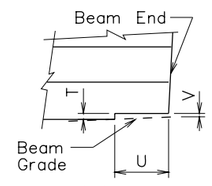
ANCHORAGE REINFORCEMENT



INSERT DETAIL



DETAIL "X"



DETAIL "Y"

NOTES:

1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
3. Roughen the top surface of each beam to an amplitude of approximately 1/4 inch and maintain clean and free of laitance.
4. Shop drawings shall show the detensioning plan by numbering the sequence of the strand pattern.
5. Prestressing strands shall be stabilized strand (1/2 inch nominal diameter) low relaxation uncoated seven wire strand in accordance with AASHTO M 203 grade 270. An initial stress of 202.5 psi shall be applied to the strand
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   ASTM A570, Grade 36

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11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.

REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			
S6			

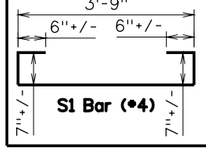
BEARING PADS		
NO.	DESCRIPTION	LOCATION

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

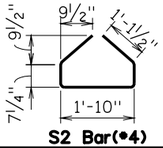
MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	

NUMBER OF 1/2" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

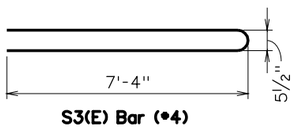
MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)										TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM								TOP					
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨		f'ci	f'c	



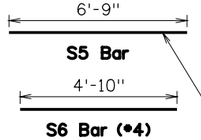
S1 Bar (#4)



S2 Bar(#4)



S3(E) Bar (#4)

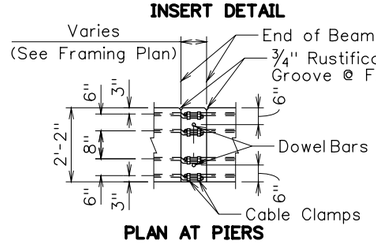


S6 Bar (#4)

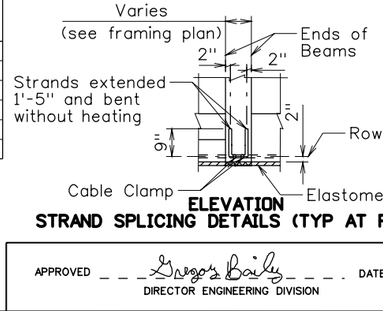
Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

(E) denotes epoxy coated reinforcing steel bars

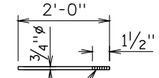
* Specify bar size (refer to S5 bar table)



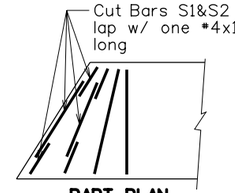
PLAN AT PIERS



ELEVATION
STRAND SPLICING DETAILS (TYP AT PIERS)



THREADED ANCHOR BAR DETAIL



PART PLAN
(Showing skewed end, 15° skew or greater)

NO.	REVISION	DATE:	BY:

C:\Users\V3 Addendum 07\new\BRD-IVJ 84x61_new.dgn 26-JAN-2007 10:38

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

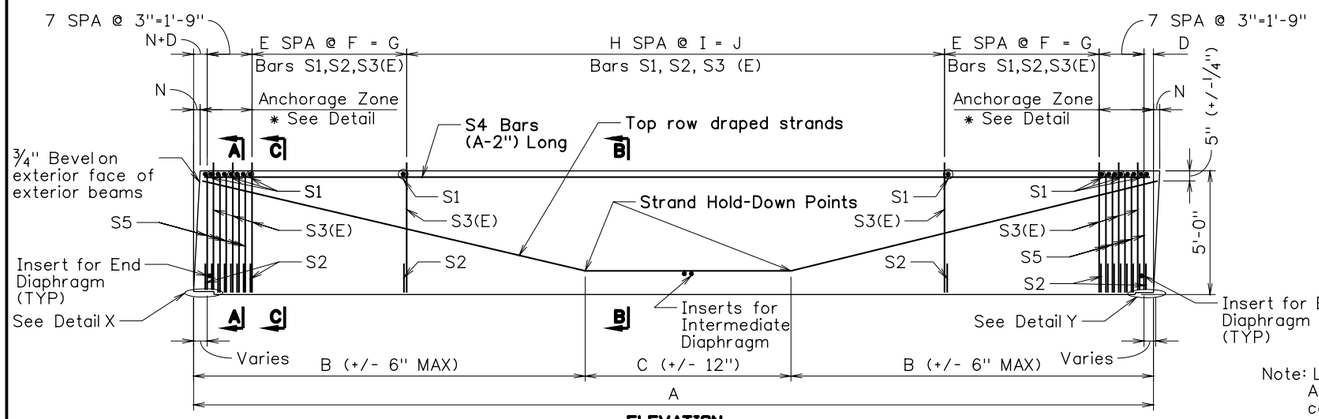
DESIGNED		DATE 12/5/06
DRAWN		
CHECKED		
REVIEWED		

APPROVED Gregg Bailey DIRECTOR ENGINEERING DIVISION DATE 12/18/06

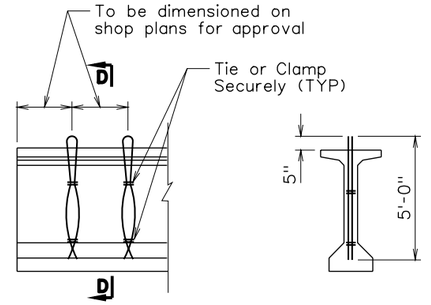
AASHTO TYPE IV – J PC BEAM
84" DEEP, 61" TOP FLANGE
BRD-IVJ 84X61

SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				

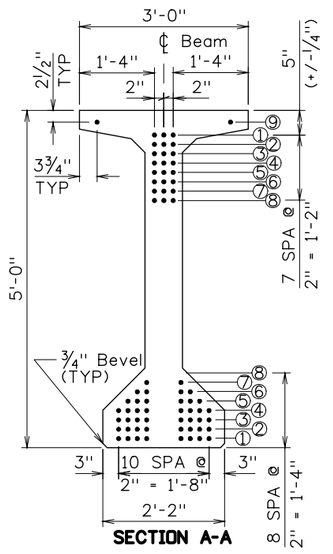


ELEVATION

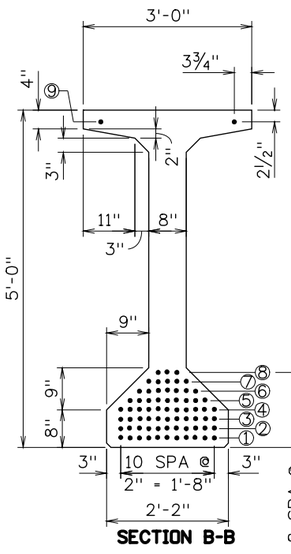


LIFTING DEVICE **SECTION D-D**

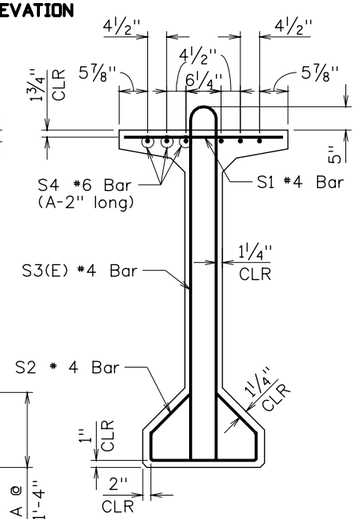
Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.



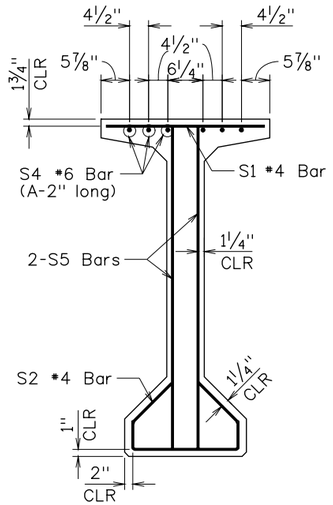
SECTION A-A



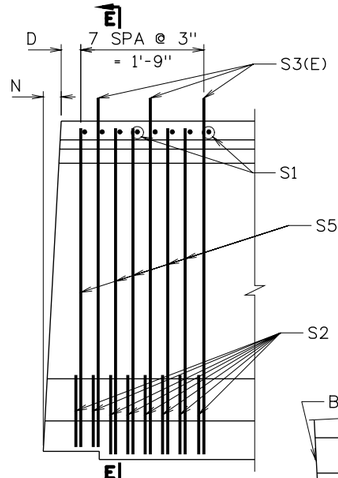
SECTION B-B



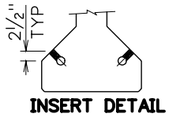
SECTION C-C
TYPICAL SECTION SHOWING STEEL REINFORCEMENT



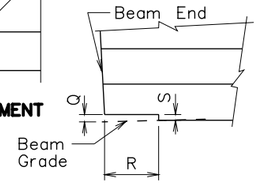
SECTION E-E
TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE



E
ANCHORAGE REINFORCEMENT



INSERT DETAIL



DETAIL "X" **DETAIL "Y"**

NOTES:

1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
3. Roughen the top surface of each beam to an amplitude of approximately 1/4 inch and maintain clean and free of laitance.
4. Shop drawings shall show the detensioning plan by numbering the sequence of the strand pattern.
5. Prestressing strands shall be stabilized strand (1/2 inch nominal diameter) low relaxation uncoated seven wire strand in accordance with AASHTO M 203 grade 270. An initial stress of 202.5 psi shall be applied to the strand
6. Uncoated seven wire stress relieved strand may be substituted. However, if the Contractor chooses this alternate, he shall provide the design for the stress relieved strand and shall revise the original plans to reflect these changes. This design and plan modification shall be made at the Contractor's expense.
7. Deformed wire fabric is permitted instead of reinforcing steel bars provided an equal steel area is provided. Wire fabric must conform to the requirements of AASHTO Section M225.
8. The Elastomeric bearing pads under the prestressed beams shall conform to AASHTO Division 2, Section 18 Duro 60. Section 18.2.3.2 specifies laminate material to be:

   ASTM A245
   ASTM A570, Grade 36

9. Payment for Elastomeric bearing pads and any preformed joint material specified shall be included in Item 603-01. See pier & abutment sheets for details.
10. The threaded inserts shall have a minimum safe work load of 2500 lb in tension. All inserts shall be plugged to prevent concrete intrusion. Omit inserts on exterior face of exterior beams.
11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.

REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			

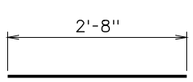
BEARING PADS		
NO.	DESCRIPTION	LOCATION

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

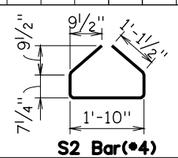
MARK	NO REQD	DIMENSIONS																			APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	

NUMBER OF 1/2" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

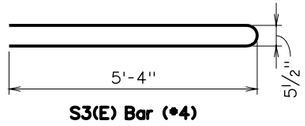
MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)																TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM								TOP									f'ci	f'c	
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨				



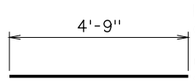
S1 Bar (#4)



S2 Bar(#4)



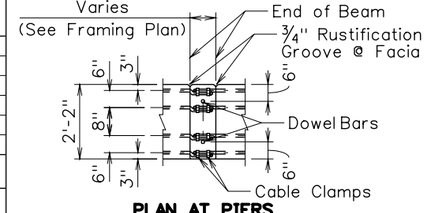
S3(E) Bar (#4)



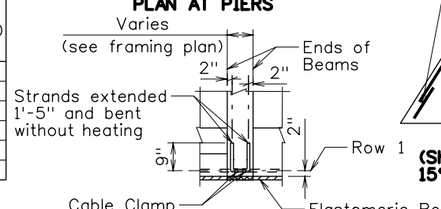
S5 Bar
* Specify bar size (refer to S5 bar table)

Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

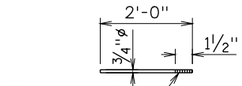
(E) denotes epoxy coated reinforcing steel bars



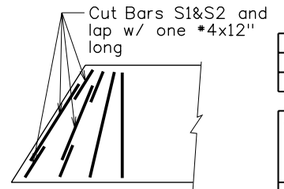
PLAN AT PIERS



ELEVATION
STRAND SPLICING DETAILS (TYP AT PIERS)



THREADED ANCHOR BAR DETAIL



PART PLAN
(Showing skewed end, 15° skew or greater)

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

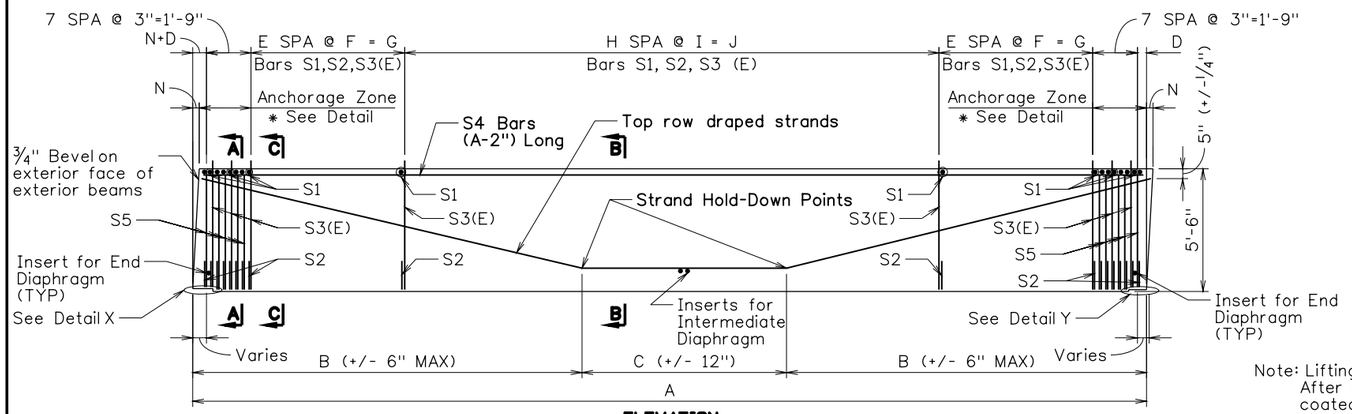
APPROVED Gregory Bailey DIRECTOR ENGINEERING DIVISION DATE 12/18/06

DESIGNED		DATE 12/5/06
DRAWN		
CHECKED		
REVIEWED		

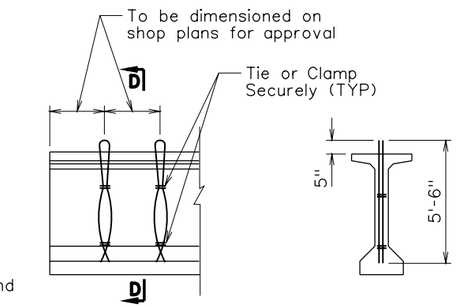
AASHTO TYPE IV MODIFIED
60" PRECAST CONC. BEAM
BRD-IVM 60X36

SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



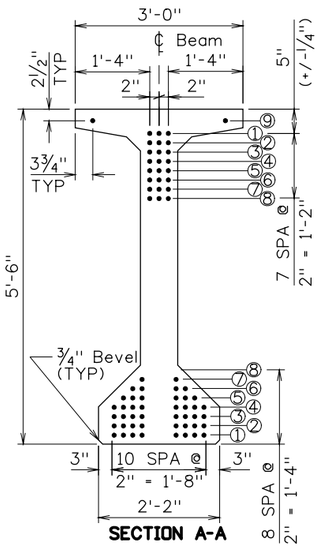
ELEVATION



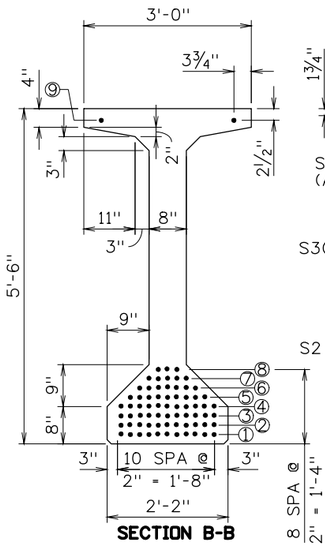
LIFTING DEVICE

SECTION D-D

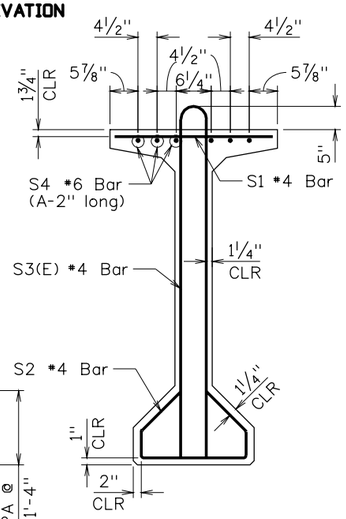
Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.



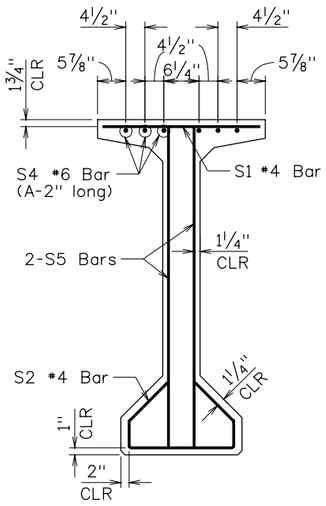
SECTION A-A



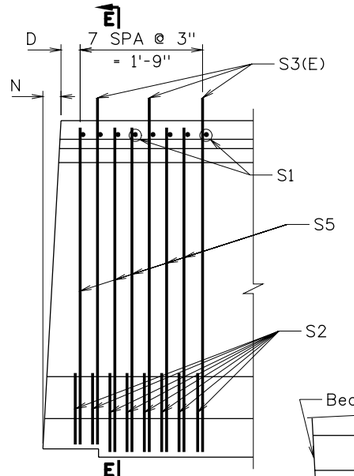
SECTION B-B



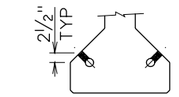
SECTION C-C
TYPICAL SECTION SHOWING STEEL REINFORCEMENT



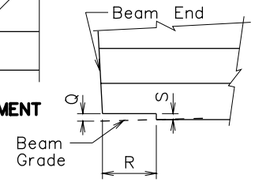
SECTION E-E
TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE



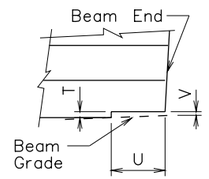
E
ANCHORAGE REINFORCEMENT



INSERT DETAIL



DETAIL "X"



DETAIL "Y"

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REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

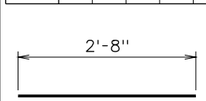
REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

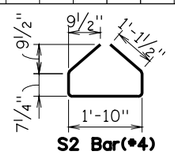
MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	

NUMBER OF 1/2" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

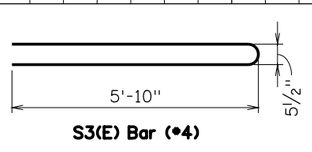
MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)										TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM							TOP						
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨		f'ci	f'c	



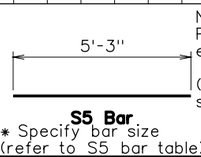
S1 Bar (#4)



S2 Bar(#4)



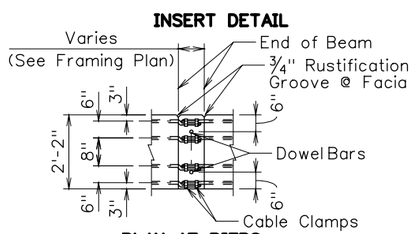
S3(E) Bar (#4)



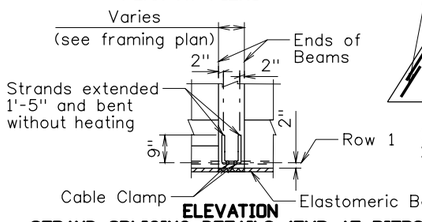
S5 Bar
* Specify bar size (refer to S5 bar table)

Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

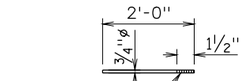
(E) denotes epoxy coated reinforcing steel bars



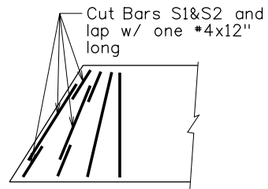
PLAN AT PIERS



ELEVATION
STRAND SPLICING DETAILS (TYP AT PIERS)



THREADED ANCHOR BAR DETAIL



PART PLAN
(Showing skewed end, 15° skew or greater)

BEARING PADS		
NO.	DESCRIPTION	LOCATION

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

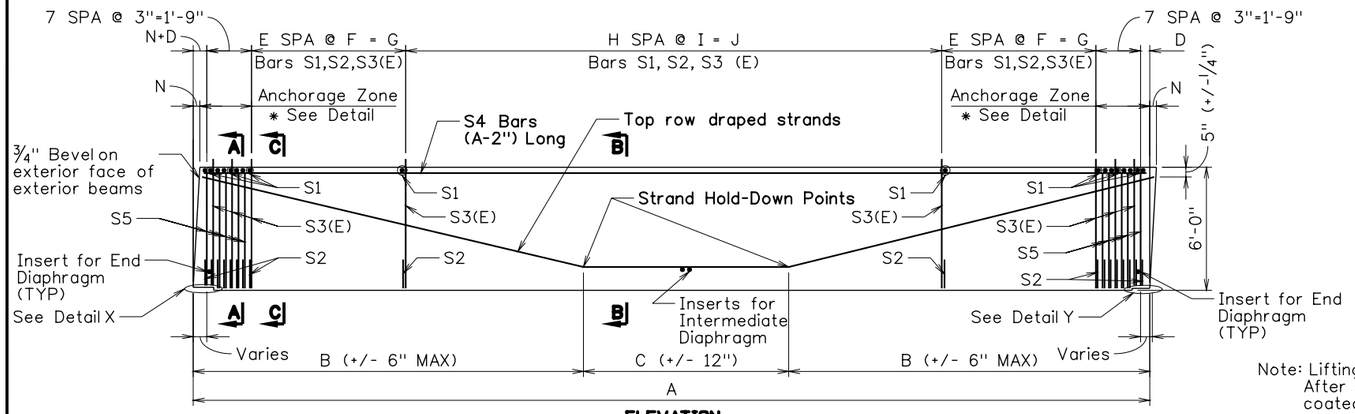
DESIGNED	DATE 12/5/06
DRAWN	
CHECKED	
REVIEWED	

APPROVED Gregory Bailey DIRECTOR ENGINEERING DIVISION DATE 12/18/06

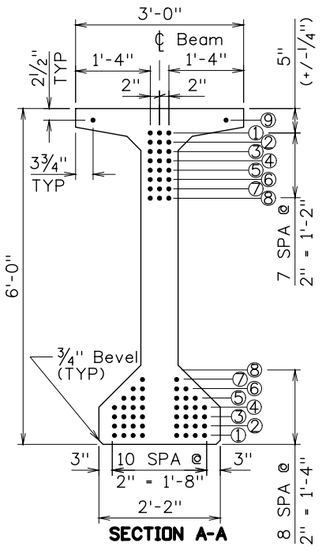
AASHTO TYPE IV MODIFIED
66" PRECAST CONC. BEAM
BRD-IVM 66X36

SHEET OF
BRIDGE NO.

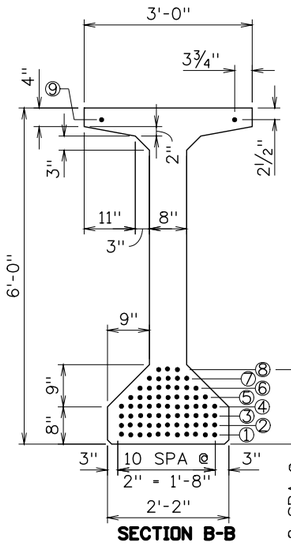
PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



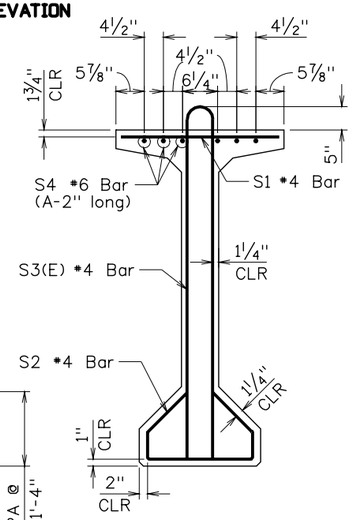
ELEVATION



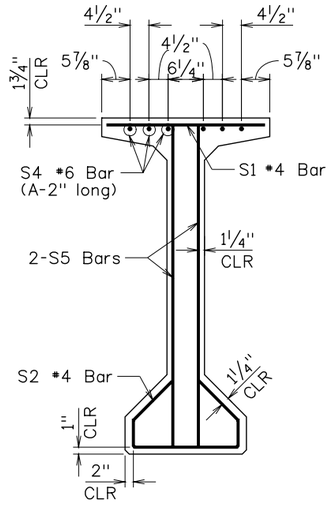
SECTION A-A



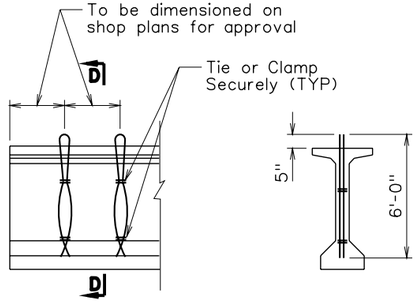
SECTION B-B



SECTION C-C
TYPICAL SECTION SHOWING STEEL REINFORCEMENT



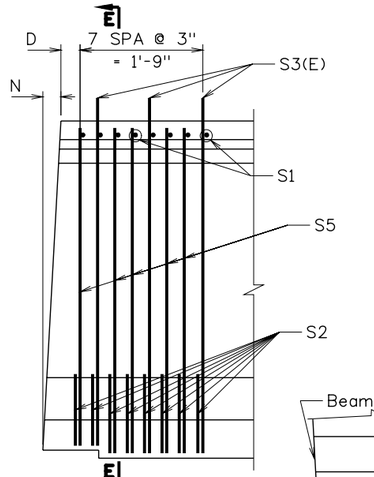
SECTION E-E
TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE



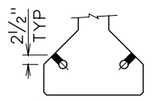
LIFTING DEVICE

SECTION D-D

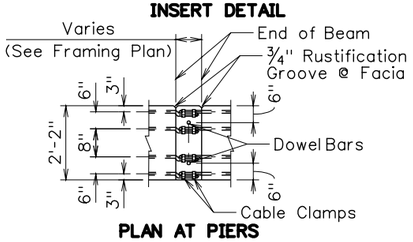
Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.



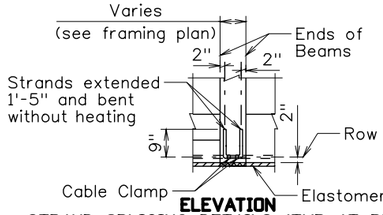
ANCHORAGE REINFORCEMENT



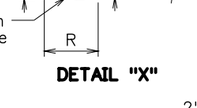
INSERT DETAIL



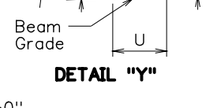
PLAN AT PIERS



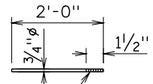
ELEVATION
STRAND SPLICING DETAILS (TYP AT PIERS)



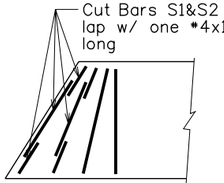
DETAIL "X"



DETAIL "Y"



THREADED ANCHOR BAR DETAIL



PART PLAN
(Showing skewed end, 15° skew or greater)

NOTES:

1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall beYYYY psi within 28 days.
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3. Roughen the top surface of each beam to an amplitude of approximately 1/4 inch and maintain clean and free of laitance.
4. Shop drawings shall show the detensioning plan by numbering the sequence of the strand pattern.
5. Prestressing strands shall be stabilized strand (1/2 inch nominal diameter) low relaxation uncoated seven wire strand in accordance with AASHTO M 203 grade 270. An initial stress of 202.5 psi shall be applied to the strand
6. Uncoated seven wire stress relieved strand may be substituted. However, if the Contractor chooses this alternate, he shall provide the design for the stress relieved strand and shall revise the original plans to reflect these changes. This design and plan modification shall be made at the Contractor's expense.
7. Deformed wire fabric is permitted instead of reinforcing steel bars provided an equal steel area is provided. Wire fabric must conform to the requirements of AASHTO Section M225.
8. The Elastomeric bearing pads under the prestressed beams shall conform to AASHTO Division 2, Section 18 Duro 60. Section 18.2.3.2 specifies laminate material to be:

   ASTM A245
   ASTM A570, Grade 36

9. Payment for Elastomeric bearing pads and any preformed joint material specified shall be included in Item 603-01. See pier & abutment sheets for details.
10. The threaded inserts shall have a minimum safe work load of 2500 lb in tension. All inserts shall be plugged to prevent concrete intrusion. Omit inserts on exterior face of exterior beams.
11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.

REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			

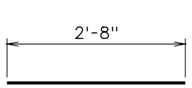
BEARING PADS		
NO.	DESCRIPTION	LOCATION

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

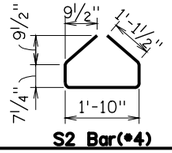
MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	

NUMBER OF 1/2" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

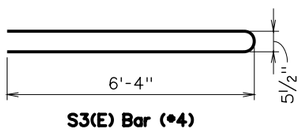
MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)																TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM								TOP											
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨		f'ci	f'c	



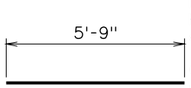
S1 Bar (#4)



S2 Bar(#4)



S3(E) Bar (#4)



S5 Bar*

Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

(E) denotes epoxy coated reinforcing steel bars

* Specify bar size (refer to S5 bar table)

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

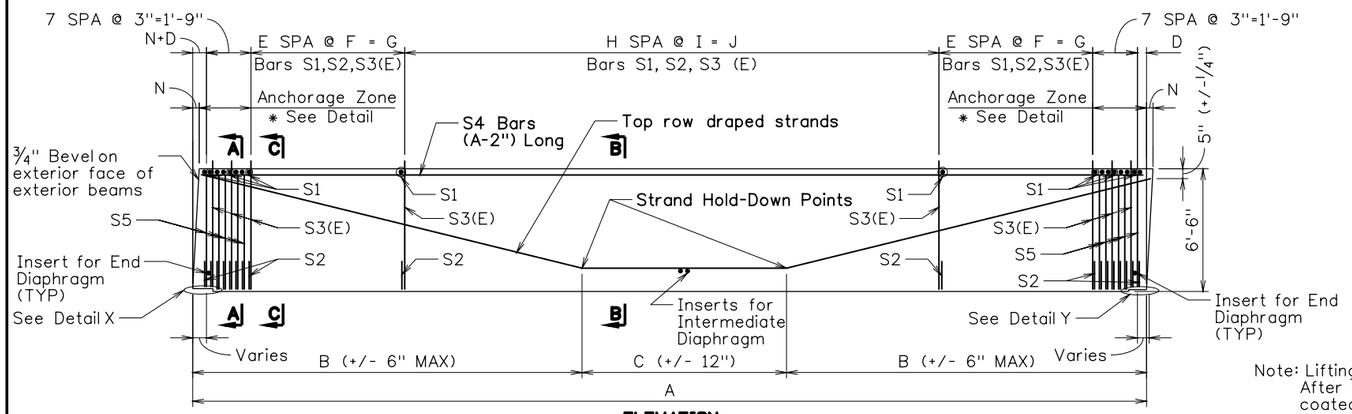
DESIGNED	DATE 12/5/06
DRAWN	
CHECKED	
REVIEWED	

APPROVED Gregory Bailey DATE 12/18/06
DIRECTOR ENGINEERING DIVISION

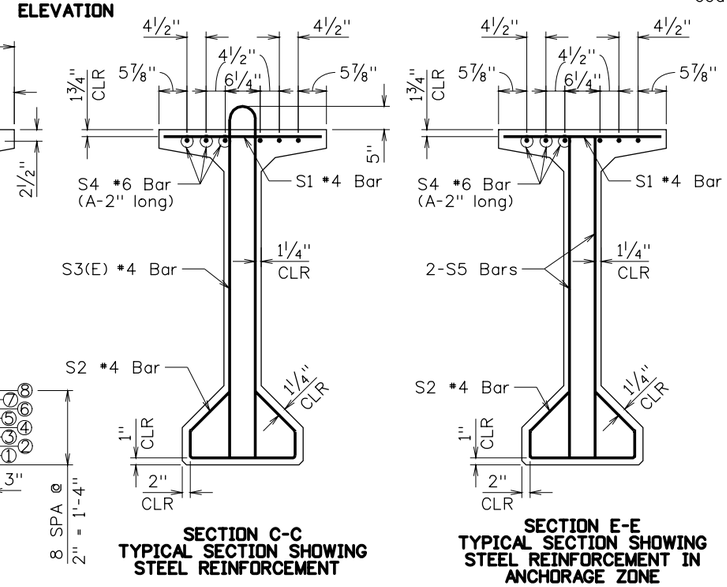
AASHTO TYPE IV MODIFIED
72" PRECAST CONC. BEAM
BRD-IV 72X36

SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



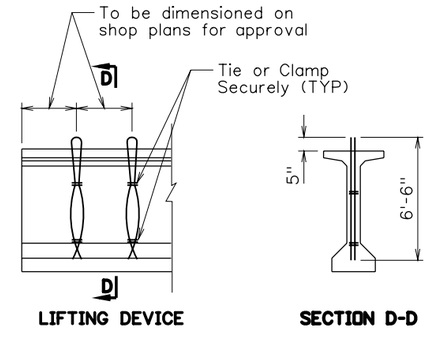
ELEVATION



SECTION A-A **SECTION B-B**

SECTION C-C TYPICAL SECTION SHOWING STEEL REINFORCEMENT

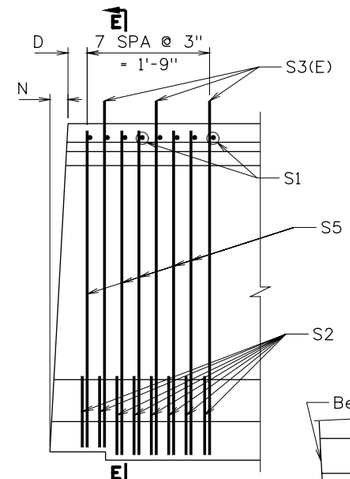
SECTION E-E TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE



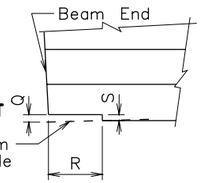
LIFTING DEVICE

SECTION D-D

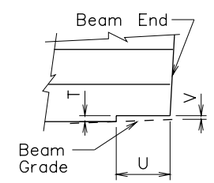
Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.



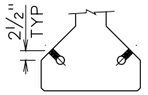
E
ANCHORAGE REINFORCEMENT



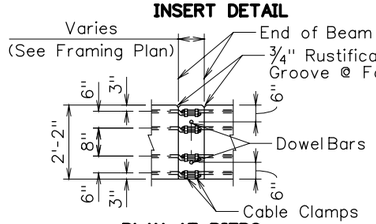
DETAIL "X"



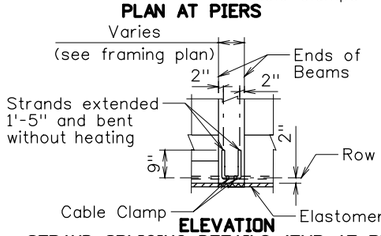
DETAIL "Y"



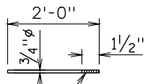
INSERT DETAIL



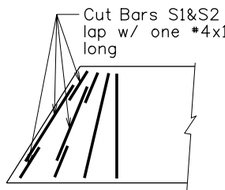
PLAN AT PIERS



ELEVATION
STRAND SPLICING DETAILS (TYP AT PIERS)



THREADED ANCHOR BAR DETAIL



PART PLAN
(Showing skewed end, 15° skew or greater)

NOTES:

1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
3. Roughen the top surface of each beam to an amplitude of approximately 1/4 inch and maintain clean and free of laitance.
4. Shop drawings shall show the detensioning plan by numbering the sequence of the strand pattern.
5. Prestressing strands shall be stabilized strand (1/2 inch nominal diameter) low relaxation uncoated seven wire strand in accordance with AASHTO M 203 grade 270. An initial stress of 202.5 psi shall be applied to the strand
6. Uncoated seven wire stress relieved strand may be substituted. However, if the Contractor chooses this alternate, he shall provide the design for the stress relieved strand and shall revise the original plans to reflect these changes. This design and plan modification shall be made at the Contractor's expense.
7. Deformed wire fabric is permitted instead of reinforcing steel bars provided an equal steel area is provided. Wire fabric must conform to the requirements of AASHTO Section M225.
8. The Elastomeric bearing pads under the prestressed beams shall conform to AASHTO Division 2, Section 18 Duro 60. Section 18.2.3.2 specifies laminate material to be:

   ASTM A245
   ASTM A570, Grade 36

9. Payment for Elastomeric bearing pads and any preformed joint material specified shall be included in Item 603-01. See pier & abutment sheets for details.
10. The threaded inserts shall have a minimum safe work load of 2500 lb in tension. All inserts shall be plugged to prevent concrete intrusion. Omit inserts on exterior face of exterior beams.
11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.

REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			

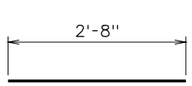
BEARING PADS		
NO.	DESCRIPTION	LOCATION

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

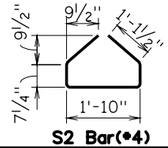
MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	

NUMBER OF 1/2" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)										TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM								TOP					
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨		f'ci	f'c	

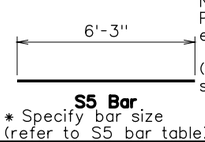


S1 Bar (*4)



S2 Bar(*4)

S3(E) Bar (*4)



S5 Bar
* Specify bar size (refer to S5 bar table)

Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

(E) denotes epoxy coated reinforcing steel bars

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

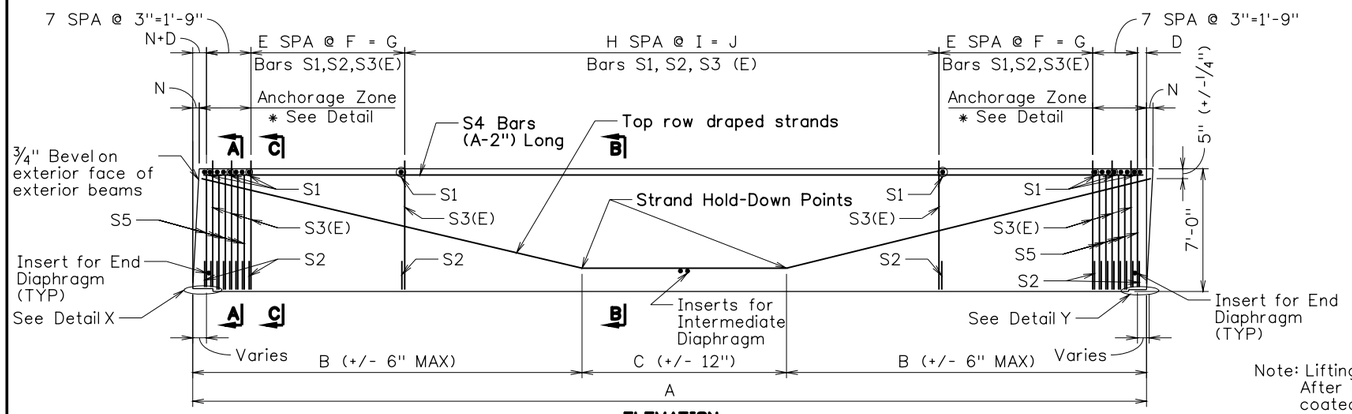
DESIGNED	DATE 12/5/06
DRAWN	
CHECKED	
REVIEWED	

APPROVED Gregory Bailey DIRECTOR ENGINEERING DIVISION DATE 12/18/06

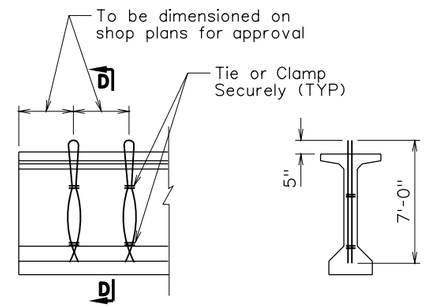
AASHTO TYPE IV MODIFIED
78" PRECAST CONC. BEAM
BRD-IVM 78X36

SHEET OF
BRIDGE NO.

PROJECT NUMBERS		DISTRICT	COUNTY	SHEET NO.	TOTAL
STATE	FEDERAL				



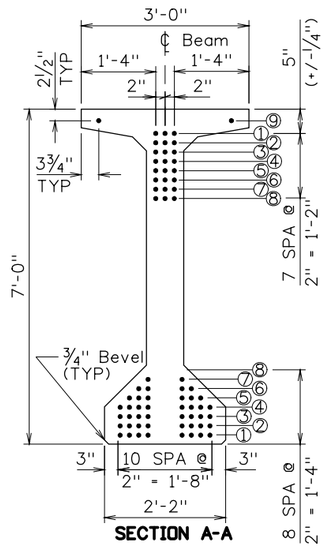
ELEVATION



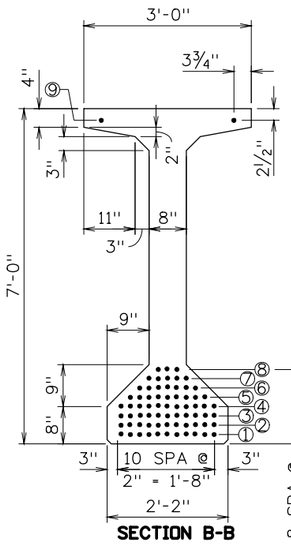
LIFTING DEVICE

SECTION D-D

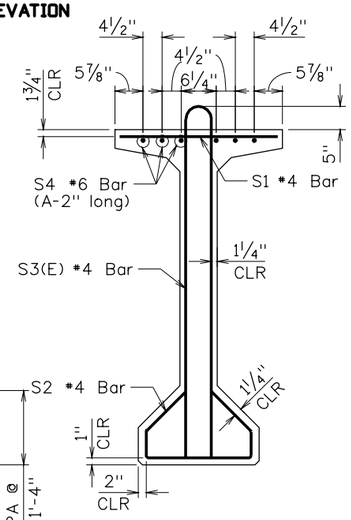
Note: Lifting shall be by equal loads to each pair of loops. After erection, the loops shall be cut flush, and ends coated with asphaltic material.



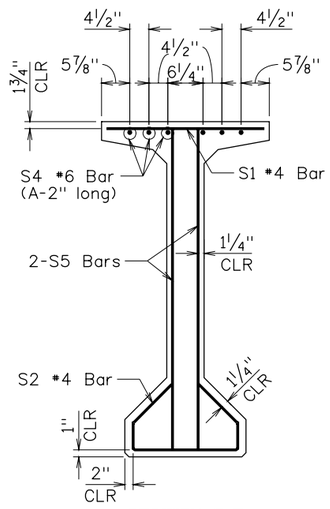
SECTION A-A



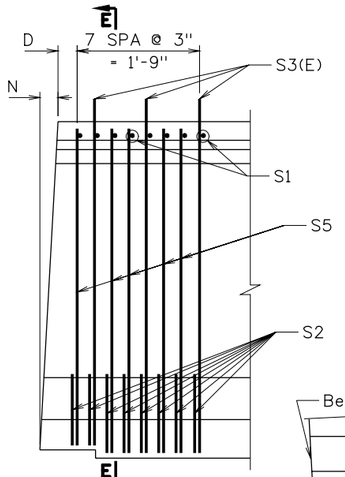
SECTION B-B



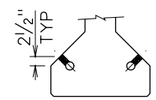
SECTION C-C
TYPICAL SECTION SHOWING STEEL REINFORCEMENT



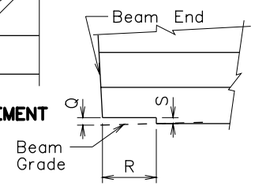
SECTION E-E
TYPICAL SECTION SHOWING STEEL REINFORCEMENT IN ANCHORAGE ZONE



E
ANCHORAGE REINFORCEMENT



INSERT DETAIL



DETAIL "X" DETAIL "Y"

NOTES:
1. The concrete shall attain a compressive strength of at least XXX psi, as shown by standard cylinders cured identically with the beams, before transferring bond stress to the concrete; or before releasing the end anchors. Cylinder strength shall be YYYY psi within 28 days.
2. The Department will reject the beams if the finished units contained honeycombed concrete to the extent that the Engineer determines the strength or deterioration resistance is reduced. Beam shortening due to shrinking and elastic changes is limited to 0.0005L.
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   ASTM A570, Grade 36

9. Payment for Elastomeric bearing pads and any preformed joint material specified shall be included in Item 603-01. See pier & abutment sheets for details.
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11. All threaded inserts and anchorage dowels are to be hot-dip galvanized after fabrication. Include the cost in Item 603-01.
12. S5 vertical reinforcing bars placed at the ends of the beam is designed for bursting resistance as per LRFD 5.10.10.1. Refer to S5 bar table.

REINFORCING BAR LIST				
MARK	SIZE	COUNT/BEAM	TOTAL	LENGTH
S1				
S2				
S3(E)				
S4				

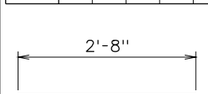
REINFORCING BAR LIST			
MARK	SIZE	COUNT/BEAM	TOTAL
*S5			

BEAM DIMENSIONS (MEASURED ALONG ℄ BEAM)

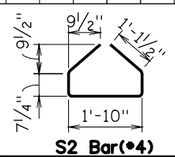
MARK	NO REQD	DIMENSIONS																				APPOX. WT EACH (LBS)
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	P	Q	R	S	T	U	V	

NUMBER OF 1/2" Dia.-- 7 WIRE STRANDS IN INDICATED ROW

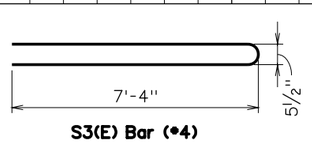
MARK	MIDSPAN (SECTION B-B)									END (SECTION A-A)										TOTAL NO. PER BEAM	CONCRETE STRENGTHS (PSI)		INITIAL PRESTRESS FORCE/STRAND (LBS)
	BOTTOM								TOP	BOTTOM							TOP						
	①	②	③	④	⑤	⑥	⑦	⑧	⑨	①	②	③	④	⑤	⑥	⑦	⑧	①	②	③	④	⑤	⑥	⑦	⑧	⑨		f'ci	f'c	



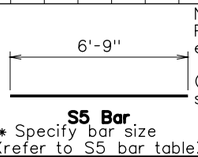
S1 Bar (*4)



S2 Bar(*4)



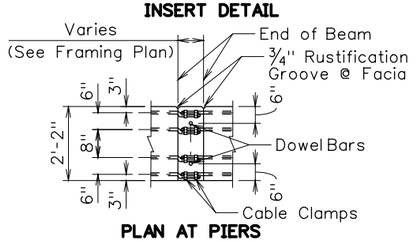
S3(E) Bar (*4)



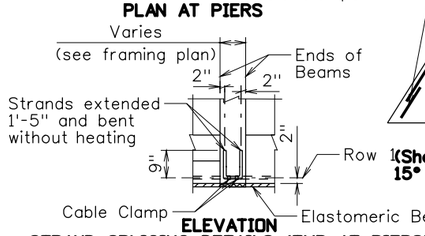
S5 Bar
* Specify bar size (refer to S5 bar table)

Note:
Place S3(E) bar parallel to skew for ease of Deck rebar placement.

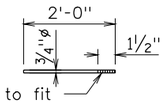
(E) denotes epoxy coated reinforcing steel bars



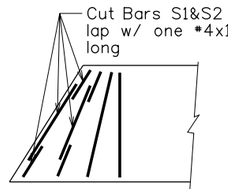
PLAN AT PIERS



ELEVATION
STRAND SPLICING DETAILS (TYP AT PIERS)



THREADED ANCHOR BAR DETAIL



PART PLAN
(Showing skewed end, 15° skew or greater)

BEARING PADS		
NO.	DESCRIPTION	LOCATION

NO.	REVISION	DATE:	BY:

WEST VIRGINIA DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
ENGINEERING DIVISION

DESIGNED	DATE 12/5/06
DRAWN	
CHECKED	
REVIEWED	

APPROVED Gregory Bailey DIRECTOR ENGINEERING DIVISION DATE 12/18/06

AASHTO TYPE IV MODIFIED
84" PRECAST CONC. BEAM
BRD-IVM 84X36

SHEET OF
BRIDGE NO.