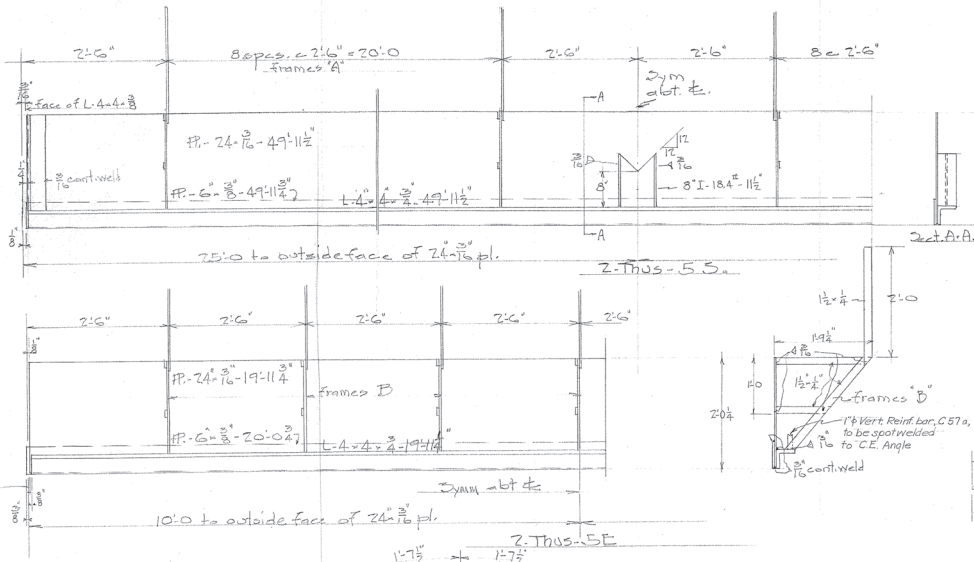
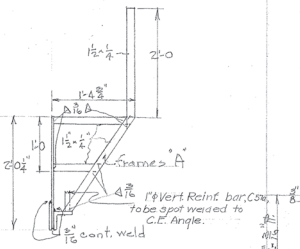
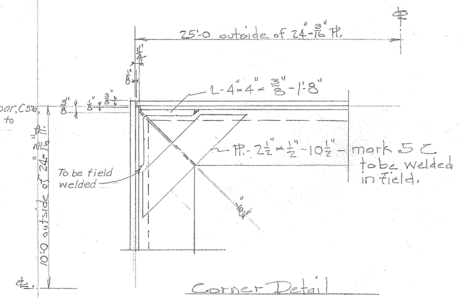
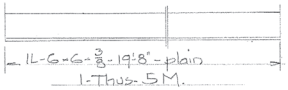
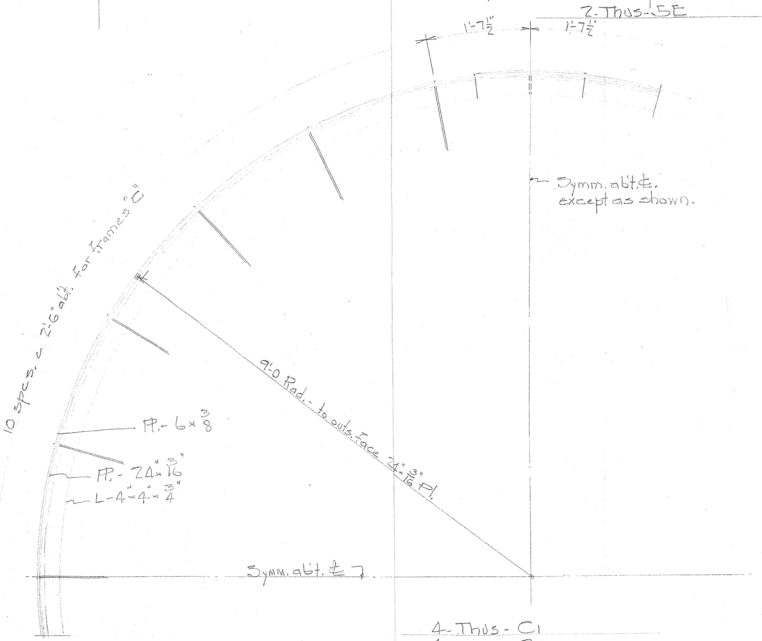


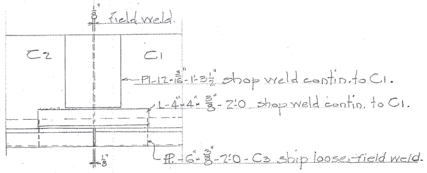




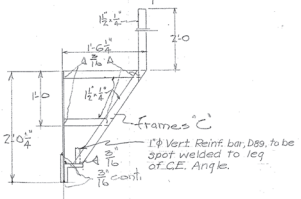


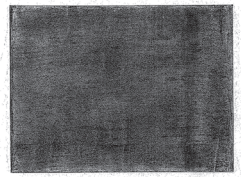


4-Thus-C1
4- " -C2
8- " -C3- single pls.- see splice.



Elevation of Splice.





CUTTING EDGES FOR PIERS-4-5-6.
LIBERTY BEND BRIDGE.
MISSOURI RIVER CUT-OFF.

Contractors-
Massman Constr. Co.
Kansas City Bridge Co.

U.S. ENGINEERS.
Sverdrup & Parcel
Cons. Engineers.

JACKSON COUNTY

Sheet 4A

L-568

Rev. 4-12-47
3-5-47

Drg. # 5858

APPROVED: 4-10-47

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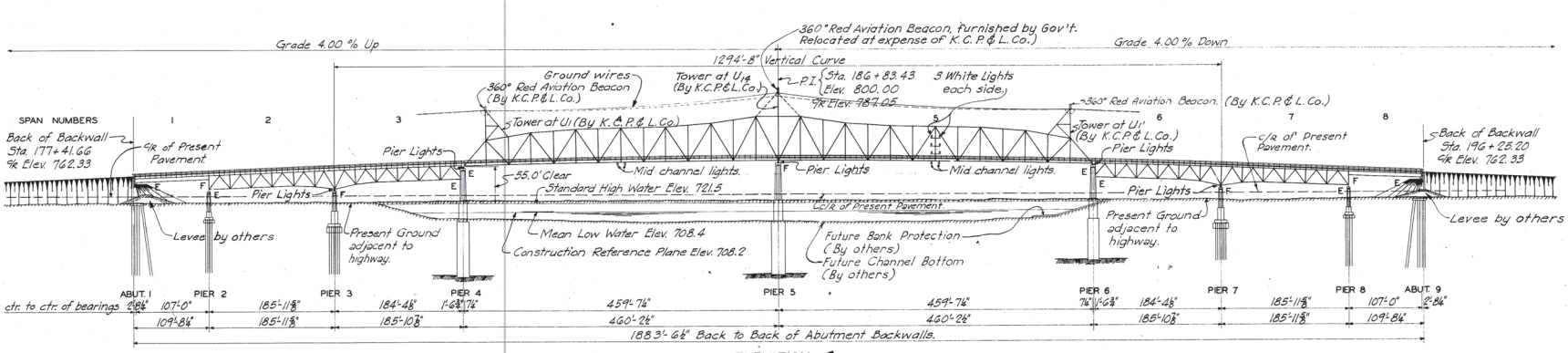
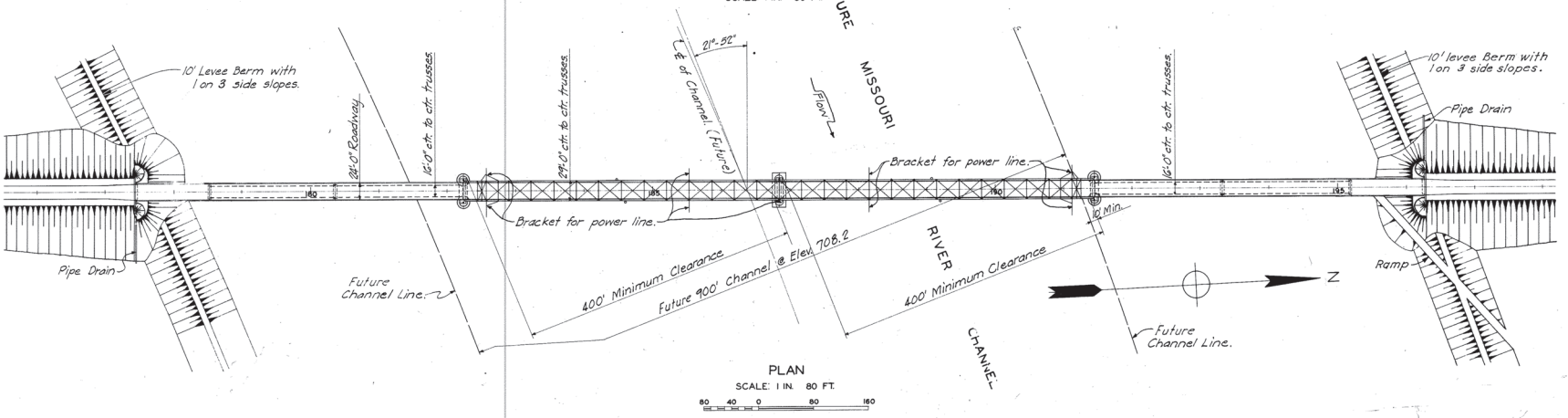
MISSOURI STATE HIGHWAY DEPARTMENT



ELEVATION
SCALE: 1 IN. 80 FT.



PLAN
SCALE: 1 IN. 80 FT.

PAINTING BRIDGE OVER MISSOURI RIVER

AT COURTNEY MISSOURI

PROJECT NO. RTE. 71 BP C048-71 BP (7M)

JACKSON COUNTY

L-568

Note: This drawing is not to scale. Follow dimensions.

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MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

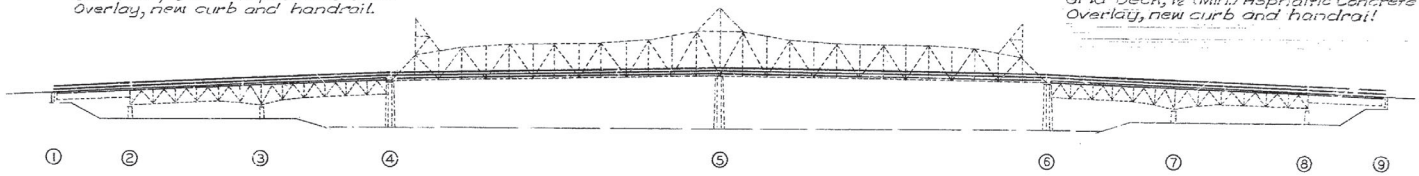
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	5	

SEC./SUR. 12 TWP. 50 RGE. 32

107' Simple Plate Girder Span & (186'-186') Continuous Deck Truss Spans - Install Half Concrete Filled Grid Deck, 1½" (Min.) Asphaltic Concrete Overlay, new curb and handrail.

(460'-460') Continuous Thru Truss Spans Install new handrail & 1½" (Min.) Asphaltic Concrete Overlay

107' Simple Plate Girder Span & (186'-186') Continuous Deck Truss Spans - Install Half Concrete Filled Grid Deck, 1½" (Min.) Asphaltic Concrete Overlay, new curb and handrail



ELEVATION

GENERAL NOTES:

Design Loading:
Grid Deck (Half Concrete Filled) - H520-44

Design Unit Stresses:
Class B1 Concrete (substructure repair) fc = 1,600psi
Class B1 Concrete (Grid Deck) fc = 1,600 psi
Reinforcing Steel (Grade 60) fy = 60,000 psi
Structural Carbon Steel fs = 20,000 psi

Structural Steel:
Structural Steel shall be A36 except as noted.

Reinforcing Steel:
Minimum clearance to reinforcing steel shall be 1½" unless otherwise shown.

Navigation and Clearance Lights:
All navigation and clearance lighting shall be kept in operation during all construction.

Old and New Work:
Outline of old work is indicated by light dashed lines. Heavy lines indicate new work.
Bars bonded in old concrete not removed shall be cleanly stripped and embedded into new concrete where possible. If length is available, old bars shall extend into new concrete at least 40 diameters for smooth bars and 30 diameters for deformed bars.

Profile Grade:
Thru Truss - No "Profile Grade Elevations" are given. A smooth traffic surface is to be obtained, top of expansion devices are to conform to crown and slope of roadway surface.
Plate Girder and Deck Truss - See Top of Wearing Surface Elevations on sheet No. 4.

Concrete Bonding Compound:
An approved epoxy bonding agent is required between old and new concrete for substructure repair. See Standard Specifications.

Painting:
Shop None; Field, System B Aluminum. See Special Provisions.

Traffic Maintained:
One lane traffic is to be maintained during construction. See Special Provisions.

Dimensions:
Contractor shall verify all dimensions in the field before ordering new steel.

Drainage System Removal:
Drainage system at Abutments No. 1 & 9 is to be removed. Holes in concrete of abutments caused by drainage system removal are to be filled by surface grouting. Drainage system appurtenances riveted directly to plate girders, that do not interfere with the installation of the grid deck, are to remain in place. See Special Provisions.

Relocation of Existing 2" ϕ Conduit:
Relocate existing 2" ϕ conduit to tops of remaining existing rail posts as shown. A support that provides a permanent rigid connection of conduit to posts shall be submitted by the contractor and approved by the Engineer before relocation of conduit is begun.

ESTIMATED QUANTITIES

ITEM		SUBSTR.	SUPERSTR.	TOTAL
Removal of Existing Bridge Deck	Sq. Ft.		25,200	25,200
Asphaltic Cement (Asphaltic Concrete)	Ton		21.6	21.3
Mineral Aggregate (Asphaltic Concrete) (Type "A" Mix)	Ton		412.1	412.1
Bridge Deck Water Proofing (Liquid)	Sq. Yd.		5180	5180
Substructure Repair (Unformed) See Special Provisions	Sq. Ft.	140		140
Special Work (Bridges) See Special Provisions	Lump Sum	1		1
Preformed Compression Expansion Joint Seal (2.5 inches)	Lin. Ft.		52	52
Preformed Compression Expansion Joint Seal (5.0 inches)	Lin. Ft.		52	52
Fabricated Structural Carbon Steel (Miscellaneous) See Special Provisions	Lb.		119,850	119,850
Painting (System B) Aluminum See Special Provisions	Lump Sum		1	1
Steel Grid Floor (Half Concrete Filled)	Sq. Ft.		23,903	23,903
Bridge Rail - 2 Tube Structural Steel	Lin. Ft.		3,770	3,770
Temporary Traffic Barrier (See Spec. Prov.)	Lump Sum		1	1

Note: Special Work (Bridges) includes 3.0 cubic yards of Class B1 Concrete and 170 Lbs. of Grade 60 Reinforcing Steel.

BRIDGE OVER MISSOURI RIVER
STATE ROAD FROM I-35 TO RTE. 24
AT LIBERTY BEND
PROJECT NO. BRF-291-1(8) **STA.** 177+41.66
JOB NO. 4-U291-564 **RTE.** 291
JACKSON **COUNTY**
DATE November 5, 1984

STD.
STD.
L-588R

DESIGNED RFR 1984
DETAILED RFR 1984
CHECKED Apr 1984

Note: This drawing is not to scale. Follow dimensions.

See Typical Plans

Sheet No. 1 **of** 13.

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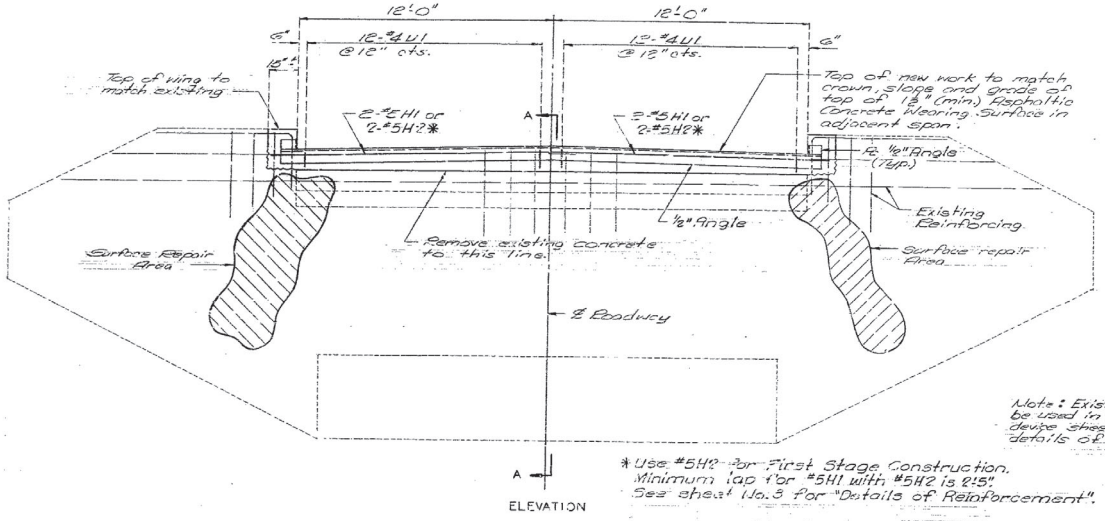
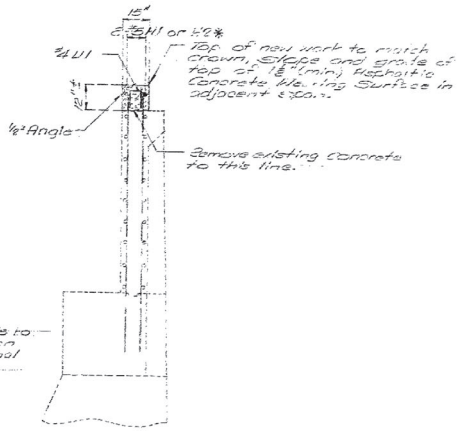
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	12	



ELEVATION

* Use #5H2 for First Stage Construction. Minimum lap for #5H1 with #5H2 is 2'-5".
See sheet No. 3 for "Details of Reinforcement".

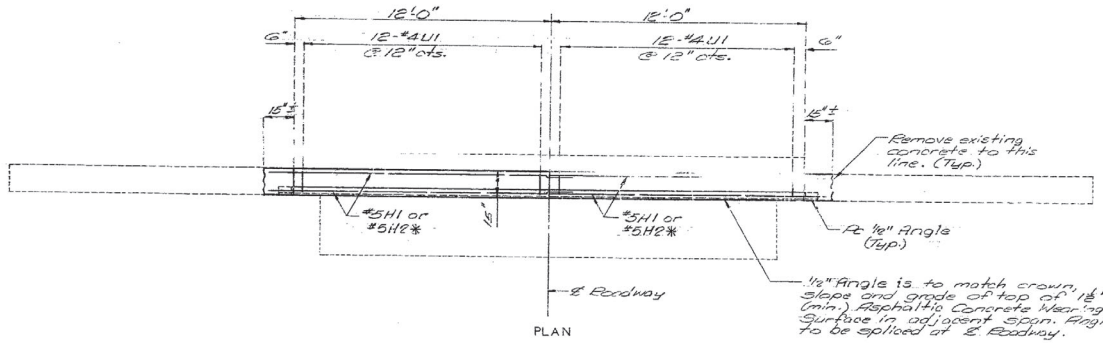


SECTION A-A

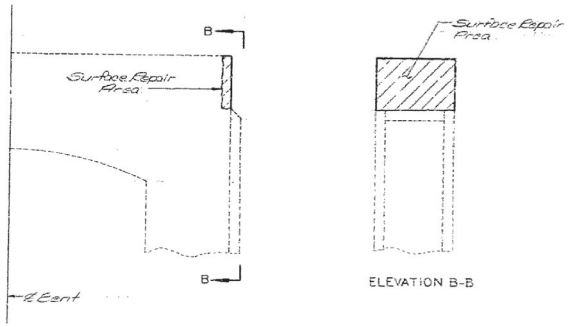
Note: Existing reinforcement is to be used in place. See expansion device sheet No. 9 for additional details of ½" Angle.

Note: Existing concrete in Surface Repair Areas is to be removed to sound concrete behind the existing reinforcing. (See Special Provisions)

Note: Stage construction requirements for handling traffic are to be met at all times during removal of old work and placing of new work.



PLAN



PART ELEVATION

ELEVATION B-B

DETAILS OF PIER NO. 8

Note: See sheet No. 3 for "Details of Reinforcing Steel".

DETAILS OF ABUTMENT NO. 1

DETAILED March 1984
CHECKED Apr. 1984

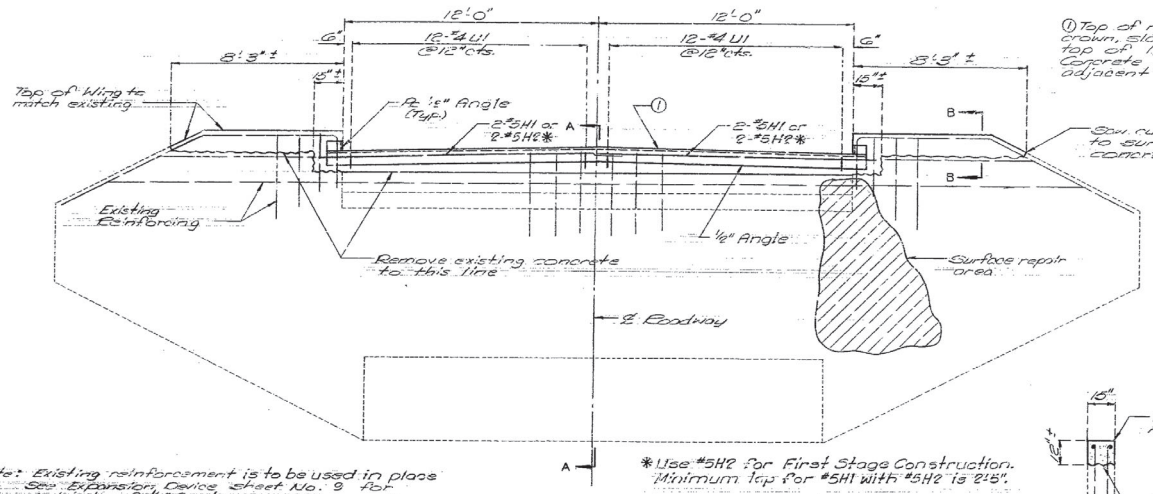
Note: This drawing is not to scale. Follow dimensions.

Sheet No. 2 of 13.

JACKSON COUNTY

-568R

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		12	7	



ELEVATION

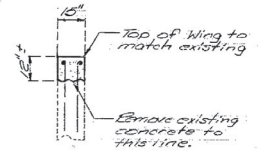
① Top of new work to match crown, slope and grade of top of 1½" (min.) Asphaltic Concrete Wearing Surface in adjacent span.

*Use #5H2 for First Stage Construction. Minimum lap for #5H1 with #5H2 is 2'-5".

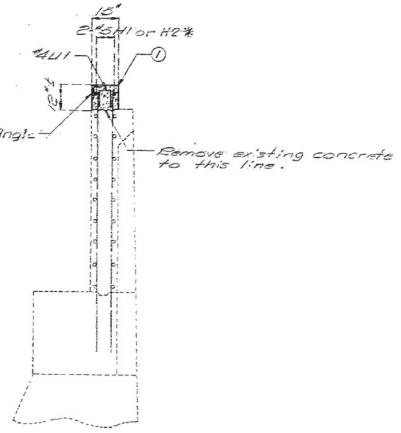
Note: Existing reinforcement is to be used in place. See Expansion Device sheet No. 9 for additional details of 1/2" Angle.

Stage construction requirements for handling traffic are to be met at all times during removal of old work and placing of new work.

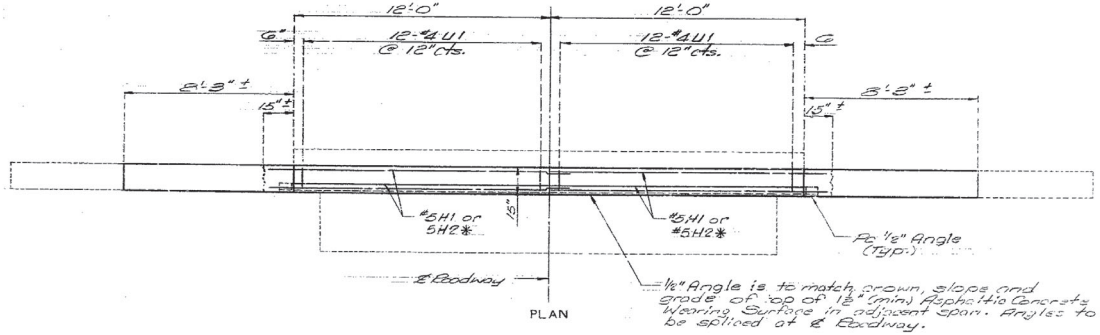
Existing concrete in Surface Repair Areas is to be removed to sound concrete behind the existing reinforcement. (See Special Provisions)



SECTION B-B

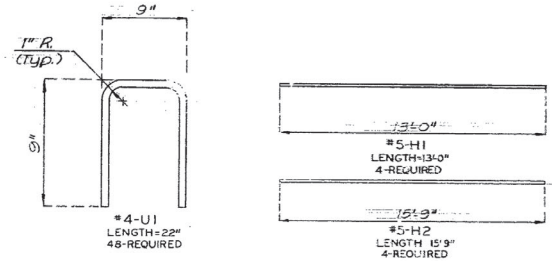


SECTION A-A



PLAN

1/2" Angle is to match crown, slope and grade of top of 1½" (min.) Asphaltic Concrete Wearing Surface in adjacent span. Angles to be spliced at ℄ Roadway.



DETAILS OF REINFORCING STEEL

DETAILS OF ABUTMENT NO. 9

DETAILED March 1984
CHECKED Apr 1984

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 3 of 13.

JACKSON COUNTY

L-568R

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FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	8	

288

ELEVATIONS AT TOP OF ASP'ALTIC CONCRETE WEARING SURFACE

Note: Stations and elevations are located at cross beams.

Station	Elevations at ℄ Roadway	Elevations at Gutter Line
Sta. 177+43.90	Elev. 762.72	Elev. 762.64
+51.58	Elev. 763.03	.95
+59.26	.33	Elev. 763.25
+66.94	.64	.56
+74.62	.95	.87
+82.30	.25	Elev. 764.17
+89.98	.56	.48
+97.66	.87	.79
Sta. 178+05.34	Elev. 765.18	Elev. 765.10
+13.02	.48	.40
+20.70	.79	.71
+28.38	Elev. 766.10	Elev. 766.02
+36.06	.41	.33
+43.74	.71	.63
+51.42	Elev. 767.02	.94
+66.78	.63	Elev. 767.55
+82.14	Elev. 768.25	Elev. 768.17
+97.50	.86	.78
Sta. 179+12.86	Elev. 769.48	Elev. 769.40
+28.22	Elev. 770.09	Elev. 770.01
+43.58	.71	.63
+58.94	Elev. 771.32	Elev. 771.24
+74.30	.93	.85
+89.66	Elev. 772.55	Elev. 772.47
Sta. 180+05.02	Elev. 773.16	Elev. 773.08
+20.38	.78	.70
+35.74	Elev. 774.39	Elev. 774.31
+51.10	Elev. 775.00	.92
+66.46	.59	Elev. 775.51
+81.82	Elev. 776.17	Elev. 776.09
+97.18	.73	.65
Sta. 181+12.54	Elev. 777.28	Elev. 777.20
+27.90	.81	.74
+43.26	Elev. 778.34	Elev. 778.26
+58.62	.84	.76
+73.98	Elev. 779.33	Elev. 779.25
+89.34	.81	.73
Sta. 182+04.70	Elev. 78_.27	Elev. 780.19
+20.06	.72	.64
Sta. 191+45.83	Elev. 780.75	Elev. 780.67
+61.23	.30	.22
+76.63	Elev. 779.84	Elev. 779.76
+92.03	.36	.28
Sta. 192+07.43	Elev. 778.87	Elev. 778.79
+22.83	.36	.28
+38.23	Elev. 777.84	Elev. 777.76
+53.63	.31	.23
+69.03	Elev. 776.76	Elev. 776.68
+84.43	.19	.11
+99.83	Elev. 775.61	Elev. 775.53
Sta. 193+15.23	.02	Elev. 774.94
+30.63	Elev. 774.41	.33
+46.03	Elev. 773.80	Elev. 773.72
+61.43	.18	.10
+76.83	Elev. 772.56	Elev. 772.48
+92.23	Elev. 771.95	Elev. 771.87
Sta. 194+07.63	.33	.25
+23.03	Elev. 770.72	Elev. 770.64
+38.43	.10	.02
+53.83	Elev. 769.48	Elev. 769.40
+69.23	Elev. 768.87	Elev. 768.79
+84.63	.25	.17
Sta. 195+00.03	Elev. 767.64	Elev. 767.56
+15.43	.02	Elev. 766.94
+23.11	Elev. 766.71	.63
+30.79	.41	.33
+38.47	.10	.02
+46.15	Elev. 765.79	Elev. 765.71
+53.83	.48	.40
+61.51	.18	.10
+69.19	Elev. 764.87	Elev. 764.79
+76.87	.56	.48
+84.55	.26	.18
+92.23	Elev. 763.95	Elev. 763.87
+99.91	.64	.56
Sta. 196+07.59	.33	.25
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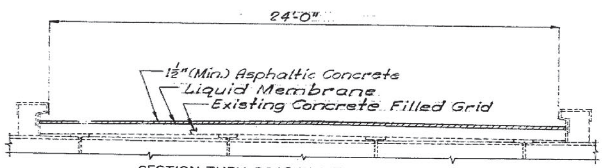
+22.95	Elev. 762.72	.64



SECTION THRU ROADWAY-THRU TRUSS SPANS
(SHOWING 1½" (MIN.) ASPHALTIC CONCRETE OVERLAY)

DETAILED APR. 1984
CHECKED Apr. 1984

Note: This drawing is not to scale. Follow dimensions.

JACKSON COUNTY L-568R

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	9	

107'-8 3/8"± (Minimum panel length = ℄ to ℄ 4-Cross Beams)

PLAN OF PROPOSED GRID DECK - SPANS (1-2) & (9-8)

DETAILS OF PROPOSED SHIMS

PART SECTION A-A

SECTION THRU ROADWAY - ℄ GIRDER SPANS

AT ABUTMENTS NO. 1 & 9

AT PIERS NO. 2 & 8

PART LONGITUDINAL SECTION SPANS (1-2) & (9-8)

1/2" TRIM PLATE TEMPLATE (BASED ON 5 3/16" DEEP GRID DECK)

DETAILS FOR PLATE GIRDER SPANS

DETAILED DEC. 1983

CHECKED Apr. 1984

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 5 of 13.

JACKSON COUNTY

L-568R

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	10	

14-W8x28 Rail Posts @ abt. 7'-8" cts.
(Placed on Existing Cross Beams)

6'-6"±

W8x28 Rail Post (Placed on Proposed Cross Beam)

Guard Rail Attachment Plate

Curb Closure Angle (L-8x6x½)

ST 6"x3"x⅜"

Curb Closure Angle (L-8x6x½)

Top Curb Angle (L-6x6x⅝)

5⅜"± Steel Grid Deck with 1½" (Min.) Asphaltic Concrete

23-Curb Support Angles (L-8x6x½)

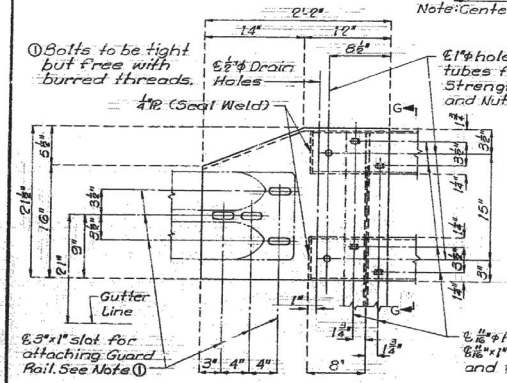
ABUT. NO. 1 OR 9

PIER NO. 2 OR 8

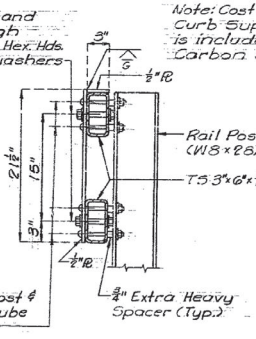
Note: Center one Curb Support Angle between rail posts and center one Curb Support Angle at each rail post.

SECTION NEAR RIGHT HANDRAIL & CURB-SPANS (1-2) & (9-8)

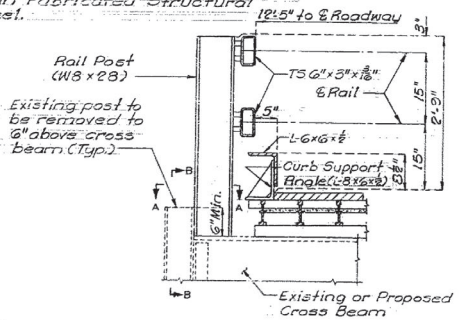
Note: Cost of Top Curb Angle, Curb Closure Angles, Curb Support Angles and ½" brace plates is included in Fabricated Structural Carbon Steel.

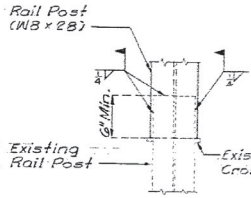


DETAILS OF GUARD RAIL ATTACHMENT PLATE

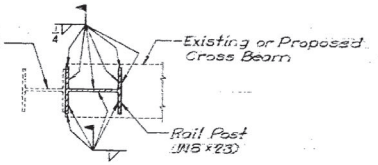


SECTION G-G

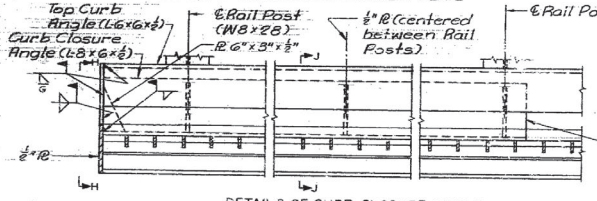




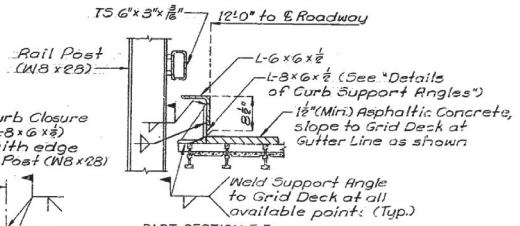
PART SECTION B-B



PART SECTION A-A

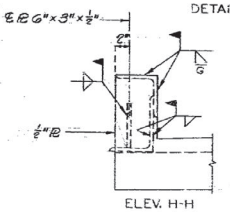


DETAILS OF CURB CLOSURE ANGLE

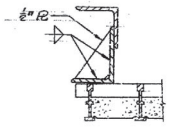


PART SECTION F-F

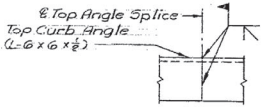
Note: Rail Posts (W8x28) are included in price bid for Bridge Rail per Linear Foot.
See sheet No. 12 for additional details of bridge rail.



ELEV. H-H

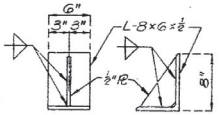


SECTION J-J



DETAILS OF TOP CURB ANGLE SPLICE

Note: Top Curb Angle (L-6x6x½) to be fabricated in lengths of 12'-0"±.



DETAILS OF CURB SUPPORT ANGLE

290

DETAILED DEC. 1983
CHECKED Apr. 1984

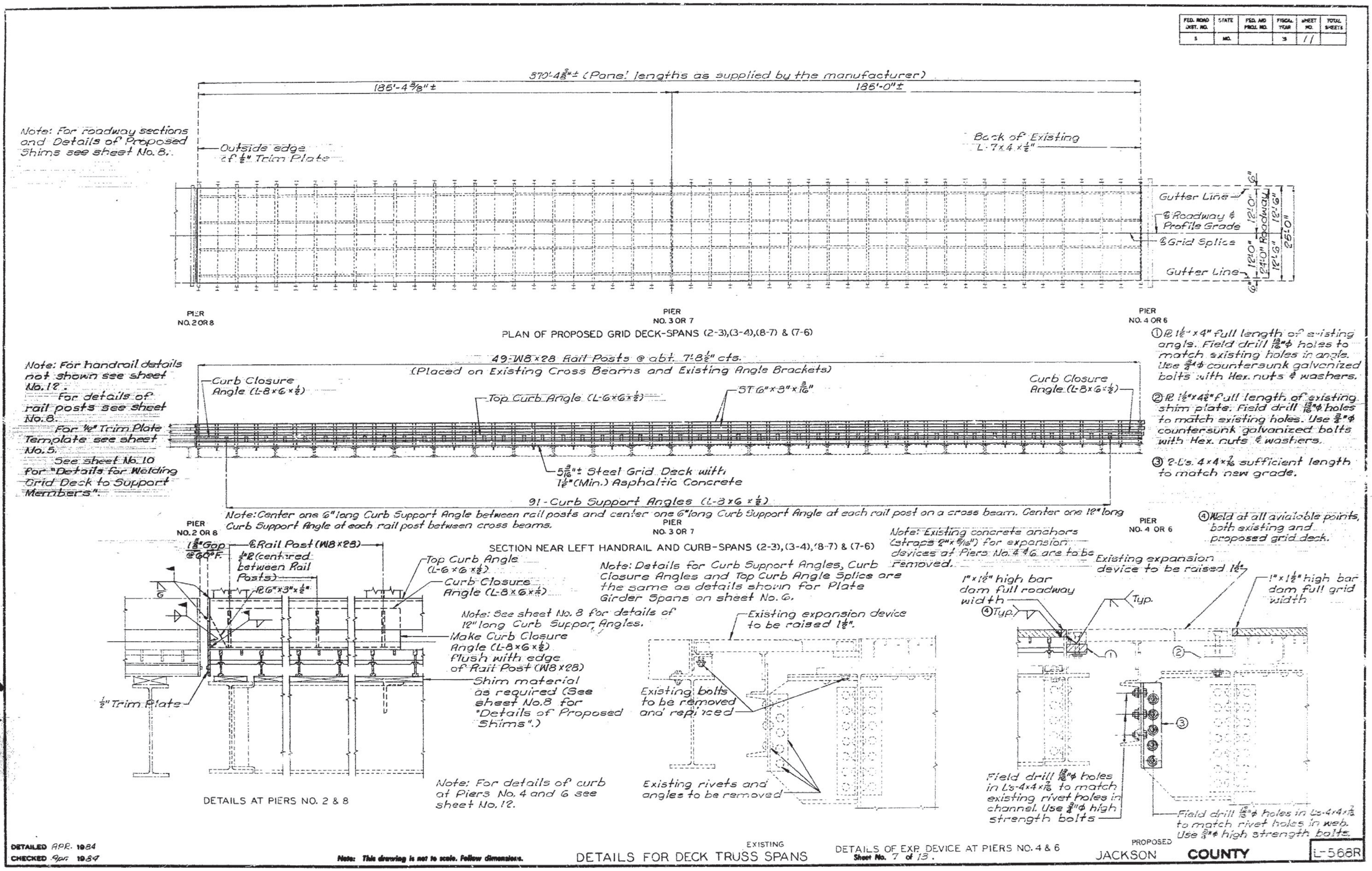
Note: This drawing is not to scale. Follow dimensions.

DETAILS FOR PLATE GIRDER SPANS

Sheet No. 6 of 13.

JACKSON COUNTY

L-588R



FED. ROAD DIST. NO. | STATE | FED. AID PROJ. NO. | FISCAL YEAR | SHEET NO. | TOTAL SHEETS
5 | MO. | | '5 | 11 |
370'-4⅜"± (Panel lengths as supplied by the manufacturer)
185'-4⅜"±
185'-0"±
Note: For roadway sections and Details of Proposed Shims see sheet No. 8.
Outside edge of ½" Trim Plate
Back of Existing L-7x4x½"
Gutter Line
℄ Roadway & Profile Grade
℄ Grid Splice
Gutter Line
6" 12'-0" 12'-0" 6" 24'-0" Roadway 12'-6" 12'-6" 25'-0"
PIER NO. 2 OR 8
PIER NO. 3 OR 7
PIER NO. 4 OR 6
PLAN OF PROPOSED GRID DECK-SPANS (2-3),(3-4),(8-7) & (7-6)
Note: For handrail details not shown see sheet No. 12.
For details of rail posts see sheet No. 8.
For ½" Trim Plate Template see sheet No. 5.
See sheet No. 10 for "Details for Welding Grid Deck to Support Members".
49-W8x28 Rail Posts @ abt. 7'-8½" cts.
(Placed on Existing Cross Beams and Existing Angle Brackets)
Curb Closure Angle (L-8x6x½)
Top Curb Angle (L-6x6x½)
ST 6"x8"x3/16"
Curb Closure Angle (L-8x6x½)
5 3/16"± Steel Grid Deck with 1½"(Min.) Asphaltic Concrete
91-Curb Support Angles (L-8x6x½)
Note: Center one 6" long Curb Support Angle between rail posts and center one 6" long Curb Support Angle at each rail post on a cross beam. Center one 12" long Curb Support Angle at each rail post between cross beams.
SECTION NEAR LEFT HANDRAIL AND CURB-SPANS (2-3),(3-4),(8-7) & (7-6)
① ℞ 1½"x4" full length of existing angle. Field drill 13/16"φ holes to match existing holes in angle. Use ¾"φ countersunk galvanized bolts with Hex. nuts & washers.
② ℞ 1½"x4½" full length of existing shim plate. Field drill 13/16"φ holes to match existing holes. Use ¾"φ countersunk galvanized bolts with Hex. nuts & washers.
③ 2-L's. 4x4x7/16 sufficient length to match new grade.
④ Weld at all available points, both existing and proposed grid deck.
1⅜" Gap @ 60°F.
℄ Rail Post (W8x28)
½" ℞ (centered between Rail Posts)
℞ 6"x3"x½"
Top Curb Angle (L-6x6x½)
Curb Closure Angle (L-8x6x½)
Note: See sheet No. 8 for details of 12" long Curb Support Angles.
Make Curb Closure Angle (L-8x6x½) flush with edge of Rail Post (W8x28)
Shim material as required (See sheet No. 8 for "Details of Proposed Shims".)
½" Trim Plate
DETAILS AT PIERS NO. 2 & 8
Note: For details of curb at Piers No. 4 and 6 see sheet No. 12.
Note: Details for Curb Support Angles, Curb Closure Angles and Top Curb Angle Splice are the same as details shown for Plate Girder Spans on sheet No. 6.
Note: Existing concrete anchors (straps 2"x5/16") for expansion devices at Piers No. 4 & 6 are to be removed.
Existing expansion device to be raised 1⅛".
Existing bolts to be removed and replaced
Existing rivets and angles to be removed
Existing expansion device to be raised 1⅛".
1"x1½" high bar dam full roadway width
1"x1½" high bar dam full grid width
Typ.
Field drill 13/16"φ holes in L's-4x4x7/16 to match existing rivet holes in channel. Use ¾"φ high strength bolts
Field drill 13/16"φ holes in L's-4x4x7/16 to match rivet holes in web. Use ¾"φ high strength bolts.
DETAILED APR. 1984
CHECKED Apr. 1984
Note: This drawing is not to scale. Follow dimensions.
EXISTING
DETAILS FOR DECK TRUSS SPANS
DETAILS OF EXP. DEVICE AT PIERS NO. 4 & 6
Sheet No. 7 of 13.
PROPOSED
JACKSON COUNTY
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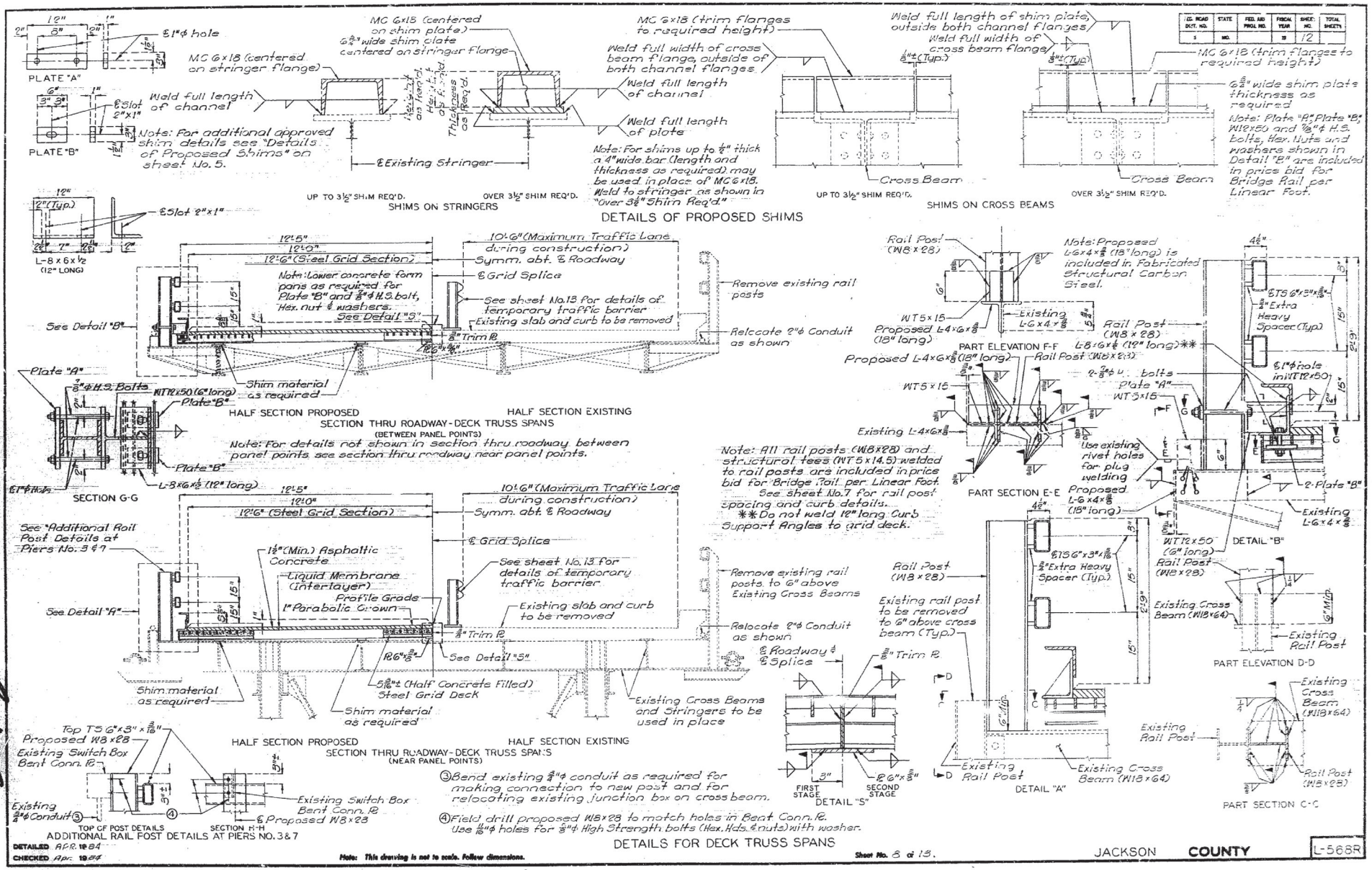

CO. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	12	

DETAILED Apr. 1984
CHECKED Apr. 1984

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 8 of 13.

JACKSON COUNTY

L-568R

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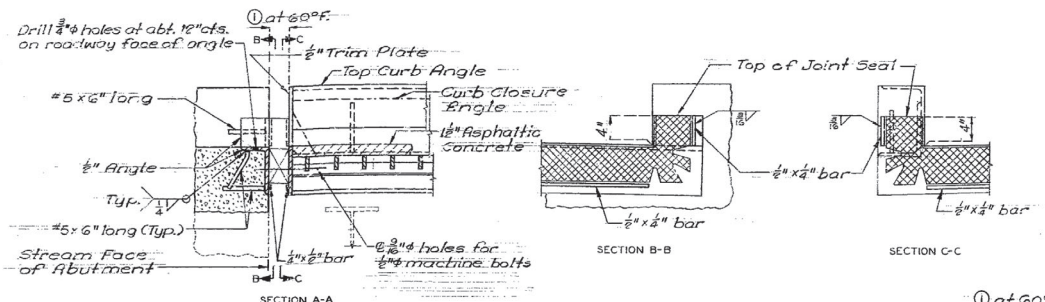
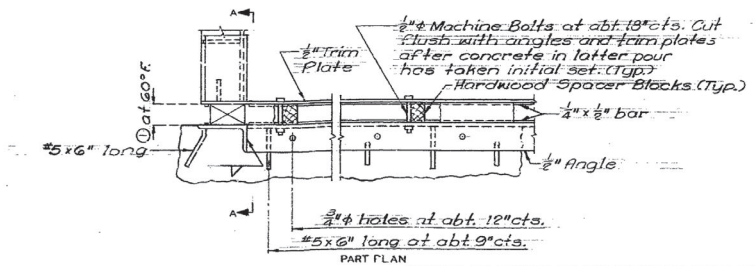
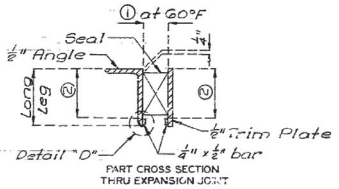
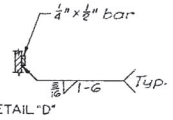
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	13	

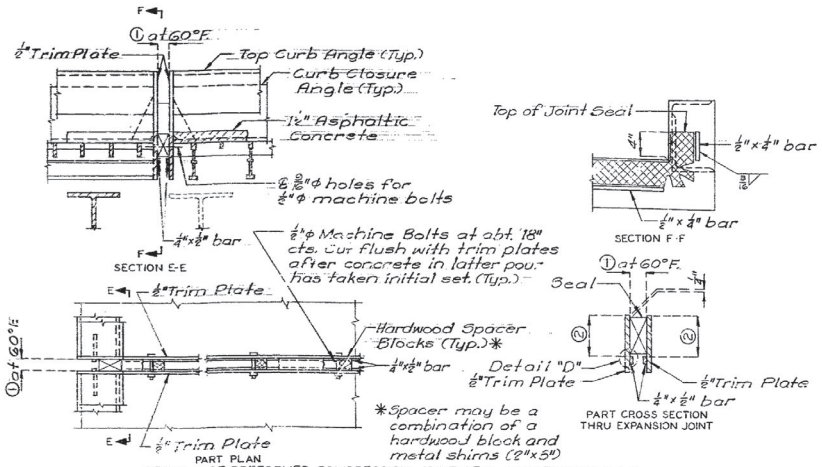






DETAILS OF PREFORMED COMPRESSION JOINT SEAL AT ABUTMENTS NO. 1 & 9





DETAILS OF PREFORMED COMPRESSION JOINT SEAL AT PIERS NO. 2 & 8

NOTES FOR PREFORMED COMPRESSION JOINT SEAL:

STRUCTURAL STEEL FOR EXPANSION DEVICE SHALL BE FABRICATED IN ONE SECTION EXCEPT THAT WHEN THE LENGTH IS OVER 50' SPLICING IS PERMISSIBLE.

THE EXPANSION DEVICE SHALL BE BENT TO CONFORM TO CROWN AND GRADE OF ROADWAY.

NO. 5 BARS FOR EXPANSION DEVICE SHALL BE STRUCTURAL GRADE.

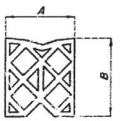
APPROVED STUD WELDED ANCHORS (C-1010 THRU C-1020) OR DEFORMED BAR ANCHORS (ASTM A496) MAY BE USED IN LIEU OF NO. 5 BARS SHOWN.

PLAN DIMENSIONS ARE BASED ON INSTALLATION AT 60° F.

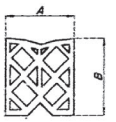
DIMENSION ① SHALL BE INCREASED ③ FOR EACH 10° FALL IN TEMPERATURE AND DECREASED ③ FOR EACH 10° RISE IN TEMPERATURE AT INSTALLATION.

SEE SPECIAL PROVISIONS FOR THE REQUIREMENTS OF COMPRESSION JOINT SEAL.

③ = ¼" at Abutments No. 1 & 9
③ = 0 at Piers No. 2 & 8



TYPE A1



TYPE B3

	TABLE OF TRANSVERSE BRIDGE SEAL DIMENSIONS					
	TYPE	"A" (WIDTH)	"B" (HEIGHT)	①	②	MAX. LIMIT OF COMPRESSIBILITY
REQ'D. AT PIERS NO. 2 & 8	A1 OR B3	2.5"	NOT LESS THAN "A"	1⅝"	"B"+½"	46%
	A1 OR B3	3.0"	NOT LESS THAN "A"	1⅞"	"B"+½"	43%
	A1 OR B3	3.5"	NOT LESS THAN "A"	2¼"	"B"+½"	42%
	A1 OR B3	4.0"	NOT LESS THAN "A"	2⅝"	"B"+½"	42%
	A1 OR B3	4.5"	NOT LESS THAN "A"	2¾"	"B"+½"	40%
REQ'D. AT ABUTS. NO. 1 & 9	A1 OR B3	5.0"	NOT LESS THAN "A"	2⅞"	"B"+½"	40%

SIZE OF ARMOR ANGLE:

VERTICAL LEG OF ANGLE SHALL BE A MINIMUM OF "B"+1¼". HORIZONTAL LEG OF ANGLE SHALL BE A MINIMUM OF 3". MINIMUM THICKNESS OF ANGLE SHALL BE ⅜" FOR SEAL WIDTHS THROUGH 3.5" AND ½" FOR SEAL WIDTHS GREATER THAN 3.5".

IN LIEU OF THE SPECIFIED SEAL, THE NEXT LARGER SEAL MAY BE SUBSTITUTED. DIMENSIONS AND LIMITS SHALL CORRESPOND TO THE ACTUAL SEAL INSTALLED.

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STD PC/S	REVISED
OCT. 1973	OCT. 1982

DETAILED JAN. 1984
CHECKED Apr. 1984

DETAILS OF PREFORMED COMPRESSION JOINT SEAL AT ABUTMENTS NO. 1 & 9 AND PIERS NO. 2 & 8

Note: This drawing is not to scale. Follow dimensions.

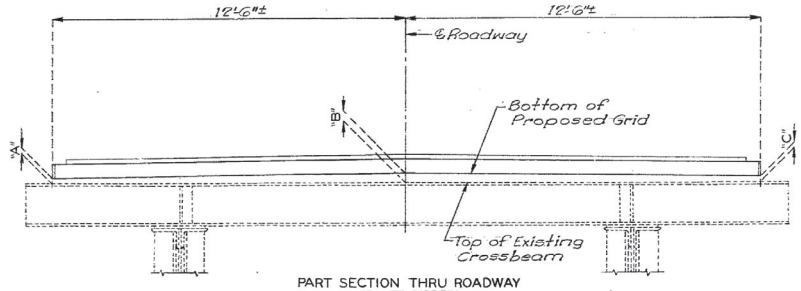
Sheet No. 3 of 13

JACKSON COUNTY

L-568R

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		73	14	

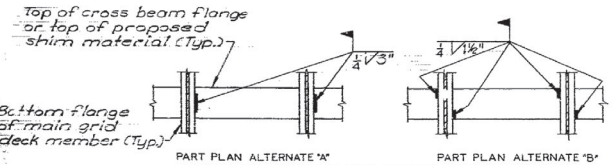
Note: Rail posts and other details are not shown for clarity.



PART SECTION THRU ROADWAY
(PLATE GIRDER)

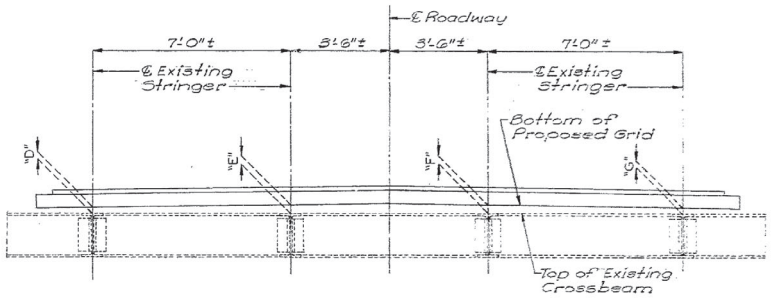
TABLE OF SHIM HEIGHT DIMENSIONS							
PLATE GIRDER SPAN (1-2)				PLATE GIRDER SPAN (8-9)			
CROSSBEAM STATION±	A	B	C	CROSSBEAM STATION±	A	B	C
177+43.90	4 5/8"	5 5/8"	4 5/8"	195+16.60 *	2 3/8"	3 3/8"	2 1/4"
51.58	4 1/8"	5 1/8"	5 3/4"	23.11	2 7/8"	4"	3 1/8"
59.26	3 1/2"	4 7/8"	4 3/8"	30.79	3 1/4"	4 1/8" ±	3"
66.94	4 1/8"	5 3/8"	4 1/2"	38.47	2 3/8"	3 7/8"	3 1/4"
74.62	3 3/4"	5 1/4"	4 3/8"	46.15	2 7/8"	4 1/4"	3 5/8"
82.30	3 1/2"	4 3/4"	4"	53.83	2 5/8"	3 5/8"	2 5/8"
89.98	3 1/4"	5 1/8"	4 3/8"	61.51	2 3/4"	3 5/8"	2 1/2"
97.66	4 3/4"	5 5/8"	4 1/2"	69.19	2 5/8"	4 3/8"	4 1/8"
178+05.34	4 1/8"	5 3/8"	4 5/8"	76.87	2 1/2"	4 1/4"	4"
13.02	3 3/4"	5 3/8"	4 1/8"	84.55	2 7/8"	3 5/8"	2 3/8"
20.70	3 5/8"	5 1/4"	4 3/4"	92.23	2 1/4"	3 1/2"	2 3/4"
28.38	3 3/8"	4 1/2"	3 3/4"	99.91	2 1/4"	3 1/4"	2 1/4"
36.06	3 3/4"	4 3/4"	3 3/4"	196+07.59	4 1/4"	5 1/4"	4 1/4"
43.74	4 1/8"	5 1/4"	4 3/8"	15.27	3 3/8"	4 5/8"	4"
50.25 *	2 7/8"	4"	3 1/8"	22.95	2 7/8"	3 7/8"	2 7/8"

* Indicates proposed crossbeam.



PART PLAN ALTERNATE "A" PART PLAN ALTERNATE "B"

DETAILS FOR WELDING GRID DECK TO SUPPORT MEMBERS



PART SECTION THRU ROADWAY
(DECK TRUSS)

TABLE OF SHIM HEIGHT DIMENSIONS									
DECK TRUSS SPANS (2-3) & (3-4)					DECK TRUSS SPANS (6-7) & (8-9)				
CROSSBEAM STATION±	D	E	F	G	CROSSBEAM STATION±	D	E	F	G
178+51.42	2"	2 3/8"	2 5/8"	2 1/8"	191+45.83	1/8"	1"	7/8"	1/4"
66.78	2 3/8"	3"	3 1/8"	2 3/8"	61.23	3/8"	1"	1"	1/8"
82.14	2 3/4"	3 1/4"	3 1/4"	2 3/8"	76.63	7/8"	1 3/8"	1 3/8"	7/8"
97.50	2 3/4"	3 1/4"	3 1/4"	2 3/4"	92.05	7/8"	1 3/8"	1 3/8"	7/8"
179+12.86	3 1/8"	3 1/2"	3 3/8"	2 3/4"	192+07.43	5/8"	1 1/2"	1 1/4"	3/4"
28.22	3 3/8"	3 3/8"	3 3/4"	3 1/8"	22.83	1"	1 3/8"	1 3/8"	1"
43.58	2 7/8"	3 3/8"	3 1/8"	2 1/2"	38.23	1 1/4"	1 3/4"	1 3/8"	1"
58.94	3 1/8"	3 1/2"	3 3/8"	2 3/8"	53.63	3/4"	1 1/8"	1"	3/8"
74.30	2 3/8"	2 7/8"	2 3/4"	2 1/8"	69.03	1"	1 3/8"	1 3/8"	3/4"
89.66	2 1/4"	2 3/4"	2 3/4"	2 1/8"	84.43	1/2"	1 1/8"	1"	1/2"
180+05.02	2 1/4"	2 7/8"	3"	2 1/2"	99.83	5/8"	1 1/8"	1 1/4"	5/8"
20.38	1 7/8"	2 3/8"	2 1/2"	1 7/8"	193+15.23	0"	5/8"	5/8"	3/8"
35.74	1 3/8"	2 1/4"	2 3/8"	2"	30.63	1/8"	1"	1 3/8"	1 1/8"
51.10	2"	2 3/8"	2 3/8"	1 3/4"	46.03	1/4"	7/8"	1"	1/2"
66.46	1 1/2"	2 1/4"	2 3/8"	1 7/8"	61.43	0"	1/8"	5/8"	5/8"
81.82	2 1/2"	2 3/8"	2 5/8"	1 7/8"	76.83	0"	3/8"	1/2"	1/8"
97.18	1 7/8"	2 1/2"	2 1/2"	1 7/8"	92.23	1/4"	1 3/8"	1 3/4"	1 1/2"
181+12.54	1 1/2"	2 1/8"	2 1/2"	1 1/2"	194+07.63	0"	7/8"	1 1/8"	5/4"
27.90	1 3/4"	2 1/4"	2 1/4"	1 3/4"	23.03	5/8"	1 1/4"	1 3/8"	7/8"
43.26	2 3/4"	3 1/2"	2 7/8"	2"	38.43	3/4"	1 1/2"	1 1/2"	1 1/8"
58.62	2 1/2"	2 7/8"	2 3/4"	2"	53.83	1"	1 5/8"	1 5/8"	1 1/8"
73.23	2 5/8"	3 3/8"	3 1/2"	3"	69.25	7/8"	1 7/8"	1 7/8"	3/4"
89.34	2 3/8"	2 1/2"	2"	1 1/8"	84.63	1 3/8"	2"	2"	1 1/2"
182+04.70	1 3/4"	2 1/4"	2 1/4"	1 3/4"	195+00.03	1 5/8"	2"	1 7/8"	1 1/4"
20.06	1 7/8"	2 3/8"	2 3/8"	1 3/4"	15.43	1 1/2"	2"	2"	1 3/8"

Note: See sheets No. 5 & 6 for "Details of Proposed Shims". Shim heights shown are based on field survey data and the original design drawings.

SHIM HEIGHT DIMENSIONS
PLATE GIRDER & DECK TRUSS SPANS

DETAILED APR. 1984
CHECKED Apr. 1984

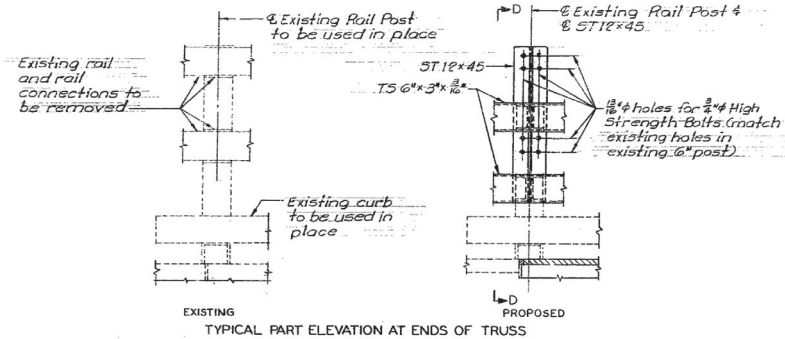
Note: This drawing is not to scale. Follow dimensions.

Sheet No. 10 of 13.

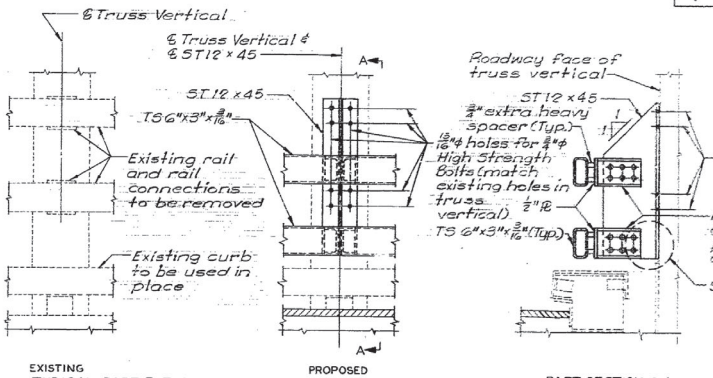
JACKSON COUNTY

L-568R

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	75	

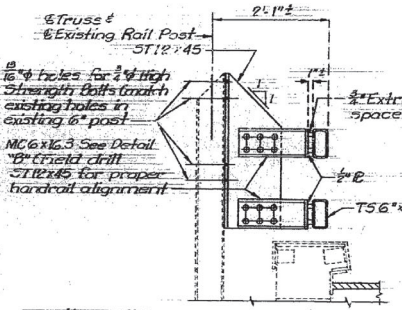


TYPICAL PART ELEVATION AT ENDS OF TRUSS
(L0 & L0')

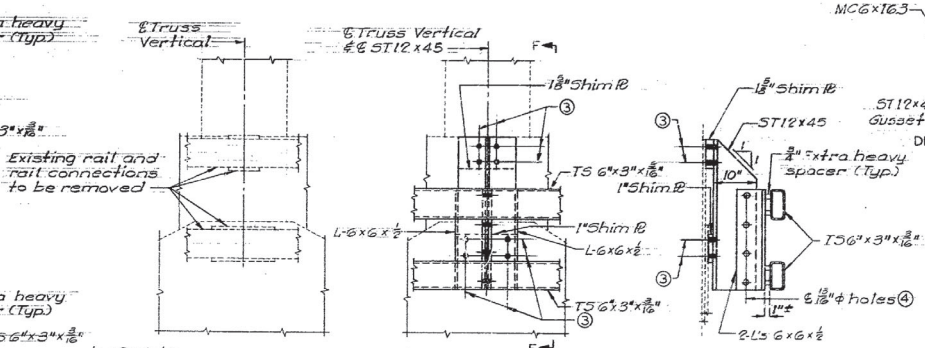


TYPICAL PART ELEVATION AT TRUSS VERTICAL
(L1 THRU L13 & L1' THRU L13')

PART SECTION A-A

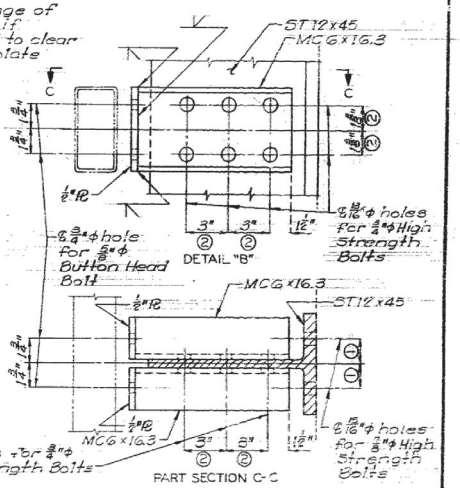


PART SECTION D-D



PART ELEVATION AT TRUSS VERTICAL L14

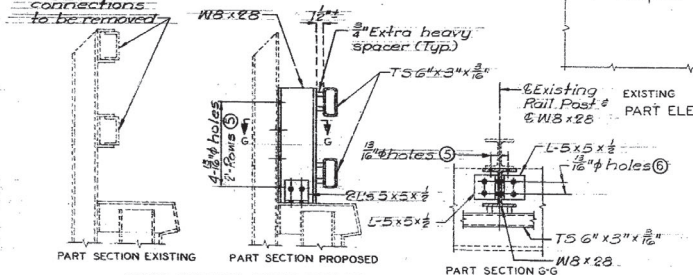
PART SECTION F-F



PART SECTION C-C

③ Field drill 13/16"ϕ holes in ST12x45 to match existing holes in truss vertical.
④ Field drill 13/16"ϕ holes in ST12x45 for proper handrail alignment.

① Field drill 13/16"ϕ holes in ST12x45 to match existing holes in truss vertical.
② Field drill 13/16"ϕ holes in ST12x45 to match holes in MC6x16.3.



DETAILS OF RAIL POSTS BETWEEN PANEL POINTS

⑤ Plug weld holes in existing rail post. Field drill 13/16"ϕ holes in existing post to match 13/16"ϕ holes in proposed W18x28. Holes to match gage of existing post.
⑥ Field drill 13/16"ϕ holes in top curb plate to match 13/16"ϕ holes in proposed L-5x5x1/2.

Note: Use 3/4"ϕ or 7/8"ϕ High Strength Bolts (Hex. Heads and Nuts) with washers for all connections except handrail.

DETAILED MAR. 1984
CHECKED Apr. 1984

RAIL DETAILS FOR THRU TRUSS SPANS

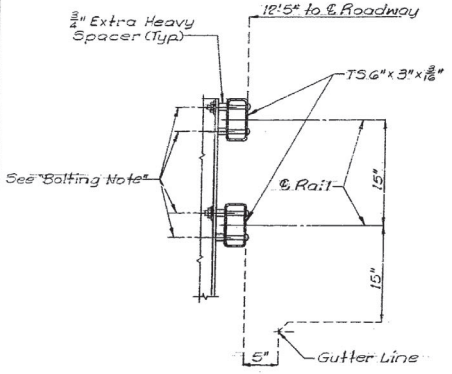
Note: This drawing is not to scale. Follow dimensions.

Sheet No. 11 of 13.

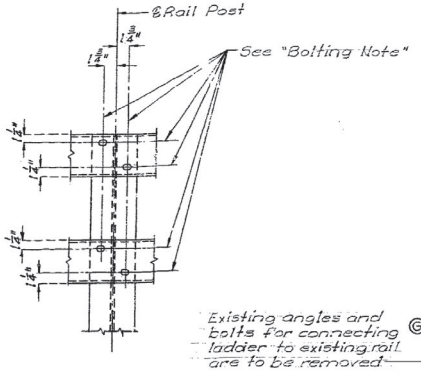
JACKSON COUNTY

L-568R

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
3	MO.		19	16	



PART SECTION THRU RAIL



PART ELEVATION AT RAIL POST

TYPICAL RAIL BOLTING DETAILS

BOLTING NOTE:

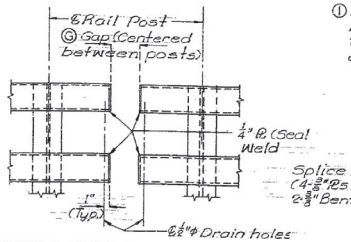
If rail is shop drilled use 11/16"x1" horizontal slot in TS 6"x 3"x 5/16" with 11/16"ϕ hole in receiving structural shape. Use 5/8"ϕ Button Head Bolts (oval shoulder) with one flat washer and Hex. nut.

If rail is field drilled use 11/16"ϕ hole in TS 6"x 3"x 5/16" with 11/16"ϕ hole in receiving structural shape. Use 5/8"ϕ Button Head Bolts with one flat washer and Hex. nut.

Location of slots or holes is to be at dimensions shown regardless of method used to install proposed rails.

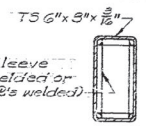
To provide for even vertical alignment of rails and free movement of rail expansion sleeves, vertical dimensions for location of rails may be varied slightly from dimensions shown.

Even horizontal alignment of rails shall be accomplished by varying the lengths of the 3/4" extra heavy spacers.

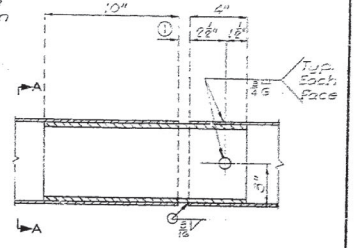


RAIL DETAILS AT EXP DEVICE PIERS NO. 4 & 6
AND AT COMR JOINT SEAL PIERS NO. 2 & 8

① Provide 3/4"(=1/8"-1/4") gap at Rail Splices. Provide a 2" gap at Rail Expansion Joints.



SECTION A-A

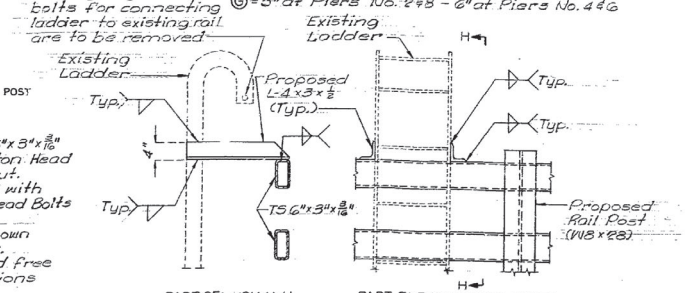


DETAIL OF RAIL EXPANSION OR SPLICE JOINT

Note: Railing shall be fabricated in two or three panel lengths unless otherwise approved.

Splice in rails shall be provided at about ℄ point between attachments.

Rail Expansion Joints shall be provided at ℄ point between rail posts either side of thru truss grid expansion points. The thru truss grid expansion points are located at panel points L6, L12, L12' & L6'.

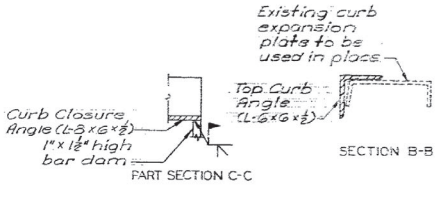


PART SECTION H-H

PART ELEVATION OF LADDER AT PIERS NO. 3 & 7

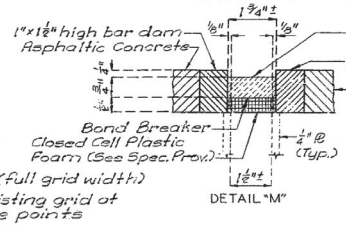
Note: Use repair details for ladders at L7 & L7' similar to those shown for ladders at Piers No. 3 & 7.

TYPICAL HANDRAIL DETAILS

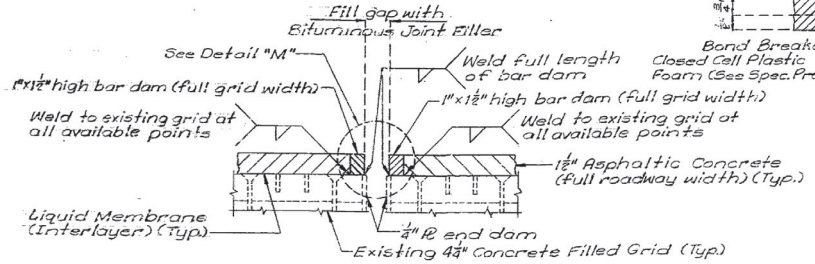


SECTION B-B

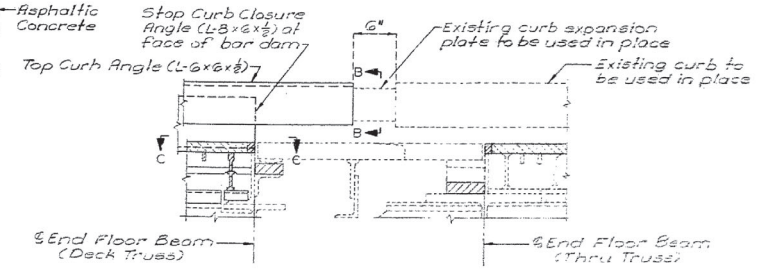
PART SECTION C-C



DETAIL "M"



PART SECTION SHOWING PROPOSED BAR DAMS
THRU TRUSS DETAILS AT L6-L12-L12' & L6'



CURB DETAILS AT PIERS NO. 4 & 6

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TYPICAL HANDRAIL DETAILS & THRU TRUSS DETAILS

DETAILED APR. 19 84
CHECKED Apr. 19 84

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 12 of 13

JACKSON COUNTY

L-568R

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
3	MO.		19	24	

(17)

GENERAL NOTES

Painting or galvanizing temporary traffic barrier is not required. All posts, plates and angles to be A36 steel. See Special Provisions for maintaining traffic during construction.

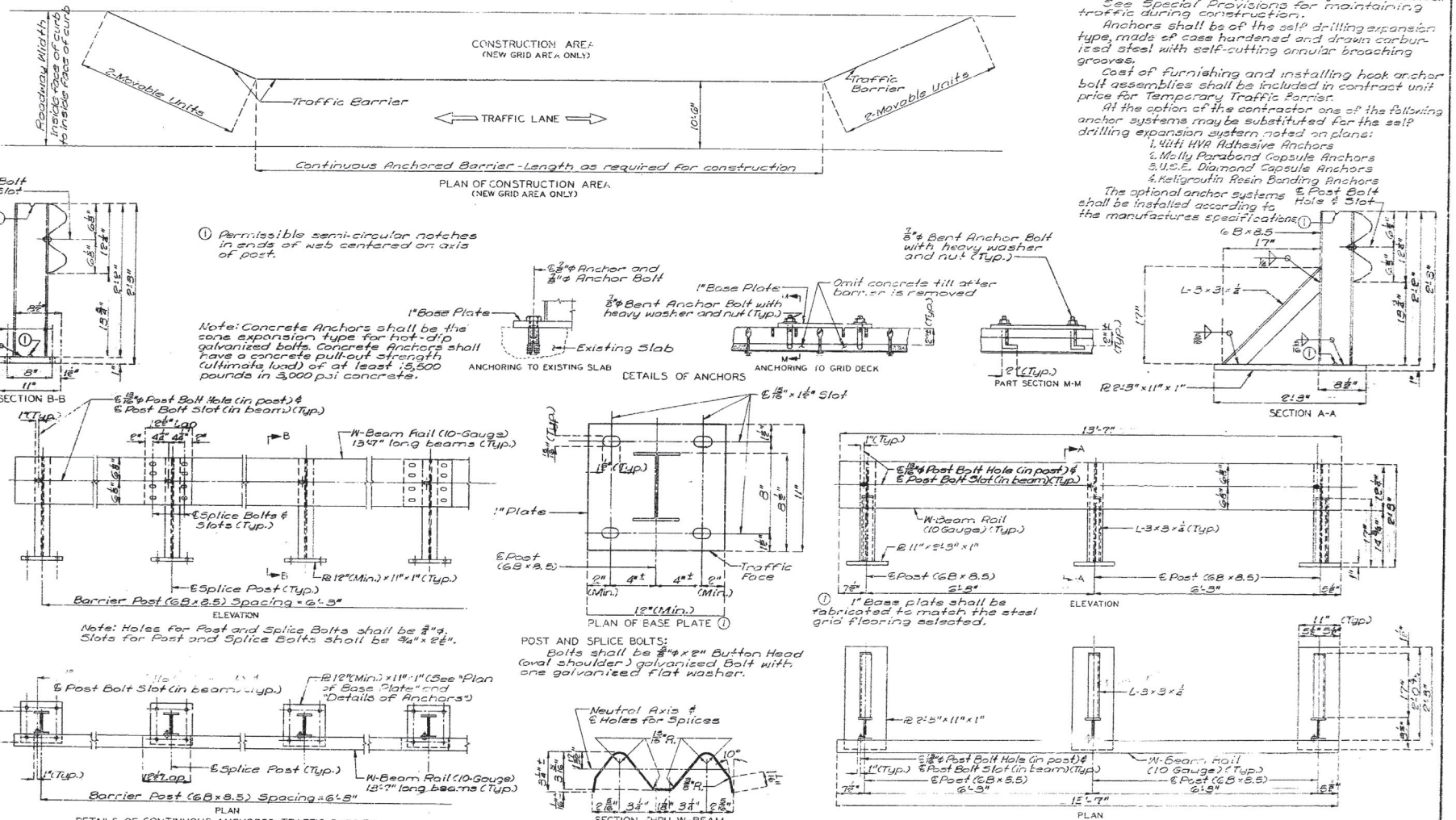
Anchors shall be of the self drilling expansion type, made of case hardened and drawn carburized steel with self-cutting annular broaching grooves.

Cost of furnishing and installing hook anchor bolt assemblies shall be included in contract unit price for Temporary Traffic Barrier.

At the option of the contractor one of the following anchor systems may be substituted for the self drilling expansion system noted on plans:

1. Hilti HVA Adhesive Anchors
2. Molly Parabond Capsule Anchors
3. U.S.E. Diamond Capsule Anchors
4. Kelligroutin Resin Bonding Anchors

The optional anchor systems shall be installed according to the manufacturers specifications.



2'27

DETAILED APR. 1954
CHECKED Apr. 1954

TEMPORARY TRAFFIC BARRIER FOR BRIDGE CONSTRUCTION

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 13 of 13.

JACKSON

L-568R

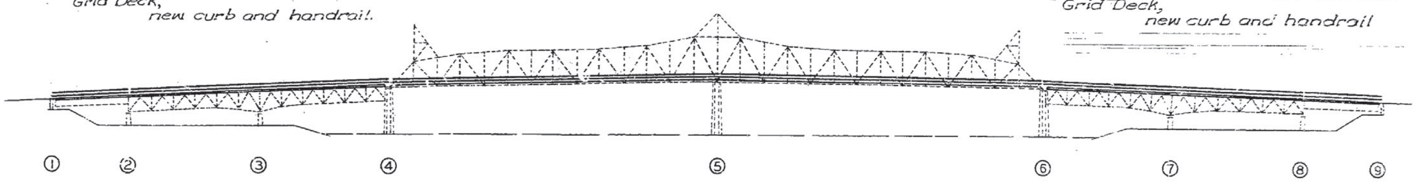
MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		8?	5	
SEC./SUP. 12		TWP. 50		RGE. 22	

107' Simple Plate Girder Span & (186'-186') Continuous Deck Truss Spans - Install Half Concrete Filled Grid Deck, new curb and handrail.

(460'-460') Continuous Thru Truss Spans Install new handrail

107' Simple Plate Girder Span & (186'-186') Continuous Deck Truss Spans - Install Half Concrete Filled Grid Deck, new curb and handrail



ELEVATION

GENERAL NOTES:

Design Loading:
Grid Deck (Half Concrete Filled) - HS 20-44

Design Unit Stresses:
Class B1 Concrete (substructure repair) fc = 1,600 psi
Class B1 Concrete (Grid Deck) fc = 1,600 psi
Reinforcing Steel (Grade 60) fy = 60,000 psi
Structural Carbon Steel fs = 20,000 psi

Structural Steel:
Structural Steel A36 except as noted.

Reinforcing Steel:
Minimum clearance to reinforcing steel 1½" unless otherwise shown.

Navigation and Clearance Lights:
All navigation and clearance lighting kept in operation during all construction.

Old and New Work:
Outline of old work is indicated by light dashed lines. Heavy lines indicate new work.
Bars bonded in old concrete not removed cleanly stripped and embedded into new concrete where possible. length is available, old bars shall extend into new concrete at least 40 diameters for smooth bars and 30 diameters for deformed bars.

Profile Grade:
Thru Truss - No "Profile Grade Elevations" are given. A smooth traffic surface is to be obtained, top of expansion devices are to conform to crown and slope of roadway surface.
Plate Girder and Deck Truss - See Top of Wearing Surface Elevations on sheet No. 4.

Concrete Bonding Compound:
An approved epoxy bonding agent is required between old and new concrete for substructure repair. See Standard Specifications.

Painting:
Shop None; Field, System B Aluminum. See Special Provisions.

Traffic Maintained:
One lane traffic is maintained during construction. See Special Provisions.

Dimensions:
Contractor verify all dimensions in the field before ordering new steel.

Drainage System Removal:
Drainage system at Abutments No. 1 & 9 removed. Holes in concrete at abutments caused by drainage system removal are filled by surface grouting. Drainage system appurtenances riveted directly to plate girders, that do not interfere with the installation of the grid deck, remain in place. See Special Provisions.

Relocation of Existing 2"⌀ Conduit:
Relocate existing 2"⌀ conduit to tops of remaining existing rail posts as shown. A support that provides a permanent rigid connection of conduit to posts submitted by the contractor and approved by the Engineer before relocation of conduit.

ESTIMATED QUANTITIES

ITEM		SUBSTR.	SUPERSTR.	TOTAL
Removal of Existing Bridge Deck	Sq. Ft.		25,200	25,200
Asphaltic Cement (Asphaltic Concrete)	Ton		0.9	0.9
Mineral Aggregate (Asphaltic Concrete) (Type "A" Mix)	Ton		17	17
Bridge Deck Water Proofing (Liquid)	Sq. Yd.		0	0
Substructure Repair (Unformed) See Special Provisions	Sq. Ft.	254		254
Special Work (Bridges) See Special Provisions	Lump Sum	1		1
Preformed Compression Expansion Joint Seal (2.5 inches)	Lin. Ft.		52	52
Preformed Compression Expansion Joint Seal (5.0 inches)	Lin. Ft.		52	52
Fabricated Structural Carbon Steel (Miscellaneous) See Special Provisions	Lb.		125870	125870
Painting (System B) Aluminum See Special Provisions	Lump Sum		1	1
Steel Grid Floor (Half Concrete Filled)	Sq. Ft.		23,903	23,903
Bridge Rail - 2 Tube Structural Steel	Lin. Ft.		3,770	3,770
Temporary Traffic Barrier (See Spec. Prov.)	Lump Sum		1	1
CONTINGENT ITEMS				
Notch Shims	502.01			116
Move out - Move In	502.02			1
Mat. Cost Shim Req.	502.03			1
Repair Str. Beam @ L-11	502.04			1
Repair Clips	502.05			52,563.47
Remake Shims	502.06			1
Floor Beam Splice	502.07			1
Repair web - Span 7	502.08			1
Shim Adj. Bt. No. 8	502.09			1
Repair Fl. Beam Bt. 1	502.10			1
Drill Holes & Plug weld	502.11			1

Note: Special Work (Bridges) includes 5.0 cubic yards of Class B1 Concrete and 170 Lbs. of Grade 60 Reinforcing Steel.

BRIDGE OVER MISSOURI RIVER
STATE ROAD FROM I-35 TO RTE. 24
AT LIBERTY BEND
PROJECT NO. BRF-291-1(B) **STA.** 177+41.66
JOB NO. 4-U291-564 **RTE.** 291
JACKSON **COUNTY**
DATE November 8, 1984

STD.
STD.
L-568R

DESIGNED APR. 1984
DETAILED APR. 1984
CHECKED Apr. 1984

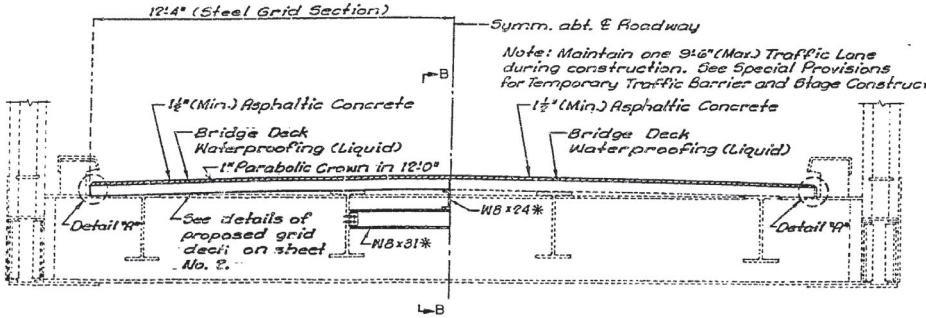
Note: This drawing is not to scale. Follow dimensions.

Sheet No. 1A of 13.

298

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

STATE	PROJ NO	SHEET NO
MO		5
SEC/SUB 12	TWP 50N RGE 38W	



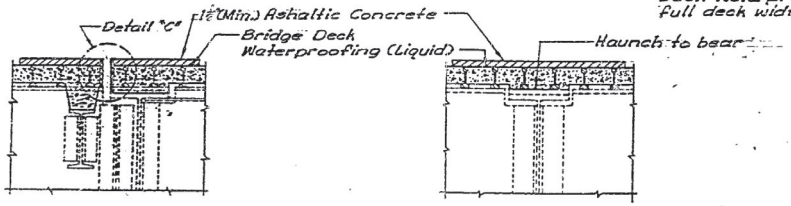
*See "Support Beam Details" on sheet No. 2.

HALF SECTION-NEW GRID DECK

HALF SECTION-EXISTING GRID DECK

SECTION THRU ROADWAY
THRU TRUSS SPANS (4-5) & (5-6)

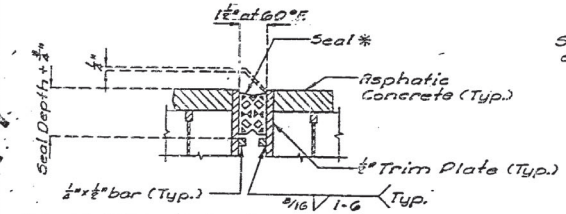
Note: For location and details of proposed replacement grid deck see sheet No. 2.
1½" (Min.) Asphaltic Concrete and Bridge Deck Waterproofing (Liquid) shall extend full deck width and full length of structure.



PART SECTION B-B
(AT L6 L12 L12 L6)

PART SECTION B-B
(AT INTERIOR FLOORBEAMS)

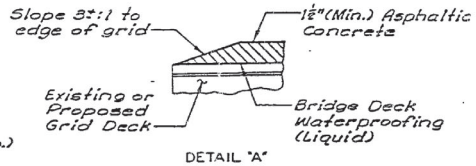
Note: Details shown in "Part Section B-B (at interior floorbeams)" are for new proposed grid, details for existing grid are similar.



*Seal (Width) = 2¼". Required Movement Range = 0.7". Depth of seal shall not be less than width of seal.

DETAIL "C"

Note: See Special Provisions for the requirements of compression joint seal.
Neoprene extrusions shall meet A.S.T.M. D3542-88 Compression joint seal shall extend to within 1" ± of outside edge of grid deck.



DETAIL "A"

GENERAL NOTES:

Design Loading:
Grid Deck (Concrete Filled) - HS 20-44

Design Unit Stresses:
Class B1 Concrete (Grid Deck) f_c = 1,600 psi
Stuctural Carbon Steel f_s = 20,000 psi

Navigation and Clearance Lights:
All navigation and clearance lighting shall be kept in operation during all construction.

Traffic Maintained:
One lane traffic is to be maintained during construction. See Special Provisions.

Profile Grade:
No "Profile Grade Elevations" are given. A smooth traffic surface is to be obtained. Top of expansion devices, trim plates of compression joint seals and grid deck shall conform to crown and slope of roadway surfaces.

Old and New Work:
Outline of old work is indicated by light dashed lines. Heavy lines indicate new work.

Painting:
Shop None; Field, System B Aluminum. See Special Provisions.

Dimensions:
Contractor shall verify all dimensions in the field before ordering new steel.

ESTIMATED QUANTITIES

ITEM	TOTAL
Removal of Existing Bridge Deck (Conc. Filled Grid) Sq.Ft.	2,960
Asphaltic Cement (Asphaltic Concrete) 60-70 or AC20 Ton	21.8
Mineral Aggregate (Asphaltic Concrete) (Type B Min.) Ton	413
Bridge Deck Waterproofing (Liquid) Sq.Yd.	5,180
Fabricated Structural Carbon Steel Lb.	7,460
Painting (System B) Aluminum, See Spec. Prov. Lump Sum	1
Steel Grid Floor (Concrete Filled) Sq.Ft.	2,960
Cleaning & Painting Existing Bearings (See Spec. Prov.) Each	16
Preformed Compression Exp. Joint Seal (2¼ in) Lin.Ft.	98

Note: Fabricated Structural Carbon Steel shall be A36 except as noted.

BRIDGE OVER MISSOURI RIVER
STATE ROAD FROM I-35 TO RTE. 24
AT LIBERTY BEND
PROJECT NO. ERF-291-1(17) STA. 177+41.66
JOB NO. 4-U291-564 RTE. 291
JACKSON COUNTY
DATE 3/25/86

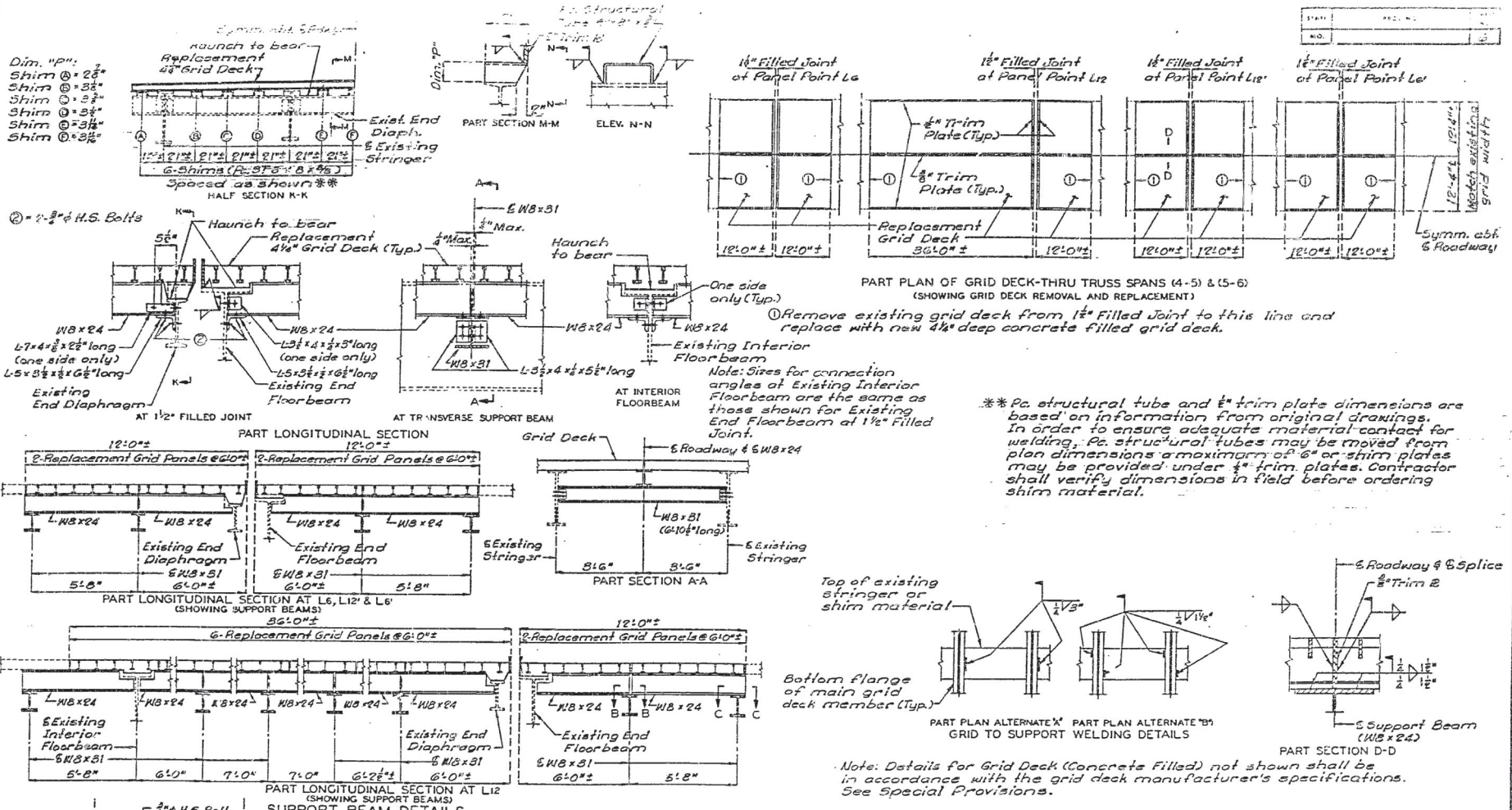
STD.
STD. 617.00
L-568RI

DESIGNED FEB. 1986
DETAILED FEB. 1986
CHECKED Feb 1986

Note: This drawing is not to scale. Follow dimensions.

SEE FINAL PLANS
Sheet No. 1 of 3.

508



50988

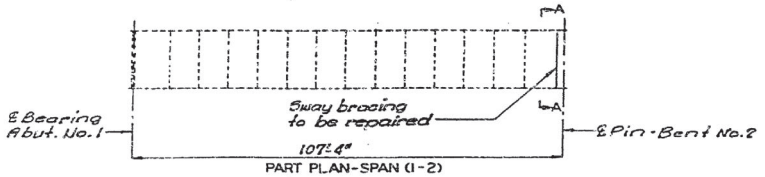
DETAILED FEB. 1986
CHECKED Feb 1986

Note: This drawing is not to scale. Follow dimensions.

JACKSON COUNTY

L-5681

STATE	PROJ NO	SHEET NO
MO		7

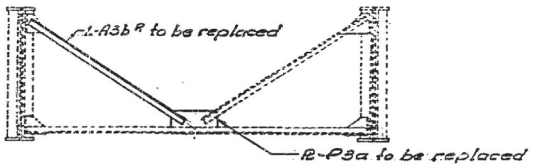


PART PLAN-SPAN (1-2)

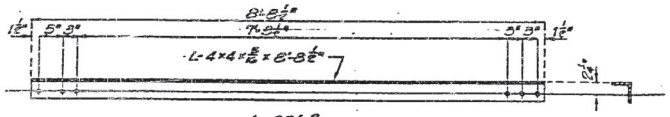
Note: Connections for sway bracing replacement members shall be 7/8"ϕ High Strength Bolts, with 15/16"ϕ holes. Holes may be field drilled. Dimensions shown may be adjusted for proper field fit.

Turn of Nut Method of tensioning high strength bolts will be permitted.

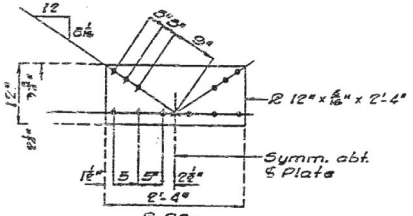
Shop drawings will not be required for sway bracing replacement members.



PART SECTION A-A

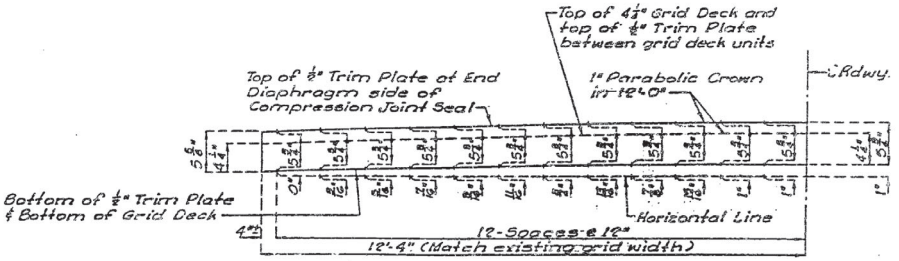


L-A3b^R
1-Required

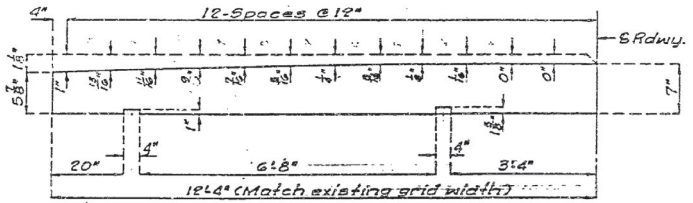


R-P3a
1-Required

DETAILS OF SWAY BRACING REPAIR



DETAILS OF ½" TRIM PLATES AT END DIAPHRAGM SIDE OF COMPRESSION JOINT SEALS AND BETWEEN GRID DECK UNITS



DETAILS OF ½" TRIM PLATE AT FLOORBEAM SIDE OF COMPRESSION JOINT SEALS

DETAILED FEB. 1986
CHECKED Feb 1986

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 3 of 3

JACKSON COUNTY

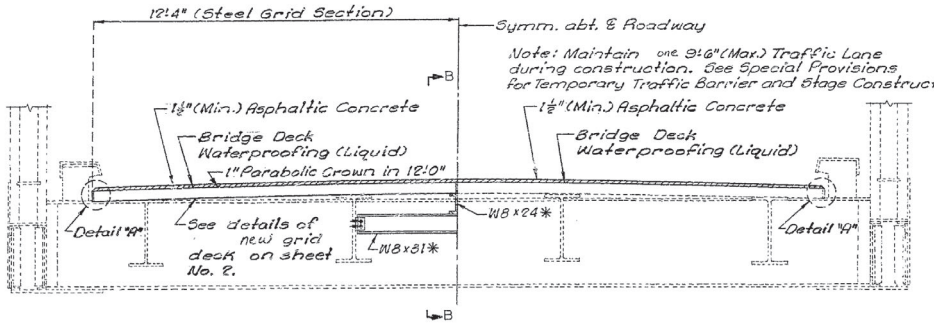
L-568RI

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

STATE	PROJ. NO.	SHEET NO.
MO.	BRF-291-1(17)	5
SEC. SUF. 12	TWP. 50N	RGE. 32W

Job No. 4U-291-564

FINAL PLAN



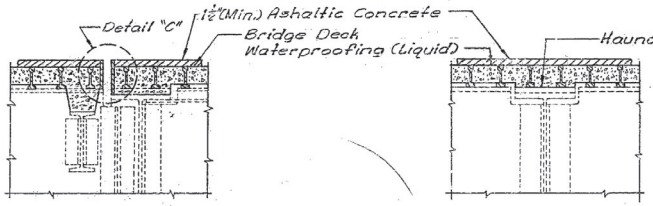
*See "Support Beam Details" on sheet No. 2.

HALF SECTION-NEW GRID DECK

HALF SECTION-EXISTING GRID DECK

SECTION THRU ROADWAY
THRU TRUSS SPANS (4-5) & (5-6)

Note: For location and details of replacement grid deck see sheet No. 2. 1½" (Min.) Asphaltic Concrete and Bridge Deck Waterproofing (Liquid) extends full deck width and full length of structure.



PART SECTION B-B
(AT L6 L12 L12' & L6')

PART SECTION B-B
(AT INTERIOR FLOORBEAMS)

Note: Details shown in "Part Section B-B (at interior floor-beams)" are for new grid, details for existing grid are similar.

GENERAL NOTES:

Design Loading:
Grid Deck (Concrete Filled) - HS 20-44

Design Unit Stresses:
Class B1 Concrete (Grid Deck) fc = 1,600 psi
Stuctural Carbon Steel fs = 20,000 psi

Navigation and Clearance Lights:
All navigation and clearance lighting kept in operation during all construction.

Traffic Maintained:
One lane traffic maintained during construction. See Special Provisions.

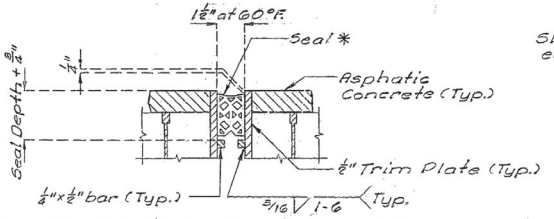
Profile Grade:
No "Profile Grade Elevations" are given. A smooth traffic surface was obtained. Top of expansion devices, trim plates at compression joint seals and grid deck conforms to crown and slope of roadway surfaces.

Old and New Work:
Outline of old work is indicated by light dashed lines. Heavy lines indicate new work.

Painting:
Shop None; Field, System B Aluminum. See Special Provisions.

Dimensions:
Contractor verified all dimensions in the field before ordering new steel.

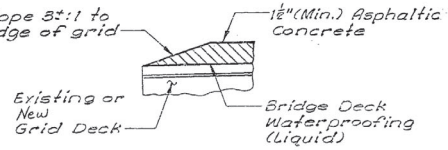
511



*Seal (Width) = 2½". Required Movement Range = 0.7". Depth of seal not less than width of seal.

DETAIL "C"

Note: See Special Provisions for the requirements of compression joint seal.
Neoprene extrusions meet A.S.T.M. D3542-83
Compression joint seal extends to within 1" ± of outside edge of grid deck.



DETAIL "A"

ESTIMATED QUANTITIES

	ITEM	TOTAL
	Removal of Existing Bridge Deck (Conc. Filled Grid) Sq. Ft.	2,960
	Asphaltic Cement (Asphaltic Concrete) AC 20 Ton	20.
	Mineral Aggregate (Asphaltic Concrete) (Type "A" Mix) Ton	414
	Bridge Deck Waterproofing (Liquid) Sq. Yd.	5,180
	Fabricated Structural Carbon Steel Lb.	8,030
	Painting (System B) Aluminum, See Spec. Prov. Lump Sum	1
	Steel Grid Floor (Concrete Filled) Sq. Ft.	2,960
	Cleaning & Painting Existing Bearings (See Spec. Prov.) Each	16
	Preformed Compression Exp. Joint Seal (2⅛ in) Lin. Ft.	98
502.01	Replace Trim Bars	1
502.02	Replace Conn. Angles	1
502.03	Level Bridge Deck (FA)	26451.05
502.04	Grid Deck Repair (FA)	42800.32
502.05	Add'l. Sandblasting	1

Note: Fabricated Structural Carbon Steel A36 except as noted.

DESIGNED FEB. 1986
DETAILED FEB. 1986
CHECKED Feb 1986

Note: This drawing is not to scale. Follow dimensions.

Sheet No. 2A of 2.

BRIDGE OVER MISSOURI RIVER
STATE ROAD FROM I-35 TO RTE. 24
AT LIBERTY BEND
PROJECT NO. BRF-291-1(17) STA. 177+41.66
JOB NO. 4-U291-564 RTE. 291
JACKSON COUNTY

DATE 3/25/86

STD.
STD. 617.00
L-568R1

STATE	PROJ. NO.	SHEET NO.
MO.		4
SEC /SUR. #2	TWP. 50N	RGE. 32W

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

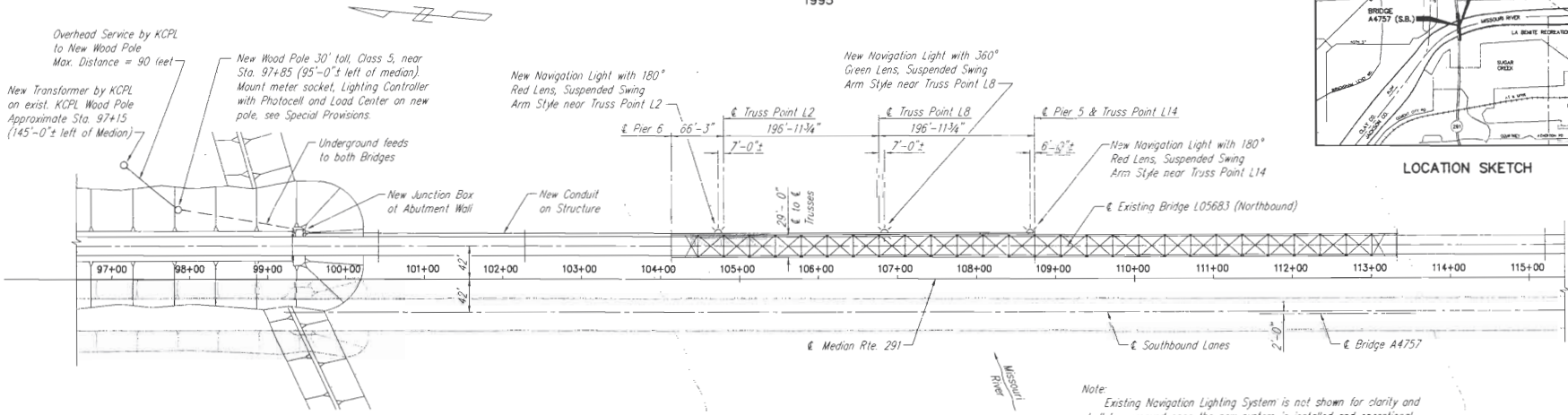
ROUTE 291 MISSOURI RIVER BRIDGE

JACKSON COUNTY

CONTRACT 3

NAVIGATION LIGHTING REMODEL (BRIDGE L05683)

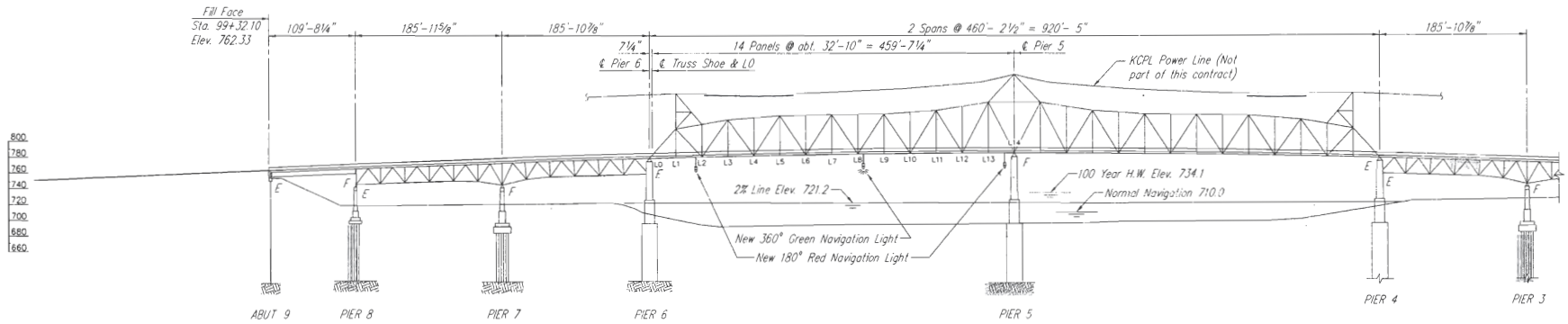
1995



PLAN

LOCATION SKETCH

Note:
Existing Navigation Lighting System is not shown for clarity and shall be removed once the new system is installed and operational. Items to be removed include the existing transformer and lighting controls above Pier 5, all navigation light fixtures, conduit and wiring. Coordinate removal of existing transformer with KCPL.



ELEVATION
(Existing Bridge L05683)

Note:
Pier 2 & Abut. 1 not shown.

ESTIMATED QUANTITIES		
ITEM	UNIT	TOTAL
Navigation Lighting System	Lump Sum	1

BASIC FLOOD DATA	
Discharge (100 yr.)	430,000 cfs
H.W. Elev.	734.1

BRIDGE OVER MISSOURI RIVER

STATE ROAD FROM I-35 TO RTE.24
AT LIBERTY BEND
PROJECT NO.
JOB NO. J4U0564E
JACKSON

STA. 99+32.10
RTE. 291
COUNTY

DATE 3/27/98

1/26/98

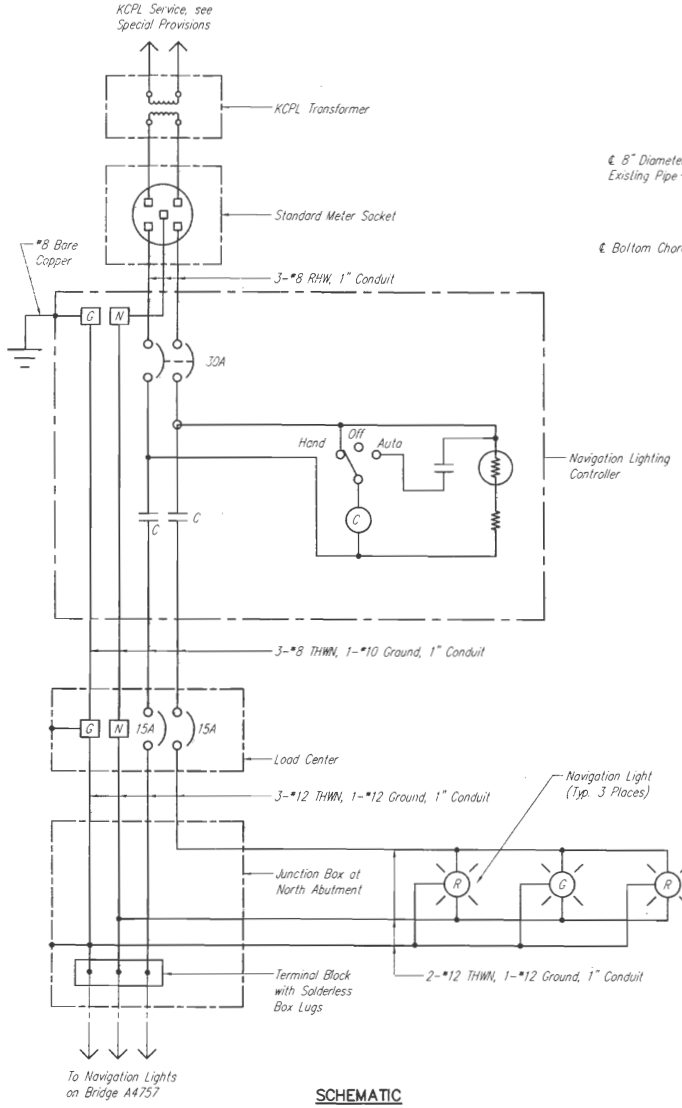
STD.
STD.
L05683

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

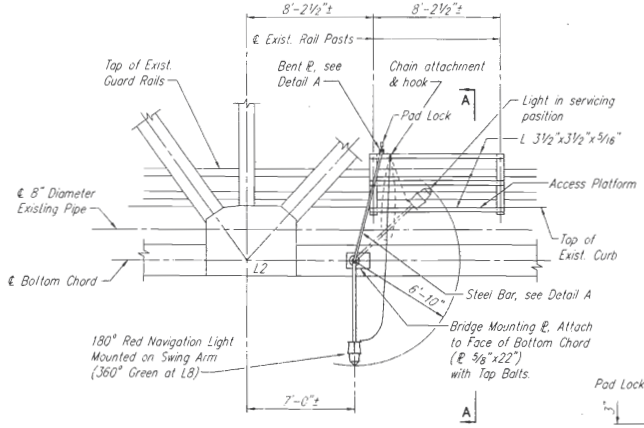
DETAILED: C.N.P. 02/95
CHECKED: T.M.S. 02/95

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

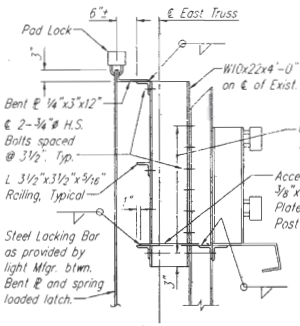
STATE	PROJ. NO.	SHEET NO.
MO		5
SEC./SUR. 12 TWP. 50N RGE. 32W		



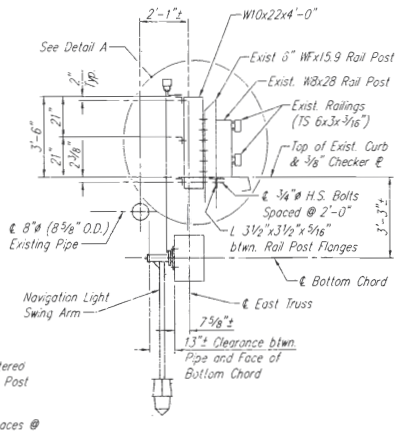
SCHEMATIC



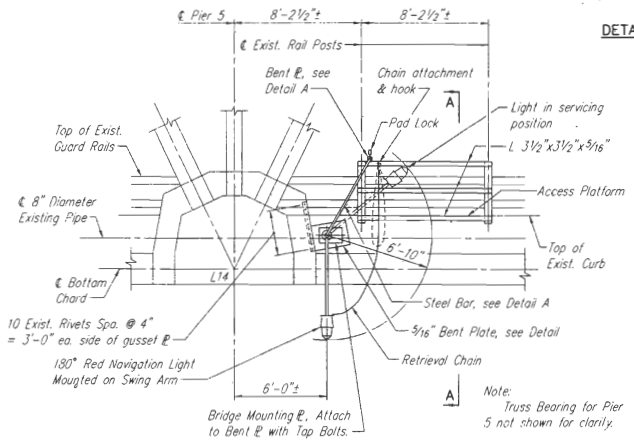
ELEVATION AT L2
LEFT MARGIN OF CHANNEL LIGHT
EAST TRUSS VIEWED FROM EAST
(L8: Opposite Hand)



DETAIL A

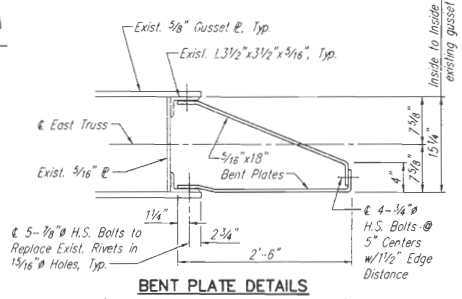


SECTION A–A
(Light near L2 shown, others are similar)



A Note: Truss Bearing for Pier 5 not shown for clarity.

ELEVATION AT L14
CENTER TRUSS LIGHT
EAST TRUSS VIEWED FROM EAST
(See Section A–A for Access Platform Details)



BENT PLATE DETAILS
(For Mounting of Navigation Lights Near L14)

NOTES:
See Special Provisions for additional requirements for Navigation Lighting System equipment.
Contractor shall verify all required dimensions prior to ordering swing arm navigation lights. Swing arms shall be fabricated by navigation light manufacturer to provide the necessary clearances between truss and pipe.
See Special Provisions for Structural Steel requirements.

1/26/98

1-26-98

NAVIGATION LIGHTING – DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: G.N.P. 02/95
CHECKED: T.M.S. 02/95

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 2 OF 2

L05683

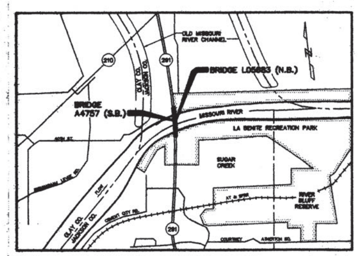
STATE	PROJ. NO.	SHEET NO.
MO.	F.A.M.-291-1(58) J4U0564E	4
SEC./SUR. 12 TWP. 50N RGE. 32W		

ID-980821-401

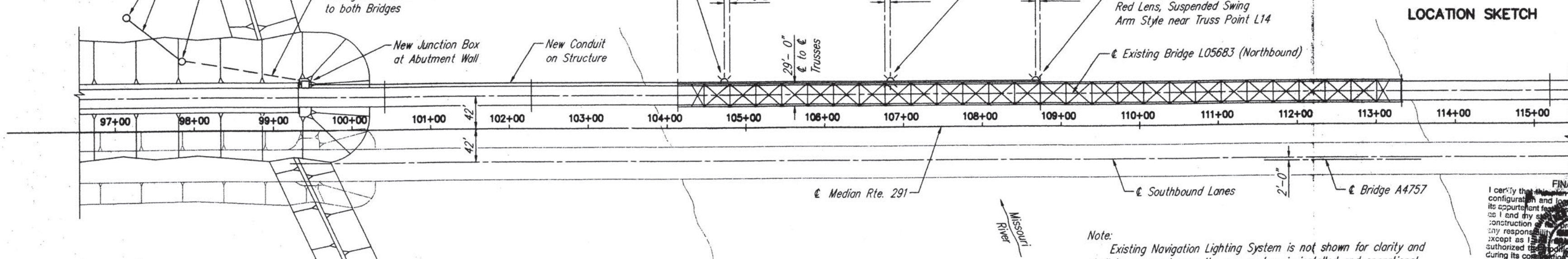
MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION
ROUTE 291 MISSOURI RIVER BRIDGE
JACKSON COUNTY

CONTRACT 3

NAVIGATION LIGHTING REMODEL (BRIDGE L05683)
1995



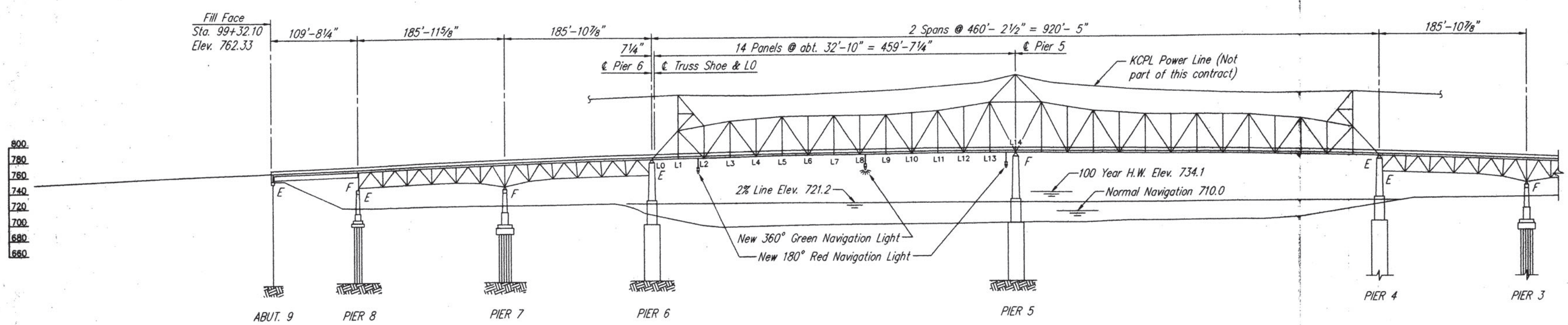
LOCATION SKETCH



PLAN

Note:
Existing Navigation Lighting System is not shown for clarity and shall be removed once the new system is installed and operational. Items to be removed include the existing transformer and lighting controls above Pier 5, all navigation light fixtures, conduit and wiring. Coordinate removal of existing transformer with KCPL.

FINAL PLANS



Note: Pier 2 & Abut. 1 not shown.

ELEVATION
(Existing Bridge L05683)

FINAL QUANTITIES		
ITEM	UNIT	TOTAL
Navigation Lighting System	Lump Sum	1

BASIC FLOOD DATA	
Discharge (100 yr.)	430,000 cfs
H.W. Elev.	734.1

BRIDGE OVER MISSOURI RIVER

STATE ROAD FROM I-35 TO RTE.24
AT LIBERTY BEND
PROJECT NO.
JOB NO. J4U0564E
JACKSON COUNTY
STA. 99+32.10
RTE. 291

DATE 3/27/98 1-26-98

1/26/98

STD.
STD.
L05683

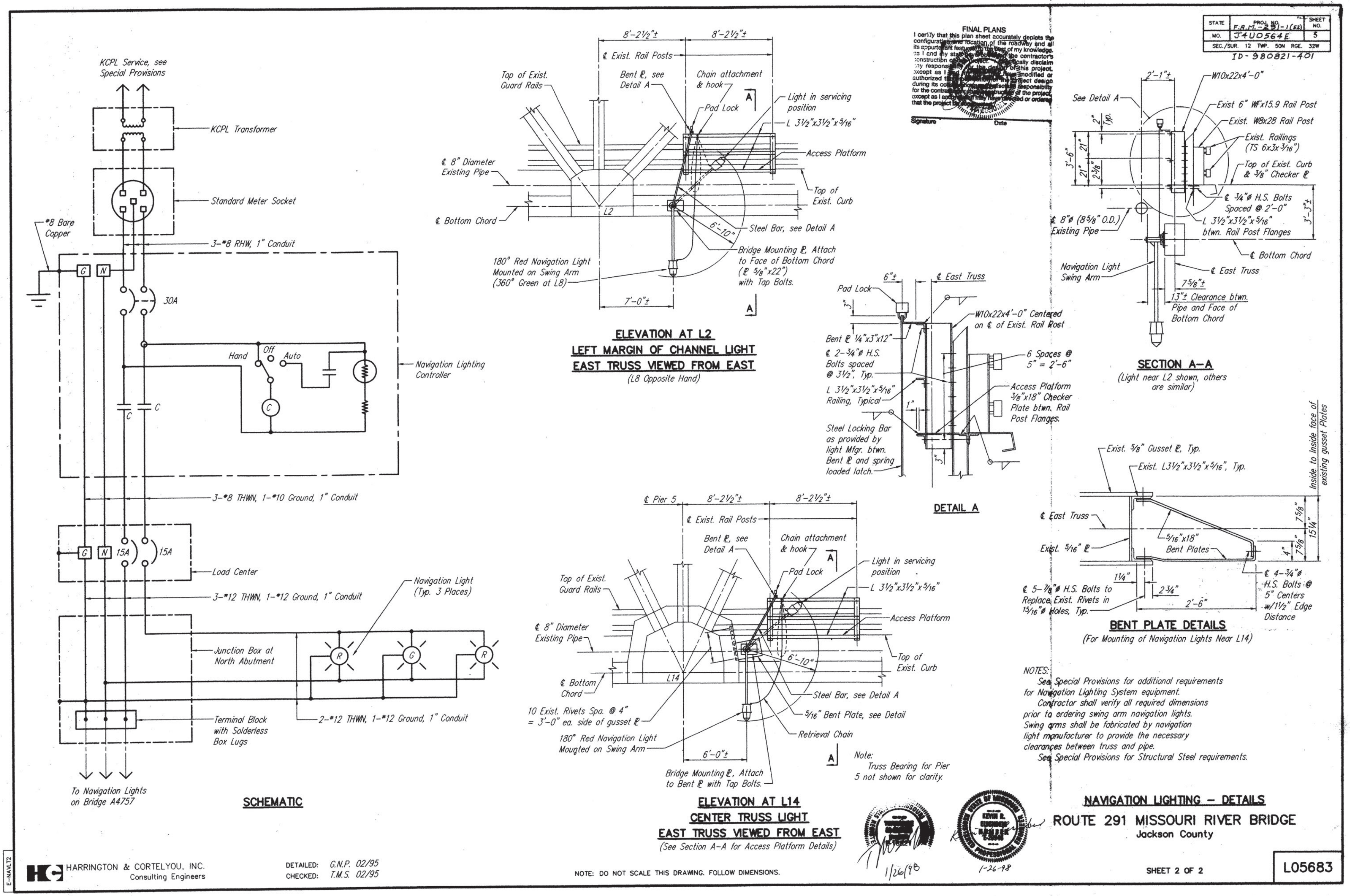
E-NAVLT1

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: G.N.P. 02/95
CHECKED: T.M.S. 02/95

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 1 OF 2



STATE MO.
PROJ. NO. F.R.M.-291-1(53)
J4U0564E
SHEET NO. 5
SEC./SUR. 12 TWP. 50N RGE. 32W
ID-980821-401
FINAL PLANS
KCPL Service, see Special Provisions
KCPL Transformer
Standard Meter Socket
#8 Bare Copper
3-#8 RHW, 1" Conduit
G
N
30A
Hand
Off
Auto
Navigation Lighting Controller
C
3-#8 THWN, 1-#10 Ground, 1" Conduit
15A
Load Center
3-#12 THWN, 1-#12 Ground, 1" Conduit
Navigation Light (Typ. 3 Places)
Junction Box at North Abutment
R
G
R
Terminal Block with Solderless Box Lugs
2-#12 THWN, 1-#12 Ground, 1" Conduit
To Navigation Lights on Bridge A4757
SCHEMATIC
8'-2½"±
8'-2½"±
℄ Exist. Rail Posts
Top of Exist. Guard Rails
Bent ℙ, see Detail A
Chain attachment & hook
Pad Lock
Light in servicing position
L 3½"x3½"x5/16"
Access Platform
℄ 8" Diameter Existing Pipe
Top of Exist. Curb
L2
℄ Bottom Chord
6'-10"
Steel Bar, see Detail A
Bridge Mounting ℙ. Attach to Face of Bottom Chord (ℙ 5/8"x22") with Tap Bolts.
180° Red Navigation Light Mounted on Swing Arm (360° Green at L8)
7'-0"±
A
ELEVATION AT L2
LEFT MARGIN OF CHANNEL LIGHT
EAST TRUSS VIEWED FROM EAST
(L8 Opposite Hand)
6"±
℄ East Truss
Pad Lock
W10x22x4'-0" Centered on ℄ of Exist. Rail Post
Bent ℙ ¼"x3"x12"
℄ 2-¾"ø H.S. Bolts spaced @ 3½", Typ.
6 Spaces @ 5" = 2'-6"
L 3½"x3½"x5/16" Railing, Typical
Access Platform 3/8"x18" Checker Plate btwn. Rail Post Flanges.
Steel Locking Bar as provided by light Mfgr. btwn. Bent ℙ and spring loaded latch.
DETAIL A
2'-1"±
W10x22x4'-0"
See Detail A
Exist 6" WFx15.9 Rail Post
Exist. W8x28 Rail Post
Exist. Railings (TS 6x3x3/16")
Top of Exist. Curb & 3/8" Checker ℙ
℄ ¾"ø H.S. Bolts Spaced @ 2'-0"
L 3½"x3½"x5/16" btwn. Rail Post Flanges
℄ 8"ø (8⅝" O.D.) Existing Pipe
℄ Bottom Chord
Navigation Light Swing Arm
℄ East Truss
7⅝"±
13"± Clearance btwn. Pipe and Face of Bottom Chord
3'-6"
3'-3"±
SECTION A-A
(Light near L2 shown, others are similar)
Exist. 5/8" Gusset ℙ, Typ.
Exist. L3½"x3½"x5/16", Typ.
Inside to inside face of existing gusset Plates
℄ East Truss
Exist. 5/16" ℙ
5/16"x18" Bent Plates
7⅝"
15¼"
℄ 5-⅞"ø H.S. Bolts to Replace Exist. Rivets in 15/16"ø Holes, Typ.
1¼"
2¾"
2'-6"
℄ 4-¾"ø H.S. Bolts @ 5" Centers w/1½" Edge Distance
BENT PLATE DETAILS
(For Mounting of Navigation Lights Near L14)
℄ Pier 5
8'-2½"±
8'-2½"±
℄ Exist. Rail Posts
Bent ℙ, see Detail A
Chain attachment & hook
Top of Exist. Guard Rails
Pad Lock
Light in servicing position
L 3½"x3½"x5/16"
Access Platform
℄ 8" Diameter Existing Pipe
Top of Exist. Curb
℄ Bottom Chord
L14
6'-10"
Steel Bar, see Detail A
10 Exist. Rivets Spa. @ 4" = 3'-0" ea. side of gusset ℙ
5/16" Bent Plate, see Detail
180° Red Navigation Light Mougted on Swing Arm
Retrieval Chain
6'-0"±
Bridge Mounting ℙ, Attach to Bent ℙ with Tap Bolts.
Note: Truss Bearing for Pier 5 not shown for clarity.
ELEVATION AT L14
CENTER TRUSS LIGHT
EAST TRUSS VIEWED FROM EAST
(See Section A-A for Access Platform Details)
NOTES:
See Special Provisions for additional requirements for Navigation Lighting System equipment.
Contractor shall verify all required dimensions prior to ordering swing arm navigation lights.
Swing arms shall be fabricated by navigation light manufacturer to provide the necessary clearances between truss and pipe.
See Special Provisions for Structural Steel requirements.
NAVIGATION LIGHTING – DETAILS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County
HARRINGTON & CORTELYOU, INC.
Consulting Engineers
DETAILED: G.N.P. 02/95
CHECKED: T.M.S. 02/95
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.
1/26/98
1-26-98
SHEET 2 OF 2
L05683
E-NAVLT2

2

STATE	PROJ. NO.	SHEET NO.
MO.		81
SEC./SUR. 12	TWP. 50N	RGE. 32W

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

ROUTE 291 MISSOURI RIVER BRIDGE

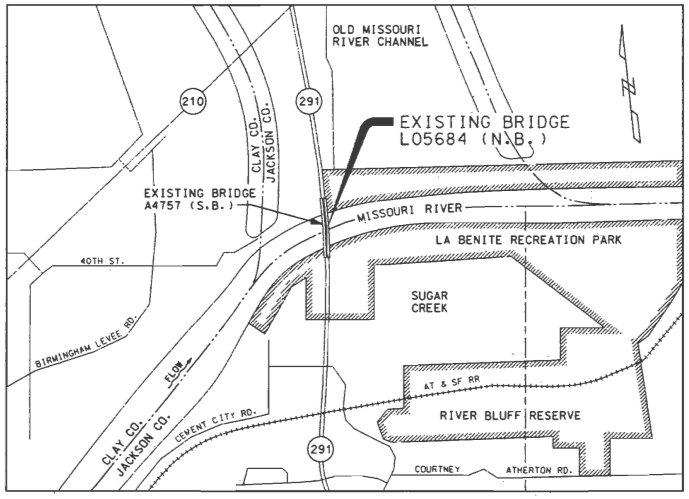
Jackson County

DECK REPLACEMENT

BRIDGE DECK FLOOR SYSTEM REHABILITATION, SUBSTRUCTURE REPAIRS AND FIELD APPLIED PROTECTIVE COATING

2001

INDEX OF SHEETS



LOCATION SKETCH

INDEX OF SHEETS

11-6-01

REPAIRS TO: BRIDGE OVER MISSOURI RIVER

STATE ROAD FROM I-35 TO RTE 24 AT LIBERTY BEND

PROJECT NO. STA. 99+32.10 (Match Existing)

JOB NO. J4P1416 RTE. 291 NBL

JACKSON **COUNTY**

DATE 11/9/01

SHEET 1 OF 40

STD. 504.00
STD. 605.10
STD. 609.00
STD. 706.35
L05684

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 08/01
CHECKED: 08/01

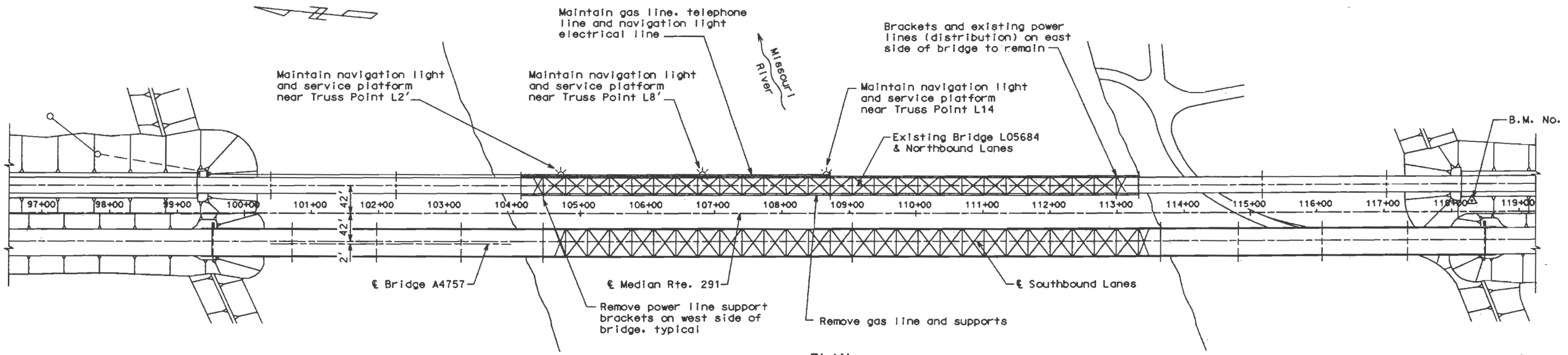
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

09:39:06 AM 1/05/01 S:\MR\re291 Deck (889-02)\Bridge\J4p1416_cover_001_f.dgn

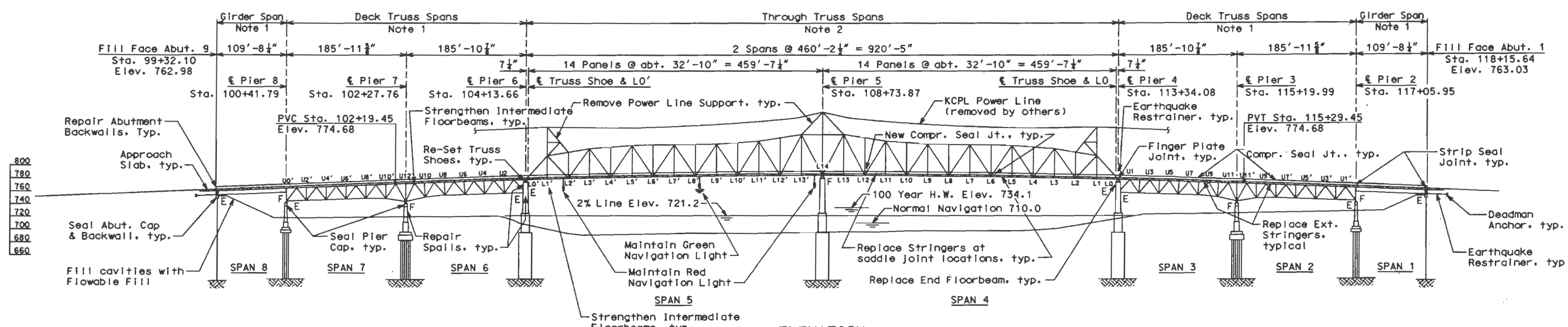
STATE	PROJ. NO.	SHEET NO.
NO.		B2

Vertical Curve Data:

PVI Sta. = 108+74.45
PVI Elev. = 801.33
High Point Sta. 108+74.45
High Point Elev. = 788.00
G_1 = +4.0700%
G_2 = −4.0700%
LVC = 1310.00'
K = 160.93



PLAN



ELEVATION

Note 1:
½ Concrete filled steel grid with 1½" asphalt overlay.
Note 2:
Concrete filled steel grid with 1½" asphalt overlay.

BASIC FLOOD DATA	
Discharge (100 yr.)	430,000 cfs
H.W. Elev.	734.1

Notes:
Dimensions shown based on original bridge plan dimensions.
All structural steel shall be cleaned and coated per current MoDOT Specifications.
Provide ⅞"Ø shear stud connectors on all stringers in truss spans.

B.M. No. 5 Elev. 763.45 USC&G BM Disk Stamped U-218 Quad 390942 Line 101-P #8 20'± Lt. Sta. 118+30± ℄ Med.

Kevin R. Eisenbeis — 11-6-01

GENERAL PLAN AND ELEVATION

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 06/01
CHECKED: 07/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

L05684

03:40:38 PM 11/06/01 S:\Rte291 Deck (889-02)\bridge\j4p1416_gpe-80_002_f.dgn

STATE	PROJ. NO.	SHEET NO.
MO.		

GENERAL NOTES:

The scope of work generally consists of the removal of existing bridge deck and electric line support towers, replacement of certain floorbeams, stringers, connection plates and clip angles, strengthening of floorbeams, modifications to bearings and abutment backwalls and the construction of slab and barrier curbs, along with other associated work as shown on the plans. The coating of all new and remaining structural steel is also part of the work in this contract.

Two way traffic will be handled on the existing southbound Missouri Route 291 bridge, which shall remain open to traffic during construction.

Utility companies whose facilities are shown on the plans or are known to be within the construction limits shall be notified by the contractor of the construction start date.

All dimensions are horizontal unless otherwise noted. Drawings shall not be scaled.

All open holes remaining after removals shall be filled with ASTM A-325 high strength bolts of the same diameter as the connector that was removed.

Contractor shall verify all dimensions and required bolt diameters and lengths in the field before ordering new steel and fasteners.

SPECIFICATIONS:

Design: 1996 Edition of the AASHTO Standard Specifications for Highway Bridges plus Interims thru 2000.

Construction: Missouri State Highway Commission Standard Specifications For Highway Construction, 1999 Edition, plus project special provisions.

DESIGN LOADING:

Load Factor Design Method - Bridge Deck
Live Load - HS20-44 with Military 24,000# Tandem Axle.
Dead Load - An allowance of 35 Lbs. per sq. ft. of roadway for future wearing surface is included in the dead load for the floor system only.
Concrete Weight - 150 Lbs. per cu. ft.
Earthquake - Category A
Fatigue - Case II, ADTT <2500

CONCRETE:

All exposed edges of concrete shall be beveled ¾" unless otherwise shown or noted.

Construction joints shall be made only at locations shown on the plans, except with the approval of the engineer.

Keys shall be provided for all construction joints unless otherwise shown.

All concrete for bridge deck and abutment backwalls shall be Class B2.

All concrete for barrier curbs shall be Class B1.

JOINT FILLER:

All joint filler shall meet the requirements of standard specification 1057.2.4, except as noted.

REINFORCING STEEL:

Reinforcing steel shall be deformed billet steel bars conforming to ASTM A615, Grade 60. All dimensions to reinforcing steel on detail drawings are to centerline of bar, except where clear distance is noted from the face of concrete.

Minimum clearance to reinforcing steel shall be 1½" unless otherwise shown.

All reinforcing steel shall be lapped according to AASHTO 8.32 unless otherwise shown or noted.

All reinforcing in the bridge deck, barrier curbs and abutment backwalls shall be epoxy coated, except as noted.

The epoxy coated reinforcing bars shall be coated in accordance with Section 710 of Mo. Std. Specs. for Highway Construction.

PROTECTIVE COATING

Existing Paint: Existing paint contains lead and shall be removed prior to recoating. Contractor shall follow all applicable requirements for removing, containing, transporting and disposing. See Special Provisions.

Protective Coating: System G by the contractor in accordance with the Special Provisions.

Prime Coat: The cost of the prime coat shall be included in the contract lump sum price for "Field Application of Inorganic Zinc Primer". New steel to be shop primed. See Special Provisions.

Field Coat: The cost of the intermediate and finish coats shall be included in the contract price, per tons, for "Intermediate - Field Coat (System G) Gray" and "Finish Field Coat (System G) Gray". See Special Provisions.

BRIDGE DECK:

Bridge deck as detailed consists of an 8" slab in truss spans and an 8" slab in the girder spans.

Cast-In-Place with conventional forming shall be used for slab construction in the plate girder and deck truss spans.

Alternate stay-in-place steel deck forms will be allowed in the through truss spans only.

Stud type shear connectors shall be applied to structural steel stringers as a part of this contract.

NAVIGATION LIGHTS:

All navigation and clearance lighting shall be kept in operation during all construction.

CONSTRUCTION:

The entire existing deck shall be removed within each structural unit (through truss, deck truss and/or plate girder spans), prior to replacement with a concrete slab. This requirement is to allow the structure to redistribute and relieve internal stresses.

The contractor shall submit for approval construction drawings showing proposed construction methods and any temporary bridging on the existing structural steel floor system used to gain access to repair areas in the bridge floor.

Prior to stringer and floorbeam removals the contractor shall provide access for MoDOT and consultant personnel to inspect structural steel in the floor system after the existing deck is removed.

Bolts and rivets connecting bottom lateral system to interior stringer brackets in the through truss spans shall be removed prior to constructing new deck slab. Laterals shall be reconnected after placement of slab.

Jacking of the existing through truss spans shall be required to allow removal, modifications and re-setting of the truss bearing masonry plates. New end floorbeams will have jacking stiffeners to carry the truss dead loads. Bearings will remain attached to the truss while bearing bases are re-positioned.

Coordination with Kansas City Power and Light Company shall be required prior to and during removal of power line supports. Support brackets and distribution lines on the east side of the bridge will remain in place. Brackets will be coated, requiring special considerations to protect the power lines and insulators. Service shall be disconnected during construction operations, and re-energized when repairs and coating is completed.

TABLE OF ESTIMATED QUANTITIES - BRIDGE DECK, AND COATING

	ITEM	UNIT	TOTAL
	Partial Removal of Bridges	L.S.	1
	Removal of Existing Bridge Deck	Sq. Ft.	46,401
	Removal and Storage of Existing Bridge Rail	L.F.	3762
	Removal of Power Line Supports	L.S.	1
	Removal of Gas Line	L.S.	1
	Bridge Approach Slab (Bridge)	Sq. Yds.	148
	Substructure Repair (Unformed)	Sq. Ft.	300
	Protective Coating For Concrete Abutments and Piers	Sq. Ft.	600
	Protective Coating - Concrete Bents (Deleterious Agents)	L.S.	1
	Slab on Steel	Sq. Yds.	5,581
***	Safety Barrier Curb	L.F.	3,823
	Laminated Neoprene Bearing Pad	Each	16
	Preformed Compression Expansion Joint Seal (3.5 in.)	L.F.	192
	Strip Seal Expansion Device	L.F.	96
	Abutment Modifications	L.S.	1
	Expansion Device (Finger Plate)	L.F.	48
	Fabricated Structural Carbon Steel (Misc.)	Lbs	45,050
	Fabricated Structural Carbon Steel (I-Beam)	Lbs	199,070
	Rehabilitate Bearing	Each	4
	Earth Quake Restrainer Assemblies	Each	24
	Slab Drain	Each	228
	Surface Preparation for Recoating Structural Steel	L.S.	1
	Field Application of Inorganic Zinc Primer	L.S.	1
	Intermediate Field Coat (System G) Gray	Tons	2.052
	Finish Field Coat (System G) Gray	Tons	2.052
	Transporting Lead Contaminated Residue to Storage Area	L.S.	1
	Transporting Lead Contaminated Residue to the Smelter	L.S.	1
	Disposal of Lead Contaminated Residue	L.S.	1
	Misc. Structural Steel Repair	L.S.	1
	Floorbeam Strengthening	Each	68
	Missing/Loose Bolt and Rivet Replacement	Each	100
	Plate Girder Crack Repair	Each	8
	Supplemental Stringer Replacement - Thru Truss	Each	8
	Supplemental Stringer Replacement - Deck Truss	Each	4
	Supplemental Floorbeam Replacement - Thru Truss	Each	2
	Supplemental Floorbeam Replacement - Deck Truss and Plate Girder	Each	4

NOTES:

Square yards of slab concrete includes all concrete and reinforcing steel for the deck slabs. Concrete and reinforcing in haunches shall be considered as incidental to price bid for "Slab on Steel".

All concrete above the construction joint at the approach slab seat in the Abutments is included in the Estimated Quantities for "Slab on Steel".

Lineal feet of safety barrier curb concrete includes all concrete, reinforcing steel, plastic water stops and movement gauges for the barrier curbs.

*** Slip forming of the safety barrier curb shall be allowed in the deck truss and plate girder spans. Contractor shall provide detailed drawings of slip forming for approval by the engineer if slip forming is to be used in the thru truss spans, see Special Provisions.

ESTIMATED QUANTITIES FOR SLAB ON STEEL

	TYPE OF SLAB	Δ * 364.250 * 364.250	SLAB ON STEEL		
			Reinf. (Lbs.)		Conc. (Cu. Yds.)
			Epoxy	Plain	Slab
Alt. A	Cast-In-Place Conventional Forms		* 288.240	-	1.311
Alt. B	Stay-In-Place Forms (Thru Truss Spans Only)		* 288.240	-	** 1.311

NOTES:

The table of Estimated Quantities for Slabs represents the quantities used by the state in preparing the cost estimate for concrete slabs. Variations may be encountered in these estimated quantities but these variations cannot be used for an adjustment in the contract unit price per square yard.

See Special Provisons for Alternate Methods of forming slabs.

* Does not include reinforcing bars used as supports.

** Concrete is not allowed in fill corrugations of S.I.P. forms.

Δ Add

Submittal of shop drawings shall be waived for structural items replaced in kind when existing members are used as templates. Thickness of items shall be confirmed in the field.

STATE OF MISSOURI KEVIN R. EISENBATH E-20946 REGISTERED PROFESSIONAL ENGINEER
2-8-02

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
CHECKED: 09/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

Δ Revised 2-8-02

GENERAL NOTES AND QUANTITIES

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SHEET 3 OF 40

L05684

10:05:39 AM 02/08/02 s:\Rt\291 Deck (889-02)\Bridge\kj4p1416_g-notes_003_f.dgn

STATE NO.	PROJ. NO.	SHEET NO.
		83

GENERAL NOTES:

The scope of work generally consists of the removal of existing bridge deck and electric line support towers, replacement of certain floorbeams, stringers, connection plates and clip angles, strengthening of floorbeams, modifications to bearings and abutment backwalls and the construction of slab and barrier curbs, along with other associated work as shown on the plans. The coating of all new and remaining structural steel is also part of the work in this contract.

Two way traffic will be handled on the existing southbound Missouri Route 291 bridge, which shall remain open to traffic during construction.

Utility companies whose facilities are shown on the plans or are known to be within the construction limits shall be notified by the contractor of the construction start date.

All dimensions are horizontal unless otherwise noted. Drawings shall not be scaled.

All open holes remaining after removals shall be filled with ASTM A-325 high strength bolts of the same diameter as the connector that was removed.

Contractor shall verify all dimensions and required bolt diameters and lengths in the field before ordering new steel and fasteners.

SPECIFICATIONS:

Design: 1996 Edition of the AASHTO Standard Specifications for Highway Bridges plus Interims thru 2000.

Construction: Missouri State Highway Commission Standard Specifications For Highway Construction, 1999 Edition, plus project special provisions.

DESIGN LOADING:

Load Factor Design Method - Bridge Deck
Live Load - HS20-44 with Military 24.000# Tandem Axle.
Dead Load - An allowance of 35 Lbs. per sq. ft. of roadway for future wearing surface is included in the dead load for the floor system only.
Concrete Weight - 150 Lbs. per cu. ft.
Earthquake - Category A
Fatigue - Case II. ADTT <2500

CONCRETE:

All exposed edges of concrete shall be beveled ¾" unless otherwise shown or noted.

Construction joints shall be made only at locations shown on the plans, except with the approval of the engineer.

Keys shall be provided for all construction joints unless otherwise shown.

All concrete for bridge deck and abutment backwalls shall be Class B2.

All concrete for barrier curbs shall be Class B1.

JOINT FILLER:

All joint filler shall meet the requirements of standard specification 1057.2.4, except as noted.

REINFORCING STEEL:

Reinforcing steel shall be deformed billet steel bars conforming to ASTM A615, Grade 60. All dimensions to reinforcing steel on detail drawings are to centerline of bar, except where clear distance is noted from the face of concrete.

Minimum clearance to reinforcing steel shall be 1½" unless otherwise shown.

All reinforcing steel shall be lapped according to AASHTO 8.32 unless otherwise shown or noted.

All reinforcing in the bridge deck, barrier curbs and abutment backwalls shall be epoxy coated, except as noted.

The epoxy coated reinforcing bars shall be coated in accordance with Section 710 of Mo. Std. Specs. for Highway Construction.

PROTECTIVE COATING

Existing Paint: Existing paint contains lead and shall be removed prior to recoating. Contractor shall follow all applicable requirements for removing, containing, transporting and disposing. See Special Provisions.

Protective Coating: System G by the contractor in accordance with the Special Provisions.

Prime Coat: The cost of the prime coat shall be included in the contract lump sum price for "Field Application of Inorganic Zinc Primer". New steel to be shop primed. See Special Provisions.

Field Coat: The cost of the intermediate and finish coats shall be included in the contract price, per tons, for "Intermediate Field Coat (System G) Gray" and "Finish Field Coat (System G) Gray". See Special Provisions.

BRIDGE DECK:

Bridge deck as detailed consists of an 8" slab in truss spans and an 8" slab in the girder spans.

Cast-In-Place with conventional forming shall be used for slab construction in the plate girder and deck truss spans.

Alternate stay-in-place steel deck forms will be allowed in the through truss spans only.

Stud type shear connectors shall be applied to structural steel stringers as a part of this contract.

NAVIGATION LIGHTS:

All navigation and clearance lighting shall be kept in operation during all construction.

CONSTRUCTION:

The entire existing deck shall be removed within each structural unit (through truss, deck truss and/or plate girder spans), prior to replacement with a concrete slab. This requirement is to allow the structure to redistribute and relieve internal stresses.

The contractor shall submit for approval construction drawings showing proposed construction methods and any temporary bridging on the existing structural steel floor system used to gain access to repair areas in the bridge floor.

Prior to stringer and floorbeam removals the contractor shall provide access for MoDOT and consultant personnel to inspect structural steel in the floor system after the existing deck is removed.

Bolts and rivets connecting bottom lateral system to interior stringer brackets in the through truss spans shall be removed prior to constructing new deck slab. Laterals shall be reconnected after placement of slab.

Jacking of the existing through truss spans shall be required to allow removal, modifications and re-setting of the truss bearing masonry plates. New end floorbeams will have jacking stiffeners to carry the truss dead loads. Bearings will remain attached to the truss while bearing bases are re-positioned.

Coordination with Kansas City Power and Light Company shall be required prior to and during removal of power line supports. Support brackets and distribution lines on the east side of the bridge will remain in place. Brackets will be coated, requiring special considerations to protect the power lines and insulators. Service shall be disconnected during construction operations, and re-energized when repairs and coating is completed.

TABLE OF ESTIMATED QUANTITIES - BRIDGE DECK, AND COATING

ITEM	UNIT	TOTAL
Partial Removal of Bridges	L.S.	1
Removal of Existing Bridge Deck	Sq. Ft.	46,401
Removal and Storage of Existing Bridge Rail	L.F.	3762
Removal of Power Line Supports	L.S.	1
Removal of Gas Line	L.S.	1
Bridge Approach Slab (Bridge)	Sq. Yds.	148
Substructure Repair (Unformed)	Sq. Ft.	300
Protective Coating For Concrete Abutments and Piers	Sq. Ft.	600
Protective Coating - Concrete Bents (Deleterious Agents)	L.S.	1
Slab on Steel	Sq. Yds.	5,581
*** Safety Barrier Curb	L.F.	3,823
Laminated Neoprene Bearing Pad	Each	16
Preformed Compression Expansion Joint Seal (3.5 in.)	L.F.	192
Strip Seal Expansion Device	L.F.	96
Abutment Modifications	L.S.	1
Expansion Device (Finger Plate)	L.F.	48
Fabricated Structural Carbon Steel (Misc.)	Lbs	45,050
Fabricated Structural Carbon Steel (I-Beam)	Lbs	199,070
Rehabilitate Bearing	Each	4
Earth Quake Restrainer Assemblies	Each	24
Slab Drain	Each	228
Surface Preparation for Recoating Structural Steel	L.S.	1
Field Application of Inorganic Zinc Primer	L.S.	1
Intermediate Field Coat (System G) Gray	Tons	2.052
Finish Field Coat (System G) Gray	Tons	2.052
Transporting Lead Contaminated Residue to Storage Area	L.S.	1
Transporting Lead Contaminated Residue to the Smelter	L.S.	1
Disposal of Lead Contaminated Residue	L.S.	1
Misc. Structural Steel Repair	L.S.	1
Floorbeam Strengthening	Each	68
Missing/Loose Bolt and Rivet Replacement	Each	100
Plate Girder Crack Repair	Each	8
Supplemental Stringer Replacement - Thru Truss	Each	8
Supplemental Stringer Replacement - Deck Truss	Each	4
Supplemental Floorbeam Replacement - Thru Truss	Each	2
Supplemental Floorbeam Replacement - Deck Truss and Plate Girder	Each	4

NOTES:

Square yards of slab concrete includes all concrete and reinforcing steel for the deck slabs. Concrete and reinforcing in haunches shall be considered as incidental to price bid for "Slab on Steel".

All concrete above the construction joint at the approach slab seat in the abutments is inaluded in the Estimated Quantities for "Slab on Steel".

Lineal feet of safety barrier curb concrete includes all concrete, reinforcing steel, plastic water stops and movement gauges for the barrier curbs.

*** Slip forming of the safety barrier curb shall be allowed in the deck truss and plate girder spans. Contractor shall provide detailed drawings of slip forming for approval by the engineer if slip forming is to be used in the thru truss spans, see Special Provisions.

ESTIMATED QUANTITIES FOR SLAB ON STEEL

TYPE OF SLAB		SLAB ON STEEL		
		Reinf. (Lbs.)		Conc. (Cu. Yds.)
		Epoxy	Plain	Slab
Alt. A	Cast-In-Place Conventional Forms	* 288,240	-	1,311
Alt. B	Stay-In-Place Forms (Thru Truss Spans Only)	* 288,240	-	*** 1,311

NOTES:

The table of Estimated Quantities for Slabs represents the quantities used by the state in preparing the cost estimate for concrete slabs. Variations may be encountered in these estimated quantities but these variations cannot be used for an adjustment in the contract unit price per square yard.

See Special Provisons for Alternate Methods of forming slabs.

* Does not include reinforcing bars used as supports.

*** Concrete is not allowed in fill corrugations of S.I.P. forms.

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
CHECKED: 09/01

11-6-01

GENERAL NOTES AND QUANTITIES

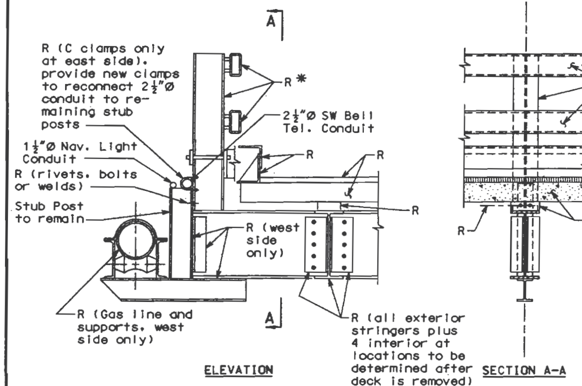
ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

SHEET 3 OF 40

L05684

STATE	PROJ. NO.	SHEET NO.
MO.		84



DECK TRUSS SPANS

Note: All intermediate cantilever brackets, tie bolts, anchor plates, etc., supporting rail posts on the west side shall be removed.

* Salvage, see Special Provisions.

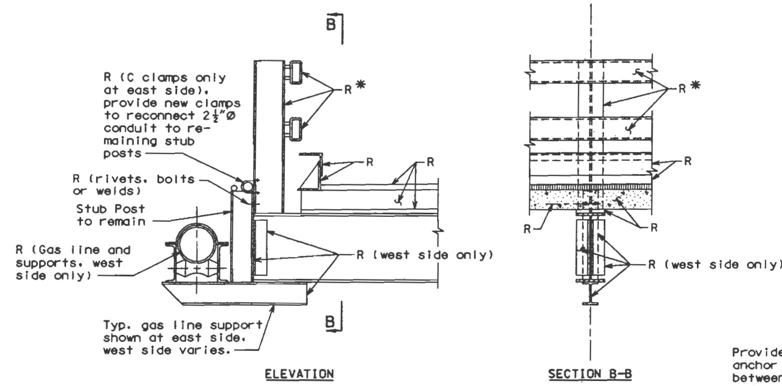
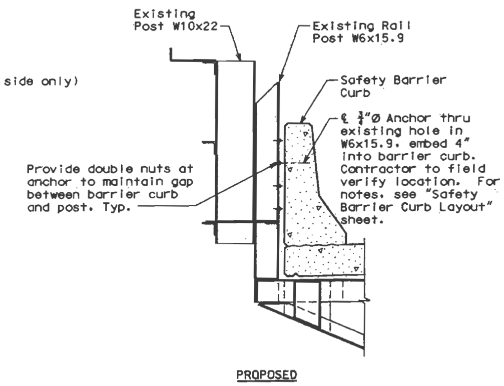
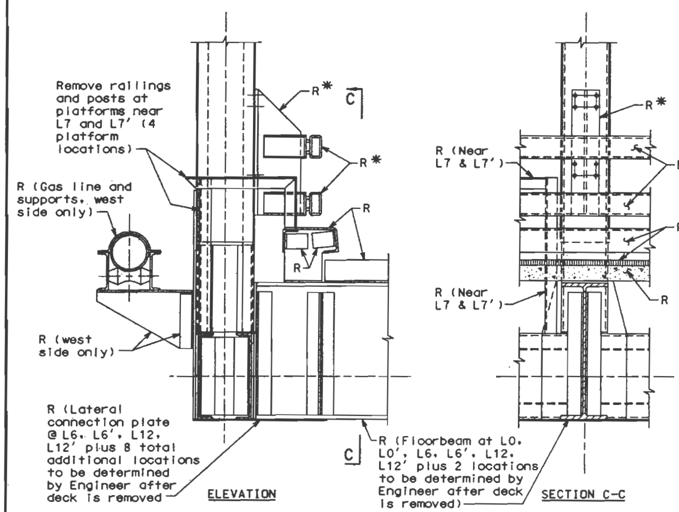


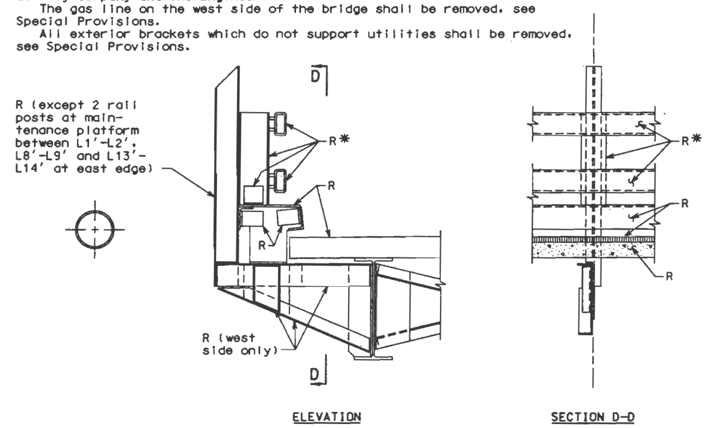
PLATE GIRDER SPANS



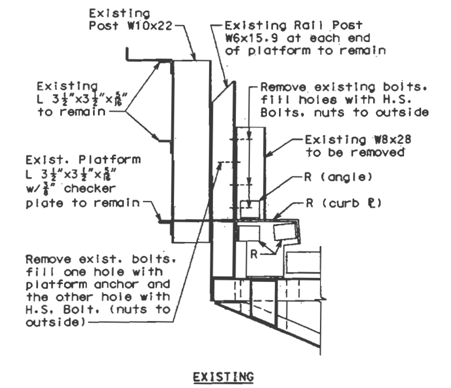
Notes:
R denotes element to be removed.
Remove all connectors at elements to be removed and fill remaining holes with H.S. Bolts (Nuts to outside at rail post).
Remove all remaining weld material by grinding at removal locations connected with welds.
Removal details symmetrical about ℄ bridge unless shown otherwise.
All utilities shall be maintained during construction. Contractor shall coordinate with utility companies and provide temporary supports as required. Any clamps required to be removed due to connection to a removed part shall be replaced with new clamps acceptable to the utility company and the Engineer.
The gas line on the west side of the bridge shall be removed, see Special Provisions.
All exterior brackets which do not support utilities shall be removed, see Special Provisions.



THRU TRUSS SPANS AT VERTICALS



THRU TRUSS SPANS BETWEEN VERTICALS



MODIFICATION OF EXISTING NAVIGATION LIGHT PLATFORMS NEAR L2', L8' & L14 (EAST SIDE ONLY)

REMOVAL DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

11-6-01

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 08/01
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NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 4 OF 40

L05684

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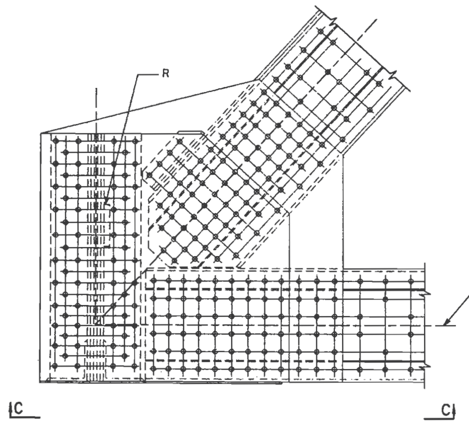
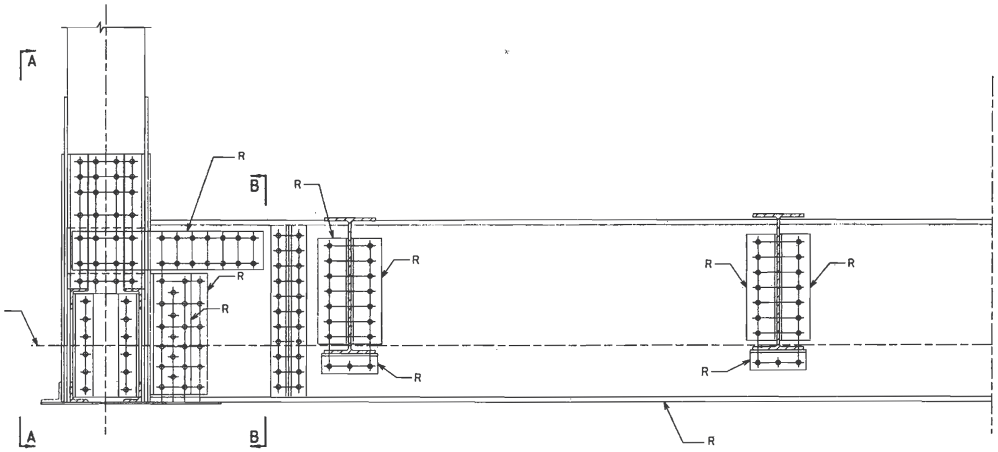
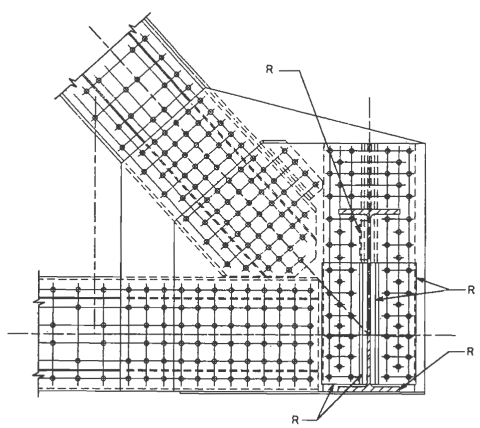


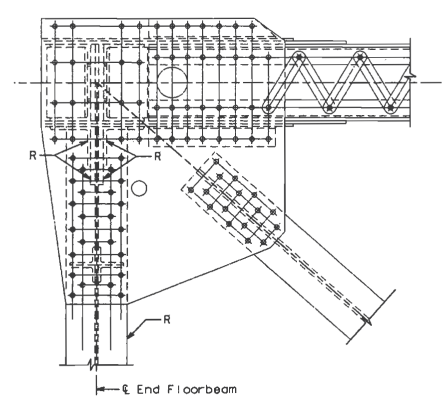
VIEW A-A



HALF SECTION @ LO/LO'



SECTION B-B



VIEW C-C

Note:
Support stringers with blocking on pier prior to removing end floorbeam.

Bearing not shown for clarity.

R denotes element to be removed.

For replacement details, see "Floorbeams - Thru Truss" sheet.

● Remove connector, replace w/ H.S. Bolt.

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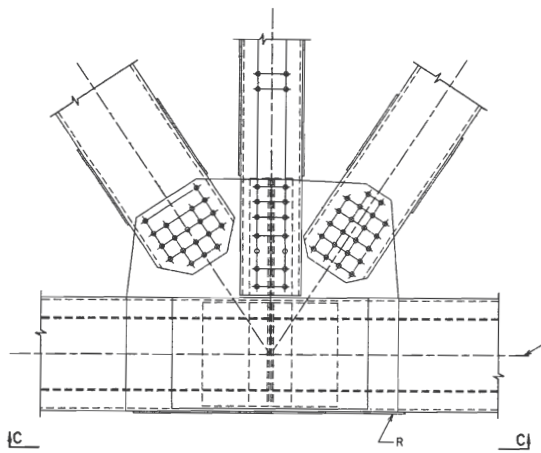
REMOVAL DETAILS - THRU TRUSS END FLOORBEAMS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

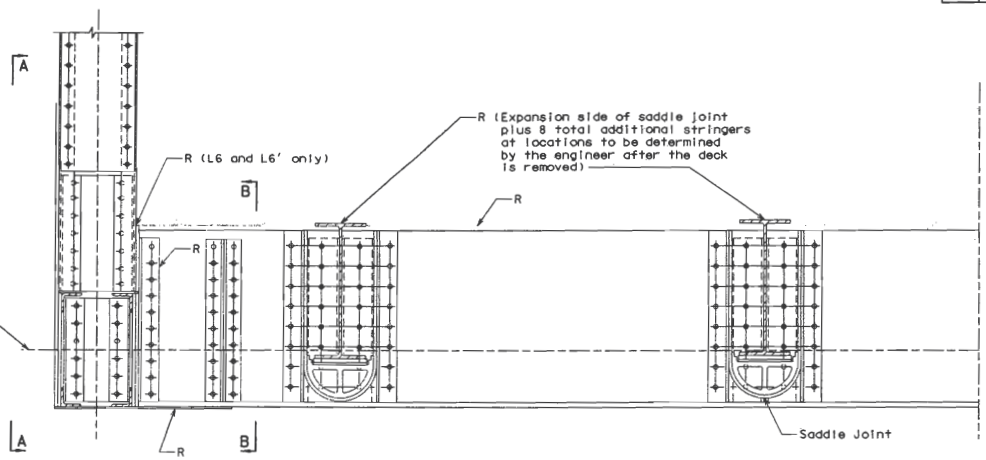
SHEET 5 OF 40

L05684

STATE	PROJ. NO.	SHEET NO.
MO.		6

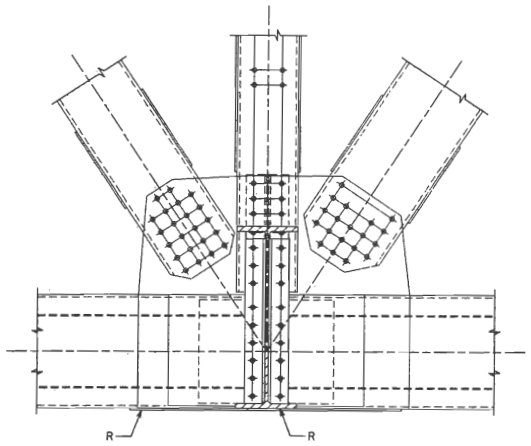


VIEW A-A

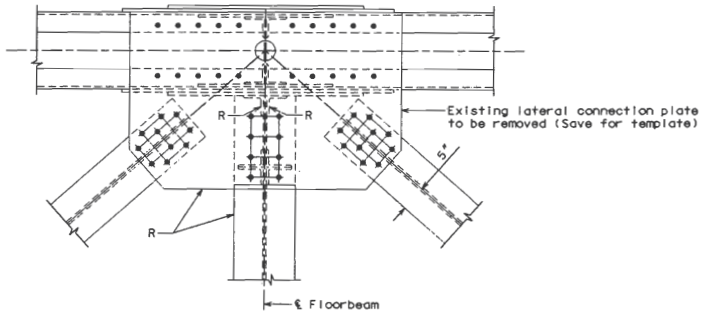


HALF SECTION OF EXISTING FLOORBEAM @ L6/L6' TO BE REMOVED

Remove the Floorbeam at L12 & L12' which is similar



SECTION B-B



VIEW C-C

Notes:

All stringer to floorbeam clip angles in thru truss span shall be removed and replaced with new angles. Shim plates shall be removed, marked and saved for possible re-use.

Clean faying surface of floorbeams, shims, if used and re-erected stringers to a Steel Structures Painting Council Specificaton SSPC-SP 10 and coat with one coat of inorganic zinc primer before erecting new stringer connection angles.

Two additional intermediate floorbeams and eight lateral connection plates will be removed at locations to be determined by the engineer after the deck is removed.

Saddle joints occur at L6, L6', L12 and L12' in the thru truss spans. Removal of additional floorbeams are similar to details shown on this sheet except saddle joints.

Contractor shall remove and reinstall, or temporarily support stringers adjacent to floorbeams which are to be replaced.

For replacement details, see "Floorbeam - Thru Truss" and "Miscellaneous Steel Repairs" sheets.

● Remove connector, replace w/ H.S. Bolt.

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REMOVAL DETAILS - THRU TRUSS INTERMEDIATE FLOORBEAMS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SHEET 6 OF 40

L05684

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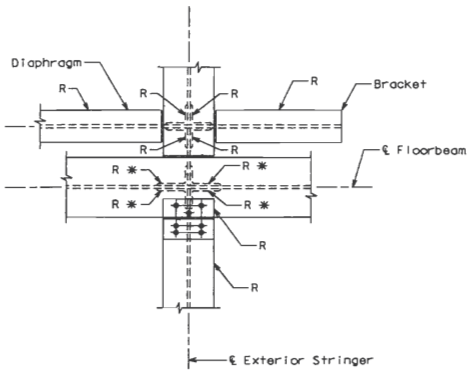
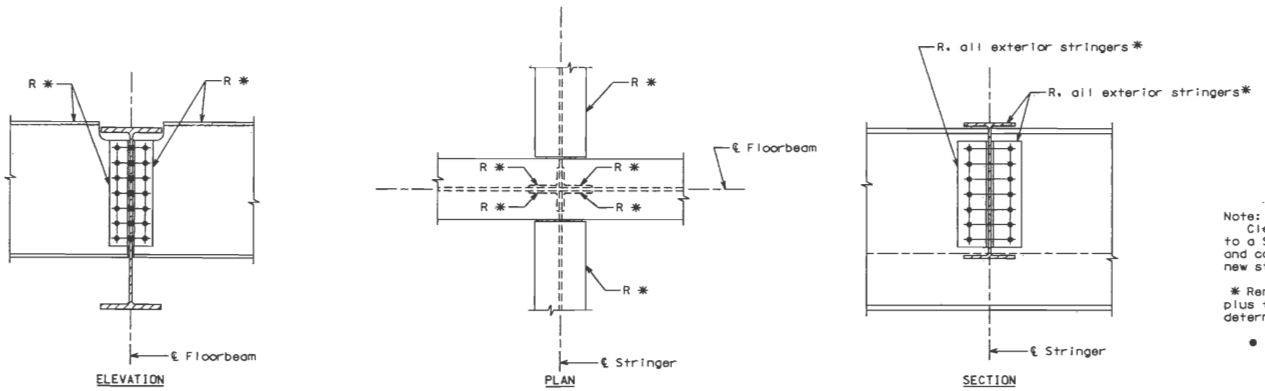
MO.		87



PLAN OF EXTERIOR STRINGER

STRINGER TO FLOORBEAM CONNECTION DETAILS AT U8 AND U8'



ELEVATION PLAN SECTION

TYPICAL STRINGER TO FLOORBEAM CONNECTION DETAILS

Note:
Clean faying surface of floorbeams and re-erected stringers to a Steel Structures Painting Council Specification SSPC-SP 10 and coat with one coat of inorganic zinc primer before erecting new stringer connection angles.

* Removals apply to all exterior stringers in deck truss spans plus four additional interior stringers at locations to be determined by the engineer after the deck is removed.

- Remove connector, replace w/ H.S. Bolt.

10-30-01

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REMOVAL DETAILS – DECK TRUSS STRINGERS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SHEET 7 OF 40

L05684

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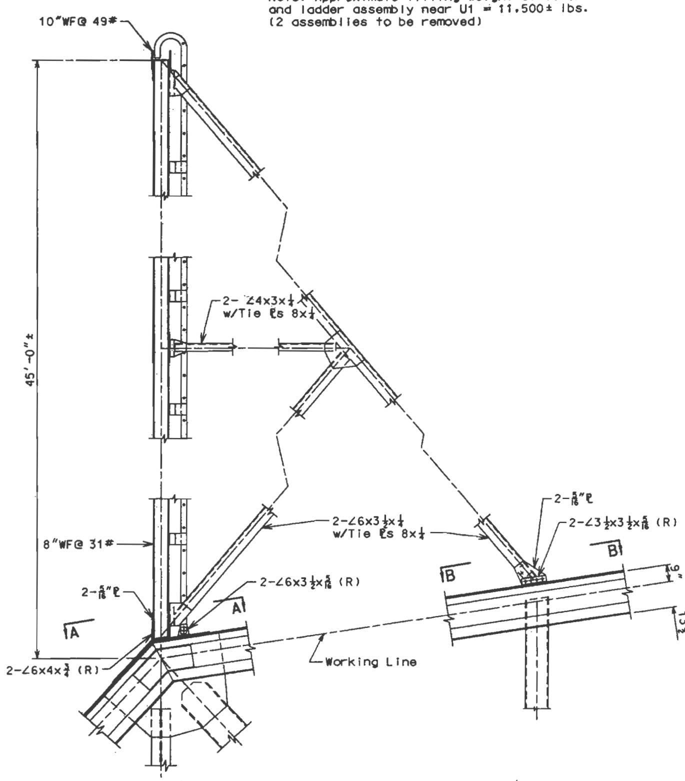
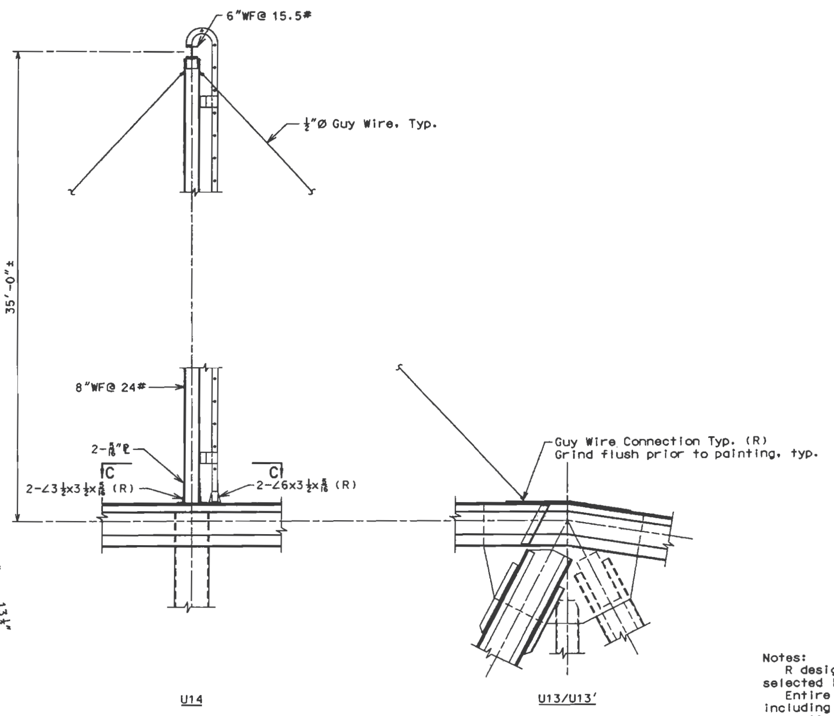
Note: Approximate lifting weight of tower and ladder assembly near U1 = 11,500± lbs. (2 assemblies to be removed)

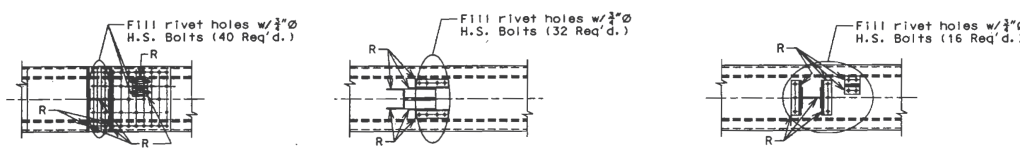


TRANSMISSION LINE TOWER REMOVAL @ U1 AND U1'

Note: Approximate lifting weight of tower and ladder assembly near U14 = 3,800± lbs. (1 assembly to be removed)



TRANSMISSION LINE TOWER REMOVAL @ U14



SECTION A-A   SECTION B-B   SECTION C-C

Notes:

R designates item to be removed (shown at selected locations for clarity only).

Entire transmission line tower support elements including verticals, diagonals, crossbeams, ladders, connection angles, attachment plates, power line insulators, aerial beacons, conduits, wires, guy wires and rivets shall be removed.

Entire distribution line support brackets on west side of bridge shall be removed. Coordinate removal of power lines with KCP&L.

Structural elements welded to truss chord plates shall be cut flush and ground smooth prior to coating.

Approximate tower assembly weights shown include all structural steel and connectors for both chords and crossbeam members.

Steel sections, guy wires and rivet sizes shown are based on original plan details. Variations or additional elements encountered during removal and disposal will be considered incidental and not grounds for additional payment.

All costs associated with furnishing and installing ¾"Ø H.S. bolts in open rivet holes at tower and bracket connections to truss will be considered incidental to lump sum price bid for "Removal of Power Line Supports".

REMOVAL DETAILS
POWER LINE SUPPORTS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

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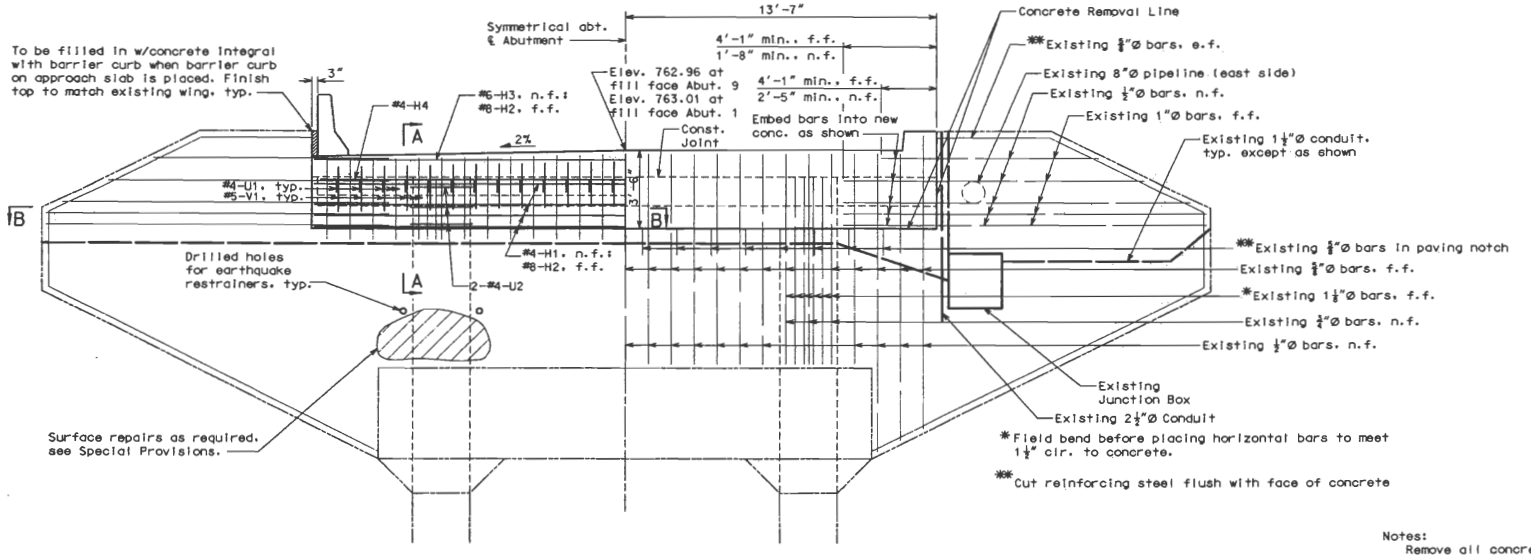
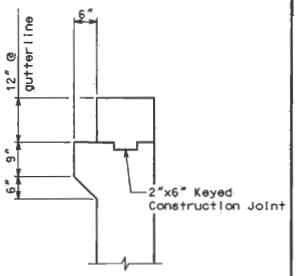


PART ELEVATION

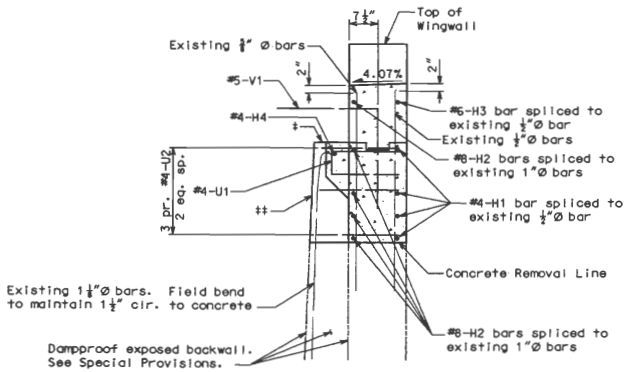
(Looking backstation at Abutment 9, Abutment 1 opposite hand)
n.f. = near face
f.f. = far face



DIMENSIONS AT PAVING NOTCH

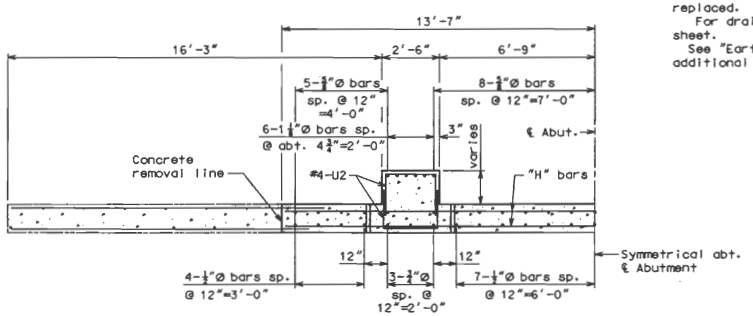
‡Finish top of pilaster to match paving notch.

‡‡Form back of pilaster to match slope of existing.



SECTION A-A

Note: Barrier Curb not shown for clarity.



SECTION B-B

Notes:

Remove all concrete and reinforcing in designated area except as noted.

Existing vertical bars to be embedded in new concrete. Cut vertical bars to maintain 2" clear to top of concrete.

Reinforcing bars to be incorporated in new concrete shall be cleaned and brush coated with epoxy coating, see Special Provisions. Contractor shall provide tarps or other means of protection to avoid epoxy spillage onto existing concrete. All epoxy spilled on existing concrete surfaces that will be in contact with new concrete shall be removed. Epoxy within 1 bar diameter of existing bars does not need to be removed.

Existing conduits, junction box and pipline on east side of bridge shall be protected during removals, and shall not be disturbed throughout construction.

Conduit clamps affected by construction shall be replaced.

For drainage details, see other "Abutment Modifications" sheet.

See "Earthquake Restrainers - Abutments 1 & 9" sheet for additional details.

11-6-01

ABUTMENT MODIFICATIONS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

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SHEET 9 OF 40

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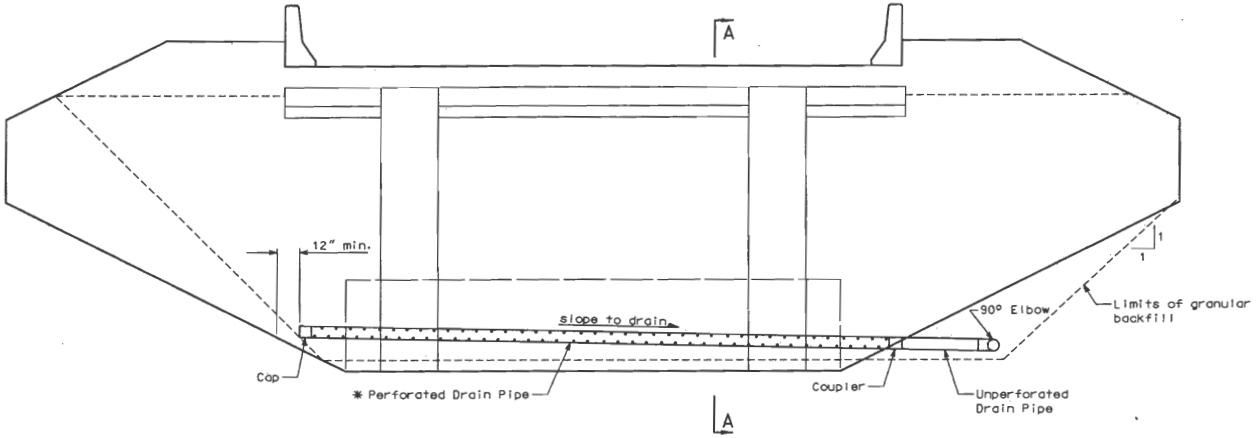
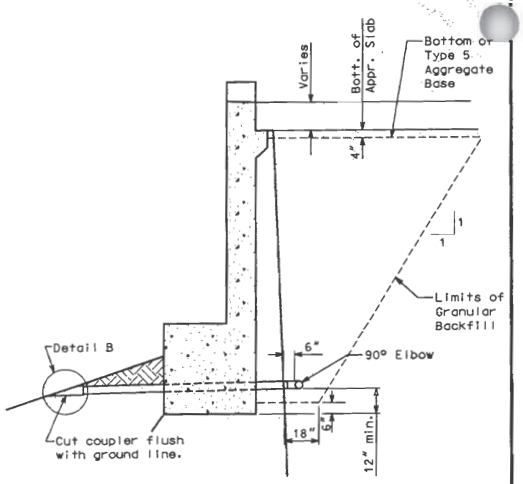


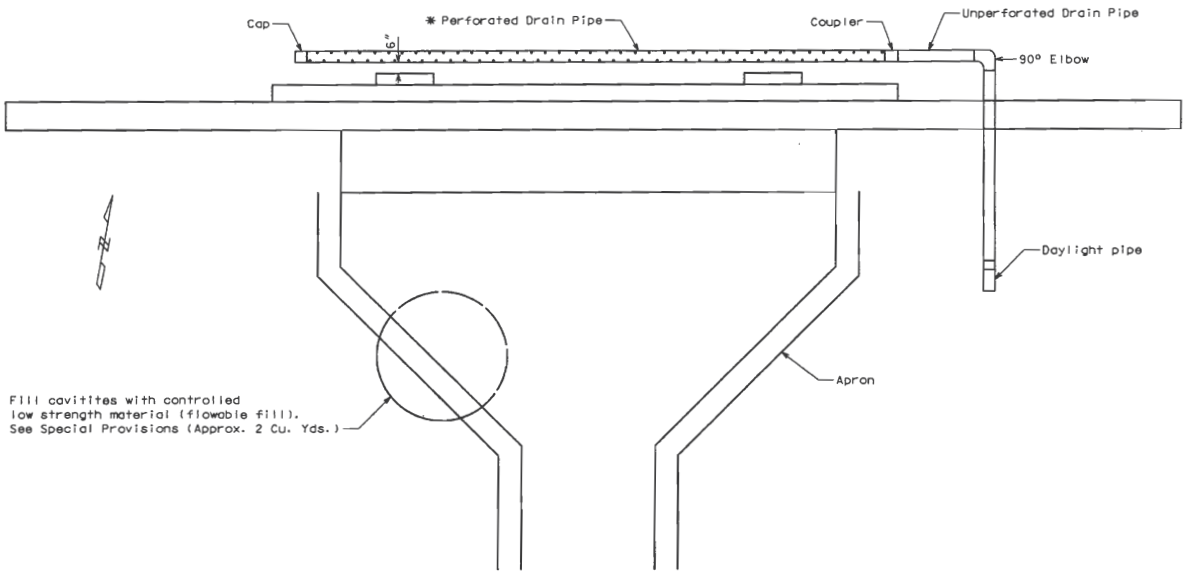
ELEVATION OF DRAIN AT ABUTMENT

(Looking backstation at Abutment 1. Abutment 9 opposite hand.)



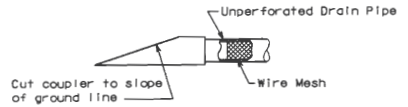
SECTION A-A

* Wrap with Geotextile Fabric, see Special Provions.



PLAN

(Abutment 9 shown. Abutment 1 similar except apron and flowable fill)



DETAIL B

Notes For Drain:

Drain pipe may be either 6" diameter corrugated metallic-coated steel pipe underdrain, 4" diameter corrugated polyvinyl chloride (PVC) drain pipe or 4" diameter corrugated polyethylene (PE) drain pipe.

Perforated pipe shall be placed at fill face side at least 12" above the bottom of the abutment barrel and plain pipe shall be used from where the drain intersects the bottom of the wing to the exit at ground line.

Furnishing and installing drains shall be in general accordance with Section 715 of the Standard Specifications.

The drains shall be installed just prior to the placement of abutment backfill.

All costs associated with abutment repairs including removal of concrete, new concrete up to construction joint at paving notch, new epoxy coated reinforcing, excavation, compacted backfill material in place, painting epoxy on existing reinforcing bars, dampproofing backwalls, drainage system, geotextile fabric around perforated pipe, filling cavities with controlled low strength material and all incidentals shall be included under the contract unit price bid per lump sum for "Abutment Modifications".

10-30-01

ABUTMENT MODIFICATIONS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

SHEET 10 OF 40

L05684

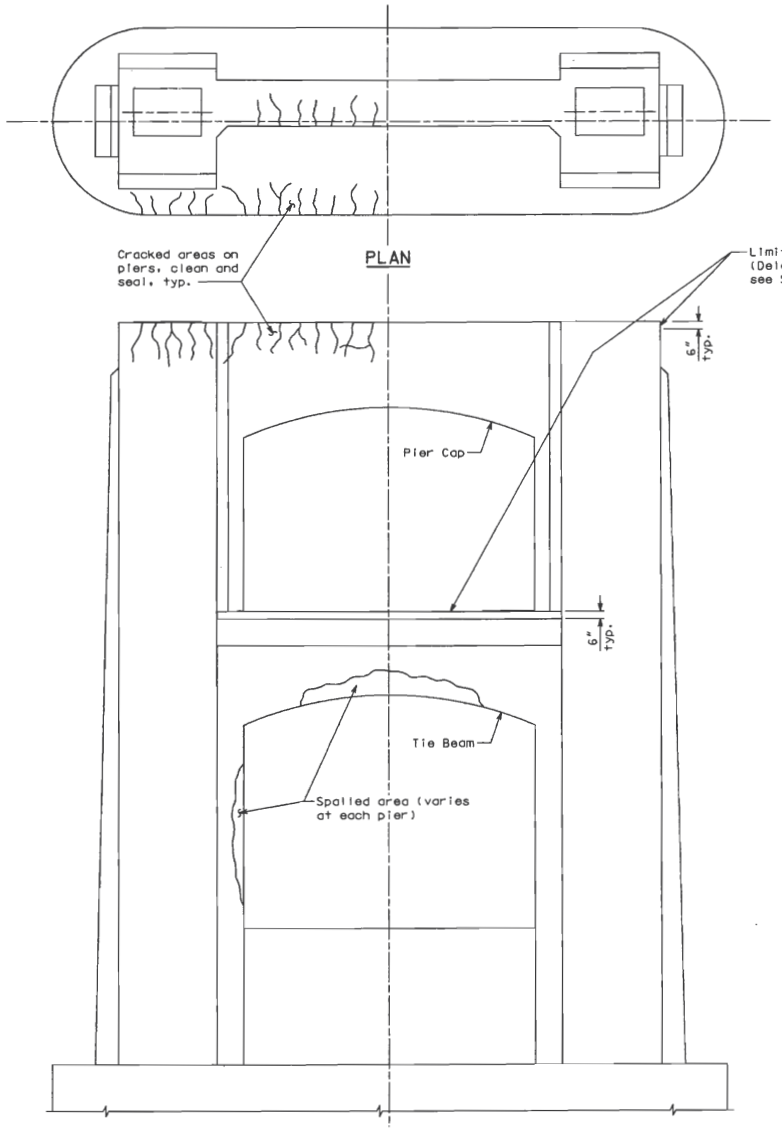
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
CHECKED: 09/01

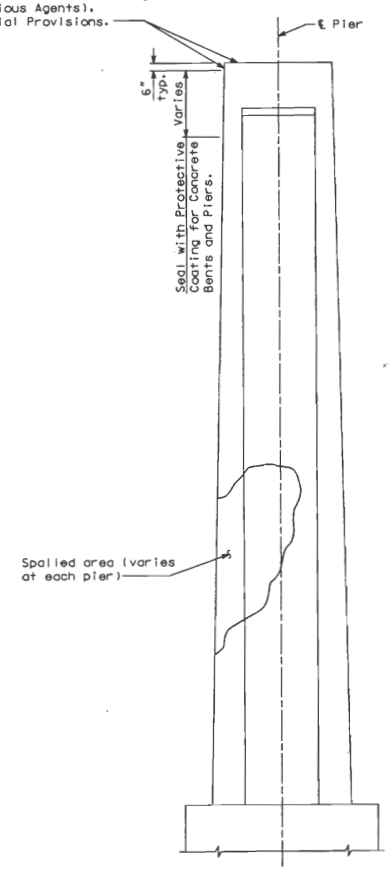
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

04:34:49 PM 10/29/01 S:\Rte291 Deck (889-02)\Bridge\dgn\4p1416_v-drain_010_f.dgn

STATE	PROJ. NO.	SHEET NO.
MO.		6 11



ELEVATION



SECTION

Notes:

Spalled areas shall be chipped and cleaned by sandblasting or other approved method. Areas cleaned shall be patched and sealed in accordance with the Special Provisions.

Pier caps and columns shall be cleaned and sealed after repair and/or replacement of structural steel elements and adjustment to bearings.

Total areas of repair shall be determined by the Engineer in the field at the time of construction.

Piers 4 & 5 shown, repairs at all other piers and abutments below areas of new concrete are similar.

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
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NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

/0-30-01

SUBSTRUCTURE REPAIR DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

SHEET 11 OF 40

L05684

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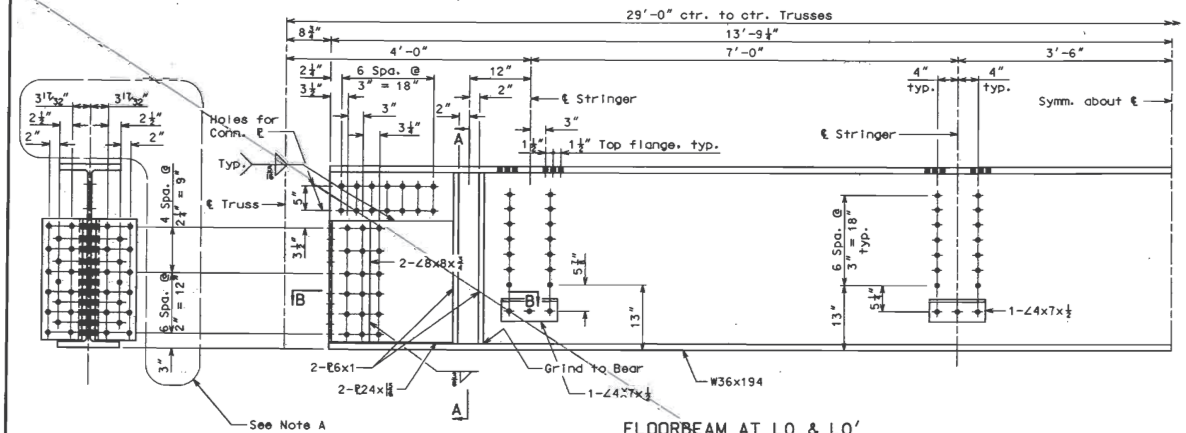
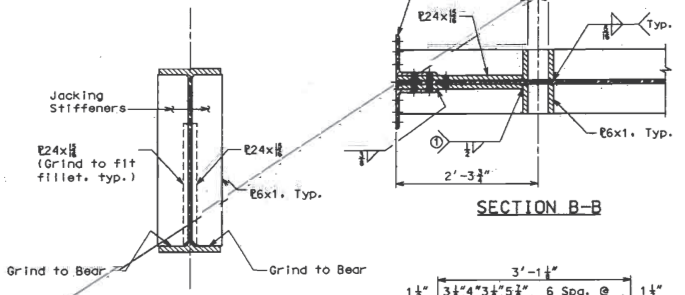
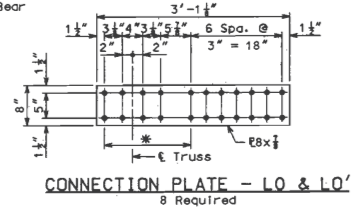
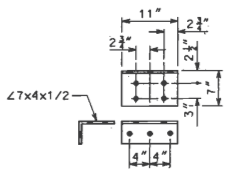
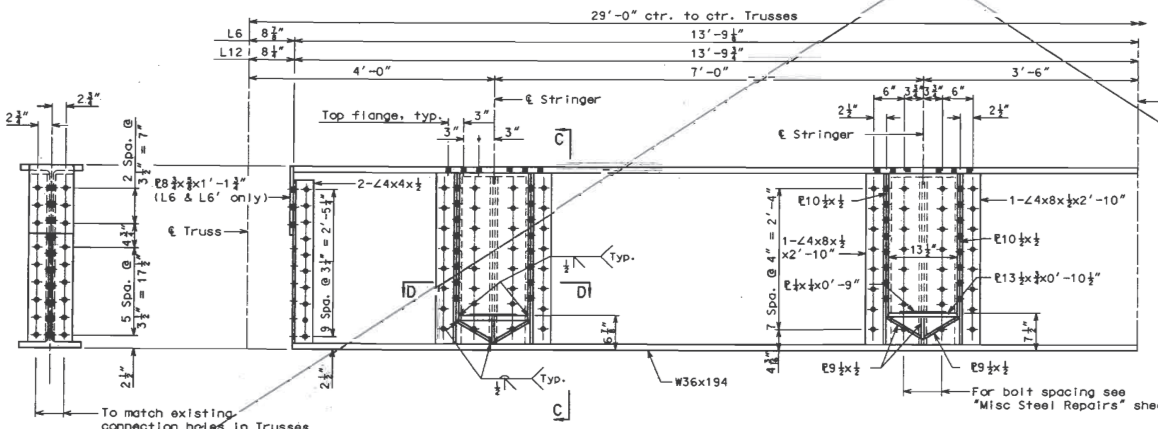


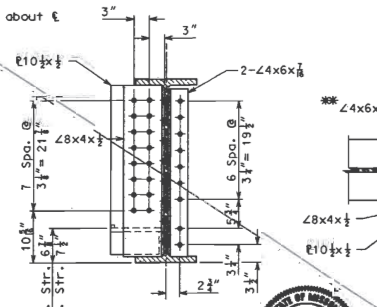
Note A: Hole spacings shown based on shop drawing dimensions. Holes shall be drilled to match existing connection holes in trusses.

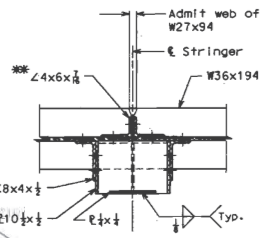












* To match existing connection holes in trusses

** Install prior to installation of saddle assemblies. Head of bolt on saddle assembly side.

Notes:
For additional details of holes in top flange of floorbeams, see "Miscellaneous Steel Repairs" sheet.
All fasteners on this sheet shall be ⅞"Ø H.S. A325 bolts installed in ⅞"Ø holes.

N-6-01

FLOORBEAMS - THRU TRUSS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

SHEET 12 OF 40

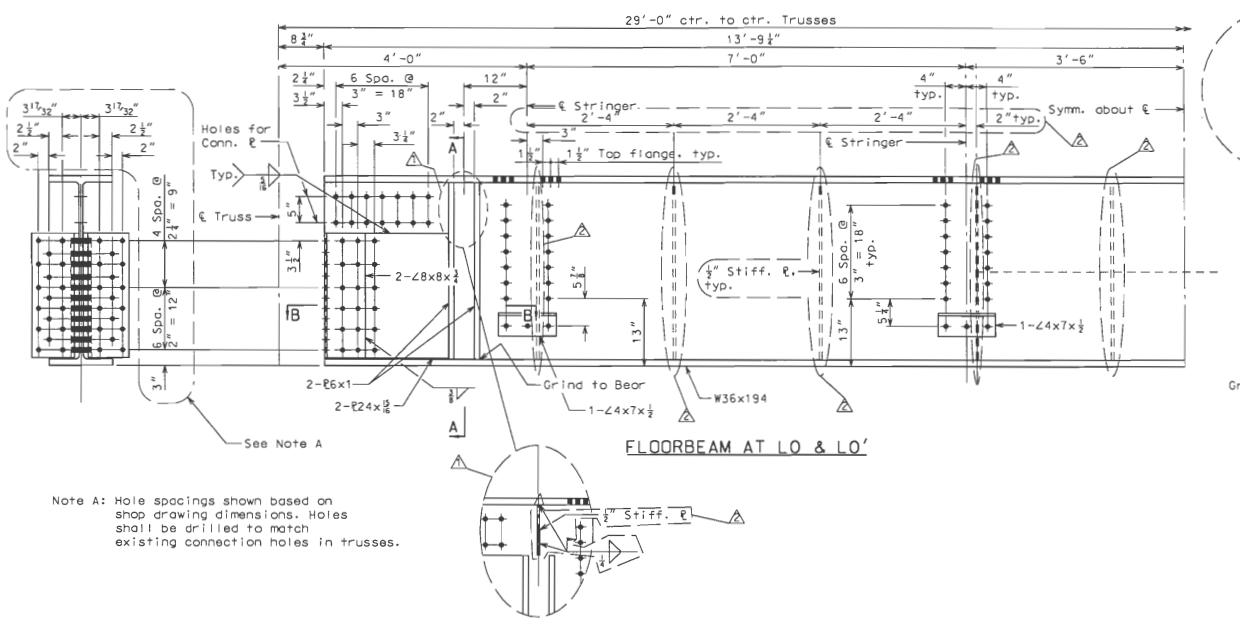
L05684

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

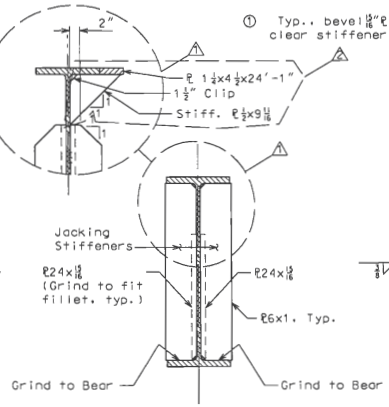
DETAILED: 09/01
CHECKED: 09/01

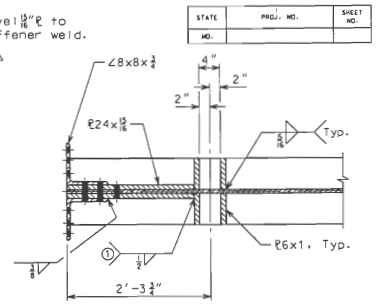
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

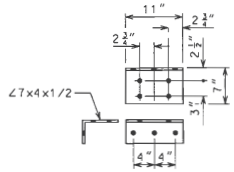
10:14:17 AM 11/05/01 S:\#Rte291 Deck (889-02)\Bridge\#j4p1416_16fibm_012_f.dgn

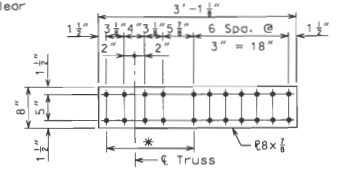


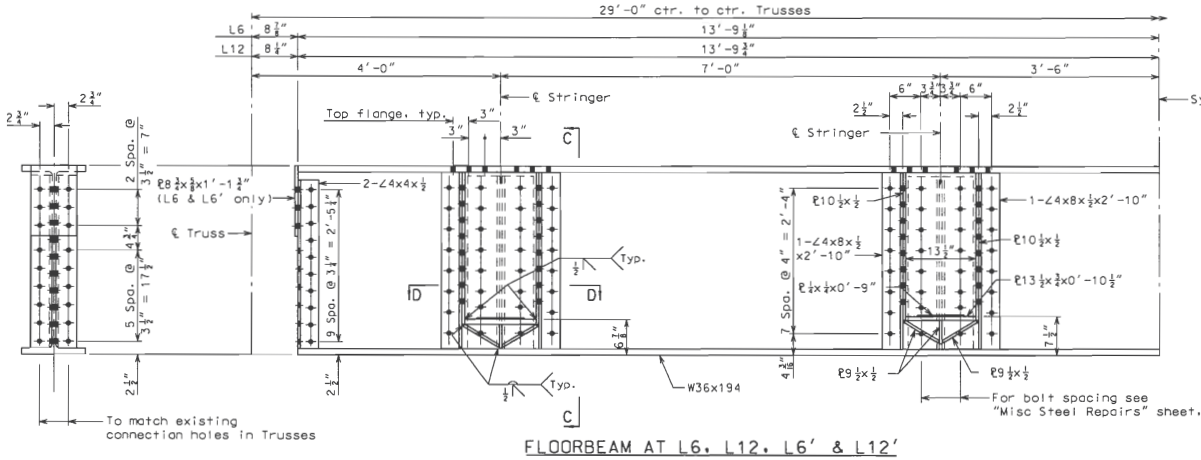
Note A: Hole spacings shown based on shop drawing dimensions. Holes shall be drilled to match existing connection holes in trusses.

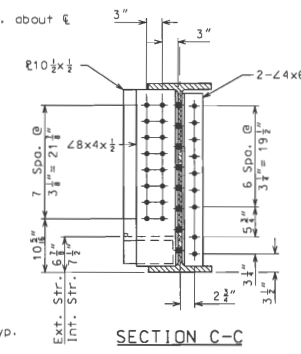






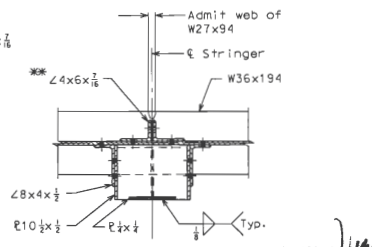






* To match existing connection holes in trusses

** Install prior to installation of saddle assemblies. Head of bolt on saddle assembly side.



Notes:
For additional details of holes in top flange of floorbeams, see "Miscellaneous Steel Repairs" sheet.
All fasteners on this sheet shall be ⅞"Ø H.S. A325 bolts installed in 15/16"Ø holes.

△2 Added ½" Stiffener Plates and dimensions. Revised 09-09-04.
△1 Clipped Jacking Stiffeners per Fabricator's request. Revised 04-19-02.

STATE OF MISSOURI STEVEN M. WARGER E-20997 REGISTERED PROFESSIONAL ENGINEER 9-23-04

FLOORBEAMS - THRU TRUSS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
CHECKED: 09/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 12 OF 40

L05684

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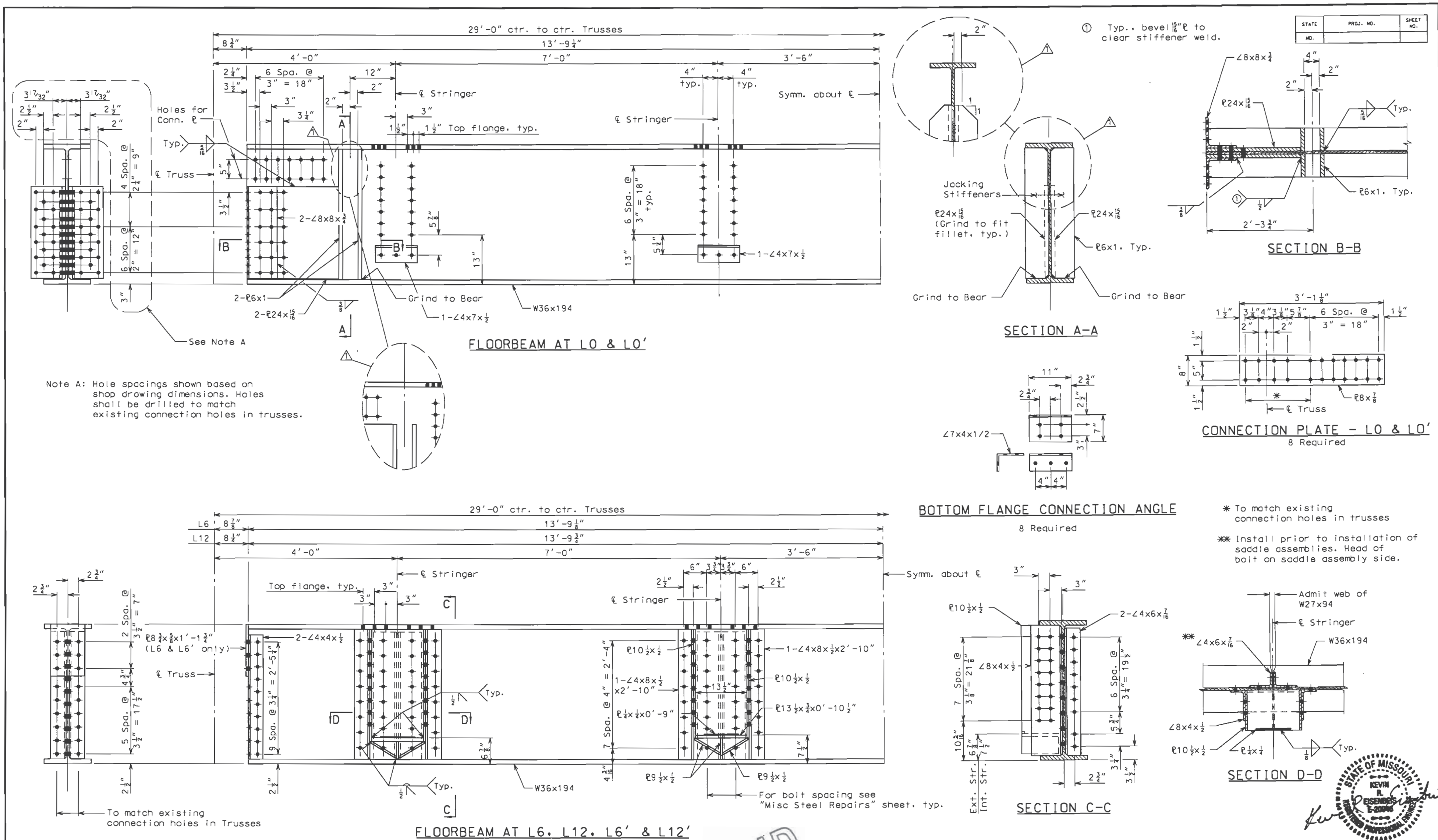


VOID

Notes:
For additional details of holes in top flange of floorbeams, see "Miscellaneous Steel Repairs" sheet.
All fasteners on this sheet shall be ⅞"Ø H.S. A325 bolts installed in 15/16"Ø holes.

⚠ Clipped Jacking Stiffeners per Fabricator's request. Revised 04-19-02.

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
CHECKED: 09/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

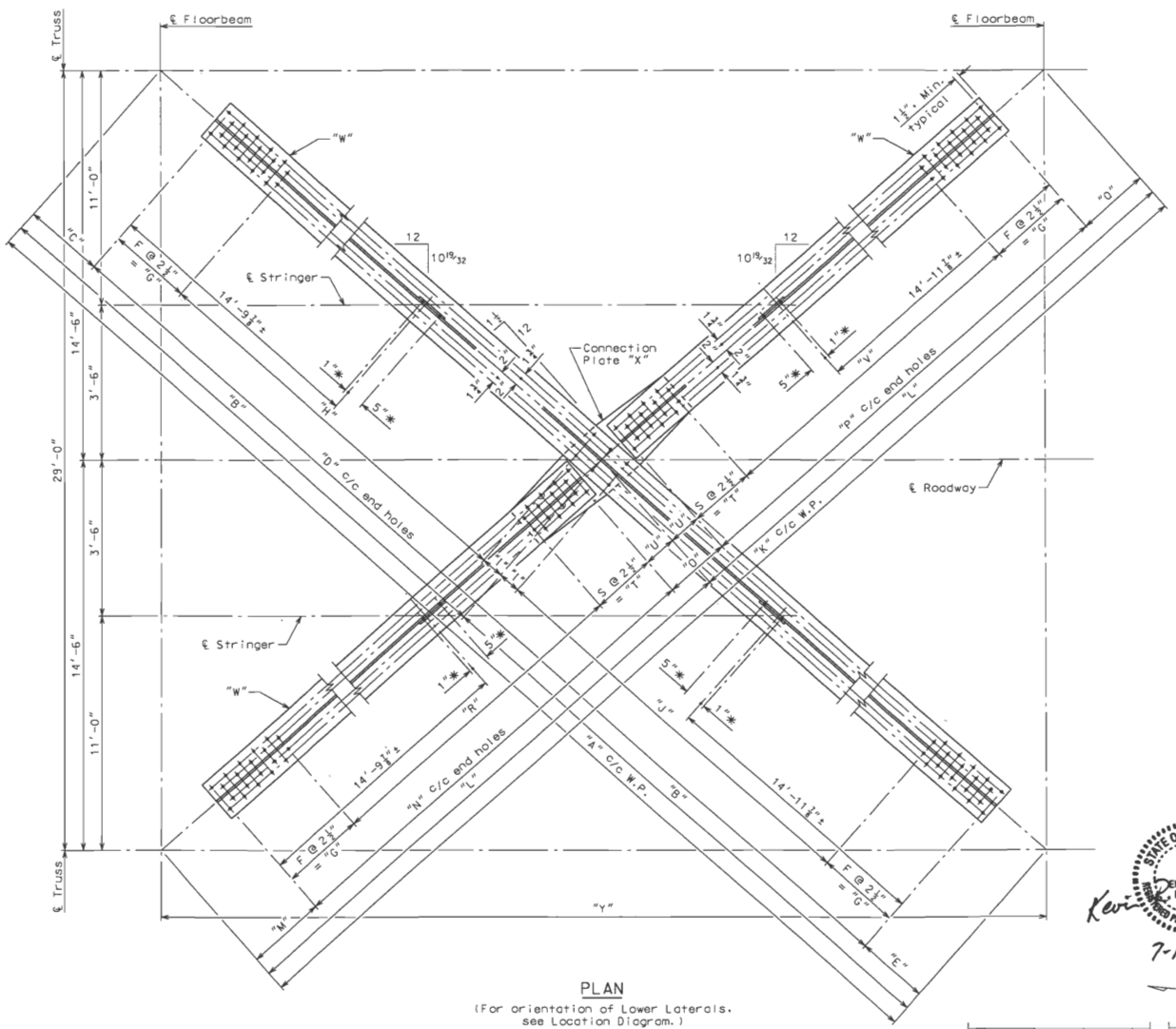
STATE OF MISSOURI KEVIN R. EISENBEIS E-23049 REGISTERED PROFESSIONAL ENGINEER
5-8-02

FLOORBEAMS - THRU TRUSS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SHEET 12 OF 40
L05684

01:28:32 PM 05/03/02 S:\Rte291 Deck (889-02)\bridge\j4p1416_16flbm_012_f.dgn

STATE	PROJ. NO.	SHEET NO.
MO.		



PLAN

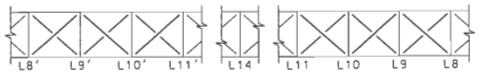
(For orientation of Lower Laterals, see Location Diagram.)

BOTTOM LATERAL DIMENSION DATA			
LOCATION	SPAN		
	L8–L9 & L8'–L9'	L9–L10 & L9'–L10'	L10–L11 & L10'–L11'
"A"	43'-9 3/8"	43'-9 3/8"	43'-9 3/8"
"B"	21'-10 13/16"	21'-10 13/16"	21'-10 13/16"
"C"	19 1/2"	19 1/2"	21 1/2"
"D"	40'-4 3/8"	40'-4 3/8"	40'-4 3/8"
"E"	21 1/2"	21 1/2"	19 1/2"
"F"	5	5	6
"G"	12 1/2"	12 1/2"	15"
"H"	18'-9 13/16"	18'-9 13/16"	18'-4 5/16"
"I"	5"	5"	6"
"J"	18'-7 13/16"	18'-7 13/16"	18'-6 5/16"
"K"	43'-9 3/8"	43'-9 3/8"	43'-9 3/8"
"L"	21'-10 13/16"	21'-10 13/16"	21'-10 13/16"
"M"	19 1/2"	19 1/2"	21 1/2"
"N"	19'-7 3/8"	19'-7 5/8"	19'-4 1/2"
"O"	15 3/8"	15 3/8"	17 3/8"
"P"	19'-5 3/8"	19'-5 3/8"	19'-6 1/2"
"Q"	21 1/2"	21 1/2"	19 1/2"
"R"	17'-6 3/8"	17'-6 3/8"	16'-10 1/2"
"S"	5	5	6
"T"	12 1/2"	12 1/2"	15"
"U"	7 11/16"	7 11/16"	8 13/16"
"V"	17'-4 3/8"	17'-4 3/8"	17'-0 1/2"
"W"	WT6x26.5	WT6x26.5	WT6x39.5
"X"	14"x 7/16"x3'-7 1/8"	14"x 3/16"x3'-7 1/8"	16"x 1/2"x4'-2 3/8"
"Y"	32'-9 1/8"	32'-9 1/8"	32'-10 1/16"

STATE OF MISSOURI
KEVIN R. EISENBEIS
E-20940
REGISTERED PROFESSIONAL ENGINEER

Kevin Eisenbeis
7-11-02

Notes:
* Field drill to attach to existing brackets. Add fill plates if required.
All dimensions shown except connection at Connection Plate "X" are based on shop drawings from the original bridge construction. Contractor shall field verify all dimensions.
W.P. denotes Working Point.
Lateral bracing shall not be removed from more than 3 bays at a time, per span.



LOCATION DIAGRAM

LOWER LATERAL BRACING DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 06/02
CHECKED: 06/02

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

⚠ New Sheet 7/10/02

SHEET 12A OF 40

L05684

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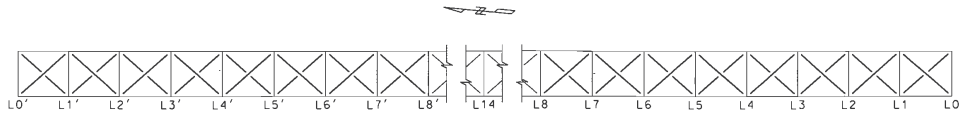
STATE	PROJ. NO.	SHEET NO.
MO.		

BOTTOM LATERAL DIMENSION DATA

LOCATION	SPAN							
	L0-L1 & L0'-L1'	L1-L2 & L1'-L2'	L2-L3 & L2'-L3'	L3-L4 & L3'-L4'	L4-L5 & L4'-L5'	L5-L6 & L5'-L6'	L6-L7 & L6'-L7'	L7-L8 & L7'-L8'
"A"	43'-9 5/8"	43'-9 5/8"	43'-9 5/8"	43'-9 5/8"	43'-9 5/8"	43'-9 5/8"	43'-9 5/8"	43'-9 5/8"
"B"	21'-10 13/16"	21'-10 13/16"	21'-10 13/16"	21'-10 13/16"	21'-10 13/16"	21'-10 13/16"	21'-10 13/16"	21'-10 13/16"
"C"	2'-4"	19 1/2"	19 1/2"	19 1/2"	21 1/2"	19 1/2"	19 1/2"	19 1/2"
"D"	39'-10 1/8"	40'-4 5/8"	40'-4 5/8"	40'-4 5/8"	40'-4 5/8"	40'-4 5/8"	40'-4 5/8"	40'-4 5/8"
"E"	19 1/2"	21 1/2"	21 1/2"	21 1/2"	19 1/2"	21 1/2"	21 1/2"	21 1/2"
"F"	7	5	5	5	5	4	4	4
"G"	17 1/2"	12 1/2"	12 1/2"	12 1/2"	12 1/2"	10"	10"	10"
"H"	17'-7 5/16"	18'-9 13/16"	18'-9 13/16"	18'-9 13/16"	18'-7 3/16"	19'-0 5/16"	19'-0 5/16"	19'-0 5/16"
"I"	6"	5"	5"	5"	5"	5"	5"	5"
"J"	18'-3 13/16"	18'-7 13/16"	18'-7 13/16"	18'-7 13/16"	18'-9 13/16"	18'-10 5/16"	18'-10 5/16"	18'-10 5/16"
"K"	43'-9 5/8"	43'-9 5/8"	43'-9 5/8"	43'-9 5/8"	43'-9 5/8"	43'-9 5/8"	43'-9 5/8"	43'-9 5/8"
"L"	21'-10 13/16"	21'-10 13/16"	21'-10 13/16"	21'-10 13/16"	21'-10 13/16"	21'-10 13/16"	21'-10 13/16"	21'-10 13/16"
"M"	2'-4"	19 1/2"	19 1/2"	19 1/2"	21 1/2"	19 1/2"	19 1/2"	19 1/2"
"N"	18'-10"	19'-7 3/8"	19'-7 3/8"	19'-7 3/8"	19'-5 3/8"	19'-7 3/8"	19'-7 3/8"	19'-7 3/8"
"O"	17 5/8"	15 3/8"	15 3/8"	15 3/8"	15 3/8"	15 3/8"	15 3/8"	15 3/8"
"P"	19'-6 1/2"	19'-5 5/8"	19'-5 5/8"	19'-5 5/8"	19'-7 3/8"	19'-5 3/8"	19'-5 3/8"	19'-5 3/8"
"Q"	19 1/2"	21 1/2"	21 1/2"	21 1/2"	19 1/2"	21 1/2"	21 1/2"	21 1/2"
"R"	16'-1 1/2"	17'-6 5/8"	17'-6 5/8"	17'-6 5/8"	17'-4 3/8"	17'-9 1/8"	17'-9 1/8"	17'-9 1/8"
"S"	6	5	5	5	5	2 4 - (5)	2 4 - (5)	2 4 - (5)
"T"	15"	12 1/2"	12 1/2"	12 1/2"	12 1/2"	2 10"-12 1/2"	2 10"-12 1/2"	2 10"-12 1/2"
"U"	8 13/16"	7 11/16"	7 11/16"	7 11/16"	7 11/16"	7 11/16"	7 11/16"	7 11/16"
"V"	16'-10"	17'-4 5/8"	17'-4 5/8"	17'-4 5/8"	17'-6 5/8"	17'-7 1/8"	17'-7 1/8"	17'-7 1/8"
"W"	WT6x39.5	WT6x26.5	WT6x26.5	WT6x26.5	WT6x26.5	WT6x26.5	WT6x26.5	WT6x26.5
"X"	16"x 1/2"x4'-2 5/8"	14"x 7/16"x3'-7 3/8"	14"x 7/16"x3'-7 3/8"	14"x 7/16"x3'-7 3/8"	14"x 7/16"x3'-7 3/8"	14"x 7/16"x3'-7 3/8"	14"x 7/16"x3'-7 3/8"	14"x 7/16"x3'-7 3/8"
"Y"	32'-9 7/8"	32'-9 7/8"	32'-9 7/8"	32'-9 7/8"	32'-9 7/8"	32'-9 7/8"	32'-9 7/8"	32'-9 7/8"

Notes:
The dimension from the ℄ of end hole to the ℄ of existing bracket connection is 14'-3 3/8" at the L0 end and 14'-11 7/8" at the L1 end of the lower lateral bracing between L0 & L1. (L0' similar).
For all other bays the dimension from the ℄ of end hole to the ℄ of existing bracket connection will be as shown on sheet 12A or opposite hand depending on the orientation of the lower lateral bracing.
See "Lower Lateral Bracing Details" sheet 12A for drawing and other notes.



LOCATION DIAGRAM

8-20-02

LOWER LATERAL BRACING DATA
LO TO L8 & LO' TO L8'

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 07/02
CHECKED: 07/02

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

2 Per Fabricator's Request 8/13/02
1 New Sheet 7/26/02

SHEET 12B OF 40

L05684

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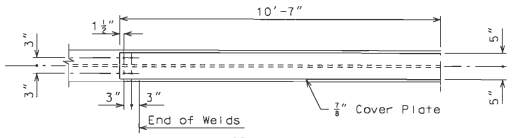
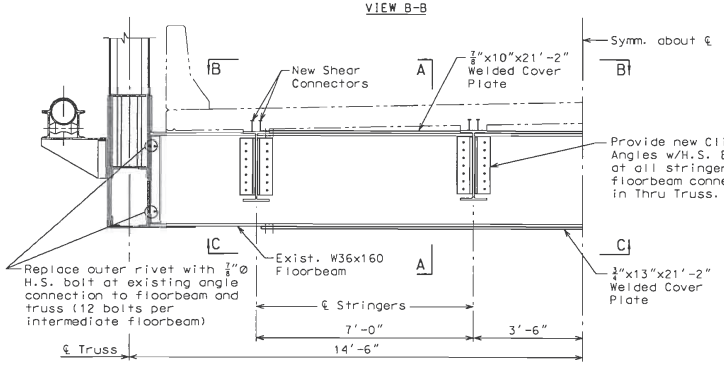
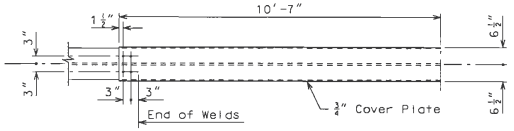
STATE	PROJ. NO.	SHEET NO.
MO.		



VIEW B-B



PART ELEVATION



VIEW C-C

THRU TRUSS FLOORBEAM DETAILS

L1 thru L5, L7 thru L11, L13, L13', L11' thru L7', L5' thru L1'.

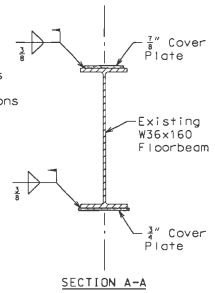
2 Notes:

Cut 12" off one end of bottom cover plate at U12. Center cover plate on floorbeams.

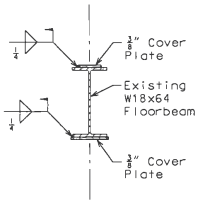
* 5'-3" at U12. Use existing holes on one end of cover plate. Field drill new holes at cut end of cover plate as specified.

‡ 2" from cut end of cover plate at U12.

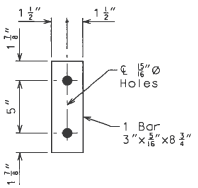
** 10'-6" at U12.

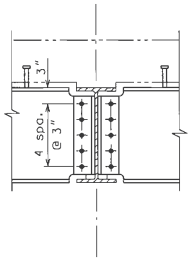


SECTION A-A



SECTION D-D



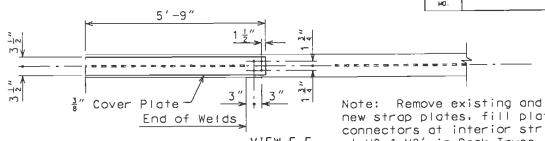


SECTION G-G

PLATE UNDER U0' FLOORBEAM

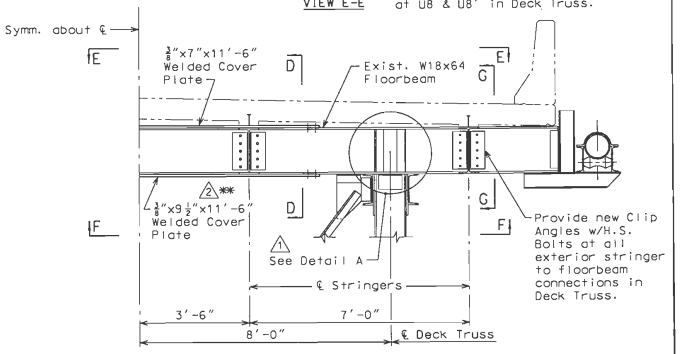
(Over west truss)

3 South Deck Truss only.

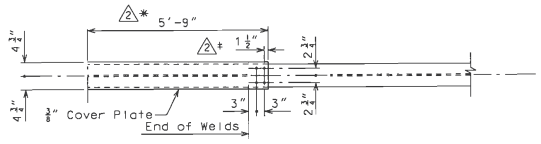


VIEW E-E

Note: Remove existing and provide new strap plates, fill plates, and connectors at interior stringers at U8 & U8' in Deck Truss.



PART ELEVATION



VIEW F-F

DECK TRUSS FLOORBEAM DETAILS

Typical at all Intermediate Floorbeams

Notes:

Bolts connecting cover plates to floorbeams shall be ⅞"Ø H.S. Bolts in 15/16"Ø Holes.

Special weld procedures are required, see Special Provisions.

1 Bolts connecting bearing stiffeners to floorbeams shall be ¾"Ø H.S. Bolts.

1 Deck truss floorbeams shall be replaced on the South Deck Truss at U0, U5, U9 and U11. The contractor has the option of replacing the existing floorbeams with Grade 36 W18x65 floorbeams with cover plates as shown above, or with Grade 50 W18x65 floorbeams (no cover plates needed).

2 Grind 3" wide strip at bottom flange after removal of existing stiffener and prior to field measuring and attaching new stiffener angle.

3 Deck truss floorbeams shall be replaced on the North Deck Truss at U3', U9', U10, U9, U7, U5 and U0. The contractor has the same options for floorbeam replacement as stated above for the South Deck Truss.

3 The south end floorbeam of the South Plate Girder span shall be replaced.

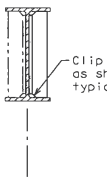
BEARING STIFFENER ANGLE REPLACEMENT LOCATIONS

1

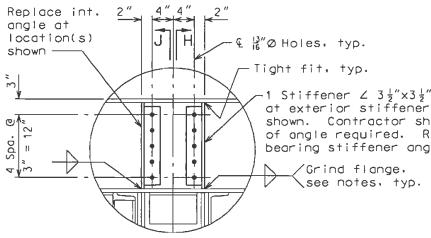
(South Deck Truss)

East Truss: U4, North side, exterior
U10, North side, exterior
U11', North side, exterior
U10', North side, exterior
U9', North side, exterior
U9', North side, interior

West Truss: U1, North side, exterior
U7, North side, exterior



1 SECTION H-H



3 J H

1 DETAIL A

Stiffeners at other truss opposite hand.

3 For Section J-J, see "Deck Truss Floorbeam Repairs" sheet.

STATE OF MISSOURI LAURA L. SHANEWALD NUMBER PE-2004000844 PROFESSIONAL ENGINEER

4-14-04

3 Revised 4/09/04
2 Revised 3/01/04
1 Revised 2/09/04

FLOORBEAM STRENGTHENING DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

SHEET 13 OF 40

L05684

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 08/01
CHECKED: 08/01

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STATE	PROJ. NO.	SHEET NO.
MO.		

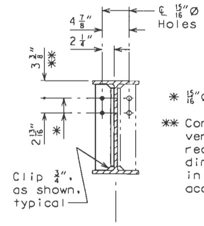
△2 BEARING STIFFENER ANGLE REPLACEMENT LOCATIONS

(North Deck Truss)

East Truss: U4', South side, exterior
U6', South side, exterior & interior
U6, South side, exterior

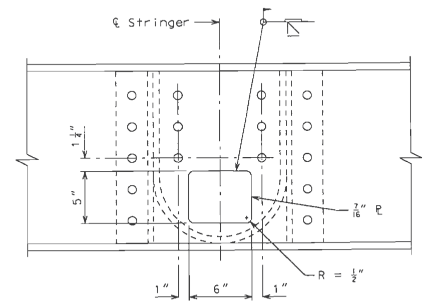
West Truss: U0', North side, exterior & interior
U1', South side, exterior
U5', South side, exterior
U7', South side, exterior
U10', South side, exterior
U11', South side, exterior
U12', South side, exterior
U1, South side, exterior

For Bearing Stiffener Angle Replacement Details, see Detail A on "Floorbeam Strengthening Details" sheet.



△2 SECTION J-J

At U6' interior, only.



FLOORBEAM U8' - SOUTH DECK TRUSS

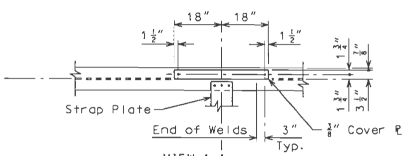
East Exterior Floorbeam Location

△2 WELDED COVER PLATE LOCATIONS

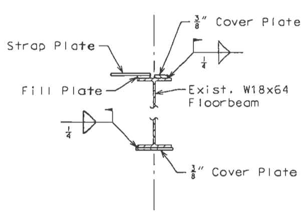
(North Deck Truss only)

Top Flange Cover ℘: U8', East exterior stringer
(2 Req'd.) U8, East exterior stringer

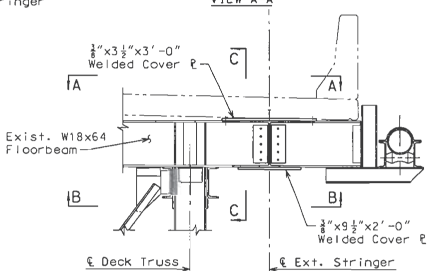
Bott. Flange Cover ℘: U5', East exterior stringer
(5 Req'd.) U6', East exterior stringer
U10', West exterior stringer
U12', East exterior stringer
U12', West exterior stringer



VIEW A-A



SECTION C-C



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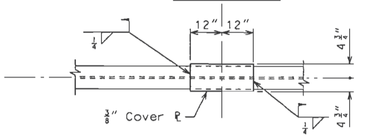

VIEW B-B

△2 DECK TRUSS FLOORBEAM DETAILS

Notes:

Remove 6" wide by 5" tall area of web as shown. Provide 1/2" radius at corners (drilled holes). Grind cut edges.

Splice in new plate (beveled edges) as shown in detail. Provide backing plate in gap between saddle and web of floorbeam.

Clean, prime and coat repaired area in accordance with Special Provisions.

Drill a 3/4"Ø hole in floorbeam U8' (South Deck Truss) web at west exterior stringer where 1/4"Ø hole in web occurs. Plug weld and grind hole.

Remove interior stringers on saddle side of floorbeams U8 & U8'. Thoroughly clean (scrape and water blast) all exterior and interior saddle bearings, including space between saddle and floorbeam web. Apply 3 component Calcium Sulfonate, per attached addendum to the Special Provisions, to area of floorbeam web behind saddle bearing casting. Contractor shall use caution when applying all 3 components of Calcium Sulfonate so as not to encroach on areas where System G coating will be applied. If any component of the Calcium Sulfonate is applied where System G coating will be applied, the Calcium Sulfonate shall be removed prior to application of System G coating. Fill gap between saddle and floorbeam web with compressible joint material, allow 1" for a mastic type sealant caulking at top of joint material.

Prime and coat remaining saddle area, in accordance with Special Provisions, prior to reinstalling existing interior stringers or new exterior stringers.

△2 For notes pertaining to Bearing Stiffener Angle Replacement and Welded Cover Plates, see "Floorbeam Strengthening Details" sheet.

△2 Grind top or bottom of floorbeam flanges, if required, at cover plate locations.

STATE OF MISSOURI — LAURA L. SHADEWALD — PROFESSIONAL ENGINEER

4-14-04

DECK TRUSS FLOORBEAM REPAIRS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

△2 Revised 4/09/04

△1 New Sheet 3/02/04

SHEET 13A OF 40

L05684

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

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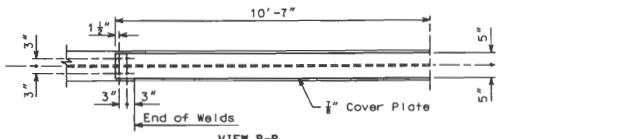
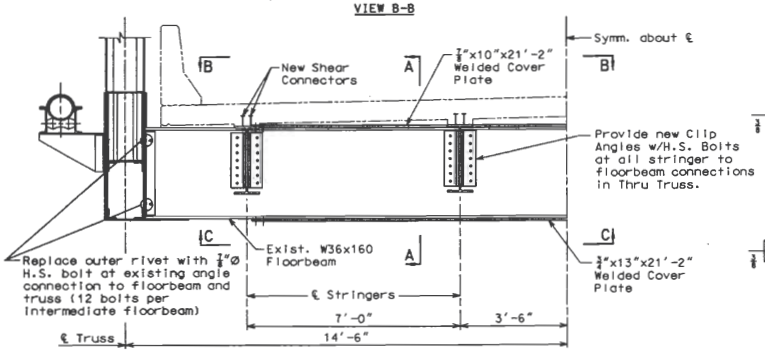


VIEW B-B



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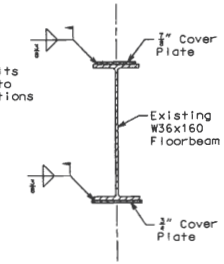
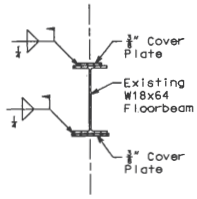
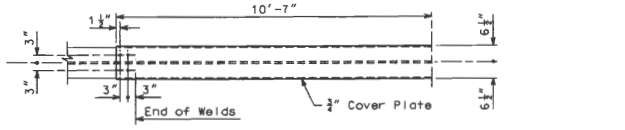


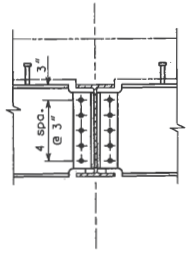
SECTION A-A



SECTION D-D



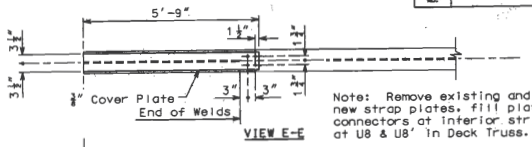
VIEW C-C



SECTION G-G

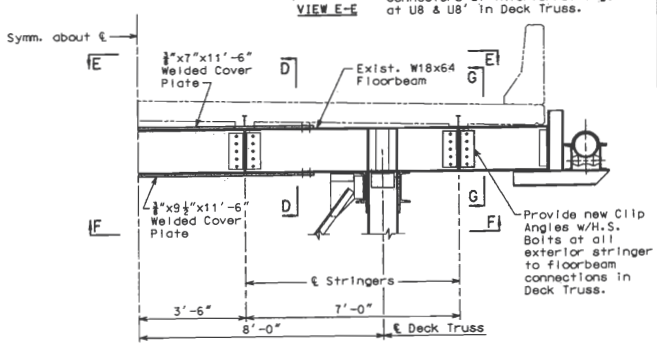
THRU TRUSS FLOORBEAM DETAILS

L1 thru L5, L7 thru L11, L13, L13', L11' thru L7', L5' thru L1'.



VIEW E-E

Note: Remove existing and provide new strap plates, fill plates, and connectors at interior stringers at U8 & U8' in Deck Trusses.



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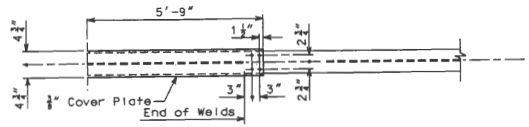

VIEW F-F

DECK TRUSS FLOORBEAM DETAILS

Typical at all Intermediate Floorbeams

Notes:
Bolts connecting cover plates to floorbeams shall be ⅞"Ø H.S. Bolts in 15/16"Ø Holes.
Special weld procedures are required, see Special Provisions.

VOID

10-30-01

FLOORBEAM STRENGTHENING DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

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SHEET 13 OF 40

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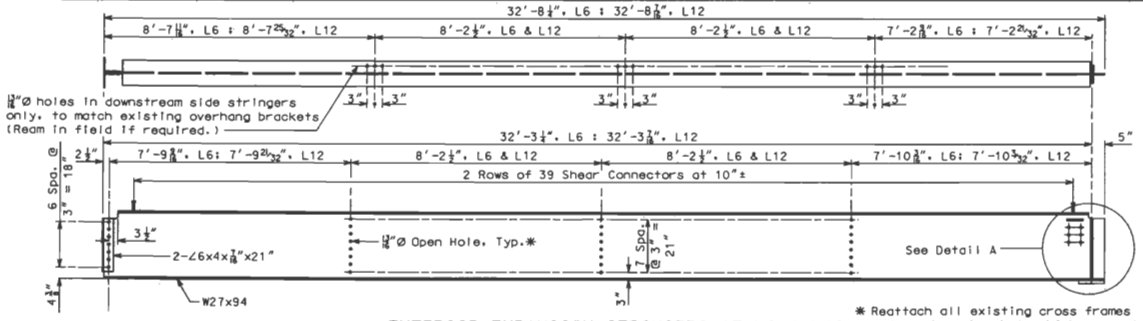
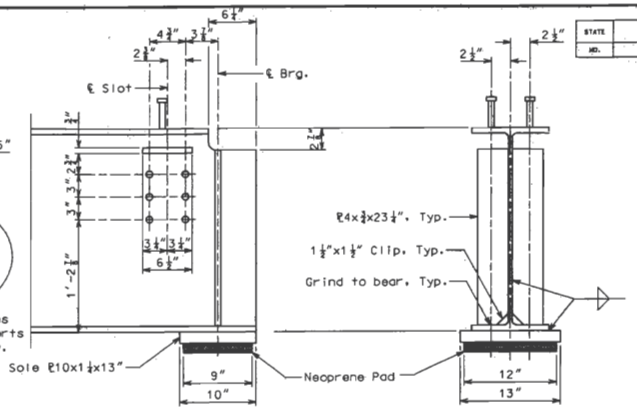


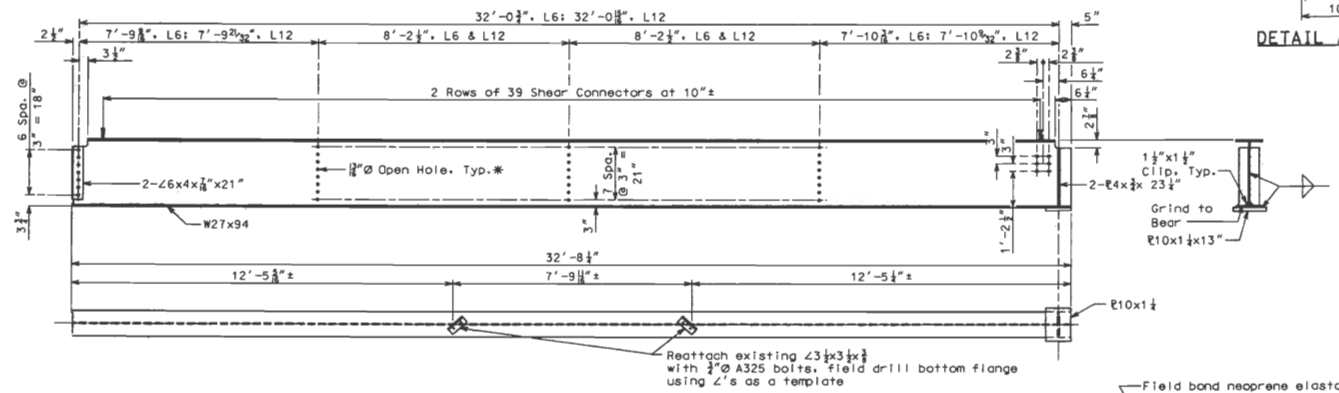
EXTERIOR EXPANSION STRINGERS AT L6 & L12

Exterior Expansion Stringers at L6' & L12' similar.
(8 Required)

* Reattach all existing cross frames and overhang brackets which supports utilities on downstream side only.

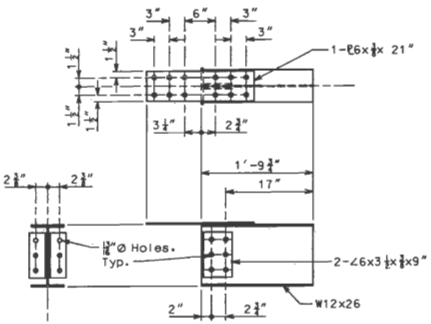


DETAIL A



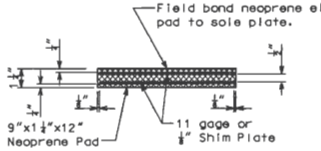
INTERIOR EXPANSION STRINGERS AT L6 & L12

Interior Expansion Stringers at L6' & L12' similar.
(8 Required)

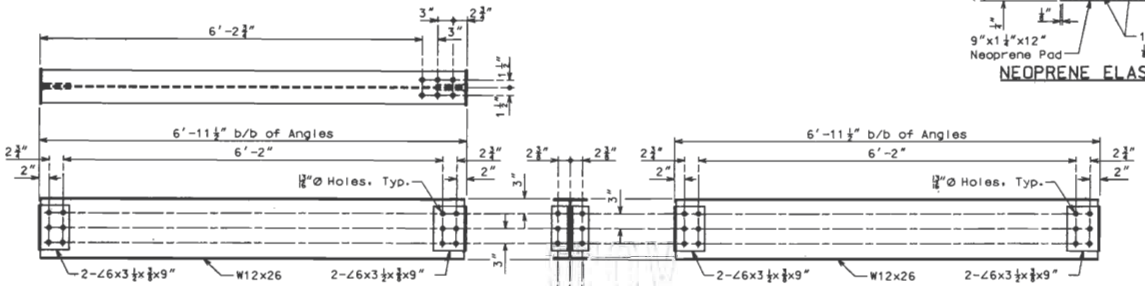


DIAPHRAGM - EXTERIOR

(8 Required)



NEOPRENE ELASTOMERIC PAD



DIAPHRAGM - OUTER BAY

(8 Required)

DIAPHRAGM - CENTER BAY

(4 Required)

Notes:

All fasteners on this sheet shall be 3/4"Ø H.S. A325 Bolts installed in 13/16"Ø holes.

All shear connectors are 3/4"Ø x 6"

Neoprene Elastomeric Pads shall be 60 Durometer. The neoprene pad shall be bonded to the bearing seat with an epoxy adhesive as approved by the bearing manufacturer for bonding neoprene to steel.

Structural steel for sole plate shall be ASTM A709 Grade 36 and shall be coated with a minimum of two coats of inorganic zinc primer (5 mils minimum).

Payment for furnishing, installing and bonding the laminated neoprene pads shall be included in the contract unit price for "Laminated Neoprene Bearing Pad".

Shear connectors shall also be installed at all existing stringers which remain in place and at any new stringers required, as determined by field inspection. Spacing to be similar to that shown on Interior Stringers at L6 and L12 detail. Quantities include 7.688 lbs. of shear connectors in the thru truss spans.

STATE	PROJ. NO.	SHEET NO.
MO.		8 (P)

STRINGERS - THRU TRUSS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

10-30-01

SHEET 14 OF 40

L05684

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

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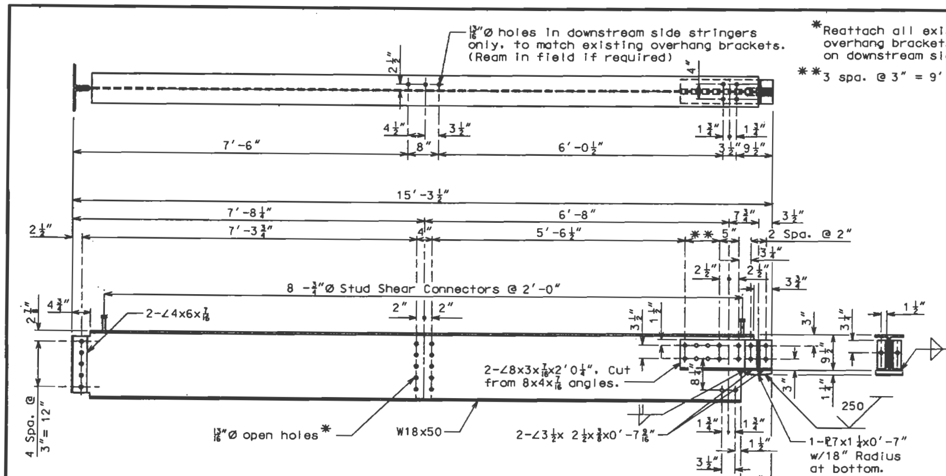
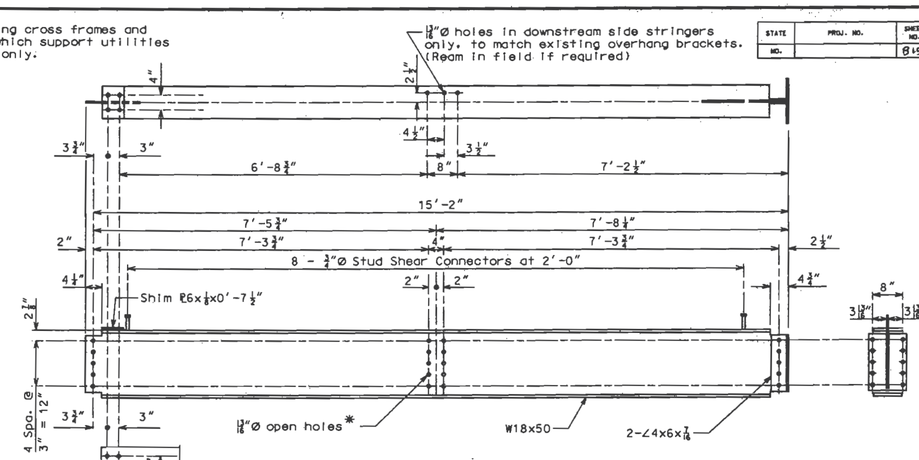


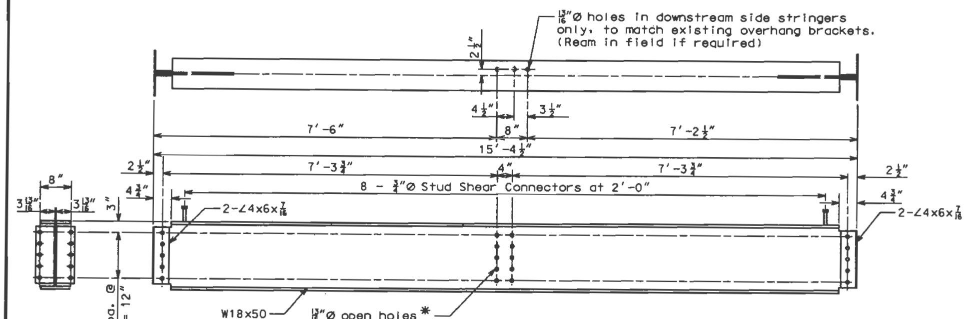
EXTERIOR STRINGER AT U7-U8 AND U8'-U7'

(8 required)



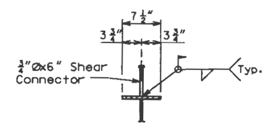
EXTERIOR STRINGER AT U8-U9 AND U9'-U8'

(8 required)

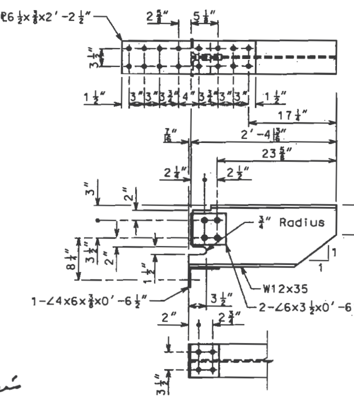


EXTERIOR STRINGER - ALL OTHER LOCATIONS

(80 required)

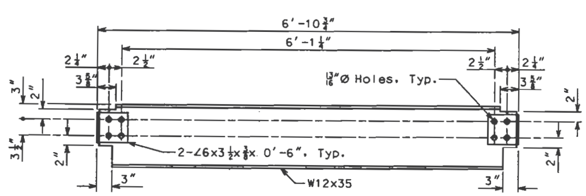


SHEAR CONNECTOR DETAIL



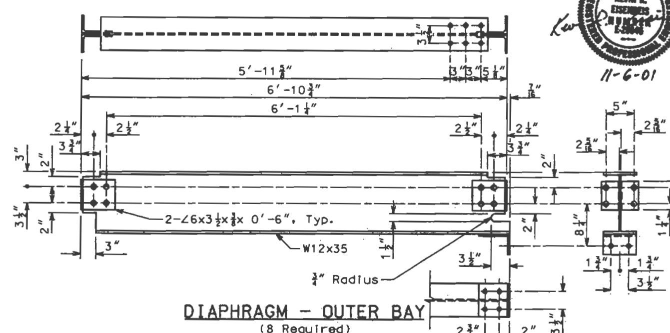
DIAPHRAGM - EXTERIOR

(8 Required)



DIAPHRAGM - CENTER BAY

(4 Required)



DIAPHRAGM - OUTER BAY

(8 Required)

11-6-01

Notes:

All fasteners on this sheet shall be 3/4"Ø H.S. A325 bolts installed in 13/16"Ø holes.

All shear connectors are 3/4"Øx6"

Shear connectors shall also be installed at all existing interior stringers which remain in place and at any new interior stringers required, as determined by field inspection. Spacing to be similar to that shown on Exterior Stringers - All Other Locations detail. Quantities include 1,351 lbs. of shear connectors in the deck truss spans. See Special Provisions.

All re-entrant corners shall have a radius of 1", except as shown.

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

STATE	PROJ. NO.	SHEET NO.
NO.		815

STRINGERS - DECK TRUSS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 10/01
CHECKED: 10/01

SHEET 15 OF 40

L05684

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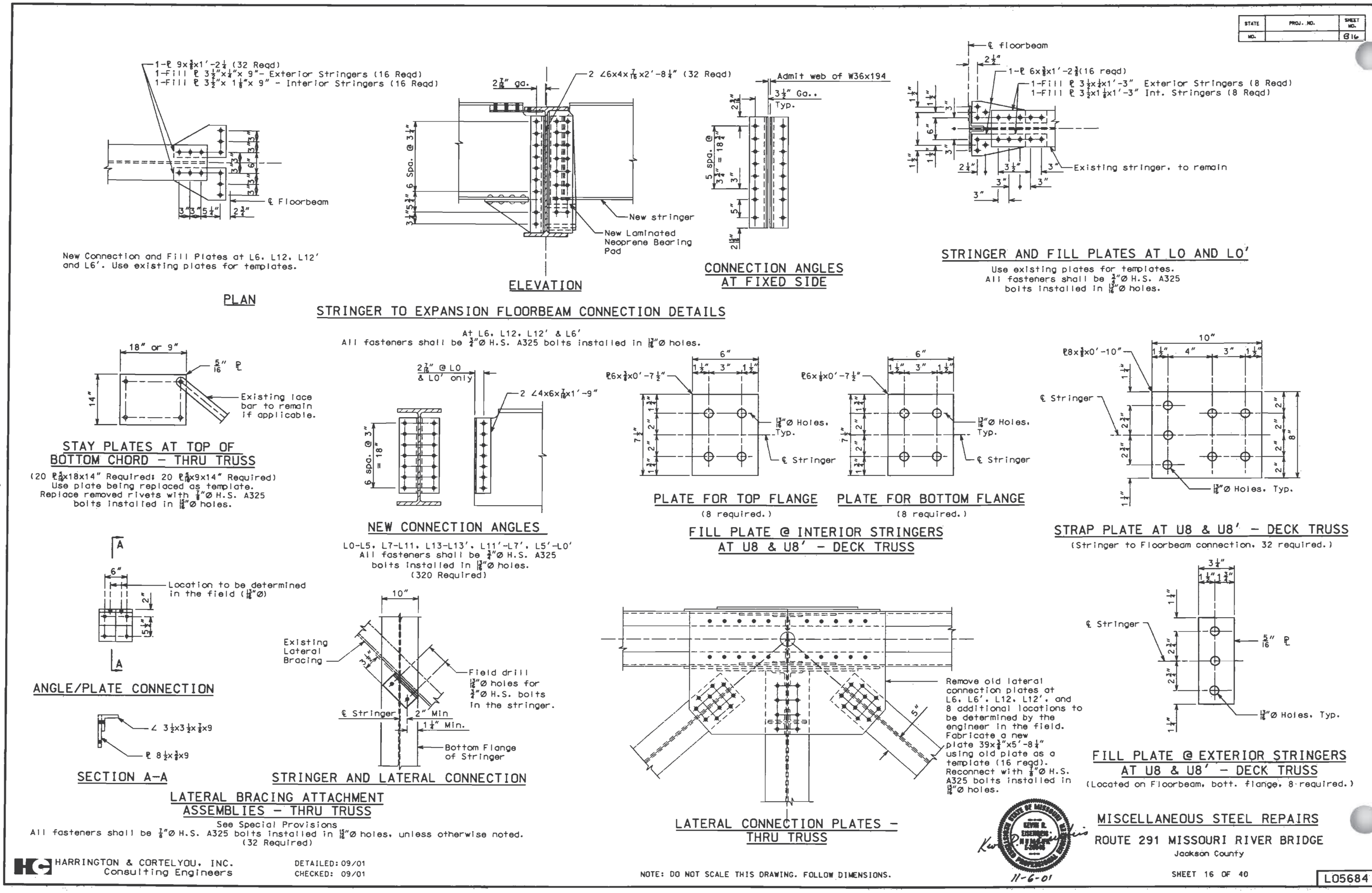
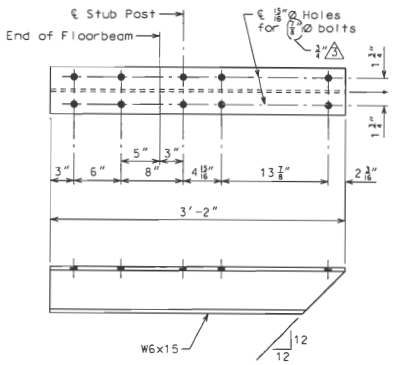

STATE | PROJ. NO. | SHEET NO.
MO. | | B16
1-℗ 9x⅜x1'-2¼ (32 Reqd)
1-Fill ℗ 3½"x¼"x 9" - Exterior Stringers (16 Reqd)
1-Fill ℗ 3½"x 1⅛"x 9" - Interior Stringers (16 Reqd)
℄ Floorbeam
New Connection and Fill Plates at L6, L12, L12' and L6'. Use existing plates for templates.
PLAN
2 ∠6x4x7/16x2'-8¼" (32 Reqd)
New stringer
New Laminated Neoprene Bearing Pad
ELEVATION
Admit web of W36x194
3½" Ga., Typ.
5 spa. @ 3½" = 18¼"
CONNECTION ANGLES AT FIXED SIDE
STRINGER TO EXPANSION FLOORBEAM CONNECTION DETAILS
At L6, L12, L12' & L6'
All fasteners shall be ¾"Ø H.S. A325 bolts installed in 13/16"Ø holes.
℄ floorbeam
1-℗ 6x⅜x1'-2¾(16 reqd)
1-Fill ℗ 3½x¼x1'-3" Exterior Stringers (8 Reqd)
1-Fill ℗ 3½x1⅛x1'-3" Int. Stringers (8 Reqd)
Existing stringer, to remain
STRINGER AND FILL PLATES AT LO AND LO'
Use existing plates for templates.
All fasteners shall be ¾"Ø H.S. A325 bolts installed in 13/16"Ø holes.
18" or 9"
5/16" ℗
Existing lace bar to remain if applicable.
STAY PLATES AT TOP OF BOTTOM CHORD - THRU TRUSS
(20 ℗⅝x18x14" Required; 20 ℗⅝x9x14" Required)
Use plate being replaced as template.
Replace removed rivets with ¾"Ø H.S. A325 bolts installed in 13/16"Ø holes.
2 13/16" @ LO & LO' only
2 ∠4x6x⅞x1'-9"
6 spa. @ 3" = 18"
NEW CONNECTION ANGLES
LO-L5, L7-L11, L13-L13', L11'-L7', L5'-LO'
All fasteners shall be ¾"Ø H.S. A325 bolts installed in 13/16"Ø holes.
(320 Required)
℗6x¾x0'-7½"
13/16"Ø Holes, Typ.
℄ Stringer
PLATE FOR TOP FLANGE
(8 required.)
℗6x⅛x0'-7½"
PLATE FOR BOTTOM FLANGE
(8 required.)
FILL PLATE @ INTERIOR STRINGERS AT U8 & U8' - DECK TRUSS
℗8x⅜x0'-10"
℄ Stringer
13/16"Ø Holes, Typ.
STRAP PLATE AT U8 & U8' - DECK TRUSS
(Stringer to Floorbeam connection, 32 required.)
Location to be determined in the field (13/16"Ø)
ANGLE/PLATE CONNECTION
∠ 3½x3½x⅜x9
℗ 8½x⅜x9
SECTION A-A
Existing Lateral Bracing
Field drill 13/16"Ø holes for ¾"Ø H.S. bolts in the stringer.
℄ Stringer
2" Min
1¼" Min.
Bottom Flange of Stringer
STRINGER AND LATERAL CONNECTION
LATERAL BRACING ATTACHMENT ASSEMBLIES - THRU TRUSS
See Special Provisions
All fasteners shall be ¾"Ø H.S. A325 bolts installed in 13/16"Ø holes, unless otherwise noted.
(32 Required)
Remove old lateral connection plates at L6, L6', L12, L12', and 8 additional locations to be determined by the field. engineer in the field. Fabricate a new plate 39x⅜"x5'-8¼" using old plate as a template (16 reqd). Reconnect with ¾"Ø H.S. A325 bolts installed in 13/16"Ø holes.
LATERAL CONNECTION PLATES - THRU TRUSS
5/16" ℗
13/16"Ø Holes, Typ.
FILL PLATE @ EXTERIOR STRINGERS AT U8 & U8' - DECK TRUSS
(Located on Floorbeam, bott. flange, 8 required.)
HARRINGTON & CORTELYOU, INC. Consulting Engineers
DETAILED: 09/01
CHECKED: 09/01
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.
11-6-01
MISCELLANEOUS STEEL REPAIRS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County
SHEET 16 OF 40
L05684
02:53:20 PM 11/06/01 S:\Rte291 Deck (889-02)\bridge\j4p1416_miscstl_016_f.dgn

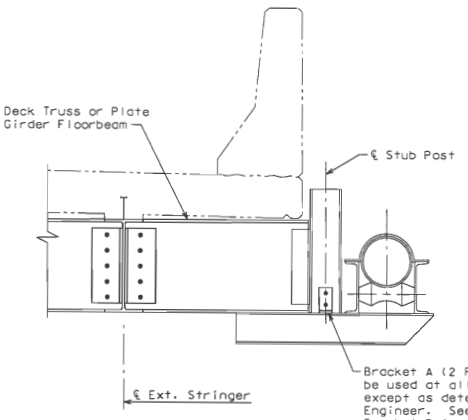


GAS LINE SUPPORT
(58 Req'd.)

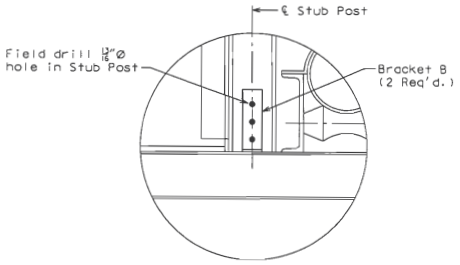
Note:
Gas line supports shall be placed at the following locations:

Plate Girder Spans:
3rd Floorbeam from End Bent, east side only
7th Floorbeam from End Bent
11th Floorbeam from End Bent

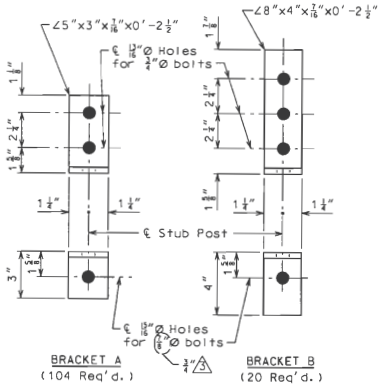
Deck Truss Spans:
U0', U2', U4', U6', U8', U10', U12, U10, U8, U6, U4, & U2



PART ELEVATION



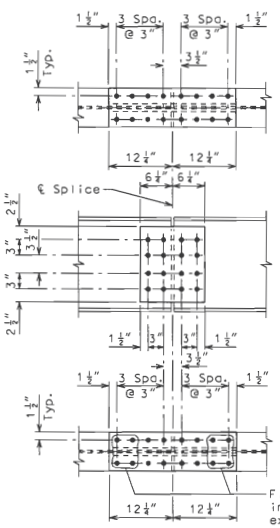
DETAIL A



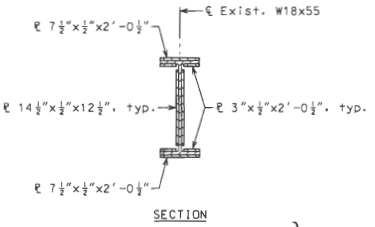
CONNECTION BRACKET DETAILS

Notes:
Replace Gas Line Support and Connection Bracket at specified locations on Deck Truss and Plate Girder Spans.
All fasteners shall be 7/8"Ø H.S. A325 bolts installed in 15/16"Ø holes unless otherwise noted.
Bracket B shall be used at locations where the bottom of the Stub Post has severe corrosion. These locations will be determined in the field by the Engineer.
The 7th floorbeam from the north End Bent on the west side has a welded steel box acting as a spacer between the floorbeam and the gas line support. This box shall be reused. The connection for the gas line support at this location will require longer bolts than the other gas line support connections. The Contractor shall determine this dimension in the field.
△2 Clean steel per specifications prior to installing new horizontal angles. Provide new H.S. bolts with washers for connections to brace and plate girder. Field verify bolt lengths required.

△3 All fasteners shall be 3/4"Ø H.S. A325 galvanized bolts, with washers both sides, installed in 15/16"Ø holes unless otherwise noted.

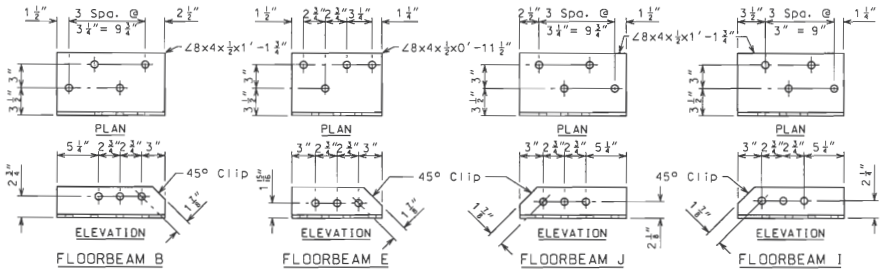


Notes:
Contractor shall field verify all dimensions shown for splice connection.
All fasteners for floorbeam splice connection shall be 7/8" H.S. Bolts installed in 15/16"Ø holes.

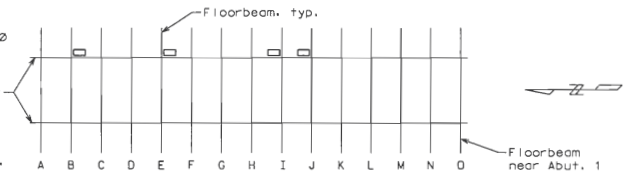


SECTION

FLOORBEAM SPLICE REPLACEMENT DETAILS
At center of south end floorbeam on north Plate Girder Span.



Note:
Holes in angles are 15/16"Ø for 7/8"Ø H.S. A325 bolts



SOUTH PLATE GIRDER SPAN - PLAN VIEW

△2 HORIZONTAL ANGLES OF FLOORBEAM SUPPORT BRACE - SOUTH PLATE GIRDER

MISCELLANEOUS STEEL REPLACEMENTS

△3 Changes 9/23/04
△2 Added Angles 5/5/04
△1 New Sheet 4/13/04

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SHEET 16A OF 40

L05684

STATE	PROJ. NO.	SHEET NO.
MO.		

STATE OF MISSOURI STEVEN M. WARGER E-20997 REGISTERED PROFESSIONAL ENGINEER
9-23-04

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 04/04
CHECKED: 04/04

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

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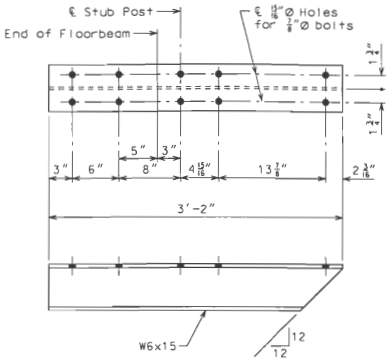
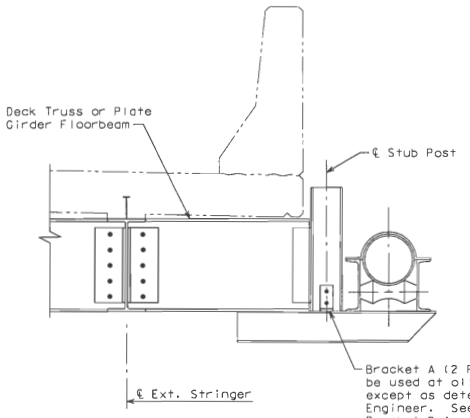


GAS LINE SUPPORT
(58 Req'd.)

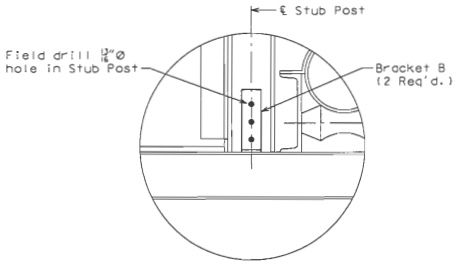
Note:
Gas line supports shall be placed at the following locations:

Plate Girder Spans:
3rd Floorbeam from End Bent, east side only
7th Floorbeam from End Bent
11th Floorbeam from End Bent

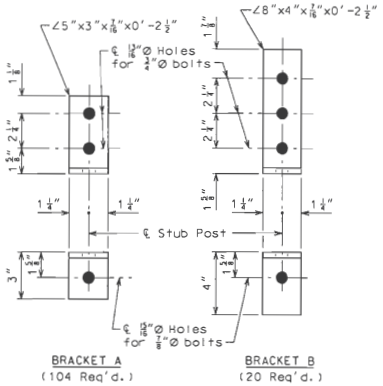
Deck Truss Spans:
U0', U2', U4', U6', U8', U10', U12, U10, U8, U6, U4, & U2



PART ELEVATION



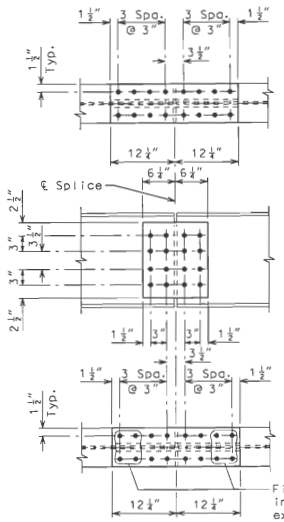
DETAIL A



BRACKET A (104 Req'd.)
BRACKET B (20 Req'd.)

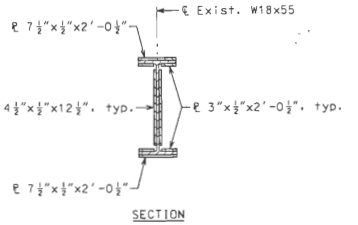
CONNECTION BRACKET DETAILS

Notes:
Replace Gas Line Support and Connection Bracket at specified locations on Deck Truss and Plate Girder Spans.
All fasteners shall be 7/8"Ø H.S. A325 bolts installed in 15/16"Ø holes unless otherwise noted.
Bracket B shall be used at locations where the bottom of the Stub Post has severe corrosion. These locations will be determined in the field by the Engineer.
The 7th floorbeam from the north End Bent on the west side has a welded steel box acting as a spacer between the floorbeam and the gas line support. This box shall be reused. The connection for the gas line support at this location will require longer bolts than the other gas line support connections. The Contractor shall determine this dimension in the field.
2 Clean steel per specifications prior to installing new horizontal angles. Provide new H.S. bolts with washers for connections to brace and plate girder. Field verify bolt lengths required.

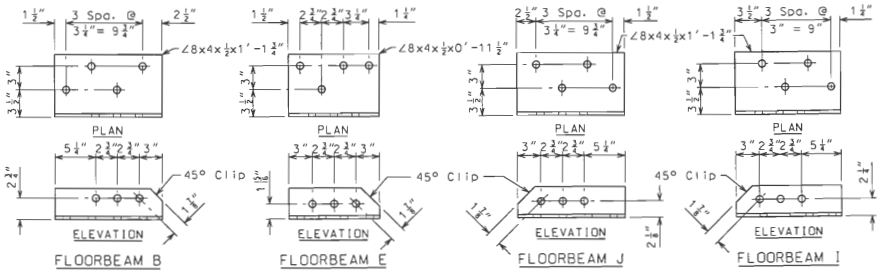


FLOORBEAM SPLICE REPLACEMENT DETAILS
At center of south end floorbeam on north Plate Girder Span.

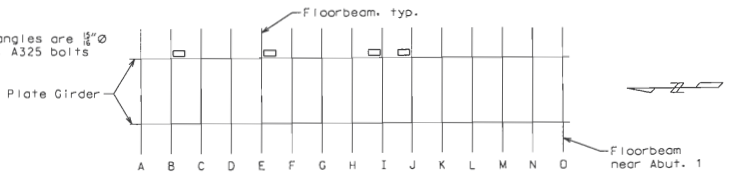
Notes:
Contractor shall field verify all dimensions shown for splice connection.
All fasteners for floorbeam splice connection shall be 7/8" H.S. Bolts installed in 15/16"Ø holes.



SECTION



Note:
Holes in angles are 15/16"Ø for 7/8"Ø H.S. A325 bolts



SOUTH PLATE GIRDER SPAN - PLAN VIEW

2 HORIZONTAL ANGLES OF FLOORBEAM SUPPORT BRACE - SOUTH PLATE GIRDER

STATE OF MISSOURI LAURA L. SCHAEFER NUMBER PROFESSIONAL ENGINEER
05-05-04

VOID

MISCELLANEOUS STEEL REPLACEMENTS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

2 Added Angles 5/5/04
1 New Sheet 4/13/04

SHEET 16A OF 40

L05684

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 04/04
CHECKED: 04/04

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

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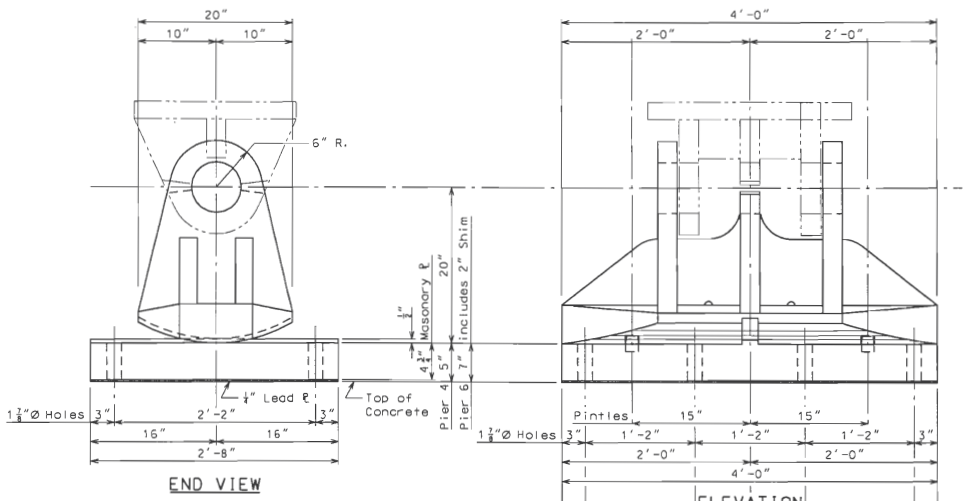
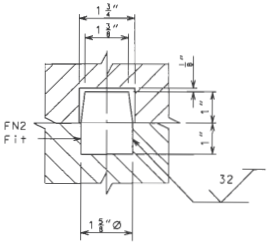
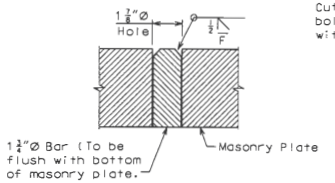




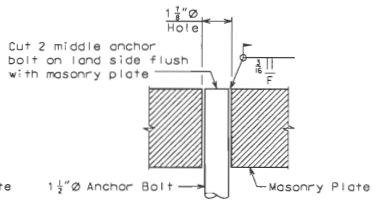
DETAIL OF PINTLE



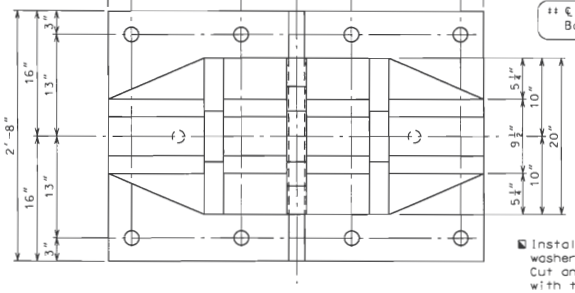
PLUGGING DETAIL

DETAIL OF EXISTING EXPANSION SHOE

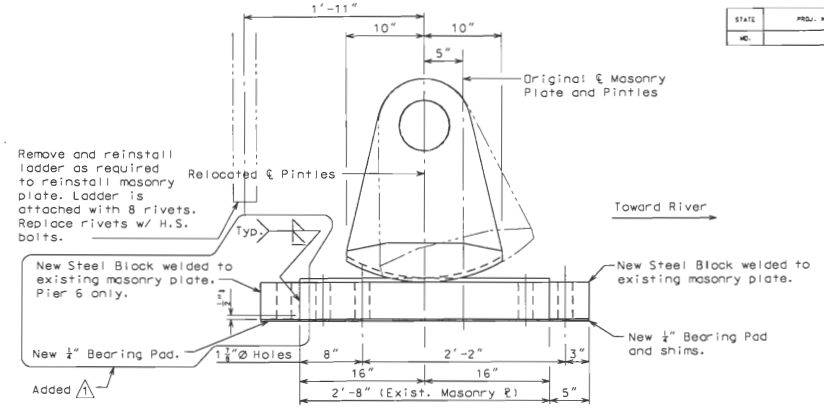
(Based on Original Plans)

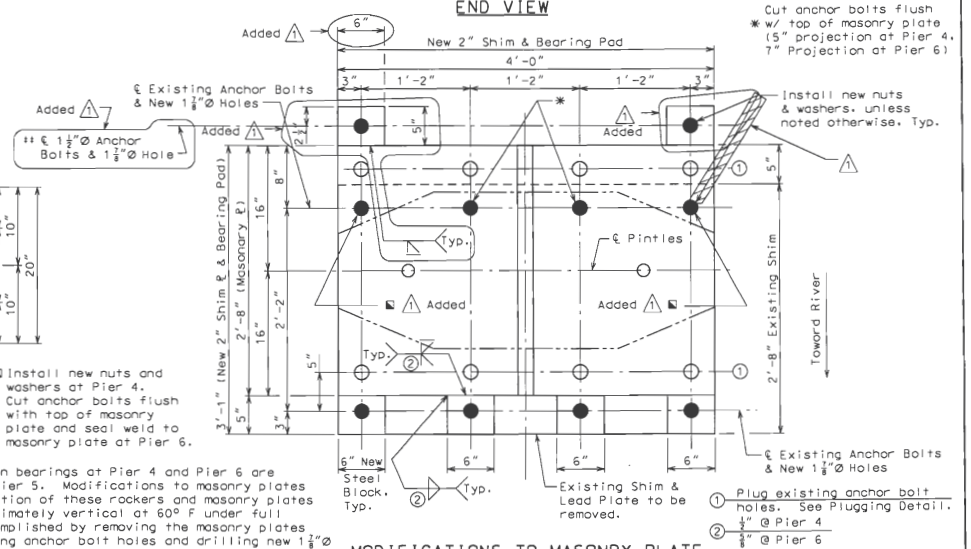


SEAL WELD DETAIL



◪ Install new nuts and washers at Pier 4. Cut anchor bolts flush with top of masonry plate and seal weld to masonry plate at Pier 6.





MODIFICATIONS TO MASONRY PLATE

Notes:

The rockers in the expansion bearings at Pier 4 and Pier 6 are tilted landward or away from Pier 5. Modifications to masonry plates are provided to shift the position of these rockers and masonry plates so that the rockers set approximately vertical at 60° F under full dead load. This shall be accomplished by removing the masonry plates and shims, plugging the existing anchor bolt holes and drilling new 1⅞"Ø anchor bolts holes in masonry plate and shims offset as shown in the details. It will be necessary to add steel blocks on the river side of the masonry plates to contain the new anchor bolt holes. Each masonry plate has two pintles which may have to be replaced. After refabrication, the masonry plates shall be re-installed using new nuts and washers except the middle anchor bolts on the land side shall be cut off flush with the masonry plates and seal welded to the masonry plate.

Predicted horizontal deflection of truss bearings due to addition of new slab and barrier curbs is ¾". Anticipated movement for each 10° F temperature rise or fall is ¾"±.

Contractor may provide new full size A36 masonry plates w/pintles in lieu of welded steel blocks with approval of the Engineer.

Provide ¼" Rubber and Fabric bearing pad under masonry plates in conformance with Article 1038.3 of the Standard Specifications.

New shims and bearing pads to match thickness of existing shims and lead plates.

Cost of removal and reinstallation of ladders, including connectors, shall be incidental to price bid for "Rehabilitate Bearing".

Contractor shall verify all dimensions.

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

Added ⚠1 ‡Start weld ½" from bottom of new steel block. Typ. ‡‡New 1½"Ø swedged anchor bolts shall be embedded 16" min. into top of pier cap in a 2"Ø min. drilled hole, held in place with an epoxy grout.

STATE OF MISSOURI — KEVIN R. ESSENMACHER E-20946 — REGISTERED PROFESSIONAL ENGINEER

6-13-03

⚠1 Revised 6-13-03

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 08/01
CHECKED: 08/01

BEARING MODIFICATIONS - THRU TRUSS

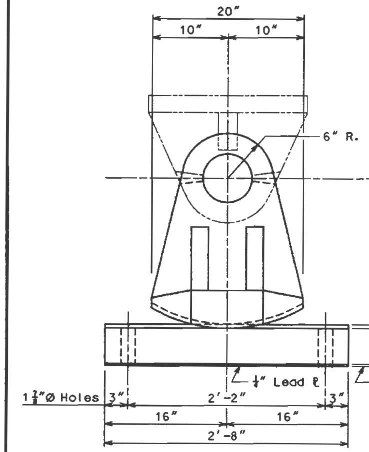
ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

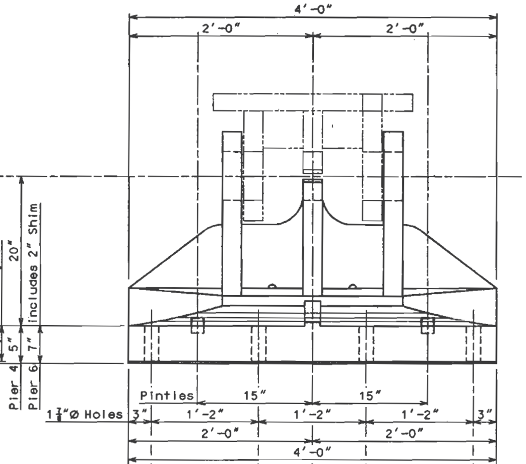
SHEET 17 OF 40

L05684

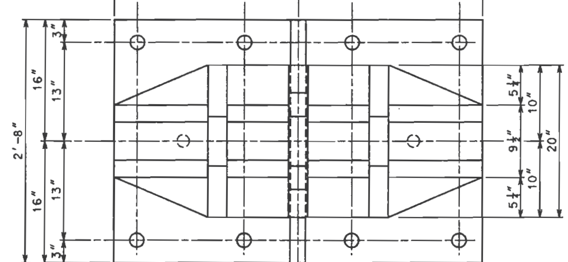
STATE	PROJ. NO.	SHEET NO.
MO.		B17



END VIEW



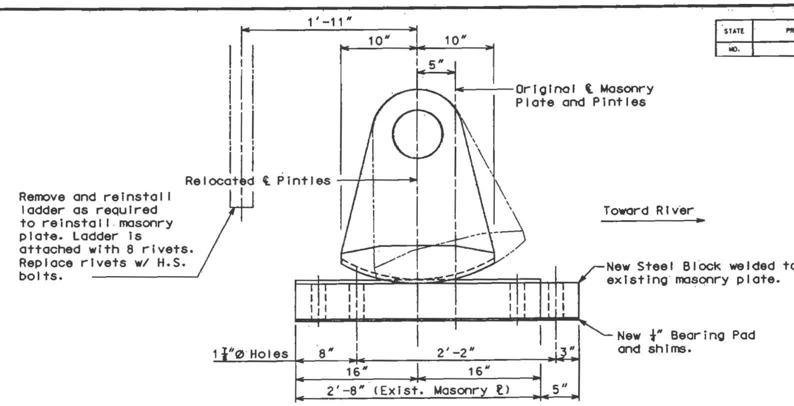
ELEVATION



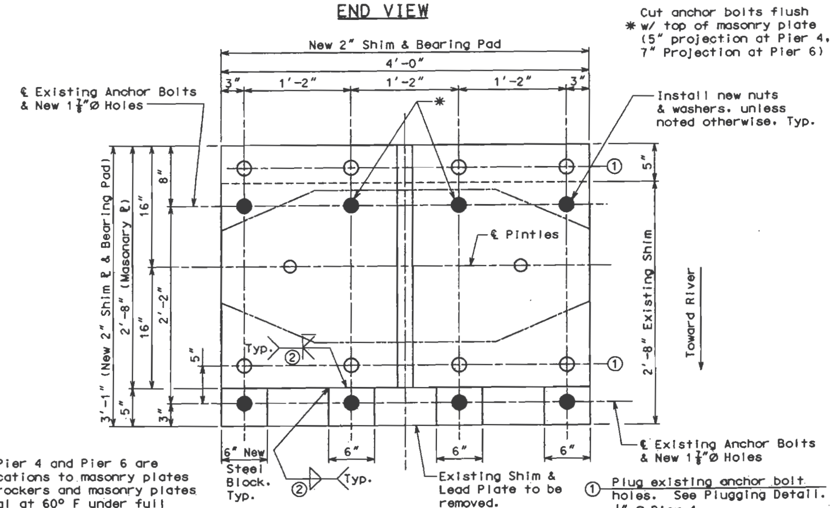
PLAN

DETAIL OF EXISTING EXPANSION SHOE

(Based on Original Plans)



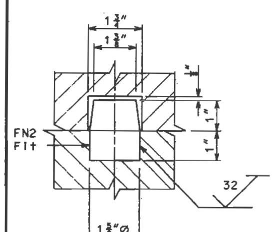
END VIEW



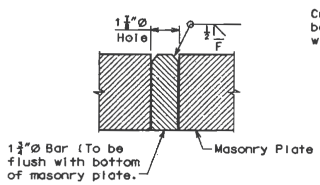
① Plug existing anchor bolt holes. See Plugging Detail.

② 1/2" @ Pier 4; 5/8" @ Pier 6

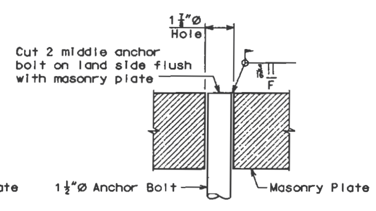
MODIFICATIONS TO MASONRY PLATE



DETAIL OF PINTLE



PLUGGING DETAIL



SEAL WELD DETAIL

Notes:

The rockers in the expansion bearings at Pier 4 and Pier 6 are tilted landward or away from Pier 5. Modifications to masonry plates are provided to shift the position of these rockers and masonry plates so that the rockers set approximately vertical at 60° F under full dead load. This shall be accomplished by removing the masonry plates and shims, plugging the existing anchor bolt holes and drilling new 1 7/8"Ø anchor bolts holes in masonry plate and shims offset as shown in the details. It will be necessary to add steel blocks on the river side of the masonry plates to contain the new anchor bolt holes. Each masonry plate has two pintles which may have to be replaced. After refabrication, the masonry plates shall be re-installed using new nuts and washers except the middle anchor bolts on the land side shall be cut off flush with the masonry plates and seal welded to the masonry plate.

Predicted horizontal deflection of truss bearings due to addition of new slab and barrier curbs is 3/8". Anticipated movement for each 10° F temperature rise or fall is 1/4"±.

Contractor may provide new full size A36 masonry plates w/pintles in lieu of welded steel blocks with approval of the Engineer.

Provide 1/4" Rubber and Fabric bearing pad under masonry plates in conformance with Article 1038.3 of the Standard Specifications.

New shims and bearing pads to match thickness of existing shims and lead plates.

Cost of removal and reinstallation of ladders, including connectors, shall be incidental to price bid for "Rehabilitate Bearing".

Contractor shall verify all dimensions.

VOID

BEARING MODIFICATIONS - THRU TRUSS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

11-6-01

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 08/01
CHECKED: 08/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

L05684

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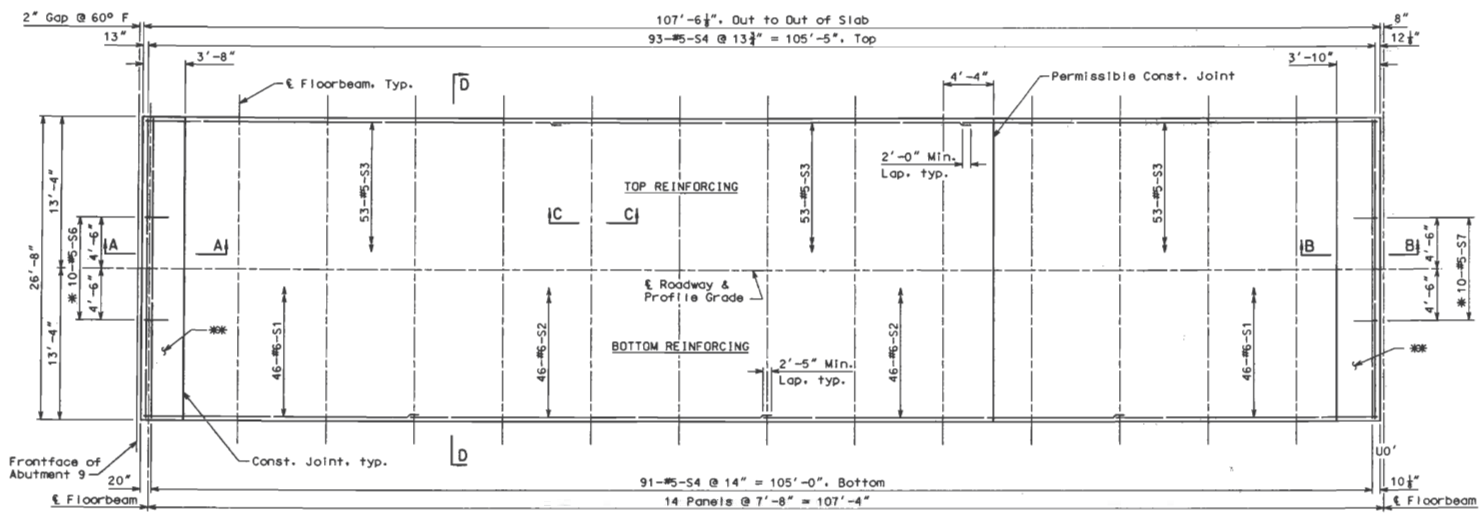


SLAB PLAN

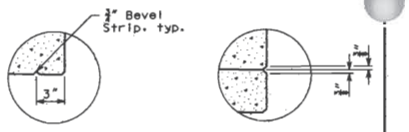
(Slab Plan for Span 8 shown. Span 1 opposite hand.)

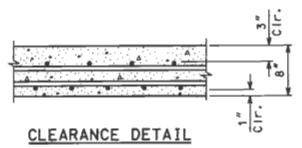
Note:
The Contractor shall pour and satisfactorily finish the roadway slab at a rate of not less than 25 cubic yards per hour.

* Space #5-S6 and S7 bars to match every other top longitudinal slab bar.

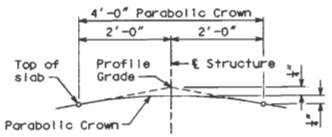
** Expansion joint slab pour shall be placed in pairs and simultaneously at each expansion joint, and only after completion of the span pours. The direction of pours shall be uphill.

Note:
Stop bevel strip 3" from edge of floorbeam flanges, typ.

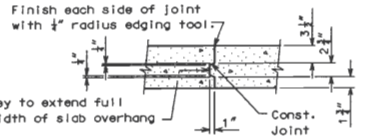




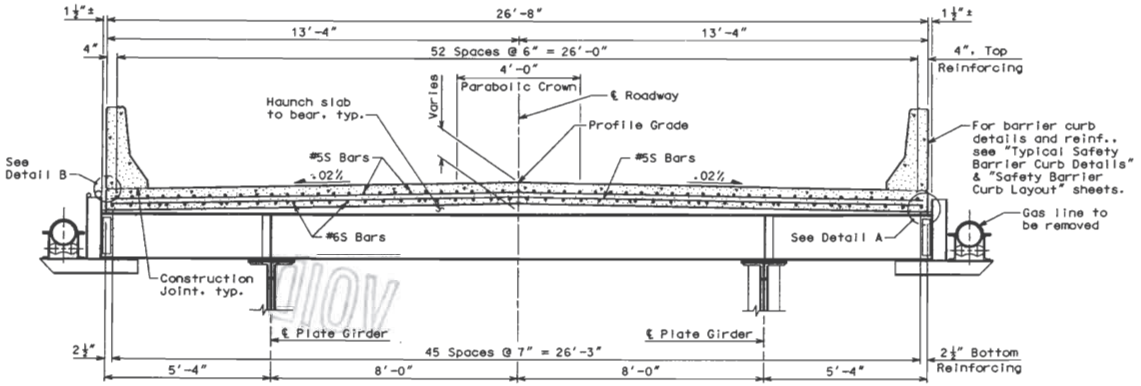
CLEARANCE DETAIL



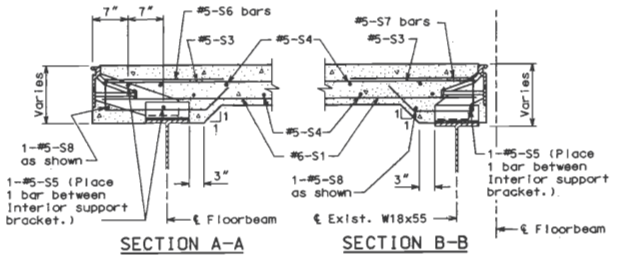
PARABOLIC CROWN DETAIL



TYPICAL CONSTRUCTION JOINT



SECTION D-D THRU ROADWAY



SECTION A-A SECTION B-B

Notes:
Slab to be built parallel to grade and a minimum thickness of 8". Estimated quantities include slab and haunching.
Longitudinal dimensions are horizontal.
For deck drains, see "Slab Drain" sheet.
For Section C-C, see "Slab Details-Deck Truss Spans" sheet.

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

11-6-01

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 08/01
CHECKED: 10/01

SLAB DETAILS - PLATE GIRDER SPANS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

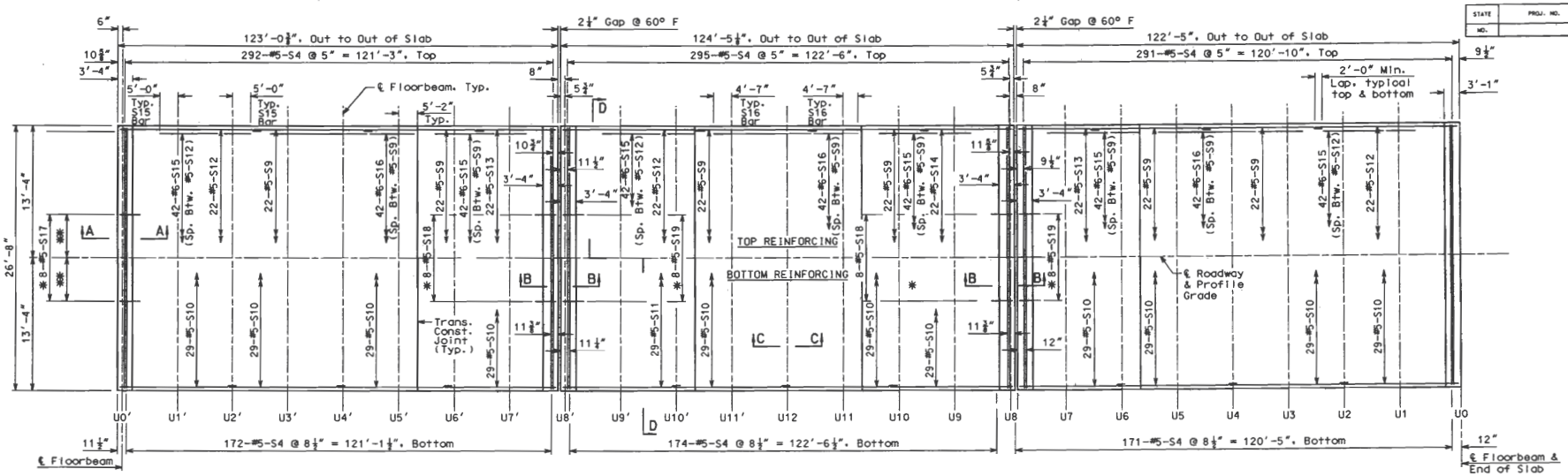
SHEET 18 OF 40

L05684

STATE	PROJ. NO.	SHEET NO.
MO.		B1P

11:48:10 AM 11/06/01 S:\Rte291 Deck (889-02)\Bridges\dp1416_pgslab_018_f-.dgn

STATE	PROJ. NO.	SHEET NO.
MO.		619



SLAB PLAN

(Slab Plan for Spans 6 & 7 shown. Spans 2 & 3 opposite hand)

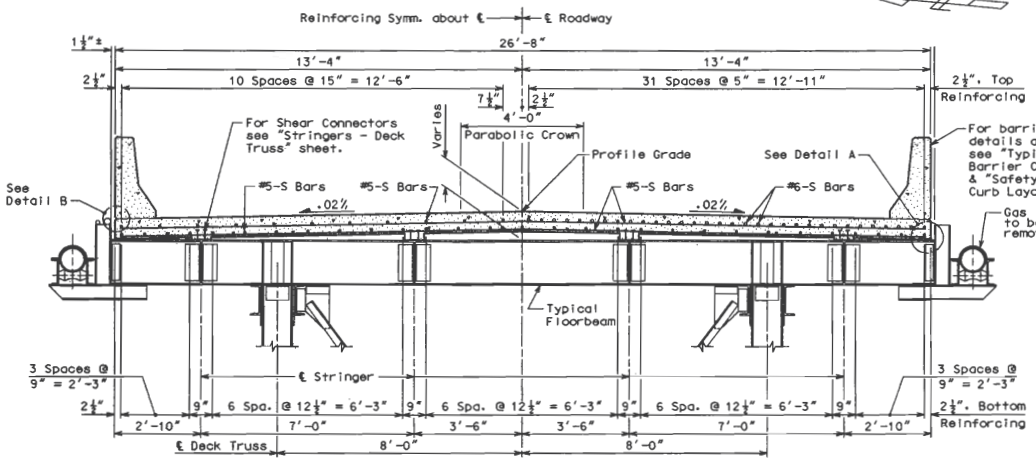
SPAN 7

* Space with #5-S12, #5-S13 or #5-S14 bars.

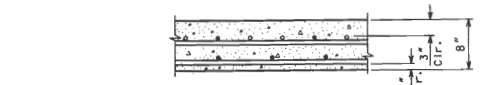
** 4'-4½", Typ. at U0, U8 & U8'.

SPAN 6

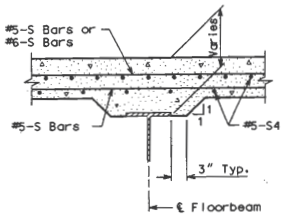
Note:
Modifications to existing structural steel floor system not shown for clarity.



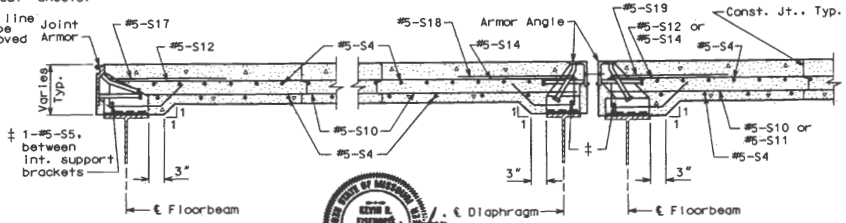
SECTION D-D THRU ROADWAY



CLEARANCE DETAIL



SECTION C-C



SECTION A-A

SECTION B-B

(For dimensions not shown see Section A-A)

Notes:
Slab to be built parallel to grade and a minimum thickness of 8". Estimated quantities include slab and haunching.
Longitudinal dimensions are horizontal.
For deck drains, see "Slab Drain" sheet.
For Parabolic Crown Detail, Detail A & Detail B, and Typical Const. Joint see "Slab Details - Plate Girder Spans" sheet.

11-6-01

SLAB DETAILS - DECK TRUSS SPANS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

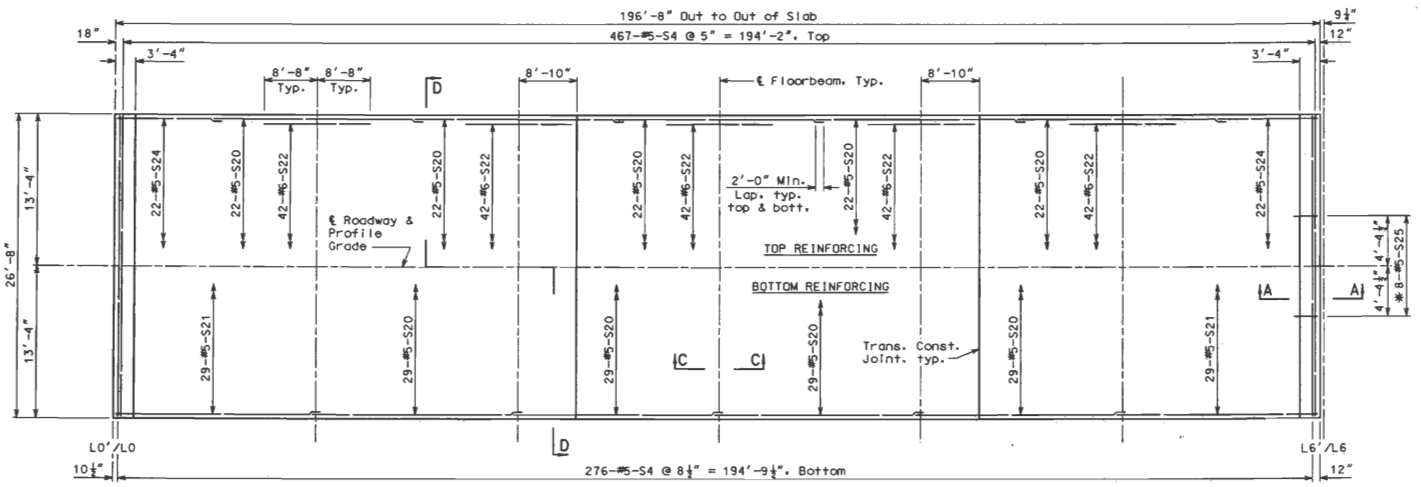
DETAILED: 08/01
CHECKED: 09/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 19 OF 40

L05684

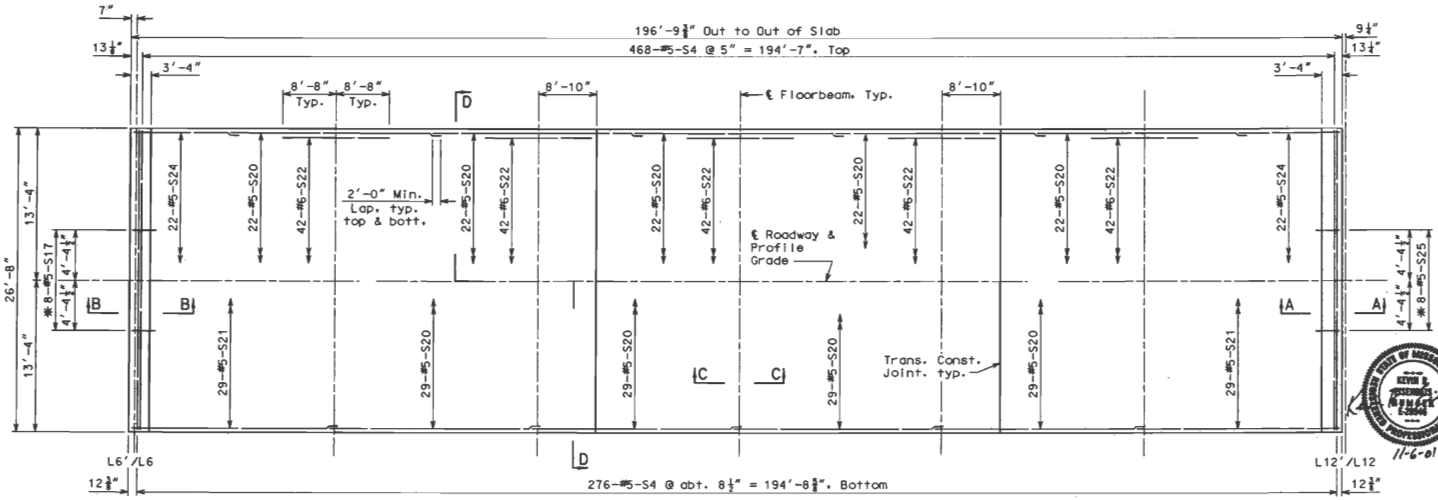
STATE	PROJ. NO.	SHEET NO.
MO.		820



SLAB PLAN – L0′ TO L6′

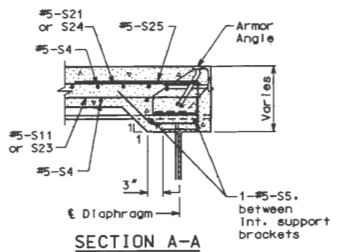
(Slab Plan for L0 to L6 opp. hand)

* Space with #5-S21, #5-S24 or #5-S27 bars.

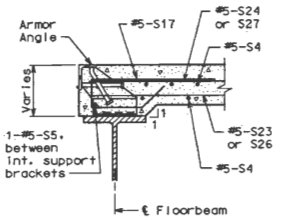


SLAB PLAN – L6′ TO L12′

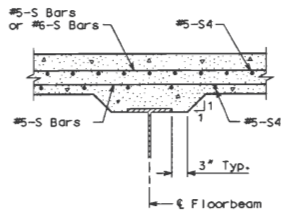
(Slab Plan for L6 to L12 opp. hand)



SECTION A–A



SECTION B–B



SECTION C–C

(Typical Haunch at Floorbeams)

Notes:
Slab to be built parallel to grade and a minimum thickness of 8". Estimated quantities include slab and haunching.
Longitudinal dimensions are horizontal.
For deck drains, see "Slab Drain" sheet.
For additional details, see "Slab Details – Thru Truss Spans" second sheet.

11-6-01

SLAB DETAILS – THRU TRUSS SPANS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
CHECKED: 09/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 20 OF 40

L05684

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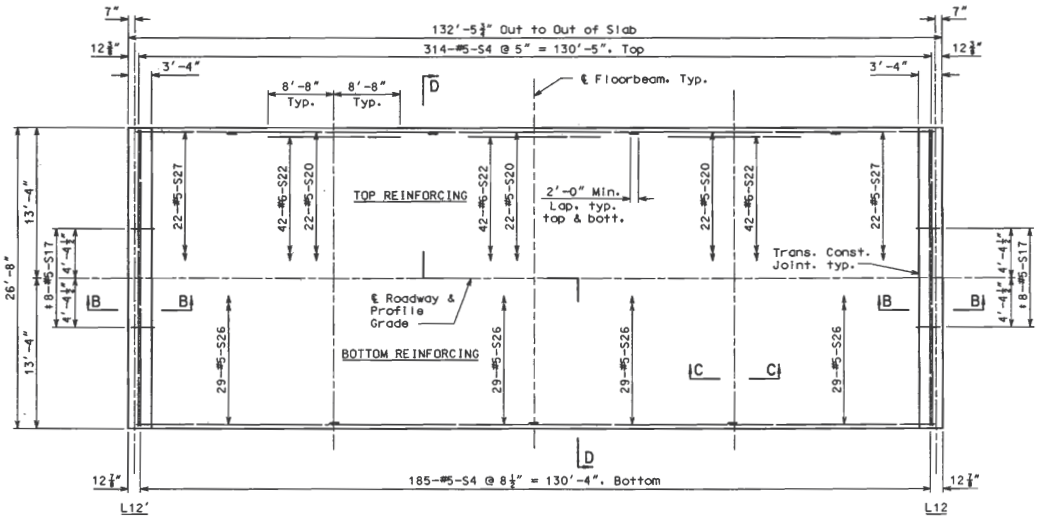
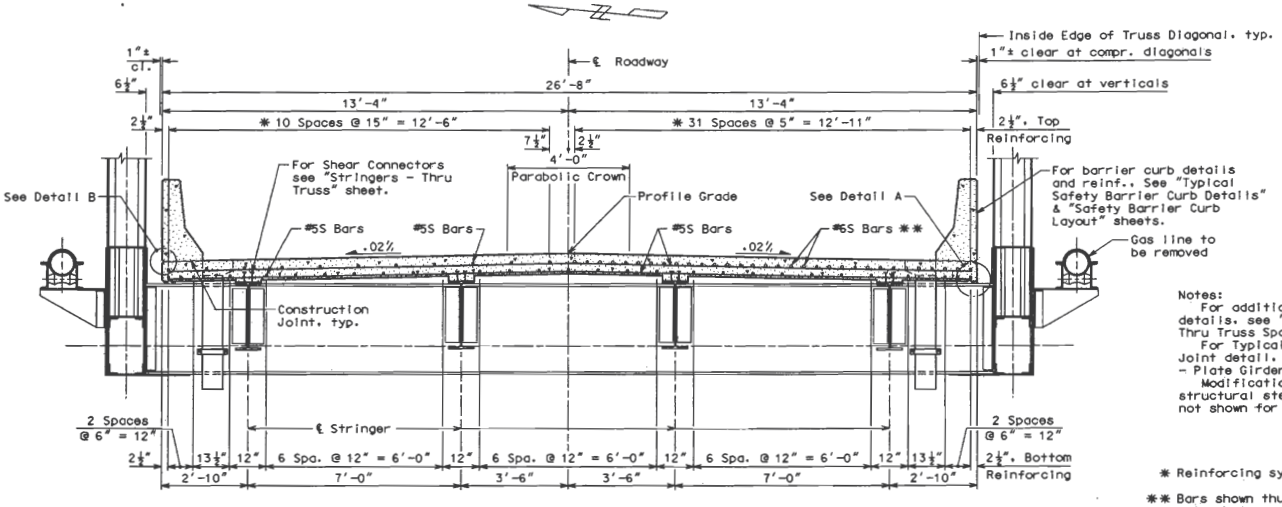


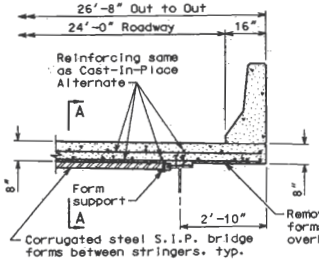
SLAB PLAN – L12′ TO L12

(For spacing of reinforcing see Section Thru Roadway)

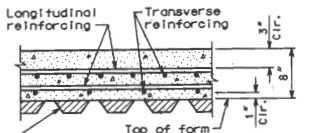
♦Space with #5-S27 bars.



SECTION D–D THRU ROADWAY



PART SECTION THRU SLAB



The corrugation valleys of the forms shall be blocked out with styrofoam or an upper plate to minimize dead load. The method and material used shall be submitted to the Engineer for approval.

SECTION A–A

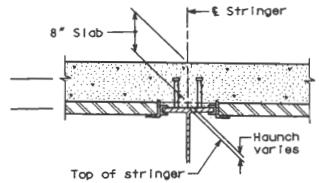
Stay-In-Place Form Notes:

Stay-In-Place forms will be allowed at thru truss spans only.

Details shown are intended only to describe the use of Stay-In-Place forms for construction of the slab. Details not shown are the same as for the Cast-In-Place Alternate, except as otherwise shown or noted.

The Contractor shall submit complete details to the Engineer for approval. See Special Provisions.

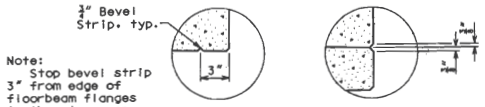
Stay-In-Place forms and supporting elements shall not be welded to girder flanges.



THEORETICAL SLAB HAUNCH

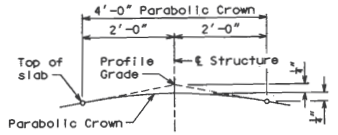
(See "Deflection and Camber Diagrams" sheet.)

STAY-IN-PLACE FORM OPTION DETAILS

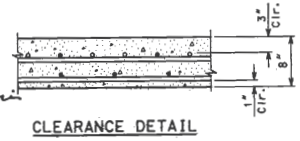


Note: Stop bevel strip 3" from edge of floorbeam flanges in thru truss spans, typical.

DETAIL A DETAIL B



PARABOLIC CROWN DETAIL



CLEARANCE DETAIL

Notes:

For additional notes and details, see "Slab Details - Thru Truss Spans" first sheet.

For Typical Construction Joint detail, see "Slab Details - Plate Girder Span" sheet.

Modifications to existing structural steel floor system not shown for clarity.

✱ Reinforcing symm. about ℄

✱✱ Bars shown thus "o" indicates extra bars over floorbeams. See "Slab Details - Thru Truss Spans"

11-6-01

SLAB DETAILS – THRU TRUSS SPANS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

STATE	PROJ. NO.	SHEET NO.
MO.		821

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 08/01
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SHEET 21 OF 40

L05684

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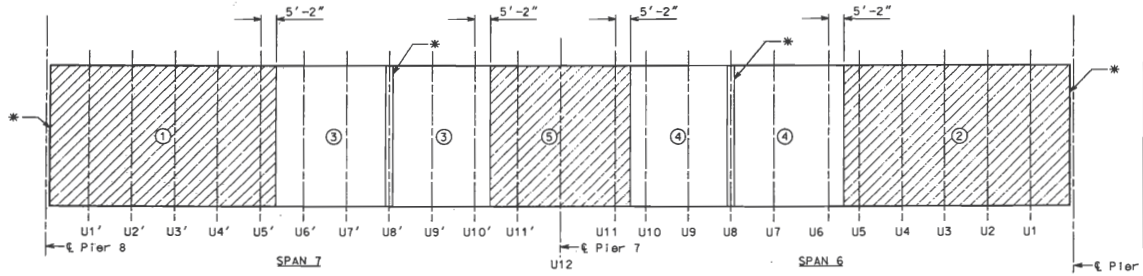
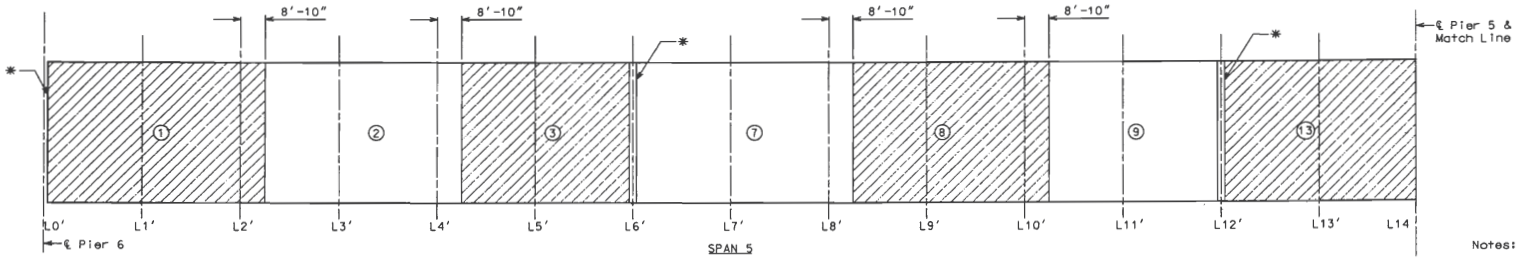
STATE	PROJ. NO.	SHEET NO.
MO.		B 22

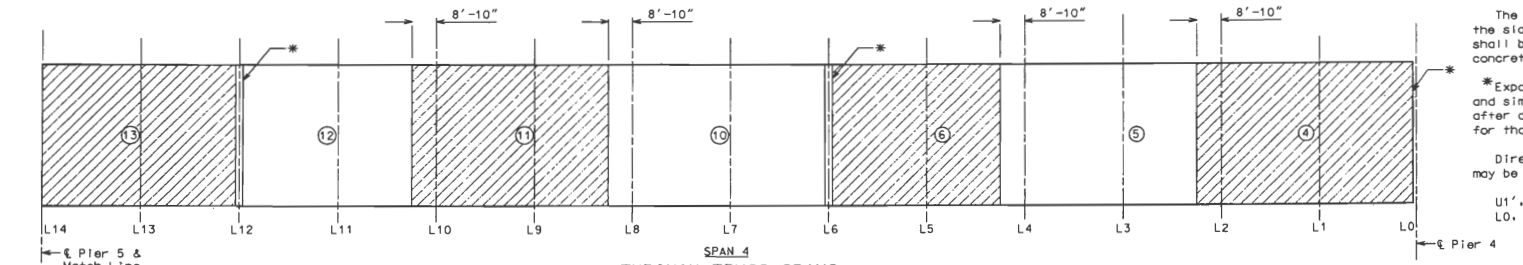


DECK TRUSS SPANS POURING SEQUENCE

(Spans 6 & 7 shown, Spans 2 & 3 opposite hand)

	SEQUENCE OF POURS – DECK TRUSS					Min. Rate of Pour (Cu. Yds./Hr.)	
	Direction					With Retarder	Without Retarder
Basic sequence	1 End to 3	2 4 to End	3 1 to 5	4 5 to 2	5 3 to 4	25.0	28.8
Alternate Pours to the basic skip sequence are subject to the approval of the engineer in accordance with Section 703.3.12.4 of Missouri Standard Specifications							
Alternate "A" Pours	1 + 3 End to 5		2 + 4 5 to End		5 3 to 4	31.1	51.9
Alternate "B" Pours	1 + 3 End to 5		5 + 4 + 2 3 to End			40.3	67.1





THROUGH TRUSS SPANS POURING SEQUENCE

	SEQUENCE OF POURS – THROUGH TRUSS SPANS													Min. Rate of Pour (Cu. Yds./Hr.)	
	Direction													With Retarder	Without Retarder
Basic sequence	1 End to 2	2 1 to 3	3 2 to 7	4 End to 5	5 4 to 6	6 5 to 10	7 3 to 8	8 7 to 9	9 8 to 13	10 6 to 11	11 10 to 12	12 11 to 14	13 9 to 12	25.0	25.0, Typ. 41.4 (Pour 13)
Alternate Pours to the basic skip sequence are subject to the approval of the engineer in accordance with Section 703.3.12.4 of Missouri Standard Specifications															
Alternate "A" Pours	1 + 2 End to 3		3 + 7 2 to 8		4 + 5 End to 6		6 + 10 5 to 11		8 + 9 7 to 13		11 + 12 10 to 14		13 12 to 9	27.0	45.0
Alternate "B" Pours	1 + 2 + 3 End to 7			7 + 8 + 9 3 to 13			4 + 5 + 6 End to 10		10 + 11 + 12 6 to 14			13 12 to 9		37.4	62.4

Notes:

The contractor shall pour and satisfactorily finish the slab pours at the rate given. Retarder, if used, shall be an approved type and retard the set of concrete to 2.5 hours.

*Expansion joint slab pour shall be placed in pairs and simultaneously at each expansion joint, and only after completion of the numbered sequence of pours for that unit.

Direction of pours shall be uphill. Section 13 may be poured either direction.

U1', U1, U2', U2 etc. designates Deck Truss joints
L0, L0', L1, L1' etc. designates Truss Truss joints

SLAB POURING SEQUENCE

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SHEET 22 OF 40

L05684

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
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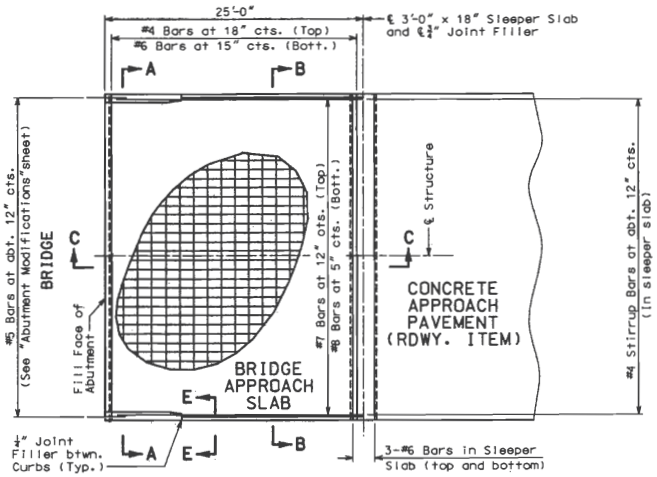
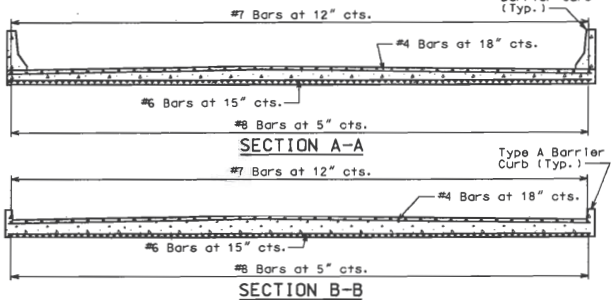
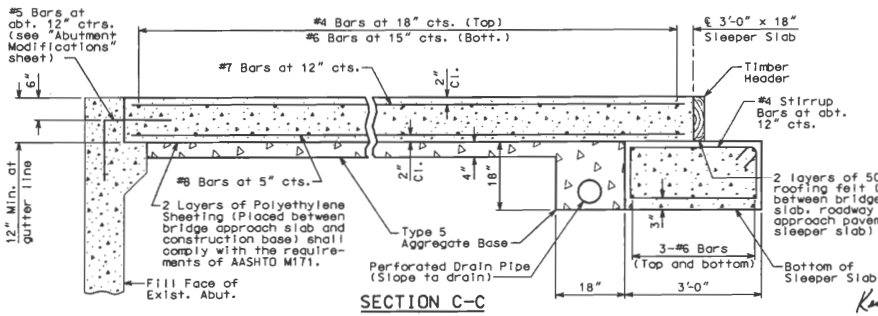
STATE	PROJ. NO.	SHEET NO.
MO.		823

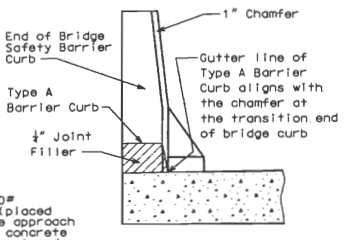


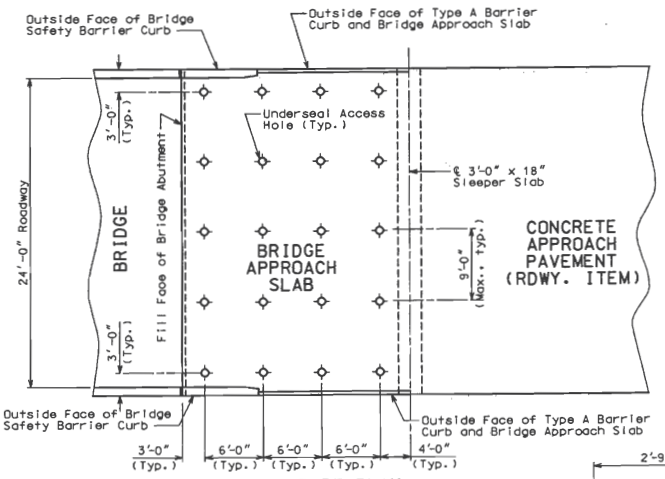
PART PLAN SHOWING REINFORCEMENT



Note: With the approval of the Engineer, the Contractor may crown the bottom of the approach slab to match the crown of the roadway surface.

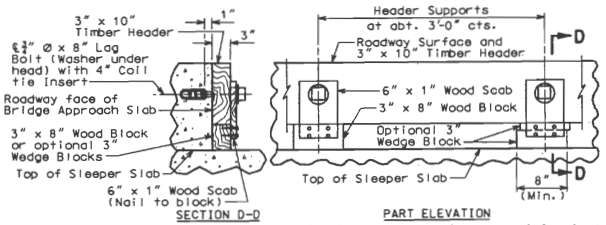






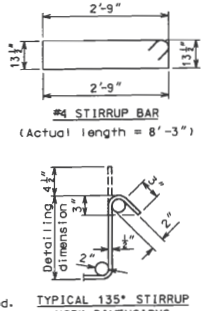
PART PLAN

(Showing typical Underseal Access Hole locations)

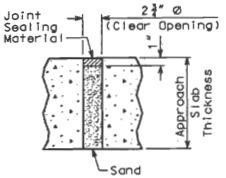


Note: Remove timber header when concrete pavement is placed.

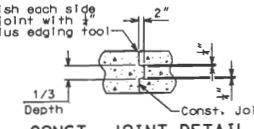
DETAILS OF TIMBER HEADER



Note:
Nominal lengths are based on out to out dimensions shown in bending diagram and are listed for fabricators use (nearest inch).



TYPICAL UNDERSEAL ACCESS HOLE DETAIL



CONST. JOINT DETAIL

(If required)

GENERAL NOTES:

All concrete for the bridge approach slab and sleeper slab shall be in accordance with Section 503 (f'c = 4,000 psi) of the Missouri Standard Specifications.

All joint filler shall meet the requirements of Section 1057.2.5 of the Missouri Standard Specifications, except as noted.

The reinforcing steel in the bridge approach slab and the sleeper slab shall be epoxy coated Grade 60 with Fy = 60,000 psi.

Minimum clearance to reinforcing steel shall be 1-1/2", unless otherwise shown.

The reinforcing steel in the bridge approach slab and the sleeper slab shall be continuous. The transverse reinforcing steel may be made continuous by lap splicing the #4 & #6 bars 18" and 26" respectively.

Mechanical bar splices will be permitted and shall develop at least 125 percent of the specified yield strength of the reinforcing bars being spliced. The contractor shall furnish the Engineer the manufacturer's certification that this requirement is met and is required to follow the manufacturer's recommendation for installation.

Mechanical bar splices shall be epoxy coated in accordance with Section 710 of the Missouri Standard Specifications.

Hooks and bends shall be in accordance with the CRSI Manual of Standard Practice for Detailing Reinforced Concrete Structures, Stirrup and Tie Dimensions.

The contractor shall pour and satisfactorily finish the bridge slab before pouring the bridge approach slabs.

Longitudinal construction joints in approach slab and sleeper slab shall be aligned with longitudinal construction joints in bridge slab.

Payment for furnishing all materials, labor and excavation necessary to construct the approach slab, including the timber header, sleeper slab, underdrain, Type 5 aggregate base and all other appurtenances and incidental work as shown on this sheet, complete in place, shall be considered as completely covered under the contract unit price for Bridge Approach Slab (Bridge), per sq. yd.

For Concrete Approach Pavement details, see roadway plans.

See Missouri Standard Plans Drawing 609.00 for details of Type A Barrier Curb.

When a lap splice is required for the use of a mechanical bar splice, the minimum lap length shall be 40" for transverse approach slab bar splices.

At the contractor's option, Grade 40 reinforcement may be substituted for the Grade 60 #5 dowel bars connecting the bridge approach slab to the bridge end bent. No additional payment will be made for this substitution.

When Grade 40 reinforcement is substituted for the Grade 60 #5 dowel bars connecting the bridge approach slab to the bridge abutment, the reinforcement may be bent up to 90 degrees with a 2" minimum radius near the abutment to allow compaction of the backfill material near the abutment. Damage to epoxy coating shall be repaired according to Section 710.3.3 of the Missouri Standard Specifications.

Drain pipe may be either 6" diameter corrugated metallic-coated pipe underdrain, 4" diameter corrugated polyvinyl chloride (PVC) drain pipe, or 4" diameter corrugated polyethylene (PE) drain pipe.

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 08/01
CHECKED: 09/01

BRIDGE APPROACH SLAB

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

SHEET 23 OF 40

L05684

04:37:10 PM 10/29/01 S:\Rte291 Deck (889-02)\Bridge\Mj4p1416_aprosld_023_f.dgn

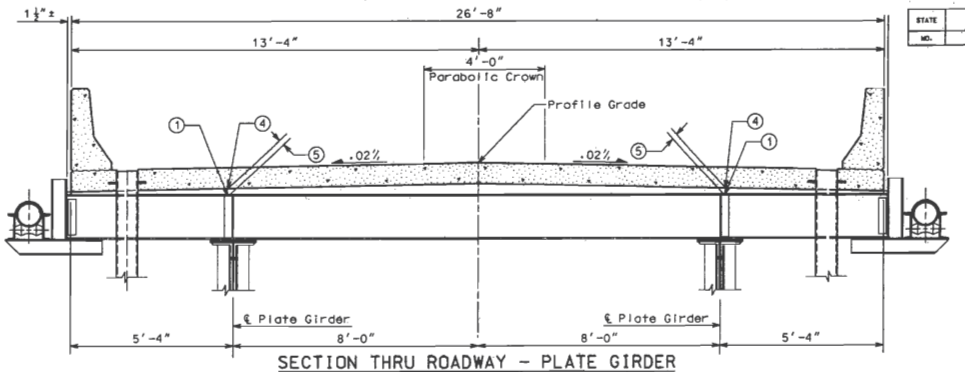
THRU TRUSS

JOINT	① PREDICTED ELEV. AFTER DECK REMOVAL	② PREDICTED DEFLEC. DUE TO SLAB & BARRIER (INCHES)	③ PREDICTED TOP OF FLOORBEAM ELEVATION	④ THEORETICAL BOTTOM OF SLAB ELEV.		*⑤ THEORETICAL HAUNCH AT STRINGER (adjacent to floorbeam)	
				INTERIOR STRINGER	EXTERIOR STRINGER	INT. (IN)	EXT. (IN)
L0′	780.34	0.000	780.34	780.70	780.56	2.82	2.14
L1′	781.34	1.062	781.25	781.60	781.46	2.70	2.02
L2′	782.26	1.807	782.11	782.44	782.30	2.46	1.78
L3′	783.03	2.547	782.82	783.21	783.07	3.18	2.50
L4′	783.77	2.938	783.53	783.92	783.78	3.18	2.50
L5′	784.41	3.293	784.14	784.55	784.41	3.42	2.74
L6′	784.97	3.281	784.70	785.12	784.98	3.54	2.86
L7′	785.48	3.250	785.21	785.63	785.49	3.54	2.86
L8′	785.92	2.886	785.68	786.06	785.92	3.06	2.38
L9′	786.25	2.544	786.04	786.43	786.29	3.18	2.50
L10′	786.51	1.932	786.35	786.74	786.60	3.18	2.50
L11′	786.73	1.417	786.61	786.97	786.83	2.82	2.14
L12′	786.84	0.835	786.77	787.14	787.00	2.94	2.26
L13′	786.94	0.452	786.90	787.24	787.10	2.58	1.90
L14	787.00	0.000	787.00	787.28	787.14	1.86	1.18
L13	786.94	0.452	786.90	787.24	787.10	2.58	1.90
L12	786.91	0.835	786.84	787.14	787.00	2.10	1.42
L11	786.74	1.417	786.62	786.98	786.84	2.82	2.14
L10	786.62	1.932	786.46	786.74	786.60	1.86	1.18
L9	786.26	2.544	786.05	786.44	786.30	3.18	2.50
L8	785.99	2.886	785.75	786.08	785.94	2.46	1.78
L7	785.49	3.250	785.22	785.64	785.50	3.54	2.86
L6	785.08	3.281	784.81	785.14	785.00	2.46	1.78
L5	784.43	3.293	784.16	784.57	784.43	3.42	2.74
L4	783.85	2.938	783.61	783.94	783.80	2.46	1.78
L3	783.06	2.547	782.85	783.24	783.10	3.18	2.50
L2	782.34	1.807	782.19	782.47	782.33	1.86	1.18
L1	781.37	1.062	781.28	781.63	781.49	2.70	2.02
L0	780.39	0.000	780.39	780.73	780.59	2.58	1.90

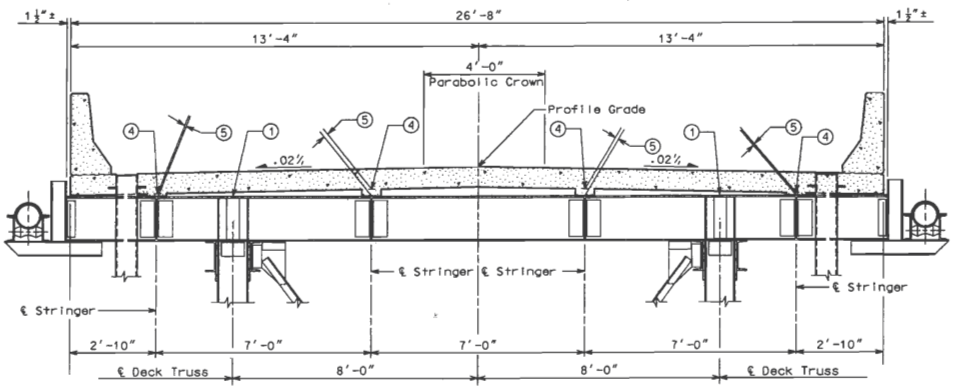
* Does not include correction factor for floorbeam cambers

THRU TRUSS

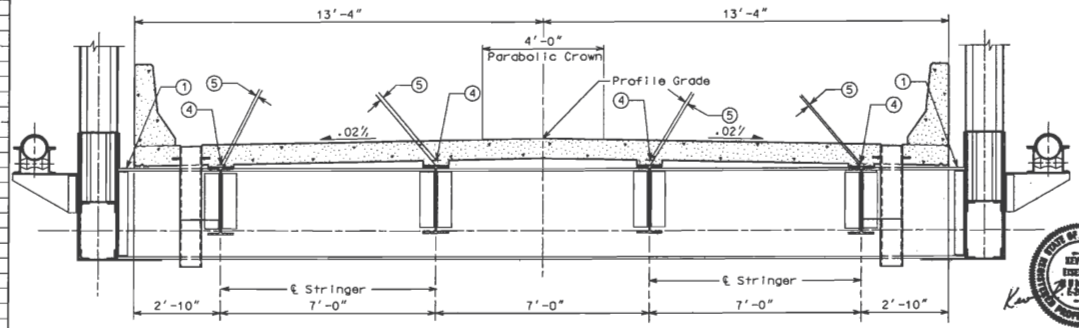
JOINT	① ACTUAL ELEV. AFTER DECK REMOVAL	② PREDICTED DEFLEC. DUE TO SLAB & BARRIER (INCHES)	③ PREDICTED TOP OF FLOORBEAM ELEVATION (ADJUSTED)	④ THEORETICAL BOTTOM OF SLAB ELEV.		⑤ THEO. HAUNCH AT STRINGER (adjacent to floorbeam) (ADJUSTED)	
				INTERIOR STRINGER	EXTERIOR STRINGER	INT. (IN)	EXT. (IN)
L0′		0.000		780.70	780.56		
L1′		1.062		781.60	781.46		
L2′		1.807		782.44	782.30		
L3′		2.547		783.21	783.07		
L4′		2.938		783.92	783.78		
L5′		3.293		784.55	784.41		
L6′		3.281		785.12	784.98		
L7′		3.250		785.63	785.49		
L8′		2.886		786.06	785.92		
L9′		2.544		786.43	786.29		
L10′		1.932		786.74	786.60		
L11′		1.417		786.97	786.83		
L12′		0.835		787.14	787.00		
L13′		0.452		787.24	787.10		
L14		0.000		787.28	787.14		
L13		0.452		787.24	787.10		
L12		0.835		787.14	787.00		
L11		1.417		786.98	786.84		
L10		1.932		786.74	786.60		
L9		2.544		786.44	786.30		
L8		2.886		786.08	785.94		
L7		3.250		785.64	785.50		
L6		3.281		785.14	785.00		
L5		3.293		784.57	784.43		
L4		2.938		783.94	783.80		
L3		2.547		783.24	783.10		
L2		1.807		782.47	782.33		
L1		1.062		781.63	781.49		
L0		0.000		780.73	780.59		



SECTION THRU ROADWAY – PLATE GIRDER



SECTION THRU ROADWAY – DECK TRUSS



SECTION THRU ROADWAY – THROUGH TRUSS

For notes, see "Deflection & Camber Diagrams" sheet.

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

DEFLECTION & CAMBER DIAGRAMS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SHEET 24 OF 40

L05684

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
CHECKED: 09/01

STATE	PROJ. NO.	SHEET NO.
MO.		824

10-30

04:40:17 PM 10/29/01 S:\Rte291 Deck 1889-02\Bridges\4p1416_deflcam_024_f.dgn

STATE	PROJ. NO.	SHEET NO.
NO.		B25

DECK TRUSS - N. END

JOINT	① PREDICTED ELEV. AFTER DECK REMOVAL	① ACTUAL ELEV. AFTER DECK REMOVAL	② PREDICTED DEFLEC. DUE TO SLAB & BARRIER (INCHES)	③ PREDICTED TOP OF FLOORBEAM ELEVATION	③ PREDICTED TOP OF FLOORBEAM ELEVATION (ADJUSTED)	④ THEORETICAL BOTTOM OF SLAB @ STRINGER INT	④ THEORETICAL BOTTOM OF SLAB @ STRINGER EXT	⑤ THEORETICAL HAUNCH @ FLOORBEAM INT (IN.)	⑤ THEORETICAL HAUNCH @ FLOORBEAM EXT (IN.)	⑤ THEO. HAUNCH @ FLOORBEAM INT (IN.) (ADJUSTED)	⑤ THEO. HAUNCH @ FLOORBEAM EXT (IN.) (ADJUSTED)
U0	780.29		0.000	780.29		780.68	780.54	4.68	3.00		
U1	779.83		0.347	779.80		780.23	780.09	5.16	3.48		
U2	779.37		0.666	779.31		779.77	779.63	5.52	3.84		
U3	778.91		0.863	778.84		779.28	779.14	5.28	3.60		
U4	778.45		1.005	778.37		778.79	778.65	5.04	3.36		
U5	777.93		1.028	777.84		778.28	778.14	5.28	3.60		
U6	777.40		0.999	777.32		777.75	777.61	5.16	3.48		
U7	776.86		0.844	776.79		777.21	777.07	5.04	3.36		
U8	776.31		0.683	776.25		776.66	776.52	4.92	3.24		
U9	775.70		0.444	775.66		776.08	775.94	5.04	3.36		
U10	775.10		0.272	775.08		775.50	775.36	5.04	3.36		
U11	774.51		0.109	774.50		774.90	774.76	4.80	3.12		
U12	773.95		0.000	773.95		774.28	774.14	3.96	2.28		
U11′	773.38		0.109	773.37		773.65	773.51	3.36	1.68		
U10′	772.77		0.272	772.75		773.02	772.88	3.24	1.56		
U9′	772.16		0.444	772.12		772.39	772.25	3.24	1.56		
U8′	771.55		0.683	771.49		771.76	771.62	3.24	1.56		
U7′	770.94		0.844	770.87		771.13	770.99	3.12	1.44		
U6′	770.32		0.999	770.24		770.50	770.36	3.12	1.44		
U5′	769.70		1.028	769.61		769.87	769.73	3.12	1.44		
U4′	769.08		1.005	769.00		769.24	769.10	2.88	1.20		
U3′	768.46		0.863	768.39		768.61	768.47	2.64	0.96		
U2′	767.83		0.666	767.77		767.98	767.84	2.52	0.84		
U1′	767.19		0.347	767.16		767.35	767.21	2.28	0.60		
U0′	766.56		0.000	766.56		766.72	766.58	1.92	0.24		

DECK TRUSS - S. END

JOINT	① PREDICTED ELEV. AFTER DECK REMOVAL	① ACTUAL ELEV. AFTER DECK REMOVAL	② PREDICTED DEFLEC. DUE TO SLAB & BARRIER (INCHES)	③ PREDICTED TOP OF FLOORBEAM ELEVATION	③ PREDICTED TOP OF FLOORBEAM ELEVATION (ADJUSTED)	④ THEORETICAL BOTTOM OF SLAB @ STRINGER INT	④ THEORETICAL BOTTOM OF SLAB @ STRINGER EXT	⑤ THEORETICAL HAUNCH @ FLOORBEAM INT (IN.)	⑤ THEORETICAL HAUNCH @ FLOORBEAM EXT (IN.)	⑤ THEO. HAUNCH @ FLOORBEAM INT (IN.) (ADJUSTED)	⑤ THEO. HAUNCH @ FLOORBEAM EXT (IN.) (ADJUSTED)
U0	780.29		0.000	780.29		780.71	780.57	5.04	3.36		
U1	779.83		0.347	779.80		780.26	780.12	5.52	3.84		
U2	779.37		0.666	779.31		779.80	779.66	5.88	5.20		
U3	778.91		0.863	778.84		779.31	779.17	5.64	3.96		
U4	778.45		1.005	778.37		778.82	778.68	5.40	3.72		
U5	777.93		1.028	777.84		778.31	778.17	5.64	3.96		
U6	777.40		0.999	777.32		777.79	777.65	5.64	3.96		
U7	778.69		0.844	776.79		777.25	777.11	5.52	3.84		
U8	776.31		0.683	776.25		776.69	776.55	5.28	3.60		
U9	775.70		0.444	775.66		776.12	775.98	5.52	3.84		
U10	775.10		0.272	775.08		775.54	775.40	5.52	3.84		
U11	774.51		0.109	774.50		774.94	774.80	5.28	3.60		
U12	773.95		0.000	773.95		774.33	774.19	4.56	2.88		
U11′	773.38		0.109	773.37		773.70	773.56	3.96	2.28		
U10′	772.77		0.272	772.75		773.07	772.93	3.84	2.16		
U9′	772.16		0.444	772.12		772.44	772.30	3.84	2.16		
U8′	771.55		0.683	771.49		771.80	771.66	3.72	2.04		
U7′	770.94		0.844	770.87		771.17	771.03	3.60	1.92		
U6′	770.32		0.999	770.24		770.54	770.40	3.60	1.92		
U5′	769.70		1.028	769.61		769.91	769.77	3.60	1.92		
U4′	769.08		1.005	769.00		769.28	769.14	3.36	1.68		
U3′	768.46		0.863	768.39		768.65	768.51	3.12	1.44		
U2′	767.83		0.666	767.77		768.02	767.88	3.00	1.32		
U1′	767.19		0.347	767.17		767.39	767.25	2.64	0.96		
U0′	766.56		0.000	766.56		766.72	766.58	1.92	0.24		

PLATE GIRDER SPANS - N. END

FLBM	① PREDICTED ELEV. AFTER DECK REMOVAL	① ACTUAL ELEV. AFTER DECK REMOVAL	② PREDICTED DEFLEC. DUE TO SLAB & BARRIER (INCHES)	③ PREDICTED TOP OF FLOORBEAM ELEVATION	③ PREDICTED TOP OF FLOORBEAM ELEVATION (ADJUSTED)	④ THEORETICAL BOTTOM OF SLAB @ STRINGER	⑤ THEORETICAL HAUNCH @ FLOORBEAM OVER STRINGER (INCHES)	⑤ THEO. HAUNCH @ FLOORBEAM OVER STRINGER (ADJUSTED) (INCHES)
ABUT 9								
1	762.16		0.000	762.16		762.20	0.48	
2	762.47		0.333	762.44		762.51	0.84	
3	762.78		0.648	762.73		762.82	1.13	
4	763.09		0.928	763.01		763.14	1.56	
5	763.40		1.156	763.30		763.45	1.80	
6	763.71		1.331	763.60		763.76	1.92	
7	764.02		1.438	763.90		764.07	2.04	
8	764.33		1.473	764.21		764.38	2.04	
9	764.64		1.438	764.52		764.70	2.16	
10	764.95		1.331	764.84		765.01	2.04	
11	765.26		1.156	765.16		765.32	1.92	
12	765.57		0.928	765.49		765.63	1.68	
13	765.88		0.648	765.83		765.94	1.32	
14	766.19		0.333	766.16		766.26	1.20	
15	766.50		0.000	766.50		766.57	0.84	

PLATE GIRDER SPANS - S. END

FLBM	① PREDICTED ELEV. AFTER DECK REMOVAL	① ACTUAL ELEV. AFTER DECK REMOVAL	② PREDICTED DEFLEC. DUE TO SLAB & BARRIER (INCHES)	③ PREDICTED TOP OF FLOORBEAM ELEVATION	③ PREDICTED TOP OF FLOORBEAM ELEVATION (ADJUSTED)	④ THEORETICAL BOTTOM OF SLAB @ STRINGER	⑤ THEORETICAL HAUNCH @ FLOORBEAM OVER STRINGER (INCHES)	⑤ THEO. HAUNCH @ FLOORBEAM OVER STRINGER (ADJUSTED) (INCHES)
ABUT 1								
1	762.05		0.000	762.05		762.25	2.40	
2	762.36		0.333	762.33		762.56	2.76	
3	762.67		0.648	762.62		762.87	3.00	
4	762.98		0.928	762.90		763.18	3.36	
5	763.29		1.156	763.19		763.49	3.60	
6	763.60		1.331	763.49		763.81	3.84	
7	763.91		1.438	763.79		764.12	3.96	
8	764.22		1.473	764.10		764.43	3.96	
9	764.53		1.438	764.41		764.74	3.96	
10	764.84		1.331	764.73		765.05	3.84	
11	765.15		1.156	765.05		765.37	3.84	
12	765.46		0.928	765.38		765.68	3.60	
13	765.77		0.648	765.72		765.99	3.24	
14	766.08		0.333	766.05		766.30	3.00	
15	766.39		0.000	766.39		766.62	2.76	

① Elevation at top of floorbeam to be obtained in the field from the contractor after complete removal of the existing deck and repair or replacement of the designated structural members is complete.

② Estimated/Predicted downward deflection of truss/floorbeam or girder/floorbeam due to to slab & barrier curb dead load (CIP OPTION) Multiply ② by 1.01 for steel SIP form option (thru truss spans only). Assumed weight of SIP form is 2 p.s.f.

③ Column ① − $\frac{\text{Column ②}}{12}$. Values shown based on predicted camber of truss or plate girder after deck removal.

④ Bottom of slab along ℄ stringer lines at ℄ of floorbeams given based on the proposed profile grade and cross slope as shown in section.

⑤ Column ④ − Column ③ + a correction factor (thru truss only) for the following.
Interior Stringer = -1.5 inches or as noted on sections
Exterior Stringer = -0.5 inches or as noted on sections
Floorbeam Camber @ L6, L6′, L12, L12′
@ Interior Stringer = 0.25 inches
@ Exterior Stringer = 0.100 inches

Floorbeam Camber @ L0, L0′
@ Interior Stringer = 0.125 inches
@ Exterior Stringer = 0.050 inches

Floorbeam Camber @ Remaining locations
@ Interior Stringer = 0.212 inches
@ Exterior Stringer = 0.085 inches

⑤ Column ④ − Column ③ at deck truss and plate girder spans.

Existing bridge deck profile was established without profile grade elevations. A smooth traffic surface was to be obtained. Top of expansion devices, trim plates of compression joint seals and grid deck were adjusted to conform to crown and slope of the roadway surfaces at the time of construction. Simillar field adjustments may be made if so directed by the engineer.

10-30-01

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
CHECKED: 09/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

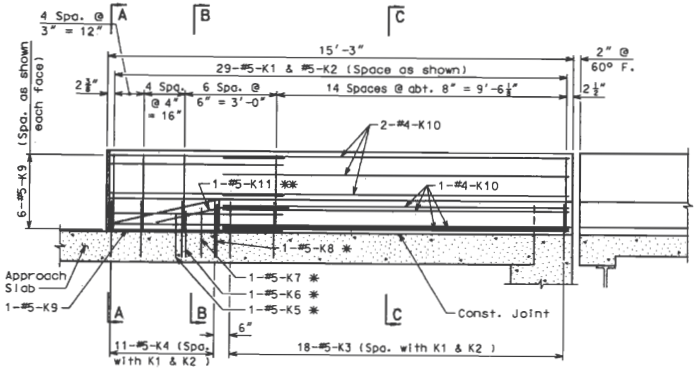
DEFLECTION & CAMBER DIAGRAMS

ROUTE 291 MISSOURI RIVER BRIDGE

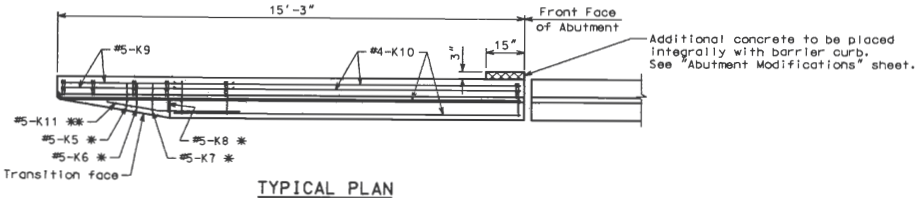
Jackson County

L05684

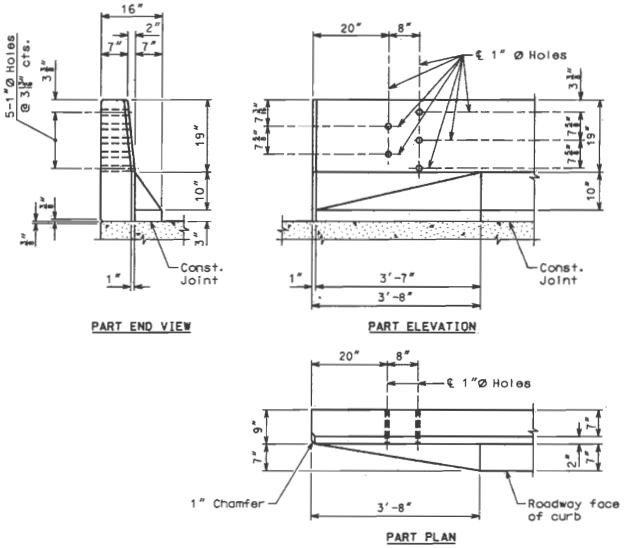
STATE	PROJ. NO.	SHEET NO.
MO.		B 26



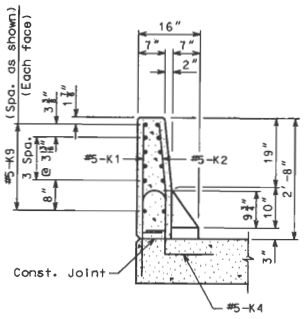
TYPICAL ELEVATION



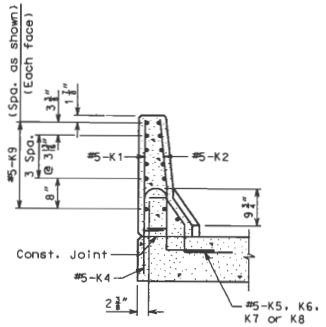
TYPICAL PLAN



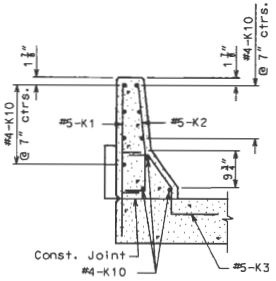
DETAILS OF GUARD RAIL ATTACHMENT



SECTION A-A



SECTION B-B



SECTION C-C

Notes:
* Spaced with #5-K4 bars.
** Fit bar to follow transition face of curb. East barrier curb shown. West barrier curb similar. Use a minimum lap of 2'-0" between K9 and K10 bars. See "Typical Safety Barrier Curb Details" sheet for additional notes.

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 08/01
CHECKED: 09/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

(0-30-01)

SAFETY BARRIER CURB AT ABUTMENTS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SHEET 26 OF 40

L05684

STATE	PROJ. NO.	SHEET NO.
MO.		827

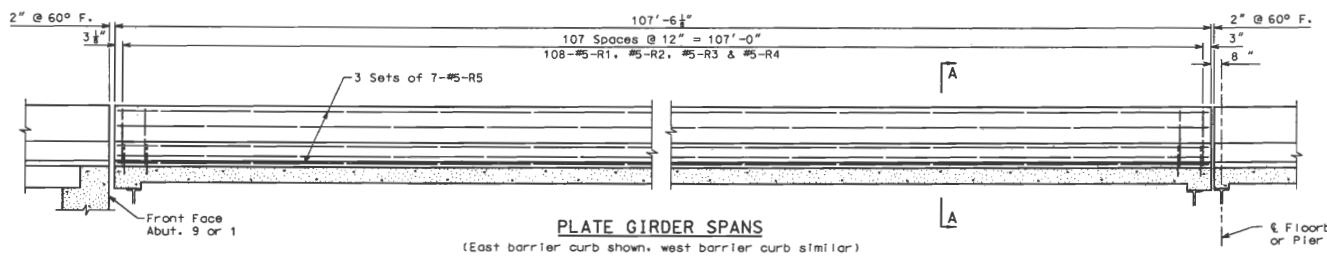
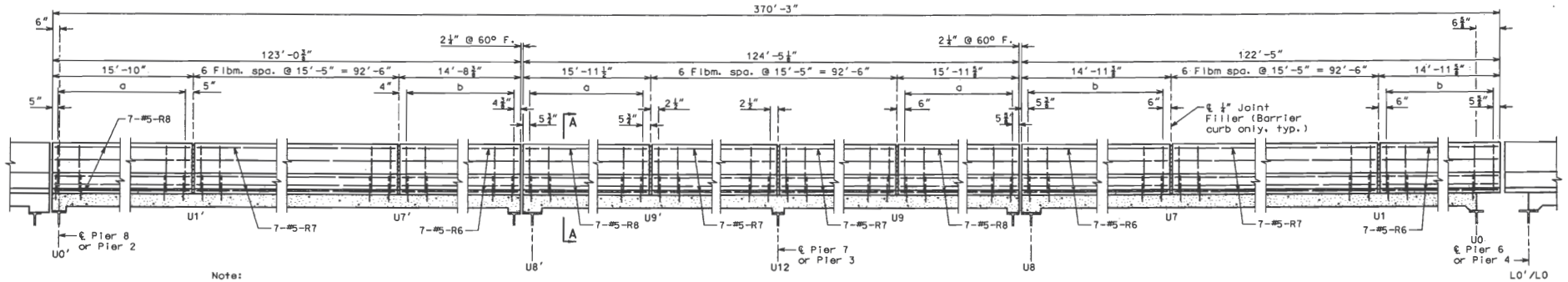


PLATE GIRDER SPANS

(East barrier curb shown, west barrier curb similar)

LEGEND

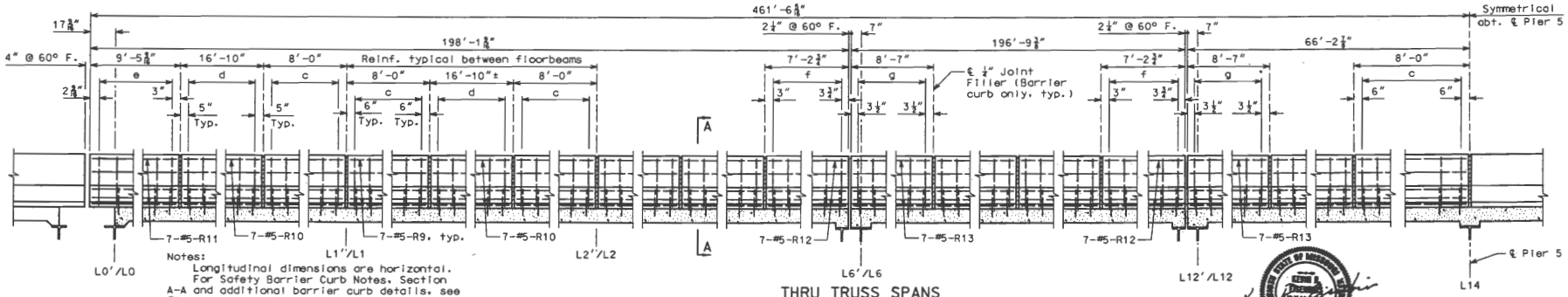
a = 15 Spa. @ 12" = 15'-0"
16-#5-R1, #5-R2, #5-R3 & #5-R4
b = 14 Spa. @ 12" = 14'-0"
15-#5-R1, #5-R2, #5-R3 & #5-R4
c = 7 Spa. @ 12" = 7'-0"
8-#5-R1, #5-R2, #5-R3 & #5-R4
d = 16 Spa. @ 12" = 16'-0"
17-#5-R1, #5-R2, #5-R3 & #5-R4
e = 9 Spa. @ 12" = 9'-0"
10-#5-R1, #5-R2, #5-R3 & #5-R4
f = 7 Spa. @ abt. 12" = 6'-8"
8-#5-R1, #5-R2, #5-R3 & #5-R4
g = 8 Spa. @ 12" = 8'-0"
9- #5-R1, #5-R2, #5-R3 & #5-R4



Note:
For reinforcing not shown in the deck truss spans, use letter designation a, with 2 1/2" clear to ℄ joint.

DECK TRUSS SPANS

(East barrier curb shown, west barrier curb similar)



Notes:
Longitudinal dimensions are horizontal.
For Safety Barrier Curb Notes, Section A-A and additional barrier curb details, see "Typical Safety Barrier Curb Details" sheet.
Cast-in-place or Drilled-in platform anchors required in back of barrier curb on east face of thru truss span near L2', L8' and L14. See "Removal Details" sheet.
Use of drilled-in-place anchor would require drilling through existing hole in place, see "Removal Details" sheet..

THRU TRUSS SPANS

(East barrier curb shown, west barrier curb similar)

Note:
The 3/4"Ø resin anchor system or cast-in-place anchor system used to attach navigation platforms to barrier curbs shall have a minimum pullout strength of 10,000 lbs. in concrete with f'c=4,000 psi., see Special Provisions. Provide two nuts with each anchor.

Note:
Reinforcing on thru truss spans is typical between floorbeams as shown in pattern c-d-c. Other letter designations shall replace the appropiate c.
Minimal clearances occur between the back of the barrier curb and structural steel elements in the thru truss spans, see Special Provisions.

10-30-01

SAFETY BARRIER CURB LAYOUT

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 08/01
CHECKED: 09/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 27 OF 40

L05684

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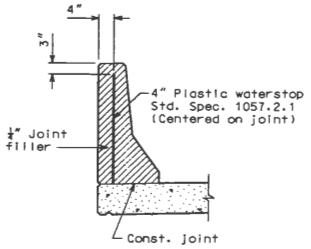
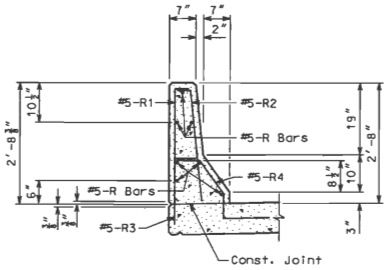


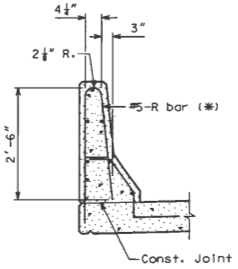
DETAILS OF PLASTIC WATERSTOP

Notes:
Plastic waterstop shall be placed in all safety barrier curb filled joints.
Cost of plastic waterstop complete in place to be included in the contract unit price for Safety Barrier Curb.



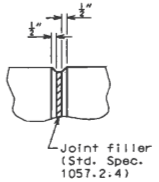
PART SECTION A-A

Notes:
Use a minimum lap of 2'-11" for #5 horizontal safety barrier curb bars.
The cross-sectional area above the slab = 2.28 sq. ft.

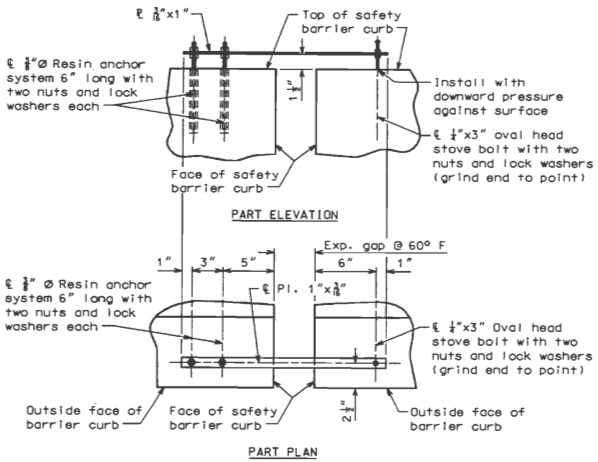


R-BAR PERMISSIBLE ALTERNATE SHAPE

(*) The R1 and R2 bar combination may be furnished as one bar, as shown, at the contractor's option. (All dimensions are out to out.)

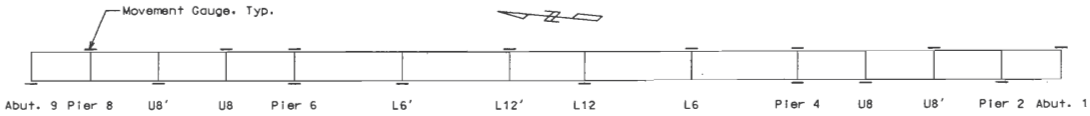


FILLED JOINT DETAIL



BARRIER CURB MOVEMENT GAUGE DETAIL

Notes:
A movement gauge shall be provided at all safety barrier curb expansion joints. See "Location of Movement Gauges".
All steel for movement gauges shall be galvanized.
Cost of movement gauge complete in place shall be included in the contract unit price bid for Safety Barrier Curb.



LOCATION OF MOVEMENT GAUGES

SAFETY BARRIER CURB NOTES:

Top of safety barrier curb shall be built parallel to grade with safety barrier curb joints (except at end bents) normal to grade.
All exposed edges of safety barrier curb shall have either a ½" radius or a ¾" bevel, unless otherwise noted.
When the safety barrier curb is bid by linear feet, the contract unit price shall include the cost of all concrete and reinforcement, complete in place.
Concrete in the safety barrier curb shall be Class B1.
Measurement of safety barrier curb is to the nearest linear foot measured horizontally from end to end of barrier curb.
Cost of furnishing and installing platform anchors (6 required) shall be included in contract unit price bid for "Safety Barrier Curb". Double nuts shall be provided at each anchor.

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

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TYPICAL SAFETY BARRIER CURB DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SHEET 28 OF 40

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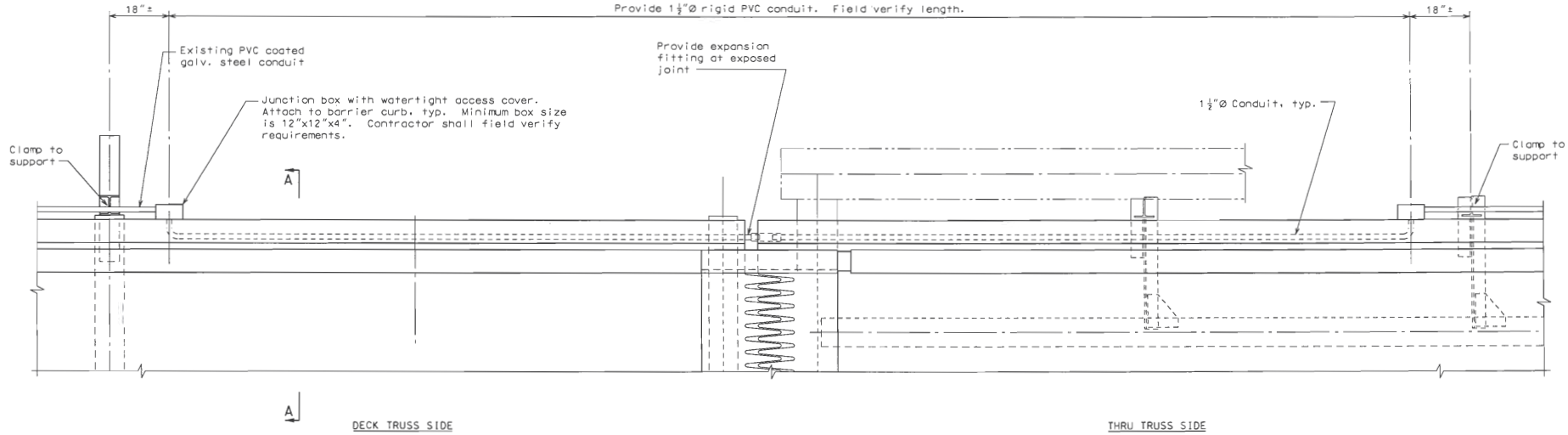
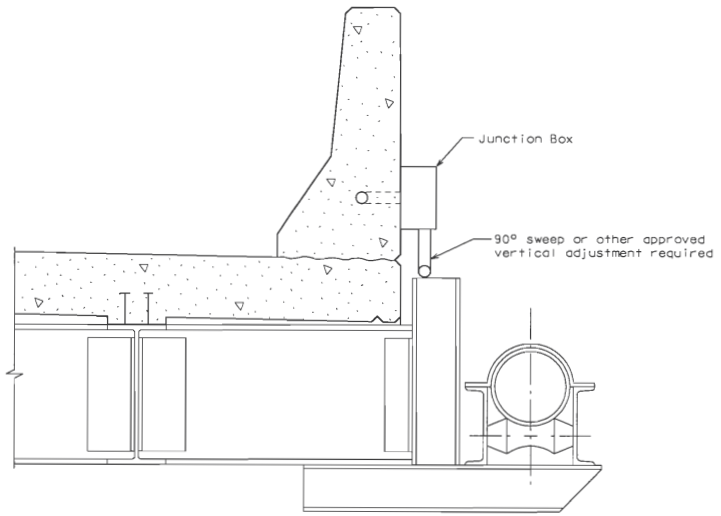


PLAN



SECTION A-A

NOTES:

Work shall not be allowed to interfere with displaying navigation lights at night.

Installation shall be completed by competent electricians supervised by foremen experienced in this class of work.

Flexible conduit shall not be used as expansion fitting.

All conduit shall be rigid non-metallic schedule 40 heavy wall PVC (polyvinyl chloride plastic) with 3" minimum cover in concrete. Each section of conduit shall bear the underwriter laboratories, Inc., (UL) label.

All conduit clamps shall be commercially available conduit clamp approved by the Engineer.

Shift reinforcing steel in field where necessary to clear conduit and junction boxes.

Expansion fittings shall provide a minimum movement in either direction of 5¼" at open joints. Expansion fittings shall be equal to Carlon Electtical Construction Products or Cantex, Inc.

Safety barrier curb junction boxes shall be PVC molded and equal to Carlon Electrical Construction Products or Cantex, Inc. The conduit terminations shall be permanent or separable. The terminations and covers shall be of water-tight construction and shall meet requirments for NEMA 4 enclosure.

Weepholes shall be provided at appropriated locations to drain any moisture in the conduit system.

STATE OF MISSOURI
STEVEN M. WARGER
E-20997
REGISTERED PROFESSIONAL ENGINEER

9-24-03

⚠1 New sheet, 09-22-04

NAVIGATION LIGHT CONDUIT AT PIER 6

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

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SHEET 28A OF 40

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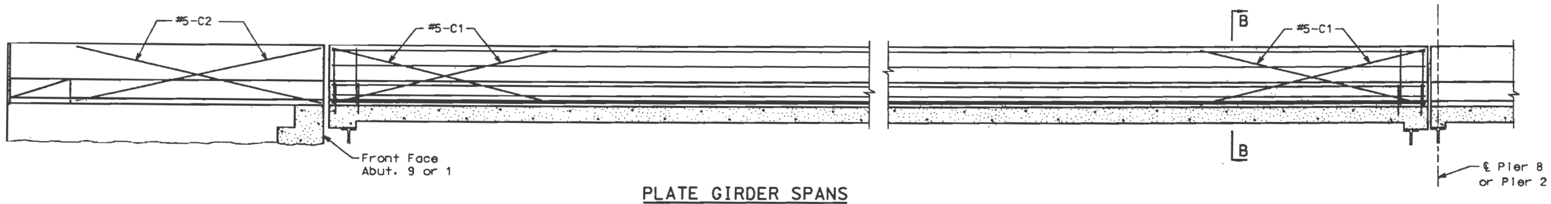
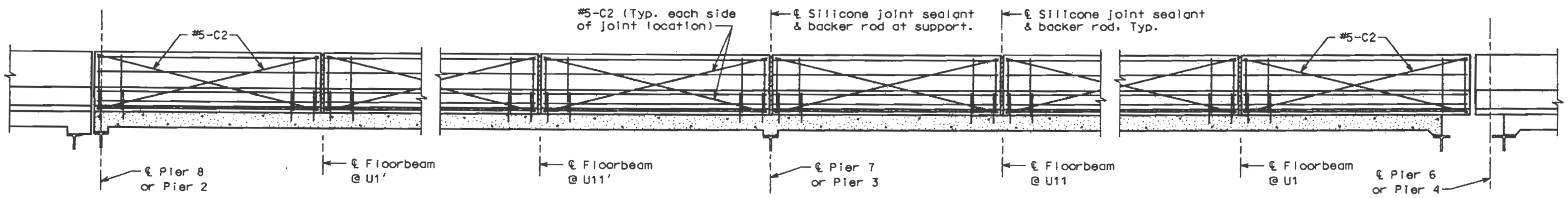


PLATE GIRDER SPANS

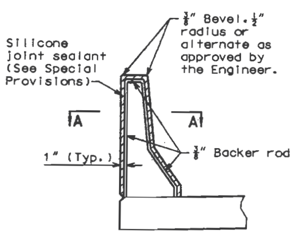


DECK TRUSS SPANS

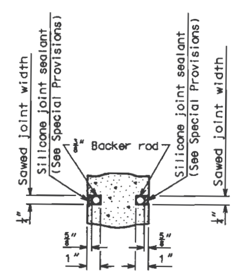
TYPICAL SECTION NEAR LEFT SAFETY BARRIER CURB AT SUPPORT LOCATIONS
(OPTIONAL SLIP-FORM BRIDGE SAFETY BARRIER CURB)

(East barrier curb shown. West barrier curb similar.)

Notes:
Slip-form option is allowed in plate girder and deck truss spans.
Contractor shall provide detailed construction drawings of slip forming for approval by the Engineer if slip forming is to be used in the thru truss spans, see Special Provisions.
Top of safety barrier curb shall be built parallel to grade with safety barrier curb joints (except at end bents) normal to grade.
When the safety barrier curb is bid by linear feet, the contract unit price shall include the cost of all concrete and reinforcement, complete-in-place.
Concrete in the safety barrier curb shall be Class B1.
Measurement of safety barrier curb is to the nearest linear foot measured horizontally from end to end of barrier curb.
Joint sealant and backer rods shall be used on all slip-form bridge safety barrier curbs instead of joint filler.
Plastic waterstop shall not be used with slip-form option.
C Bars (Slip-form option only) shall be used in addition to cast-in-place conventional forming reinforcement for bridge safety barrier curb. 5C1 bars shall be located at the ends of the plate girder spans. 5C2 bars shall be located on the approach slab side of joint and between all joints in the Deck Truss Spans.
5C1 bar length = 10'-0" 5C2 bar length = 15'-3"
Number required = 16 Number required = 200
Total additional weight = 3,350 lbs.

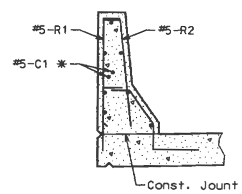


SECTION THRU JOINT



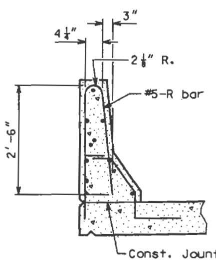
SECTION A-A

Note: Cost of silicone joint sealant and backer rod complete in place to be included in the contract unit price for Safety Barrier Curb.



PART SECTION B-B

Note: ✱ Each side of joint location.



R-BAR PERMISSIBLE
ALTERNATE SHAPE

The R1 and R2 bar combination may be furnished as one bar, as shown, at the contractor's option. All dimensions are out to out.

OPTIONAL SLIP-FORM
SAFETY BARRIER CURB

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

10-30-01

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

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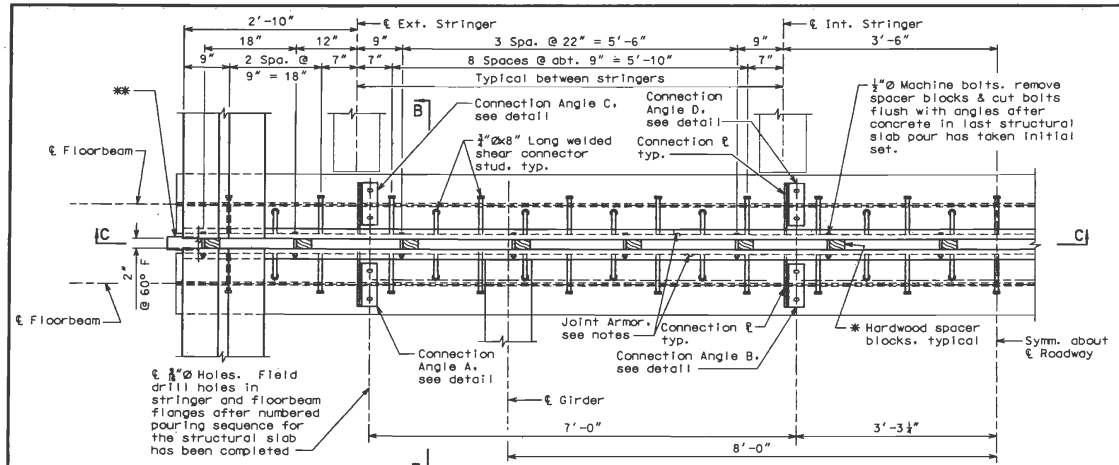
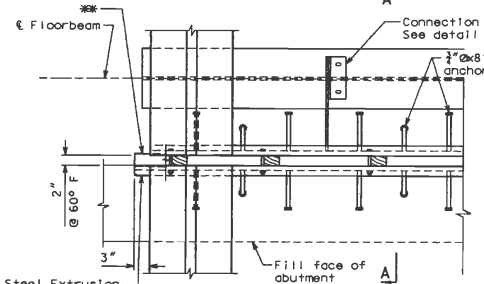


HALF PLAN – PIER 8

(Pier 2 opposite hand)

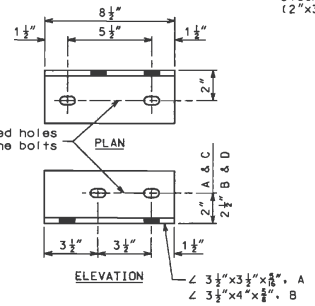
** Extend Neoprene Strip Seal 3" past edge of Slab.

* Spacer may be a combination of a hardwood block and metal shims (2"x3")



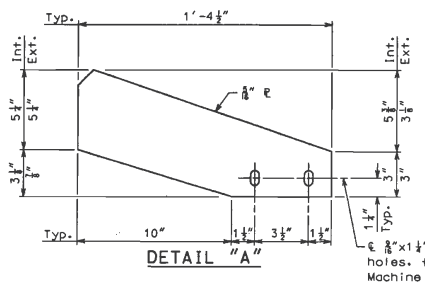
PART PLAN – ABUTMENT 9

(Abutment 1 opposite hand)
For dimensions not shown, see "Half Plan – Pier 8"

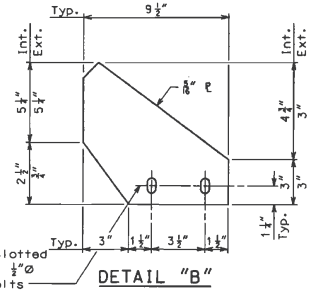


CONNECTION ANGLE – A,B,C & D

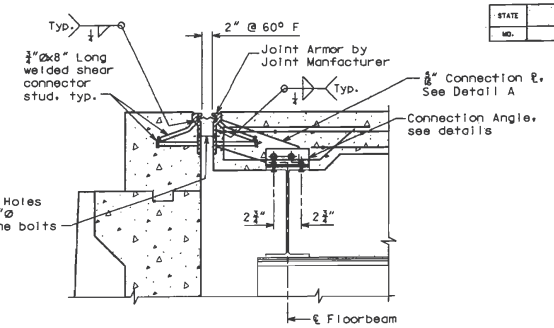
(Angle A & B shown.
Angle C & D opposite hand)



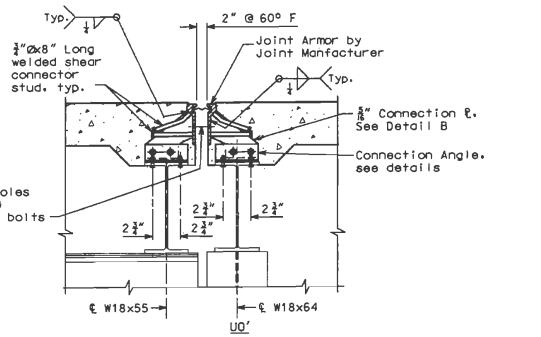
DETAIL "A"



DETAIL "B"



SECTION A-A @ ABUTMENTS



SECTION B-B @ PIERS 2 & 8

NOTES:

The expansion device shall be fabricated and installed in accordance with the recommendations of the manufacturer, and as set forth in the Special Provisions.

The contractor must verify all dimensions prior to fabrication.

All welds shall conform to Section 712 of the Missouri Standards Specifications.

Splices of steel extrusion shall develop full strength.

All steel shall be ASTM A709 Grade 36, except steel extrusions shall be ASTM A709 Grade 50W or Grade 36.

Neoprene Strip Seal shall meet ASTM D-2628.

Anchors for the extrusions or armor shall be approved welded studs (C1010 thru C1020).

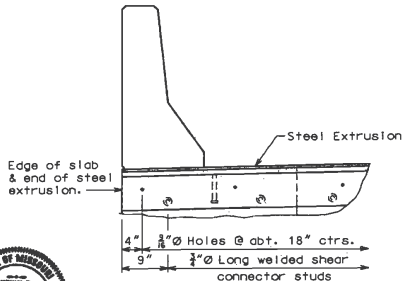
Payment for furnishing, coating or galvanizing and placing steel extusions, miscellaneous structural steel, and neoprene strip seals shall be made under the contract unit price for Strip Seal Expansion Device.

Structural steel for the expansion device shall be coated with a minimum of two coats of inorganic zinc primer (5 mils minimum) or galvanized in accordance with ASTM A123. Anchors need not be protected from overspray.

Plan dimensions are based on installation at 60°F. The gap at the Abutments shall be increased ⅛" for each 10°F fall in temperature and decreased ⅛" for each 10°F rise in temperature from the installation temperature. The gap at Piers 2 & 8 shall be increased ¼" for each 10°F fall in temperature and decreased ¼" for each 10°F rise in temperature from the installation temperature.

Longitudinal reinforcing steel shall be placed so that ends shall not be more than 1"± from vertical leg of extrusion at Expansion Device.

Concrete shall be forced under and around strip seal extrusions and studs. Proper consolidation of the concrete shall be achieved by localized internal vibration.



SECTION C-C

STRIP SEAL EXPANSION JOINT
ABUTMENTS AND PIERS 2 & 8

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

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Consulting Engineers

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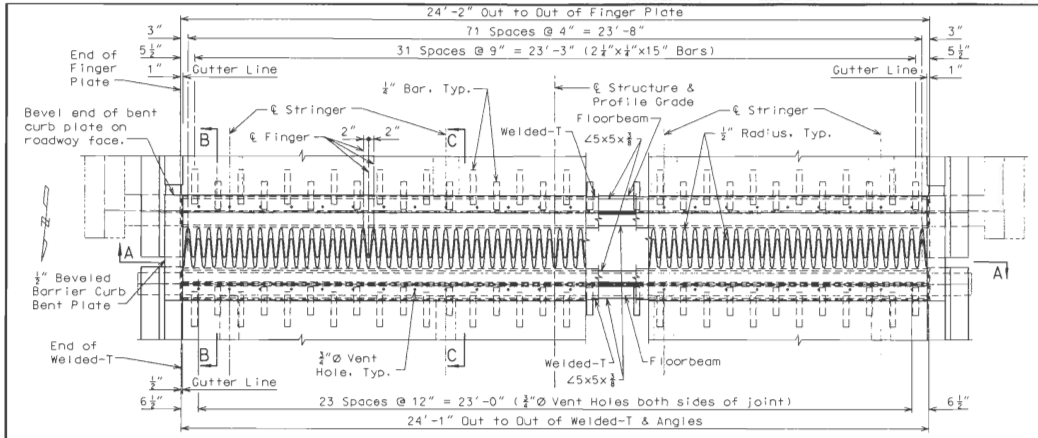
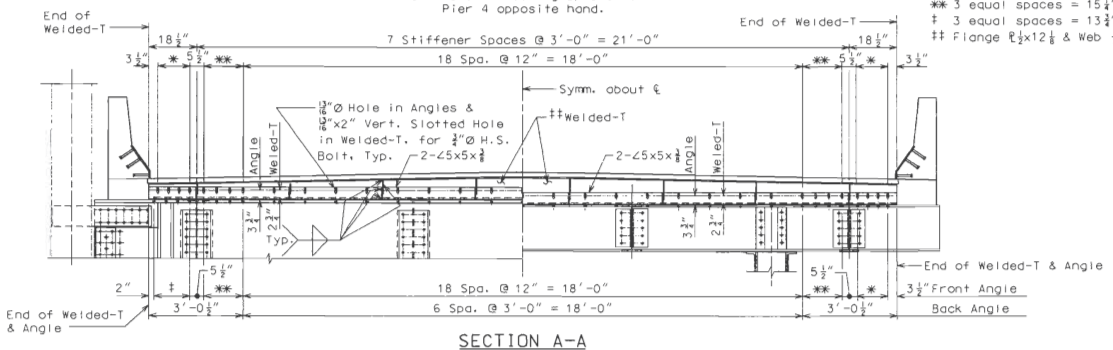


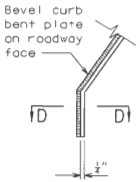
PLAN

Pier 6 shown (looking up-station)
Pier 4 opposite hand.

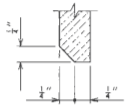


SECTION A-A

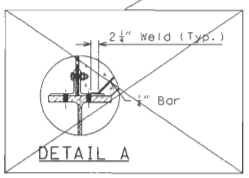
* 3 equal spaces = 12¼".
** 3 equal spaces = 15¼".
‡ 3 equal spaces = 13¾".
‡‡ Flange ℄ ½x12⅛ & Web ½" ℄



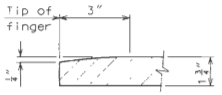
PART ELEVATION AT END OF BEVELED CURB BENT PLATE



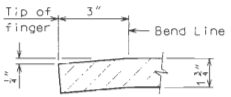
SECTION D-D



DETAIL A



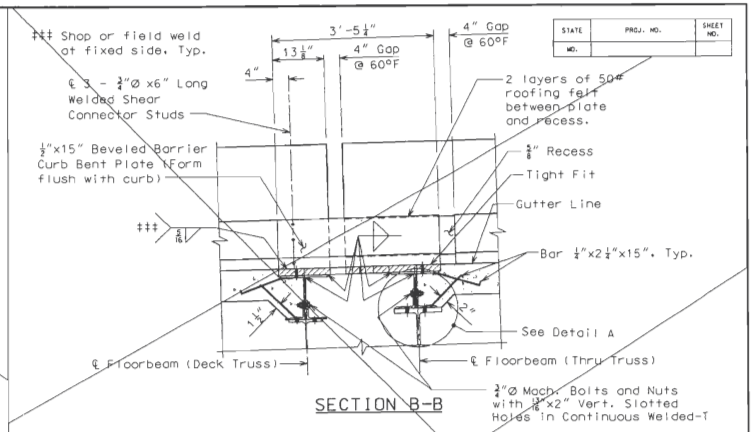
FINGER DETAIL



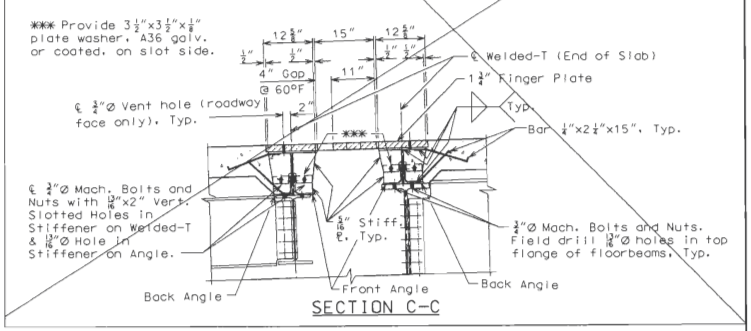
OPTIONAL FINGER DETAIL

⚠ Note: For Sections A-A & B-B and Detail A, see Sheet 31A.

⚠ X-ed out Sections A-A & B-B and Detail A. Added note. Revised 09-09-04



SECTION B-B



SECTION C-C

Notes:

Finger plates shall be cut with a machine guided gas torch from one plate. The plate from which fingers are cut may be spliced before fingers are cut. The surface of cut shall be perpendicular to the surface of the plate. The cut shall not exceed ½" in width. The centerline of cut shall not deviate more than 1/16" from the position of centerline of cut shown. No splicing of finger plate or finger plate assembly will be allowed after fingers are cut.

Plan dimensions are based on installation at 60° F. The expansion gap and other dimensions shall be increased ½" (Pier 4 & Pier 6) for each 10° F fall in temperature and decreased ½" (Pier 4 & Pier 6) for each 10° F rise in temperature at installation.

Structural steel for the expansion device and curb plate shall be coated with a minimum of two coats of inorganic zinc primer (5 mils minimum) or galvanized in accordance with ASTM A123. Anchors need not be protected from overspray.

Payment for furnishing, coating or galvanizing and installing structural steel for the expansion device will be made at the contract unit price for Expansion Device (Finger Plate) per lin. ft.

All holes shown for connections to existing steel to be subpunched 1/16"ø (Shop or field drill) and reamed to 13/16"ø in field.

1¼" Finger Plate and Welded-T shall be bent to conform to crown of roadway.

Longitudinal reinforcing steel shall be placed so that ends shall not be more than 1"± from web of Welded-T at expansion device.

Material for the expansion device shall be ASTM A709 Grade 36 structural steel. Anchors for the expansion device shall be approved stud welded anchors (C1010 thru C1020).

Finger plate expansion device shall be assembled in the shop to assure proper alignment prior to shipping.

Concrete shall be forced under and around finger plate supporting hardware, studs, angles and bars. Proper consolidation of the concrete shall be achieved by localized internal vibration.

STATE OF MISSOURI — STEVEN D. WARGER — NUMBER E-20997 — REGISTERED PROFESSIONAL ENGINEER
9-21-04

FINGER PLATE EXPANSION JOINT - PIERS 4 & 6

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

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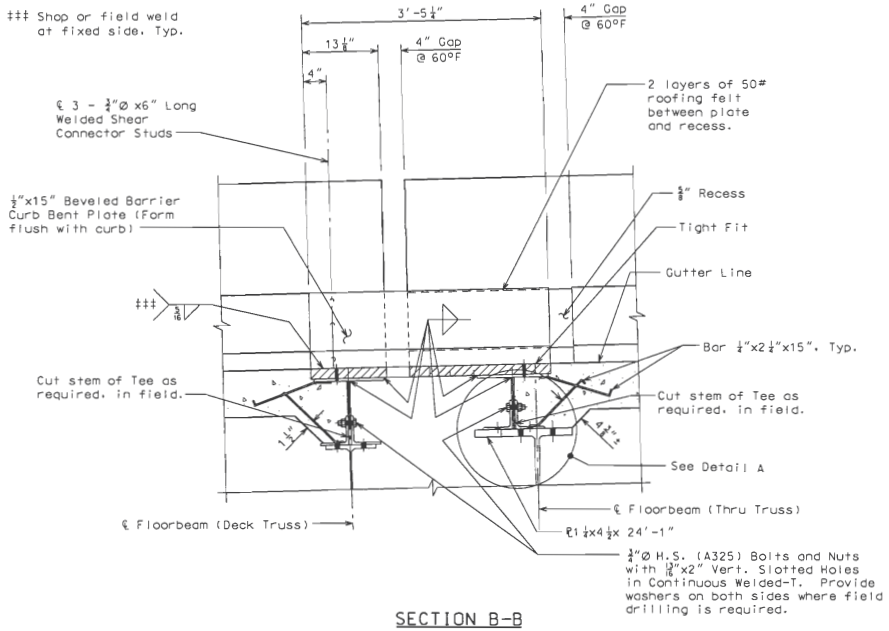
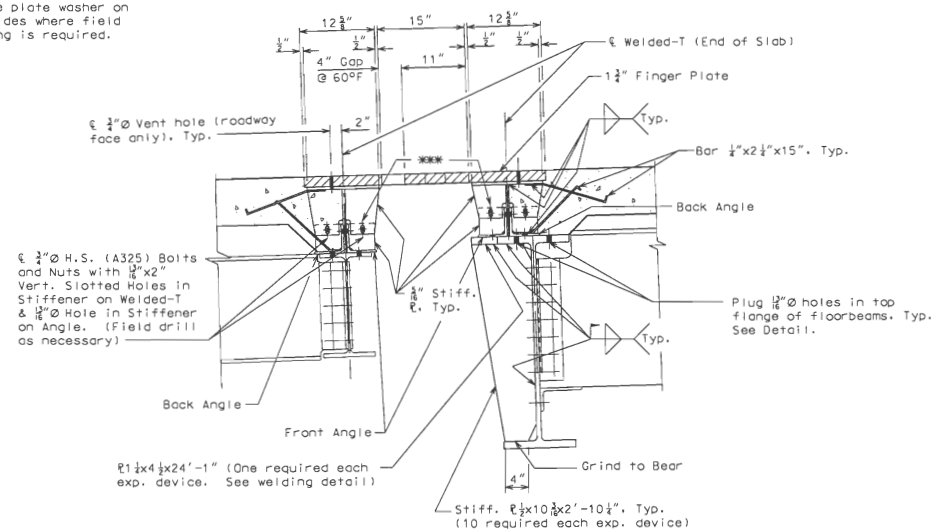


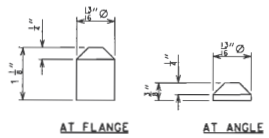
SECTION B-B

✱✱✱ Provide 3½"x3½"x⅛" plate washer. A36 galv. or coated, on slot side. Provide plate washer on both sides where field drilling is required.



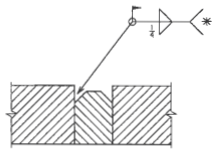
SECTION C-C

Note:
For Stiff. ℄½x10⅝x2'-10½" spacing, see Floorbeam At L0 & L0' detail on "Floorbeams - Thru Truss" sheet.

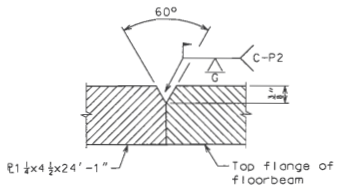


DETAIL OF PLUGS

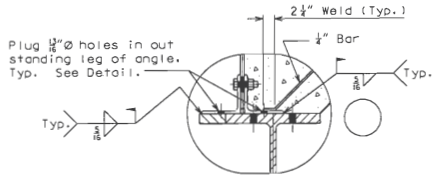
✱ Top of recess to be filled with weld and ground flush.



PLUGGING DETAIL



WELDING DETAIL



DETAIL A

⚠ Added sheet 09-09-04.

EXPANSION JOINT MODIFICATIONS AT PIERS 4 & 6

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

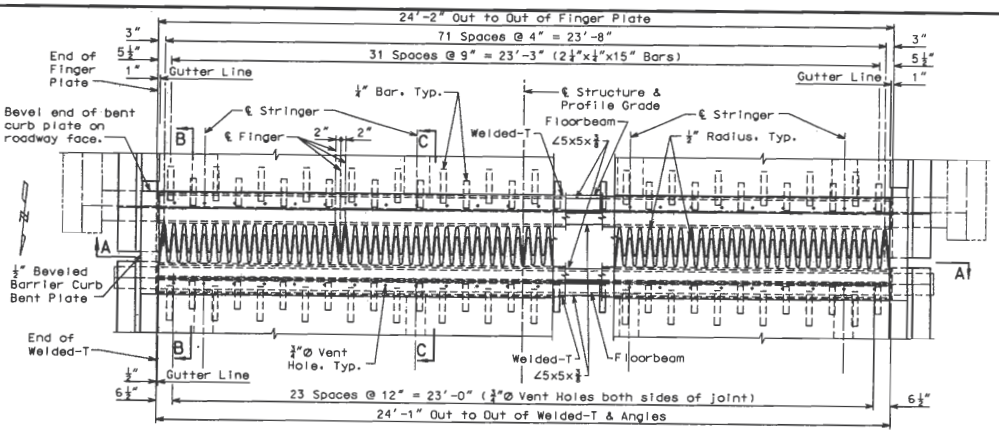
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/04
CHECKED: 09/04

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

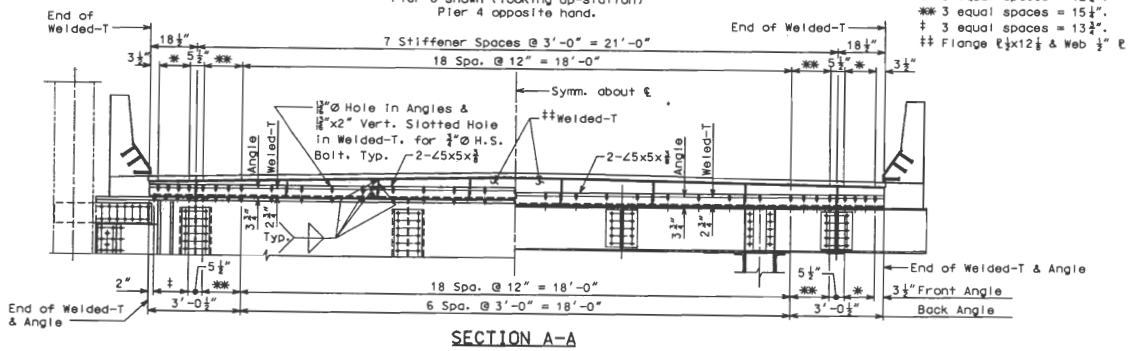
SHEET 31A OF 40

L05684

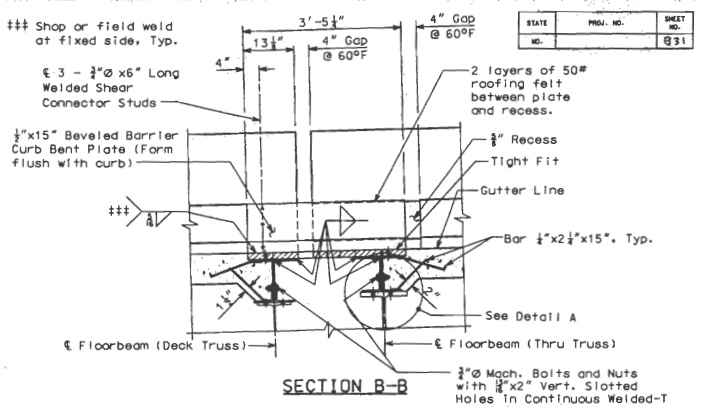


PLAN

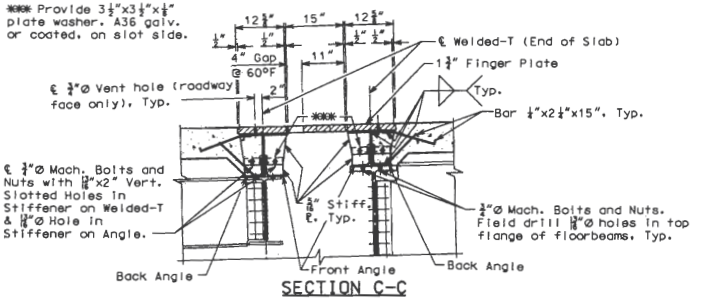
Pier 6 shown (looking up-station)
Pier 4 opposite hand.



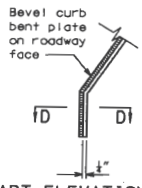
SECTION A-A



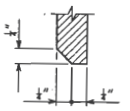
SECTION B-B



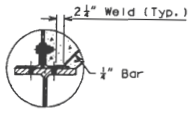
SECTION C-C



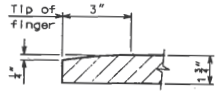
PART ELEVATION AT END OF BEVELED CURB BENT PLATE



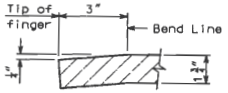
SECTION D-D



DETAIL A



FINGER DETAIL



OPTIONAL FINGER DETAIL

Notes:

Finger plates shall be cut with a machine guided gas torch from one plate. The plate from which fingers are cut may be spliced before fingers are cut. The surface of cut shall be perpendicular to the surface of the plate. The cut shall not exceed ¼" in width. The centerline of cut shall not deviate more than ⅛" from the position of centerline of cut shown. No splicing of finger plate or finger plate assembly will be allowed after fingers are cut.

Plan dimensions are based on installation at 60° F. The expansion gap and other dimensions shall be increased ½" (Pier 4 & Pier 6) for each 10° F fall in temperature and decreased ½" (Pier 4 & Pier 6) for each 10° F rise in temperature at installation.

Structural steel for the expansion device and curb plate shall be coated with a minimum of two coats of inorganic zinc primer (5 mils minimum) or galvanized in accordance with ASTM A123. Anchors need not be protected from overspray.

Payment for furnishing, coating or galvanizing and installing structural steel for the expansion device will be made at the contract unit price for Expansion Device (Finger Plate) per lin. ft.

All holes shown for connections to existing steel to be subpunched ¹⁵⁄₁₆"Ø (Shop or field drill) and reamed to 1⅛"Ø in field.

1½" Finger Plate and Welded-T shall be bent to conform to crown of roadway.

Longitudinal reinforcing steel shall be placed so that ends shall not be more than 1"± from web of Welded-T at expansion device.

Material for the expansion device shall be ASTM A709 Grade 36 structural steel. Anchors for the expansion device shall be approved stud welded anchors (C1010 thru C1020).

Finger plate expansion device shall be assembled in the shop to assure proper alignment prior to shipping.

Concrete shall be forced under and around finger plate supporting hardware, studs, angles and bars. Proper consolidation of the concrete shall be achieved by localized internal vibration.

FINGER PLATE EXPANSION JOINT - PIERS 4 & 6
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SHEET 31 OF 40

L05684

VOID

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 10/01
CHECKED: 10/01

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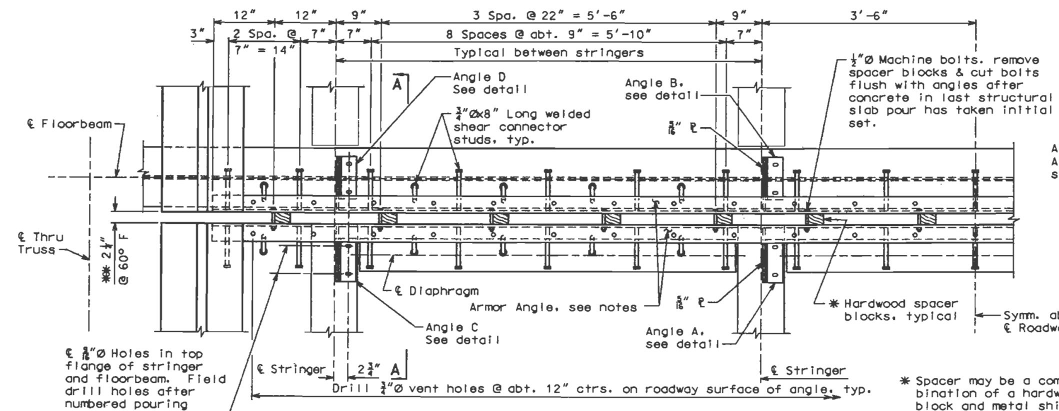
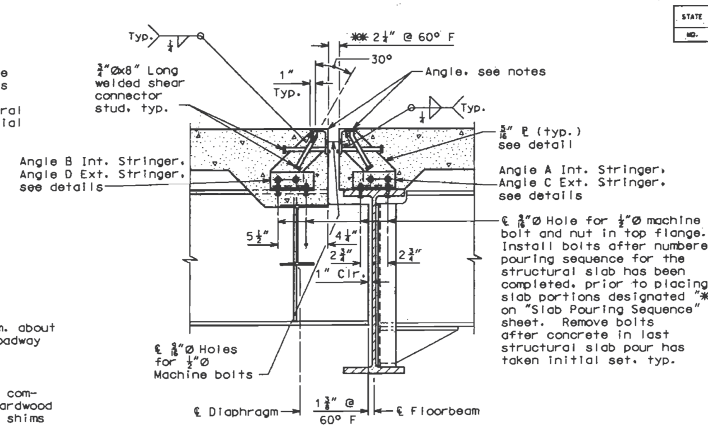
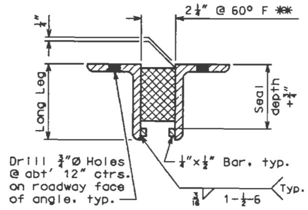


HALF PLAN

(Contraction joint details shown near L6' and L12', details near L6 and L12 opposite hand)



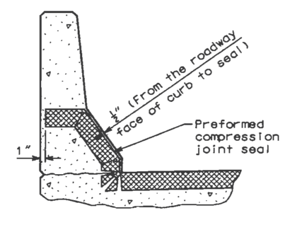
SECTION A-A



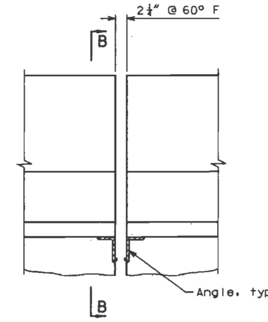
PART CROSS SECTION THRU EXPANSION JOINT

SIZE OF ARMOR ANGLE:

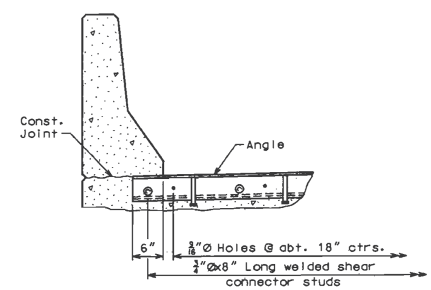
If a seal size larger than that indicated on the plans is used, the movement range and all dimensions for the armor angles shall be shown on the shop drawings.
Concrete shall be forced under armor angle and around studs. Proper consolidation of the concrete shall be achieved by localized internal vibration.



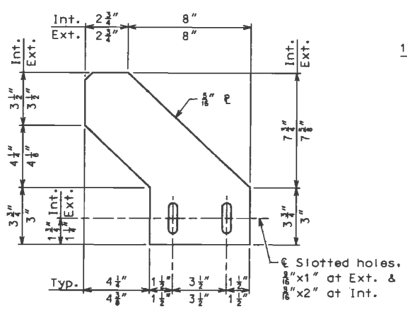
PART SECTION THRU JOINT SEAL



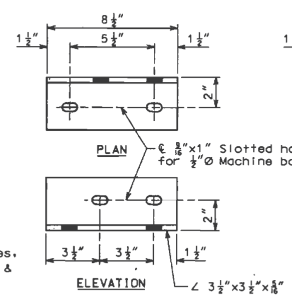
PART ELEVATION OF BARRIER CURB



SECTION B-B

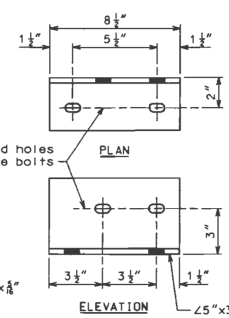


DETAIL "A"



ANGLE A & B

(Angle A shown, Angle B opposite hand)



ANGLE C & D

(Angle C shown, Angle D opposite hand)

GENERAL NOTES:

Structural steel for expansion device shall be fabricated in one section.
The expansion device shall be bent to conform to crown and grade of roadway.
Structural steel for the armored joint shall be ASTM A709 Grade 36.
See Special Provisions for the requirements of compression joint seal.
Structural steel for the expansion device shall be coated with a minimum of two coats of inorganic zinc primer (5 mils minimum) or galvanized in accordance with ASTM A123. Anchors need not be protected from overspray.
Furnishing, coating or galvanizing and installing the structural steel armored joint shall be included in the contract unit price for the Preformed Compression Expansion Joint Seal.
Neoprene extrusions shall meet ASTM D3542.
Longitudinal reinforcing steel shall be placed so that ends shall not be more than 1" from vertical leg of angle at expansion device.
The seal shall be 3 1/2" wide with a required movement range of 1.3".
** Decrease gap 1/16" for every 20°F rise and increase gap 1/16" for every 20°F fall in temperature.

10-30-01

CONTRACTION JOINT - THRU TRUSS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
CHECKED: 09/01

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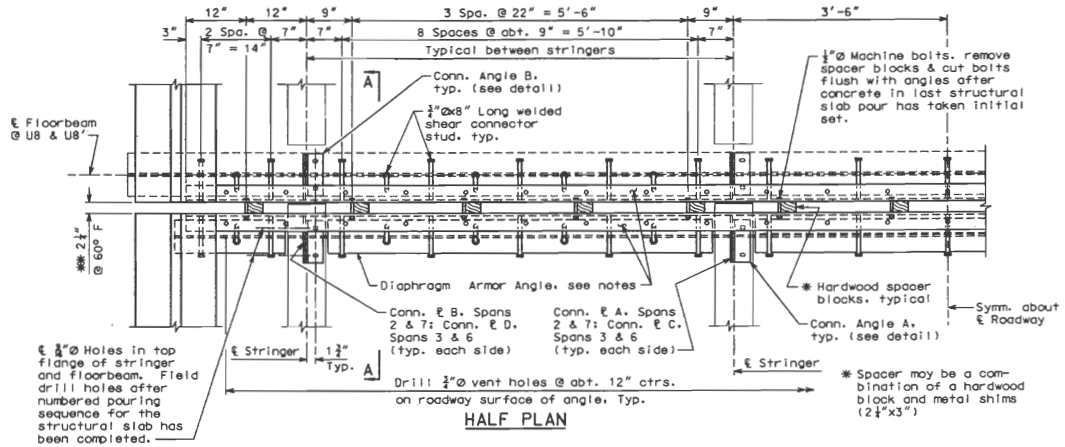
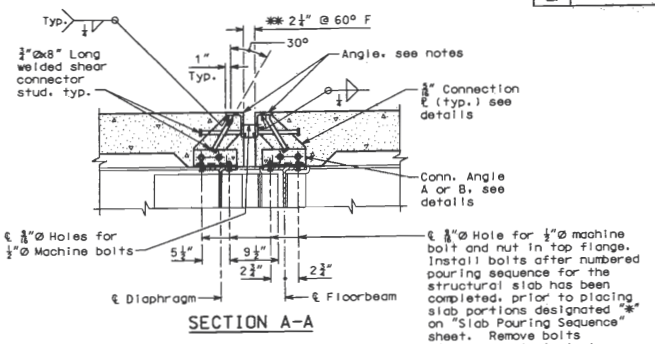
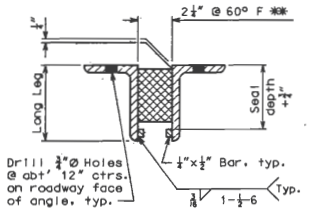


HALF PLAN

* Spacer may be a combination of a hardwood block and metal shims (2½"x3")



SECTION A-A

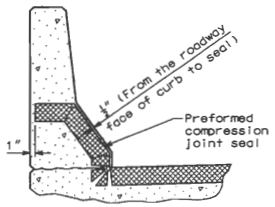


PART CROSS SECTION THRU EXPANSION JOINT

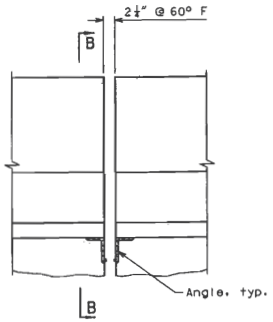
SIZE OF ARMOR ANGLE:

If a seal size larger than that indicated on the plans is used, the movement range and all dimensions for the armor angles shall be shown on the shop drawings.

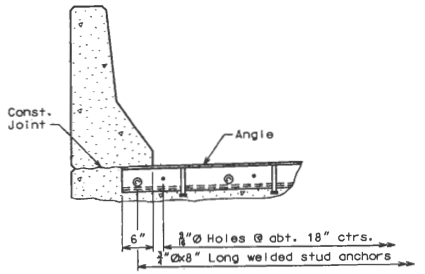
Concrete shall be forced under armor angle and around studs. Proper consolidation of the concrete shall be achieved by localized internal vibration.



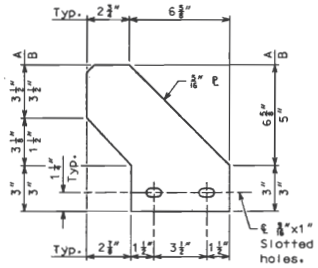
PART SECTION THRU JOINT SEAL



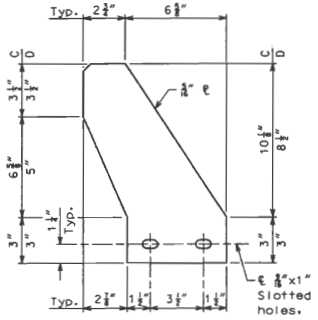
PART ELEVATION OF BARRIER CURB



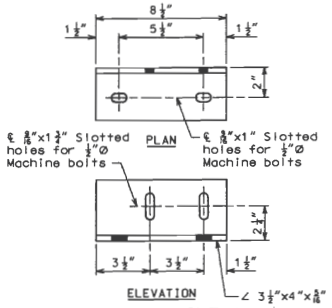
SECTION B-B



CONNECTION PLATE A & B



CONNECTION PLATE C & D



CONNECTION ANGLE A & B

(Conn. Angle A shown, Conn. Angle B opposite hand)

GENERAL NOTES:

Structural steel for expansion device shall be fabricated in one section.

The expansion device shall be bent to conform to crown and grade of roadway.

Structural steel for the armored joint shall be ASTM A709 Grade 36.

See Special Provisions for the requirements of compression joint seal.

Structural steel for the expansion device shall be coated with a minimum of two coats of inorganic zinc primer (5 mils minimum) or galvanized in accordance with ASTM A123. Anchors need not be protected from overspray.

Furnishing, coating or galvanizing and installing the structural steel armored joint shall be included in the contract unit price for the Preformed Compression Expansion Joint Seal.

Neoprene extrusions shall meet ASTM D3542.

Longitudinal reinforcing steel shall be placed so that ends shall not be more than 1" from vertical leg of angle at expansion device.

The seal shall be 3½" wide with a required movement range of 1.3".

** Decrease gap ⅛" for every 20°F rise and increase gap ⅛" for every 20°F fall in temperature.

10-30-01

CONTRACTION JOINT - DECK TRUSS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 10/01
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SHEET 33 OF 40

L05684

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DECK DRAIN LOCATIONS

STATION	OFFSET	STATION	OFFSET
99+34.18	11.50 Rt., 11.50 Lt.	108+84.12	11.50 Rt., 11.50 Lt.
99+69.00	11.50 Rt., 11.50 Lt.	108+94.37	11.50 Rt., 11.50 Lt.
100+04.00	11.50 Rt., 11.50 Lt.	109+04.62	11.50 Rt., 11.50 Lt.
100+43.87	11.50 Rt., 11.50 Lt.	109+16.95	11.50 Rt., 11.50 Lt.
100+72.62	11.50 Rt., 11.50 Lt.	109+27.20	11.50 Rt., 11.50 Lt.
101+03.45	11.50 Rt., 11.50 Lt.	109+37.45	11.50 Rt., 11.50 Lt.
101+34.28	11.50 Rt., 11.50 Lt.	109+49.79	11.50 Rt., 11.50 Lt.
101+65.11	11.50 Rt., 11.50 Lt.	109+60.04	11.50 Rt., 11.50 Lt.
101+95.94	11.50 Rt., 11.50 Lt.	109+70.29	11.50 Rt., 11.50 Lt.
102+29.84	11.50 Rt., 11.50 Lt.	109+82.62	11.50 Rt., 11.50 Lt.
102+60.67	11.50 Rt., 11.50 Lt.	109+92.87	11.50 Rt., 11.50 Lt.
102+91.50	11.50 Rt., 11.50 Lt.	110+03.12	11.50 Rt., 11.50 Lt.
103+22.33	11.50 Rt., 11.50 Lt.	110+15.45	11.50 Rt., 11.50 Lt.
103+53.16	11.50 Rt., 11.50 Lt.	110+25.70	11.50 Rt., 11.50 Lt.
103+83.99	11.50 Rt., 11.50 Lt.	110+35.95	11.50 Rt., 11.50 Lt.
104+16.29	11.50 Rt., 11.50 Lt.	110+48.29	11.50 Rt., 11.50 Lt.
104+36.79	11.50 Rt., 11.50 Lt.	110+58.54	11.50 Rt., 11.50 Lt.
104+49.12	11.50 Rt., 11.50 Lt.	110+68.79	11.50 Rt., 11.50 Lt.
104+59.37	11.50 Rt., 11.50 Lt.	110+81.12	11.50 Rt., 11.50 Lt.
104+69.62	11.50 Rt., 11.50 Lt.	110+91.37	11.50 Rt., 11.50 Lt.
104+81.95	11.50 Rt., 11.50 Lt.	111+01.62	11.50 Rt., 11.50 Lt.
104+92.20	11.50 Rt., 11.50 Lt.	111+13.95	11.50 Rt., 11.50 Lt.
105+02.45	11.50 Rt., 11.50 Lt.	111+24.20	11.50 Rt., 11.50 Lt.
105+14.79	11.50 Rt., 11.50 Lt.	111+34.45	11.50 Rt., 11.50 Lt.
105+25.04	11.50 Rt., 11.50 Lt.	111+46.79	11.50 Rt., 11.50 Lt.
105+35.29	11.50 Rt., 11.50 Lt.	111+57.04	11.50 Rt., 11.50 Lt.
105+47.62	11.50 Rt., 11.50 Lt.	111+67.29	11.50 Rt., 11.50 Lt.
105+57.87	11.50 Rt., 11.50 Lt.	111+79.62	11.50 Rt., 11.50 Lt.
105+68.12	11.50 Rt., 11.50 Lt.	111+89.87	11.50 Rt., 11.50 Lt.
105+80.45	11.50 Rt., 11.50 Lt.	112+00.12	11.50 Rt., 11.50 Lt.
105+90.70	11.50 Rt., 11.50 Lt.	112+12.45	11.50 Rt., 11.50 Lt.
106+00.95	11.50 Rt., 11.50 Lt.	112+22.70	11.50 Rt., 11.50 Lt.
106+13.29	11.50 Rt., 11.50 Lt.	112+32.95	11.50 Rt., 11.50 Lt.
106+23.54	11.50 Rt., 11.50 Lt.	112+45.29	11.50 Rt., 11.50 Lt.
106+33.79	11.50 Rt., 11.50 Lt.	112+55.54	11.50 Rt., 11.50 Lt.
106+46.12	11.50 Rt., 11.50 Lt.	112+65.79	11.50 Rt., 11.50 Lt.
106+56.37	11.50 Rt., 11.50 Lt.	112+78.12	11.50 Rt., 11.50 Lt.
106+66.62	11.50 Rt., 11.50 Lt.	112+88.37	11.50 Rt., 11.50 Lt.
106+78.95	11.50 Rt., 11.50 Lt.	112+98.62	11.50 Rt., 11.50 Lt.
106+89.20	11.50 Rt., 11.50 Lt.	113+10.95	11.50 Rt., 11.50 Lt.
106+99.45	11.50 Rt., 11.50 Lt.	113+21.20	11.50 Rt., 11.50 Lt.
107+11.79	11.50 Rt., 11.50 Lt.	113+31.45	11.50 Rt., 11.50 Lt.
107+22.04	11.50 Rt., 11.50 Lt.	113+65.83	11.50 Rt., 11.50 Lt.
107+32.29	11.50 Rt., 11.50 Lt.	113+96.66	11.50 Rt., 11.50 Lt.
107+44.62	11.50 Rt., 11.50 Lt.	114+27.49	11.50 Rt., 11.50 Lt.
107+54.87	11.50 Rt., 11.50 Lt.	114+58.32	11.50 Rt., 11.50 Lt.
107+65.12	11.50 Rt., 11.50 Lt.	114+89.15	11.50 Rt., 11.50 Lt.
107+77.45	11.50 Rt., 11.50 Lt.	115+17.90	11.50 Rt., 11.50 Lt.
106+66.62	11.50 Rt., 11.50 Lt.	115+49.72	11.50 Rt., 11.50 Lt.
107+87.70	11.50 Rt., 11.50 Lt.	115+80.55	11.50 Rt., 11.50 Lt.
107+97.95	11.50 Rt., 11.50 Lt.	116+11.38	11.50 Rt., 11.50 Lt.
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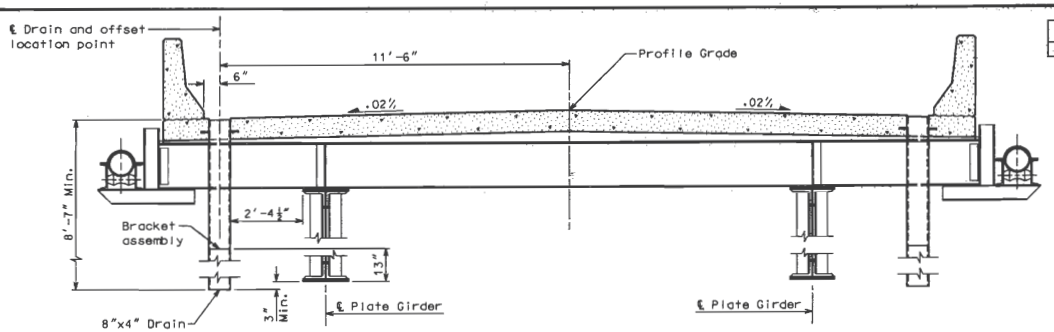
108+30.79	11.50 Rt., 11.50 Lt.	117+03.87	11.50 Rt., 11.50 Lt.
108+43.12	11.50 Rt., 11.50 Lt.	118+13.56	11.50 Rt., 11.50 Lt.
108+53.37	11.50 Rt., 11.50 Lt.	118+49.00	11.50 Rt., 11.50 Lt.
108+63.62	11.50 Rt., 11.50 Lt.	118+83.56	11.50 Rt., 11.50 Lt.

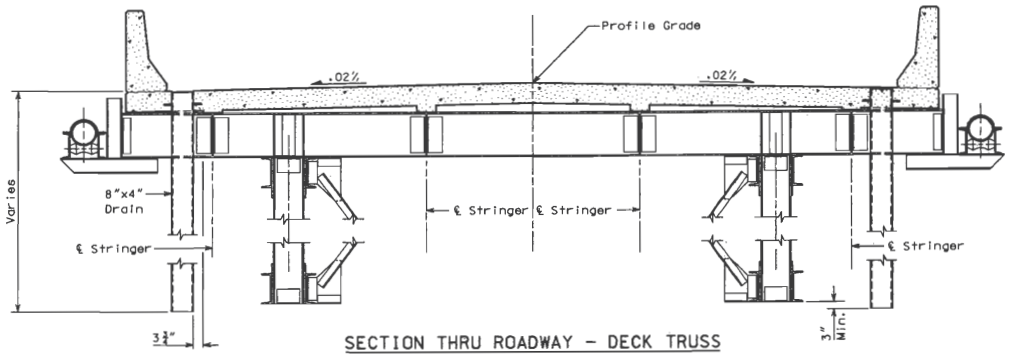
Notes:
For additional details. See "Slab Drain Details" Sheet.

Bracket assemblies required for all drains.

Slab Drain locations are approximate. Adjustments may be made in the field. Shop drawings showing bracket assemblies and proposed connections shall be submitted. Drain locations at the deck truss units will vary based on the connection method used. Variations will be required due to alignment of the vertical drain downspout with the vertical members of the deck truss (deck truss verticals are not plumb). Slotted holes in the connection members are acceptable but the length of slot shall be minimized where possible. Bracket spacing may be varied as required for connections. All work and materials related to adjustments is incidental to the unit price bid for slab drains.

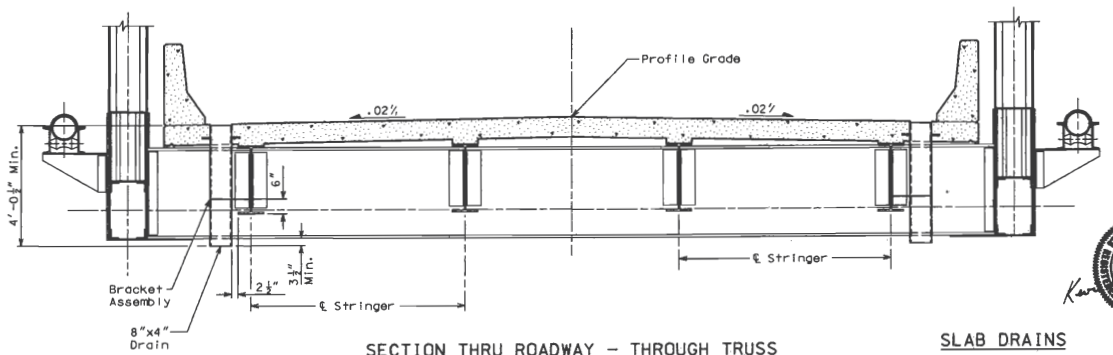


SECTION THRU ROADWAY - PLATE GIRDER



SECTION THRU ROADWAY - DECK TRUSS

For brackets at deck truss and additional details, see "Slab Drain Details" sheet.



SECTION THRU ROADWAY - THROUGH TRUSS

STATE	PROJ. NO.	SHEET NO.
MO.		034

SLAB DRAINS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SHEET 34 OF 40

L05684

10-30-01

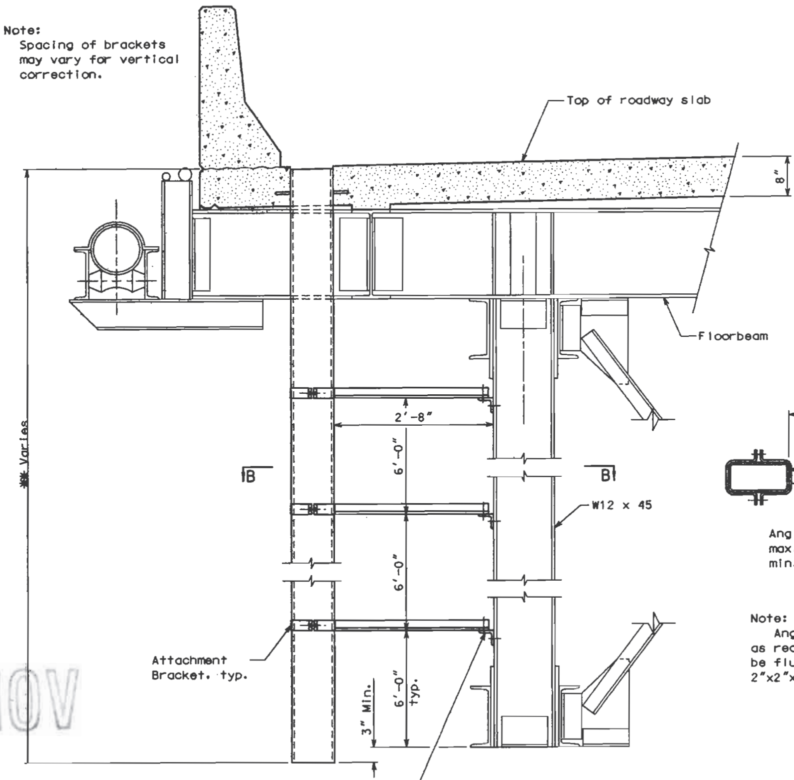
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
CHECKED: 09/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

04:54:32 PM 10/29/01 S:\Rte291 Deck (889-02)\Bridge\dgn\4p1416_slabdrn_034_f.dgn

Note:
Spacing of brackets may vary for vertical correction.



✱✱ Additional Bracket Required at U12-L12

PART ELEVATION OF SLAB AT DRAIN

(Deck Truss)

Notes:

Slab drains may be fabricated of either ¼" welded sheets of ASTM A709 Grade 36 steel or from ¼" structural steel tubing ASTM A500 or A501.

Slab drain bracket assembly shall be ASTM A709 Grade 36 steel.

Outside dimensions of drains are 8"x4".

Locate drains in slab by dimensions shown in Section thru Roadway on "Slab Drains" sheet.

Shift reinforcing steel in field where necessary to clear drains.

The drains and bracket assembly shall be galvanized in accordance with ASTM A123.

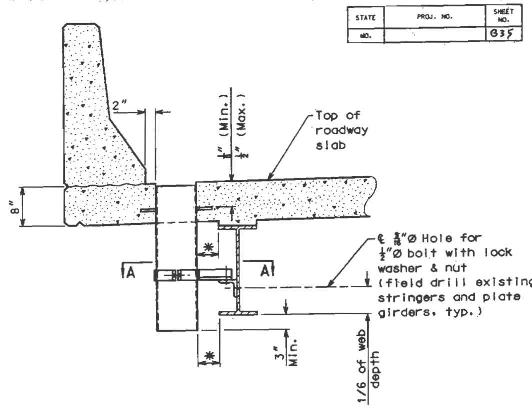
All bolts, hardened washers, lock washers and nuts shall be galvanized in accordance with ASTM A153.

The bolt hole for the bracket assembly attachment shall be located on the Wide Flange Beam shop drawings when required.

Shop drawings will not be required for the slab drains.

Shop drawings will be required for bracket assemblies in the deck truss spans.

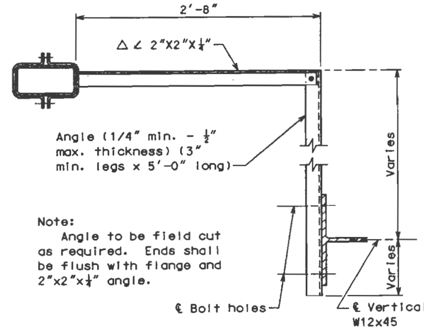
STATE	PROJ. NO.	SHEET NO.
MO.		035



✱ VARIES (SEE SECTIONS)

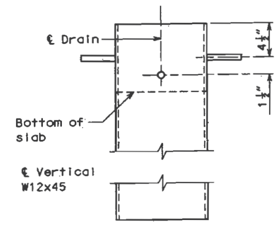
PART ELEVATION OF SLAB AT DRAIN

(Thru Truss & Plate Girder)

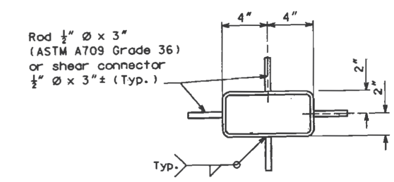


Note:
Angle to be field cut as required. Ends shall be flush with flange and 2"x2"x¼" angle.

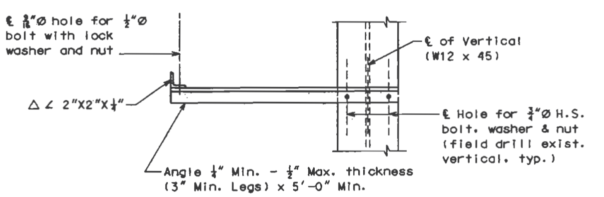
SECTION B-B



ELEVATION OF DRAIN



PLAN OF DRAIN

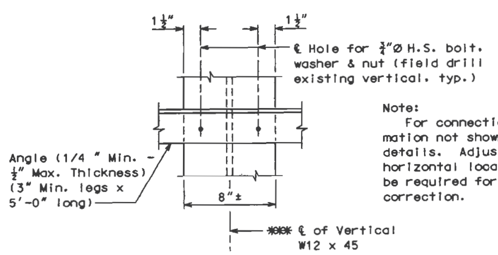


CONNECTION DETAIL @ U12-L12, U0'-L0'

(West side shown, East side similar)

△ See Standard Bracket Assembly in Section A-A this sheet.

DECK TRUSS ATTACHMENT

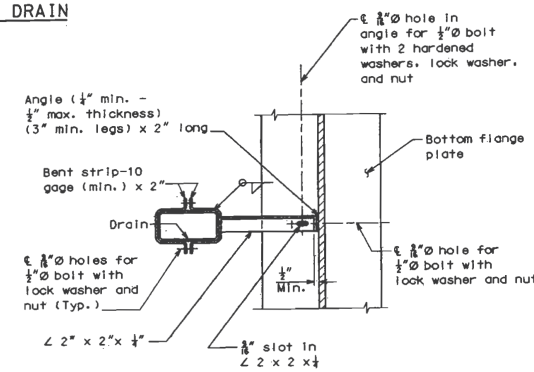


Note:
For connection information not shown see other details. Adjustment in horizontal location will be required for vertical correction.

CONNECTION DETAIL

@ U2-L2, U4-L4, U6-L6, U8-L8, U10-L10, U2'-L2', U4'-L4', U6'-L6', U8'-L8', U10'-L10'

✱✱✱ Verticals on deck truss are not truly vertical. Field verify location of connection angles.



SECTION A-A

KEVIN R. EISENBEIS NUMBER E-26846 PROFESSIONAL ENGINEER
11-6-01

SLAB DRAIN DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

SHEET 35 OF 40

L05684

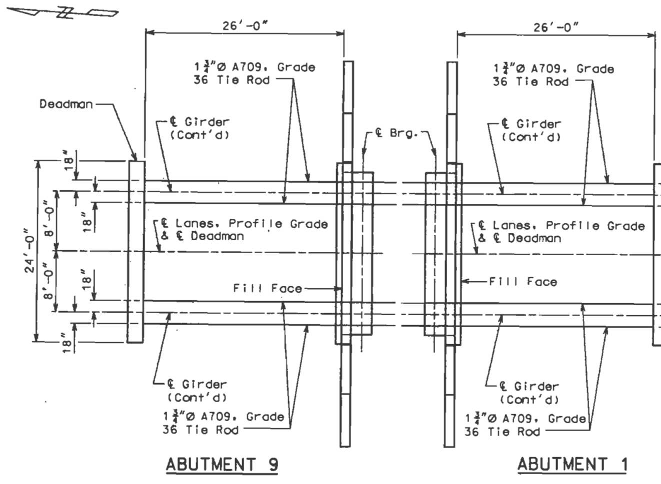
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 10/01
CHECKED: 10/01

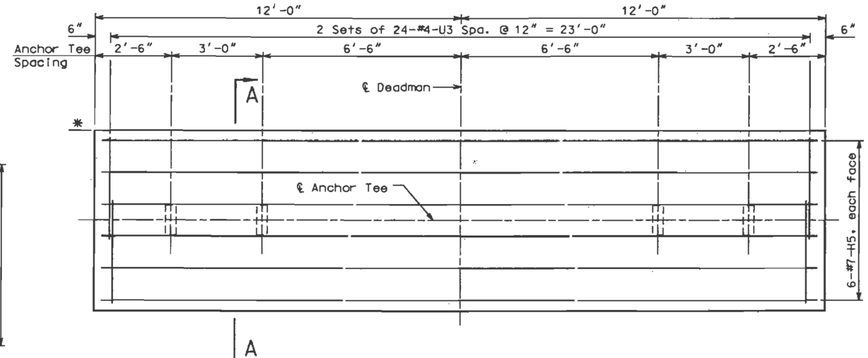
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

12:10:19 PM 11/06/01 S:\Rte291 Deck (889-02)\bridge\j4p1416_el-drain_035_f.dgn

STATE	PROJ. NO.	SHEET NO.
MO.		B36

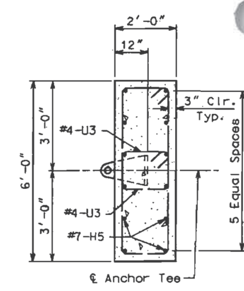


PLAN OF EARTHQUAKE RESTRAINERS

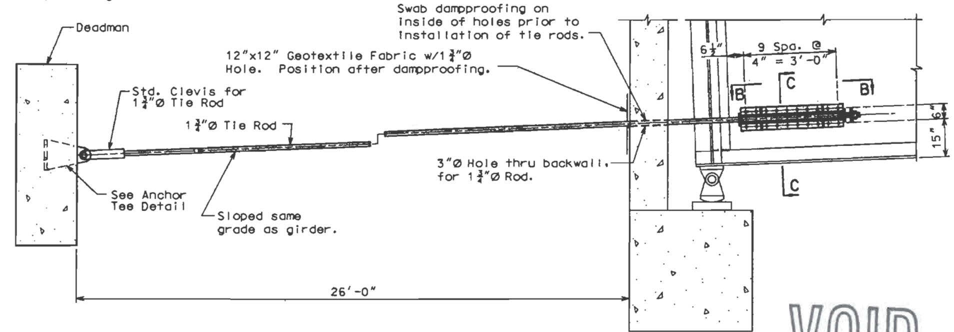


ELEVATION OF DEADMAN

✱ 4'-0" min. below profile grade.



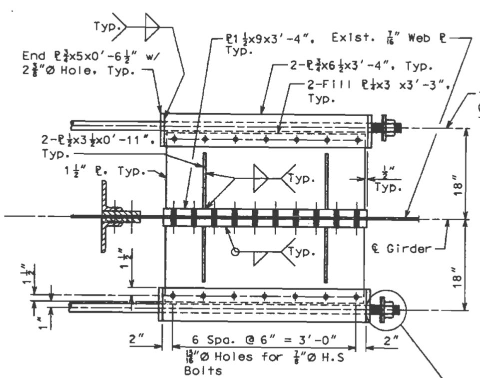
SECTION A-A



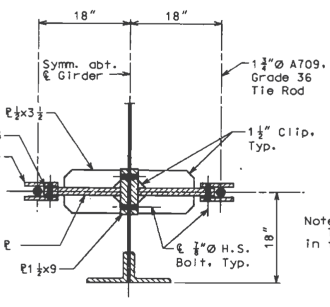
SECTION THRU ABUTMENT ANCHORAGE

(Abutment 9 shown, Abutment 1 opp. hand)

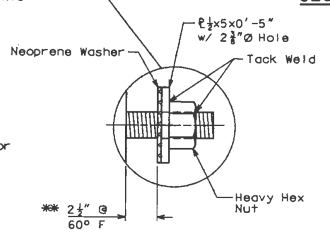
VOID



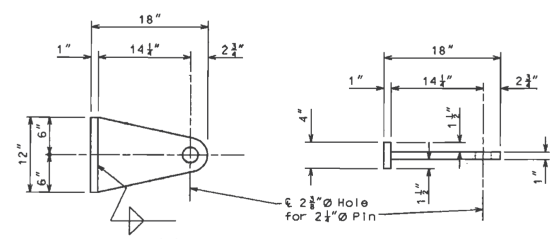
SECTION B-B



SECTION C-C



✱✱ The dimension shall be increased or decreased 1/8" for each 10° F rise or fall in temperature from 60° F.



ANCHOR TEE DETAIL

Notes Cont.:
The following material quantities are included in the assemblies per each abutment (4 assemblies):

Class B Concrete		10.7 Cu. Yds.
Reinforcing Steel	(Grade 60)	905 Lbs.
Structure Steel		3,740 Lbs.

Notes:

Structural steel for plates, tie rods, clevises and pins of restrainer assemblies shall be ASTM A709, Grade 36. High strength bolts shall be 7/8"Ø ASTM A325, Type I in 15/16"Ø holes unless otherwise noted. High strength bolts, nuts and washers will be sampled for quality assurance as specified in Standard Specification 106 and Field Section (FS-712) from Materials Manual.

All steel used in the earthquake restrainer assemblies shall be galvanized in accordance with ASTM A123 and Section 712 of the Missouri Standard Specifications for Highway Construction.

Coat anchor tees, clevises, pins and tie rods with an approved bituminuous paint. See Special Provisions.

Provide 12" of sand compacted to a plane below the tie rods so no bending of the tie rods will occur.

Provide 12" of hand compacted sand above the tie rods in such a manner as to avoid damaging the protective coating on the anchor assembly.

Sand shall meet the gradation as specified in 1005.2 of the Standard Specifications.

The cost of furnishing and installing the earthquake restrainer assemblies (4 per abutment) including deadman concrete and reinforcing steel, anchor tees, pins, clevises, tie rods, nuts, drilled holes thru concrete abutment backwalls, structural steel plates and bolts, field drilled holes thru existing girder webs, excavation, backfill, geotextile fabric and other incidental items required to install the earthquake restrainers complete-in-place, shall be completely covered in the Unit bid price for "Earthquake Restrainer Assemblies" per each.

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
CHECKED: 09/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

10-30-01

EARTHQUAKE RESTRAINERS - ABUTMENTS 1

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SHEET 36 OF 40

L05684

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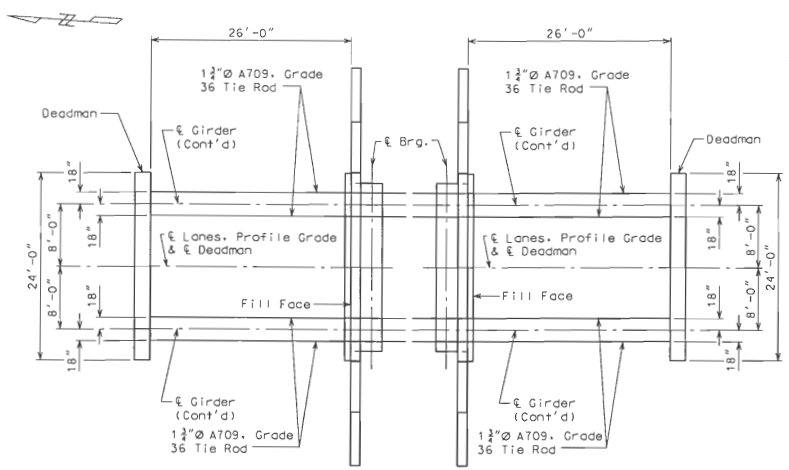
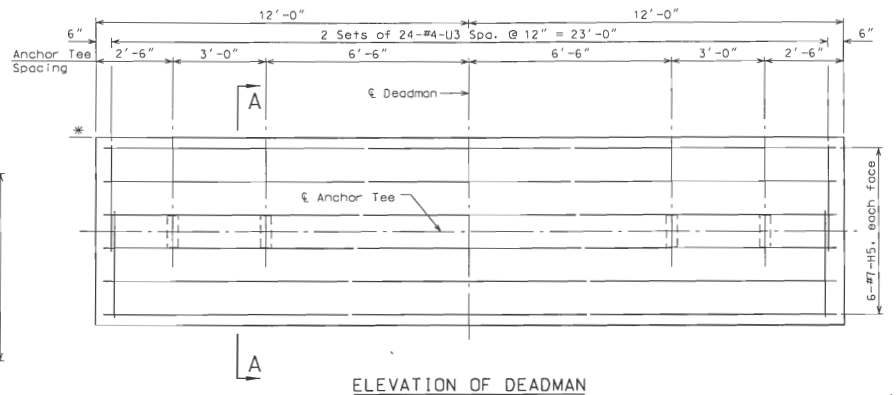
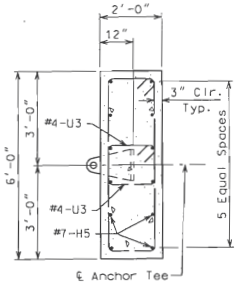


PLAN OF EARTHQUAKE RESTRAINERS

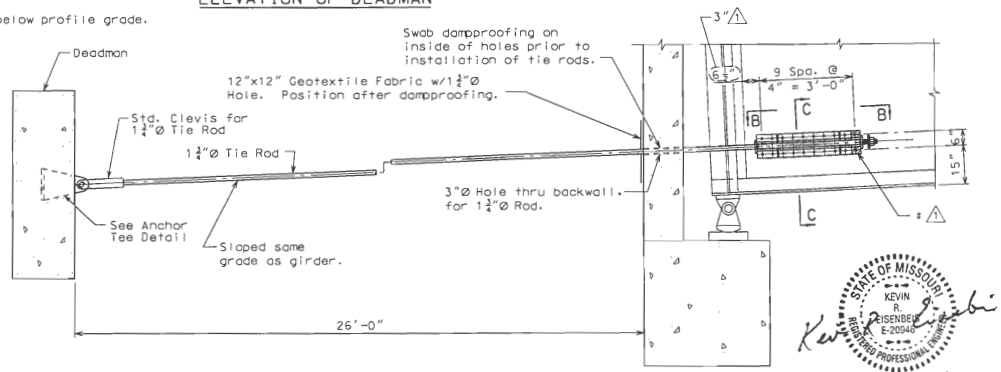


ELEVATION OF DEADMAN



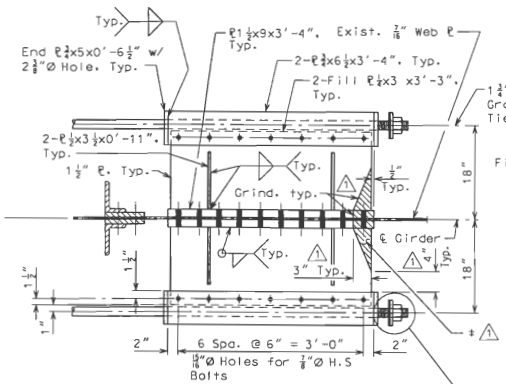
SECTION A-A

* 4'-0" min. below profile grade.

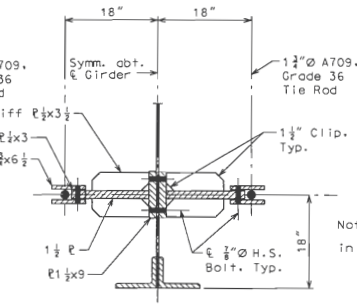


SECTION THRU ABUTMENT ANCHORAGE

(Abutment 9 shown, Abutment 1 opp. hand)



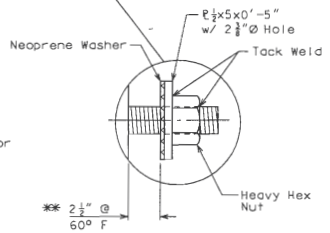
SECTION B-B



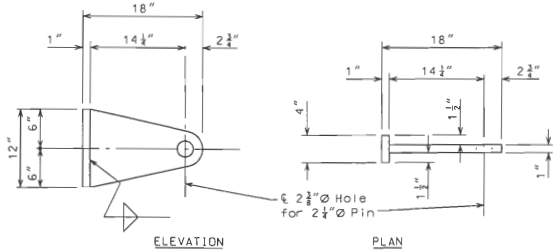
SECTION C-C

Notes Cont.:
The following material quantities are included in the assemblies per each abutment (4 assemblies):

Class B Concrete	10.7 Cu. Yds.
Reinforcing Steel (Grade 60)	905 Lbs.
Structure Steel	3,740 Lbs.



** The dimension shall be increased or decreased ¼" for each 10° F rise or fall in temperature from 60° F.



ANCHOR TEE DETAIL

Notes:

Structural steel for plates, tie rods, clevises and pins of restrainer assemblies shall be ASTM A709, Grade 36. High strength bolts shall be ⅞"Ø ASTM A325, Type 1 in 15/16"Ø holes unles otherwise noted. High strength bolts, nuts and washers will be sampled for quality assurance as specified in Standard Specification 106 and Field Section (FS-712) from Materials Manual.

All steel used in the earthquake restrainer assemblies shall be galvanized in accordance with ASTM A123 and Section 712 of the Missouri Standard Specifications for Highway Construction.

Coat anchor tees, clevises, pins and tie rods with an approved bituminuous paint. See Special Provisions.

Provide 12" of sand compacted to a plane below the tie rods so no bending of the tie rods will occur.

Provide 12" of hand compacted sand above the tie rods in such a manner as to avoid damaging the protective coating on the anchor assembly.

Sand shall meet the gradation as specified in 1005.2 of the Standard Specifications.

The cost of furnishing and installing the earthquake restrainer assemblies (4 per abutment) including deadman concrete and reinforcing steel, anchor tees, pins, clevises, tie rods, nuts, drilled holes thru concrete abutment backwalls, structural steel plates and bolts, field drilled holes thru existing girder webs, excavation, backfill, geotextile fabric and other incidental items required to install the earthquake restrainers complete-in-place, shall be completely covered in the Unit bid price for "Earthquake Restrainer Assemblies" per each.

STATE OF MISSOURI
KEVIN R. EISENBEIS
E-20940
REGISTERED PROFESSIONAL ENGINEER

3-9-04

EARTHQUAKE RESTRAINERS - ABUTMENTS 1 & 9

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
CHECKED: 09/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

⚠1 Revised 3/09/04

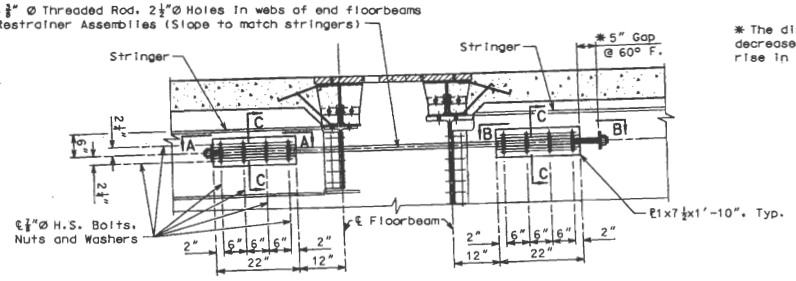
SHEET 36 OF 40

L05684

3:34:26 PM 3/9/2004 s:\Rte291 Deck (889-02)\Bridge\fp1416_eq-abut_036_f.dgn

STATE	PROJ. NO.	SHEET NO.
MO.		037

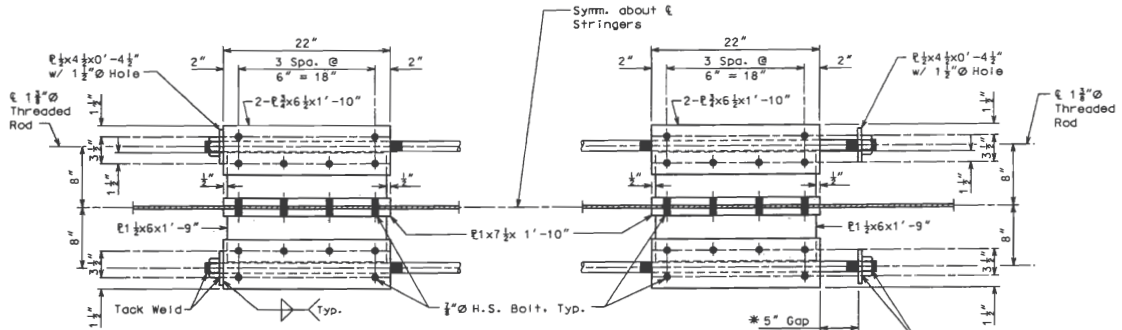
℄ 1⅜" Ø Threaded Rod, 2½"Ø Holes in webs of end floorbeams & Restrainer Assemblies (Slope to match stringers)



ELEVATION

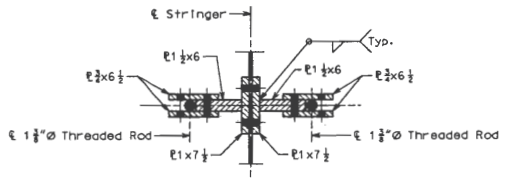
(8 Restrainer Assemblies total ea. pier, 1 ea. side of ea. stringer)
(Detail at Pier 6 shown, detail opp. hand at Pier 4)

* The dimension shall be increased or decreased ½" for each 10°F. fall or rise in temperature from 60°F.



SECTION A-A

SECTION B-B



SECTION C-C

Notes:

Structural steel for plates shall be ASTM A709, Grade 36. Threaded rods shall be A307 and all bolts shall be ASTM A325 Type I. ⅞"Ø in 15/16"Ø holes unless otherwise noted. High strength bolts, nuts and washers will be sampled for quality assurance as specified in Standard Specification 106 and Field Section (FS-712) from Materials Manual.

All steel used in earthquake restrainer assemblies shall be galvanized in accordance with ASTM A123 and Section 712 of the Missouri Standard Specifications for Highway Construction.

The cost of furnishing and installing the restrainer assemblies including washers, nuts, steel anchor assemblies, drilling holes thru existing steel, and other incidental items shall be completely covered in the Unit bid price for "Earthquake Restrainer Assemblies" per each.

Total weight of 16 restrainer assemblies is 6,240 lbs.

Kevin R. Dennis
10-30-01

EARTHQUAKE RESTRAINERS - PIERS 4 & 6

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

SHEET 37 OF 40

L05684

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
CHECKED: 09/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

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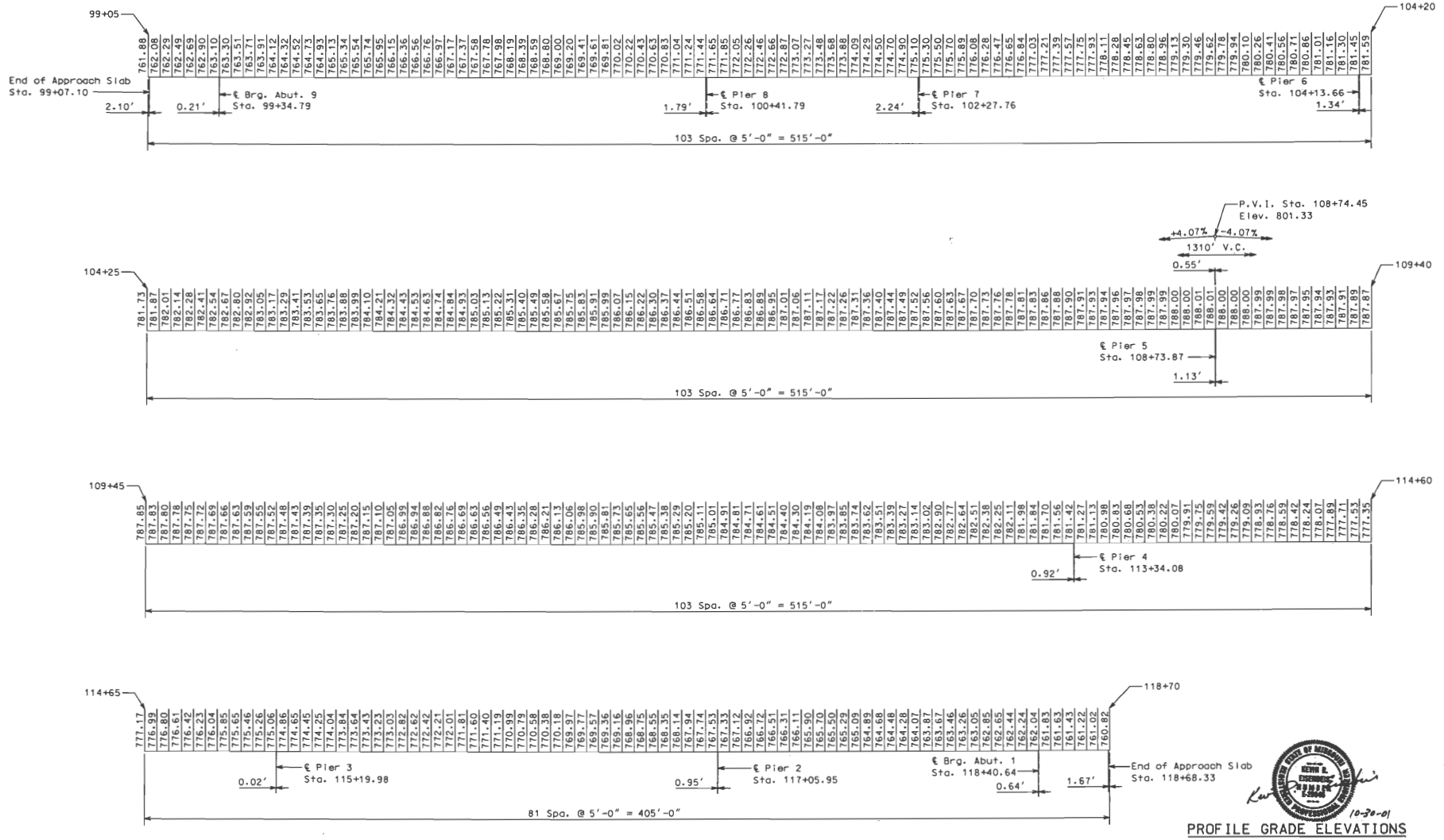
STATE	PROJ. NO.	SHEET NO.
MO.		038



10-30-01

PROFILE GRADE ELEVATIONS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

SHEET 38 OF 40

L05684

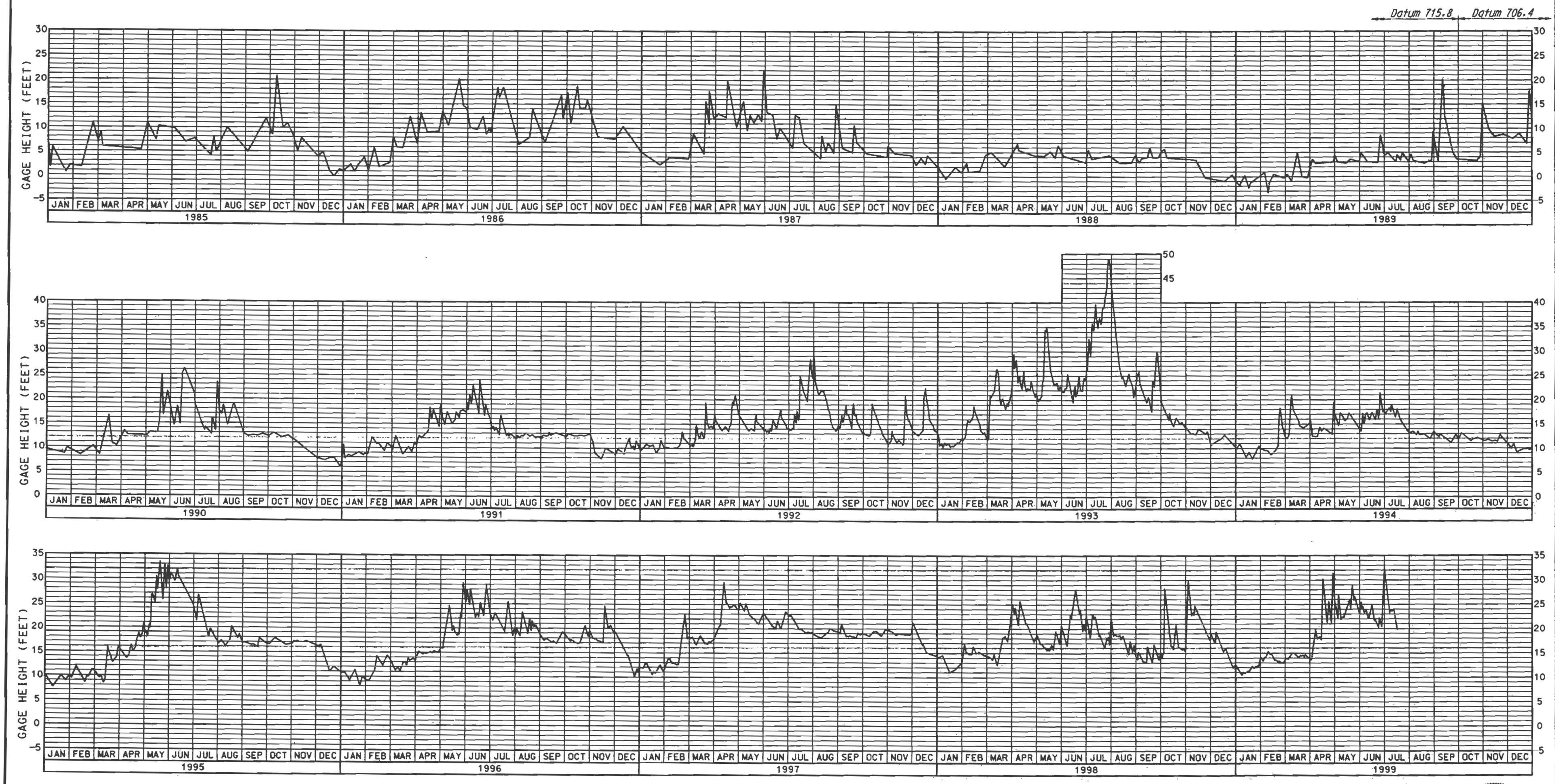
HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
CHECKED: 09/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

08:27:46 AM 10/30/01 S:\Rte291 Deck (889-02)\Bridge\14p1416_progrdel_038_f.dgn

STATE	PROJ. NO.	SHEET NO.
MO.		839



NOTES

Stage hydrograph was plotted from readings of the Missouri River near the Hannibal Bridge located at river mile 366.1 in Kansas City, Missouri.
Gage Zero is 715.8 ft. M.S.L. (Mean Sea Level) for plots prior to October, 1989 and 706.4 for plots after October, 1989.
Seasonal variations in the water elevations at the Hannibal Bridge can be estimated by adding the gage reading to Elev. 715.8 or 706.4, as appropriate.

The Route 291 Bridge is located at river mile 352.7.
An estimate for seasonal variations in water surface elevations at the Route 291 Bridge can be made by deducting 11.7± to 14.6± feet from those at the Hannibal Bridge.
Stage hydrograph is based on information provided by the U.S. Army Corps of Engineers.
Accuracy of details or dimensions are not guaranteed.

HC HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
CHECKED: 09/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

10-30-01

STAGE HYDROGRAPH

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

SHEET 39 OF 40

L05684

04:57:55 PM 10/29/01 S:#Rte291 Deck (889-02)#bridge#j4p1416_s-hydro_039_f.dgn

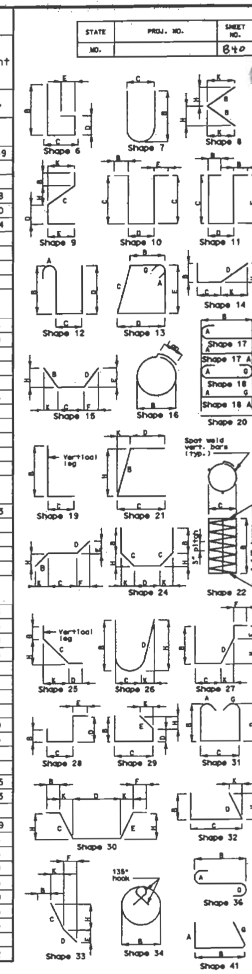
STATE	PROJ. NO.	SHEET NO.
MO.		640

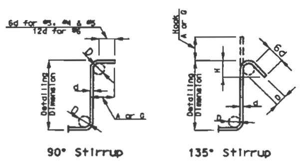
BILL OF REINFORCING STEEL

No. Req'd.	Size	Mark	Location	Epoxy (E)	Shape No.	Stirrup (S)	Substr. (X)	Varies (V)	No. Each	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	Nominal Length FT.	Nominal Length IN.	Actual Length FT.	Actual Length IN.	Weight LBS.
PLATE GIRDER SPANS (1 & 8)																												
184	6	S1	Longitudinal	E	20					24	3													24	3	24	3	6702
184	6	S2	Longitudinal	E	20					33	0													33	0	33	0	9120
318	5	S3	Longitudinal	E	20					37	2													37	2	37	2	12327
368	5	S4	Transverse	E	20					26	5													26	5	26	5	10140
8	5	S5	Transverse	E	20					6	6													6	6	6	6	54
20	5	S6	Longitudinal	E	29					2	0	0	5.5	0	20	0	6			0	4.25	0	4.25	4	8	4	5	92
20	5	S7	Longitudinal	E	29					2	0	0	6	0	11	0	7			0	5	0	5	4	0	3	9	78
4	5	S8	Transverse	E	20					10	0													10	0	10	0	42
DECK TRUSS SPANS (2, 3, 6, 7)																												
2792	5	S4	Transverse	E	20					26	5													26	5	26	5	76940
10	5	S5	Transverse	E	20					6	6													6	6	6	6	68
264	5	S9	Longitudinal	E	20					33	0													33	0	33	0	9086
638	5	S10	Longitudinal	E	20					32	3													32	3	32	3	21460
58	5	S11	Longitudinal	E	20					33	4													33	4	33	4	2016
132	5	S12	Longitudinal	E	20					39	0													39	0	39	0	5370
88	5	S13	Longitudinal	E	20					24	0													24	0	24	0	2202
44	5	S14	Longitudinal	E	20					25	3													25	3	25	3	1159
504	6	S15	Longitudinal	E	20					25	5													25	5	25	5	19244
252	6	S16	Longitudinal	E	20					40	0													40	0	40	0	15140
16	5	S17	Longitudinal	E	29					2	0	0	5	0	10	0	6				4.25		4.25	3	9	3	6	62
32	5	S18	Longitudinal	E	29					2	0	0	5.5	0	8	0	6				4.25		4.25	3	8	3	5	122
32	5	S19	Longitudinal	E	29					2	0	0	6	0	10	0	7				5		5	3	11	3	8	130
THRU TRUSS SPANS (L0 to L6 & L6′ to L0′)																												
1486	5	S4	Transverse	E	20					26	5													26	5	26	5	40943
4	5	S5	Transverse	E	20					6	6													6	6	6	6	27
452	5	S20	Longitudinal	E	20					34	10													34	10	34	10	16422
116	5	S21	Longitudinal	E	20					33	7													33	7	33	7	4063
420	6	S22	Longitudinal	E	20					17	4													17	4	17	4	10935
88	5	S24	Longitudinal	E	20					17	2													17	2	17	2	1576
16	5	S25	Longitudinal	E	29					2	0	0	8	0	9	0	9				6.375		6.375	4	2	3	11	65
THRU TRUSS SPANS (L6 to L12 & L12′ to L6′)																												
1488	5	S4	Transverse	E	20					26	5													26	5	26	5	40998
6	5	S5	Transverse	E	20					6	6													6	6	6	6	41
16	5	S17	Longitudinal	E	29					2	0	0	5	0	10	0	6			0	4.25	0	4.25	3	9	3	6	58
452	5	S20	Longitudinal	E	20					34	10													34	10	34	10	16422
116	5	S21	Longitudinal	E	20					33	7													33	7	33	7	4063
420	6	S22	Longitudinal	E	20					17	4													17	4	17	4	10935
88	5	S24	Longitudinal	E	20					17	2													17	2	17	2	1576
16	5	S25	Longitudinal	E	29					2	0	0	8	0	9	0	9			0	6.375	0	6.375	4	2	3	11	65

BILL OF REINFORCING STEEL

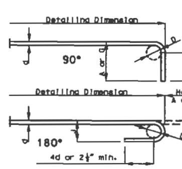
No. Req'd.	Size	Mark	Location	Epoxy (E)	Shape No.	Stirrup (S)	Substr. (X)	Varies (V)	No. Each	B FT.	B IN.	C FT.	C IN.	D FT.	D IN.	E FT.	E IN.	F FT.	F IN.	H FT.	H IN.	K FT.	K IN.	Nominal Length FT.	Nominal Length IN.	Actual Length FT.	Actual Length IN.	Weight LBS.
THRU TRUSS SPANS (L12 to L12′)																												
499	5	S4	Transverse	E	20					26	5													26	5	26	5	13749
2	5	S5	Transverse	E	20					6	6													6	6	6	6	14
16	5	S17	Longitudinal	E	29					2	0	0	5	0	10	0	6			0	4.25	0	4.25	3	9	3	6	58
66	5	S20	Longitudinal	E	20					34	10													34	10	34	10	2398
126	6	S22	Longitudinal	E	20					17	4													17	4	17	4	3280
116	5	S26	Longitudinal	E	20					34	7													34	7	34	7	4184
44	5	S27	Longitudinal	E	20					17	10													17	10	17	10	818
ABUTMENT MODIFICATIONS (2 ABUTMENTS)																												
8	4	H1	Backwall	E	20					26	11													26	11	26	11	144
10	8	H2	Backwall	E	20					26	11													26	11	26	11	719
2	6	H3	Backwall	E	20					26	11													26	11	26	11	81
2	4	H4	Paving Notch	E	20					26	5													26	5	26	5	35
52	4	U1	Paving Notch	E	10								18		6									3	6	3	4	116
24	4	U2	Pilaster	E	10								18	2	1.75									5	2	5	0	80
52	5	V1	Backwall	E	19					2	2	2	2											4	4	4	3	231
DEADMAN ANCHORS (2 DEADMAN ANCHORS)																												
24	7	H5	Deadman		20					23	6													23	6	23	6	1153
96	4	U3	Deadman		13	S				0	18	3	4.50	0	18	3	4.50							10	6	10	3	657
BARRIER CURBS																												
116	5	K1	Safety Barrier Curb	E	19	S				2	5	0	5.125											2	10	2	9	333
116	5	K2	Safety Barrier Curb	E	14	S				0	5.125	0	9.125	1	6					0	2	1	5.875	2	9	2	7	313
72	5	K3	Safety Barrier Curb	E	27	S						0	5.125	1	0		9	1	0	0	9.875	0	6.875	3	2	2	11	219
44	5	K4	Safety Barrier Curb	E	42	S				1	8.75	0	6	1	6.75	1	0							4	6	4	5	203
4	5	K5	Safety Barrier Curb	E	27	S						0	4.375	0	6.875	0	9	1	0	0	5.50	0	4	2	9	2	5	10
4	5	K6	Safety Barrier Curb	E	27	S						0	4.375	0	7.875	0	9			0	6.50	0	4.50	2	10	2	6	10
4	5	K7	Safety Barrier Curb	E	27	S						0	4.375	0	9.625	0	9			0	7.875	0	5.50	2	11	2	8	11
4	5	K8	Safety Barrier Curb	E	27	S						0	4.375	0	11.375	0	9			0	9.25	0	6.50	3	1	2	10	12
48	5	K9	Safety Barrier Curb	E	20					5	7													5	7	5	7	280
40	5	K10	Safety Barrier Curb	E	20					11	5													11	5	11	5	476
4	5	K11	Safety Barrier Curb	E	8					2	2									2	2	0	2.375	4	4	4	4	18
3820	5	R1	Safety Barrier Curb	E	19	S				2	6	0	3.50											2	9	2	8	10625
3820	5	R2	Safety Barrier Curb	E	15	S				2	6	0	3.50							2	6	0	3	2	9	2	8	10625
3820	5	R3	Safety Barrier Curb	E	19	S				1	5	0	6											1	11	1	10	7304
3820	5	R4	Safety Barrier Curb	E	27	S						0	6	0	11	0	7	1	0	0	9.125	0	6.375	3	0	2	10	11289
84	5	R5	Safety Barrier Curb	E	20					37	3													37	3	37	3	3264
84	5	R6	Safety Barrier Curb	E	20					14	5													14	5	14	5	1263
504	5	R7	Safety Barrier Curb	E	20					15	1													15	1	15	1	7929
84	5	R8	Safety Barrier Curb	E	20					15	7													15	7	15	7	1365
644	5	R9	Safety Barrier Curb	E	20					7	8													7	8	7	8	5150
392	5	R10	Safety Barrier Curb	E	20					16	6													16	6	16	6	6746
28	5	R11	Safety Barrier Curb	E	20					9	1													9	1	9	1	265
56	5	R12	Safety Barrier Curb	E	20					6	10													6	10	6	10	399
56	5	R13	Safety Barrier Curb	E	20					8	3													8	3	8	3	482





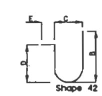
STIRRUP HOOK DIMENSIONS				
Grades 40 - 50 - 60 KSI				
Bar Size	D	90° Hook	135° Hook	
		Hook A or G	Hook A or G	Approx. H
#4	2″	4½″	4½″	3″
#5	2½″	6″	5½″	3¾″
#6	4½″	12″	8″	4½″

Note: Unless otherwise noted, diameter "D" is the same for all bends and hooks on a bar.



END HOOK DIMENSIONS				
Bar Size	D	All Grades		
		180° Hooks		90° Hook
		A or G	J	A or G
#3	2¼″	5″	3″	6″
#4	3″	6″	4″	8″
#5	3¾″	7″	5″	10″
#6	4½″	8″	6″	12″
#7	5¼″	10″	7″	14″
#8	6″	11″	8″	16″
#9	9½″	15″	11¾″	19″
#10	10¾″	17″	13¼″	22″
#11	12″	19″	14¾″	2′-0″
#14	18¼″	2′-3″	21¾″	2′-7″

Notes:
All standard hooks and bends other than 180 degrees to be bent with the same procedure as for 90 degree standard hooks.
Hooks and bends shall be in accordance with the procedures as shown on this sheet.
E = epoxy coated reinforcement
S = stirrup
X = bar is included in substructure quantities
V = bar dimensions vary in equal increments between dimensions shown on this line and the following line
No. Ea. = number of bars of each length
Nominal lengths are based on out to out dimensions shown in bending diagrams and are listed for fabricators use (nearest inch).
Actual lengths are measured along centerline bar to the nearest inch.
Payweights are based on actual lengths.
Reinforcing steel (Grade 60) FY = 60 ksi



BILL OF REINFORCING

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 10/01
CHECKED: 10/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

L05684

MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	B1
SEC./SUR. 12	TWP. 50N	RGE. 32W

ROUTE 291 MISSOURI RIVER BRIDGE

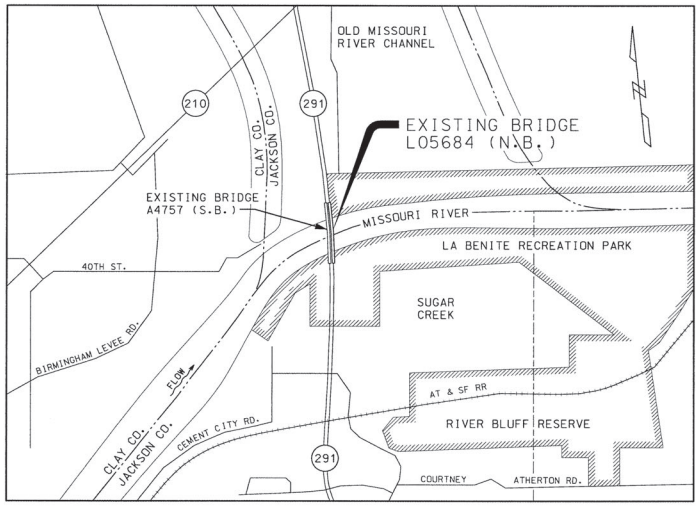
Jackson County

DECK REPLACEMENT

BRIDGE DECK FLOOR SYSTEM REHABILITATION, SUBSTRUCTURE REPAIRS AND FIELD APPLIED PROTECTIVE COATING

2001

INDEX OF SHEETS



LOCATION SKETCH

INDEX OF SHEETS

REPAIRS TO: BRIDGE OVER MISSOURI RIVER

STATE ROAD FROM I-35 TO RTE 24 AT LIBERTY BEND

PROJECT NO. FAF-291-1(61) STA. 99+32.10 (Match Existing)

JOB NO. J4P1416 RTE. 291 NBL

JACKSON **COUNTY**

DATE

STD. 504.00
STD. 605.10
STD. 609.00
STD. 706.35
L05684

SHEET 1 OF 40

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 08/01
CHECKED: 08/01

⚠ Added sheet numbers 09-22-04

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

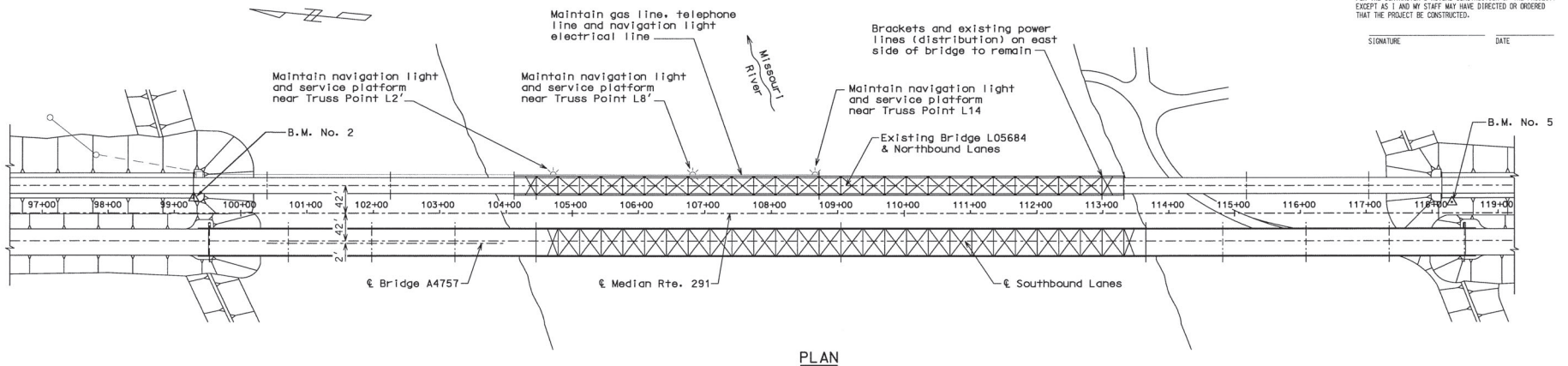
$$$time$$$ $$$date$$$ $$$file$$$

STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	B2

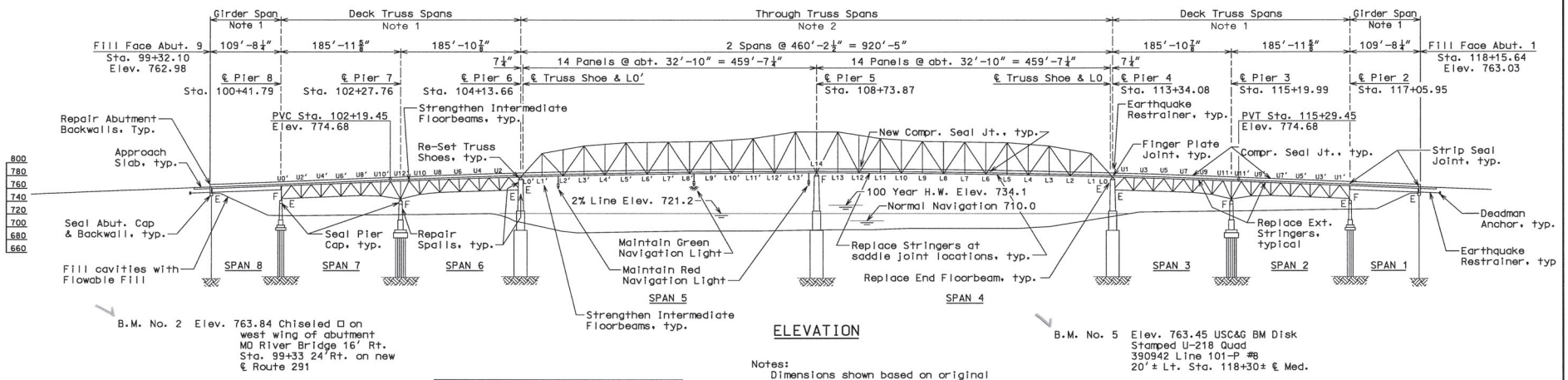
FINAL PLANS

I CERTIFY THAT THIS PLAN SHEET ACCURATELY DEPICTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND ALL ITS APPURTENANT FEATURES. TO THE BEST OF MY KNOWLEDGE, AS I AND MY STAFF HAVE OBSERVED THE CONTRACTOR'S CONSTRUCTION OF THIS PROJECT. I SPECIFICALLY DISCLAIM ANY RESPONSIBILITY FOR THE DESIGN OF THIS PROJECT, EXCEPT AS I AND MY STAFF MAY HAVE MODIFIED OR AUTHORIZED THE MODIFICATION OF THE PROJECT DESIGN DURING ITS CONSTRUCTION; AND I DISCLAIM RESPONSIBILITY FOR THE CONTRACTOR'S ACTUAL CONSTRUCTION OF THE PROJECT, EXCEPT AS I AND MY STAFF MAY HAVE DIRECTED OR ORDERED THAT THE PROJECT BE CONSTRUCTED.

SIGNATURE _____ DATE _____



PLAN



ELEVATION

B.M. No. 2 Elev. 763.84 Chiseled □ on west wing of abutment MO River Bridge 16' Rt. Sta. 99+33 24'Rt. on new ℄ Route 291

B.M. No. 5 Elev. 763.45 USC&G BM Disk Stamped U-218 Quad 390942 Line 101-P #8 20'± Lt. Sta. 118+30± ℄ Med.

BASIC FLOOD DATA	
Discharge (100 yr.)	430,000 cfs
H.W. Elev.	734.1

Notes:
Dimensions shown based on original bridge plan dimensions.
All structural steel shall be cleaned and coated per current MoDOT Specifications.
Provide ¾"Ø shear stud connectors on all stringers in truss spans.

GENERAL PLAN AND ELEVATION

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 06/01
CHECKED: 07/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 2 OF 40

L05684

$$$$time$$$$ $$$$date$$$$ $$$$file$$$$

STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	B3

GENERAL NOTES:

The scope of work generally consists of the removal of existing bridge deck and electric line support towers, replacement of certain floorbeams, stringers, connection plates and clip angles, strengthening of floorbeams, modifications to bearings and abutment backwalls and the construction of slab and barrier curbs, along with other associated work as shown on the plans. The coating of all new and remaining structural steel is also part of the work in this contract.

Two way traffic will be handled on the existing southbound Missouri Route 291 bridge, which shall remain open to traffic during construction.

Utility companies whose facilities are shown on the plans or are known to be within the construction limits shall be notified by the contractor of the construction start date.

All dimensions are horizontal unless otherwise noted. Drawings shall not be scaled.

All open holes remaining after removals shall be filled with ASTM A-325 high strength bolts of the same diameter as the connector that was removed.

Contractor shall verify all dimensions and required bolt diameters and lengths in the field before ordering new steel and fasteners.

SPECIFICATIONS:

Design: 1996 Edition of the AASHTO Standard Specifications for Highway Bridges plus Interims thru 2000.

Construction: Missouri State Highway Commission Standard Specifications For Highway Construction, 1999 Edition, plus project special provisions.

DESIGN LOADING:

Load Factor Design Method - Bridge Deck
Live Load - HS20-44 with Military 24.000# Tandem Axle.
Dead Load - An allowance of 35 Lbs. per sq. ft. of roadway for future wearing surface is included in the dead load for the floor system only.
Concrete Weight - 150 Lbs. per cu. ft.
Earthquake - Category A
Fatigue - Case II, ADTT <2500

CONCRETE:

All exposed edges of concrete shall be beveled ¾" unless otherwise shown or noted.

Construction joints shall be made only at locations shown on the plans, except with the approval of the engineer.

Keys shall be provided for all construction joints unless otherwise shown.

All concrete for bridge deck and abutment backwalls shall be Class B2.

All concrete for barrier curbs shall be Class B1.

JOINT FILLER:

All joint filler shall meet the requirements of standard specification 1057.2.4, except as noted.

REINFORCING STEEL:

Reinforcing steel shall be deformed billet steel bars conforming to ASTM A615, Grade 60. All dimensions to reinforcing steel on detail drawings are to centerline of bar, except where clear distance is noted from the face of concrete.

Minimum clearance to reinforcing steel shall be 1½" unless otherwise shown.

All reinforcing steel shall be lapped according to AASHTO 8.32 unless otherwise shown or noted.

All reinforcing in the bridge deck, barrier curbs and abutment backwalls shall be epoxy coated, except as noted.

The epoxy coated reinforcing bars shall be coated in accordance with Section 710 of Mo. Std. Specs. for Highway Construction.

PROTECTIVE COATING

Protective Coating: System G by the contractor in accordance with the Special Provisions.

Prime Coat: The cost of the prime coat shall be included in the contract lump sum price for "Field Application of Inorganic Zinc Primer". New steel to be shop primed. See Special Provisions.

Field Coat: The cost of the intermediate and finish coats shall be included in the contract price, per tons, for "Intermediate Field Coat (System G) Gray" and "Finish Field Coat (System G) Gray". See Special Provisions.

BRIDGE DECK:

Bridge deck as detailed consists of an 8" slab in truss spans and an 8" slab in the girder spans.

Cast-In-Place with conventional forming shall be used for slab construction in the plate girder and deck truss spans.

Alternate stay-in-place steel deck forms will be allowed in the through truss spans only.

Stud type shear connectors shall be applied to structural steel stringers as a part of this contract.

NAVIGATION LIGHTS:

All navigation and clearance lighting shall be kept in operation during all construction.

CONSTRUCTION:

The entire existing deck shall be removed within each structural unit (through truss, deck truss and/or plate girder spans), prior to replacement with a concrete slab. This requirement is to allow the structure to redistribute and relieve internal stresses.

The contractor shall submit for approval construction drawings showing proposed construction methods and any temporary bridging on the existing structural steel floor system used to gain access to repair areas in the bridge floor.

Prior to stringer and floorbeam removals the contractor shall provide access for MoDOT and consultant personnel to inspect structural steel in the floor system after the existing deck is removed.

Bolts and rivets connecting bottom lateral system to interior stringer brackets in the through truss spans shall be removed prior to constructing new deck slab. Laterals shall be reconnected after placement of slab.

Jacking of the existing through truss spans shall be required to allow removal, modifications and re-setting of the truss bearing masonry plates. New end floorbeams will have jacking stiffeners to carry the truss dead loads. Bearings will remain attached to the truss while bearing bases are re-positioned.

Coordination with Kansas City Power and Light Company shall be required prior to and during removal of power line supports. Support brackets and distribution lines on the east side of the bridge will remain in place. Brackets will be coated, requiring special considerations to protect the power lines and insulators. Service shall be disconnected during construction operations, and re-energized when repairs and coating is completed.

QUANTITIES FOR SLAB ON STEEL

TYPE OF SLAB		⚠ ✱ 364.250 ✱ 364.250	SLAB ON STEEL		
			Reinf. (Lbs.)		Conc. (Cu. Yds.)
			Epoxy	Plain	Slab
Alt. A	Cast-In-Place Conventional Forms		✱ 288.240	-	1.311
Alt. B	Stay-In-Place Forms (Thru Truss Spans Only)		✱ 288.240	-	✱✱ 1.311

NOTES:

The table of Quantities for Slabs represents the quantities used by the state in preparing the cost for concrete slabs. Variations may be encountered in these quantities but these variations cannot be used for an adjustment in the contract unit price per square yard.

See Special Provisons for Alternate Methods of forming slabs.

✱ Does not include reinforcing bars used as supports.

✱✱ Concrete is not allowed in fill corrugations of S.I.P. forms.

TABLE OF FINAL QUANTITIES - BRIDGE DECK, AND COATING

	ITEM	UNIT	TOTAL
	Partial Removal of Bridges	L.S.	1
	Removal of Existing Bridge Deck	Sq. Ft.	46,401
	Removal and Storage of Existing Bridge Rail	L.F.	3762
	Removal of Power Line Supports	L.S.	1
	Removal of Gas Line	L.S.	0
	Bridge Approach Slab (Bridge)	Sq. Yds.	148
	Substructure Repair (Unformed) + (Formed) (300+303.09) =	Sq. Ft.	603.09
	Protective Coating For Concrete Abutments and Piers	Sq. Ft.	600
	Protective Coating - Concrete Bents (Deleterious Agents)	L.S.	1
	Slab on Steel	Sq. Yds.	5,581
✱✱	Safety Barrier Curb	L.F.	3,823
	Laminated Neoprene Bearing Pad	Each	16
	Preformed Compression Expansion Joint Seal (3.5 in.)	L.F.	192
	Strip Seal Expansion Device	L.F.	96
	Abutment Modifications	L.S.	1
	Expansion Device (Finger Plate)	L.F.	48
	Fabricated Structural Carbon Steel (Misc.)	Lbs	45,050
	Fabricated Structural Carbon Steel (I-Beam)	Lbs	199,070
	Rehabilitate Bearing	Each	4
	Earth Quake Restrainer Assemblies	Each	24
	Slab Drain	Each	228
	Surface Preparation for Recoating Structural Steel	L.S.	1
	Field Application of Inorganic Zinc Primer	L.S.	1
	Intermediate Field Coat (System G) Gray	Tons	2.052
	Finish Field Coat (System G) Gray	Tons	2.052
	Transporting Lead Contaminated Residue to Storage Area	L.S.	1
	Transporting Lead Contaminated Residue to the Smelter	L.S.	1
	Disposal of Lead Contaminated Residue	L.S.	1
	Misc. Structural Steel Repair	L.S.	1
	Floorbeam Strengthening	Each	55
	Missing/Loose Bolt and Rivet Replacement	Each	252
	Plate Girder Crack Repair	Each	6
	Supplemental Stringer Replacement - Thru Truss	Each	8
	Supplemental Stringer Replacement - Deck Truss	Each	4
	Supplemental Floorbeam Replacement - Thru Truss	Each	2
	Supplemental Floorbeam Replacement - Deck Truss and Plate Girder	Each	12
	Surface Preparation for Recoating Structural Steel - 5001	L.S.	1
	Field Application of Inorganic Zinc Primer - 5002	L.S.	1
	Misc. Intermediate Field Coat (System G) Gray - 5003	L.S.	1
	Misc. Field Finish Coat (System G) Gray - 5004	L.S.	1
	Transporting Lead Contaminated Residue to Storage Area - 5005	L.S.	1
	Transporting Lead Contaminated Residue to Smelter - 5006	L.S.	1
	Disposal of Lead Contaminated Residue - 5007	L.S.	1
	Misc. Lateral Bracing Replacement - 5008	LB	54456
	Misc. Removal of Welds on Clip Angles - 5009	Each	225
	Misc. Utility Support Bracket Repair - 5011	Each	24
	Force Account - 5016	Each	16558.97
	Force Account Thru Truss Haunch Adjustment - 5017	Each	62796.62
	Misc. Structural Steel Construction - 5018	L.S.	1
	Force Account Core Drilling into Pier 6 - 5019	Each	7479.19
	Misc. North Deck Truss and Plate Girder Span - 5020	L.S.	1
	Misc. Removal and Replacement of MGE Gas Line - 5021	L.S.	1
	Substructure Repair (Formed) - 5027	SQFT	303.09
	Misc. Structural Steel Construction - 5028	L.S.	1
	Bridge Lighting Navigation Light Conduit and Wire - 5029	L.S.	1

FINAL PLANS

I CERTIFY THAT THIS PLAN SHEET ACCURATELY DEPICTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND ALL ITS APPURTENANT FEATURES. TO THE BEST OF MY KNOWLEDGE. AS I AND MY STAFF HAVE OBSERVED THE CONTRACTOR'S CONSTRUCTION OF THIS PROJECT. I SPECIFICALLY DISCLAIM ANY RESPONSIBILITY FOR THE DESIGN OF THIS PROJECT, EXCEPT AS I AND MY STAFF MAY HAVE MODIFIED OR AUTHORIZED THE MODIFICATION OF THE PROJECT DESIGN DURING ITS CONSTRUCTION; AND I DISCLAIM RESPONSIBILITY FOR THE CONTRACTOR'S ACTUAL CONSTRUCTION OF THE PROJECT, EXCEPT AS I AND MY STAFF MAY HAVE DIRECTED OR ORDERED THAT THE PROJECT BE CONSTRUCTED.

SIGNATURE _____ DATE _____

⚠ Add

Submittal of shop drawings shall be waived for structural items replaced in kind when existing members are used as templates. Thickness of items shall be confirmed in the field.

GENERAL NOTES AND QUANTITIES

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
CHECKED: 09/01

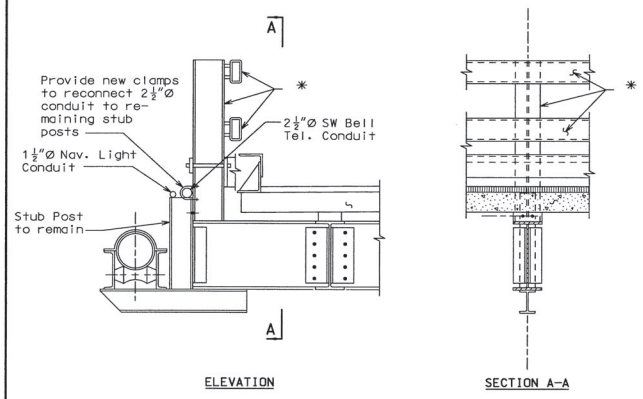
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

⚠ Revised 2-8-02

SHEET 3 OF 40

L05684

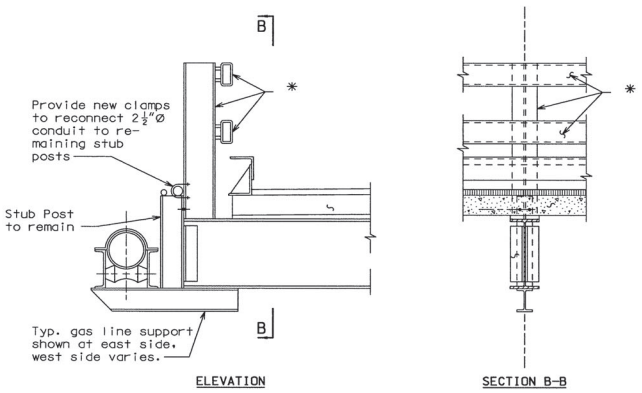
$$$time$$$ $$$date$$$ $$$file$$$



ELEVATION

SECTION A-A

DECK TRUSS SPANS



ELEVATION

SECTION B-B

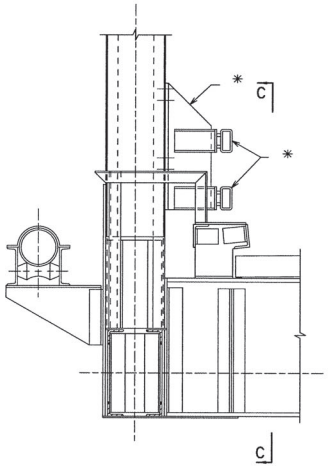
PLATE GIRDER SPANS

* Salvage, see Special Provisions.

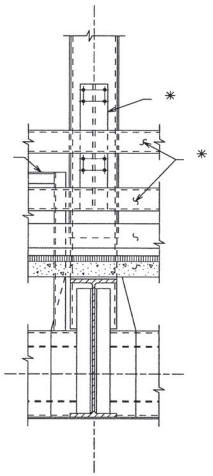
Notes:

All utilities shall be maintained during construction. Contractor shall coordinate with utility companies and provide temporary supports as required. Any clamps required to be removed due to connection to a removed part shall be replaced with new clamps acceptable to the utility company and the Engineer.

All exterior brackets which do not support utilities shall be removed, see Special Provisions.

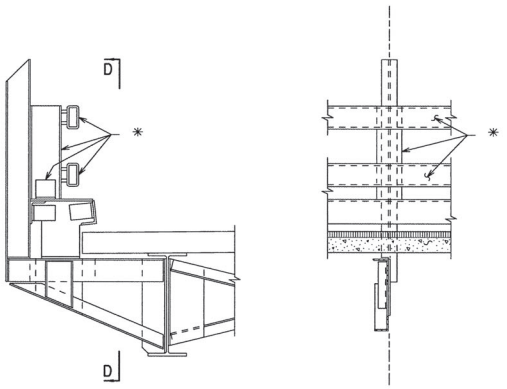


ELEVATION



SECTION C-C

THRU TRUSS SPANS AT VERTICALS



ELEVATION

SECTION D-D

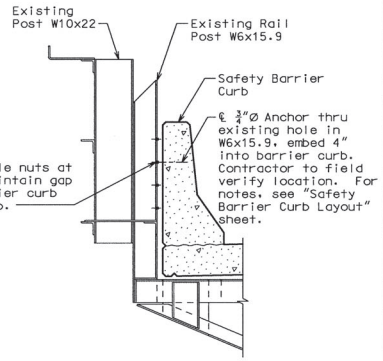
THRU TRUSS SPANS BETWEEN VERTICALS

FINAL PLANS

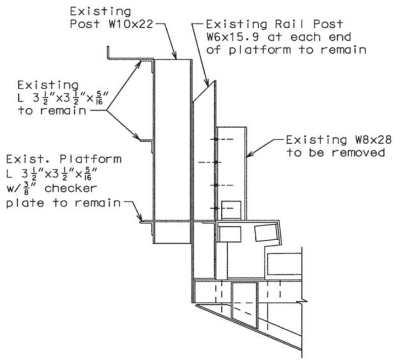
I CERTIFY THAT THIS PLAN SHEET ACCURATELY DEPICTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND ALL ITS APPURTENANT FEATURES. TO THE BEST OF MY KNOWLEDGE, AS I AND MY STAFF HAVE OBSERVED THE CONTRACTOR'S CONSTRUCTION OF THIS PROJECT. I SPECIFICALLY DISCLAIM ANY RESPONSIBILITY FOR THE DESIGN OF THIS PROJECT. EXCEPT AS I AND MY STAFF MAY HAVE MODIFIED OR AUTHORIZED THE MODIFICATION OF THE PROJECT DESIGN DURING ITS CONSTRUCTION; AND I DISCLAIM RESPONSIBILITY FOR THE CONTRACTOR'S ACTUAL CONSTRUCTION OF THE PROJECT, EXCEPT AS I AND MY STAFF MAY HAVE DIRECTED OR ORDERED THAT THE PROJECT BE CONSTRUCTED.

SIGNATURE _____ DATE _____

STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	B4



PROPOSED



EXISTING

MODIFICATION OF EXISTING NAVIGATION LIGHT PLATFORMS NEAR L2', L8' & L14 (EAST SIDE ONLY)

REMOVAL DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 08/01
CHECKED: 09/01

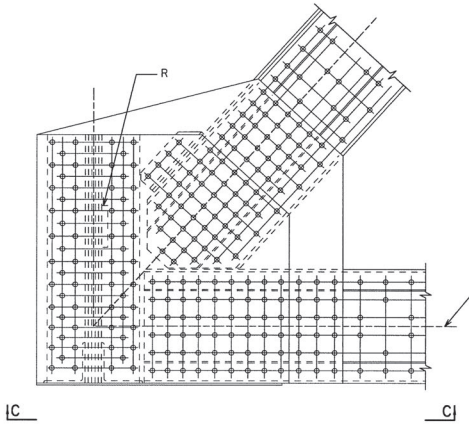
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 4 OF 40

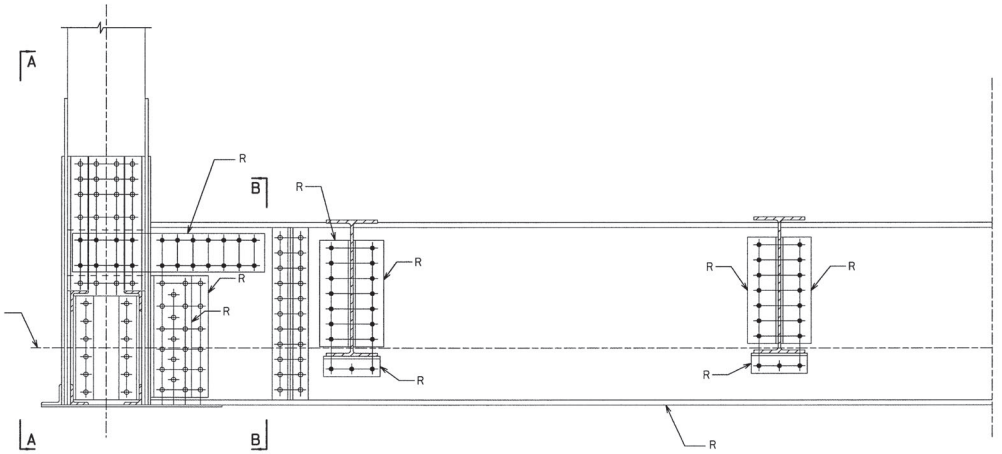
L05684

$$$time$$$ $$$date$$$ $$$file$$$

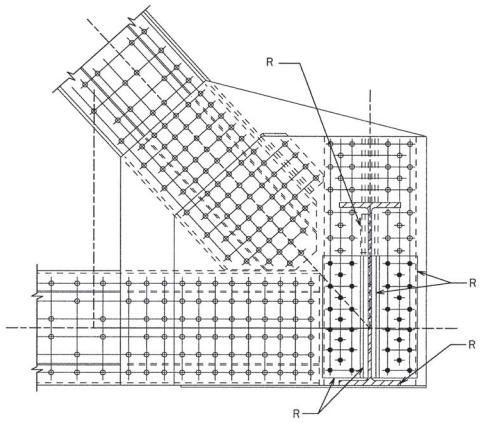
STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	B5



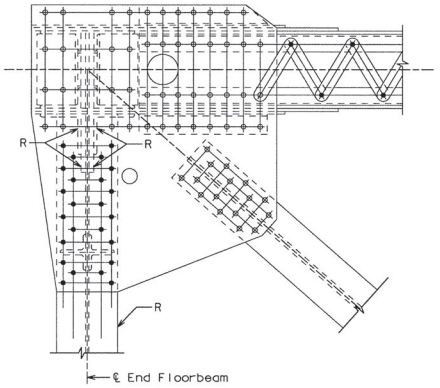
VIEW A-A



HALF SECTION @ LO/LO'



SECTION B-B



VIEW C-C

FINAL PLANS

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SIGNATURE _____ DATE _____

Note:
Support stringers with blocking on pier prior to removing end floorbeam.

Bearing not shown for clarity.

R denotes element to be removed.

For replacement details, see "Floorbeams - Thru Truss" sheet.

- Remove connector, replace w/ H.S. Bolt.

REMOVAL DETAILS - THRU TRUSS END FLOORBEAMS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SHEET 5 OF 40

LO5684

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 08/01
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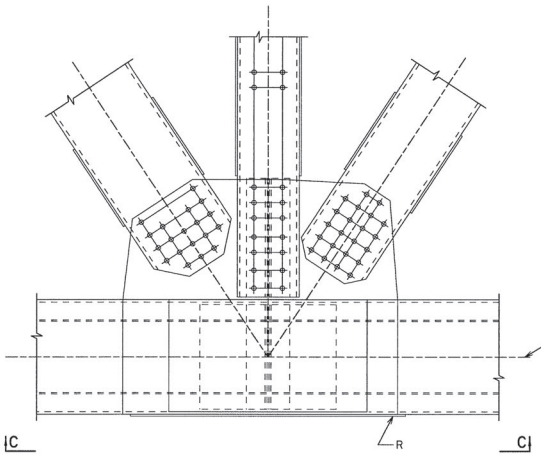
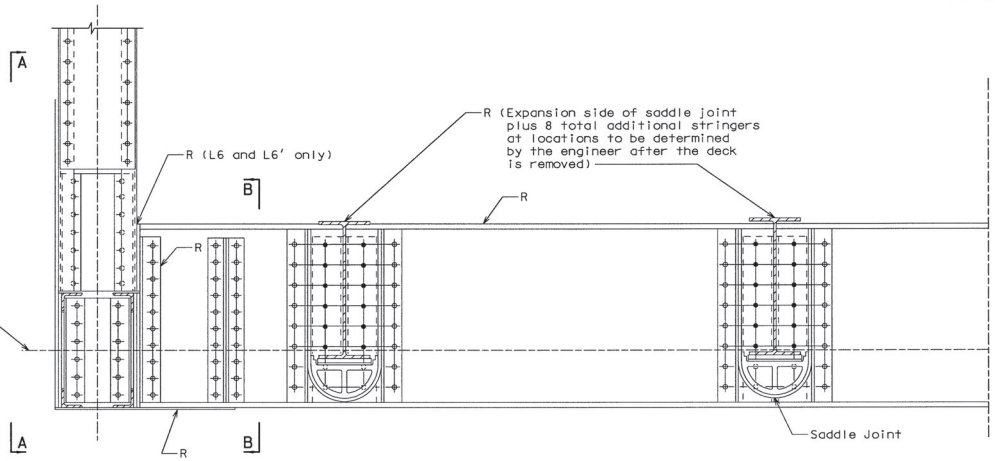
$$$time$$$ $$$date$$$ $$$file$$$

STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	B6

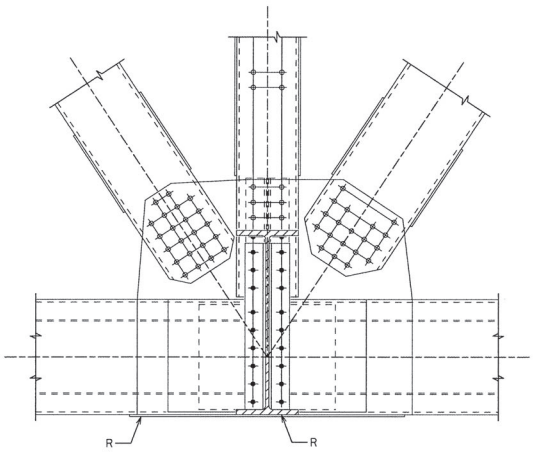


VIEW A-A

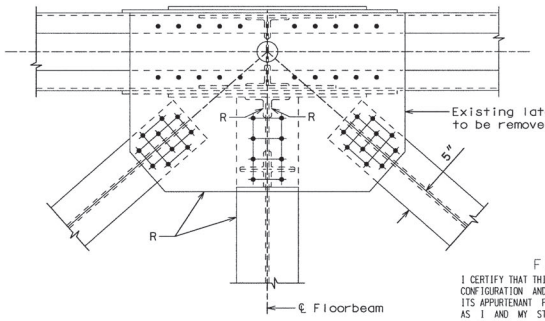


HALF SECTION OF EXISTING FLOORBEAM @ L6/L6' TO BE REMOVED

Remove the Floorbeam at L12 & L12' which is similar



SECTION B-B



VIEW C-C

Notes:

All stringer to floorbeam clip angles in thru truss span shall be removed and replaced with new angles. Shim plates shall be removed, marked and saved for possible re-use.

Clean faying surface of floorbeams, shims, if used and re-erected stringers to a Steel Structures Painting Council Specificaton SSPC-SP 10 and coat with one coat of inorganic zinc primer before erecting new stringer connection angles.

Two additional intermediate floorbeams and eight lateral connection plates will be removed at locations to be determined by the engineer after the deck is removed.

Saddle joints occur at L6, L6', L12 and L12' in the thru truss spans. Removal of additional floorbeams are similar to details shown on this sheet except saddle joints.

Contractor shall remove and reinstall, or temporarily support stringers adjacent to floorbeams which are to be replaced.

For replacement details, see "Floorbeam - Thru Truss" and "Miscellaneous Steel Repairs" sheets.

- Remove connector, replace w/ H.S. Bolt.

FINAL PLANS

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SIGNATURE DATE

REMOVAL DETAILS - THRU TRUSS INTERMEDIATE FLOORBEAMS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 08/01
CHECKED: 09/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 6 OF 40

L05684

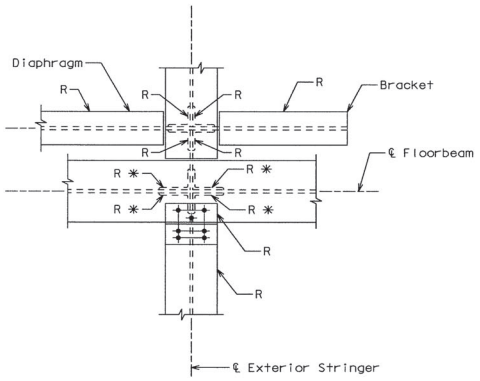
$$$time$$$ $$$date$$$ $$$file$$$

STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	87

FINAL PLANS

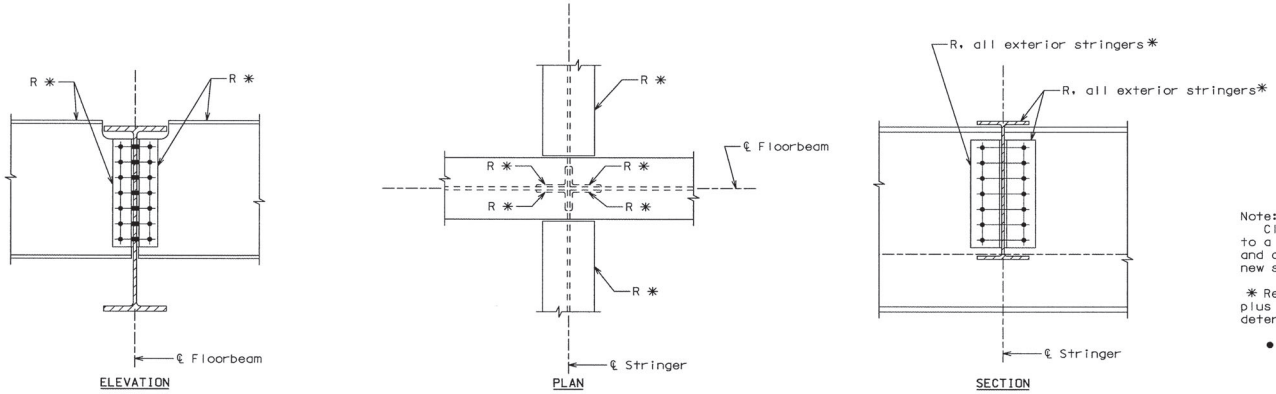
I CERTIFY THAT THIS PLAN SHEET ACCURATELY DEPICTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND ALL ITS APPURTENANT FEATURES. TO THE BEST OF MY KNOWLEDGE, AS I AND MY STAFF HAVE OBSERVED THE CONTRACTOR'S CONSTRUCTION OF THIS PROJECT. I SPECIFICALLY DISCLAIM ANY RESPONSIBILITY FOR THE DESIGN OF THIS PROJECT, EXCEPT AS I AND MY STAFF MAY HAVE MODIFIED OR AUTHORIZED THE MODIFICATION OF THE PROJECT DESIGN DURING ITS CONSTRUCTION; AND I DISCLAIM RESPONSIBILITY FOR THE CONTRACTOR'S ACTUAL CONSTRUCTION OF THE PROJECT, EXCEPT AS I AND MY STAFF MAY HAVE DIRECTED OR ORDERED THAT THE PROJECT BE CONSTRUCTED.

SIGNATURE _____ DATE _____



PLAN OF EXTERIOR STRINGER

STRINGER TO FLOORBEAM CONNECTION DETAILS AT U8 AND U8'



TYPICAL STRINGER TO FLOORBEAM CONNECTION DETAILS

Note:
Clean faying surface of floorbeams and re-erected stringers to a Steel Structures Painting Council Specification SSPC-SP 10 and coat with one coat of inorganic zinc primer before erecting new stringer connection angles.

✳ Removals apply to all exterior stringers in deck truss spans plus four additional interior stringers at locations to be determined by the engineer after the deck is removed.

- Remove connector, replace w/ H.S. Bolt.

REMOVAL DETAILS - DECK TRUSS STRINGERS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 08/01
CHECKED: 09/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

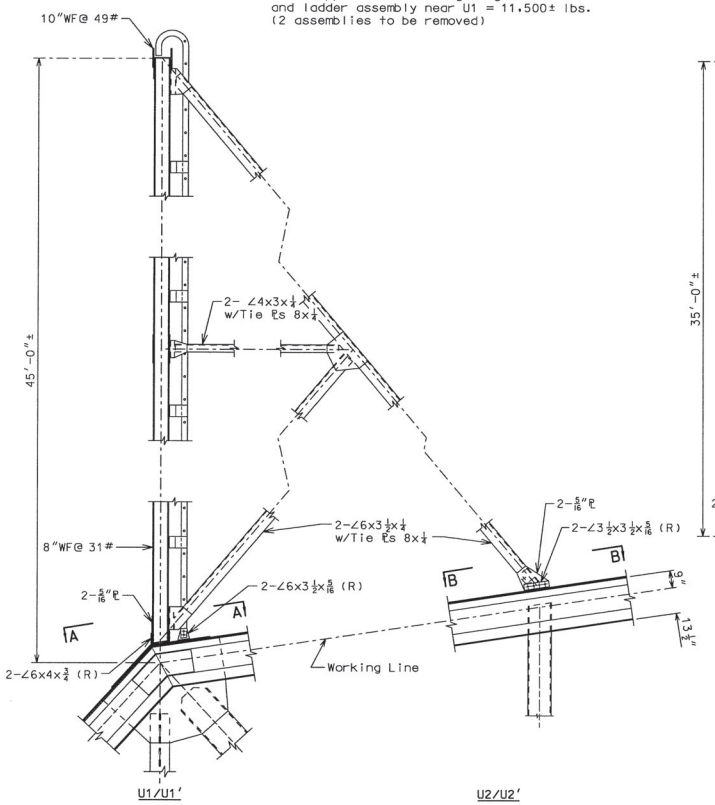
SHEET 7 OF 40

L05684

$$$time$$$ $$$date$$$ $$$file$$$

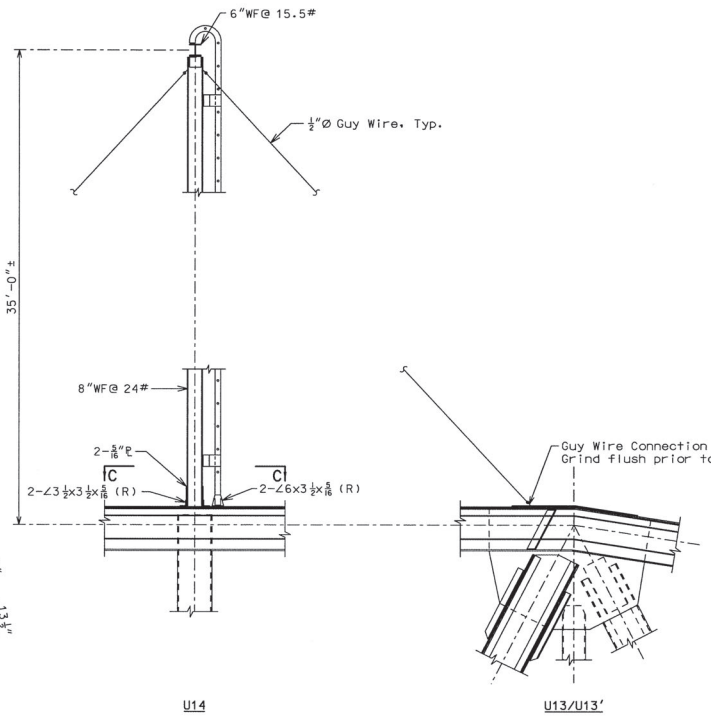
STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	88

Note: Approximate lifting weight of tower and ladder assembly near U1 = 11,500± lbs. (2 assemblies to be removed)



TRANSMISSION LINE TOWER REMOVAL @ U1 AND U1'

Note: Approximate lifting weight of tower and ladder assembly near U14 = 3,800± lbs. (1 assembly to be removed)



TRANSMISSION LINE TOWER REMOVAL @ U14

FINAL PLANS

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SIGNATURE _____ DATE _____

Notes:

R designates item to be removed (shown at selected locations for clarity only).

Entire transmission line tower support elements including verticals, diagonals, crossbeams, ladders, connection angles, attachment plates, power line insulators, aerial beacons, conduits, wires, guy wires and rivets shall be removed.

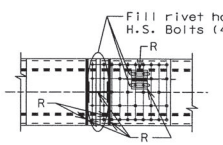
Entire distribution line support brackets on west side of bridge shall be removed. Coordinate removal of power lines with KCP&L.

Structural elements welded to truss chord plates shall be cut flush and ground smooth prior to coating.

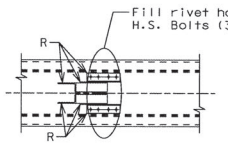
Approximate tower assembly weights shown include all structural steel and connectors for both chords and crossbeam members.

Steel sections, guy wires and rivet sizes shown are based on original plan details. Variations or additional elements encountered during removal and disposal will be considered incidental and not grounds for additional payment.

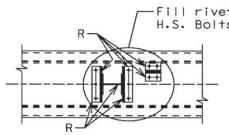
All costs associated with furnishing and installing ¾"Ø H.S. bolts in open rivet holes at tower and bracket connections to truss will be considered incidental to lump sum price bid for "Removal of Power Line Supports".



SECTION A-A



SECTION B-B



SECTION C-C

REMOVAL DETAILS
POWER LINE SUPPORTS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 08/01
CHECKED: 09/01

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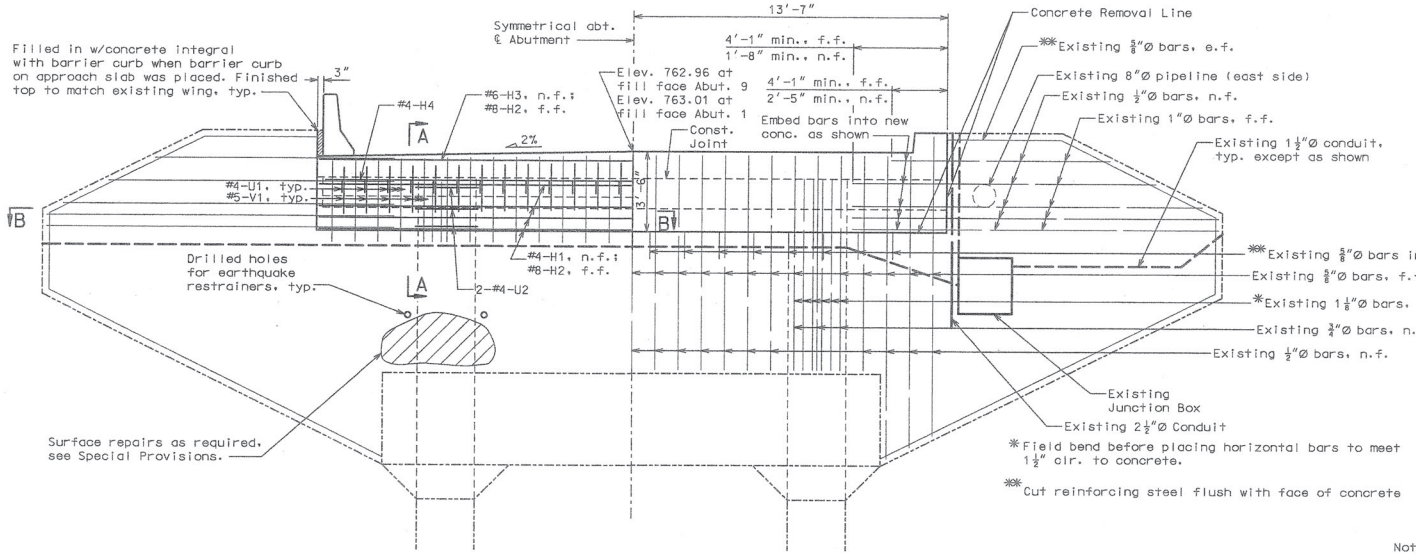
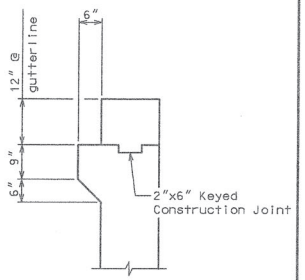
L05684

STATE	CONTRACT ID	SHEET NO.
MO.	020116-401	89



PART ELEVATION

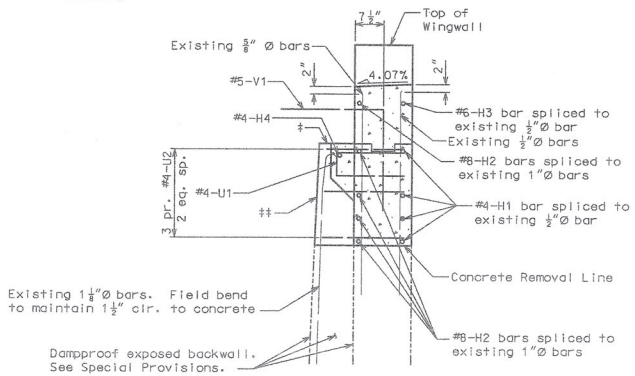
(Looking backstation at Abutment 9, Abutment 1 opposite hand)
n.f. = near face
f.f. = far face



DIMENSIONS AT PAVING NOTCH

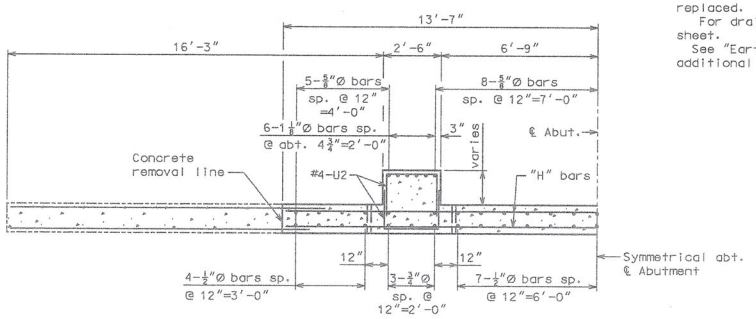
‡Finish top of pilaster to match paving notch.

‡‡Form back of pilaster to match slope of existing.



SECTION A-A

Note: Barrier Curb not shown for clarity.



SECTION B-B

Notes:

Remove all concrete and reinforcing in designated area except as noted.

Existing vertical bars to be embedded in new concrete. Cut vertical bars to maintain 2" clear to top of concrete.

Reinforcing bars to be incorporated in new concrete shall be cleaned and brush coated with epoxy coating, see Special Provisions. Contractor shall provide tarps or other means of protection to avoid epoxy spillage onto existing concrete. All epoxy spilled on existing concrete surfaces that will be in contact with new concrete shall be removed. Epoxy within 1 bar diameter of existing bars does not need to be removed.

Existing conduits, junction box and pipline on east side of bridge shall be protected during removals, and shall not be disturbed throughout construction.

Conduit clamps affected by construction shall be replaced.

For drainage details, see other "Abutment Modifications" sheet.

See "Earthquake Restrainers - Abutments 1 & 9"sheet for additional details.

FINAL PLANS

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ABUTMENT MODIFICATIONS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
CHECKED: 09/01

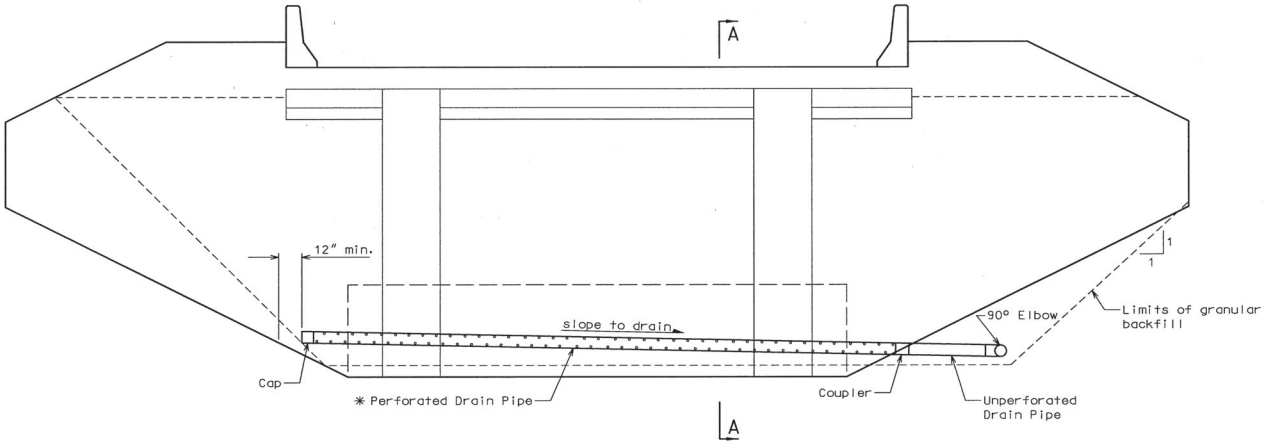
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 9 OF 40

L05684

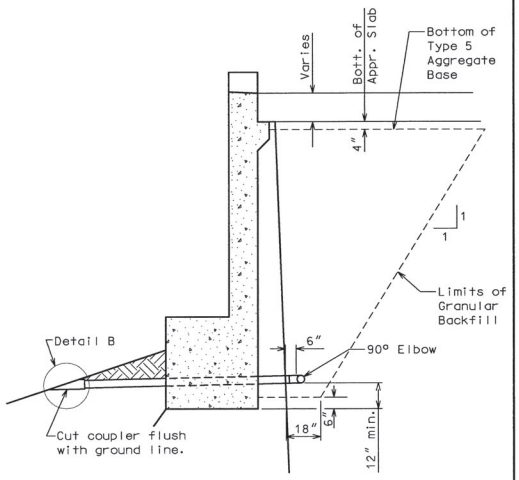
$$$time$$$ $$$date$$$ $$$file$$$

STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	B10



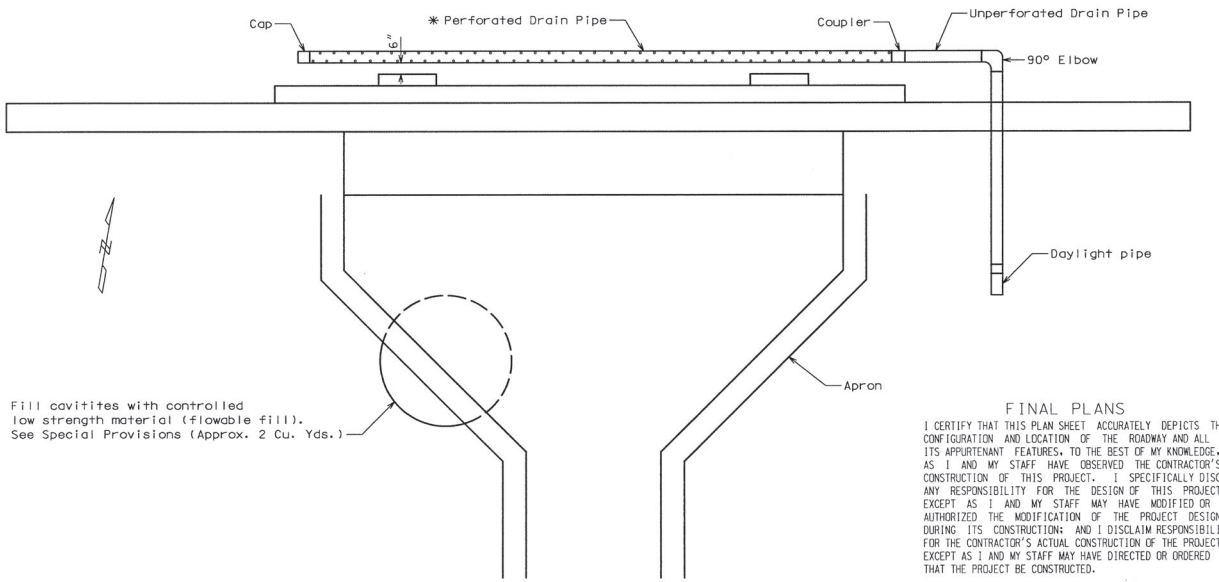
ELEVATION OF DRAIN AT ABUTMENT

(Looking backstation at Abutment 1. Abutment 9 opposite hand.)



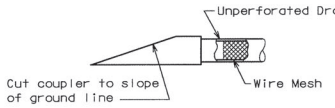
SECTION A-A

* Wrap with Geotextile Fabric. see Special Provions.



PLAN

(Abutment 9 shown, Abutment 1 similar except apron and flowable fill)



DETAIL B

FINAL PLANS

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SIGNATURE _____ DATE _____

Notes For Drain:

Drain pipe may be either 6" diameter corrugated metallic-coated steel pipe underdrain, 4" diameter corrugated polyvinyl chloride (PVC) drain pipe or 4" diameter corrugated polyethylene (PE) drain pipe.

Perforated pipe shall be placed at fill face side at least 12" above the bottom of the abutment barrel and plain pipe shall be used from where the drain intersects the bottom of the wing to the exit at ground line.

Furnishing and installing drains shall be in general accordance with Section 715 of the Standard Specifications.

The drains shall be installed just prior to the placement of abutment backfill.

All costs associated with abutment repairs including removal of concrete, new concrete up to construction joint at paving notch, new epoxy coated reinforcing, excavation, compacted backfill material in place, painting epoxy on existing reinforcing bars, dampproofing backwalls, drainage system, geotextile fabric around perforated pipe, filling cavities with controlled low strength material and all incidentals shall be included under the contract unit price bid per lump sum for "Abutment Modifications".

ABUTMENT MODIFICATIONS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
CHECKED: 09/01

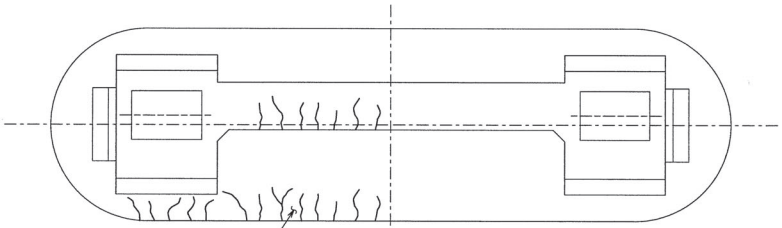
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 10 OF 40

L05684

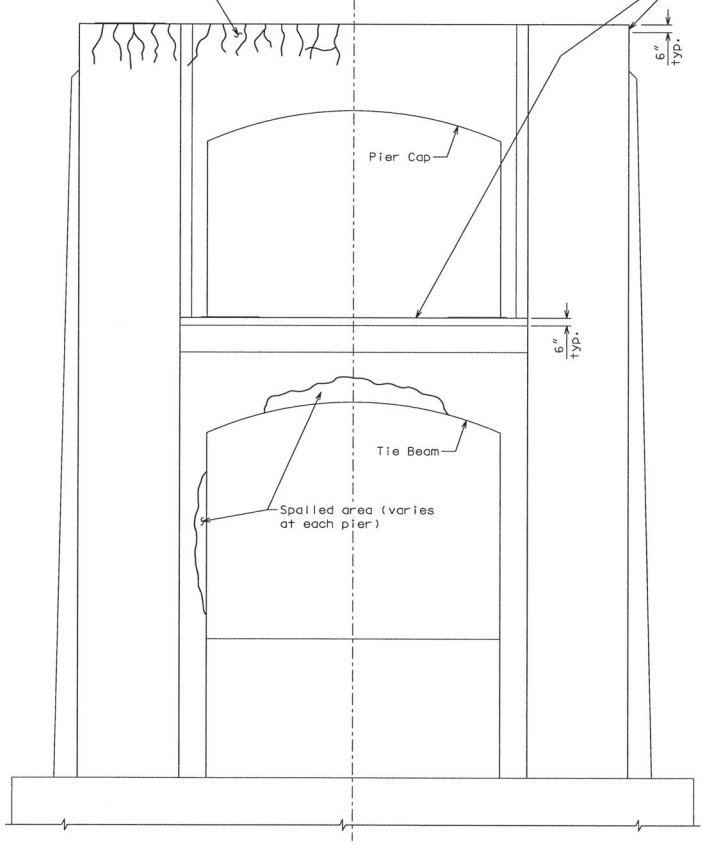
$$$time$$$ $$$date$$$ $$$file$$$

STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	B11

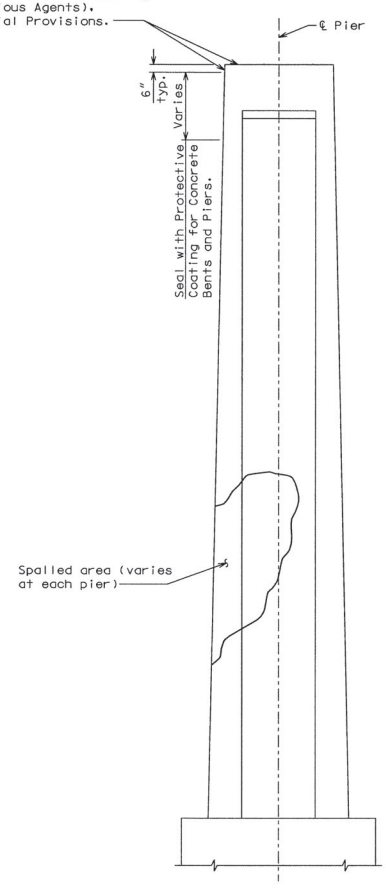


PLAN

Cracked areas on piers, clean and seal, typ.



ELEVATION



SECTION

FINAL PLANS

I CERTIFY THAT THIS PLAN SHEET ACCURATELY DEPICTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND ALL ITS APPURTENANT FEATURES, TO THE BEST OF MY KNOWLEDGE, AS I AND MY STAFF HAVE OBSERVED THE CONTRACTOR'S CONSTRUCTION OF THIS PROJECT. I SPECIFICALLY DISCLAIM ANY RESPONSIBILITY FOR THE DESIGN OF THIS PROJECT, EXCEPT AS I AND MY STAFF MAY HAVE MODIFIED OR AUTHORIZED THE MODIFICATION OF THE PROJECT DESIGN DURING ITS CONSTRUCTION; AND I DISCLAIM RESPONSIBILITY FOR THE CONTRACTOR'S ACTUAL CONSTRUCTION OF THE PROJECT, EXCEPT AS I AND MY STAFF MAY HAVE DIRECTED OR ORDERED THAT THE PROJECT BE CONSTRUCTED.

SIGNATURE _____ DATE _____

Notes:

Spalled areas shall be chipped and cleaned by sandblasting or other approved method. Areas cleaned shall be patched and sealed in accordance with the Special Provisions.

Pier caps and columns shall be cleaned and sealed after repair and/or replacement of structural steel elements and adjustment to bearings.

Total areas of repair shall be determined by the Engineer in the field at the time of construction.

Piers 4 & 5 shown, repairs at all other piers and abutments below areas of new concrete are similar.

SUBSTRUCTURE REPAIR DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

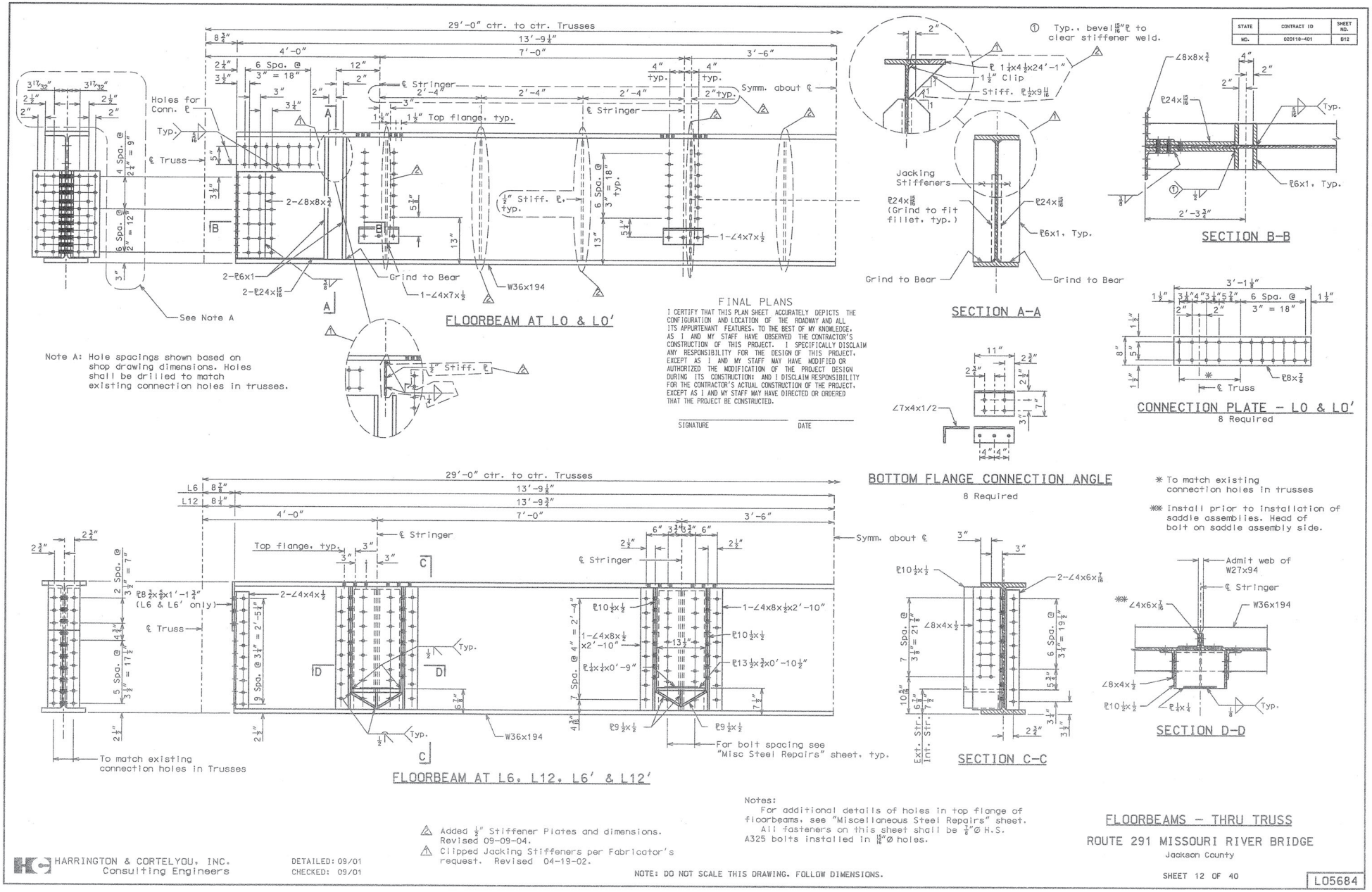
DETAILED: 09/01
CHECKED: 09/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 11 OF 40

L05684

$$$$time$$$$ $$$$date$$$$ $$$$file$$$$



STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	B12

Notes:
For additional details of holes in top flange of floorbeams, see "Miscellaneous Steel Repairs" sheet.
All fasteners on this sheet shall be ⅞"Ø H.S. A325 bolts installed in 15/16"Ø holes.

⚠ Added ½" Stiffener Plates and dimensions. Revised 09-09-04.
⚠ Clipped Jacking Stiffeners per Fabricator's request. Revised 04-19-02.

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
CHECKED: 09/01

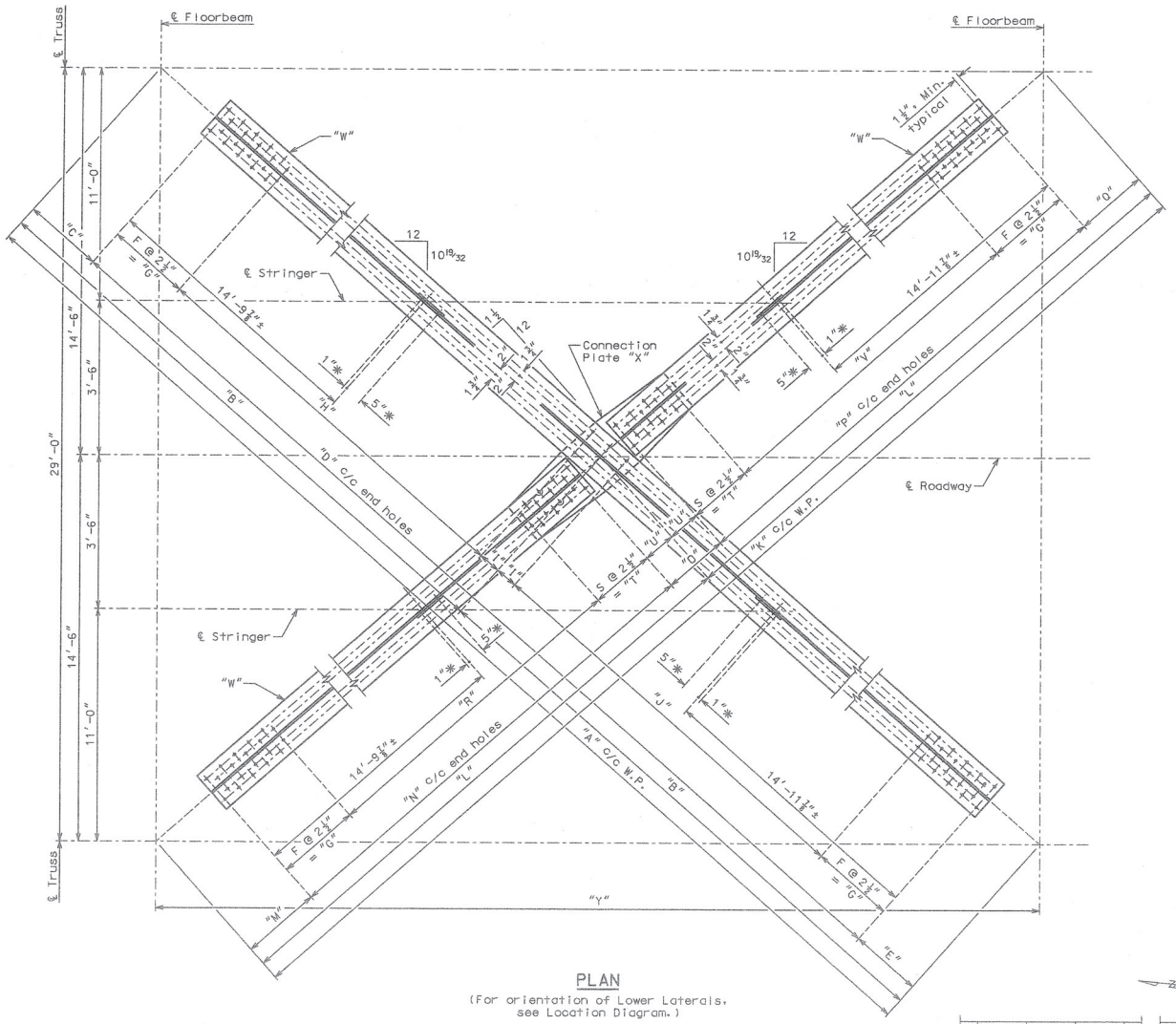
FLOORBEAMS - THRU TRUSS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SHEET 12 OF 40

L05684

$$$time$$$ $$$date$$$ $$$file$$$

STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	B12a



PLAN

(For orientation of Lower Laterals, see Location Diagram.)

BOTTOM LATERAL DIMENSION DATA			
LOCATION	SPAN		
	L8–L9 & L8′–L9′	L9–L10 & L9′–L10′	L10–L11 & L10′–L11′
"A"	43′-9⅝"	43′-9⅝"	43′-9⅝"
"B"	21′-10 13/16"	21′-10 13/16"	21′-10 13/16"
"C"	19½"	19½"	21½"
"D"	40′-4⅝"	40′-4⅝"	40′-4⅝"
"E"	21½"	21½"	19½"
"F"	5	5	6
"G"	12½"	12½"	15"
"H"	18′-9 13/16"	18′-9 13/16"	18′-4 5/16"
"I"	5"	5"	6"
"J"	18′-7 13/16"	18′-7 13/16"	18′-6 5/16"
"K"	43′-9⅝"	43′-9⅝"	43′-9⅝"
"L"	21′-10 13/16"	21′-10 13/16"	21′-10 13/16"
"M"	19½"	19½"	21½"
"N"	19′-7⅞"	19′-7⅞"	19′-4½"
"O"	15⅜"	15⅜"	17⅝"
"P"	19′-5⅝"	19′-5⅝"	19′-6½"
"Q"	21½"	21½"	19½"
"R"	17′-6⅝"	17′-6⅝"	16′-10½"
"S"	5	5	6
"T"	12½"	12½"	15"
"U"	7 11/16"	7 11/16"	8 13/16"
"V"	17′-4⅝"	17′-4⅝"	17′-0½"
"W"	WT6x26.5	WT6x26.5	WT6x39.5
"X"	14"x 7/16"x3′-7⅜"	14"x 7/16"x3′-7⅜"	16"x½"x4′-2⅜"
"Y"	32′-9⅞"	32′-9⅞"	32′-10 1/16"

Notes:
* Field drill to attach to existing brackets. Add fill plates if required.
All dimensions shown except connection at Connection Plate "X" are based on shop drawings from the original bridge construction. Contractor shall field verify all dimensions.
W.P. denotes Working Point.
Lateral bracing shall not be removed from more than 3 bays at a time, per span.

FINAL PLANS

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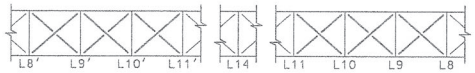


LOCATION DIAGRAM

LOWER LATERAL BRACING DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 06/02
CHECKED: 06/02

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

1 New Sheet 7/10/02

SHEET 12A OF 40

L05684

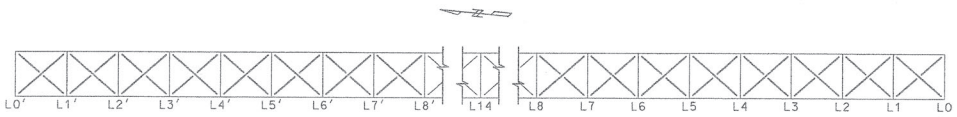
$$$time$$$ $$$date$$$ $$$file$$$

STATE	CONTRACT ID	SHEET NO.
MO.	020116-401	B12b

BOTTOM LATERAL DIMENSION DATA

LOCATION	SPAN							
	L0–L1 & L0′–L1′	L1–L2 & L1′–L2′	L2–L3 & L2′–L3′	L3–L4 & L3′–L4′	L4–L5 & L4′–L5′	L5–L6 & L5′–L6′	L6–L7 & L6′–L7′	L7–L8 & L7′–L8′
"A"	43′-9 5/8"	43′-9 5/8"	43′-9 5/8"	43′-9 5/8"	43′-9 5/8"	43′-9 5/8"	43′-9 5/8"	43′-9 5/8"
"B"	21′-10 13/16"	21′-10 13/16"	21′-10 13/16"	21′-10 13/16"	21′-10 13/16"	21′-10 13/16"	21′-10 13/16"	21′-10 13/16"
"C"	2′-4"	19 1/2"	19 1/2"	19 1/2"	21 1/2"	19 1/2"	19 1/2"	19 1/2"
"D"	39′-10 1/8"	40′-4 5/8"	40′-4 5/8"	40′-4 5/8"	40′-4 5/8"	40′-4 5/8"	40′-4 5/8"	40′-4 5/8"
"E"	19 1/2"	21 1/2"	21 1/2"	21 1/2"	19 1/2"	21 1/2"	21 1/2"	21 1/2"
"F"	7	5	5	5	5	4	4	4
"G"	17 1/2"	12 1/2"	12 1/2"	12 1/2"	12 1/2"	10"	10"	10"
"H"	17′-7 5/16"	18′-9 13/16"	18′-9 13/16"	18′-9 13/16"	18′-7 3/16"	19′-0 5/16"	19′-0 5/16"	19′-0 5/16"
"I"	6"	5"	5"	5"	5"	5"	5"	5"
"J"	18′-3 13/16"	18′-7 13/16"	18′-7 13/16"	18′-7 13/16"	18′-9 13/16"	18′-10 5/16"	18′-10 5/16"	18′-10 5/16"
"K"	43′-9 5/8"	43′-9 5/8"	43′-9 5/8"	43′-9 5/8"	43′-9 5/8"	43′-9 5/8"	43′-9 5/8"	43′-9 5/8"
"L"	21′-10 13/16"	21′-10 13/16"	21′-10 13/16"	21′-10 13/16"	21′-10 13/16"	21′-10 13/16"	21′-10 13/16"	21′-10 13/16"
"M"	2′-4"	19 1/2"	19 1/2"	19 1/2"	21 1/2"	19 1/2"	19 1/2"	19 1/2"
"N"	18′-10"	19′-7 5/8"	19′-7 5/8"	19′-7 5/8"	19′-5 5/8"	19′-7 5/8"	19′-7 5/8"	19′-7 5/8"
"O"	17 5/8"	15 3/8"	15 3/8"	15 3/8"	15 3/8"	15 3/8"	15 3/8"	15 3/8"
"P"	19′-6 1/2"	19′-5 5/8"	19′-5 5/8"	19′-5 5/8"	19′-7 5/8"	19′-5 5/8"	19′-5 5/8"	19′-5 5/8"
"Q"	19 1/2"	21 1/2"	21 1/2"	21 1/2"	19 1/2"	21 1/2"	21 1/2"	21 1/2"
"R"	16′-1 1/2"	17′-6 3/8"	17′-6 3/8"	17′-6 3/8"	17′-4 3/8"	17′-9 1/8"	17′-9 1/8"	17′-9 1/8"
"S"	6	5	5	5	5	2 4 ¬5¹	2 4 ¬5¹	2 4 ¬5¹
"T"	15"	12 1/2"	12 1/2"	12 1/2"	12 1/2"	2 10"–12 1/2"	2 10"–12 1/2"	2 10"–12 1/2"
"U"	8 13/16"	7 11/16"	7 11/16"	7 11/16"	7 11/16"	7 11/16"	7 11/16"	7 11/16"
"V"	16′-10"	17′-4 5/8"	17′-4 5/8"	17′-4 5/8"	17′-6 5/8"	17′-7 1/8"	17′-7 1/8"	17′-7 1/8"
"W"	WT6x39.5	WT6x26.5	WT6x26.5	WT6x26.5	WT6x26.5	WT6x26.5	WT6x26.5	WT6x26.5
"X"	16"x 1/2"x4′-2 5/8"	14"x 7/16"x3′-7 3/8"	14"x 7/16"x3′-7 3/8"	14"x 7/16"x3′-7 3/8"	14"x 7/16"x3′-7 3/8"	14"x 7/16"x3′-7 3/8"	14"x 7/16"x3′-7 3/8"	14"x 7/16"x3′-7 3/8"
"Y"	32′-9 7/8"	32′-9 7/8"	32′-9 7/8"	32′-9 7/8"	32′-9 7/8"	32′-9 7/8"	32′-9 7/8"	32′-9 7/8"

Notes:
The dimension from the ℄ of end hole to the ℄ of existing bracket connection is 14′-3 3/8" at the L0 end and 14′-11 7/8" at the L1 end of the lower lateral bracing between L0 & L1, (L0′ similar).
For all other bays the dimension from the ℄ of end hole to the ℄ of existing bracket connection will be as shown on sheet 12A or opposite hand depending on the orientation of the lower lateral bracing.
See "Lower Lateral Bracing Details" sheet 12A for drawing and other notes.



LOCATION DIAGRAM

FINAL PLANS

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SIGNATURE _____ DATE _____

LOWER LATERAL BRACING DATA
L0 TO L8 & L0′ TO L8′

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 07/02
CHECKED: 07/02

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

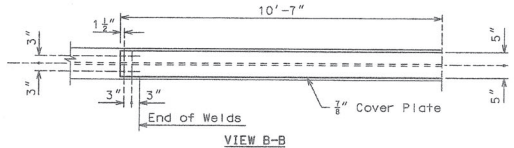
2 Per Fabricator's Request 8/13/02
1 New Sheet 7/26/02

SHEET 12B OF 40

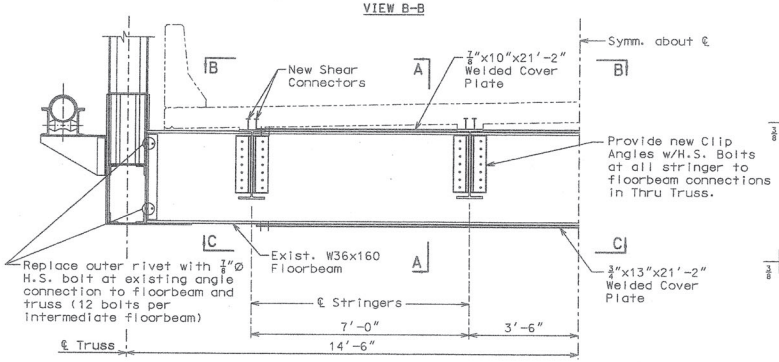
L05684

$$$time$$$ $$$date$$$ $$$file$$$

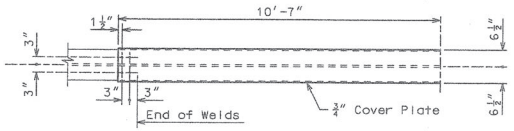
STATE	CONTRACT ID	SHEET NO.
MO.	020116-401	B13



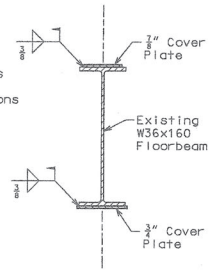
VIEW B-B



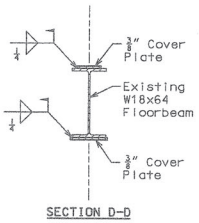
PART ELEVATION



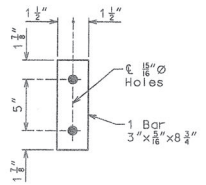
VIEW C-C

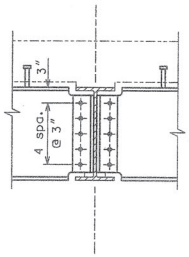


SECTION A-A



SECTION D-D





SECTION G-G

THRU TRUSS FLOORBEAM DETAILS

L1 thru L5, L7 thru L11, L13, L13', L11' thru L7', L5' thru L1'.

⚠1 PLATE UNDER U0' FLOORBEAM

(Over west truss)

⚠3 South Deck Truss only.

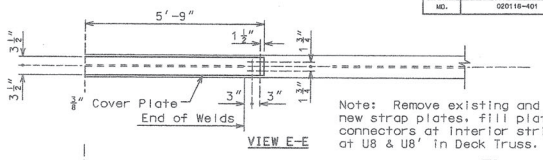
⚠2 Notes:

Cut 12" off one end of bottom cover plate at U12. Center cover plate on floorbeams.

✱ 5'-3" at U12. Use existing holes on one end of cover plate. Field drill new holes at cut end of cover plate as specified.

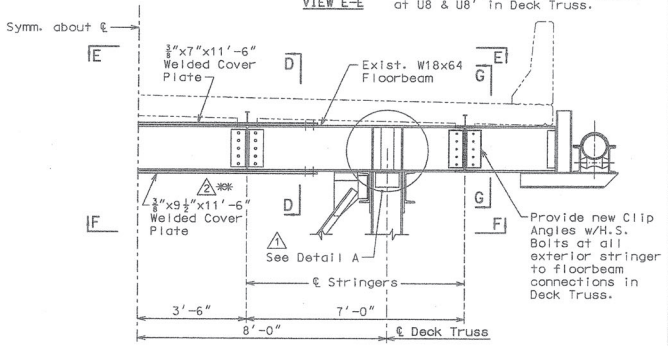
‡ 2" from cut end of cover plate at U12.

✱✱ 10'-6" at U12.

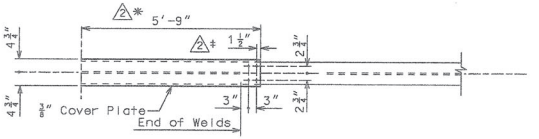


VIEW E-E

Note: Remove existing and provide new strap plates, fill plates, and connectors at interior stringers at U8 & U8' in Deck Truss.



PART ELEVATION



VIEW F-F

DECK TRUSS FLOORBEAM DETAILS

Typical at all Intermediate Floorbeams

Notes:

Bolts connecting cover plates to floorbeams shall be ⅞"Ø H.S. Bolts in 15/16"Ø Holes.

Special weld procedures are required, see Special Provisions.

⚠1 Bolts connecting bearing stiffeners to floorbeams shall be ¾"Ø H.S. Bolts.

⚠1 Deck truss floorbeams shall be replaced on the South Deck Truss at U0, U5, U9 and U11. The contractor has the option of replacing the existing floorbeams with Grade 36 W18x65 floorbeams with cover plates as shown above, or with Grade 50 W18x65 floorbeams (no cover plates needed).

⚠2 Grind 3" wide strip at bottom flange after removal of existing stiffener and prior to field measuring and attaching new stiffener angle.

⚠3 Deck truss floorbeams shall be replaced on the North Deck Truss at U3', U9', U10, U9, U7, U5 and U0. The contractor has the same options for floorbeam replacement as stated above for the South Deck Truss.

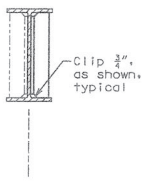
⚠3 The south end floorbeam of the South Plate Girder span shall be replaced.

⚠1 BEARING STIFFENER ANGLE REPLACEMENT LOCATIONS

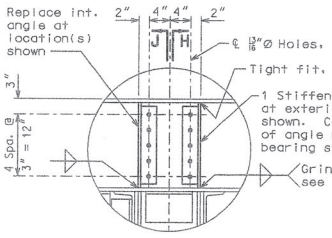
(South Deck Truss)

East Truss: U4, North side, exterior
U10, North side, exterior
U11', North side, exterior
U10', North side, exterior
U9', North side, exterior
U9', North side, interior

West Truss: U1, North side, exterior
U7, North side, exterior



⚠1 SECTION H-H



⚠3 J H

⚠1 DETAIL A

Stiffeners at other truss opposite hand.

⚠3 For Section J-J, see "Deck Truss Floorbeam Repairs" sheet.

FINAL PLANS

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SIGNATURE _____ DATE _____

⚠3 Revised 4/09/04
⚠2 Revised 3/01/04
⚠1 Revised 2/09/04

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 08/01
CHECKED: 08/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

FLOORBEAM STRENGTHENING DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

SHEET 13 OF 40

L05684

$$$time$$$ $$$date$$$ $$$file$$$

STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	813A

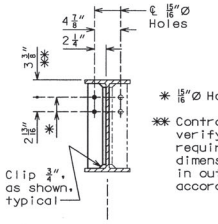
② BEARING STIFFENER ANGLE REPLACEMENT LOCATIONS

(North Deck Truss)

East Truss: U4′, South side, exterior
U6′, South side, exterior & interior
U6, South side, exterior

West Truss: U0′, North side, exterior & interior
U1′, South side, exterior
U5′, South side, exterior
U7′, South side, exterior
U10′, South side, exterior
U11′, South side, exterior
U12′, South side, exterior
U1, South side, exterior

For Bearing Stiffener Angle Replacement Details, see Detail A on "Floorbeam Strengthening Details" sheet.

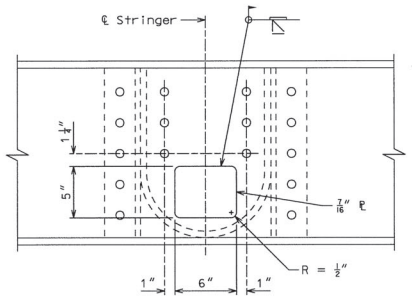


* 15/16"Ø Holes

** Contractor shall verify length of angle required and adjust dimensions to holes in outstanding leg accordingly.

② SECTION J-J

At U6′ interior, only.



FLOORBEAM U8′ – SOUTH DECK TRUSS

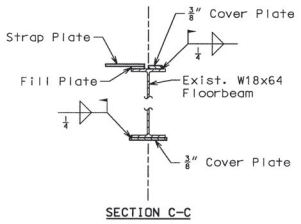
East Exterior Floorbeam Location

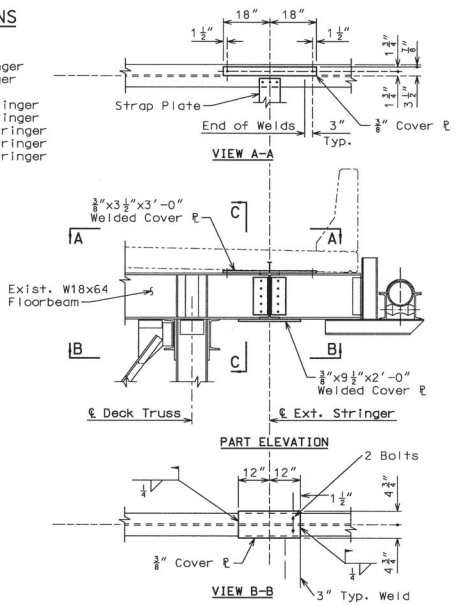
② WELDED COVER PLATE LOCATIONS

(North Deck Truss only)

Top Flange Cover ℄: U8′, East exterior stringer (2 Req'd.) U8, East exterior stringer

Bott. Flange Cover ℄: U5′, East exterior stringer (5 Req'd.) U6′, East exterior stringer
U10′, West exterior stringer
U12′, East exterior stringer
U12′, West exterior stringer





② DECK TRUSS FLOORBEAM DETAILS

Notes:

Remove 6" wide by 5" tall area of web as shown. Provide 1/2" radius at corners (drilled holes). Grind cut edges.

Splice in new plate (beveled edges) as shown in detail. Provide backing plate in gap between saddle and web of floorbeam.

Clean, prime and coat repaired area in accordance with Special Provisions.

Drill a 3/4"Ø hole in floorbeam U8′ (South Deck Truss) web at west exterior stringer where 1/4"Ø hole in web occurs. Plug weld and grind hole.

Remove interior stringers on saddle side of floorbeams U8 & U8′. Thoroughly clean (scrape and water blast) all exterior and interior saddle bearings, including space between saddle and floorbeam web. Apply 3 component Calcium Sulfonate, per attached addendum to the Special Provisions, to area of floorbeam web behind saddle bearing casting. Contractor shall use caution when applying all 3 components of Calcium Sulfonate so as not to encroach on areas where System G coating will be applied. If any component of the Calcium Sulfonate is applied where System G coating will be applied, the Calcium Sulfonate shall be removed prior to application of System G coating. Fill gap between saddle and floorbeam web with compressible joint material, allow 1" for a mastic type sealant caulking at top of joint material. Prime and coat remaining saddle area, in accordance with Special Provisions, prior to reinstalling existing interior stringers or new exterior stringers.

② For notes pertaining to Bearing Stiffener Angle Replacement and Welded Cover Plates, see "Floorbeam Strengthening Details" sheet.

② Grind top or bottom of floorbeam flanges, if required, at cover plate locations.

FINAL PLANS

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SIGNATURE _____ DATE _____

DECK TRUSS FLOORBEAM REPAIRS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 03/04
CHECKED: 03/04

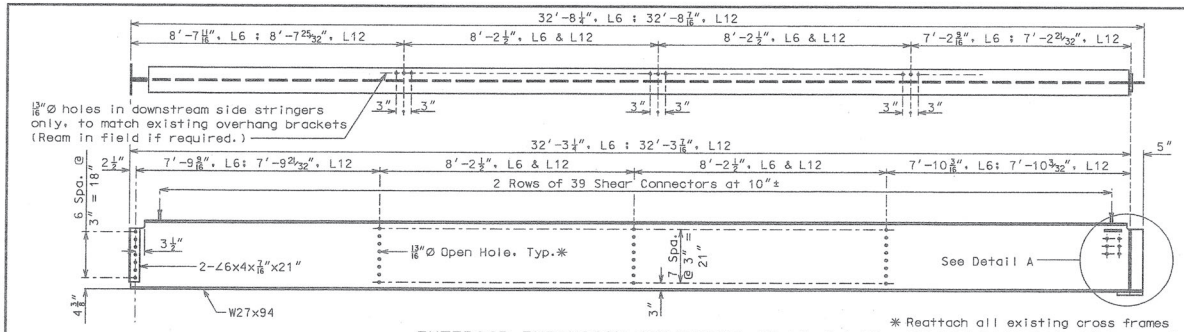
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

② Revised 4/09/04
① New Sheet 3/02/04

SHEET 13A OF 40

L05684

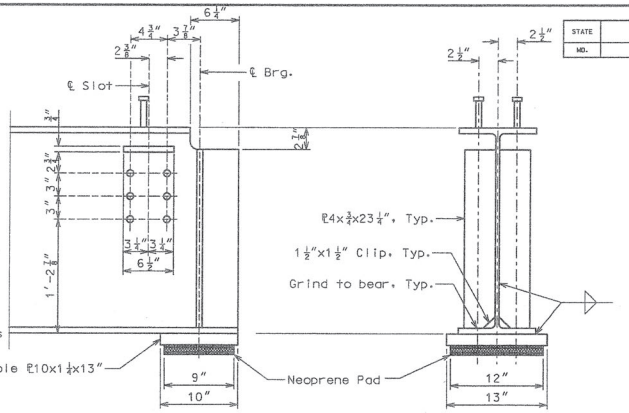
$$$time$$$ $$$date$$$ $$$file$$$



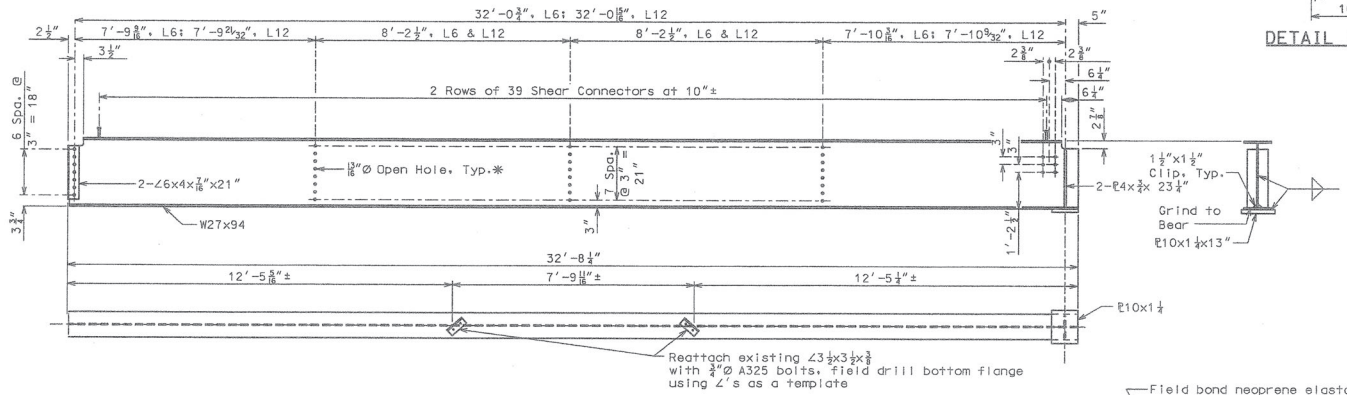
EXTERIOR EXPANSION STRINGERS AT L6 & L12

Exterior Expansion Stringers at L6′ & L12′ similar.
(8 Required)

* Reattach all existing cross frames and overhang brackets which supports utilities on downstream side only.

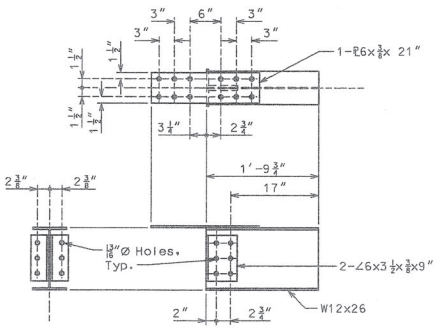


DETAIL A



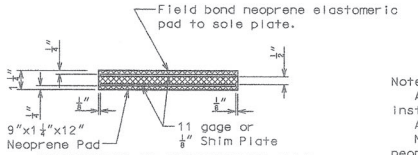
INTERIOR EXPANSION STRINGERS AT L6 & L12

Interior Expansion Stringers at L6′ & L12′ similar.
(8 Required)

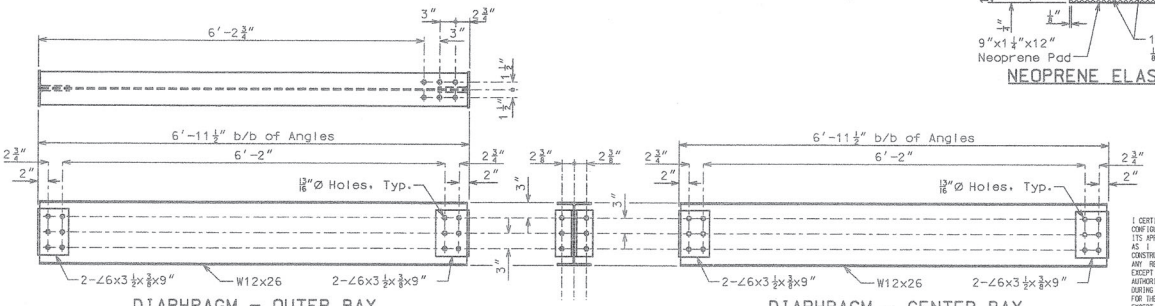


DIAPHRAGM – EXTERIOR

(8 Required)



NEOPRENE ELASTOMERIC PAD



DIAPHRAGM – OUTER BAY

(8 Required)

DIAPHRAGM – CENTER BAY

(4 Required)

Notes:

All fasteners on this sheet shall be ¾″Ø H.S. A325 Bolts installed in ¹³⁄₁₆″Ø holes.

All shear connectors are ¾″Øx6″

Neoprene Elastomeric Pads shall be 60 Durometer. The neoprene pad shall be bonded to the bearing seat with an epoxy adhesive as approved by the bearing manufacturer for bonding neoprene to steel.

Structural steel for sole plate shall be ASTM A709 Grade 36 and shall be coated with a minimum of two coats of inorganic zinc primer (5 mils minimum).

Payment for furnishing, installing and bonding the laminated neoprene pads shall be included in the contract unit price for "Laminated Neoprene Bearing Pad".

Shear connectors shall also be installed at all existing stringers which remain in place and at any new stringers required, as determined by field inspection. Spacing to be similar to that shown on Interior Stringers at L6 and L12 detail. Quantities include 7,688 lbs. of shear connectors in the thru truss spans.

FINAL PLANS

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STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	B14

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
CHECKED: 09/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

STRINGERS – THRU TRUSS

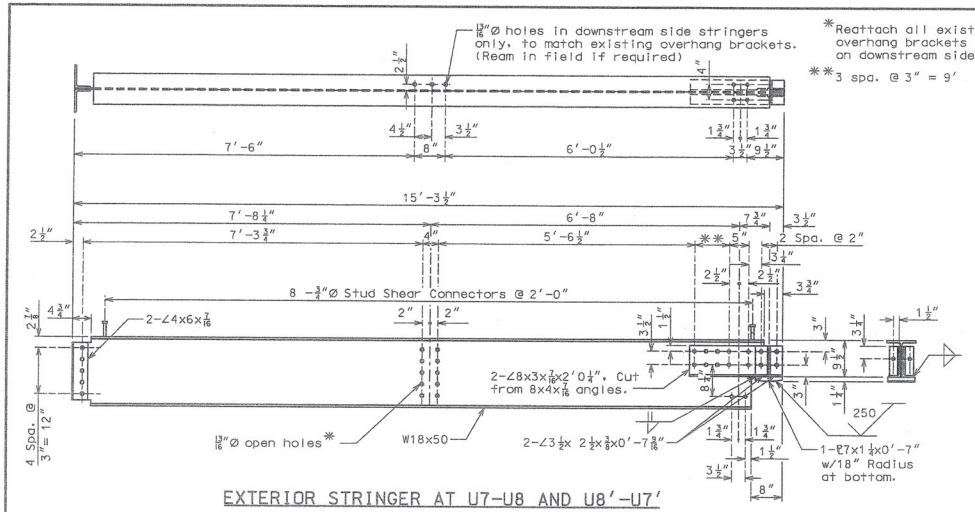
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SHEET 14 OF 40

L05684

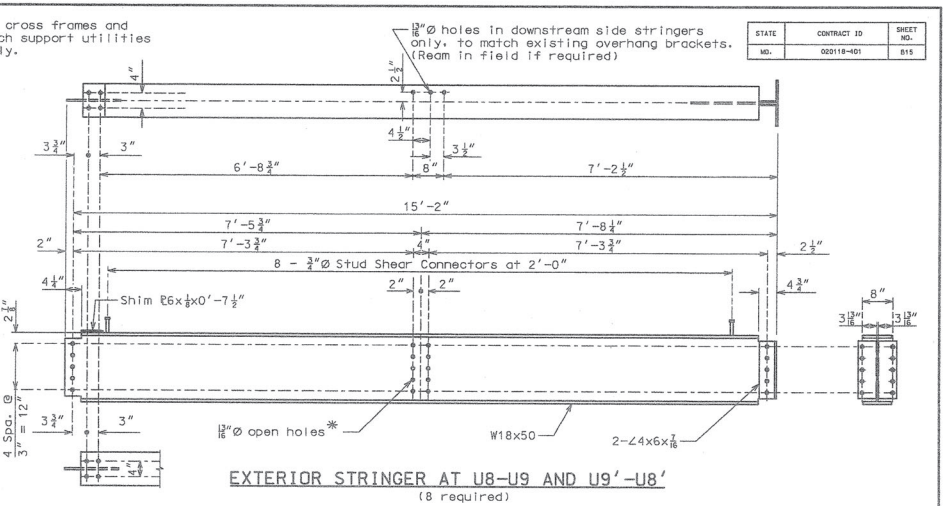
$$$$time$$$$ $$$$date$$$$ $$$$file$$$$

STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	B15



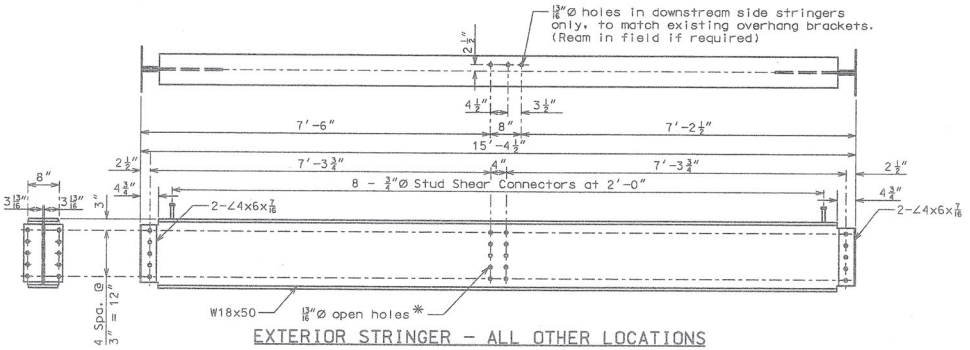
EXTERIOR STRINGER AT U7-U8 AND U8'-U7'

(8 required)



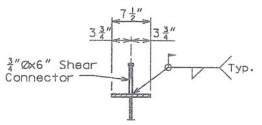
EXTERIOR STRINGER AT U8-U9 AND U9'-U8'

(8 required)



EXTERIOR STRINGER - ALL OTHER LOCATIONS

(80 required)



SHEAR CONNECTOR DETAIL

FINAL PLANS

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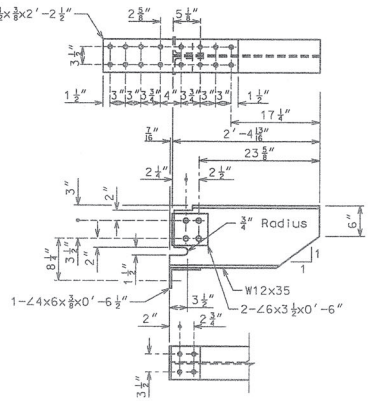


DIAPHRAGM - EXTERIOR

(8 Required)

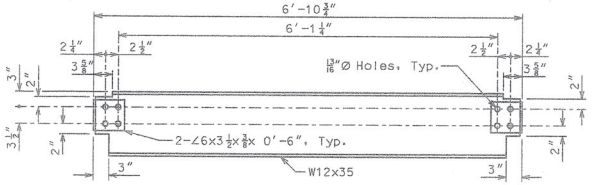
Notes:

All fasteners on this sheet shall be ¾"Ø H.S. A325 bolts installed in 13/16"Ø holes.

All shear connectors are ¾"Ø x 6".

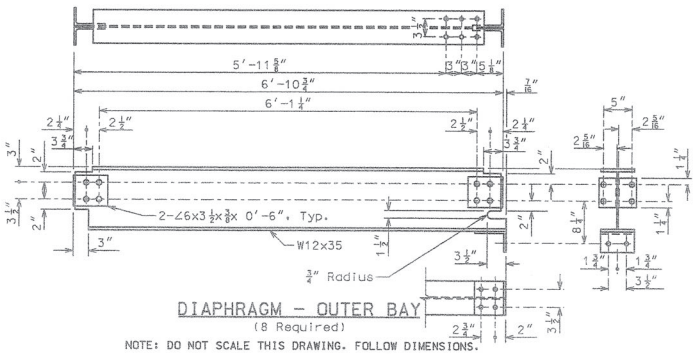
Shear connectors shall also be installed at all existing interior stringers which remain in place and at any new interior stringers required, as determined by field inspection. Spacing to be similar to that shown on Exterior Stringers - All Other Locations detail. Quantities include 1,351 lbs. of shear connectors in the deck truss spans. See Special Provisions.

All re-entrant corners shall have a radius of 1", except as shown.



DIAPHRAGM - CENTER BAY

(4 Required)



DIAPHRAGM - OUTER BAY

(8 Required)

STRINGERS - DECK TRUSS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 10/01
CHECKED: 10/01

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SHEET 15 OF 40

L05684

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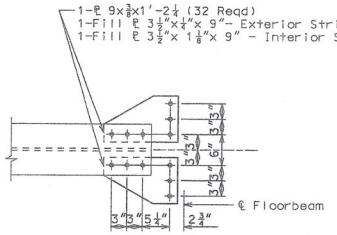
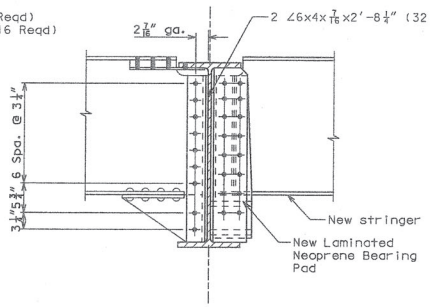
STATE	CONTRACT ID	SHEET NO.
MO.	C20118-401	B16

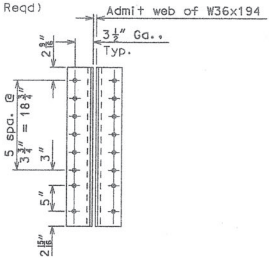


New Connection and Fill Plates at L6, L12, L12' and L6'. Use existing plates for templates.

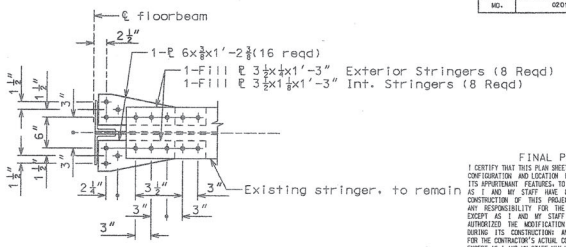
PLAN



ELEVATION



CONNECTION ANGLES AT FIXED SIDE



STRINGER AND FILL PLATES AT L0 AND L0'

Use existing plates for templates.
All fasteners shall be ¾"Ø H.S. A325 bolts installed in 13/16"Ø holes.

FINAL PLANS

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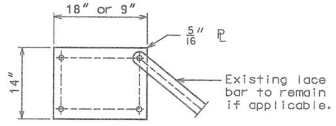
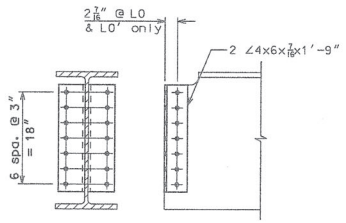
STRINGER TO EXPANSION FLOORBEAM CONNECTION DETAILS



STAY PLATES AT TOP OF BOTTOM CHORD - THRU TRUSS

(20 ℄⅝x18x14" Required; 20 ℄⅝x9x14" Required)
Use plate being replaced as template.
Replace removed rivets with ¾"Ø H.S. A325 bolts installed in 13/16"Ø holes.

At L6, L12, L12' & L6'
All fasteners shall be ¾"Ø H.S. A325 bolts installed in 13/16"Ø holes.



NEW CONNECTION ANGLES

L0-L5, L7-L11, L13-L13', L11'-L7', L5'-L0'
All fasteners shall be ¾"Ø H.S. A325 bolts installed in 13/16"Ø holes.
(320 Required)

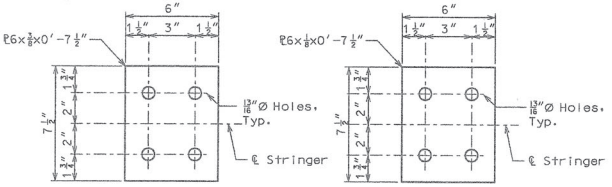
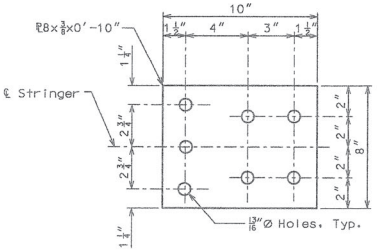


PLATE FOR TOP FLANGE (8 required.)

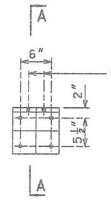
PLATE FOR BOTTOM FLANGE (8 required.)

FILL PLATE @ INTERIOR STRINGERS AT U8 & U8' - DECK TRUSS

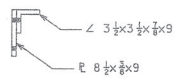


STRAP PLATE AT U8 & U8' - DECK TRUSS

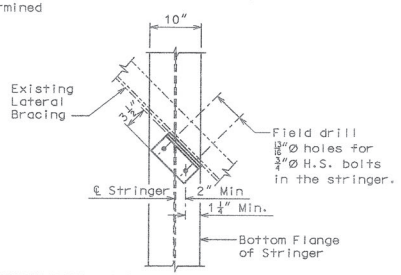
(Stringer to Floorbeam connection, 32 required.)



ANGLE/PLATE CONNECTION



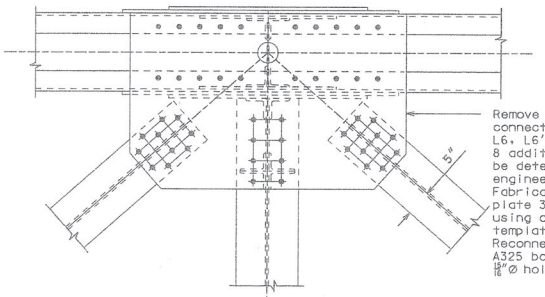
SECTION A-A



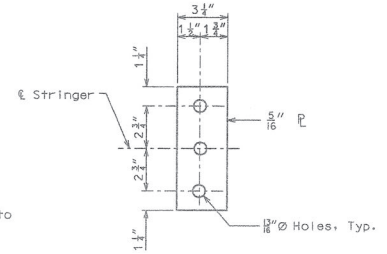
STRINGER AND LATERAL CONNECTION

LATERAL BRACING ATTACHMENT ASSEMBLIES - THRU TRUSS

See Special Provisions
All fasteners shall be ⅞"Ø H.S. A325 bolts installed in 15/16"Ø holes, unless otherwise noted.
(32 Required)



LATERAL CONNECTION PLATES - THRU TRUSS



FILL PLATE @ EXTERIOR STRINGERS AT U8 & U8' - DECK TRUSS

(Located on Floorbeam, bott. flange, 8 required.)

MISCELLANEOUS STEEL REPAIRS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
CHECKED: 09/01

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SHEET 16 OF 40

L05684

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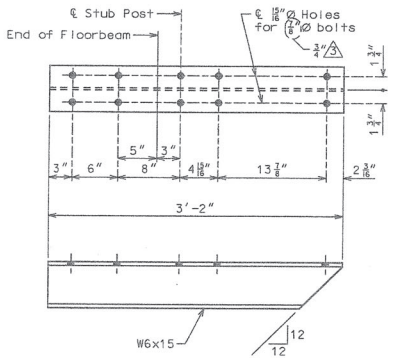
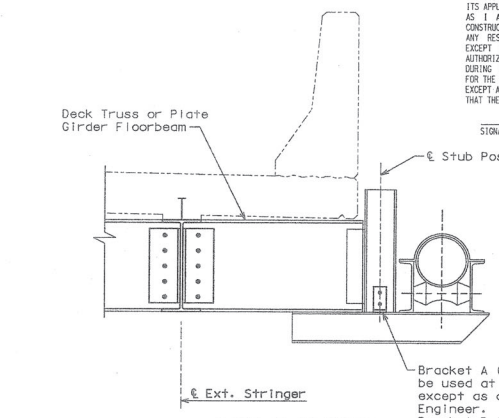


GAS LINE SUPPORT
(58 Req'd.)

Note:
Gas line supports shall be placed at the following locations:

Plate Girder Spans:
3rd Floorbeam from End Bent, east side only
7th Floorbeam from End Bent
11th Floorbeam from End Bent

Deck Truss Spans:
U0', U2', U4', U6', U8', U10', U12, U10, U8, U6, U4, & U2



PART ELEVATION

FINAL PLANS

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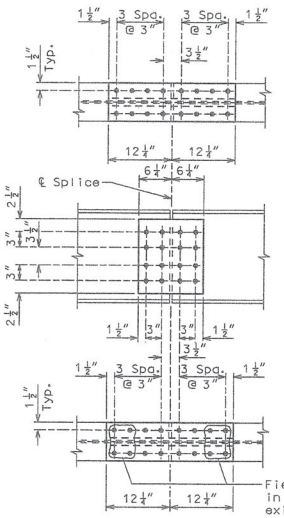
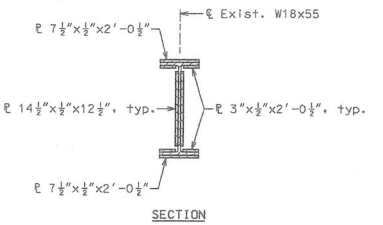
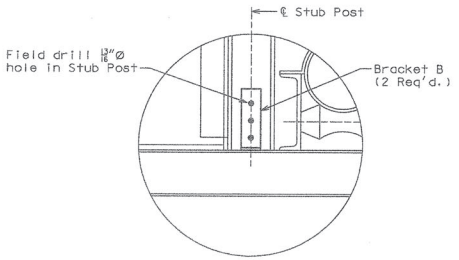


Notes:
Contractor shall field verify all dimensions shown for splice connection.
All fasteners for floorbeam splice connection shall be 7/8" H.S. Bolts installed in 15/16"Ø holes.

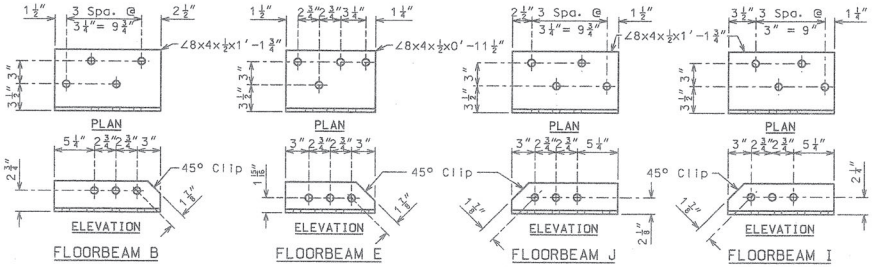


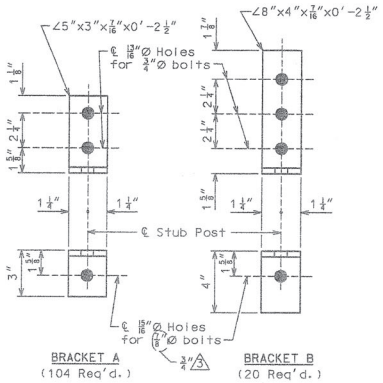
SECTION

FLOORBEAM SPLICE REPLACEMENT DETAILS
At center of south end floorbeam on north Plate Girder Span.



DETAIL A



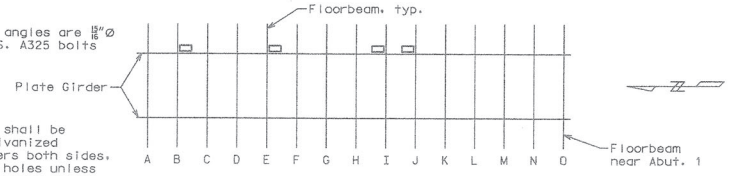


CONNECTION BRACKET DETAILS

Notes:
Replace Gas Line Support and Connection Bracket at specified locations on Deck Truss and Plate Girder Spans.
All fasteners shall be 7/8"Ø H.S. A325 bolts installed in 15/16"Ø holes unless otherwise noted.
Bracket B shall be used at locations where the bottom of the Stub Post has severe corrosion. These locations will be determined in the field by the Engineer.
The 7th floorbeam from the north End Bent on the west side has a welded steel box acting as a spacer between the floorbeam and the gas line support. This box shall be reused. The connection for the gas line support at this location will require longer bolts than the other gas line support connections. The Contractor shall determine this dimension in the field.
△2 Clean steel per specifications prior to installing new horizontal angles. Provide new H.S. bolts with washers for connections to brace and plate girder. Field verify bolt lengths required.

△3 All fasteners shall be 7/8"Ø H.S. A325 galvanized bolts, with washers both sides, installed in 15/16"Ø holes unless otherwise noted.

Note:
Holes in angles are 15/16"Ø for 7/8"Ø H.S. A325 bolts



SOUTH PLATE GIRDER SPAN – PLAN VIEW

△2 HORIZONTAL ANGLES OF FLOORBEAM SUPPORT BRACE – SOUTH PLATE GIRDER

MISCELLANEOUS STEEL REPLACEMENTS

STATE	CONTRACT ID	SHEET NO.
MO.	G20118-401	B16a

△3 Changes 9/23/04
△2 Added Angles 5/5/04
△1 New Sheet 4/13/04

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

SHEET 16A OF 40

L05684

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 04/04
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NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

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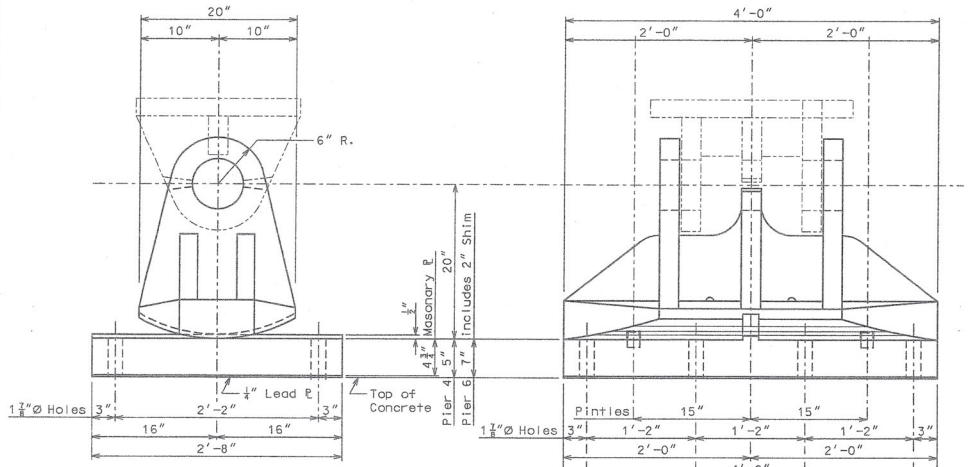
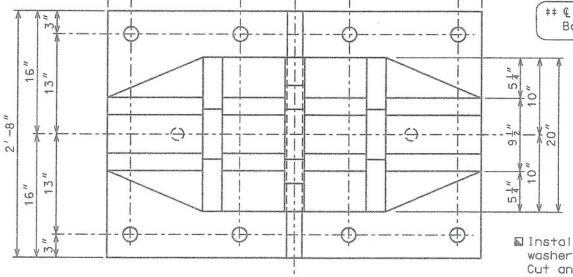


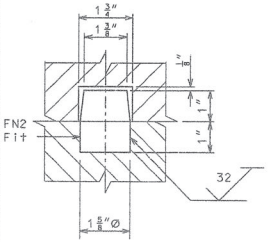
END VIEW

ELEVATION



PLAN

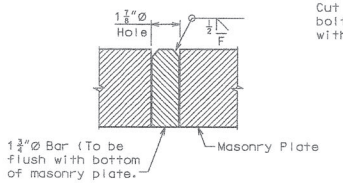
▣ Install new nuts and washers at Pier 4. Cut anchor bolts flush with top of masonry plate and seal weld to masonry plate at Pier 6.



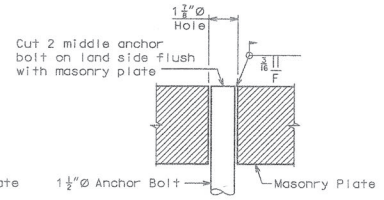
DETAIL OF PINTLE

DETAIL OF EXISTING EXPANSION SHOE

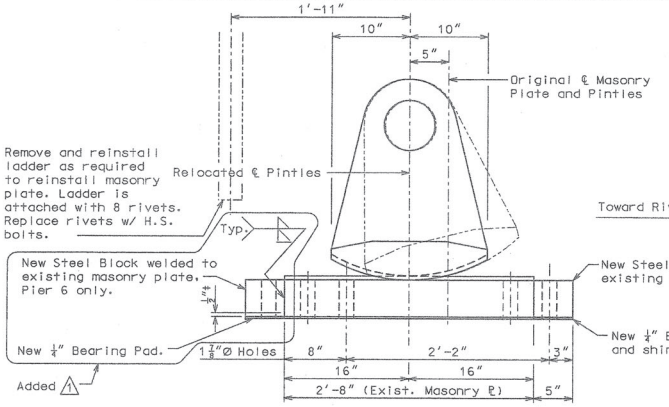
(Based on Original Plans)



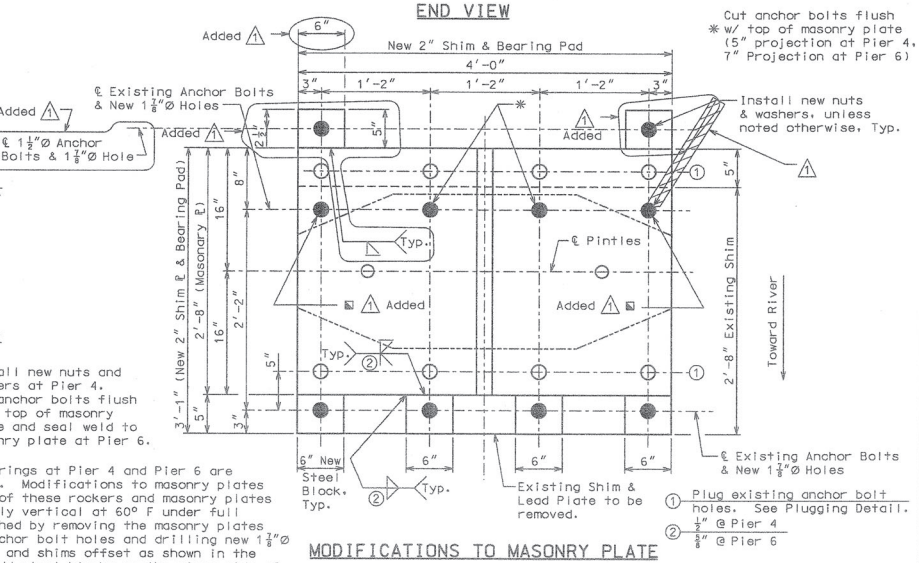
PLUGGING DETAIL



SEAL WELD DETAIL



END VIEW



Cut anchor bolts flush * w/ top of masonry plate (5" projection at Pier 4, 7" Projection at Pier 6)

① Plug existing anchor bolt holes. See Plugging Detail.

② ½" @ Pier 4, ⅝" @ Pier 6

MODIFICATIONS TO MASONRY PLATE

Added ⚠1 ‡Start weld ¼" from bottom of new steel block, Typ.
‡‡New 1½"Ø swedged anchor bolts shall be embedded 16" min. into top of pier cap in a 2"Ø min. drilled hole, held in place with an epoxy grout.

Notes:

The rockers in the expansion bearings at Pier 4 and Pier 6 are tilted landward or away from Pier 5. Modifications to masonry plates are provided to shift the position of these rockers and masonry plates so that the rockers set approximately vertical at 60° F under full dead load. This shall be accomplished by removing the masonry plates and shims, plugging the existing anchor bolt holes and drilling new 1⅞"Ø anchor bolts holes in masonry plate and shims offset as shown in the details. It will be necessary to add steel blocks on the river side of the masonry plates to contain the new anchor bolt holes. Each masonry plate has two pintles which may have to be replaced. After refabrication, the masonry plates shall be re-installed using new nuts and washers except the middle anchor bolts on the land side shall be cut off flush with the masonry plates and seal welded to the masonry plate.

Predicted horizontal deflection of truss bearings due to addition of new slab and barrier curbs is ⅜". Anticipated movement for each 10° F temperature rise or fall is ⅜".

Contractor may provide new full size A36 masonry plates w/pintles in lieu of welded steel blocks with approval of the Engineer.

Provide ¼" Rubber and Fabric bearing pad under masonry plates in conformance with Article 1038.3 of the Standard Specifications.

New shims and bearing pads to match thickness of existing shims and lead plates.

Cost of removal and reinstallation of ladders, including connectors, shall be incidental to price bid for "Rehabilitate Bearing".

Contractor shall verify all dimensions.

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	017

FINAL PLANS

I CERTIFY THAT THIS PLAN SHEET ACCURATELY DEPICTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND ALL ITS APPURTENANT FEATURES. TO THE BEST OF MY KNOWLEDGE, AS I AND MY STAFF HAVE OBSERVED THE CONTRACTOR'S CONSTRUCTION OF THIS PROJECT. I SPECIFICALLY DISCLAIM ANY RESPONSIBILITY FOR THE DESIGN OF THIS PROJECT, EXCEPT AS I AND MY STAFF MAY HAVE MODIFIED OR AUTHORIZED THE MODIFICATION OF THE PROJECT DESIGN DURING ITS CONSTRUCTION AND I DISCLAIM RESPONSIBILITY FOR THE CONTRACTOR'S ACTUAL CONSTRUCTION OF THE PROJECT, EXCEPT AS I AND MY STAFF MAY HAVE DIRECTED OR ORDERED THAT THE PROJECT BE CONSTRUCTED.

SIGNATURE _____ DATE _____

Toward River

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 08/01
CHECKED: 08/01

⚠1 Revised 6-13-03

BEARING MODIFICATIONS – THRU TRUSS

ROUTE 291 MISSOURI RIVER BRIDGE

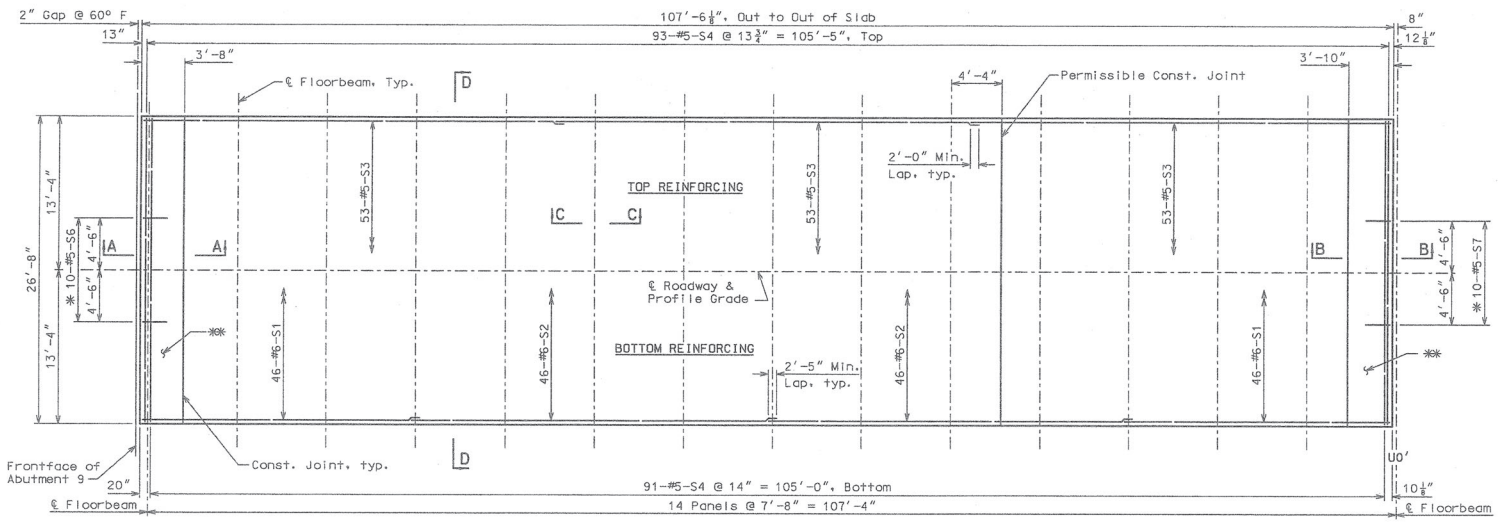
Jackson County

SHEET 17 OF 40

L05684

$$$time$$$ $$$date$$$ $$$file$$$

STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	818



SLAB PLAN

(Slab Plan for Span 8 shown, Span 1 opposite hand.)

Note:
The Contractor shall pour and satisfactorily finish the roadway slab at a rate of not less than 25 cubic yards per hour.

* Space #5-S6 and S7 bars to match every other top longitudinal slab bar.

** Expansion joint slab pour shall be placed in pairs and simultaneously at each expansion joint, and only after completion of the span pours. The direction of pours shall be uphill.

FINAL PLANS

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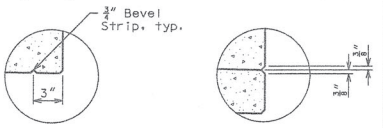
SIGNATURE

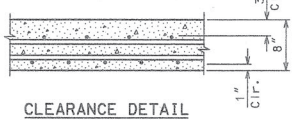
DATE

Note:
Stop bevel strip 3" from edge of floorbeam flanges, typ.

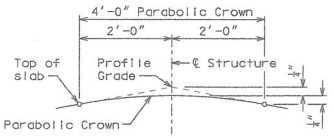


DETAIL A

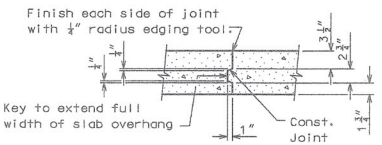
DETAIL B



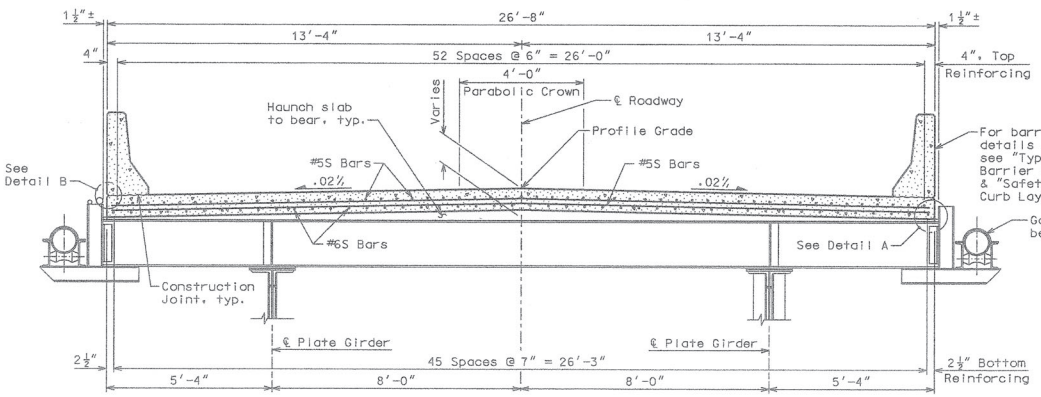
CLEARANCE DETAIL



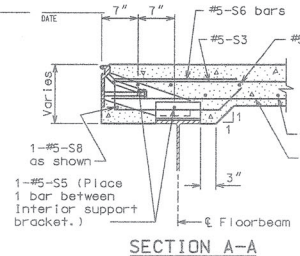
PARABOLIC CROWN DETAIL



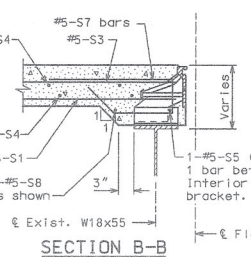
TYPICAL CONSTRUCTION JOINT



SECTION D-D THRU ROADWAY



SECTION A-A



SECTION B-B

Notes:
Slab to be built parallel to grade and a minimum thickness of 8". Estimated quantities include slab and haunching.
Longitudinal dimensions are horizontal.
For deck drains, see "Slab Drain" sheet.
For Section C-C, see "Slab Details-Deck Truss Spans" sheet.

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SLAB DETAILS - PLATE GIRDER SPANS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

SHEET 18 OF 40

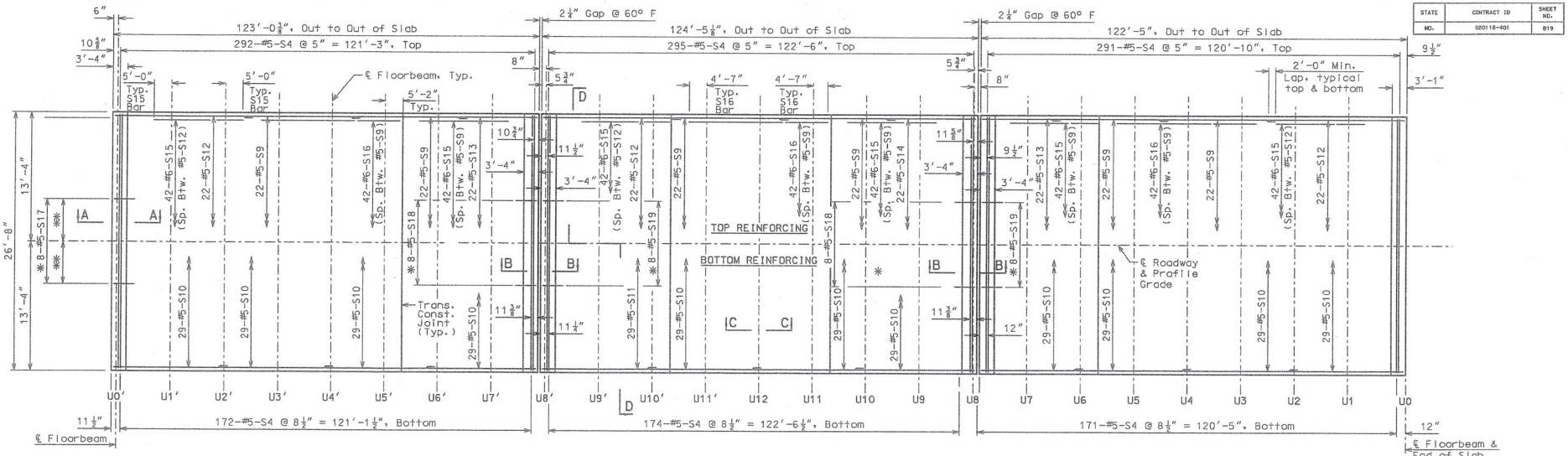
L05684

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 08/01
CHECKED: 10/01

$$$time$$$ $$$date$$$ $$$file$$$

STATE	CONTRACT ID	SHEET NO.
MO.	0Z0118-401	819



SPAN 7

* Space with #5-S12, #5-S13 or #5-S14 bars.

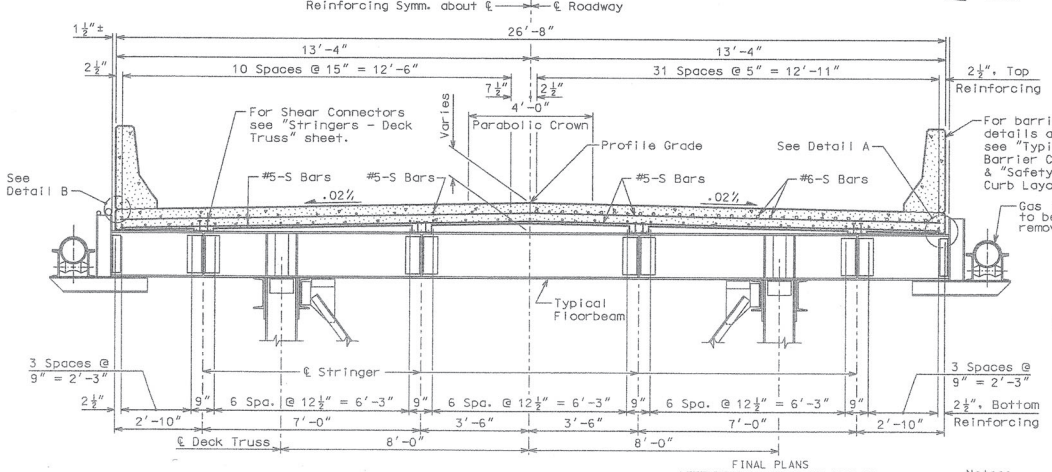
** 4'-4½", Typ. at U0, U8 & U8'.

SLAB PLAN

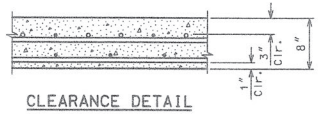
(Slab Plan for Spans 6 & 7 shown, Spans 2 & 3 opposite hand)

SPAN 6

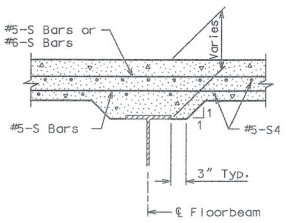
Note: Modifications to existing structural steel floor system not shown for clarity.



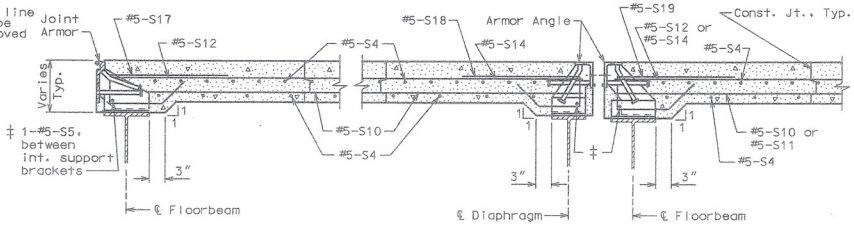
SECTION D-D THRU ROADWAY



CLEARANCE DETAIL



SECTION C-C



SECTION A-A

SECTION B-B

(For dimensions not shown see Section A-A)

Notes:
Slab to be built parallel to grade and a minimum thickness of 8". Estimated quantities include slab and haunching.
Longitudinal dimensions are horizontal.
For deck drains, see "Slab Drain" sheet.
For Parabolic Crown Detail, Detail A & Detail B, and Typical Const. Joint see "Slab Details - Plate Girder Spans" sheet.

SLAB DETAILS - DECK TRUSS SPANS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

FINAL PLANS

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SIGNATURE DATE

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 08/01
CHECKED: 09/01

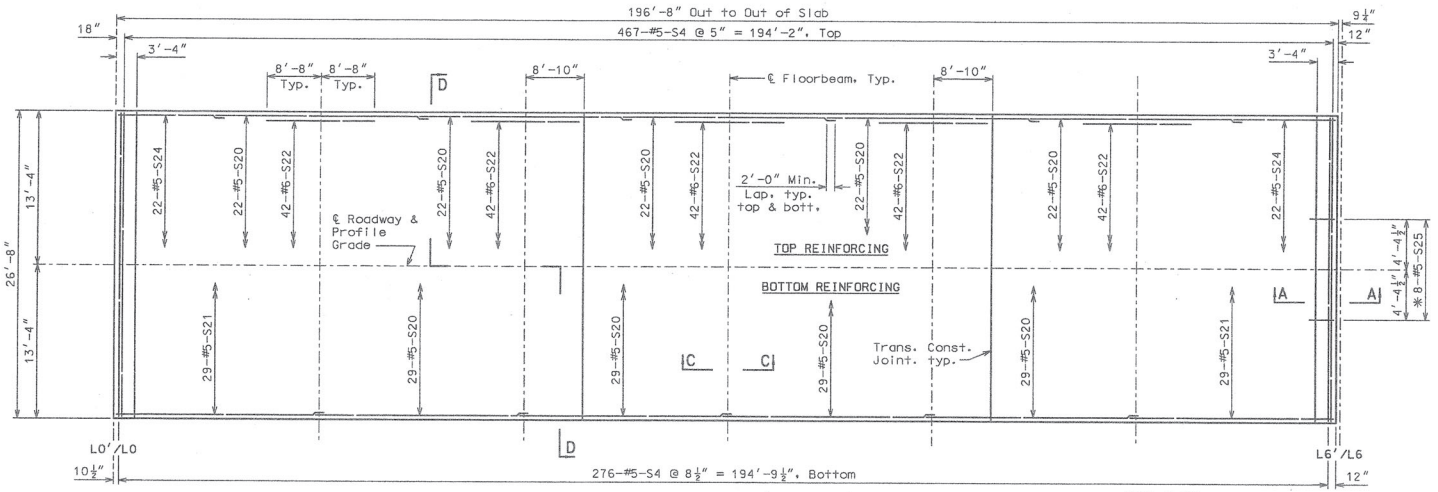
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 19 OF 40

L05684

$$$time$$$ $$$date$$$ $$$file$$$

STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	B20



SLAB PLAN – L0' TO L6'

(Slab Plan for L0 to L6 opp. hand)

* Space with #5-S21, #5-S24 or #5-S27 bars.

FINAL PLANS

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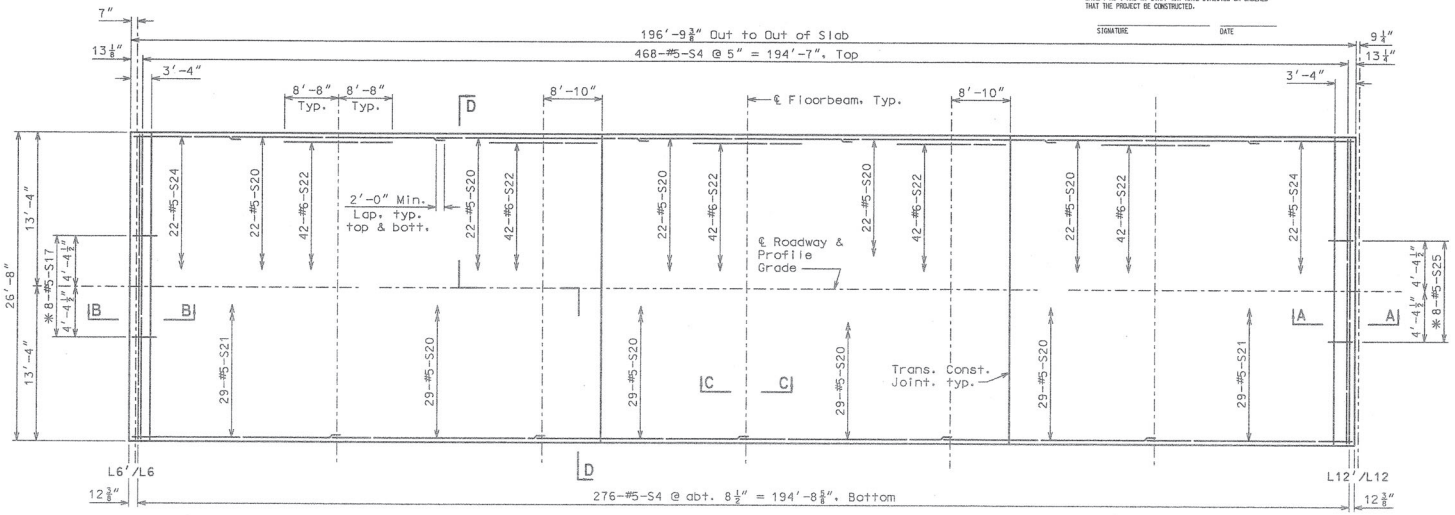
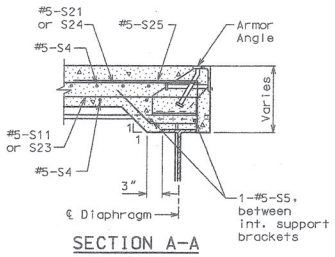
SIGNATURE DATE

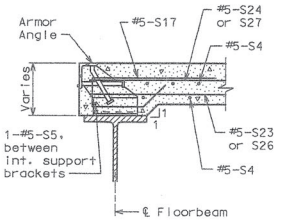


SLAB PLAN – L6' TO L12'

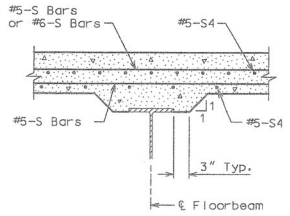
(Slab Plan for L6 to L12 opp. hand)



SECTION A-A



SECTION B-B



SECTION C-C

(Typical Haunch at Floorbeams)

Notes:

Slab to be built parallel to grade and a minimum thickness of 8". Estimated quantities include slab and haunching.

Longitudinal dimensions are horizontal.

For deck drains, see "Slab Drain" sheet.

For additional details, see "Slab Details – Thru Truss Spans" second sheet.

SLAB DETAILS – THRU TRUSS SPANS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

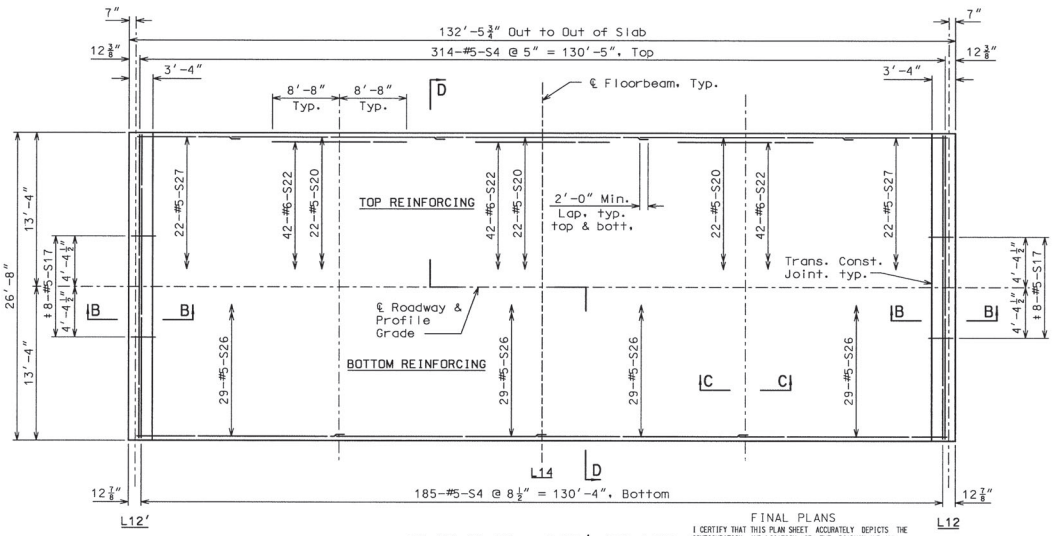
DETAILED: 09/01
CHECKED: /01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 20 OF 40

L05684

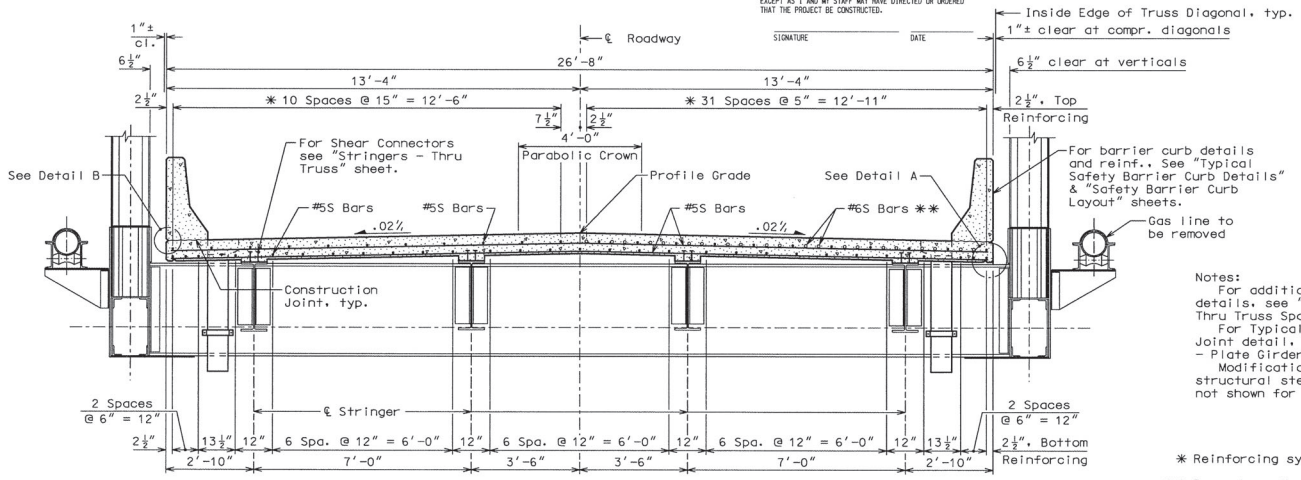
$$$time$$$ $$$date$$$ $$$file$$$



SLAB PLAN – L12′ TO L12

(For spacing of reinforcing see Section Thru Roadway)

‡Space with #5-S27 bars.



SECTION D–D THRU ROADWAY

FINAL PLANS

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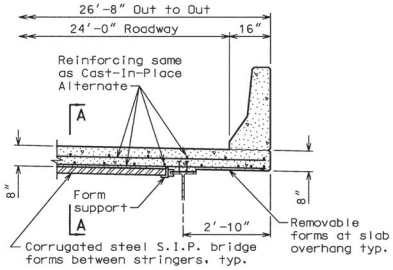
SIGNATURE DATE



PART SECTION THRU SLAB

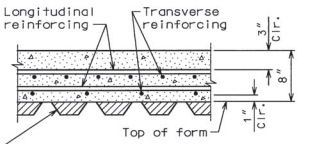
Stay-In-Place Form Notes:

Stay-In-Place forms will be allowed at thru truss spans only.

Details shown are intended only to describe the use of Stay-In-Place forms for construction of the slab. Details not shown are the same as for the Cast-In-Place Alternate, except as otherwise shown or noted.

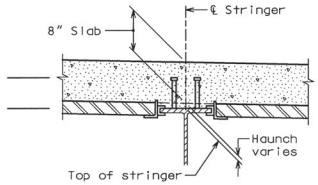
The Contractor shall submit complete details to the Engineer for approval. See Special Provisions.

Stay-In-Place forms and supporting elements shall not be welded to girder flanges.



The corrugation valleys of the forms shall be blocked out with styrofoam or an upper plate to minimize dead load. The method and material used shall be submitted to the Engineer for approval.

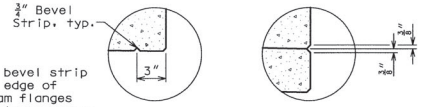
SECTION A–A



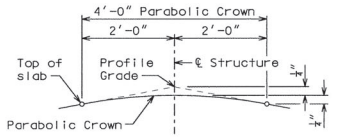
THEORETICAL SLAB HAUNCH

(See "Deflection and Camber Diagrams" sheet.)

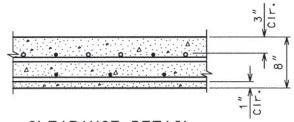
STAY-IN-PLACE FORM OPTION DETAILS



Note:
Stop bevel strip 3" from edge of floorbeam flanges in thru truss spans, typical.



PARABOLIC CROWN DETAIL



CLEARANCE DETAIL

Notes:

For additional notes and details, see "Slab Details - Thru Truss Spans" first sheet.

For Typical Construction Joint detail, see "Slab Details - Plate Girder Span" sheet.

Modifications to existing structural steel floor system not shown for clarity.

✳ Reinforcing symm. about ℄

✳✳ Bars shown thus "o" indicates extra bars over floorbeams. See "Slab Details - Thru Truss Spans"

SLAB DETAILS – THRU TRUSS SPANS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	B21

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 08/01
CHECKED: 09/01

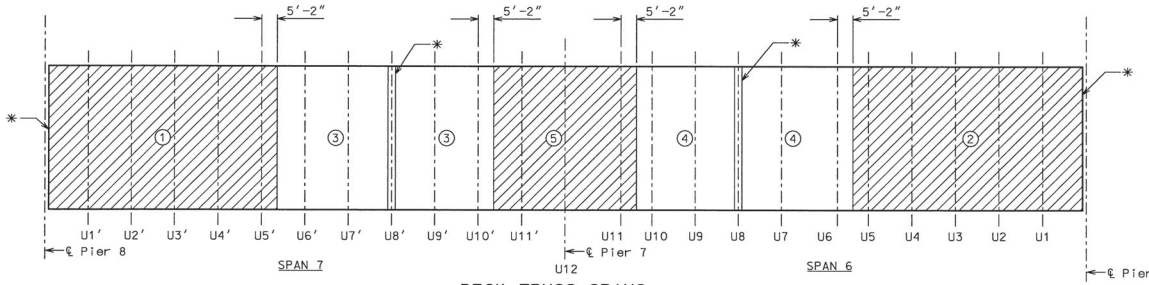
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 21 OF 40

L05684

$$$time$$$ $$$date$$$ $$$file$$$

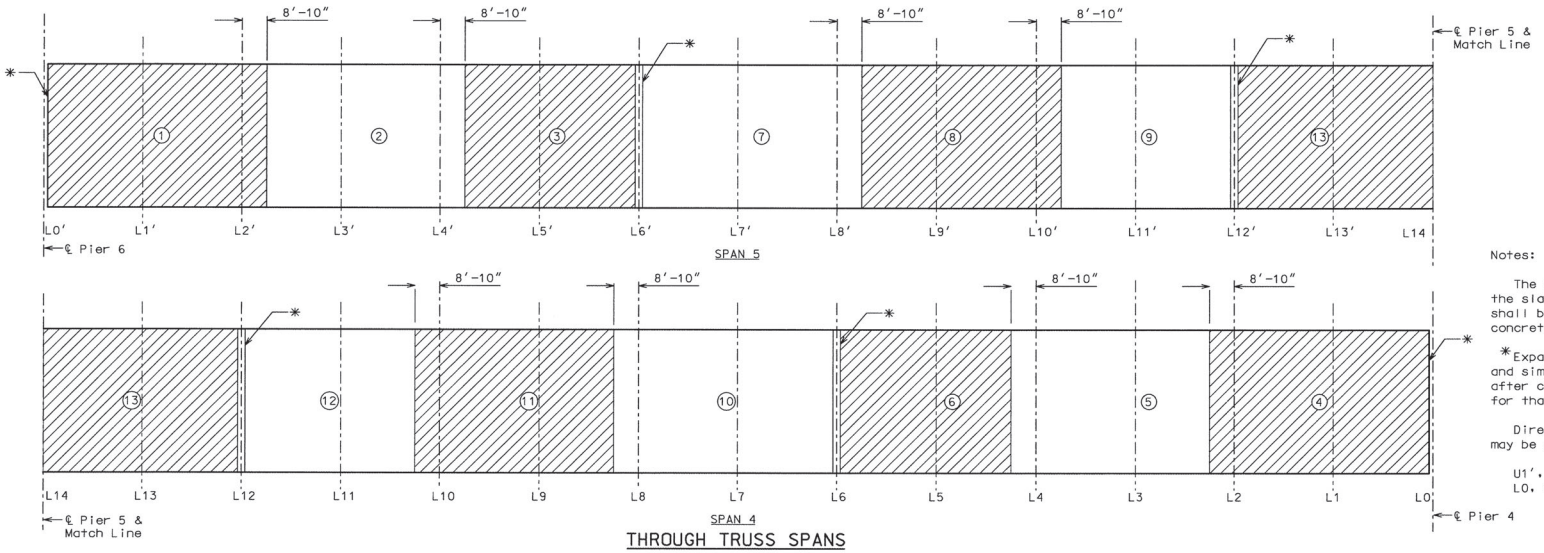
STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	B22



DECK TRUSS SPANS POURING SEQUENCE

(Spans 6 & 7 shown, Spans 2 & 3 opposite hand)

	SEQUENCE OF POURS – DECK TRUSS					Min. Rate of Pour (Cu. Yds./Hr.)	
	Direction					With Retarder	Without Retarder
Alternate Pours to the basic skip sequence are subject to the approval of the engineer in accordance with Section 703.3.12.4 of Missouri Standard Specifications							
Alternate "B" Pours	1 + 3		5 + 4 + 2			40.3	67.1
	End to 5		3 to End				



THROUGH TRUSS SPANS POURING SEQUENCE

Notes:

The contractor shall pour and satisfactorily finish the slab pours at the rate given. Retarder, if used, shall be an approved type and retard the set of concrete to 2.5 hours.

*Expansion joint slab pour shall be placed in pairs and simultaneously at each expansion joint, and only after completion of the numbered sequence of pours for that unit.

Direction of pours shall be uphill. Section 13 may be poured either direction.

U1', U1, U2', U2 etc. designates Deck Truss joints
L0, L0',L1, L1' etc. designates Truss Truss joints

	SEQUENCE OF POURS – THROUGH TRUSS SPANS					Min. Rate of Pour (Cu. Yds./Hr.)	
	Direction					With Retarder	Without Retarder
Alternate Pours to the basic skip sequence are subject to the approval of the engineer in accordance with Section 703.3.12.4 of Missouri Standard Specifications							
Alternate "A" Pours							
Alternate "B" Pours	1 + 2 + 3	7 + 8 + 9	4 + 5 + 6	10 + 11 + 12	13	37.4	62.4
	End to 7	3 to 13	End to 10	6 to 14	12 to 9		

FINAL PLANS

I CERTIFY THAT THIS PLAN SHEET ACCURATELY DEPICTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND ALL ITS APPURTENANT FEATURES. TO THE BEST OF MY KNOWLEDGE, AS I AND MY STAFF HAVE OBSERVED THE CONTRACTOR'S CONSTRUCTION OF THIS PROJECT. I SPECIFICALLY DISCLAIM ANY RESPONSIBILITY FOR THE DESIGN OF THIS PROJECT. EXCEPT AS I AND MY STAFF MAY HAVE MODIFIED OR AUTHORIZED THE MODIFICATION OF THE PROJECT DESIGN DURING ITS CONSTRUCTION; AND I DISCLAIM RESPONSIBILITY FOR THE CONTRACTOR'S ACTUAL CONSTRUCTION OF THE PROJECT, EXCEPT AS I AND MY STAFF MAY HAVE DIRECTED OR ORDERED THAT THE PROJECT BE CONSTRUCTED.

SIGNATURE _____ DATE _____

SLAB POURING SEQUENCE

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

SHEET 22 OF 40

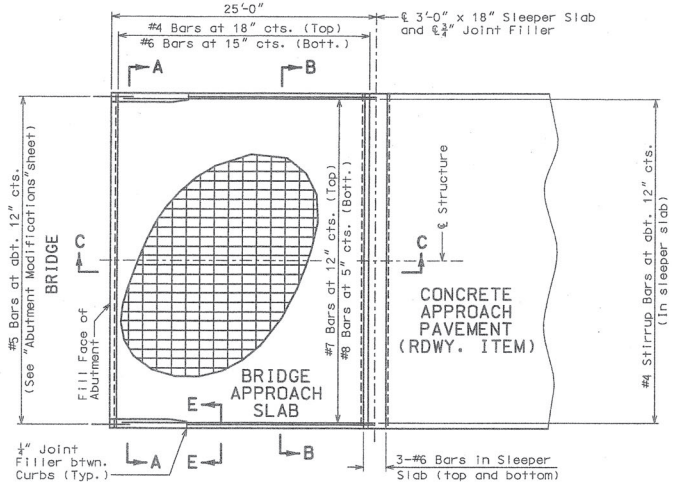
L05684

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

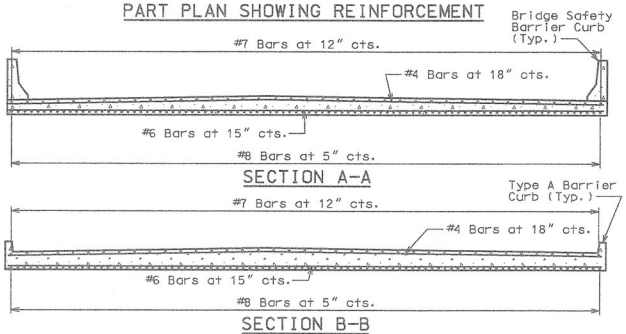
DETAILED: 09/01
CHECKED: 09/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

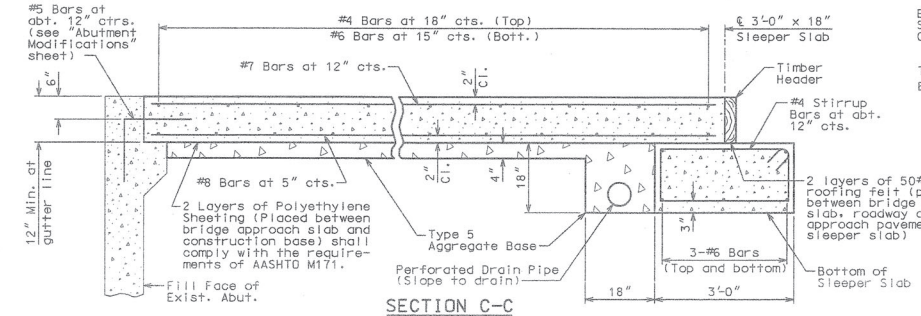
$$$$time$$$$ $$$$date$$$$ $$$$file$$$$

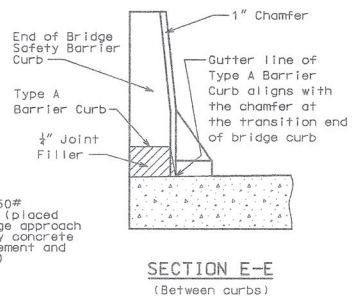


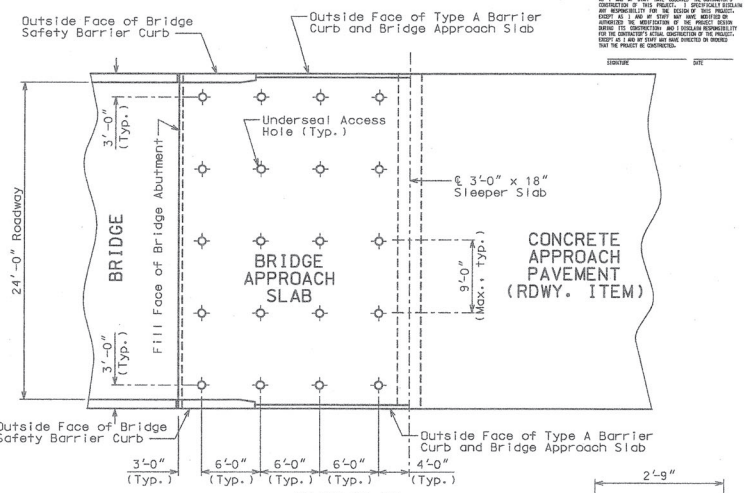
PART PLAN SHOWING REINFORCEMENT



Note: With the approval of the Engineer, the Contractor may crown the bottom of the approach slab to match the crown of the roadway surface.

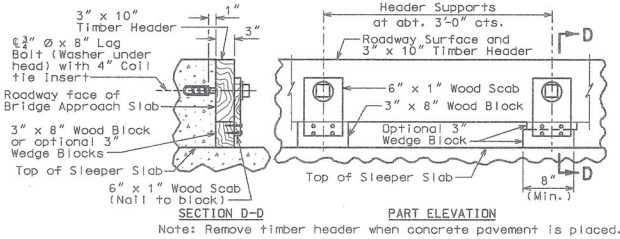






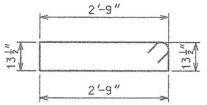
PART PLAN

(Showing typical Underseal Access Hole locations)



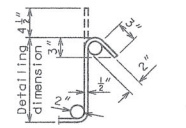
Note: Remove timber header when concrete pavement is placed.

DETAILS OF TIMBER HEADER



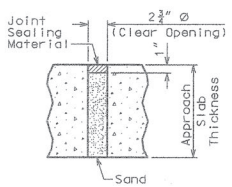
#4 STIRRUP BAR

(Actual length = 8'-3")

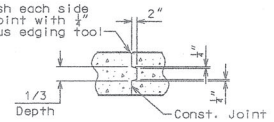


TYPICAL 135° STIRRUP HOOK DIMENSIONS BENDING DIAGRAM

Note: Nominal lengths are based on out to out dimensions shown in bending diagram and are listed for fabricators use (nearest inch).



TYPICAL UNDERSEAL ACCESS HOLE DETAIL



CONST. JOINT DETAIL

(If required)

GENERAL NOTES:

All concrete for the bridge approach slab and sleeper slab shall be in accordance with Section 503 (f'c = 4,000 psi) of the Missouri Standard Specifications.

All joint filler shall meet the requirements of Section 1057.2.5 of the Missouri Standard Specifications, except as noted.

The reinforcing steel in the bridge approach slab and the sleeper slab shall be epoxy coated Grade 60 with Fy = 60,000 psi.

Minimum clearance to reinforcing steel shall be 1-1/2", unless otherwise shown.

The reinforcing steel in the bridge approach slab and the sleeper slab shall be continuous. The transverse reinforcing steel may be made continuous by lap splicing the #4 & #6 bars 18" and 26" respectively.

Mechanical bar splices will be permitted and shall develop at least 125 percent of the specified yield strength of the reinforcing bars being spliced. The contractor shall furnish the Engineer the manufacturer's certification that this requirement is met and is required to follow the manufacturer's recommendation for installation.

Mechanical bar splices shall be epoxy coated in accordance with Section 710 of the Missouri Standard Specifications.

Hooks and bends shall be in accordance with the CRSI Manual of Standard Practice for Detailing Reinforced Concrete Structures, Stirrup and Tie Dimensions.

The contractor shall pour and satisfactorily finish the bridge slab before pouring the bridge approach slabs.

Longitudinal construction joints in approach slab and sleeper slab shall be aligned with longitudinal construction joints in bridge slab.

Payment for furnishing all materials, labor and excavation necessary to construct the approach slab, including the timber header, sleeper slab, underdrain, Type 5 aggregate base and all other appurtenances and incidental work as shown on this sheet, complete in place, shall be considered as completely covered under the contract unit price for Bridge Approach Slab (Bridge), per sq. yd.

For Concrete Approach Pavement details, see roadway plans.

See Missouri Standard Plans Drawing 609.00 for details of Type A Barrier Curb.

When a lap splice is required for the use of a mechanical bar splice, the minimum lap length shall be 40" for transverse approach slab bar splices.

At the contractor's option, Grade 40 reinforcement may be substituted for the Grade 60 #5 dowel bars connecting the bridge approach slab to the bridge end bent. No additional payment will be made for this substitution.

When Grade 40 reinforcement is substituted for the Grade 60 #5 dowel bars connecting the bridge approach slab to the bridge abutment, the reinforcement may be bent up to 90 degrees with a 2" minimum radius near the abutment to allow compaction of the backfill material near the abutment. Damage to epoxy coating shall be repaired according to Section 710.3.3 of the Missouri Standard Specifications.

Drain pipe may be either 6" diameter corrugated metallic-coated pipe underdrain, 4" diameter corrugated polyvinyl chloride (PVC) drain pipe, or 4" diameter corrugated polyethylene (PE) drain pipe.

STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	823

FINAL PLANS

I CERTIFY THAT THIS PLAN SHEET ACCURATELY DEPICTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND ALL ITS APPURTENANT FEATURES, TO THE BEST OF MY KNOWLEDGE, AS I AND MY STAFF HAVE OBSERVED THE CONSTRUCTION OF THE PROJECT. I ALSO CERTIFY THAT THE DESIGN REVISION AND RESPONSIBILITY FOR THE DESIGN OF THIS PROJECT, EXCEPT AS I AND MY STAFF MAY HAVE MODIFIED OR AUTHORIZED THE MODIFICATION OF THE PROJECT DESIGN DURING ITS CONSTRUCTION, AND I DISCLAIM RESPONSIBILITY FOR THE CONTRACTOR'S ACTUAL CONSTRUCTION OF THE PROJECT. EXCEPT AS I AND MY STAFF MAY HAVE DIRECTED OR ENSURED THAT THE PROJECT IS CONSTRUCTED.

SIGNATURE DATE

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 08/01
CHECKED: 09/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

BRIDGE APPROACH SLAB

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

SHEET 23 OF 40

L05684

$$$time$$$ $$$date$$$ $$$file$$$

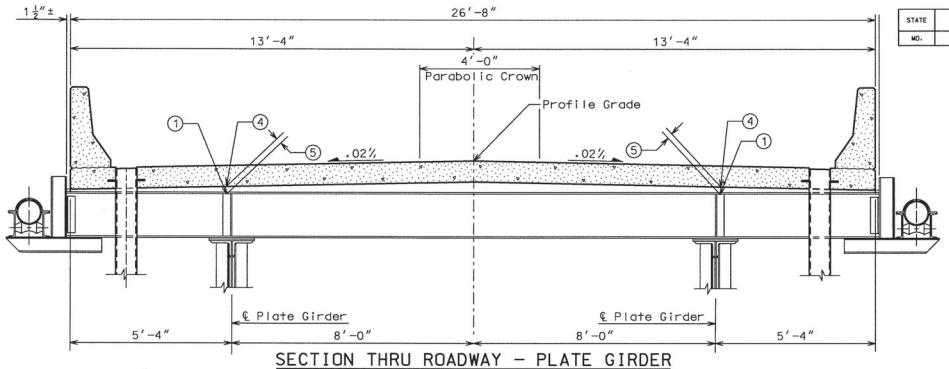
THRU TRUSS

JOINT	① PREDICTED ELEV. AFTER DECK REMOVAL	② PREDICTED DEFLEC. DUE TO SLAB & BARRIER (INCHES)	③ PREDICTED TOP OF FLOORBEAM ELEVATION	④ THEORETICAL BOTTOM OF SLAB ELEV. INTERIOR STRINGER	④ THEORETICAL BOTTOM OF SLAB ELEV. EXTERIOR STRINGER	✱⑤ THEORETICAL HAUNCH AT STRINGER (adjacent to floorbeam) INT. (IN)	✱⑤ THEORETICAL HAUNCH AT STRINGER (adjacent to floorbeam) EXT. (IN)
L0′	780.34	0.000	780.34	780.70	780.56	2.82	2.14
L1′	781.34	1.062	781.25	781.60	781.46	2.70	2.02
L2′	782.26	1.807	782.11	782.44	782.30	2.46	1.78
L3′	783.03	2.547	782.82	783.21	783.07	3.18	2.50
L4′	783.77	2.938	783.53	783.92	783.78	3.18	2.50
L5′	784.41	3.293	784.14	784.55	784.41	3.42	2.74
L6′	784.97	3.281	784.70	785.12	784.98	3.54	2.86
L7′	785.48	3.250	785.21	785.63	785.49	3.54	2.86
L8′	785.92	2.886	785.68	786.06	785.92	3.06	2.38
L9′	786.25	2.544	786.04	786.43	786.29	3.18	2.50
L10′	786.51	1.932	786.35	786.74	786.60	3.18	2.50
L11′	786.73	1.417	786.61	786.97	786.83	2.82	2.14
L12′	786.84	0.835	786.77	787.14	787.00	2.94	2.26
L13′	786.94	0.452	786.90	787.24	787.10	2.58	1.90
L14	787.00	0.000	787.00	787.28	787.14	1.86	1.18
L13	786.94	0.452	786.90	787.24	787.10	2.58	1.90
L12	786.91	0.835	786.84	787.14	787.00	2.10	1.42
L11	786.74	1.417	786.62	786.98	786.84	2.82	2.14
L10	786.62	1.932	786.46	786.74	786.60	1.86	1.18
L9	786.26	2.544	786.05	786.44	786.30	3.18	2.50
L8	785.99	2.886	785.75	786.08	785.94	2.46	1.78
L7	785.49	3.250	785.22	785.64	785.50	3.54	2.86
L6	785.08	3.281	784.81	785.14	785.00	2.46	1.78
L5	784.43	3.293	784.16	784.57	784.43	3.42	2.74
L4	783.85	2.938	783.61	783.94	783.80	2.46	1.78
L3	783.06	2.547	782.85	783.24	783.10	3.18	2.50
L2	782.34	1.807	782.19	782.47	782.33	1.86	1.18
L1	781.37	1.062	781.28	781.63	781.49	2.70	2.02
L0	780.39	0.000	780.39	780.73	780.59	2.58	1.90

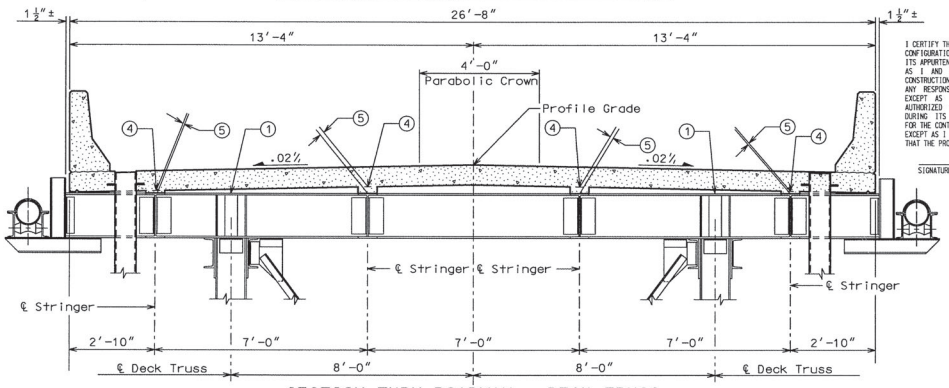
✱ Does not include correction factor for floorbeam cambers

THRU TRUSS

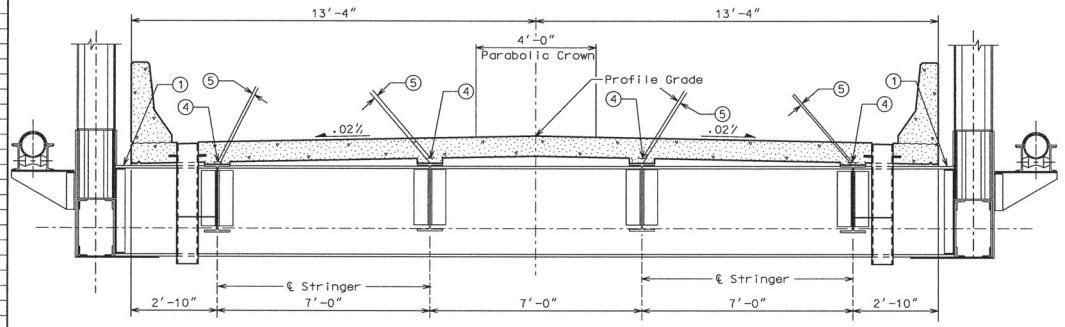
JOINT	① ACTUAL ELEV. AFTER DECK REMOVAL	② PREDICTED DEFLEC. DUE TO SLAB & BARRIER (INCHES)	③ PREDICTED TOP OF FLOORBEAM ELEVATION (ADJUSTED)	④ THEORETICAL BOTTOM OF SLAB ELEV. INTERIOR STRINGER	④ THEORETICAL BOTTOM OF SLAB ELEV. EXTERIOR STRINGER	⑤ THEO. HAUNCH AT Floorbeam (ADJUSTED) INT. (IN)	⑤ THEO. HAUNCH AT Floorbeam (ADJUSTED) EXT. (IN)
L0′	780.48	0.000	780.48	780.70	780.56	2.60	0.92
L1′	781.42	1.062	781.33	781.60	781.46	3.35	1.68
L2′	782.25	1.807	782.10	782.44	782.30	4.02	2.36
L3′	783.04	2.547	782.82	783.21	783.07	4.62	2.94
L4′	783.77	2.938	783.52	783.92	783.78	4.70	3.02
L5′	784.40	3.293	784.13	784.55	784.41	5.03	3.35
L6′	785.00	3.281	784.73	785.12	784.98	4.70	3.08
L7′	785.48	3.250	785.19	785.63	785.49	5.12	3.56
L8′	785.96	2.886	785.70	786.06	785.92	4.25	2.63
L9′	786.30	2.544	786.08	786.43	786.29	4.12	2.44
L10′	786.58	1.932	786.41	786.74	786.60	3.84	2.16
L11′	786.79	1.417	786.68	786.97	786.83	3.48	1.80
L12′	786.94	0.835	786.87	787.14	787.00	3.29	1.61
L13′	787.06	0.452	787.02	787.24	787.10	2.64	0.96
L14	787.02	0.000	787.02	787.28	787.14	3.24	1.56
L13	787.08	0.452	787.04	787.24	787.10	2.38	0.70
L12	786.96	0.835	786.90	787.14	787.00	2.94	1.32
L11	786.80	1.417	786.69	786.98	786.84	3.53	1.79
L10	787.64	1.932	786.47	786.74	786.60	3.21	1.53
L9	786.35	2.544	786.17	786.44	786.30	3.42	1.67
L8	786.01	2.886	785.77	786.08	785.94	3.70	2.02
L7	785.60	3.250	785.33	785.64	785.50	3.76	2.08
L6	785.09	3.281	784.81	785.14	785.00	3.91	2.29
L5	784.52	3.293	784.24	784.57	784.43	3.87	2.25
L4	783.91	2.938	783.66	783.94	783.80	3.33	1.65
L3	783.16	2.547	782.95	783.24	783.10	3.41	1.73
L2	782.39	1.807	782.24	782.47	782.33	3.08	1.34
L1	781.53	1.062	781.44	781.63	781.49	3.17	1.49
L0	780.60	0.000	780.60	780.73	780.59	2.58	0.90



SECTION THRU ROADWAY – PLATE GIRDER



SECTION THRU ROADWAY – DECK TRUSS



SECTION THRU ROADWAY – THROUGH TRUSS

STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	B24

FINAL PLANS

I CERTIFY THAT THIS PLAN SHEET ACCURATELY DEPICTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND ALL ITS APPURTENANT FEATURES. TO THE BEST OF MY KNOWLEDGE, AS I AND MY STAFF HAVE OBSERVED THE CONTRACTOR'S CONSTRUCTION OF THIS PROJECT. I SPECIFICALLY DISCLAIM ANY RESPONSIBILITY FOR THE DESIGN OF THIS PROJECT, EXCEPT AS I AND MY STAFF MAY HAVE MODIFIED OR AUTHORIZED THE MODIFICATION OF THE PROJECT DESIGN DURING ITS CONSTRUCTION AND I DISCLAIM RESPONSIBILITY FOR THE CONTRACTOR'S ACTUAL CONSTRUCTION OF THE PROJECT. EXCEPT AS I AND MY STAFF MAY HAVE DIRECTED OR ORDERED THAT THE PROJECT BE CONSTRUCTED.

SIGNATURE DATE

DEFLECTION & CAMBER DIAGRAMS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

For notes, see "Deflection & Camber Diagrams" sheet.

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 24 OF 40

L05684

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
CHECKED: 09/01

$$$time$$$ $$$date$$$ $$$file$$$

STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	25

DECK TRUSS - N. END

JOINT	① PREDICTED ELEV. AFTER DECK REMOVAL	① ACTUAL ELEV. AFTER DECK REMOVAL	② PREDICTED DEFLEC. DUE TO SLAB & BARRIER (INCHES)	③ PREDICTED TOP OF FLOORBEAM ELEVATION	③ PREDICTED TOP OF FLOORBEAM ELEVATION (ADJUSTED)	④ THEORETICAL BOTTOM OF SLAB @ STRINGER INT	④ EXT	⑤ THEORETICAL HAUNCH @ FLOORBEAM INT (IN.)	⑤ EXT (IN.)	⑤ THEO. HAUNCH @ FLOORBEAM INT (IN.) (ADJUSTED)	⑤ EXT (IN.) (ADJUSTED)
U0	780.29	780.34	0.000	780.29	780.05	780.68	780.54	4.68	3.00	5.80	4.00
U1	779.83	779.86	0.347	779.80	779.57	780.23	780.09	5.16	3.48	5.61	3.57
U2	779.37	779.38	0.666	779.31	779.07	779.77	779.63	5.52	3.84	5.77	3.97
U3	778.91	778.92	0.863	778.84	778.58	779.28	779.14	5.28	3.60	5.93	4.19
U4	778.45	778.43	1.005	778.37	778.07	778.79	778.65	5.04	3.36	5.80	3.94
U5	777.93	777.97	1.028	777.84	777.56	778.28	778.14	5.28	3.60	5.56	3.58
U6	777.40	777.40	0.999	777.32	777.04	777.75	777.61	5.16	3.48	5.28	3.27
U7	776.86	776.88	0.844	776.79	776.50	777.21	777.07	5.04	3.36	5.01	3.18
U8	776.31	776.30	0.683	776.25	775.97	776.66	776.52	4.92	3.24	4.97	3.23
U9	775.70	775.78	0.444	775.66	775.41	776.08	775.94	5.04	3.36	4.20	3.15
U10	775.10	775.17	0.272	775.08	774.83	775.50	775.36	5.04	3.36	4.36	2.68
U11	774.51	774.60	0.109	774.50	774.25	774.90	774.76	4.80	3.12	4.31	2.66
U12	773.95	773.96	0.000	773.95	773.64	774.28	774.14	3.96	2.28	3.99	2.43
U11′	773.38	773.34	0.109	773.37	773.02	773.65	773.51	3.36	1.68	3.78	2.28
U10′	772.77	772.72	0.272	772.75	772.37	773.02	772.88	3.24	1.56	3.68	2.36
U9′	772.16	772.10	0.444	772.12	771.77	772.39	772.25	3.24	1.56	4.03	2.50
U8′	771.55	771.50	0.683	771.49	771.14	771.76	771.62	3.24	1.56	3.63	2.31
U7′	770.94	770.89	0.844	770.87	770.51	771.13	770.99	3.12	1.44	3.65	2.39
U6′	770.32	770.27	0.999	770.24	769.88	770.50	770.36	3.12	1.44	3.51	2.34
U5′	769.70	769.64	1.028	769.61	769.28	769.87	769.73	3.12	1.44	3.72	2.40
U4′	769.08	769.04	1.005	769.00	768.67	769.24	769.10	2.88	1.20	3.16	2.32
U3′	768.46	768.42	0.863	768.39	768.05	768.61	768.47	2.64	0.96	2.92	2.08
U2′	767.83	767.80	0.666	767.77	767.45	767.98	767.84	2.52	0.84	2.96	1.88
U1′	767.19	767.18	0.347	767.16	767.13	767.35	767.21	2.28	0.60	2.77	1.48
U0′	766.56	766.60	0.000	766.56	766.61	766.72	766.58	1.92	0.24	2.37	0.72

DECK TRUSS - S. END

JOINT	① PREDICTED ELEV. AFTER DECK REMOVAL	① ACTUAL ELEV. AFTER DECK REMOVAL	② PREDICTED DEFLEC. DUE TO SLAB & BARRIER (INCHES)	③ PREDICTED TOP OF FLOORBEAM ELEVATION	③ PREDICTED TOP OF FLOORBEAM ELEVATION (ADJUSTED)	④ THEORETICAL BOTTOM OF SLAB @ STRINGER INT	④ EXT	⑤ THEORETICAL HAUNCH @ FLOORBEAM INT (IN.)	⑤ EXT (IN.)	⑤ THEO. HAUNCH @ FLOORBEAM INT (IN.) (ADJUSTED)	⑤ EXT (IN.) (ADJUSTED)
U0	780.29	780.34	0.000	780.29	780.05	780.71	780.57	5.04	3.36	5.70	3.78
U1	779.83	779.86	0.347	779.80	779.57	780.26	780.12	5.52	3.84	5.77	3.97
U2	779.37	779.36	0.666	779.31	779.07	779.80	779.66	5.88	5.20	5.93	4.19
U3	778.91	778.92	0.863	778.84	778.58	779.31	779.17	5.64	3.96	5.80	3.94
U4	778.45	778.43	1.005	778.37	778.07	778.82	778.68	5.40	3.72	5.56	3.58
U5	777.93	777.97	1.028	777.84	777.56	778.31	778.17	5.64	3.96	5.28	3.27
U6	777.40	777.40	0.999	777.32	777.04	777.79	777.65	5.64	3.96	5.01	3.18
U7	776.69	776.88	0.844	776.79	776.50	777.25	777.11	5.52	3.84	4.97	3.23
U8	776.31	776.30	0.683	776.25	775.97	776.69	776.55	5.28	3.60	4.20	3.15
U9	775.70	775.78	0.444	775.66	775.41	776.12	775.98	5.52	3.84	4.36	2.68
U10	775.10	775.17	0.272	775.08	774.83	775.54	775.40	5.52	3.84	4.31	2.66
U11	774.51	774.60	0.109	774.50	774.25	774.94	774.80	5.28	3.60	3.99	2.43
U12	773.95	773.96	0.000	773.95	773.64	774.33	774.19	4.56	2.88	3.78	2.28
U11′	773.38	773.34	0.109	773.37	773.02	773.70	773.56	3.96	2.28	3.68	2.36
U10′	772.77	772.72	0.272	772.75	772.37	773.07	772.93	3.84	2.16	4.03	2.50
U9′	772.16	772.10	0.444	772.12	771.77	772.44	772.30	3.84	2.16	3.63	2.31
U8′	771.55	771.50	0.683	771.49	771.14	771.80	771.66	3.72	2.04	3.65	2.39
U7′	770.94	770.89	0.844	770.87	770.51	771.17	771.03	3.60	1.92	3.51	2.34
U6′	770.32	770.27	0.999	770.24	769.88	770.54	770.40	3.60	1.92	3.72	2.40
U5′	769.70	769.64	1.028	769.61	769.28	769.91	769.77	3.60	1.92	3.16	2.32
U4′	769.08	769.04	1.005	769.00	768.67	769.28	769.14	3.36	1.68	2.92	2.08
U3′	768.46	768.42	0.863	768.39	768.05	768.65	768.51	3.12	1.44	2.96	1.88
U2′	767.83	767.80	0.666	767.77	767.45	768.02	767.88	3.00	1.32	2.77	1.48
U1′	767.19	767.18	0.347	767.16	767.13	767.39	767.25	2.64	0.96	3.09	1.35
U0′	766.56	766.60	0.000	766.56	766.61	766.72	766.58	1.92	0.24	1.66	0.10

PLATE GIRDER SPANS - N. END

FLBM	① PREDICTED ELEV. AFTER DECK REMOVAL	① ACTUAL ELEV. AFTER DECK REMOVAL	② PREDICTED DEFLEC. DUE TO SLAB & BARRIER (INCHES)	③ PREDICTED TOP OF FLOORBEAM ELEVATION	③ PREDICTED TOP OF FLOORBEAM ELEVATION (ADJUSTED)	④ THEORETICAL BOTTOM OF SLAB @ STRINGER	⑤ THEORETICAL HAUNCH @ FLOORBEAM OVER STRINGER (INCHES)	⑤ THEO. HAUNCH @ FLOORBEAM OVER STRINGER (ADJUSTED) (INCHES)
ABUT 9								
1	762.16	762.16	0.000	762.16	762.16	762.20	0.48	0.48
2	762.47	762.47	0.333	762.44	762.44	762.51	0.84	0.84
3	762.78	762.78	0.648	762.73	762.73	762.82	1.13	1.13
4	763.09	763.09	0.928	763.01	763.01	763.14	1.56	1.56
5	763.40	763.40	1.156	763.30	763.30	763.45	1.80	1.80
6	763.71	763.71	1.331	763.60	763.60	763.76	1.92	1.92
7	764.02	764.02	1.438	763.90	763.90	764.07	2.04	2.04
8	764.33	764.33	1.473	764.21	764.21	764.38	2.04	2.04
9	764.64	764.64	1.438	764.52	764.52	764.70	2.16	2.16
10	764.95	764.95	1.331	764.84	764.84	765.01	2.04	2.04
11	765.26	765.26	1.156	765.16	765.16	765.32	1.92	1.92
12	765.57	765.57	0.928	765.49	765.49	765.63	1.68	1.68
13	765.88	765.88	0.648	765.83	765.83	765.94	1.32	1.32
14	766.19	766.19	0.333	766.16	766.16	766.26	1.20	1.20
15	766.50	766.50	0.000	766.50	766.50	766.57	0.84	0.84

PLATE GIRDER SPANS - S. END

FLBM	① PREDICTED ELEV. AFTER DECK REMOVAL	① ACTUAL ELEV. AFTER DECK REMOVAL	② PREDICTED DEFLEC. DUE TO SLAB & BARRIER (INCHES)	③ PREDICTED TOP OF FLOORBEAM ELEVATION	③ PREDICTED TOP OF FLOORBEAM ELEVATION (ADJUSTED)	④ THEORETICAL BOTTOM OF SLAB @ STRINGER	⑤ THEORETICAL HAUNCH @ FLOORBEAM OVER STRINGER (INCHES)	⑤ THEO. HAUNCH @ FLOORBEAM OVER STRINGER (ADJUSTED) (INCHES)
ABUT 1								
1	762.05	762.05	0.000	762.05	762.05	762.25	2.40	2.40
2	762.36	762.36	0.333	762.33	762.33	762.56	2.76	2.76
3	762.67	762.67	0.648	762.62	762.62	762.87	3.00	3.00
4	762.98	762.98	0.928	762.90	762.90	763.18	3.36	3.36
5	763.29	763.29	1.156	763.19	763.19	763.49	3.60	3.60
6	763.60	763.60	1.331	763.49	763.49	763.81	3.84	3.84
7	763.91	763.91	1.438	763.79	763.79	764.12	3.96	3.96
8	764.22	764.22	1.473	764.10	764.10	764.43	3.96	3.96
9	764.53	764.53	1.438	764.41	764.41	764.74	3.96	3.96
10	764.84	764.84	1.331	764.73	764.73	765.05	3.84	3.84
11	765.15	765.15	1.156	765.05	765.05	765.37	3.84	3.84
12	765.46	765.46	0.928	765.38	765.38	765.68	3.60	3.60
13	765.77	765.77	0.648	765.72	765.72	765.99	3.24	3.24
14	766.08	766.08	0.333	766.05	766.05	766.30	3.00	3.00
15	766.39	766.39	0.000	766.39	766.39	766.62	2.76	2.76

① Elevation at top of floorbeam to be obtained in the field from the contractor after complete removal of the existing deck and repair or replacement of the designated structural members is complete.

② Estimated/Predicted downward deflection of truss/floorbeam or girder/floorbeam due to to slab & barrier curb dead load (CIP OPTION) Multiply ② by 1.01 for steel SIP form option (thru truss spans only). Assumed weight of SIP form is 2 p.s.f.

③ Column ① - $\frac{\text{Column ②}}{12}$ Values shown based on predicted camber of truss or plate girder after deck removal.

④ Bottom of slab along ℄ stringer lines at ℄ of floorbeams given based on the proposed profile grade and cross slope as shown in section.

⑤ Column ④ - Column ③ + a correction factor (thru truss only) for the following.

Interior Stringer = -1.5 inches or as noted on sections
Exterior Stringer = -0.5 inches or as noted on sections
Floorbeam Camber @ L6, L6′, L12, L12′
@ Interior Stringer = 0.25 inches
@ Exterior Stringer = 0.100 inches
Floorbeam Camber @ L0, L0′
@ Interior Stringer = 0.125 inches
@ Exterior Stringer = 0.050 inches
Floorbeam Camber @ Remaining locations
@ Interior Stringer = 0.212 inches
@ Exterior Stringer = 0.085 inches

⑤ Column ④ - Column ③ at deck truss and plate girder spans.

Existing bridge deck profile was established without profile grade elevations. A smooth traffic surface was to be obtained. Top of expansion devices, trim plates of compression joint seals and grid deck were adjusted to conform to crown and slope of the roadway surfaces at the time of construction. Similiar field adjustments may be made if so directed by the engineer.

FINAL PLANS

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Consulting Engineers

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DEFLECTION & CAMBER DIAGRAMS

ROUTE 291 MISSOURI RIVER BRIDGE

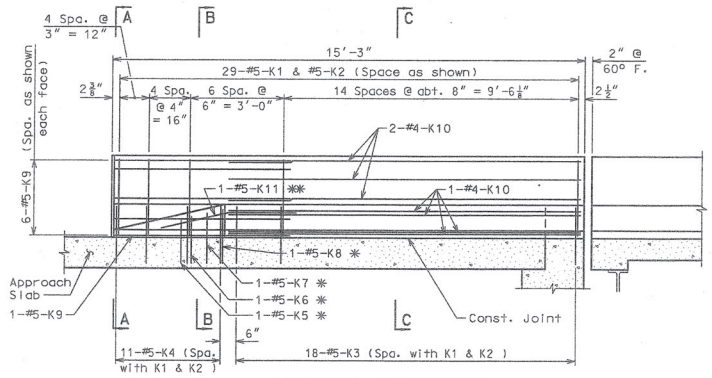
Jackson County

SHEET 25 OF 40

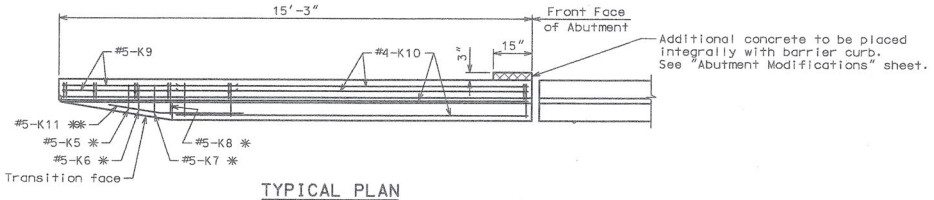
L05684

$$$time$$$ $$$date$$$ $$$file$$$

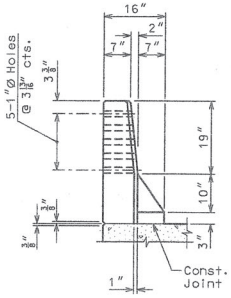
STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	26



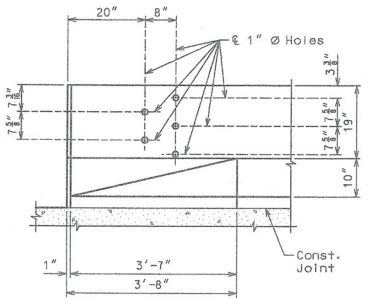
TYPICAL ELEVATION



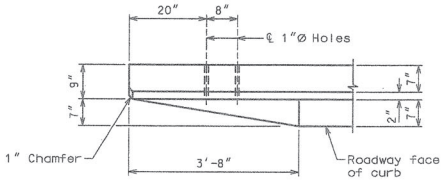
TYPICAL PLAN



PART END VIEW

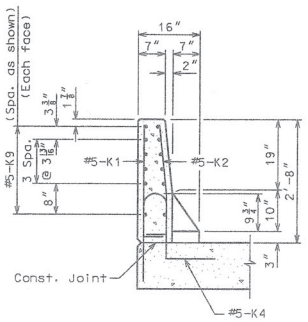


PART ELEVATION

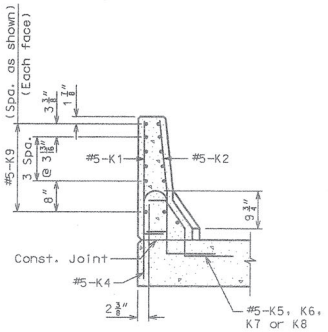


PART PLAN

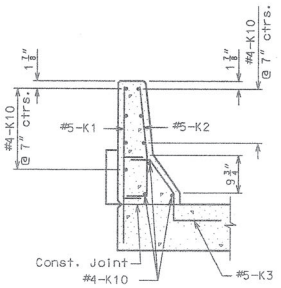
DETAILS OF GUARD RAIL ATTACHMENT



SECTION A-A



SECTION B-B



SECTION C-C

FINAL PLANS

I CERTIFY THAT THIS PLAN SHEET ACCURATELY DEPICTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND ALL ITS APPURTENANT FEATURES. TO THE BEST OF MY KNOWLEDGE, AS I AND MY STAFF HAVE OBSERVED THE CONTRACTOR'S CONSTRUCTION OF THIS PROJECT. I SPECIFICALLY DISCLAIM ANY RESPONSIBILITY FOR THE DESIGN OF THIS PROJECT, EXCEPT AS I AND MY STAFF MAY HAVE MODIFIED OR AUTHORIZED THE MODIFICATION OF THE PROJECT DESIGN DURING ITS CONSTRUCTION; AND I DISCLAIM RESPONSIBILITY FOR THE CONTRACTOR'S ACTUAL CONSTRUCTION OF THE PROJECT, EXCEPT AS I AND MY STAFF MAY HAVE DIRECTED OR ORDERED THAT THE PROJECT BE CONSTRUCTED.

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Notes:
* Spaced with #5-K4 bars.
** Fit bar to follow transition face of curb. East barrier curb shown, West barrier curb similar.
Use a minimum lap of 2'-0" between K9 and K10 bars.
See "Typical Safety Barrier Curb Details" sheet for additional notes.

SAFETY BARRIER CURB AT ABUTMENTS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

SHEET 26 OF 40

L05684

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STATE	CONTRACT ID	SHEET NO.
MO.	020116-401	27

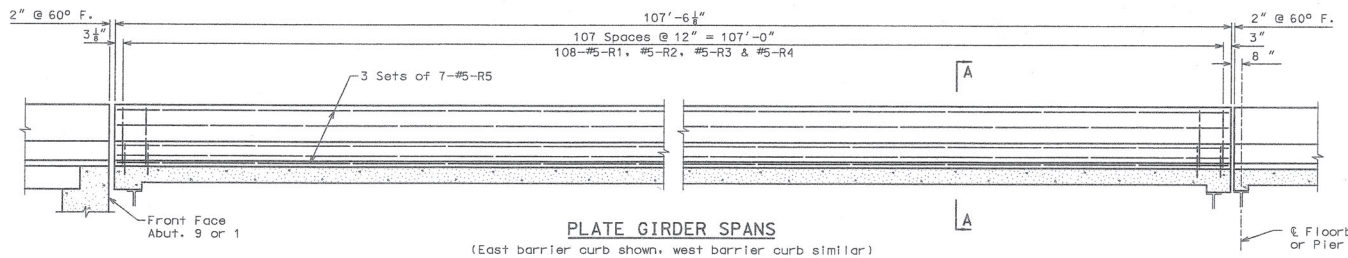
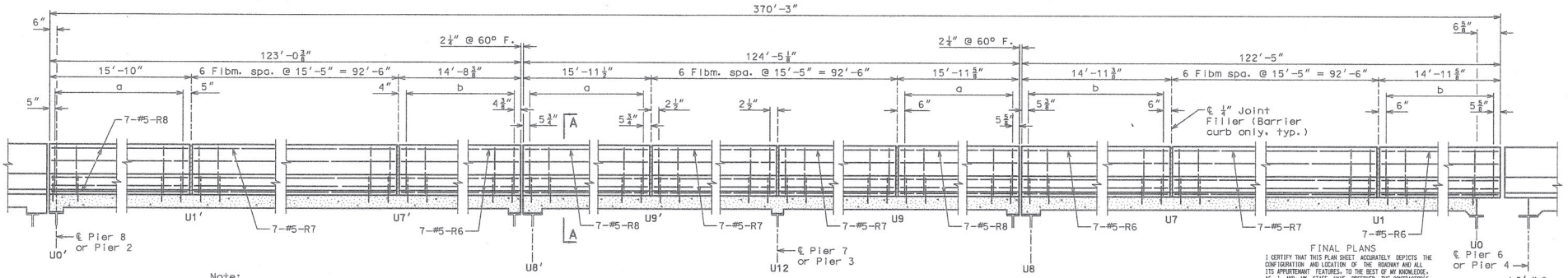


PLATE GIRDER SPANS

(East barrier curb shown, west barrier curb similar)

LEGEND

a = 15 Spa. @ 12" = 15'-0"
16-#5-R1, #5-R2, #5-R3 & #5-R4
b = 14 Spa. @ 12" = 14'-0"
15-#5-R1, #5-R2, #5-R3 & #5-R4
c = 7 Spa. @ 12" = 7'-0"
8-#5-R1, #5-R2, #5-R3 & #5-R4
d = 16 Spa. @ 12" = 16'-0"
17-#5-R1, #5-R2, #5-R3 & #5-R4
e = 9 Spa. @ 12" = 9'-0"
10-#5-R1, #5-R2, #5-R3 & #5-R4
f = 7 Spa. @ abt. 12" = 6'-8"
8-#5-R1, #5-R2, #5-R3 & #5-R4
g = 8 Spa. @ 12" = 8'-0"
9- #5-R1, #5-R2, #5-R3 & #5-R4



Note:
For reinforcing not shown in the deck truss spans, use letter designation a, with 2 1/2" clear to ℄ joint.

DECK TRUSS SPANS

(East barrier curb shown, west barrier curb similar)

FINAL PLANS

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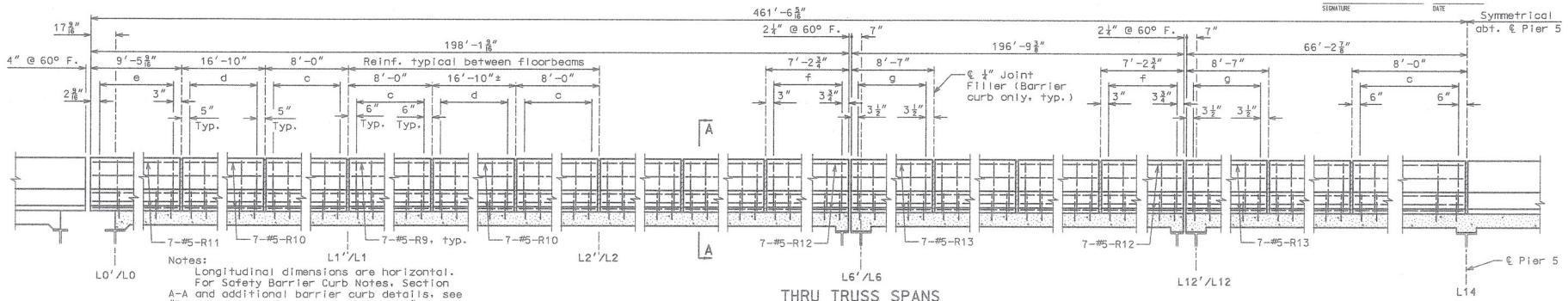
SIGNATURE DATE



Notes:
Longitudinal dimensions are horizontal.
For Safety Barrier Curb Notes, Section A-A and additional barrier curb details, see "Typical Safety Barrier Curb Details" sheet.
Cast-in-place or Drilled-in platform anchors required in back of barrier curb on east face of thru truss span near L2', L8' and L14. See "Removal Details" sheet.
Use of drilled-in-place anchor would require drilling through existing hole in place, see "Removal Details" sheet..

THRU TRUSS SPANS

(East barrier curb shown, west barrier curb similar)

Note:
The 3/4"Ø resin anchor system or cast-in-place anchor system used to attach navigation platforms to barrier curbs shall have a minimum pullout strength of 10,000 lbs. in concrete with f'c=4,000 psi., see Special Provisions. Provide two nuts with each anchor.

Note:
Reinforcing on thru truss spans is typical between floorbeams as shown in pattern c-d-c. Other letter designations shall replace the appropiate c.
Minimal clearances occur between the back of the barrier curb and structural steel elements in the thru truss spans, see Special Provisions.

Note:
Permit 4-03-00510U provides for 3" conduit in east barrier wall with fiber optic

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SAFETY BARRIER CURB LAYOUT

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

SHEET 27 OF 40

L05684

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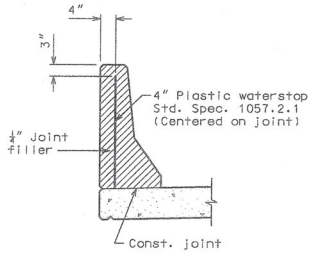
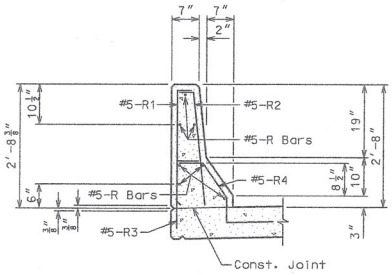
STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	28



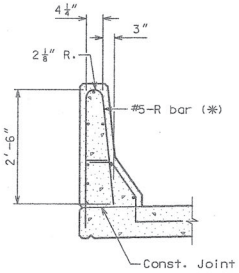
DETAILS OF PLASTIC WATERSTOP

Notes:
Plastic waterstop shall be placed in all safety barrier curb filled joints.
Cost of plastic waterstop complete in place to be included in the contract unit price for Safety Barrier Curb.



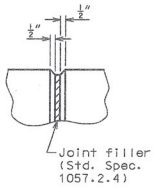
PART SECTION A-A

Notes:
Use a minimum lap of 2'-11" for #5 horizontal safety barrier curb bars.
The cross-sectional area above the slab = 2.28 sq. ft.

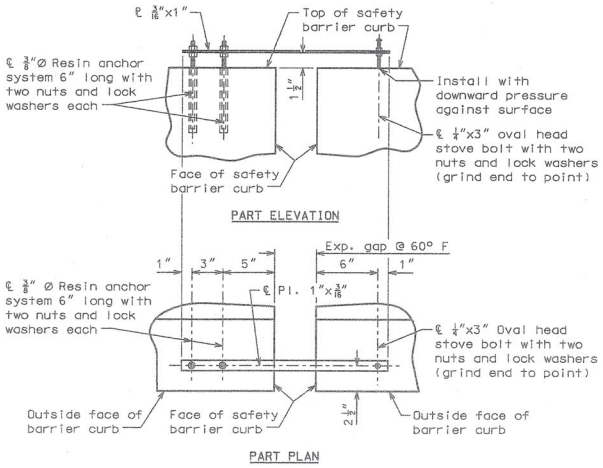


R-BAR PERMISSIBLE ALTERNATE SHAPE

(*) The R1 and R2 bar combination may be furnished as one bar, as shown, at the contractor's option. (All dimensions are out to out.)

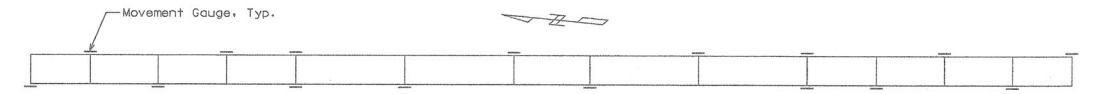


FILLED JOINT DETAIL



BARRIER CURB MOVEMENT GAUGE DETAIL

Notes:
A movement gauge shall be provided at all safety barrier curb expansion joints. See "Location of Movement Gauges".
All steel for movement gauges shall be galvanized.
Cost of movement gauge complete in place shall be included in the contract unit price bid for Safety Barrier Curb.



LOCATION OF MOVEMENT GAUGES

FINAL PLANS

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SAFETY BARRIER CURB NOTES:

Top of safety barrier curb shall be built parallel to grade with safety barrier curb joints (except at end bents) normal to grade.
All exposed edges of safety barrier curb shall have either a ½" radius or a ⅜" bevel, unless otherwise noted.
When the safety barrier curb is bid by linear feet, the contract unit price shall include the cost of all concrete and reinforcement, complete in place.
Concrete in the safety barrier curb shall be Class B1.
Measurement of safety barrier curb is to the nearest linear foot measured horizontally from end to end of barrier curb.
Cost of furnishing and installing platform anchors (6 required) shall be included in contract unit price bid for "Safety Barrier Curb". Double nuts shall be provided at each anchor.

TYPICAL SAFETY BARRIER CURB DETAILS

ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
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SHEET 28 OF 40

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STATE	CONTRACT ID	SHEET NO.
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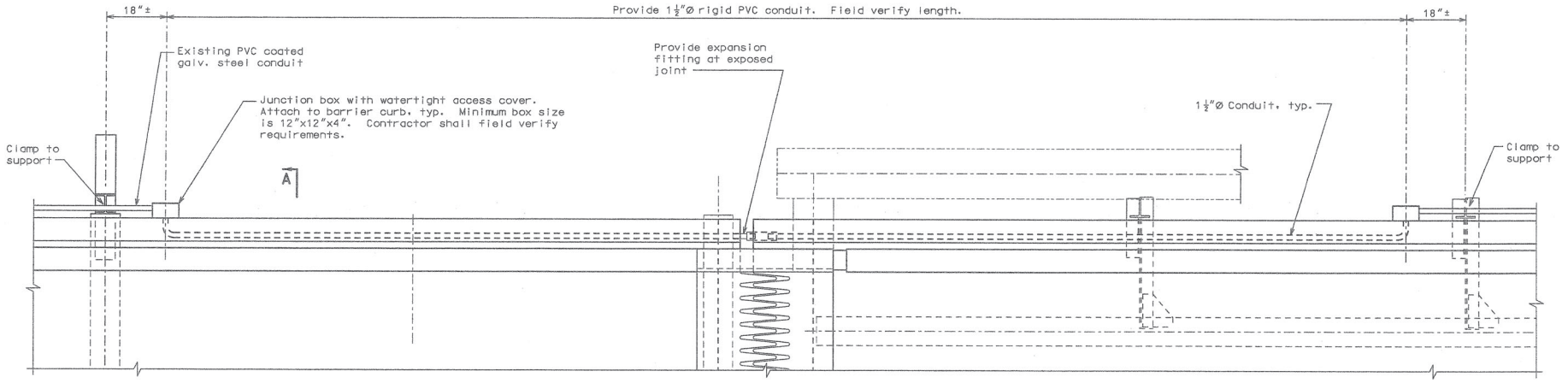
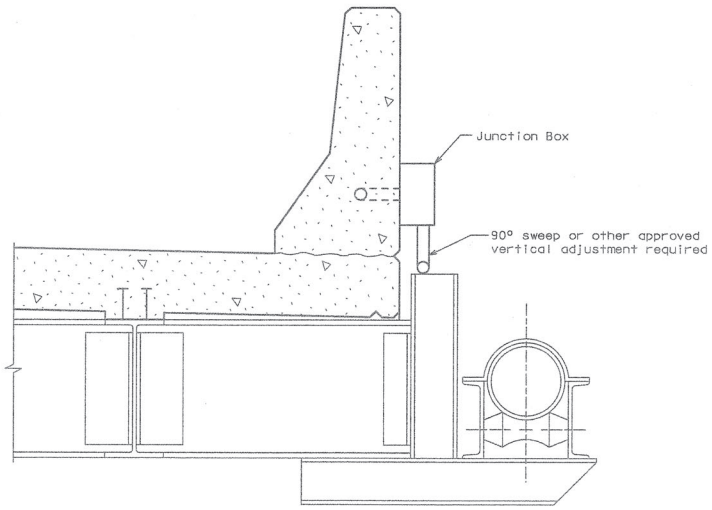


PLAN



SECTION A-A

FINAL PLANS

I CERTIFY THAT THIS PLAN SHEET ACCURATELY DEPICTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND ALL ITS APPURTENANT FEATURES. TO THE BEST OF MY KNOWLEDGE, AS I AND MY STAFF HAVE OBSERVED THE CONTRACTOR'S CONSTRUCTION OF THIS PROJECT. I SPECIFICALLY DISCLAIM ANY RESPONSIBILITY FOR THE DESIGN OF THIS PROJECT, EXCEPT AS I AND MY STAFF MAY HAVE MODIFIED OR AUTHORIZED THE MODIFICATION OF THE PROJECT DESIGN DURING ITS CONSTRUCTION; AND I DISCLAIM RESPONSIBILITY FOR THE CONTRACTOR'S ACTUAL CONSTRUCTION OF THE PROJECT, EXCEPT AS I AND MY STAFF MAY HAVE DIRECTED OR ORDERED THAT THE PROJECT BE CONSTRUCTED.

SIGNATURE _____ DATE _____

⚠ New sheet, 09-22-04

NOTES:

Work shall not be allowed to interfere with displaying navigation lights at night.

Installation shall be completed by competent electricians supervised by foreman experienced in this class of work.

Flexible conduit shall not be used as expansion fitting.

All conduit shall be rigid non-metallic schedule 40 heavy wall PVC (polyvinyl chloride plastic) with 3" minimum cover in concrete. Each section of conduit shall bear the underwriter laboratories, Inc., (UL) label.

All conduit clamps shall be commercially available conduit clamp approved by the Engineer.

Shift reinforcing steel in field where necessary to clear conduit and junction boxes.

Expansion fittings shall provide a minimum movement in either direction of 5½" at open joints. Expansion fittings shall be equal to Carlon Electtical Construction Products or Cantex, Inc.

Safety barrier curb junction boxes shall be PVC molded and equal to Carlon Electrical Construction Products or Cantex, Inc. The conduit terminations shall be permanent or separable. The terminations and covers shall be of water-tight construction and shall meet requirments for NEMA 4 enclosure.

Weepholes shall be provided at appropriated locations to drain any moisture in the conduit system.

NAVIGATION LIGHT CONDUIT AT PIER 6

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/04
CHECKED: 09/04

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 28A OF 40

L05684

$$$time$$$ $$$date$$$ $$$file$$$

STATE	CONTRACT ID	SHEET NO.
MO.	0Z0118-401	29

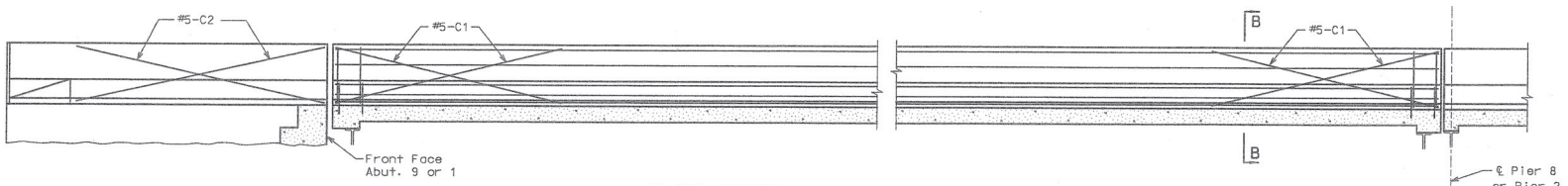
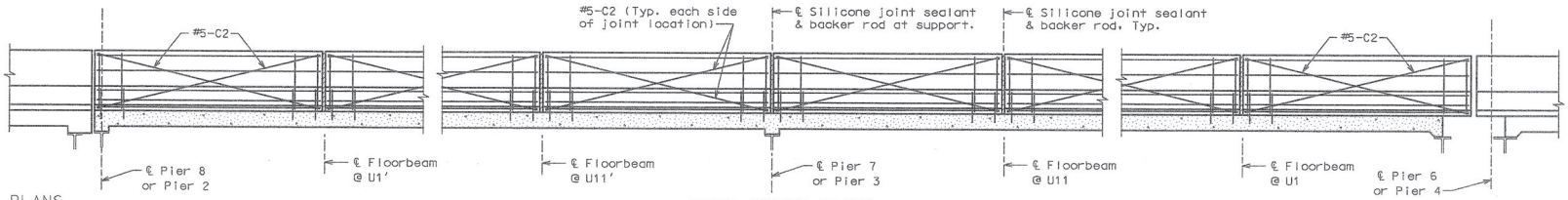


PLATE GIRDER SPANS



DECK TRUSS SPANS

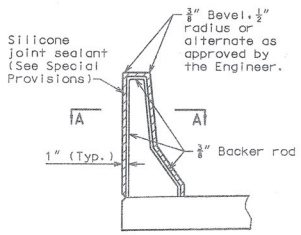
TYPICAL SECTION NEAR LEFT SAFETY BARRIER CURB AT SUPPORT LOCATIONS
(OPTIONAL SLIP-FORM BRIDGE SAFETY BARRIER CURB)

(East barrier curb shown, West barrier curb similar.)

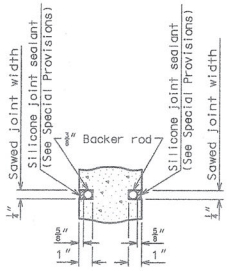
FINAL PLANS

I CERTIFY THAT THIS PLAN SHEET ACCURATELY DEPICTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND ALL ITS APPURTENANT FEATURES. TO THE BEST OF MY KNOWLEDGE, AS I AND MY STAFF HAVE OBSERVED THE CONTRACTOR'S CONSTRUCTION OF THIS PROJECT. I SPECIFICALLY DISCLAIM ANY RESPONSIBILITY FOR THE DESIGN OF THIS PROJECT, EXCEPT AS I AND MY STAFF MAY HAVE MODIFIED OR AUTHORIZED THE MODIFICATION OF THE PROJECT DESIGN DURING ITS CONSTRUCTION; AND I DISCLAIM RESPONSIBILITY FOR THE CONTRACTOR'S ACTUAL CONSTRUCTION OF THE PROJECT, EXCEPT AS I AND MY STAFF MAY HAVE DIRECTED OR ORDERED THAT THE PROJECT BE CONSTRUCTED.

SIGNATURE _____ DATE _____

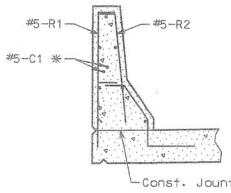


SECTION THRU JOINT



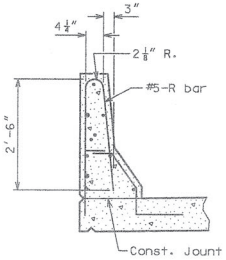
SECTION A-A

Note: Cost of silicone joint sealant and backer rod complete in place to be included in the contract unit price for Safety Barrier Curb.



PART SECTION B-B

Note: * Each side of joint location.



R-BAR PERMISSIBLE ALTERNATE SHAPE

The R1 and R2 bar combination may be furnished as one bar, as shown, at the contractor's option. All dimensions are out to out.

Notes:

Slip-form option is allowed in plate girder and deck truss spans.

Contractor shall provide detailed construction drawings of slip forming for approval by the Engineer if slip forming is to be used in the thru truss spans, see Special Provisions.

Top of safety barrier curb shall be built parallel to grade with safety barrier curb joints (except at end bents) normal to grade.

When the safety barrier curb is bid by linear feet, the contract unit price shall include the cost of all concrete and reinforcement, complete-in-place.

Concrete in the safety barrier curb shall be Class B1.

Measurement of safety barrier curb is to the nearest linear foot measured horizontally from end to end of barrier curb.

Joint sealant and backer rods shall be used on all slip-form bridge safety barrier curbs instead of joint filler.

Plastic waterstop shall not be used with slip-form option.

C Bars (Slip-form option only) shall be used in addition to cast-in-place conventional forming reinforcement for bridge safety barrier curb. 5C1 bars shall be located at the ends of the plate girder spans. 5C2 bars shall be located on the approach slab side of joint and between all joints in the Deck Truss Spans.

5C1 bar length = 10'-0" 5C2 bar length = 15'-3"
Number required = 16 Number required = 200
Total additional weight = 3,350 lbs.

OPTIONAL SLIP-FORM SAFETY BARRIER CURB

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 08/01
CHECKED: 09/01

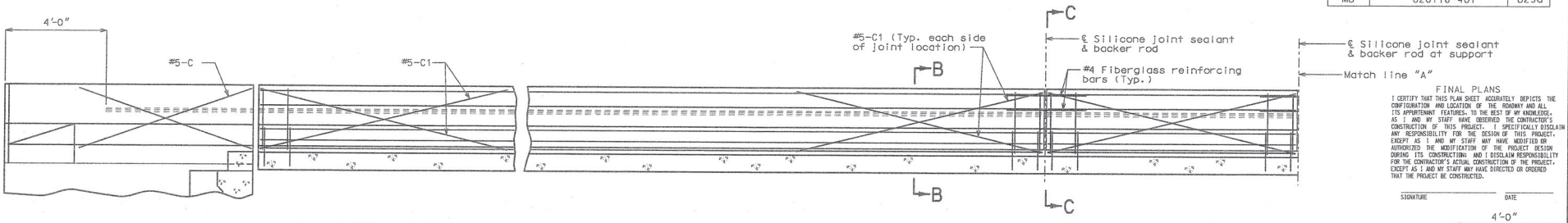
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 29 OF 40

L05684

$$$time$$$ $$$date$$$ $$$file$$$

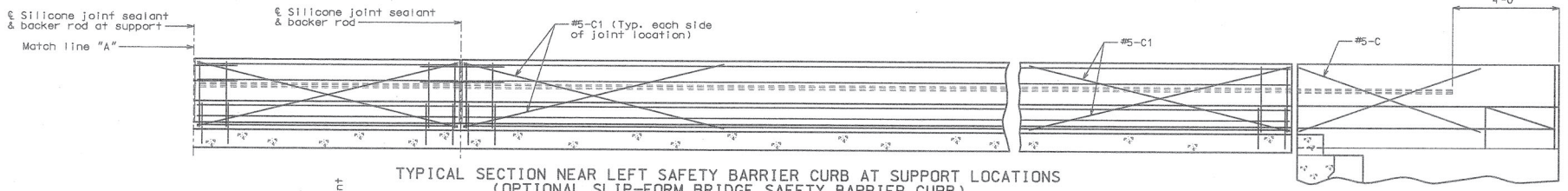
State	Contract ID	Sheet No.
MO	020118-401	B29a



FINAL PLANS

I CERTIFY THAT THIS PLAN SHEET ACCURATELY DEPICTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND ALL ITS APPURTENANT FEATURES. TO THE BEST OF MY KNOWLEDGE, AS I AND MY STAFF HAVE OBSERVED THE CONTRACTOR'S CONSTRUCTION OF THIS PROJECT. I SPECIFICALLY DISCLAIM ANY RESPONSIBILITY FOR THE DESIGN OF THIS PROJECT, EXCEPT AS I AND MY STAFF MAY HAVE MODIFIED OR AUTHORIZED THE MODIFICATION OF THE PROJECT DESIGN DURING ITS CONSTRUCTION; AND I DISCLAIM RESPONSIBILITY FOR THE CONTRACTOR'S ACTUAL CONSTRUCTION OF THE PROJECT, EXCEPT AS I AND MY STAFF MAY HAVE DIRECTED OR ORDERED THAT THE PROJECT BE CONSTRUCTED.

SIGNATURE _____ DATE _____



TYPICAL SECTION NEAR LEFT SAFETY BARRIER CURB AT SUPPORT LOCATIONS (OPTIONAL SLIP-FORM BRIDGE SAFETY BARRIER CURB)

Notes:

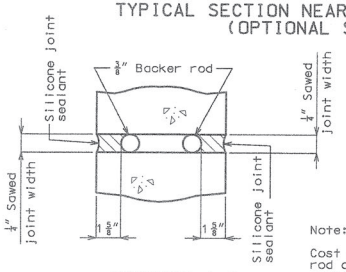
Top of safety barrier curb shall be built parallel to grade with barrier curb joints (except at end bents) normal to grade.

Payment for all concrete and reinforcement, complete-in-place, will be considered completely covered by the contract unit price for safety barrier curb per linear foot.

Concrete in the safety barrier curb shall be Class B-1.

Measurement of safety barrier curb is to the nearest linear foot for each structure, measured along the outside top of slab from end of wing to end of wing.

The curb shall be cured by application of Type 1-D or Type 2 Liquid Membrane-Forming Compound in accordance with Sec 1055. Scale prevention treatment will not be permitted.



SECTION A-A

Notes:

Joint sealant and backer rods shall be used on all slip-form barrier curbs instead of joint filler and shall be in accordance with Sec 717 for silicone joint sealant for saw cut and formed joints.

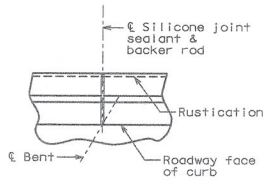
Plastic waterstop shall not be used with slip-form option.

C Bars (Slip-form option only) shall be used in addition to cast-in-place conventional forming reinforcement for bridge safety barrier curb.

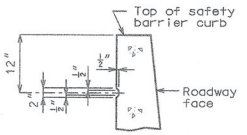
For Slip-Form option, all sides of the safety barrier curb shall have a vertically broomed finish and the curb top shall have a tranversely broomed finish.

Note:

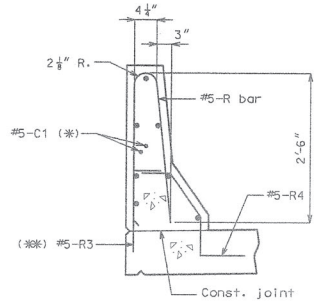
Cost of silicone joint sealant and backer rod complete-in-place will be considered completely covered by the contract unit price for Safety Barrier Curb.



PART PLAN SHOWING SAFETY BARRIER CURB JOINT



PART SECTION SHOWING RUSTICATION DETAILS

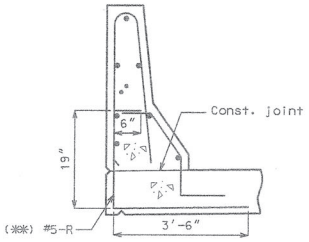


Notes:

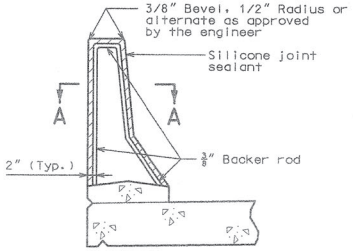
(*) Each side of joint location.

(**) The R3 bar and #5 bottom transverse slab bar in cantilever (P/S panels only) combination may be furnished as one bar at the contractor's option.

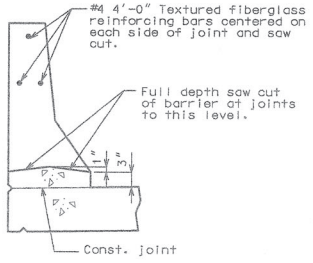
PART SECTION B-B



PART SECTION B-B
(Optional #5-R bar shown)

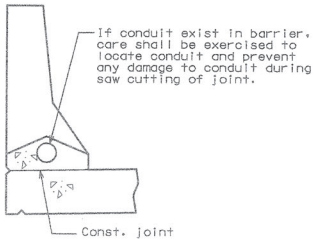


SECTION THRU JOINT



PART SECTION C-C

RUSTICATION DETAIL
(Use on highway grade separation only)



PART SECTION C-C
(Use when conduit required)

OPTIONAL SLIP-FORM BRIDGE SAFETY BARRIER CURB

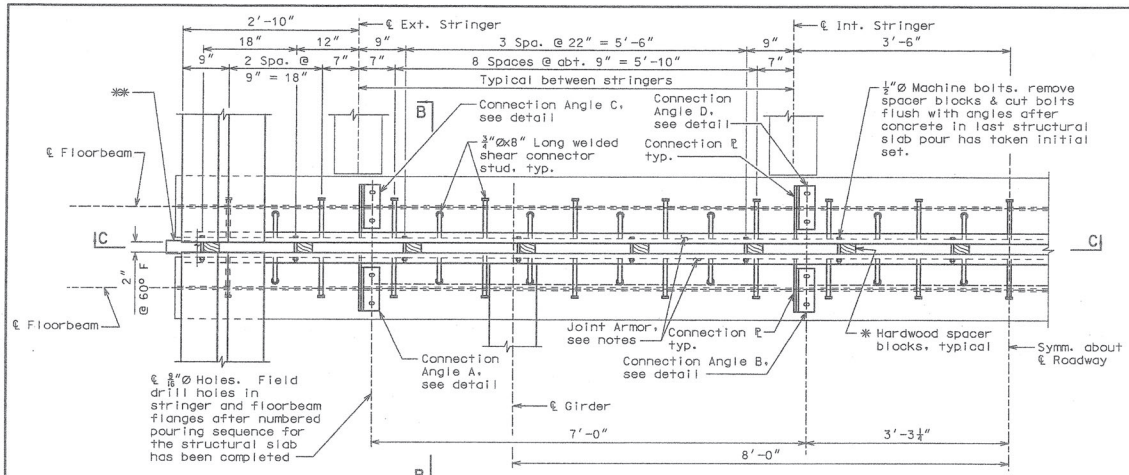
(Left barrier curb shown, right barrier curb similar.)

Detailed 02/05
Checked

Note: This drawing is not to scale. Follow dimensions.

JACKSON COUNTY | L05684

STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	30

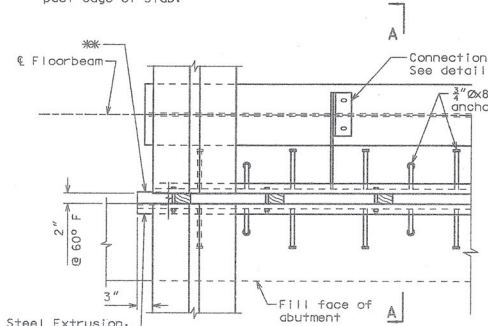


HALF PLAN – PIER 8

(Pier 2 opposite hand)

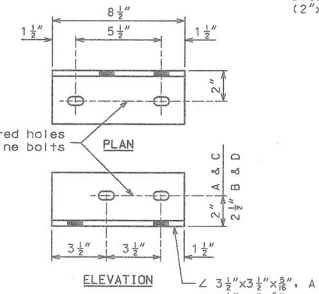
** Extend Neoprene Strip Seal 3" past edge of Slab.

* Spacer may be a combination of a hardwood block and metal shims (2"x3")



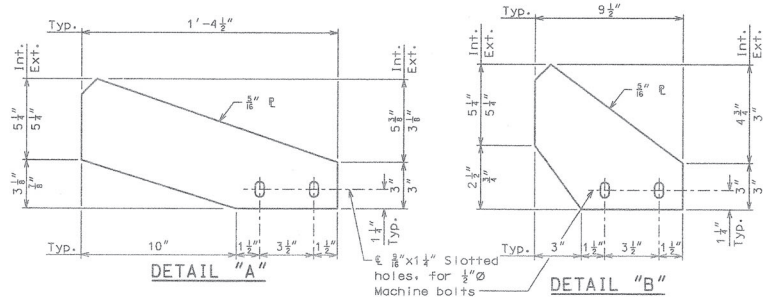
PART PLAN – ABUTMENT 9

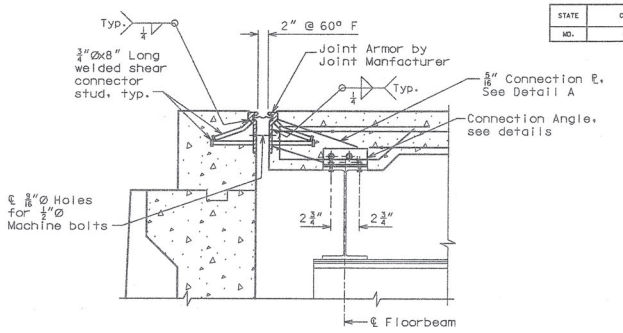
(Abutment 1 opposite hand)
For dimensionsnot shown, see "Half Plan – Pier 8"



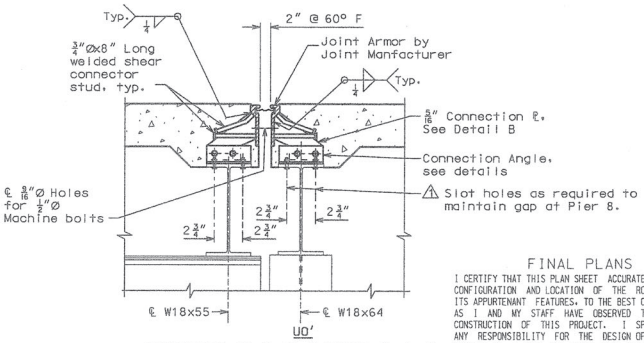
CONNECTION ANGLE – A,B,C & D

(Angle A & B shown, Angle C & D opposite hand)





SECTION A-A @ ABUTMENTS



SECTION B-B @ PIERS 2 & 8

FINAL PLANS

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SIGNATURE _____ DATE _____

NOTES:

The expansion device shall be fabricated and installed in accordance with the recommendations of the manufacturer, and as set forth in the Special Provisions.

The contractor must verify all dimensions prior to fabrication.

All welds shall conform to Section 712 of the Missouri Standards Specifications.

Splices of steel extrusion shall develop full strength.

All steel shall be ASTM A709 Grade 36, except steel extrusions shall be ASTM A709 Grade 50W or Grade 36.

Neoprene Strip Seal shall meet ASTM D-2628.

Anchors for the extrusions or armor shall be approved welded studs (C1010 thru C1020).

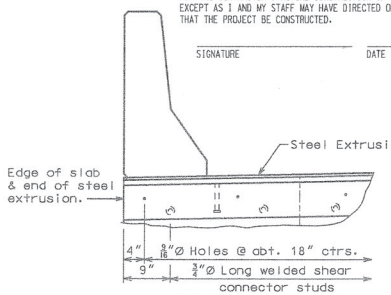
Payment for furnishing, coating or galvanizing and placing steel extusions, miscellaneous structural steel, and neoprene strip seals shall be made under the contract unit price for Strip Seal Expansion Device.

Structural steel for the expansion device shall be coated with a minimum of two coats of inorganic zinc primer (5 mils minimum) or galvanized in accordance with ASTM A123. Anchors need not be protected from overspray.

Plan dimensions are based on installation at 60°F. The gap at the Abutments shall be increased 1/16" for each 10°F fall in temperature and decreased 1/16" for each 10°F rise in temperature from the installation temperature. The gap at Piers 2 & 8 shall be increased 1/8" for each 10°F fall in temperature and decreased 1/8" for each 10°F rise in temperature from the installation temperature.

Longitudinal reinforcing steel shall be placed so that ends shall not be more than 1"± from vertical leg of extrusion at Expansion Device.

Concrete shall be forced under and around strip seal extrusions and studs. Proper consolidation of the concrete shall be achieved by localized internal vibration.



SECTION C-C

STRIP SEAL EXPANSION JOINT
ABUTMENTS AND PIERS 2 & 8

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
CHECKED: 10/01

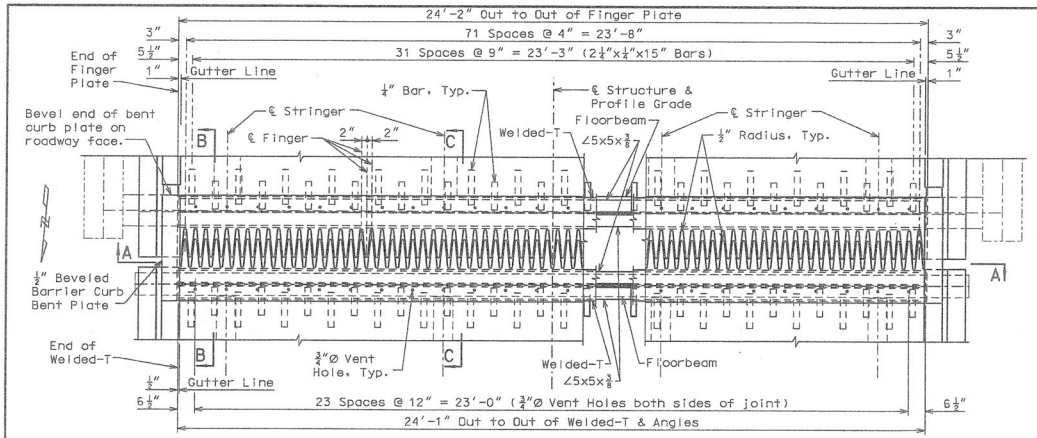
NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

⚠1 Added slotted holes. Revised 09-23-04.

SHEET 30 OF 40

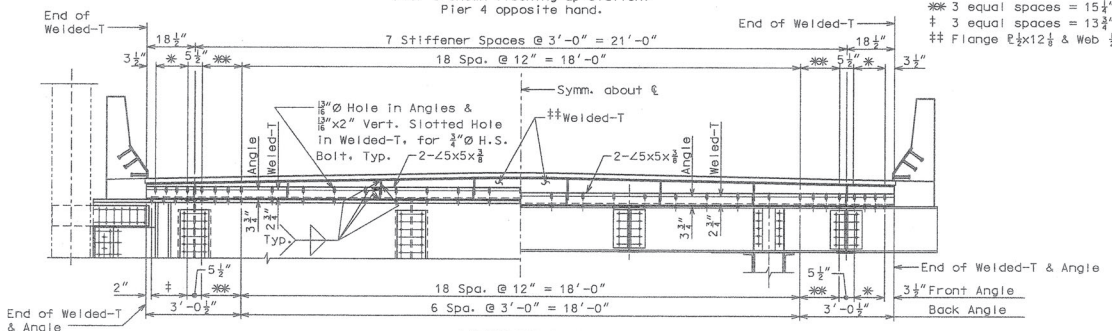
L05684

$$$trims$$$ $$$date$$$ $$$file$$$



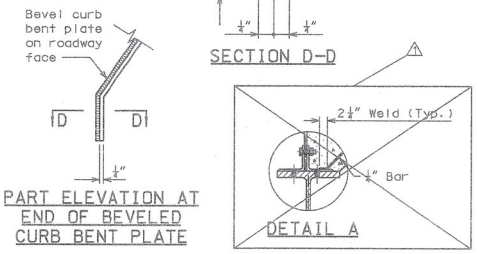
PLAN

Pier 6 shown (looking up-station)
Pier 4 opposite hand.

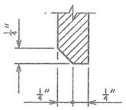


SECTION A-A

* 3 equal spaces = 12¼".
** 3 equal spaces = 15¼".
‡ 3 equal spaces = 13¾".
‡‡ Flange ℄½x12⅛ & Web ½" ℄

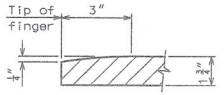


PART ELEVATION AT END OF BEVELED CURB BENT PLATE

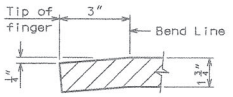


SECTION D-D

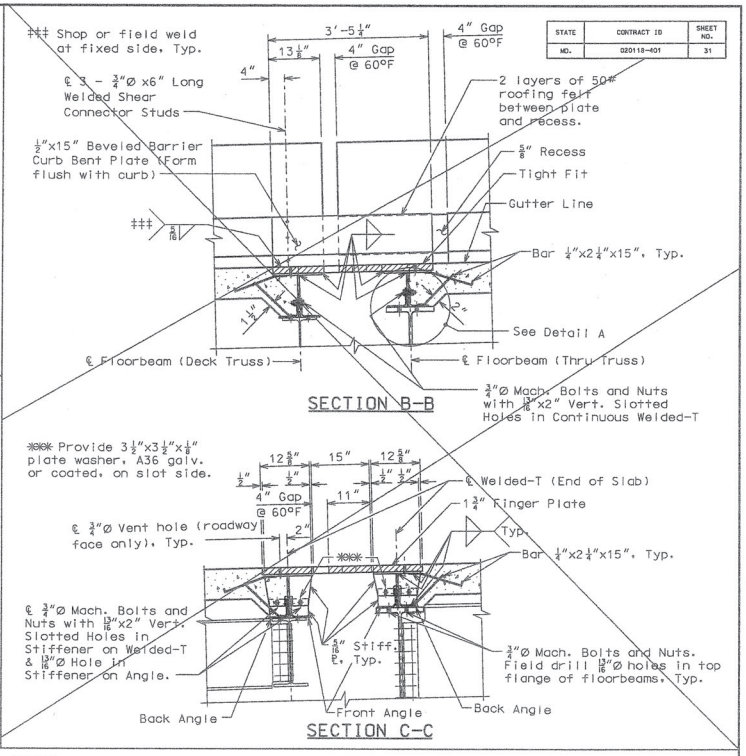
DETAIL A



FINGER DETAIL



OPTIONAL FINGER DETAIL



SECTION B-B

SECTION C-C

FINAL PLANS

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SIGNATURE _____ DATE _____

⚠ Note: For Sections B-B & C-C and Detail A, see Sheet 31A.

Notes:

Finger plates shall be cut with a machine guided gas torch from one plate. The plate from which fingers are cut may be spliced before fingers are cut. The surface of cut shall be perpendicular to the surface of the plate. The cut shall not exceed ⅛" in width. The centerline of cut shall not deviate more than 1/16" from the position of centerline of cut shown. No splicing of finger plate or finger plate assembly will be allowed after fingers are cut.

Plan dimensions are based on installation at 60° F. The expansion gap and other dimensions shall be increased ½" (Pier 4 & Pier 6) for each 10° F fall in temperature and decreased ½" (Pier 4 & Pier 6) for each 10° F rise in temperature at installation.

Structural steel for the expansion device and curb plate shall be coated with a minimum of two coats of inorganic zinc primer (5 mils minimum) or galvanized in accordance with ASTM A123. Anchors need not be protected from overspray.

Payment for furnishing, coating or galvanizing and installing structural steel for the expansion device will be made at the contract unit price for Expansion Device (Finger Plate) per lin. ft.

All holes shown for connections to existing steel to be subpunched 13/16"Ø (Shop or field drill) and reamed to 13/16"Ø in field.

1¼" Finger Plate and Welded-T shall be bent to conform to crown of roadway.

Longitudinal reinforcing steel shall be placed so that ends shall not be more than 1"± from web of Welded-T at expansion device.

Material for the expansion device shall be ASTM A709 Grade 36 structural steel. Anchors for the expansion device shall be approved stud welded anchors (C1010 thru C1020).

Finger plate expansion device shall be assembled in the shop to assure proper alignment prior to shipping.

Concrete shall be forced under and around finger plate supporting hardware, studs, angles and bars. Proper consolidation of the concrete shall be achieved by localized internal vibration.

⚠ X-ed out Sections B-B & C-C and Detail A. Added note. Revised 09-09-04.

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	31

FINGER PLATE EXPANSION JOINT - PIERS 4 & 6

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

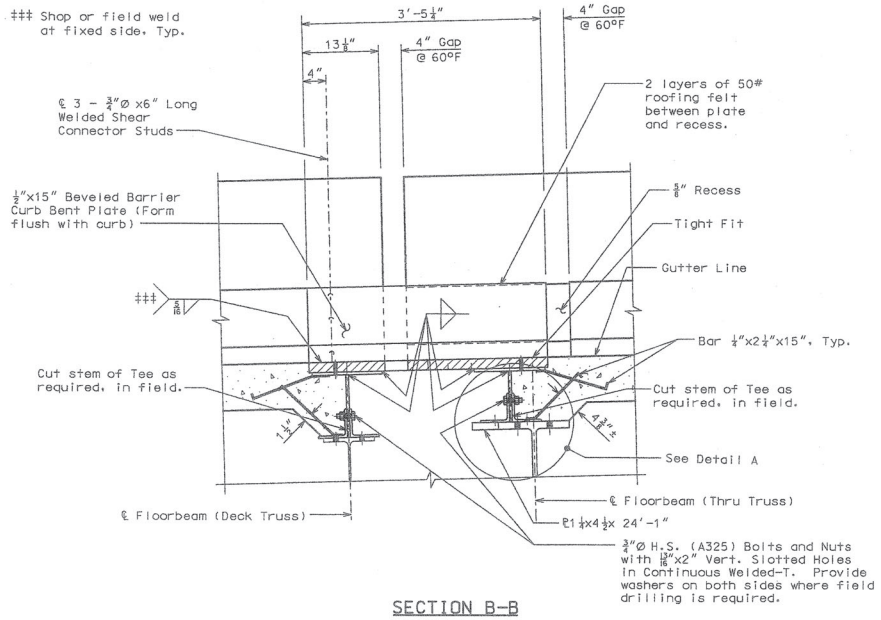
DETAILED: 10/01
CHECKED: 10/01

SHEET 31 OF 40

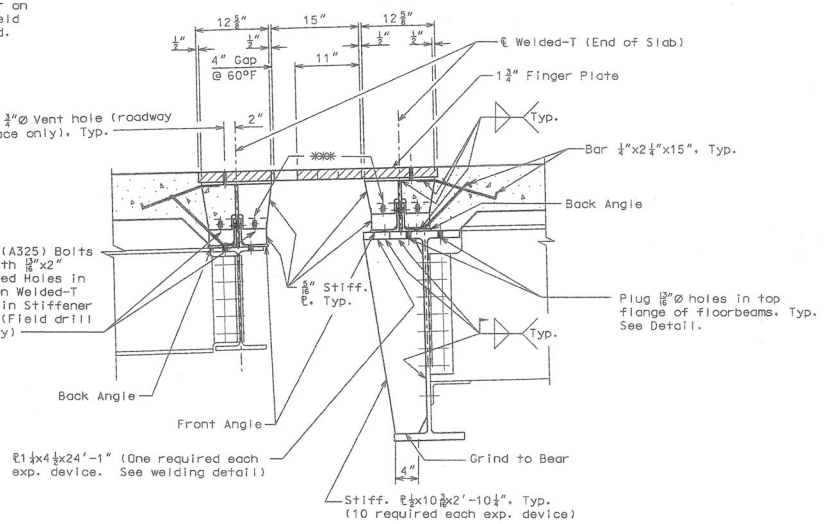
L05684

$$$time$$$ $$$date$$$ $$$files$$$

STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	31a



SECTION B-B



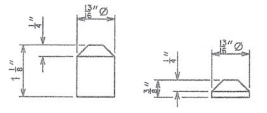
SECTION C-C

Note:
For Stiff. ℄½x10 3/8x2'-10¼" spacing, see Floorbeam At L0 & L0' detail on "Floorbeams - Thru Truss" sheet.

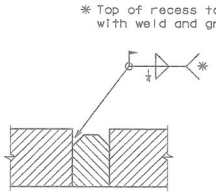
FINAL PLANS

I CERTIFY THAT THIS PLAN SHEET ACCURATELY DEPICTS THE CONFIGURATION AND LOCATION OF THE ROADWAY AND ALL ITS APPURTENANT FEATURES, TO THE BEST OF MY KNOWLEDGE, AS I AND MY STAFF HAVE OBSERVED THE CONTRACTOR'S CONSTRUCTION OF THIS PROJECT. I SPECIFICALLY DISCLAIM ANY RESPONSIBILITY FOR THE DESIGN OF THIS PROJECT, EXCEPT AS I AND MY STAFF MAY HAVE MODIFIED OR AUTHORIZED THE MODIFICATION OF THE PROJECT DESIGN DURING ITS CONSTRUCTION; AND I DISCLAIM RESPONSIBILITY FOR THE CONTRACTOR'S ACTUAL CONSTRUCTION OF THE PROJECT, EXCEPT AS I AND MY STAFF MAY HAVE DIRECTED OR ORDERED THAT THE PROJECT BE CONSTRUCTED.

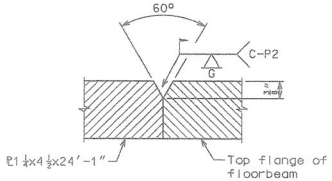
SIGNATURE _____ DATE _____



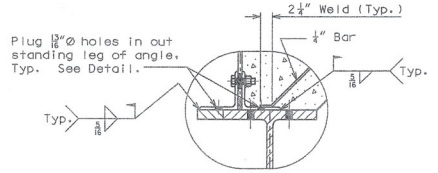
DETAIL OF PLUGS



PLUGGING DETAIL



WELDING DETAIL



DETAIL A

EXPANSION JOINT MODIFICATIONS AT PIERS 4 & 6

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

SHEET 31A OF 40

L05684

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

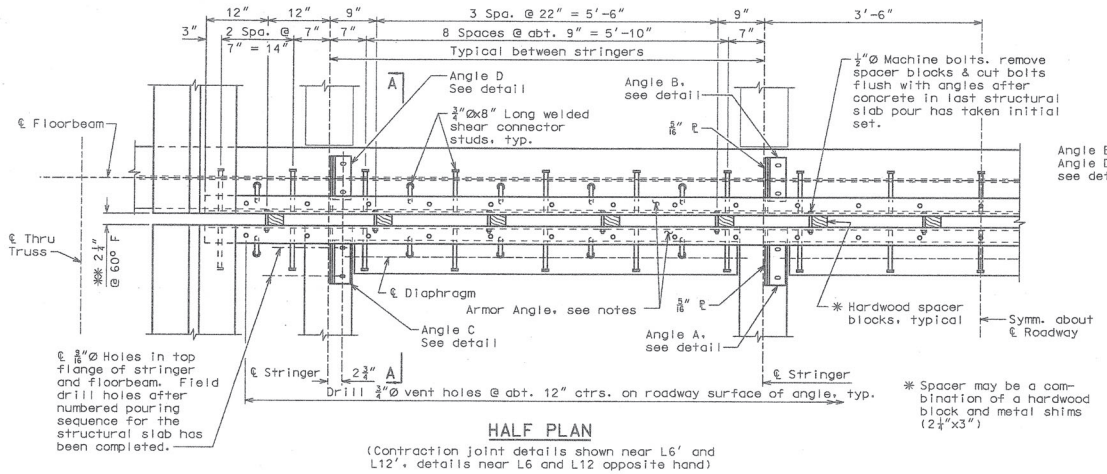
DETAILED: 09/04
CHECKED: 09/04

⚠ Added sheet 09-09-04.

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

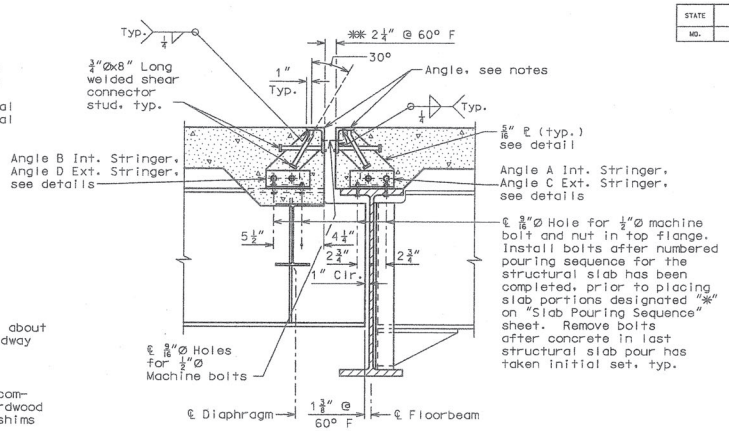
$$$time$$$ $$$date$$$ $$$file$$$

STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	32

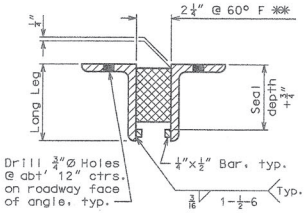


HALF PLAN

(Contraction joint details shown near L6' and L12', details near L6 and L12 opposite hand)



SECTION A-A

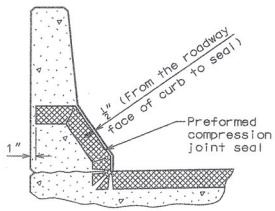


PART CROSS SECTION THRU EXPANSION JOINT

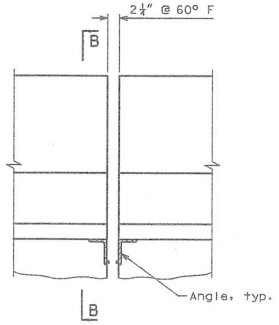
SIZE OF ARMOR ANGLE:

If a seal size larger than that indicated on the plans is used, the movement range and all dimensions for the armor angles shall be shown on the shop drawings.

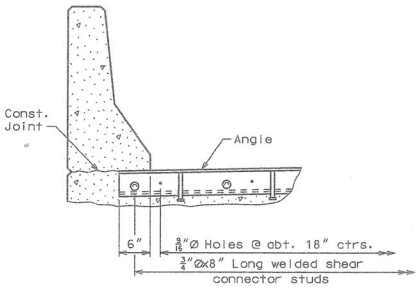
Concrete shall be forced under armor angle and around studs. Proper consolidation of the concrete shall be achieved by localized internal vibration.



PART SECTION THRU JOINT SEAL



PART ELEVATION OF BARRIER CURB



SECTION B-B

FINAL PLANS

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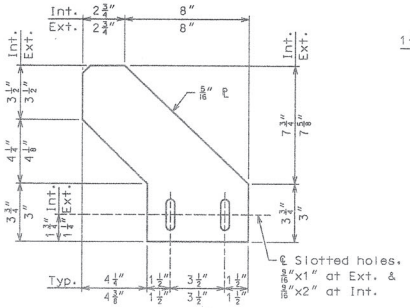
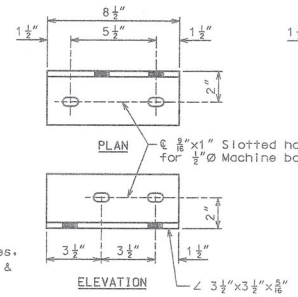
SIGNATURE _____ DATE _____

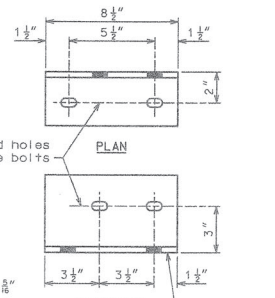


DETAIL "A"



ANGLE A & B

(Angle A shown, Angle B opposite hand)



ANGLE C & D

(Angle C shown, Angle D opposite hand)

GENERAL NOTES:

Structural steel for expansion device shall be fabricated in one section.

The expansion device shall be bent to conform to crown and grade of roadway.

Structural steel for the armored joint shall be ASTM A709 Grade 36.

See Special Provisions for the requirements of compression joint seal.

Structural steel for the expansion device shall be coated with a minimum of two coats of inorganic zinc primer (5 mils minimum) or galvanized in accordance with ASTM A123. Anchors need not be protected from overspray.

Furnishing, coating or galvanizing and installing the structural steel armored joint shall be included in the contract unit price for the Preformed Compression Expansion Joint Seal.

Neoprene extrusions shall meet ASTM D3542.

Longitudinal reinforcing steel shall be placed so that ends shall not be more than 1" from vertical leg of angle at expansion device.

The seal shall be 3½" wide with a required movement range of 1.3".

※※ Decrease gap 1/16" for every 20°F rise and increase gap 1/16" for every 20°F fall in temperature.

CONTRACTION JOINT - THRU TRUSS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

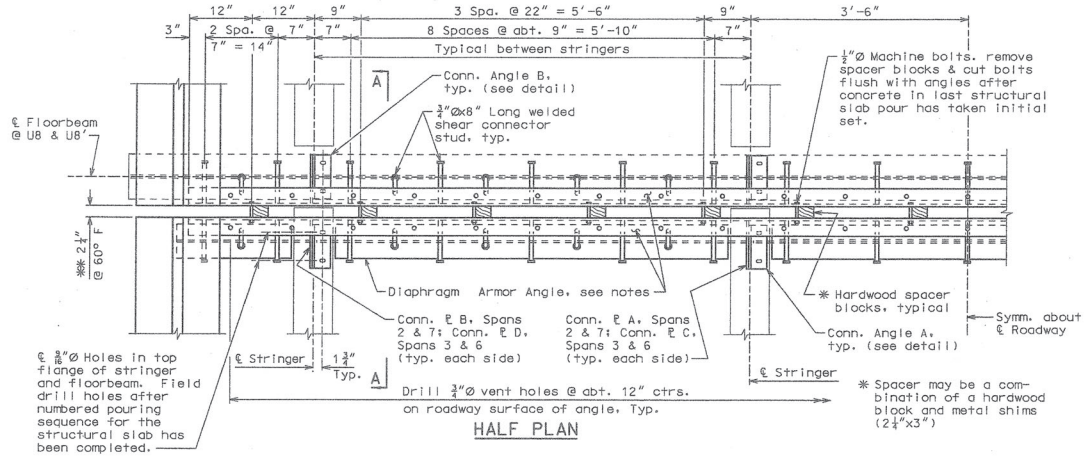
DETAILED: 09/01
CHECKED: 09/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

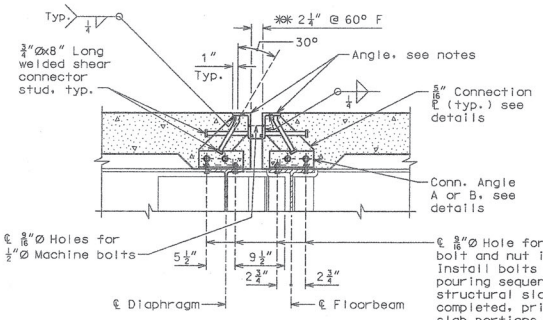
L05684

$$$time$$$ $$$date$$$ $$$file$$$

STATE	CONTRACT ID	SHEET NO.
MO.	0Z0118-401	33



HALF PLAN



SECTION A-A

FINAL PLANS

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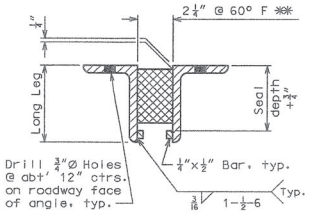

PART CROSS SECTION THRU EXPANSION JOINT

SIZE OF ARMOR ANGLE:

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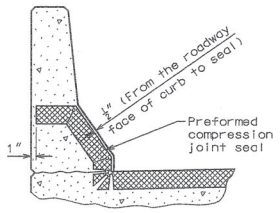
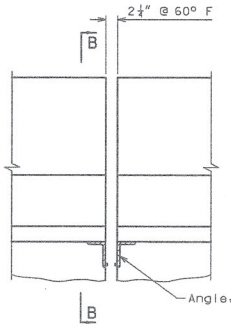
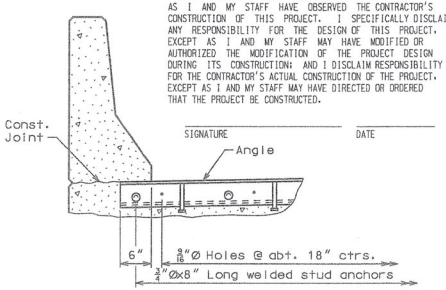


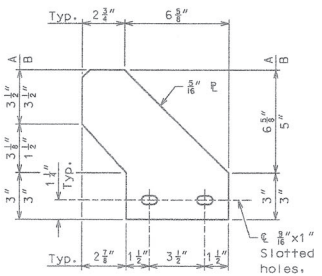
PART SECTION THRU JOINT SEAL



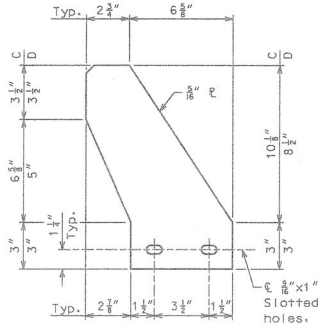
PART ELEVATION OF BARRIER CURB



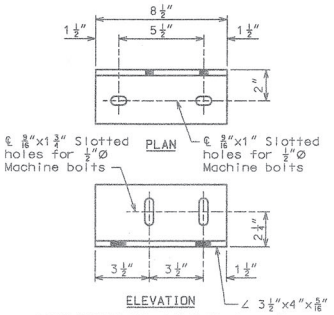
SECTION B-B



CONNECTION PLATE A & B



CONNECTION PLATE C & D



CONNECTION ANGLE A & B

(Conn. Angle A shown, Conn. Angle B opposite hand)

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CONTRACTION JOINT - DECK TRUSS

ROUTE 291 MISSOURI RIVER BRIDGE

Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 10/01
CHECKED: 10/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 33 OF 40

L05684

$$$$time$$$$ $$$$date$$$$ $$$$file$$$$

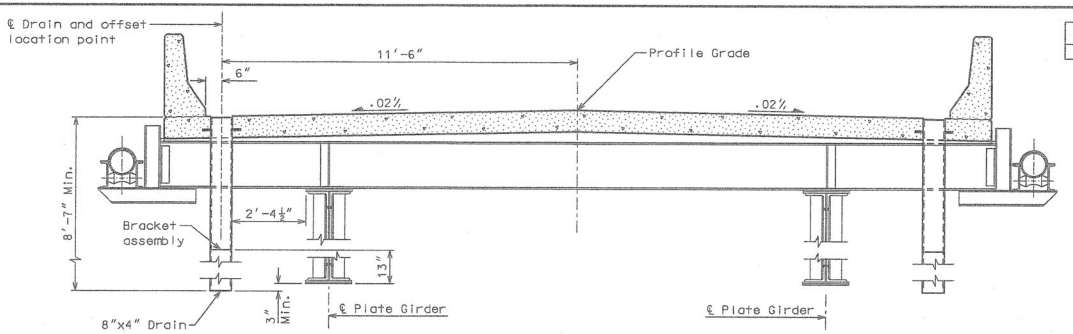
DECK DRAIN LOCATIONS

STATION	OFFSET	STATION	OFFSET
99+34.18	11.50 Rt., 11.50 Lt.	108+84.12	11.50 Rt., 11.50 Lt.
99+69.00	11.50 Rt., 11.50 Lt.	108+94.37	11.50 Rt., 11.50 Lt.
100+04.00	11.50 Rt., 11.50 Lt.	109+04.62	11.50 Rt., 11.50 Lt.
100+43.87	11.50 Rt., 11.50 Lt.	109+16.95	11.50 Rt., 11.50 Lt.
100+72.62	11.50 Rt., 11.50 Lt.	109+27.20	11.50 Rt., 11.50 Lt.
101+03.45	11.50 Rt., 11.50 Lt.	109+37.45	11.50 Rt., 11.50 Lt.
101+34.28	11.50 Rt., 11.50 Lt.	109+49.79	11.50 Rt., 11.50 Lt.
101+65.11	11.50 Rt., 11.50 Lt.	109+60.04	11.50 Rt., 11.50 Lt.
101+95.94	11.50 Rt., 11.50 Lt.	109+70.29	11.50 Rt., 11.50 Lt.
102+29.84	11.50 Rt., 11.50 Lt.	109+82.62	11.50 Rt., 11.50 Lt.
102+60.67	11.50 Rt., 11.50 Lt.	109+92.87	11.50 Rt., 11.50 Lt.
102+91.50	11.50 Rt., 11.50 Lt.	110+03.12	11.50 Rt., 11.50 Lt.
103+22.33	11.50 Rt., 11.50 Lt.	110+15.45	11.50 Rt., 11.50 Lt.
103+53.16	11.50 Rt., 11.50 Lt.	110+25.70	11.50 Rt., 11.50 Lt.
103+83.99	11.50 Rt., 11.50 Lt.	110+35.95	11.50 Rt., 11.50 Lt.
104+16.29	11.50 Rt., 11.50 Lt.	110+48.29	11.50 Rt., 11.50 Lt.
104+36.79	11.50 Rt., 11.50 Lt.	110+58.54	11.50 Rt., 11.50 Lt.
104+49.12	11.50 Rt., 11.50 Lt.	110+68.79	11.50 Rt., 11.50 Lt.
104+59.37	11.50 Rt., 11.50 Lt.	110+81.12	11.50 Rt., 11.50 Lt.
104+69.62	11.50 Rt., 11.50 Lt.	110+91.37	11.50 Rt., 11.50 Lt.
104+81.95	11.50 Rt., 11.50 Lt.	111+01.62	11.50 Rt., 11.50 Lt.
104+92.20	11.50 Rt., 11.50 Lt.	111+13.95	11.50 Rt., 11.50 Lt.
105+02.45	11.50 Rt., 11.50 Lt.	111+24.20	11.50 Rt., 11.50 Lt.
105+14.79	11.50 Rt., 11.50 Lt.	111+34.45	11.50 Rt., 11.50 Lt.
105+25.04	11.50 Rt., 11.50 Lt.	111+46.79	11.50 Rt., 11.50 Lt.
105+35.29	11.50 Rt., 11.50 Lt.	111+57.04	11.50 Rt., 11.50 Lt.
105+47.62	11.50 Rt., 11.50 Lt.	111+67.29	11.50 Rt., 11.50 Lt.
105+57.87	11.50 Rt., 11.50 Lt.	111+79.62	11.50 Rt., 11.50 Lt.
105+68.12	11.50 Rt., 11.50 Lt.	111+89.87	11.50 Rt., 11.50 Lt.
105+80.45	11.50 Rt., 11.50 Lt.	112+00.12	11.50 Rt., 11.50 Lt.
105+90.70	11.50 Rt., 11.50 Lt.	112+12.45	11.50 Rt., 11.50 Lt.
106+00.95	11.50 Rt., 11.50 Lt.	112+22.70	11.50 Rt., 11.50 Lt.
106+13.29	11.50 Rt., 11.50 Lt.	112+32.95	11.50 Rt., 11.50 Lt.
106+23.54	11.50 Rt., 11.50 Lt.	112+45.29	11.50 Rt., 11.50 Lt.
106+33.79	11.50 Rt., 11.50 Lt.	112+55.54	11.50 Rt., 11.50 Lt.
106+46.12	11.50 Rt., 11.50 Lt.	112+65.79	11.50 Rt., 11.50 Lt.
106+56.37	11.50 Rt., 11.50 Lt.	112+78.12	11.50 Rt., 11.50 Lt.
106+66.62	11.50 Rt., 11.50 Lt.	112+88.37	11.50 Rt., 11.50 Lt.
106+78.95	11.50 Rt., 11.50 Lt.	112+98.62	11.50 Rt., 11.50 Lt.
106+89.20	11.50 Rt., 11.50 Lt.	113+10.95	11.50 Rt., 11.50 Lt.
106+99.45	11.50 Rt., 11.50 Lt.	113+21.20	11.50 Rt., 11.50 Lt.
107+11.79	11.50 Rt., 11.50 Lt.	113+31.45	11.50 Rt., 11.50 Lt.
107+22.04	11.50 Rt., 11.50 Lt.	113+65.83	11.50 Rt., 11.50 Lt.
107+32.29	11.50 Rt., 11.50 Lt.	113+96.66	11.50 Rt., 11.50 Lt.
107+44.62	11.50 Rt., 11.50 Lt.	114+27.49	11.50 Rt., 11.50 Lt.
107+54.87	11.50 Rt., 11.50 Lt.	114+58.32	11.50 Rt., 11.50 Lt.
107+65.12	11.50 Rt., 11.50 Lt.	114+89.15	11.50 Rt., 11.50 Lt.
107+77.45	11.50 Rt., 11.50 Lt.	115+17.90	11.50 Rt., 11.50 Lt.
106+66.62	11.50 Rt., 11.50 Lt.	115+49.72	11.50 Rt., 11.50 Lt.
107+87.70	11.50 Rt., 11.50 Lt.	115+80.55	11.50 Rt., 11.50 Lt.
107+97.95	11.50 Rt., 11.50 Lt.	116+11.38	11.50 Rt., 11.50 Lt.
108+10.29	11.50 Rt., 11.50 Lt.	116+42.21	11.50 Rt., 11.50 Lt.
108+20.54	11.50 Rt., 11.50 Lt.	116+73.04	11.50 Rt., 11.50 Lt.
108+30.79	11.50 Rt., 11.50 Lt.	117+03.87	11.50 Rt., 11.50 Lt.
108+43.12	11.50 Rt., 11.50 Lt.	118+13.56	11.50 Rt., 11.50 Lt.
108+53.37	11.50 Rt., 11.50 Lt.	118+49.00	11.50 Rt., 11.50 Lt.
108+63.62	11.50 Rt., 11.50 Lt.	118+83.56	11.50 Rt., 11.50 Lt.

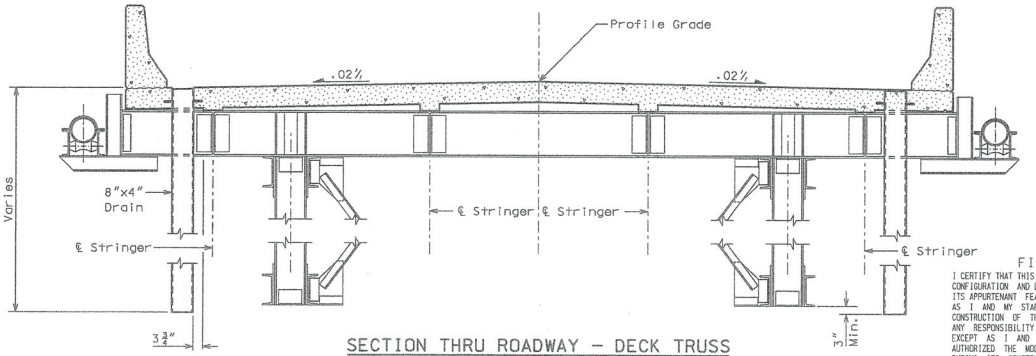
Notes:
For additional details, See "Slab Drain Details" Sheet.

Bracket assemblies required for all drains.

Slab Drain locations are approximate. Adjustments may be made in the field. Shop drawings showing bracket assemblies and proposed connections shall be submitted. Drain locations at the deck truss units will vary based on the connection method used. Variations will be required due to alignment of the vertical drain downspout with the vertical members of the deck truss (deck truss verticals are not plumb). Slotted holes in the connection members are acceptable but the length of slot shall be minimized where possible. Bracket spacing may be varied as required for connections. All work and materials related to adjustments is incidental to the unit price bid for slab drains.

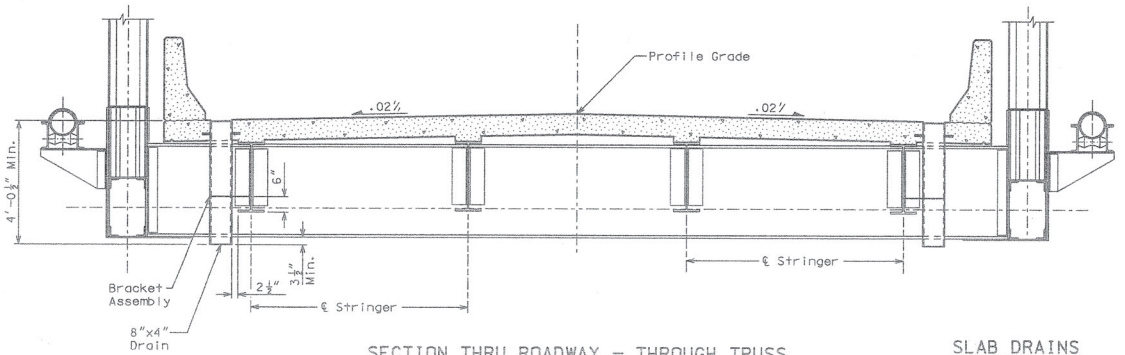


SECTION THRU ROADWAY - PLATE GIRDER



SECTION THRU ROADWAY - DECK TRUSS

For brackets at deck truss and additional details, see "Slab Drain Details" sheet.



SECTION THRU ROADWAY - THROUGH TRUSS

STATE	CONTRACT ID	SHEET NO.
MO.	020118-401	34

FINAL PLANS

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SIGNATURE _____ DATE _____

SLAB DRAINS
ROUTE 291 MISSOURI RIVER BRIDGE
Jackson County

HARRINGTON & CORTELYOU, INC.
Consulting Engineers

DETAILED: 09/01
CHECKED: 09/01

NOTE: DO NOT SCALE THIS DRAWING. FOLLOW DIMENSIONS.

SHEET 34 OF 40

L05684

$$$time$$$ $$$date$$$ $$$file$$$