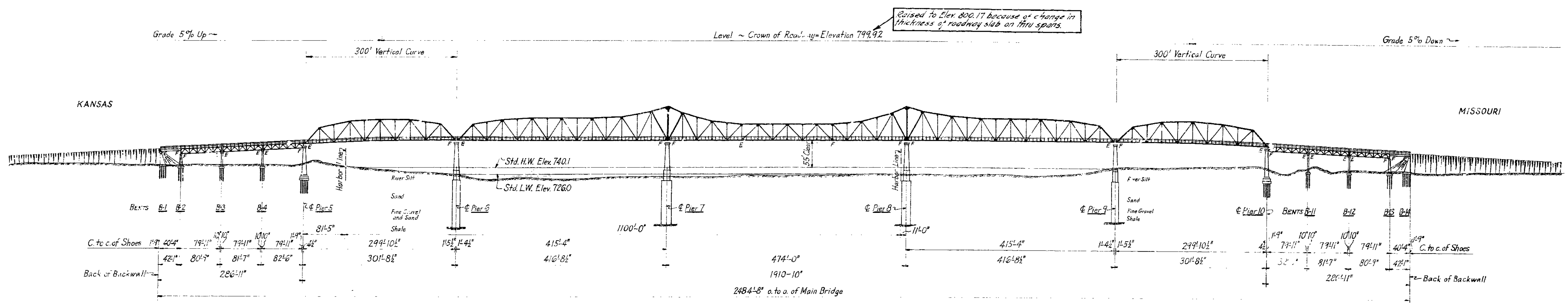
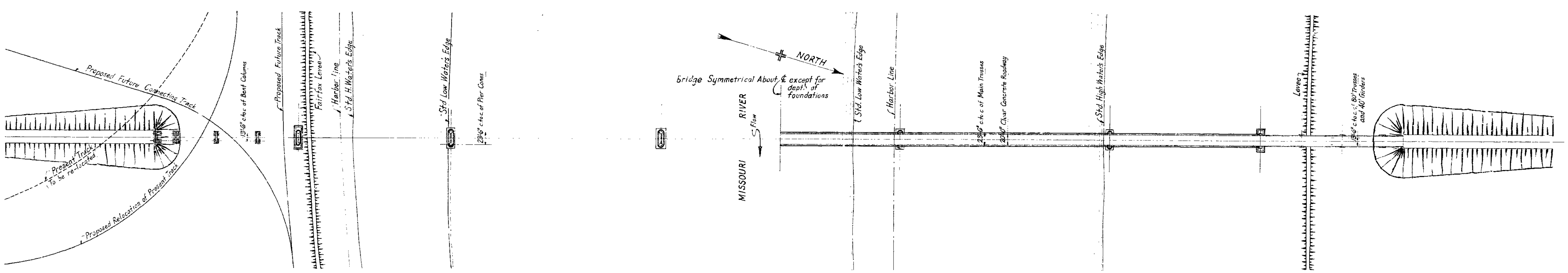


ELEVATION



PLAN

GENERAL NOTES:

Concrete in Slab to have a minimum ultimate strength of 3750 pounds per square inch, as specified in the special provision of the Specifications. Concrete in Approach Bents and Abutments, in Pier Shafts, in working chambers of Caissons, in seal course and base of Piers 5 and 10 to be Class B. Concrete in bases of Main Piers, except as called for above, to be Class C.

Before commencing construction, the contractor constructing the foundations for the Main Piers shall submit to the Engineers for approval, complete working details of the method he proposes to use. The method and details proposed shall be approved before construction of such foundations is begun.

Bevel exposed edges of all concrete work $\frac{3}{4}$" where no other bevel is noted. Provide substantial keys at all concrete construction joints.

All piling shall be driven to support a load of not less than 25 Tons. No piling shall be ordered until authorized by the Engineer in writing. Piling in Piers 5 and 10 to be plain timber. All other piling to be creosoted.

Lap splices in reinforcing bars 48 diameters unless otherwise noted. Hooks on bars shall be bent to a diameter of not less than six times the diameter of the bar. Bars bent up, shall, unless otherwise noted, be bent to an angle of 45° with the bottom reinforcing, using a radius of bend of not less than four diameters.

INDEX

Sheet	Title
1	General Plan and Elevation.
2	Approach Substructure Details.
3	" " "
4	Main Pier Details
5	Stress Sheet ~ Main Spans.
6	Main Span Structural Details Lo-L4.
7	" " " " L5-L10.
8	" " " " L11-L16.
9	" " " " L17-L22.
10	" " " " Cross Sections.
11	300 Ft. Span " "
12	Expansion and Handrail Details.
13	Structural Details ~ Approach Spans.
14	Details of Shoes.
15	Anchor Bolt Diagram.
	SUPP. SHEETS
16	Detail of Bridge Name Plate.
17	Reinforcing Schedule - Slab & Curb.

PLATTE CO. K-456

RTE. 69

BRIDGE OVER MISSOURI RIVER AT KANSAS CITY KANSAS

FOR REGIONAL BRIDGE CO. INC.

GENERAL PLAN AND ELEVATION

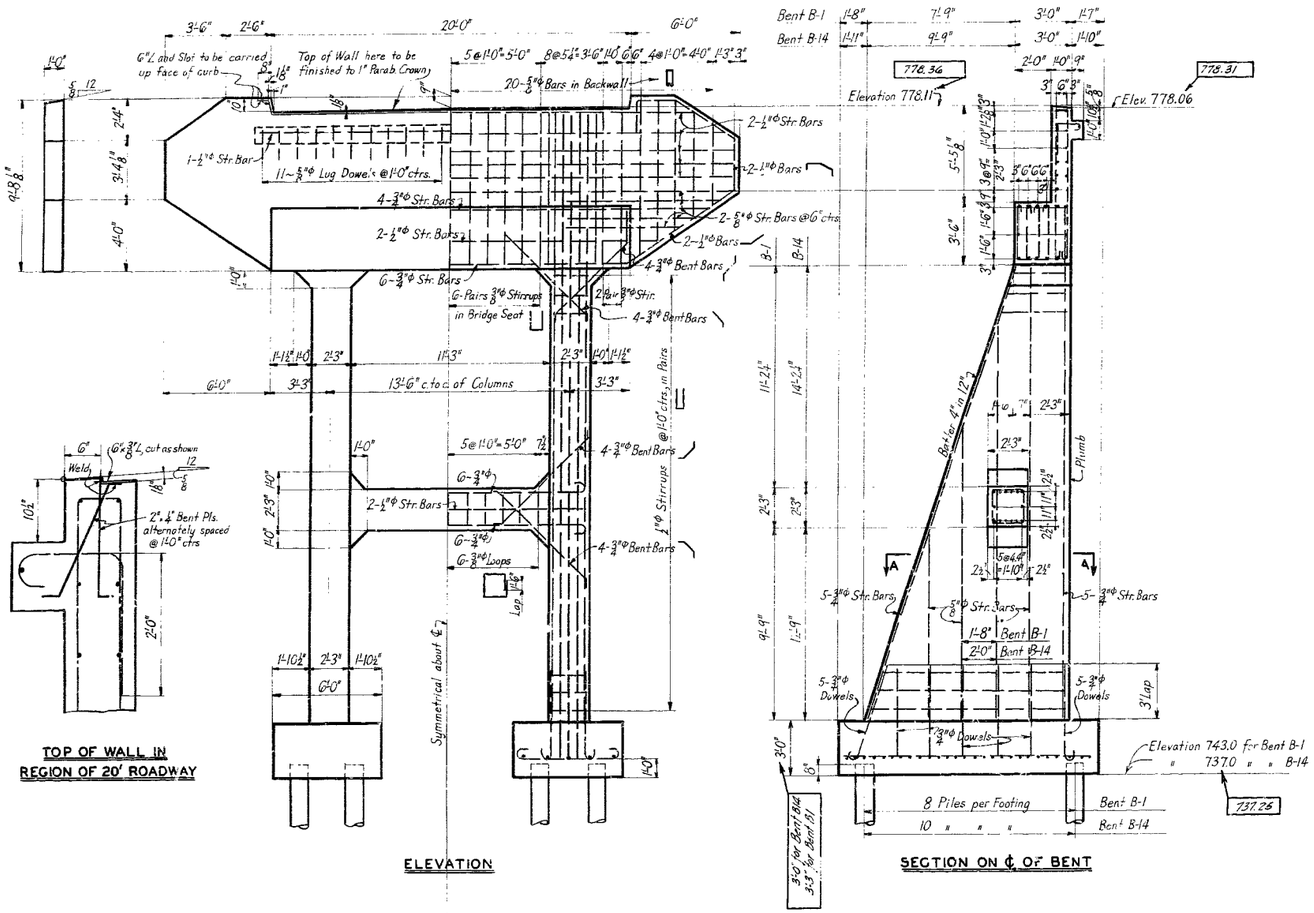
FINISHED

SVERDRUP AND PARCEL
CONSULTING ENGINEERS
ST. LOUIS, MO.

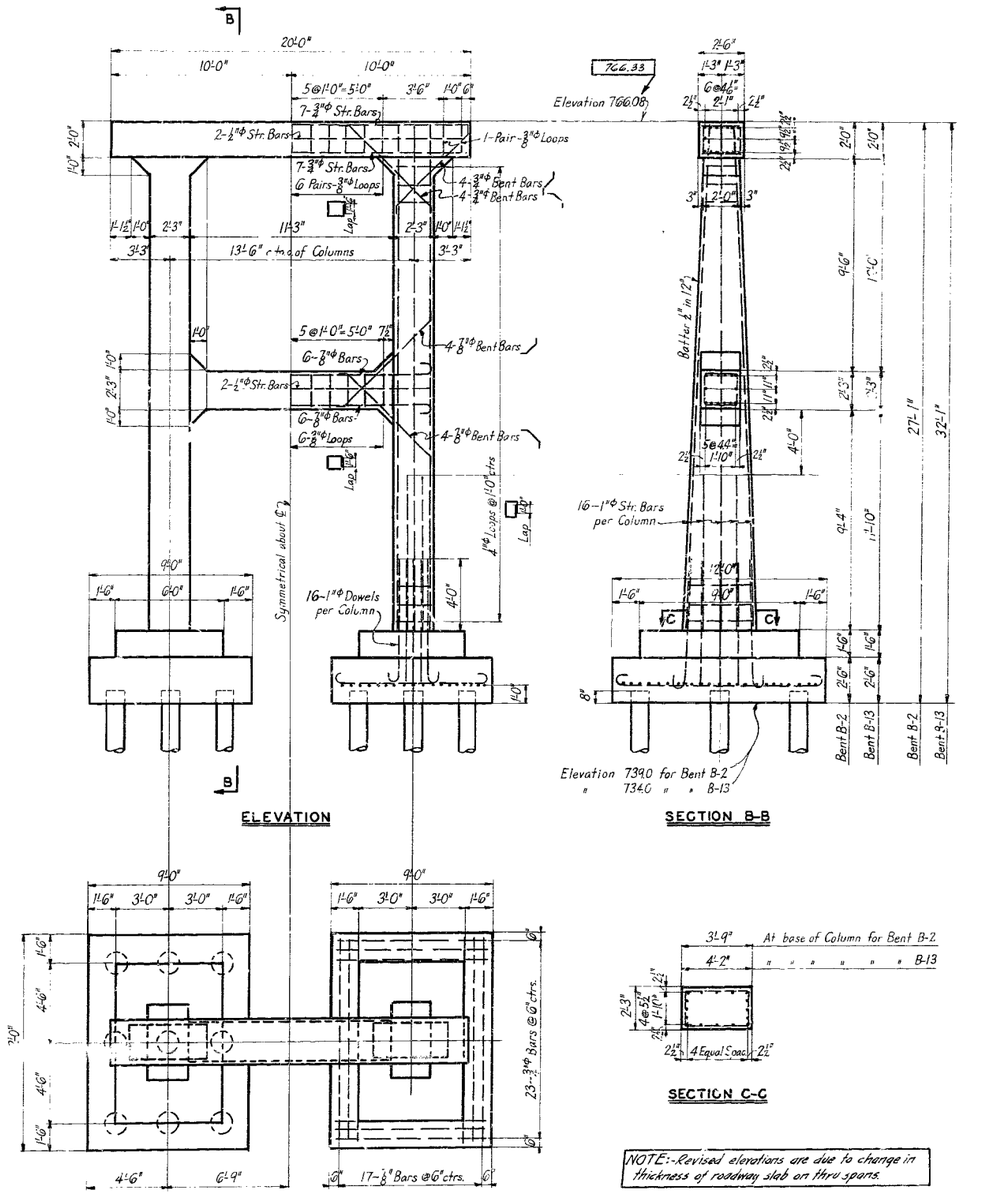
FINISHED

Made by C.E.S.Jr. March 1933
Traced by " "
Checked by J.R.T. May 1933

SHEET NO. 1



All Piles shown on this Sheet to be of Creosoted Timber ~ 35'0" long.
All Concrete " " " " " " Class B.
Expansion plates on Bents B-1 & B-14 included in the quantity item for Structural Steel.



NOTE:-Revised elevations are due to change in thickness of roadway slab on thru spans.

BRIDGE OVER MISSOURI RIVER AT KANSAS CITY, KANSAS

FOR REGIONAL BRIDGE CO., INC.

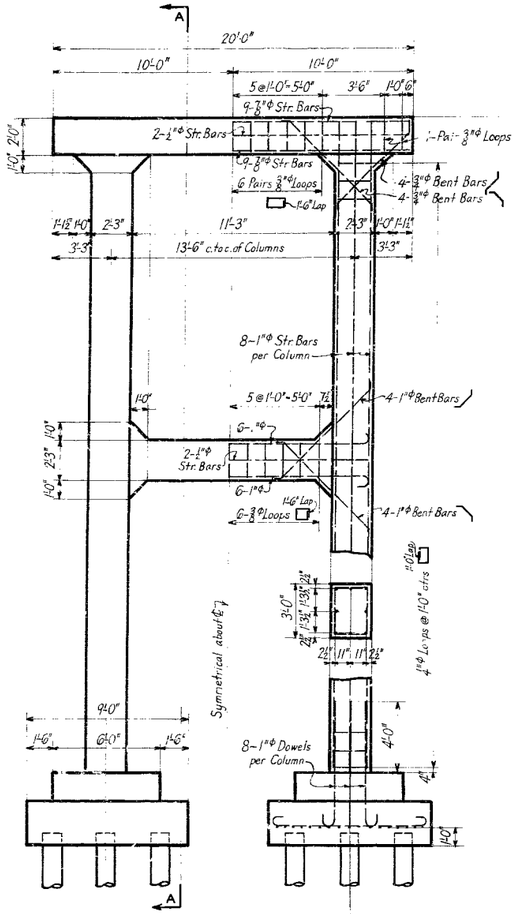
APPROACH SUBSTRUCTURE DETAILS

SVERDRUP AND PARCEL
CONSULTING ENGINEERS
ST. LOUIS, MO.

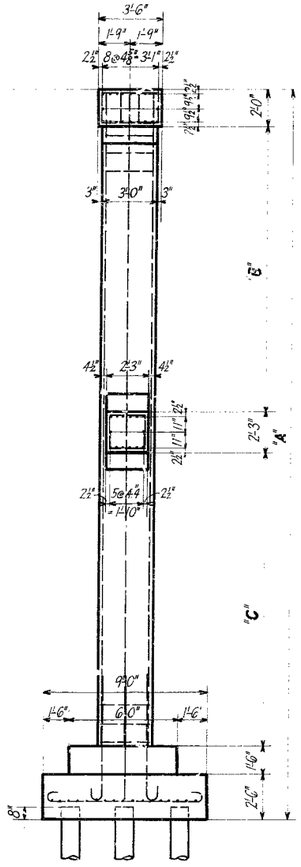
BRIDGE ENGINEER

Made by C.E.S.Jr April 1933
Traced by L.F.E.C.E.S.Jr May 1933
Checked by W.A.F. May 1933

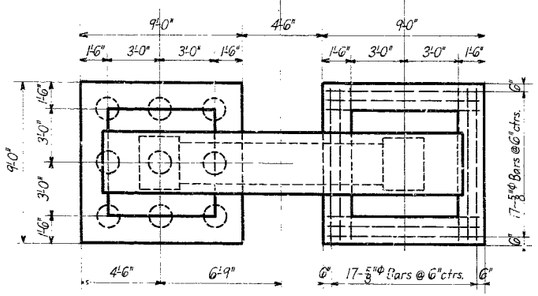
SHEET NO. 2



ELEVATION



SECTION A-A

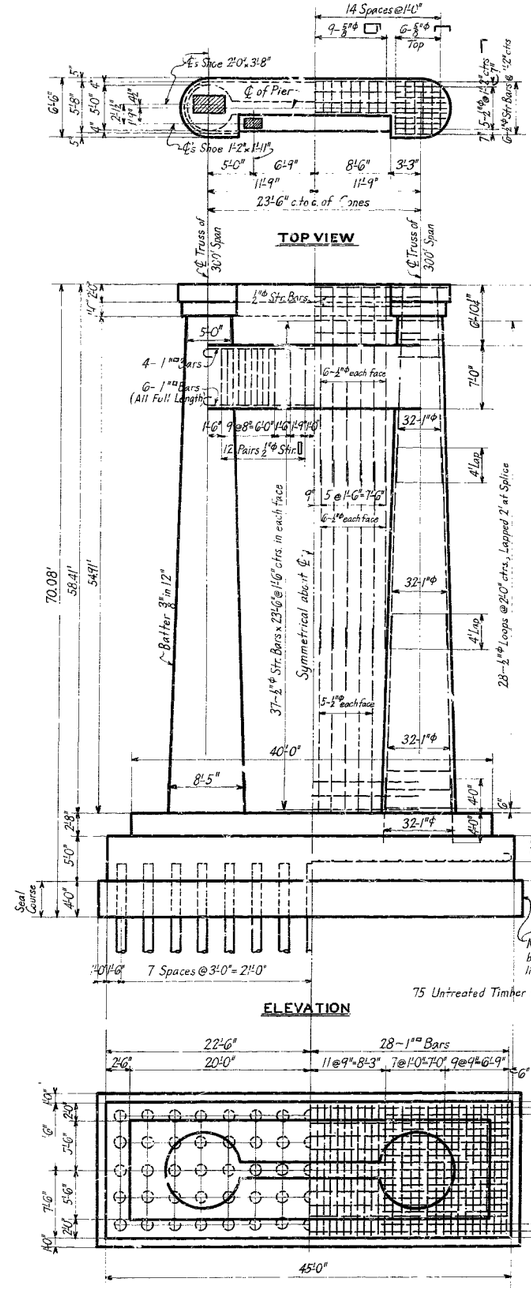


PLAN

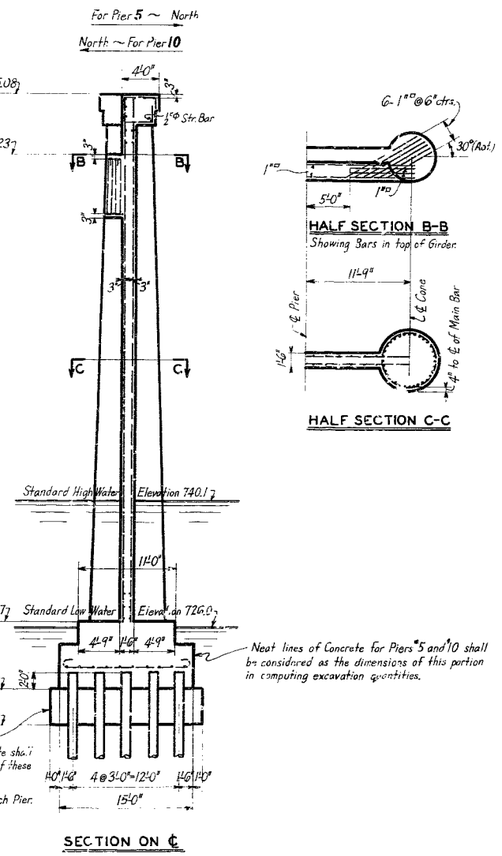
BENT ⟶	B-3	B-4	B-11	B-12
Elev. Top of Bent	770.08	774.16	774.16	770.08
Elev. Bott. of Footing	739.00	739.00	734.00	734.00
Dimension A	31'-1"	35'-2"	40'-2"	36'-1"
" B	11'-6"	13'-6"	16'-0"	14'-0"
" C	11'-4"	13'-5"	15'-11"	13'-10"

Timber Piles in Bents above to be 35'-0" long — Creosoted.

BENTS B-3, B-4, B-11 AND B-12



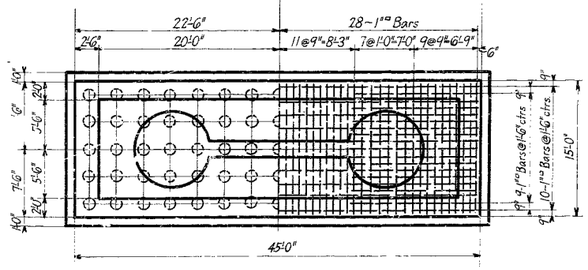
ELEVATION



SECTION ON ℄

HALF SECTION B-B
Showing Bars in top of Girder.

HALF SECTION C-C



PLAN

PIERS 5 AND 10

All Concrete detailed on this Sheet to be Class B

BRIDGE OVER MISSOURI RIVER AT KANSAS CITY, KANSAS

FOR REGIONAL BRIDGE CO., INC.

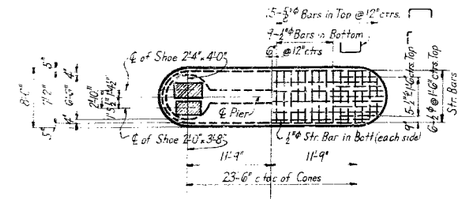
APPROACH SUBSTRUCTURE DETAILS

SVERDRUP AND PARCEL
CONSULTING ENGINEERS
ST. LOUIS, MO.

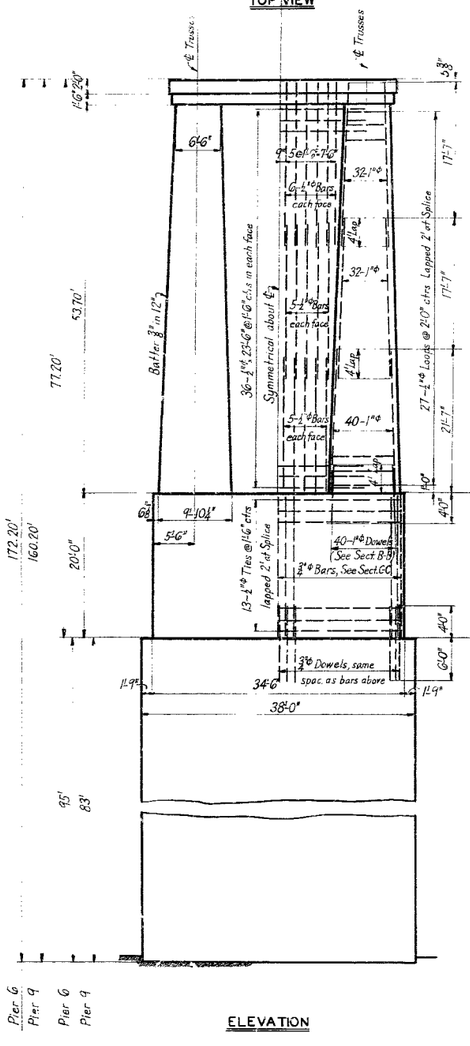
Made by C.E.S. Jr. April 1933
Traced by " May 1933
Checked by J.A.J. May 1933

SHEET NO. 3

3270

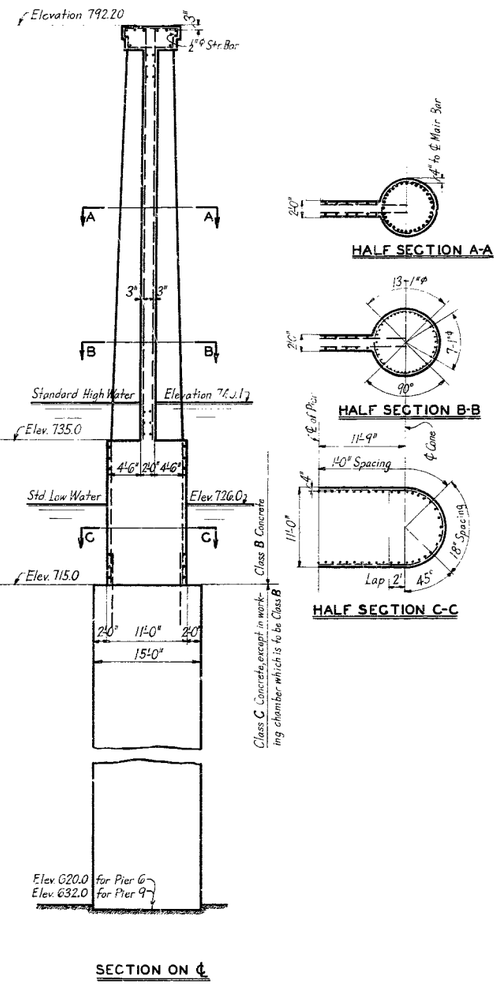


TOP VIEW

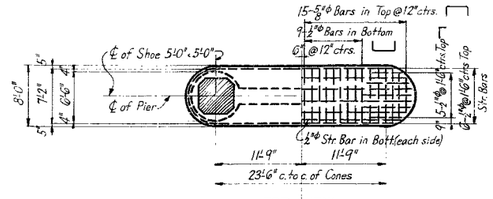


ELEVATION

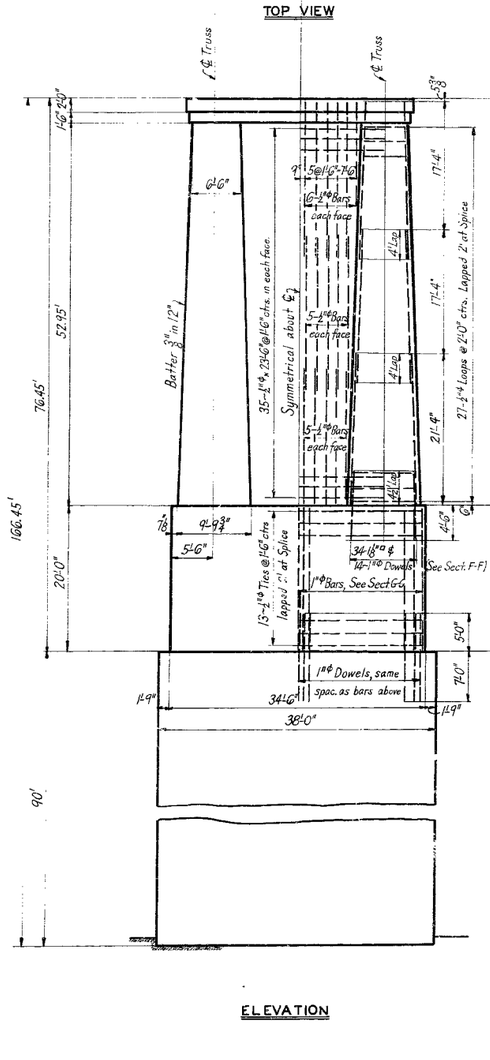
SECTION ON ℄



PIERS 6 AND 9

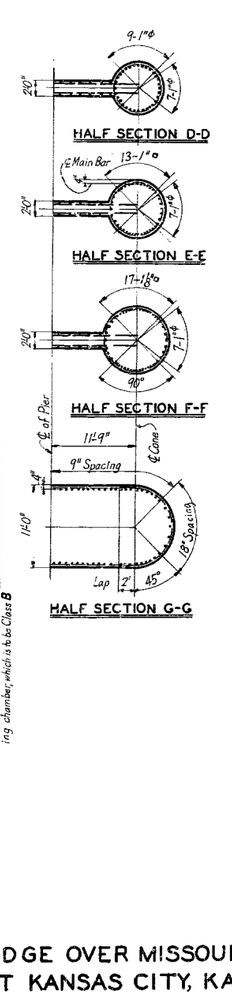


TOP VIEW



ELEVATION

SECTION ON ℄



PIERS 7 AND 8

BRIDGE OVER MISSOURI RIVER AT KANSAS CITY, KANSAS

FOR REGIONAL BRIDGE CO., INC

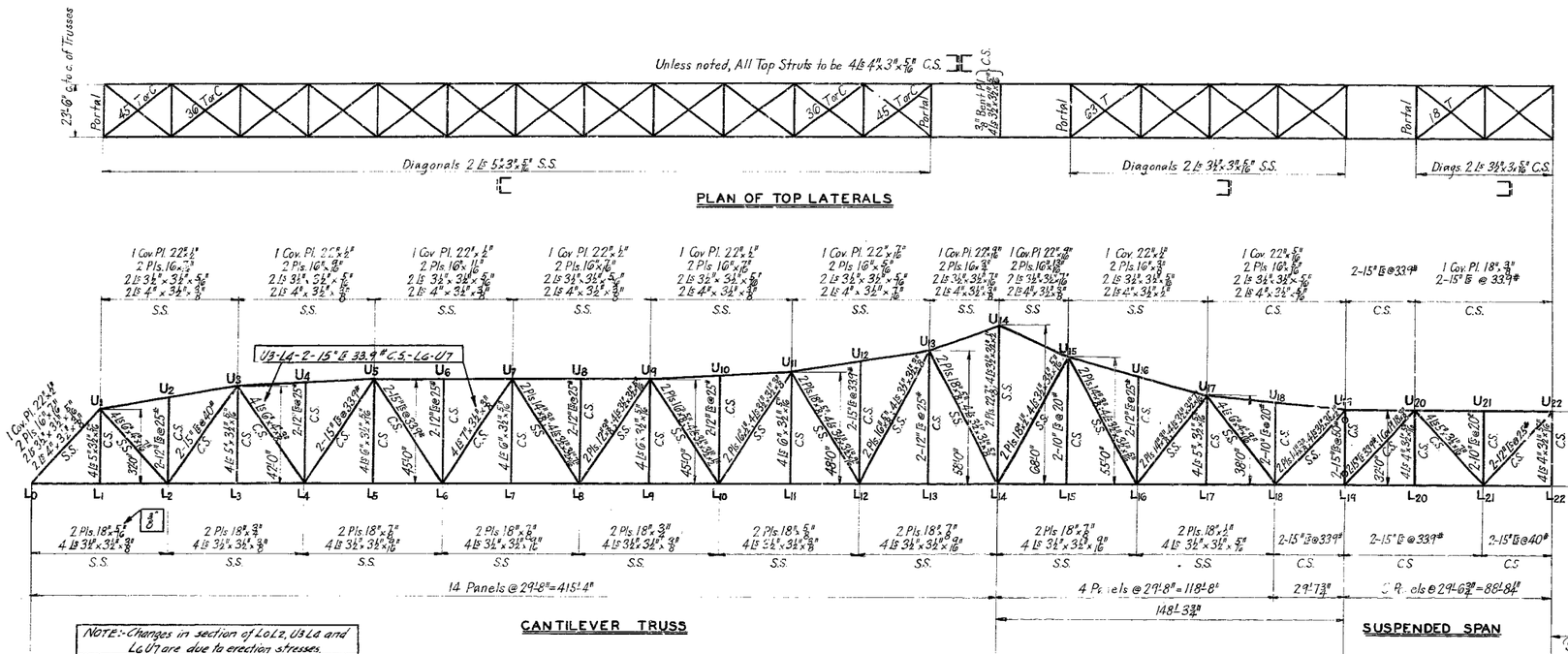
MAIN PIER DETAILS

SVERDRUP AND PARCEL
CONSULTING ENGINEERS
ST. LOUIS, MO.

Made by C.E.S.Jr April 1933.
Traced by L.F. & C.E.S. May 1933
Checked by J.A.L. May 1933

SHEET NO. 4

Concrete in working chamber and shafts to be Class B.
All other Concrete to be Class C.



PLAN OF BOTTOM LATERALS

MEMBER	50# WIND	DEAD LOAD	CONC. L.L.	UNIF. L.L.	20# WIND	DESIGN STRESS DL+LL.	DESIGN STRESS INCL. WIND
L0L2	263 T	238 T	15 T	103 T	160 T	356 T	516 T
L2L4	265 C	—	6 C	31 C	160 C	—	276 C
L4L6	473 T	435 T	30 T	199 T	296 T	664 T	958 T
L6L8	473 C	—	13 C	12 C	294 C	—	386 C
L8L10	588 T	500 T	38 T	254 T	368 T	792 T	1160 T
L10L12	588 C	—	21 C	111 C	368 C	—	886 C
L12L14	611 T	445 T	42 T	275 T	382 T	762 T	1144 T
L14L16	611 C	—	30 C	157 C	382 C	—	1666 C
L16L18	588 T	242 T	38 T	254 T	368 T	570 T	938 T
L18L20	588 C	—	39 C	201 C	368 C	1070 C	1756 C
L20L22	632 T	—	26 T	175 T	407 T	195 T	602 T
L22L24	632 C	101 C	45 C	232 C	407 C	443 C	850 C
L24L26	729 T	—	9 T	56 T	492 T	—	254 T
L26L28	729 C	475 C	43 C	226 C	472 C	744 C	1216 C
L0U1	79 T	350 C	23 C	151 C	35 C	524 C	—
U1U3	79 C	—	9 T	47 T	35 T	—	—
U3U5	114 C	376 C	25 C	166 C	53 C	567 C	—
U5U7	114 T	—	11 T	56 T	53 T	—	—
U7U9	213 C	487 C	55 C	233 C	99 C	755 C	—
U9U11	213 T	—	18 T	92 T	99 T	—	—
U11U13	266 C	490 C	41 C	270 C	124 C	801 C	—
U13U15	264 T	—	26 T	134 T	124 T	—	—
U15U17	276 C	362 C	41 C	270 C	130 C	673 C	—
U17U19	276 T	—	35 T	179 T	130 T	—	—
U9U11	246 C	83 C	33 C	217 C	118 C	433 C	—
U11U13	246 T	—	41 T	217 T	118 T	300 T	418 T
U13U15	161 C	—	18 C	116 C	81 C	—	—
U15U17	161 T	293 T	45 T	231 T	81 T	569 T	—
U13U15	—	—	—	—	—	—	—
U15U17	59 T	64 GT	41 T	218 T	35 T	905 T	—
U1L2	—	195 T	16 T	96 T	—	307 T	—
L2U3	—	—	7 C	31 C	—	—	—
L2U3	—	111 C	12 C	72 C	—	195 C	—
L4U5	—	—	8 T	42 T	—	—	—
L4U5	—	90 T	15 T	72 T	—	177 T	—
L4U5	—	—	7 C	47 C	—	—	—
L6U7	—	236	12 C	58 C	—	116 C	—
L6U7	—	—	9 T	53 T	—	69 T	—
L6U7	—	—	13 T	54 T	—	84 T	—
L8U9	—	—	16 C	8 C	62 C	—	114 C
L8U9	—	—	12 C	42 C	—	—	—
L8U9	—	83 T	16 T	70 T	—	163 T	—
L10U11	—	—	11 T	32 T	—	—	—
L10U11	—	151 C	11 C	80 C	—	242 C	—
L10U11	—	—	8 C	23 C	—	—	—
L12U13	—	216 T	12 T	91 T	—	319 T	—
L12U13	—	—	5 T	11 T	—	—	—
L12U13	—	289 C	15 C	99 C	—	403 C	—
U9L10	—	—	4 C	6 C	—	—	—
L10U11	—	—	17 T	113 T	—	480 T	—
U11L12	—	—	1 C	6 T	—	—	—
L12U13	—	356 C	20 C	114 C	—	490 C	—
U13L14	—	—	1 T	6 C	—	—	—
L12U13	—	408 T	21 T	127 T	—	556 T	—
U13L14	145 C	306 C	19 C	125 C	65 C	450 C	—
U1L1	145 T	—	8 T	40 T	65 T	—	—
U2L2	—	39 T	26 T	26 T	—	91 T	—
U3L3	—	8 C	—	—	—	8 C	—
U3L3	—	42 T	26 T	26 T	—	94 T	—
U5L4	—	—	—	—	—	—	—
U5L5	—	8 C	—	—	—	8 C	—
U5L5	—	45 T	26 T	26 T	—	95 T	—
U7L6	—	9 C	—	—	—	9 C	—
U7L7	—	—	—	—	—	—	—
U7L7	—	43 T	26 T	26 T	—	95 T	—
U8L8	—	8 C	—	—	—	8 C	—
U9L9	—	—	—	—	—	—	—
U9L9	—	42 T	26 T	26 T	—	94 T	—
U10L10	—	8 C	—	—	—	8 C	—
U11L11	—	—	—	—	—	—	—
U11L11	—	41 T	26 T	26 T	—	93 T	—
U12L12	—	8 C	—	—	—	8 C	—
U13L13	—	44 T	26 T	26 T	—	96 T	—
U14L14	—	476 C	31 C	161 C	—	668 C	—
L6U7	258 C	544 C	39 C	167 C	72 GC	770 C	1202 C
L16L18	318 C	312 C	29 C	110 C	205 C	451 C	656 C
L18L19	—	—	—	—	—	—	—
U16U18	91 T	669 T	43 T	226 T	36 T	938 T	—
U18U19	127 T	450 T	37 T	156 T	54 T	643 T	—
U17U19	—	—	—	—	—	—	—
U19L19	—	—	—	—	—	—	—
U19L19	—	42 T	26 T	26 T	—	94 T	—
U19L20	—	—	—	—	—	—	—
U19L20	—	8 C	—	—	—	8 C	—
U19L21	—	40 T	26 T	26 T	—	92 T	—
U19L21	—	6 C	—	—	—	6 C	—
U21L22	2 GT	166 T	19 T	62 T	15 T	247 T	—
L19L20	—	—	—	—	—	—	—
L19L21	35 T	149 T	16 T	52 T	19 T	217 T	—
L19L20	—	—	—	—	—	—	—
L19L21	104 C	144 C	17 C	43 C	47 C	204 C	—
L19L20	—	238 T	21 T	81 T	—	340 T	—
L19L20	—	—	—	—	—	—	—
L19L20	—	195 C	19 C	68 C	—	282 C	—
L19L20	—	266 T	24 T	95 T	—	386 T	—
L19L20	—	—	—	—	—	—	—
L19L20	—	218 C	24 C	78 C	—	320 C	—
L19L20	—	44 T	26 T	26 T	—	96 T	—
L19L20	—	—	—	—	—	—	—
L19L20	—	8 C	—	—	—	8 C	—
L19L20	—	40 T	26 T	26 T	—	92 T	—
L19L20	—	—	—	—	—	—	—
L19L20	—	6 C	—	—	—	6 C	—
L19L20	—	—	—	—	—	—	—
L19L20	78 T	111 T	15 T	42 T	52 T	168 T	—
L19L20	—	—	—	—	—	—	—
L19L20	97 T	199 T	26 T	75 T	65 T	300 T	—
L19L20	—	—	—	—	—	—	—
L19L20	—	—	—	—	—	—	—
L19L20	—	—	—	—	—	—	—
L19L20	19 C	178 C	23 C	67 C	11 C	268 C	—
L19L20	—	—	—	—	—	—	—
L19L20	23 C	164 C	22 C	62 C	13 C	248 C	—
L19L20	—	—	—	—	—	—	—
L19L20	—	98 T	18 T	42 T	—	158 T	—
L19L20	—	—	5 C	5 C	—	—	—
L19L20	—	32 C	13 C	25 C	—	70 C	—
L19L20	—	—	9 T	13 T	—	—	—
L19L20	—	38 T	26 T	25 T	—	89 T	—
L19L20	—	—	—	—	—	—	—
L19L20	—	7 C	—	—	—	7 C	—
L19L20	—	—	—	—	—	—	—
L19L20	—	39 T	26 T	25 T	—	90 T	—
L19L20	—	—	—	—	—	—	—

All stresses shown above are in kips
Design stress including wind shown only where such stress governs.
Live load stresses shown include impact.

GENERAL NOTES

DESIGN — In accordance with the A.S.H.O. Standard Specifications for Highway Bridges dated 1931, modified.

LOADING — H15 Live Load

UNIT STRESSES — Stresses in Carbon Steel, Cast Steel, etc., are those given in Paragraph 5.4.2. of the Specifications in the column headed: "For live load and lateral forces." Stresses in Silicon Steel are 150 % of those allowed for Carbon Steel.

MATERIALS — All Carbon Steel, Silicon Steel, Cast Steel, Forgings, etc. shall conform to the current specifications of the A.S.T.M. "S.S." indicates Silicon Steel; "C.S." Carbon Steel.

PUNCHING & REAMING — All work shall conform to the Paragraph headed: "Fabrication of Structural Steel" in the special provisions of the Specifications.

RIVETS — Rivets shall be 7/8" ϕ except as otherwise noted on detail drawings.

PAINT — Structural Steel and Castings shall receive one shop coat and two field coats of paint as called for in the Paragraph headed: "Paint" of the special provisions of the Specifications.

GUSSETS — All Gusset Plates shall be cut back not more than 4" from the back of the chord lb.

BRIDGE OVER MISSOURI RIVER AT KANSAS CITY, KANSAS

FOR REGIONAL BRIDGE CO., INC.

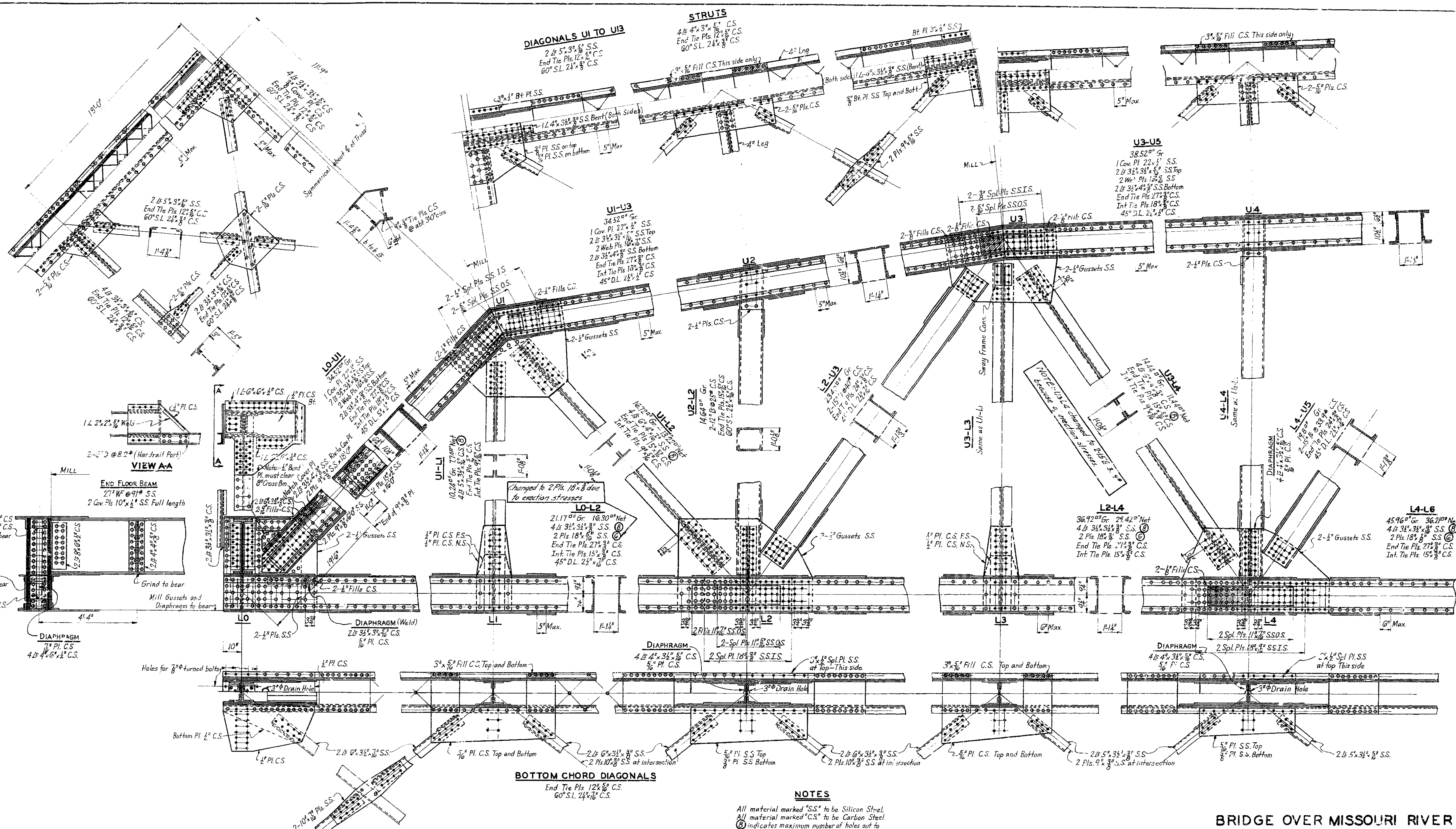
STRESS SHEET - MAIN SPANS

SVERDRUP AND PARCEL
CONSULTING ENGINEERS
ST. LOUIS, MO.

Made by J.A.J. April 1933
Traced by L.F. & C.E.B. May 1933
Checked by B.R.S. June 1933

SHEET NO 5

322



NOTES

All material marked "S.S." to be Silicon Steel.
All material marked "C.S." to be Carbon Steel.
⑧ indicates maximum number of holes out to maintain required net section.
All rivets ⅞"φ except in battens and lacing of bracing, which are to be ¾"φ.
Clear distance between batten plates on tension members shall not exceed 3'0".
See Sheet #10 for Typical Cross-Section.

BRIDGE OVER MISSOURI RIVER AT KANSAS CITY, KANSAS

FOR REGIONAL BRIDGE CO., INC.

MAIN SPAN STRUCTURAL DETAILS L0-L4

SVERDRUP AND PARCEL
CONSULTING ENGINEERS
ST. LOUIS, MO.

Made by L.F. April 1933
Traced by L.F. & C.E.S.J. May 1933
Checked by J.R.S. June 1933

SHEET NO. 6

324

Revised 8-11-33 (3"x½" Splice Pl. at U9 Changed to S.S.)

TOP CHORD STRUTS

4 Ls 4"x3"x5/16" C.S.
End Tie Pls 12"x5/16" C.S
60°S.L. 2¼"x3/8" C.S

TOP CHORD DIAGONALS

2 Ls 5"x3"x5/16" S.S.
End Tie Pls 12"x5/16" C.S.
60° S.L. 2¼"x3/8" C.S.
Intersection same as shown on Sheet #6

BOTTOM CHORD DIAGONALS

End Tie Pls. 12"x5/16" C.S
60° S.L. 2¼"x5/16" C.S.

NOTES

All material marked "S.S" to be Silicon Steel.
All material marked "C.S" to be Carbon Steel
⑧ indicates maximum number of holes out to maintain required net section.
All rivets 7/8"φ except in battens and lacing of bracing, which are to be 3/4"φ.
Clear distance between batten plates on tension members shall not exceed 3'-0"
See Sheet #10 for Typical Cross-Section.

BRIDGE OVER MISSOURI RIVER
AT KANSAS CITY, KANSAS

FOR REGIONAL BRIDGE CO., INC.

MAIN SPAN STRUCTURAL DETAILS L5-L10

SVERDRUP AND PARCEL
CONSULTING ENGINEERS
ST. LOUIS, MO.

Made by L.F. April 1933
Traced by L.F. & C.E.S.Jr. May 1933
Checked by B.R.S. June 1933.

SHEET NO. 7

525

Rev 8-11-33 (Lateral Pls. at L12 & L16 Changed to S.S.)

BRIDGE OVER MISSOURI RIVER AT KANSAS CITY, KANSAS

FOR REGIONAL BRIDGE CO., INC.

MAIN SPAN STRUCTURAL DETAILS L11-L16

SVERDRUP AND PARCEL
CONSULTING ENGINEERS
ST. LOUIS, MO.

FINISHED

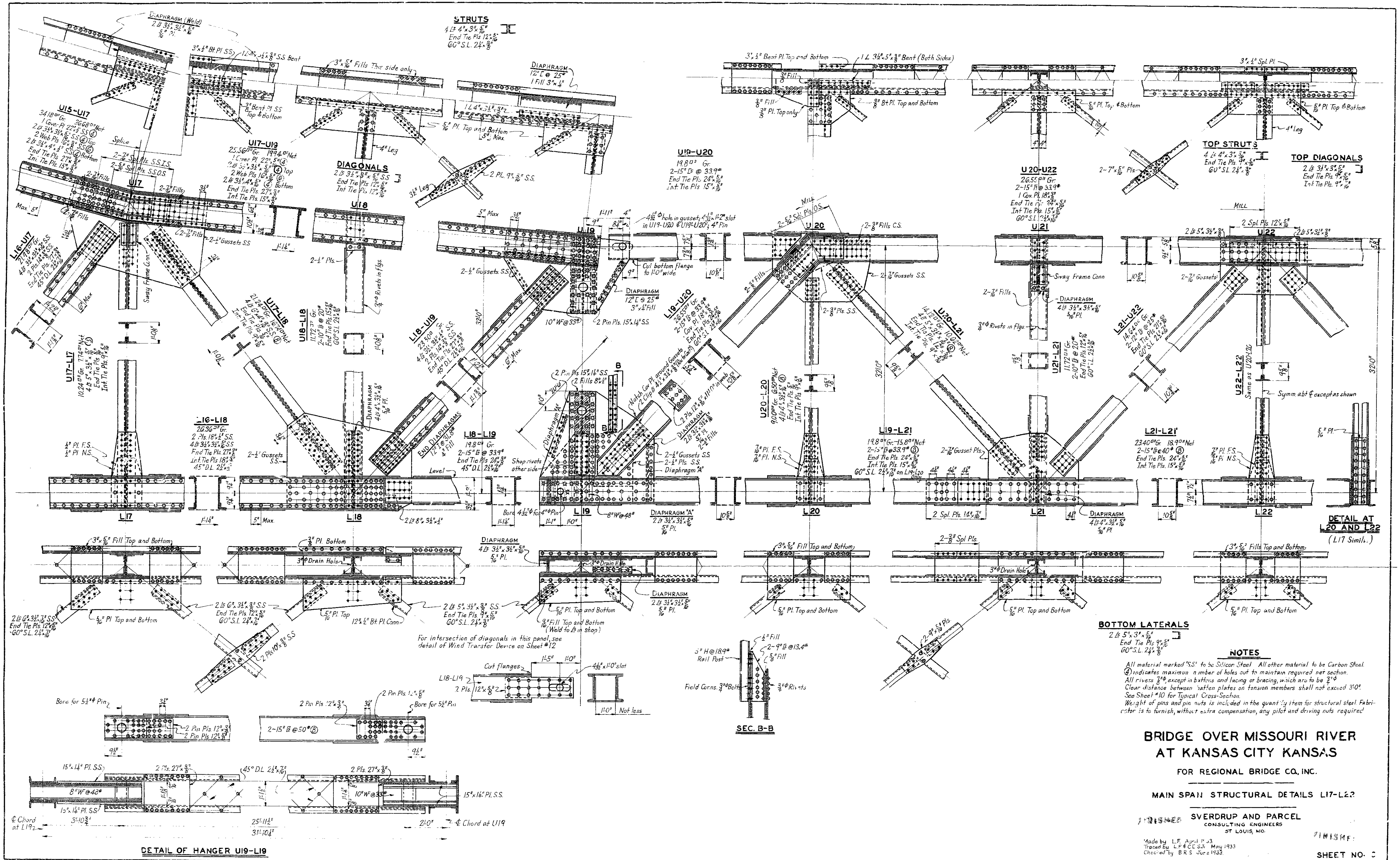
FINISHED

NOTES

All Material marked "S.S." to be Silicon Steel. All Material marked "C.S." to be Carbon Steel.
⑧ indicates maximum number of holes out to maintain required net section.
All rivets 7/8"φ except in battens and lacing of bracing, which are to be 3/4"φ.
Clear distance between batten plates on tension members shall not exceed 3'-0".
See Sheet #10 for Typical Cross Section.

Made by L.F. April 1933
Traced by L.F. & C.E.S. Jr. May 1933.
Checked by B.R.S. June 1933

SHEET NO. 8



NOTES

All material marked "S.S." to be Silicon Steel. All other material to be Carbon Steel.
④ indicates maximum number of holes out to maintain required net section.
All rivets 7/8"φ, except in battens and lacing or bracing, which are to be 3/4"φ.
Clear distance between batten plates on tension members shall not exceed 3'-0".
See Sheet #10 for Typical Cross-Section.
Weight of pins and pin nuts is included in the quantity item for structural steel. Fabricator is to furnish, without extra compensation, any pilot and driving nuts required.

BRIDGE OVER MISSOURI RIVER AT KANSAS CITY KANSAS

FOR REGIONAL BRIDGE CO. INC.

MAIN SPAN STRUCTURAL DETAILS L17-L22

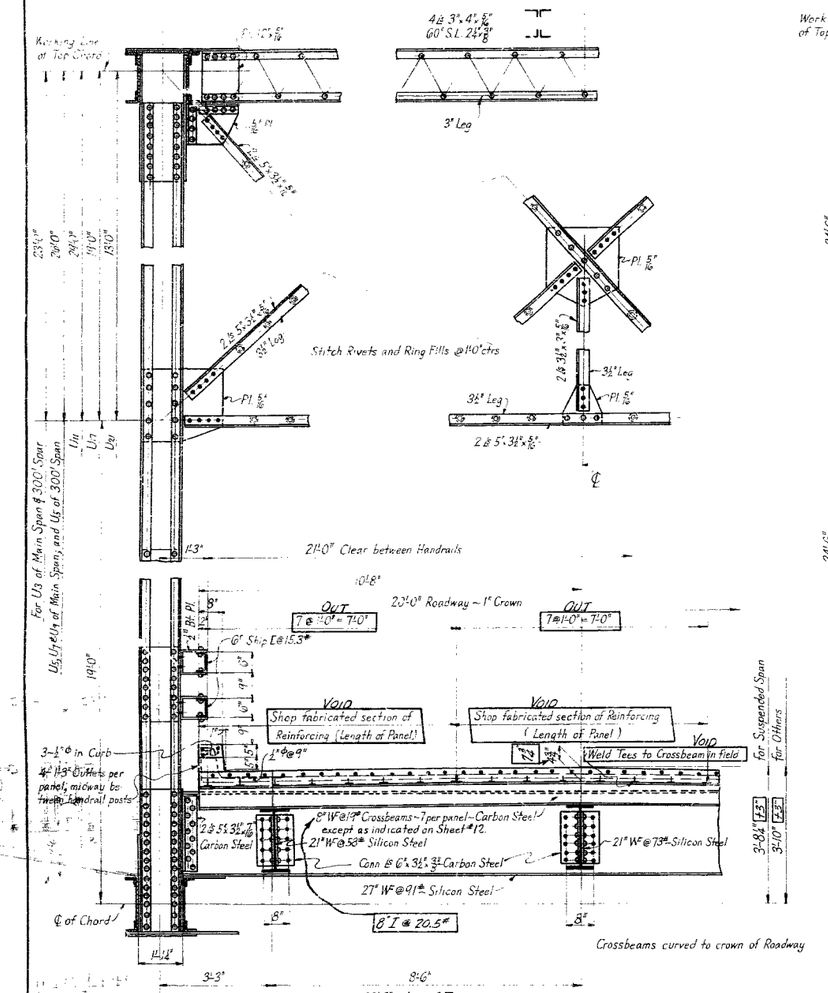
FINISHED

SVERDRUP AND PARCEL
CONSULTING ENGINEERS
ST LOUIS, MO.

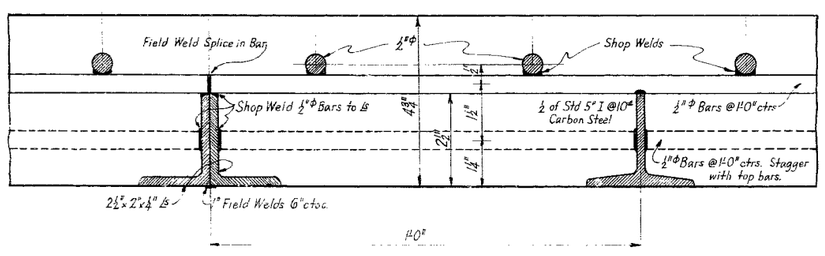
Made by L.F. April 1933
Traced by L.F. & C.E.S.J. May 1933
Checked by B.R.S. June 1933

FINISHED

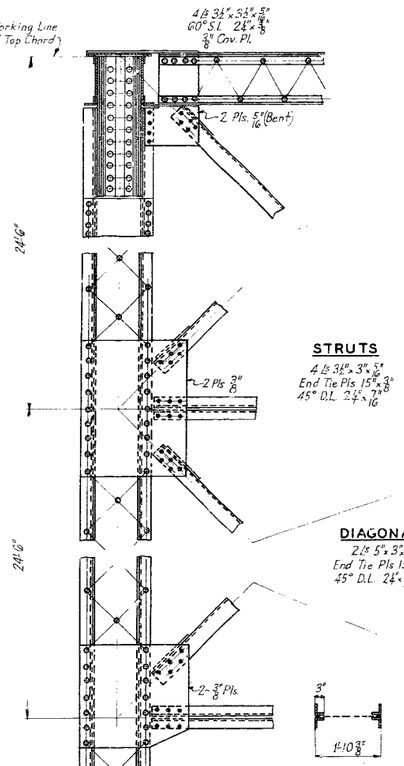
SHEET NO.



TYPICAL CROSS SECTION



TYPICAL SLAB DETAILS } VOID



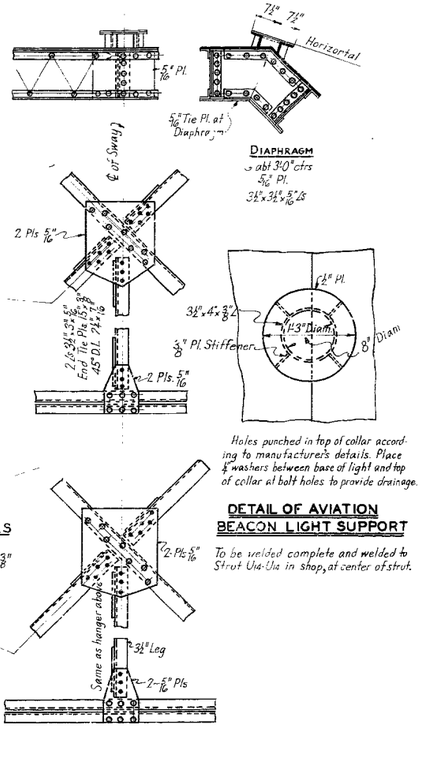
SWAY FRAME AT U14 (DEVELOPED VIEW)

STRUTS

4 Ls 3½"×3"×⅝"
End Tie Pls 15"×⅜"
45° D.L. 2½"×7"/16

DIAGONALS

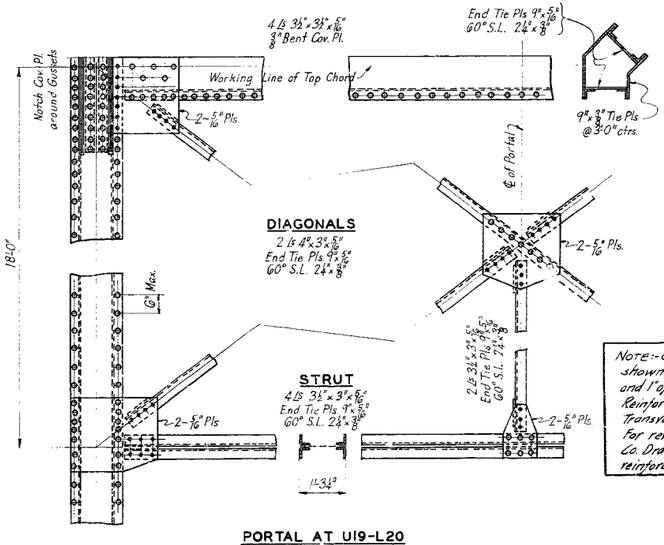
2 Ls 5"×3"×⅝"
End Tie Pls 15"×⅜"
45° D.L. 2½"×7"/16



Holes punched in top of collar according to manufacturer's details. Place ¼ washers between base of light and top of collar at bolt holes to provide drainage.

DETAIL OF AVIATION BEACON LIGHT SUPPORT

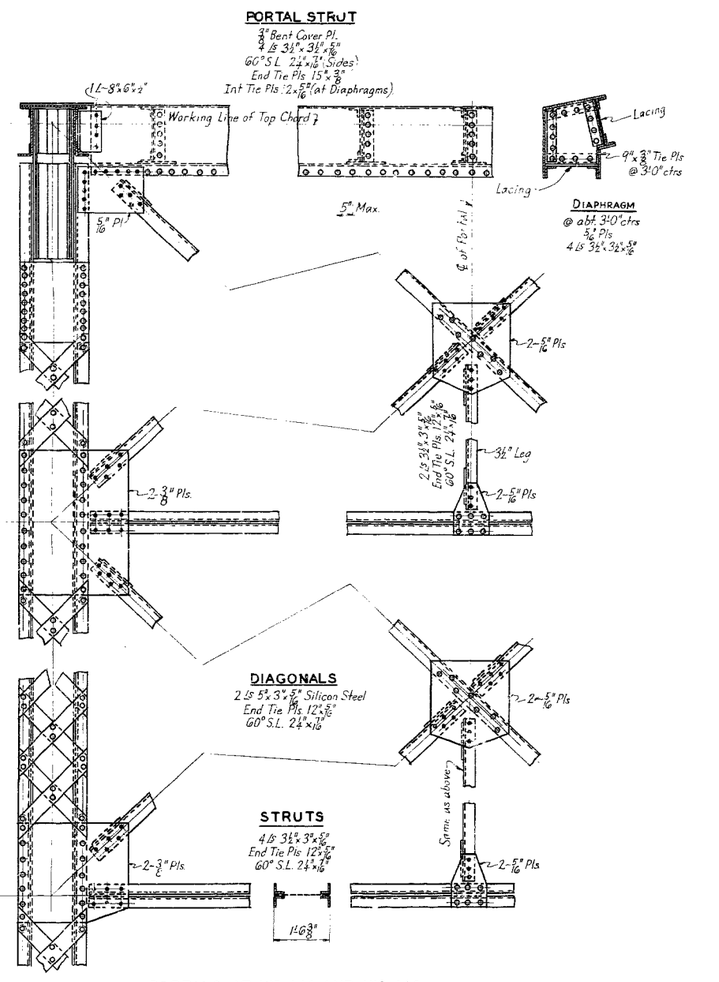
To be welded complete and welded to Strut U14-U15 in shop, at center of strut.



PORTALS AT U19-L20

PORTAL STRUT

⅜" Bent Cover Pl.
4 Ls 3½"×3½"×⅝"
60° S.L. 2½"×7/16 (Sides)
End Tie Pls 15"×⅜"
Int Tie Pls 2"×5/16" (at Diaphragms)



PORTALS AT U13-L14 AND U15-L14

NOTES

All material in sway frames and portals to be Carbon Steel, unless noted. All rivets ⅞" ϕ except rivets in batten plates & lace bars of bracing, which are ¾" ϕ

VOID — Slab Reinforcing Steel to have no paint applied in the shop. Field paint to consist of 2 coats of paint similar to that used on the Structural Steel, applied to the exposed flange of the tees after the forms have been removed and surface cleaned with a wire brush

NOTE:- Changes in cross section are due to change from slab as shown to a slab 7½" thick, consisting of 6¾" Haydite concrete and 1" of portland cement concrete, poured monolithically. Slab Reinforcing:- Longitudinal- ½" ϕ @ 6" ctrs. in bottom, ½" ϕ @ 8" ctrs. top. Transverse- 2-½" ϕ top and bottom between adjacent crossbeams. For revised cross section of thru spans see Kansas City Bridge Co. Drawing No. 5303. For details and setting plan of all deck reinforcing see Sverdrup & Parcel Drawing No. X1.

BRIDGE OVER MISSOURI RIVER AT KANSAS CITY KANSAS

FOR REGIONAL BRIDGE CO., INC.

MAIN SPAN STRUCTURAL DETAILS—CROSS SECTIONS

SVERDRUP AND PARCEL
CONSULTING ENGINEERS
ST. LOUIS, MO.

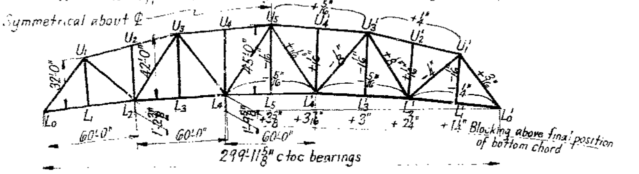
Made by L.F. April 1933
Traced by L.F.E.S.Jr. May 1933
Checked by J.F.J. June 33

SHEET NO. 10

327

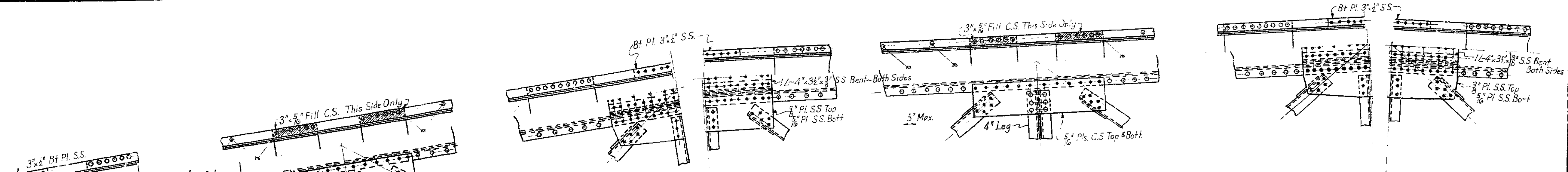
NOTES

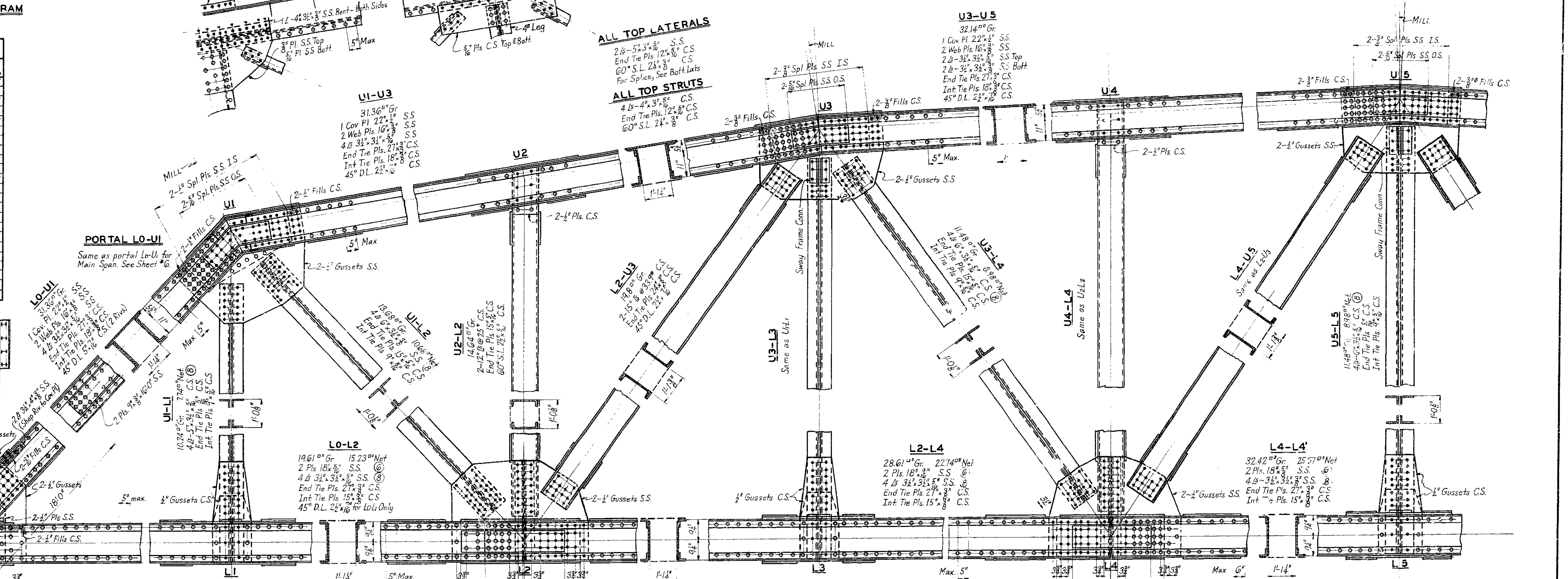
Shape of truss shown : final shape after calculated deflection has occurred.
Lengths of Members are to be computed for the final shape of truss shown, and the corrections as indicated applied to these lengths. All Posts and Hangers to be placed on radial lines.

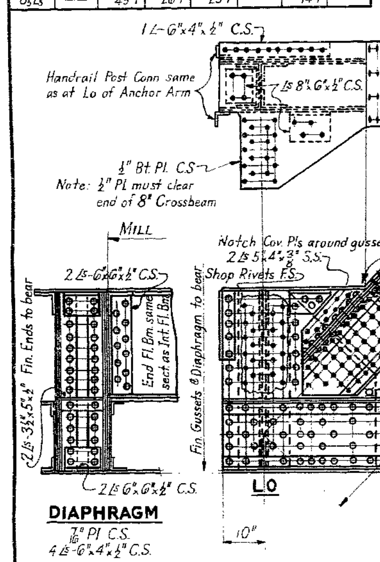


CAMBER DIAGRAM

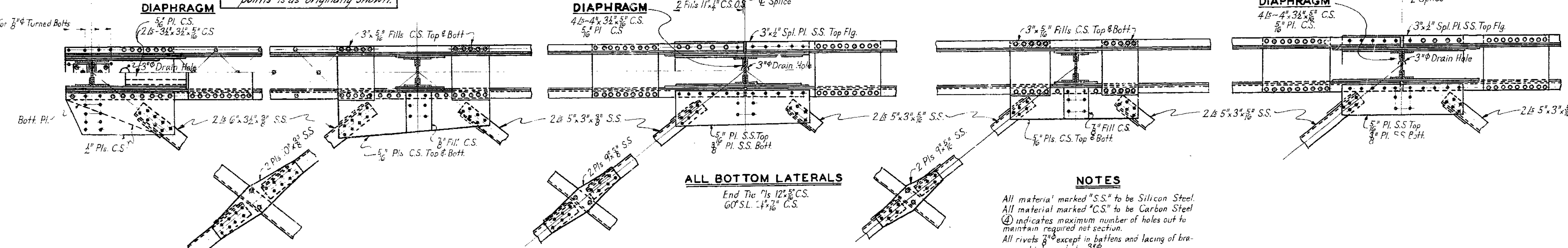
TABLE OF STRESSES							
MEMBER	50# WIND	DEAD LOAD	CONC L.L.	UNIF L.L.	20# WIND	DESIGN STRESS DL+LL	DESIGN STRESS INCL WIND
L_0L_2	168 T	218 T	16 T	74 T	106 T	308 T	414 T
	165 C	—	—	—	106 C	—	—
L_2L_4	279 T	392 T	27 T	132 T	180 T	551 T	731 T
	279 C	—	—	—	180 C	—	—
L_4L_4'	301 T	438 T	30 T	146 T	194 T	614 T	808 T
	301 C	—	—	—	194 C	—	—
L_0U_1	—	320 C	22 C	108 C	—	450 C	—
	—	—	—	—	—	—	—
U_1U_3	55 C	342 C	24 C	115 C	27 C	481 C	508 C
	55 T	—	—	—	27 T	—	—
U_3U_5	90 C	435 C	30 C	144 C	45 C	609 C	654 C
	90 T	—	—	—	45 T	—	—
U_1L_2	—	175 T	15 T	64 T	—	254 T	—
L_2U_3	—	94 C	12 C	44 C	—	150 C	—
U_3L_4	—	72 T	12 T	40 T	—	124 T	—
	—	—	8 C	17 C	—	—	—
L_4U_5	—	7 C	11 C	29 C	—	64 C	—
	—	—	11 T	27 T	—	50 T	—
U_1L_1	—	40 T	26 T	25 T	—	91 T	—
U_2L_2	—	8 C	—	—	—	8 C	—
U_3L_3	—	42 T	26 T	25 T	—	93 T	—
U_4L_4	—	9 C	—	—	—	9 C	—
U_5L_5	—	43 T	26 T	25 T	—	94 T	—







NOTE:- On account of erection stresses, LoL2 at north end only of south span only was changed to 2 Pls 18"×9/16" S.S. and 4 Ls 3½"×3½"×5/16" S.S. LoL2 at other points is as originally shown.



NOTES

All material marked "S.S." to be Silicon Steel.
All material marked "C.S." to be Carbon Steel
(4) indicates maximum number of holes out to maintain required net section.
All rivets 7/8"φ except in battens and lacing of bracing, which are to be 3/4"φ.
Clear distance between batten plates on tension members shall not exceed 3'-0".
See Sheet #10 for Typical Cross Section.
Shop weld 7/8" Fills to bottom Lateral Plates at L_1, L_3, & L_5.

BRIDGE OVER MISSOURI RIVER AT KANSAS CITY, KANSAS

FOR REGIONAL BRIDGE CO., INC.

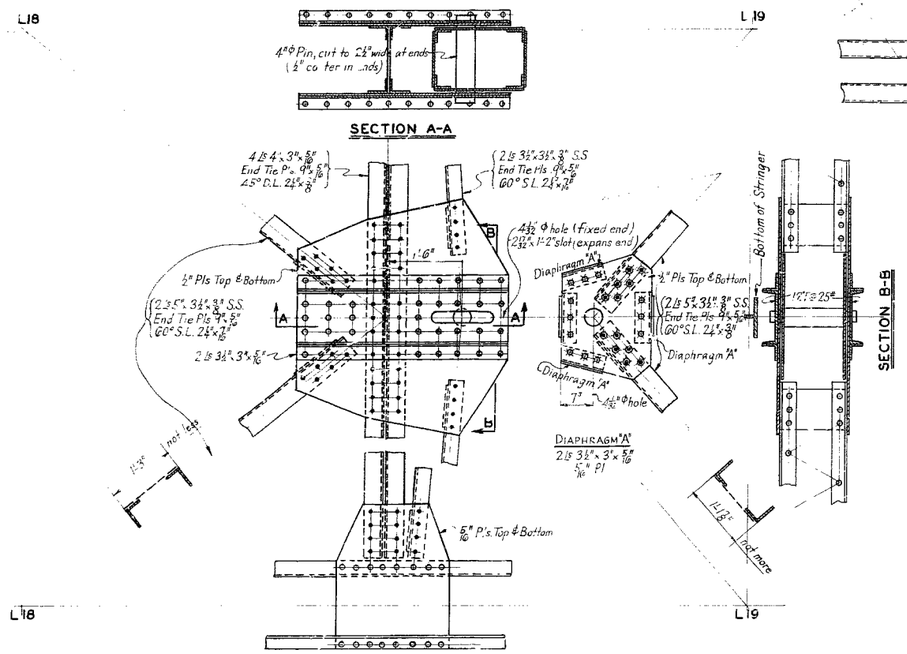
300 FT. SPAN STRUCTURAL DETAILS

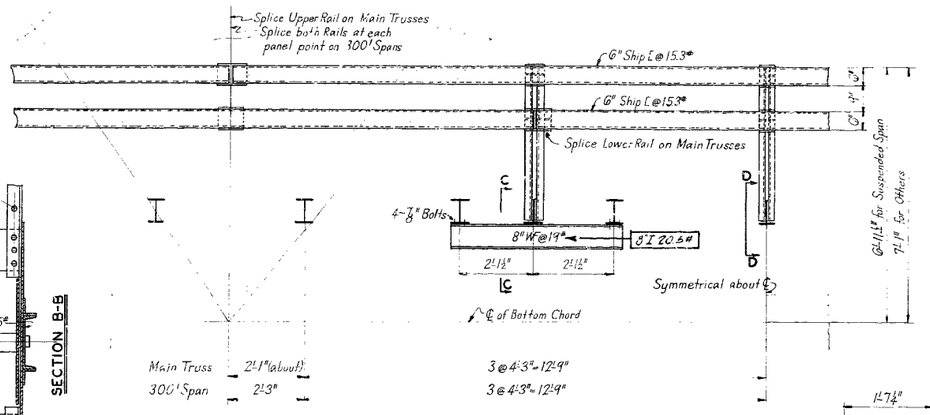
SVERDRUP AND PARCEL
CONSULTING ENGINEERS
ST. LOUIS, MO.

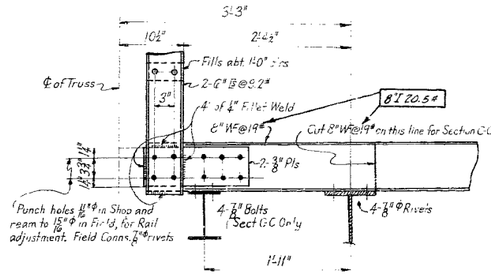
Made by B.R.S. April 1933
Traced by L.F. & C.E.S.Jr. May 1933
Checked by J.A.J. June 1933

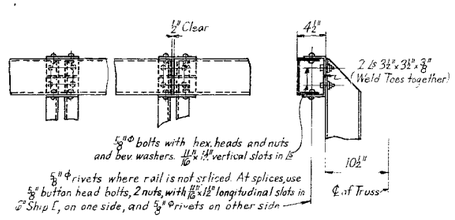
SHEET NO. 11

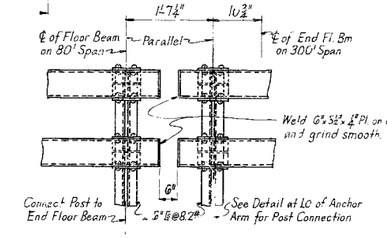
Rev. 6-15-33 (Lacing Added on LoL1)

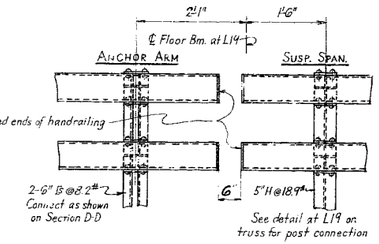


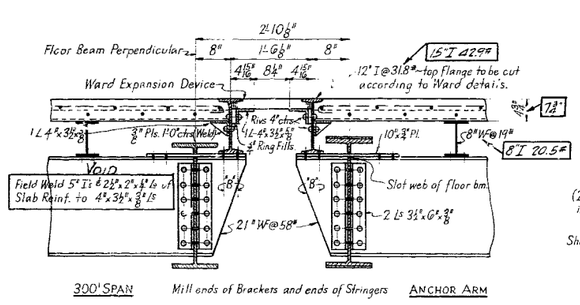


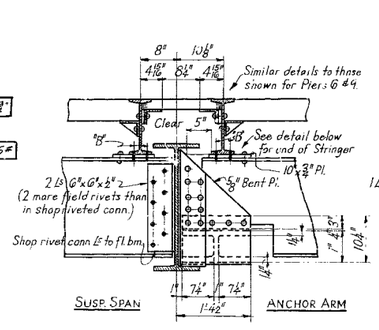


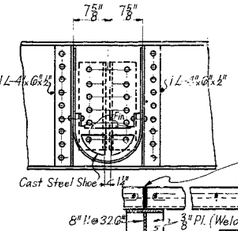


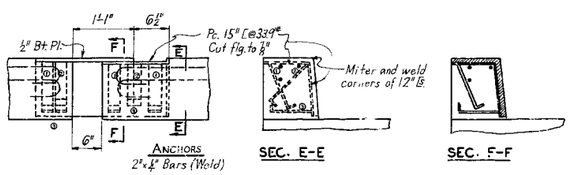


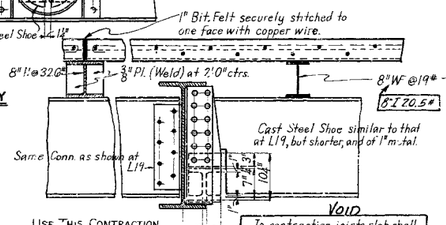


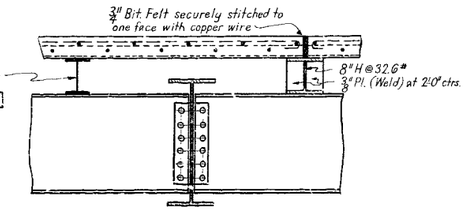


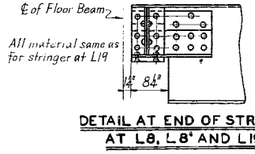


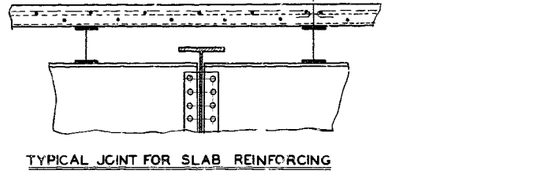


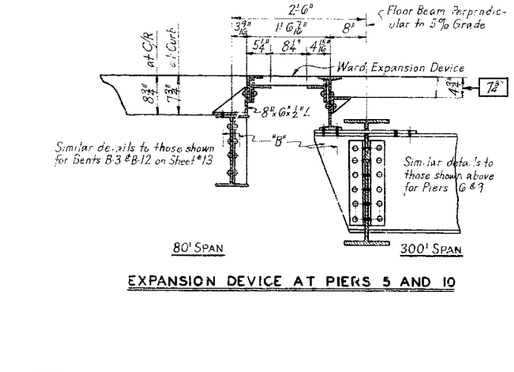


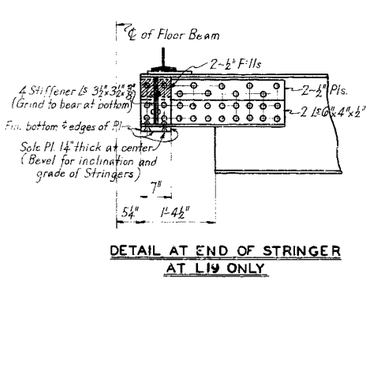












NOTES

All material marked "S.S" to be Silicon Steel. All other material, except as noted, to be Carbon Steel.
Expansion device supports to be curved to a parabola, to conform to crown of roadway.
Attachment of Ward Expansion Device to be made in accordance with the manufacturer's details.
Expansion Devices and structural steel supports to be assembled together in shop to insure fit in Field.
Holes marked "B" to be reamed in shop with parts assembled, and pieces match-marked.
Weight of Ward Expansion Devices is included in the quantity item for Cast Steel.
All expansion joints are shown in normal position at a temperature of 60° F.
Unless otherwise noted, all rivets are to be ⅞" Φ except in battens, and lacing of bracing, which are to be ¾" Φ.
All crossbeams to be curved to conform to crown of Roadway.

NOTE:- Steel framing remains as shown, unless otherwise noted. For change in roadway slab refer to Sheet No. 10.

BRIDGE OVER MISSOURI RIVER AT KANSAS CITY, KANSAS

FOR REGIONAL BRIDGE CO., INC.

EXPANSION AND HANDRAIL DETAILS

SVERDRUP AND PARCEL
CONSULTING ENGINEERS
ST. LOUIS, MO.

Made by L.F. April 1933
Traced by L.F. & E.S.Jr. May 1933
Checked by B.P.S June 1933

SHEET NO. 12

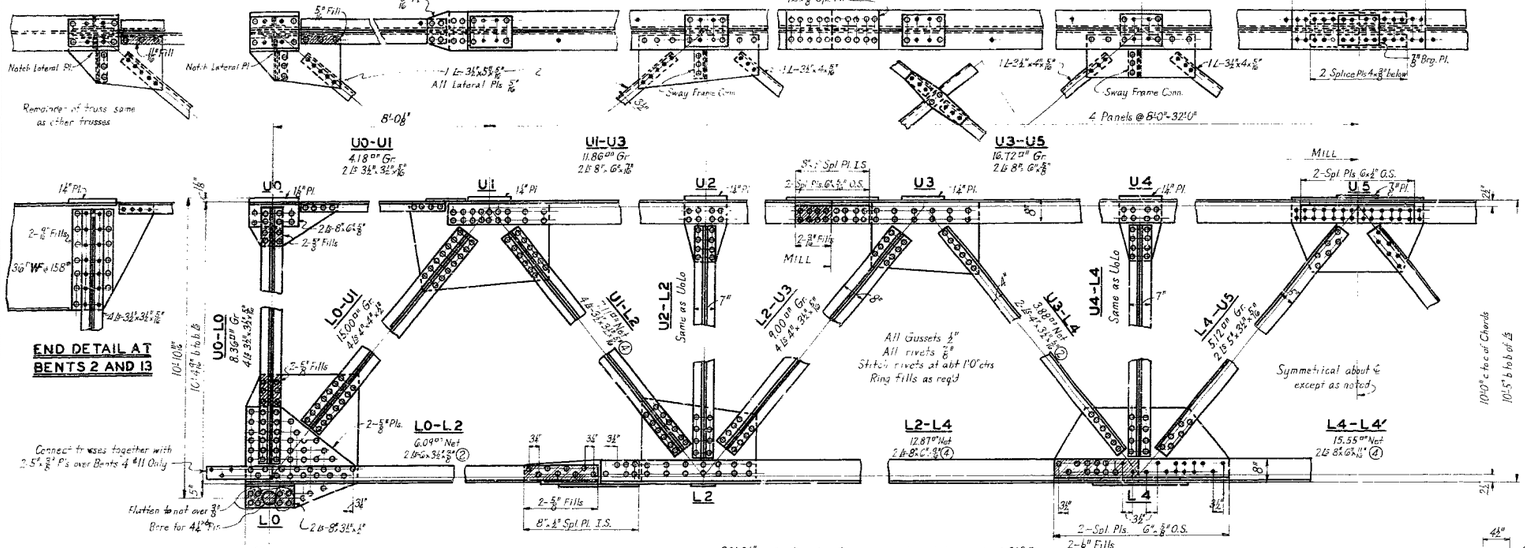
Revised 7-17-33. (Dimension in Sec. C-C & D changed to 11'-8")

329

Revised 7-17-33 (Size of Hanger B in Portal & Sway Frame Shown)

330

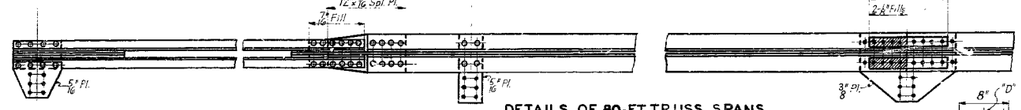
END DETAIL AT BENTS 2 AND 13



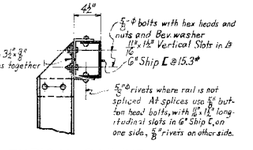
Trusses to be combined by lengthening top chord and shortening bottom chord ⅛" in each 16' panel

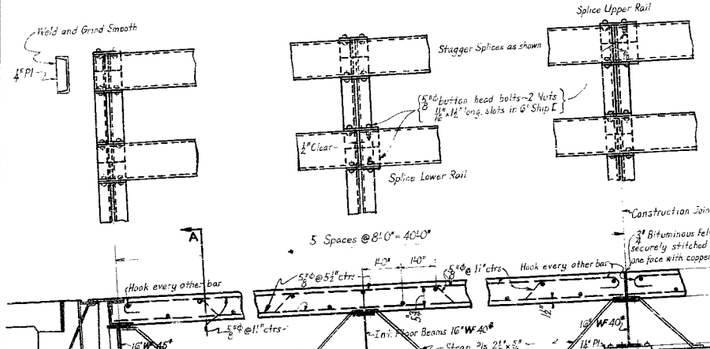
Workmanship on trusses to conform to standard specifications for punched work, except field splices which shall be subpunched ⅞" ø and reamed to 1⅛" ø while parts are assembled in shop. Reamed pieces to be match-marked.

DETAILS OF 80-FT. TRUSS SPANS

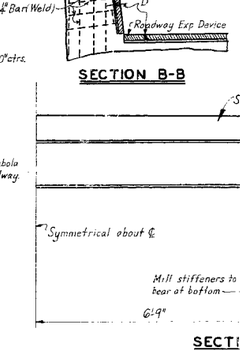


TYPICAL RAILING CONNECTION

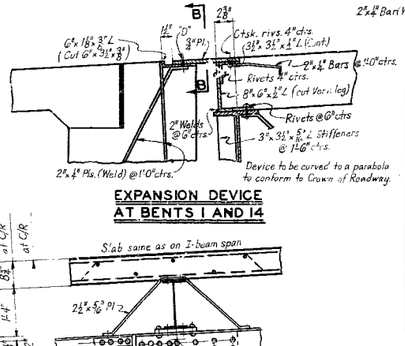




TYPICAL DETAILS FOR SPANS 1-2 AND 13-14

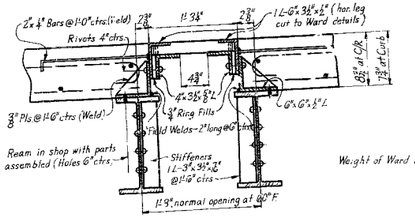


SECTION B-B



EXPANSION DEVICE AT BENTS 1 AND 14

SECTION A



EXPANSION DEVICE AT BENTS 3 AND 12

Attachment of the Ward Exp. Device to structural steel supports to be made in accordance with manufacturer's details.

Expansion device and structural steel supports to be assembled together in shop to insure fit in field. Supports to be curved to a parabola to conform to crown of roadway. Match-mark all pieces after shop assembly.

Weight of Ward Exp. Device is included in the quantity item for Cast Steel.

TYPICAL DETAIL FOR TRUSSES

SLAB DETAIL AT BENTS 4 AND 11

NOTES

All structural steel shown on this sheet to be Carbon Steel.

All rivets ⅞" ø unless noted

④ indicates maximum number of holes out to maintain net section of member.

SLAB REINFORCEMENT FOR I-BEAM AND DECK TRUSS SPANS

Longitudinal: ⅝" ø bars @ 11" ctrs. top and bottom, with ⅝" ø bent bars alternating top and bottom, in between, giving 5½" spacing in top over cross beams and 5½" spacing in bottom at mid-panel. Lap splices 2'6".

Transverse: ½" ø bars at about 1'0" spacing, alternating top and bottom.

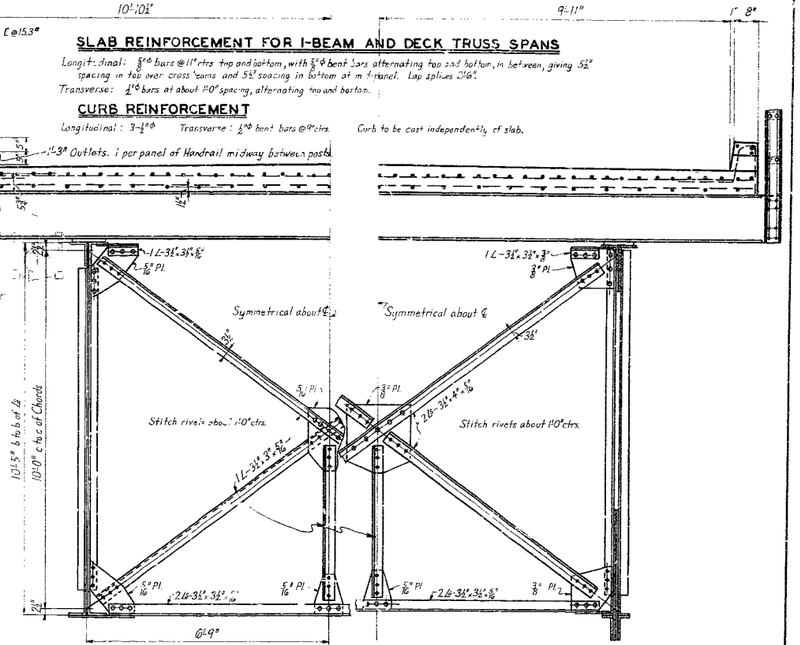
CURB REINFORCEMENT

Longitudinal: 3-¾" ø Transverse: ½" ø bent bars @ 9" ctrs. Curb to be cast independently of slab.

1-3" Outlets, 1 per panel of Handrail midway between posts.

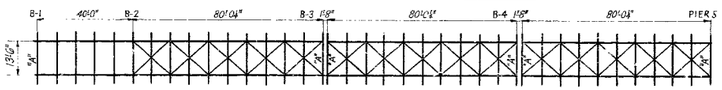
Punch holes 1⅛" ø in shop, ream to 1⅛" ø in field for rail alignment.

Flow coats for handrail with ⅞" ø rivets.



HALF CROSS-SECTION AT SWAY FRAMES

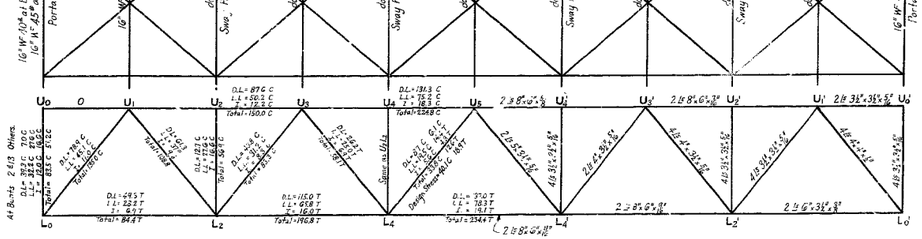
HALF CROSS-SECTION AT U0-L0



Cross beams marked "A" are 16" WF @ 45#. All other cross beams are 16" WF @ 40#. Longitudinal dimensions given are parallel to grade.

FLOOR PLAN OF SOUTH APPROACH

North Approach Opposite Hand.



STRESSES IN 80-FT DECK SPANS

BRIDGE OVER MISSOURI RIVER AT KANSAS CITY, KANSAS

FOR REGIONAL BRIDGE CO., INC.

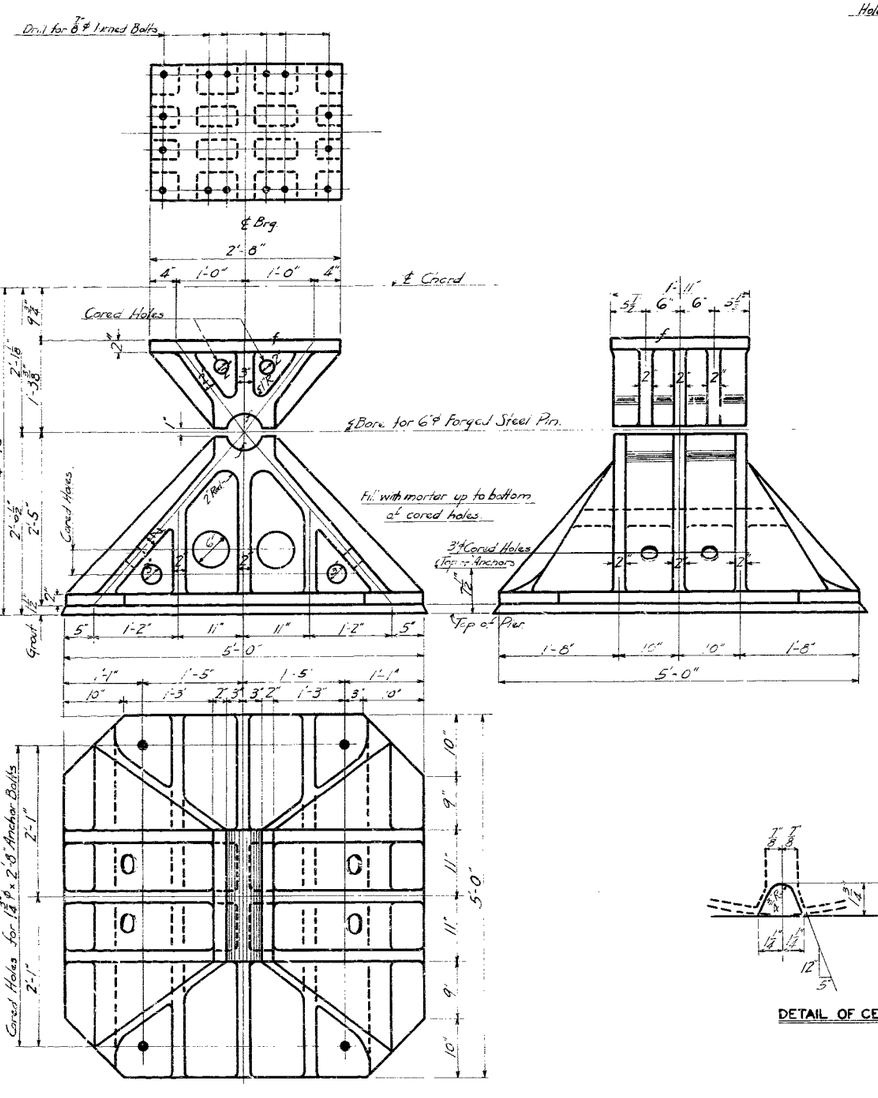
STRUCTURAL DETAILS—APPROACH SPANS

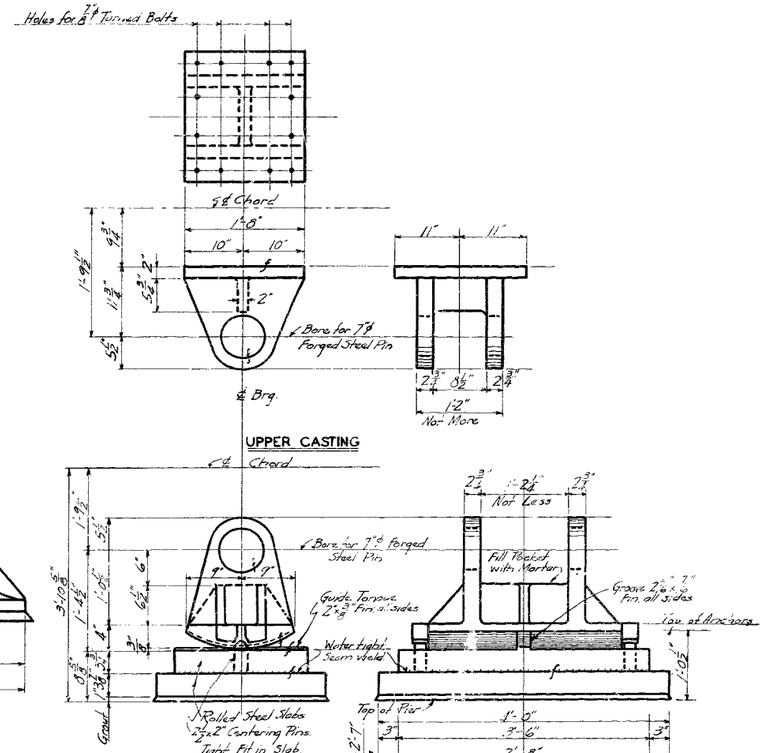
FINISHED SVERDRUP AND PARCEL
CONSULTING ENGINEERS
ST LOUIS, MO.

Made by L.F. April 1933
Traced by L.F. & C.E.S.Jr. May 1933
Checked by B.R.S. June 1933

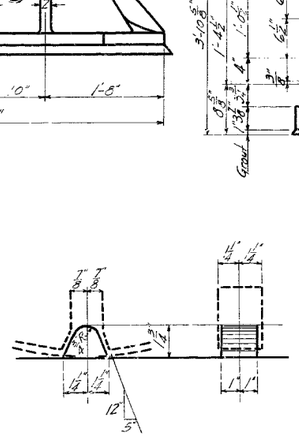
FINISHED

SHEET NO. 13



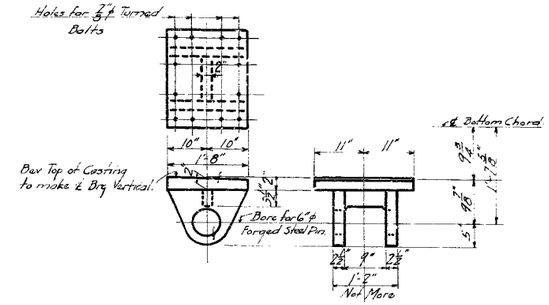


UPPER CASTING



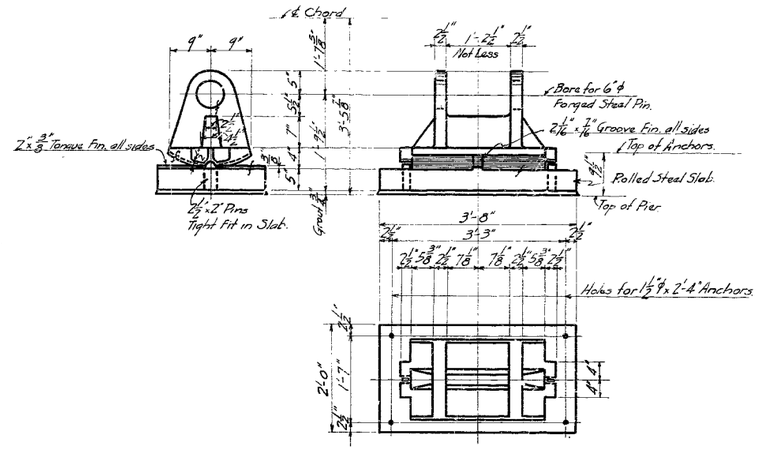
DETAIL OF CENTERING PINS

LOWER CASTINGS AND SLABS



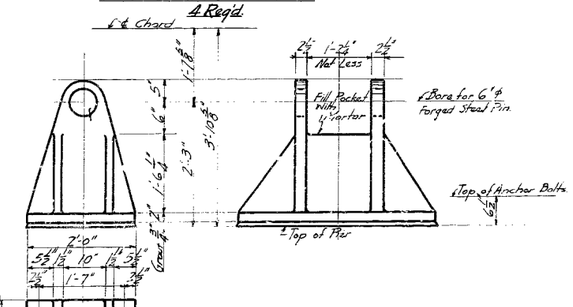
UPPER CASTINGS - 300' SPANS

8 Req'd.



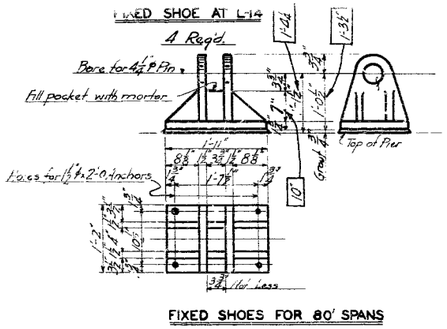
ROCKER SHOES - 300' SPANS

4 Req'd.



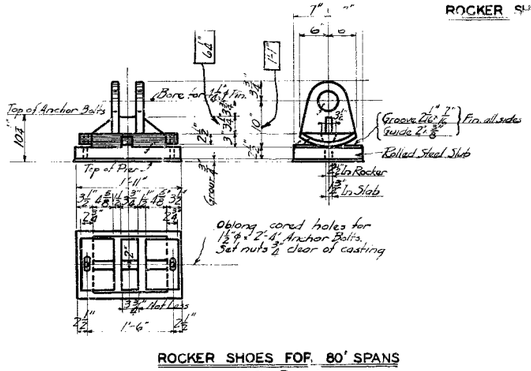
FIXED SHOES - 300' SPANS

4 Req'd.



FIXED SHOES FOR 80' SPANS

8 Req'd.



ROCKER SHOES FOR 80' SPANS

16 Req'd.

ROCKER SHOE AT LO OF ANCHOR ARM

4 Req'd.

NOTES:

All material cast steel annealed unless noted.
All fillets ½" radius unless noted.
Pins, pin nuts, rolled steel slabs and anchor bolts included in the quantity item for Structural Steel.
Fin. surfaces of pins and castings to be coated with White Lead and tallow at the shop.
All anchor bolts to be furnished with square head, 2 square nuts and 4" plate washers.

BRIDGE OVER MISSOURI RIVER AT KANSAS CITY, KANSAS

FOR REGIONAL BRIDGE CO. INC.

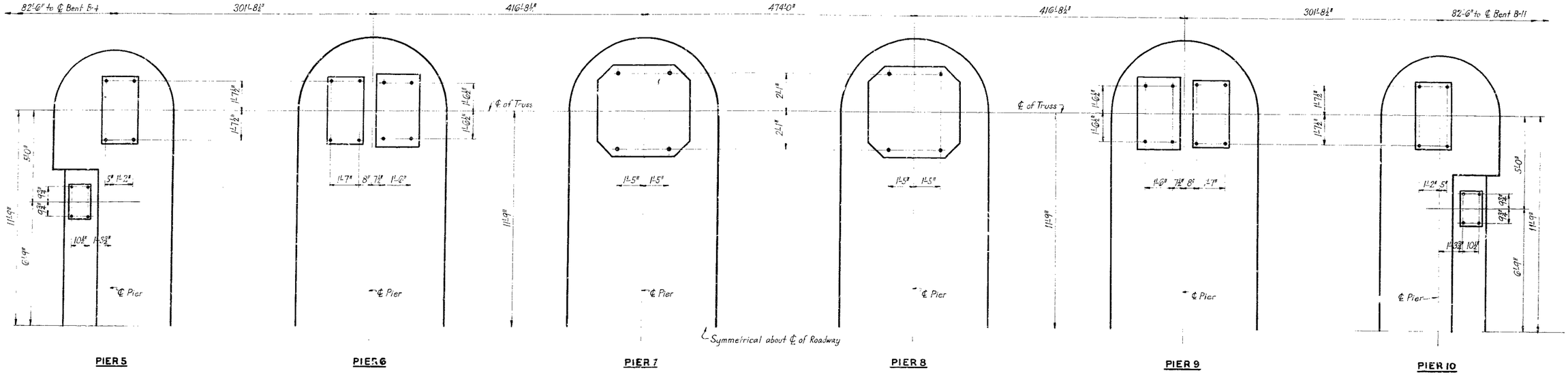
DETAILS OF SHOES

SVERDRUP AND PARCEL
CONSULTING ENGINEERS
ST. LOUIS, MO.

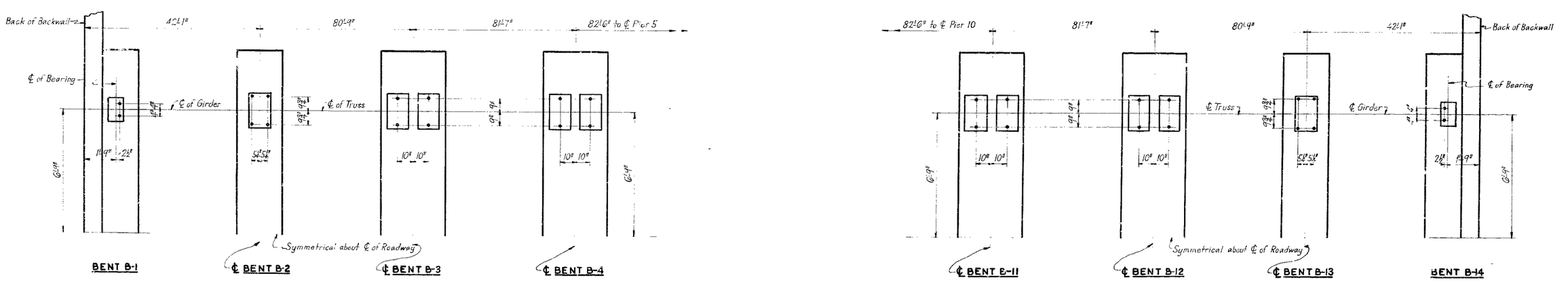
Made by B.R.S. April, 1933
Traced - E.B.M. June, 1933.
Checked - J.A.J. June, 1933.

SHEET NO. 14.

3271



PIERS



BENTS

NORTH

BRIDGE OVER MISSOURI RIVER AT KANSAS CITY KANSAS

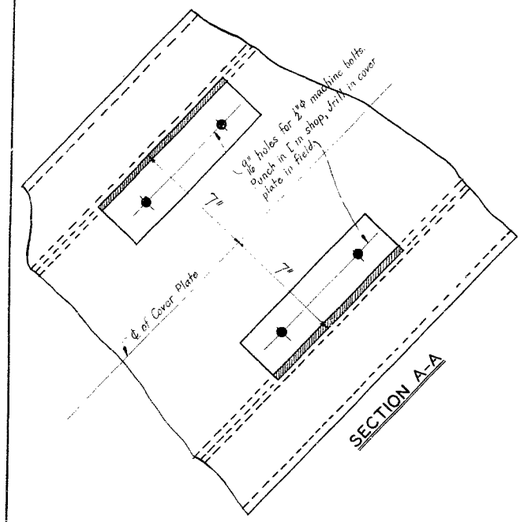
FOR REGIONAL BRIDGE CO., INC.

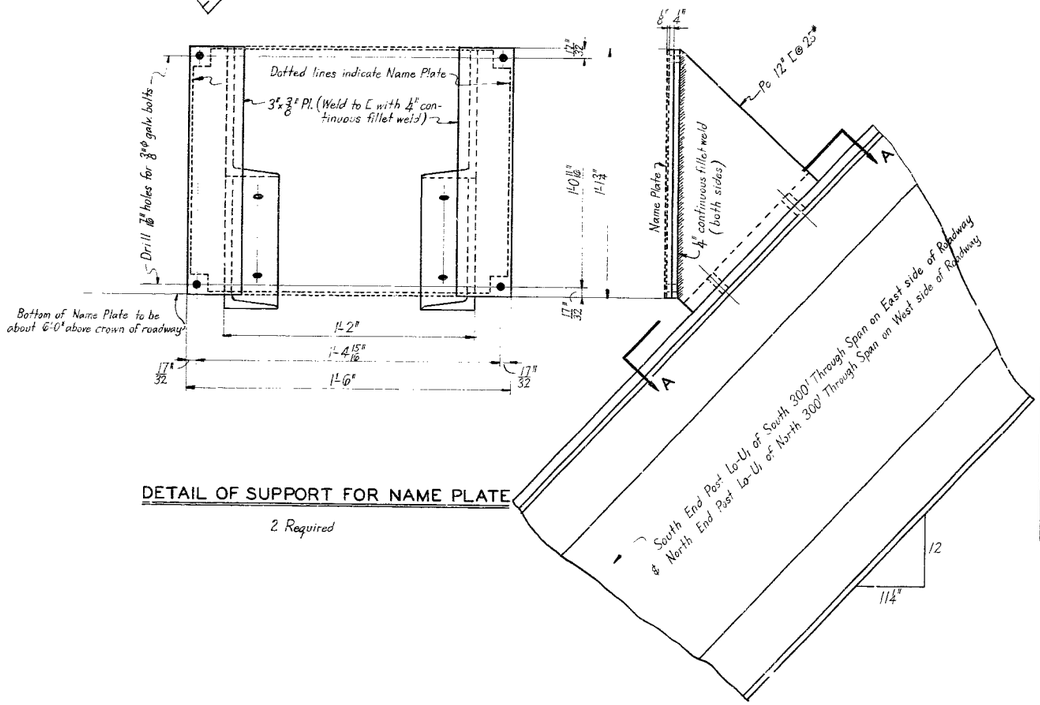
ANCHOR BOLT DIAGRAM

SVERDRUP AND PARCEL
CONSULTING ENGINEERS
ST. LOUIS, MO.

Made by C.E.S.Jr. July 1933
Traced by C.E.S.Jr. July 1933
Checked by J.A.J. July 1933

SHEET NO. 15





DETAIL OF SUPPORT FOR NAME PLATE

2 Required

Pebbled Finish

FAIRFAX BRIDGE

INITIATED BY
GREATER KANSAS CITY REGIONAL PLAN ASSOCIATION

FINANCED BY
RECONSTRUCTION FINANCE CORPORATION

IN COOPERATION WITH
STATE HIGHWAY COMMISSION OF MISSOURI
STATE HIGHWAY COMMISSION OF KANSAS
CITY OF KANSAS CITY, KANSAS
PLATTE COUNTY, MISSOURI
WYANDOTTE COUNTY, KANSAS
REGIONAL BRIDGE COMPANY

SVERDRUP AND PARCEL
CONSULTING ENGINEERS

DEDICATED
A.D. 1934

KANSAS CITY BRIDGE CO.
CONTRACTORS

Polished Finish

FULL SIZE ELEVATION OF NAME PLATE

2 Required

Name Plates to be cast of an alloy composed of the following metals:-
88 % Aluminum, 10% Zinc, 2% Copper
Face of letters and edges of plate to have polished finish.
Background to have pebbled finish.
Attachment bolts to be galvanized with hex. heads and galv. hex. nuts.

BRIDGE OVER MISSOURI RIVER
AT KANSAS CITY, KANSAS
FOR REGIONAL BRIDGE CO. INC.

DETAIL OF BRIDGE NAME PLATE

SVERDRUP AND PARCEL
CONSULTING ENGINEERS
ST. LOUIS, MO.

Made By C.E.S. Jr. & L.F. May 1934
Traced By C.E.S. Jr. & L.F. May 1934
Checked By R.R.S. May 1934

SUPP. SHEET NO. 16

NOTE

FOR SL2, SL3, SL4, SL6, SL7, SL8, SL9.
In 2 Curbs - 6 Bars
In top of slab - 33 Bars
Total - 39 Bars

2 SL1 in each curb
63 SL1 in slab

63 Bars

63 SL1 in slab

Panel L5 to L8 same as Panel L2 L5

Panel L8 L11 same as Panel L2 L5

Panel L11 L14 same as Panel L2 L5

39 Bars

Panel L22 L19' same as Panel L2 L5

Panel L19' L16' same as Panel L2 L5

Panel L16' L14' same as Panel L14 L16

Panel L14' L11' same as Panel L2 L5

Panel L11' L8' same as Panel L2 L5

Panel L8' L5' same as Panel L2 L5

Panel L5' L2 same as Panel L2 L5

2 SL1 in each curb
63 SL1 in slab
39 Bars SL8

2 SL1 in each curb
63 SL1 in slab
39 Bars SL9

63 Bars SL11

63 Bars SL8

LONGITUDINAL SECTION THROUGH SLAB, MAIN SPAN

Showing Marks of Longitudinal Bars in Slab & Curb

2 SL1 in each curb
63 SL1 in slab
39 Bars

63 Bars

LONGITUDINAL SECTION THROUGH SLAB, 300' SPAN

Showing Marks of Longitudinal Bars in Slab and Curb

DL7
DL3

Same as DL3

DL3 AND DL7

DL8

SL1

DT2 AND ST2
(ALIKE)

DL10 AND DL11

24 DL3 24 DL3 24 DL3 24 DL8 24 DL8 24 DL3

24 DL3 24 DL8 24 DL8 24 DL7 24 DL7 24 DL8 24 DL8 24 DL3

40:2⅜"

80:2⅝"

1:3½"

81:0⅝"

81:1⅜"

LONGITUDINAL SECTION THROUGH APPROACH SLAB

Showing Marks of Longitudinal Bent Bars in Slab.

6 DL9 in curbs
23 DL11 in slab

6 DL5 in curbs
23 DL12 in slab

6 DL9 in curbs
23 DL6 in slab

6 DL9 in curbs
23 DL6 in slab

Hook bars in curb only
6 DL11 in curbs
23 DL6 in slab

6 DL11 in curbs
23 DL6 in slab.

6 DL9 in curbs
23 DL6 in slab

Hook bars in slab only
6 DL9 in curbs
23 DL10 in slab

6 DL9 in curbs
23 DL10 in slab

6 DL9 in curbs
23 DL6 in slabs

Hook bars in curb only
6 DL11 in curbs
23 DL6 in slab

23 DL12 23 DL11 23 DL12 23 DL6 23 DL6 23 DL12 23 DL12 23 DL6 23 DL6 23 DL12 23 DL12 23 DL6 23 DL6 23 DL12

LONGITUDINAL SECTION THROUGH APPROACH SLAB

Showing Marks of Longitudinal Straight or Hooked Bars in Slab and Curb

BILL OF REINFORCING BARS
SPANS 5 - 6 & 9 - 10

Mark	Reqd / Span	Total / 2 Spans	Size	Length	Shape
ST1	284	568	½"ϕ	21:0"	Str.
ST2	748	1496	½"ϕ	4:2"	Bent
SL1	512	1024	½"ϕ	4:8"	Bent
SL2	39	78	½"ϕ	28:2"	Straight
SL4	204	408	½"ϕ	29:2"	"
SL6	393	786	½"ϕ	31:2"	"
SL7	126	252	½"ϕ	30-10"	"
SL8	195	390	½"ϕ	32:8"	"
SL10	63	126	½"ϕ	35:8"	"

BILL OF REINFORCING BARS
ENTIRE MAIN SPAN

Mark	Total / Reqd.	Size	Length	Shape
ST1	1232	½"ϕ	21:0"	Str.
ST2	3264	½"ϕ	4:2"	Bent
SL1	2032	½"ϕ	4:8"	Bent
SL2	180	½"ϕ	28:2"	Str.
SL3	390	½"ϕ	27:2"	"
SL4	243	½"ϕ	29:2"	"
SL5	441	½"ϕ	30:6"	"
SL6	63	½"ϕ	31:2"	"
SL7	1929	½"ϕ	30:10"	"
SL8	1077	½"ϕ	32:8"	"
SL9	102	½"ϕ	31:6"	"
SL11	63	½"ϕ	35:0"	"

℄ of floor beam

½"ϕ - DT2

Outlet

5½" 3@9"=2:3" 6½" 1:3" 2'6" 3@9"=2:3" 5½"

3:6½" 1:3" 3:6½"

8:0"

TYPICAL PANEL AT CURB FOR APPROACH SPANS

℄ Panel Point ℄ of Handrail Post ℄ of Handrail Post Symm. abt. ℄ of Panel

Outlet Outlet Outlet

½"ϕ - ST2

4@9"=3:0" 5½" 1:3" 2'6½" 6@9½"=4:9" 6½" 1:3" 2'6½" 9" 9" 4½"

3:7½" 1:3" 3:7½" 2:6½" 1:3" 2:6½"

8:5½" 6:4½"

14:10"

TYPICAL PANEL AT CURB FOR MAIN SPAN

Panel as shown is for anchor arm and cantilever arm. Suspended span and 300' span similar.

BILL OF REINFORCING BARS
80 FT. TRUSS SPANS

Mark	Reqd. in 1 Span 2-3 or 12-13	Reqd. in 1 Span 3-4 or 11-12	Reqd. in 1 Span 4-5 or 10-11	Total / 6 Spans	Size	Length	Shape
DL2	46	46	46	276	⅝"ϕ	15:6"	Str.
DL3	48	24	24	192	⅝"ϕ	22:7"	Bent
DL6	115	92	92	598	⅝"ϕ	28:6"	Str.
DL7	-	24	24	96	⅝"ϕ	23:5"	Bent
DL8	48	48	48	288	⅝"ϕ	23:4"	"
DL9	12	12	12	72	½"ϕ	24:3"	Str.
DL10	-	23	23	92	⅝"ϕ	24:4"	Bent
DL11	6	6	6	36	½"ϕ	29:4"	Bent
DT1	81	81	81	486	½"ϕ	21:0"	Str.
DT2	200	202	202	1208	½"ϕ	4:2"	Bent

BILL OF REINFORCING BARS
40 FT. BEAM SPANS

Mark	Reqd / Span	Total / 2 Spans	Size	Length	Shape
DL1	46	92	⅝"ϕ	26:9"	Str.
DL2	46	92	⅝"ϕ	15:6"	"
DL3	48	96	⅝"ϕ	22:7"	Bent
DL4	6	12	⅝"ϕ	26:6"	Str.
DL5	6	12	⅝"ϕ	15:3"	"
DT1	41	82	½"ϕ	21:0"	"
DT2	102	204	½"ϕ	4:2"	Bent

Bars having "D" as first letter of mark are used in beam and deck truss spans; those having "S" as first letter are used in through truss spans.

Second letter "L" designates longitudinal bars; T designates transverse bars.

All reinforcing steel to comply with specifications and general drawings furnished by Sverdrup and Parcel.

NOTE

For section through slab on through truss spans see Kansas City Bridge Co. Drawing 5303, dated Oct, 1933.

BRIDGE OVER MISSOURI RIVER AT KANSAS CITY, KANSAS

FOR REGIONAL BRIDGE CO., INC.

REINFORCING SCHEDULE - SLAB AND CURB

SVERDRUP AND PARCEL
CONSULTING ENGINEERS
ST. LOUIS, MO.

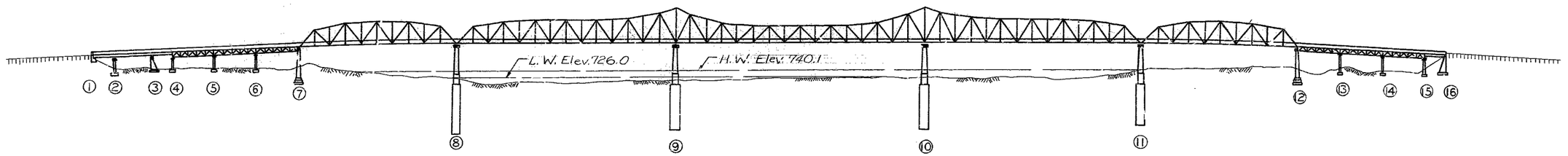
Made by L.F. Jan. 1934
Traced by W.L.W.
Checked by J.A.J. Feb. 1934

SUPP. SHEET NO. 17

4532

MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	MO.		19	6	



GENERAL ELEVATION

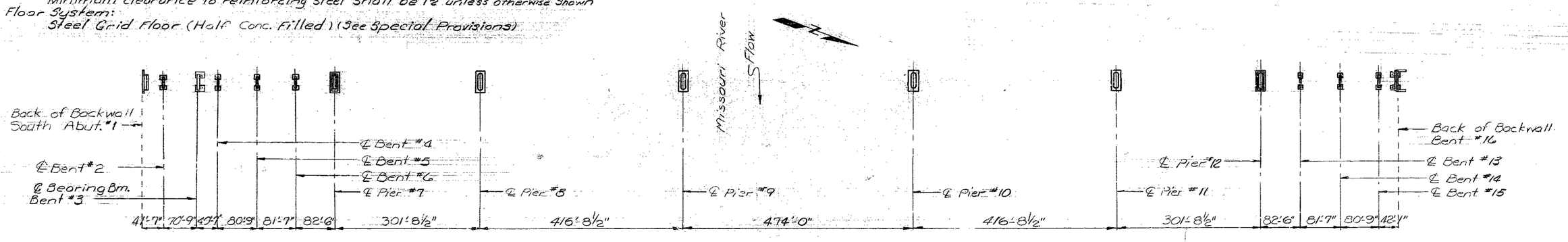
GENERAL NOTES:

Design Specifications: A.A.S.H.T.O. - 1977
Design Loading
HS-20-44 Floor System, No Future Wearing Surface, Earth 120#
Equivalent Fluid Pressure 30#

Design Unit Stresses:
Class A Concrete (Substr. Repair) fc = 1500 psi.
Class B Concrete (New Substr.) fc = 1,200 psi.
Class B1 Spec. Conc. (Superstr. Grid Fill) fc = 1,600 psi.
Reinforcing Steel fy = 60,000 psi (Grade 60)
Structural Carbon steel fs = 20,000 psi.
Minimum clearance to reinforcing steel shall be 1½ unless otherwise shown
Floor System:
Steel Grid Floor (Half Conc. Filled) (See Special Provisions)

Painting: Shop None; Field, System A or B Aluminum. (See Special Provisions)

Note: Light dotted lines indicate old work. Heavy lines indicate new work. Contractor shall verify all dimensions in field before ordering new steel.
Note: For field connections use ⅞" High Strength Bolts, holes 15/16" except as noted.
Note: A minimum vertical clearance of 21'-6" from top of rails and a minimum lateral clearance of 12'-6" from the centerline of track to nearest temporary construction falsework shall be maintained during construction.
Note: All joint filler shall meet the requirements of Std. Spec. 1057.2.4.



PLAN

ESTIMATED QUANTITIES				
ITEM		SUBSTR.	SUPERSTR	TOTAL
Removal of Existing Bridge Deck	Sq.Ft.		55,640	55,640
Special Work	Lump Sum			1
Asphalt Cement (Asphaltic Concrete)	Ton		24	24
Mineral Aggregate (Asphaltic Concrete) (Spec. Mix)	Ton		451.6	451.6
Subs. Repair (Formed)	Sq.Ft.	323		323
Subst. Repair (Unformed)	Sq.Ft.	98		98
Class B Conc. Misc. (Bent #16)	Cu.yd.	21.9		21.9
Tack Coat	Gal.		290	290
Elast. Exp. Jt. Seal (2 in.)	Lin. Ft.		22	22
Elast. Exp. Jt. Seal (2½ in.)	Lin. Ft.		44	44
Elast. Exp. Jt. Seal (4 in.)	Lin. Ft.		44	44
Elast. Exp. Jt. Seal (6½ in.)	Lin. Ft.		66	66
Preformed Comp. Exp. Jt. Seal (2½)	Lin. Ft.		506	506
Reinforcing Steel (Grade 60)	Lb.	2360		2360

ESTIMATED QUANTITIES CONT.				
ITEM		SUBSTR.	SUPERSTR.	TOTAL
Steel Grid Floor (Half Concrete Filled)	Sq.Ft.		56,296	56,296
Painting (System A or B) Aluminum	Lump Sum		1	1
Protective Coating for Piers & Bents	Lump Sum	1		1
*Cleaning Existing Bearings	Lump Sum		1	1
Fab. Str. Steel Revisions	Lb.		200,550	200,550
Bridge Guardrail (2 Tube Str. St.)	Lin. Ft.		3190	5190
Pressure Grouting Epoxy	Lin. Ft.	130		130

*Grout around brgs. to be paid for in price bid for Subst. Repair: (See Special Provisions)
Note: All steel is A-36 except as noted on portal details.

B.M. #8 Pointed □ on S.W.W. Br. No. K-456
Elev. 494.51, [U.S.G.S. Datum Elev. 774.18]

BRIDGE OVER MISSOURI RIVER
FAIRFAX BRIDGE AT RIVERSIDE

PROJ BHO-083(5)
JOB NO. 4-U-69-64 RTE. 69

PLATTE COUNTY MISSOURI
WYANDOTTE COUNTY KANSAS

STD. 706.30
K-456R

DETAILED Sept. 19 78
CHECKED Nov. 19 78

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

Sheet No. 1 of 30. Date 4-16-79

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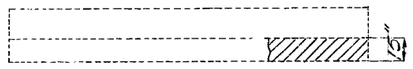
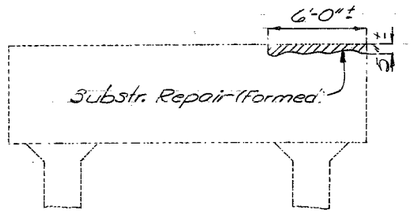
MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	7	





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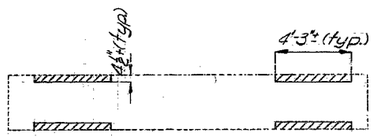

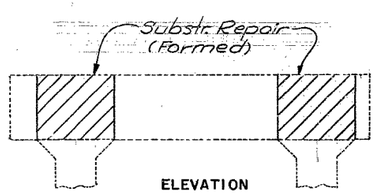

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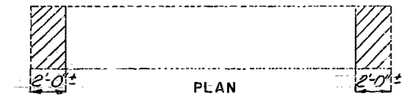

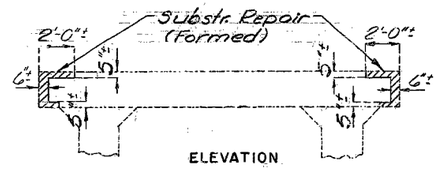

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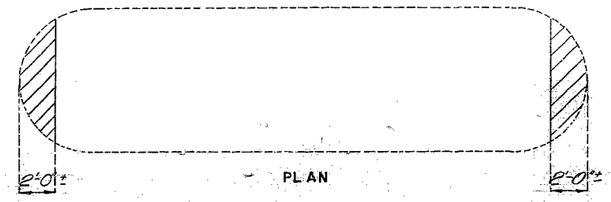
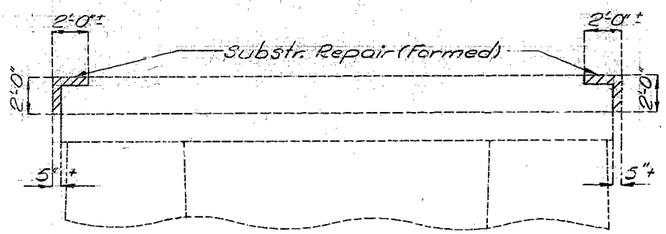
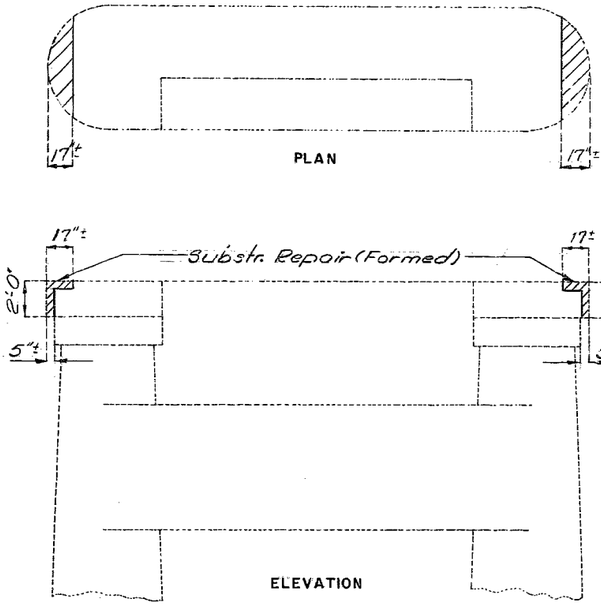




PIER NO. 8, 9, 10, & 11



PIER NO. 7 & 12

Note: Cross hatched areas indicates substructure areas to be repaired. (See Spec. Provisions.)

437

DETAILED July 1978
CHECKED Oct. 1978

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

Sheet No. 2 of 30.

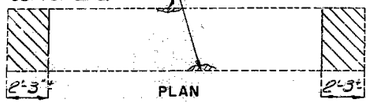
PLATTE COUNTY

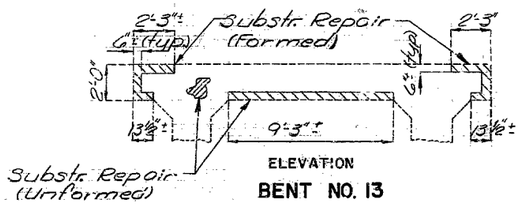
K-456R

MISSOURI STATE HIGHWAY DEPARTMENT

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

Remove and replace concrete in vertical faces of bearing beam as required to a minimum of 2" behind existing reinforcing steel and to sound concrete.





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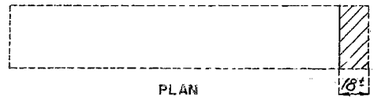
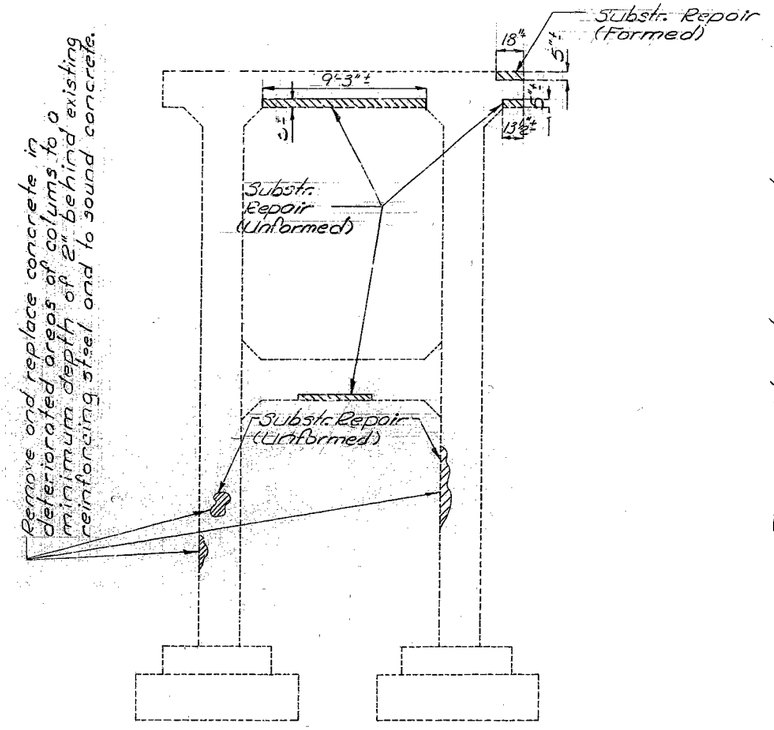
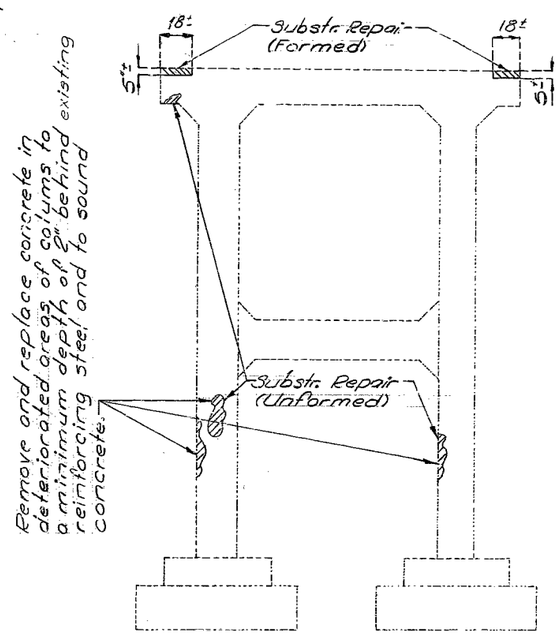




ELEVATION

BENT NO. 14



ELEVATION

BENT NO. 15

Note: Cross hatched areas indicates substructure areas to be repaired. (See Spec. Provisions.)

438

DETAILED Aug 19 78
CHECKED Oct. 19 78

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

Sheet No. 3 of 30.

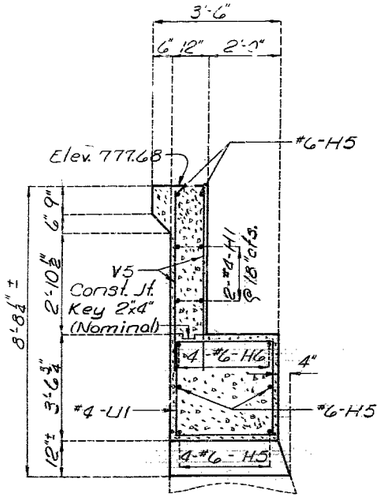
PLATTE COUNTY

K-456R

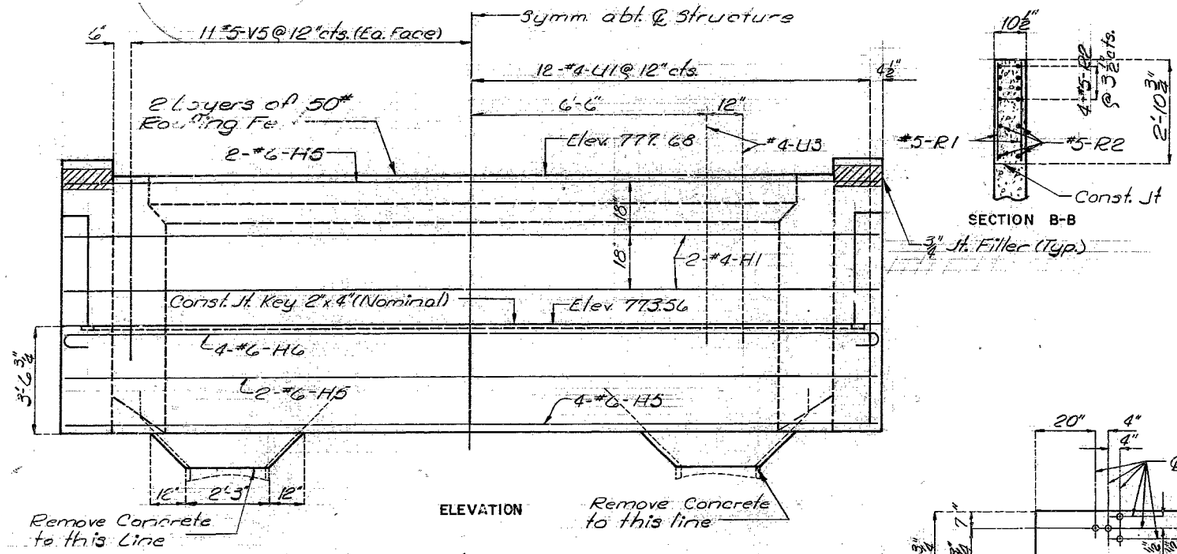
MISSOURI STATE HIGHWAY DEPARTMENT

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

439

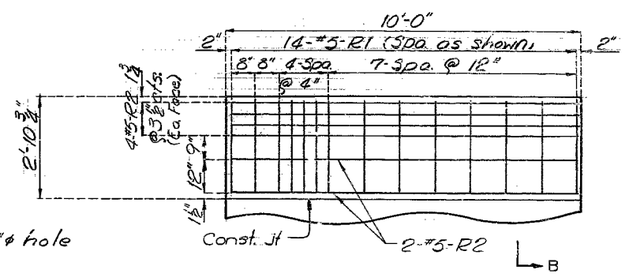


SECTION AT ℄ BENT

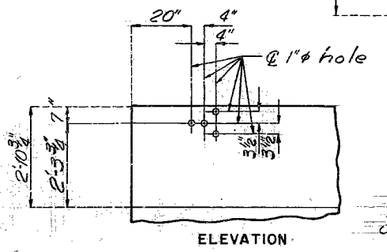


ELEVATION

SECTION B-B

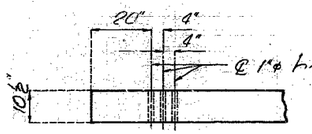


TYPICAL ELEVATION OF END POST

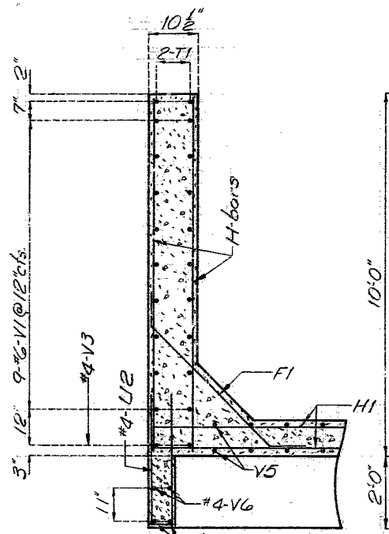


ELEVATION

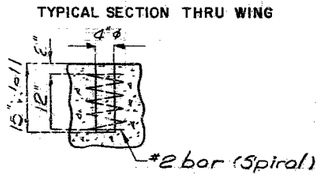
Note: All reinforcing bars in tops of substructure beams or caps shall be spaced to clear anchor bolts for bearings by at least 2".



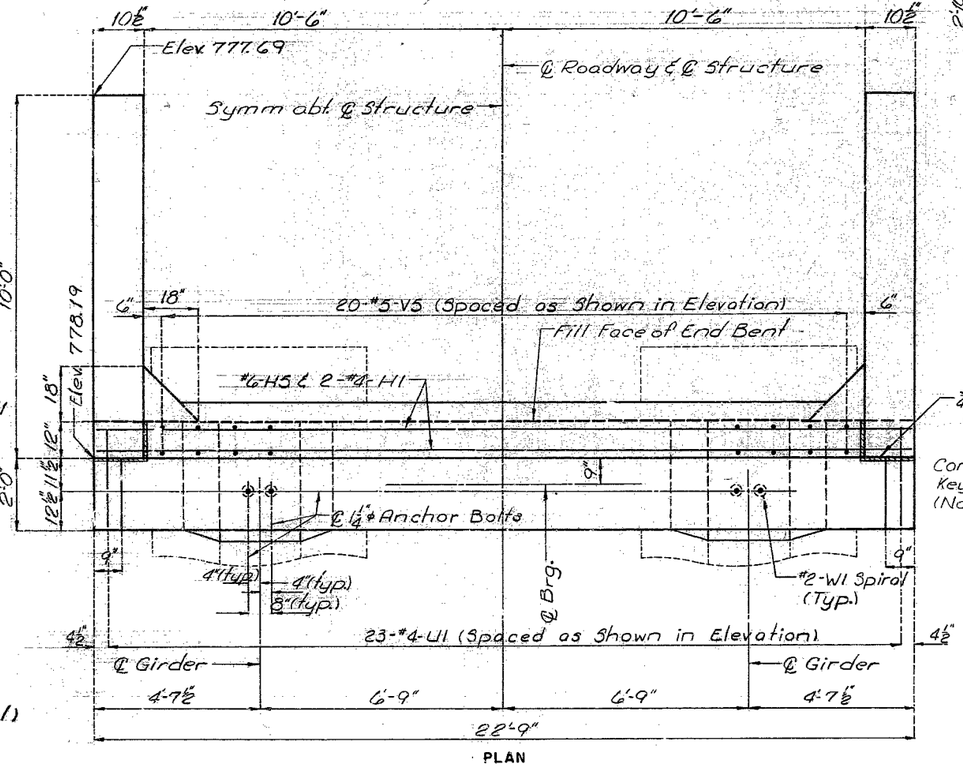
PLAN



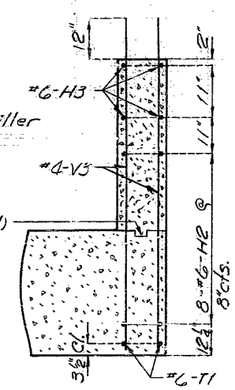
TYPICAL SECTION THRU WING



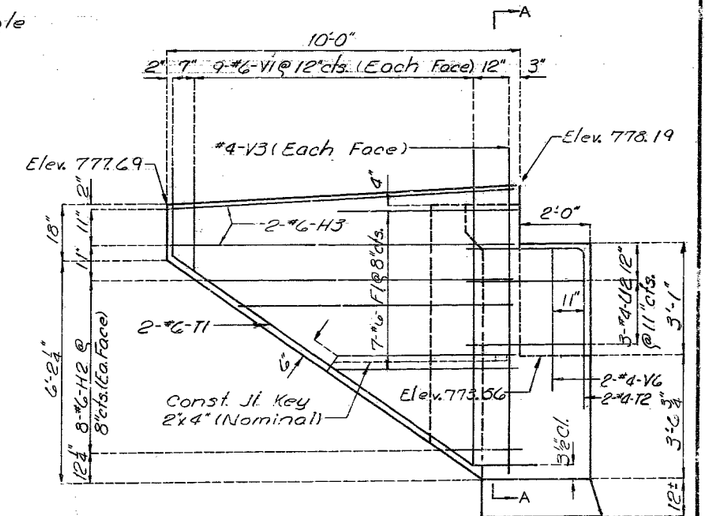
DETAILS OF ANCHOR BOLT WELLS



PLAN



SECTION A-A



TYPICAL ELEVATION OF WING

DETAILS OF END BENT NO. 16

DETAILED Sept. 19 78
CHECKED Oct. 19 78

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

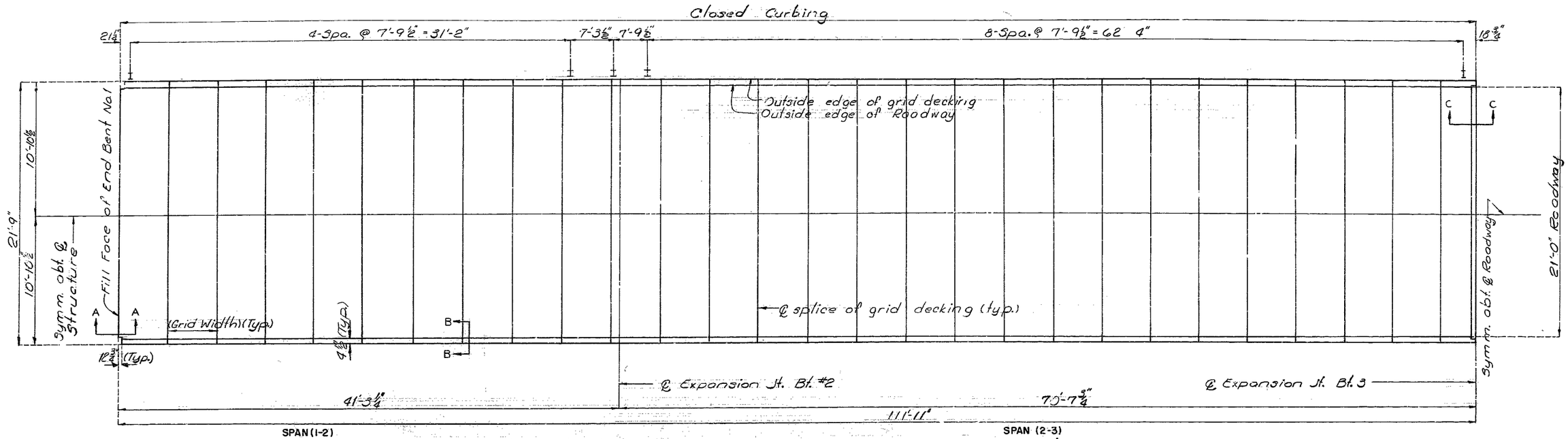
Sheet No. 4 of 30.

PLATTE COUNTY

K-456R

MISSOURI STATE HIGHWAY DEPARTMENT

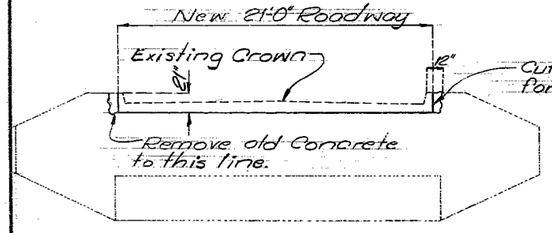
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	10	



Note: Longitudinal slab dimensions are measured along grade. For Details of Open & Closed Curbing see sheet No. 20

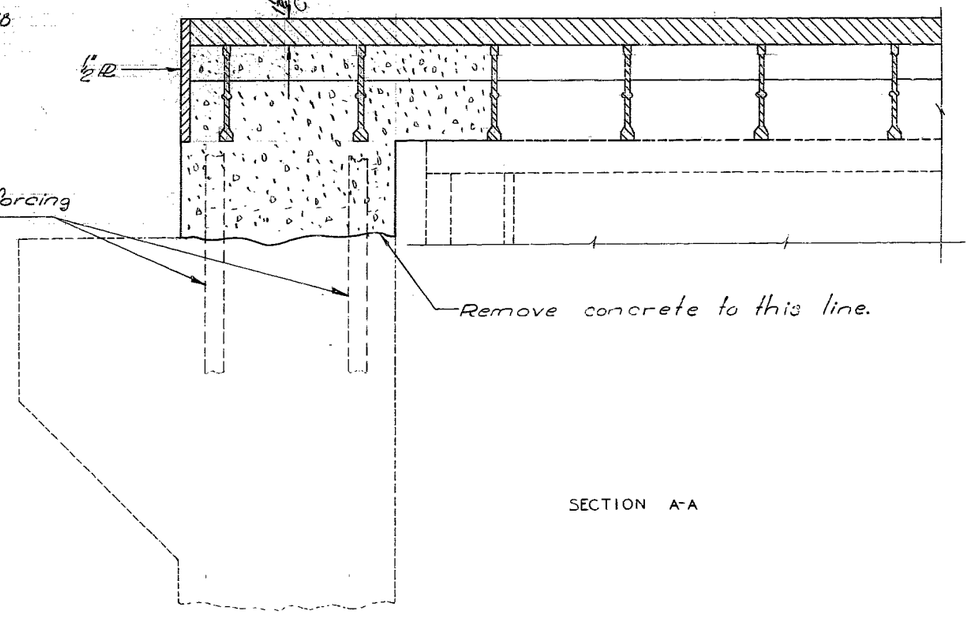
Note: For details of grid splice see sheet No. 18

Note: Handrail posts shall be set normal to grade.



DETAILS OF BENT NO.1

Note: For details of Section B-B see Sheet No. 21



SECTION A-A

Note: For details of Section C-C see sheet No. 11.

440

DETAILED Aug. 19 78
CHECKED Sept. 19 78

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

Sheet No. 5 of 30.

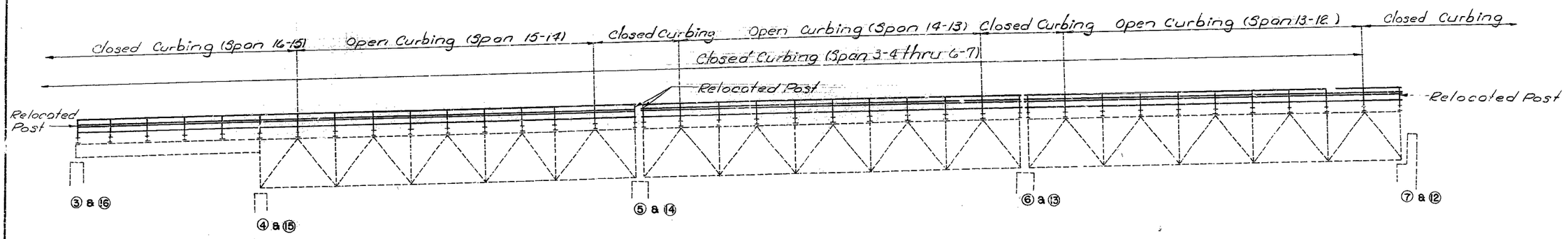
PLATTE COUNTY

K-456R

MISSOURI STATE HIGHWAY DEPARTMENT

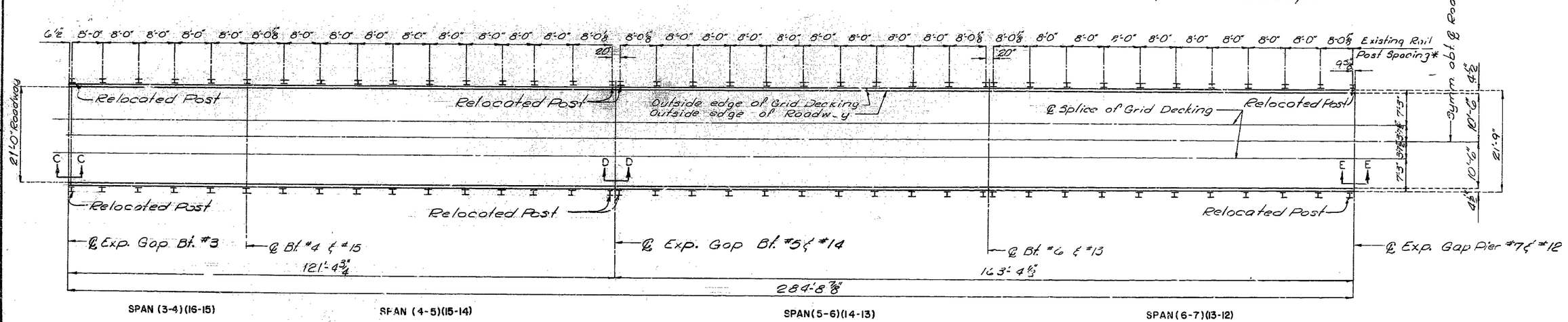
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	11	

441



PART ELEVATION

* Use same spacing for new Posts except for relocated posts



SPAN (3-4)(16-15) SPAN (4-5)(15-14) SPAN(5-6)(14-13) SPAN(6-7)(13-12)

PART PLAN

Note: For details of Section C-C see sheet No. 11
For details of Grid Splices see sheet No. 18.
Note: For details of relocated rail post see sheet No 22

Note: Dimensions shown are parallel to grade ℄ crown of Roadway.
For Details of open & closed Curbing see sheet No. 20

Note: For details of Section D-D see sheet No. 13
For details of Section E-E see sheet No. 14

DETAILED July 19 78
CHECKED Sept. 19 78

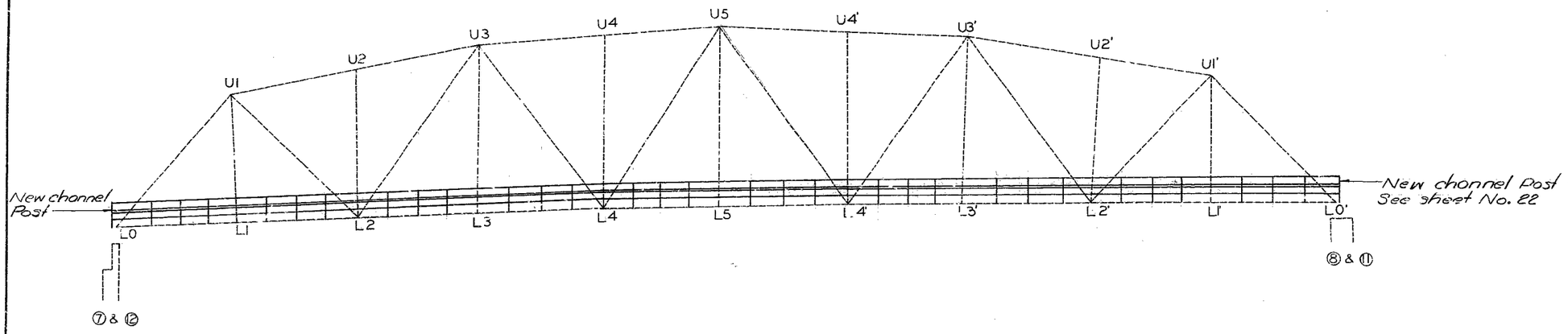
Note: This drawing is not to scale. Follow dimensions.

PLATTE COUNTY

K-456R

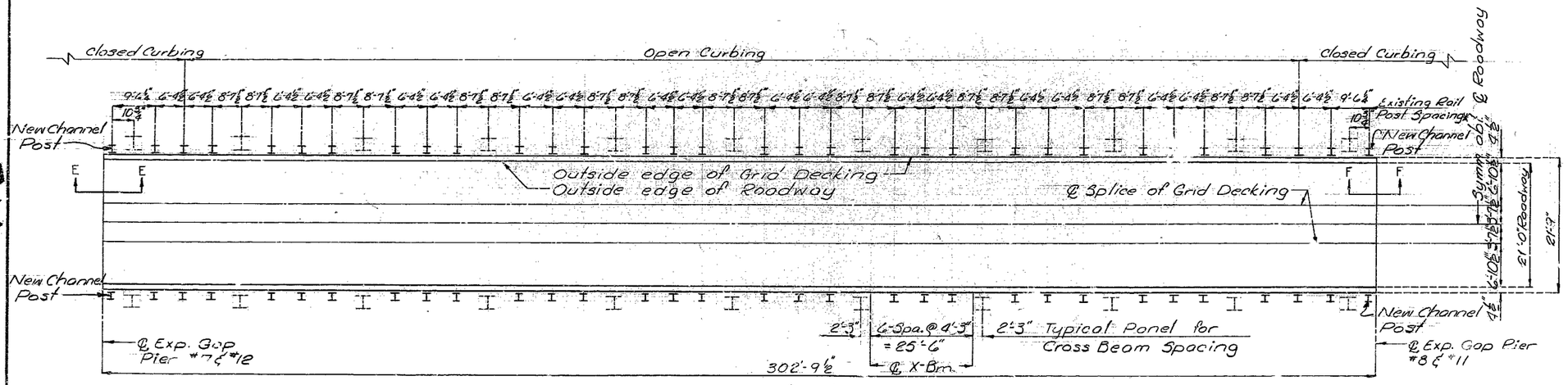
MISSOURI STATE HIGHWAY DEPARTMENT

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



PART ELEVATION

Note: Grid transverse bars may be clipped to fit at truss vertical members when necessary.



442

Note: For details of Section E-E see sheet No. 14
For details of Section F-F see sheet No. 15.
For details of Grid Splice see sheet No. 18.

PART PLAN

Note: Dimensions shown are parallel to grade @ Crown of roadway.
For Details of Open & Closed Curbing see sheet No. 20.

DETAILED April 19 78
CHECKED Sept. 19 78

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

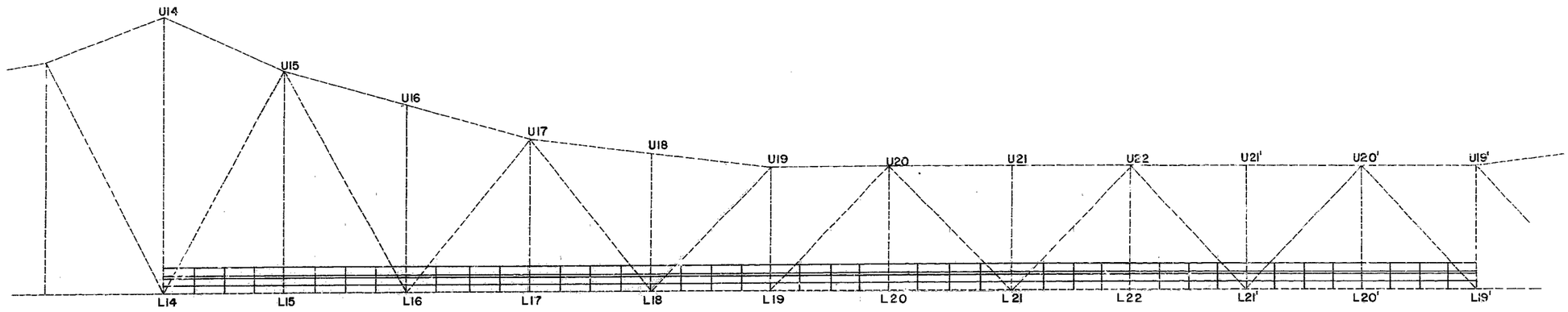
Sheet No. 7 of 30.

PLATTE COUNTY

K-456R

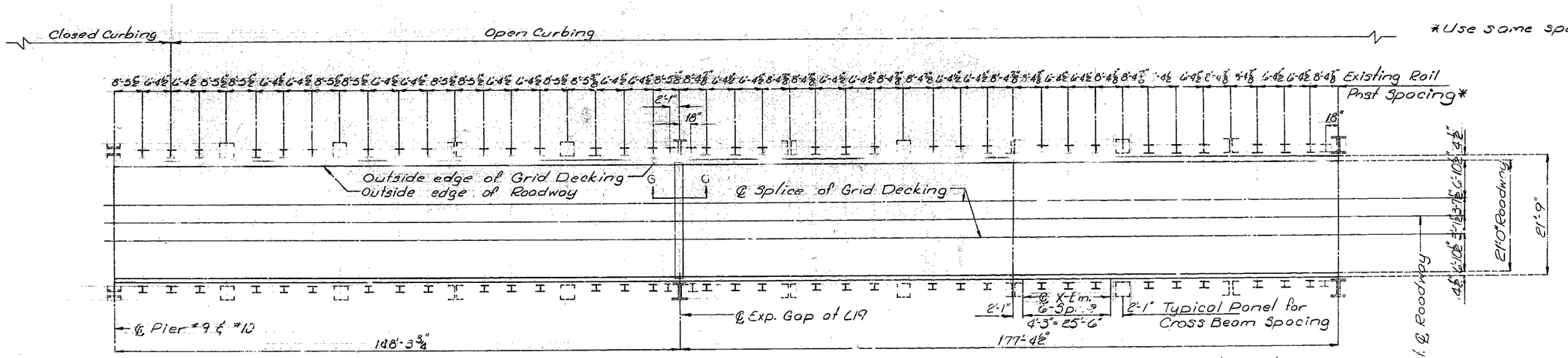
MISSOURI STATE HIGHWAY DEPARTMENT

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



PART ELEVATION

Note: Grid transverse bars may be clipped to fit at truss vertical members when necessary.



PART PLAN

Note: For details of Grid Splice see sheet No. 18.

Note: Dimensions shown are parallel to grade @ Crown of Roadway.
For Details of Open & Closed Curbing see sheet No. 20.

Note: For details of Section GG see sheet No. 16
Note: Use existing Rail Posts of L19 and L19'.

DETAILED May 1978
CHECKED Sept. 1978

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

Sheet No. 8 of 30.

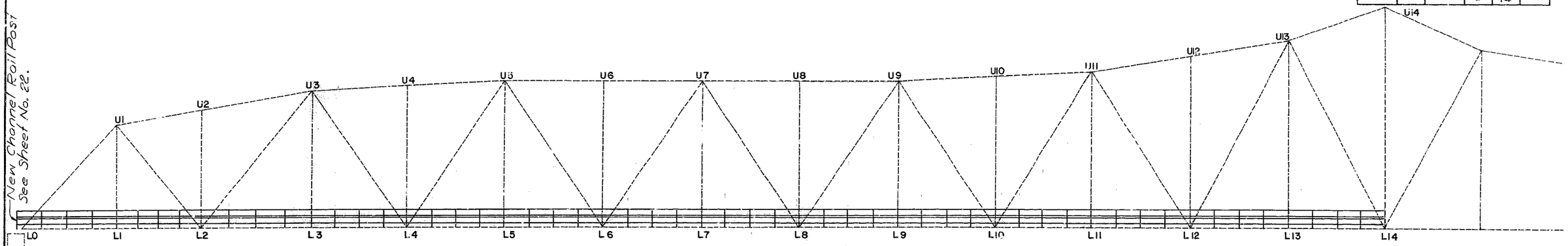
PLATTE COUNTY

K-456R

MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	14	

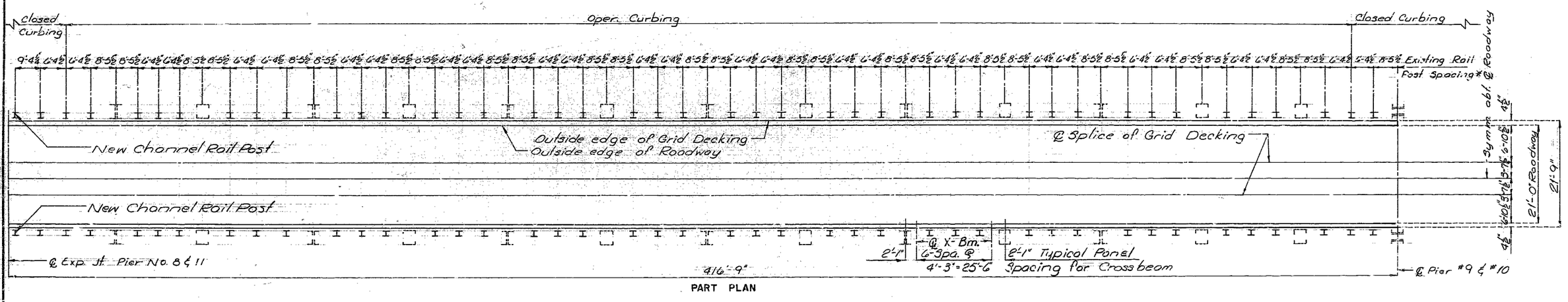
New Channel Rail Post
See Sheet No. 22.



⑧ & ⑪

PART ELEVATION

*Use same spacing for new Posts



PART PLAN

Note: Grid tronverse bars may be clipped to fit at vertical truss members when necessary.

Note: Dimensions shown are parallel to grade @ Crown of Roadway.
For details of Open & Closed Curbing see sheet No. 20.

Note: For details of Grid Splice see sheet No. 18.

DETAILED April 19 78
CHECKED Sept. 19 78

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

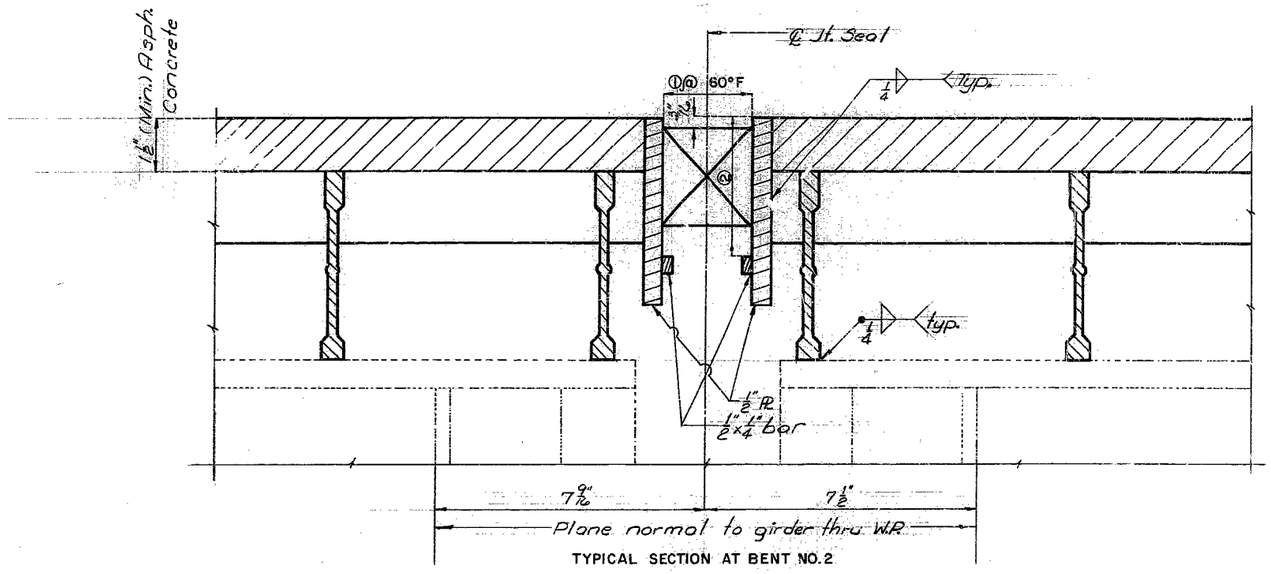
Sheet No. 9 of 30.

PLATTE COUNTY

K-456R

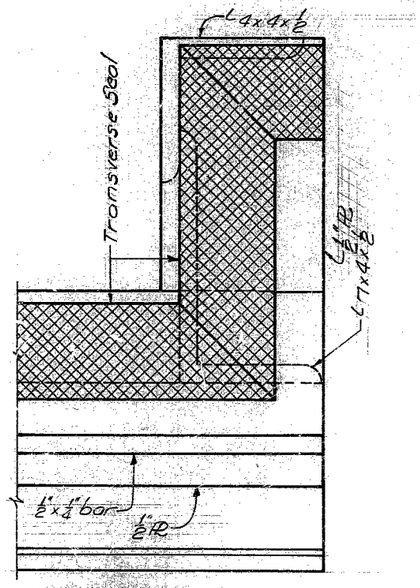
MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	15	

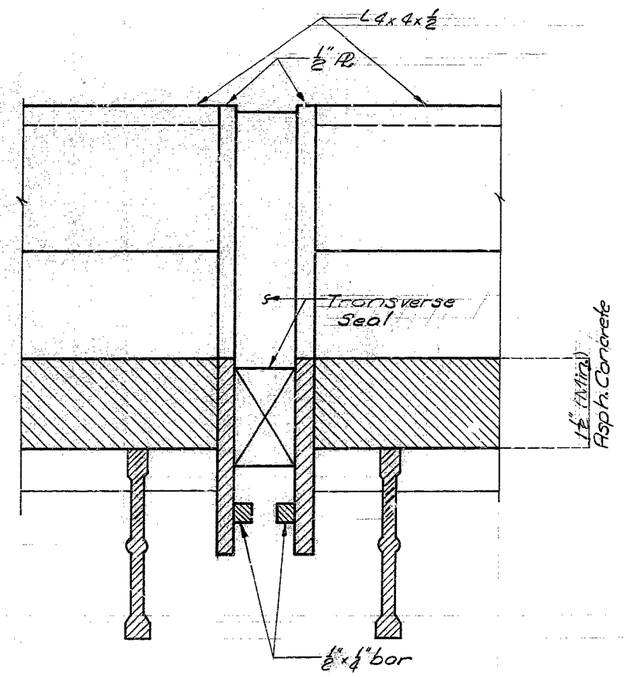


TYPICAL SECTION AT BENT NO. 2

Note: For Information on Transverse Seal see Sheet No. 12



TYPICAL SECTION THRU TRANSVERSE SEAL AT CURB



TYPICAL ELEV. THRU TRANSVERSE SEAL AT CURB

445

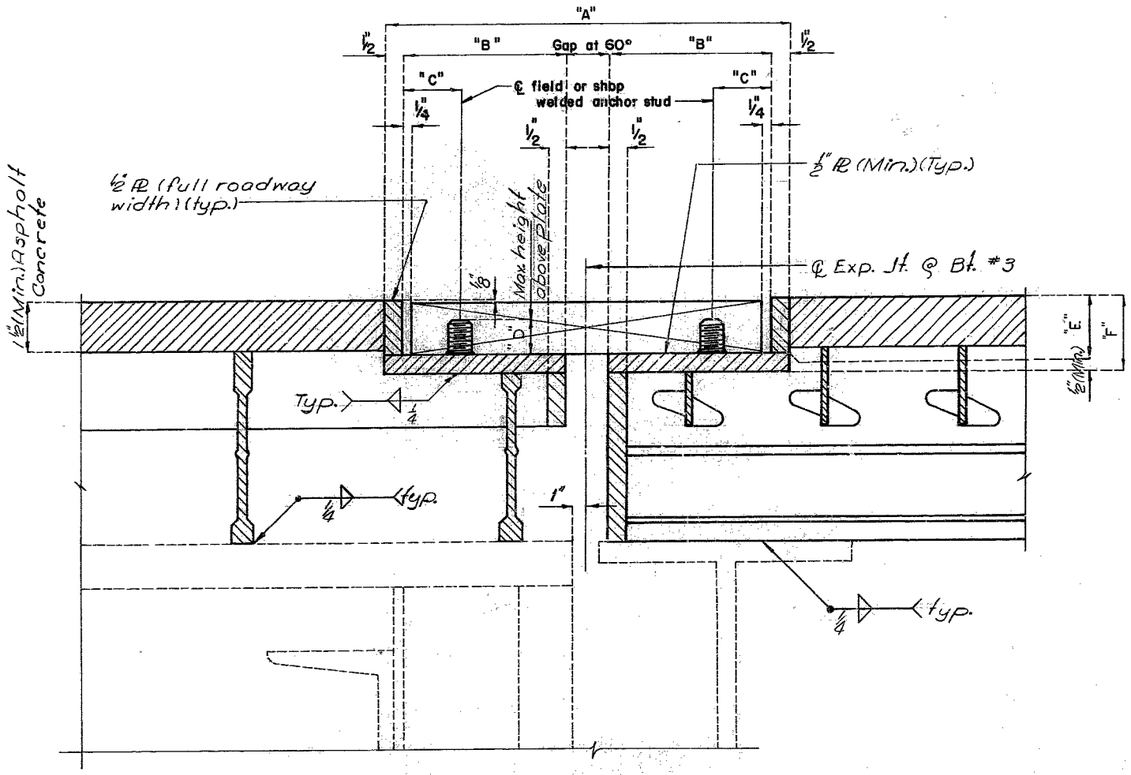
DETAILED Nov. 1978
CHECKED Nov. 1978

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

PLATTE COUNTY K-456R

MISSOURI STATE HIGHWAY DEPARTMENT

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

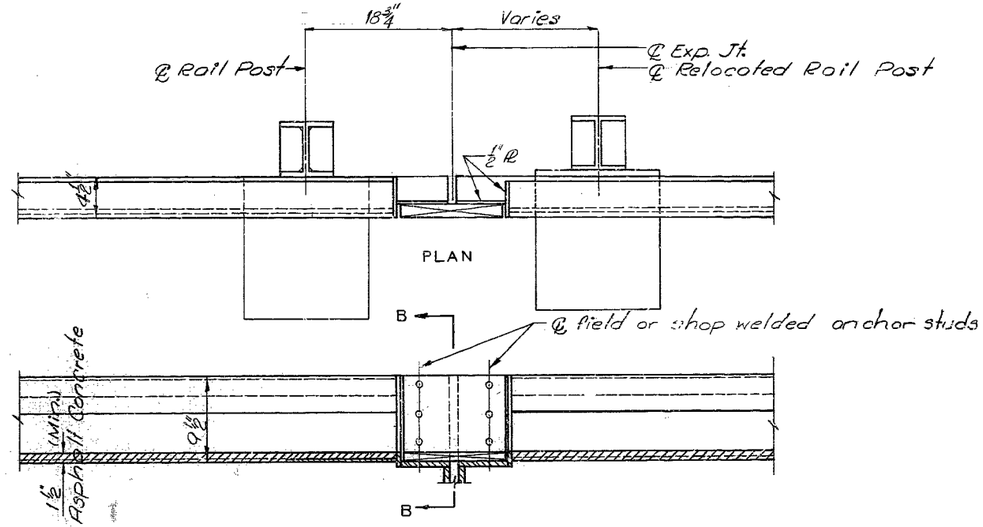


SECTION C-C (Bent No. 3 only)

TABLE OF DIMENSIONS

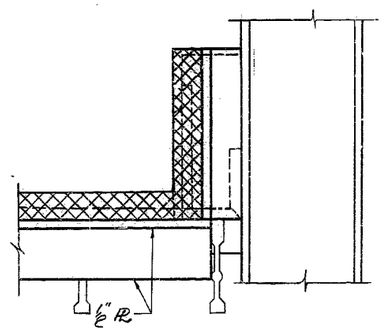
LOCATION	ACCEPTABLE ALTERNATE TYPES	EXP. GAP AT 60°	"A" AT 60°	"B"	"C"	"D"	"E"	"F"	ANCHOR STUDS SIZE	ANCHOR STUDS "G"
BENT NO. 3	FEL-SPAN T20	1 5/8"	11 9/16"	4 1/2"	1 5/8"	1"	1 11/16"	1 13/16"	1/2"	30
	WABO-ELASTODAM 200	1 1/4"	11 1/4"	4 1/2"	1 5/8"	1"	1 11/16"	1 13/16"	1/2"	40
	DELASTIFLEX LM200	1 1/2"	11 5/8"	4 11/16"	2 9/16"	1"	2"	2 1/2"	1/2"	45
	ON-FLEX 25	1 1/2"	11"	4 1/4"	1 5/8"	1 1/4"	1 11/16"	2 3/16"	1/2"	65

Note: For location of Section C-C see sheet No. 5 for Bent #3 only.



Note: Rail Post not shown in Elevation for clarity.

Note: Exp. Device to conform to crown of roadway.



SECTION B-B

GENERAL NOTES:

THE EXPANSION JOINT SEAL SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS SHOWN ON THE SHOP DRAWINGS AND IN ACCORDANCE WITH THE SPECIAL PROVISIONS.

THE NUTS ON THE ANCHOR STUDS SHALL BE TIGHTENED TO THE FOOT POUNDS "G" SPECIFIED IN THE TABLE OF DIMENSIONS. RETIGHTEN TO "G" FOOT POUNDS A MINIMUM OF 30 MINUTES AFTER INITIAL TIGHTENING. THE WELDED ANCHOR STUDS SHALL BE THE REDUCED BASE TYPE.

MATERIAL FOR THE ARMORED JOINT SHALL BE A36 STRUCTURAL GRADE STEEL.

SEE SPECIAL PROVISIONS FOR PAINTING.

PLAN DIMENSIONS ARE BASED ON INSTALLATION AT 60°F. THE EXPANSION GAP AND OTHER DIMENSIONS SHALL BE ADJUSTED DURING INSTALLATION FOR COMPLIANCE WITH ANY TEMPERATURE CHANGE.

PLATES SHALL BE FIELD ADJUSTED BY ADDING OR REMOVING METAL SHIMS (2 x 3), AS REQUIRED FOR TEMPERATURE CORRECTION. THE EXPANSION GAP SHALL BE ADJUSTED FOR ANY TEMPERATURE CORRECTION PRIOR TO POURING TOP OF END BENT BACKWALL.

CONTACT SURFACE OF STEEL TO ALUMINUM SHALL BE INSULATED WITH THE MATERIAL SPECIFIED ON THE SHOP DRAWINGS.

FURNISHING AND INSTALLING THE ELASTOMERIC EXPANSION JOINT SEAL WILL BE PAID FOR AT THE CONTRACT BID PRICE PER LINEAR FOOT.

FURNISHING, PAINTING AND INSTALLING THE STRUCTURAL STEEL ARMORED JOINT WILL BE INCLUDED IN THE CONTRACT PRICE BID FOR STEEL GRID FLOOR (CONC. FILLED)

446

DETAILS OF EXPANSION JOINT AT BENT NO. 3

DETAILED May 19 78
CHECKED Sept. 19 78

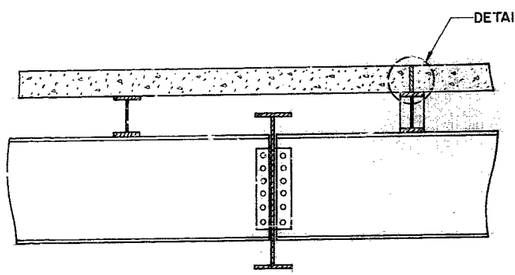
Note: This drawing is not to scale. Follow dimensions.

PLATTE COUNTY

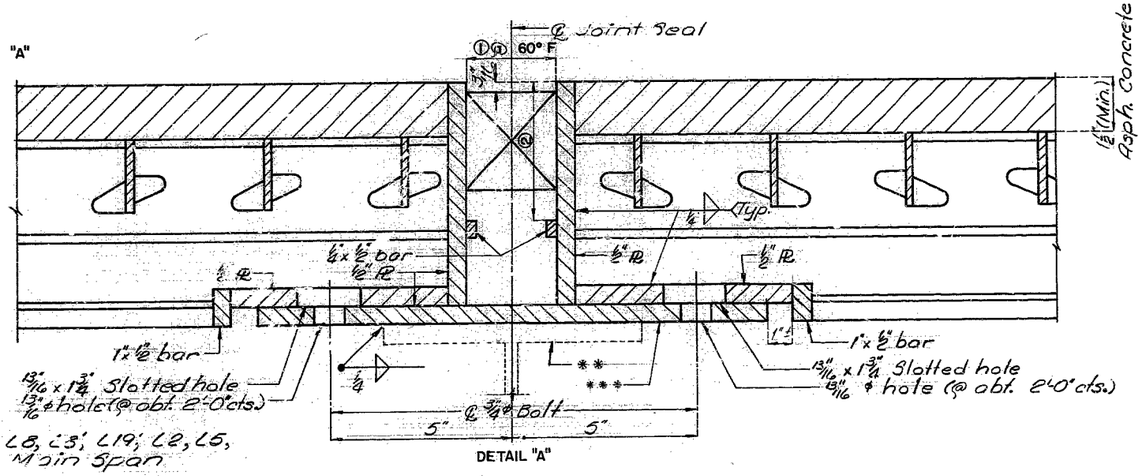
K-456R

MISSOURI STATE HIGHWAY DEPARTMENT

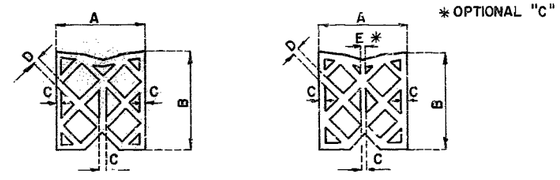
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	17	



EXISTING CONTRACTION JOINT
AT L2, L5, L11, L14, L16
L22, L2', L5', L11', L14', L16'
OF MAIN SPAN AND AT L2
L2' OF 300' SPANS



Note: Exp. Device to conform to crown of roadway.



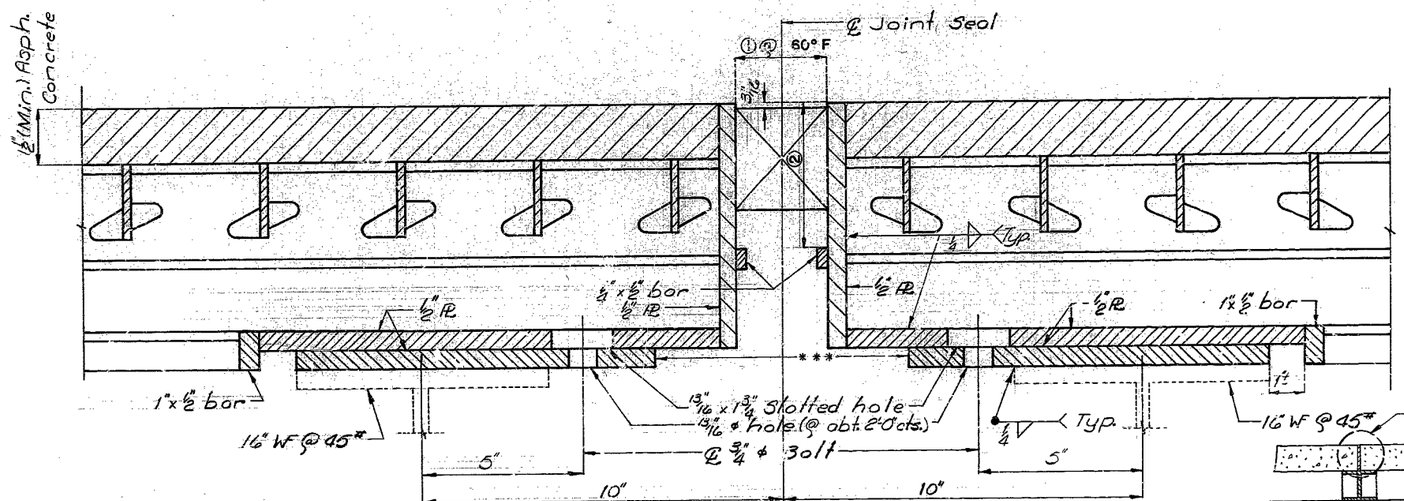
* OPTIONAL "C"

TABLE OF TRANSVERSE SEAL TOLERANCES (INCHES)					
TYPE	"A" (WIDTH)	"B" (HEIGHT)	"C" (SHELL)	"D" (WEBS)	"E" (B3 ONLY) (SMALL WEBS)
A1 OR B3	2.500 +.250 −.000	2.750 +.125 −.125	0.187 +.046 −.015	0.093 +.031 −.015	0.062 +.031 −.031

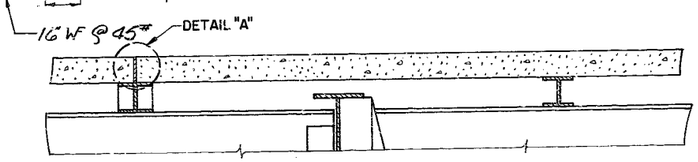
TABLE OF TRANSVERSE SEALS				
TYPE	GROOVE SIZE AT 60°F		SEAL SIZE	
	①	②	WIDTH	HEIGHT
A1 OR B3	1-5/8"	4"	2-1/2"	2-3/4"

TABLE OF GROOVE SIZE "①" (INSTALLATION DIMENSIONS)	
TEMP (° F)	SEAL WIDTHS STEEL STRUCTURE
2 2"	
-10°	2 1/8"
0°	2"
+20°	1-7/8"
+40°	1-3/4"
+60°	1-5/8"
+80°	1-3/8"
+100°	1-1/4"
+110°	1-1/4"
+120°	1-1/8"

NOTE: See Special Provisions for requirements of Compression Joint Seal.



TYPICAL SECTION AT BENT NO. 6 ℄ 13



EXISTING CONTRACTION JOINT
AT L8, L8' AND L19'

Note: For details of curb at Transverse Seal see sheet No. 10

*** Furnishing, Painting and installing the base plates for exp. device will be included in the price bid for Fabricated Structural Steel Revisions. The steel for the armored joint will be included in the price bid for Steel Grid Floor (Conc. Filled).

447

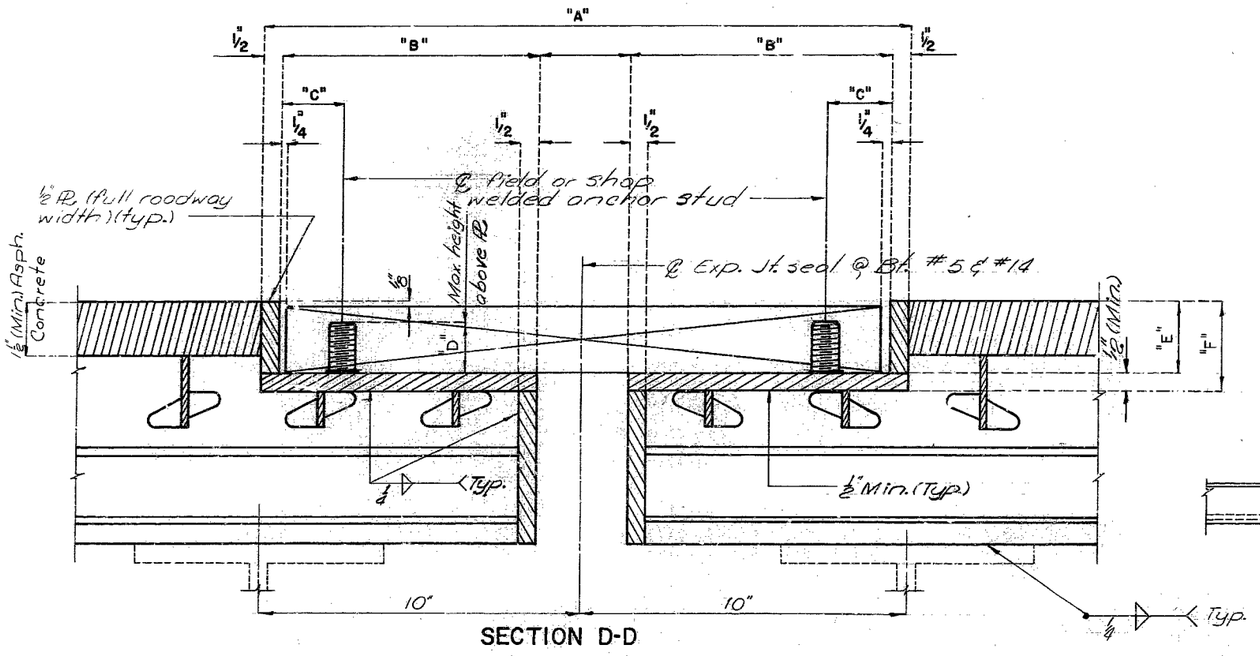
DETAILED Oct. 19 78
CHECKED Nov. 19 78

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

PLATTE COUNTY K-456R

MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	18	

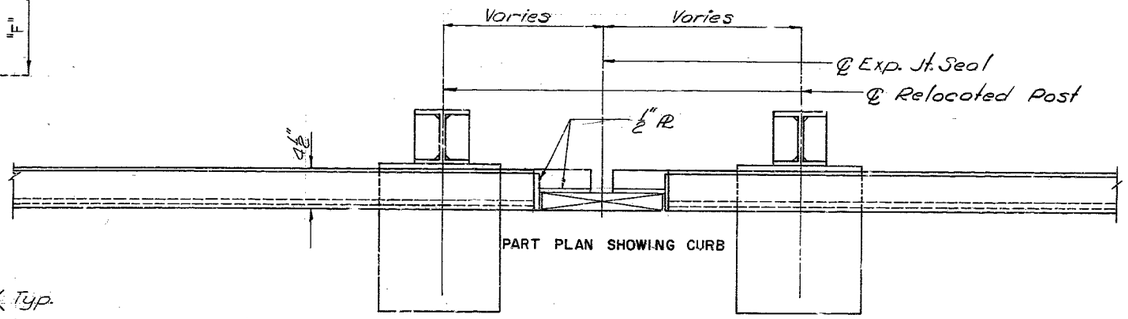


SECTION D-D

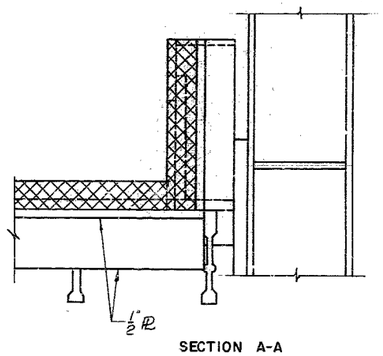
Note: For location of Section D-D see Sheet No. 6

LOCATION	ACCEPTABLE ALTERNATE TYPES	EXP. GAP AT 60°	"A" AT 60°	"B"	"C"	"D"	"E"	"F"	ANCHOR STUDS SIZE	ANCHOR STUDS "G"
BENT NO. 5 & 14	DELASTIFLEX LM300	2"	12 3/8"	4 4/16"	2 9/16"	1"	2"	2 1/2"	1/2"	45
	FEL-SPAN T30SA	1 3/8	9 1/8	3 1/4	1 5/8"	1 1/4"	1 7/16"	2 3/16"	1/2"	50
	ON-FLEX 45	2"	11 1/2"	4 1/4"	1 5/8"	2 3/8"	2 15/16"	3 3/16"	1/2"	65
	WABO-ELASTODAM 300(S)	1 3/4	9 1/4"	3 1/4"	1 1/8"	1 1/4"	1 1/16"	2 3/16"	1/2"	40

Note: For General Notes see sheet No. 11.

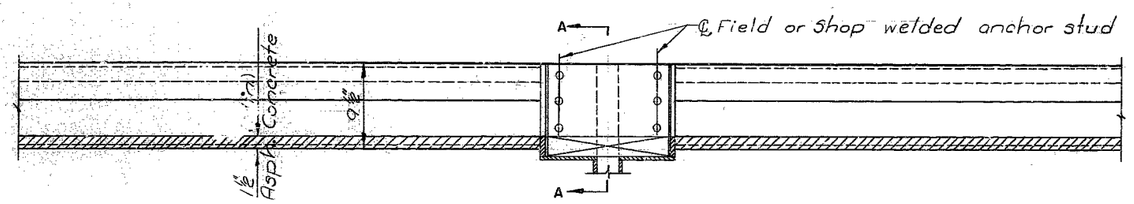


PART PLAN SHOWING CURB



SECTION A-A

Note: Exp. Device to conform to crown of roadway.



PART ELEVATION NEAR CURB

Note: Rail Posts in Elevation not shown for clarity.

448

DETAILS OF EXPANSION JOINT SEAL AT BENTS NO. 5 & 14

DETAILED July 19 78
CHECKED Sept 19 78

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

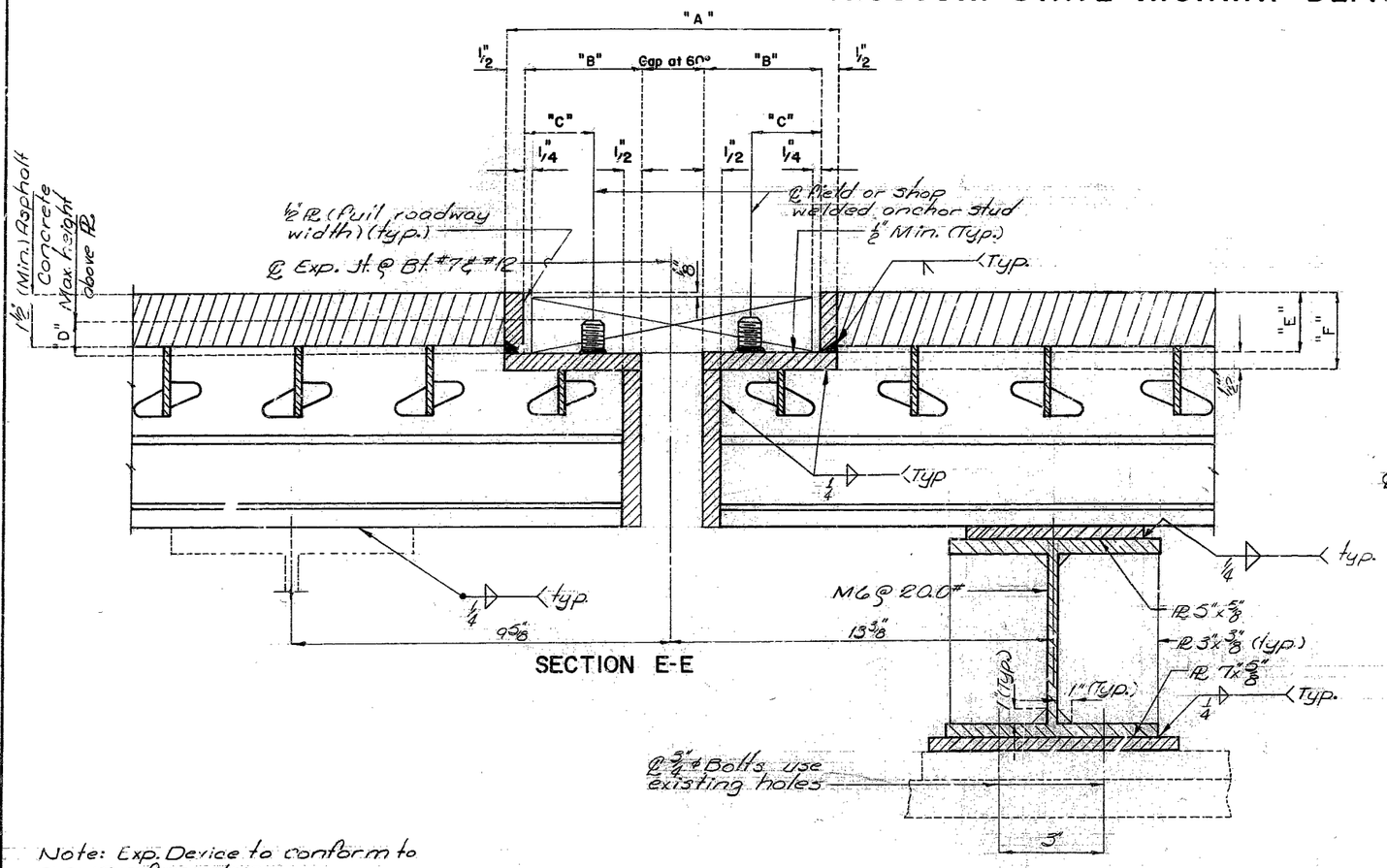
Sheet No. 13 of 30.

PLATTE COUNTY

K-456R

MISSOURI STATE HIGHWAY DEPARTMENT

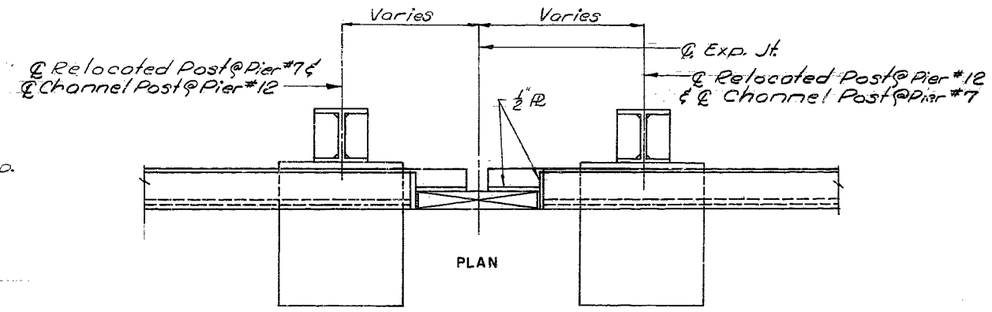
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	19	



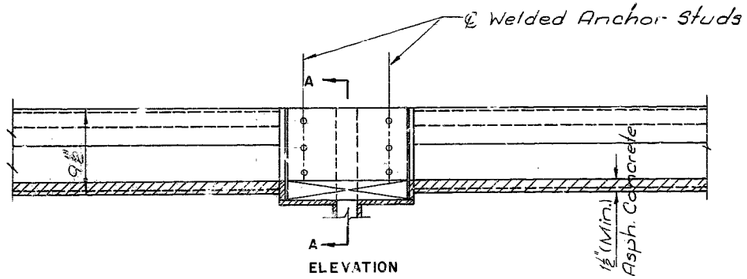
SECTION E-E

TABLE OF DIMENSIONS										
LOCATION	ACCEPTABLE ALTERNATE TYPES	EXP GAP AT 60°	"A" AT 60°	"B"	"C"	"D"	"E"	"F"	ANCHOR STUDS SIZE	"G"
BENT NO. 7 & 12	TRANSFLEX 400 A	3 1/8"	24 3/8"	9 7/8"	2 11/16"	1 1/2"	2 3/16"	2 13/16"	3/4"	8 5
	WABO-Flex 3R4A	2 5/8"	24 3/8"	10 1/8"	1 13/16"	3/4"	2 3/16"	2 13/16"	3/4"	8 5

Note: For General Notes See sheet No. 11.
For location of Section E-E see sheet No. 7.



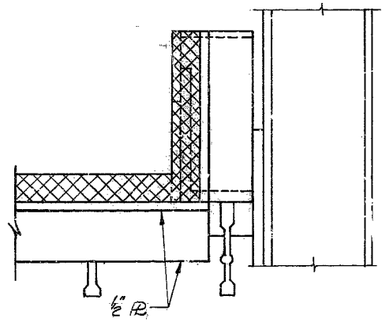
PLAN



ELEVATION

Note: Exp. Device to conform to crown of roadway.

Note: Rail Post not shown in Elevation for clarity.



SECTION A-A

DETAILS OF EXPANSION JOINT SEAL AT PIER NO. 7 & 12

DETAILED Mar. 19 78
CHECKED Sept. 19 78

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

Sheet No. 14 of 30.

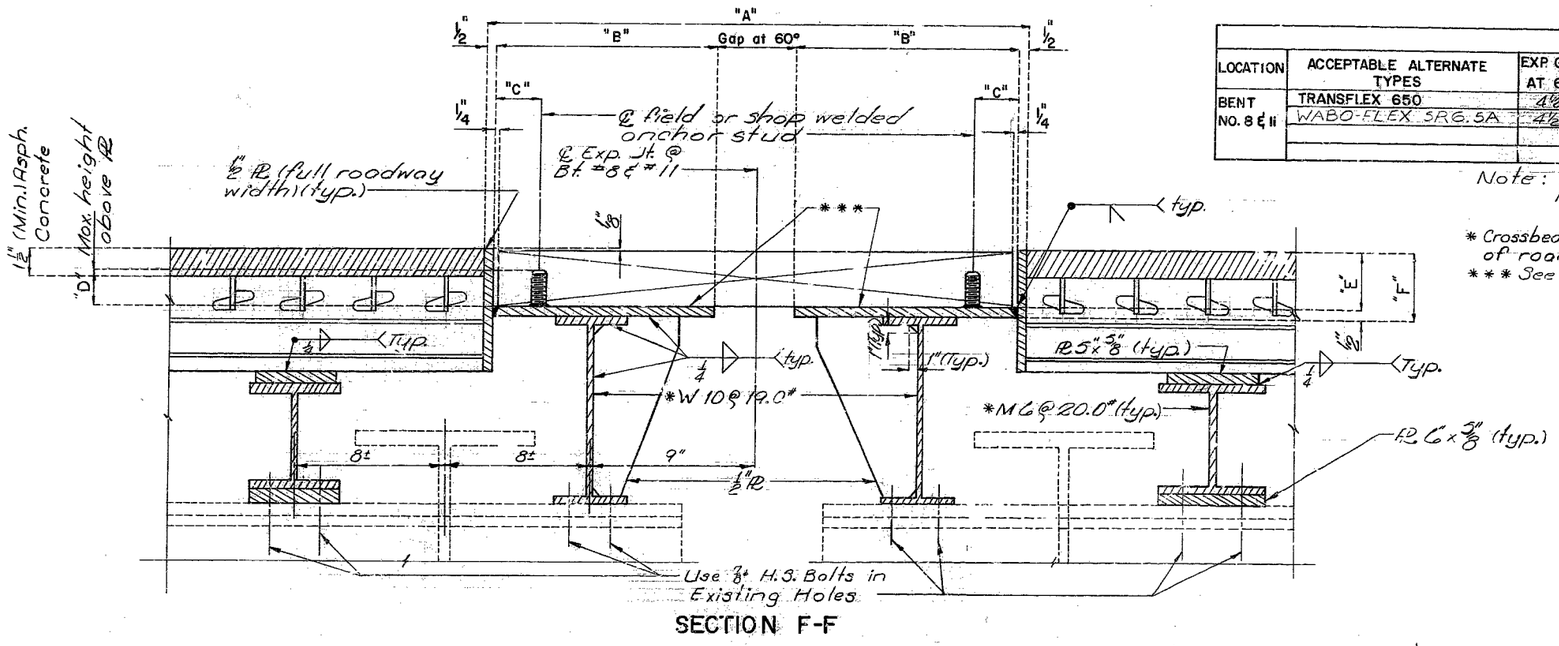
PLATTE COUNTY

K-456R

409

MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	20	



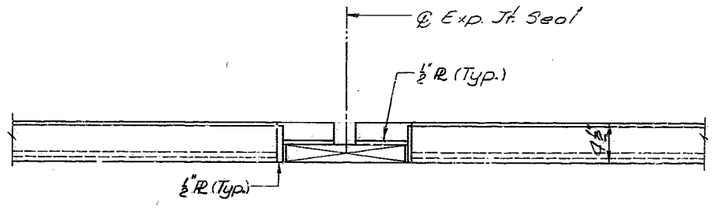
SECTION F-F

LOCATION	ACCEPTABLE ALTERNATE TYPES	EXP. GAP AT 60°	"A" AT 60°	"B"	"C"	"D"	"E"	"F"	ANCHOR STUDS SIZE	ANCHOR STUDS "G"
BENT No. 8 & 11	TRANSFLEX 650	4⅛"	297¼"	12⅛"	2⅜"	2"	3 3/16"	3 1/16"	⅞"	100
	WABO-FLEX SR6.5A	4½"	295¼"	11⅛"	2⅛"	2"	3 3/16"	3 1/16"	⅞"	100

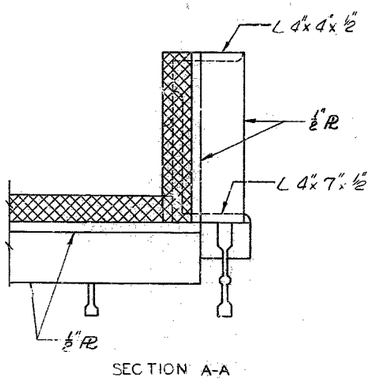
TABLE OF DIMENSIONS

Note: For General Notes see sheet No. 11
For location of Section F-F see Sheet No. 7

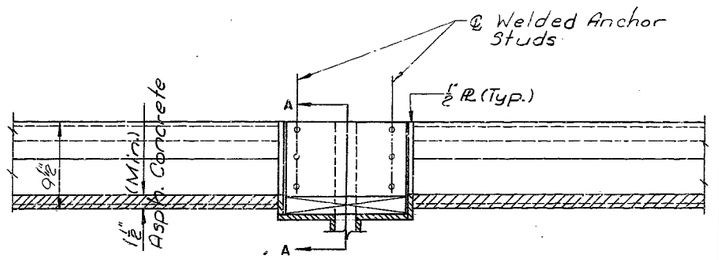
* Crossbeams to be curved to conform to crown of roadway.
*** See Sheet #12



PART PLAN SHOWING CURB



SECTION A-A



PART ELEVATION NEAR CURB

450

DETAILS OF EXPANSION JOINT SEAL AT PIERS NO. 8 & 11

DETAILED April 19 78
CHECKED Sept. 19 78

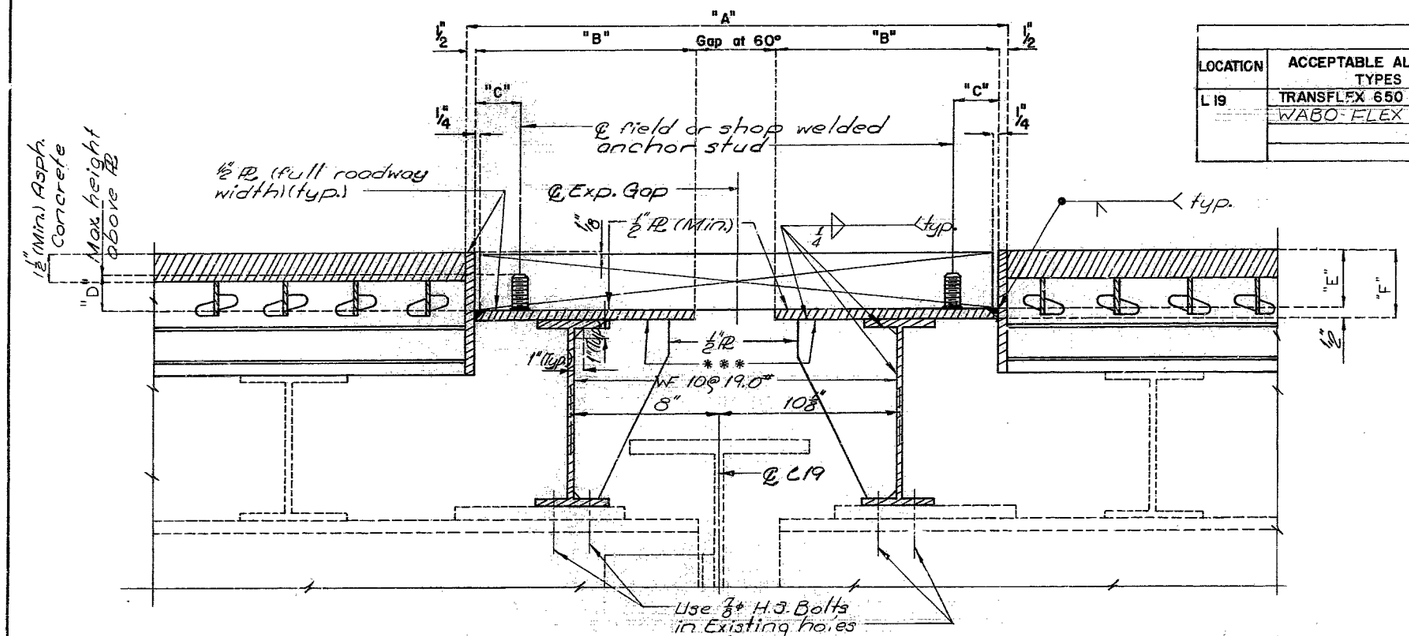
Note: This drawing is not to scale. Follow dimensions.

Sheet No. 15 of 30.

PLATTE COUNTY K-456R

MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	21	

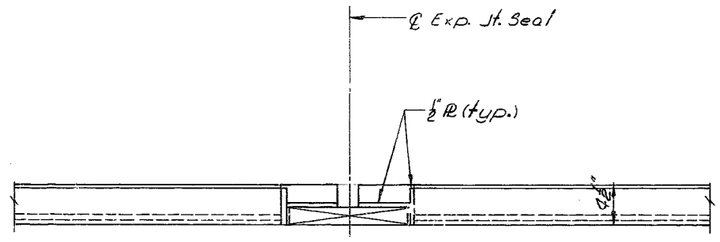


SECTION G-G

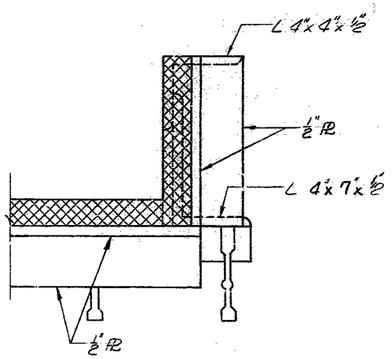
LOCATION	ACCEPTABLE ALTERNATE TYPES	EXP. GAP AT 60°	"A" AT 60°	"B"	"C"	"D"	"E"	"F"	ANCHOR STUDS SIZE	ANCHOR STUDS "C"
L19	TRANSFLEX 650	4½"	29¾"	12⅛"	2⅜"	2"	3 3/16"	3 11/16"	⅞"	100
	WABO-FLEX SR6.5A	4½"	29¼"	11⅞"	2⅛"	2"	3 3/16"	3 11/16"	⅞"	100

TABLE OF DIMENSIONS

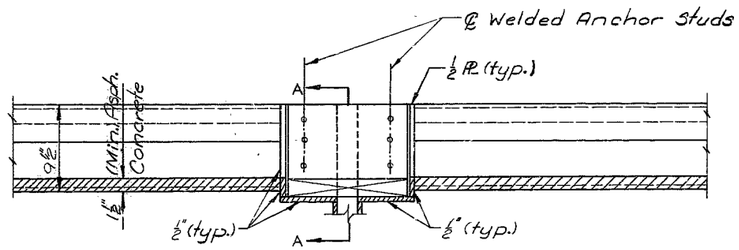
Note: For General Notes see sheet No. 11
For location of Section G-G see sheet No. 8
*** See Sheet #12



PART PLAN SHOWING CURB



SECTION A-A



PART ELEVATION NEAR CURB

451

DETAILS OF EXPANSION JOINT SEAL AT L19

DETAILED April 19 78
CHECKED Sept. 19 78

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

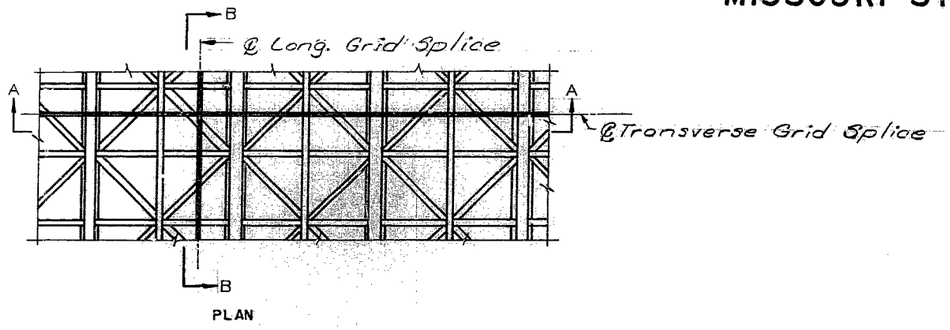
Sheet No. 16 of 30.

PLATTE COUNTY

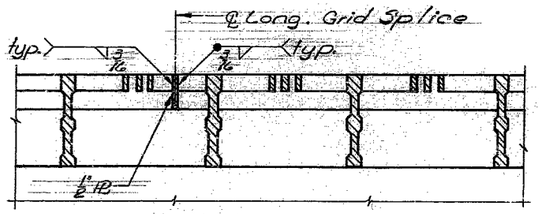
K-456R

MISSOURI STATE HIGHWAY DEPARTMENT

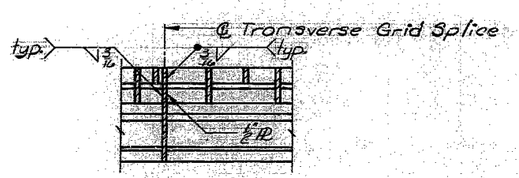
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		18	22	



PLAN

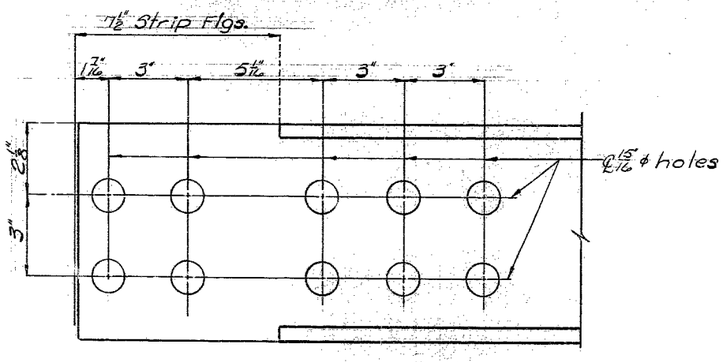


SECTION A-A

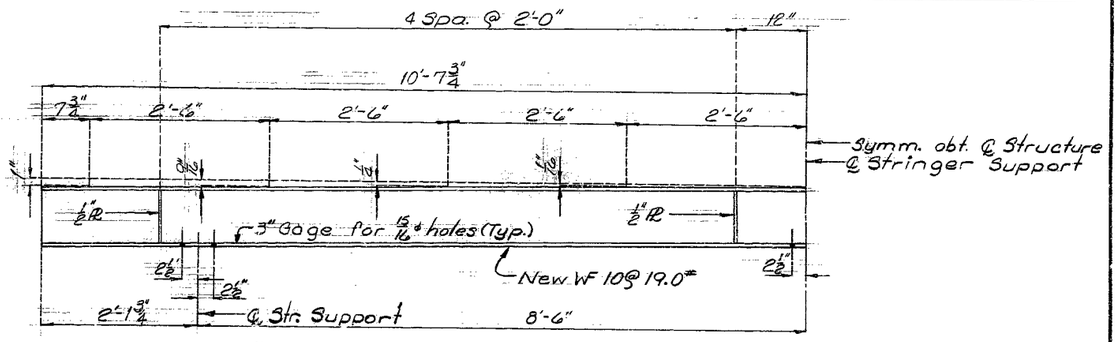


SECTION B-B

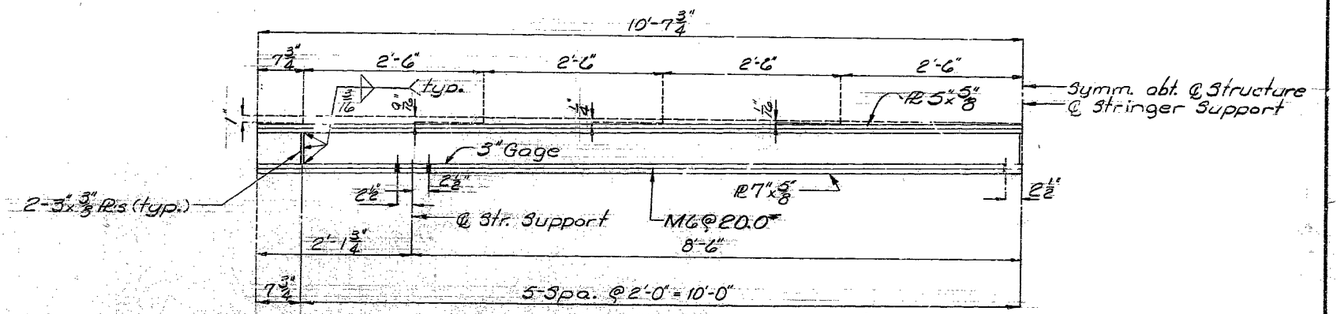
DETAILS OF GRID SPLICES



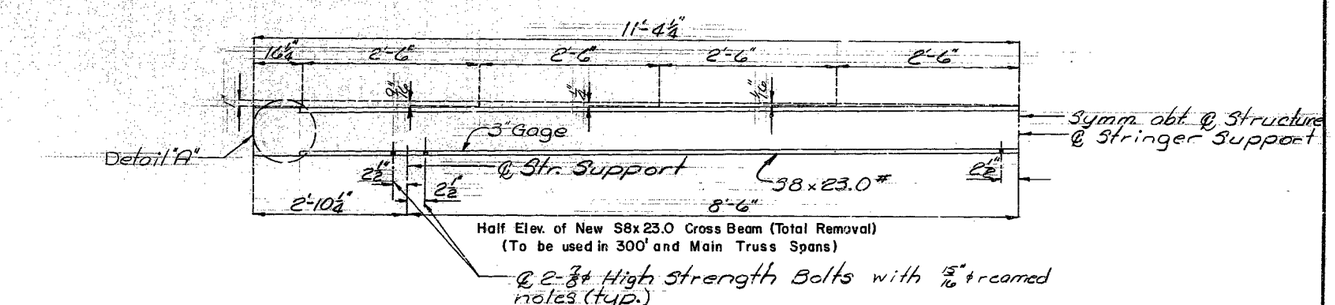
DETAIL "A"



Half Elev. of New WF 10x19.0 Cross Beam at Bt. NO. 8 ℄ 11 and L19.



Half Elev. of New M6x20.0 Cross Beam at Bt NO. 8 ℄ 11 c. 1 NO. 7 ℄ 12



Half Elev. of New S8x23.0 Cross Beam (Total Removal)
(To be used in 300' and Main Truss Spans)

DETAILS OF CROSS BEAM REPLACEMENT

452

DETAILED Dec. 19 78
CHECKED Dec. 19 78

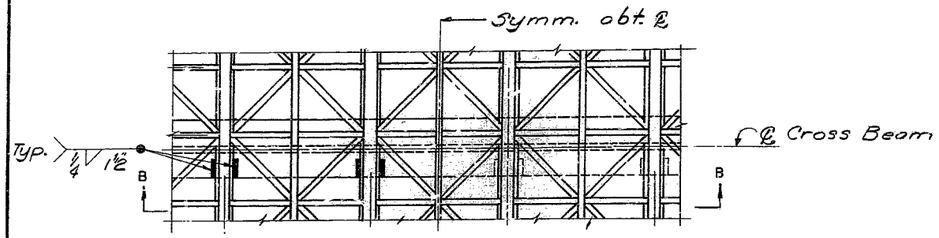
Note: This drawing is not to scale. Follow dimensions.

PLATTE COUNTY

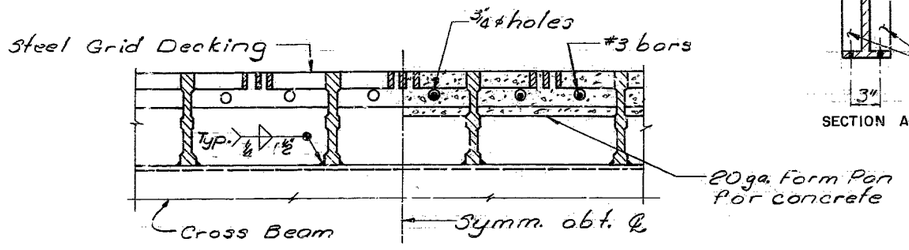
K-456R

MISSOURI STATE HIGHWAY DEPARTMENT

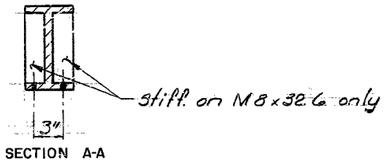
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	23	



PLAN

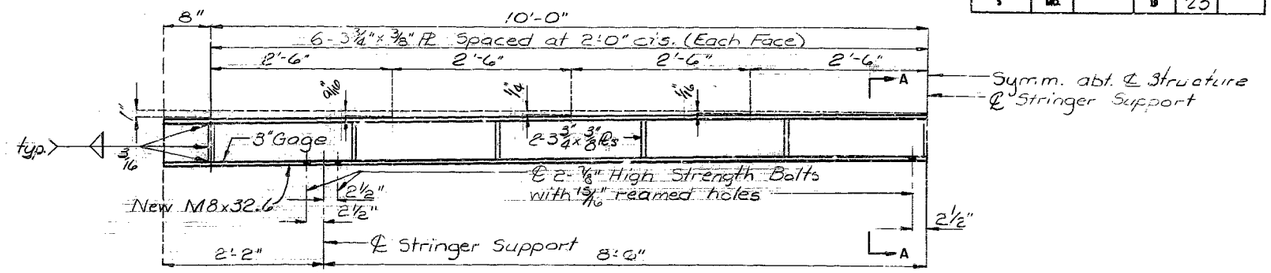


SECTION B-B

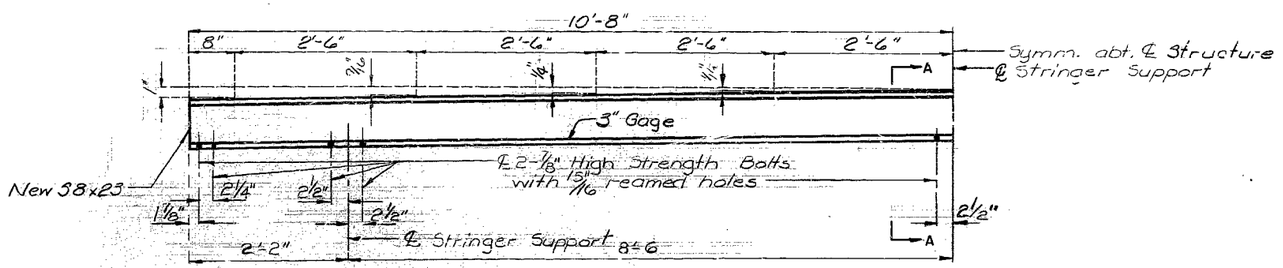


SECTION A-A

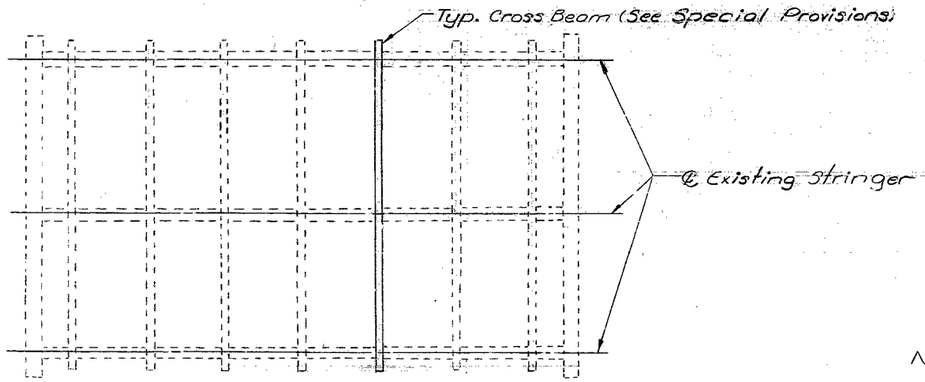
TYPICAL GRID SECTION



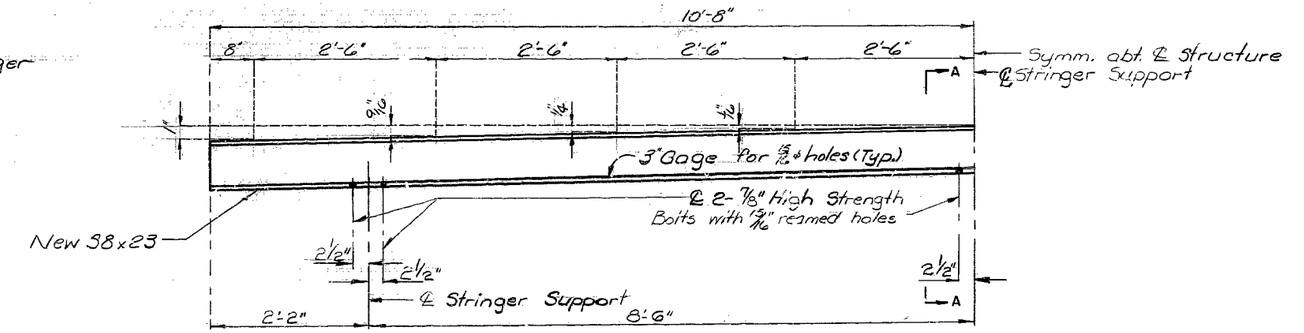
Half Elev. of New M8x32.6 Cross Beam (Total Removal)
(To be used in Spans * at the Preformed Exp. Device locations only)



Half Elev. of New S8x23 Cross Beam (Total Removal)
(To be used in Spans *)



Part Plan of Cross Beams (Span 5-6, 6-7, 7-8, 8-9, & 9-10)
(Showing Typical Removal & Replacement of Cross Beams)
(See Special Provisions)



Half Elev. of New S8x23 Cross Beam (Total Removal)
(To be used in Spans *)

*300' AND MAIN TRUSS SPANS

DETAILS OF CROSS BEAM REPLACEMENT

453

DETAILED Nov. 19 78
CHECKED Nov. 19 78

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

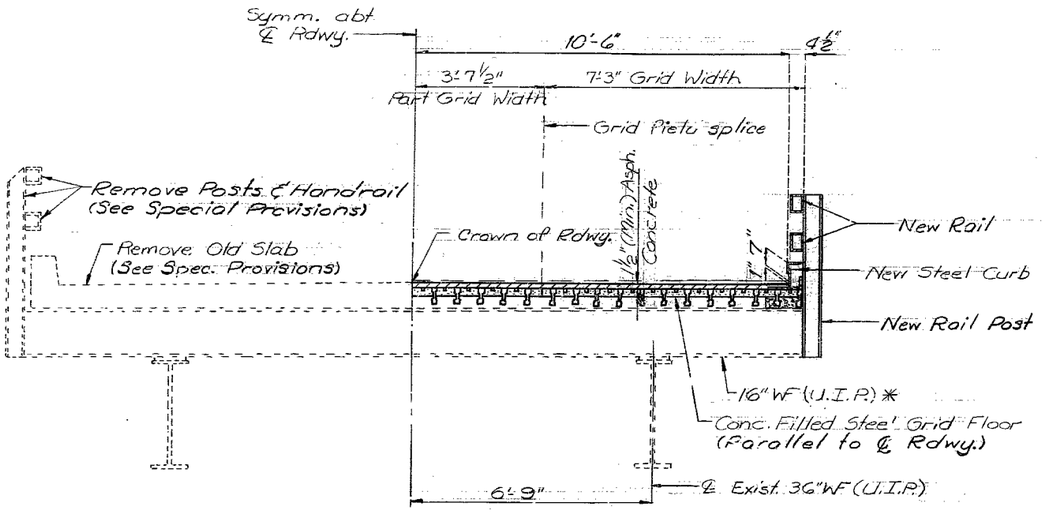
Sheet No. 18 of 30.

PLATTE COUNTY

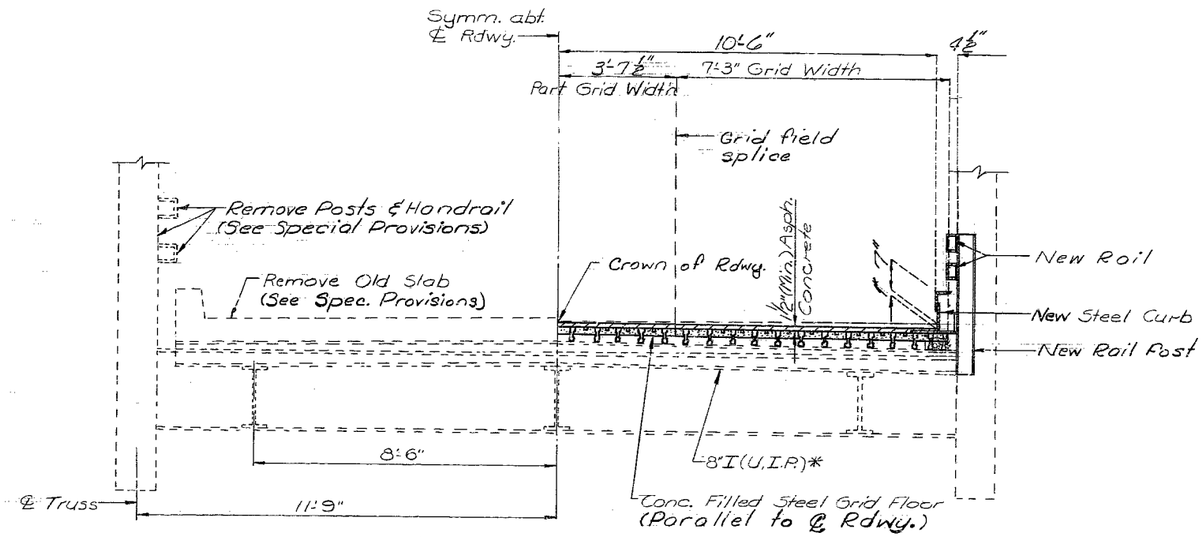
K-456R

MISSOURI STATE HIGHWAY DEPARTMENT

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

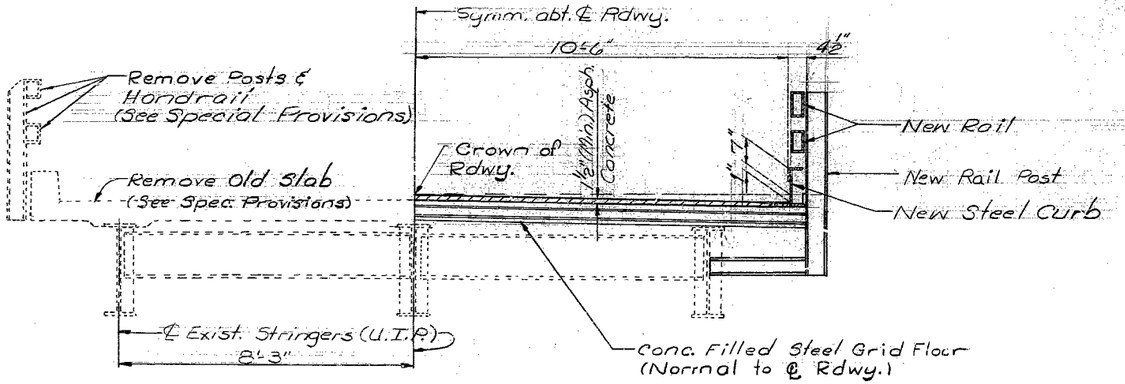


SECTION THRU SPAN (3-4) & (15-16)

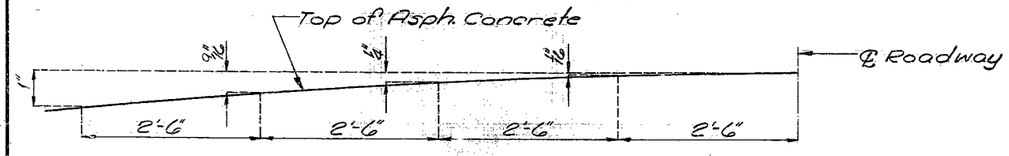


SECTION THRU TRUSS SPANS

* See Special Provisions if replacement is required by the Engineer.

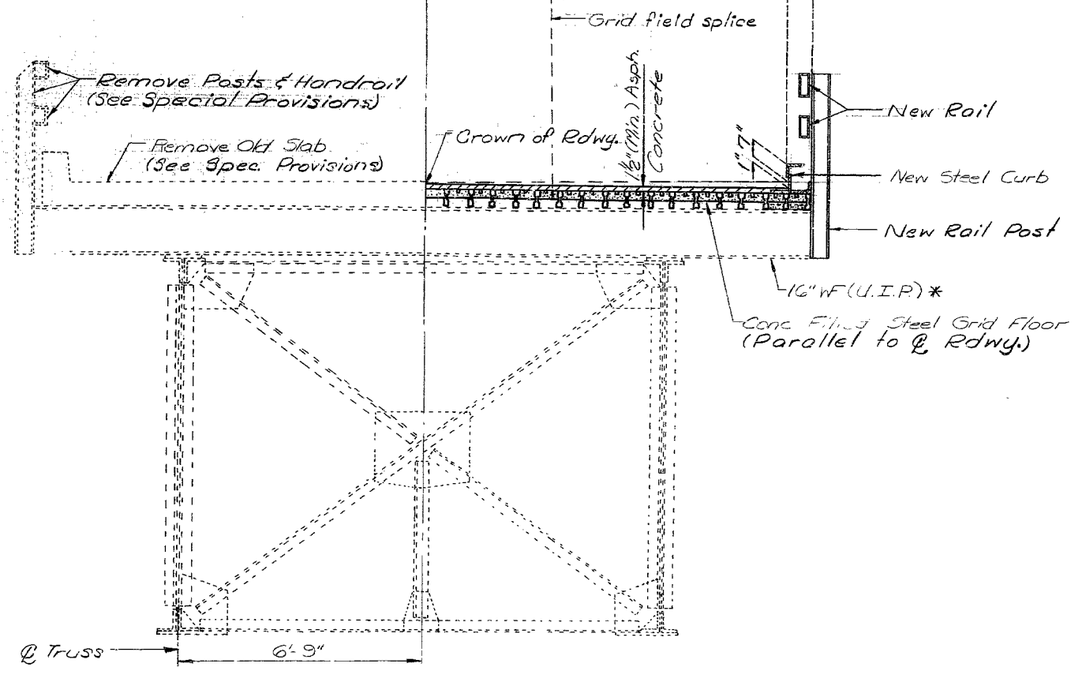


SECTION THRU SPANS (1-2) & (2-3)



DETAIL OF ROADWAY CROWN

Note: Grid to be attached directly to existing crossbeam stringers.
1" Crown to be constructed out of Asphalt except in the overhead truss spans.



SECTION THRU DECK TRUSS SPANS

454

DETAILED July 1978
CHECKED Oct. 1978

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

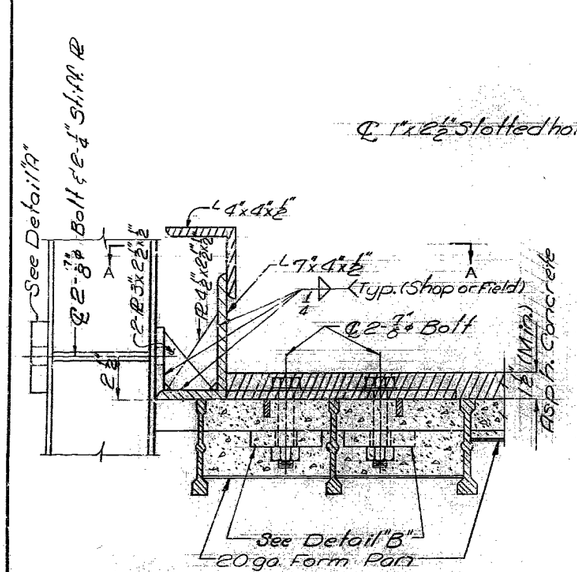
Sheet No. 19 of 30.

PLATTE **COUNTY**

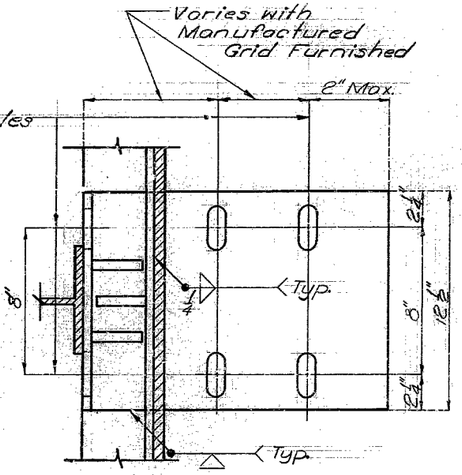
K-456R

MISSOURI STATE HIGHWAY DEPARTMENT

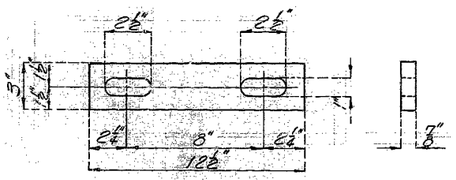
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	25	



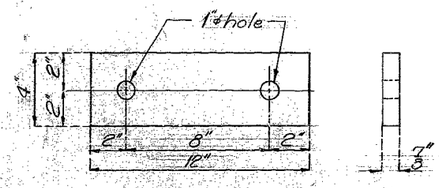
TYPICAL SECTION THRU CURB NEAR RAIL POST



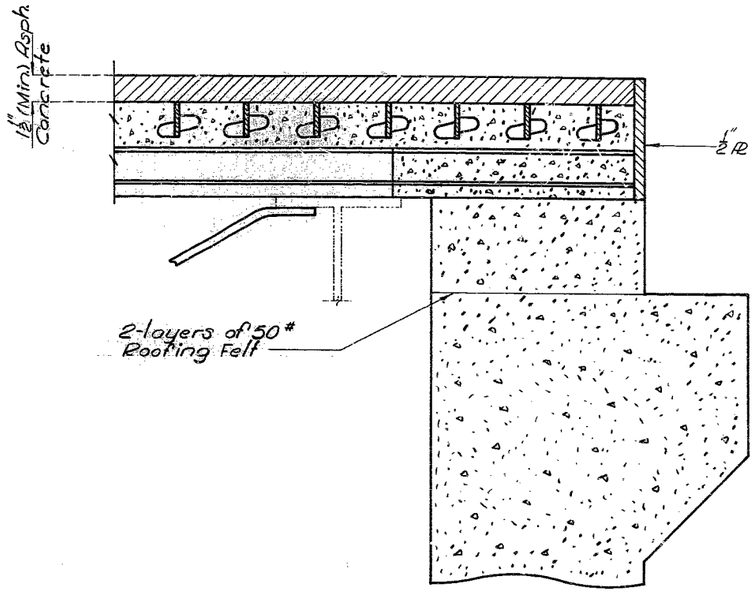
SECTION A-A



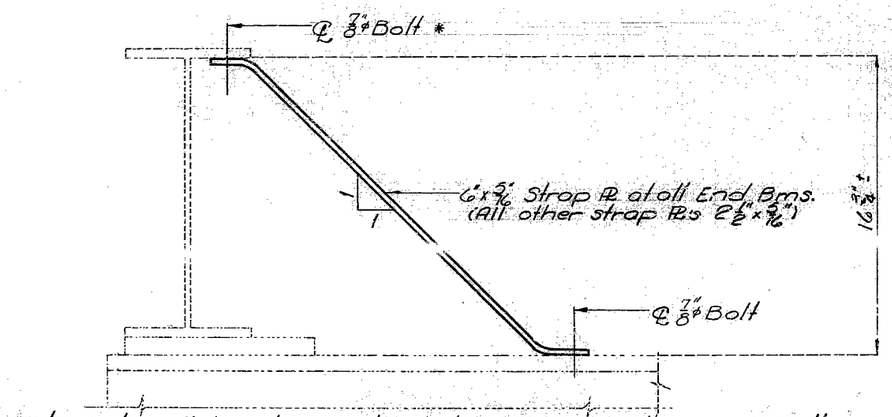
DETAIL "B"



DETAIL "A"



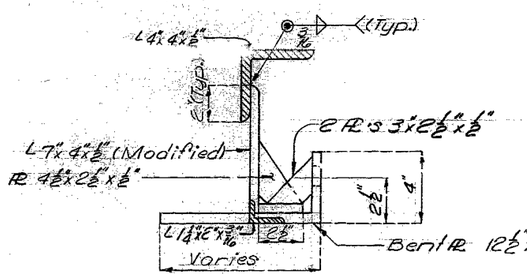
SECTION C-C (BENT NO. 16 ONLY)



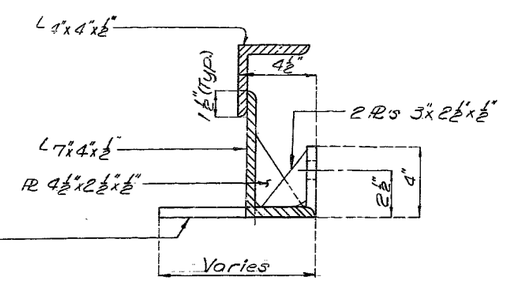
Note: Replace all Knee braces located in Spans (3-4) thru (6-7) (12-13) thru (15-16)

TYPICAL KNEE BRACE DETAILS

* Field weld if bolts interfere with placement of grid.



(OPEN CURB)



(CLOSED CURB)

TYPICAL CURB DETAILS

456

DETAILED Mar. 19 79
CHECKED Mar. 19 79

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

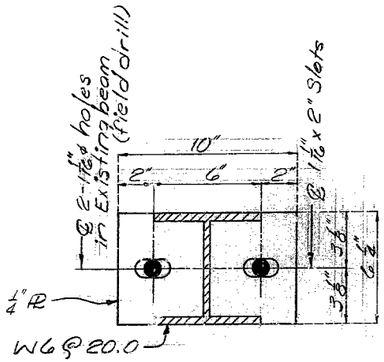
Sheet No. 20 of 30.

PLATTE COUNTY

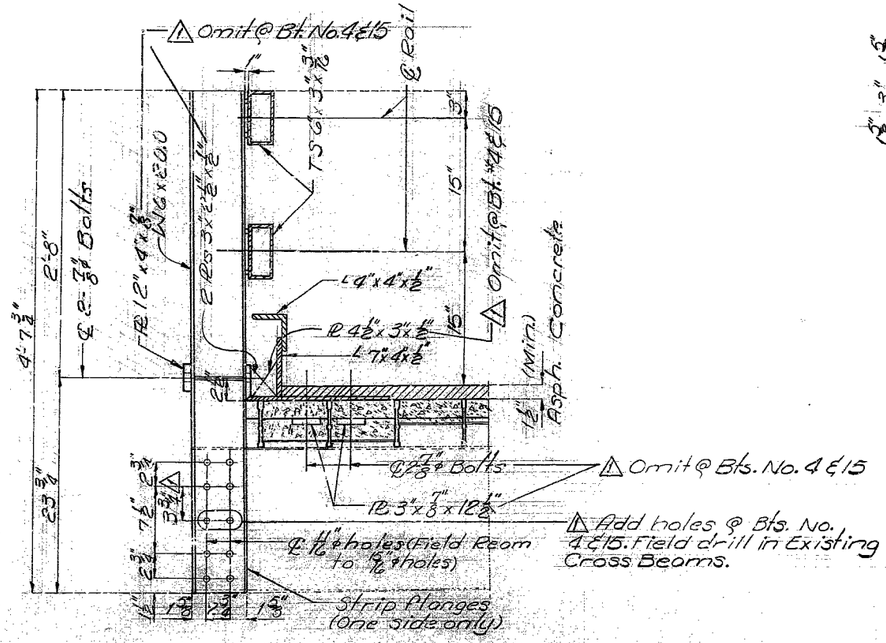
K-456R

MISSOURI STATE HIGHWAY DEPARTMENT

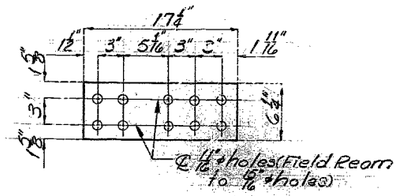
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	26	



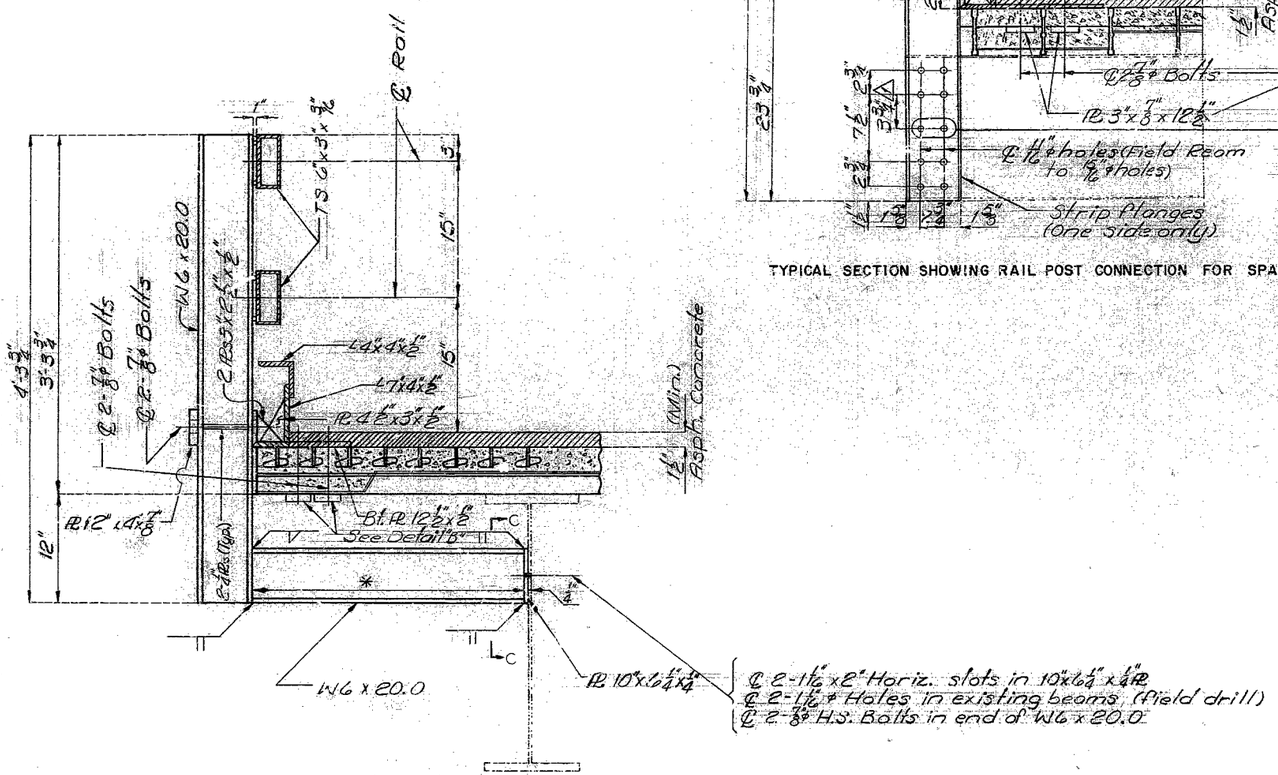
SECTION C-C



TYPICAL SECTION SHOWING RAIL POST CONNECTION FOR SPANS 3 THRU 6 AND 12 THRU 15

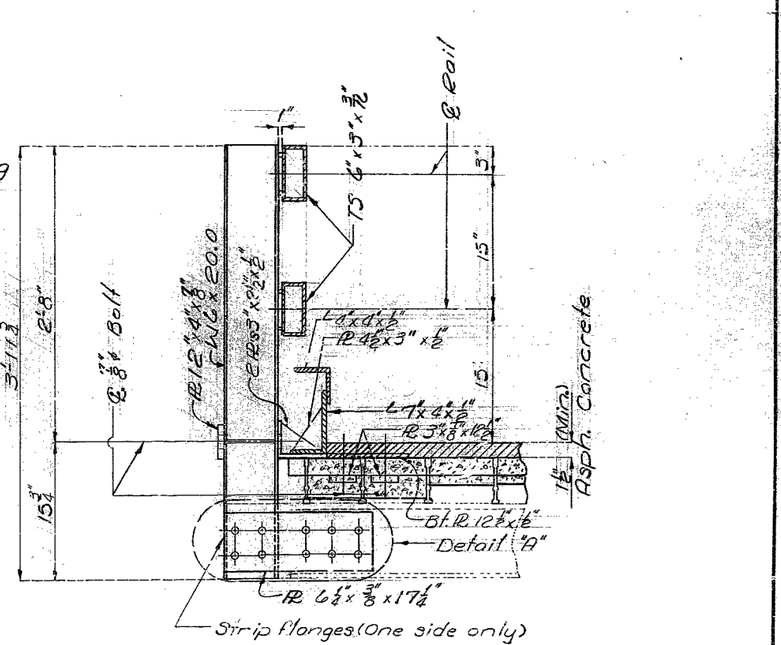


DETAIL "A"

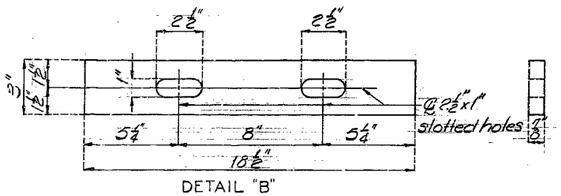


SECTION B-B

*2'-7" for Span 1-2, 2'-6 7/8" for Span (2-3)



TYPICAL SECTION SHOWING RAIL POST CONNECTION IN TRUSS SPANS



DETAIL "B"

Note: For location of Section B-B see Sheet No. 5.
Note: For Details of connections not shown see sheet No. 20 & 23.

456

DETAILED Mar 19 79
CHECKED Mar 19 79

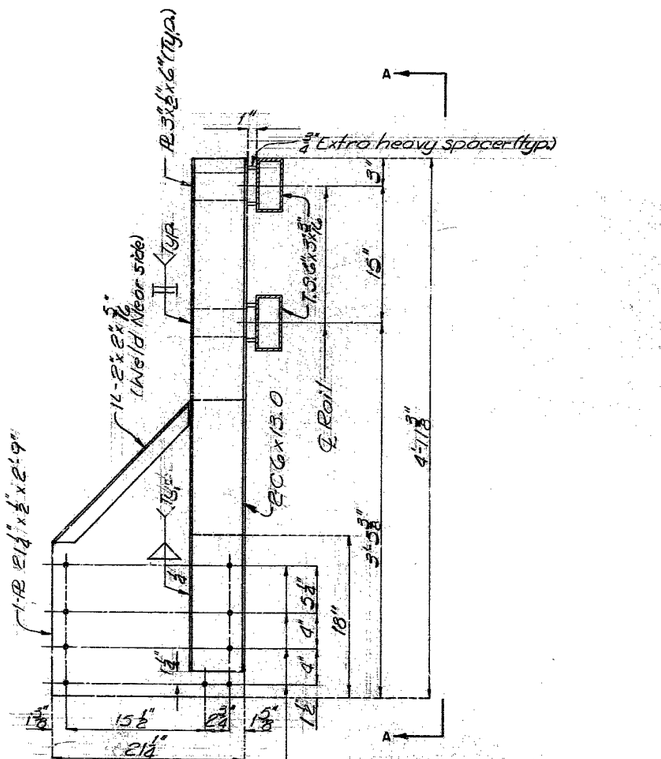
Note: This drawing is not to scale. Follow dimensions.

Sheet No. 21 of 30. ⚠ Revised 9/26/79 PLATTE COUNTY K-456R

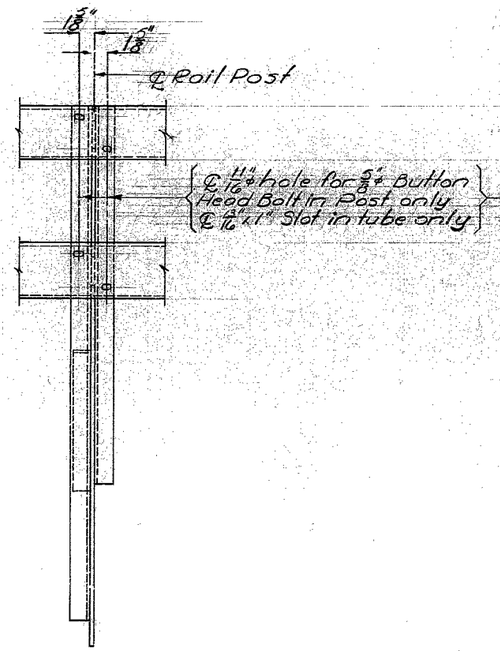
MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	27	

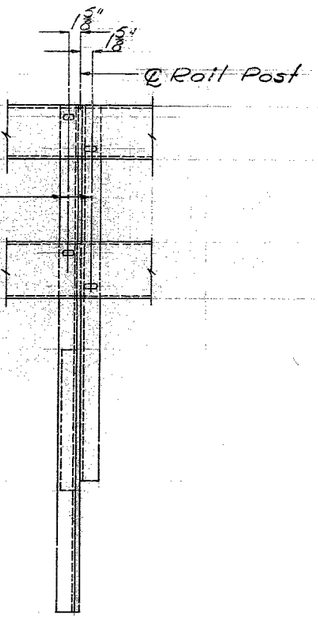
157



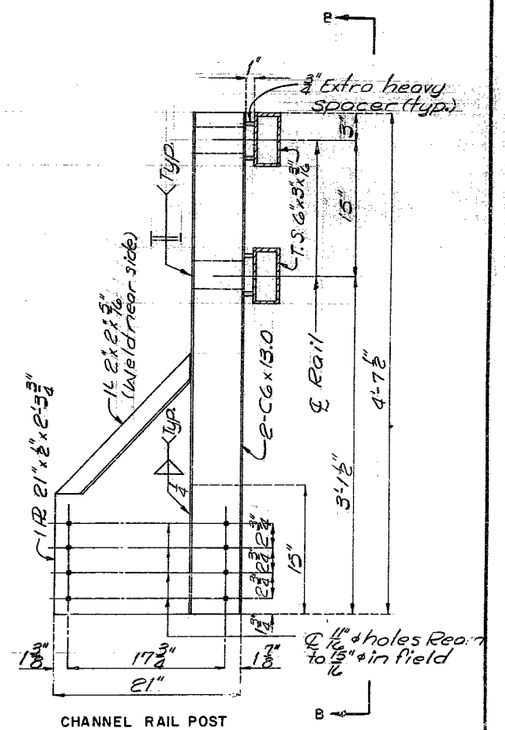
CHANNEL RAIL POST
ON SIMPLE TRUSS SPANS



SECTION A-A



SECTION B-B



CHANNEL RAIL POST
ON MAIN TRUSS SPANS

DETAILED MAR 19 79
CHECKED Mar 19 79

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

Sheet No. 22 of 30.

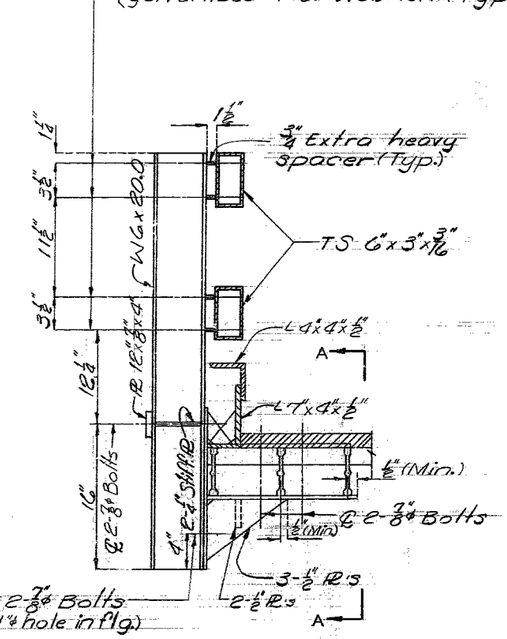
PLATTE COUNTY

K-456R

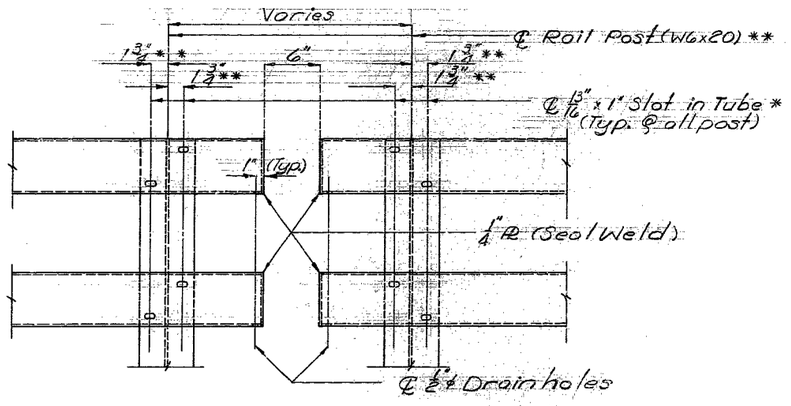
MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	28	

458



RAIL POST CONNECTION AT RELOCATED POST NEAR EXP. GAP



RAIL DETAILS AT EXP. JOINTS AND AT RAIL ENDS AT END BENTS

Note: Rail ends 2" from End Post of End Bt. #16 and rail ends 12" past first post at End Bt. #1.

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

Rail post, all steel connecting bolts, washers, & connection plates shall be galvanized after fabrication. For protective coating and material requirement see section 1040 of standard specifications.

Structural steel tube railing shall be galvanized same as steel rail post and conform to the requirement of ASTM designation A-500 or A-501.

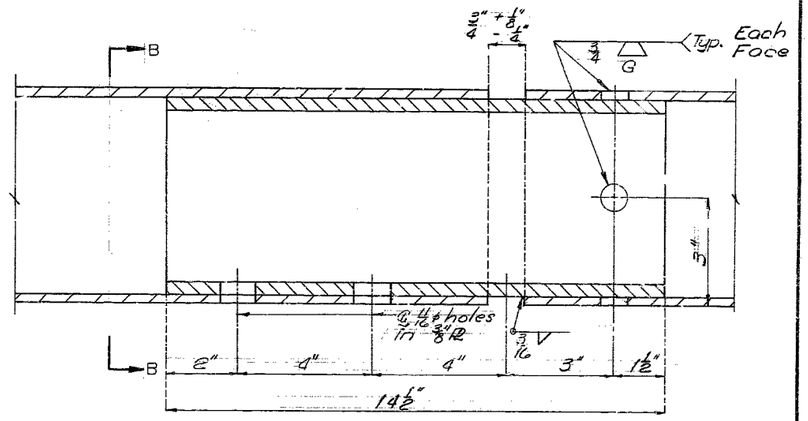
Splice in rails shall be provided at about the ¼ point between post. Rail expansion splice should be provided at Transverse Seal Joints.

Fabrication of structural steel shall be in accordance with section 712 of standard specifications.

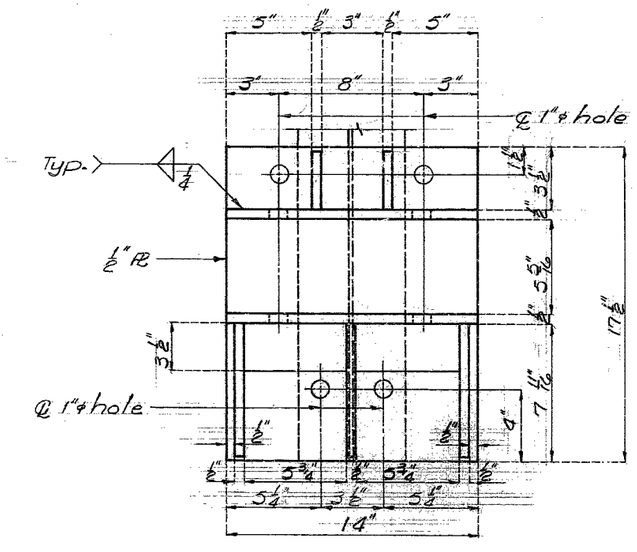
Note: For rail post details not shown see Sheet No. 20 & 21.

*Note: Optional use of ⅝" ϕ studs to be fastened to T.S. 6"x3"x3/16 in place of ⅞" ϕ Button Head Bolts (Shop or field applied) 1" Extra heavy spacer to be used in place of ¾" Extra heavy spacer.

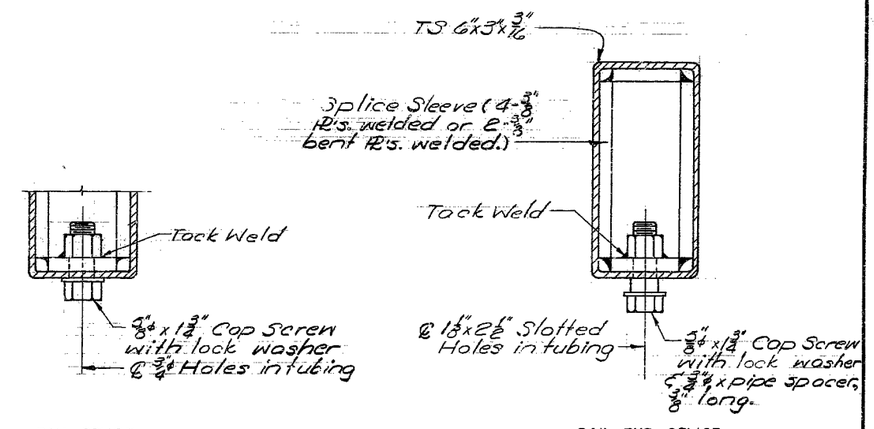
** See sheet No. 22 for rail connection details of channel rail post. For attachment of rail to vertical truss members see Special Provisions.



DETAIL OF RAIL EXPANSION OR SPLICE JOINT



SECTION A-A



RAIL SPLICE

RAIL EXP. SPLICE

SECTION B-B

DETAILED Mar. 19 79
CHECKED Mar. 19 79

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

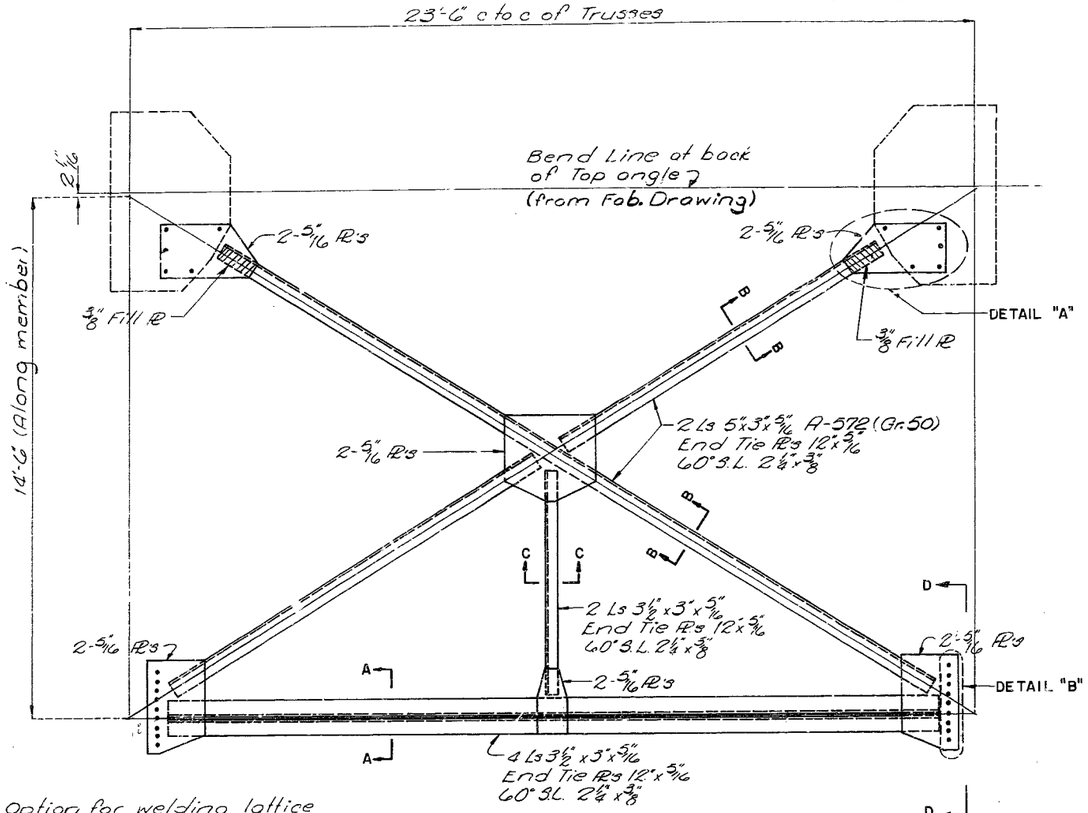
Sheet No. 23 of 30.

PLATTE COUNTY

K-456R

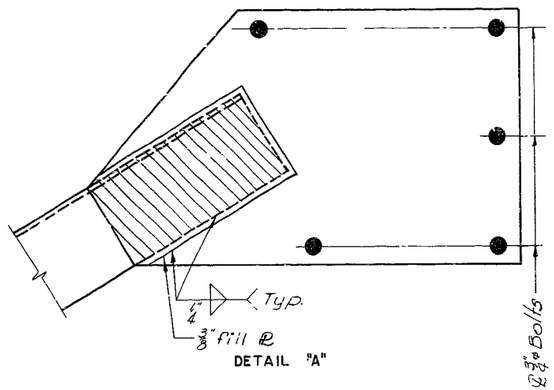
MISSOURI STATE HIGHWAY DEPARTMENT

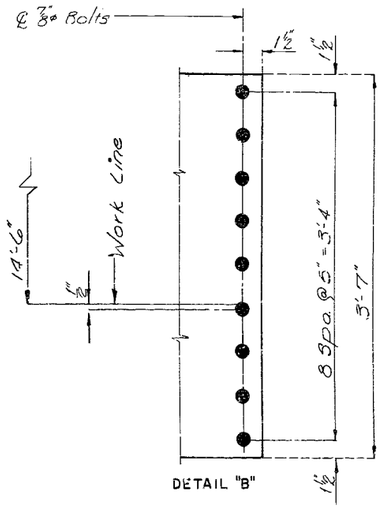
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	29	

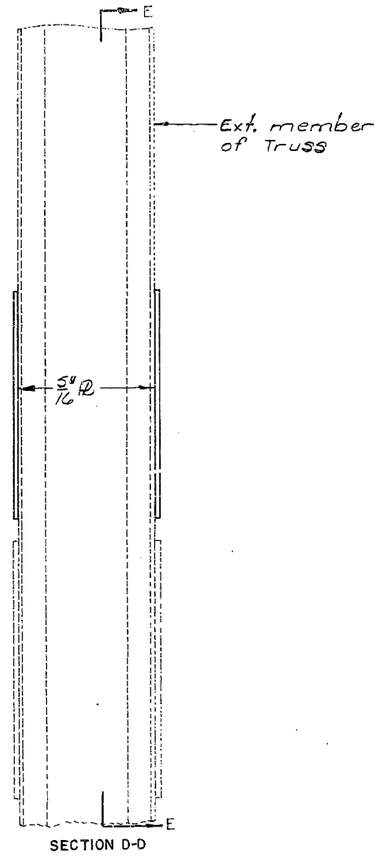


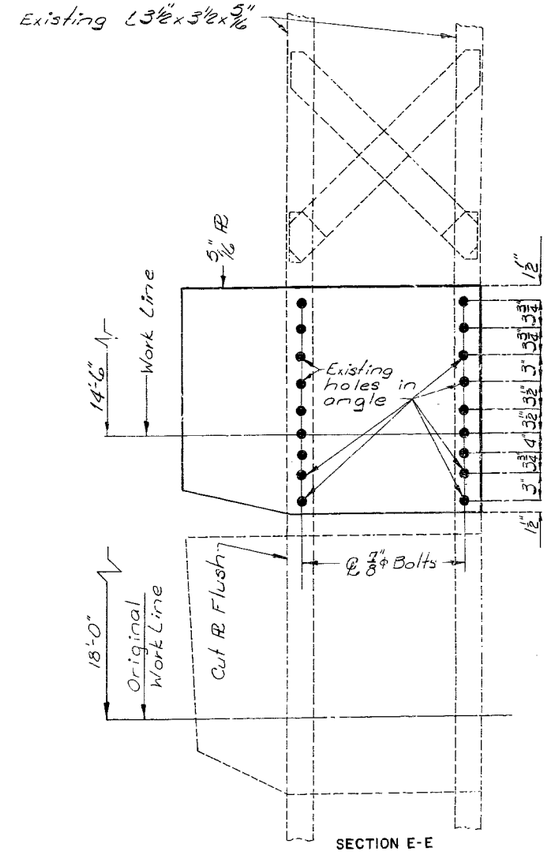
Note: Option for welding lattice in Special Provisions.

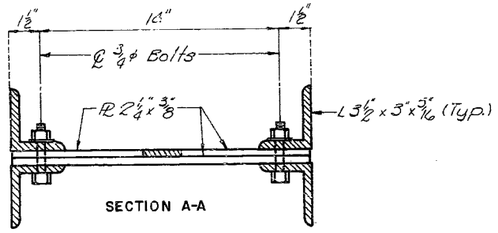
PORTAL LO-UI

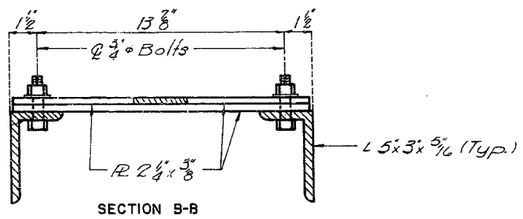


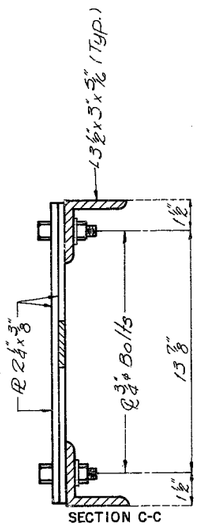












DETAILED June 19 78
CHECKED Sept. 1978

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

DETAILS OF PORTAL AT LO-UI SIMPLE SPAN

Sheet No. 24 of 30.

PLATTE COUNTY K-456R

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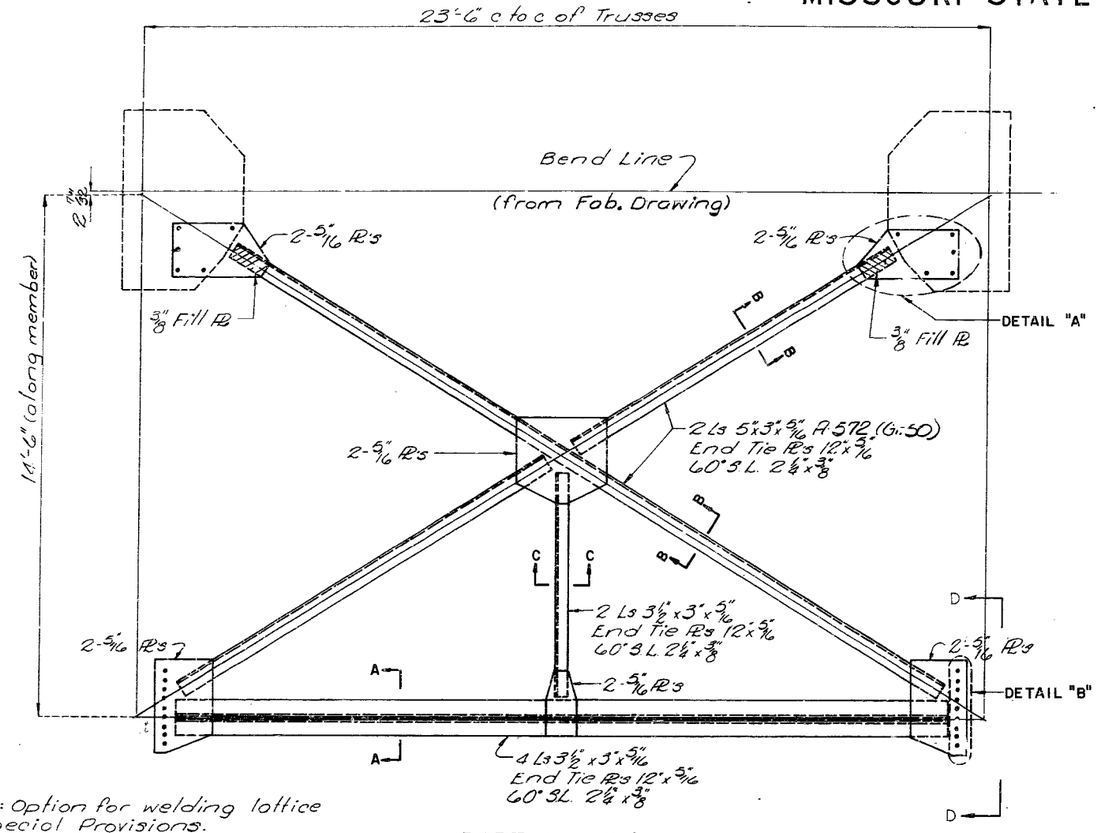
MISSOURI STATE HIGHWAY DEPARTMENT

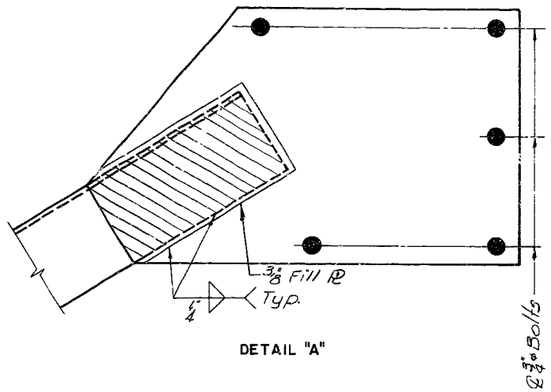
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	30	

460

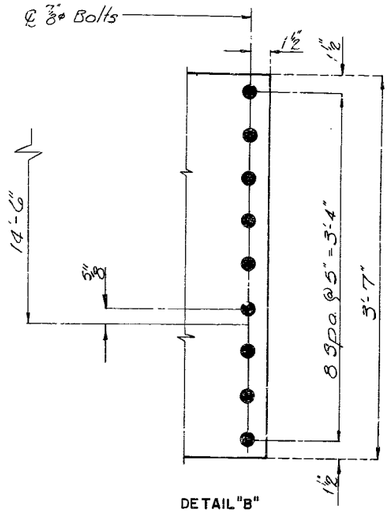


Note: Option for welding lattice in Special Provisions.

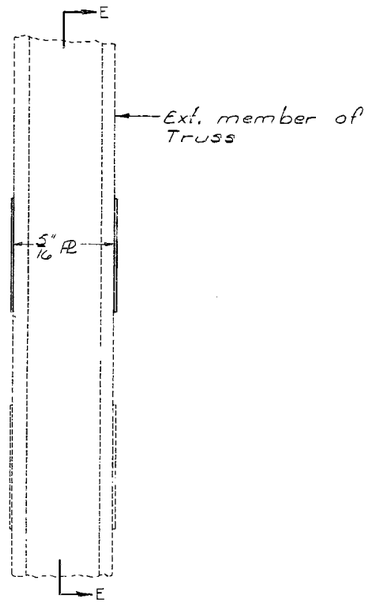
PORTAL LO-UI



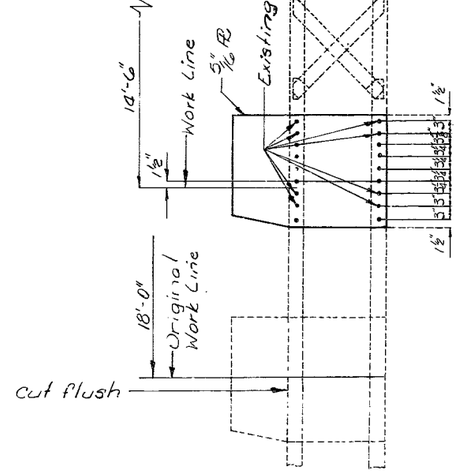
DETAIL "A"



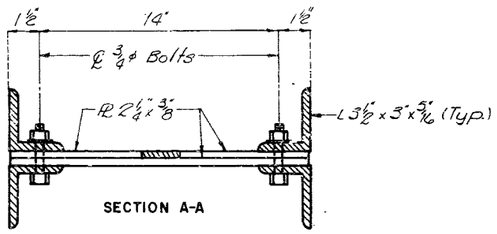
DETAIL "B"



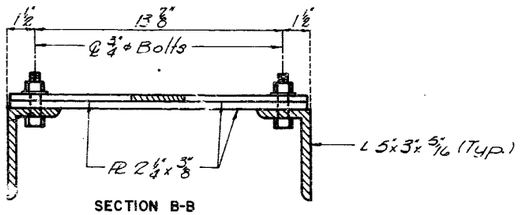
SECTION D-D



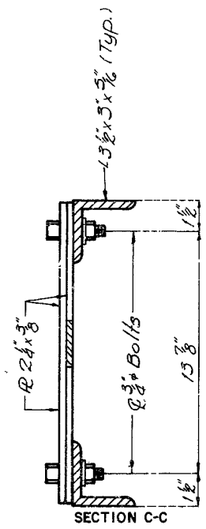
SECTION E-E



SECTION A-A



SECTION B-B



SECTION C-C

DETAILED June 19 78
CHECKED Oct. 19 78

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

DETAILS OF PORTAL AT LO-UI MAIN SPAN

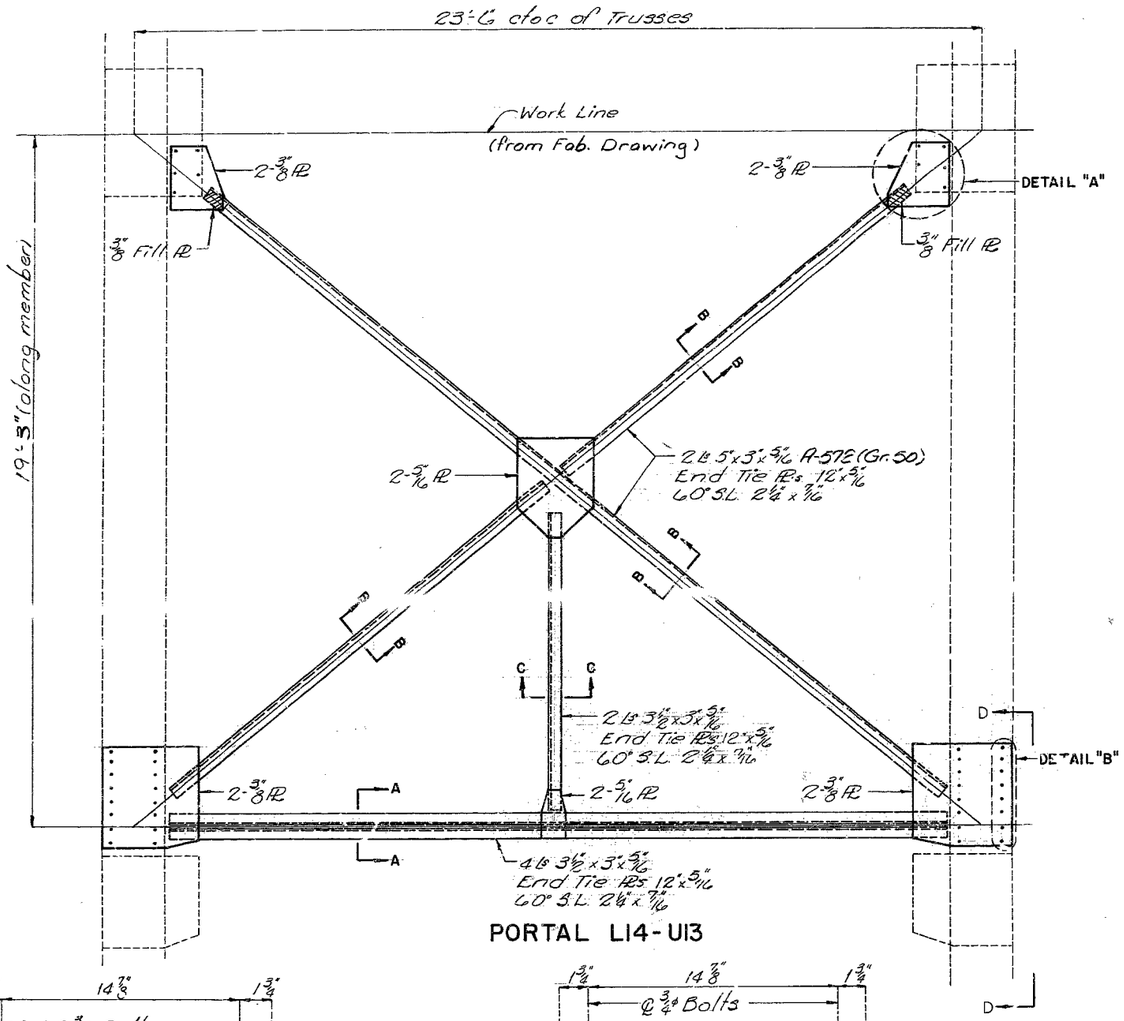
Sheet No. 25 of 30.

PLATTE COUNTY

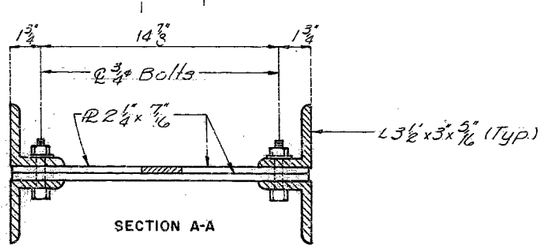
K-456R

MISSOURI STATE HIGHWAY DEPARTMENT

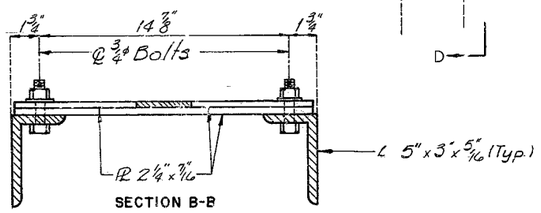
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	31	



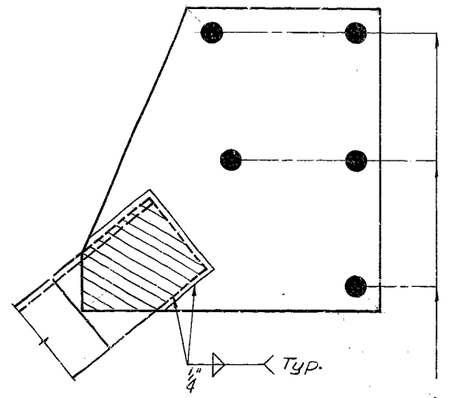
PORTAL L14-U13



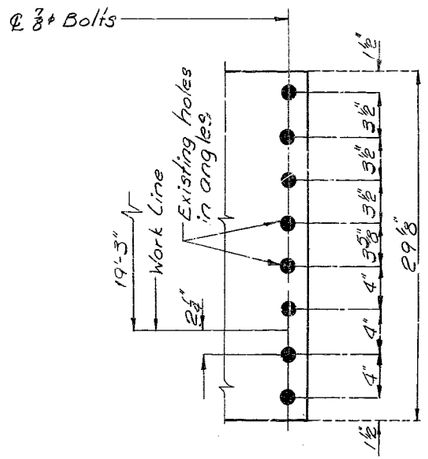
SECTION A-A



SECTION B-B



DETAIL "A"



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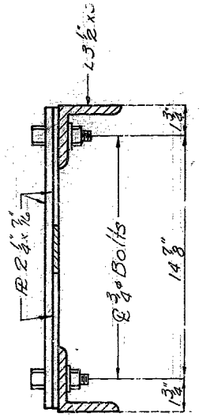
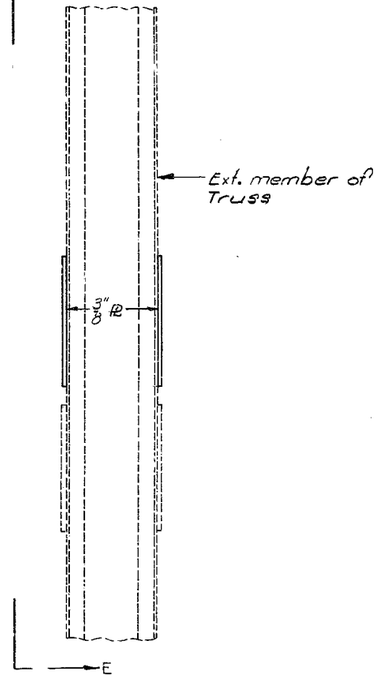
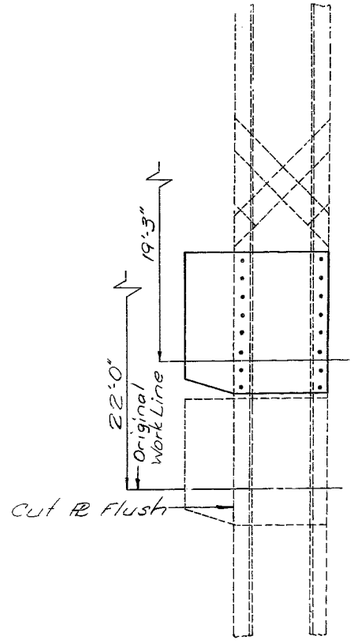


SECTION C-C



SECTION D-D



SECTION E-E

DETAILS OF PORTAL AT L14-U13 MAIN SPAN

DETAILED July 19 78
CHECKED Sept. 19 78

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

Sheet No. 26 of 30.

PLATTE COUNTY

K-456R

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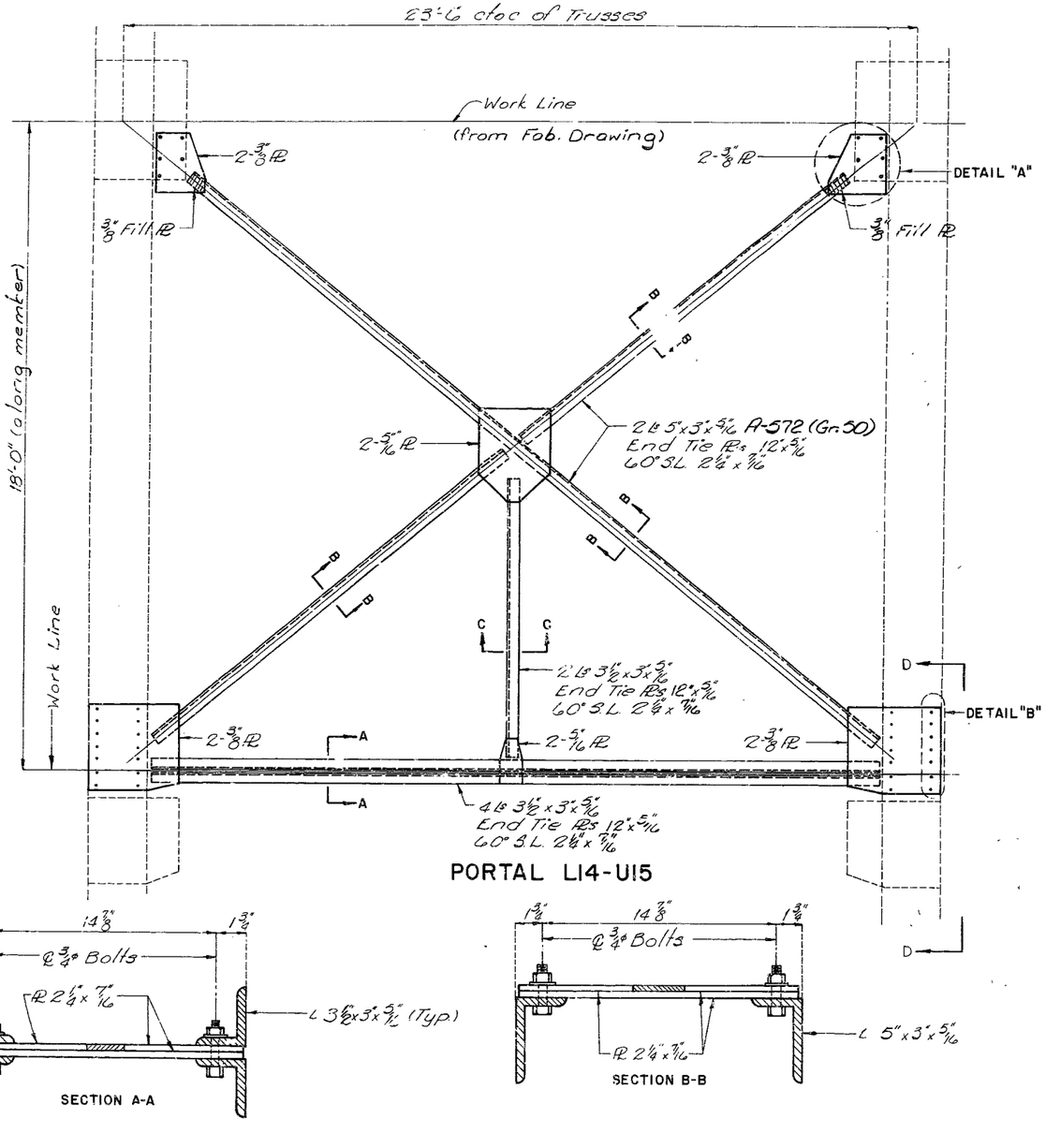
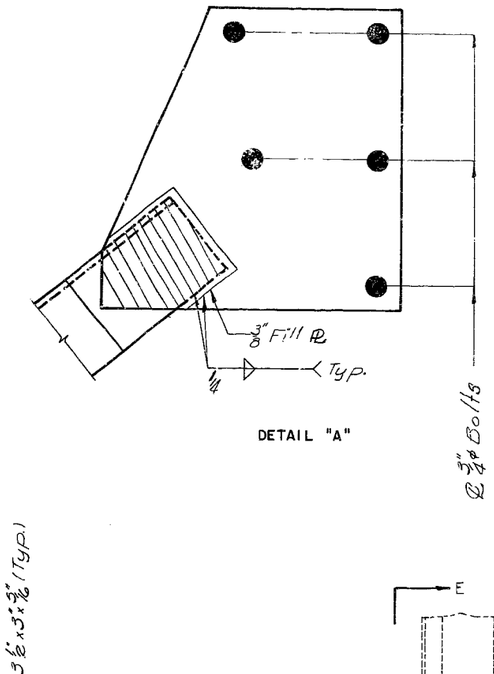
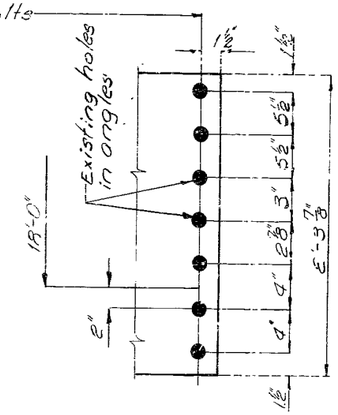
MISSOURI STATE HIGHWAY DEPARTMENT

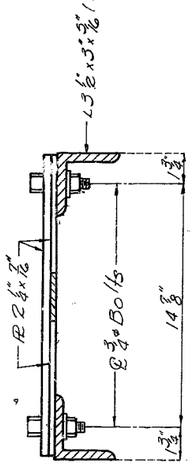
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	MO.		19	32	

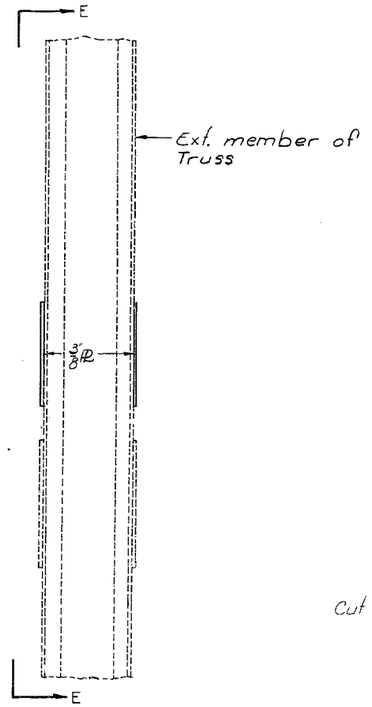
462

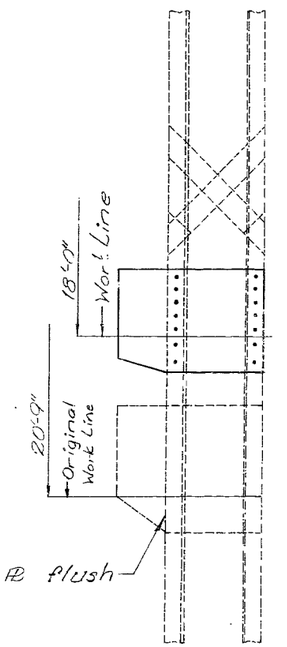












DETAILS OF PORTAL AT L14-U15 MAIN SPAN

DETAILED June 19 78
CHECKED Sept 19 78

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

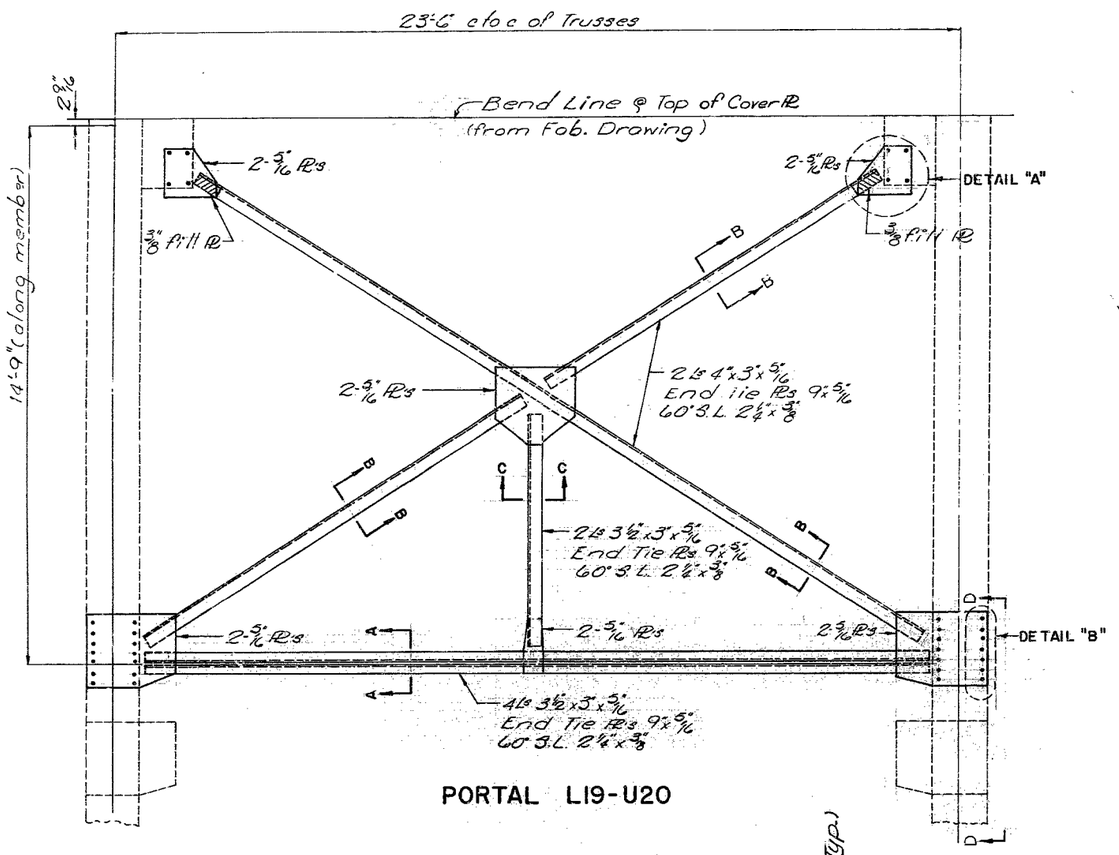
Sheet No. 27 of 30.

PLATTE COUNTY

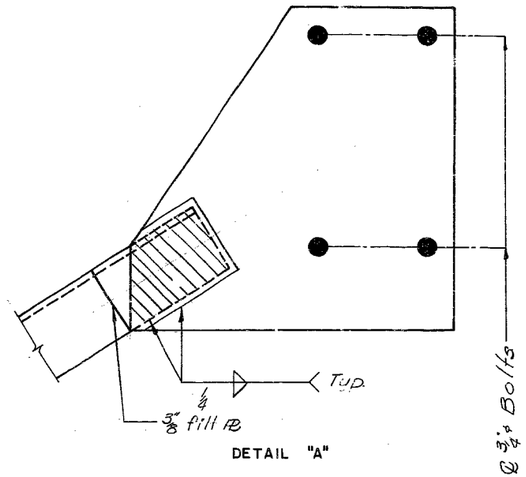
K-456R

MISSOURI STATE HIGHWAY DEPARTMENT

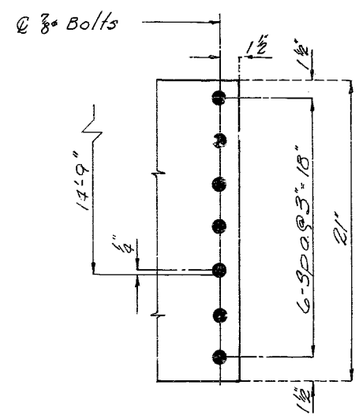
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	33	



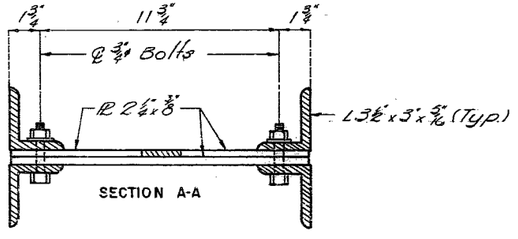
PORTAL L19-U20



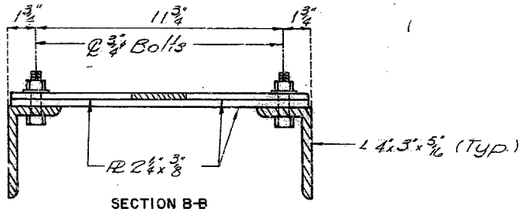
DETAIL "A"



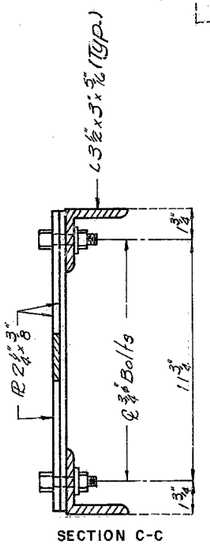
DETAIL "B"



SECTION A-A

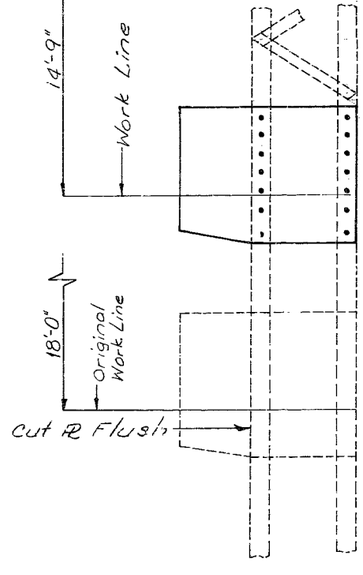


SECTION B-B



SECTION C-C

SECTION D-D



SECTION E-E

403

DETAILED May 19 78
CHECKED Oct. 19 78

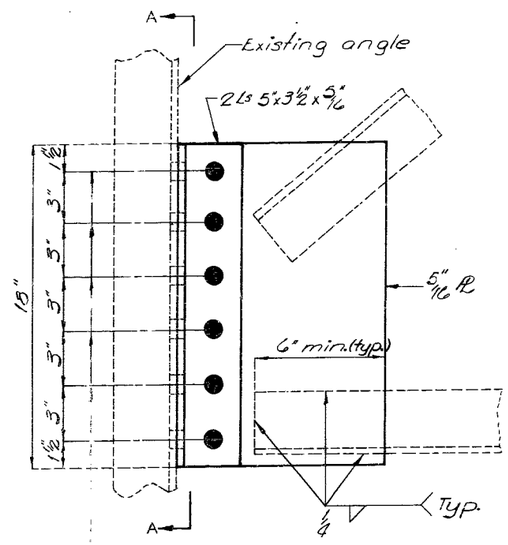
Note: This drawing is not to scale. Follow dimensions.

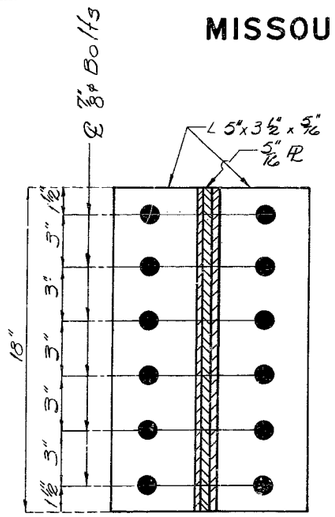
DETAILS OF PORTAL AT L19-U20 MAIN SPAN

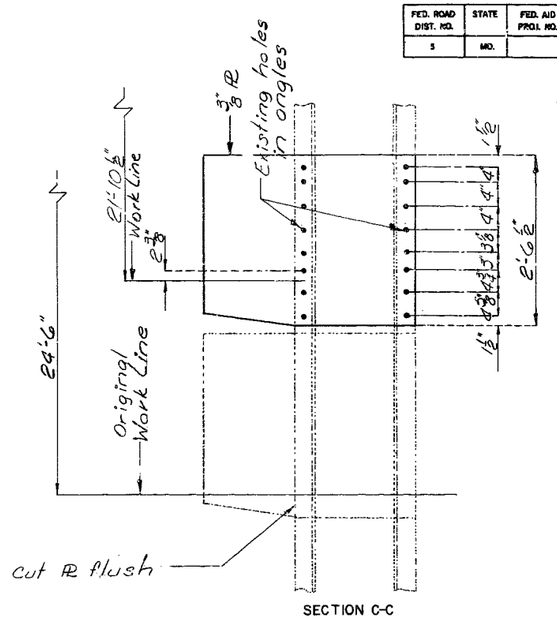
Sheet No. 28 of 30.

PLATTE COUNTY

K-456R







MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	34	

DETAIL "A"

SECTION A-A

SECTION B-B

SECTION C-C

DETAIL "B"

Note: Raise all sway frames a Min. of 2'-0" except at U14
Raise sway frame at U14 a Min. of 2'-7½". Cut existing angles
or replacement angles and move to new location and weld
as shown.

TYPICAL SWAY FRAME DETAIL AT U3, U5, U7, U9, U11, U17, U21, U3', U5', U7', U9', U11',
U17', & U21' of MAIN TRUSS AND U3, U5 & U3' of SIMPLE TRUSS

SWAY FRAME DETAIL AT U14

DETAILED Nov. 1978
CHECKED Dec. 1978

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

SWAY FRAME DETAIL

Sheet No. 29 of 30.

PLATTE COUNTY

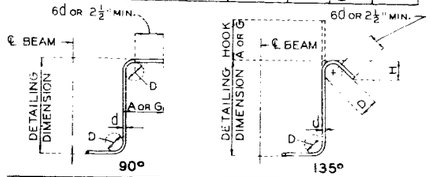
K-456R

MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19	35	

COMPLETE BILL OF REINFORCING STEEL

NO. REQD.	MARK NO. SIZE	MARK NO. MARK	LOCATION	EPOXY (E)	SHAPE NO.	STIRRUP (S)	SUBSTR. (X)	VARIES (V)	NO. EACH	DIMENSIONS 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.
			END BENT NO.16																									
14	6	F1	BACKWALL		25		X			14.000		4	8.625	14.000						3	4.000	3	4.000	7	1	7	0	147
4	4	H1	BACKWALL		20		X			22	6.000													22	6	22	6	60
32	6	H2	WING		20		X	V	4	2	1.000													2	1	2	1	
			INCR = 11.625 IN							8	10.000													8	10	8	10	262
8	6	H3	WING		20		X			9	9.000													9	9	9	9	117
8	6	H5	BKWL.& BEAM		20		X			22	6.000													22	6	22	6	270
4	6	H6	BEAM		18		X			22	6.000													23	10	23	10	143
56	5	R1	END POST		19	S	X			2	7.000		6.000											3	11	3	50	180
24	5	R2	END POST		20		X			9	9.000													9	9	9	9	444
4	6	T1	WING		25		X			2	5.000	10	6.500	22.000						6	0.000	8	8.000	14	10	14	9	89
4	4	T2	CURTAIN WALL		19	S	X			4	6.000	3	5.000											7	11	7	10	21
23	4	U1	BEAM		13	S	X			2	9.000	3	3.000	2	9.000	3	3.000							12	9	12	6	192
6	4	U2	CURTAIN WALL		10	S	X					2	11.000		6.000									6	4	6	2	25
4	4	U3	BEAM		10	S	X						6.000	2	9.000									3	9	3	7	10
36	6	V1	WING		20		X	V	4	2	11.000													2	11	2	11	
			INCR = 8.750 IN							8	9.000													8	9	8	9	315
4	4	V3	WING		20		X			9	0.000													9	0	9	0	24
92	5	V5	BACKWALL		20		X			5	6.000													5	6	5	6	241
4	4	V6	CURTAIN WALL		20		X			4	0.000													4	0	4	0	11
4	2	W1	BEAM		22		X			12.000		9.125												19	9	19	9	13
			END OF BAR LIST																									

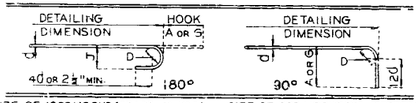


STIRRUP HOOK DIMENSIONS

GRADES 40-50-60 KSI

BAR SIZE	D (IN.)	90° HOOK HOOK A OR G	135° HOOK HOOK A OR G	135° HOOK APPROX. H
#3	1-1/2"	4"	4"	2-1/2"
#4	2"	4-1/2"	4-1/2"	3"
#5	2-1/2"	6"	5-1/2"	3-3/4"
#6	4-1/2"	8"	7"	4-1/2"

NOTE: UNLESS OTHERWISE NOTED DIAMETER "D" IS THE SAME FOR ALL BENDS AND HOOKS ON A BAR.



SIZE OF 180° HOOKS (GRADE 40 KSI)
D = 3d FOR #3 THRU #11
D = 10d FOR #14 AND #18

SIZE OF 90° HOOKS (ALL GRADES) AND 180° HOOKS (GRADE 60 KSI)
D = 6d FOR #3 THRU #8
D = 8d FOR #9, #10 AND #11
D = 10d FOR #14 AND #18

END HOOK DIMENSIONS

BAR SIZE	180° HOOKS GRADE 40 A OR G	180° HOOKS GRADE 40 J	180° HOOKS GRADE 60 A OR G	180° HOOKS GRADE 60 J	90° HOOKS ALL GRADES A OR G
#3	5"	2-3/4"	5"	3"	6"
#4	6"	3-1/2"	6"	4"	8"
#5	7"	4-1/2"	7"	5"	10"
#6	8"	5-1/4"	8"	6"	12"
#7	9"	6-1/4"	10"	7"	14"
#8	10"	7"	11"	8"	16"
#9	12"	8"	15"	11-1/4"	19"
#10	13"	9"	17"	12-3/4"	22"
#11	14"	10"	19"	14-1/4"	21-0"
#14	21-2"	20-1/2"	21-2"	20-1/2"	21-7"
#18	21-11"	21-3"	21-11"	21-3"	31-5"

NOTES:
ALL STANDARD HOOKS AND BENDS OTHER THAN 180 DEG. TO BE BENT WITH SAME PROCEDURE AS FOR 90 DEG. STD. 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.

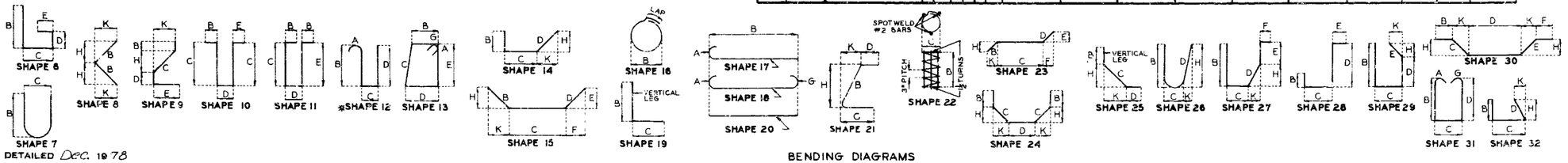
V - BAR DIMENSIONS VARY IN EQUAL INCREMENTS BETWEEN DIMENSIONS SHOWN ON THIS LINE AND THE FOLLOWING LINE.

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.

* ALL HOOKS AND BENDS FOR SHAPE NO. 12 - GRADE 40 (ONLY) ARE BASED ON D = 5d.



BENDING DIAGRAMS

STD. 90.8.5 MAY 1974 | REVISED OCT. 1978

DETAILED Dec. 1978
CHECKED Dec. 1978

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

Sheet No. 30 of 30

PLATTE COUNTY

K-456R

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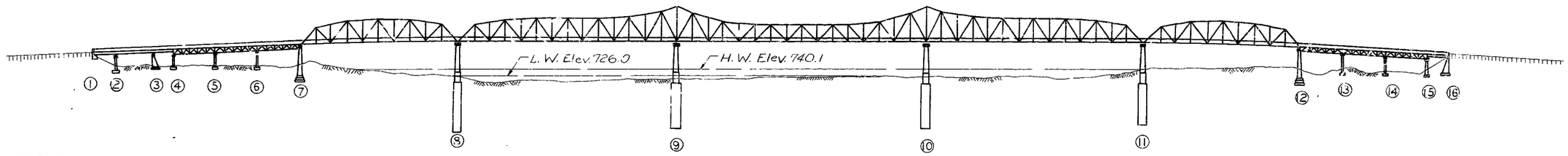
MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	MO.		19	6	

FINAL PLANS



GENERAL ELEVATION

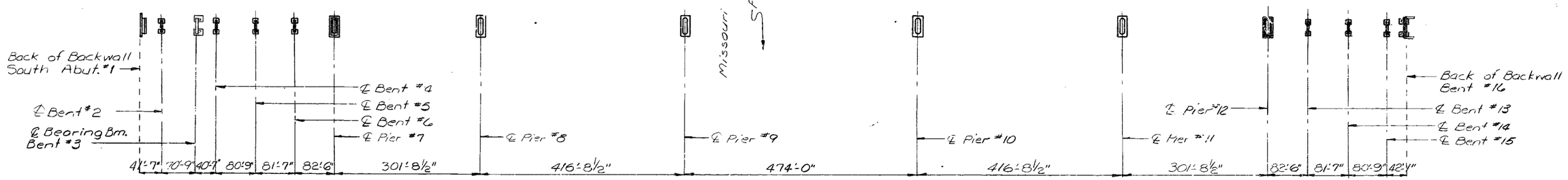
GENERAL NOTES:

Design Specifications: A.A.S.H.T.O.-1977
Design Loading
H3-20-44 Floor System, No Future Wearing Surface, Earth 120#
Equivalent Fluid Pressure 30#

Design Unit Stresses:
Class A Concrete (Substr. Repair) fc = 1500 psi.
Class B Concrete (New Substr.) fc = 1,200 psi.
Class B1 Spec. Conc. (Superstr. Grid Fill) fc = 1,600 psi.
Reinforcing Steel fy = 60,000 psi (Grade 60)
Structural Carbon steel fs = 20,000 psi.
Minimum clearance to reinforcing steel 1½ unless otherwise shown
Floor System:
Steel Grid Floor (Half Conc. Filled) (See Special Provisions)

Painting: Shop None; Field, System A or B Aluminum. (See Special Provisions)

Note: Light dotted lines indicate old work. Heavy lines indicate new work. Contractor shall verify all dimensions in field before ordering new steel.
Note: For field connections use ⅞" High Strength Bolts, holes 15/16" except as noted.
Note: A minimum vertical clearance of 21'-6" from top of rails and a minimum lateral clearance of 12'-6" from the centerline of track to nearest temporary construction falsework shall be maintained during construction.
Note: All joint filler meet the requirements of Std. Spec. 1057.2.4.



PLAN

FINAL QUANTITIES			
ITEM	SUBSTR.	SUPERSTR	TOTAL
Removal of Existing Bridge Deck Sq.Ft.		55,640	55,640
Special Work Lump Sum		1	1
Asphalt Cement (Asphaltic Concrete) Ton		27.6	27.6
Mineral Aggregate (Asphaltic Concrete)(Spec. Mix) Ton		547	547
Substr. Repair (Formed) Sq.Ft.	769		769
Substr. Repair (Unformed) Sq.Ft.	262		262
Class B Conc. Misc. (Bent #16) Cu.yd.	21.9		21.9
Tack Coat Gal.		420	420
Elast. Exp. Jt. Seal (2 in.) Lin.Ft.		22	22
Elast. Exp. Jt. Seal (2½ in.) Lin.Ft.		44	44
Elast. Exp. Jt. Seal (4" in.) Lin.Ft.		44	44
Elast. Exp. Jt. Seal (6½ in.) Lin.Ft.		66	66
Preformed Comp. Exp. Jt. Seal (2½") Lin.Ft.		506	506
Reinforcing Steel (Grade 60) Lb.	2360		2360

FINAL QUANTITIES CONT.			
ITEM	SUBSTR.	SUPERSTR.	TOTAL
Steel Grid Floor (Half Concrete Filled) Sq.Ft.		41,441	41,441
Painting (System B) Aluminum Lump Sum		1	1
Protective Coating for Piers & Bents Lump Sum	1		1
Cleaning Existing Bearings Lump Sum		1	1
Fab. Str. Steel Revisions Lb.		219,900	219,900
Bridge Guardrail (2 Tube Str. Sh.) Lin.Ft.		5190	5190
Pressure Grouting-Epoxy Lin.Ft.		0	0
Contingent Items			
Steel Grid Floor (Modified) Sq.Ft.	502.01	14,805	14,805
Contraction Joint Beams Lump Sum	502.05	1	1

Note: All steel is A-36 except as noted on portal details.

FINAL QUANTITIES			
CONTINGENT ITEMS	SUBSTR.	SUPERSTR.	TOTAL
502.51 Modify Exp. Joint Beams		1604.38	1604.38
502.[illegible] Install Anchors	3492.48		3492.48
502.63 Bent 15 Excavation	1400.88		1400.88
502.[illegible] Replace Bearings	7316.50		7316.50
502.[illegible] Bearing Repair, Bents 3 And 16	4710.67		4710.67
502.[illegible] Insect Rework Areas		7284.44	7284.44

B.M. #8 Pointed □ on S.W.W. Br. No. K-456
Elev. 494.51, [U.S.G.S. Datum Elev. 774.18]

BRIDGE OVER MISSOURI RIVER
FAIRFAX BRIDGE AT RIVERSIDE

PROJ BHO-083(3)
JOB NO. 4-U-69-64 RTE. 69
PLATTE COUNTY MISSOURI
WYANDOTTE COUNTY KANSAS

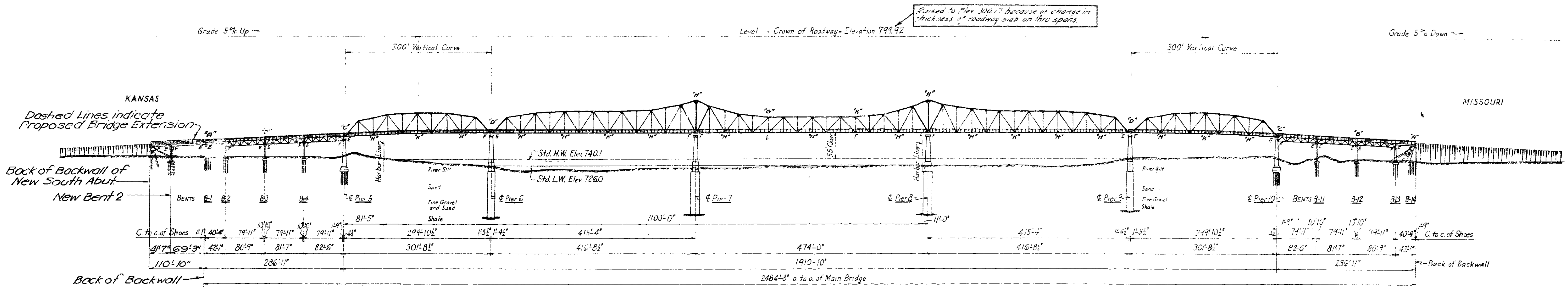
STD. 706.30
K-456R

DETAILED Sept. 19 78
CHECKED Nov. 19 78

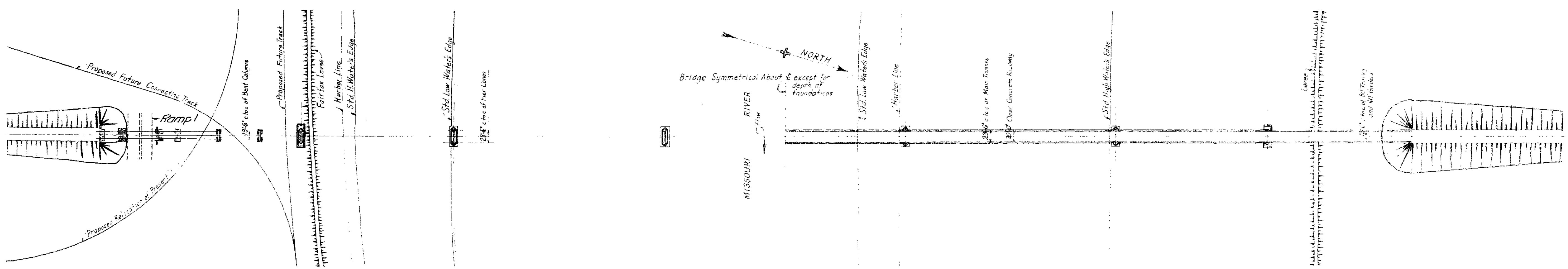
Note: This drawing is not to scale. Follow dimensions.

Sheet No. 1A of 30. Date 4-16-79

466



ELEVATION



PLAN

ESTIMATED QUANTITIES		
Item		
Class "B" Concrete	Cu. Yds.	71.6
Fabricated Structural Steel	Lbs.	5700
Reinforcing Steel	Lbs.	6440
Primer (RC-0 or 60-100 Penetration Asphalt)	Gals.	270
[illegible] "C" Asphalt [illegible]	Tons	[illegible]

Note: Estimated quantities of Primer and type "C" Asphaltic Concrete include surfacing of Proposed Bridge Extension and 25' of approach pavement south of New South Abut. (See Special Provision)

GENERAL NOTES:

Design Specifications: A.A.S.H.O. 1953
Structural Steel Stress: 18,000 #/□"
Reinforcing Steel Stress: 20,000 #/□"
Concrete Class "B" Stress 1,000 #/□"
Qualification of welding operators will be required.

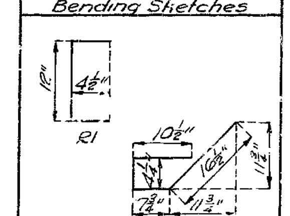
[illegible] ...ions show[illegible] existing str[illegible] taken from the original plans and shop drawings and shall be verified in field prior to construction.

The steel bar dams and filler plates shall extend full width of roadway slab, however, they may be installed in two sections to permit construction traffic on one half at a time if the Contractor desires. Before traffic is permitted to cross over sections of bar dams in place, sufficient bituminous material shall be placed on roadway slab adjacent to both sides of expansion joint to prevent any damage to either the steel bar dams or tires of vehicles.

Paint: Shop, none. Field: See Special Provisions.

REINFORCING STEEL			
No.	Size	Length	Mark
880	#4	21"	R1
880	#4	3'-3"	R2
160	#5	21'-0"	R3

Bending Sketches



ALTERATIONS TO
BRIDGE OVER MISSOURI RIVER
STATE ROAD FROM KANSAS CITY KANSAS TO ROUTE 45
PROJECT NO. F.T. 69 - M 83 (1)

PLATTE CO. MISSOURI
WYANDOTTE CO. KANSAS

SUBMITTED BY J. A. Williams, BRIDGE ENGINEER DATE 2-20-1958
APPROVED BY Ref. M. Whitton CHIEF ENGINEER DATE 2-20-1958

K-456A1

335

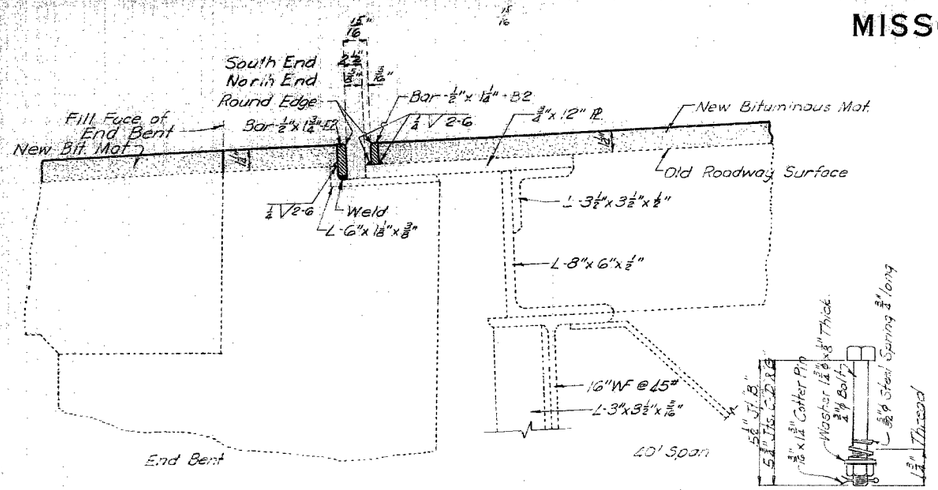
Drawn Jan. 1958 by M.H.P. & J.H.K.
Checked Feb 1958 by M.E.L.

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

Sheet No. 1 of 2.

MISSOURI STATE HIGHWAY DEPARTMENT

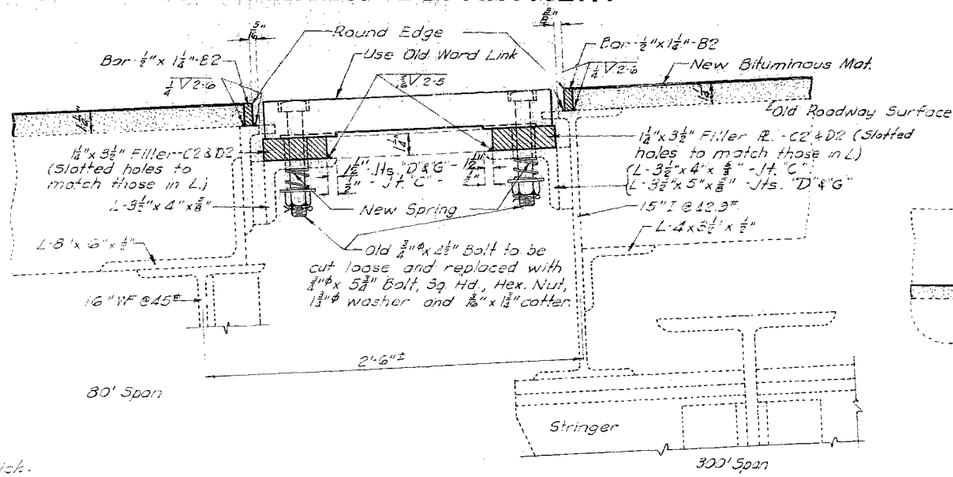
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.		19		



SECTION THRU EXP. JOINT "A"

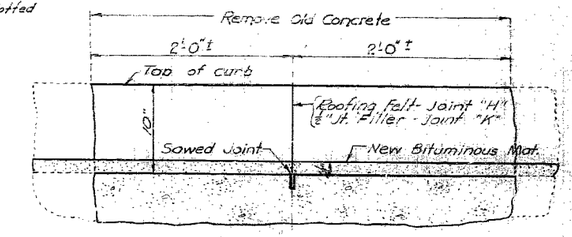
Cadmium plated .0005 Thick. Complete.

DETAIL OF BOLTS

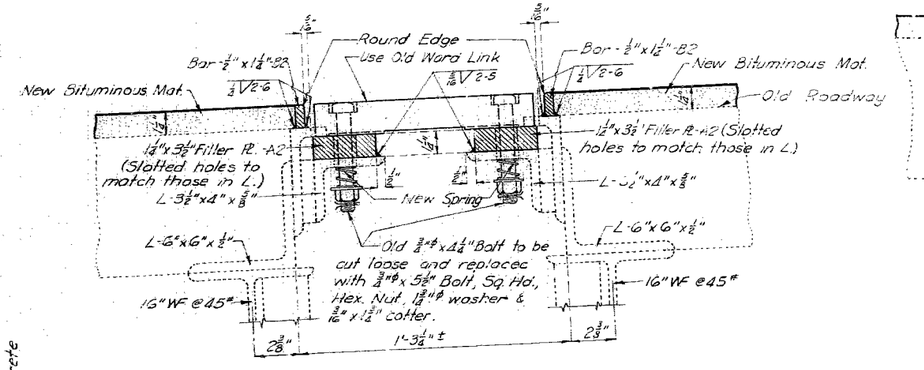


SECTION THRU EXP. JOINT "C"

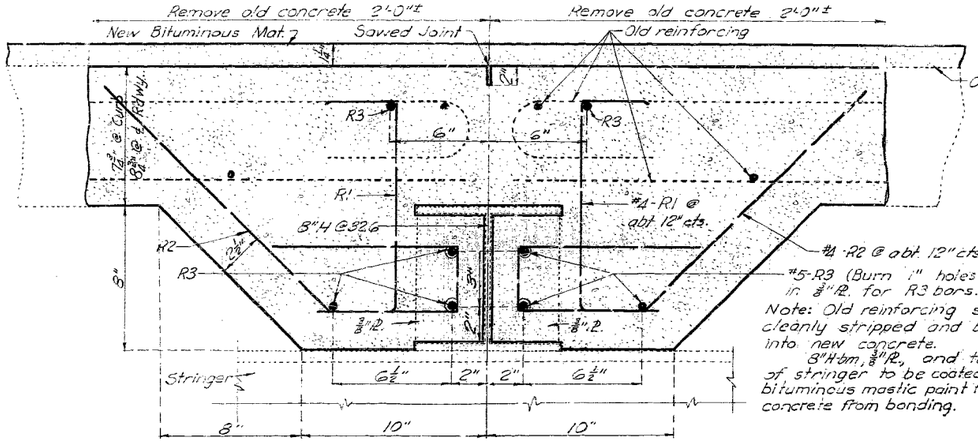
Note: Joint "C" shown. Both sides of Section Thru Joints "D" & "G" similar to those for 300' Span.



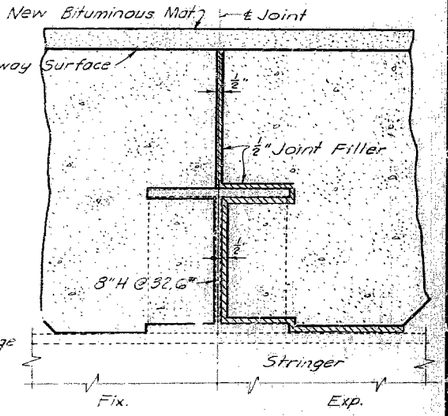
DETAIL OF CURB OVER JOINTS "H" & "K"



SECTION THRU EXP. JOINT "B"

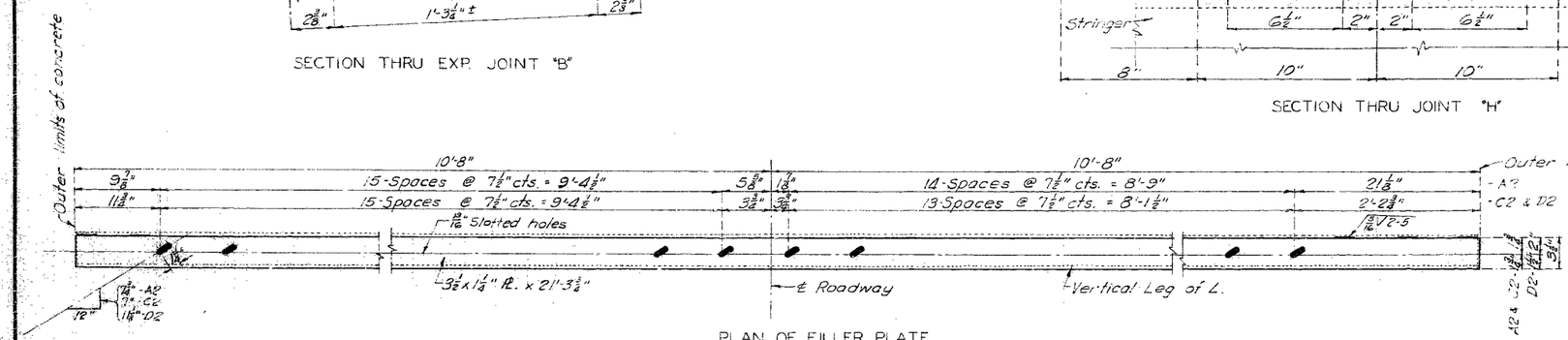


SECTION THRU JOINT "H"



SECTION THRU JOINT "K"

Note: Details not shown are same as those for joint "H".



PLAN OF FILLER PLATE

Make 4-A2 Jt. "B"
Make 4-C2 Jt. "C"
Make 6-D2 Jts. "D"&"G"

PLAIN MATERIAL			BOLT LIST				
No.	Mark	Description	No.	Size	Length	Location
16	B2	Bar-1½"x½"x 20'-0"	124	¾"ø	5½	A2 to L
2	E2	Bar-½"x⅜"x 20'-0"	300	¾"ø	5½	C2&D2 to L

Note: Light dotted lines indicate old work. Heavy lines indicate new work.

ALTERATIONS TO

BRIDGE OVER MISSOURI RIVER

STATE ROAD FROM KANSAS CITY, KANSAS TO ROUTE 45

ABOUT

PROJECT NO. RT.69-M83(1) **STA.**

PLATTE CO. MISSOURI

WYANDOTTE CO. KANSAS

K-456A1

Drawn Jan. 1958 by W.H.P.

Checked Feb. 1958 by M.E.L.

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

Sheet No. 2 of 2.

336

NEW FAIRFAX BRIDGE PROJECT

NEAR

KANSAS CITY, KANSAS

FOR

PLATTE COUNTY, MISSOURI

1955

CONTRACT IV - SOUTH APPROACH HIGHWAY

FINAL DESIGN DRAWINGS

APPROVED

COUNTY COURT OF PLATTE COUNTY MISSOURI

PRESIDING JUDGE ---------- DATE

MISSOURI STATE HIGHWAY COMMISSION

CHIEF ENGINEER ---------- DATE

STATE HIGHWAY COMMISSION OF KANSAS

CHIEF ENGINEER ---------- DATE

SVERDRUP AND PARCEL, INC.
CONSULTING ENGINEERS
ST. LOUIS, MO.

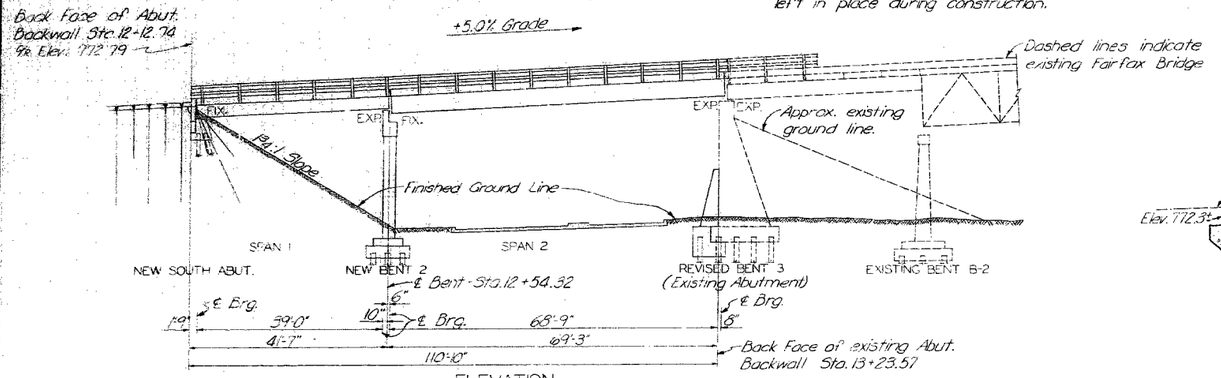
SUBMITTED BY:

REGISTERED PROFESSIONAL ENGINEER
KANSAS NO. 841

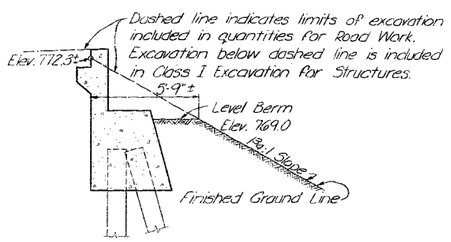
337

Note: Control Elev. on ℄ℓ back face of Existing Abutment backwall = 778.33.

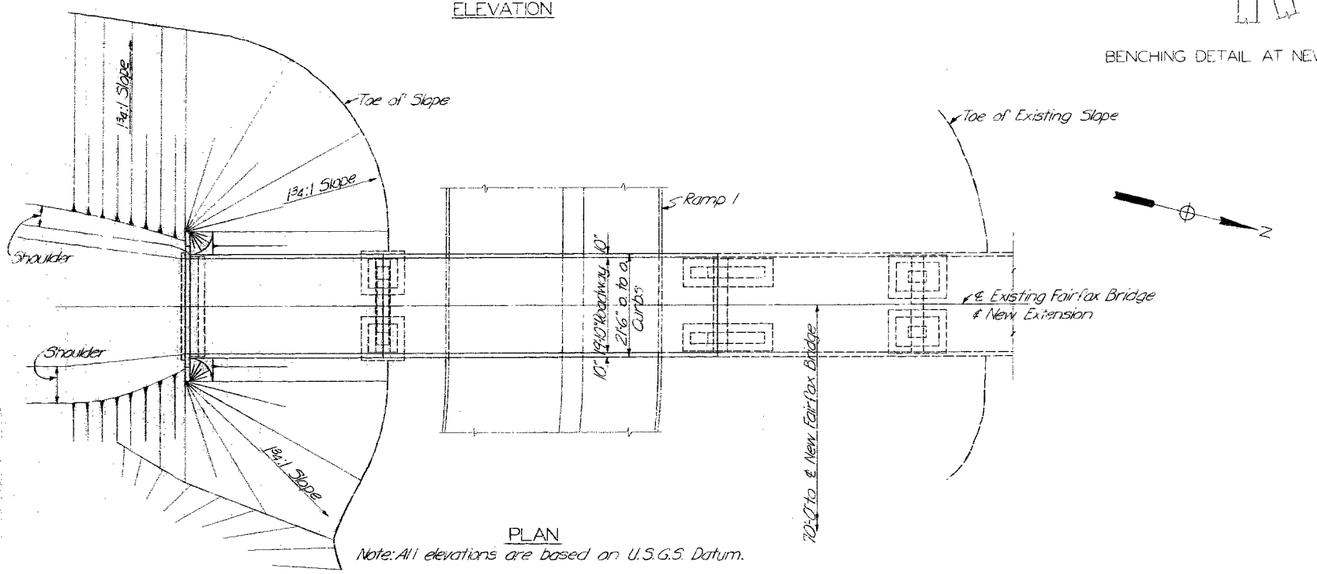
Note: Existing superstructure is to be left in place during construction.



ELEVATION



BENCHING DETAIL AT NEW SOUTH ABUT.

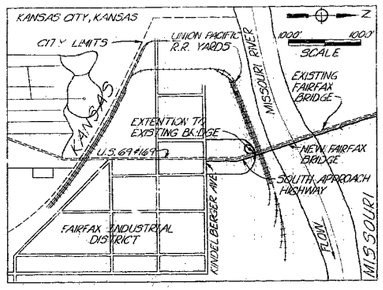


PLAN

Note: All elevations are based on U.S.G.S. Datum.

ESTIMATED QUANTITES					AS BUILT QUANTITIES		
Item	Unit	Substr.	Superstr.	Total	Substr.	Superstr.	Total
Class I Excavation for Structures	Cu.Yd.				178		178
Treated Timber Piles in Place	Lin.Ft.	1160	———	1160	1,004.5		1,004.5
Class "A" Concrete	Cu.Yd.	77.6	———	77.8	77.8		77.8
Lightweight Concrete	Cu.Yd.	———	57.6	57.6		57.7	57.7
Fabricated Structural Steel	Lb.	———	77,600	77,600		77,840	77,840
Reinforcing Steel	Lb.	7,240	12,660	19,900	7,240	12,660	19,900
Steel Castings	Lb.	———	1,400	1,400		1,520	1,520
Removal of Existing Concrete	Lump Sum	One	———	One			One

△



LOCATION PLAN

GENERAL NOTES

SPECIFICATIONS: Standard Specifications of the Kansas State Highway Commission, 1955 Edition, supplemented by General and Special Provisions.

DESIGN: In accordance with Division III of the A.A.S.H.O. "Standard Specifications for Highway Bridges", 1953 Edition.

DESIGN LOADING: Live Load - H15-44.
Dead Load - Provision is made for a future wearing surface of 15 pounds per square foot of roadway surface.

DESIGN UNIT STRESSES:

Structural Steel	16,000	pounds	per	square	inch
Reinforcing Steel	20,000	"	"	"	"
Concrete (Lightweight Aggregate)	1000	"	"	"	"
Concrete (Stone Aggregate)	1200	"	"	"	"

CONCRETE: Class "A" air-entrained concrete shall be used for all substructure units. Roadway slab and curbs shall be Haydite, air-entrained concrete. See Special Provisions.

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

REINFORCEMENT: All reinforcement steel shall be lapped a minimum of 30 diameters unless otherwise shown. All dimensions to reinforcing steel on detail drawings are to ℄ of bar, except where the clear distance is noted from the face of concrete.

TIMBER PILES: All timber piles shall be driven to sustain a load of 25 tons. They shall have a minimum penetration of 30 feet.

JOINT FILLER: Where joint filler is specified on the plans, it shall conform with the requirements for Expansion Joint Filler, Type "A", as given in Section 117.20 of the Standard Specifications. Payment for filler will be included in unit contract prices for items in which it is placed.

JOINT SEAL: Where joint seal is specified it shall conform to the requirement as given in the Standard Specifications. Payment for seal will be included in contract prices for other items of work.

COPPER FLASHING: Payment for Copper Flashing will be included in unit contract price for concrete.

RIVETS: Rivets are as noted on drawings. Field connections to be riveted unless otherwise shown or noted. No Rivets. Used H.S. Bolts.

△

PAINTING OF METALWORK: Shop coat - Red Lead, first field coat - Aluminum, second field coat - Aluminum. The first field coat of Aluminum shall be tinted with Prussian Blue in order to differentiate it from the second field coat. The second field coat shall be Aluminum, untinted. Payment for cleaning and painting shall be included in the price bid for the respective metal work payment items. No paint required for existing steel.

FABREEKA PADS: See Special Provisions.

ROADWAY WEARING SURFACE: The roadway slab as detailed includes a 2" wearing surface poured monolithically with slab.

EXCAVATION: All excavation above finished ground line is included in quantities for Road Work.
Class I Excavation for Stuctures includes all excavation below finished ground line, or as noted on Benching Detail at New South Abut., and within the limits set forth by the Standard Specifications.

CONSTRUCTION JOINTS: Construction joints shall be made only at the locations shown on the plans. Keys shall be provided at all construction joints.

INDEX OF DRAWINGS

21 GENERAL PLAN AND ELEVATION
22 NEW SOUTH ABUTMENT AND NEW BENT 2
23 REVISED BENT 3 AND SUBSTRUCTURE BAR LIST
24 STEEL DETAILS
25 STEEL AND SLAB DETAILS
26 STANDARD BI-TYPICAL BAR TYPES AND HOOK DIMENSIONS

ALTERATIONS TO EXISTING FAIRFAX BRIDGE OVER MISSOURI RIVER NEAR KANSAS CITY, KANSAS

FOR PLATTE COUNTY, MISSOURI

GENERAL PLAN AND ELEVATION

SVERDRUP AND PARCEL, INC.
CONSULTING ENGINEERS
ST. LOUIS, MO.

FINISHED

FINISHED

KANSAS

Drawn by: H.T. Sanders, June 1956

Checked by: G.R. Pennington, June 1956

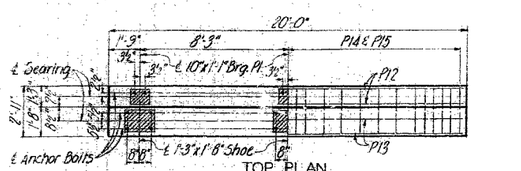
Note: Do not scale this drawing. Follow dimensions.

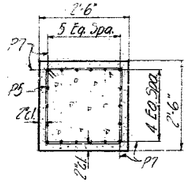
Revision △ Quantities and Rivets 1-20-59 By R.E.B. Ch'k'd. J.E.C.

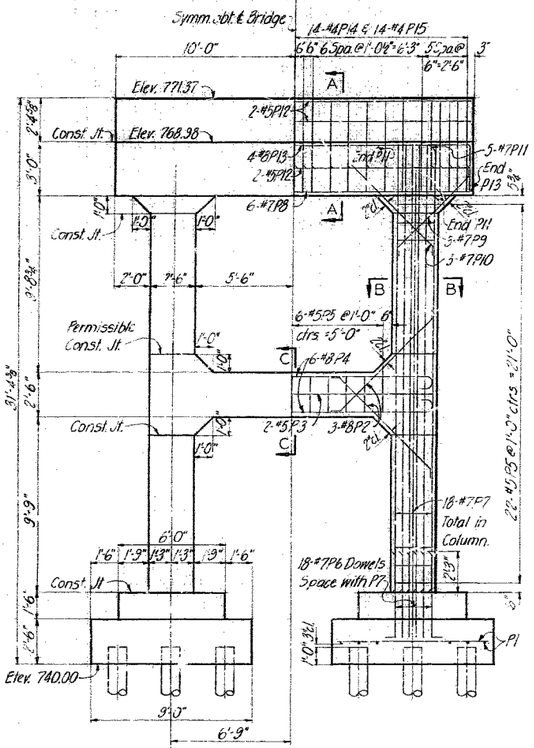
SHEET 21 OF 26

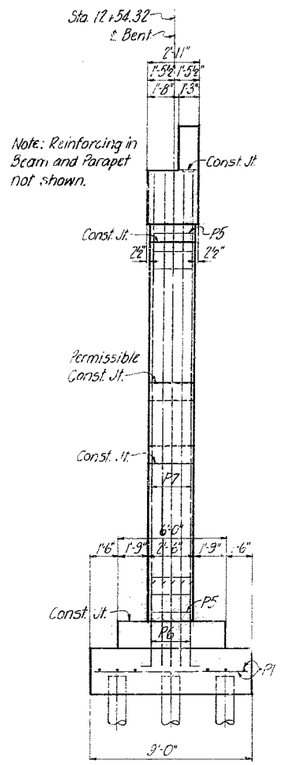
AS BUILT DRAWING

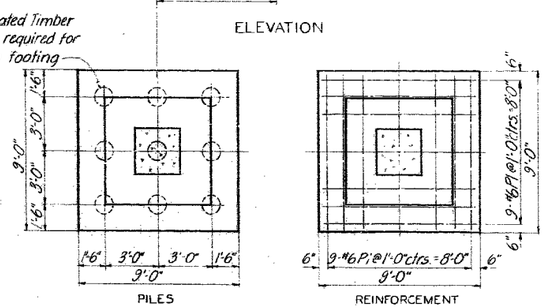
FINAL DESIGN DRAWING

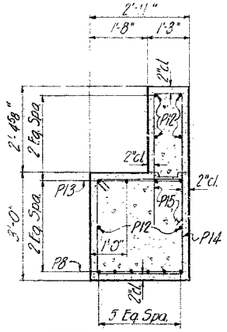


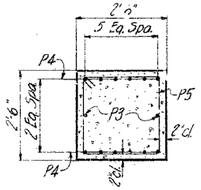




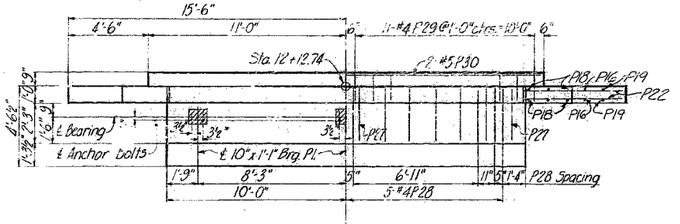


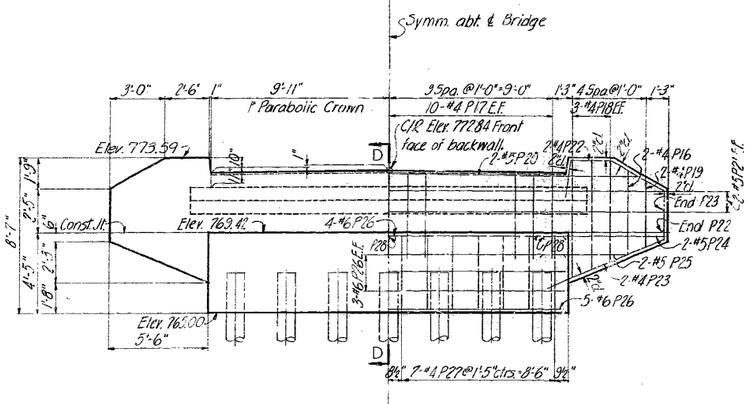


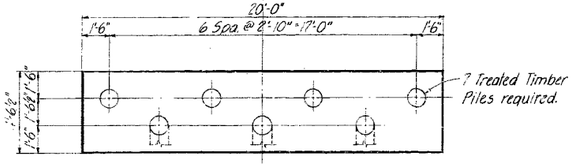




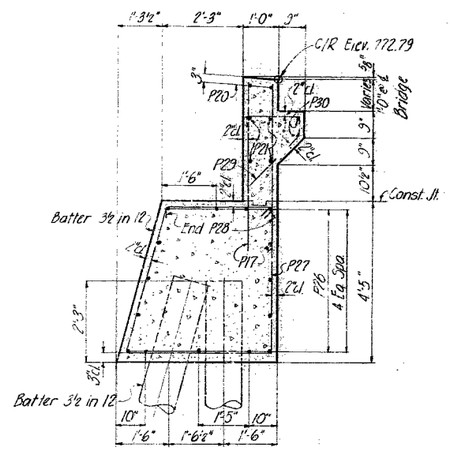
NEW BENT 2







NEW SOUTH ABUTMENT



NOTES

E.P. indicates Each Face.
Anchor bolts shall be cast in place.
See Sheet 25 for details of copper flashing to be placed at New South Abutment.

ALTERATIONS TO
EXISTING FAIRFAX BRIDGE
OVER MISSOURI RIVER
NEAR KANSAS CITY, KANSAS
FOR
PLATTE COUNTY, MISSOURI

NEW SOUTH ABUTMENT
AND NEW BENT 2

SVERDRUP AND PARCEL, INC.
CONSULTING ENGINEERS
ST. LOUIS, MO.

FINISHED

1205
56346

Drawn by: R.E. Skubiz, May 1956
Checked by: G.R. Pennington, June 1956

Note: Do not scale this drawing. Follow dimensions.

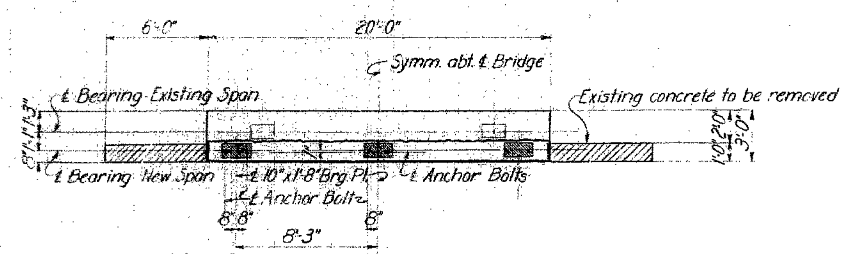
FINISHED

SHEET 22 OF 26

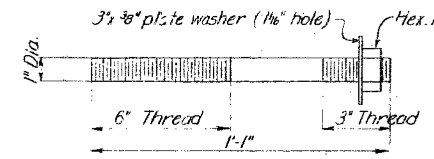
K-456 A2

AS BUILT DRAWING

FINAL DESIGN DRAWING

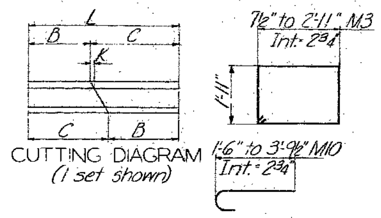


TOP PLAN



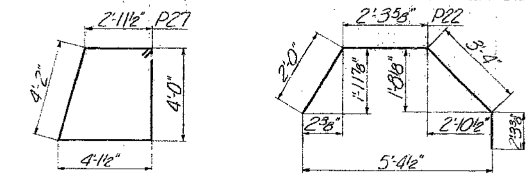
ANCHOR BOLT

6 Anchor Bolts and 6-1" Cinch Anchors required



CUTTING DIAGRAM (1 set shown)

Mark	Cutting Schedule	B	C	K	L
P18	Cut 2 sets of 3 each	5'-7½"	6'-5½"	5"	12'-1"
M3	Cut 1 set of 11 & Bend	5'-10"	10'-5"	5½"	16'-3"
M10	Cut 2 sets of 11 each & Bend	2'-1"	4'-4½"	2¾"	6'-5½"

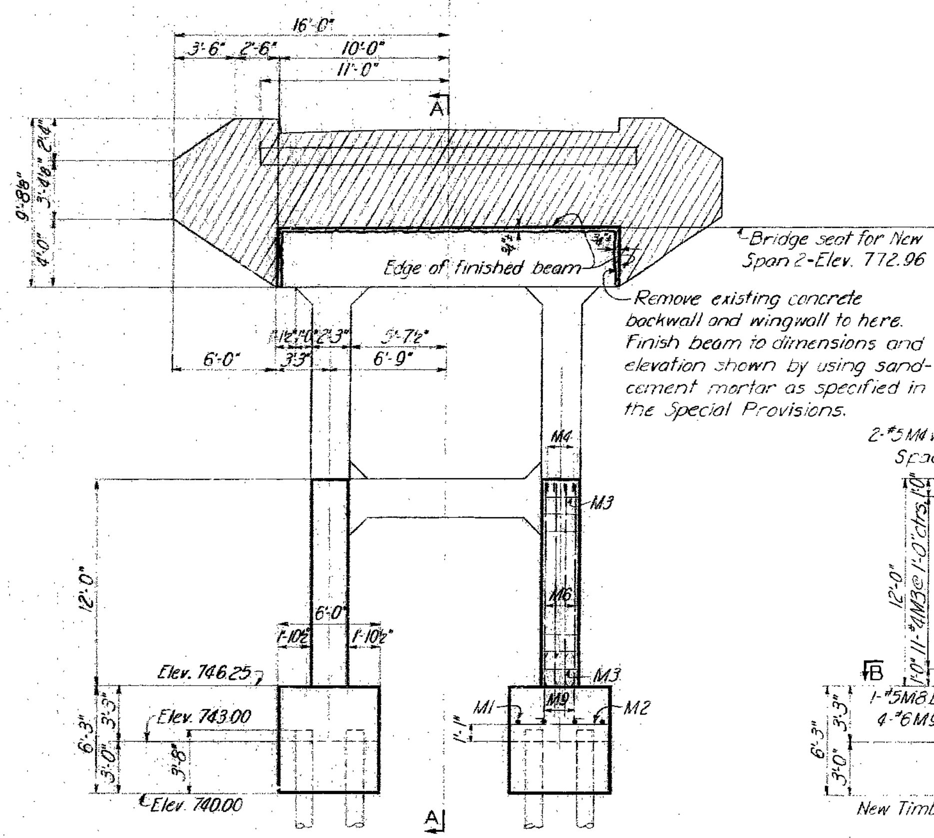


SPECIAL BENDING DETAILS

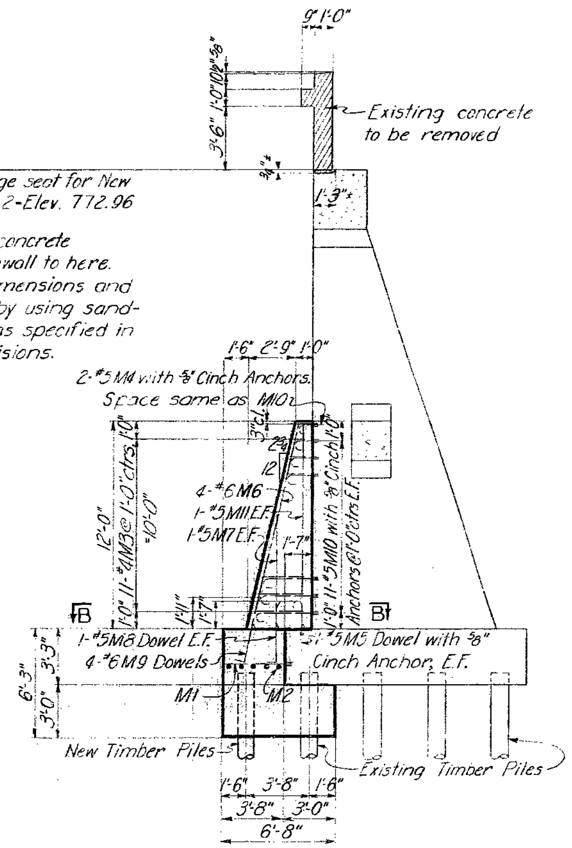
No. Reqd.	Size	Length	Mark	Type	Location	A	B	C	D	E	F	G	H	J	K	R	O
						NEW BENT 2											
36	#6	8'-6"	P1	Str.	Footing												
12	#8	8'-6"	P2	14	Strut	—	6"	7'-6"	6"	—			4¼"		4¼"		8'-2⅛"
2	#5	15'-8"	P3	Str.	do												
12	#8	17'-10"	P4	1	do	1'-1"	15'-8"					1'-1"					
55	#5	9'-6"	P5	T1	Strut & Col.	5"	2'-2"	2'-2"	2'-2"	2'-2"		5"					
36	#7	5'-2"	P6	2	Column	5"	4'-9"					—					
36	#7	24'-10"	P7	Str.	do												
6	#7	19'-8"	P8	Str.	Beam												
6	#7	6'-8"	P9	19	Column		5"	5'-9¾"	5"				3½"		3½"		6'-4¾"
6	#7	7'-2"	P10	19	do		5"	6'-9"	—				3½"		3½"		7'-0½"
10	#7	6'-1"	P11	11	Beam	—	2'-3"	1'-6⅞"	2'-3"							1⅛"	3'-3"
6	#5	19'-8"	P12	Str.	do												
4	#8	24'-11"	P13	17	do		2'-7½"	19'-8"	2'-7½"								
27	#4	11'-3"	P14	T1	do	4½"	2'-7"	2'-8"	2'-7"	2'-8"		4½"					
27	#4	8'-3"	P15	17	do		3'-8"	11"	3'-8"								
						NEW SOUTH ABUTMENT											
4	#4	4'-10"	P16	Str.	Wall												
38	#4	4'-8"	P17	Str.	do												
6	#4	12'-1"	P18	Str.	do	See Cutting Diagram											
4	#4	3'-9	P19	Str.	do												
2	#5	28'-0"	P20	Str.	do												
4	#5	30'-8"	P21	Str.	do												
4	#4	9'-11"	P22	Spcl.	do	See Bending Detail											
4	#4	8'-9"	P23	19	do		1'-8"	7'-1"	—				1'-6½"		7⅝"		
4	#5	7'-1"	P24	Str.	do												
4	#5	5'-1"	P25	Str.	do												
15	#6	19'-8"	P26	Str.	Beam												
14	#4	16'-0"	P27	Spcl.	do	See Bending Detail											
9	#4	3'-6"	P28	2	do	3"	2'-11½"					3"					
22	#4	4'-2"	P29	16	Wall	3"	1'-5"	6⅛"	2'-0"				1'-5"		1'-5"		
2	#5	21'-8"	P30	Str.	do												
						REVISED BENT 3											
8	#5	3'-11"	M1*	Str.	Footing												
10	#5	5'-6"	M2	Str.	do												
11	#4	16'-3"	M3	Spcl.	Shaft	See Cutting Diagram & Bending Detail											
4	#5	1'-11"	M4*	1	do	7"	1'-4"					—					
4	#5	2'-8"	M5*	1	Footing	7"	2'-1"					—					
8	#6	12'-8"	M6	19	Shaft		8"	12'-0½"	—				7¾"		1¾"		12'-2¼"
4	#5	6'-6"	M7	Str.	do												
4	#5	4'-1"	M8	2	Footing	4"	3'-9"					—					
8	#6	4'-5"	M9	2	do	4"	4'-1"					—					
22	#5	6'-6"	M10*	Spcl.	Shaft	See Cutting Diagram & Bending Detail											
4	#5	11'-9"	M11	Str.	do												

Note: Reinf. bars indicated thus * shall be plain bars, threaded 3" on anchor end.

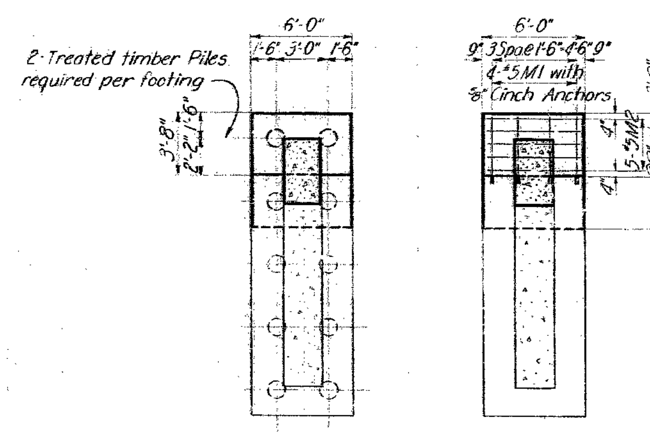
SUBSTRUCTURE BAR LIST



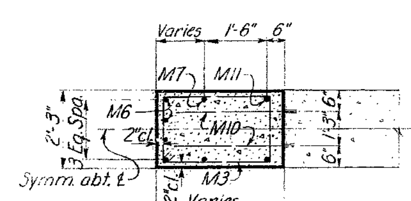
ELEVATION



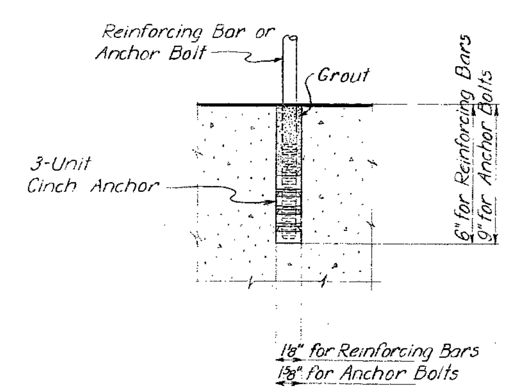
SECTION A-A



FOOTING PLAN



SECTION B-B



EMBEDMENT OF CINCH ANCHOR

REVISED BENT 3

NOTES

Dimensioning, bending and hooks for Special Bending Details shall conform to the standards as shown or noted on Sheet 26.

A dash is used in the appropriate dimension column to indicate that a hook, bend or portion of the standard bar type is to be omitted.

For Typical Bar Types and Hook Dimensions, see Sheet 26.

E.F. indicates Each Face.

Threaded plain reinforcing bars are included in above bar list and will be paid for as "Reinforcing Steel".

Cinch Anchors indicated on this sheet shall be type 2, three-unit threaded Ring Wedge Cinch Anchors, or equal.

Cost of furnishing and placing Cinch Anchors shall be included in Lump Sum bid for "Removal of Existing Concrete."

ALTERATIONS TO EXISTING FAIRFAX BRIDGE OVER MISSOURI RIVER NEAR KANSAS CITY, KANSAS

FOR

PLATTE COUNTY, MISSOURI

REVISED BENT 3 AND SUBSTRUCTURE BAR LIST

SVERDRUP AND PARCEL, INC. CONSULTING ENGINEERS ST. LOUIS, MO.

FINISHED

Drawn by: G. L. Dyslin, July 1956

Checked by: G. R. Pennington, July 1956

Note: Do not scale this drawing. Follow dimensions.

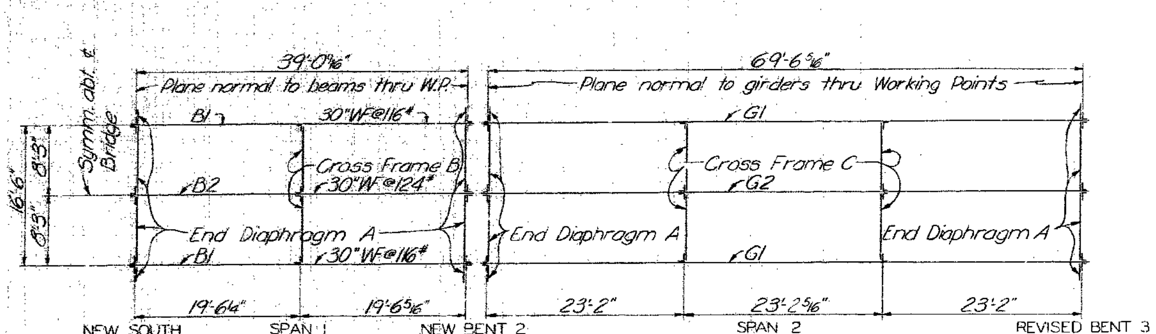
SHEET 23 OF 26

K-856A2

AS BUILT DRAWING

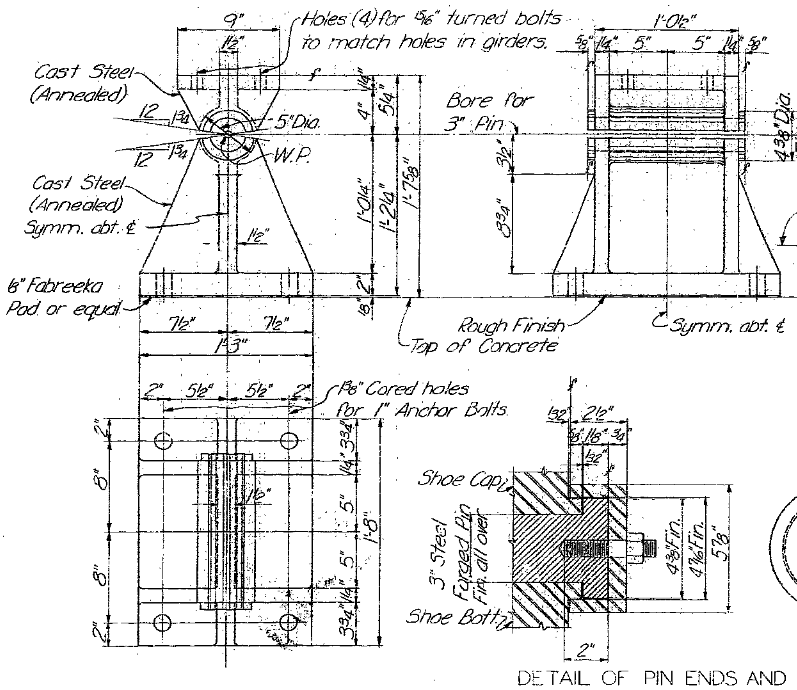
FINAL DESIGN DRAWING

340

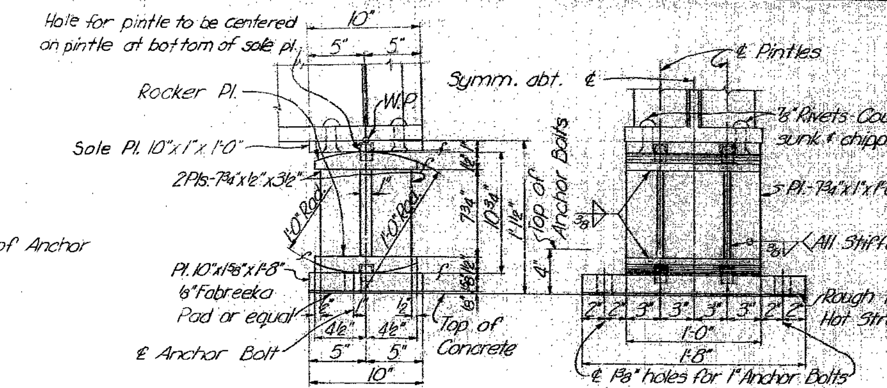


FRAMING PLAN

Longitudinal dimensions are measured parallel to grade.
For girder material in Span 2, see Section Thru G1 & G2.

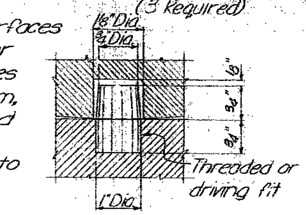


FIXED SHOE AT NEW BENT 2 - SPAN 2
(3 Required)

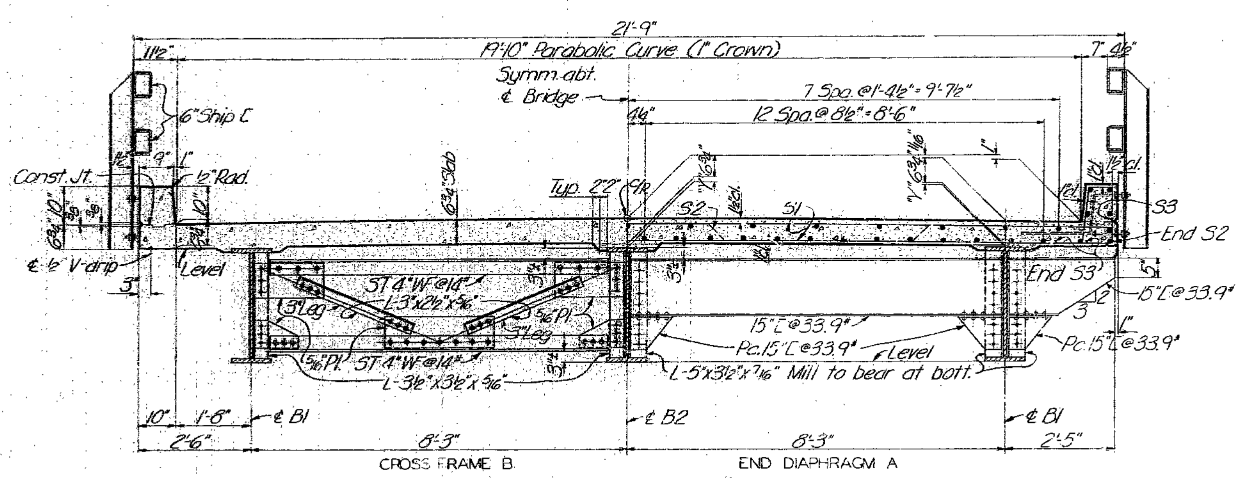


EXPANSION SHOE AT REVISED BENT 3 - SPAN 2
(3 Required)

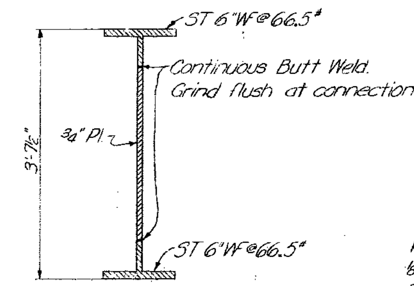
Note: Contact surfaces between rocker plates and plates welded to them, shall be finished to provide full contact prior to welding.



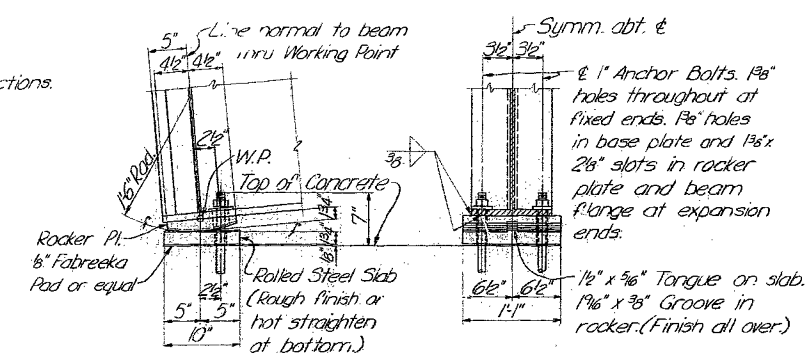
DETAIL OF PINTLE
(12 Required)
Finish all over.



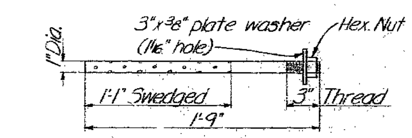
CROSS SECTION THRU SPAN 1



SECTION THRU G1 & G2

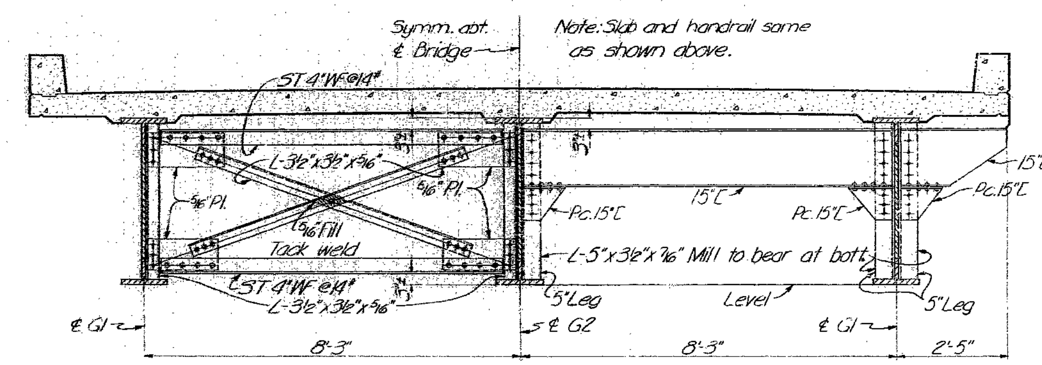


SHOES-SPAN 1
(3 Exp. Required)
(3 Fixed Required)



ANCHOR BOLT
(24 Required)

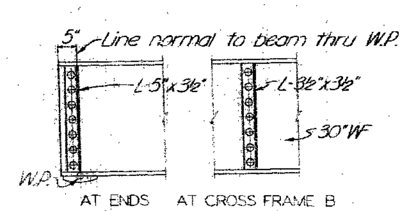
Note: Use this anchor bolt at New South Abut. & New Bent 2. For anchor bolt at Revised Bent 3, see Sheet 23.



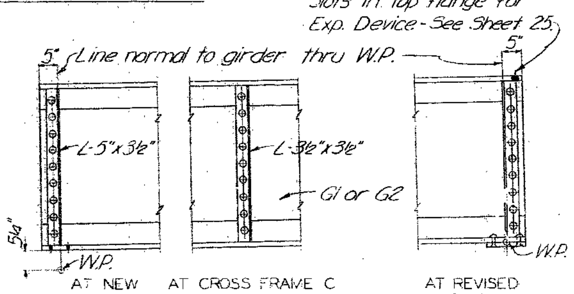
CROSS SECTION THRU SPAN 2

HAUNCH HEIGHTS "Y"		
Span	Beam or Girder	"Y"
1	B1	⅞"
	B2	1"
2	G1	⅝"
	G2	1"

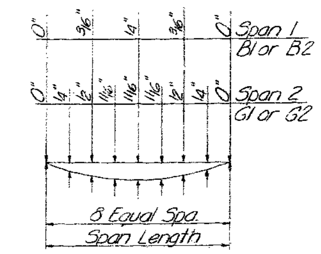
For location of dimension "Y", see Cross Section Thru Span 1.
Dimension "Y" is at ℄ bearing.
For haunches at intermediate points add "Y" to Dead Load Deflection Ordinates.



BEAM ELEVATION



GIRDER ELEVATION



DEAD LOAD
DEFLECTION ORDINATES

Note: Beams & Girders are not to be cambered.
Deflection due to dead load of steel only, equals the following percentages of the deflections shown:
Span 1 = 20%
Span 2 = 30%

NOTES

Work this sheet with Sheet 25.
All rivets in beams or girders shall be ⅞". All others shall be ¾". Where desired for convenience in erection, shop and field rivets may be interchanged.
Steel castings shall conform to A.S.T.M. Designation A27, Grade 65-35, fully annealed. All fillets on castings shall be ½".
Steel forgings for pins shall conform to A.S.T.M. Designation A235, Class C1, fully annealed.
The diameter of turned bolts as billed shall be the shank diameter. The threaded portion shall be 1/16" smaller in diameter than the shank, and the hole shall be the same diameter as the shank, providing a driving fit.

ALTERATIONS TO
EXISTING FAIRFAX BRIDGE
OVER MISSOURI RIVER
NEAR KANSAS CITY, KANSAS
FOR
PLATTE COUNTY, MISSOURI

STEEL DETAILS FINISHED

SVERDRUP AND PARCEL, INC.
CONSULTING ENGINEERS
ST. LOUIS, MO.

FINISHED

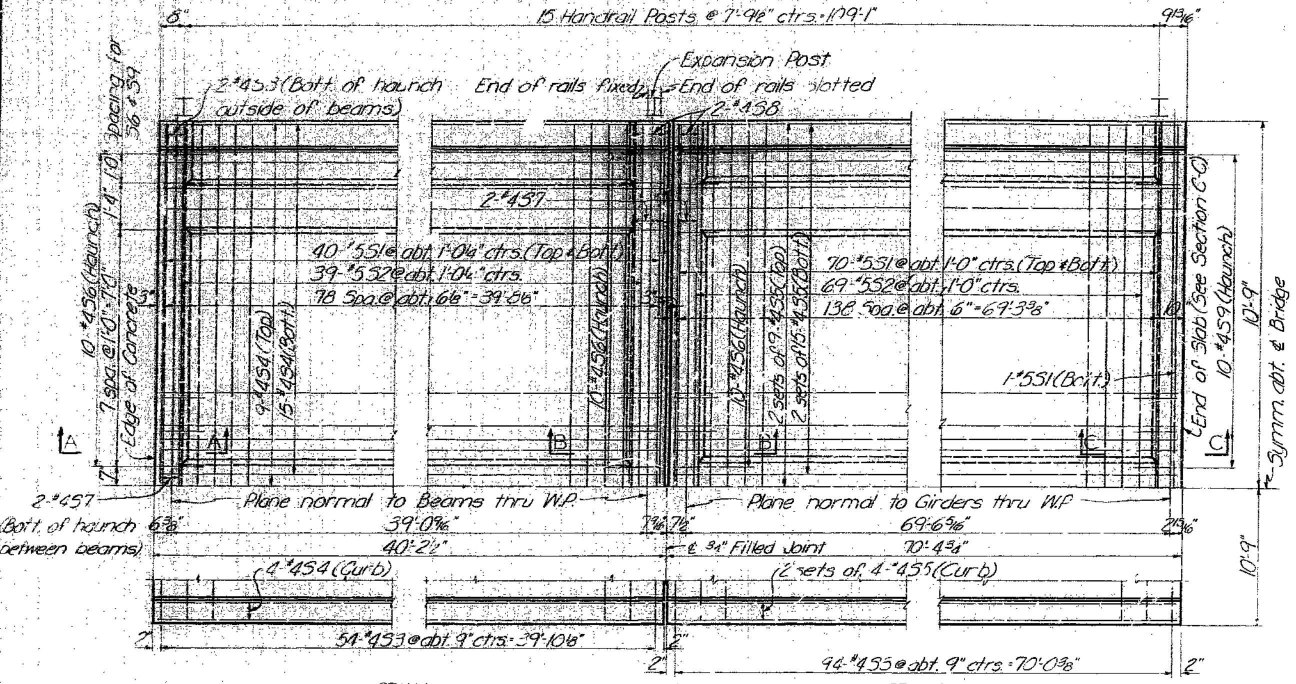
Drawn by: H.T. Sanders, May, 1956
Checked by: G.R. Pennington, June, 1956

Note: Do not scale this drawing. Follow dimensions.

SHEET 24 OF 26 K-456A2

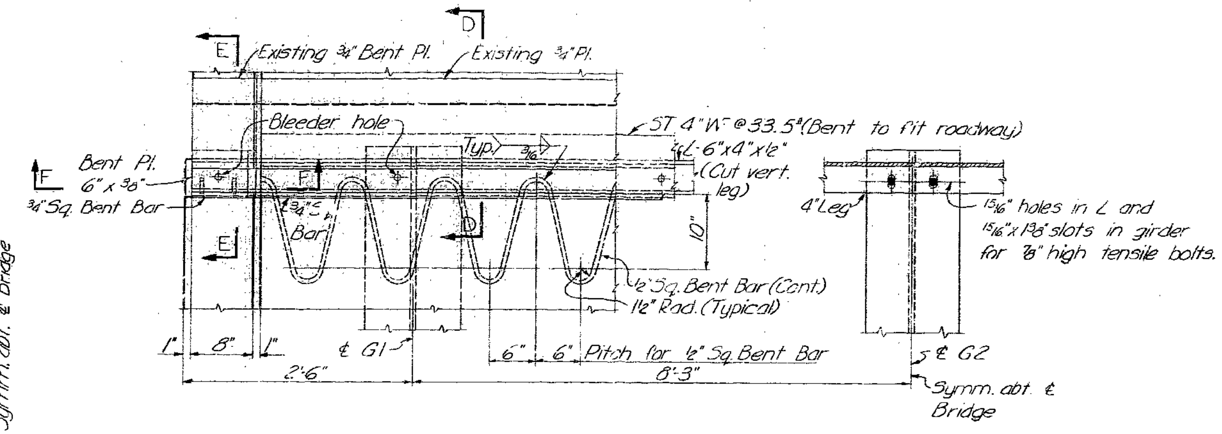
AS BUILT DRAWING FINAL DESIGN DRAWING

341

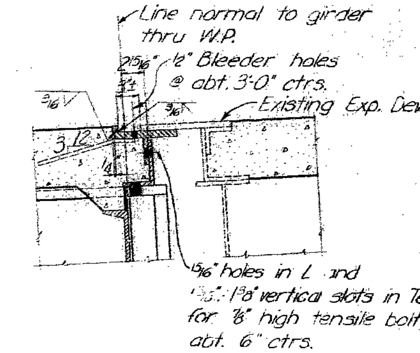


SLAB DETAILS

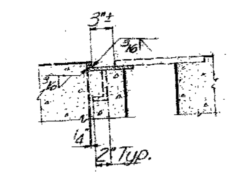
Longitudinal slab dimensions are measured along grade.
Handrail posts are spaced along top of curb.



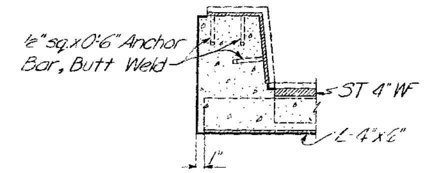
PART PLAN OF EXPANSION DEVICE AT REVISED BENT 3



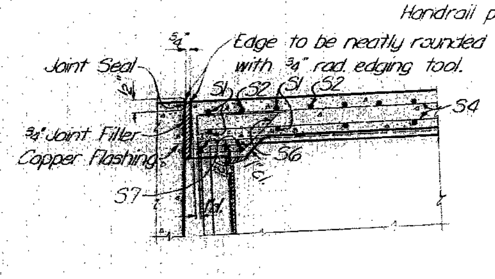
SECTION D-D



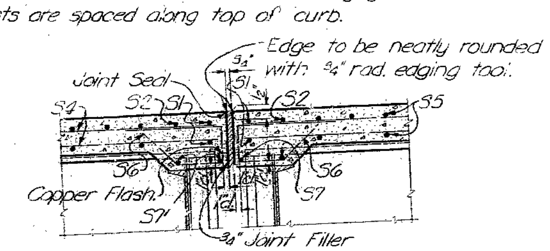
SECTION E-E



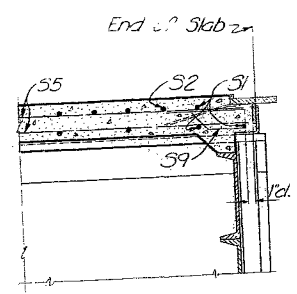
SECTION F-F



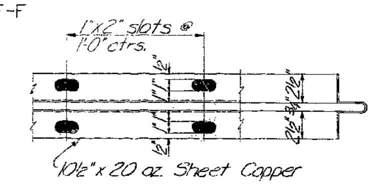
SECTION A-A



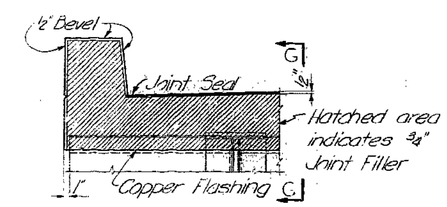
SECTION B-B



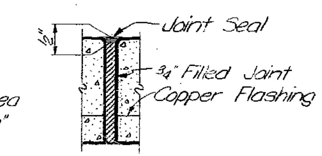
SECTION C-C



COPPER FLASHING



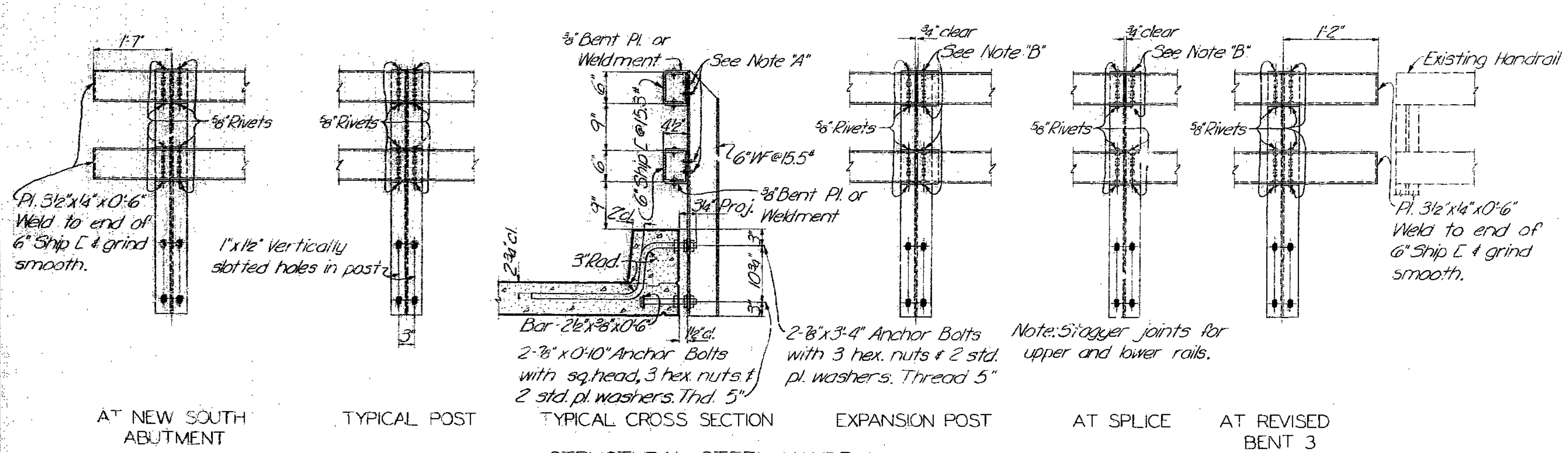
LIMITS OF COPPER FLASHING AND JOINT FILLER



SECTION G-G

SUPERSTRUCTURE BAR LIST					
No. Reqd.	Size	Length	Mark	Type	Location
221	#5	21'-3"	S1	Str.	Slab
106	#5	22'-6"	S2	Spcl.	do
296	#4	4'-7"	S3	Spcl.	Curb
55	#4	39'-11"	S4	Str.	Slab & Curb
110	#4	35'-8"	S5	Str.	do
60	#4	3'-2"	S6	Spcl.	Haunch
12	#4	7'-2"	S7	Str.	do
12	#4	1'-9"	S8	Str.	do
20	#4	2'-7"	S9	Spcl.	do

Note: Dimensioning and bending for Special Bending Details shall conform to the standards as shown or noted on Sheet 26.



STRUCTURAL STEEL HANDRAIL

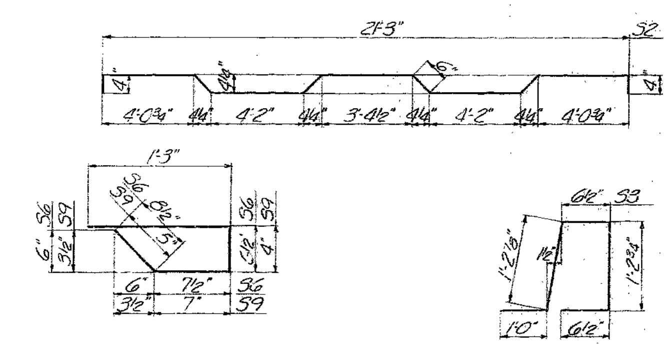
Note: Handrail posts shall be set normal to grade.

Note "A": 11/16" holes in posts. 11/16" x 1½" vertical slots in bent plate for ⅝" bolts with hex. heads & nuts & std. pl. washer under heads & nuts.

Note "B": 11/16" holes in bent plate. 11/16" x 1¾" horizontal slots in 6" ℄ for ⅝" button head bolts with 2 hex. nuts & 1 std. pl. washer.

NOTES

Work this sheet with Sheet 24.



SPECIAL BENDING DETAILS

ALTERATIONS TO EXISTING FAIRFAX BRIDGE OVER MISSOURI RIVER NEAR KANSAS CITY, KANSAS

FOR

PLATTE COUNTY, MISSOURI

STEEL AND SLAB DETAILS

SVERDRUP AND PARCEL, INC.
CONSULTING ENGINEERS
ST. LOUIS, MO.

Drawn by: H.T. Sanders, May 1956
Checked by: G.R. Pennington, June 1956

Note: Do not scale this drawing. Follow dimensions.

SHEET 25 OF 26

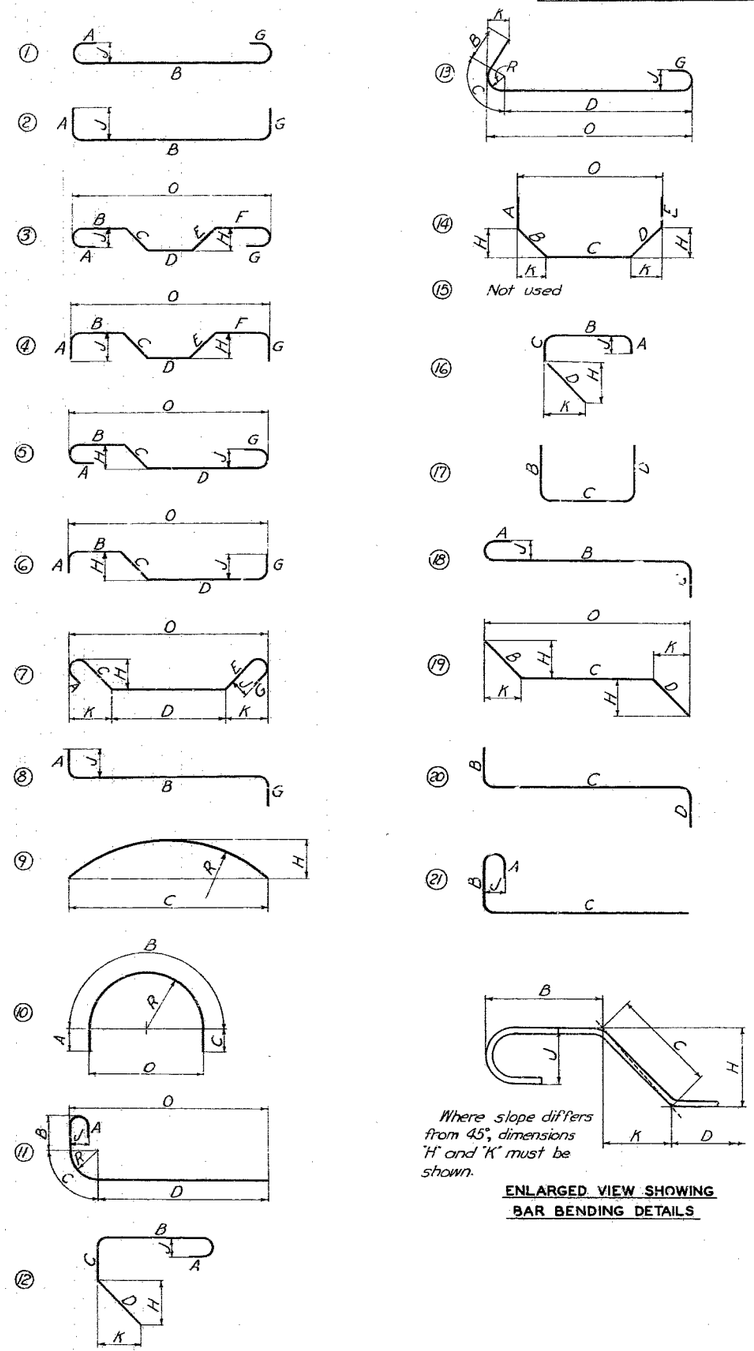
K-456A2

AS BUILT DRAWING

FINAL DESIGN DRAWING

342

TYPICAL BAR TYPES



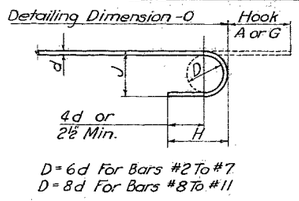
Where slope differs from 45°, dimensions "H" and "K" must be shown.

ENLARGED VIEW SHOWING BAR BENDING DETAILS

NOTES

1. All dimensions are out to out, except "R" which is to inside of bend.
2. "J" Dimension on 180° hooks to be shown in Bar List only where necessary to restrict hook size, otherwise standard hooks are to be used.
3. Where "J" is not shown, "J" will be kept equal to or less than "H". Where "J" can exceed "H", it should be shown in Bar List.
4. "H" Dimension on stirrups to be shown on Bar List where necessary to restrict hooks.
5. Corrections in length, due to bending around a mandrel, will be made only when the radius "R" (as in types 11 and 13) exceeds the standard radii indicated in standard hook dimensions. However, the dimensions "A" or "G" shown for standard hooks have been corrected for curvature.
6. All bends shown are bent around a standard mandrel, except where radius "R" is indicated.
7. Figures in circles show bar types.
8. Where "R" is shown on bar types 9, 10, 11 and 13, the length of bend shall be measured along outside of bend. The length of bar type T3 shall also be measured along outside of bar.

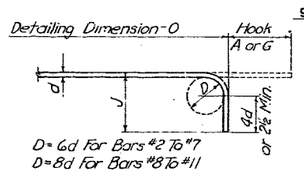
STANDARD HOOK DIMENSIONS



D = 6d For Bars #2 To #7
D = 8d For Bars #8 To #11

180° HOOK

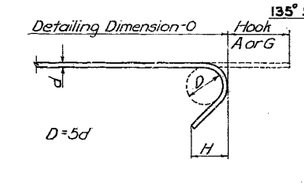
Bar Size	Hook A or G	J	Approx. H
#2	4"	2"	3½
#3	5"	3"	4"
#4	6"	4"	4½
#5	7"	5"	5"
#6	8"	6"	6"
#7	10"	7"	7"
#8	1'-1"	10"	9"
#9	1'-3"	1'-1⅛"	10⅛"
#10	1'-5"	1'-0⅝"	11¼"
#11	1'-7"	1'-2"	1'-0⅝"



D = 6d For Bars #2 To #7
D = 8d For Bars #8 To #11

90° HOOK

Bar Size	Hook A or G	Approx. J
#2	3"	3½"
#3	3"	4"
#4	3"	4½"
#5	4"	5"
#6	4"	6"
#7	5"	7"
#8	6"	9"
#9	7"	10"
#10	8"	11½"
#11	9"	1'-0½"



135° STIRRUP HOOK

Bar Size	Hook A or G	H
#2	3½"	2"
#3	4"	2⅝"
#4	4½"	2⅞"
#5	5"	2⅞"

BAR SIZE EQUIVALENTS			
#2	6"ϕ	#7	⅞"ϕ
#3	⅜"ϕ	#8	1"ϕ
#4	½"ϕ	#9	1"□
#5	⅝"ϕ	#10	1⅛"□
#6	¾"ϕ	#11	1¼"□

ALTERATIONS TO
EXISTING FAIRFAX BRIDGE
OVER MISSOURI RIVER
NEAR KANSAS CITY, KANSAS
FOR
PLATTE COUNTY, MISSOURI

STANDARD BAR TYPES AND HOOK DIMENSIONS

SVERDRUP AND PARCEL, INC.
CONSULTING ENGINEERS
ST. LOUIS, MO.

1259
515/149

Drawn by: A. Avila, Dec. 1951
Traced by: L. Glaser, Dec. 1951
Checked by: W. Littlefield, Jan. 1952
Revised: Feb., 1953

FINISHED

SHEET 26 OF 26

FINISHED

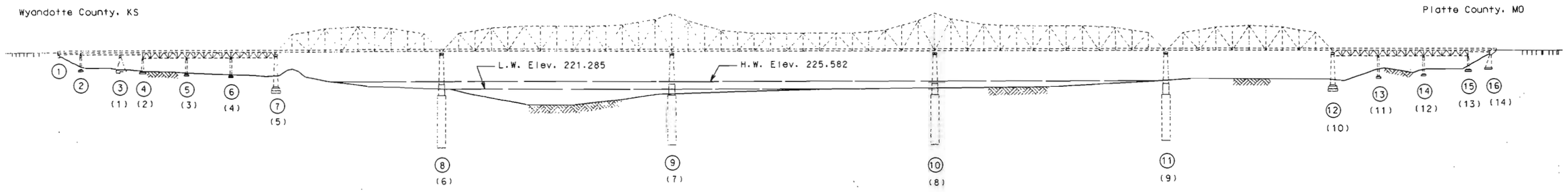
K-156A2

AS BUILT DRAWING

FINAL DESIGN DRAWING STANDARD BI

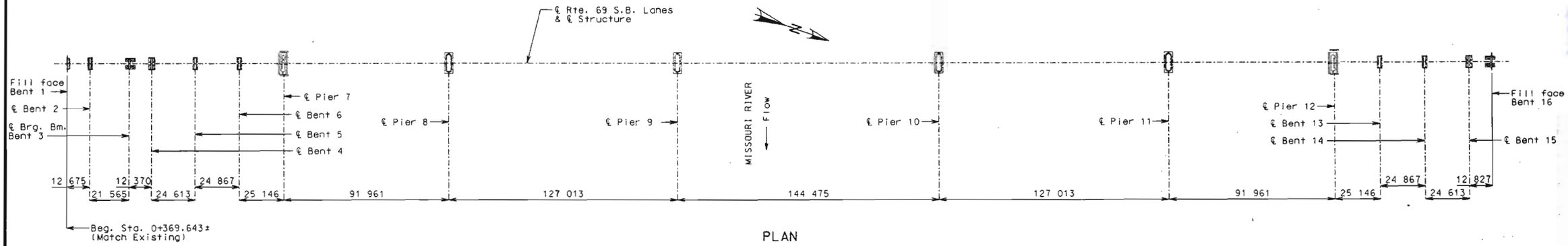
MISSOURI HIGHWAY AND TRANSPORTATION COMMISSION

State	Proj. No.	Sheet No.
MO		B1
Sec./Sur. 8	Twp. 50N	Rge. 33W



GENERAL ELEVATION

Bent and pier numbers in parentheses indicate numbering of bents and piers prior to rehabilitation of bridge in 1957 (addition of two bents).



PLAN

DATE 8-20-99

Note: See sheet no. 2 for Estimated Quantities and General Notes.

REPAIRS TO BRIDGE OVER MISSOURI RIVER
FAIRFAX BRIDGE AT RIVERSIDE

STATE ROAD FROM PLATTE COUNTY, MO
TO WYANDOTTE COUNTY, KS

PROJECT NO.

JOB. NO. J4U1292

STA. 0+369.643±

RTE. 69 S.B.L

PLATTE COUNTY

Date: 8/24/99

STD. M706.35

K04563

Designed Oct. 1998
Detailed Oct. 1998
Checked July 1999

ESTIMATED QUANTITIES

ITEM		SUBSTR.	SUPERSTR.	TOTAL
Asphalt Removal (Bridges)	sq. meter		5083.7	5083.7
Partial Removal of Existing Steel Grid Deck	sq. meter		256.9	256.9
Remove & Replace Dam Angle @ Open Curb Areas	meter		1053.5	1053.5
Remove and Replace End Posts	each		2	2
Partial Removal of Substructure Concrete	lump sum	1		1
Temporary Falsework	lump sum	1		1
Alternate Asphaltic Concrete Wearing Surface (Bridge)	sq. meter		4847	4847
Polymer Modified Asphalt (Seal Coat)	Liter		8250	8250
Cover Aggregate	Megagram		73	73
Class B Concrete (Substr)	cu. meter	8.6		8.6
Substructure Repair (Formed)	sq. meter	15.0		15.0
Substructure Repair (Unformed)	sq. meter	60.0		60.0
Protective Coating - Concrete Bents (Deleterious Agents)	lump sum	1		1
Slab on Steel	sq. meter		257	257
Concrete Repair in Steel Grid Deck	sq. meter		50.0	50.0
Strip Seal Expansion Device (@ Bent No. 3)	meter		6.5	6.5
Strip Seal Expansion Device (@ Bents No. 5 & 14)	meter		13.0	13.0
Navigation Lighting System	lump sum		1	1
Reinforcing Steel (Epoxy Coated)	kilogram	975		975
Expansion Device (Finger Plate) (@ Piers No. 7 & 12)	meter		13.0	13.0
Expansion Device (Finger Plate) (@ Piers No. 8 & 11)	meter		13.0	13.0
Expansion Device (Finger Plate) (@ Panel Point L19)	meter		6.5	6.5
Steel Curb	meter		79.5	79.5
Remove & Replace Rail Tubes	meter		49.0	49.0
Existing Diaphragm Connections to Flange	lump sum		1	1
Surface Preparation for Recoating Structural Steel	lump sum		1	1
Field Application of Inorganic Zinc Primer	lump sum		1	1
Transporting Lead Contaminated Residue to Storage Area	lump sum		1	1
Transporting Lead Contaminated Residue to the Smelter	lump sum		1	1
Disposal of Lead Contaminated Residue	lump sum		1	1
Intermediate Field Coat (System G) Gray	lump sum		1	1
Finish Field Coat (System G) Gray	lump sum		1	1

Estimated Quantities for Alternate Asphaltic Concrete Wearing Surface

Type of Wearing Surface	Asphaltic Binder (Megagram)	Mineral Aggregate (Megagram)	SM Fibers (Kilogram)	Mix Used (✓)
SP125MCSM Mix	29.9	445	1468	
SP125MCLP Mix	26.9	439	N/A	

MoDOT construction personnel shall complete column labeled "Mix Used (✓)".

Type PG 70-22 asphalt binder is required in the asphaltic concrete mix for the bridge deck overlay.

The polymer modified asphalt shall be applied at the rate of 1.7 liters per square meter.

The cover aggregate shall be applied at a rate of 15.0 kg per square meter.

Estimated Quantities for Slab on Steel

Item		Total
Reinforcing Steel (Epoxy Coated)	kilogram	10 700
Concrete	cu. meter	45.5

The table of Estimated Quantities for Slab on Steel 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 meter of Slab on Steel.

Note: Contractor shall protect existing 305 mm gas line and maintain navigation lighting system during construction.

GENERAL NOTES:

State	Proj. No.	Sheet No.
MO		B 2

Design Specifications:
AASHTO - 1996 and Interims thru 1998
Load Factor Design (Slab Replacement)

Design Loading:
MS18

Design Unit Stresses:

Class B Concrete (Substructure)	f'c = 21 MPa
Class B1 Concrete (Barrier End Post)	f'c = 28 MPa
Class B2 Concrete (Slab Replacement)	f'c = 28 MPa
Reinforcing Steel (Grade 420)	fy = 420 MPa
Structural Carbon Steel (ASTM A709M Grade 250)	fy = 250 MPa

Reinforcing Steel:
Minimum clearance to reinforcing steel shall be 40 mm, unless otherwise shown.

Miscellaneous:

A minimum vertical clearance of 6500 mm from top of rails and a minimum lateral clearance of 3800 mm from ℄ track to nearest temporary construction falsework shall be maintained during construction.

Roadway surfacing adjacent to bridge ends to match new bridge overlay.

Structure to be closed to traffic during construction. See roadway plans for traffic control during construction.

High strength bolts, nuts and washers will be sampled for quality assurance as specified in Section 106 of the Missouri Standard Specifications (Metric) and Field Section (FS-712) from Materials Manual.

Dimensions:

All dimensions are shown in millimeters (mm) unless otherwise specified.

Drawings are not to scale. Follow dimensions.

All elevations are specified in meters except as noted.

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

Maintain Grade:
In order to maintain grade and a minimum thickness of overlay as shown on plans, it may be necessary to use additional quantities of overlay at various locations throughout the structure. No payment will be allowed for additional labor, materials, or equipment for variations in thickness of overlay.

Verify Dimensions:
Contractor shall verify all dimensions in field before ordering materials.

Bars Bonded in Old Concrete:
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, unless otherwise noted.

Structural Steel:
Fabricated structural steel shall be ASTM A709M Grade 250 except as noted.

Coating:

Protective Coating: System G by the contractor. (See Special Provisions.)

All exposed steel including form pans and steel grid shall be prepared, prime coated, intermediate coated and finish coated.

Prime Coat: The cost of the prime coat shall be included in the contract unit price per lump sum of Field Application of Inorganic Zinc Primer. Tint of the prime coat for System G shall be similar to the color of the field coat to be used.

Existing structural steel exposed by the herein described removals which will become inaccessible in the completed rehabilitated structure shall be prepared and coated with a prime coat of the specified coating system while exposed.

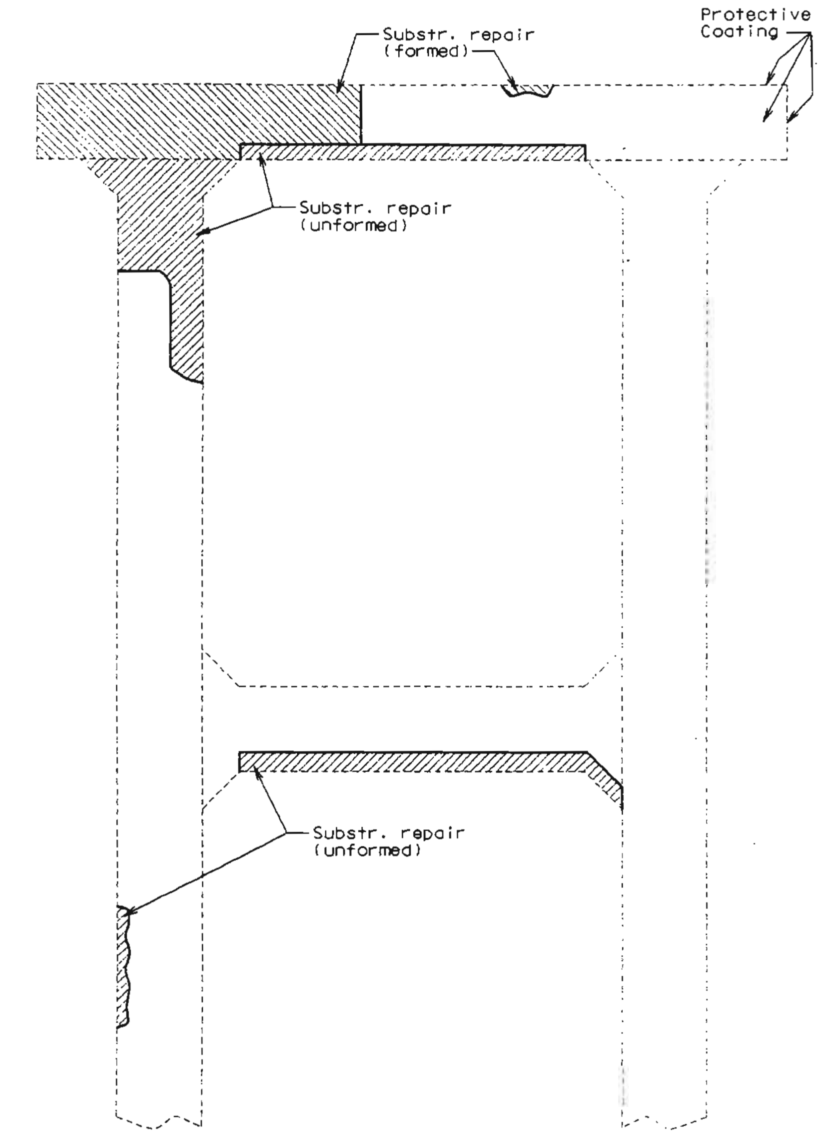
Field Coat: The color of the finish coat shall be Gray (Federal Standard #26373). The cost of the intermediate coat shall be included in the contract unit price per lump sum of Intermediate Field Coat (System G) Gray. The cost of the finish coat shall be included in the contract unit price per lump sum of Finish Field Coat (System G) Gray.

DATE 8-20-99

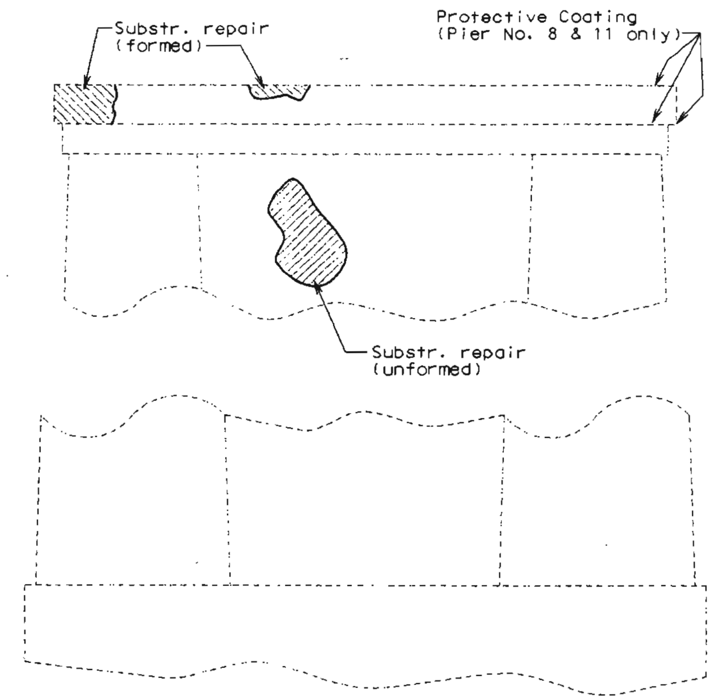
Detailed Oct. 1998
Checked July 1999

QUANTITIES & GENERAL NOTES

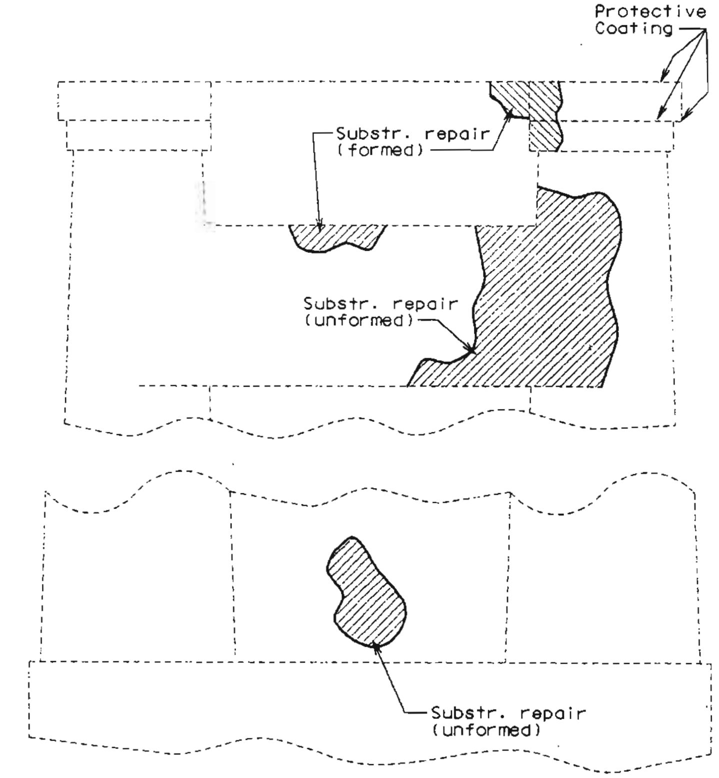
State	Proj. No.	Sheet No.
MO		B3



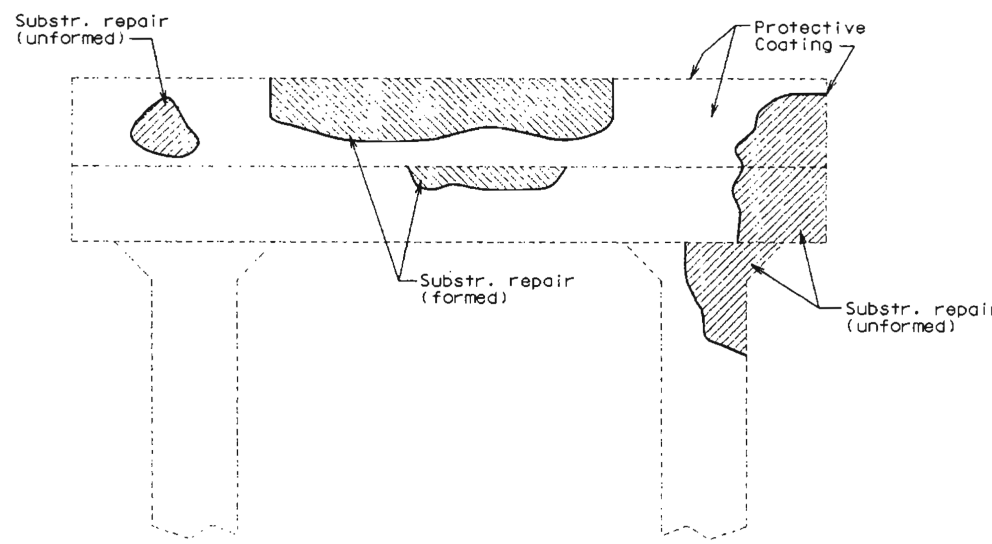
PART ELEVATION OF BENT 5
SHOWING SUBSTRUCTURE REPAIR



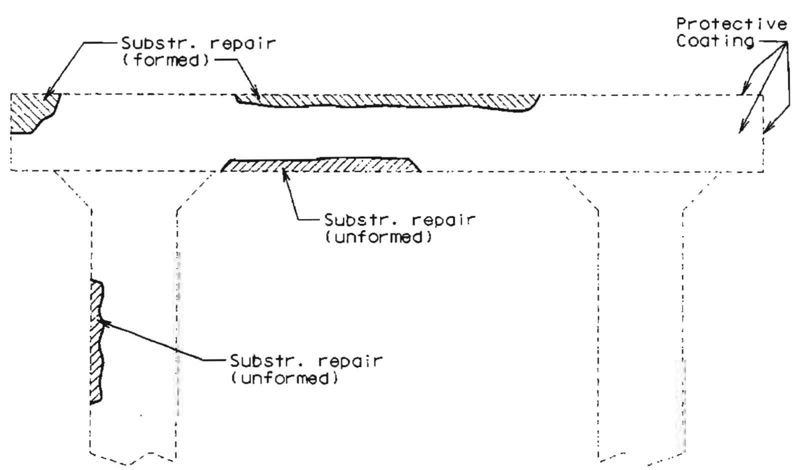
PART ELEVATION OF PIERS 8 THRU 11
SHOWING SUBSTRUCTURE REPAIR



PART ELEVATION OF PIERS 7 & 12
SHOWING SUBSTRUCTURE REPAIR



PART ELEVATION OF BENT 2
SHOWING SUBSTRUCTURE REPAIR



PART ELEVATION OF BENTS 4, 6, 13, & 15
SHOWING SUBSTRUCTURE REPAIR

Estimated Quantities for Substructure Repair (Formed and Unformed)

Location	Area (sq. meters)
Bent No. 1	0.6
Bent No. 2	9.5
Bent No. 3	2.8
Bent No. 4	0.4
Bent No. 5	16.1
Bent No. 6	10.6
Pier No. 7	11.1
Pier No. 8	0.7
Pier No. 9	2.2
Pier No. 10	1.7
Pier No. 11	0.1
Pier No. 12	0.2
Bent No. 13	3.2
Bent No. 14	7.7
Bent No. 15	8.1
Bent No. 16	0.0
Totals	75.0

Note: The table of Estimated Quantities for Substructure Repair (Formed and Unformed) represents the quantities used by the state in preparing the cost estimate for substructure repairs. Variation may be encountered in these estimated quantities, but these variations cannot be used for an adjustment in the contract unit price per square meter of Substructure Repair (Formed) or Substructure Repair (Unformed).

Some typical substructure repair areas are shown here. Actual repair areas shall be designated by the Engineer.

Clean and seal all areas of substructure caps at Bent/Pier Nos. 2, 3, 4, 5, 6, 7, 8, 11, 12, 13, 14 & 15.

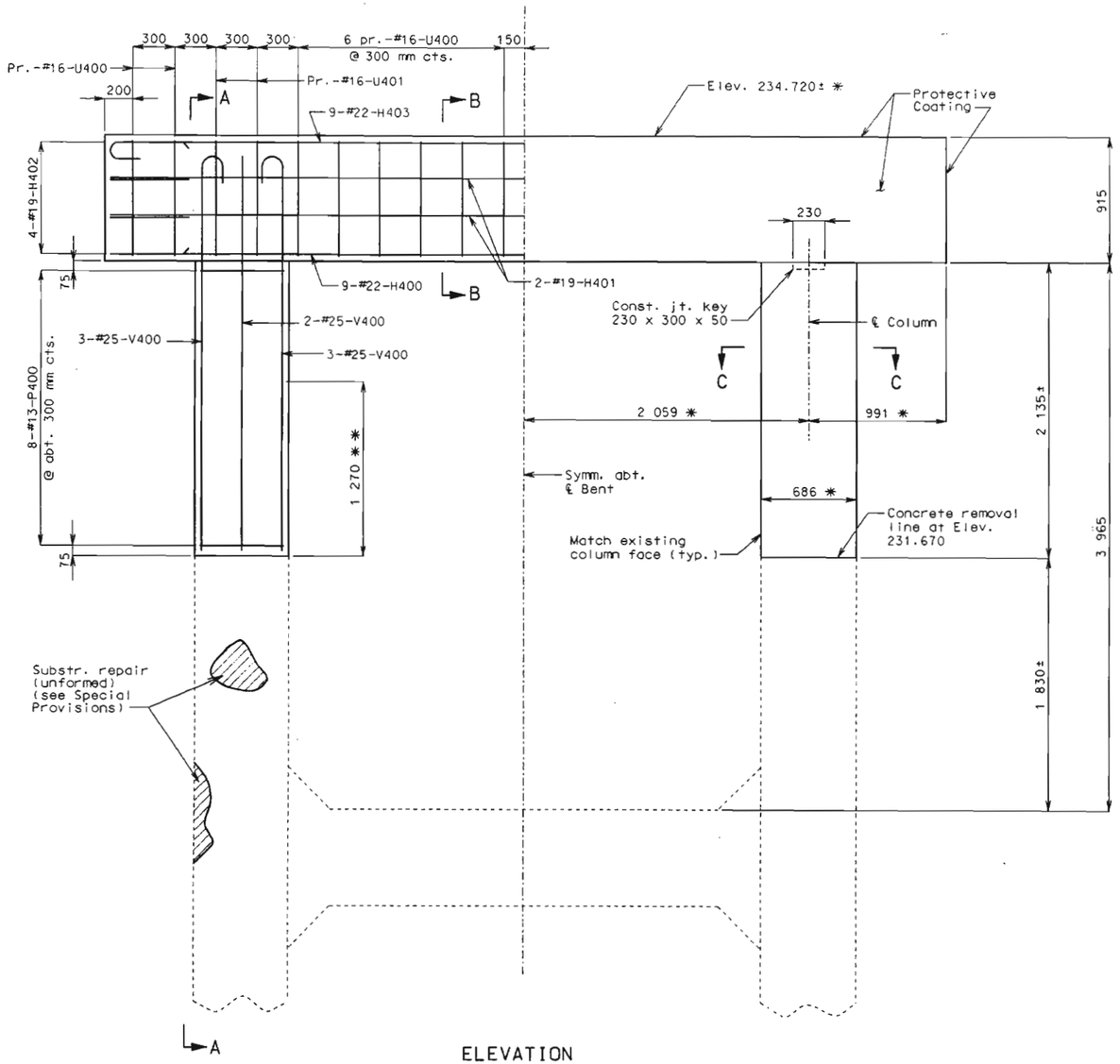
DATE 8-20-99

SUBSTRUCTURE REPAIR

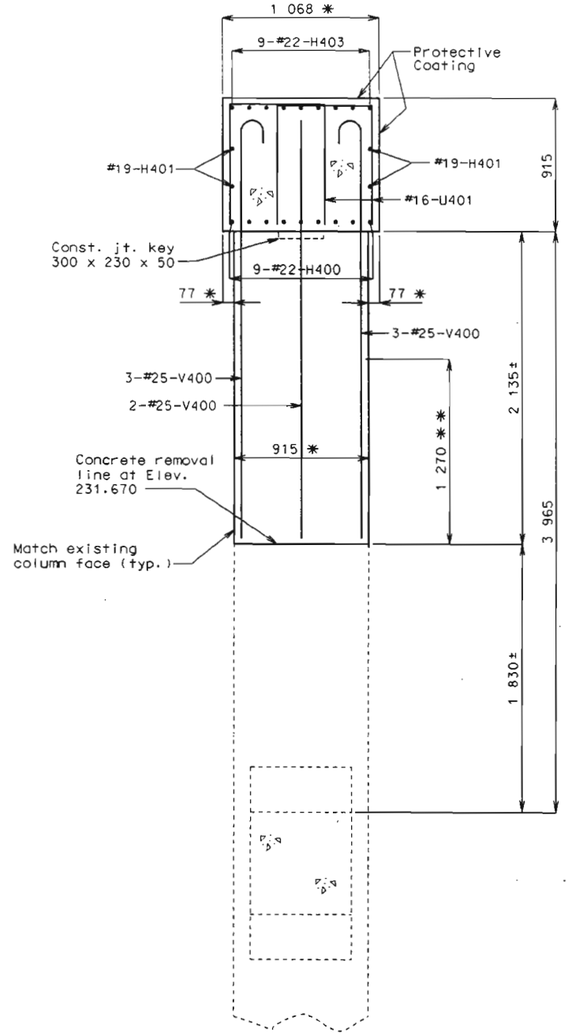
Detailed Sept 1998
Checked July 1999

PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		34



ELEVATION



SECTION A-A

* Match existing.

** Cut off existing vertical bars with 1270 mm projection into new column concrete and lap with new #25-V400 bars.

For Sections B-B and C-C, see sheet no. 5 .

For Plan of Beam, see sheet no. 5 .

Contractor shall provide temporary falsework to support approximately 321 kN at the end of each deck truss (total load = 321 x 4 = 1284 kN) during rehabilitation of Bent No. 14. See Special Provisions.

SUBSTRUCTURE QUANTITY TABLE FOR BT. NO. 14

ITEM		QUANTITY
Partial Removal of Substructure Concrete	lump sum	1
Temporary Falsework	lump sum	1
Class B Concrete (Substr)	cu. meter	8.6
Reinforcing Steel (Epoxy Coated)	kg	975

These quantities are included in the estimated quantities table on sheet no. 2.

STATE OF MISSOURI KURT E. GRIBBLE NUMBER E-23570 REGISTERED PROFESSIONAL ENGINEER

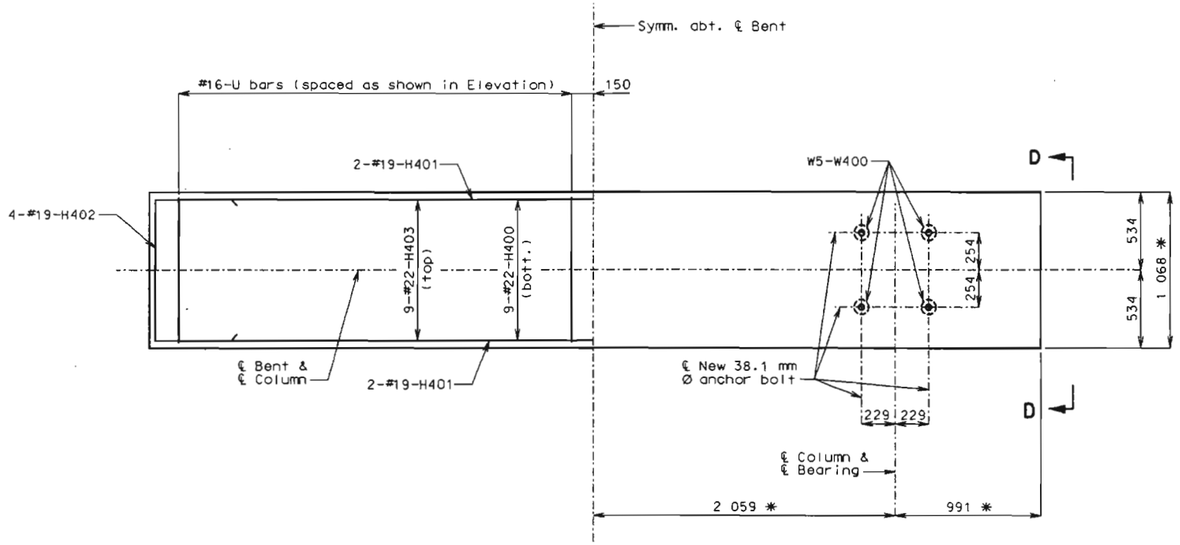
DATE 8-20-99

Detailed Sept 1998
Checked July 1999

DETAILS OF BENT NO. 14 REHABILITATION

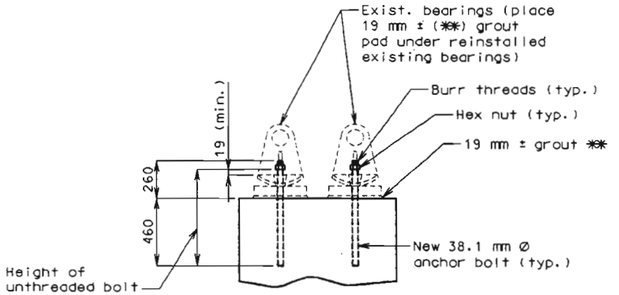
PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		35



PLAN OF BEAM

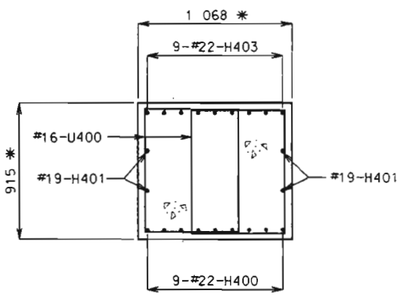
* Match existing



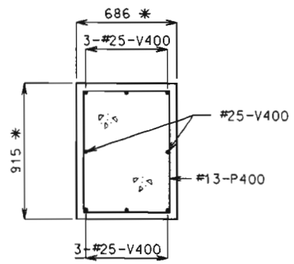
PART ELEVATION D-D

** Grout under bearing as required to maintain grade of roadway surface.

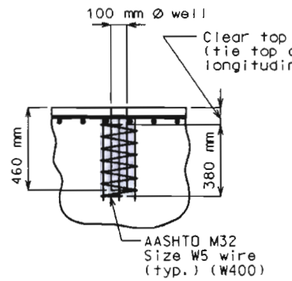
Note: Secure bearings with a hex nut per anchor bolt. The hex nut shall clear the rocker casting by 19 mm min.



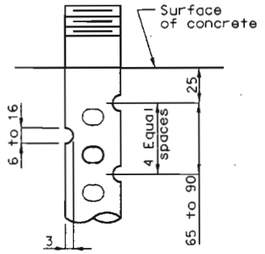
SECTION B-B



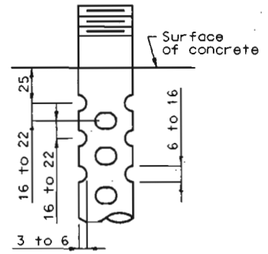
SECTION C-C



DETAIL OF ANCHOR BOLT WELLS



DETAIL FOR 19.0 mm Ø THRU 63.5 mm Ø ANCHOR BOLTS



OPTIONAL DETAIL FOR 34.9 mm Ø THRU 63.5 mm Ø ANCHOR BOLTS

SWEDGE ANCHOR BOLT DETAILS

Note: For location of Sections B-B and C-C, see sheet no. 4.

Anchor bolts shall be 38.1 mm diameter ASTM A709M Grade 345W steel swedged bolts and shall extend 380 mm into the concrete with ASTM A194M-2, 2H, or ASTM A563M-C, D, DH, DH3 heavy hexagon nuts. Actual manufacturer's certified mill test reports (chemical and mechanical) shall be provided. Swedging shall be 25 mm less than the extension into the concrete.

All structural steel for the anchor bolts and heavy hexagon nuts shall be coated with a minimum of two coats of inorganic zinc primer (125 micrometers minimum thickness) or galvanized in accordance with ASTM A153.

Cost of anchor bolts, hardened washers and heavy hexagon nuts for bearings shall be included in the price bid for Class B Concrete.

STATE OF MISSOURI KURT E. GAMBLE NUMBER E-23576 REGISTERED PROFESSIONAL ENGINEER

DATE 8-20-99

DETAILS OF BENT NO. 14 REHABILITATION

Detailed Sept 1998
Checked July 1999

PLATTE COUNTY K04563

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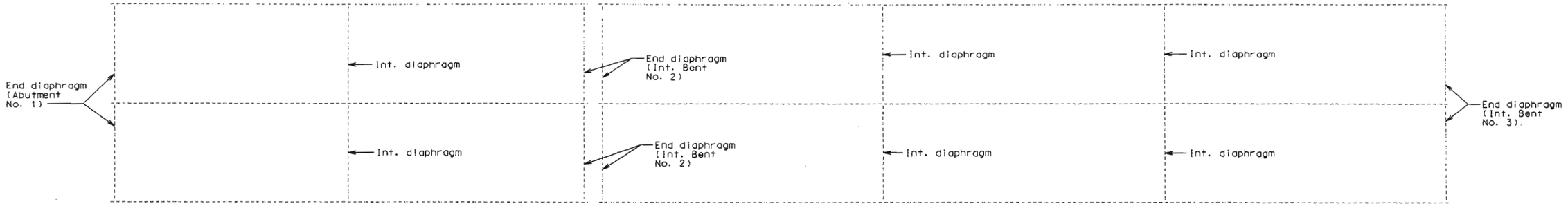
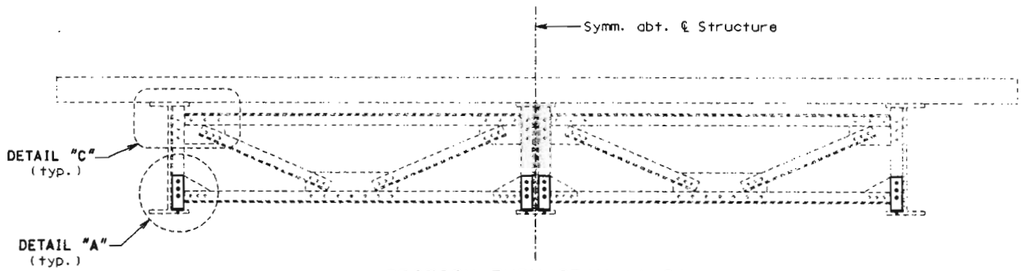
MO		36

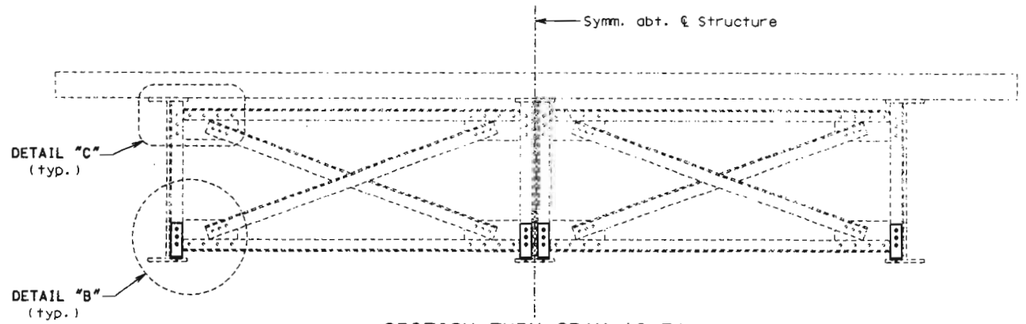


SPAN (1-2) SPAN (2-3)

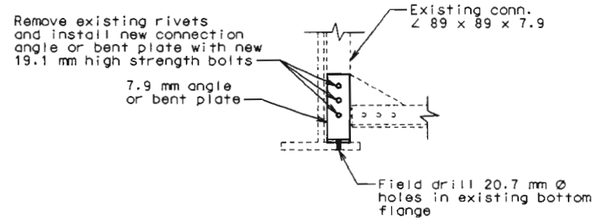
PART PLAN



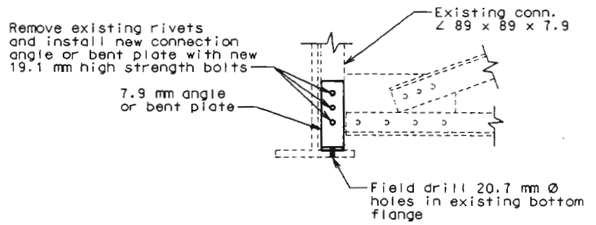
SECTION THRU SPAN (1-2)
SHOWING INTERMEDIATE DIAPHRAGMS



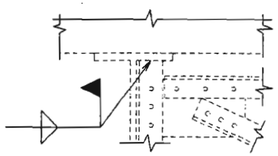
SECTION THRU SPAN (2-3)
SHOWING INTERMEDIATE DIAPHRAGMS



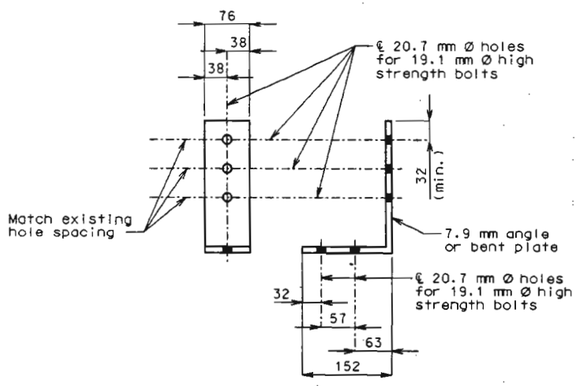
DETAIL "A"



DETAIL "B"



DETAIL "C"



DETAILS OF 7.9 mm CLIP ANGLE OR BENT PLATE
(12 REQ'D)

STATE OF MISSOURI
KURT E. GINDLE
NUMBER E-23678
PROFESSIONAL ENGINEER
DATE 8-26-99

DETAILS OF EXISTING DIAPHRAGM CONNECTIONS TO FLANGE

Detailed May 1999
Checked July 1999

PLATTE COUNTY K04563

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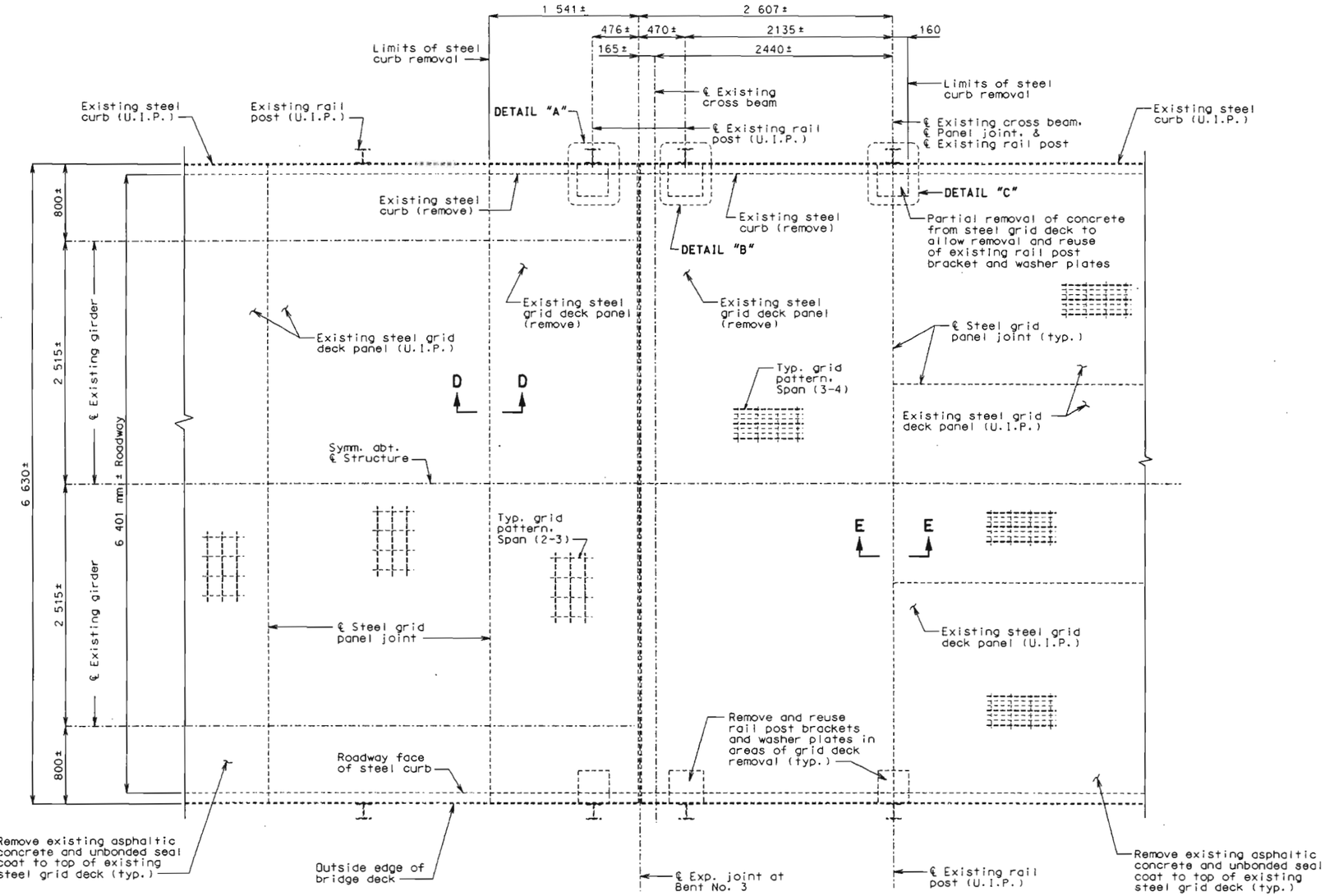

PART SPAN (2-3)

PART SPAN (3-4)

PART PLAN OF EXISTING DECK

Note: Removed rail post brackets and washer plates shall be cleaned and coated with a prime coat of the specified coating system before reinstallation with the new slab.

Payment for the removal of steel curb, rail post brackets and washer plates, as designated on the plans, shall be included in the contract unit price for Partial Removal of Existing Steel Grid Deck.

Note: For Details "A", "B", & "C" and Sections D-D & E-E, see sheet no. 8.

STATE OF MISSOURI
KURT E. GRIBBLE
NUMBER E-23578
REGISTERED PROFESSIONAL ENGINEER

DATE 8-20-99

Detailed June 1999
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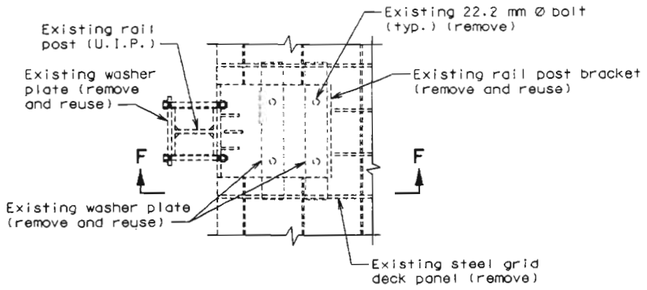
DETAILS OF DECK REMOVAL AT BENT NO. 3

Sheet No. 7 of 46

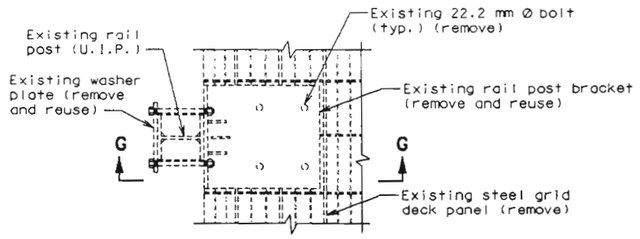
PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		38



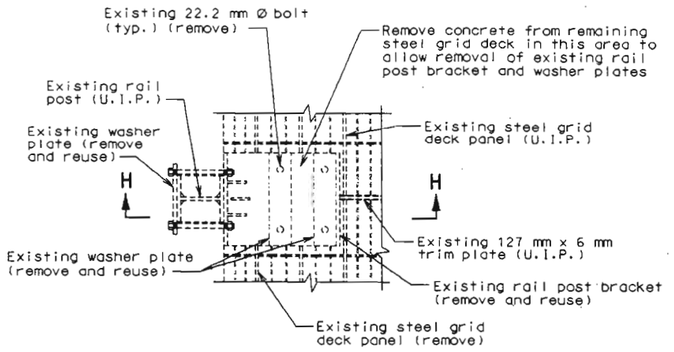
DETAIL "A"

(Rotated 90° counterclockwise)
Note: Steel curb not shown for clarity.



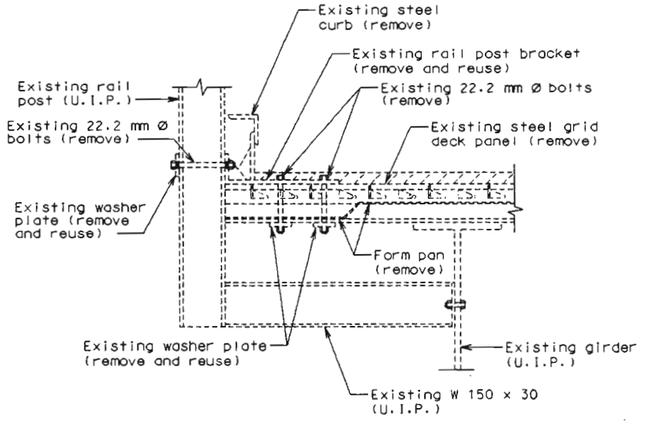
DETAIL "B"

(Rotated 90° counterclockwise)
Note: Steel curb not shown for clarity.

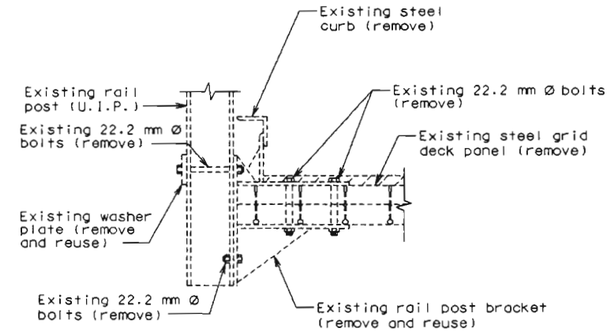


DETAIL "C"

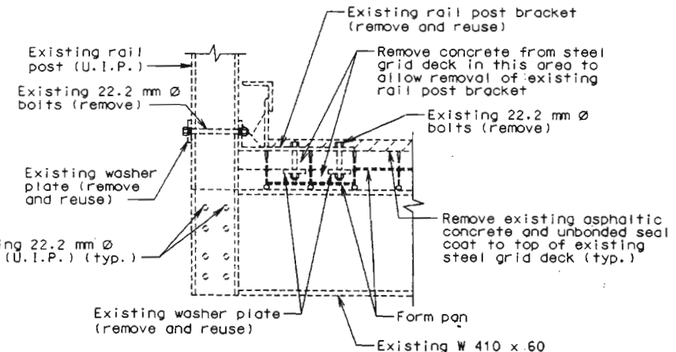
(Rotated 90° counterclockwise)
Note: Steel curb not shown for clarity.



SECTION F-F



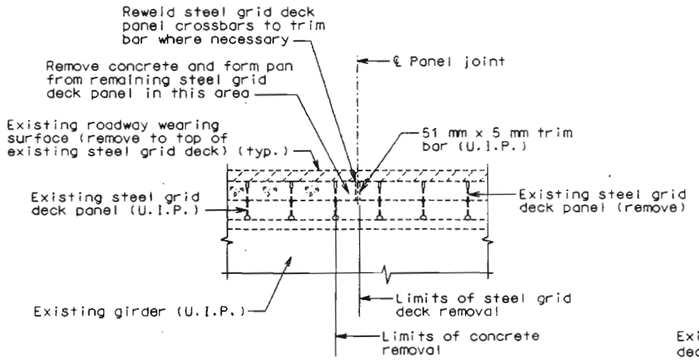
SECTION G-G



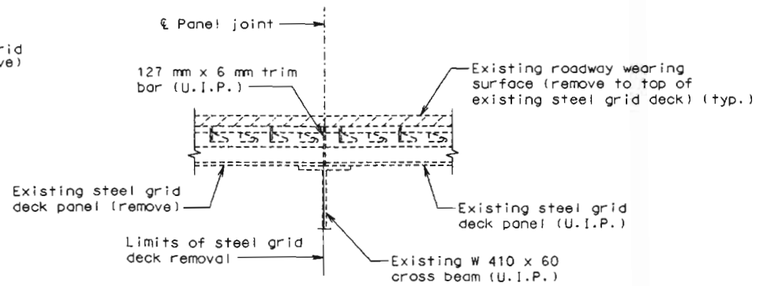
SECTION H-H

Note: For location of Details "A", "B", and "C", see sheet no. 7.

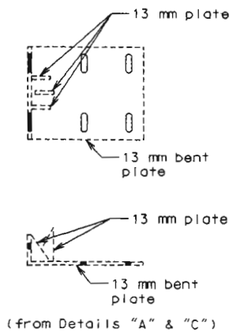
For location of Sections D-D and E-E, see sheet no. 7.



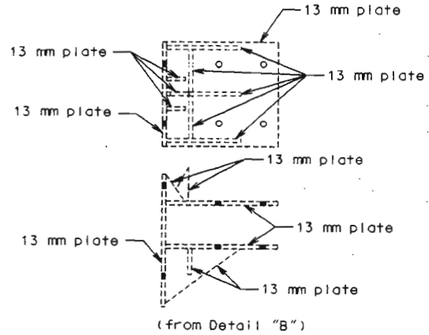
SECTION D-D



SECTION E-E



(from Details "A" & "C")



(from Detail "B")

DETAILS OF RAIL POST BRACKETS
(Remove and reuse with new slab)

DETAILS OF DECK REMOVAL AT BENT NO. 3

STATE OF MISSOURI KURT E. GRIBBLE NUMBER E-23570 REGISTERED PROFESSIONAL ENGINEER
DATE 8-20-99

Detailed June 1999
Checked July 1999

PLATTE COUNTY K04563

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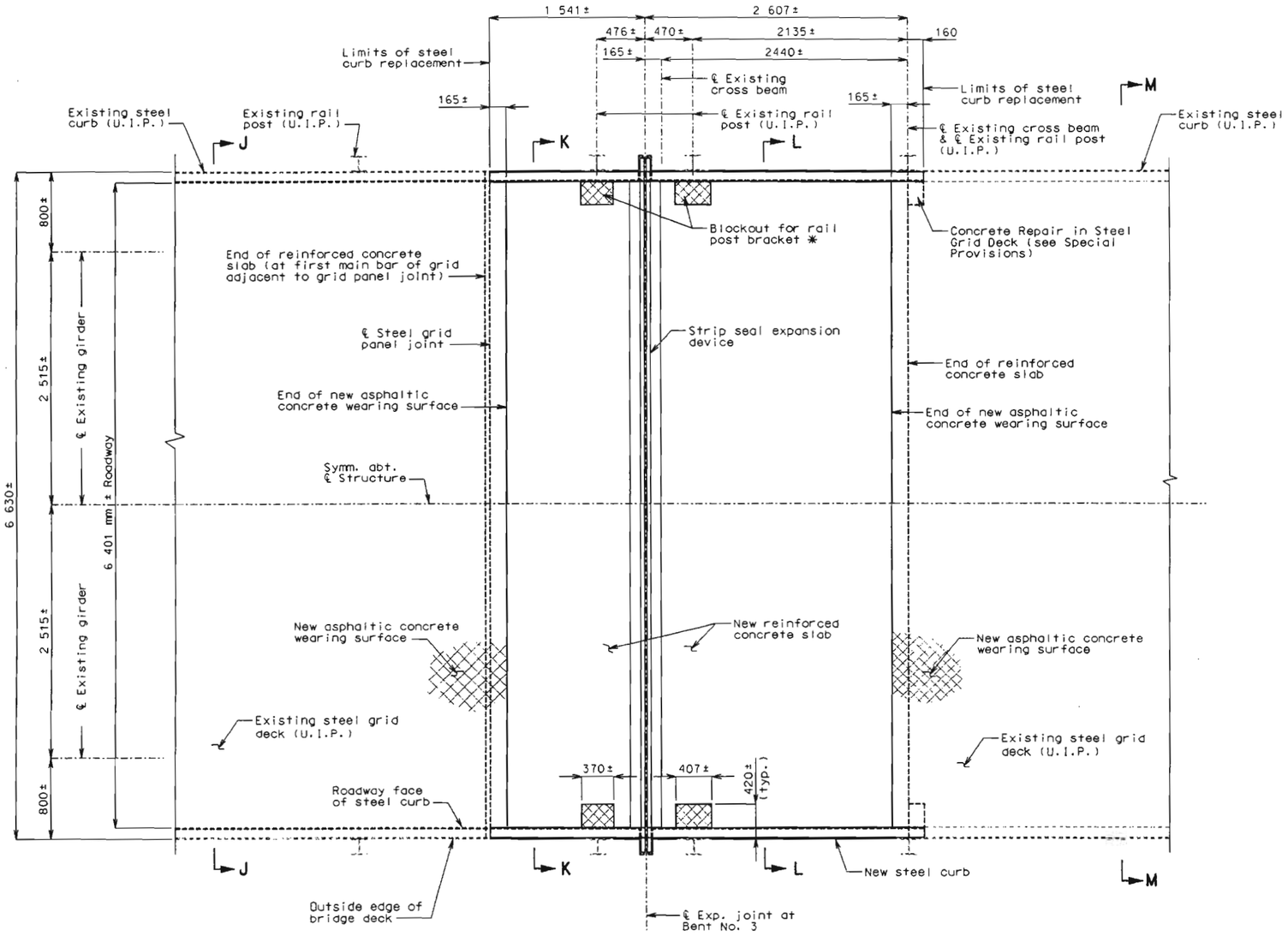
MO		139



PART SPAN (2-3)

PART SPAN (3-4)

PART PLAN

Note: For Sections J-J and M-M, see sheet no. 14.

For Sections K-K and L-L, see sheet no. 12.

For longitudinal section thru new reinforced concrete slabs, see sheet no. 11.

For details of strip seal expansion device, see sheet no. 10.

For details of new steel curb and rail post attachments, see sheet no. 13.

* Blockout to be filled with asphaltic concrete after installation of rail post bracket.

Details for steel curb replacement have been developed based on available plans and on using the existing rail posts in their present locations. The contractor shall verify the existing rail post locations before ordering steel curb replacement.

Payment for the reinstallation of the existing rail post brackets and washer plates with new H.S. bolts, hex nuts, and washers shall be included in the contract unit price for Slab on Steel.

Payment for furnishing and installing new steel curb with anchor bolts, hex nuts, and washers shall be included in the contract unit price for Steel Curb.

STATE OF MISSOURI
KURT E. GRIBBLE
NUMBER E-23576
REGISTERED PROFESSIONAL ENGINEER

DATE 8-20-99

Detailed June 1999
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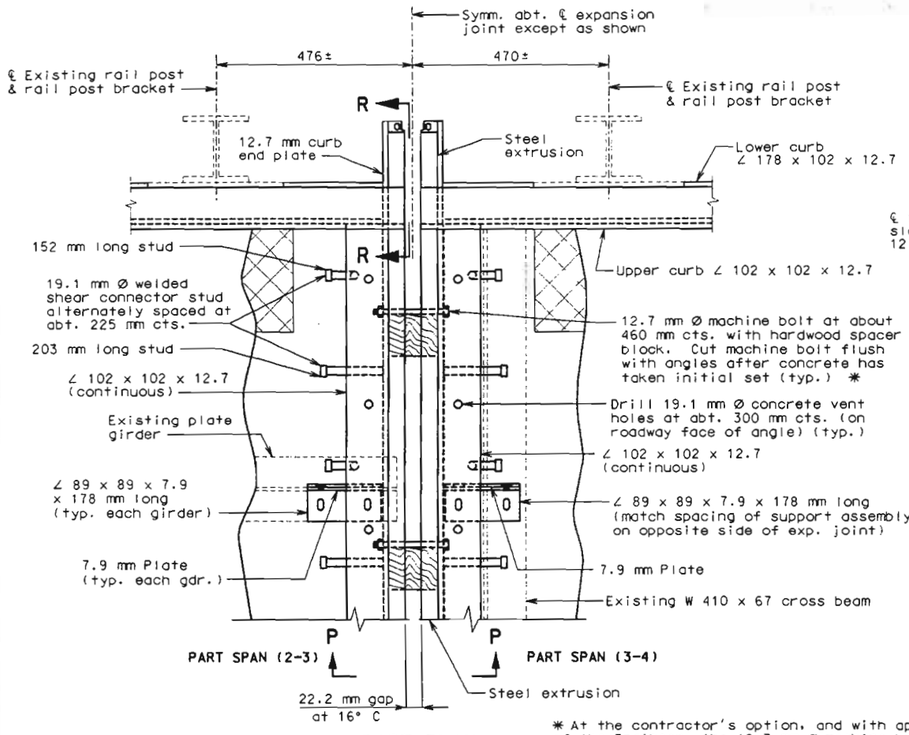
DETAILS OF DECK REPLACEMENT AT BENT NO. 3

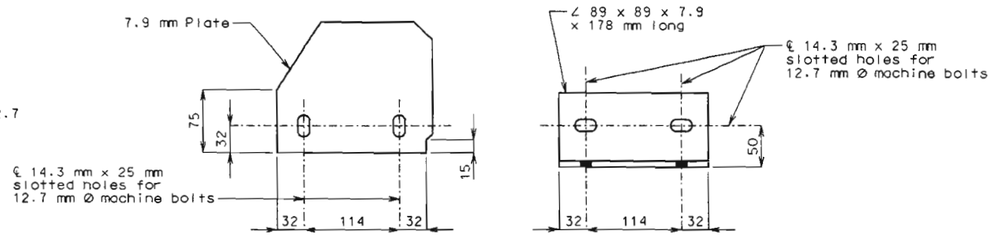
PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		B10

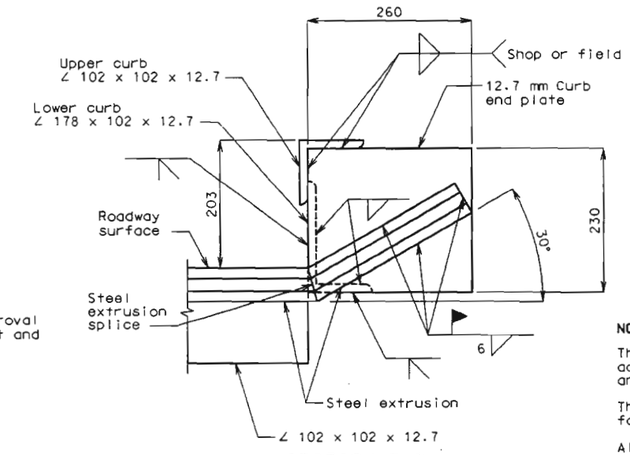


PART PLAN

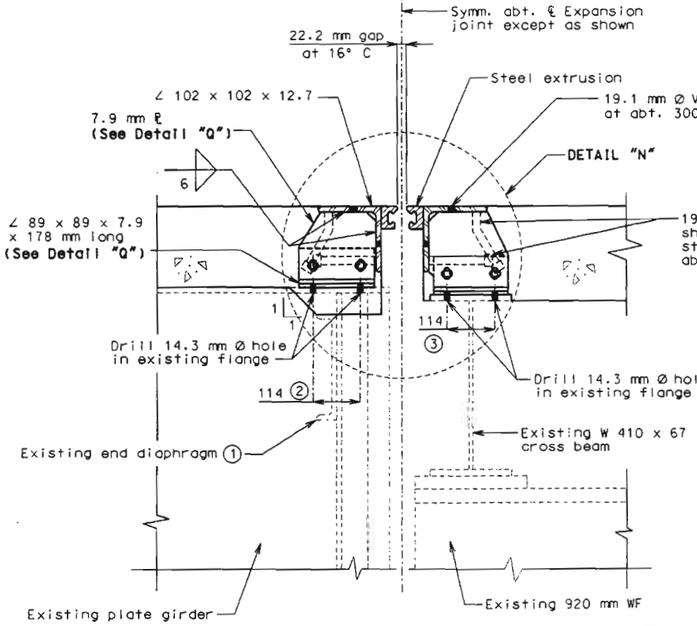
* At the contractor's option, and with approval of the Engineer, the 12.7 mm Ø machine bolt and hardwood spacer may be omitted.



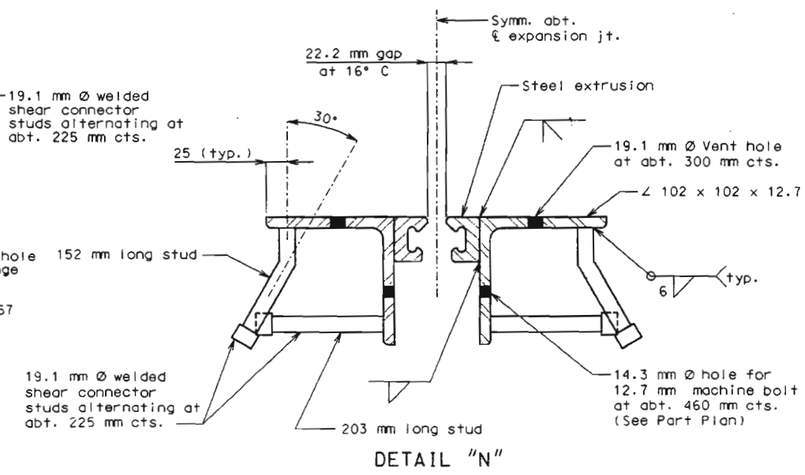
DETAIL "Q"
(Support Assembly)



SECTION R-R



PART SECTION P-P



DETAIL "N"

① Haunch new slab to bear on existing end diaphragms

② Centered on transverse leg of existing bearing stiffener angle

③ Centered on existing W 410 x 67 cross beam

STRIP SEAL GLAND
MOVEMENT RATING 51 mm

Note: Strip seal gland shall extend to the end of the steel extrusion.

NOTES FOR STRIP SEAL:

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 Standard Specifications (Metric).

Splices of the steel extrusion shall develop full strength.

All steel shall be ASTM A709M Grade 250, except steel extrusions shall be ASTM Grade 345W or Grade 250.

Neoprene strip seal shall meet ASTM D-2628M.

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

Payment for steel extrusions and neoprene strip seal 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 (125 micrometers minimum thickness) or galvanized in accordance with ASTM A123. Anchors need not be protected from overspray.

Payment for furnishing, coating or galvanizing, and placing structural steel plates and angles shall be included in the contract unit price for Strip Seal Expansion Device.

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

Concrete shall be forced under and around angles, studs, and support assemblies. Proper consolidation of the concrete shall be achieved by localized internal vibration.

Plan dimensions are based on installation at 16 degrees Celsius. The expansion gap and other dimensions shall be increased 2.0 mm for each 5 degrees Celsius fall and decreased 2.0 mm for each 5 degrees Celsius rise in temperature at installation.

STATE OF MISSOURI
KURT E. GRIBBLE
NUMBER E-23576
REGISTERED PROFESSIONAL ENGINEER
DATE 8-20-99

DETAILS OF STRIP SEAL EXPANSION DEVICE AT BENT NO. 3

Detailed June 1999
Checked July 1999

PLATTE COUNTY K04563

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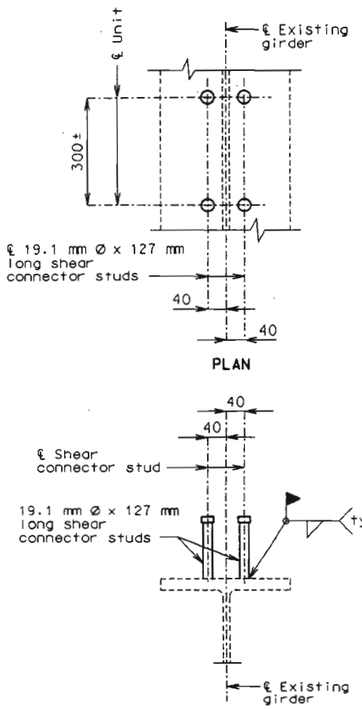
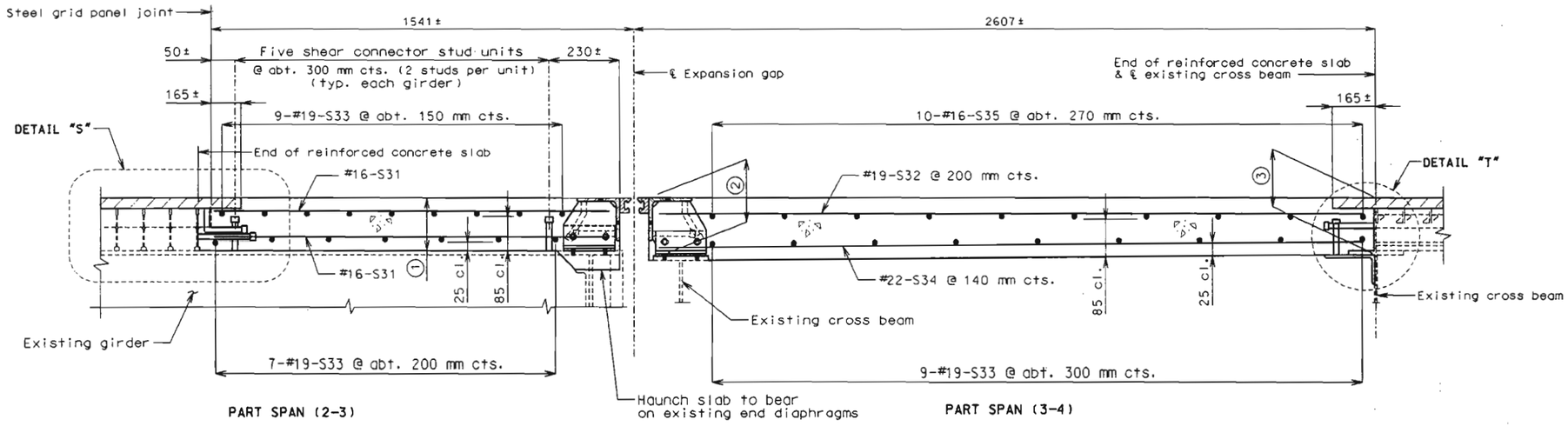


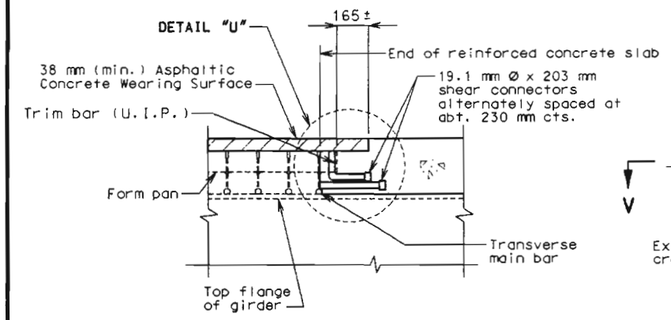
DETAILS OF SHEAR CONNECTOR STUDS
(2 STUDS PER UNIT)
SPAN (2-3) ONLY



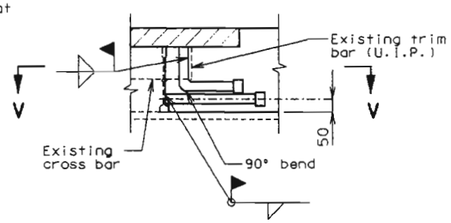
PART SECTION AT BENT NO. 3

Note: For additional slab reinforcement at first rail post in Span (3-4), see sheet no. 13.

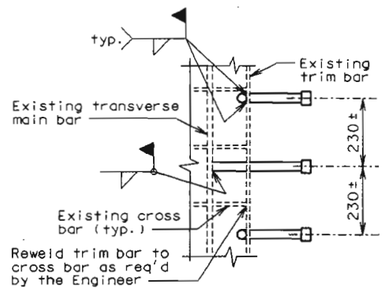
	①	②	③
At crown of roadway	195	233	208
At gutter line	170	208	183



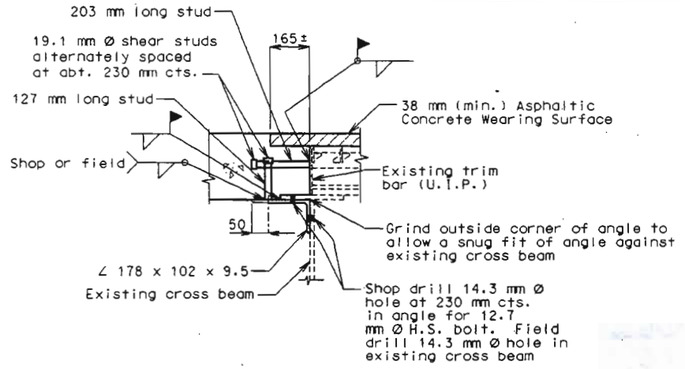
DETAIL "S"



DETAIL "U"



PART SECTION V-V



DETAIL "T"

Note: Payment for furnishing and installing shear connector studs (except those for expansion device armor) and ∠ 178 x 102 x 9.5 at cross beam shall be included in the contract unit price for Slab on Steel.

STATE OF MISSOURI
KURT E. GRIBBLE
NUMBER E-23576
REGISTERED PROFESSIONAL ENGINEER
DATE 8-20-99

DETAILS OF DECK REPLACEMENT AT BENT NO. 3

Detailed June 1999
Checked July 1999

PLATTE COUNTY K04563

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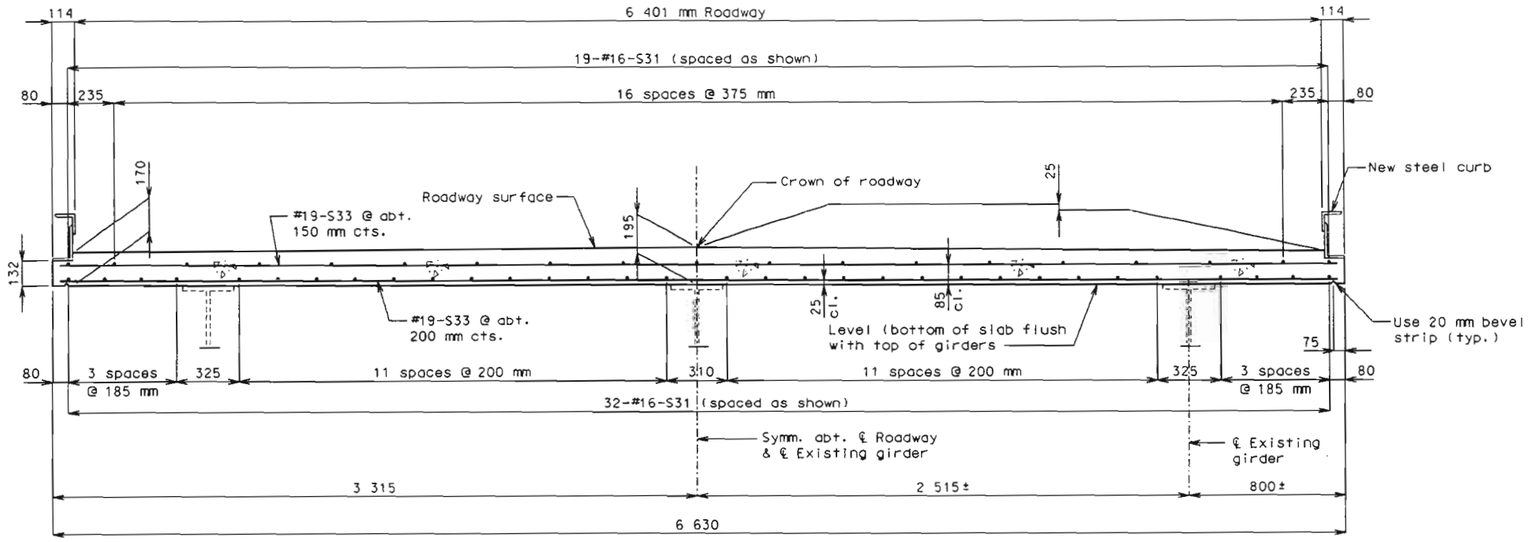
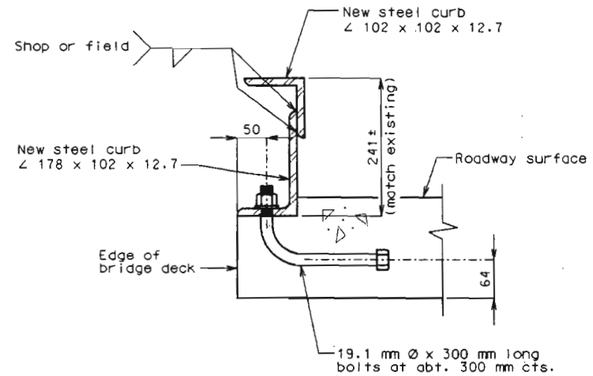
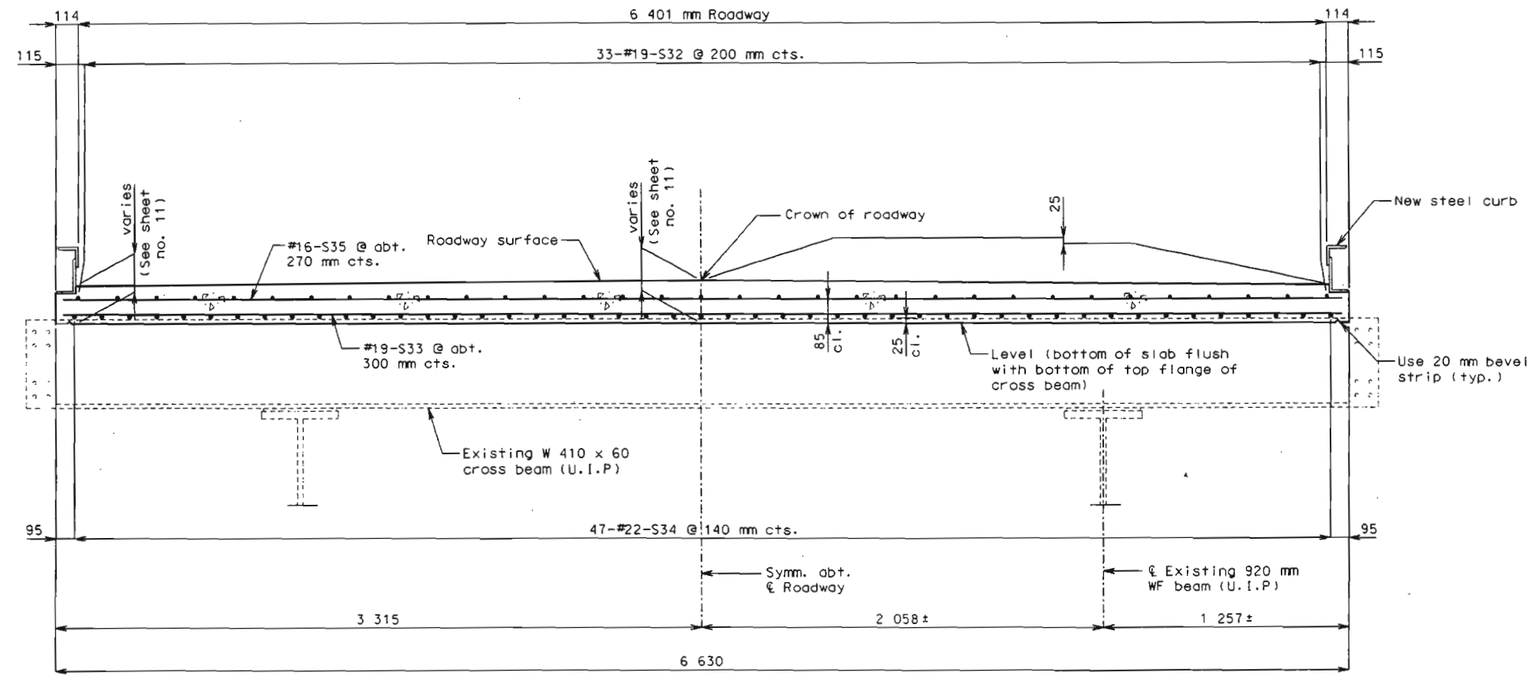


SECTION K-K (SPAN 2-3)



TYPICAL SECTION SHOWING STEEL CURB ATTACHMENT IN AREA OF NEW REINFORCED CONCRETE SLAB



SECTION L-L (SPAN 3-4)

Note: For additional slab reinforcement at first rail post in Span (3-4), see sheet no. 13.

Note: Top of new slab and expansion device shall conform to 25 mm crown of roadway.

For details of roadway crown, see sheet no. 14.

For location of Sections K-K and L-L, see sheet no. 9.

STATE OF MISSOURI
KURT E. GRUBBLE
NUMBER E-23578
REGISTERED PROFESSIONAL ENGINEER

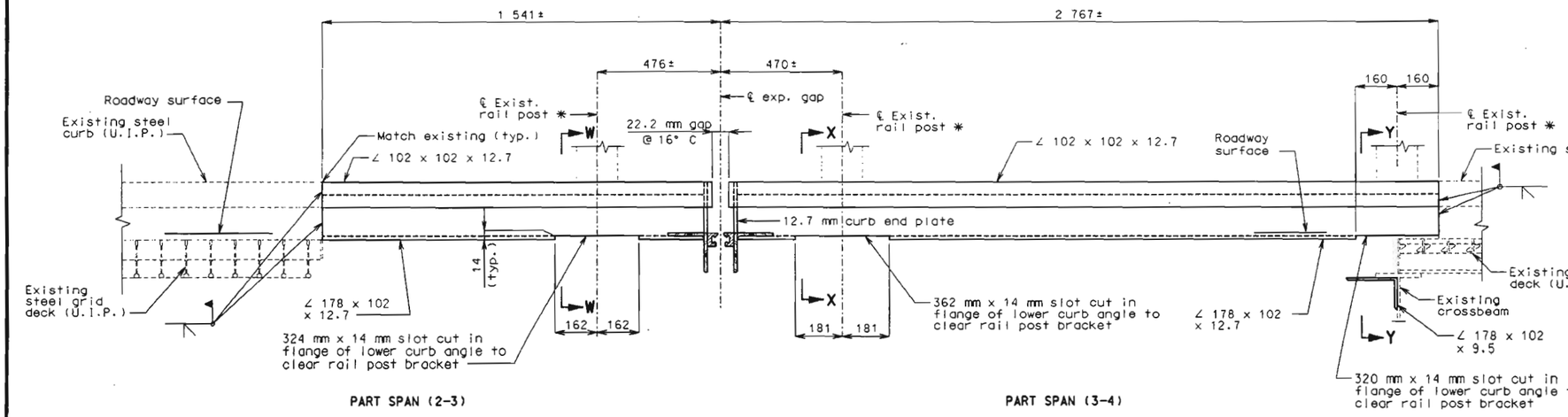
DATE 8-23-99

DETAILS OF DECK REPLACEMENT AT BENT NO. 3

Detailed June 1999
Checked July 1999

PLATTE COUNTY K04563

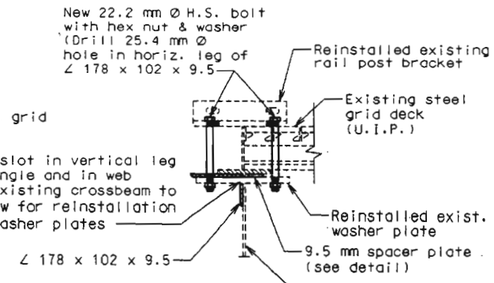
State	Proj. No.	Sheet No.
MO		B13



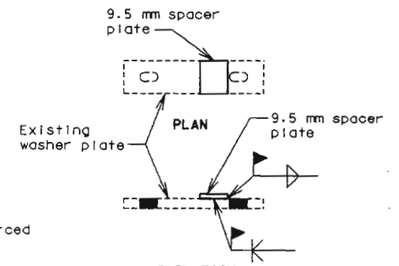
PART SECTION SHOWING STEEL CURB

* Reuse existing rail post bracket and washer plates

Note: Reuse rail post brackets in their present locations (as shown in plan and elevation views) with the new reinforced concrete slab.

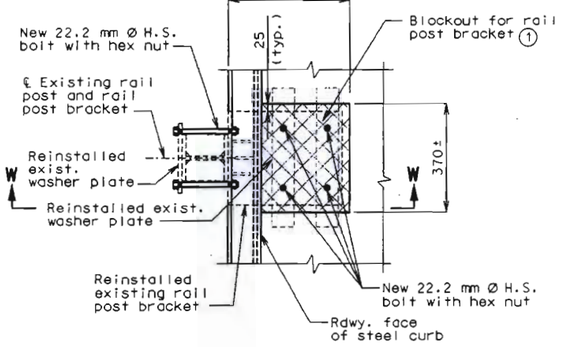


DETAIL "Z"
(Steel curb not shown for clarity)

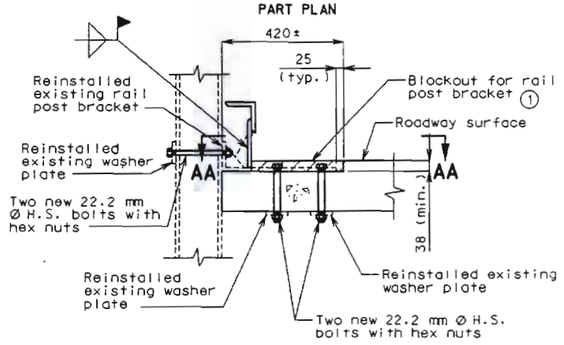


DETAILS OF 9.5 mm SPACER PLATE

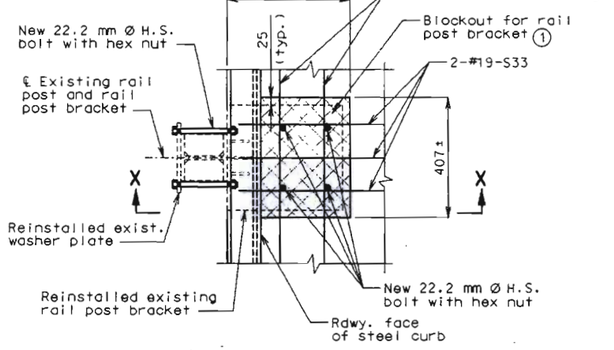
① Blockout to be filled with asphaltic concrete after installation of rail post brackets.



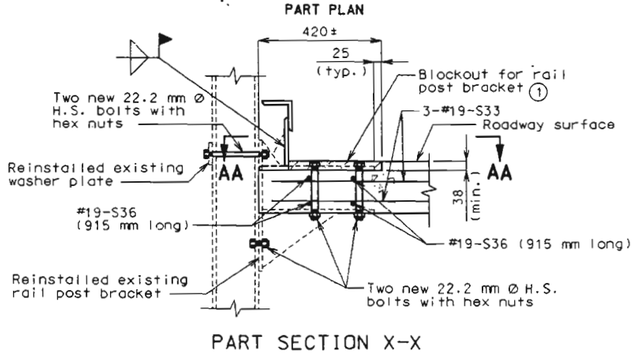
PART PLAN



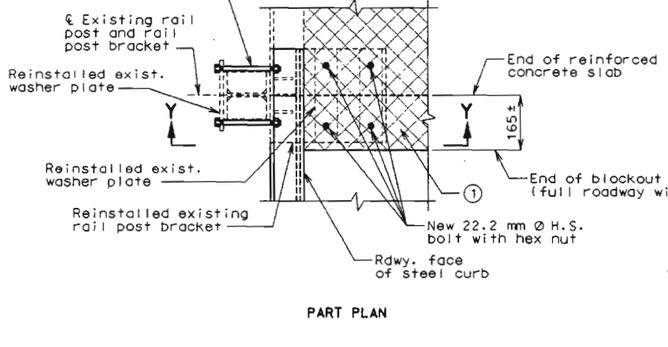
PART SECTION W-W



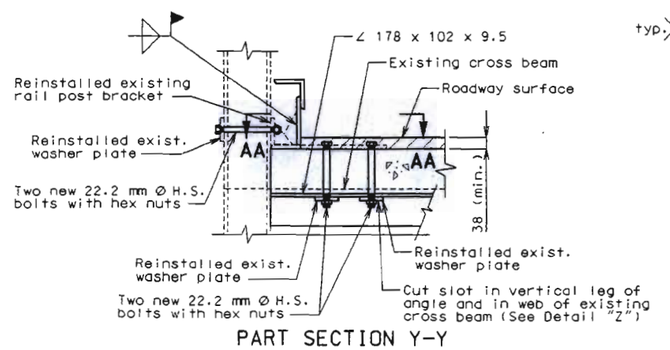
PART PLAN



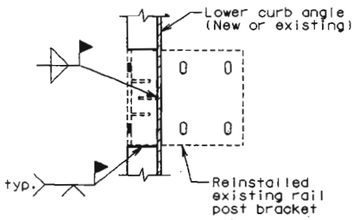
PART SECTION X-X



PART PLAN



PART SECTION Y-Y



PART SECTION AA-AA
(Showing field welds)

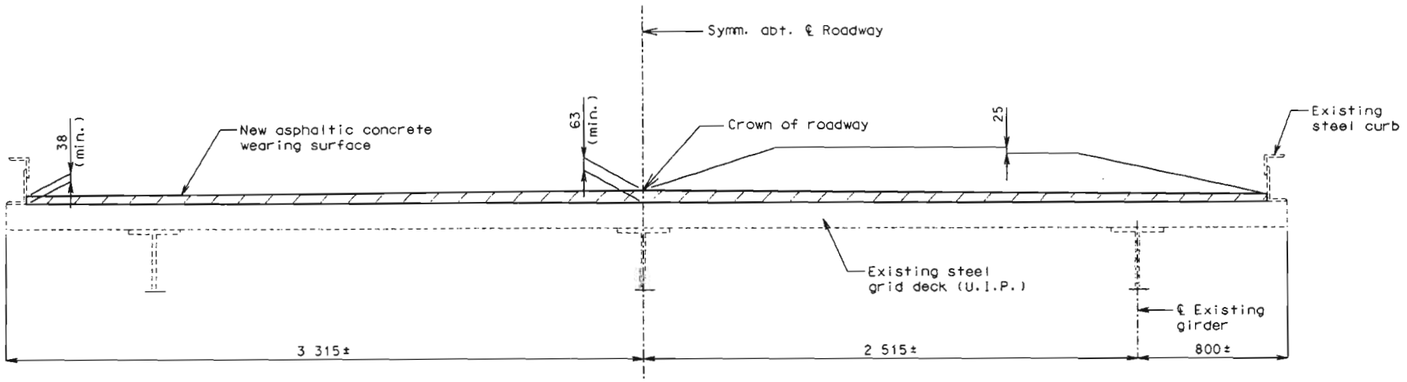
STATE OF MISSOURI
KURT E. GRIBBLE
NUMBER E-23576
REGISTERED PROFESSIONAL ENGINEER
DATE 8-20-99

DETAILS OF STEEL CURB & RAIL POST ATTACHMENT AT BENT NO. 3

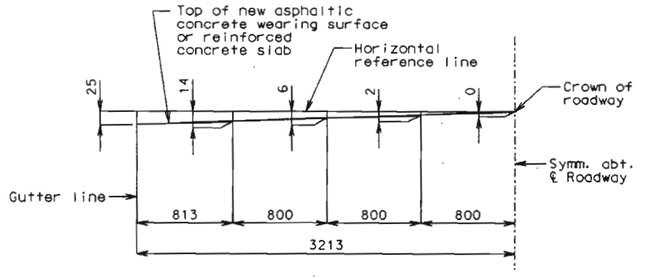
Detailed June 1999
Checked July 1999

PLATTE COUNTY K04563

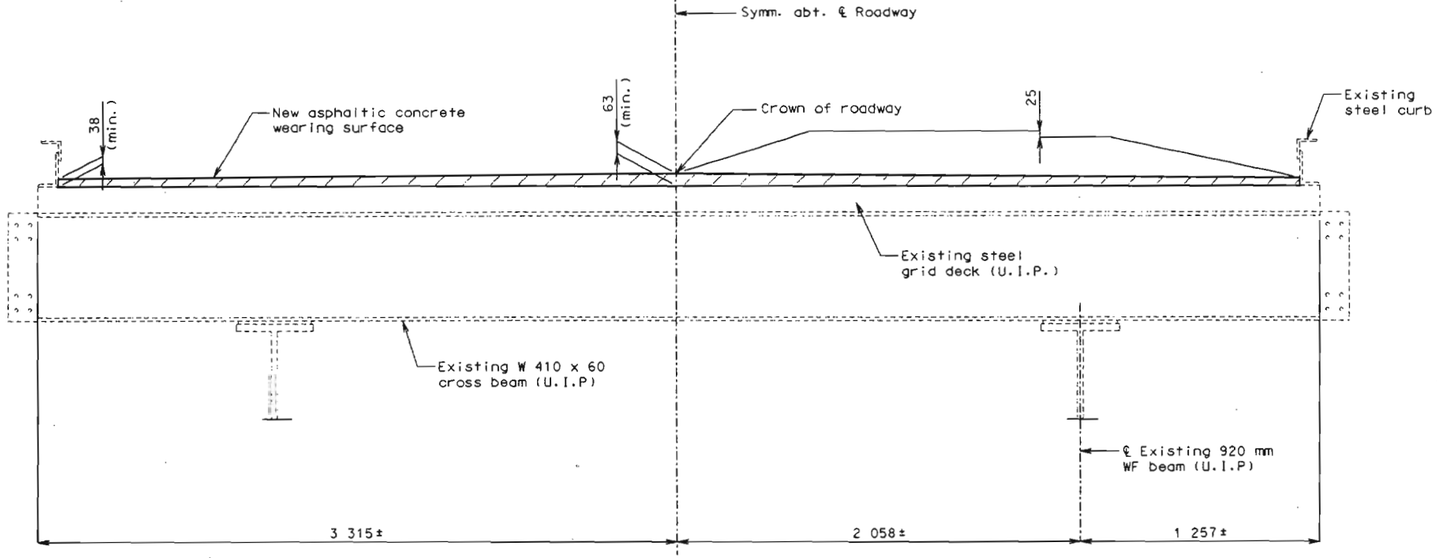
State	Proj. No.	Sheet No.
MO		B14



SECTION J-J (SPAN 2-3)



DETAIL OF ROADWAY CROWN



SECTION M-M (SPAN 3-4)

Note: For location of Sections J-J and M-M, see sheet no. 9.

STATE OF MISSOURI
KURT E. GRIBBLE
NUMBER E-23678
REGISTERED PROFESSIONAL ENGINEER
DATE 8-20-99

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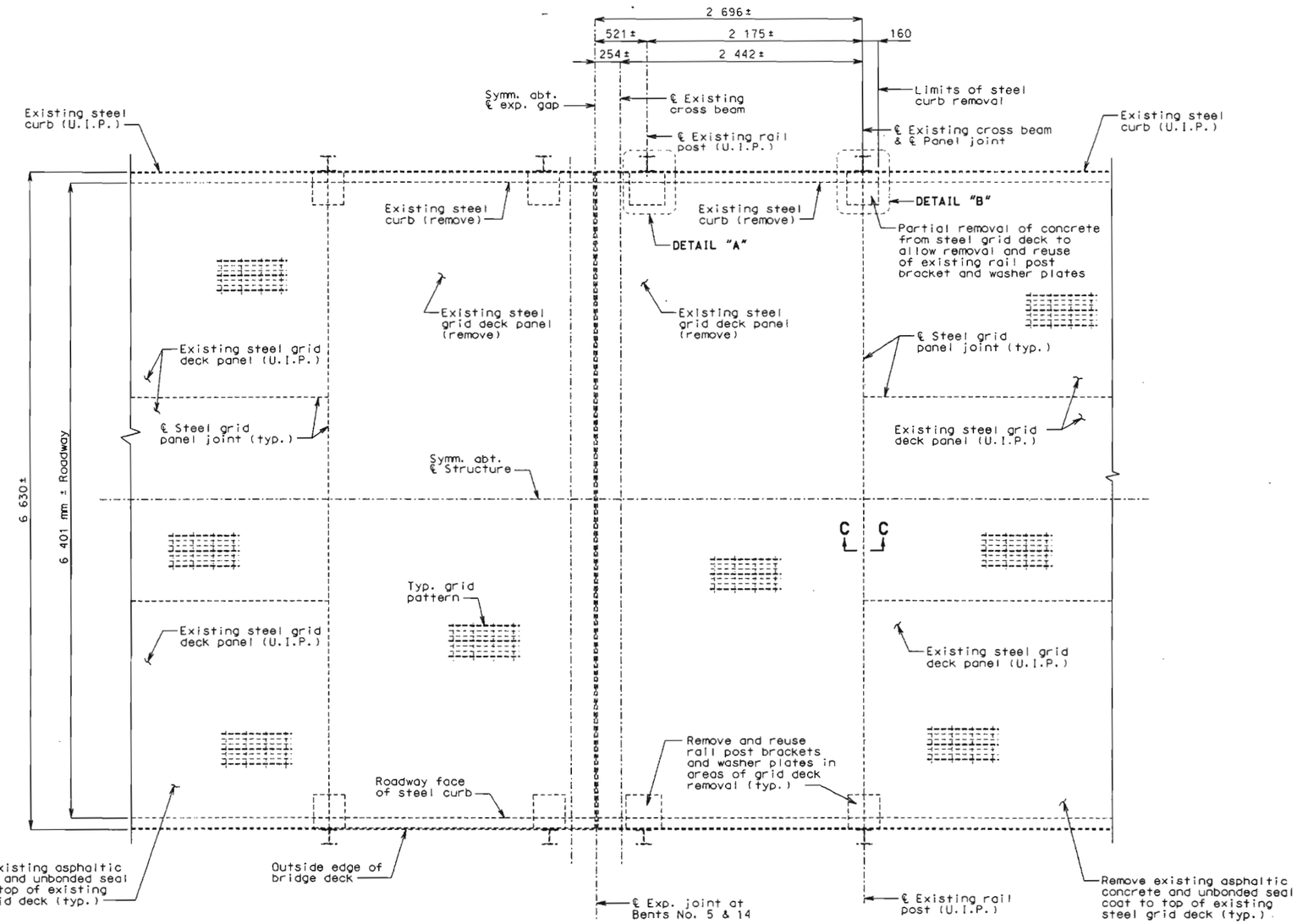
DETAILS OF ASPHALTIC CONCRETE WEARING SURFACE NEAR BENT NO. 3

Sheet No. 14 of 46

PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		13 15



PART SPAN (4-5)
PART SPAN (15-14)

PART SPAN (5-6)
PART SPAN (14-13)

PART PLAN OF EXISTING DECK

Note: Removed rail post brackets and washer plates shall be cleaned and coated with a prime coat of the specified coating system before reinstallation with the new slab.

Payment for the removal of steel curb, rail post brackets and washer plates, as designated on the plans, shall be included in the contract unit price for Partial Removal of Existing Steel Grid Deck.

Note: For Details "A" and "B", and Section C-C, see sheet no. 16.

STATE OF MISSOURI
KURT E. GRABLE
NUMBER E-23578
REGISTERED PROFESSIONAL ENGINEER
DATE 8-25-99

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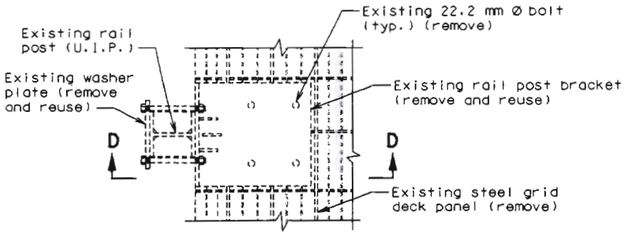
Checked July 1999

DETAILS OF DECK REMOVAL AT BENTS NO. 5 & 14

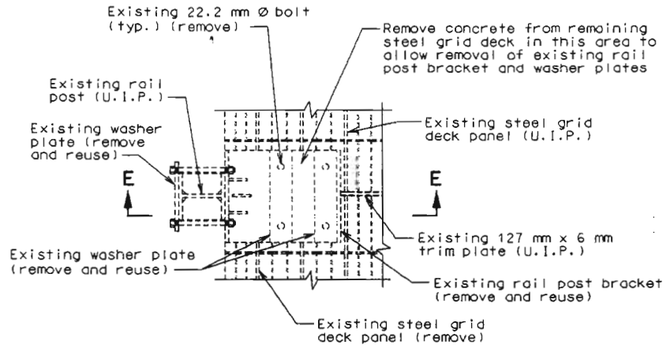
Sheet No. 15 of 46

PLATTE COUNTY K04563

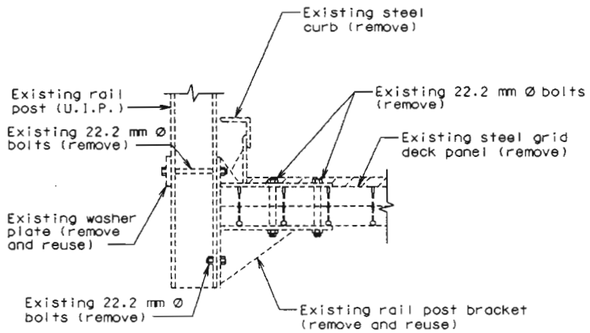
State	Proj. No.	Sheet No.
MO		B16



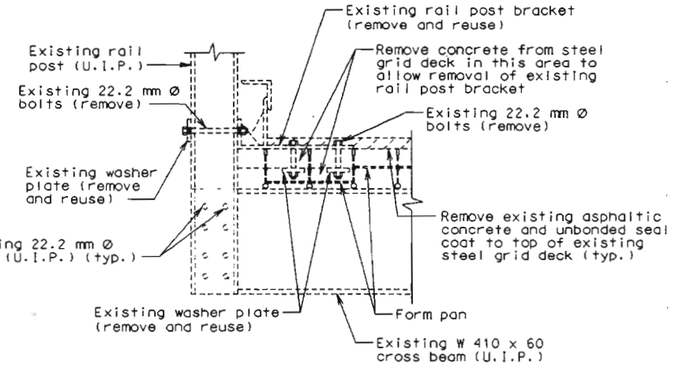
DETAIL "A"
(Rotated 90° counterclockwise)
Note: Steel curb not shown for clarity.



DETAIL "B"
(Rotated 90° counterclockwise)
Note: Steel curb not shown for clarity.

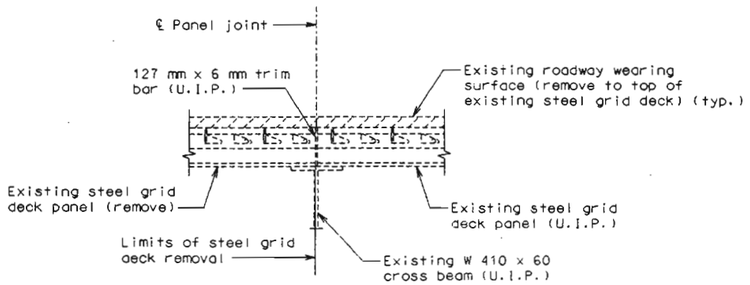


SECTION D-D

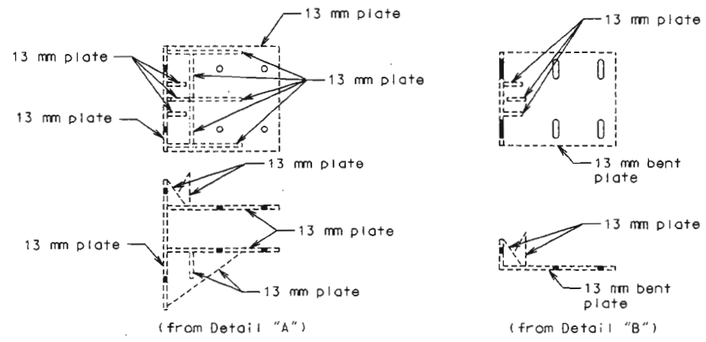


SECTION E-E

Note: For location of Details "A" & "B" and Section C-C. see sheet no. 15.



SECTION C-C



DETAILS OF RAIL POST BRACKETS
(Remove and reuse with new slab)

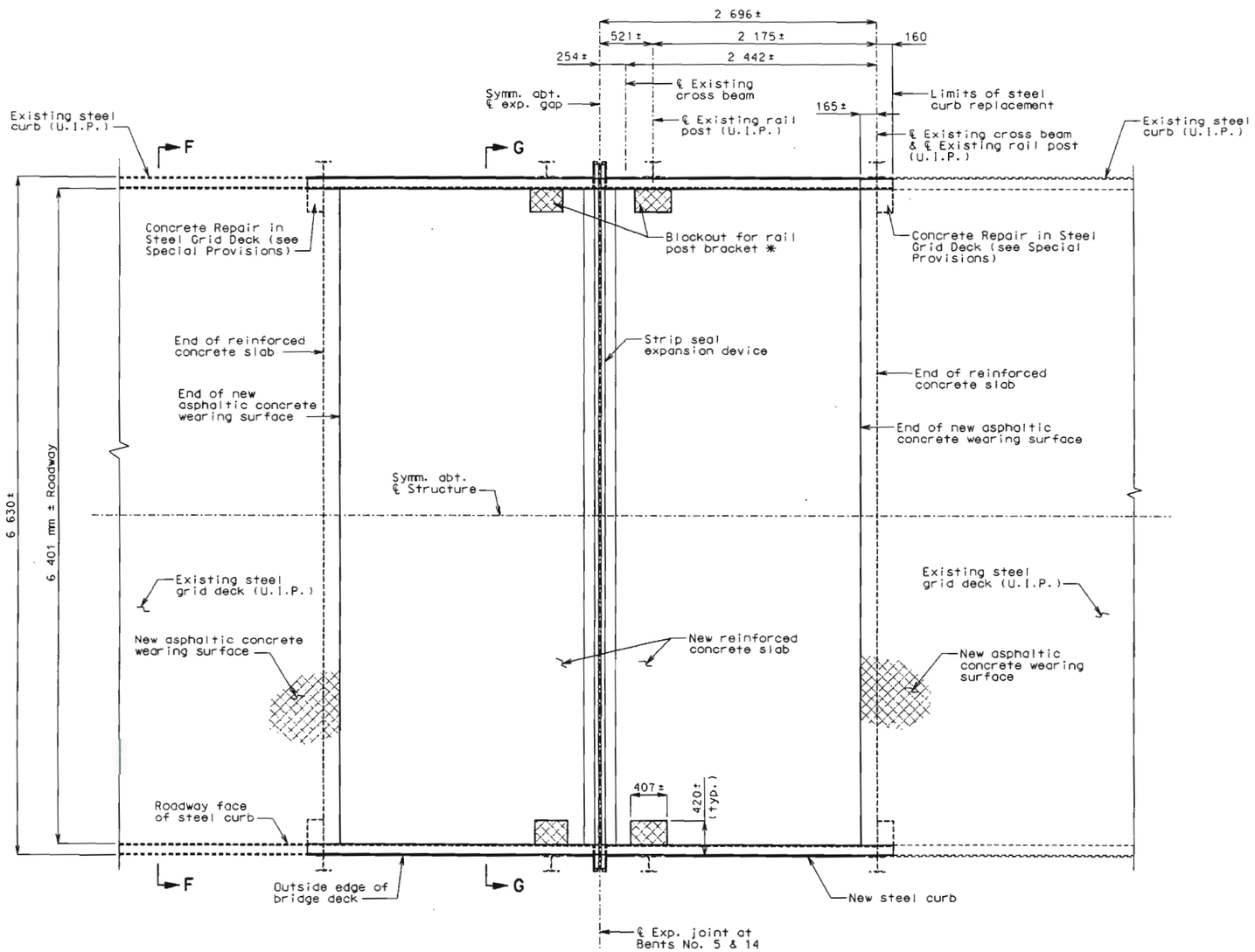
DATE 9-20-99

DETAILS OF DECK REMOVAL AT BENTS NO. 5 & 14

Detailed June 1999
Checked July 1999

PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		17



PART SPAN (4-5)
PART SPAN (15-14)

PART SPAN (5-6)
PART SPAN (14-13)

PART PLAN

Note: For Sections F-F and G-G, see sheet no. 20.

For longitudinal section thru new reinforced concrete slabs, see sheet no. 19.

For details of strip seal expansion device, see sheet no. 18.

For details of new steel curb and rail post attachments, see sheet no. 21.

* Blockout to be filled with asphaltic concrete after installation of rail post bracket.

Details for steel curb replacement have been developed based on available plans and on using the existing rail posts in their present locations. The contractor shall verify the existing rail post locations before ordering steel curb replacement.

Payment for the reinstallation of the existing rail post brackets and washer plates with new H.S. bolts, hex nuts, and washers shall be included in the contract unit price for Slab on Steel.

Payment for furnishing and installing new steel curb with anchor bolts, hex nuts, and washers shall be included in the contract unit price for Steel Curb.

STATE OF MISSOURI
KURT E. GRIBBLE
NUMBER E-23670
REGISTERED PROFESSIONAL ENGINEER

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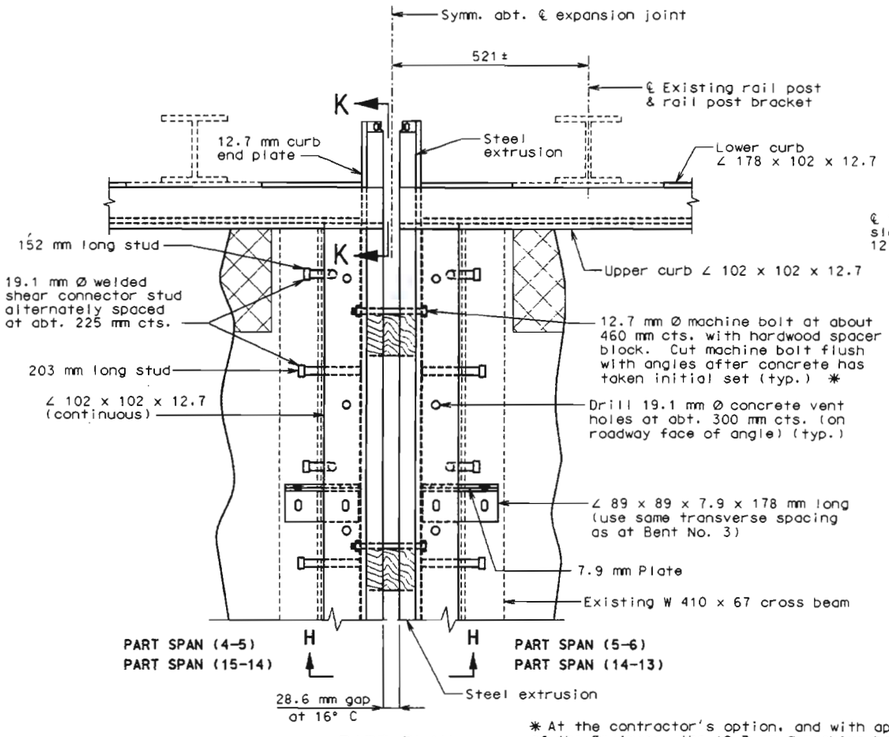
DETAILS OF DECK REPLACEMENT AT BENTS NO. 5 & 14

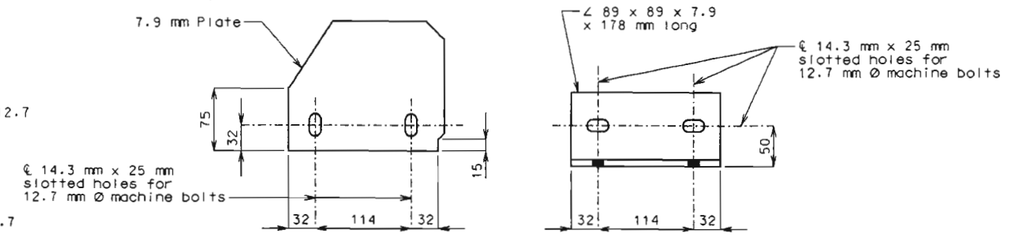
PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		B18



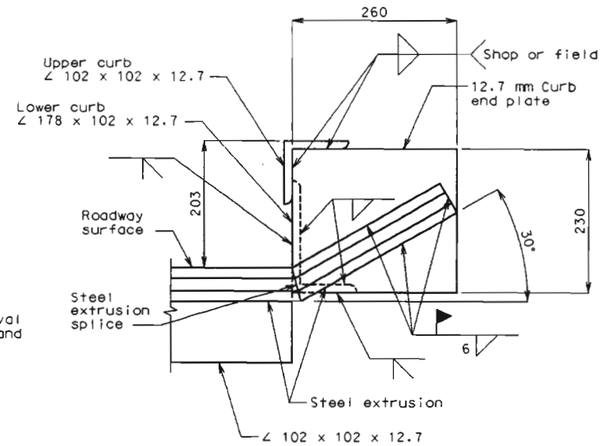
PART PLAN

✱ At the contractor's option, and with approval of the Engineer, the 12.7 mm Ø machine bolt and hardwood spacer may be omitted.

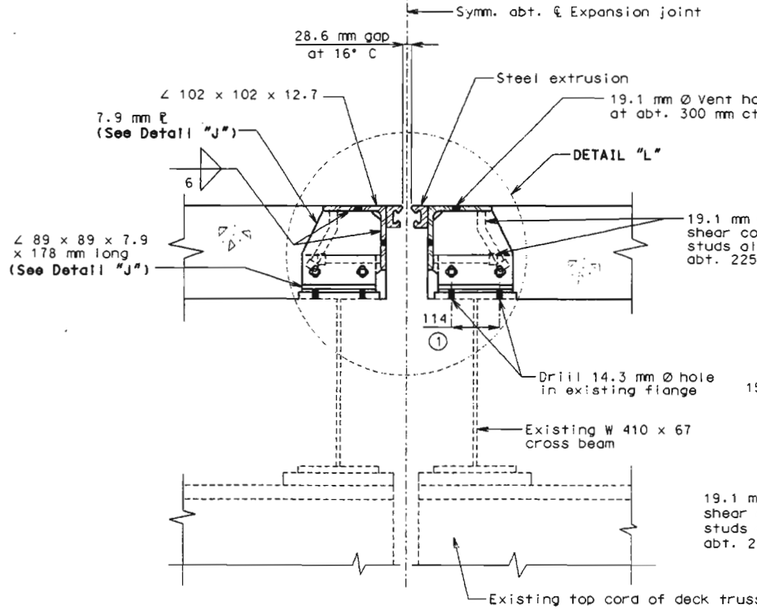


① Centered on existing W 410 x 67 cross beam

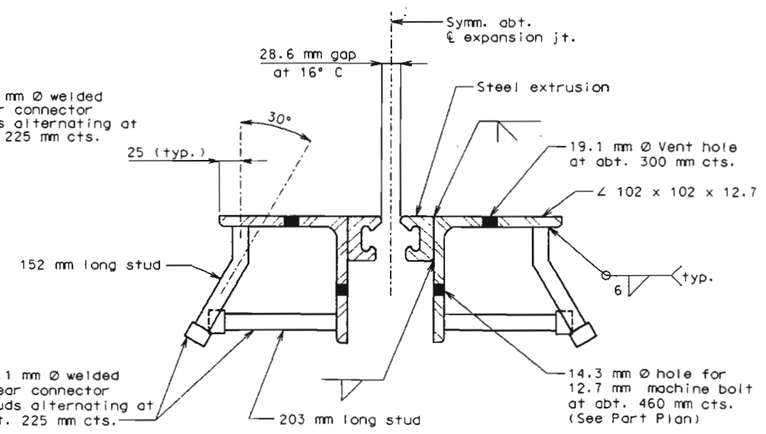
DETAIL "J"
(Support Assembly)



SECTION K-K



PART SECTION H-H



DETAIL "L"

STRIP SEAL GLAND
MOVEMENT RATING 51 mm

Note: Strip seal gland shall extend to the end of the steel extrusion.

NOTES FOR STRIP SEAL:

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 Standard Specifications (Metric).

Splices of the steel extrusion shall develop full strength.

All steel shall be ASTM A709M Grade 250, except steel extrusions shall be ASTM Grade 345W or Grade 250.

Neoprene strip seal shall meet ASTM D-2628M.

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

Payment for steel extrusions and neoprene strip seal 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 (125 micrometers minimum thickness) or galvanized in accordance with ASTM A123. Anchors need not be protected from overspray.

Payment for furnishing, coating or galvanizing, and placing structural steel plates and angles shall be included in the contract unit price for Strip Seal Expansion Device.

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

Concrete shall be forced under and around angles, studs, and support assemblies. Proper consolidation of the concrete shall be achieved by localized internal vibration.

Plan dimensions are based on installation at 16 degrees Celsius. The expansion gap and other dimensions shall be increased 2.2 mm for each 5 degrees Celsius fall and decreased 2.2 mm for each 5 degrees Celsius rise in temperature at installation.

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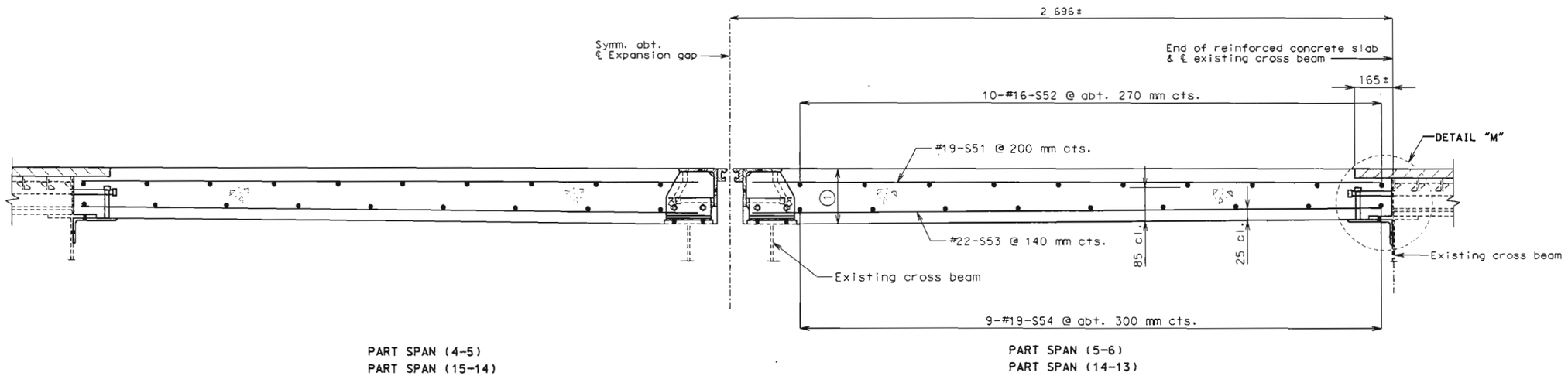
DETAILS OF STRIP SEAL EXPANSION DEVICE AT BENTS NO. 5 & 14

PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		B-19



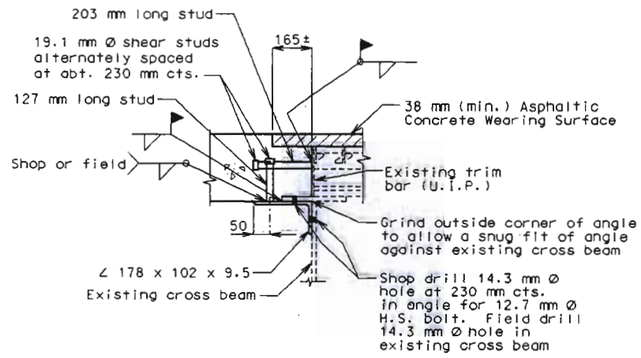
PART SPAN (4-5)
PART SPAN (15-14)

PART SPAN (5-6)
PART SPAN (14-13)

PART SECTION AT BENTS NO. 5 & 14

Note: For additional slab reinforcement at rail posts near expansion joint, see sheet no. 21.

	①
At crown of roadway	208
At gutter line	183



DETAIL "M"

Note: Payment for furnishing and installing shear connector studs (except those for expansion device armor) and ∠ 178 x 102 x 9.5 at cross beam shall be included in the contract unit price for Slab on Steel.

STATE OF MISSOURI
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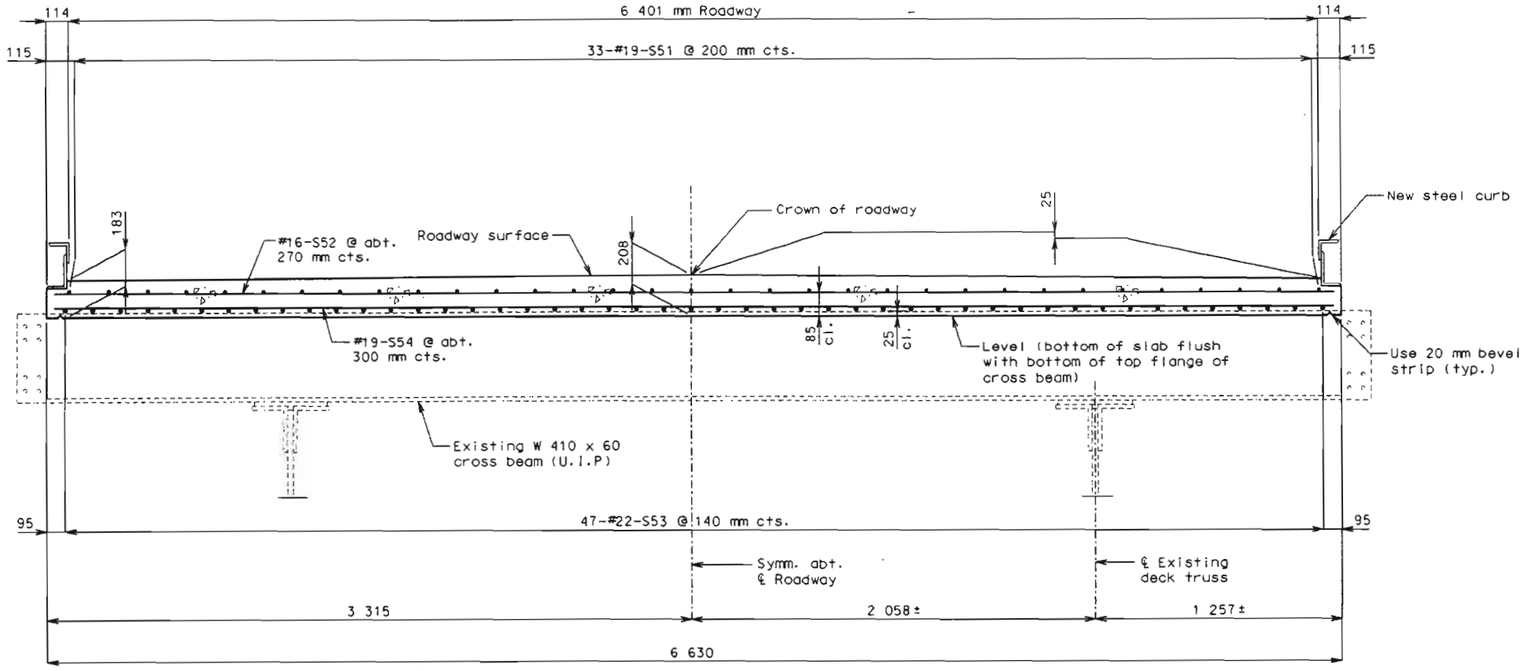
DETAILS OF DECK REPLACEMENT AT BENTS NO. 5 & 14

Detailed June 1999
Checked July 1999

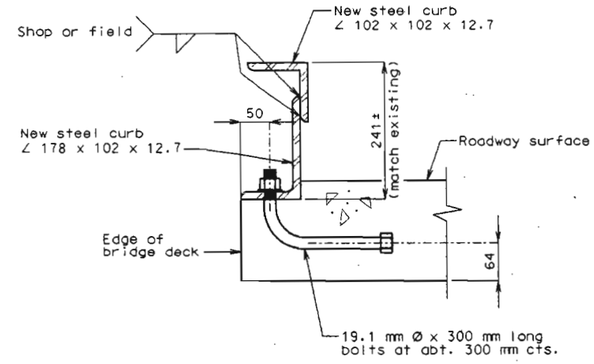
PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		B 20



SECTION G-G

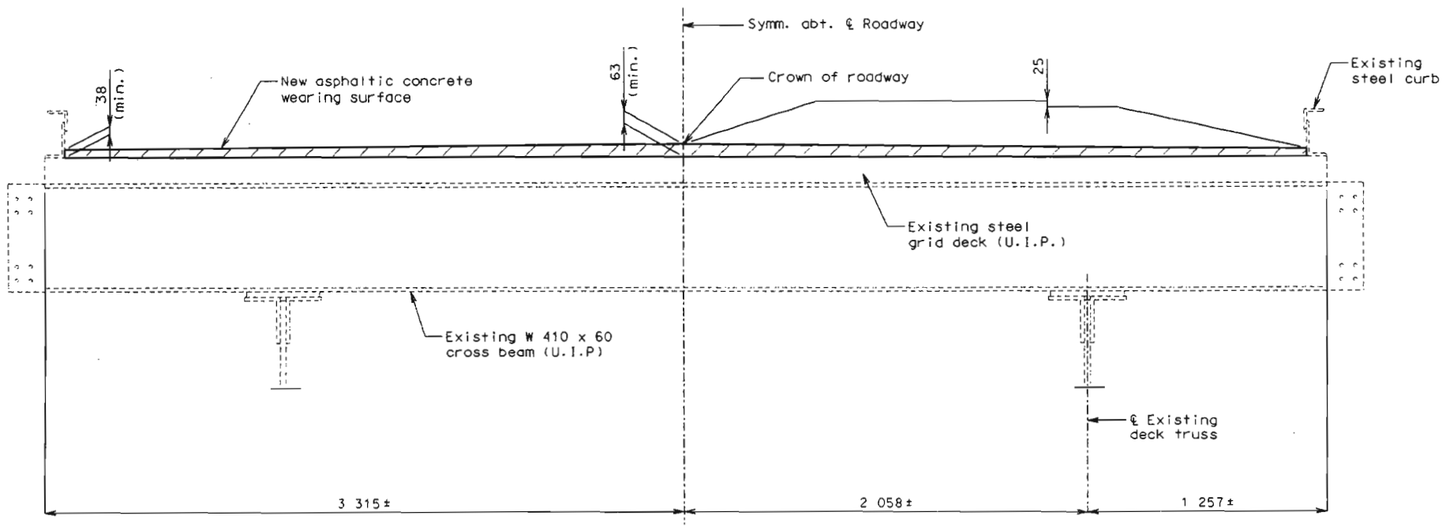
Note: For additional slab reinforcement at rail posts near expansion joint, see sheet no. 21.



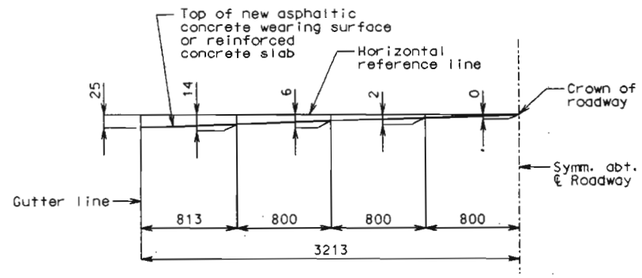
TYPICAL SECTION SHOWING STEEL CURB ATTACHMENT IN AREA OF NEW REINFORCED CONCRETE SLAB

Note: Top of new slab and expansion device shall conform to 25 mm crown of roadway.

For location of Sections F-F and G-G, see sheet no. 17.



SECTION F-F



DETAIL OF ROADWAY CROWN

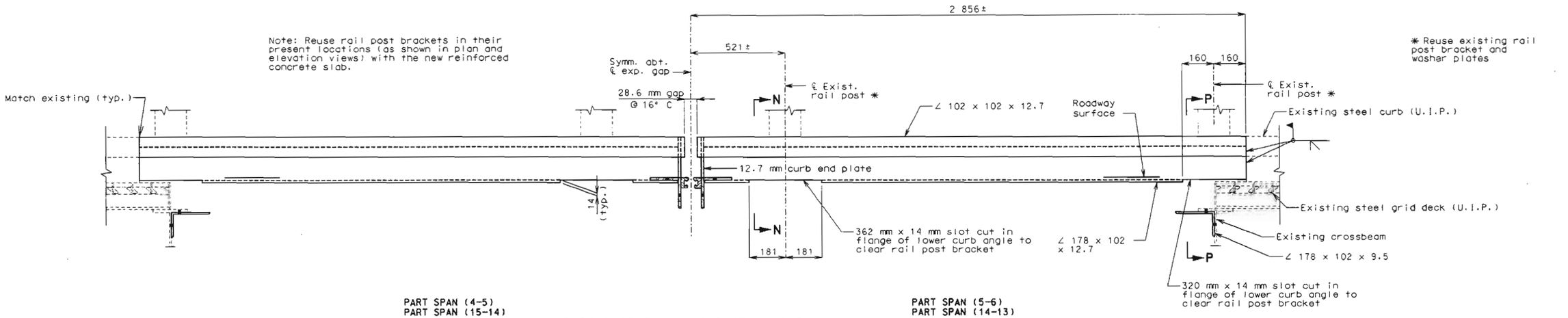
STATE OF MISSOURI
KURT E. GRIBBLE
NUMBER E-23576
REGISTERED PROFESSIONAL ENGINEER
DATE 8-20-99

DETAILS OF DECK REPLACEMENT AT BENTS NO. 5 & 14

Detailed June 1999
Checked July 1999

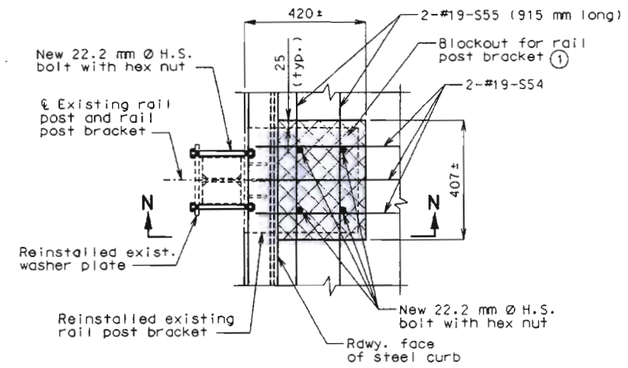
PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		B21

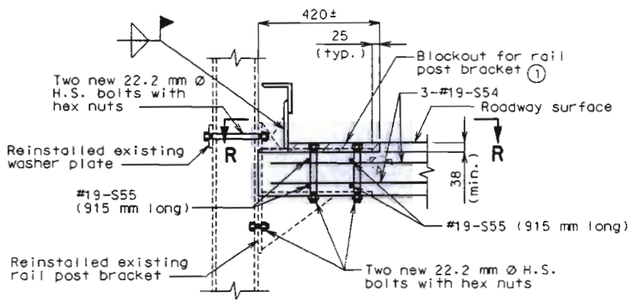


PART SECTION SHOWING STEEL CURB

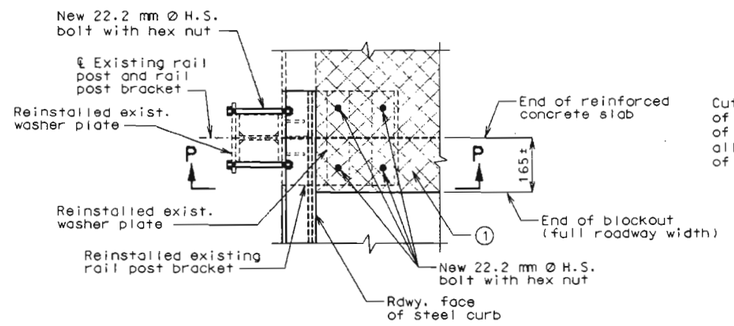
① Blockout to be filled with asphaltic concrete after installation of rail post brackets.



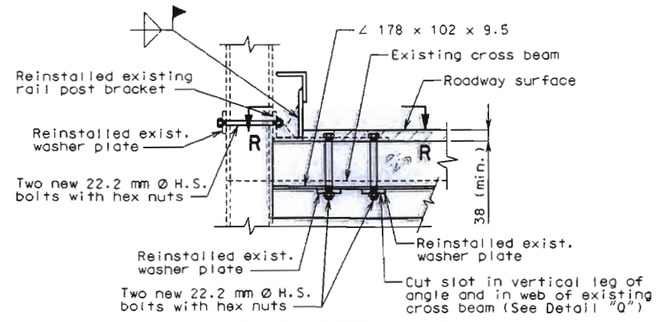
PART PLAN



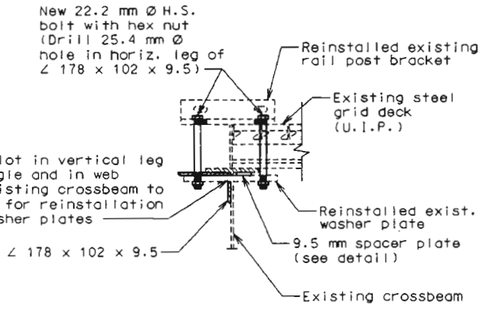
PART SECTION N-N



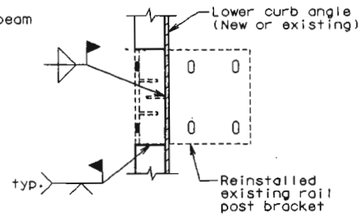
PART PLAN



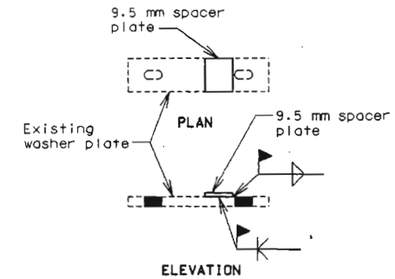
PART SECTION P-P



DETAIL "Q"
(Steel curb not shown for clarity)



PART SECTION R-R
(Showing field welds)



DETAILS OF 9.5 mm SPACER PLATE

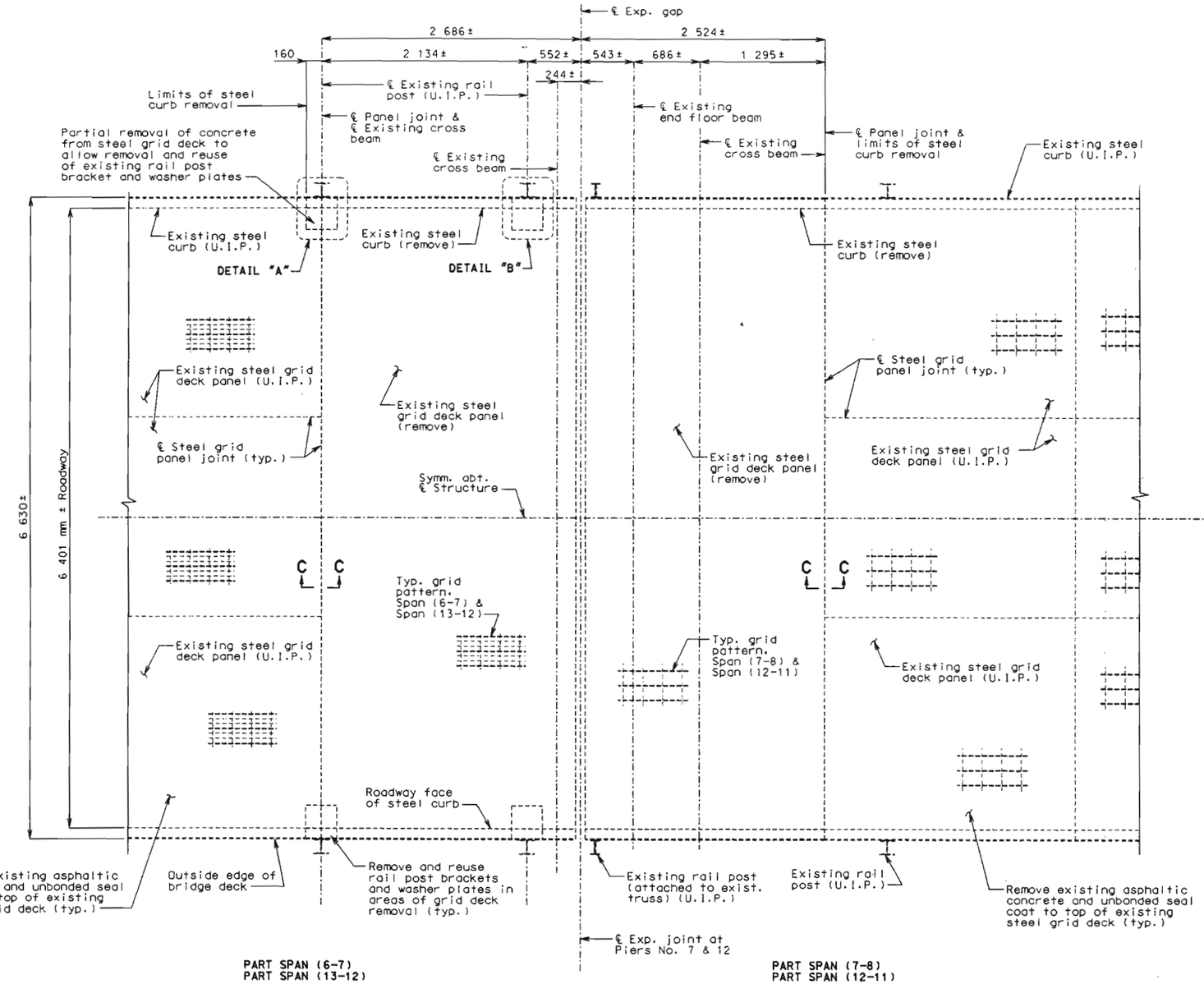
STATE OF MISSOURI
KURT E. GRIBBLE
NUMBER E-23576
PROFESSIONAL ENGINEER
DATE 8-25-99

DETAILS OF STEEL CURB & RAIL POST ATTACHMENT AT BENTS NO. 5 & 14

Detailed June 1999
Checked July 1999

PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		B22



PART PLAN OF EXISTING DECK

Note: Removed rail post brackets and washer plates shall be cleaned and coated with a prime coat of the specified coating system before reinstallation with the new slab.

Payment for the removal of steel curb, rail post brackets and washer plates, as designated on the plans, shall be included in the contract unit price for Partial Removal of Existing Steel Grid Deck.

Note: For Details "A" & "B" and Section C-C, see sheet no. 23.

STATE OF MISSOURI
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NUMBER E-23578
REGISTERED PROFESSIONAL ENGINEER

DATE 8-25-99

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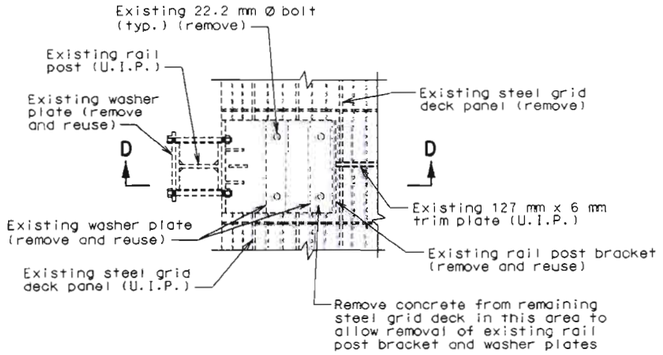
DETAILS OF DECK REMOVAL AT PIERS NO. 7 & 12

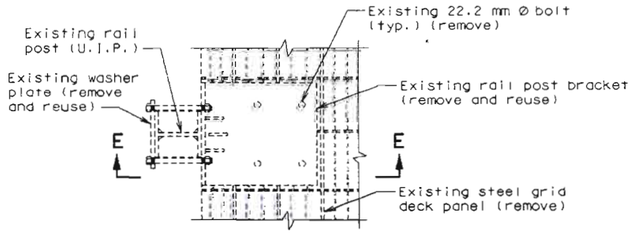
Sheet No. 22 of 46

PLATTE COUNTY K04563

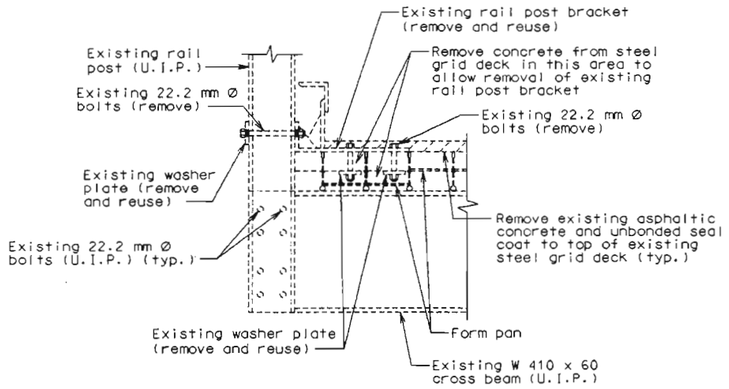
State	Proj. No.	Sheet No.
MO		823



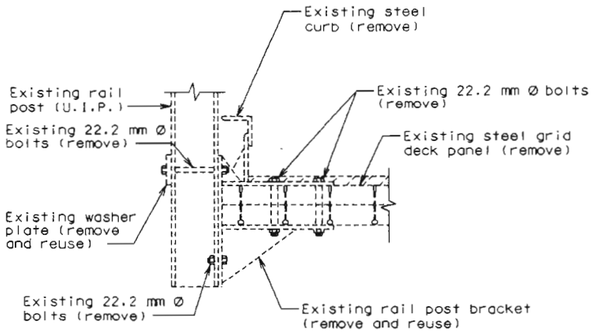
DETAIL "A"
(Rotated 90° counterclockwise)
Note: Steel curb not shown for clarity.



DETAIL "B"
(Rotated 90° counterclockwise)
Note: Steel curb not shown for clarity.

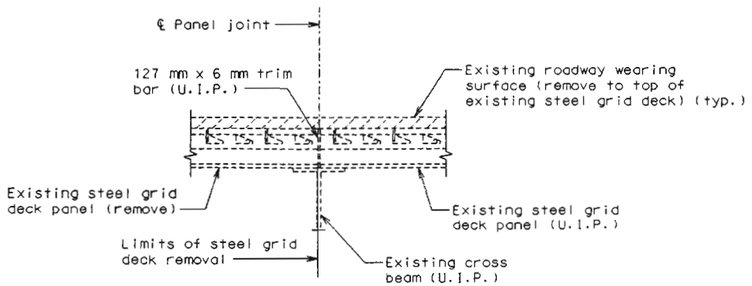


SECTION D-D

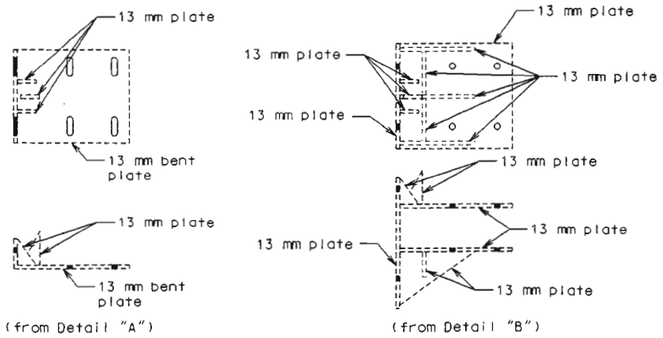


SECTION E-E

Note: For location of Details "A" & "B" and Section C-C, see sheet no. 22.



SECTION C-C
Spans (7-8) & (12-13) shown
Spans (6-7) & (11-12) by opposite hand



DETAILS OF RAIL POST BRACKETS
(Remove and reuse with new slab)

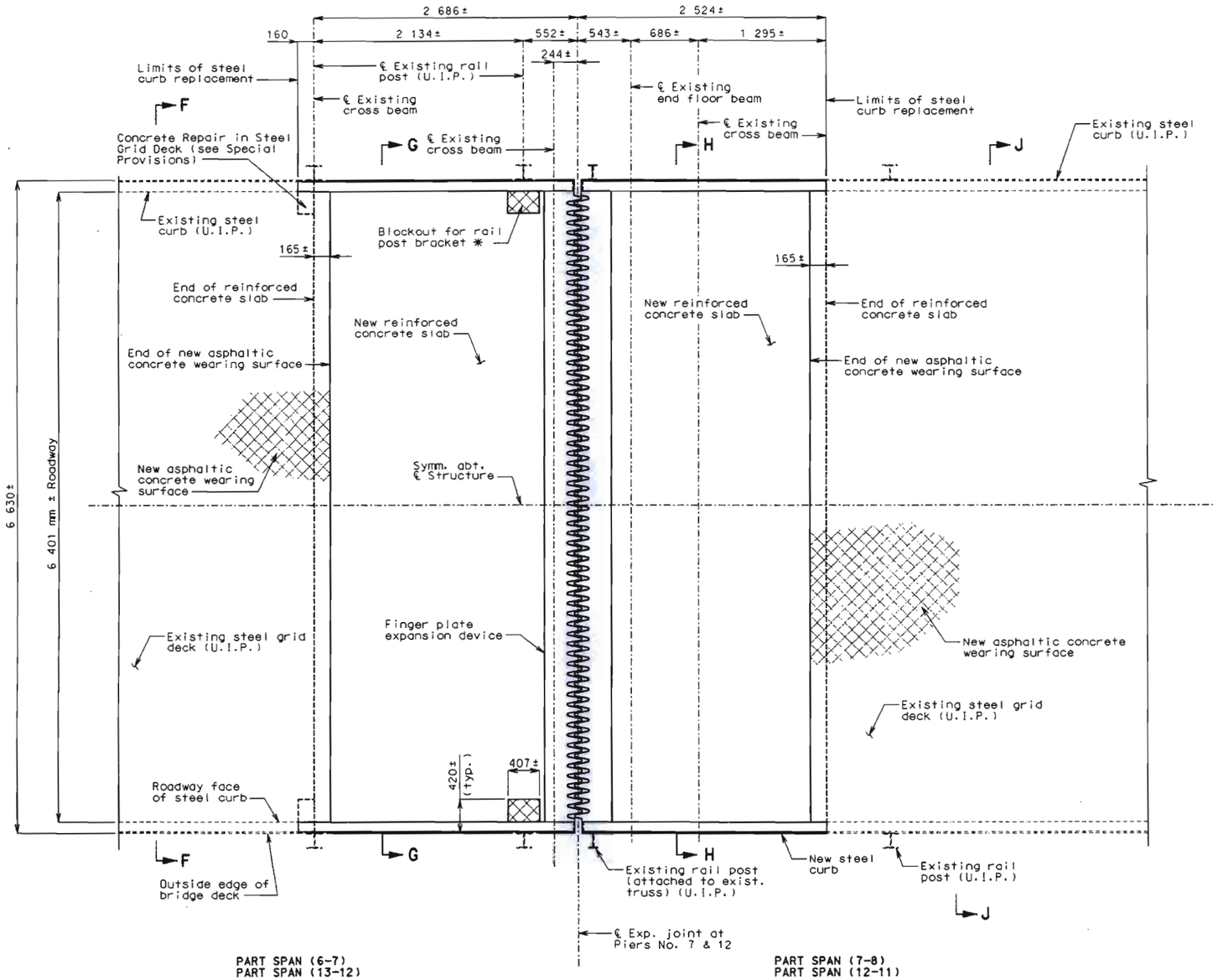
STATE OF MISSOURI
KURT E. GRIBBLE
NUMBER E-23578
REGISTERED PROFESSIONAL ENGINEER
DATE 8-20-99

DETAILS OF DECK REMOVAL AT PIERS NO. 7 & 12

Detailed June 1999
Checked July 1999

PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		B24



PART PLAN

Note: For Sections F-F and J-J, see sheet no. 29.

For Sections G-G and H-H, see sheet no. 27.

For longitudinal section thru new reinforced concrete slabs, see sheet no. 26.

For details of finger plate expansion device, see sheet no. 25.

For details of new steel curb and rail post attachments, see sheet no. 28.

* Blockout to be filled with asphaltic concrete after installation of rail post bracket.

Details for steel curb replacement have been developed based on available plans and on using the existing rail posts in their present locations. The contractor shall verify the existing rail post locations before ordering steel curb replacement.

Payment for the reinstallation of the existing rail post brackets and washer plates with new H.S. bolts, hex nuts, and washers shall be included in the contract unit price for Slab on Steel.

Payment for furnishing and installing new steel curb with anchor bolts, hex nuts, and washers shall be included in the contract unit price for Steel Curb.

STATE OF MISSOURI
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REGISTERED PROFESSIONAL ENGINEER
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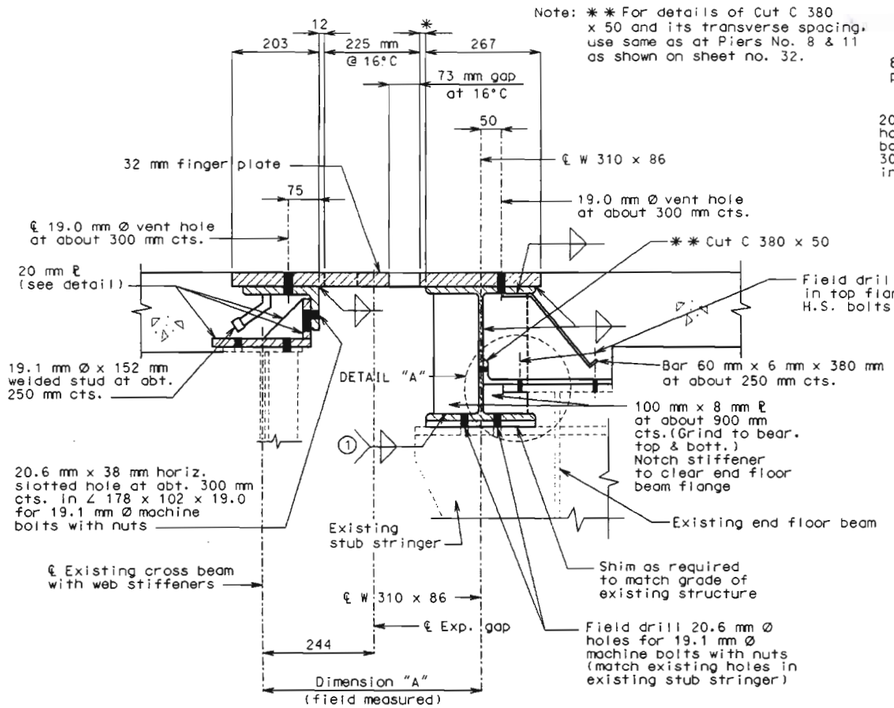
DETAILS OF DECK REPLACEMENT AT PIERS NO. 7 & 12

Sheet No. 24 of 46

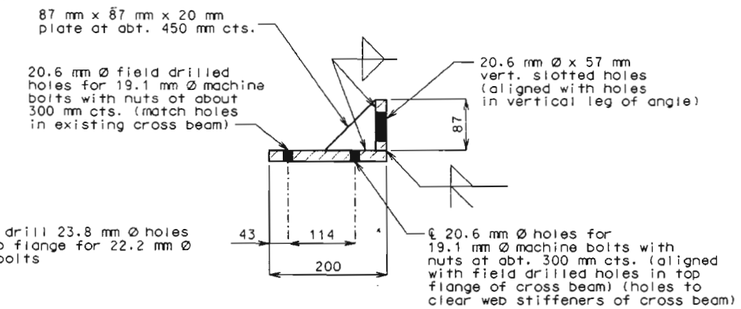
PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		B25



PART SECTION THRU EXPANSION DEVICE

Note: * * For details of Cut C 380 x 50 and its transverse spacing, use same as at Piers No. 8 & 11 as shown on sheet no. 32.



DETAIL OF 20 mm PLATES

① Top & bottom, each side of WF

* Dimension "A" (adjusted to 16°C) minus 484 mm (12 mm min.)

Note: If dimension "*" exceeds 100 mm, then center the ℄ expansion gap on dimension "A" and modify all details affected by the shift of ℄ expansion gap.

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

GENERAL 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 3 mm in width. The centerline of cut shall not deviate more than 2 mm 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 16 degree Celsius. The expansion gap and other dimensions shall be increased 5.4 mm for each 5 degree Celsius fall in temperature and decreased 5.4 mm for each 5 degree Celsius rise in temperature at installation.

Structural steel for the expansion device shall be coated with a minimum of two coats of inorganic zinc primer (125 micrometer minimum thickness) or galvanized in accordance with the 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 meter.

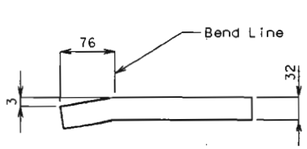
All holes shown for connections to be subpunched 20.6 mm Ø (Shop or field drill) and reamed to 23.8 mm Ø in field.

32 mm Finger Plate, W 310 x 86, and ∠ 178 x 102 x 19.0 shall be bent to conform to crown of roadway.

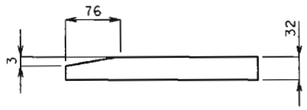
Longitudinal reinforcing steel shall be placed so that ends shall not be more than 25 mm from 20 mm vertical plate, or web of W 310 x 86, at expansion device.

Material for the expansion device shall be ASTM A709M Grade 250 structural steel. Anchors for the expansion device shall be approved stud welded anchors (C1010 thru C1020).

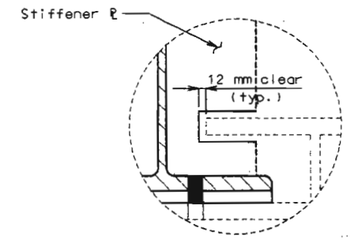
Removal of existing expansion device and support for steel grid on top of stub stringer is included in the contract unit price for Partial Removal of Existing Steel Grid Deck.



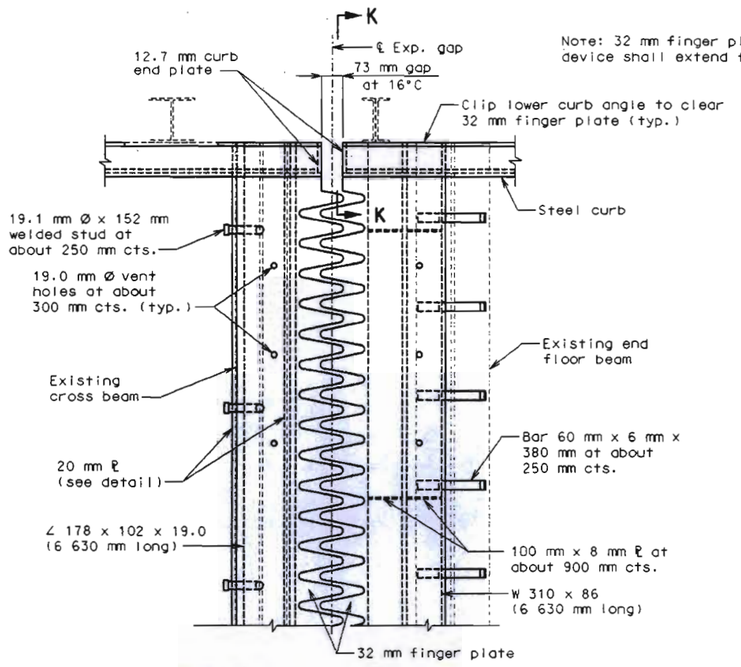
OPTIONAL FINGER DETAIL



FINGER DETAIL



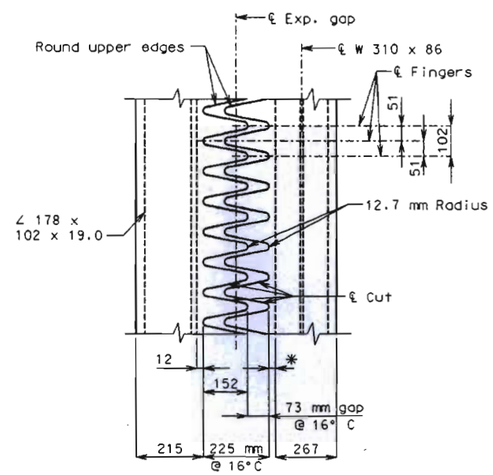
DETAIL "A" SHOWING NOTCH IN STIFFENER AT TOP FLANGE OF END FLOOR BEAM (CUT CHANNEL NOT SHOWN FOR CLARITY)



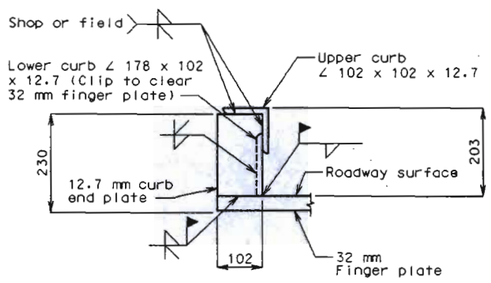
PART SPAN (6-7)
PART SPAN (13-12)
PART SPAN (7-8)
PART SPAN (12-11)

PART PLAN OF EXPANSION DEVICE

Note: 32 mm finger plate expansion device shall extend full width of bridge deck.



TYPICAL PLAN OF PLATE



SECTION K-K

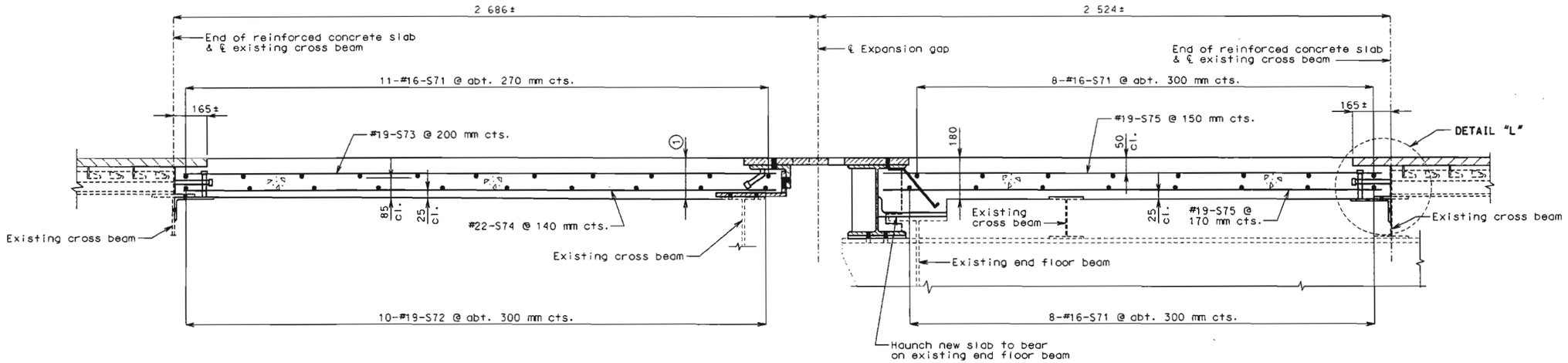
STATE OF MISSOURI
KURT E. GRIBBLE
NUMBER E-23578
REGISTERED PROFESSIONAL ENGINEER
DATE 8-25-99

DETAILS OF FINGER PLATE EXPANSION DEVICE AT PIERS NO. 7 & 12

Detailed June 1999
Checked July 1999

PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		326



SPAN (6-7)
SPAN (13-12)

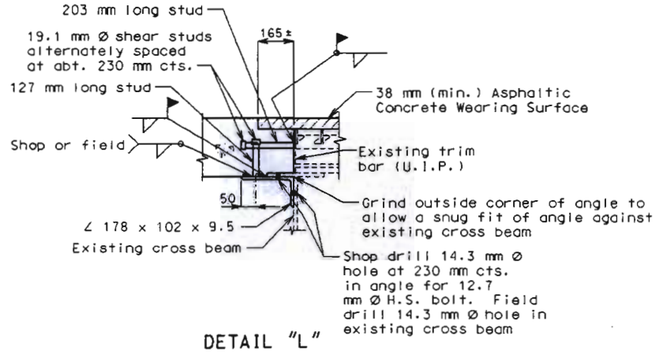
SPAN (7-8)
SPAN (12-11)

	①
At crown of roadway	208
At gutter line	183

PART SECTION AT PIERS NO. 7 & 12

Note: For additional slab reinforcement at rail posts in deck truss spans near expansion joint, see sheet no. 28.

Note: Payment for furnishing and installing shear connector studs (except those for expansion device armor) and ∠ 178 x 102 x 9.5 at cross beam shall be included in the contract unit price for Slab on Steel.



DETAIL "L"

Spans (7-8) & (12-13) shown
Spans (6-7) & (11-12) by opposite hand

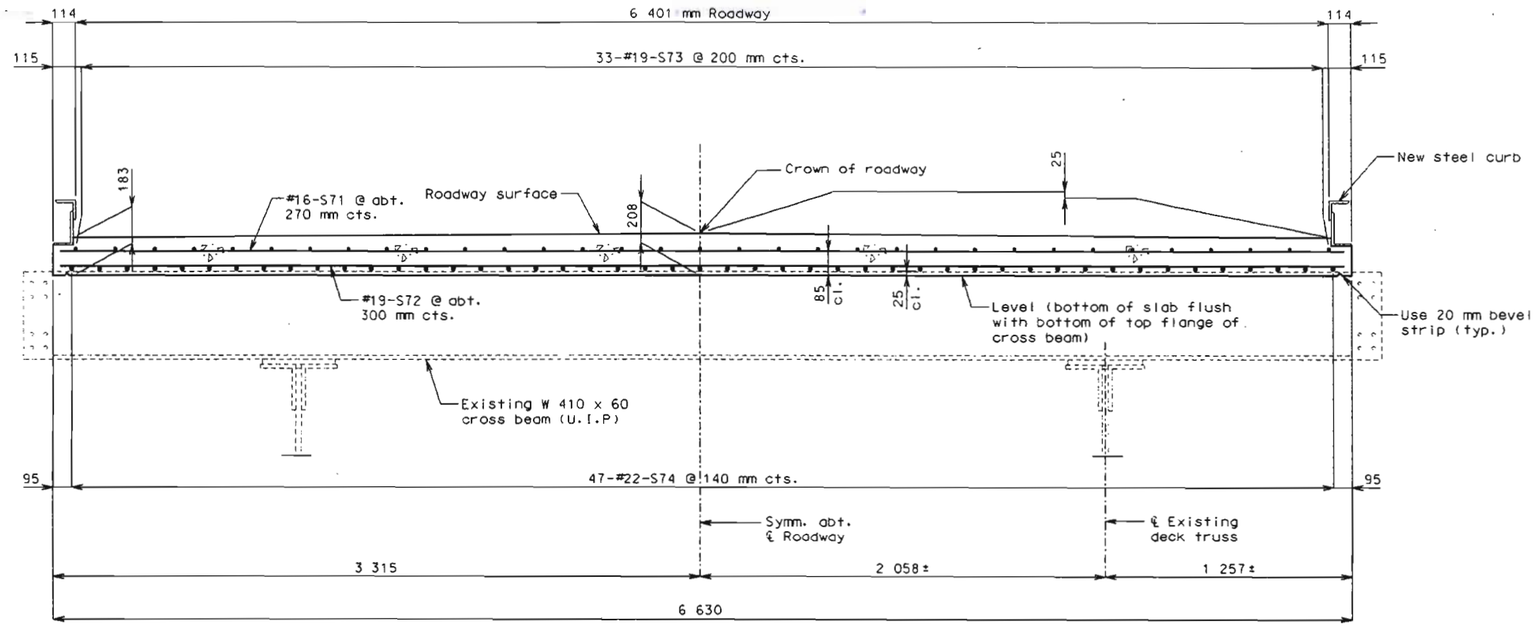
STATE OF MISSOURI
KURT E. GRIBBLE
NUMBER E-23578
REGISTERED PROFESSIONAL ENGINEER
DATE 8-23-99

Detailed June 1999
Checked July 1999

DETAILS OF DECK REPLACEMENT AT PIERS NO. 7 & 12

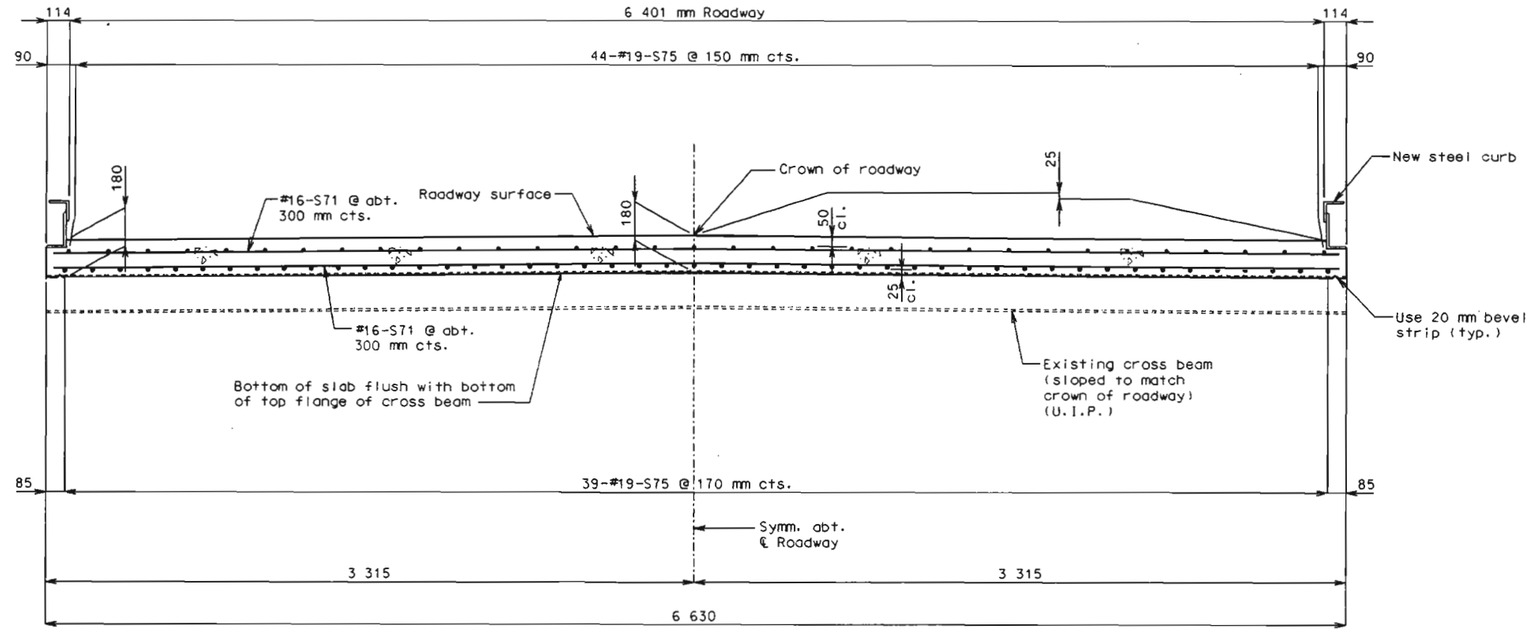
PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		327

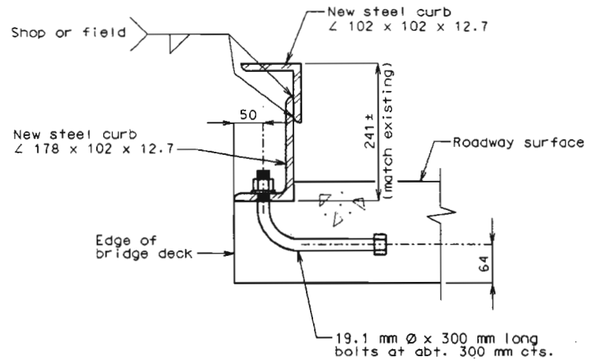


SECTION G-G

Note: For additional slab reinforcement at rail posts in deck truss spans near expansion joint, see sheet no. 28.



SECTION H-H



TYPICAL SECTION SHOWING STEEL CURB ATTACHMENT IN AREA OF NEW REINFORCED CONCRETE SLAB

Note: Top of new slab and expansion device shall conform to 25 mm crown of roadway.

For details of roadway crown, see sheet no. 29.

For location of Sections G-G and H-H, see sheet no. 24.

KENT E. GRIBBLE NUMBER E-23570 STATE OF MISSOURI REGISTERED PROFESSIONAL ENGINEER

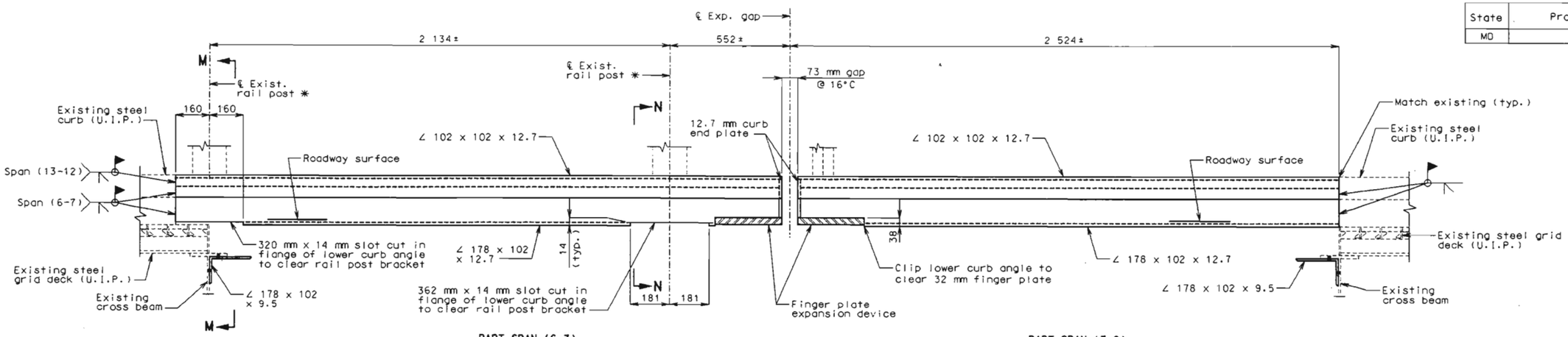
DATE 8-20-99

DETAILS OF DECK REPLACEMENT AT PIERS NO. 7 & 12

Detailed June 1999
Checked July 1999

PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		1328



Note: Reuse rail post brackets in their present locations (as shown in plan and elevation views) with the new reinforced concrete slab.

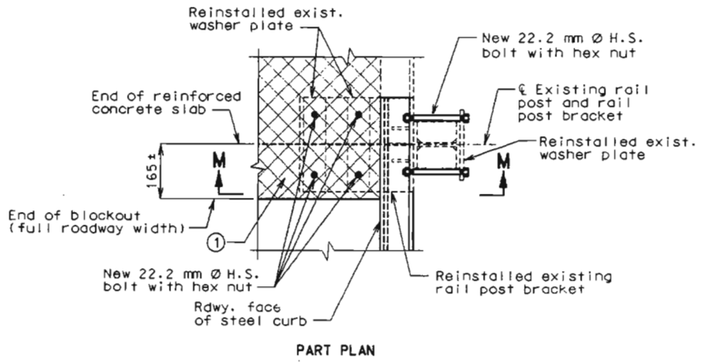
PART SPAN (6-7)
PART SPAN (13-12)

PART SPAN (7-8)
PART SPAN (12-11)

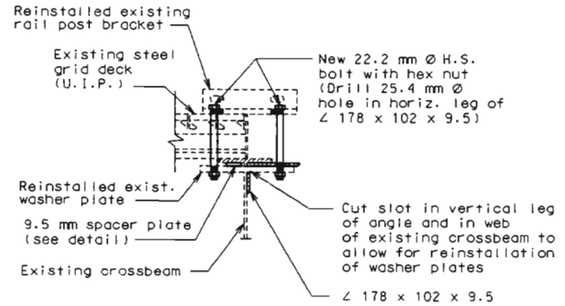
PART SECTION SHOWING STEEL CURB
(LEFT SIDE SHOWN, RIGHT SIDE SIMILAR)

✱ Reuse existing rail post bracket and washer plates.

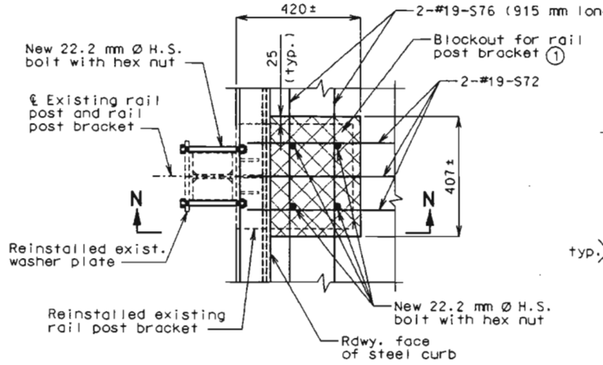
① Blockout to be filled with asphaltic concrete after installation of rail post brackets.



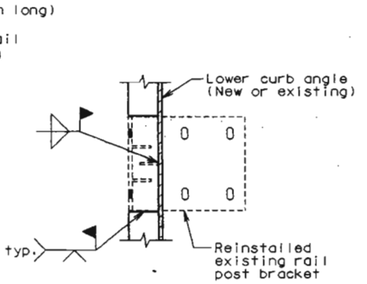
PART PLAN



DETAIL "Q"
(Steel curb not shown for clarity)

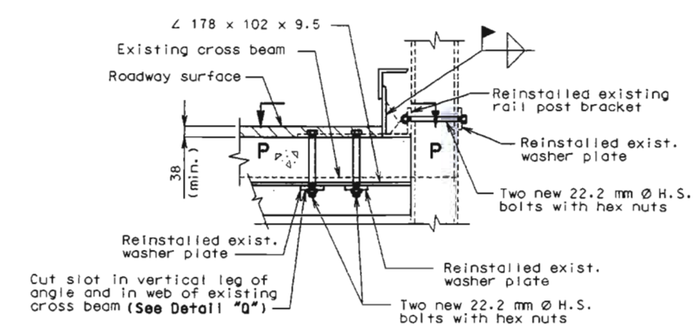


PART PLAN

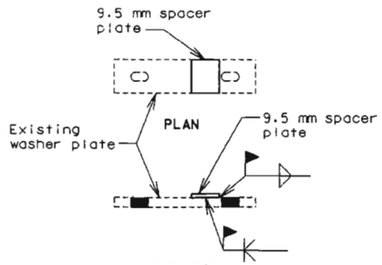


PART SECTION P-P
(Showing field welds)

(As shown for Part Section N-N. Part Section M-M by opposite hand)

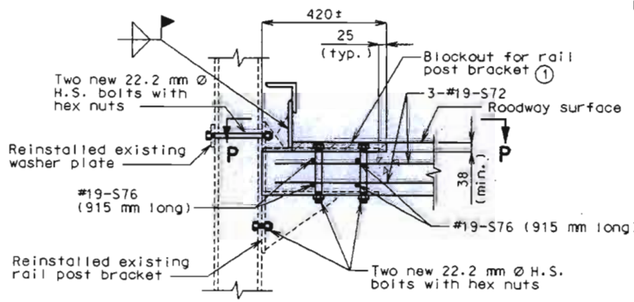


PART SECTION M-M



ELEVATION

DETAILS OF 9.5 mm SPACER PLATE



PART SECTION N-N

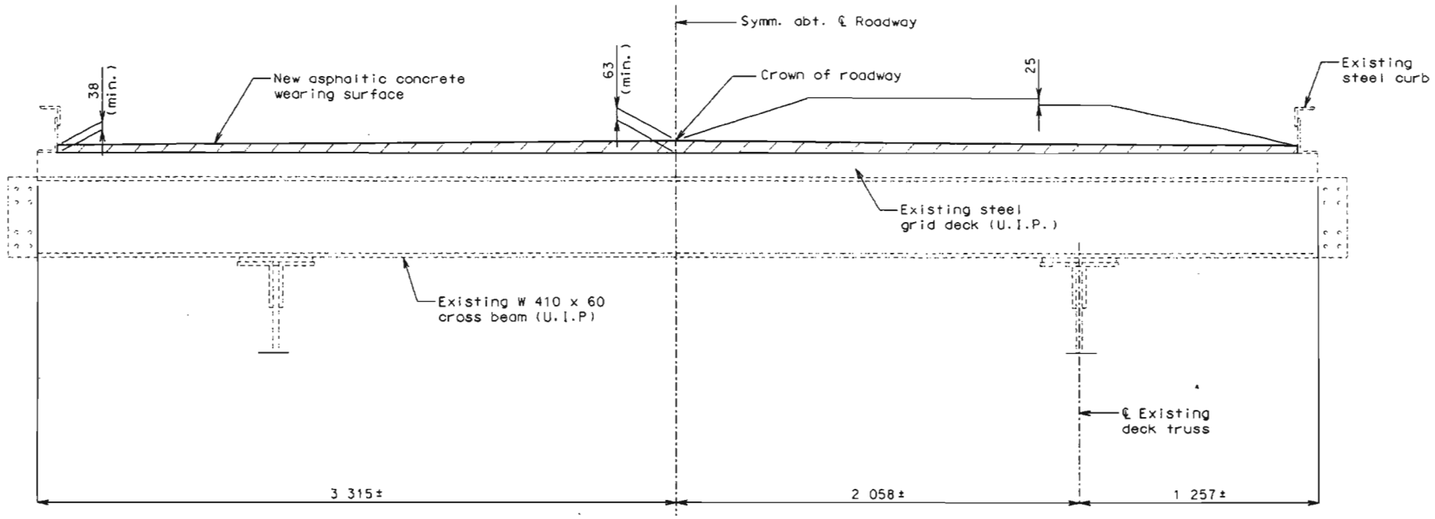
STATE OF MISSOURI
KURT E. GRUBBLE
NUMBER E-23576
REGISTERED PROFESSIONAL ENGINEER
DATE 8-20-99

DETAILS OF STEEL CURB & RAIL POST ATTACHMENT AT PIERS NO. 7 & 12

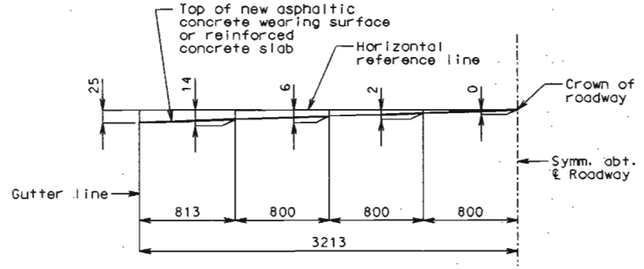
Detailed June 1999
Checked July 1999

PLATTE COUNTY K04563

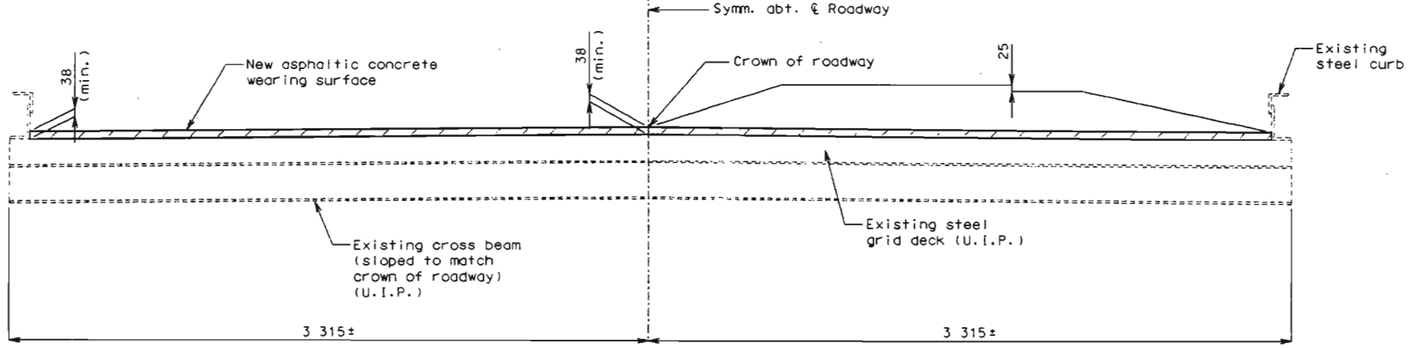
State	Proj. No.	Sheet No.
MO		B29



SECTION F-F



DETAIL OF ROADWAY CROWN



SECTION J-J

Note: For location of Sections F-F and J-J, see sheet no. 24.

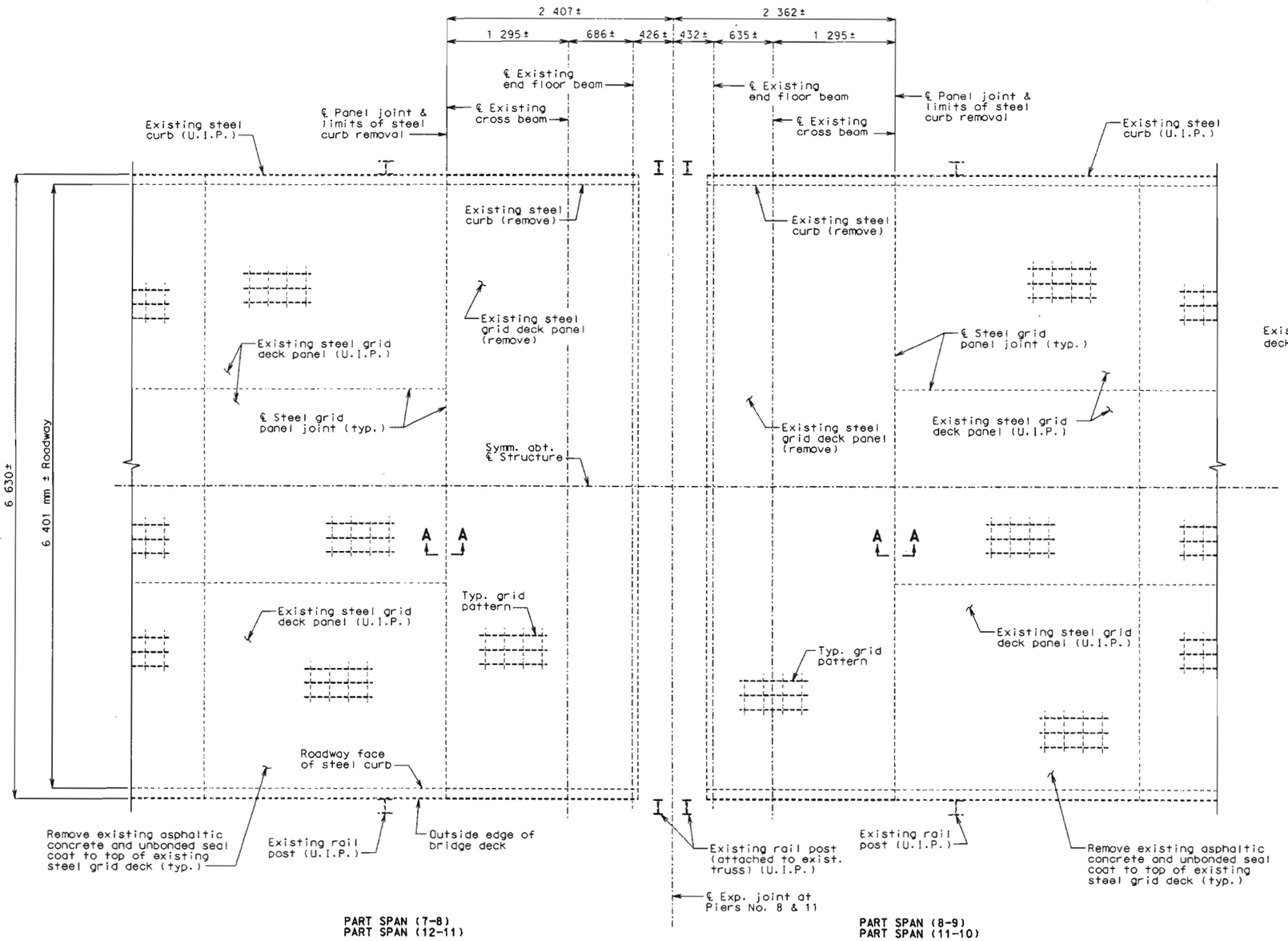
STATE OF MISSOURI
KURT E. GRIBBLE
NUMBER E-23578
REGISTERED PROFESSIONAL ENGINEER
DATE 8-23-99

DETAILS OF ASPHALTIC CONCRETE WEARING SURFACE AT PIERS NO. 7 & 12

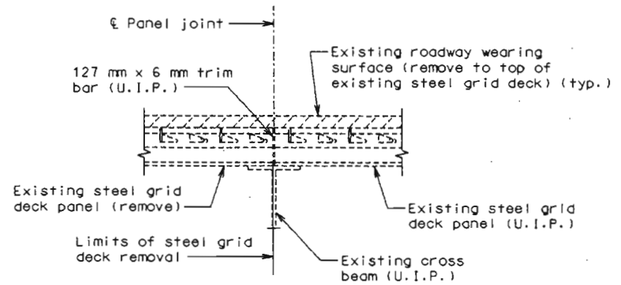
Detailed June 1999
Checked July 1999

PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		B3o



PART PLAN OF EXISTING DECK



SECTION A-A

Spans (8-9) & (11-12) shown
Spans (7-8) & (10-11) by opposite hand

Note: Payment for the removal of steel curb, as designated on the plans, shall be included in the contract unit price for Partial Removal of Existing Steel Grid Deck.

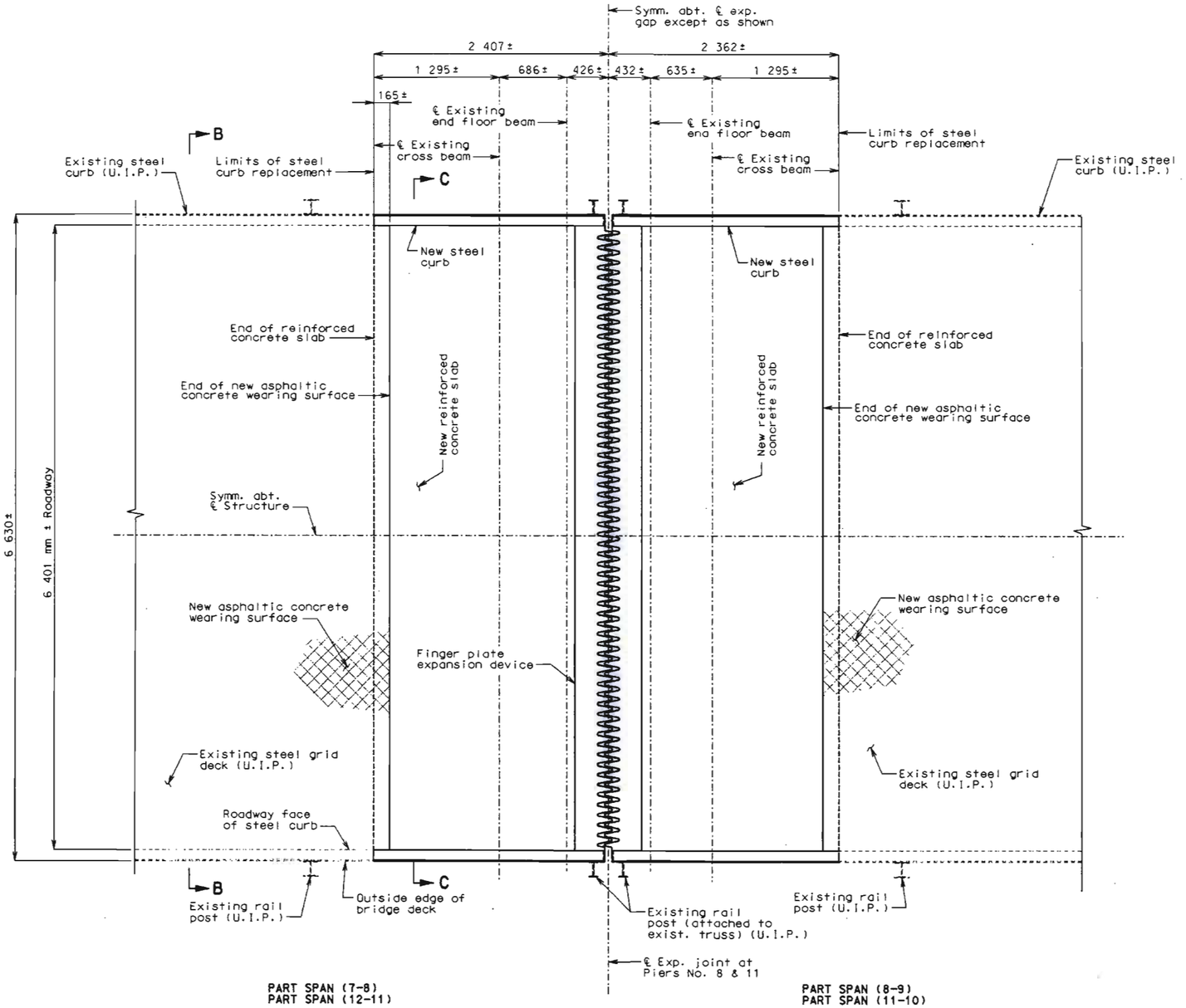
STATE OF MISSOURI
KURT E. GRIBBLE
NUMBER E-23578
REGISTERED PROFESSIONAL ENGINEER
DATE 8-25-99

Detailed June 1999
Checked July 1999

DETAILS OF DECK REMOVAL AT PIERS NO. 8 & 11

PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		B31



PART PLAN

Note: For Sections B-B and C-C. see sheet no. 34.

For longitudinal section thru new reinforced concrete slabs. see sheet no. 33.

For details of finger plate expansion device. see sheet no. 32.

For details of new steel curb. see sheet no. 33.

Details for steel curb replacement have been developed based on available plans and on using the existing rail posts in their present locations. The contractor shall verify the existing rail post locations before ordering steel curb replacement.

Payment for furnishing and installing new steel curb with anchor bolts. hex nuts. and washers shall be included in the contract unit price for Steel Curb.

STATE OF MISSOURI
KURT E. GRIBBLE
NUMBER E-23576
REGISTERED PROFESSIONAL ENGINEER

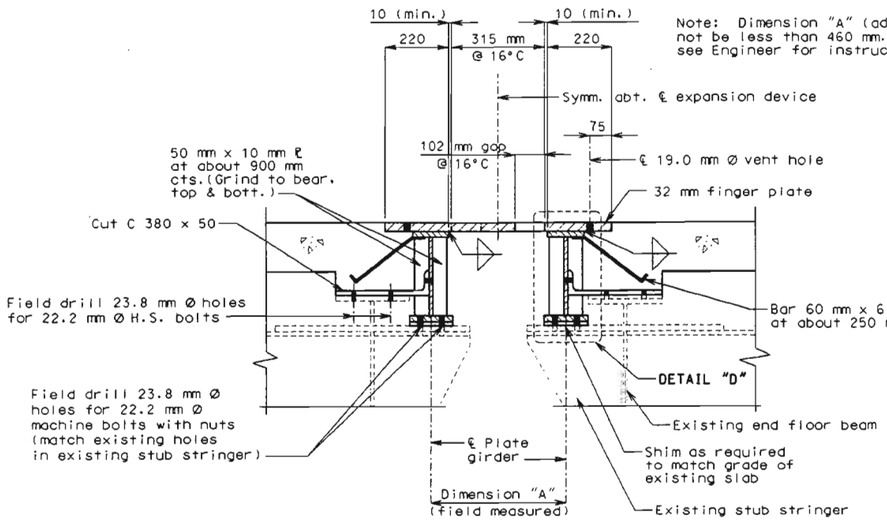
DATE 8-20-99

Detailed June 1999
Checked July 1999

DETAILS OF DECK REPLACEMENT AT PIERS NO. 8 & 11

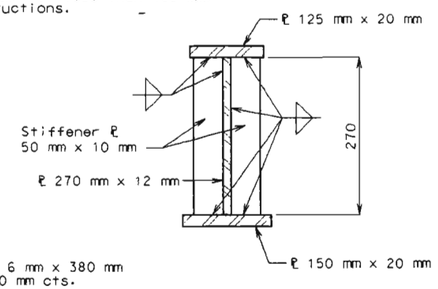
PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		B 32

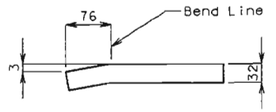


PART SECTION THRU EXPANSION DEVICE

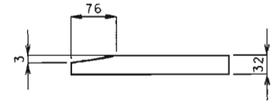
Note: Dimension "A" (adjusted to 16°C) shall not be less than 460 mm. If less than 460 mm, see Engineer for instructions.



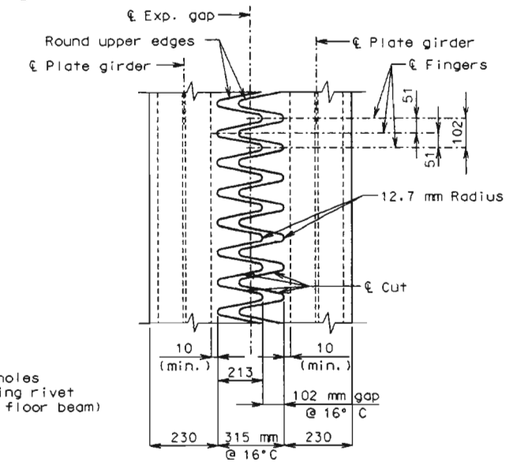
DETAIL "D"



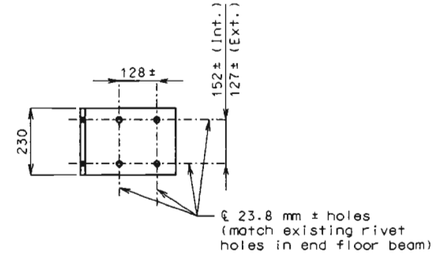
OPTIONAL FINGER DETAIL



FINGER DETAIL

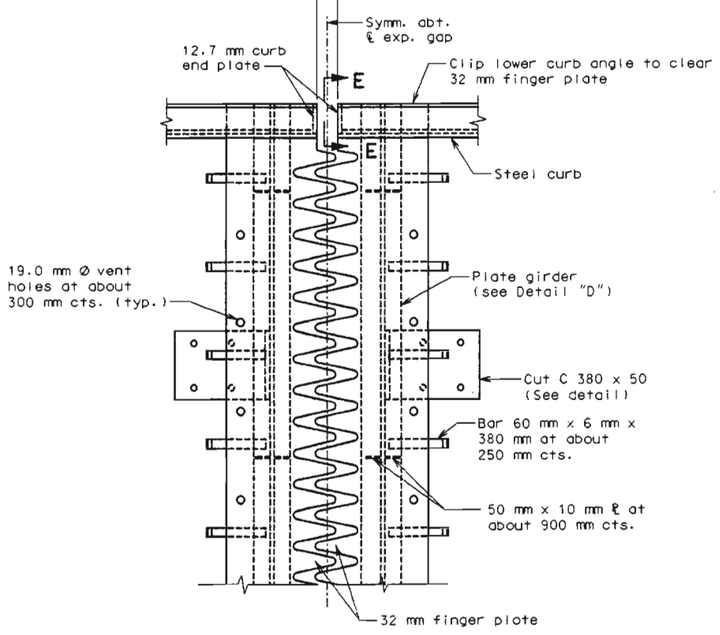


TYPICAL PLAN OF PLATE



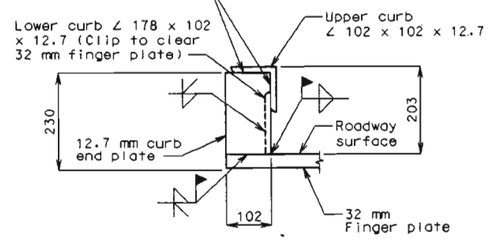
DETAIL OF CUT C 380 x 50

Note: Concrete shall be forced under and around finger plate supporting hardware. Proper consolidation of the concrete shall be achieved by localized internal vibration.

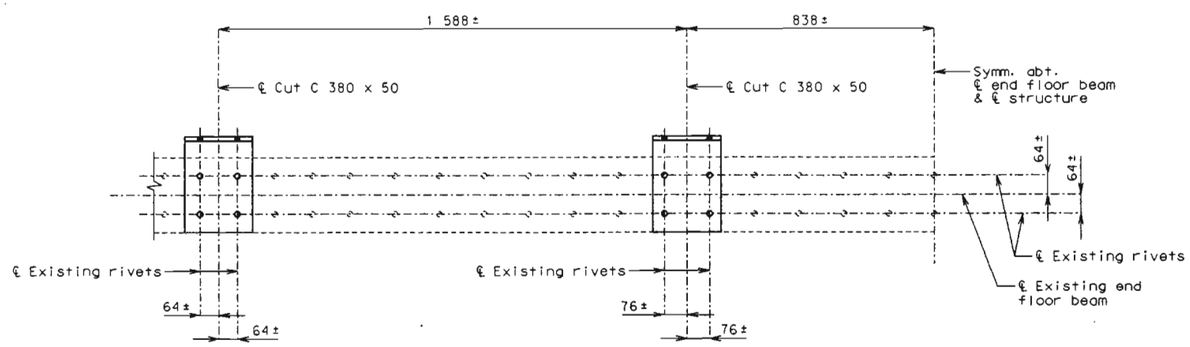


PART PLAN OF EXPANSION DEVICE

Note: 32 mm finger plate expansion device shall extend full width of bridge deck.



SECTION E-E



Note: Remove indicated existing rivets and attach cut C 380 x 50 using 22.2 mm Ø H.S. bolts.

PART PLAN OF EXISTING END FLOOR BEAM (MAIN TRUSS)

(SHOWING LOCATION OF CUT C 380 x 50)

(Use same details for simple span truss)

GENERAL 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 3 mm in width. The centerline of cut shall not deviate more than 2 mm 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 16 degree Celsius. The expansion gap and other dimensions shall be increased 7.4 mm for each 5 degree Celsius fall in temperature and decreased 7.4 mm for each 5 degree Celsius rise in temperature at installation.

Structural steel for the expansion device shall be coated with a minimum of two coats of inorganic zinc primer (125 micrometer minimum thickness) or galvanized in accordance with the 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 meter.

All holes shown for connections to be subpunched 20.6 mm Ø (Shop or field drill) and reamed to 23.8 mm Ø in field.

32 mm Finger Plate and plate girders shall be bent to conform to crown of roadway.

Longitudinal reinforcing steel shall be placed so that ends shall not be more than 25 mm from web of plate girder at expansion device.

Material for the expansion device shall be ASTM A709M Grade 250 structural steel. Anchors for the expansion device shall be approved stud welded anchors (C1010 thru C1020).

Removal of existing expansion device and supporting beams on top of stub stringers is included in the contract unit price for Partial Removal of Existing Steel Grid Deck.

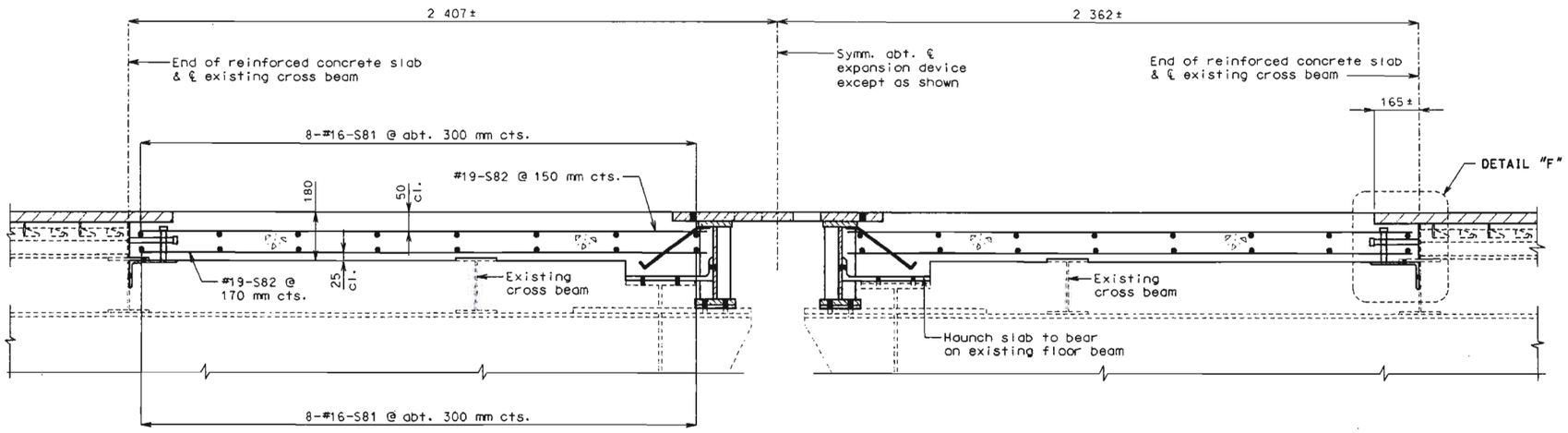
STATE OF MISSOURI
KURT E. GRIBBLE
NUMBER E-23578
REGISTERED PROFESSIONAL ENGINEER
DATE 8-20-99

Detailed June 1999
Checked July 1999

DETAILS OF FINGER PLATE EXPANSION DEVICE AT PIERS NO. 8 & 11

PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		B33

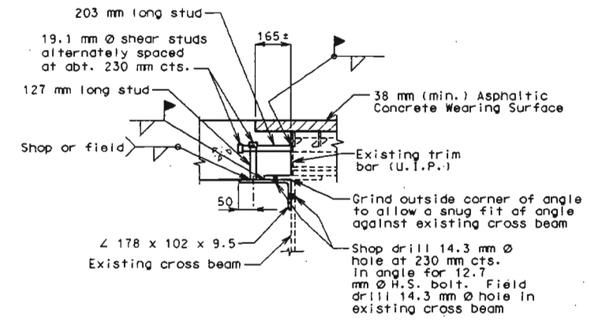


PART SPAN (7-8)
PART SPAN (12-11)

PART SPAN (8-9)
PART SPAN (11-10)

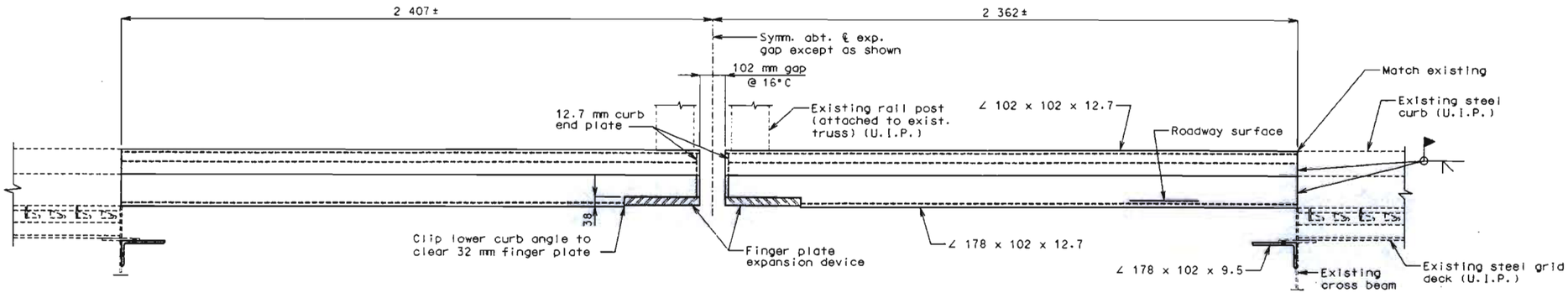
PART SECTION AT PIERS NO. 8 & 11

Note: Payment for furnishing and installing shear connector studs and ∠ 178 x 102 x 9.5 at cross beam shall be included in the contract unit price for Slab on Steel.



DETAIL "F"

Spans (8-9) & (11-10) shown
Spans (7-8) & (12-11) by opposite hand



PART SPAN (7-8)
PART SPAN (12-11)

PART SPAN (8-9)
PART SPAN (11-10)

PART SECTION SHOWING STEEL CURB

(Left side shown, right side similar)

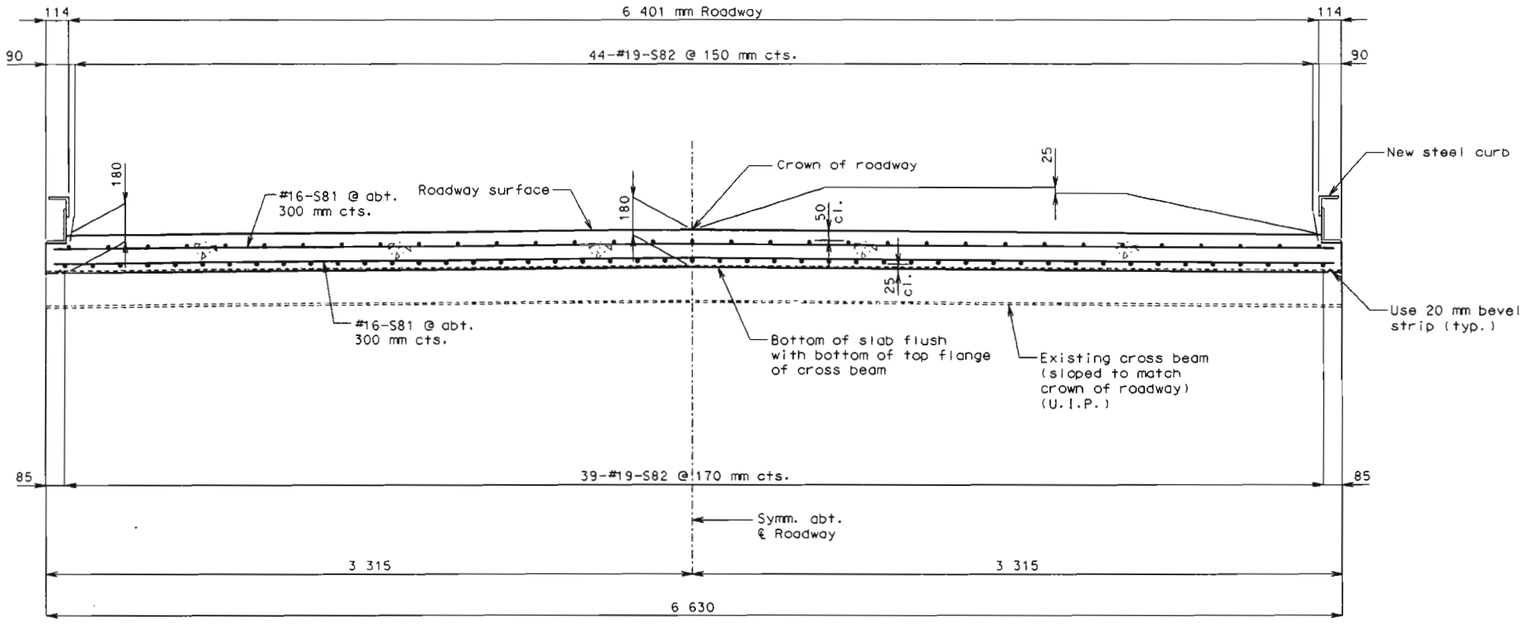
STATE OF MISSOURI
KURT E. GRIBBLE
NUMBER E-23576
REGISTERED PROFESSIONAL ENGINEER
DATE 8-20-99

DETAILS OF DECK REPLACEMENT AT PIERS NO. 8 & 11

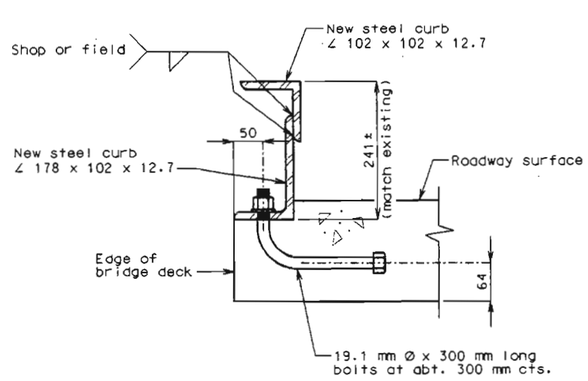
Detailed June 1999
Checked July 1999

PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		B34



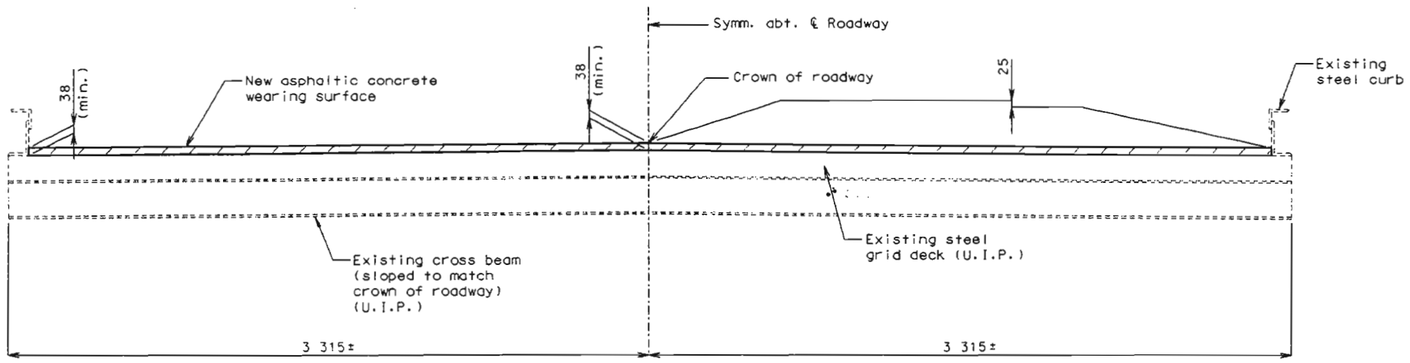
SECTION C-C



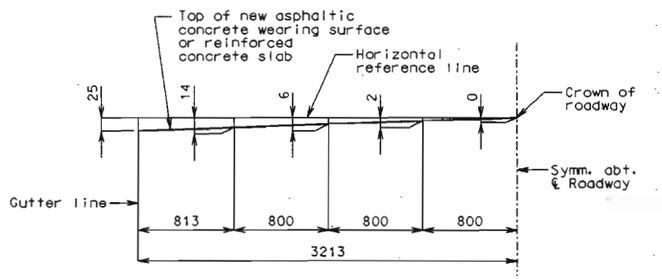
TYPICAL SECTION SHOWING STEEL CURB ATTACHMENT IN AREA OF NEW REINFORCED CONCRETE SLAB

Note: Top of new slab and expansion device shall conform to 25 mm crown of roadway.

For location of Sections B-B and C-C, see sheet no. 31.



SECTION B-B



DETAIL OF ROADWAY CROWN

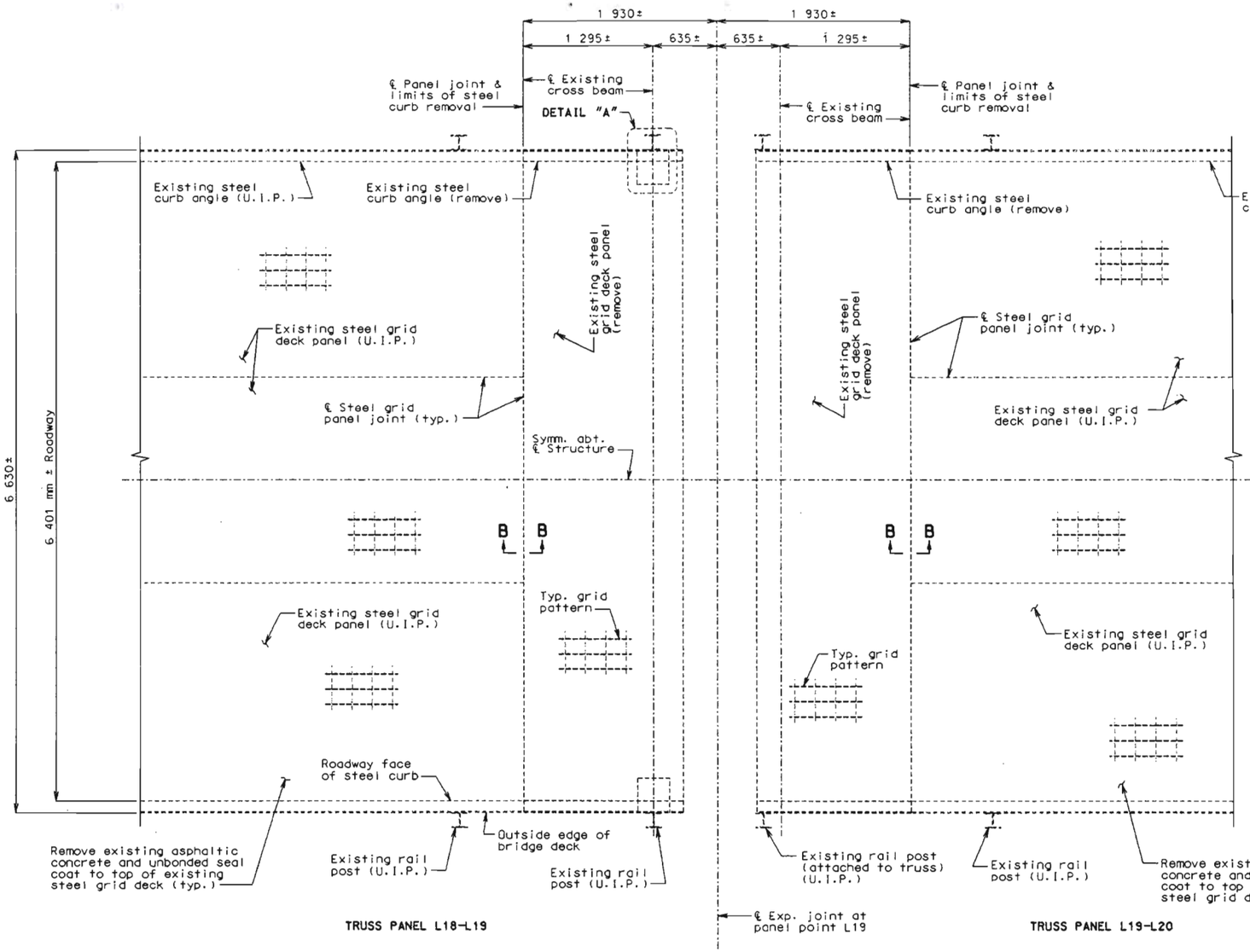
STATE OF MISSOURI
KURT E. GRIBBLE
NUMBER E-23576
REGISTERED PROFESSIONAL ENGINEER
DATE 8-20-99

Detailed June 1999
Checked July 1999

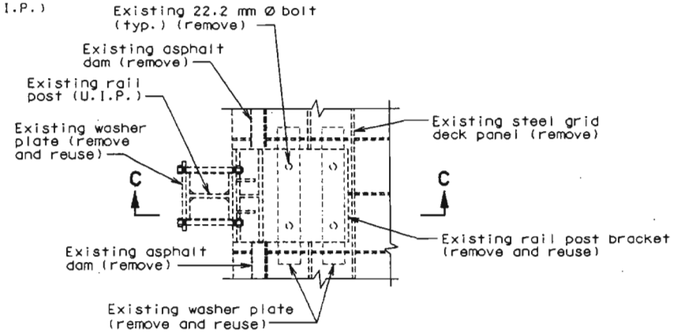
DETAILS OF DECK REPLACEMENT AT PIERS NO. 8 & 11

PLATTE COUNTY K04563

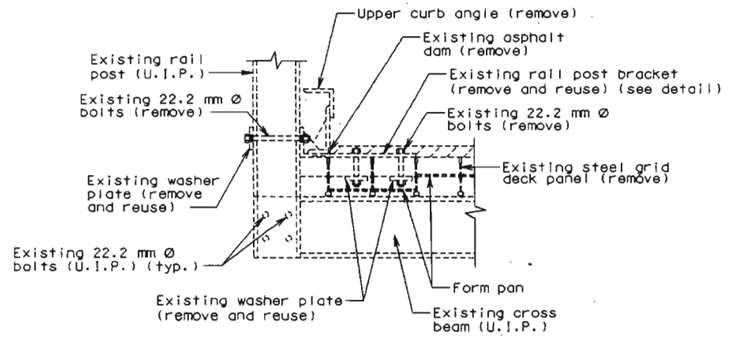
State	Proj. No.	Sheet No.
MO		835



PART PLAN OF EXISTING DECK



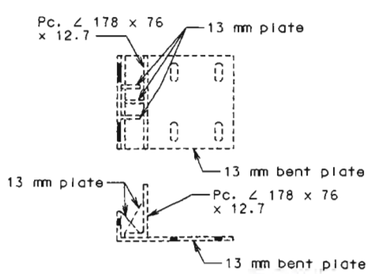
DETAIL "A"
(Rotated 90° counterclockwise)
Note: Steel curb not shown for clarity.



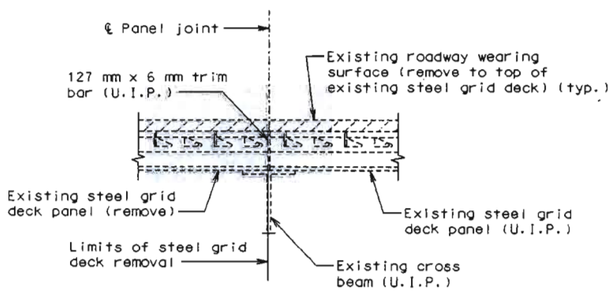
SECTION C–C

Note: Removed rail post brackets and washer plates shall be cleaned and coated with a prime coat of the specified paint system before reinstallation with the new slab.

Payment for the removal of steel curb, rail post brackets and washer plates, as designated on the plans, shall be included in the contract unit price for Partial Removal of Existing Steel Grid Deck.



DETAILS OF RAIL POST BRACKETS
(Remove and reuse with new slab)



SECTION B–B
(Truss panel L19–L20 shown.
Truss panel L18–L19 by opposite hand)

STATE OF MISSOURI
KURT E. GRIBBLE
NUMBER E-23576
REGISTERED PROFESSIONAL ENGINEER
DATE 8-20-99

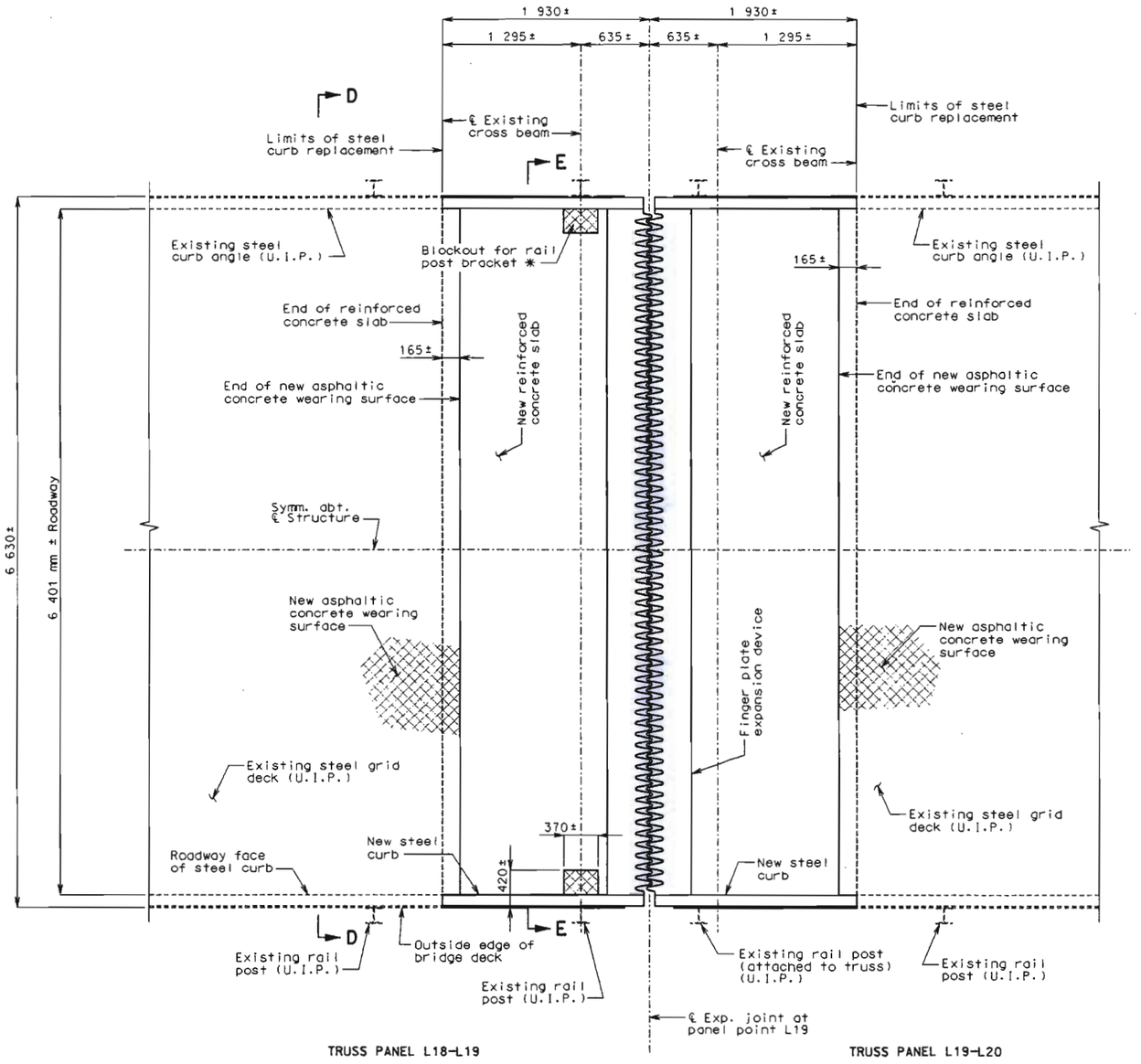
Detailed June 1999
Checked July 1999

DETAILS OF DECK REMOVAL AT PANEL POINT L19

Sheet No. 35 of 46

PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		1336



PART PLAN

Note: For Sections D-D and E-E, see sheet no. 39.

For longitudinal section thru new reinforced concrete slabs, see sheet no. 38.

For details of finger plate expansion device, see sheet no. 37.

For details of new steel curb and rail post attachments, see sheet no. 40.

* Blockout to be filled with asphaltic concrete after installation of rail post bracket.

Details for steel curb replacement have been developed based on available plans and on using the existing rail posts in their present locations. The contractor shall verify the existing rail post locations before ordering steel curb replacement.

Payment for the reinstallation of the existing rail post brackets and washer plates with new H.S. bolts, hex nuts, and washers shall be included in the contract unit price for Slab on Steel.

Payment for furnishing and installing new steel curb with anchor bolts, hex nuts, and washers shall be included in the contract unit price for Steel Curb.

STATE OF MISSOURI
KURT E. GRIBBLE
NUMBER E-23576
PROFESSIONAL ENGINEER

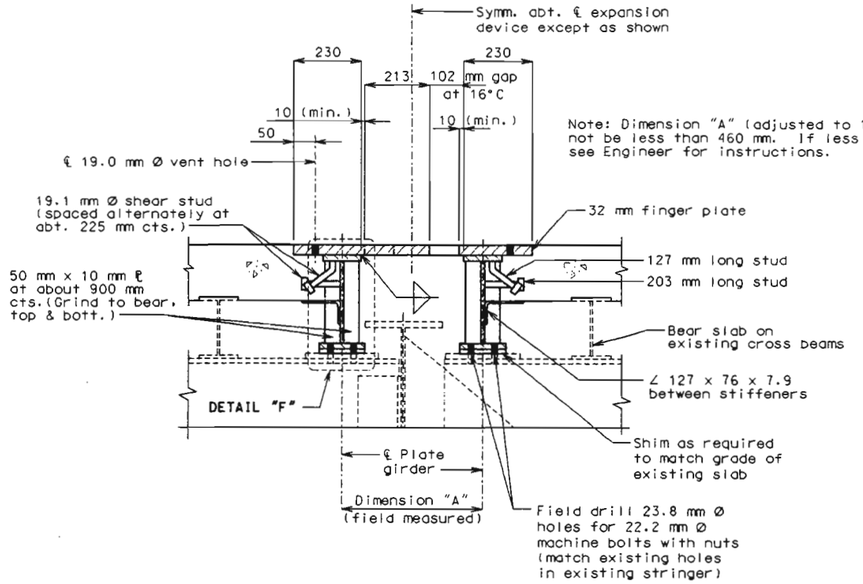
DATE 8-20-99

DETAILS OF DECK REPLACEMENT AT PANEL POINT L19

Detailed June 1999
Checked July 1999

PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		B37

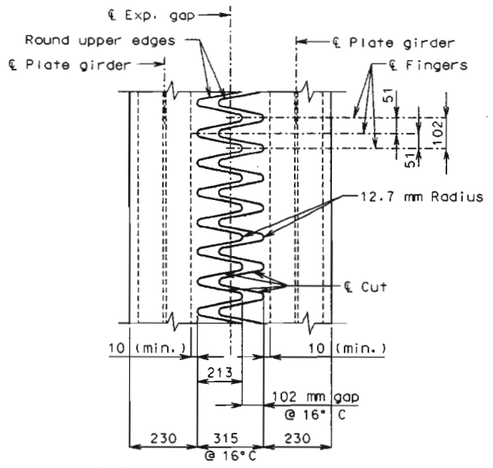


Note: Dimension "A" (adjusted to 16°C) shall not be less than 460 mm. If less than 460 mm, see Engineer for instructions.

TRUSS PANEL L18–L19 TRUSS PANEL L19–L20

PART SECTION THRU EXPANSION DEVICE

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



TYPICAL PLAN OF PLATE

GENERAL 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 3 mm in width. The centerline of cut shall not deviate more than 2 mm 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 16 degree Celsius. The expansion gap and other dimensions shall be increased 8.5 mm for each 5 degree Celsius fall in temperature and decreased 8.5 mm for each 5 degree Celsius rise in temperature at installation.

Structural steel for the expansion device shall be coated with a minimum of two coats of inorganic zinc primer (125 micrometer minimum thickness) or galvanized in accordance with the 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 meter.

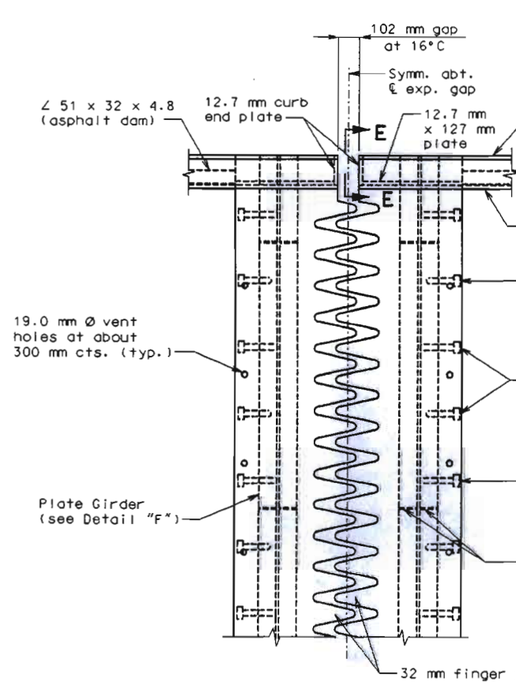
All holes shown for connections to be subpunched 20.6 mm Ø (Shop or field drill) and reamed to 23.8 mm Ø in field.

32 mm Finger Plate and plate girders shall be bent to conform to crown of roadway.

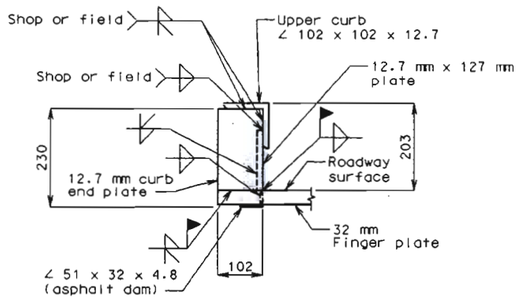
Longitudinal reinforcing steel shall be placed so that ends shall not be more than 25 mm from web of plate girder at expansion device.

Material for the expansion device shall be ASTM A709M Grade 250 structural steel. Anchors for the expansion device shall be approved stud welded anchors (C1010 thru C1020).

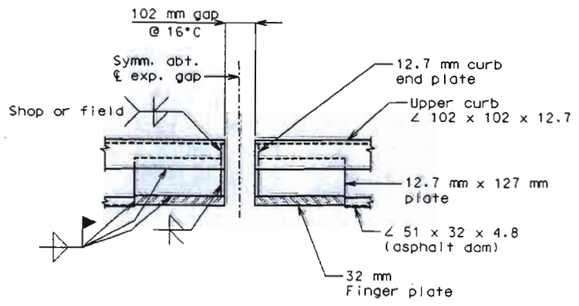
Removal of existing expansion device and supporting beams on top of stringers is included in the contract unit price for Partial Removal of Existing Steel Grid Deck.



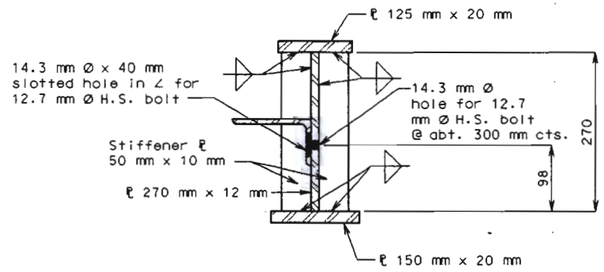
PART PLAN OF EXPANSION DEVICE



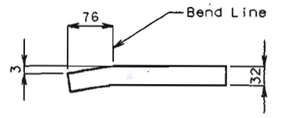
SECTION E–E



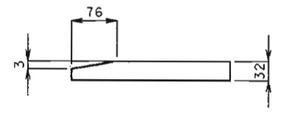
PART SECTION NEAR CURB



DETAIL "F"



OPTIONAL FINGER DETAIL



FINGER DETAIL

STATE OF MISSOURI KENT E. GRIBBLE HUNTER E-23576 REGISTERED PROFESSIONAL ENGINEER

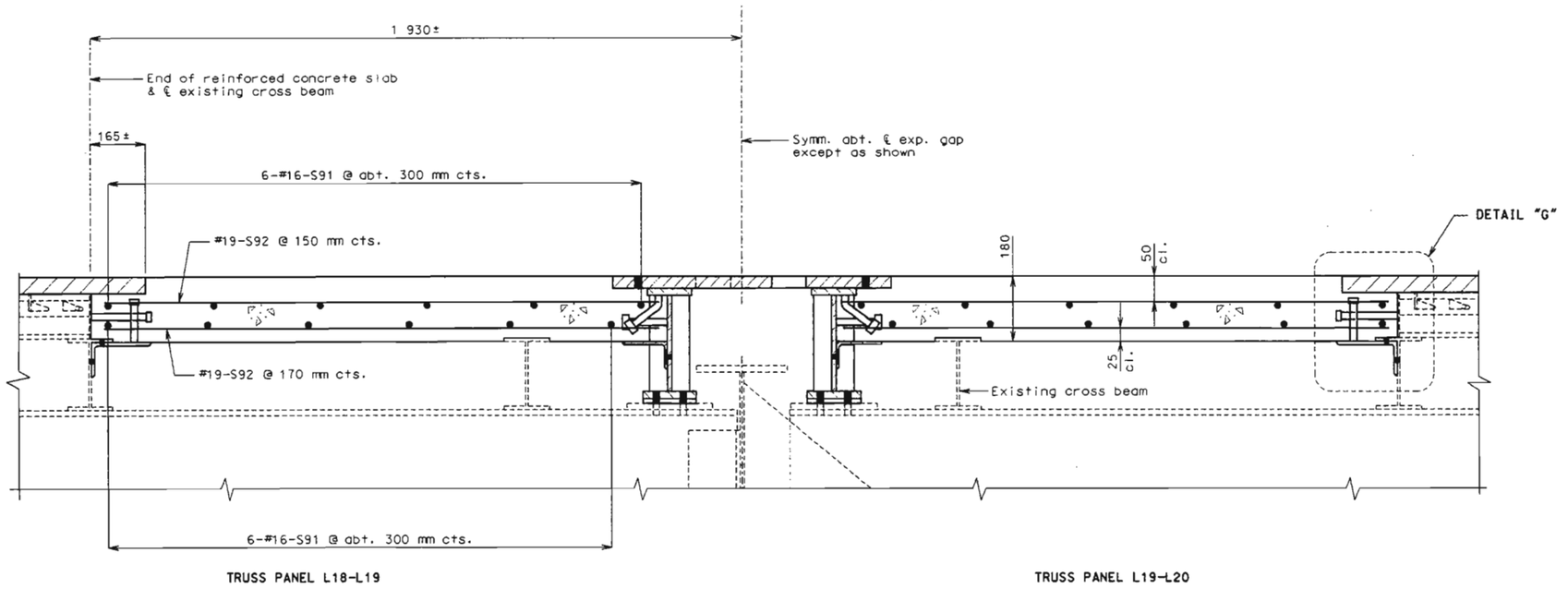
DATE 8-20-99

DETAILS OF FINGER PLATE EXPANSION DEVICE AT PANEL POINT L19

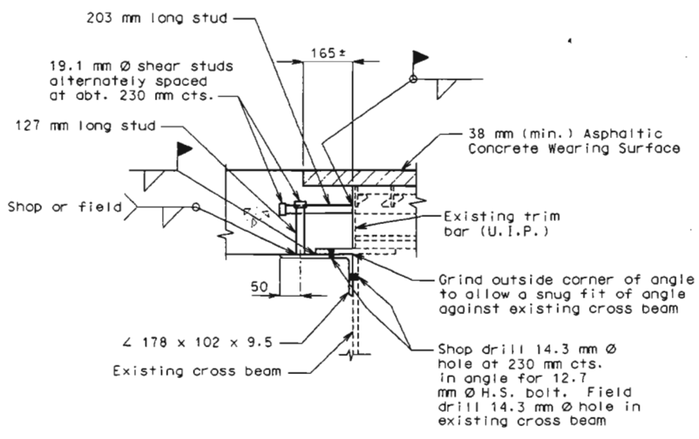
Detailed June 1999
Checked July 1999

PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		B 3P



PART SECTION AT PANEL POINT L19



DETAIL "G"

Note: Payment for furnishing and installing shear connector studs and ∠ 178 x 102 x 9.5 at cross beam shall be included in the contract unit price for Slab on Steel.

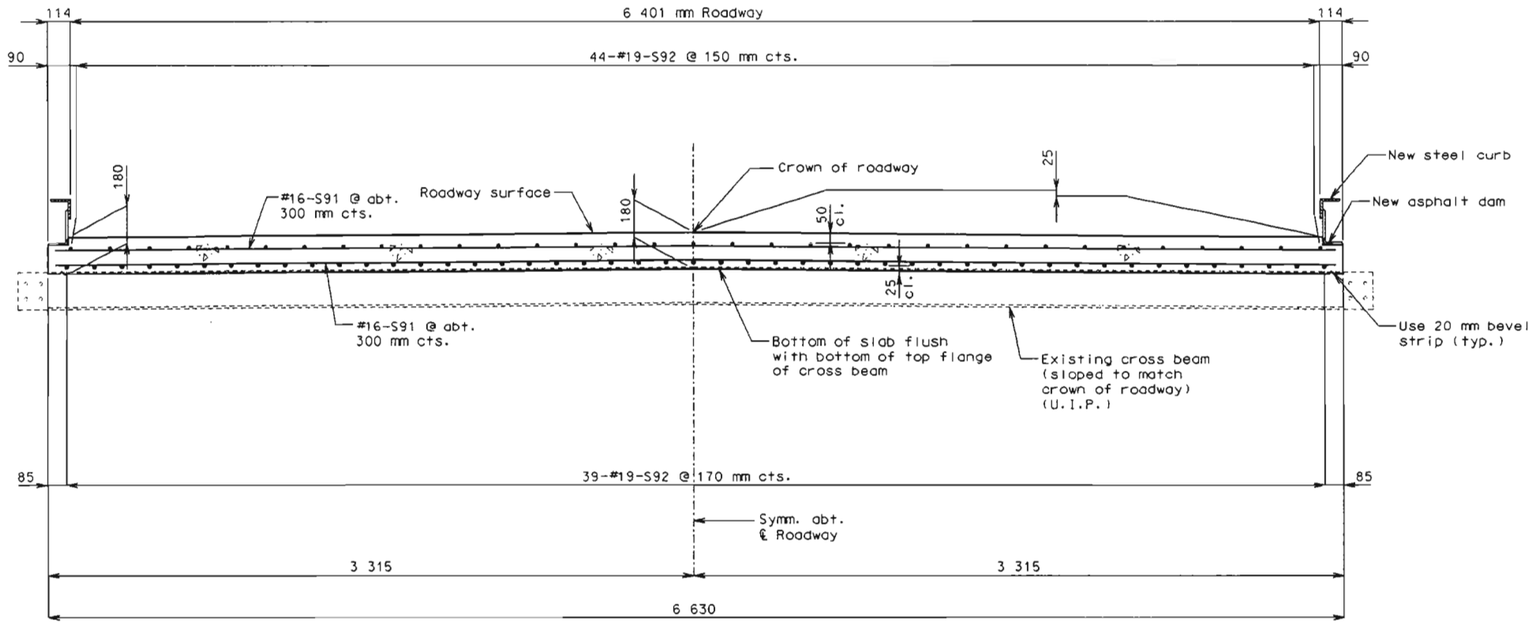
STATE OF MISSOURI
KURT E. GRIBBLE
NUMBER E-23578
REGISTERED PROFESSIONAL ENGINEER
DATE 8-20-99

DETAILS OF DECK REPLACEMENT AT PANEL POINT L19

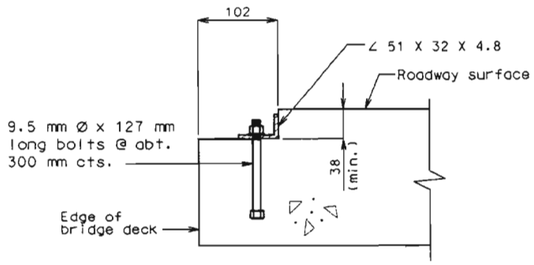
Detailed June 1999
Checked July 1999

PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		B39



SECTION E-E

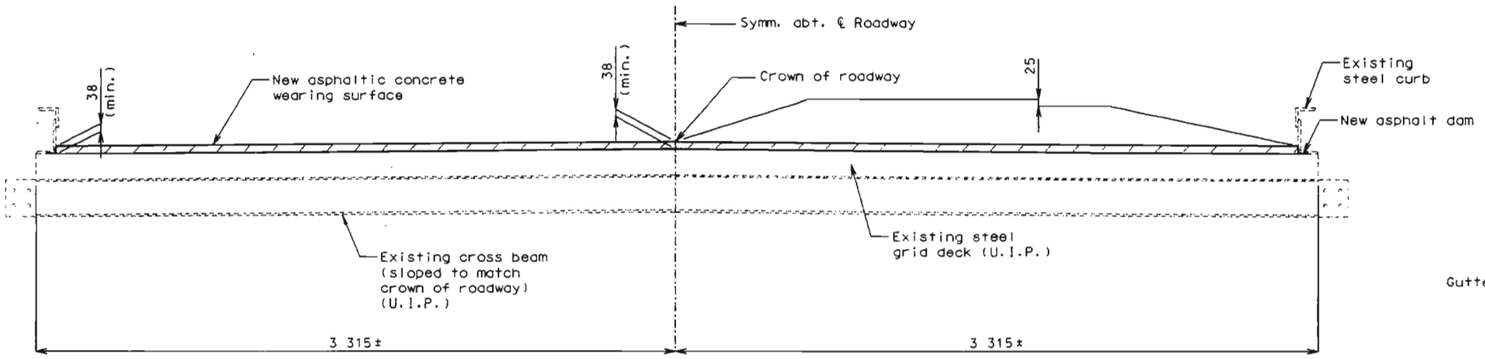


TYPICAL SECTION SHOWING ASPHALT DAM ATTACHMENT IN AREA OF NEW REINFORCED CONCRETE SLAB

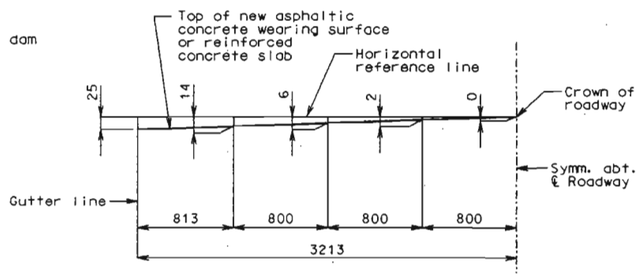
Note: Top of new slab and expansion device shall conform to 25 mm crown of roadway.

For location of Sections D-D and E-E, see sheet no. 36.

Payment for furnishing and installing new steel dam angles with anchor bolts, hex nuts, and washers shall be included in the contract unit price for Remove and Replace Dam Angle @ Open Curb Areas per meter.



SECTION D-D



DETAIL OF ROADWAY CROWN

STATE OF MISSOURI
KURT E. GRIBBLE
NUMBER E-23676
REGISTERED PROFESSIONAL ENGINEER
DATE 8-20-99

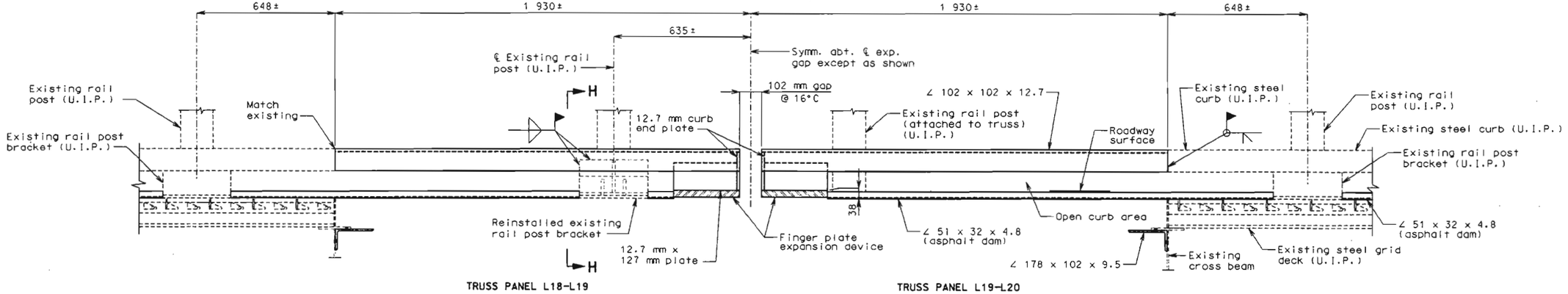
Detailed June 1999
Checked July 1999

DETAILS OF DECK REPLACEMENT AT PANEL POINT L19

Sheet No. 39 of 46

PLATTE COUNTY K04563

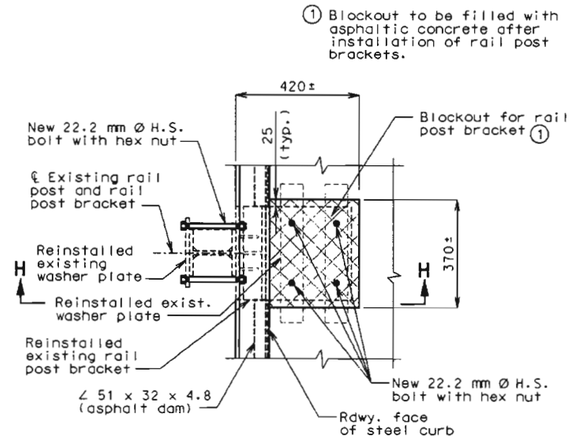
State	Proj. No.	Sheet No.
MO		B40



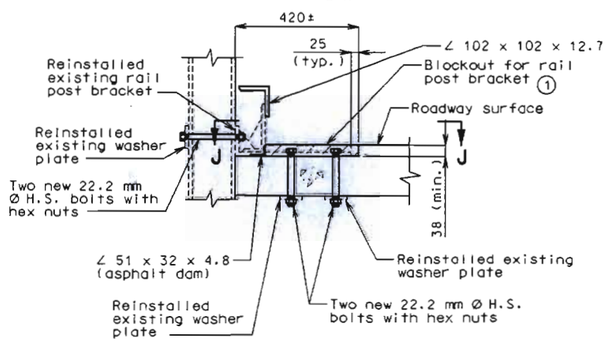
TRUSS PANEL L18–L19 TRUSS PANEL L19–L20

PART SECTION SHOWING STEEL CURB

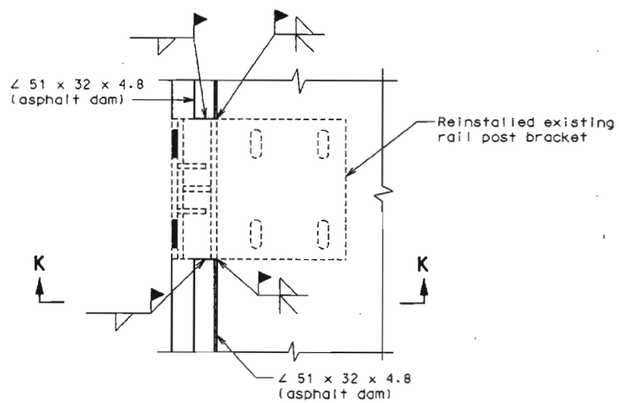
(Left side shown. right side similar)



PART PLAN



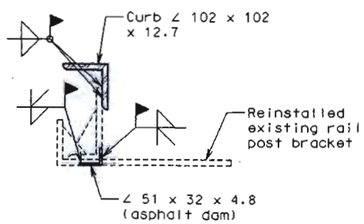
PART SECTION H–H



SECTION J–J

(Upper curb angle not shown for clarity)

(Typ. for all rail post bracket locations)



SECTION K–K

STATE OF MISSOURI KURT E. GRUBBE NUMBER E-23576 REGISTERED PROFESSIONAL ENGINEER

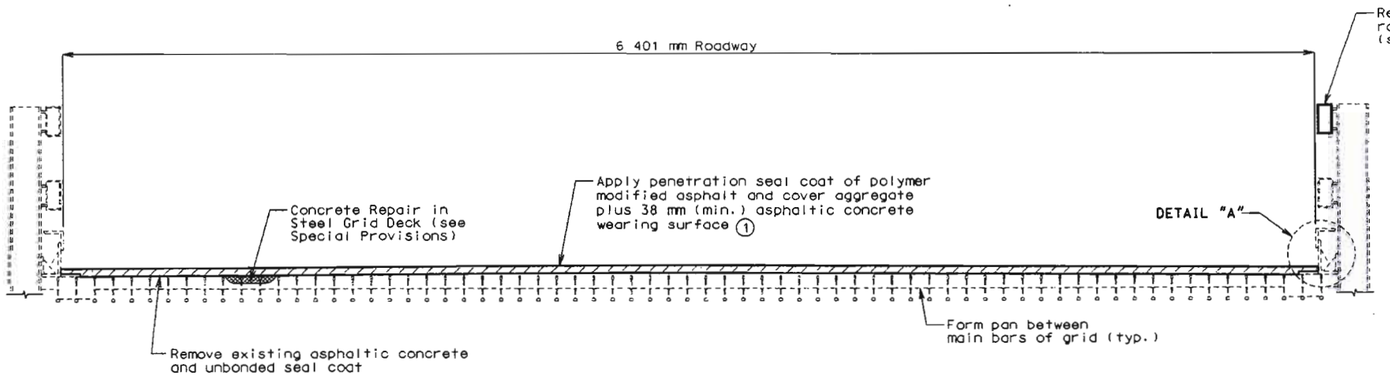
DATE 8-20-99

DETAILS OF STEEL CURB & RAIL POST ATTACHMENT AT PANEL POINT L19

Detailed June 1999
Checked July 1999

PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		341

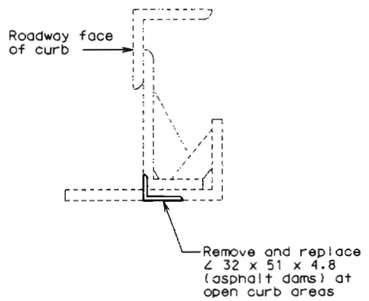


SECTION THRU REHABILITATED SLAB

Note: Main bars of steel grid deck run parallel to ℄ roadway everywhere except for spans (1-2) and (2-3).

(1) 25 mm crown to be constructed of additional asphalt except in the overhead truss spans and areas of deck replacement.

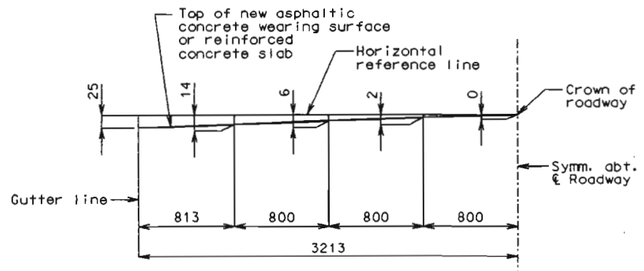
Note: For fabrication and installation information for new replacement rail tubes, see applicable sheets from K-456R, which are included in the contract plans and marked "For Information Only".



DETAIL "A"

(at open curb)

Note: Weld new ∠ 51 x 32 x 4.8 (asphalt dam) to existing steel grid deck at all points of contact. Weld ends of asphalt dam to edge of rail post brackets at all points of contact.



DETAIL OF ROADWAY CROWN

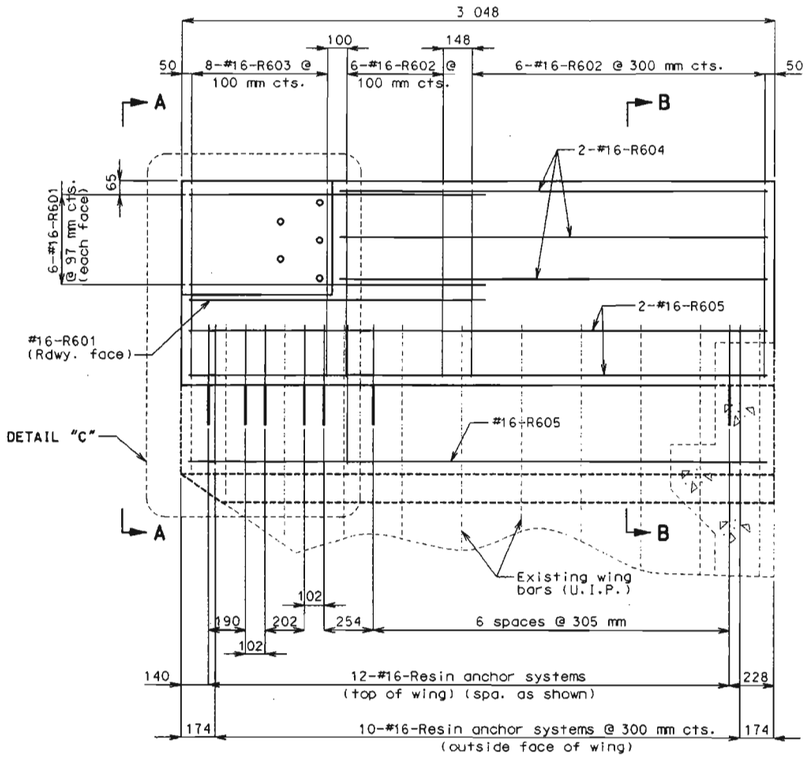
STATE OF MISSOURI
KURT E. SIMMELE
NUMBER E-23575
REGISTERED PROFESSIONAL ENGINEER
DATE 8-20-99

DETAILS OF SLAB REHABILITATION

Detailed Oct. 1998
Checked July 1999

PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		B42



TYPICAL ELEVATION OF END POST

Note: Remove existing end posts at Bent No. 16 to construction joint at top of wing and replace with new end posts as shown.

All exposed edges of end post shall have either a 15 mm radius or a 10 mm bevel, unless otherwise noted.

Concrete in the end post shall be Class B1 with f'c = 28 MPa.

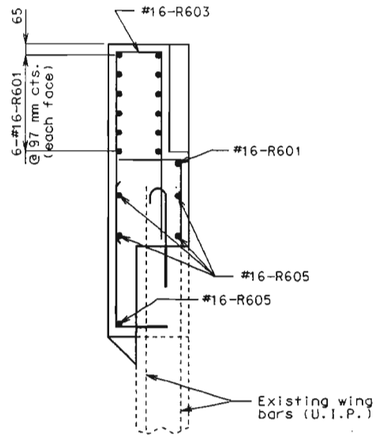
The contractor shall use one of the resin anchor systems listed in the job special provisions. These anchor systems shall be installed according to the manufacturer's specifications, except as modified by the job special provisions.

Cost of furnishing and installing the anchor system complete in place shall be included in the price bid for Remove and Replace End Posts per each.

The 15.9 mm diameter resin anchor systems shall have a minimum ultimate pullout strength of 68.9 kN in concrete with f'c = 28 MPa, see special provisions.

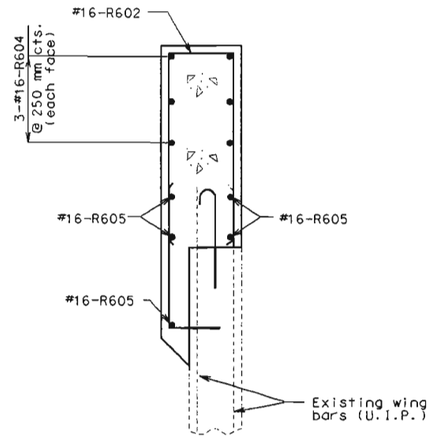
An epoxy coated #16 Grade 420 reinforcing bar as shown here shall be substituted for the 15.9 mm threaded rod stud.

The cost for removing existing end posts and the reconstruction of new end posts shall be included in the price bid for Remove and Replace End Posts per each.

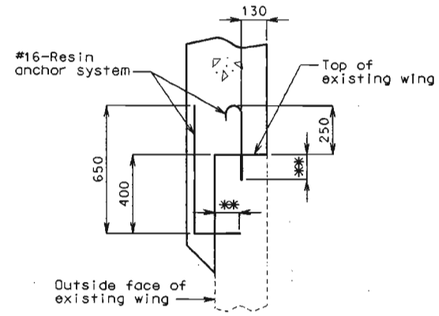


ELEVATION A-A

* Slope 6 mm toward roadway

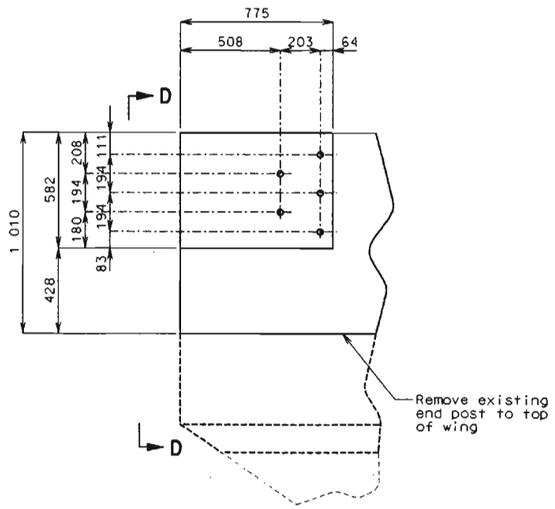


SECTION B-B

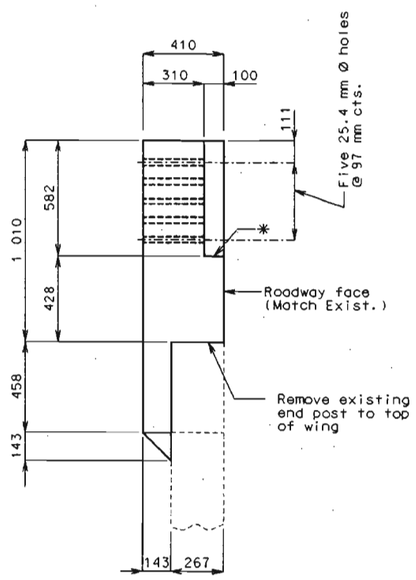


PART SECTION SHOWING RESIN ANCHOR SYSTEMS

** Manufacturer's recommended embedment depth (see Special Provisions)



DETAIL "C"



ELEVATION D-D

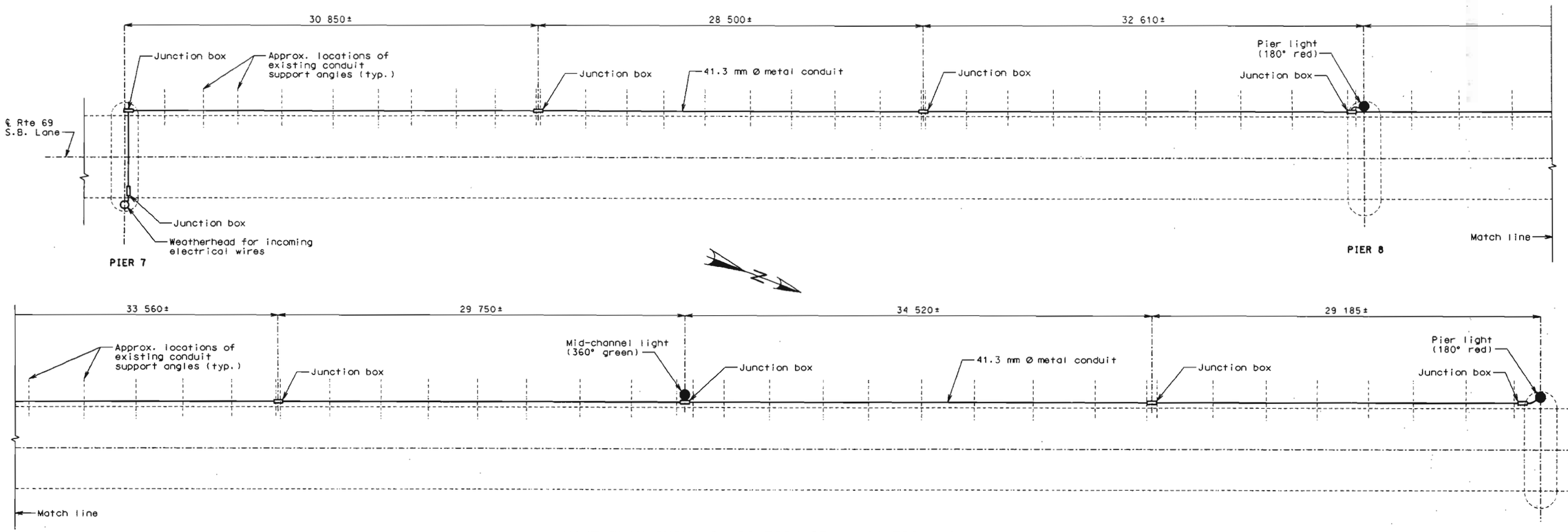
STATE OF MISSOURI
KURT E. GRIBBLE
NUMBER E-23578
DATE 8-20-99

Detailed Sept 1998
Checked July 1999

DETAILS OF END POST AT BENT NO. 16

PLATTE COUNTY K04563

State	Proj. No.	Sheet No.
MO		B43



PART PLAN SHOWING LOCATION OF NAVIGATION LIGHTS

GENERAL NOTES FOR NAVIGATION LIGHTING:

Conduit shall be galvanized rigid steel. Each section of conduit shall bear the Underwriters Laboratories, Inc. (UL) label (Sec. 1060).

All conduit from the 41.3 mm Ø main conduit to the light fixtures shall be 25.4 mm Ø flexible metallic conduit.

Weepholes shall be provided at appropriate locations to drain any moisture in the conduit lines.

All junction boxes shall be 305 mm x 305 mm x 102 mm (min.) cast aluminum or stainless steel, drilled for mounting, and meet other requirements of Sec. 1062 except for the requirement to be flanged. See other sheets for mounting details

The terminations shall be permanent or separable.

The terminations and covers shall be of watertight construction.

Navigation lighting shall meet the requirements of the U.S. Coast Guard.

Existing navigation lighting shall be kept in operation during construction. After installing the new system, the existing system and any other older system shall be removed and disposed of as approved by the engineer and shall be included in the pay item for Navigation Lighting System per lump sum.

Expansion fittings shall be installed in conduit lines between all junction boxes as approved by the engineer.

Expansion fittings shall be installed on conduit lines at each slab expansion device.

Expansion fittings shall provide a minimum movement in either direction of 75 mm at expansion device at Pier No. 8 and 25 mm at all other locations between junction boxes.

Light fixtures shall be bridge lamps as manufactured by the Tideland Signal Corporation of Houston, Texas.

The fixtures shall be furnished complete with lamp-out relays, mountings, and all incidentals.

All bolts, nuts, and washers shall be galvanized, except as noted.

Any field-drilled holes required for attachment of above items shall be considered as part of the navigation lighting system.

Payment for furnishing and installing conduit system for navigation lighting, complete in place, will be paid for at the contract unit price for Navigation Lighting System, lump sum.

Note: Navigation lighting required on west side only.

STATE OF MISSOURI
KENT E. GRIBBLE NUMBER E-23576
REGISTERED PROFESSIONAL ENGINEER
DATE 8-20-99

Detailed Oct. 1998
Checked July 1999

DETAILS OF NAVIGATION LIGHTING

PLATTE COUNTY K04563

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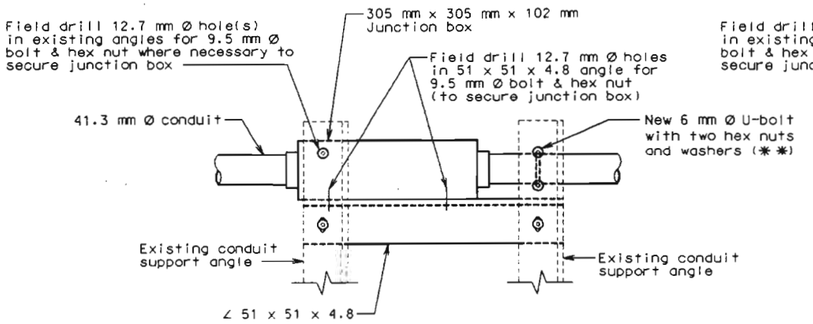
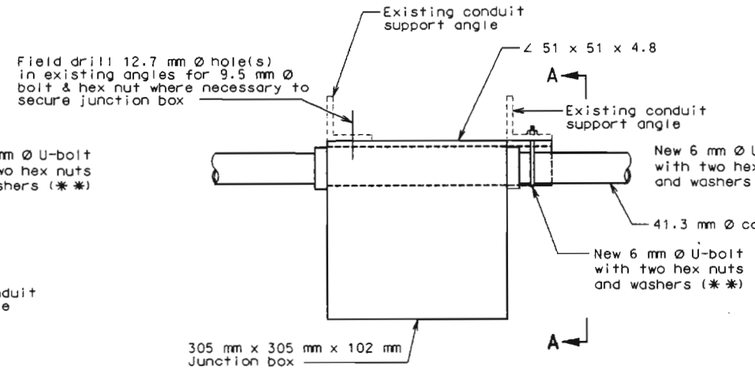
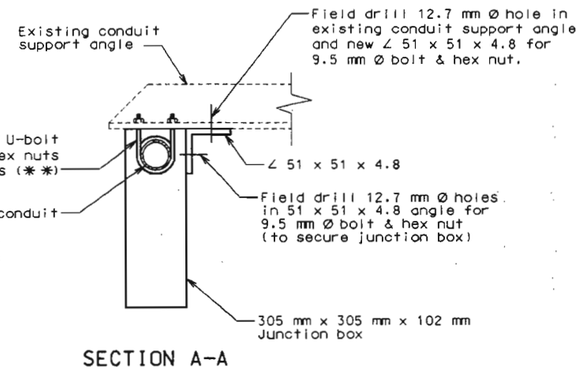


PLAN



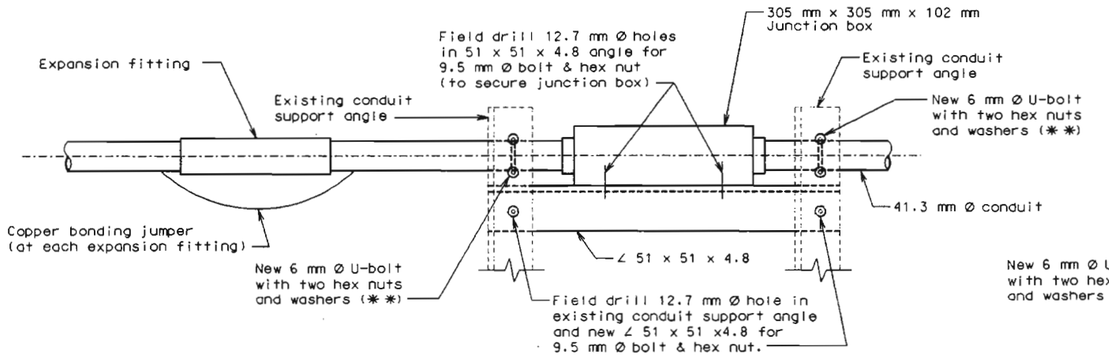
ELEVATION



SECTION A-A

ALTERNATE METHOD FOR SECURING JUNCTION BOXES

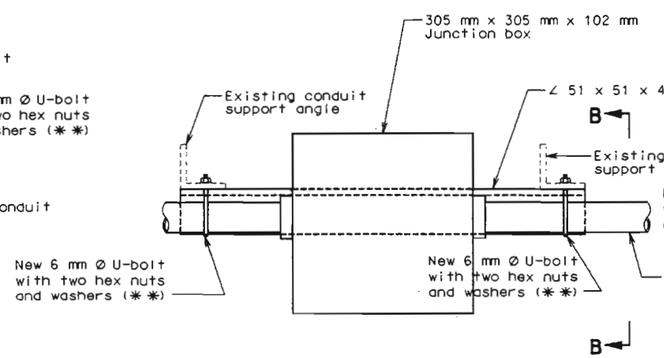
(WHERE JUNCTION BOX WILL NOT FIT BETWEEN EXISTING CONDUIT SUPPORT ANGLES)



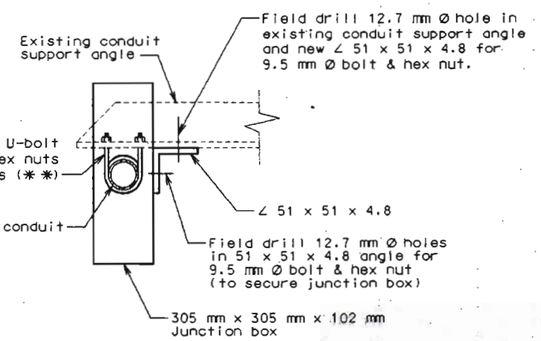
PLAN SHOWING JUNCTION BOX & EXPANSION FITTINGS

* Expansion fittings shall be installed in conduit lines between all junction boxes and at slab expansion joints as approved by the engineer.

* * Use existing holes in conduit support angle.



ELEVATION



SECTION B-B

JUNCTION BOX ATTACHMENT DETAILS

(WHERE JUNCTION BOX WILL FIT BETWEEN EXISTING CONDUIT SUPPORT ANGLES)

STATE OF MISSOURI
KURT E. GRIBBLE
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DETAILS OF NAVIGATION LIGHTING

PLATTE COUNTY K04563

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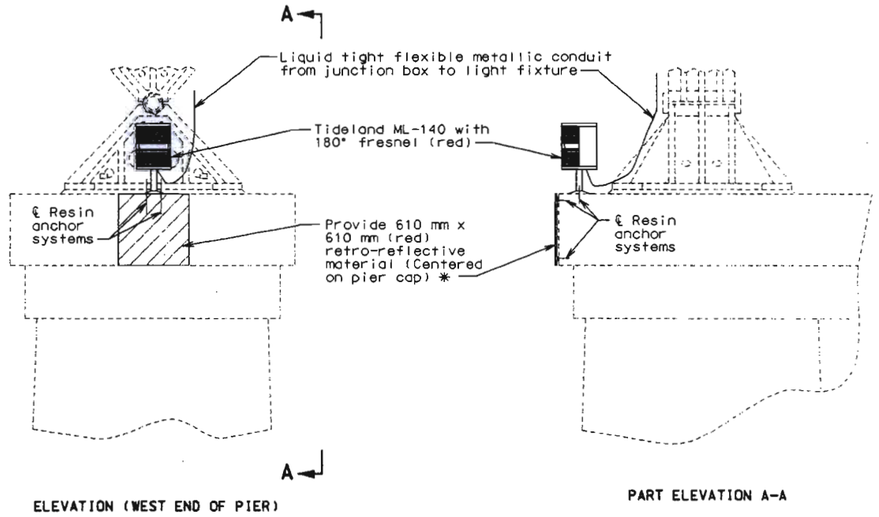
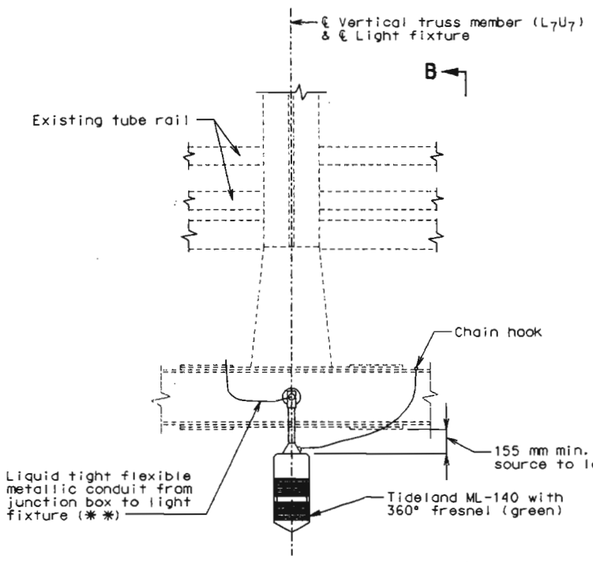


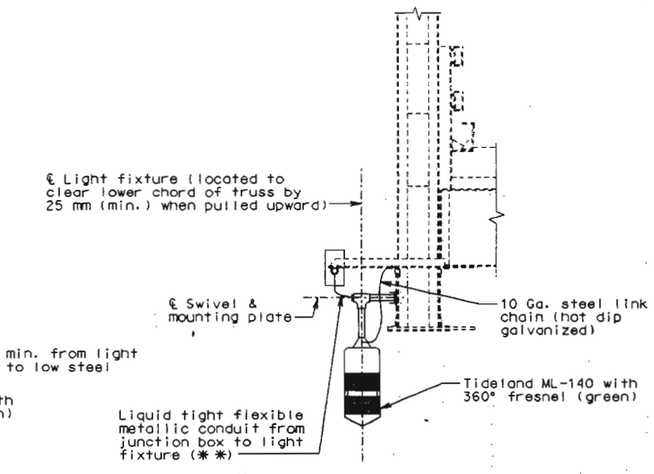
ELEVATION (WEST END OF PIER)

PART ELEVATION A-A

NAVIGATION LIGHTS AT PIERS 8 & 9



PART ELEVATION (WEST SIDE)
(conduit system not shown for clarity)



PART SECTION B-B

NAVIGATION LIGHT AT MID-CHANNEL (L7) (SPAN 8-9)

* Type 2 reflective sheeting on an aluminum flat sheet in accordance with Section 1042 of the Missouri Standard Specifications. For mounting, use 9.5 mm Ø stainless steel studs, washers, and nuts with resin anchor systems. See Special Provisions. Space aluminum flat plate away from existing concrete with 9.5 mm stainless steel spacer.

* * Minimize length of flexible conduit as approved by the engineer.

Utilize existing holes where possible when mounting swivel plate. Use galvanized bolts, size and number as recommended by the manufacturer and approved by the engineer.

Galvanized studs used for the resin anchor systems shall be the same size and number as recommended by the manufacturer and approved by the engineer.

STATE OF MISSOURI
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NUMBER E-23576
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Detailed Sept 1998
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DETAILS OF NAVIGATION LIGHTING

PLATTE COUNTY K04563

BILL OF REINFORCING STEEL

No. Req'd.	Mark No. Size	Mark No. Mark	Location	Epoxy (E)	Shape No.	Stirrup (S)	Substr. (X)	Varies (V)	No. Each	Dimensions B mm	C mm	D mm	E mm	F mm	H mm	K mm	Nominal Length mm	Actual Length mm	Mass kg
			SUB-STRUCTURE																
			BENT NO. 14																
11	22	H400	BEAM	E	20		X			6020							6020	6020	201
6	19	H401	BEAM	E	20		X			6020							6020	6020	81
8	19	H402	BEAM	E	10	S	X				560	955					2075	1980	35
9	22	H403	BEAM	E	18		X			6020							6520	6520	179
18	13	P400	COLUMN	E	13	S	X			605	835	605	835				3110	3030	54
32	16	U400	BEAM	E	13	S	X			655	835	655	835				3260	3160	157
8	16	U401	BEAM	E	10	S	X				835	655					2325	2260	28
18	25	V400	COLUMN	E	17		X			2860							3135	3135	224
8	W5	W400	BEAM	E	22		X			381	230						7010	7010	14
			SUPER-STRUCTURE																
			@ BENT 3																
51	16	S31	SLAB	E	20					1405							1405	1405	111
33	19	S32	SLAB	E	20					2470							2470	2470	182
31	19	S33	SLAB	E	20					6550							6550	6550	454
47	22	S34	SLAB	E	20					2470							2470	2470	353
10	16	S35	SLAB	E	20					6550							6550	6550	102
8	19	S36	SLAB	E	20					915							915	915	16
			@ BT 5 & 14																
132	19	S51	SLAB	E	20					2560							2560	2560	755
40	16	S52	SLAB	E	20					6550							6550	6550	407
188	22	S53	SLAB	E	20					2560							2560	2560	1464
60	19	S54	SLAB	E	20					6550							6550	6550	878
32	19	S55	SLAB	E	20					915							915	915	65
			@ BT 7 & 12																
54	16	S71	SLAB	E	20					6550							6550	6550	549
32	19	S72	SLAB	E	20					6550							6550	6550	468
66	19	S73	SLAB	E	20					2450							2450	2450	361
94	22	S74	SLAB	E	20					2450							2450	2450	701
166	19	S75	SLAB	E	20					2105							2105	2105	781
16	19	S76	SLAB	E	20					915							915	915	33
			@ BT 8 & 12																
64	16	S81	SLAB	E	20					6550							6550	6550	651
332	19	S82	SLAB	E	20					2050							2050	2050	1521
			@ L19																
24	16	S91	SLAB	E	20					6550							6550	6550	244
166	19	S92	SLAB	E	20					1620							1620	1620	601

BILL OF REINFORCING STEEL

No. Req'd.	Mark No. Size	Mark No. Mark	Location	Epoxy (E)	Shape No.	Stirrup (S)	Substr. (X)	Varies (V)	No. Each	Dimensions B mm	C mm	D mm	E mm	F mm	H mm	K mm	Nominal Length mm	Actual Length mm	Mass kg
			END POST @ BENT 16																
26	16	R601	END POST	E	20					1600							1600	1600	65
24	16	R602	END POST	E	10	S					930	330					2190	2125	79
16	16	R603	END POST	E	10	S					930	230					2090	2025	50
12	16	R604	END POST	E	20					2190							2190	2190	41
12	16	R605	END POST	E	20					2965							2965	2965	55

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Shape 6 · Shape 7 · Shape 8 · Shape 9 · Shape 10 · Shape 11 · Shape 12 · Shape 13 · Shape 14 · Shape 15 · Shape 16 · Shape 17 · Shape 18 · Shape 20 · Shape 19 · Shape 21 · Shape 23 · Shape 24 · Shape 22 · Shape 25 · Shape 26 · Shape 27 · Shape 28 · Shape 29 · Shape 31 · Shape 30 · Shape 32 · Shape 36 · Shape 35 · Shape 34 · Shape 33

Spot weld AASHTO M32 size W5 wire (typ.)

Vertical leg

75 mm pitch · 1-1/2 turns

C pitch

(Shape 35 shall be a smooth bar or wire.)

BENDING DIAGRAMS

6d for #10, #13, & #16
12d for #19

90° Stirrup

135° Stirrup

Detailed July 1999
Checked July 1999

STIRRUP HOOK DIMENSIONS (mm)

Grades 300 & 420 MPa

Bar Size	D	90° Hook A or G	135° Hook A or G	135° Hook Approx. H
#13	50	115	115	80
#16	65	155	140	95
#19	115	305	205	115

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

Detailing Dimension · 90° · 12d · 180° · 4d or 64 mm min.

END HOOK DIMENSIONS (mm)

Bar Size	D	All Grades 180° Hooks A or G	180° Hooks J	90° Hook A or G
#10	60	125	80	150
#13	80	150	105	200
#16	95	175	130	250
#19	115	200	155	300
#22	135	250	180	375
#25	155	275	205	425
#29	240	375	300	475
#32	275	425	335	550
#36	305	475	375	600
#43	465	675	550	775

Two additional #13-P400, #16-R605, #19-H401, #22-H400 and #25-V400 are included in the bar bill for testing.

Note:
All standard hooks and bends other than 180 degree 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 fabricator's use (nearest 5 mm).
Actual lengths are measured along centerline bar to the nearest 5 mm.
Payweights are based on actual lengths.
Four angle or channel spacers are required for each column spiral. Spacers are to be placed on inside of spirals. Length and mass of column spirals do not include splices or spacers.
Reinforcing steel (Grade 420) = FY 420 MPa

STATE OF MISSOURI · KURT E. GRIBBLE · NUMBER E-23676 · REGISTERED PROFESSIONAL ENGINEER

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