Documentation of the Historic Union Pacific Railroad Bridge

Bridge No. J-872
Franklin County
South Outer Road I-44 / Business Route 66

MoDOT

U.S. Department of Transportation
Federal Highway Administration

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Bridge over Union Pacific Railroad
Bridge No. J-872
Franklin County
South Outer Road I-44/Business Route 66
MoDOT Job No. J6I0899

David C. Austin, Historian
June 2001

Historical Narrative

The Union Pacific Railroad Overpass (Bridge No. J-872) spans the Union Pacific Railroad at Interstate 44-South Outer Road (Business Route 66) in northeast Franklin County, approximately one-half mile southeast of Gray Summit. Designed by the Missouri State Highway Department and constructed by Samuel A. Robertson in 1932-1933, the Union Pacific Overpass is a skewed, one-span, reinforced concrete, three-rib open spandrel arch structure, with two concrete deck girder approach spans and reinforced concrete bents. The overpass is distinguished for its three-rib open spandrel arch design placed on an extreme skew of 32 degrees. It is also associated with the Route 66 spur route, built in the early 1930s as a traffic relief route from St. Louis to Gray Summit.[1]

Planning and construction of the overpass followed the passage of Proposition No. 3 in 1928. Among other provisions, Proposition No. 3 allowed for approximately 300 miles of "Traffic Relief" (TR) routes in the St. Louis and Kansas City metropolitan areas. The Missouri State Highway Department consequently developed Route 66-TR in St. Louis and eastern Franklin counties to relieve congestion along U.S. Routes 50 and 66, which shared traffic from St. Louis to Gray Summit. The new Route 66-TR, running south of the original highway, passed through Pacific on the Franklin County line and continued west to intersect Route 50/66 near Gray Summit. The new highway required an overpass structure to cross over the Missouri Pacific Railroad tracks southeast of Gray Summit, where the double railroad tracks ran through a deep rock cut.[2]

Discussions between the highway department and the railroad concerning the overpass structure began in February 1931. Roy C. Johnson, the Engineer of Grade Separations, led the negotiations on behalf of the highway department. Typically,

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[1]Clayton B. Fraser, Pacific Overpass data sheet, Missouri Historic Bridge Inventory, 5 Vols., Missouri Department of Transportation, Project No. NBIH (6) (Loveland, Colorado: Fraserdesign, Inc., 1996).

[2] C. H. "Skip" Curtis, *The Missouri U.S. Route 66 Tour Book* (Lake St. Louis, Mo.: Curtis Enterprises, 1994), 4, 8, 123; Missouri State Highway Commission, "Map of Missouri Showing State Road System, Route Numbers, Road Conditions and Points of Interest," (Jefferson City: Botz-Hugh Stephens Press, 1930).

railroad companies paid half the costs of grade separation structures and therefore sought to minimize their costs. Johnson reported that the railroad company in this case offered to supply some used steel deck plate girders for possible use on the structure, if they could be adapted into the design. The highway department's Bridge Engineer, N. R. Sack, quickly dismissed the possibility, saying that retrofitting old steel for new bridges had never been economical, but Sack later instructed Johnson to submit detailed designs of the railroad's girders for comparative purposes.[3]

Approximately one year later, in February 1932, the Bureau of Bridges had a preliminary design for the overpass calling for a 75' arch span set on a 32 degree skew, flanked on either end by a 40' concrete deck girder and a 35' concrete deck girder. The estimated cost of the bridge totaled $13,830. In May, Sack requested S. M. Rudder, the Division Engineer of Division No. 6 at Kirkwood, to make a field check of the bridge site to ensure the preliminary drawings were accurate. Sack particularly wanted to re-check the slope of the rock cut, and the stationing, grade, and alignment of the railroad tracks. Sack also advised Roy Johnson as the negotiator with the railroad that the use of the steel plate girders would cost more than the highway department's proposed arch design. Sack believed the rock cut "provides an ideal situation for the use of the arch span." As well as being economical, the arch design allowed for the possible future widening of the bridge deck from 32' to 40' without constructing additional arch rings, a decided advantage over the steel plate girders.[4]

The Missouri Pacific Railroad responded to the proposed bridge and road plans with concerns about alterations to their nearby drainages. The grade of the new highway, as planned, would breach protective levees and change diversion ditches, causing water runoff to enter the rock cut. The railroad emphasized "the importance of absolute protection against overflow of water into this cut . . . ." Johnson concurred with the railroad's arguments, and the Bridge Bureau consequently revised the bridge plans to address the problem. The revisions raised the grade of the roadway and slightly lengthened the overpass structure. The final design of the bridge, prepared in June 1932, consisted of a 71' arch span, and concrete deck girder approach spans of 40' and 45'. The estimated cost of the structure increased to $14,750. The railroad approved the new

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[3] Roy C. Johnson to S. M. Rudder, February 20, 1931; N. R. Sack, Memorandum to Mr. R. C. Johnson, February 24, 1931; N. R. Sack, Memorandum to Mr. R. C. Johnson, March 12, 1931; R. C. Johnson, Memorandum to Mr. Sack, March 21, 1931, Bridge No. J-872 Correspondence File, Bridge Division, Missouri Department of Transportation, Jefferson City.

[4] "Field Check Memoranda, Bureau of Bridges," February 23, 1932; "Preliminary Estimate of Cost," May 12, 1932; N. R. Sack to S. M. Rudder, May 13, 1932; N. R. Sack, Memorandum to Mr. R. C. Johnson, May 17, 1932, Bridge No. J-872 Bridge Correspondence File.

design in late June, allowing Sack's bridge office to proceed with the detailed plans of the overpass structure during July and August.[5]

On August 31, 1932, the Missouri State Highway Commission awarded the construction contract for Section 1 of Route 66-TR to the Gaines Brothers Company of Fairland, Oklahoma. Section 1 included the Missouri Pacific overpass as well as the western-most 2.9 miles of Route 66-TR. The Gaines Brothers Company also received the contract for Section 2 of Route 66-TR which involved another 2.2 miles of highway through Pacific to the Franklin County line. The Gaines Brothers Company sublet the construction of the Missouri Pacific Overpass to Samuel A. Robertson, an independent bridge contractor then working from his home on Forest Avenue in St. Louis. Work on the overpass and the adjoining sections of highway began almost immediately. P. M. Heller would supervise the work for the highway department. During the first week of September, the Gaines Brothers Company began moving in equipment to a field camp outside of Pacific. Their grading work there would entail the excavation of a road cut 250' long and up to 96' deep.[6]

Few details are known concerning the construction of the overpass itself. Evidently, however, Samuel Robertson encountered minimal difficulties in erecting the structure. The excavations for some of the bent footings went slightly deeper than expected due to variations in the bedrock. In erecting the falsework and forms, Robertson had to provide minimal horizontal and vertical clearances for passing trains. Surviving records indicate that the pouring of the concrete for the footings and columns of Bents 1 and 2 occurred at the end of September. The first pouring of the arch rings took place on October 24. According to construction plan notes, each of the three arch rings were poured simultaneously in specified stages: first, two blocks at the ends of the rings at the springing line, followed by a block at the arch crowns. Two blocks left and right of the crowns were then poured before the arch rings were closed with two 4' key sections. Robertson next turned to pouring the decks on the adjacent girder spans. By that time, cold November weather required sheltering the concrete within temporary housing and heating it with steam pipes and stoves. With the deck girders completed by the end of November, Robertson poured the spandrel bents and the arch deck during

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[5]E. A. Hadley to T. H. Cutler, May 28, 1932; Roy C. Johnson, Memorandum to N. R. Sack, May 31, 1932; N. R. Sack, Memorandum to Mr. R. C. Johnson, June 3, 1932; "Preliminary Estimate of Cost," June 10, 1932; Roy C. Johnson, Memorandum to N. R. Sack, June 22, 1932; N. R. Sack, Memorandum to Mr. R. C. Johnson, June 24, 1932, Bridge No. J-872 Bridge Correspondence File.

[6] Missouri State Highway Department, "Tabulation of Bids Received," Franklin County, Route 66, Sections 1 and 2, August 31, 1932, Plans and Records Office, Design Division, Missouri Department of Transportation; Polk-Gould Directory Company, *Gould's St. Louis City Directory, 1932* (St. Louis: Polk-Gould Directory Company, 1932), 1044, 1891; P. H. Daniells to Gaines Brothers Construction Company, November 7, 1932, Bridge No. J-872 Bridge Correspondence File; *Plowman-Transcript* (Pacific), September 9, 23, 30, October 28, 1932.

December. Finally, in about mid-January 1933, Robertson completed the overpass structure with the balustrades and end posts.[7]

Although the overpass was complete, several more months elapsed before this section of Route 66-TR opened for traffic. The Gaines Brothers Company sublet the road paving work to the Atkinson Paving Company of Watertown, South Dakota. By the end of April 1933, the paving company had laid a waterline along the route to supply their paving machinery with water. However, the paving work did not begin until the following June. To help offset the unemployment of the ongoing Great Depression, Atkinson Paving hired around 400 local men, working 30-hour weeks in two shifts. They first paved the section in the town of Pacific, where the new roadway was 40' wide, then moved to the west end of the project near Gray Summit and worked east, averaging about 1,000' of concrete paving per day. Except for some minor shoulder work, the paving of Route 66-TR was completed on July 26, 1933, giving travelers an alternative route to and from St. Louis.[8]

Pacific residents celebrated the formal opening of the Gray Summit to Pacific section of Route 66-TR on Saturday, August 12, 1933. The Pacific Lions Club and the local American Legion sponsored the events which included speakers, concessions, and an evening dance, with music provided by Eddie Randle and His Seven Blue Devils, a black band out of St. Louis. Other entertainment included a "battle royal" between five local black men brawling over a $5 purse. About 4,000 people attended the festivities, held at the foot of Pacific's Sand Mountain. The celebration continued well into the night, although the occasion was marred by a fistfight which broke out on the dance floor. The highway department conducted its final inspection and approved Section 1 of Route 66-TR on September 1, 1933.[9]

Description of the Union Pacific Overpass

The Union Pacific Overpass (Bridge No. J-872) spans the Union Pacific Railroad (formerly the Missouri Pacific Railroad) at Interstate 44-South Outer Road (Business Route 66) in northeast Franklin County. The bridge consists of one 71' reinforced concrete, three-ribbed, open spandrel arch, and two reinforced concrete deck girder spans

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[7] "Identification and Concrete Mix Information Blank," September 29-December 10, 1932, *passim*; D. B. Levi to P. H. Daniells, January 16, 1933; D. C. Wolfe, Memorandum to Mr. Sack, January 17, 1933, Bridge No. J-872 Bridge Correspondence File.

[8] *The Pacific Transcript* (Pacific), April 28, June 2, 9, 16, July 28, 1933.

[9] *The Pacific Transcript*, July 14, 28, August 11, 18, 1933; D. B. Levi to P. M. Daniells, September 29, 1933, Bridge No. J-872 Bridge Correspondence File.

of 40’ and 45’, carried on reinforced concrete bents.[10] The substructure bents and spandrel bents are skewed 32 degrees to the right (south) relative to the highway centerline, to be positioned parallel with the railroad tracks. The overall bridge length is 162’-5”.

The substructure consists of two end abutments and two column bents. The two end abutments are both reinforced concrete, four-column open bents carried into bedrock. The footings measure 4’-6” x 8’-4” x 2’-6”. The footings support front-battered columns which rise 13’-5” on Bent No. 1 (east side) and 14’-2” on Bent No. 4. Spaced 15’-8” apart, the four columns are connected with tie beams 1’-9” x 3’-6”. Wing extensions bring the total length of the tie beams to over 67’.

Bent Nos. 2 and 3 are skewed, three-column open bents carried into bedrock. As well as supporting the deck girder spans, the bents also serve as buttresses for the three arch rings. The bent footings measure 4’-6” x 6’-1” x 5’-0”. The three bent columns are each 2’-6” x 2’-6”, with varying heights up to the adjoining tie beams of 15’-7” at Bent No. 2 (east side) and 12’-6” at Bent No. 3. Tie beams connecting the columns measure 3’-9” x 2’-6” x 41’-6”.

The three arch rings, each 5’-0” wide, narrow gradually from a vertical thickness of 2’-4” at the springing line to 1’-3” at the crown. The centers of the arch rings are spaced 14’-0” apart. The rise measures 20’-0” from the springing line to the crown extrados. The arches support six spandrel bents placed on a 32 degree skew which act as floor beams to support the bridge deck. The spandrel bent columns are 3’-6” x 1’-3”, with connecting tie beams 41’-1” long. The arch rings are cross-braced with tie beams at the second and fifth spandrel bents.

The two deck girder spans are supported by five reinforced concrete girders, including two outside girders 2’-0” wide and three intermediate girders 1’-8” wide. The bridge deck is 32’-0” wide and has a grade of 4.4 percent. Concrete curbs and balustrades feature posts above the bents, and flared end posts at the bridge entrances.

Except for some noticeable physical deterioration, the Union Pacific Overpass remains unaltered from its original configuration. The overpass is significant for its distinctive three-rib open spandrel arch design, as the Missouri State Highway Department typically used two ribs in its spandrel arch spans. Based on Standard Drawing No. S918, and chosen for its economical construction, the bridge’s design was altered in this case to provide for the 32 degree skew necessitated by the railroad cut. The bridge is also associated with the U. S. Route 66 Traffic Relief route, constructed in the early 1930s to reduce traffic congestion in the St. Louis metropolitan area.

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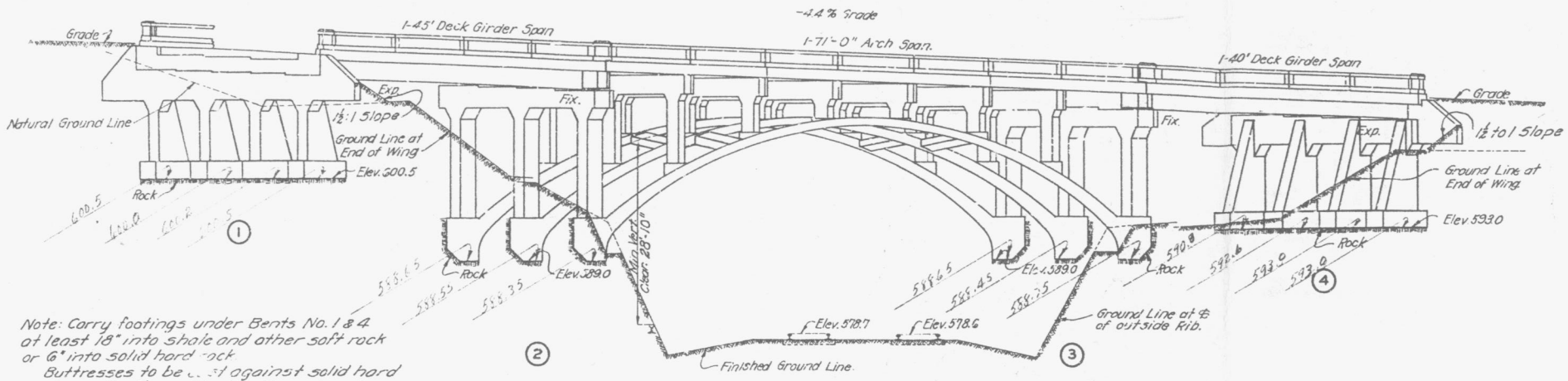
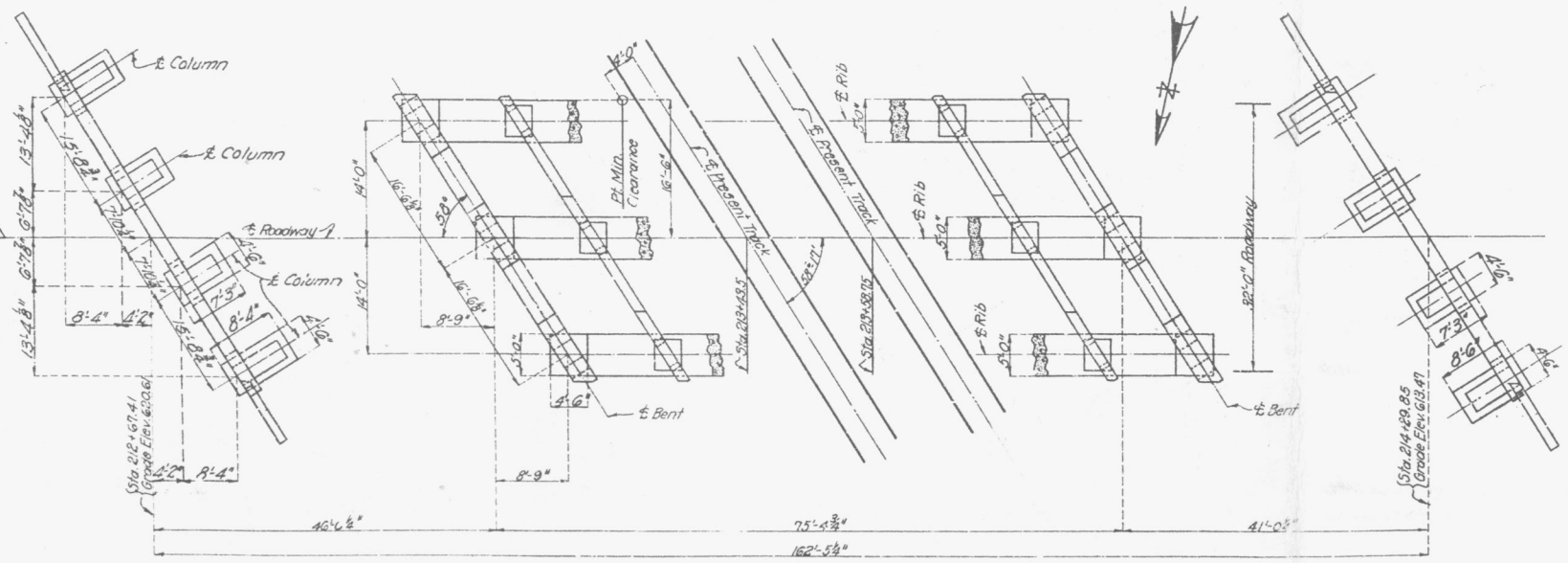
[10] Missouri State Highway Department, “Bridge Over Mo. Pac. R.R.,” 1932 [Bridge No. J-872 construction drawings, ten sheets], Bridge Division, Missouri Department of Transportation, Jefferson City.

MISSOURI STATE HIGHWAY DEPARTMENT

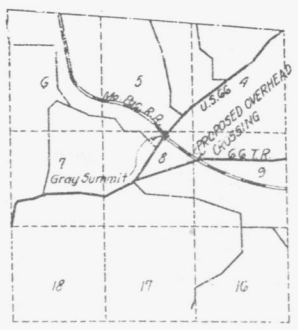
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.	USGGTR-51	19		



GENERAL ELEVATION



PLAN



LOCATION SKETCH
Scale Approx. 1" = 1 Mile

ESTIMATED QUANTITIES

ITEMS	Concrete Cu. Yds. Class "A"	Class "X"	Class "B"	FINAL QUAN.
Handrails	15.9			15.9
Deck Girder Spans No. 1-2 and 3-4		180.7		180.7
Slab and Curb over Arch Span		81.2		84.2
Arch Ribs			71.5	71.5
Girder Bents No. 1 & 4, Buttresses & Bents No. 2 & 3			178.1	180.8
Spandrel Bents			47.1	47.1
Total	15.9	264.9	296.7	
Phosphar Bronze Bearing Plates (8"x 20")	4 Sets 5 Plates Each			4
Phosphar Bronze Bearing Plates (12"x 20"	6 Sets 5 Plates Each			6
Excavation	230 Cu. Yds.			312.5
Reinforcing Steel	110,860 Lbs.			110,900
Heating Concrete				312.5
				13.5

Note: All bridge excavation to be paid for as Class I Bridge Excavation.

GENERAL NOTES:

Concrete in handrail and handrail posts shall be Class "A". Concrete in deck girder spans and slab and curbs on arch span shall be Class "X". Concrete in all substructure including girder bents, spandrel bents, and arch ring shall be Class "B".

All concrete shall be proportioned by the weight proportioning method. See Specifications.

Exposed edges to be beveled ¾" where no other bevel is noted.

Where rubber compound is specified on plans for use in partition and expansion joints, the premoulded joint shall be securely stitched to one face of concrete with copper wire.

Two name plates type "A" as shown on Std. S918 to be furnished and placed by contractor. Cost of name plates to be included in price bid for other items.

Bridge excavation in accordance with Section I of Standard Specifications issued April 1, 1930.

See Special Provisions in regard to use of admixture, early strength concrete in arch ring, removal of arch centering, finishing concrete surfaces, bar chairs and spacers, etc.

Falsework for span over existing railroad tracks to be constructed with a minimum vertical clearance of 22'-0" above top of rail and a minimum horizontal clearance of 8'-6" from centerline of tracks.

Only sufficient camber to be used in construction to insure against settlement below lines given as finished grade. No permanent camber required in individual span.

Construction joint in slab on deck girder spans permitted longitudinally midway between girders. Provide keys.

INDEX OF SHEETS:

B.M. No. 19 - Elev. 603.97 - R.R. Spike in T.P. 75' Lt. Sta. 214+25.

BRIDGE OVER MO. PAC. R.R.

STATE ROAD FROM PACIFIC TO GRAY SUMMIT

ABOUT 4 MILES WEST OF PACIFIC

PROJECT NO. U.S-66T.R.-SI STA. 212+67.41

FRANKLIN COUNTY

SUBMITTED BY M.R. Sayk BRIDGE ENGINEER DATE 5/13/32

APPROVED BY T.H. Cutler CHIEF ENGINEER DATE 5/13/32

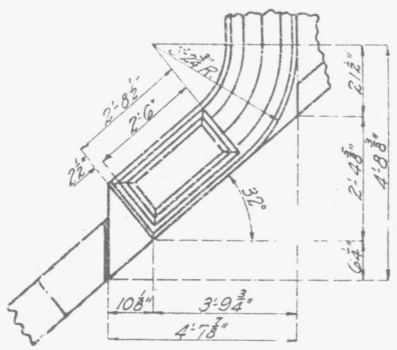
STD. S918

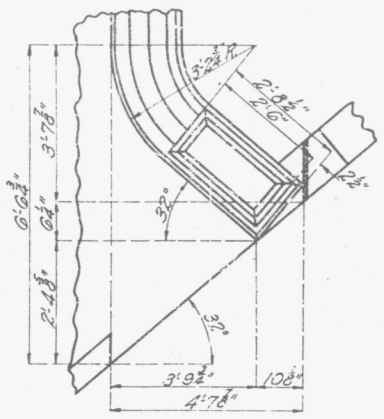
J-872

Drawn May 1932 By H.E.C.-H.D.-
Traced May 1932 By H.E.C.-G.W.
Checked May 1932 By R.W.B.-I.B.

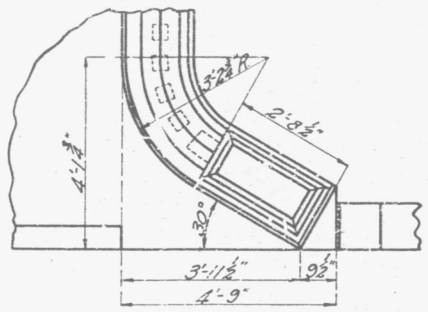
MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.	U.S. 36 Pt 31	19		

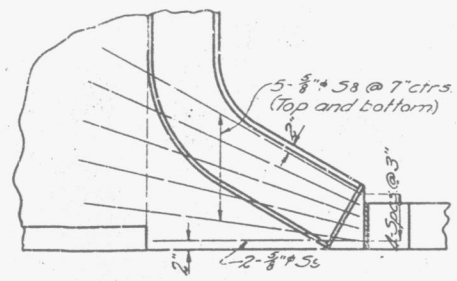




PLAN SHOWING DIMENSIONS

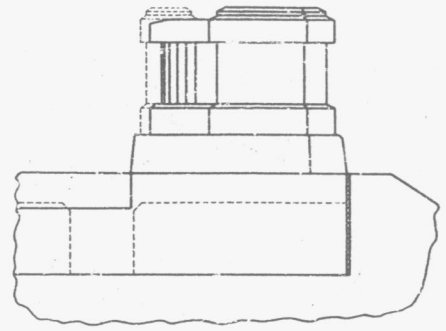


PLAN SHOWING DIMENSIONS

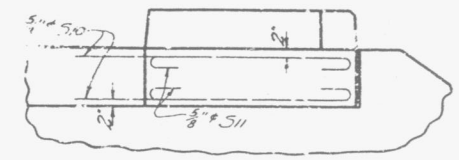


PLAN SHOWING REINFORCING

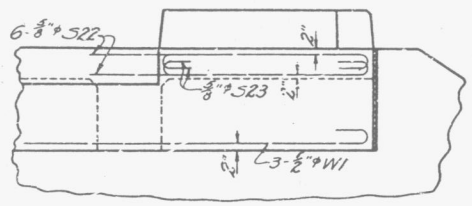
SQUARE END BENT



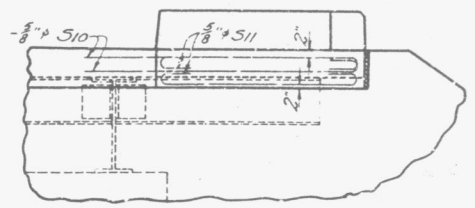
DECK GIRDER SPAN SHOWING POST



SLAB SPAN SHOWING REINFORCING

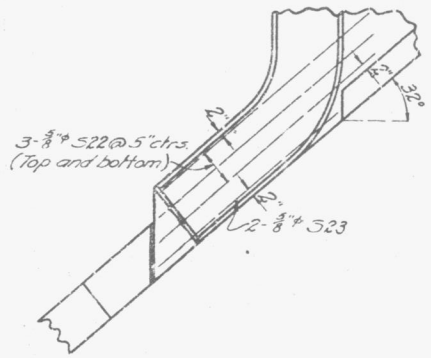


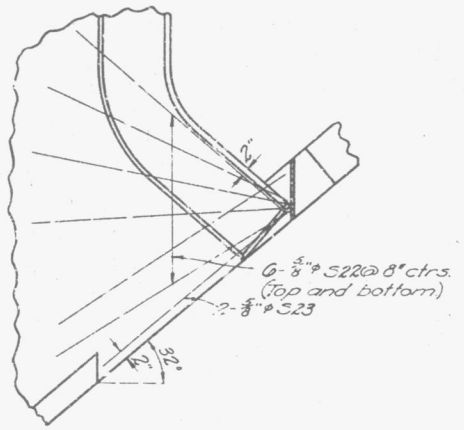
DECK GIRDER SPAN SHOWING REINFORCING



I-BEAM SPAN SHOWING REINFORCING

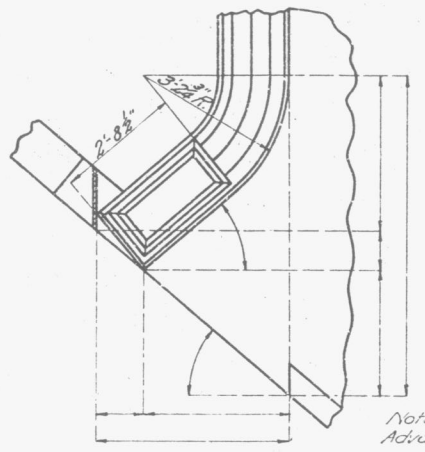
TYPICAL END ELEVATIONS

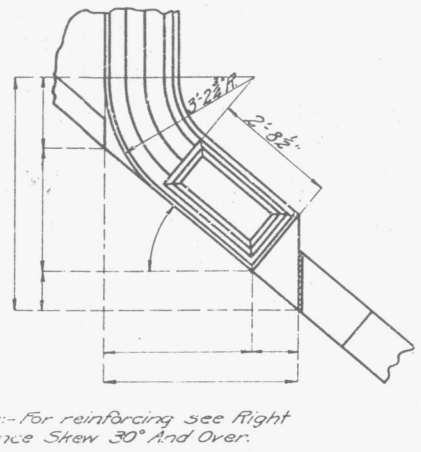




PLAN SHOWING REINFORCING

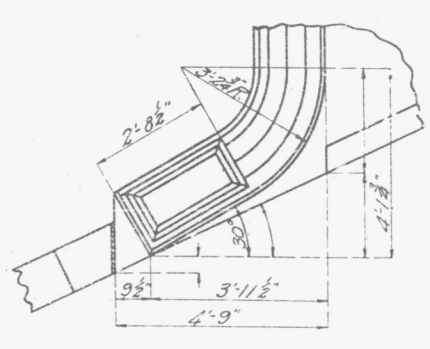
RIGHT ADVANCE SKEW 30° AND OVER

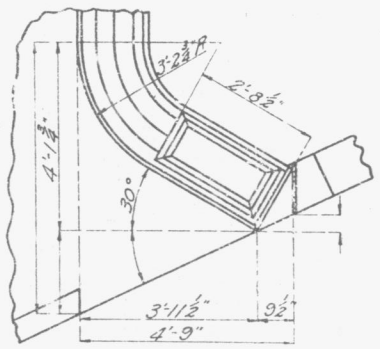




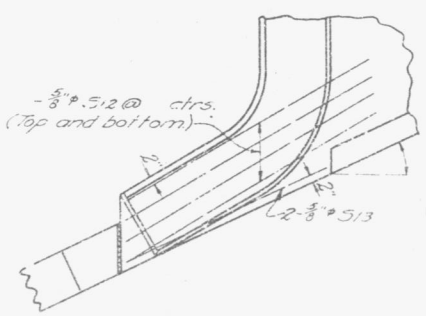
Note:- For reinforcing see Right Advance Skew 30° And Over.

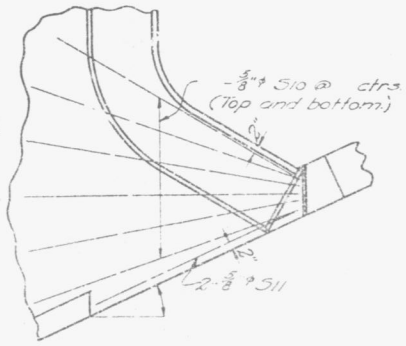
LEFT ADVANCE SKEW 30° AND OVER





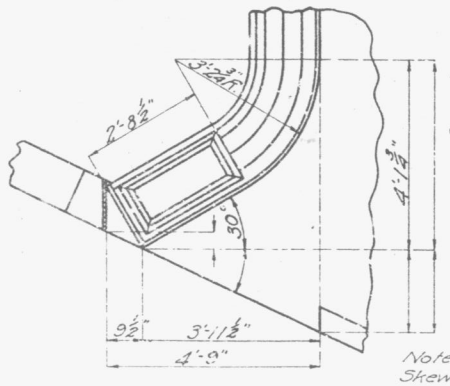
PLAN SHOWING DIMENSIONS

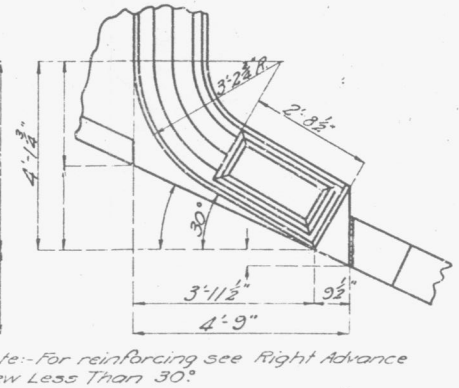




PLAN SHOWING REINFORCING

RIGHT ADVANCE SKEW LESS THAN 30°





Note:- For reinforcing see Right Advance Skew Less Than 30°.

LEFT ADVANCE SKEW LESS THAN 30°

BRIDGE OVER MO. PAC. R.R.

STATE ROAD FROM PACIFIC TO GRAY SUMMIT

ABOUT 4 MILES WEST OF PACIFIC FINISHED

PROJECT NO. U.S.66 T.R-S1 STA. 212+67.41

FRANKLIN COUNTY

SUBMITTED BY M. R. Lay BRIDGE ENGINEER DATE 8/10/32

APPROVED BY T. H. Cutler CHIEF ENGINEER DATE 8/10/32

FINISHED

STD. 59.8

J-872

Assembled July 1932 by H.D.-S.W.
Checked August 1932 by I.B.
Drawn April 1932 by C.A.F.
Checked 1932 by

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

TYPICAL DETAILS OF CONCRETE RAIL AT END BENT

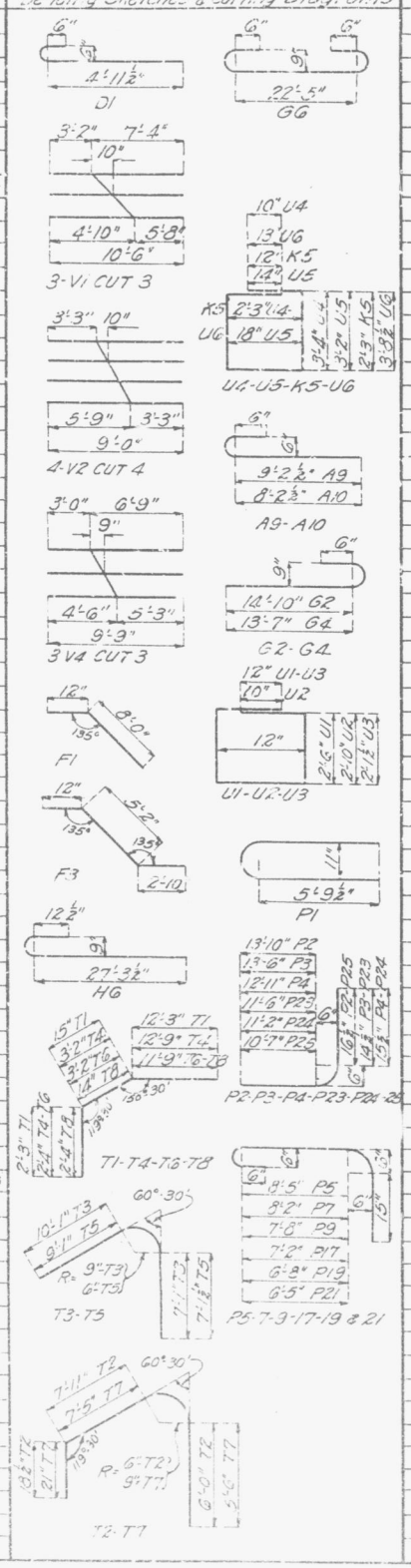
MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.	U.S.66T.R-5(1)	19		

COMPLETE BILL OF REINFORCING STEEL

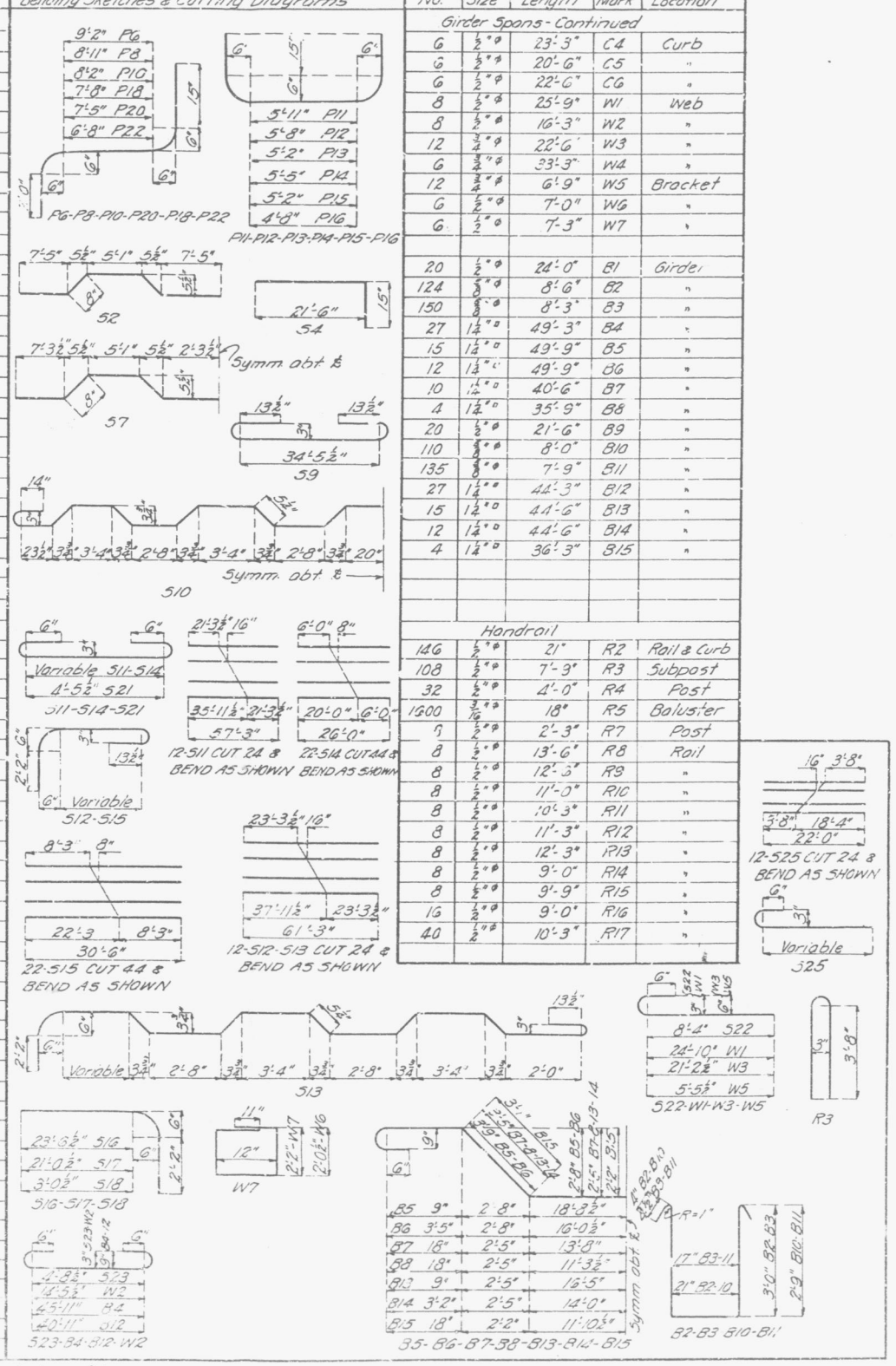
No.	Size	Length	Mark	Location
End Bents No. 1 & 4				
48	¾"ø	6'-5"	D1	Footing
3	½"ø	10'-6"	V1	Wing
4	½"ø	9'-0"	V2	"
24	¾"ø	13'-3"	V3	Column
3	⅝"ø	9'-9"	V4	Wing
24	¾"ø	14'-0"	V6	Column
6	¾"ø	5'-2"	V	Splice Bars
36	¾"ø	9'-0"	F1	Haunch
12	¾"ø	9'-0"	F3	"
7	¾"ø	19'-3"	H1	Wing
9	¾"ø	6'-0"	H2	"
7	¾"ø	21'-3"	H3	"
12	¾"ø	31'-6"	H4	Beam
38	⅞"ø	15'-6"	H5	"
20	1"ø	29'-6"	H6	"
10	1⅛"ø	52'-3"	H7	"
1	¾"ø	9'-6"	H8	Wing
1	¾"ø	12'-0"	H9	"
7	¾"ø	21'-0"	H10	"
7	¾"ø	19'-0"	H11	"
1	¾"ø	10'-6"	H12	"
1	¾"ø	12'-6"	H13	"
68	½"ø	10'-5"	U5	Beam
2	¾"ø	15'-9"	T1	Wing
2	¾"ø	16'-6"	T2	"
2	¾"ø	18'-9"	T3	"
2	¾"ø	18'-3"	T4	"
2	¾"ø	17'-3"	T5	"
2	¾"ø	17'-3"	T6	"
2	¾"ø	16'-3"	T7	"
2	¾"ø	15'-3"	T8	"
54	½"ø	1'-6"	U6	Beam
Bents No. 2 & No. 3				
24	¾"ø	6'-0"	D2	Footing
2	1"ø	21'-6"	G5	Beam
24	1½"ø	25'-9"	G6	"
8	¾"ø	21'-0"	G7	"
32	¾"ø	9'-0"	F1	Haunch
16	¾"ø	9'-0"	F3	"
86	¾"ø	12'-0"	U4	Beam
8	¾"ø	19'-0"	K1	Column
8	¾"ø	K6 2"	K2	"
4	¾"ø	19'-6"	K3	"
4	¾"ø	16'-6"	K4	"
49	⅞"ø	10'-0"	K5	"
Buttresses				
36	½"ø	4'-6"	A1	Buttress
48	⅝"ø	10'-6"	A9	"
48	⅝"ø	9'-6"	A11	"
Arch Rings				
174	¾"ø	4'-5"	A1	Ring
48	¾"ø	17'-5"	A2	"
48	¾"ø	18'-3"	A3	"
48	¾"ø	16'-9"	A4	"
48	¾"ø	17'-0"	A5	"
24	¾"ø	22'-6"	A6	"
24	¾"ø	23'-0"	A7	"
32	¾"ø	18'-0"	A8	Strut

Bending Sketches & Cutting Diagrams



No.	Size	Length	Mark	Location
Spandrel Bents				
48	1"ø	22'-3"	G1	Beam
24	1⅛"ø	15'-6"	G2	"
24	1"ø	20'-6"	G3	"
24	1⅛"ø	15'-3"	G4	"
186	½"ø	8'-0"	U1	"
78	½"ø	8'-6"	U2	"
36	½"ø	7'-3"	U3	"
24	¾"ø	13'-0"	P1	Column
8	¾"ø	16'-0"	P2	"
8	¾"ø	15'-6"	P3	"
8	¾"ø	15'-0"	P4	"
4	¾"ø	11'-9"	P5	"
4	¾"ø	14'-0"	P6	"
4	¾"ø	11'-6"	P7	"
4	¾"ø	13'-9"	P8	"
4	¾"ø	11'-0"	P9	"
4	¾"ø	13'-0"	P10	"
8	¾"ø	10'-0"	P11	"
8	¾"ø	9'-9"	P12	"
8	¾"ø	9'-3"	P13	"
8	¾"ø	9'-6"	P14	"
8	¾"ø	9'-3"	P15	"
8	¾"ø	8'-9"	P16	"
4	¾"ø	10'-6"	P17	"
4	¾"ø	12'-6"	P18	"
4	¾"ø	10'-0"	P19	"
4	¾"ø	12'-3"	P20	"
4	¾"ø	9'-9"	P21	"
4	¾"ø	11'-6"	P22	"
8	¾"ø	13'-6"	P23	"
8	¾"ø	13'-3"	P24	"
8	¾"ø	12'-9"	P25	"
Slab and Curbs on Arch				
70	¾"ø	21'-0"	S1	Slab
"	¾"ø	21'-3"	S2	"
70	¾"ø	21'-0"	S3	"
90	½"ø	22'-9"	S4	"
40	½"ø	21'-6"	S5	"
35	¾"ø	31'-3"	S6	"
35	¾"ø	32'-0"	S7	"
35	¾"ø	31'-3"	S8	"
12	½"ø	20'-9"	C1	Curb
6	½"ø	31'-3"	C2	"
Girder Spans				
104	¾"ø	37'-6"	S9	Slab
52	¾"ø	38'-9"	S10	"
24	¾"ø	57'-3"	S11	"
24	¾"ø	61'-3"	S12	"
24	¾"ø	61'-3"	S13	"
44	¾"ø	26'-0"	S14	"
44	¾"ø	30'-6"	S15	"
8	½"ø	26'-6"	S16	"
8	½"ø	24'-0"	S17	"
36	½"ø	6'-0"	S18	"
28	¾"ø	24'-0"	S19	"
28	½"ø	21'-6"	S20	"
8	¾"ø	6'-3"	S21	"
36	⅝"ø	9'-3"	S22	"
2	¾"ø	6'-6"	S23	"
6	½"ø	25'-0"	C3	Curb
16	⅝"ø	7'-0"	S24	Slab
24	⅞"ø	22'-0"	S25	"

Bending Sketches & Cutting Diagrams



No.	Size	Length	Mark	Location
Girder Spans - Continued				
6	½"ø	23'-3"	C4	Curb
6	½"ø	20'-6"	C5	"
6	½"ø	22'-6"	C6	"
8	½"ø	25'-9"	W1	Web
8	½"ø	16'-3"	W2	"
12	¾"ø	22'-6"	W3	"
6	¾"ø	33'-3"	W4	"
12	¾"ø	6'-9"	W5	Bracket
6	½"ø	7'-0"	W6	"
6	½"ø	7'-3"	W7	"
20	½"ø	24'-0"	B1	Girder
124	⅝"ø	8'-6"	B2	"
150	⅝"ø	8'-3"	B3	"
27	1¼"ø	49'-3"	B4	"
15	1¼"ø	49'-9"	B5	"
12	1¾"ø	49'-9"	B6	"
10	1¼"ø	40'-6"	B7	"
4	1¼"ø	35'-9"	B8	"
20	½"ø	21'-6"	B9	"
110	⅝"ø	8'-0"	B10	"
135	⅝"ø	7'-9"	B11	"
27	1¼"ø	44'-3"	B12	"
15	1¼"ø	44'-6"	B13	"
12	1¼"ø	44'-6"	B14	"
4	1¼"ø	36'-3"	B15	"
Handrail				
146	½"ø	21"	R2	Rail & Curb
108	½"ø	7'-3"	R3	Subpost
32	½"ø	4'-0"	R4	Post
1600	⅝"ø	18"	R5	Baluster
1	½"ø	2'-3"	R7	Post
8	½"ø	13'-6"	R8	Rail
8	½"ø	12'-3"	R9	"
8	½"ø	11'-0"	R10	"
8	½"ø	10'-3"	R11	"
8	½"ø	11'-3"	R12	"
8	½"ø	12'-3"	R13	"
8	½"ø	9'-0"	R14	"
8	½"ø	9'-9"	R15	"
16	½"ø	9'-0"	R16	"
40	½"ø	10'-3"	R17	"

Note. Dimensions given are along centerline of bars and are for computed lengths.
Reinforcing bars ¾" or over in diameter which are bent to an angle greater than 90° shall be of structural grade.

BRIDGE OVER MO. PAC. R. R.

STATE ROAD FROM PACIFIC TO GRAY SUMMIT
ABOUT 4 MILES WEST OF PACIFIC
PROJECT NO. U.S. 66 T.R-5 I STA. 212+67.4

FRANKLIN COUNTY

SUBMITTED BY M. R. Tuck DATE 8/10/32 DISTRICT ENGINEER
APPROVED BY T. H. Cutler DATE 8/15/32 CHIEF ENGINEER

STD. 5918
J-872

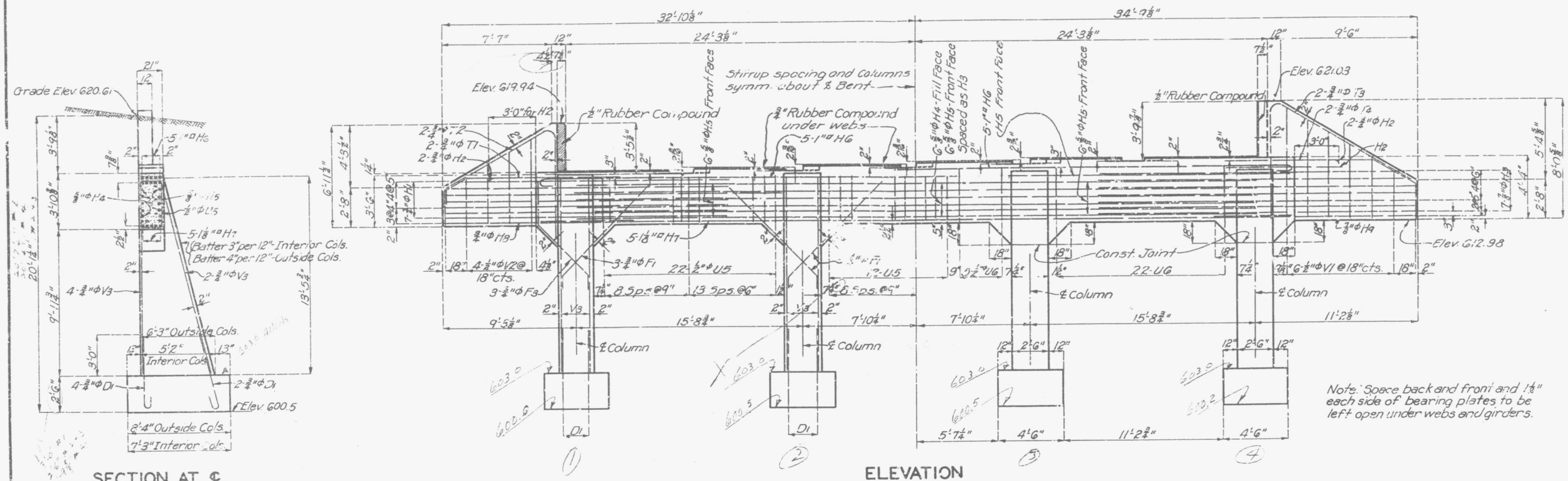
Drawn July 1932 by H.D.
Traced July 1932 by G.W.
Checked July 1932 by J.B.

260

Sheet No. 2 of 10 Sheets

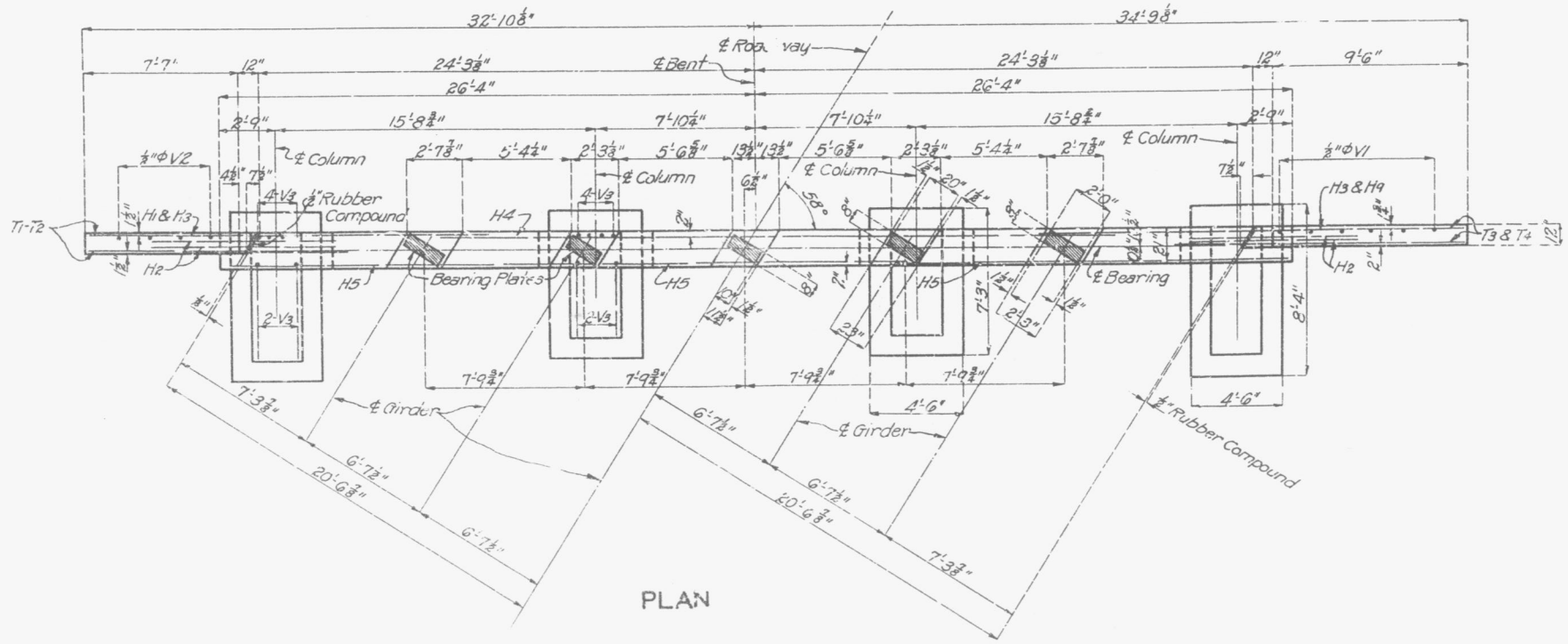
MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOT SHE
5	MO.	U.S.66TR-S1	19		



SECTION AT ℄

ELEVATION



PLAN

DETAILS OF BENT NO. 1

BRIDGE OVER MO. PAC. R.R.

STATE ROAD FROM PACIFIC TO GRAY SUMMIT

ABOUT 4 MILES WEST OF PACIFIC

PROJECT NO. U.S.66 TR-S1 STA. 212+67.41

FRANKLIN COUNTY

SUBMITTED BY W. R. Stark BRIDGE ENGINEER DATE 8/10/32

APPROVED BY T. H. Cutler CHIEF ENGINEER DATE 8/10/32

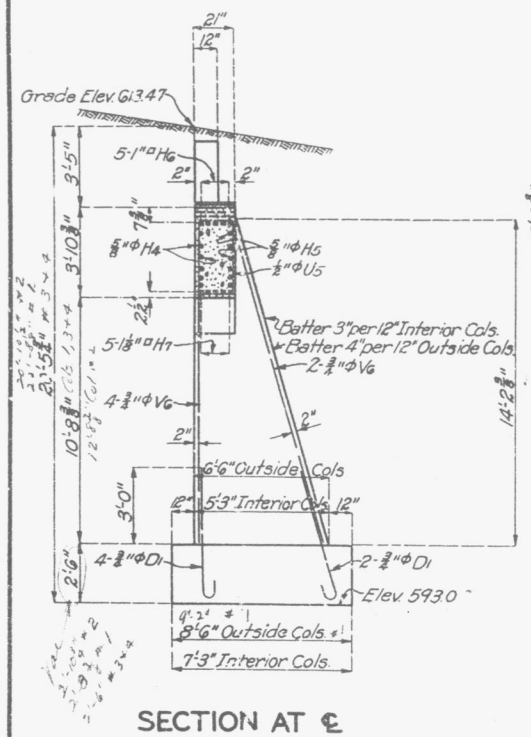
STD. S

J-8

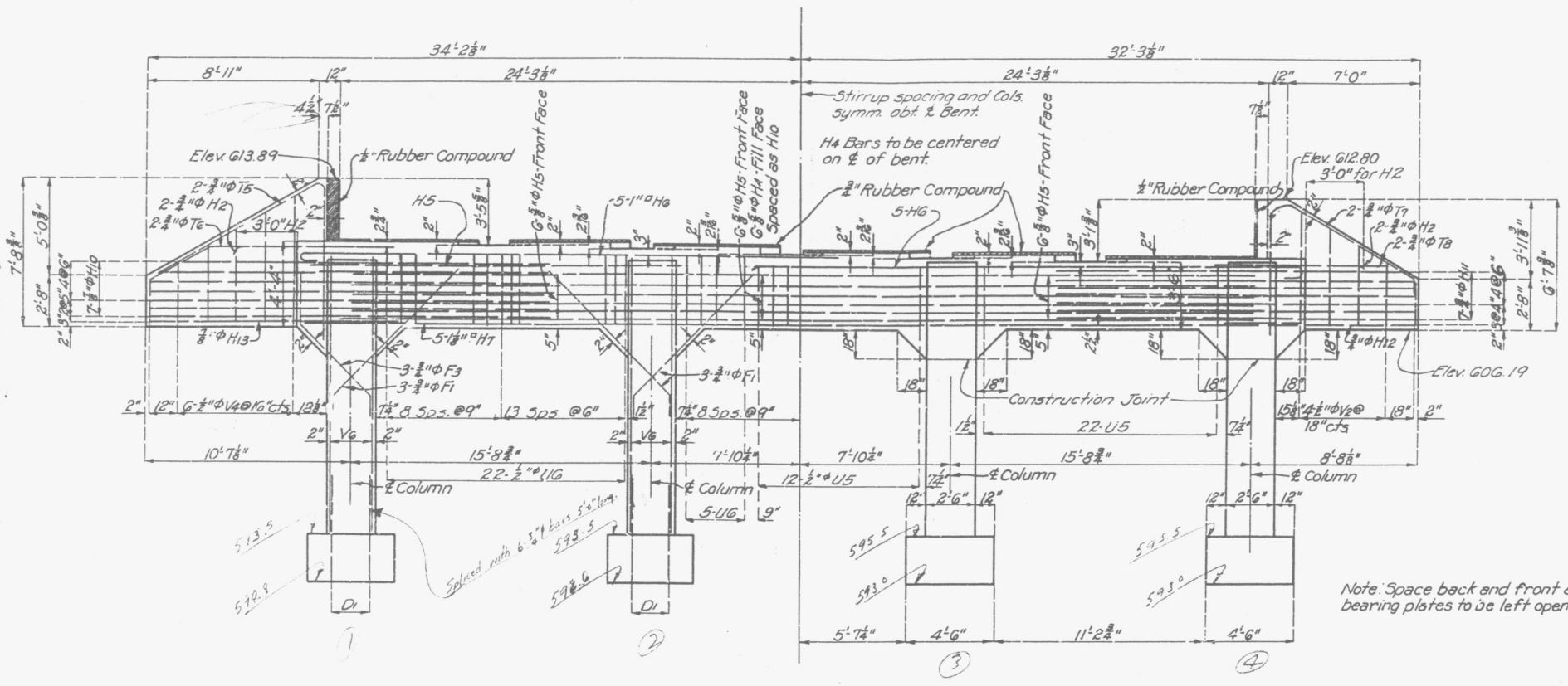
Drawn July 1932 By H.S.
Traced July 1932 By H.W.H.
Checked Aug. 1932 By T.J.

MISSOURI STATE HIGHWAY DEPARTMENT

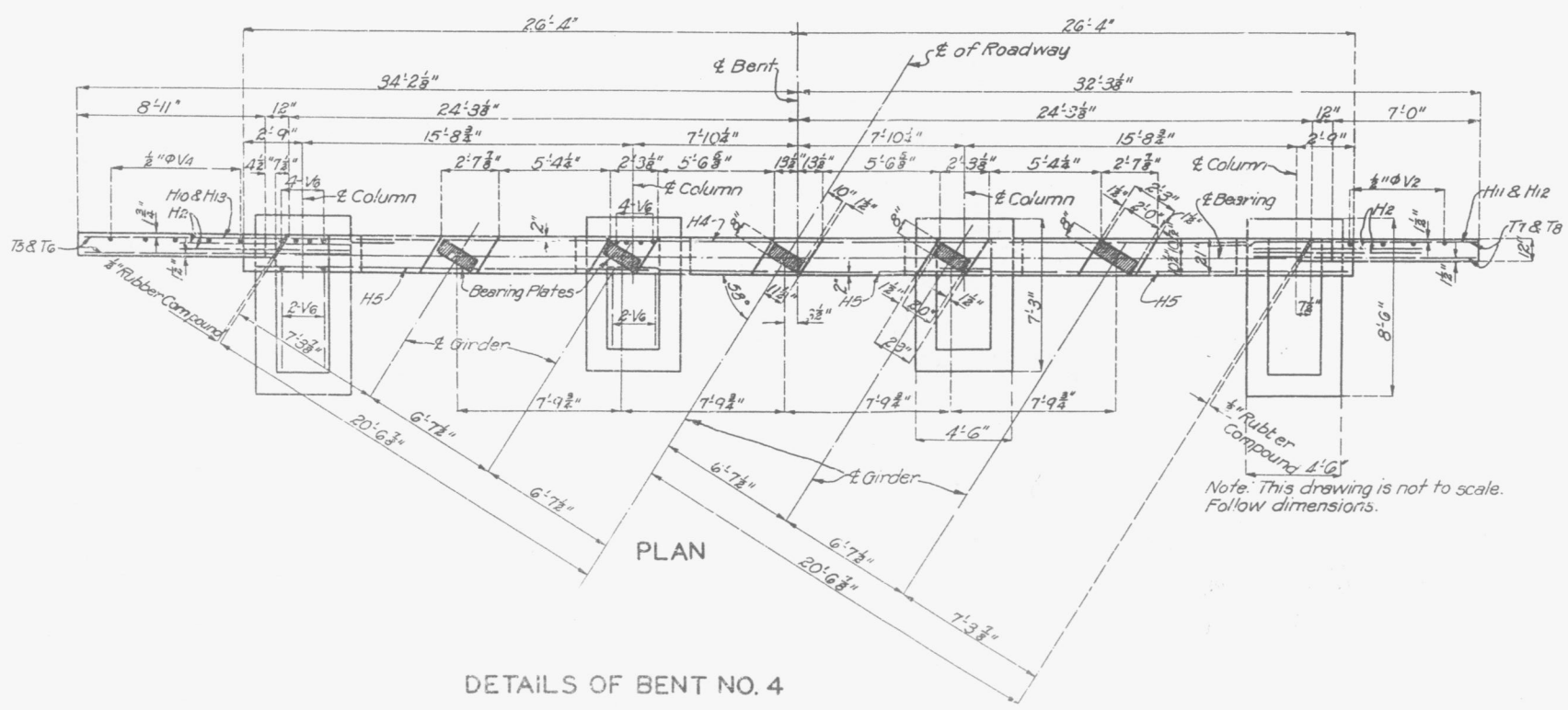
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
8	MO.	U.S.56GTR-S1	19		



SECTION AT ℄



ELEVATION



PLAN

DETAILS OF BENT NO. 4

Drawn July 1932 By H.D.
Traced July 1932 By H.W.H.
Checked Aug. 1932 By T.B.

Sheet No. 4 of 10.

BRIDGE OVER MO. PAC. R. R.

STATE ROAD FROM PACIFIC TO GRAY SUMMIT

ABOUT 4 MILES WEST OF PACIFIC

PROJECT NO. U.S. 56 TR-S1 STA. 212 + 67.41

FRANKLIN COUNTY

SUBMITTED BY M R Lack DATE 8/10/32 BRIDGE ENGINEER

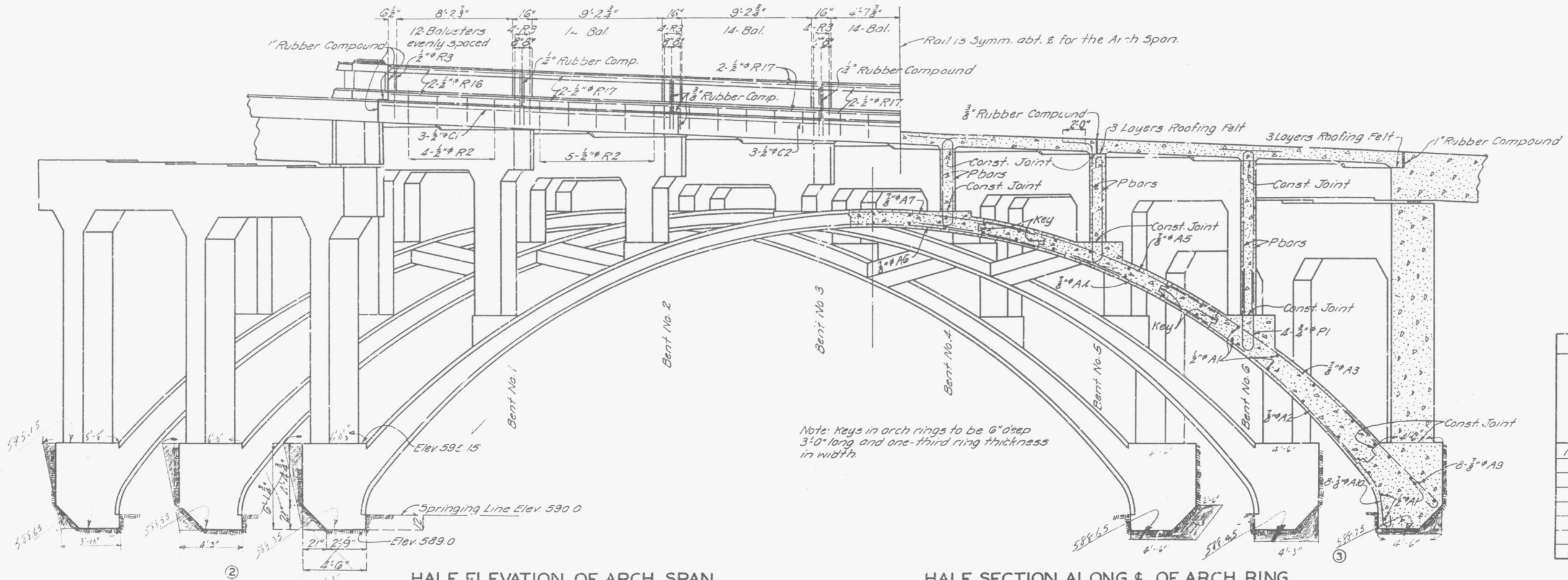
APPROVED BY T H Cutler DATE 8/10/32 CHIEF ENGINEER

STD. S918

J-872

MISSOURI STATE HIGHWAY DEPARTMENT

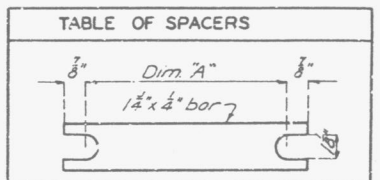
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.	USGGTR-51	19		



HALF ELEVATION OF ARCH SPAN

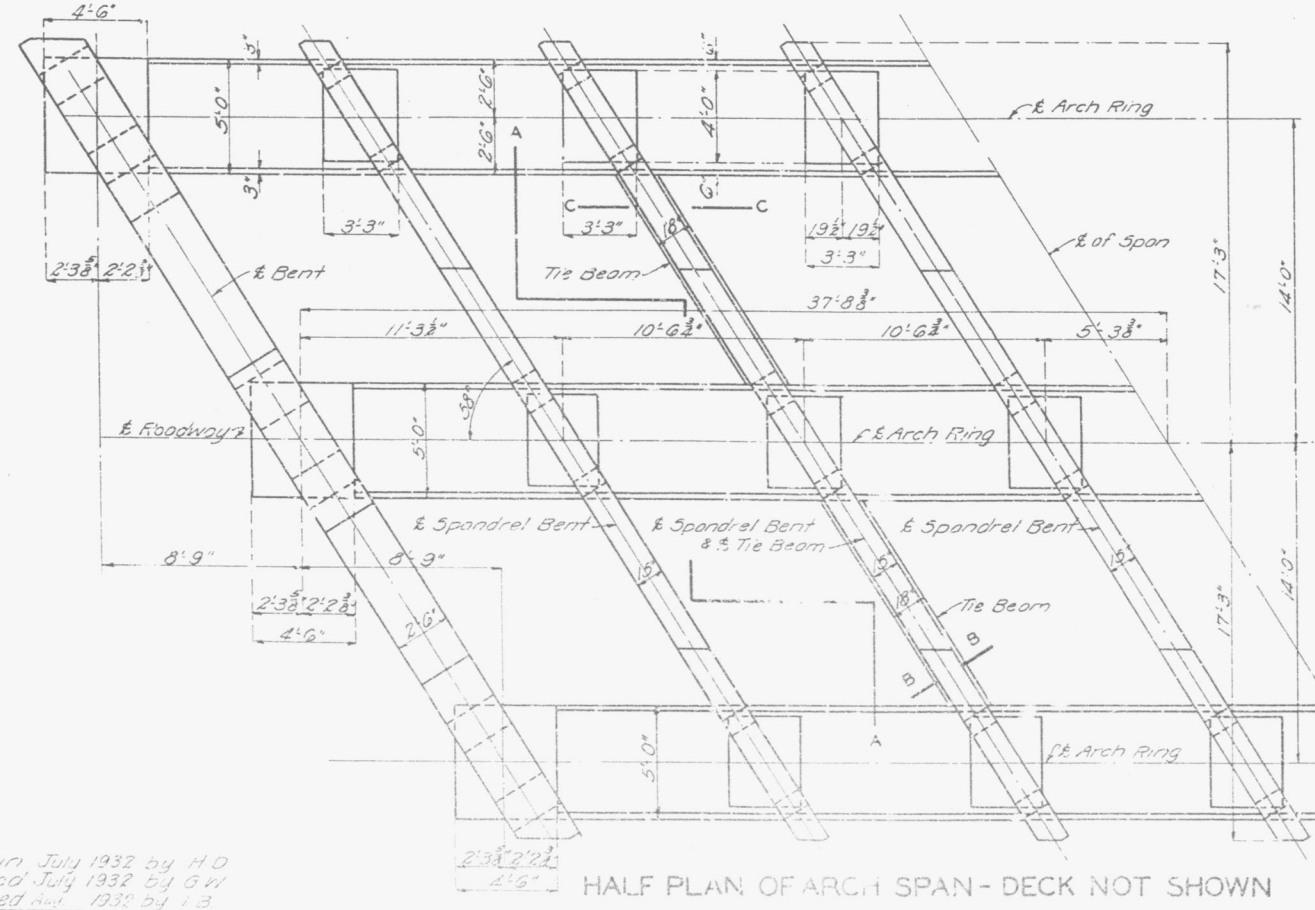
HALF SECTION ALONG ℄ OF ARCH RING

TABLE OF SPACERS

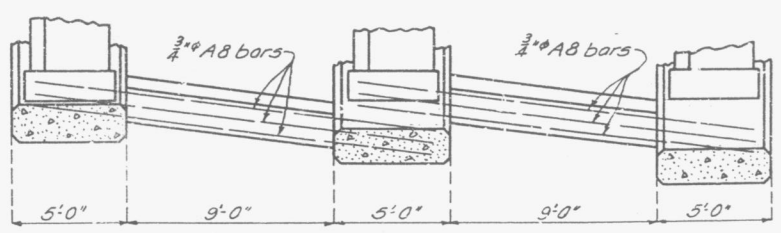


No.	Dim. "A"	No.	Dim. "A"
18	22½"	18	11⅞"
18	18½"	18	11½"
18	15½"	18	11⅜"
18	14"	18	11¼"
18	12⅞"	36	11⅛"
18	12⅜"	9	11"
18	11⅞"		

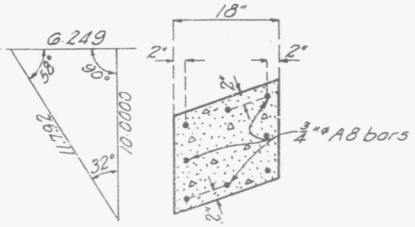
Note: Weight of spacers included in weight of reinforcing steel.
Spacers listed above to be billed and tagged separately and identified as to length.



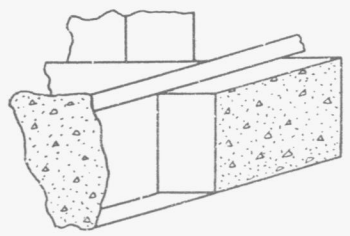
HALF PLAN OF ARCH SPAN - DECK NOT SHOWN



SECTION A-A SHOWING TIE BEAM



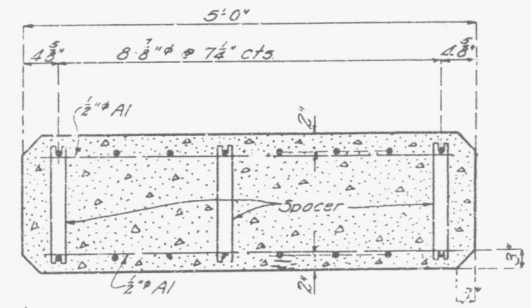
SECTION B-B THRU TIE BEAM



SECTION C-C THRU TIE BEAM

Note: Tie beams to be located at Spandrel Bents No. 2 & 5. Tie beams to be placed as shown on details above and are not to interfere with 3" bevel edges of rings.

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



Note: ½" ø bars A1 @ 2'-6" cts. measured horizontally are to be placed in ring at points where ordinates are shown in detail giving "Dimensions of Arch Ring" on Sheet No. 6. Spacers to be placed as shown in above detail and spaced same as ½" ø tie bars "A1". Wire spacers securely to both main and transverse steel. All main reinforcing steel to be spliced in Block No. 4.

SECTION THRU ARCH RING SHOWING REINF.

BRIDGE OVER MO. PAC. R.R.

STATE ROAD FROM PACIFIC TO GRAY SUMMIT

ABOUT 4 MILES WEST OF PACIFIC

PROJECT NO. U.S. 66 TR-S1 STA. 212 + 67.41

FRANKLIN COUNTY

SUBMITTED BY M R Long DATE 3/10/32
BRIDGE ENGINEER

APPROVED BY T H Cutler DATE 3/10/32
CHIEF ENGINEER

STD. 5918

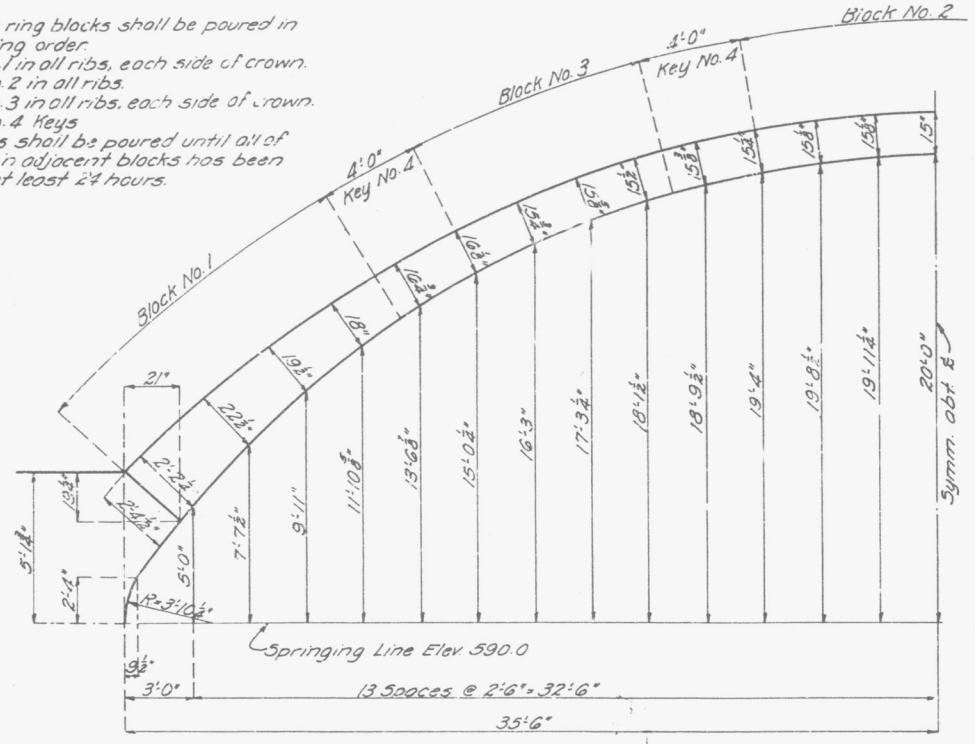
J-872

Drawn July 1932 by H D
Traced July 1932 by G W
Checked Aug 1932 by J B

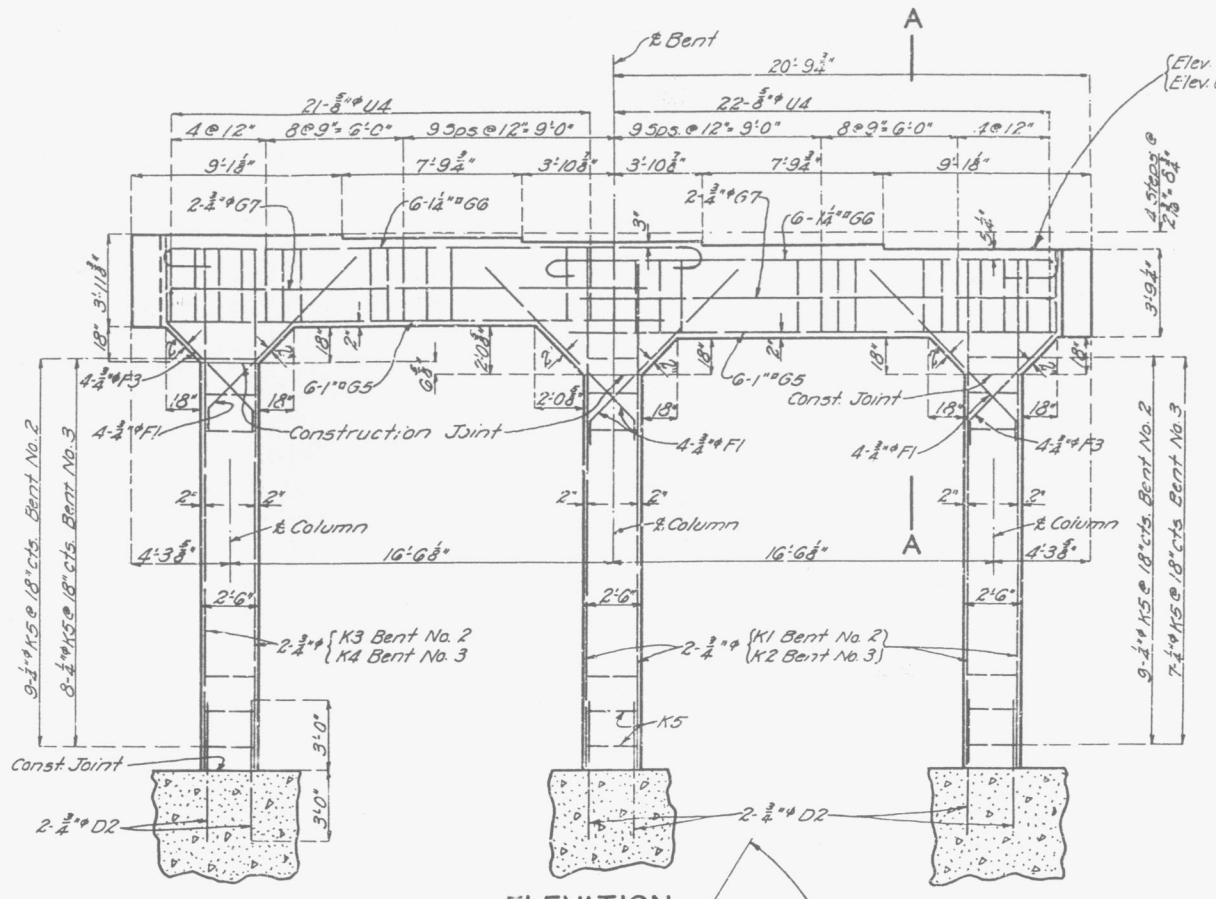
MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
3	MO.	U.S.66TR-5(1)	19		

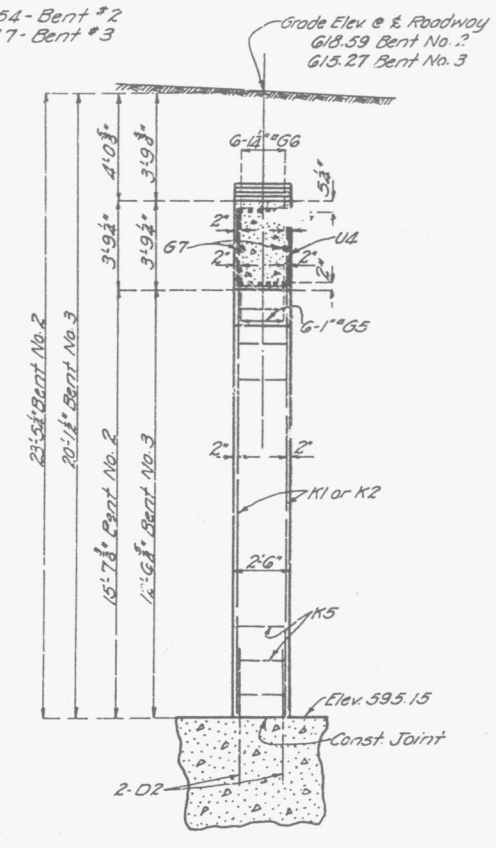
Note: Arch ring blocks shall be poured in the following order.
Block No. 1 in all ribs, each side of crown.
Block No. 2 in all ribs.
Block No. 3 in all ribs, each side of crown.
Block No. 4 Keys.
No keys shall be poured until all of concrete in adjacent blocks has been in place at least 24 hours.



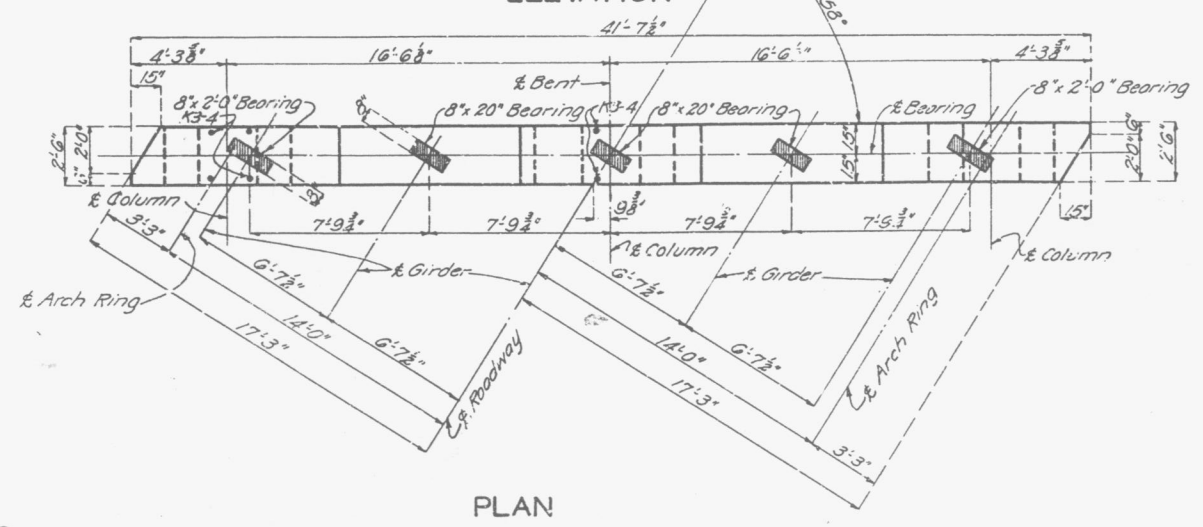
DIMENSIONS OF ARCH RING



ELEVATION



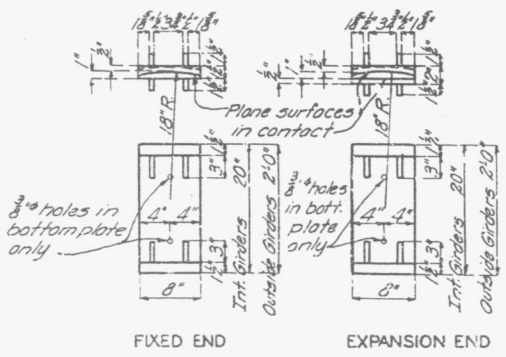
SECTION A-A



PLAN

DETAILS OF BENTS NO. 2 & 3

Note: Space back and front of bearing plates and space between top of bents and bottom of girder webs to be left open to depth of plates.



Note: A mixture of graphite and oil to be placed between plates before placing in concrete.

PHOSPHOR BRONZE BEARING PLATES

Note: 4 sets of 5 plates each 8"x 2'-0" required for outside girders. 6 sets of 5 plates each 8"x 20" required for intermediate girders.
Each set consisting of 1 top plate and 1 bottom plate for fixed end and 1 top plate, 1 floater plate and 1 bottom plate for expansion end.

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

BRIDGE OVER MO. PAC. R. R.

STATE ROAD FROM PACIFIC TO GRAY SUMMIT
ABOUT 4 MILES WEST OF PACIFIC
PROJECT NO. U.S.66TR-5I STA. 212+67.41

FRANKLIN COUNTY

SUBMITTED BY T. R. Lacy, BRIDGE ENGINEER, DATE 8/10/32
APPROVED BY T. H. Cutler, CHIEF ENGINEER, DATE 8/10/32

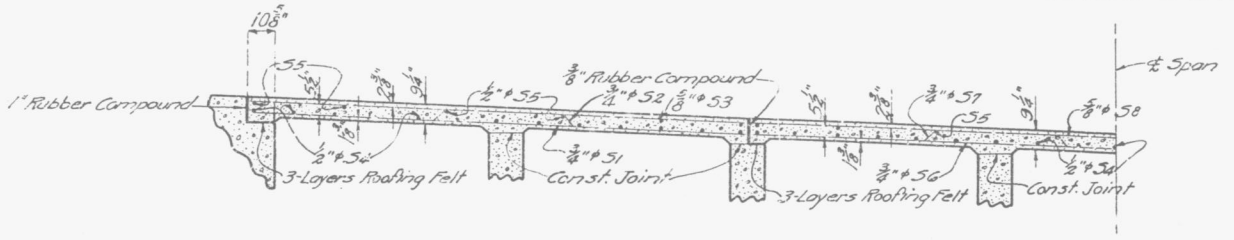
STD. 5918
J-872

Drawn July 1932 by H.D.
Traced July 1932 by G.W.
Checked Aug. 1932 by I.B.

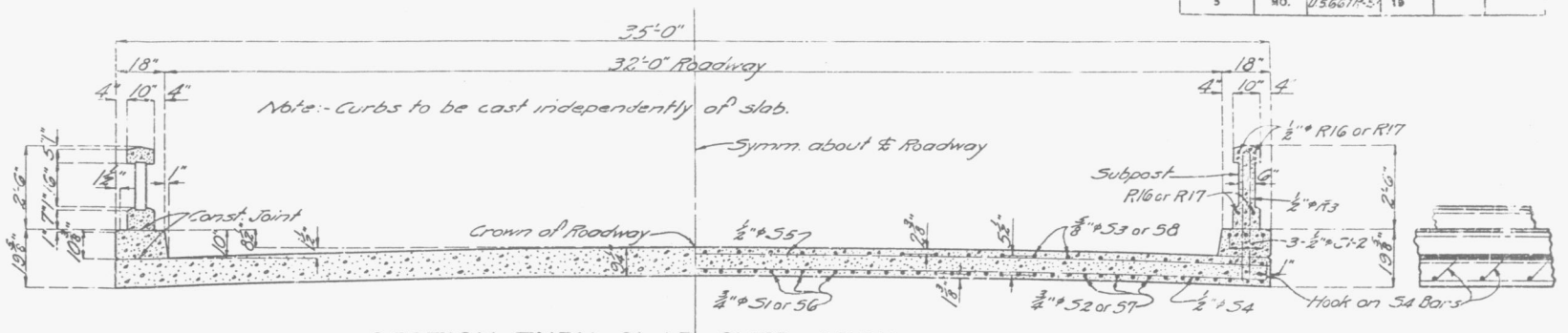
Sheet No. 6 of 10.

MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.	U566TR-5	19		



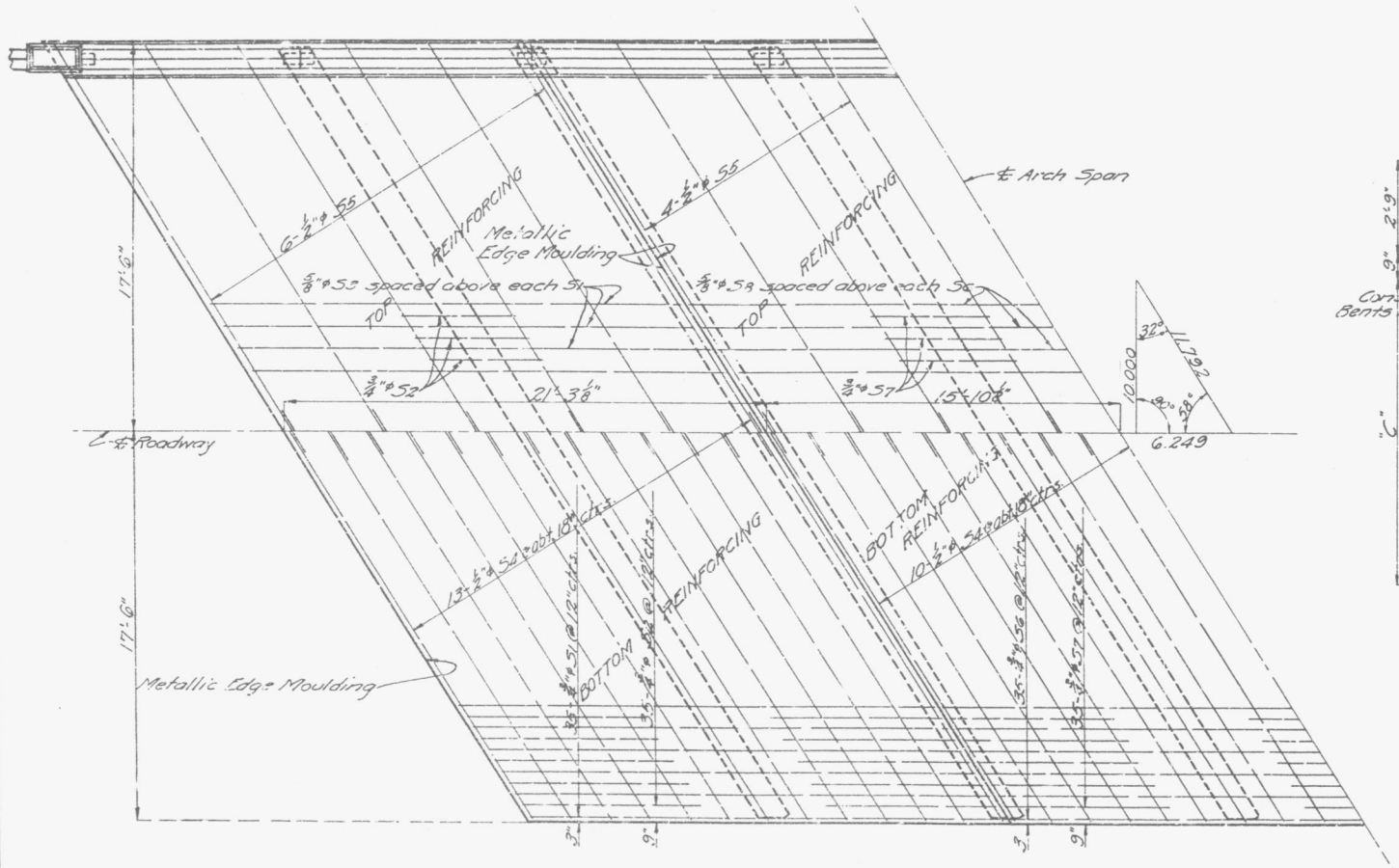
SECTION PARALLEL TO ℄ ROADWAY



SECTION THRU SLAB OVER ARCH

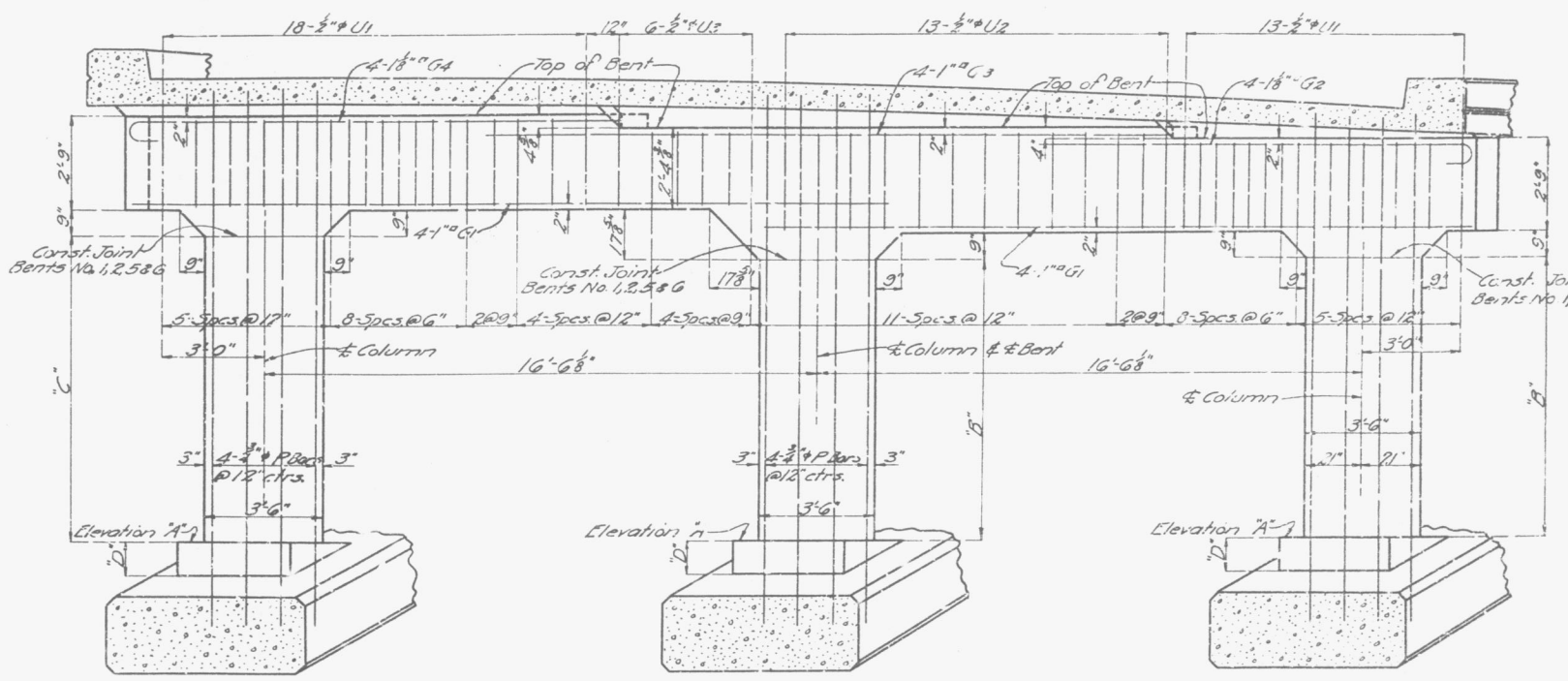
(AT RT. ANGLES TO ℄ RDWY.)

PART ELEV.

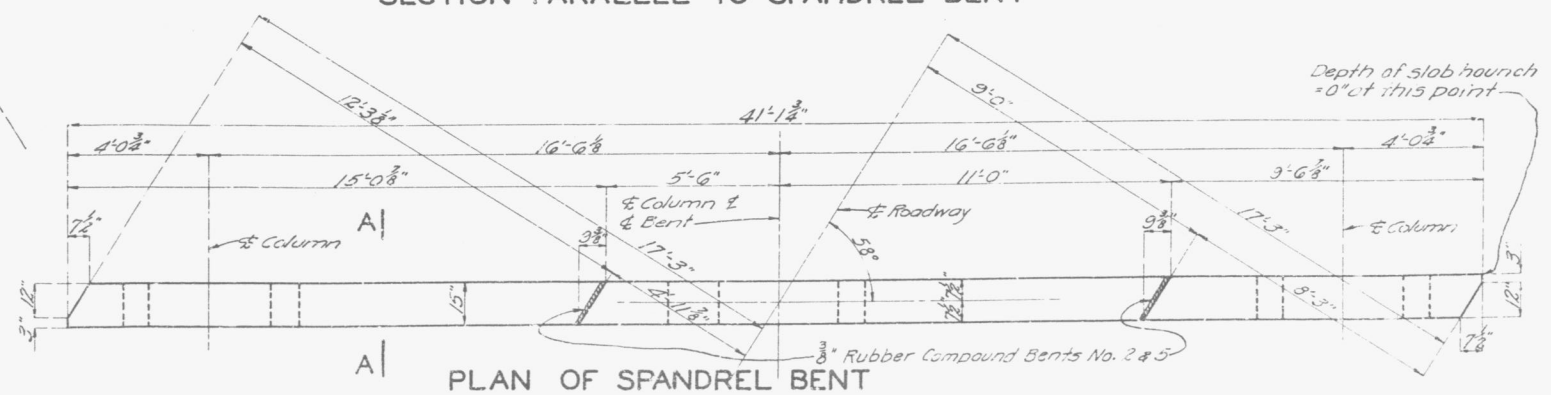


HALF PLAN

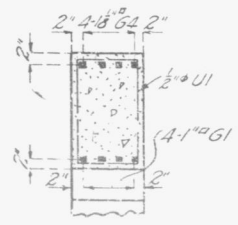
DETAILS OF SLAB ON ARCH SPAN



SECTION PARALLEL TO SPANDREL BENT



PLAN OF SPANDREL BENT



SECTION A-A

SPANDREL BENT DATA

BENT No.	GRADE ELEV AT ℄ BENT	ELEV "A"	DIMENSIONS "B"	DIMENSIONS "C"	DIMENSIONS "D"	R BARS IN LEFT COL. No.	R BARS IN LEFT COL. MARK	R BARS IN LEFT COL. No.	R BARS IN LEFT COL. MARK	P BARS IN CENTER COL. No.	P BARS IN CENTER COL. MARK	P BARS IN CENTER COL. No.	P BARS IN CENTER COL. MARK	P BARS IN RIGHT COL. No.	P BARS IN RIGHT COL. MARK	P BARS IN RIGHT COL. No.	P BARS IN RIGHT COL. MARK
1	618.09	603.80	9'-4⅝"	10'-7⅞"	2'-3"	4	P	8	P2	4	P1	8	P3	4	P1	8	P1
2	617.63	608.96	5'-8¾"	4'-5⅜"	15⅝"	4	P5	4	P5	4	P7	4	P8	4	P9	4	P10
3	617.16	611.12	1'-3⅝"	2'-1⅜"	4⅝"	8	P11	–	–	8	P12	–	–	8	P13	–	–
4	616.70	611.12	7⅞"	1'-6⅜"	4⅝"	8	P14	–	–	8	P15	–	–	8	P16	–	–
5	616.23	608.96	2'-4"	3'-0⅜"	15⅝"	4	P17	4	P18	4	P19	4	P20	4	P21	4	P22
6	615.77	603.80	7'-0⅜"	7'-9"	2'-3"	4	P1	8	P23	4	P1	3	P24	4	P1	8	P25

Note:- See Hall's Section Along ℄ of Ring on Sheet No. 5 for method of placing P-Bars. P-Bars in spandrel bents No. 2 and 5 to be placed so as to allow slab section to expand up grade.

BRIDGE OVER MO. PAC. R.R.

STATE ROAD FROM PACIFIC TO GRAY SUMMIT

ABOUT 4 MILES WEST OF PACIFIC

PROJECT NO. U.S. 66 TR-S1 STA. 212+67.41

FRANKLIN COUNTY

SUBMITTED BY M R Clark BRIDGE ENGINEER DATE 3/10/32

APPROVED BY T M Cutler CHIEF ENGINEER DATE 3/

STD. SHT. 8

J-872

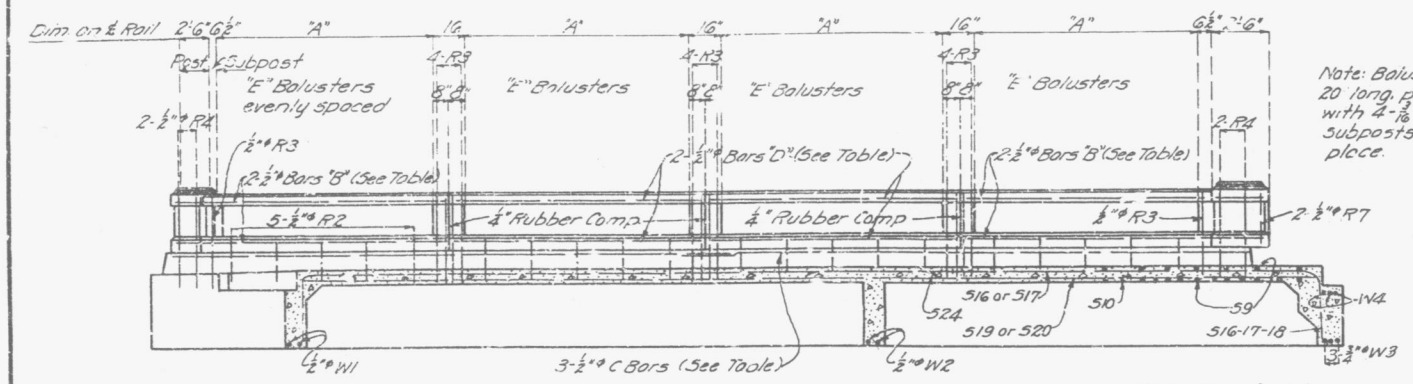
Drawn July 1932 by H.D.
Traced July 1932 by CAF-S.V.
Checked July 1932 by J.B.

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

Sheet No. 7 of 10

MISSOURI STATE HIGHWAY DEPARTMENT

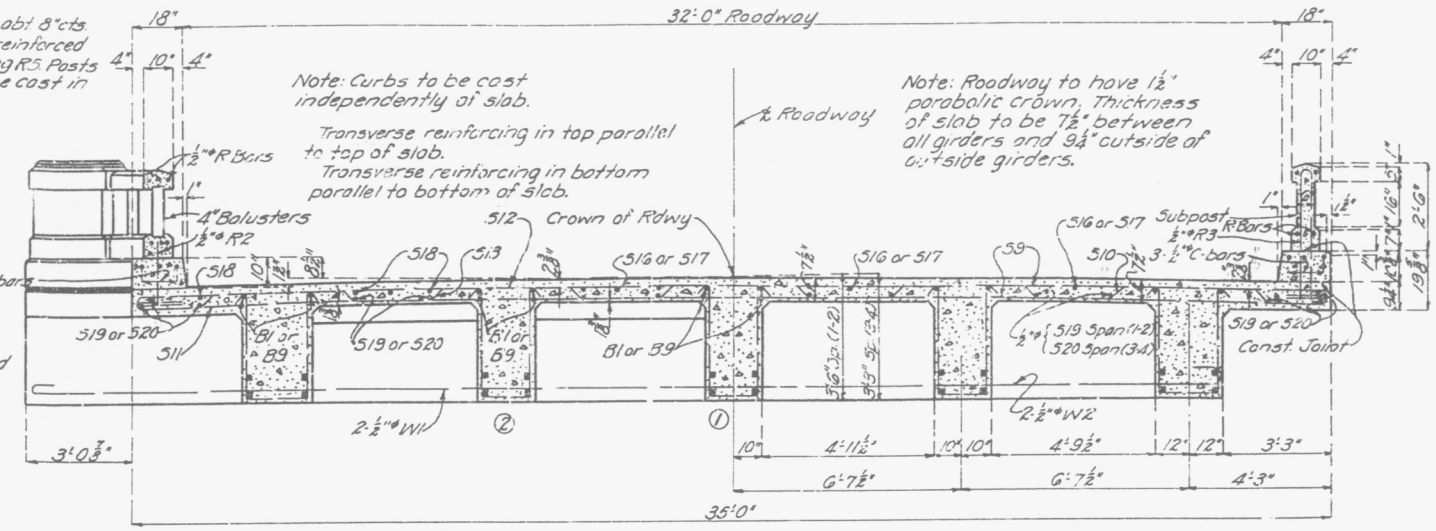
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
7	MO.	U.S.66TR-5(1)	19		



LONGITUDINAL SECTION SHOWING HANDRAIL

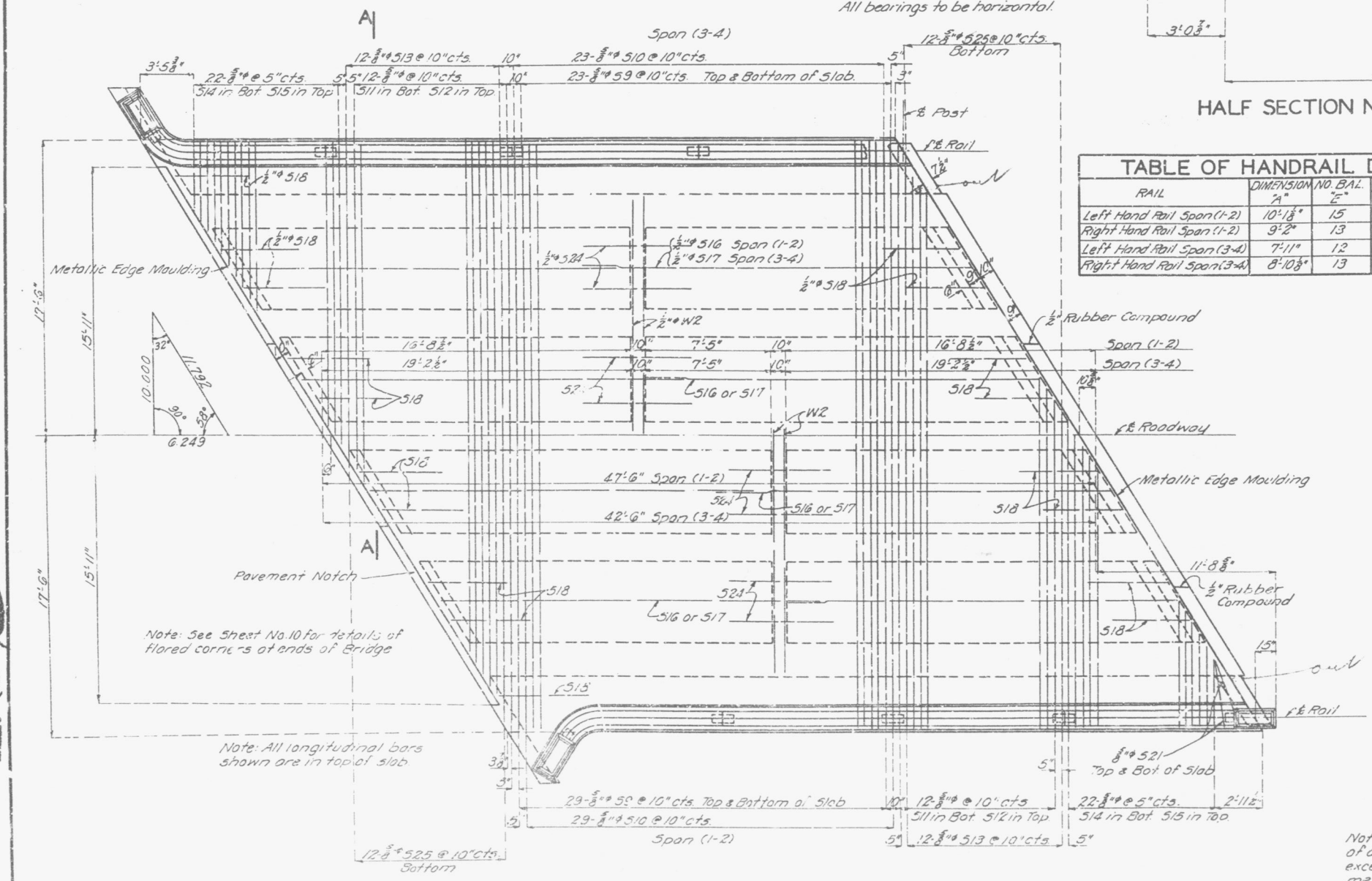
Note: Balusters 4"x4" @ abt 8" cts. 20' long, precast. Each reinforced with 4-⅛"ø wires 18" long R5. Posts subposts and rail to be cast in place.

Note: Top of slab, curbs and rails and top of posts shall be constructed parallel to grade. Posts, subposts and balusters to be vertical. All bearings to be horizontal.



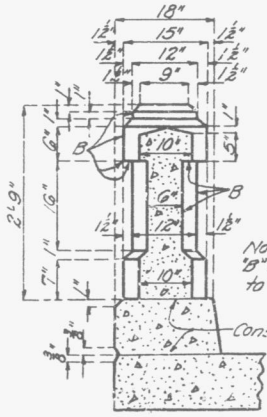
HALF SECTION NEAR END BENT

HALF SECTION THRU SPAN



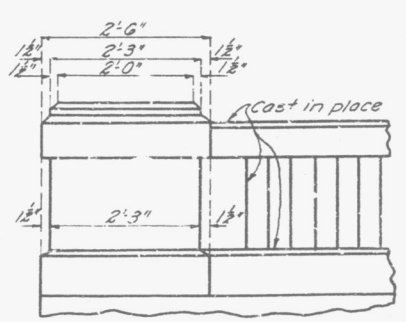
PLAN OF GIRDER SPAN

TABLE OF HANDRAIL DATA					
RAIL	DIMENSION "A"	NO. BAL. "E"	BARS "B"	BARS "D"	BARS C
Left Hand Rail Span (1-2)	10'-1⅞"	15	R8	R10	C3
Right Hand Rail Span (1-2)	9'-2"	13	R9	R11	C4
Left Hand Rail Span (3-4)	7'-11"	12	R12	R14	C5
Right Hand Rail Span (3-4)	8'-10⅜"	13	R13	R15	C6

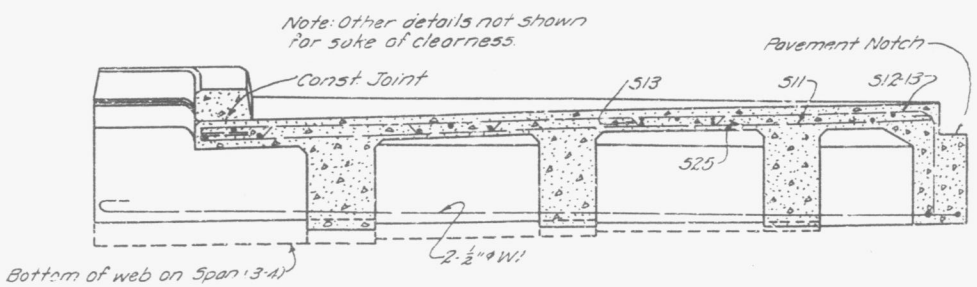


Note: All edges marked "B" on post and railing to be beveled ½"

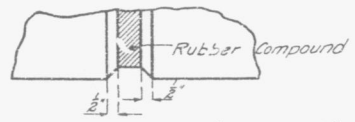
SECTION THRU RAIL AT SUBPOST



ELEVATION OF POST



SECTION A-A THRU SPAN (1-2)



Note: Use bevel as shown for exposed faces of all joints consisting of rubber compound except at top surface of roadway slab. Use metallic edge moulding at top surface of roadway slab each side of joint

DETAIL OF BEVEL FOR RUBBER COMPOUND JOINTS

BRIDGE OVER MO. PAC. R. R.

STATE ROAD FROM PACIFIC TO GRAY SUMMIT

ABOUT 4 MILES WEST OF PACIFIC

PROJECT NO. U.S.66TR-5(1) STA. 212+67.41

FRANKLIN COUNTY

SUBMITTED BY W R Lacy DATE 8/10/32
BRIDGE ENGINEER

APPROVED BY T H Cutler DATE 8/10/32
CHIEF ENGINEER

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

Drawn July 1932 by H.O.
Traced July 1932 by S.W.
Checked Aug. 1932 by I.B.

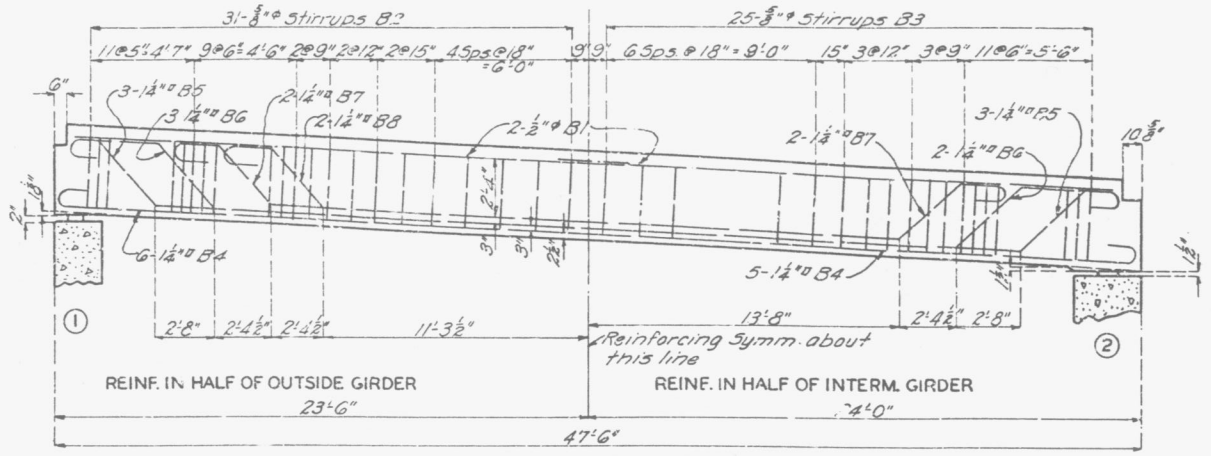
STD. 5918

J-872

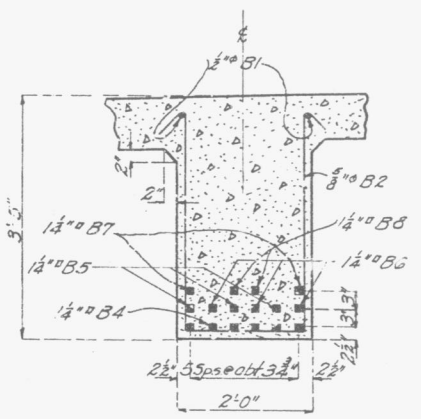
Sheet No. 8 of 10.

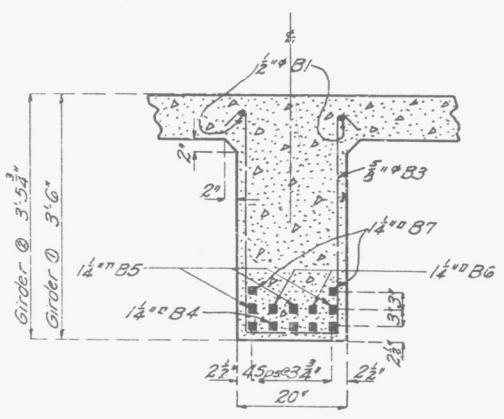
MISSOURI STATE HIGHWAY DEPARTMENT

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	MO.	U.S.66TR-SI	19		



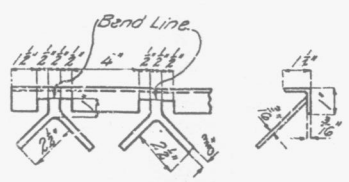
ELEVATION OF GIRDER - SPAN (1-2) SHOWING REINFORCING





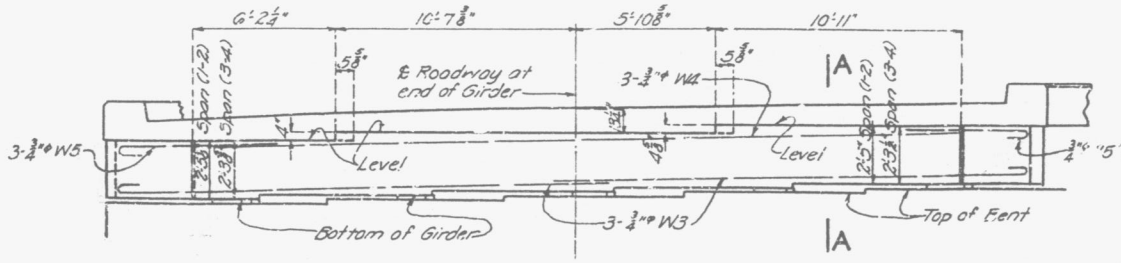
Note: All bearings to be horizontal.

SECTION OF GIRDERS-SPAN (1-2)



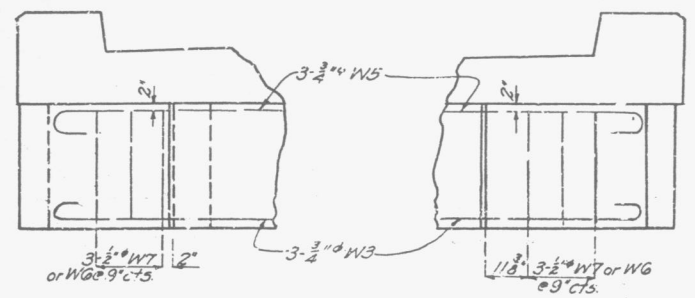
Note: Cost of metallic edge moulding to be included in unit bid price for concrete.

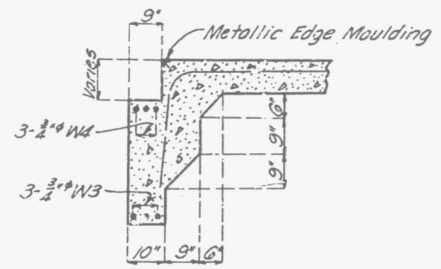
METALLIC EDGE MOULDING



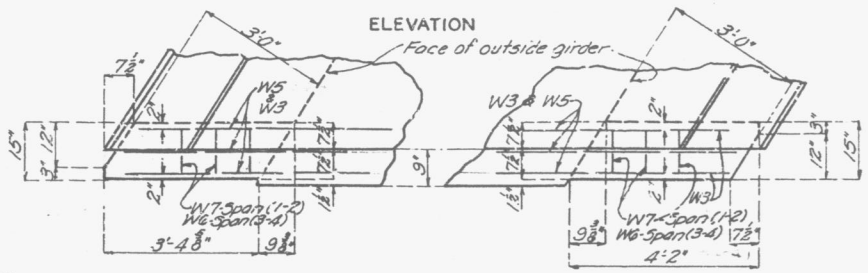
END ELEVATION OF GIRDER SPAN AT INT. BENT NO. 2

Note: End of Girder Span at Bent No. 3 slopes opposite hand.

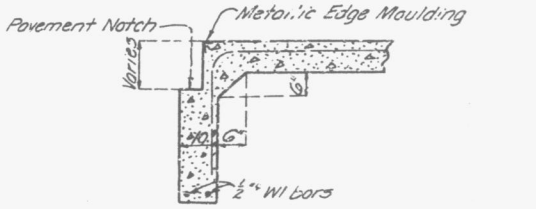




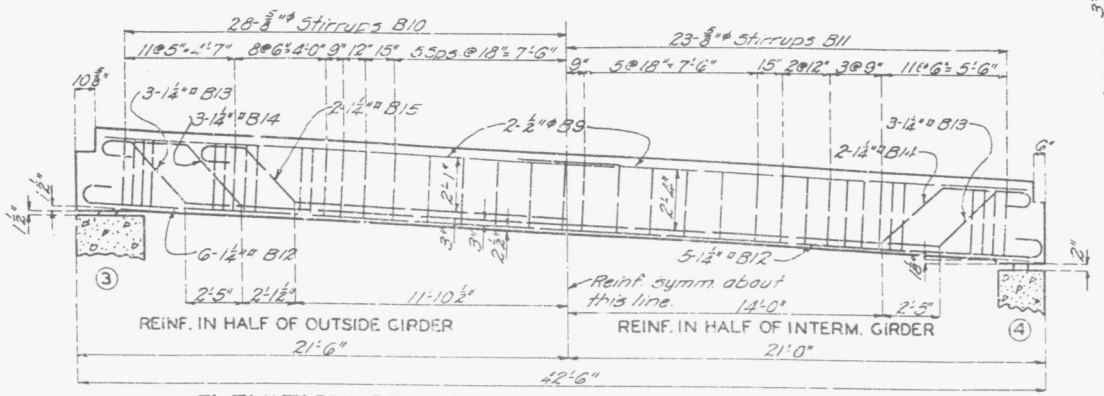
SEC. A-A NORMAL ON WEB



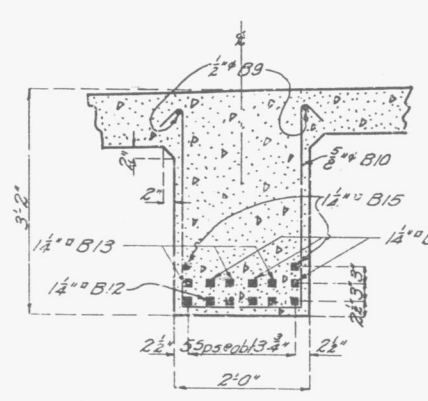
DETAILS OF BRACKETS OVER INT. BENTS

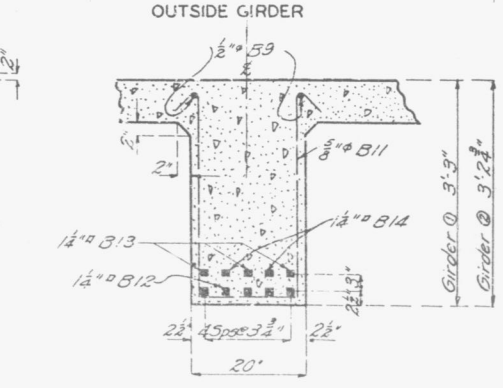


SEC. B-B NORMAL ON WEB

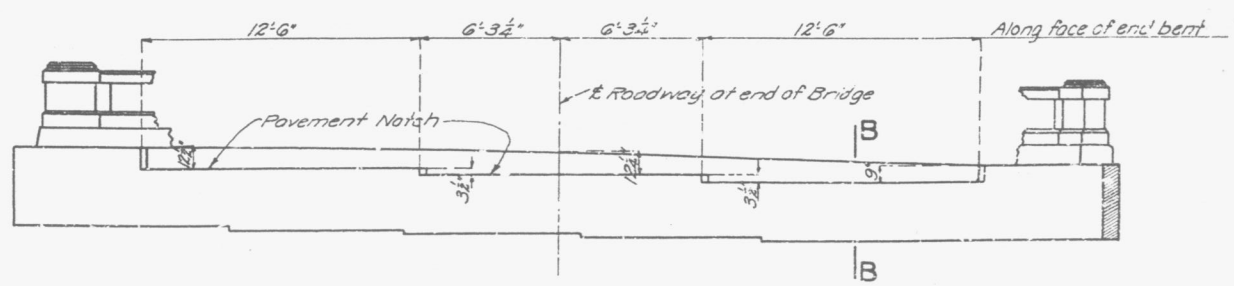


ELEVATION OF GIRDER - SPAN (3-4) SHOWING REINFORCING





SECTION OF GIRDERS-SPAN (3-4)



END ELEVATION OF GIRDER SPAN AT END BENT NO. 1

Note: End of Girder Span at End Bent No. 4 slopes opposite hand.

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

BRIDGE OVER MO. PAC. R. R.

STATE ROAD FROM PACIFIC TO GRAY SUMMIT

ABOUT 4 MILES WEST OF PACIFIC

PROJECT NO. U.S. 66 TR-SI STA. 212+67.41

FRANKLIN COUNTY

SUBMITTED BY M. R. Hoff BRIDGE ENGINEER DATE 8/10/32

APPROVED BY T. H. Cutler CHIEF ENGINEER DATE 8/10/32

STD. S918

J-872

Drawn July 1932 by H.O.
Traced July 1932 by G.W.
Checked August 1932 by T.S.

Index to Photographs
Bridge over Union Pacific Railroad

Bridge No. J-872
Franklin County
South Outer Road I-44/Business Route 66
MoDOT Job No. J6I0899

Randall Dawdy, Photographer
February 2001

1. Side elevation of Bridge No. J-872, view to the northwest.

2. Open rib spandrel arches and deck girder span at Bent No. 2, view to the north.

3. Open rib spandrel arch and skewed spandrel bents, view to the west.

4. Open rib spandrel arches and skewed spandrel bents, view to the north.

5. Open rib spandrel arch and skewed spandrel bents, view to the west.

6. View of underside of arch ribs, view to the east.

7. View of underside of arch ribs, view to the east.

8. Bent No. 2, view to the west.

9. Concrete balustrade on north side of bridge deck.

10. Close-up view of curved balustrade and end post at northeast corner.

11. Bridge deck and roadway (Business Route 66), view to the west.

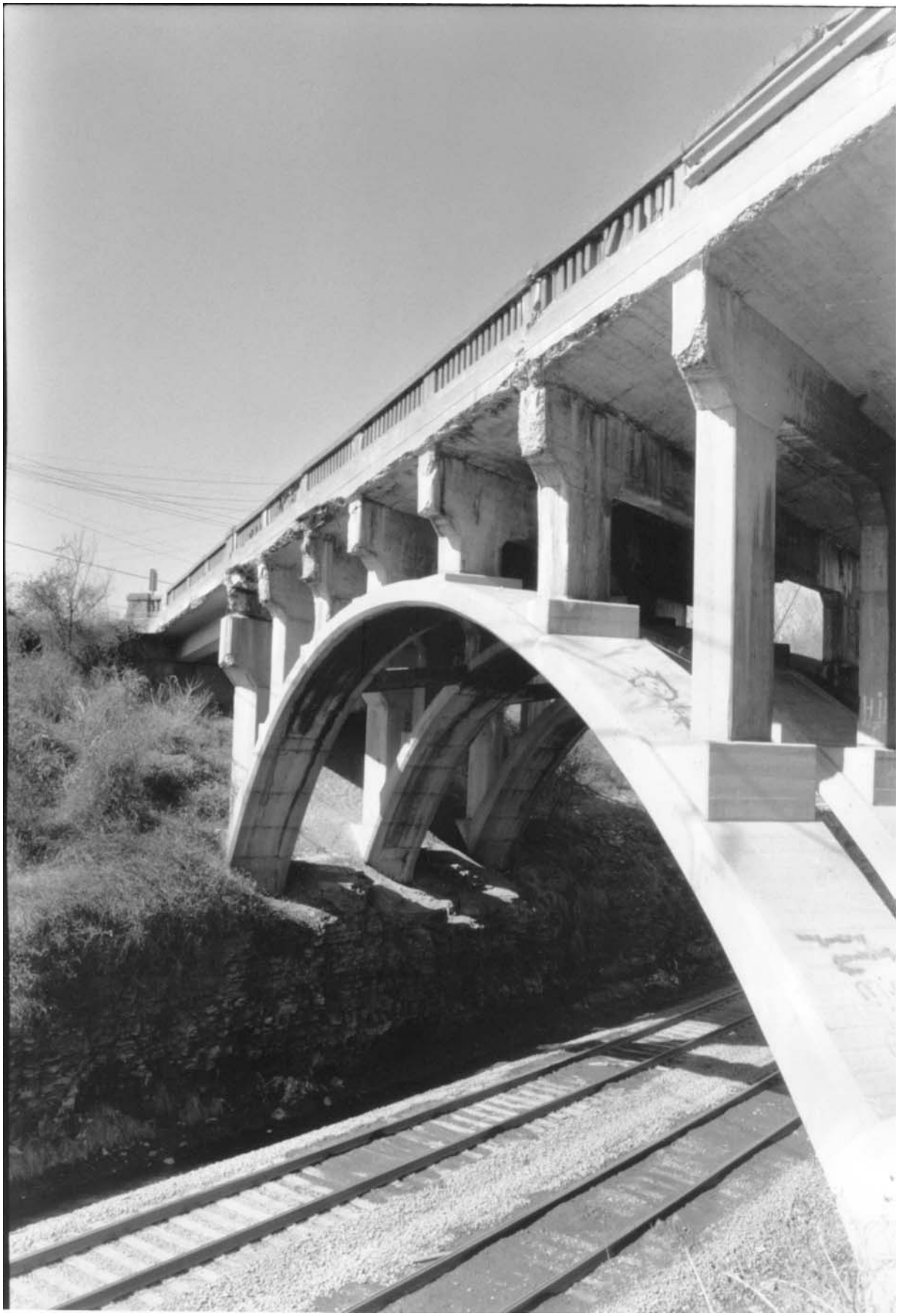
Photograph 1

Photograph 2

Photograph 3

Photograph 4

Photograph 5



Photograph 6

Photograph 7

Photograph 8

Photograph 9

Photograph 10

Photograph 11