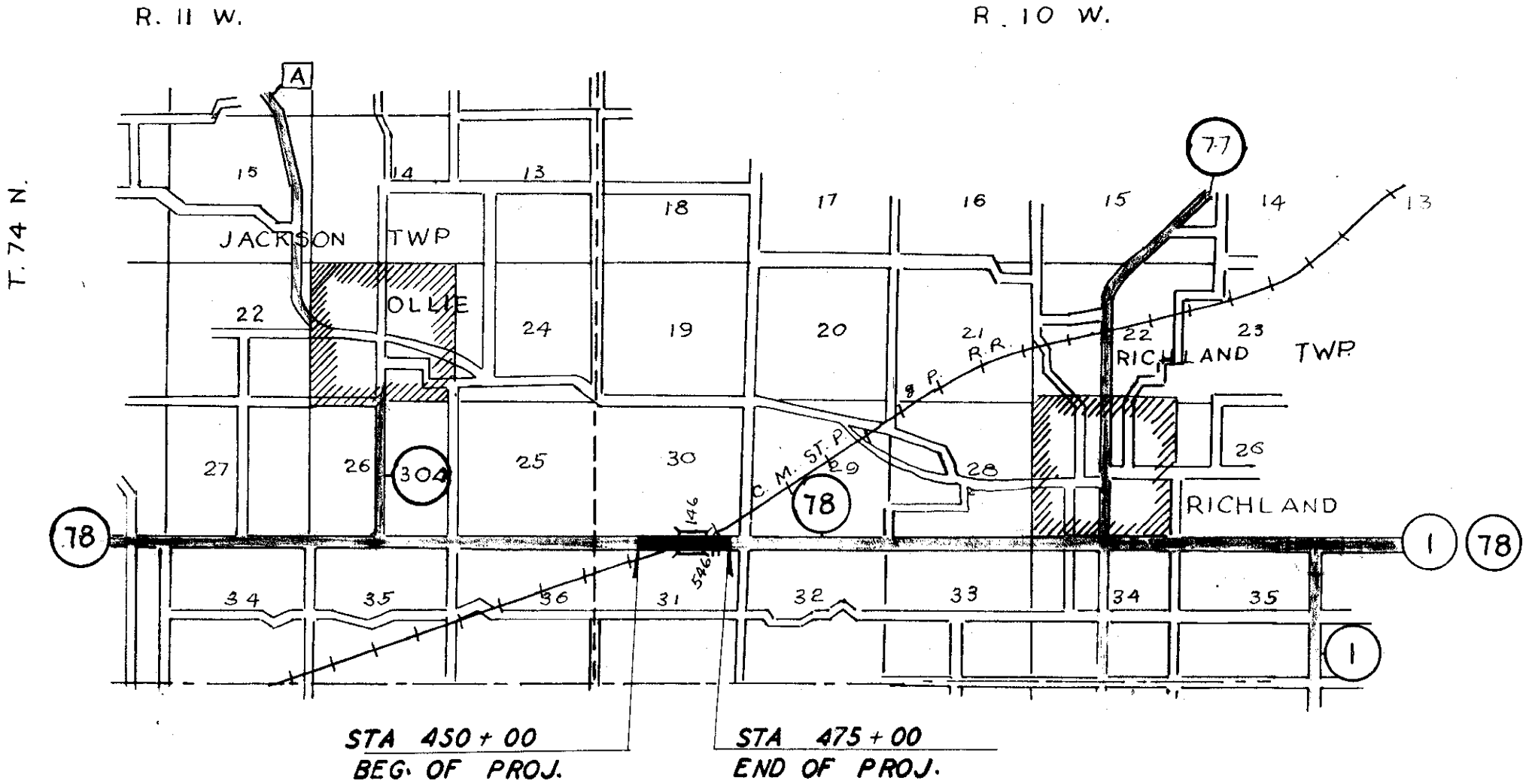
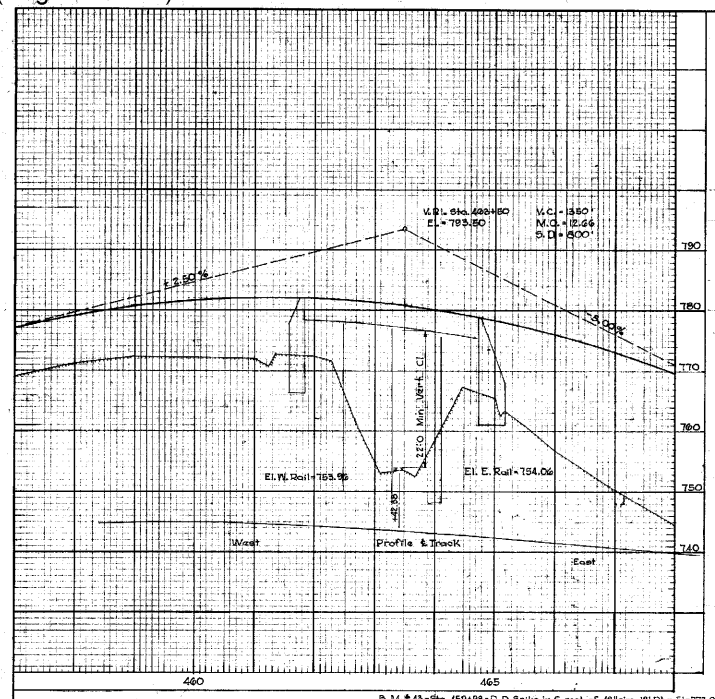
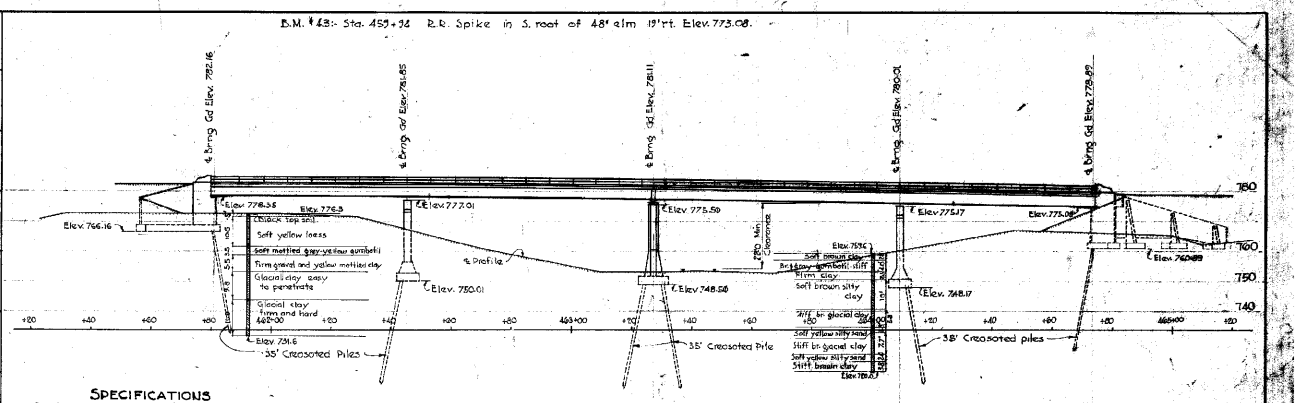

R. 11 W.
R. 10 W.
T. 74 N.
A
JACKSON TWP
OLLIE
RICHLAND TWP
RICHLAND
C. M. ST. P.
R.R.
78
77
1
30A
146
546
STA 450 + 00
BEG. OF PROJ.
STA 475 + 00
END OF PROJ.



B.M. # 43 - Sta. 459+98 - R.R. Spike in S. root of 48" elm - 18' Rt. - El. = 773.08
(Data from Preliminary Survey T-618)

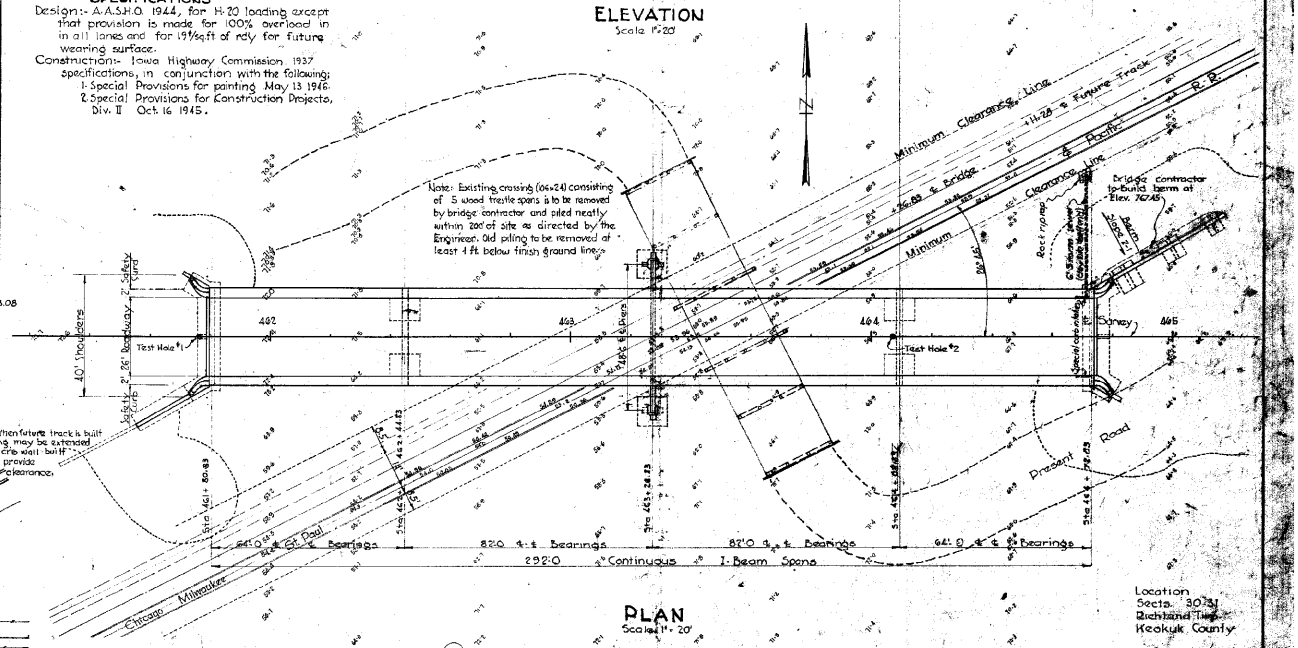


SPECIFICATIONS

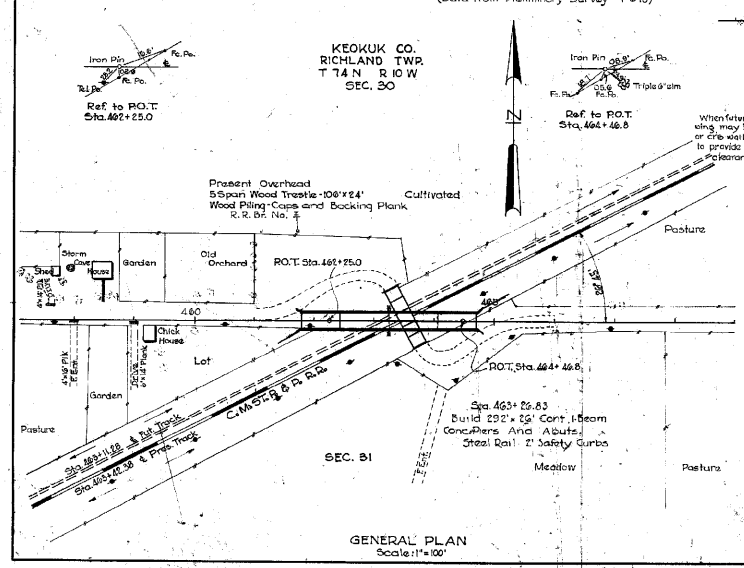
Design:- A.A.S.H.O. 1944, for H-20 loading except that provision is made for 100% overload in in all lanes and for 191#/sq ft of rdy for future wearing surface.

Constructions:- Iowa Highway Commission 1937 specifications, in conjunction with the following:
1. Special Provisions for painting May 13 1946.
2. Special Provisions for Construction Projects, Div. II Oct. 16 1945.

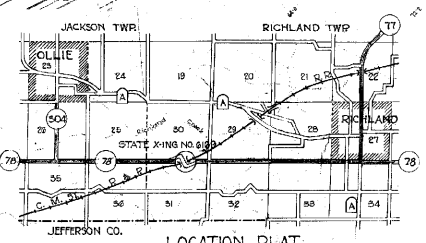
ELEVATION
Scale 1" = 20'



PLAN
Scale 1" = 20'



GENERAL PLAN
Scale: 1" = 100'



LOCATION PLAT

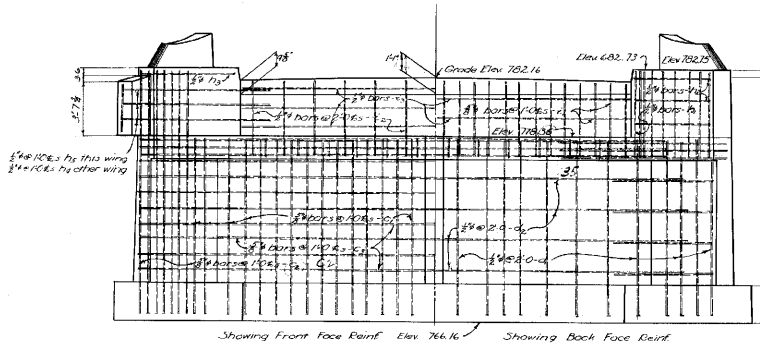
ESTIMATED QUANTITIES				
		Sub-str	Super str	Total
Concrete	c.y.	~~572.7~~ 572.7	237.5	~~572.7~~ 571.7
Rein steel	lbs	~~80820~~ 80820	51663	~~79956~~ 80820
Structural Steel	lbs	~~307150~~ 307150		~~307150~~ 307,150
Creo. Piling	L.F.	1668.35'		~~5310~~ 5071
Excavation	Cu.Yd.	744		744
Excavation	C.U.Yd.			120
Removal of old crossing				lump sum
6" Storm sewer	L.F.			42

* For berm in front of N.E. Wing

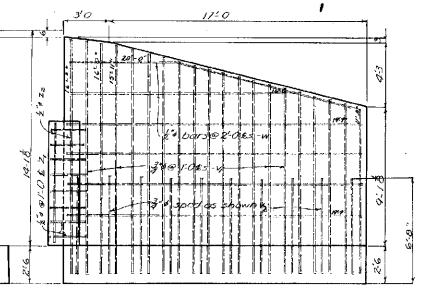
DESIGN FOR
292' x 26' MULTIPLE SPAN OVERHEAD CROSSING
2-64' & 2-82' CONTINUOUS I-BEAM SPANS
AT INTERSECTION OF
C.M.ST.P. & P. R.R. AND IOWA PRIM. NO. 78
GENERAL PLAN
STATION 463+26.83 PROJECT NO. F-830 (1)
KEOKUK COUNTY
IOWA STATE HIGHWAY COMMISSION
IOWA CROSSING NO. 6169

Jan. 31, 1947 Sheet 1 of 7 Scales as shown

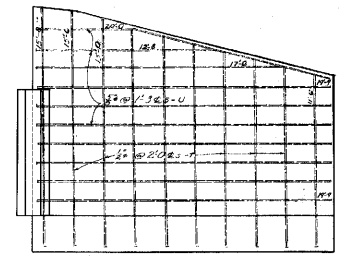
Bench Mark No 43 Sta 459+90 RR Spike in S Root of 48" Elm 19' Rt Elev 713.08

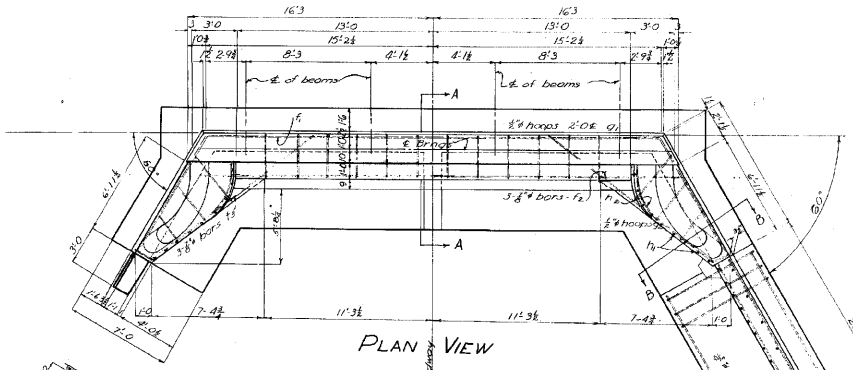


REAR ELEVATION
With Wing Removed

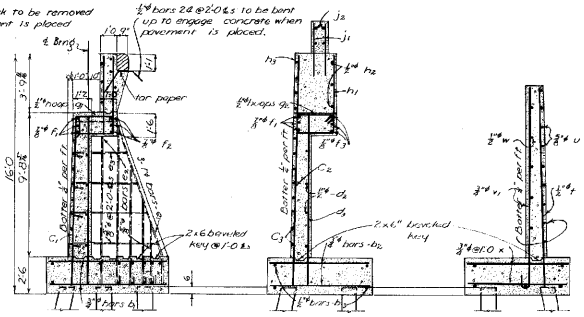


ELEVATION OF WING

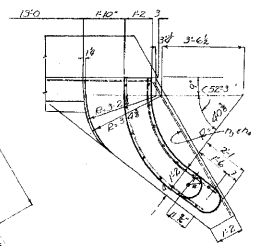


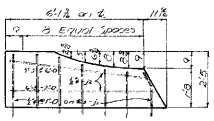


PLAN VIEW

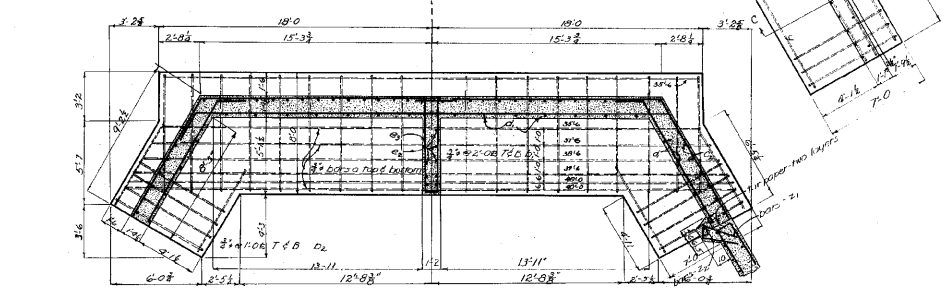


SECT. A-A SECT. B-B SECT. C-C

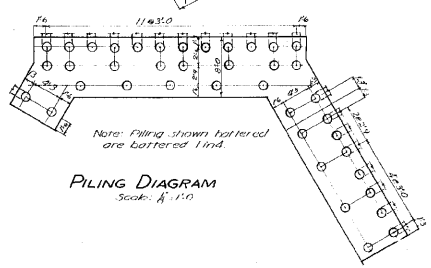




WING POST DETAIL
Scale: ½" = 1'0



FOOTING PLAN



Note: Piling shown battered are battered 1 in 4.

PILING DIAGRAM
Scale: ½" = 1'0

BILL OF REINFORCING

Mark	Location	Size	Numb	Length	Shape	Weight
a_1	Main Rfg Lngth T&B	⅝"φ	14	Var		400
b_1	" " Trans " "	⅝"φ	36	7'-9		419
b_2	Wing " " " "	⅝"φ	16	6'-9		162
b_3	" " Lngth " "	⅝"φ	8	7'-0		37
c_1	Breast Wall F.F.V.	⅝"φ	30	11'-10		370
c_2	Wing Walls F.F.V.	⅝"φ	14	16'-2		236
c_3	Breast " F.F.H.	⅝"φ	16	25'-0		417
d_1	" " B.F.V.	⅝"φ	22	11'-10		174
d_2	" " B.F.H.	⅝"φ	4	38'-6		92
d_3	Wing Wall "	⅝"φ	8	11'-0		59
e_1	Counterft Tension Bars	1"φ	3	15'-0		120
e_2	" Vertical "	⅝"φ	10	Var.		69
e_3	" Horizontal "	⅝"φ	4	Var.		46
f_1	Bridge Seat Lngth F.F.	⅝"φ	6	25'-6		312
f_2	" " " B.F.	⅝"φ	3	32'-6		199
f_3	" " " "	⅝"φ	6	14'-0	✓	172
g_1	" " Hoops	⅝"φ	12	7'-9		63
g_2	" " "	⅝"φ	6	Var.		44
h_1	Wing Post Base B.F.V.	⅝"φ	18	6'-3		75
h_2	" " B.F.H.	⅝"φ	6	8'-9		35
h_3	" " " F.F.H.T.	⅝"φ	2	9'-9		13
h_4	" " " " B	⅝"φ	3	12'-0		23
h_5		⅝"φ	3	15'-0		29
h_6	N. Wing Overhang V	⅝"φ	2	3'-4		4
h_7	" " " H	⅝"φ	3	4'-9		10
i_1	Backwall B.F.V.	⅝"φ	26	5'-6		149
i_2	" F.F.V.	⅝"φ	13	8'-10		42
i_3	" Hor. BF & FFH	⅝"φ	5	25'-8		86
j_1	Wing Post B.F.& F.F.V	⅝"φ	28	8'-0		75
j_2	" " " " H	⅝"φ	8	Var		33
k	Pavement anchors	⅝"φ	13	4'-0		35
r	Special Wing F.F.V.	⅝"φ	10	Var.		91
u	" " F.F.H.	⅝"φ	10	Var.		196
v_1	" " B.F.V.	⅝"φ	20	Var.		427
v_2	" " "	⅝"φ	10	7'-0		105
w	" " B.F.H.	⅝"φ	6	Var.		77
x	" " Rfg Trans T&B	⅝"φ	40	6'-9		406
y	" " " Lngth " "	⅝"φ	5	19'-9		66
z_1	Wing Lock H.	⅝"φ	8	5'-6		29
z_2	" " V.	⅝"φ	2	8'-0		10

ESTIMATED QUANTITIES		
	Reinforcing Steel-Lbs.	5427
	Concrete C.Y.	95.1
	Creosoted Piling 40@35	1400 LF
	Excavation C.Y.	158

Design for
292' x 26' OVERHEAD CROSSING
2-64' & 2-82' Continuous I-Beam Spans
At Intersection of
C.M. St. P. & P. RR. & Iowa Prim No. 78

WEST ABUTMENT DETAILS

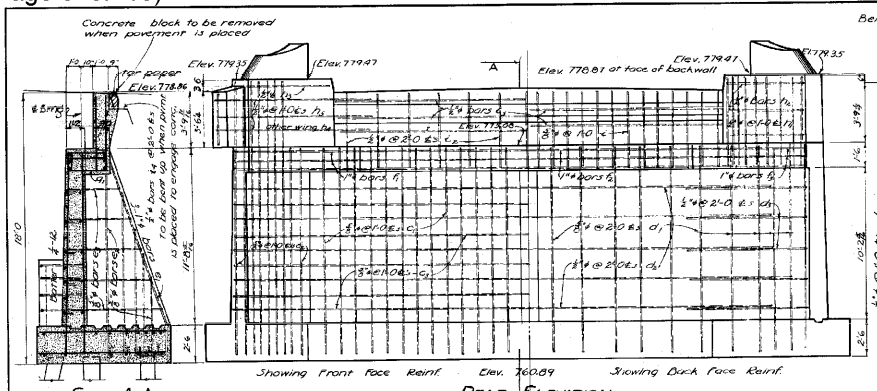
Sta. 463+26.83 Project No. F-930 (1)

KEOKUK COUNTY
Iowa Highway Commission
Iowa Crossing No. 6169

Jan. 1947 Sheet 2 of 7 Scales as noted

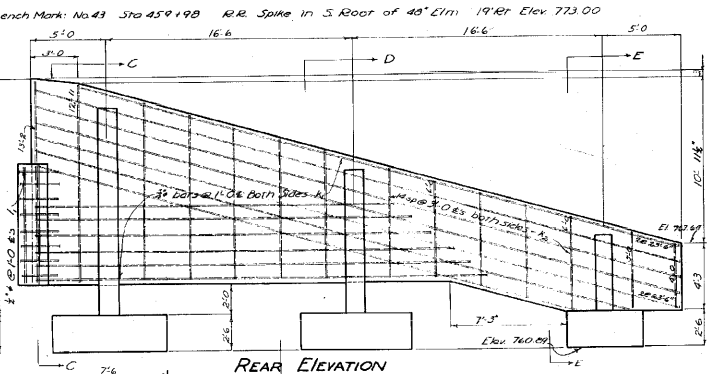
Location
Sec. 13-30-31
Richland Twp.
Keokuk Co.
Over C.M. St. P. & P. RR.

Design # 146 Keokuk County File # 13457

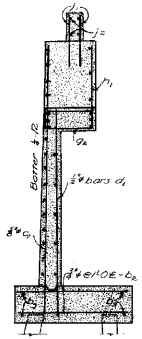


SECT. A-A

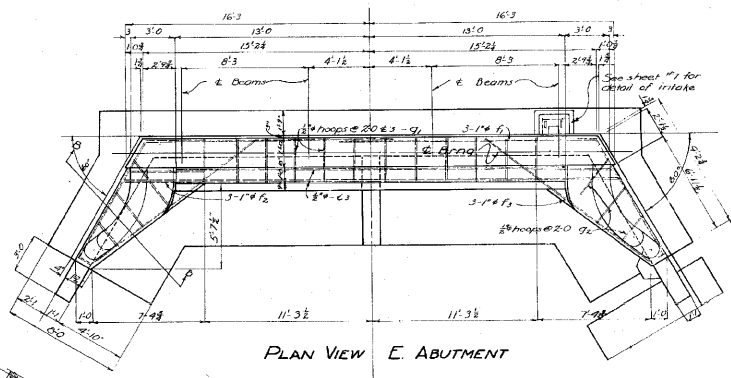
REAR ELEVATION



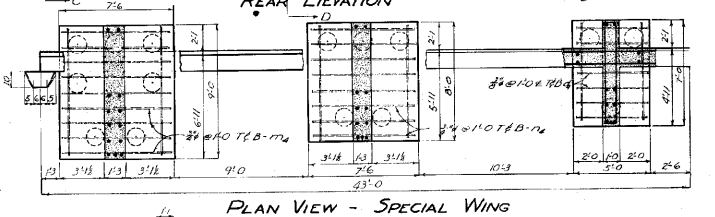
REAR ELEVATION



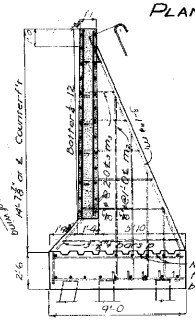
SECT. B-B



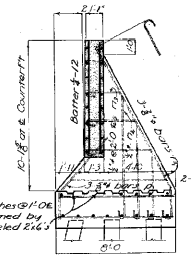
PLAN VIEW E. ABUTMENT



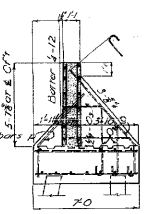
PLAN VIEW - SPECIAL WING



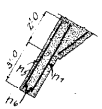
SECT. C-C

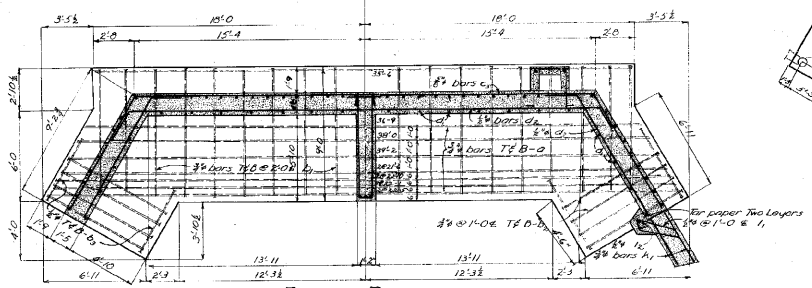


SECT. D-D

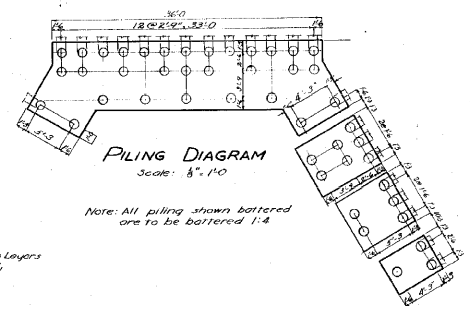


SECT. E-E





FOOTING PLAN



PILING DIAGRAM

Scale: 1/8" = 1'-0

Note: All piling shown battered are to be battered 1:4

Location:
Sect. 30-31
Richland Twp.
Keokuk County
Over C.M.St.P.&P.R.R.

BILL OF REINFORCING

Mark	Location	Size	Numb.	Length	Shape	Weight
a	Main Footing Longt. T&B	3/4"	24	Var.		408
b_1	" " Trans. " "	3/4"	36	8'-9		475
b_2	" " " " "	3/4"	16	7'-9		186
b_3	" " Longt. " "	3/4"	8	7'-0		37
c_1	Breastwall F.F.V.	3/4"	30	13'-10		433
c_2	Wingwall F.F.V.	3/4"	16	18'-1		302
c_3	Breastwall F.F.H.	3/4"	18	25'-3		474
d_1	" B.F.V.	3/4"	22	13'-10		317
d_2	" B.F.H.	3/4"	5	35'-6		185
d_3	Wingwall B.F.H.	3/4"	10	11'-0		115
e_1	Counterfort Tension	1"	3	17'-6		140
e_2	" Vert.	3/4"	10	18'-3 A Var.		110
e_3	" Hor.	3/4"	5	10'-0 A Var.		57
f_1	Bridge Seat Longt. F.F.	1"	6	25'-6		408
f_2	" " " "	1"	3	32'-6		258
f_3	" " " "	1"	6	14'-0		272
g_1	" " Hoops	5/8"	12	7'-9		63
g_2	" " "	5/8"	6	Var.		44
h_1	Wing Post Base B.F.V.	5/8"	16	6'-3		75
h_2	" " " " " H	5/8"	6	8'-6		32
h_3	" " " F.F.H.T.	5/8"	2	9'-9		13
h_4	" " " " B	5/8"	3	12'-0		24
h_5	" " " "	5/8"	3	15'-0		29
h_6	S. Wing overhang V	5/8"	2	3'-4		4
h_7	" " " H	5/8"	3	4'-9		10
i_1	Backwall B.F.V.	5/8"	26	5'-6		149
i_2	" F.F.V.	5/8"	13	4'-10		42
i_3	" B.F.& F.F.H.	5/8"	5	25'-8		86
j_1	Wing Post " " V.	5/8"	28	4'-0		75
j_2	" " " " H.	5/8"	8	Var.		33
j_3	Pavement Anchors	5/8"	13	4'-0		35
k_1	Special Wing Wall H.	3/4"	26	Var.		1473
k_2	" " " V.	5/8"	28	Var.		154
l_1	Wing Locks H.	5/8"	8	5'-6		29
l_2	" " V.	5/8"	2	7'-9		10
m_1	High Cft. Tension	1"	3	19'-4		154
m_2	" " Vert.	3/4"	8	Var.		79
m_3	" " Hor.	3/4"	6	10'-0 A Var.		53
m_4	" " Footing Trans. T&B	3/4"	15	7'-3		163
m_5	" " " Longt. "	5/8"	6	8'-9		23
n_1	Intermed. Cft. Tension	5/8"	3	14'-8 A Var.		90
n_2	" " V	3/4"	6	Var.		46
n_3	" " H	5/8"	4	Var.		31
n_4	" " Ftg. Trans. T&B	3/4"	13	7'-3		141
n_5	" " Longt. "	5/8"	6	7'-9		31
o_1	Small Cft. Tension	5/8"	3	9'-8		30
o_2	Small Cft. V	5/8"	4	Var.		12
o_3	" " H	5/8"	3	10'-5 A Var.		13
o_4	" " Ftg. Trans. T&B	3/4"	11	4'-9		54
o_5	" " Longt. "	5/8"	4	6'-9		18
p	All Counterfts.	5/8"	8	7'-0		59
	Storm Sewers Intake	See sheet 7				37

ESTIMATED QUANTITIES	
Reinforcing Steel	7674 Lbs
Concrete	115.8 CY
Creosoted Piling 46@35'=1610 L.F.	
Excavation C.I.	157 CY

Note: For details of wing posts see details of West Abutment on sheet 2.

Design for

292'x26' OVERHEAD CROSSING

2-64' & 2-82' CONTINUOUS I-BEAM SPANS

At Intersection of

C.M. ST. P. & P. R.R. & IOWA. PRIM. No. 378

EAST ABUTMENT DETAILS

Station 463+26.83 Project F-930(1)

KEOKUK COUNTY

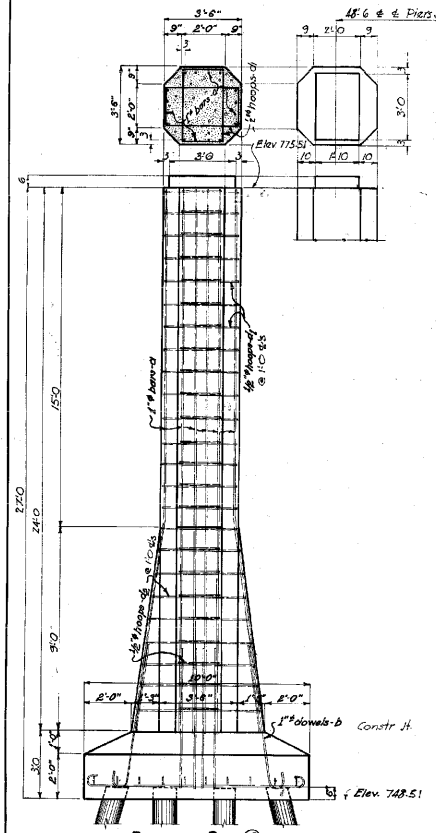
Iowa Highway Commission

Iowa Crossing No. 6169

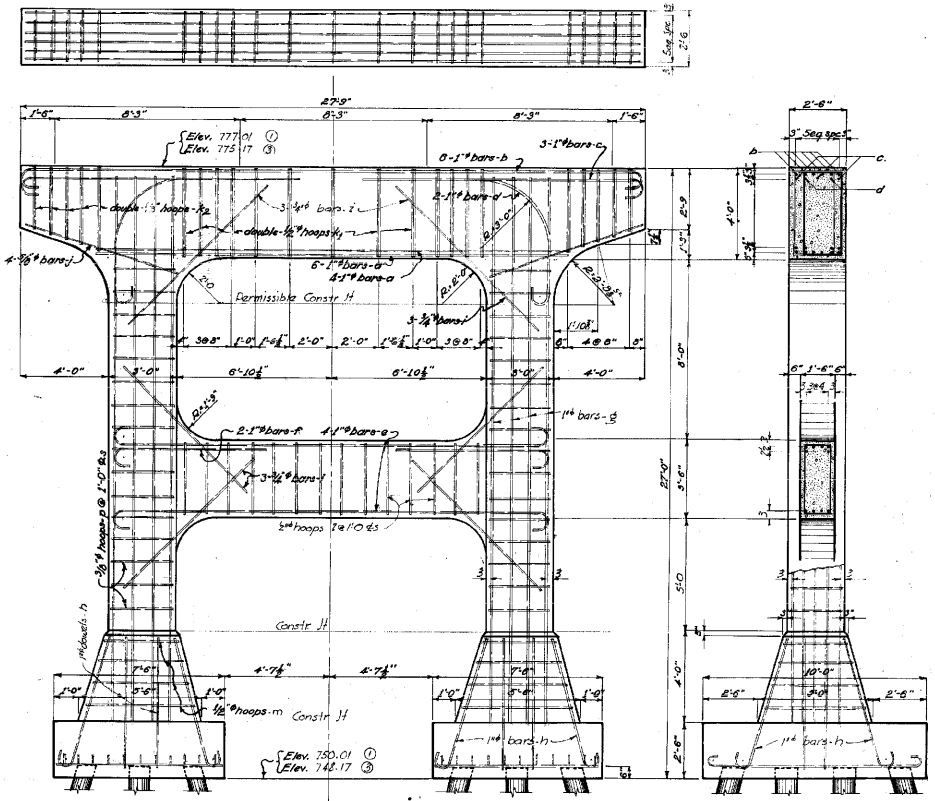
Jan 1987 Sheet 3 of 7 Scales as noted

Design # 146 Keokuk County File # 13457

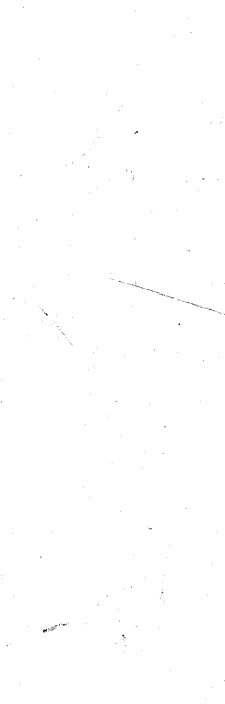
Bench Mark #43: Sta. 453+98 R.R. Spk. in S. Root of 4.0" Elm. 19' Rt. Elev. 773.08



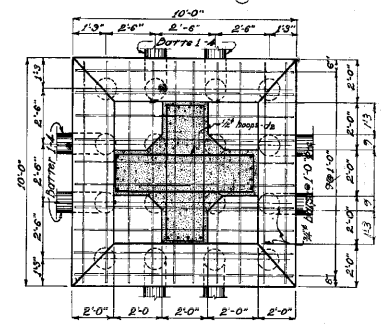
ELEVATION PIER ②



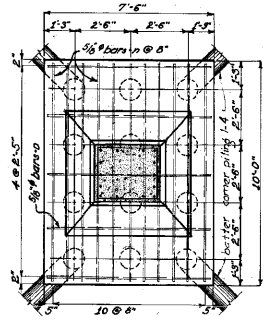
ELEVATION PIER ① & ③



SECTION ON ℄



FOOTING PLAN



FOOTING PLAN

General Notes:

All concrete to be Class A. All exposed corners 90° or sharper to be filleted with ¾" beveled strips.

All reinforcing to be securely tied in place before concrete is placed.

All piling to be driven to full 18 Ton bearing.

Construction to be in accordance with the 1937 specifications of the Iowa Highway Comm. in conjunction with special provisions listed on sheet 1.

BILL OF REINFORCING STEEL

Mark	Location	Size	No.	Length	Shape	Weight
	PIERS ① & ③ (TWO PIERS)					
a	Beam Lngtl. Bottom	1" ø	20	20:0	—	1068
b	" " Top	1" ø	12	29:5	⟷	941
c	" " "	1" ø	12	13:6	→	432
d	" " "	1" ø	8	11:0	⊃	235
e	Strut Lngtl.	1" ø	16	21:5	⟷	914
f	" "	1" ø	8	7:9	→	165
g	Columns Vertical	1" ø	56	24:4	—	3634
h	Pedestals "	1" ø	48	6:9	—	864
i	Beam & Strut Fillets	⅜" ø	36	8:6	—	460
j	Cantilever Bottom	5/8" ø	16	7:0	—	117
h_1	Beam Hoops	1/2" ø	52	11:3	▭	390
h_2	Cantilever "	1/2" ø	48	10:0	▭	264
l	Strut "	1/2" ø	28	9:0	▭	168
m	Pedestal "	1/2" ø	16	16:0	▭	171
n	Footing Lngtl.	5/8" ø	44	16:11	⟷	505
o	" Transv.	5/8" ø	20	7:3	—	151
p	Column Hoops	3/8" ø	64	16:0	▭	241
						10720
	PIERS ② (TWO PIERS)					
a	Shaft Vertical	1" ø	32	23:10	—	2030
b	Footing Dowels	1" ø	32	12:6	⟷	1067
c	Footing Horiz.	3/4" ø	40	11:3	⟷	675
d_1	Shaft Hoops	1/2" ø	60	10:0	▭	400
d_2	" "	1/2" ø	36	12:6	▭	300
						4472

ESTIMATED QUANTITIES

Part	Piers ①&③	Pier ②	Total
Concrete	81.8 c.y.	42.5	124.3 c.y.
Reinf. Steel	10720 lbs	4472 lbs	15192 lbs
Creo. Piling	48 @ 35'	32 @ 35	2800 LF
Excav. Cl. I	304 c.y.	125 c.y.	429 c.y.
Excav. Cl. II			

Location:
Sections: 30-31
Richland Twp.
Keokuk Co.
Over C.M. St. P. & P. R.R.

Design For

292'x26' OVERHEAD CROSSING

264'-2-32' CONTINUOUS I-BEAM SPANS

INTERSECTION

C.M. ST. P. & P. R.R. AND IOWA PRIM. No. 378

SUBSTRUCTURE DETAILS

Station 453+26.06 Project No. F930 (1)

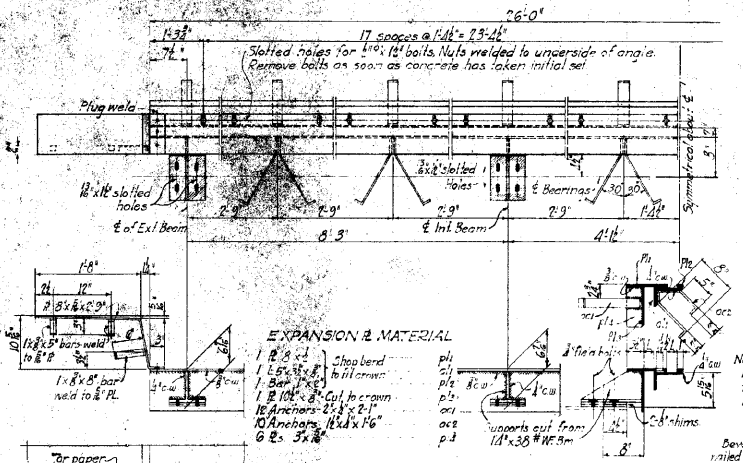
KEOKUK COUNTY

Iowa Highway Commission

IOWA CROSSING No. 6169

Sheet 4 of 7 Scale ⅜"=1'-0"

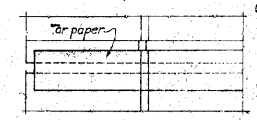
Design No. 146 Keokuk Co. File No. 13457

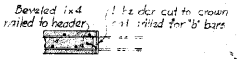


EXPANSION ∠ MATERIAL

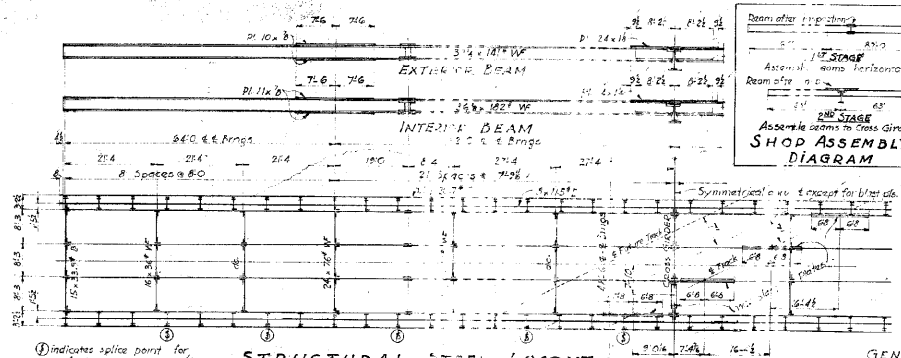
1	∠ 8 x 8 x 1	Shop bend to fit crown
1	∠ 6 x 3½ x ⅜	
1	Bar 1" x 6"	
1	∠ 10½" x 8" Cut to crown	
18	Anchors 2½" x ⅜" x 2½"	
10	Anchors 1½" x ¼" x 1½"	
6	∠ 3" x ⅜"	

EXPANSION PLATE DETAIL
Scale 1" = 1'-0"



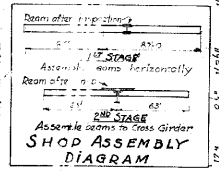


DETAIL OF FLOOR CONSTRUCTION JOINT

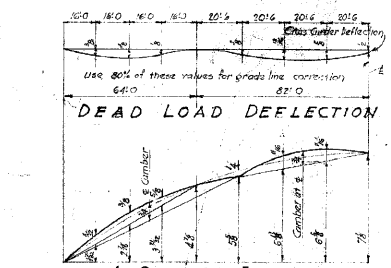


Ⓢ indicates splice point for rail fascia & curb channels

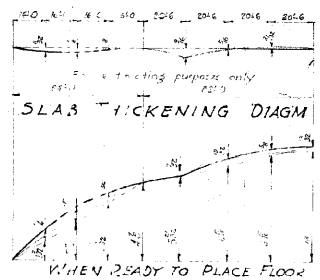
STRUCTURAL STEEL LAYOUT
Scale 1" = 1'-0"



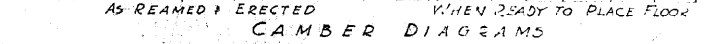
SHOP ASSEMBLY DIAGRAM



DEAD LOAD DEFLECTION

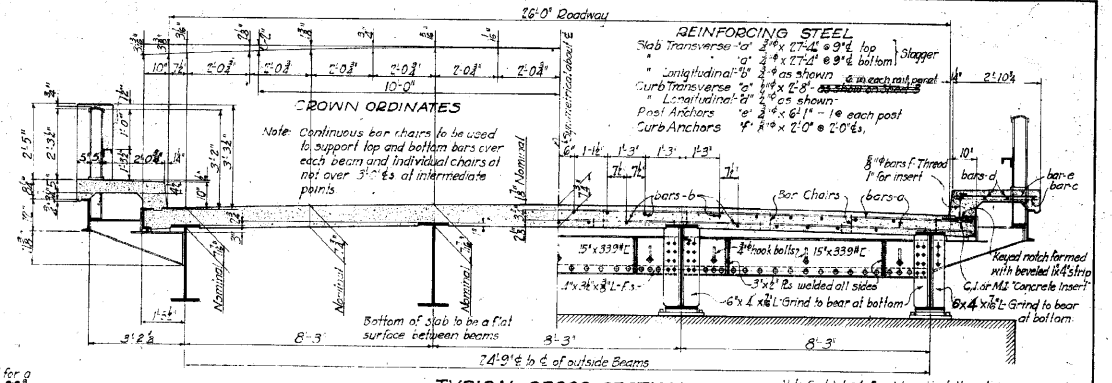


SLAB THICKENING DIAGM



AS REAMED & ERECTED — WHEN READY TO PLACE FLOOR

CAMBER DIAGRAMS

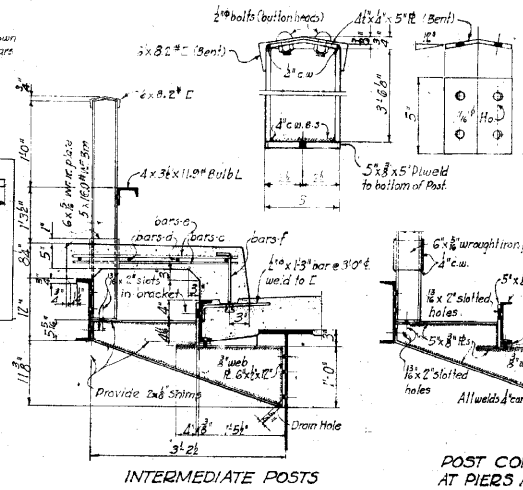


REINFORCING STEEL

Slab Transverse "a"	¾" x 27'-4" @ 9" ℄ top	Stagger
" " "a"	¾" x 27'-4" @ 9" ℄ bottom	
" Longitudinal "b"	¾" @ as shown	@ in each rail panel
Curb Transverse "c"	½" x 2'-8"	
" Longitudinal "d"	½" @ as shown	
Post Anchors	"e" ½" x 6'-1" – 1 @ each post	
Curb Anchors	"f" ½" x 2'-0" @ 2'-0" ℄s.	

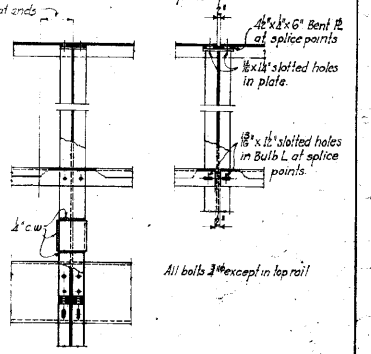
TYPICAL CROSS SECTION
Scale 1" = 1'-0"

Note Contractor to furnish and install, as shown, approved - Cast or Malleable Iron, concrete inserts, 2½" in length. Cost of inserts to be included in price bid for Reinforcing Steel. 294 inserts required.



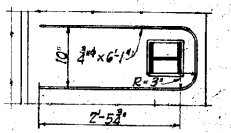
INTERMEDIATE POSTS

POST CONNECTION AT PIERS AND ABUTS.



POST AND RAIL CONN.

RAIL, RAIL POST & BRACKET DETAILS
Scale 1" = 1'-0"



DETAIL OF BARS "e"

GENERAL NOTES

This bridge is designed for H20 loading under the std. specifications (1944) of the A.A.S.H.O. except that provisions made for full 100% overload in all lanes, and for 18# per sq. ft. of roadway for future wearing surface.

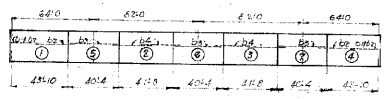
All field connections to be riveted except rail, rail post and fascia and curb channels, and expan pls. which are bolted.

All rivets and bolts to be ¾" except as shown otherwise.

Bottom flanges of beams to be truly perpendicular to webs at bring., and curved soleplts to have full line bearing on masonry bds.

All beam splices to be sub punched and reamed assembled. Shop assembly to be in two stages as shown above. Reaming to each case to be done after inspection.

Longitudinal slab is to be pinned in section, and in order indicated below. Curbs may be placed continuously.

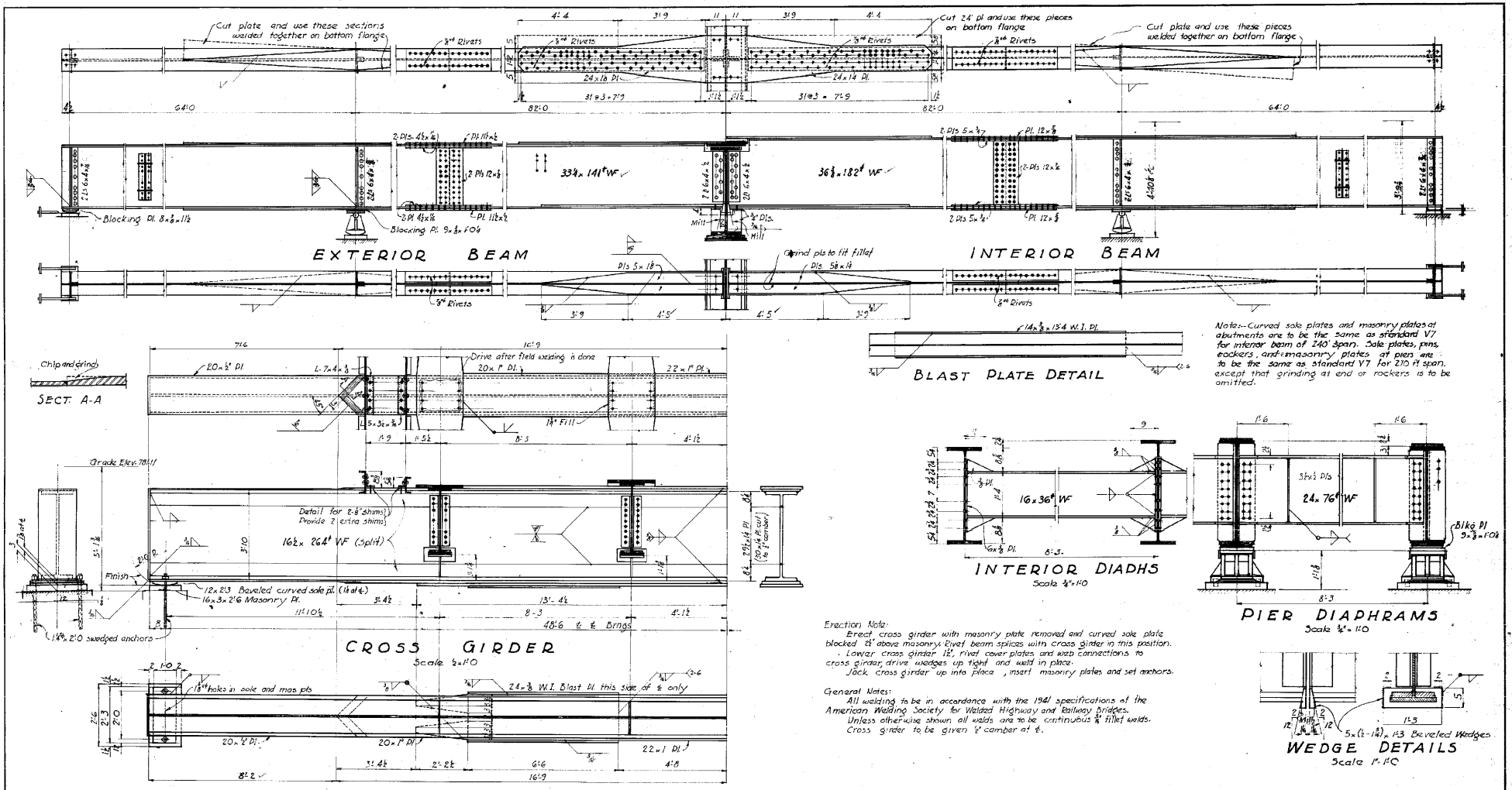


SUPERSTR REINFORCING							
Mark	Location	Nmbr	Size	Length	Shape	Weight
a	Slab Transverse	779	¾"	27'-4		31280
b1	Slab Longtl Top ④ ①	36	1	26'-6		1433
b2	" " Top 8 (1)(4)	96		34'-11		3588
b3	" " " 5(4)(7)	99		40'-0		5948
b4	" " " 2(3)	132		24'-10		4924
c	Curb Transv	444	½"	2'-8		789
d	Curb Longtl	80	½"	30'-10		1644
e	Curb Post Anchor	76	½"	6'-1		694
f	Curb Anchors	294	½"	2'-0		613
g	End diaphs	6	⅜"	8'-1		50
	Total					51663

Location
Sects. 30-31
Richland Twp
Keokuk Co.
Over CM & St P. R.R

Design For
292 x 26 OVERHEAD CROSSING
2-64' & 2-82' CONTINUOUS 1 BEAM SPANS
AT INTERSECTION
C.M. St. P. & P. R.R. AND IOWA PRIMARY No. 78
SUPERSTR DETAILS
Station 463+26.83 Project No F-930 (1)
KEOKUK COUNTY
Iowa Highway Commission
IOWA CROSSING No. 6169
Jan 1947 Sheet 5 of 7 Scales as shown

Design 146 Keokuk File 13457



Erection Note:
Erect cross girder with masonry plate removed and curved sole plate blocked 2½" above masonry. Rivet beam splices with cross girder in this position.
Lower cross girder 1½", rivet cover plates and web connections to cross girder, drive wedges up tight and weld in place.
Jack cross girder up into place, insert masonry plates and set anchors.

General Notes:
All welding to be in accordance with the 1941 specifications of the American Welding Society for Welded Highway and Railway Bridges.
Unless otherwise shown all welds are to be continuous ⅜" fillet welds.
Cross girder to be given ½" camber at ℄.

MOMENT AND REACTION TABLE

Stress / Load	Unit Loads Ext. Bm	Unit Loads Int. Bm	Neg. Mom. 1st Pier Ext. Bm	Neg. Mom. 1st Pier Int. Bm	Neg. Mom. 2nd Pier Ext. Bm	Neg. Mom. 2nd Pier Int. Bm	Pos. Mom. 1st Span Ext. Bm	Pos. Mom. 1st Span Int. Bm	Pos. Mom. 2nd Span Ext. Bm	Pos. Mom. 2nd Span Int. Bm	Reaction Abut Ext. Bm	Reaction Abut Int. Bm	Reaction 1st Pier Ext. Bm	Reaction 1st Pier Int. Bm	Reaction 2nd Pier Ext. Bm	Reaction 2nd Pier Int. Bm	Cross Girder Mom.	Cross Girder Shear
Dead Load	1129	1155	659.2	674.3	698.0	714.0	295.0	302.0	264.7	270.8	24.0	24.7	97.2	94.3	95.3	95.4	3204.0	203.6
Live Load (uniform)	304	528	179.7	331.3	219.6	365.7	132.7	230.5	152.9	265.5	9.1	15.8	25.8	44.8	28.0	48.6	1127.5	66.1
Live Load (concentr.)	*8550	*14850	112.2	195.3	117.8	204.6	114.2	198.2	118.3	205.8	12.3	21.4	12.4	21.4	12.4	21.4	346.5	29.2
Live Load Impact	26.2%	26.2%	80.2	139.5	87.0	151.0	65.4	113.4	71.8	124.7	5.6	7.8	10.1	17.5	10.7	18.5	442.0	28.5
Total			1047.5	1540.4	1113.4	1435.3	607.3	844.1	607.7	866.8	33.0	71.7	140.5	178.0	146.4	183.9	5120.0	27.3
with overload						1437.6	613.0	924.2	633.8	975.2								
Sect. Mod. Reqd.			694.8	893.6	742.3	958.4	408.7	616.1	422.6	650.1							341.30	

* Increase 44.3% for shear stresses and reactions.

SUPERSTRUCTURE QUANTITIES		
Concrete	237.5	c.y.
Structural Steel	306,220	lbs.
Reinforcing Steel	51,663	lbs.

Location
Sects 30-31,
Richland Twp
Keokuk County
Over C.M.St.P.&P. R.R.

Design For
292'-26' OVERHEAD CROSSING
2-64' & 2-82' CONTINUOUS I-BEAM SPANS
INTERSECTION OF
C.M.ST.P.&P.R.R. & IOWA PRIM. No. 3
SUPERSTRUCTURE DETAILS
Station 463 + 26.83 Project No. F 930(1)
KEOKUK COUNTY
Iowa Highway Commission
IOWA CROSSING No. 6169
Jan 1947 Sheet 6 of 7 Scales as noted

Design 140 Keokuk File 13457