DEC 10 1957

STATE OF IOWA
STATE HIGHWAY COMMISSION
DESIGN FOR
134'-2"x20' PRE-STRESSED CONCRETE BEAM BRIDGE
SECONDARY ROAD SYSTEM PROJ. S-2766(1)

CRAWFORD COUNTY

OCTOBER 1957.

MILEAGE SUMMARY: = 136'-8 5/10 = 0.0258 MILES.

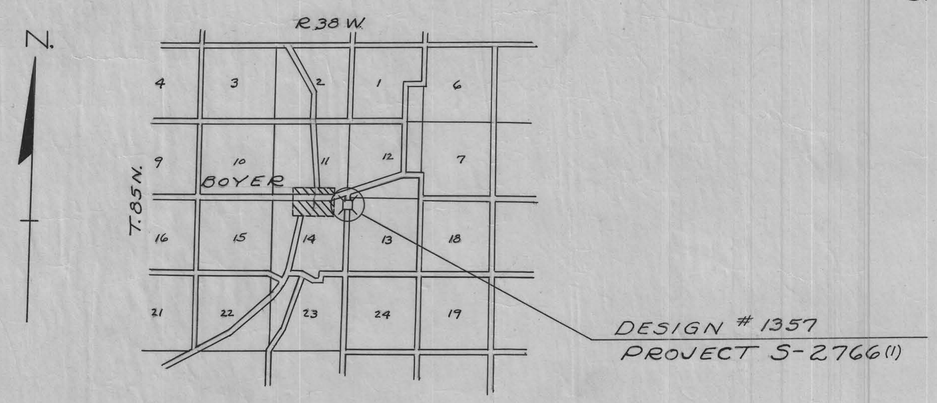
SPECIFICATIONS:
Design: A.A.S.H.O. Series of 1953.
Construction: Standard Specifications of the Iowa State Highway Commission, Series of 1956, plus current Special Provisions except as noted.

DESIGN-1357 STOCKHOLM TWP. CRAWFORD COUNTY
SEC. 13 & 14, STA. 44+81.125 OVER BOYER RIVER.

134'-2"x20' PRESTRESSED CONCRETE BEAM BRIDGE

DESCRIPTION	ABUT'S.	PIERS	SUPERSTRUCT.	TOTAL
CONCRETE Class-"C"				
" Class-"A"	42.80 C.Y.	14.18 C.Y.	~~76.60~~ ~~69.40~~ C.Y.	~~134.58~~ ~~126.38~~ C.Y.
REIN. STEEL	2216 LBS.	2568 LBS.	15,367 LBS.	20,151 LBS.
STRUCT. STEEL			2480 "	2480 "
TREATED PILING	18@55'=990'			990 L.F.
PRECAST CONC. PILING P10-B		14@45'=630'		630 "
PRE-STRESSED CONC. BEAMS.			5@55'-0" (a)	5@55'-0" (a)
" "			10@38'-4"	10@38'-4"
			272'-8½" L.F.	272'-8½" L.F.
HANDRAIL				
EXCAVATION Class "20"	40 C.Y.			40 C.Y.
" Class "10"	1110 "			1110 "
REMOVAL OF OLD STRUCTURE				LUMP SUM.

NOTE: Bridge Sign Assemblies Will be furnished & placed by Crawford County to Conform With S. & T. Instruction No. 11, revised March-1, 1956



APPROVED.

[redacted]

BOARD OF SUPERVISORS DATE

APPROVED.

1/5

[redacted]

CHIEF ENGINEER DATE
IOWA HIGHWAY COMMISSION.

DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS.
RECOMMENDED FOR APPROVAL

[redacted]

DISTRICT ENGINEER DATE

APPROVED

[redacted]

DIVISION ENGINEER. DATE

Revised 6-10-58 Superstructure Concrete Quantities Changed.

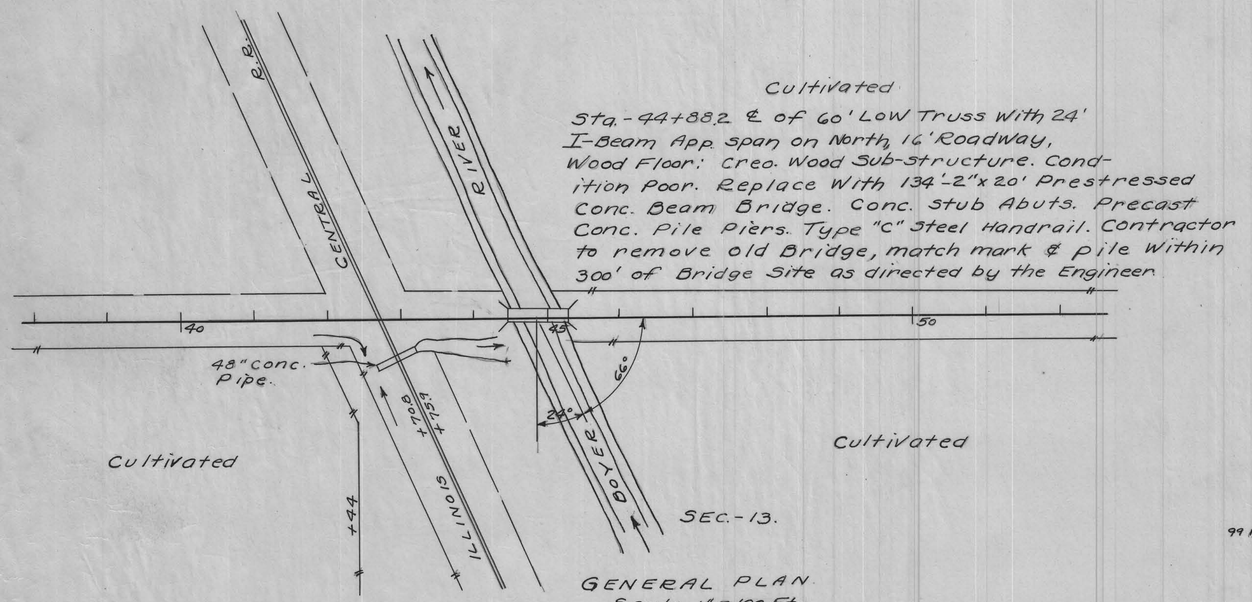
11-26-57

4+17 DEC. 16 '57

Sheet # 1 of 5

CRAWFORD COUNTY. DESIGN No.-1357 PROJ. No.-S-2766(1) 19304

STOCKHOLM TOWNSHIP
T. 85 N. R. 38 W.
SEC. - 14.

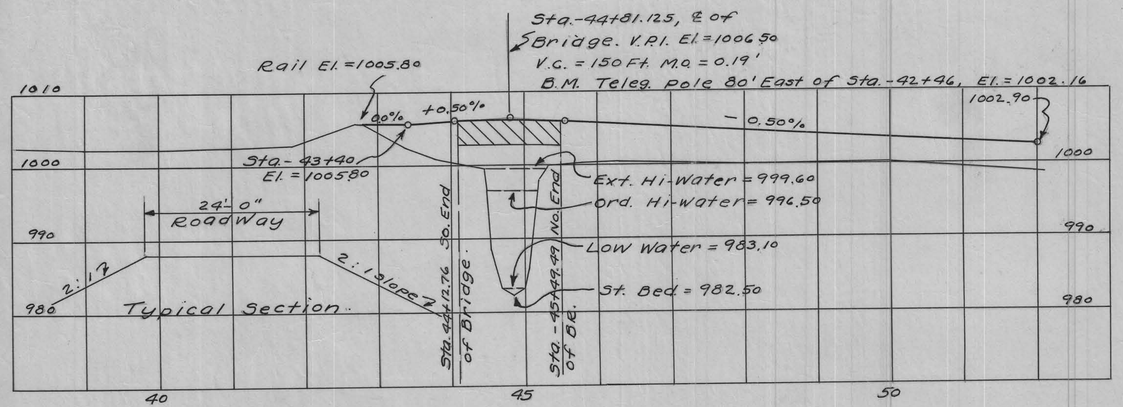


GENERAL PLAN
Scale 1" = 100 Ft.

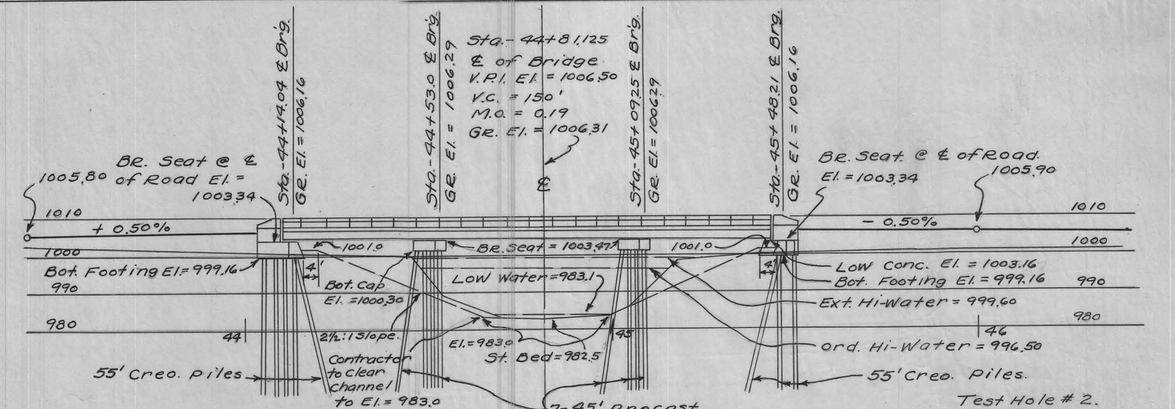
GENERAL NOTES:

All exposed corners of 90° or Sharper are to be filleted 3/4". All reinforcing bars are to be Securely Wired in place and adequately Supported on bar chairs before concrete is placed. Forms for Slab are to be Supported by the Prestressed beams. Bridge Seats of both Abutments & piers are to be Stepped as shown to provide for Crown of roadway. For details of Super-Structure refer to Sheet P C-5 & P C-5 (a). For details of Sub-Structure refer to Standard P-10, for Piers and H10-3 for Abutments. All Construction to be in accordance With the Iowa Highway Commission's Standards, Series of 1956 plus current Special Provisions as noted.

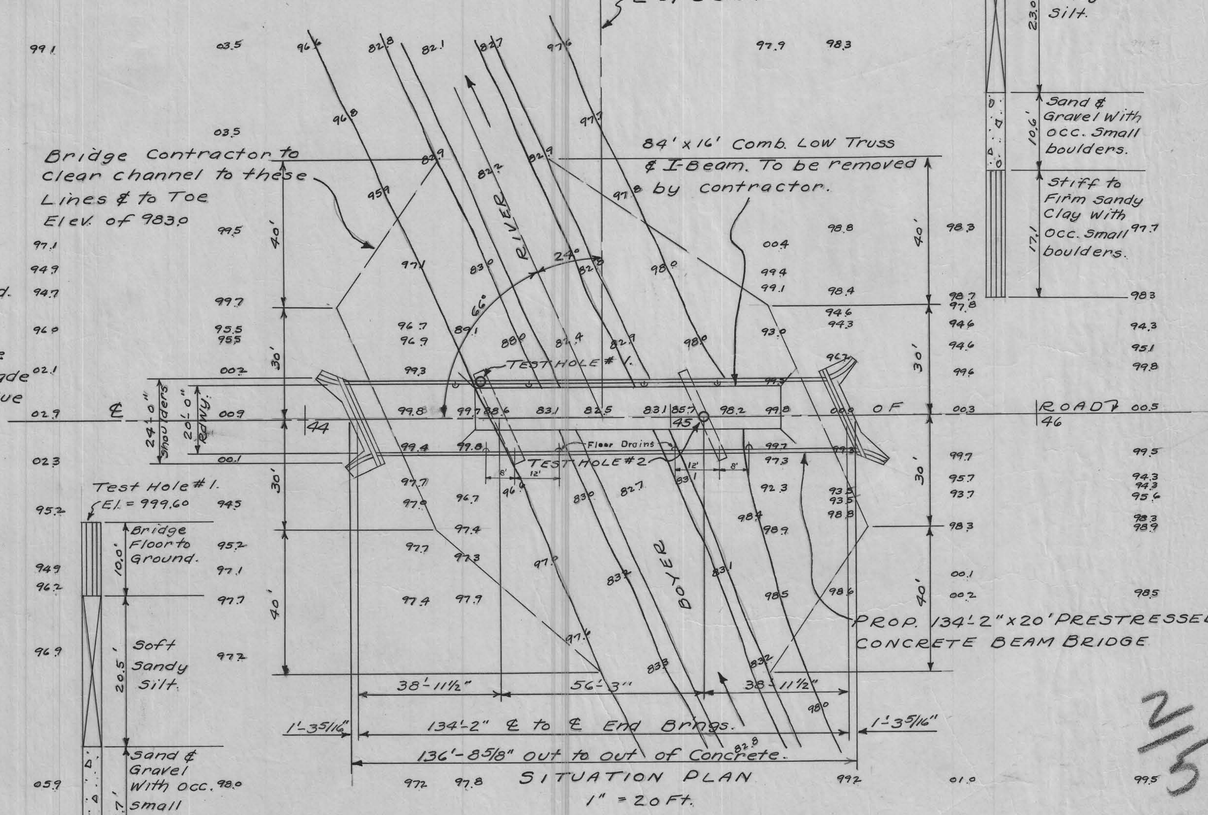
Rail is to be anchored into Conc. Wing post as Shown on Standard H10-3, The Floor Slab is to be thickened over the piers & Abutments to compensate for the Natural Camber of the Pre-Stressed beams. Shots should be taken after the beams are in place but before the Slab is poured and a New grade layed over the bridge. This Will usually revise the grade a fraction of an inch. An allowance should be made for deflection of the beams due to the Weight of the Slab (Approx 1/8" ℄ for 38'-4" beams & 9/16" ℄ for 55'-0" beams.)



ROAD PROFILE
Scale: Vert. 1" = 10 Ft.
Horiz. 1" = 100 Ft.



SECTION ALONG ℄ OF ROAD
Scale 1" = 20 Ft.

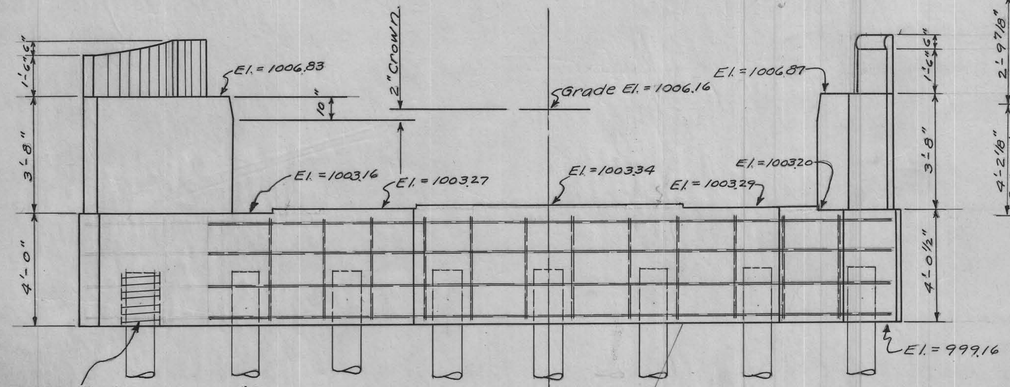


Location
Section: 13-14
Stockholm Twp.
T. 85 N. R. 38 W.

DESIGN FOR
134'-2" x 20' PRE-STRESSED CONCRETE BEAM BRIDGE
CONCRETE FLOOR - STEEL HANDRAIL TYPE "C"
STA. - 44+81.125 PROJECT No. S-2766(1)
CRAWFORD COUNTY, IOWA.

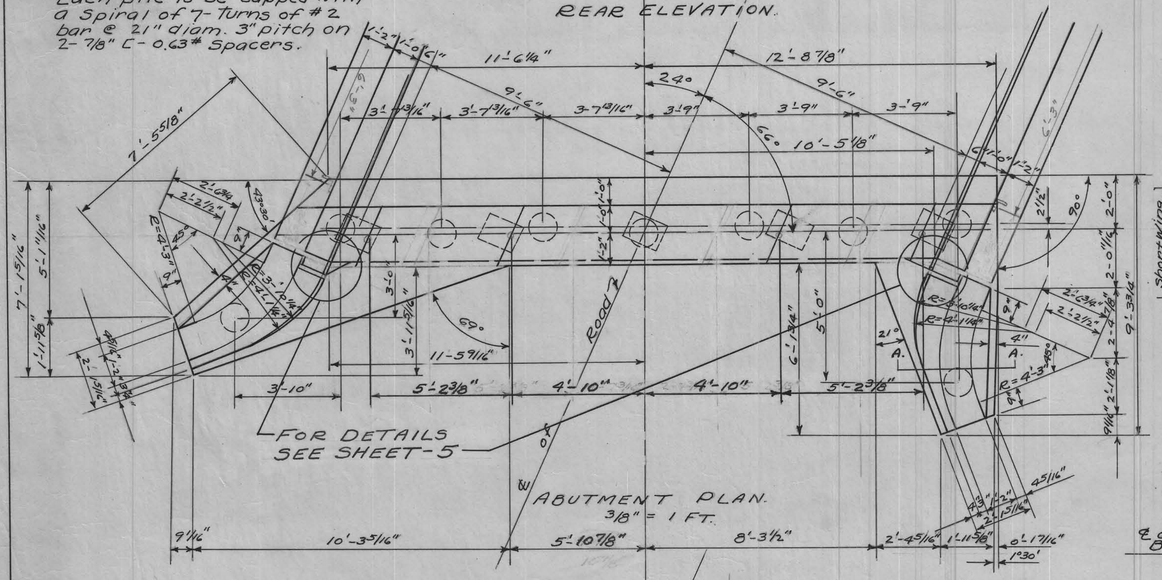
Sheet #2 of 5

CRAWFORD COUNTY DESIGN No. 1357 PROJECT # S-2766(1)

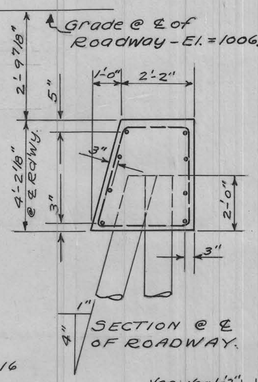


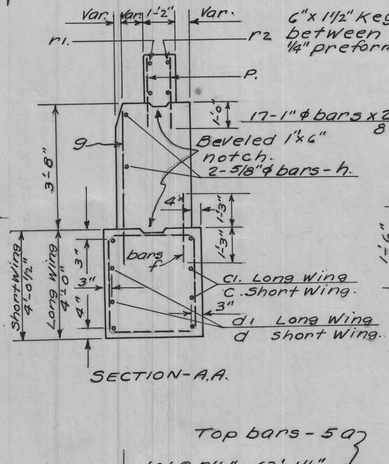
REAR ELEVATION.

Each pile to be capped with a Spiral of 7- Turns of #2 bar @ 21" diam. 3" pitch on 2- 7/8" C- 0.63# Spacers.



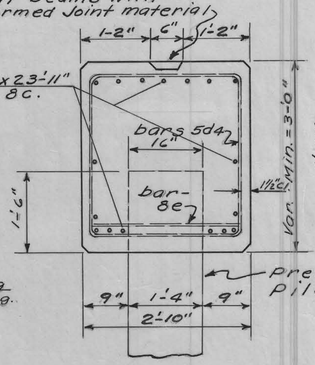
ABUTMENT PLAN.
3/8" = 1 FT.



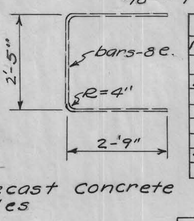


SECTION-A.A.

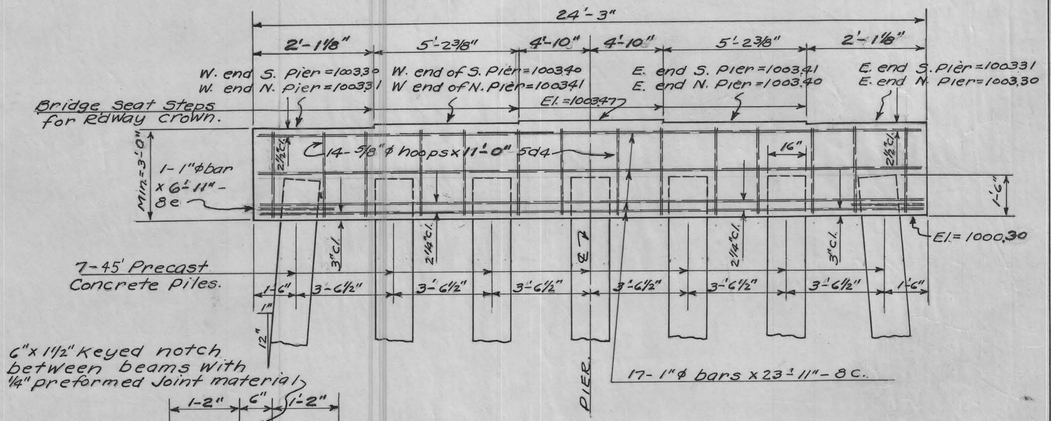
6"x1½" Keyed notch between Beams with ½" preformed Joint material



END ELEVATION OF PIER

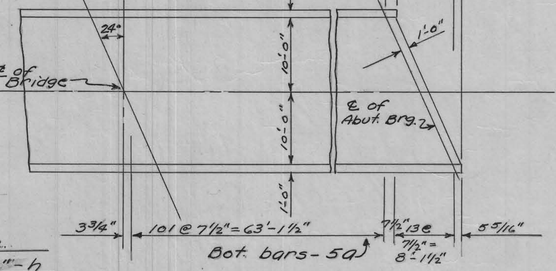


PIER ELEVATION
3/8" = 1 Ft.

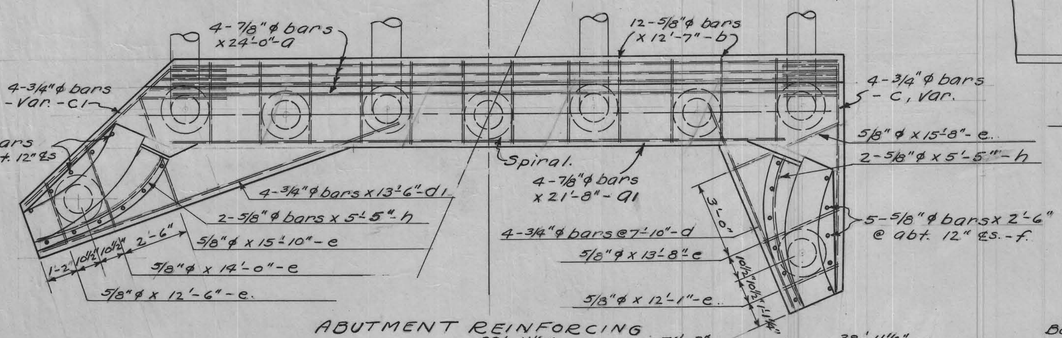


QUANTITIES - ONE PIER.						
Mark.	Location	Shape	Size	Length	No.	Lbs.
8c.	Cap. Long'l.	——	1"ϕ	23'-11"	17	1086
5d4	" hoops	□	5/8"ϕ	11'-0"	14	161
8e	" ends.	⊏	1"ϕ	6'-11"	2	37
	Total Rein. Steel.			=		1284 Lbs.
7-45' Precast Concrete Piles				=		315 L.Ft.
Class "A" Concrete				=		7.09 C.Y.

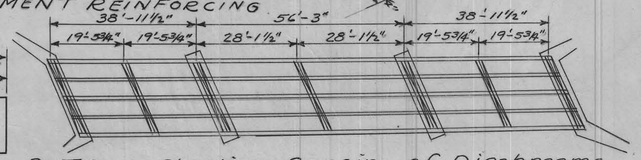
QUANTITIES-ONE ABUTMENT.						
Mark	Location	Shape	Size	Length	No.	Lbs.
a.	Br. seat Lg.	——	7/8"ϕ	24'-0"	4	196
a1	" " "	——	"	21'-8"	4	177
b	" " Hoops	□	5/8"ϕ	12'-7"	12	157
c	Wing fits F.F.	⌐	3/4"ϕ	Var	4	58
c1	" " "	/	"	"	4	54
d	" " B.F.	——	"	7'-10"	4	47
d1	" " "	——	"	13'-6"	4	81
e	" " Hoops	□	5/8"ϕ	Var.	6	87
f	Wing down F.F.	——	"	2'-6"	10	26
g	" Vert. B.F.	——	"	4'-9"	12	59
h	" Hor. B.F.	——	"	5'-5"	4	24
p	" post Vert.	——	1/2"ϕ	2'-4"	24	37
p1	" " Hor. 13.	—	"	5'-4"	4	14
p2	" " " 0.3.	—	"	4'-8"	4	12
W	Pile Spiral	⌀	1/4"ϕ	38'-6"	9	58
x	Spiral Spac.	——	7/8"C	1'-10"	18	21
	Total Rein. Steel			=		1108 Lbs.
9-55' Treated Wood Piles				=		495 L.Ft.
2- Wing Posts Class-"A" Conc.				=		0.80 C.Y.
2- post Bases.			"	"	=	0.10 C.Y.
First Pour			"	"A"	=	16.50 C.Y.



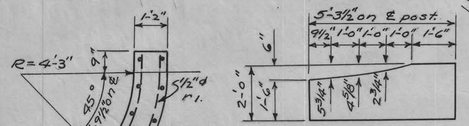
TRANSVERSE BAR LAYOUT.



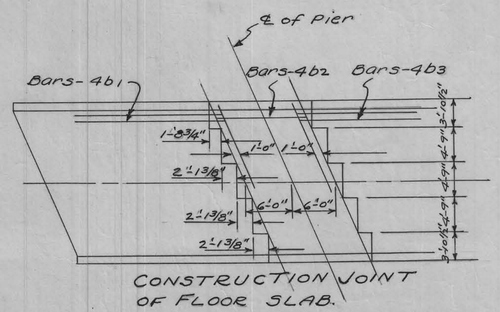
ABUTMENT REINFORCING



DETAIL: Showing Spacing of Diaphragms. Diaphragms are to be Skewed as Shown, ~~Using Two Coil Ties on Skew to Conform With Angle of Bridge.~~



HORIZ. SECTION - WING POST.



CONSTRUCTION JOINT OF FLOOR SLAB.

ABUTMENT NOTES:
General notes to be as listed on Standard H10-3. Piling to be driven to full penetration if practicable but to not less than 20 ton bearing cap.

PIER NOTES:
General notes to be as listed on Standard P-10. Piling to be driven to full penetration if practicable but in no case to less than 30 ton bearing cap. Concrete piles to be Precast with dimension "K" of 16". Construction to be in accordance With Iowa State Highway Comm. Standards of 1956 except as noted.

DESIGN FOR 24° SKEW

134'x2"x20' PRE-STRESSED CONCRETE BEAM BRIDGE
CONCRETE FLOOR - STEEL HANDRAIL, TYPE "C"
STA-44+81.125 PROJECT No. S-2766(1)
CRAWFORD COUNTY, IOWA.

Sheet #3 of 5

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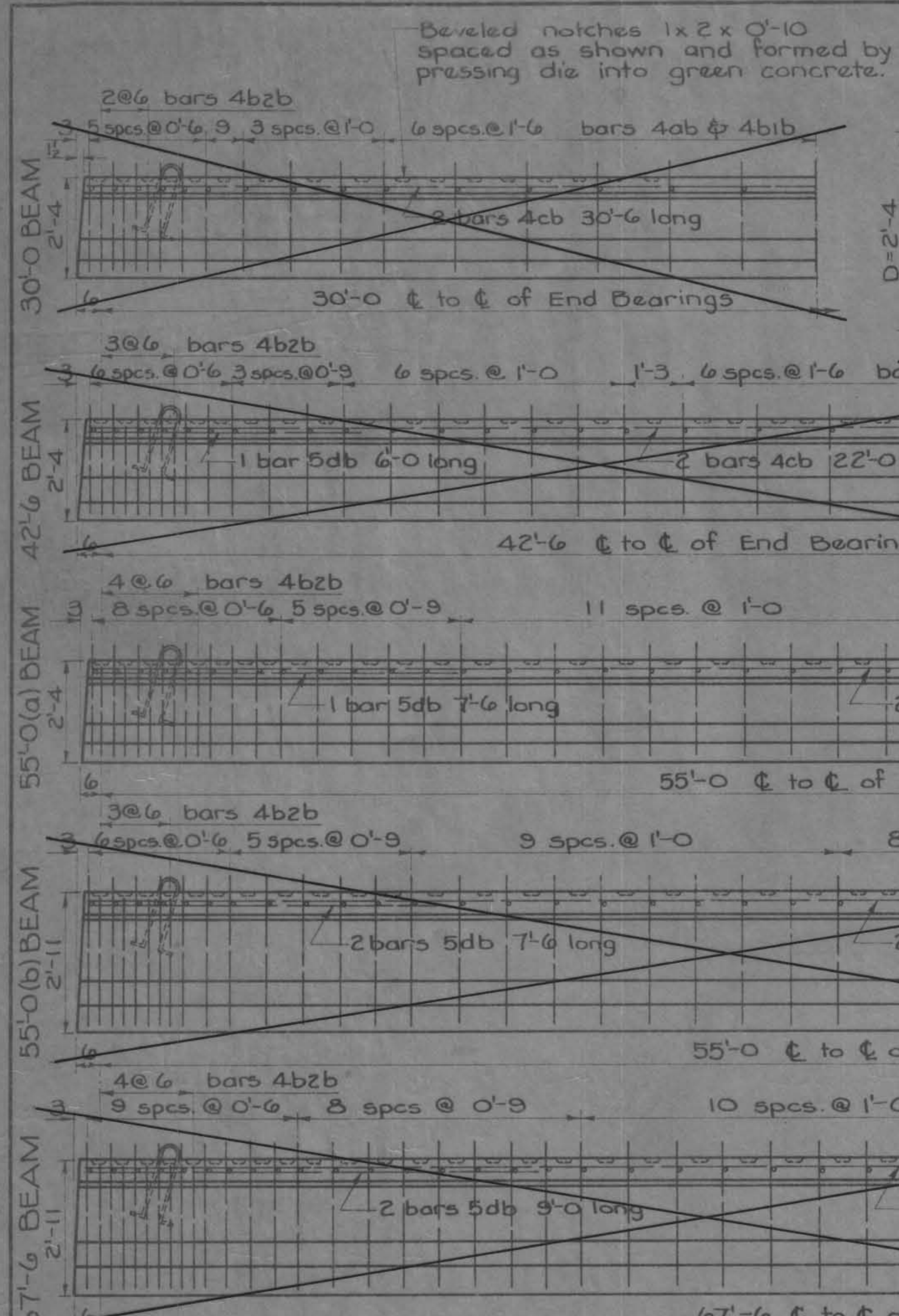
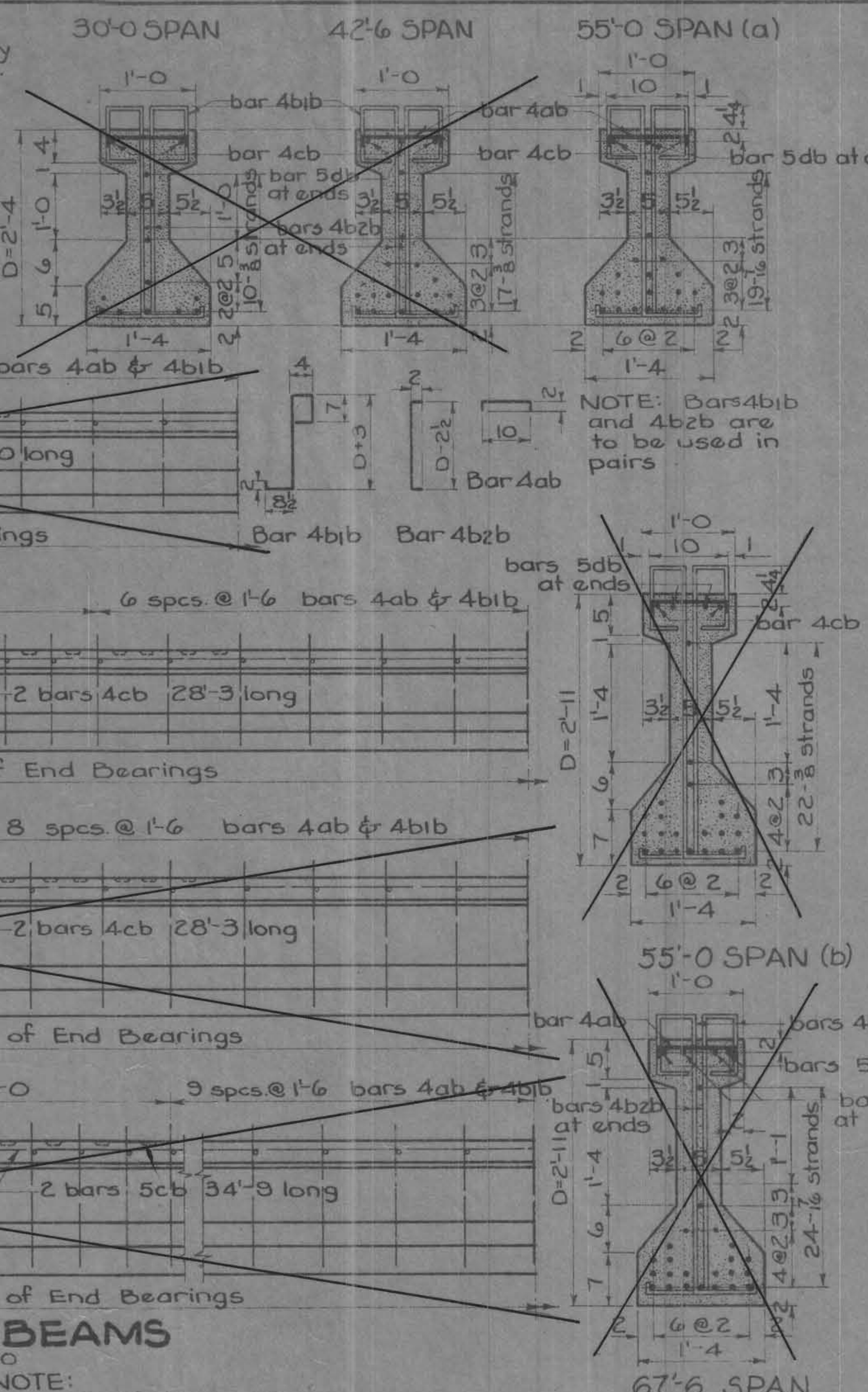
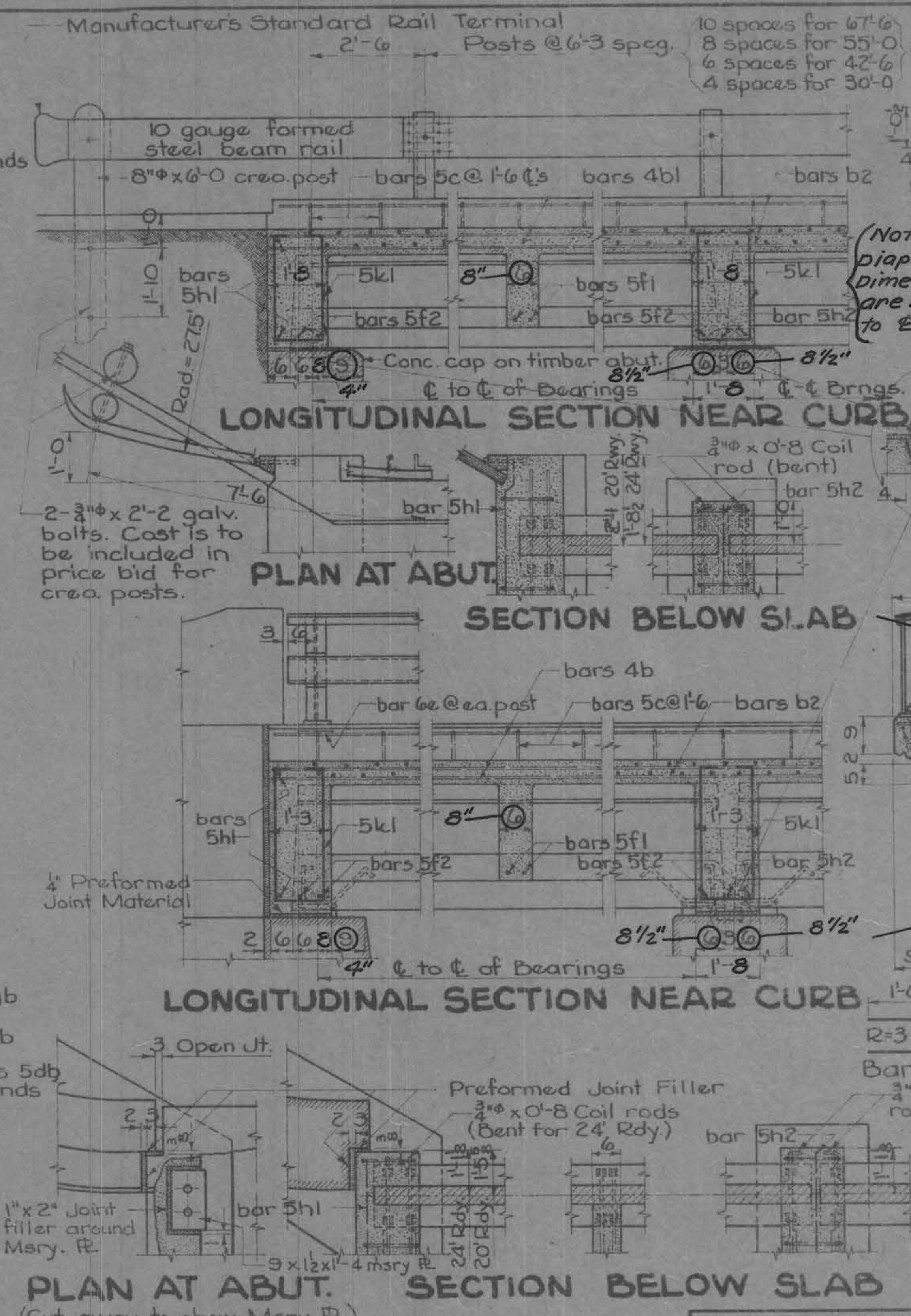
CRAWFORD COUNTY. DESIGN No. 1357 PROJ. No. S-2766(1)

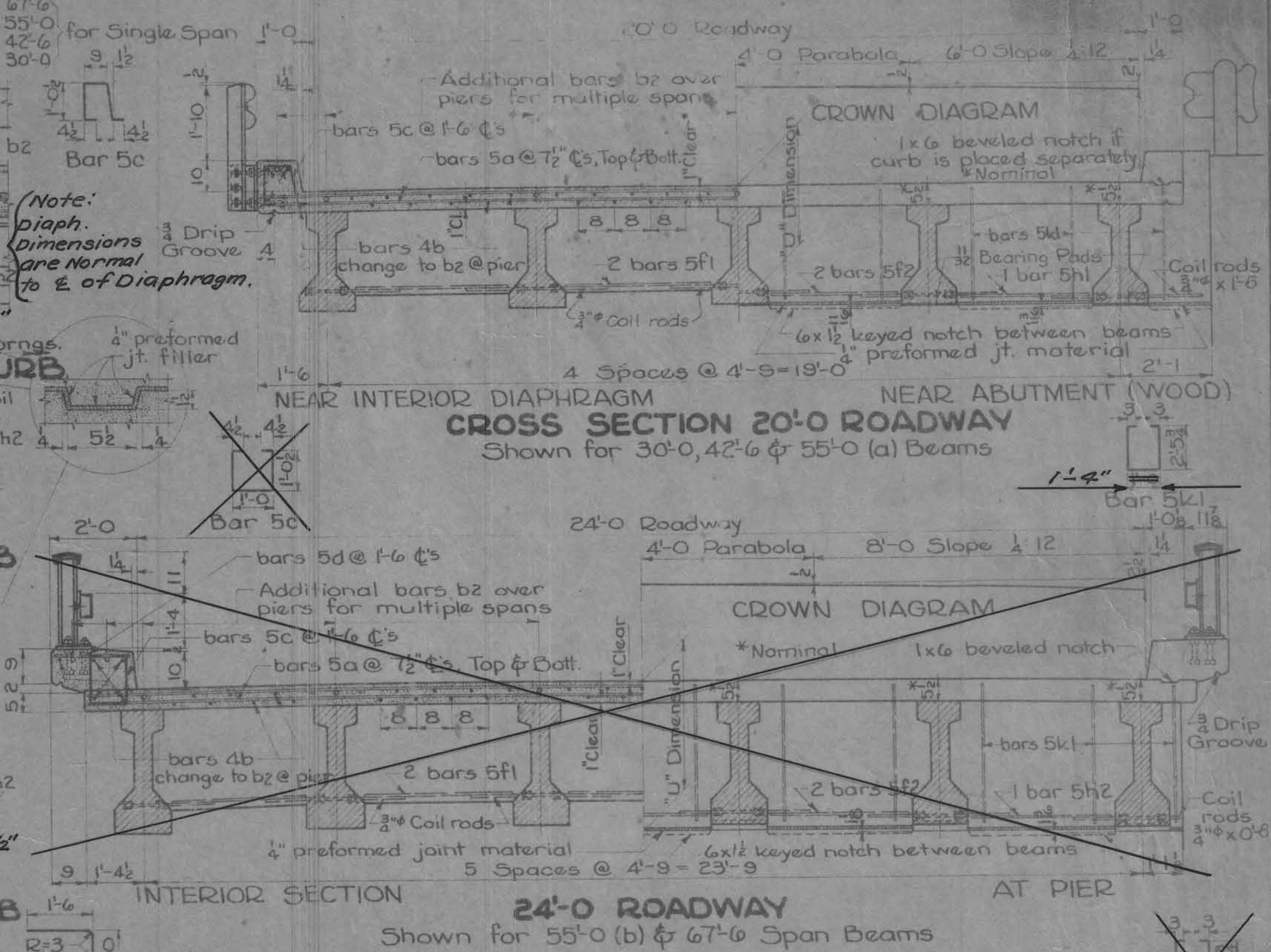


DETAILS of BEAMS

Scale: 3/8" = 1'-0





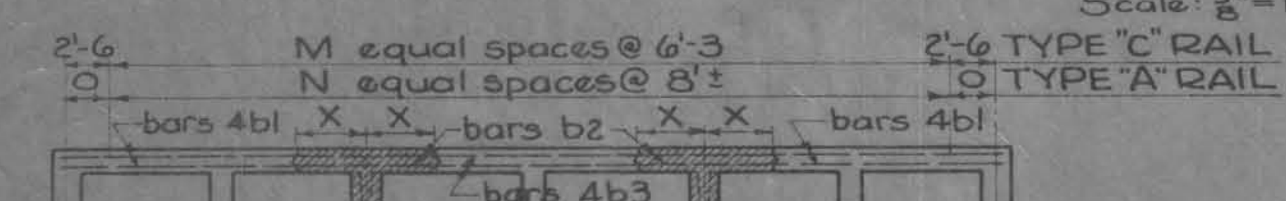


24'-0 ROADWAY
Shown for 55'-0 (b) & 67'-6 Span Beams

Coil rods shown below shall be similar to and equal to those manufactured by the Superior Concrete Accessories Co. Inc. of Chicago and the Richmond Screw Anchor Co. of St. Joseph, Mo.

COIL TIE DETAILS

Coil ties are to be held in place in forms by slotted coil setting studs projecting through forms. Studs are to be left in place until beams are erected when they are to be replaced with coil rods. Cost of coil ties and rods is to be included in price bid for beams.



2'-6 TYPE "C" RAIL / 0 TYPE "A" RAIL

NOTE: Sections of floor over piers and pier diaphragms shown cross-hatched are to be placed last. Curbs may be placed continuously.

MULTIPLE SPAN COMBINATIONS			℄-℄ End Brngs.	X	M	N	bars b2
~~30'-7½~~	~~31'-3~~	~~30'-7½~~	~~92'-6~~	4'	14	12@7'-8½	4b2
~~30'-7½~~	~~43'-9~~	~~30'-7½~~	~~105'-0~~	5'	16	13@8'-0 15/16	4b2
~~43'-1½~~	~~43'-9~~	~~43'-1½~~	~~130'-0~~	6'	20	16@8'-1½	4b2
~~43'-1½~~	56'-3 (a)	~~43'-1½~~	~~142'-6~~	7'	22	18@7'-11	5b2
~~55'-7½ (a)~~	~~56'-3 (a)~~	~~55'-7½ (a)~~	~~167'-6~~	8'	26	21@7'-11 11/16+	5b2
~~55'-7½ (b)~~	~~68'-9~~	~~55'-7½ (b)~~	~~180'-0~~	9'	28	23@7'-9 7/8+	6b2
~~68'-1½~~	~~68'-9~~	~~68'-1½~~	~~205'-0~~	9'	32	26@7'-10 5/8-	6b2

NOTES ON PRESTRESSED BEAMS:

Concrete in beams shall have a 28 day crushing strength of 5000 p.s.i. and a minimum of 4500 p.s.i. when stress is released. It shall contain no Class "V" aggregate. The maximum size of coarse aggregate shall be 1".

Prestressing tendons shall be 7 wire strands of high strength uncoated wire, stress relieved after stranding with a modulus of elasticity of about 25,000,000, ultimate breaking strength of 27,000 lbs. for 7/16 strands and 20,000 lbs. for 3/8 strands, yield strength (0.2% offset) of 85% of the ultimate and minimum elongation in 10" of 4%. Strands are to be initially stressed to 70% of the ultimate – 18,900 for 7/16 and 14,000 for 3/8. Stress is to be determined by the measured elongation and checked by gauges on calibrated jacks.

After release of strands, beams are to be supported at all times near ends and handled by means of lifting loops near ends of beams.

BEAM DATA

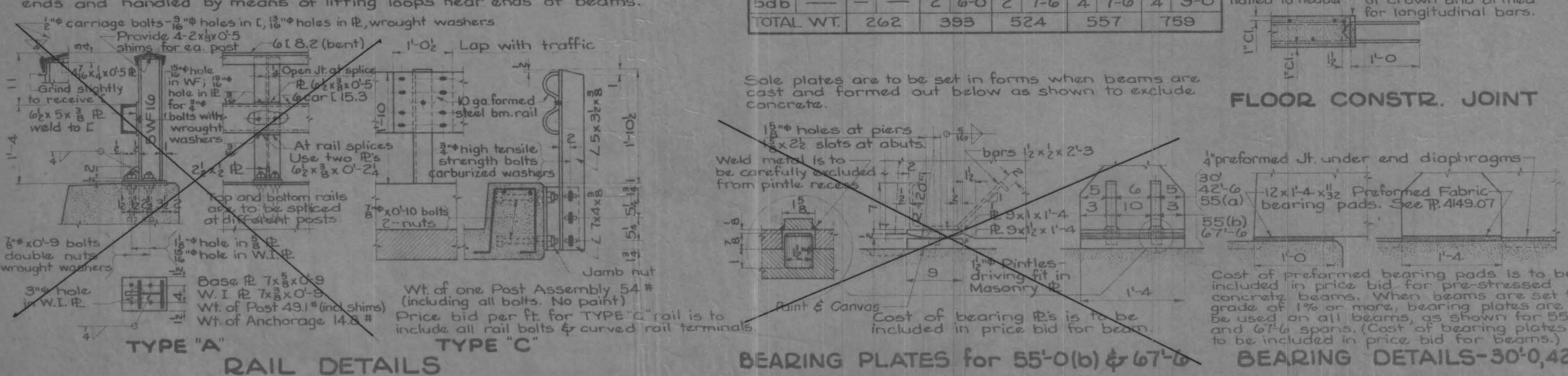
SPAN	DEPTH	STRANDS	CONC. c.y.	REINF. STEEL lbs.	STRUCT. STEEL lbs.	INITIAL PRE-STRESS	CAMBER AS ERECTED	CAMBER SLAB IN PLACE
30'-0	2'-4	10-3/8	2.06	262	*217	140 k	3/8	5/16
42'-6	2'-4	17-3/8	2.90	393	*217	238 k	11/16	1/2
55'-0(a)	2'-4	19-7/16	3.73	524	*217	360 k	1 7/16	7/8
55'-0(b)	2'-11	22-3/8	4.66	557	217	308 k	7/8	1/2
67'-6	2'-11	24-7/16	5.70	759	217	453 k	1 5/8	15/16

* If required.

BILL of REINF. STEEL for ONE BEAM

BAR	SHAPE	30'-0 Nº	30'-0 Length	42'-6 Nº	42'-6 Length	55'-0(a) Nº	55'-0(a) Length	55'-0(b) Nº	55'-0(b) Length	67'-6 Nº	67'-6 Length
4ab	⊓	31	1'-2	45	1'-2	61	1'-2	57	1'-2	73	1'-2
4b1b	⌐	62	4'-4	90	4'-4	122	4'-4	114	4'-11	146	4'-11
4b2b	]	12	2'-5	16	2'-5	20	2'-5	16	3'-0	20	3'-0
cb	—	(4) 2	30'-6	(4) 4	22'-0	(4) 4	28'-3	(4) 4	28'-3	(5) 4	34'-9
5db	—	—	—	2	6'-0	2	7'-6	4	7'-6	4	9'-0
TOTAL WT.		262		393		524		557		759	

Sole plates are to be set in forms when beams are cast and formed out below as shown to exclude concrete.



LIFTING LOOP / FLOOR DRAIN DETAIL / FLOOR CONSTR. JOINT

"U" DIMENSION

SPAN	20'-0 Rdy.	24'-0 Rdy.
~~30'-0~~	~~2'-9 7/8~~	~~2'-10~~
~~42'-6~~	~~2'-9 7/8~~	~~2'-10~~
55'-0(a)	2'-9 7/8	2'-10
~~55'-0(b)~~	~~3'-6 1/8~~	~~3'-6 1/4~~
~~67'-6~~	~~3'-6 1/8~~	~~3'-6 1/4~~

GENERAL NOTES:

These bridges are designed for H15-44 loading.

The two types of rail and curb shown may be used interchangeably on the 20'-0 and 24'-0 roadways.

All spans may be used with timber abutments similar to Standard H10-2, concrete stub abutments similar to Standard H10-3, or other types of rigid concrete abutments. When used in multiples as shown they should be set on flexible type piers.

Slab concrete is to have a 28 day crushing strength of 3500 psi and is to contain no Class "V" aggregate. It is to be placed as dry as practicable to reduce shrinkage to a minimum and special precautions are to be taken to secure complete bond between slab and beams.

All exposed corners of 90° or sharper are to be filleted 3/4".

All reinforcing bars are to be securely wired in place and adequately supported on bar chairs before concrete is placed.

Forms for slab are to be supported by the prestressed beams.

For number and spacing of floor drains, see Situation Plan.

Bridge seats of both abutments and piers are to be stepped as shown due to crown of roadway. All beams are to be set vertical.

Intermediate diaphragms are located at ℄ of beams.

Revised 6-10-58 Superstructure Concrete Quantities Changed.

SPECIFICATIONS:

Design: A.A.S.H.O., Series of 1953, and United States Bureau of Public Roads Design Criteria for Pre-stressed Conc. Bridges, 1955

Construction: Standard Specifications of the Iowa State Highway Commission, Series of 1956, plus current Special Provisions except as noted.

Location
Section: 13-14
Stockholm TWP
T.85N. R.38W.

BILL of REINF. STEEL-SUPERSTRUCTURE

BAR	LOCATION	SHAPE	Nº	LENGTH	WEIGHT
5a	Slab Transverse	—	56 / 408	var. / 21'-8"	9853
4b1	Slab Longitudinal	—	88	34'-10½"	2,050
4b2	Slab Lngtl. Over Piers	—	102	12'-0"	818
4b3	Slab Longitudinal	—	88	23'-6½"	1384
5c	Curb Dowels	⊓	180	3'-3"	610
5d	Curb Transv. (Type "A" Rail)		—	—	—
6e	Rail Post Anchor (Type "A" Rail)	⊏	—	—	—
5f1	Intermediate Diaphragm	—	24	3'-10"	96
5f2	Abut. & Pier Diaph's Short	—	32	3'-7"	120
5h1	Abutment Diaph's Long	—	16	6'-10½"	115
5h2	Pier Diaphragms Long	—	8	6'-10½"	57
5k1	Abutment & Pier Hoops	□	40	6'-4"	264
		TOTAL =			15,367

ESTIMATED QUANTITIES-SUPERSTRUCTURE

ITEM	UNIT	QUANTITY
Concrete	cu.yd.	~~69.40~~ 77.6
Reinforcing Steel	lbs.	15,367
Structural Steel	lbs.	2480
Pre-stressed Conc. Beams	Beam	5@55'-0"(a)
Pre-stressed Conc. Beams	Beam	10@38'-4"
Formed Steel Beam Rail	L.F.	272'-8½"
Creosoted Wood Rail Posts 8"Φx6'-0	Post	—

Design for
PRE-TENSIONED
PRE-STRESSED CONCRETE BEAM BRIDGES
30'-0, 42'-6, 55'-0 & 67'-6 SPANS
20'-0 AND 24'-0 ROADWAYS
H-15-44 LOADING

134'-2" x 20' CONCRETE BEAM BRIDGE
STA.-44+81.125 PROJECT No. S-2766(1)

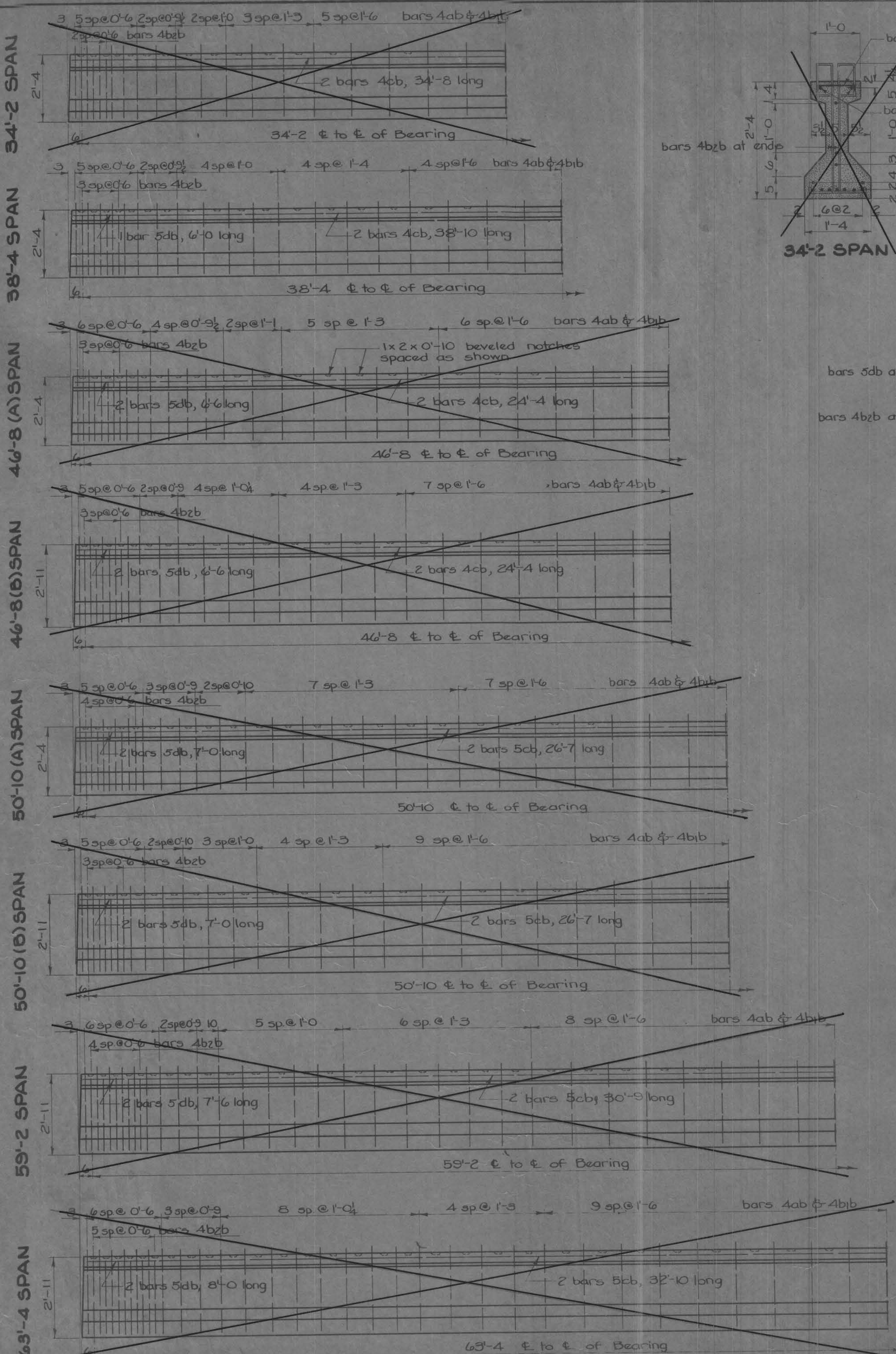
Iowa State Highway Commission
December 1956 Sheet PC-5

Rev. 4-23-57 - Strands revised

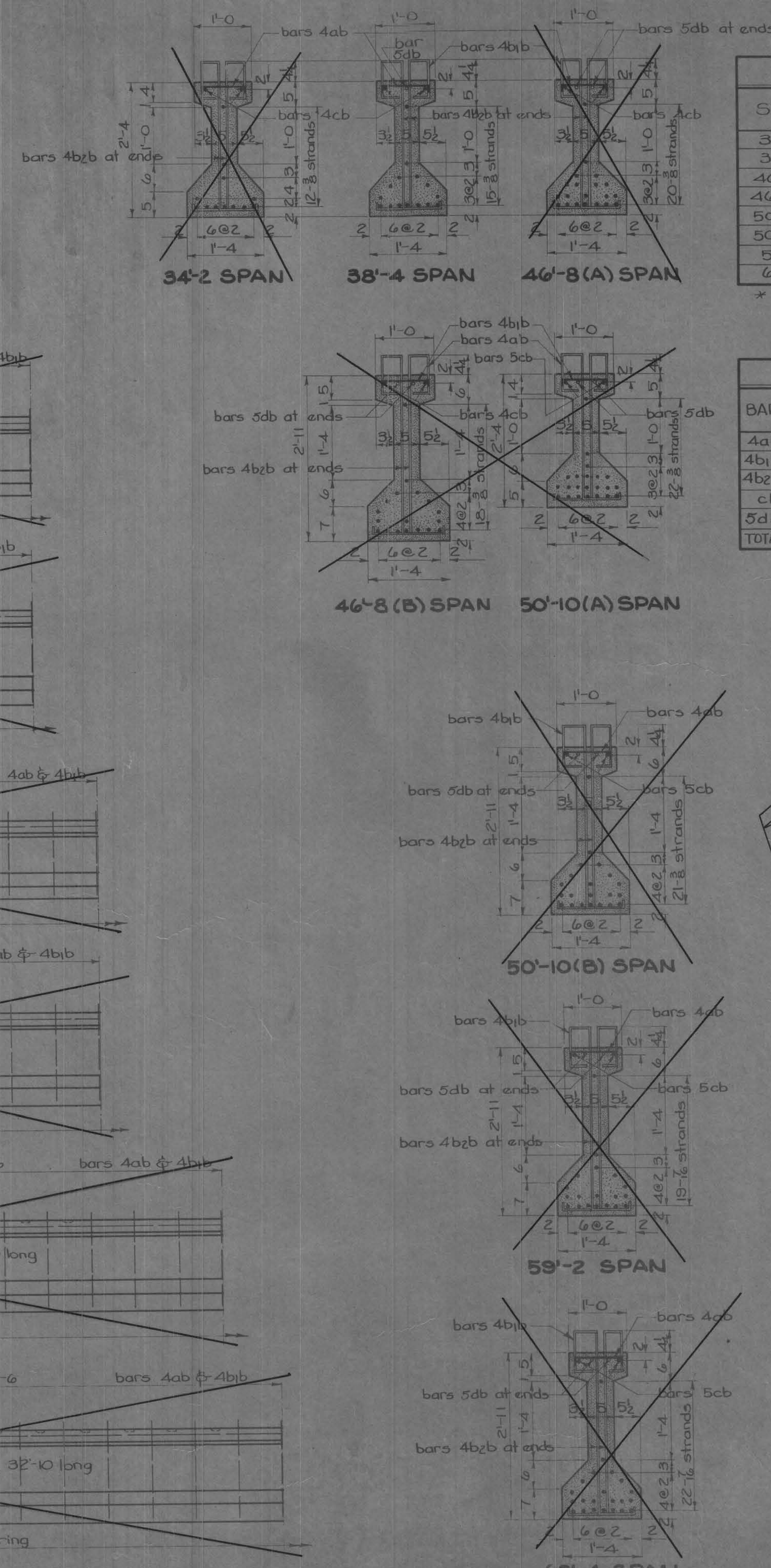
CRAWFORD COUNTY DESIGN No. 1357. PROJECT# S-2766(1) Sheet #4 of 5

Designed by Traced by: R.D. Rozlansky Checked by

4/5



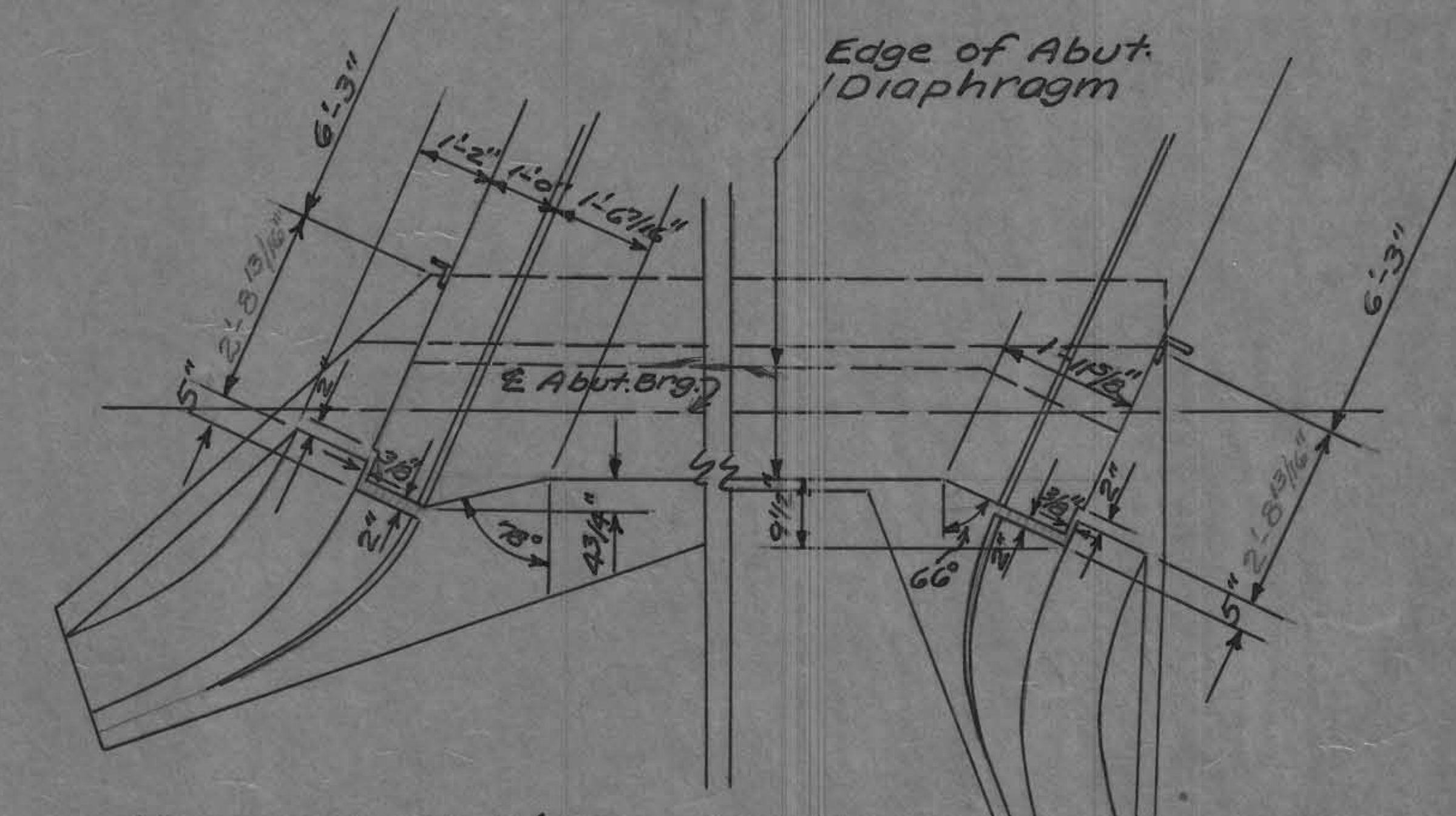
DETAILS OF BEAMS



BEAM DATA								
SPAN	DEPTH	STRANDS	INITIAL PRE-STRESS	CONCR. (cu.yd.)	REINF. STEEL (lbs.)	STRUCT. STEEL (lbs.)	BEAM CAMBER As Erected	BEAM CAMBER Slab in Place
34'-2	2'-4	12-3/8	168 k	2.34	294	* 217	5/16	1/4
38'-4	2'-4	15-3/8	210 k	2.62	345	* 217	7/16	5/16
46'-8 A	2'-4	20-3/8	280 k	3.17	424	* 217	13/16	1/2
46'-8 B	2'-11	18-3/8	252 k	3.94	452	217	1/2	5/16
50'-10 A	2'-4	22-3/8	308 k	3.45	490	* 217	1 1/8	11/16
50'-10 B	2'-11	21-3/8	294 k	4.30	514	217	11/16	7/16
59'-2	2'-11	19-7/16	360 k	4.93	615	217	1 1/16	11/16
63'-4	2'-11	22-7/16	416 k	5.28	663	217	1 7/16	15/16

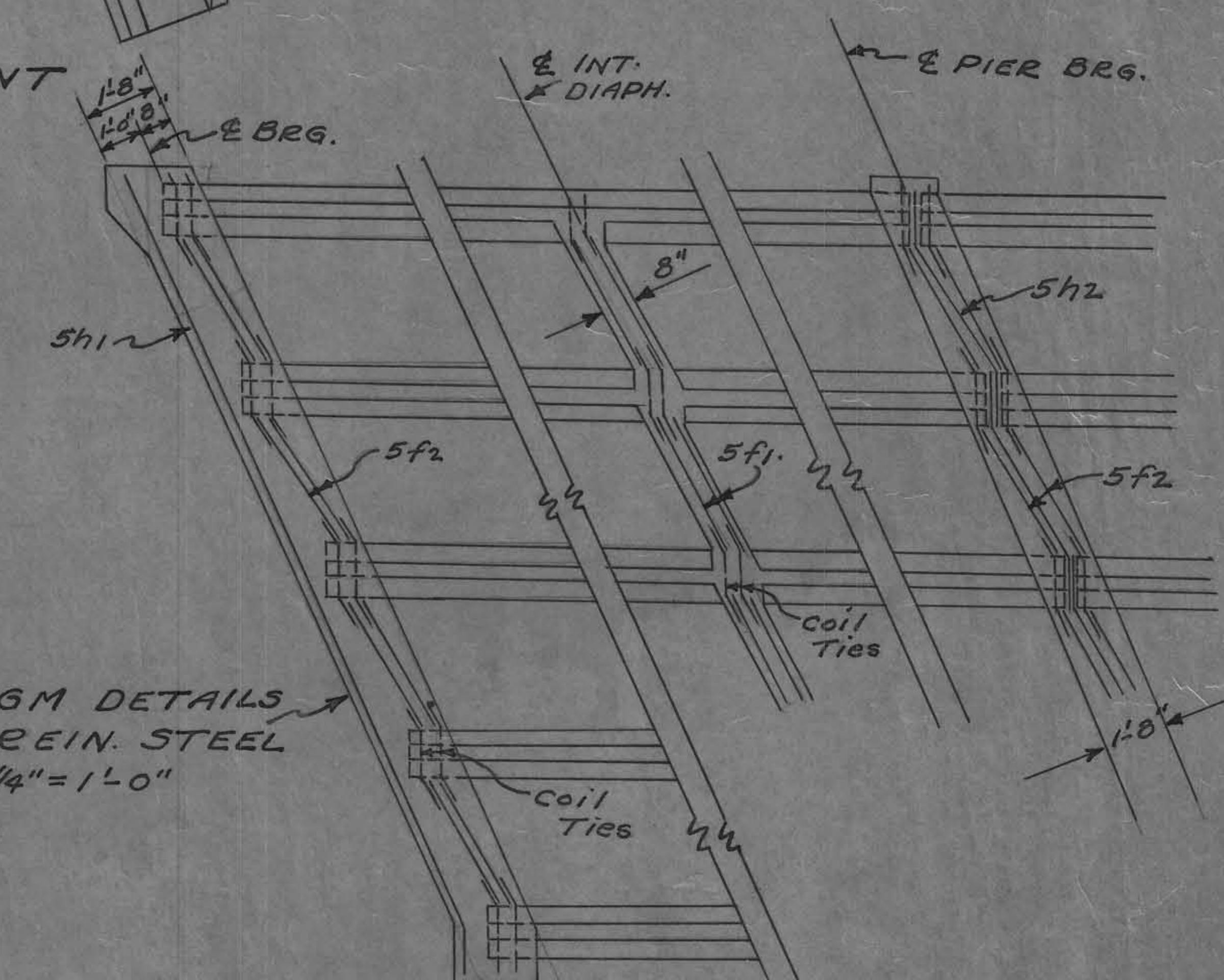
* If required

BILL OF REINFORCING STEEL FOR ONE BEAM																	
BAR	SHAPE	34'-2		38'-4		46'-8 A		46'-8 B		50'-10 A		50'-10 B		59'-2		63'-4	
		Nº	Length	Nº	Length	Nº	Length	Nº	Length	Nº	Length	Nº	Length	Nº	Length	Nº	Length
4ab	⊓	35	1'-1	39	1'-1	47	1'-1	45	1'-1	49	1'-1	47	1'-1	57	1'-1	61	1'-1
4b1b	⅃	70	4'-4	78	4'-4	94	4'-4	90	4'-11	98	4'-4	94	4'-11	114	4'-11	122	4'-11
4b2b	[	12	2'-5	16	2'-5	16	2'-5	16	3'-0	20	2'-5	16	3'-0	20	3'-0	24	3'-0
cb	—	2	4) 34'-8	2	4) 38'-10	4	4) 24'-4	4	4) 24'-4	4	5) 26'-7	4	5) 26'-7	4	5) 30'-9	4	5) 32'-10
5db	—	—	—	2	6'-0	4	6'-6	4	6'-6	4	7'-0	4	7'-0	4	7'-6	4	8'-0
TOTAL WT. (lbs.)		294		345		424		452		490		514		615		663	



ABUTMENT WING DETAILS
SHOWING
SPECIAL SLAB-WING JOINT
Scale 3/8" = 1'-0"

NOTE:
This sheet is supplementary to Iowa State Highway Commission design sheet PCS and covers additional spans not covered on that sheet.
For details, notes and specifications not shown refer to sheet PCS.



DIAPHRAGM DETAILS
SHOWING REIN. STEEL
Scale: 1/4" = 1'-0"

DESIGN FOR 24° SKEW

134'x2"x20' PRE-STRESSED CONCRETE BEAM BRIDGE
CONCRETE FLOOR - STEEL HANDRAIL, TYPE "C"

STA.-44+81.125 PROJECT No. S-2766(1)

CRAWFORD COUNTY, IOWA

Sheet #5 of 5. PCS(a)

CRAWFORD COUNTY. DESIGN No. 1357 PROJ. No. S-2766(1)

Designed by Traced by R.D. Rozanskiy Checked by

7-1-57