DEC 10 1957

STATE OF IOWA
STATE HIGHWAY COMMISSION
DESIGN FOR
205'-0" x 20' PRE-STRESSED CONCRETE BEAM BRIDGE
And 12' x 10' R.C. BOX CULVERT
SECONDARY ROAD SYSTEM PROJ. S-1273(2)
CRAWFORD COUNTY
SEPTEMBER 1957.

MILEAGE SUMMARY: =207'-8¼" = 0.0393 MILES. Design 1257
12'-0 = 0.00227 Miles Design 557

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.

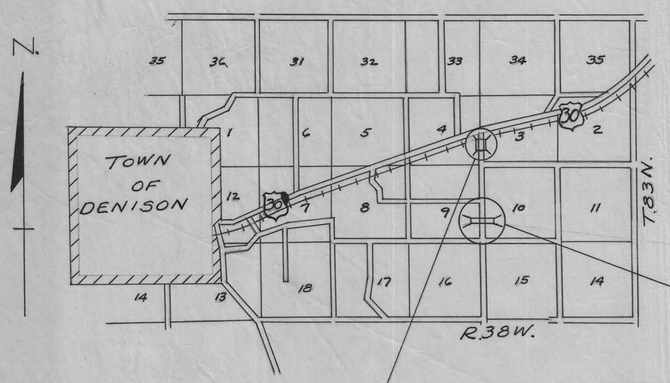
DESIGN-1257, EAST BOYER TWP CRAWFORD COUNTY
SEC. 3-4, STA.-123+94.0 OVER EAST BOYER RIVER
205'-0" x 20' PRESTRESSED CONCRETE BEAM BRIDGE

DESCRIPTION.	ABUT'S.	PIERS.	SUPERSTRUCT.	TOTAL
~~CONCRETE Class-"C"~~	~~C.Y.~~			~~C.Y.~~
" Class-"A"	42.40 "	15.00 C.Y.	112.40 C.Y.	169.80 "
REIN. STEEL	2292 LBS.	2690 LBS.	24,591 LBS	29,573 LBS.
STRUCT STEEL			3,724 "	3,724 "
TREATED PILING	18@45' L.F.			810 L.F.
PRECAST CONC. PILING. P	10-B	14@45' L.F.		630 "
PRE-STRESSED CONC. BEAMS.			15@ 67'-6"	15@ 67'-6"
HANDRAIL Type "C"			414'-1" L.F.	414'-1" L.F.
EXCAVATION Class "20"	34 C.Y.			34 C.Y.
" Class "10"				1809 C.Y.
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, 1957.

DESIGN-557, EAST BOYER TWP. CRAWFORD COUNTY.
SEC. 9-10, STA.-66+16.0 12'x10' REIN. CONCRETE BOX CULVERT.

CONCRETE	REIN. STEEL	EXCAVATION.	REMOVAL OF OLD STRUCTURE
132.40 C.Y.	14,304 LBS.	174 C.Y.	LUMP SUM.



DESIGN No.-557
PROJECT No.-S-1273(2)

DESIGN No.-1257
PROJECT No. S-1273(2)

APPROVED
[redacted]
BOARD OF SUPERVISORS DATE

APPROVED
[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

Note: Abutment Elevations Revised Dec 17, 1957.

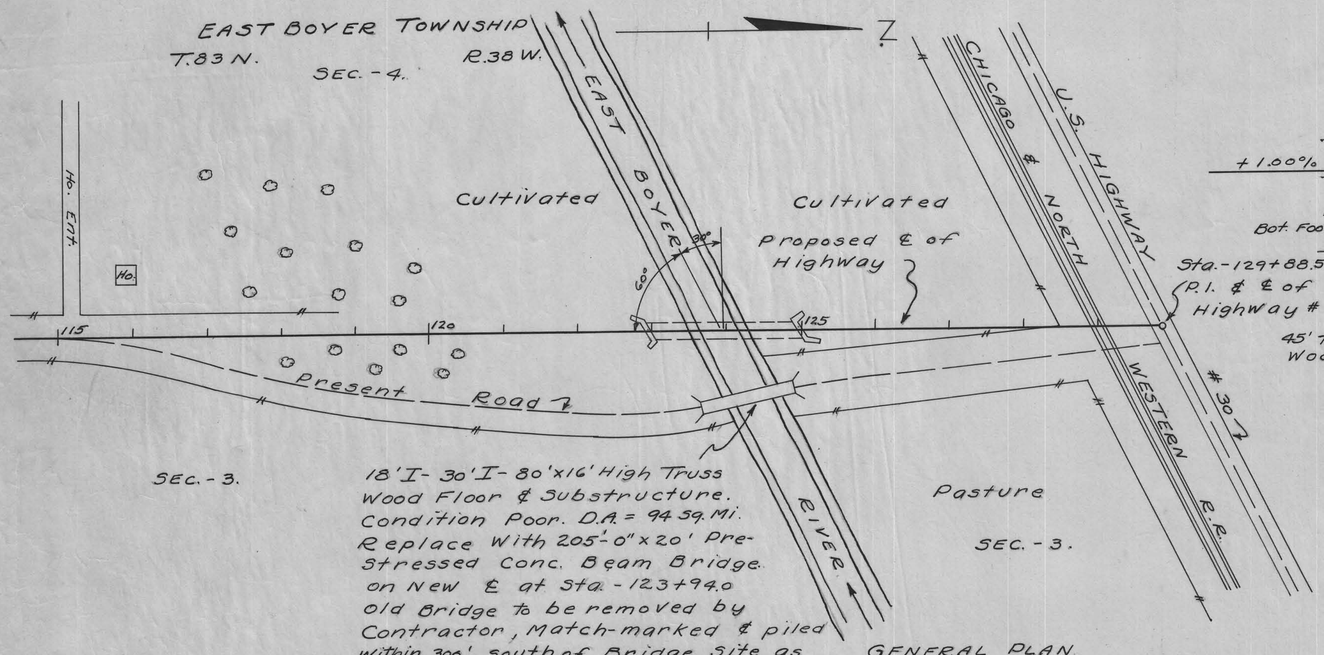
11-26-57

4+17 DEC. 10/67

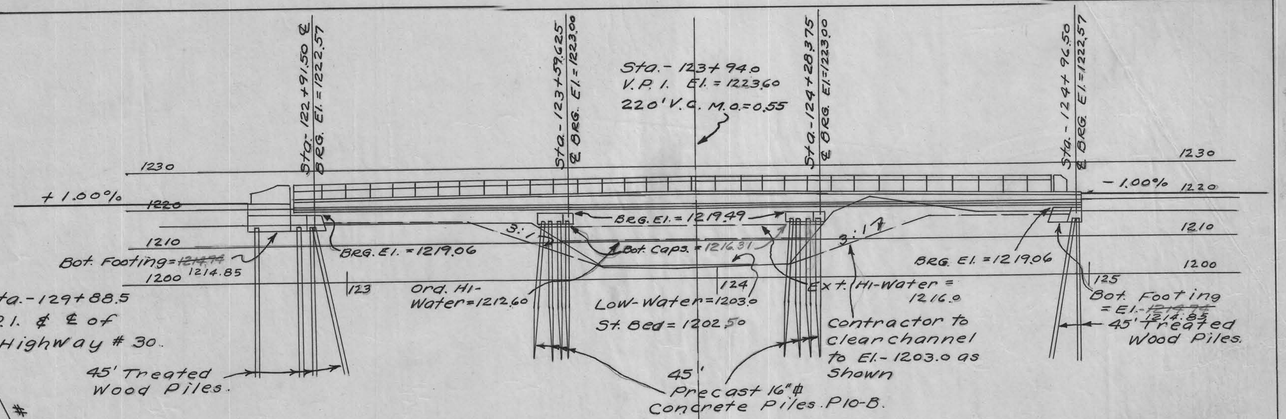
CRAWFORD COUNTY. DESIGN. No. 557 & 1257 PROJ. No. S-1273(2) File #1913

Sheet # 1 of 4

(12 Rev)



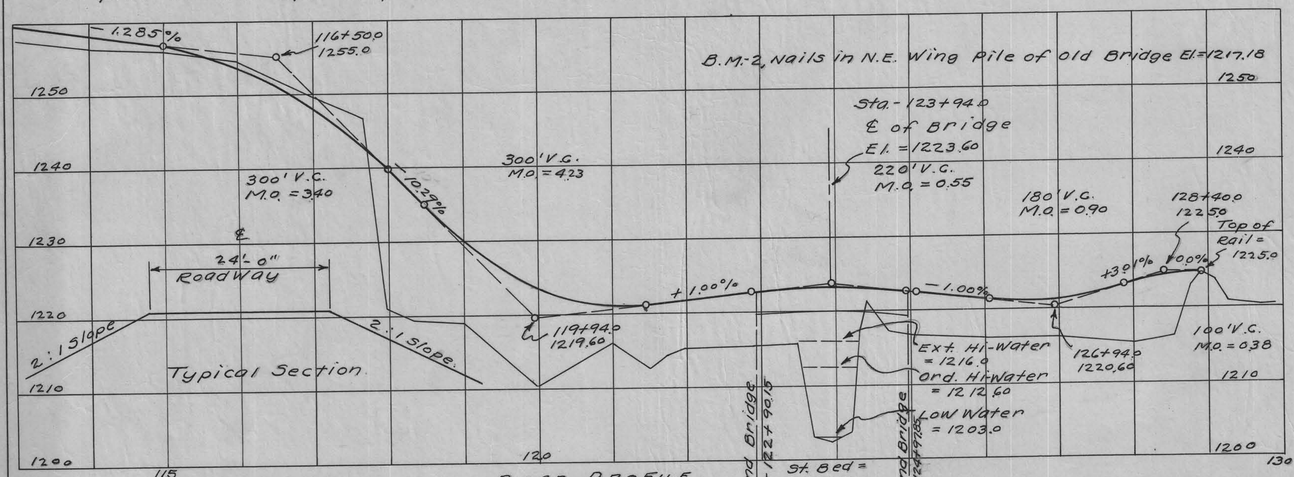
GENERAL PLAN
1" = 100 Ft.



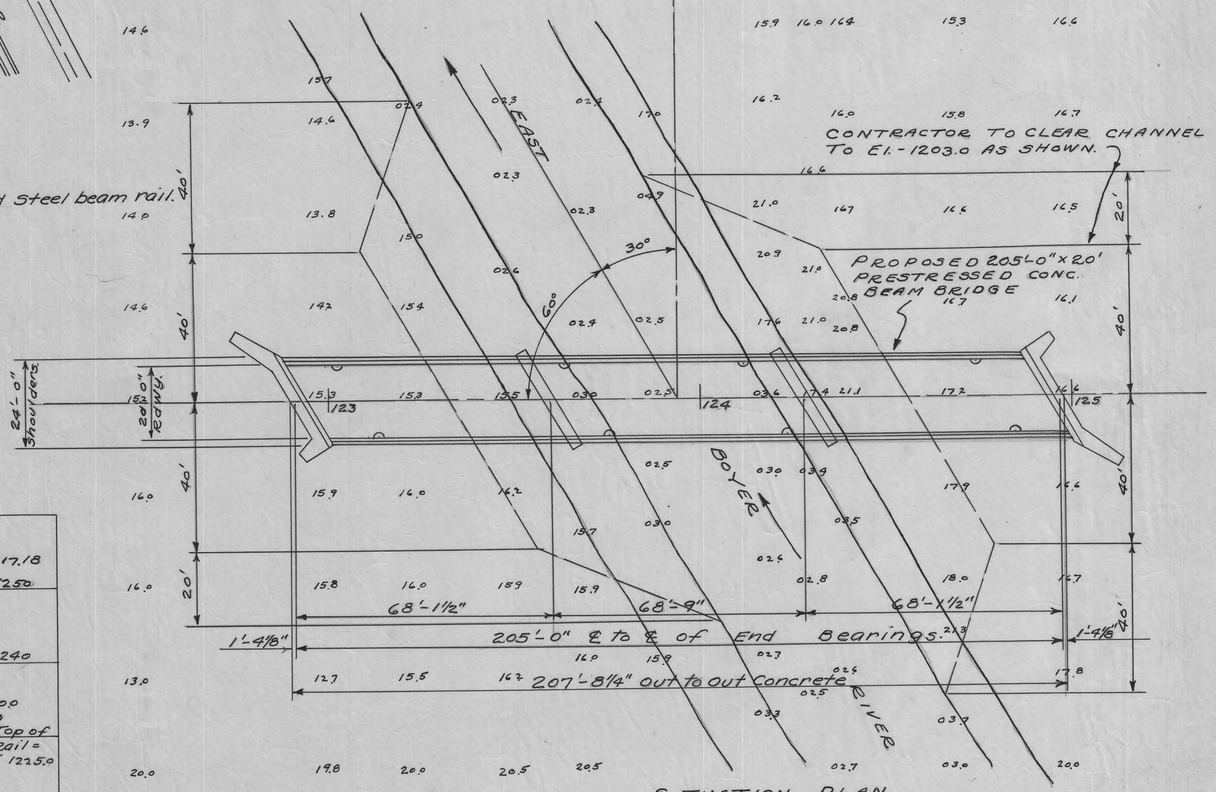
SECTION ALONG ℄ OF ROADWAY
Scale 1" = 20 Ft.

GENERAL NOTES:

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 1/16" ℄ for 67'-6" beams). All exposed Corners of 90° or sharper are to be filleted 3/4". Reinforcing bars are to be Securely Wired in place & supported on bar Chairs before conc. is placed. Forms for Slab are to be supported by the Pre-Stressed beams. Bridge Seats for both Piers & Abutments are to be Stepped as shown to provide for Crown of Road-way. For details of Super-Structure refer to Sheet P C-5. For Sub-structure refer to Standard P-10 for Piers & H10-3 for Abuts. With modifications Shown on Sheet # 4 of these Plans. All Construction to be in accordance With the Iowa Highway Commission's Standards, Series of 1956 plus current Special provisions as noted.



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



SITUATION PLAN
Scale 1" = 20 Ft.

1/4

DESIGN FOR 30° SKEW

205'-0" x 20' PRE-STRESSED CONCRETE BEAM BRIDGE

CONCRETE FLOOR - STEEL HANDRAIL

STA. - 123+94.0 PROJECT No. S-1273

CRAWFORD COUNTY, IOWA.

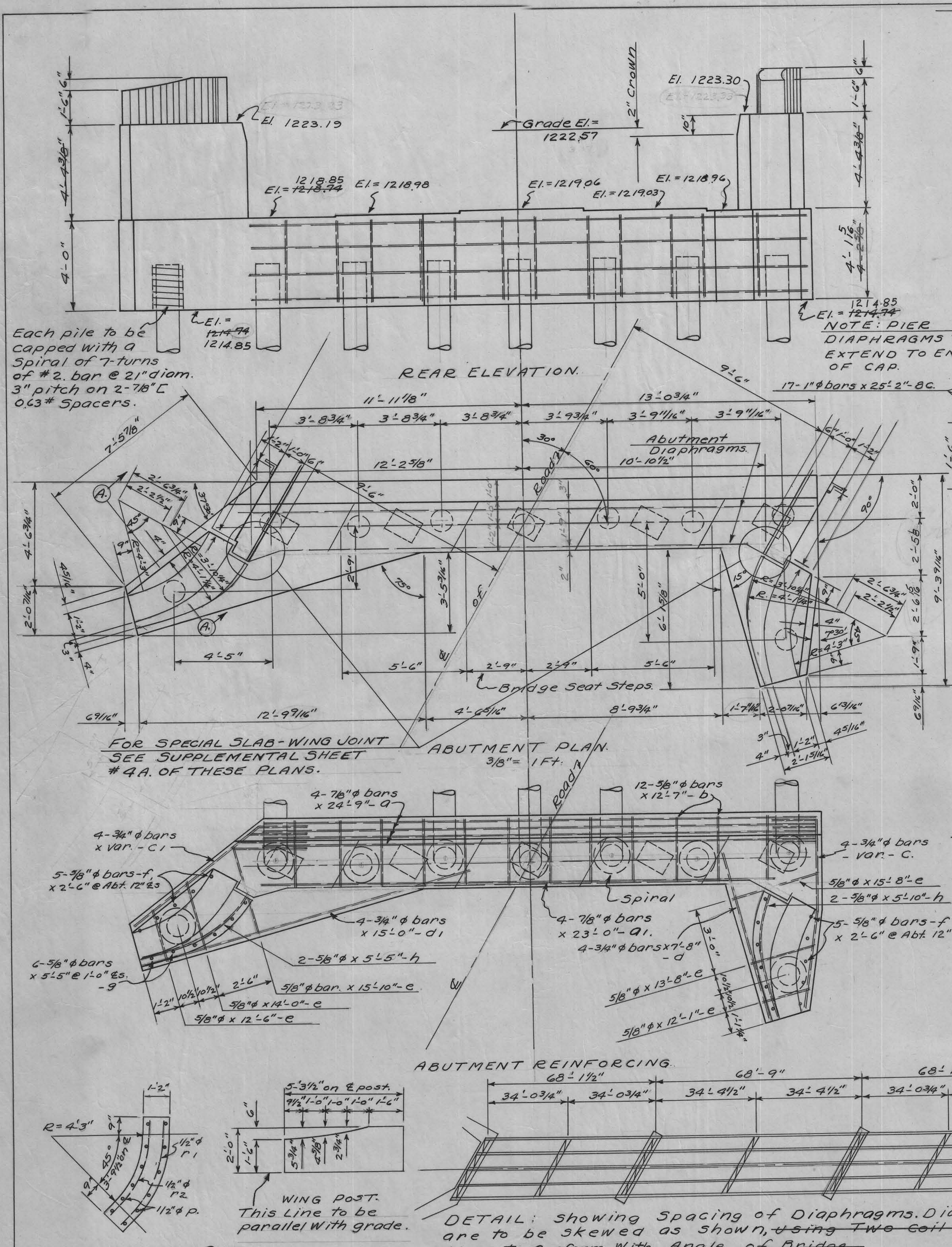
Location
Section 3-4
East Boyer Twp.
T. 83 N. R. 38 W.

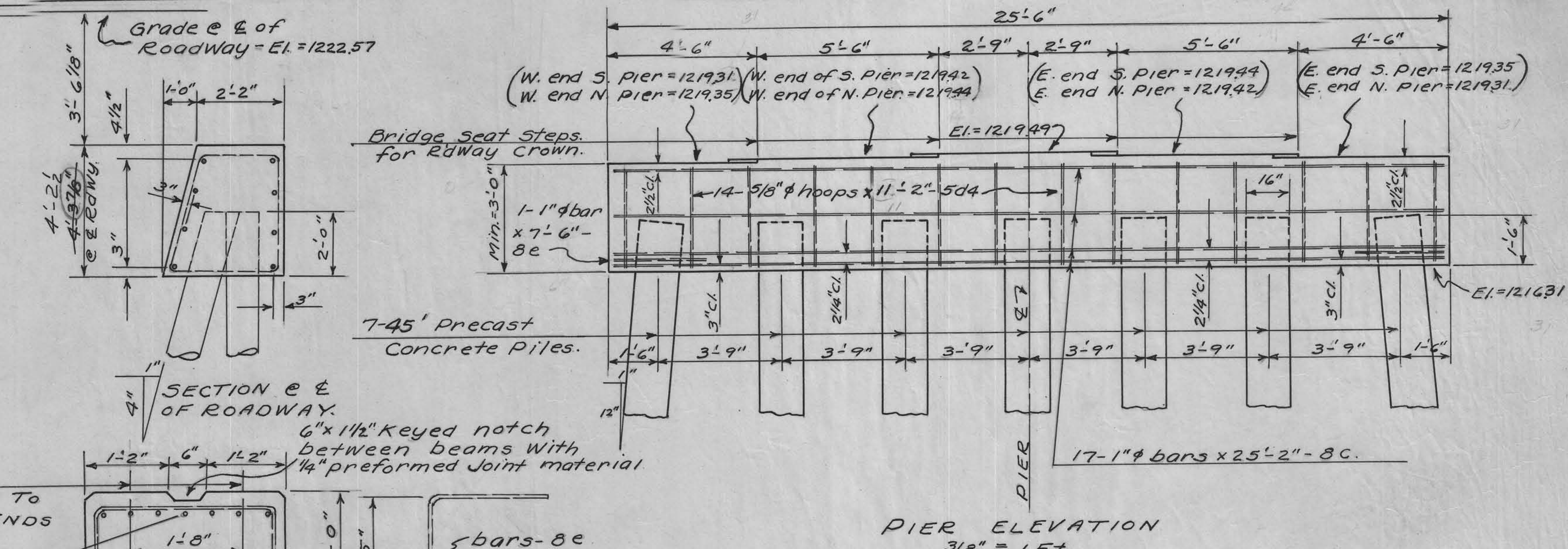
Note: Abutment bottom ftg elevation revised Dec. 17, 1957.

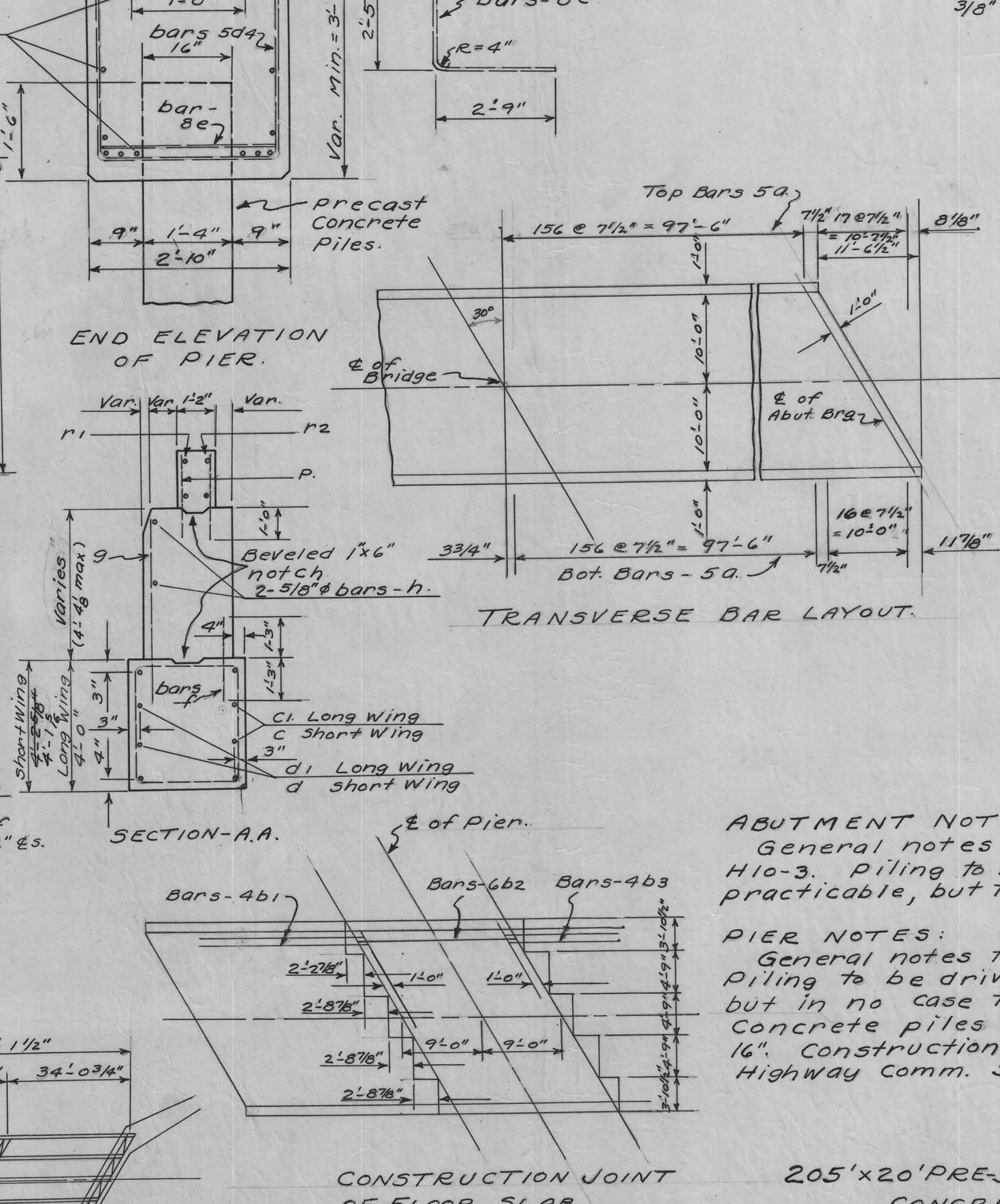
Sheet # 2 of 4

CRAWFORD COUNTY DESIGN No. - 1257 PROJ. No. - S-1273(2) File # 1943

(12) Rev







QUANTITIES - ONE PIER.						
Mark	Location	Shape	Size	Length	No.	Lbs.
8c	Cap. Long'l.		1"ϕ	25-'2"	17	1142
5d4	" hoops		5/8"ϕ	11'-2"	14	163
8e	" ends		1"ϕ	7'-6"	2	40
	Total Rein. Steel				=	1345 Lbs.
7-45' Precast Concrete Piles					=	315 L.Ft.
Class "A" Concrete =						7.50 C.Y.

QUANTITIES-ONE ABUTMENT						
Mark	Location	Shape	Size	Length	No	Lbs.
a	Br. seat Lg.		7/8"ϕ	24'-9"	4	202
a1	" " "		"	23'-0"	4	188
b	" " Hoops.		5/8"ϕ	12'-7"	12	157
c	Wing fts. F.F.		3/4"ϕ	Var.	4	61
c1	" " "		"	"	4	55
d	" " B.F.		"	7'-8"	4	46
d1	" " "		"	15'-0"	4	90
e	" " Hoops		5/8"ϕ	Var.	6	87
f	Wing dow. F.F.		"	2'-6"	10	26
g	Wing Vert. B.F.		"	5'-5"	12	68
h	" Hor. B.F.		"	5'-5	4	24
p	" post Vert.		1/2"ϕ	2'-4"	24	37
r1	" " Hor. i.s.		"	5'-4"	4	14
r2	" " " o.s.		"	4'-6"	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 =					1146
9-	45' Treated Wood Piles =					405 L.Ft.
2-	Wing Posts Class-"C" Conc. =					0.80 C.Y.
2-	Post Bases		"	"A"	"	= 4.10 C.Y.
	First Pour.		"	"A"	"	= 16.30 C.Y.

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.

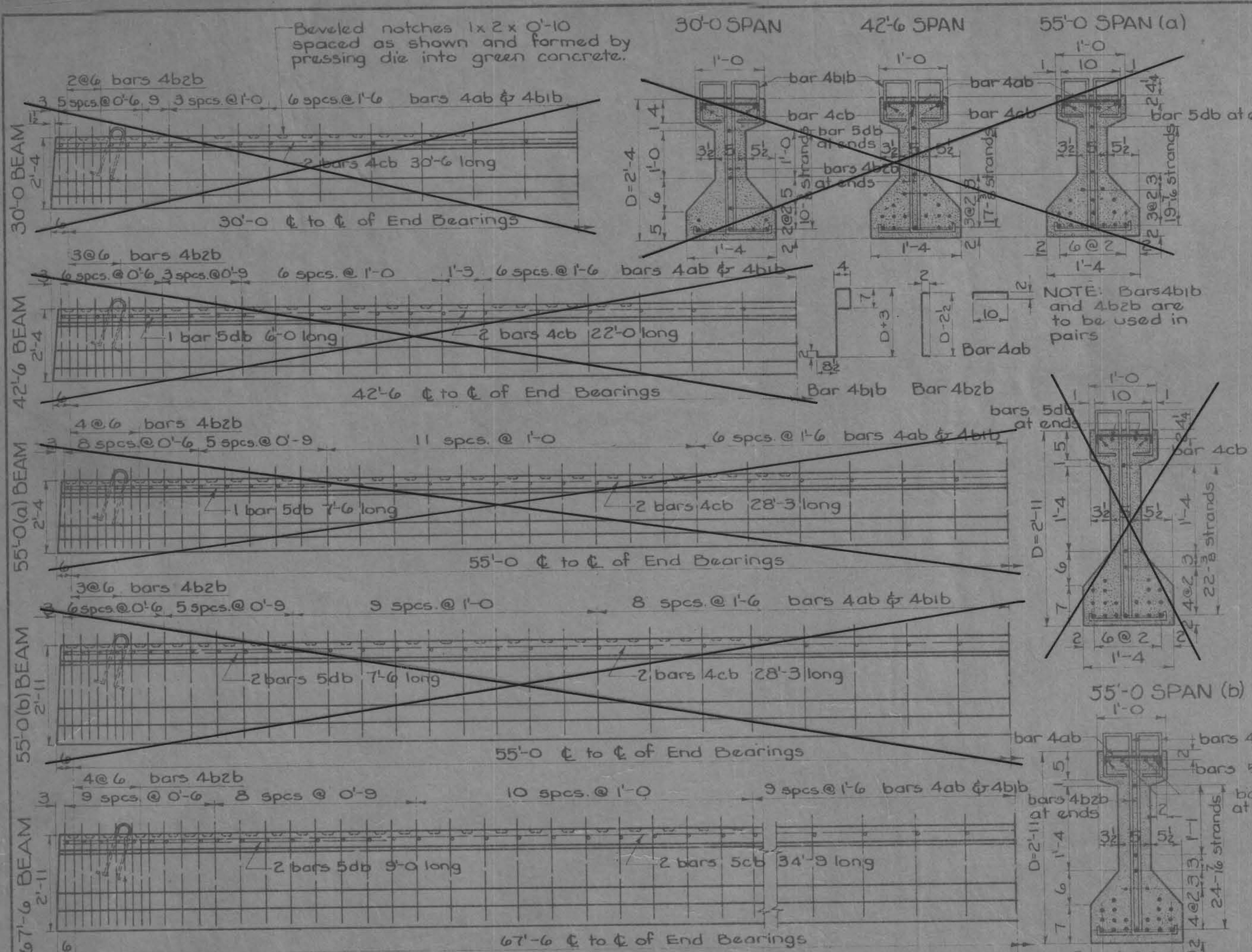
2/4

DESIGN FOR 30° SKEW
205'x20' PRE-STRESSED CONCRETE BEAM BRIDGE
CONCRETE FLOOR - STEEL HANDRAIL
STA-123+94.0 PROJECT No. S-1273
CRAWFORD COUNTY, IOWA.

Revised Dec 17, 1957. Abutment Elevations revised.

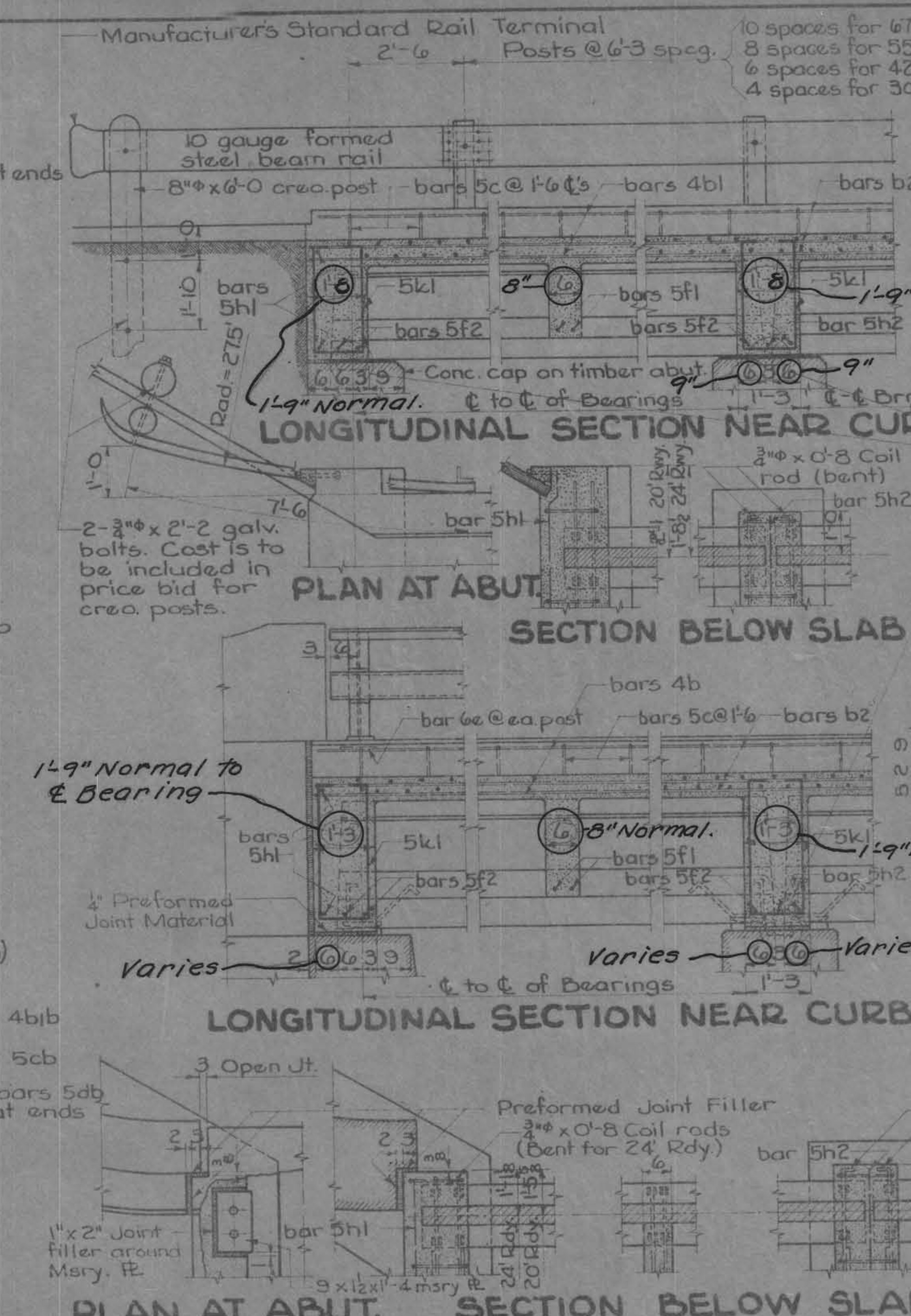
Sheet #3 of 4

CRAWFORD COUNTY. DESIGN No. - 1257 PROJ. No. S-1273(2)



DETAILS of BEAMS

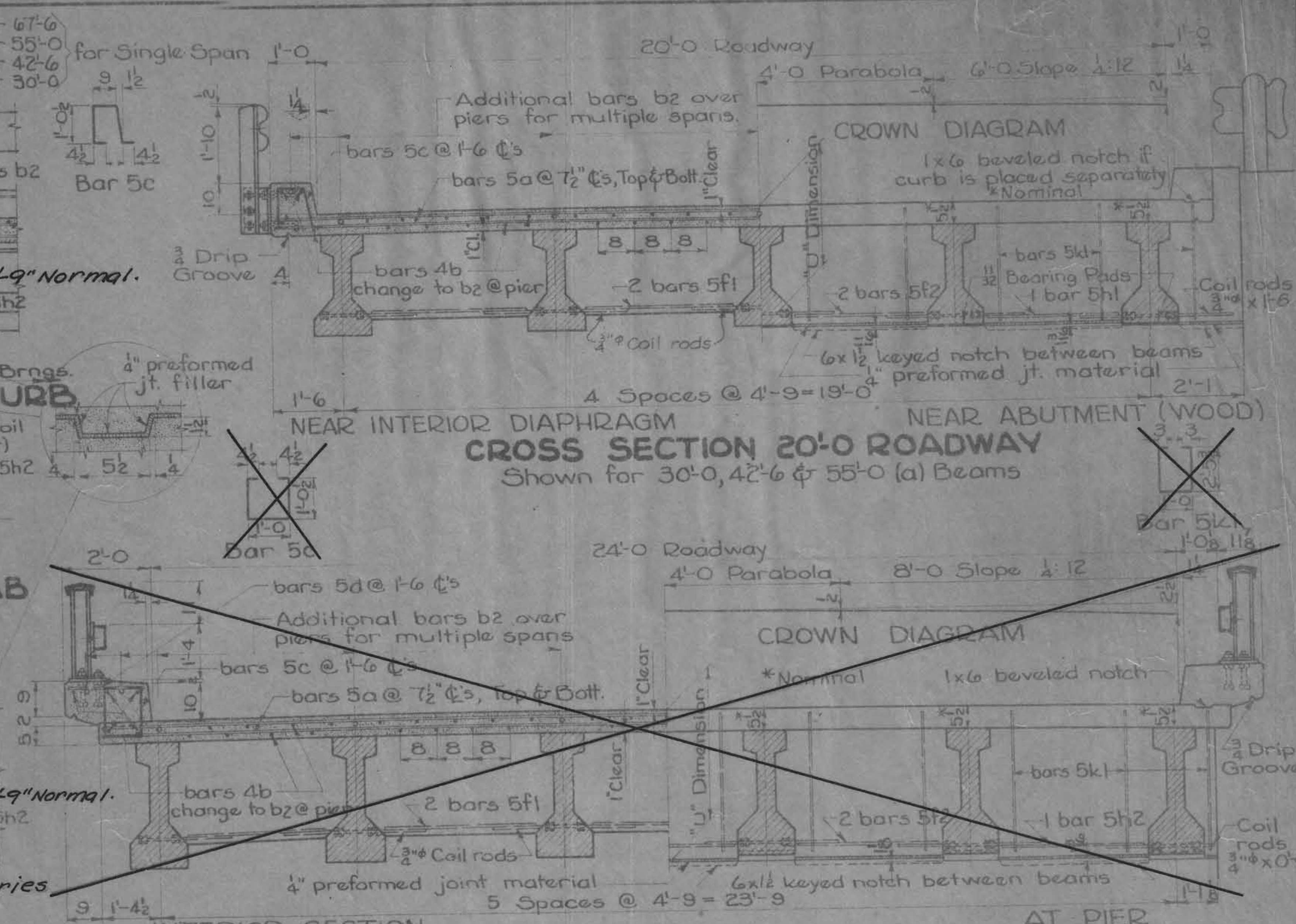
Scale: 3/8" = 1'-0



PLAN AT ABUT. (Cut away to show Msry. Pl.)

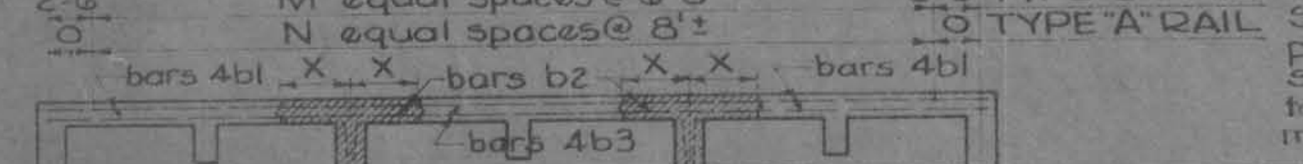
SECTION BELOW SLAB

LONGITUDINAL SECTION NEAR CURB



CROSS SECTION 20'-0 ROADWAY
Shown for 30'-0, 42'-6 & 55'-0 (a) Beams

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



M equal spaces @ 6'-3
N equal spaces @ 8'±
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'-½~~	~~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.

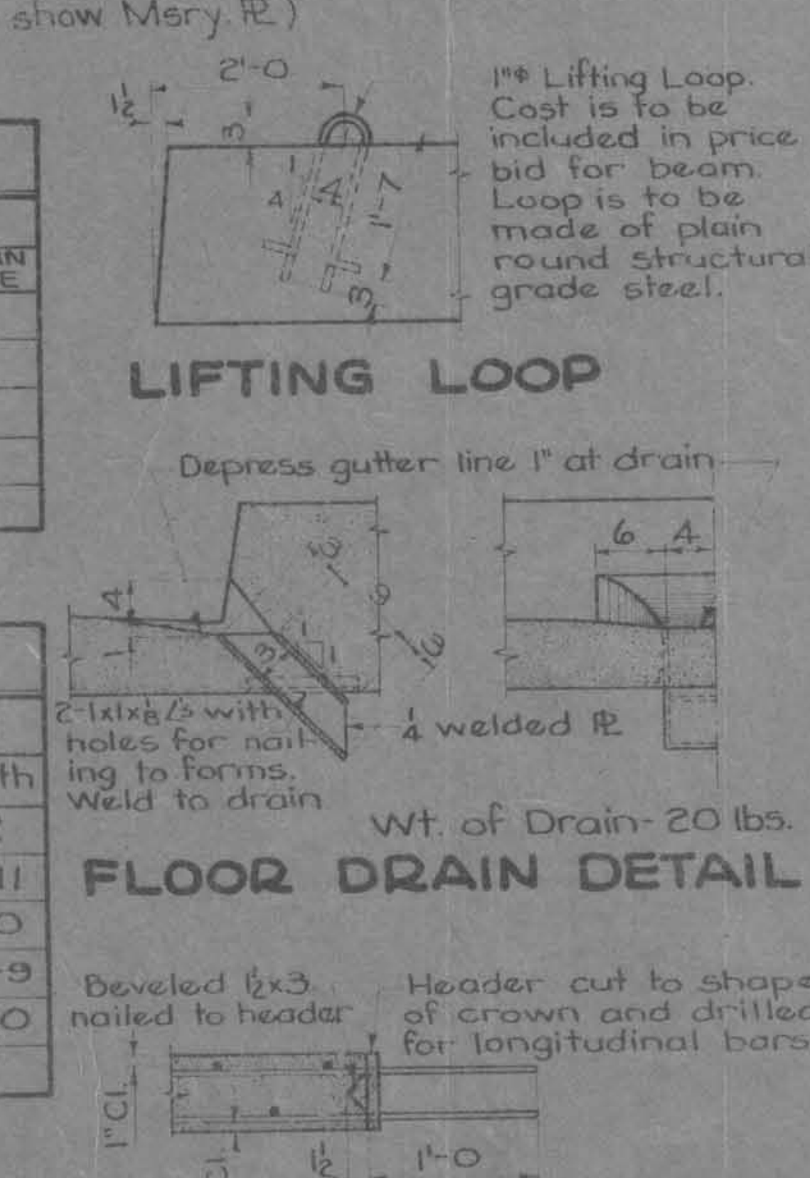
BEAM DATA

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	



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.

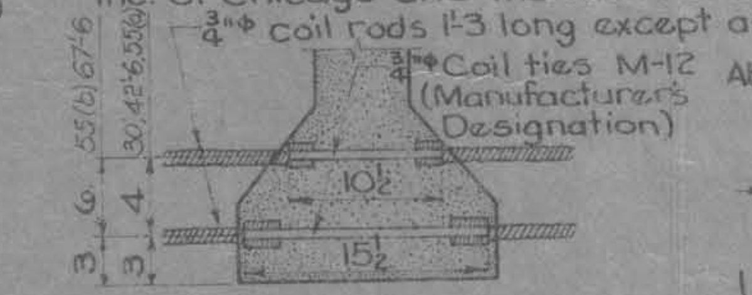
Forms for slab are to be supported by the prestressed beams.

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.

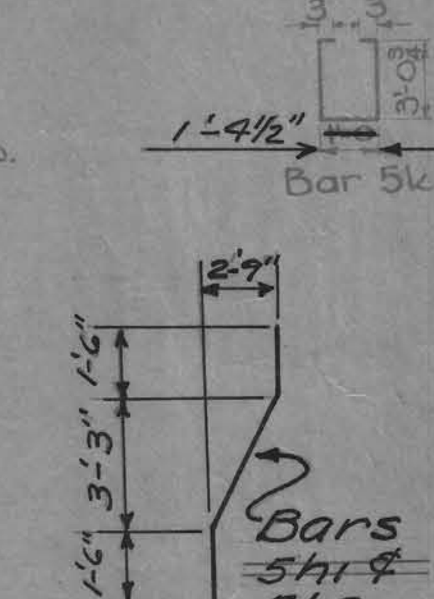
Coil rods shown below shall be similar to and equal to those manufactured by the Superior Concrete Accessories Co. Inc. of Chicago and the Richmond Screw Anchor Co. of St. Joseph, Mo.



LOCATION OF COIL TIES

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.

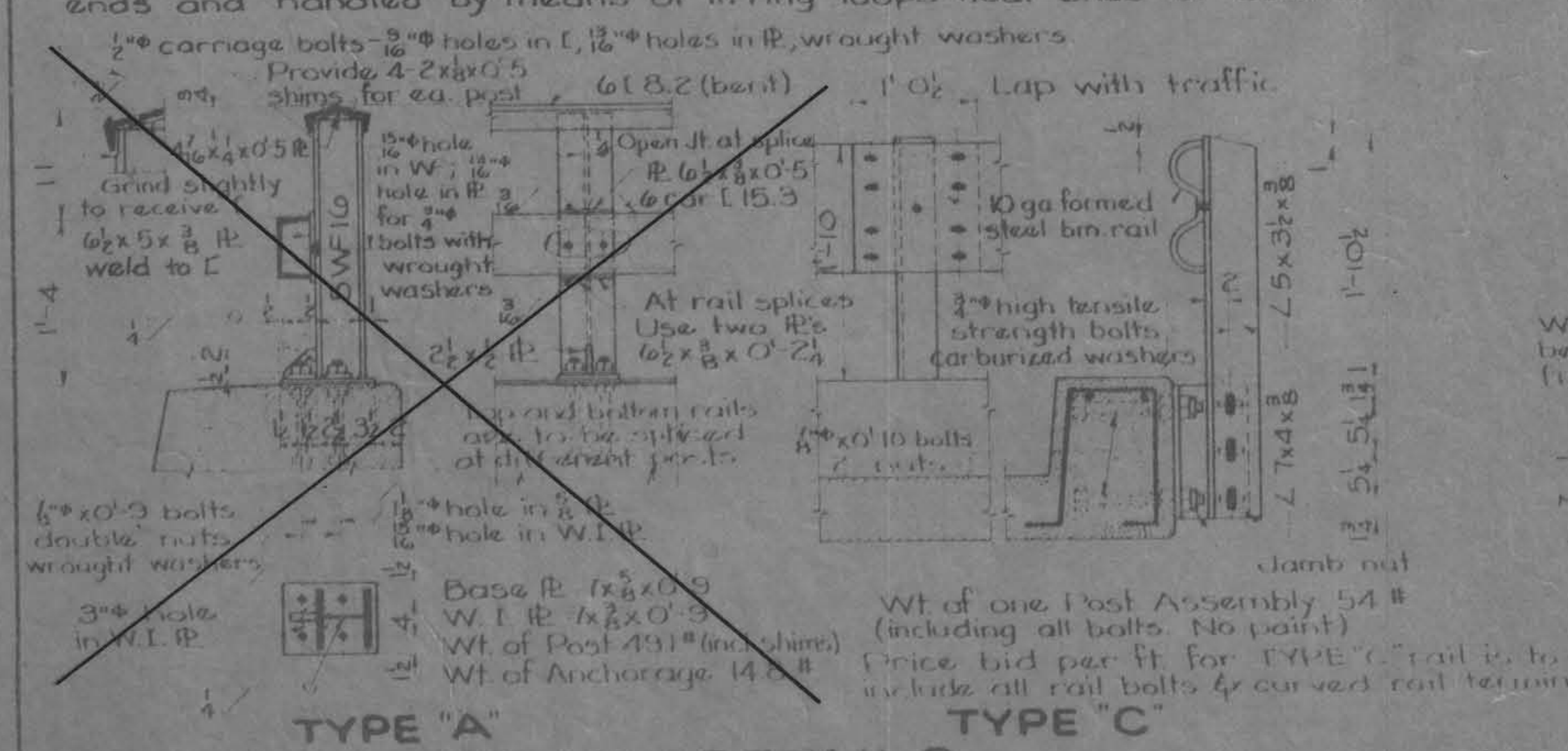


BILL of REINF. STEEL-SUPERSTRUCTURE

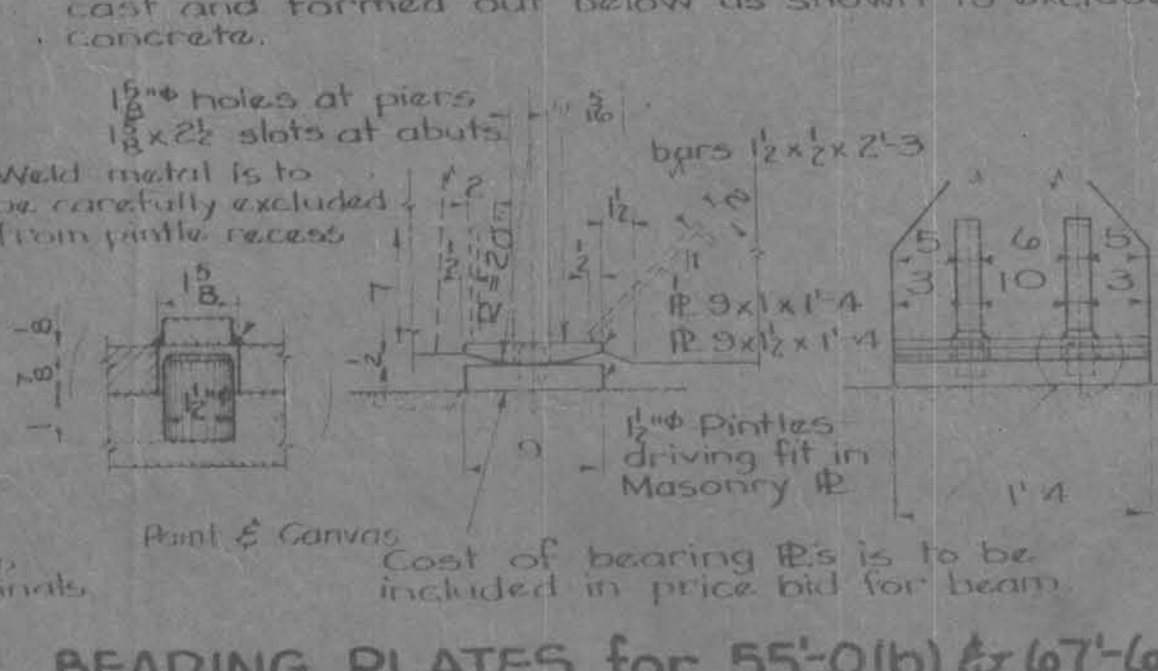
BAR	LOCATION	SHAPE	Nº	LENGTH	WEIGHT
5a	Slab Transverse	—	70 627	var. 21'-8"	15,021
4b1	Slab Longitudinal	—	176	31'-0"	3,645
6b2	Slab Lngtl. Over Piers	—	102	17'-8"	2707
4b3	Slab Longitudinal	—	88	26'-10"	1577
5c	Curb Dowels	⊓⊔	276	3'-3"	936
5d	Curb Transv. (Type "A" Rail)	⊓	—	—	—
6e	Rail Post Anchor (Type "A" Rail)	⊏	—	—	—
5f1	Intermediate Diaphragm	—	24	4'-1"	102
5f2	Abut. & Pier Diaph's. Short	—	32	3'-9"	125
5h1	Abutment Diaph's. Long	—	4	24'-6"	103
5h2	Pier Diaphragms Long	—	8	7'-5"	62
5k1	Abutment & Pier Hoops	□	40	7'-6"	313
					TOTAL = 24,591

ESTIMATED QUANTITIES-SUPERSTRUCTURE

ITEM	UNIT	QUANTITY
Concrete	cu.yd.	112.40
Reinforcing Steel	lbs.	24,591
Structural Steel	lbs.	3,724
Pre-stressed Conc. Beams	Beam	15@67'-6"
Pre-stressed Conc. Beams	Beam	—
Formed Steel Beam Rail	L.F.	414'-1" "C"
Creosoted Wood Rail Posts 8"φx6'-0	Post	—



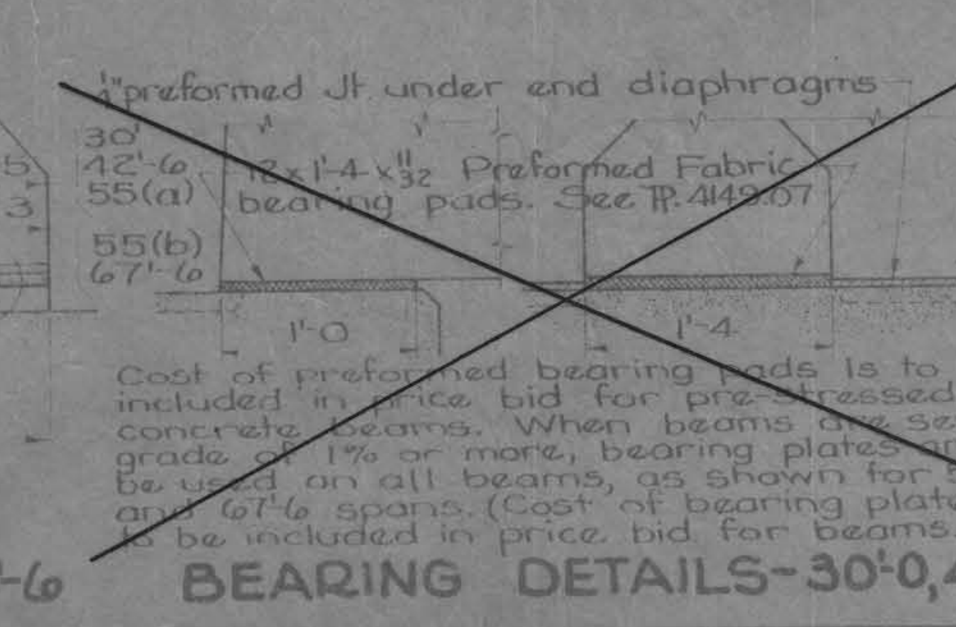
TYPE "A" TYPE "C"
RAIL DETAILS



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

Cost of bearing Pl's. is to be included in price bid for beam.

BEARING PLATES for 55'-0(b) & 67'-6



BEARING DETAILS-30'-0, 42'-6 & 55'-0(a)

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 3-4
East Boyer Twp.
T.83N. R.38W.

Rev. 4-23-57 - Strands revised

Design for
PRE-TENSIONED
PRE-STRESSED CONCRETE BEAM BRIDGES
30'-0, 42'-6, 55'-0 & 67'-6 SPANS
20'-0 AND 24'-0 ROADWAYS
H15-44 LOADING

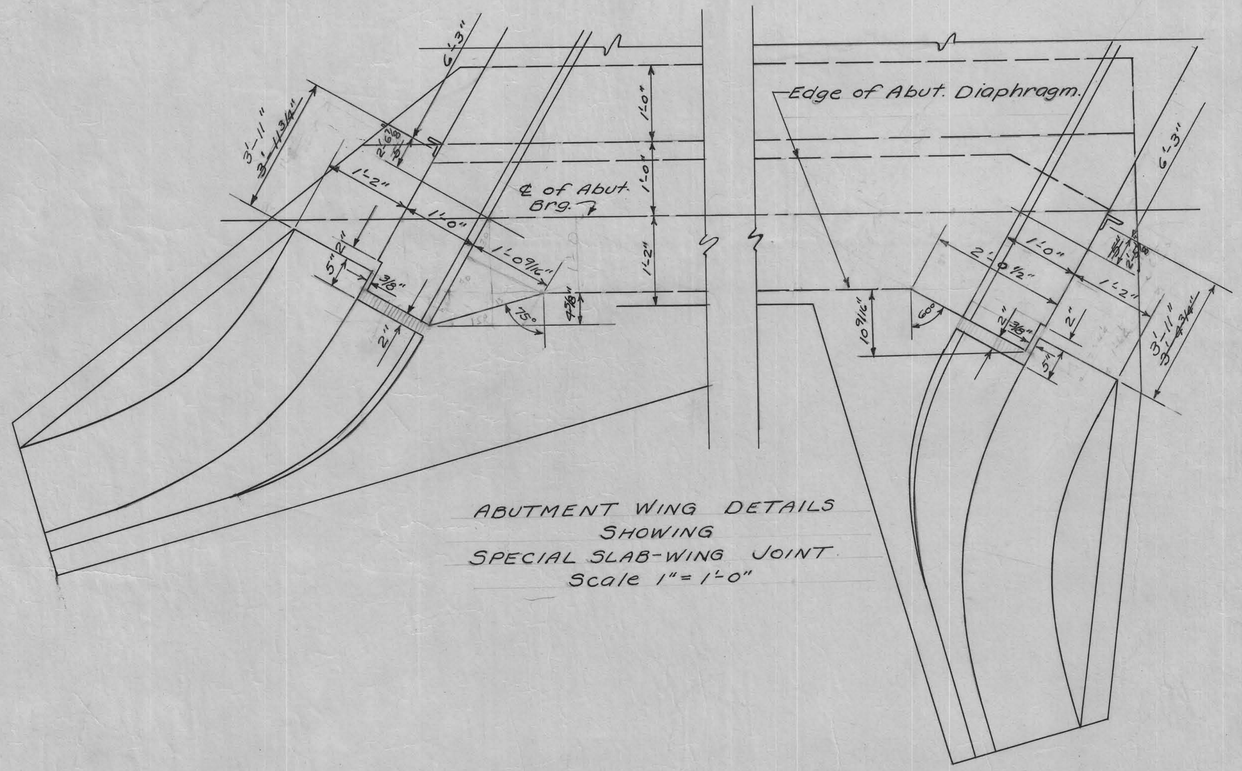
205'x20' CONCRETE BEAM BRIDGE
STA.-123+94.0 PROJ. NO. S-1273

Iowa State Highway Commission
December 1956
Sheet PC-5

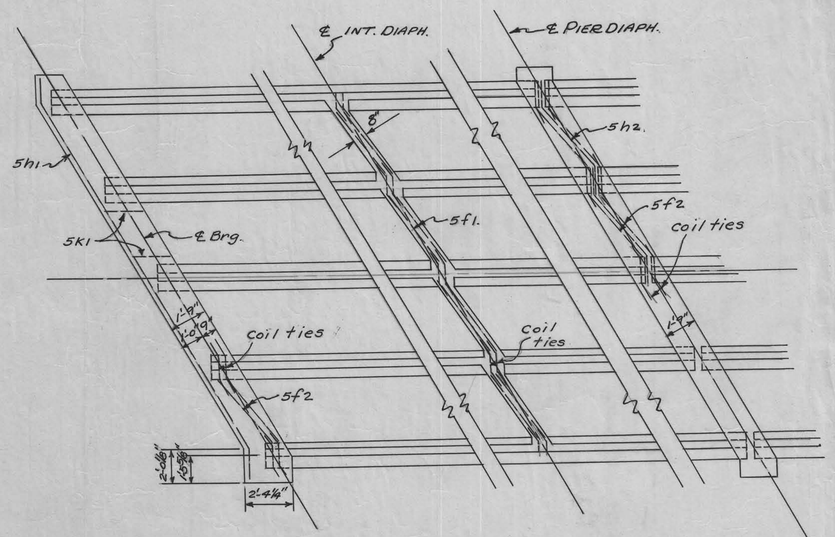
3
4

Design # 1257 CRAWFORD COUNTY. Proj # S-1273(2) Sheet # 4 of 4. File

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



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



ABUTMENT, INTERMEDIATE & PIER DIAPHRAGMS.
SCALE = 1/4"= 1'-0"

Revised Jan 31, 1958 - Rail post locations changed.

4/4

DESIGN FOR 30° SKEW.

205'x20' PRE-STRESSED CONCRETE BEAM BRID
CONCRETE FLOOR - STEEL HANDRAIL
STA-123+94.0 PROJECT No. S-12
CRAWFORD COUNTY, IOWA.
SUPPLEMENTAL SH

CRAWFORD COUNTY. DESIGN No.-1257 PROJ. No. S-12