

BRIDGES & CULVERTS WINNESHEEK CO. NOVEMBER 6, 1962 L.F.T.

FEED	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
1	IOWA				

Design No 961	T-98N	R-8W	Station 131+85.02
Section 7	Over Madison Creek		Decorah Township
<b>376'-2 X 30' PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE ON 1°00' CURVE</b>			
ESTIMATE OF QUANTITIES			
Item	Total		
Concrete	633.1 c.y.		
Reinforcing Steel	141,077 lbs.		
Prestressed Concrete Beams	7 only		
10BP42 Steel	14 only		
10BP42 Steel furnish	16 @ 15', 16 @ 20', 10 @ 30'		
Bearing Piling drive	16 @ 27', 9 @ 35'		
Excavation	227 c.y.		
Class 20	264 c.y.		
Class 21	87 c.y.		
Granular Backfill	28 tons		
4" Tile Drain	87 L.F.		
OR Aluminum Handrail (4'-6" End Posts)	OR 736.0 L.F.		
OR Steel Handrail (4'-6" End Posts)	OR 735.0 L.F.		

\* If Steel Handrail is used, reduce Reinforcing Steel Estimate 53 lbs.

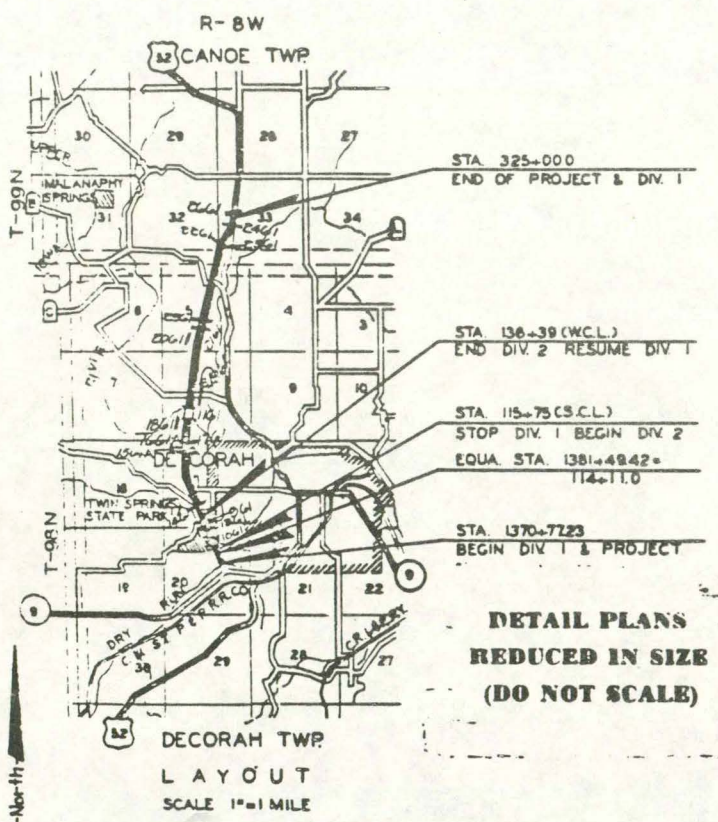
STATE OF IOWA  
STATE HIGHWAY COMMISSION  
DESIGN FOR  
**BRIDGES AND CULVERTS**  
PRIMARY ROAD SYSTEM  
PROJECT NO. F -1112(1)  
**WINNESHEEK COUNTY**  
AUGUST 1962

Design No 1061	T-98N	R-8W	Station 118+37.00
Section 20	Over Dry Run Creek		Decorah Township
<b>84' X 30' OPEN SPANDREL CONCRETE ARCH BRIDGE 40° SKEW</b>			
ESTIMATE OF QUANTITIES			
Item	Total		
Concrete	261.2 c.y.		
Reinforcing Steel	60,007 lbs.		
*Excavation, Class 22	95 c.y.		
Aluminum Handrail (4'-6" End Posts)	125.0 L.F.		
Mortar Rubble Masonry	44 c.y.		
*Mass Concrete	13.3 c.y.		

\* Refer to Design Sheets for Notes

Design No 1161	T-26A	R-8W	Station 106+29.00
Section 8	Over Upper Iowa River		Decorah Township
<b>410'-0 X 30' CONTINUOUS I-BEAM BRIDGE 15° SK.</b>			
ESTIMATE OF QUANTITIES			
Item	Total		
Concrete	772.2 c.y.		
Reinforcing Steel	170,804 lbs.		
*Structural Steel	392,802 lbs.		
4" Tile Drain	150 L.F.		
10BP42 Steel furnish	16 @ 15', 16 @ 20', 10 @ 30'		
Bearing Piling drive	16 @ 27', 9 @ 35'		
Granular Backfill	156 Tons		
Excavation	304 c.y.		
Class 20	265 c.y.		
Class 21	87 c.y.		
OR Aluminum Handrail (4'-6" End Posts)	OR 806.0 L.F.		
** Steel Handrail (4'-6" End Posts)	OR 802.7 L.F.		
Class 22 Excavation	140 c.y.		

\* Includes 348,916 lbs A-36 Steel  
\*\* If Steel Handrail is used, reduce Reinforcing Steel Estimate 108 lbs.



DESIGN NO.	LOCATION			DESCRIPTION	ESTIMATE OF QUANTITIES											
	Section	Township	Station		Size and Type	Concrete Cubic Yards	Reinf. Steel lbs.	Excavation Class 20	Excavation Class 23	Cubic Yards Class 24	Channel	Granular Backfill Tons	Conc. Ent. Pipe Cully L.F.	Conc. Pipe Aprons 30"x42"	P.C. Conc. Pavement 10'-3q Ws	Removals
1361	20	Decorah	124+70	3'x3'x12' Reinforced Concrete Box Culvert	49.5	3557	77									
1461	17	Decorah	146+70	3'x3'x30' Reinf. Conc. Box Culv. & Stub Flume-15° Sk	172.9	13,509	170		15	89						
1561	17	Decorah	170+55	2'x3'x15' Reinf. Concrete Box Culvert - 10° Skew	62.4	3787		57			95					
1661	17	Decorah	173+49	2'x3'x20' Reinforced Concrete Box Culvert	89.7	2783		26			60					
1761	17	Decorah	178+23	2'x3'x20' Reinforced Concrete Box Culvert	35.8	2063		29			60					
1861	8		194+26-40	Lt - 30'x28' Conc. Ent. Pipe Cully & 3'x2' Stub Flume	14.6	241	70			100	22				ONE INLET	
1961	8		1212+07	5'x5'x43' Reinforced Concrete Box Culvert	35.4	2832	119									
2061	5	Decorah	240+42.5	63'-Lt - 42'x28' Conc. Ent. Pipe Cully & 4'x3' Stub Flume	20.0	1115	57			309	20				ONE INLET	
2161	5		252+17	4'x4'x168' R.C.B. Cully & Stub Flume, with 6'x4' Tapered Inlet	114.6	5529	179			7						
2261	33	Canoe	304+82	3'x3'x16' Reinf. Concrete Box Culvert - 10° Skew	60.5	5554	79			21						
2361	33	Canoe	1122+23.7	3'x3' Reinf. Concrete Box Culvert Ext - 30° 40' Sk.	54.1	4442	23								As Per Plan	
2461	33		318+87	4'x5.5'x49' Reinf. Conc. Box Cully - Stockpass	59.0	3237	216									
2561	5	Decorah	253+50	4'x5.5'x54' Reinf. Conc. Box Cully - Stockpass	41.7	3469	74									
2661	33	CANOE	326+00	4'x5.5'x48' REINF. CONC. BOX CULV. - STOCKPASS	38.5	3181	228							40	AS PER PLAN	
1561-A	17	DECORAH	170+56	2'x3'x20' REINF. CONC. BOX CULV. & STUB FLUME - 10° SKEW	51.4	2923				148						
1661-A	17		173+49	2'x3'x22' REINF. CONC. BOX CULV. & STUB FLUME	35.6	2018				88						
Totals					770.4	64,406	1,360	265	15	526	60	22,200	1	1	40	

**Specifications**  
Construction Standard Specifications of the Iowa State Highway Commission, Series of 1960, plus current Supplemental Specifications and Special Provisions.

Design Stresses for the following materials are in accordance with A.A.S.H.O. Standard Specifications for Highway Bridges, Series of 1961.  
Structural Steel in accordance with Section 1.4.2 "Structural Carbon Steel."  
Reinforcing Steel in accordance with Section 1.4.12 "Reinforcement" for Intermediate, Hard, or Rail Steel Grade.  
Concrete in accordance with Section 1.4.11 f'c = 3500 psi.  
Prestressed Concrete in accordance with Section 1.13.7 f'c = 5000 psi.  
Prestressing Steel in accordance with Section 1.13.7 fpu = 250,000 psi.  
Mortar Rubble Masonry in accordance with A.A.S.H.O. Construction, Section 7.

Design Stresses for A-36 Steel to be in accordance with B.R.R. Circular Memorandum dated August 29, 1960 entitled "Unit Stresses for A.S.T.M. A-36 Carbon Steel."

- Revised 7-23-63 Design 1061, Sheet 4a of 7 added, concrete quantities changed, on Sheets 1, 4 & 5 of 7.
- Revised 7-16-63 Design Nos 1561 & 1661 superseded by 1561A & 1661A Quantities change accordingly.
- Revised 7-16-63 Design No 1061, Sheet 3a of 7 added; concrete, reinforcing and Class 22 Excavation quantities changed.
- Revised 6-12-63 Design No 1061, Sheet 5 of 7, Permissible splice for bottom bar bars added.
- Revised 3-12-63 Design No 1061, Sheet 2 of 7, Rib notch dimension corrected.
- Revised 12-28-62 Design No 2161, Reinforcing Steel quantity corrected.

- Revised 12-14-62 Design 2161 - Longitudinal Dim. Corrected
- Revised 12-10-62 Design 1161 - Title Sheet, Sheets 1, 7 - Structural Steel quantity changed due to Contractor's desire to eliminate 16 splices, and details changed Sheet 6A added.
- Revised 10-24-62 Design 1161 - Title Sheet - Total Estimated Quantities changed. Class 22 Excavation added.
- Sheet 1 - Bot of Footing Elev., Pier 1 changed, Total Estimated Quantities changed. Class 22 Excavation added to total Estimators Quantities. Test Holes F-4720 & F-4721 added to Situation Plan.
- Sheet 2 - Test Holes F-4720 & F-4721 added.
- Sheet 4 - This sheet voided for Pier 1, and Sheet 4a added.
- Sheet 10a - Note added making sections of steel handrail continuous through at least three sections.
- Revised 10-24-62 Design 961 - Sheet 11 - Note added making sections of steel handrail continuous through at least three posts.
- Revised 10-8-62 Design 961 - Title Sheet, Sheet 10f and Sheet 9 of 11 - piling quantity changed.
- Revised 9-25-62 Aluminum Post Casting finish changed, sheet 2 of 7 design 1061, sheet 10 of 10 design 1161.

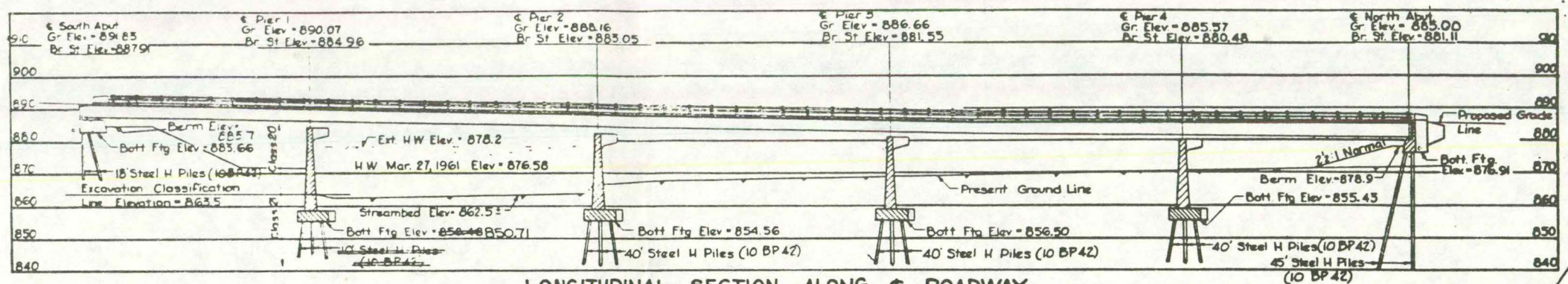
These Bridges will require Bridge Sign Assemblies furnished and placed by others as specified in Traffic and Highway Planning Instruction No. 11, Revised 10-1-61.

**Mileage Summary:**  
Bridge at Sta 131+85.02 = .072 mile  
Bridge at Sta 118+37.00 = .019 mile  
Bridge at Sta 106+29.00 = .078 mile  
Total = .169 mile

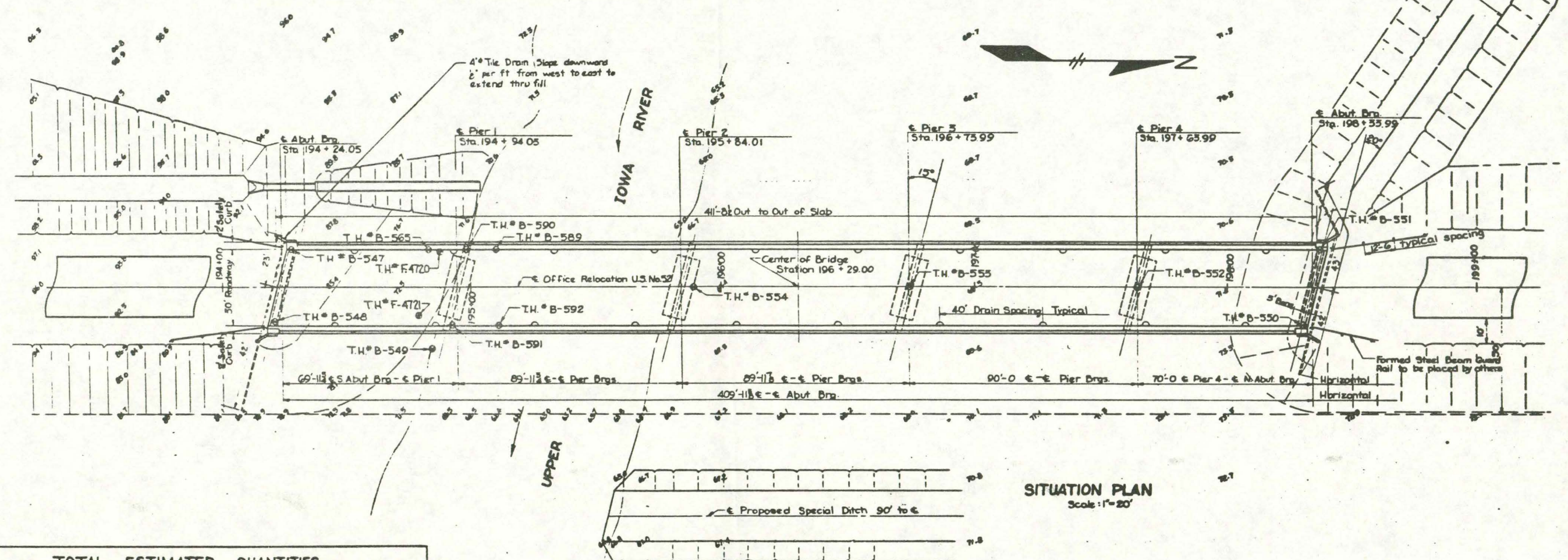
APPROVED: *R.M. Cotton*  
DEPUTY CHIEF ENGINEER  
IOWA HIGHWAY COMMISSION  
DATE: 9-17-62

DEPARTMENT OF COMMERCE  
BUREAU OF PUBLIC ROADS  
APPROVED: \_\_\_\_\_  
DIVISION ENGINEER  
DATE: \_\_\_\_\_

800 VC  
 P.I. Station 194+50  
 P. Elev. = 887.12  
 -0.554%



LONGITUDINAL SECTION ALONG ROADWAY  
 Scale: 1" = 20'



SITUATION PLAN  
 Scale: 1" = 20'

TOTAL ESTIMATED QUANTITIES					
Item	Unit	Superstr.	2 Abuts.	4 Piers	Total
Concrete	CY	412.6	62.4	297.2	772.2
Reinforcing Steel	lbs	120448	6342	42978	178,804
Structural Steel*	lbs	406,094		23,818	430,912
4" Tile Drains	LF		150		150
10BP42 Steel Furnish	LF		94.18	94.45	188.63
Bearing Piling Drive	LF		94.18	94.45	188.63
Granular Backfill	Tons		156		156
Class 20 Excavation	CY		164	270	434
Class 21 Excavation	CY			265	265
Aluminum Handrail (4" End Posts)	LF	806.0			806.0
Steel Handrail (4" End Posts)	LF	802.7			802.7
Class 22 Excavation	CY			160	160

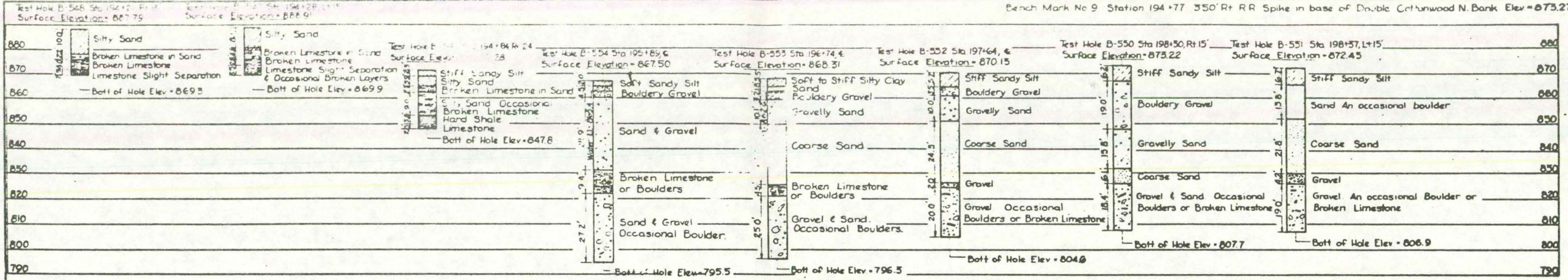
\* Includes 246,966 lbs. of A-36 Steel. \*\* If steel handrail is used, reduce Reinforcing Steel Estimate 108 lbs.

HYDRAULIC DATA  
 Drainage Area = 472 sq. mi.  
 Design Discharge = 21,000 cfs.

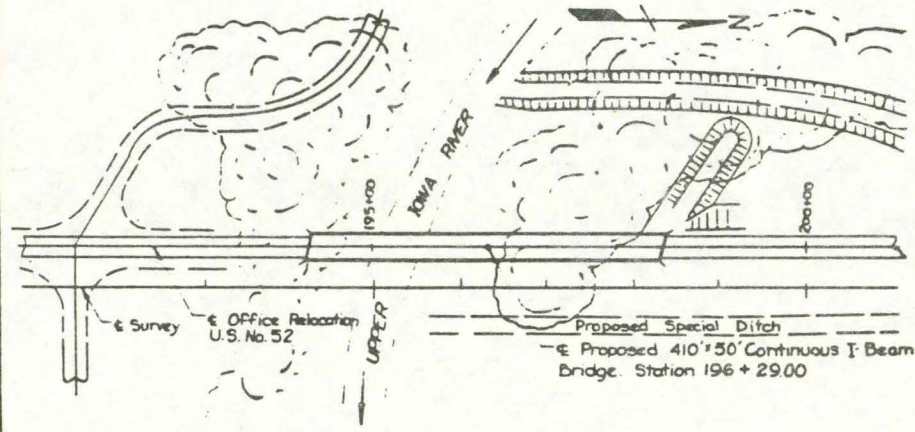
LOCATION  
 Section 8  
 T-90N R-8W  
 Decatur Twp.  
 Winneshiek Co.  
 Over Upper Iowa River  
 On U.S. No. 52

Revised 12-10-62: Structural Steel quantity changed due to contractor's desire to eliminate 16 splices. Details changed and Sheet 6a added.  
 Revised (10-24-62): Test Holes F-4720 & F-4721 added to Situation Plan. Bottom of Footing Elev., Pier 1 changed. Total Estimated Quantities changed. Class 22 Excavation added to Total Estimated Quantities.

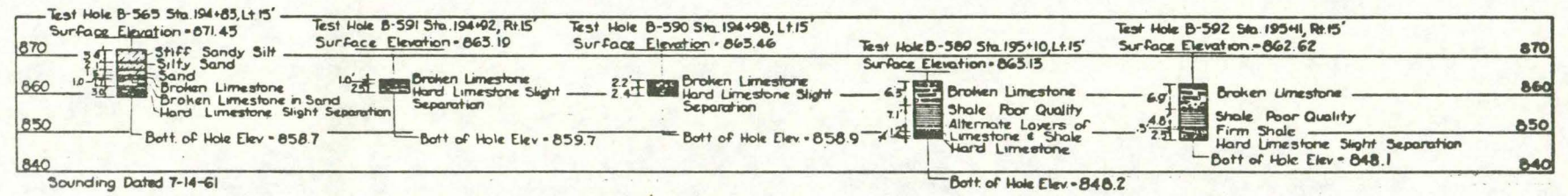
Design for 15' Skew  
**410'-0" X 30' CONTINUOUS I-BEAM BRIDGE**  
 70'-0" End Spans  
 Concrete Floor & Substructure  
 90'-0" Interior Spans  
 Tubular Rail  
**SITUATION PLAN**  
 Station 196+29.00  
**WINNESHIK COUNTY**  
 Iowa State Highway Commission  
 October 1961  
 Design No. 1161 Winneshiek County  
 Project No. F-1112 (1)  
 Sheet 1 of 10  
 File No. 2058



Soundings Dated 7-7-61

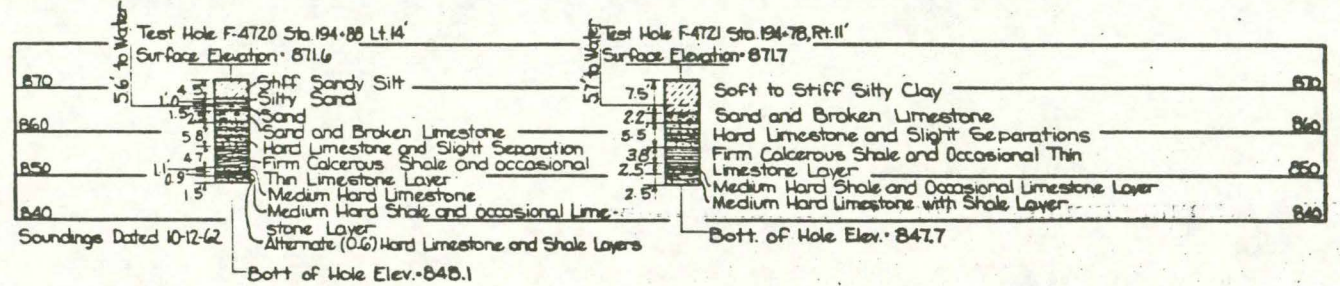


GENERAL PLAN  
Scale: 1"=100'



Soundings Dated 8-2-61  
Test Holes B-589-592 drilled in 1.5' of water

SOUNDING DATA



Soundings Dated 10-12-62

**GENERAL NOTES:**

This bridge is designed for H20-S16-44 loading plus an allowance of 10 lbs per sq ft of roadway for future wearing surface. The approach fills are not a part of this contract, but are to be in place before abutment piles are driven. The Bridge Contractor is to level and shape the berms to the elevations shown. Formed steel beam rail and treated posts are not a part of this contract and will be furnished by others. DESIGN STRESSES for the following materials are in accordance with A.A.S.H.O. Standard Specifications for Highway Bridges, Series of 1961:  
Structural Steel in accordance with Section 1.4.2 "Structural Carbon Steel."  
Reinforcing Steel in accordance with Section 1.4.12 "Reinforcement for Intermediate, Hard or Rail Steel Grade."  
Concrete in accordance with Section 1.4.11.  $f_c = 5500$  psi.

Design stresses for structural steel (A-36) to be in accordance with BPR Circular Memorandum dated Aug 29, 1960 entitled "Unit Stresses for ASTM A-36 Carbon Steel."  
The Bridge Contractor is to install the tile drain behind each abutment as detailed. The price bid for "Tile Drain" is to include the excavations necessary for installation.

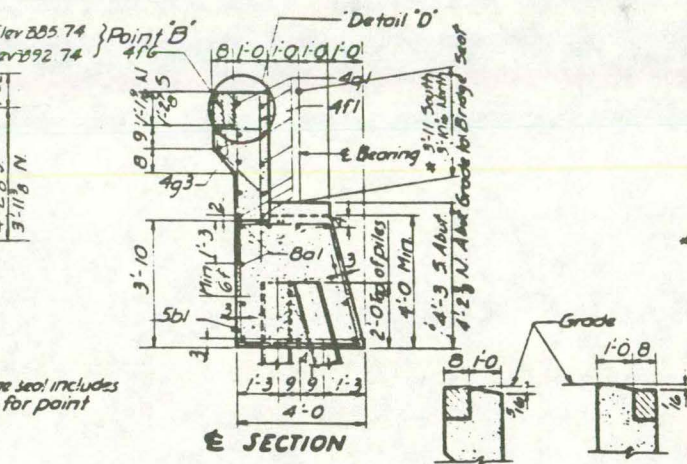
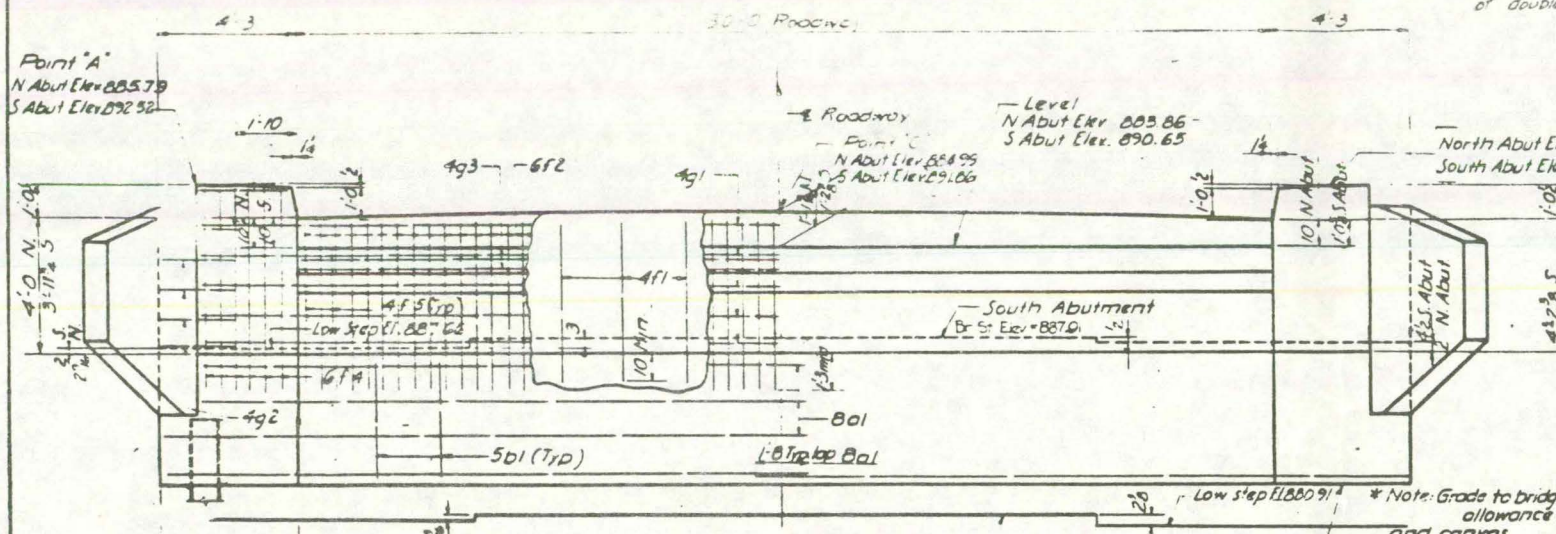
**SPECIFICATIONS:**

Design: AA S.H.O., Series of 1961.  
Construction: Standard Specifications of the Iowa State Highway Commission, Series of 1960, plus current special provisions, and supplemental specifications.

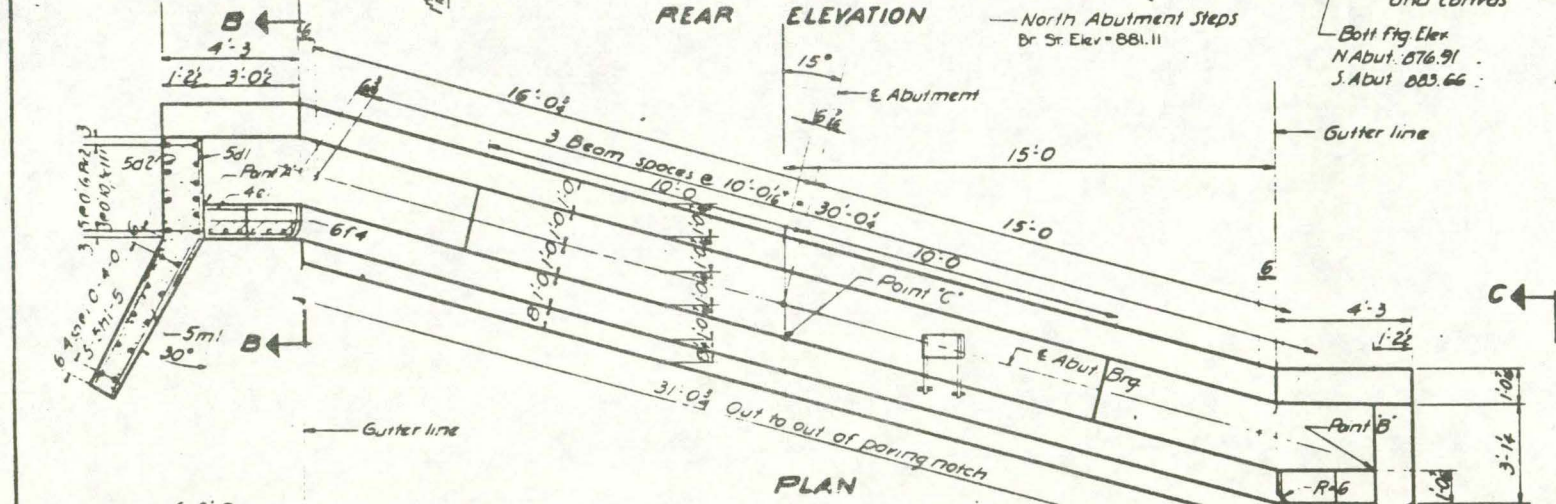
Design for 15° Skew  
**410'-0" x 30' CONTINUOUS I-BEAM BRIDGE**  
70'-0" End Spans 90'-0" Interior Spans  
Concrete Floor & Substructure Tubular Rail  
**GENERAL PLAN**  
Station 196+29.00 Project No. F-112(1)  
**WINNESHIEK COUNTY**  
Iowa State Highway Commission  
October 1961 Sheet 2 of 10  
Design No. 1161 Winneshiek County File No. 21058

Revised (10-24-62) Test Holes - F-4720 and F-4721 added.

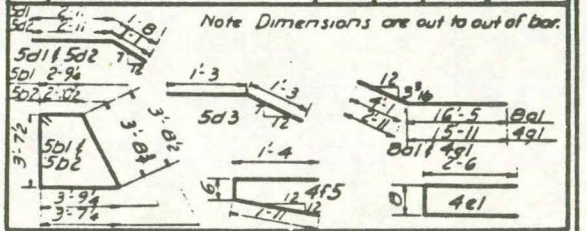
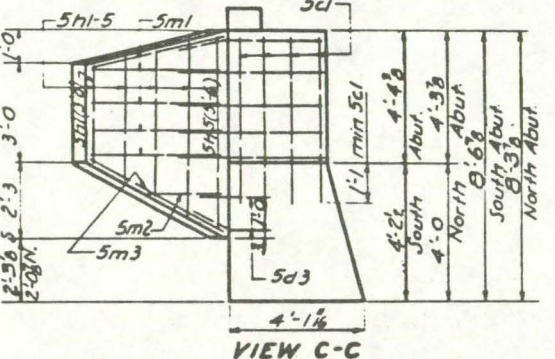
Bench Mark N<sup>o</sup> 9 Station 194+77 350 Ft RE Spike in base of double cottonwood N Bank Elev. 875.27



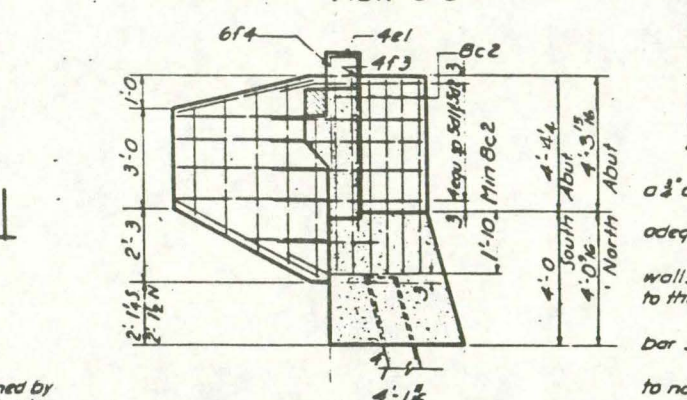
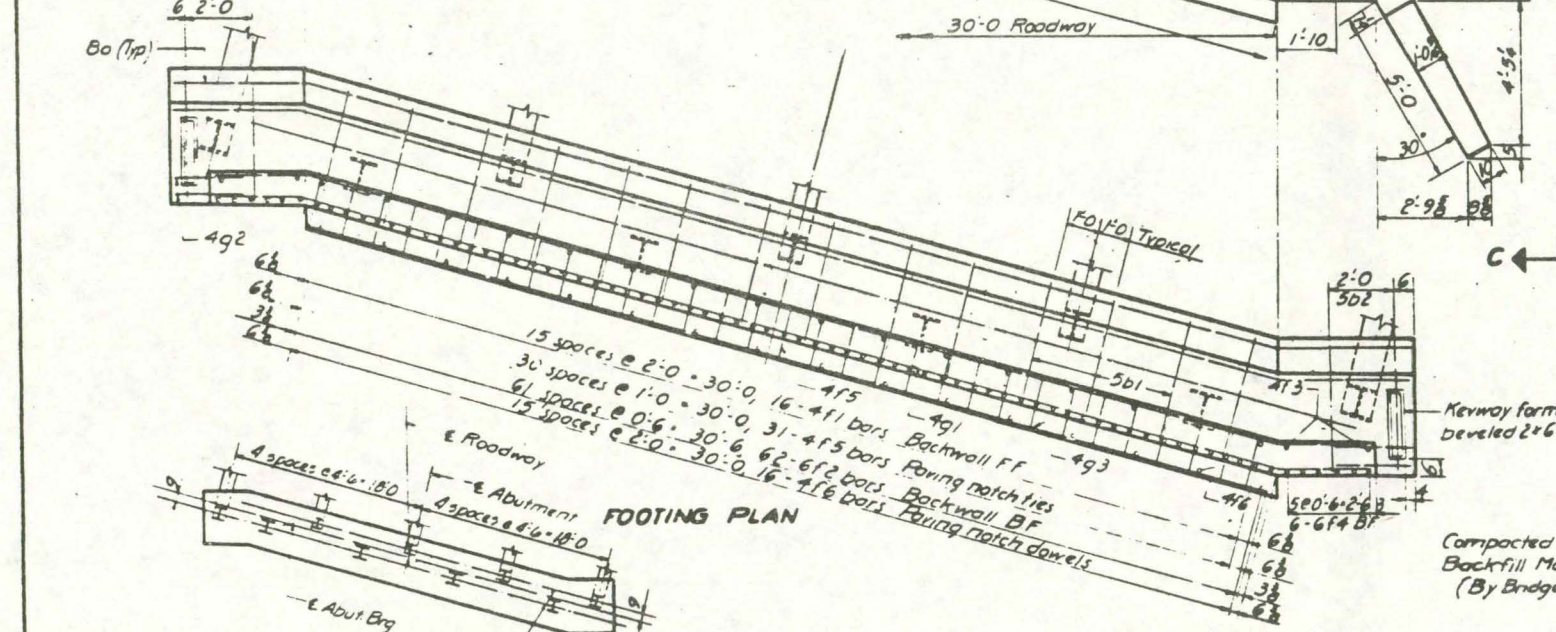
REINFORCING STEEL - ONE ABUT.				
Item	Shape	N <sup>o</sup>	Length	Weight
5d1	Footings Longit	22	20'-6"	120.4
5d1	" " hoops	14	14'-5"	27.1
5d2	" " Ends	4	14'-9"	6.2
5c1	End Walls Vert	8	5'-9"	4.4
5c2	" " BF	12	6'-0"	19.2
5d1	" " Horiz BF	10	4'-7"	4.8
5d2	" " FF	10	4'-0"	4.2
5d3	Footings to Wing Dowels	8	2'-6"	2.1
4e1	Curb Horiz	2	5'-6"	7
4f1	Backwall Vert	16	5'-2"	5.5
6f2	" " BF	62	5'-7"	52.0
4f3	" " Ends Vert	4	6'-2"	1.6
6f4	" " BF	12	6'-7"	11.9
4f5	Paving Notch Tie	31	3'-8"	7.6
4f6	" " Dowels	16	1'-6"	1.6
4g1	Backwall Horiz	20	18'-10"	25.2
4g2	" " " " "	20	2'-0"	2.7
4g3	Paving Notch Horiz	2	30'-10"	4.1
5h1-5	Wing Vert	20	Varies	8.9
5m1	" " Horiz	20	4'-8"	9.7
5m2	" " " " "	4	2'-5"	1.0
5m3	" " FF	4	5'-3"	2.2
*Structural grade steel				
				Total 317.1



Note: After bending down paving notch dowels and covering with two layers of tar paper, place temporary paving block as shown.

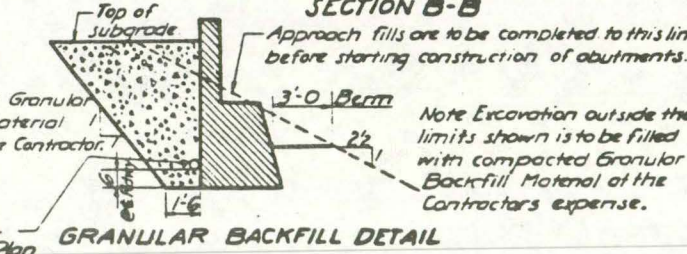


CONCRETE PLACEMENT QUANTITIES - 1 ABUT.		
Item	Unit	Amount
Footings	C.Y.	21.3
Backwall	C.Y.	6.1
Wings	C.Y.	5.0
Paving Block	C.Y.	0.8
<b>TOTAL</b>	<b>C.Y.</b>	<b>33.2</b>



TOTAL ESTIMATED QUANTITIES - TWO ABUTS.		
Item	Unit	Total
Concrete	C.Y.	67.4
Reinforcing Steel	Lbs.	634.2
10 BP42 Steel 9 x 18'	Furnish	L.F. 567
Bearing Piling 9 x 65'	Drive	L.F. 567
Granular Backfill	Tons	156
Class 20 Excavator	C.Y.	16.4

**ABUTMENT NOTES:**  
 All exposed corners 90° or sharper are to be formed with a 3/8" dressed and beveled fillet.  
 All reinforcing is to be securely wired in place and adequately supported on metal bar chairs before concrete is placed.  
 Bridge Contractor is to backfill abutments between wing walls with compacted granular backfill material conforming to the requirements of Section 4133 of the I.S.H.C. Std. Specs. of 1960.  
 Clear distance from face of concrete to near reinforcing bar shall be 2" unless otherwise shown or noted.  
 Piling is to be driven to full penetration if practicable, but to no less than 37 tons bearing (North Abutment only).  
 Piling for South Abutment to be driven to refusal in limestone.  
 Number of piles is based on 37 ton bearing.



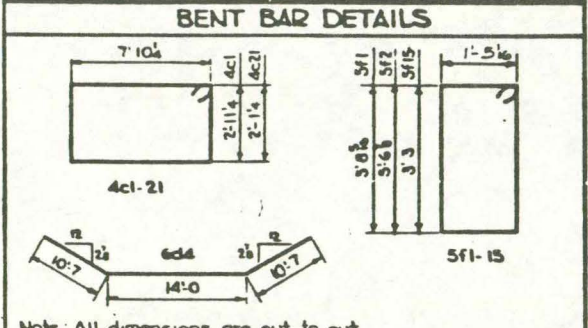
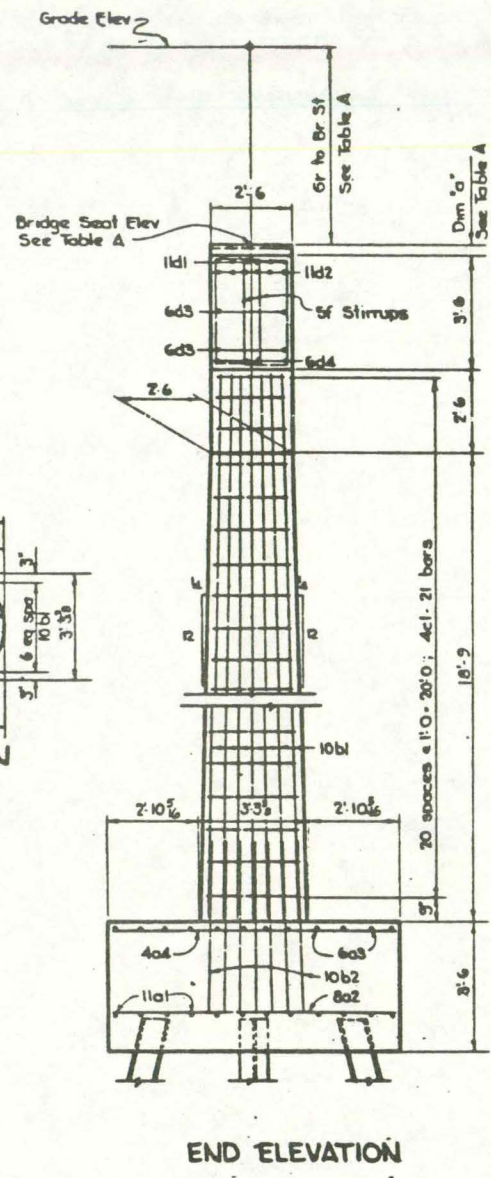
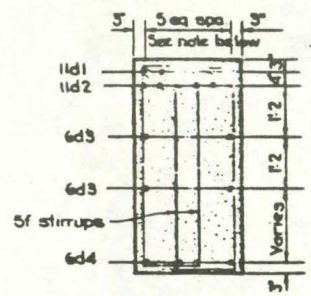
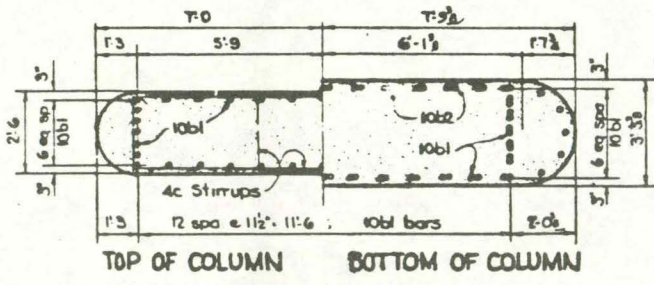
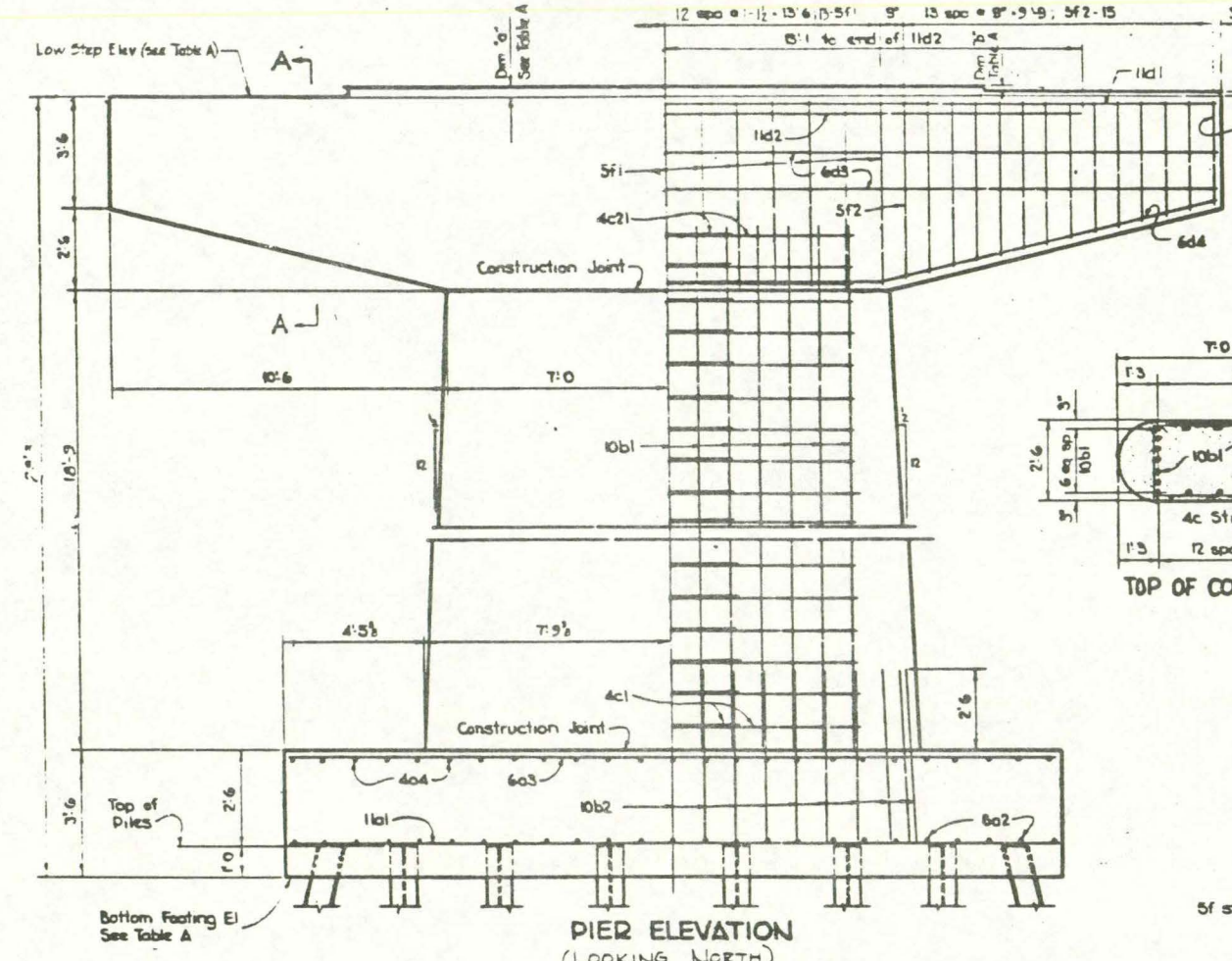
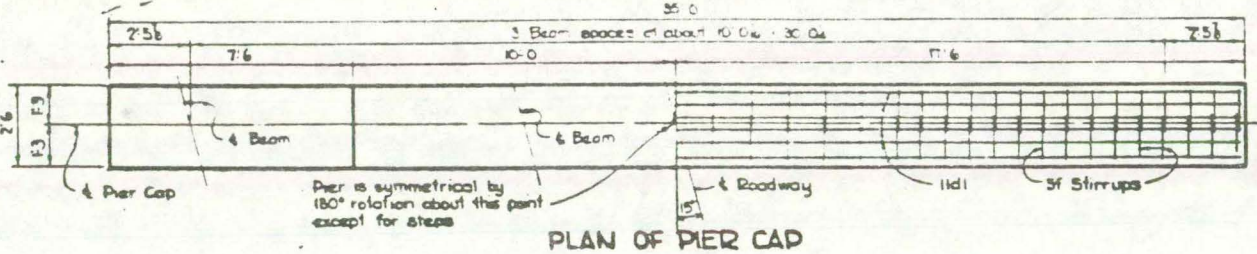
Design for 15° Skew  
**410' x 30' CONTINUOUS I-BEAM BRIDGE**  
 70'-0" End Spans 90'-0" Center Spans  
 Conc. Floor and substructure Tubular Rail  
**ABUTMENT DETAILS**  
 Station 194+29.00 Project F-1112(1)  
**WINNESHIEK COUNTY**  
 Iowa State Highway Commission  
 October 1961 Sheet 3 of 10  
 Design No. 116. Winneshiek Co. File No. 21050

NOTE:  
 9-18" piles required for South Abut.  
 9-45" piles required for North Abut.

4" Tile Drain.  
 (See Situation Plan Sheet 3 for length)

Bench Mark No 9 Sta 194+77 35.0 Ft R.R. Spike in base of double cottonwood N Bank Elev: 873.27

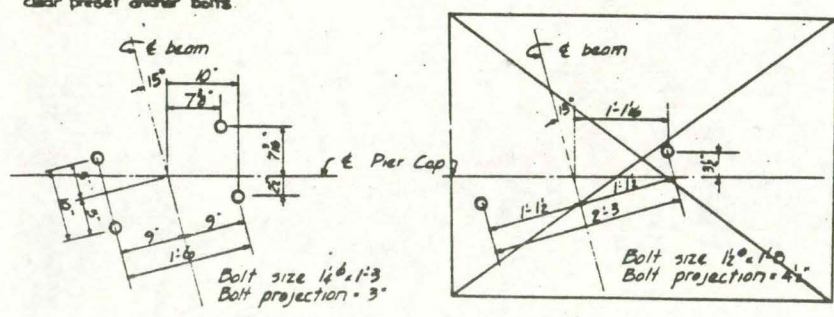
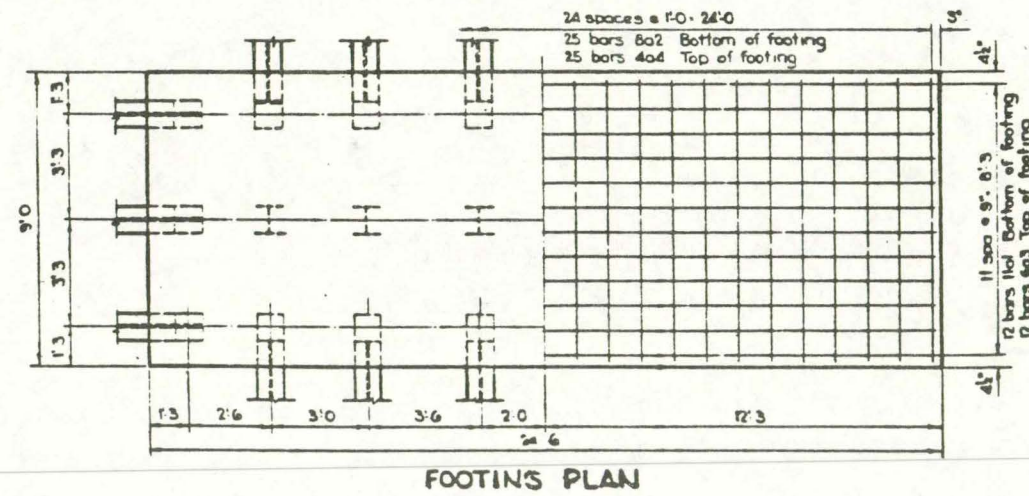
REINFORCING STEEL - ONE PIER					
Bar	Location	Shape	#	Length	Weight
11a1	footing longitud bottom	—	12	24'-2"	1541
8a2	" transv "	—	25	8'-8"	579
6a3	" longitud top	—	12	24'-2"	496
4a4	" transv top	—	25	8'-8"	145
10b2	Column dowels	—	46	5'-0"	990
10b1	" vertical	—	36	21'-9"	3292
4c1-21	" ties	□	42	Varies	596
11d1	Cap longitud top	—	6	34'-8"	1105
11d2	" "	—	6	24'-2"	834
6d3	" " center	—	4	34'-8"	208
6d4	" " bottom	—	4	35'-2"	211
5f1	" stirrups	□	26	14'-11"	405
5f2-15	" "	□	56	Varies	722
					11066



CONCRETE PLACEMENT QUANT. - ONE PIER	
Footing	28.6 cy.
Column	28.4 cy.
Cap	17.5 cy.
<b>Total</b>	<b>ONE 74.5 cy.</b>

TOTAL ESTIMATED QUANT. - TWO PIERS	
Concrete	74.5 x 2 = 149.0 cy.
Reinforcing Steel	11066 x 2 = 22132 lbs.
10BP42 Steel	Furnish 960-1200 L.F.
Bearing Piling	Drive 960-1200 L.F.
Class 20 Excavation	60-164 cy.
Class 21 Excavation	100-173 cy.

TABLE A									
Pier	Dim 'a'	Dim 'b'	Dim 'c'	Grade Elev	Gr to Br St	Br St Elev	Low Step Elev	Bot Flg Elev	Pile Length
2	24'	3'	12'	888.16	5'-1 1/2"	883.05	882.81	854.56	40'

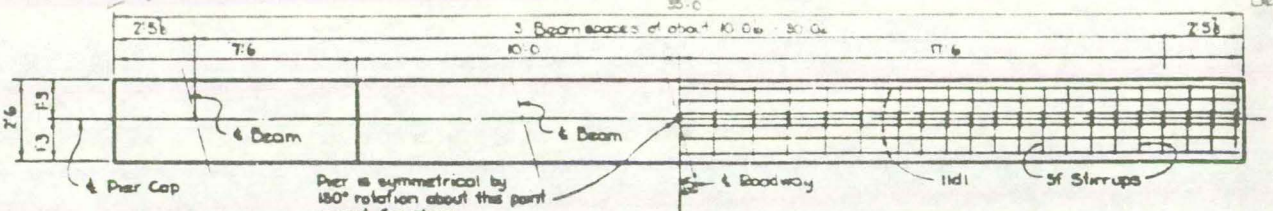


**PIER NOTES:**  
 All exposed corners of 90° or sharper shall be filleted with a 3/4" dressed and beveled strip.  
 Minimum clear distance from face of concrete to near reinforcing bar shall be 2" unless otherwise noted or shown.  
 Anchor bolts shall be preset. Weight of anchor bolts is included in superstructure structural steel estimate.  
 Piles for Pier 1 are to be driven to refusal in longitudinal. Number of piles is based on a 57 Ton bearing capacity per pile. Piles for Pier 2 are to be driven to full penetration if practicable, but in no case, less than 57 Ton bearing capacity per pile.  
 Design: AA S.H.O. Series of 1961.  
 Construction: Standard Specifications of I.S.H.C. Series 1960, plus current special provisions and supplemental specifications.

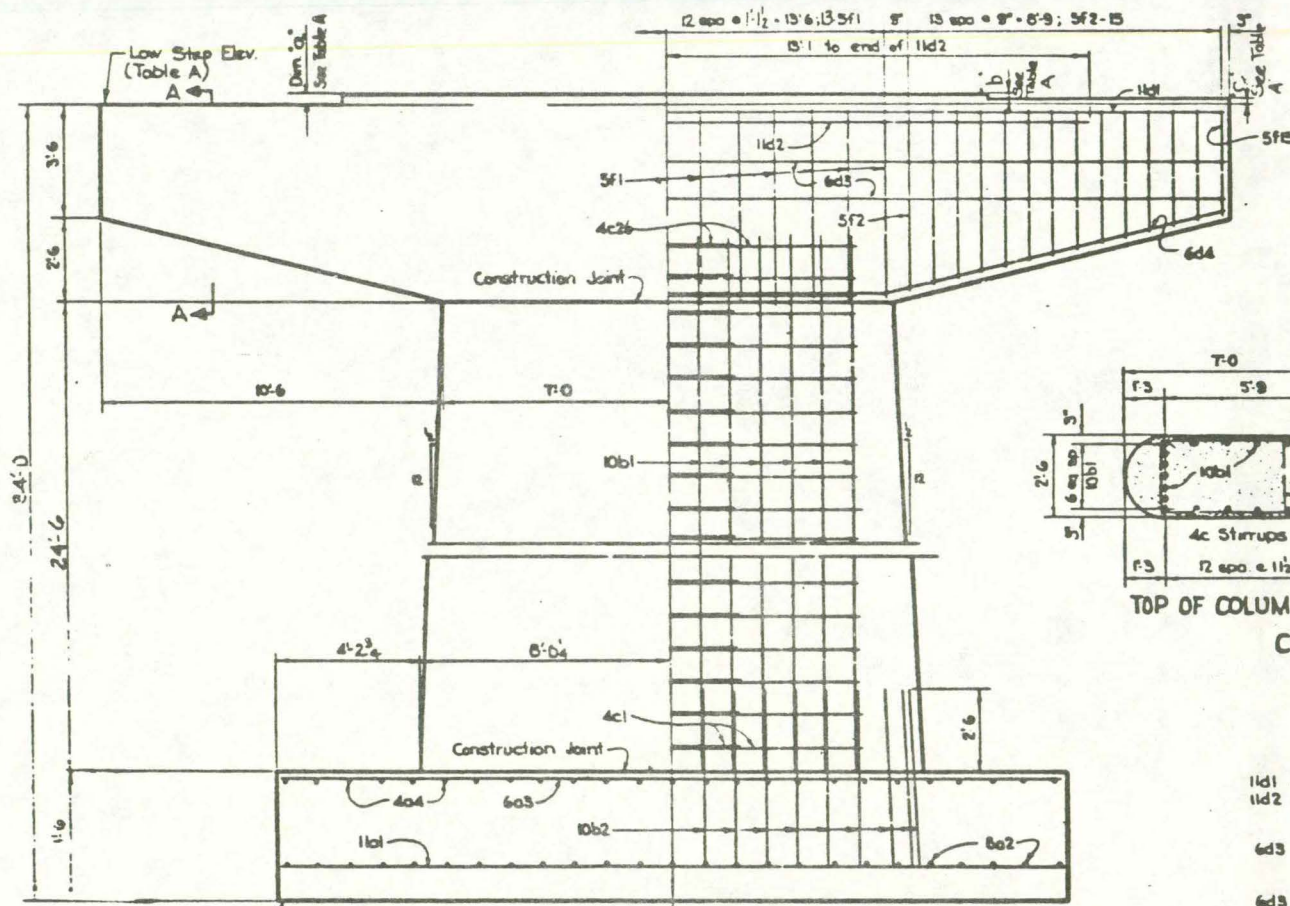
Design for 15° Skew  
**410' x 30' CONTINUOUS I-BEAM BRIDGE**  
 70'-0" End Spans 90'-0" Center Spans  
 Concrete floor and substructure Tubular Rail  
**PIER 1, 2 DETAILS**  
 Station 196+29.00 Project F-1112(1)  
**WINNESHIEK COUNTY**  
 Iowa State Highway Commission  
 October, 1961 Sheet 4 of 10

Revised (10-24-62): This sheet void for Pier 1. See Sheet 4A.

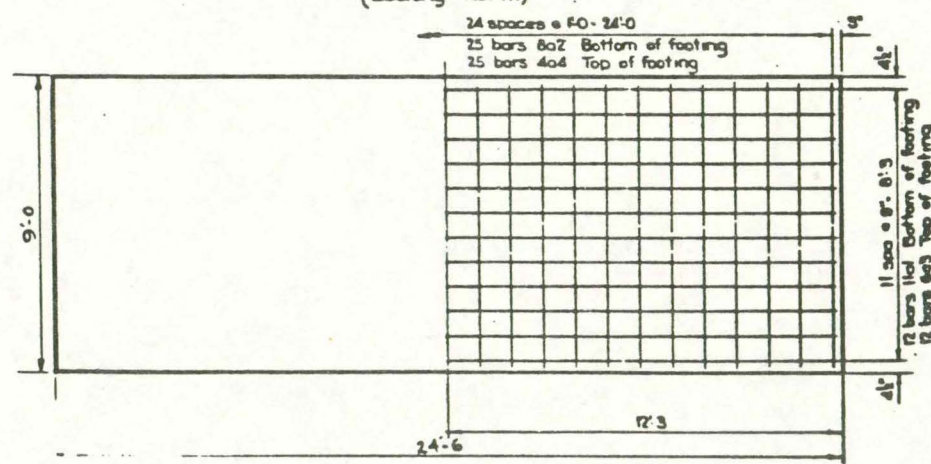
Bench Mark No 9: Sta. 194+77 350' R; R.R. Spike in base of double cottonwood N. Bank Elev. 873.27



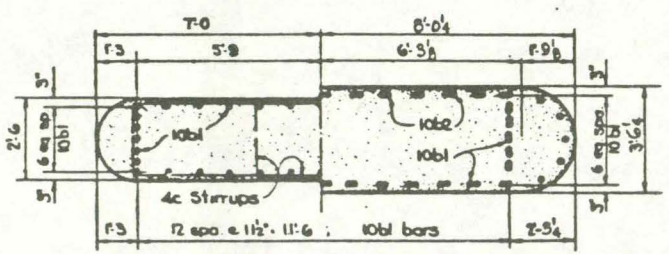
PLAN OF PIER CAP



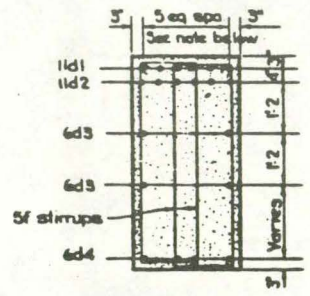
PIER ELEVATION (Looking North)



FOOTING PLAN

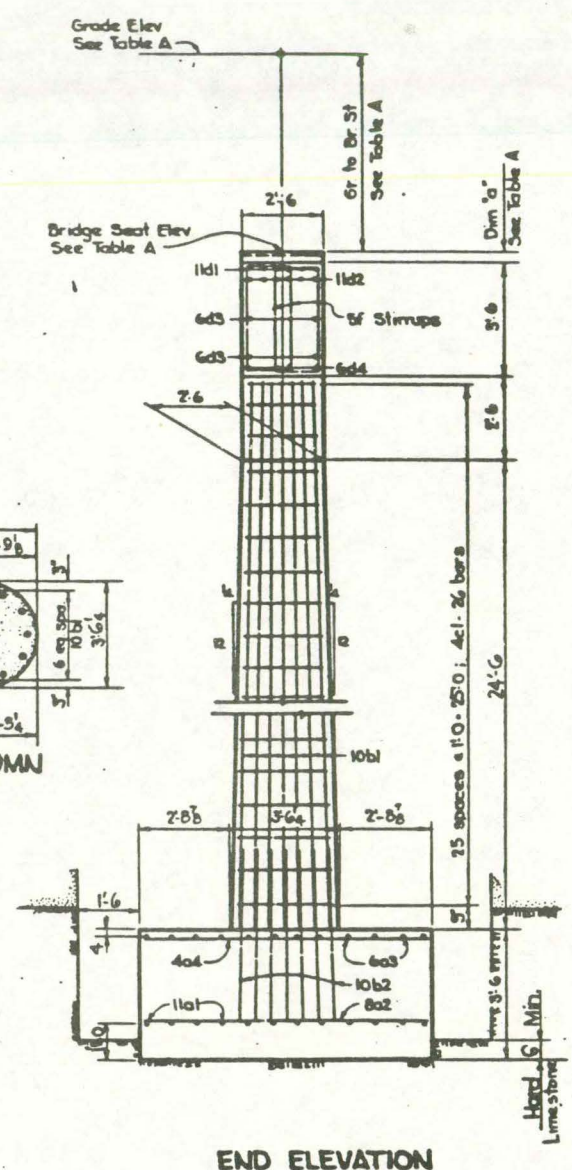


TOP OF COLUMN BOTTOM OF COLUMN COLUMN PLAN

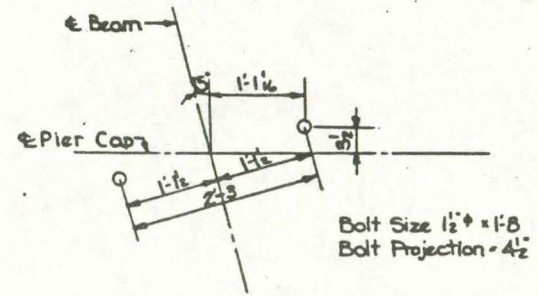


SECTION A-A

Note: Shift bars as necessary to clear preset anchor bolts.

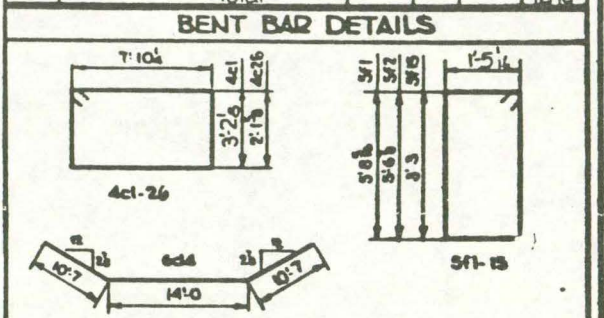


END ELEVATION



ANCHOR BOLT LOCATION

Bar	Location	Shape	#	Length	Weight
11a1	Footing longitud bottom	—	12	24'2"	1541
8a2	" transv "	—	25	8'-8"	578
6a3	" longitud top	—	12	24'2"	496
4a4	" transv top	—	25	8'-8"	143
10b2	Column dowels	—	46	5'-0"	980
10b1	" vertical	—	36	27'-0"	4185
4c1-2b	" ties	□	52	Varies	751
11d1	Cap longitud top	—	6	34'-6"	1108
11d2	" " "	—	6	26'-2"	854
6d3	" " center	—	4	34'-8"	308
6d4	" " bottom	—	4	35'-2"	211
5f1	" stirrups	□	26	14'-11"	405
5f2-15	" " "	□	56	Varies	722
Total					12110



Note: All dimensions are out to out.

Item	Quantity
Footing	28.6 cy
Column	39.4 cy
Cap	17.3 cy
Total	85.3 cy

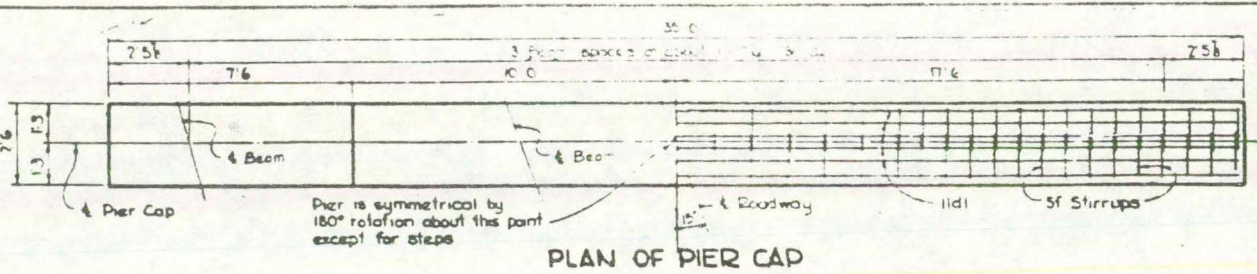
Item	Quantity
Concrete	85.3 cy
Reinforcing Steel	12110 lbs.
Class 22 Excavation	160 cy

Pier	Dim. 'a'	Dim. 'b'	Dim. 'c'	Grade Elev.	Or. to Br. St. Elev.	Br. St. Elev.	Low Step Elev.	Butt Ptg. Elev.
1	2'-6"	4'	2'-6"	890.07	5'-0"	884.94	884.71	850.71

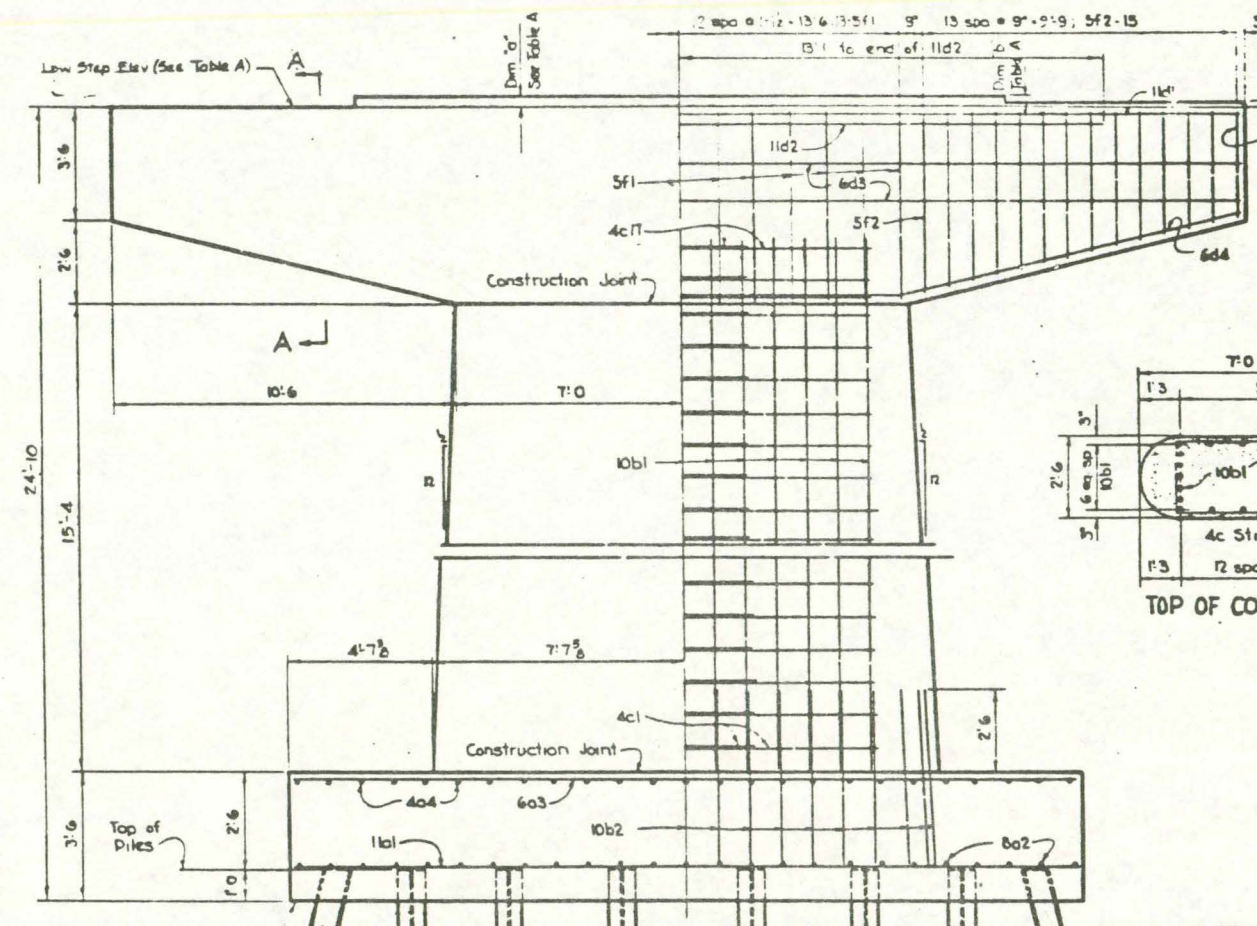
**PIER NOTES:**  
 All exposed corners of 90° or sharper shall be filleted with a 1/4" dressed and beveled strip.  
 Minimum clear distance from face of concrete to near reinforcing bar shall be 1 1/2" unless otherwise noted or shown.  
 Anchor bolts shall be preset. Weight of anchor bolts is included in superstructure structural steel estimate.  
 Footings are to extend at least 6' into hard limestone with the final 6' of excavation to be to the neat lines of footing.  
 Design: A.A.S.H.O. Series of 1961.  
 Construction: Standard Specs of I.S.H.C. Series 1960, plus current special provisions and Supplemental Specifications.

Design for 15' Skew  
**410' x 30' CONTINUOUS I-BEAM BRIDGE**  
 70'-0" End Spans      90'-0" Center Spans  
 Concrete Floor & Substructure      Tubular Rail  
**PIER 1 DETAILS**  
 Station 196+29.00      Project No. 112(C)  
**WINNESHIEK COUNTY**  
 Iowa State Highway Commission  
 October 1961      Sheet 4A of 10  
 Design No. 1161      Winneshiek County      File No. 2058

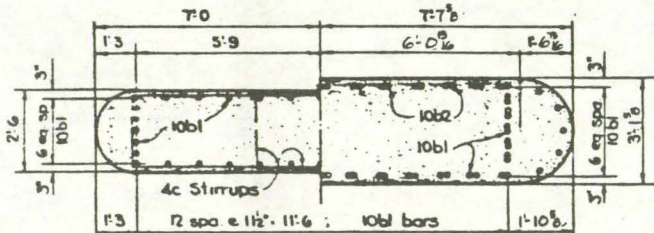
Revised 10-24-62 This sheet added to show Pier 1 changes



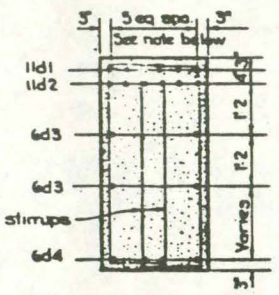
PLAN OF PIER CAP



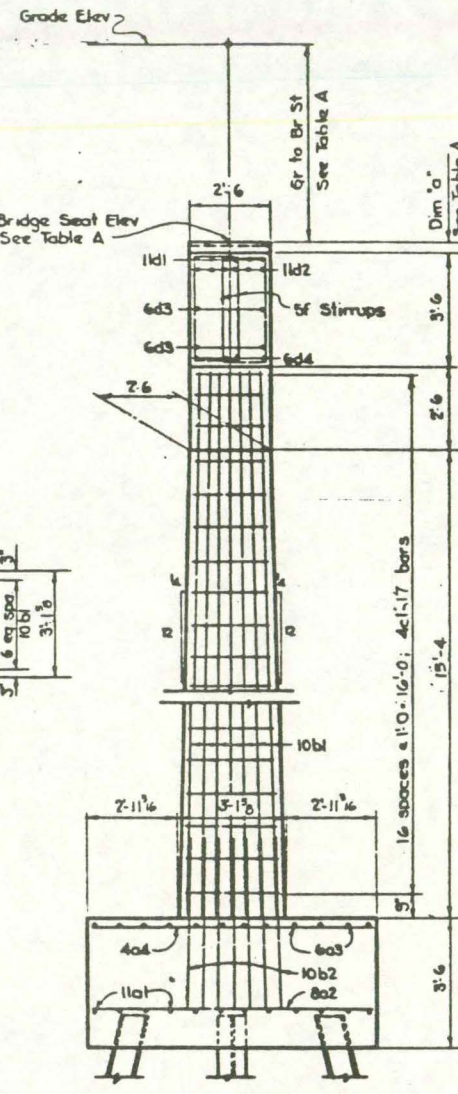
PIER ELEVATION (LOOKING NORTH)



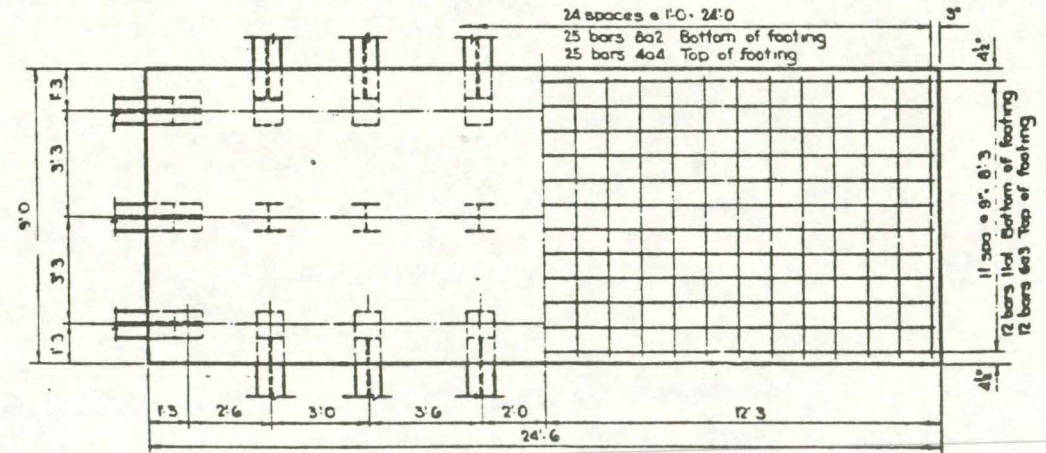
COLUMN PLAN



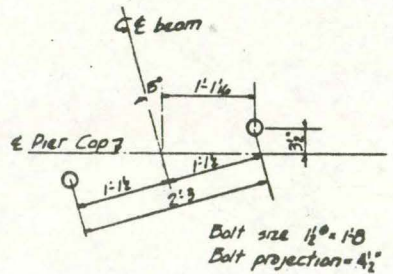
SECTION A-A



END ELEVATION



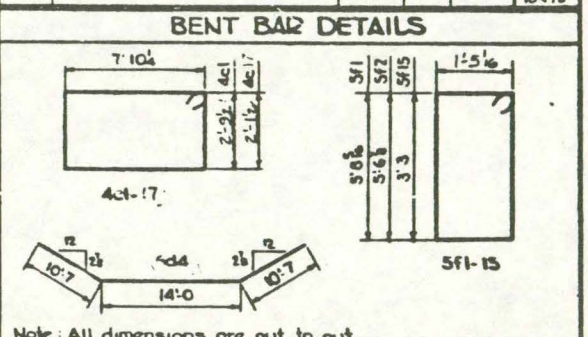
FOOTING PLAN



ANCHOR BOLT LOCATION

**REINFORCING STEEL - ONE PIER**

Bar	Location	Shape	#	Length	Weight
11a1	Footing longitud bottom	—	12	24'2"	1541
8a2	transv	—	25	8'-8"	579
6a3	longitud top	—	12	24'2"	436
4a4	transv top	—	25	8'-8"	145
10b2	Column dowels	—	46	5'-0"	990
10b1	vertical	—	36	17'-10"	2762
4c1-17	ties	□	54	Varies	481
11d1	Cap longitud top	—	6	34'-8"	1105
11d2	"	—	6	26'-2"	834
6d3	center	—	4	34'-8"	208
6d4	bottom	—	4	35'-2"	211
5f1	stirrups	□	26	14'-11"	405
5f2-15	"	□	56	Varies	722
					10419



**CONCRETE PLACEMENT QUANT. - ONE PIER**

Item	Quantity
Footing	28.6 cy
Column	22.5 cy
Cap	17.5 cy
<b>Total</b>	<b>68.6 cy</b>

**TOTAL ESTIMATED QUANT. - TWO PIERS**

Item	Quantity
Concrete	137.2 cy
Reinforcing Steel	20858 lbs
10 BP42 Steel	Furnish 1920 LF
Bearing Piling 48 @ 40'	Drive 1920 LF
Class 20 Excavation	160 cy
Class 21 Excavation	165 cy

**TABLE A**

Pier	Dim "a"	Dim "b"	Dim "c"	Grade Elev	G- to Br St Elev	Br St Elev	Low Step Elev	Bel. Fig.	Pile Length
3	2'-0"	1'-6"	1'-6"	886.66	5'-11 1/2"	881.55	881.33	856.50	40'
4	2'-0"	1'-6"	1'-6"	885.57	5'-0"	880.48	880.27	855.48	40'

**PIER NOTES:**

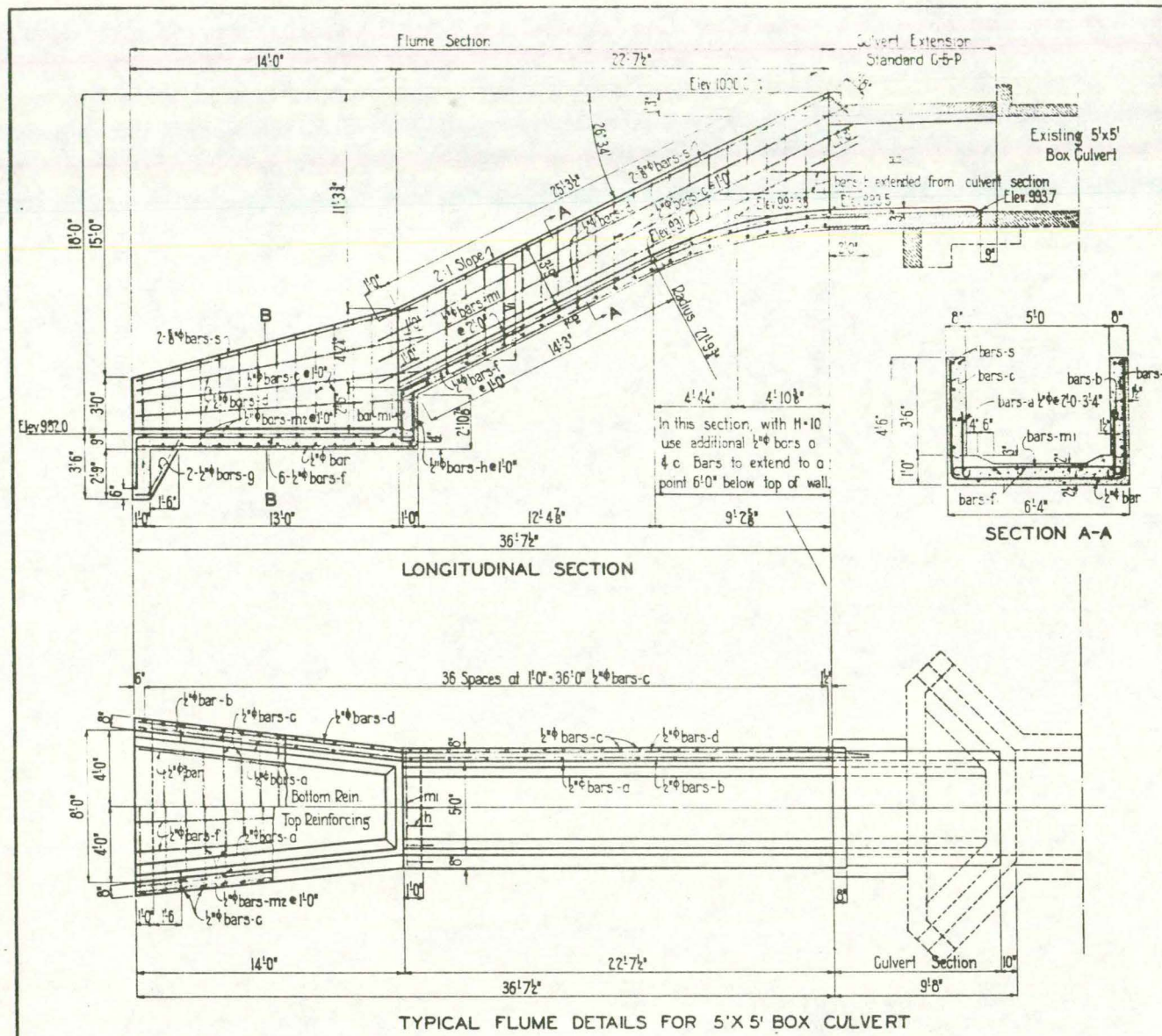
- All exposed corners of 90° or sharper shall be filleted with a 1/4" dressed and beveled strip.
- Minimum clear distance from face of concrete to near reinforcing bar shall be 2" unless otherwise noted or shown.
- Anchor bolts shall be preset. Weight of anchor bolts is included in superstructure structural steel estimate.
- Piles are to be driven to full penetration if practicable, but in no case less than 57 Ton bearing capacity per pile.

Design: A.A.S.H.O. Series of 1961.  
Construction: Standard Specs. of I.S.H.C. Series 1960 plus current special provisions and supplemental specifications.

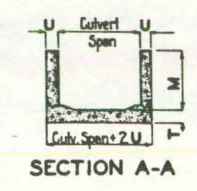
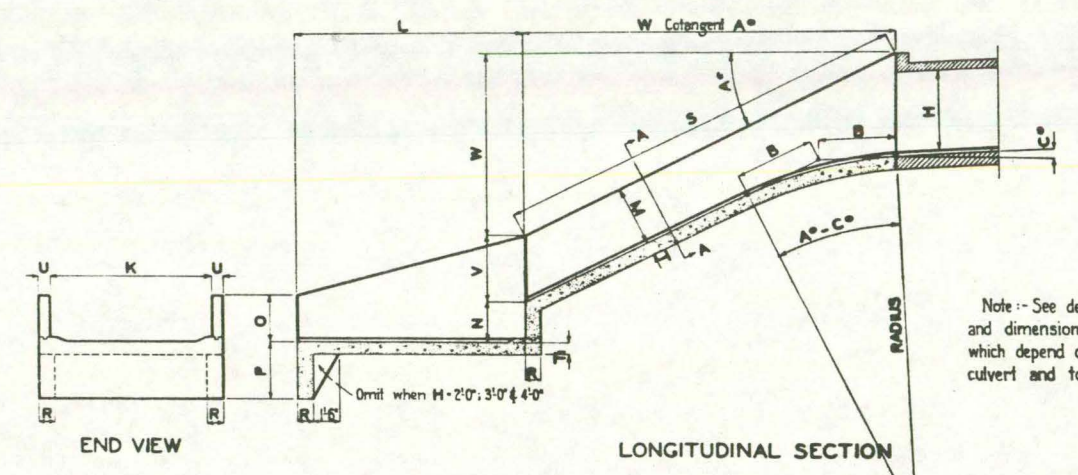
Design for 15° Skew  
**410' x 30' CONTINUOUS I-BEAM BRIDGE**  
 70'-0" End Spans 90'-0" Center Spans  
 Concrete Floor and Substructure Tubular Rail

**PIER 3,4 DETAILS**

Station 196+29.00 Project F-1112(1)  
**WINNESHIEK COUNTY**  
 Iowa State Highway Commission  
 October, 1961 Sheet 5 of 10  
 Design No. 1161 Winneshiek Co. File No. 21050



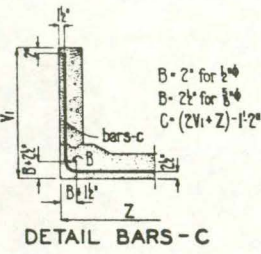
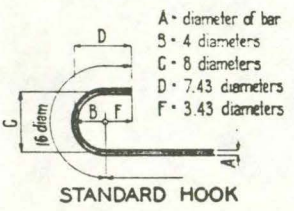
TYPICAL FLUME DETAILS FOR 5'X5' BOX CULVERT



Note: - See design sheet for angles A and C and dimensions B, S, V, W and RADIUS which depend on the skew angle, gradient of culvert and total drop.

CULVERT	H	K	L	M	N	O	P	R	T	T1	U	V*
2'X2'	2'-0"	2'-0"	9'-0"	1'-6"	1'-6"	1'-6"	2'-6"	9"	9"	9"	6"	1'-6 1/2"
3'X3'	3'-0"	3'-0"	9'-0"	1'-6"	1'-6"	1'-6"	2'-6"	9"	9"	9"	6"	1'-6 1/2"
3'X3'	3'-0"	3'-0"	10'-0"	2'-3"	2'-0"	2'-0"	3'-0"	9"	9"	9"	8"	2'-6 1/2"
4'X4'	4'-0"	4'-0"	12'-0"	3'-0"	2'-3"	2'-6"	3'-3"	10"	9"	9"	8"	3'-4 1/2"
5'X4'	4'-0"	7'-0"	12'-0"	3'-0"	2'-3"	2'-6"	3'-3"	10"	9"	9"	8"	3'-4 1/2"
5'X5'	5'-0"	6'-0"	14'-0"	3'-9"	2'-6"	3'-0"	3'-6"	10"	9"	9"	8"	4'-2 1/2"
6'X4'	4'-0"	8'-0"	12'-0"	3'-0"	2'-3"	2'-6"	3'-3"	10"	9"	9"	8"	3'-4 1/2"
6'X5'	5'-0"	9'-0"	14'-0"	3'-9"	2'-6"	3'-0"	3'-6"	10"	9"	9"	8"	4'-2 1/2"
6'X6'	6'-0"	10'-0"	16'-0"	4'-6"	2'-9"	3'-6"	4'-0"	13"	9"	9"	8"	5'-0 1/2"
8'X6'	6'-0"	12'-0"	16'-0"	4'-6"	2'-9"	3'-6"	4'-0"	13"	9"	9"	8"	5'-0 1/2"
8'X8'	8'-0"	14'-0"	18'-0"	6'-0"	3'-0"	4'-0"	4'-3"	13"	9"	10"	8"	6'-8 1/2"
10'X6'	6'-0"	14'-0"	16'-0"	4'-6"	2'-9"	3'-6"	4'-0"	13"	9"	9"	8"	5'-0 1/2"
10'X8'	8'-0"	16'-0"	18'-0"	6'-0"	3'-0"	4'-0"	4'-3"	13"	10"	10"	8"	6'-8 1/2"
10'X10'	10'-0"	18'-0"	20'-0"	7'-6"	3'-6"	5'-0"	4'-6"	13"	10"	14"	9"	8'-4 1/2"

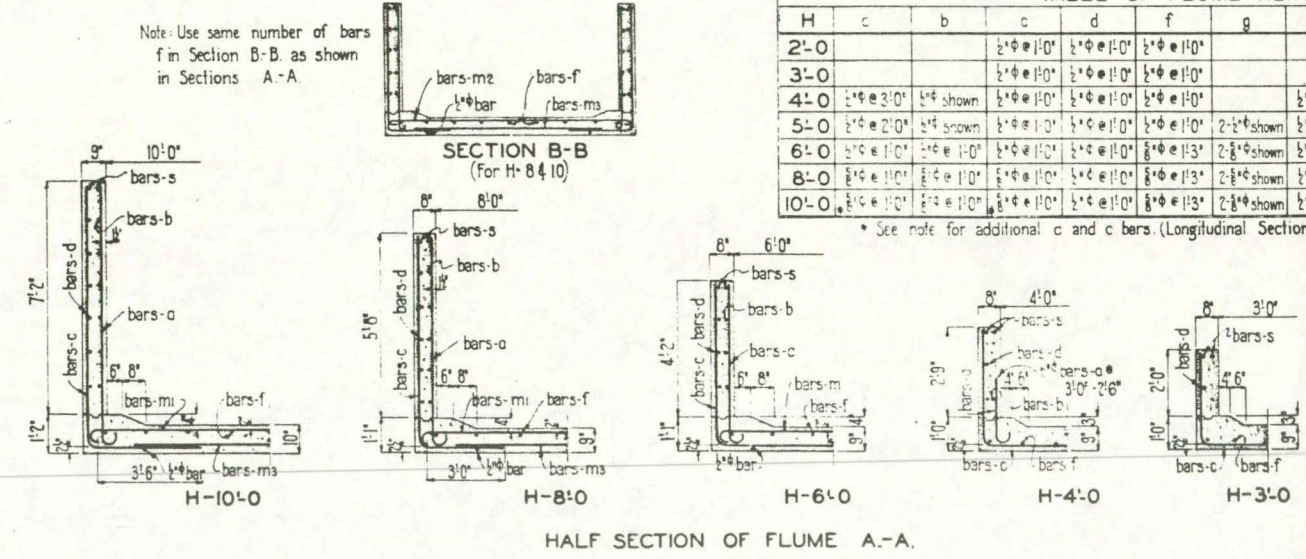
\* Use when flume is normal to  $\epsilon$  of road and on 2 to 1 slope.



H	c	b	c	d	f	g	h	m1	m2	m3	s
2'-0"			2-#4 @ 1'-0"	2-#4 @ 1'-0"	2-#4 @ 1'-0"						2-#4 shown
3'-0"			2-#4 @ 1'-0"	2-#4 @ 1'-0"	2-#4 @ 1'-0"						2-#4 shown
4'-0"	2-#4 @ 3'-0"	2-#4 shown	2-#4 @ 1'-0"	2-#4 @ 1'-0"	2-#4 @ 1'-0"		2-#4 @ 1'-0"				2-#4 shown
5'-0"	2-#4 @ 2'-0"	2-#4 shown	2-#4 @ 1'-0"	2-#4 @ 1'-0"	2-#4 @ 1'-0"	2-#4 shown	2-#4 @ 2'-0"	2-#4 @ 1'-0"			2-#4 shown
6'-0"	2-#4 @ 1'-0"	2-#4 @ 1'-0"	2-#4 @ 1'-0"	2-#4 @ 1'-0"	2-#4 @ 1'-0"	2-#4 shown	2-#4 @ 1'-0"	2-#4 @ 1'-0"	2-#4 @ 1'-0"		2-#4 shown
8'-0"	2-#4 @ 1'-0"	2-#4 @ 1'-0"	2-#4 @ 1'-0"	2-#4 @ 1'-0"	2-#4 @ 1'-0"	2-#4 shown	2-#4 @ 1'-0"	2-#4 @ 1'-0"	2-#4 @ 1'-0"	2-#4 @ 2'-0"	2-#4 shown
10'-0"	2-#4 @ 1'-0"	2-#4 @ 1'-0"	2-#4 @ 1'-0"	2-#4 @ 1'-0"	2-#4 @ 1'-0"	2-#4 shown	2-#4 @ 1'-0"	2-#4 @ 1'-0"	2-#4 @ 1'-0"	2-#4 @ 2'-0"	2-#4 shown

\* See note for additional c and c bars (Longitudinal Section)

**GENERAL NOTES:-**  
 Flumes are to be constructed on stable foundations with all holes back filled and compacted.  
 Skewed flumes are to be constructed to fit the normal slope changing the angle A as required.  
 Construction joints formed by beveled 2x4's, are to be placed in the base as shown.  
 Bars b, f and s may be spliced by using a 40 diameter lap.  
 All exposed corners 90° or sharper are to be filleted with a 3/4" dressed beveled strip. Floor to be finished smooth.  
 Standard Specifications, Series of 1960 of the Iowa State Highway Commission.

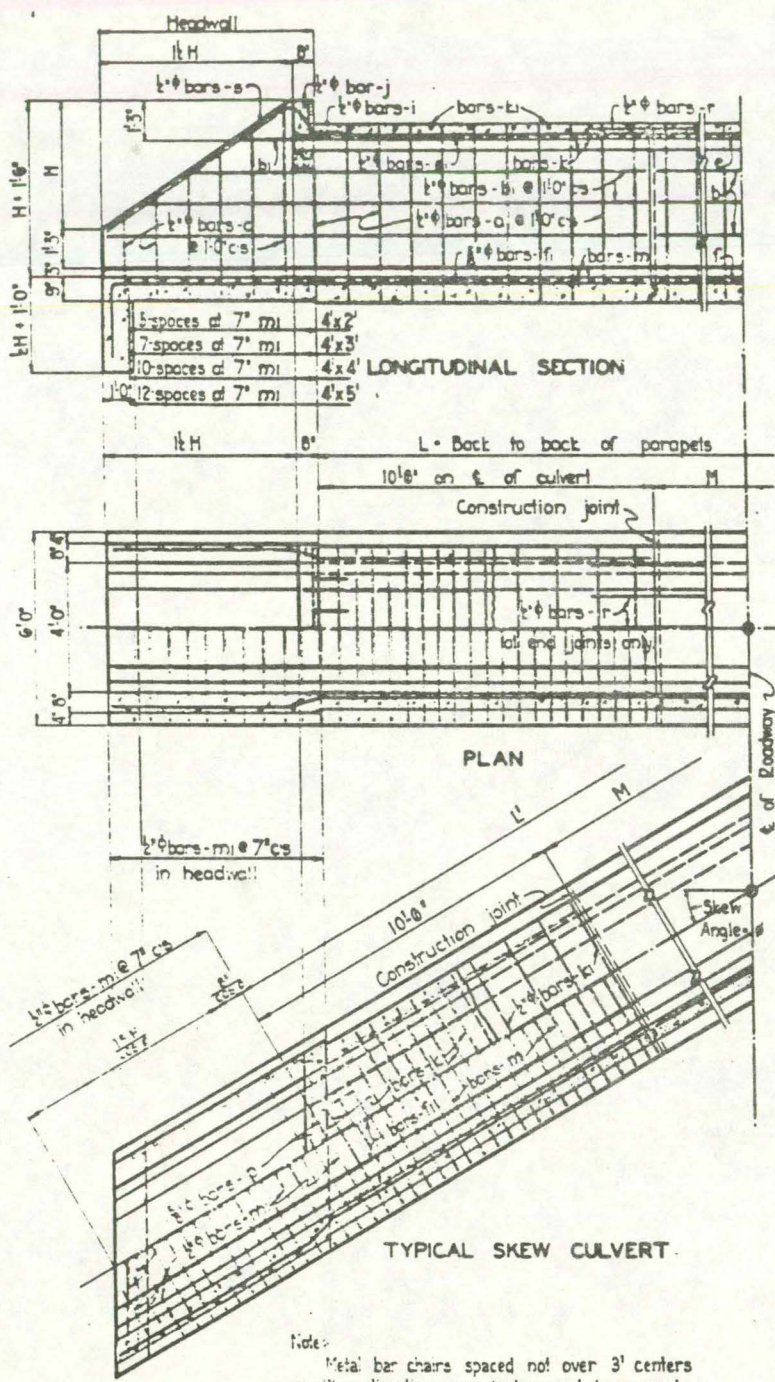


STANDARD DESIGN  
**CONCRETE FLUMES**  
 IOWA STATE HIGHWAY COMMISSION  
 MAY, 1945

APPROVED BY *B.R. White*  
 CHIEF ENGINEER







Note: Metal bar chairs spaced not over 3' centers in either direction, are to be used to support the lower layer of the top slab bars.

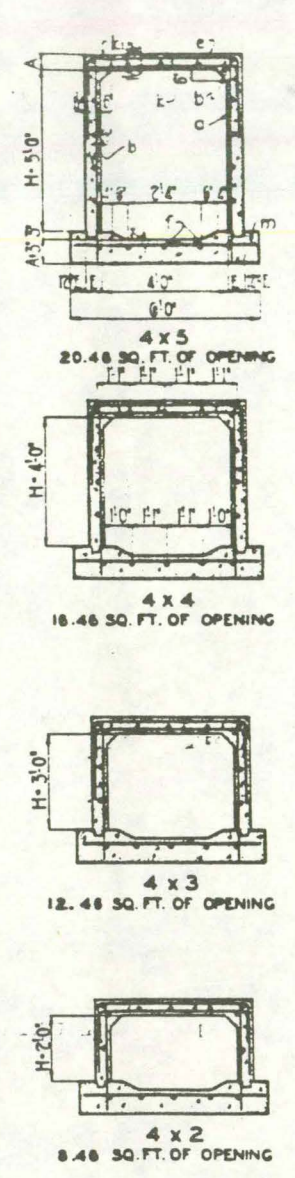
**GENERAL NOTES**

Construction joints formed by beveled 2"x4"s to be placed in barrel as shown. Longitudinal reinforcing not to extend thru joints. Longitudinal bars between joints may be spliced by using a 1"6" lap. Number of b, e and f bars given in Bill of Reinforcing are for each intermediate section of length M. Bars k and m to be cut to fit skew at ends of culvert.

All exposed corners 90° or sharper to be filleted with a 3/8" dress ed beveled strip. Sides of footings are to be formed to insure correct line and grade. Floor of barrel to be finished smooth. A section 10'-0" long of barrel to be built monolithic with headwall at each end.

Standard Specifications, Series of 1960, of the Iowa State Highway Commission

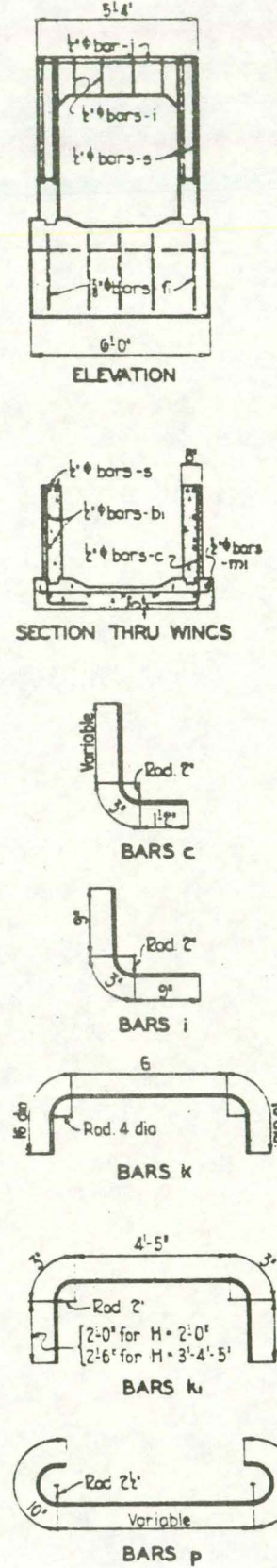
**BARREL SECTIONS**



All dimensions on above sections same as for 4x5 except H.

**QUANTITIES IN TWO HEADWALLS ONLY FOR SKEWS TO 45°**

4 x 5	Concrete - $\frac{7.87}{\cos \phi}$ Cu. Yds.	Steel - $76 + \frac{478}{\cos \phi}$ Pounds.
4 x 4	Concrete - $\frac{6.14}{\cos \phi}$ Cu. Yds.	Steel - $77 + \frac{375}{\cos \phi}$ Pounds.
4 x 3	Concrete - $\frac{4.57}{\cos \phi}$ Cu. Yds.	Steel - $80 + \frac{276}{\cos \phi}$ Pounds.
4 x 2	Concrete - $\frac{3.15}{\cos \phi}$ Cu. Yds.	Steel - $57 + \frac{210}{\cos \phi}$ Pounds.



**BAR DETAILS**

**BILL OF REINFORCING**

SKEW ANGLE	φ = 0°				φ = 15°				φ = 30°				φ = 45°							
	Position of bars	Mark	Number	Size Spacing	Length	Number	Size Spacing	Length	Number	Size Spacing	Length	Number	Size Spacing	Length						
Walls Vertical	a	2L+2	2"	1'-0"	H+2A+3'	2L+2	2"	1'-0"	H+2A+3'	2L+2	2"	1'-0"	H+2A+3'	2L+2	2"	1'-0"	H+2A+3'			
	b	2H	2"	M-4'	2H	2H	2"	M-4'	2H	2H	2"	M-4'	2H	2H	2"	M-4'	2H			
Wings Vertical	c	Table 2	"	"	2	Table 2	"	"	2	Table 2	"	"	2	Table 2	"	"	2			
	d	5	5"	M-4'	5	5	5"	M-4'	5	5	5"	M-4'	5	5	5"	M-4'	5			
Slab Longitudinal	e	2	"	"	10'-10"	2	"	"	10'-10"	2	"	"	10'-10"	2	"	"	10'-10"			
	f	5	5"	M-4'	5	5	5"	M-4'	5	5	5"	M-4'	5	5	5"	M-4'	5			
Floor	g	10	"	"	10'-10"	10	"	"	10'-10"	10	"	"	10'-10"	10	"	"	10'-10"			
	h	5	5"	M-4'	5	5	5"	M-4'	5	5	5"	M-4'	5	5	5"	M-4'	5			
Parapet Vertical	i	8	2"	1'-0"	1'-9"	8	2"	1'-0"	1'-9"	10	2"	1'-0"	1'-9"	12	2"	1'-0"	1'-9"			
	j	2	"	"	5'-0"	2	"	"	5'-0"	2	"	"	5'-0"	2	"	"	5'-0"			
Slab	k	Table 5	"	"	Table 5	Table 5	"	"	Table 5	Table 5	"	"	Table 5	Table 5	"	"	Table 5			
	l	1-3"	See Detail	"	1-3"	See Detail	"	"	1-3"	See Detail	"	"	1-3"	See Detail	"	"	1-3"	See Detail		
Floor	m	Table 5	"	"	5'-8"	Table 5	"	"	5'-8"	Table 5	"	"	5'-8"	Table 5	"	"	5'-8"			
	n	10	10"	1'-0"	4'-0"	10	10"	1'-0"	4'-0"	10	10"	1'-0"	4'-0"	10	10"	1'-0"	4'-0"			
Parapet and Curtain	p	Skews only	"	"	8	4"	4'	6'-5"	8	4"	4'	7'-0"	8	4"	4'	8'-4"	8	4"	4'	8'-4"
	q	10	10"	1'-0"	4'-0"	10	10"	1'-0"	4'-0"	10	10"	1'-0"	4'-0"	10	10"	1'-0"	4'-0"			
Wing: Slope	r	8	4"	1.83H+10'	8	4"	4'	1.87H+10'	8	4"	4'	2.06H+10'	8	4"	4'	2.54H+10'				
	s	8	4"	1.83H+10'	8	4"	4'	1.87H+10'	8	4"	4'	2.06H+10'	8	4"	4'	2.54H+10'				
Floor: Headwalls	t	shown	2"	7'	5'-8"	shown	2"	7'	5'-8"	shown	2"	7'	5'-8"	shown	2"	7'	5'-8"			
	u	shown	2"	7'	5'-8"	shown	2"	7'	5'-8"	shown	2"	7'	5'-8"	shown	2"	7'	5'-8"			

**TABLE - 1 b, BARS TWO EACH LENGTH REQUIRED**

SKEW	4 x 5	4 x 4	4 x 3	4 x 2
0°	12'-9"	12'-9"	12'-9"	12'-9"
15°	12'-9"	12'-9"	12'-9"	12'-9"
30°	12'-9"	12'-9"	12'-9"	12'-9"
45°	12'-9"	12'-9"	12'-9"	12'-9"

**TABLE - 2 c BARS FOUR EACH LENGTH REQUIRED**

**TABLE - 3 e, BARS ALL HEIGHTS TWO EACH LENGTH REQUIRED**

SKEW	4 x 5	4 x 4	4 x 3	4 x 2
0°	21'-0"	21'-0"	21'-0"	21'-0"
15°	21'-0"	21'-0"	21'-0"	21'-0"
30°	21'-0"	21'-0"	21'-0"	21'-0"
45°	21'-0"	21'-0"	21'-0"	21'-0"

**TABLE - 4 f, BARS TWO EACH LENGTH REQUIRED**

SKEW	4 x 5	4 x 4	4 x 3	4 x 2
0°	21'-0"	21'-0"	21'-0"	21'-0"
15°	21'-0"	21'-0"	21'-0"	21'-0"
30°	21'-0"	21'-0"	21'-0"	21'-0"
45°	21'-0"	21'-0"	21'-0"	21'-0"

**TABLE 5 DIMENSIONS AND QUANTITIES FOR BARREL SECTIONS**

DIMENSIONS	k AND m BARS		QUANTITIES PER FOOT OF BARREL												
	Length of Bars	Concrete	4x5		4x4		4x3		4x2						
FILL	A	E	G	Size Spacing	k	m	Concrete	Steel	Concrete	Steel	Concrete	Steel	Concrete	Steel	
0'	8"	6"	4'-3"	3/8"	5' cs	5'-11"	5'-8"	.551 C.Y.	58.32*	.514 C.Y.	55.65*	.477 C.Y.	52.98*	.440 C.Y.	49.77*
1'	7"	6"	4'-4"	3/8"	6' cs	5'-8"	5'-8"	.517 C.Y.	44.24*	.480 C.Y.	41.57*	.443 C.Y.	38.90*	.406 C.Y.	35.69*
2'	6"	6"	4'-5"	3/8"	5' cs	5'-8"	5'-8"	.483 C.Y.	45.40*	.446 C.Y.	42.73*	.409 C.Y.	40.06*	.372 C.Y.	36.85*
3'-6"	6"	6"	4'-6"	3/8"	7' cs	5'-8"	5'-8"	41.86*	41.86*	39.19*	39.19*	36.52*	36.52*	33.85*	33.85*
7'-8"	6"	6"	4'-7"	3/8"	6' cs	5'-8"	5'-8"	44.02*	44.02*	41.35*	41.35*	38.68*	38.68*	35.47*	35.47*
9'-10"	6"	6"	4'-8"	3/8"	5' cs	5'-8"	5'-8"	47.06*	47.06*	44.38*	44.38*	41.71*	41.71*	38.51*	38.51*
13'-14"	7"	6"	4'-9"	3/8"	8' cs	5'-11"	5'-11"	51.7 C.Y.	47.23*	.480 C.Y.	44.56*	.443 C.Y.	41.88*	.406 C.Y.	38.63*
15'-16"	7"	6"	4'-10"	3/8"	7' cs	5'-8"	5'-8"	49.81*	49.81*	47.14*	47.14*	44.46*	44.46*	41.26*	41.26*
17'-20"	8"	6"	4'-11"	3/8"	6' cs	5'-11"	5'-11"	53.26*	53.26*	50.59*	50.59*	47.91*	47.91*	44.71*	44.71*
17'-20"	8"	6"	4'-11"	3/8"	6' cs	5'-11"	5'-8"	.551 C.Y.	53.48*	.514 C.Y.	50.81*	.477 C.Y.	48.14*	.440 C.Y.	44.93*

**QUANTITIES IN TWO HEADWALLS**

SKEW ANGLE	4x5		4x4		4x3		4x2	
	Concrete	Steel	Concrete	Steel	Concrete	Steel	Concrete	Steel
0°	7.67 C.Y.	514*	6.14 C.Y.	410*	4.57 C.Y.	314*	3.13 C.Y.	226*
15°	6.15 C.Y.	572*	6.33 C.Y.	465*	4.73 C.Y.	366*	3.24 C.Y.	275*
30°	9.09 C.Y.	629*	7.09 C.Y.	512*	5.28 C.Y.	396*	3.61 C.Y.	297*
45°	11.13 C.Y.	753*	8.68 C.Y.	607*	6.46 C.Y.	470*	4.43 C.Y.	355*

Headwalls constant for all fills. Bars r at end construction joints are included in headwall quantities. To obtain total quantities add quantities of barrel section to those given for two headwalls.

APPROVED BY J. R. Miller CHIEF ENGINEER

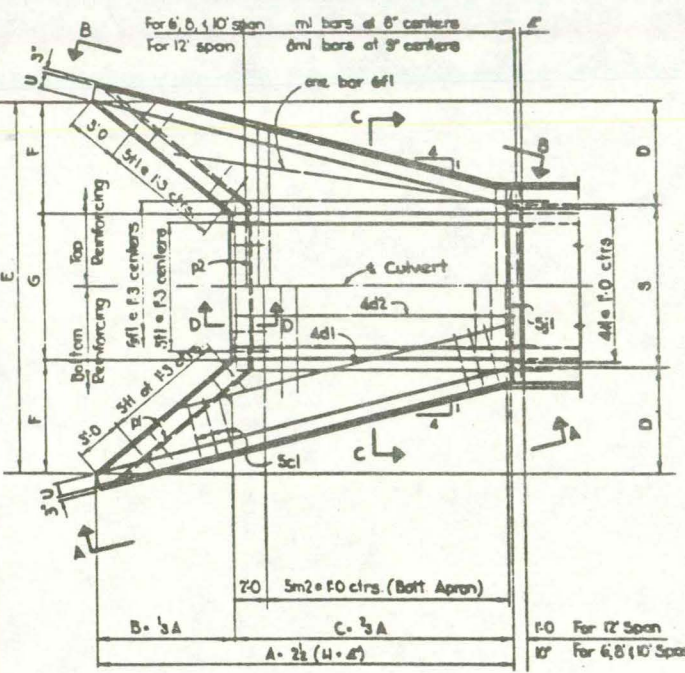
STANDARD DESIGN  
CONCRETE BOX CULVERTS  
4'0" SPAN  
PARALLEL WING WALLS  
IOWA STATE HIGHWAY COMMISSION  
APRIL 1932

REVISED JUNE 1944



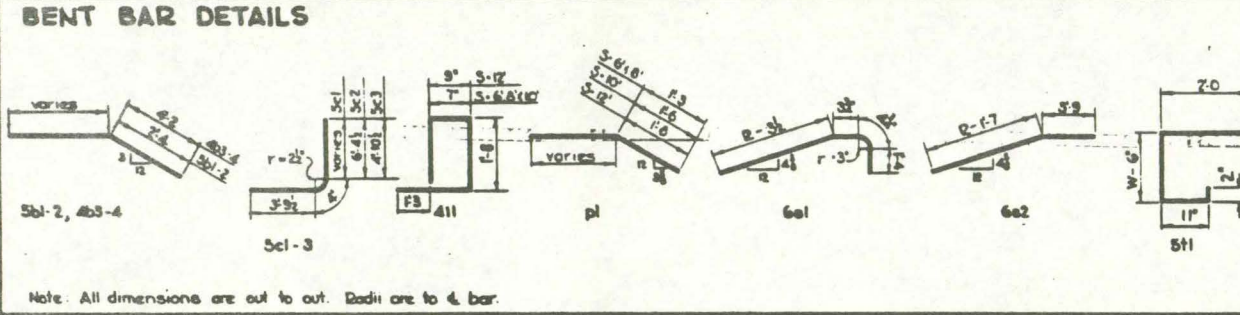
BILL OF REINFORCING for ONE HEADWALL 0° SKEW - Size Shown is CULVERT SPAN x CULVERT HEIGHT \* Size of bar is shown in corner of "N" Column

Table with columns for LOCATION, SHAPE, BAR, and various dimensions (R x I2, R x I0, etc.) and weights. Includes rows for Barrel Walls, Wingwalls, Aprons, Parapets, and Curtains.



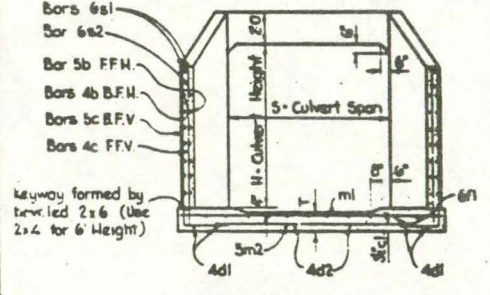
PLAN

ESTIMATED QUANTITIES ONE HEADWALL table showing REINFORCING STEEL and CONCRETE quantities for various dimensions.

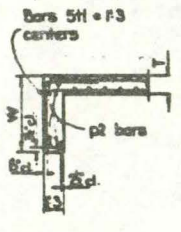


Note: All dimensions are out to out. Radii are to 4 bar.

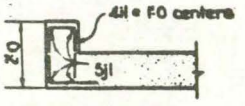
DIMENSION TABLE with columns S x H, A, B, C, D, E, F, G, N, P, R, T, U, W, S x H and rows for various span and height combinations.



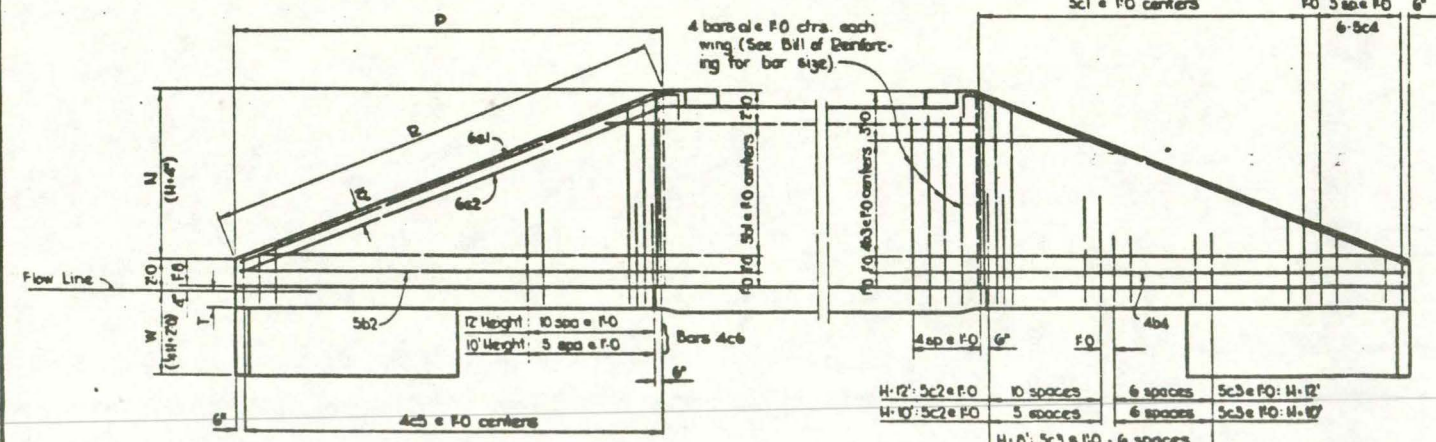
SECTION C-C



SECTION D-D



SECTION THRU PARAPET



VIEW A-A Showing Front Face Reinforcing

VIEW B-B Showing Back Face Reinforcing

HEADWALL NOTES:

These headwalls are based on a 2:1 slope normal to the roadway. The sides of the footing are to be formed to insure correct line and grade. All exposed corners of 90° or sharper are to be filleted with a 3/8" dressed and beveled strip. All reinforcing is to be securely wired in place before the concrete is poured. All slab and floor reinforcing steel is to be supported by bar chairs at intervals of not more than 3'-0" in either direction as outlined in the Standard Specifications. Clear distance from face of concrete to near reinforcing bar is to be 1 1/2" unless otherwise noted or shown. Concrete quantities are estimated from the back of parapet. In the "Bill of Reinforcing" bar lengths shown are the "in place" dimension. Lengths do not include splices. Bars over 40' long are to be spliced, and the weight shown includes allowance for a 20 diameter lap. For variable bars, the length of shortest and longest bar is given.

These Standards do not include any allowance for dowels at construction joints in the culvert barrel. Separate quantity allowance shall be made for additional materials needed at construction joints whether dowels or connected with bell joints.

Concrete quantities shown assume the following barrel wall thickness: 12' Span - 12" Wall, 8' Span - 8" Wall, 10' Span - 10" Wall. For barrel walls thicker than these, the following corrections should be made for each headwall for each additional inch of barrel thickness: 12' Spans - 0.15 c.y., 8' Spans - 0.05 c.y., 10' Spans - 0.10 c.y., 6' Spans - No Correction.

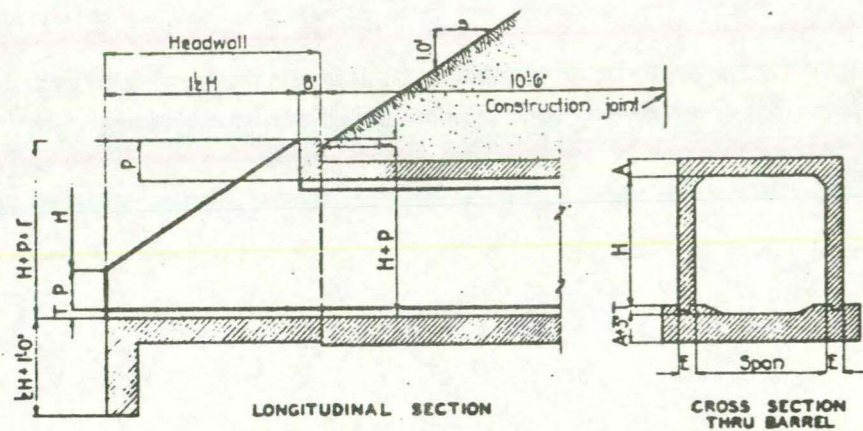
SPECIFICATIONS:

Design: A.A.S.H.O Series of 1957. Design stresses for the following materials are in accordance with A.A.S.H.O Standard Specifications for Highway Bridges, Series of 1957. Reinforcing Steel in accordance with Section 1.4.12 "Reinforcement" for Intermediate, Hard, or Rail Steel Grade. Concrete in accordance with Section 1.4.11 f'c = 3000 p.s.i. Construction: Current Standard Specifications of the Iowa State Highway Commission and current special provisions.

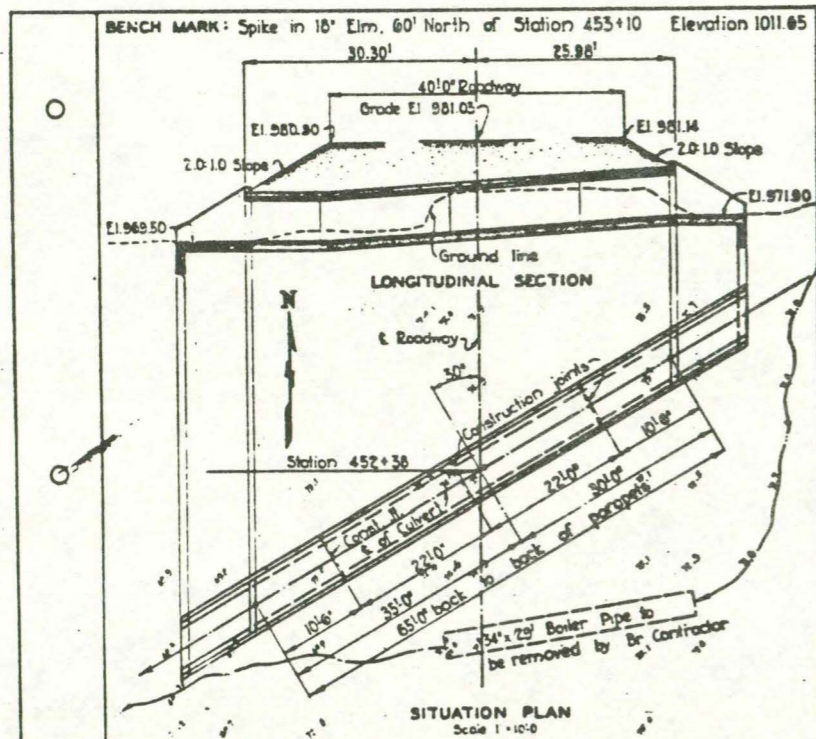
Standard Design for CONCRETE BOX HEADWALLS 0° SKEW Flaring Wingwalls Iowa State Highway Commission January, 1960

Approved by [Signature] Chief Engineer

CBH-00



CULVERT DETAILS OF PARALLEL WING TYPE



DETAILS TO BE LIKE IOWA STATE HIGHWAY COMMISSION STANDARDS C4 P

DRAINAGE AREA	60 Acres Hilly	SECTION	31
SIZE AND TYPE	4' x 5' x 65' 0" 30° Skew	TOWNSHIP	Bellevue
DEPTH OF FILL	5'-0"	COUNTY	Jackson
ESTIMATED QUANTITIES	PIPE EXCAVATION 38.0 C.Y. CONCRETE 40.5 C.Y. REINFORCING 3350 LBS.	STATION	452+38
		PROJECT	P-729
		DATE	June 1944
		DESIGN NO.	2444

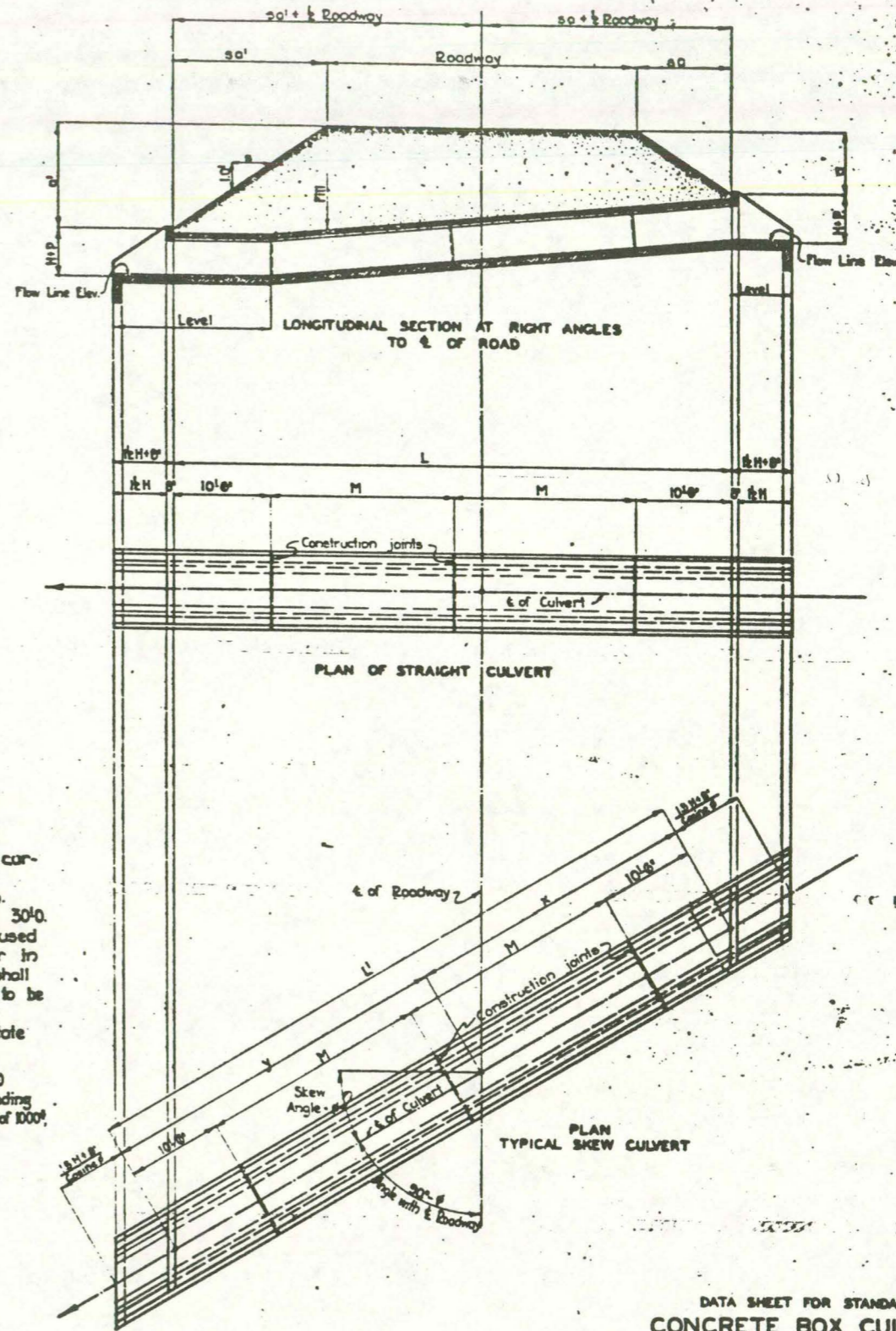
TYPICAL SITUATION PLAN  
BASED ON 40'-0 ROADWAY AND 2.0 TO 1.0 SLOPE

DIMENSIONS

- a = Distance Grade to flow line less (H+P) at inlet end.
  - a' = Distance Grade to flow line less (H+P) at outlet end.
  - A = Slab thickness.
  - E = Wall thickness.
  - H = Height of Opening.
  - L = Distance back to back of parapets at right angles to center line of roadway.
  - L' = Distance back to back of parapets on center line of culvert. (Skew Culverts)
  - φ = Skew Angle of culvert.
  - M = Length of intermediate sections between construction joints.
  - P = Parapet Heights:  
1'3" for 2', 3', 4' and 5' Spans.  
1'8" for 8', 8' and 10' Spans.
  - s = Slope of fill over culvert.
  - T = Trough depth:  
3' for 2', 3', 4' and 5' Spans.  
4' for 8', 8' and 10' Spans.
  - x = Distance center line of roadway to back of parapet on center line of culvert at inlet end.
  - y = Distance center line of roadway to back of parapet on center line of culvert at outlet end.
- $L = s a + s a' + \text{Roadway}$   
 $x = \frac{s a + \frac{1}{2} \text{ Roadway}}{\text{Cosine } \phi}$   
 $L' = \frac{L}{\text{Cosine } \phi}$   
 $y = \frac{s a' + \frac{1}{2} \text{ Roadway}}{\text{Cosine } \phi}$

GENERAL NOTES

Standard Headwall Sections, includes wings, parapets, curtailwalls and floor for minimum fill.  
 Barrel section is computed for maximum fill over slab.  
 Maximum length M between construction joints to be 30'-0.  
 A sheet metal form not less than 18 gage may be used to form transverse construction joints in sidewalls and floor in place of beveled timber shown. If metal form is used it shall be left in place, joint in top slab may be omitted. Bars r to be used in either case.  
 Standard Specifications, Series of 1920, of the Iowa State Highway Commission, for construction.  
 Sheets C2P to C10P inclusive and CSP have been revised for H-20 loading. Sections are based on earth fills of 125<sup>lb</sup> per cu. foot and H-20 loading including impact for fills less than 3.0'. Unit stresses not to exceed ft of 1000<sup>lb</sup>,  $\phi$  of 20,000<sup>lb</sup> (n-10) shear of 90° and bond of 187.5<sup>lb</sup>.



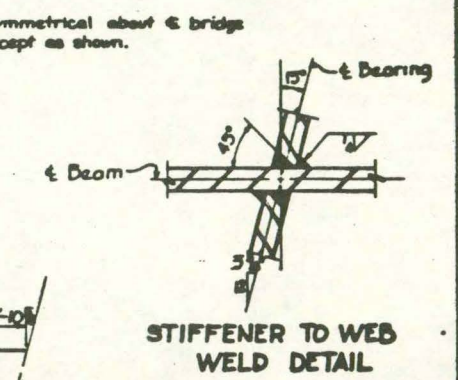
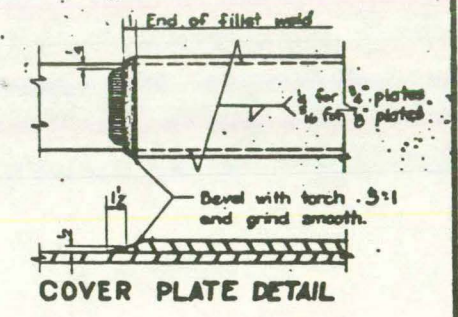
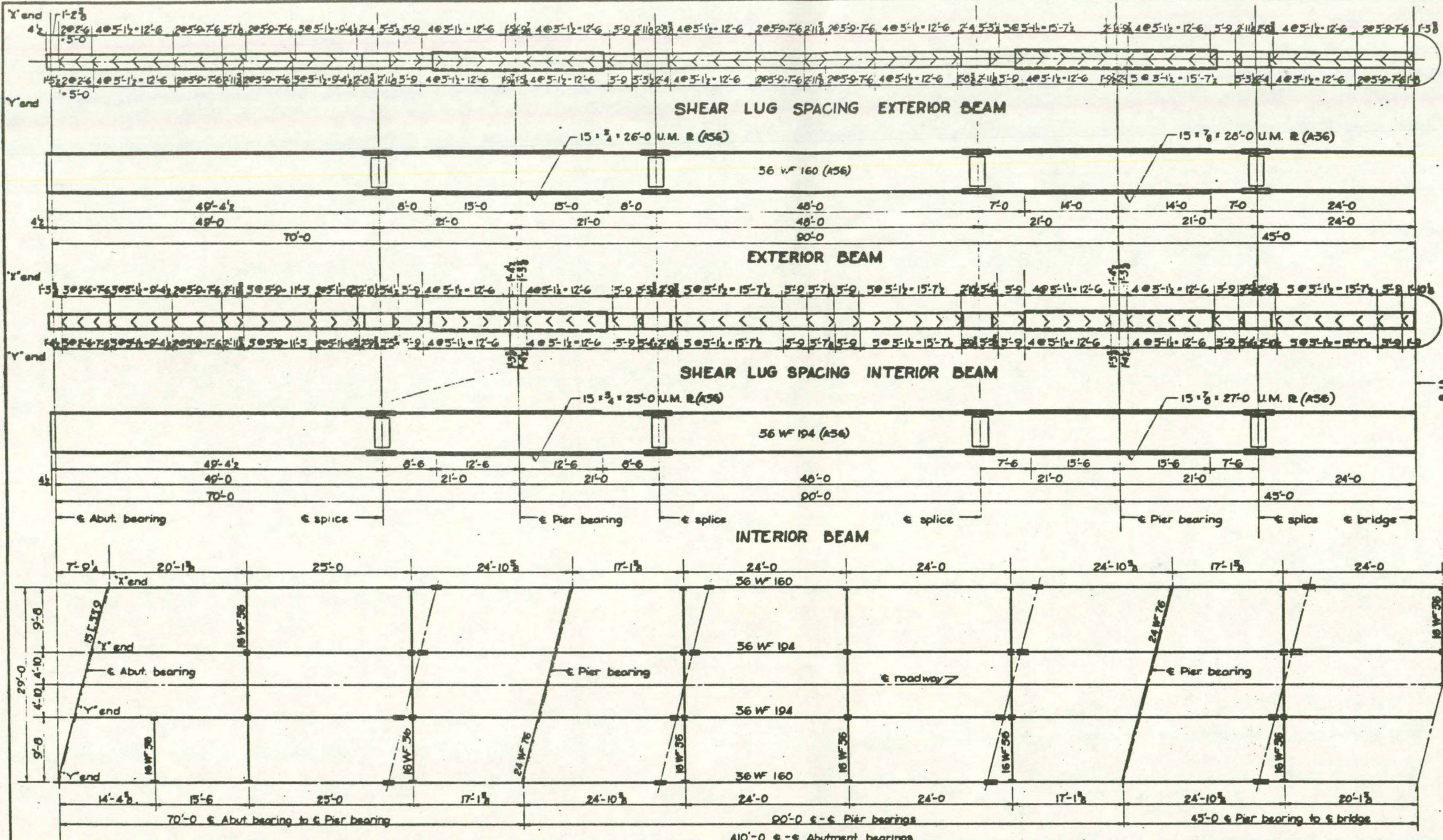
DATA SHEET FOR STANDARD  
CONCRETE BOX CULVERTS  
HEIGHTS 2'-3'-4' AND 5'  
PARALLEL WING WALLS  
IOWA STATE HIGHWAY COMMISSION  
APRIL 1932

APPROVED BY *J. R. Miller*  
CHIEF ENGINEER

REVISED JUNE 1944

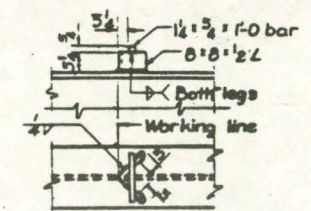


THIS PLAN SUPERSEDES ALL CONFLICTING STANDARDS OF PRIOR DATE



NOTE: Splice points of beams are to be supported by falsework or other approved means as directed by the Engineer and adjusted as closely as possible to the dimensions shown on "Beams as Fabricated and Erected" before riveting or bolting is completed.

Approved stud shear connectors may be used as an alternate for the angle shear connectors shown. If studs are used, each angle lug is to be replaced by a group of 15-3/4" x 4" studs. The centroid of the stud group is to be in the approximate location of the angle lug replaced. Maximum spacing between stud rows is to be 24" and where the lug angle spacing exceeds 24" the equivalent studs are to be located in two or more rows so that the maximum spacing is not exceeded. Studs are to be welded in the shop at locations shown on shop drawings approved by the Iowa Highway Commission.



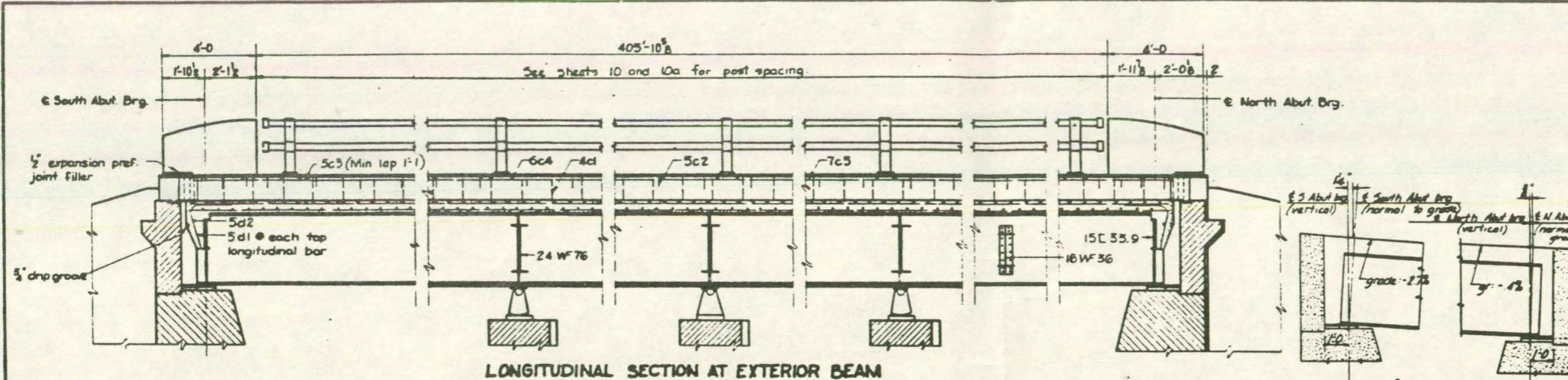
Revised 12-16-62: 16 splices eliminated due to contractor's desire. See sheet 60 for new splice locations and resulting diagrams.

Design for 15° Skew  
**410'-0" x 30' CONTINUOUS I-BEAM BRIDGE**  
 70'-0" End Spans  
 Concrete Floor & Substructure  
 90'-0" Interior Spans  
 Tubular Roll  
**SUPERSTRUCTURE DETAILS**  
 Station 196+29.00  
 Project No. F-11126)  
**WINNESHIEK COUNTY**  
 Iowa State Highway Commission  
 October 1961  
 Sheet 6 of 10  
 Design No. 1161 Winneshiek Co. File No. 21055

**TOTAL ANTICIPATED DEAD LOAD DEFLECTION**  
 Note: Encircled figures indicate deflection due to concrete alone. Use for grade line correction. Straight line between abutments.

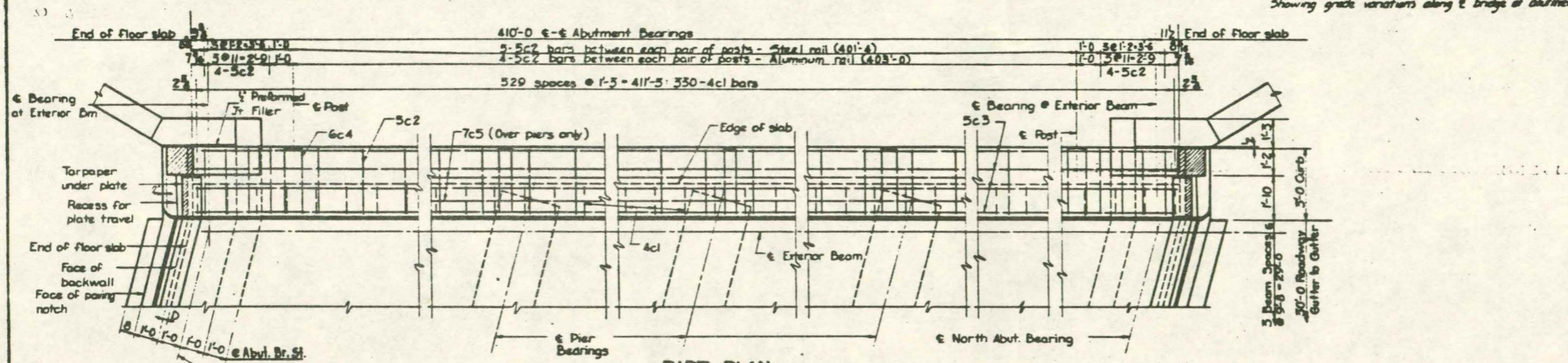
**BEAMS AS FABRICATED AND ERECTED**  
 Fabricate beams with natural bow up to reduce slab thickening

**SLAB THICKENING DIAGRAM**  
 For estimating purposes only.

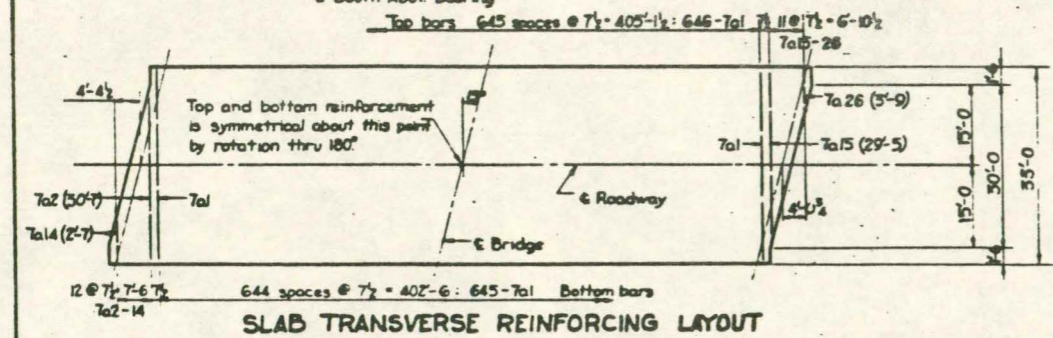


LONGITUDINAL SECTION AT EXTERIOR BEAM

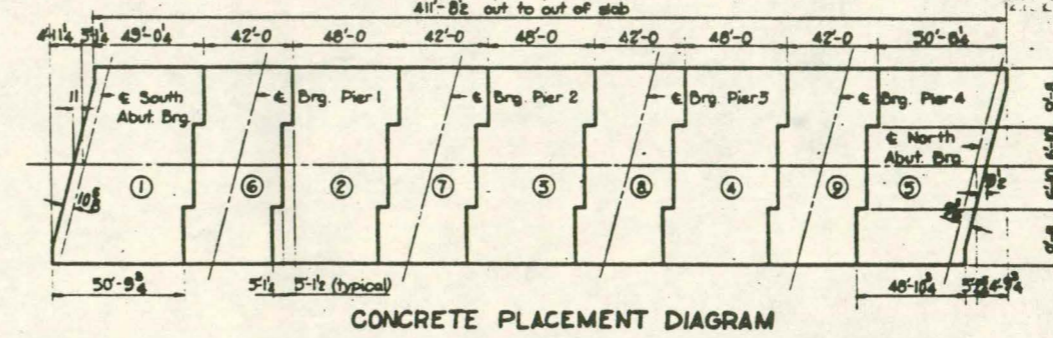
PART LONGITUDINAL SECTION  
Showing grade variations along E bridge at abutments



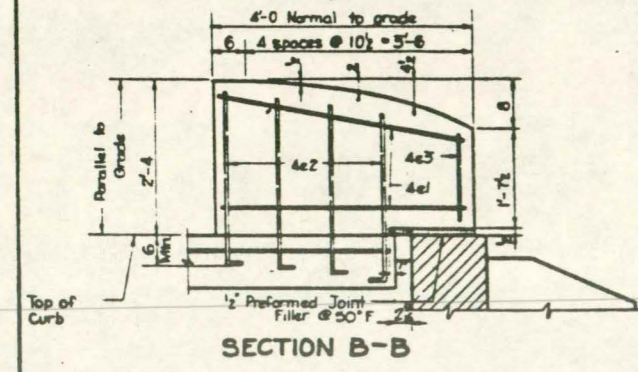
PART PLAN



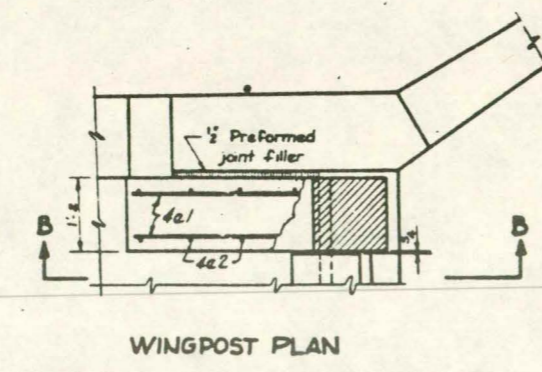
SLAB TRANSVERSE REINFORCING LAYOUT



CONCRETE PLACEMENT DIAGRAM



SECTION B-B



WINGPOST PLAN

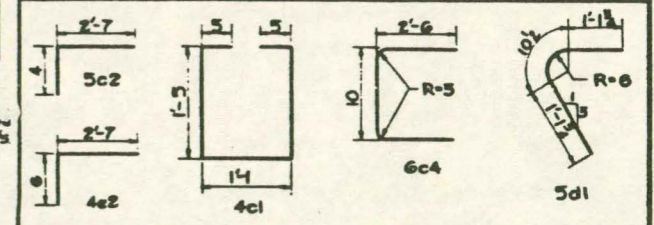
**SLAB PLACEMENT NOTES:**  
Roadway slab shall be placed in sections and in sequence indicated above and preferably at intervals not exceeding 84 hours. Curbs may be placed continuously. All slab reinforcing steel is to be in place before any section is poured. Alternate procedures for placing concrete may be submitted for approval together with a statement of the proposed method, and evidence that the Contractor possesses the necessary equipment and facilities to accomplish the required results.

Revised 12-10-62: Structural steel quantity changed due to Contractor's desire to eliminate 16 splices

**REINFORCING BAR LIST**

Bar	Location	Shape	No	Length	Weight
7a1	Slab transverse top and bottom	—	1291	32'-8"	86,202
7a2-14	bottom	—	26	Varies	801
7a15-26	top	—	24	Varies	815
6b1	Slab longitudinal top and bottom	—	407	38'-7"	23,586
4c1	Curb transverse	—	660	4'-6"	1,984
5c2	Curb transverse	—	452	2'-10"	1,276
5c3	Curb longitudinal	—	88	38'-5"	3,526
6c4	Curb at post	—	106	5'-6"	876
7c5	Curb longitudinal at piers	—	16	31'-0"	1,014
5d1	End diaphragm longitudinal	—	56	3'-2"	119
5d2	transverse	—	6	9'-7"	60
4e1	Wing post horizontal	—	16	3'-8"	59
4e2	vertical	—	32	5'-0"	64
4e3		—	8	1'-6"	8
Total					120,448

**BENT BAR DETAILS**

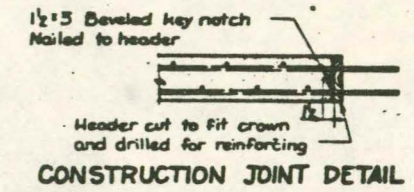


**CONCRETE PLACEMENT QUANTITIES**

Section	Location	Unit	Amount
1		c.y.	40.8
2		c.y.	59.5
3		c.y.	39.1
4		c.y.	39.5
5		c.y.	40.6
6		c.y.	32.5
7		c.y.	32.5
8		c.y.	32.5
9		c.y.	52.5
Two Curbs		c.y.	82.0
Four Wing Posts		c.y.	1.5
Total		c.y.	412.6

**ESTIMATED SUPERSTRUCTURE QUANTITIES**

Item	Unit	Amount
Concrete	c.y.	412.6
Reinforcing Steel	lbs.	120,448
Structural Steel	lbs.	406,004
Aluminum Rail (E-E End Posts)		806'-0"
Steel Rail (E-E End Posts)	L.F.	802.7



CONSTRUCTION JOINT DETAIL

Design for 15° Skew  
**410'-0" x 30' CONTINUOUS I-BEAM BRIDGE**  
70'-0" End Spans  
Concrete Floor & Substructure  
90'-0" Interior Spans  
Tubular Rail

**SUPERSTRUCTURE DETAILS**

Station 106+29.00 Project No. F-1112(1)

**WINNESHIEK COUNTY**

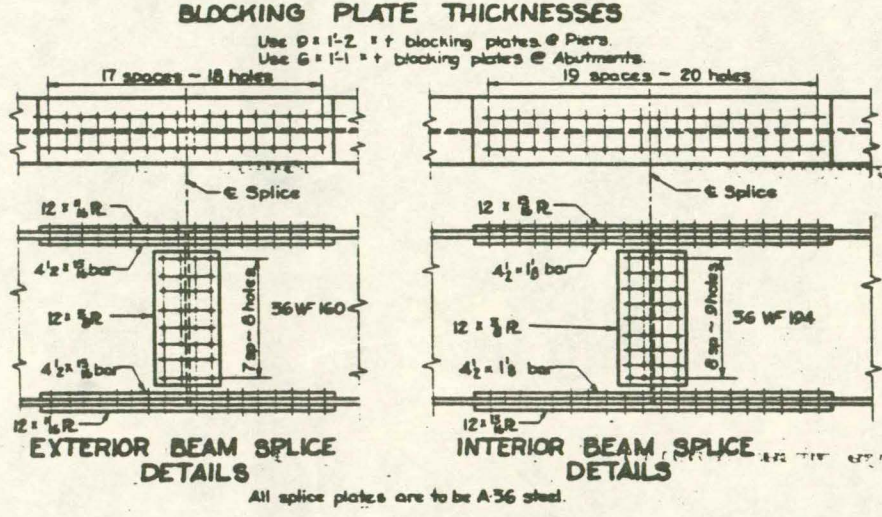
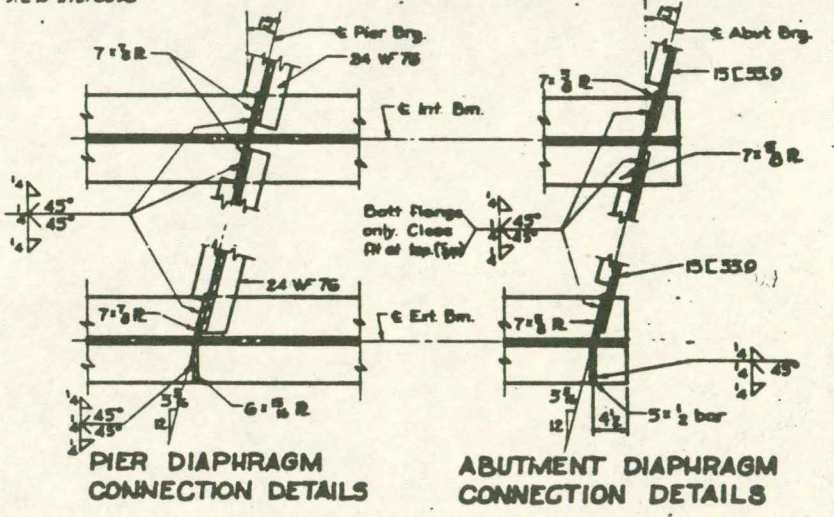
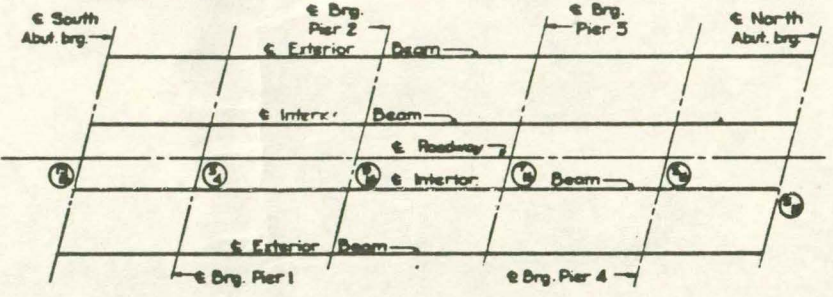
Iowa State Highway Commission  
October 1961 Sheet 7 of 10  
Design No. 1161 Winneshiek County File No. 21058

**BEARING NOTES:**

The casting of R1A, R2A, S2, R3A, and S3 shall comply with Article 4153.04 of the I.C. Standard Specifications.  
 The masonry plates marked MP1A, MP2A, MP2P, MP3A, and MP3P shall comply with the requirements of ASTM A-7 steel.  
 The weight of bearings shown does not include the weight of paint.  
 All bearings are to be set in paint and canvas.  
 Anchor bolts shall be set in accordance with Article 2408.46 of the Standard Specifications.  
 After masonry plates, rockers, and shoes are in correct location, pour mortar around anchor bolts to fill holes.  
 The pins shall comply with Article 4153.02 of the I.C. Standard Specifications and with the requirements of ASTM A-108 steel.  
 Surfaces finished with an ASA 125 finish shall be shop coated with an application of white lead and tallow as soon as the surfacing process is done. The shop coated surfaces are to be wiped clean and then a field coat of white lead and tallow is to be applied just before the erection of structural steel in the field.

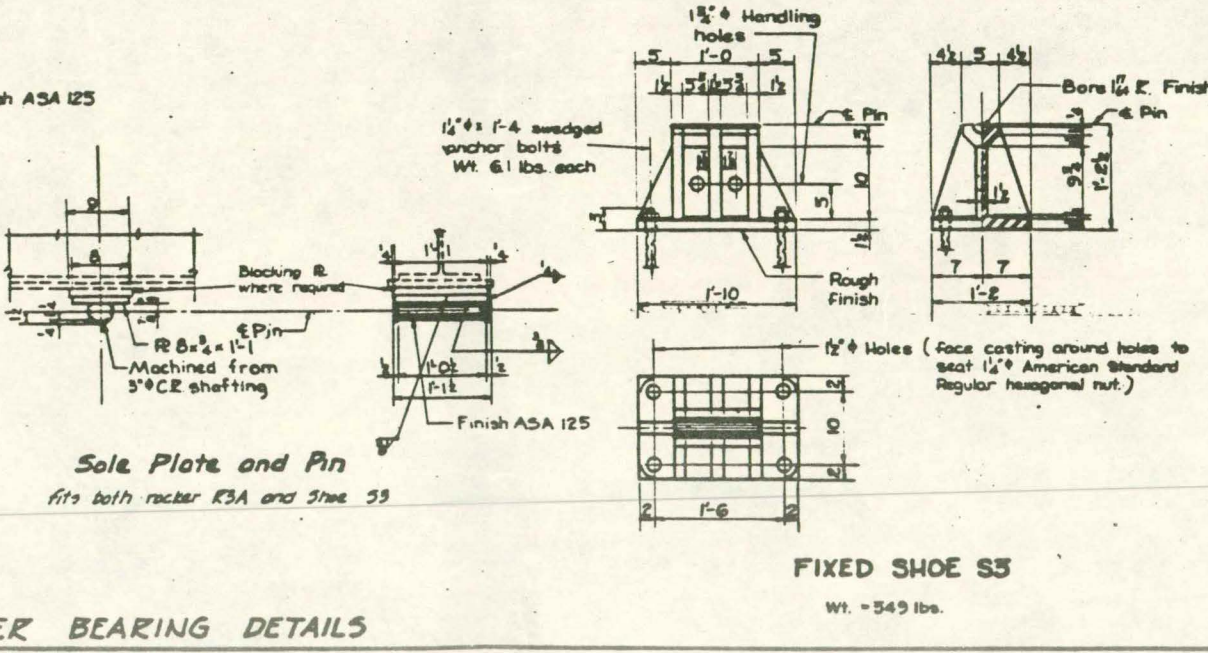
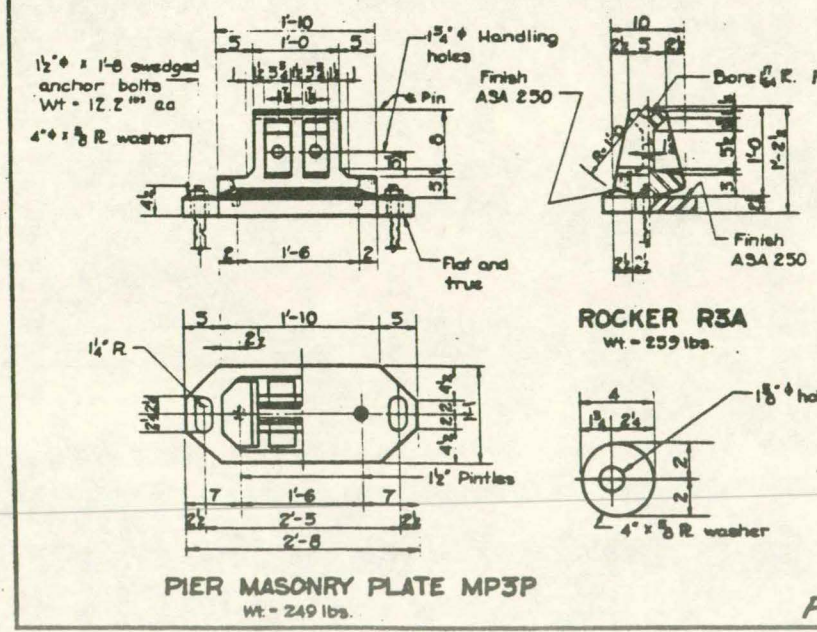
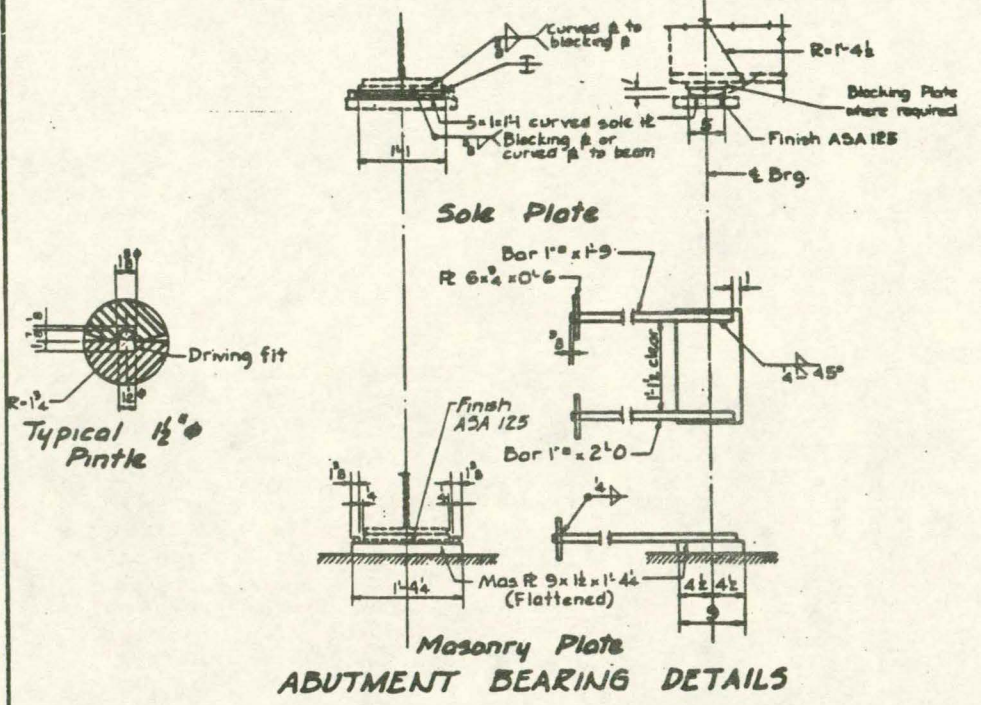
	MOMENT AND REACTION TABLE																	
	Loads		Pos. M. End Span		Neg. M. Pier 1&4		Pos. M. 2 <sup>nd</sup> Span		Neg. M. Pier 2&5		Pos. M. Center Span		Abut. Reaction		Reaction Pier 1&4		Reaction Pier 2&5	
	Ext.	Int.	Ext.	Int.	Ext.	Int.	Ext.	Int.	Ext.	Int.	Ext.	Int.	Ext.	Int.	Ext.	Int.	Ext.	Int.
D.L. No.1	779	1,229	257.1	374.1	552.5	871.4	223.2	355.5	574.8	906.8	214.0	357.6	19.4	30.5	70.2	110.6	70.5	111.0
D.L. No.2	595	1,035	195.1	350	584.0	66.7	208.1	36.1	400.7	68.6	199.7	34.7	15.5	2.7	52.8	92	55.6	9.5
U.L.L.	492	5,624			523.9	434.6			563.5	487.7					40.7	54.6	452	58.0
C.L.L.	1100	1100			169.9	227.9			178.9	240.0					170	22.9	170	22.9
H20-S16	20.96	28.13	564.0	756.9			553.4	742.6			558.9	750.1	59.5	53.0				
Impact			144.6	194.1	120.4	161.6	128.7	172.7	126.2	169.5	150.0	174.5	10.1	13.6	14.1	18.9	14.0	18.8
Total					1550.5	1762.2			1644.1	1873.4			84.5	99.8	194.6	216.2	198.1	220.0

In the load column for concentrated live load the upper figure is for moment and the lower figure is for shear. \* 9.5% increase \*\* 9.2% increase

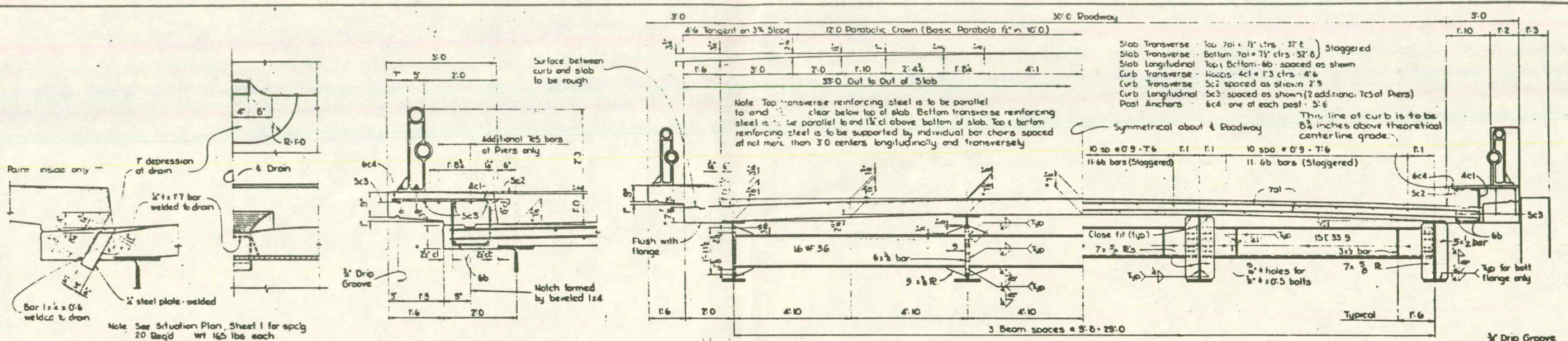


ROCKER AND EXPANSION PLATE SETTING						
	S. Abut.	Pier 1	Pier 2	Pier 5	Pier 4	N. Abut.
Temperature at time of setting						
10° F	5	-1/4	-	-1/4	-1/4	5/4
50° F	2 1/2	0	-	0	0	2 1/2
90° F	2	0	-	0	0	1 1/2

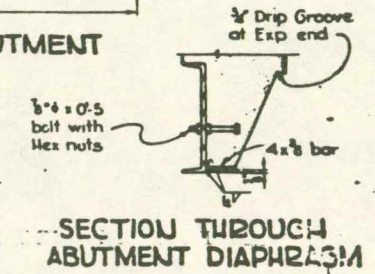
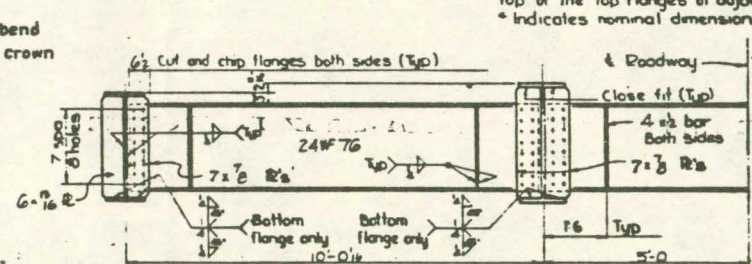
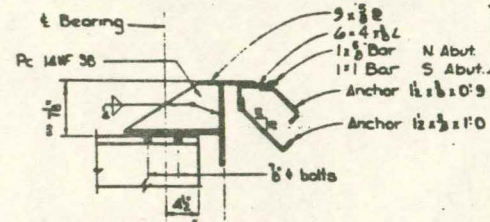
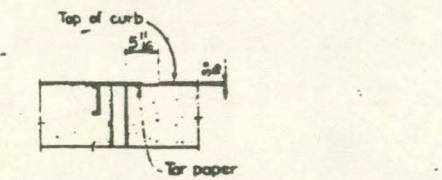
Normal to Expansion Plates.  
 Note: Settings for other temperatures are proportional to those shown for a 40° temperature change.



Design for 15' skew  
**410'-0" x 30' CONTINUOUS I-BEAM BRIDGE**  
 70'-0" End Spans  
 Concrete Floor & Substructure  
 90'-0" Interior Spans  
 Tubular Roll  
**SUPERSTRUCTURE DETAILS**  
 Station 196+29.00 Project No. F-112(1)  
**WINNESHIEK COUNTY**  
 Iowa State Highway Commission  
 October 1961 Sheet 8 of 10  
 Design: 1161 Winneshiek County File No. 21058

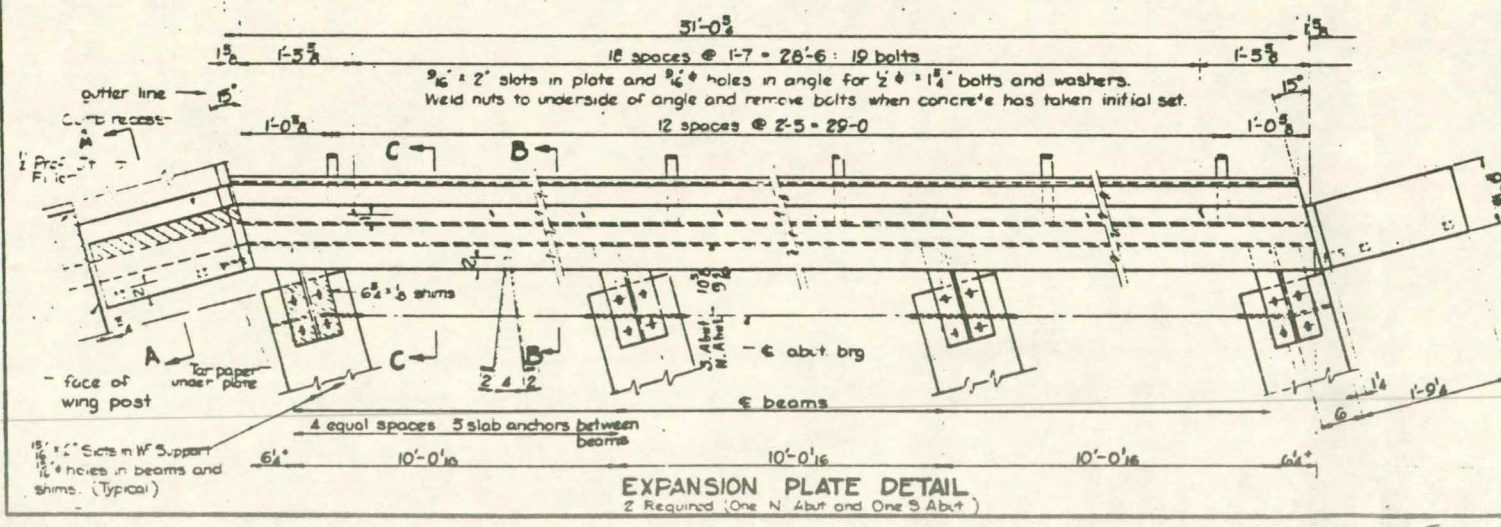
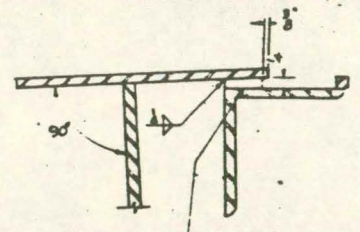
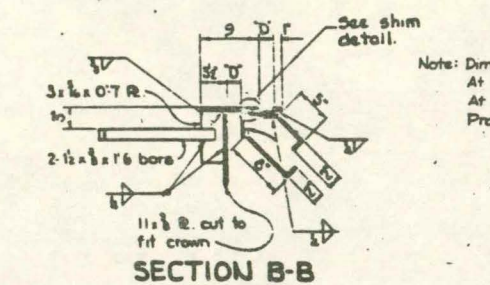
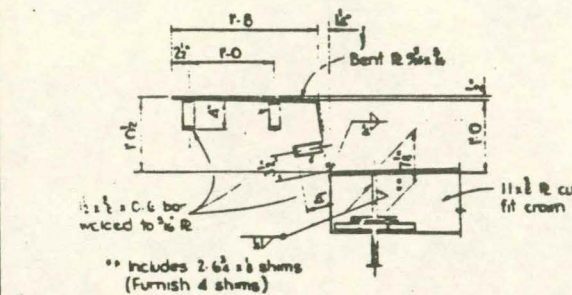


Note: 4" x 8" outside dimension rolled tube with 1/2" wall thickness may be substituted for the welded floor drain shown.



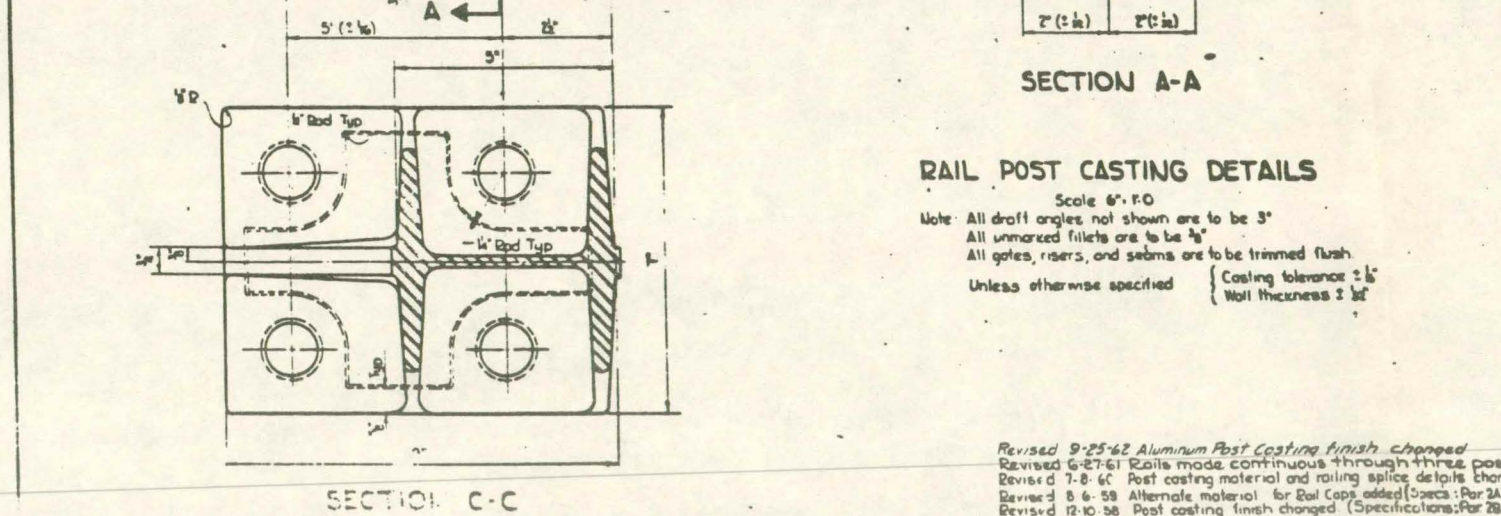
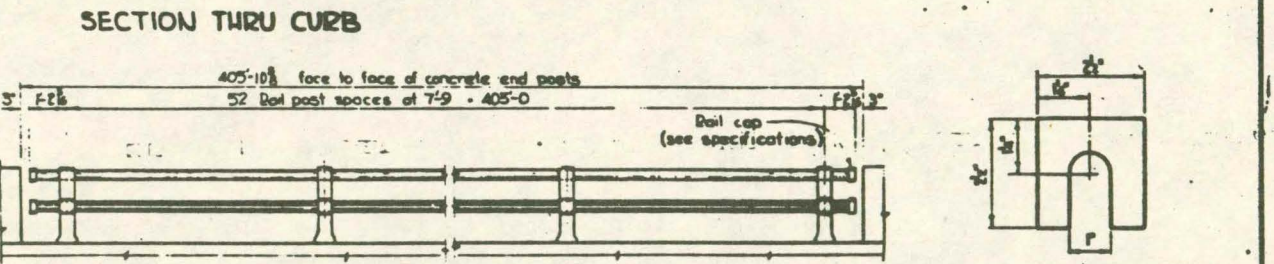
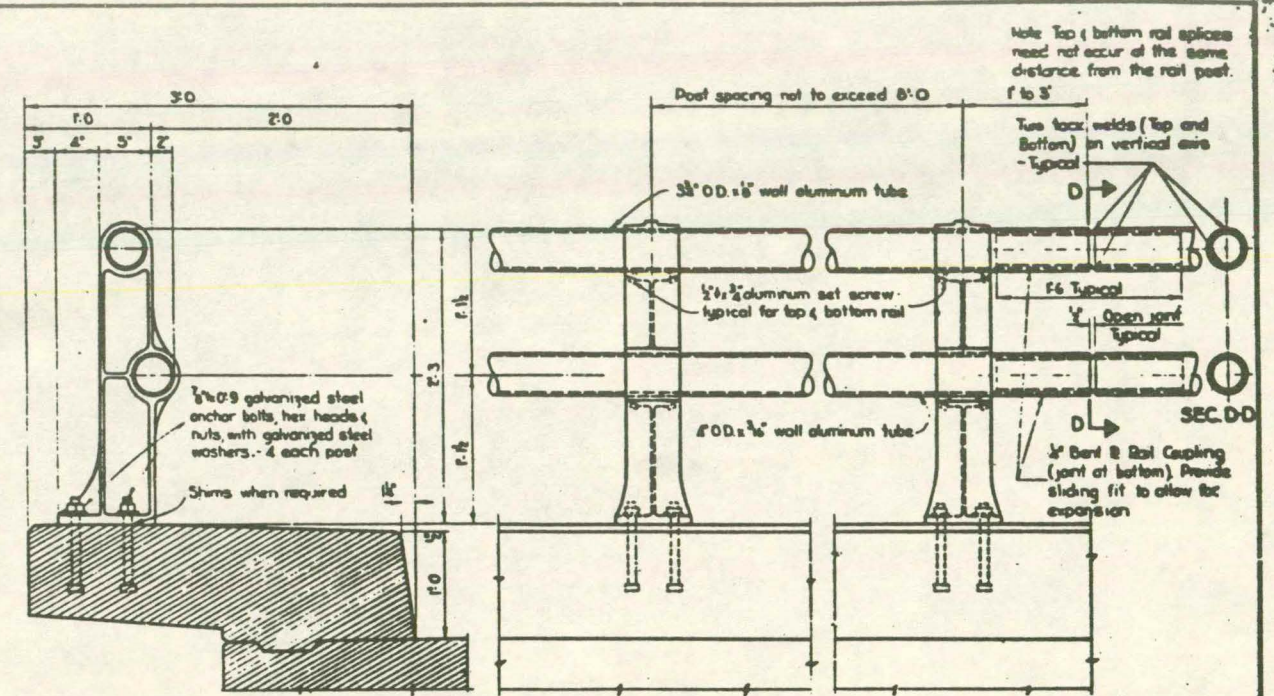
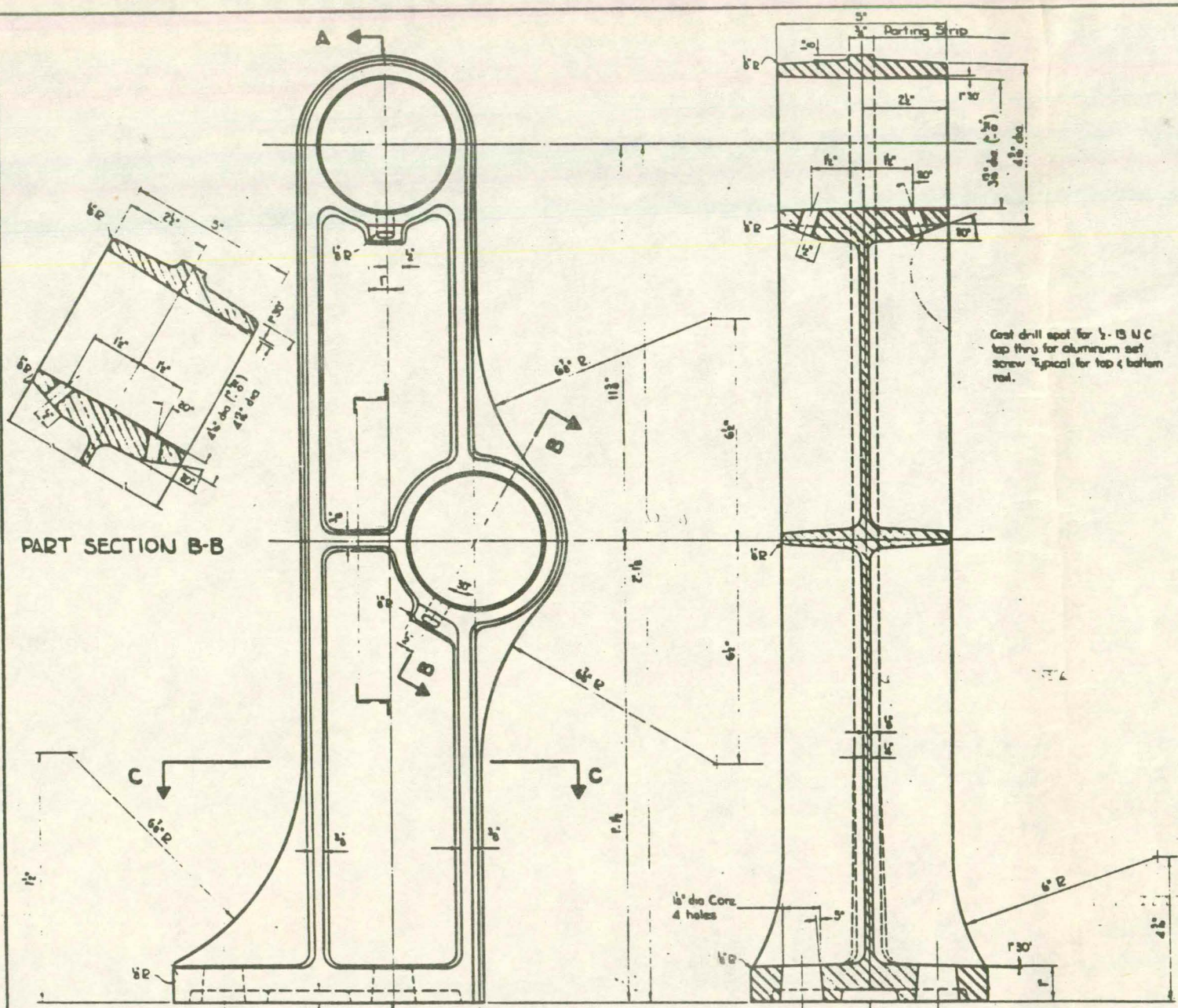
**SUPERSTRUCTURE NOTES:**  
This bridge is designed for H20 S16 loading plus 19#/sq. ft. of roadway for future wearing surface.  
The floor slab, as shown, includes 1/2" of wearing surface.  
Field connections may be riveted or bolted, except as noted or shown. Splice connections, if bolted, will require "High Tensile Strength Bolts". Structural Steel weights have been computed using "High Tensile Strength Bolts".  
All open holes are to be 1/2" unless otherwise noted.  
All rivets and bolts are to be 1/2" unless otherwise noted.  
Bottom flanges of beams are to be perpendicular to webs of reaction points.  
Beams are to be sub-punched and reamed. Before reaming, all beams are to be assembled to proper camber as shown on Sheet 6. Beams as Fabricated and Erected for inspection. After inspection, holes are to be reamed and all parts match marked.  
Masonry plates are to be set in point & canvas.  
Bearing surfaces of unfinished masonry plates are to be flat and true.  
Shop coat of paint is to be omitted on tops of top flanges of beams and on other steel surfaces in contact with concrete.  
Parts inaccessible after erection are to be given three coats of paint in the shop.  
Forms for the slab and curb are to be supported by the beams.  
Cost of all preformed joint filler to be included in price bid for concrete.  
Main beams, cover plates and splice plates shall conform to the A.S.T.M. Specifications for A36 Carbon Steel. All other Structural Steel shall conform to the A.S.T.M. Specifications for A-7 Steel, except as noted on sheet # 8.

**SPECIFICATIONS:**  
Design: AASHTO 1961  
Construction: Iowa State Highway Commission Standard Specifications Series of 1960, plus current special provisions, and supplemental specifications.



Design for 15' Slab  
**410'-0" x 30' CONTINUOUS I-BEAM BRIDGE**  
70'-0" End Spans  
Concrete Floor & Substructure  
90'-0" Interior Spans  
Tubular Rail

**SUPERSTRUCTURE DETAILS**  
Station 196+29.00  
Project W F-1112(1)  
**WINNESHIEK COUNTY**  
Iowa State Highway Commission  
October 1961  
Design 116  
Winneshiek Co. File # 21058  
Sheet 9 of 10



**SPECIFICATIONS:**

**1. DESCRIPTION OF BID ITEM**

A. Aluminum handrail is to be bid on a linear foot basis measured from center to center of end posts. The price bid for "Aluminum Handrail" shall consist of furnishing, fabricating, erecting, and cleaning all metal handrail and shall include the furnishing and installation of anchor bolts and all other incidental items in accordance with these plans and specifications.

**2. COMPONENT PARTS AND MATERIALS**

A. Aluminum Bridge Rail Tubing

1. Aluminum tubing shall comply with the ASTM Specification B231 - alloy 6011A condition T6 (commercial designation 6061-T6). The rail tubing is to be fabricated from random length tubing and joined as indicated. Each rail section must pass thru at least three joints before being applied.

2. The aluminum rail tubing shall be closed at the ends next to the concrete and posts, as detailed, by means of cast caps or plugs or by means of welded end plates. The cast caps or plugs shall comply with the material specifications as outlined for post castings or with ASTM Spec B 26 alloy 505A condition F.

B. Aluminum Rail Post Castings

1. Aluminum post castings shall comply with:  
(a) The ASTM Specification B108 - alloy 367 OB condition T6 for aluminum alloy permanent mold castings (commercial designation - A336-T6)

2. The post castings shall have smooth and even surfaces, free from shrinkage cracks, oxide inclusions, and other defects.

3. The post castings shall follow the outlines and dimensions as detailed. Minor changes, such as draft angles and radii for fillets and corners, shall be permitted. Draft on front and back face of post may be omitted, providing minimum wall thicknesses as detailed are maintained. Shop drawings for post castings must be submitted and approved by the Engineer before castings are made.

4. The 1/2" porting strip is to be finished with a R0 grit finish or an approved equal.

5. Before setting posts, the entire base of the post casting shall be coated with an aluminum impregnated caulking compound 5/8" thick. The caulking compound shall comply with Federal Specifications TT-C-598 for entic grade to which shall be added aluminum paste complying with Paragraph 411.02 in proportion to one pound of aluminum to 5 pound of caulking compound.

C. Aluminum Set Screws for Posts

1. Aluminum set screws shall comply with the ASTM Specification B211 - alloy CS 42 A (commercial designation 2024-T4 with LP 205 alumite finish). The finished set screws shall be supplied in the T-4 temper and shall be given an anodic coating of at least 0.0002" in thickness and chromate sealed. The set screws shall have a hexagon socket head and oval point.

D. Aluminum Shims

1. Aluminum shims shall comply with the ASTM Specification B-208 - alloy 990A condition O (commercial designation - 800-O).

2. Current tentative ASTM Standard Specifications.

**3. CONSTRUCTION**

A. The specifications for construction shall be the Standard Specifications of the Iowa State Highway Commission, Series of 1960, plus current Special Provisions with the added provisions.

1. The anchor bolts for the aluminum posts shall be set at the line and elevations shown on the plans. They shall be firmly held in place by suitable templates that will ensure their correct position during the placement of concrete.

2. The cast aluminum posts and the aluminum tube rails shall be carefully handled during their unloading, handling, and erection. Members that are marred, disfigured or damaged to the extent that they impair their usefulness or appearance shall be rejected and replaced at the contractor's expense.

3. The aluminum handrail shall be stored above ground upon suitable platforms and kept free from dirt, grease, and contact with dissimilar metals. The stored aluminum handrail shall be protected from moisture as far as practical.

4. After anchor bolts have been tightened, the excess caulking compound shall be removed and all openings around the base of the post painted full and flush with caulking compound.

5. After erection, rails and posts and the concrete around the post bases shall be thoroughly cleaned of all dirt, grease, caulking compound and other foreign material by an approved means as directed by the Engineer.

6. Set screws are to be tightened to prevent rails from rattling, but they are not to be tightened so as to prevent movement due to rail expansion.

ALUMINUM HANDRAIL QUANTITIES	
Aluminum Handrail (4-4 End Posts)	806.0 lin ft.

Design for 15° Skew  
**410'-0" x 30' CONTINUOUS I-BEAM BRIDGE**  
 70'-0" End Spans  
 Concrete Floor & Substructure  
 90'-0" Interior Spans  
 Tubular Rail

**ALUMINUM HANDRAIL DETAILS**

Station 196 + 29.00 Pkg W-F-1112(1)

**WINNESHIEK COUNTY**  
 Iowa State Highway Commission  
 October 1961 Rail Standard Sheet 1000 Sheet 10 of 10

Design No. 1161 Winneshiek County File No. 21036

Revised 9-25-62 Aluminum Post Casting finish changed  
 Revised 6-27-61 Rails made continuous through three posts.  
 Revised 7-8-61 Post casting material and railing splice details changed.  
 Revised 8-6-59 Alternate material for Rail Caps added (Specs: Part 2A Item 4)  
 Revised 8-10-58 Post casting finish changed (Specifications: Part 2B Item 4)  
 Revised 10-6-58 Post casting base dia'd at end and other minor changes