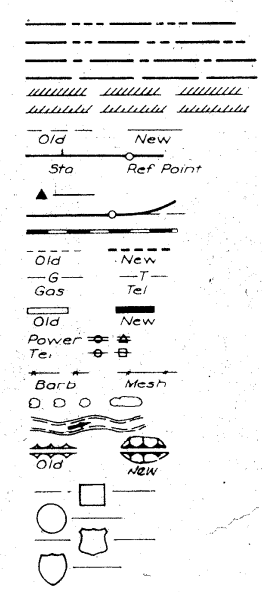


BRIDGE
I-380-6(109)267--01-57

LINN COUNTY

- State Line
Co. Line
Twp. Line
Sec. Line
Corp. Line
Urban Bdry.
R.O.W. Lines
Survey Line
- Sec. Corner
Profile Grade
Railroad
Field Tile
Underground Lines
- Culverts
Utility Poles
Fences
Trees Or Brush
Stream
Dike
- County Road No.
Primary Road No.
U. S. Road No.
Interstate Road No.

CONVENTIONAL SIGNS



IOWA
DEPARTMENT OF TRANSPORTATION
Highway Division

PLANS OF PROPOSED IMPROVEMENT ON THE
INTERSTATE ROAD SYSTEM

LINN COUNTY
BRIDGE

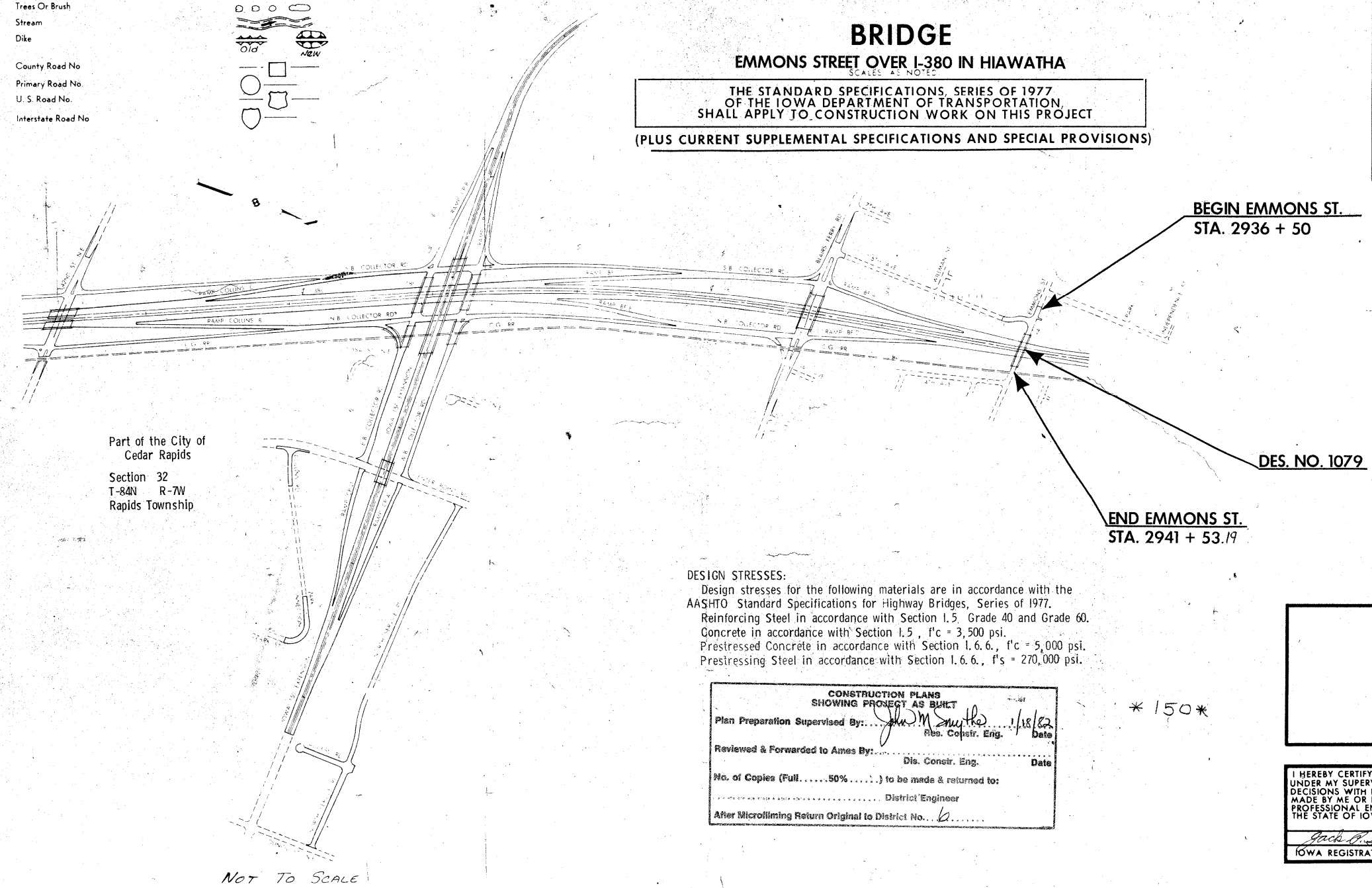
EMMONS STREET OVER I-380 IN HIAWATHA

THE STANDARD SPECIFICATIONS, SERIES OF 1977
OF THE IOWA DEPARTMENT OF TRANSPORTATION,
SHALL APPLY TO CONSTRUCTION WORK ON THIS PROJECT
(PLUS CURRENT SUPPLEMENTAL SPECIFICATIONS AND SPECIAL PROVISIONS)

STATE	DIST. NO.	YEAR	NO.	SHEETS
IOWA	1	1	1	22
PROJECT NUMBER				
I-380-6(109)267--01-57				
R.O.W. PROJECT NUMBER				
I-380-6(70)267--01-57				
PRELIMINARY ENGINEER NUMBER				
I-380-6(3)259--01-57				

INDEX OF SHEETS	
NO.	DESCRIPTION
1	TITLE SHEET
2	ESTIMATE SHEET
3-22	BRIDGE DESIGN NO. 1079

THIS AS BUILT PLAN INCLUDES			
YEAR	WORK	CONTRACTOR	PROJ. INSPECTOR
1980-81	B. BRIDGE	LUNDA	D. KROTZ



Part of the City of
Cedar Rapids
Section 32
T-84N R-7W
Rapids Township

DESIGN STRESSES:
Design stresses for the following materials are in accordance with the
AASHTO Standard Specifications for Highway Bridges, Series of 1977.
Reinforcing Steel in accordance with Section 1.5, Grade 40 and Grade 60.
Concrete in accordance with Section 1.5, f'c = 3,500 psi.
Prestressed Concrete in accordance with Section 1.6.6, f'c = 5,000 psi.
Prestressing Steel in accordance with Section 1.6.6, f's = 270,000 psi.

CONSTRUCTION PLANS
SHOWING PROJECT AS BUILT

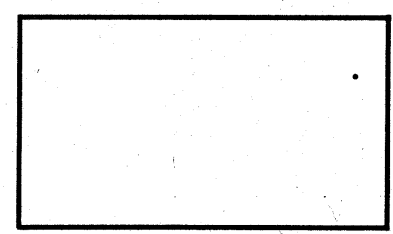
Plan Preparation Supervised By: *John M. Smyth* 1/18/82
Res. Constr. Eng. Date

Reviewed & Forwarded to Ames By: _____
Dis. Constr. Eng. Date

No. of Copies (Full.....50%.....) to be made & returned to:
District Engineer

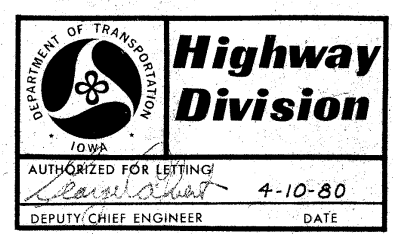
After Microfilming Return Original to District No. 6

* 150 *



I HEREBY CERTIFY THAT THIS PLAN WAS PREPARED
UNDER MY SUPERVISION AND THAT ENGINEERING
DECISIONS WITH REGARD TO THE DESIGN WERE
MADE BY ME OR BY OTHER DULY REGISTERED
PROFESSIONAL ENGINEERS UNDER THE LAWS OF
THE STATE OF IOWA.

Jack P. Shedd
IOWA REGISTRATION NUMBER 5293 DATE 6-28-79

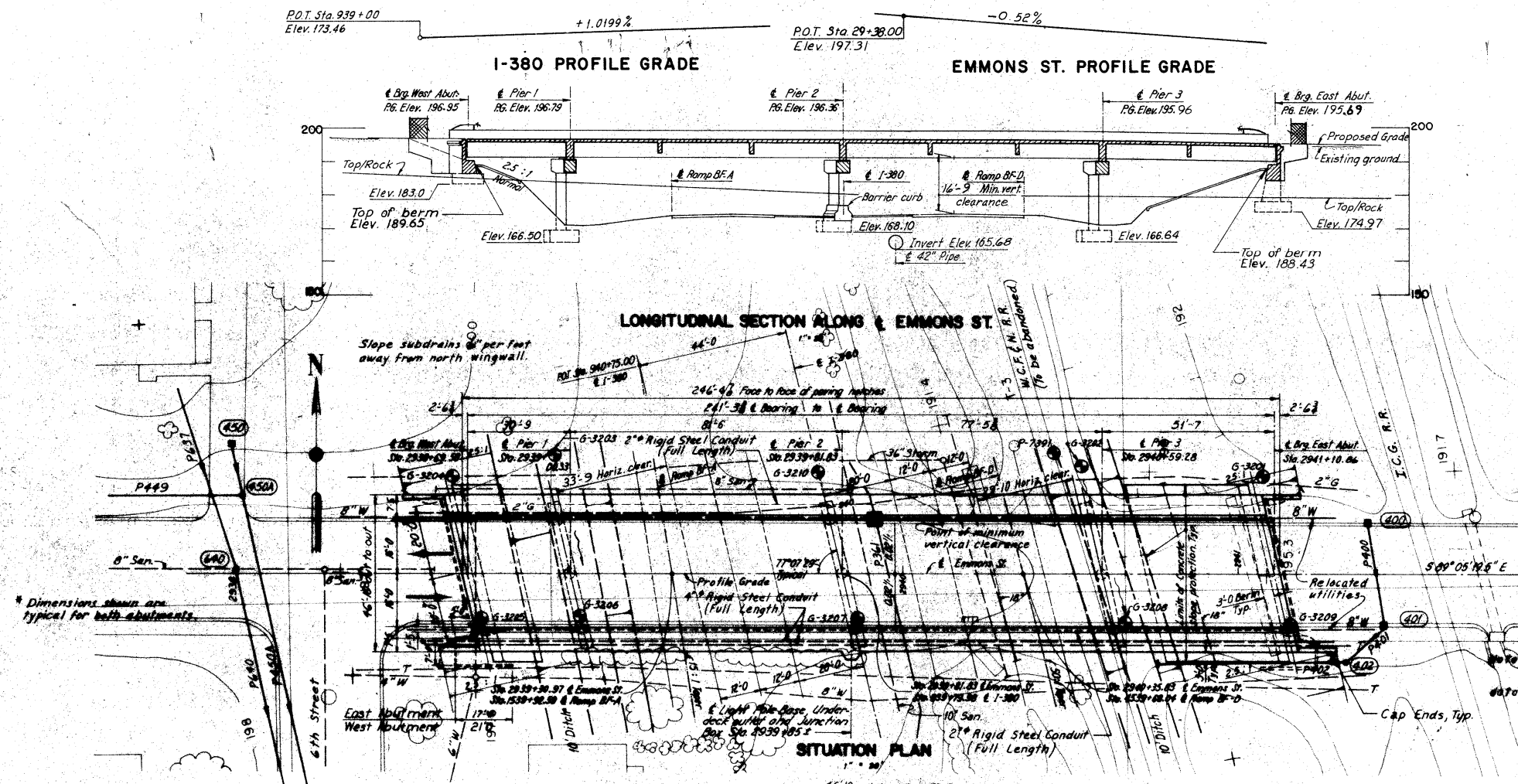


U.S. DEPT. TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

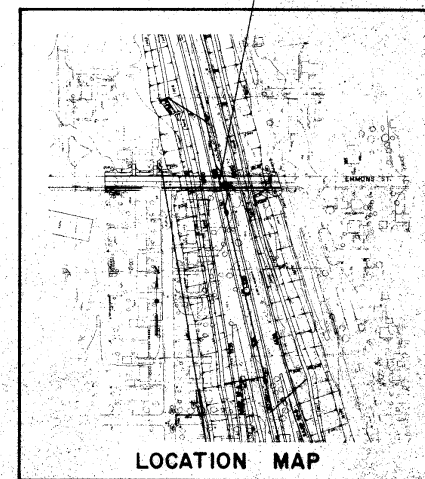
APPROVED

DIVISION ENGINEER DATE

FEDERAL DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	IOWA				



Sta. 2939+81.83 @ Emmons St. =
Sta. 939+79.98 @ I-380



DESIGN TRAFFIC

Emmons Street Traffic Count

LOCATION

Emmons Street over I-380
Linn County
Rapid Township
T84N RTW
Section 33

BENCH MARKS

IDAOT BRASS PLUG WEST END
OF EMMONS ST. BRIDGE TOP
BARRIER CURB NORTH SIDE
ELEV. 199.36

I hereby certify that this plan, specification or report was prepared by me or under my direct personal supervision and that I am a duly registered Professional Engineer under the laws of the State of Iowa.

Signed Jack P. Shedd Date 1-23-80
Jack P. Shedd, P.E. Iowa Reg. No. 5293

EMMONS STREET OVER I-380
DESIGN FOR 12°52'31" SKEW
241'-3" x 32'-0" PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE
30'-9, 81'-6, 77'-5, 51'-7 SPANS

SITUATION PLAN

STA. 2939+81.83 @ EMMONS ST. =
STA. 939+79.98 @ I-380 PROJECT NO. I-380-6(100)267-DI-57
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION
1980 DESIGN SHEET 1 OF 20
DESIGN NO. 1079 LINN COUNTY FILE 2609 SHEET 3 OF 22

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY

MADE TKN DATE 1-24-80 CHECKED LJR DATE 1-25-80

TYPICAL SECTION

Note:
All transverse dimensions
are normal to Emmons Street.

FEDERAL DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	IOWA				

SPECIFICATIONS

DESIGN: AASHTO Series of 1977 plus current interim Specifications.

CONSTRUCTION: Iowa Department of Transportation, Highway Division Standard Specifications, Series of 1977 plus current Supplemental Specifications.

DESIGN STRESS

Design stresses for the following materials are in accordance with the AASHTO Standard Specifications for Highway Bridges, Series of 1977.

Reinforcing steel in accordance with Section 1.5, Grade 40 and Grade 60.

Concrete in accordance with 1.5, $f'_c = 3,500$ psi.

Prestressed Concrete Beams, See Design Sheet 14 and 15 of 20.

GENERAL NOTES

These bridges are designed for HS20-44 loading plus 20 lb. per sq. ft. of roadway for future wearing surface.

The bridge contractor is to install the subdrain behind each abutment as detailed. The price bid for "Subdrain" is to include the excavation necessary for installation.

Drawings shall not be scaled.

All dimensions are horizontal unless shown otherwise.

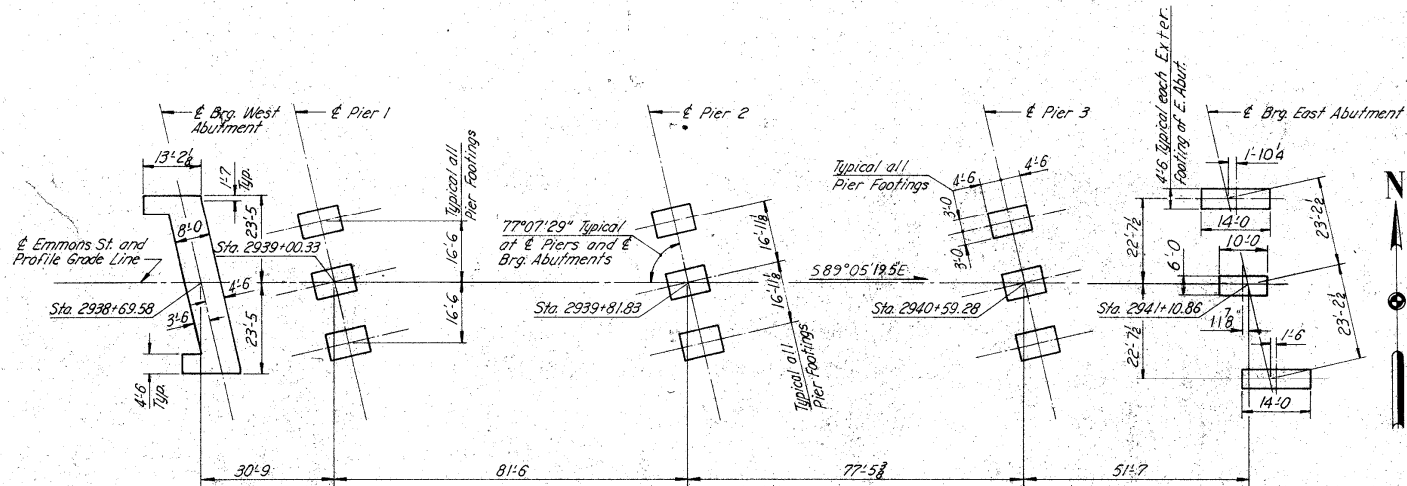
Utilities shall be relocated or abandoned by others.

The approaches are not a part of this estimate. The bridge contractor is to level off and shape the berms to the elevations and dimensions shown.

The transverse and longitudinal slab bars are Grade 60 (top and bottom) and all other bars are Grade 40. In general, all bars within the top mat of slab reinforcing, barrier rail bars, sidewalk and light pole base bars are to be epoxy coated, see Bill of Reinforcement.

Unless otherwise specified, the reinforcement supplied for this structure may be Grade 40, 50 or 60 reinforcement in accordance with the Standard Specifications. The design stresses for all grades are based on 40 grade reinforcement.

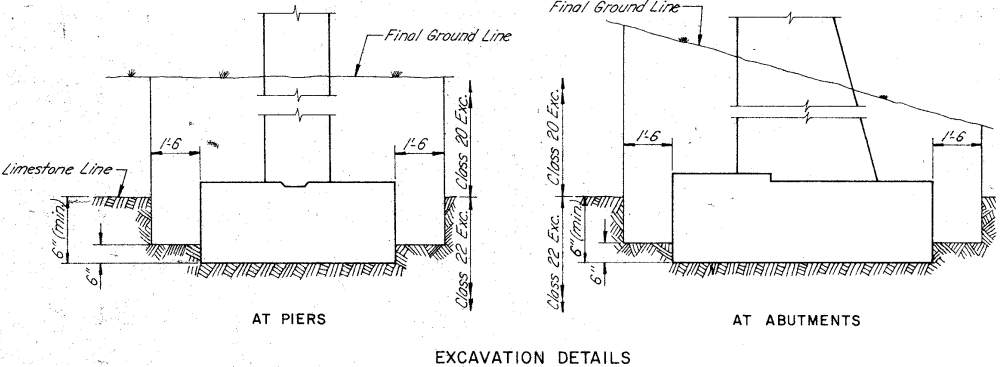
If 60 grade reinforcement is specified in the superstructure, pier, or abutment notes then only 60 grade reinforcement shall be supplied for the part of the structure designated, and the design stresses are to be for 60 grade.



FOOTING PLAN

TOTAL ESTIMATED QUANTITIES						
ITEM NO.	ITEM	UNIT	2 ABUT.	3 PIERS	SUPERSTR.	TOTAL
1	Structural Concrete	Cu. Yds.	211.5	191.3	387.1	789.9
2	Reinforcing Steel	Lbs.	20,915	32,244	33,600	86,759
3	Reinforcing Steel -- Epoxy Coated	Lbs.			63,035	63,035
4	Prestensioned, Prestressed Concrete Beams	C30 No.			7	7
		C80R No.			7	7
		C75R No.			7	7
5	Structural Steel	Lbs.			5,740	5,740
6	Excavation, Class 20	Cu. Yds.	391.1			391.1
7	Excavation, Class 22	Cu. Yds.	124.21	204.21		328.93
8	Granular Backfill	Cu. Yds.	188			188
9	Concrete Slope Protection	Sq. Yds.	351.0			351.0
10	Concrete Barrier Rail	Lin. Ft.			487	487
11	Steel Sidewalk Rail	Lin. Ft.			486.18	486.18
12	Chain Link Fence, as per plan	Stations			5.32	5.32
13	Subdrain	Lin. Ft.	155.0			155.0
14	4" Rigid Steel Conduit	Lin. Ft.			501	501
15	1" Rigid Steel Conduit	Lin. Ft.			9	9
16	2" Rigid Steel Conduit	Lin. Ft.			541	541
17	Preformed Elastic Neoprene Jt. (3")	Lin. Ft.			102	102
18	Water Line Installation	Lump Sum			LumpSum	LumpSum

ITEM NO.	ESTIMATE REFERENCE INFORMATION
1	361.4 Cu. Yds. of Class C Concrete 423.4 Cu. Yds. of Class D Concrete
2	28,505 Lbs. of Grade 60
3	38,426 Lbs. of Grade 60 -- 3,732 Lin. Ft. No. 8 bar 11,355 Lin. Ft. No. 6 bar -- 34,522 Lin. Ft. No. 5 bar



AT PIERS

EXCAVATION DETAILS

AT ABUTMENTS

EMMONS STREET OVER I-380
DESIGN FOR 12°52'31" SKEW
241'-3" x 32'-0" PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE
30'-9, 81'-6, 77'-5, 51'-7 SPANS
FOOTING PLAN &
GENERAL NOTES

STA. 2939+81.83 @ EMMONS ST.
STA. 939+79.98 @ I-380

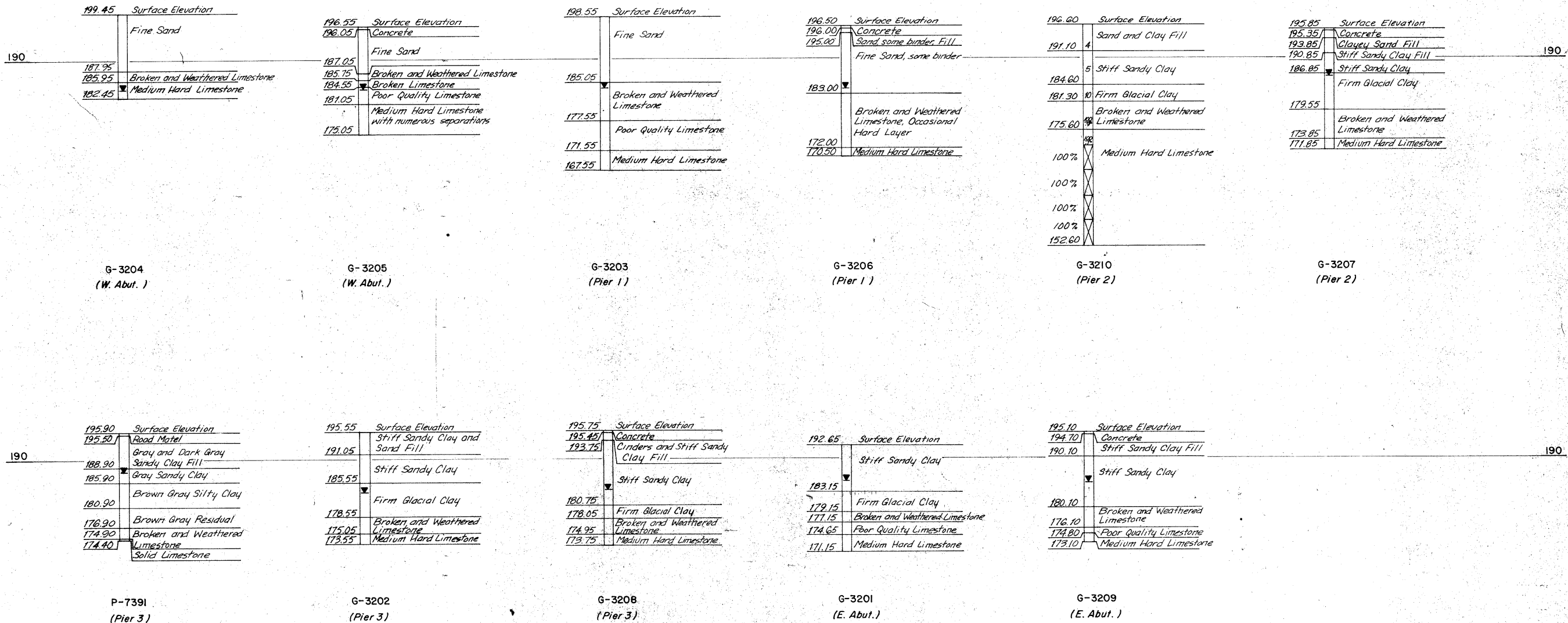
LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION
1980
DESIGN SHEET 2 OF 20

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY

MADE TKN DATE 1-21-80 CHECKED LJR DATE 1-21-80

5860-99-01

FEDERAL DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	IOWA				



LEGEND

- The numbers shown inside the boring log diagram indicate N-values, the number of blows of a 140 lb hammer falling 50 inches required to drive a 2" O.D., 1 3/8" I.D., split barrel sampler one foot. Penetration of less than one foot is shown 100/1.9" (blows per penetration in inches).
- Indicates interval of rock core and percent recovery.
- Indicates G.W.L. as recorded on the report of Bridge Soundings.

Note:
For location of soundings see Sheet 1 of 20.

NOTE:
Subsurface information shown on this drawing was obtained solely for use in establishing design controls for the project. The accuracy of this information is not guaranteed and it is not to be construed as part of the plans governing the construction of this project.

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY

MADE JFS DATE 11-20-78 CHECKED GDL DATE 11-20-78

EMMONS STREET OVER I-380
DESIGN FOR 12°52'31" SKEW
241'-3" x 32'-0" PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE
30'-9", 81'-6", 77'-5", 51'-7" SPANS

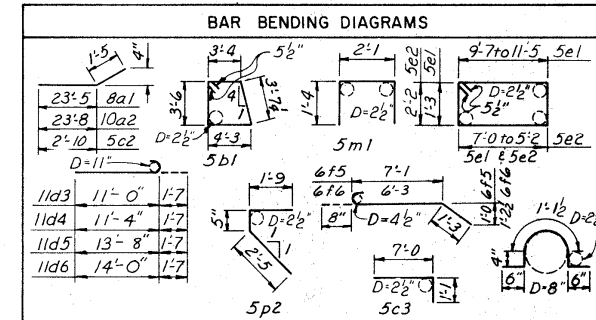
SOUNDING DATA

STA. 2939+81.83 @ EMMONS ST. =
STA. 939+79.98 @ I-380

LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION
1980 DESIGN SHEET 3 OF 20
DESIGN NO. 1079 LINN COUNTY FILE26090SHEET 5 of 22

FEDERAL DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	IOWA				

BILL OF REINFORCEMENT EAST ABUTMENT						
BAR	LOCATION	SHAPE	GRADE	NO.	LENGTH	WEIGHT
8a1	Footings	—	40	12	24'-10"	796
10a2	Footings	—	40	28	25'-1"	3022
5b1	Footings	—	40	48	15'-7"	780
5c1	Backwall	—	40	12	44'-8"	559
5c2	Backwall Dowel	—	40	24	4'-3"	106
5c3	B.W. Sidewalk	—	40	4	8'-1"	34
11d1	Counterfort Walls	—	40	34	13'-8"	2469
11d2	Counterfort Walls	—	40	4	8'-3"	175
11d3	Outer C.F. Walls	—	40	4	12'-7"	267
11d4	Center C.F. Wall	—	40	4	12'-11"	275
11d5	Outer C.F. Walls	—	40	8	15'-3"	648
11d6	Outer C.F. Wall	—	40	8	15'-7"	662
11d7	Center C.F. Wall	—	40	8	6'-10"	290
11d8	Center C.F. Wall	—	40	2	10'-11"	116
5e1	Outer C.F. Walls	—	40	2Ser6	Varies	306
5e2	Center C.F. Wall	—	40	1Ser6	Varies	109
5f1	Maskwall	—	40	20	3'-7"	75
5f2	Wingwall	—	40	24	5'-11"	148
5f3	Wingwall Dowel	—	40	32	3'-10"	128
5f4	Wingwall	—	40	16	6'-1"	102
6f5	Fillet	—	40	12	9'-0"	162
6f6	Fillet	—	40	12	8'-2"	147
5g1	Paving Notch	—	40	18	1'-8"	31
5g2	Maskwall	—	40	16	6'-0"	100
5g3	Wingwall	—	40	8	6'-1"	58
5g4	Wingwall	—	40	10	9'-5"	98
5g5	Wingwall	—	40	10	9'-3"	96
5g6	Fillet	—	40	7	7'-8"	56
5h1	End Post Wing	—	40	32	6'-8"	223
5k1	Backwall	—	40	35	6'-7"	240
6k2	Backwall	—	40	35	6'-10"	359
5k3	Backwall	—	40	10	6'-10"	71
6k4	Backwall	—	40	10	7'-1"	106
5m1	Beam Step	—	40	24	4'-9"	119
5n1	Beam Step	—	40	24	2'-2"	54
4p1	Backwall Notch	—	40	2	31'-10"	43
5p2	Backwall Notch	—	40	33	4'-7"	158
5r1	Paving Back	—	40	4	2'-10"	12
5s1	End Post Wing	—	40	4Ser8	Varies	184
6t1	Outer C.F. Footing	—	40	56	4'-0"	336
6t2	Outer C.F. Footing	—	40	20	13'-6"	406
6t3	Center C.F. Footing	—	40	12	9'-6"	171
6t4	Outer C.F. Footing	—	40	20	5'-6"	165
TOTAL						14,462



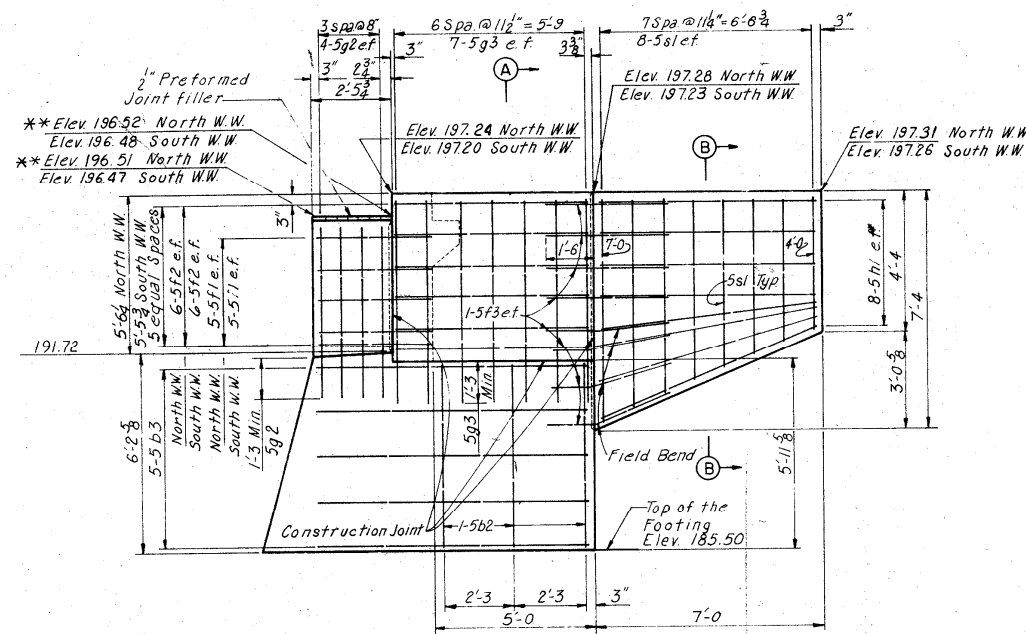
Note: All dimensions are out to out, D = Pin Diameter.

EMMONS STREET OVER I-380
 DESIGN FOR 12°52'31" SKEW
 241'-3" x 32'-0" PRETENSIONED PRESTRESSED
 CONCRETE BEAM BRIDGE
 30'-9, 81'-6, 77'-5, 51'-7 SPANS

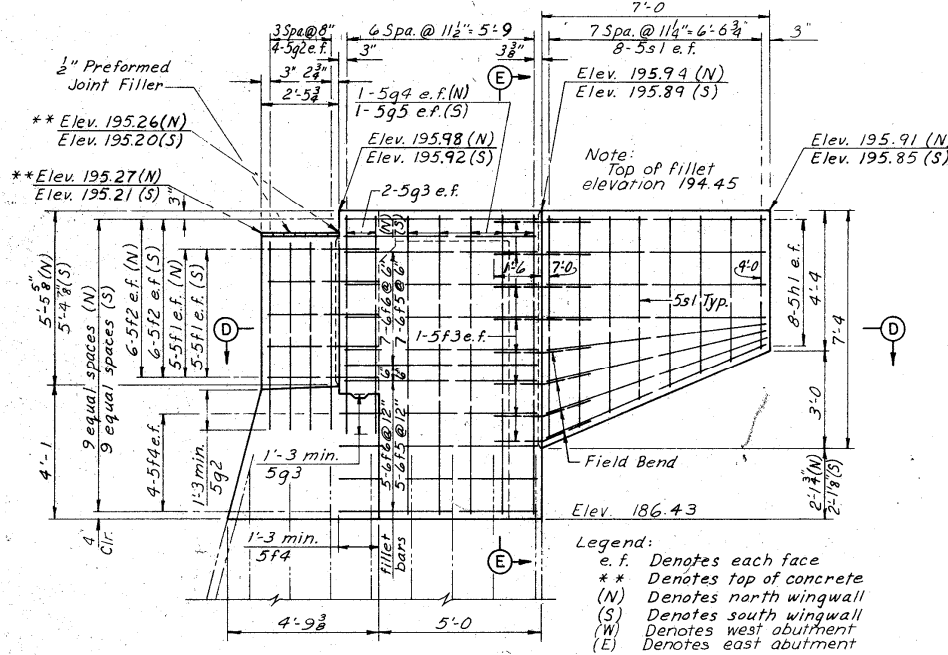
ABUTMENT DETAILS

STA. 2939+81.83 @ EMMONS ST.
 STA. 939+79.98 @ I-380

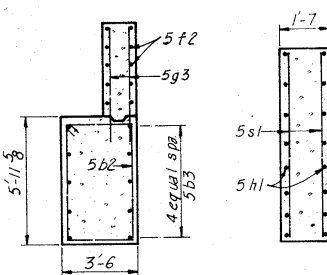
LINN COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION
 1980
 DESIGN NO. 1079 LINN COUNTY FILE 26090 SHEET 7 of 22



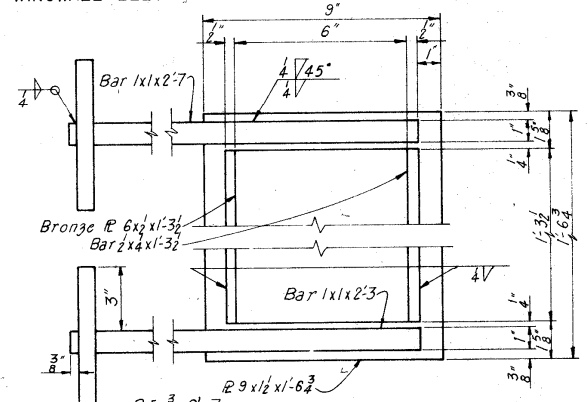
WINGWALL ELEVATION WEST ABUTMENT



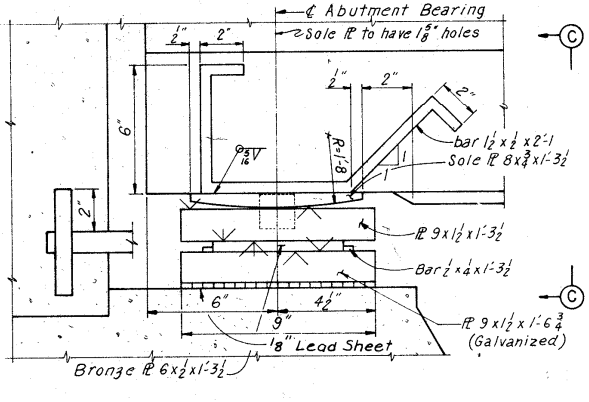
WINGWALL ELEVATION EAST ABUTMENT



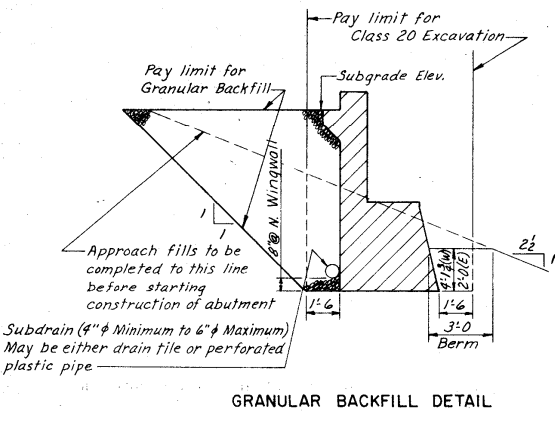
SECTION A-A SECTION B-B



PLAN OF MASONRY PLATE AND BRONZE PLATE



ELEVATION



GRANULAR BACKFILL DETAIL

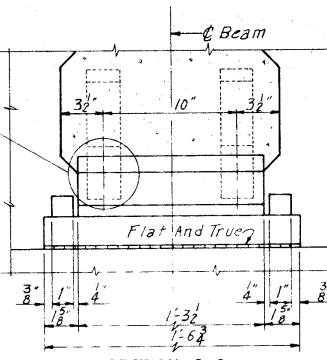
ABUTMENT BEARING NOTES

Bronze plates shall be lubricated in accordance with DOT Specifications Article 4190.03 (sliding surface only). Top edges of bronze plates shall be beveled 1/4". Masonry plates to be galvanized after welding.

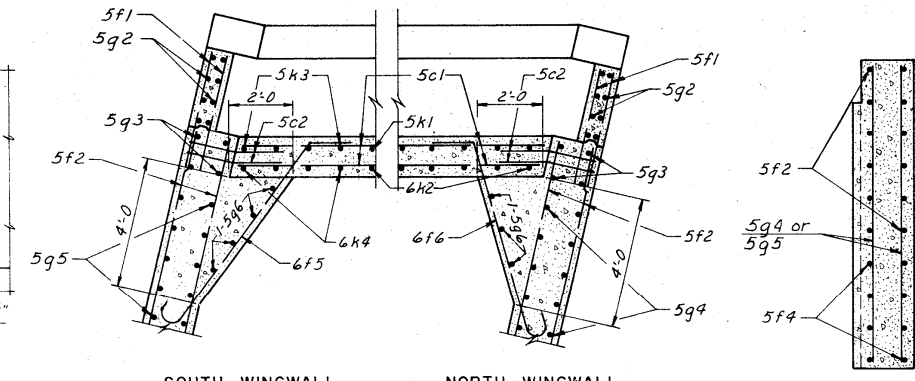
Surfaces marked "M" shall be finished ANSI 250 and surfaces marked "W" shall be finished ANSI 125. Masonry plates are to be set on sheet of lead.

Pintle plates, bronze plates and masonry plates are a part of the superstructure Structural Steel Quantity. Cost of anchored curved sole plates is to be included in price bid for Pretensioned Prestressed Concrete Beams. (7 required each abutment @ 178 Lbs. each)

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



SECTION C-C



SOUTH WINGWALL NORTH WINGWALL

SECTION D-D

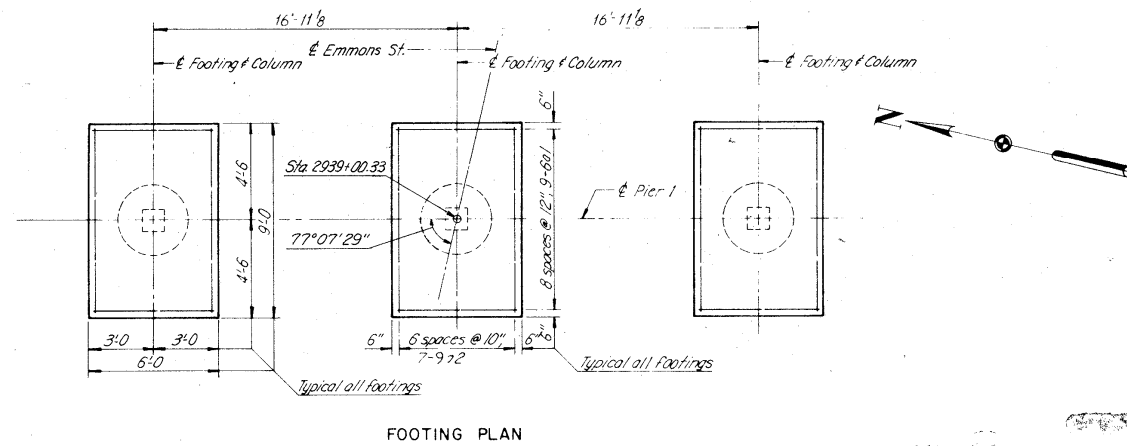
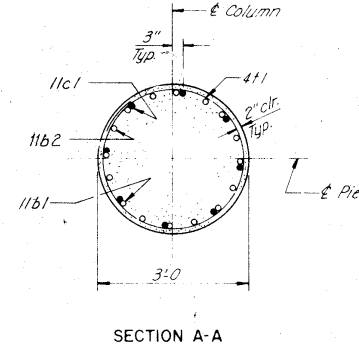
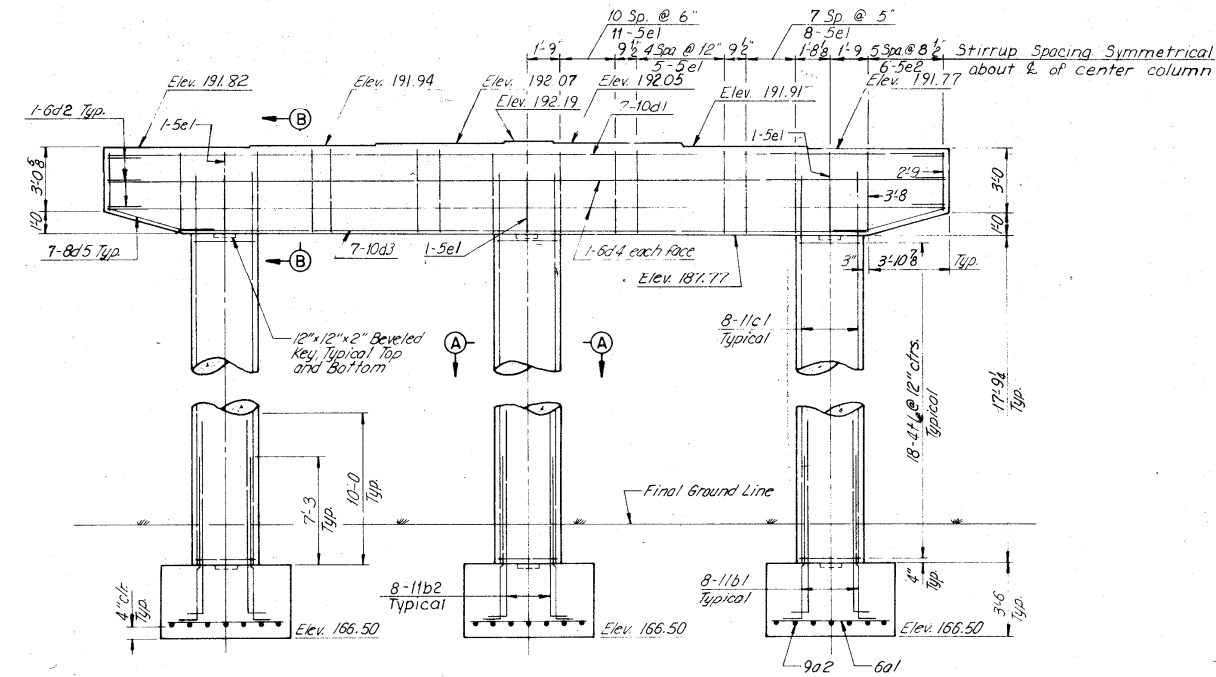
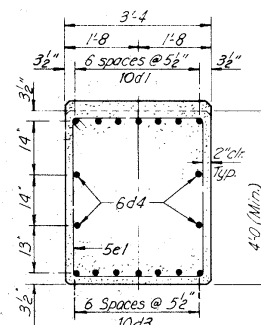
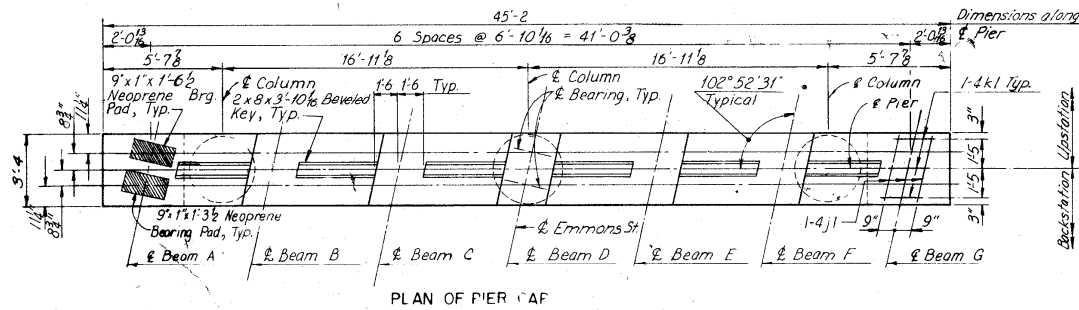
SECTION E-E

ABUTMENT BEARING DETAILS

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
 CONSULTING ENGINEERS
 KANSAS CITY

MADE RLB DATE 1-10-80 CHECKED LJR DATE 1-18-80

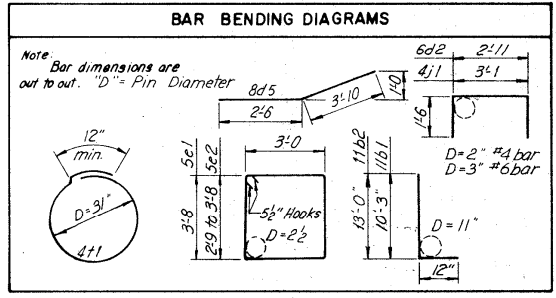
FED. DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	PROJECT NO.	TOTAL SHEETS
	IOWA				



BILL OF REINFORCEMENT					
BAR	LOCATION	SHAPE	PIER 1		
			NO.	LENGTH	WEIGHT
6a1	Footing		27	5'-6"	223
9a2	Footing		21	8'-6"	607
11b1	Footing Dowels		24	11'-3"	1,435
11b2	Footing Dowels		24	14'-0"	1,785
11c1	Column		24	21'-0"	2,678
10d1	Cap. Top		7	44'-10"	1,350
6d2	Cap. Ends		6	5'-11"	53
10d3	Cap. Bottom		7	37'-4"	1,125
6d4	Cap. Sides		4	44'-10"	269
8d5	Cap. Bottom		14	6'-4"	237
5e1	Cap. Stirrup		51	14'-3"	758
5e2	Cap. Stirrup		2 Ser. 6	Varies	167
4j1	Pads		21	6'-1"	85
4k1	Pads		21	2'-0"	28
4t1	Column Ties		54	9'-3"	334
				TOTAL	11,134

CONCRETE PLACEMENT QUANTITIES		
ITEM	UNIT	QUANTITY
Footings	Cu. Yds.	21.0
Columns	Cu. Yds.	14.0
Capbeam	Cu. Yds.	22.8
TOTAL	Cu. Yds.	57.8

QUANTITIES		
ITEM	UNIT	QUANTITY
Structural Concrete, Class C	Cu. Yds.	57.8
Reinforcing Steel	Lbs.	11,134
Excavation, Class 22	Cu. Yds.	69.6



Notes:
 Clear distance from face of concrete to nearest reinforcing bar shall be 2" unless otherwise noted or shown.
 All exposed corners of 90° or sharper are to be filleted with 1/2" inch dressed and beveled strip.
 Column dowel bars shall be securely fastened into position prior to the placement of footing concrete.
 The design bearing pressure for footings on limestone is 8 tons per sq. ft.

EMMONS STREET OVER I-380
 DESIGN FOR 12°52'31" SKEW
 241'-3 3/8" x 32'-0" PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE
 30'-9, 81'-6, 77'-5 1/2, 51'-7 SPANS

PIER 1

STA. 2939+81.83 @ EMMONS ST.
 STA. 939+79.98 @ I-380

LINN COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION
 1980
 DESIGN SHEET 7 OF 20

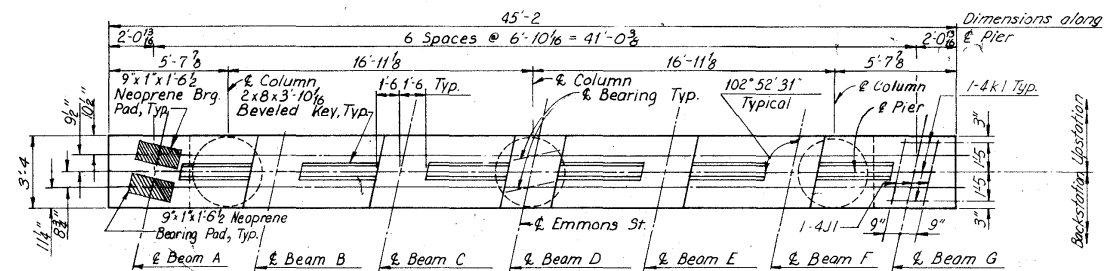
DESIGN NO. 1079 LINN COUNTY FILE 26090SHEET 7 OF 20

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
 CONSULTING ENGINEERS
 KANSAS CITY

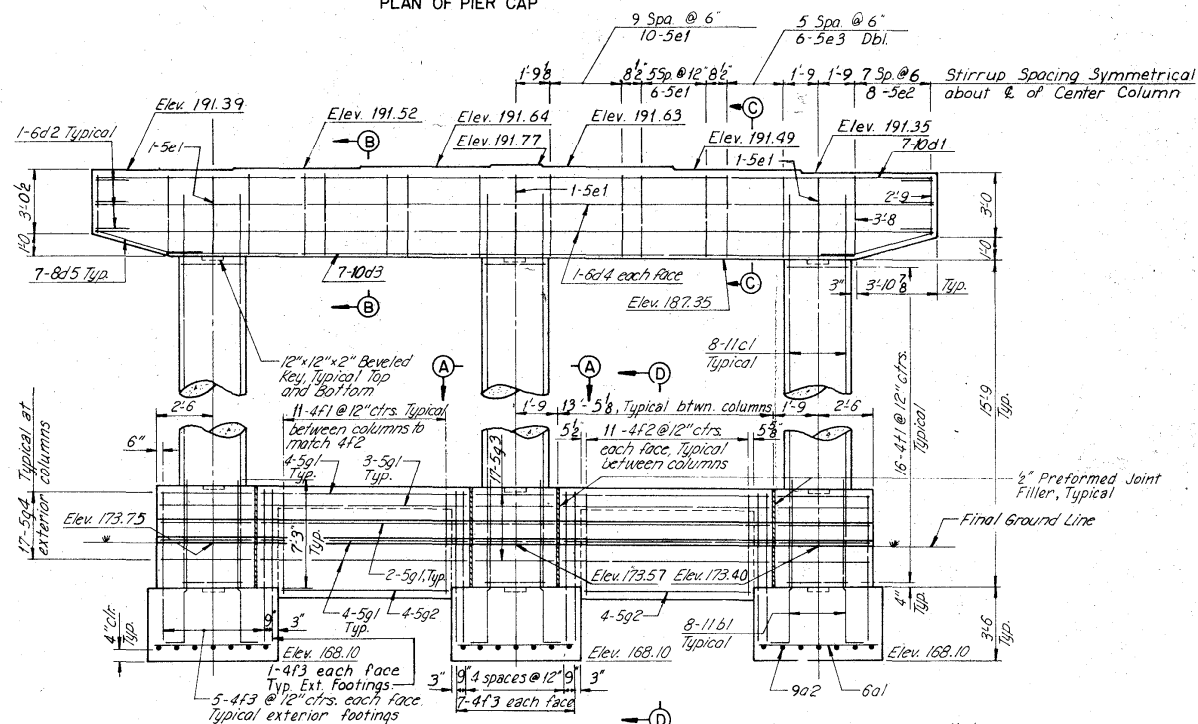
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5860-99-01

FEDERAL DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	IOWA				

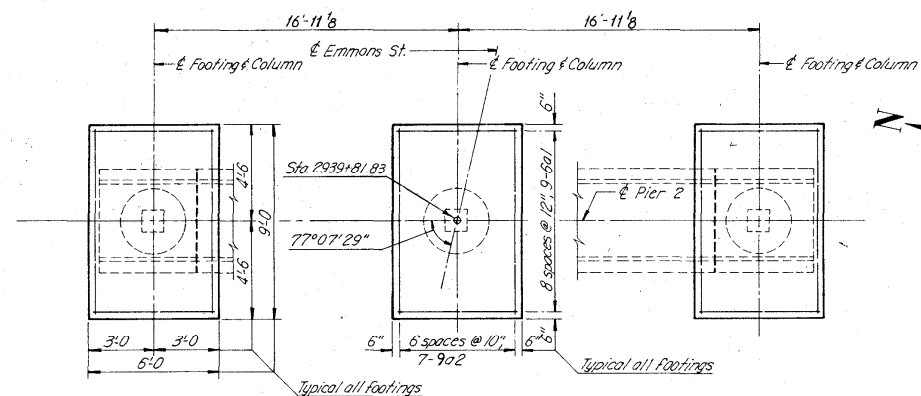


PLAN OF PIER CAP

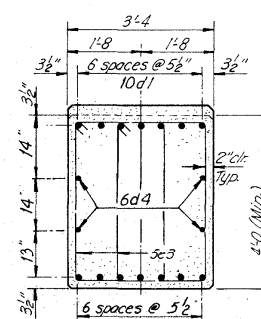


ELEVATION

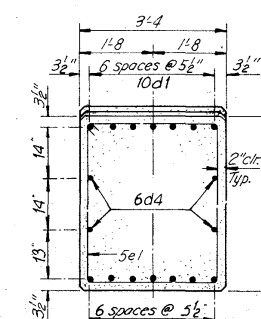
Note: The cost of the 1/2 inch preformed joint filler is included in the unit price bid for structural concrete.



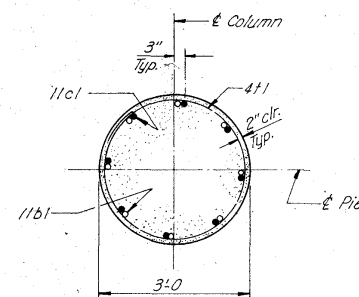
FOOTING PLAN



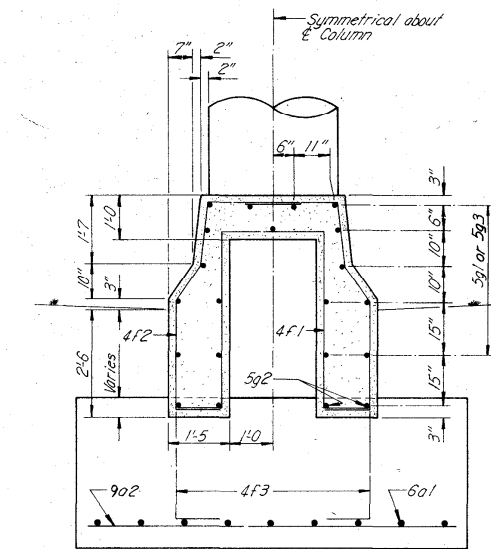
SECTION C-C



SECTION B-B



SECTION A-A



SECTION D-D

BILL OF REINFORCEMENT

BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
6a1	Footings		27	5'-6"	223
9a2	Footings		21	8'-6"	607
11b1	Footings Dowels		24	11'-3"	1,435
11c1	Column		24	19'-0"	2,423
10d1	Cap. Top		7	44'-10"	1,350
6d2	Cap. End		6	5'-11"	53
10d3	Cap. Bottom		7	37'-4"	1,125
6d4	Cap. Sides		4	44'-10"	269
8d5	Cap. Bottom		14	6'-4"	237
5e1	Cap. Stirrup		35	14'-3"	520
5e2	Cap. Stirrup		2 Ser. 8	Varies	223
5e3	Cap. Stirrup		24	12'-5"	311
4f1	Barrier Curb		22	12'-10"	189
4f2	Barrier Curb		44	8'-1"	238
4f3	Barrier Curb		38	10'-7"	269
5g1	Barrier Curb		34	13'-1"	464
5g2	Barrier Curb		8	10'-7"	88
5g3	Barrier Curb		17	3'-2"	56
5g4	Barrier Curb		34	3'-11"	139
4j1	Pads		21	6'-1"	85
4k1	Pads		21	2'-0"	28
4t1	Column Ties		48	9'-3"	297
TOTAL					10,629

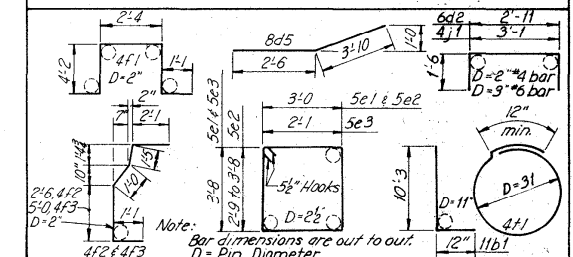
CONCRETE PLACEMENT QUANTITIES

ITEM	UNIT	QUANTITY
Footings	Cu. Yds.	21.0
Columns	Cu. Yds.	8.7
Capbeam	Cu. Yds.	22.8
Barrier Curb	Cu. Yds.	23.9
TOTAL	Cu. Yds.	76.4

QUANTITIES

ITEM	UNIT	QUANTITY
Structural Concrete, Class C	Cu. Yds.	76.4
Reinforcing Steel	Lbs.	10,629
Excavation, Class 22	Cu. Yds.	64.8

BAR BENDING DIAGRAMS



Notes:
Clear distance from face of concrete to nearest reinforcing bar shall be 2" unless otherwise noted or shown.
All exposed corners of 90° or sharper are to be filleted with a 1/2-inch dressed and hatched strip.
Column dowel bars shall be securely fastened into position prior to the placement of footing concrete.
The design bearing pressure for footings on limestone is 8 tons per sq. ft.

EMMONS STREET OVER I-380
DESIGN FOR 12°52'31" SKEW
241'-3 3/4" x 32'-0" PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE
30'-9", 81'-6", 77'-5 1/2", 51'-7" SPANS

PIER 2

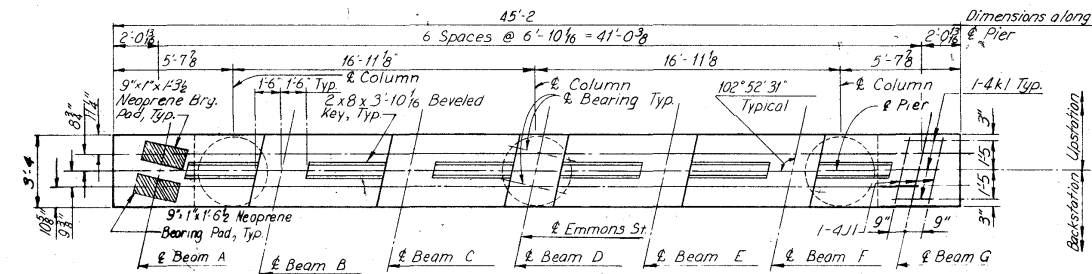
STA. 2939+81.83 Q. EMMONS ST. =
STA. 939+79.98 Q. I-380

LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION
1980
DESIGN SHEET 8 OF 20

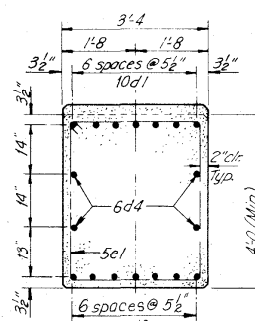
HOWARD, NEEDLES & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY

MADE T.K.N. DATE 12-14-79 CHECKED L.J.R. DATE 12-20-79

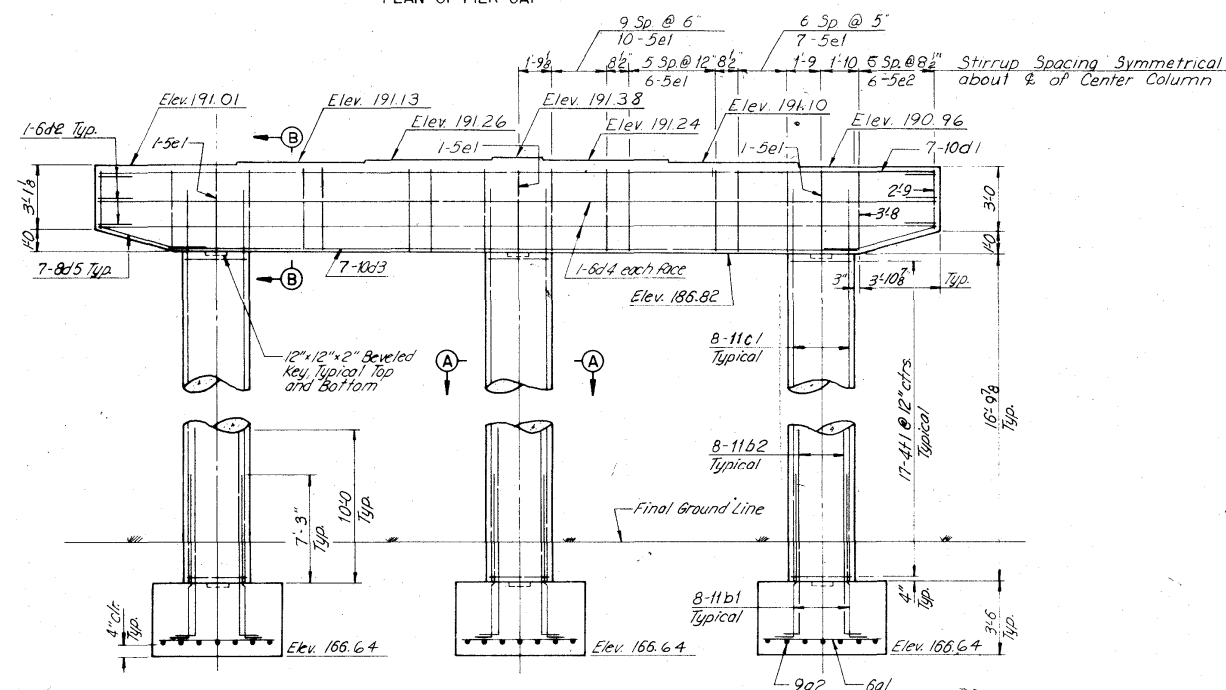
FEDERAL DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	IOWA				



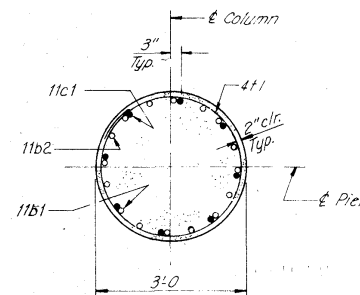
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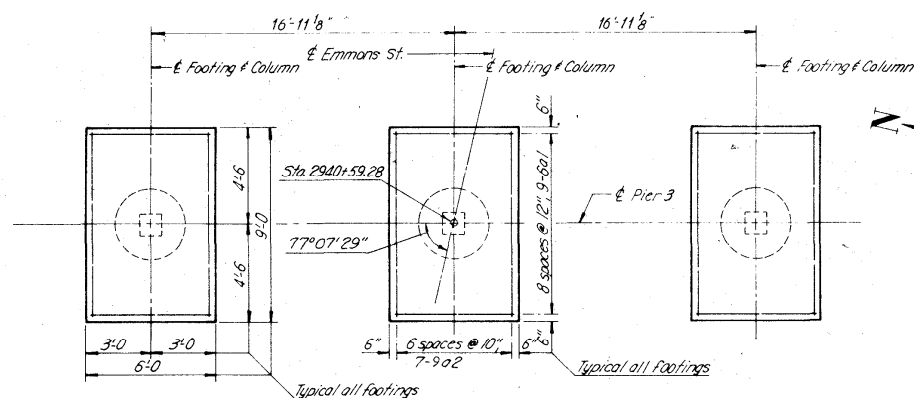
SECTION B-B



ELEVATION



SECTION A-A



FOOTING PLAN

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY

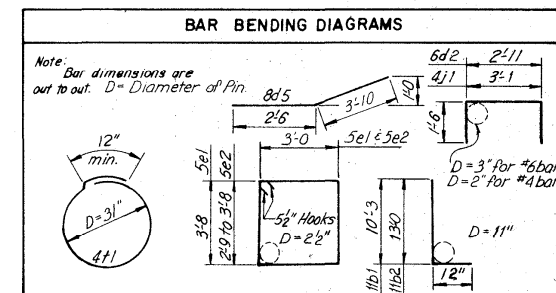
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Notes:
Clear distance from face of concrete to nearest reinforcing bar shall be 2" unless otherwise noted or shown.
All exposed corners of 90° or sharper are to be filled with a 4" inch dressed and beveled strip.
Column dowel bars shall be securely fastened into position prior to the placement of footing concrete.
The design bearing pressure for footings on limestone is 8 tons per sq.ft.

BILL OF REINFORCEMENT					
BAR	LOCATION	SHAPE	PIER 3		
			NO.	LENGTH	WEIGHT
6a1	Footing		27	5'-6	223
9a2	Footing		21	8'-6	607
11b1	Footing Dowels		24	11'-3	1,435
11b2	Footing Dowels		24	14'-0	1,785
10c1	Column		24	20'-1	2,074
10d1	Cap. Top		7	44'-10	1,350
6d2	Cap. End		6	5'-11	53
10d3	Cap. Bottom		7	37'-4	1,125
6d4	Cap. Sides		4	44'-10	269
8d5	Cap. Bottom		14	6'-4	237
5e1	Cap. Stirrup		49	14'-3	728
5e2	Cap. Stirrup		2 Ser. 6	Varies	167
4j1	Pods		21	6'-1	85
4k1	Pods		21	2'-0	28
4t1	Column Ties		51	9'-3	315
				TOTAL	10,481

CONCRETE PLACEMENT QUANTITIES		
ITEM	UNIT	QUANTITY
Footings	Cu. Yds.	21.0
Columns	Cu. Yds.	13.2
Capbeam	Cu. Yds.	22.9
TOTAL	Cu. Yds.	57.1

QUANTITIES		
ITEM	UNIT	QUANTITY
Structural Concrete, Class C	Cu. Yds.	57.1
Reinforcing Steel	Lbs.	10,481
Excavation, Class 22	Cu. Yds.	70.32



EMMONS STREET OVER I-380
DESIGN FOR 12°52'31" SKEW
241'-3 3/8 x 32'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE
30'-9, 81'-6, 77'-5 1/2, 51'-7 SPANS

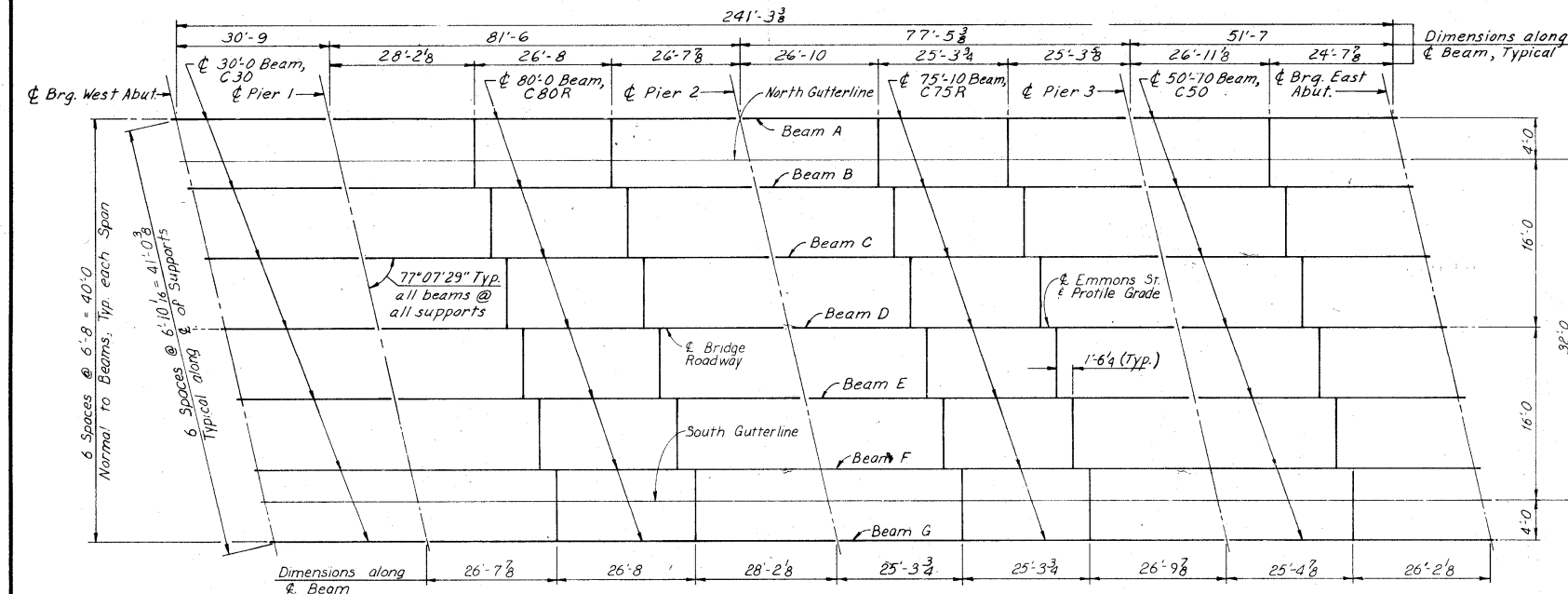
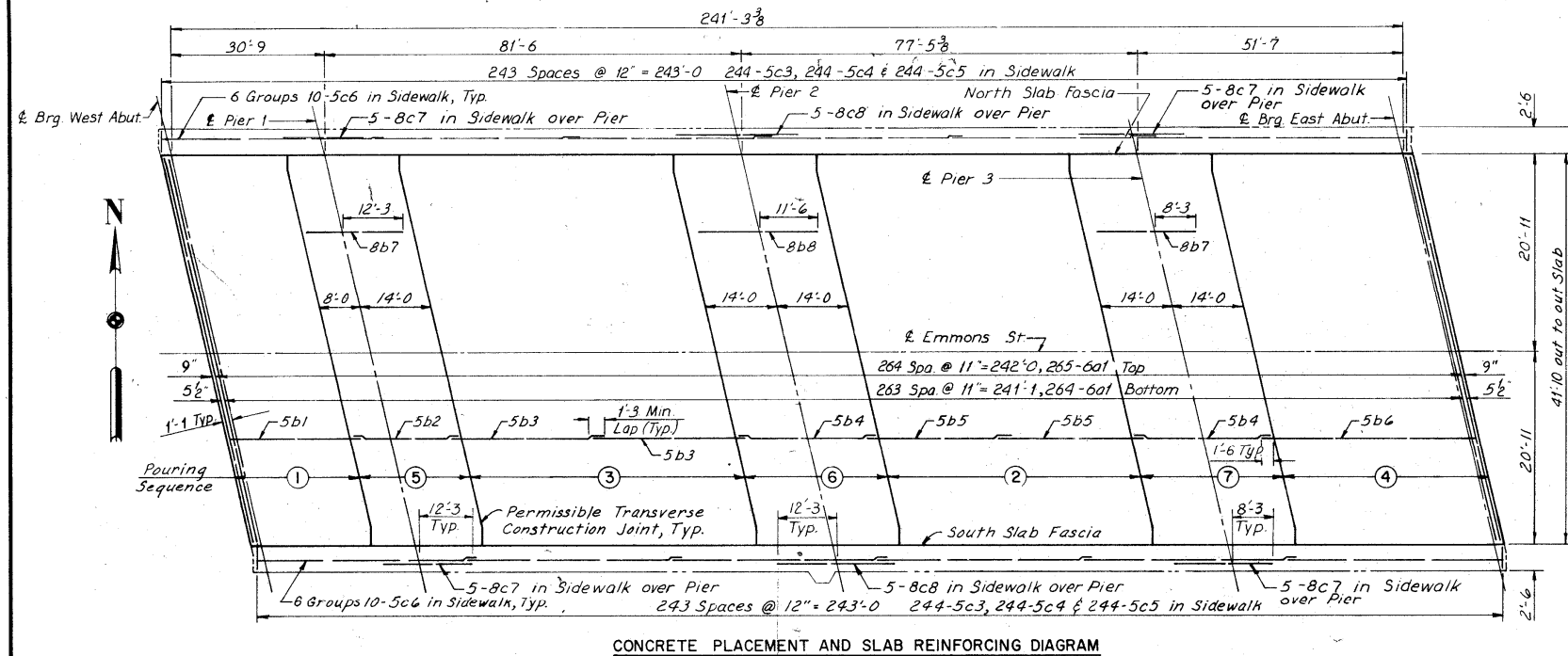
PIER 3

STA. 2939+81.83 @ EMMONS ST.
STA. 939+79.98 @ I-380

LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION
1980 DESIGN SHEET 9 OF 20

DESIGN NO. 1079 LINN COUNTY FILE 26090 SHEET 77 OF 22

FEDERAL DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	IOWA				

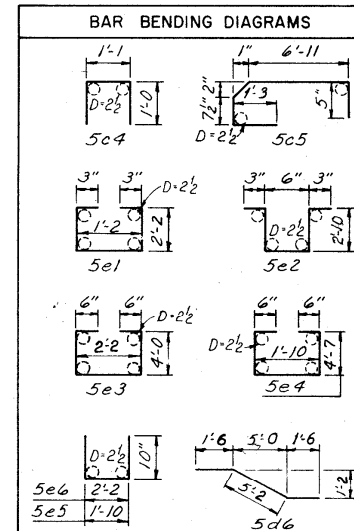
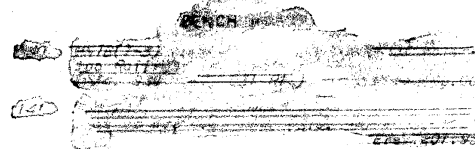


CONCRETE PLACEMENT NOTE:

Roadway slab shall be placed in sections and in sequence indicated and preferably at intervals not exceeding 24 hours. Alternate procedures for placing slab concrete may be submitted for approval together with a statement of proposed method and evidence that the contractor possesses the necessary equipment and facilities to accomplish the desired results.

BEAM LAYOUT DIAGRAM

TOP OF CONCRETE PAVEMENT ELEVATIONS																				
ℓ Beam	ℓ Brg W. Abut.	0.25	0.50	0.75	Pier 1			0.25	0.50	0.75	Pier 2			0.25	0.50	0.75	Pier 3			ℓ Brg. E. Abut.
					ℓ C. Brg.	ℓ T. Brg.	ℓ C. Brg.				ℓ U. Brg.	ℓ T. Brg.	ℓ U. Brg.				ℓ T. Brg.			
Beam A	196.57	196.53	196.49	196.45	196.42	196.41	196.30	196.20	196.10	195.99	195.98	195.89	195.79	195.69	195.59	195.58	195.52	195.45	195.38	195.32
Beam B	196.70	196.66	196.62	196.58	196.54	196.53	196.43	196.33	196.22	196.12	196.11	196.01	195.91	195.81	195.71	195.64	195.57	195.51	195.44	
Beam C	196.82	196.78	196.75	196.71	196.67	196.66	196.56	196.45	196.35	196.24	196.24	196.14	196.04	195.94	195.84	195.83	195.77	195.70	195.63	195.57
Beam D	196.95	196.91	196.87	196.83	196.79	196.78	196.68	196.58	196.47	196.37	196.36	196.26	196.16	196.06	195.97	195.96	195.89	195.83	195.76	195.69
Beam E	196.81	196.77	196.73	196.69	196.65	196.64	196.54	196.44	196.33	196.23	196.22	196.12	196.02	195.92	195.83	195.82	195.75	195.68	195.62	195.55
Beam F	196.67	196.63	196.59	196.55	196.51	196.50	196.40	196.29	196.19	196.09	196.08	195.98	195.88	195.79	195.69	195.68	195.61	195.54	195.48	195.41
Beam G	196.52	196.49	196.45	196.41	196.37	196.36	196.26	196.15	196.05	195.95	195.94	195.84	195.74	195.64	195.54	195.53	195.47	195.40	195.34	195.27



Note: Bar dimensions are out to out, D = Pin Diameter.

CONCRETE PLACEMENT QUANTITIES	
LOCATION	QUANTITY
Section 1	29.3
Section 2	58.9
Section 3	63.0
Section 4	45.1
Section 5	37.7
Section 6	43.8
Section 7	43.6
Sidewalk	65.3
Light Blister	0.4
TOTAL	387.1

QUANTITIES	
ITEM	QUANTITY
Structural Concrete, Class D (Cu.Yds.)	387.1
Reinforcing Steel (Lbs.)	33,600
*Reinforcing Steel, Epoxy Coated (Lbs.)	63,035
Prestressed Concrete Beams	
C30 (30'-0")	7
C50 (50'-10")	7
C75R (75'-10")	7
C80R (80'-0")	7
Structural Steel A36 (Lbs.)	5,740

*Includes 9,117 Lbs. for sidewalk barrier rolls and 200 Lbs. for light blister.

BILL OF REINFORCEMENT						
BAR	LOCATION	SHAPE	GRADE	NO.	LENGTH	WEIGHT
EPOXY COATED BARS						
6a1	Slab Transv., Top	—	60	265	42'-7"	16,940
5b1	Slab Long., Top	—	60	50	25'-2"	1,312
5b2	Slab Long., Top	—	60	50	21'-6"	1,121
5b3	Slab Long., Top	—	60	100	28'-11"	3,016
5b4	Slab Long., Top	—	60	100	27'-6"	2,868
5b5	Slab Long., Top	—	60	100	26'-10"	2,789
5b6	Slab Long., Top	—	60	50	40'-0"	2,086
8b7	Slab Long., Top	—	60	98	19'-9"	5,168
8b8	Slab Long., Top	—	60	49	23'-9"	3,107
5c3	Sidewalk Transv.	—	40	488	4'-0"	2,036
5c4	Sidewalk Vertical	—	40	488	3'-1"	1,569
5c5	Sidewalk Vertical	—	40	488	9'-5"	4,783
5c6	Sidewalk Long.	—	40	120	41'-7"	5,205
8c7	Sidewalk Long.	—	40	20	19'-9"	1,055
8c8	Sidewalk Long.	—	40	10	23'-9"	834
Total						53,718
NON-EPOXY COATED BARS						
5e1	Abut. Diaphragm	—	40	48	6'-0"	300
5e2	Inter. Diaphragm	—	40	120	6'-8"	834
5e3	Pier Diaphragm	—	40	72	11'-2"	839
5e4	Pier Diaphragm	—	40	12	12'-0"	150
5e5	Pier Diaphragm	—	40	30	3'-6"	110
5e6	Pier Diaphragm	—	40	72	34'-10"	288
6a1	Slab Transv., Bottom	—	60	264	42'-7"	16,883
5b1	Slab Long., Bottom	—	60	44	25'-2"	1,155
5b2	Slab Long., Bottom	—	60	44	21'-6"	987
5b3	Slab Long., Bottom	—	60	88	28'-11"	2,853
5b4	Slab Long., Bottom	—	60	88	27'-6"	2,524
5b5	Slab Long., Bottom	—	60	88	26'-10"	2,483
5b6	Slab Long., Bottom	—	60	44	40'-0"	1,836
5d3	Abut. and Pier Diaphragm	—	40	156	5'-11"	963
5d4	Abut. Diaphragm	—	40	8	21'-4"	178
5d5	Pier Diaphragm	—	40	36	41'-11"	185
5d6	Pier Diaphragm	—	40	18	8'-2"	153
5d7	Inter. Diaphragm	—	40	180	5'-10"	1,085
TOTAL						33,400

EMMONS STREET OVER I-380
DESIGN FOR 12°52'31" SKEW
241'-3 3/8" x 32'-0" PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE
30'-9, 81'-6, 77'-5 1/2, 51'-7 SPANS

SUPERSTRUCTURE DETAILS

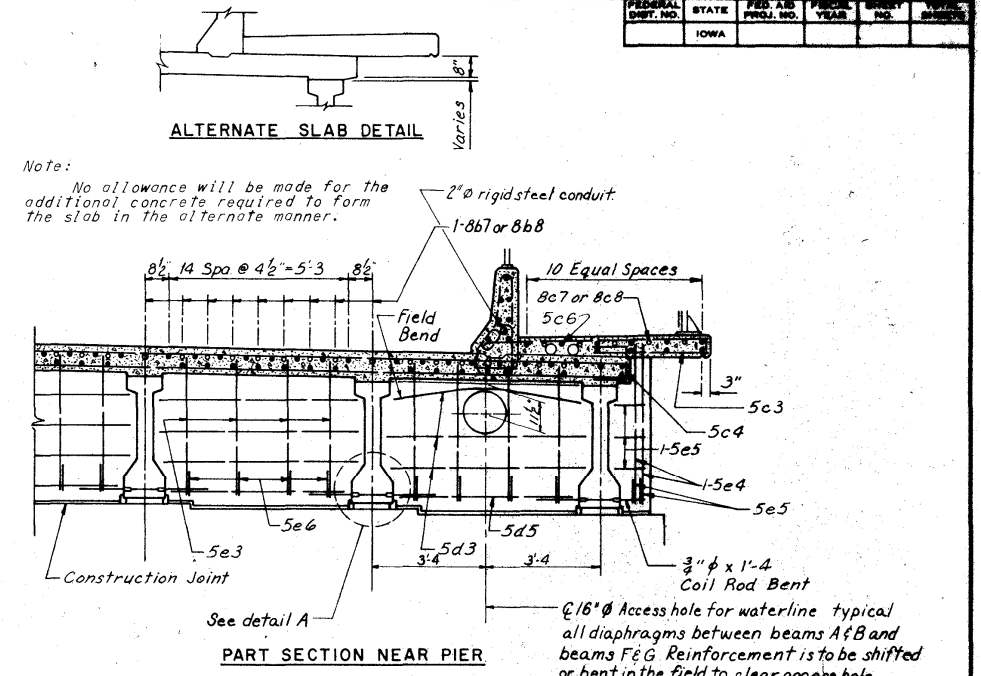
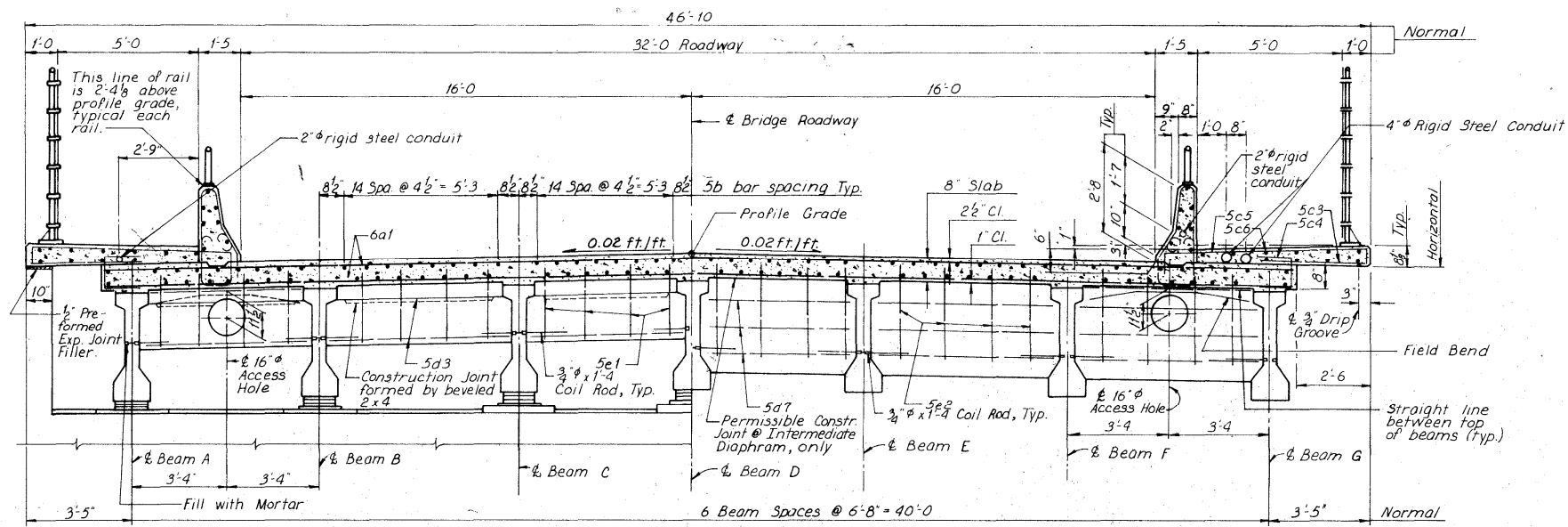
STA. 2939+81.83 @ EMMONS ST.
STA. 939+79.98 @ I-380

LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION
1980
DESIGN NO. 1079 LINN COUNTY FILE 26090 SHEET 12 OF 22

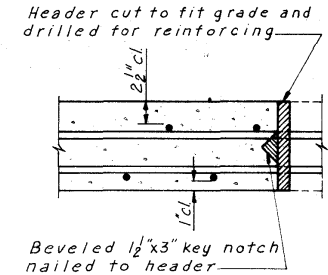
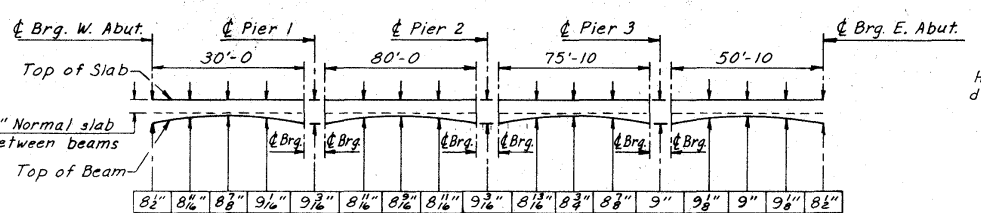
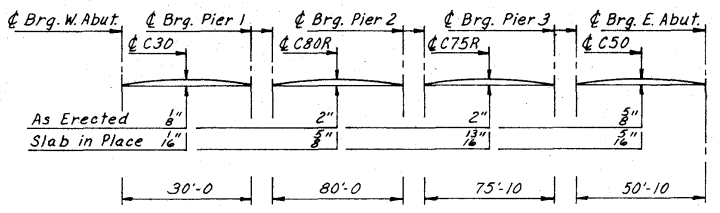
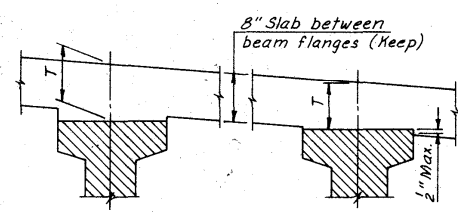
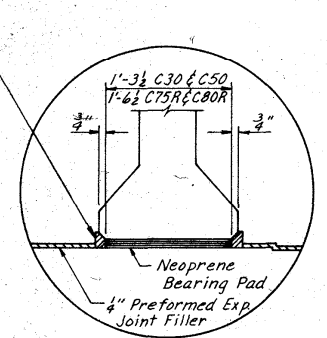
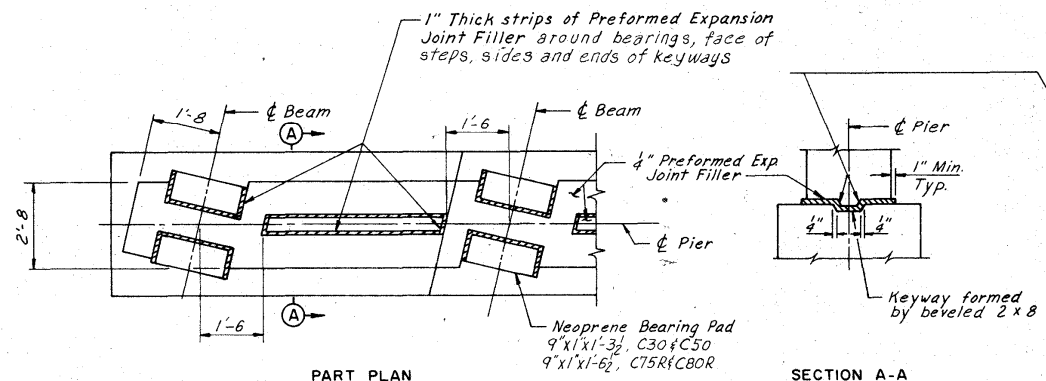
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY

MADE T.K.N. DATE 1-9-80 CHECKED L.J.R. DATE 1-10-80

5860-99-01



GUTTERLINE ELEVATIONS		
Substructure Unit	N. G. L.	S. G. L.
2 Brg. W. Abut.	196.65	196.61
2 Pier 1	196.49	196.45
2 Pier 2	196.06	196.02
2 Pier 3	195.66	195.62
2 Brg. E. Abut.	195.39	194.35



SUPERSTRUCTURE NOTES:

This bridge is designed for HS20-44 loading plus 20 lbs. per sq. ft. of roadway for future wearing surface.

Clear distance from face of concrete to near reinforcing bar is to be 2" unless otherwise noted or shown.

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

Cost of bearing material at piers and the anchored curved sole plates of the abutment bearings are included in the price bid for "Pretensioned Prestressed Concrete Beams".

Forms for slab and curbs are to be supported by the beams. For details of Pretensioned Prestressed Concrete Beams, see Sheets 14 and 15 of 20.

All exposed corners of 90° or sharper are to be filleted with a $\frac{3}{4}$ " dressed and beveled strip.

The pier diaphragm is to be placed monolithically with slab.

Cost of all Prefrmed Expansion Joint Filler material is to be included in the price bid for "Structural Concrete".

The epoxy coating of the reinforcing bars shall be in accordance with current Special Provisions and Supplemental Specifications of the Iowa Department of Transportation.

Coil rods and coil ties are incidental to the cost of "Pretensioned Prestressed Concrete Beams".

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS

MADE B.J.T. DATE 1-4-79 CHECKED LJR DATE 1-10-80

EMMONS STREET OVER I-380
DESIGN FOR 12°52'31" SKEW
241'-3 3/8 x 32'-0 PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE
30'-9. 81'-6. 77'-5 1/2. 51'-7 SPANS

SUPERSTRUCTURE DETAILS

STA. 2939+81.83 @ EMMONS ST. =
STA. 939+79.98 @ I-380

STA. 939+79.98 @ I-380

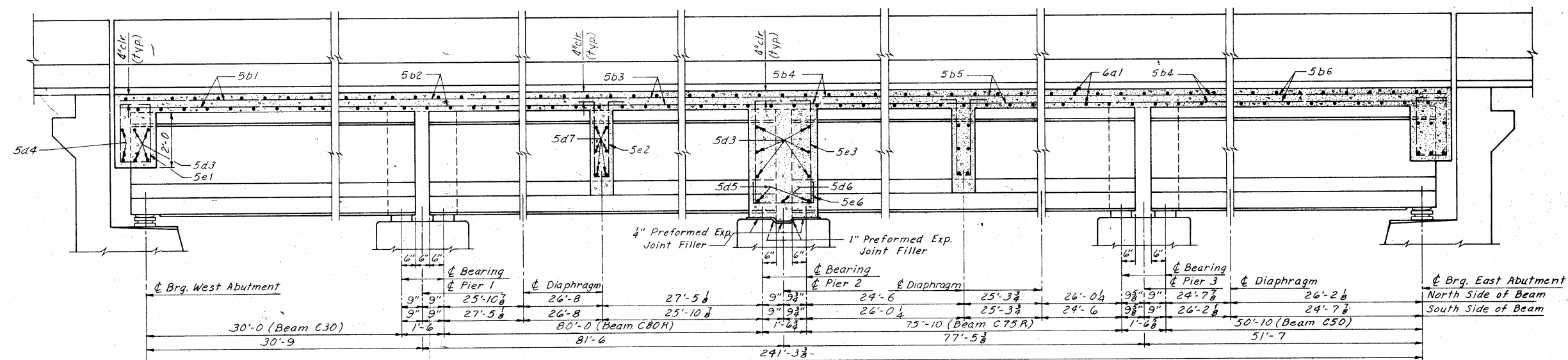
LINN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION

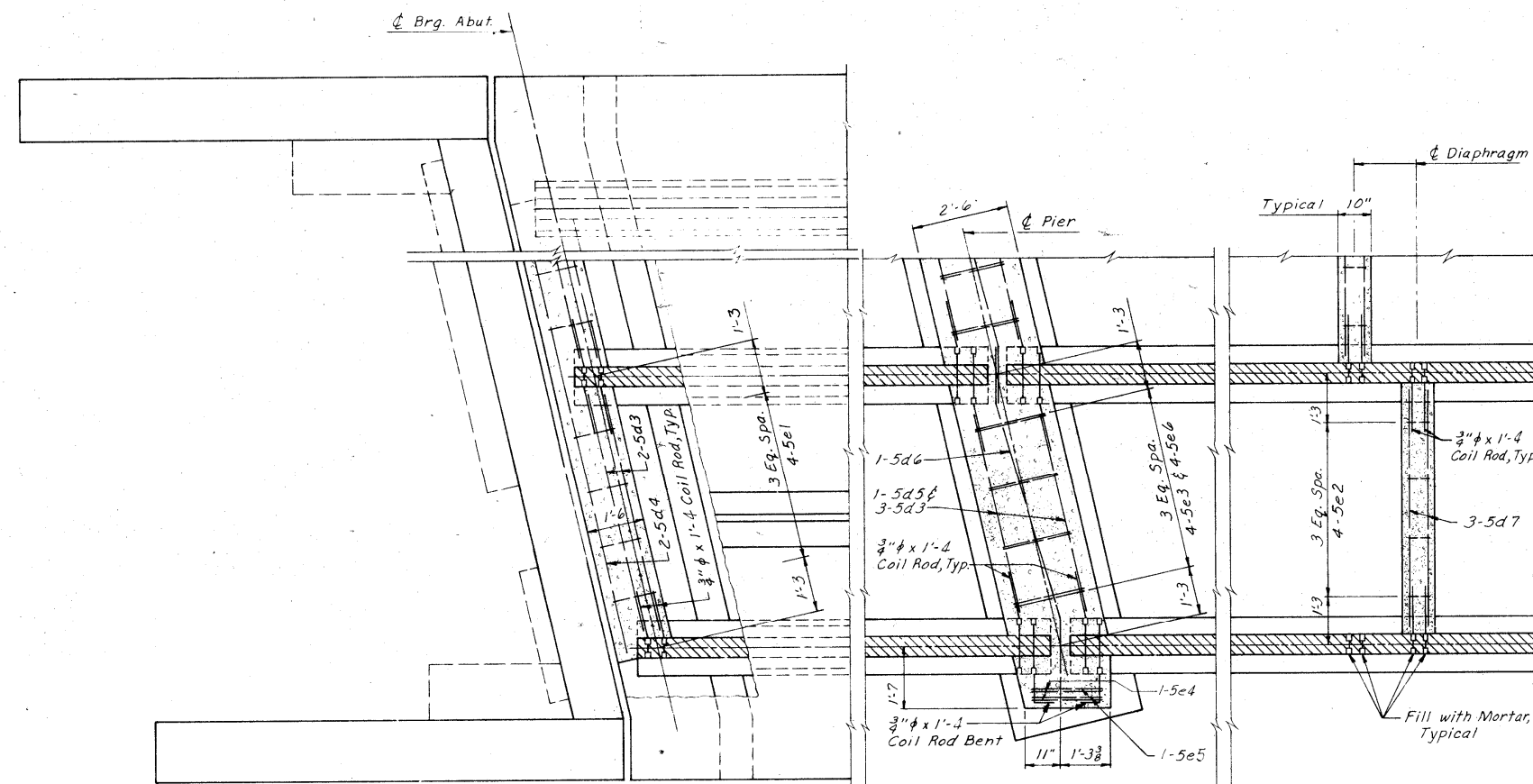
DESIGN SHEET II OF 20

DESIGN NO. 1079 LINN COUNTY FILE 26090 SHEET 17 of 72

FEDERAL DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	IOWA				



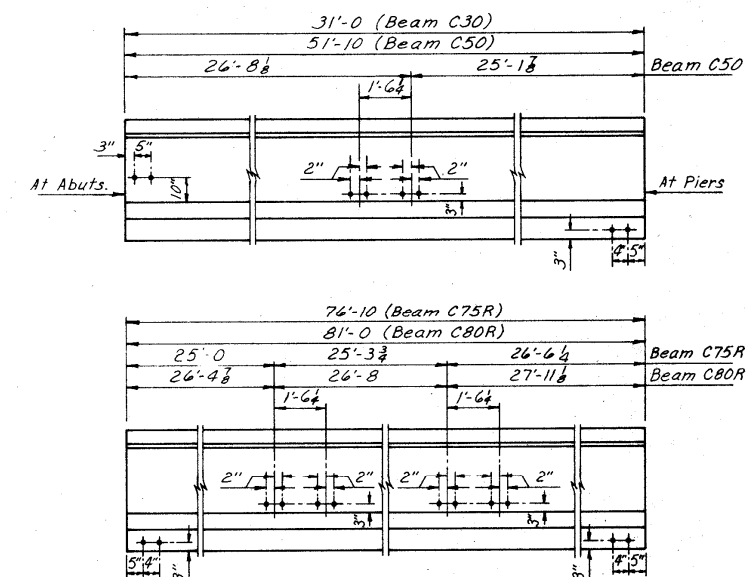
PART LONGITUDINAL SECTION NEAR BARRIER RAIL



PART PLAN AT ABUTMENT

PART SECTION AT PIER

PART SECTION NEAR MIDSPAN



TYPICAL COIL TIE LOCATIONS

Note: See Sheet 13 of 20 for additional coil tie locations in Beams A, B, F and G.

EMMONS STREET OVER I-380
DESIGN FOR 12°52'31" SKEW
241'-3 3/8" x 32'-0" PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE
30'-9, 81'-6, 77'-5 1/2, 51'-7 SPANS

SUPERSTRUCTURE DETAILS

STA. 2939+81.83 @ EMMONS ST. =
STA. 939+79.98 @ I-380

LINN COUNTY

IOWA DEPARTMENT OF TRANSPORTATION
1980

DESIGN NO. 1079 LINN COUNTY FILE 26090 SHEET 14 OF 22

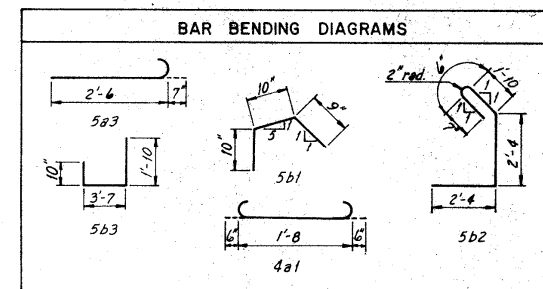
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY

MADE T.K.N. DATE 12-11-79 CHECKED L.J.R. DATE 12-14-79

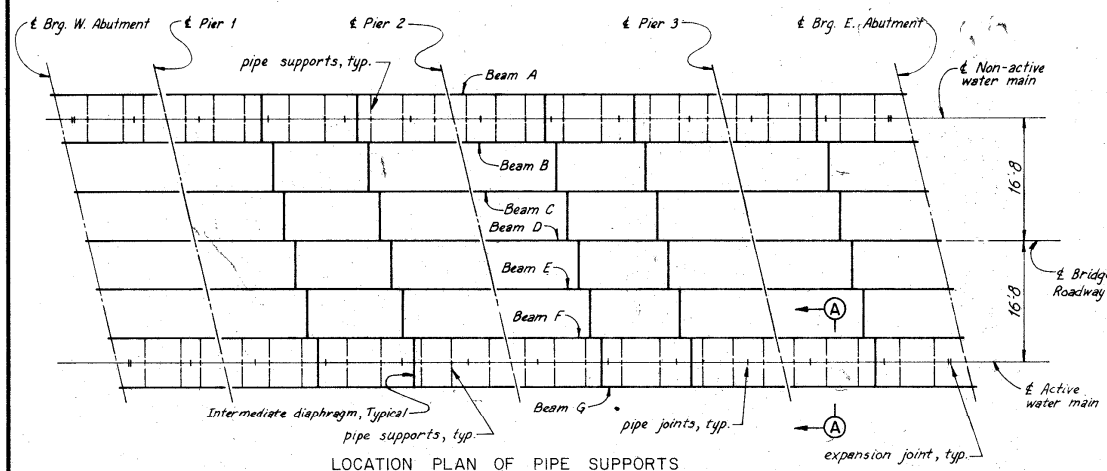
5860-99-01

FEDERAL DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
	IOWA				

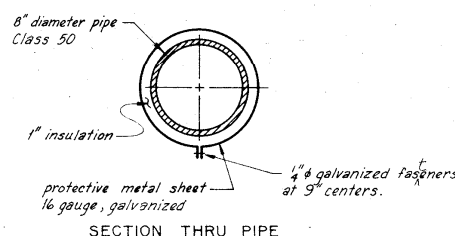
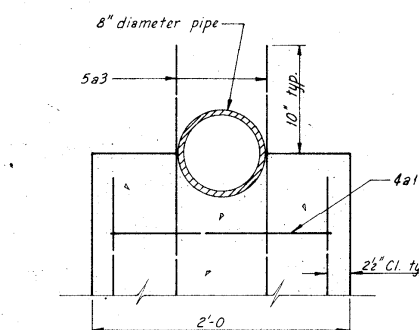
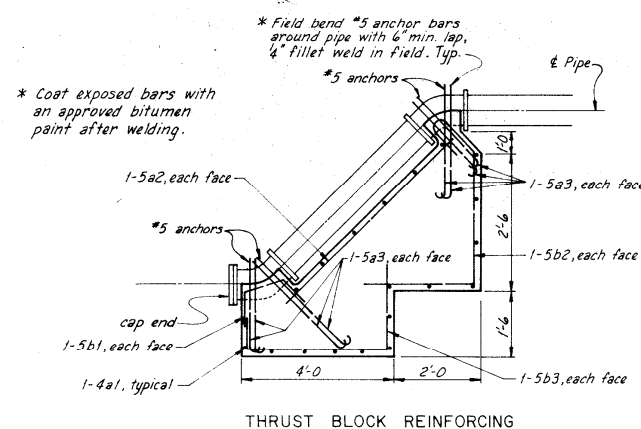
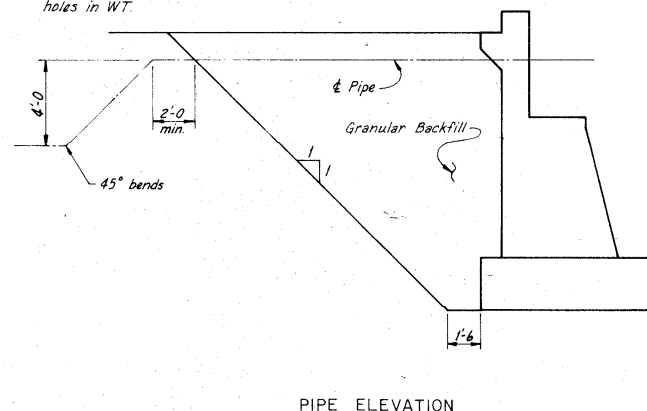
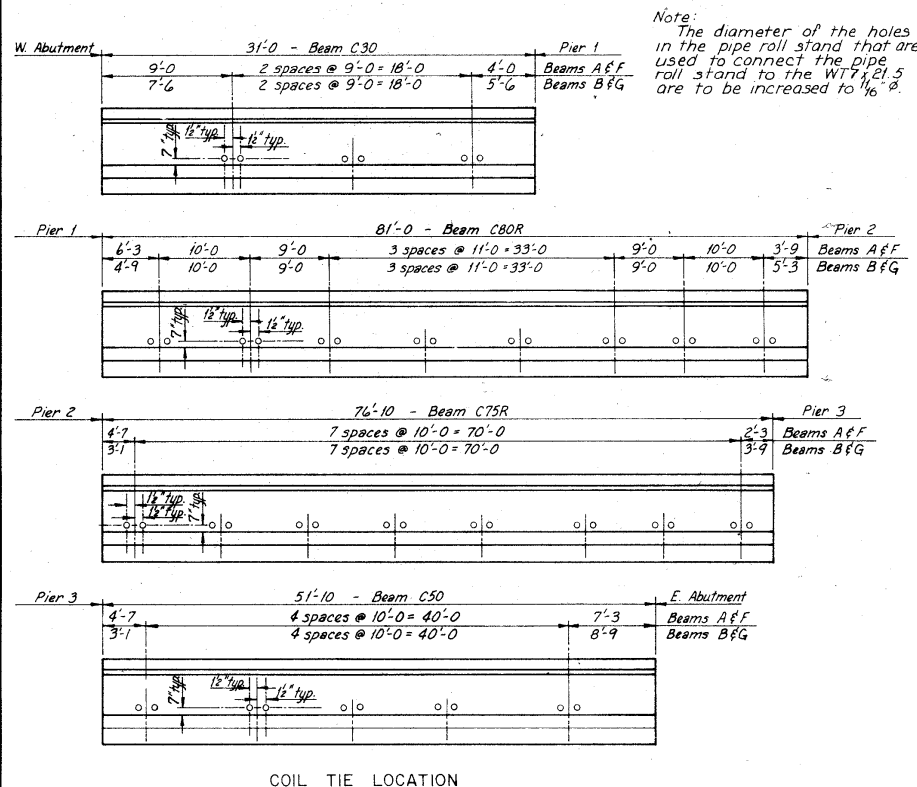
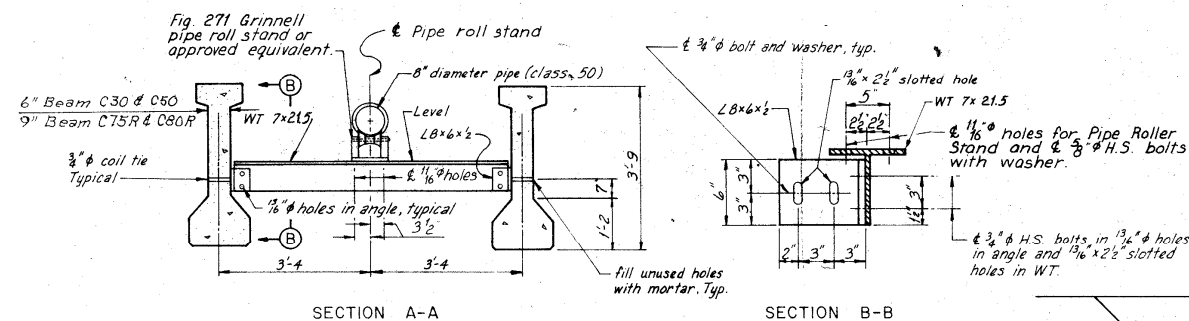
BILL OF REINFORCEMENT - 1 THRUST BLOCK					
BAR	LOCATION	SHAPE	NO.	LENGTH	WEIGHT
4a1	Thrust Block		20	21'-8"	36
5a2	Thrust Block		2	5'-4"	11
5a3	Thrust Block		16	3'-1"	51
5b1	Thrust Block		2	21'-5"	5
5b2	Thrust Block		2	7'-8"	18
5b3	Thrust Block		2	6'-1"	13
Not Included in "Reinforcing Steel" Quantity - Total				132	



Note:
4 Thrust Blocks required.



WATER LINE INSTALLATION
The water line installation is to be in accordance with the Special Provisions.



EMMONS STREET OVER I-380
DESIGN FOR 12°52'31" SKEW
241'-3 3/4" x 32'-0" PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE
30'-9, 81'-6, 77'-5 1/2, 51'-7 SPANS
WATER MAIN DETAILS

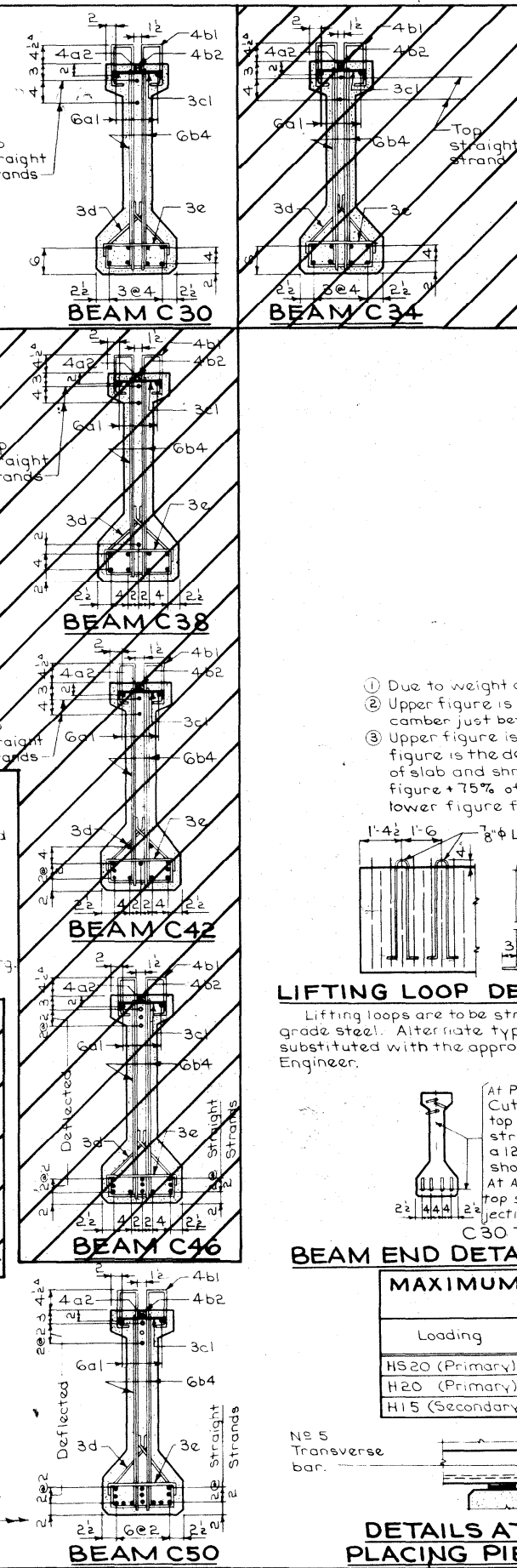
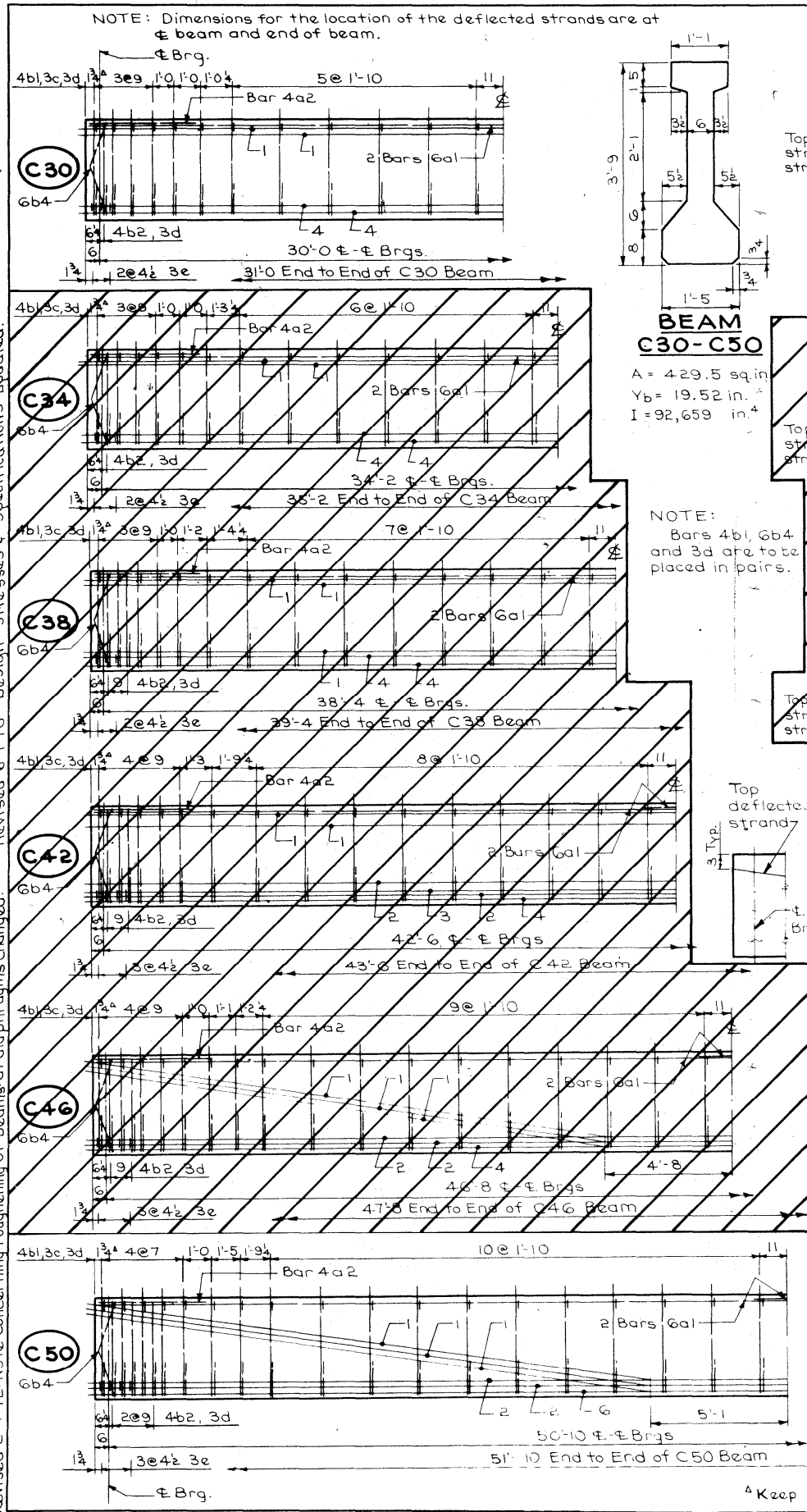
STA. 2939+81.83 @ EMMONS ST.
STA. 939+79.98 @ I-380

LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION
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DESIGN NO. 1079 LINN COUNTY FILE 28090 SHEET 15 OF 22

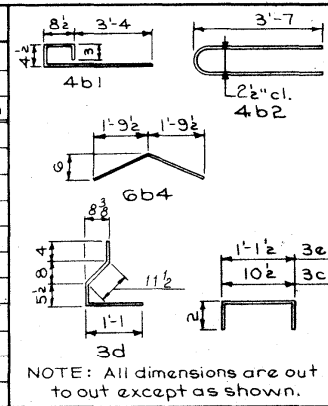
HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY

MADE T.K.N. DATE 11-20-79 CHECKED L.J.R. DATE 11-21-79

Revised 8-29-77: Agency updated.
 Revised 5-2-75: Minor notations changed.
 Revised 5-10-72: New sheet made.
 Revised 6-1-72: Note concerning roughening of beams at diaphragms changed.
 Revised 12-15-78: 2" PC Concrete W.S. Column deleted from Beam Spacing Table.
 Revised 12-15-78: Design Stresses & Specifications updated.



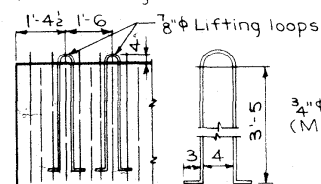
REINFORCING BAR LIST							
Beam	C30	C34	C38	C42	C46	C50	
Span	30'-0"	34'-2"	38'-4"	42'-6"	46'-8"	50'-10"	
Bar	Shape	No	Length	No	Length	No	Length
6a1	—	2	30'-9"	2	34'-11"	2	39'-1"
4a2	—	2	4'-0"	2	4'-0"	2	4'-0"
4b1	—	48	5'-5"	52	5'-2"	56	5'-2"
4b2	—	2	7'-3"	2	7'-2"	4	7'-2"
6b4	—	4	3'-9"	4	3'-9"	4	3'-9"
3c1	—	24	1'-3"	28	1'-1"	30	1'-1"
*3d	—	52	2'-10"	56	2'-8"	64	2'-8"
3e	—	6	1'-6"	6	1'-5"	8	1'-5"



*Where deflecting strands interfere with placement some in-place bending may be necessary.

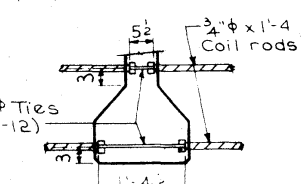
BEAM DATA							
Beam	C30	C34	C38	C42	C46	C50	
Span	30'-0"	34'-2"	38'-4"	42'-6"	46'-8"	50'-10"	
Initial Prestress	Kips	289	289	318	376	376	
Size Strands		12	12	12	12	12	
Straight Strands		10	10	11	13	10	
Deflected Strands					3	3	
Hold Down Force	Kips				14.1	13.2	
Camber (2)		0.8	1.1	1.3	1.7	2.0	
D.L. Deflection (3) in (6'-8" Spc)		0.4	0.6	0.7	1.0	1.5	
D.L. Deflection (3) in (8'-0" Spc)		0.1	0.2	0.3	0.5	0.8	
D.L. Deflection (3) in (10'-0" Spc)		0.1	0.2	0.3	0.5	0.8	
Reinforcing Steel	lb.	373	391	435	473	524	
Concrete	cy.	3.43	3.69	4.35	4.82	5.27	

- Due to weight of 8" slab and diaphragms.
- Upper figure is the beam camber at release. Lower figure is the beam camber just before slab is placed.
- Upper figure is the elastic deflection of beam due to weight of 8" slab. Lower figure is the deflection due to the combined effect of creep due to weight of slab and shrinkage of slab. The total deflection of beam is the upper figure + 75% of lower figure for end spans and upper figure + 50% of the lower figure for interior spans.



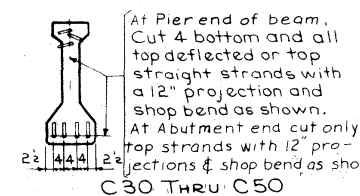
LIFTING LOOP DETAILS

Lifting loops are to be structural grade steel. Alternate types may be substituted with the approval of the Engineer.



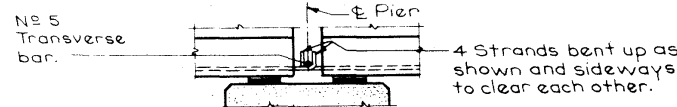
COIL TIE DETAILS

Number and location of coil ties to be as detailed on specific designs.



BEAM END DETAIL AT PIER AND ABUTMENT

MAXIMUM SPACING OF BEAMS FOR SPANS SHOWN			
Loading	Future W.S.	Slab Thickness	Maximum Spacing
H520 (Primary)	20 psf	8"	7'-6"
H20 (Primary)	20 psf	8"	8'-0"
H15 (Secondary)		8"	8'-6"



DETAILS AT PIER BEFORE PLACING PIER DIAPHRAGM

NOTES:

Unless otherwise noted lengths of all beams shall be increased 0.005L to compensate for creep shrinkage and elastic shortening.
 All deflected strands are to be held down at 4 points except that the hold down point may be moved toward the end of the beam a distance not to exceed .05 span at the producer's option.
 Tops of beams are to be struck off level and artificially roughened in accordance with the I.D.O.T. Materials Department recommendations. Bearing details will be as detailed on the Bridge design sheets.
 All strands are to be 1/2" Φ 270 kip grade.
 Beams for continuous bridges shall be at least 4 weeks old before the slab is placed except as otherwise approved by the Engineer.
 The portions of the prestress beams that are to be embedded in the abutment and pier diaphragms shall be roughened for a distance of 10" from the beam end by sand blasting or other approved methods to provide suitable bond between the beam and the diaphragm in accordance with Article 2403.15 of the specifications.

DESIGN STRESSES:

Design stresses for the following materials are to be in accordance with AASHTO Standard Specifications for Highway Bridges, Series of 1977.
 Reinforcing steel in accordance with Section 1.5.26 (b), $f_s = 20,000 \text{ psi}$.
 Concrete in accordance with Section 1.6.6 (b), $f_c = 5000 \text{ psi}$.
 Prestressing steel in accordance with Section 1.6.6 (a), $f_s = 270,000 \text{ psi}$.

SPECIFICATIONS:

DESIGN: AASHTO Series of 1977.
 CONSTRUCTION: Standard Specifications of the Iowa Department of Transportation, current series, plus current special provisions and supplemental specifications.

EMMONS STREET OVER I-380
 DESIGN FOR 12'-52.31" SKEW
 241'-3 3/8" x 32'-0" PRETENSIONED PRESTRESSED
 CONCRETE BEAM BRIDGE
 30'-9", 81'-6", 77'-5 1/2", 51'-7" SPANS

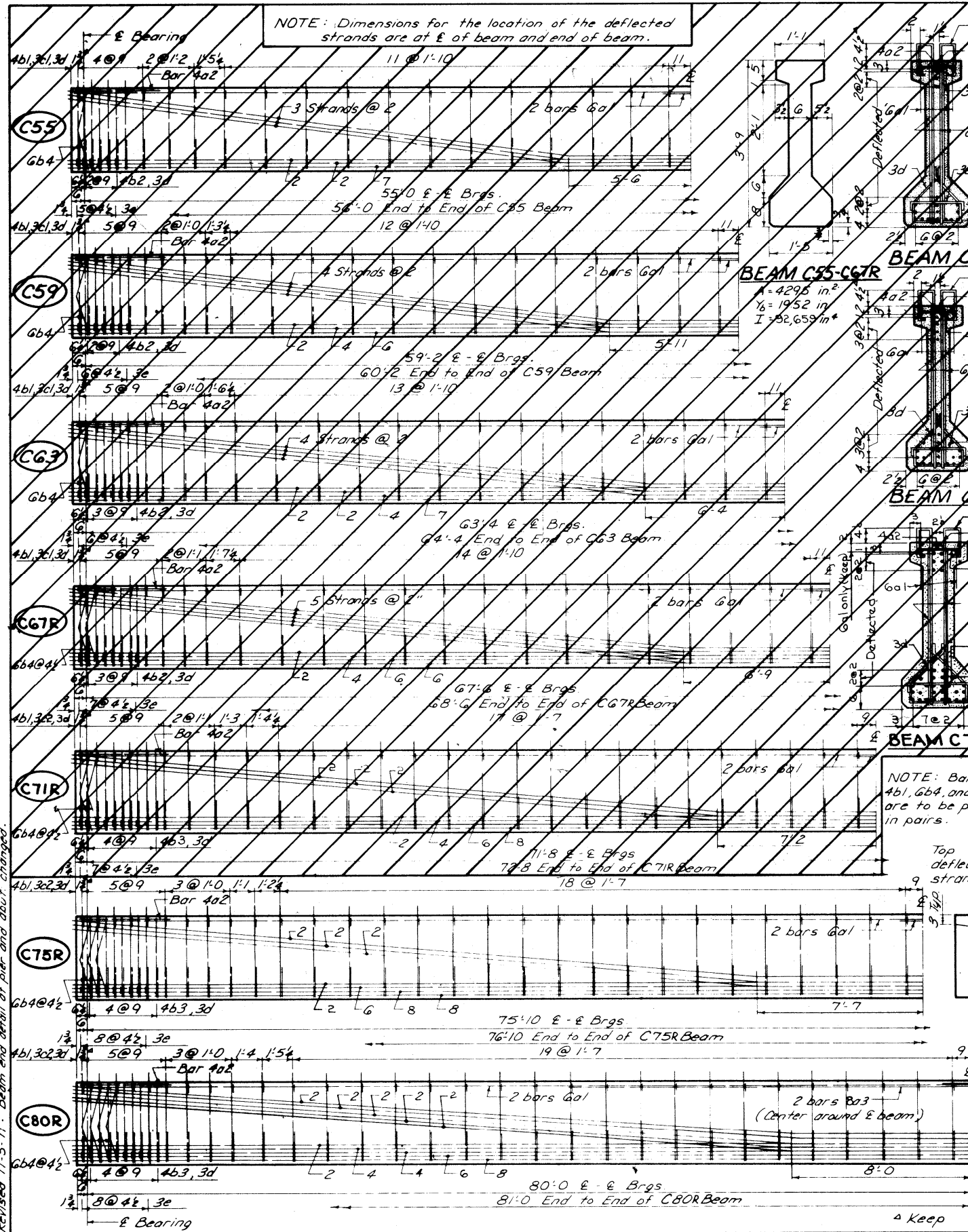
BEAM DETAILS

STA. 2939-81.83 @ EMMONS ST.
 STA. 939-79.98 @ I-380

LINN COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION
 1980
 DESIGN SHEET 14 OF 20
 DESIGN NO. 1079 LINN COUNTY FILE 26090 SHEET

STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
IOWA			16	22

Revised 1-22-77: Beam deflections for 8" slab shown.
 Revised 12-15-78: 2" PC Concrete W.S. column deleted from Beam Spacing Table. 9a3 Bar changed to 8a3, C80R Beam.
 Revised 6-1-78: Design Stresses & Specifications updated.
 Revised 8-29-77: Agency updated.
 Revised 5-2-75: Beams C71, 75 and 80 Strand pattern changed in C71. R Designation added to revised beams.
 Revised 5-10-72: New sheet made.
 Revised 11-5-71: Beam end detail at pier and abut changed.



REINFORCING BAR LIST

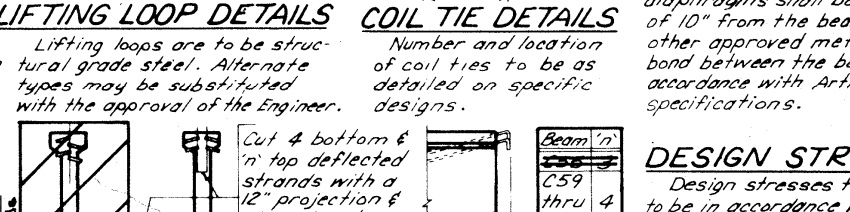
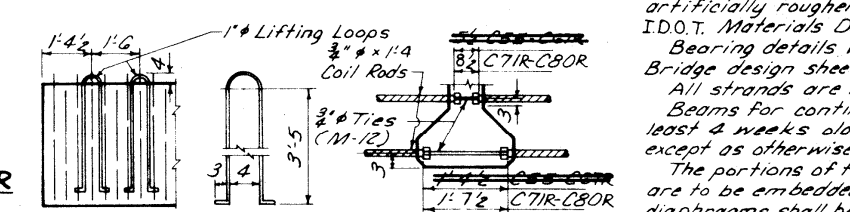
Beam	C55	C59	C63	C67R	C71R	C75R	C80R
Span	55'-0"	59'-2"	63'-4"	67'-6"	71'-8"	75'-10"	80'-0"
Bar Shape	1/2" length N# length	1/2" length N# length	1/2" length N# length	1/2" length N# length	1/2" length N# length	1/2" length N# length	1/2" length N# length
Gal	2 4:0	2 4:0	2 4:0	2 4:0	2 4:0	2 4:0	2 4:0
4a2	2 4:0	2 4:0	2 4:0	2 4:0	2 4:0	2 4:0	2 4:0
8a3	2 4:0	2 4:0	2 4:0	2 4:0	2 4:0	2 4:0	2 4:0
4b1	16 5:2	8 5:2	8 5:2	12 5:2	10 5:2	11 5:2	12 5:2
4b2	6 7:2	6 7:2	8 7:2	8 7:2	10 7:2	10 7:2	10 7:2
4b3	4 8:9	4 8:9	4 8:9	4 8:9	4 8:9	4 8:9	4 8:9
6b4	3 8:9	3 8:9	4 8:9	4 8:9	4 8:9	4 8:9	4 8:9
3c1	4 8:9	4 8:9	4 8:9	4 8:9	4 8:9	4 8:9	4 8:9
3c2	4 8:9	4 8:9	4 8:9	4 8:9	4 8:9	4 8:9	4 8:9
**3d	8 8:9	8 8:9	8 8:9	8 8:9	8 8:9	8 8:9	8 8:9
3e	12 1:5	14 1:5	14 1:5	16 1:5	16 1:5	18 1:5	18 1:5

BEAM DATA

Beam	C55	C59	C63	C67R	C71R	C75R	C80R
Span	55'-0"	59'-2"	63'-4"	67'-6"	71'-8"	75'-10"	80'-0"
Initial Prestress Kips	408	462	549	665	751	867	983
Size Strands	11	12	15	18	20	24	24
Straight Strands	3	4	4	5	6	6	10
Deflected Strands	8	8	11	13	14	18	14
Hold Down Force Kips	11.5	14.3	17.6	21.0	23.9	28.0	32.3
Camber @	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"	1/4"
DL Deflection @ in (6" x 8" span)	1.49	1.53	1.69	1.77	1.85	2.01	2.26
EL Deflection @ in (6" x 8" span)	1.49	1.53	1.69	1.77	1.85	2.01	2.26
EL Deflection @ in (6" x 8" span)	1.49	1.53	1.69	1.77	1.85	2.01	2.26
Reinforcing Steel	16	16	16	16	16	16	16
Concrete C.Y.	6.19	6.68	7.11	7.57	8.05	8.54	9.02

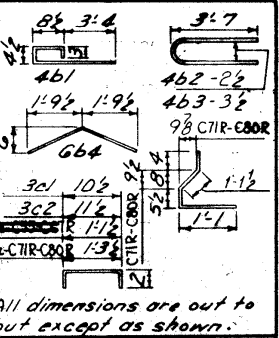
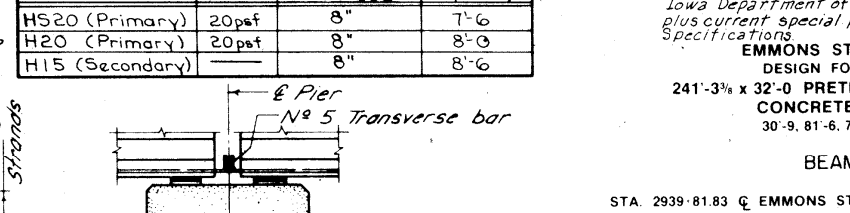
NOTES:

① Due to weight of 8" slab and diaphragms.
 ② Upper figure is the beam camber at release. Lower figure is the beam camber just before slab is placed.
 ③ Upper figure is the elastic deflection of beam due to weight of 8" slab. Lower figure is the deflection due to the combined effect of creep due to weight of slab and shrinkage of slab. Total deflection of beam is upper figure + 75 % of lower figure for end spans and upper figure + 50 % of lower figure for interior spans.



MAXIMUM SPACING OF BEAMS FOR SPANS SHOWN

Loading	Future W.S.	Slab Thickness	Maximum Spacing
H20 (Primary)	20psf	8"	7'-6"
H20 (Primary)	20psf	8"	8'-0"
H15 (Secondary)	—	8"	8'-6"



Unless otherwise noted lengths of all beams shall be increased .0005 L to compensate for creep shrinkage and elastic shortening. All deflected strands are to be held down at 4 points except that the hold down point may be moved toward the end of the beam a distance not to exceed .05 span at the producer's option. Tops of beams are to be struck off level and artificially roughened in accordance with the I.D.O.T. Materials Department recommendations. Bearing details will be as detailed on the Bridge design sheets. All strands are to be 1/2" x 270 kip grade. Beams for continuous bridges shall be at least 4 weeks old before the slab is placed except as otherwise approved by the Engineer. The portions of the prestress beams that are to be embedded in the abutment and pier diaphragms shall be roughened for a distance of 10" from the beam end by sandblasting or other approved methods to provide suitable bond between the beam and the diaphragm in accordance with Article 2403.15 of the specifications.

DESIGN STRESSES:

Design stresses for the following materials are to be in accordance with A.A.S.H.T.O. Standard Specifications for Highway Bridges, Series of 1977. Reinforcing steel in accordance with section 15.06(B), $f_s = 20,000$ psi. Concrete in accordance with 16.6(B), $f'_c = 5000$ psi. Prestressing steel in accordance with 16.6(A), $f_s = 270,000$ psi.

SPECIFICATIONS:

DESIGN: A.A.S.H.T.O. Series 1977. CONSTRUCTION: Standard Specifications of Iowa Department of Transportation, current series, plus current special provisions and supplemental specifications.

EMMONS STREET OVER I-380
 DESIGN FOR 12° 52' 31" SKEW
 241'-3 3/8" x 32'-0" PRETENSIONED PRESTRESSED CONCRETE BEAM BRIDGE
 30'-9", 81'-6", 77'-5", 51'-7" SPANS

BEAM DETAILS

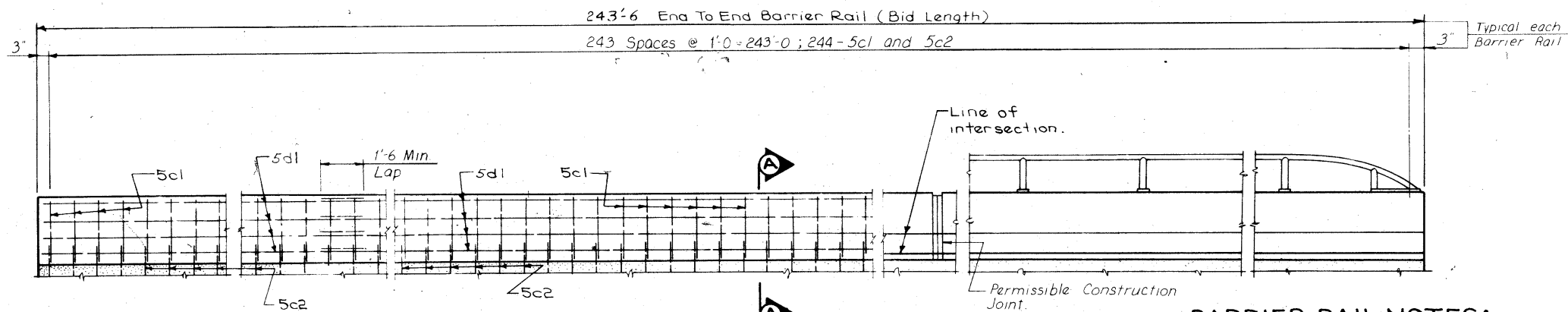
STA. 2939+81.83 @ EMMONS ST.
 STA. 939+79.98 @ I-380

DESIGN SHEET 15 OF 20

DESIGN NO. 1079 LINN COUNTY FILE 26090SHEET

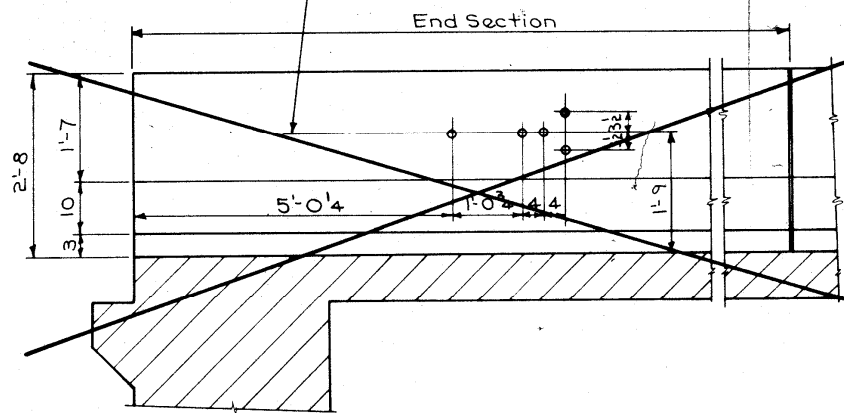
STATE	FED. ROAD DIST. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
IOWA	5		17	22

DESIGNED BY: _____ TRACED BY: _____
 DETAILED BY: TKN 11-26-79 CHECKED BY: LJR 11-26-79

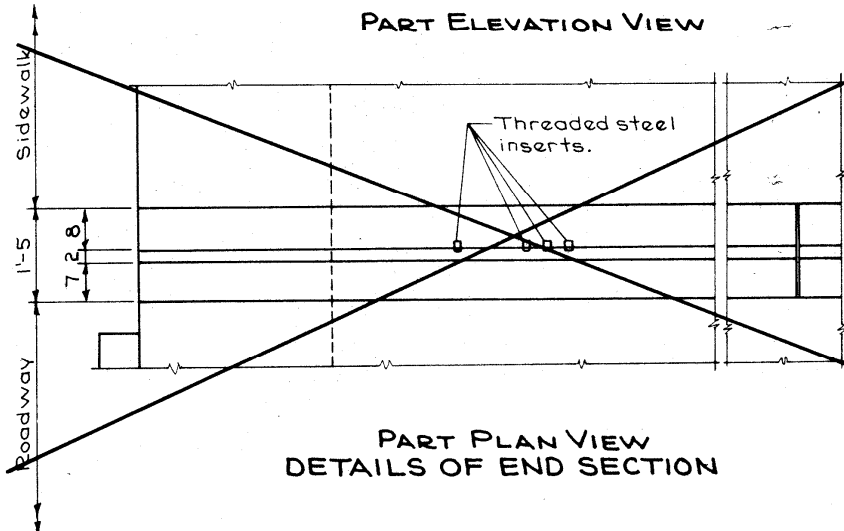


ELEVATION OF BARRIER RAIL LAYOUT

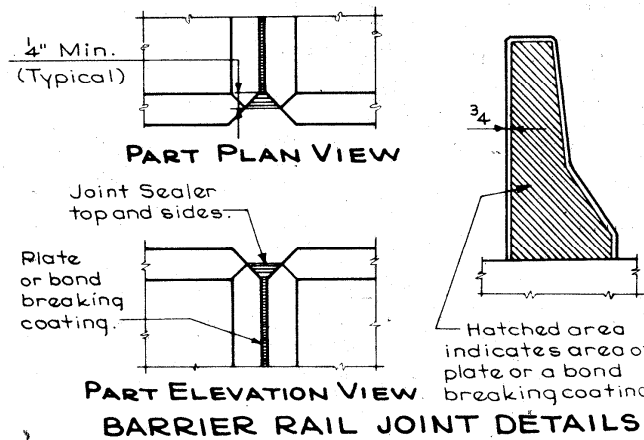
Provide five threaded steel inserts with solid bottom to fit 3/8 x 2 galvanized cap screws with galvanized round washers. Cost of inserts to be included in price bid for "Structural Concrete". Screws and washers are not a part of this contract.



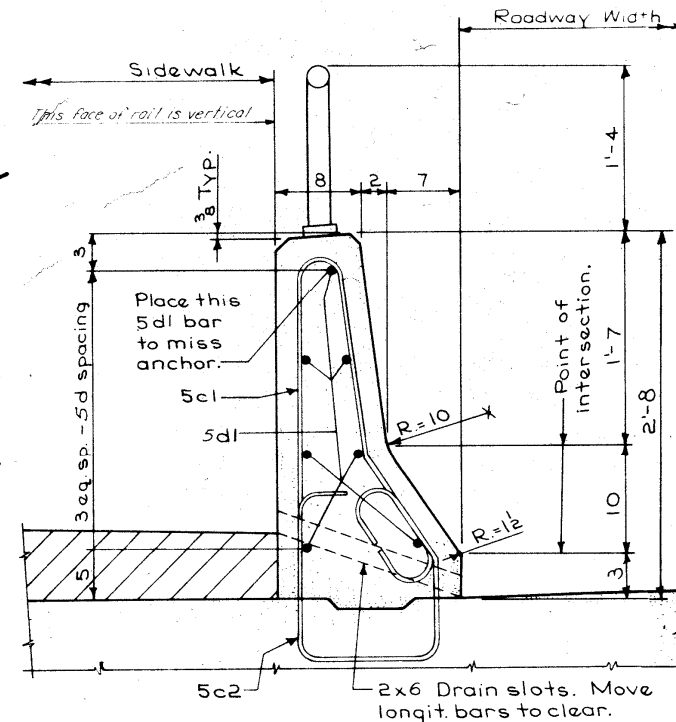
PART ELEVATION VIEW



PART PLAN VIEW
DETAILS OF END SECTION



PART ELEVATION VIEW
BARRIER RAIL JOINT DETAILS



PART SECTION A-A

BARRIER RAIL NOTES:

Minimum clear distance from face of concrete to near reinforcing bar is to be 2" unless otherwise noted or shown.

All exposed corners 90° or sharper are to be filleted with a 3/4" dressed and beveled strip.

Top of the barrier rail is to be parallel to the theoretical E grade.

The permissible construction joints are to be placed between vertical bars at a minimum spacing of 20 feet. Construction joint contact surfaces are to be coated with an approved bond breaker.

The joint sealer shall conform to Fed Spec. TT-500230 or TT-500227 for Type II, Class A or B.

Cost of the joint sealer and bond breaker shall be considered incidental to other construction.

All barrier rail concrete is to be Class D.

For details of steel sidewalk rail see another sheet of these plans.

The concrete barrier rail is to be bid on a lineal foot basis measured from end to end of rail. The number of lineal feet of barrier rail installed will be paid for at the contract price per lineal foot based on plan quantities. Price bid for Concrete Barrier Rail shall be full compensation for furnishing all material, excluding reinforcing steel, and all of the equipment and labor required to erect the rail in accordance with these plans and current specifications. All barrier rail reinforcing steel is to be included with the superstructure reinforcing steel.

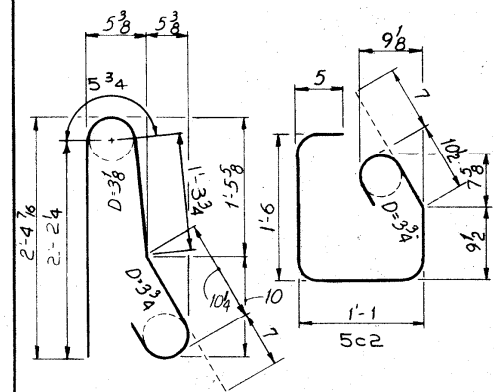
All barrier rail reinforcing steel is to be epoxy-coated after bending.

NOTE: Cross sectional area of the Barrier Rail = 2.47 square feet.

EPOXY REINFORCING STEEL

Bar	Location	Shape	Nº	Length	Weight
5c1	Vertical	U	488	5'-5"	2757
5c2	Vertical	U	488	5'-3"	2672
5d1	Longitudinal	—	98	36'-1"	3688
Total (lb.)					9117

BENT BAR DETAILS



NOTE: All dimensions are out to out. D = Pin diameter.

CONCRETE PLACEMENT SUMMARY

Concrete	Total
487.0 @ 0.0915 c.y. Per L.F.	44.56 cu yd.

CONCRETE BARRIER RAIL QUANTITIES

Item	Unit	Quantity
Concrete Barrier Rail	L.F.	487.0

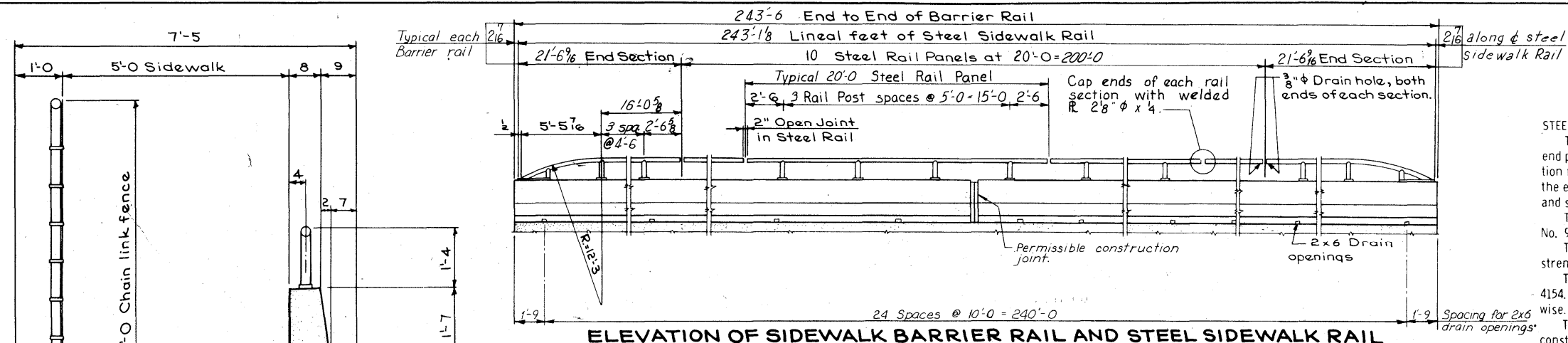
EMMONS STREET OVER I-380
DESIGN FOR 12° 52' 31" SKEW
241'-3 3/8" x 32'-0" PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE
30'-9", 81'-6", 77'-5 1/2", 51'-7" SPANS

SIDEWALK BARRIER RAIL

STA. 2939+81.83 @ EMMONS ST.
STA. 939+79.98 @ I-380

LINN COUNTY
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1980
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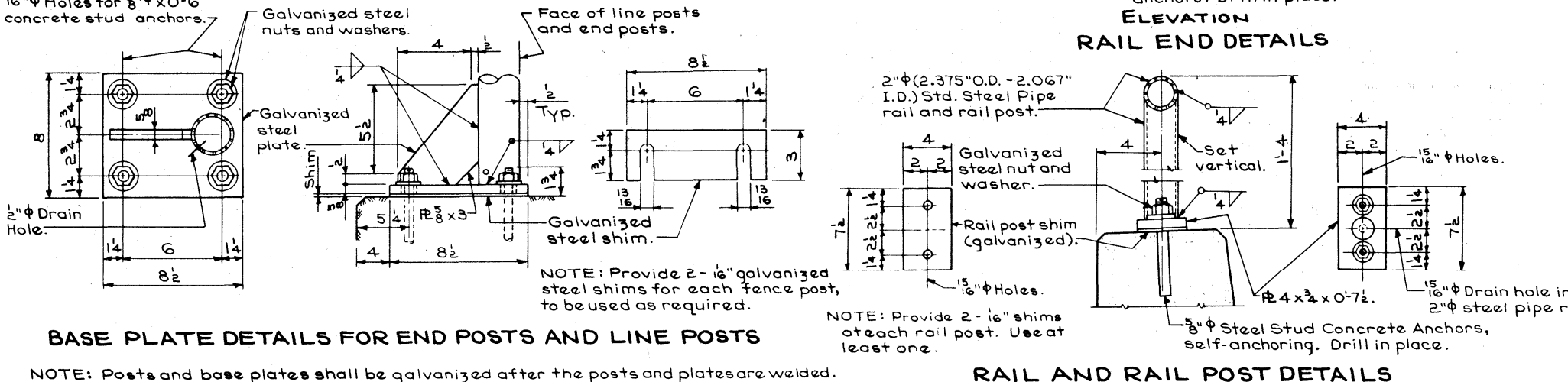
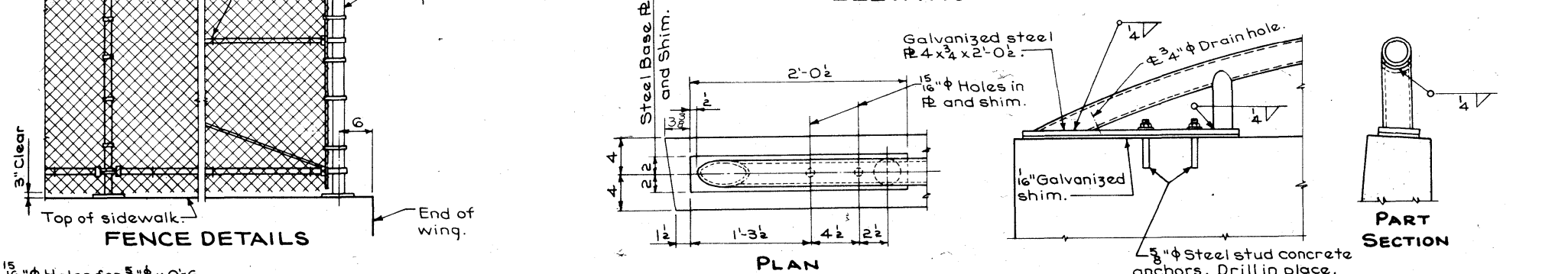
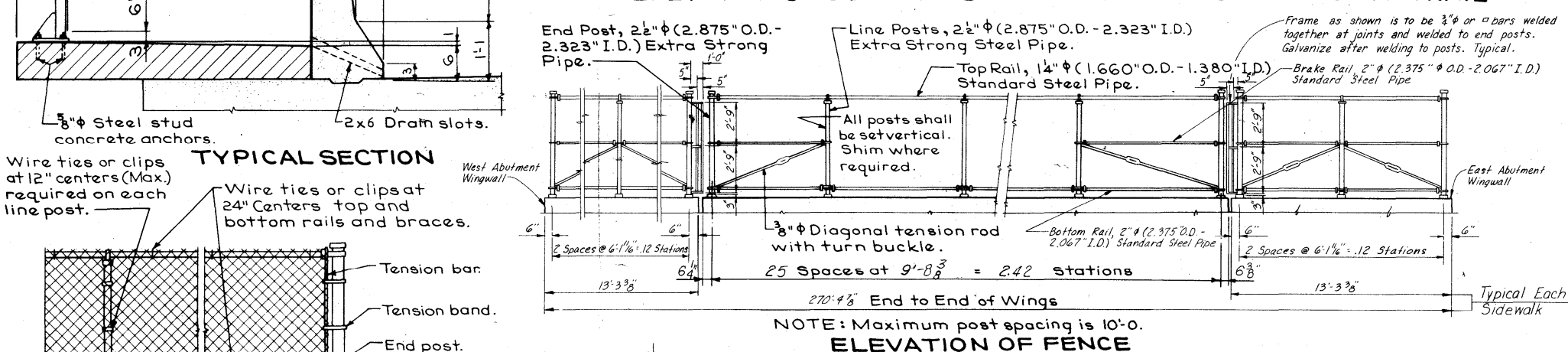
FEDERAL DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
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QUANTITIES	
Item	Amount
Steel Sidewalk Rail	486.18 L.F.
Chain Link Fence As Per Plan	5.32 Stations

STEEL CHAIN LINK FENCE NOTES:
 The chain link fence is to be bid on a station basis measured from Q to Q of end posts. The price bid for "Chain Link Fence, as per plan" shall be full compensation for furnishing all material, including concrete anchors and shims, and all of the equipment and labor required to erect the fence in accordance with these plans and specifications.
 The chain link fence shall be either zinc or aluminum coated fabric, 2" mesh, No. 9 wires, 72" height with knuckled selvages top and bottom.
 The stud concrete anchors shall be galvanized and have a minimum pullout strength of 8000 pounds based on 4000 psi concrete.
 The posts, braces, rails and special fittings shall be in accordance with Articles 4154.10 and 4154.11 of the Standard Construction Specifications unless noted otherwise.
 The fence shall be true to line, taut, and comply with the best practice for fence construction of this type. All ends of wires shall be turned so that they extend away from the sidewalk side of the fence.

STEEL SIDEWALK RAIL NOTES:
 The steel sidewalk rail is to be bid on a lineal foot basis measured end to end of rail. The price bid for "Steel sidewalk rail" shall be full compensation for furnishing all material, including anchor bolts and shims, and all of the equipment and labor required to erect the rail in accordance with these plans and specifications.
 Material for the tube rails and posts shall be galvanized, standard weight steel pipe meeting ASTM A-120. End caps, base plates, and shims shall meet ASTM A-36 and are to be galvanized after fabrication to meet ASTM A-123.
 Ends of rail sections are to be sawed or milled. All cut ends are to be true, smooth, and free of butts or ragged edges.
 No painting will be required.
 The stud concrete anchors shall be galvanized and have a minimum pullout strength of 8000 pounds based on 4000 psi concrete.
 For details of concrete barrier rail see another sheet of these plans.

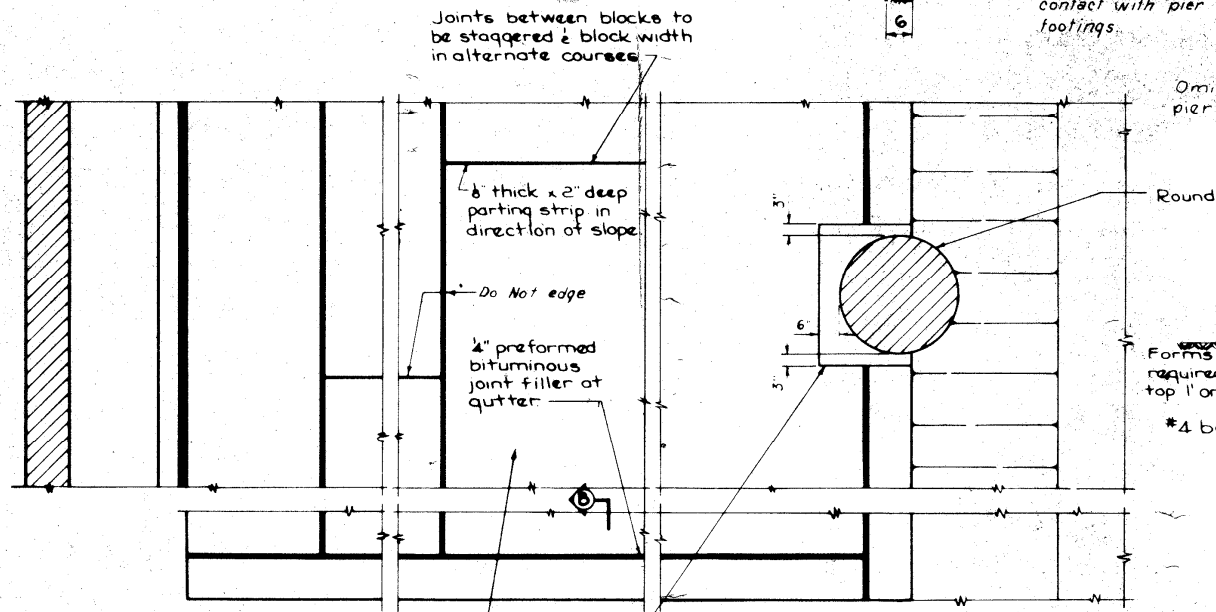
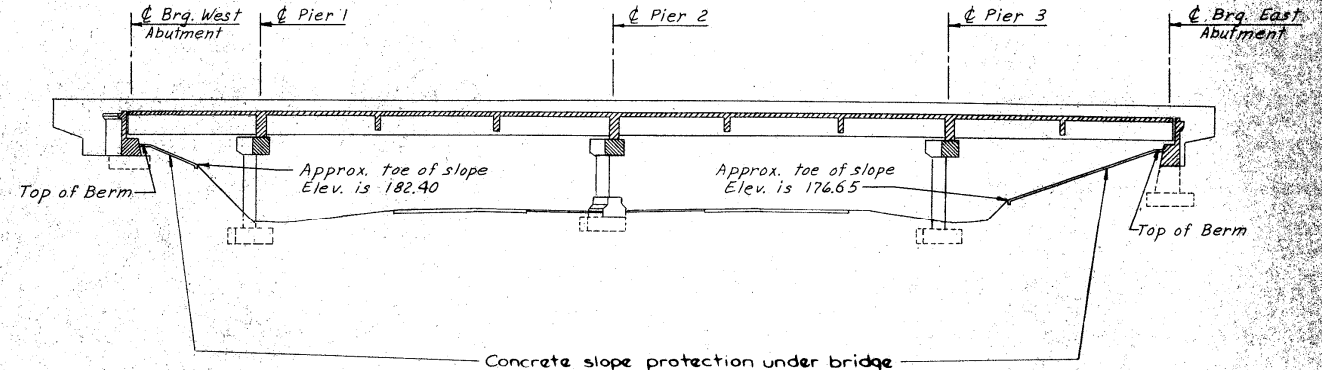
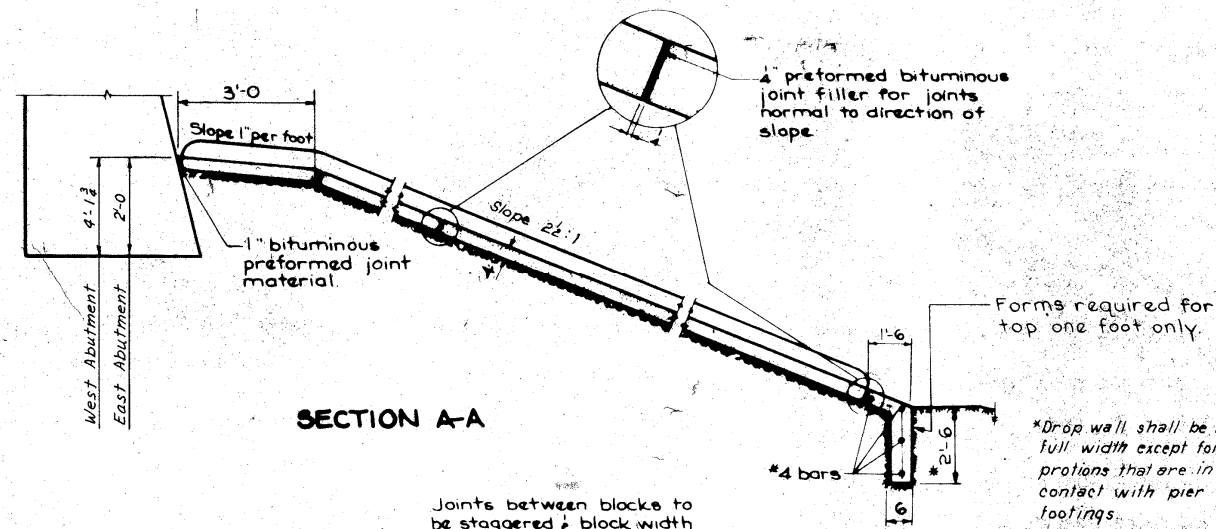


EMMONS STREET OVER I-380
 DESIGN FOR 12°52'31" SKEW
 241'-3 3/8" x 32'-0" PRETENSIONED PRESTRESSED
 CONCRETE BEAM BRIDGE
 30'-9", 81'-6", 77'-5 1/2", 51'-7" SPANS

FENCE DETAILS

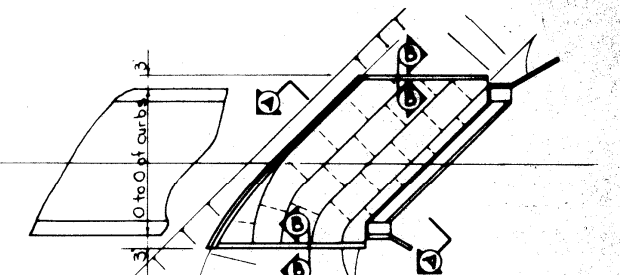
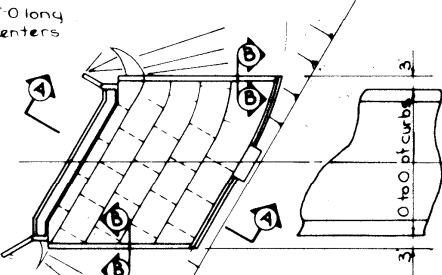
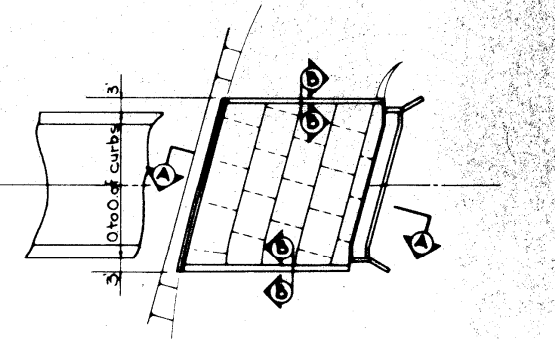
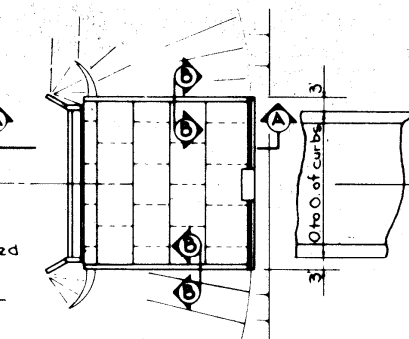
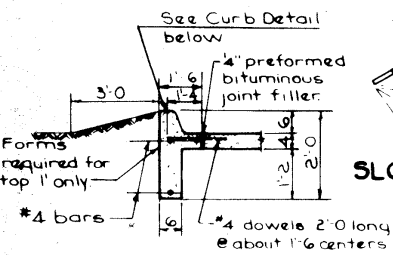
STA. 2939+81.83 @ EMMONS ST.
 STA. 939+79.98 @ I-380

LINN COUNTY
 IOWA DEPARTMENT OF TRANSPORTATION
 1980
 DESIGN NO. 1079 LINN COUNTY FILE 26090 SHEET



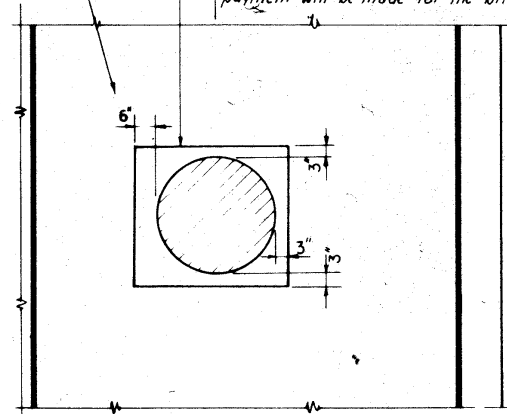
Omit drop wall along pier column as shown.

Round pier column



Nominal dimension of cast in place concrete blocks = 10' x 10'

Slope protection is to be formed out around column to this line and the remaining void filled with commercial bituminous patching material as approved by the Engineer. No separate payment will be made for the bituminous material.



GENERAL NOTES:

- This sheet shows details for placing portland cement concrete slope protection under overhead structures.
- The current specifications of the Iowa Dept. of Transportation shall apply with modifications or additions listed below:
- Concrete - Class C Structural
- Finish - Class 1, Floated Surface Finish
- Cure - Cure as per current Specifications
- Subgrade Preparation - The subgrade is to be shaped and compacted so that finished slope protection will be similar to examples shown on this sheet. The subgrade shall be firm when concrete is placed. Sprinkling required shall be done early enough so that concrete is not placed on a muddy subgrade. No subgrade paper will be required.
- The cast in place concrete is to be poured in approximately 10' wide courses, but all courses on one slope should have approximately equal widths. Adjacent courses shall not be poured within 15 hours of one

another. The joints in the direction of the slope are to be staggered about 1/2 block width.

Basis of payment: Payment will be made on a square yard basis for slope protection constructed. The unit price bid per square yard is to include costs of all materials and labor required to construct this protection as shown or intended by these plans. The subgrade preparation including any necessary excavation or filling required to shape the slope to the lines shown on the plans and disposal of excess earth excavated as directed by the Engineer, are considered incidental to placing the concrete slope protection.

Where erosion control work is completed the Contractor shall be responsible for any plant materials destroyed adjacent to slope protection area. The Contractor shall replant, reseed and mulch all areas disturbed adjacent to slope protection areas in accordance with Section 2601 of Standard Specifications, Series of 1977, at his expense.

Pay quantities are to be based on field measured out to out dimensions.

QUANTITIES	
West Abutment	182.40 Sq. Yds.
East Abutment	216.65 Sq. Yds.
Total	399.05 Sq. Yds.

EMMONS STREET OVER I-380
DESIGN FOR 12' 52" 31" SKEW
241'-3 3/4" x 32'-0" PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE
30'-9", 81'-6", 77'-5", 51'-7" SPANS

CONCRETE SLOPE PROTECTION

STA. 2939+81.83 @ EMMONS ST.
STA. 939+79.98 @ I-380

LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION
1980
DESIGN SHEET 19 OF 20

DESIGN NO. 1079 LINN COUNTY FILE 26090 SHEET 21 OF 22

LIGHTING NOTES:
Construction shall conform to the current Iowa D.O.T. Standard Specifications and Special Provisions and current Supplemental Specifications for Highway Lighting.

Conduit installation shall comply with the article "Electrical Ducts", section 2523.

All "C" entrance holes in junction boxes shall be drilled and tapped for the specified conduit size. All other holes shall have a concrete - tight slip fit. Conduit ends shall not protrude into junction box more than 1/4". Drain pipe end shall be flush with inside surface of box. Grounding buttons shall be located approximately 3' from the inside surface of the box wall, and not closer than 3' to the edge of any hole in the box floor. Holes for drain pipe shall be placed in the low corner of the box, with a minimum clearance of 1" between the edge of the hole and the inside surface of the box wall. Typical details are shown on this sheet.

The contract unit price per linear foot of conduit shall be full compensation for furnishing all material (including junction boxes and fittings), labor and any work incidental to the installation. The concrete and weight of reinforcing steel is included in the Superstructure Estimated Quantities.

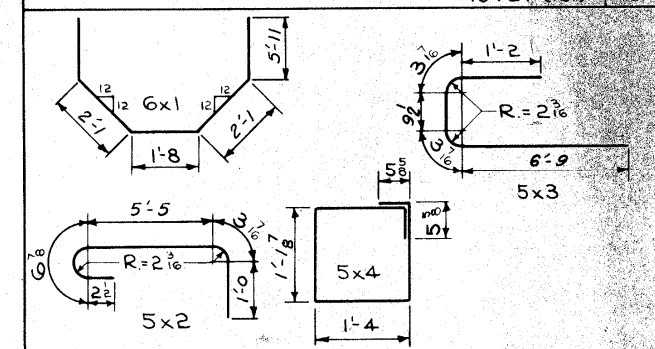
The length of conduit installed shall be measured in feet by the Engineer. Cost of furnishing and installing poles, lights and lighting conductor is not a part of this estimate.

Expansion fitting shall be as specified or as approved by the Engineer. Typical details are shown on this sheet.

Anchor bolt material shall comply with the requirements of ASTM A-325 or A-193 Grade B7. Anchor bolt nuts shall comply with ASTM A-325. Anchor bolts shall be galvanized.

* Reinforcing Bars to be epoxy coated.

*REINFORCING BAR LIST - ONE BASE					
Bar	Location	Shape	Nº	Length	Weight
6x1	Slab Anchors		4	17'-8"	106
5x2	Pole Base To Barrier Rail		4	7'-6"	31
5x3	Pole Base To Slab		4	9'-3"	39
5x4	Pole Base Hoop		4	5'-8"	24
Total (lb.)					200



All dimensions are out to out. Radii to E bar.

LIGHTING QUANTITIES

Item	Amount
2" Rigid Steel Conduit	541 L.F.
1" Rigid Steel Conduit	9 L.F.
Structural Concrete Class D	0.4 C.Y.
Reinforcing Steel	200 lb.

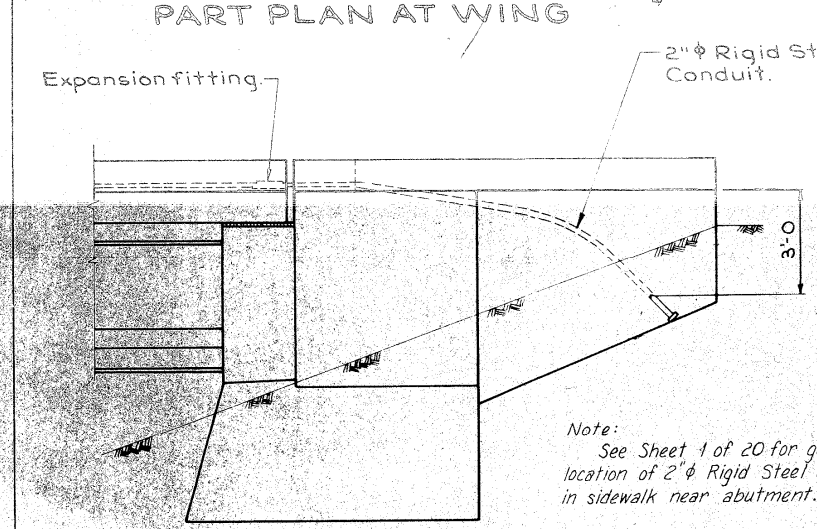
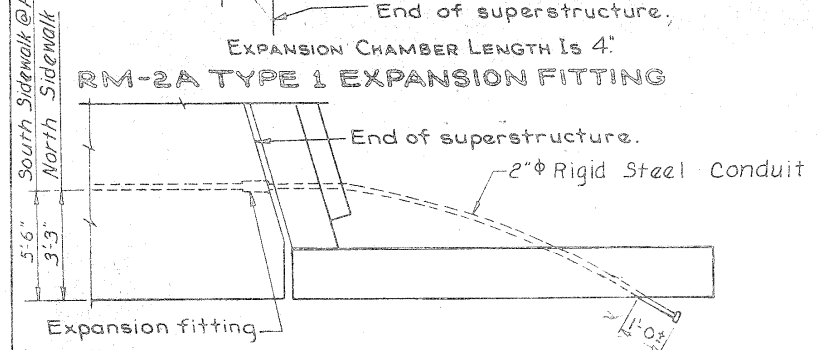
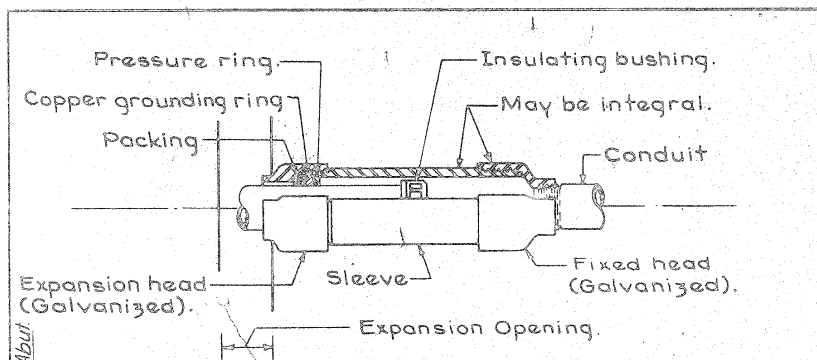
NOTE: For location and lengths of conduits needed see Design Sheet 1. Total quantities for concrete and reinforcing steel for pole bases are included in the superstructure quantities on another sheet.

EMMONS STREET OVER I-380
DESIGN FOR 12" 52'31" SKEW
241'-3" x 32'-0" PRETENSIONED PRESTRESSED
CONCRETE BEAM BRIDGE
30'-9", 81'-6", 77'-5", 51'-7" SPANS

LIGHTING DETAILS

STA. 2939+81.83 @ EMMONS ST.
STA. 939+79.98 @ I-380

LINN COUNTY
IOWA DEPARTMENT OF TRANSPORTATION
1980
DESIGN SHEET 200F 20

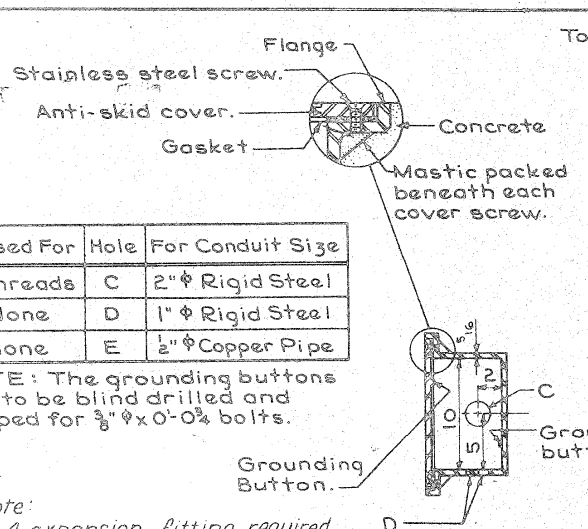


Note:
See Sheet 1 of 20 for general location of 2" Rigid Steel Conduit in sidewalk near abutment.

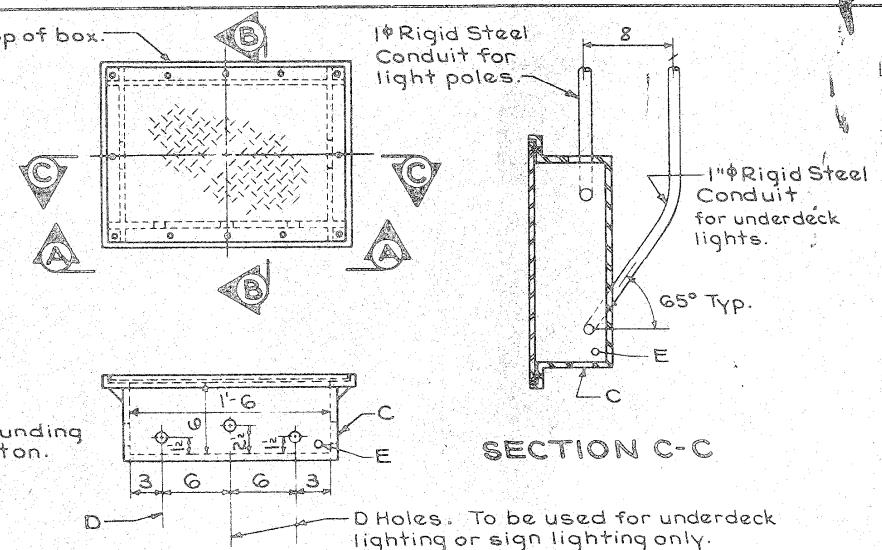
Bossed For	Hole	For Conduit Size
5 Threads	C	2" Rigid Steel
None	D	1" Rigid Steel
None	E	1/2" Copper Pipe

NOTE: The grounding buttons are to be blind drilled and tapped for 3/8" x 0'-0" bolts.

Note:
4 expansion fitting required for 2" Rigid Steel Conduit and 4 expansion fitting required for 4" Rigid Steel Conduit.



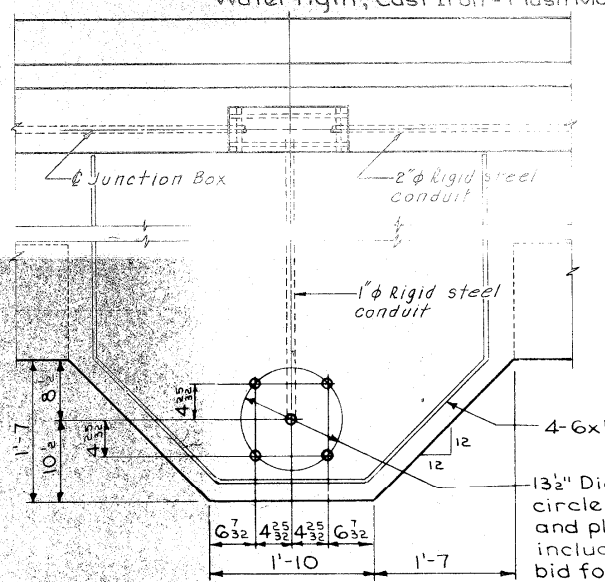
SECTION B-B



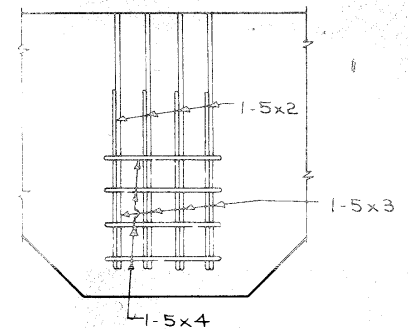
VIEW A-A

RM-9, TYPE 1 JUNCTION BOX

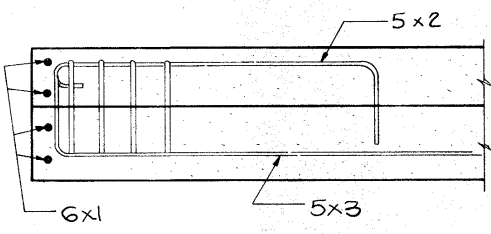
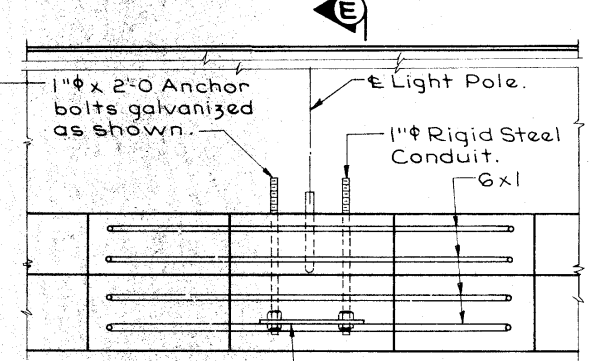
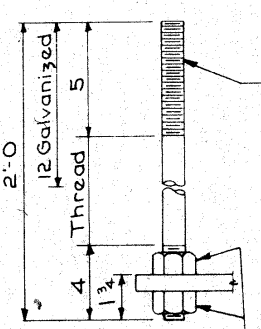
Watertight, Cast Iron - Flush Mount



PLAN OF POLE BASE
BASE REINFORCING BARS NOT SHOWN

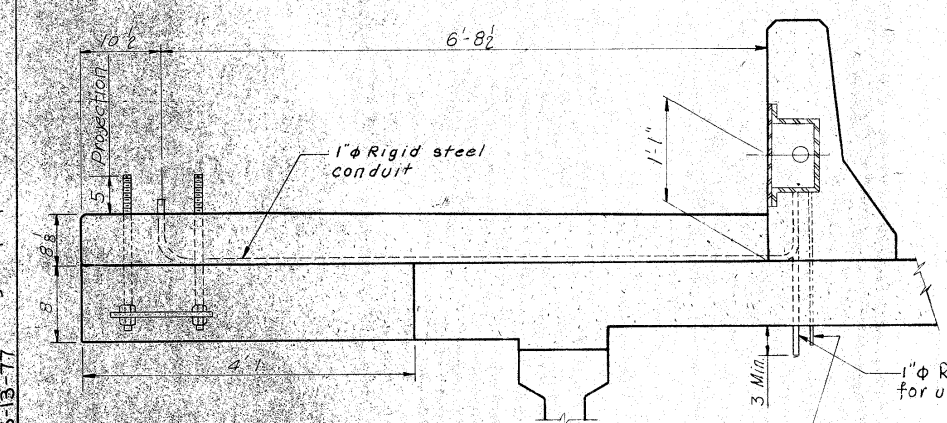
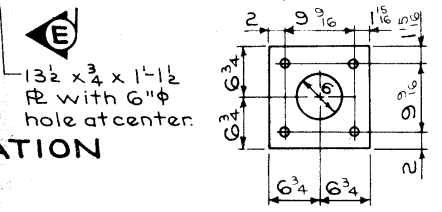


PLAN OF POLE BASE REINFORCING



SECTION THROUGH BASE SHOWING REINFORCING

ELEVATION



SECTION E-E

HOWARD, NEEDLES, TAMMEN & BERGENDOFF
CONSULTING ENGINEERS
KANSAS CITY
MADE TKN DATE 1-4-80 CHECKED LJR DATE 1-8-80

5660-95-01 B-29-77: Agency updated.
Revised 6-15-77