DESIGN DATA				
Traffic	Average Daily			Max.Hr.
Current 2006	Pass: 1,710	Trucks: 1,185	Total: 2,895	290
Forecast 2026	Pass: 3,405	Trucks: 2,360	Total: 5,765	580
Clear Zone Dist. 32 ft		Design Speed: 75 mph		
Minimum Sight Dist. for Stopping: 820 ft		Bridges:		
Full Control of Access				
No Point of Access Other Than at Interchange Ramps				
Pavement Design Life 20 (years)				

JOB# 39

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	SBI-6-029(063)203	16432	1	1

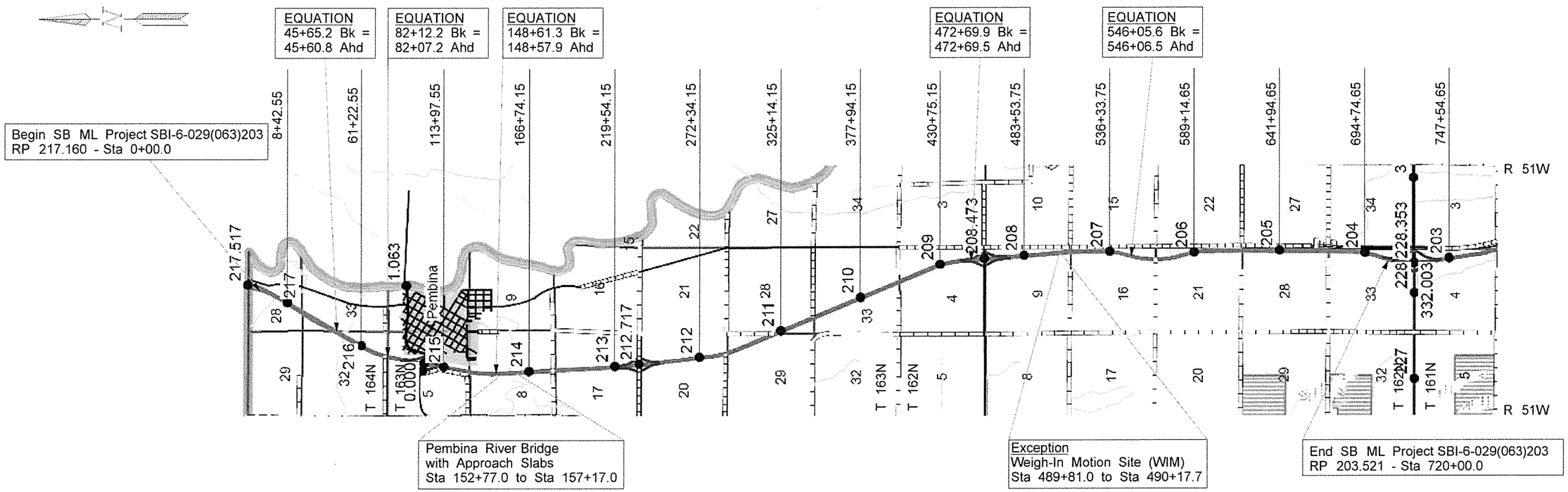
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

SBI-6-029(063)203
Pembina County
Joliette Interchange to Canadian Line - (Southbound)
CPR, Grinding (Both Lanes),
Crack & Seat and Hot Bituminous Overlay, and Ramp Overlays

GOVERNING SPECIFICATIONS:
Standard Specifications adopted by the North Dakota Department of Transportation October 2008; Standard Drawings currently in effect; and other Contract Provisions submitted herein.

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
SBI-6-029(063)203	13.5484	13.6387

Pembina River Bridge with Approach Slabs 0.0833 miles



DESIGNERS

Darell Arne /s/

Douglas A. Schumaker /s/

DISTRICT REVIEW

Edward Pavlish /s/
GRAND FORKS DISTRICT

APPROVED DATE 9/25/08

Ronald Jason Henke /s/
OFFICE OF PROJECT DEVELOPMENT
ND DEPARTMENT OF TRANSPORTATION

I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of ND.

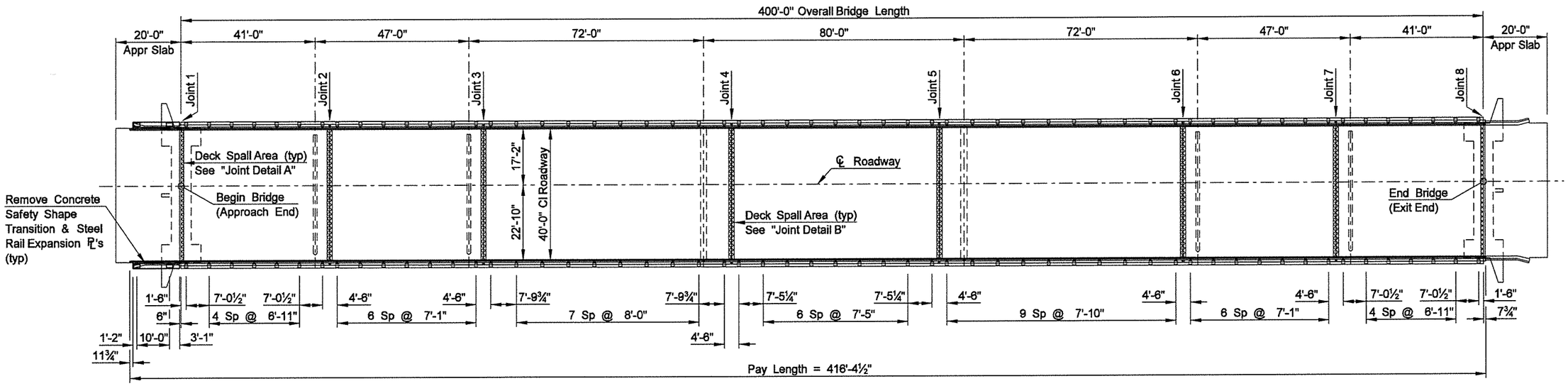
APPROVED DATE 9/25/08

James Douglas Rath /s/
DESIGN DIVISION

This document was originally issued and sealed by James Douglas Rath Registration Number PE-4288, on 9/25/08 and the original document is stored at the North Dakota Department of Transportation

23 U.S.C. 409
NDDOT Reserves All Objections

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	SBI-6-029(063)203	170	3



PLAN

Indicates Deck Spall Areas

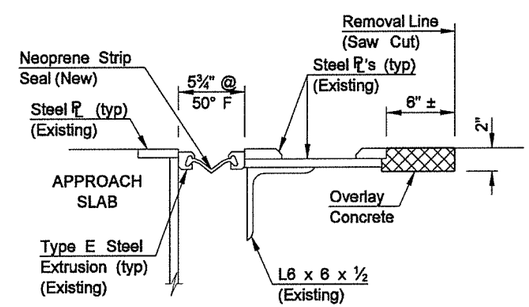
NOTES:

100 SCOPE OF WORK: Work at this site consists of removing concrete safety shape transitions at the approach end, constructing concrete curbs and posts on the existing north approach slab, installing double box beam rail retrofit, repairing concrete spall areas on the bridge deck surface, replacing the neoprene strip seals at the bridge ends, and placing silicone sealant at all interior deck joints.

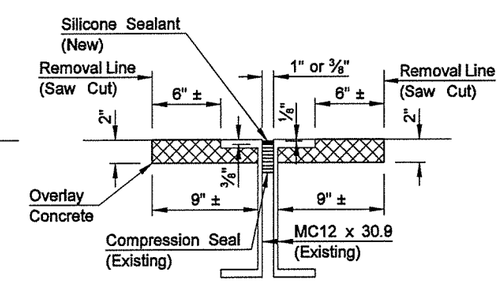
930 SILICONE SEALANT: Silicone sealant shall be placed on top of the existing compression seals at Joints 2 - 7. After placing the new concrete, the joint shall be cleaned of all foreign material with the existing compression seals being ⅜" below the deck surface, before the silicone sealant is installed. A low modulus (Type 5) silicone sealant shall be used. The silicone sealant shall extend 6" up the face of the curb. All materials, labor and equipment required to place the silicone sealant shall be included in the bid item "Silicone Sealant."

930 EXPANSION JOINT STRIP SEAL: The neoprene glands shall be replaced in the expansion joints at the bridge ends. After removing the existing neoprene strip seal, the retaining grooves shall be cleaned of all foreign material and sandblasted before the new strip seal is installed. The glands shall be capable of handling 4 inches of movement. The existing neoprene glands were installed in 1996. The application of any adhesive on the steel extrusion's retaining groove and the strip seal installation shall be performed according to the manufacturer's recommendation. All materials, labor and equipment required to remove and replace the neoprene strip seals shall be included in the bid item "Expansion Joint Strip Seal."

930 DECK SPALL REPAIR: The bridge deck has spall areas as shown at each deck joint. The actual limits of the areas to be repaired shall be determined by the Engineer in the field. The deck spall repair shall be constructed as a Bridge Deck Overlay meeting Section 650 of the NDDOT Standard Specifications with the exception that a mobile mixer will not be required. The minimum depth of removal shall be 2". The perimeter of the repair area shall be saw cut to a depth of 1". The saw cutting and all material, labor and equipment required to remove the concrete and repair the deck spall areas shall be included in the bid item "Deck Spall Repair."



(JOINTS 1 & 8)
JOINT DETAIL A



(JOINTS 2 - 7)
JOINT DETAIL B

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
602	1130	CLASS AE-3 CONCRETE	CY	2.9
612	0115	REINFORCING STEEL-GRADE 60	LBS	638
624	3002	DOUBLE BOX BEAM RAIL RETROFIT - E-RAIL	LF	832.8
764	1990	REMOVE CONCRETE SAFETY SHAPE TRANSITION	EA	2
930	8644	SILICONE SEALANT	LF	246
930	8680	EXPANSION JOINT STRIP SEAL	LF	85
930	9610	DECK SPALL REPAIR	SF	400

This document was originally issued and sealed by Brian W. Raschke, Registration Number PE 4361, on 09/17/08 and the original document is stored at the North Dakota Department of Transportation

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

PEMBINA RIVER BRIDGE
(SOUTHBOUND)
BRIDGE LAYOUT

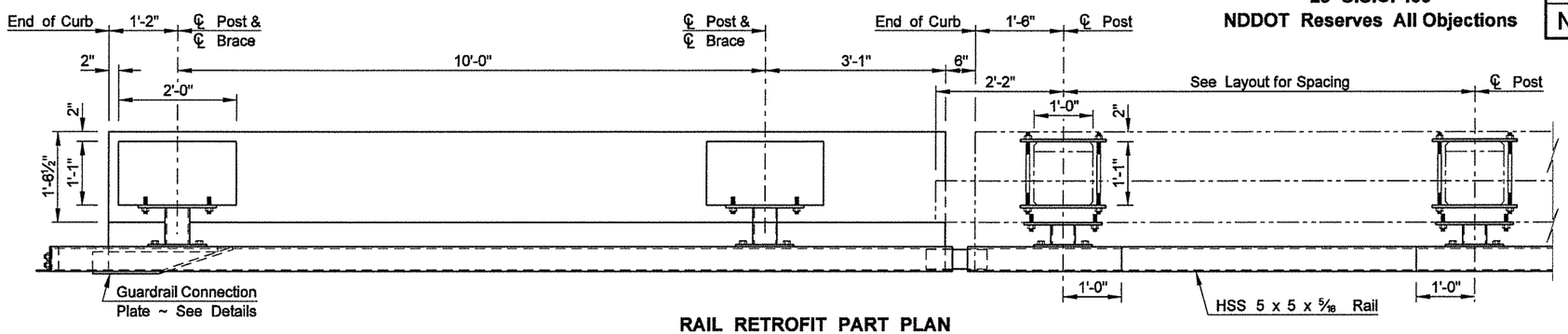
PROJECT: SBI-6-029(063)203

PEMBINA COUNTY

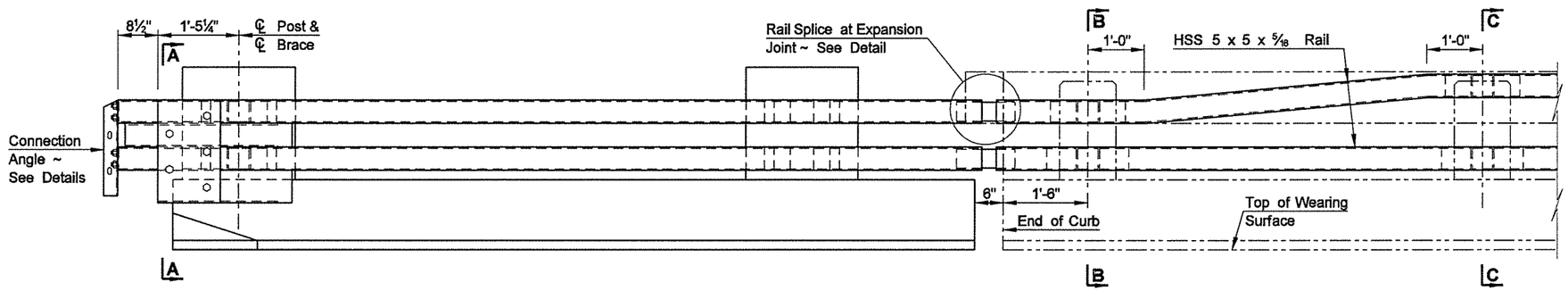
09/17/08 — Terrence R. Udland
DATE — BRIDGE ENGINEER

23 U.S.C. 409
NDDOT Reserves All Objections

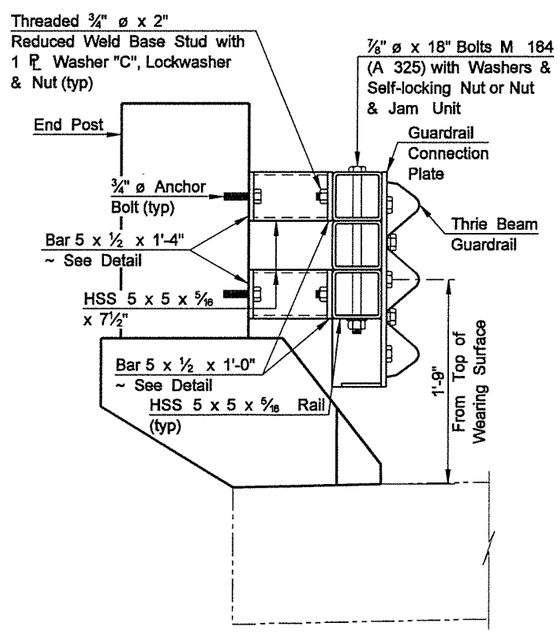
STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	SBI-6-029(063)203	170	4



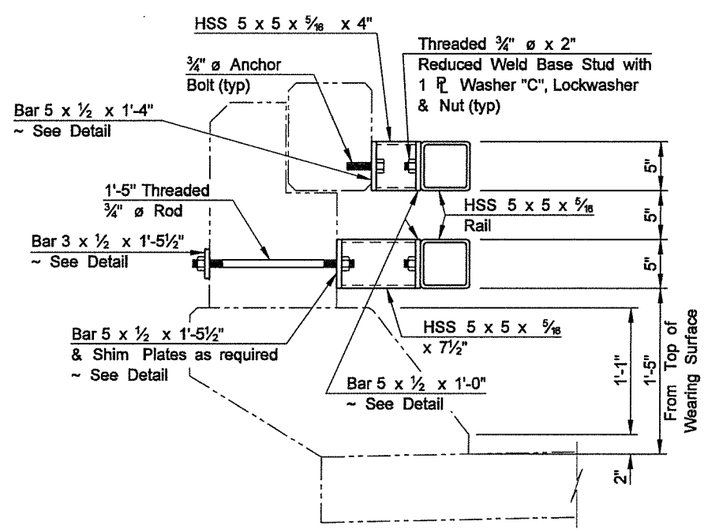
RAIL RETROFIT PART PLAN



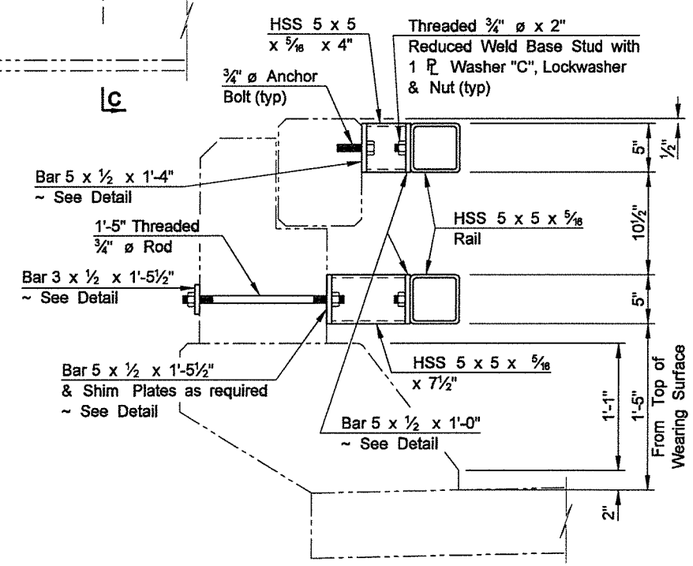
RAIL RETROFIT PART ELEVATION



A-A



B-B



C-C

NOTE:

See Dwg 29-214.223L-4 for notes and details not shown on this drawing.

This document was originally issued and sealed by Brian W. Raschke, Registration Number PE 4361, on 09/17/08 and the original document is stored at the North Dakota Department of Transportation

QUANTITIES

SEE DWG 29-214.223L-4

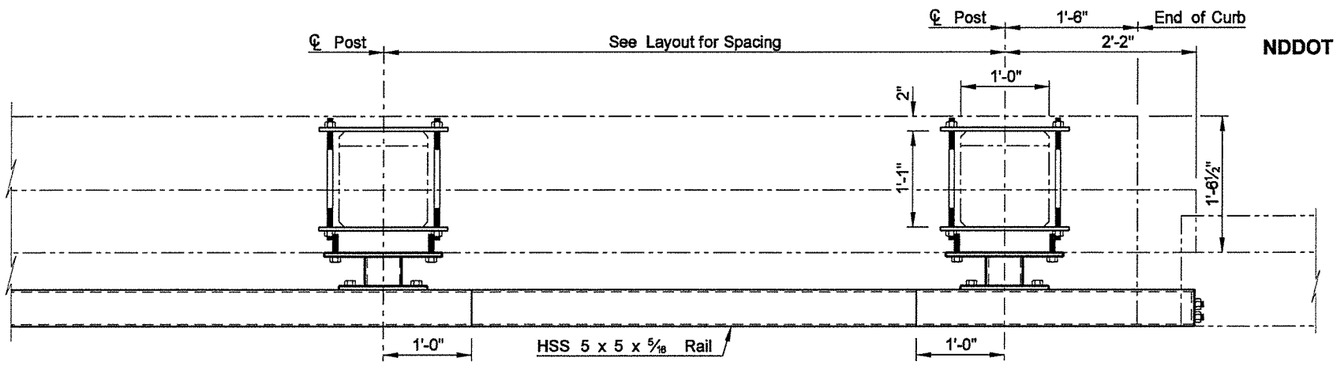
PEMBINA RIVER BRIDGE

(SOUTHBOUND)
(APPROACH END)

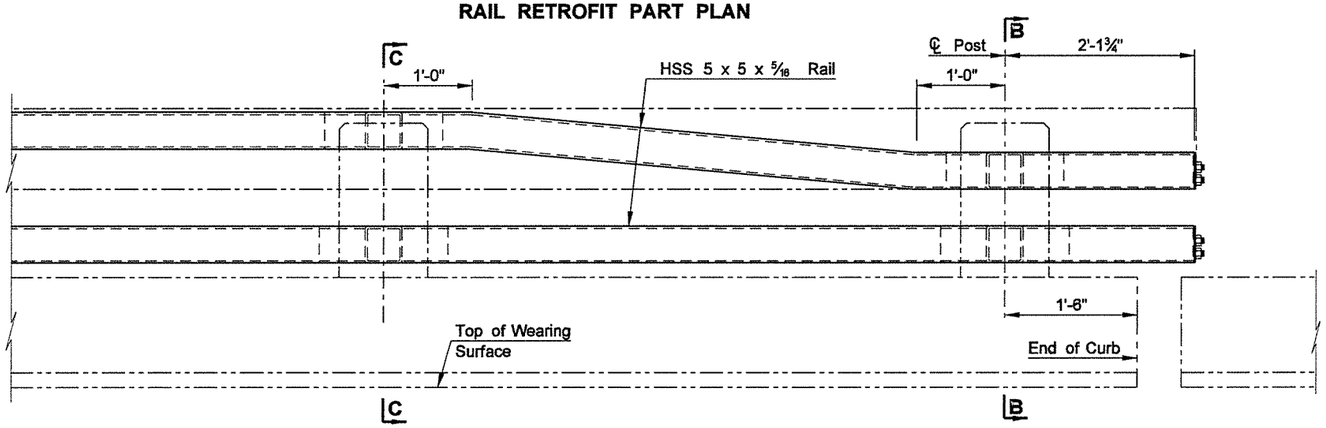
DOUBLE BOX BEAM E-RAIL RETROFIT DETAILS

23 U.S.C. 409
NDDOT Reserves All Objections

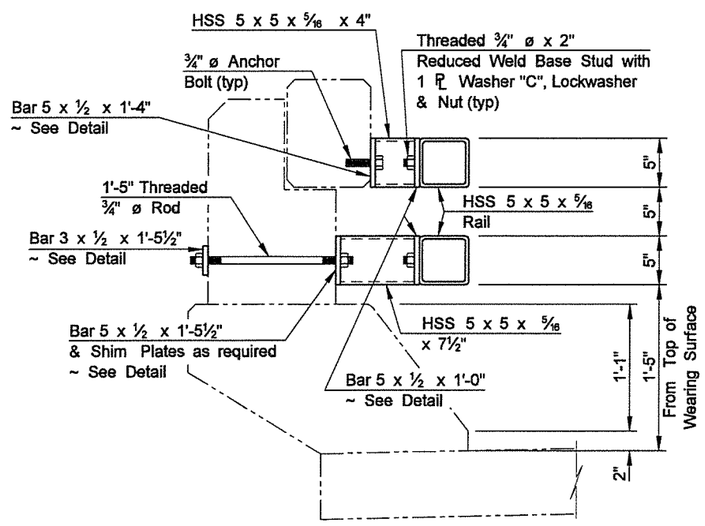
STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	SBI-6-029(063)203	170	5



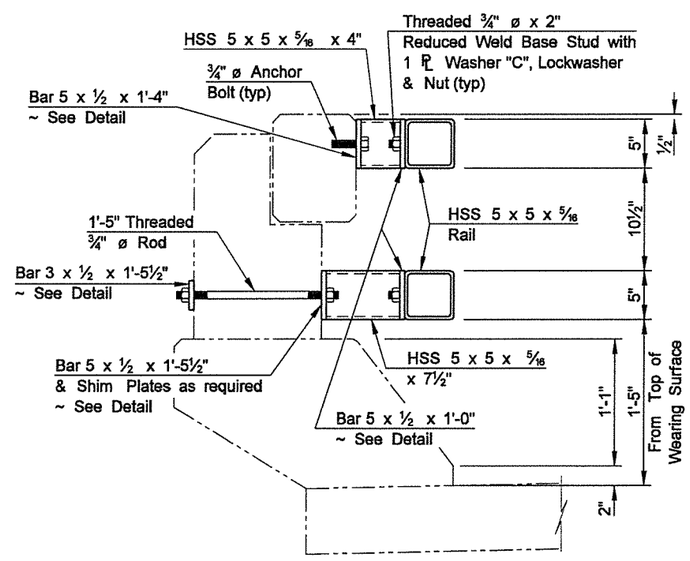
RAIL RETROFIT PART PLAN



RAIL RETROFIT PART ELEVATION



B-B



C-C

NOTE:

See Dwg 29-214.223L-4 for notes and details not shown on this drawing.

This document was originally issued and sealed by Brian W. Raschke, Registration Number PE 4361, on 09/17/08 and the original document is stored at the North Dakota Department of Transportation

QUANTITIES

SEE DWG 29-214.223L-4

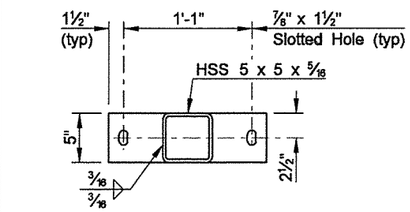
PEMBINA RIVER BRIDGE

(SOUTHBOUND)
(EXIT END)

DOUBLE BOX BEAM
E-RAIL RETROFIT DETAILS

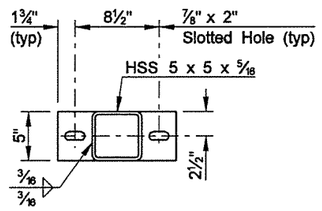
STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	SBI-6-029(063)203	170	6

23 U.S.C. 409
NDDOT Reserves All Objections



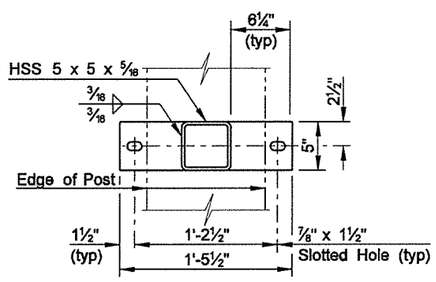
(CONCRETE RAIL CONNECTION)

BAR 5 X ½ X 1'-4" DETAIL



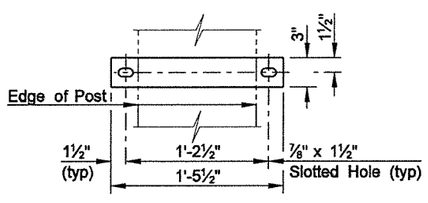
(RAIL CONNECTION)

BAR 5 X ½ X 1'-0" DETAIL



(CONCRETE POST CONNECTION)

BAR 5 X ½ X 1'-5½" DETAIL

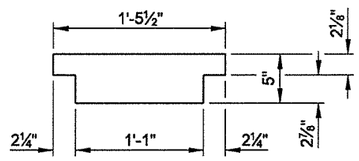


(CONCRETE POST CONNECTION)

BAR 3 X ½ X 1'-5½" DETAIL

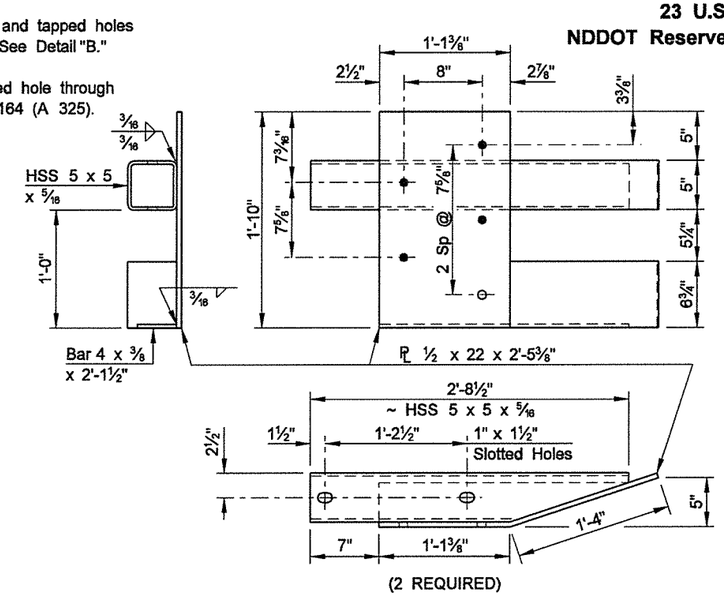
The filled circles indicate drilled and tapped holes for ⅞" ø bolts M 164 (A 325). See Detail "B."

The open circle indicates a drilled hole through the ½" plate for a ⅞" ø bolt M 164 (A 325).



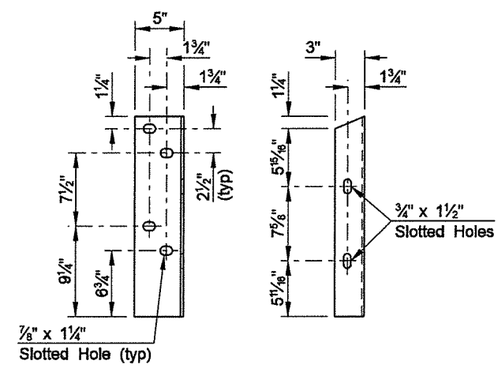
¼" & ⅛" Thickness
Quantity determined in field.

SHIM PLATE DETAIL



(2 REQUIRED)

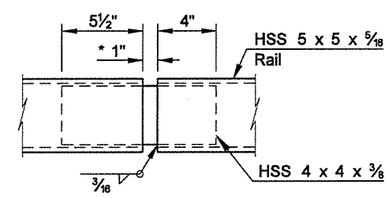
GUARDRAIL CONNECTION PLATE DETAILS



L5 X 3 X ¼ X 1'-8½"

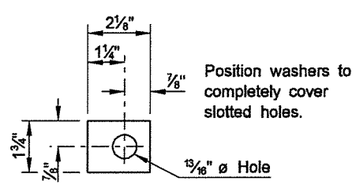
(2 REQUIRED)

CONNECTION ANGLE DETAILS



* 3" at expansion joints at bridge ends.

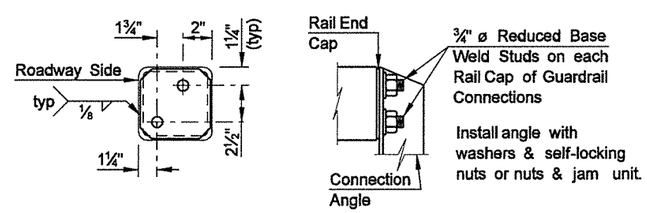
RAIL SPLICE DETAIL



Position washers to completely cover slotted holes.

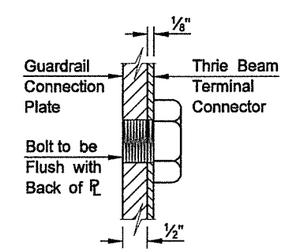
(¼" PL AASHTO M 270 GRADE 36)

PL WASHER "C"



Rail cap shall be a Bar 4¾ x ⅜ x 4¾".
Cope corners 1" to provide zinc drains.

RAIL CAP DETAILS



DETAIL "B"

NOTES:

The bid item shall be "Double Box Beam Rail Retrofit - E-Rail." The pay length shall be end to end and in linear feet.

Rail elements shall be square structural tubing in accordance with ASTM Specification A 500 Grade B.

Steel plates and angles shall conform to AASHTO Specification M 270 Grade 36, unless otherwise noted.

Railing shall be fabricated to the horizontal and vertical alignment of the structure.

Payment for the railing shall include compensation for furnishing and installing the guardrail connection plates.

All structural steel shall be hot-dip galvanized after fabrication according to AASHTO M 111.

Rails shall be fabricated so that each rail segment between splices is attached to a minimum of two posts.

The threaded rods shall be M 270 Grade 36 Steel and galvanized according to M 232. The threaded rods shall be tightened to provide a minimum tensile force of 2,500 lbs and a maximum tensile force of 2,700 lbs.

The anchor bolts shall be embedded into the concrete with a chemical adhesive system that can develop a tensile strength of at least 17,500 lbs.

All anchor and splice bolts shall be AASHTO M 164 (A 325) and shall be galvanized according to M 232.

The Contractor shall field verify all dimensions and incorporate them into the shop drawings. The double box beam rail retrofit shop drawings shall be submitted for review to the Engineer before fabrication.

This document was originally issued and sealed by Brian W. Raschke, Registration Number PE 4361, on 09/17/08 and the original document is stored at the North Dakota Department of Transportation

QUANTITIES

E-RAIL RETROFIT	832.8 LF

PEMBINA RIVER BRIDGE

(SOUTHBOUND)

DOUBLE BOX BEAM E-RAIL RETROFIT DETAILS

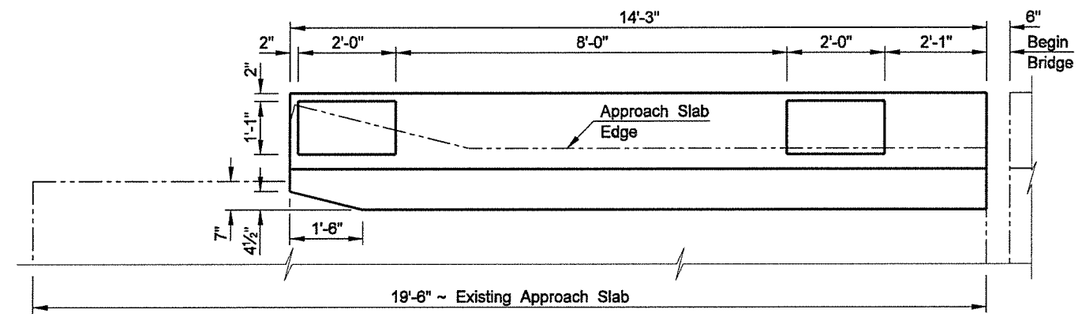
BILL OF REINFORCING STEEL, GRADE 60

LETTER PREFIX OF BAR MARK DENOTES SHAPE ~ SEE BAR DETAILS

LOCATION	SIZE	MARK	NO. EACH /SET	NOMINAL LENGTH	DETAILING DIMENSIONS a	b	c	d	e	f	g	h	k	m
APPROACH CURBS & POSTS	5	A500	10	14'-0"		14'-0"								
	6	A501	2	14'-0"		14'-0"								
	5	D500	16	3'-6"		2'-4"	1'-2"					12	7.4	
	6	D501	24	3'-3"		2'-1"	1'-2"					9.2	12	
	5	F500	42	4'-9"			1'-3"	1'-1"	1'-7"	2.75"	10"	12	7.4	9.2
	4	N500	16	6'-2"	10"	1'-9"	6"					0	12	

23 U.S.C. 409
NDDOT Reserves All Objections

STATE	PROJECT NUMBER	SECTION NO.	SHEET NO.
ND	SBI-6-029(063)203	170	7

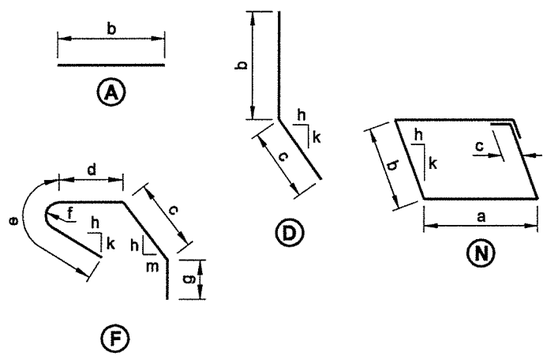


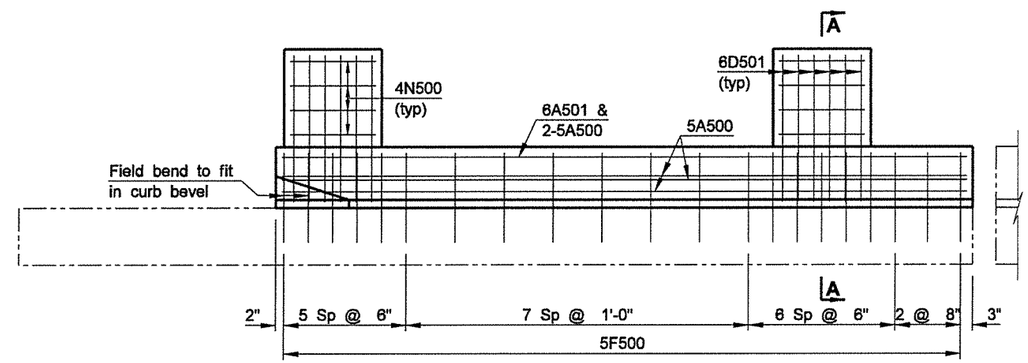
(SHOWING DIMENSIONS)

CONCRETE CURB & POSTS PLAN

NOTES:

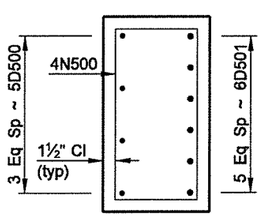
1. Fabrication and tolerances shall be in accordance with the CRSI Manual of Standard Practice.
2. All dimensions are out to out of bars.
3. Nominal length of each bent bar or cut bar is the sum total of the detailing dimensions for that bar, unless otherwise noted.
4. The "f" dimension indicates the inside radius unless otherwise noted.
5. The 5F500 bars shall be embedded into the concrete with a chemical adhesive system. The "g" dimension of the 5F500 bar is based on the embedment shown. The actual "g" dimension shall be based on embedment according to the chemical adhesive manufacturer's recommendations.



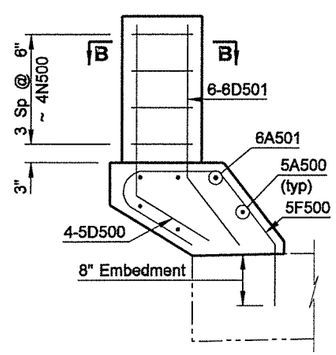


(SHOWING REINFORCING)

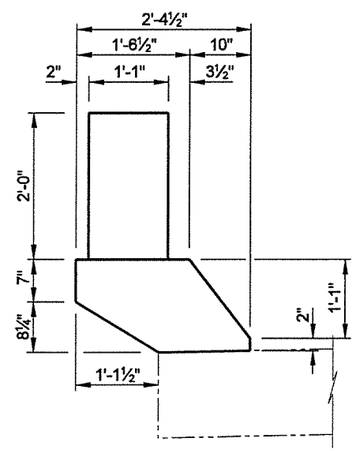
CONCRETE CURB & POSTS ELEVATION



B-B



SHOWING REINFORCING



SHOWING DIMENSIONS

A-A

This document was originally issued and sealed by Brian W. Raschke, Registration Number PE 4361, on 09/17/08 and the original document is stored at the North Dakota Department of Transportation

QUANTITIES	
CLASS AE-3 CONCRETE	2.9 CY
REINFORCING STEEL	638 LBS

PEMBINA RIVER BRIDGE

(SOUTHBOUND)
(APPROACH END)

REINFORCING BAR LIST & CONCRETE CURB & POST DETAILS

29-214,223 L

STATE	PROJECT NO.	PCN	SHEET NO.
ND	AC-SIM-SS-9-999(178)	15780	1

JOB# 16

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

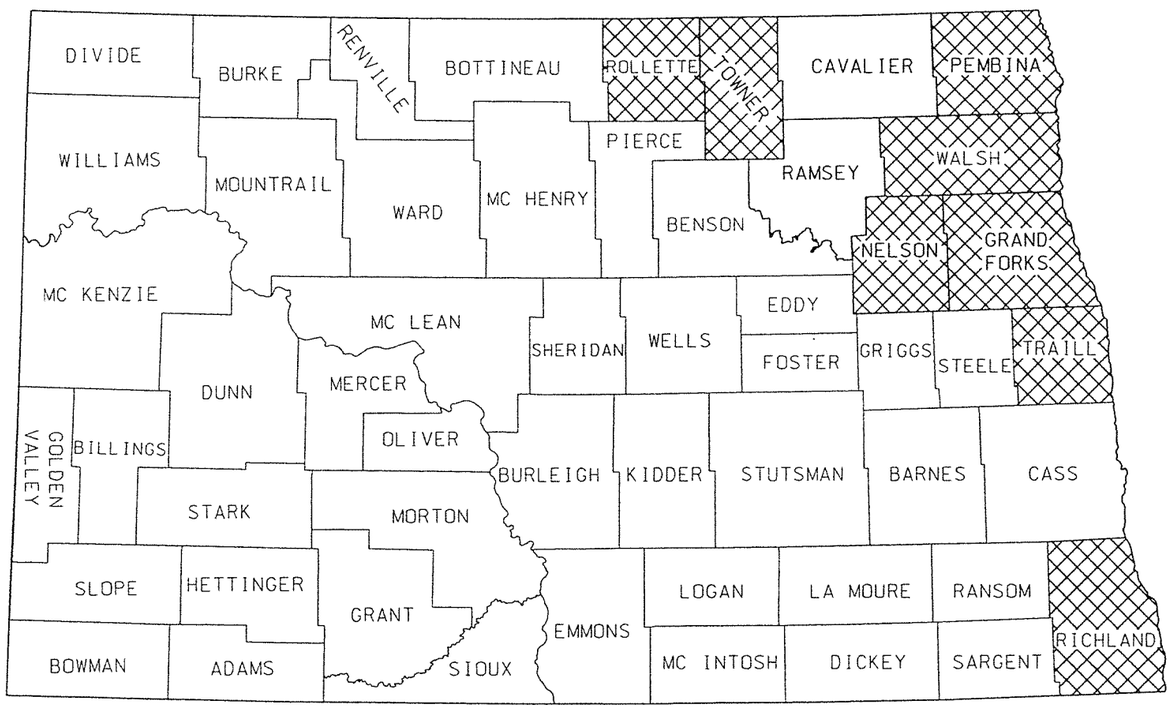
STATEWIDE

AC-SIM-SS-9-999(178)

MAINTENANCE REPAIR WORK ON TWENTY SITES THROUGHOUT THE STATE

GOVERNING SPECIFICATIONS:

Standard Specifications adopted by the North Dakota Department of Transportation October 2002; Standard Drawings currently in effect; and other Contract Provisions submitted herein.



STATE COUNTY MAP

INDEX OF DRAWINGS

SHEET NO.	DESCRIPTION	SITE NUMBER
1	TITLE SHEET	ALL
2	SITE LOCATIONS	ALL
3	ESTIMATE OF QUANTITIES	ALL
4	TRAFFIC CONTROL	ALL
5	EMBANKMENT REPAIR & RIPRAP	1
6	CONCRETE SLOPE PROTECTION REPAIR & FLOWABLE FILL PLACEMENT	2
7	MUD JACKING APPROACH SLABS	3
8	BOX CULVERT JOINT REPAIR	4
9	BOX CULVERT JOINT REPAIR	5
10	BOX CULVERT JOINT REPAIR	6
11	RIPRAP	7
12	RIPRAP	8
13	BOX CULVERT JOINT REPAIR	9
14	CONCRETE SLOPE PROTECTION REPAIR	10
15	CONCRETE SLOPE PROTECTION REPAIR & JOINT TREATMENT	11
16	CONCRETE SLOPE PROTECTION REPAIR & JOINT TREATMENT	12
17	CONCRETE SLOPE PROTECTION REPAIR	13
18	ABUTMENT PEDESTAL REPAIR	14
19	CONCRETE SLOPE PROTECTION REPAIR	15
20	EXPANSION JOINT REPAIR	16
21	EXPANSION JOINT REPAIR	17
22	RIPRAP	18
23	BOX CULVERT JOINT REPAIR	19
24-25	BOX CULVERT SPALL & JOINT REPAIR	20
26-27	TRAFFIC CONTROL DEVICES LIST	ALL

LIST OF STANDARD DRAWINGS

D-704-8	BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS
D-704-9, 10, 11, 12	CONSTRUCTION SIGN DETAILS
D-704-14	CONSTRUCTION SIGN AND BARRICADE ASSEMBLY DETAILS
D-704-24	CONSTRUCTION SIGN AND BARRICADE LOCATION DETAILS
D-704-35	SIGN LAYOUT FOR ONE LANE CLOSURE - INTERSTATE SYSTEM
D-708-1	STANDARD SLOPE PROTECTION UNDER BRIDGES

NOTE: STANDARD DRAWINGS ARE INCLUDED IN THE BACK OF THE PLANS

APPROVED DATE 4/28/04

DIRECTOR,
OFFICE OF PROJECT DEVELOPMENT
ND DEPARTMENT OF TRANSPORTATION

I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of ND.

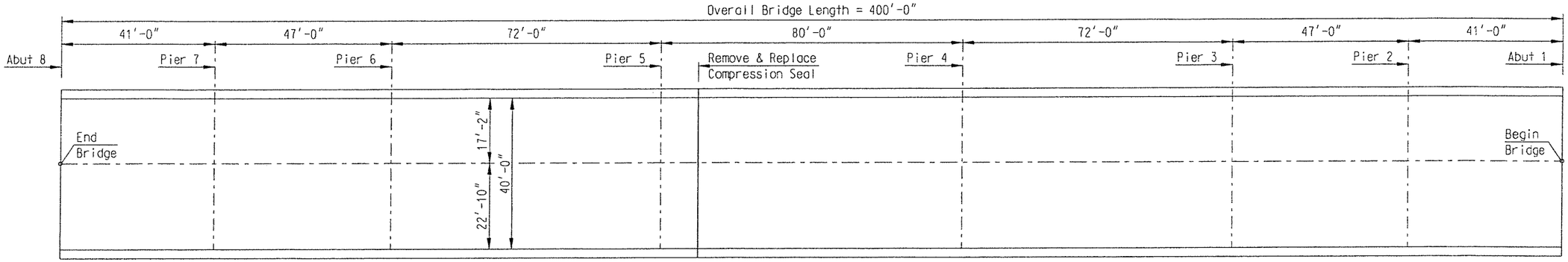
APPROVED DATE 4-28-04

BRIDGE ENGINEER
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

TERRENCE R. UDLAND REGISTERED PROFESSIONAL ENGINEER 2674 NORTH DAKOTA

TITLE 04DDF014 RAR

STATE	PROJECT NUMBER	SHEET NO.
ND	SIM-9-999(178)	21



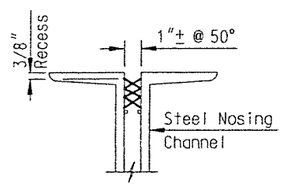
PLAN

NOTES:

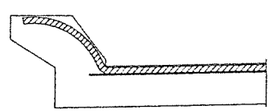
100 SCOPE OF WORK: The work at this site consists of replacing compression seal in the joint near pier 5.

100 EXPANSION JOINT MODIFICATION: After removing the failed compression seals, the expansion joints shall be cleaned of all foreign material and pressure washed before any new compression seals are installed. The application of any adhesive on the nosing channels shall be performed according to the manufacturer's recommendation. All materials, labor and equipment required to remove and replace the compression seal shall be included in the bid item "Expansion Joint Modification."

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
950	8673	EXPANSION JOINT MODIFICATION	LF	43



COMPRESSION SEAL DETAIL



COMPRESSION SEAL AT CURB

PEMBINA RIVER

EXPANSION JOINT REPAIR

PEMBINA COUNTY

FHWA REGION	STATE	PROJECT NO.	SHEET NO.
8	N.D.	SNH-6-999(003)	1

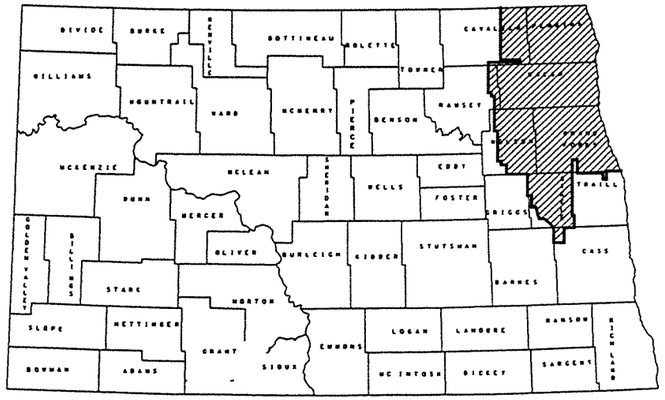
JOB # 15

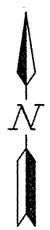
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

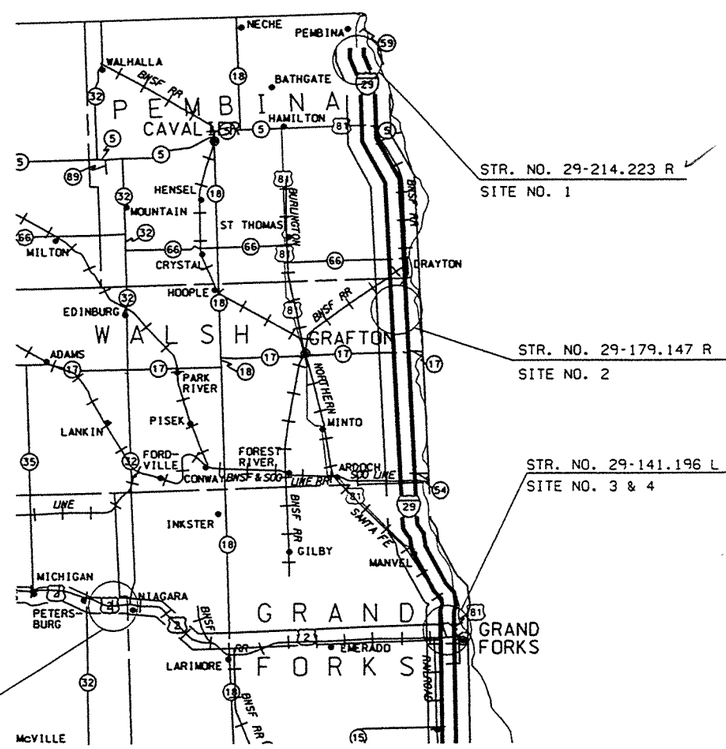
GRAND FORKS DISTRICT

SNH-6-999(003)

PROJECT SNH-6-999(003) CONSISTS OF REPAIRING EXPANSION JOINT STRIP SEALS AND EROSION CONTROL







GRAND FORKS DISTRICT

GOVERNING SPECIFICATIONS

STANDARD SPECIFICATIONS ADOPTED BY THE NORTH DAKOTA DEPARTMENT OF TRANSPORTATION OCTOBER 1997. STANDARD DRAWINGS CURRENTLY IN EFFECT, AND OTHER CONTRACT PROVISIONS SUBMITTED HEREIN.

INDEX OF DRAWINGS

SHEET NO.	DESCRIPTION
1	TITLE SHEET
2	ESTIMATE OF QUANTITIES
3	NOTES & SCOPE OF WORK
4	EXPANSION JOINT MODIFICATION DETAILS
5	EROSION CONTROL DETAILS

STANDARD DRAWINGS

D-704-8	BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS
D-704-9	CONSTRUCTION SIGN DETAIL
D-704-10	CONSTRUCTION SIGN DETAIL
D-704-11	CONSTRUCTION SIGN DETAIL
D-704-12	CONSTRUCTION SIGN DETAIL
D-704-13	CONSTRUCTION SIGN DETAIL
D-704-14	CONSTRUCTION SIGN AND BARRICADE ASSEMBLY DETAIL
D-704-33	SIGN LAYOUT FOR ONE LANE CLOSURE
D-704-34	SIGN LAYOUT FOR ONE LANE CLOSURE
D-704-35	SIGN LAYOUT FOR ONE LANE CLOSURE INTERSTATE SYSTEM

APPROVED	TERRENCE R. UDLAND REGISTERED PROFESSIONAL PE 2674 ENGINEER NORTH DAKOTA	APPROVED DATE 5-24-99 David K. O'Leary P.E. 1199
5-24-99 DATE	BRIDGE ENGINEER	DIRECTOR OF HIGHWAYS & ENGINEERING NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

ESTIMATE OF QUANTITIES

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	SNH-6-999(003)	2

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
103	0100	CONTRACT BOND	L SUM	1	1
602	1130	CLASS AE-3 CONCRETE	CY	4	4
702	0100	MOBILIZATION	L SUM	1	1
704	1100	TRAFFIC CONTROL	L SUM	1	1
708	5810	CONCRETE EROSION CONTROL BLANKET	SY	191.1	191.1
930	8673	EXPANSION JOINT MODIFICATION-STRIP SEAL	LF	287	287

FHWA REGION	STATE	FEDERAL AID PROJECT NUMBER	SHEET NO.
8	ND	SNH-6-999(003)	3

100 SCOPE OF WORK: This project includes structural repair work on five bridges in the Grand Forks District. The type of repair required, type of traffic control and estimated quantities is listed in the table shown below. The work shall be done on one-half of the roadway at a time.

602 CLASS AE-3 CONCRETE: High-early-strength concrete shall be used.

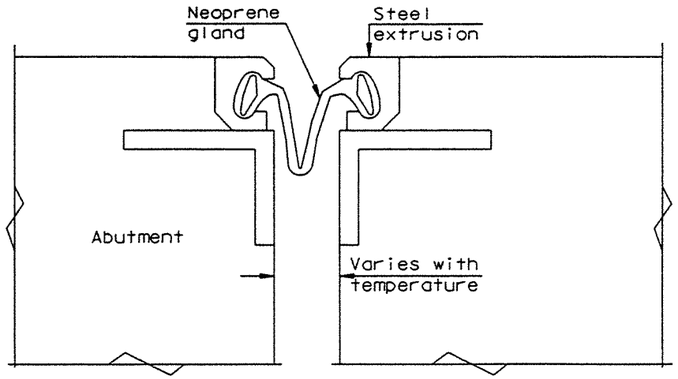
704 TRAFFIC CONTROL: The type of traffic control shall be that shown in the table below. Traffic control for all sites shall be set up only while work is going on at that site during daylight hours with the exception of Br. No. 2-313.200 L. which can be set up for an extended period. The traffic control shall be removed and normal traffic operations restored at the end of each work day, with the exception of Br. No. 2-313.200 L as noted above. All materials, labor, and equipment necessary to set up and take down the traffic control at all five sites shall be included in the lump sum bid item "Traffic Control".

708 CONCRETE EROSION CONTROL BLANKET: The concrete erosion control blanket shall have a minimum weight equal to 40 psf and have filter fabric attached. The earth work, filter fabric, removal of the existing metal flumes, and other material necessary to complete the work shall be incidental to bid item "Concrete Erosion Control Blanket". See Erosion Control Details sheet for concrete erosion control installations.

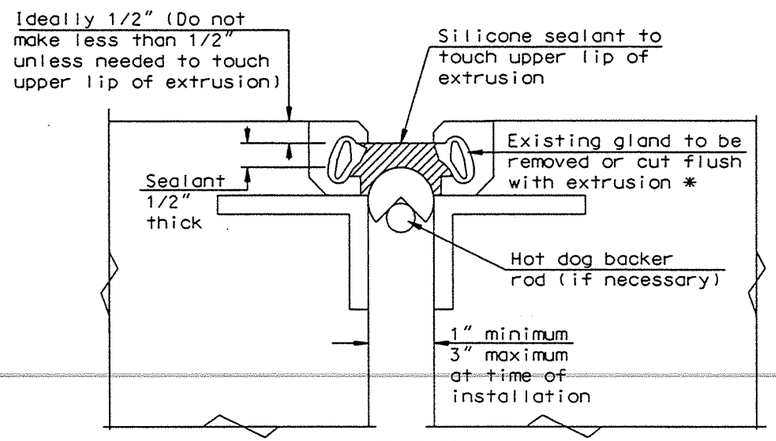
930 EXPANSION JOINT MODIFICATION-STRIP SEAL: See Expansion Joint Modification-Strip Seal details sheet for expansion joint modification.

					QUANTITIES				
SITE	BRIDGE NO.	LOCATION OR BRIDGE NAME	TYPE OF REPAIR	TYPE OF TRAFFIC CONTROL	EXPANSION JOINT MODIFICATION STRIP SEAL (LF)	CONCRETE EROSION CONTROL BLANKET (SY)		CONCRETE CY	REMARKS
1	29-214.223 R	Pembina River	Strip Seal	D-704-35	31				South Joint
2	29-179.147 R	Park River	Strip Seal	D-704-35	98				Span 2 & 4
3	29-141.196 L	US 2/I-29 Inter.	Strip Seal	D-704-35	48				North Joint
4	29-141.196 R	US 2/I-29 Inter.	Strip Seal	D-704-35	78				Pier 2 & 5
5	2-313.200 L	BNRR Overhead	Strip Seal & Drainage Erosion Control	D-704-33 D-704-34	32	191.1		4	
				TOTAL	287	191.1		4	

FHWA REGION	STATE	FEDERAL AID PROJECT NUMBER	SHEET NO.
8	ND	SNH-6-999(003)	4



EXISTING



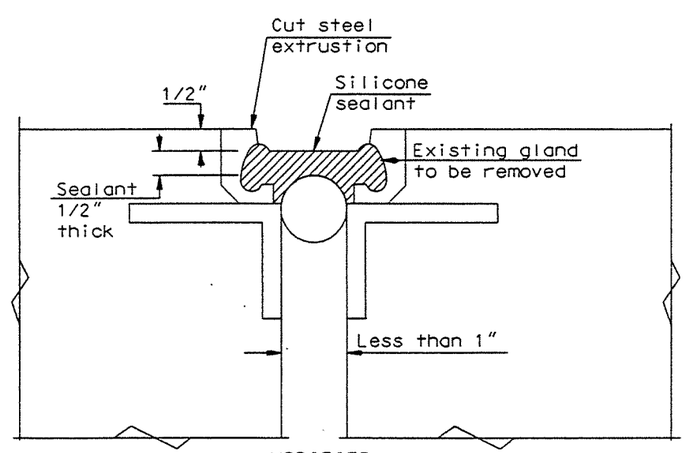
MODIFIED

STRIP SEAL JOINT MODIFICATION

(If opening is 1" to 3")

* If gland is removed the channel shall be filled with sealant

930 EXPANSION JOINT MODIFICATION: The neoprene gland shall be removed or cut flush with the extrusion. If, at the time of installation, the gap is less than 1", the lips of the steel extrusion shall be cut off and the entire gland shall be removed. The surfaces that will come in contact with the silicone sealant will be cleaned by sand blasting. The surfaces will then have a zinc-based primer applied. The Contractor shall use primer for galvanized steel that is recommended by the silicone sealant manufacturer. The backer rod and silicone sealant will be installed according to the manufacturer's recommendation. The silicone sealant shall be a rapid cure, self leveling, cold applied, two component silicone sealant that will bond to and be compatible with the properly prepared steel. All materials, labor and equipment necessary to remove or cut the gland, prepare the surfaces and install the silcione sealant and backer rod shall be included in the bid item "Expansion Joint Modification-Strip Seal".



MODIFIED

STRIP SEAL JOINT MODIFICATION

(If opening is less than 1")

EXPANSION JOINT MODIFICATION STRIP SEAL

DESIGN DATA						
Traffic	Average Daily					Est.Max.Hr.
Current 1996	Pass.	990	Trucks	250	Total 1240	225
Forecast 2016	Pass.	1485	Trucks	375	Total 1860	340
Minimum Sight Dist. for: Stopping 1050'	Design Speed 70 MPH					
Full control of access No point of access other than at Interchange Ramps						

JOB# 13

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

IN PEMBINA COUNTY

FEDERAL AID PROJECT NO. IM-6-029(021)197

GRINDING, CPR & HBP OVERLAY (SOUTH BOUND)

FHWA REGION	STATE	PROJECT NO.	SHEET NO.
8	ND	IM-6-029(021)197	1

GOVERNING SPECIFICATIONS:

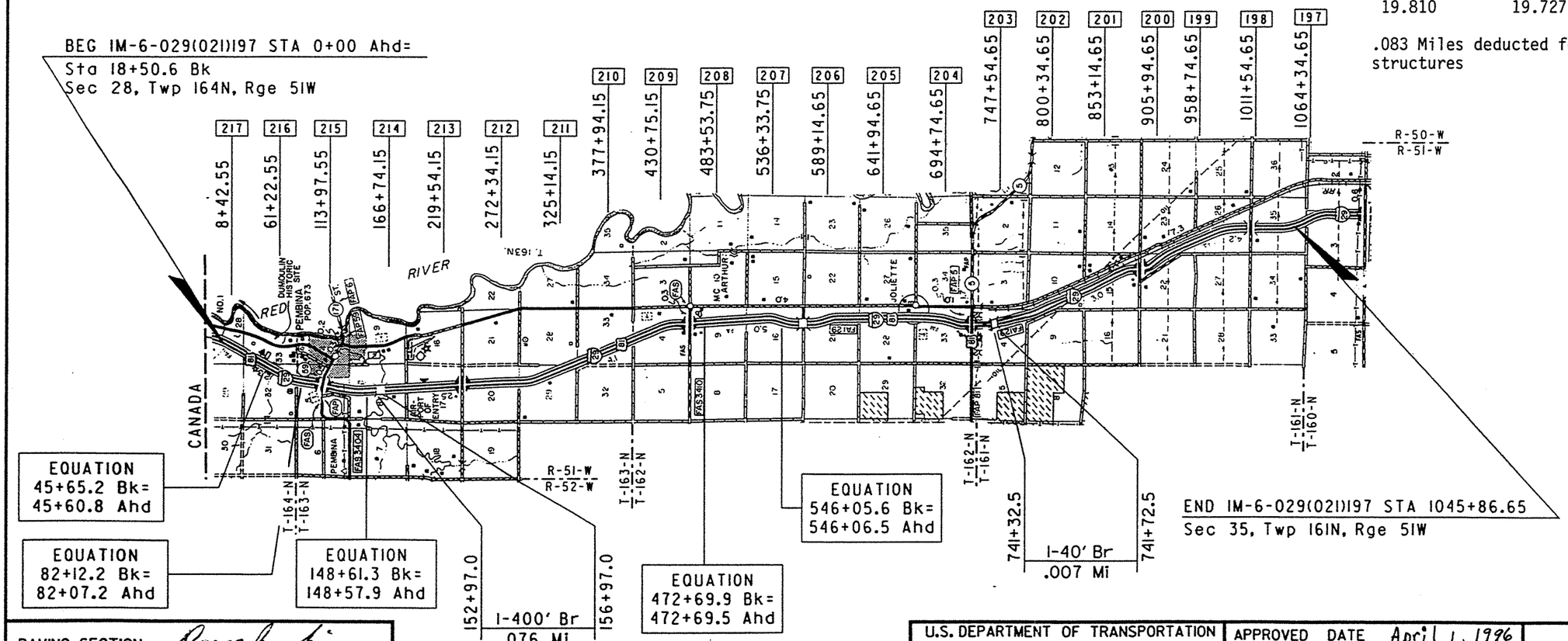
Standard Specifications adopted by the North Dakota Department of Transportation September 1992; Standard Drawings currently in effect; and other Contract Provisions submitted herein.

LENGTH OF PROJECT

Miles-Gross	Miles-Net
19.810	19.727

.083 Miles deducted for structures

BEG IM-6-029(021)197 STA 0+00 Ahd=
Sta 18+50.6 Bk
Sec 28, Twp 164N, Rge 51W



END IM-6-029(021)197 STA 1045+86.65
Sec 35, Twp 161N, Rge 51W

PAVING SECTION Dave Jenkins
URBAN SECTION
TRAFFIC SECTION Douglas A. Schumacher
RURAL SECTION
RECOMMEND APPROVAL 4/1 1996
DESIGN ENGINEER David O. Baer

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED

DIVISION ADMINISTRATOR DATE

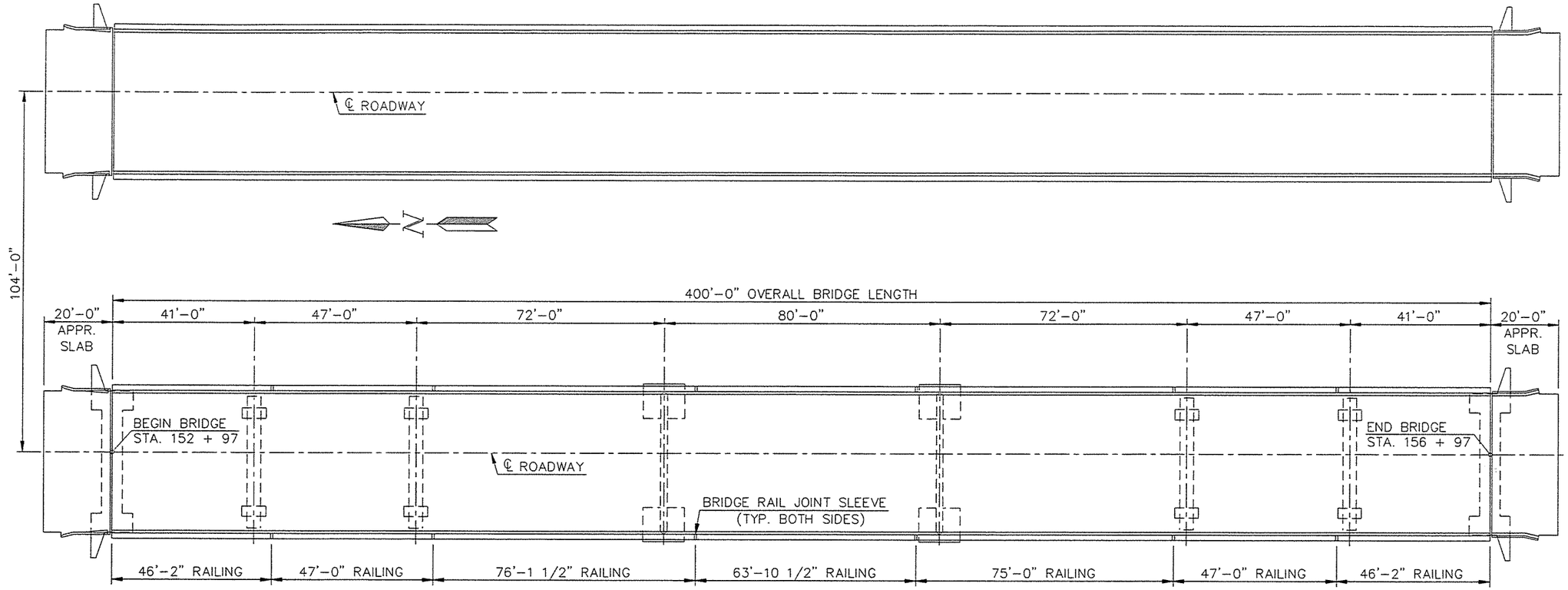
APPROVED DATE April 1, 1996

Ray Zink
DIRECTOR OF HIGHWAYS AND ENGINEERING
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

RAY ZINK REGISTERED PROFESSIONAL ENGINEER P.E. 972 NORTH DAKOTA

c:\davjen\96dej001.dgn Mar. 08, 1996 10:38:26

FHWA REGION	STATE	FED. AID PROJECT NUMBER	SHEET NO.
8	N.D.	IM-6-029(021)197	81



PLAN

SCOPE OF WORK:

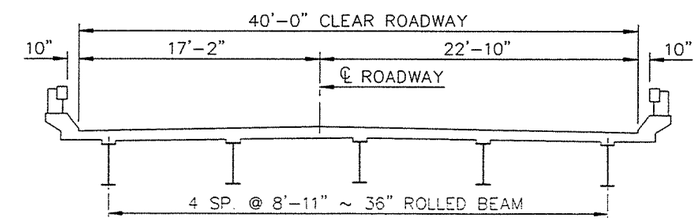
THE WORK ON THIS PROJECT IS ONLY FOR THE LEFT OR SOUTHBOUND BRIDGE. THE WORK INVOLVES REMOVING AND REPLACING THE APPROACH SLABS, REMOVING AND REPLACING THE END BEAMS THAT SUPPORT THE APPROACH SLABS AND INSTALLING BRIDGE RAIL JOINT SLEEVES. THE WORK SHALL BE DONE IN STAGES SEPARATED BY THE CENTERLINE ROADWAY.

STEEL:

BEFORE THE NEW CONCRETE FOR THE END BEAMS ARE PLACED, THE EXISTING REINFORCING STEEL AND STRUCTURAL STEEL SHALL BE CLEANED (REMOVE RUST). ANY REINFORCING STEEL DAMAGED OR RUSTED TO AN EXTENT THAT IT IS NO LONGER EFFECTIVE IN THE OPINION OF THE ENGINEER SHALL BE REPLACED. THE COST TO CLEAN AND/OR REPLACE THE REINFORCING STEEL AND STRUCTURAL STEEL SHALL BE INCIDENTAL TO THE BID ITEM "CLASS AE-3 CONCRETE".

EXPANSION JOINT MODIFICATION:

THE "EXPANSION JOINT MODIFICATION" INCLUDES REMOVING THE EXISTING STEEL EXTRUSION FROM THE EXISTING APPROACH SLABS, WELDING THEM ON THE NEW APPROACH SLAB BEARING AND SUPPLING AND INSTALLING A NEW NEOPRENE STRIP SEAL GLAND. THIS GLAND SHALL BE LARGE ENOUGH FOR FOUR INCHES OF MOVEMENT.



DECK SECTION

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
202	0113	REMOVAL OF CONCRETE	CU. YD.	3.4
550	0217	CONCRETE BRIDGE APPROACH SLAB (REMOVE AND REPLACE)	SQ. YD.	183.3
602	1130	CLASS AE-3 CONCRETE	CU. YD.	3.4
616	0362	STRUCTURAL STEEL M-183	LBS.	3,412
930	8673	EXPANSION JOINT MODIFICATION (STRIP SEAL)	L. FT.	85

STEVEN J. MILLER
REGISTERED PROFESSIONAL ENGINEER
1360
NORTH DAKOTA

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

PEMBINA RIVER

BRIDGE LAYOUT

PROJECT: IM-6-029(021)197
STATION 154 + 97

PEMBINA COUNTY

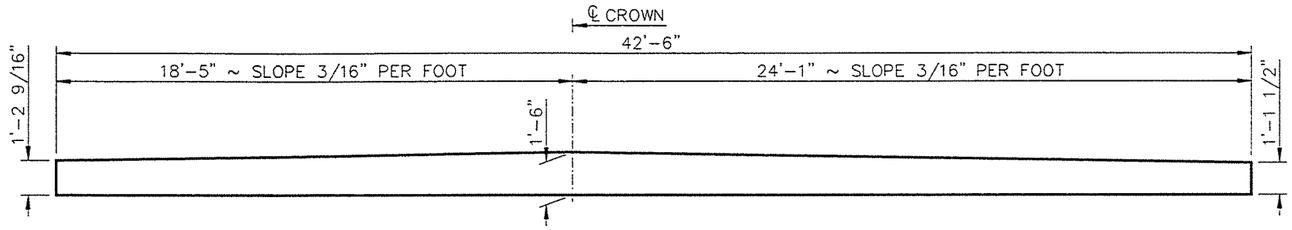
DATE — BRIDGE ENGINEER

95DLS38 JT

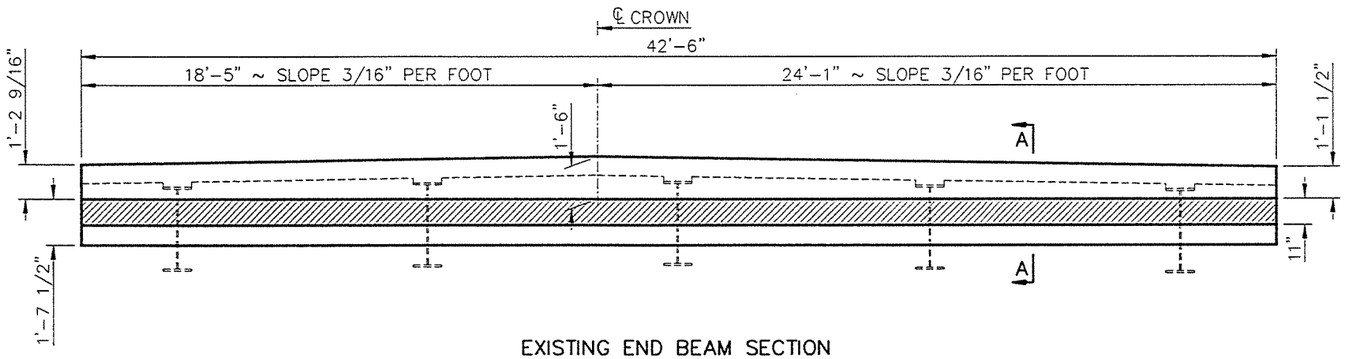
c:\win32app\ustation\out\dgn\95dls Mar. 20, 1996 15:13:57

29-214.223L

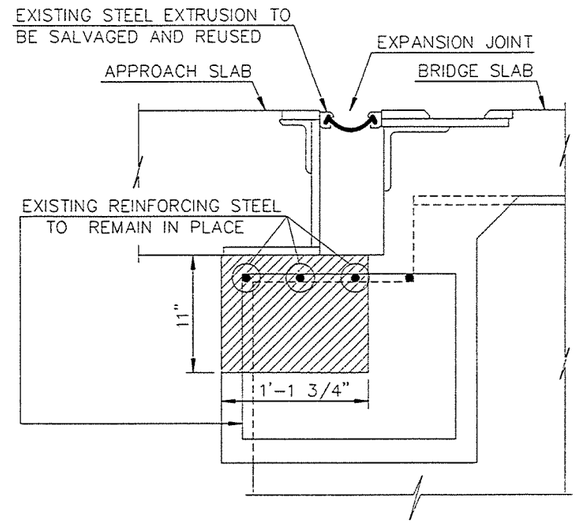
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IM-6-029(0212)197	82



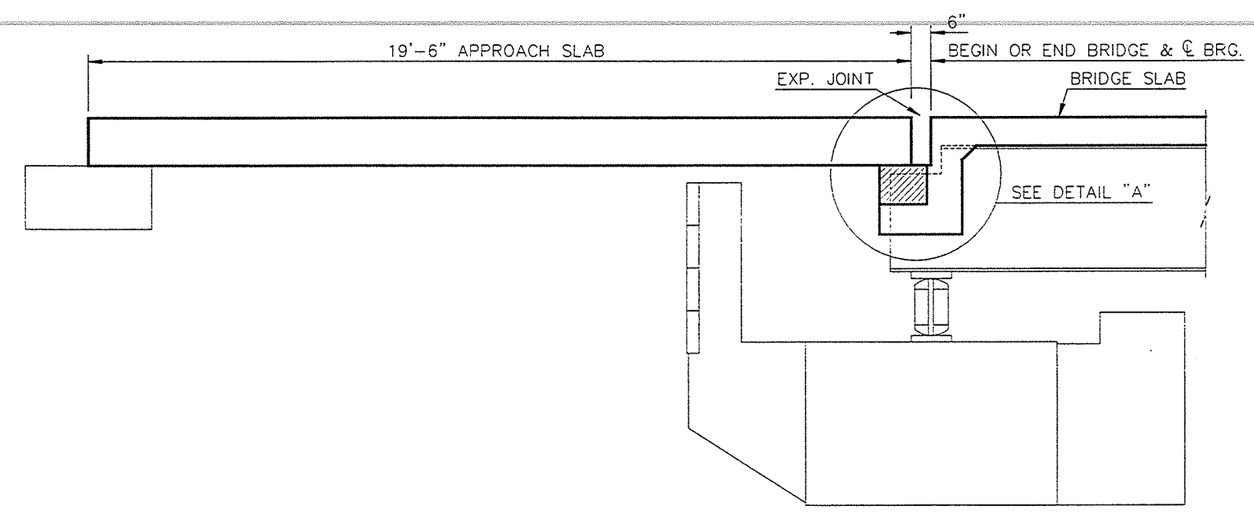
EXISTING APPROACH SLAB SECTION



EXISTING END BEAM SECTION



DETAIL A



A-A

INDICATES CONCRETE TO BE REMOVED.

NOTE:

CARE SHALL BE TAKEN TO ENSURE NO DAMAGE IS DONE TO THE EXISTING REINFORCING STEEL DURING REMOVAL OF CONCRETE.

QUANTITIES	(ONE END)
REMOVAL OF CONCRETE	1.7 C.Y.

PEMBINA RIVER

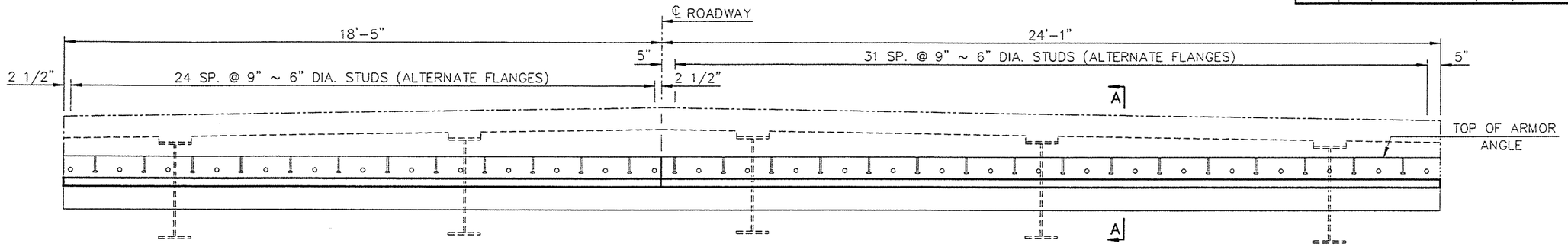
END BEAM
CONCRETE REMOVAL DETAILS

JT

29-214.223L-1

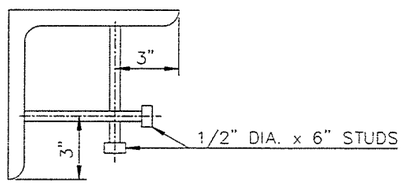
c:\ustation\out\dgn\95dls32.dgn Dec. 27, 1995 07:48:05

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IM-6-029(0212)197	83

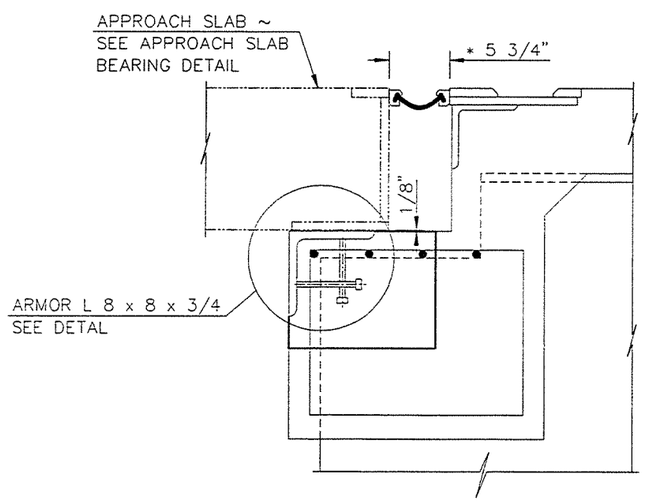


(SHOWING 6" STUD PLACEMENT ON ARMOR ANGLE)

END BEAM SECTION

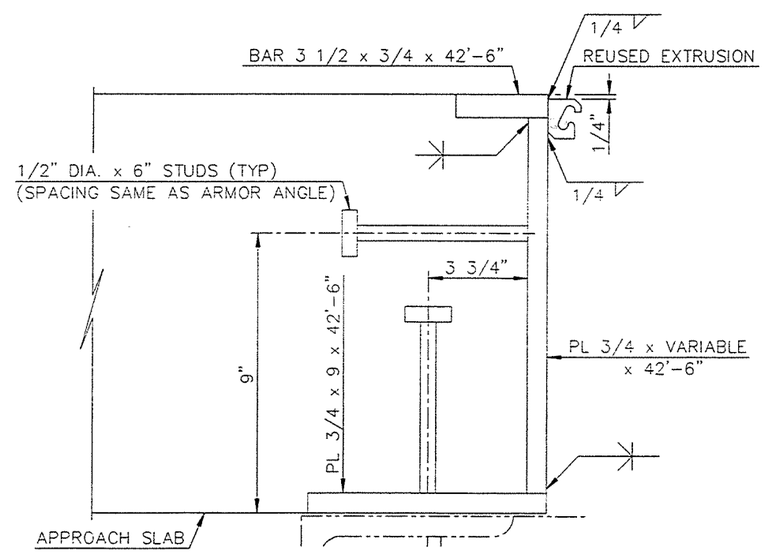


ARMOR ANGLE 8 x 8 x 3/4 DETAIL



(SHOWING END BEAM MODIFICATION)

A-A



APPROACH SLAB BEARING DETAIL

NOTE:

* 5 3/4" @ 50° F.

THE ARMOR ANGLE AND THE STUDS FOR THE ARMOR ANGLE USED IN THE MODIFICATION OF THE END BEAMS SHALL BE THE BID ITEM "STRUCTURAL STEEL M-183".

THE 3/4" PLATES, BAR, STUDS, AND LABOR TO FABRICATE AND INSTALL THE APPROACH SLAB BEARING SHALL BE CONSIDERED INCIDENTAL TO THE BID ITEM "CONCRETE BRIDGE APPROACH SLAB (REMOVE AND REPLACE)".

QUANTITIES	(ONE END)
CLASS AE-3 CONCRETE	1.7 C.Y.
STRUCTURAL STEEL M-183	1706 LBS.

PEMBINA RIVER

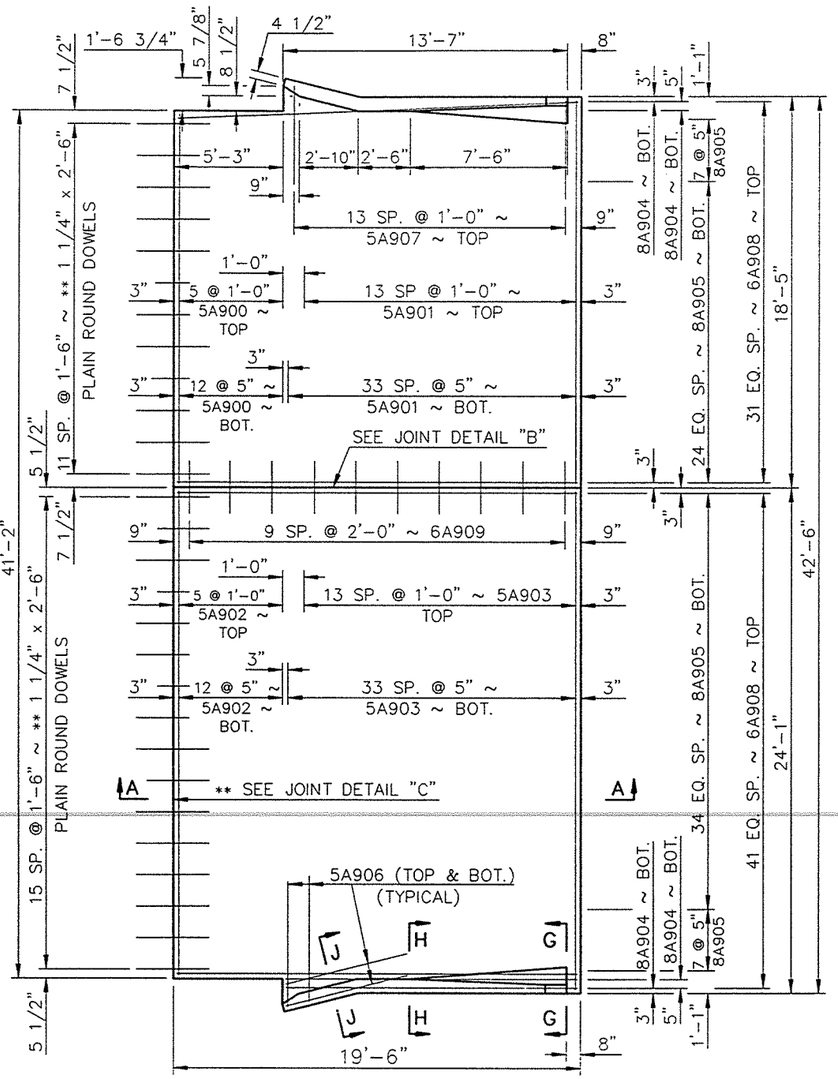
END BEAM DETAILS

JT

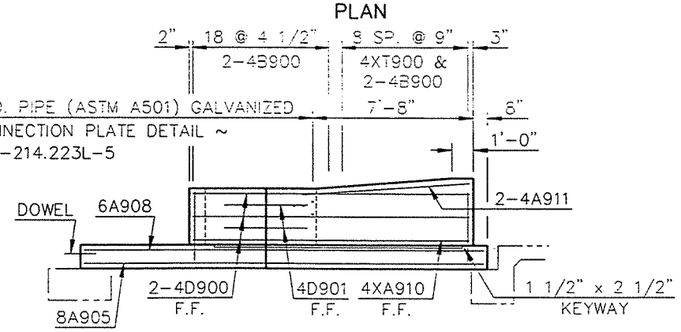
29-214.223L-2

c:\ustation\out\dgn\95dls32a.dgn Dec. 27, 1995 07:49:46

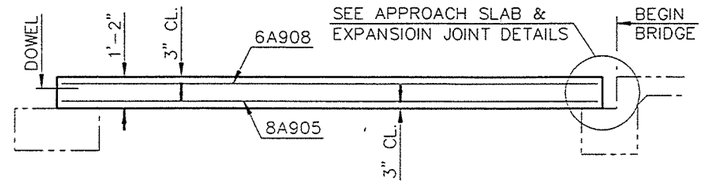
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IM-6-029(021)197	84



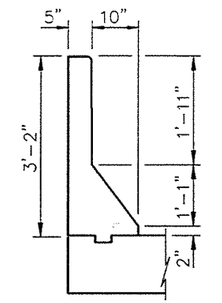
PLAN



ELEVATION

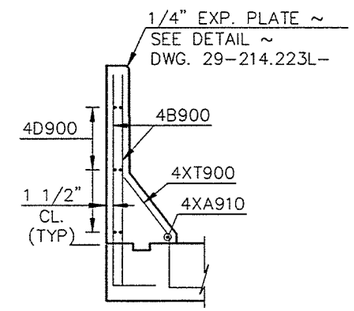


A-A



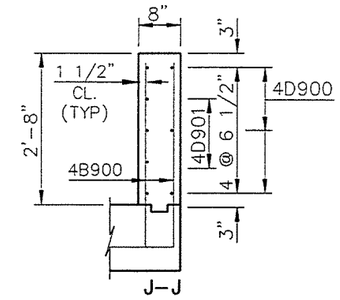
SHOWING DIMENSIONS

G-G

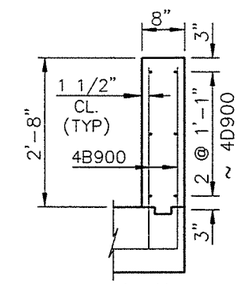


(FIELD BEND 4XT900's TO FIT AS REQUIRED) SHOWING DIMENSIONS

G-G



J-J



H-H

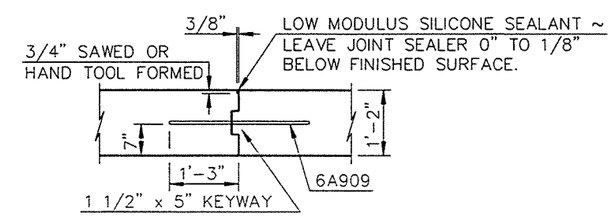
SKEW ANGLE = 0 DEG.

BAR LIST - ONE SLAB

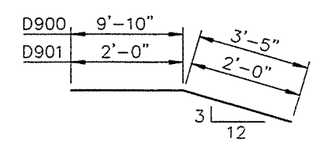
SIZE	MARK	NO.	LENGTH
5	A900	19	17'-5"
5	A901	48	18'-1"
5	A902	19	23'-1"
5	A903	48	23'-9"
8	A904	4	13'-11"
8	A905	74	19'-2"
5	A906	16	6'-0"
5	A907	28	4'-8"
6	A908	74	19'-2"
6	A909	10	2'-6"
4	XA910	2	7'-6"
4	A911	4	8'-0"
4	B900	112	4'-0"
4	D900	12	13'-3"
4	D901	4	4'-0"
4	XT900	18	3'-0"

ESTIMATED MATERIAL QUANTITIES

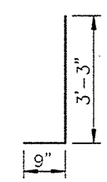
REINFORCING STEEL (LBS.)	CONCRETE (C.Y.)
9721	37.4



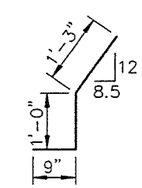
JOINT DETAIL B



D900 & D901



B900



XT900

NOTES:

THE ABOVE ESTIMATED MATERIAL QUANTITIES ARE FOR INFORMATIONAL PURPOSES ONLY. ALL MATERIALS INCLUDING CONCRETE, REINFORCING BARS, PLAIN ROUND BARS, BACKER ROD, POLYETHYLENE MEMBRANE, SAW CUTTING, SILICON SEALANT, PREFORMED JOINT FILLER, CONNECTION PLATE ASSEMBLY, ANY SELECT BACKFILL REQUIRED UNDER THE APPROACH SLAB AND LABOR REQUIRED TO BUILD THE APPROACH SLABS AND APPROACH SLAB BARRIERS SHALL BE INCIDENTAL TO THE PAY ITEM "CONCRETE BRIDGE APPROACH SLAB (REMOVE & REPLACE)".

THE CONCRETE SHALL BE CLASS AE-3 AND THE REINFORCING STEEL SHALL BE GRADE 60. THE POLY-ETHYLENE MEMBRANE SHALL MEET THE REQUIREMENTS OF AASHTO M171.

THE BAR MARKS BEGINNING WITH AN "X", INDICATE AN EPOXY COATED BAR.

SURFACE FINISH "D" SHALL BE REQUIRED FOR ALL SURFACES OF THE CURB TRANSITIONS.

** SEE "JOINT DETAIL C" & NOTES ~ DWG. 29-214.223L-4.

QUANTITIES	
APPROACH SLAB	91.7 S.Y.

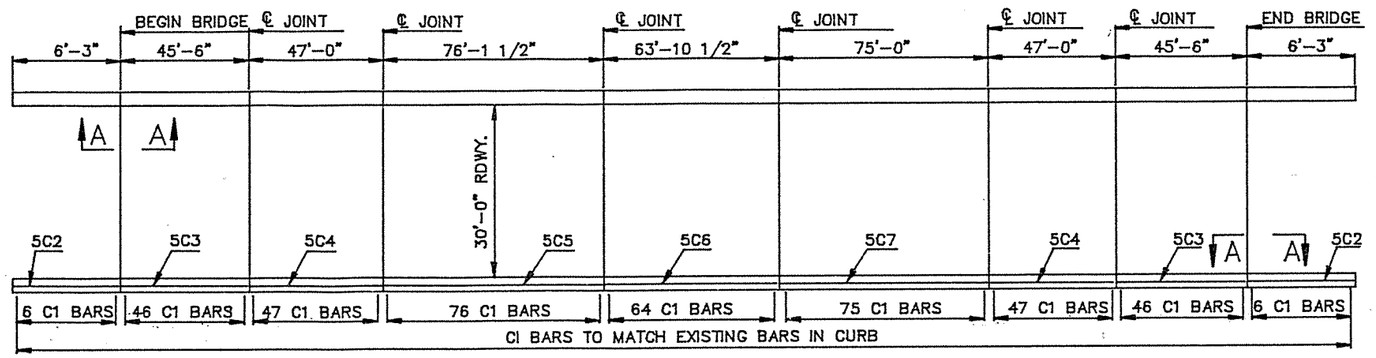
PEMBINA RIVER

BEGIN BRIDGE

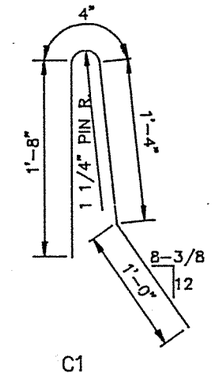
APPROACH SLAB

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-029-5(030)215	45

REVISED 5-8-89

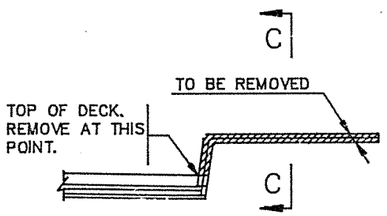


PLAN

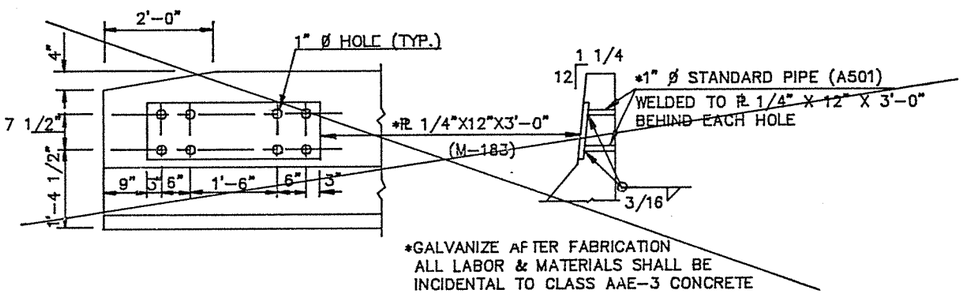


BENT BAR DETAIL

BAR LIST				
MARK	NO.	SIZE	LENGTH	SHAPE
C1	826	5	4'-4"	BENT
C2	20	5	5'-8"	STR.
C3	20	5	45'-2"	STR.
C4	20	5	46'-6"	STR.
C5	20	5	38'-10"	STR.
C6	20	5	32'-9"	STR.
C7	20	5	38'-3"	STR.
H1	826	5	2'-2"	STR.



EXISTING EXPANSION JT.
(AT BEGIN & END BRIDGE)



BARRIER END DETAIL

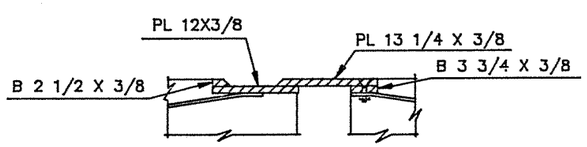
GENERAL NOTES

100 GENERAL: THIS PROJECT CONSISTS OF REMOVING EXISTING RAILING & POSTS & INSTALLING A JERSEY BARRIER. THE RAILING & POSTS SHALL BE SALVAGED. THE SALVAGED MATERIAL SHALL BE HAULED & STOCKPILED AT THE DISTRICT MAINTENANCE YARD AT DRAYTON, N. DAK. SALVAGING, HAULING & STOCKPILING SHALL NOT BE PAID FOR DIRECTLY BUT SHALL BE CONSIDERED AS INCIDENTAL TO THE PAY ITEM, "CLASS AAE-3 CONCRETE".

202 REMOVAL OF CONCRETE: ALL WORK TO REMOVE THE END POSTS & CURB TO THE REMOVAL LIMITS AS SHOWN AND TO PROPERLY DISPOSE OF THE CONCRETE SHALL BE INCIDENTAL TO THE PAY ITEM "CLASS AAE-3 CONCRETE".

602 SURFACE FINISH "D": SURFACE FINISH "D" SHALL BE APPLIED TO ALL EXPOSED FACES OF THE BARRIER.

602 BARRIERS: BARRIERS SHALL BE CONSTRUCTED ACCORDING TO THE PROVISIONS OF SECTION 602.03 B. 4. V-GROOVE CONTRACTION JOINTS SHALL BE ADDED AT APPROXIMATELY 10-FOOT SPACING IN THE BARRIERS.



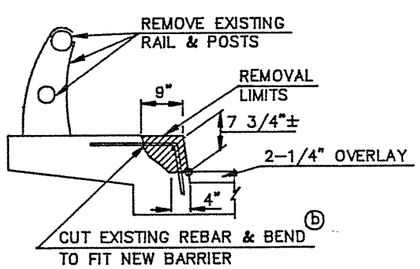
C-C

ⓐ H1 BARS SHALL BE ANCHOR UNITS INSTALLED WITH A HIGH STRENGTH ADHESIVE SPECIFICALLY INTENDED FOR CONCRETE ANCHORAGE.(HILTI,HBR OR AN APPROVED EQUAL).

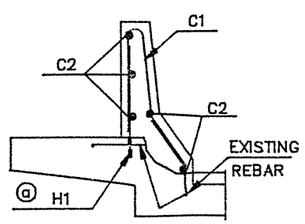
ⓑ ANY EXISTING STEEL WHICH IS DAMAGED SHALL BE REPLACED BY A H1 BAR. THESE BARS SHALL NOT BE PAID FOR DIRECTLY. THEIR COST SHALL BE INCLUDED IN THE PRICE BID FOR CLASS AAE-3 CONCRETE.

REINFORCING STEEL NOTES

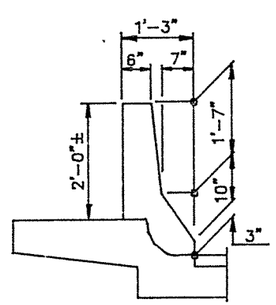
1. FABRICATION AND TOLERANCES SHALL BE IN ACCORDANCE WITH THE CRSI MANUAL OF STANDARD PRACTICE.
2. ALL DIMENSIONS ARE OUT TO OUT OF BARS.
3. NOMINAL LENGTH OF EACH BENT BAR OR CUT BAR IS THE SUM TOTAL OF THE DETAILING DIMENSIONS FOR THAT BAR, UNLESS OTHERWISE NOTED.



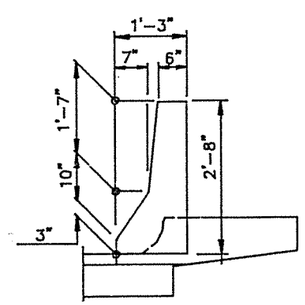
EXISTING



MODIFIED

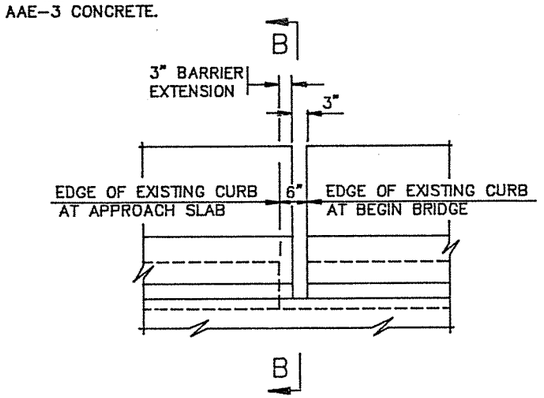


MODIFIED
(SHOWING DIMENSIONS)



B-B

TYPICAL ELEVATION



A-A

* INFORMATIONAL PURPOSES ONLY

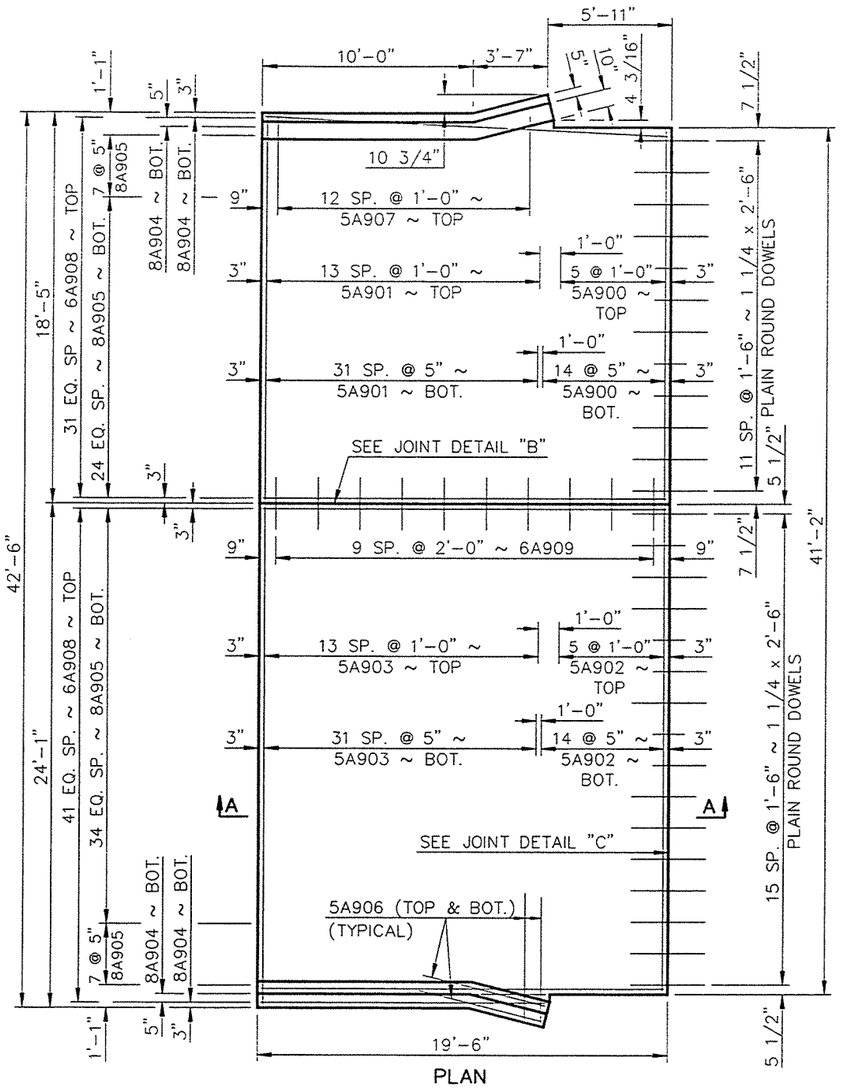
QUANTITIES		
CLASS AAE-3 CONC.	49.4	C.Y.
REINFORCING STEEL	9921	LBS.
REMOVAL OF CONC.	11.0	C.Y.

PEMBINA RIVER BRIDGE
BARRIER WALL
DETAILS
EAST BRIDGE

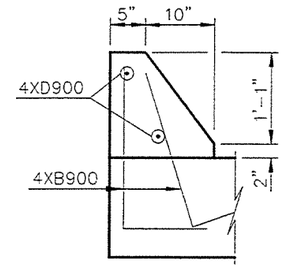
88GAL29

29-214.223R

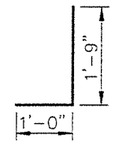
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IM-6-029(021)197	85



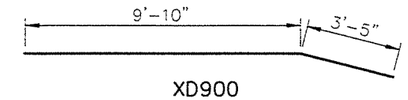
PLAN



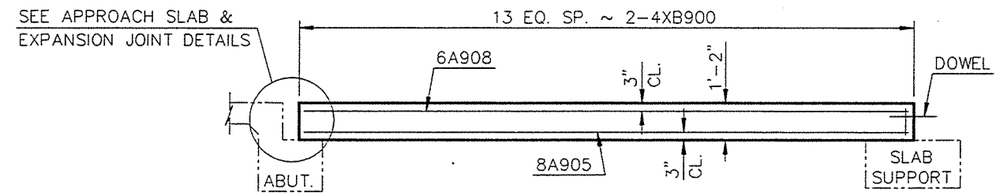
F-F



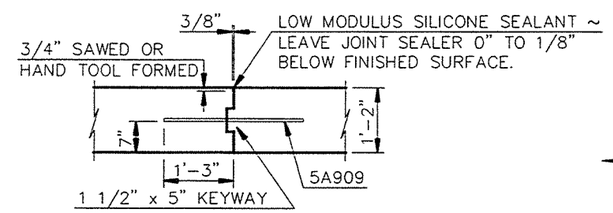
XB900



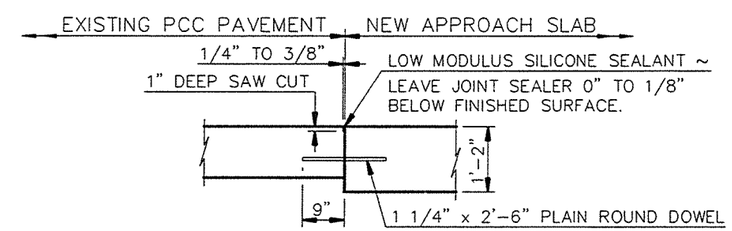
XD900



A-A



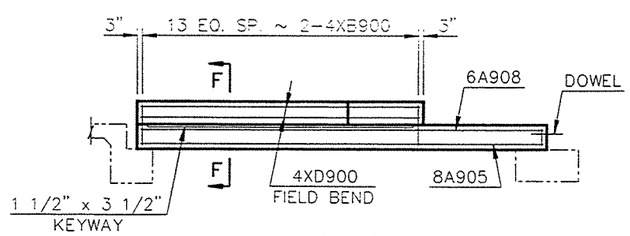
JOINT DETAIL B



JOINT DETAIL C

SKEW ANGLE = 0 DEG.			
BAR LIST - ONE SLAB			
SIZE	MARK	NO.	LENGTH
5	A900	21	17'-5"
5	A901	46	18'-1"
5	A902	21	23'-1"
5	A903	46	23'-9"
8	A904	4	13'-3"
8	A905	74	19'-2"
5	A906	16	6'-0"
5	A907	26	4'-8"
6	A908	74	19'-2"
6	A909	10	2'-6"
4	XB900	56	2'-9"
4	XD900	4	13'-3"

ESTIMATED MATERIAL QUANTITIES	
REINFORCING STEEL (LBS.)	CONCRETE (C.Y.)
9356	36.8



ELEVATION

NOTES:

THE ABOVE ESTIMATED MATERIAL QUANTITIES ARE FOR INFORMATIONAL PURPOSES ONLY. ALL MATERIALS INCLUDING CONCRETE, REINFORCING BARS, PLAIN ROUND DOWELS, BACKER ROD, POLYETHYLENE MEMBRANE, SAW CUTTING, SILICON SEALANT, PREFORMED JOINT FILLER, ANY SELECT BACKFILL REQUIRED UNDER THE APPROACH SLAB AND LABOR REQUIRED TO BUILD THE APPROACH SLABS AND APPROACH SLAB BARRIERS SHALL BE INCIDENTAL TO THE PAY ITEM "CONCRETE BRIDGE APPROACH SLAB (REMOVE & REPLACE)".

THE CONCRETE SHALL BE CLASS AE-3 AND THE REINFORCING STEEL SHALL BE GRADE 60. THE POLY-ETHYLENE MEMBRANE SHALL MEET THE REQUIREMENTS OF AASHTO M171.

THE BAR MARKS BEGINNING WITH AN "X", INDICATE AN EPOXY COATED BAR.

SURFACE FINISH "D" SHALL BE REQUIRED FOR ALL SURFACES OF THE CURB TRANSITIONS.

* DOWELS SHALL BE DRILLED & ANCHORED USING A HIGH STRENGTH ADHESIVE AT THE MIDPOINT OF THE EXISTING PCC PAVEMENT.

ALL DOWEL BARS SHALL BE EPOXY COATED AND CONFORM TO AASHTO M-254 TYPE B.

FREE ENDS OF TYPE B EPOXY COASTED DOWELS (MIN. OF ONE-HALF OF DOWEL LENGTH PLUS 2 INCHES) SHALL BE GIVEN A THIN, UNIFORM COATING OF GREASE. THIS COATING SHALL BE APPLIED WITHIN TWO HOURS BEFORE COVERING WITH CONCRETE.

QUANTITIES	
APPROACH SLAB	91.6 S.Y.

PEMBINA RIVER

END BRIDGE

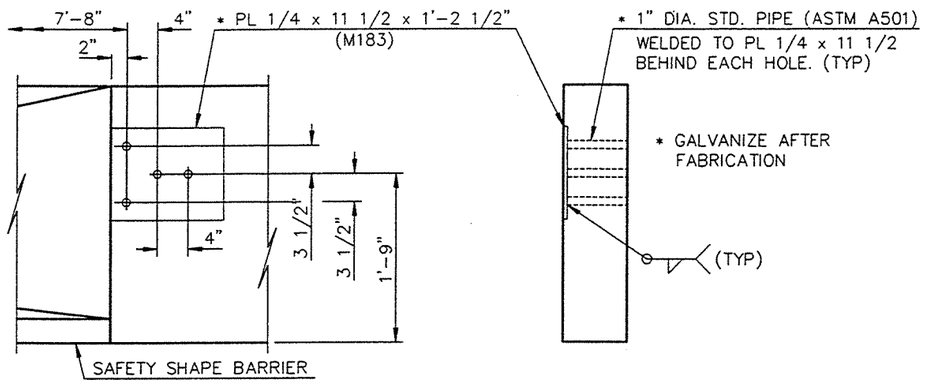
APPROACH SLAB

95DLS31 JT

c:\win32app\ustation\out\dgn\95dls Mar. 20, 1996 15:42:34

29-214.223L-4

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IM-6-029(021)197	86



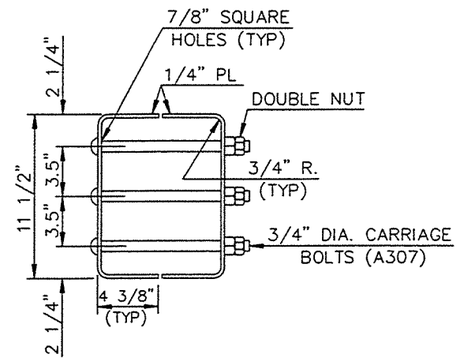
(SEE DWG. 29-214.223L-3)

(SHOWING INSIDE FACE)

CONNECTION PLATE DETAILS

NOTE:

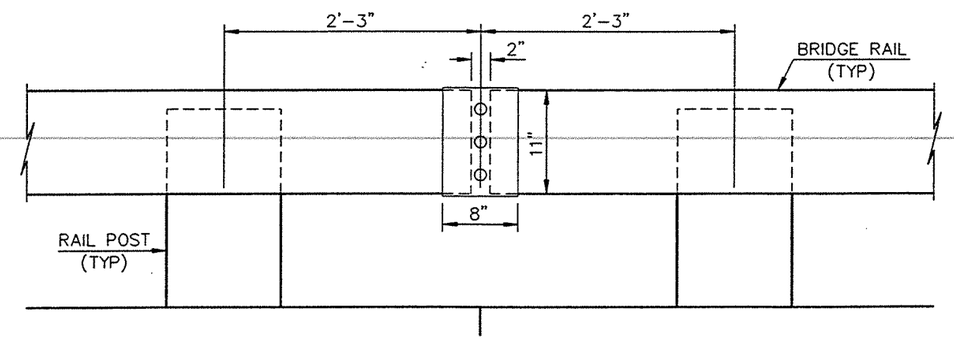
THE STEEL PLATES SHALL BE M183 STEEL. THE PLATES, BOLTS AND NUTS SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111. THE MATERIALS AND LABOR TO INSTALL THE EXPANSION PLATES BETWEEN THE APPROACH SLAB BARRIERS AND THE BRIDGE RAILS SHALL BE INCIDENTAL TO THE PAY ITEM "CONCRETE BRIDGE APPROACH SLAB".



SLEEVE DETAIL

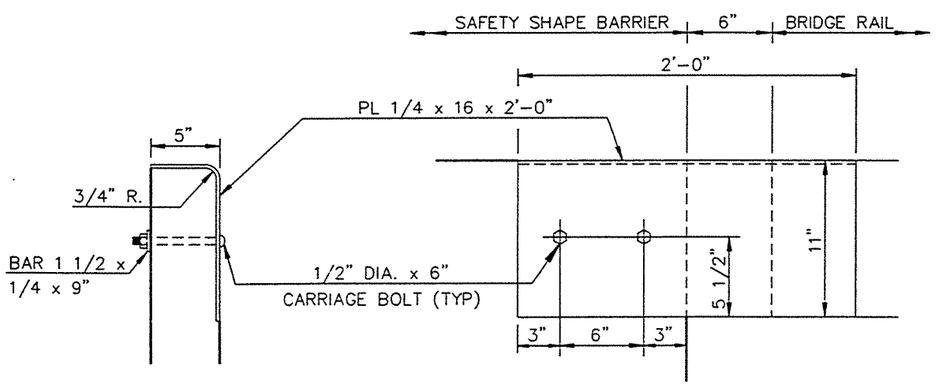
NOTE:

THE STEEL PLATES SHALL BE M183 STEEL. PLATES, BOLTS AND NUTS SHALL BE GALVANIZED IN ACCORDANCE WITH AASHTO M111. THE MATERIALS AND LABOR TO INSTALL THE RAIL SLEEVES SHALL BE INCIDENTAL TO THE PAY ITEM "CONCRETE BRIDGE APPROACH SLAB (REMOVE & REPLACE)".



(12 REQUIRED ~ SEE BRIDGE LAYOUT FOR LOCATIONS)

BRIDGE RAIL JOINT SLEEVE DETAIL



(2 REQUIRED ~ ONE AS SHOWN, ONE OPPOSITE)

SAFETY SHAPE BARRIER/BRIDGE RAIL EXPANSION PLATE DETAILS

PEMBINA RIVER

BRIDGE RAIL JOINT SLEEVE DETAILS
CONNECTION PLATE DETAILS
~~BRIDGE RAIL EXPANSION DETAILS~~

JT

29-214.223L-5

c:\ustation\out\dgn\95dls33.dgn Dec. 22, 1995 10:12:43

7

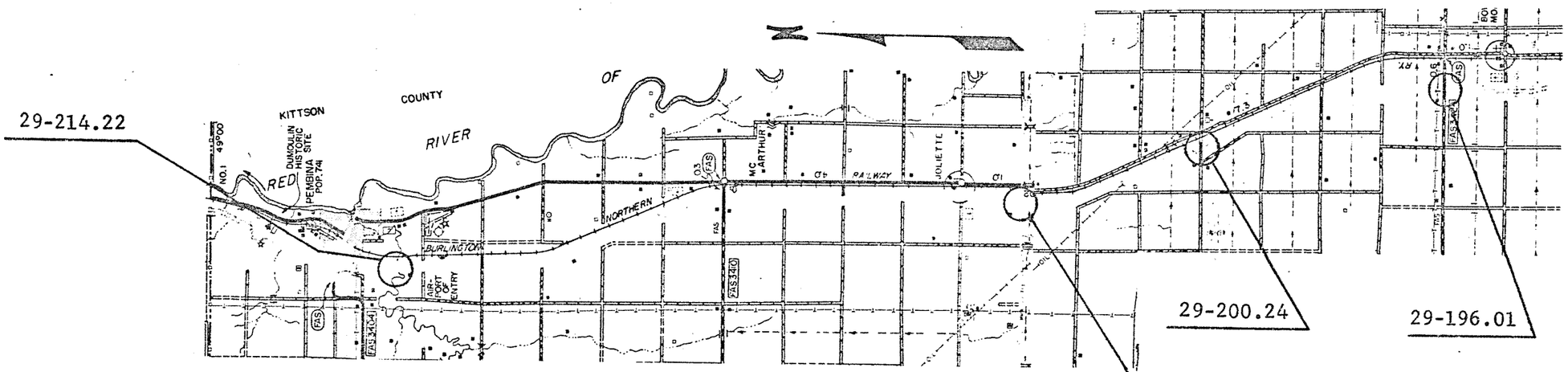
FHWA REGION	STATE	PROJECT	SHEET NO.
8	N.D.	IR-029-3(36)092	1

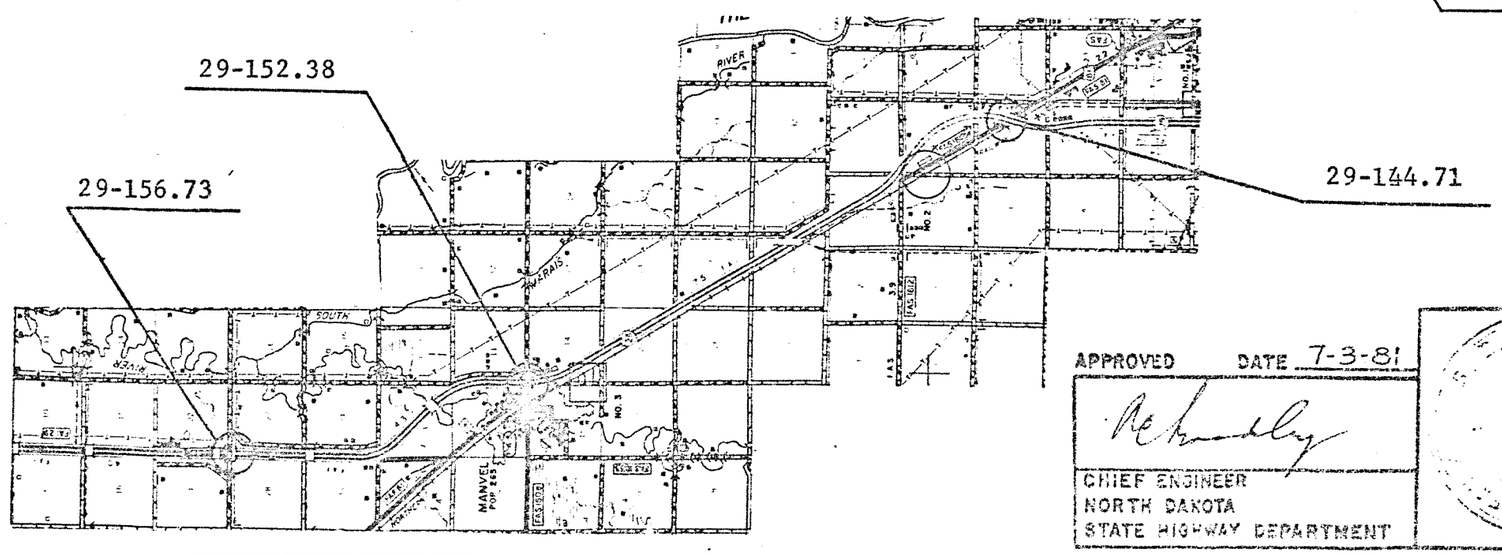
NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

REPAIR & OVERLAY PORTLAND CEMENT CONCRETE BRIDGE
DECKS IN GRAND FORKS & PEMBINA COUNTIES
FEDERAL AID PROJECT NO. IR-029-3(36)092
CONTRACT NO. 2

GOVERNING SPECIFICATIONS:

Standard Specifications adopted by the North Dakota State Highway Department, Oct. 1976, and approved by the Federal Highway Administration on December 17, 1976, and other Contract Provisions submitted herewith.





APPROVED DATE 7-10-81

Stanley Haas

BRIDGE ENGINEER
NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

STANLEY HAAS
REGISTERED
PROFESSIONAL
ENGINEER
4.94
NORTH DAKOTA

APPROVED DATE 7-3-81

CHIEF ENGINEER
NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED

DIVISION ENGINEER DATE

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-029-1(36)092	3

THE CONTRACTOR SHALL NOTIFY THE DISTRICT OFFICE OF THE STATE HIGHWAY DEPARTMENT WELL IN ADVANCE OF ANY WORK REQUIRED TO BE DONE BY THE STATE MAINTENANCE SO AS NOT TO INTERFERE WITH THE CONTRACTOR'S OPERATIONS.

STRUCTURAL DETAILS OF SPECIFIC STRUCTURES ARE AVAILABLE AT THE DISTRICT OFFICE OR AT THE BRIDGE DIVISION OF THE CENTRAL OFFICE IN BISMARCK.

LIMITS OF CLASS 2 AND 3 OVERLAY SHALL BE DETERMINED BY THE ENGINEER AND OUTLINED WITH SOME SUITABLE MARKING. THESE AREAS SHALL NOT BE EXPANDED UNLESS APPROVED BY THE ENGINEER.

ANY REINFORCING STEEL WHICH IS REPLACED IN THE DECK OR ABUTMENT SHALL BE PAID FOR IN ACCORDANCE WITH SECTION 109-5 OF THE ND STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES. THE LAP LENGTH SHALL BE A MINIMUM OF 30 DIAMETERS. NO WELDED SPLICES WILL BE ALLOWED.

WITH THE EXCEPTION OF THE BOWESMONT INTERCHANGE, THE OVERLAY SHALL BE PLACED OVER ONE HALF OF THE BRIDGE FROM THE LONGITUDINAL CENTERLINE TO THE CURB IN ONE CONTINUOUS POUR. TRAFFIC SHALL BE MAINTAINED ON THE OTHER HALF OF THE ROADWAY.

CANOPY
SHOULD THE DEPTH OF CONCRETE REMOVAL MAKE IT POSSIBLE FOR THE CHIPPING HAMMER TO PENETRATE THE FULL DEPTH OF THE SLAB, A MEANS OF PROTECTING THE ROADWAY BENEATH THE STRUCTURE FROM FALLING DEBRIS SHALL BE PROVIDED AS DIRECTED BY THE ENGINEER.

PAYMENT FOR SUCH PROTECTION WILL BE MADE IN ACCORDANCE WITH SECTION 109.5 OF THE ND STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES.

SUB-BASE MATERIAL
THE COST OF PLACING ANY REQUIRED AGGREGATE UNDER THE REPLACED APPROACH PANELS AND THE PCC PAVEMENT PANELS, INCLUDING THAT REQUIRED TO BRING THEM TO THE PROPER GRADE, SHALL BE INCIDENTAL TO THE ITEMS REMOVE AND REPLACE APPROACH SLAB AND REMOVE AND REPLACE PCC PAVEMENT.

BOWESMONT INTERCHANGE
WORK ON THE ABUTMENT MODIFICATION AND ON THE DECK OVERLAY SHALL NOT BEGIN UNTIL THE SPRING OF 1983 AND SHALL BE OPENED TO TWO-WAY TRAFFIC BY JULY 15, 1983.

PANEL REMOVAL
THE THICKNESS OF THE EXISTING PCC PAVEMENT PANELS AND/OR THE APPROACH SLAB MAY VARY FROM THE ORIGINAL PLACEMENT THICKNESS DUE TO MUDJACKING WHICH HAS BEEN DONE BY MAINTENANCE FORCES ON SOME STRUCTURES. THE COST OF ANY EXTRA REMOVAL SHALL BE INCIDENTAL TO THE ITEMS REMOVE AND REPLACE PCC PAVEMENT AND REMOVE AND REPLACE APPROACH SLAB.

REFACING CURBS
THE ROADWAY FACES OF THE CURBS TO BE REFACED SHALL BE CLEANED BY SANDBLASTING AND/OR CHIPPING TO A DEPTH SUFFICIENT TO OBTAIN SOUND, DURABLE CONCRETE. THE MINIMUM DEPTH OF CONCRETE REMOVED SHALL BE SUCH THAT AN AVERAGE DEPTH OF ONE INCH OF CLEARANCE BEYOND THE INSIDE SURFACE OF THE VERTICAL CURB STEEL IS OBTAINED.

THE CURBS SHALL BE REFACED BEFORE THE OVERLAY CONCRETE IS PLACED ON THE DECK. PRIOR TO REFACING THE CURB, THE CLEANED SURFACE SHALL BE TREATED WITH A CEMENT GROUT OR OTHER APPROVED BONDING AGENT. THE CURBS SHALL BE REFACED WITH LOW SLUMP OVERLAY CONCRETE. THE THICKNESS OF THIS REFACING MATERIAL SHALL PROVIDE A MINIMUM OF ONE AND ONE-HALF INCHES OF COVER ON THE STEEL REINFORCEMENT. TO OBTAIN A UNIFORM, EVEN FACE ON THE CURBS, FORMING OR OTHER METHODS APPROVED BY THE ENGINEER SHALL BE USED. PAYMENT WILL BE AT THE UNIT PRICE BID PER LINEAR FOOT OF CURB REFACED AND WILL INCLUDE ALL LABOR, MATERIALS, AND EQUIPMENT REQUIRED TO COMPLETE THE WORK.

CLASS OF CONCRETE
THE CONCRETE MIX USED IN THE OVERLAYS SHALL BE AS SPECIFIED IN THE SPECIAL PROVISIONS. ALL OTHER CONCRETE SHALL BE EITHER CLASS AE-1 OR AE-3 AT THE OPTION OF THE CONTRACTOR.

HOT BITUMINOUS PAVEMENT - SPECIAL
THE ASPHALT CEMENT AND THE TACK COAT ARE NOT SEPARATE PAY ITEMS, BUT SHALL BE INCLUDED IN THE PRICE BID FOR "HOT BITUMINOUS PAVEMENT-SPECIAL". THE AGGREGATE USED FOR HOT BITUMINOUS PAVEMENT AND THE TYPE AND GRADE OF LIQUID ASPHALT FOR TACK SHALL BE APPROVED BY THE ENGINEER IN THE FIELD. THE HOT BITUMINOUS PAVEMENT MATERIAL SHALL BE HOT MIXED, BLADE LAID, COMPACTED AND MAY BE OBTAINED FROM A COMMERCIAL SOURCE. IT IS INTENDED THAT THE OPTIMUM AMOUNT OF ASPHALT CEMENT BE USED IN THE MIX, AND THE QUANTITY SHOWN UNDER THE BASIS OF ESTIMATE MAY BE ADJUSTED BY THE ENGINEER IF NECESSARY.

SHOP DRAWINGS
THE CONTRACTOR SHALL SUBMIT THE FOLLOWING SHOP DRAWINGS TO THE BRIDGE ENGINEER FOR APPROVAL BEFORE FABRICATION:

1. STEEL EXTRUSIONS FOR EXPANSION JOINT MODIFICATIONS.

CONSTRUCTION JOINTS
ALL CONSTRUCTION JOINTS SHALL BE CLEANED OUT PRIOR TO PLACEMENT OF THE OVERLAY. THE OVERLAY SHALL THEN BE SAW CUT AT THESE LOCATIONS WITHIN 24 HOURS OF PLACEMENT. THE SAW CUT SHALL BE 1" DEEP BY 1/8" TO 3/8" WIDE. THE JOINT SHALL THEN BE SEALED WITH HOT POURED ELASTIC TYPE JOINT SEALER 0" to 1/8" BELOW THE FINISHED PAVEMENT. THE COST OF ANY SUCH WORK SHALL BE INCIDENTAL TO CLASS 1 OVERLAY.

GUARD RAIL AND/OR END POSTS
THE APPROACH GUARD RAIL WHICH IS SPECIFIED TO BE REMOVED AND RESET SHOULD BE RESET SO THAT THE TOP OF THE RAIL IS 27" ABOVE THE GROUND LINE AS RE-ESTABLISHED FOR THE BRIDGE APPROACHES. ALSO, THE BRIDGE END OF THE GUARD RAIL SHOULD MATCH THE ELEVATION OF THE MOUNTING HOLES IN THE END POSTS.

IF THE CONTRACTOR WISHES TO REMOVE ANY APPROACH GUARD RAIL OR END POSTS OTHER THAN THOSE SPECIFIED IN CONNECTION WITH PLACING CURB AND GUTTER SECTIONS, APPROACH TAPERS, OR DECK OVERLAYS, HE SHALL DO SO FOR HIS CONVENIENCE ONLY. THE COST OF ANY SUCH REMOVAL SHALL BE AT THE CONTRACTOR'S EXPENSE, AND THE REMOVED ITEMS SHALL BE REPLACED TO EXISTING CONDITIONS.

TWO-LANE, TWO-WAY ROADWAYS: THE MAINTENANCE AND PROTECTION OF TRAFFIC FOR TWO-LANE, TWO-WAY ROADWAYS AT 32ND AVENUE, THOMPSON, AND MAYVILLE INTERCHANGES PROVIDES FOR FLAGGING THE TRAFFIC AT ALL TIMES, UNTIL THE ROADWAY IS COMPLETELY OPEN TO TRAFFIC. IN LIEU OF PROVIDING FLAGGING DURING THE TIME ONE-LANE TRAFFIC IS MAINTAINED A TRAFFIC SIGNAL SYSTEM MAY BE PROVIDED ELIMINATING THE NEED FOR FLAGGING DURING THE TIME ONE-LANE TRAFFIC IS MAINTAINED. THE COST OF FLAGGING DURING THE ONE-LANE TRAFFIC IS MAINTAINED SHALL BE CONSIDERED INCIDENTAL AND SHALL BE INCLUDED IN THE PRICE BID FOR TRAFFIC CONTROL. THE TRAFFIC SIGNAL SYSTEM SHALL BE APPROVED BY THE ENGINEER PRIOR TO THE PRE-CONSTRUCTION CONFERENCE.

PORTABLE PRECAST CONCRETE MEDIAN BARRIERS: THE NUMBER OF PRECAST CONCRETE MEDIAN BARRIERS FURNISHED ON THE PROJECT SHALL BE 90-10 FOOT UNITS. THIS NUMBER WILL PROVIDE COVERAGE FOR LONGEST STRUCTURE AND APPROACH ON THIS PROJECT. IF THE CONTRACTOR CHOOSES TO WORK ON MORE THAN ONE STRUCTURE, ADDITIONAL BARRIERS AND ATTENUATION DEVICES SHALL BE FURNISHED AT HIS OWN EXPENSE. THE 90-10 FOOT BARRIERS SHALL BECOME THE PROPERTY OF THE STATE UPON COMPLETION OF THE PROJECT. THE CONTRACTOR SHALL FURNISH, INSTALL, MOVE AND DELIVER TO THE STATE HIGHWAY DISTRICT YARD AS REQUIRED. THE COST OF FURNISHING, INSTALLING, MOVING AND DELIVERING THE PRECAST CONCRETE MEDIAN BARRIERS SHALL BE INCIDENTAL TO THE PRICE BID FOR TRAFFIC CONTROL.

SHOULDER REPAIR
AREAS OF BITUMINOUS SURFACED SHOULDERS USED TO CARRY TRAFFIC DURING CONSTRUCTION SHALL BE MAINTAINED BY THE CONTRACTOR AND, AFTER COMPLETION OF THE WORK, SHALL BE RESTORED TO SATISFACTORY CONDITION. THE CONTRACTOR WILL BE REIMBURSED AT THE RATE OF $25.00 PER TON FOR HOT MIX USED TO MAINTAIN AND REPAIR THE SHOULDERS. THIS PAYMENT WILL CONSTITUTE FULL REIMBURSEMENT FOR ALL MATERIALS, LABOR, AND EQUIPMENT REQUIRED TO MAINTAIN AND REPAIR THE SHOULDERS. THE QUALITY OF AGGREGATE AND GRADE OF ASPHALT CEMENT USED FOR THE HOT MIX SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.

MOUNTABLE CURB & GUTTER
WHERE SPECIFIED, THE MOUNTABLE CURB & GUTTER SHALL BE BUILT TO MATCH THE NEW GRADE AS ESTABLISHED FOR THE BRIDGE APPROACHES. IN A DISTANCE OF 10 FEET, THE CURB SHALL TRANSITION FROM THE EXISTING SECTION ON THE BRIDGE TO THE TYPICAL SECTION SHOWN ON THE STANDARD.

P. Manvel Int, Johnstown Int, Carlisle Int, Joliette Int ... 9-23

SPECIAL PROVISIONS

NO.	NAME
SP-103-3	Award and Execution of Contract
SP-107-7	Legal Relations and Responsibility to Public
SP-108-9	Prosecution and Progress
SP-108-19	Prosecution and Progress
SP-109-4	Measurement and Payment
SP-406-7	Hot Bituminous Pavement
Sp. 4?	
SP-746-1	Flagging
SP-756-2	Field Laboratory
SP-762-6	Maintenance and Protection of Traffic
SP-384	Pressure Relief Joint Filler
SP-402	Repair and Overlay of Portland Cement Concrete Box Decks with Low Slump Concrete
SP-370	Railway Protection Insurance
SP-610-3	Portland Cement Concrete
SP-806-3	Aggregates For Portland Cement

SUMMARY OF QUANTITIES

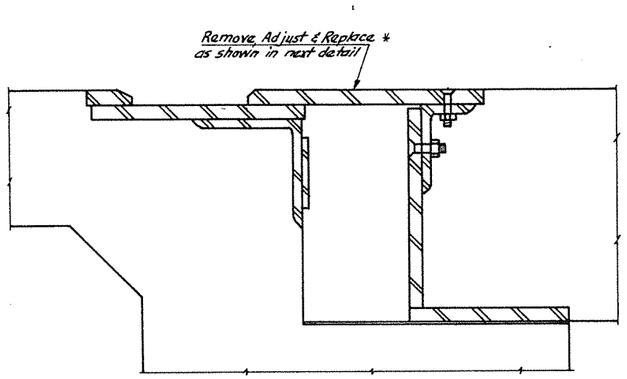
ESTIMATE OF QUANTITIES

SPEC. NO.	302	406	705	708	716	722	746	750	756	762	900	900	900	900	900	900	900	900	900	900	900	900	103
CODE NO.	0120	0230	0100	0410	0100	0150	0100	0100	0100	3298	8673	9587	9620	9690	9700	9701	9702	9705	9499	9501	9586	8682	0100
BRIDGE NO.	AGGREGATE BASE COURSE CL. 5	HOT BITUMINOUS PAVEMENT-SPECIAL	MOBILIZATION	MOUNTABLE CURB & GUTTER TYPE I	ADJUST CATCH BASIN	REMOVE & RESET GUARDRAIL	FLAGGING	LINSEED OIL TREATMENT	FIELD LABORATORY TYPE "A"	TRAFFIC CONTROL	EXPANSION JOINT MODIFICATION (STRIP SEAL)	FINGER EXPANSION JOINT MODIFICATION	ABUTMENT REPAIR (INTEGRAL)	CURB OVERLAY	CLASS 1 OVERLAY	CLASS 2 OVERLAY	CLASS 3 OVERLAY	OVERLAY TAPER	10" P.C.C. PAVEMENT (REMOVE & REPLACE)	APPROACH SLAB (REMOVE & REPLACE)	PRESSURE RELIEF JOINT	SLAB JOINT MODIFICATION AT HINGE POINTS	CONTRACT BOND
	TON	TON	L.S.	L. FT.	EACH	L. FT.	M. HR.	GAL.	L.S.	L.S.	L. FT.	L. FT.	EACH	L. FT.	S.Y.	S.Y.	S.Y.	S.Y.	S.Y.	S.Y.	L. FT.	L. FT.	L. SUM
N. GRAND FORKS INT 29-44.7[illegible] RT		4.2	1		4		160	45.2	1	1		74.0		844.0	1644.4	328.9	82.2		913.8	346.7			1
N. GRAND FORKS INT 29-44.[illegible] LT		4.2			4		160	44.7				74.0		844.0	1644.4	328.9	82.2		879.5	346.7			
MANVEL INT 29-[illegible]	546.0	222.9		160.0	4	300.0	240	17.5						530.0	1060.0	371.0	53.0						
JOHNSTOWN INT 29-[illegible]	468.0	187.2		160.0	4	300.0	240	13.1						470.0	783.3	156.7	39.2						
BOWESMONT INT 29-95.01		34.4		80.0		80.0		10.6					2	488.0	650.7	130.1	32.5						
CARLISLE INT 29-[illegible].24		11.8					100	10.4							693.3	104.0	34.7						
JOLIETTE INT 29-[illegible] 41		14.6					200	13.7						510.0	850.0	170.0	42.5						
PEMBINA RIVER 29-[illegible].22 RT							120	26.0			60.0				1333.3	266.7	66.7	402.9	68.1	73.3	58.6	180.0	
PEMBINA RIVER 29-[illegible].22 LT							48				80.0												
GRAND TOTAL	1014.0	479.3	1	400.0	16	680.0	1268	181.2	1	1	140.0	148.0	2	3686.0	8659.4	1856.3	433.0	402.9	1861.4	766.7	58.6	180.0	1

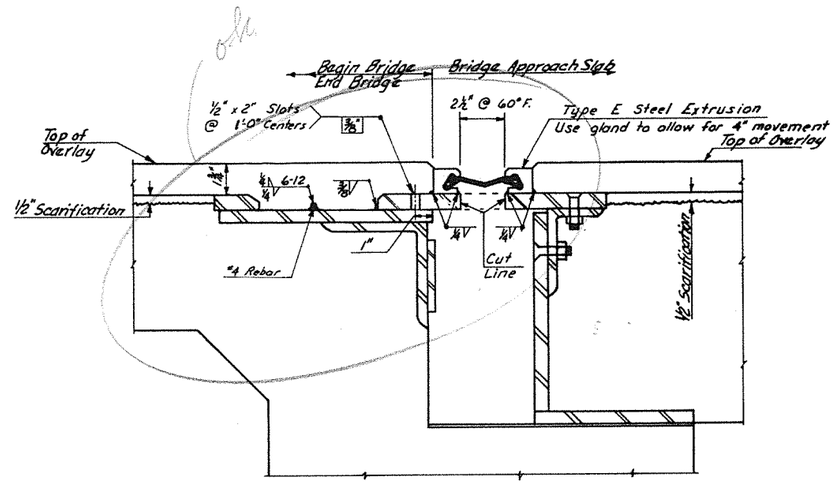
Revised 7/14/82

NOTES & QUANTITIES

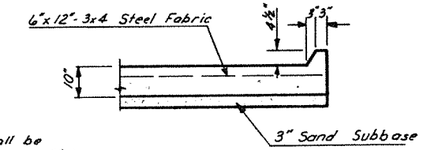
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-029-3(36)092	15



EXISTING EXPANSION JOINT

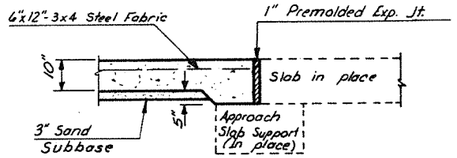


MODIFIED EXPANSION JOINT



A-A

NOTE
Cost of Curb shall be incidental to Approach Slab (Remove & Replace).



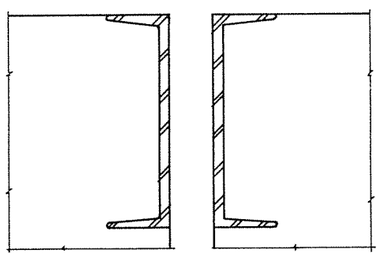
B-B

APPROACH SLAB EXPANSION JOINT MODIFICATION

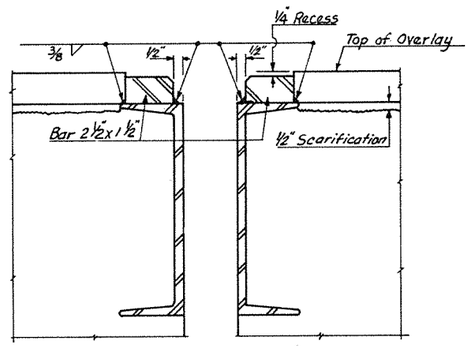
(One at each end of Bridge)
East Rdwy.
Pay length = 37.0' as Expansion Joint Modification (Strip Seal)

* TO MAINTAIN TRAFFIC ON ½ OF ROADWAY, PLATE SHALL BE FIELD CUT ON BRIDGE CENTERLINE PRIOR TO REMOVAL.

THE BOTTOM EDGE OF THE STEEL EXPANSION PLATES ON THE CURBS WILL HAVE TO BE FIELD CUT TO ALLOW CLEARANCE FOR THE ELEVATION OF THE OVERLAY. THE COST FOR THIS ITEM SHALL BE INCIDENTAL TO THE ITEM FOR EXPANSION JOINT MODIFICATION.

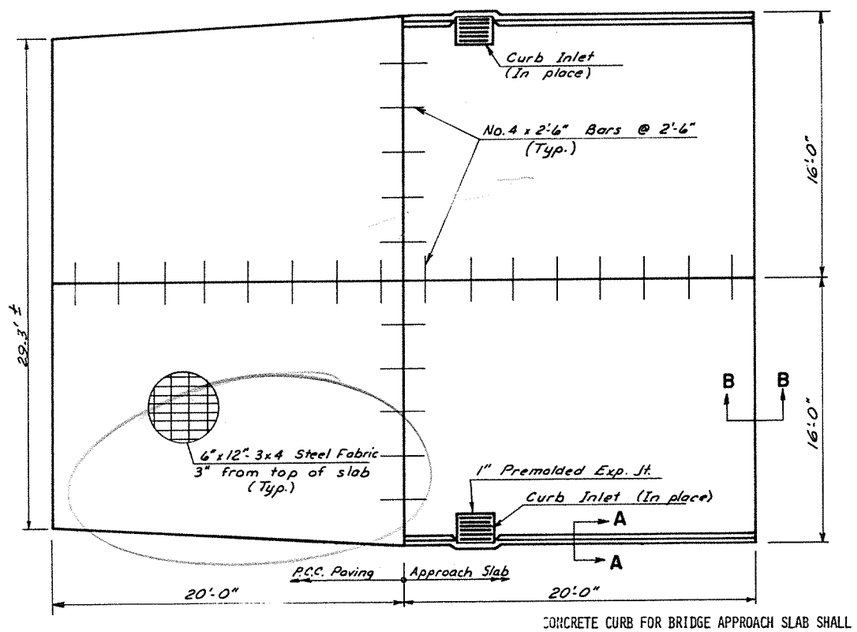


EXISTING



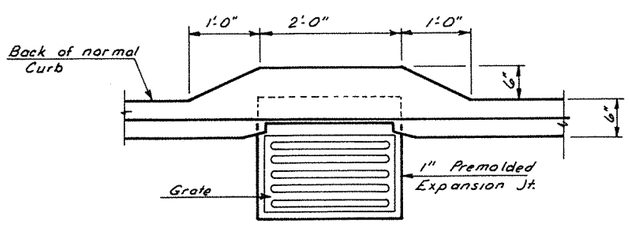
MODIFIED
Bar 2½"x1½"=37'-0"

OPEN JOINT OVER EACH PIER
(6 Joints of this type)

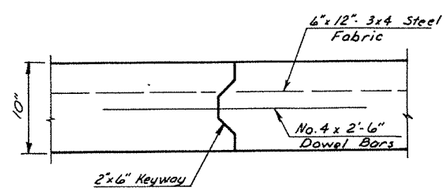


PLAN

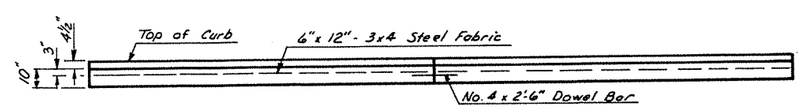
CONCRETE CURB FOR BRIDGE APPROACH SLAB SHALL BE INCLUDED IN THE PRICE BID FOR "APPROACH SLAB, REMOVE AND REPLACE".



CURB WIDENING



SECTION AT CONSTRUCTION JOINTS



ELEVATION

CONTRACT NO. 2

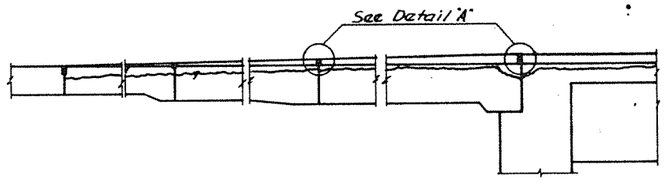
PEMBINA RIVER BRIDGE

OVERLAY DETAILS

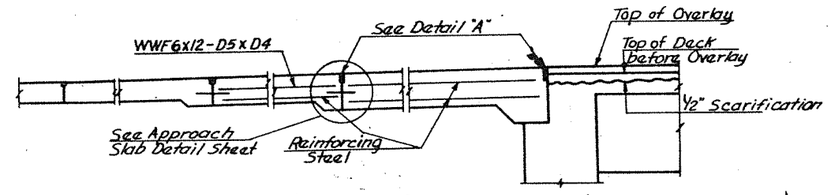
RIGHT

29-214.223-14

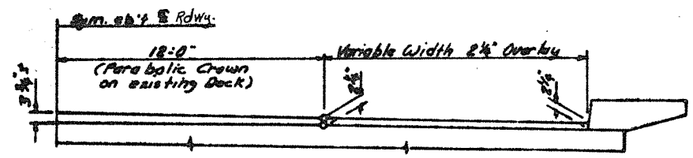
FED. ROAD DIST. NO.	STATE	PROJ. NO.	TOTAL SHEETS
8	N. D.	IR-029-3(36)092	16



APPROACH SLAB
(Slab overlayed)

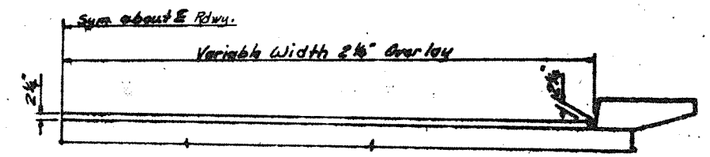


APPROACH SLAB
(Full depth removal & replacement to final surface grade)



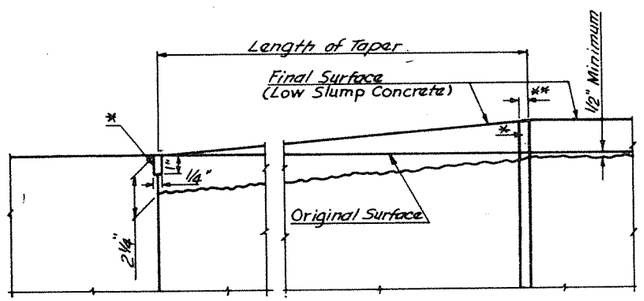
ELEVATION

North Grand Forks Interchange



ELEVATION

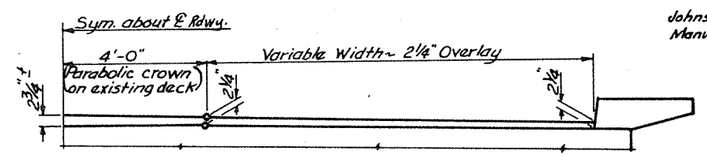
Johnstown
Manvel



DETAIL "A"

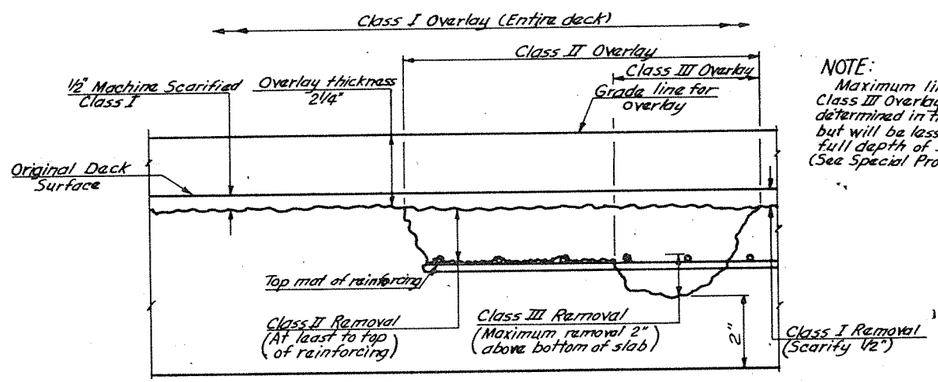
* To be filled with hot poured joint filler

** Remove existing premolded joint filler & fill with hot poured joint filler. Width 1/2" ±



ELEVATION

Pembina
Joliette
Carlisle
Bowesmont



BRIDGE DECK

NOTE:
Maximum limits for Class III Overlay will be determined in the field, but will be less than full depth of slab. (See Special Provisions)

QUANTITIES

OVERLAY DETAILS

CONTRACT NO. 2

29-214.223 L & R

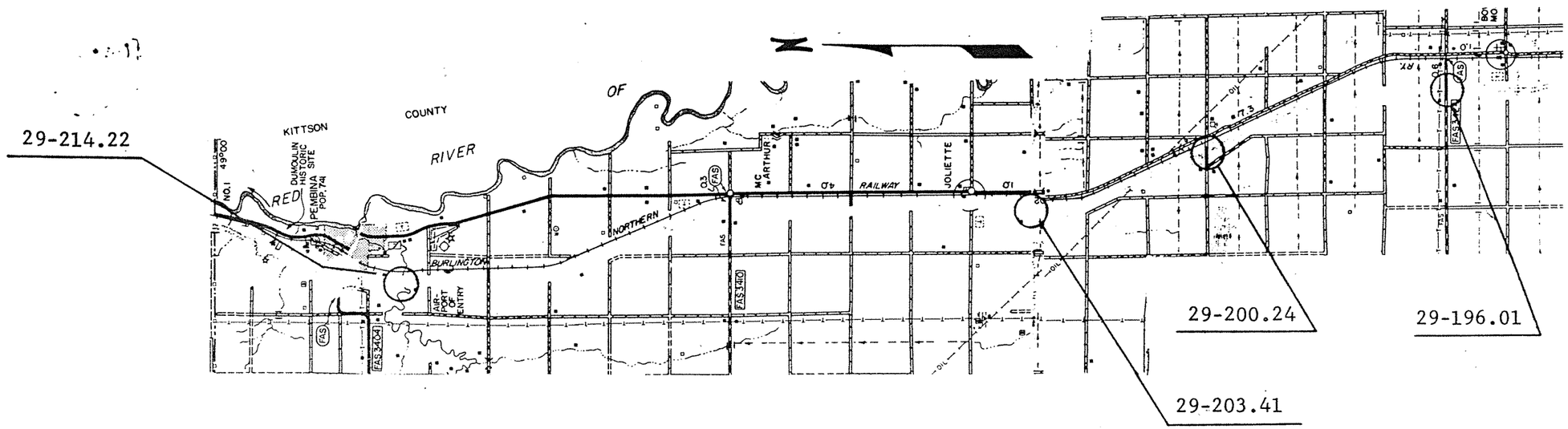
FHWA REGION	STATE	PROJECT	SHEET NO.
8	N.D.	IR-029-3(36)092	1

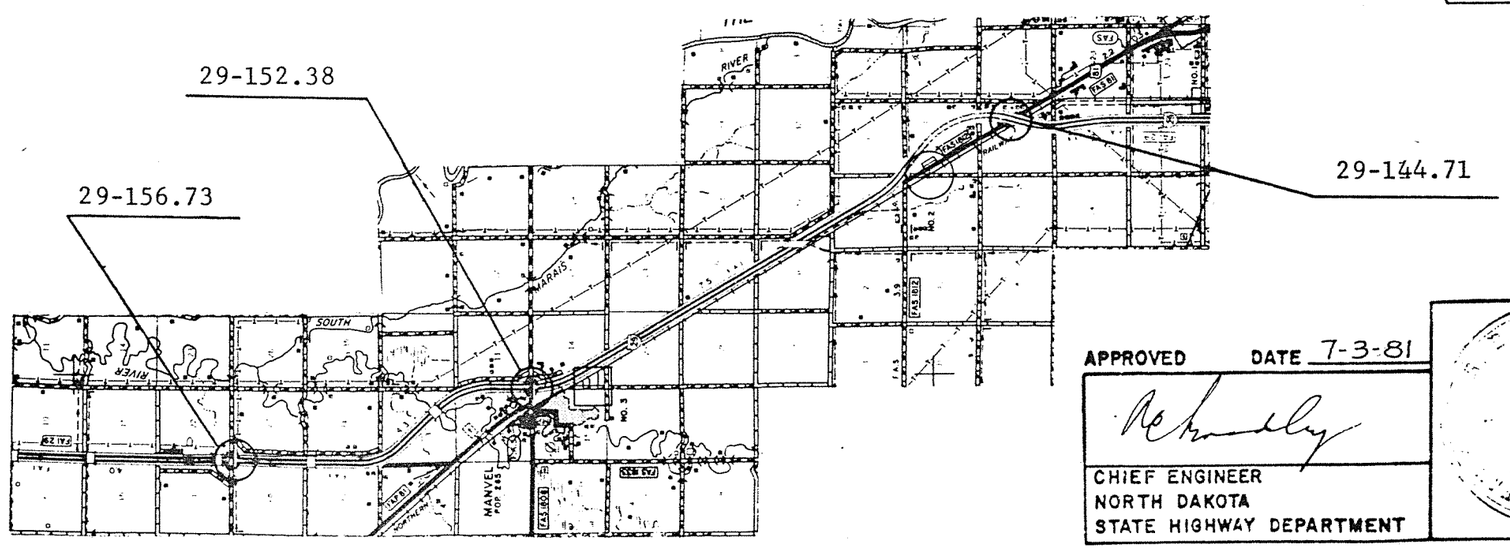
NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

REPAIR & OVERLAY PORTLAND CEMENT CONCRETE BRIDGE
DECKS IN GRAND FORKS & PEMBINA COUNTIES
FEDERAL AID PROJECT NO. IR-029-3(36)092
CONTRACT NO. 2

GOVERNING SPECIFICATIONS:

Standard Specifications adopted by the North Dakota State Highway Department, Oct. 1976, and approved by the Federal Highway Administration on December 17, 1976, and other Contract Provisions submitted herewith.





APPROVED DATE 7-10-81

Stanley Haas

BRIDGE ENGINEER
NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

STANLEY HAAS
REGISTERED
PROFESSIONAL
4,94
ENGINEER
NORTH DAKOTA

APPROVED DATE 7-3-81

CHIEF ENGINEER
NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED

DIVISION ENGINEER DATE

TABLE OF CONTENTS

SHEET NO.	GENERAL
1	Title Sheet
2	Table of Contents
3	Summary of Quantities, Special Provision List & Notes
4-7	North Grand Forks Interchange
8	Manvel Interchange
9	Johnstown Interchange
10-11	Bowesmont Interchange
12	Carlisle Interchange
13	Joliette Interchange
14-15	Pembina River Bridge
16	Overlay Details
17-18	Detour Layout
19-23	Signing Layouts and Attenuation Device Details
24	D-708-1 Valley Gutter & Curb & Gutter
25	D-708-10 Portable Precast Concrete Median Barrier
26-31	D-754-1,2,3,4,5 & 5A Construction Signs & Barricade Details

FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-029-3(36)092	3

THE CONTRACTOR SHALL NOTIFY THE DISTRICT OFFICE OF THE STATE HIGHWAY DEPARTMENT WELL IN ADVANCE OF ANY WORK REQUIRED TO BE DONE BY THE STATE MAINTENANCE SO AS NOT TO INTERFERE WITH THE CONTRACTOR'S OPERATIONS.

STRUCTURAL DETAILS OF SPECIFIC STRUCTURES ARE AVAILABLE AT THE DISTRICT OFFICE OR AT THE BRIDGE DIVISION OF THE CENTRAL OFFICE IN BISMARCK.

LIMITS OF CLASS 2 AND 3 OVERLAY SHALL BE DETERMINED BY THE ENGINEER AND OUTLINED WITH SOME SUITABLE MARKING. THESE AREAS SHALL NOT BE EXPANDED UNLESS APPROVED BY THE ENGINEER.

ANY REINFORCING STEEL WHICH IS REPLACED IN THE DECK OR ABUTMENT SHALL BE PAID FOR IN ACCORDANCE WITH SECTION 109-5 OF THE ND STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES. THE LAP LENGTH SHALL BE A MINIMUM OF 30 DIAMETERS. NO WELDED SPLICES WILL BE ALLOWED.

WITH THE EXCEPTION OF THE BOWESMONT INTERCHANGE, THE OVERLAY SHALL BE PLACED OVER ONE HALF OF THE BRIDGE FROM THE LONGITUDINAL CENTERLINE TO THE CURB IN ONE CONTINUOUS POUR. TRAFFIC SHALL BE MAINTAINED ON THE OTHER HALF OF THE ROADWAY.

CANOPY
SHOULD THE DEPTH OF CONCRETE REMOVAL MAKE IT POSSIBLE FOR THE CHIPPING HAMMER TO PENETRATE THE FULL DEPTH OF THE SLAB, A MEANS OF PROTECTING THE ROADWAY BENEATH THE STRUCTURE FROM FALLING DEBRIS SHALL BE PROVIDED AS DIRECTED BY THE ENGINEER.

PAYMENT FOR SUCH PROTECTION WILL BE MADE IN ACCORDANCE WITH SECTION 109.5 OF THE ND STANDARD SPECIFICATIONS FOR ROADS AND BRIDGES.

SUB-BASE MATERIAL
THE COST OF PLACING ANY REQUIRED AGGREGATE UNDER THE REPLACED APPROACH PANELS AND THE PCC PAVEMENT PANELS, INCLUDING THAT REQUIRED TO BRING THEM TO THE PROPER GRADE, SHALL BE INCIDENTAL TO THE ITEMS REMOVE AND REPLACE APPROACH SLAB AND REMOVE AND REPLACE PCC PAVEMENT.

BOWESMONT INTERCHANGE
WORK ON THE ABUTMENT MODIFICATION AND ON THE DECK OVERLAY SHALL NOT BEGIN UNTIL THE SPRING OF 1983 AND SHALL BE OPENED TO TWO-WAY TRAFFIC BY JULY 15, 1983.

PANEL REMOVAL
THE THICKNESS OF THE EXISTING PCC PAVEMENT PANELS AND/OR THE APPROACH SLAB MAY VARY FROM THE ORIGINAL PLACEMENT THICKNESS DUE TO MUDJACKING WHICH HAS BEEN DONE BY MAINTENANCE FORCES ON SOME STRUCTURES. THE COST OF ANY EXTRA REMOVAL SHALL BE INCIDENTAL TO THE ITEMS REMOVE AND REPLACE PCC PAVEMENT AND REMOVE AND REPLACE APPROACH SLAB.

REFACING CURBS
THE ROADWAY FACES OF THE CURBS TO BE REFACED SHALL BE CLEANED BY SANDBLASTING AND/OR CHIPPING TO A DEPTH SUFFICIENT TO OBTAIN SOUND, DURABLE CONCRETE. THE MINIMUM DEPTH OF CONCRETE REMOVED SHALL BE SUCH THAT AN AVERAGE DEPTH OF ONE INCH OF CLEARANCE BEYOND THE INSIDE SURFACE OF THE VERTICAL CURB STEEL IS OBTAINED.

THE CURBS SHALL BE REFACED BEFORE THE OVERLAY CONCRETE IS PLACED ON THE DECK. PRIOR TO REFACING THE CURB, THE CLEANED SURFACE SHALL BE TREATED WITH A CEMENT GROUT OR OTHER APPROVED BONDING AGENT. THE CURBS SHALL BE REFACED WITH LOW SLUMP OVERLAY CONCRETE. THE THICKNESS OF THIS REFACING MATERIAL SHALL PROVIDE A MINIMUM OF ONE AND ONE-HALF INCHES OF COVER ON THE STEEL REINFORCEMENT. TO OBTAIN A UNIFORM, EVEN FACE ON THE CURBS, FORMING OR OTHER METHODS APPROVED BY THE ENGINEER SHALL BE USED. PAYMENT WILL BE AT THE UNIT PRICE BID PER LINEAR FOOT OF CURB REFACED AND WILL INCLUDE ALL LABOR, MATERIALS, AND EQUIPMENT REQUIRED TO COMPLETE THE WORK.

CLASS OF CONCRETE
THE CONCRETE MIX USED IN THE OVERLAYS SHALL BE AS SPECIFIED IN THE SPECIAL PROVISIONS. ALL OTHER CONCRETE SHALL BE EITHER CLASS AE-1 OR AE-3 AT THE OPTION OF THE CONTRACTOR.

HOT BITUMINOUS PAVEMENT - SPECIAL
THE ASPHALT CEMENT AND THE TACK COAT ARE NOT SEPARATE PAY ITEMS, BUT SHALL BE INCLUDED IN THE PRICE BID FOR "HOT BITUMINOUS PAVEMENT-SPECIAL". THE AGGREGATE USED FOR HOT BITUMINOUS PAVEMENT AND THE TYPE AND GRADE OF LIQUID ASPHALT FOR TACK SHALL BE APPROVED BY THE ENGINEER IN THE FIELD. THE HOT BITUMINOUS PAVEMENT MATERIAL SHALL BE HOT MIXED, BLADE LAID, COMPACTED AND MAY BE OBTAINED FROM A COMMERCIAL SOURCE. IT IS INTENDED THAT THE OPTIMUM AMOUNT OF ASPHALT CEMENT BE USED IN THE MIX, AND THE QUANTITY SHOWN UNDER THE BASIS OF ESTIMATE MAY BE ADJUSTED BY THE ENGINEER IF NECESSARY.

SHOP DRAWINGS
THE CONTRACTOR SHALL SUBMIT THE FOLLOWING SHOP DRAWINGS TO THE BRIDGE ENGINEER FOR APPROVAL BEFORE FABRICATION:

1. STEEL EXTRUSIONS FOR EXPANSION JOINT MODIFICATIONS.

CONSTRUCTION JOINTS
ALL CONSTRUCTION JOINTS SHALL BE CLEANED OUT PRIOR TO PLACEMENT OF THE OVERLAY. THE OVERLAY SHALL THEN BE SAW CUT AT THESE LOCATIONS WITHIN 24 HOURS OF PLACEMENT. THE SAW CUT SHALL BE 1" DEEP BY 1/8" TO 3/8" WIDE. THE JOINT SHALL THEN BE SEALED WITH HOT POURED ELASTIC TYPE JOINT SEALER 0" TO 1/8" BELOW THE FINISHED PAVEMENT. THE COST OF ANY SUCH WORK SHALL BE INCIDENTAL TO CLASS 1 OVERLAY.

GUARD RAIL AND/OR END POSTS
THE APPROACH GUARD RAIL WHICH IS SPECIFIED TO BE REMOVED AND RESET SHOULD BE RESET SO THAT THE TOP OF THE RAIL IS 27" ABOVE THE GROUND LINE AS RE-ESTABLISHED FOR THE BRIDGE APPROACHES. ALSO, THE BRIDGE END OF THE GUARD RAIL SHOULD MATCH THE ELEVATION OF THE MOUNTING HOLES IN THE END POSTS.

IF THE CONSTRACTOR WISHES TO REMOVE ANY APPROACH GUARD RAIL OR END POSTS OTHER THAN THOSE SPECIFIED IN CONNECTION WITH PLACING CURB AND GUTTER SECTIONS, APPROACH TAPERS, OR DECK OVERLAYS, HE SHALL DO SO FOR HIS CONVENIENCE ONLY. THE COST OF ANY SUCH REMOVAL SHALL BE AT THE CONTRACTOR'S EXPENSE, AND THE REMOVED ITEMS SHALL BE REPLACED TO EXISTING CONDITIONS.

TWO-LANE, TWO-WAY ROADWAYS: THE MAINTENANCE AND PROTECTION OF TRAFFIC FOR TWO-LANE, TWO-WAY ROADWAYS AT 32ND AVENUE, THOMPSON, AND MAYVILLE INTERCHANGES PROVIDES FOR FLAGGING THE TRAFFIC AT ALL TIMES, UNTIL THE ROADWAY IS COMPLETELY OPEN TO TRAFFIC. IN LIEU OF PROVIDING FLAGGING DURING THE TIME ONE-LANE TRAFFIC IS MAINTAINED A TRAFFIC SIGNAL SYSTEM MAY BE PROVIDED ELIMINATING THE NEED FOR FLAGGING DURING THE TIME ONE-LANE TRAFFIC IS MAINTAINED. THE COST OF FLAGGING DURING THE ONE-LANE TRAFFIC IS MAINTAINED SHALL BE CONSIDERED INCIDENTAL AND SHALL BE INCLUDED IN THE PRICE BID FOR TRAFFIC CONTROL. THE TRAFFIC SIGNAL SYSTEM SHALL BE APPROVED BY THE ENGINEER PRIOR TO THE PRE-CONSTRUCTION CONFERENCE.

PORTABLE PRECAST CONCRETE MEDIAN BARRIERS: THE NUMBER OF PRECAST CONCRETE MEDIAN BARRIERS FURNISHED ON THE PROJECT SHALL BE 90-10 FOOT UNITS. THIS NUMBER WILL PROVIDE COVERAGE FOR LONGEST STRUCTURE AND APPROACH ON THIS PROJECT. IF THE CONTRACTOR CHOOSES TO WORK ON MORE THAN ONE STRUCTURE, ADDITIONAL BARRIERS AND ATTENUATION DEVICES SHALL BE FURNISHED AT HIS OWN EXPENSE. THE 90-10 FOOT BARRIERS SHALL BECOME THE PROPERTY OF THE STATE UPON COMPLETION OF THE PROJECT. THE CONTRACTOR SHALL FURNISH, INSTALL, MOVE AND DELIVER TO THE STATE HIGHWAY DISTRICT YARD AS REQUIRED. THE COST OF FURNISHING, INSTALLING, MOVING AND DELIVERING THE PRECAST CONCRETE MEDIAN BARRIERS SHALL BE INCIDENTAL TO THE PRICE BID FOR TRAFFIC CONTROL.

SPECIAL PROVISIONS

NO.	NAME
SP-103-3	Award and Execution of Contract
SP-107-7	Legal Relations and Responsibility to Public
SP-108-9	Prosecution and Progress
SP-108-19	Prosecution and Progress
SP-109-4	Measurement and Payment
SP-406-7	Hot Bituminous Pavement
SP-40	EXPANSION JOINT STRIP SEAL
SP-746-1	Flagging
SP-756-2	Field Laboratory
SP-762-6	Maintenance and Protection of Traffic
SP-384	Pressure Relief Joint Filler Bridge
SP-402	Repair and Overlay of Portland Cement Concrete Decks with Low Slump Concrete
SP-370	Railway Protection Insurance
SP-610-3	Portland Cement Concrete
SP-806-3	Aggregates For Portland Cement

SHOULDER REPAIR
AREAS OF BITUMINOUS SURFACED SHOULDERS USED TO CARRY TRAFFIC DURING CONSTRUCTION SHALL BE MAINTAINED BY THE CONTRACTOR AND, AFTER COMPLETION OF THE WORK, SHALL BE RESTORED TO SATISFACTORY CONDITION. THE CONTRACTOR WILL BE REIMBURSED AT THE RATE OF $25.00 PER TON FOR HOT MIX USED TO MAINTAIN AND REPAIR THE SHOULDERS. THIS PAYMENT WILL CONSTITUTE FULL REIMBURSEMENT FOR ALL MATERIALS, LABOR, AND EQUIPMENT REQUIRED TO MAINTAIN AND REPAIR THE SHOULDERS. THE QUALITY OF AGGREGATE AND GRADE OF ASPHALT CEMENT USED FOR THE HOT MIX SHALL BE SUBJECT TO THE APPROVAL OF THE ENGINEER.

MOUNTABLE CURB & GUTTER
WHERE SPECIFIED, THE MOUNTABLE CURB & GUTTER SHALL BE BUILT TO MATCH THE NEW GRADE AS ESTABLISHED FOR THE BRIDGE APPROACHES. IN A DISTANCE OF 10 FEET, THE CURB SHALL TRANSITION FROM THE EXISTING SECTION ON THE BRIDGE TO THE TYPICAL SECTION SHOWN ON THE STANDARD.

SUMMARY OF QUANTITIES

ESTIMATE OF QUANTITIES

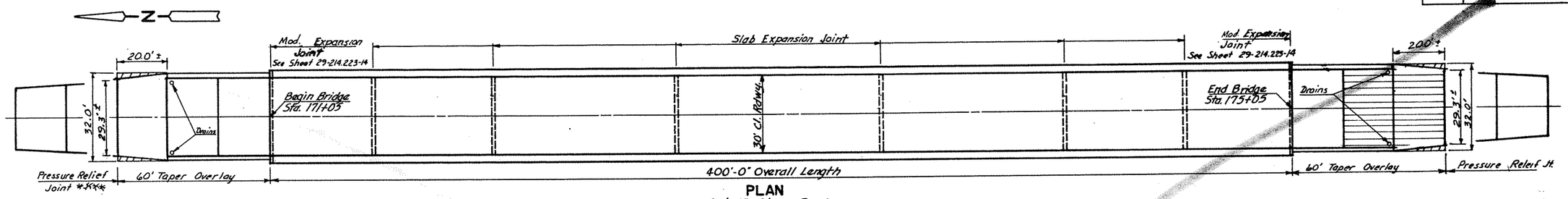
SPEC. NO.	302	406	705	708	716	722	746	750	756	762	900	900	900	900	900	900	900	900	900	900	900	900	103
CODE NO.	0120	0230	0100	0410	0100	0150	0100	0100	0100	3298	8673	9587	9620	9690	9700	9701	9702	9705	9499	9501	9586	8682	0100
BRIDGE NO.	AGGREGATE BASE COURSE CL. 5	HOT BITUMINOUS PAVEMENT-SPECIAL	MOBILIZATION	MOUNTABLE CURB & GUTTER TYPE I	ADJUST CATCH BASIN	REMOVE & RESET GUARDRAIL	FLAGGING	LINSEED OIL TREATMENT	FIELD LABORATORY TYPE "A"	TRAFFIC CONTROL	EXPANSION JOINT MODIFICATION (STRIP SEAL)	FINGER EXPANSION JOINT MODIFICATION	ABUTMENT REPAIR (INTEGRAL)	CURB OVERLAY	CLASS I OVERLAY	CLASS 2 OVERLAY	CLASS 3 OVERLAY	OVERLAY TAPER	10" P.C.C. PAVEMENT (REMOVE & REPLACE)	APPROACH SLAB (REMOVE & REPLACE)	PRESSURE RELIEF JOINT	SLAB JOINT MODIFICATION AT HINGE POINTS	CONTRACT BOND
	TON	TON	L.S.	L. FT.	EACH	L. FT.	M. HR	GAL.	L. S.	L. S.	L. FT.	L. FT.	EACH	L. FT.	S.Y	S. Y.	S. Y	S. Y	S.Y.	S.Y.	L. FT.	L. FT.	L. SUM
N. GRAND FORKS INT. 29-144.76 RT.		4.2	1		4		160	45.2	1	1		74.0		844.0	1644.4	328.9	82.2		913.8	346.7			1
N GRAND FORKS INT 29-144.726 LT.		4.2			4		160	44.7				74.0		844.0	1644.4	328.9	82.2		879.5	346.7			
MANVEL INT. 29-152.38	546.0	222.9		160.0	4	300.0	240	17.5						530.0	1060.0	371.0	53.0						
JOHNSTOWN INT. 29-156.73	468.0	187.2		160.0	4	300.0	240	13.1						470.0	783.3	156.7	39.2						
BOWESMONT INT. 29-196.01		34.4		80.0		80.0		10.6					2	488.0	650.7	130.1	32.5						
CARLISLE INT. 29-200.24		11.8					100	10.4							693.3	104.0	34.7						
JOLIETTE INT. 29-203.41		14.6					200	13.7						510.0	850.0	170.0	42.5						
PEMBINA RIVER 29-214.22 RT.							120	26.0			60.0				1333.3	266.7	66.7	402.9	68.1	73.3	58.6	180.0	
PEMBINA RIVER 29-214.22 LT.							48				80.0												
GRAND TOTAL	1014.0	479.3	1	400.0	16	680.0	1268	181.2	1	1	140.0	148.0	2	3686.0	8659.4	1856.3	433.0	402.9	1861.4	766.7	58.6	180.0	1

Revised 7/14/82

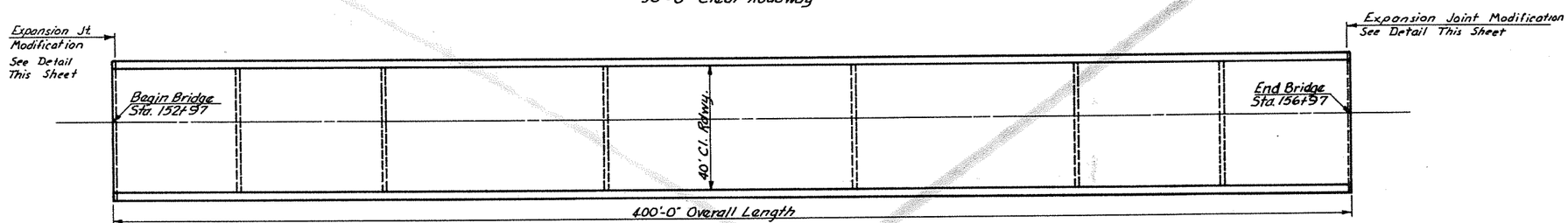
NOTES & QUANTITIES

CONTRACT NO 2 29-2

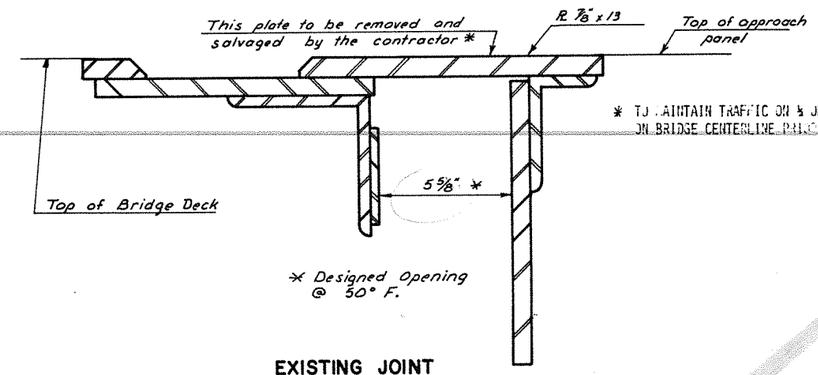
FED. ROAD DIST. NO.	STATE	Federal Aid Project Number	TOTAL SHEETS
8	N.D.	IR-029-3(36)C92	14



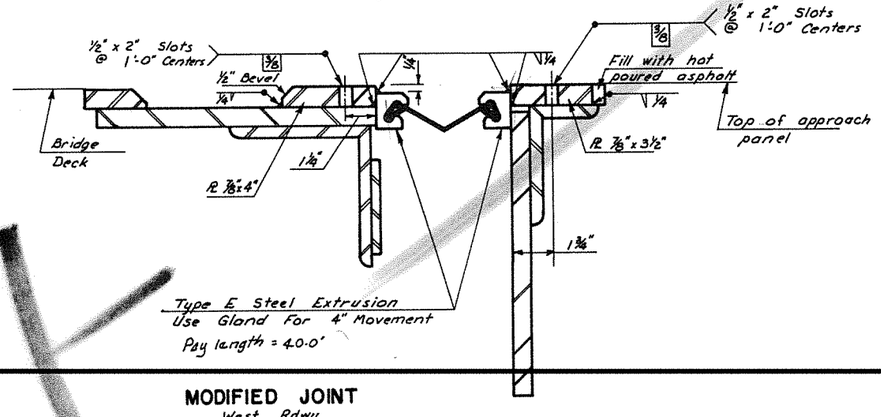
PLAN
30'-0" Clear Roadway



PLAN
40'-0" Clear Roadway



EXISTING JOINT
West Rdwy.



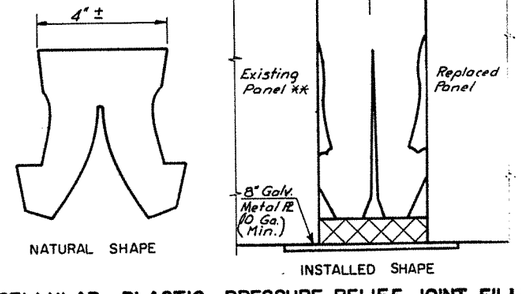
MODIFIED JOINT
West Rdwy.
One at each end of bridge

ASPHALT OVERLAY (Incidental to Taper Overlay)

FULL DEPTH CONCRETE REMOVAL & REPLACEMENT. SET GRADE TO ALLOW FOR TAPER OVERLAY.

FOAM SPACER

If Joint Filler does not bottom on pavement base, a rigid polystyrene or polyurthane foam spacer shall be placed below filler and must be a material which is easily compressible.



CELLULAR PLASTIC PRESSURE RELIEF JOINT FILLER

NOTE:
THE OVERLAY IS TO EXTEND OVER THE JOINT AT THE ENDS OF THE EAST STRUCTURE. A SAW CUT SHALL THEN BE MADE IN THE OVERLAY AT THESE LOCATIONS WITHIN 24 HOURS OF POURING THE OVERLAYS. THE WIDTH OF THE SAW CUT SHOULD MATCH THE MAXIMUM WIDTH OF THE EXISTING JOINT. THE SAWED JOINT IS TO BE FILLED WITH HOT POURED ASPHALT.

ALL REMOVAL, LABOR AND NEW MATERIALS SHALL BE INCIDENTAL TO THE PAY ITEMS "APPROACH SLAB, REMOVE AND REPLACE", AND "P.C.C. PAVING, REMOVING AND REPLACE".

** NOTE
Any dowels or reinforcement projecting from surface of existing panel shall be removed or sawed off.

*** WHERE NO PANEL IS TO BE REPLACED, A 4" SECTION OF PANEL MUST BE REMOVED BY SAWING AND CHIPPING. THE SAW CUT SHALL BE A MINIMUM OF ½ THE PANEL THICKNESS. TWO 6" METAL PLATES MAY BE USED IN LIEU OF ONE 8" GALVANIZED PLATE.

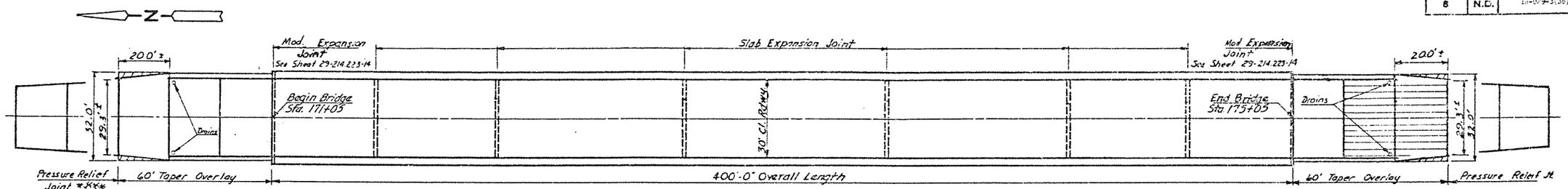
TRACING | CHECKED BY
QUANTITIES | MADE BY | CHECKED BY

CONTRACT NO. 2

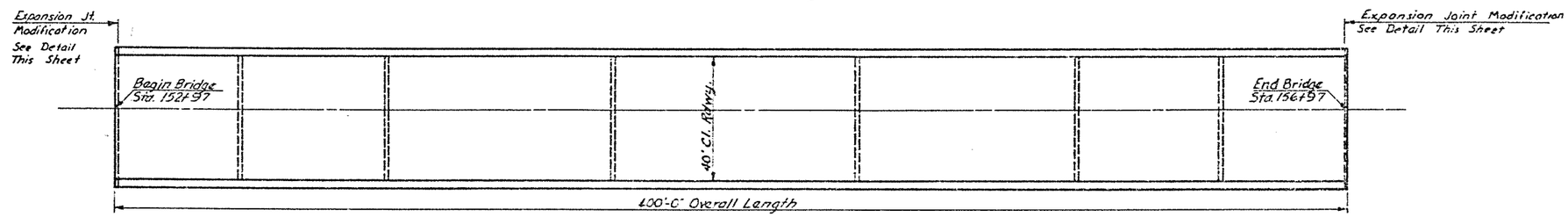
PEMBINA RIVER

29-214.223-13

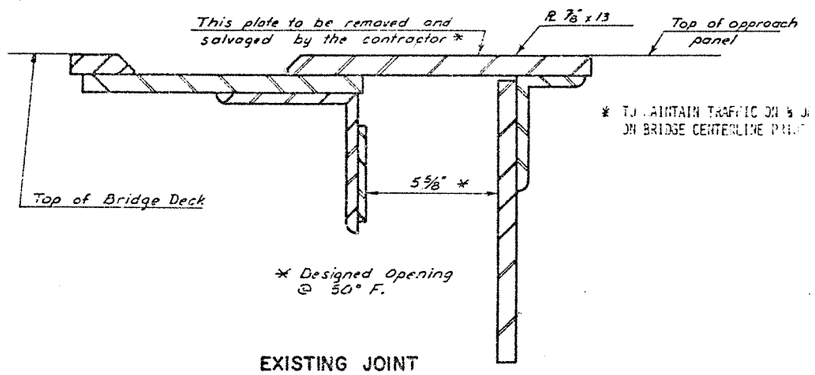
FED. ROAD DIST. NO.	STATE	Federal Aid Project Number	TOTAL SHEETS
8	N.D.	[illegible]	14



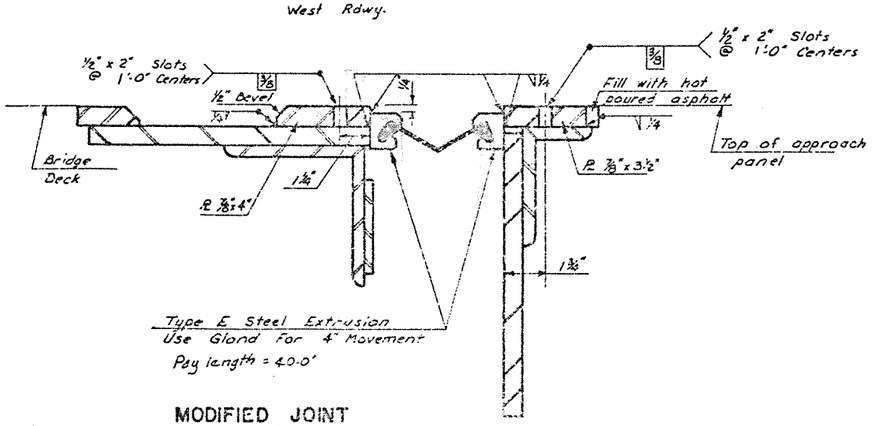
PLAN
30'-0" Clear Roadway



PLAN
40'-0" Clear Roadway



EXISTING JOINT
West Rdwy.



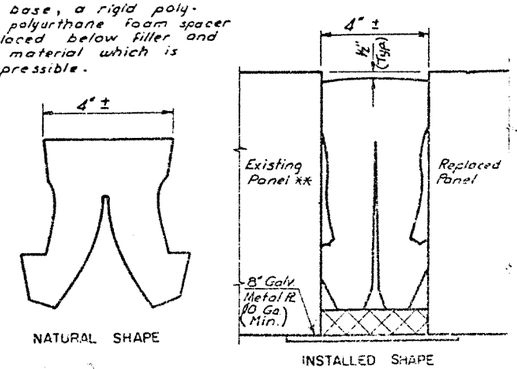
MODIFIED JOINT
West Rdwy.
One at each end of bridge

ASPHALT OVERLAY
(Incidental to Taper Overlay)

FULL DEPTH CONCRETE REMOVAL & REPLACEMENT. SET GRADE TO ALLOW FOR TAPER OVERLAY.

FOAM SPACER

If Joint Filler does not bottom on pavement base, a rigid polystyrene or polyurthane foam spacer shall be placed below filler and must be a material which is easily compressible.



CELLULAR PLASTIC PRESSURE RELIEF JOINT FILLER

NOTE:
THE OVERLAY IS TO EXTEND OVER THE JOINT AT THE ENDS OF THE EAST STRUCTURE. A SAW CUT SHALL THEN BE MADE IN THE OVERLAY AT THESE LOCATIONS WITHIN 24 HOURS OF POURING THE OVERLAYS. THE WIDTH OF THE SAW CUT SHOULD MATCH THE MAXIMUM WIDTH OF THE EXISTING JOINT. THE SAWED JOINT IS TO BE FILLED WITH HOT POURED ASPHALT.

ALL REMOVAL, LABOR AND NEW MATERIALS SHALL BE INCIDENTAL TO THE PAY ITEMS "APPROACH SLAB, REMOVE AND REPLACE", AND "P.C.C. PAVING, REMOVING AND REPLACE".

** NOTE
Any dowels or reinforcement projecting from surface of existing panel shall be removed or sawed off.

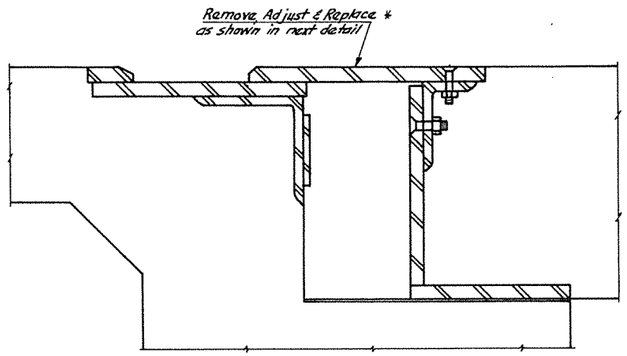
*** WHERE NO PANEL IS TO BE REPLACED, A 4" SECTION OF PANEL MUST BE REMOVED BY SAWING AND CHIPPING. THE SAW CUT SHALL BE A MINIMUM OF ½ THE PANEL THICKNESS. TWO 6" METAL PLATES MAY BE USED IN LIEU OF ONE 8" GALVANIZED PLATE.

CONTRACT NO. 2

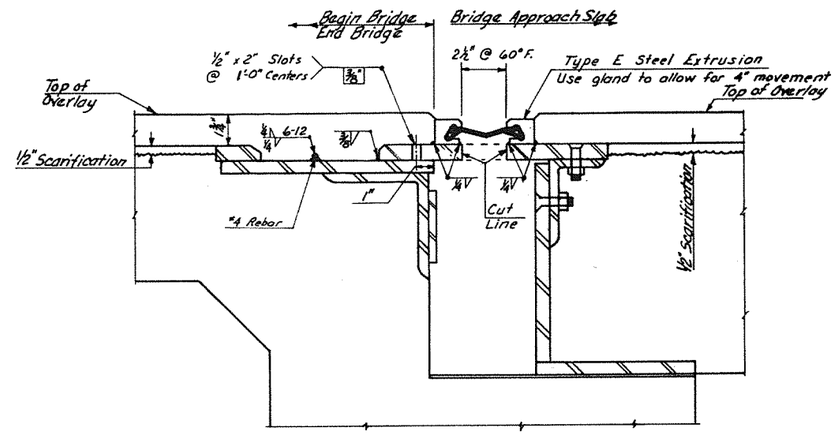
PEMBINA RIVER

29-214.223-13

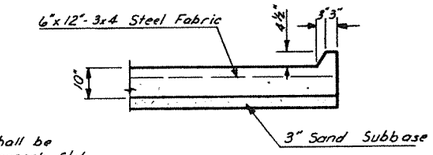
FHWA REGION	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N.D.	IR-029-3(36)092	15



EXISTING EXPANSION JOINT

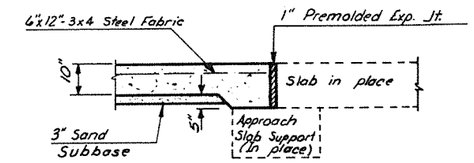


MODIFIED EXPANSION JOINT



A-A

NOTE
Cost of Curb shall be incidental to Approach Slab (Remove & Replace).



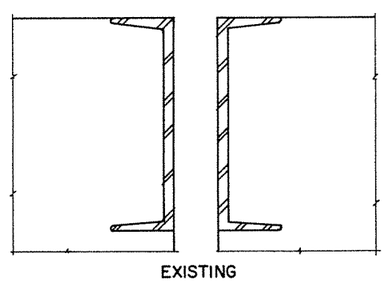
B-B

APPROACH SLAB EXPANSION JOINT MODIFICATION

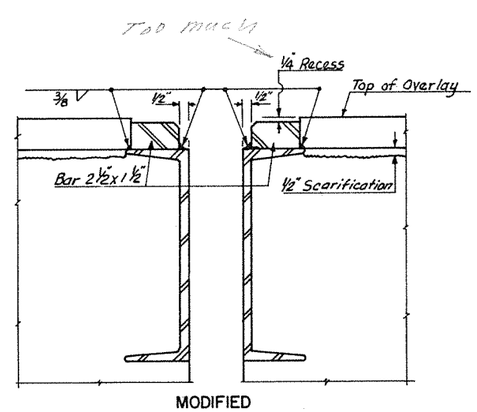
(One at each end of Bridge)
East Rdwy.
Pay length = 37.0' as Expansion Joint Modification (Strip Seal)

* TO MAINTAIN TRAFFIC ON ½ OF ROADWAY, PLATE SHALL BE FIELD CUT ON BRIDGE CENTERLINE PRIOR TO REMOVAL.

THE BOTTOM EDGE OF THE STEEL EXPANSION PLATES ON THE CURBS WILL HAVE TO BE FIELD CUT TO ALLOW CLEARANCE FOR THE ELEVATION OF THE OVERLAY. THE COST FOR THIS ITEM SHALL BE INCIDENTAL TO THE ITEM FOR EXPANSION JOINT MODIFICATION.

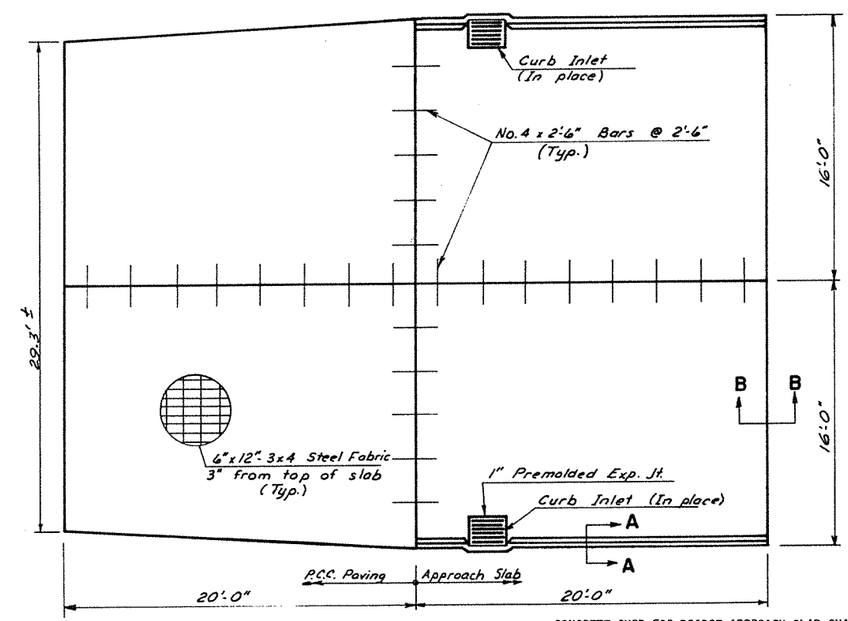


EXISTING



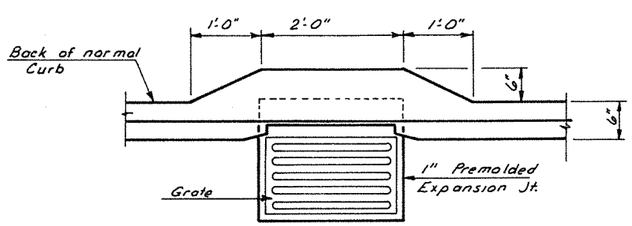
MODIFIED
Bar 2½"x 1½"=37'-0"

OPEN JOINT OVER EACH PIER
(6 Joints of this type)

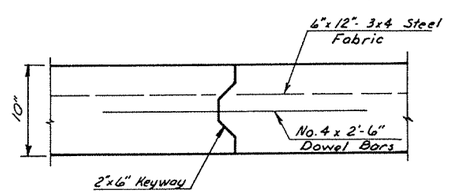


PLAN

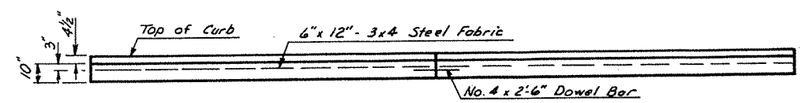
CONCRETE CURB FOR BRIDGE APPROACH SLAB SHALL BE INCLUDED IN THE PRICE BID FOR "APPROACH SLAB, REMOVE AND REPLACE".



CURB WIDENING



SECTION AT CONSTRUCTION JOINTS



ELEVATION

CONTRACT NO. 2

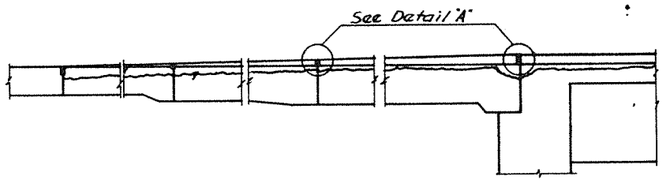
PEMBINA RIVER BRIDGE

OVERLAY DETAILS

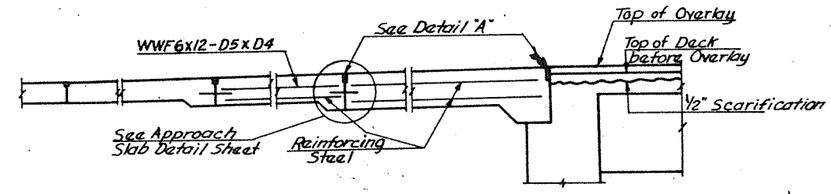
Right

29-214.223-14

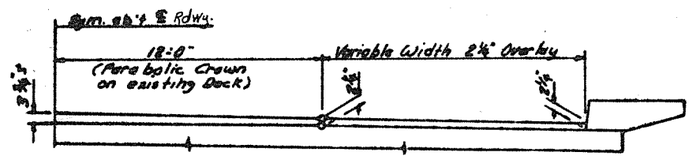
FED. ROAD DIST. NO.	STATE	PROJ. NO.	TOTAL SHEETS
8	N. D.	IR-029-3(36)092	16



APPROACH SLAB
(Slab overlayed)

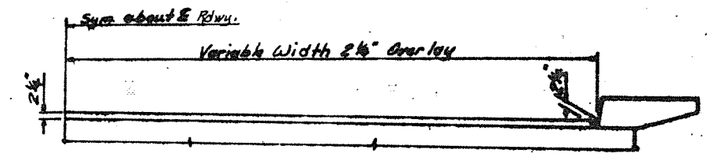


APPROACH SLAB
(Full depth removal & replacement to final surface grade)



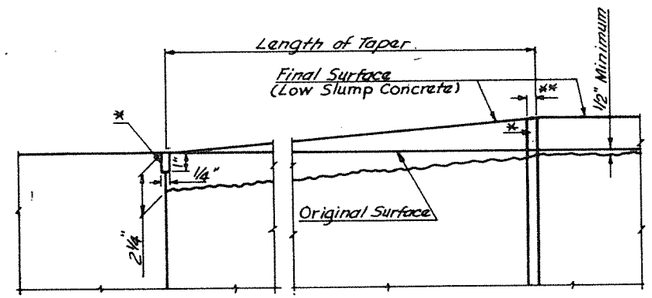
ELEVATION

North Grand Forks Interchange



ELEVATION

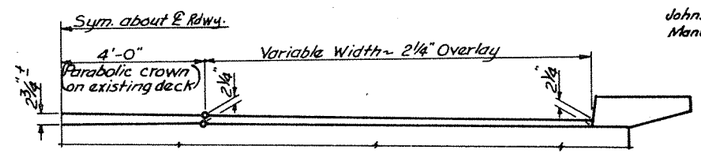
Johnstown
Manvel



DETAIL "A"

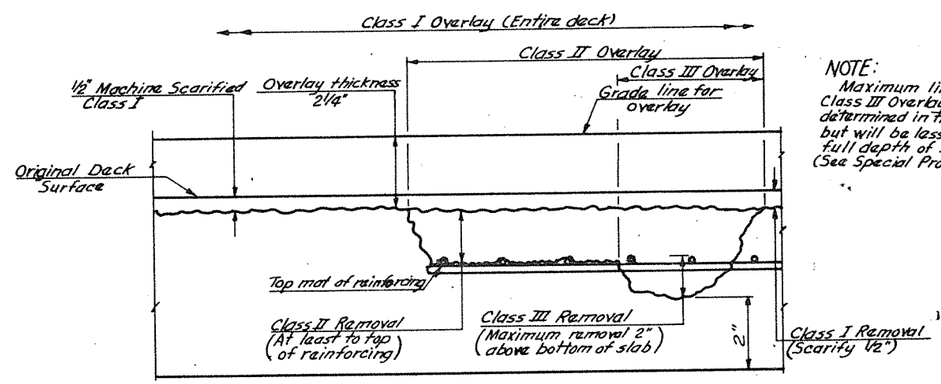
* To be filled with hot poured joint filler

** Remove existing premolded joint filler & fill with hot poured joint filler. Width 1 1/2" ±



ELEVATION

Pembina
Joliette
Carlisle
Bowesmont



BRIDGE DECK

NOTE:
Maximum limits for Class III Overlay will be determined in the field, but will be less than full depth of slab. (See Special Provisions)

QUANTITIES

OVERLAY DETAILS

CONTRACT NO. 2

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	SHEET NO.
8	N. D.	I-29-5 (23)197	1

GOVERNING SPECIFICATIONS:

Standard Specifications adopted by the North Dakota State Highway department July 1971 and approved as standard by the Fed. Highway Administration Sept. 29, 1971. Required Contract Provision (Form PR-1273) dated April, 1974 and others submitted herewith.

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

PLANS

FOR THE PROPOSED IMPROVEMENT OF A

STATE HIGHWAY

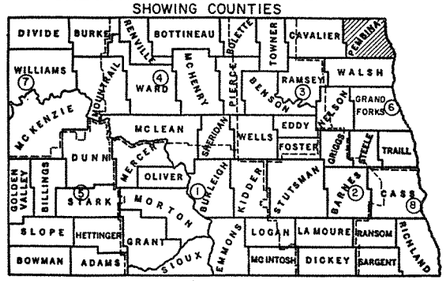
IN PEMBINA COUNTY

FEDERAL AID PROJECT NO. I-29-5 (23) 197

~~GRADING &~~ STRUCTURES — 1

(WEST ROADWAY & RAMP REVISIONS)

SKETCH-MAP OF NORTH DAKOTA
SHOWING COUNTIES



SCALES
- LAYOUT SHEET: 1 IN. = 5000 FT.
- PLAN AND PROFILE DRAWINGS: HOR. 1 IN. = 100 FT.; VERT. 1 IN. = 10 FT.
- STRUCTURAL DRAWINGS:- AS SHOWN
- CROSS SECTION SHEETS:- 1 IN. = 10 FT.

LENGTH OF PROJECT		
PROJECT	MILES-GROSS	MILES-NET
I-29-5(23)197	19.994	19.994
TOTALS	19.994	19.994

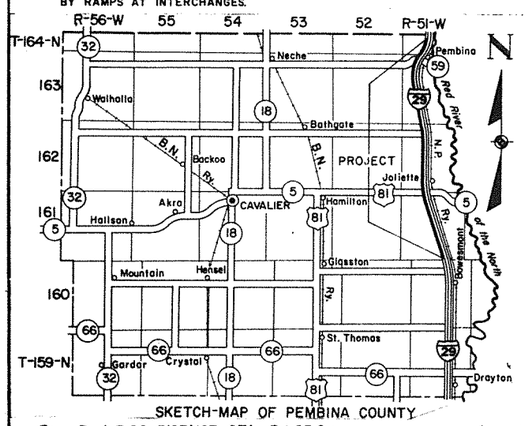
DESIGN DATA

TRAFFIC	AVERAGE DAILY	EST. 30TH. MAX. HR.
CURRENT TRAFFIC (1975)	1055 PASS. 185 TRUCKS 1240	TOTAL 185
TRAFFIC FORECAST (1995)	3280 PASS. 580 TRUCKS 3860	TOTAL 580

DESIGN SPEED 80MPH
TRAFFIC CLASSIFICATION "M"
MINIMUM SIGHT DISTANCE (STOPPING) 1050'
FULL CONTROL OF ACCESS.
NO POINT OF ACCESS OTHER THAN BY RAMPS AT INTERCHANGES.

STA.	CLEAR RDWY. WIDTH	DESIGN LOAD'NG
154 + 97 W. RDY.	40.0'	HS-20 (1944) *
741 + 52.5	46.0' RT., 50.0' LT.	HS-20 (1944) *

* AND ALTERNATE LOADING AS DESIGNATED IN PPM 20-4, SECTION 4 C

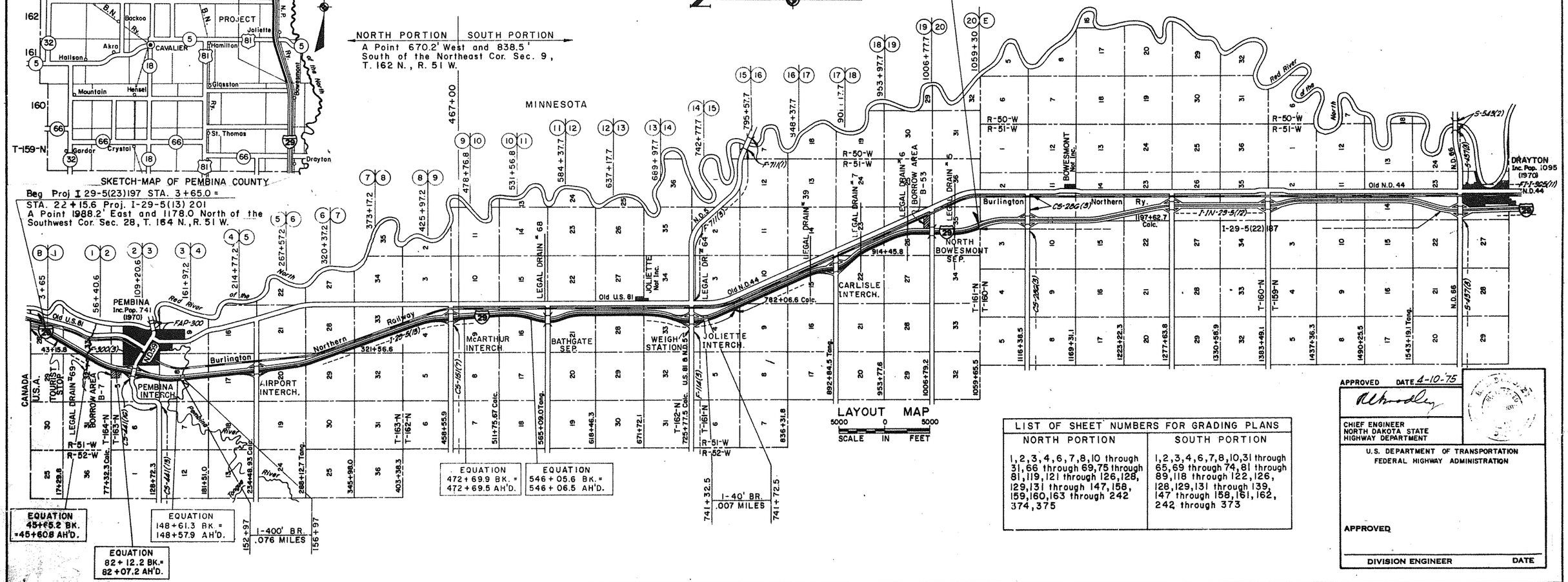


SKETCH-MAP OF PEMBINA COUNTY

NORTH PORTION | SOUTH PORTION
A Point 670.2' West and 838.5' South of the Northeast Cor. Sec. 9, T. 162 N., R. 51 W.

End Proj. I-29-5(23) 197 STA. 1059+30 = STA. 1059+30 Proj. I-29-5(22) 187 = STA. 1074 +76.6 Proj. I-IN-29-5 (12) A Point 3137.3' East and 32.5' North of the Southwest Cor. Sec. 35, T. 161 N., R. 51 W.

Beg Proj I 29-5(23)197 STA. 3+65.0 = STA. 22+15.6 Proj. I-29-5(13) 201 A Point 1988.2' East and 1178.0 North of the Southwest Cor. Sec. 28, T. 164 N., R. 51 W.



LIST OF SHEET NUMBERS FOR GRADING PLANS	
NORTH PORTION	SOUTH PORTION
1,2,3,4,6,7,8,10 through 31,66 through 69,75 through 81,119,121 through 126,128, 129,131 through 147,158, 159,160,163 through 242 374,375	1,2,3,4,6,7,8,10,31 through 65,69 through 74,81 through 89,118 through 122,126, 128,129,131 through 139, 147 through 158,161,162, 242 through 373

APPROVED DATE 4-10-75

CHIEF ENGINEER
NORTH DAKOTA STATE HIGHWAY DEPARTMENT

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED

DIVISION ENGINEER DATE

FED. ROAD DIV. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.	I-29-5(8)		1	23

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

PLANS

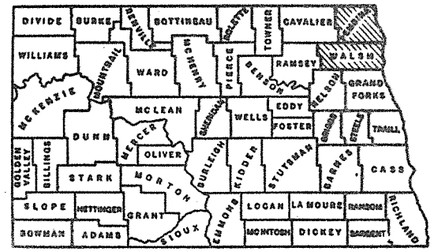
FOR THE PROPOSED IMPROVEMENT OF A

STATE HIGHWAY

IN PEMBINA COUNTY

FEDERAL AID PROJECT NO. I-29-5(8)-213

STRUCTURAL PLANS



SKETCH-MAP OF NORTH DAKOTA SHOWING COUNTIES

SCALES
- LAYOUT SHEET: 1 IN. = 5280 FT.
- PLAN AND PROFILE DRAWINGS: HOR. 1 IN. = 100 FT. VERT. 1 IN. = 10 FT.
- STRUCTURAL DRAWINGS:- AS SHOWN
- CROSS SECTION SHEETS:- 1 IN. = 10 FT.

INDEX OF DRAWINGS

Sheet No. 1 Title sheet & Quantities
Sheet No. 2 Plan and Profile Sheets
Sheet No. 3 to 18 Structural drawings.
Sheet No. 19 to 23 Cross-Sections.

Sheet Nos. 2 and 19 to 23 Inc. are from I-29-5(5)

LENGTH OF PROJECT		
PROJECT	MILES-GROSS	MILES-NET
I-29-5(8)	0.075	0.075
TOTALS	0.075	0.075

GOVERNING SPECIFICATIONS:

Standard Specifications adopted by the North Dakota State Highway department Jan 1956 and approved as standard by the Bureau of Public Roads May 7, 1956. Required Special Provisions dated Oct. 9, 1957 and approved by the Bureau of Public Roads Nov. 29, 1957 and others submitted herewith.

KEY TO CONVENTIONAL SIGNS

- STATE & NATIONAL LINES
- COUNTY LINE
- TOWNSHIP & RANGE LINES
- GRADE LINE
- CENTERLINE OF CONSTRUCTION
- OLD RIGHT OF WAY LINE
- NEW RIGHT OF WAY LINE
- ABANDONED RIGHT OF WAY LINE
- PROPERTY LINE

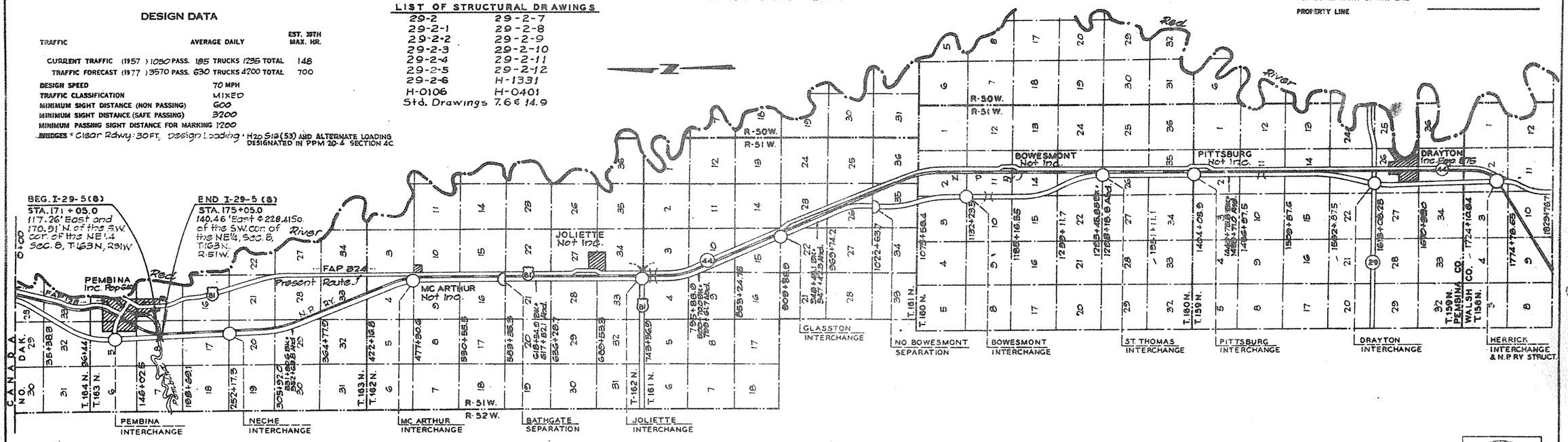
DESIGN DATA

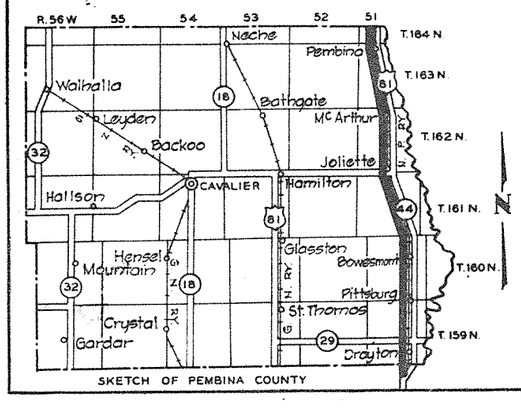
TRAFFIC	AVERAGE DAILY	EST. 30TH MAX. HR.
CURRENT TRAFFIC (1957) 1050 PASS. 185 TRUCKS 1235 TOTAL		148
TRAFFIC FORECAST (1977) 3570 PASS. 630 TRUCKS 4200 TOTAL		700
DESIGN SPEED	70 MPH	
TRAFFIC CLASSIFICATION	MIXED	
MINIMUM SIGHT DISTANCE (NON PASSING)	600	
MINIMUM SIGHT DISTANCE (SAFE PASSING)	3200	
MINIMUM PASSING SIGHT DISTANCE FOR MARKING	1200	

BRIDGES - Clear Rdwy: 30 FT, Design Loading - H20 S16(53) AND ALTERNATE LOADING DESIGNATED IN PPM 20-4 SECTION 4C

LIST OF STRUCTURAL DRAWINGS

29-2	29-2-7
29-2-1	29-2-8
29-2-2	29-2-9
29-2-3	29-2-10
29-2-4	29-2-11
29-2-5	29-2-12
29-2-6	H-1331
H-0106	H-0401
Std. Drawings	7.6 & 14.9





SKETCH OF PEMBINA COUNTY

① See Special Provisions

QUANTITIES

	15B Class 2 Excavation	15C Class 3 Excavation	15D Class 4 Excavation	17 Embankment	60A Class A-1½ Concrete	62A Reinforcing Steel	63A Structural Steel	64B Treated Timber	65 Loading Test	65C Furnish & Deliver Steel Piling (14BP73)	65C Driving Steel Piling (14BP73)	65C Furnish & Deliver Steel Piling (14BP89)	65C Driving Steel Piling (14BP89)	Ornamental Metal Railing	Water for Compaction 10 gal/yd.	Bridge Bench Marks
	Cu. Yds.	Cu. Yds.	Cu. Yds.	Cu. Yds.	Cu. Yds.	LB.	LB.	M.B.M.	Each	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	Lin. Ft.	M. Gal.	Set
Sta. 173+05	250	865	2,050	1,550	1047.4	158,915	407,000	1.196	1	1160	1144	4080	3988	809.0	15.5	1
Grand Total	250	865	2,050	1,550	1047.4	158,915	407,000	1.196	1 ①	1160 ①	1144 ①	4080 ①	3988 ①	809.0	15.5	1

APPROVED DATE 6-20-1958

R. C. Bradley

CHIEF ENGINEER
NORTH DAKOTA STATE
HIGHWAY DEPARTMENT

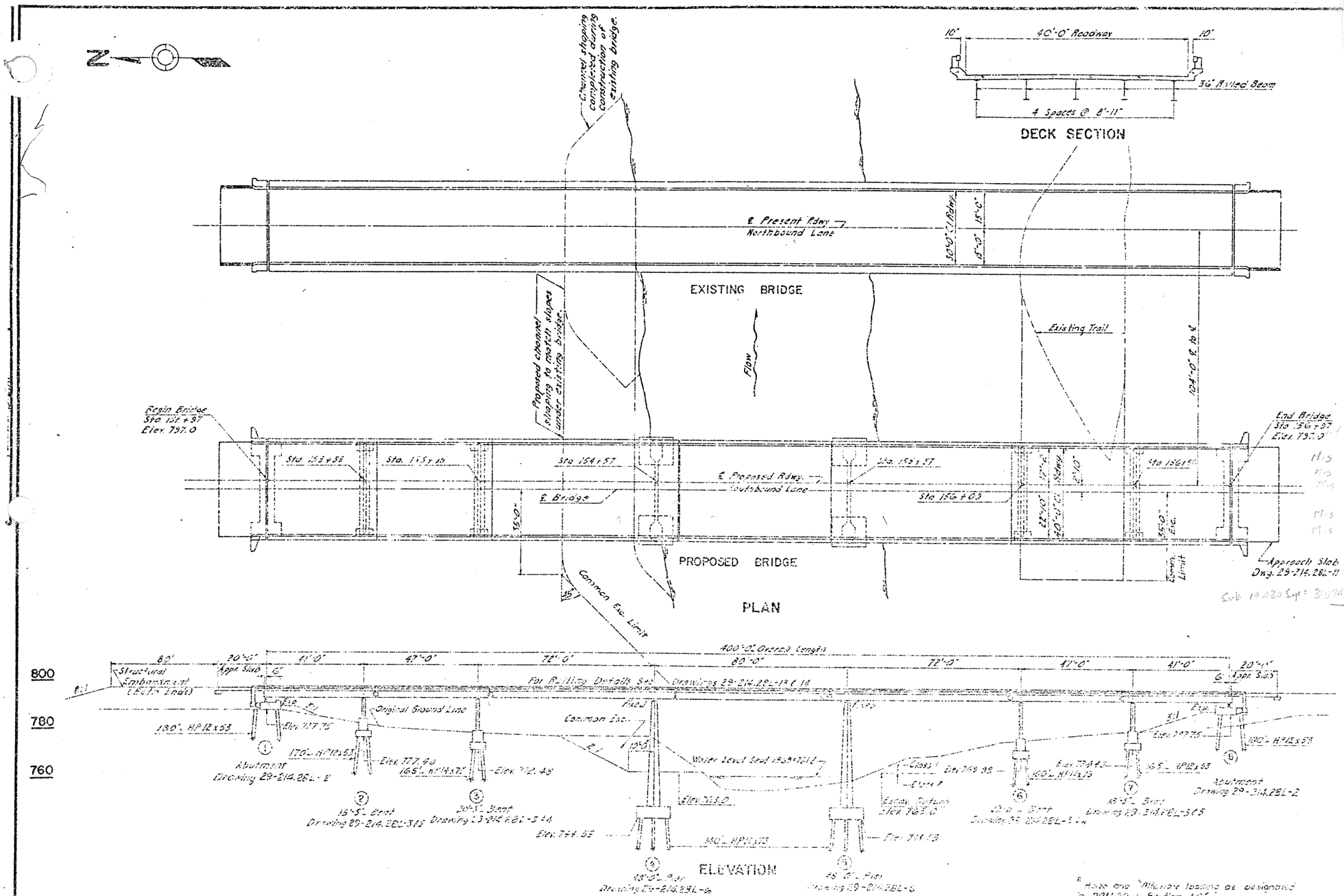
R. C. BRADLEY REGISTERED PROFESSIONAL ENGINEER NORTH DAKOTA

DEPARTMENT OF COMMERCE
BUREAU OF PUBLIC ROADS

APPROVED

DIVISION ENGINEER DATE

BRIDGE CODE	FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
X-071	8	N. D.	I-029-5(23)	90	



The general notes for this project are shown on Drawing 29-214.23L-1.

SPECIAL PROVISIONS

NO.	NAME

ESTIMATE OF QUANTITIES

SPEC. NO.	CODE NO.	BID ITEM		
203	0101	COMMON EXCAVATION - TYPE 1	14,657	CU. YD.
205	0100	CLASS 1 EXCAVATION	515	CU. YD.
209	0110	CLASS B EXCAVATION	500	CU. YD.
209	0100	SELECT BACKFILL	23	CU. YD.
253	0050	MOISTURE CONTROL	LUMP SUM	
610	112	CLASS AE-1 CONCRETE (STRUCTURE)	595.0	CU. YD.
610	1134	CLASS AE-1 CONCRETE (BEAM SUPERSTRUCTURE)	609.2	CU. YD.
610	0150	CLASS AE-2 CONCRETE (RAILING & POSTS)	26.50	CU. YD.
615	0110	REINFORCING STEEL (GRADE 40)	143,770	LB.
615	0301	STRUCTURAL STEEL (A-36) (ROLLED BEAM)	114,625	LB.
620	0110	TREATED TIMBER	1.53	M. B.M.
622	0040	STEEL PILING (HP12x53)	3460	LIN. FT.
622	0060	STEEL PILING (HP14x73)	4750	LIN. FT.
	0231	PREFORMED COMPRESSION JOINT SEAL 1/2 IN.	107.0	LIN. FT.
	0213	PREFORMED COMPRESSION JOINT SEAL 1 1/2 IN.	41.5	LIN. FT.
625	0100	COPPER PAN	2	EACH
710	0100	LINSEED OIL TREATMENT	31	GAL.

STRUCTURAL DRAWINGS

GENERAL DRAWING TO BE USED WITH THIS SHEET IS 29-214.23L-1

CONSTRUCTION SPECIFICATIONS: A.A.S.H.O. 1969

SUPERSEDING SPECIFICATIONS: A.A.S.H.O. 1969 & 1970 INTERIM

DESIGN LOADING: H20-S16-44 *

SPAN: 1-100'-0" & 3-150'-0"

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

PEMBINA RIVER
BRIDGE LAYOUT

PROJECT I-029-5(23) SFN 1961 87

PEMBINA COUNTY

APPROVED: 3-29-74

* Note one "Alternate loading as designated in AASHO 20-44, Section 4.C."

BENCH MARKS

DESCRIPTION	LOCATION	ELEV.
1" Mon. by N.D.H.D. Survey	[illegible]	[illegible]
Point Spot N.W. Corner Br.	[illegible]	[illegible]
1" Mon. by N.D.H.D. Survey	[illegible]	[illegible]

PILE LOADING

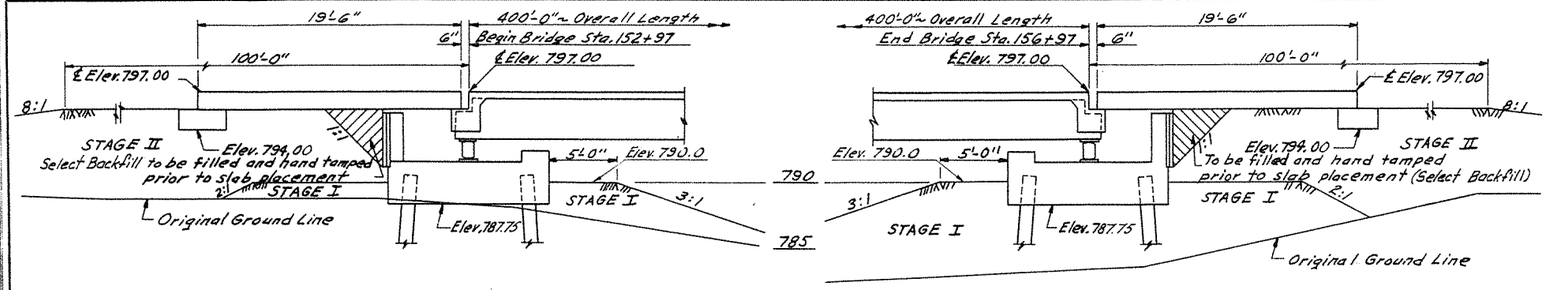
LOCATION	LOAD LOAD	LIVE LOAD	EARTH LOAD	WIND 30 LB.	WIND 15 LB.	WIND 100 LB.		TOTAL LOAD	ALLOWABLE LOAD
Abut. End	[illegible]	[illegible]	[illegible]					[illegible]	[illegible]
Bent 1	[illegible]	[illegible]	[illegible]	[illegible]				[illegible]	[illegible]
Bent 2	[illegible]	[illegible]	[illegible]	[illegible]				[illegible]	[illegible]
Bent 3	[illegible]	[illegible]	[illegible]	[illegible]				[illegible]	[illegible]
Bent 4	[illegible]	[illegible]	[illegible]	[illegible]				[illegible]	[illegible]
Bent 5	[illegible]	[illegible]	[illegible]	[illegible]				[illegible]	[illegible]
Abut. End	[illegible]	[illegible]	[illegible]					[illegible]	[illegible]

DESIGN STRESSES:
[illegible]

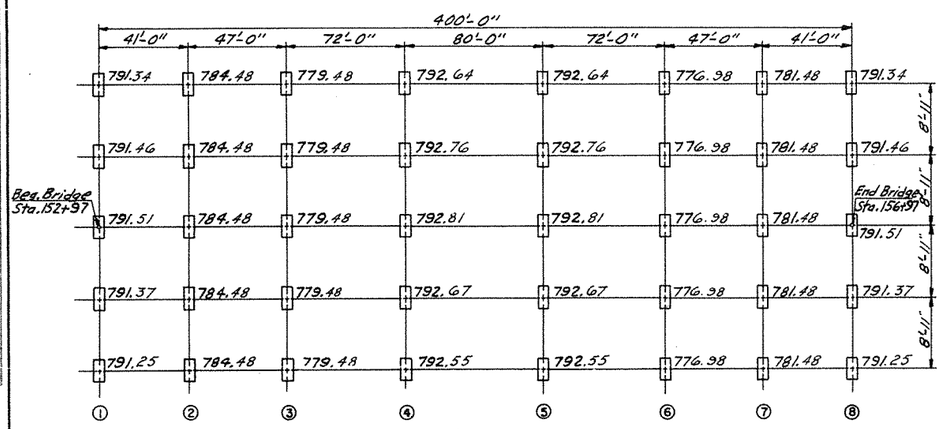
29-214.28L

29-2R 29-214.28L

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N.D.	I-029-5(23)	91	

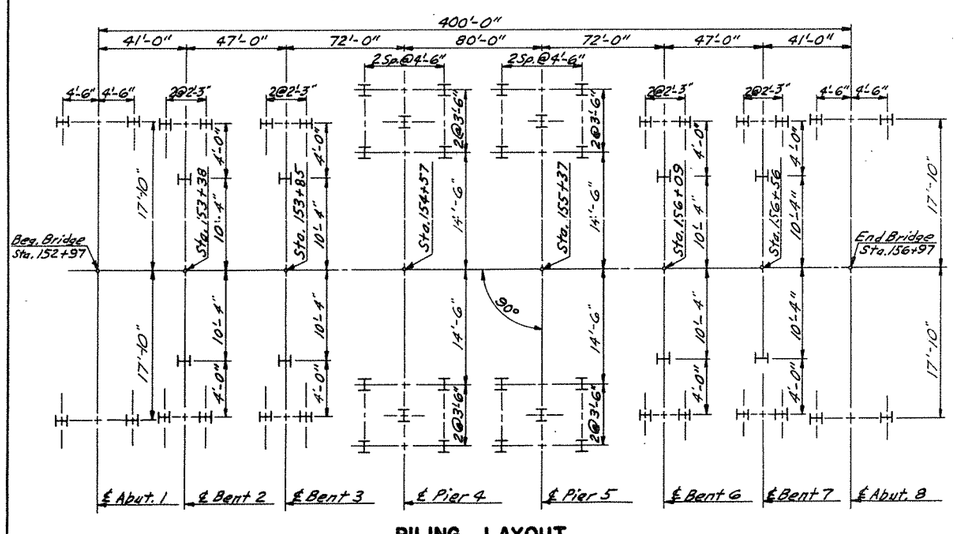


EMBANKMENT DETAILS AT ABUTMENTS



BEARING PLATE LAYOUT

In all cases the elevations shown are top of concrete. At Bents 2, 3, 6, & 7 this elevation is the top of Bent Footing (See Drawing 29-214.28L-3)



PILING LAYOUT

(Not to Scale)

HYDRAULIC DESIGN DATA

DRAINAGE AREA	3928 SQ. MI.
DESIGN FREQUENCY	50 YEAR
DESIGN DISCHARGE	14,880 CFS
STREAM GRADIENT	0.000379 FT/FT.
WATERWAY PROVIDED BELOW DESIGN STAGE (Qso)	2771 SQ. FT.
WATERWAY PROVIDED BELOW CLEARANCE	7244 SQ.FT.
AVERAGE VELOCITY OF FLOW IN NATURAL CHANNEL (Qso)	5.4 FPS
DEPTH OF FLOW (Qso)	23.5 FT.
VELOCITY OF FLOW UNDER BRIDGE (Qso)	5.4 FPS
FREEBOARD PROVIDED (Qso)	13.7 FT.
MAXIMUM RECORDED STAGE (1966) (BACKWATER RED RIVER)	793.6
MAXIMUM RECORDED DISCHARGE	UNKNOWN
FREQUENCY OF MAXIMUM FLOOD	UNKNOWN
MINIMUM WATER ELEVATION (SEPT. 1969)	761.8
CALCULATED HIGH WATER (Qso)	779.3
CLEARANCE ELEVATION	793.0
100-YEAR FLOOD HAZARD MAGNITUDE	18,500 CFS

100-YEAR FLOOD STAGE = BACKWATER EFFECT OF RED RIVER CONTROLS AT ELEV. 793.3 – 793.6 (1974 COOP. STUDY PLOT)

LINSEED OIL TREATMENT:

LINSEED OIL TREATMENT SHALL NOT BE DONE UNTIL ALL CONCRETE WORK IS COMPLETED AND THE ASPHALT CURB SEAL HAS BEEN INSTALLED.

STATIONING:

THE SURVEY STATIONING IS FROM NORTH TO SOUTH WHEREAS THE MILEAGE GIVEN IS DETERMINED FROM SOUTH TO NORTH.

STRUCTURAL EMBANKMENT:

THE CONTRACTOR MAY CONSTRUCT THE STRUCTURAL EMBANKMENT PRIOR TO THE PROPOSED STARTING DATE SHOWN IN THE PROGRESS SCHEDULE. IF THIS IS DONE, NO WORKING DAYS WILL BE CHARGED FOR THE GRADING WORK DONE BEFORE THE SCHEDULED STARTING DATE.

CONCRETE:

THE CONTRACTOR MAY SUBSTITUTE AE-3 CONCRETE FOR AE-1 CONCRETE BUT NOT AE-1 FOR AE-3. ANY SUBSTITUTIONS, HOWEVER, WILL BE AT THE CONTRACTOR'S EXPENSE AND THE CLASS OF CONCRETE PAID FOR WILL BE THAT CLASS SHOWN ON THE PLANS.

NOTES:

GENERAL:

WORK SHALL CONFORM TO ALL APPLICABLE PARAGRAPHS OF THE NORTH DAKOTA STATE HIGHWAY DEPARTMENT SPECIFICATIONS FOR ROAD AND BRIDGE CONSTRUCTION.

THE COST OF FURNISHING AND PLACING JOINT FILLER, ASPHALT CURB SEAL, , AND OTHER MISC. ITEMS SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CONCRETE.

WELDING WILL NOT BE PAID FOR DIRECTLY BUT SHALL BE INCLUDED IN THE UNIT PRICE BID FOR STRUCTURAL STEEL.

BEARING AREAS SHALL BE FINISHED TRUE TO PLAN AND ELEVATION BY GRINDING, IF NECESSARY, BEFORE BEARING PLATES ARE SET.

ALL RIVETS OR HIGH STRENGTH BOLTS ARE TO BE 7/8" DIAMETER. OPEN HOLES ARE TO BE 15/16" DIAMETER EXCEPT AS NOTED. SHOP CONNECTIONS SHALL BE MADE AS SHOWN. FIELD CONNECTIONS SHALL BE MADE WITH HIGH TENSILE STRENGTH BOLTS OR SHALL BE RIVETED.

EXCAVATION:

EXCAVATION CLASS I AT THE ABUTMENTS SHALL EXTEND FROM THE BOTTOM OF THE FOOTING TO THE UPPER LIMIT OF THE STAGE I EMBANKMENT, AS SHOWN ON THIS SHEET. EXCAVATION CLASS I AT THE BENTS SHALL EXTEND FROM THE BOTTOM OF THE FOOTINGS TO THE ELEVATION OF THE ORIGINAL GROUND LINE AT EACH BENT. EXCAVATION CLASS 2 AT PIERS 4 AND 5 SHALL EXTEND FROM THE BOTTOM OF THE FOOTINGS TO ELEVATION 763.0, OR THE ORIGINAL GROUND LINE, WHICHEVER IS LOWER.

THE CHANNEL EXCAVATION IN THE VICINITY OF PIER 4, WHICH HAS BEEN DESIGNATED AS COMMON EXCAVATION, SHALL COMMENCE IN THE AREA EAST OF THE PROPOSED BRIDGE WHERE IT BECOMES TANGENT TO THE LINE AND GRADE OF PREVIOUS EXCAVATION DONE UNDER THE EXISTING BRIDGE. FROM THIS POINT, IT SHALL PROGRESS UPSTREAM UNDER THE LOCATION OF THE PROPOSED BRIDGE TO A POINT 35 FEET WEST OF THE CENTER OF THE PROPOSED BRIDGE, THEN TURN AT AN ANGLE OF 45 DEGREES TOWARD THE RIVER. THE VERTICAL LIMITS SHALL EXTEND UPWARD FROM THE BASE ELEVATION 763.0 AND FROM THE 2:1 BACKSLOPE PLANE.

EMBANKMENT:

ALL EMBANKMENT AT THE ENDS OF THE BRIDGE SHALL BE PLACED ACCORDING TO THE ELEVATIONS AND DIMENSIONS SHOWN ON THIS SHEET AND AS WIDE AS SHOWN ON THE GRADING PLANS OR AS STAKED BY THE ENGINEER.

THE EMBANKMENT SHALL BE PLACED IN STAGES. THE FIRST STAGE SHALL BE PLACED AND COMPACTED PRIOR TO THE DRIVING OF ANY ABUTMENT PILING. THE SECOND STAGE SHALL BE PLACED AND COMPACTED AFTER THE ABUTMENTS ARE CONSTRUCTED AND BACKING PLANK PLACED.

BACKFILL:

ALL BACKFILLING SHALL BE DONE ACCORDING TO SECTIONS 228 AND 203-2.3.2 OF THE STANDARD SPECIFICATIONS.

REINFORCING STEEL:

DIMENSIONS FOR BENT BARS ARE GIVEN OUT TO OUT AND TO TANGENT INTERSECTIONS UNLESS OTHERWISE NOTED. BENT BARS SHALL BE BENT AROUND ACI STANDARD SIZE PINS. THE BAR FABRICATOR SHALL ADD A PREFIX TO ALL BAR DESIGNATIONS TO DIFFERENTIATE BETWEEN THE SEVERAL PARTS OF THE STRUCTURE.

CONCRETE:

ALL CONCRETE SHALL BE COMPACTED BY VIBRATION. THE DECK SLAB CONCRETE SHALL BE STRUCK OFF AND COMPACTED BY AN APPROVED DECK FINISHING MACHINE. ALL EXPOSED EDGES OF CONCRETE SHALL BE BEVELED WITH 3/4" (CONT.)

CONCRETE CONTINUED:

TRIANGULAR MOLDING UNLESS OTHERWISE NOTED.

ALL CONCRETE ABOVE THE TOP OF THE CURBS SHALL BE CLASS AAE-3. SLAB, CURBS, AND END BEAMS SHALL BE CLASS AE-3. ABUTMENTS, BENTS, AND PIERS SHALL BE CLASS AE-1.

THE "RUBBED SURFACE FINISH" OR THE "SPECIAL SURFACE FINISH" (SECTION 602-3.10.5) WILL BE REQUIRED FOR THE ROADWAY AND OUTSIDE FACES OF CURBS, EDGES OF SLAB, ALL FACES OF THE RAILS, RAIL POSTS AND END POSTS, AND ALL EXPOSED FACES OF THE ABUTMENT WINGS. ALL OTHER SURFACES SHALL BE GIVEN THE "ORDINARY SURFACE FINISH". ALL "ORDINARY SURFACE FINISH" SHALL BE COMPLETED WITHIN 24 HOURS AFTER REMOVAL OF THE FORMS.

IF THE EXPOSED FACES OF THE ABUTMENTS, BENTS, AND PIERS HAVE A SURFACE FINISH ACCEPTABLE TO THE ENGINEER WITHOUT RUBBING, THE REQUIREMENT FOR "RUBBED OR SPECIAL SURFACE FINISH" MAY BE WAIVED AT THE OPTION OF THE ENGINEER AND THE "ORDINARY SURFACE FINISH" WILL APPLY.

THE SLAB SECTIONS SHALL BE POURED STARTING WITH THE SUSPENDED SPAN, PANEL "D". THE NEXT SECTIONS POURED SHALL BE PANEL "C" AND/OR "E", THEN PANELS "B", AND FINALLY PANELS "A" SHALL BE POURED. IN PANELS "A", "B", "C", AND E"", THE SUSPENDED END OF THE PANEL SHALL BE POURED FIRST, WORKING TOWARD THE CANTILEVER END, AS INDICATED BY THE DIRECTIONAL ARROWS SHOWN ON SLAB LAYOUT DETAIL, DWG. 29-214.28L-12.

NO CURBS WILL BE POURED UNTIL THE SLABS FOR THE ENTIRE BRIDGE HAVE BEEN POURED.

MATERIALS: (STRUCTURAL STEEL)

ROLLED BEAMS, COVER PLATES, HINGE PLATES, STIFFENERS, DIAPHRAGMS, CHANNEL SHEAR CONNECTORS, BEARING PLATES, ANCHOR BOLTS, ICE NOSES, AND ALL COLUMNS AND BRACING MEMBERS IN BENTS: A36

ALL HINGE PINS: A-235, CLASS E

BLAST CLEANING:
COMMERCIAL BALST CLEANING OF ALL EXPOSED MAIN AND SECONDARY STEEL MEMBERS WILL BE REQUIRED PRIOR TO PAINTING. (INCLUDE IN UNIT PRICE BID FOR STRUCTURAL STEEL.)

PAINT:

PAINT AND PAINTING SHALL CONFORM TO THE STANDARD SPEC., SECTION 718 AND 870-1.2.

ALL EXPOSED STEEL SURFACES SHALL BE GIVEN ONE SHOP COAT OF RED LEAD PAINT (INCLUDING TOP OF UPPER FLANGES BUT NOT SHEAR CONNECTORS), ONE SPOT COAT OF RED LEAD PAINT AFTER ERECTION AND CONCRETE WORK IS COMPLETED, AND TWO FIELD COATS OF ENAMEL CONFORMING TO SECTION 718 -2.5. THE FIRST FIELD COAT SHALL CONFORM TO GREEN NO. 24260 AND THE SECOND COAT SHALL CONFORM TO GRAY-GREEN COLOR NO. 24300. BOTH COATS SHALL MEET THE FEDERAL STANDARD NO. 595 FOR COLOR. COLOR CHIPS ARE ON FILE IN THE BRIDGE DIVISION OF THE NORTH DAKOTA STATE HIGHWAY DEPARTMENT, BISMARCK.

PILING:
THE PILE LENGTHS SHOWN ON THE BRIDGE LAYOUT DRAWING SHALL BE CONSIDERED TO BE THE ORDER LENGTH IN ALL CASES. NO TEST BORINGS HAVE BEEN TAKEN AT THE SITE OF THE PROPOSED BRIDGE. ALL PILE LENGTHS HAVE BEEN DETERMINED FROM THE PILE DRIVING RECORDS FOR THE EXISTING BRIDGE LOCATED IMMEDIATELY DOWNSTREAM FROM THE PROPOSED STRUCTURE; THE PILE DRIVING RECORDS ARE ON FILE IN THE BRIDGE DIVISION OF THE NORTH DAKOTA STATE HIGHWAY DEPARTMENT, BISMARCK.

PILE HAMMERS:
THE PILES FOR THIS STRUCTURE SHALL BE DRIVEN BY A STEAM (OR AIR) OR DIESEL HAMMER HAVING A RATED ENERGY AND RAM WEIGHT NOT LESS THAN 64,822 FOOT-POUND-TONS AS COMPUTED BY THE FORMULA $W(E-10,609)+1.222E$ WHERE W IS THE WEIGHT OF THE RAM IN TONS AND E IS THE RATED HAMMER ENERGY AS ALLOWED IN SECTION 622. IN NO CASE SHALL THE RAM WEIGHT BE LESS THAN 4800 POUNDS.

CURING CONCRETE:
EXCEPT AS PROVIDED IN THE FOLLOWING PARAGRAPH, LIQUID MEMBRANE CURING COMPOUND SHALL NOT BE USED ON ANY CONCRETE WHICH TO TO RECEIVE FURTHER TREATMENT.
THE WATER SOLUBLE LIQUID MEMBRANE CURE (SECTION 550-4.13.2.1) AND 880-5 OF THE STANDARD SPECIFICATIONS) SHALL BE USED FOR CURING THE DECK SLAB CONCRETE. A PROTECTIVE COVERING SHALL BE USED SO THAT LINSEED OIL IS NOT APPLIED TO THE AREA WITHIN THREE INCHES OF THE GUTTER LINE UNTIL AFTER THE ASPHALT CURB SEAL IS IN PLACE. IF THE CONTRACTOR ELECTS TO USE THIS METHOD OF CURING THE DECK SLAB CONCRETE, THE QUANTITY FOR LINSEED OIL TREATMENT MAY BE REDUCED WITHOUT ADJUSTMENT TO ITS UNIT BID PRICE. APPLICATION OF 0.015 GALLONS PER SQUARE YARD SHALL BE APPLIED TO THE DECK AND CURBS.

	℄ BEAM NO. 5	℄ BEAM NO. 1	℄ ROADWAY
Begin Bridge ℄ ℄ Brg. Abut. No. 1	796.77	796.68	797.00
	796.78	796.69	797.01
	796.79	796.70	797.02
	796.79	796.69	797.01
	796.78	796.68	797.00
5 Sp. @ 8.2' = 41'-0"	796.77	796.68	797.00
	796.78	796.70	797.02
	796.79	796.70	797.02
	796.79	796.69	797.01
	796.78	796.68	797.00
5 Sp. @ 9.4' = 47'-0" ℄ Bent No. 2	796.77	796.68	797.00
10 Spaces @ 7.2' = 72'-0" ℄ Bent No. 3	796.78	796.70	797.02
	796.83	796.74	797.06
	796.86	796.77	797.09
	796.88	796.79	797.12
	796.88	796.80	797.11
	796.86	796.79	797.11
	796.83	796.77	797.09
	796.80	796.74	797.07
	796.77	796.71	797.05
10 Spaces @ 8.0' = 80'-0" ℄ Pier No. 4	796.74	796.65	796.97
	796.78	796.70	797.02
	796.82	796.73	797.05
	796.84	796.75	797.07
	796.84	796.76	797.08
	796.85	796.75	797.07
	796.82	796.73	797.05
	796.78	796.70	797.02
	796.74	796.65	796.97
	796.77	796.68	797.00
10 Spaces @ 7.2' = 72'-0" ℄ Pier No. 5	796.80	796.71	797.03
	796.85	796.74	797.07
	796.86	796.77	797.09
	796.88	796.79	797.11
	796.88	796.80	797.12
	796.86	796.79	797.11
	796.83	796.77	797.09
	796.78	796.74	797.06
	796.77	796.68	797.02
5 Sp. @ 9.4' = 47'-0" ℄ Bent No. 6	796.78	796.69	797.00
5 Sp. @ 8.2' = 41'-0" ℄ Bent No. 7	796.79	796.70	797.02
	796.78	796.70	797.02
	796.77	796.68	797.00
	796.77	796.68	797.00
	796.78	796.69	797.01
	796.79	796.70	797.02
	796.79	796.69	797.02
	796.78	796.68	797.01
End Bridge ℄ ℄ Brg. Abut. 8	796.77	796.68	797.00

SCREED ELEVATION

Elevations are to top of finished concrete

PEMBINA RIVER

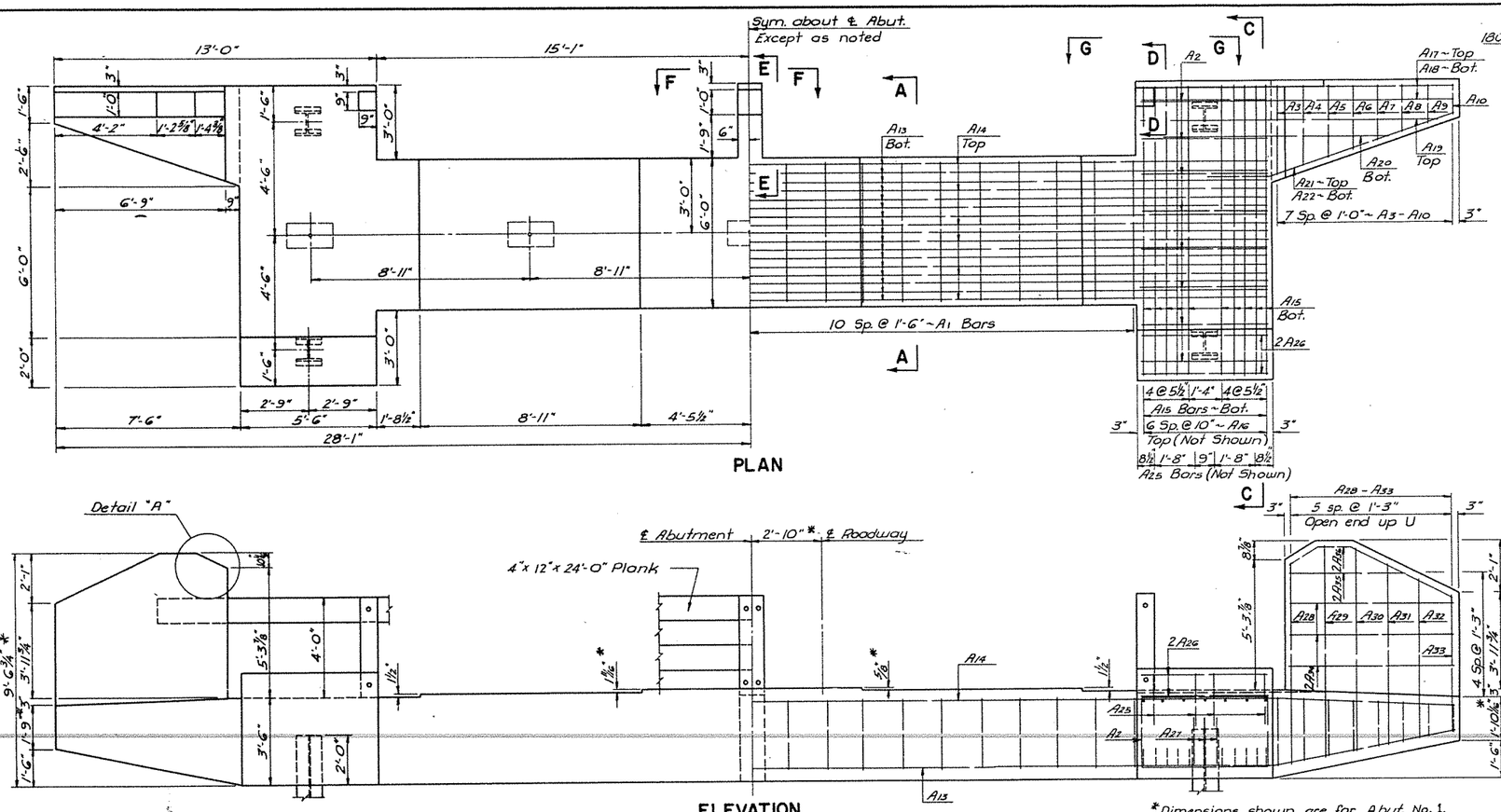
EMBANKMENT DETAILS, PILING & BRG. & LAYOUT SCREED ELEVATION & NOTES

DETAILS	CHECKED BY	J.E.G.
TRACING	MADE BY	J.E.G.
	CHECKED BY	G.A.L.
QUANTITIES	MADE BY	
	CHECKED BY	

29-214.28L-1

29-214.28L-1

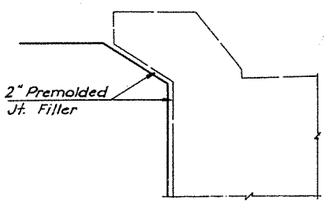
FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N. D.	I-029-5(23)	92	



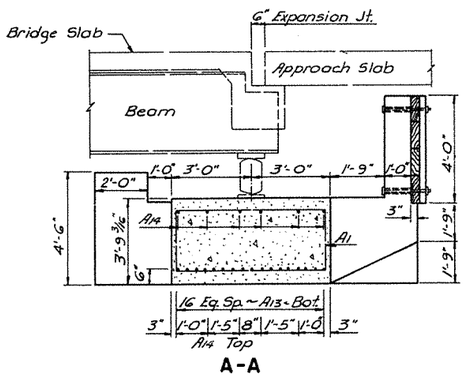
PLAN

ELEVATION

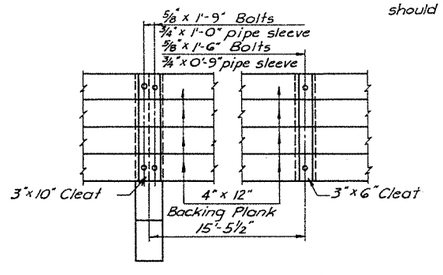
*Dimensions shown are for Abut. No. 1. For Abut. No. 8, these dimensions should be reversed about ℄ abutment.



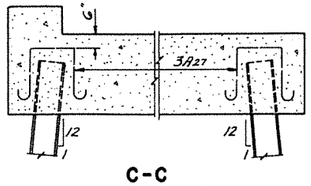
DETAIL "A"



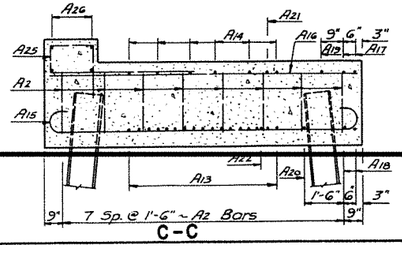
A-A



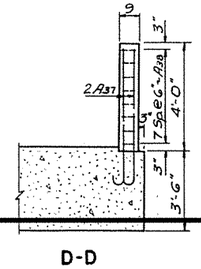
F-F G-G



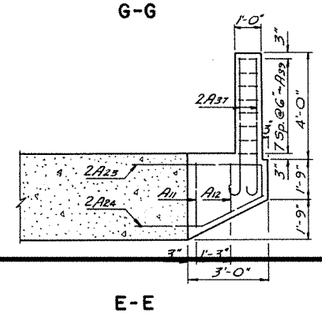
C-C
Showing A27 Bars



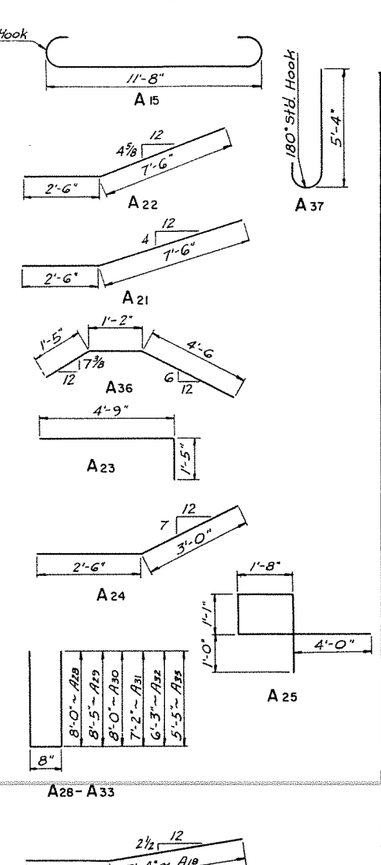
C-C

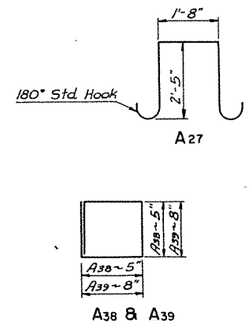


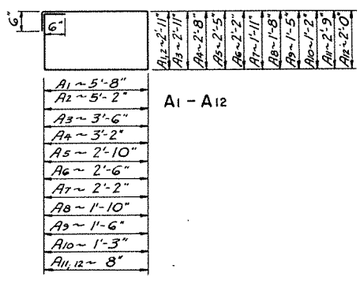
D-D



E-E







BENT BAR DETAILS
Dimensions shown are out to out

BAR LIST (ONE ABUT.)

MARK	NUMBER FOOTING	NUMBER WING	NUMBER POSTS	SIZE	LENGTH	SHAPE	UNIT WT.
A1	21			5	18'-2"	Bent	18.95
A2	16			5	17'-2"	"	17.91
A3	2			5	13'-10"	"	14.43
A4	2			5	12'-8"	"	13.21
A5	2			5	11'-6"	"	12.00
A6	2			5	10'-4"	"	10.78
A7	2			5	9'-2"	"	9.56
A8	2			5	8'-0"	"	8.34
A9	2			5	6'-10"	"	7.13
A10	2			5	5'-10"	"	6.08
A11	1			5	7'-10"	"	8.17
A12	1			5	6'-4"	"	6.61
A13	17			11	40'-10"	Str.	216.93
A14	6			6	40'-10"	"	61.34
A15	20			9	13'-8"	Bent	46.47
A16	14			5	11'-8"	Str.	12.17
A17	4			8	12'-8"	"	33.82
A18	4			8	12'-8"	Bent	33.82
A19	2			8	12'-4"	Str.	32.93
A20	2			8	10'-3"	Bent	27.37
A21	2			8	10'-0"	"	26.70
A22	2			8	10'-0"	"	26.70
A23	2			6	6'-2"	"	9.26
A24	2			6	5'-6"	"	8.26
A25	8			5	10'-6"	"	10.95
A26	8			5	5'-2"	Str.	5.39
A27	12			6	7'-10"	Bent	11.77
A28	2			5	16'-8"	"	17.39
A29	2			5	17'-6"	"	18.25
A30	2			5	16'-8"	"	17.39
A31	2			5	15'-0"	"	15.65
A32	2			5	13'-2"	"	13.73
A33	2			5	11'-6"	"	12.00
A34		12		4	6'-5"	Str.	4.28
A35		4		4	5'-1"	"	3.39
A36		4		5	7'-1"	Bent	7.39
A37	12			5	5'-11"	"	6.17
A38			16	3	2'-1"	"	.78
A39			8	3	3'-4"	"	1.25

NOTE:

The treated timber backing plank has been provided for the abutments in the eventuality that extreme abut. movement might still be provided for. In such a circumstance the backing plank and concrete posts would be removed and the backfill immediately behind the abutment excavated, allowing the end of the beams to project into the void provided, cantilevering from the rollers.

In the probability the abutments move toward the river it will become necessary to reset the rollers to a plumb position. Holes have been provided in the bottom flange of the end beams so that the sole plate may be reattached in the position desired.

The beam holes may also be used to hold the jacking bracket while a jack is inserted between the bracket and the jacking toe, and the beams jacked longitudinally to counteract non-returning beam movement which has moved the spans toward the river.

BILL OF MATERIALS (ONE ABUT.)

NO.	SIZE	DESCRIPTION	
6	4" x 12" x 24'-0"	Backing Plank (To Timber Full Sawn Weight)	△
1	3" x 10" x 4'-0"	Cleat	
2	3" x 6" x 4'-0"	Cleats	
4	¾" ø x 1'-0"	Pipe Sleeves	△
4	¾" ø x 0'-9"	Pipe Sleeves	△
4	⅝" ø x 1'-9"	Galv. Timb. Bolts with washer head & nuts	△
4	⅝" ø x 1'-6"	" " " " " " "	△

△ To be included in price bid for Treated timber.

QUANTITIES (ONE ABUT.)

Class AE-1 Concrete	50.7	C.Y.
Reinforcing Steel	7203	Lbs.
Treated Timber	.790	M.BM.

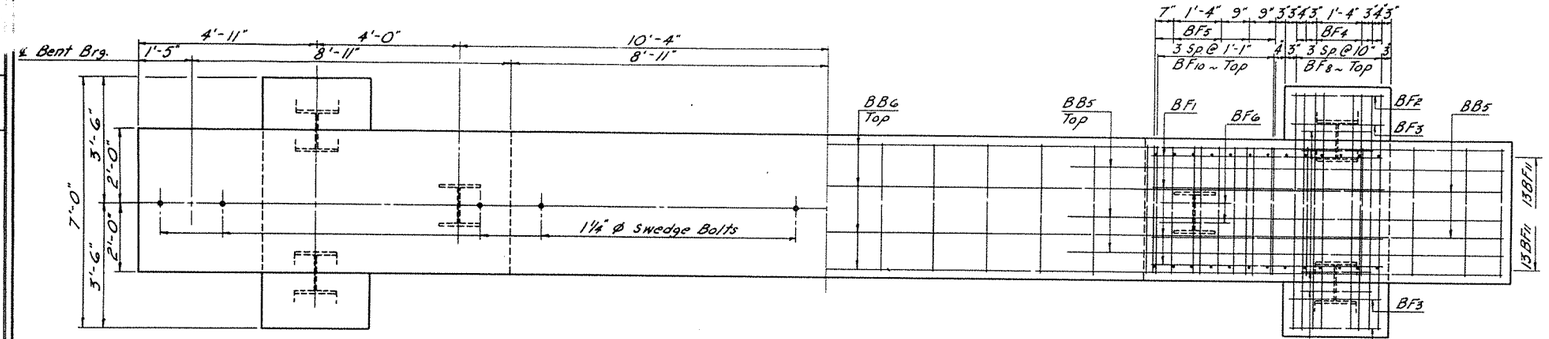
PEMBINA RIVER

~~ABUTMENT~~

29-214.28L-2

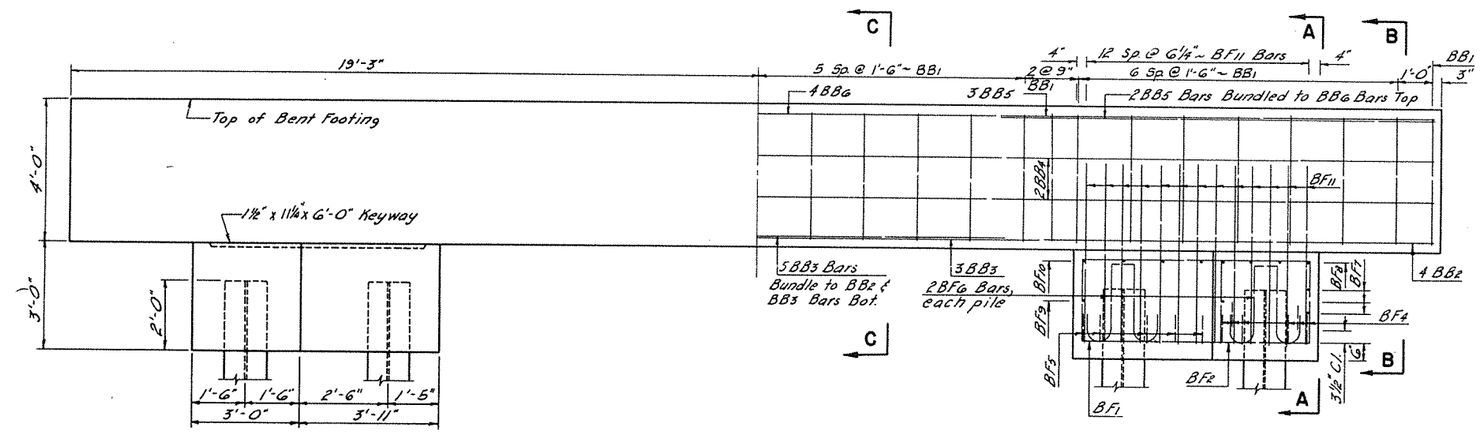
29-214.28L-2

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N. D.	I-029-5 (23)	93	



HALF PLAN
Showing Dimensions

HALF PLAN
Showing Reinforcing

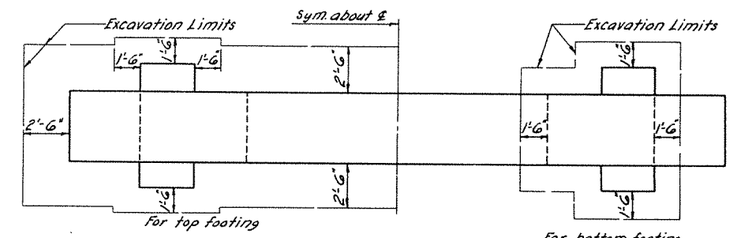


HALF ELEVATION
Showing Dimensions

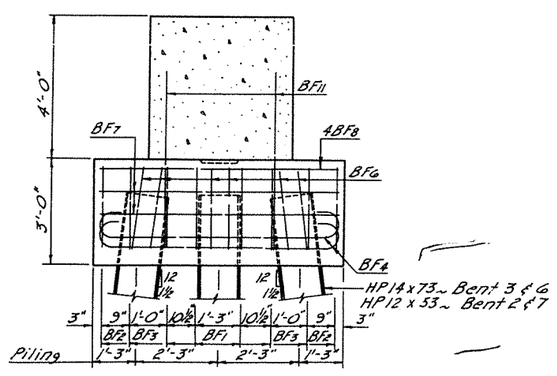
HALF ELEVATION
Showing Reinforcing

BAR LIST (4 BENT FOOTINGS)

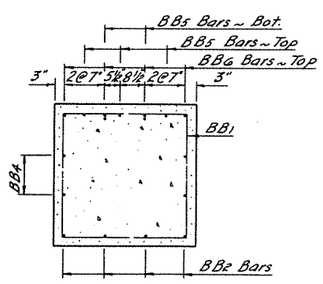
MARK	NUMBER FOOTING	NUMBER WALL	SIZE	LENGTH	SHAPE	UNIT WT.
BB1		116	4	15'-4"	Bent	10.24
BB2		16	9	38'-0"	Str.	129.30
BB3		32	9	14'-0"	"	47.60
BB4		16	5	38'-0"	"	39.64
BB5		40	8	12'-3"	"	32.71
BB6		16	8	38'-0"	"	101.47
BF1	32		5	18'-4"	Bent	19.12
BF2	16		5	10'-6"	"	10.95
BF3	16		5	7'-0"	"	7.30
BF4	48		10	8'-8"	"	37.29
BF5	40		6	4'-10"	"	7.26
BF6	48		6	6'-4"	"	9.51
BF7	24		6	6'-6"	Str.	9.76
BF8	32		6	6'-6"	"	9.76
BF9	8		6	3'-6"	"	3.26
BF10	32		6	3'-6"	"	5.26
BF11	208		6	5'-0"	"	7.51



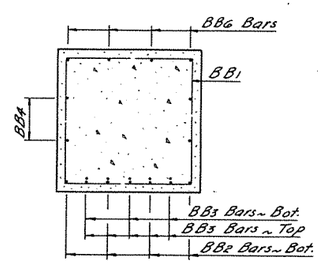
EXCAVATION LIMITS



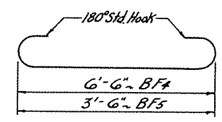
A-A



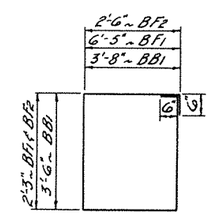
B-B



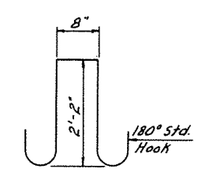
C-C



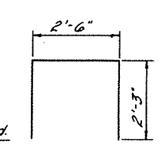
BF4 & BF5 BARS



BB1, BF1 & BF2 BARS



BF6 BAR



BF3 BAR

BENT BAR DETAILS
Dimensions shown are out to out

QUANTITIES (BENT FTGS. 2, 3, 6 & 7)		
Class AE-1 Concrete	123.9	C.Y.
Reinforcing Steel	14,104	Lbs.

PEMBINA RIVER

BENT FOOTING DETAILS

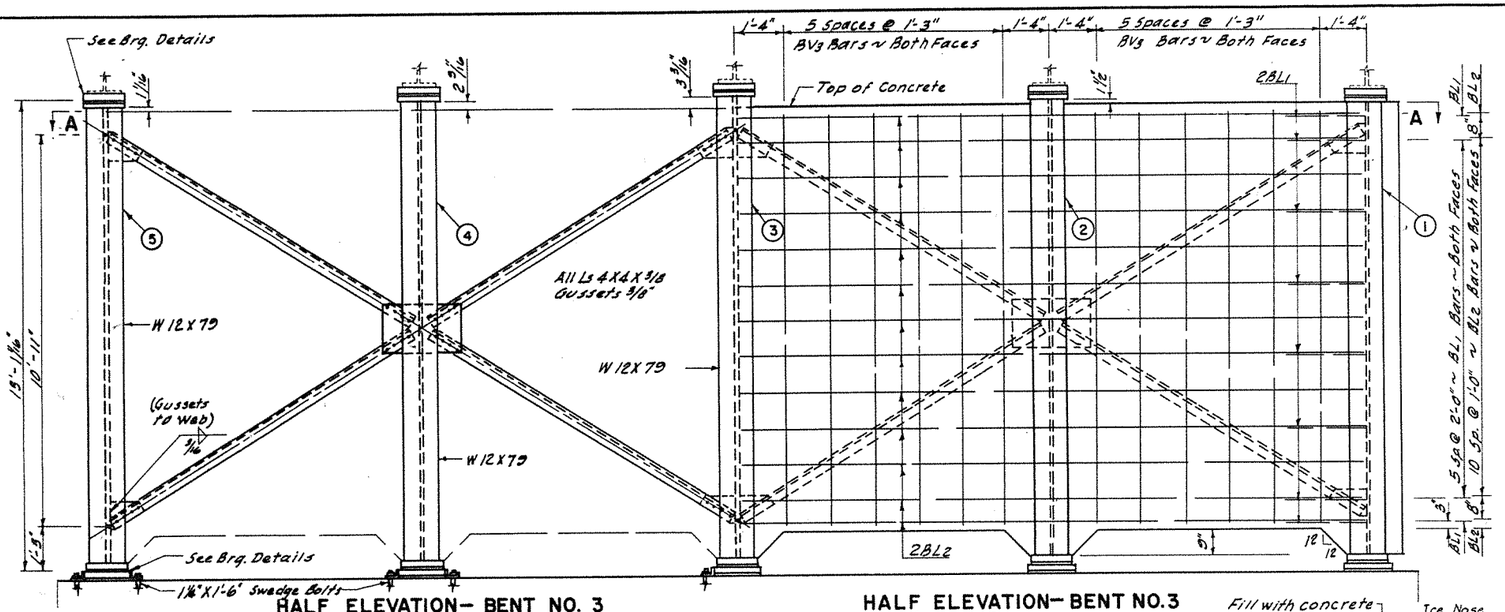
CHECKED BY	L.E.G.
MADE BY	L.E.G.
CHECKED BY	G.A.L.
MADE BY	G.A.L.
CHECKED BY	L.E.G.

TRACING
QUANTITIES

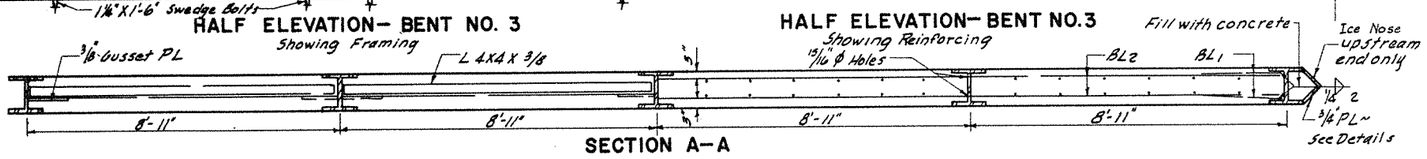
29-214.28L-3

29-214.28L-3

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N. D.	I-029-5 (23)	94	

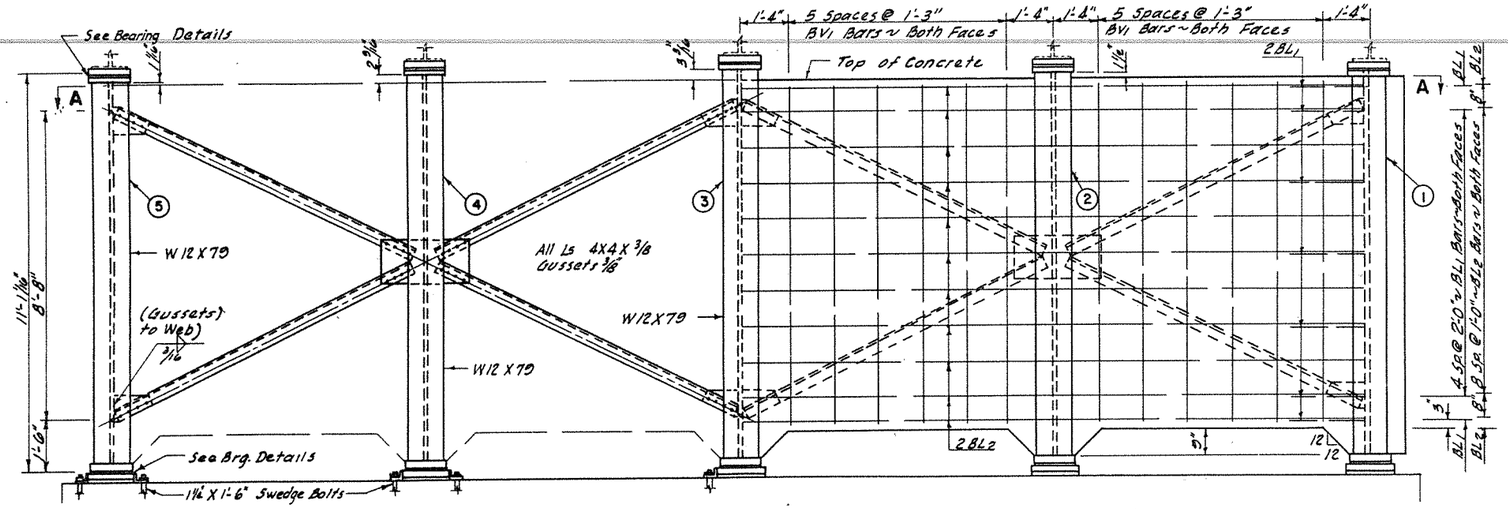


HALF ELEVATION— BENT NO. 3
Showing Framing



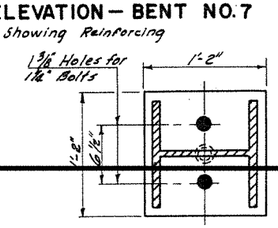
HALF ELEVATION— BENT NO. 3
Showing Reinforcing

SECTION A—A

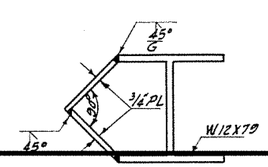


HALF ELEVATION— BENT NO. 7
Showing Framing

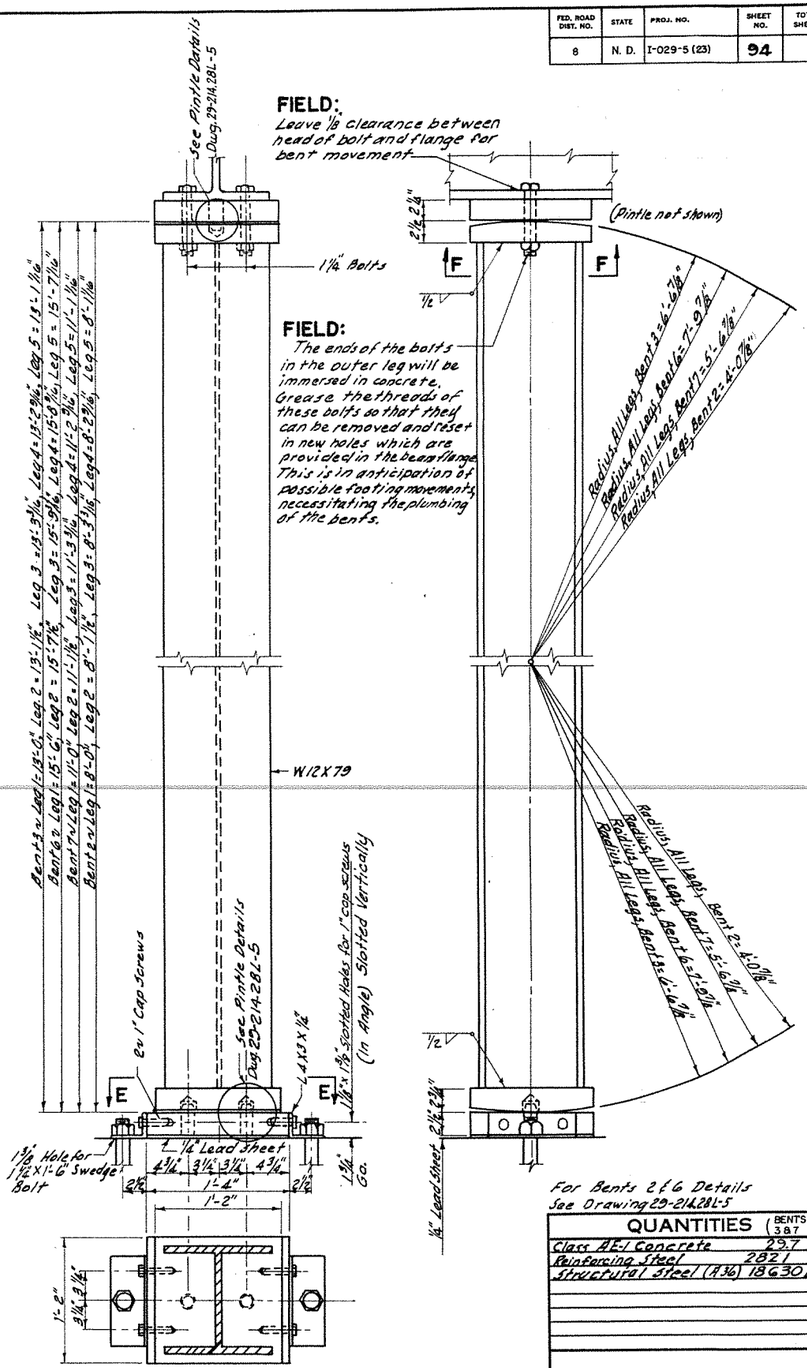
HALF ELEVATION— BENT NO. 7
Showing Reinforcing



F-F



ICE NOSE DETAILS



E-E
BENT BEARING DETAILS

For Bents 2 & 6 Details See Drawing 29-214.28L-5

NOTES:

All plates and contact surfaces shown in views E-E & F-F shall be milled before the parts are welded together.

Check the threads of the 1¼" Swedge bolts at the base of the bents to prevent the nuts from loosening due to vibration.

Lead sheets are included in structural steel quantities.

QUANTITIES (BENTS 3 & 7)

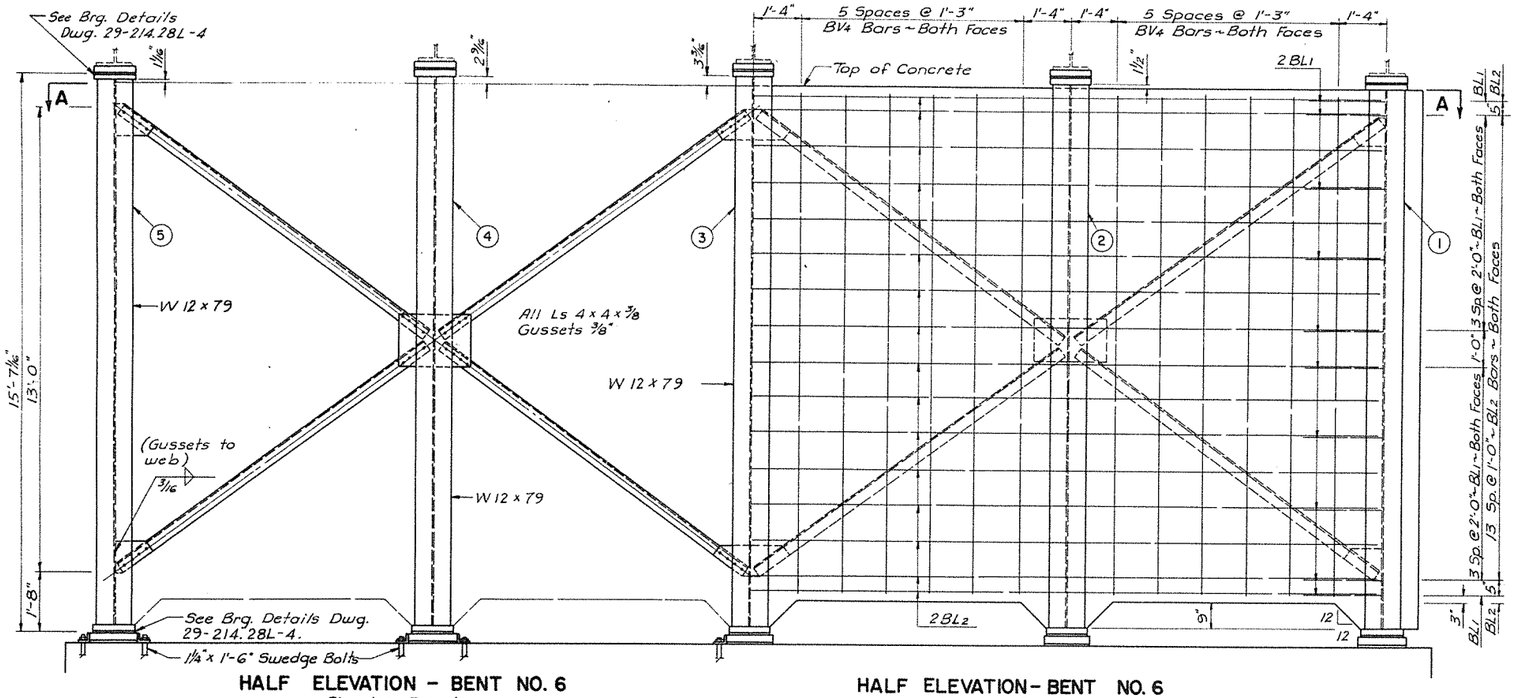
Class AE-1 Concrete	29.7	C.Y.
Reinforcing Steel	2821	Lbs.
Structural Steel (A36)	18630	Lbs.

PEMBINA RIVER

BENTS 3 & 7 DETAILS

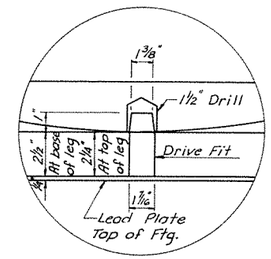
29-214.28L-4

FED. ROAD DIST. NO.	STATE	PROJ. NO	SHEET NO.	TOTAL SHEETS
8	N. D.	I-029-5(23)	95	



HALF ELEVATION - BENT NO. 6
Showing Framing

HALF ELEVATION - BENT NO. 6
Showing Reinforcing

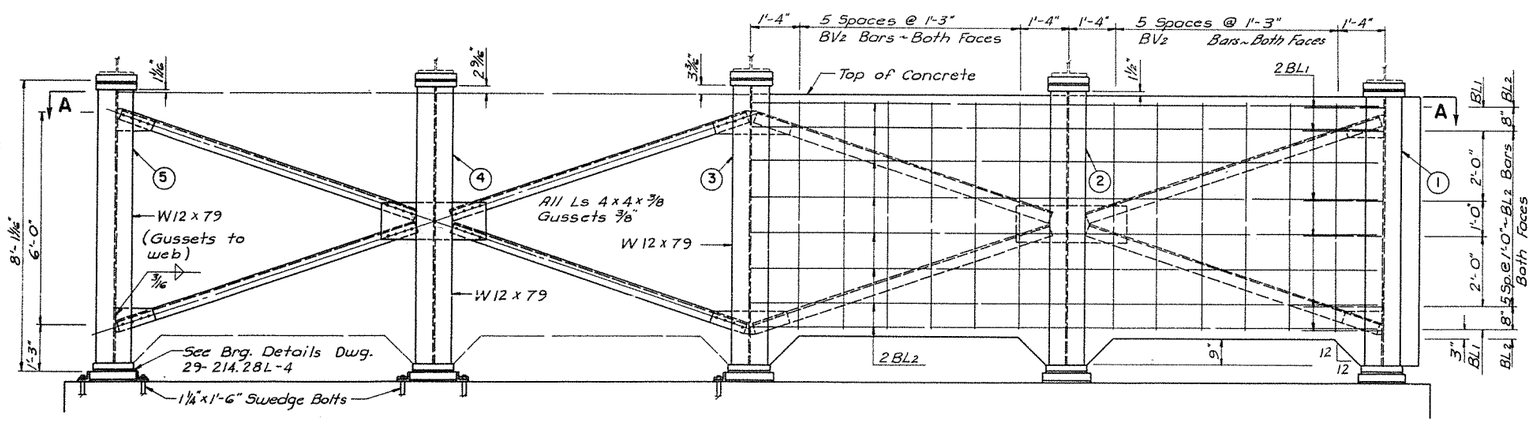


PINTLE DETAILS

*BAR LIST (BENTS 2, 3, 6 & 7)

MARK	NUMBER BENT 2	BENT 6	BENT 7	BENT 3	SIZE	LENGTH	SHAPE	UNIT WT.
BL1**	24				5	2'-3"	Str.	2.35
BL2	16				5	35'-4"	"	36.86
BV2	48				5	6'-6"	"	6.78
BL1**		40			5	2'-3"	Str.	2.35
BL2		32			5	35'-4"	"	36.86
BV4		48			5	14'-0"	"	14.60
BL1**			28		5	2'-3"	Str.	2.35
BL2			22		5	35'-4"	"	36.86
BV1			48		5	9'-6"	"	9.91
BL1**				32	5	2'-3"	Str.	2.35
BL2				26	5	35'-4"	"	36.86
BV3				48	5	11'-6"	"	12.00

*See Drawing 29-214.28L-4
** BL1 Bars to be paid for as Structural Steel.



HALF ELEVATION - BENT NO. 2
Showing Framing

HALF ELEVATION - BENT NO. 2
Showing Reinforcing

QUANTITIES (BENT 2 & 6)		
Class AE-1 Concrete	29.0	C.Y.
Reinforcing Steel	2796	Lbs.
Structural Steel (A36)	18380	Lbs.

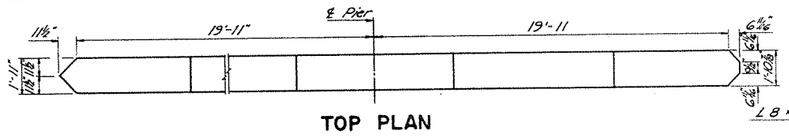
PEMBINA RIVER

9-786

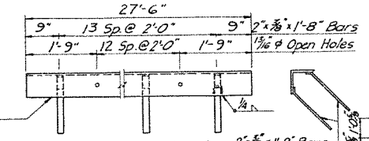
MADE BY	G.H.L.
CHECKED BY	L.E.G.
MADE BY	G.A.L.
CHECKED BY	L.E.G.
MADE BY	G.A.L.
CHECKED BY	L.E.G.
TRACING	
QUANTITIES	

29-214.28L-5

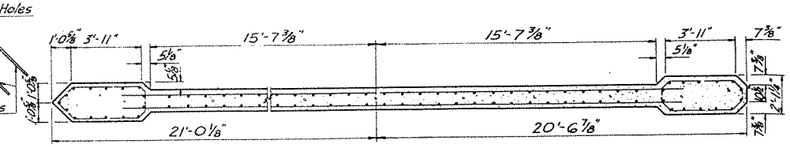
FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N. D.	I-029-5 (23)	96	



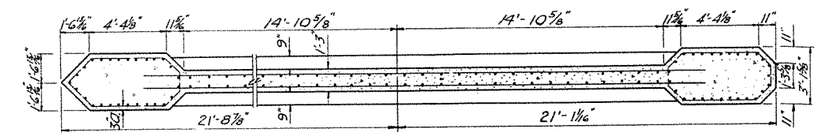
TOP PLAN



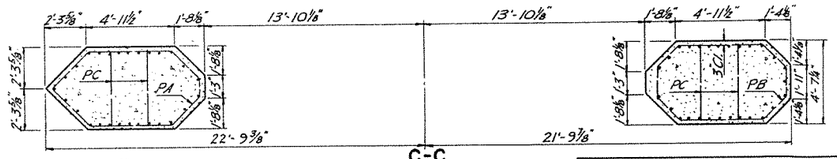
ICE NOSE ANGLE



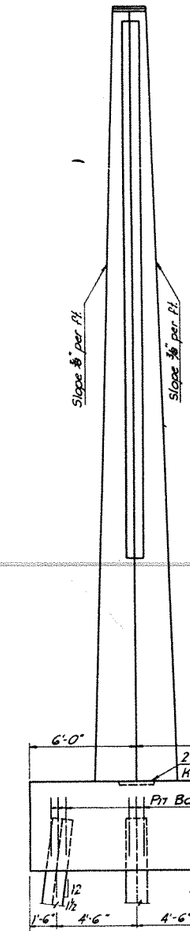
A-A



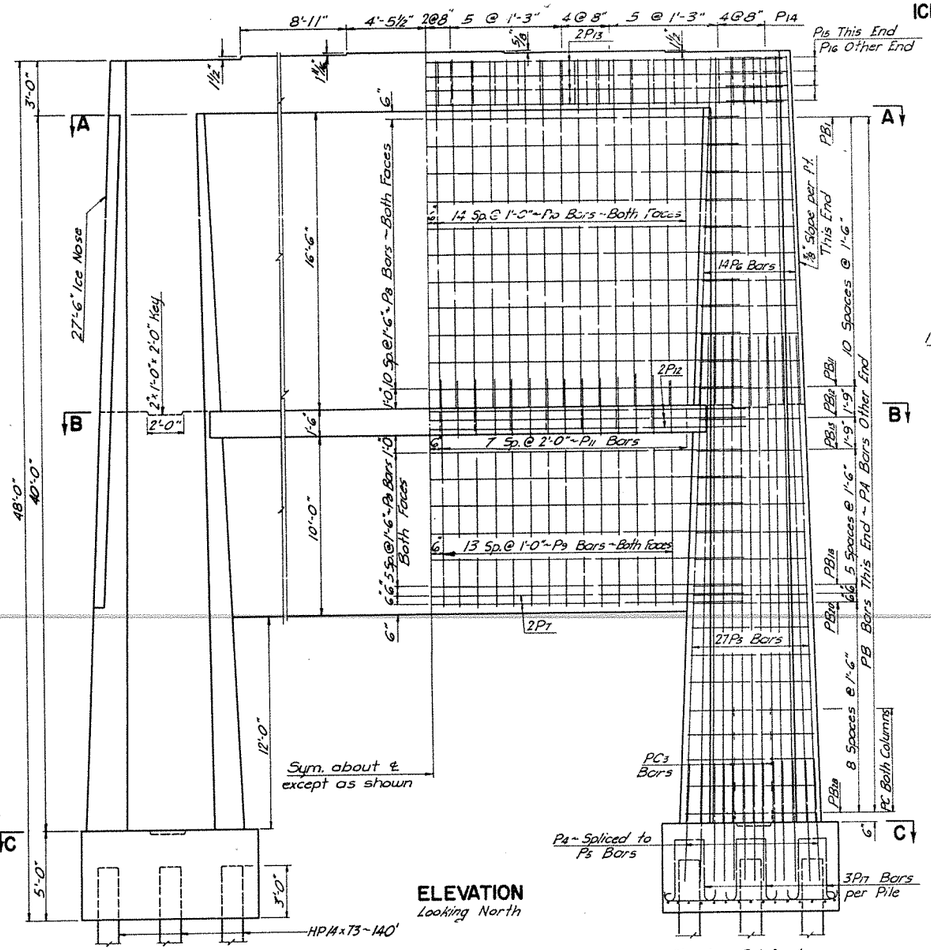
B-B



C-C



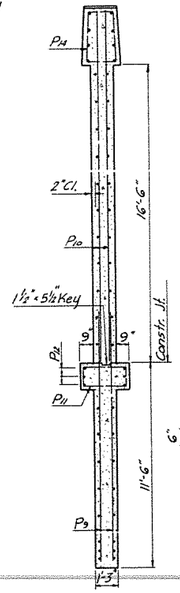
END VIEW



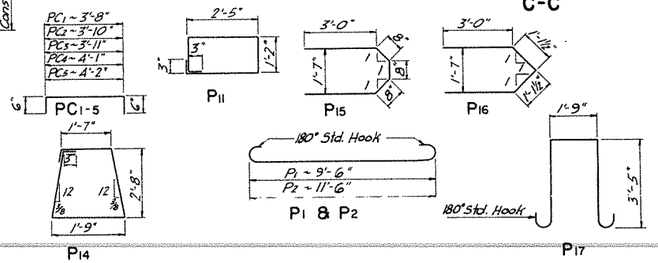
ELEVATION
Looking North

Showing Dimensions

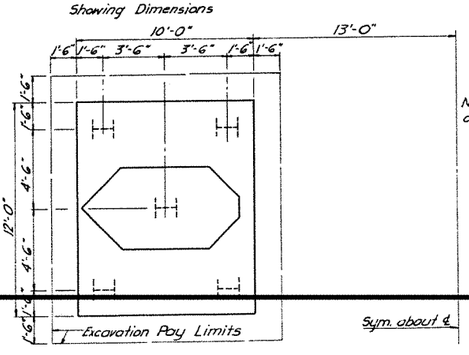
Showing Reinforcing



℄ SECTION



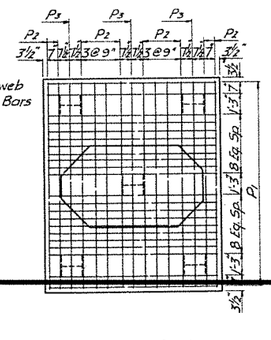
BENT BAR DETAILS
Dimensions are out to out



Showing Dimensions

FOOTING PLAN

Note: Burn holes in web of steel piles for P5 Bars

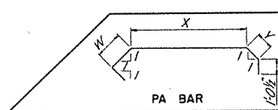


Showing Reinforcing

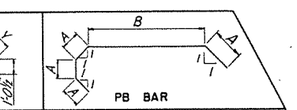
BAR LIST (ONE PIER)

MARK	NUMBER: FOOTING	NUMBER: WALL	NUMBER: COLUMN & CAP	SIZE	LENGTH	SHAPE	UNIT WT
P1	44			6	10'-10"	Bent	16.27
P2	24			8	13'-2"	"	35.16
P3	6			8	11'-6"	Str.	30.71
P4	54			9	7'-6"	"	25.50
P5			54	9	27'-4"	"	92.93
P6			29	9	19'-4"	"	65.73
P7	4			11	35'-8"	"	189.48
P8	34			5	34'-4"	"	35.81
P9	56			5	12'-9"	"	13.30
P10	60			5	19'-3"	"	20.08
P11	16			5	7'-8"	Bent	8.00
P12	6			8	35'-9"	Str.	95.47
P13		8		8	39'-10"	"	106.37
P14		41		4	9'-2"	Bent	6.12
P15		4		6	8'-0"	"	12.02
P16		4		6	8'-3"	"	12.40
P17	30			6	9'-11"	"	14.90
PA		25 pr.		5	254'-2"	"	265.12
PB		25 pr.		5	249'-11"	"	260.69
PC1		4		4	4'-8"	Bent	3.12
PC2		4		4	4'-10"	"	3.23
PC3		4		4	4'-11"	"	3.28
PC4		4		4	5'-1"	"	3.39
PC5		4		4	5'-2"	"	3.45
SP4*		1		4	3'-8"	Str.	
SP5*		1		5	4'-0"	"	
SP6*		1		6	4'-6"	"	
SP7*		1		7	5'-0"	"	
SP8*		1		8	5'-4"	"	

* Sample replacement bars to be spliced to bars from which 2'-0" sample has been cut. Furnish only one of each for entire bridge. The replacement bars will not be paid for directly. Their cost shall be included in the unit price bid for reinforcing steel.



PA BAR



PB BAR

MARK	W	X	Y	LENGTH
PA1	1'-1¾"	3'-8½"	4'-6"	6'-0"
PA2	1'-2½"	3'-9"	5¾"	6'-11"
PA3	1'-3⅜"	3'-9⅜"	6½"	7'-1"
PA4	1'-4⅛"	3'-9⅞"	7⅜"	7'-3"
PA5	1'-5"	3'-10⅜"	8¼"	7'-6"
PA6	1'-5⅝"	3'-10¾"	9"	7'-8"
PA7	1'-6⅝"	3'-11¼"	9⅞"	7'-10"
PA8	1'-7½"	3'-11¾"	10¾"	8'-0"
PA9	1'-8¼"	4'-0⅛"	11½"	8'-2"
PA10	1'-9⅛"	4'-0⅝"	1'-0⅜"	8'-4"
PA11	1'-9⅞"	4'-1"	1'-1¼"	8'-6"
PA12	1'-10¾"	4'-1½"	1'-2¼"	8'-9"
PA13	1'-11¾"	4'-2⅛"	1'-3⅜"	8'-11"
PA14	2'-0½"	4'-2½"	1'-4⅜"	9'-1"
PA15	2'-1⅛"	4'-3"	1'-5"	9'-3"
PA16	2'-2"	4'-3½"	1'-5¾"	9'-5"
PA17	2'-2¾"	4'-3⅞"	1'-6⅜"	9'-7"
PA18	2'-3⅜"	4'-4⅜"	1'-7½"	9'-9"
PA19	2'-3⅞"	4'-4½"	1'-7¾"	9'-11"
PA20	2'-4¼"	4'-4⅝"	1'-8"	9'-11"
PA21	2'-5⅛"	4'-5⅛"	1'-8⅞"	10'-2"
PA22	2'-6"	4'-5⅝"	1'-9¾"	10'-4"
PA23	2'-6⅞"	4'-6¼"	1'-10½"	10'-6"
PA24	2'-7⅜"	4'-6⅝"	1'-11¼"	10'-7"
PA25	2'-8⅛"	4'-7⅛"	2'-0"	10'-9"
PA26	2'-9⅜"	4'-7⅜"	2'-0¾"	10'-11"
PA27	2'-10¼"	4'-7⅞"	2'-1⅝"	11'-1"
PA28	2'-11"	4'-8⅜"	2'-2½"	11'-3"
Total Length One Set				254'-2"

MARK	A	B	LENGTH
PB1	8¼"	3'-8½"	6'-6"
PB2	8⅞"	3'-9"	6'-8"
PB3	9⅛"	3'-9⅜"	6'-10"
PB4	9⅜"	3'-9⅞"	7'-0"
PB5	10⅛"	3'-10⅜"	7'-3"
PB6	10½"	3'-10¾"	7'-5"
PB7	11"	3'-11¼"	7'-7"
PB8	11⅜"	3'-11¾"	7'-9"
PB9	11⅞"	4'-0⅛"	8'-0"
PB10	1'-0¼"	4'-0⅝"	8'-2"
PB11	1'-0⅝"	4'-1"	8'-4"
PB12	1'-1¼"	4'-1⅜"	8'-7"
PB13	1'-1¾"	4'-2⅛"	8'-9"
PB14	1'-2⅛"	4'-2⅝"	9'-0"
PB15	1'-2⅝"	4'-3"	9'-2"
PB16	1'-3⅛"	4'-3½"	9'-4"
PB17	1'-3½"	4'-3⅞"	9'-6"
PB18	1'-4"	4'-4⅜"	9'-8"
PB19	1'-4⅞"	4'-4½"	9'-9"
PB20	1'-4¼"	4'-4⅝"	9'-10"
PB21	1'-4½"	4'-4¾"	9'-11"
PB22	1'-5"	4'-5¼"	10'-1"
PB23	1'-5½"	4'-5¾"	10'-4"
PB24	1'-6"	4'-6¼"	10'-6"
PB25	1'-6⅛"	4'-6⅝"	10'-8"
PB26	1'-6⅞"	4'-7"	10'-11"
PB27	1'-7¼"	4'-7½"	11'-1"
PB28	1'-7¾"	4'-8"	11'-3"
Total Length One Set			249'-11"

QUANTITIES (ONE PIER)

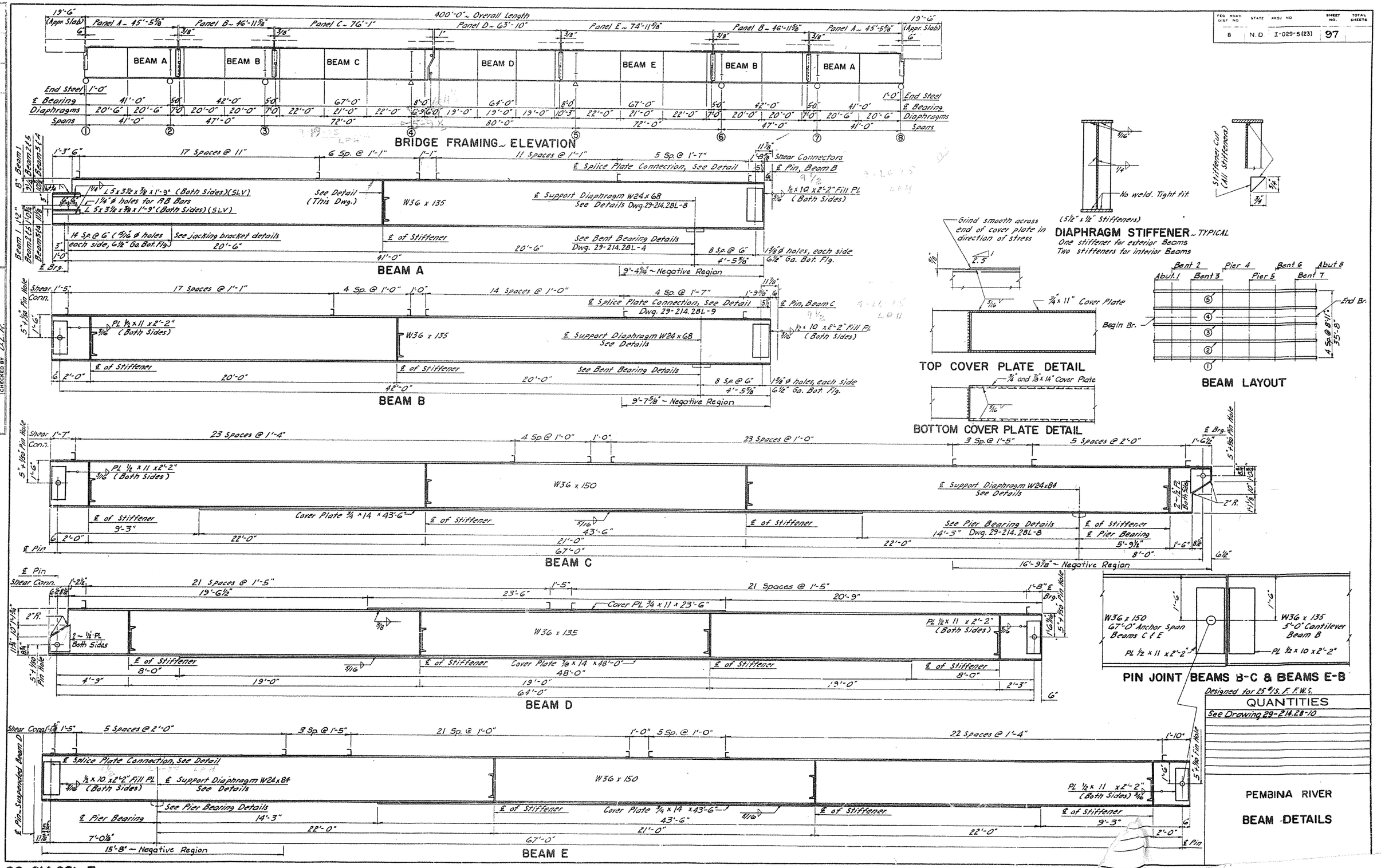
Class AE-1 Concrete	155.5	Cu. Yd.
Reinforcing Steel	17435	Lbs.
Structural Steel (R36)	1189	Lbs.

PEMBINA RIVER

48'-0" PIER

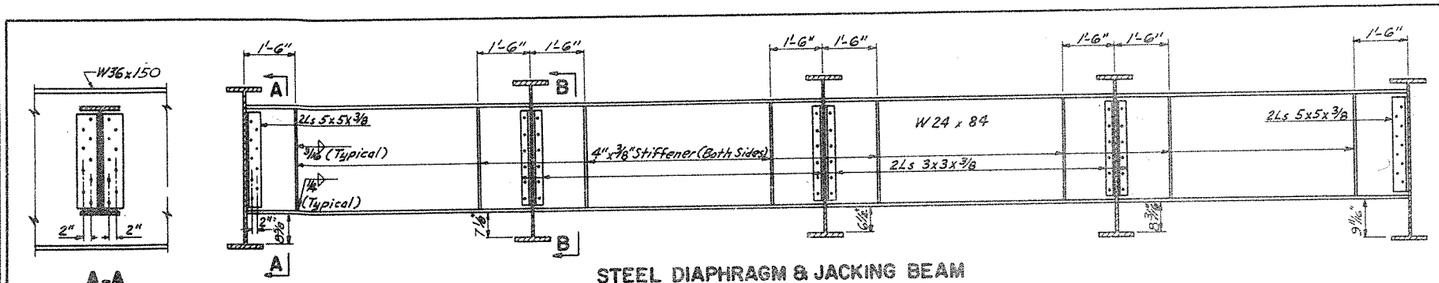
29-214.28L-6

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N.D.	I-029-5(23)	97	

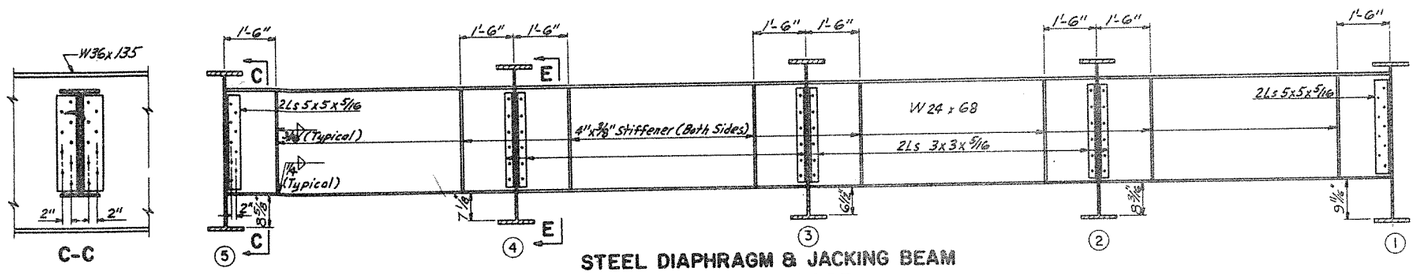


29-214.28L-7

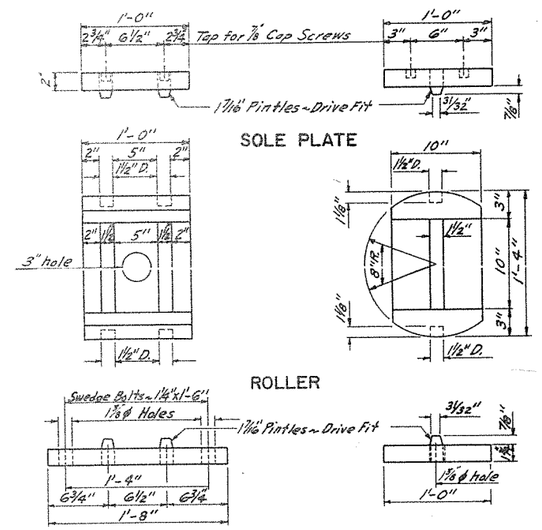
FED. ROAD DIST. NO.	STATE	PROJ. NO	SHEET NO.	TOTAL SHEETS
8	N.D.	I-029-5(23)	98	



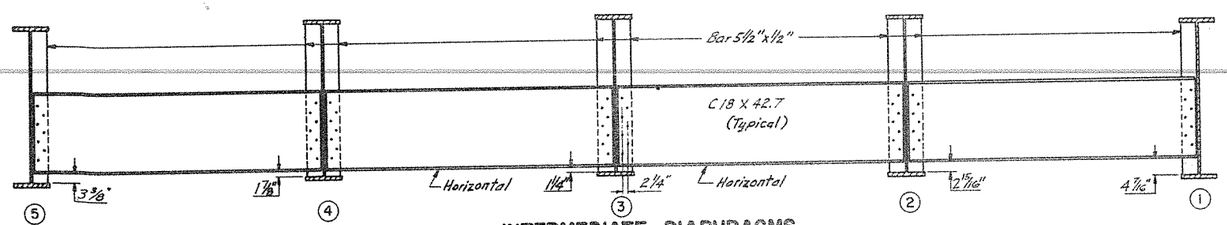
STEEL DIAPHRAGM & JACKING BEAM
AT PIERS 4 & 5
See Beam Details



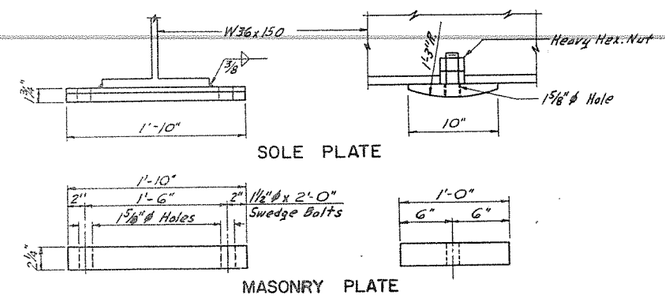
STEEL DIAPHRAGM & JACKING BEAM
AT BENTS 2,3,6 & 7
See Beam Details



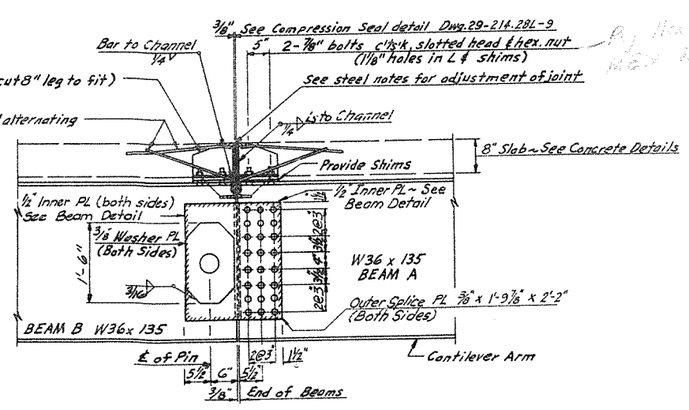
EXPANSION BEARING DETAILS
STEEL CASTINGS, ASTM A27 GRADE 70-36, OR WELDED A-36 STEEL PLATES.
At Abutments



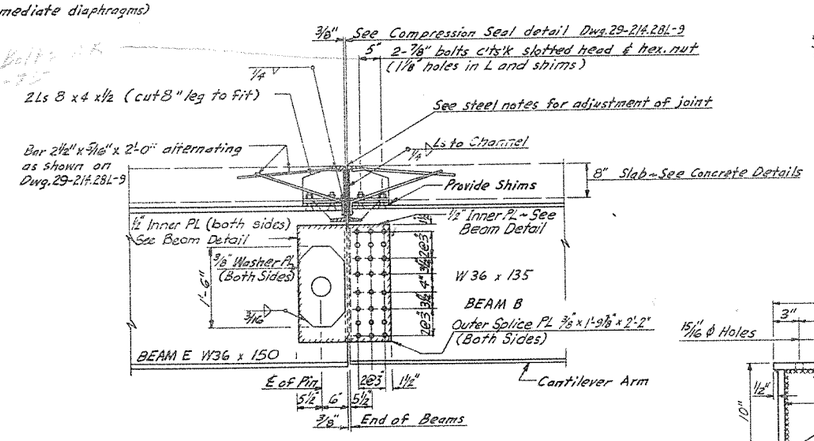
INTERMEDIATE DIAPHRAGMS
(Typical for all intermediate diaphragms)



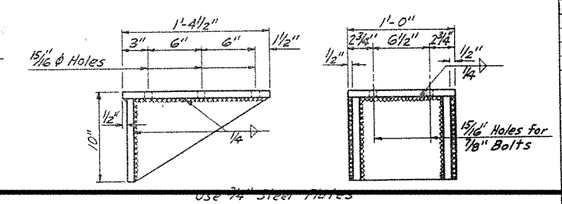
FIXED BEARING DETAILS
At Piers 4 & 5



D-D
Location of section shown on Drawing 29-214.28L-9



D-D
Location of section shown on Drawing 29-214.28L-9



JACKING BRACKET
2 Required for each Abut.
Provide 6 - 7/8" bolts per bracket

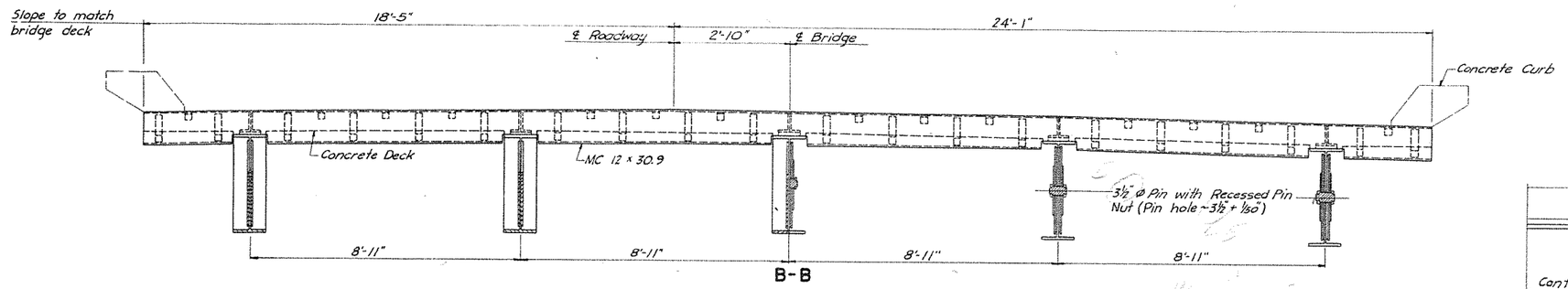
Designed for 25#/S.F. F.W.S.

QUANTITIES
See Drawing 29-214.28L-10

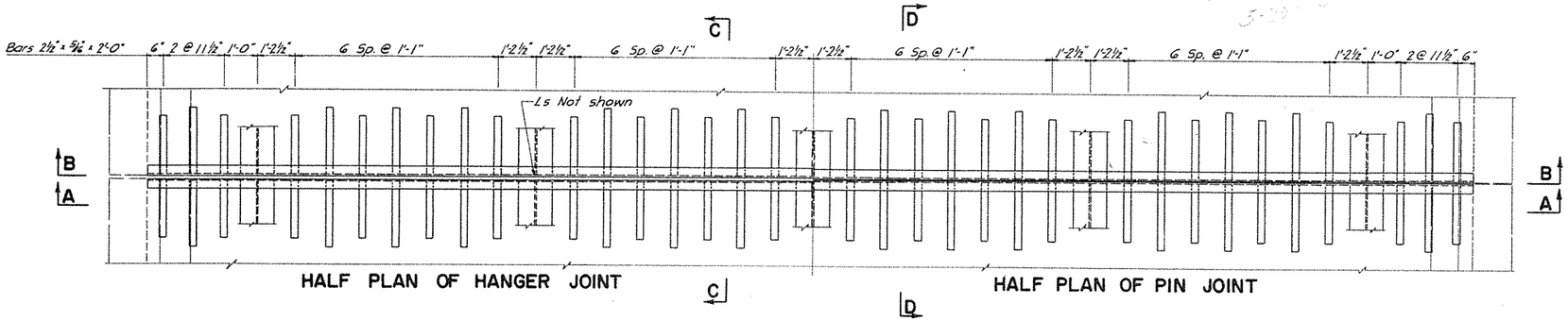
PEMBINA RIVER
MISCELLANEOUS STEEL
& BEARING DETAILS

29-214.28L-8

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N.D.	I-029-5(23)	99	

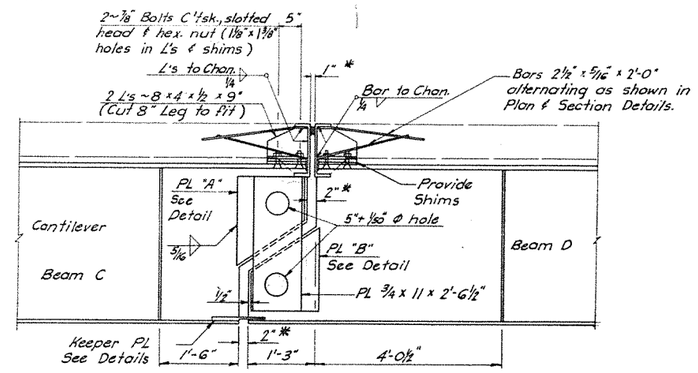


B-B

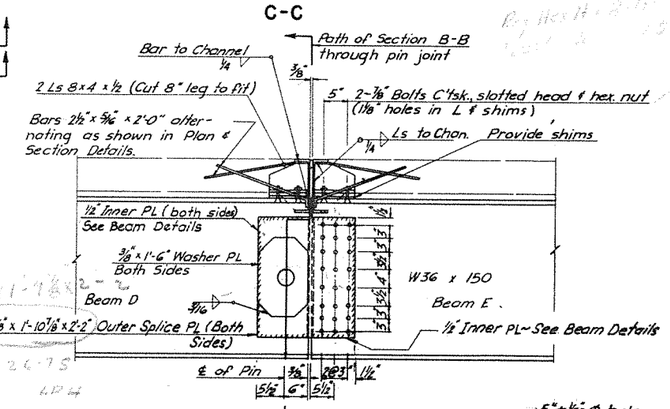


HALF PLAN OF HANGER JOINT

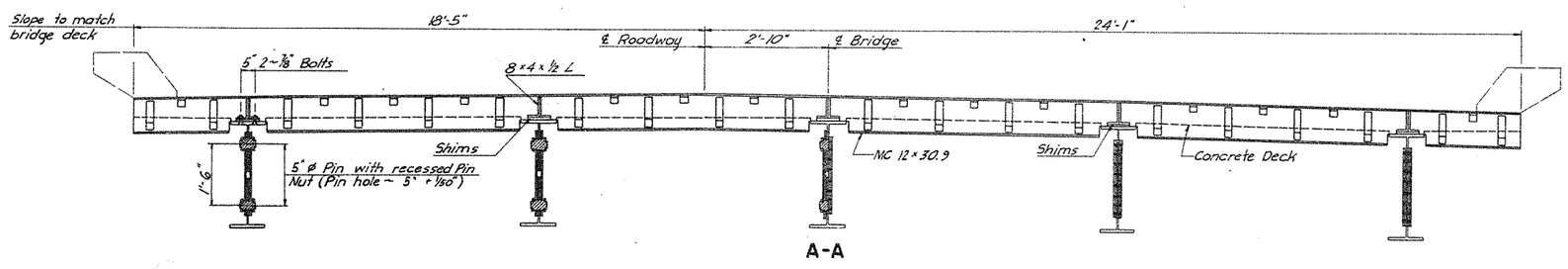
HALF PLAN OF PIN JOINT



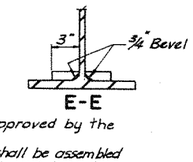
C-C



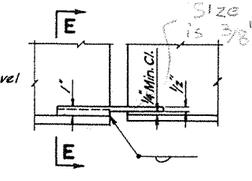
D-D

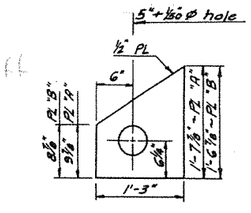


A-A

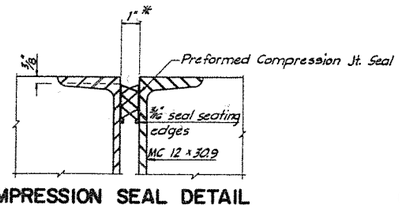


E-E



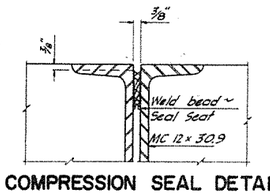


PLATES "A" & "B" DETAIL



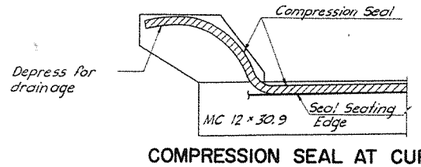
COMPRESSION SEAL DETAIL

Detail taken from Section C-C



COMPRESSION SEAL DETAIL

Detail taken from Section D-D



COMPRESSION SEAL AT CURB

Same @ 1" and ⅜" opening

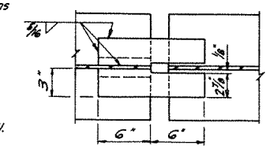
NOTES:

Type of seal used shall be approved by the Bridge Engineer.

All expansion or fixed joints shall be assembled to fit the crown of roadway and all interior joints shall be shop assembled on their supporting beams and properly fitted together and match marked. To allow for field adjustment, ⅛" shims has been assumed between the L supports and the beams.

The field shimming of the last half of each joint shall be done after the concrete has been poured in the adjoining slab. for placement of Expansion Joint at Abutment see Dwg. 29-214.28L-11.

All pins nuts, after being tighened, shall be tack welded to the ends of the pins.



KEEPER PL DETAILS

SEALS

LOCATION	WIDTH OF SEAL GROOVE	WIDTH OF SEAL	LENGTH OF SEAL L.F.
At Pin Joint	⅝"	⅝"	45'-6" (For 1 Joint)
At Hinge Joint	1" @ 50°	1⅜"	45'-6"

*At 50° F. ~ Change per degree F. = 0.00624 in.

QUANTITIES

See Drawing 29-214.28L-10 for Struct. Steel Quant.

Pref. Compr. Jt. Seal ⅝"	227.5 L.F.
Pref. Compr. Jt. Seal 1¾"	45.5 L.F.

PEMBINA RIVER

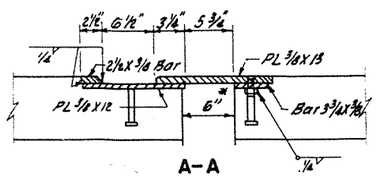
DECK JOINTS, HANGER & COMPRESSION SEAL DETAILS

CHECKED BY	C.A.L.
MADE BY	G.A.L.
CHECKED BY	L.A.G.
TRACING MADE BY	G.A.L.
CHECKED BY	L.A.G.
QUANTITIES MADE BY	G.P.B.
CHECKED BY	D.L.B.

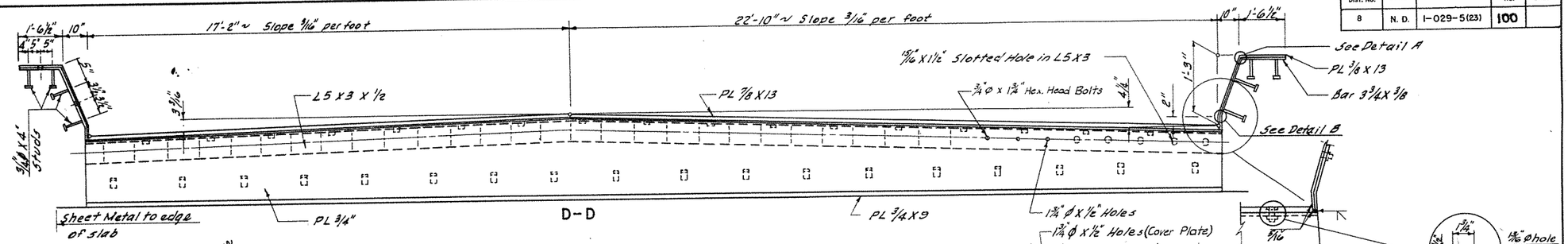
29-214.28L-9

29-214.28L-9

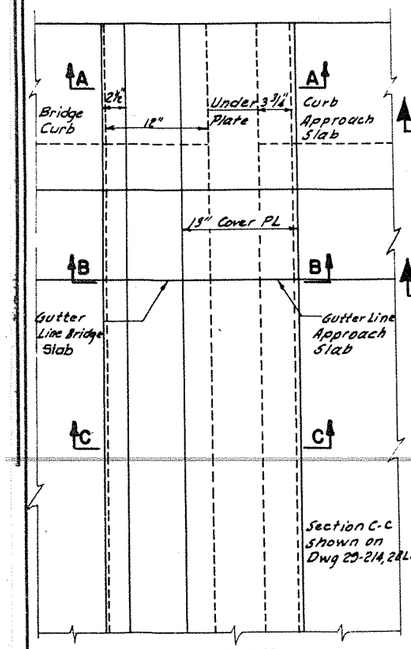
FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N. D.	I-029-5(23)	100	



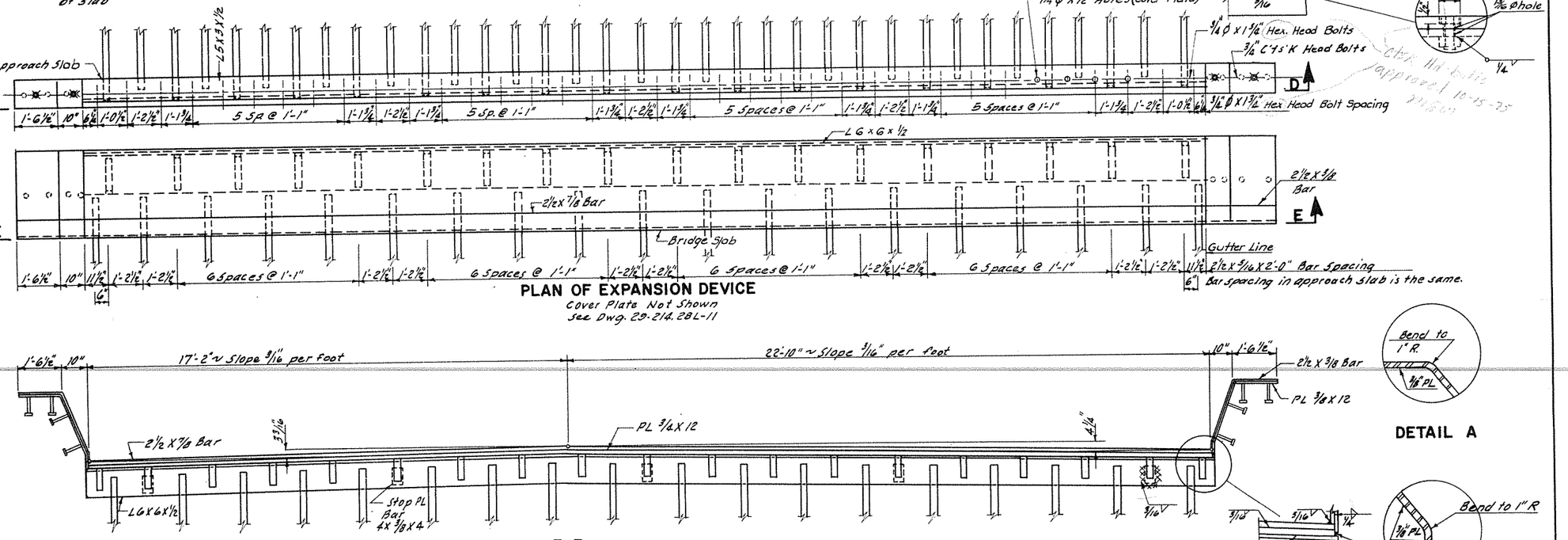
A-A



D-D



PART PLAN

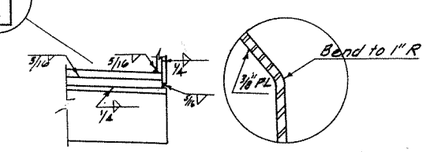


PLAN OF EXPANSION DEVICE

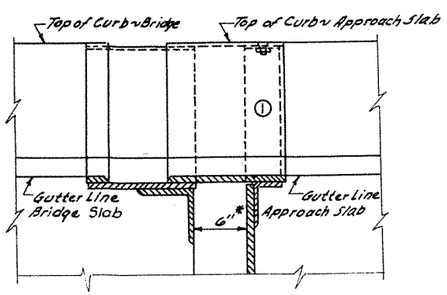
Cover Plate Not Shown
See Dwg. 29-214.28L-11

E-E

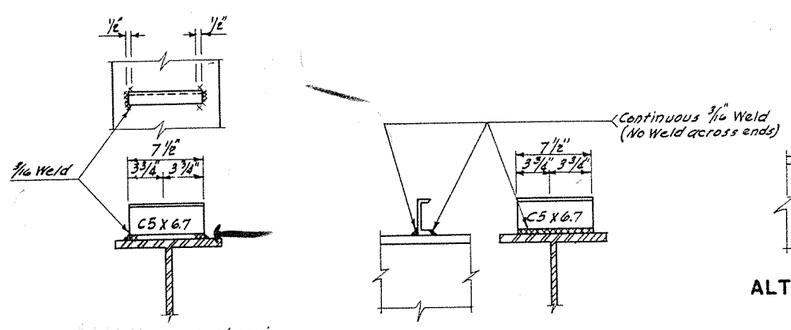
DETAIL A



DETAIL B



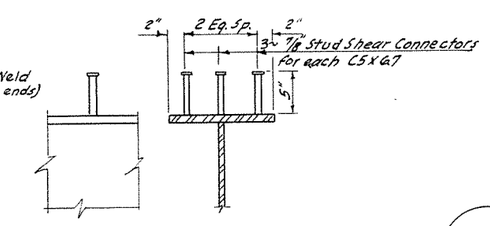
B-B



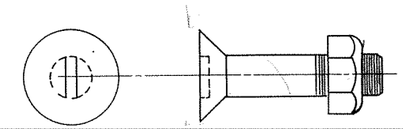
Use in negative moment regions

Use in positive moment regions

SHEAR CONNECTOR DETAILS



ALTERNATE SHEAR CONNECTORS



3/4" BOLT AND NUT

Furnish with slotted C'ts'K head A325 Bolts

NOTE:
Quantities include all structural steel shown on the superstructure drawings.
Designed for 25#/S.F. F.W.S.

QUANTITIES
Structural Steel (#36) 422,164 Lbs.

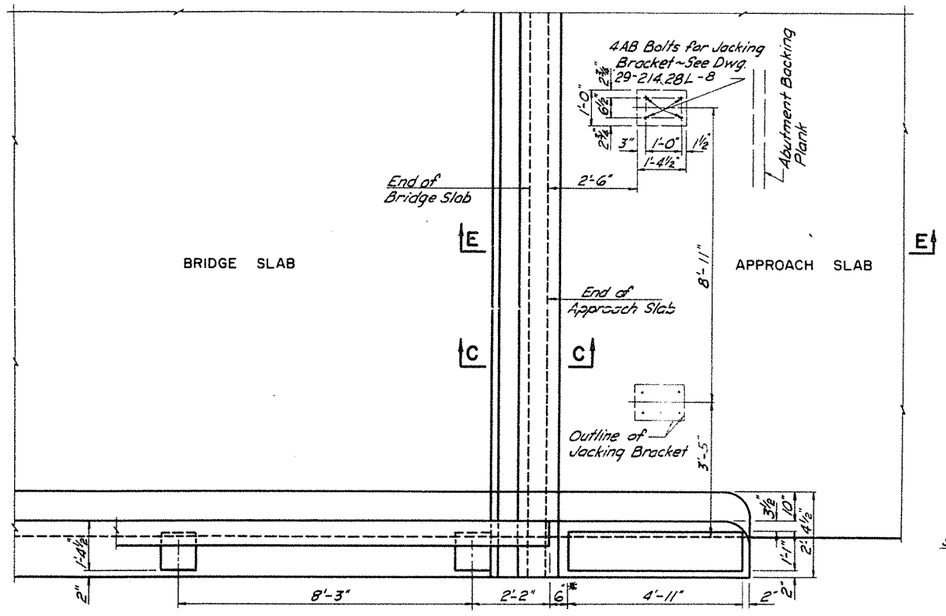
*At 38° F. = change per degree F. = 0.0140" in.

PEMBINA RIVER

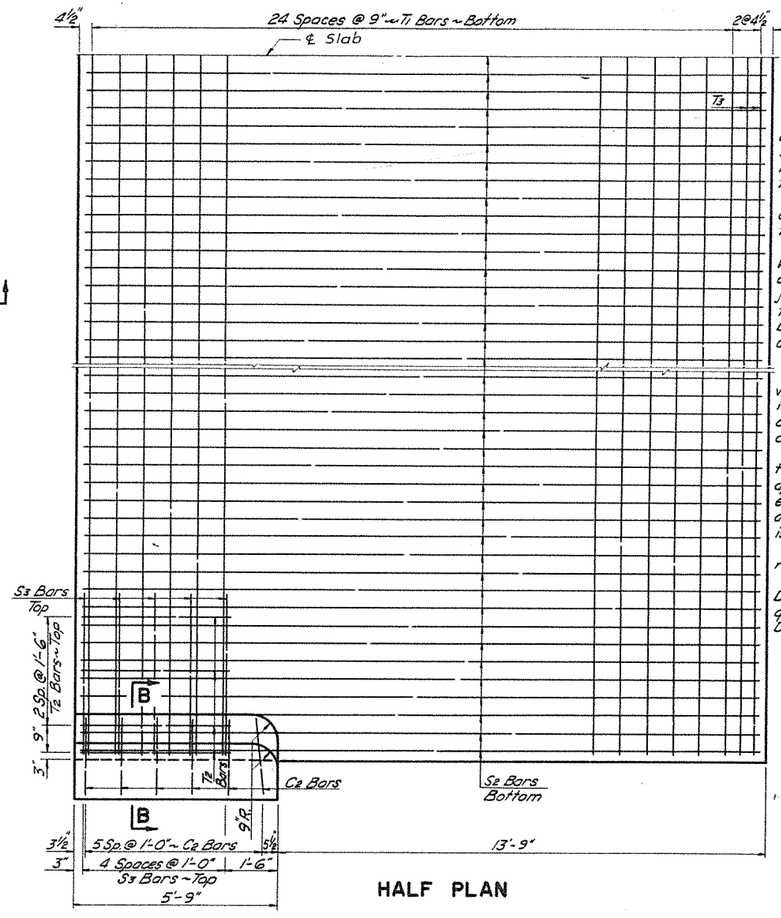
APPROACH SLAB EXPANSION JOINT

29-214.28L-10

FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N.D.	I-029-5(23)	101	



PART PLAN



HALF PLAN

NOTES:

MAINTENANCE:

If a situation should arise whereby the approach slab is pushed toward the abutment by the roadway slab, closing the expansion opening, a means has been provided to correct this condition.

First, a (6"±) slab section will be cut and removed from the far end of the approach slab.

Second, the steel jacking brackets will be attached to the bolts provided on the underside of the approach slab; jacks will then be inserted between the brackets and the end beam of the bridge and the approach slab jacked to closure with the roadway slab.

CONSTRUCTION:

¾" holes have been provided in the vertical leg of the 6"x6"x½" L so that it may be bolted to the concrete forms and the bridge half of the expansion device accurately adjusted to grade.

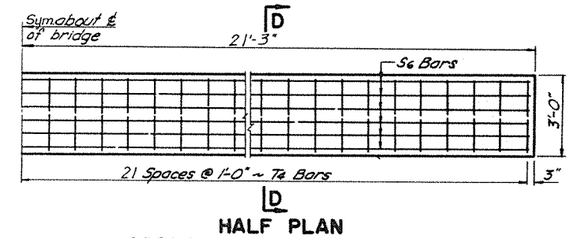
Slotted holes have been provided in the vertical leg of the 5"x3"x½" L of the approach slab so that this half of the expansion device may be accurately adjusted to grade when approach slab is poured.

See Dwgs. 29-214.28L-13 & 14 for railing details and general layout.

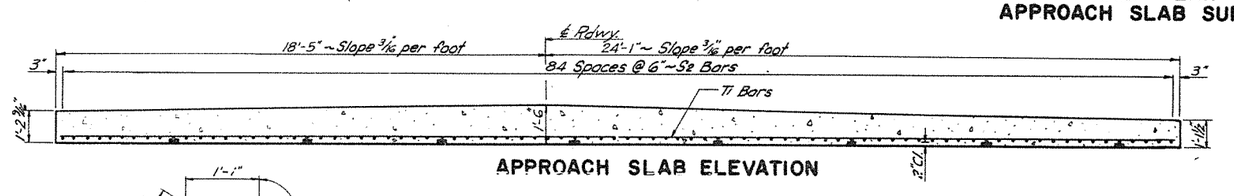
Railing quantities are shown on Dwg. 29-214.28L-13. Railing end post quantities are included in the quantities, Dwg. 29-214.28L-13.

BAR LIST (ONE APPR. SLAB & SUPPORT)

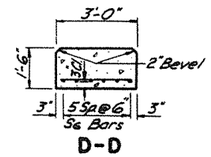
MARK	NUMBER SLAB	NUMBER SUPPORT	NUMBER CURB	SIZE	LENGTH	SHAPE	UNIT WT.
C2	12			5	6'-7"	Bent	6.87
S2	85			8	19'-0"	Str.	50.74
S3	10			6	5'-0"	Bent	7.51
S4			10	5	5'-3"	Str.	5.48
S5			2	6	4'-9"	"	7.13
S6		6		7	42'-2"	"	86.21
T1	25			4	42'-2"	Str.	28.15
T2	8			4	4'-3"	"	2.84
T3	2			6	42'-2"	"	63.34
T4		43		4	2'-6"	"	1.67



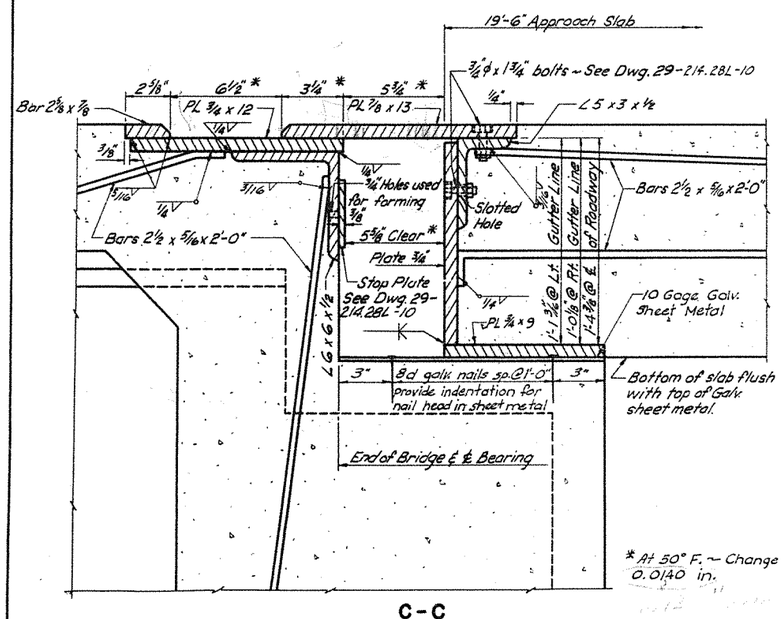
HALF PLAN
APPROACH SLAB SUPPORT



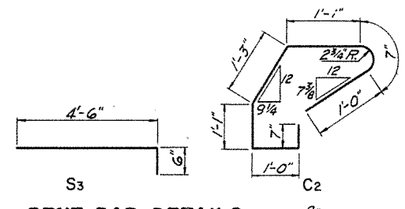
APPROACH SLAB ELEVATION



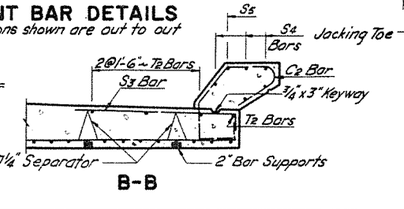
D-D



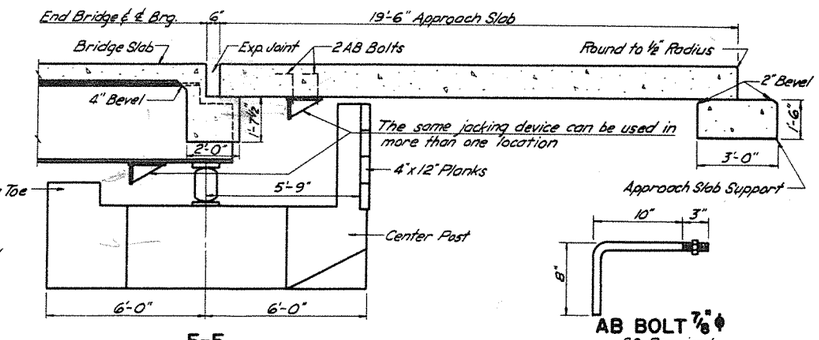
C-C
(See Dwg. 29-214.28L-10)



BENT BAR DETAILS
Dimensions shown are out to out



B-B



E-E

AB BOLT 7/8"φ
20 Required
(Included as Structural Steel)

Designed for 25#/S.F. F.W.S.

QUANTITIES (ONE SLAB)

Class AE-3 Concrete	49.0	C.Y.
Reinforcing Steel	5992	Lbs.

PEMBINA RIVER

APPROACH SLAB

* At 50° F. ~ Change per degree F. = 0.0140 in.

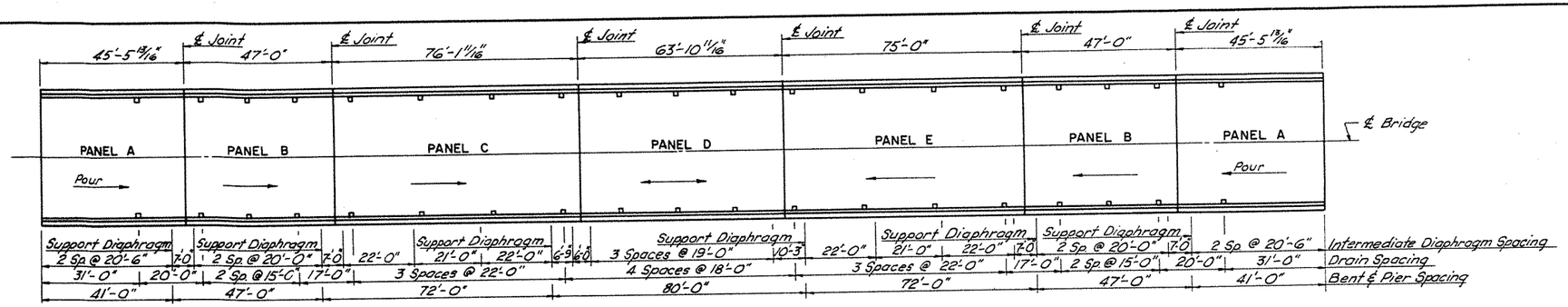
CHECKED BY	L.F.O.
MADE BY	G.H.L.
CHECKED BY	L.E.G.
MADE BY	G.H.L.
CHECKED BY	G.H.L.

TRACING
QUANTITIES

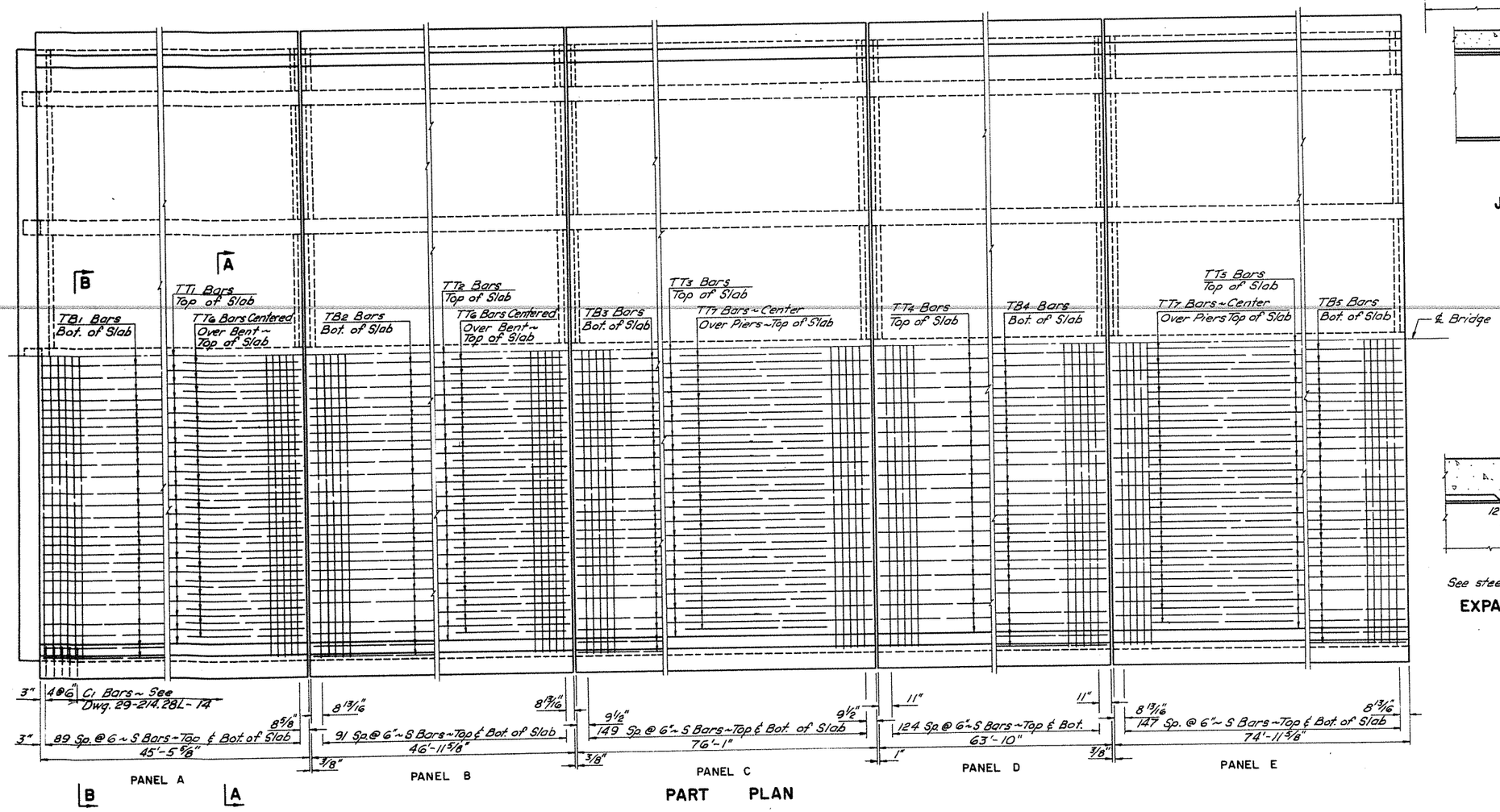
29-214.28L-11

29-214.28L-11

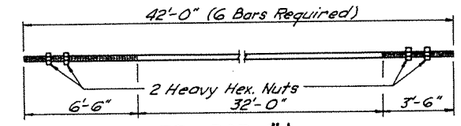
FED. ROAD DIST. NO.	STATE	PROJ. NO.		SHEET NO.	TOTAL SHEETS
8	N. D.	I-029-5(23)		102	



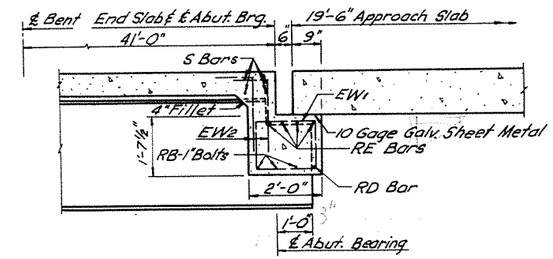
SLAB LAYOUT



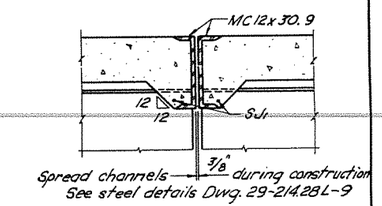
PART PLAN



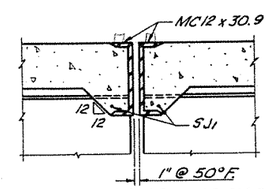
RB BAR 1" ϕ
(Included in structural steel)



JUNCTION OF BRIDGE & APPROACH



PIN JOINT



See steel detail Dwg. 29-214.28L-9

EXPANSION JOINT

Designed for 25#/S.F. F.W.S.

QUANTITIES

See Drawing 29-214.28L-13

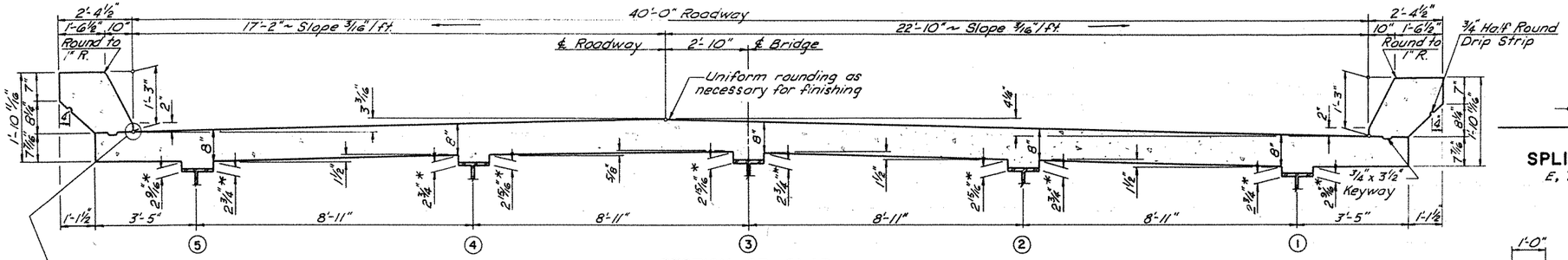
PEMBINA RIVER

SLAB DETAILS

29-214.28L-12

29-214.28L-12

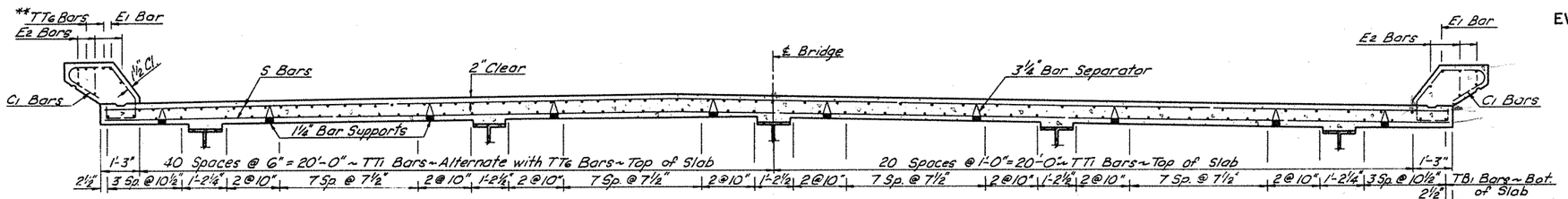
FED. ROAD DIST. NO.	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N. D.	I-029-5(23)	103	



SECTION OF SLAB
Showing Dimensions

Seal corner with Asphalt Flashing Compound (Knife grade)

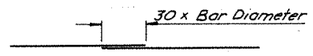
* Allow for variation in girder elevation by adjusting the riser dimension to maintain required slab thickness.



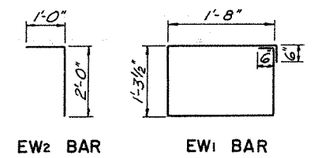
SECTION A-A
Showing Reinforcing Over Bent No. 2

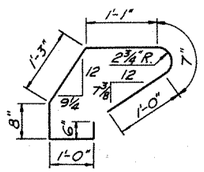
SECTION B-B
Showing Reinforcing in Span Between Supports

**Centered over Bent

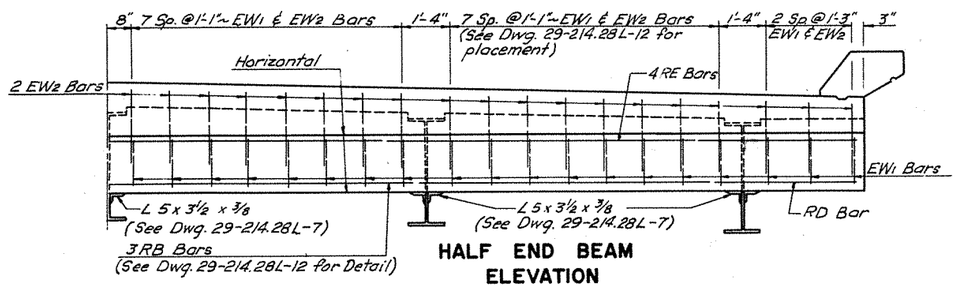


SPLICING DETAIL
E, TB & TT Bars

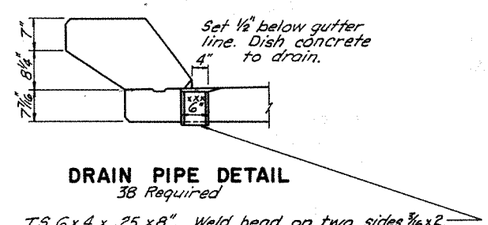




BENT BAR DETAILS
Dimensions shown are out to out

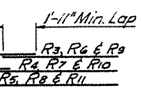


HALF END BEAM ELEVATION



DRAIN PIPE DETAIL
38 Required

TS 6 x 4 x .25 x 8'. Weld bead on two sides 3/16 x 2. Hot dip galvanized after fabrication. To be paid for as structural steel.

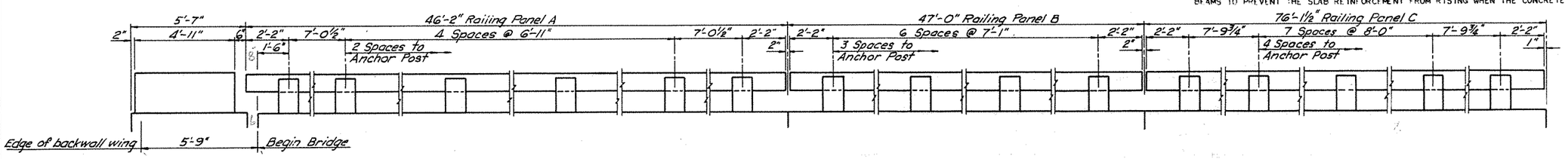


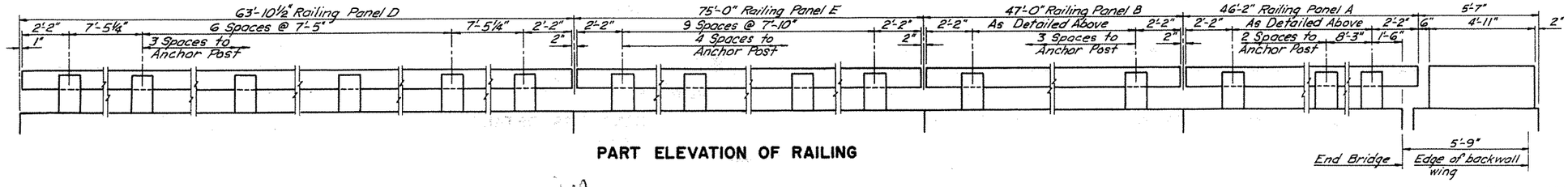
R BAR SPLICING DETAIL

Use R3, R4 & R5 in Span 3
Use R6, R7 & R8 in Span 4
Use R9, R10 & R11 in Span 5
Use R1 in Spans 1 & 7
Use R2 in Spans 2 & 6

REINFORCING STEEL:
THE TOP LAYER OF TRANSVERSE DECK SLAB REINFORCEMENT SHALL BE TIED DOWN WITH WIRE TIES TO THE SHEAR CONNECTORS OF THE BEAMS. SMALL HOLES MAY BE BURNED THROUGH THE TOP PORTION OF THE SHEAR CONNECTOR WEB TO FACILITATE MAKING THE TIE.

THE TIES SHALL BE AT INTERVALS OF 5 TO 6 FEET ALONG THE FULL LENGTH OF ALL BEAMS TO PREVENT THE SLAB REINFORCEMENT FROM RISING WHEN THE CONCRETE IS PLACED.





PART ELEVATION OF RAILING

BAR LIST (SUPERSTRUCTURE)

MARK	NUMBER SLAB	NUMBER RAILING & POSTS	NUMBER CURB	SIZE	LENGTH	SHAPE	UNIT WT.
C1	984		5	6	6'-1"	Bent	6.35
E1		4	6	45	45'-2"	Str.	67.84
E2		20	5	45	45'-2"	"	47.11
E3		4	6	46	46'-8"	"	70.10
E4		20	5	46	46'-8"	"	48.68
E5		4	6	38	38'-10"	"	58.33
E6		20	5	38	38'-8"	"	40.33
E7		4	6	32	32'-9"	"	49.17
E8		20	5	32	32'-6"	"	33.90
E9		4	6	38	38'-3"	"	57.45
E10		20	5	38	38'-1"	"	39.73
EW1	76		4	6	6'-11"	Bent	4.62
EW2	152		4	3	3'-0"	"	2.00
P4		300	6	4	4'-4"	Bent	6.51
P5		42	6	5	5'-1"	"	7.64
P6		228	5	4	4'-9"	"	4.95
P7	228		3	4	4'-2"	"	1.56
P8	200		3	3	3'-2"	"	1.17
P9	28		3	4	4'-8"	"	1.75
R1	24		6	45	45'-9"	Str.	68.72
R2	24		6	46	46'-6"	"	69.85
R3	8		6	35	35'-10"	"	53.82
R4	8		6	38	38'-10"	"	58.33
R5	8		6	41	41'-10"	"	62.84
R6	8		6	29	29'-8"	"	44.56
R7	8		6	32	32'-8"	"	49.07
R8	8		6	35	35'-8"	"	53.57
R9	8		6	35	35'-3"	"	52.95
R10	8		6	38	38'-3"	"	57.45
R11	8		6	41	41'-3"	"	61.96
RC	784		3	3	3'-3"	Bent	1.22
RD	2		8	42	42'-2"	Str.	112.60
RE	8		6	42	42'-2"	"	63.34
S	1574		6	42	42'-2"	Str.	63.34
SJ	48		5	7	7'-8"	"	8.00
TB1	112		5	45	45'-2"	Str.	47.11
TB2	112		5	46	46'-8"	"	48.68
TB3	112		5	38	38'-8"	"	40.33
TB4	112		5	32	32'-6"	"	33.90
TB5	112		5	38	38'-1"	"	39.73
TT1	82		4	45	45'-2"	"	30.15
TT2	82		4	46	46'-8"	"	31.15
TT3	82		4	38	38'-6"	"	25.70
TT4	82		4	32	32'-4"	"	21.59
TT5	82		4	37	37'-11"	"	25.31
TT6	160	16	5	8	8'-0"	"	8.34
TT7	80	8	5	15	15'-0"	"	15.65

Designed for 25#/S.F. F.W.S.

QUANTITIES

Class AE-3 Concrete	507.9 CY
Class AAE-3 Concrete	26.93 CY
Reinforcing Steel	162,809 Lbs.
Structural Steel (A36)	1074 Lbs.

Railing and end post quantities included.

PEMBINA RIVER

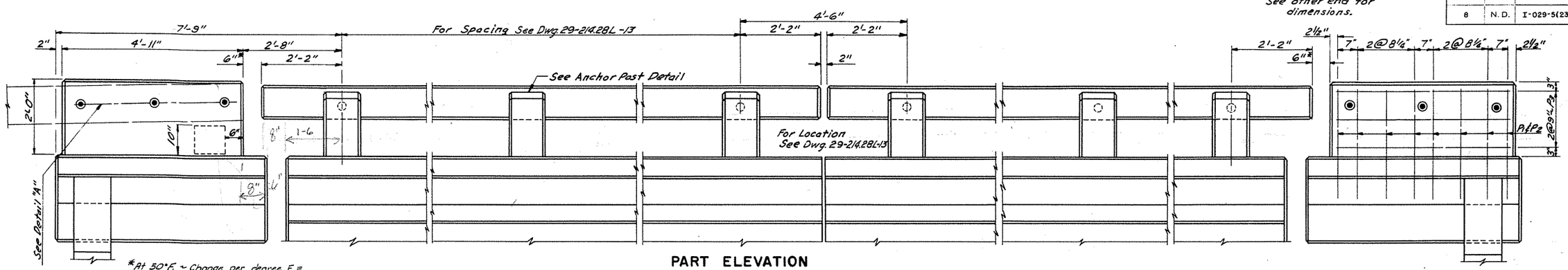
SLAB & RAILING DETAILS

DRAWING | CHECKED BY D.L.R. | DATE 5-6-7
QUANTITIES | MADE BY G.A.L. | CHECKED BY D.L.R.

29-214.28L-13

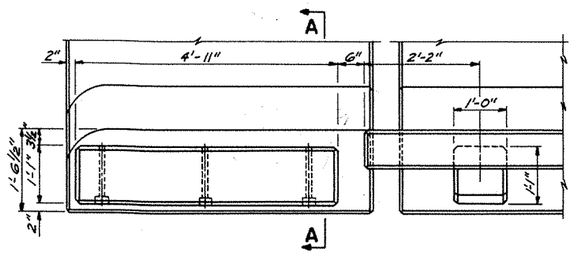
29-214

FED ROAD DIST NO	STATE	PROJ. NO.	SHEET NO.	TOTAL SHEETS
8	N. D.	I-029-5(23)	104	

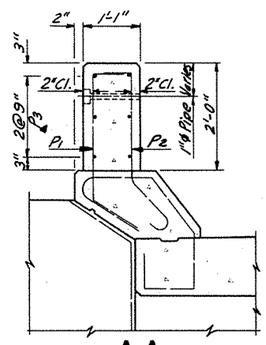


*At 50°F. ~ Change per degree F. = 0.0140 in.

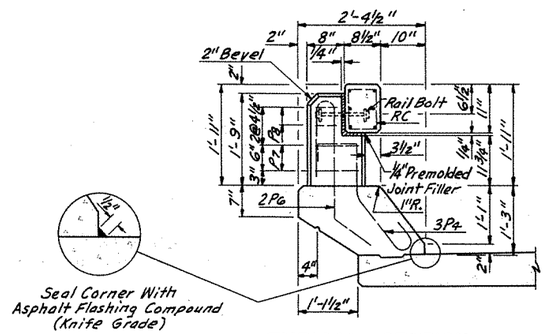
PART ELEVATION



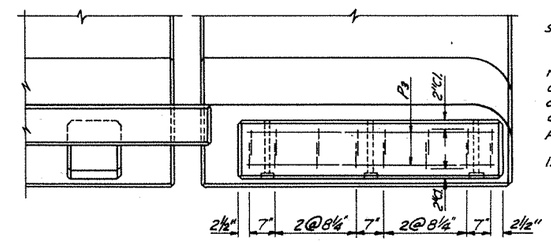
PART PLAN



A-A



TYPICAL SECTION



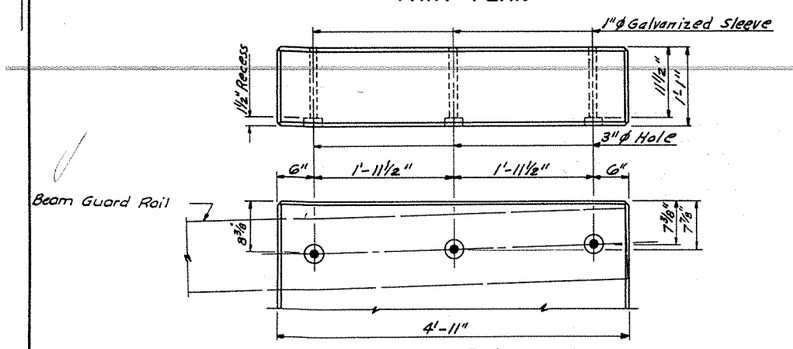
PART PLAN

NOTES:

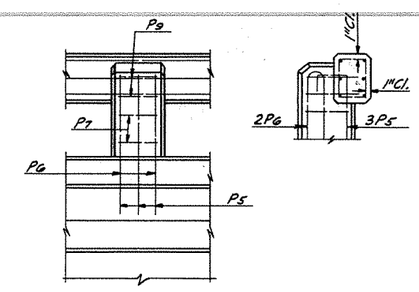
All concrete above top of curb shall be Class AAE-3.

"Rubbed Surface Finish" will be required for the roadway faces of curbs, the outside vertical faces of curb and slab, and all faces of rails, intermediate and end posts.

Designed in accordance with 1965 A.A.S.H.O. Specifications.

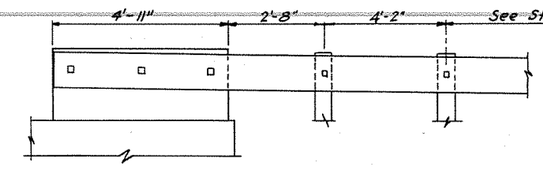


DETAIL "A"



ANCHOR POST DETAIL

See Dwg. 29-214.28L-13 For Placement



BEAM GUARD RAIL DETAIL

* Number of bars shown on Dwg. 29-214.28L-13.

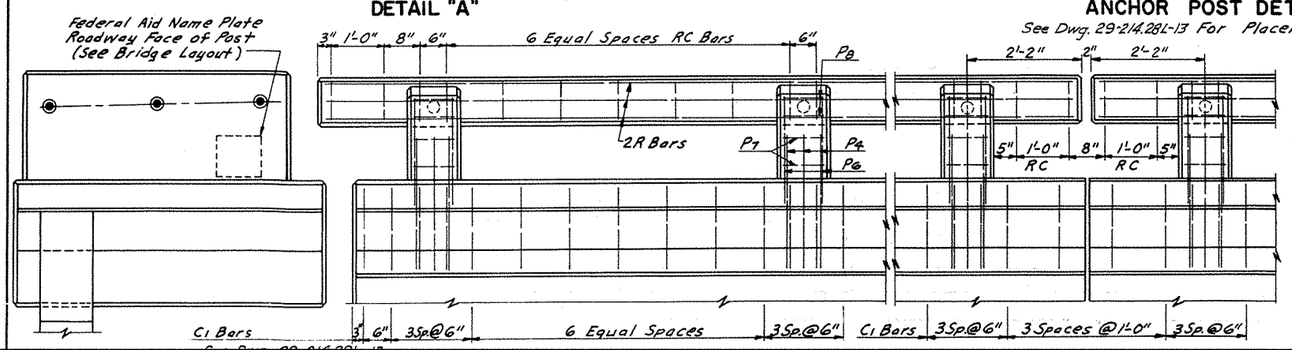
** Number, length & splicing information of R bars shown on Dwg. 29-214.28L-13.

BAR LIST
(BARS FOR FOUR END POSTS)

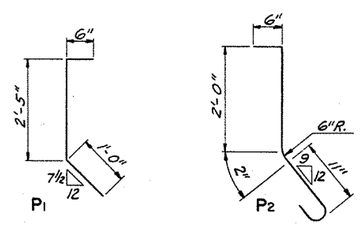
MARK	NO.	SIZE	LENGTH	SHAPE
P1	32	5	3'-11"	Bent
P2	32	5	4'-2"	"
P3	24	4	4'-7"	Str.

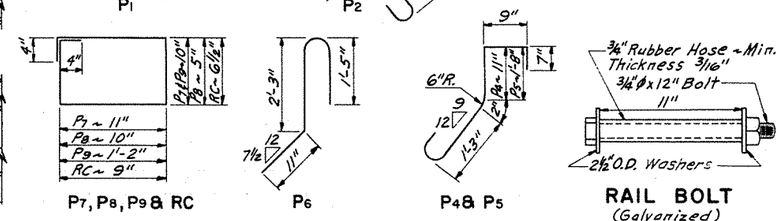
BAR LIST
(BARS FOR RAILING AND POSTS)

MARK	NO.	SIZE	LENGTH	SHAPE
P4	*	6	4'-4"	Bent
P5	*	6	5'-1"	"
P6	*	5	4'-9"	"
P7	*	3	4'-2"	"
P8	*	3	3'-2"	"
P9	*	3	4'-8"	"
RC	*	3	3'-3"	Bent
R**	**	6	**	Str.



RAIL DETAILS





BENT BAR DETAILS

Dimensions shown are out to out

QUANTITIES 4 END POSTS ‡	
Class AAE-3 Concrete	1.58 Cu.Yd.
Reinforcing Steel	344 Lbs.

‡ Railing and end post quantities are included in slab quantities on Dwg. 29-214.28L-13.

PEMBINA RIVER

RAILING, POSTS & END POSTS

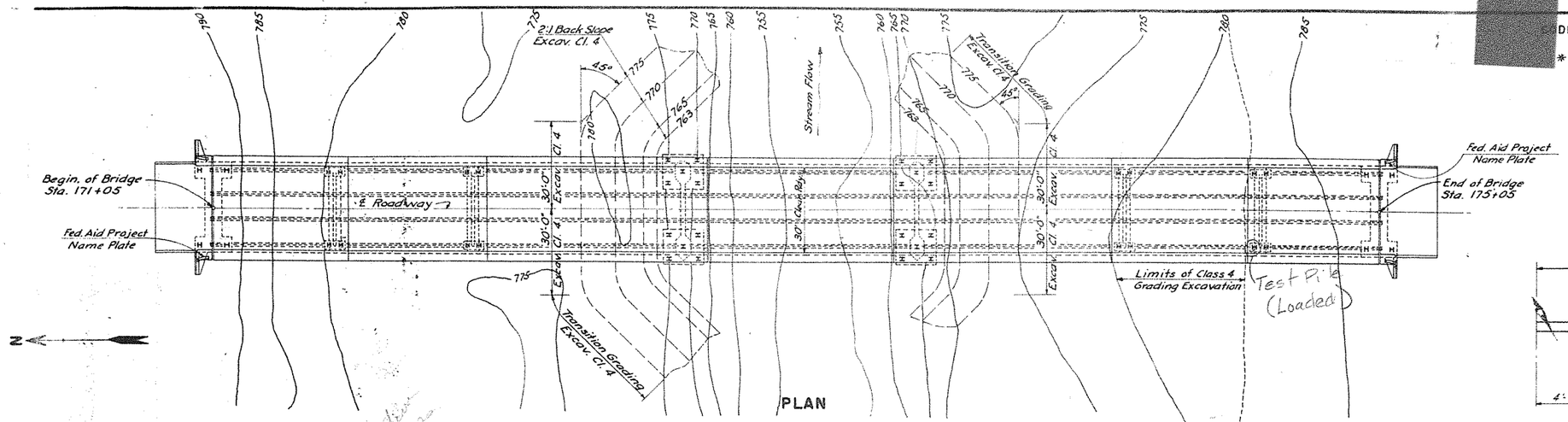
29-214.28L-14

794.53

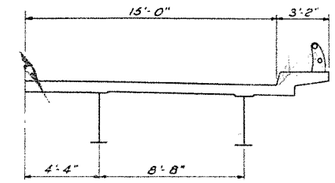
CODE: X031

FED. ROAD DIST. NO	STATE	PROJ. NO	FISCAL YEAR	SHEET NO	TOTAL SHEETS
5	N.D.	I-29-5(8)		3	23

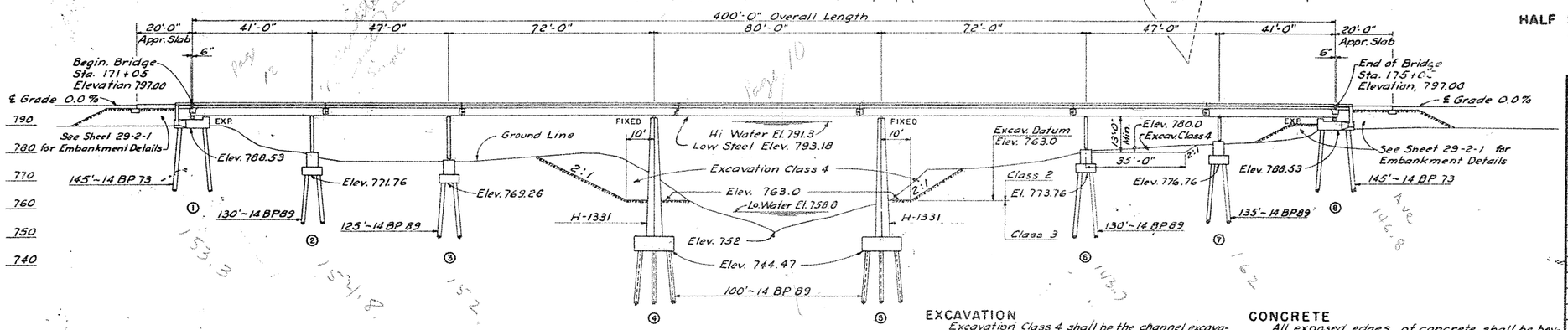
* DESIGN LOADING H20 S16 (53) AND ALTERNATE LOADING DESIGNATED IN PPM 20-4 SECTION 4C



PLAN



HALF SECTION OF DECK
Scale 1" = 4'



ELEVATION

* See Special Provisions

ESTIMATE OF QUANTITIES (ONE BRIDGE)

SPEC. NO.	BID ITEM			
12	REMOVING EXISTING STRUCTURE AT STA.			
15B	EXCAVATION CLASS-2	269	250	CU. YD.
15C	" CLASS 3	878	665	CU. YD.
15D	" CLASS 4	1870	2,050	CU. YD.
17△	EMBANKMENT	676	1,550	CU. YD.
60A	CONCRETE CLASS A-1			CU. YD.
	" CLASS A-1½	1064.8	1047.4+	CU. YD.
62A	REINFORCING STEEL		158,915	LB.
63A□	STRUCTURAL STEEL	409,605	407,000	LB.
64A	UNTREATED TIMBER			M.B.M.
64B	TREATED TIMBER		1.196	M.B.M.
65A	UNTREATED TIMBER PILING @ FT.			LIN. FT.
65B	TREATED TIMBER PILING @ FT.			LIN. FT.
✱65	LOADING TEST		1	EACH
✱65C△	FURNISH & DELIVER STEEL PILING (14BP73)		1160	LIN. FT.
✱65C△	DRIVING STEEL PILING (14BP73)		1144	LIN. FT.
✱65C△	FURNISH & DELIVER STEEL PILING (14BP89)		4080	LIN. FT.
✱65C△	DRIVING STEEL PILING (14BP89)		3988	LIN. FT.
	ORNAMENTAL METAL RAILING		809.0	LIN. FT.
	WATER FOR COMPACTION 10 GAL./YD.		15.5	M. GAL.
	BRIDGE BENCH MARKS		1	SET
	□ SEE NOTES, SHEET 29-2-7			
	△ SEE NOTES, SHEET 29-2-1			

STRUCTURAL DRAWINGS

GENERAL DRAWING	29-2 (THIS SHEET) & 29-2-1
SUBSTRUCTURE	29-2-2 TO 29-2-4 H-0401 & H-1331
SUPERSTRUCTURE	29-2-5 TO 29-2-12, H-0106, STD. 7.6 & STD. 14.9

✱ DESIGN LOADING — SCALE 1 INCH = 20 FEET

NORTH DAKOTA
STATE HIGHWAY DEPARTMENT

PEMBINA RIVER
BRIDGE LAYOUT

PROJECT I-29-5(8) STA. 173+05

PEMBINA COUNTY

APPROVED
6-20-58 DATE — Joseph R. Kirby BRIDGE ENGINEER

EXCAVATION

Excavation Class 4 shall be the channel excavation near piers 4 & 5, the lateral limits shall extend 30' on each side of the roadway centerline, then at an angle of 45° toward the river. The vertical limits shall extend upward from the base elevation 763.0 and from the 2:1 backslope plane.

Excavation Class 4 shall also include the grading excavation near piers 6 & 7. The lateral limits shall be terminated by the removal of the overburden to elevation 780.0 within the prescribed section, and the vertical limits shall extend upward from elevation 780.0 and the 2:1 backslope plane. Excavation class 4 limits are defined graphically on plan & elevation views, this sheet.

Excavation Class 3 shall be that structural excavation between the bottom of the pier footings and extending vertically upward to elevation 763.0 or the natural ground line, whichever is the lesser.

Excavation Class 2 shall be the structural excavation above elevation 763.0 and extending upward to the natural ground line excluding excavation Class 4.

CONCRETE

All exposed edges of concrete shall be beveled with ¾" triangular molding except as shown on the plans.

The "Rubbed Surface Finish" shall be given to the railing end posts, to the outside and roadway vertical faces of curbs, and to the exposed faces of the abutment wing walls. All other surfaces shall be given the "Ordinary Surface Finish."

All concrete shall be Class A-1½ and shall be compacted by vibration.

The slab sections shall be poured in order starting with the suspended span, Panel D and working toward either or both ends of the bridge. The suspended end of the other beam spans shall be poured first, working toward the cantilever end.

No curbs will be poured until the slabs for the entire bridge have been poured.

GENERAL

The cost of furnishing and placing the premolded joint filler, galvanized sheet metal, asphalt curb seal, name plates and other miscellaneous items shall be included in the price bid for Class A-1½ concrete.

See sheet 29-2-1 for embankment details, approach slab elevations and notes

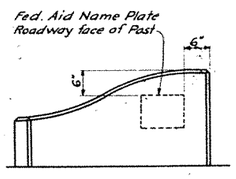
REINFORCING STEEL

Bent bar details are given center to center unless noted.

The Bar Fabricator shall add a prefix to all bar designations to differentiate between the several parts of the structure.

See sheet 29-2-1 for Embankment & Piling Notes.

See sheet 29-2-7 for Structural Steel Notes.



NAME PLATE LOCATION ON END POST

ALSO SEE PLAN (THIS SHEET), RAILING DETAILS SHEET 29-2-10 & STANDARD SHEET 14.9

FEDERAL AID PROJECT
I-29-5(8)
NORTH DAKOTA
1958

FEDERAL AID NAME PLATE
2 REQUIRED

BENCH MARKS

NO.	DESCRIPTION	LOCATION	ELEV.
15	Iron Mon. by yard post	Sta. 155+00 Lt.	791.21
16	Iron Mon. by T.P.	Sta. 164+48 Lt.	789.38
17	R.R. Spk. Sq. R.Ry. Abut.	Sta. 174+50 Lt.	790.50
18	R.R. Spk. in F.P.	Sta. 184+63 Lt.	791.20

PILE LOADING

LOCATION	DEAD LOAD	LIVE LOAD	EARTH	WIND 50 LB.	WIND 15 LB.	WIND 100 LB. L.L.	LONG FORCE	ICE		DESIGN LOAD
Abutments	20.20T.	13.90T.								34.10 T.
Bent 2	Group I	Design	Loading							73.00 T.
Bent 3	Group I	Design	Loading							86.91 T.
Pier 4 & 5	Group III	Design	Loading							89.40 T.
Bent 6	Group I	Design	Loading							83.41 T.
Bent 7	47.14T.	21.75T.	1.08T.							69.97 T.

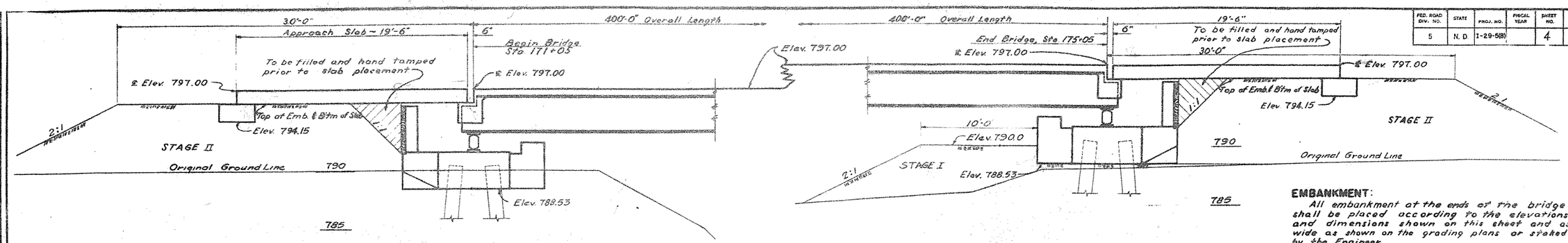
AASHO Specs. Section 1.4.1

REVISIONS	
	VIDED BY

TOPOGRAPHY	PLOTTED BY	CEG
	CHECKED BY	BCN
DETAILS	MADE BY	CEG
	CHECKED BY	OCA
TRACING	MADE BY	CEG
	CHECKED BY	CEG
QUANTITIES	MADE BY	CEG
	CHECKED BY	JCF

29-2

FED. ROAD DIV. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.	I-29-5(8)		4	23



EMBANKMENT & DETAILS AT BRIDGE ENDS

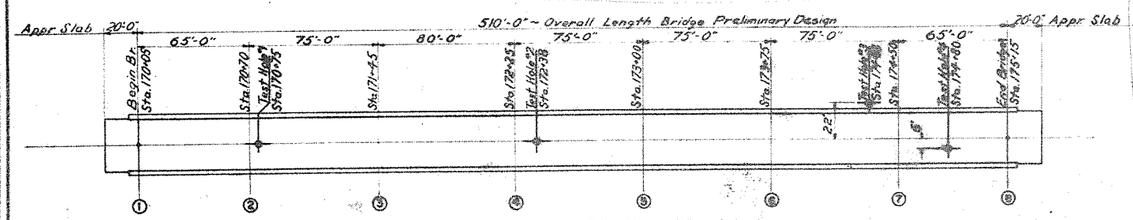
EMBANKMENT:

All embankment at the ends of the bridge shall be placed according to the elevations and dimensions shown on this sheet and as wide as shown on the grading plans or staked by the Engineer.

It shall be placed in stages. The first stage shall be placed and compacted prior to the driving of any abutment piling. The second stage shall be placed and compacted after the abutments are constructed and backing plank placed.

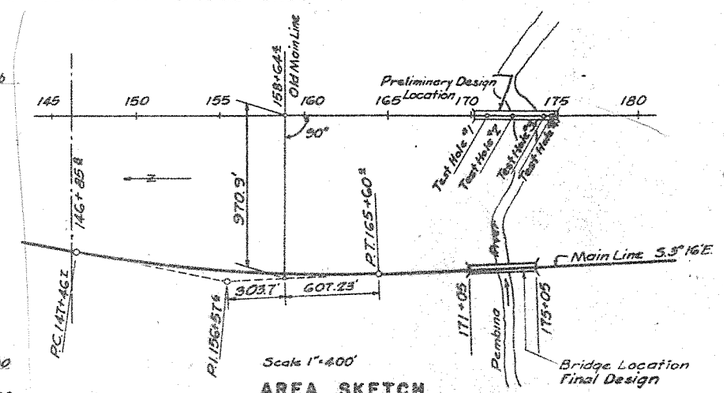
Embankment shall be placed and compacted (using "Extra Compaction") according to Sec. 17 of the Standard Specifications.

The method of measurement and basis of payment for all embankment material shall be the cubic yard in place in the embankment.



LOCATION OF TEST BORINGS

Preliminary Bridge Design Location



AREA SKETCH

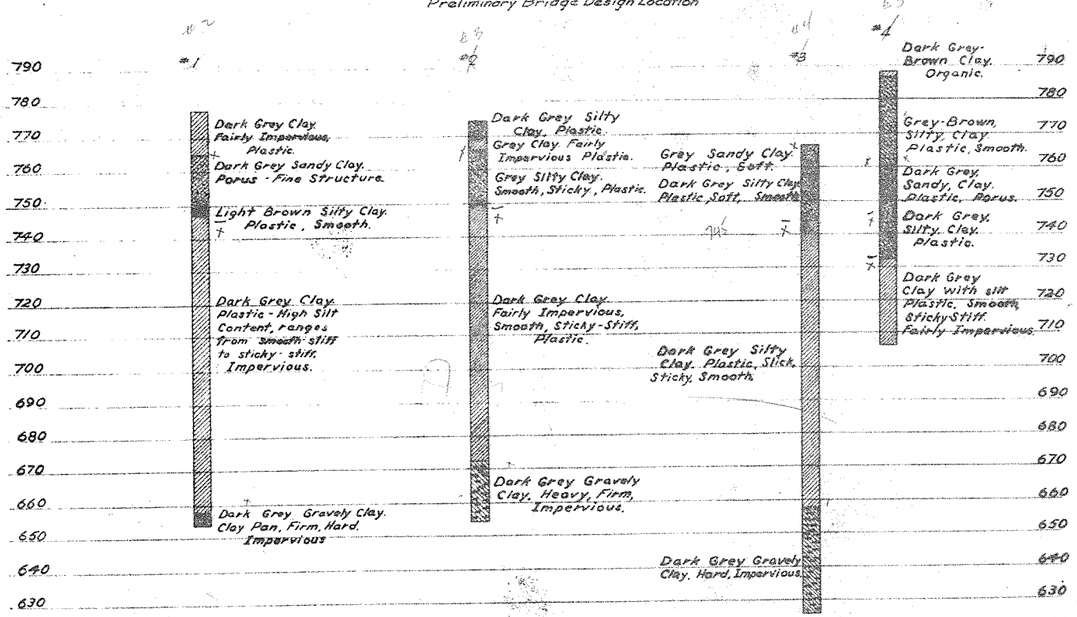
PILING (SEE SPECIAL PROVISIONS)

A single or double acting steam, air or diesel hammer may be used in driving the steel piles. The minimum size of hammer allowable will be one that develops not less than 22,000 foot pounds of energy per blow. A special pile driving cap recessed to fit closely around the pile and having full bearing on the pile head shall be used.

The face of the pile flanges shall be placed as shown on the detailed drawings of abutments and bents.

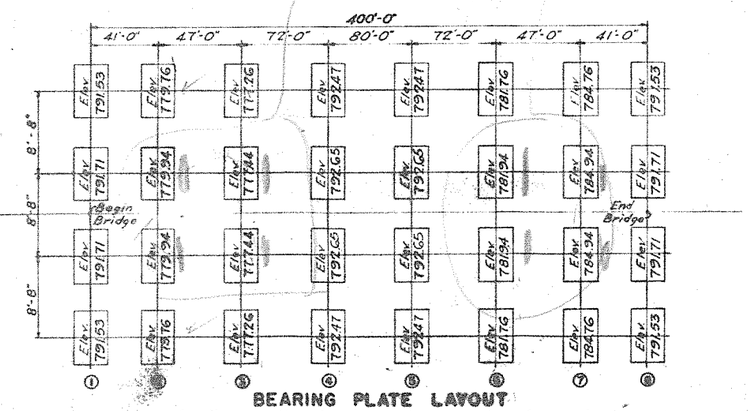
The loading test shall be made on a 14 BP 89 pile in one of the first groups driven and as soon after the group has been driven as possible.

The test pile shall be loaded to failure or a maximum load of 300 tons, whichever occurs first.



BORING DATA

Note: The data shown was obtained for design purposes only. The State assumes no responsibility if soil conditions encountered during construction differ from those above.



BEARING PLATE LAYOUT

In all cases the elevations shown are top of concrete. At Bents ② ③ & ⑥ ⑦ this elevation is the top of Bent Footing (See sheet 29-2-4).

PEMBINA RIVER BRIDGE

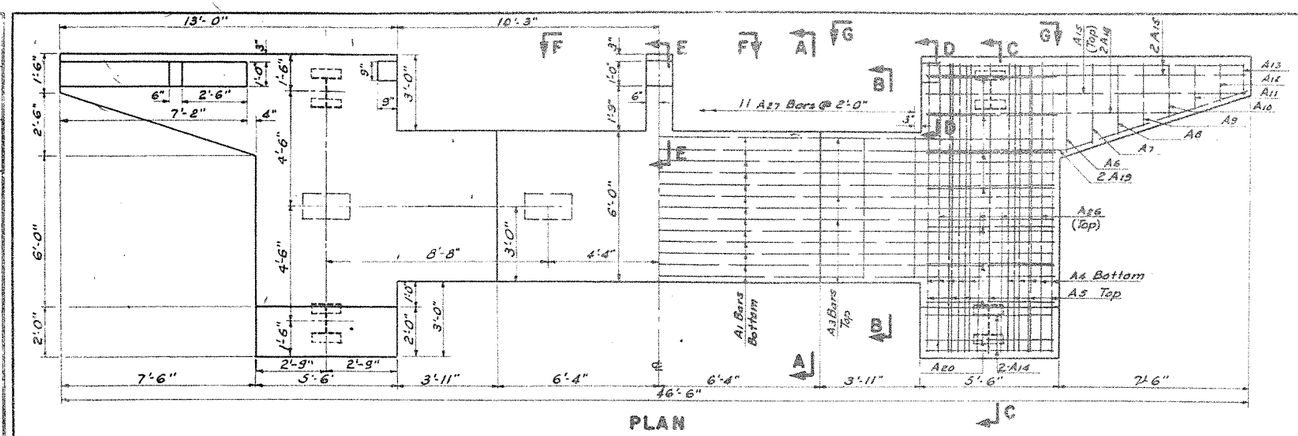
EMBANKMENT, BORING DATA & BEARING PLATE LAYOUT

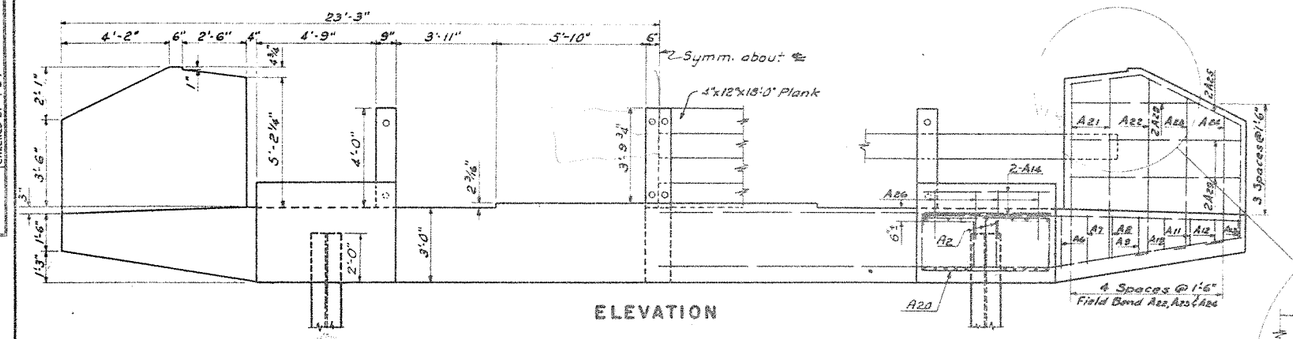
PROJECT I-29-5 (8)

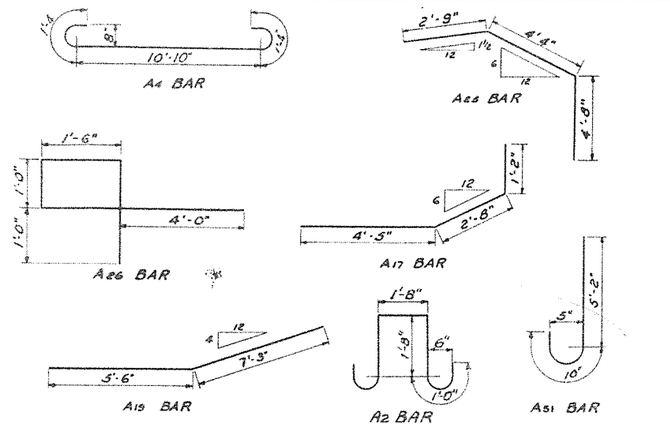
29-2-1

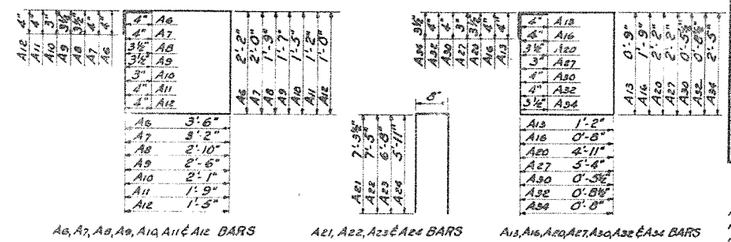
29-2-1

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N.D.	I-29-5(8)		5	2









BENT BAR DETAILS

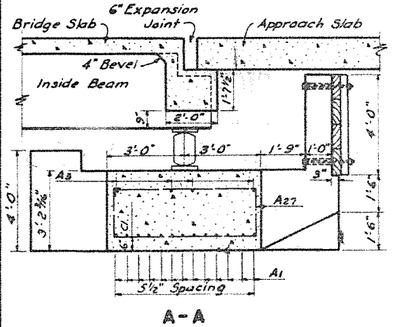
BAR LIST				
MARK	NO.	SIZE	LENGTH	SHAPE
A1	13	10	31'-0"	Str.
A2	12	6	7'-0"	Bent
A3	4	6	31'-0"	Str.
A4	20	9	13'-6"	Bent
A5	14	5	11'-6"	Str.
A6	2	5	12'-0"	Bent
A7	2	5	11'-0"	Bent
A8	2	5	9'-9"	Bent
A9	2	5	8'-9"	Bent
A10	2	5	7'-6"	Bent
A11	2	5	6'-6"	Bent
A12	2	5	5'-6"	Bent
A13	2	5	4'-6"	Bent
A14	8	5	3'-0"	Str.
A15	10	8	12'-6"	Str.
A16	1	5	5'-6"	Bent
A17	2	6	8'-3"	Bent
A18	4	8	10'-0"	Str.
A19	4	8	12'-9"	Bent
A20	16	5	14'-9"	Bent
A21	4	5	15'-3"	Bent
A22	2	5	15'-6"	Bent
A23	2	5	14'-0"	Bent
A24	2	5	12'-6"	Bent
A25	4	5	11'-9"	Bent
A26	8	5	10'-0"	Bent
A27	11	5	13'-6"	Bent
A28	4	4	5'-0"	Str.
A29	8	4	6'-9"	Str.
A30	16	3	2'-6"	Bent
A31	12	5	6'-0"	Bent
A32	8	3	3'-6"	Bent
A33	2	6	7'-0"	Str.
A34	1	5	6'-9"	Bent

NOTE:

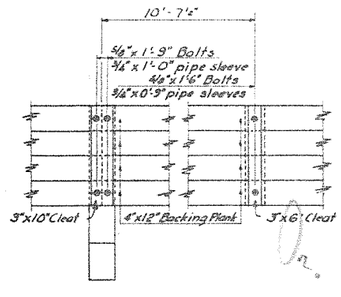
In the probability that the abutments move toward the river it will become necessary to reset the rollers to a plumb position. Holes have been provided in the bottom flange of the end beams so that the sole plate may be reattached in the position desired.

The beam holes may also be used to hold the jacking bracket while a jack is inserted between the bracket and the jacking toe, and the beams jacked longitudinally to counteract non-returning beam movement which has moved the spans toward the river.

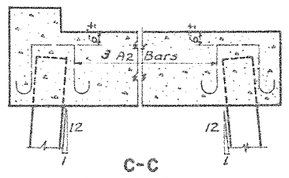
The tr. timber backing plank has been provided for the abutments in the eventuality that extreme abut. movement might still be provided for. In such a circumstance the backing plank and concrete posts would be removed and the backfill immediately behind the abutment excavated, allowing the end of the beams to project into the void provided, cantilevering from the rollers.



A-A

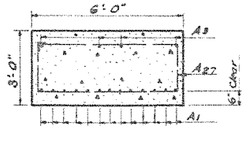


F-F G-G

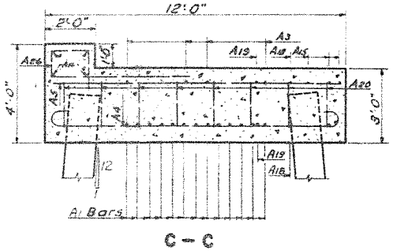


C-C

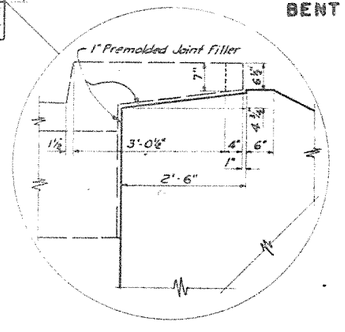
Showing A2 Bars

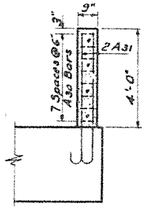


B-B

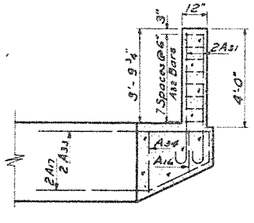


C-C





D-D



E-E

BILL OF MATERIALS		
NO.	SIZE	DESCRIPTION
8	4"x12"x18'-0"	Backing Plank (Tr. Timber-Full Sawn Rough)
1	3"x10"x 4'-0"	Cleats "
2	3"x 6"x 4'-0"	Cleats "
4	¾"ϕx1'-0"	Pipe Sleeves
4	¾"ϕx0'-9"	Pipe Sleeves
4	⅝"ϕx1'-9"	Galv. Timb. Bolts with washer heads & nuts
4	⅝"ϕx 1'-6"	Galv. Timb. Bolts with washer heads & nuts

QUANTITIES (One Abut.)	
Concrete Class A-1½	36.5 Cu Yd.
Reinforcing Steel	4796 Lb.
Treated Timber	598 M.F.M.

PEMBINA RIVER BRIDGE

ABUTMENT

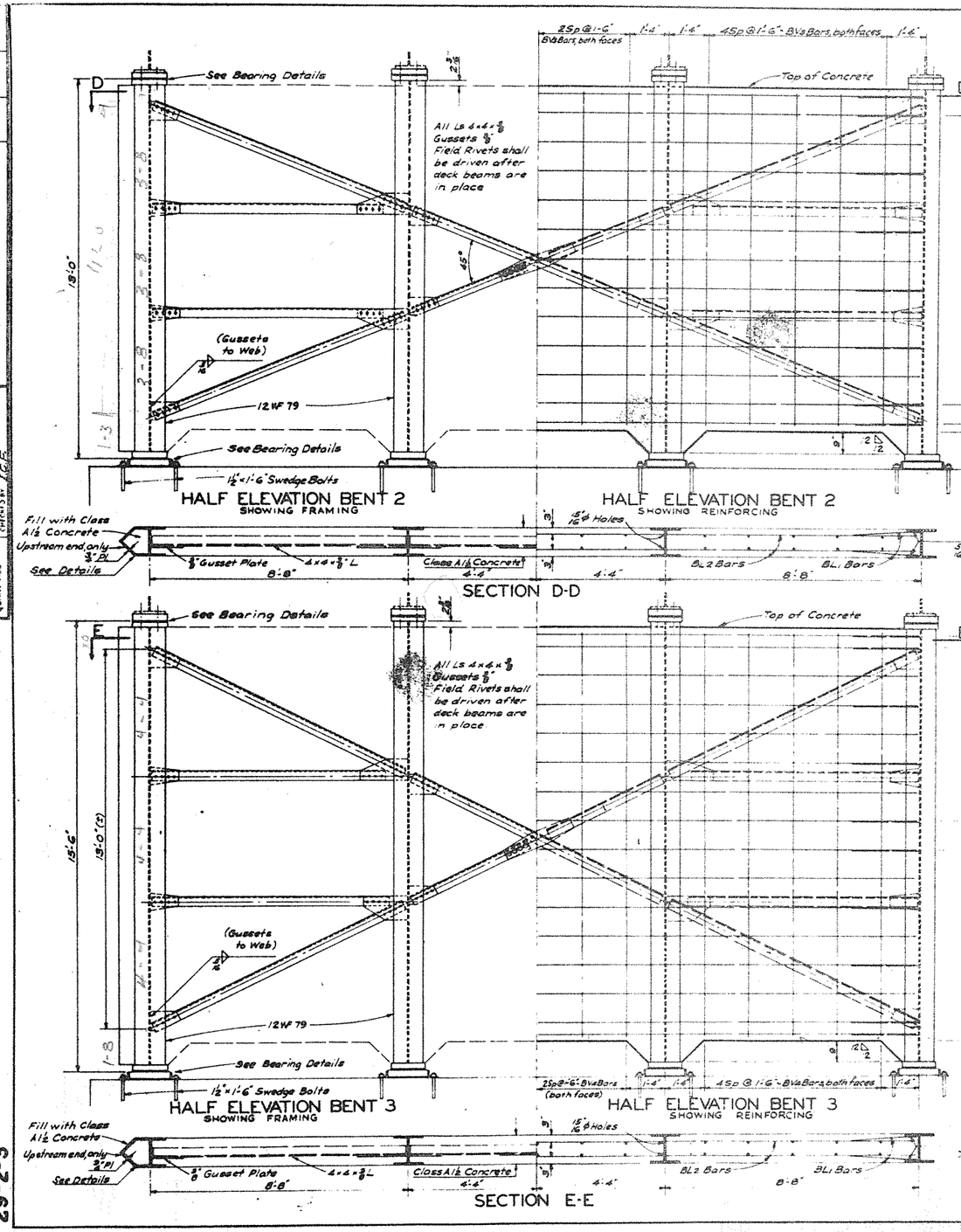
PROJECT I-29-5(8)

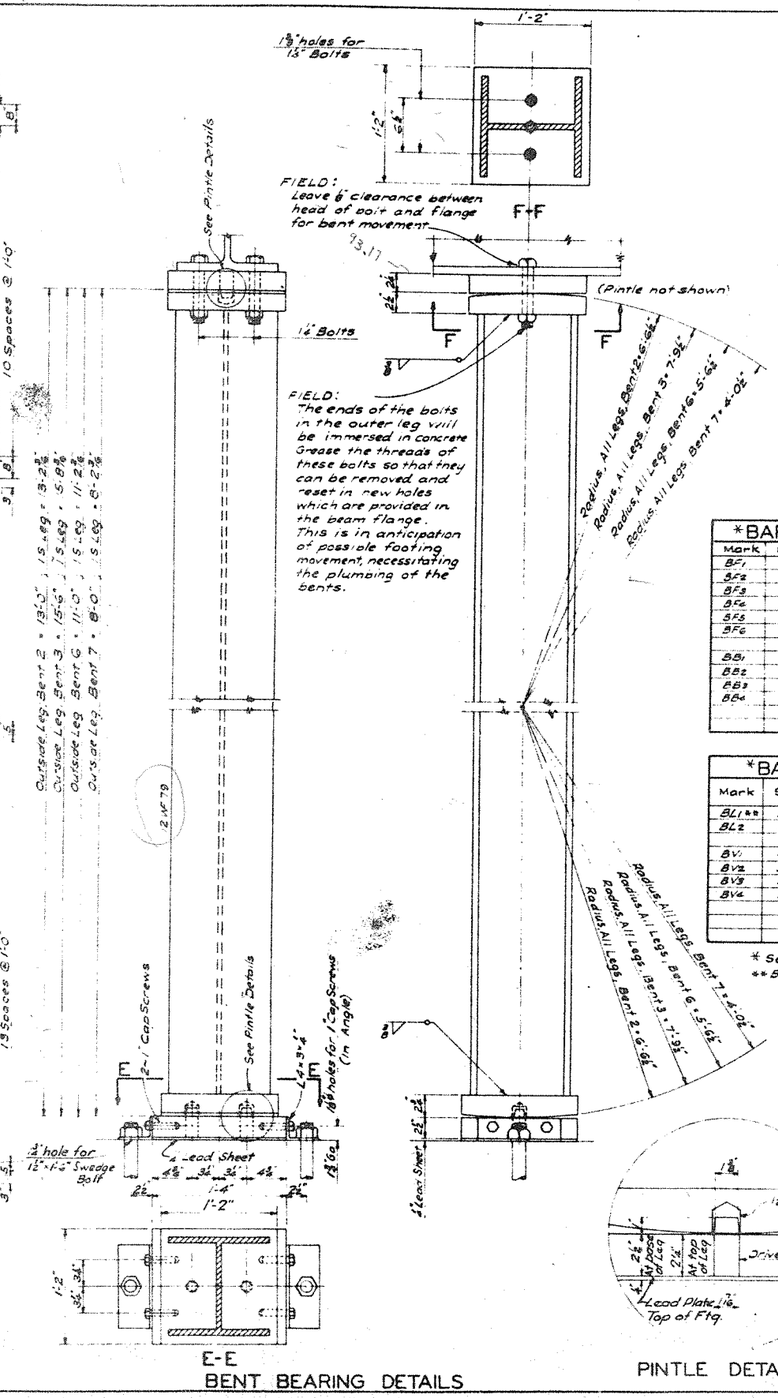
TRACING	MADE BY	O.C.A.
	CHECKED BY	C.E.G.
QUANTITIES	MADE BY	C.E.G.
	CHECKED BY	T.C.F.

29-2-2

29-2-2

FED. ROAD DIV. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N D	I-29-5(8)		6	2



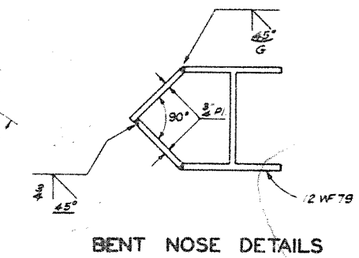


NOTES

All plates and contact surfaces shown in views E-E & F-F shall be milled before the parts are welded together.

Check the threads of the 1½" Swedge bolts at the base of the bents to prevent the nuts from loosening due to vibration.

Lead sheets are included in Structural Steel quantities.



BENT NOSE DETAILS

*BAR LIST – 4 BENT FOOTINGS

Mark	Size	Length	Shape	Number Required
BF1	10	8'-9"	Bent	48
BF2	8	6'-8"	Str	32
BF3	6	6'-8"		32
BF4	5	0'-6"	Bent	64
BF5	9	7'-0"	"	32
BF6	6	5'-0"	Str	96
BB1	10	29'-8"	Str	64
BB2	8	29'-8"		16
BB3	5	14'-8"	Bent	200
BB4	6	29'-8"	Str	16

*BAR LIST – BENTS 2, 3, 6, & 7

Mark	Size	Length	Shape	Number Required Bent #2	Bent #3	Bent #6	Bent #7
B1 **	5	2'-3"	Str	32	40	28	24
B2	5	25'-6"	"	26	32	22	16
B V1	5	8'-6"	Str			30	
B V2	5	6'-6"					30
B V3	5	11'-6"		30			
B V4	5	14'-0"			30		

* See Sheet 29-2-4

** B1 Bars to be paid for as Structural Steel

See Sheet 29-2-4

QUANTITIES	Bents & Bent Ftgs No. 2, 3, 6 & 7
Structural Steel	32,000 Lb.
Reinforcing Steel	21,944 Lb.
Concrete Class A1½	150.9 Cu. Yd.
Piling (See Layout)	
Excavation (See Layout)	

PEMBINA RIVER BRIDGE

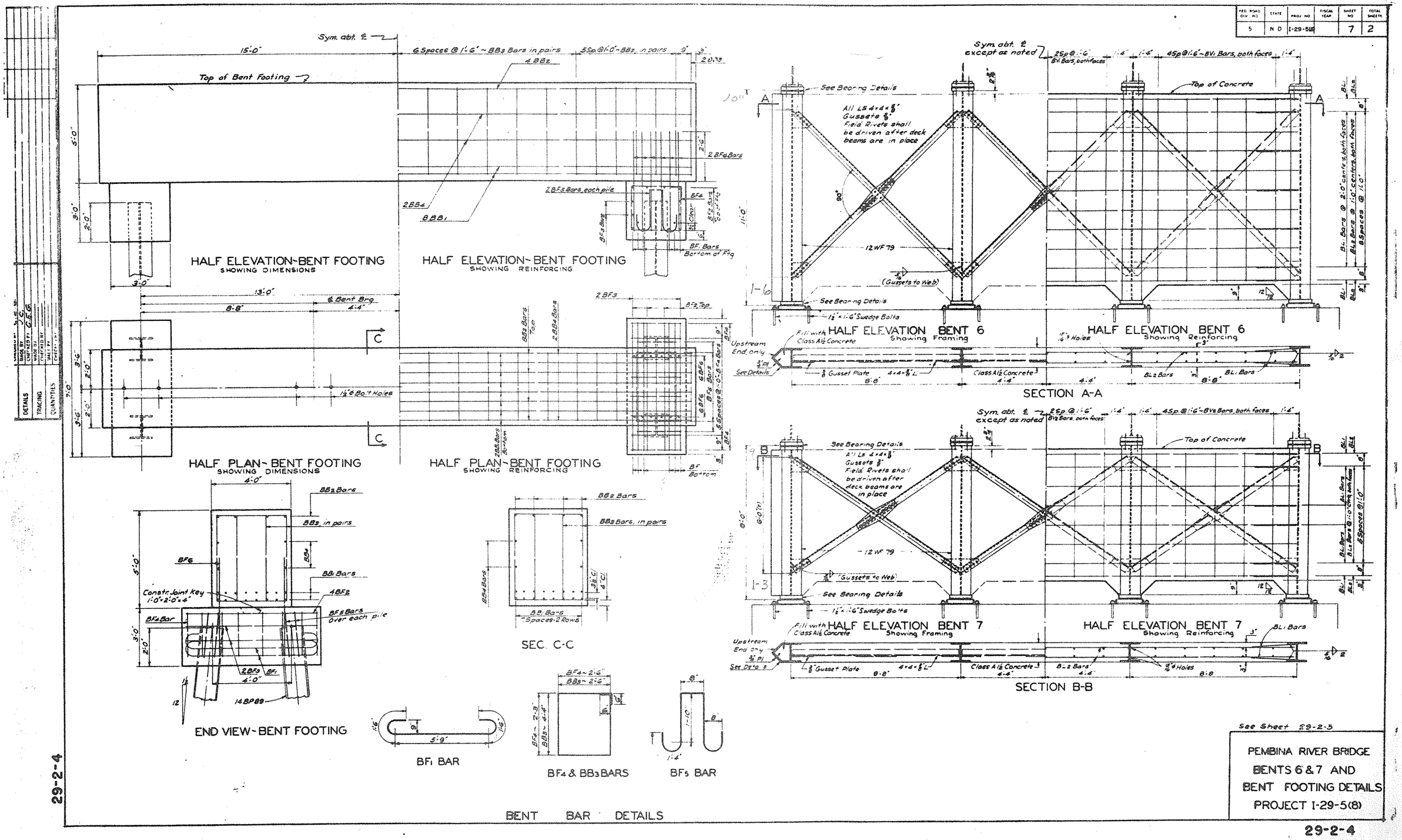
BENTS 2 & 3 - DETAILS

PROJECT I-29-5 (8)

TRACING	MADE BY	
	CHECKED BY	C.E.C.
QUANTITIES	CHECKED BY	C.E.C.
	CHECKED BY	C.E.C.

29-2-3

FED. ROAD DIV. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N D	I-29-5(8)		7	2



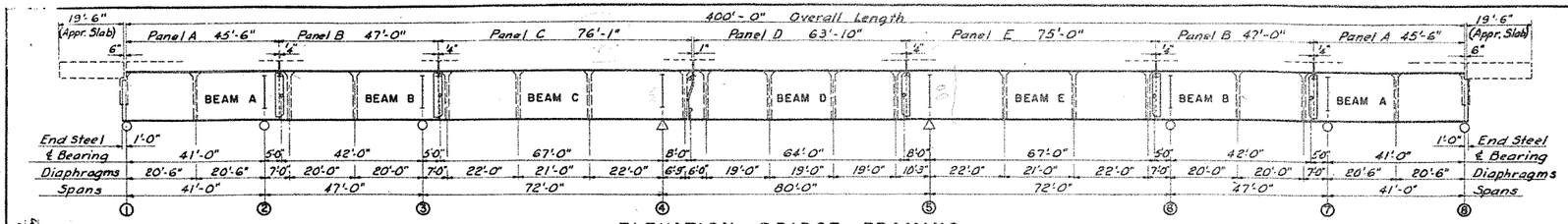
PEMBINA RIVER BRIDGE
BENTS 6 & 7 AND
BENT FOOTING DETAILS
PROJECT I-29-5(8)

BENT BAR DETAILS

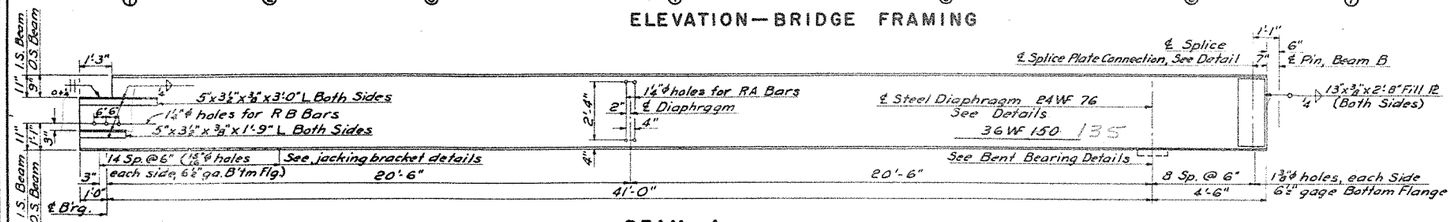
29-2-4

29-2-4

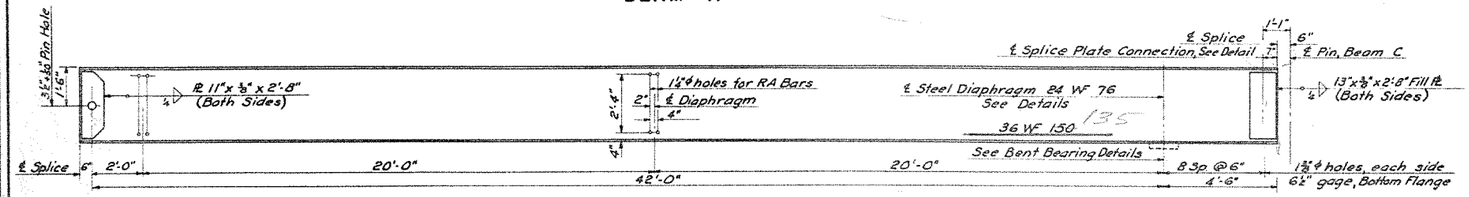
FED. ROAD DIV. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.	I-29-5(8)		8	2



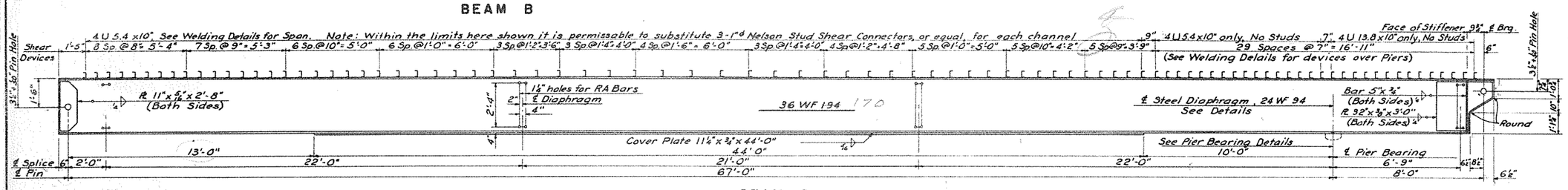
ELEVATION—BRIDGE FRAMING



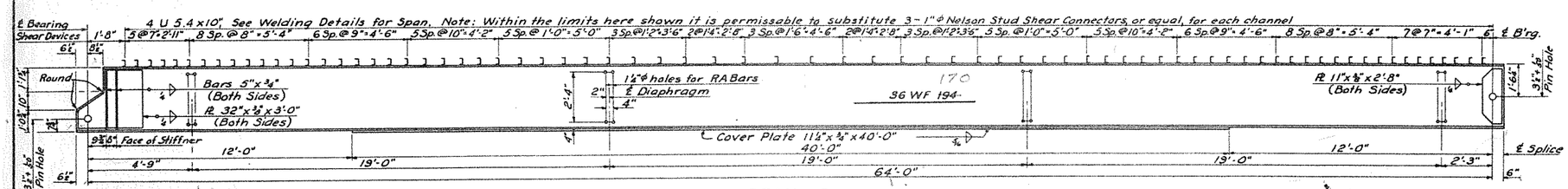
BEAM A



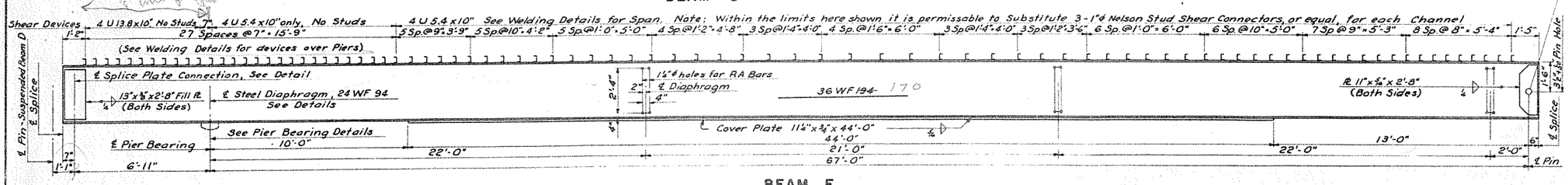
BEAM B



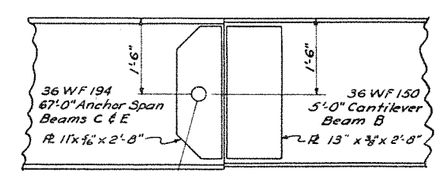
BEAM C



BEAM D



BEAM E



PIN JOINT, BEAMS B-C & BEAMS E-B

NOTE: Quantities are for beams and also include shear devices, cover plates, and steel diaphragms shown on sheets 29-2-7 and 29-2-8.

QUANTITIES

Structural Steel	372,000 Lb.

PEMBINA RIVER BRIDGE

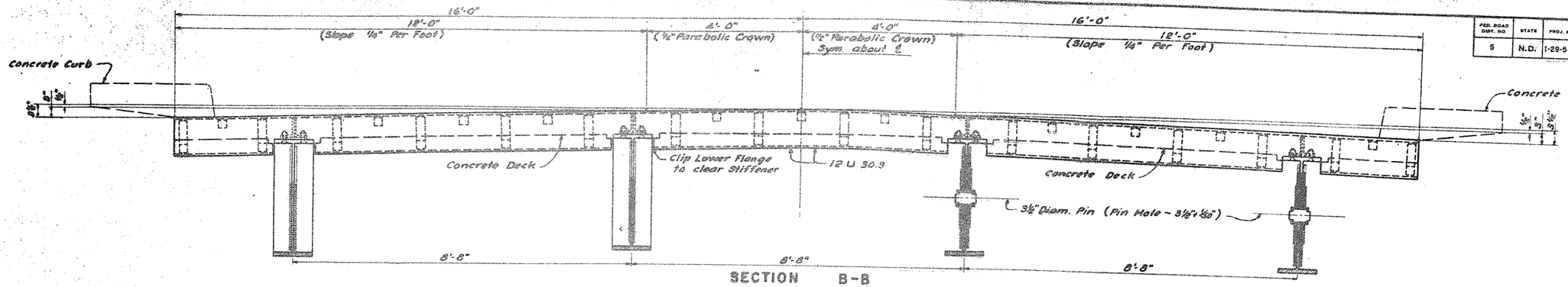
BEAM DETAILS

PROJECT I-29-5(8)

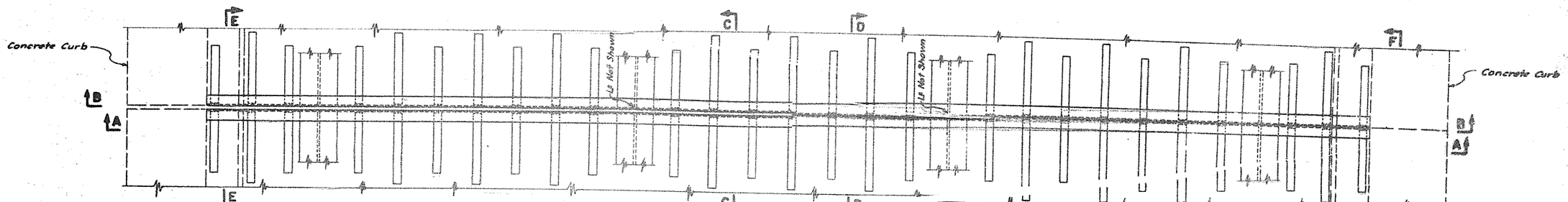
TRACING	DRAWN BY DRA
	CHECKED BY CEG
QUANTITIES	WRITTEN BY CEG
	CHECKED BY JCF

29-2-5

FED. ROAD DIST. NO	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N.D.	I-29-5(8)		9	2

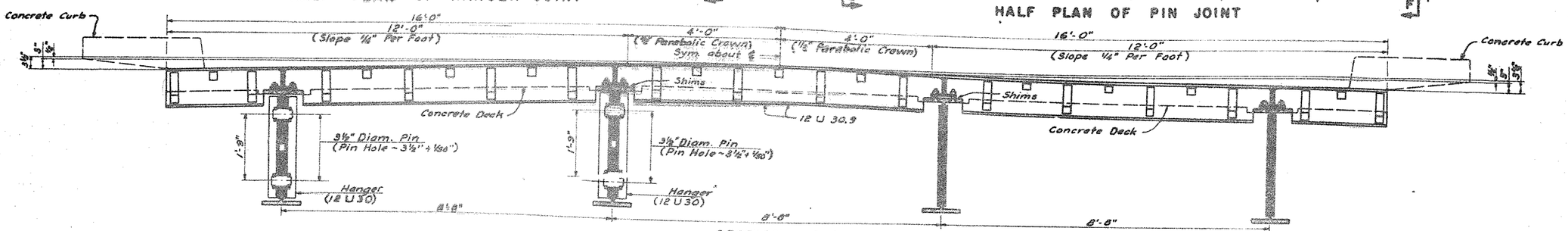


SECTION B-B

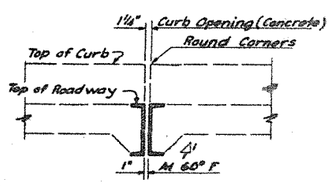


HALF PLAN OF HANGER JOINT

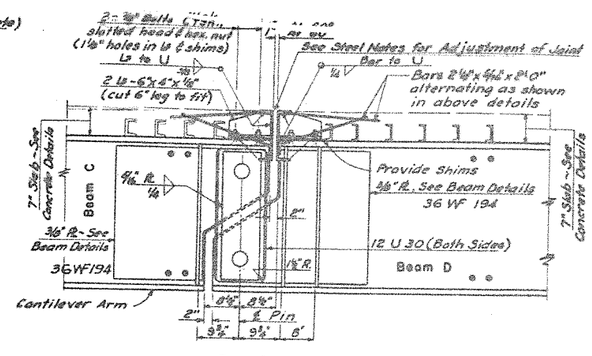
HALF PLAN OF PIN JOINT



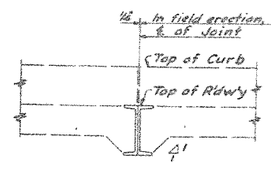
SECTION A-A



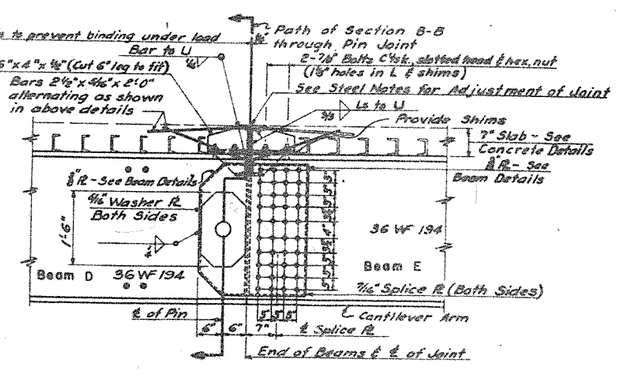
E - E



C - C



F - F



D - D

Note: Quantities included on this sheet are the deck joints, hangers, pins, splice plates, the approach slab expansion devices from sheet 29-2-9 and the pins and splice plates from sheet 29-2-8.

QUANTITIES	
Structural Steel	34,350 Lb.

PEMBINA RIVER BRIDGE

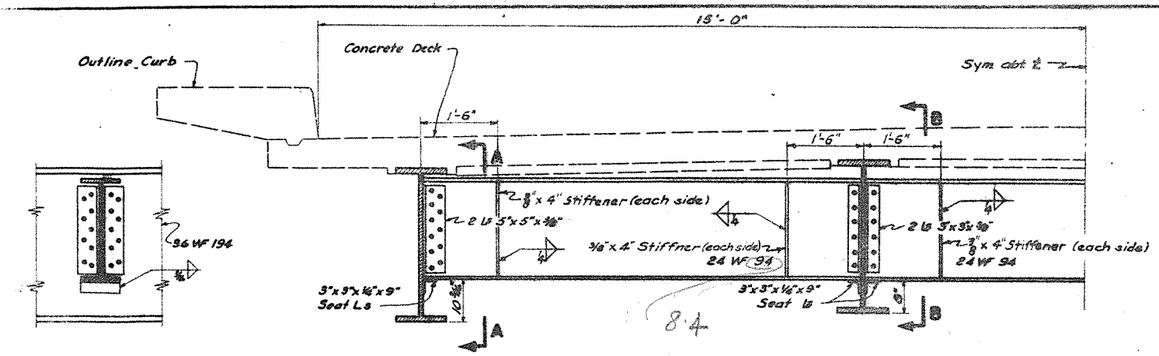
DECK JOINTS & HANGER DETAILS

PROJECT I-29-5(8)

DETAILS	MADE BY	V.S.
	CHECKED BY	TCF
TRACING	MADE BY	DCA
	CHECKED BY	TCF
QUANTITIES	MADE BY	TCF
	CHECKED BY	TCF

29-2-62

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N.D.	I-29-5(8)		10	2

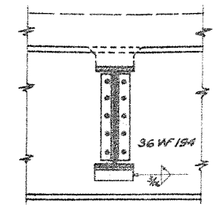


A-A

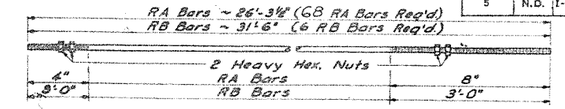
STEEL DIAPHRAGM & JACKING BEAM

AT PIERS 4 & 5

See Beam Details

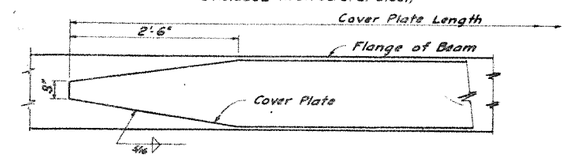


B-B

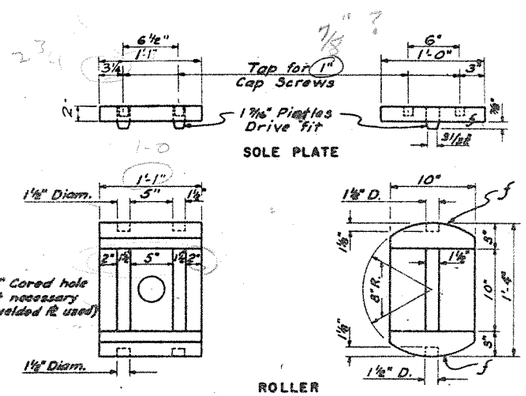


RA & RB BARS 1" ϕ

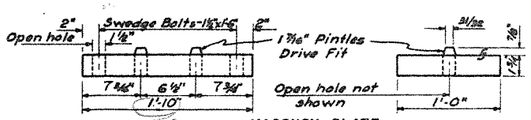
(Included in Structural Steel)



COVER PLATE END TAPER



ROLLER

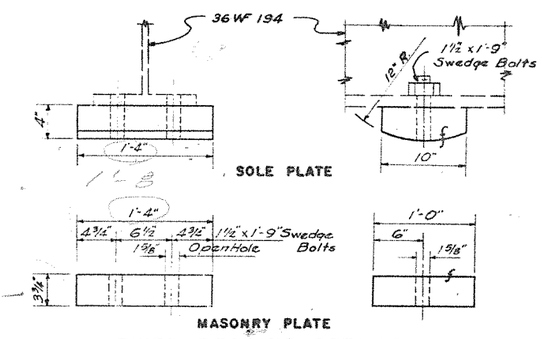


MASONRY PLATE

EXPANSION BEARING DETAILS

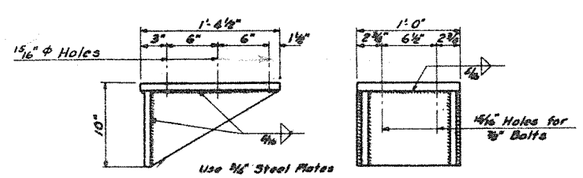
CAST STEEL OR WELDED STEEL PLATES

At Abutments



FIXED BEARING DETAILS

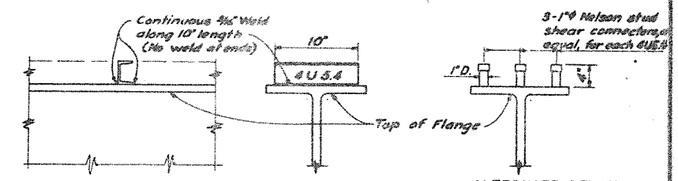
At Piers 4 & 5



JACKING BRACKET

2 Required for each Abut.

Provide 6 ~ 3/4" bolts per bracket



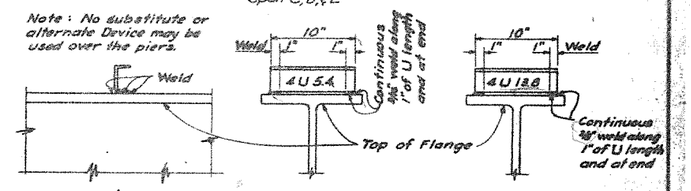
ALTERNATE DEVICE

SHEAR DEVICE DETAILS

USED ON 36WF194 EXCEPT OVER PIERS

See Beam Details

Span C, D, & E



SHEAR DEVICE DETAILS

USED ON 36WF194 OVER PIERS

See Beam Details

Span C, D, & E

NOTE: Quantities on this sheet include the bearings for the abutments and piers 4 & 5, jacking brackets, and the RA and RB bars.

STRUCTURAL STEEL NOTES

GENERAL

All rivets 7/8"

Open holes are to be 15/16" except as noted.

Field connections shall be made with 7/8" high tensile strength bolts or rivets unless otherwise noted.

All pin nuts, after being tightened shall be tack welded to the ends of pins.

WELDING

Welding shall be done with the electric arc process and shall conform to the current "Standard Specifications for Welded Highway and Railway Bridges - Design, Construction and Repair" of the American Welding Society. The cost of all welding shall be incidental to and included in the unit price bid for Structural Steel.

ADJUSTMENT OF EXPANSON JOINT

SHOP: All expansion or fixed joints shall be assembled to fit the crown of roadway and all interior joints shall be shop assembled on their supporting beams and properly fitted together and match marked. To allow for field adjustment, 1/8" of shims has been assumed between the L supports (sheet 29-2-6) and the beams.

FIELD: The field shimming of the last half of each joint shall be done after the concrete has been poured in the adjaining slab. For placement of Expansion Joint at Abutment. See sheet 29-2-12.

PAINT

North Dakota Highway Specifications. No paint, shop or field, on top of beams. All exposed steel surfaces shall be given one shop coat of red lead paint and two field coats preceded by a spot coat of red lead paint in accordance with Section 80 & 132.17 of the Standard Specifications. The first field coat shall be aluminum paint with prussian blue added for tinting. The second field coat shall be aluminum paint.

QUANTITIES	
Structural Steel	14,300 Lb.

PEMBINA RIVER BRIDGE

MISCELLANEOUS STEEL & BEARINGS DETAILS

PROJECT I-29-5(8)

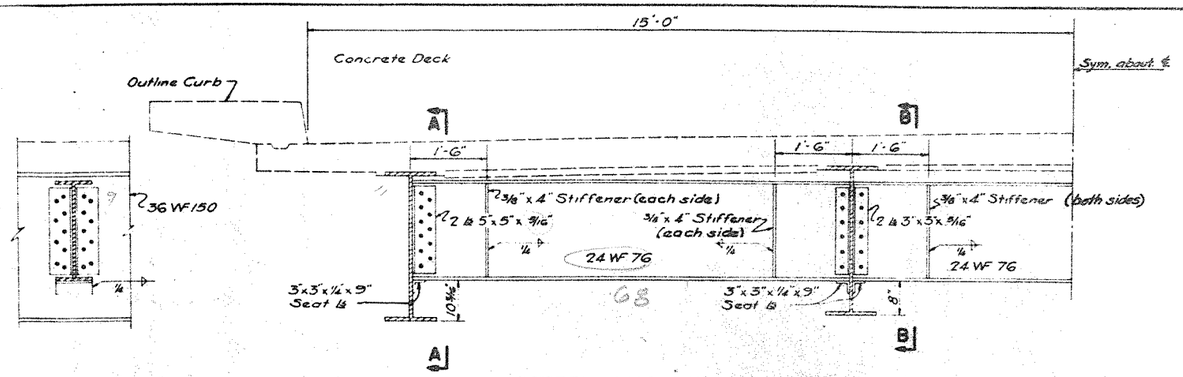
DESIGN	MADE BY	J.C.
	CHECKED BY	I.C.F.
DETAILS	MADE BY	J.C.
	CHECKED BY	I.C.F.
TRACING	MADE BY	D.C.A.
	CHECKED BY	I.C.F.
QUANTITIES	MADE BY	C.E.G.
	CHECKED BY	I.C.F.

REVISIONS

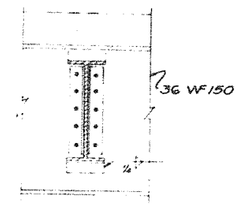
MADE BY CH.

29-2-7

FED ROAD DIST NO	STATE	PROJ NO	FISCAL YEAR	SHEET NO	TOTAL SHEETS
5	N.D.	I-29-5(8)		11	2

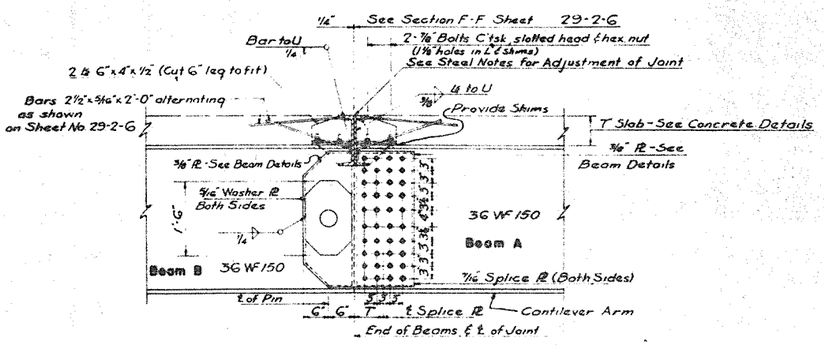


A-A

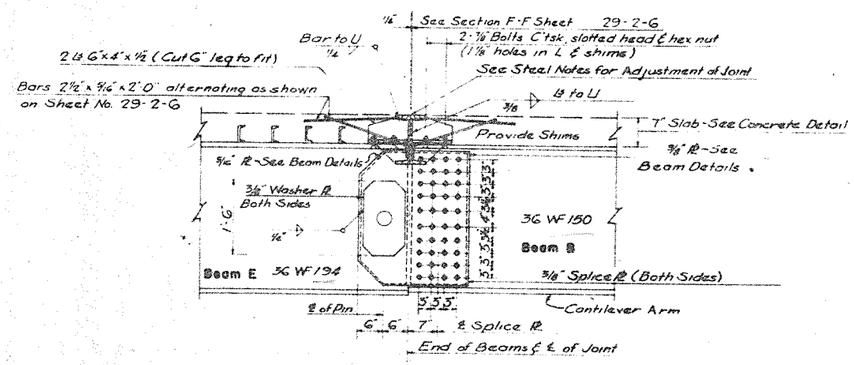


B-B

STEEL DIAPHRAGM & JACKING BEAM
AT PIERS 2,3,6,8 & 7
See Beam Details



D-D
Location of Section Shown on Sheet 29-2-6



D-D
Location of Section Shown on Sheet 29-2-6

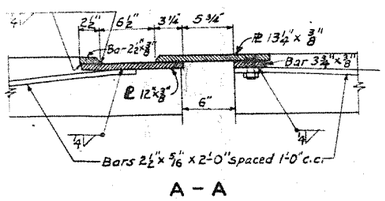
NOTE: Quantities for pins and splice plates are included in quantities on sheet 29-2-6
Quantities for steel diaphragms included on sheet 29-2-5

PEMBINA RIVER BRIDGE
MISCELLANEOUS STEEL DETAILS
PROJECT I-29-5(8)

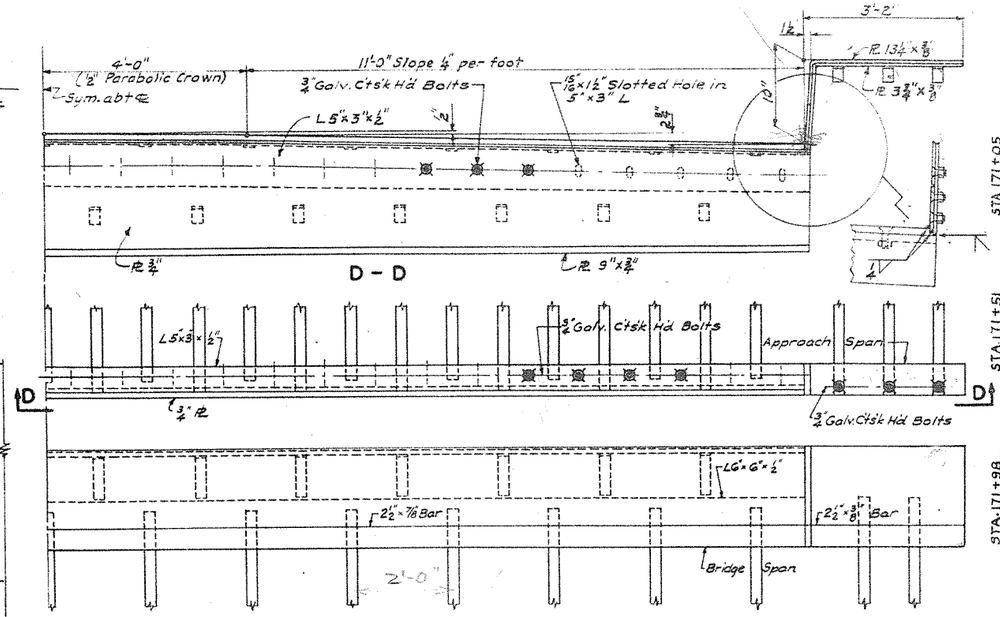
DETAILS — CHECKED BY LGF
TRACING — MADE BY GEE
QUANTITIES — CHECKED BY GEE
MADE BY GEE

29-2-8

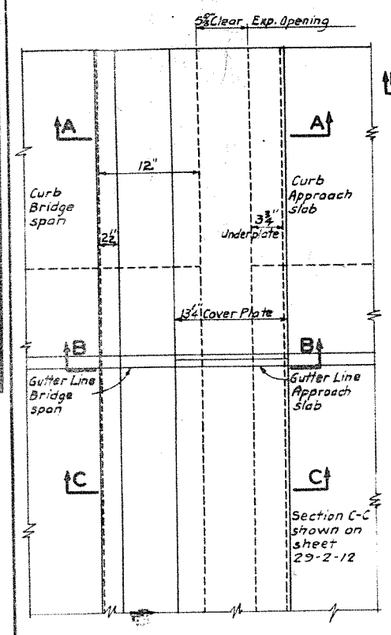
FED. ROAD DIV. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.	I-29-5(8)		12	2



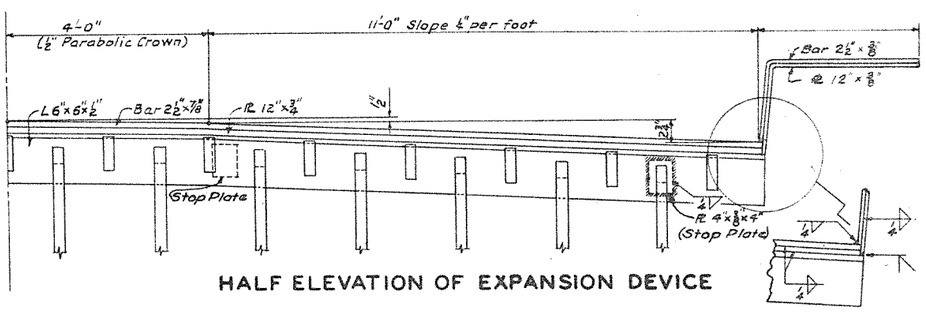
A – A



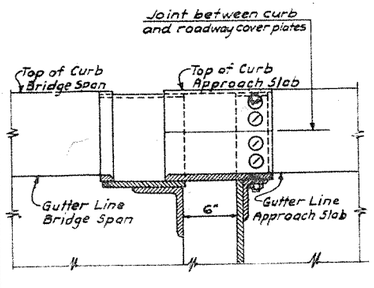
HALF PLAN OF EXPANSION DEVICE
COVER PLATE NOT SHOWN
SEE SHEET 29-2-12



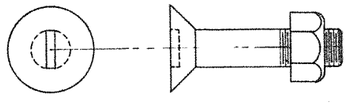
PART PLAN



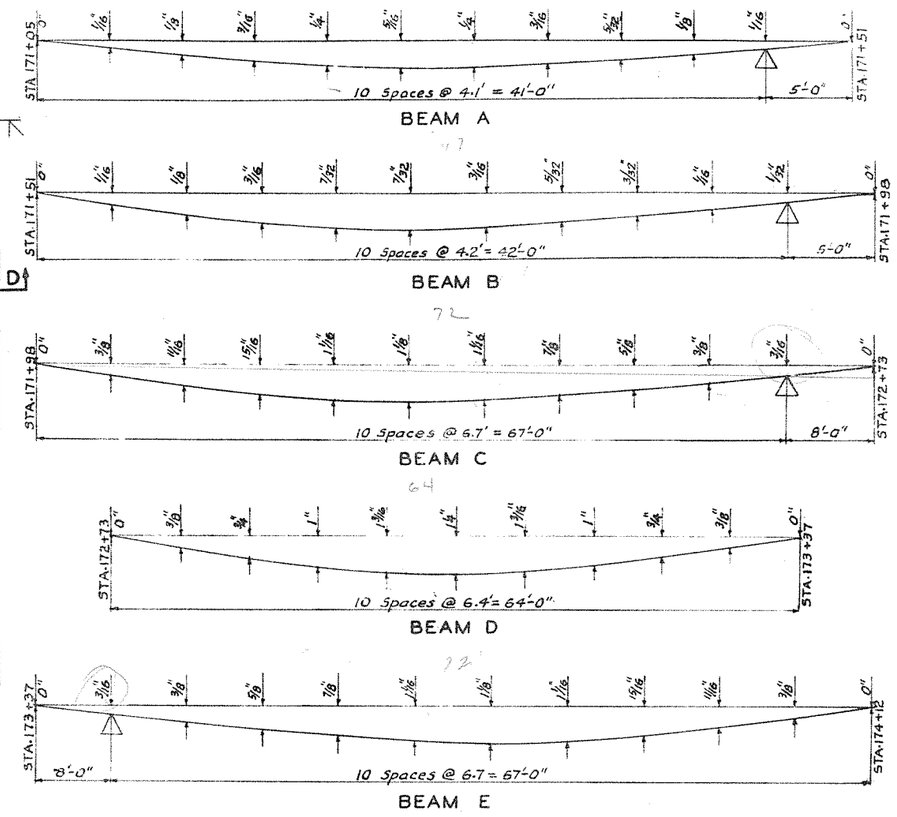
HALF ELEVATION OF EXPANSION DEVICE



B – B



¾" GALV. BOLT AND NUT
FURNISH WITH SLOTTED CT'SK HEAD AND LOCK WASHER



FIELD RISER DIAGRAM

HORIZONTAL SCALE 1" = 6'-0"
SHOWING DIMENSION "d" (See sheet 29-2-10)

The field riser diagram shows dimensions from an assumed chord drawn between ends of the beam compensating for the deflection due to dead load. It is also necessary to make additions or subtractions to the riser dimensions to compensate for the rolling tolerance in the beam and the deflection due to its own weight.

Note: Quantities for Approach Slab Expansion Devices are included in the quantities on Sheet 29-2-6.

PEMBINA RIVER BRIDGE

APPROACH SLAB EXPANSION JOINT & RISER DIAGRAM

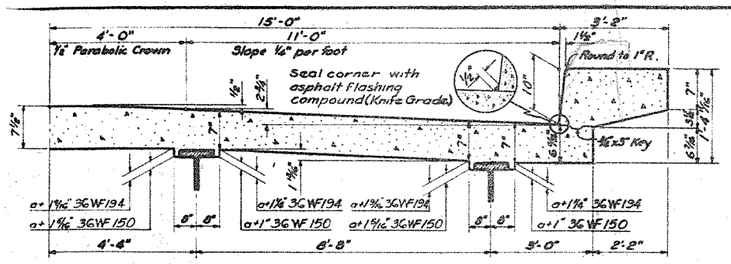
PROJECT I-29-5(8)

REVISIONS

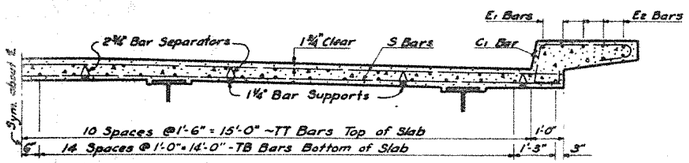
	MADE BY	CHECKED BY
DETAILS	F.E.G.	N.M.
TRACING	T.E.F.	J.C.
QUANTITIES	I.C.F.	J.C.

29-2-9

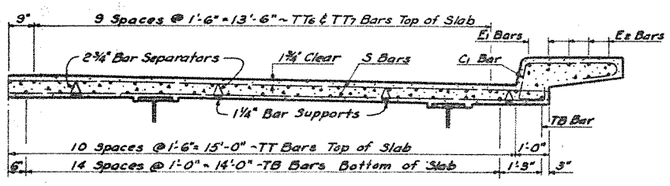
FED. ROAD DIV. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.	I-29-5(8)		13	2



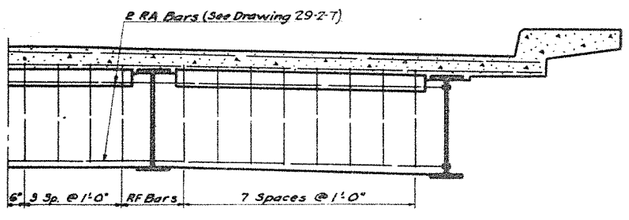
HALF SECTION OF SLAB
Showing Dimensions
Scale: Horiz: ½"=1'-0"
Vert: 1"=1'-0"



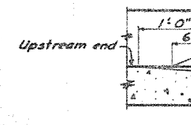
HALF SECTION OF SLAB
Showing Reinforcing between Piers
(See Slab Panels - Sheet 29-2-11)



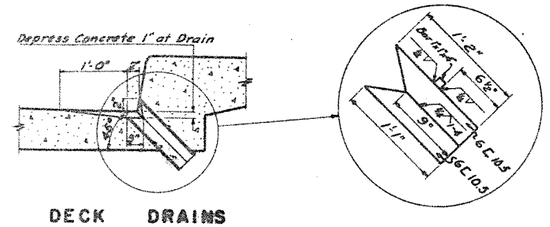
HALF SECTION OF SLAB
Showing Reinforcing over Piers
(See Slab Panels - Sheet 29-2-11)



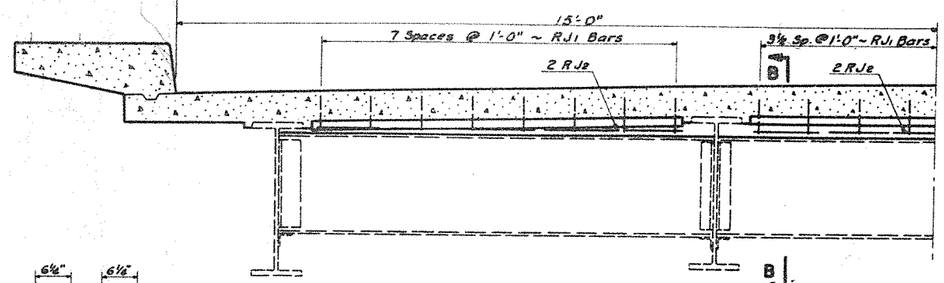
HALF SECTION OF SLAB
Showing Diaphragms
See Steel Details for Diaphragm over Piers



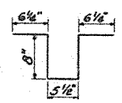
SECTION THRU DRAIN



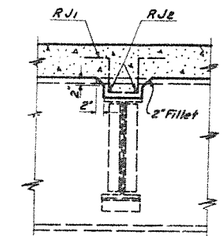
DECK DRAINS
38 Required



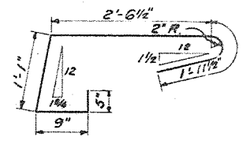
HALF SECTION OF SLAB AT STEEL DIAPHRAM



RJ1 BAR

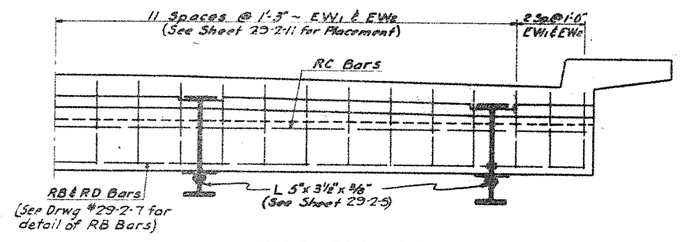


B - B

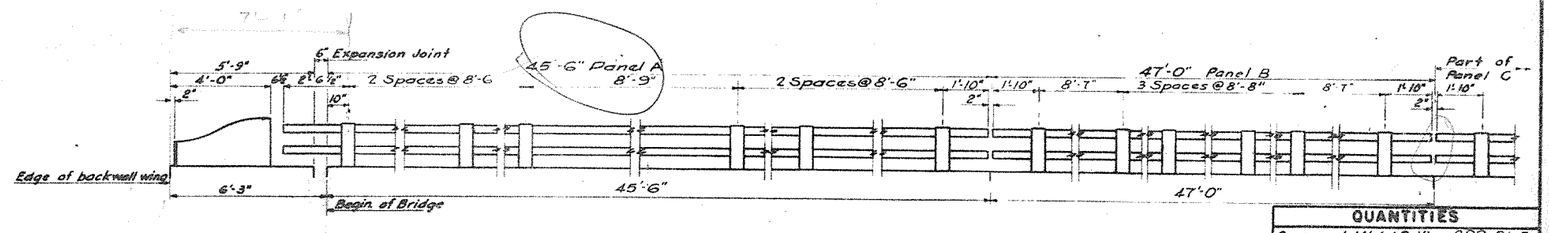


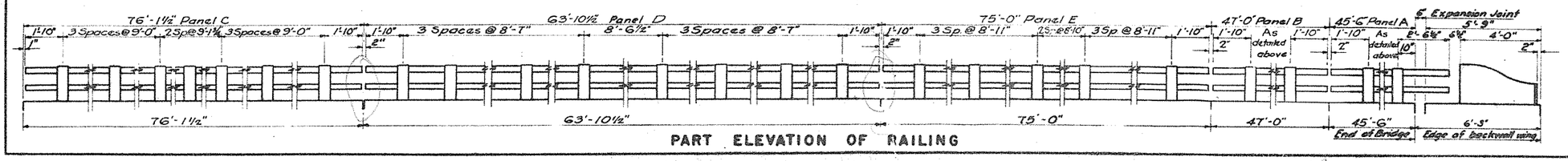
C1 BAR

BENT BAR DETAILS



HALF END BEAM





PART ELEVATION OF RAILING

BAR LIST

MARK	NO.	SIZE	LENGTH	SHAPE
C1	802	5	6'-9"	Bent
EA1	8	6	23'-3"	Str.
EA2	48	5	23'-6"	Str.
EB1	8	6	24'-6"	Str.
EB2	48	5	24'-3"	Str.
EC1	4	6	39'-0"	Str.
EC2	24	5	38'-9"	Str.
ED1	4	6	33'-0"	Str.
ED2	24	5	32'-3"	Str.
EE1	4	6	38'-6"	Str.
EE2	24	5	38'-3"	Str.
EW1	54	4	6'-1"	Bent
EW2	108	4	3'-0"	Bent
RF	408	4	8'-6"	Bent
S1	1592	5	31'-9"	Str.
S2	8	6	31'-9"	Str.
SJ1	86	5	7'-3"	Str.
TB1	128	5	23'-6"	Str.
TB2	128	5	24'-3"	Str.
TB3	64	5	38'-9"	Str.
TB4	64	5	32'-9"	Str.
TB5	64	5	38'-3"	Str.
TT1	84	4	23'-3"	Str.
TT2	84	4	24'-0"	Str.
TT3	42	4	38'-6"	Str.
TT4	42	4	32'-6"	Str.
TT5	42	4	38'-0"	Str.
TT6	80	5	8'-0"	Str.
TT7	40	5	10'-0"	Str.
RC	8	6	31'-9"	Str.
RD	2	8	31'-9"	Str.
RJ1	144	4	2'-10"	Bent
RJ2	96	6	7'-3"	Str.

NOTE
See Sheets H-0106 & 29-2-12 for railing and end post details. End post quantities are included in bridge slab quantities, sheet 29-2-11.

QUANTITIES

Ornamental Metal Railing	809.0 L.F.
Structural Steel Drains	950 Lb.

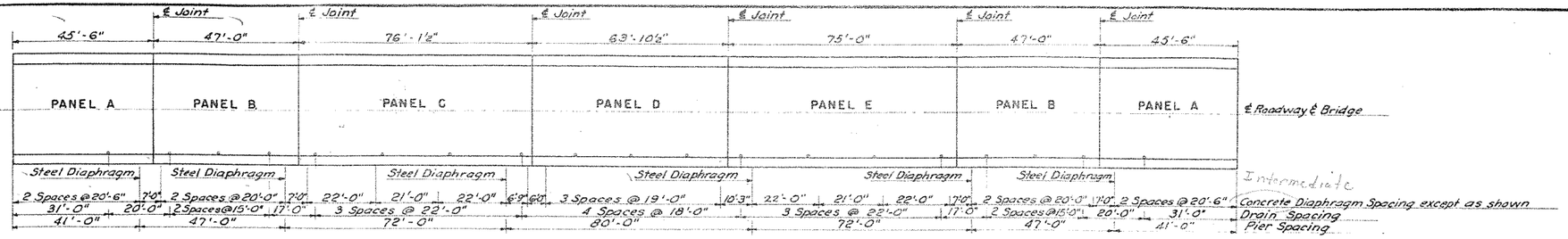
PEMBINA RIVER BRIDGE
SLAB & RAILING DETAILS
PROJECT I-29-5(8)

CHECKED BY	E.G.B.
MADE BY	D.C.A.
CHECKED BY	V.S.
MADE BY	C.E.G.
CHECKED BY	R.E.L.

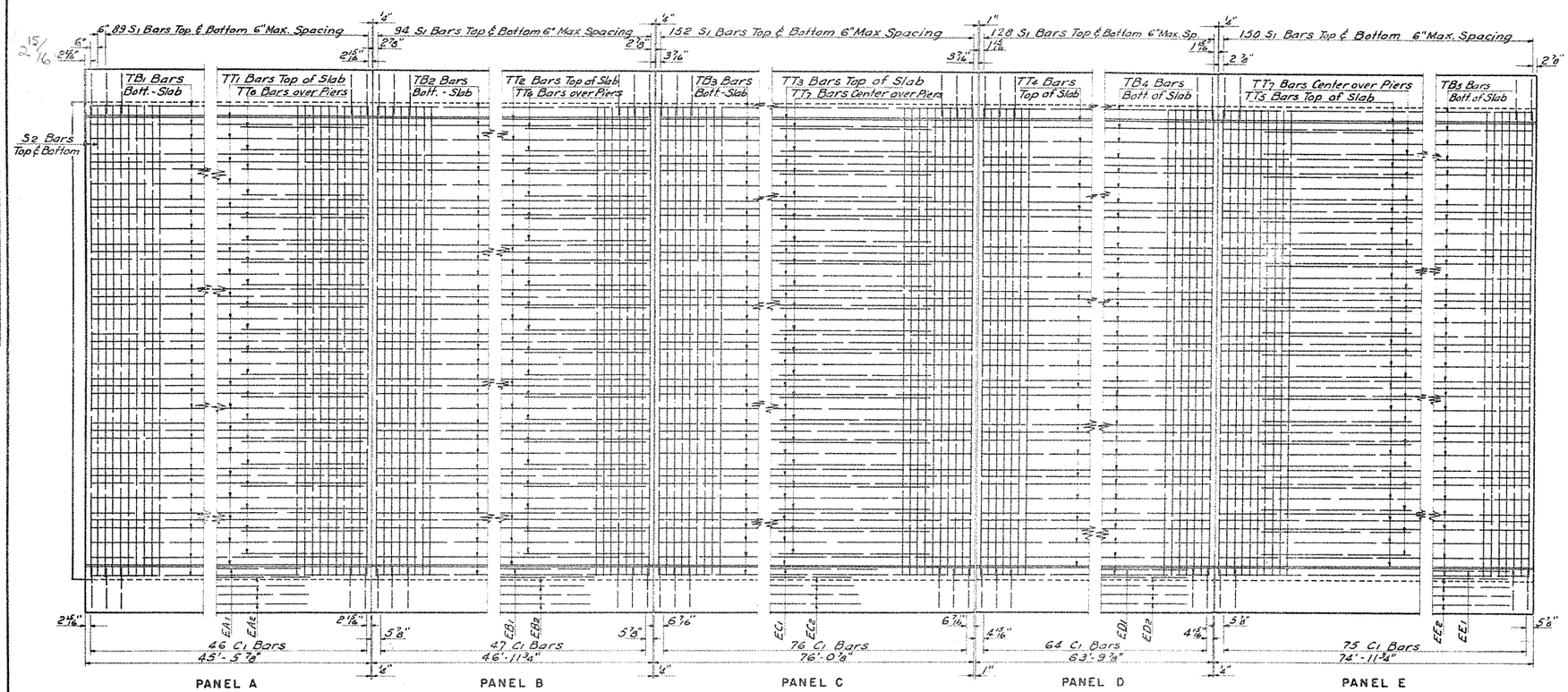
TRACING
QUANTITIES

29-2-10

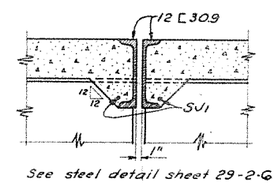
FED. ROAD DIV. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.	I-29-5(8)		14	2



SLAB LAYOUT

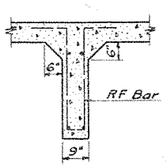


PART PLAN

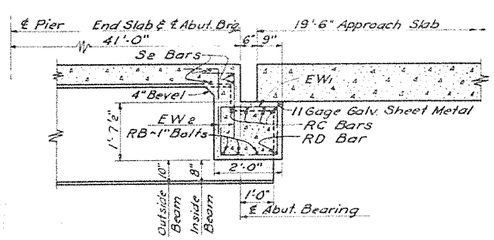


OPEN JOINT

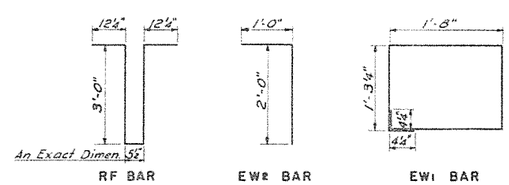
NOTE: See sheets H-0106, 29-2-10 & 29-2-12 for railing and end post details. See sheet 29-2-10 for bar list & railing quantities. End post quantities are included on this sheet.



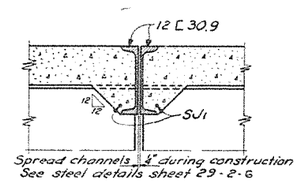
DIAPHRAGM



JUNCTION OF BRIDGE & APPROACH



BENT BAR DETAILS



CLOSED JOINT

QUANTITIES	
Concrete Class A-1½	399.9 Cu. Yd.
Reinforcing Steel	89,883 Lb.

PEMBINA RIVER BRIDGE

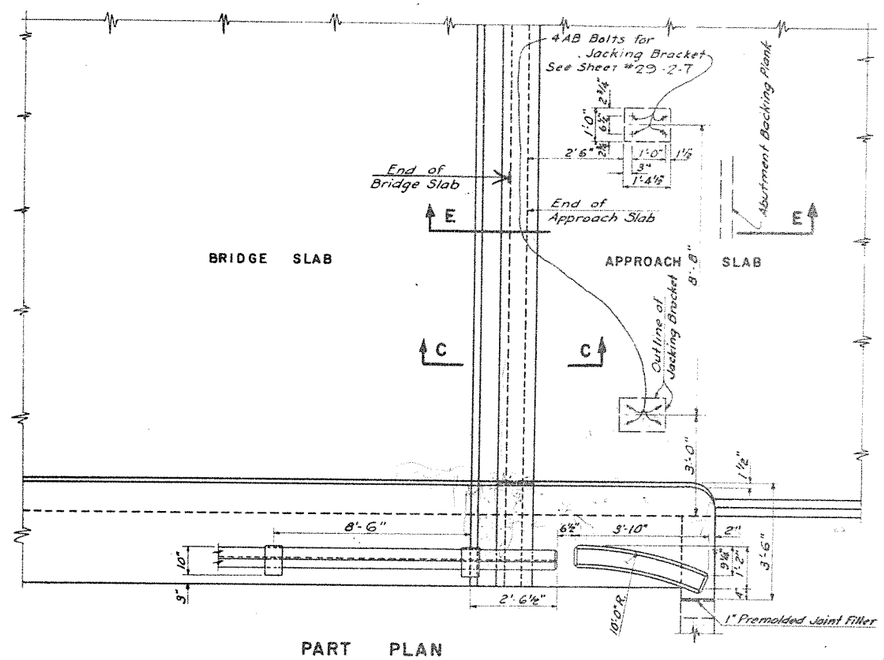
SLAB DETAILS

PROJECT I-29-5(8)

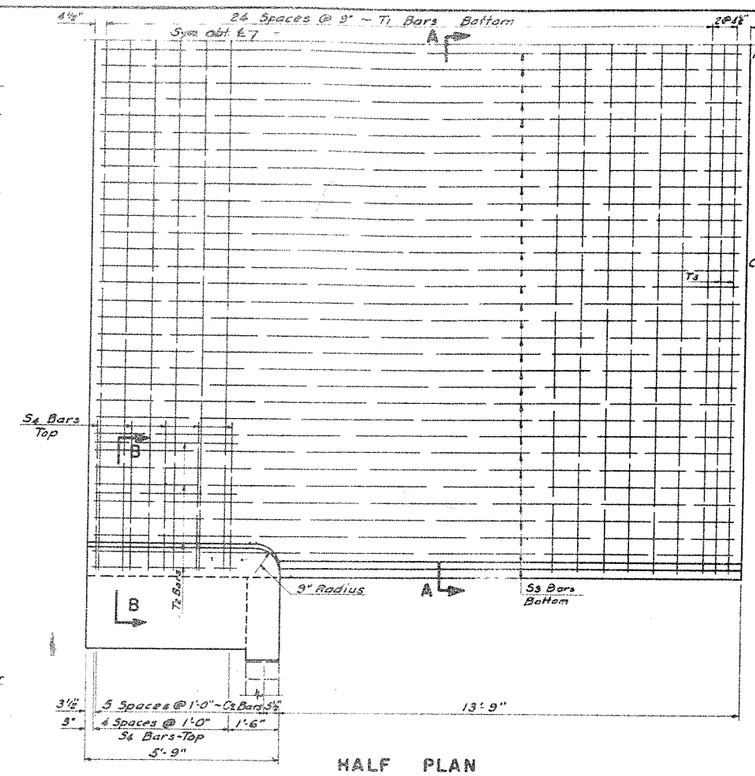
PREPARED QUANTITIES CHECKED BY ICF MADE BY CEG CHECKED BY ICF

29-2-11

FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N.D.	I-29-5(8)		15	23



PART PLAN



HALF PLAN

NOTES

MAINTENANCE: If a situation should arise whereby the approach slab is pushed toward the abutment by the roadway slab, closing the expansion opening, a means has been provided to correct this condition.

First, a (6"x) slab section will be cut and removed from the far end of the approach slab.

Second, the steel jacking brackets will be attached to the bolts provided on the underside of the approach slab; jacks will then be inserted between the brackets and the end beam of the bridge and the approach slab jacked to closure with the roadway slab.

CONSTRUCTION: ⅞" holes have been provided in the vertical leg of the 6"x6"x½" L so that it may be bolted to the concrete forms and the bridge half of the expansion device accurately adjusted to grade.

Slotted holes have been provided in the vertical leg of the 5"x3"x½" L of the approach slab so that this half of the expansion device may be accurately adjusted to grade when approach slab is poured.

See Sheet H-0106 & 29-2-10 for railing details and general layout.

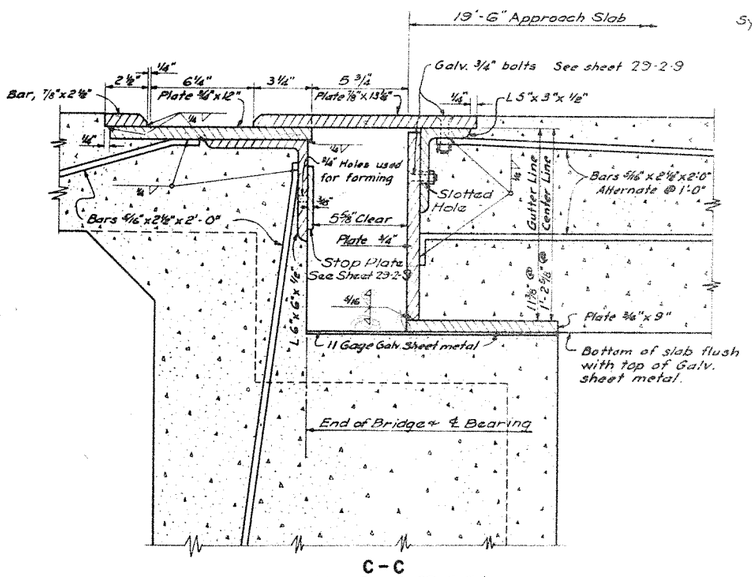
Railing quantities are shown on sheet 29-2-10. Railing end post quantities are included in the quantities, sheet 29-2-11.

BAR LIST (Approach slab)

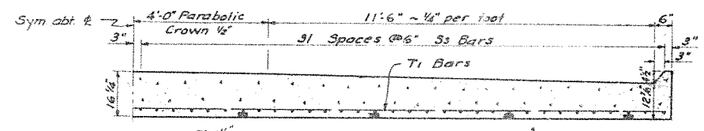
MARK	NO.	SIZE	LENGTH	SHAPE
C2	12	5	7'-6"	Bent
S3	64	7	19'-0"	Str.
S4	10	6	5'-0"	Bent
S5	12	5	5'-3"	Str.
S6	2	6	4'-9"	Str.
T1	25	4	31'-6"	Str.
T2	8	4	4'-3"	Str.
T3	2	6	31'-6"	Str.

BAR LIST (Approach slab support)

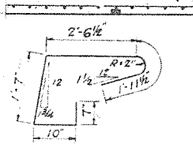
MARK	NO.	SIZE	LENGTH	SHAPE
S7	6	7	31'-6"	Str.
T4	32	4	2'-6"	Str.



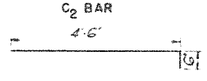
C-C
(See Sheet 29-2-9)



A-A

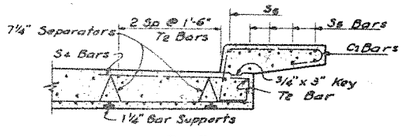


C2 BAR

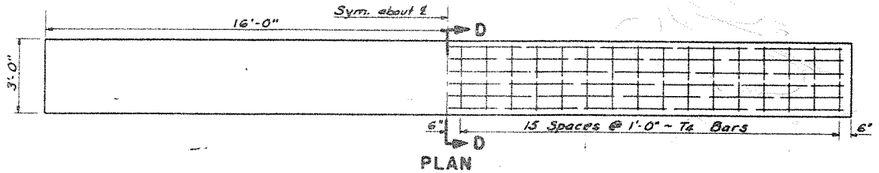


S4 BAR

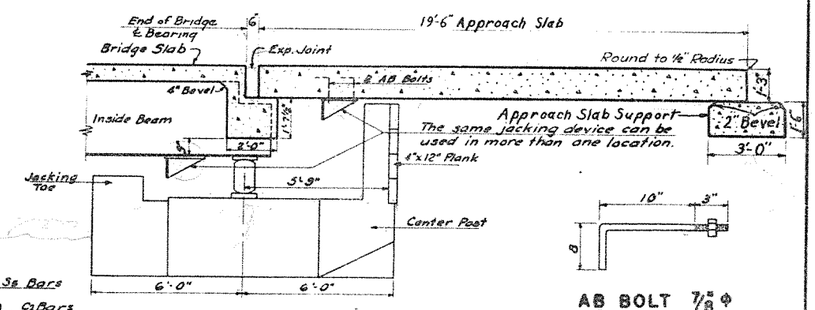
BENT BAR DETAIL



B-B
See Sheet 29-2-2

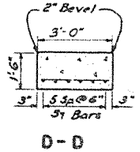


PLAN
APPROACH SLAB SUPPORT



E-E

AB BOLT ⅞" ϕ
16 Required
(Included as Struct. Steel)



D-D

QUANTITIES (One Slab)

Concrete Class A-1½	33.3 Cu.Yd.
Reinforcing Steel	3877 Lb.

PEMBINA RIVER BRIDGE

APPROACH SLAB

PROJECT I-29-5(8)

TRACING	MADE BY	D.C.A.
	CHECKED BY	J.C.
QUANTITIES	MADE BY	J.B.S.
	CHECKED BY	D.C.A.

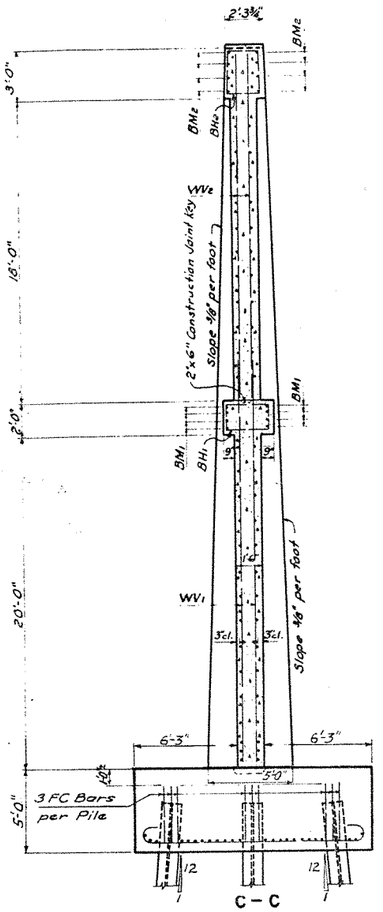
29-2-12

29-2-12

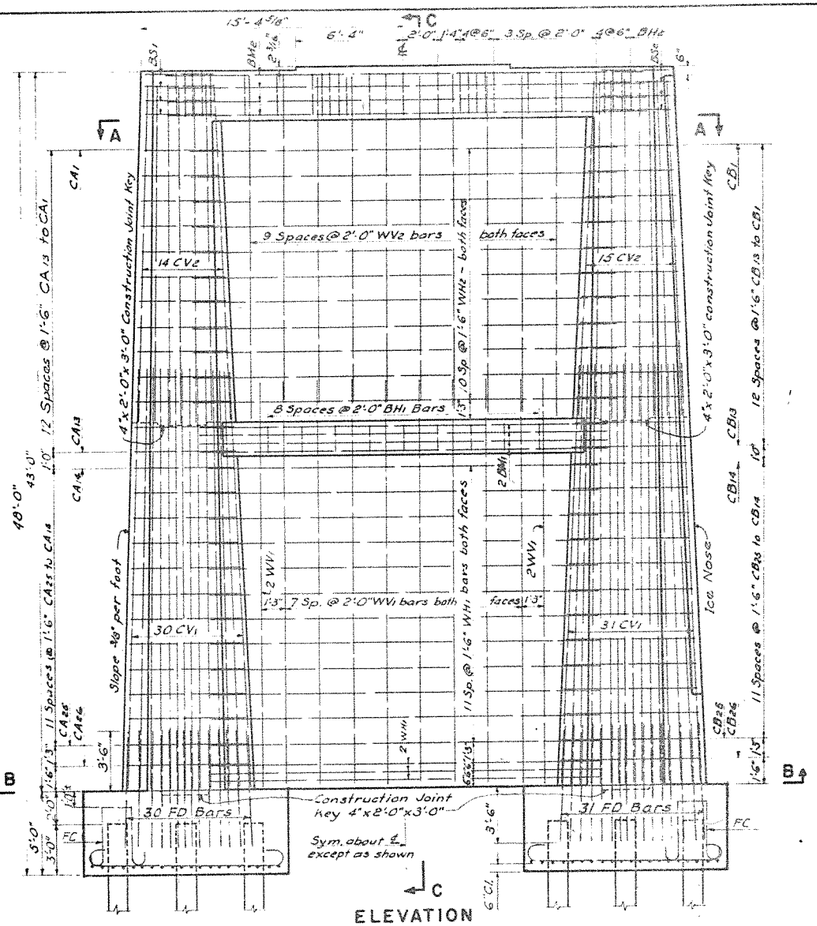
FED. ROAD DIST. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N.D.			16	23

REVISIONS	MADE BY	CHK. BY

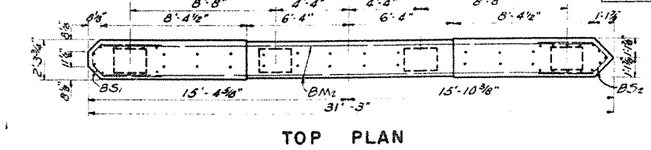
DESIGN	MADE BY	JC
	CHECKED BY	CEG
DETAILS	MADE BY	CEG
	CHECKED BY	ICF
TRACING	MADE BY	OCA
	CHECKED BY	CEG
QUANTITIES	MADE BY	CEG
	CHECKED BY	ICF



C – C

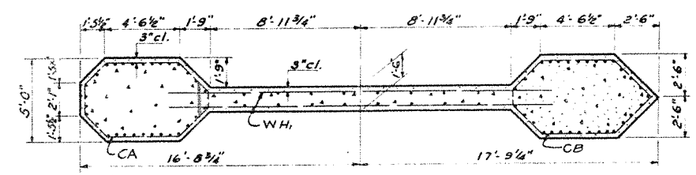


ELEVATION

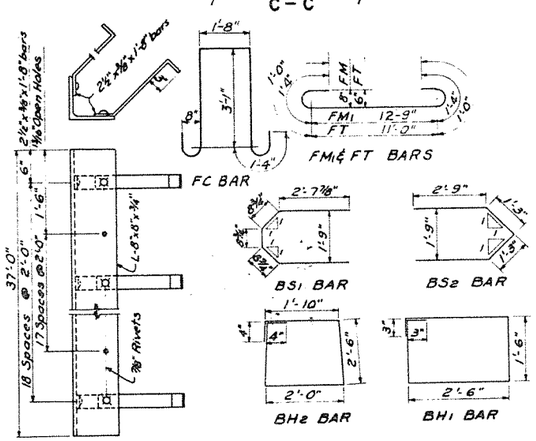


TOP PLAN

A – A

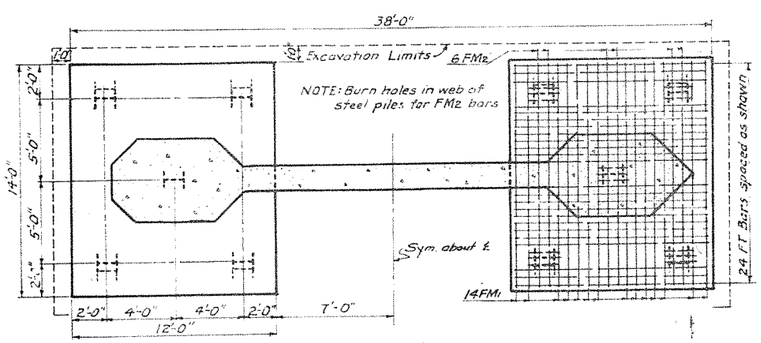


B – B

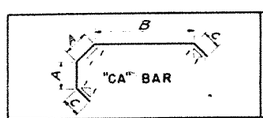


ICE NOSE ANGLE

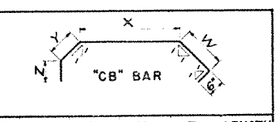
BENT BAR DETAILS



FOOTING PLAN



"CA" BAR



"CB" BAR

MARK	A	B	C	LENGTH
CA1	0'-10⅛"	3'-3¼"	0'-9"	6'-6"
CA2	0'-10⅝"	3'-4¼"	0'-9¾"	6'-9"
CA3	0'-11⅛"	3'-4¾"	0'-9¼"	7'-0"
CA4	0'-11⅝"	3'-5¼"	0'-11¼"	7'-3"
CA5	1'-0"	3'-5⅝"	0'-10⅝"	7'-3"
CA6	1'-0⅛"	3'-6⅛"	0'-11⅛"	7'-6"
CA7	1'-1"	3'-6⅝"	1'-0⅝"	7'-9"
CA8	1'-1⅜"	3'-7⅛"	1'-1⅜"	8'-0"
CA9	1'-1⅞"	3'-7½"	1'-1⅞"	8'-3"
CA10	1'-2⅜"	3'-8"	1'-1⅞"	8'-3"
CA11	1'-2⅞"	3'-8½"	1'-1⅞"	8'-6"
CA12	1'-3½"	3'-9"	1'-2½"	8'-9"
CA13	1'-3¾"	3'-9⅜"	1'-3⅜"	9'-0"
CA14	1'-4"	3'-9½"	1'-3⅛"	9'-0"
CA15	1'-4⅛"	3'-10¼"	1'-3⅛"	9'-3"
CA16	1'-5"	3'-10⅝"	1'-4⅝"	9'-6"
CA17	1'-5⅛"	3'-11⅛"	1'-5⅜"	9'-9"
CA18	1'-5⅜"	3'-11⅝"	1'-4⅝"	9'-9"
CA19	1'-6⅛"	4'-0⅛"	1'-5⅝"	10'-0"
CA20	1'-6¼"	4'-0¼"	1'-6¼"	10'-3"
CA21	1'-7⅛"	4'-1"	1'-7⅛"	10'-6"
CA22	1'-7⅜"	4'-1"	1'-6½"	10'-6"
CA23	1'-8⅛"	4'-2"	1'-7⅛"	10'-9"
CA24	1'-8⅜"	4'-2⅜"	1'-8⅛"	11'-0"
CA25	1'-9⅛"	4'-2⅜"	1'-8⅜"	11'-3"
CA26	1'-9½"	4'-3¼"	1'-8⅜"	11'-3"
Total Length one set				233'-6"

MARK	W	X	Y	Z	LENGTH
CB1	1'-5½"	3'-3¼"	0'-10⅛"	0'-7⅝"	6'-9"
CB2	1'-6¼"	3'-4¼"	0'-10⅝"	0'-8⅞"	7'-0"
CB3	1'-7"	3'-4¾"	0'-11⅛"	0'-10⅛"	7'-3"
CB4	1'-7⅞"	3'-5¼"	0'-11⅝"	0'-11¼"	7'-6"
CB5	1'-8⅜"	3'-5⅝"	1'-0"	0'-9¾"	7'-6"
CB6	1'-9⅜"	3'-6⅛"	1'-0½"	0'-11"	7'-9"
CB7	1'-10¼"	3'-6⅝"	1'-1"	1'-0⅛"	8'-0"
CB8	1'-11"	3'-7⅛"	1'-1⅜"	0'-10½"	8'-0"
CB9	1'-11⅞"	3'-7½"	1'-1⅞"	0'-11¾"	8'-3"
CB10	2'-0⅝"	3'-8"	1'-2⅜"	1'-1"	8'-6"
CB11	2'-1⅜"	3'-8½"	1'-2⅞"	1'-2¼"	8'-9"
CB12	2'-2¼"	3'-9"	1'-3½"	1'-0½"	8'-9"
CB13	2'-3"	3'-9⅜"	1'-3⅜"	1'-1⅜"	9'-0"
CB14	2'-3⅞"	3'-9⅝"	1'-4"	1'-3⅜"	9'-3"
CB15	2'-4⅜"	3'-10⅛"	1'-4½"	1'-1⅞"	9'-3"
CB16	2'-5⅛"	3'-10⅝"	1'-5"	1'-3¼"	9'-6"
CB17	2'-5⅝"	3'-11⅛"	1'-5½"	1'-4⅛"	9'-9"
CB18	2'-6⅜"	3'-11⅝"	1'-5⅞"	1'-5⅜"	10'-0"
CB19	2'-7⅛"	4'-0⅛"	1'-6⅜"	1'-4"	10'-0"
CB20	2'-8¼"	4'-0⅝"	1'-6¾"	1'-5⅛"	10'-3"
CB21	2'-9⅛"	4'-1"	1'-7¼"	1'-6⅜"	10'-6"
CB22	2'-9⅞"	4'-1½"	1'-7¾"	1'-4⅜"	10'-6"
CB23	2'-10⅜"	4'-2"	1'-8¼"	1'-6"	10'-9"
CB24	2'-11⅛"	4'-2⅜"	1'-8⅜"	1'-7⅜"	11'-0"
CB25	3'-0¼"	4'-2⅞"	1'-9⅛"	1'-8¾"	11'-3"
CB26	3'-1"	4'-3⅛"	1'-9½"	1'-7½"	11'-3"
Total Length one set					236'-3"

BAR LIST (One Pier)

MARK	NO.	SIZE	LENGTH	SHAPE
BS1	4	5	7'-6"	Bent
BS2	4	5	8'-0"	Bent
CA1 to CA26	2 Sets	5	233'-6"	Bent
CB1 to CB26	2 Sets	5	236'-3"	Bent
CV1	61	8	25'-0"	Str.
CV2	29	8	20'-0"	Str.
FC	30	8	10'-6"	Bent
FD	61	8	7'-0"	Str.
FM1	28	8	15'-5	Bent
FM2	12	8	13'-6"	Str.
FT	48	6	13'-0"	Bent
WV1	20	5	24'-0"	Str.
WV2	20	5	20'-6"	Str.
WH1	30	5	23'-0"	Str.
WH2	22	5	25'-0"	Str.
BM1	8	8	24'-0"	Str.
BM2	8	8	29'-0"	Str.
BH1	9	5	8'-6"	Bent
BH2	27	5	9'-6"	Bent

QUANTITIES (one pier)	
Concrete Class A-1½	178.5 Cu. Yd.
Reinforcing Steel	14871 Lb.
Structural Steel	1700 Lb.

PEMBINA RIVER BRIDGE

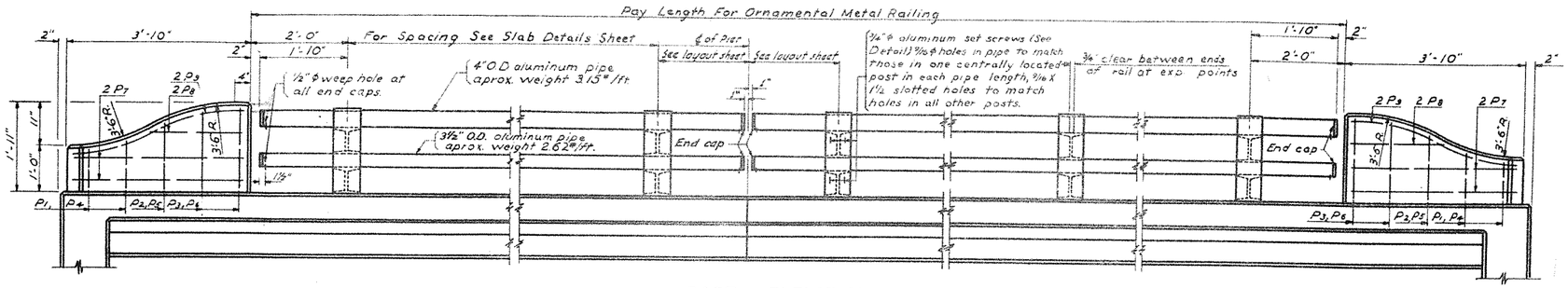
48' PIER

PROJECT I-29-5(8)

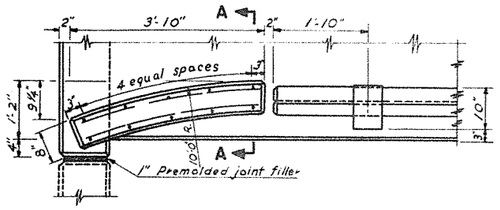
H-1331

H-1331

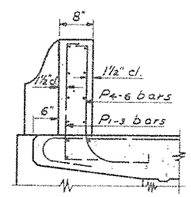
FED. ROAD DIV. NO.	STATE	PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
5	N. D.				



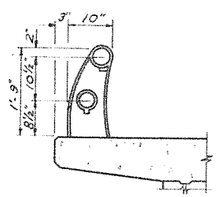
PART ELEVATION



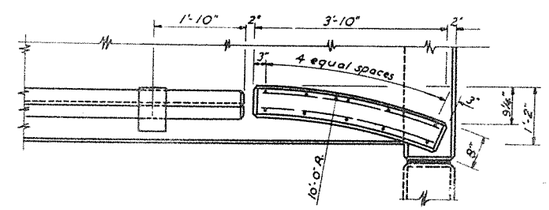
PART PLAN



SECTION A-A



TYPICAL SECTION



PART PLAN

NOTES:

Rail posts shall be aluminum alloy sand or permanent mold castings 356-T6, alloy SG70A condition T6. Sand castings shall conform to A.S.T.M. Spec. B 26.

Rail pipe to be aluminum drawn tube 6061-T6 conforming to A.S.T.M. Spec. B 210-56 T, alloy GS11A condition T6, or extruded tube 6061-T6 conforming to A.S.T.M. Spec. B-235-56 T, alloy GS11A condition T6. Mill Finish.

Bolts and screws to be aluminum alloy 2024-T4 with No 205 alumilite finish conforming to A.S.T.M. Spec. B211-56 T alloy CG42A condition T4.

Pins shall conform to A.S.T.M. Sec. B 211-56 T, alloy GS11A condition T6.

All aluminum castings shall be finished by grinding off the gates and parting line followed by sand blasting and one coat of lacquer.

All bolts shall have at least 0.0002 inch anodic coating and chromate seal.

All concrete in the end posts shall be Class A-1 1/2. End posts shall be given the "Rubbed Surface Finish".

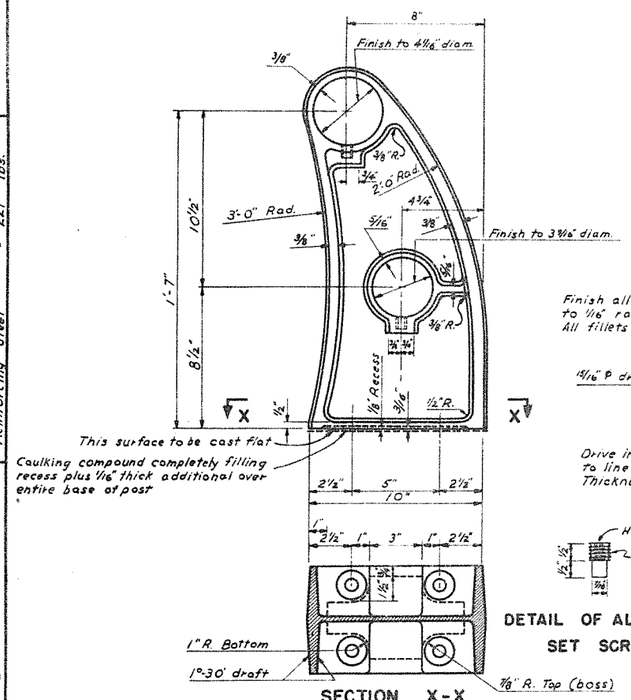
Railing and end post quantities are included in slab quantities on slab sheet.

All posts shall be set normal to grade.

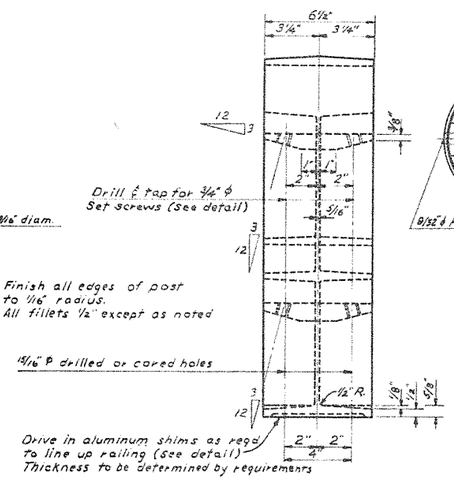
All pipe, rail posts, anchor bolt assemblies, bolts, screws, shims, pins, end caps and compound shall be included in the price bid for Ornamental Metal Railing.

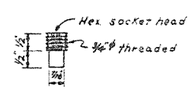
Each section of pipe rail shall project through, or into, at least three and preferably four posts.

The bottom of rail posts in contact with concrete shall be coated with caulking compound; grade I- For gun application; white, natural or grey in color and furnished in cartridges; conforming to the latest Federal Specifications TT-C-598. Application shall be made to clean and dry surfaces above 40°F. Joints may be freed from dust by swabbing with waste moistened with turpentine or universal spirits. Compound shall be placed with care to prevent smearing the area outside and around the base of the post.

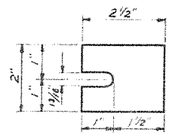


SECTION X-X



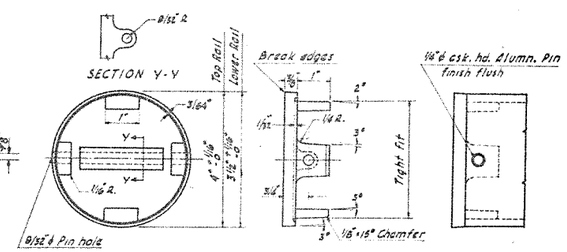


DETAIL OF ALUMINUM SET SCREWS

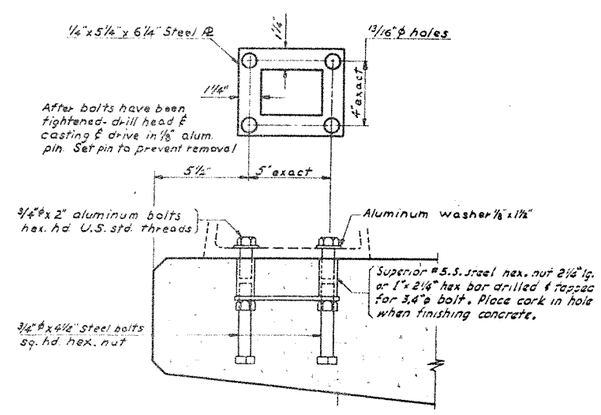


DETAIL OF ALUMINUM SHIMS

RAIL POST DETAILS



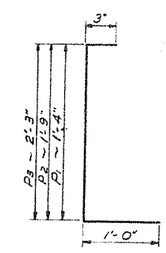
CAST ALUMINUM END CAP FOR RAIL



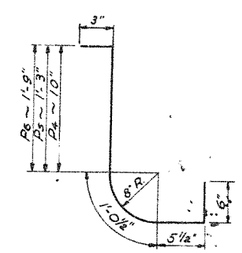
ANCHOR BOLT ASSEMBLY

BAR LIST (4 END POSTS)

MARK	NO.	SIZE	LENGTH	SHAPE
P1	8	5	2'-7"	Bent
P2	4	5	3'-0"	Bent
P3	8	5	3'-6"	Bent
P4	8	5	3'-1"	Bent
P5	4	5	3'-6"	Bent
P6	8	5	4'-0"	Bent
P7	16	4	3'-9"	Field Bent
P8	8	4	2'-0"	Field Bent
P9	8	5	4'-0"	Field Bent



P1, P2 & P3 BARS



P4, P5 & P6 BARS

BENT BAR DETAILS

STANDARD RAILING DETAILS

CHECKED BY F.L.P.
QUANTITIES MADE BY E.G.P.
CHECKED BY Z.M.

Concrete Class A-1 1/2 : 0.5 Cu. Yd.
Reinforcing Steel : 221 lbs.

H-0106

H-0106