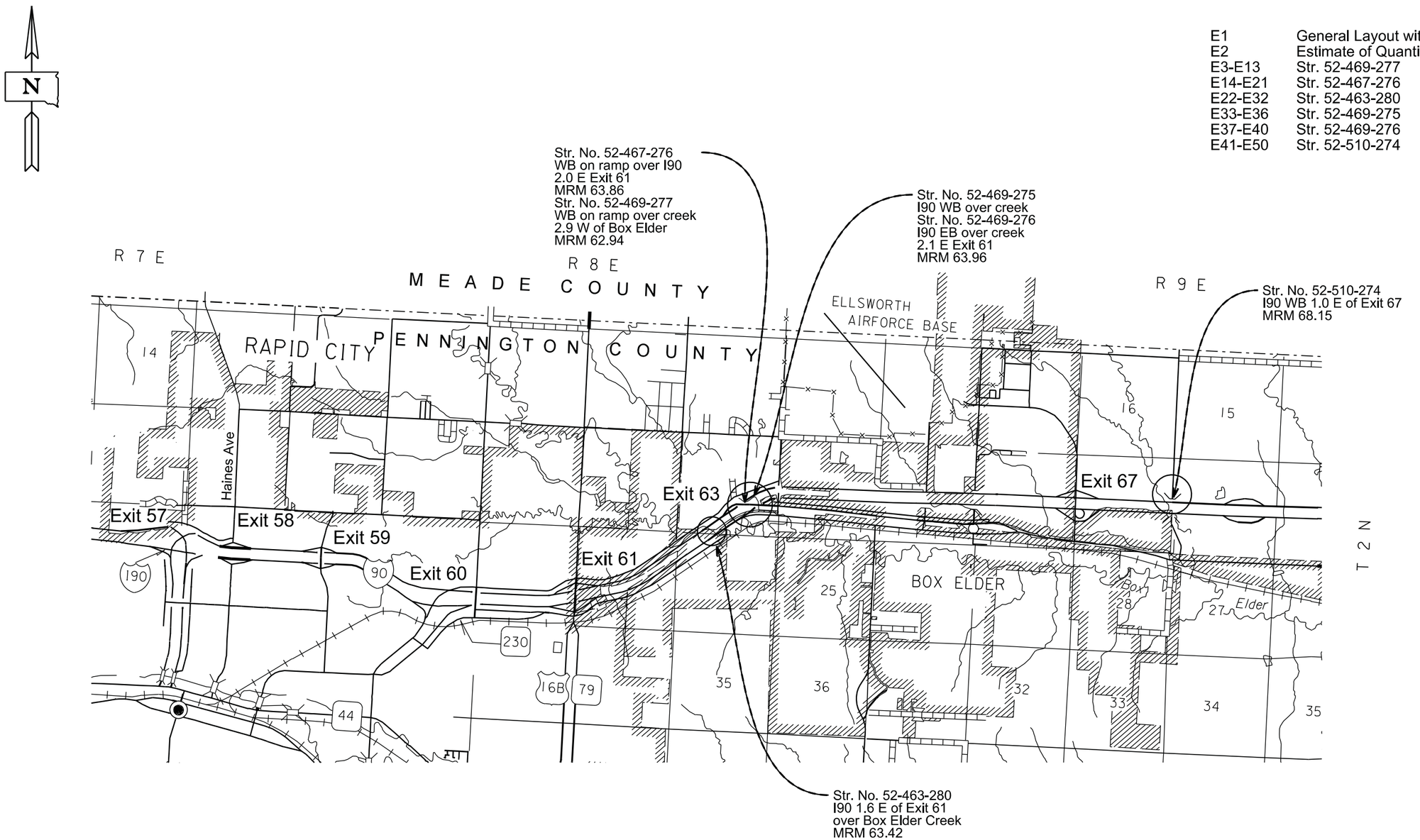
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E1	E50

SECTION E: STRUCTURE PLANS

INDEX OF SHEETS

E1	General Layout with Index
E2	Estimate of Quantities
E3-E13	Str. 52-469-277
E14-E21	Str. 52-467-276
E22-E32	Str. 52-463-280
E33-E36	Str. 52-469-275
E37-E40	Str. 52-469-276
E41-E50	Str. 52-510-274



Section E - Estimate of Quantities

Str. 52-469-277

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
410E0103	Fatigue Retrofit Steel Girder, Type C	66	Each
410E3010	Magnetic Particle Weld Inspection	246	In
412E0100	Bridge Repainting, Class I	Lump Sum	LS
412E0500	Paint Residue Containment	Lump Sum	LS
460E0172	Concrete Patching Material, Bridge Deck	24.8	CuFt
460E0174	Concrete Patching Material, Miscellaneous	0.4	CuFt
460E0190	Concrete Crack Injection/Sealing	48	In
460E0300	Breakout Structural Concrete	0.4	CuYd
480E5000	Galvanic Anode	10	Each
491E0005	Two Coat Bridge Deck Polymer Chip Seal	490.6	SqYd
491E0110	Abrasive Blasting of Bridge Deck	490.6	SqYd
491E0120	Bridge Deck Grinding	490.6	SqYd
491E0130	Concrete Removal, Class A	4.0	SqYd
491E0140	Concrete Removal, Class B	4.0	SqYd

Str. 52-467-276

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
410E0103	Fatigue Retrofit Steel Girder, Type C	114	Each
410E3010	Magnetic Particle Weld Inspection	438	In
412E0100	Bridge Repainting, Class I	Lump Sum	LS
412E0500	Paint Residue Containment	Lump Sum	LS
460E0172	Concrete Patching Material, Bridge Deck	99.0	CuFt
491E0005	Two Coat Bridge Deck Polymer Chip Seal	1,160.4	SqYd
491E0110	Abrasive Blasting of Bridge Deck	1,160.4	SqYd
491E0120	Bridge Deck Grinding	1,160.4	SqYd
491E0130	Concrete Removal, Class A	16.0	SqYd
491E0140	Concrete Removal, Class B	16.0	SqYd

Str. 52-463-280

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
410E2600	Membrane Sealant Expansion Joint	65.2	Ft
460E0070	Class A45 Concrete, Bridge Repair	2.2	CuYd
460E0300	Breakout Structural Concrete	2.2	CuYd
480E0200	Epoxy Coated Reinforcing Steel	181	Lb
480E0504	No. 4 Rebar Splice	2	Each
480E0506	No. 6 Rebar Splice	1	Each
491E0025	Bridge Deck Polymer Chip Seal Placed on Existing Chip Seal	2,093.8	SqYd
491E0030	Spot Repair of Existing Bridge Deck Chip Seal	104.8	SqYd
491E0110	Abrasive Blasting of Bridge Deck	2,093.8	SqYd

Str. 52-469-275

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
460E0172	Concrete Patching Material, Bridge Deck	39.0	CuFt
491E0005	Two Coat Bridge Deck Polymer Chip Seal	346.2	SqYd
491E0110	Abrasive Blasting of Bridge Deck	346.2	SqYd
491E0120	Bridge Deck Grinding	346.2	SqYd
491E0130	Concrete Removal, Class A	4.0	SqYd
491E0140	Concrete Removal, Class B	4.0	SqYd

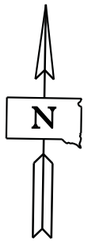
Str. 52-469-276

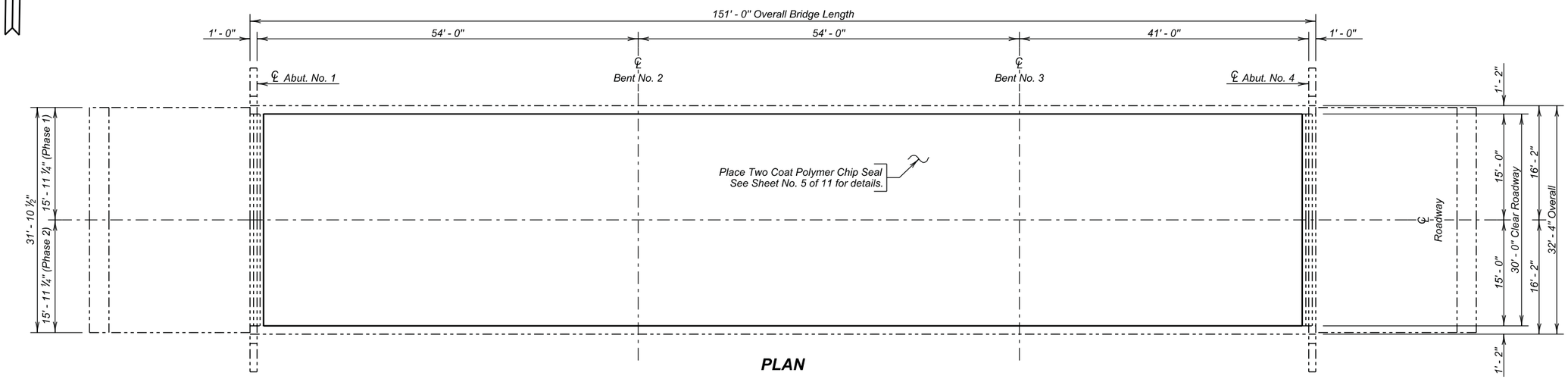
BID ITEM NUMBER	ITEM	QUANTITY	UNIT
460E0172	Concrete Patching Material, Bridge Deck	39.0	CuFt
491E0005	Two Coat Bridge Deck Polymer Chip Seal	346.2	SqYd
491E0110	Abrasive Blasting of Bridge Deck	346.2	SqYd
491E0120	Bridge Deck Grinding	346.2	SqYd
491E0130	Concrete Removal, Class A	4.0	SqYd
491E0140	Concrete Removal, Class B	4.0	SqYd

Str. 52-510-274

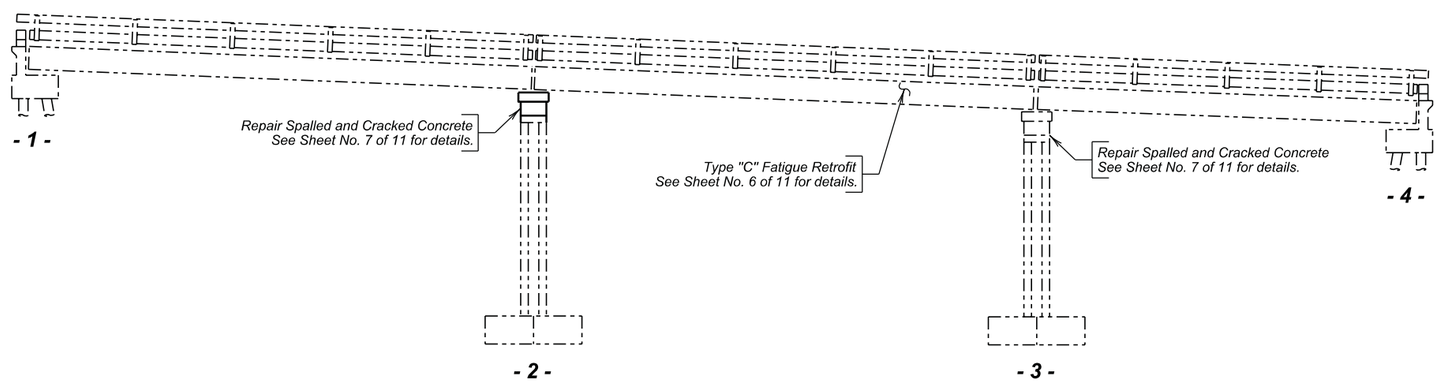
BID ITEM NUMBER	ITEM	QUANTITY	UNIT
410E2600	Membrane Sealant Expansion Joint	31.8	Ft
460E0070	Class A45 Concrete, Bridge Repair	0.6	CuYd
460E0300	Breakout Structural Concrete	0.6	CuYd
480E0200	Epoxy Coated Reinforcing Steel	90	Lb
480E0504	No. 4 Rebar Splice	2	Each
480E0506	No. 6 Rebar Splice	1	Each
491E0025	Bridge Deck Polymer Chip Seal Placed on Existing Chip Seal	543.4	SqYd
491E0030	Spot Repair of Existing Bridge Deck Chip Seal	27.2	SqYd
491E0110	Abrasive Blasting of Bridge Deck	543.4	SqYd

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E3	E50





PLAN



ELEVATION

INDEX OF BRIDGE SHEETS -

Sheet No. 1 - Layout for Upgrading
Sheet No. 2 - Estimate of Structure Quantities and Notes
Sheet No. 3 - Notes (Continued)
Sheet No. 4 - Notes (Continued)
Sheet No. 5 - Polymer Chip Seal Layout
Sheet No. 6 - Type C Fatique Retrofit Details
Sheet No. 7 - Bent Cap Breakout and Repair Details
Sheet No. 8 thru 11 - Original Construction Plans

LAYOUT FOR UPGRADING

FOR

151' - 0" COMPOSITE I - BEAM BRIDGE

30' - 0" ROADWAY — 0° SKEW
OVER CHANNEL — SEC. 23 - T2N - R8E
STR. NO. 52-469-277 — IM 0901(175)58
PCN 035J

PENNINGTON COUNTY

S. D. DEPT. OF TRANSPORTATION

SEPTEMBER 2015

1 OF 11

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	KR	Kevin N. Goeden
PENN035J	035JRC01		BRIDGE ENGINEER

ESTIMATE OF STRUCTURE QUANTITIES

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
410E0103	Fatigue Retrofit Steel Girder, Type C	66	Each
410E3010	Magnetic Particle Weld Inspection	246	In
412E0100	Bridge Repainting, Class I	Lump Sum	LS
412E0500	Paint Residue Containment	Lump Sum	LS
460E0172	Concrete Patching Material, Bridge Deck	24.8	CuFt
460E0174	Concrete Patching Material, Miscellaneous	0.4	CuFt
460E0190	Concrete Crack Injection/Sealing	48	In
460E0300	Breakout Structural Concrete	0.4	CuYd
480E5000	Galvanic Anode	10	Each
491E0005	Two Coat Bridge Deck Polymer Chip Seal	490.6	SqYd
491E0110	Abrasive Blasting of Bridge Deck	490.6	SqYd
491E0120	Bridge Deck Grinding	490.6	SqYd
491E0130	Concrete Removal, Class A	4.0	SqYd
491E0140	Concrete Removal, Class B	4.0	SqYd

SPECIFICATIONS

1. Design Specifications: AASHTO Standard Specifications for Highway Bridges 17th Edition using Working Stress Design.

2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2015 Edition and Required Provisions, Supplemental Specifications and Special Provisions as included in the Proposal.

3. All Welding and Welding Inspection shall be in conformance with the AASHTO/AWS Bridge Welding Code D1.5M/D1.5:2010 unless otherwise noted in this plan set.

DETAILS AND DIMENSIONS OF EXISTING BRIDGE

All details and dimensions of the existing bridge, contained in these plans, are based on the original construction plans and shop plans. It is the Contractor's responsibility to inspect and verify the actual field conditions and any necessary as-built dimensions affecting the satisfactory completion of the work required for this project.

SHOP PLANS

Shop plans shall be required as specified by Section 410.3 A of the Construction Specifications.

SCOPE OF BRIDGE WORK & SEQUENCE OF OPERATIONS

All work on this structure shall be accomplished with the traffic control shown elsewhere in the plans. Alternate sequence of operations may be submitted by the contractor for approval by the engineer a minimum of two weeks prior to the preconstruction meeting.

1. Perform bridge deck grinding and repair the deck by removing all loose and delaminated concrete from the bridge deck surface for the first phase of construction.

2. Clean the bridge deck surface with abrasive blasting for the first phase of construction.

3. Place the Two Coat Polymer Bridge Deck Chip Seal for the first phase of construction.

4. Weld the diaphragm stiffeners to the flanges at the indicated locations.

5. Paint all work affected areas as described in the Bridge Repainting, Class I notes.

6. Breakout and repair spalled areas at Bents 2 and 3 as indicated in the plans.

7. Switch traffic and repeat steps 1 through 3 for the second phase of construction.

FATIGUE RETROFIT - STEEL GIRDER, TYPE "C"

1. This work consists of cleaning and removing paint in the areas where the existing diaphragm stiffeners bear on the bottom flanges of the main girders, welding the existing diaphragm stiffeners to the bottom flanges, and painting the finished welds to match the existing color.

2. Preparation of the base metal prior to welding shall be in accordance with Section 3 of the Bridge Welding Code. Existing paint shall be removed a distance of 4 inches from each side of the weld.

3. Preheat will be required. Preheat and interpass temperature requirements shall be in accordance with Section 4.2 of the Bridge Welding Code. The minimum preheat and interpass temperature shall be *155* degrees F determined from Annex VIII of the Bridge Welding Code for high restraint conditions. The use of temperature indicating crayons shall be a minimum acceptable method for monitoring preheat and interpass temperatures.

4. SMAW electrode atmospheric exposure requirements shall comply with Section 4.5 of the Bridge Welding Code. Electrodes shall be purchased in hermetically sealed containers. If the container shows evidence of damage, the electrodes shall be dried in a drying oven for at least one hour between 700 and 800 degrees F before they are used. Immediately after opening a hermetically sealed container, or removal from a drying oven, electrodes shall be stored in storage ovens at a temperature of 250 degrees F. Electrodes exposed to the atmosphere upon removal from drying, storage ovens or hermetically sealed containers shall be used within four hours maximum, or redried at 450 to 550 degrees F for two hours minimum. Electrodes exposed to the atmosphere for periods less than four hours may be returned to a storage oven and maintained at a minimum of 250 degrees F for a minimum of four hours before reissue. Electrodes shall be redried no more than one time. Electrodes which have been wet shall not be used.

5. All welds shall be cleaned in accordance with Section 3.11 of the Bridge Welding Code. Completed welds and adjacent areas shall be cleaned of all weld spatter, slag, smoke and heat affected paint.

6. The Contractor shall submit a Welding Procedure Specification on Form III-2 (on page 189 of the Bridge Welding Code) and notify the Department of the Contractor's welding schedule thirty days prior to any Fatigue Retrofit welding.

7. All costs for labor, materials and incidentals necessary to prepare the weld area, complete the weld and provide access to each weld for Nondestructive Testing shall be paid for at the contract unit price per each for "Fatigue Retrofit - Steel Girder, Type C".

8. Removal of work affected paint and repainting the work affected areas is covered and paid for in the Paint Residue Removal and Containment and Bridge Repainting notes on sheet No. 3 of 11.

MAGNETIC PARTICLE INSPECTION

1. The Contractor shall be responsible for retaining a qualified Testing Agency to perform magnetic particle inspection (MT) and visual inspection on the fillet welds produced in the field under the payment item "Fatigue Retrofit - Steel Girder Type C". All of the MT and visual inspections shall be performed by an AWS Certified Welding Inspector qualified and certified in conformance with the provisions of AWS QC1. Additionally, personnel performing the Non-Destructive testing (NDT) shall be qualified in conformance with the American Society for Nondestructive Testing's (ASNT) Recommended Practice No. SNT-TC-1A, or equivalent, as a NDT Level II inspector. The Testing Agency and inspectors provided shall be subject to the approval of the Bridge Construction Engineer.

2. Twenty percent of the weld locations will be tested using MT. A weld location is defined as 100% of the fillet weld length in one unit of "Fatigue Retrofit - Steel Girder Type C". The MT results shall be reported on Form III-6 in Annex III of the Bridge Welding Code. The MT Inspection shall be performed by the yoke method. The MT Inspection shall be in accordance with Section 6 of the Bridge Welding Code.

3. All of the completed fillet welds in "Fatigue Retrofit - Steel Girder Type C" shall be visually inspected for acceptance by the Testing Agency. The visual inspection shall be in accordance with Section 6 of the Bridge Welding Code. The Testing Agency shall record the locations of the visual inspection and the findings of the visual inspections together with detailed descriptions of all recommended repairs.

ESTIMATE OF STRUCTURE QUANTITIES AND NOTES

FOR

151' - 0" COMPOSITE I - BEAM BRIDGE

STR. NO. 52-469-277

SEPTEMBER 2015

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	BWS	Kevin N. Goeden
PENN035J	035JRC01		BRIDGE ENGINEER

MAGNETIC PARTICLE INSPECTION (CONTINUED)

4. Based on the results of the Magnetic Particle Inspection and visual inspection, the Bridge Construction Engineer will determine the acceptability of the completed fillet welds and any recommended repairs. Any necessary repairs to the completed welds shall be accomplished in accordance with Chapter 12 of the Bridge Welding Code, 2002 Edition. All weld repair procedures, should they be required, shall be approved prior to use by the Bridge Construction Engineer.

5. All costs incurred by the Magnetic Particle Inspection and visual inspection, including all labor, equipment, access provisions and any incidentals necessary to perform the inspection in accordance with these plans shall be incidental to the contract unit price per inch for Magnetic Particle Weld Inspection.

BRIDGE REPAINTING, CLASS I

1. The work affected areas for the fatigue retrofit shall be painted in accordance with Section 412 of the Construction Specifications and in accordance with SSPC Standard PA1. The areas of painting of the lower flanges are described below:

2. For informational purposes, 13.5 square feet of structural steel will require painting. The quantity shown for the work affected areas is for an area four inches on either side of all welds.

3. Paint color

   Top Coat - The paint color shall be an approved green color. Prior to ordering the paint, a paint chip of the green color shall be submitted to the Department for color approval.

   Primer Coat - Color shall sharply contrast with the top coat.

PAINT RESIDUE REMOVAL AND CONTAINMENT

Paint removal on the existing bridge shall be in accordance with Section 412.3 B.1 of the Construction Specification.

TWO COAT BRIDGE DECK POLYMER CHIP SEAL

The Two Coat Bridge Deck Polymer Chip Seal shall be applied in accordance with the Construction Specifications.

CONCRETE BREAKOUT

1. The existing bent cap shall be broken out to the limits shown on the plans. Breakout limits shall be defined with a 3/4" deep sawcut (unless specified otherwise in these plans), where practical, as approved by the Engineer. Reinforcing steel that is exposed and is scheduled for use in the new construction shall be cleaned and straightened to the satisfaction of the Engineer. Care shall be taken not to damage the existing grout pads on top of bent cap or existing reinforcing steel that is to be reused in the new construction during concrete breakout. Any reinforcing steel that is damaged during concrete breakout shall be replaced or repaired, as approved by the Engineer, by the Contractor at no cost to the Department.

3. All broken out concrete shall be disposed of by the Contractor in accordance with the Environmental Commitments.

4. During concrete removal operations, no broken out concrete shall be allowed to fall into the creek.

5. The contract unit price per cubic yard for "Breakout Structural Concrete" shall include breaking out concrete, cleaning, straightening existing reinforcing steel, and disposal of all broken out material.

BENT CAP REPAIR

1. After all delaminated concrete has been removed, the area shall be abrasive blasted and blown clean with clean, dry, oil-free compressed air at 90 psi.

2. The concrete patching material used in the bent cap patching applications shall be supplied as the following or an equivalent as approved by the Office of Bridge Design:

   Vertical Patch
   Symons
   2400 Arthur Avenue
   Elk Grove Village, IL 60007
   Phone: (847) 298-3200
   Web site: www.symons.com

   Meadow-Patch 20
   W. R. Meadows, Inc.
   P.O. Box 338
   Hampshire, IL 60140-0338
   Phone: (847) 214-2100
   Web site: www.wrmeadows.com

   Speed Crete Red Line
   The Euclid Chemical Company
   19218 Redwood Rd.
   Cleveland, OH 44110
   Phone: (800) 321-7628
   Web site: www.euclidchemical.com

   The concrete patching material shall be extended with aggregate of the quality, size and gradation specified in the manufacturer's technical literature.

3. The bent caps shall be rebuilt to the dimensions of the original construction plans unless otherwise shown on the plans. When used, cap forms may be removed when the concrete attains a compressive strength of 2000 psi.

4. All costs associated with accessing, furnishing, placing and finishing the concrete patching material including all equipment, labor and incidentals shall be incidental to the contract unit price per cubic foot for "Concrete Patching Material, Miscellaneous".

GALVANIC ANODE

1. The Contractor shall furnish and place Galvanic anodes in the concrete repair areas specified in this plan set.

2. The galvanic anodes shall be supplied as one of the following:

   a. Galvashield XP2
      Vector Corrosion Technologies
      13312 N 56th St, Suite 102
      Tampa, FL 33617
      Phone: (813) 830-7566
      Website: www.vector-corrosion.com

   b. Sentinel Silver
      Euclid Chemical Company
      19218 Redwood Road
      Cleveland, OH 44110
      Phone: (800) 321-7628
      Website: www.euclidchemical.com

   c. Sika Galvashield XP+
      Sika Corporation US
      201 Polito Avenue
      Lyndhurst, NJ 07071
      Phone: (800) 933-7452
      Website: http://usa.sika.com

NOTES (CONTINUED)
FOR
151' - 0" COMPOSITE I - BEAM BRIDGE

STR. NO. 52-469-277
SEPTEMBER 2015

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	BWS	Kevin N. Boeden BRIDGE ENGINEER
PENN036J	035JRC01		

GALVANIC ANODE (CONTINUED)

3. The anodes shall be placed in accordance with manufacturer's recommendations and as approved by the Engineer. The anodes have not been shown on the drawings. The Contractor shall provide shop drawings of the galvanic anode installation including locations of the individual anodes to the Office of Bridge Design.

4. The anodes shall be placed with a minimum ¾" cover and shall be set in Embedding Mortar per the manufacturer's recommendations. The anodes shall be fully encased in the concrete repair material. Where adequate cover does not exist, a concrete pocket shall be chipped out behind the anode to provide sufficient cover. The Contractor may need to chip around the reinforcing bar locally at the anode installation to make the electrical connection. The reinforcing steel at the connection location shall be cleaned per the manufacturer's recommendations to provide sufficient electrical connection and mechanical bond.

5. The electrical continuity of the electrical connections and reinforcing steel shall be confirmed per the manufacturer's recommendations.

6. The Contractor shall provide manufacturer's product literature and installation instructions to the Engineer 10 days prior to installation.

7. All costs associated with placing anodes including labor, equipment, materials and incidentals shall be included in the contract unit price per each for "Galvanic Anode".

NOTES (CONTINUED)

FOR

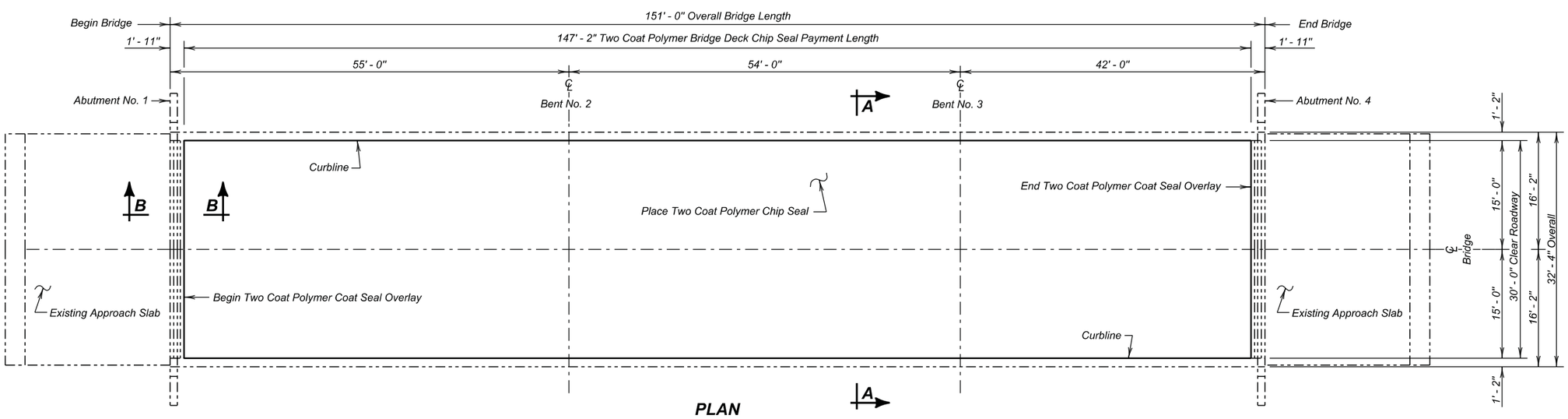
151' - 0" COMPOSITE I - BEAM BRIDGE

STR. NO. 52-469-277

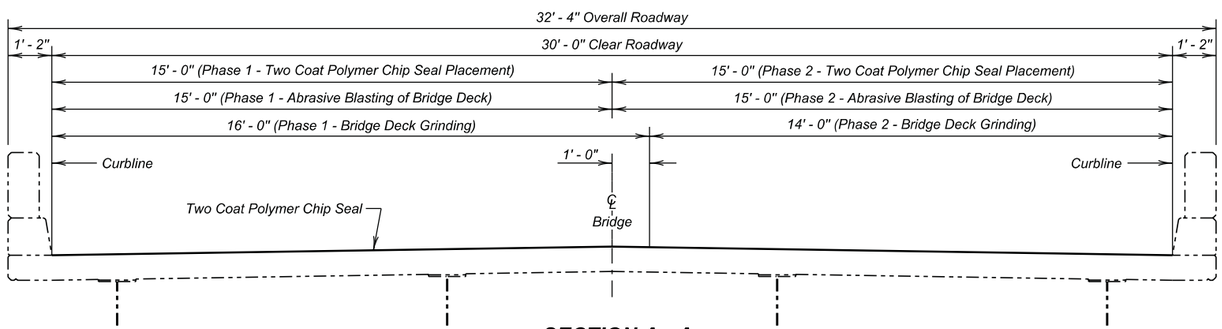
SEPTEMBER 2015

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	BWS	Kevin N. Goeden
PENN035J	035JRC01		BRIDGE ENGINEER

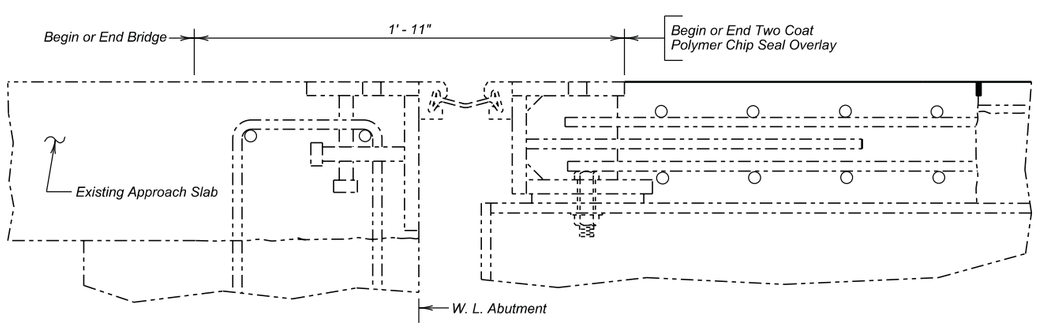
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E7	E50



PLAN



SECTION A - A



SECTION B - B

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY PHASE 1	QUANTITY PHASE 2
* Concrete Patching Material, Bridge Deck	Cu. Ft.	12.4	12.4
Two Coat Bridge Deck Polymer Chip Seal	Sq. Yd.	245.3	245.3
Abrasive Blasting of Bridge Deck	Sq. Yd.	245.3	245.3
Bridge Deck Grinding	Sq. Yd.	261.7	228.9
* Concrete Removal, Class A	Sq. Yd.	2.0	2.0
* Concrete Removal, Class B	Sq. Yd.	2.0	2.0

* Concrete Patching Material, Bridge Deck; Concrete Removal, Class A; and Concrete Removal, Class B may not be encountered and may be removed from the project at the direction of the Engineer.

POLYMER CHIP SEAL LAYOUT

FOR

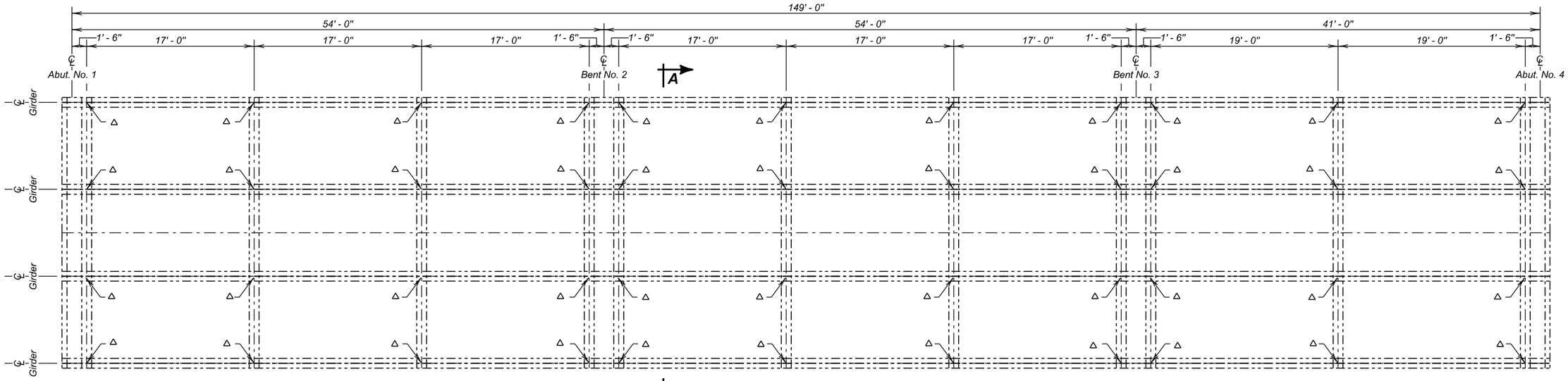
151' - 0" COMPOSITE I - BEAM BRIDGE

30' - 0" ROADWAY — 0° SKEW
OVER CHANNEL — SEC. 23 - T2N - R8E
STR. NO. 52-469-277 — IM 0901(175)58

PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2015

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	KR	Kevin N. Goeden
PENN035J	035JRC05		BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E8	E50



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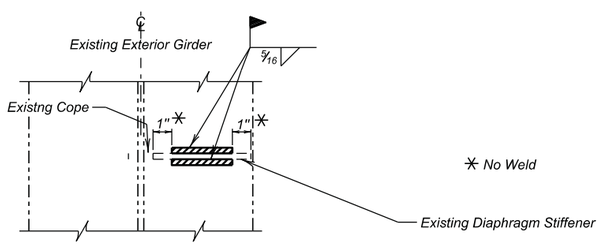
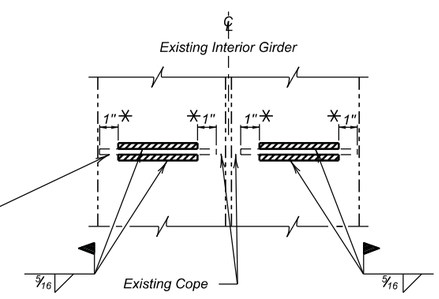


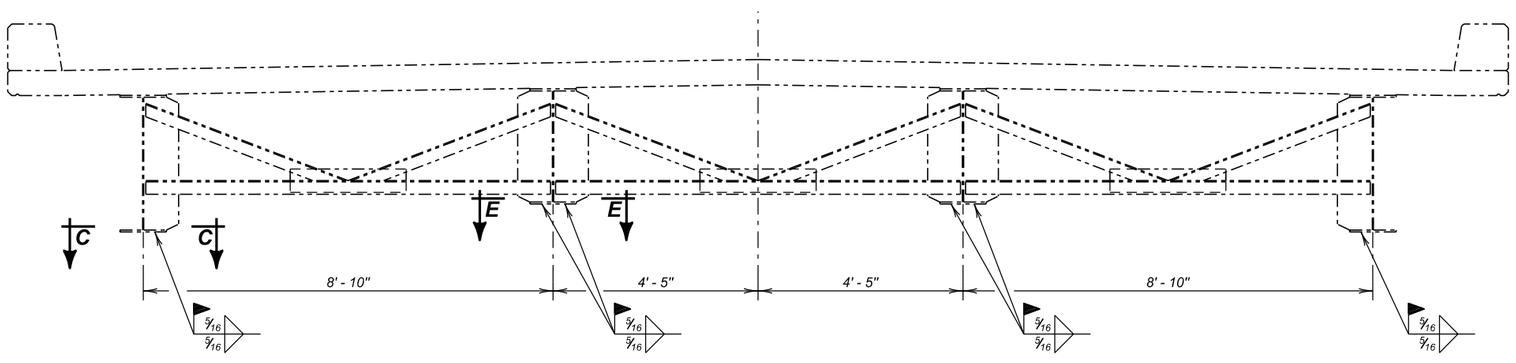
SECTION C - C

(One typical unit of Fatigue Retrofit is shown)



SECTION E - E

(Two typical units of Fatigue Retrofit shown)



SECTION A - A

NOTE:

Type "C" Fatigue Retrofit Locations

The final result is to ensure that both the top and bottom of the existing diaphragm stiffeners are welded to the existing flanges.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Fatigue Retrofit Steel Girder, Type C	Each	66
Magnetic Particle Weld Inspection	Inch	246
Bridge Repainting, Class I	LS	Lump Sum
Paint Residue Containment	LS	Lump Sum

TYPE "C" FATIGUE RETROFIT DETAILS

FOR

151' - 0" COMPOSITE I - BEAM BRIDGE

30' - 0" ROADWAY — 0° SKEW

OVER CHANNEL — SEC. 23 - T2N - R8E

STR. NO. 52-469-277 — IM 0901(175)58

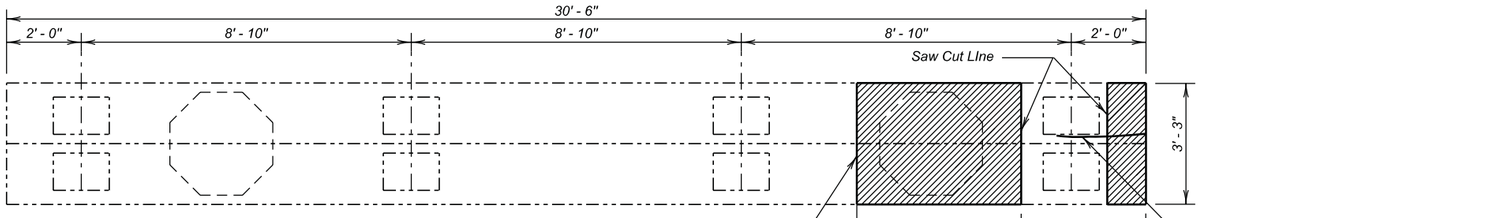
PENNINGTON COUNTY

S. D. DEPT. OF TRANSPORTATION

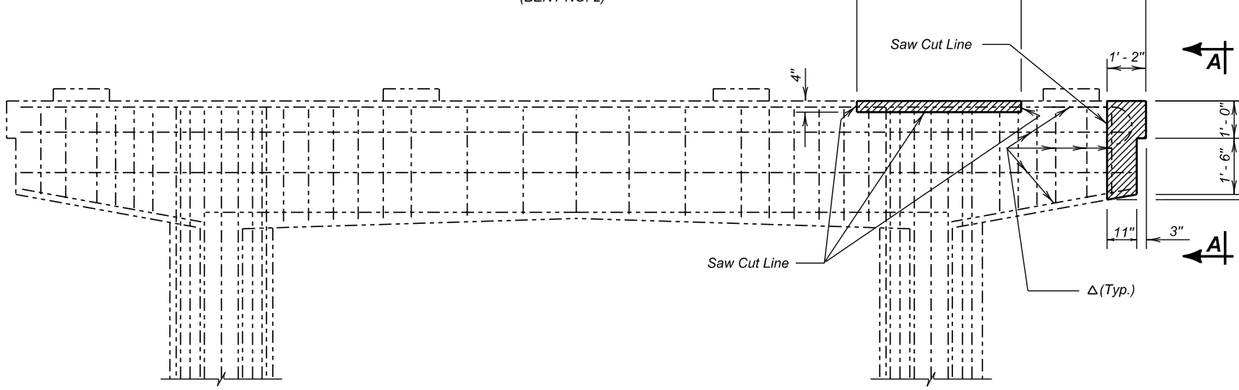
SEPTEMBER 2015

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	KR	Kevin N. Goeden
PENN035J	035JRC06		BRIDGE ENGINEER

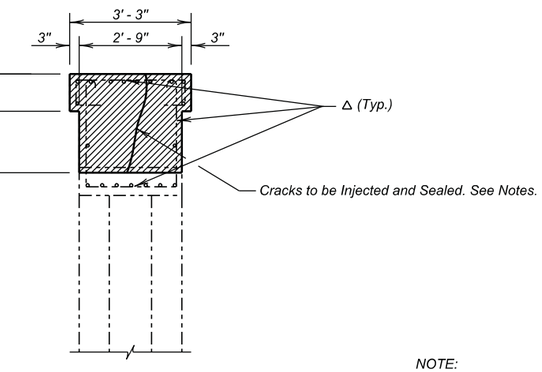
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E9	E50



PLAN
(BENT NO. 2)



ELEVATION
(BENT NO. 2 - West Face)



SECTION A - A
(South Face)

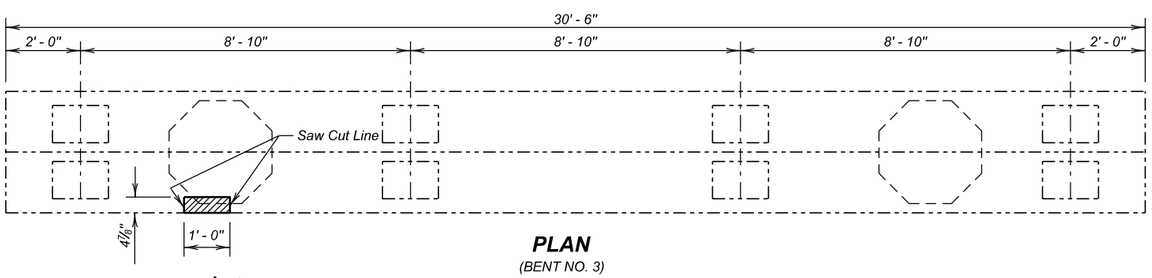
NOTE:

Shaded areas indicate limits of concrete breakout.

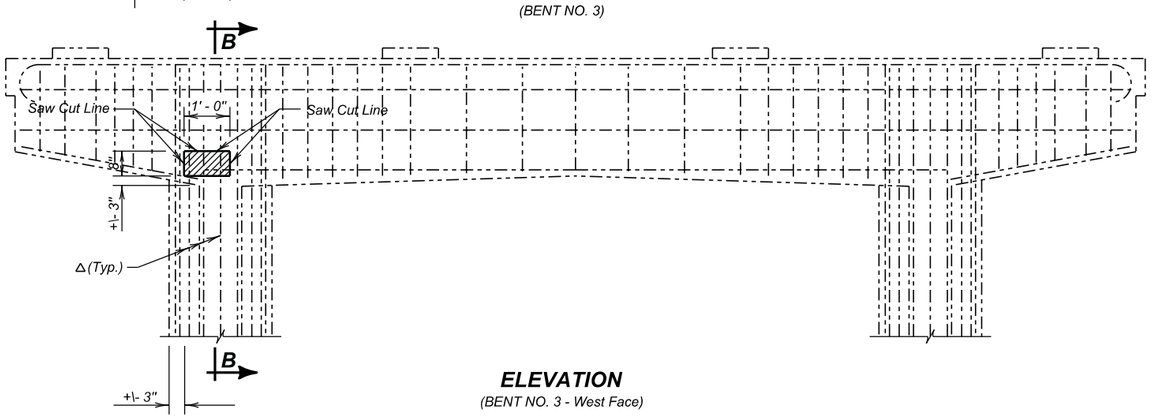
△ All bars to be salvaged.

ESTIMATED QUANTITIES

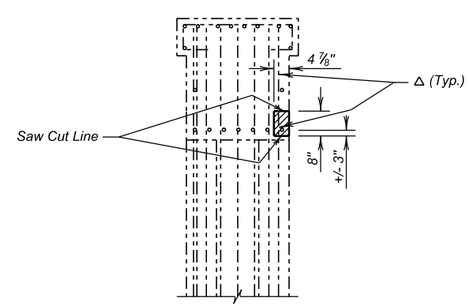
ITEM	UNIT	QUANTITY
Breakout Structural Concrete	Cu. Yd.	0.4
Concrete Patching Material, Miscellaneous	Cu. Yd.	0.4
Galvanic Anode	Each	10
Concrete Crack Injection/Sealing	In.	48



PLAN
(BENT NO. 3)



ELEVATION
(BENT NO. 3 - West Face)



SECTION B - B
(South Face)

BENT CAP BREAKOUT & REPAIR DETAILS

FOR

151' - 0" COMPOSITE I - BEAM BRIDGE

30' - 0" ROADWAY — 0° SKEW

OVER CHANNEL — SEC. 23 - T2N - R8E

STR. NO. 52-469-277 — IM 0901(175)58

PENNINGTON COUNTY

S. D. DEPT. OF TRANSPORTATION

SEPTEMBER 2015

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	KR	Kevin N. Goeden
PENN035J	035JRC07		BRIDGE ENGINEER

—X031—

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E10	E50

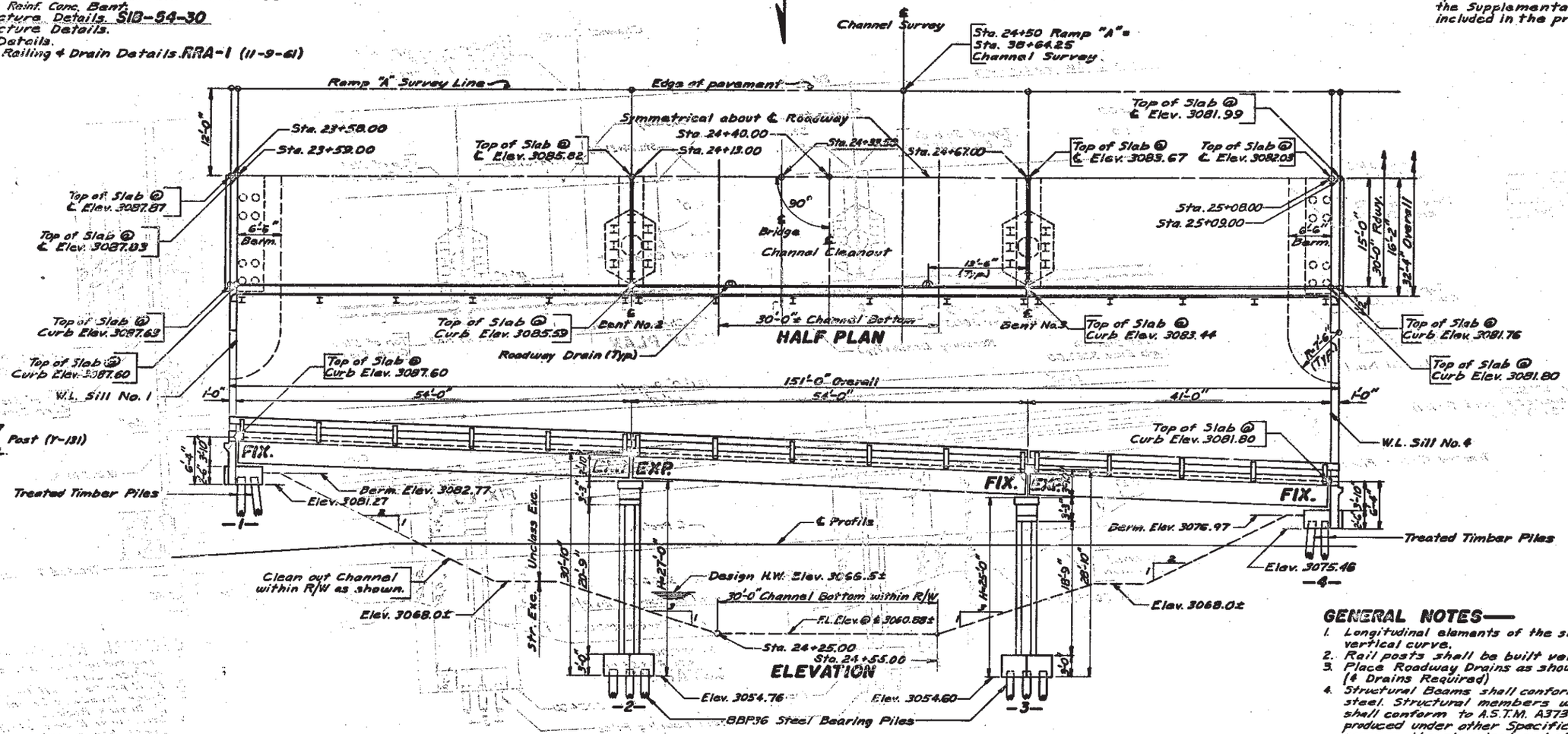
INDEX OF BRIDGE SHEETS—

Sheet No. 1-General Drawing & Quantities.
Sheet No. 2-Subsurface Investigations.
Sheet No. 3-Details for Standard Reinf. Conc. Sill. WP-54-30
Sheet No. 4-Details for Reinf. Conc. Bent.
Sheet No. 5-Superstructure Details. SIB-54-30
Sheet No. 6-Superstructure Details.
Sheet No. 7-Special Details.
Sheet No. 8-Standard Railing & Drain Details RRA-1 (11-9-61)

SPECIFICATION NOTE—

Use current South Dakota Standard Specifications for Roads and Bridges and the Supplemental Specifications as included in the proposal.

Q	1828 cfs
A	262 sq.ft.
V	7.0 ft/sec.

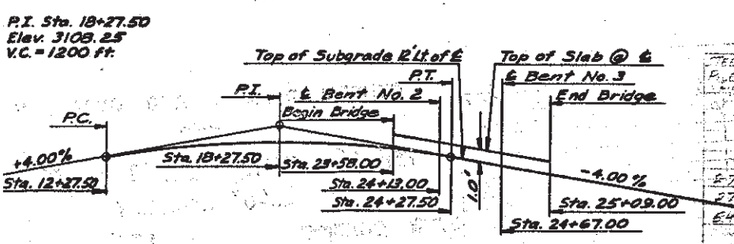


GENERAL NOTES—

1. Longitudinal elements of the slab shall conform to the vertical curve.
2. Rail posts shall be built vertical.
3. Place Roadway Drains as shown in Half Plan View. (4 Drains Required)
4. Structural Beams shall conform to A.S.T.M. A36 (Current) steel. Structural members which are to be welded shall conform to A.S.T.M. A373 (Current) steel. Steel produced under other Specifications, but shown to possess the chemical and physical properties of A373 (Current) steel, will be accepted for use where the latter is specified.

ORIGINAL CONSTRUCTION PLANS

B.M. #11 — Elev. 3069.87
Std. Disc in Concrete Post (T-131)
516' Rt. Sta. 108+18 M.L.



SUBGRADE CURVE DATA

ESTIMATED QUANTITIES

ITEM	Conc. Cl. "A" Cu. Yds.	Steel-Lbs. Reinf.	Steel-Lbs. Struct.	Type & Steel Rail Lin. Ft.	Treated Timber Piles-Lin. Ft.	Excavation-Cu. Yds. Struct.	Excavation-Cu. Yds. Unclass.	8BP36 Steel Bearing Piles @ (Note)	Fill Lin. Ft.	Fill Cu. Yd.
Superstructure-41'-0" Span	29.0	8,660	26,715	85.2						
Superstructure-2-54'-0" Spans	76.4	23,060	77,020	219.1						
Substructure-Sill No. 1	25.7	1,980	495		16 @ 25' = 400'	15				53
Substructure-Sill No. 4	23.0	2,040	495		16 @ 20' = 320'	15			72	558
Substructure-Bent No. 2	32.4	7,090				65.6		16 @ 20' @ 36" = 11520	13	254
Substructure-Bent No. 3	31.1	6,780				65.6		16 @ 15' @ 36" = 8640		
Totals	218.2	49,520	104,725	304.3	720	161.2		20160	85	812

Q One Treated Timber Test Pile shall be driven at Sills No. 1 & 4 before remaining piles are ordered.
Q One BP36 Steel Bearing Test Pile shall be driven at Bents No. 2 & 3 before remaining steel piles are ordered.
b See Grading Plans for Unclassified Excavation.
PILE NOTE-Piles driven at Sills No. 1 & 4, including test piles, shall obtain their full bearing (18 tons) in the natural ground below the new embankments, elevations 3070.5± and 3071.5± respectively. Pre-bored holes through the fill to natural ground are required and shall be a minimum diameter 2" larger than nominal diameter, 3' from the butt, of the pile.
8BP36 Bearing Piles shown at Bents No. 2 & 3 replace timber piles shown on standard detail sheet CB-30-00-B.
8BP36 Bearing Piles shall develop a minimum bearing value of 25 Tons per pile.

F.C. 4-16-63 (RD)

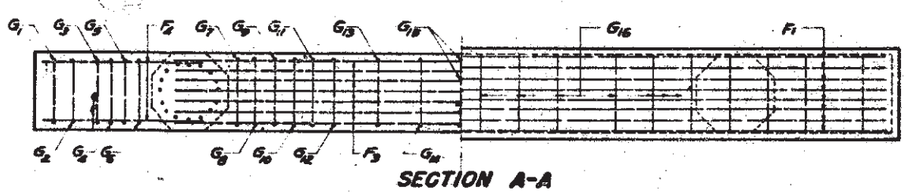
GENERAL DRAWING AND QUANTITIES
FOR
151'-0" COMP. I-BEAM VIADUCT
30'-0" ROADWAY
OVER CHANNEL — SEC. 23—T28N-R[illegible]
STA. 23+58.00 TO 25+09.00 I 90-2(10)62
PENNINGTON COUNTY
STR. NO. 52-469-277 SOUTH DAKOTA N20-S[illegible]-[illegible]
DEPARTMENT OF HIGHWAYS

—X031— MARCH 1971 8 OF 11

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVE
	D.A.H.	G.D.M.	[illegible] ENGINEER

52-469-277

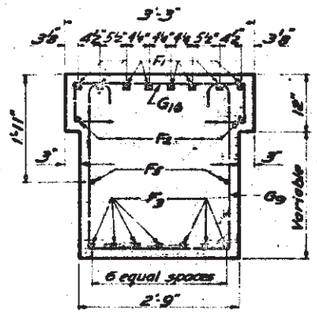
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E11	E50



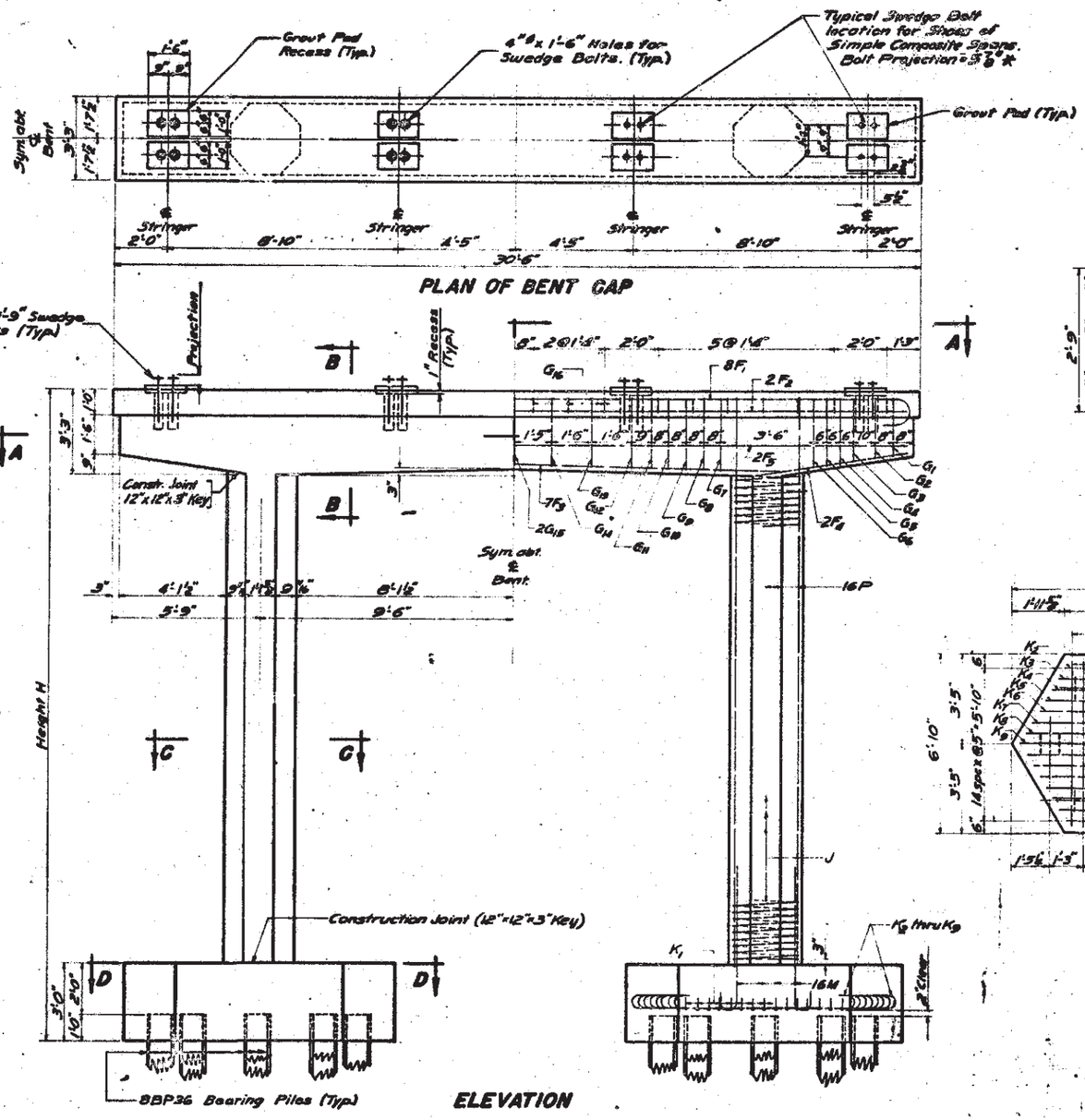
SECTION A-A

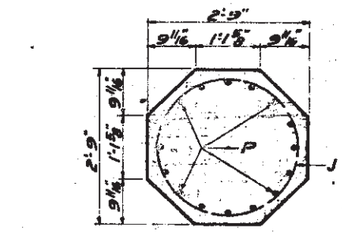
Note.— See Details of Shoes on span sheets.

* See sheet of "Special Details" for revision of these dimensions if bridge is on other than level grade.

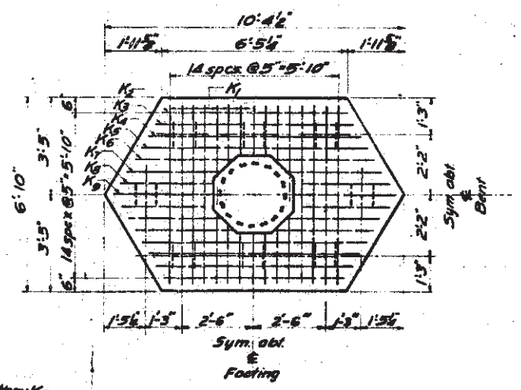


SECTION B-B

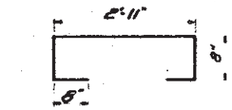




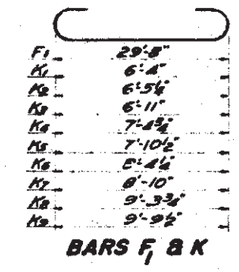
SECTION C-C



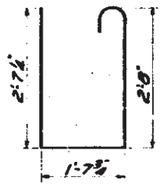
SECTION D-D



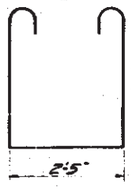
BARS G_{16}



BARS F_1 & K



BARS G_{15}



BARS $G_{1 \text{ to } 14}$

BARS F_3

BARS M

Spirals - 2½" pitch - 1½ extra turns at each en Splice as required usin a lap of 1½ turns.

BARS J

BILL OF CONSTANT REINFORCING STEEL

Mk.	No.	Size	Length	Weight
F_1	8	1½"□	32'-3"	1110
F_2	2	⅞"φ	29'-9"	122
F_3	7	1"□	20'-0"	476
F_4	4	¾"φ	5'-9"	95
F_5	2	⅝"φ	29'-9"	62
$G_{1 \text{ to } 14}$	28	⅝"φ	Ave.=9'-0"	263
G_{15}	2	⅝"φ	7'-6"	16
G_{16}	20	½"φ	5'-6"	73
K_1	30	⅞"φ	8'-0"	491
$K_{2 \text{ thru } 9}$	30	1"φ	Ave.=10'-3"	822
M	32	⅞"φ	5'-9"	376

BILL OF VARIABLE REINFORCING STEEL AND TOTAL QUANTITIES

Height H feet	32-1"□ Bars P		Spiral-⅜"φ Bars J			Total Quantities	
	Length	Weight	No.	Length	Weight	Reinf. Steel Lbs.	Cl. A Conc. Cu Yds.
15	11'-9"	1278	2	328'-3"	247	5140	26.8
16	12'-9"	1387	2	364'-3"	274	5280	27.3
17	13'-9"	1496	2	400'-3"	301	5415	27.7
18	14'-9"	1605	2	436'-3"	328	5550	28.2
19	15'-9"	1714	2	472'-3"	355	5685	28.7
20	16'-9"	1822	2	508'-3"	382	5820	29.1
21	17'-9"	1931	2	544'-3"	409	5955	29.6
22	18'-9"	2040	2	580'-3"	436	6095	30.0
23	19'-9"	2149	2	616'-3"	463	6455	30.5
24	20'-9"	2258	2	652'-3"	490	6595	31.0
25	21'-9"	2366	2	688'-3"	518	6730	31.4
26	22'-9"	2475	2	724'-3"	545	6865	31.9
27	23'-9"	2584	2	760'-3"	572	7000	32.4
28	24'-9"	2693	2	796'-3"	599	7135	32.8
29	25'-9"	2802	2	832'-3"	626	7275	33.3
30	26'-9"	2910	2	868'-3"	653	7400	33.8
31	27'-9"	3019	2	904'-0"	680	7545	34.2
32	28'-9"	3128	2	940'-0"	707	7680	34.7

GENERAL NOTES.—

All edges on bent cap shall be chamfered 1½"
Use 2" clear cover on all reinforcing except 3" clear cover on footing reinforcing.
Dimensions for reinforcing bars are out to out.
All hooks of bars ⅝" and under shall have 6 dia. clear opening; hooks of bars 1" and over shall have 8 dia. clear opening.
Use 3 vertical spacer bars per column for spirals. Cost of spacers shall be included in the unit price bid for reinforcing steel.
Design loading: H20-S16-44 (T-Current) A.A.S.H.O.
Piling shall develop a minimum bearing value of 30 Tons per pile.
Structural Excavation per foot of depth = 6.6 cu. yds.
Unit Stresses: Concrete f_c = 1600 p.s.i.
Reinf. Steel = 20,000 p.s.i. (Int. grade)
All reinforcing steel shall conform to A-15 Intermediate Grade and A.S.T.M. A-305 (T-Current), except spirals may be smooth bars.

ORIGINAL CONSTRUCTION PLANS

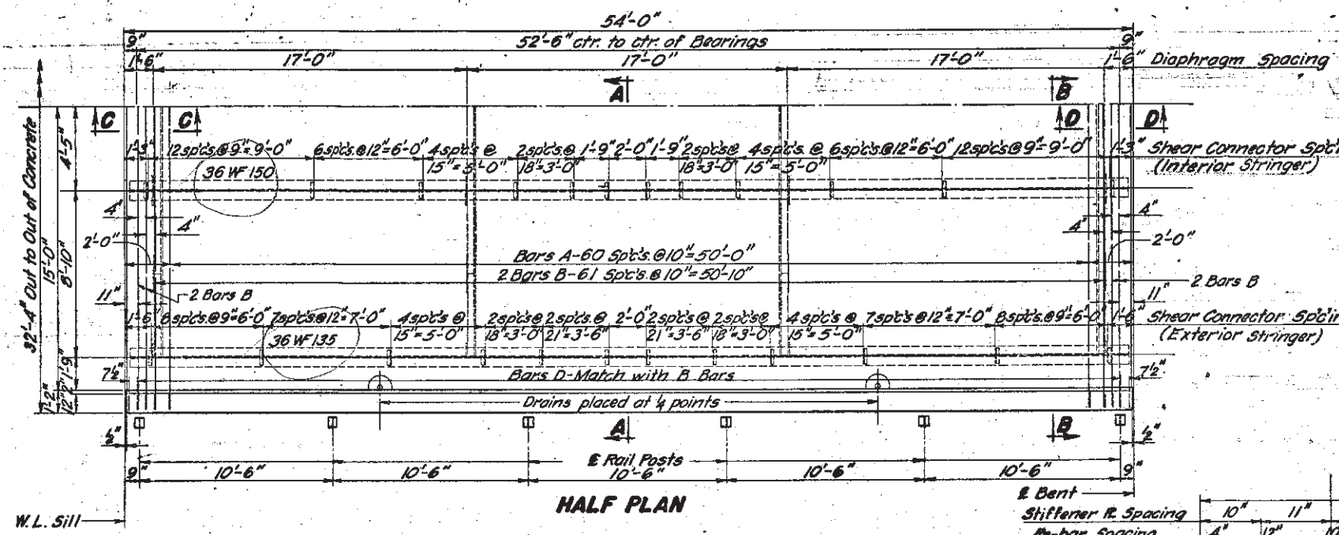
BENT DETAILS
FOR
151'-0" CONP. I-BEAM VIADUCT
OVER CHANNEL SEC 23——T2N-R
STA. 23+58.00 TO 25+09.00 190-2(1)
PENNINGTON COUNTY
STR. NO. 52-469-277 SOUTH DAKOTA H20-S16-
STATE HIGHWAY COMMISSION
1947

Rev. from CB-30-00-B
Cap Re-Steel Rev. 3-16-50
Dim. marked '*' Rev. 9-30-48
Rev. 6-24-49
Rev. 5-20-

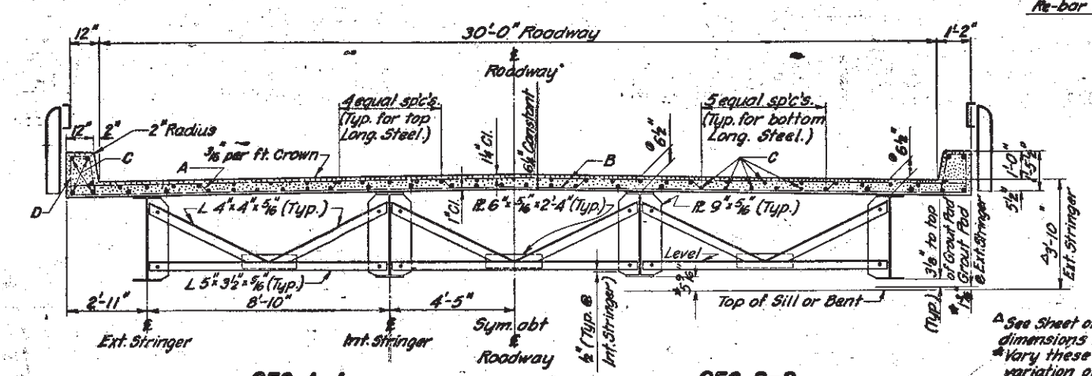
DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED

52003

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E12	E50



HALF PLAN

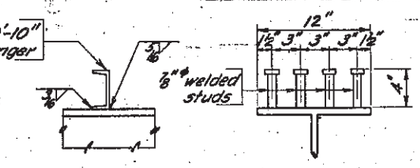


SEC. A-A

SEC. B-B

△ See Sheet of Special Details for these dimensions if Bridge is on other than level grade.
* Vary these dimensions in accordance with variation of dimensions marked △.

◊ Dimensions shown apply only at ℄ Bearings. Intermediate points must be increased for ordinates shown in DEAD LOAD DEFLECTION DIAGRAM plus or minus any irregularity or deflection in beam when erected.



CHANNEL

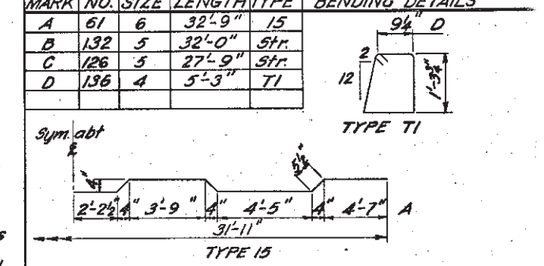
WELDED STUD

DETAILS FOR SHEAR CONNECTORS

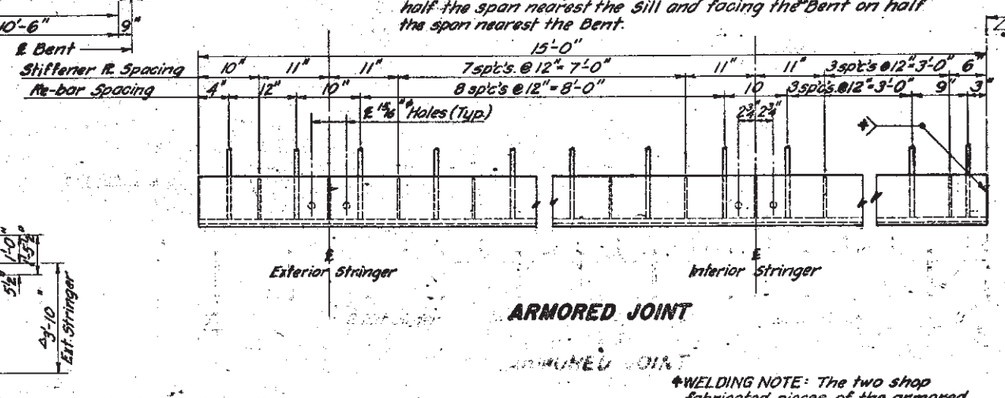
Channel or welded stud shear connectors are spaced as shown at left in HALF PLAN.
The contractor may substitute a row of 4-⅞"φ welded studs for each channel shear connector as shown.
Shear connectors will be paid for as Structural Steel based on the weight of channels, regardless of type of connector used.
Channels shall be placed on the girders facing the Sill on half the span nearest the Sill and facing the Bent on half the span nearest the Bent.

REINFORCING STEEL SCHEDULE

MARK	NO.	SIZE	LENGTH	TYPE	BENDING DETAILS
A	61	6	32'-9"	15	
B	132	5	32'-0"	Str.	
C	126	5	27'-9"	Str.	
D	136	4	5'-3"	T1	



NOTE:-All dimensions are out to out of bars.



ARMORED JOINT

ESTIMATED QUANTITIES

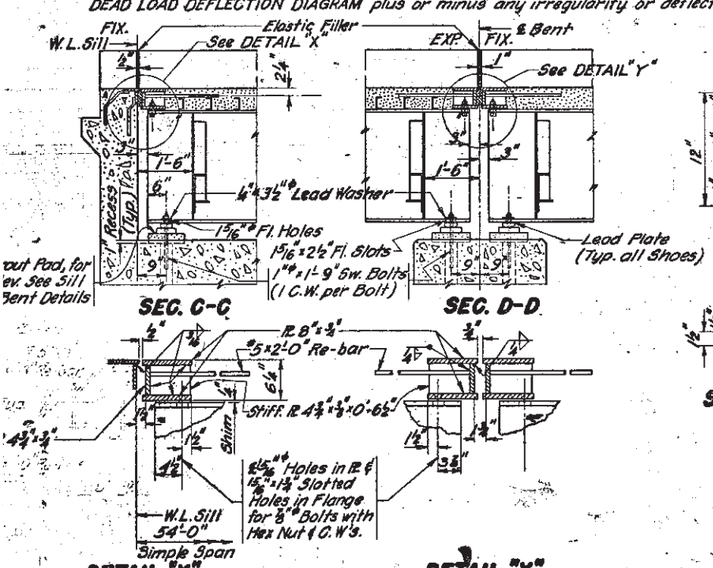
ITEM	UNIT	QUANTITIES for 1-SPAN
Class "A" Concrete	Cu. Yds.	38.2
Reinforcing Steel	Lbs.	11,530
Structural Steel	Lbs.	38,510
Railing	Lin. Ft.	111

GENERAL NOTES—

1. Cost of welding shall be absorbed in the unit price bid for structural steel.
2. Lead plates and lead washers shall be paid for under the item of structural steel.
3. All exposed steel surfaces shall be painted one shop coat of red lead paint and two field coats of aluminum or other approved paint.
4. Beams do not require mill cambering.
5. Cost of canvas and red lead under bearing plates shall be absorbed in the unit price bid for Cl. "A" Conc.
6. All exposed concrete edges shall be chamfered 1" unless otherwise noted.
7. See Standard Railing Sheet for details of handrails and drains.

Design Loading: H20-S16-44 (T Current)
Unit Stresses: Re-Steel f_s = 20,000 p.s.i. (Intermed. Gr. Steel)
Concrete f_c = 1600 p.s.i.

8. Elastic Filler shall conform to South Dakota Standard Specifications for Roads and Bridges, Sec. 88-2.
9. Cost of Elastic Filler shall be included in the unit price bid for Class "A" Concrete.

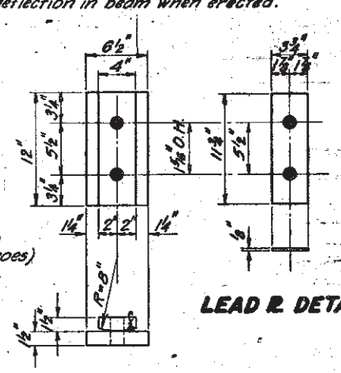


SEC. C-C

SEC. D-D

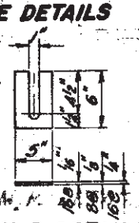
DETAIL "X"

DETAIL "Y"

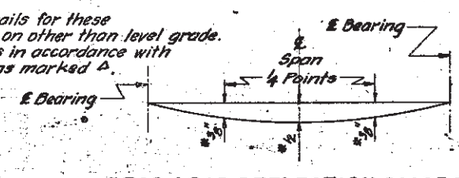


LEAD ℞ DETAIL

SHOE DETAILS



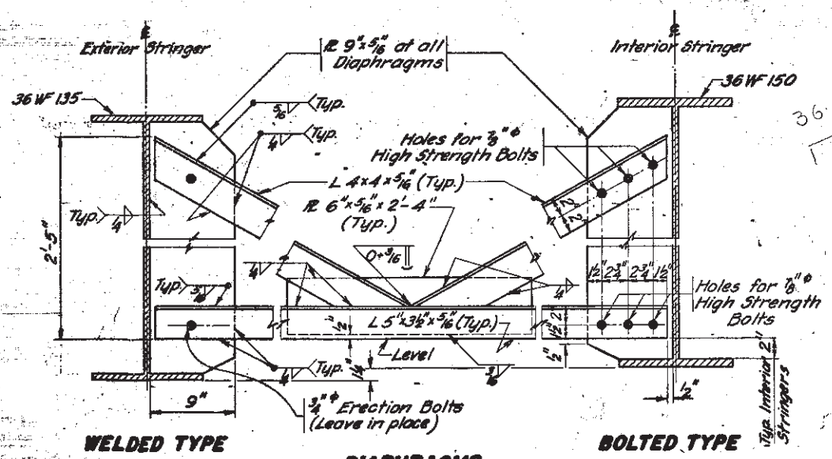
SHIM ℞ DETAILS



DEAD LOAD DEFLECTION DIAGRAM

* Deflection due to concrete alone.

* WELDING NOTE: The two shop fabricated pieces of the armored joint shall be joined in the field by buttwelds, preferably V welds, in accordance with the latest Specifications of the American Welding Society. Type of welds shall be shown on shop plans for the Bridge Department's approval.



WELDED TYPE

DIAPHRAGMS

BOLTED TYPE

NOTE: Diaphragms shall be attached by welding or bolting as shown, at option of the contractor.

ORIGINAL CONSTRUCTION PLANS

DETAILS FOR

STANDARD I-BEAM VIADUCT

COMPOSITE SECTION

30'-0" ROADWAY 54'-0" SPAN

SOUTH DAKOTA

DEPARTMENT OF HIGHWAYS

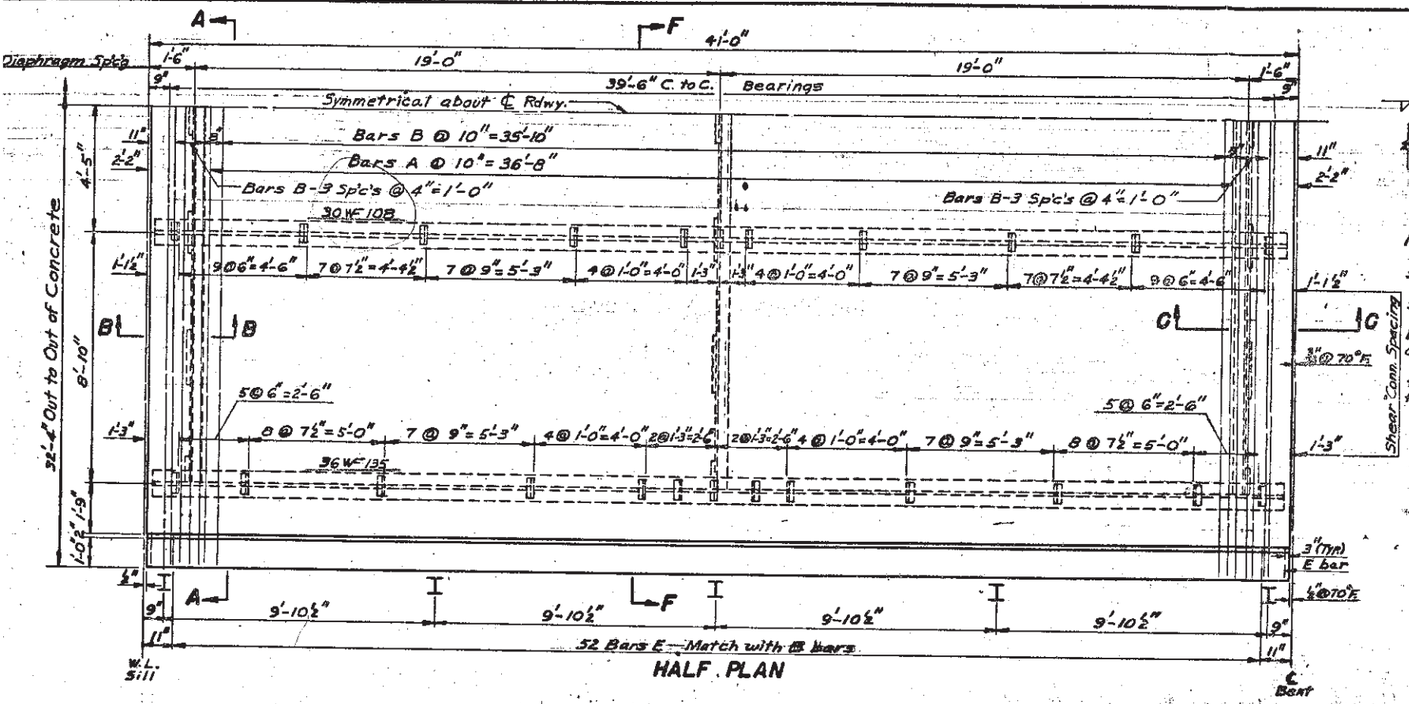
STR. NO. 52-469-277 1961

10 OF 11

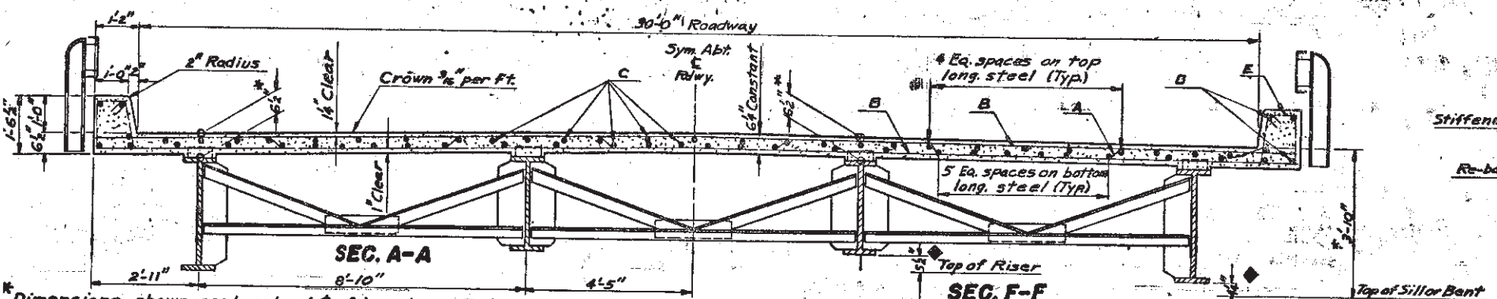
DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	DJB	M.B.S.	K.R. Kerr BRIDGE ENGINEER

SIB-54-30

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E13	E50



HALF PLAN



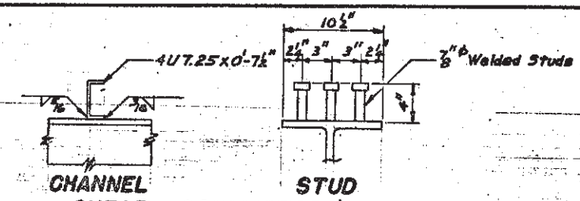
SEC. A-A

SEC. F-F

*Dimensions shown apply only at ℄ of bearings. Intermediate points must be increased for ordinates shown in DEAD LOAD DEFLECTION DIAGRAM plus or minus any irregularity or deflection in beam when erected.

†See sheet of "Special Details" for these dimensions if bridge is on other than level grade.

◆Vary this dimension in accordance with variation of dimensions marked #.



CHANNEL SHEAR CONNECTORS

STUD SHEAR CONNECTORS

NOTE:

Channel or welded stud shear connectors are spaced as shown on Half Plan.

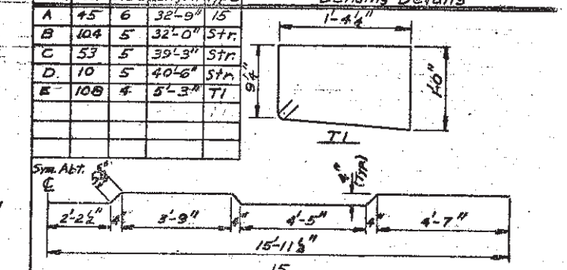
The Contractor may substitute a row of 7/8" ϕ welded studs for each channel shear connector as shown.

Shear connectors will be paid for as structural steel based on the weight of channels, regardless of type of connector used.

Channels shall be placed on the girders facing the sill on half the span nearest the sill and facing the bent on half the span nearest the bent.

REINFORCING SCHEDULE

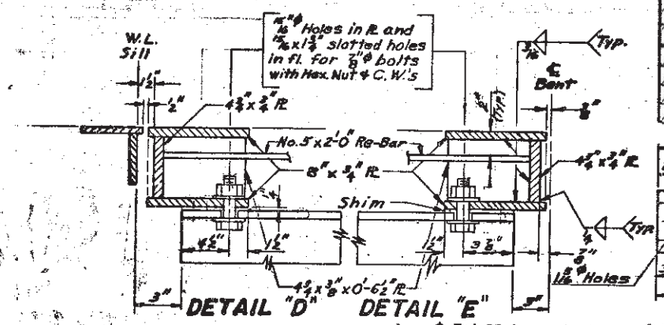
Mk.	No.	Size	Length	Type	Bending Details
A	45	6	32'-9"	15	
B	104	5	32'-0"	Str.	
C	53	5	39'-3"	Str.	
D	10	5	40'-6"	Str.	
E	108	4	5'-3"	T1	



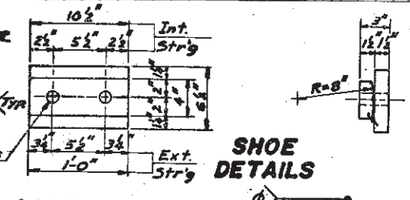
Note: All dimensions are out to out of bars.

ESTIMATED QUANTITIES

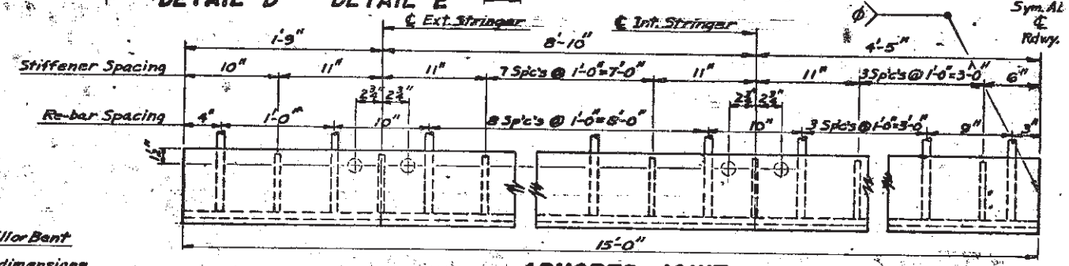
ITEM	Unit	Quant.
Concrete, Class "A"	Cu. Yds.	29.0
Steel, Reinforcing	Lbs.	5,660
Steel, Structural	Lbs.	86,716
Railing - (End Span)	Lin. Ft.	85.2



DETAIL "D" DETAIL "E"



SHOE DETAILS



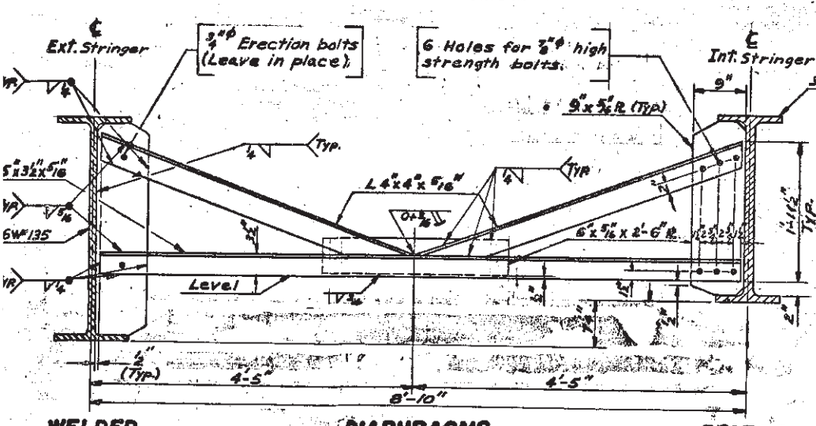
ARMORED JOINT

ϕ The two shop fabricated pieces of the armored joint shall be joined in the field by buttwelds, preferably V-welds in accordance with the latest specs. of the AWS. Type of welds shall be shown on plans for Bridge Dept. approval.

⊙ NOTE: Elastic Filler shall conform to South Dakota Std. Spec. for Roads and Bridges, Sec. 88-2. Cost of Elastic Filler shall be included in the unit price bid for Cl. "A" Conc.

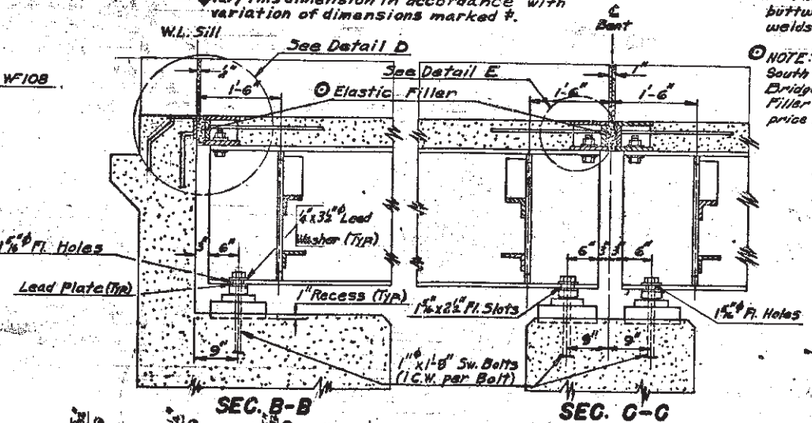
GENERAL NOTES:

1. Lead plates and lead washers shall be paid for under the item of structural steel.
2. Cost of welding shall be absorbed in the unit price bid for structural steel.
3. All exposed steel surfaces shall be painted one shop coat of red lead paint & two field coats of aluminum or other approved paint.
4. Beams do not require mill cambering.
5. Cost of canvas & red lead under bearing plates shall be absorbed in the unit price bid for Cl. "A" concrete.
6. All exposed concrete edges shall be chamfered 1"



WELDED TYPE DIAPHRAGMS BOLTED TYPE

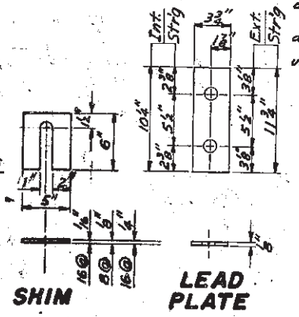
Note: Diaphragms shall be attached by welding or bolting as shown, at option of contractor.



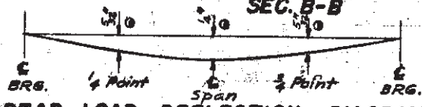
SEC. B-B

SEC. C-C

Bent (Exp.) Bent (Fixed)



SHIM LEAD PLATE



DEAD LOAD DEFLECTION DIAGRAM ● Deflection due to concrete alone

ORIGINAL CONSTRUCTION PLANS

SUPERSTRUCTURE DETAILS FOR

151'-0" COMP. I-BEAM VIADUCT

OVER CHANNEL STA. 24+50 SEC 23 — T2N-R8E

PENNINGTON COUNTY I 90-2(11)62

30'-0" ROADWAY SOUTH DAKOTA 41'-0" SPAN

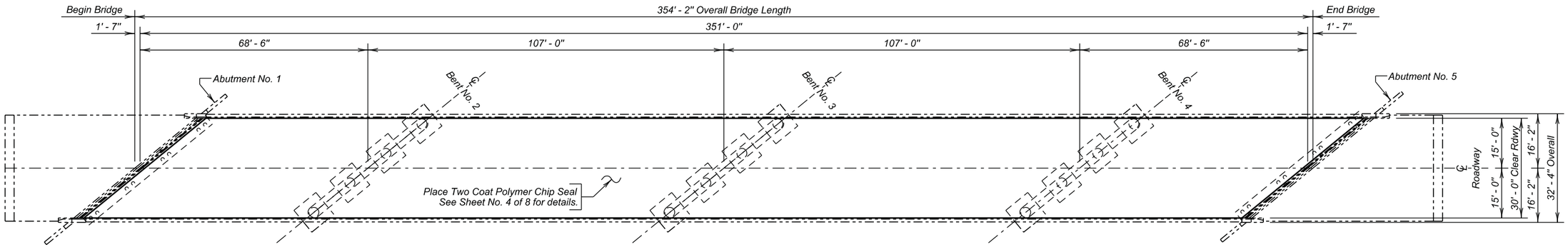
DEPARTMENT OF HIGHWAYS

H20-S16-44 MARCH 1961 (11) OF (11)

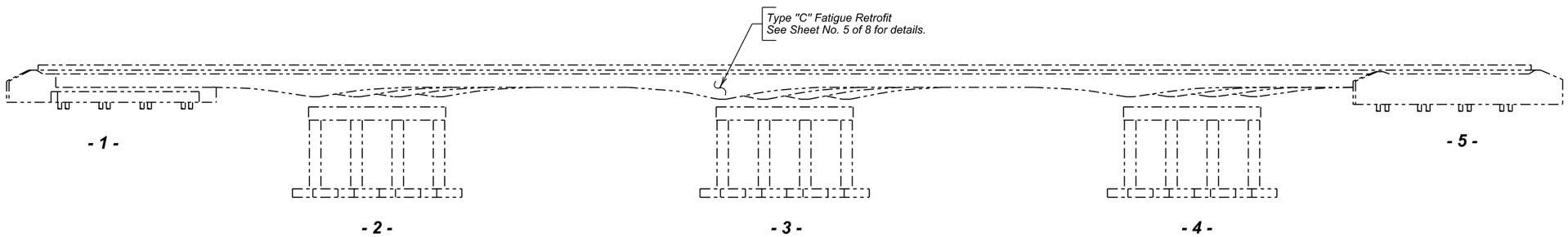
STR. NO. 52-469-277

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	D.A.H.	M.B.S.	K.K. Sewell, BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E14	E50



PLAN



ELEVATION

INDEX OF BRIDGE SHEETS -

Sheet No. 1 - Layout for Upgrading
Sheet No. 2 - Estimate of Structure Quantities and Notes
Sheet No. 3 - Notes (Continued)
Sheet No. 4 - Two Coat Bridge Deck Polymer Chip Seal Layout
Sheet No. 5 - Type "C" Fatigue Retrofit Details
Sheet No. 6 thru 8 - Original Construction Plans

LAYOUT FOR UPGRADING

FOR

354' - 2" CONT. COMP. GIRDER BRIDGE

30' - 0" ROADWAY — 50° 43' SKEW L.H.F.
OVER INTERSTATE 90 — SEC. 23 - T2N - R8E
STR. NO. 52-467-276 — IM 0901(175)58
PCN 035J

PENNINGTON COUNTY

S. D. DEPT. OF TRANSPORTATION

SEPTEMBER 2015

1 OF 8

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	KR	Kevin N. Boeden
PENN035J	035JRD01		BRIDGE ENGINEER

ESTIMATE OF STRUCTURE QUANTITIES

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
410E0103	Fatigue Retrofit Steel Girder, Type C	114	Each
410E3010	Magnetic Particle Weld Inspection	438	In
412E0100	Bridge Repainting, Class I	Lump Sum	LS
412E0500	Paint Residue Containment	Lump Sum	LS
460E0172	Concrete Patching Material, Bridge Deck	99.0	CuFt
491E0005	Two Coat Bridge Deck Polymer Chip Seal	1160.4	SqYd
491E0110	Abrasive Blasting of Bridge Deck	1160.4	SqYd
491E0120	Bridge Deck Grinding	1160.4	SqYd
491E0130	Concrete Removal, Class A	16.0	SqYd
491E0140	Concrete Removal, Class B	16.0	SqYd

SPECIFICATIONS

1. Design Specifications: AASHTO Standard Specifications for Highway Bridges 17th Edition using Working Stress Design.

2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2015 Edition and Required Provisions, Supplemental Specifications and Special Provisions as included in the Proposal.

3. All Welding and Welding Inspection shall be in conformance with the AASHTO/AWS Bridge Welding Code D1.5M/D1.5:2010 unless otherwise noted in this plan set.

DETAILS AND DIMENSIONS OF EXISTING BRIDGE

All details and dimensions of the existing bridge, contained in these plans, are based on the original construction plans and shop plans. It is the Contractor's responsibility to inspect and verify the actual field conditions and any necessary as-built dimensions affecting the satisfactory completion of the work required for this project.

SHOP PLANS

Shop plans shall be required as specified by Section 410.3 A of the Construction Specifications.

SCOPE OF BRIDGE WORK & SEQUENCE OF OPERATIONS

All work on this structure shall be accomplished with the traffic control shown elsewhere in the plans. Alternate sequence of operations may be submitted by the contractor for approval by the engineer a minimum of two weeks prior to the preconstruction meeting.

1. Perform bridge deck grinding and repair the deck by removing all loose and delaminated concrete from the bridge deck surface for the first phase of construction.

2. Clean the bridge deck surface with abrasive blasting for the first phase of construction.

3. Place the Two Coat Polymer Bridge Deck Chip Seal for the first phase of construction.

4. Weld the diaphragm stiffeners to the flanges at the indicated locations.

5. Paint all work affected areas as described in the Bridge Repainting, Class I notes.

6. Switch traffic and repeat steps 1 through 3 for the second phase of construction.

FATIGUE RETROFIT - STEEL GIRDER, TYPE "C"

1. This work consists of cleaning and removing paint in the areas where the existing diaphragm stiffeners bear on the bottom flanges of the main girders, welding the existing diaphragm stiffeners to the bottom flanges, and painting the finished welds to match the existing color.

2. Preparation of the base metal prior to welding shall be in accordance with Section 3 of the Bridge Welding Code. Existing paint shall be removed a distance of 4 inches from each side of the weld.

3. Preheat will be required. Preheat and interpass temperature requirements shall be in accordance with Section 4.2 of the Bridge Welding Code. The minimum preheat and interpass temperature shall be *155* degrees F determined from Annex VIII of the Bridge Welding Code for high restraint conditions. The use of temperature indicating crayons shall be a minimum acceptable method for monitoring preheat and interpass temperatures.

4. SMAW electrode atmospheric exposure requirements shall comply with Section 4.5 of the Bridge Welding Code. Electrodes shall be purchased in hermetically sealed containers. If the container shows evidence of damage, the electrodes shall be dried in a drying oven for at least one hour between 700 and 800 degrees F before they are used. Immediately after opening a hermetically sealed container, or removal from a drying oven, electrodes shall be stored in storage ovens at a temperature of 250 degrees F. Electrodes exposed to the atmosphere upon removal from drying, storage ovens or hermetically sealed containers shall be used within four hours maximum, or redried at 450 to 550 degrees F for two hours minimum. Electrodes exposed to the atmosphere for periods less than four hours may be returned to a storage oven and maintained at a minimum of 250 degrees F for a minimum of four hours before reissue. Electrodes shall be redried no more than one time. Electrodes which have been wet shall not be used.

5. All welds shall be cleaned in accordance with Section 3.11 of the Bridge Welding Code. Completed welds and adjacent areas shall be cleaned of all weld spatter, slag, smoke and heat affected paint.

6. The Contractor shall submit a Welding Procedure Specification on Form III-2 (on page 189 of the Bridge Welding Code) and notify the Department of the Contractor's welding schedule thirty days prior to any Fatigue Retrofit welding.

7. All costs for labor, materials and incidentals necessary to prepare the weld area, complete the weld and provide access to each weld for Nondestructive Testing shall be paid for at the contract unit price per each for "Fatigue Retrofit - Steel Girder, Type C".

8. Removal of work affected paint and repainting the work affected areas is covered and paid for in the Paint Residue Removal and Containment and Bridge Repainting notes on sheet No. 3 of 8.

MAGNETIC PARTICLE INSPECTION

1. The Contractor shall be responsible for retaining a qualified Testing Agency to perform magnetic particle inspection (MT) and visual inspection on the fillet welds produced in the field under the payment item "Fatigue Retrofit - Steel Girder Type C". All of the MT and visual inspections shall be performed by an AWS Certified Welding Inspector qualified and certified in conformance with the provisions of AWS QC1. Additionally, personnel performing the Non Destructive testing (NDT) shall be qualified in conformance with the American Society for Nondestructive Testing's (ASNT) Recommended Practice No. SNT-TC-1A, or equivalent, as a NDT Level II inspector. The Testing Agency and inspectors provided shall be subject to the approval of the Bridge Construction Engineer.

2. Twenty percent of the weld locations will be tested using MT. A weld location is defined as 100% of the fillet weld length in one unit of "Fatigue Retrofit - Steel Girder Type C". The MT results shall be reported on Form III-6 in Annex III of the Bridge Welding Code. The MT Inspection shall be performed by the yoke method. The MT Inspection shall be in accordance with Section 6 of the Bridge Welding Code.

3. All of the completed fillet welds in "Fatigue Retrofit - Steel Girder Type C" shall be visually inspected for acceptance by the Testing Agency. The visual inspection shall be in accordance with Section 6 of the Bridge Welding Code. The Testing Agency shall record the locations of the visual inspection and the findings of the visual inspections together with detailed descriptions of all recommended repairs.

4. Based on the results of the Magnetic Particle Inspection and visual inspection, the Bridge Construction Engineer will determine the acceptability of the completed fillet welds and any recommended repairs. Any necessary repairs to the completed welds shall be accomplished in accordance with Chapter 12 of the Bridge Welding Code 2002 Edition. All weld repair procedures, should they be required, shall be approved prior to use by the Bridge Construction Engineer.

ESTIMATE OF STRUCTURE QUANTITIES AND NOTES

FOR

354' - 2" CONTINUOUS COMP. GIRDER BRIDGE

STR. NO. 52-467-276

SEPTEMBER 2015

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	BWS	Kevin N. Goeden
PENN035J	035JRD02		BRIDGE ENGINEER

MAGNETIC PARTICLE INSPECTION (CONTINUED)

5. All costs incurred by the Magnetic Particle Inspection and visual inspection, including all labor, equipment, access provisions and any incidentals necessary to perform the inspection in accordance with these plans shall be incidental to the contract unit price per inch for Magnetic Particle Weld Inspection.

BRIDGE REPAINTING, CLASS I

1. The work affected areas for the fatigue retrofit shall be painted in accordance with Section 412 of the Standard Specifications and in accordance with SSPC Standard PA1. The areas of painting of the lower flanges are described below:

2. For informational purposes, 24.3 square feet of structural steel will require painting. The quantity shown for the work affected areas is for an area four inches on either side of all welds.

3. Paint color

   Top Coat - The paint color shall be an approved green color. Prior to ordering the paint, a paint chip of the green color shall be submitted to the Department for color approval.

   Primer Coat - Color shall sharply contrast with the top coat.

PAINT RESIDUE REMOVAL AND CONTAINMENT

Paint removal on the existing bridge shall be in accordance with Section 412 of the Construction Specification.

TWO COAT BRIDGE DECK POLYMER CHIP SEAL

The Two Coat Bridge Deck Polymer Chip Seal shall be applied in accordance with the Construction Specifications.

NOTES (CONTINUED)

FOR

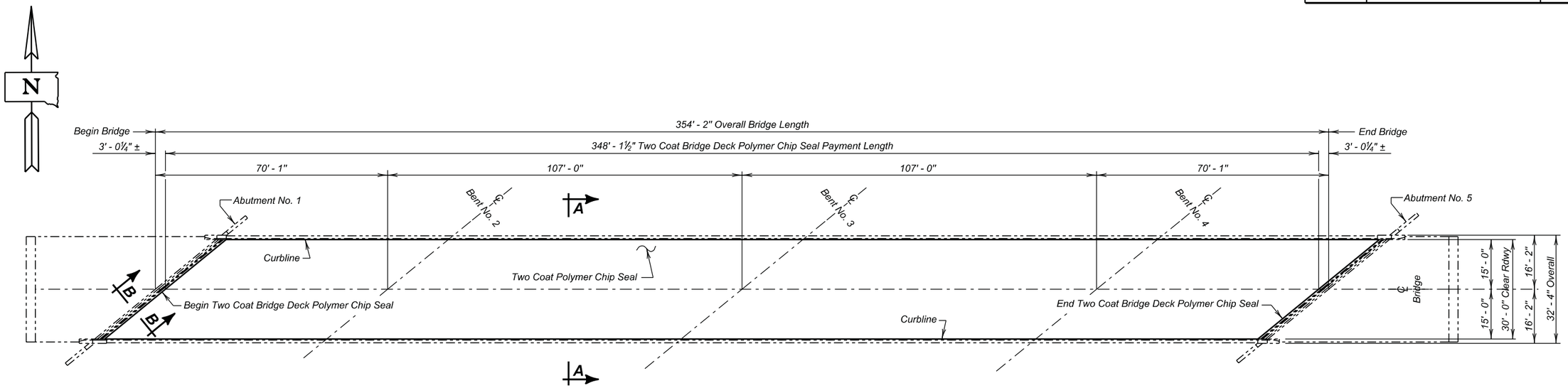
354' - 2" CONTINUOUS COMP. GIRDER BRIDGE

STR. NO. 52-467-276

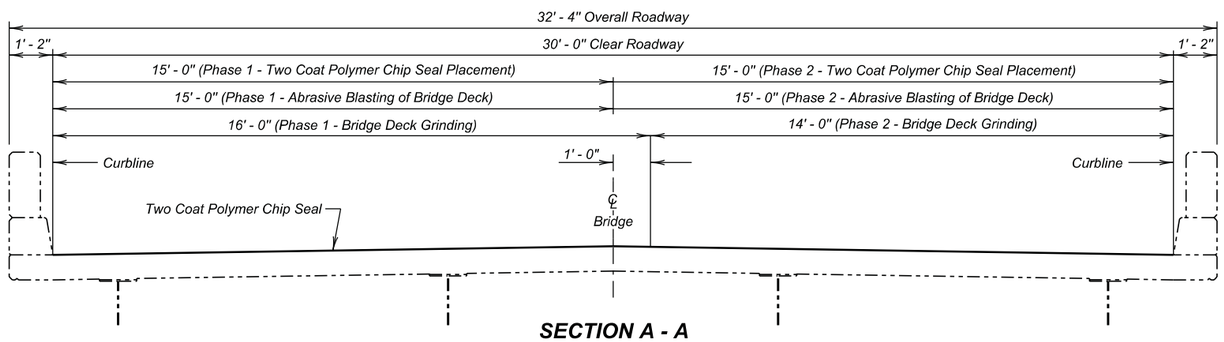
SEPTEMBER 2015

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	BWS	Kevin N. Boeden
PENN035J	035JRD02		BRIDGE ENGINEER

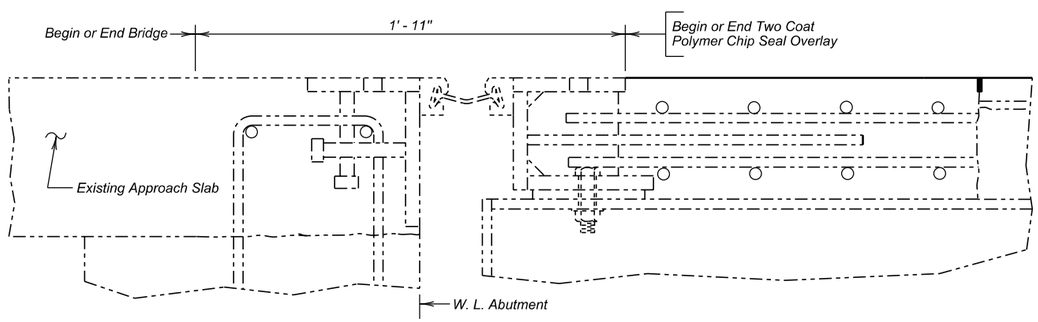
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E17	E50



PLAN



SECTION A - A



SECTION B - B

ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY PHASE 1	QUANTITY PHASE 2
*	Concrete Patching Material, Bridge Deck	Cu. Ft.	52.8	46.2
	Two Coat Bridge Deck Polymer Chip Seal	Sq. Yd.	580.2	580.2
	Abrasive Blasting of Bridge Deck	Sq. Yd.	580.2	580.2
	Bridge Deck Grinding	Sq. Yd.	618.9	541.5
*	Concrete Removal, Class A	Sq. Yd.	8.5	7.5
*	Concrete Removal, Class B	Sq. Yd.	8.5	7.5

* Concrete Patching Material, Bridge Deck; Concrete Removal, Class A; and Concrete Removal, Class B may not be encountered and may be removed from the project at the direction of the Engineer.

TWO COAT BRIDGE DECK POLYMER CHIP SEAL LAYOUT

FOR

354' - 2" CONTINUOUS COMP. GIRDER BRIDGE

30' - 0" ROADWAY — 50°43' SKEW L.H.F.

OVER INTERSTATE 90 — SEC. 23 - T2N - R8E

STR. NO. 52-467-276 — IM 0901(175)58

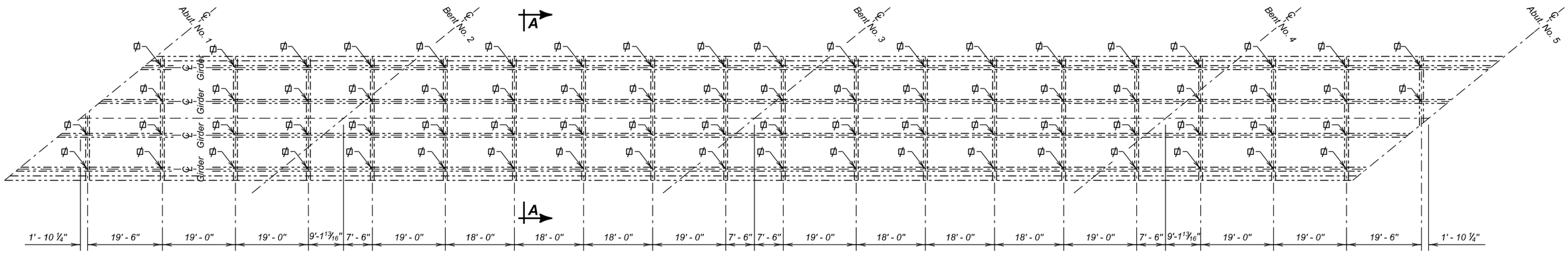
PENNINGTON COUNTY

S. D. DEPT. OF TRANSPORTATION

SEPTEMBER 2015

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	KR	Kevin N. Goeden BRIDGE ENGINEER
PENN035J	035JRD04		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E18	E50



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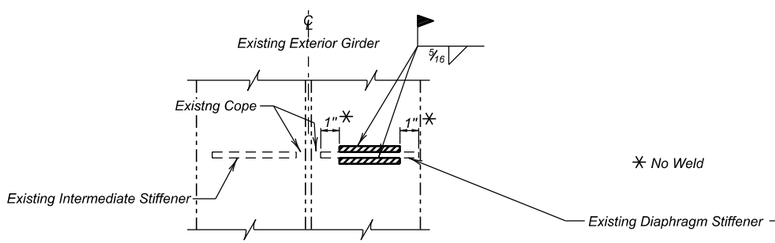
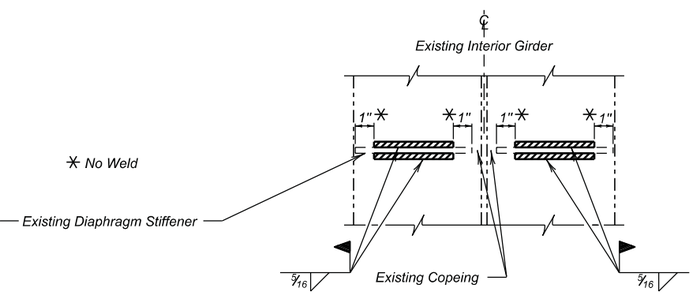


SECTION C - C

(One typical unit of Fatigue Retrofit is shown)



SECTION E - E

(Two typical units of Fatigue Retrofit shown)

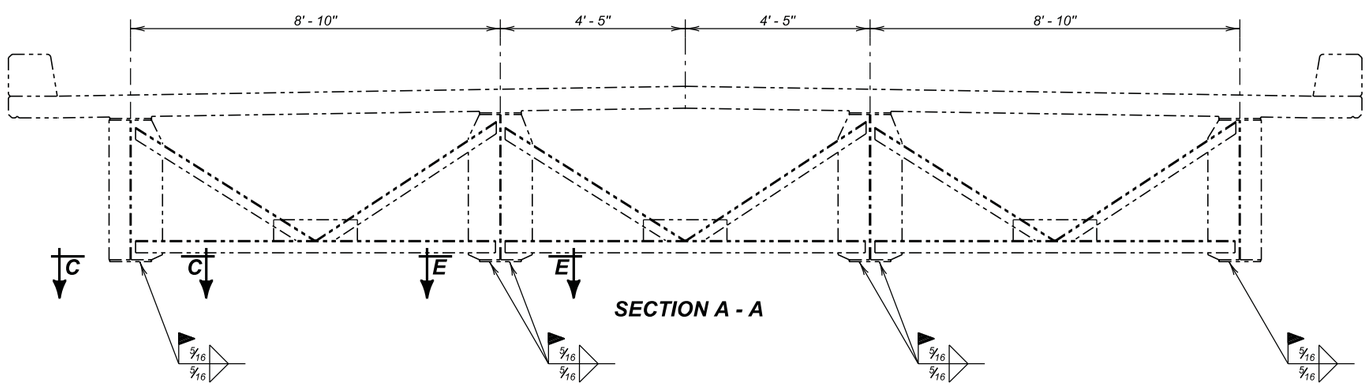
NOTE:

Type "C" Fatigue Retrofit Locations

The final result is to ensure that both the top and bottom of the existing diaphragm stiffeners are welded to the existing flanges.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Fatigue Retrofit Steel Girder, Type C	Each	114
Magnetic Particle Weld Inspection	Inch	438
Bridge Repainting, Class I	LS	Lump Sum
Paint Residue Containment	LS	Lump Sum



SECTION A - A

TYPE "C" FATIGUE RETROFIT DETAILS

FOR

354' - 2" CONTINUOUS COMP. GIRDER BRIDGE

30' - 0" ROADWAY — 50° 43' SKEW L.H.F.

OVER INTERSTATE 90 — SEC. 23 - T2N - R8E

STR. NO. 52-467-276 — IM 0901(175)58

PENNINGTON COUNTY

S. D. DEPT. OF TRANSPORTATION

SEPTEMBER 2015

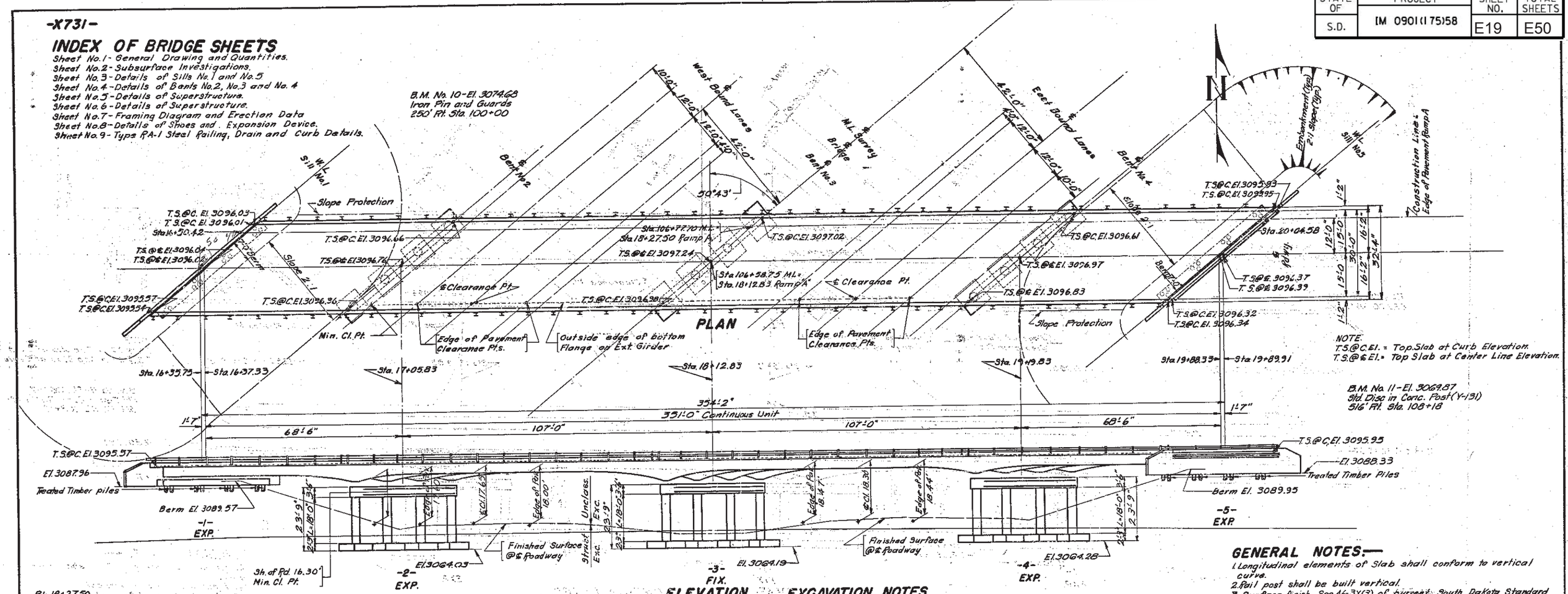
DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	KR	Kevin N. Goeden
PENN035J	035JRD05		BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E19	E50

-X731-

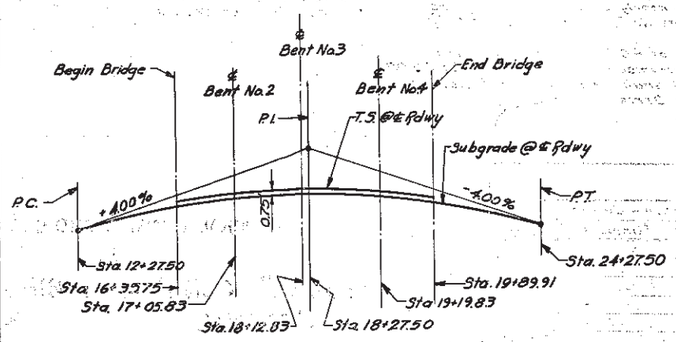
INDEX OF BRIDGE SHEETS

Sheet No. 1 - General Drawing and Quantities.
Sheet No. 2 - Subsurface Investigations.
Sheet No. 3 - Details of Sills No. 1 and No. 5
Sheet No. 4 - Details of Bents No. 2, No. 3 and No. 4
Sheet No. 5 - Details of Superstructure.
Sheet No. 6 - Details of Superstructure.
Sheet No. 7 - Framing Diagram and Erection Data
Sheet No. 8 - Details of Shoes and Expansion Device.
Sheet No. 9 - Type RA-1 Steel Railing, Drain and Curb Details.



ELEVATION

P.I. 18+27.50
EL. 3108.50 @℄ Rdwy.
V.C. 1200



SUBGRADE CURVE DATA

EXCAVATION NOTES—

1. Footings for Bents No. 2, 3, and 4 shall be cast against solid undisturbed firm clay and carried into same approximately depth of footings. Limits of firm clay excavation for these footings shall be bound as nearly as practicable by the neat lines as shown in details of footing for Bents No. 2, 3, and 4 on Sheet No. 4 of 9
2. Firm clay shall develop a minimum bearing value of 4.0 tons per sq. ft. If the bearing value is less than 4.0 tons per sq. ft. communicate with the BRIDGE DIVISION.
3. Final footing elevations for Bents No. 2, 3, and 4 shall be established before ordering Column reinforcing steel for the respective Bents.

GENERAL NOTES:—

1. Longitudinal elements of Slab shall conform to vertical curve.
2. Rail post shall be built vertical.
3. Surface finish, Sec. 46:3X(3) of current South Dakota Standard Specifications shall also include such portions of the Structure which are visible from any traveled lane.
4. Omit all floor drains.

ESTIMATED QUANTITIES

ITEM	Number Feet Piles	Pile Footings	Class A Concrete Cu. Yds.	Steel - Lbs. Reinf.	Steel - Lbs. Struct.	Type A Steel Railing Lin. Ft.	Treated Timber Piles ϕ Lin. Ft.	Excavation - Cu. Yds. Struct.	Excavation - Cu. Yds. Unclass. ▲	Slope Protection ★ Sq. Yd.
Superstructure			244.96	78,805	22,845	710.4				
Sill No. 1	57	25	37.4	3,905	1,395		12 x 25 x 300	25	23.87	102.49
Bent No. 2			69.3	10,310				125	106.65	
Bent No. 3			70.8	16,940				145	109.23	
Bent No. 4			68.3	10,310				120	104.63	
Sill No. 5	327	47	37.3	3,905	1,395		12 x 25 x 300	25	23.87	340.00
		2			23,994				38.19	
		45			23,994				38.19	
Totals			527.7	124,270	23,994	710.4	ϕ 600	415	544.63	★ 442.69

ϕ One Treated Timber Test Pile shall be driven at Sills No. 1 and No. 5 before remaining piles are ordered.
▲ See Grading Plans for Unclassified Excavation.
PILE NOTE. Piles driven at Sills No. 1 and No. 5, including test piles, shall obtain their full bearing (20 Tons) in the natural ground below the new embankment, elevations 3069.5 and 3069 respectively. Prebored holes thru the fill to natural ground are required, and shall be a minimum diameter 2" Larger than the nominal diameter (3 ft. from butt) of the pile.
★ See Grading Plans for Slope Protection.

SPECIFICATION NOTES—

Use current South Dakota Standard Specifications for Roads and Bridges, and Supplemental Specifications as included in the proposal.

ORIGINAL CONSTRUCTION PLANS

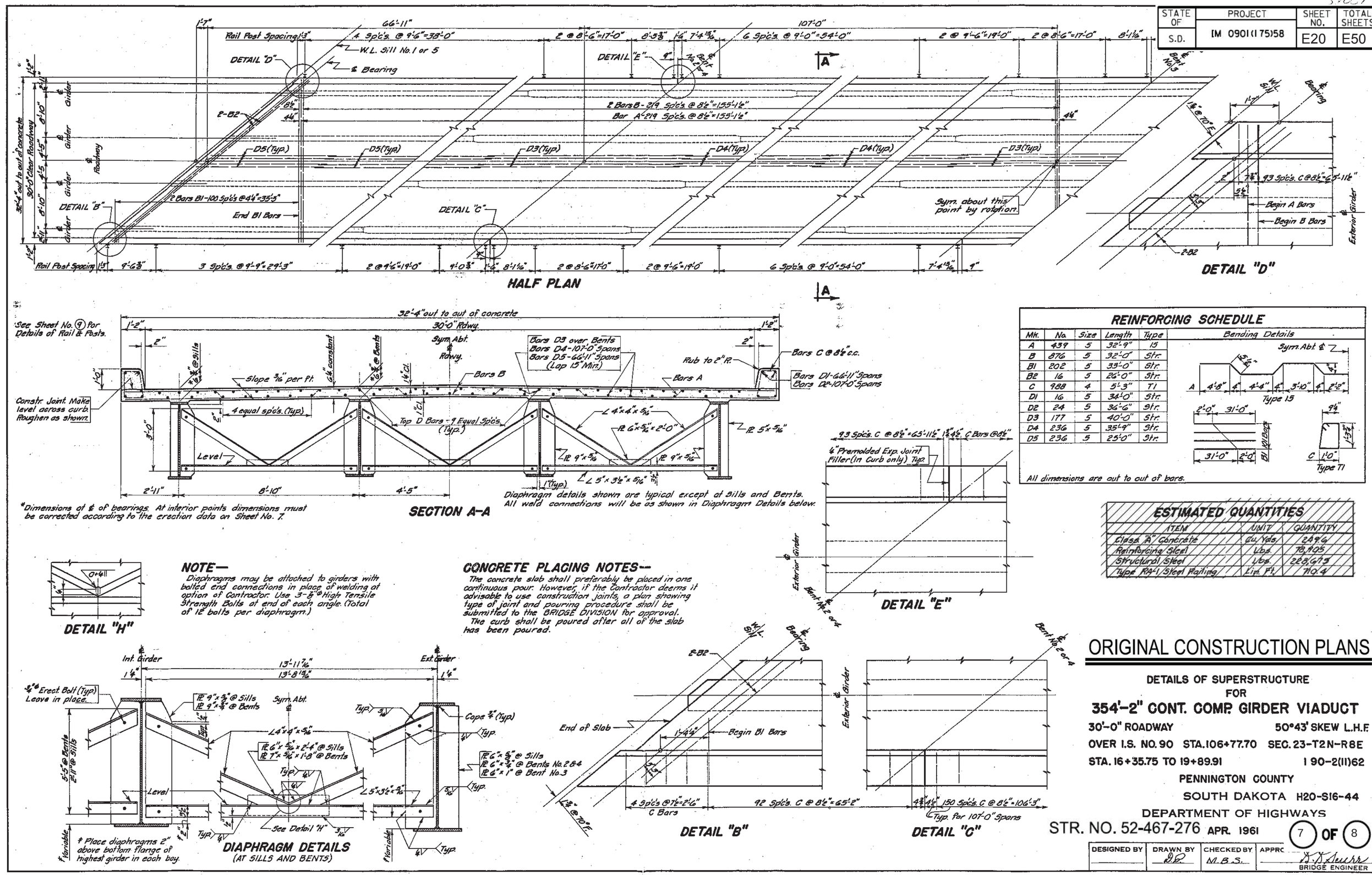
GENERAL DRAWING AND QUANTITIES
FOR
354'-2" CONT. COMP. GIRDER VIADUCT
30'-0" ROADWAY — 50°43' SKEW L.H.F.
OVER I.S. NO. 90 STA. 106+77.70 — SEC. 23 -T2N-R8E
STA. 16+35.75 TO STA. 19+89.91 — I 90-2(11)62
PENNINGTON COUNTY
STR. NO. 52-467-276 SOUTH DAKOTA — H20-S16-44
DEPARTMENT OF HIGHWAYS
MAR. 1961 — 6 OF 8

-X731-

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	M.V.W.	M.B.S.	BRIDGE ENGINEER

52-467-276

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E20	E50



NOTE—

Diaphragms may be attached to girders with bolted end connections in place of welding at option of Contractor. Use 3-⅝" @ High Tensile Strength Bolts at end of each angle. (Total of 12 bolts per diaphragm.)

CONCRETE PLACING NOTES—

The concrete slab shall preferably be placed in one continuous pour. However, if the Contractor deems it advisable to use construction joints, a plan showing type of joint and pouring procedure shall be submitted to the BRIDGE DIVISION for approval.

The curb shall be poured after all of the slab has been poured.

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type
A	439	5	32'-9"	15
B	876	5	32'-0"	Str.
B1	202	5	33'-0"	Str.
B2	16	5	26'-0"	Str.
C	988	4	5'-3"	T1
D1	16	5	34'-0"	Str.
D2	24	5	36'-6"	Str.
D3	177	5	40'-0"	Str.
D4	236	5	35'-9"	Str.
D5	236	5	25'-0"	Str.

Bending Details

All dimensions are out to out of bars.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Class "A" Concrete	Cu. Yds.	249.6
Reinforcing Steel	Lbs.	78,905
Structural Steel	Lbs.	223,673
Type RA-1 Steel Railing	Lin. Ft.	710.4

ORIGINAL CONSTRUCTION PLANS

DETAILS OF SUPERSTRUCTURE
FOR
354'-2" CONT. COMP. GIRDER VIADUCT

30'-0" ROADWAY — 50°43' SKEW L.H.F.
OVER I.S. NO. 90 STA. 106+77.70 SEC. 23-T2N-R8E
STA. 16+35.75 TO 19+89.91 I 90-2(11)62
PENNINGTON COUNTY
SOUTH DAKOTA H20-S16-44
DEPARTMENT OF HIGHWAYS

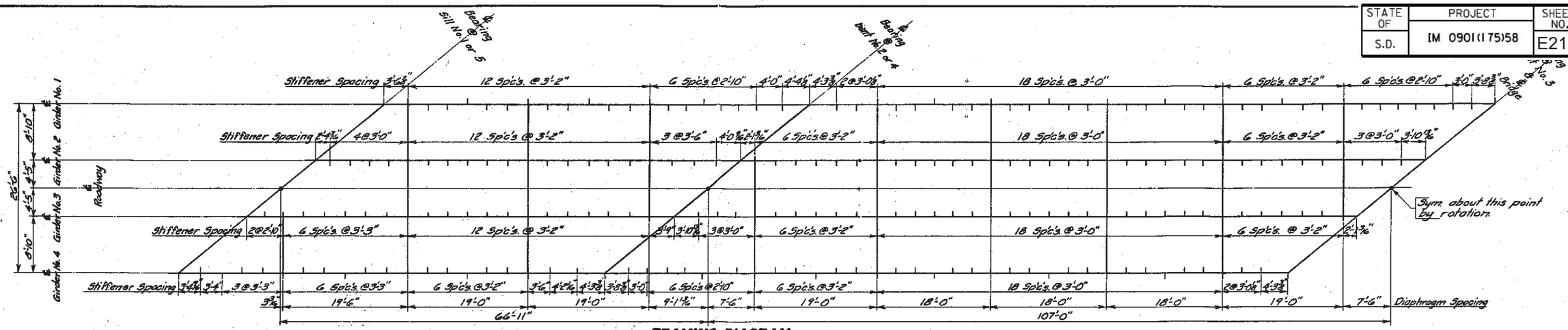
STR. NO. 52-467-276 APR. 1961

7 OF 8

DESIGNED BY	DRAWN BY	CHECKED BY	APPRO
	D.R.	M.B.S.	

BRIDGE ENGINEER

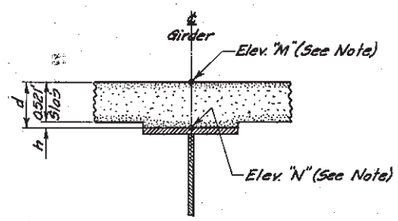
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E21	E50



FRAMING DIAGRAM

TABLE OF SLAB FORM ELEVATIONS AND COMPUTATIONS

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Girder No.1	Elev. M	3096.053	3096.243	3096.400	3096.530	3096.673	3096.868	3097.016	3097.038	3097.043	3097.032	3097.005	3096.852	3096.651	3096.505	3096.371	3096.211	3096.017
	(-) Elev. N																	
	(=) d																	
	(-) 0.521																	
	(=) h																	
Girder No.2	Elev. M	3096.063	3096.265	3096.434	3096.576	3096.730	3096.945	3097.112	3097.153	3097.178	3097.187	3097.178	3097.044	3096.863	3096.729	3096.608	3096.460	3096.278
	(-) Elev. N																	
	(=) d																	
	(-) 0.521																	
	(=) h																	
Girder No.3	Elev. M	3095.927	3096.142	3096.322	3096.476	3096.643	3096.877	3097.063	3097.124	3097.168	3097.195	3097.206	3097.092	3096.929	3096.807	3096.698	3096.562	3096.392
	(-) Elev. N																	
	(=) d																	
	(-) 0.521																	
	(=) h																	
Girder No.4	Elev. M	3095.645	3095.872	3096.065	3096.231	3096.410	3096.663	3096.869	3096.948	3097.012	3097.058	3097.089	3096.993	3096.850	3096.740	3096.643	3096.519	3096.361
	(-) Elev. N																	
	(=) d																	
	(-) 0.521																	
	(=) h																	



NOTE—

This table contains the necessary information to determine the depth of concrete, in feet, over the girders at the points shown. All calculations can be carried in the spaces provided. Elevation "M" is the elevation of the top of slab form before any concrete has been poured. This elevation includes correction for vertical curve and deflection due to D.L. above girders. Elevation "N" is the field measured elevation taken on top of girders at the points shown. This elevation must be taken after girder erection is completed, but prior to placing any of the concrete. Girders shall not be supported by construction shoring while elevations are taken.

SUPERSTRUCTURE NOTES—

Structural members which are to be welded shall conform to A.S.T.M. A373 (current) steel.

Steel produced under other specifications but shown to possess the physical and chemical properties of A373 (current) steel will be accepted for use where the latter is specified.

Steel for pins shall conform to structural steel A.S.T.M. A235 (current) or equivalent.

Cost of welding shall be included in the unit price bid for structural steel.

All exposed steel surfaces shall be painted with one shop coat of Red Lead paint and two field coats of Aluminum or other approved paint.

All exposed concrete edges shall be chamfered 1" unless otherwise noted.

Cost of canvas and red lead shall be included in the unit price bid for Class "A" Concrete.

All expansion rockers shall be positioned to set vertical at 70°F.

Longitudinal elements of the slab shall conform to the vertical curve.

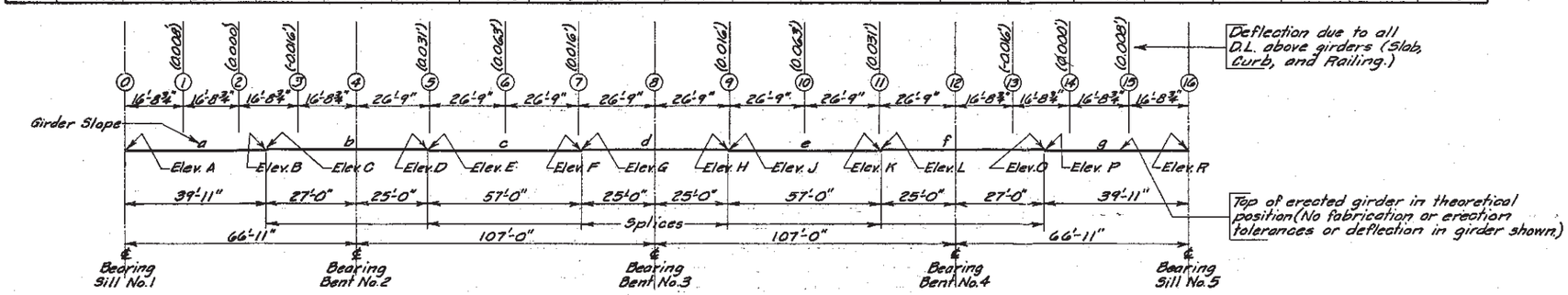
Unit Stresses: Concrete - f_c = 1600 p.s.i.; Re-Steel - f_s = 20000 p.s.i.

Design Loading: H20-S16-44 (1957) A.A.S.H.O.

All reinforcing steel bars shall conform to ASTM Specifications A305 (T-Current) and A15 (T-Current) Intermediate Grade.

ERECTION ELEVATIONS AND GIRDER SLOPES

Girder No.	Elevations (Top of Girder) A	B	C	D	E	F	G	H	J	K	L	O	P	R	Slopes % a	b	c	d	e	f	g
1	3095.490	3095.887	3095.918	3096.288	3096.256	3096.447	3096.483	3096.478	3096.442	3096.240	3096.271	3095.891	3095.860	3095.455	+0.9943	+0.7098	+0.3344	-0.0102	-0.3546	-0.7302	-1.0144
2	3095.500	3095.926	3095.957	3096.363	3096.332	3096.564	3096.600	3096.631	3096.595	3096.433	3096.465	3096.123	3096.091	3095.715	+1.0660	+0.7819	+0.4065	+0.0618	-0.2830	-0.6581	-0.9425
3	3095.364	3095.819	3095.850	3096.294	3096.263	3096.535	3096.572	3096.639	3096.602	3096.482	3096.513	3096.209	3096.177	3095.830	+1.1386	+0.8535	+0.4786	+0.1338	-0.2107	-0.5862	-0.8706
4	3095.083	3095.566	3095.597	3096.079	3096.047	3096.361	3096.398	3096.501	3096.464	3096.385	3096.416	3096.149	3096.118	3095.799	+1.2100	+0.9258	+0.5504	+0.2058	-0.1388	-0.5142	-0.7987



ERECTION ELEVATIONS DIAGRAM

ORIGINAL CONSTRUCTION PLANS

FRAMING DIAGRAM AND ERECTION DATA
FOR

354'-2" CONT. COMP. GIRDER VIADUCT

30'-0" ROADWAY — 50°43' SKEW L.H.F.
OVER I.S. NO. 90 STA. 106+77.70 — SEC. 23-T2N-R8E
STA. 16+35.75 TO 19+89.91 — I 90-2(11)62

PENNINGTON COUNTY
SOUTH DAKOTA H20-S16-44
DEPARTMENT OF HIGHWAYS

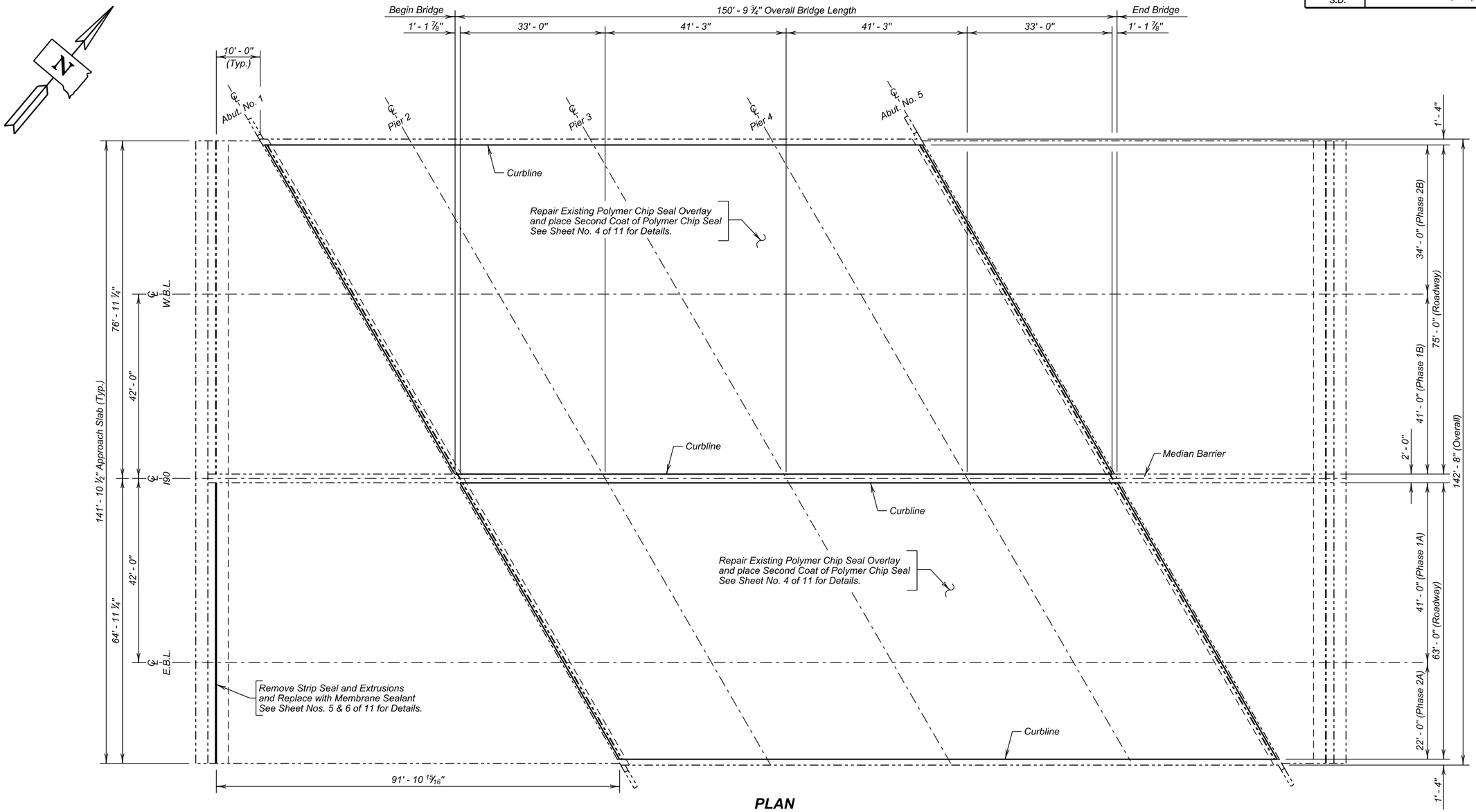
STR. NO. 52-467-276 APR. 1961

8 OF 8

DESIGNED BY	DRAWN BY	CHECKED BY	APPRO
	D.R.	M.B.S.	

BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E22	E50



PLAN

-X021-
INDEX OF BRIDGE SHEETS -

Sheet No. 1 - Layout for Upgrading
Sheet No. 2 - Estimate of Structure Quantities and Notes
Sheet No. 3 - Notes (Continued)
Sheet No. 4 - Polymer Chip Seal Overlay
Sheet No. 5 - Details of Approach Slab Joint Replacement
Sheet No. 6 - Membrane Sealant Details
Sheet No. 7 thru 11 - Original Construction Plans

LAYOUT FOR UPGRADING
FOR
150' - 9 ¾" CONT. CONCRETE BRIDGE

1 - 75' - 0" & 1 - 63' - 0" — 30° R.H.F. SKEW
OVER BOX ELDER CREEK — SEC. 23-T2N-R8E
STR. NO. 52-463-280 — IM 0901(175)58
PCN 035J

PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2015

1 OF 11

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	KR	Kevin N. Goeden
PENN035J	035JRE01		BRIDGE ENGINEER

ESTIMATE OF STRUCTURE QUANTITIES

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
410E2600	Membrane Sealant Expansion Joint	65.2	Ft
460E0070	Class A45 Concrete, Bridge Repair	2.2	CuYd
460E0300	Breakout Structural Concrete	2.2	CuYd
480E0200	Epoxy Coated Reinforcing Steel	181	Lb
480E0504	No. 4 Rebar Splice	2	Each
480E0506	No. 6 Rebar Splice	1	Each
491E0025	Bridge Deck Polymer Chip Seal Place on Existing Chip Seal	2093.8	SqYd
491E0030	Spot Repair of Existing Bridge Deck Chip Seal	104.8	SqYd
491E0110	Abrasive Blasting of Bridge Deck	2093.8	SqYd

SPECIFICATIONS

1. Design Specifications: AASHTO Standard Specifications for Highway Bridges 17th Edition using Working Stress Design.

2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2015 Edition and Required Provisions, Supplemental Specifications and Special Provisions as included in the Proposal.

DETAILS AND DIMENSIONS OF EXISTING BRIDGE

All details and dimensions of the existing bridge, contained in these plans, are based on the original construction plans and shop plans. It is the Contractor's responsibility to inspect and verify the actual field conditions and any necessary as-built dimensions affecting the satisfactory completion of the work required for this project.

SCOPE OF BRIDGE WORK & SEQUENCE OF OPERATIONS

All work on this structure shall be accomplished with the traffic control shown elsewhere in the plans. Alternate sequence of operations may be submitted by the contractor for approval by the engineer a minimum of two weeks prior to the preconstruction meeting.

1. Prepare the surface of the existing Bridge Deck Polymer Chip Seal Overlay for a second coat of Polymer Chip Seal for the first phase of construction.

2. Apply the second coat of Bridge Deck Polymer Chip Seal for the first phase of construction.

3. Breakout the existing approach slab and sleeper slab to the limits shown in the plans for the first phase of construction.

4. Install new Membrane Sealant for the first phase of construction.

5. Switch traffic and repeat steps 1 through 4 for the second phase of construction.

GENERAL CONSTRUCTION – BRIDGE

1. All mild reinforcing steel shall conform to ASTM A615, Grade 60.

2. All exposed concrete corners and edges shall be chamfered 3/4" unless noted otherwise in the plans. Match existing chamfer if the existing chamfer differs.

3. Use 2" clear cover on all reinforcing steel except as shown otherwise.

4. Request for construction joints or resteel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

5. Surfaces of fresh concrete at construction joints shall be rough floated sufficiently to consolidate the surface. All construction joints shall be cleaned of surface laitance, curing compounds and other foreign materials prior to placing fresh concrete against the joint.

CONCRETE BREAKOUT

1. The existing approach slab and sleeper slab shall be broken out to the limits shown on the plans. Breakout limits shall be defined with a 3/4" deep sawcut (unless specified otherwise in these plans), where practical, as approved by the Engineer. Reinforcing steel that is exposed and is scheduled for use in the new construction shall be cleaned and straightened to the satisfaction of the Engineer. Care shall be taken not to damage the existing reinforcing steel that is to be reused in the new construction during concrete breakout. Any reinforcing steel that is damaged during concrete breakout shall be replaced or repaired, as approved by the Engineer, by the Contractor at no cost to the Department.

2. All broken out concrete, discarded reinforcing bars and expansion devices shall be disposed of by the Contractor. Any disposal of discarded material shall be in accordance with the Environmental Commitments.

3. The contract unit price per cubic yard for "Breakout Structural Concrete" shall include breaking out concrete, cleaning, straightening existing reinforcing steel, removal of the existing armored device in the approach slab, removal of the extrusion in the barrier by air carbon arc, and disposal of all broken out material.

4. The existing reinforcing steel in the approach slab and sleeper slab is epoxy coated. Reinforcing steel that is exposed and is scheduled for use in the new construction shall be cleaned of all adhering concrete and rust (if present) with a wire brush and straightened to the satisfaction of the Engineer. Any reinforcing steel that is damaged during concrete breakout shall be replaced or repaired, as approved by the Engineer, by the Contractor at no cost to the Department. After all concrete removal and rebar straightening, the Contractor shall visually inspect the epoxy coating on the salvaged reinforcing steel with the Engineer and repair all areas of damaged epoxy coating as approved by the Engineer. The damaged coating areas shall be repaired with a touch up coating material supplied by an epoxy coating manufacturer who supplies coating material for new epoxy coated reinforcing steel. This coating shall be inert in concrete and compatible with the existing coating on the reinforcing steel. The coating shall be allowed to cure for 24 hours or as per the manufacturer's recommendations, whichever is more stringent, before concrete can be placed. These bars shall be clean and free from all surface contaminants before coating. The cost of cleaning and placing the epoxy touch up coating to the existing reinforcing steel shall be incidental to the various bid items.

PLACING A NEW POLYMER CHIP SEAL ON AN EXISTING POLYMER CHIP SEAL

1. This work consists of the following:

   a. Spot repair of existing single layer polymer chip seal.

   b. Preparation of the existing bridge deck polymer chip seal surface.

   c. Furnishing and placing a new coat of polymer chip seal on the existing coat of Polymer chip seal.

2. The polymer chip seal shall be applied in accordance with Section 491 of the Construction Specifications. The polymer chip seal shall be a Type 1 material as described in the approved product list.

3. The entire bridge deck surface shall be given a light abrasive blasting to remove surface contaminants. Upon completion of the abrasive blasting, the entire bridge deck shall be blown clean with dry compressed air to remove all dust and debris. Cleaning by abrasive blasting and compressed air shall be done no more than 24 hours prior to the placement of the polymer chip seal. Abrasive blasting shall be accomplished in accordance with the construction specifications.

ESTIMATE OF STRUCTURE QUANTITIES AND NOTES
FOR
150' - 9¾" CONT. CONCRETE BRIDGE

STR. NO. 52-463-280
SEPTEMBER 2015

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	BWS	Kevin N. Goeden
PENN035J	035JRE02		BRIDGE ENGINEER

PLACING A NEW POLYMER CHIP SEAL ON AN EXISTING POLYMER CHIP SEAL (CONTINUED)

4. The epoxy paint traffic striping shall be completely removed, as approved by the engineer, prior to placement of the Polymer Chip Seal. All cost associated with the removal of the epoxy paint traffic striping shall be incidental to the contract unit price per square yard for Abrasive Blasting of Bridge Deck.

5. The existing polymer chip seal may have damaged areas and/or areas with no polymer chip seal that will need to be spot repaired. The spot repairs shall be accomplished after the cleaning of the entire deck surface described in note number 3. The Bridge Construction Engineer shall be notified at least 24 hours in advance of starting spot repairs to inspect the cleaned surface and to verify the number, size and location of the spot repairs.

6. The following procedure shall be used for preparation of spot repair areas:

   a. Remove the existing polymer chip seal (when present) in areas where more than 25% of the chip seal is missing as determined by the engineer. The removal of any existing Polymer chip seal shall be by bridge deck grinding until all of the Polymer is removed and only the concrete of the deck surface is visible in the removed area.

   b. Check the concrete in the repair area for any concrete delaminations. Delaminations shall be repaired as directed by the Bridge Construction Engineer.

   c. Clean and prepare the deck surface for the polymer chip seal patch by abrasive blasting. The abrasive blasting shall remove all surface laitance and shall expose the coarse aggregate to the satisfaction of the Engineer. After abrasive blasting, the spot repair area shall be blown clean with dry compressed air to remove all dust and debris. Abrasive blasting and cleaning shall be done no more than 24 hours prior to the placement of the polymer chip seal patch.

   d. Apply a new first coat of polymer chip seal to the spot repair areas. Spot repairs shall be allowed to cure for the amount of time as specified by the manufacturer prior to placement of the second coat polymer chip seal coat over the entire deck surface.

7. Spot repair of Existing Bridge Deck Chip Seal will be measured and paid for at the contract unit price per square yard. Payment will be full compensation for all labor, equipment, materials, and all incidental work required to remove existing polymer chip (when specified) and clean and prepare the surface accepting the new polymer.

8. Bridge Deck Polymer Chip Seal Placed on Existing Chip Seal will be paid for at the contract unit price per square yard. Payment will be full compensation for all labor, equipment, materials, and all incidental work required to furnish and install the Bridge Deck Polymer Chip Seal Placed on Existing Chip Seal including the removal and disposal of the excess cover aggregate.

AIR CARBON ARC PROCESS

1. The existing extrusions in the median barrier must be removed for installation of the new membrane sealant.

2. All cutting of existing extrusions called for by these plans shall be accomplished using the air carbon arc process unless noted otherwise by the plans.

3. Lay out all cut lines on the steel surfaces, using a marker visible during the cutting process, before any air carbon arc cutting begins.

4. Extreme care shall be exercised during the cutting process so that absolutely no damage (such as nicks, gouges, splattering) to the surrounding metal shall occur.

5. Grind all surfaces cut with the air carbon arc process to remove high carbon deposits, provide a smooth finish, and radius edges.

DESIGN MIX OF CONCRETE

1. Class A45 Concrete shall be used for the bid items Class A45 Concrete, Bridge Repair.

2. The Type of cement, concrete strength requirements, aggregate requirements, slump and air requirements for the contract item Class A45 Concrete, Bridge Repair, shall conform to the requirements of Section 460 of the Construction Specification.

NOTES (CONTINUED)

FOR

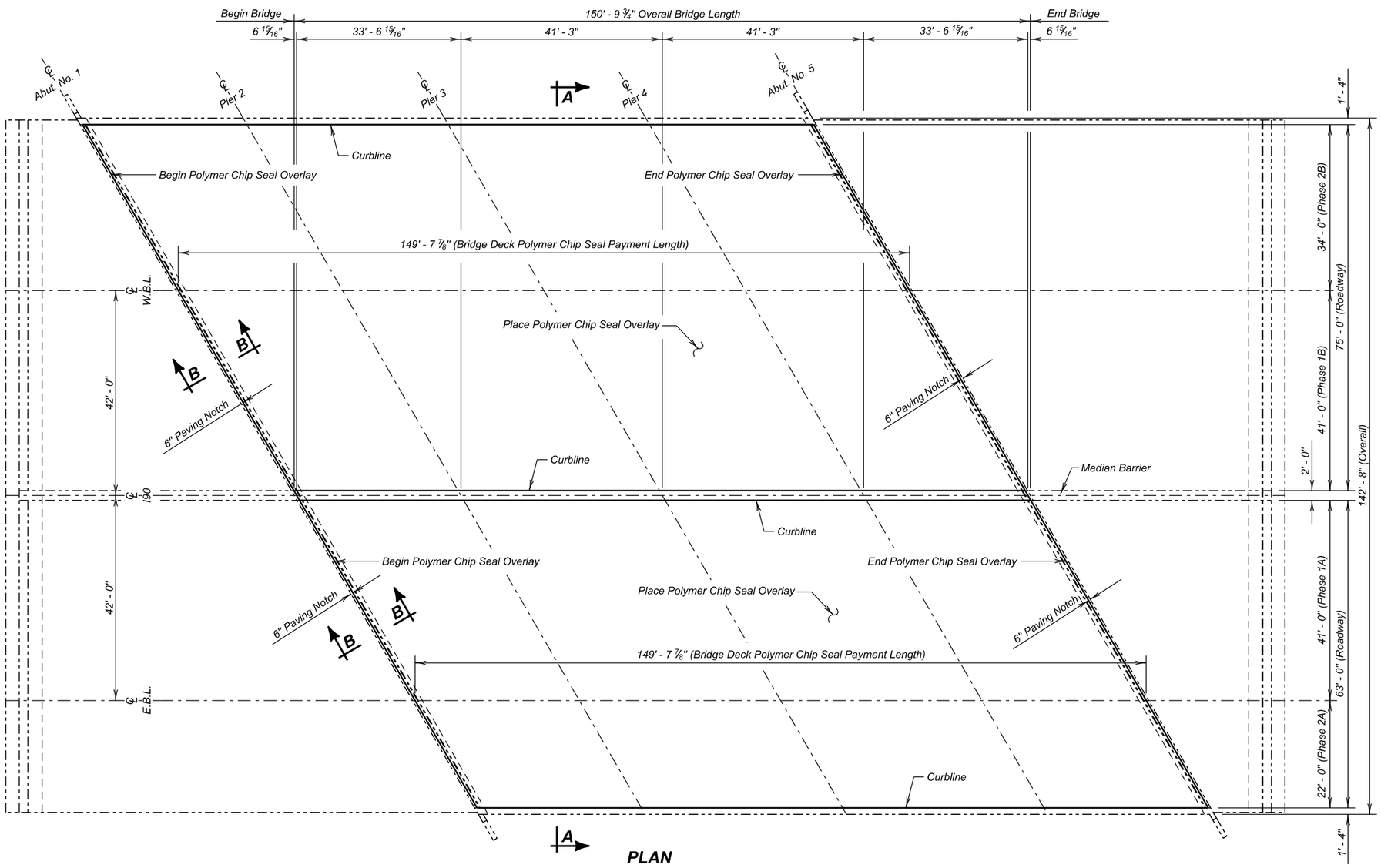
150' - 9¾" CONT. CONCRETE BRIDGE

STR. NO. 52-463-280

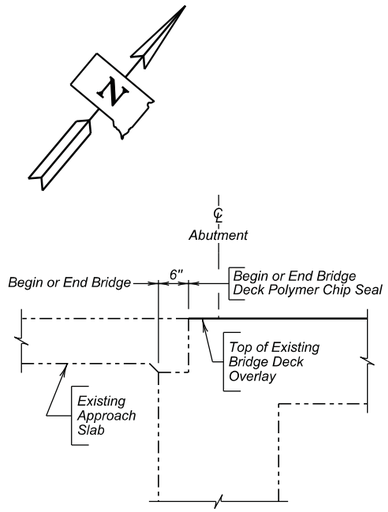
SEPTEMBER 2015

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	BWS	Kevin N. Goeden
PENN035J	035JRE03		BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E25	E50



PLAN



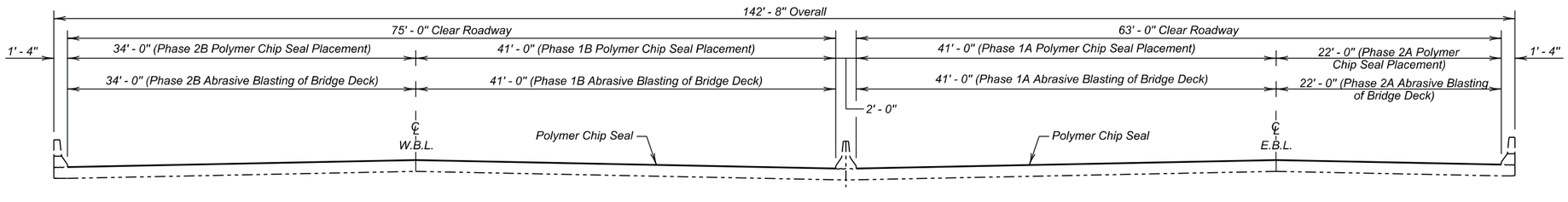
SECTION B - B

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY	
		Phase IA	Phase 2A
Bridge Deck Polymer Chip Seal Placed on Existing Chip Seal	Sq. Yd.	681.1	365.8
Abrasive Blasting of Bridge Deck	Sq. Yd.	681.8	365.8
Spot Repair of Existing Bridge Deck Chip Seal	Sq. Yd.	34.1	18.3

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY	
		Phase IB	Phase 2B
Bridge Deck Polymer Chip Seal Placed on Existing Chip Seal	Sq. Yd.	681.1	365.8
Abrasive Blasting of Bridge Deck	Sq. Yd.	681.8	365.8
Spot Repair of Existing Bridge Deck Chip Seal	Sq. Yd.	34.1	18.3



SECTION A - A

POLYMER CHIP SEAL OVERLAY
FOR
150' - 9 3/4" CONT. CONCRETE BRIDGE

1 - 75' - 0" & 1 - 63' - 0"
OVER BOX ELDER CREEK
STR. NO. 52-463-280

30° R.H.F. SKEW
SEC. 23-T2N-R8E
IM 0901(175)58

PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2015

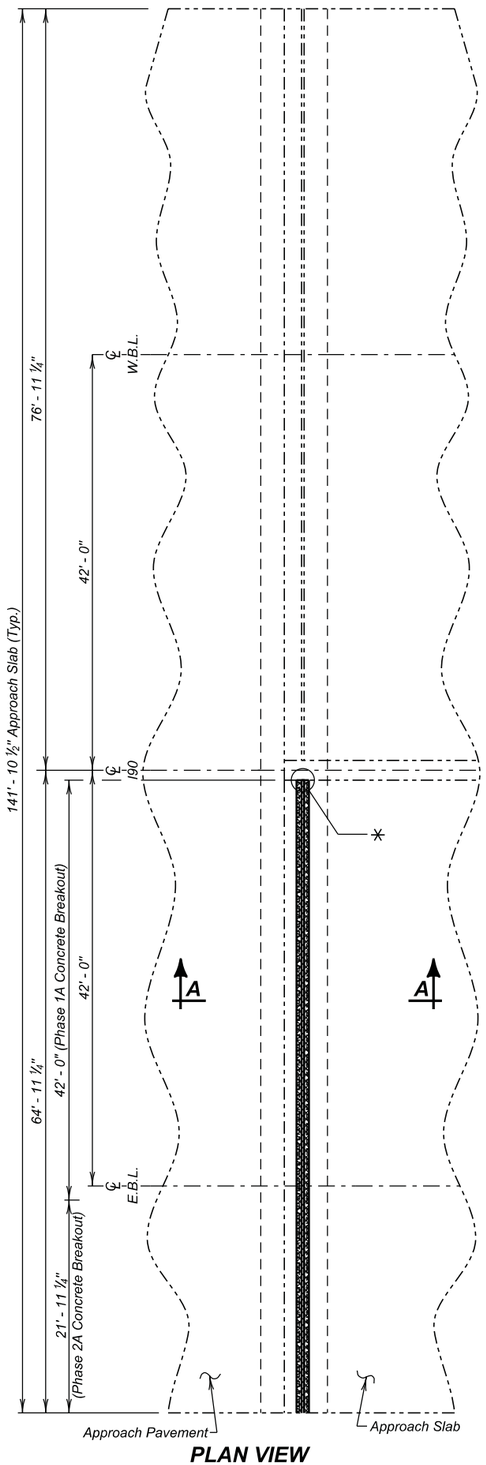
DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	KR	Kevin N. Boeden
PENN035J	035JRE04		BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E26	E50

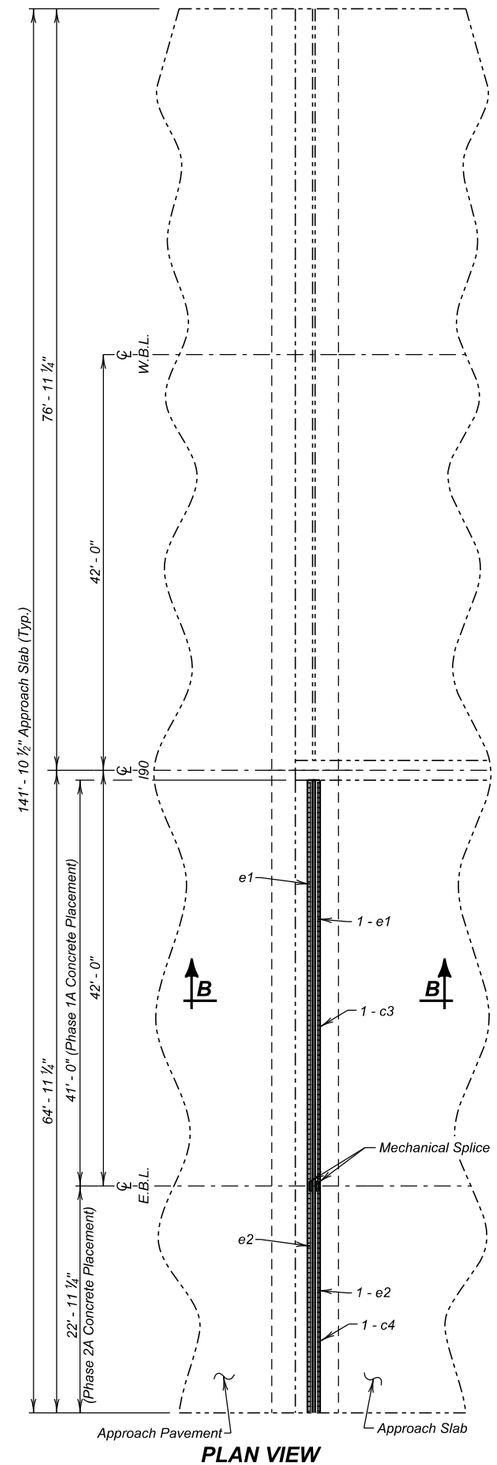
REINFORCING SCHEDULE
(for one approach slab)

Mk.	No.	Size	Length	Type	
e1	2	4	40' - 10"	Str.	Phase 1
e3	1	6	40' - 10"	Str.	
e2	3	4	22' - 9"	Str.	Phase 2
e4	1	6	22' - 9"	Str.	

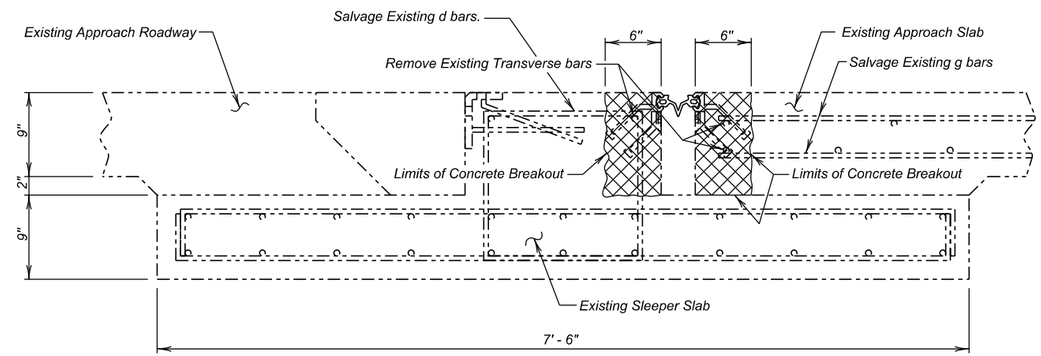
NOTES:
All dimensions are out to out of bars.



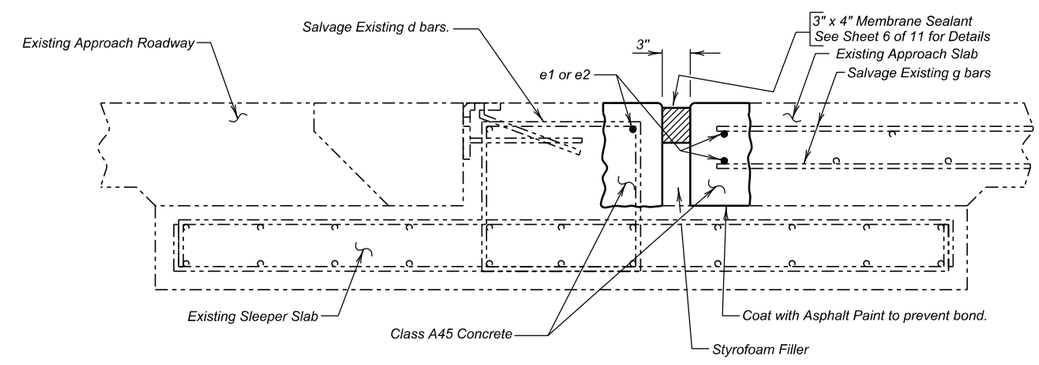
PLAN VIEW
(Showing Existing Joint)



PLAN VIEW
(Showing New Joint)



SECTION A - A
(Concrete Removal Shown)



SECTION B - B
(Joint Reconstruction Shown)

ESTIMATED QUANTITIES

ITEM	UNIT	Phase 1A	Phase 2A
Breakout Structural Concrete	Cu. Yd.	1.4	0.8
Class A45 Concrete Bridge Repair	Cu. Yd.	1.4	0.8
Epoxy Coated Reinforcing Steel	Lb.	116	65
No. 4 Rebar Splice	Each	2	-
No. 6 Rebar Splice	Each	1	-

Limits of Concrete Breakout

✳ Temporarily remove sliding plates for installation of the new membrane sealant. Remove existing extrusions in median barrier. See Air Carbon Arc Process Notes.

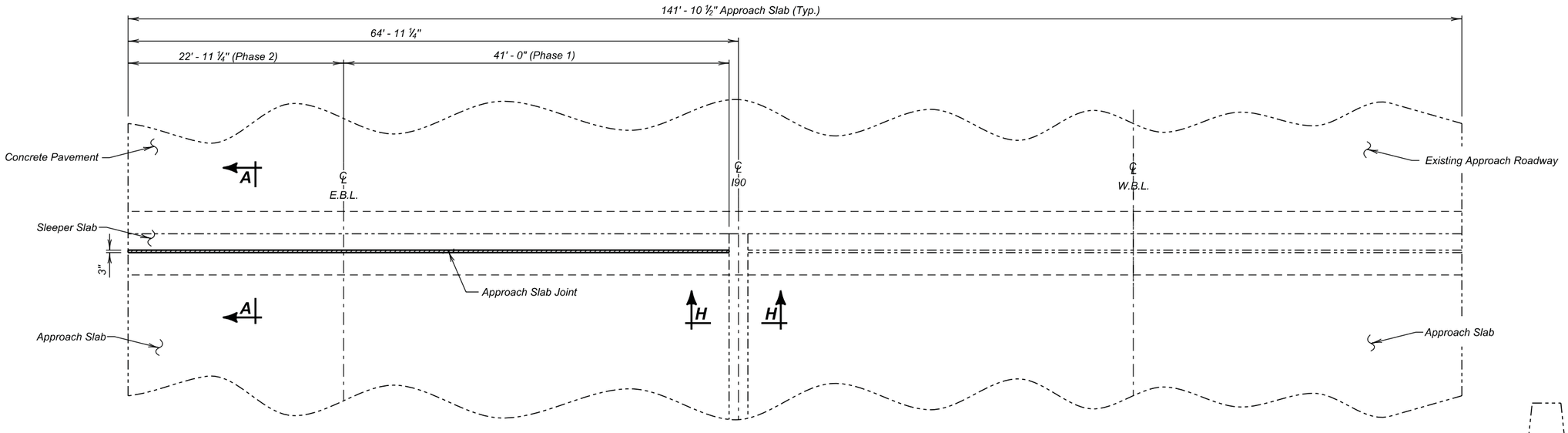
(WEST APPROACH SLAB JOINT)
DETAILS OF APPROACH SLAB JOINT REPLACEMENT
FOR
150' - 9 ¾" CONT. CONCRETE BRIDGE

1 - 75' - 0" & 1 - 63' - 0" — 30° R.H.F. SKEW
OVER BOX ELDER CREEK — SEC. 23-T2N-R8E
STR. NO. 52-463-280 — IM 0901(175)58

PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2015

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	KR	Kevin N. Boeden
PENN035J	035JRE05		BRIDGE ENGINEER

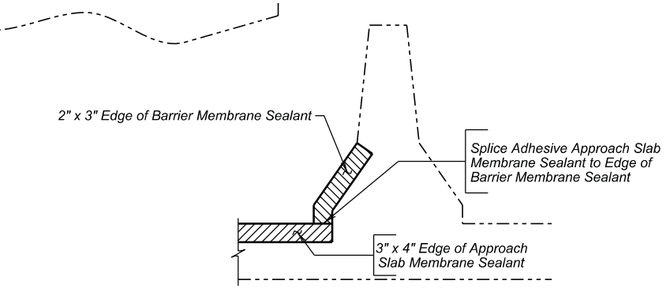
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E27	E50



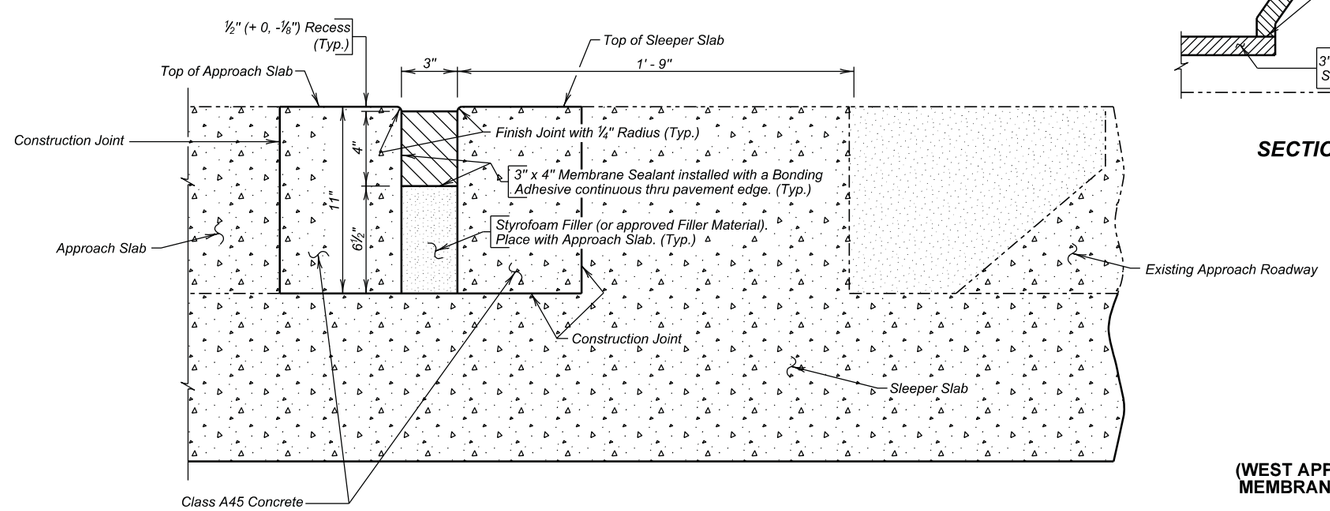
PLAN

GENERAL NOTES

1. The Membrane Sealant shall be on the approved product list for Membrane Sealant Expansion Joints.
2. The manufacturer shall supply the membrane sealant in packaging that precompresses the membrane sealant. The precompressed dimension shall be as recommended by the sealant manufacturer, however, in no case shall the precompressed dimension exceed 75% of the joint opening width. The foam sealant shall be slowly self expanding to permit workers ample time to install the membrane sealant before the membrane sealant exceeds the joint opening width.
3. The membrane sealant shall provide a water tight seal throughout a joint movement range of + 25% (minimum) from the specified joint opening dimension.
4. The membrane sealant shall be supplied in pieces a minimum of 5 feet in length. The foam sealant shall be ultra-violet and ozone resistant.
5. The bonding adhesive used to attach the membrane sealant to the adjacent concrete shall be approved by the membrane sealant manufacturer.
6. Adhesive used to join adjacent pieces of the membrane sealant shall be as recommended by the manufacturer.
7. If Styrofoam filler material is used in the construction, it shall be closed cell and water-tight as approved by the Engineer.
8. The minimum concrete air temperature at the time of joint installation and adhesive curing shall be 40° F.
9. A technical representative of the membrane sealant manufacturer shall be present at the jobsite during installation. The technical representative shall be knowledgeable in the correct procedures for the preparation and installation of the joint material to ensure the Contractor installs the joint to the Manufacturers recommendations.
10. Surfaces that will be in contact with the membrane sealant shall be thoroughly cleaned by abrasive blasting to remove all laitance and contaminants (such as oil, curing compounds, etc.) from the surface. At a minimum, two passes of abrasive blasting with the nozzle held at an angle to within 1 to 2 inches of the surface will be required. Cleaning of the surfaces with solvents, wire brushing, or grinding shall not be permitted.
11. After abrasive blasting, but immediately prior to membrane joint installation, the entire joint contact surface shall be air blasted. The air compressor used for joint cleaning shall be equipped with trap devices capable of providing moisture-free and oil-free air at a recommended pressure of 90 psi. To obtain complete bonding with the adhesive, the adjacent surfaces must be dry and clean. The contact surfaces for the joint shall be visually inspected by the Engineer immediately prior to joint installation to verify the surface is dry and clean.
12. Individual spliced sections shall be installed as per the manufacturers' recommendations. The membrane joint sealant manufacturer shall submit a detailed installation procedure to the Engineer at least 5 days prior to joint installation for his review.
13. Traffic shall not be allowed on the joint until the bonding adhesive has had time to cure, as recommended by the manufacturer.
14. Use plywood or other material to protect concrete adjacent to the joint from spalling before any equipment is moved across the joint. Any spall areas will be repaired at the Contractor's expense by breaking out and replacing adjacent concrete, as approved by the Engineer.
15. The Membrane Sealant Expansion Joint will be measured in feet to the nearest one-tenth foot, complete in place. Measurement will be made of the overall horizontal length. The Membrane Sealant Expansion Joint will be paid for at the contract unit price per foot complete in place. Payment for this item shall be full compensation for furnishing all the required materials in place, including labor, equipment and incidentals necessary to complete the work in accordance with the plans and the foregoing specifications.



SECTION H - H



SEC. A - A

ESTIMATED QUANTITIES
(For One Approach Slab)

ITEM	UNIT	Phase 1 A	Phase 2 A
Membrane Sealant Expansion Joint	Ft.	42.3	22.9

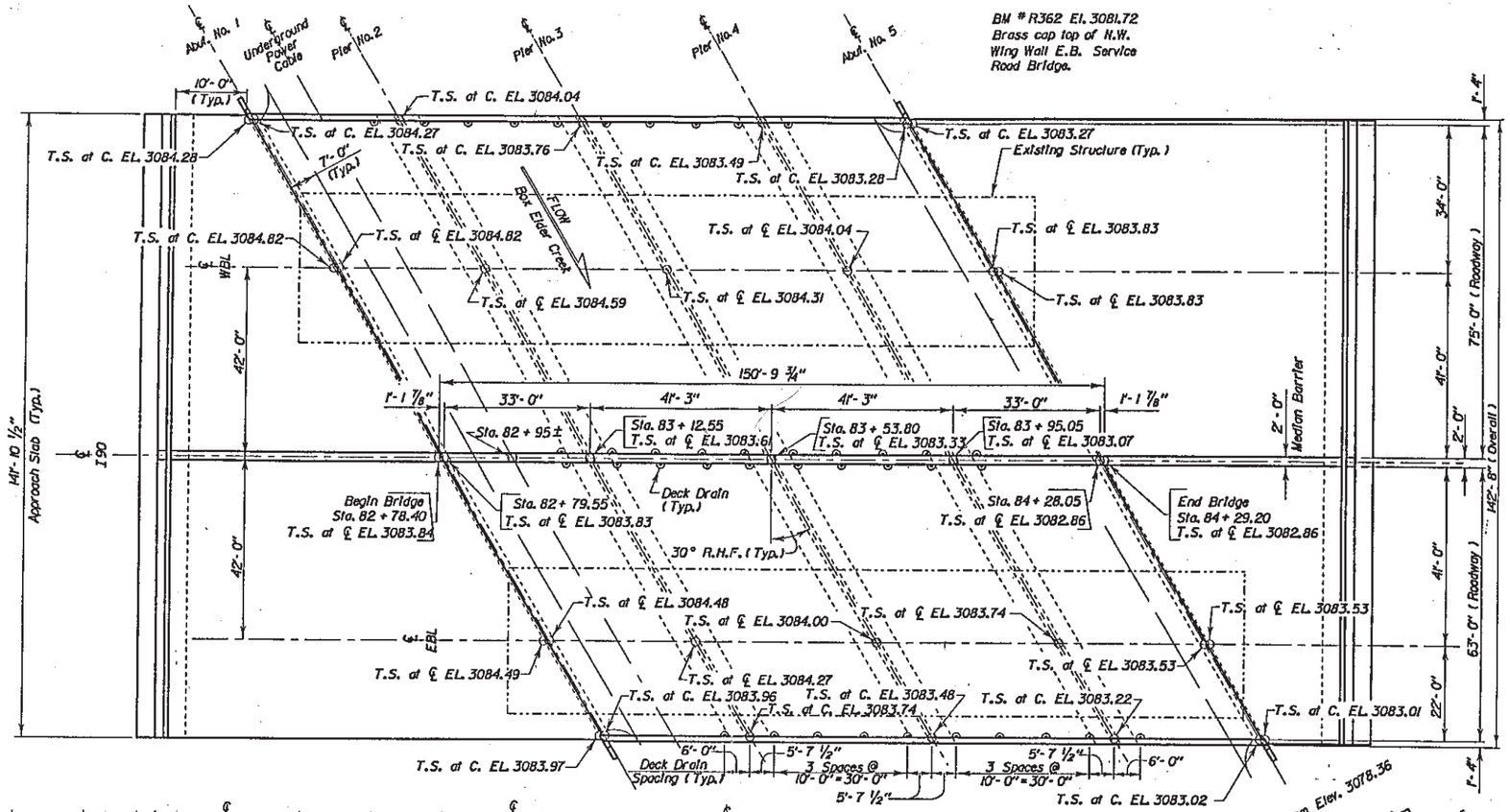
(WEST APPROACH SLAB JOINT)
MEMBRANE SEALANT DETAILS
FOR
150' - 9 ¾" CONT. CONCRETE BRIDGE

1 - 75' - 0" & 1 - 63' - 0" — 30° R.H.F. SKEW
OVER BOX ELDER CREEK — SEC. 23-T2N-R8E
STR. NO. 52-463-280 — IM 0901(175)58

PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2015

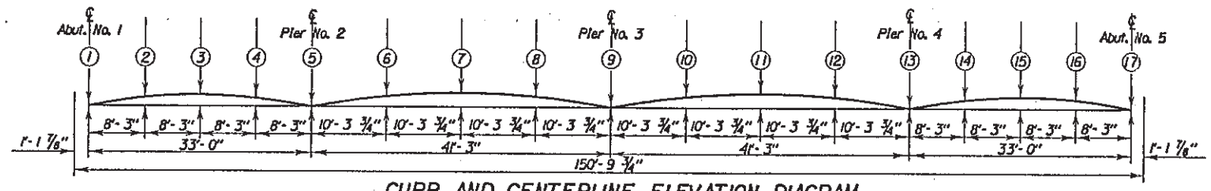
DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	KR	Kevin N. Goeden
PENN035J	035JRE06		BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E28	E50

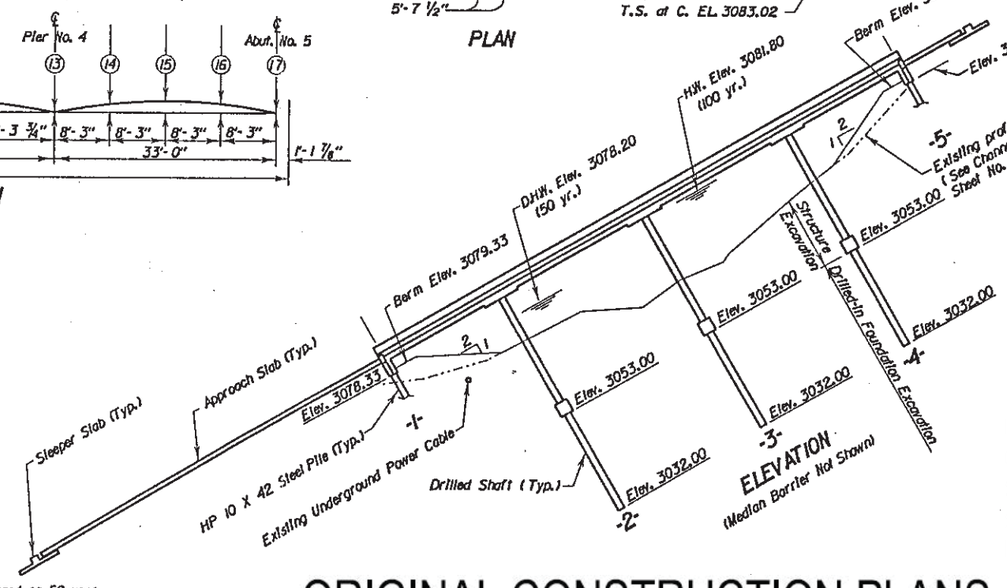


NOTE: T.S. at ℄ = Top of Slab at Center Line Elevation.
T.S. at C. = Top of Slab at Curb Elevation.

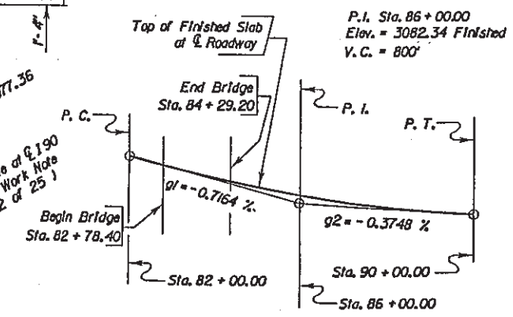
PLAN



CURB AND CENTERLINE ELEVATION DIAGRAM
(See TABLE OF SLAB ELEVATIONS for elevations)



ELEVATION
(Median Barrier Not Shown)



VERTICAL CURVE DATA

TABLE OF SLAB ELEVATIONS

Slab Point	Left Curb W.B.L.	Center Line W.B.L.	Right Curb W.B.L.	Left Curb E.B.L.	Center Line E.B.L.	Right Curb E.B.L.
1	3084.273	3084.816	3083.833	3083.825	3084.485	3083.960
2	3084.243	3084.787	3083.805	3083.797	3084.458	3083.933
3	3084.190	3084.734	3083.753	3083.745	3084.407	3083.883
4	3084.114	3084.659	3083.679	3083.671	3084.333	3083.809
5	3084.044	3084.590	3083.610	3083.603	3084.266	3083.742
6	3083.989	3084.536	3083.558	3083.550	3084.214	3083.691
7	3083.936	3084.484	3083.506	3083.499	3084.164	3083.642
8	3083.849	3084.398	3083.421	3083.414	3084.080	3083.559
9	3083.764	3084.313	3083.338	3083.331	3083.998	3083.477
10	3083.711	3084.261	3083.287	3083.280	3083.948	3083.428
11	3083.660	3084.211	3083.238	3083.230	3083.900	3083.380
12	3083.575	3084.127	3083.155	3083.147	3083.818	3083.298
13	3083.492	3084.044	3083.073	3083.066	3083.737	3083.219
14	3083.451	3084.004	3083.034	3083.027	3083.699	3083.181
15	3083.416	3083.971	3083.001	3082.994	3083.667	3083.149
16	3083.359	3083.914	3082.946	3082.939	3083.612	3083.095
17	3083.279	3083.834	3082.867	3082.859	3083.534	3083.017

Elevations listed above are top of finished slab at centerline or curbline as indicated. Camber for Dead Deflection Load Plus Plastic Flow, shown on sheet 13 of 25 of Bridge Plans have been included in the Elevations shown above.

HYDRAULIC DATA

Q_d	8280 c.f.s.
A_d	981 sq. ft.
V_d	8.4 f.p.s.
Q_F	8280 c.f.s.
Q_{100}	14690 c.f.s.

Q_d = Design discharge for the proposed bridge based on 50 year frequency. El. 3078.20

Q_F = Designated peak discharge for the basin approaching proposed project based on 50 year frequency.

Q_{100} = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 3081.80

ORIGINAL CONSTRUCTION PLANS

-X020-
INDEX OF BRIDGE SHEETS-

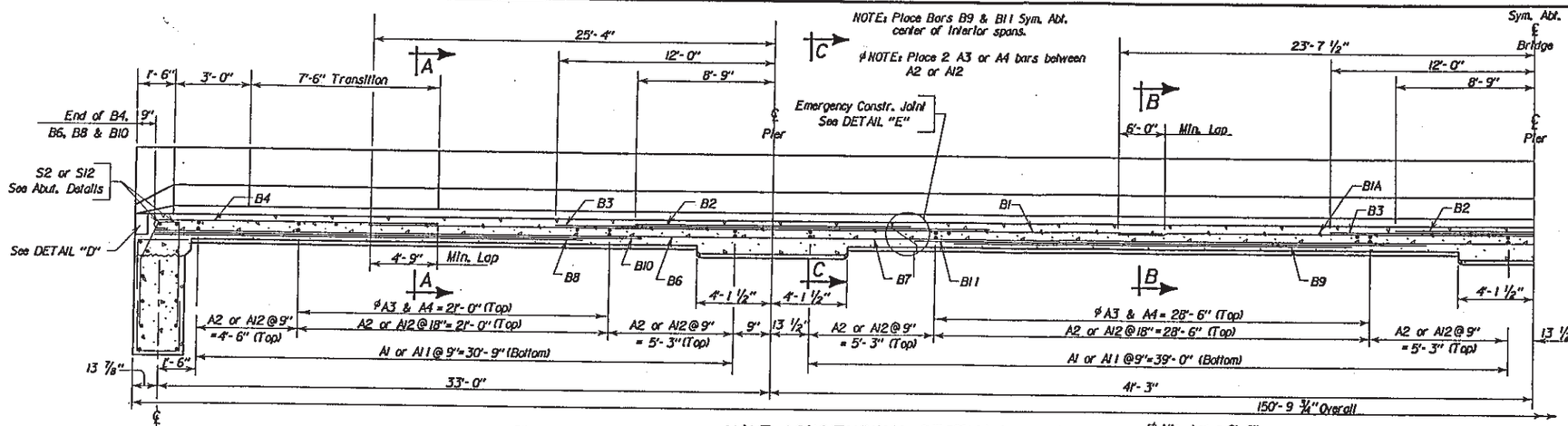
Sheet No. 1 - General Drawing
Sheet No. 2 - Estimate of Structure Quantities & Notes
Sheet No. 3 - Notes (Continued)
Sheet No. 4 - Phased Construction Details
Sheet No. 5 - Subsurface Investigation, Piling and Drilled Shaft Layout
Sheet No. 6 - Subsurface Investigation (Continued)
Sheet No. 7 - Subsurface Investigation (Continued)
Sheet No. 8 - Abutment No. 1 Details
Sheet No. 9 - Abutment No. 5 Details
Sheet No. 10 - Abutment Details (Continued)
Sheet No. 11 - Pier Details
Sheet No. 12 - Pier Details
Sheet No. 13 - Superstructure Details
Sheet No. 14 - End Block, Barrier Curb & Drain Details
Sheet No. 15 - Median Barrier Details
Sheet No. 16 - Details of Bridge End Backfill
Sheet No. 17 - Details of Approach Slab Adjacent to Bridge
Sheet No. 18 - Details of Approach Slab Adjacent to Bridge
Sheet No. 19 - Details of Approach Slab Median Barrier
Sheet No. 20 - Median Barrier Expansion Device Details
Sheet No. 21 - Median Barrier Expansion Device Details
Sheet No. 22 - Approach Slab Joint Details
Sheet No. 23 - Details of Standard Plate No. 308 & No. 302
Sheet No. 24 - Details of 5 - Bolt Insert Plate Assembly & 3 - Cable Guard Rail Connection
Sheet No. 25 - Details of Standard Plate No. 305

GENERAL DRAWING
FOR
150'-9 3/4" CONTINUOUS CONCRETE BR.
1-75'-0" & 1-63'-0" ROADWAY SEC. 23-T2N-R8E
OVER BOX ELDER CREEK 30° R. H. F. SKEW
STA. 82+78.40 TO STA. 84+29.20 IM90-2(77)63
STR. NO. 52-463-280 HS20-44
PCEMS NO. 2374 (& ALT.)
PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
- X020 - NOVEMBER 1992

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
SJ/KZ	TB	SJ/KZ	BRIDGE ENGINEER
PENN0525	0525B001		

PLANS BY: OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E29	E50

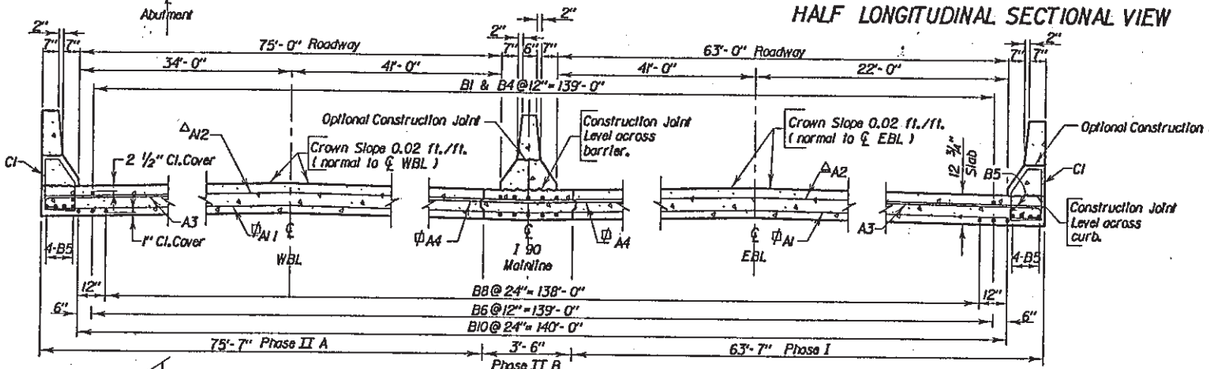


HALF LONGITUDINAL SECTIONAL VIEW

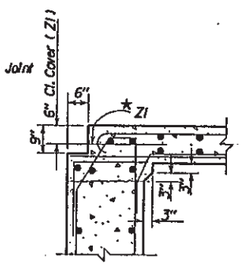
ϕ Min. Lap = 2'-6"
Δ Min. Lap = 2'-0"

NOTE: All Barrier Curb Details shown on sheet 14 of 25.

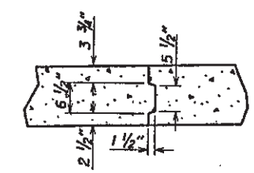
NOTE: Median Barrier Details shown on sheet 15 of 25.



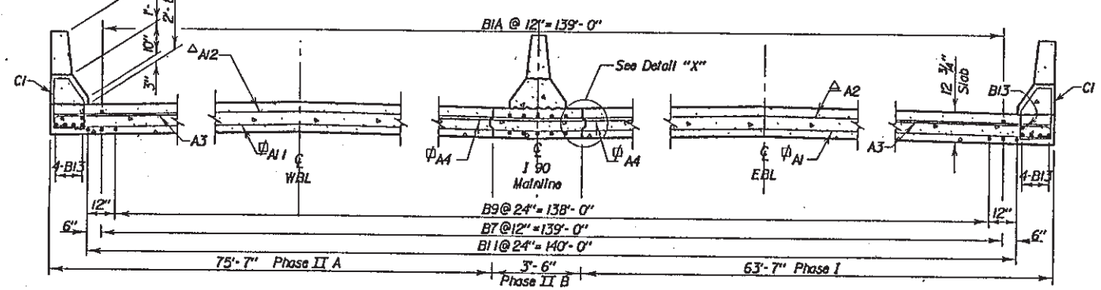
SEC. A-A



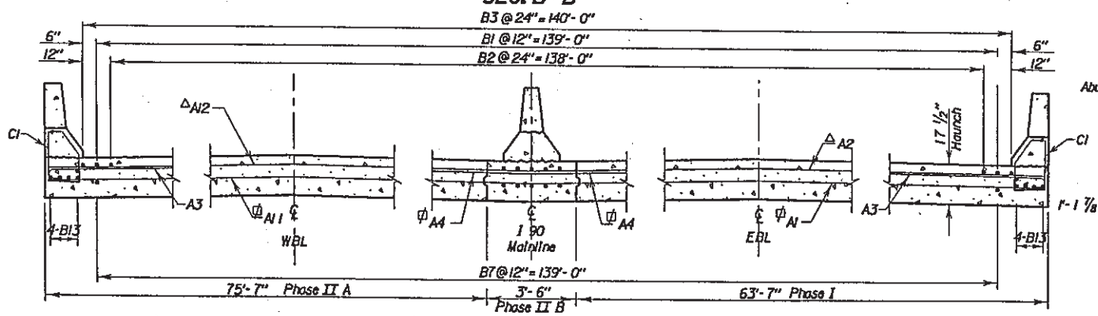
DETAIL "D"



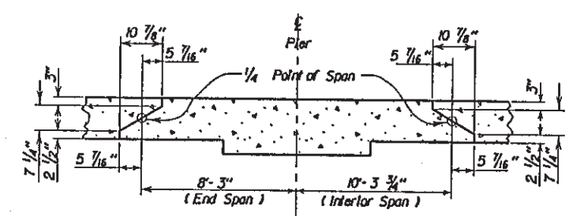
DETAIL "X"



SEC. B-B



SEC. C-C

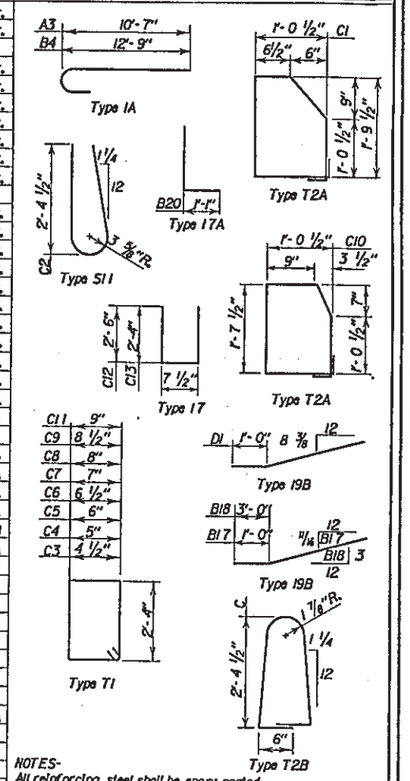


DETAIL "E"

REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type
A1	380	6	39'-5"	Str.
A2	248	5	38'-11"	Str.
A3	264	6	11'-3"	1A
A4	264	6	12'-8"	Str.
A11	380	6	46'-9"	Str.
A12	248	5	46'-6"	Str.
B1	280	10	49'-0"	Str.
B1A	140	10	47'-3"	Str.
B2	210	10	17'-6"	Str.
B3	213	9	24'-0"	Str.
B4	280	9	14'-0"	1A
B5	20	5	33'-9"	Str.
B6	280	10	33'-3"	Str.
B7	280	10	41'-3"	Str.
B8	140	10	22'-9"	Str.
B9	140	10	19'-0"	Str.
B10	142	10	25'-9"	Str.
B11	142	10	26'-0"	Str.
B12	36	5	44'-3"	Str.
B13	20	5	41'-3"	Str.
B15	12	5	15'-0"	Str.
B16	6	4	50'-0"	Str.
B17	8	4	8'-6"	19B
B18	12	8	4'-3"	19B
B19	12	5	2'-4"	Str.
B20	12	6	3'-7"	17A
B21	12	4	50'-9"	Str.
B23	27	6	52'-10"	Str.
C	150	5	5'-11"	T2B
C1	284	5	6'-4"	T2A
C2	256	5	5'-1"	S11
C3	4	5	6'-4"	T1
C4	4	5	6'-5"	T1
C5	4	5	6'-7"	T1
C6	4	5	6'-8"	T1
C7	4	5	6'-9"	T1
C8	4	5	6'-11"	T1
C9	4	5	7'-0"	T1
C10	16	6	7'-2"	T2A
C11	16	5	7'-1"	T1
C12	4	6	5'-8"	17
C13	4	5	5'-3"	17
D1	300	5	2'-0"	19B
D2	10	7	2'-0"	Str.
★ Z1	374	7	4'-0"	Str.

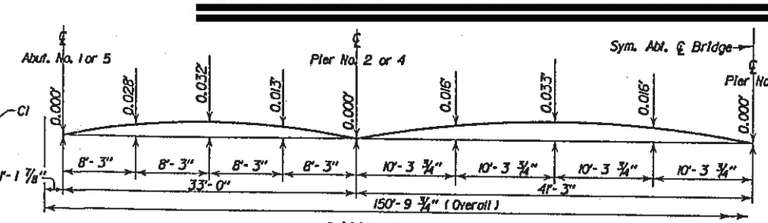
Bending Details



NOTES-
All reinforcing steel shall be epoxy coated.
Bend in field as necessary to fit.
★ See Sheet 17 of 25 for location of Z1 bars.
All dimensions are out to out of bars.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Class A45 Concrete, Bridge Deck	Cu. Yd.	948.6
Epoxy Coated Reinforcing Steel	Lb.	376178
Deck Drains (Slab Bridge)	Each	40



CAMBER DIAGRAM

Camber is calculated for dead load deflection plus plastic flow and shall be added to the proposed grade elevations at the respective stations to establish the elevations of the top of the finished roadway slab.

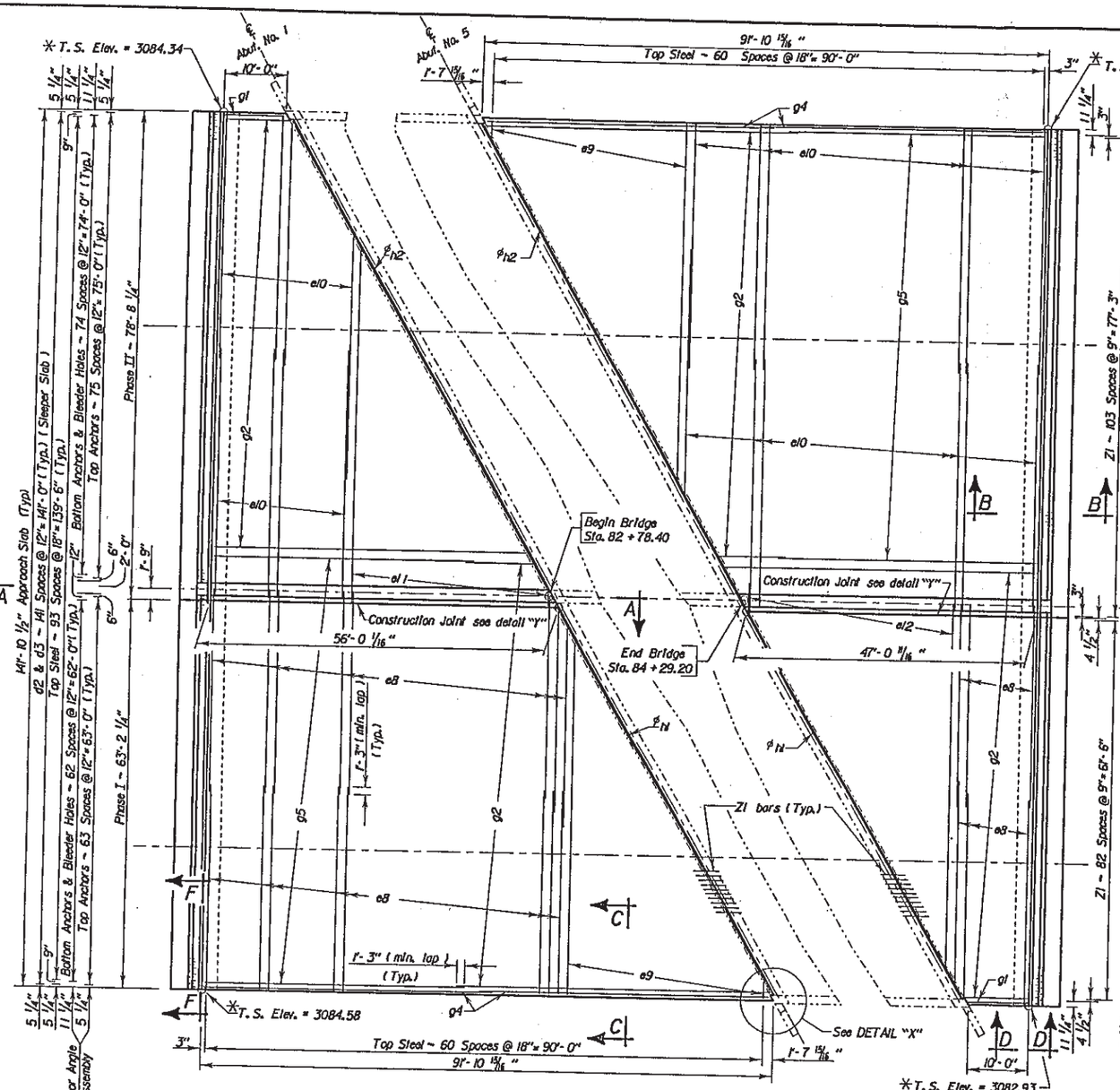
ORIGINAL CONSTRUCTION PLANS

SUPERSTRUCTURE DETAILS
FOR
150'-9 3/4" CONTINUOUS CONCRETE BR.
1-75'-0" & 1-63'-0" ROADWAY SEC. 23-T2N-R8E
OVER BOX ELDER CREEK 30° R. H. F. SKEW
STA. 82+78.40 TO STA. 84+29.20 IM90-2(77)63
STR. NO. 52-463-280 HS20-44 (& ALT.)

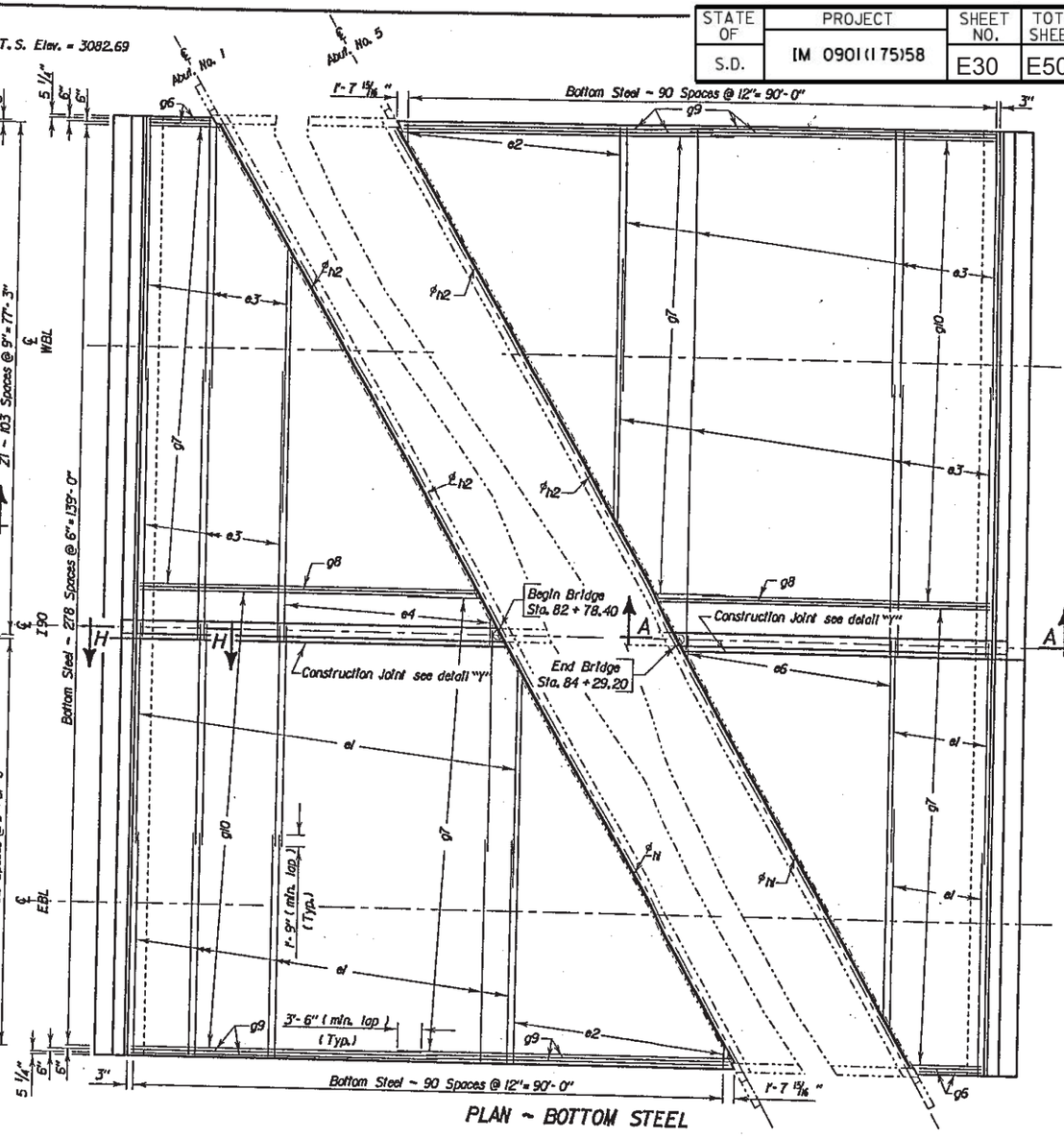
PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
NOVEMBER 1992

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
SJ/KZ	TB	SJ/KZ	BRIDGE ENGINEER
PENN0525	0525BA13		

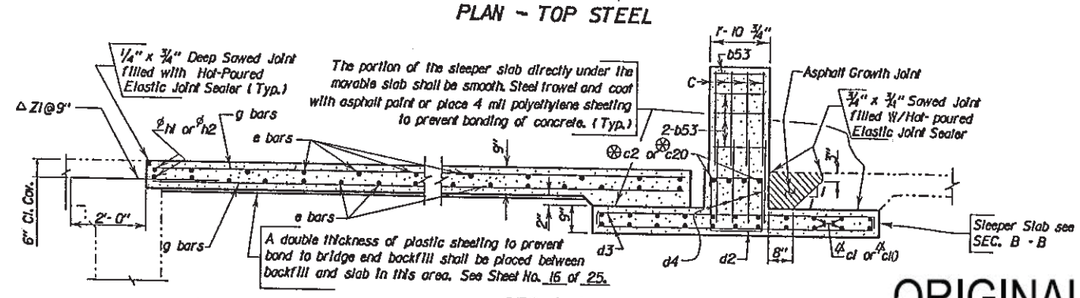
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E30	E50



PLAN ~ TOP STEEL



PLAN ~ BOTTOM STEEL



Z1 bars are listed and included in superstructure quantities.

SEC. A-A
(Median Barrier not shown)

φ min. lap = 2'-6"
⊗ min. lap = 4'-3"
⁂ min. lap = 1'-9"

NOTE:
This sheet is to be used in conjunction with sheets 18 & 19 of 25.

DETAILS OF APPROACH SLAB ADJ. TO BRIDGE
FOR
150'-9 3/4" CONTINUOUS CONCRETE BR.
1-75'-0" & 1-63'-0" ROADWAY SEC. 23-T2N-R8E
OVER BOX ELDER CREEK 30° R. H. F. SKEW
STA. 82+78.40 TO STA. 84+29.20 IM90-2(77)63
STR. NO. 52-463-280 HS20-44 (& ALT.)

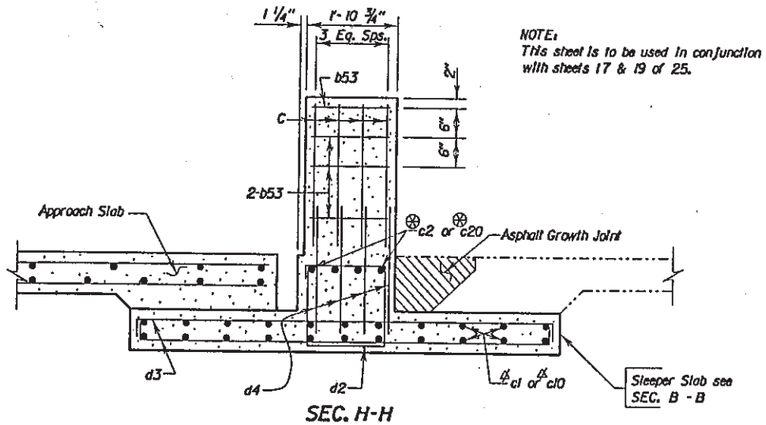
PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
NOVEMBER 1992

ORIGINAL CONSTRUCTION PLANS

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
SJ/KZ PENN0525	TB 0525BA17	SJ/KZ	BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E31	E50

NOTE:
This sheet is to be used in conjunction with sheets 17 & 19 of 25.



SEC. H-H

ESTIMATED QUANTITIES

(For Two Approach Slabs, Two Sleeper Slabs & Two Approach Slab Median Barriers)

ITEM	UNIT	QUANTITY
Conc. Approach Slab Adjacent to Bridge	Sq. Yd.	1624.5
Bridge Approach Sleeper Slab	Sq. Yd.	236.5

1. 410.7 Cu. Yds. Concrete In Approach Slab.
2. 116155 Lbs. Epoxy Coated Re-Steel In Approach Slab.
3. 78.8 Cu. Yds. Concrete In Sleeper Slab.
4. 14559 Lbs. Epoxy Coated Re-Steel In Sleeper Slab.
5. 11254 Lbs. Structural Steel In Armor Assembly
6. 10.5 Cu. Yds. Concrete In Median Barriers.
7. 2574 Lbs. Epoxy Coated Re-Steel In Median Barriers

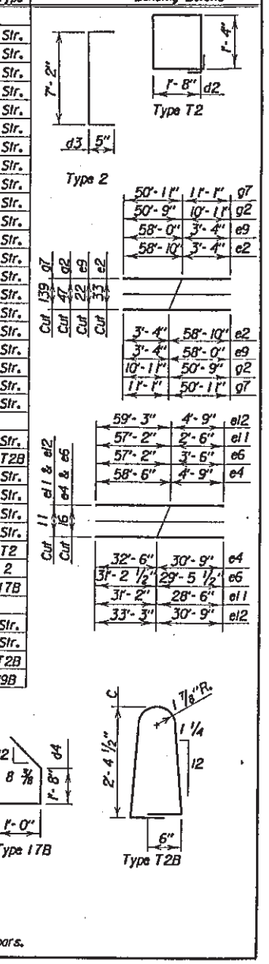
Items 1 thru 7 are approximate quantities contained in the above bid items and are for information only.

REINFORCING SCHEDULE

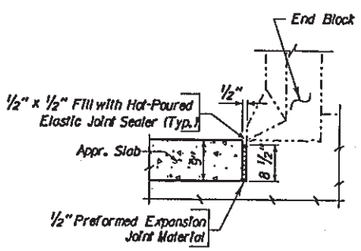
(For Two Approach Slabs, Two Sleeper Slabs & Two Approach Slab Median Barriers)

	Mk.	No.	Size	Length	Type
	Approach Slab				
	e1	146	6	33'-7"	Str.
#	e2	33	6	62'-2"	Str.
	e3	158	6	40'-1"	Str.
#	e4	16	6	63'-3"	Str.
#	e6	16	6	60'-8"	Str.
	e8	96	4	33'-1"	Str.
#	e9	22	4	61'-4"	Str.
	e10	108	4	39'-10"	Str.
#	e11	11	4	59'-8"	Str.
#	e12	11	4	64'-0"	Str.
	g1	2	4	9'-11"	Str.
#	g2	94	4	61'-8"	Str.
	g4	4	4	46'-5"	Str.
	g5	47	4	42'-0"	Str.
	g6	4	8	9'-11"	Str.
#	g7	278	8	62'-0"	Str.
	g8	2	8	51'-2"	Str.
	g9	8	8	47'-4"	Str.
	g10	278	8	44'-0"	Str.
	h1	8	6	38'-6"	Str.
	h2	8	6	46'-0"	Str.
	Sleeper Slab				
	b53	14	6	1'-7"	Str.
	C	8	5	5'-11"	T2B
	c1	88	5	33'-7"	Str.
	c2	16	8	36'-1"	Str.
	c10	88	5	40'-1"	Str.
	c20	16	8	41'-4"	Str.
	d2	284	4	6'-9"	T2
	d3	568	4	8'-0"	2
	d4	16	6	3'-10"	17B
	Median Barrier				
	B33	18	6	29'-7"	Str.
	B43	18	6	26'-1"	Str.
	C	105	5	5'-11"	T2B
	D1	202	5	2'-0"	19B

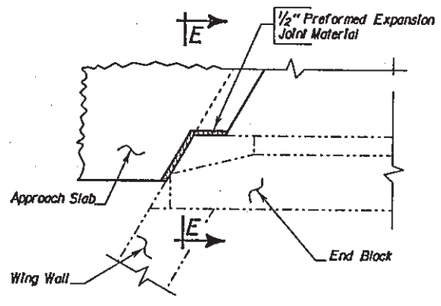
Bending Details



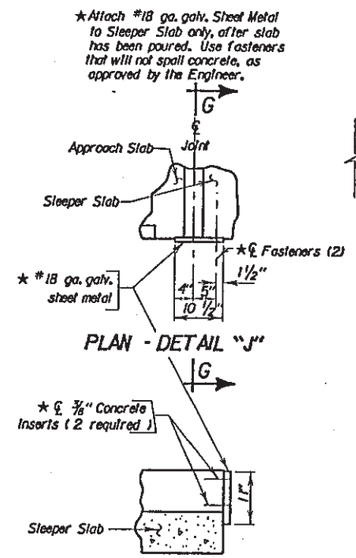
NOTE --
All Bars to be Epoxy Coated.
See cutting diagram.
All dimensions are out to out of bars.



SEC. E-E

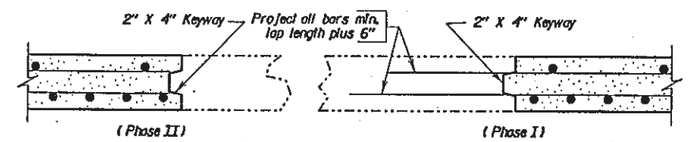


DETAIL "X"

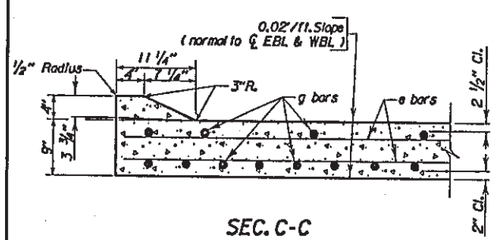


PLAN - DETAIL "J"

SEC. G-G



DETAIL "Y"
(Approach Slab shown, Sleeper Slab similar)



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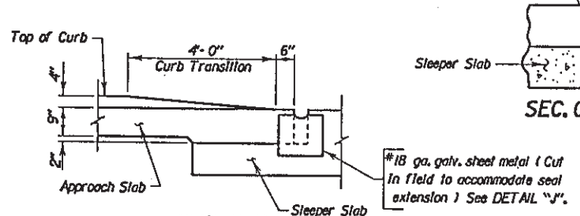
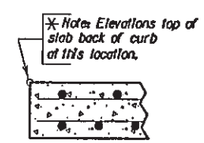


VIEW D-D



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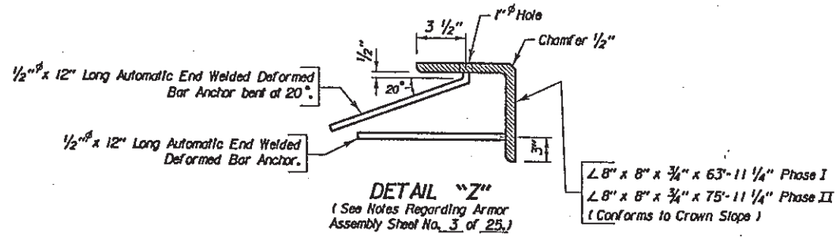
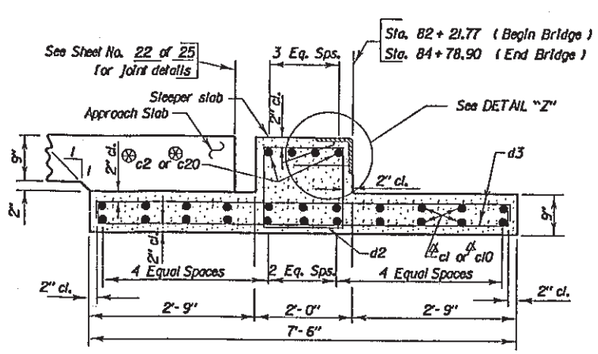


DETAIL "Z"
(See Notes Regarding Armor Assembly Sheet No. 3 of 25.)

⊗ min. lap = 4'-3"
℄ min. lap = 1'-9"



SEC. B-B
(Sleeper Slab)

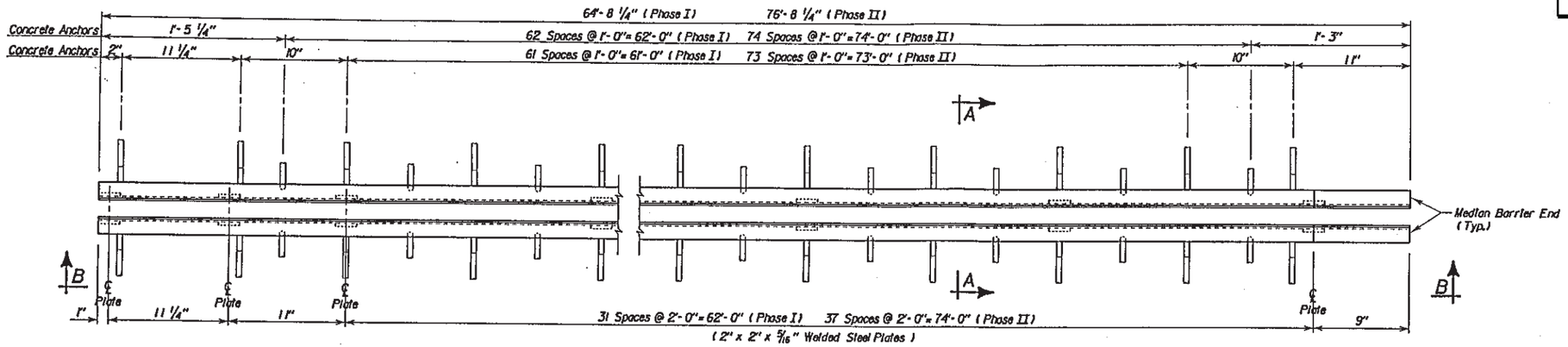
ORIGINAL CONSTRUCTION PLANS

DETAILS OF APPROACH SLAB ADJ. TO BRIDGE
FOR
150'-9 3/4" CONTINUOUS CONCRETE BR.
1-75'-0" & 1-63'-0" ROADWAY SEC. 23-T2N-R8E
OVER BOX ELDER CREEK 30° R. H. F. SKEW
STA. 82+78.40 TO STA. 84+29.20 IM90-2(77)63
STR. NO. 52-463-280 HS20-44
(& ALT.)

PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
NOVEMBER 1992

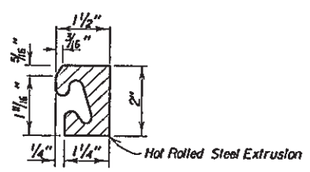
DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
SJ/KZ PENN0525	TB 0525BAB	SJ/KZ	BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E32	E50



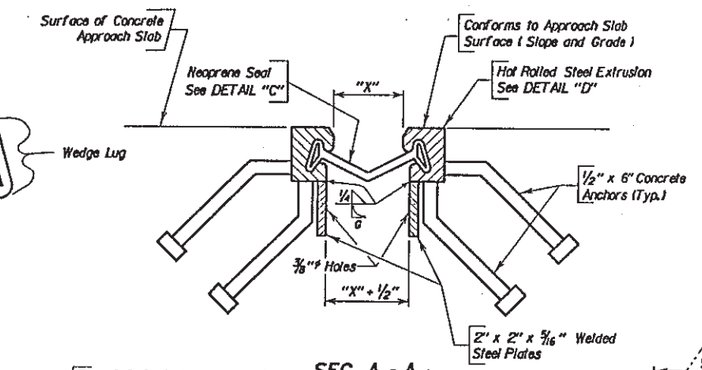
PLAN OF STRIP SEAL
(Neoprene Seal not shown)

TEMP.	DIMENSION "X"
30°	2 3/8"
40°	2 1/4"
50°	2 3/16"
60°	2 1/16"
70°	2"
80°	1 13/16"
90°	1 13/16"

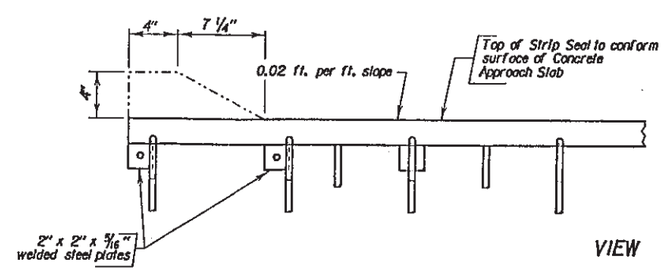


DETAIL "D"

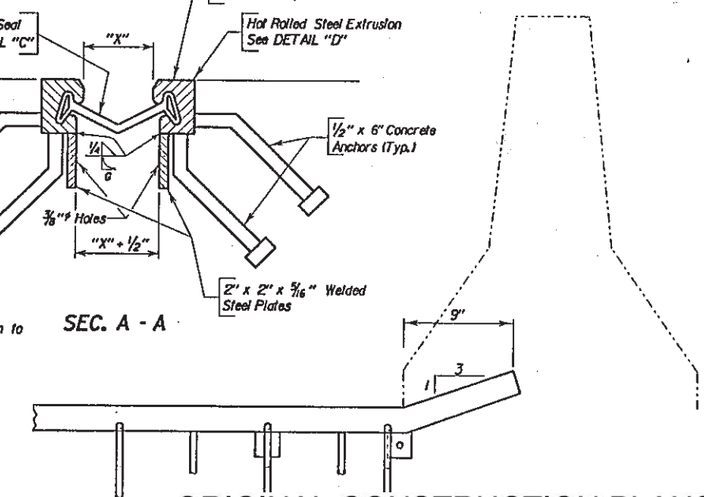
DETAIL "C"
Neoprene Seal shall have a 4" movement capability.



SEC. A - A



VIEW B - B



GENERAL NOTES :

1. Materials for the Steel Extrusion shall conform to ASTM-A36, A242 or A588. Materials for the 2" x 2" x 5/16" welded steel plates shall conform to ASTM-A36. Material for the 1/2"ϕ x 6" Concrete Anchors shall conform to Type A steel studs of Section 7 of the latest edition of the ANSI/AWS D1.1 Structural Steel Welding Code.
2. Material for the Neoprene Seal shall conform to ASTM D2628 modified to omit the recovery test. No splices will be permitted in the Neoprene Seal.
3. The installation of the Neoprene Seal shall be as recommended by its Manufacturer and approved by the Engineer, but in general shall be as follows: The Neoprene Seal shall be installed and bonded to the Steel Extrusion with a high-solids lubricant adhesive. The Neoprene surfaces shall be roughened with a wire brush before the application of the lubricant adhesive. The Neoprene Seal may be installed either prior to or after the time the Steel Extrusions are concreted in the approach slabs. The Steel Extrusion shall be dry, clean, free from dirt, grease and contaminates at the time the Neoprene Seal is installed.
4. Due to the length of the Steel Extrusions, Splices are permitted. No welds shall be permitted in the internal section of the extrusion where the Neoprene Seal is located. Weld details shall be shown on the Shop Plans for approval by the Engineer. Welding shall be in accordance with ANSI/AWS D1.1-90 Structural Welding Code. Galvanize the Steel Extrusions and anything welded to them after all welding is completed. They shall be galvanized in accordance with AASHTO M111 (ASTM A123). If welded splices are used subsequent to galvanizing, the weld details and the procedures for preparing the surface for welding and repairing the galvanizing after welding shall be included with the shop plans.
5. The thickness and shape of the Neoprene Seal may vary from the sketch shown (Detail "C" on this sheet) according to the manufacturer's design; however, the wedge lugs must properly fit the groove in the Steel Extrusion. Before installation the shop plans of the proposed Neoprene Seal showing the fixed dimensions, thickness of Neoprene Seal, and dimensions pertinent to the fit of the Neoprene Seal in the Steel Extrusion shall be submitted to and approved by the Engineer.
6. The Strip Seal Expansion Joint will be measured in linear feet to the nearest one-tenth foot, complete in place. Measurement will be made of the overall horizontal length. The Strip Seal Expansion Joint will be paid for at the contract unit price per linear foot complete in place. Payment for this item shall be full compensation for furnishing all the required materials in place, inclusive of labor, equipment and incidentals necessary to complete the work in accordance with plans and the foregoing specifications.
7. The lubricant-adhesive used to install the neoprene seal shall conform to the requirements of ASTM D4070. The neoprene seal and the lubricant adhesive should be supplied or recommended by the same source as they must be compatible.
8. Since the configuration and dimensions of the Steel Extrusion may vary according to each manufacturer's design, they need not conform exactly to that shown in DETAIL "D", however, any deviations from the plan shown configuration or dimensions must be approved by the Office of Bridge Design.
9. The Strip Seal Expansion Joint supplier shall submit a detailed gland installation procedure with the shop plans.
10. The cost of welding shall be included in the unit cost for Strip Seal Expansion Joint.
11. The Neoprene Seal shall be of sufficient length such that a minimum length of 6" shall extend beyond each end of the Steel Extrusions.

ESTIMATED QUANTITIES
(For Two Approach Slabs)

ITEM	UNIT	QUANTITY
Strip Seal Expansion Joint	Lin. Ft.	283.8

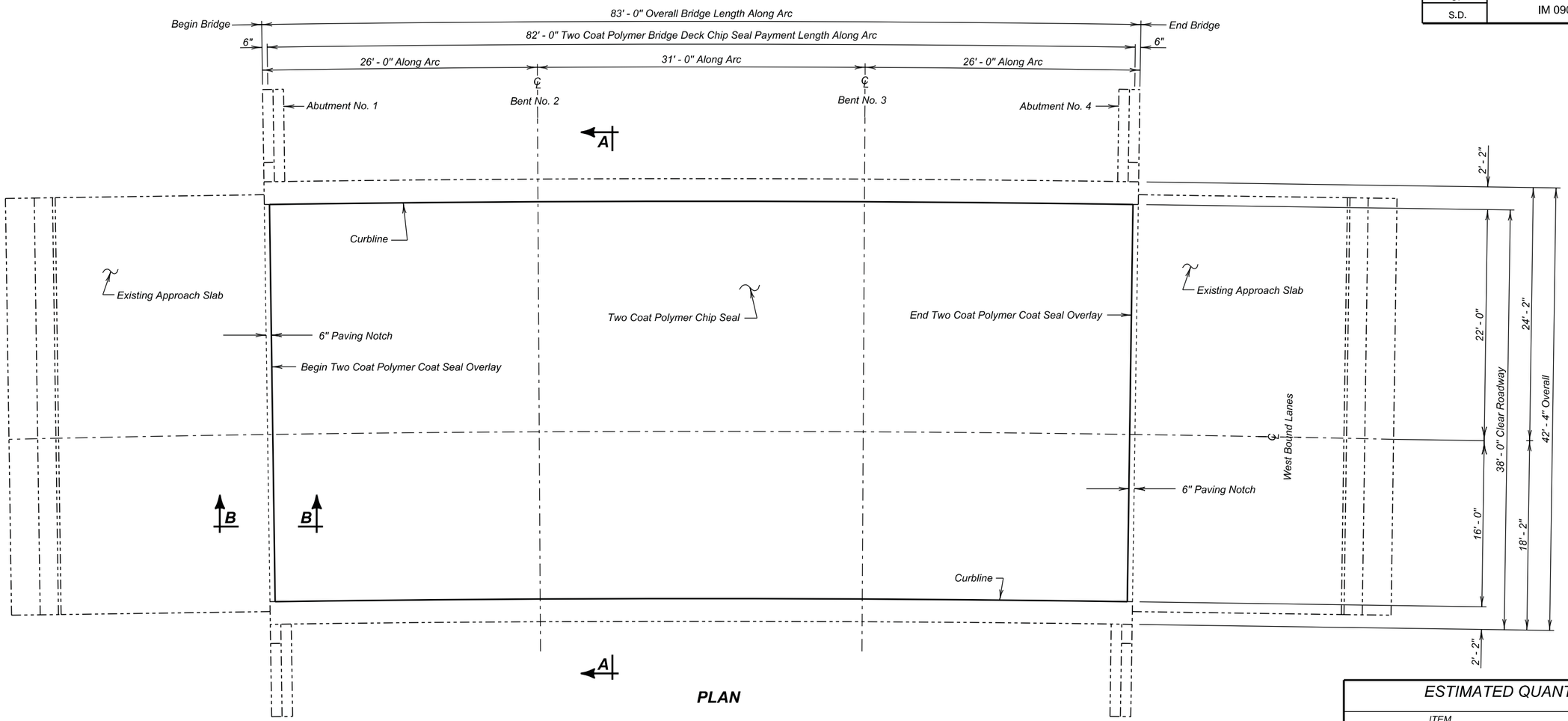
ORIGINAL CONSTRUCTION PLANS

APPROACH SLAB JOINT DETAILS
FOR
150'-9 3/4" CONTINUOUS CONCRETE BR.
1-75'-0" & 1-63'-0" ROADWAY SEC. 23-T2N-R8E
OVER BOX ELDER CREEK 30° R. H. F. SKEW
STA. 82+78.40 TO STA. 84+29.20 IM90-2(77)63
STR. NO. 52-463-280 HS20-44 (& ALT.)

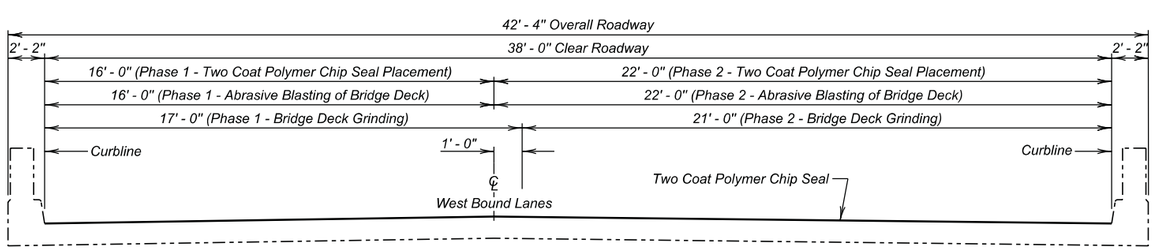
PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
NOVEMBER 1992

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
SJ/KZ PENN0525	TB 0525BA22	SJ/KZ	BRIDGE ENGINEER

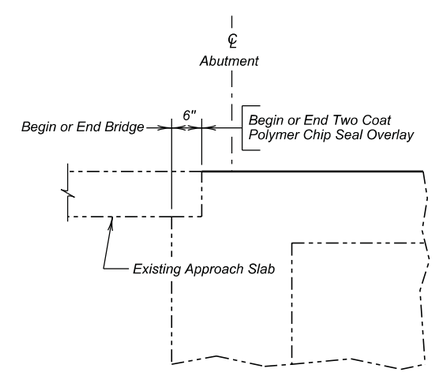
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E33	E50



PLAN



SECTION A - A



SECTION B - B

ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY PHASE 1	QUANTITY PHASE 2
*	Concrete Patching Material, Bridge Deck	Cu. Ft.	19.5	19.5
	Two Coat Bridge Deck Polymer Chip Seal	Sq. Yd.	145.8	200.4
	Abrasive Blasting of Bridge Deck	Sq. Yd.	145.8	200.4
	Bridge Deck Grinding	Sq. Yd.	154.9	191.3
*	Concrete Removal, Class A	Sq. Yd.	2.0	2.0
*	Concrete Removal, Class B	Sq. Yd.	2.0	2.0

* Concrete Patching Material, Bridge Deck; Concrete Removal, Class A; and Concrete Removal, Class B may not be encountered and may be removed from the project at the direction of the Engineer.

(WESTBOUND LANES)
TWO COAT POLYMER CHIP SEAL LAYOUT
FOR

83' - 0" CONTINUOUS CONCRETE BRIDGE

38' - 0" ROADWAY — 0° SKEW
OVER CREEK — SEC. 23 - T2N - R8E
STR. NO. 52-469-275 — IM 0901(175)58
PCN 035J

PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2015

1 OF 4

INDEX OF BRIDGE SHEETS -

Sheet No. 1 - Two Coat Polymer Chip Seal Layout
Sheet No. 2 - Estimate of Structure Quantities and Notes
Sheet No. 3 thru 4 - Original Construction Plans

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	KR	Kevin N. Boeden
PENN035J	035JRF01		BRIDGE ENGINEER

ESTIMATE OF STRUCTURE QUANTITIES

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
460E0172	Concrete Patching Material, Bridge Deck	39.0	CuFt
491E0005	Two Coat Bridge Deck Polymer Chip Seal	346.2	SqYd
491E0110	Abrasive Blasting of Bridge Deck	346.2	SqYd
491E0120	Bridge Deck Grinding	346.2	SqYd
491E0130	Concrete Removal, Class A	4.0	SqYd
491E0140	Concrete Removal, Class B	4.0	SqYd

SPECIFICATIONS

1. Design Specifications: AASHTO Standard Specifications for Highway Bridges 17th Edition using Working Stress Design.

2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2015 Edition and Required Provisions, Supplemental Specifications and Special Provisions as included in the Proposal.

DETAILS AND DIMENSIONS OF EXISTING BRIDGE

All details and dimensions of the existing bridge, contained in these plans, are based on the original construction plans and shop plans. It is the Contractor's responsibility to inspect and verify the actual field conditions and any necessary as-built dimensions affecting the satisfactory completion of the work required for this project.

SCOPE OF BRIDGE WORK & SEQUENCE OF OPERATIONS

All work on this structure shall be accomplished with the traffic control shown elsewhere in the plans. Alternate sequence of operations may be submitted by the contractor for approval by the engineer a minimum of two weeks prior to the preconstruction meeting.

1. Perform bridge deck grinding and repair the deck by removing all loose and delaminated concrete from the bridge deck surface for the first phase of construction.

2. Clean the bridge deck surface with abrasive blasting for the first phase of construction.

3. Place the Two Coat Polymer Bridge Deck Chip Seal for the first phase of construction.

4. Switch traffic and repeat steps 1 through 3 for the second phase of construction.

TWO COAT BRIDGE DECK POLYMER CHIP SEAL

The Two Coat Bridge Deck Polymer Chip Seal shall be applied in accordance with the Construction Specifications.

ESTIMATE OF STRUCTURE QUANTITIES AND NOTES

FOR

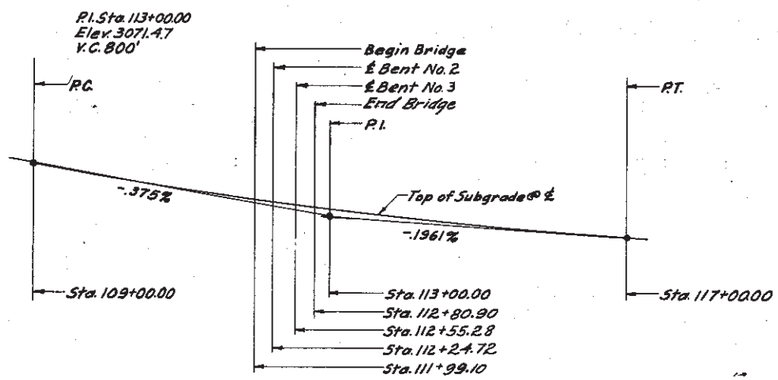
83' - 0" CONTINUOUS CONCRETE BRIDGE

STR. NO. 52-469-275

SEPTEMBER 2015

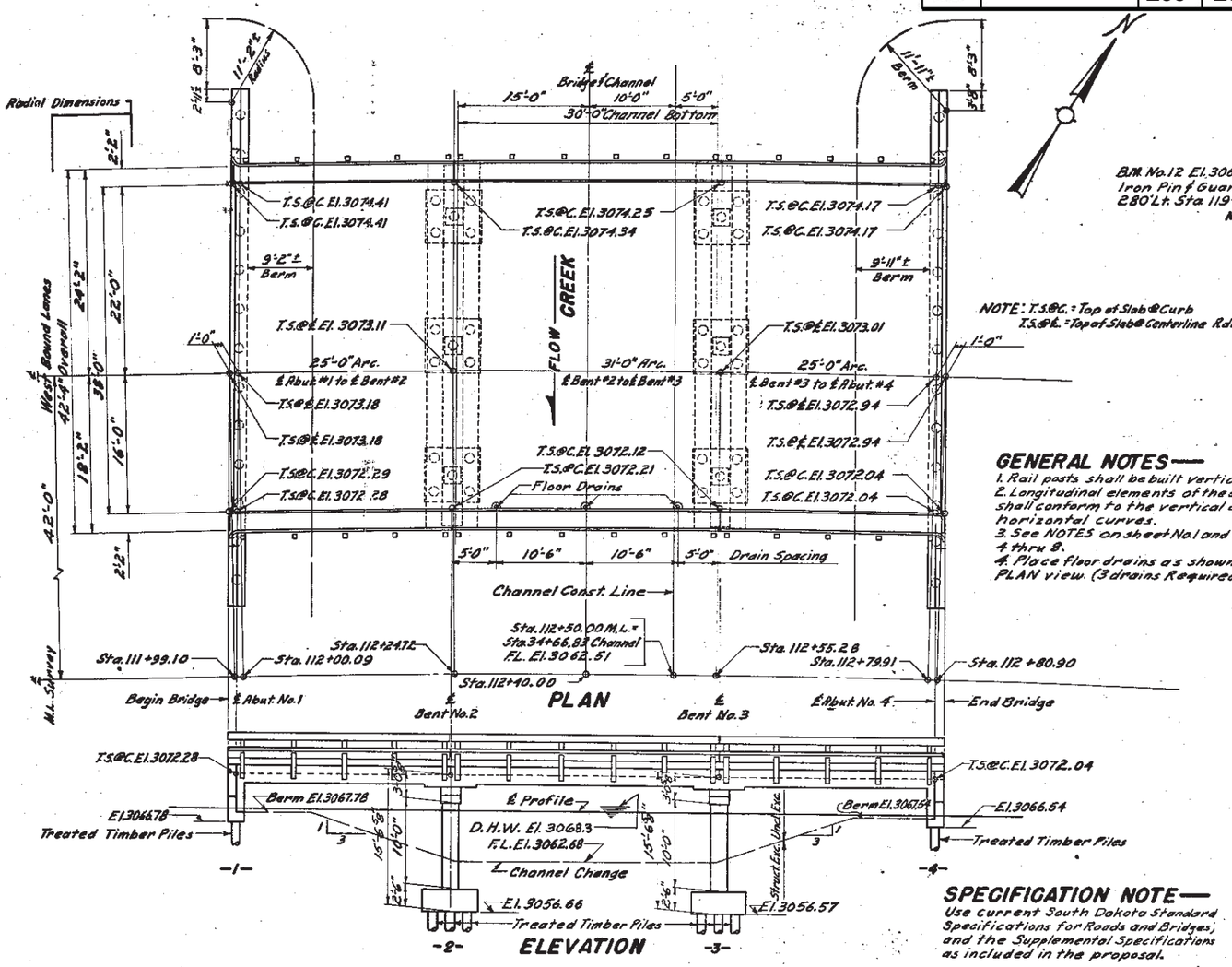
DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	BWS	Kevin N. Goeden
PENN035J	035JFD02		BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E35	E50



SUBGRADE CURVE DATA

Q	1828 c.f.s.
A	2.62 sq.ft.
V	7.0 f.p.s.



GENERAL NOTES—

1. Rail posts shall be built vertical.
2. Longitudinal elements of the slab shall conform to the vertical and horizontal curves.
3. See NOTES on sheet No. 1 and Sheets 4 thru 8.
4. Place floor drains as shown on PLAN view. (3 drains Required)

SPECIFICATION NOTE—

Use current South Dakota Standard Specifications for Roads and Bridges, and the Supplemental Specifications as included in the proposal.

ESTIMATED QUANTITIES

ITEM	Cl. "A" Conc. Cu. Yds.	Steel - Lbs. Reinf.	Steel - Lbs. Struct.	Type A Steel Railing - Lin. Ft.	Treated Timber Piles - ¢ Lin. Ft.	Excavation - Cu. Yds. Struct.	Excavation - Cu. Yds. △ Unclass.	Pile Shoes * No.
Superstructure	134.6	38,960	85	168.3				
Abutment No. 1	25.6	2,280	620		30 @ 20' = 260	10		13
Abutment No. 4	25.6	2,280	620		13 @ 20' = 260	10		13
Bent No. 2	22.8	3,885			15 @ 10' = 150'	50		15
Bent No. 3	22.8	3,885			15 @ 10' = 150'	50		15
Totals	231.4	52,330	1325	168.3	¢ 870	120		* —

¢ One Treated Timber Test Pile shall be driven at Abut. No. 1 and Bent No. 3 before remaining piles are ordered.
△ See Grading Plans for Unclassified Excavation.
* All Steel Pile Shoes as approved by the ENGINEER shall be used. The cost shall be included in the unit price bid for Treated Timber Piles.

ORIGINAL CONSTRUCTION PLANS

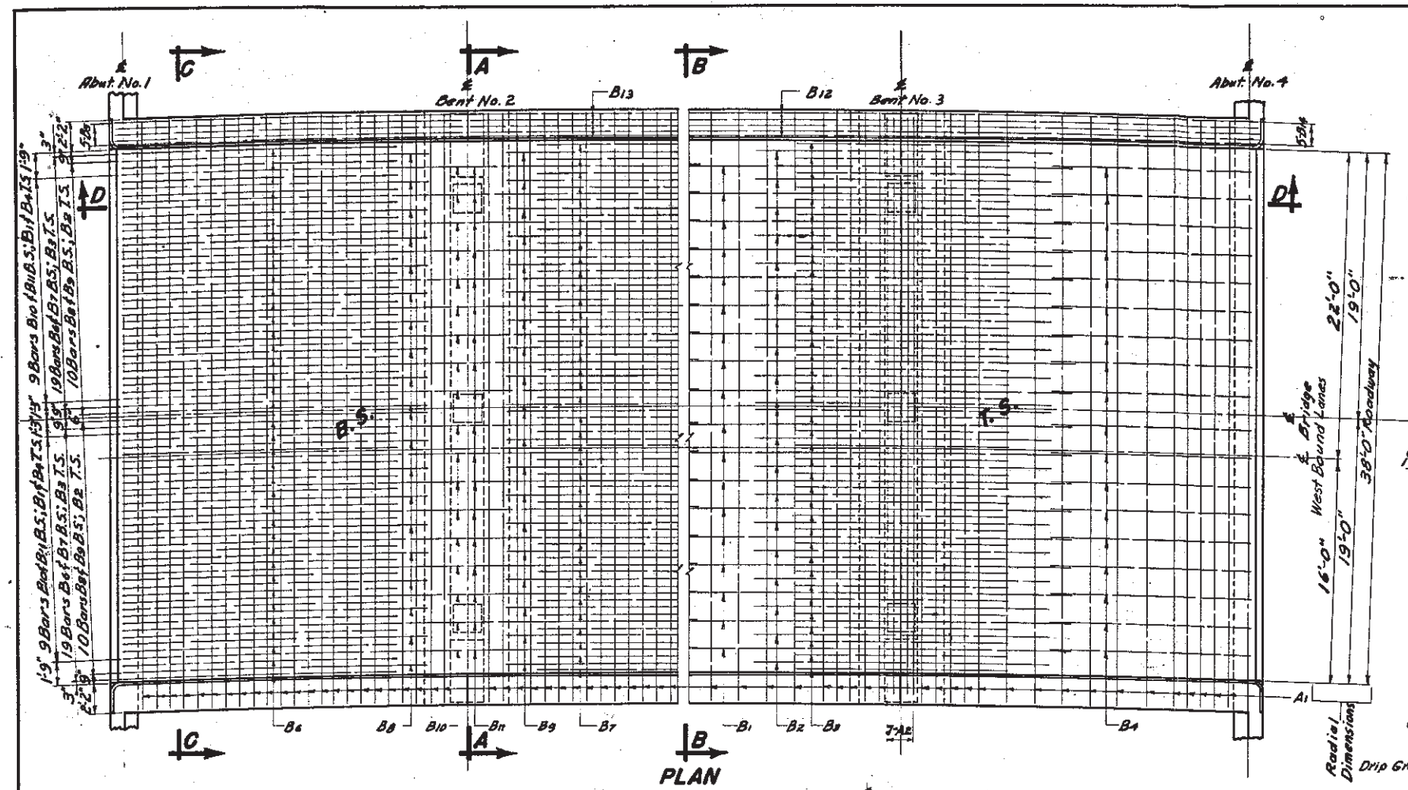
(WEST BOUND LANES)
GENERAL DRAWING AND QUANTITIES
FOR
83'-0" CONTINUOUS CONCRETE BRIDGE
38'-0" ROADWAY

OVER CREEK — SEC. 23-T2N-R8E
STA. 111+99.10 TO STA. 112+80.90 — I 90-2 (11) 62
PENNINGTON COUNTY
STR. NO. 52-469-275 — SOUTH DAKOTA — H20-S16-44 (8 AIT)
DEPARTMENT OF HIGH[illegible]
MARCH 1961

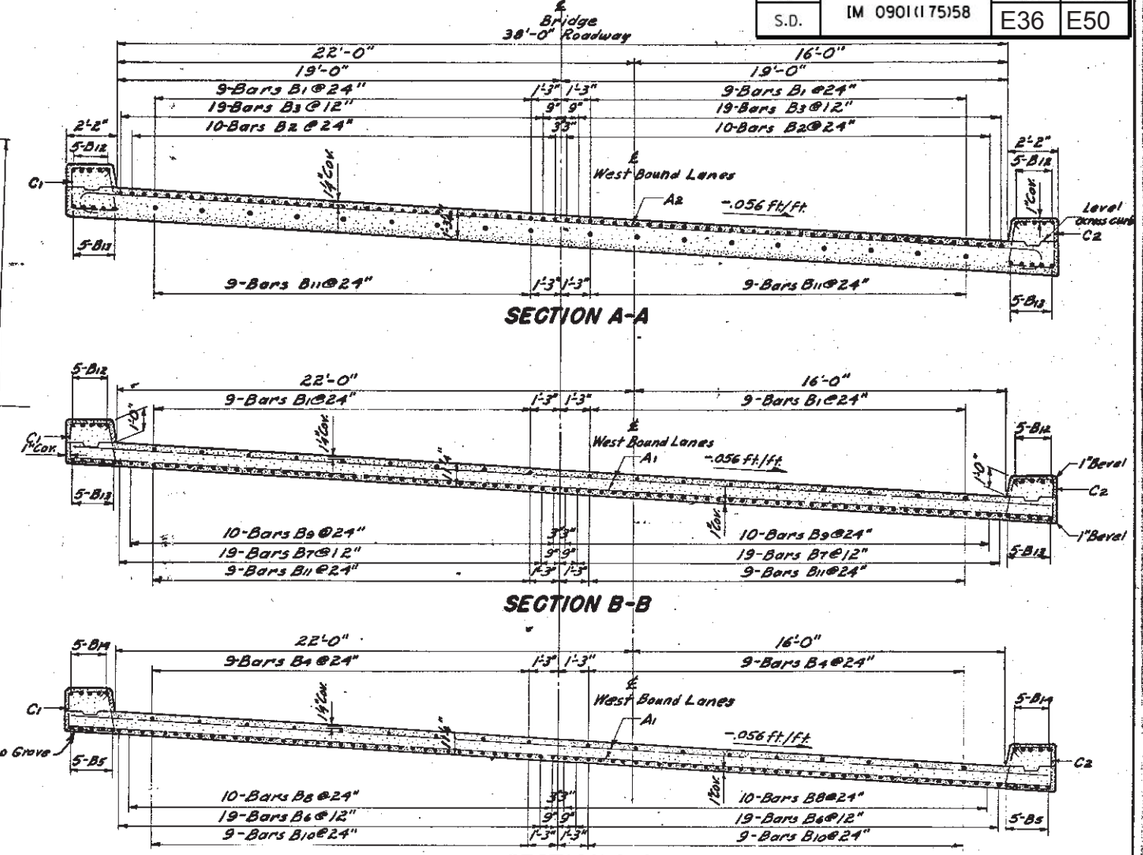
3 OF 4

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	C.H.J.	R.K.	BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E36	E50



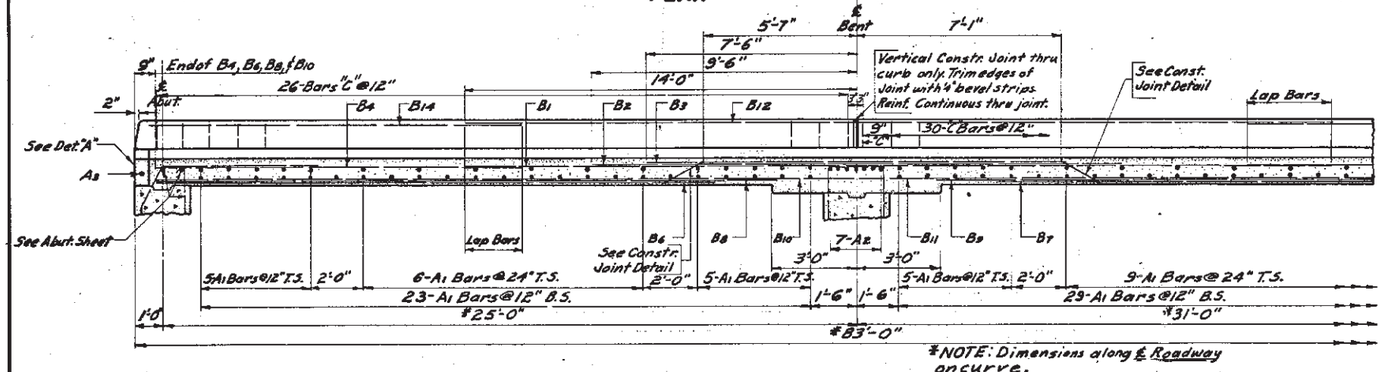
PLAN



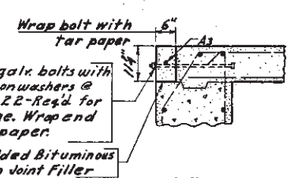
SECTION A-A

SECTION B-B

SECTION C-C



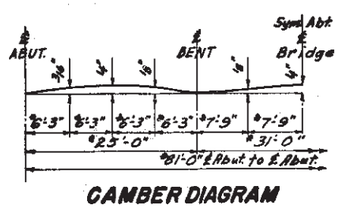
HALF LONGITUDINAL SECTIONAL VIEW D-D



DETAIL "A"

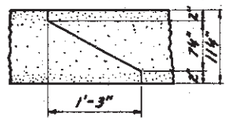
ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Class "A" Concrete	Cu. Yd.	134.6
Reinforcing Steel	Lb.	39,900
*Structural Steel	Lb.	85

* Includes 27 lbs for 3 drains



CAMBER DIAGRAM

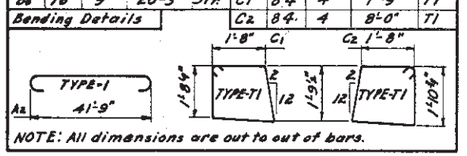
Camber is calculated for dead load plus plastic flow and shall be added to the proposed grade elevations at the respective stations to establish the elevation of the top of the finished roadway slab.



CONST. JOINT DETAIL

REINFORCING SCHEDULE

MK.	NO.	SIZE	LENGTH	TYPE	MK.	NO.	SIZE	LENGTH	TYPE
A1	126	6	41'-9"	Str.	B7	38	9	18'-6"	Str.
A2	14	8	44'-0"	1	B8	40	8	22'-6"	Str.
A3	2	5	37'-9"	Str.	B9	20	8	25'-6"	Str.
B1	36	9	31'-0"	Str.	B10	36	8	25'-3"	Str.
B2	40	8	19'-6"	Str.	B11	18	8	31'-0"	Str.
B3	76	8	16'-3"	Str.	B12	20	8	30'-0"	Str.
B4	36	6	13'-3"	Str.	B13	10	6	31'-0"	Str.
B5	20	8	25'-9"	Str.	B14	20	6	13'-0"	Str.
B6	76	9	20'-3"	Str.	C1	84	4	7'-9"	T1
Bending Details					C2	84	4	8'-0"	T1



NOTE: All dimensions are out to out of bars.

ORIGINAL CONSTRUCTION PLANS

(WEST BOUND LANES)
DETAILS OF SUPERSTRUCTURE
FOR
83'-0" CONTINUOUS CONCRETE BRIDGE
38'-0" ROADWAY

OVER CREEK — SEC. 23-T2N-R6E

STA. 111+99.10 TO STA. 112+80.90 — I 90-2 (11) 62

PENNINGTON COUNTY

STR. NO. 52-469-275 SOUTH DAKOTA — H20-S16-44 (8 ALT.)

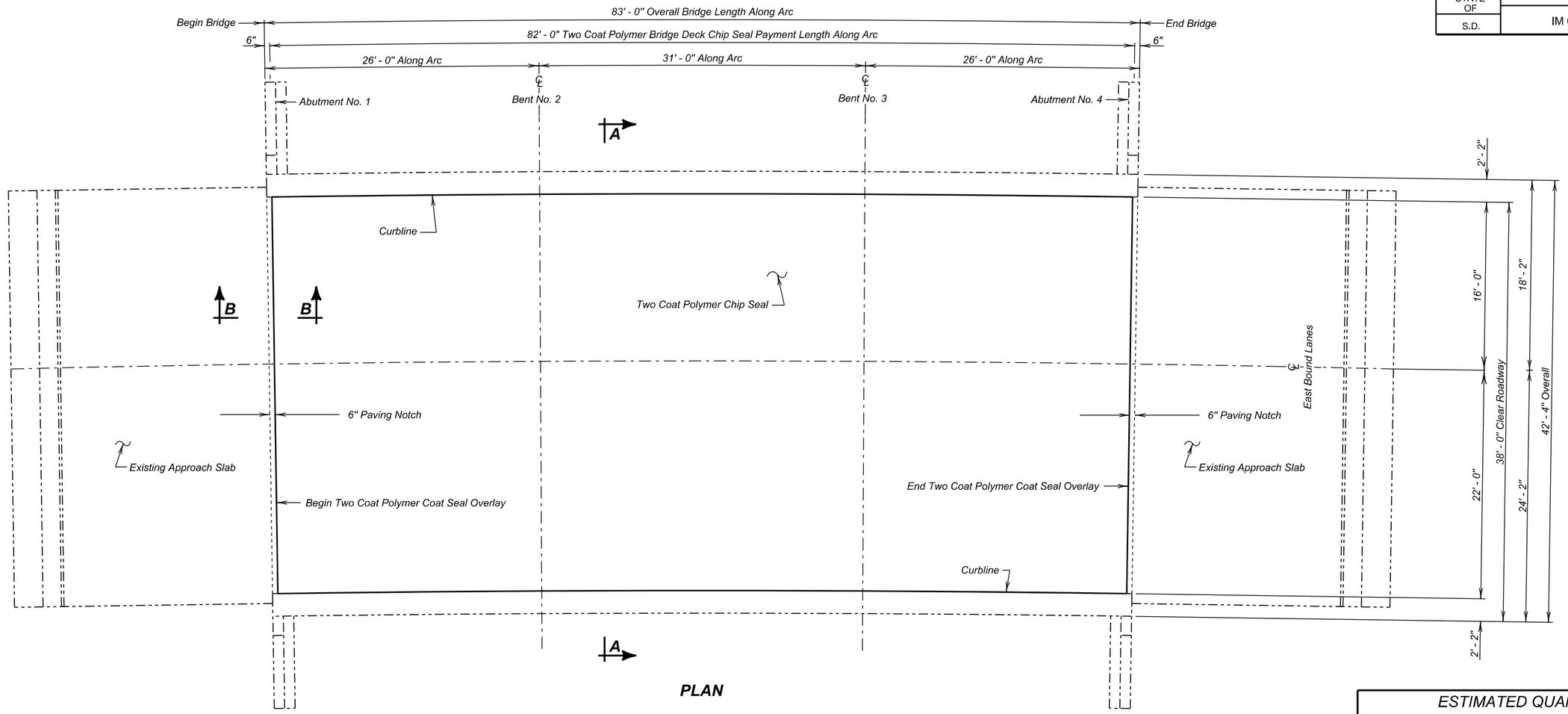
DEPARTMENT OF HIGHWAYS

MARCH 1961

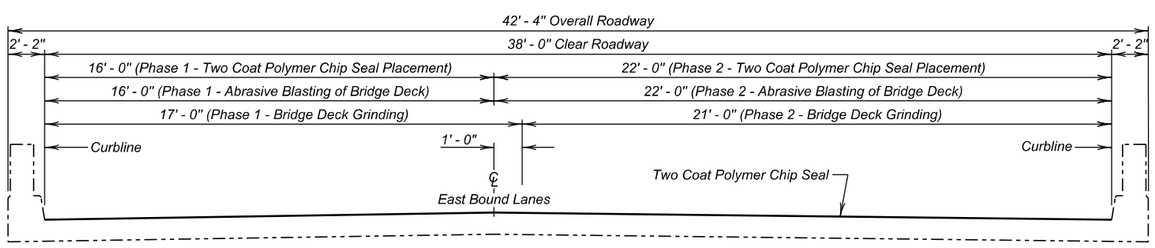
4 OF 4

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	C.H.J.	R.K.	R. K. Sewer, BRIDGE ENGINEER

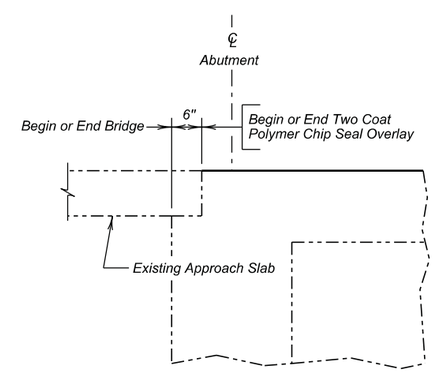
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E37	E50



PLAN



SECTION A - A



SECTION B - B

ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY PHASE 1	QUANTITY PHASE 2
*	Concrete Patching Material, Bridge Deck	Cu. Ft.	19.5	19.5
	Two Coat Bridge Deck Polymer Chip Seal	Sq. Yd.	145.8	200.4
	Abrasive Blasting of Bridge Deck	Sq. Yd.	145.8	200.4
	Bridge Deck Grinding	Sq. Yd.	154.9	191.3
*	Concrete Removal, Class A	Sq. Yd.	2.0	2.0
*	Concrete Removal, Class B	Sq. Yd.	2.0	2.0

* Concrete Patching Material, Bridge Deck; Concrete Removal, Class A; and Concrete Removal, Class B may not be encountered and may be removed from the project at the direction of the Engineer.

(EASTBOUND LANES)
TWO COAT POLYMER CHIP SEAL LAYOUT

FOR

83' - 0" CONTINUOUS CONCRETE BRIDGE

38' - 0" ROADWAY — 0° SKEW
OVER CREEK — SEC. 23 - T2N - R8E
STR. NO. 52-469-276 — IM 0901(175)58
PCN 035J

PENNINGTON COUNTY

S. D. DEPT. OF TRANSPORTATION

SEPTEMBER 2015

1 OF 4

INDEX OF BRIDGE SHEETS -

Sheet No. 1 - Two Coat Polymer Chip Seal Layout
Sheet No. 2 - Estimate of Structure Quantities and Notes
Sheet No. 3 thru 4 - Original Construction Plans

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	KR	Kevin N. Goeden
PENN035J	035JRG01		BRIDGE ENGINEER

ESTIMATE OF STRUCTURE QUANTITIES

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
460E0172	Concrete Patching Material, Bridge Deck	39.0	CuFt
491E0005	Two Coat Bridge Deck Polymer Chip Seal	346.2	SqYd
491E0110	Abrasive Blasting of Bridge Deck	346.2	SqYd
491E0120	Bridge Deck Grinding	346.2	SqYd
491E0130	Concrete Removal, Class A	4.0	SqYd
491E0140	Concrete Removal, Class B	4.0	SqYd

SPECIFICATIONS

1. Design Specifications: AASHTO Standard Specifications for Highway Bridges 17th Edition using Working Stress Design.

2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2015 Edition and Required Provisions, Supplemental Specifications and Special Provisions as included in the Proposal.

DETAILS AND DIMENSIONS OF EXISTING BRIDGE

All details and dimensions of the existing bridge, contained in these plans, are based on the original construction plans and shop plans. It is the Contractor's responsibility to inspect and verify the actual field conditions and any necessary as-built dimensions affecting the satisfactory completion of the work required for this project.

SCOPE OF BRIDGE WORK & SEQUENCE OF OPERATIONS

All work on this structure shall be accomplished with the traffic control shown elsewhere in the plans. Alternate sequence of operations may be submitted by the contractor for approval by the engineer a minimum of two weeks prior to the preconstruction meeting.

1. Perform bridge deck grinding and repair the deck by removing all loose and delaminated concrete from the bridge deck surface for the first phase of construction.

2. Clean the bridge deck surface with abrasive blasting for the first phase of construction.

3. Place the Two Coat Polymer Bridge Deck Chip Seal for the first phase of construction.

4. Switch traffic and repeat steps 1 through 3 for the second phase of construction.

TWO COAT BRIDGE DECK POLYMER CHIP SEAL

The Two Coat Bridge Deck Polymer Chip Seal shall be applied in accordance with the Construction Specifications.

ESTIMATE OF STRUCTURE QUANTITIES AND NOTES

FOR

83' - 0" CONTINUOUS CONCRETE BRIDGE

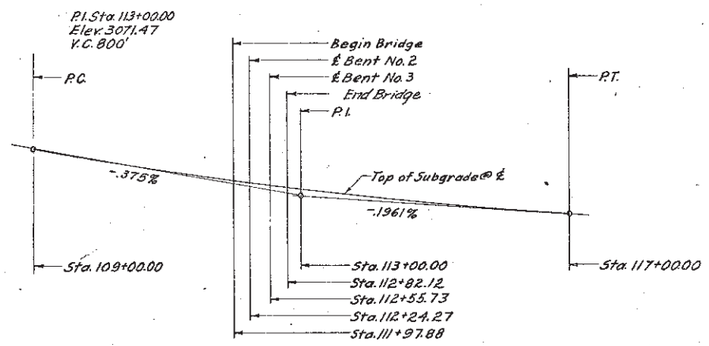
STR. NO. 52-469-276

SEPTEMBER 2015

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	BWS	Kevin N. Goeden
PENN035J	035JRG02		BRIDGE ENGINEER

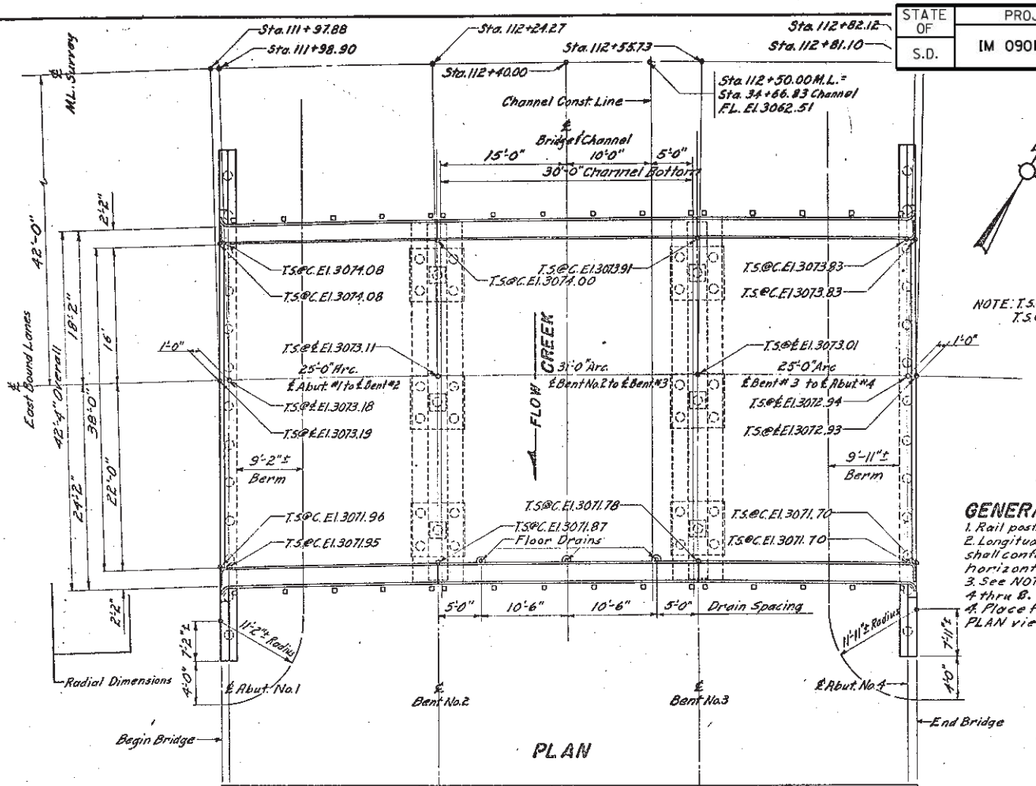
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E39	E50

B.M. No. 11 El. 3069.87
Std. Disc. In Concrete Post (Y-131)
516' Rt. Sta. 108+18 M.L.



SUBGRADE CURVE DATA

Q	1828 c.f.s.
A	2.62 sq. ft.
V	7.0 f.p.s.



B.M. No. 12 El. 3068.11
Iron Pin & Guards
280' Lt. Sta. 119+50
M.L.

NOTE: T.S.@C. = Top of Slab at Curb
T.S.@℄ = Top of Slab at Centerline Bdg.

GENERAL NOTES—

1. Rail posts shall be built vertical.
2. Longitudinal elements of the slab shall conform to the vertical and horizontal curves.
3. See NOTES on sheet No. 1 and Sheets 4 thru 8.
4. Place floor drains as shown on PLAN view. (3 drains Required).

SPECIFICATION NOTE—

Use current South Dakota Standard Specifications for Roads and Bridges, and the Supplemental Specifications as included in the proposal.

ESTIMATED QUANTITIES

ITEM	Cl. "A" Conc. Cu. Yds.	Steel-Lbs. Reinf.	Steel-Lbs. Struct.	Type A Steel Railing-Lin. Ft.	Treated Timber Piles - ♦ Lin. Ft.	Excavation-Cu. Yds. Struct.	Excavation-Cu. Yds. A Unclass	Pile Shoes * No.
Superstructure	134.6	28,900	85	168.3'				
Abutment No. 1	25.6	2,280	620		13@20'=260	10		13
Abutment No. 4	25.6	2,280	620		13@20'=260	10		13
Bent No. 2	22.8	3,885			15@10'=150'	50		15
Bent No. 3	22.8	3,885			15@10'=150'	50		15
Totals	231.4	52,230	1325	168.3	♦ 820	120		* —

♦ One Treated Timber Test Pile shall be driven at Abut. No. 4 and Bent No. 2, before remaining piles are ordered.
A See Grading Plans for Unclassified Excavation.
* All Steel Pile Shoes as approved by the ENGINEER shall be used. The cost shall be included in the unit price bid for Treated Timber Piles.

ORIGINAL CONSTRUCTION PLANS

(EAST BOUND LANES)

GENERAL DRAWING AND QUANTITIES

FOR

83'-0" CONTINUOUS CONCRETE BRIDGE

38'-0" ROADWAY

OVER CREEK — SEC. 23-T2N-R8E

STA. 111+97.88 TO STA. 112+82.12 — 1 90-2 (11) 62

PENNINGTON COUNTY

STR. NO. 52-469-276 — SOUTH DAKOTA — H20-S16-44

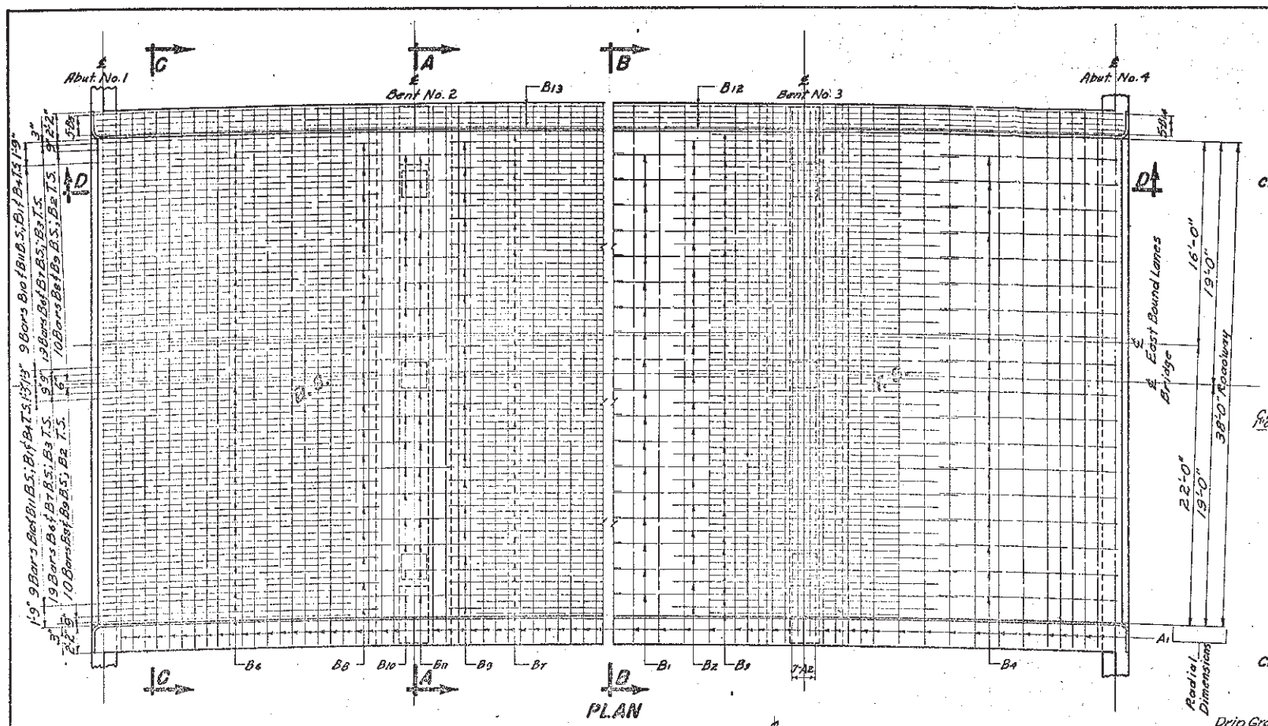
DEPARTMENT OF HIGHWAYS

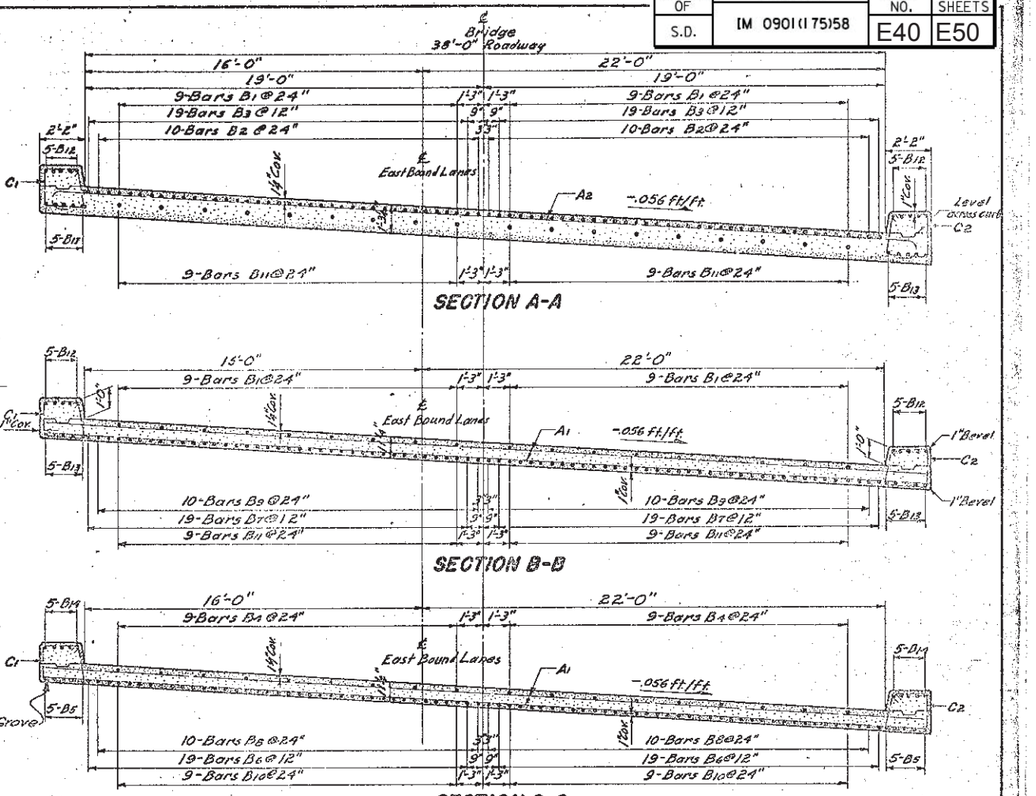
MARCH 1961

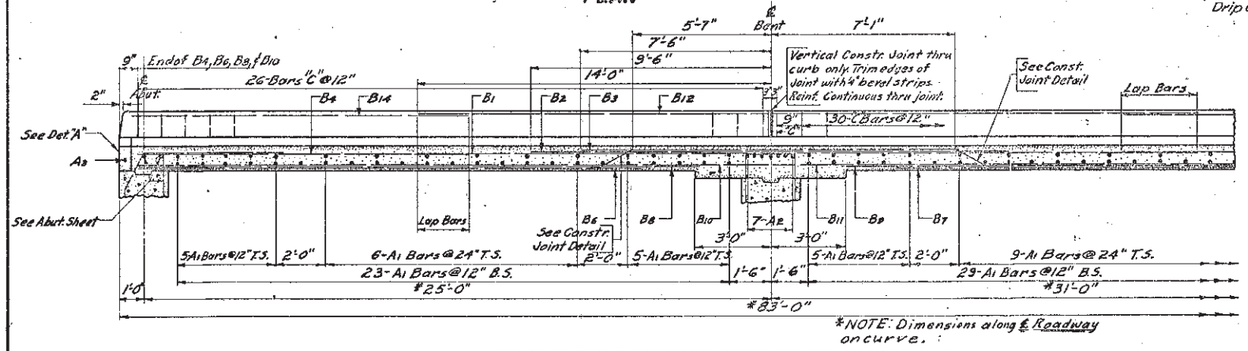
3 OF 4

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	C.H.J.	R.K.	BRIDGE ENGINEER

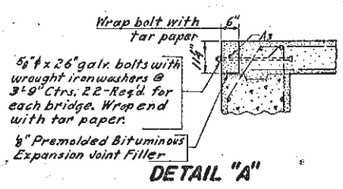
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E40	E50







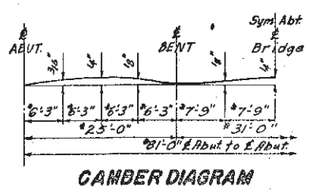
HALF LONGITUDINAL SECTIONAL VIEW D-D



DETAIL "A"

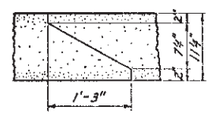
ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Class "A" Concrete	Cu. Yd.	154.6
Reinforcing Steel	Lb.	33,900
*Structural Steel	Lb.	65

* Includes 27 lbs for 3 drains



CAMBER DIAGRAM

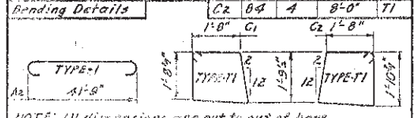
Camber is calculated for dead load plus plastic flow and shall be added to the proposed grade elevations at the respective stations to establish the elevation of the top of the finished roadway slab.



CONST. JOINT DETAIL

REINFORCING SCHEDULE

MK.	NO.	SIZE	LENGTH	TYPE	MK.	NO.	SIZE	LENGTH	TYPE
A1	126	6	41'-9"	Str.	B7	38	9	18'-6"	Str.
A2	14	8	44'-0"	1	B8	40	8	22'-6"	Str.
A3	2	5	37'-9"	Str.	B9	20	8	25'-6"	Str.
B1	36	9	31'-0"	Str.	B10	36	8	25'-3"	Str.
B2	40	8	19'-6"	Str.	B11	18	8	31'-0"	Str.
B3	76	8	16'-3"	Str.	B12	20	8	30'-0"	Str.
B4	36	6	13'-3"	Str.	B13	10	8	31'-0"	Str.
B5	20	8	25'-9"	Str.	B14	20	6	13'-0"	Str.
B6	76	9	20'-3"	Str.	C1	84	4	7'-9"	T1
Bending Details					C2	84	4	8'-0"	T1



NOTE: All dimensions are out to out of bars.

ORIGINAL CONSTRUCTION PLANS

(EAST BOUND LANES)

DETAILS OF SUPERSTRUCTURE

FOR

83'-0" CONTINUOUS CONCRETE BRIDGE

38'-0" ROADWAY

OVER CREEK — SEC. 23-T2N-R8E

STA. 111+97.88 TO STA. 112+62.12 — 190-2(11)62

PENNINGTON COUNTY

STR. NO. 52-469-276

SOUTH DAKOTA — N20-[illegible]-46 (CALL)

DEPARTMENT OF HIGHWAYS

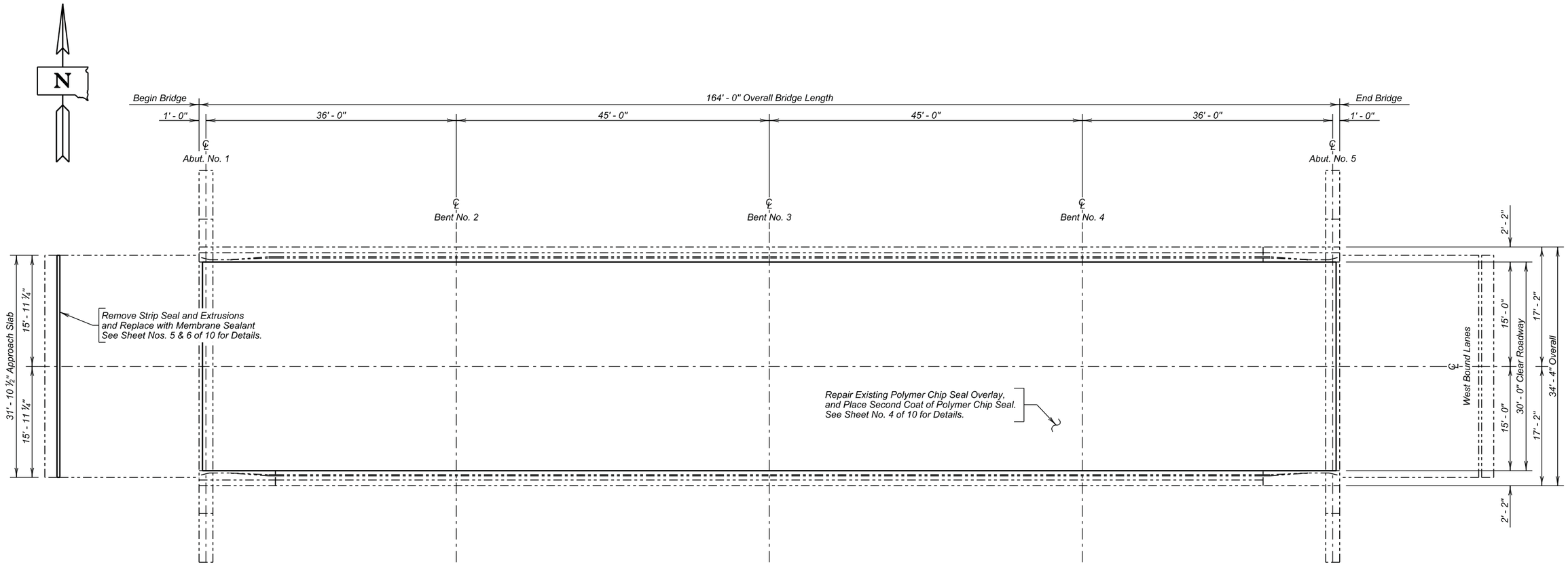
MARCH 1961

4 OF 4

DESIGNED BY	DRAWN	CHECKED BY	APPROVED

STATE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E41	E50



PLAN

-X021-

INDEX OF BRIDGE SHEETS -

Sheet No. 1 - Layout for Upgrading
Sheet No. 2 - Estimate of Structure Quantities and Notes
Sheet No. 3 - Notes (Continued)
Sheet No. 4 - Polymer Chip Seal Layout
Sheet No. 5 - Approach Slab Joint Details
Sheet No. 6 - Membrane Sealant Details
Sheet No. 7 thru 10 - Original Construction Plans

(WEST BOUND LANES)
LAYOUT FOR UPGRADING
FOR
164' - 0" CONT. CONCRETE BRIDGE

30' - 0" ROADWAY — 0°SKEW
OVER CO. ROAD & DRAW — SEC. 21/22-T2N-R9E
STR. NO. 52-510-274 — IM 0901(175)58
PCN 035J

PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2015

1 OF 10

PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	KR	Kevin N. Boeden
PENN035J	035JRH01		BRIDGE ENGINEER

ESTIMATE OF STRUCTURE QUANTITIES

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
410E2600	Membrane Sealant Expansion Joint	31.8	Ft
460E0070	Class A45 Concrete, Bridge Repair	0.6	CuYd
460E0300	Breakout Structural Concrete	0.6	CuYd
480E0200	Epoxy Coated Reinforcing Steel	90	Lb
480E0504	No. 4 Rebar Splice	2	Each
480E0506	No. 6 Rebar Splice	1	Each
491E0025	Bridge Deck Polymer Chip Seal Place on Existing Chip Seal	543.4	SqYd
491E0030	Spot Repair of Existing Bridge Deck Chip Seal	27.2	SqYd
491E0110	Abrasive Blasting of Bridge Deck	543.4	SqYd

SPECIFICATIONS

1. Design Specifications: AASHTO Standard Specifications for Highway Bridges 17th Edition using Working Stress Design.

2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2015 Edition and Required Provisions, Supplemental Specifications and Special Provisions as included in the Proposal.

DETAILS AND DIMENSIONS OF EXISTING BRIDGE

All details and dimensions of the existing bridge, contained in these plans, are based on the original construction plans and shop plans. It is the Contractor's responsibility to inspect and verify the actual field conditions and any necessary as-built dimensions affecting the satisfactory completion of the work required for this project.

SCOPE OF BRIDGE WORK & SEQUENCE OF OPERATIONS

All work on this structure shall be accomplished with the traffic control shown elsewhere in the plans. Alternate sequence of operations may be submitted by the contractor for approval by the engineer a minimum of two weeks prior to the preconstruction meeting.

1. Prepare the surface of the existing Bridge Deck Polymer Chip Seal Overlay for a second coat of Polymer Chip Seal for the first phase of construction.

2. Apply the second coat of Bridge Deck Polymer Chip Seal for the first phase of construction.

3. Breakout the existing approach slab and sleeper slab to the limits shown in the plans for the first phase of construction.

4. Install new Membrane Sealant for the first phase of construction.

5. Switch traffic and repeat steps 1 through 4 for the second phase of construction.

GENERAL CONSTRUCTION – BRIDGE

1. All mild reinforcing steel shall conform to ASTM A615, Grade 60.

2. All exposed concrete corners and edges shall be chamfered 3/4" unless noted otherwise in the plans. Match existing chamfer if the existing chamfer differs.

3. Use 2" clear cover on all reinforcing steel except as shown otherwise.

4. Request for construction joints or resteel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

5. Surfaces of fresh concrete at construction joints shall be rough floated sufficiently to consolidate the surface. All construction joints shall be cleaned of surface laitance, curing compounds and other foreign materials prior to placing fresh concrete against the joint.

CONCRETE BREAKOUT

1. The existing approach slab and sleeper slab shall be broken out to the limits shown on the plans. Breakout limits shall be defined with a 3/4" deep sawcut (unless specified otherwise in these plans), where practical, as approved by the Engineer. Care shall be taken not to damage the existing reinforcing steel that is to be reused in the new construction during concrete breakout.

2. All broken out concrete, discarded reinforcing bars and expansion devices shall be disposed of by the Contractor. Any disposal of discarded material shall be in accordance with the Environmental Commitments.

3. The contract unit price per cubic yard for "Breakout Structural Concrete" shall include breaking out concrete, cleaning, straightening existing reinforcing steel, removal of the existing armored device, and disposal of all broken out material.

4. The existing reinforcing steel in the approach slab and sleeper slab is epoxy coated. Reinforcing steel that is exposed and is scheduled for use in the new construction shall be cleaned of all adhering concrete and rust (if present) with a wire brush and straightened to the satisfaction of the Engineer. Any reinforcing steel that is damaged during concrete breakout shall be replaced or repaired, as approved by the Engineer, by the Contractor at no cost to the Department. After all concrete removal and rebar straightening, the Contractor shall visually inspect the epoxy coating on the salvaged reinforcing steel with the Engineer and repair all areas of damaged epoxy coating as approved by the Engineer. The damaged coating areas shall be repaired with a touch up coating material supplied by an epoxy coating manufacturer who supplies coating material for new epoxy coated reinforcing steel. This coating shall be inert in concrete and compatible with the existing coating on the reinforcing steel. The coating shall be allowed to cure for 24 hours or as per the manufacturer's recommendations, whichever is more stringent, before concrete can be placed. These bars shall be clean and free from all surface contaminants before coating. The cost of cleaning and placing the epoxy touch up coating to the existing reinforcing steel shall be incidental to the various bid items.

PLACING A NEW POLYMER CHIP SEAL ON AN EXISTING POLYMER CHIP SEAL

1. This work consists of the following:

   a. Spot repair of existing single layer polymer chip seal.

   b. Preparation of the existing bridge deck polymer chip seal surface.

   c. Furnishing and placing a new coat of polymer chip seal on the existing coat of polymer chip seal.

2. The polymer chip seal shall be applied in accordance with Section 491 of the Construction Specifications. The polymer chip seal shall be a Type 1 material as described in the approved product list.

3. The entire bridge deck surface shall be given a light abrasive blasting to remove surface contaminants. Upon completion of the abrasive blasting, the entire bridge deck shall be blown clean with dry compressed air to remove all dust and debris. Cleaning by abrasive blasting and compressed air shall be done no more than 24 hours prior to the placement of the polymer chip seal. Abrasive blasting shall be accomplished in accordance with the construction specifications.

ESTIMATE OF STRUCTURE QUANTITIES AND NOTES

FOR

164' - 0" CONT. CONCRETE BRIDGE

STR. NO. 52-510-274

SEPTEMBER 2015

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	BWS	Kevin N. Goeden
PENN035J	035JRH02		BRIDGE ENGINEER

PLACING A NEW POLYMER CHIP SEAL ON AN EXISTING POLYMER CHIP SEAL (CONTINUED)

4. The epoxy paint traffic striping shall be completely removed, as approved by the engineer, prior to placement of the Polymer Chip Seal. All cost associated with the removal of the epoxy paint traffic striping shall be incidental to the contract unit price per square yard for Abrasive Blasting of Bridge Deck.

5. The existing polymer chip seal may have damaged areas and/or areas with no polymer chip seal that will need to be spot repaired. The spot repairs shall be accomplished after the cleaning of the entire deck surface described in note number 3. The Bridge Construction Engineer shall be notified at least 24 hours in advance of starting spot repairs to inspect the cleaned surface and to verify the number, size and location of the spot repairs.

6. The following procedure shall be used for preparation of spot repair areas:

   a. Remove the existing polymer chip seal (when present) in areas where more than 25% of the chip seal is missing as determined by the engineer. The removal of any existing polymer chip seal shall be by bridge deck grinding until all of the polymer is removed and only the concrete of the deck surface is visible in the removed area.

   b. Check the concrete in the repair area for any concrete delaminations. Delaminations shall be repaired as directed by the Bridge Construction Engineer.

   c. Clean and prepare the deck surface for the polymer chip seal patch by abrasive blasting. The abrasive blasting shall remove all surface laitance and shall expose the coarse aggregate to the satisfaction of the Engineer. After abrasive blasting, the spot repair area shall be blown clean with dry compressed air to remove all dust and debris. Abrasive blasting and cleaning shall be done no more than 24 hours prior to the placement of the polymer chip seal patch.

   d. Apply a new first coat of polymer chip seal to the spot repair areas. Spot repairs shall be allowed to cure for the amount of time as specified by the manufacturer prior to placement of the second polymer chip seal coat over the entire deck surface.

7. Spot Repair of Existing Bridge Deck Chip Seal will be measured and paid for at the contract unit price per square yard. Payment will be full compensation for all labor, equipment, materials, and all incidental work required to remove existing polymer chip (when specified) and clean and prepare the surface accepting the new polymer.

8. Bridge Deck Polymer Chip Seal Placed on Existing Chip Seal will be paid for at the contract unit price per square yard. Payment will be full compensation for all labor, equipment, materials, and all incidental work required to furnish and install the Bridge Deck Polymer Chip Seal Placed on Existing Chip Seal including the removal and disposal of the excess cover aggregate.

NOTES (CONTINUED)

FOR

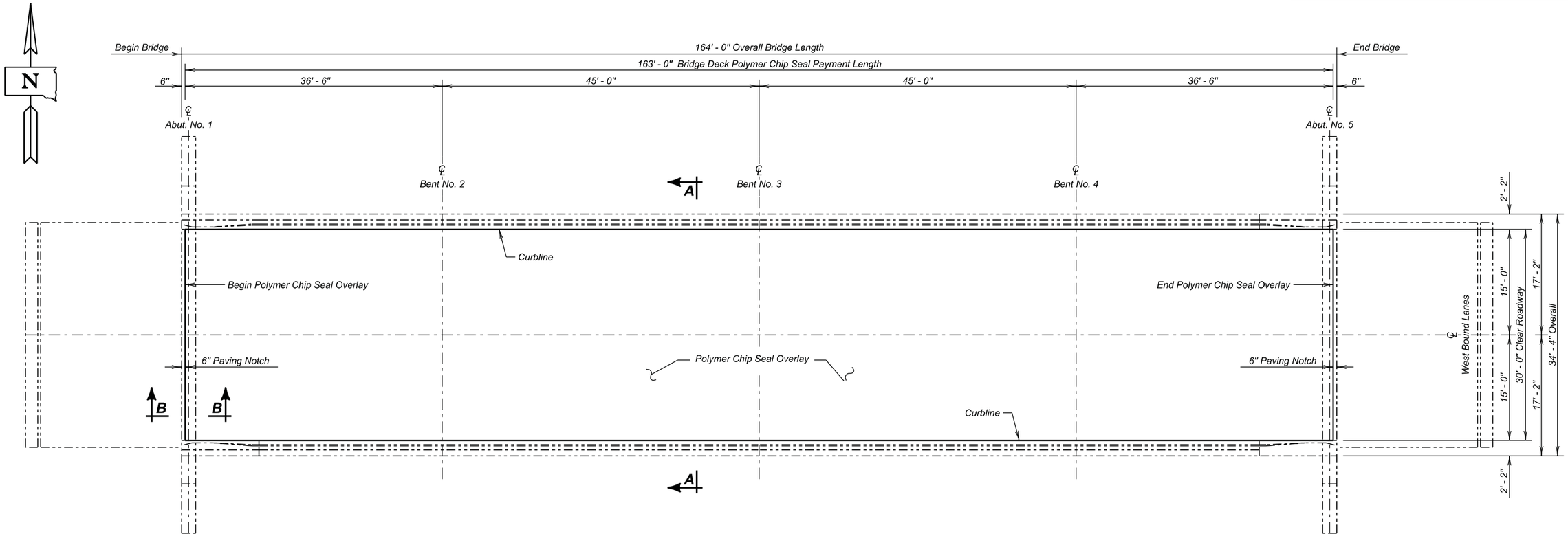
164' - 0" CONT. CONCRETE BRIDGE

STR. NO. 52-510-274

SEPTEMBER 2015

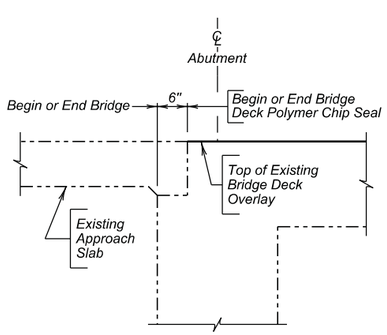
DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	BWS	Kevin N. Goeden
PENN035J	035JRH03		BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E44	E50

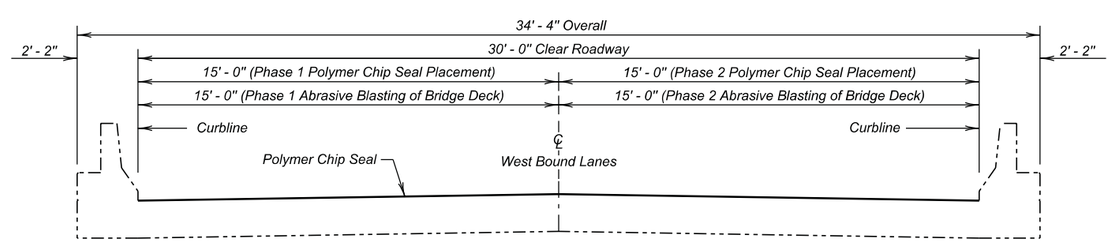


PLAN

ESTIMATED QUANTITIES			
ITEM	UNIT	QUANTITY	
		Phase I	Phase 2
Bridge Deck Polymer Chip Seal Placed on Existing Chip Seal	Sq. Yd.	271.7	271.7
Abrasive Blasting of Bridge Deck	Sq. Yd.	271.7	271.7
Spot Repair of Existing Bridge Deck Chip Seal	Sq. Yd.	13.6	13.6



SECTION B - B



SECTION A - A

(WEST BOUND LANES)
POLYMER CHIP SEAL LAYOUT
FOR
164' - 0" CONT. CONCRETE BRIDGE

30' - 0" ROADWAY — 0°SKEW
OVER CO. ROAD & DRAW — SEC. 21/22-T2N-R9E
STR. NO. 52-510-274 — IM 0901(175)58

PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2015

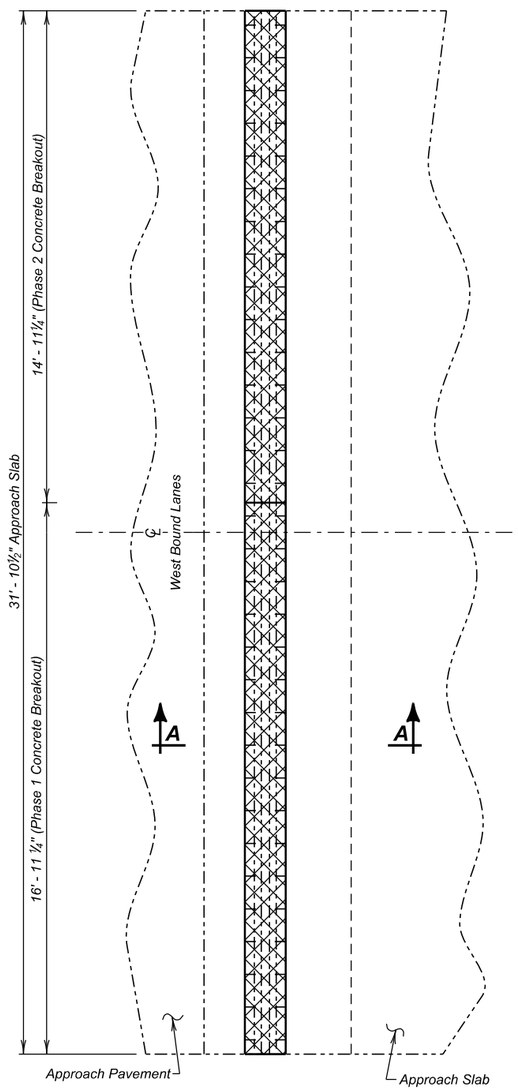
DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	KR	Kevin N. Goeden
PENN035J	035JRH04		BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E45	E50

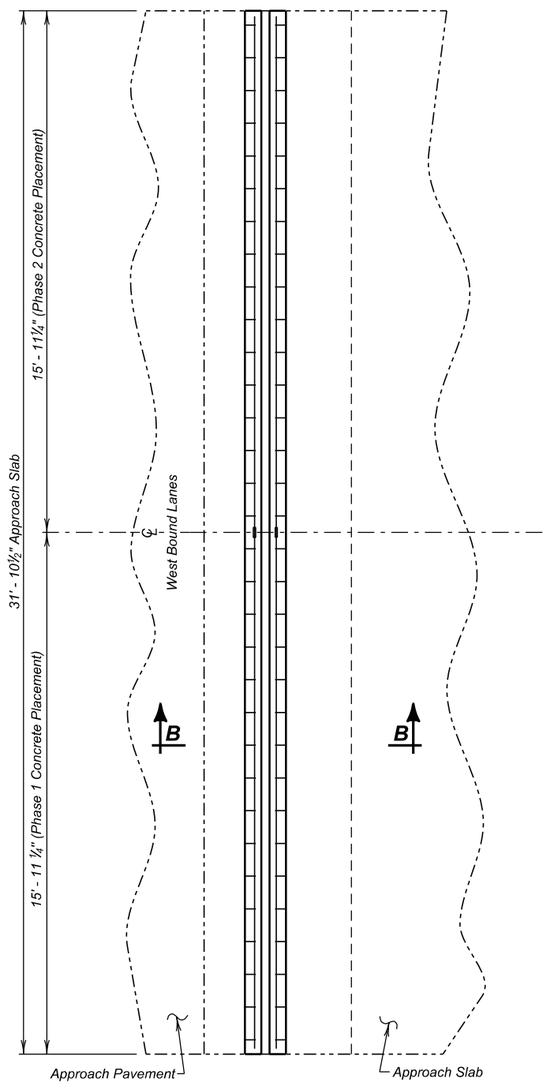
REINFORCING SCHEDULE
(for one approach slab)

Mk.	No.	Size	Length	Type	Bending Details
e1	2	4	15' - 9"	Str.	Phase 1
e2	1	6	15' - 9"	Str.	
e1	2	4	15' - 9"	Str.	Phase 2
e2	1	6	15' - 9"	Str.	

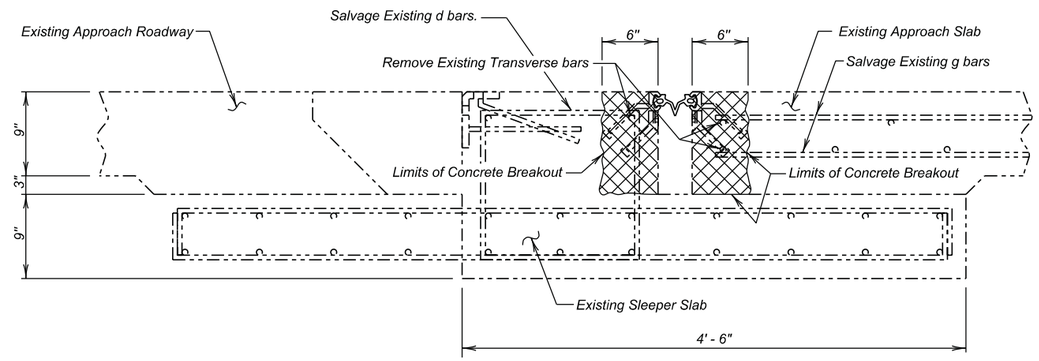
NOTES:
All dimensions are out to out of bars.



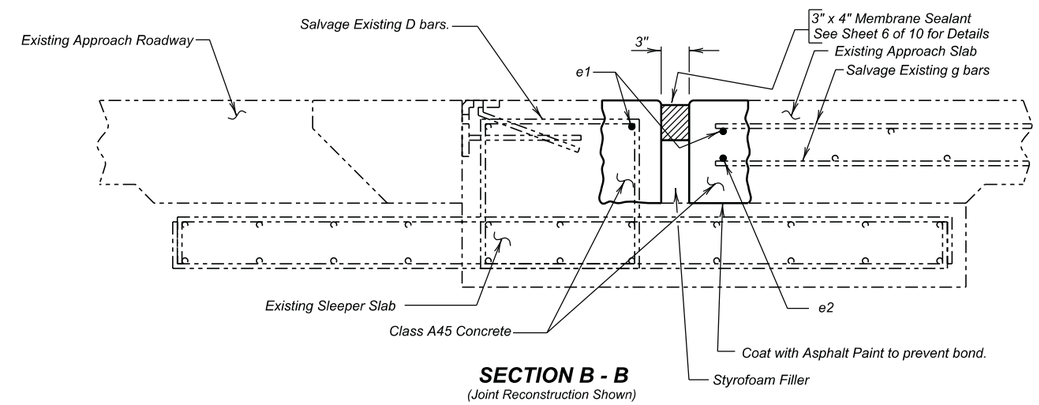
PLAN VIEW
(Showing Existing Joint)



PLAN VIEW
(Showing New Joint)



SECTION A - A
(Concrete Removal Shown)



SECTION B - B
(Joint Reconstruction Shown)

ESTIMATED QUANTITIES

ITEM	UNIT	Phase 1	Phase 2
Breakout Structural Concrete	Cu. Yd.	0.3	0.3
Class A45 Concrete Bridge Repair	Cu. Yd.	0.3	0.3
Epoxy Coated Reinforcing Steel	Lb.	45	45
No. 4 Rebar Splice	Each	2	-
No. 6 Rebar Splice	Each	1	-

Limits of Concrete Breakout

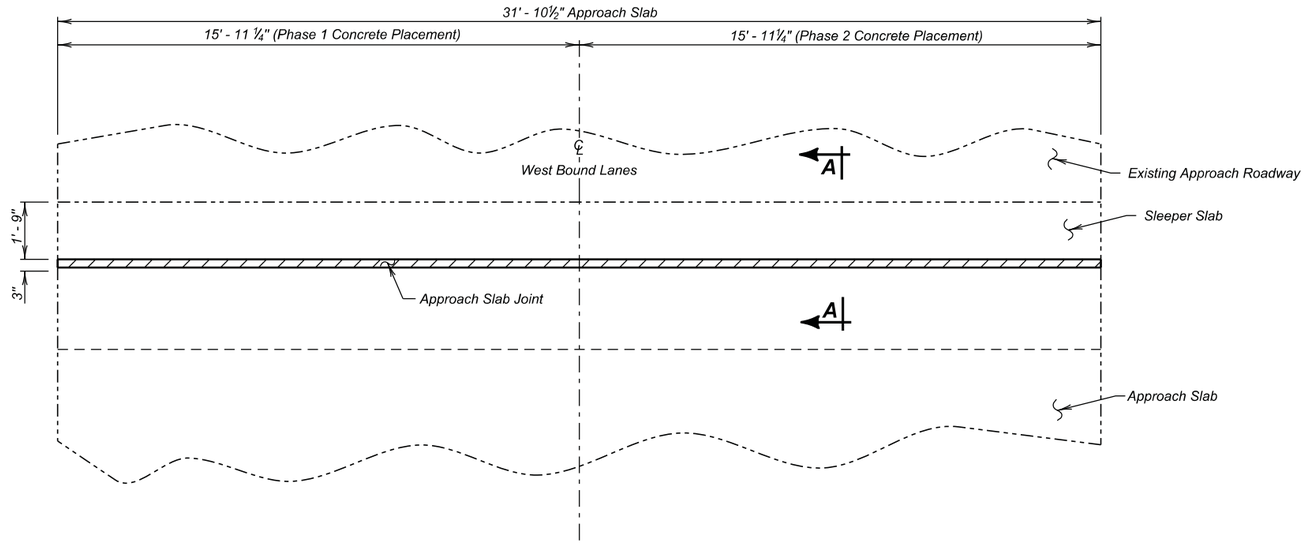
(WEST BOUND LANES)
APPROACH SLAB JOINT DETAILS
FOR
164' - 0" CONT. CONCRETE BRIDGE

30' - 0" ROADWAY — 0°SKEW
OVER CO. ROAD & DRAW — SEC. 21/22-T2N-R9E
STR. NO. 52-510-274 — IM 0901(175)58

PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2015

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	KR	Kevin N. Goeden
PENN035J	035JRH05		BRIDGE ENGINEER

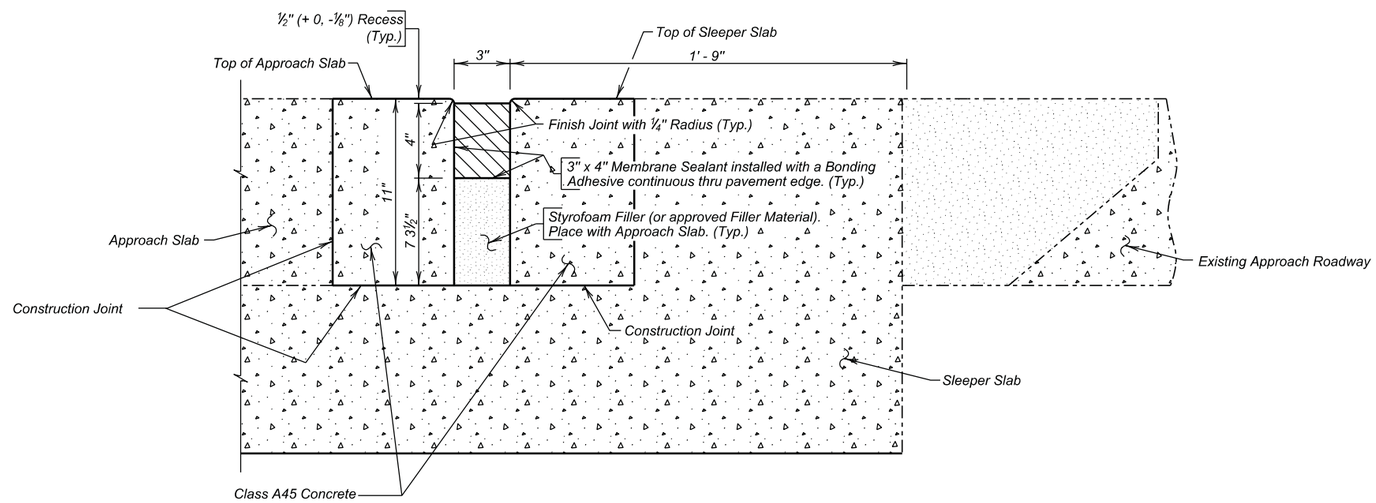
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E46	E50



PLAN

GENERAL NOTES

1. The Membrane Sealant shall be on the approved product list for Membrane Sealant Expansion Joints.
2. The manufacturer shall supply the membrane sealant in packaging that precompresses the membrane sealant. The precompressed dimension shall be as recommended by the sealant manufacturer, however, in no case shall the precompressed dimension exceed 75% of the joint opening width. The foam sealant shall be slowly self expanding to permit workers ample time to install the membrane sealant before the membrane sealant exceeds the joint opening width.
3. The membrane sealant shall provide a water tight seal throughout a joint movement range of + 25% (minimum) from the specified joint opening dimension.
4. The membrane sealant shall be supplied in pieces a minimum of 5 feet in length. The foam sealant shall be ultra-violet and ozone resistant.
5. The bonding adhesive used to attach the membrane sealant to the adjacent concrete shall be approved by the membrane sealant manufacturer.
6. Adhesive used to join adjacent pieces of the membrane sealant shall be as recommended by the manufacturer.
7. If Styrofoam filler material is used in the construction, it shall be closed cell and water-tight as approved by the Engineer.
8. The minimum concrete air temperature at the time of joint installation and adhesive curing shall be 40° F.
9. A technical representative of the membrane sealant manufacturer shall be present at the jobsite during installation. The technical representative shall be knowledgeable in the correct procedures for the preparation and installation of the joint material to ensure the Contractor installs the joint to the Manufacturers recommendations.
10. Surfaces that will be in contact with the membrane sealant shall be thoroughly cleaned by abrasive blasting to remove all laitance and contaminants (such as oil, curing compounds, etc.) from the surface. At a minimum, two passes of abrasive blasting with the nozzle held at an angle to within 1 to 2 inches of the surface will be required. Cleaning of the surfaces with solvents, wire brushing, or grinding shall not be permitted.
11. After abrasive blasting, but immediately prior to membrane joint installation, the entire joint contact surface shall be air blasted. The air compressor used for joint cleaning shall be equipped with trap devices capable of providing moisture-free and oil-free air at a recommended pressure of 90 psi. To obtain complete bonding with the adhesive, the adjacent surfaces must be dry and clean. The contact surfaces for the joint shall be visually inspected by the Engineer immediately prior to joint installation to verify the surface is dry and clean.
12. Individual spliced sections shall be installed as per the manufacturers' recommendations. The membrane joint sealant manufacturer shall submit a detailed installation procedure to the Engineer at least 5 days prior to joint installation for his review.
13. Traffic shall not be allowed on the joint until the bonding adhesive has had time to cure, as recommended by the manufacturer.
14. Use plywood or other material to protect concrete adjacent to the joint from spalling before any equipment is moved across the joint. Any spall areas will be repaired at the Contractor's expense by breaking out and replacing adjacent concrete, as approved by the Engineer.
15. The Membrane Sealant Expansion Joint will be measured in feet to the nearest one-tenth foot, complete in place. Measurement will be made of the overall horizontal length. The Membrane Sealant Expansion Joint will be paid for at the contract unit price per foot complete in place. Payment for this item shall be full compensation for furnishing all the required materials in place, including labor, equipment and incidentals necessary to complete the work in accordance with the plans and the foregoing specifications.



SEC. A - A

ESTIMATED QUANTITIES
(For One Approach Slab)

ITEM	UNIT	Phase 1	Phase 2
Membrane Sealant Expansion Joint	Ft.	15.9	15.9

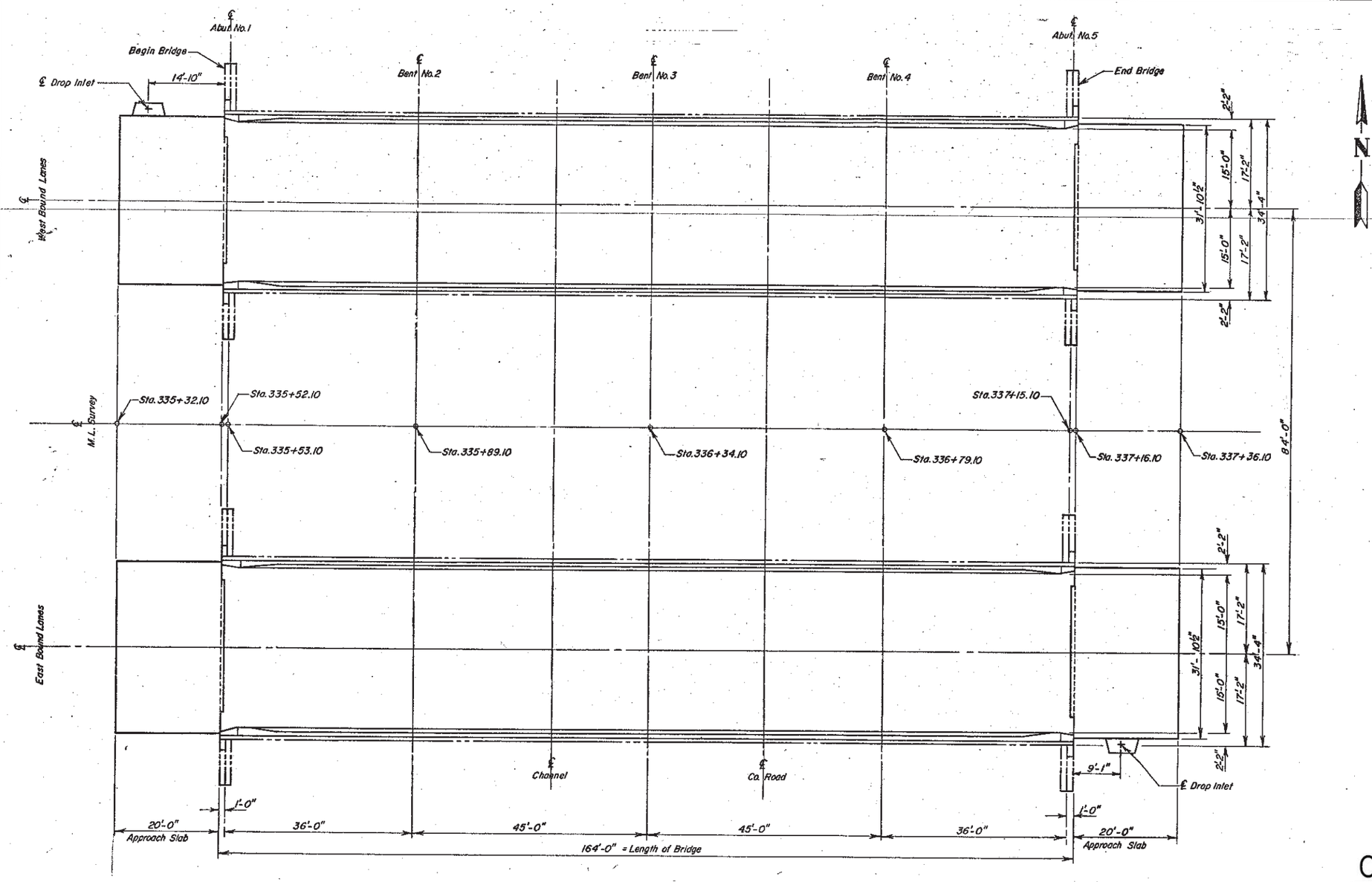
(WEST BOUND LANES)
MEMBRANE SEALANT DETAILS
FOR
164' - 0" CONT. CONCRETE BRIDGE

30' - 0" ROADWAY — 0°SKEW
OVER CO. ROAD & DRAW — SEC. 21/22-T2N-R9E
STR. NO. 52-510-274 — IM 0901(175)58

PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2015

DESIGNED BY	CK. DES. BY	DRAFTED BY	
BWS	MM	KR	Kevin N. Goeden
PENN035J	035JRH06		BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E47	E50



PLAN

INDEX OF BRIDGE SHEETS—

Sheet No. 1 - Layout Sheet.
Sheet No. 2 - Estimate of Quantities and Notes.
Sheet No. 3 - General Drawing, West Bound Lanes.
Sheet No. 4 - Barrier Curb Details for Replacement of Railing, West Bound Lanes.
Sheet No. 5 - Details of Approach Slab Adjacent to Bridge, West Bound Lanes.
Sheet No. 6 - General Drawing, East Bound Lanes.
Sheet No. 7 - Barrier Curb Details for Replacement of Railing, East Bound Lanes.
Sheet No. 8 - Details of Approach Slab Adjacent to Bridge, East Bound Lanes.
Sheet Nos. 9 thru 18 - Original Construction Plans.

GENERAL NOTES FOR INFORMATIONAL PURPOSES—

The Bridge portion of the work to be done under these plans includes, but is not limited to, the following items:

a. Removal of existing bridge railing.
b. Removal of a minimum of 1/4" concrete from the entire bridge deck. This will vary in accordance to centerline profile shown on the General Drawing as well as removal of unsound concrete, as shown on these plans and determined by the Engineer.
c. Removal of approach slabs, curb and gutter within limits of construction, and removal of end blocks.
d. Construction of barrier railing.
e. Construction of bridge end approach slabs and sleeper slabs.
f. Installation of 1 1/4" minimum latex modified deck overlay conforming with the centerline profile shown on the General Drawing.

ORIGINAL CONSTRUCTION PLANS

LAYOUT
FOR UPGRADING OF TWIN
164'-0" CONTINUOUS CONCRETE BRIDGES
30'-0" ROADWAY

OVER CO. ROAD & DRAW — SEC. 21/22-T2N-R9E
STA. 335+52.10 TO 337+16.10 — I 90-2(57) 57 & IR 90-2(63) 57
STR. NO. 52-510-275/52-510-274
PENNINGTON COUNTY — HS 20-44 (& ALT.)

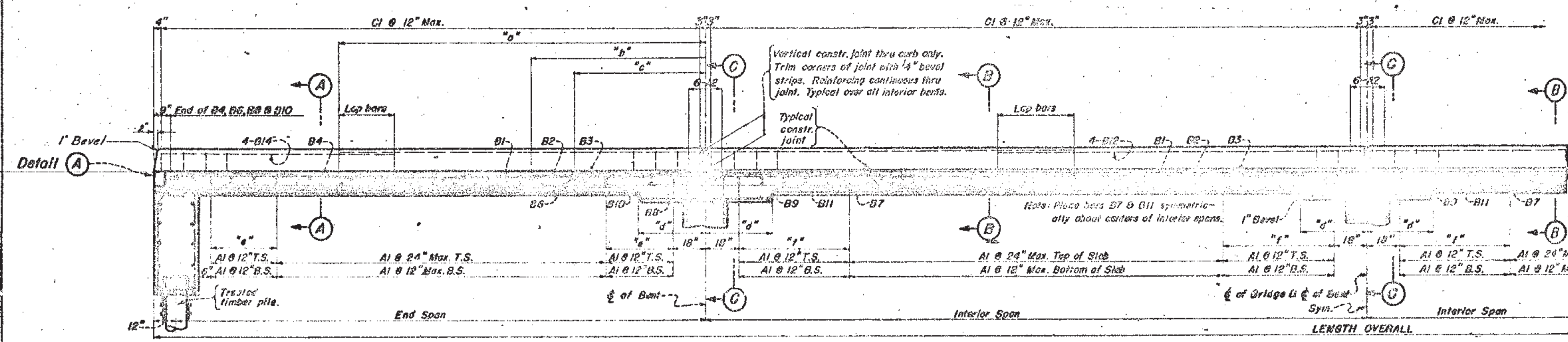
S. D. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
DEC. 1977

7 OF 10

PLANS BY:
BRIDGE PROGRAM, SO. DAK. DIVISION OF HIGHWAYS.

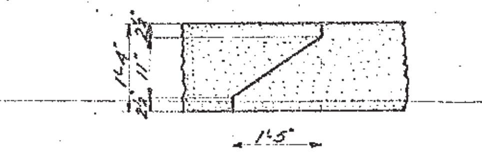
DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	L. a. k.	C.D.	K.C. Wilson BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E48	E49

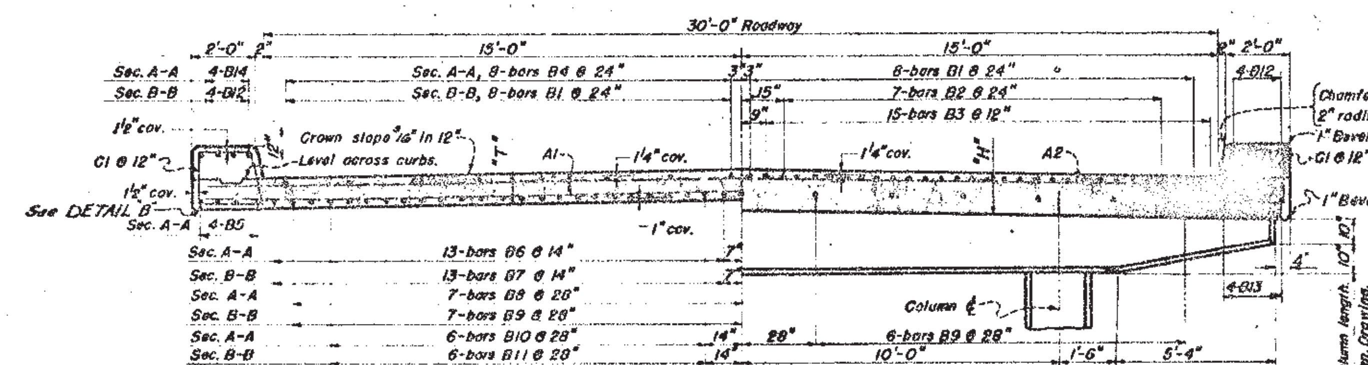


HALF LONGITUDINAL SECTIONAL VIEW

(Railing not shown)



CONSTRUCTION JOINT DETAIL-TYP.

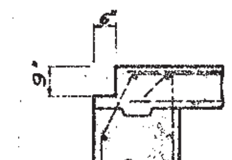


HALF SECTION A-A
HALF SECTION B-B

As shown and noted.

℄ Roadway Sym.

HALF SECTION C-C



DETAIL (A)

DETAIL "B"

NOTES

These notes cover substructure, superstructure, and railing details. The General Plan for each structure will show spans, elevations, and other necessary notes and details.

CONSTRUCTION SPECIFICATIONS: South Dakota Highway Commission's "Standard Specifications for Roads and Bridges," current issue, shall govern unless noted otherwise herein, on plans, or in Special Provisions.

PILING: All piles shall be treated timber. Piles will not be necessary under footings if the soil bearing pressure exceeds 3 1/4 Tons/sq.ft. If piles are not used on interior bents, decrease footing thickness to two feet, & change quantity of Class A Concrete accordingly, and relocate footing reinforcing steel to allow 4" cover from bot. of ftg.

STRUCTURAL STEEL: All 1" ϕ bolts including washers, 4" x 5/8" bent bars, and floor drains shall be paid for as Structural Steel.

CONCRETE: Class A Concrete shall develop a minimum allowable compressive strength of 4000 p.s.i. at 28 days. All exposed concrete corners and edges shall be chamfered to a 3/4" bevel unless noted otherwise. If necessary to facilitate construction, transverse construction joints may be made at the quarter points of each or any span adjacent to interior bents. A 1/4" wearing surface placed integral with the slab has been allowed for and is included in the slab thicknesses tabulated. All costs for expansion joint filler and tar paper shall be included in the unit price bid per cu. yd for Class A Concrete.

DESIGN DATA: Design loading: H20-S16-44 (T-Current) AASHO and Alternate Loading designated in P.P.M. 20-4, Sec. 4c. Unit Stresses: Concrete, fc = 1600 p.s.i., n = 8; Reinforcing, fs = 20,000 p.s.i. (Int. Grade Steel). Equivalent fluid pressure of earth = 40# sq. ft. Minimum pile loading = 20 Tons per pile.

ORIGINAL CONSTRUCTION PLANS

SLAB DATA

REINFORCING SCHEDULE

LENGTH OVERALL	END SPAN	INTERIOR SPAN	A1 No.	A1 Size	A1 Length	A2 No.	A2 Size	A2 Length	A2 Type	A2 B	A3 No.	A3 Size	A3 Length
74'-0"	16'	20'	110	5/8	33'-6"	18	7/8	35'-3"	1	33'-7"	2	5/8	29'-9"
83'-0"	18'	22'-6"	124				7/8	35'-3"					
92'-0"	20'	25'	140				1"	35'-9"					
101'-0"	22'	27'-6"	156				1"						
110'-0"	24'	30'	170				1"						
119'-0"	26'	32'-6"	186				1"						
128'-0"	28'	35'	200				1"						
137'-0"	30'	37'-6"	218				1"						
146'-0"	32'	40'	232				1"						
155'-0"	34'	42'-6"	248				1"						
164'-0"	35'	45'	262	6	34'-0"	18	9	35'-6"	1	34'-0"	2	5	29'-9"

LENGTH OVERALL	B1 No.	B1 Size	B1 Length	B2 No.	B2 Size	B2 Length	B3 No.	B3 Size	B3 Length	B4 No.	B4 Size	B4 Length	B5 No.	B5 Size	B5 Length
74'-0"	48	7/8	23'-0"	42	7/8	13'-0"	90	3/4	9'-0"	32	3/4	7'-3"	16	3/4	16'-9"
83'-0"		7/8	25'-6"		7/8	13'-6"		3/4	9'-0"			8'-0"		3/4	19'-9"
92'-0"		7/8	28'-0"		7/8	15'-6"		7/8	12'-0"			8'-9"		7/8	20'-9"
101'-0"		1"	31'-0"		1"	15'-6"		7/8	12'-0"			9'-3"		1"	22'-9"
110'-0"		1"	33'-6"		1"	18'-0"		3/4	12'-0"			10'-0"		1"	24'-9"
119'-0"		1"	36'-0"		1"	20'-0"		1"	14'-0"			10'-9"		1"	26'-9"
128'-0"		1"	38'-6"		1"	21'-0"		1"	16'-0"			11'-6"		1"	28'-9"
137'-0"		1"	41'-0"		1"	21'-0"		1"	15'-0"			12'-3"		1"	30'-9"
146'-0"		1"	43'-6"		1"	23'-0"		1"	18'-6"			13'-0"		1"	32'-9"
155'-0"		1 1/8	46'-6"		1 1/8	19'-6"		1"	12'-0"			13'-6"		1 1/8	34'-9"
164'-0"	48	10	49'-0"	42	10	20'-6"	90	10	13'-6"	32	6	14'-3"	16	11	36'-9"

LENGTH OVERALL	B6 No.	B6 Size	B6 Length	B7 No.	B7 Size	B7 Length	B8 No.	B8 Size	B8 Length	B9 No.	B9 Size	B9 Length	B10 No.	B10 Size	B10 Length
74'-0"	52	7/8	13'-6"	52	7/8	14'-0"	26	7/8	16'-3"	26	7/8	20'-0"	24	7/8	14'-6"
83'-0"		7/8	14'-6"		7/8	11'-6"		7/8	12'-3"		7/8	22'-6"		7/8	15'-0"
92'-0"		7/8	15'-6"		7/8	15'-0"		1"	20'-3"		1"	25'-0"		1"	17'-6"
101'-0"		7/8	17'-0"		7/8	16'-0"		1"	22'-3"		1"	27'-6"		1"	19'-0"
110'-0"		1"	19'-0"		1"	17'-0"		1"	24'-3"		1"	30'-0"		1"	20'-6"
119'-0"		7/8	19'-6"		7/8	17'-0"		1"	26'-3"		1"	32'-6"		1"	21'-6"
128'-0"		1"	21'-0"		1"	19'-0"		1"	28'-3"		1"	35'-0"		1"	23'-6"
137'-0"		1"	22'-6"		1"	21'-6"		1"	30'-3"		1"	37'-6"		1"	25'-0"
146'-0"		1"	24'-0"		1"	24'-0"		1"	32'-3"		1"	40'-0"		1"	26'-6"
155'-0"		1"	24'-6"		1"	22'-6"		1 1/8	34'-3"		1 1/8	42'-6"		1 1/8	27'-6"
164'-0"	52	10	27'-9"	52	10	26'-0"	26	11	36'-3"	26	11	45'-0"	24	11	30'-0"

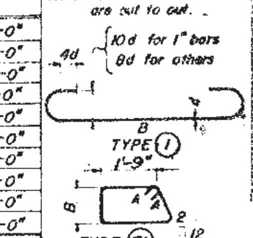
LENGTH OVERALL	B11 No.	B11 Size	B11 Length	B12 No.	B12 Size	B12 Length	B13 No.	B13 Size	B13 Length	B14 No.	B14 Size	B14 Length	C1 No.	C1 Size	C1 Length	C1 Type	A	B
74'-0"	24	7/8	16'-0"	24	3/4	23'-0"	16	3/4	20'-0"	16	3/4	7'-9"	156	1/2	7'-6"	T1	7"	1'-5 1/2"
83'-0"		7/8	17'-6"		3/4	25'-6"		3/4	22'-6"			8'-6"	172		7'-9"			1'-6 1/2"
92'-0"		1"	19'-0"		7/8	28'-0"		7/8	25'-0"			9'-3"	192		7'-9"			1'-6 1/4"
101'-0"		1"	20'-0"		1"	31'-0"		1"	27'-6"			9'-9"	208		8'-0"			1'-7 1/2"
110'-0"		1"	23'-0"		1"	33'-6"		1"	30'-0"			10'-6"	228		8'-0"			1'-8"
119'-0"		1"	22'-6"		1"	36'-0"		1"	32'-6"			11'-3"	244		8'-3"			1'-8 3/4"
128'-0"		1"	25'-0"		1"	38'-6"		1"	35'-0"			12'-0"	264		8'-3"			1'-9 1/2"
137'-0"		1"	27'-0"		1"	41'-0"		1"	37'-6"			12'-9"	280		8'-6"			1'-10 1/4"
146'-0"		1"	28'-0"		1"	43'-6"		1"	40'-0"			13'-6"	300		8'-6"			1'-11"
155'-0"		1 1/8	28'-6"		1 1/8	46'-6"		1 1/8	42'-6"			14'-0"	316		8'-9"			1'-11 3/4"
164'-0"	24	11	33'-0"	24	11	49'-0"	16	11	45'-0"	16	6	14'-9"	336	4	8'-9"	T1	5"	2'-0 1/2"

DIMENSIONS

"T"	"H"	"a"	"b"	"c"	"d"	"e"	"f"	LENGTH OVERALL
8 1/2"	11 1/2"	11'-6"	6'-6"	4'-6"	24"	2'-0"	3'-0"	74'-0"
9 1/4"	12 1/2"	12'-9"	6'-9"	4'-6"	27"	2'-0"	3'-0"	83'-0"
9 3/4"	13 1/4"	14'-0"	8'-3"	6'-0"	30"	3'-0"	4'-0"	92'-0"
10 1/2"	14 1/4"	15'-6"	8'-3"	6'-0"	33"	3'-0"	4'-0"	101'-0"
11"	15"	16'-9"	8'-0"	6'-0"	36"	3'-0"	5'-0"	110'-0"
11 3/4"	16"	18'-0"	10'-0"	7'-0"	39"	4'-0"	5'-0"	119'-0"
12 1/2"	17"	19'-3"	10'-6"	8'-0"	42"	4'-0"	6'-0"	128'-0"
13 1/4"	18"	20'-6"	10'-6"	7'-6"	45"	5'-0"	6'-0"	137'-0"
14"	19"	21'-9"	11'-6"	9'-3"	48"	5'-0"	7'-0"	146'-0"
14 3/4"	20"	23'-3"	9'-9"	6'-0"	51"	5'-0"	7'-0"	155'-0"
16"	21 1/4"	24'-6"	10'-3"	6'-9"	54"	6'-0"	8'-0"	164'-0"

BAR BENDS

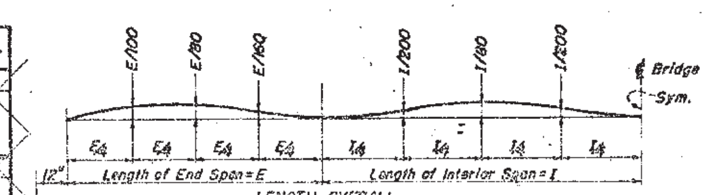
Note: All detail dimensions are out to out.



ESTIMATED QUANTITIES

LENGTH OVERALL	Two Abutments: Class A Concrete Cu. Yds.*	Two Abutments: Reinforcing Steel Lbs.	Two Abutments: Number of Piles	Two Abutments: Structural Steel Lbs.	Three Interior Bents: Class A Concrete Cu. Yds. Constant Quantity	Three Interior Bents: Cu.Yds./lin.ft. for six columns "Q"	Three Interior Bents: Reinforcing Steel Lbs. Constant Quantity	Three Interior Bents: Lbs./lin.ft. for six columns "R"	Three Interior Bents: Number of Piles	Slabs & Curbs: Class A Concrete Cu. Yds.	Slabs & Curbs: Reinforcing Steel Lbs.	Slabs & Curbs: 5/8" ϕ Bolts	Slabs & Curbs: Number of Floor Drains	Slabs & Curbs: Structural Steel Lbs.	Totals: Class A Concrete Cu. Yds.	Totals: Reinforcing Steel Lbs.	Totals: Structural Steel Lbs.	Totals: Number of Piles
74'-0"	35.6	3630	16	760	26.0	0.617	3350	96.3	24	77.1	19165	18	16	170	138.7+("Q"x"L")	26145+("R"x"L")	930	60
83'-0"			16	760	26.0	0.617	3375		24	93.6	20650		20	210	155.2+	[illegible]	970	40
92'-0"			16	760	26.0	0.617	[illegible]		[illegible]	109.3	25870		20	220	170.9+	[illegible]	[illegible]	40
101'-0"			16	760	33.8	0.617	[illegible]	99.3	30	129.5	[illegible]		24	[illegible]	[illegible]	[illegible]	[illegible]	46
110'-0"			18	855	34.9	0.787	[illegible]	119.6	30	146.4	[illegible]		28	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
119'-0"			18	855	34.9	0.787	4100	119.6	30	[illegible]	[illegible]		28	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
128'-0"			18	855	35.0	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		28	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
137'-0"			20	[illegible]	35.0	[illegible]	[illegible]	[illegible]	36	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
146'-0"			20	[illegible]	45.6	[illegible]	[illegible]	[illegible]	48	[illegible]	[illegible]		32	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
155'-0"			20	[illegible]	47.4	[illegible]	7115	[illegible]	48	271.3	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
164'-0"	[illegible]	[illegible]	20	[illegible]	52.5	[illegible]	[illegible]	[illegible]	60	312.0	[illegible]		10	125	[illegible]	[illegible]	[illegible]	[illegible]

* [illegible] slab and curbs directly over abutments.



CAMBER DIAGRAM

Camber is calculated for dead load plus plastic flow. Camber is calculated thus, using the [illegible] Bridge as an illustration: [illegible] [illegible]

DETAILS OF SPECIAL SUPERSTRUCTURE

FOR

164'-0" CONTINUOUS CONCRETE BRIDGE

30'-0" ROADWAY

OVER COUNTY ROAD & DRAW SEC. 21/22-T2N-R9E

STA. 3?5+52.10 TO 337+16.10 I-90-2(46)8

PENNINGTON COUNTY H20-S16-44 (& ALT.)

STR. NO. 52-510-274 SOUTH DAKOTA

STATE HIGHWAY COMMISSION

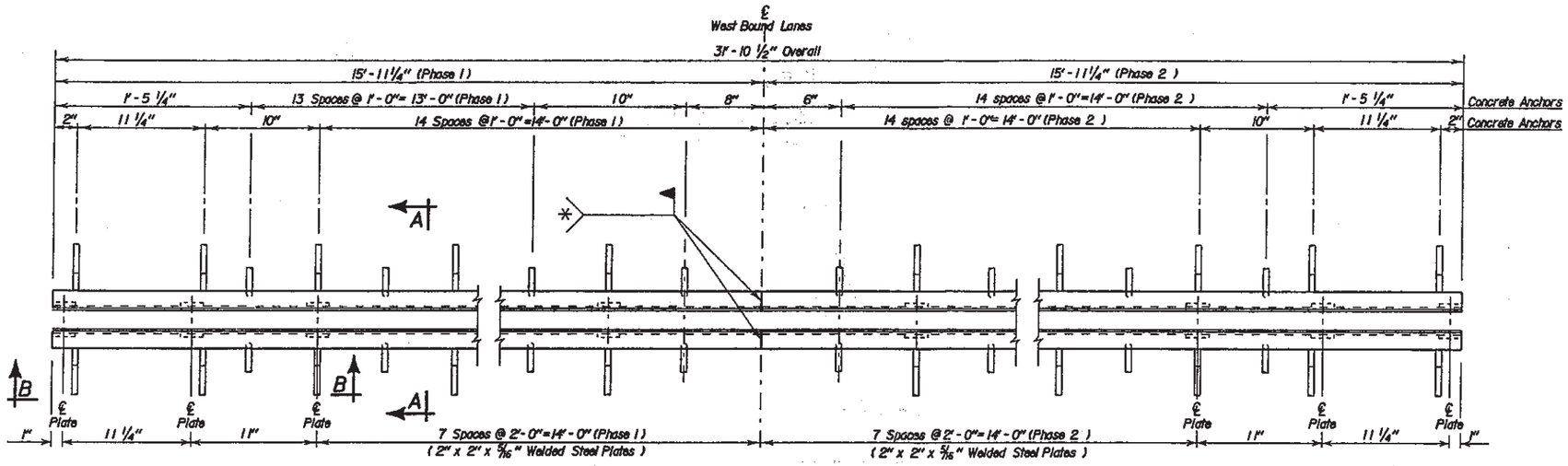
NOV. 1960 8 OF 10

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
H.O.T.	H.O.T.	[illegible]	[illegible]

PROJ. NO. I90-2(57)57 & IR 90-2(63)57 (11) OF (18)

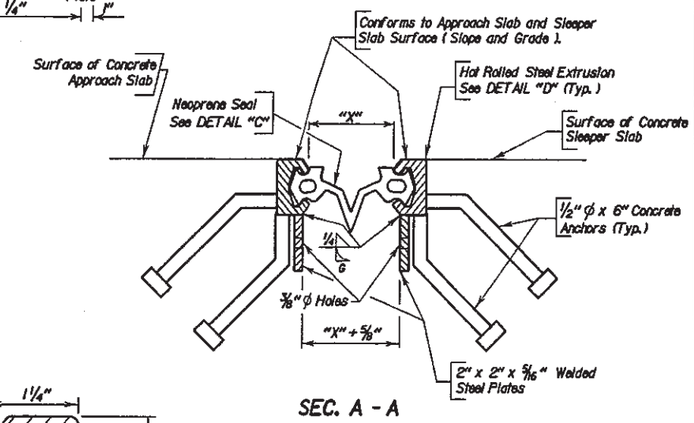
Rev. by O.C.
Ck by C.H.J.

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E49	E50



PLAN OF STRIP SEAL
(Neoprene Seal not shown)

TEMP.	DIMENSION "X"
30°	2 1/4"
40°	2 3/16"
50°	2 1/8"
60°	2 1/16"
70°	2"
80°	1 15/16"
90°	1 7/8"



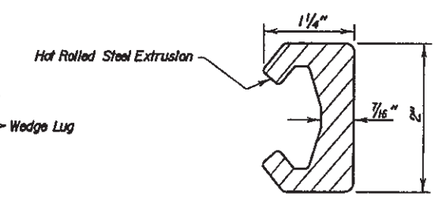
SEC. A - A

GENERAL NOTES:

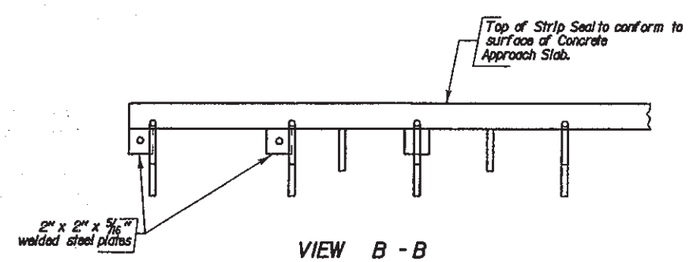
1. Materials for the Steel Extrusion shall conform to ASTM-A36, A242 or A588. Materials for the 2" x 2" x 5/16" welded steel plates shall conform to ASTM-A36. Material for the 1/2" diameter x 6" Concrete Anchors shall conform to Type A steel studs of Section 7 of the latest edition of the ANSI/AWS D1.1 Structural Welding Code-Steel.
2. Material for the neoprene seal shall conform to ASTM D2628 modified to omit the recovery test. No splices will be permitted in the neoprene seal.
3. The lubricant-adhesive used to install the neoprene seal shall conform to the requirements of ASTM D4070. The neoprene seal and the lubricant adhesive should be supplied or recommended by the same source as they must be compatible.
4. The installation of the neoprene seal shall be as recommended by its Manufacturer and approved by the Engineer, but in general shall be as follows: The neoprene seal shall be installed and bonded to the steel extrusion with a high-solids lubricant adhesive. The neoprene surfaces shall be roughened with a wire brush before the application of the lubricant adhesive. The neoprene seal may be installed either prior to or after the time the steel extrusions are concreted in the approach slabs. The steel extrusion shall be dry, clean, free from dirt, grease and contaminates at the time the neoprene seal is installed.
5. Due to the length of the steel extrusions, splices are permitted. No welds shall be permitted in the internal section of the extrusion where the neoprene seal is located. Weld details shall be shown on the shop plans for approval by the Engineer. Welding shall be in accordance with latest edition of the ANSI/AWS D1.1 Structural Welding Code-Steel. Galvanize the steel extrusions and anything welded to them after all welding is completed. They shall be galvanized in accordance with AASHTO M111 (ASTM A123). If welded splices are used subsequent to galvanizing, the weld details and the procedures for preparing the surface for welding and repairing the galvanizing after welding shall be included with the shop plans.
6. The thickness and shape of the neoprene seal may vary from the sketch shown (Detail "C" on this sheet) according to the manufacturer's design; however, the wedge lugs must properly fit the groove in the steel extrusion. Before installation, the shop plans of the proposed neoprene seal showing the fixed dimensions, thickness of neoprene seal, and dimensions pertinent to the fit of the neoprene seal in the steel extrusion shall be submitted to and approved by the Engineer.
7. Since the configuration and dimensions of the steel extrusion may vary according to each manufacturer's design, they need not conform exactly to that shown in DETAIL "D", however, any deviations from the plan shown configuration or dimensions must be approved by the Office of Bridge Design.
8. The Strip Seal Expansion Joint supplier shall submit a detailed gland installation procedure with the shop plans.
9. The cost of welding shall be included in the unit cost for Strip Seal Expansion Joint.
10. The neoprene seal shall be of sufficient length such that a minimum length of 6" shall extend beyond each end of the steel extrusions.
11. The Strip Seal Expansion Joint will be measured in linear feet to the nearest one-tenth foot, complete in place. Measurement will be made of the overall horizontal length. The Strip Seal Expansion Joint will be paid for at the contract unit price per linear foot complete in place. Payment for this item shall be full compensation for furnishing all the required materials in place, inclusive of labor, equipment and incidentals necessary to complete the work in accordance with plans and the foregoing specifications.

* 12. Due to phased construction, the steel extrusion shall be spliced in the Field at the location shown above. The Weld Details and the procedures for preparing the surface for welding and repairing the galvanizing after welding shall be included with the shop plans.

DETAIL "C"
Neoprene Seal shall have a 3" movement capability.



DETAIL "D"



VIEW B - B

ESTIMATED QUANTITIES (For Two Approach Slabs)			
ITEM	UNIT	PHASE 1 QUANTITY	PHASE 2 QUANTITY
Strip Seal Expansion Joint	L.F.	31.9	31.9

ORIGINAL CONSTRUCTION PLANS

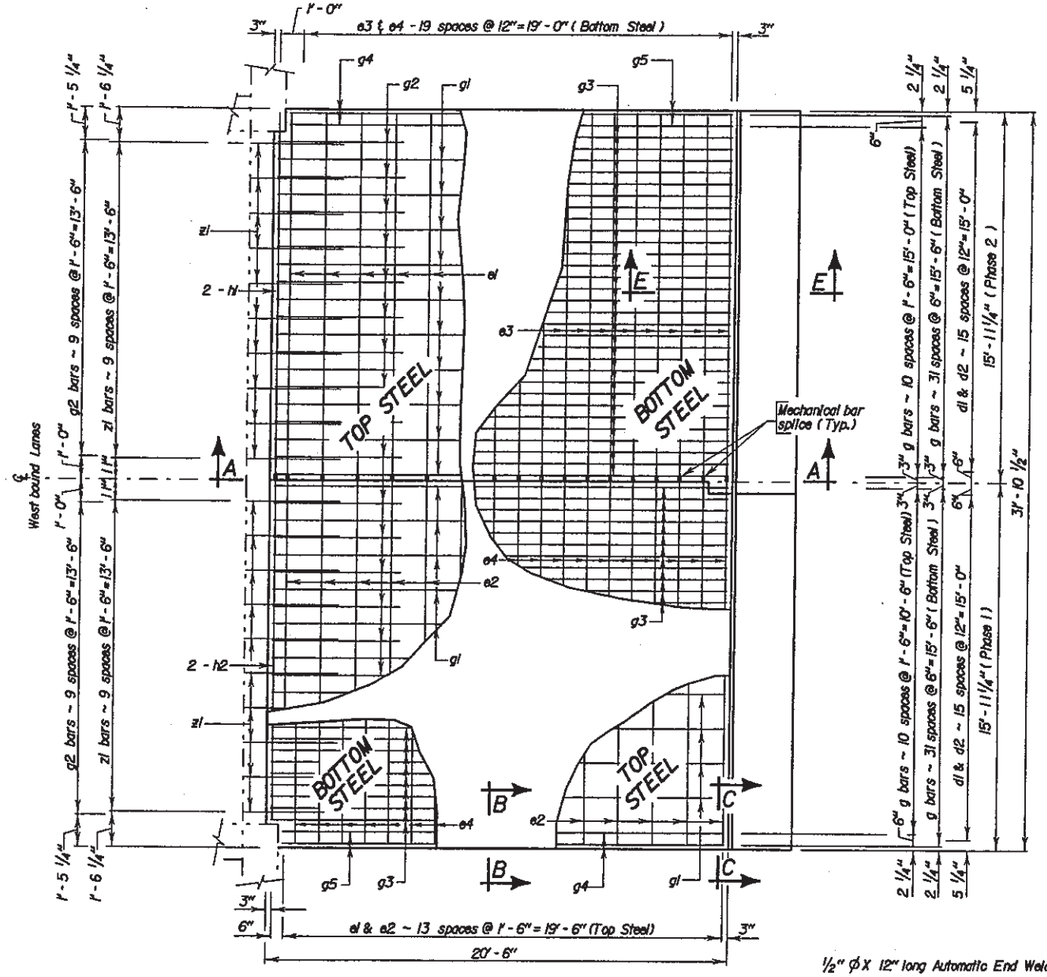
(WEST BOUND LANES)
APPROACH SLAB JOINT DETAILS FOR
164' - 0" CONT. CONC. BRIDGE

30' - 0" ROADWAY — 0° SKEW
STR. NO. 52-510-274 — SEC. 21/22-T2N-R9E
OVER CROSSROAD — IM 90-2(122)68

PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
JUNE 2000

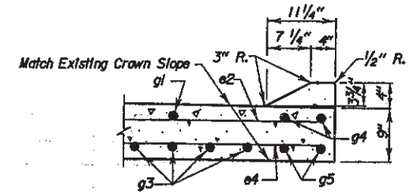
DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
EJA	SLG	CJD	John C. Cole, BRIDGE ENGINEER
PENN3480	3480PA08		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0901(175)58	E50	E50

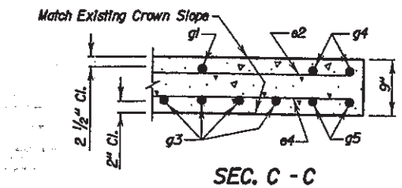


PLAN

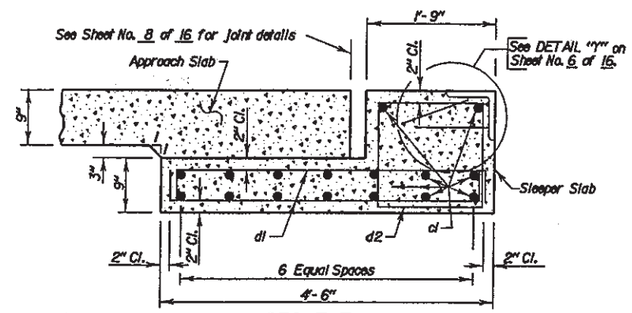
(Approach Slab shown adjacent to Abutment No. 5)
(Approach Slab adjacent to Abutment No. 1 similar by opposite hand)



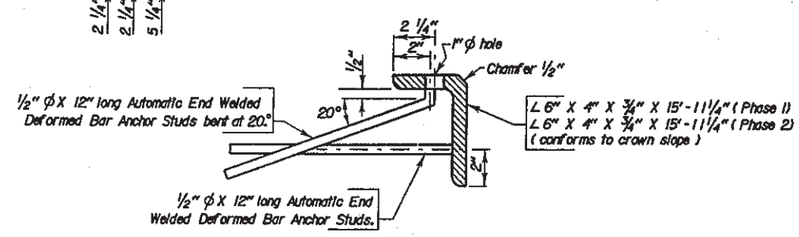
SEC. B - B



SEC. C - C



SEC. E-E



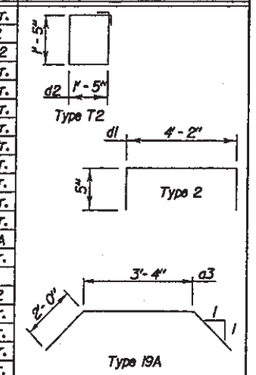
DETAIL "Y"

(See Notes Regarding Armor Angle Assembly)

REINFORCING SCHEDULE

(For Two Approach and Sleeper Slabs)

	Mk.	No.	Size	Length	Type	Bending Details
PHASE 1	ϕc1	32	5	15'-9"	Str.	
	d1	64	4	5'-0"	2	
	d2	32	4	6'-5"	T2	
	ϕe2	28	4	15'-9"	Str.	
	ϕe4	40	6	15'-9"	Str.	
	g1	20	4	20'-2"	Str.	
	g2	20	4	6'-0"	Str.	
	g3	60	8	20'-2"	Str.	
	g4	4	4	19'-8"	Str.	
	g5	4	8	19'-8"	Str.	
	ϕh2	4	6	14'-10"	Str.	
	△z1	20	6	4'-0"	Str.	
PHASE 2	a3	4	4	7'-4"	19A	
	ϕa2	32	5	15'-9"	Str.	
	d1	64	4	5'-0"	2	
	d2	32	4	6'-5"	T2	
	ϕe1	28	4	15'-9"	Str.	
	ϕe3	40	6	15'-9"	Str.	
	g1	20	4	20'-2"	Str.	
	g2	20	4	6'-0"	Str.	
	g3	60	8	20'-2"	Str.	
	g4	4	4	19'-8"	Str.	
	g5	4	8	19'-8"	Str.	
	ϕh	4	6	14'-10"	Str.	
	△z1	20	6	4'-0"	Str.	



Note -
All Bars to be Epoxy Coated.
All Dimensions are out to out of bars.
△ Dowels
ϕ These bars shall be spliced using mechanical splice devices. Equivalent Splice Length for No. 4 & 5 Rebar is 2'-0" & for No. 6 Rebar is 2'-6".

ESTIMATED QUANTITIES

(For Two Approach and Sleeper Slabs)

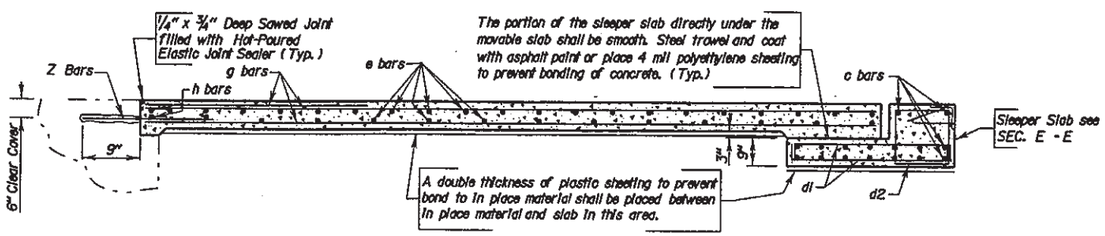
ITEM	UNIT	PHASE 1 QUANTITY	PHASE 2 QUANTITY
Concrete Approach Slab for Bridge	S.Y.	72.4	72.6
Concrete Approach Sleeper Slab for Bridge	S.Y.	15.4	15.4
Install Dowel in Concrete	Each	20	20
ϕ No. 4 Rebar Splice	Each	28	—
ϕ No. 5 Rebar Splice	Each	32	—
ϕ No. 6 Rebar Splice	Each	44	—
Breakout Structural Concrete	C.Y.	0.1	0.1

	PHASE 1	PHASE 2
1. Concrete in Approach Slabs.	19.0 C.Y.	19.1 C.Y.
*2. Epoxy Coated Re-Steel in Approach Slabs.	5173 Lb.	5193 Lb.
3. Concrete in Sleeper Slabs	6.0 C.Y.	6.1 C.Y.
4. Epoxy Coated Re - Steel in Sleeper Slabs.	877 Lb.	877 Lb.
5. Structural Steel in Armor Assembly.	796 Lb.	796 Lb.
6. Polyethylene Sheeting	160 S.Y.	160 S.Y.

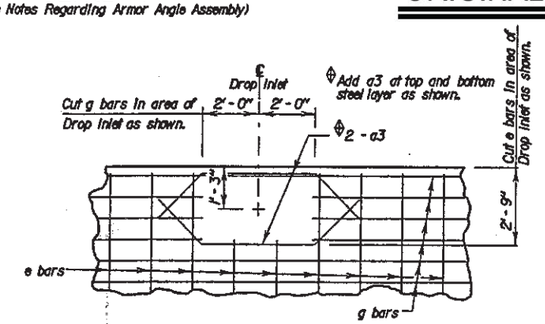
Items 1 thru 6 are approximate quantities contained in the above bid item and are for information only.

* Does not include the following quantities for z1 bars as these are paid for in the Bid Item "Install Dowel in Concrete".

	PHASE 1	PHASE 2
	120 Lb.	120 Lb.



SEC. A-A



DETAIL "Z"

See Sheet No. 6 of 16 for location on Approach Slab.
(Bottom Steel Shown)

ORIGINAL CONSTRUCTION PLANS

(WEST BOUND LANES)

DETAILS OF APPROACH SLAB ADJACENT TO ABUTMENTS FOR

164' - 0" CONT. CONC. BRIDGE

30' - 0" ROADWAY — 0° SKEW

STR. NO. 52-510-274 — SEC. 21/22-T2N-R9E

OVER CROSSROAD — IM 90-2(122)68

PENNINGTON COUNTY

S. D. DEPT. OF TRANSPORTATION

JUNE 2000

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
EJA	SLG	CJD	BRIDGE ENGINEER
PENN3480	3480PA07		