

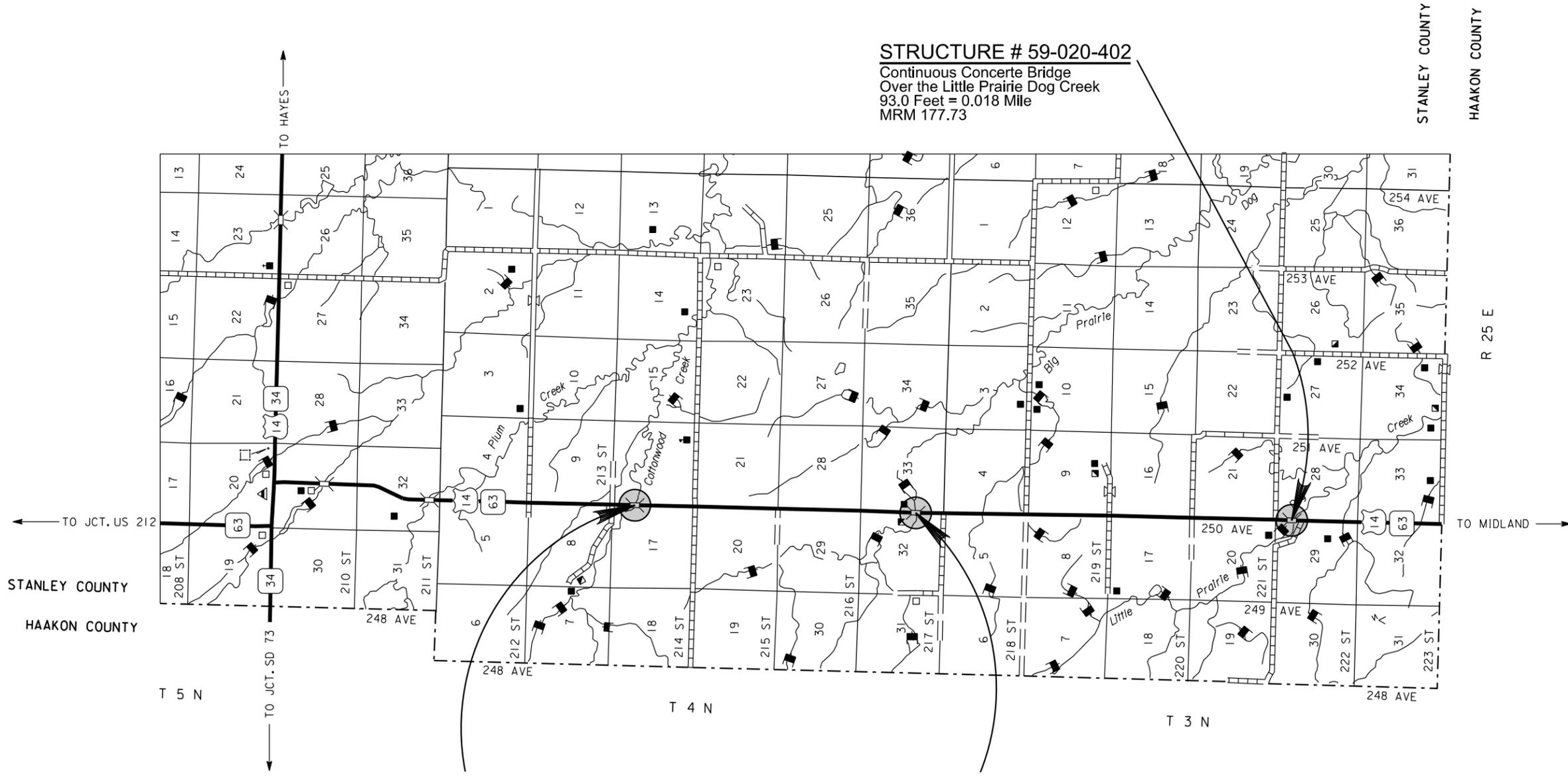
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0014(206)177	E1	E23

Plotting Date: 03/14/2016

SECTION E: STRUCTURE PLANS

INDEX OF SHEETS

- Sheet E1: Title Sheet
- Sheet E2: Estimate of Structure Quantities
- Sheet E3 - E9: Str. No. 59-020-402
- Sheet E10-E16: Str. No. 59-020-358
- Sheet E17-E23: Str. No. 59-020-322



STRUCTURE # 59-020-402
 Continuous Concrete Bridge
 Over the Little Prairie Dog Creek
 93.0 Feet = 0.018 Mile
 MRM 177.73

STRUCTURE # 59-020-322
 Continuous Concrete Bridge
 Over the Cottonwood Creek
 94.0 Feet = 0.018 Mile
 MRM 185.67

STRUCTURE # 59-020-358
 Continuous Concrete Bridge
 Over the Big Prairie Dog Creek
 140.0 Feet = 0.027 Mile
 MRM 182.28

Plot Scale - 1:0.169082

Plotted From - tpr12561

File - ...Stan04V2\SecE_TitleSheet.dgn

ESTIMATE OF QUANTITIES

Str. No. 59-020-402

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
400E0172	Concrete Patching Material, Bridge Deck	58.9	CuFt
400E0300	Breakout Structural Concrete	0.8	CuYd
400E0380	Install Dowel in Concrete	16	Each
480E0200	Epoxy Coated Reinforcing Steel	56	Lb
491E0005	Two Coat Bridge Deck Polymer Chip Seal	306.8	SqYd
491E0110	Abrasive Blasting of Bridge Deck	306.8	SqYd
491E0120	Bridge Deck Grinding	306.8	SqYd
491E0130	Concrete Removal, Class A	3.5	SqYd
491E0140	Concrete Removal, Class B	3.5	SqYd

Str. No. 59-020-358

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
400E0172	Concrete Patching Material, Bridge Deck	60.2	CuFt
400E0300	Breakout Structural Concrete	0.8	CuYd
400E0380	Install Dowel in Concrete	16	Each
480E0200	Epoxy Coated Reinforcing Steel	56	Lb
491E0005	Two Coat Bridge Deck Polymer Chip Seal	463.4	SqYd
491E0110	Abrasive Blasting of Bridge Deck	463.4	SqYd
491E0120	Bridge Deck Grinding	463.4	SqYd
491E0130	Concrete Removal, Class A	4.0	SqYd
491E0140	Concrete Removal, Class B	4.0	SqYd

Str. No. 59-020-322

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
400E0172	Concrete Patching Material, Bridge Deck	55.2	CuFt
400E0300	Breakout Structural Concrete	0.8	CuYd
400E0380	Install Dowel in Concrete	16	Each
480E0200	Epoxy Coated Reinforcing Steel	56	Lb
491E0005	Two Coat Bridge Deck Polymer Chip Seal	310.0	SqYd
491E0110	Abrasive Blasting of Bridge Deck	310.0	SqYd
491E0120	Bridge Deck Grinding	310.0	SqYd
491E0130	Concrete Removal, Class A	4.3	SqYd
491E0140	Concrete Removal, Class B	4.3	SqYd

ESTIMATE OF STRUCTURE QUANTITIES

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
460E0172	Concrete Patching Material, Bridge Deck	58.9	CuFt
460E0300	Breakout Structural Concrete	0.8	CuYd
460E0380	Install Dowel in Concrete	16	Each
480E0200	Epoxy Coated Reinforcing Steel	56	Lb
491E0005	Two Coat Bridge Deck Polymer Chip Seal	306.6	SqYd
491E0110	Abrasive Blasting of Bridge Deck	306.6	SqYd
491E0120	Bridge Deck Grinding	306.6	SqYd
491E0130	Concrete Removal, Class A	3.5	SqYd
491E0140	Concrete Removal, Class B	3.5	SqYd

SPECIFICATIONS

- Design Specifications: AASHTO Standard Specifications for Highway Bridges 2002 Edition with 2003 Interim Specifications using Working Stress Design.
- 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 and are provided as information only. 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 in the plans. Alternate sequence of operations may be submitted by the Contractor for approval by the Engineer at the pre-construction meeting.

- Perform Bridge Deck Grinding for the first phase of construction.
- Breakout the concrete in the existing paving notch, install dowel bars, and place resteel for the first phase of construction.
- Place concrete in the paving notch for the first phase of construction.
- Repair the bridge deck by removing all loose and delaminated concrete from the bridge deck surface for the first phase of construction.
- Clean the bridge deck surface with abrasive blasting for the first phase of construction.
- Place the Two Coat Bridge Deck Polymer Chip Seal for the first phase of construction.

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

GENERAL CONSTRUCTION NOTES

- All mild reinforcing steel shall conform to ASTM A615, Grade 60.
- Use 2" clear cover on all reinforcing steel except as shown otherwise.
- 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.
- The Concrete Patching Material used to fill the paving notches shall conform to Section 491 of the Construction Specifications.

BRIDGE DECK GRINDING

The Contractor will have the option of grinding the entire deck surface during phase one. Any additional costs incurred for grinding the entire deck surface shall be at no additional cost to the department.

CONCRETE BREAKOUT

- The paving notch concrete shall be broken out to the limits shown on the plans. Breakout limits shall be defined with a 3/4 inch deep sawcut (unless specified otherwise in these plans), where practical, as approved by the Engineer.
- Where new concrete is placed adjacent to existing asphalt concrete, the existing asphalt shall be sawed full depth to a true line with a vertical face. There will not be a separate payment made for sawing.
- The Contractor will be allowed to use the vertical saw cut in the asphalt concrete as a form for the new paving notch concrete placement.
- All broken out concrete shall be disposed of by the Contractor. Any disposal of discarded material shall be in accordance to the Environmental Commitment Notes.
- The contract unit price per cubic yard for "Breakout Structural Concrete" shall include sawing, breakout concrete, cleaning, and disposal of all broken out material.

INSTALLING DOWELS IN CONCRETE

- Holes drilled in the existing concrete shall be true and normal or as shown in the plans. Drilling holes using a core drill shall not be allowed. Care shall be taken not to damage the existing reinforcing steel. The Contractor can expect to encounter and have to drill through reinforcing steel or shift the dowel spacing as approved by the Engineer to miss the existing reinforcing steel. If the Contractor shifts the dowel spacing, the unused drill holes shall be filled completely with epoxy resin.
- The epoxy resin mixture shall be of a type for bonding steel to hardened concrete and shall conform to AASHTO M235 Type IV (Equivalent to ASTM C881, Type IV). Grade 1, 2 or 3 may be used for vertical dowels.
- The diameter of the drilled holes shall not be less than 1/8 inch greater, nor more than 3/8 inch greater than the diameter of the dowels or as per the Manufacturer's recommendations. The drilled holes shall be blown out with compressed air using a device that will reach the back of the hole to ensure that all debris or loose material has been removed prior to epoxy injection.
- Mix epoxy resin as recommended by the Manufacturer and apply by an injection method as approved by the Engineer. Beginning at the back of the drilled holes, fill the holes 1/3 to 1/2 full of epoxy, or as recommended by the Manufacturer, prior to insertion of the steel bar. Rotate the steel bar during installation to eliminate voids and ensure complete bonding of the bar. Insertion of the bars by the dipping or painting method will not be allowed.
- No loads shall be applied to the epoxy grouted dowel bars until the epoxy resin has had sufficient time to cure as specified by the epoxy resin manufacturer.
- Dowel bars shall be deformed bars conforming to ASTM A615 Grade 60.
- The cost of epoxy resin, dowels, installation and other incidental items shall be incidental to the contract unit price per each for "Install Dowel in Concrete".

ESTIMATE OF STRUCTURE QUANTITIES AND NOTES FOR 93' - 0" CONTINUOUS CONCRETE BRIDGE

STR. NO. 59-020-402

FEBRUARY 2016

2 OF 7

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
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TWO COAT POLYMER BRIDGE DECK CHIP SEAL

1. The Two Coat Polymer Bridge Deck Chip Seal for this bridge shall be a CIS Precision Epoxy Binder as supplied by AIS-CIS, LLC. Contact information is as follows:

AIS-CIS, LLC
 Greg Wuller
 240 Main Street
 Grandview, MO 64030
Greg.Wuller@ais-kc.com
 Office Phone: (816)331-1600
 Fax: (816) 331-1181

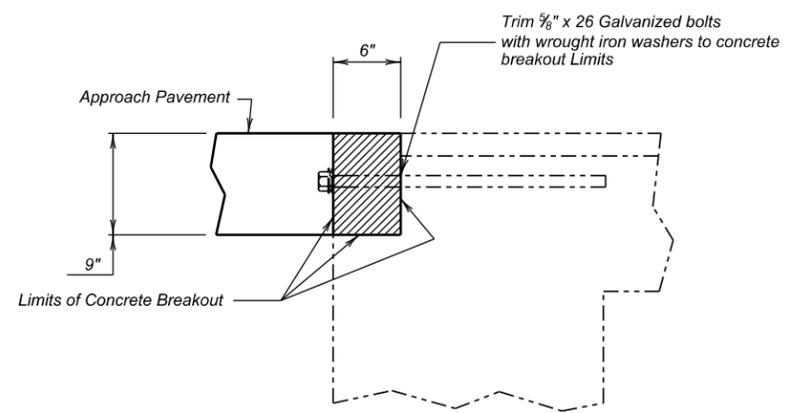
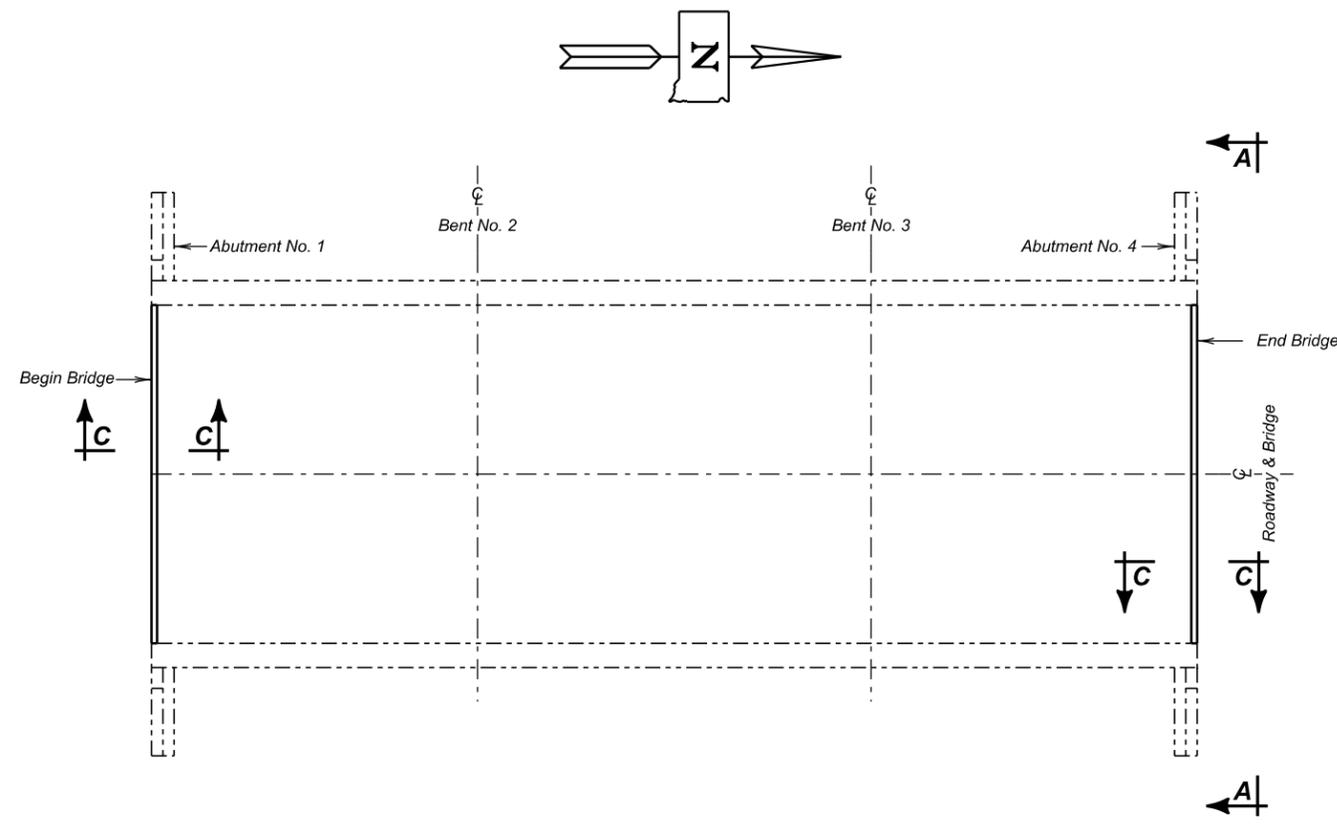
2. The Two Coat Bridge Deck Polymer Chip Seal shall be applied in accordance with the Construction Specifications.

NOTES (CONTINUED)
 FOR
93' - 0" CONTINUOUS CONCRETE BRIDGE
 STR. NO. 59-020-402
 FEBRUARY 2016

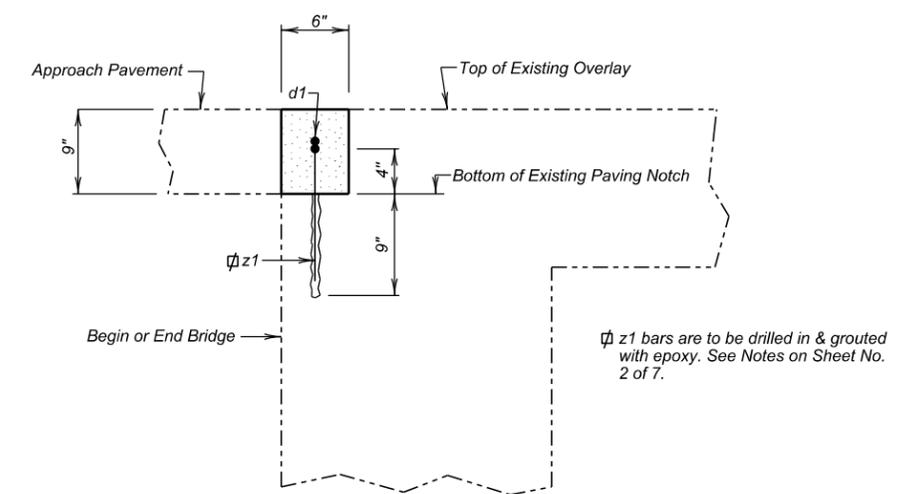
DESIGNED BY KSK STAN04V2	CK. DES. BY MM 04V2SA03	DRAFTED BY KSK	<i>Kevin N. Boeden</i> BRIDGE ENGINEER
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REINFORCING SCHEDULE						
(For Both Ends of Bridge)						
Mk.	No.	Size	Length	Type	Bending Details	
PHASE 1	d1	4	5	6' - 9"	Str.	 Type 17A
	Δ z1	8	5	2' - 6"	17A	
PHASE 2	d1	4	5	6' - 9"	Str.	
	Δ z1	8	5	2' - 6"	17A	

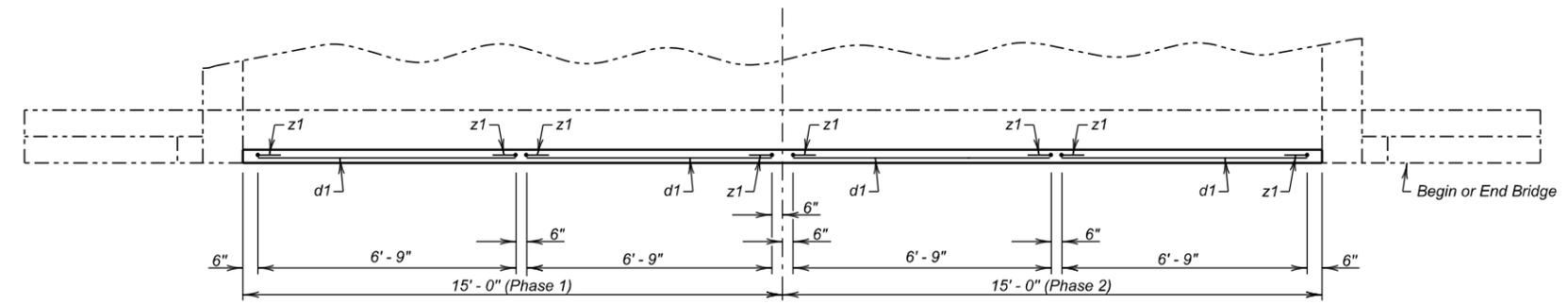
NOTES:
 All Dimensions are out to out of bars.
 All Bars to be Epoxy Coated.
 Δ Dowels



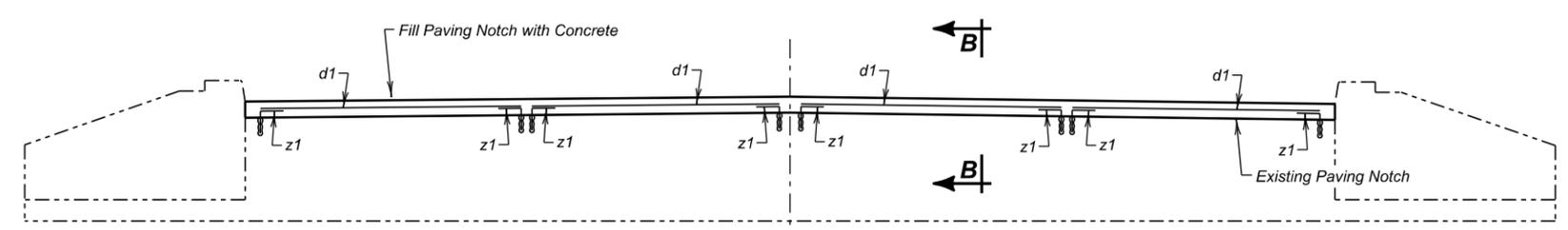
SECTION C - C
Existing Paving Block Removal



SECTION B - B



PLAN



VIEW A - A

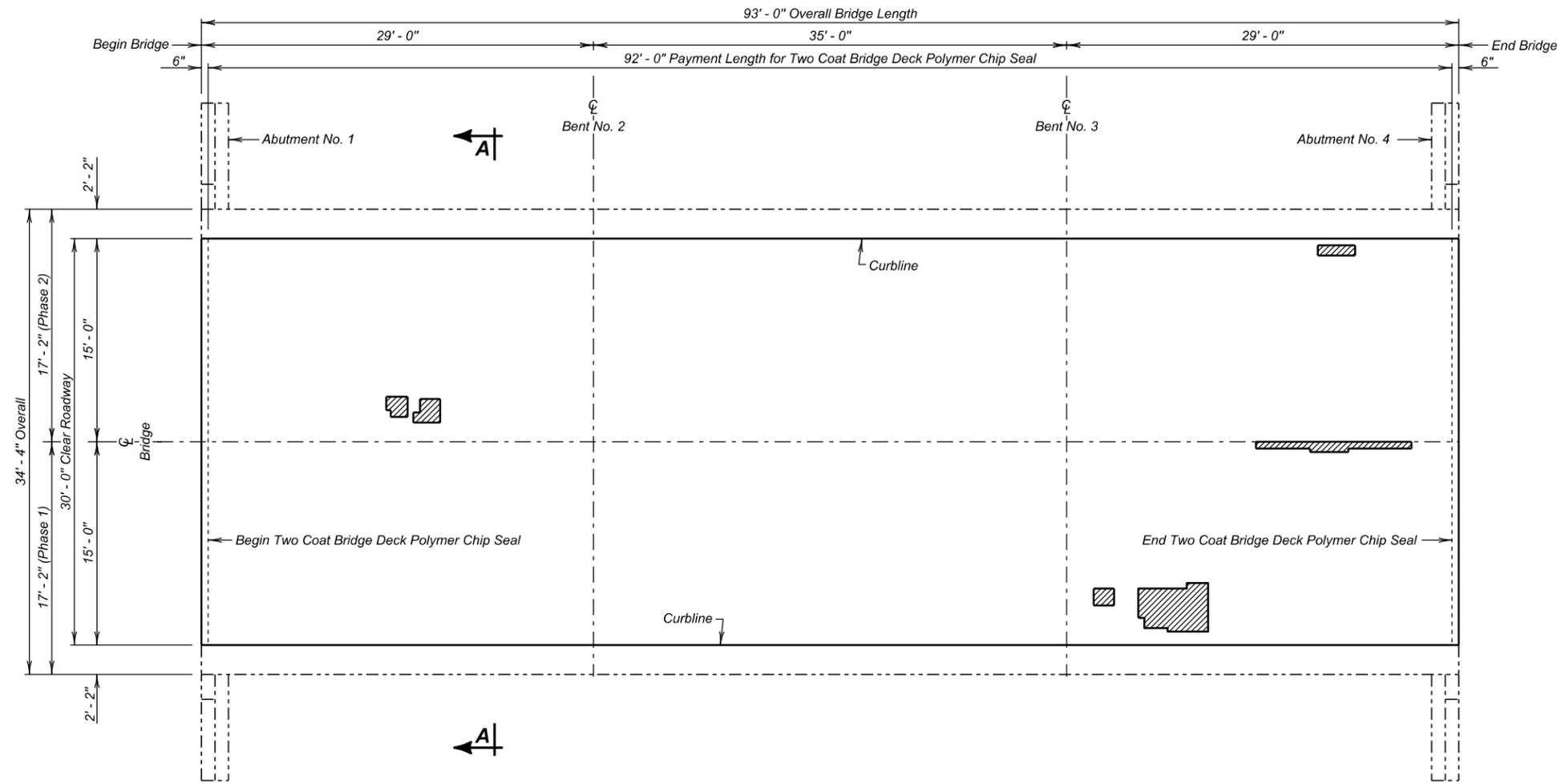
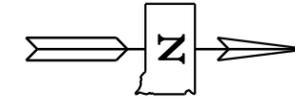
ITEM	UNIT	QUANTITY	
		Phase 1	Phase 2
Concrete Patching Material, Bridge Deck	Cu. Ft.	11.3	11.3
Breakout Structural Concrete	Cu. Yd.	0.4	0.4
Install Dowel in Concrete	Each	8	8
Epoxy Coated Reinforcing Steel	Lb	28	28

* 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
21 Lb.	21 Lb.

EXISTING PAVING NOTCH REINFORCEMENT
 FOR
93' - 0" CONTINUOUS CONCRETE BRIDGE
 30' - 0" ROADWAY 0° SKEW
 OVER LITTLE PRAIRIE DOG CREEK SEC. 28 / 29-T3N-R25E
 STR. NO. 59-020-402 NH 0014(206)177

STANLEY COUNTY
 S. D. DEPT. OF TRANSPORTATION
 FEBRUARY 2016

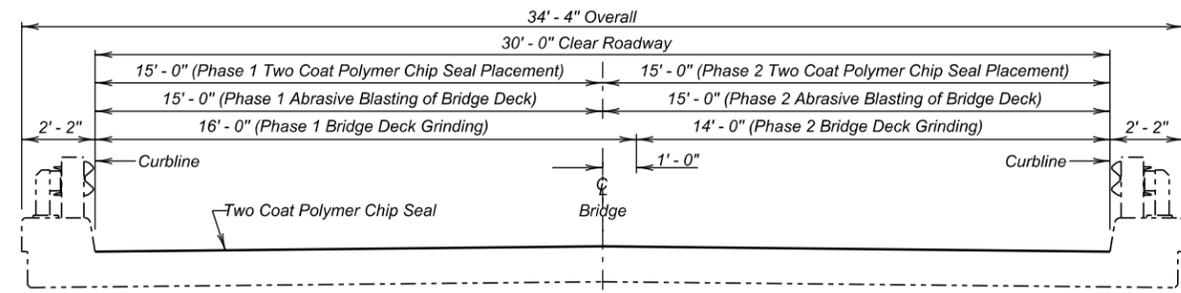


LEGEND

Shaded areas indicate anticipated locations of unsound concrete requiring concrete repair and are based on a deck condition survey conducted in the fall of 2013.

PLAN

ESTIMATED QUANTITIES			
ITEM	UNIT	QUANTITY	
		Phase I	Phase 2
Concrete Patching Material, Bridge Deck	Cu. Ft.	28.0	8.3
Two Coat Bridge Deck Polymer Chip Seal	Sq. Yd.	153.3	153.3
Abrasive Blasting of Bridge Deck	Sq. Yd.	153.3	153.3
Bridge Deck Grinding	Sq. Yd.	163.6	143.0
Concrete Removal, Class A	Sq. Yd.	2.7	0.8
Concrete Removal, Class B	Sq. Yd.	2.7	0.8



SECTION A - A

POLYMER CHIP SEAL DETAILS
FOR
93' - 0" CONTINUOUS CONCRETE BRIDGE
30' - 0" ROADWAY 0° SKEW
OVER LITTLE PRAIRIE DOG CREEK SEC. 28 / 29-T3N-R25E
STR. NO. 59-020-402 NH 0014(206)177

STANLEY COUNTY
S. D. DEPT. OF TRANSPORTATION
FEBRUARY 2016

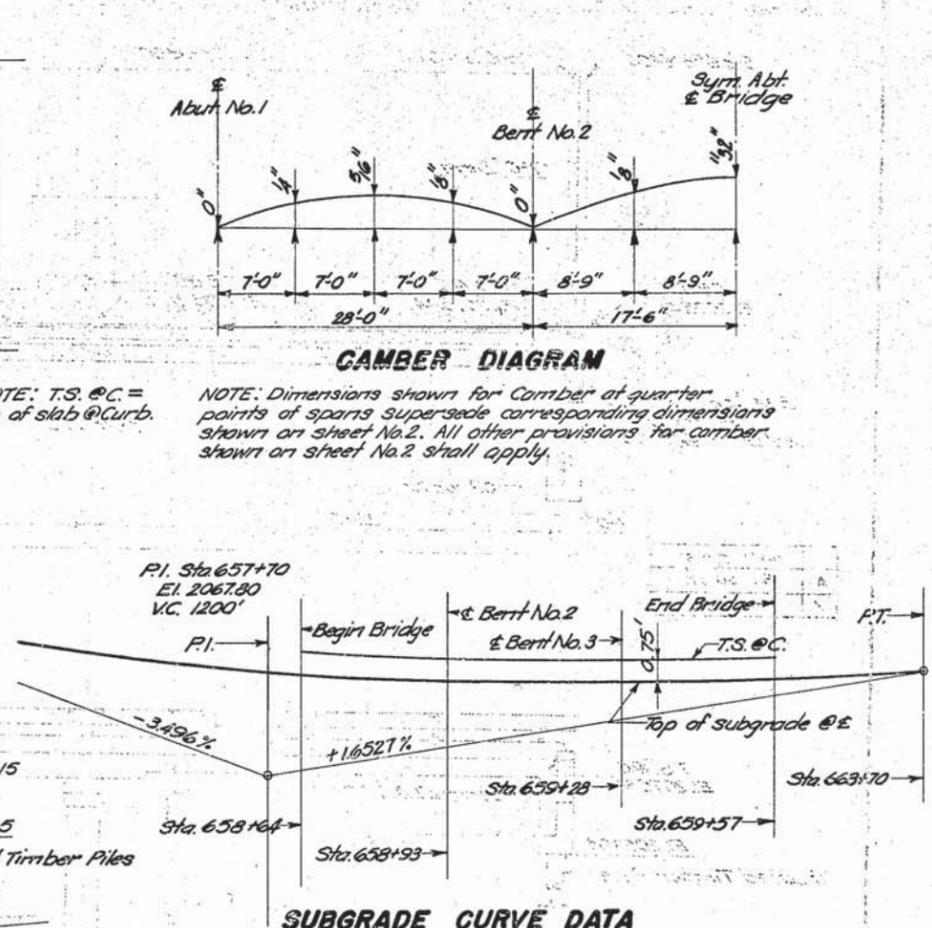
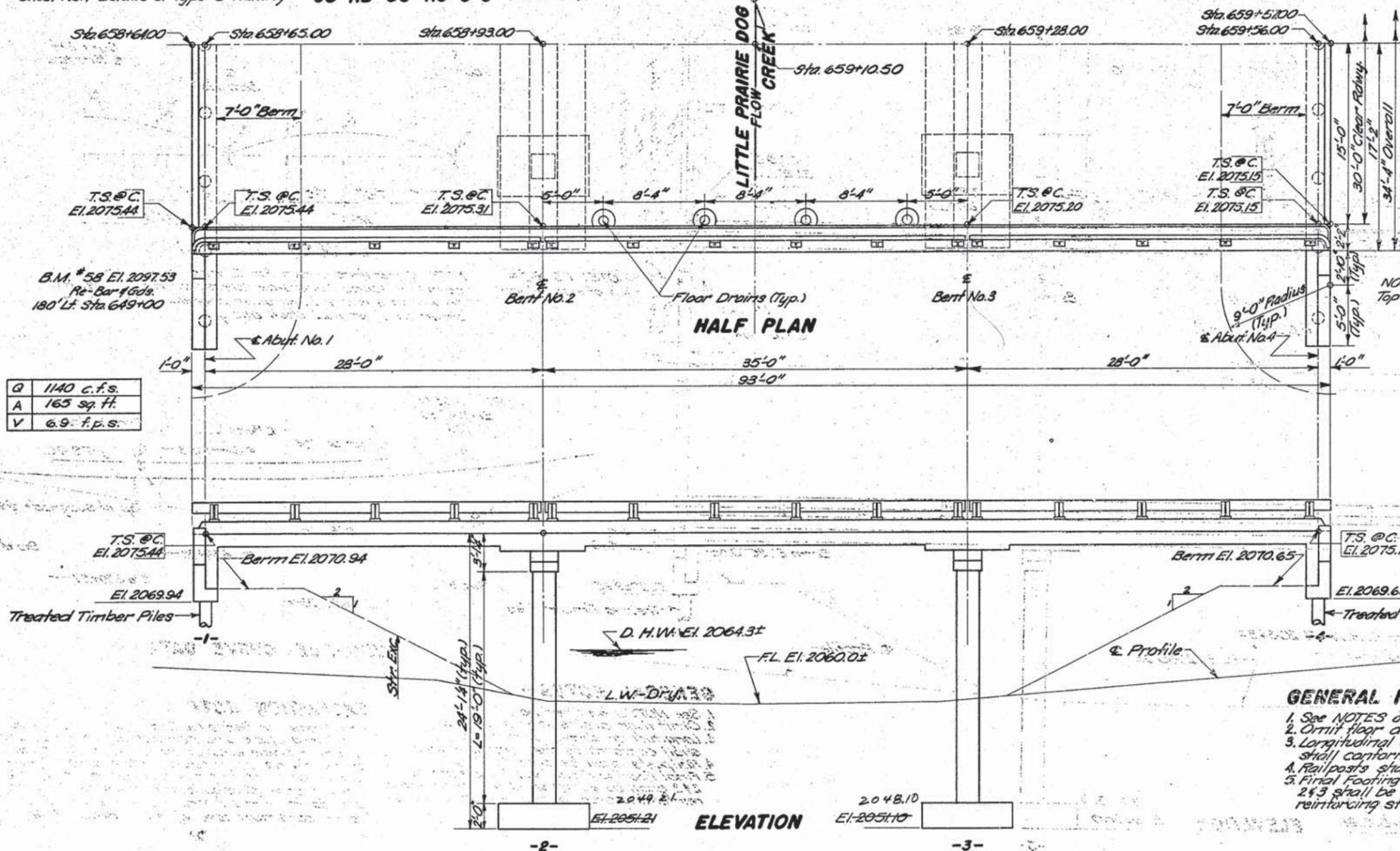
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INDEX OF BRIDGE SHEETS-

Sheet No. 1 - General Drawing and Quantities
 Sheet No. 2 - Details of Std. Superstructure **FBOP-CS-30-00-119-1-3** (10-10-57)
 Sheet No. 3 - Details of Std. Substructure **FBOP-CS-30-00-209-2-3**
 Sheet No. 4 - Details of Type-B Railing **CS-RB-00-119-3-3** (12-31-54)

B.M. #59 El. 2064.80
 Re-bar & Gds.
 186' Lt. Sta. 660+00

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Q	1140 c.f.s.
A	165 sq. ft.
V	6.9 f.p.s.

NOTE: T.S. @ C. = Top of slab @ Curb.
 NOTE: Dimensions shown for Camber at quarter points of spans supersede corresponding dimensions shown on sheet No. 2. All other provisions for camber shown on sheet No. 2 shall apply.

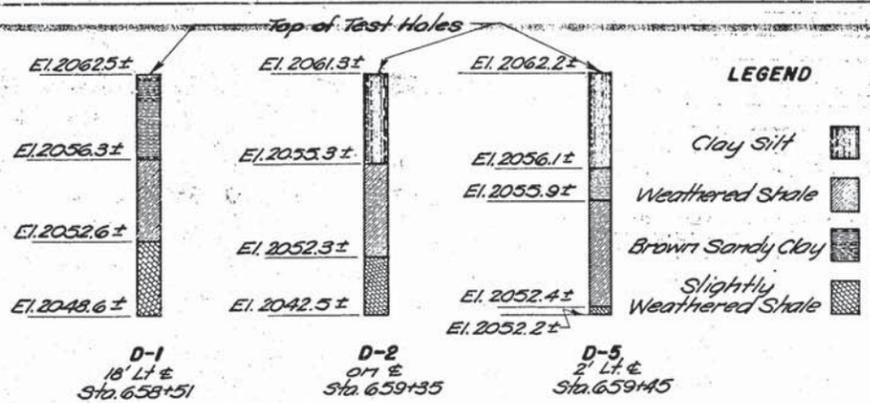
GENERAL NOTES--

- See NOTES on Sheet No. 2.
- Omit floor drains in end spans.
- Longitudinal elements of the slab shall conform to the vertical curve.
- Railposts shall be built vertical.
- Final Footing Elevations for Bents No. 2 & 3 shall be established before ordering reinforcing steel for the respective Bents.

EXCAVATION NOTE

1. Footings for Bents No. 2 & 3 shall be cast against slightly weathered shale and carried into same approximately 1'. Limits of shale excavation for footings shall be bounded as nearly as practicable by the neat lines as shown in details of Bent footings (see sheet No. 3) at (A).
 2. Shale shall develop a minimum bearing value of 3 1/2 tons per sq. ft. If the bearing value is less than 3 1/2 tons per sq. ft., communicate with the BRIDGE DIVISION.

TEST HOLE DATA



ESTIMATED QUANTITIES

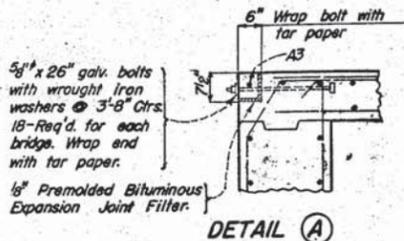
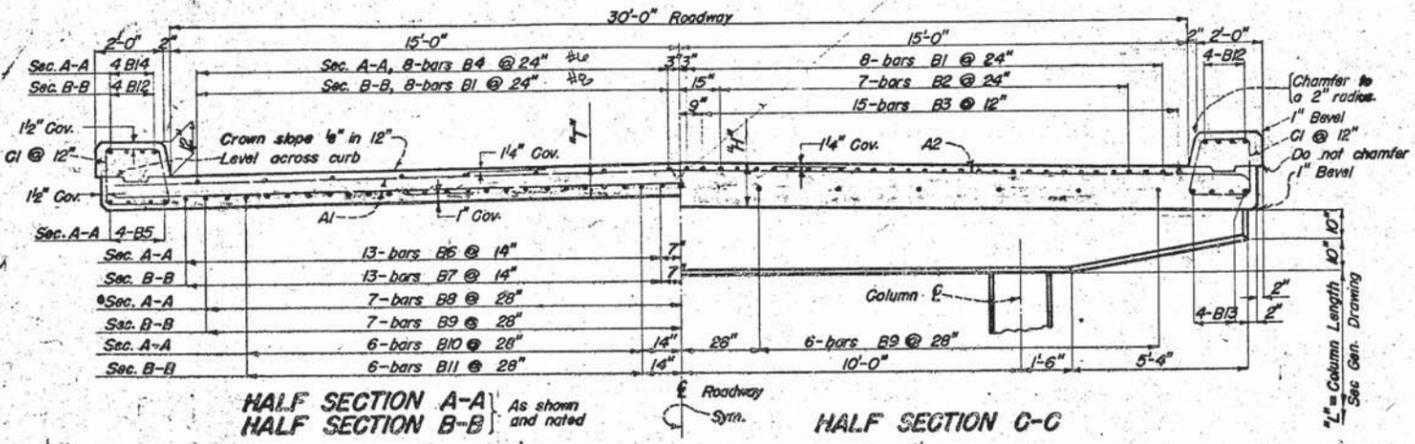
ITEM	C.I. & Cong. Cu. Yds.	Steel - Lbs. Reinf. 5/8" dia.	Reinforcing Steel - Lbs. 1/2" dia.	Treated Timber Piles 9" dia. x 12' L.	Excavation - Cu. Yds. (Unclassified)
Superstructure	187.2	31,645	180	189.5	11,254
Abutts. No. 1 & No. 4	35.6	3,630	1,575	18 @ 20' = 360	1,500
Bents No. 2 & No. 3	31.8	4,990			85
Totals	254.6	40,265	985	349.5	13,839

One treated timber test pile shall be driven at Abutts. No. 1 & 4 before remaining piles are ordered.
 See grading plans for Unclassified Excavation.
 PILE NOTE: - Piles driven at Abutts. No. 1 & 4, including test piles, shall obtain their full bearing (20 tons) in the natural ground below the new embankments - Elevations 2062.2' and 2063.7' respectively. Pre-Bored Holes through the fill are required and shall be a minimum diameter 2" larger than the nominal diameter (3' from butt) of the pile.
 Finald 3 Mar. 61 D.H.

GENERAL DRAWING AND QUANTITIES
 FOR
93'-0" CONTINUOUS CONCRETE BRIDGE
 30'-0" ROADWAY
 OVER LITTLE PRAIRIE DOG CREEK SEC. 28/29-T3N-R25E
 STA. 658+64.00 TO 659+57.00 S 1261(1)
 STANLEY COUNTY
 STR. NO. 59-020-402 SOUTH DAKOTA H20-44
 DEPARTMENT OF HIGHWAYS
 JULY 1959

ORIGINAL CONSTRUCTION PLANS

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	DL	W.C.P.	<i>[Signature]</i>



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.

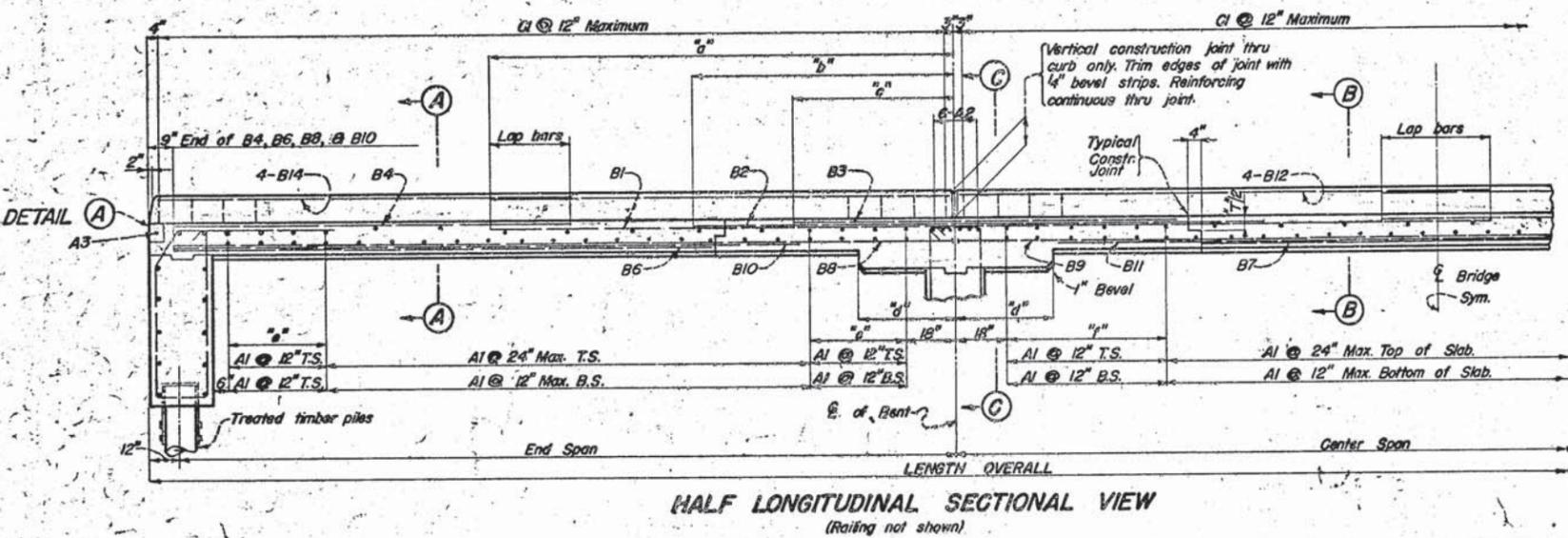
CONSTRUCTION SPECIFICATIONS: South Dakota Highway Commission's "Standard Specifications for Roads and Bridges," current issue, shall govern unless noted otherwise herein, on plans, or in Special Provisions.

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 bottom of footing.

STRUCTURAL STEEL: All 5/8" and 1 1/4" 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: H20-44 (T-3-45) A.A.S.H.O. Unit stresses: Concrete, f = 1,350 p.s.i., n = 8; Reinforcing, f = 20,000 p.s.i. (Int. Grade Steel). Column design: American Concrete Institute Requirements (ACI 318-47). Equivalent fluid pressure of earth at 40' sq.ft. Minimum pile loading = 20 Tons per pile.

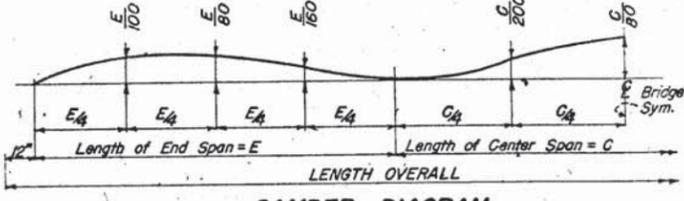


SLAB DATA

LENGTH OVERALL	END SPAN	CENTER SPAN	REINFORCING SCHEDULE																												DIMENSIONS												LENGTH OVERALL	BAR BENDS																										
			A1		A2		A3		B1		B2		B3		B4		B5		B6		B7		B8		B9		B10		B11		B12		B13		B14		C1																																	
54'-0"	16'	20'	79	33-6	12	7	35-3	1	33-7	2	29-9	32	7	24-0	7	13-6	3	9-0	3	8-0	16	3	16-9	52	7	13-6	26	7	14-0	26	7	16-3	13	7	20-0	24	7	14-6	12	7	16-0	16	3	22-6	8	3	20-0	16	3	8-6	114	1/2	7-6	TI	7	1-5 1/2	8 1/2	11 1/2	11-0	6-6	4-6	24	2-0	3-0	54-0	4d	10d for 1" bars, 8d for others			
60'-6"	18'	22'-6"	89	35-3	12	7	35-3	1	33-7	2	29-9	32	7	24-0	7	13-6	3	9-0	3	8-0	16	3	16-9	52	7	13-6	26	7	14-0	26	7	16-3	13	7	20-0	24	7	14-6	12	7	16-0	16	3	22-6	8	3	20-0	16	3	8-6	114	1/2	7-6	TI	7	1-5 1/2	8 1/2	11 1/2	11-0	6-6	4-6	24	2-0	3-0	60-6	4d	10d for 1" bars, 8d for others			
67'-0"	20'	25'	101	35-9	12	7	35-9	1	33-7	2	29-9	32	7	26-0	7	16-6	3	11-6	3	11-0	16	3	18-9	52	7	15-6	26	7	15-0	26	7	17-6	13	7	20-0	24	7	15-6	12	7	17-6	16	3	24-0	8	3	22-6	8	3	20-0	16	3	8-6	114	1/2	7-6	TI	7	1-5 1/2	8 1/2	11 1/2	11-0	6-6	4-6	24	2-0	3-0	67-0	4d	10d for 1" bars, 8d for others
73'-6"	22'	27'-6"	112	35-9	12	7	35-9	1	33-7	2	29-9	32	7	26-0	7	16-6	3	11-6	3	11-0	16	3	18-9	52	7	15-6	26	7	15-0	26	7	17-6	13	7	20-0	24	7	15-6	12	7	17-6	16	3	24-0	8	3	22-6	8	3	20-0	16	3	8-6	114	1/2	7-6	TI	7	1-5 1/2	8 1/2	11 1/2	11-0	6-6	4-6	24	2-0	3-0	73-6	4d	10d for 1" bars, 8d for others
80'-0"	24'	30'	122	35-9	12	7	35-9	1	33-7	2	29-9	32	7	28-0	7	16-6	3	11-0	3	11-0	16	3	19-0	52	7	15-0	26	7	15-0	26	7	17-6	13	7	20-0	24	7	15-0	12	7	17-6	16	3	24-0	8	3	22-6	8	3	20-0	16	3	8-6	114	1/2	7-6	TI	7	1-5 1/2	8 1/2	11 1/2	11-0	6-6	4-6	24	2-0	3-0	80-0	4d	10d for 1" bars, 8d for others
86'-6"	26'	32'-6"	134	35-9	12	7	35-9	1	33-7	2	29-9	32	7	30-0	7	16-6	3	11-0	3	11-0	16	3	19-0	52	7	15-0	26	7	15-0	26	7	17-6	13	7	20-0	24	7	15-0	12	7	17-6	16	3	24-0	8	3	22-6	8	3	20-0	16	3	8-6	114	1/2	7-6	TI	7	1-5 1/2	8 1/2	11 1/2	11-0	6-6	4-6	24	2-0	3-0	86-6	4d	10d for 1" bars, 8d for others
93'-0"	28'	35'	144	35-9	12	7	35-9	1	33-7	2	29-9	32	7	32-0	7	16-6	3	11-0	3	11-0	16	3	19-0	52	7	15-0	26	7	15-0	26	7	17-6	13	7	20-0	24	7	15-0	12	7	17-6	16	3	24-0	8	3	22-6	8	3	20-0	16	3	8-6	114	1/2	7-6	TI	7	1-5 1/2	8 1/2	11 1/2	11-0	6-6	4-6	24	2-0	3-0	93-0	4d	10d for 1" bars, 8d for others
99'-6"	30'	37'-6"	157	35-9	12	7	35-9	1	33-7	2	29-9	32	7	34-0	7	16-6	3	11-0	3	11-0	16	3	19-0	52	7	15-0	26	7	15-0	26	7	17-6	13	7	20-0	24	7	15-0	12	7	17-6	16	3	24-0	8	3	22-6	8	3	20-0	16	3	8-6	114	1/2	7-6	TI	7	1-5 1/2	8 1/2	11 1/2	11-0	6-6	4-6	24	2-0	3-0	99-6	4d	10d for 1" bars, 8d for others
106'-0"	32'	40'	167	35-9	12	7	35-9	1	33-7	2	29-9	32	7	36-0	7	16-6	3	11-0	3	11-0	16	3	19-0	52	7	15-0	26	7	15-0	26	7	17-6	13	7	20-0	24	7	15-0	12	7	17-6	16	3	24-0	8	3	22-6	8	3	20-0	16	3	8-6	114	1/2	7-6	TI	7	1-5 1/2	8 1/2	11 1/2	11-0	6-6	4-6	24	2-0	3-0	106-0	4d	10d for 1" bars, 8d for others
112'-6"	34'	42'-6"	177	35-9	12	7	35-9	1	33-7	2	29-9	32	7	38-0	7	16-6	3	11-0	3	11-0	16	3	19-0	52	7	15-0	26	7	15-0	26	7	17-6	13	7	20-0	24	7	15-0	12	7	17-6	16	3	24-0	8	3	22-6	8	3	20-0	16	3	8-6	114	1/2	7-6	TI	7	1-5 1/2	8 1/2	11 1/2	11-0	6-6	4-6	24	2-0	3-0	112-6	4d	10d for 1" bars, 8d for others
119'-0"	36'	45'	189	35-9	12	7	35-9	1	33-7	2	29-9	32	7	40-0	7	16-6	3	11-0	3	11-0	16	3	19-0	52	7	15-0	26	7	15-0	26	7	17-6	13	7	20-0	24	7	15-0	12	7	17-6	16	3	24-0	8	3	22-6	8	3	20-0	16	3	8-6	114	1/2	7-6	TI	7	1-5 1/2	8 1/2	11 1/2	11-0	6-6	4-6	24	2-0	3-0	119-0	4d	10d for 1" bars, 8d for others

ESTIMATED QUANTITIES

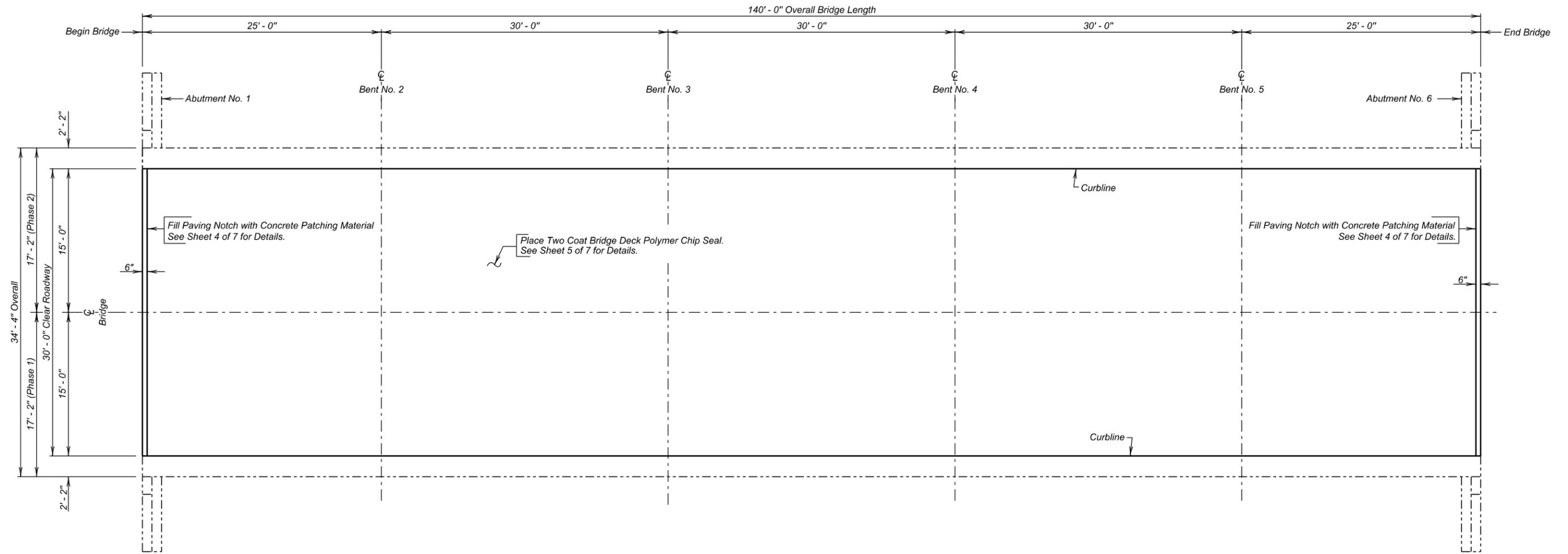
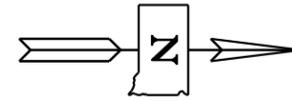
LENGTH OVERALL	TWO ABUTMENTS				TWO INTERIOR BENTS				SLABS & CURBS				TOTALS, Exclusive of railing & Excavation				
	Class A Concrete Cu.Yds.	Reinforcing Steel Lbs.	Number of Piles	Structural Steel Lbs.	Class A Concrete Cu.Yds.	Reinforcing Steel Lbs.	Number of Piles	Structural Steel Lbs.	Class A Concrete Cu.Yds.	Reinforcing Steel Lbs.	Number of Piles	Structural Steel Lbs.	Class A Concrete Cu.Yds.	Reinforcing Steel Lbs.	Number of Piles	Structural Steel Lbs.	
54'-0"	35.6	3650	15	760	17.3	0.412	2235	64.2	16	54.9	13,735	18	140	107.8+(0.412*12)	19607+(12*12)	900	32
60'-6"	41.6	4250	16	860	17.3	0.412	2250	64.2	16	61.7	14,930	14	155	119.6+(0.412*12)	20,810+(12*12)	925	33
67'-0"	47.6	4850	16	860	17.3	0.412	2250	64.2	16	77.9	18,710	14	170	137.8+(0.412*12)	24,590+(12*12)	950	32
73'-6"	53.6	5450	16	860	22.6	0.412	2350	64.2	20	91.7	21,590	18	210	159.9+(0.412*12)	27,850+(12*12)	970	36
80'-0"	59.6	6050	18	855	23.2	0.498	2555	79.8	20	106.4	24,955	18	220	183.4+(0.412*12)	31,100+(12*12)	1,075	39
86'-6"	65.6	6650	18	855	27.2	0.498	2735	79.8	20	121.2	26,965	20	245	209.2+(0.412*12)	33,350+(12*12)	1,100	39
93'-0"	71.6	7250	18	855	27.3	0.593	3155	96.7	24	136.0	31,675	20	255	235.0+(0.412*12)	36,430+(12*12)	1,119	42
99'-6"	77.6	7850	20	950	27.3	0.593	3175	96.7	24	150.8	33,360	20	265	260.8+(0.412*12)	40,165+(12*12)	1,215	44
106'-0"	83.6	8450	20	950	31.0	0.695	4105	129.7	32	174.1	39,060	24	320	284.6+(0.412*12)	44,785+(12*12)	1,275	52
112'-6"	89.6	9050	20	950	31.6	0.801	5140	127.1	32	197.4	41,910	26	350	308.4+(0.412*12)	50,690+(12*12)	1,305	52
119'-0"	95.6	9650	20	950	34.4	0.807	5795	127.1	37	214.4	44,785	26	370	332.2+(0.412*12)	56,600+(12*12)	1,320	53



Camber is calculated for dead load plus plastic flow. Camber is calculated thus using the 106'-0" Bridge as an illustration: E = 32' and C = 40', G/80 = 40/80 = 1/2, provide 1/2" camber at center of center span. The values obtained for camber shall be added to the proposed grade elevations at the respective stations to establish the elevations of the top of the finished roadway slab. The slab shall also be raised 3/8" additional over the interior bents at Roadway E to provide for dead load deflections and plastic flow at the E of the bents as noted on details thereof.

DETAILS OF STANDARD SUPERSTRUCTURE FOR
3-SPAN CONTINUOUS CONCRETE SLAB BRIDGES
 WITH
 INTERIOR FRAMED BENTS ON PILES
 30'-0" ROADWAY 54'-0" TO 119'-0" OVERALL LENGTH
 SOUTH DAKOTA
 STATE HIGHWAY COMMISSION
 STR. NO. 59-020-402 1948

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0014(206)177	E10	E23



PLAN

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 - Existing Paving Notch Reinforcement
- Sheet No. 5 - Polymer Chip Seal Details
- Sheet No. 6 - Original Construction Plans
- Sheet No. 7 - Original Construction Plans

**LAYOUT FOR UPGRADING
FOR**

140' - 0" CONTINUOUS CONCRETE BRIDGE
 30' - 0" ROADWAY 0° SKEW
 OVER BIG PRAIRIE DOG CREEK SEC. 32-T4N-R25E
 STR. NO. 59-020-358 NH 0014(206)177
 PCN 04V2

STANLEY COUNTY
 S. D. DEPT. OF TRANSPORTATION

FEBRUARY 2016

1 OF 7

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

DESIGNED BY KSK STAN04V2	CK. DES. BY MM 04V2SB01	DRAFTED BY KSK <i>Kevin N. Coeden</i> BRIDGE ENGINEER
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ESTIMATE OF STRUCTURE QUANTITIES

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
460E0172	Concrete Patching Material, Bridge Deck	60.2	CuFt
460E0300	Breakout Structural Concrete	0.8	CuYd
460E0380	Install Dowel in Concrete	16	Each
480E0200	Epoxy Coated Reinforcing Steel	56	Lb
491E0005	Two Coat Polymer Bridge Deck Chip Seal	463.4	SqYd
491E0110	Abrasive Blasting of Bridge Deck	463.4	SqYd
491E0120	Bridge Deck Grinding	463.4	SqYd
491E0130	Concrete Removal, Class A	4.0	SqYd
491E0140	Concrete Removal, Class B	4.0	SqYd

SPECIFICATIONS

- Design Specifications: AASHTO Standard Specifications for Highway Bridges 2002 Edition with 2003 Interim Specifications using Working Stress Design.
- 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 and are provided as information only. 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 in the plans. Alternate sequence of operations may be submitted by the Contractor for approval by the Engineer at the pre-construction meeting.

- Perform Bridge Deck Grinding for the for the first phase of construction.
- Breakout the concrete in the existing paving notch, install dowel bars, and place resteel for the first phase of construction.
- Place concrete in the paving notch for the first phase of construction.
- Repair the bridge deck by removing all loose and delaminated concrete from the bridge deck surface for the first phase of construction.
- Clean the bridge deck surface with abrasive blasting for the first phase of construction.
- Place the Two Coat Polymer Bridge Deck Chip Seal for the first phase of construction.

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

GENERAL CONSTRUCTION NOTES

- All mild reinforcing steel shall conform to ASTM A615, Grade 60.
- All exposed concrete edges or corners shall be chamfered 3/4 inch except where noted otherwise in the plans. Match the existing chamfer if the chamfer differs.
- Use 2" clear cover on all reinforcing steel except as shown otherwise.
- 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.
- The Concrete Patching Material used to fill the paving notches shall conform to Section 491 of the Construction Specifications.

BRIDGE DECK GRINDING

The Contractor will have the option of grinding the entire deck surface during phase one. Any additional costs incurred for grinding the entire deck surface shall be at no additional cost to the Department.

CONCRETE BREAKOUT

- The paving notch concrete shall be broken out to the limits shown on the plans. Breakout limits shall be defined with a 3/4 inch deep sawcut (unless specified otherwise in these plans), where practical, as approved by the Engineer.
- Where new concrete is placed adjacent to existing asphalt concrete, the existing asphalt shall be sawed full depth to a true line with a vertical face. There will not be a separate payment made for sawing.
- The Contractor will be allowed to use the vertical saw cut in the asphalt concrete as a form for the new paving notch concrete placement.
- All broken out concrete shall be disposed of by the Contractor. Any disposal of discarded material shall be in accordance to the Environmental Commitment Notes.
- The contract unit price per cubic yard for "Breakout Structural Concrete" shall include sawing, breakout concrete, cleaning, and disposal of all broken out material.

INSTALLING DOWELS IN CONCRETE

- Holes drilled in the existing concrete shall be true and normal or as shown in the plans. Drilling holes using a core drill shall not be allowed. Care shall be taken not to damage the existing reinforcing steel. The Contractor can expect to encounter and have to drill through reinforcing steel or shift the dowel spacing as approved by the Engineer to miss the existing reinforcing steel. If the Contractor shifts the dowel spacing, the unused drill holes shall be filled completely with the epoxy resin as approved by the Engineer.
- The epoxy resin mixture shall be of a type for bonding steel to hardened concrete and shall conform to AASHTO M235 Type IV (Equivalent to ASTM C881, Type IV). Grade 1, 2 or 3 may be used for vertical dowels.
- The diameter of the drilled holes shall not be less than 1/8 inch greater, nor more than 3/8 inch greater than the diameter of the dowels or as per the Manufacturer's recommendations. The drilled holes shall be blown out with compressed air using a device that will reach the back of the hole to ensure that all debris or loose material has been removed prior to epoxy injection.
- Mix epoxy resin as recommended by the Manufacturer and apply by an injection method as approved by the Engineer. Beginning at the back of the drilled holes, fill the holes 1/3 to 1/2 full of epoxy, or as recommended by the Manufacturer, prior to insertion of the steel bar. Rotate the steel bar during installation to eliminate voids and ensure complete bonding of the bar. Insertion of the bars by the dipping or painting method will not be allowed.
- No loads shall be applied to the epoxy grouted dowel bars until the epoxy resin has had sufficient time to cure as specified by the epoxy resin manufacturer.
- Dowel bars shall be deformed bars conforming to ASTM A615 Grade 60.
- The cost of epoxy resin, dowels, installation and other incidental items shall be incidental to the contract unit price per each for "Install Dowel in Concrete".

ESTIMATE OF STRUCTURE QUANTITIES AND NOTES FOR 140' - 0" CONTINUOUS CONCRETE BRIDGE

STR. NO. 59-020-358

FEBRUARY 2016

2 OF 7

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0014(206)177	E12	E23

TWO COAT POLYMER BRIDGE DECK CHIP SEAL

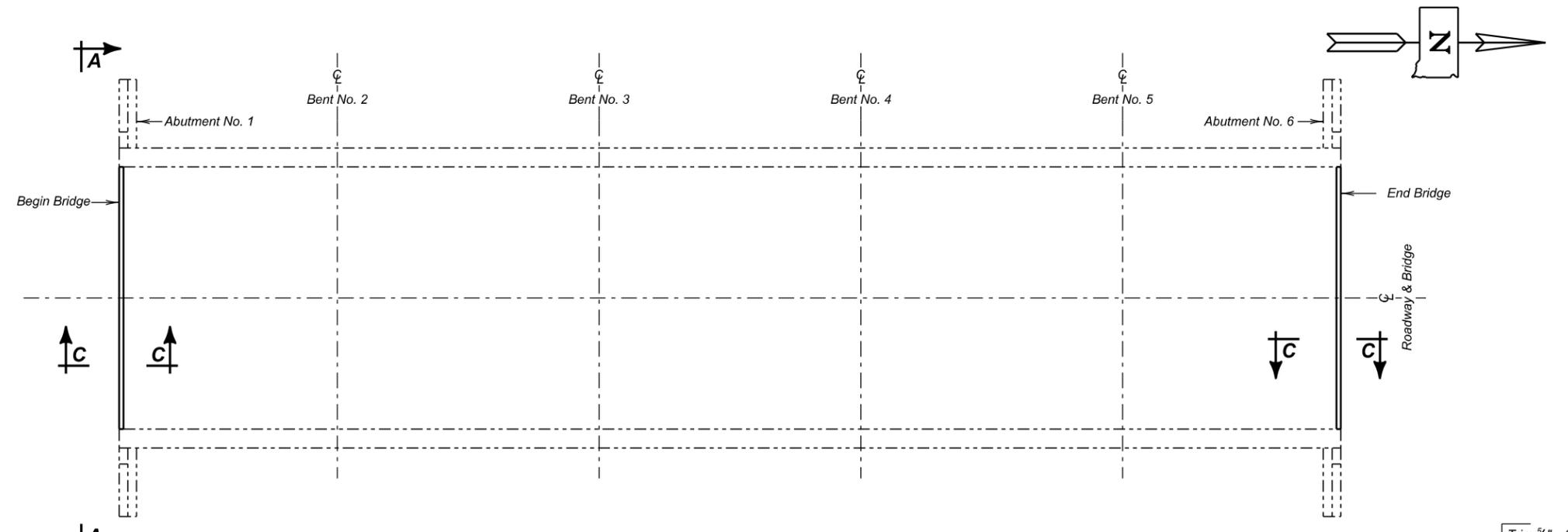
1. The Two Coat Polymer Bridge Deck Chip Seal for this bridge shall be an EPX50-Overlay as supplied by the E-Chem Company. Contact information is as follows:

E-Chem: Engineered Chemical Solutions for Concrete
 Ray Breer
 Business Development Manager
 P.O. Box 95483
 Albuquerque, NM 87199
ray@e-chem.net
<http://e-chem.net>
 Cell: (720) 201-8810
 Office: (505)217-2121
 Fax: (505)217-3721

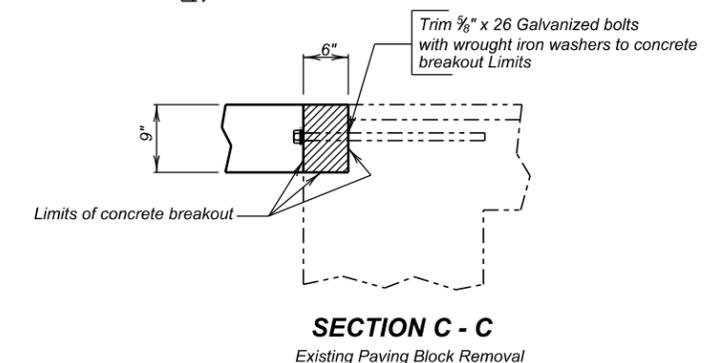
2. The Two Coat Polymer Bridge Deck Chip Seal shall be applied in accordance with the Construction Specifications.

NOTES (CONTINUED)
 FOR
140' - 0" CONTINUOUS CONCRETE BRIDGE
 STR. NO. 59-020-358
 FEBRUARY 2016

DESIGNED BY KSK STAN04V2	CK. DES. BY MM 04V2SB03	DRAFTED BY KSK	<i>Kevin N. Boeden</i> BRIDGE ENGINEER
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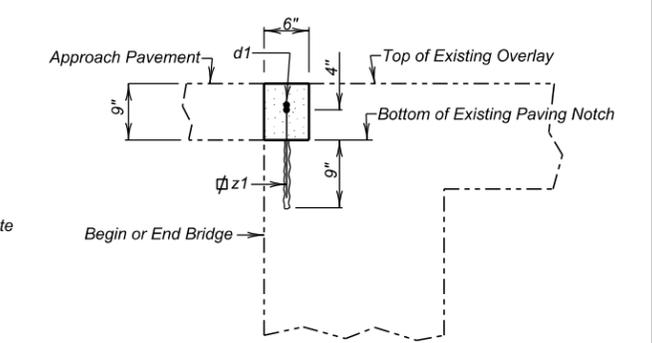
BRIDGE LAYOUT



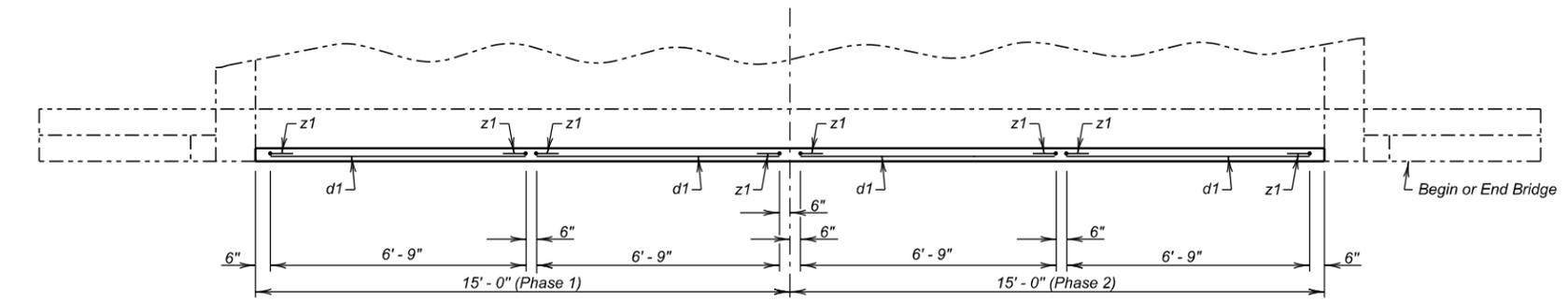
SECTION C - C
Existing Paving Block Removal

REINFORCING SCHEDULE (For Both Ends of Bridge)						
Mk.	No.	Size	Length	Type	Bending Details	
PHASE 1	d1	4	5	6' - 9"	Str.	<p>13" z1 Type 17A</p>
	Δz1	8	5	2' - 6"	17A	
PHASE 2	d1	4	5	6' - 9"	Str.	
	Δz1	8	5	2' - 6"	17A	

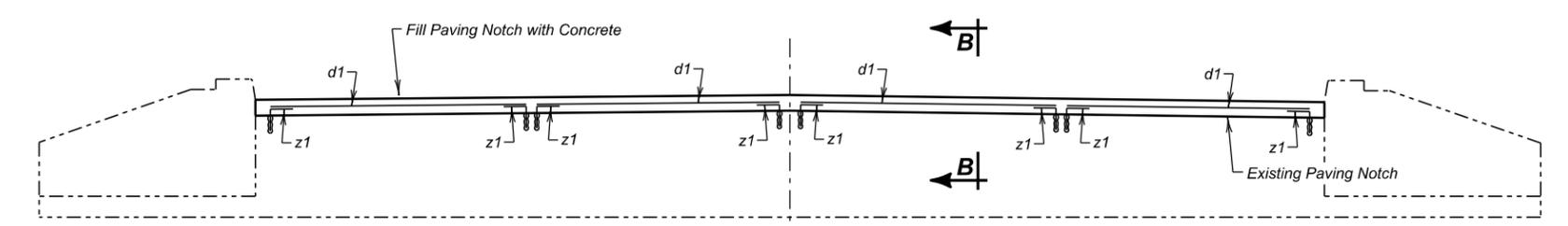
NOTES:
All Dimensions are out to out of bars.
All Bars to be Epoxy Coated.
Δ Dowels



SECTION B - B



PLAN



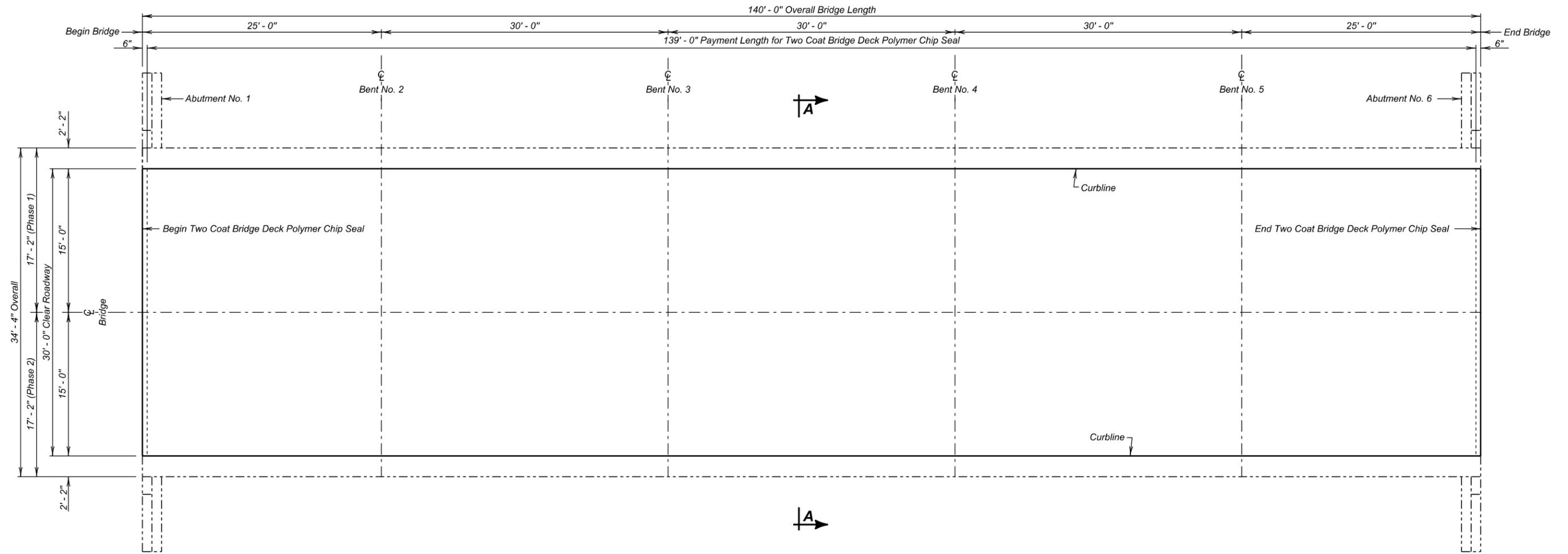
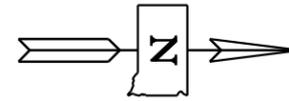
VIEW A - A

ITEM	UNIT	QUANTITY	
		Phase 1	Phase 2
Concrete Patching Material, Bridge Deck	Cu. Ft.	11.3	11.3
Breakout Structural Concrete	Cu. Yd.	0.4	0.4
Install Dowel in Concrete	Each	8	8
* Epoxy Coated Reinforcing Steel	Lb	28	28

* Does not include the following quantities for z1 bars as these are paid for in the bid item "Install Dowel in Concrete".
PHASE 1: 21 Lb.
PHASE 2: 21 Lb.

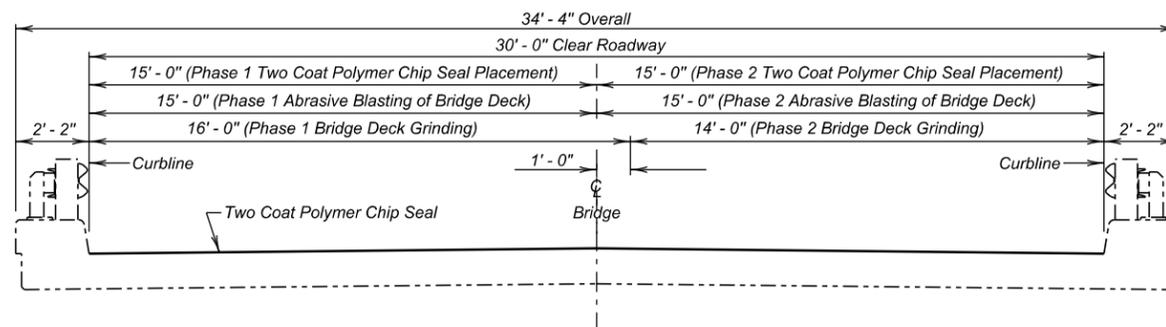
EXISTING PAVING NOTCH REINFORCEMENT
FOR
140' - 0" CONTINUOUS CONCRETE BRIDGE
30' - 0" ROADWAY 0° SKEW
OVER BIG PRAIRIE DOG CREEK SEC. 32-T4N-R25E
STR. NO. 59-020-358 NH 0014(206)177

STANLEY COUNTY
S. D. DEPT. OF TRANSPORTATION
FEBRUARY 2016



PLAN

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



SECTION A - A

ITEM	UNIT	QUANTITY	
		Phase 1	Phase 2
		* Concrete Patching Material, Bridge Deck	Cu. Ft.
Two Coat Bridge Deck Polymer Chip Seal	Sq. Yd.	231.7	231.7
Abrasive Blasting of Bridge Deck	Sq. Yd.	231.7	231.7
Bridge Deck Grinding	Sq. Yd.	247.1	216.3
* Concrete Removal, Class A	Sq. Yd.	2.0	2.0
* Concrete Removal, Class B	Sq. Yd.	2.0	2.0

POLYMER CHIP SEAL DETAILS
FOR

140' - 0" CONTINUOUS CONCRETE BRIDGE
30' - 0" ROADWAY 0° SKEW
OVER BIG PRAIRIE DOG CREEK SEC. 32-T4N-R25E
STR. NO. 59-020-358 NH 0014(206)177

STANLEY COUNTY
S. D. DEPT. OF TRANSPORTATION
FEBRUARY 2016

INDEX OF BRIDGE SHEETS:-

- Sheet No. 1-General Drawing and Quantities
- Sheet No. 2-Details of Std. Substructure FBOP-CS-30-00-209-1-3 (10-10-57)
- Sheet No. 3-Details of Std. Substructure FBOP-CS-30-00-209-2-3
- Sheet No. 4-Details of Std. Type-B Railing CS-RB-00-209-3-3 (12-31-54)

B.M. No. 38-El. 2050.24
Rebar and Gds.
200' Lt. Sta. 414+00

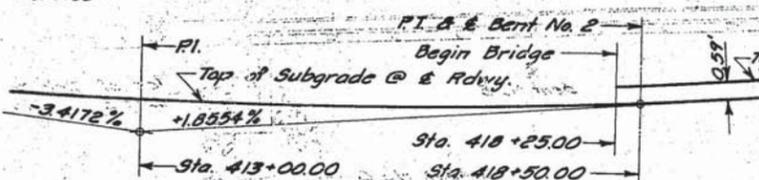
B.M. No. 39-El. 2048.29
Rebar and Gds.
200' Lt. Sta. 420+00

STATE OF S.D.	PROJECT NH 0014(206)177	SHEET NO. E15	TOTAL SHEETS E23
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Q	1400 c.f.s.
A	369 sq. ft.
V	3.8 ft./sec.

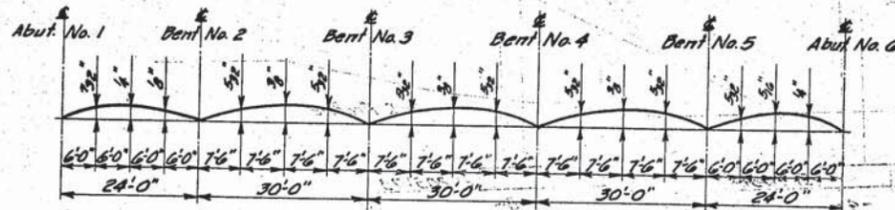
P.I. Sta. 413+00.00
El. 2049.20
V.C. 1100'



SUBGRADE CURVE DATA

EXCAVATION NOTES:-

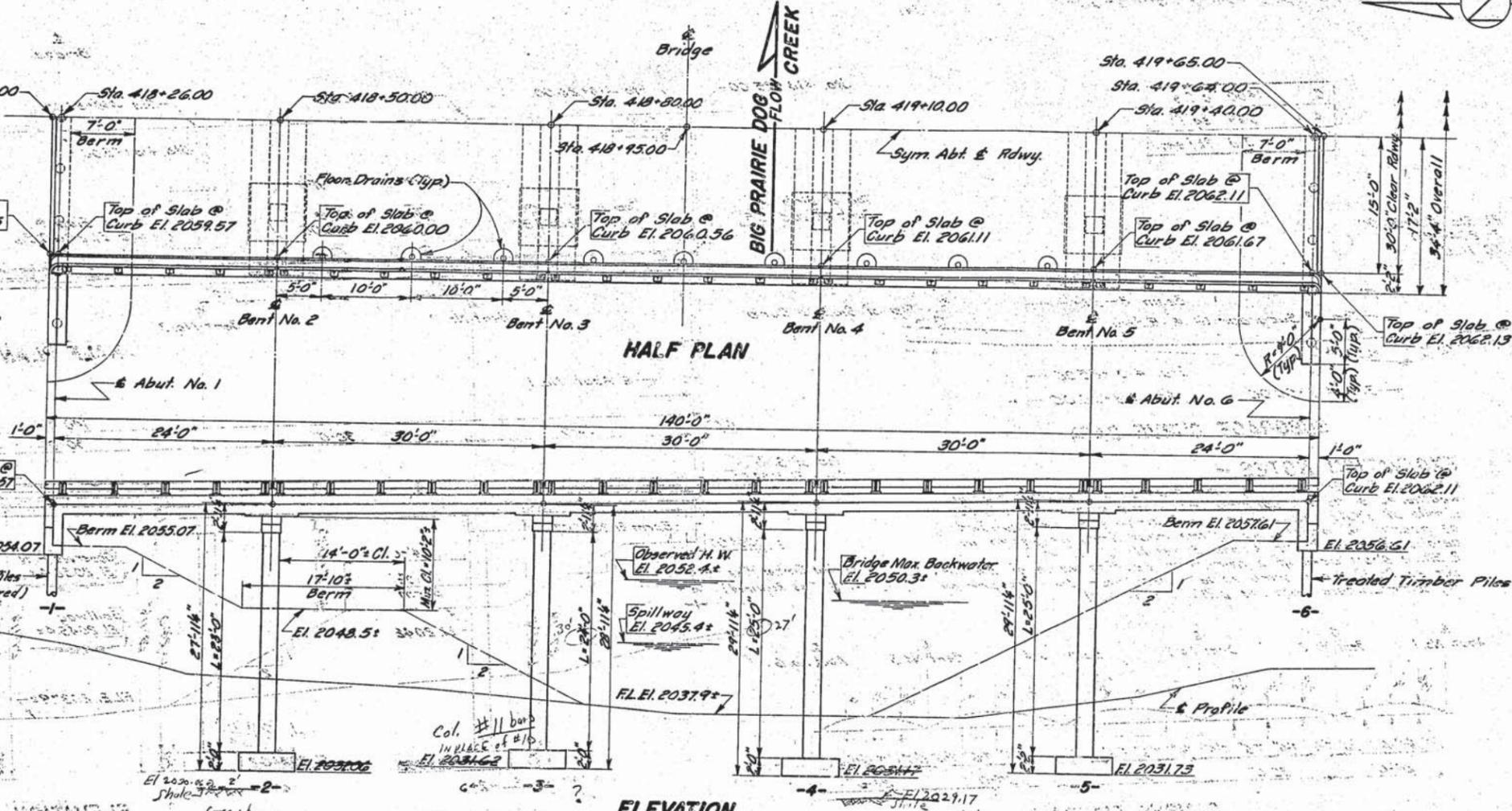
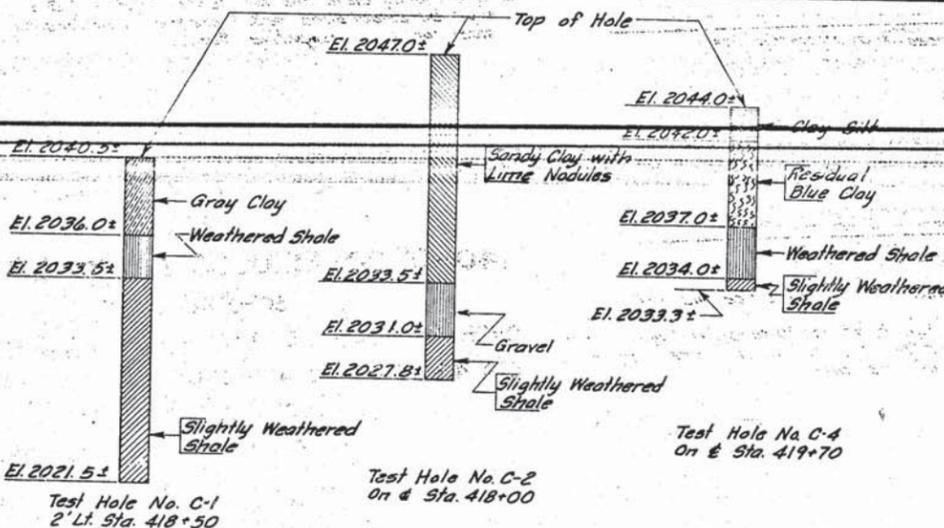
- Footings for Bents No. 2, 3, 4 & 5 shall be cast against slightly weathered shale and carried into same approximately 1'. Limits of shale excavation for footings shall be bounded as nearly as practicable by the neat lines as shown in details of Bent Footings (See Sheet No. 3 of 4).
- Shale shall develop a minimum bearing value of 3 1/4 tons per sq. ft. If the bearing value is less than 3 1/4 tons per sq. ft., communicate with the BRIDGE DIVISION.



GAMBER DIAGRAM

NOTE:- Dimensions shown above for camber at quarter points of spans, supersede corresponding dimensions shown on Sheet No. 2. All other provisions for camber, shown on Sheet No. 2, shall apply.

TEST HOLE DATA



ELEVATION

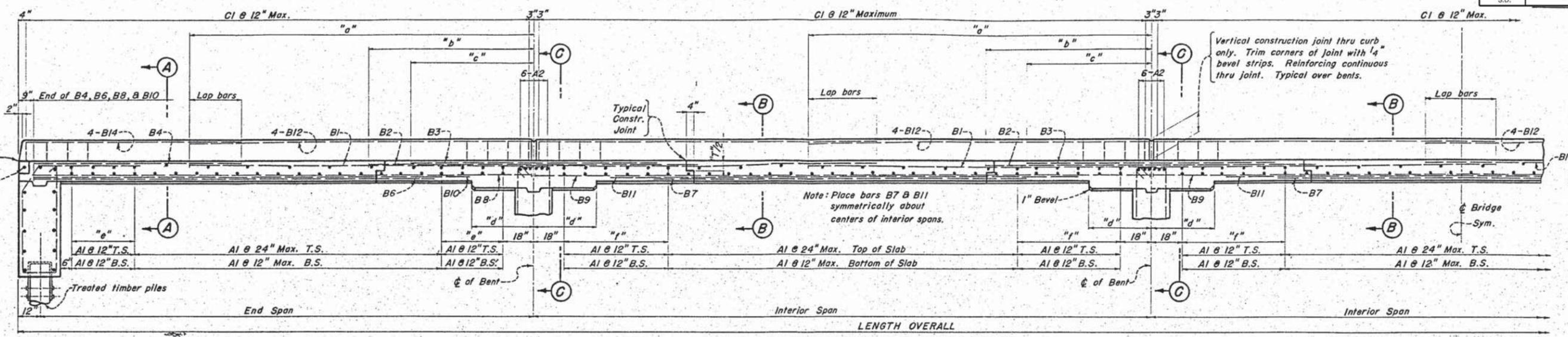
ITEM	ESTIMATED QUANTITIES		Type-B Steel Railing-Lin. Ft.	Treated Timber Piles-Lin. Ft.	Pile Shoes # No.	Excavation-Cu. Yds.	
	Cl. A Conc. Cu. Yds.	Steel-Lbs. Reinf. Struct.				Struct.	Unclass.
Superstructure	188.3	45,520	215	282.3			
Abut. No. 1	17.8	1,815	425				
Abut. No. 6	17.8	1,815	430				
Bent No. 2	10.7	2,145					
Bent No. 3	16.2	2,235					
Bents No. 4 & 5	34.3	4,550					
Totals	290.3	58,130	1,070	282.3	4	265	1,076.8

* One Treated Timber Test Pile shall be driven at Abuts. No. 1 & 6 before remaining piles are ordered.
 † See Grading Plans for Unclassified Excavation.
 ‡ American No. 1 All Steel Pile Shoes or equivalent shall be used, the cost shall be included in the unit price bid for Treated Timber Piles (Sill No. 1 only).
 PILE NOTE - Piles driven at Abuts. No. 1 and No. 6, including test piles, shall obtain their full bearing (20 tons) in the natural ground below the new embankment elevation 2044.5± and 2043.7± respectively. Pre-bored holes thru the fill are required and shall be a minimum diameter .2" larger than the nominal diameter (3' from butt) of the pile.

- ### GENERAL NOTES:-
- See NOTES on Sheet No. 2 and No. 4.
 - Rail Posts shall be built vertical.
 - Longitudinal elements of slab shall conform to the vertical curve.
 - Omit floor drains in end spans.
 - Final footing elevations for Bents No. 2, 3, 4 & 5 shall be established before ordered reinforcing steel for the respective Bents.

GENERAL DRAWING AND QUANTITIES FOR
140'-0" CONTINUOUS CONCRETE BRIDGE
 30'-0" ROADWAY
 OVER BIG PRAIRIE DOG CR. SEC. 32-T4N-R25E
 STA. 418+25.00 TO 419+65.00 S 1261(1)
 STANLEY COUNTY SOUTH DAKOTA H20-44
 DEPARTMENT OF HIGHWAYS
 JULY 1959
 FINALED 3 March 1961
 STR. NO. 59-020-358

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED BY
	D.E.	J.H.	F.H. Sewell



HALF LONGITUDINAL SECTIONAL VIEW (Railing not shown)

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.

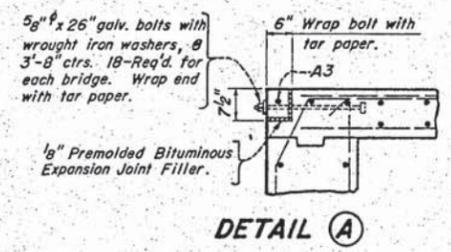
CONSTRUCTION SPECIFICATIONS: South Dakota Highway Commission's "Standard Specifications for Roads and Bridges," current issue, shall govern unless noted otherwise herein, on plans, or in Special Provisions.

PILING: All piles shall be treated timber. Piles will not be necessary under footings if the soil bearing pressure exceeds 3 1/2 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 bottom of footing.

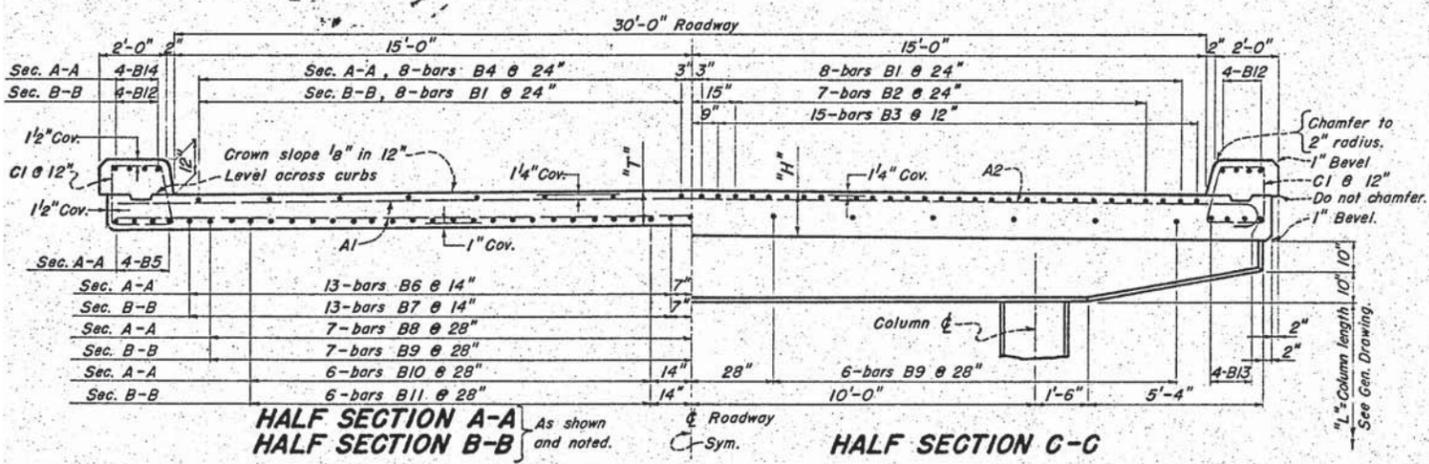
STRUCTURAL STEEL: All 5/8" and 1" bolts including washers, 4"x5/8" bent bars, and floor drains shall be paid for as Structural Steel.

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 otherwise noted. 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 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: H20-44 (T-3-45) A.A.S.H.O. Unit stresses: Concrete, $f_c = 1350$ p.s.i., $n = 8$; Reinforcing $f_s = 20,000$ p.s.i. (Int. Grade Steel). Column design: American Concrete Institute Requirements (ACI 318-47). Equivalent fluid pressure of earth at 40' sq.ft. Minimum pile loading = 20 Tons per pile.



DETAIL A



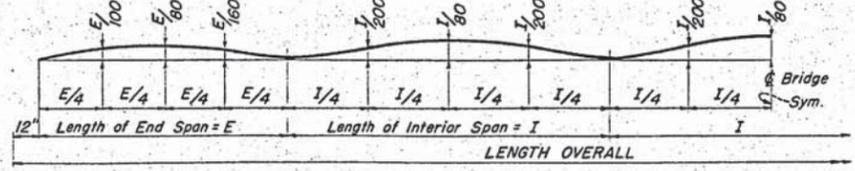
HALF SECTION A-A
HALF SECTION B-B
HALF SECTION C-C

SLAB DATA

END SPAN	INTERIOR SPAN	REINFORCING SCHEDULE																								DIMENSIONS								LENGTH OVERALL	BAR BENDS																																		
		A1	A2	A3	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	C1	"a"	"b"	"c"	"d"	"e"	"f"	"g"	"h"																																										
16'	20'	141	5/8	33'-6"	24	7/8	35'-3"	1	33'-7"	2	5/8	29'-9"	64	7/8	23'-0"	56	7/8	13'-0"	120	3/4	9'-0"	32	3/4	7'-3"	16	3/4	16'-9"	52	7/8	13'-6"	78	7/8	14'-0"	26	7/8	16'-3"	39	7/8	20'-0"	24	7/8	14'-6"	36	7/8	16'-0"	32	3/4	23'-0"	24	3/4	20'-0"	16	3/4	7'-9"	198	1/2	7'-6"	TI	7"	1'-5 1/2"	8 1/2"	11 1/2"	11'-6"	6'-6"	4'-6"	24	2'-0"	3'-0"	94'-0"
18'	22'-6"	159					7/8	35'-3"						7/8	25'-6"	7/8	13'-6"		3/4	9'-0"			8'-0"		3/4	18'-9"	7/8	14'-6"	7/8	14'-6"	7/8	18'-3"	7/8	22'-6"	7/8	16'-0"	7/8	17'-6"	3/4	25'-6"	3/4	22'-6"		8'-6"	218	7'-9"		1'-6 3/4"	9 3/4"	12 1/2"	12'-9"	6'-9"	4'-6"	27	2'-0"	3'-0"	105'-6"												
20'	25'	179					1"	35'-9"						1"	28'-0"	1"	16'-6"		7/8	12'-0"			8'-9"		1"	20'-9"	1"	15'-6"	1"	15'-0"	1"	20'-3"	1"	25'-0"	1"	17'-6"	1"	19'-0"	7/8	28'-0"	7/8	25'-0"		9'-3"	244	7'-9"		1'-6 3/4"	9 3/4"	13 3/4"	14'-0"	8'-3"	6'-0"	30	3'-0"	4'-0"	117'-0"												
22'	27'-6"	200					1"	31'-0"						1"	31'-0"	1"	16'-6"		7/8	12'-0"			9'-3"		1"	22'-9"	1"	17'-0"	1"	16'-0"	1"	22'-3"	1"	27'-6"	1"	19'-0"	1"	20'-0"	1"	31'-0"	1"	27'-6"		9'-9"	264	8'-0"		1'-7 1/2"	10 1/2"	14 1/4"	15'-6"	8'-3"	6'-0"	33	3'-0"	4'-0"	128'-6"												
24'	30'	218					1"	33'-6"						1"	16'-0"	3/4	12'-0"		1"	10'-0"			10'-0"		1"	24'-9"	1"	19'-0"	1"	19'-0"	1"	24'-3"	1"	30'-0"	1"	20'-6"	1"	23'-0"	1"	33'-6"	1"	30'-0"		10'-6"	290	8'-0"		1'-8"	11"	15"	16'-9"	8'-0"	6'-0"	36	3'-0"	5'-0"	140'-0"												
26'	32'-6"	238					1"	36'-0"						1"	20'-0"	1"	14'-0"		1"	10'-9"			10'-9"		1"	26'-9"	1"	19'-6"	1"	17'-0"	1"	26'-3"	1"	32'-6"	1"	21'-6"	1"	25'-0"	1"	37'-6"	1"	37'-6"		12'-9"	356	8'-6"		1'-8 3/4"	11 3/4"	16"	18'-0"	10'-0"	7'-0"	39	4'-0"	5'-0"	151'-6"												
28'	35'	256					1"	38'-6"						1"	21'-0"	1"	16'-0"		1"	11'-6"			11'-6"		1"	28'-9"	1"	21'-0"	1"	19'-0"	1"	28'-3"	1"	35'-0"	1"	23'-6"	1"	25'-0"	1"	38'-6"	1"	35'-0"		12'-0"	336	8'-3"		1'-9 1/2"	12 1/2"	17"	19'-3"	10'-6"	8'-0"	42	4'-0"	6'-0"	163'-0"												
30'	37'-6"	279					1"	41'-0"						1"	21'-0"	1"	15'-0"		1"	12'-3"			12'-3"		1"	30'-9"	1"	22'-6"	1"	21'-6"	1"	30'-3"	1"	37'-6"	1"	25'-0"	1"	27'-0"	1"	41'-0"	1"	37'-6"		12'-9"	356	8'-6"		1'-10 1/4"	13 3/4"	18"	20'-6"	10'-6"	7'-6"	45	5'-0"	6'-0"	174'-6"												
32'	40'	297					1"	43'-6"						1"	23'-0"	1"	18'-6"		1"	13'-0"			13'-0"		1"	32'-9"	1"	24'-0"	1"	24'-0"	1"	32'-3"	1"	40'-0"	1"	26'-6"	1"	28'-0"	1"	43'-6"	1"	40'-0"		13'-6"	382	8'-6"		1'-11"	14"	19"	21'-9"	11'-6"	9'-3"	48	5'-0"	7'-0"	186'-0"												
34'	42'-6"	315					1"	46'-6"						1"	19'-6"	1"	12'-0"		1"	13'-6"			13'-6"		1"	34'-9"	1"	24'-6"	1"	22'-6"	1"	34'-3"	1"	42'-6"	1"	27'-6"	1"	28'-6"	1"	46'-6"	1"	42'-6"		14'-0"	402	8'-9"		1'-11 3/4"	14 3/4"	20"	23'-3"	9'-9"	6'-0"	51	5'-0"	7'-0"	197'-6"												
36'	45'	335	5/8	33'-6"	24	1"	35'-9"	1	33'-7"	2	5/8	29'-9"	64	1"	49'-0"	56	1"	20'-6"	120	1"	13'-6"	32	3/4	14'-3"	16	1"	36'-9"	52	1"	26'-6"	78	1"	25'-0"	26	1"	36'-3"	39	1"	45'-0"	24	1"	29'-0"	36	1"	31'-0"	32	1"	49'-0"	24	1"	45'-0"	16	3/4	14'-9"	428	1/2	8'-9"	TI	7"	2'-0"	15 1/2"	21"	24'-6"	10'-3"	6'-9"	54	6'-0"	8'-0"	209'-0"

ESTIMATED QUANTITIES

TWO ABUTMENTS		FOUR INTERIOR BENTS				SLABS & CURBS				TOTALS, Exclusive of Railing & Excavation				
Class A Concrete Cu. Yds.	Reinforcing Steel Lbs.	Number of Piles	Structural Steel Lbs.	Class A Concrete - Cu. Yds. Constant	Reinforcing Steel - Lbs. Constant	Number of Piles	Class A Concrete - Cu. Yds. Constant	Reinforcing Steel - Lbs. Constant	Number of Piles	Class A Concrete - Cu. Yds. Constant	Reinforcing Steel - Lbs. Constant	Number of Piles	Class A Concrete - Cu. Yds. Constant	Reinforcing Steel - Lbs. Constant
35.6	3630	16	760	34.7	0.824	4465	128.4	32	99.4	24,605	18	20	169.7	32,700
		16	760	34.7	0.824	4500	128.4	32	120.5	26,745	26	260	190.8	34,875
		16	760	34.7	0.824	4510	128.4	32	140.6	33,740	26	270	210.9	41,880
		16	760	45.1	0.824	4660	128.4	40	165.3	39,425	30	320	246.0	47,715
		18	855	46.5	0.996	5115	159.5	40	188.3	45,520	30	330	270.4	54,265
		18	855	46.5	0.996	5470	159.5	40	216.5	49,015	36	400	298.6	58,115
		18	855	46.6	1.185	6305	193.3	48	246.6	57,835	36	420	328.8	67,770
		20	950	46.6	1.185	6345	193.3	48	278.6	66,550	36	435	360.8	76,525
		20	950	61.9	1.390	10215	251.4	64	312.6	72,000	40	500	410.1	85,845
		20	950	63.2	1.611	10285	254.3	64	349.4	79,210	46	590	447.2	93,125
35.6	3630	20	950	68.8	1.611	10590	254.3	64	386.2	88,275	18	46	610	490.6



CAMBER DIAGRAM

Camber is calculated for dead load plus plastic flow. Camber is calculated thus using the 18'-0" Bridge as an illustration: $E=32'$ and $I=40'$, $I/80=40/80=1/2$, provide $1/2"$ camber at centers of interior spans. The values obtained for camber shall be added to the proposed grade elevations of the respective stations to establish the elevation of the top of the finished roadway slab.

The slab shall also be raised 5/8" additional over the interior bents at Roadway ξ to provide for dead load deflection and plastic flow at the ξ of the bents as noted on details thereof.

DETAILS OF STANDARD SUPERSTRUCTURE FOR 5-SPAN CONTINUOUS CONCRETE SLAB BRIDGES WITH INTERIOR FRAMED BENTS ON PILES 30'-0" ROADWAY 94'-0" TO 209'-0" OVERALL LGTH. SOUTH DAKOTA STATE HIGHWAY COMMISSION

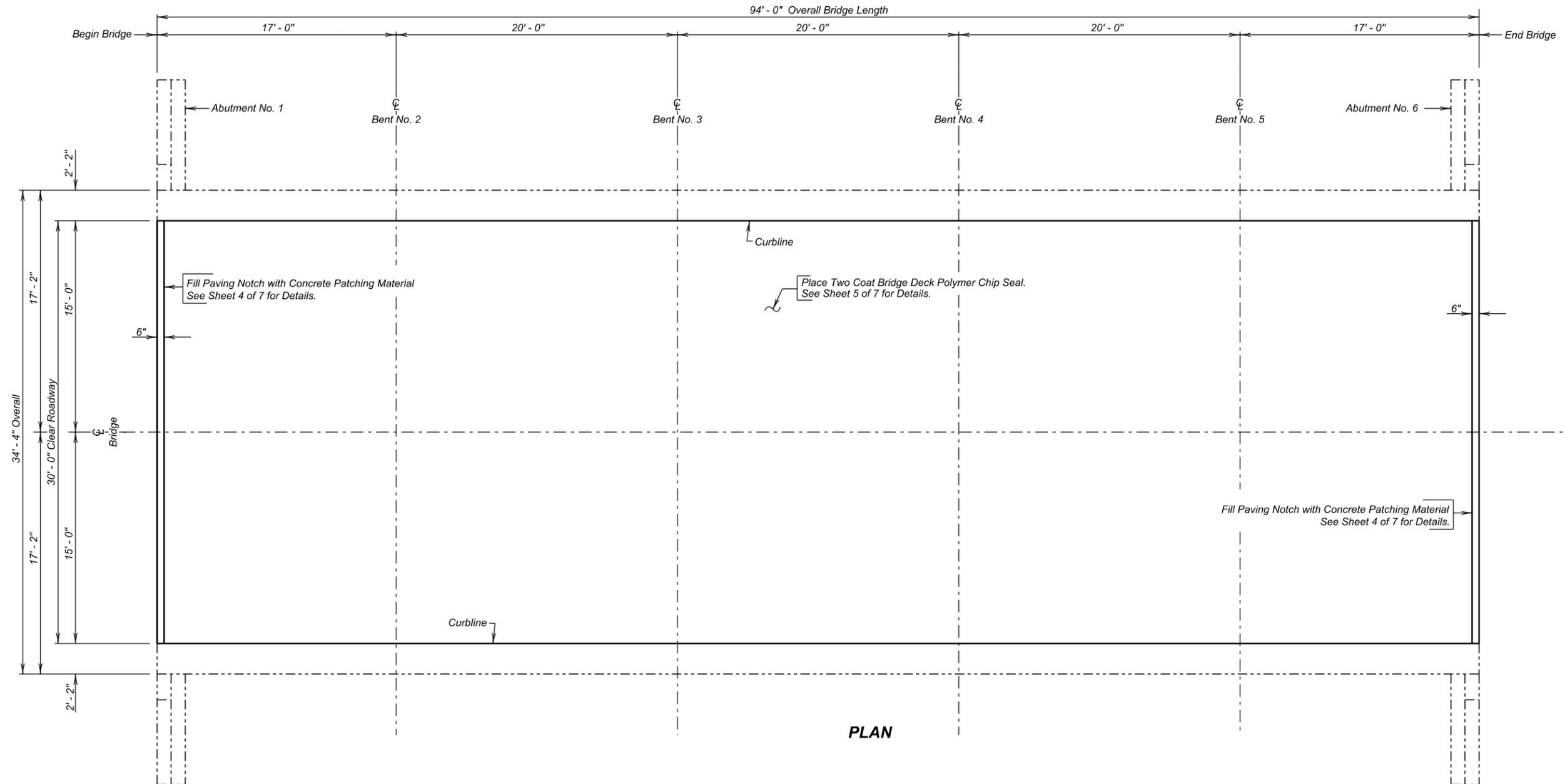
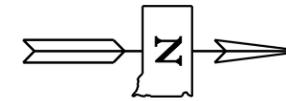
STR. NO. 59-020-358 1948 7 OF 7

DESIGNED BY H.O.T.	DRAWN BY H.O.T.	CHECKED BY R.E.J.	APPROVED BRIDGE ENGINEER
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ORIGINAL CONSTRUCTION PLANS

Spec. Note Rev 10-10-57

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0014(206)177	E17	E23



PLAN

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 - Existing Paving Notch Reinforcement
- Sheet No. 5 - Polymer Chip Seal Details
- Sheet No. 6 - Original Construction Plans
- Sheet No. 7 - Original Construction Plans

**LAYOUT FOR UPGRADING
FOR**

94' - 0" CONTINUOUS CONCRETE BRIDGE
 30' - 0" ROADWAY 0° SKEW
 OVER COTTONWOOD CREEK SEC. 17-T4N-R25E
 STR. NO. 59-020-322 NH 0014(206)177
 PCN 04V2

STANLEY COUNTY
 S. D. DEPT. OF TRANSPORTATION
 FEBRUARY 2016

1 OF 7

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

DESIGNED BY KSK STAN04V2	CK. DES. BY MM 04V2SC01	DRAFTED BY KSK <i>Kevin N. Coeden</i> BRIDGE ENGINEER
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ESTIMATE OF STRUCTURE QUANTITIES

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
460E0172	Concrete Patching Material, Bridge Deck	55.2	CuFt
460E0300	Breakout Structural Concrete	0.8	CuYd
460E0380	Install Dowel in Concrete	16	Each
480E0200	Epoxy Coated Reinforcing Steel	56	Lb
491E0005	Two Coat Polymer Bridge Deck Chip Seal	310.0	SqYd
491E0110	Abrasive Blasting of Bridge Deck	310.0	SqYd
491E0120	Bridge Deck Grinding	310.0	SqYd
491E0130	Concrete Removal, Class A	4.3	SqYd
491E0140	Concrete Removal, Class B	4.3	SqYd

SPECIFICATIONS

- Design Specifications: AASHTO Standard Specifications for Highway Bridges 2002 Edition with 2003 Interim Specifications using Working Stress Design.
- 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 and are provided as information only. 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 in the plans. Alternate sequence of operations may be submitted by the Contractor for approval by the Engineer at the pre-construction meeting.

- Perform Bridge Deck Grinding for the first phase of construction.
- Breakout the concrete in the existing paving notch, install dowel bars, and place resteel for the first phase of construction.
- Place concrete in the paving notch for the first phase of construction.
- Repair the bridge deck by removing all loose and delaminated concrete from the bridge deck surface for the first phase of construction.
- Clean the bridge deck surface with abrasive blasting for the first phase of construction.
- Place the Two Coat Polymer Bridge Deck Chip Seal for the first phase of construction.

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

GENERAL CONSTRUCTION NOTES

- All mild reinforcing steel shall conform to ASTM A615, Grade 60.
- Use 2" clear cover on all reinforcing steel except as shown otherwise.
- 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.
- Concrete Patching Material used to fill the existing paving notches shall conform to Section 491 of the Construction Specifications.

BRIDGE DECK GRINDING

The Contractor will have to option of grinding the entire deck surface during phase one. Any additional cost incurred for grinding the entire deck surface shall be at no additional cost to the Department.

CONCRETE BREAKOUT

- The paving notch concrete shall be broken out to the limits shown on the plans. Breakout limits shall be defined with a 3/4 inch deep sawcut (unless specified otherwise in these plans), where practical, as approved by the Engineer.
- Where new concrete is placed adjacent to existing asphalt concrete, the existing asphalt shall be sawed full depth to a true line with a vertical face. There will not be a separate payment made for sawing.
- The Contractor will be allowed to use the vertical saw cut in the asphalt concrete as a form for the new paving notch concrete placement.
- All broken out concrete shall be disposed of by the Contractor. Any disposal of discarded material shall be in accordance to the Environmental Commitment Notes.
- The contract unit price per cubic yard for "Breakout Structural Concrete" shall include sawing, breakout concrete, cleaning, and disposal of all broken out material.

INSTALLING DOWELS IN CONCRETE

- Holes drilled in the existing concrete shall be true and normal or as shown in the plans. Drilling holes using a core drill shall not be allowed. Care shall be taken not to damage the existing reinforcing steel. The Contractor can expect to encounter and have to drill through reinforcing steel or shift the dowel spacing as approved by the Engineer to miss the existing reinforcing steel. If the Contractor shifts the dowel spacing, the unused drill holes shall be filled completely with the epoxy resin as approved by the Engineer.
- The epoxy resin mixture shall be of a type for bonding steel to hardened concrete and shall conform to AASHTO M235 Type IV (Equivalent to ASTM C881, Type IV). Grade 1, 2 or 3 may be used for vertical dowels.
- The diameter of the drilled holes shall not be less than 1/8 inch greater, nor more than 3/8 inch greater than the diameter of the dowels or as per the Manufacturer's recommendations. The drilled holes shall be blown out with compressed air using a device that will reach the back of the hole to ensure that all debris or loose material has been removed prior to epoxy injection.
- Mix epoxy resin as recommended by the Manufacturer and apply by an injection method as approved by the Engineer. Beginning at the back of the drilled holes, fill the holes 1/3 to 1/2 full of epoxy, or as recommended by the Manufacturer, prior to insertion of the steel bar. Rotate the steel bar during installation to eliminate voids and ensure complete bonding of the bar. Insertion of the bars by the dipping or painting method will not be allowed.
- No loads shall be applied to the epoxy grouted dowel bars until the epoxy resin has had sufficient time to cure as specified by the epoxy resin manufacturer.
- Dowel bars shall be deformed bars conforming to ASTM A615 Grade 60.
- The cost of epoxy resin, dowels, installation and other incidental items shall be incidental to the contract unit price per each for "Install Dowel in Concrete".

ESTIMATE OF STRUCTURE QUANTITIES AND NOTES FOR 94' - 0" CONTINUOUS CONCRETE BRIDGE

STR. NO. 59-020-322

FEBRUARY 2016

2 OF 7

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0014(206)177	E19	E23

TWO COAT POLYMER BRIDGE DECK CHIP SEAL

1. The Two Coat Polymer Bridge Deck Chip Seal for this bridge shall be an EP50-Overlay as supplied by the E-Chem Company. Contact information is as follows:

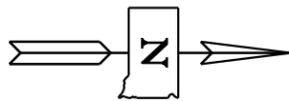
E-Chem: Engineered Chemical Solutions for Concrete
Ray Breer
Business Development Manager
P.O. Box 95483
Albuquerque, NM 87199
ray@e-chem.net
<http://e-chem.net>
Cell: (720) 201-8810
Office: (505)217-2121
Fax: (505)217-3721

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

NOTES (CONTINUED)
FOR
94' - 0" CONTINUOUS CONCRETE BRIDGE
STR. NO. 59-020-322
FEBRUARY 2016

(3) OF (7)

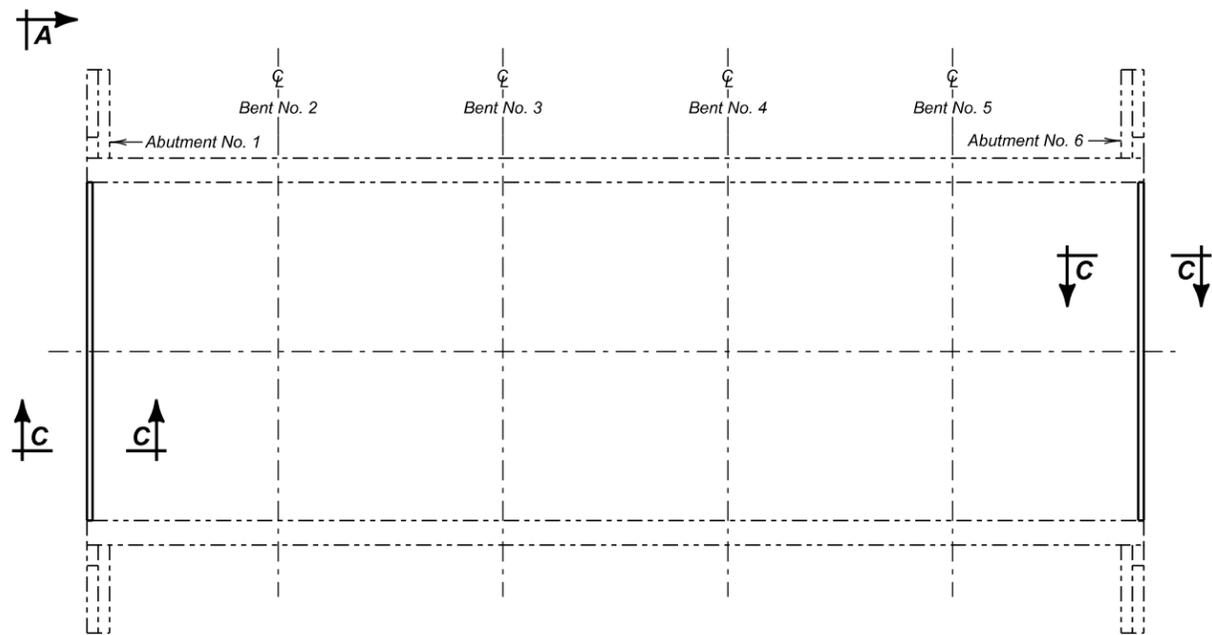
DESIGNED BY KSK STAN04V2	CK. DES. BY MM 04V2SC03	DRAFTED BY KSK	<i>Kevin N. Goeden</i> BRIDGE ENGINEER
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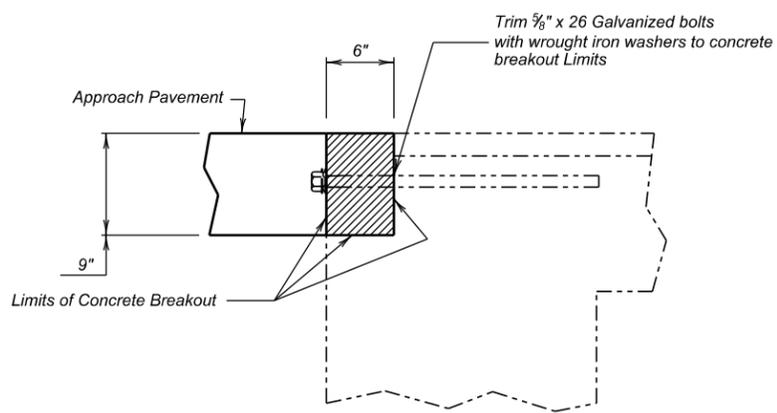
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0014(206)177	E20	E23

REINFORCING SCHEDULE						
(For Both Ends of Bridge)						
Mk.	No.	Size	Length	Type	Bending Details	
					Bending Details	
PHASE 1	d1	4	5	6' - 9"	Str.	 Type 17A
	Δ z1	8	5	2' - 6"	17A	
PHASE 2	d1	4	5	6' - 9"	Str.	
	Δ z1	8	5	2' - 6"	17A	

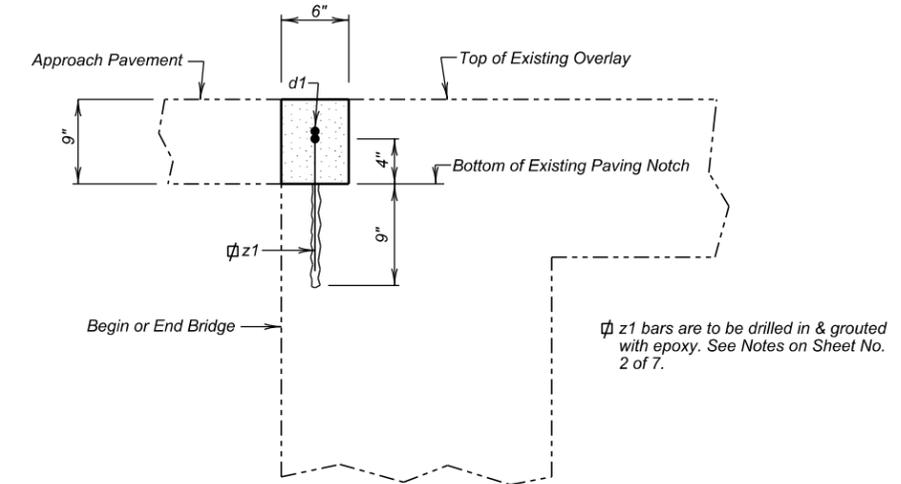
NOTES:
 All Dimensions are out to out of bars.
 All Bars to be Epoxy Coated.
 Δ Dowels



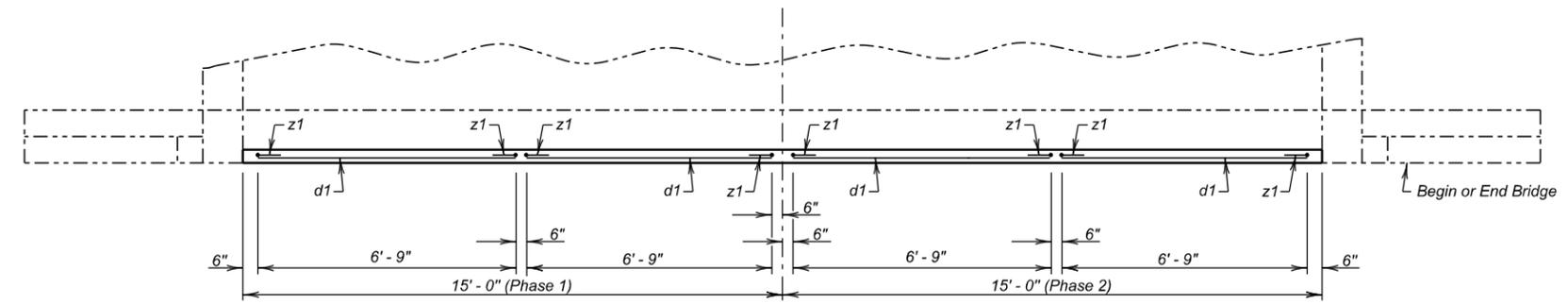
BRIDGE LAYOUT



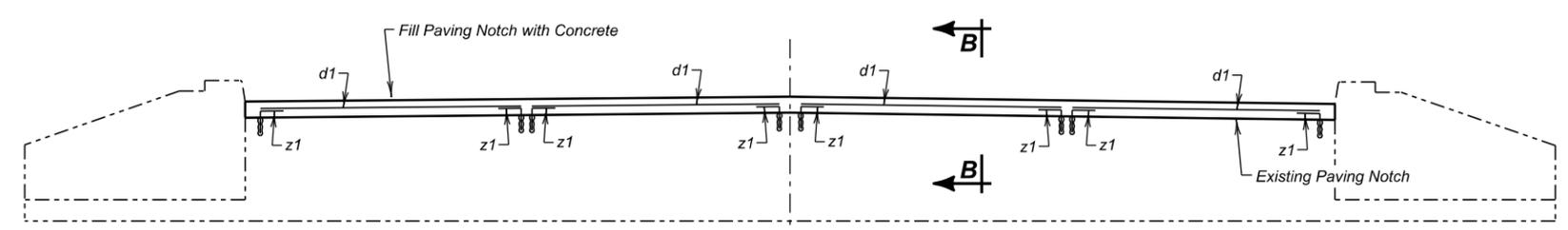
SECTION C - C
Existing Paving Block Removal



SECTION B - B



PLAN



VIEW A - A

ITEM	UNIT	QUANTITY	
		Phase 1	Phase 2
		Concrete Patching Material, Bridge Deck	Sq. Ft.
Breakout Structural Concrete	Cu. Yd.	0.4	0.4
Install Dowel in Concrete	Each	8	8
Epoxy Coated Reinforcing Steel	Lb	28	28

* 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
21 Lb.	21 Lb.

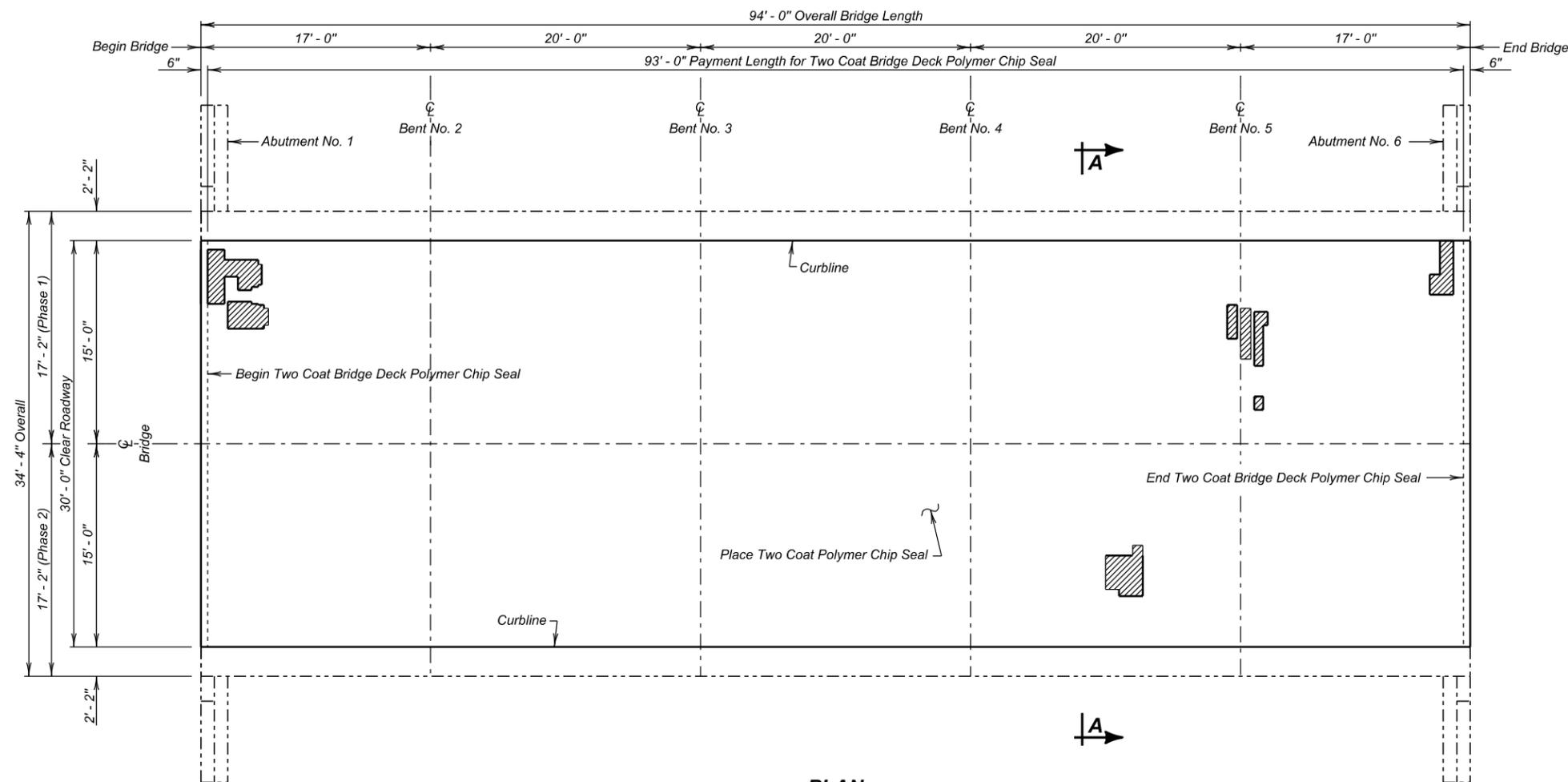
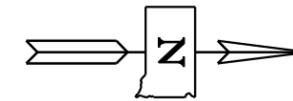
EXISTING PAVING NOTCH REINFORCEMENT

FOR
94' - 0" CONTINUOUS CONCRETE BRIDGE
 30' - 0" ROADWAY 0° SKEW
 OVER COTTONWOOD CREEK SEC. 17-T4N-R25E
 STR. NO. 59-020-322 NH 0014(206)177

STANLEY COUNTY
 S. D. DEPT. OF TRANSPORTATION

FEBRUARY 2016

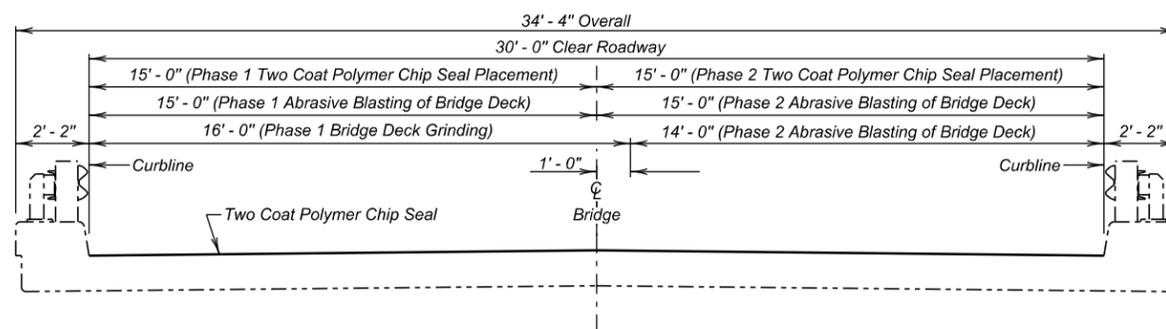
DESIGNED BY KSK STAN04V2	CK. DES. BY MM 04V2SC04	DRAFTED BY KR/EJA	 BRIDGE ENGINEER
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LEGEND

Shaded areas indicate anticipated locations of unsound concrete requiring concrete repair and are based on a deck condition survey conducted in the fall of 2013.

PLAN



SECTION A - A

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY	
		Phase 1	Phase 2
Concrete Patching Material, Bridge Deck	Cu. Ft.	25.7	6.9
Two Coat Bridge Deck Polymer Chip Seal	Sq. Yd.	155.0	155.0
Abrasive Blasting of Bridge Deck	Sq. Yd.	155.0	155.0
Bridge Deck Grinding	Sq. Yd.	165.3	144.7
Concrete Removal, Class A	Sq. Yd.	3.4	0.9
Concrete Removal, Class B	Sq. Yd.	3.4	0.9

POLYMER CHIP SEAL DETAILS FOR

94' - 0" CONTINUOUS CONCRETE BRIDGE
 30' - 0" ROADWAY
 OVER COTTONWOOD CREEK
 STR. NO. 59-020-322

0° SKEW
 SEC. 17-T4N-R25E
 NH 0014(206)177

STANLEY COUNTY
 S. D. DEPT. OF TRANSPORTATION
 FEBRUARY 2016

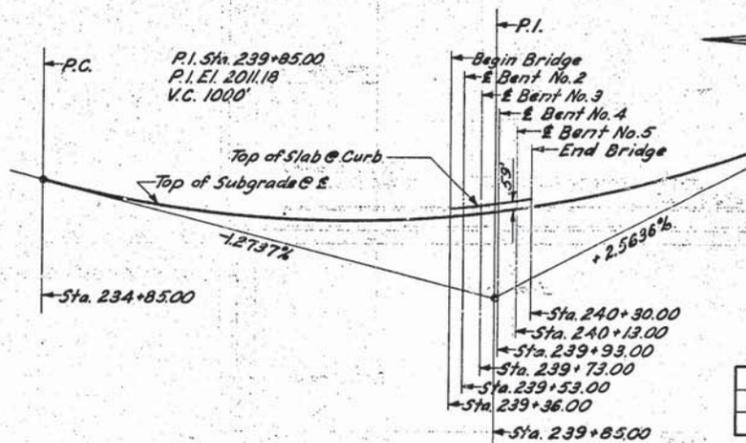
INDEX OF BRIDGE SHEETS—

- Sheet No.1 General Drawing and Quantities **FBOP-CS-30-00-209-1-3** (10-10-57)
- Sheet No.2 Details for Std. Superstructure **FBOP-CS-30-00-209-2-3**
- Sheet No.3 Details for Std. Substructure **CS-RB-00-209-3-3** (12-31-54)
- Sheet No.4 Details of Type-B Railing **CS-RB-00-209-3-3** (12-31-54)

B.M. No. 21 El. 2011.80
Rebar # 6s.
200' Lt. Sta. 237+00

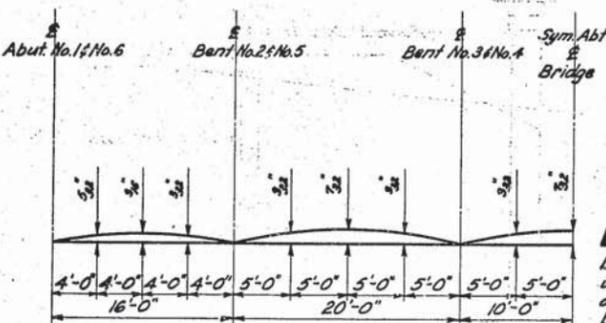
B.M. No. 22 El. 2010.62
Rebar # 6s.
200' Lt. Sta. 245+00

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH 0014(206)177	E22	E23



VERTICAL CURVE DATA

Q	1800 cu. ft.
A	427 sq. ft.
V	4.2 f.p.s.

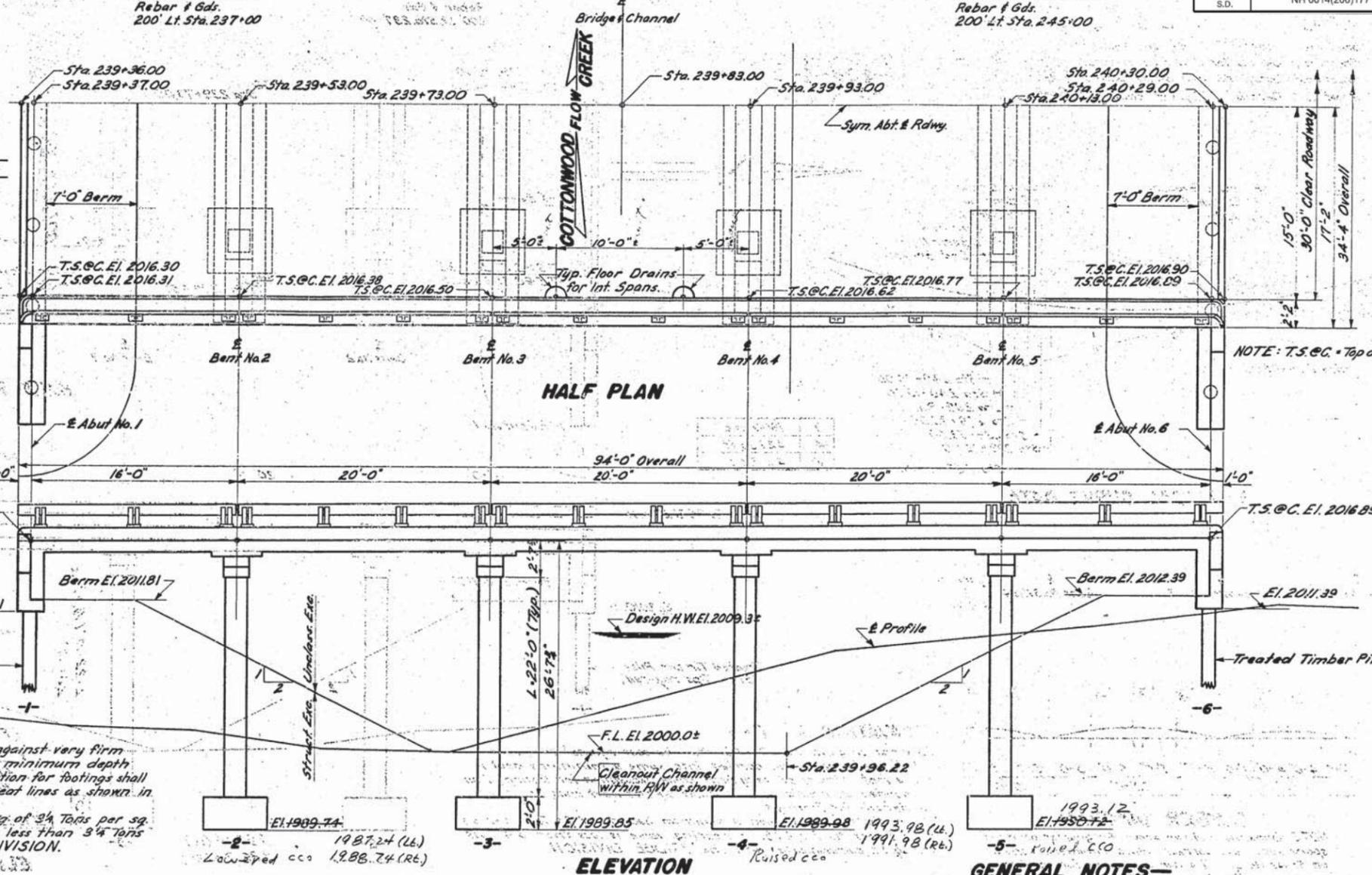


GAMBER DIAGRAM

NOTE: Dimensions shown above, for quarter points of spans supersede corresponding dimensions shown on Sheet No. 2. All other provisions for camber, shown on Sheet No. 2, shall apply.

EXCAVATION NOTE—

- Footings for Bents No. 2, 3, 4 & 5 shall be cast against very firm undisturbed shale and carried into same a minimum depth of one foot. Limits of very firm shale excavation for footings shall be bounded as nearly as practicable by the neat lines as shown in the details for footings.
- Firm shale shall develop a minimum bearing of 3 1/2 tons per sq. ft. at Bents No. 2, 3, 4 & 5. If bearing value is less than 3 1/2 tons per sq. ft., communicate with the BRIDGE DIVISION.



HALF PLAN

ELEVATION

NOTE: T.S. & C. = Top of Slab at Curb

ESTIMATED QUANTITIES						
ITEM	CU. Yds.	Sq. Ft.	Lineal Ft.	Lineal Ft.	Sq. Ft.	Lineal Ft.
Superstructure	39.4	24,605	170	190.3	15,220	328
Abutments No. 1 & No. 6	35.6	5,630	780			
Bents No. 2, 3, 4 & 5	48.1	7,290				
Totals	123.1	37,525	930	180.3	15,220	328

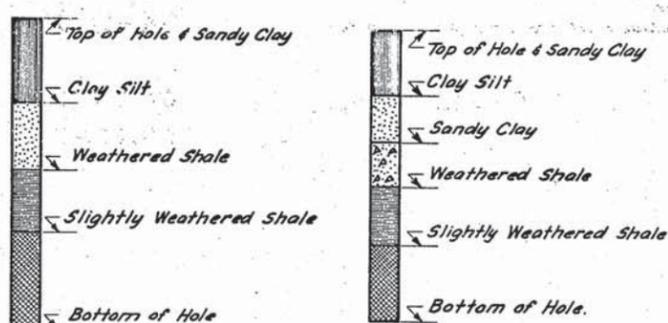
One Treated Timber Test Pile shall be driven at Abuts. No. 1 & No. 6 before remaining piles are ordered.
See Grading Plans for Unclassified Excavation.
PILE NOTE:—Piles driven at Abut. No. 1, including test piles, shall obtain their full bearing (20 tons) in the natural ground below the new embankment elevation 2003.25. Pre-bored holes thru the fill are required and shall be a minimum diameter 2" larger than the nominal diameter (3" from butt) of the pile.
American No. 1 All-Steel Pile Shoes or equivalent shall be used, the cost to be included in the unit price bid for Treated Timber Piles. (Sill No. 1 only)

GENERAL NOTES—

- See NOTES on Sheet No. 2.
- Omit floor drains in the end spans.
- Rail posts shall be built vertical.
- Longitudinal elements of the slab shall conform to the vertical curve.
- Final Footing Elevations for Bents No. 2, No. 3, No. 4 & No. 5 shall be established before ordering reinforcing steel for the respective bents.

TEST HOLE DATA

Station	Distance from Survey	Elevation				
		Top of Hole & Sandy Clay	Clay Silt	Weathered Shale	Slightly Weathered Shale	Bottom of Hole
Sta. 239+83	5' Lt.	2005.0 & 1995.5	1999.0	1995.0	1991.3	1984.9
Sta. 240+70	£	2011.2 & 2003.0	2007.2	1995.0	1991.4	1987.3
Sta. 238+80	£	2004.7	1999.7	1995.2	1990.7	1989.2



(Typ.) Hole B-4

(Typ.) Holes B-1 & B-2

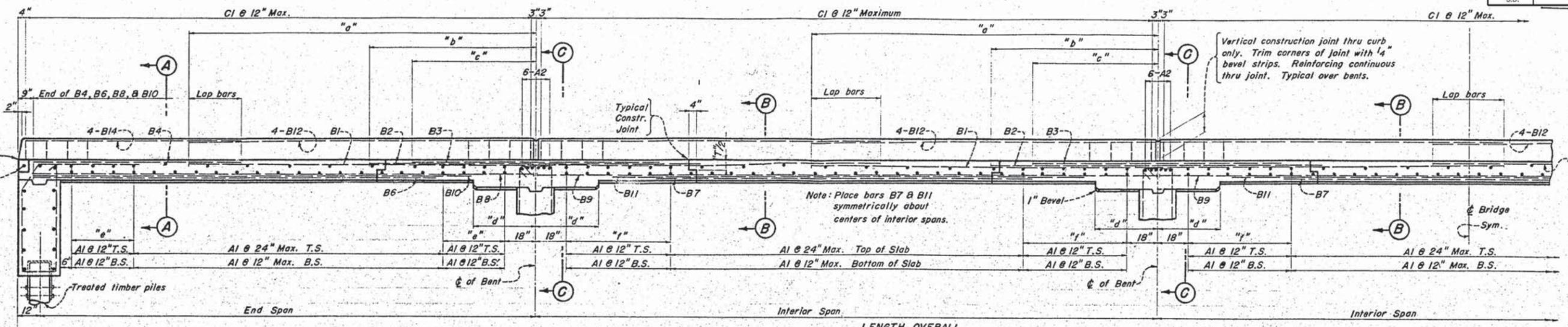
GENERAL DRAWING AND QUANTITIES
FOR
94'-0" CONTINUOUS CONCRETE BRIDGE
30'-0" ROADWAY
OVER COTTONWOOD CREEK SEC. 17-T4N-R25E
STA. 239+36.00 TO 240+30.00 \$ 1261 (1)
STR. NO. 59-020-322 STANLEY COUNTY
SOUTH DAKOTA

Finald 3 March 61
24

ORIGINAL CONSTRUCTION PLANS

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
	o.c.	z.f.	J.P. Krumm
			BRIDGE ENGINEER

59-020-322



HALF LONGITUDINAL SECTIONAL VIEW (Railing not shown)

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.

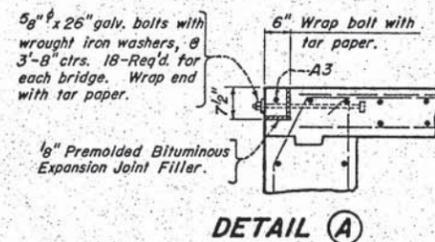
CONSTRUCTION SPECIFICATIONS: South Dakota Highway Commission's "Standard Specifications for Roads and Bridges," current issue, shall govern unless noted otherwise herein, on plans, or in Special Provisions.

PILING: All piles shall be treated timber. Piles will not be necessary under footings if the soil bearing pressure exceeds 3 1/2 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 bottom of footing.

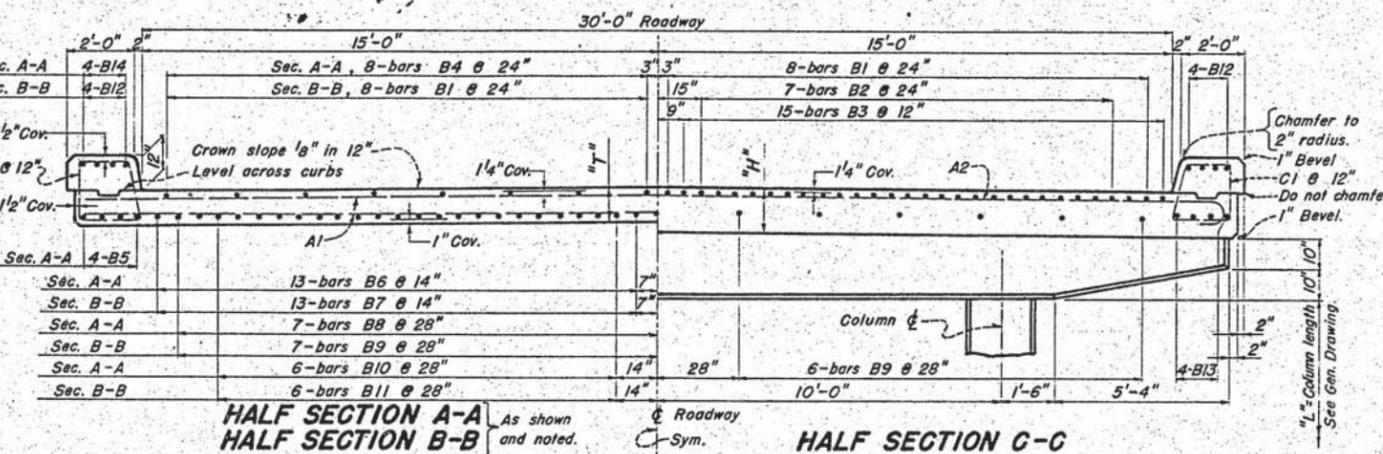
STRUCTURAL STEEL: All 5/8" and 1" bolts including washers, 4"x5/8" bent bars, and floor drains shall be paid for as Structural Steel.

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 otherwise noted. 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: H20-44 (T-3-45) A.A.S.H.O. Unit stresses: Concrete, $f_c = 1350$ p.s.i., $n = 8$; Reinforcing $f_s = 20,000$ p.s.i. (Int. Grade Steel). Column design: American Concrete Institute Requirements (ACI 318-47). Equivalent fluid pressure of earth at 40' / sq. ft. Minimum pile loading = 20 Tons per pile.



DETAIL A



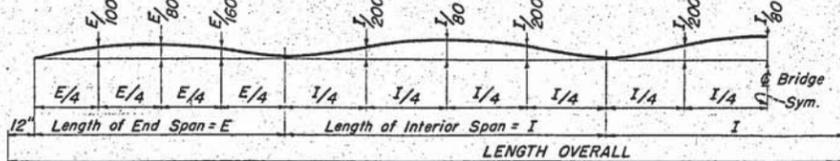
HALF SECTION A-A
HALF SECTION B-B
HALF SECTION C-C

SLAB DATA

END SPAN	INTERIOR SPAN	REINFORCING SCHEDULE														DIMENSIONS										LENGTH OVERALL	BAR BENDS																																										
		A1	A2	A3	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	B14	CI	"a"	"b"	"c"	"d"	"e"	"f"			"g"	"h"	"i"	"j"	"k"	"l"	"m"	"n"	"o"	"p"	"q"	"r"	"s"	"t"	"u"	"v"	"w"	"x"	"y"	"z"																						
16'	20'	141	5/8	33'-6"	24	7/8	35'-3"	1	33'-7"	2	5/8	29'-9"	64	7/8	23'-0"	56	7/8	13'-0"	120	3/4	9'-0"	32	3/4	7'-3"	16	3/4	16'-9"	52	7/8	13'-6"	78	7/8	14'-0"	26	7/8	16'-3"	39	7/8	20'-0"	24	7/8	14'-6"	36	7/8	16'-0"	32	3/4	23'-0"	24	3/4	20'-0"	16	3/4	7'-9"	198	1/2	7'-6"	71	7"	1'-5 1/2"	8 1/2"	11 1/2"	11'-6"	6'-6"	4'-6"	24'	2'-0"	3'-0"	94'-0"
18'	22'-6"	159	1"	35'-3"	1	1"	35'-3"	1	35'-3"	1	1"	35'-3"	64	7/8	25'-6"	7/8	13'-6"	3/4	9'-0"	8'-0"	3/4	18'-9"	7/8	14'-6"	7/8	14'-6"	7/8	18'-3"	7/8	22'-6"	7/8	16'-0"	7/8	17'-6"	3/4	25'-6"	3/4	22'-6"	8'-6"	218	7'-9"	1'-6 1/4"	9 1/4"	12 1/2"	12'-9"	6'-9"	4'-6"	27'	2'-0"	3'-0"	105'-6"																		
20'	25'	179	1"	35'-9"	1	1"	35'-9"	1	35'-9"	1	1"	35'-9"	64	7/8	28'-0"	7/8	16'-6"	7/8	12'-0"	8'-9"	7/8	20'-9"	7/8	15'-6"	7/8	18'-3"	1"	20'-3"	1"	25'-0"	1"	17'-6"	1"	19'-0"	7/8	28'-0"	7/8	25'-0"	9'-3"	244	7'-9"	1'-6 3/4"	9 3/4"	13 1/4"	14'-0"	8'-3"	6'-0"	30'	3'-0"	4'-0"	117'-0"																		
22'	27'-6"	200	1"	36'-0"	1	1"	36'-0"	1	36'-0"	1	1"	36'-0"	64	7/8	31'-0"	1"	16'-6"	7/8	12'-0"	9'-3"	1"	22'-9"	7/8	17'-0"	7/8	15'-0"	1"	22'-3"	1"	27'-6"	1"	19'-0"	1"	20'-0"	1"	31'-0"	1"	27'-6"	9'-9"	264	8'-0"	1'-7 1/2"	10 1/2"	14 1/4"	15'-6"	8'-3"	6'-0"	33'	3'-0"	4'-0"	128'-6"																		
24'	30'	218	1"	36'-6"	1"	1"	36'-6"	1"	36'-6"	1"	1"	36'-6"	64	7/8	33'-6"	1"	16'-0"	3/4	12'-0"	10'-0"	1"	24'-9"	1"	19'-0"	1"	19'-0"	1"	24'-3"	1"	30'-0"	1"	20'-6"	1"	23'-0"	1"	33'-6"	1"	30'-0"	10'-6"	290	8'-0"	1'-8"	11"	15"	16'-9"	8'-0"	6'-0"	36'	3'-0"	5'-0"	140'-0"																		
26'	32'-6"	238	1"	36'-6"	1"	1"	36'-6"	1"	36'-6"	1"	1"	36'-6"	64	7/8	36'-0"	1"	20'-0"	1"	14'-0"	10'-9"	1"	26'-9"	1"	19'-6"	1"	17'-0"	1"	26'-3"	1"	32'-6"	1"	21'-6"	1"	22'-6"	1"	36'-0"	1"	32'-6"	11'-3"	310	8'-3"	1'-9 3/4"	11 3/4"	16"	18'-0"	10'-0"	7'-0"	39'	4'-0"	5'-0"	151'-6"																		
28'	35'	256	1"	36'-6"	1"	1"	36'-6"	1"	36'-6"	1"	1"	36'-6"	64	7/8	38'-6"	1"	21'-0"	1"	16'-0"	11'-6"	1"	28'-9"	1"	21'-0"	1"	19'-0"	1"	28'-3"	1"	35'-0"	1"	23'-6"	1"	25'-0"	1"	38'-6"	1"	35'-0"	12'-0"	336	8'-3"	1'-9 1/2"	12 1/2"	17"	19'-3"	10'-6"	8'-0"	42'	4'-0"	6'-0"	163'-0"																		
30'	37'-6"	279	1"	36'-6"	1"	1"	36'-6"	1"	36'-6"	1"	1"	36'-6"	64	7/8	41'-0"	1"	21'-0"	1"	15'-0"	12'-3"	1"	30'-9"	1"	22'-6"	1"	21'-6"	1"	30'-3"	1"	37'-6"	1"	25'-0"	1"	27'-0"	1"	41'-0"	1"	37'-6"	12'-9"	356	8'-6"	1'-10 1/4"	13 1/4"	18"	20'-6"	10'-6"	7'-6"	45'	5'-0"	6'-0"	174'-6"																		
32'	40'	297	1"	36'-6"	1"	1"	36'-6"	1"	36'-6"	1"	1"	36'-6"	64	7/8	43'-6"	1"	23'-0"	1"	18'-6"	13'-0"	1"	32'-9"	1"	24'-0"	1"	24'-0"	1"	32'-3"	1"	40'-0"	1"	26'-6"	1"	28'-0"	1"	43'-6"	1"	40'-0"	13'-6"	382	8'-6"	1'-11"	14"	19"	21'-9"	11'-6"	9'-3"	48'	5'-0"	7'-0"	186'-0"																		
34'	42'-6"	315	1"	36'-6"	1"	1"	36'-6"	1"	36'-6"	1"	1"	36'-6"	64	7/8	46'-6"	1"	19'-6"	1"	12'-0"	13'-6"	1"	34'-9"	1"	24'-6"	1"	22'-6"	1"	34'-3"	1"	42'-6"	1"	27'-6"	1"	28'-6"	1"	46'-6"	1"	42'-6"	14'-0"	402	8'-9"	1'-11 1/4"	14 3/4"	20"	23'-3"	9'-9"	6'-0"	51'	5'-0"	7'-0"	197'-6"																		
36'	45'	335	5/8	33'-6"	24	1"	35'-9"	1	33'-7"	2	5/8	29'-9"	64	1 1/8	49'-0"	56	1 1/8	20'-6"	120	1 1/8	13'-6"	32	3/4	14'-3"	16	1 1/8	36'-9"	52	1"	26'-6"	78	1"	25'-0"	26	1 1/8	36'-3"	39	1 1/8	45'-0"	24	1 1/8	29'-0"	36	1 1/8	31'-0"	32	1 1/8	49'-0"	24	1 1/8	45'-0"	16	3/4	14'-9"	428	1/2	8'-9"	71	7"	2'-0"	152"	21"	24'-6"	10'-3"	6'-9"	54'	6'-0"	8'-0"	209'-0"

ESTIMATED QUANTITIES

TWO ABUTMENTS		FOUR INTERIOR BENTS				SLABS & CURBS				TOTALS, Exclusive of Railing & Excavation				
Class A Reinforcing Concrete Cu. Yds.	Reinforcing Steel Lbs.	Number of Piles	Structural Steel Lbs.	Class A Concrete - Cu. Yds. Constant	Reinforcing Steel - Lbs./In. Ft. for Columns = "Q"	Number of Piles	Class A Concrete - Cu. Yds.	Reinforcing Steel - Lbs.	Number of Piles	Structural Steel Lbs.	Class A Concrete - Cu. Yds.	Reinforcing Steel - Lbs.	Number of Piles	Structural Steel Lbs.
356	3630	16	760	34.7	0.824	465	128.4	32	99.4	24,605	18	20	200	199.7
16	760	16	760	34.7	0.824	4500	128.4	32	120.5	26,749	26	260	190.9	3,875
16	760	16	760	34.7	0.824	4510	128.4	32	140.6	33,740	26	270	210.9	41,800
16	760	16	760	34.7	0.824	4660	128.4	40	165.3	38,425	30	320	246.0	47,715
18	855	18	855	46.5	0.996	5715	159.5	40	188.3	45,720	30	330	270.4	54,265
18	855	18	855	46.5	0.996	5470	159.5	40	216.6	48,015	36	400	298.6	58,115
20	950	20	950	51.9	1.185	6205	197.3	48	246.6	57,855	36	420	328.8	67,770
20	950	20	950	51.9	1.185	6345	197.3	48	278.6	61,550	36	435	360.8	76,625
20	950	20	950	51.9	1.185	10215	254.4	64	312.6	72,000	40	500	410.1	85,845
20	950	20	950	51.9	1.185	10285	254.3	64	348.8	79,210	46	560	447.2	93,255
35.6	3630	20	950	68.8	1.611	10580	254.3	64	386.2	88,276	48	610	490.6	102,495



CAMBER DIAGRAM

Camber is calculated for dead load plus plastic flow. Camber is calculated thus using the 186'-0" Bridge as an illustration: E=32' and I=40', I/80=40/80=1/2, provide 1/2" camber at centers of interior spans. The values obtained for camber shall be added to the proposed grade elevations at the respective stations to establish the elevation of the top of the finished roadway slab.

The slab shall also be raised 5/8" additional over the interior bents at Roadway ϕ to provide for dead load deflection and plastic flow at the ϕ of the bents as noted on details thereof.

DETAILS OF STANDARD SUPERSTRUCTURE FOR 5-SPAN CONTINUOUS CONCRETE SLAB BRIDGES WITH INTERIOR FRAMED BENTS ON PILES

30'-0" ROADWAY 94'-0" TO 209'-0" OVERALL LGTH.
STR. NO. 59-020-322 SOUTH DAKOTA
STATE HIGHWAY COMMISSION
1948

ORIGINAL CONSTRUCTION PLANS

DESIGNED BY H.O.T.	DRAWN BY H.O.T.	CHECKED BY R.E.J.	APPROVED BRIDGE ENGINEER
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