

February 17, 2023

ADDENDUM NO. 1

RE: Item #2, March 1, 2023 Letting - P 0011(141), NH 0013(146), PCN 06FR, 06WW, Marshall, Spink County - Approach Slab Repair, Polymer Chip Seal & Berm Repair

TO WHOM IT MAY CONCERN:

The following addenda to the plans shall be inserted and made a part of your proposal for the referenced project.

SPECIAL PROVISIONS: No Revisions

SDEBS BID PROPOSAL: *The electronic bid proposal for this contract has been revised to include the changes associated with this addendum. Bidders must log in to the SDEBS to retrieve and incorporate these changes into their bid.*

Bid Items were added:

Bid Item 491E0005 "Two Coat Bridge Deck Polymer Chip Seal"
Bid Item 491E0110 "Abrasive Blasting of Bridge Deck"
Bid Item 491E0120 "Bridge Deck Grinding"
Bid Item 491E0130 "Concrete Removal, Class A"
Bid item 491E0140 "Concrete Removal, Class B"
Bid Item 491E0172 "Concrete patching Material, Bridge Deck"

PLANS: Please destroy sheets 2, 23-35, & 43-56 and replace with the enclosed sheets, dated 2/15/23. Sheet 45A was added. The revisions to sheets 23-35 and sheets 43-56 included adding the Consultant Engineer's Stamp, adding a Polymer Chip Seal to structure 58-101-321, and other miscellaneous revisions. Notable plan revisions are listed here:

Sheet 2 and Sheet 44: Structure No. 58-101-321 – PCN 06WW

Bid Items were added:

Bid Item 491E0005 "Two Coat Bridge Deck Polymer Chip Seal"
Bid Item 491E0110 "Abrasive Blasting of Bridge Deck"
Bid Item 491E0120 "Bridge Deck Grinding"
Bid Item 491E0130 "Concrete Removal, Class A"
Bid item 491E0140 "Concrete Removal, Class B"
Bid Item 491E0172 "Concrete patching Material, Bridge Deck"

Sheet 25: Eliminated one of the previously listed Galvanic Anode suppliers

Sheet 31: Added detail Y and a revised detail Z

Sheet 32: Removed detail Z

Sheet 43: Added Two Coat Bridge Deck Polymer Chip Seal and related information and quantities

Sheet 44: SCOPE OF BRIDGE WORK AND SEQUENCE OF OPERATIONS note was revised

Sheet 45: Added BRIDGE DECK GRINDING note and TWO COAT BRIDGE DECK POLYMER CHIP SEAL note. AS-BUILT ELEVATION SURVEY note and SLOPE PROTECTION (RR Coordination) note was moved to sheet 45A

Sheet 45A: Sheet added to include CONCRETE PATCHING MATERIAL, BRIDGE DECK note.

Sheet 47: Section B-B was revised.

Sheet 49: Added detail Y and a revised detail Z

Sheet 50: Revised Bending Details and Cutting Diagrams and removed detail Z.

Sincerely,

Sam Weisgram
Engineering Supervisor

CC: Mark Peterson, Aberdeen Region Engineer
Bruce Schroeder, Aberdeen Area Engineer

ESTIMATE OF QUANTITIES

Revised: 2/15/23 MD

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH-P 0011(141) NH 0013(146)	2	84

GENERAL QUANTITIES – NH-P 0011(141) – PCN 06FR

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
110E0400	Remove Drop Inlet	2	Each
110E0730	Remove Beam Guardrail	475.0	Ft
110E0810	Remove Rubrail	48.0	Ft
110E1010	Remove Asphalt Concrete Pavement	785.0	SqYd
110E1700	Remove Silt Fence	100	Ft
120E0020	Unclassified Excavation	Lump Sum	LS
260E1010	Base Course	908.0	Ton
320E1200	Asphalt Concrete Composite	416.5	Ton
332E0010	Cold Milling Asphalt Concrete	694	SqYd
450E0122	18" RCP Class 2, Furnish	66	Ft
450E0130	18" RCP, Install	66	Ft
450E2008	18" RCP Flared End, Furnish	2	Each
450E2009	18" RCP Flared End, Install	2	Each
462E0100	Class M6 Concrete	2.3	CuYd
464E0100	Controlled Density Fill	62.7	CuYd
480E0100	Reinforcing Steel	416	Lb
630E0500	Type 1 MGS	250.0	Ft
630E1500	Type 1 Guardrail Transition	4	Each
630E2017	MGS MASH Flared End Terminal	4	Each
632E2220	Guardrail Delineator	16	Each
632E2510	Type 2 Object Marker Back to Back	2	Each
633E1220	High Build Waterborne Pavement Marking Paint, 4" White	1,000	Ft
633E1222	High Build Waterborne Pavement Marking Paint, 4" Yellow	125	Ft
634E0010	Flagging	15.0	Hour
634E0110	Traffic Control Signs	176.0	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0525	Linear Delineation System Panel, Barrier Mounted	30	Each
634E0600	4" Temporary Pavement Marking Tape Type I	2,344	Ft
634E0700	Traffic Control Movable Concrete Barrier	30	Each
634E0750	Temporary Concrete Barrier End Protection	2	Each
670E0200	Type A Frame and Grate	2	Each
670E5400	Precast Drop Inlet Collar	2	Each
730E0100	Cover Crop Seeding	0.5	Bu
734E0010	Erosion Control	Lump Sum	LS
734E0602	Low Flow Silt Fence	350	Ft
734E0610	Mucking Silt Fence	25	CuYd
734E0620	Repair Silt Fence	100	Ft
734E0845	Sediment Control at Inlet with Frame and Grate	2	Each
831E0300	Reinforcement Fabric (MSE)	690	SqYd

GENERAL QUANTITIES – NH 0013(146) – PCN 06WW

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
110E0400	Remove Drop Inlet	2	Each
110E0700	Remove 3 Cable Guardrail	1,120	Ft
110E0730	Remove Beam Guardrail	475.0	Ft
110E0740	Remove 3 Cable Guardrail Anchor Assembly	8	Each
110E1010	Remove Asphalt Concrete Pavement	495.0	SqYd
110E1700	Remove Silt Fence	100	Ft
120E0020	Unclassified Excavation	Lump Sum	LS
120E0600	Contractor Furnished Borrow Excavation	115	CuYd
260E1010	Base Course	828.0	Ton
320E1200	Asphalt Concrete Composite	477.4	Ton
332E0010	Cold Milling Asphalt Concrete	1,298	SqYd
462E0100	Class M6 Concrete	1.9	CuYd
480E0100	Reinforcing Steel	364	Lb
630E0500	Type 1 MGS	550.0	Ft
630E1501	Type 1 Retrofit Guardrail Transition	4	Each
630E2017	MGS MASH Flared End Terminal	4	Each
632E2220	Guardrail Delineator	20	Each
632E2510	Type 2 Object Marker Back to Back	1	Each
633E1220	High Build Waterborne Pavement Marking Paint, 4" White	2,050	Ft
633E1222	High Build Waterborne Pavement Marking Paint, 4" Yellow	1,435	Ft
634E0010	Flagging	15.0	Hour
634E0110	Traffic Control Signs	177.6	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0525	Linear Delineation System Panel, Barrier Mounted	44	Each
634E0600	4" Temporary Pavement Marking Tape Type I	3,544	Ft
634E0700	Traffic Control Movable Concrete Barrier	44	Each
634E0750	Temporary Concrete Barrier End Protection	2	Each
634E0900	Portable Temporary Traffic Control Signal	5	Unit
670E0200	Type A Frame and Grate	2	Each
670E5400	Precast Drop Inlet Collar	2	Each
730E0100	Cover Crop Seeding	0.5	Bu
734E0010	Erosion Control	Lump Sum	LS
734E0602	Low Flow Silt Fence	250	Ft
734E0610	Mucking Silt Fence	18	CuYd
734E0620	Repair Silt Fence	75	Ft
734E0845	Sediment Control at Inlet with Frame and Grate	2	Each
831E0300	Reinforcement Fabric (MSE)	770	SqYd
998E0100	Railroad Protective Insurance	Lump Sum	LS

Structure No. 46-110-123 – PCN 06FR

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E3310	Bridge Elevation Survey	Lump Sum	LS
110E0010	Remove Concrete Bridge Approach Slab	311.4	SqYd
110E0020	Remove Bridge Railing	157	Ft
120E0010	Unclassified Excavation	48	CuYd
410E2600	Membrane Sealant Expansion Joint	79.8	Ft
430E0200	Bridge End Embankment	3	CuYd
430E0300	Granular Bridge End Backfill	60.0	CuYd
430E0510	Approach Slab Underdrain Excavation	3.0	CuYd
430E0700	Precast Concrete Headwall for Drain	4	Each
460E0070	Class A45 Concrete, Bridge Repair	12.8	CuYd
460E0150	Concrete Approach Slab for Bridge	181.4	SqYd
460E0160	Concrete Approach Sleeper Slab for Bridge	39.8	SqYd
460E0300	Breakout Structural Concrete	2.2	CuYd
460E0380	Install Dowel in Concrete	164	Each
480E0200	Epoxy Coated Reinforcing Steel	1,646	Lb
480E0504	No. 4 Rebar Splice	28	Each
480E0505	No. 5 Rebar Splice	32	Each
480E0506	No. 6 Rebar Splice	44	Each
480E5000	Galvanic Anode	116	Each
680E0040	4" Underdrain Pipe	130	Ft
680E2500	Porous Backfill	5.6	Ton

Structure No. 58-101-321 – PCN 06WW

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E3310	Bridge Elevation Survey	Lump Sum	LS
110E0010	Remove Concrete Bridge Approach Slab	323.2	SqYd
120E0010	Unclassified Excavation	68	CuYd
120E3120	Bridge Berm Repair	2	Each
120E7000	Select Granular Backfill	255.2	Ton
410E2600	Membrane Sealant Expansion Joint	83.8	Ft
430E0200	Bridge End Embankment	2	CuYd
430E0300	Granular Bridge End Backfill	85.0	CuYd
460E0150	Concrete Approach Slab for Bridge	281.4	SqYd
460E0160	Concrete Approach Sleeper Slab for Bridge	41.8	SqYd
462E0250	Cellular Grout	4.8	CuYd
480E0504	No. 4 Rebar Splice	40	Each
480E0505	No. 5 Rebar Splice	32	Each
480E0506	No. 6 Rebar Splice	64	Each
491E0005	Two Coat Bridge Deck Polymer Chip Seal	1,085.4	SqYd
491E0110	Abrasive Blasting of Bridge Deck	1,085.4	SqYd
491E0120	Bridge Deck Grinding	1,085.4	SqYd
491E0130	Concrete Removal, Class A	4.0	SqYd
491E0140	Concrete Removal, Class B	4.0	SqYd
491E0172	Concrete Patching Material, Bridge Deck	45.0	CuFt
680E0224	4" PVC Outlet Pipe	20	Ft
831E1030	Perforated Geocell	3,910	SqFt

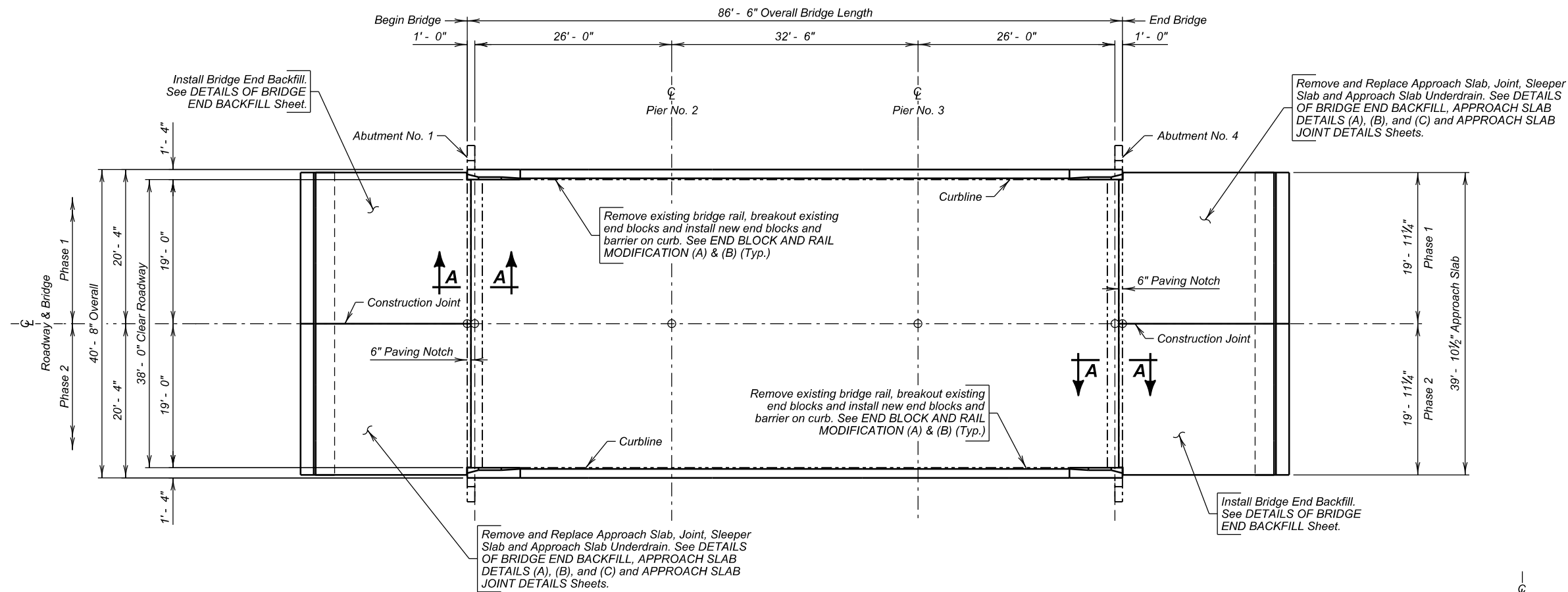
SPECIFICATIONS

Standard Specifications for Roads and Bridges, 2015 Edition and Required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

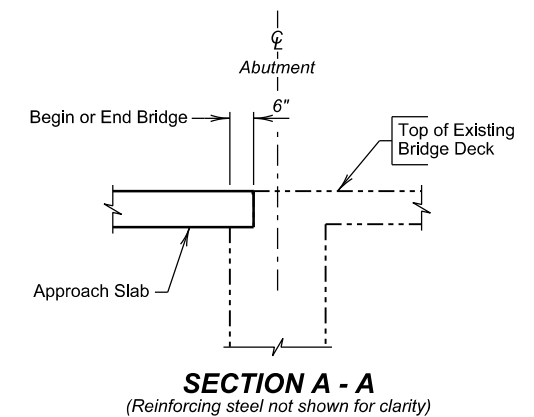
The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH-P 0011 (141)	23	84

Revised 02/15/2023 MAB



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 - Notes (Continued)
- Sheet No. 5 - End Block Rail Modification (A)
- Sheet No. 6 - End Block Rail Modification (B)
- Sheet No. 7 - Details of Bridge End Backfill
- Sheet No. 8 - Approach Slab Details (A)
- Sheet No. 9 - Approach Slab Details (B)
- Sheet No. 10 - Approach Slab Details (C)
- Sheet No. 11 - Approach Slab Joint Details
- Sheet No. 12 - As-Built Survey (A)
- Sheet No. 13 - As-Built Survey (B)
- Sheet No. 14 - Standard Plate No. 430.50 & 460.02
- Sheet No. 15 - Standard Plate No. 630.92
- Sheet Nos. 16 thru 20 - Original Construction Plans

LAYOUT FOR UPGRADING
FOR

86' - 6" CONTINUOUS CONCRETE BRIDGE
38'-0" ROADWAY
OVER CROW CREEK
STR. NO. 46-110-123
PCN 06FR

0° SKEW
SEC. 2-T126N-R58W
NH-P 0011 (141)



MARSHALL COUNTY
S. D. DEPT. OF TRANSPORTATION
MAY 2022



DESIGNED BY
GAC/CCB

CK. DES. BY
MAB

DRAFTED BY
GAC

BRIDGE ENGINEER

ESTIMATE OF STRUCTURE QUANTITIES

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
009E3310	Bridge Elevation Survey	1	LS
110E0010	Remove Concrete Bridge Approach Slab	311.4	SqYd
110E0020	Remove Bridge Railing	157	Ft
120E0010	Unclassified Excavation	48	CuYd
410E2600	Membrane Sealant Expansion Joint	79.8	Ft
430E0200	Bridge End Embankment	3	CuYd
430E0300	Granular Bridge End Backfill	60.0	CuYd
430E0510	Approach Slab Underdrain Excavation	3.0	CuYd
430E0700	Precast Concrete Headwall for Drain	4	Each
460E0070	Class A45 Concrete, Bridge Repair	12.8	CuYd
460E0150	Concrete Approach Slab for Bridge	181.4	SqYd
460E0160	Concrete Approach Sleeper Slab for Bridge	39.8	SqYd
460E0300	Breakout Structural Concrete	2.2	CuYd
460E0380	Install Dowel in Concrete	164	Each
480E0200	Epoxy Coated Reinforcing Steel	1,646	Lb
480E0504	No. 4 Rebar Splice	28	Each
480E0505	No. 5 Rebar Splice	32	Each
480E0506	No. 6 Rebar Splice	44	Each
480E5000	Galvanic Anode	116	Each
680E0040	4" Underdrain Pipe	130	Ft
680E2500	Porous Backfill	5.6	Ton

SPECIFICATIONS

- Design Specifications: AASHTO Standard Specifications for Highway Bridges 17th Edition using Allowable 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.
- The stationing shown in the original construction plans is reversed from the current project. As such, labels for the begin and end of bridge as well as the substructure units are reversed.
- The elevations shown in the original construction plans are not based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

SCOPE OF BRIDGE WORK & SEQUENCE OF OPERATIONS

All work on this structure will 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.

- Remove the existing bridge railing and end blocks for the first phase of construction.
- Remove existing approach slabs for the first phase of construction and salvage existing Z1 bars in place.
- Excavate required area for placement of bridge end backfill for the first phase of construction.
- Perform underdrain excavation for the first phase of construction.
- Place bridge end backfill and underdrain system material for the first phase of construction.
- Place approach and sleeper slabs to the correct grade for the first phase of construction.
- Replace sleeper slab joints with approved Membrane Sealant Expansion Joint for the first phase of construction.
- Place a new concrete bridge rail on top of the existing curb with end blocks for the first phase of construction.
- Switch traffic and repeat steps 1 to 8 for the second phase of construction.

GENERAL CONSTRUCTION - BRIDGE

- All mild reinforcing steel will conform to ASTM A615, Grade 60.
- All exposed concrete corners and edges will be chamfered 3/4-inch unless noted otherwise in the plans. Match existing chamfer if the existing chamfer differs.
- Use 2-inch clear cover on all reinforcing steel except as shown otherwise.
- The Contractor will only imprint one year-plate on the structure. The year plate will contain the date the existing bridge was built and will be located as specified and detailed on Standard Plate No.460.02.
- Barrier curbs and end blocks will be built perpendicular to the grade.
- Request for construction joints or reinforcing steel 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.
- Snap ties, if used in the barrier curb formwork, will be corrosion resistant. The corrosion resistant ties will be inert in concrete and compatible with reinforcing steel.

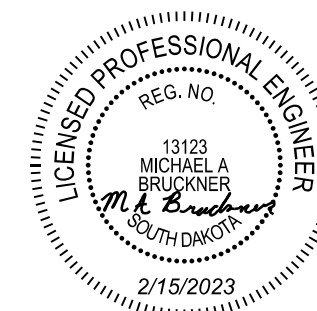
- All lap splices are contact lap splices unless noted otherwise.

DESIGN MIX OF CONCRETE

- Class A45 Concrete will be used for End Blocks, Curb for Bridge, Approach Slab for Bridge and Approach Sleeper Slab for Bridge.

INSTALL DOWEL IN CONCRETE

- Holes drilled in the existing concrete will be true and normal or as shown in the plans. Drilling holes using a core drill will not be allowed. Care will be taken not to damage the existing reinforcing steel. It is likely that some of the existing reinforcing steel shown in the original construction plans may have been placed out of position during original construction. Therefore, prior to the start of drilling any holes in the concrete, an effort will be made by Department forces to mark on the concrete surface where practical any locations of the in-place reinforcing steel. In spite of this precaution, the Contractor can still 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 will be completely filled with the epoxy resin as approved by the Engineer.
- The epoxy resin mixture will be of a type for bonding steel to hardened concrete and will conform to AASHTO M235 Type IV, Grade 3 (Equivalent to ASTM C881, Type IV, Grade 3). Grade 1, 2, or 3 may be used for vertical dowels and Grade 3 epoxy will be used for all horizontal dowels.
- The diameter of the drilled holes will 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 will 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. Care will be taken to prevent epoxy from running out of the horizontal holes prior to steel bar insertion. 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.



ESTIMATE OF STRUCTURE QUANTITIES AND NOTES
FOR
86' - 6" CONTINUOUS CONCRETE BRIDGE

STR. NO. 46-110-123

MAY 2022

2 OF 20

DESIGNED BY GAC/CCB	CK. DES. BY MAB	DRAFTED BY GAC	BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH-P 0011 (141)	25	84

Revised 02/15/2023 MAB

INSTALL DOWEL IN CONCRETE (CONTINUED)

- No loads will 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 will be deformed bars conforming to ASTM A615 Grade 60.
- The cost of epoxy resin, dowels, installation, and other incidental items will be incidental to the contract unit price per each for Install Dowel in Concrete.

NOTICE – LEAD BASED PAINT

Be advised that the paint on the steel surfaces of the existing structure is a paint containing lead. The contractor should plan his/her operations according and inform his/her employees of the hazards of lead exposure.

REMOVAL OF EXISTING BRIDGE RAIL

- The existing rail and rail posts will be completely removed by the Contractor and disposed of in accordance with the Environmental Commitments. If the Contractor elects to salvage the rail and rail posts for his own use, they must be removed from view of the ROW to the satisfaction of the Engineer prior to project completion.
- The existing rail anchor bolts protruding from the concrete will be cut off and ground flush with the concrete surface as approved by the Engineer. The exposed ends will be coated with a zinc-rich galvanizing paint in conformance with ASTM A780.
- The bridge railing to be removed consists of the steel rail, and any hardware attaching the railing to the bridge. The cost of all labor, tools, materials, and incidentals necessary to cut and remove the steel rail, cutoff the anchor bolts, and paint their exposed ends will be incidental to the contract price per foot for Remove Bridge Railing.

SURFACE FINISH

- All of the surfaces visible to the traveling public on the new concrete barrier on curbs and end blocks will be given a Class B Commercial Texture Finish in accordance with Section 460.3 L.1.c. of the Construction Specifications. Visible surfaces include the front face and top of the barrier on curb and all faces of the end blocks.
- The concrete surfaces requiring the application of the Commercial Texture Finish will be prepared in accordance with the manufacturer's recommendations. The Contractor will submit a product data sheet, or an approved equal, documenting all pertinent information with regard to preparation of the concrete surfaces, materials and equipment required, mixing requirements, and application procedures to the Engineer in advance of the application of the Commercial Texture Finish for review and approval.

- For informational purposes the amount of surface area requiring the Class B Commercial Texture Finish is 243 square feet for phase 1 and 243 square feet for phase 2.
- Any damage to the commercial texture finish during the construction including abrasion from traffic due to the traffic control will be repaired by the Contractor, as approved by the Engineer, at no expense to the Department.
- The cost of the commercial texture finish will be included in the contract unit price per cubic yard for Class A45 Concrete, Bridge Repair. This payment will be full compensation for furnishing all materials, labor, tools and equipment necessary or incidental to the application of this finish.

CONCRETE BREAKOUT

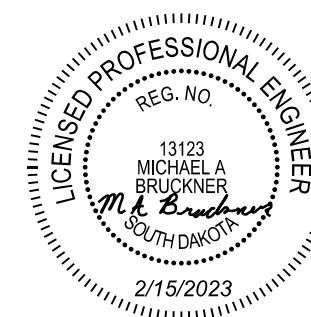
- The existing end blocks and curb portion indicated will be broken out to the limits shown on the plans. Breakout limits will be defined with a 3/4" deep sawcut (unless specified otherwise in these plans), where practical, as approved by the Engineer. Reinforcing steel that is exposed and is scheduled for use in the new construction will be cleaned and straightened to the satisfaction of the Engineer. Care will 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 will be replaced or repaired, as approved by the Engineer, by the Contractor at no cost to the Department.
- All broken out concrete and discarded reinforcing bars will be disposed of by the Contractor. Any disposal of discarded material will be in accordance with the Environmental Commitment Notes.
- During concrete removal operations, no broken-out concrete will be allowed to fall onto the creek.
- The contract unit price per cubic yard for Breakout Structural Concrete will include breaking out concrete, cleaning, straightening reinforcing steel, and disposal of all broken out material.

GALVANIC ANODE

- The Contractor will furnish and place galvanic anodes in the concrete repair areas specified in this plan set.
- The galvanic anodes will be supplied as one of the following:
 - Sentinel Silver
Euclid Chemical Company
19218 Redwood Road
Cleveland, OH 44110
Phone: (800) 321-7628
Website: www.euclidchemical.com

- Sika FerroGard 670
Sika Corporation US
201 Polito Avenue
Lyndhurst, NJ 07071
Phone: (800) 933-7452
Website: <http://usa.sika.com>

- The anodes will 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 will provide shop drawings of the galvanic anode installation including locations of the individual anodes to the Office of Bridge Design.
- The anodes will be placed with a minimum 3/4" cover and will be set in embedding mortar per the manufacturer's recommendations. The anodes will be fully encased in the concrete repair material. Where adequate cover does not exist, a concrete pocket will be chipped out behind the anode to provide minimum 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 will be cleaned per the manufacturer's recommendations to provide electrical connection and mechanical bond.
- The electrical continuity of the connections and reinforcing steel will be confirmed per the manufacturer's recommendations.
- In area of concrete repair where anodes are placed, the epoxy coating on the reinforcing steel will not require touch up.
- The Contractor will provide manufacturer's product literature and installation instructions to the Engineer 10 days prior to installation.
- All costs associated with placing anodes including labor, equipment, materials and incidentals will be included in the contract unit price per each for Galvanic Anode.
- The Contractor has the option of providing galvanic strip anodes in place of the Galvanic Anodes for the curb repair. The galvanic strip anodes will conform to the same requirements listed above for Galvanic Anode. The use of galvanic strip anodes in place of Galvanic Anodes will be at no additional cost to the Department. The galvanic strip anodes will be supplied as the following or an approved equivalent as approved by the Office of Bridge Design:



NOTES (CONTINUED)
FOR
86' - 6" CONTINUOUS CONCRETE BRIDGE

STR. NO. 46-110-123
MAY 2022

DESIGNED BY GAC/CCB	CK. DES. BY MAB	DRAFTED BY GAC	BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH-P 0011 (141)	26	84

REMOVAL OF CONCRETE BRIDGE APPROACH SLAB

1. The existing concrete approach and sleeper slabs adjacent to the structure will be completely removed by the Contractor.
2. The concrete and reinforcing steel from the removal will be disposed of by the Contractor at an approved site. An appropriate site will be as described in the Environmental Commitment Notes in this set of plans.
3. The quantity provided for Remove Concrete Bridge Approach Slab is computed using the plan area for the sleeper slab and the plan area for the approach slab determined separately.
4. All labor, tools, equipment and any incidentals necessary for removal and disposal of the existing approach slabs, polymer modified growth joint, and sleeper slabs will be incidental to the contract unit price per square yard for Remove Concrete Bridge Approach Slab.

APPROACH SLAB UNDERDRAIN SYSTEM

A new underdrain system will be placed underneath the sleeper slabs as shown in the plans. The Approach Slab Underdrain System will be constructed in accordance with Section 435 of the Construction Specifications except the drainage tubing will be as specified in these notes and as detailed in the plans.

DRAINAGE TUBING

1. The underdrains will be constructed of a PVC pipe system as shown on the plans and meeting the following requirements:

The 4" Dia. Perforated PVC Drain Pipe will be SDR 35 Solvent Weld PVC Pipe conforming to ASTM D3034 and ASTM F758. The 4" Dia. PVC Outlet Pipe will be Schedule 40 PVC Pipe conforming to ASTM D1785 designated as PVC 1120, PVC 1220, or PVC 2120. Pipe sections will be connected using a PVC Solvent Cement conforming to ASTM D2564. The Drain Sleeve will conform to ASTM D6707.
2. Care will be taken to ensure that the 4" Dia. Perforated PVC Drain Pipe (with Drain Sleeve) and the 4" Dia. PVC Outlet Pipe are not damaged during construction. Sufficient cover material will be placed over the pipes before compaction equipment is allowed over the underdrain system. Any damaged pipes will be replaced by the Contractor at no additional cost to the Department.
3. All labor, tools, equipment, and any incidentals necessary for the installation of 4" Dia. Perforated PVC Drain Pipe (with Drain Sleeve), 4" Dia. PVC Outlet Pipe, SDR Solvent Weld PVC Coupling, and PVC Cement will be incidental to the contract unit price per foot for 4" Underdrain Pipe.

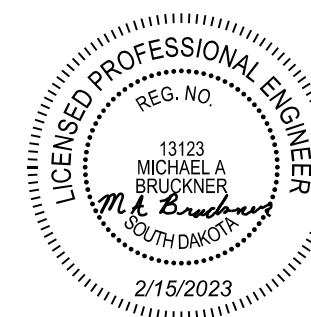
APPROACH SLABS

1. Bridge end backfill will be constructed in accordance with Section 430 of the Construction Specifications except the drainage tubing will be as specified in these notes and as detailed in the plans.
2. Excavation for placement of new approach slabs, sleeper slabs, bridge end backfill, and drainage piping will be done with minimal disturbance to the underlying material.
3. Prior to the placement of the Type B Drainage Fabric below the Granular Bridge End Backfill, the existing Select Granular Backfill material will be compacted using at least four complete passes of a smooth face vibratory roller or vibratory plate compactor. Gravel Cushion will be placed as required to fill any low spots and to achieve the elevation needed for installation of the new bridge end backfill material. The existing and fill material will be thoroughly watered prior to and during compaction. Gravel Cushion will be in accordance with Section 882 of the Construction Specifications.
4. Excavation required for the placement of Granular Bridge End Backfill and Porous Backfill will be paid for at the contract unit price per cubic yard for Unclassified Excavation as shown on the plan sheet. Measurement will not be made for Unclassified Excavation. Plans quantity will be used for payment.
5. The top of approach slab elevations will be established as provided during construction and subject to the approval of the Engineer. Care will be taken to provide a smooth transition from the bridge deck elevations to the new pavement elevations to prevent any dips or bumps in the areas of the bridge ends or ends of the new approach slabs. The maximum rate of grade transition through the approach slab will be 1/8-inch per 10 feet.
6. Sleeper slab riser will be cast with or later than the approach slab. Care will be taken to ensure the correct grade is maintained across the joint.
7. The portion of the sleeper slab below the construction joint may be precast. If the bottom portion of the sleeper slab is precast, the Contractor will submit proposed lifting and setting plans to the Bridge Construction Engineer for approval. In addition, if reinforcing or other details differ from those shown in the plans, the Contractor will submit proposed alternate details for approval.
8. The use of an Engineer approved vibratory screed will be required during placement of Class A45 Concrete for the approach slabs. Concrete placement in front of the screed will be kept parallel to the screed.
9. The concrete in the approach slab will be tined perpendicular to the centerline of the roadway.
10. The new approach slabs and sleeper slabs will have a surface finish as specified in Section 460.3 L.4 of the Construction Specifications.

11. The concrete approach slabs will be cured in accordance with Section 460.3 M of the Construction Specifications. The minimum 7-day cure time requirement will be waived. The approach slabs will be cured until a minimum compressive strength of 4,000 psi is reached.
12. Any Gravel Cushion and compaction required to fill any low spots or voids will be paid for at the contract unit price per cubic per yard for Granular Bridge End Backfill. This payment will be full compensation for furnishing, hauling, and placing all materials including disposal of all surplus materials; labor; tools; equipment; and any incidentals necessary to complete this item of work.
13. Concrete Approach Sleeper Slab for Bridge will be paid for at the contract unit price per square yard. This payment will be full compensation for furnishing, hauling, and placing all materials including: concrete, concrete anchors, and reinforcing steel; for disposal of all surplus materials; labor; tools; equipment; and any incidentals necessary to complete this item of work.
14. Concrete Approach Slab for Bridge will be paid for at the contract unit price per square yard. This payment will be full compensation for furnishing, hauling, and placing all materials including: concrete elastic joint sealer, and reinforcing steel; for disposal of all surplus materials; labor; tools; equipment; and any incidentals necessary to complete this item of work.

AS-BUILT ELEVATION SURVEY

The Contractor will be responsible for producing an as-built elevation survey soon after construction is complete and before the bridge is completely opened to traffic. The Contractor will be responsible for recording the as-built elevations at the locations shown by the table of as-built elevations shown in the plans. The completed table will be given to the Engineer who will forward a copy to the Bridge Maintenance Engineer in the Office of Bridge Design and the Senior Region Bridge Engineer. The elevations will be based on the control points provided in the plans. The Contractor will be responsible for verifying the control points provided in the plans. All costs associated with obtaining the elevations at the locations shown in the table and for the benchmark shown in the plans, including all equipment, labor and any incidentals required will be incidental to the contract lump sum price for Bridge Elevation Survey.

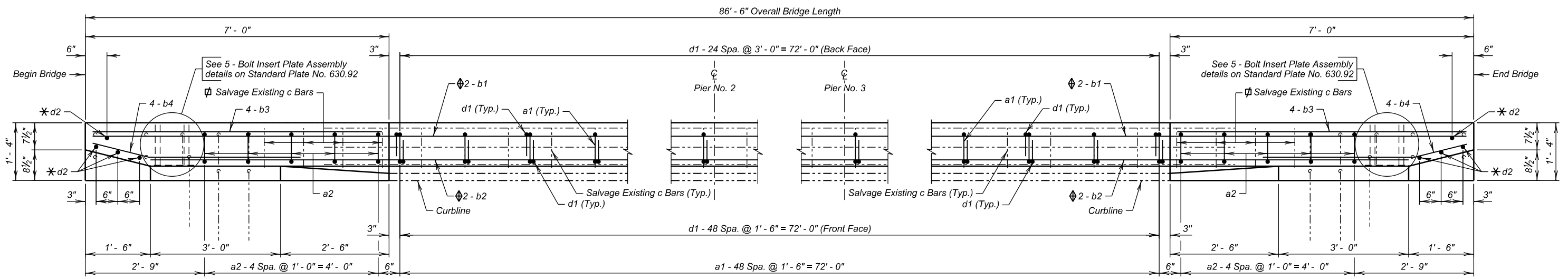


NOTES (CONTINUED)
FOR
86' - 6" CONTINUOUS CONCRETE BRIDGE

STR. NO. 46-110-123
MAY 2022

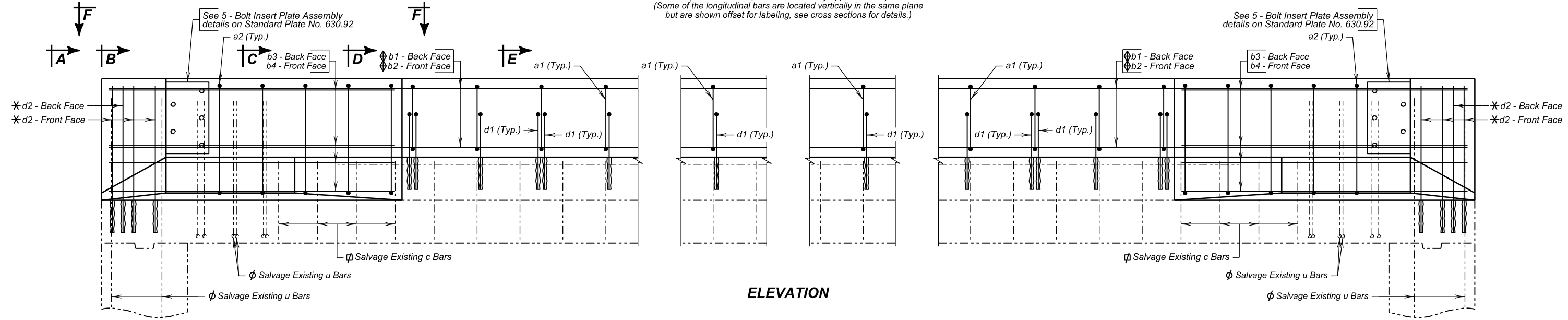
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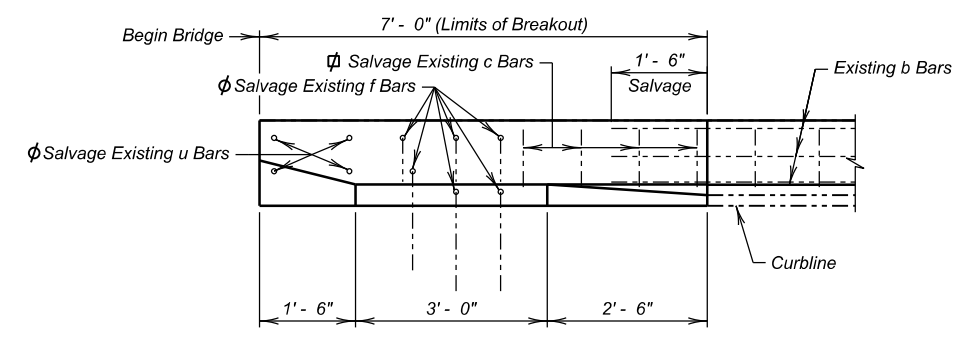


PLAN

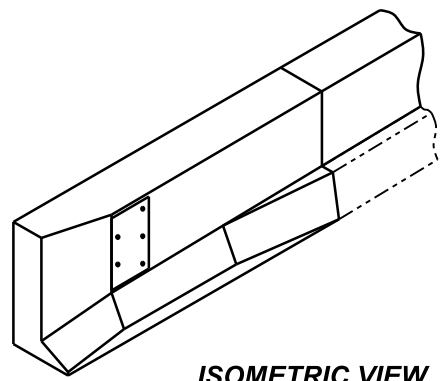
(Phase 1 shown, Phase 2 similar by opposite hand)
(Some of the longitudinal bars are located vertically in the same plane but are shown offset for labeling, see cross sections for details.)



ELEVATION



VIEW F - F
(Existing overlay not shown)



ISOMETRIC VIEW
(Existing Bridge Deck not shown)

- NOTES:**
 If existing reinforcing is struck while drilling holes for Dowels, the spacing can be shifted 2" longitudinally, 1" transversely, or as approved by the Engineer to miss existing reinforcing steel.
 ▮ Bend Existing Bars where necessary to maintain 2" clear cover.
 ✱ d1 & d2 Bars are to be drilled in and grouted with epoxy.
 ◊ Trim & Salvage Existing u and f Bars as required to maintain 2" clearance. Shift reinforcing as required to miss embedded items.
 ◆ Min. Lap 1'-9"



END BLOCK RAIL MODIFICATION (A)
 FOR
86' - 6" CONTINUOUS CONCRETE BRIDGE
 38'-0" ROADWAY 0° SKEW
 OVER CROW CREEK SEC. 2-T126N-R58W
 STR. NO. 46-110-123 NH-P 0011 (141)

MARSHALL COUNTY
 S. D. DEPT. OF TRANSPORTATION
 MAY 2022

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REINFORCING SCHEDULE

Mk.	No.	Size	Length	Type	Bending Details	
					Diagram	Description
PHASE 1						
a1	49	4	4' - 11"	T2	[Diagram: Type T2 bar with 7 1/2" width and 1'-5 1/2" length]	Type T2
a2	10	4	7' - 0"	T2		
b1	4	4	44' - 10"	Str.	[Diagram: Type 1A bar with 1'-9" length and R 3" bend]	Type 1A
b2	4	4	43' - 5"	Str.		
b3	8	4	6' - 8"	Str.	[Diagram: Type 19B bar with 7'-3" length and 3'-6" width]	Type 19B
b4	8	4	4' - 9"	19B		
Δd1	74	6	2' - 6"	1A		
Δd2	8	6	3' - 5"	Str.		
PHASE 2						
a1	49	4	4' - 11"	T2	[Diagram: Type T2 bar]	Type T2
a2	10	4	7' - 0"	T2		
b1	4	4	44' - 10"	Str.	[Diagram: Type 1A bar]	Type 1A
b2	4	4	43' - 5"	Str.		
b3	8	4	6' - 8"	Str.	[Diagram: Type 19B bar]	Type 19B
b4	8	4	4' - 9"	19B		
Δd1	74	6	2' - 6"	1A		
Δd2	8	6	3' - 5"	Str.		

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

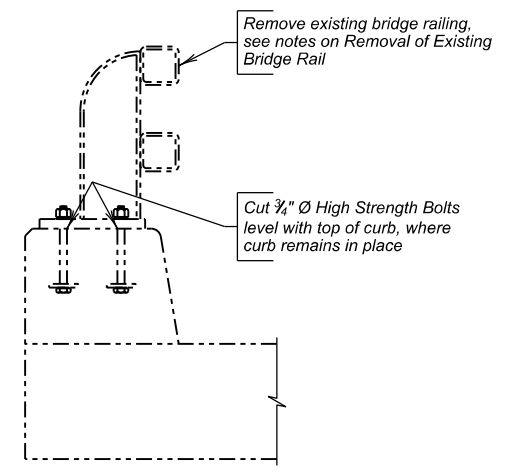
ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY	
		Phase 1	Phase 2
Remove Bridge Railing	Ft	78.5	78.5
Class A45 Concrete, Bridge Repair	CuYd	6.4	6.4
Breakout Structural Concrete	CuYd	1.1	1.1
Install Dowel in Concrete	Each	82	82
Epoxy Coated Reinforcing Steel	Lb	823	823
Galvanic Anode	Each	58	58

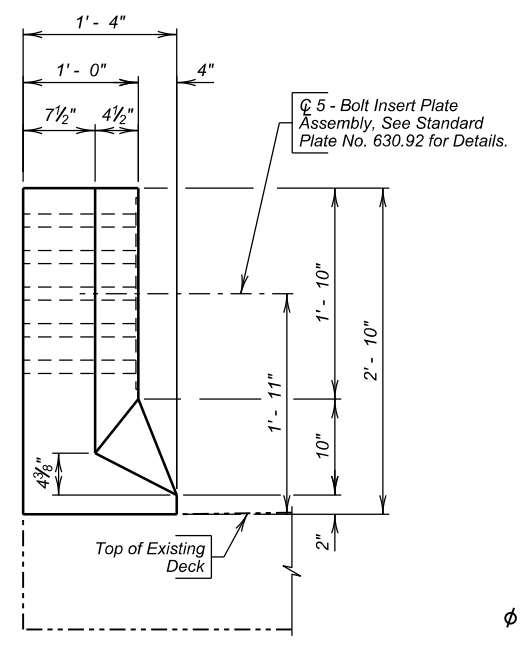
⊗ Not shown on this sheet. See notes for details.

If galvanic strip anodes are provided in place of Galvanic Anodes, the estimated quantity is 174.0 feet.

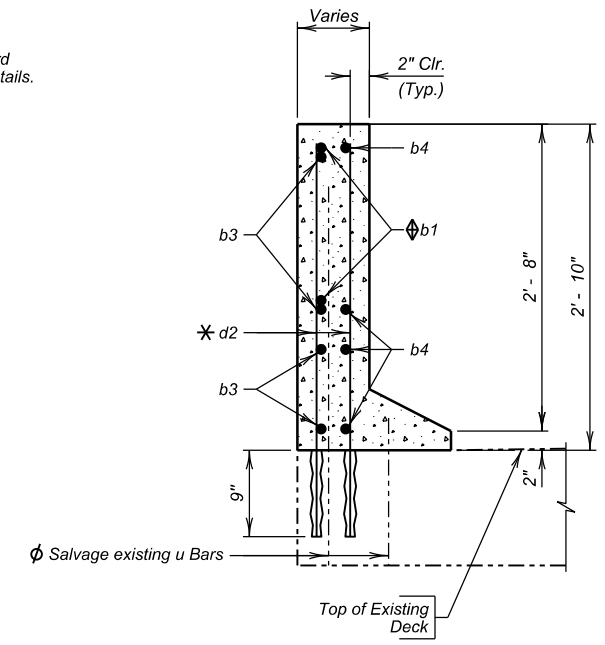
NOTES:
 If existing reinforcing is struck while drilling holes for Dowels, the spacing can be shifted 2" longitudinally, 1" transversely, or as approved by the Engineer to miss existing reinforcing steel.
 ⊕ Bend Existing Bars where necessary to maintain 2" clear cover.
 * d1 & d2 Bars are to be drilled in and grouted with epoxy.
 ⊕ Trim & Salvage Existing u and f Bars as required to maintain 2" clearance. Shift reinforcing as required to miss embedded items.
 ⊕ Min. Lap 1' - 9"



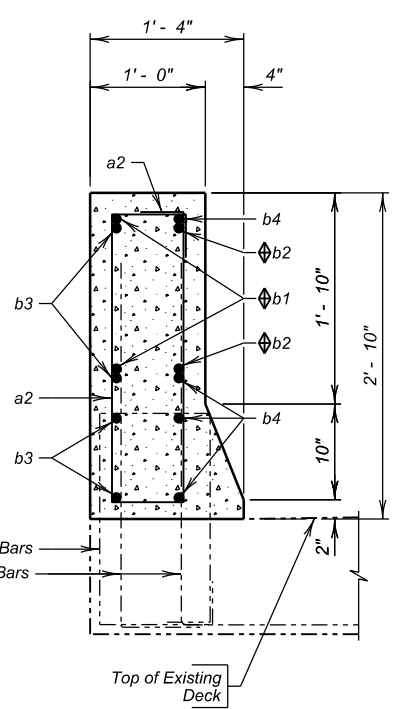
EXISTING CURB & RAIL



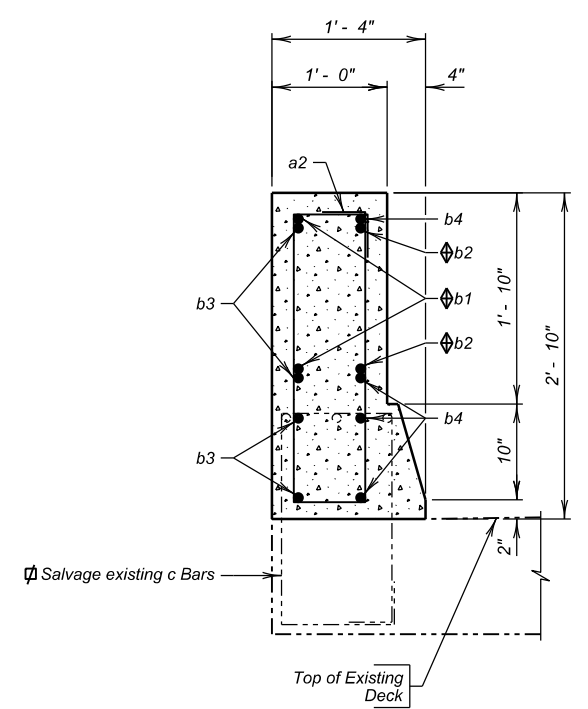
VIEW A - A



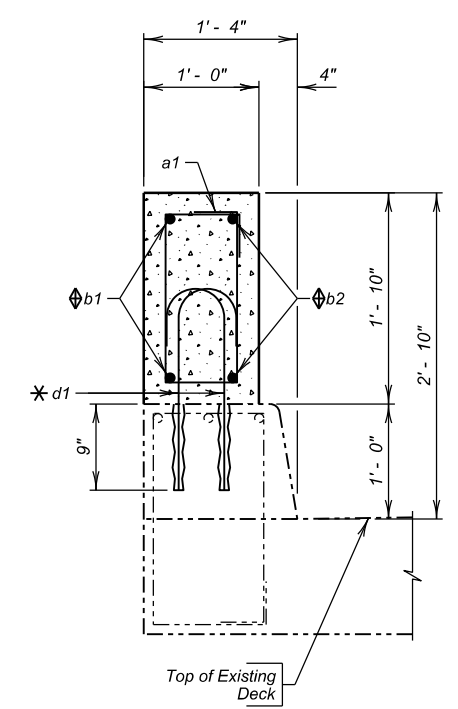
SECTION B - B



SECTION C - C



SECTION D - D



SECTION E - E

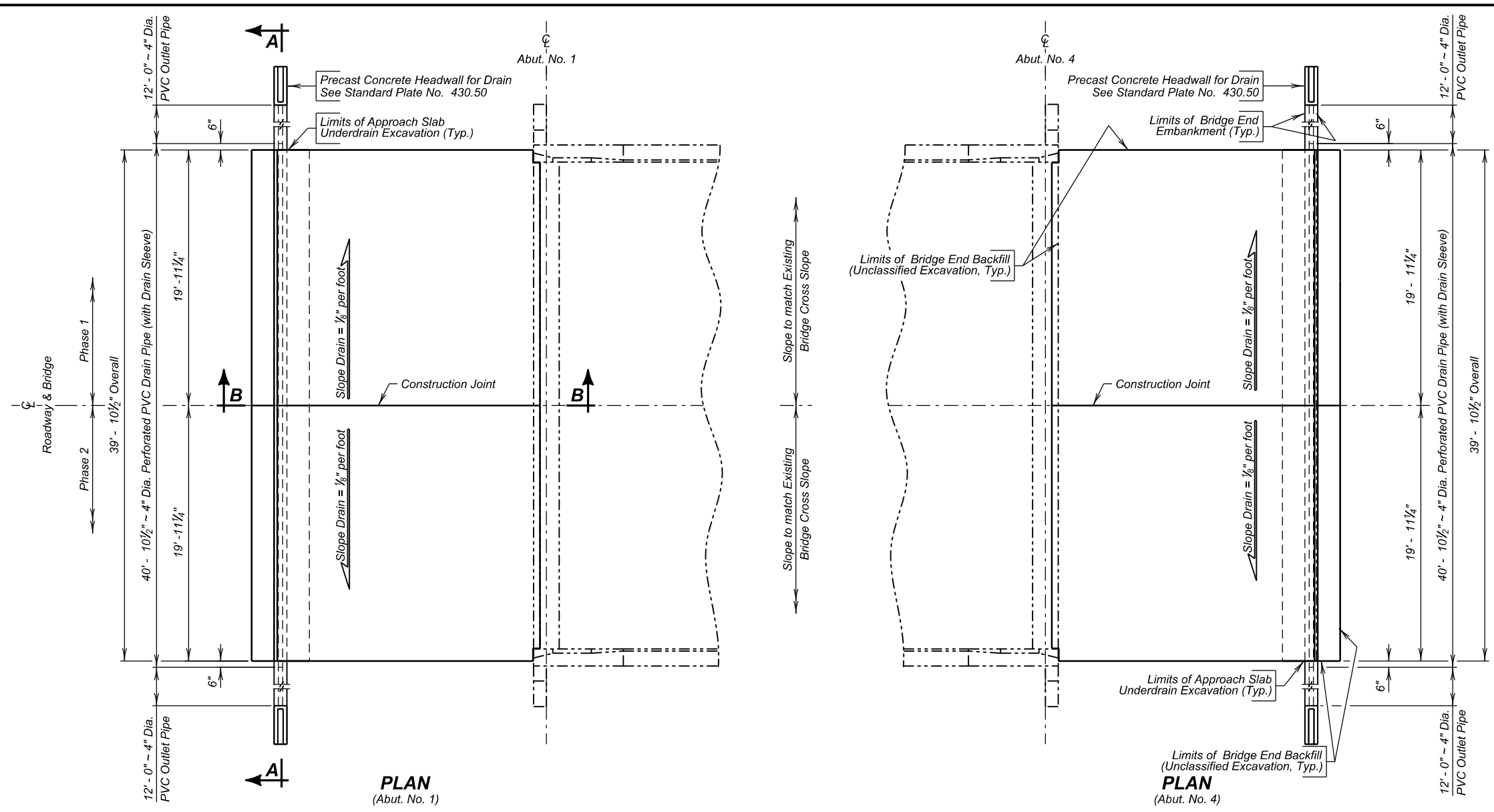
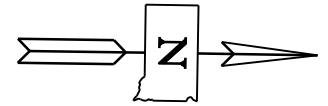


END BLOCK RAIL MODIFICATION (B)
 FOR
86' - 6" CONTINUOUS CONCRETE BRIDGE
 38'-0" ROADWAY OVER CROW CREEK
 0° SKEW
 SEC. 2-T126N-R58W
 STR. NO. 46-110-123 NH-P 0011 (141)

MARSHALL COUNTY
 S. D. DEPT. OF TRANSPORTATION
 MAY 2022

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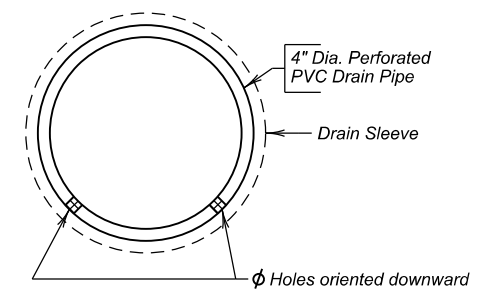
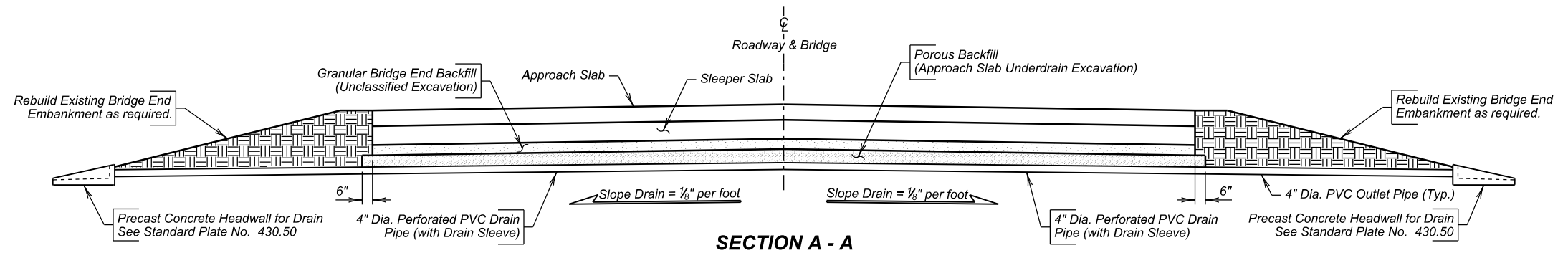
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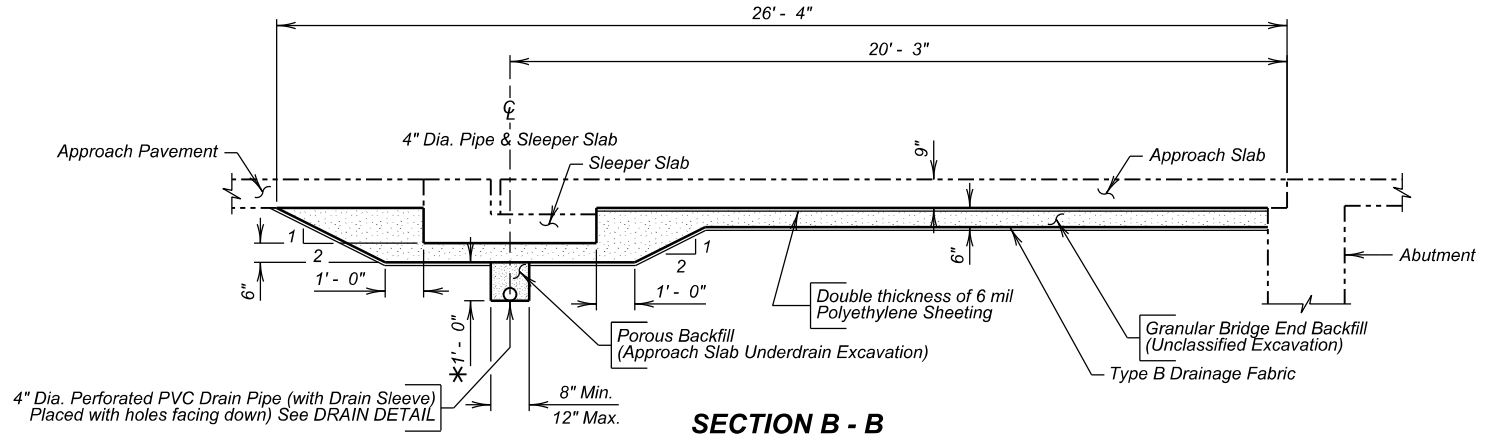
ESTIMATED QUANTITIES (For Two Approach Slabs)			
ITEM	UNIT	QUANTITY	
		Phase 1	Phase 2
Unclassified Excavation	CuYd	24	24
Bridge End Embankment	CuYd	1.5	1.5
Granular Bridge End Backfill	CuYd	30.0	30.0
Approach Slab Underdrain Excavation	CuYd	1.5	1.5
Precast Concrete Headwall for Drain	Each	2	2
4" Underdrain Pipe	Ft	65.0	65.0
Porous Backfill	Ton	2.8	2.8

- Items 1 thru 4 are approximate quantities contained in the above contract items and are for information only.
- | | Phase 1 | Phase 2 |
|--|------------|------------|
| 1. 6 mil Polyethylene Sheeting (not including laps) | 155.1 SqYd | 155.1 SqYd |
| 2. Type B Drainage Fabric | 115.3 SqYd | 115.3 SqYd |
| 3. 4" Dia. Perforated PVC Drain Pipe (with Drain Sleeve) | 41 Ft | 41 Ft |
| 4. 4" Dia. PVC Outlet Pipe | 24 Ft | 24 Ft |

- GENERAL NOTES:**
- The centerline of the trench may be adjusted by one foot toward or away from the bridge, as approved by the engineer, to miss the location of the guardrail posts.
- ✱ 12" (min.) at \bar{C} of Roadway & Bridge, bottom of trench $\frac{1}{8}$ " per foot pipe slope.
- The exact length of the 4" Dia. Perforated PVC Outlet Pipe shall be field determined. The length shown is a best estimate based on the Original Construction Plans.
- Perform excavation in a manner that limits disturbance to the existing bridge berm.
- ✱ For estimating purposes only, a factor of 1.89 Tons/CuYd was used to convert CuYds to Tons.
- ✱ Shrinkage Factor of 1.25 used.
- ✱ Quantity under sleeper slab based on a 12" wide trench.



DRAIN DETAIL
 Two hole configuration shown. Two or Four hole configuration is allowed.



DETAILS OF BRIDGE END BACKFILL
 FOR
86' - 6" CONTINUOUS CONCRETE BRIDGE
 38'-0" ROADWAY
 OVER CROW CREEK
 STR. NO. 46-110-123

0° SKEW
 SEC. 2-T126N-R58W
 NH-P 0011 (141)

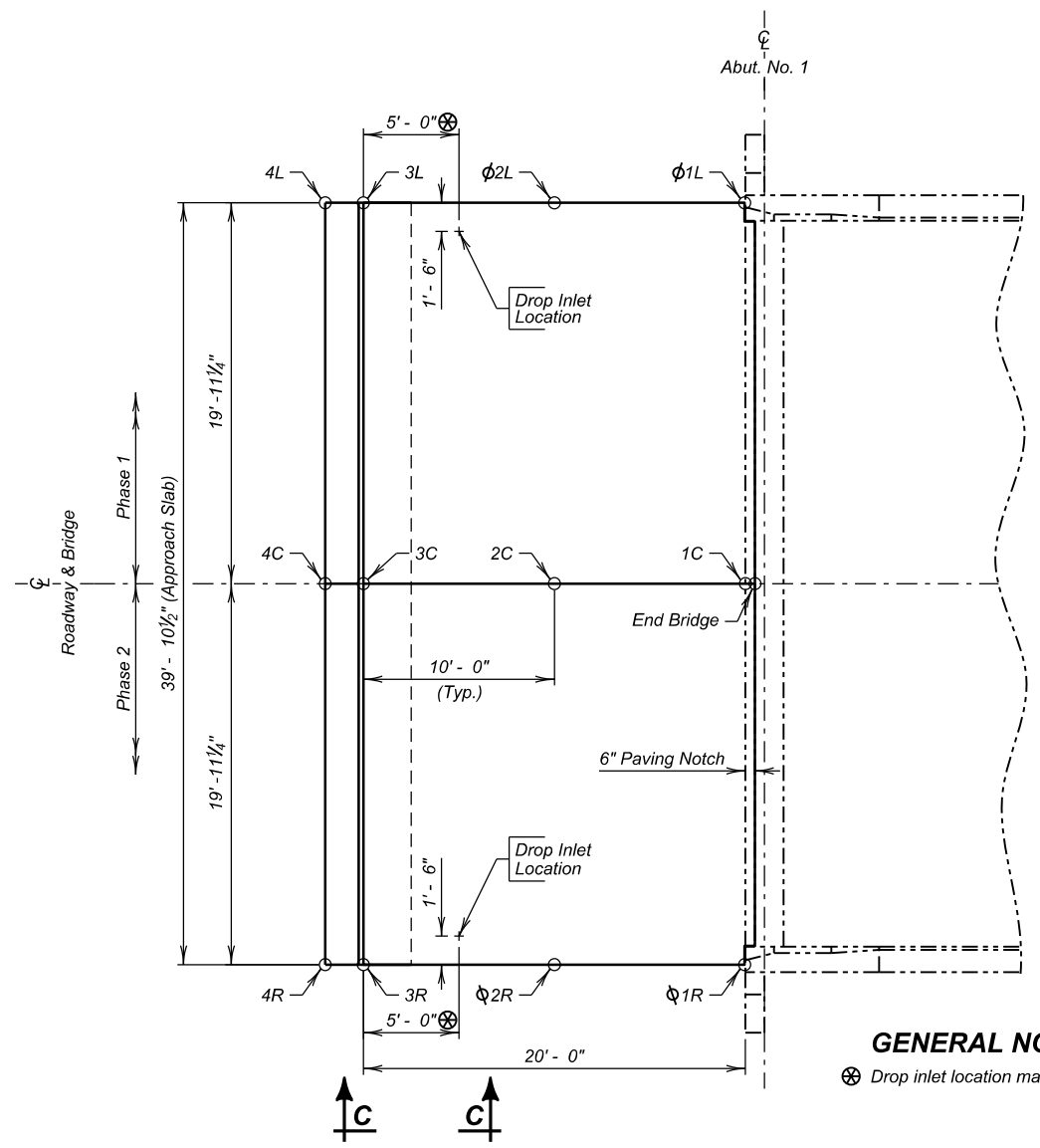
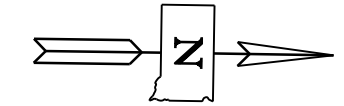
MARSHALL COUNTY
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Benchmark Description:

B.M.
Location Description: SW Corner of Bridge
Elevation: 1330.44

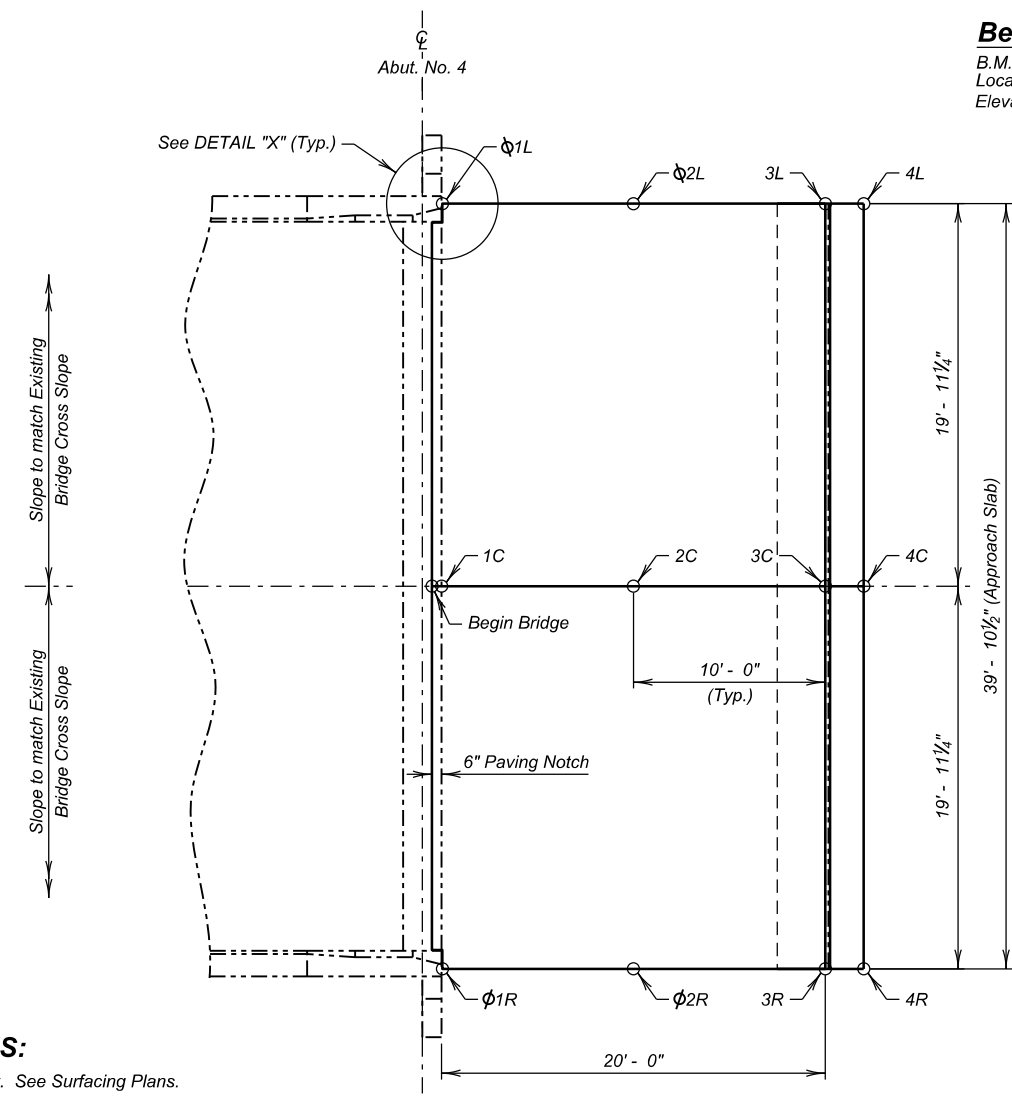
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PLAN
(Abut. No. 1)

TABLE OF ELEVATIONS ABUTMENT NO. 1					
LOCATION	ELEVATION	LOCATION	ELEVATION	LOCATION	ELEVATION
φ 1L	1327.92	1C	1327.89	φ 1R	1327.92
φ 2L	1327.90	2C	1327.87	φ 2R	1327.90
3L	1327.55	3C	1327.85	3R	1327.55
4L	1327.55	4C	1327.85	4R	1327.55

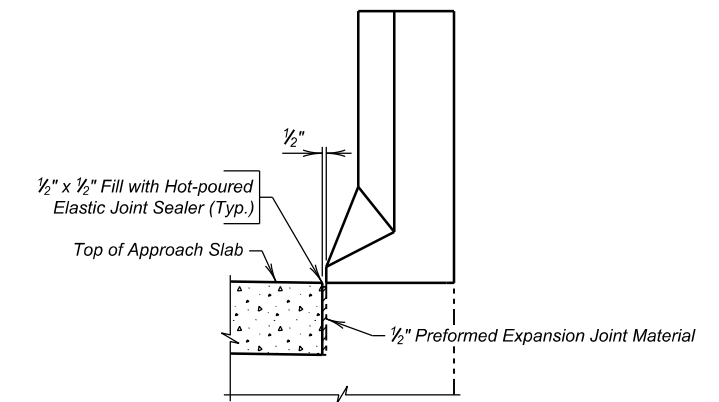
φ Top of Curb Elevations. All other Elevations are Top of Slab.



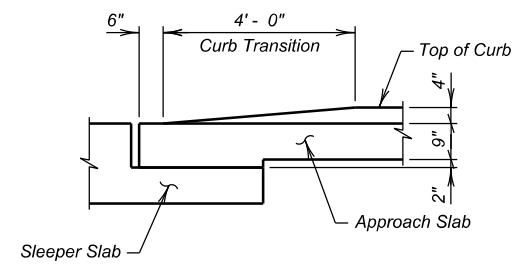
PLAN
(Abut. No. 4)

TABLE OF ELEVATIONS ABUTMENT NO. 4					
LOCATION	ELEVATION	LOCATION	ELEVATION	LOCATION	ELEVATION
φ 1L	1328.06	1C	1328.03	φ 1R	1328.06
φ 2L	1328.07	2C	1328.03	φ 2R	1328.07
3L	1327.74	3C	1328.04	3R	1327.74
4L	1327.74	4C	1328.04	4R	1327.74

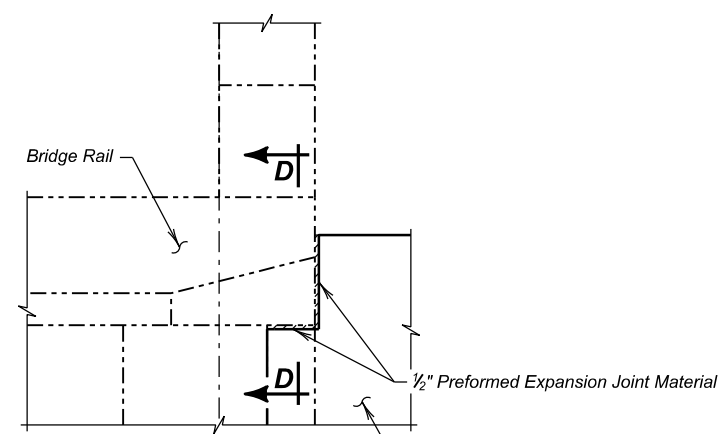
φ Top of Curb Elevations. All other Elevations are Top of Slab.



SECTION D-D



VIEW C - C



DETAIL 'X'

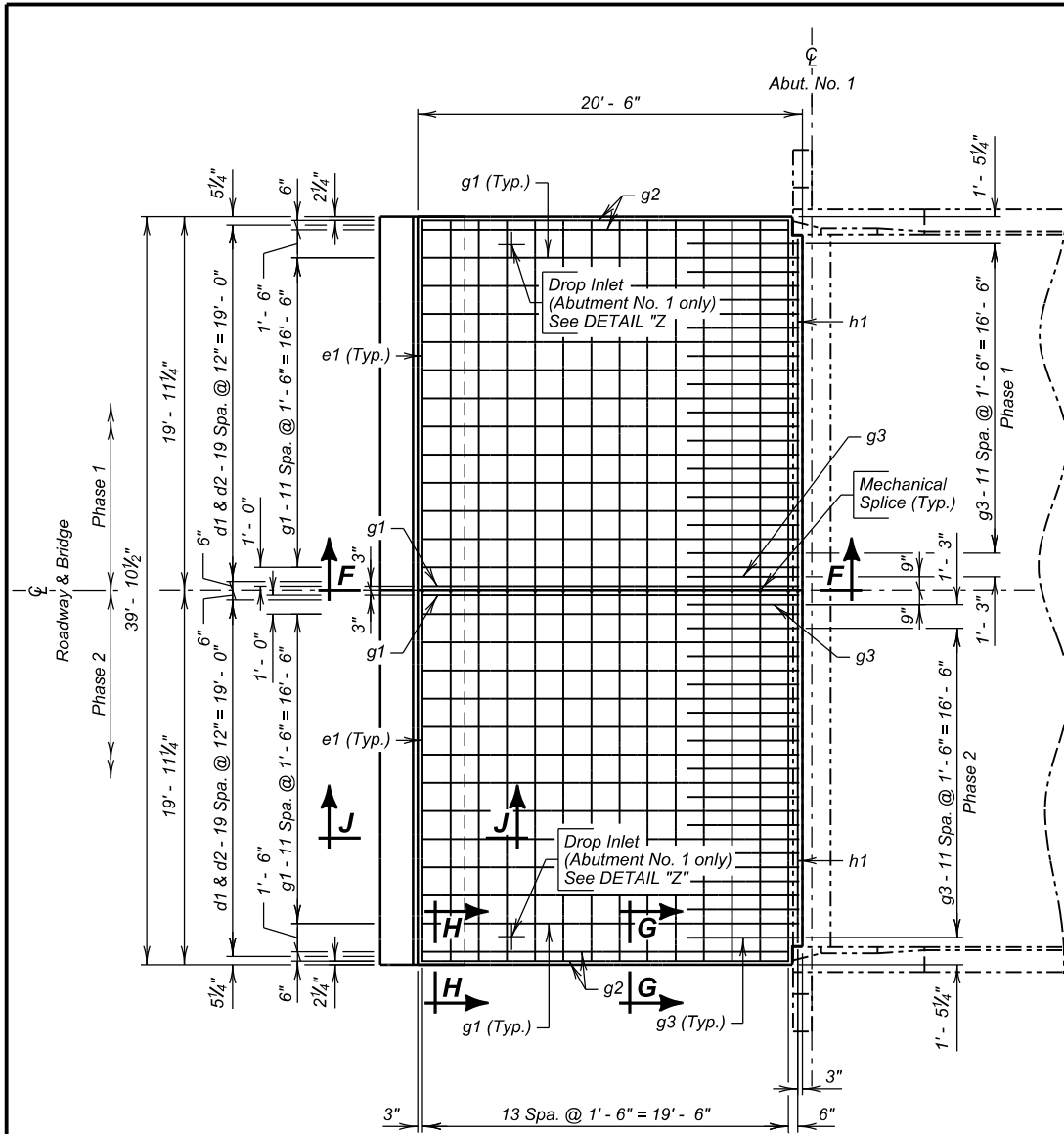
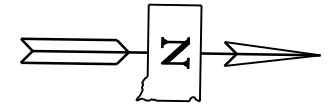


APPROACH SLAB DETAILS (A)
FOR
86' - 6" CONTINUOUS CONCRETE BRIDGE
38'-0" ROADWAY 0° SKEW
OVER CROW CREEK SEC. 2-T126N-R58W
STR. NO. 46-110-123 NH-P 0011 (141)

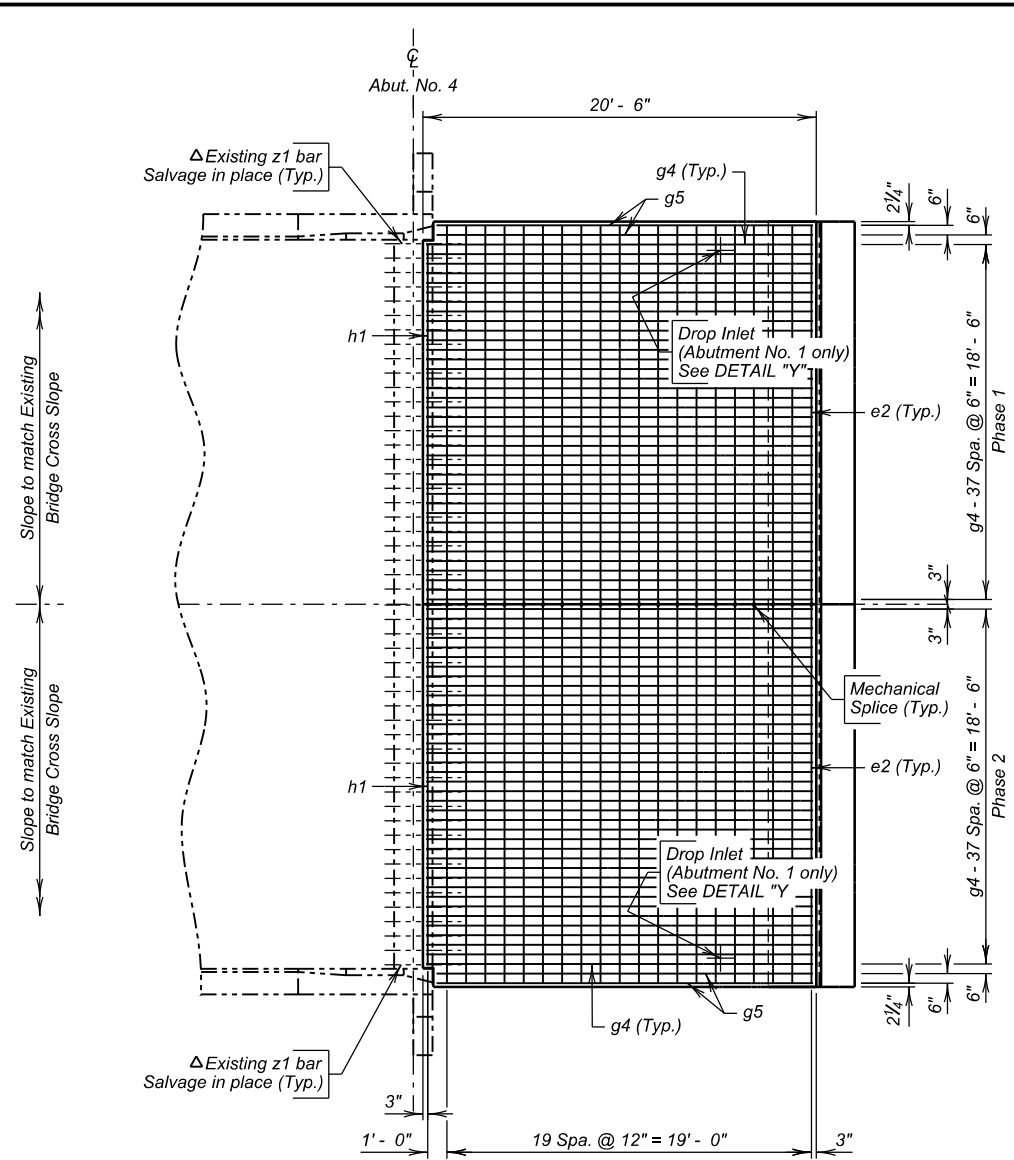
MARSHALL COUNTY
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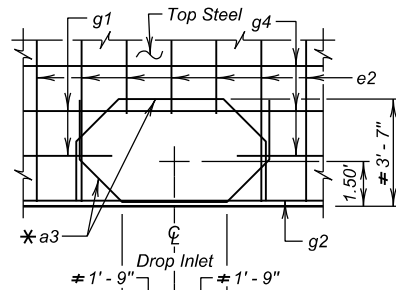
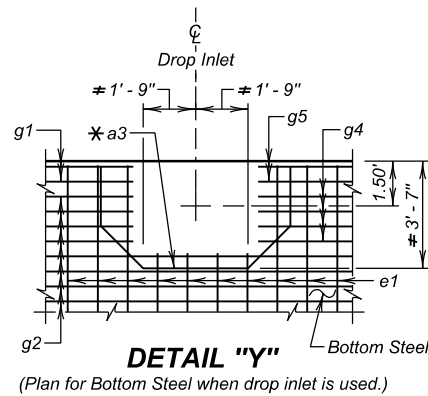


PLAN
(Top Steel Shown)
(Abutment No. 1 shown, Abutment No. 4 similar by rotation)



PLAN
(Bottom Steel Shown)
(Abutment No. 4 shown, Abutment No. 1 similar by rotation)

NOTE:
Δ Salvage Existing z1 Bars in Place. Shift new reinforcing as required to miss embedded items.



DETAIL "Z"
(Plan for Top Steel when drop inlet is used.)

* Add a3 bar to bottom layer of steel as shown in DETAIL "Y" and top layer of steel as shown in DETAIL "Z".
* Cut all bars in area of drop inlet as shown in DETAIL "Y" and DETAIL "Z".



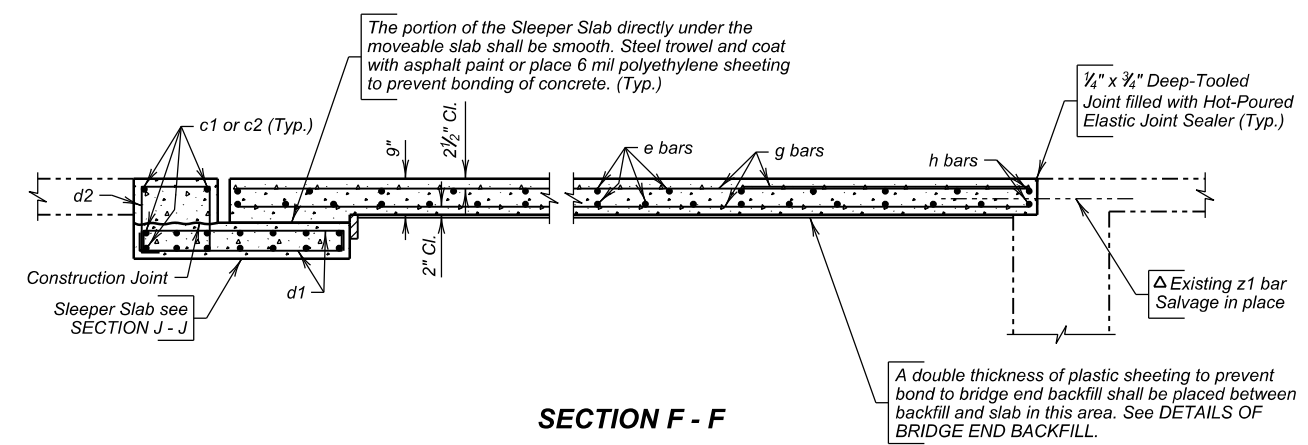
APPROACH SLAB DETAILS (B)
FOR
86' - 6" CONTINUOUS CONCRETE BRIDGE
38'-0" ROADWAY OVER CROW CREEK
STR. NO. 46-110-123

0° SKEW
SEC. 2-T126N-R58W
NH-P 0011 (141)

MARSHALL COUNTY
S. D. DEPT. OF TRANSPORTATION
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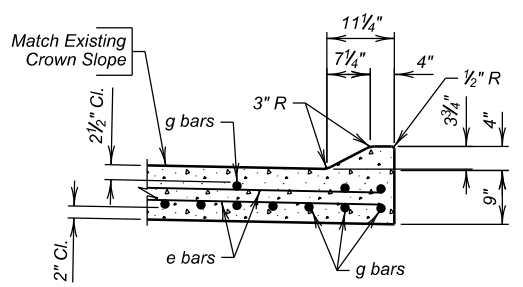
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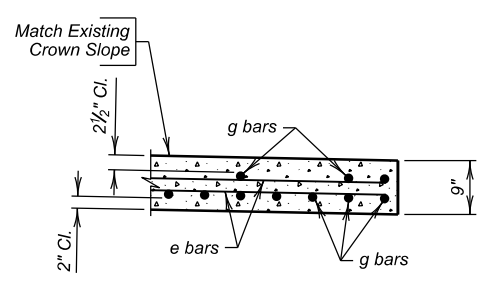
SECTION F - F

NOTE:
 Δ Salvage Existing z1 Bars in Place. Shift new reinforcing as required to miss embedded items.

A double thickness of plastic sheeting to prevent bond to bridge end backfill shall be placed between backfill and slab in this area. See DETAILS OF BRIDGE END BACKFILL.



SECTION G - G



SECTION H - H

REINFORCING SCHEDULE					(For Two Approach and Sleeper Slabs)			
Mk.	No.	Size	Length	Type	Bending Details			
PHASE 1	d1c1	32	5	19'-9"	Str.			
	d1	80	4	5'-0"	2			
	d2	40	4	6'-3"	T2			
	a3	3	4	11'-6"	14			
	d1e1	28	4	19'-9"	Str.			
	d1e2	40	6	19'-9"	Str.			
	g1	26	4	20'-2"	Str.			
	g2	4	4	19'-7"	Str.			
	g3	26	4	6'-0"	Str.			
	g4	76	8	20'-2"	Str.			
	g5	4	8	19'-7"	Str.			
	d1h1	4	6	18'-9"	Str.			
	PHASE 2	d1c1	32	5	19'-9"		Str.	
		d1	80	4	5'-0"		2	
d2		40	4	6'-3"	T2			
a3		3	4	11'-6"	14			
d1e1		28	4	19'-9"	Str.			
d1e2		40	6	19'-9"	Str.			
g1		26	4	20'-2"	Str.			
g2		4	4	19'-7"	Str.			
g3		26	4	6'-0"	Str.			
g4		76	8	20'-2"	Str.			
g5		4	8	19'-7"	Str.			
d1h1		4	6	18'-9"	Str.			

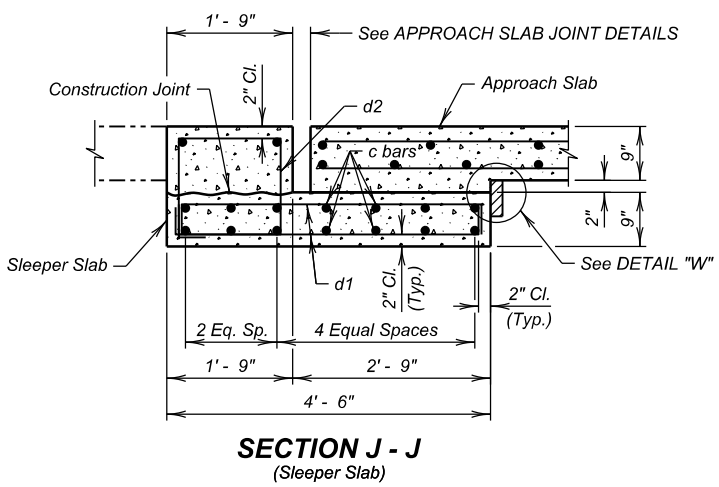
NOTES:
 All Dimensions are out to out of bars.
 All Bars to be Epoxy Coated.
 These bars shall be spliced with mechanical splice devices.

ESTIMATED QUANTITIES				
(For Two Approach and Sleeper Slabs)				
ITEM	UNIT	QUANTITY		
		Phase 1	Phase 2	
* Remove Concrete Bridge Approach Slab	SqYd	155.7	155.7	
Concrete Approach Slab for Bridge	SqYd	90.7	90.7	
Concrete Approach Sleeper Slab for Bridge	SqYd	19.9	19.9	
No. 4 Rebar Splice	Each	28	-	
No. 5 Rebar Splice	Each	32	-	
No. 6 Rebar Splice	Each	44	-	

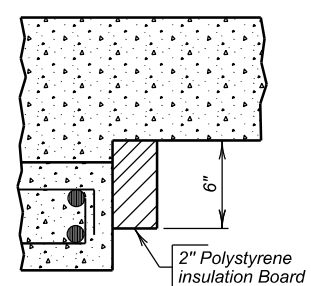
Items 1 thru 5 are approximate quantities contained in the above contract items and are for information only.

	Phase 1	Phase 2
1. Concrete in Approach Slab	23.3 CuYd	23.3 CuYd
2. Epoxy Coated Re-Steel in Approach Slab	6500 Lb	6500 Lb
3. Concrete in Sleeper Slab	7.4 CuYd	7.4 CuYd
4. Epoxy Coated Re-Steel in Sleeper Slab	1093 Lb	1093 Lb
5. 2" Polystyrene Insulation Board	20 SqFt	20 SqFt

GENERAL NOTES:
 * Removal is for both existing approach panels.

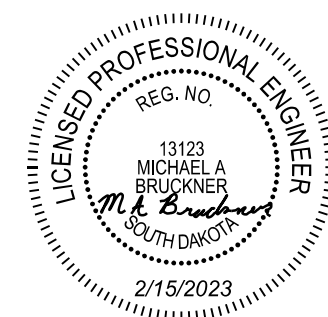


SECTION J - J
 (Sleeper Slab)



DETAIL "W"

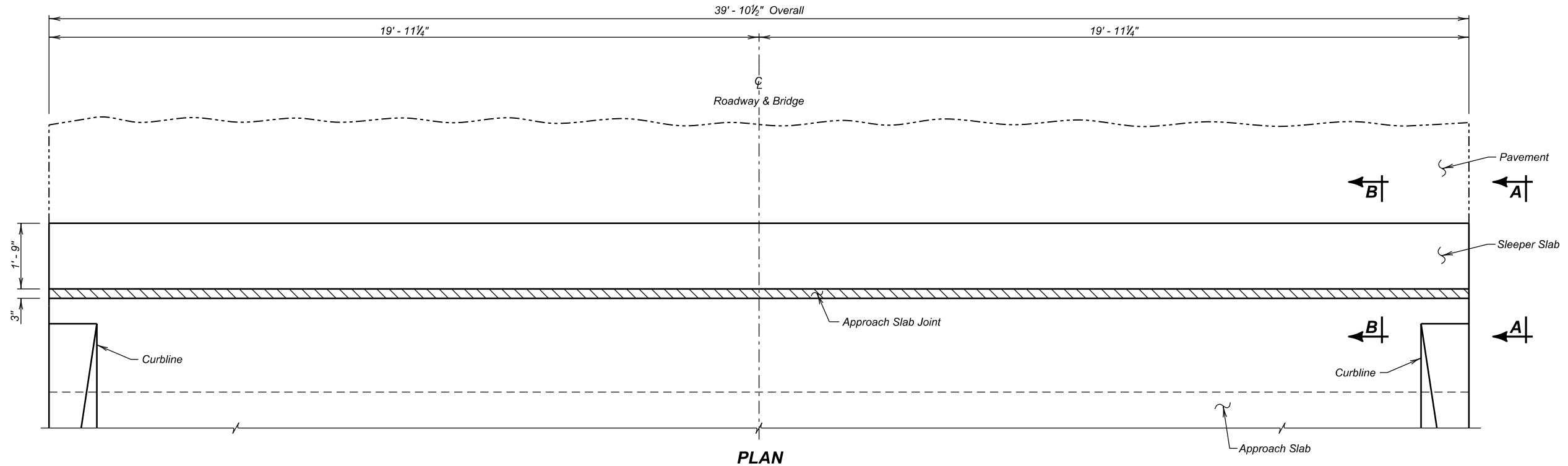
The Polystyrene Insulation Board will be firmly attached to the sleeper slab by a method to be approved by the Engineer.



APPROACH SLAB DETAILS (C)
 FOR
86' - 6" CONTINUOUS CONCRETE BRIDGE
 38'-0" ROADWAY 0° SKEW
 OVER CROW CREEK SEC. 2-T126N-R58W
 STR. NO. 46-110-123 NH-P 0011 (141)

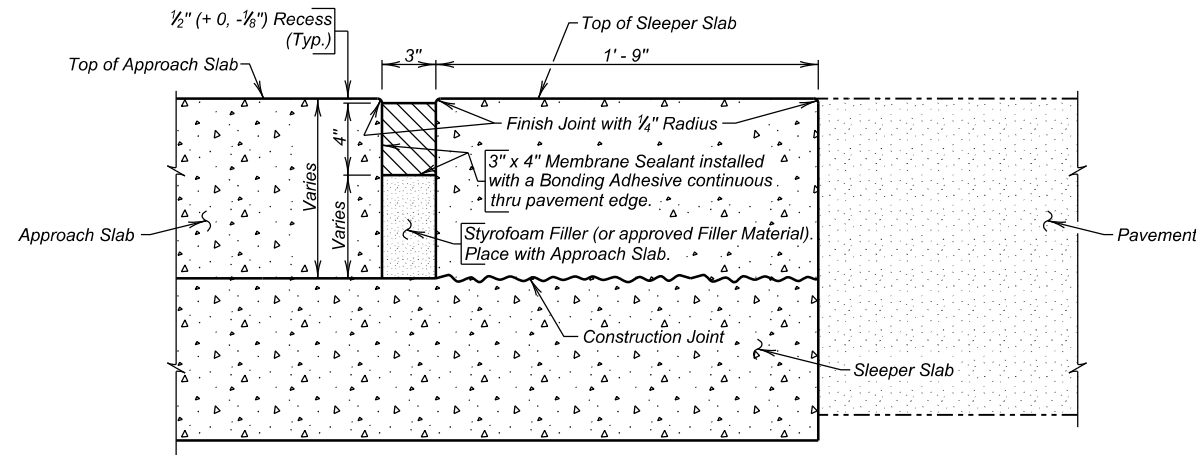
MARSHALL COUNTY
 S. D. DEPT. OF TRANSPORTATION
 MAY 2022

DESIGNED BY GAC/CCB	CK. DES. BY MAB	DRAFTED BY GAC	BRIDGE ENGINEER
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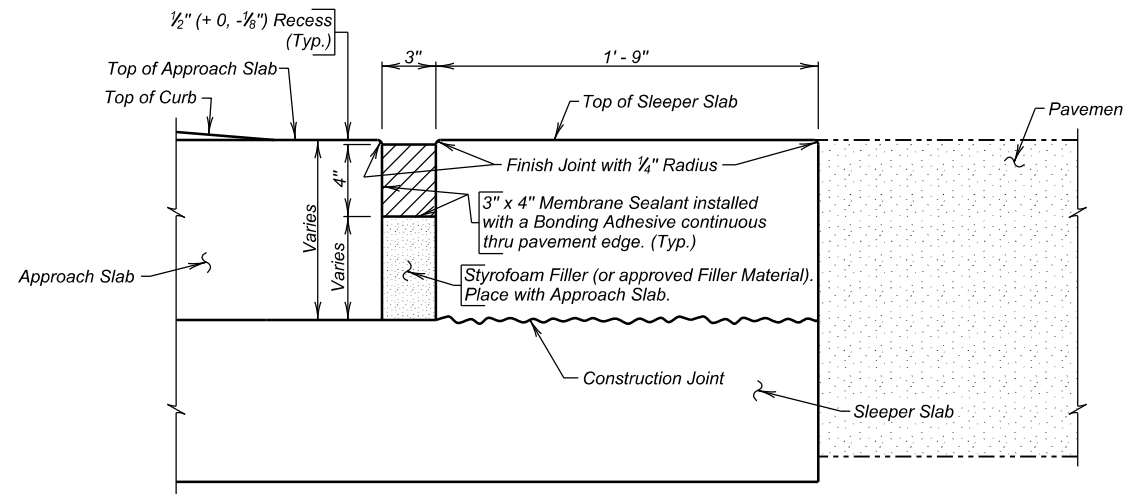


GENERAL NOTES

- The Membrane Sealant shall be on the approved product list for Membrane Sealant Expansion Joints.
- 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.
- The membrane sealant shall provide a water tight seal throughout a joint movement range of + 25% (minimum) from the specified joint opening dimension.
- 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.
- The bonding adhesive used to attach the membrane sealant to the adjacent concrete shall be approved by the membrane sealant manufacturer.
- Adhesive used to join adjacent pieces of the membrane sealant shall be as recommended by the manufacturer.
- If styrofoam filler material is used in the construction, it shall be closed cell and water-tight as approved by the Engineer.
- The minimum ambient air temperature at the time of joint installation and adhesive curing shall be 40° F.
- A technical representative of the membrane sealant manufacturer shall be present at the job site 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 manufacturer's recommendations.
- 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.
- 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.
- Individual spliced sections shall be installed as per the manufacturer's 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.
- Traffic shall not be allowed on the joint until the bonding adhesive has had time to cure, as recommended by the manufacturer.
- 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.
- 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 B - B



VIEW A - A

ESTIMATED QUANTITIES			
(For Two Approach Slabs)			
ITEM	UNIT	QUANTITY	
		Phase 1	Phase 2
Membrane Sealant Expansion Joint	Ft	39.9	39.9



APPROACH SLAB JOINT DETAILS
FOR
86' - 6" CONTINUOUS CONCRETE BRIDGE
38'-0" ROADWAY OVER CROW CREEK 0° SKEW
STR. NO. 46-110-123 SEC. 2-T126N-R58W
NH-P 0011 (141)

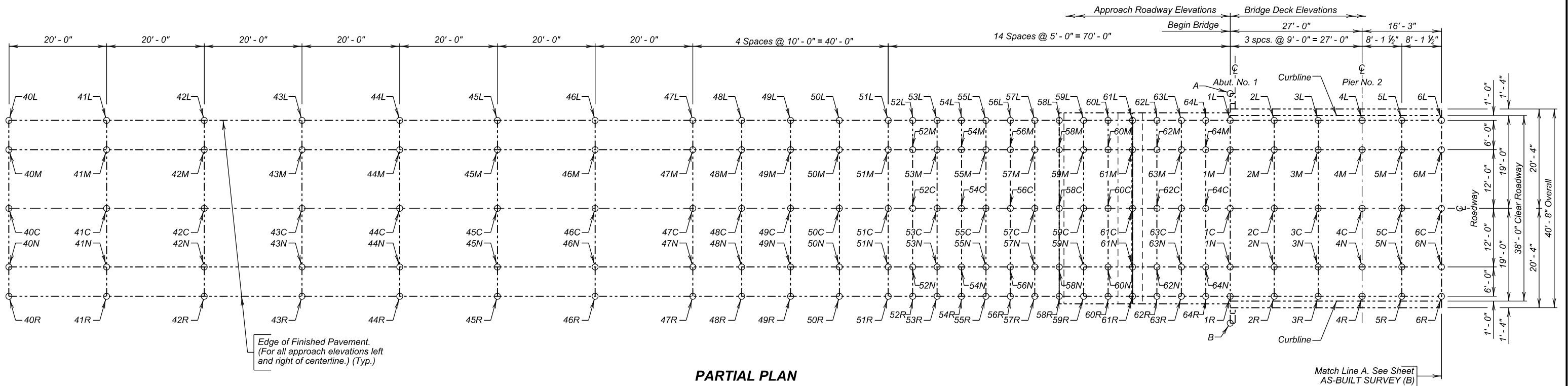
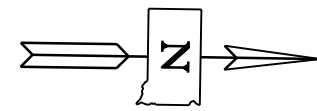
MARSHALL COUNTY
S. D. DEPT. OF TRANSPORTATION

MAY 2022

11 OF 20

DESIGNED BY GAC/CCB	CK. DES. BY MAB	DRAFTED BY GAC	BRIDGE ENGINEER
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Revised 02/15/2023 MAB



PARTIAL PLAN

Table of Elevations - Approach Roadway

Location	Elevation	Location	Elevation	Location	Elevation	Location	Elevation	Location	Elevation
40L		40M		40C		40N		40R	
41L		41M		41C		41N		41R	
42L		42M		42C		42N		42R	
43L		43M		43C		43N		43R	
44L		44M		44C		44N		44R	
45L		45M		45C		45N		45R	
46L		46M		46C		46N		46R	
47L		47M		47C		47N		47R	
48L		48M		48C		48N		48R	
49L		49M		49C		49N		49R	
50L		50M		50C		50N		50R	
51L		51M		51C		51N		51R	
52L		52M		52C		52N		52R	
53L		53M		53C		53N		53R	
54L		54M		54C		54N		54R	
55L		55M		55C		55N		55R	
56L		56M		56C		56N		56R	
57L		57M		57C		57N		57R	
58L		58M		58C		58N		58R	
59L		59M		59C		59N		59R	
60L		60M		60C		60N		60R	
61L		61M		61C		61N		61R	
62L		62M		62C		62N		62R	
63L		63M		63C		63N		63R	
64L		64M		64C		64N		64R	

Table of Elevations - Bridge Deck

Location	Elevation	Location	Elevation	Location	Elevation	Location	Elevation	Location	Elevation
1L		1M		1C		1N		1R	
2L		2M		2C		2N		2R	
3L		3M		3C		3N		3R	
4L		4M		4C		4N		4R	
5L		5M		5C		5N		5R	
6L		6M		6C		6N		6R	

Bridge Ends	
Location	Elevation
A	
B	

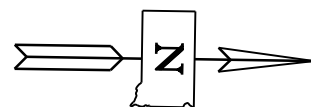
Benchmark Description:
 B.M.
 Location Description: SW Corner of Bridge
 Elevation: 1330.44

NOTE:
 The As-Built elevations shall be based on the National Geodetic Survey North American Vertical Datum of 1988 and shall be recorded at the locations shown by the table on this sheet. The completed table shall be given to the Engineer who will forward a copy to the Bridge Maintenance Engineer in the Office of Bridge Design and the Senior Region Bridge Engineer.

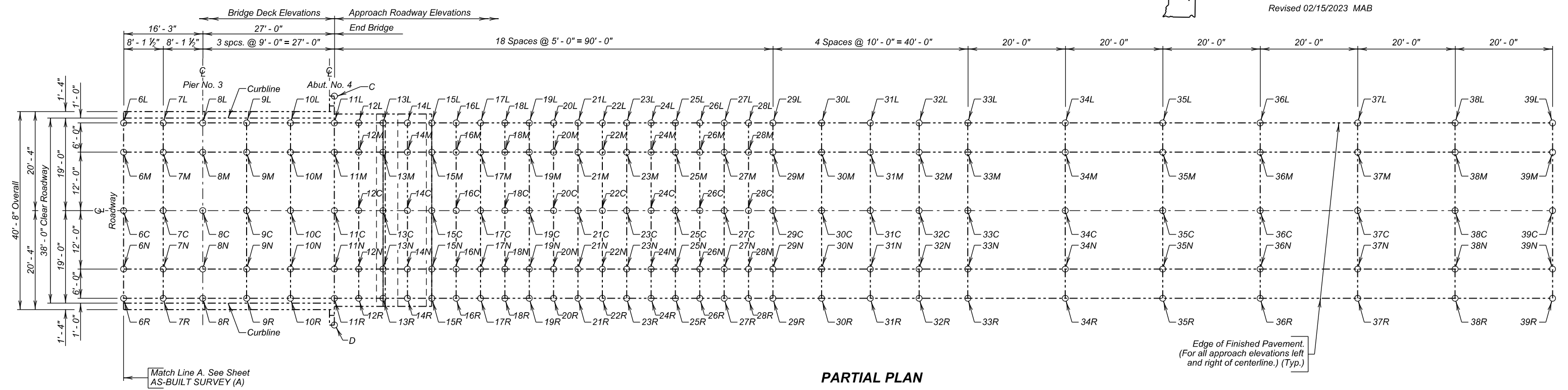


AS-BUILT SURVEY (A)
 FOR
86' - 6" CONTINUOUS CONCRETE BRIDGE
 38'-0" ROADWAY 0° SKEW
 OVER CROW CREEK SEC. 2-T126N-R58W
 STR. NO. 46-110-123 NH-P 0011 (141)

MARSHALL COUNTY
 S. D. DEPT. OF TRANSPORTATION
 MAY 2022



Revised 02/15/2023 MAB



PARTIAL PLAN

Edge of Finished Pavement.
(For all approach elevations left and right of centerline.) (Typ.)

Table of Elevations - Approach Slabs and Roadway

Location	Elevation	Location	Elevation	Location	Elevation	Location	Elevation	Location	Elevation
12L		12M		12C		12N		12R	
13L		13M		13C		13N		13R	
14L		14M		14C		14N		14R	
15L		15M		15C		15N		15R	
16L		16M		16C		16N		16R	
17L		17M		17C		17N		17R	
18L		18M		18C		18N		18R	
19L		19M		19C		19N		19R	
20L		20M		20C		20N		20R	
21L		21M		21C		21N		21R	
22L		22M		22C		22N		22R	
23L		23M		23C		23N		23R	
24L		24M		24C		24N		24R	
25L		25M		25C		25N		25R	
26L		26M		26C		26N		26R	
27L		27M		27C		27N		27R	
28L		28M		28C		28N		28R	
29L		29M		29C		29N		29R	
30L		30M		30C		30N		30R	
31L		31M		31C		31N		31R	
32L		32M		32C		32N		32R	
33L		33M		33C		33N		33R	
34L		34M		34C		34N		34R	
35L		35M		35C		35N		35R	
36L		36M		36C		36N		36R	
37L		37M		37C		37N		37R	
38L		38M		38C		38N		38R	
39L		39M		39C		39N		39R	

Table of Elevations - Bridge Deck

Location	Elevation	Location	Elevation	Location	Elevation	Location	Elevation	Location	Elevation
6L		6M		6C		6N		6R	
7L		7M		7C		7N		7R	
8L		8M		8C		8N		8R	
9L		9M		9C		9N		9R	
10L		10M		10C		10N		10R	
11L		11M		11C		11N		11R	

Bridge Ends

Location	Elevation
C	
D	

Benchmark Description:

B.M.
Location Description: SW Corner of Bridge
Elevation: 1330.44

NOTE:
The As-Built elevations shall be based on the National Geodetic Survey North American Vertical Datum of 1988 and shall be recorded at the locations shown by the table on this sheet. The completed table shall be given to the Engineer who will forward a copy to the Bridge Maintenance Engineer in the Office of Bridge Design and the Senior Region Bridge Engineer.

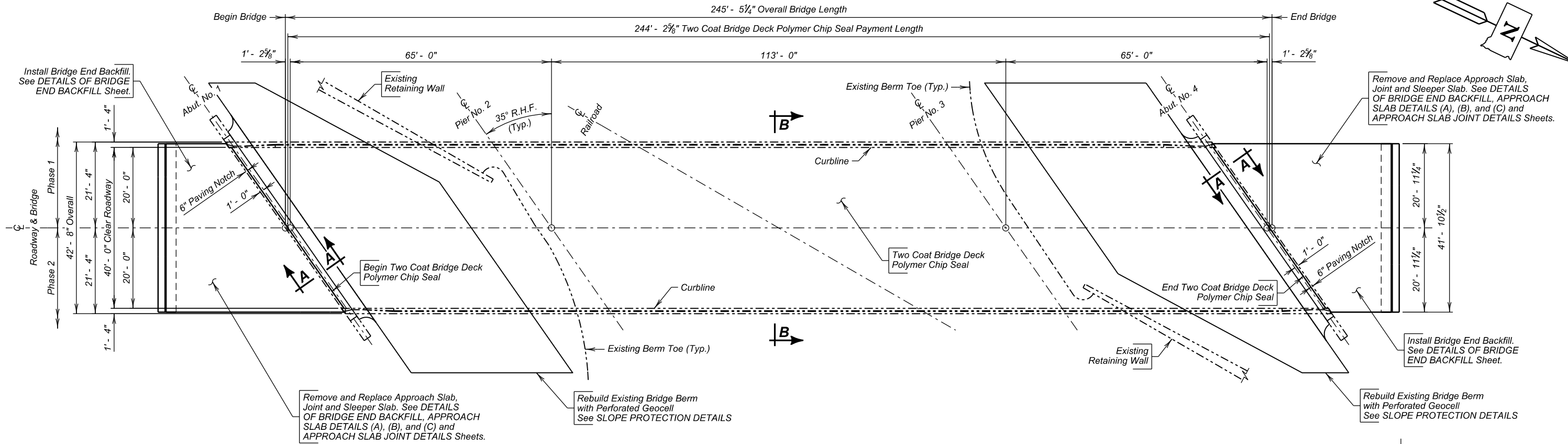


AS-BUILT SURVEY (B)
FOR
86' - 6" CONTINUOUS CONCRETE BRIDGE
38'-0" ROADWAY
OVER CROW CREEK
STR. NO. 46-110-123

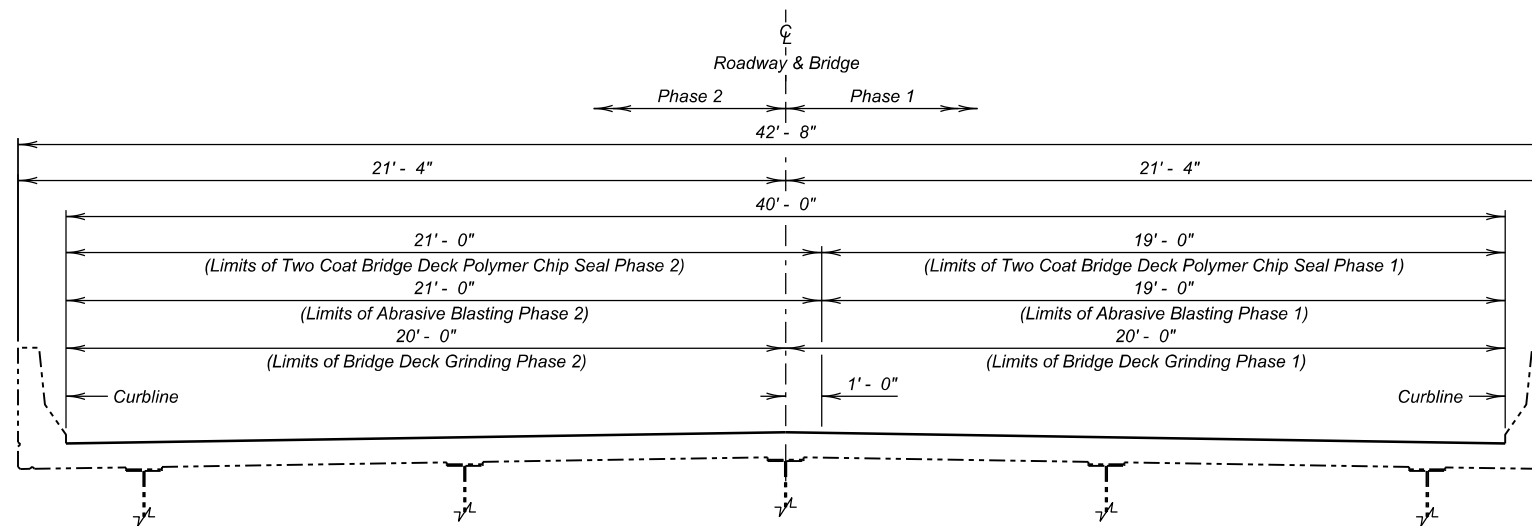
0° SKEW
SEC. 2-T126N-R58W
NH-P 0011 (141)

MARSHALL COUNTY
S. D. DEPT. OF TRANSPORTATION
MAY 2022

DESIGNED BY GAC/CCB	CK. DES. BY MAB	DRAFTED BY GAC	BRIDGE ENGINEER
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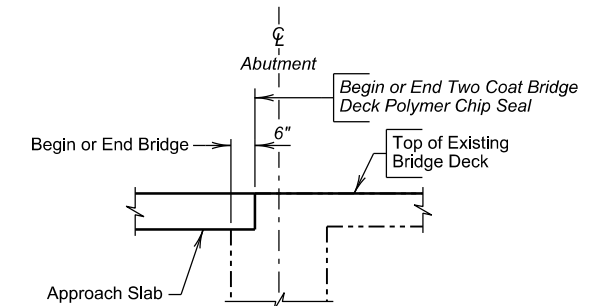


PLAN



SECTION B - B

(Concrete shading and reinforcing steel not shown for clarity)



SECTION A - A

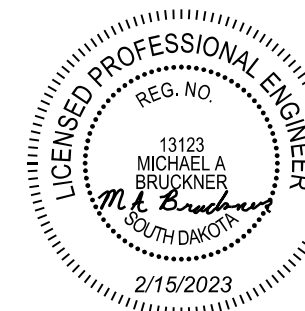
(Reinforcing steel not shown for clarity)

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. 3A - Notes (Continued)
- Sheet No. 4 - Slope Protection Details
- Sheet No. 5 - Details of Bridge End Backfill
- Sheet No. 6 - Approach Slab Details (A)
- Sheet No. 7 - Approach Slab Details (B)
- Sheet No. 8 - Approach Slab Details (C)
- Sheet No. 9 - Approach Slab Joint Details
- Sheet No. 10 - As-Built Survey (A)
- Sheet No. 11 - As-Built Survey (B)
- Sheet No. 12 - As-Built Survey (C)
- Sheet No. 13 - As-Built Survey (D)
- Sheet No. 14 - As-Built Survey (E)
- Sheet Nos. 15 thru 19 - Original Construction Plans

ESTIMATED QUANTITIES			
ITEM	UNIT	QUANTITY	
		Phase 1	Phase 2
Two Coat Bridge Deck Polymer Chip Seal	SqYd	515.6	569.8
Abrasive Blasting of Bridge Deck	SqYd	515.6	569.8
Bridge Deck Grinding	SqYd	541.7	542.7
* Concrete Removal, Class A	SqYd	2.0	2.0
* Concrete Removal, Class B	SqYd	2.0	2.0
* Concrete Patching Material, Bridge Deck	CuFt	22.5	22.5

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



LAYOUT FOR UPGRADING
 FOR
245' - 5 1/4" CONT. COMP. GIRDER BRIDGE
 40'-0" ROADWAY
 OVER RAILROAD
 STR. NO. 58-101-321
 PCN 06WW

35° SKEW R.H.F.
 SEC. 14-T115N-R64W
 NH-P 0013(146)

SINK COUNTY
 S. D. DEPT. OF TRANSPORTATION
 MAY 2022



DESIGNED BY
GAC/CCB

CK. DES. BY
MAB

DRAFTED BY
GAC

BRIDGE ENGINEER

ESTIMATE OF STRUCTURE QUANTITIES

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
009E3310	Bridge Elevation Survey	1	LS
110E0010	Remove Concrete Bridge Approach Slab	323.2	SqYd
120E0010	Unclassified Excavation	68	CuYd
120E3120	Bridge Berm Repair	2	Each
120E7000	Select Granular Backfill	255.2	Ton
410E2600	Membrane Sealant Expansion Joint	83.8	Ft
430E0200	Bridge End Embankment	2	CuYd
430E0300	Granular Bridge End Backfill	85.0	CuYd
460E0150	Concrete Approach Slab for Bridge	281.4	SqYd
460E0160	Concrete Approach Sleeper Slab for Bridge	41.8	SqYd
462E0250	Cellular Grout	4.8	CuYd
480E0504	No. 4 Rebar Splice	40	Each
480E0505	No. 5 Rebar Splice	32	Each
480E0506	No. 6 Rebar Splice	64	Each
491E0005	Two Coat Bridge Deck Polymer Chip Seal	1,085.4	SqYd
491E0110	Abrasive Blasting of Bridge Deck	1,085.4	SqYd
491E0120	Bridge Deck Grinding	1,085.4	SqYd
491E0130	Concrete Removal, Class A	4.0	SqYd
491E0140	Concrete Removal, Class B	4.0	SqYd
491E0172	Concrete Patching Material, Bridge Deck	45.0	CuFt
680E0224	4" PVC Outlet Pipe	20	Ft
831E1030	Perforated Geocell	3,910	SqFt

SPECIFICATIONS

- Design Specifications: AASHTO Standard Specifications for Highway Bridges 17th Edition using Allowable 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.
- The elevations shown in the original construction plans are not based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

SCOPE OF BRIDGE WORK & SEQUENCE OF OPERATIONS

All work on this structure will 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.

- Perform Bridge Deck Grinding for the first phase of construction.
- Where necessary, repair the bridge deck by removing and patching 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.
- Remove the existing approach and sleeper slabs for the first phase of construction.
- Remove existing flowable fill and field installed concrete bench blocks.
- Inspect exposed backwall and add select granular backfill as necessary to fill gap behind exposed backwall for the first phase of construction.
- Inspect under abutment and add cellular grout as necessary for the first phase of construction.
- Replace approach slabs and sleeper slabs to the correct grade for the first phase of construction.
- Replace sleeper slab joints with approved Membrane Sealant Expansion Joint for the first phase of construction.
- Reshape berm slope by placing the perforated geocell filled with granular backfill for the first phase of construction.
- Switch traffic and repeat steps 1 through 12 for the second phase of construction.

GENERAL CONSTRUCTION – BRIDGE

- All mild reinforcing steel will conform to ASTM A615, Grade 60.
- All exposed concrete corners and edges will be chamfered 3/4" unless noted otherwise in the plans. Match existing chamfer if the existing chamfer differs.
- Use 2" clear cover on all reinforcing steel except as shown otherwise.
- Request for construction joints or reinforcing steel 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 type of vibratory screed will be approved by the Engineer.
- Snap ties, if used in the barrier curb formwork, will be corrosion resistant. The corrosion resistant ties will be inert in concrete and compatible with reinforcing steel.

REMOVAL OF CONCRETE BRIDGE APPROACH SLAB

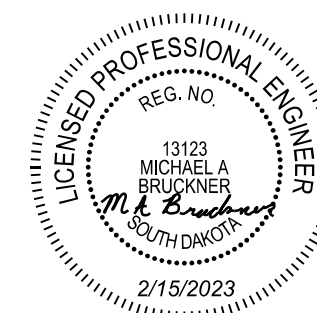
- The existing concrete approach and sleeper slabs adjacent to the structure will be completely removed by the Contractor.
- The concrete and reinforcing steel from the removal will be disposed of by the Contractor at an approved site. An appropriate site will be as described in the Environmental Commitment notes in this set of plans.
- The quantity provided for Remove Concrete Bridge Approach Slab is computed using the plan area for the sleeper slab and the plan area for the approach slab determined separately.
- All labor, tools, equipment, and any incidentals necessary for removal and disposal of the existing approach slabs, polymer modified growth joints, and sleeper slabs will be incidental to the contract unit price per square yard for Remove Concrete Bridge Approach Slab.

DESIGN MIX OF CONCRETE

- Class A45 Concrete will be used for the contract items Concrete Approach Slab for Bridge and Concrete Approach Sleeper Slab for Bridge.

APPROACH SLABS

- Excavation for placement of new approach slabs and sleeper slabs will be done with minimal disturbance to the underlying material.
- Prior to the placement of the approach and sleeper slabs, the existing Mechanical Stabilized Earth and Backfill material will be compacted using at least four complete passes of a smooth face vibratory roller or vibratory plate compactor. Base course will be placed as required to fill any low spots and to achieve the elevation needed for installation of the new approach and sleeper slabs. The existing and fill material will be thoroughly watered prior to and during compaction. Base course will be in accordance with Section 882 of the Construction Specifications. MSE should be undisturbed.



ESTIMATE OF STRUCTURE QUANTITIES AND NOTES
FOR
245' - 5 1/4" CONT. COMP. GIRDER BRIDGE

STR. NO. 58-101-321

MAY 2022

2 OF 19

DESIGNED BY GAC/CCB	CK. DES. BY MAB	DRAFTED BY GAC	BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH-P 0013(146)	45	84

Revised 02/15/2023 MAB

APPROACH SLABS (CONTINUED)

- The top of approach slab elevations will be subject to the approval of the Engineer. Care will be taken to provide a smooth transition from the bridge deck elevations to the new pavement elevations established in the field so as to prevent any dips or bumps in the areas of the bridge ends or ends of the new approach slabs. The maximum rate of grade transition through the approach slab will be 1/8 inch per 10 feet.
- Sleeper slab riser will be cast with or later than the approach slab. Care will be taken to ensure the correct grade is maintained across the joint.
- The use of a vibratory screed will be required during placement of Class A45 Concrete for the approach slabs. Concrete placement in front of the screed will be kept parallel to the screed.
- The concrete in the approach slab will be tined perpendicular to the centerline of the roadway.
- The new approach slabs and sleeper slabs will have a surface finish as specified in Section 460.3 L.4 of the Construction Specifications.
- The concrete approach slabs will be cured in accordance with Section 460.3 M of the Construction Specifications. The minimum 7-day cure time requirement will be waived. The approach slabs will be cured until a minimum compressive strength of 4,000 psi is reached.
- Concrete Approach Sleeper Slab for Bridge will be paid for at the contract unit price per square yard. This payment will be full compensation for excavation; furnishing, hauling, and placing all materials including: concrete, concrete anchors, and reinforcing steel; for disposal of all excavated material and surplus materials; labor; tools; equipment; and any incidentals necessary to complete this item of work.
- Concrete Approach Slab for Bridge will be paid for at the contract unit price per square yard. This payment will be full compensation for excavation; furnishing, hauling, and placing all materials including: concrete, elastic joint sealer, and reinforcing steel; for disposal of all excavated material and surplus materials; labor; tools; equipment; and any incidentals necessary to complete this item of work.
- Any base course and compaction required to fill any low spots or voids will be paid for at the contract unit price per cubic per yard for Granular Bridge End Backfill. This payment will be full compensation for furnishing, hauling, and placing all materials including disposal of all surplus materials; labor; tools; equipment; and any incidentals necessary to complete this item of work.

CELLULAR GROUT

- Forms will be constructed in the area where there is a void under abutment. The forms will be constructed to withstand the pressure of the grouting operation. Pressure grouting will be done to fill all the voids under the abutment.

- The grout will be cellular grout (grout with pre-generated foam) with a minimum 28-day compressive strength of 100 pounds per square inch. If water is not present within then a low density grout with a minimum of 30 pounds per cubic foot wet density may be used. When it is not possible keep water out during grouting, a high density grout with a minimum of 70 pounds per cubic foot will be used which may include approved sand. The foaming agent used will meet requirements of ASTM C869 when tested in accordance with ASTM C796.
- Both cellular grout mix designs will be submitted to the SDDOT Concrete Engineer for approval prior to use. The mix design submittal will include the base cement slurry mix per cubic yard, expansion factor from the foaming agent, and the cellular grout wet density (pounds per cubic foot).
- The Contractor will install a bypass valve adjacent to the location where the pressure grouting hose is attached for obtaining samples to be checked for wet density. The wet density of the cellular grout will be checked by the Contractor to verify the proper minimum wet density before the cellular grout filling operations begin and at a minimum once every two hours during production. The SDDOT will document the results of the density checks.
- Cellular grout will be wasted until the cellular grout meets the minimum wet density required; however, if 0.5 cubic yards or more of base cement slurry is wasted trying to meet density requirements, then that quantity will not be included for payment.
- Port holes used for grout pumping operation will be plugged until the grout has set.
- The quantity of cellular grout is estimated based on a void 6 inches in depth and full width of the abutment.
- The quantity of base cement slurry ordered will be approved by the Engineer. The quantity of base cement slurry needed will be calculated to the nearest tenth of a cubic yard using the approved mix design, expansion factor of the foaming agent, and estimated amount of cellular grout. The quantity for payment to the nearest tenth of a cubic yard of Cellular Grout is a calculated quantity based on the amount of base cement slurry used on the project to the nearest tenth of a cubic yard, expansion factor of the foaming agent, and approved mix design.
- Payment will be full compensation for labor, equipment, tools, materials, forms, excavation, and all other items of work required in furnishing, forming, placing, curing, and incidentals necessary to satisfactorily complete the work will be included in the contract unit price per cubic yard for cellular grout.

BRIDGE BERM REPAIR

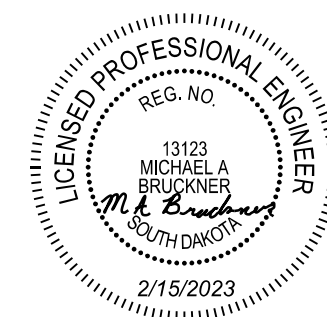
- The bridge berms shall be rebuilt and reshaped as shown in plans.
- The cost of the berm reconstruction and reshaping shall be incidental to the contract lump sum price for "Bridge Berm Repair". This payment shall be full compensation for furnishing all materials, labor, tools, and equipment necessary or incidental to the reconstruction and reshaping of the bridge berm.
- The cost for the placement of cellular grout under the bridge shall be included with those respective contract items and are not part of the "Bridge Berm Repair" required for the berm reshaping.

BRIDGE DECK GRINDING

- Perform Bridge Deck Grinding in accordance with Section 491 of the Construction Specifications.
- 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 such as additional traffic control or cleaning will be at no additional cost to the Department.

TWO COAT BRIDGE DECK POLYMER CHIP SEAL

The polymer will conform to Type I per the Department's Approved Products List for Bridge Deck Polymer Chip Seal.



NOTES (CONTINUED)
FOR

245' - 5 1/4" CONT. COMP. GIRDER BRIDGE

STR. NO. 58-101-321

MAY 2022

3 OF 19

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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	NH-P 0013(146)	45A	84

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TWO COAT BRIDGE DECK POLYMER CHIP SEAL (CONTINUED)

CONCRETE PATCHING MATERIAL, BRIDGE DECK

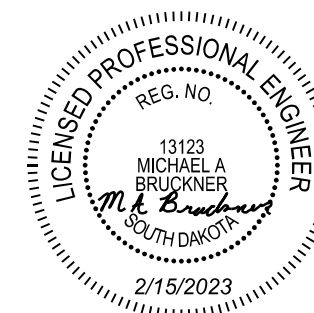
1. In lieu of the 48-hour wet cure, the contractor may use a wax-based curing compound after 4 hours of wet cure. The wax-based curing compound will be white pigmented and will be applied to the patch until the entire surface is white. After the 48-hour cure period, the curing compound will be completely sand blasted off and the surface of the patch will be allowed to air dry for a minimum of 48 hours before application of the polymer chip seal.
2. A thicker layer of the Two Coat Bridge Deck Polymer Chip Seal will not be used in place of Concrete Patching Material, Bridge Deck. Joint Nosing Material from the Department's Approved Products List may be used for Concrete Patching Material, Bridge Deck provided it is compatible with the polymer used for the chip seal and is approved by the manufacturer's representative. Joint Nosing Material will be fully cured before application of the chip seal. If Joint Nosing Material is substituted for Concrete Patching Material it will be paid for at the contract unit price per cubic foot for Concrete Patching Material, Bridge Deck.

AS-BUILT ELEVATION SURVEY

The Contractor will be responsible for producing an as-built elevation survey soon after construction is complete and before the bridge is completely opened to traffic. The Contractor will be responsible for recording the as-built elevations at the locations shown by the table of as-built elevations shown in the plans. The completed table will be given to the Engineer who will forward a copy to the Bridge Maintenance Engineer in the Office of Bridge Design and the Senior Region Bridge Engineer. The elevations will be based on the control points provided in the plans. The Contractor will be responsible for verifying the control points provided in the plans. All costs associated with obtaining the elevations at the locations shown in the table and for the benchmark shown in the plans, including all equipment, labor and any incidentals required will be incidental to the contract lump sum price for Bridge Elevation Survey.

SLOPE PROTECTION (RAILROAD COORDINATION)

1. During slope protection construction the contractor shall not interfere with the operating railroad train movements. Construction activity must not take place within 25 of the centerline track. When train movements are occurring through the construction site construction equipment shall be removed from this zone prior to arrival of any train. See special provisions for working on railroad company property.
2. See special provisions for railroad insurance requirements.



NOTES (CONTINUED)
FOR
245' - 5 1/4" CONT. COMP. GIRDER BRIDGE

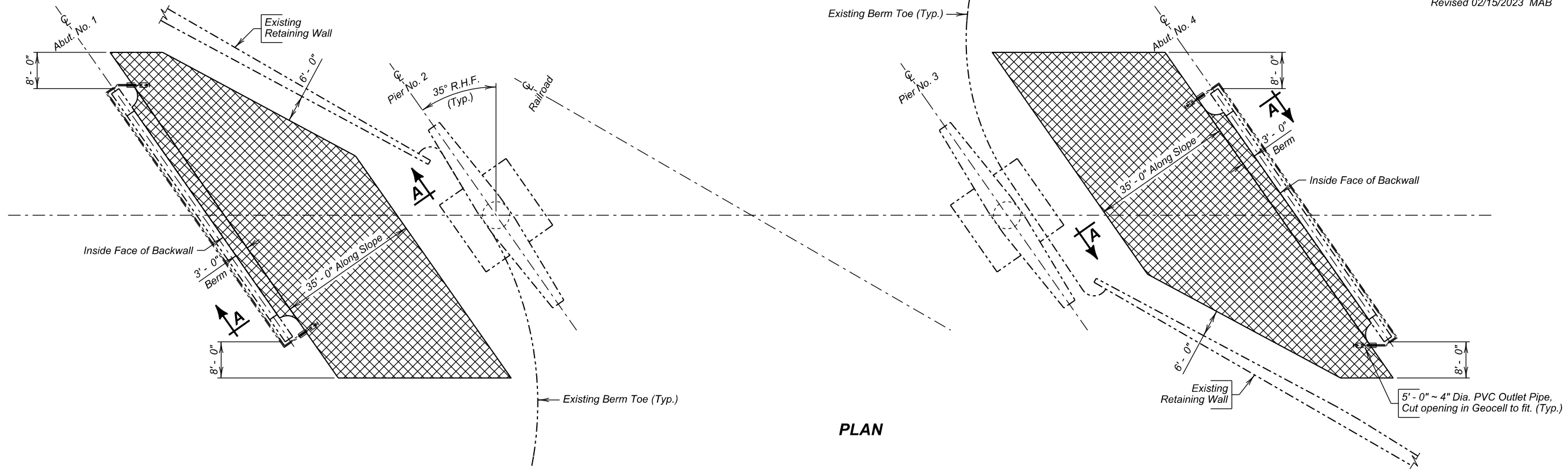
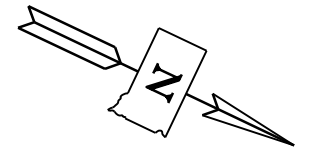
STR. NO. 58-101-321

MAY 2022

3A OF 19

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PLAN

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Bridge Berm Repair	Each	2
Perforated Geocell	SqFt	3910
Cellular Grout	CuYd	4.8
Select Granular Backfill	Tons	255.2

Item 1 is an approximate quantity contained in the above contract item and is for information only.

1. Type B Drainage Fabric 434.4 SqYd

GENERAL NOTES:

The quantity "Cellular Grout" and "Select Granular Backfill" is an estimate only. Field verify.

Shrinkage Factor of 1.25 used.

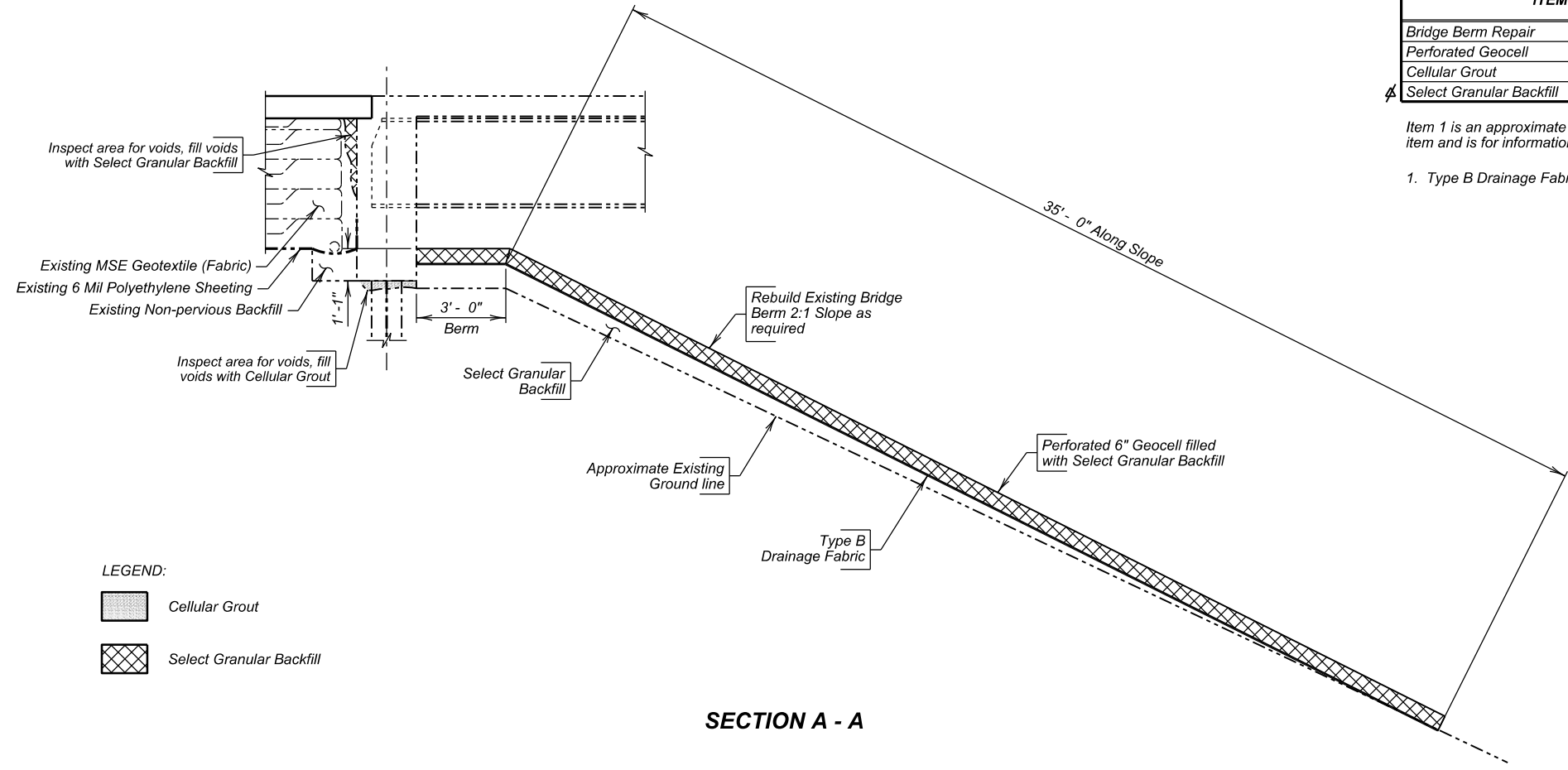
Remove existing flowable fill and field installed concrete bench blocks. Perform removals in such a manner that limits disturbance to the bridge berm.

Once the bench blocks are removed connect temporary form work to the face of the Abutment and embed the formwork a min. 1' - 0" into the existing berm.

Place Cellular Grout, "Under Pressure" in the voids under the Abutment. A minimum of three feet and maximum of five feet of head pressure will be used during grout placement.

Remove formwork and place Select Granular Backfill once Cellular Grout has reached 100 psi compressive strength.

The Item "Bridge Berm Repair" includes all Excavation, Grading, Bank Stabilization, Formwork and Pumping Equipment necessary in the placement of Cellular Grout and Geocell.



SECTION A - A

- LEGEND:
- Cellular Grout
 - Select Granular Backfill

SLOPE PROTECTION DETAILS FOR

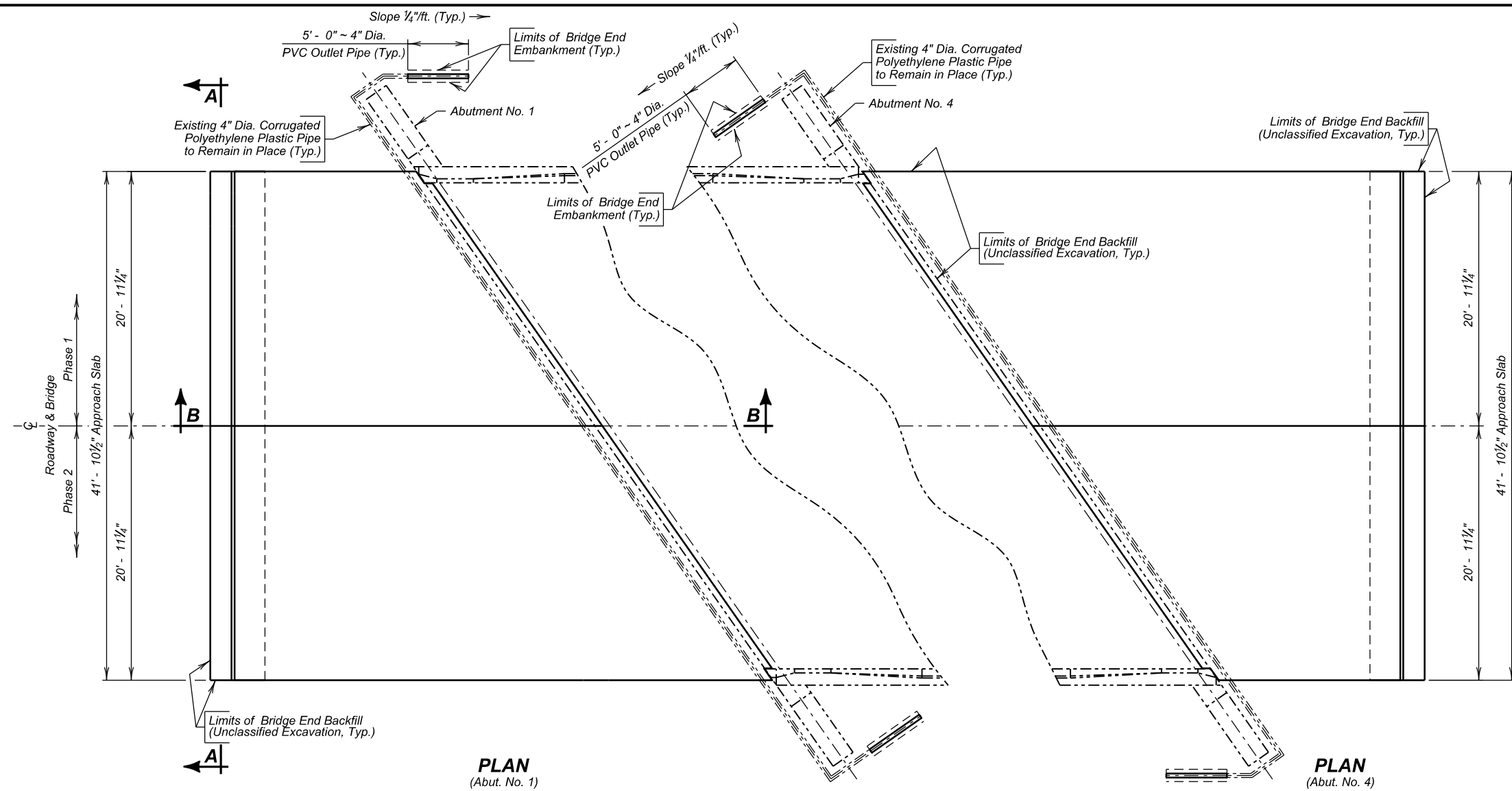
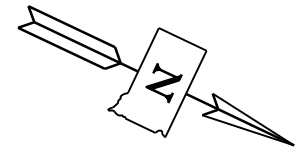
245' - 5 1/4" CONT. COMP. GIRDER BRIDGE
 40'-0" ROADWAY OVER RAILROAD 35° SKEW R.H.F.
 STR. NO. 58-101-321 SEC. 14-T115N-R64W
 PCN 06WW NH-P 0013(146)



SINK COUNTY
 S. D. DEPT. OF TRANSPORTATION
 MAY 2022

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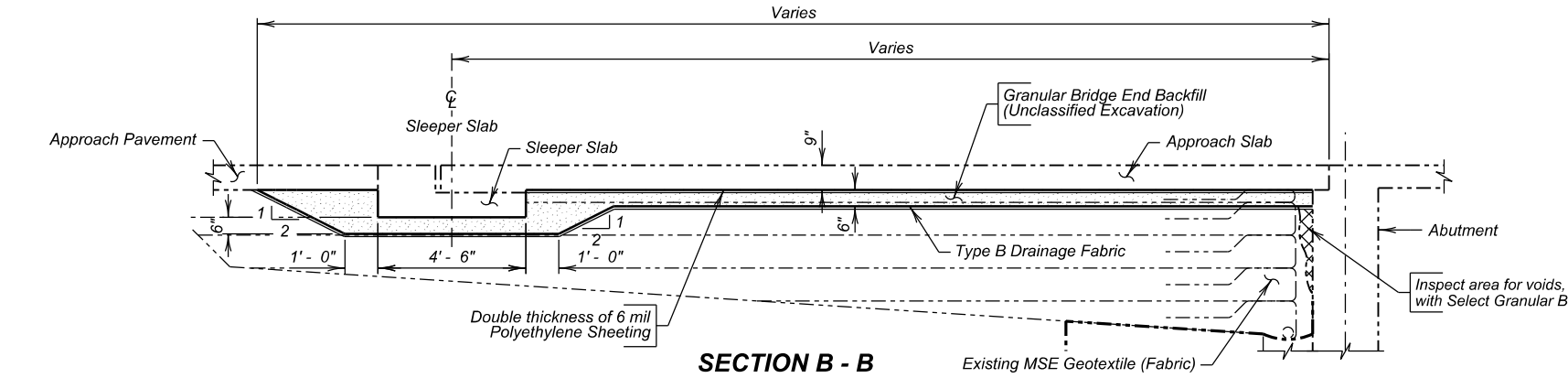
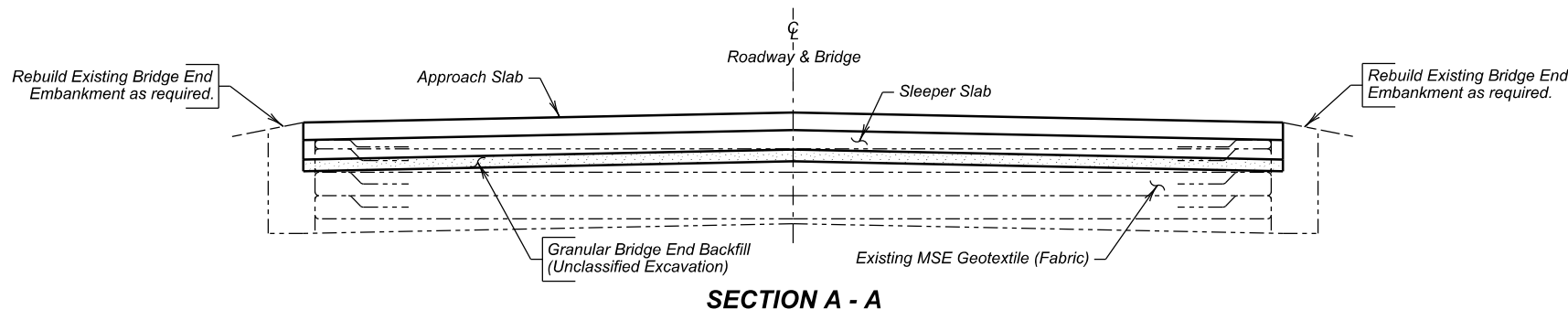


ESTIMATED QUANTITIES			
ITEM	UNIT	QUANTITY	
		Phase 1	Phase 2
Unclassified Excavation	CuYd	34	34
Bridge End Embankment	CuYd	1	1
4" PVC Outlet Pipe	Ft	10	10
Granular Bridge End Backfill	CuYd	42.5	42.5

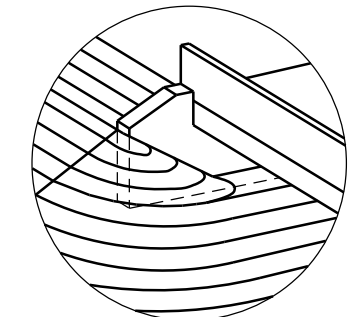
Items 1 thru 2 are approximate quantities contained in the above contract items and are for information only.

	Phase 1	Phase 2
1. 6 mil Polyethylene Sheeting (not including laps)	505.4 SqYd	505.4 SqYd
2. Type B Drainage Fabric	164.4 SqYd	164.4 SqYd

GENERAL NOTES:
 Perform excavation in a manner that limits disturbance to the existing bridge berm. Where disturbance can not be minimized or the existing spill cone has eroded, rebuild as shown.
 Shrinkage Factor of 1.25 used.



LEGEND:
 Select Granular Backfill



SPILL CONE DETAIL AT EMBANKMENT

DETAILS OF BRIDGE END BACKFILL
 FOR
245' - 5 1/4" CONT. COMP. GIRDER BRIDGE
 40'-0" ROADWAY OVER RAILROAD STR. NO. 58-101-321
 35° SKEW R.H.F. SEC. 14-T115N-R64W NH-P 0013(146)

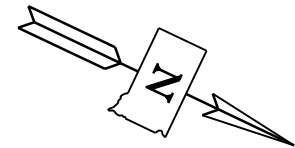
SINK COUNTY
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Benchmark Description:

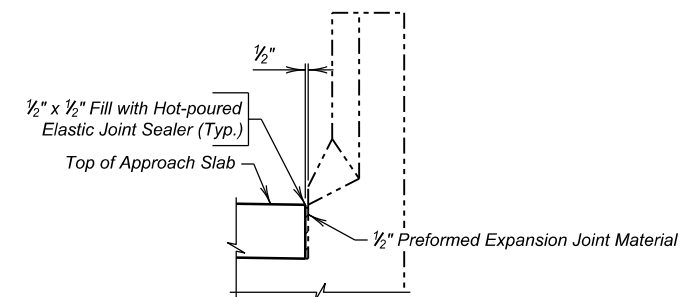
B.M.
Location Description: X=2357320.976, Y=348022.839
Elevation: 1332.98

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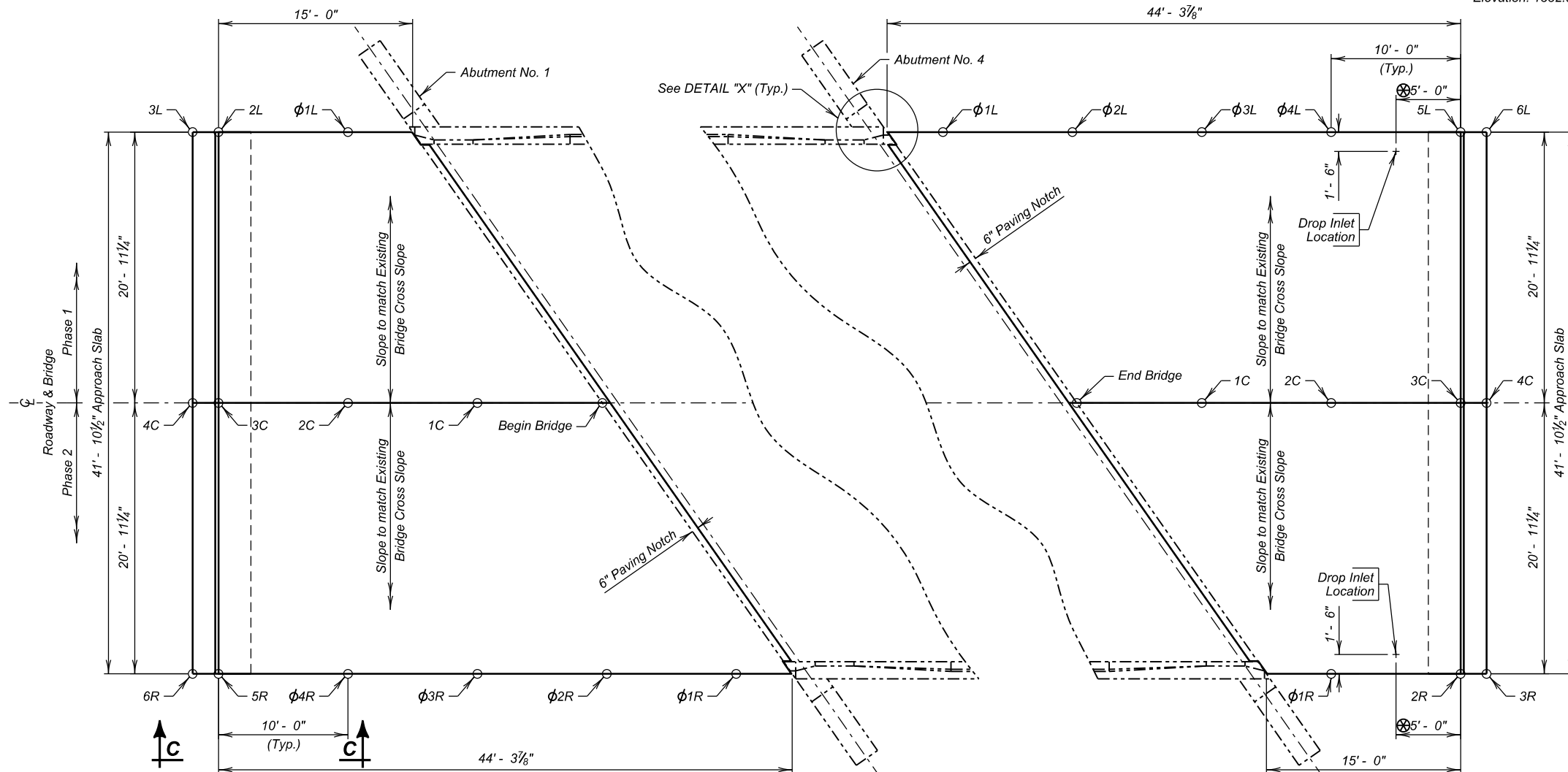


GENERAL NOTES:

- ⊗ Drop inlet location may vary. Field locate to avoid Sleeper Slab. See Surfacing Plans.



SECTION D - D



PLAN
(Abut. No. 1)

PLAN
(Abut. No. 4)

TABLE OF ELEVATIONS ABUTMENT NO. 1

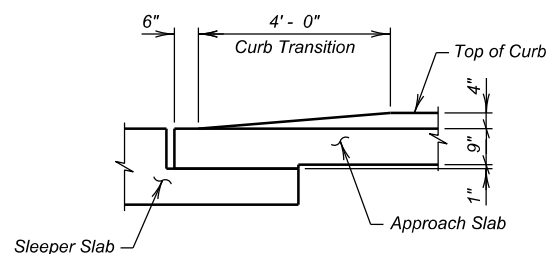
LOCATION	ELEVATION	LOCATION	ELEVATION	LOCATION	ELEVATION
φ 1L	1258.84	1C	1258.85	φ 1R	1258.90
2L	1258.47	2C	1258.82	φ 2R	1258.87
3L	1258.44	3C	1258.79	φ 3R	1258.87
		4C	1258.76	φ 4R	1258.84
				5R	1258.47
				6R	1258.44

φ Top of Curb Elevations. All other Elevations are Top of Slab.

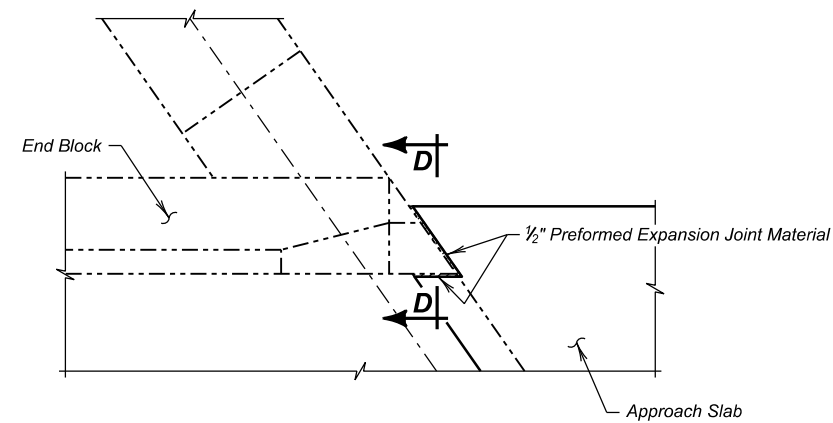
TABLE OF ELEVATIONS ABUTMENT NO. 4

LOCATION	ELEVATION	LOCATION	ELEVATION	LOCATION	ELEVATION
φ 1L	1257.85	1C	1257.72	φ 1R	1257.62
φ 2L	1257.74	2C	1257.60	2R	1257.17
φ 3L	1257.74	3C	1257.49	3R	1257.06
φ 4L	1257.62	4C	1257.37		
5L	1257.17				
6L	1257.06				

φ Top of Curb Elevations. All other Elevations are Top of Slab.



VIEW C - C



DETAIL "X"

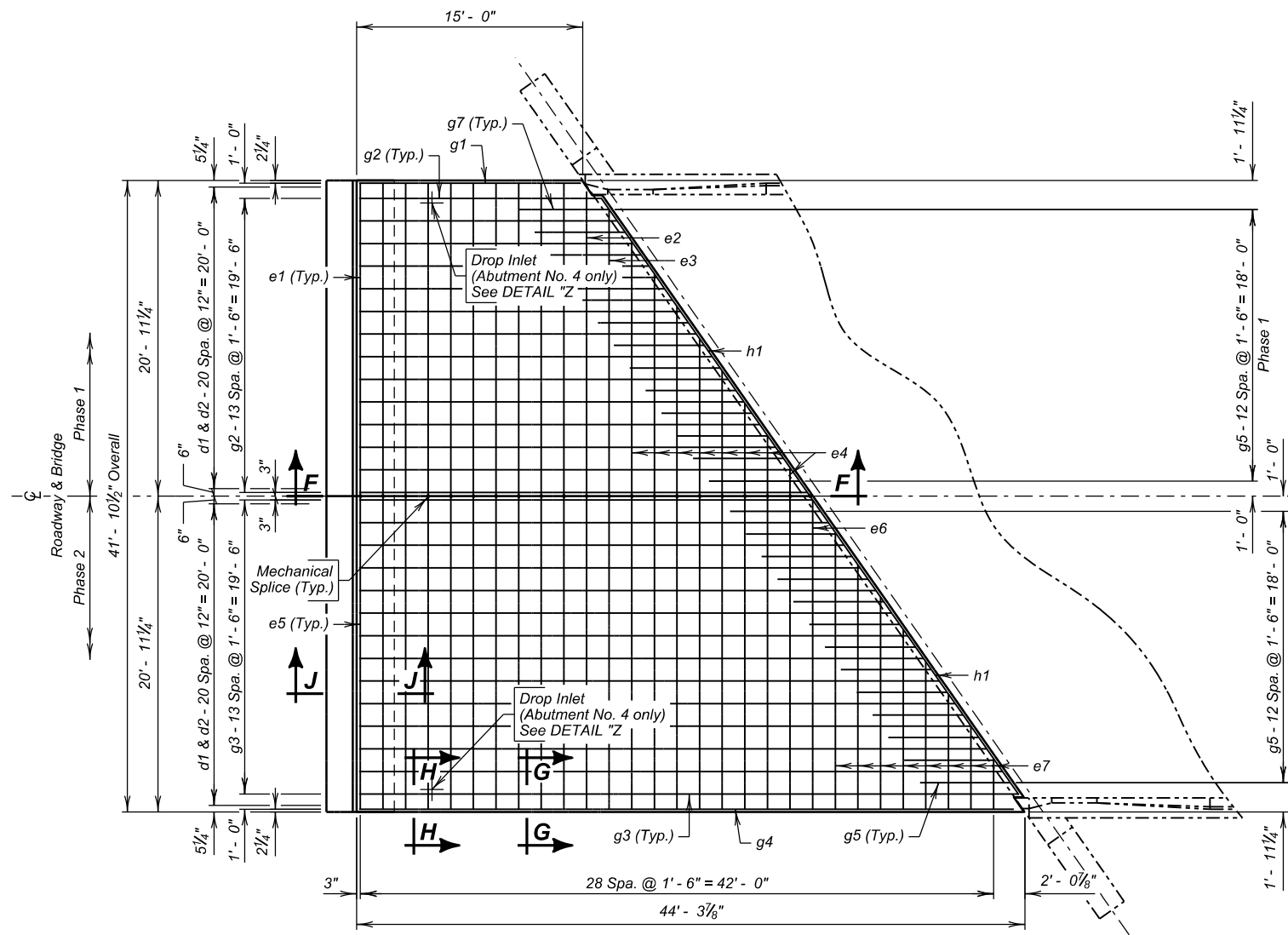


APPROACH SLAB DETAILS (A)
FOR
245' - 5 1/4" CONT. COMP. GIRDER BRIDGE
40'-0" ROADWAY
OVER RAILROAD
STR. NO. 58-101-321

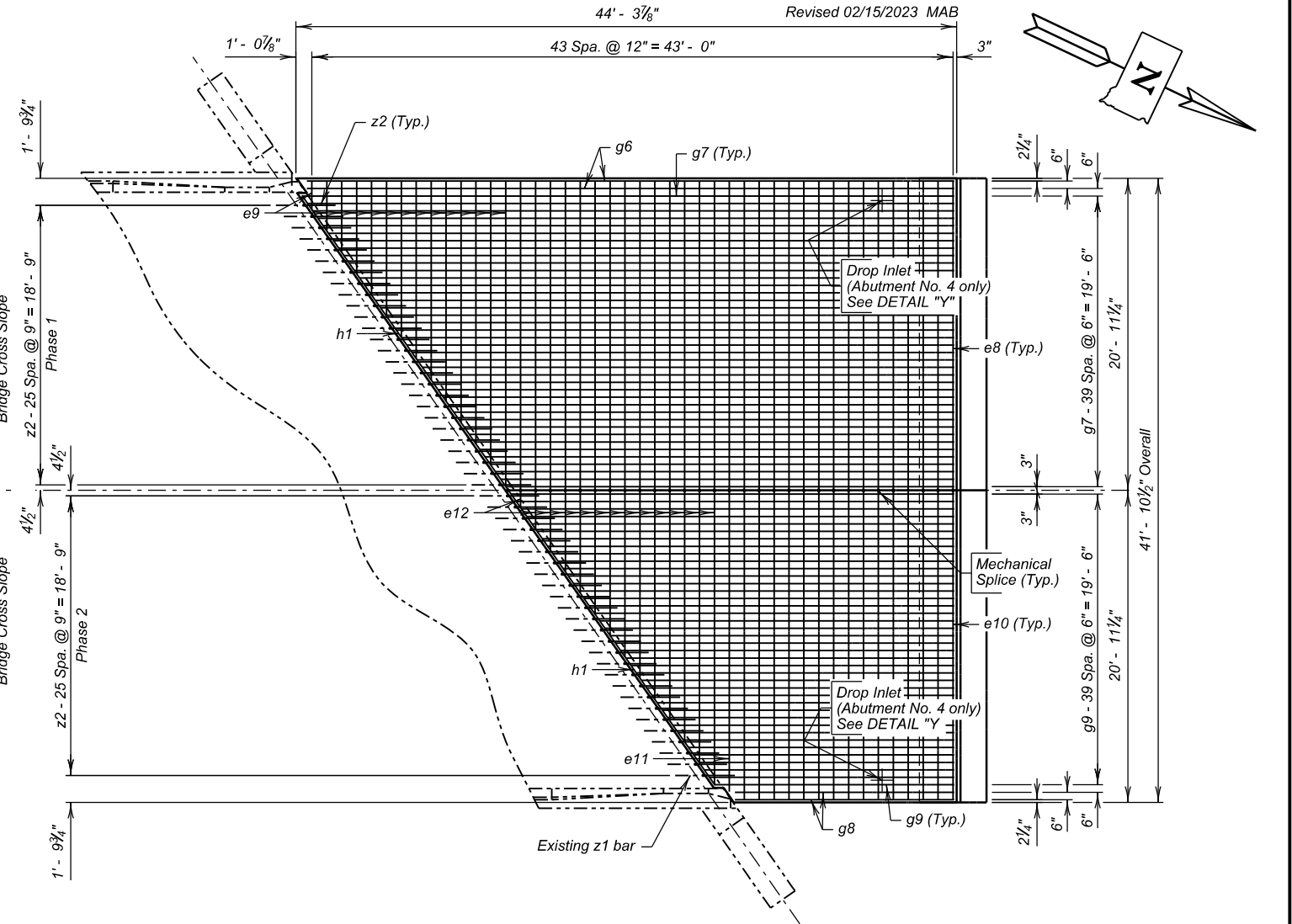
35° SKEW R.H.F.
SEC. 14-T115N-R64W
NH-P 0013(146)

SINK COUNTY
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MAY 2022

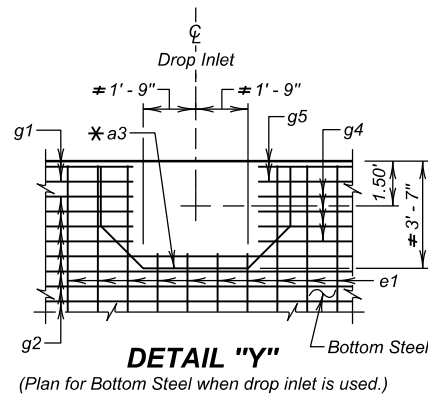
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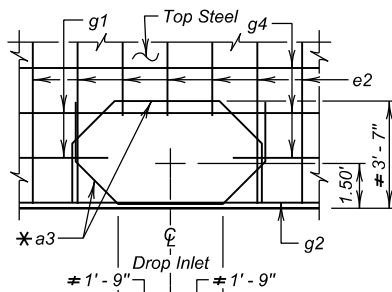
PLAN
(Top Steel Shown)
(Abutment No. 1 shown, Abutment No. 4 similar by rotation)



PLAN
(Bottom Steel Shown)
(Abutment No. 4 shown, Abutment No. 1 similar by rotation)



DETAIL "Y"
(Plan for Bottom Steel when drop inlet is used.)



DETAIL "Z"
(Plan for Top Steel when drop inlet is used.)

* Add a3 bar to bottom layer of steel as shown in DETAIL "Y" and top layer of steel as shown in DETAIL "Z".
Cut all bars in area of drop inlet as shown in DETAIL "Y" and DETAIL "Z".

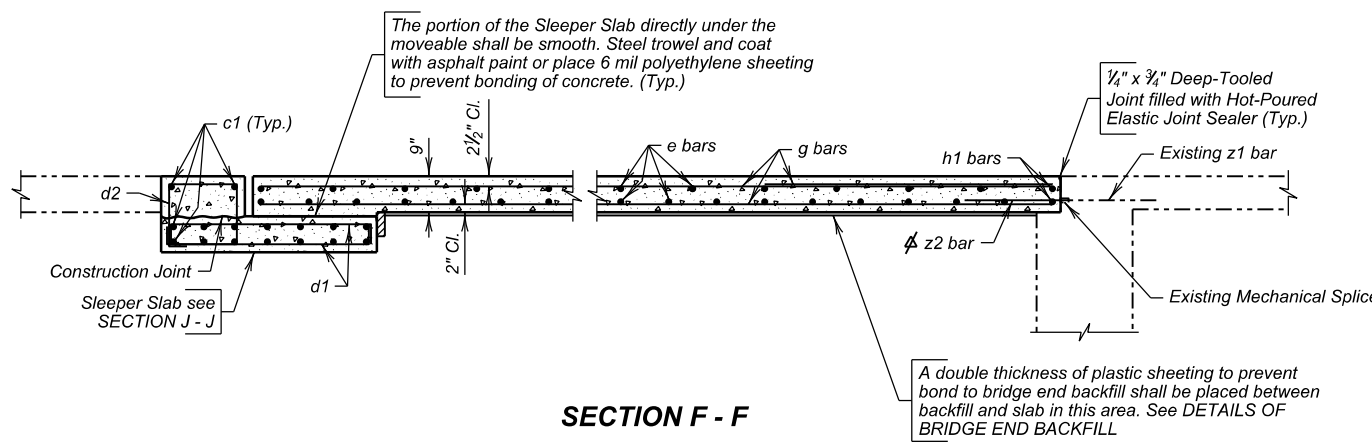


APPROACH SLAB DETAILS (B)
FOR
245' - 5 1/4" CONT. COMP. GIRDER BRIDGE
40'-0" ROADWAY
OVER RAILROAD
STR. NO. 58-101-321

35° SKEW R.H.F.
SEC. 14-T115N-R64W
NH-P 0013(146)

SINK COUNTY
S. D. DEPT. OF TRANSPORTATION
MAY 2022

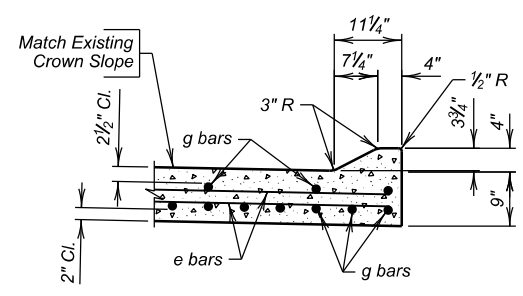
Revised 02/15/2023 MAB



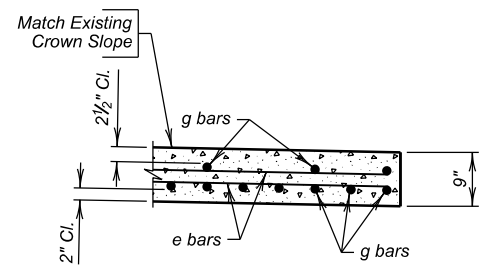
SECTION F - F

z2 bars to be mechanically spliced to existing z1 bars.

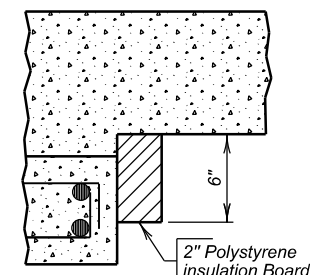
A double thickness of plastic sheeting to prevent bond to bridge end backfill shall be placed between backfill and slab in this area. See DETAILS OF BRIDGE END BACKFILL



SECTION G - G

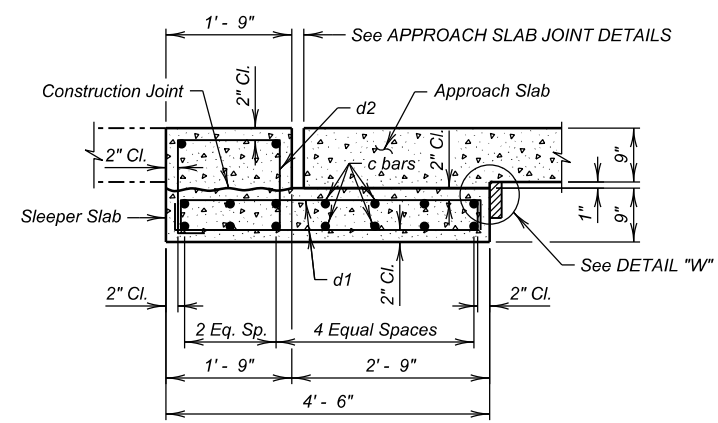


SECTION H - H



DETAIL "W"

The Polystyrene Insulation Board will be firmly attached to the sleeper slab by a method to be approved by the Engineer.



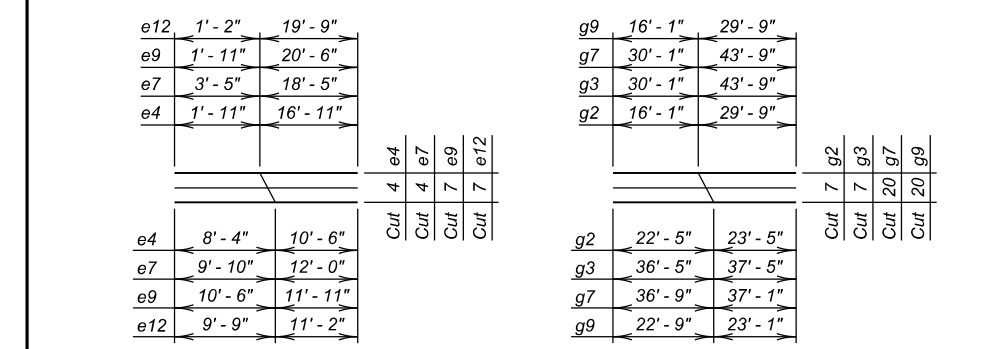
SECTION J - J
(Sleeper Slab)

ESTIMATED QUANTITIES				
(For Two Approach and Sleeper Slabs)				
ITEM	UNIT	QUANTITY		
		Phase 1	Phase 2	
Remove Concrete Bridge Approach Slab	SqYd	161.6	161.6	
Concrete Approach Slab for Bridge	SqYd	140.7	140.7	
Concrete Approach Sleeper Slab for Bridge	SqYd	20.9	20.9	
No. 4 Rebar Splice	Each	40	-	
No. 5 Rebar Splice	Each	32	-	
No. 6 Rebar Splice	Each	64	-	

Items 1 thru 5 are approximate quantities contained in the above contract items and are for information only.

	Phase 1	Phase 2
1. Concrete in Approach Slab	35.3 CuYd	35.3 CuYd
2. Epoxy Coated Re-Steel in Approach Slab	10224 Lb	10224 Lb
3. Concrete in Sleeper Slab	7.4 CuYd	7.4 CuYd
4. Epoxy Coated Re-Steel in Sleeper Slab	1144 Lb	1144 Lb
5. 2" Polystyrene Insulation Board	21 SqFt	21 SqFt

REINFORCING SCHEDULE									
(For Two Approach Slabs and Two Sleeper Slabs)									
PHASE 1					PHASE 2				
Mk.	No.	Size	Length	Type	Bending Details				
c1	32	5	20' - 9"	Str.					
d1	84	4	5' - 0"	2					
d2	42	4	6' - 3"	T2					
a3	3	4	11' - 6"	14					
e1	10	4	20' - 9"	Str.					
e2	1	4	20' - 2"	Str.					
e3	1	4	19' - 0"	Str.					
e4	4	4	18' - 10"	Str.					
e5	20	4	20' - 9"	Str.					
e6	1	4	20' - 6"	Str.					
e7	4	4	21' - 10"	Str.					
e8	30	6	20' - 9"	Str.					
e9	7	6	22' - 5"	Str.					
e10	15	6	20' - 9"	Str.					
e11	1	6	20' - 3"	Str.					
e12	7	6	20' - 11"	Str.					
g1	1	4	14' - 8"	Str.					
g2	7	4	45' - 10"	Str.					
g3	7	4	73' - 10"	Str.					
g4	1	4	43' - 5"	Str.					
g5	26	4	6' - 0"	Str.					
g6	2	8	43' - 5"	Str.					
g7	20	8	73' - 10"	Str.					
g8	2	8	14' - 9"	Str.					
g9	20	8	45' - 10"	Str.					
h1	4	6	24' - 2"	Str.					
z2	52	7	2' - 0"	Str.					



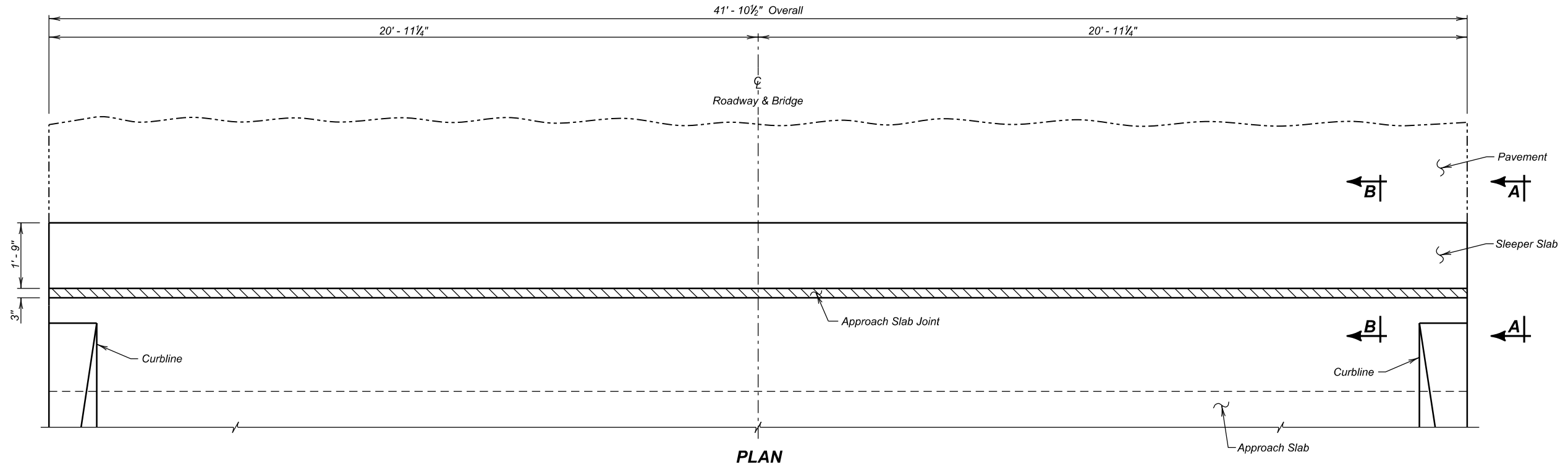
NOTES:
 All Dimensions are out to out of bars.
 All Bars to be Epoxy Coated.
 z2 bars to be mechanically spliced to existing z1 bars in bridge deck.
 See cutting diagram.
 These bars will be spliced with mechanical splice devices.



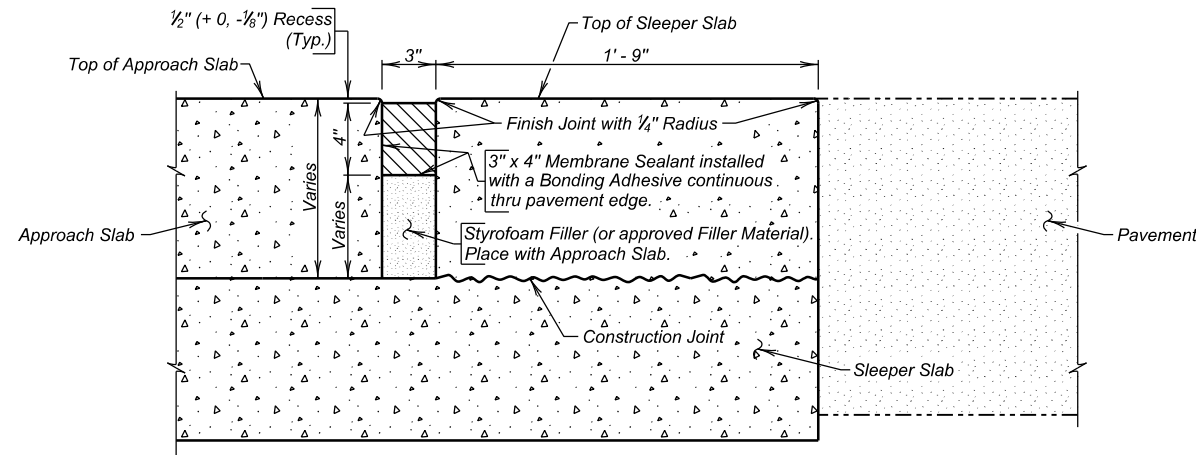
APPROACH SLAB DETAILS (C)
 FOR
245' - 5 1/4" CONT. COMP. GIRDER BRIDGE
 40'-0" ROADWAY
 OVER RAILROAD
 STR. NO. 58-101-321
 35° SKEW R.H.F.
 SEC. 14-T115N-R64W
 NH-P 0013(146)

SINK COUNTY
 S. D. DEPT. OF TRANSPORTATION
 MAY 2022

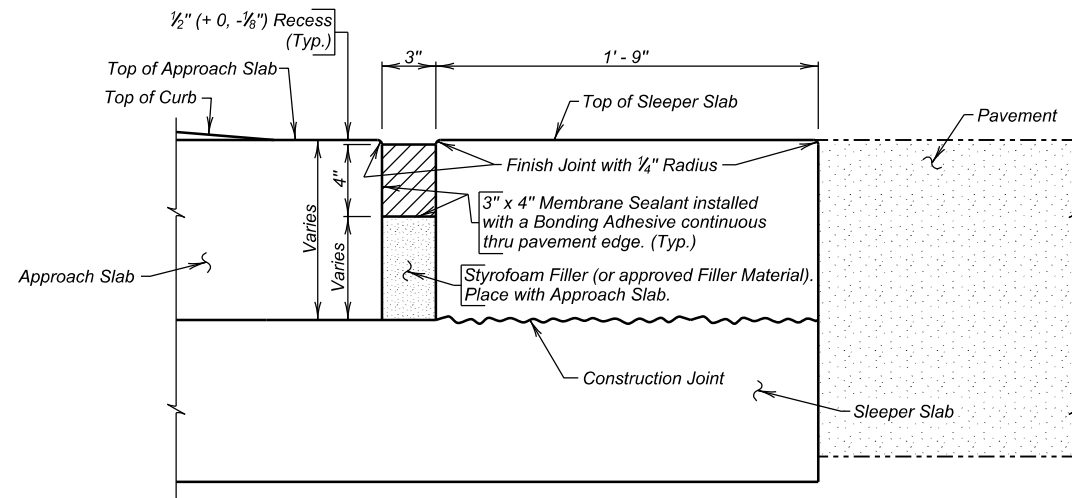
DESIGNED BY GAC/CCB	CK. DES. BY MAB	DRAFTED BY GAC	
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PLAN



SECTION B - B



VIEW A - A

ESTIMATED QUANTITIES (For Two Approach Slabs)			
ITEM	UNIT	QUANTITY	
		Phase I	Phase 2
Membrane Sealant Expansion Joint	Ft	41.9	41.9

GENERAL NOTES

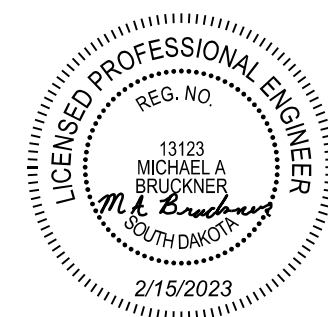
- The Membrane Sealant shall be on the approved product list for Membrane Sealant Expansion Joints.
- The manufacturer shall supply the membrane sealant in packaging that precompresses the membrane sealant. The precompressed dimension shall be as recommended by the sealant manufacturer, however, in no 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.
- The membrane sealant shall provide a water tight seal throughout a joint movement range of + 25% (minimum) from the specified joint opening dimension.
- 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.
- The bonding adhesive used to attach the membrane sealant to the adjacent concrete shall be approved by the membrane sealant manufacturer.
- Adhesive used to join adjacent pieces of the membrane sealant shall be as recommended by the manufacturer.
- If styrofoam filler material is used in the construction, it shall be closed cell and water-tight as approved by the Engineer.
- The minimum ambient air temperature at the time of joint installation and adhesive curing shall be 40° F.
- A technical representative of the membrane sealant manufacturer shall be present at the job site 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 manufacturer's recommendations.
- 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.
- 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.
- Individual spliced sections shall be installed as per the manufacturer's 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.
- Traffic shall not be allowed on the joint until the bonding adhesive has had time to cure, as recommended by the manufacturer.
- 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.
- 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.

APPROACH SLAB JOINT DETAILS
FOR

245' - 5 1/4" CONT. COMP. GIRDER BRIDGE

40'-0" ROADWAY
OVER RAILROAD
STR. NO. 58-101-321

35° SKEW R.H.F.
SEC. 14-T115N-R64W
NH-P 0013(146)

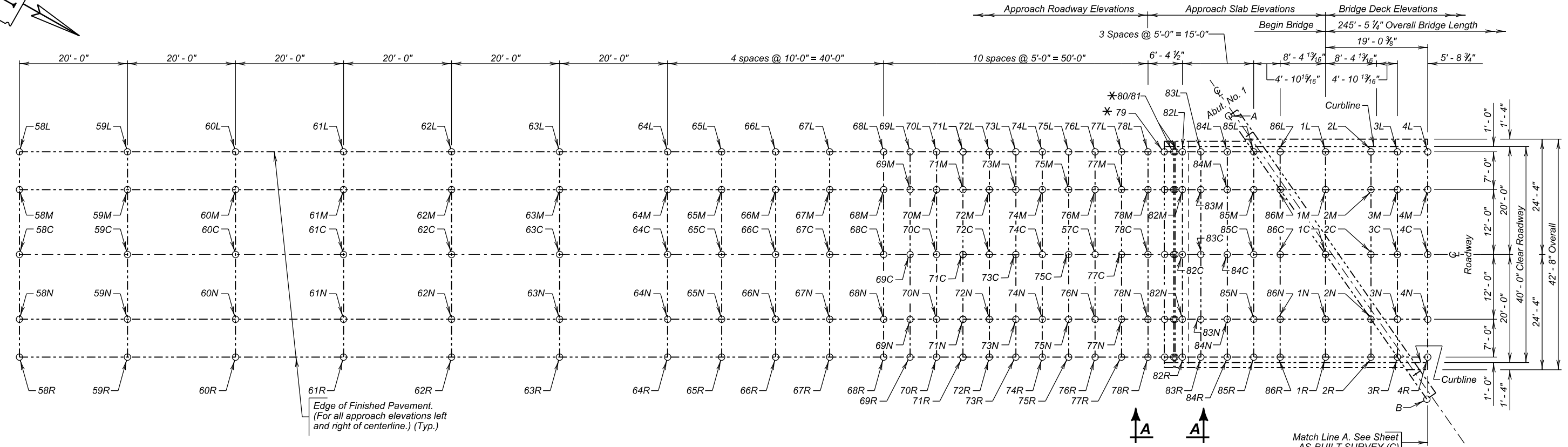
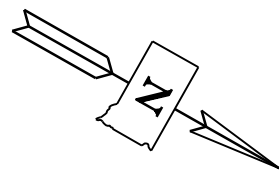


SINK COUNTY
S. D. DEPT. OF TRANSPORTATION

MAY 2022

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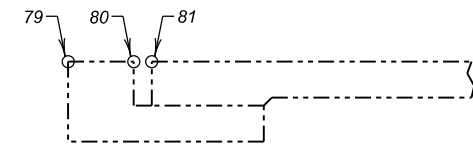
Revised 02/15/2023 MAB



PARTIAL PLAN

* Labels for all the points at the joints are not shown for clarity. These points follow the same labeling sequence as the adjacent points. Details for these points locations are also shown in VIEW A - A.

Bridge Ends	
Location	Elevation
A	
B	



VIEW A - A

NOTE:
The As-Built elevations shall be based on the National Geodetic Survey North American Vertical Datum of 1988 and shall be recorded at the locations shown by the table on this sheet. The completed table shall be given to the Engineer who will forward a copy to the Bridge Maintenance Engineer in the Office of Bridge Design and the Senior Region Bridge Engineer.

Benchmark Description:

B.M.
Location Description: X=2357320.976, Y=348022.839
Elevation: 1332.98



AS-BUILT SURVEY (A)
FOR
245' - 5 1/4" CONT. COMP. GIRDER BRIDGE
40'-0" ROADWAY
OVER RAILROAD
STR. NO. 58-101-321
35° SKEW R.H.F.
SEC. 14-T115N-R64W
NH-P 0013(146)

SPIK COUNTY
S. D. DEPT. OF TRANSPORTATION
MAY 2022

DESIGNED BY GAC/CCB	CK. DES. BY MAB	DRAFTED BY GAC	BRIDGE ENGINEER
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Table of Elevations - Approach Roadway									
Location	Elevation	Location	Elevation	Location	Elevation	Location	Elevation	Location	Elevation
58L		58M		58C		58N		58R	
59L		59M		59C		59N		59R	
60L		60M		60C		60N		60R	
61L		61M		61C		61N		61R	
62L		62M		62C		62N		62R	
63L		63M		63C		63N		63R	
64L		64M		64C		64N		64R	
65L		65M		65C		65N		65R	
66L		66M		66C		66N		66R	
67L		67M		67C		67N		67R	
68L		68M		68C		68N		68R	
69L		69M		69C		69N		69R	
70L		70M		70C		70N		70R	
71L		71M		71C		71N		71R	
72L		72M		72C		72N		72R	
73L		73M		73C		73N		73R	
74L		74M		74C		74N		74R	
75L		75M		75C		75N		75R	
76L		76M		76C		76N		76R	
77L		77M		77C		77N		77R	
78L		78M		78C		78N		78R	

Table of Elevations - Approach Slab Joints (See SEC. A - A) and Approach Slab									
Location	Elevation	Location	Elevation	Location	Elevation	Location	Elevation	Location	Elevation
79L		79M		79C		79N		79R	
80L		80M		80C		80N		80R	
81L		81M		81C		81N		81R	
82L		82M		82C		82N		82R	
83L		83M		83C		83N		83R	
84L		84M		84C		84N		84R	
		85M		85C		85N		85R	
				86C		86N		86R	
						1N		1R	
								2R	

Table of Elevations - Bridge Deck									
Location	Elevation	Location	Elevation	Location	Elevation	Location	Elevation	Location	Elevation
85L									
86L		86M							
1L		1M		1C					
2L		2M		2C		2N			
3L		3M		3C		3N		3R	
4L		4M		4C		4N		4R	

NOTE:
 The As-Built elevations shall be based on the National Geodetic Survey North American Vertical Datum of 1988 and shall be recorded at the locations shown by the table on this sheet. The completed table shall be given to the Engineer who will forward a copy to the Bridge Maintenance Engineer in the Office of Bridge Design and the Senior Region Bridge Engineer.

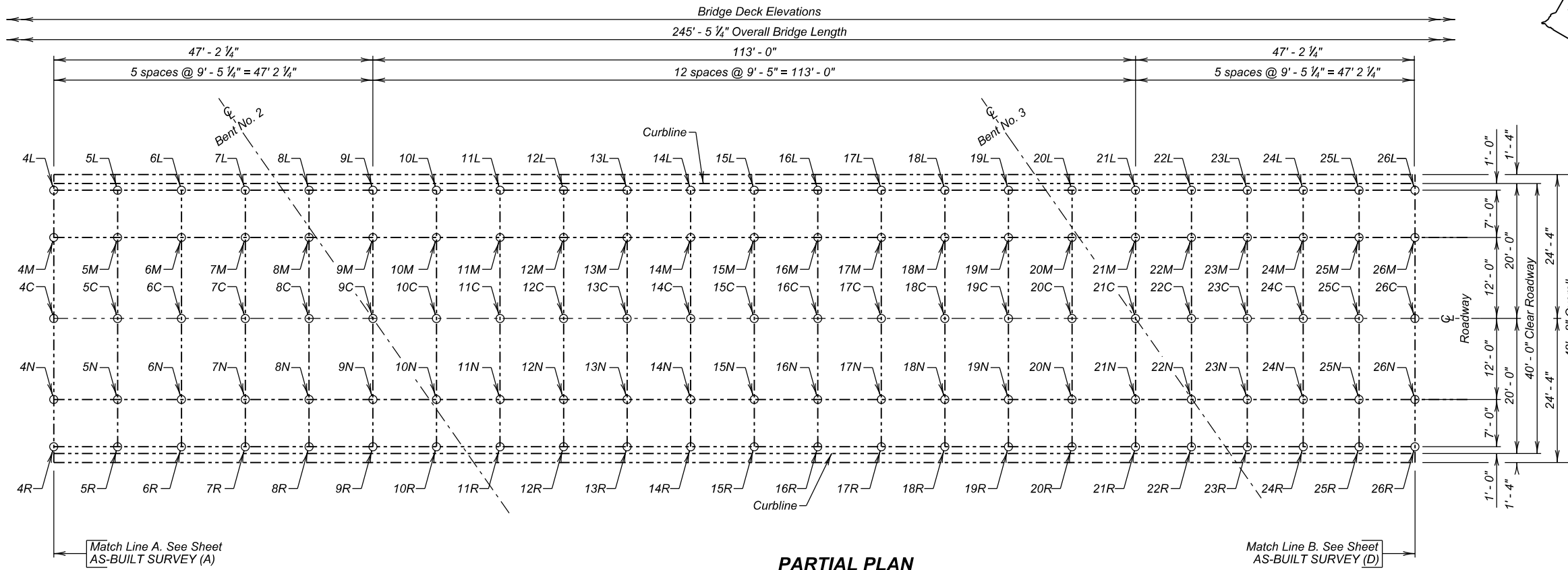
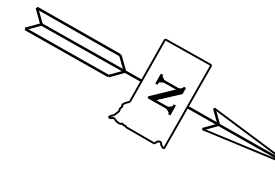


AS-BUILT SURVEY (B)
 FOR
245' - 5 1/4" CONT. COMP. GIRDER BRIDGE
 40'-0" ROADWAY 35° SKEW R.H.F.
 OVER RAILROAD SEC. 14-T115N-R64W
 STR. NO. 58-101-321 NH-P 0013(146)

SPINK COUNTY
 S. D. DEPT. OF TRANSPORTATION
 MAY 2022

DESIGNED BY GAC/CCB	CK. DES. BY MAB	DRAFTED BY GAC	BRIDGE ENGINEER
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Revised 02/15/2023 MAB

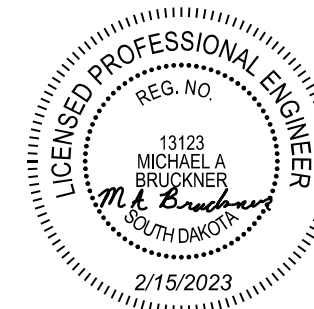


PARTIAL PLAN

Table of Elevations - Bridge Deck

Location	Elevation	Location	Elevation	Location	Elevation	Location	Elevation	Location	Elevation
4L		4M		4C		4N		4R	
5L		5M		5C		5N		5R	
6L		6M		6C		6N		6R	
7L		7M		7C		7N		7R	
8L		8M		8C		8N		8R	
9L		9M		9C		9N		9R	
10L		10M		10C		10N		10R	
11L		11M		11C		11N		11R	
12L		12M		12C		12N		12R	
13L		13M		13C		13N		13R	
14L		14M		14C		14N		14R	
15L		15M		15C		15N		15R	
16L		16M		16C		16N		16R	
17L		17M		17C		17N		17R	
18L		18M		18C		18N		18R	
19L		19M		19C		19N		19R	
20L		20M		20C		20N		20R	
21L		21M		21C		21N		21R	
22L		22M		22C		22N		22R	
23L		23M		23C		23N		23R	
24L		24M		24C		24N		24R	
25L		25M		25C		25N		25R	
26L		26M		26C		26N		26R	

NOTE:
The As-Built elevations shall be based on the National Geodetic Survey North American Vertical Datum of 1988 and shall be recorded at the locations shown by the table on this sheet. The completed table shall be given to the Engineer who will forward a copy to the Bridge Maintenance Engineer in the Office of Bridge Design and the Senior Region Bridge Engineer.



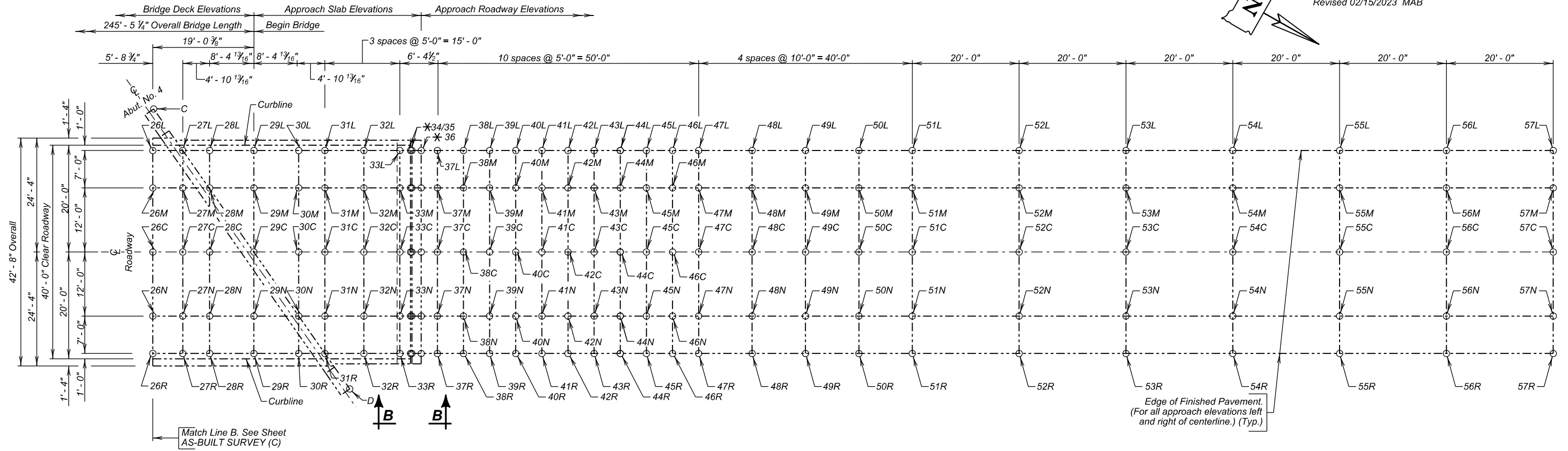
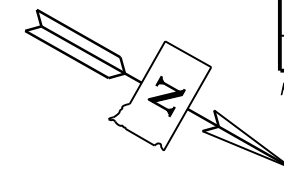
AS-BUILT SURVEY (C)
FOR
245' - 5 1/4" CONT. COMP. GIRDER BRIDGE
40'-0" ROADWAY
OVER RAILROAD
STR. NO. 58-101-321

35° SKEW R.H.F.
SEC. 14-T115N-R64W
NH-P 0013(146)

S. D. DEPT. OF TRANSPORTATION
MAY 2022

DESIGNED BY GAC/CCB	CK. DES. BY MAB	DRAFTED BY GAC	BRIDGE ENGINEER
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Revised 02/15/2023 MAB



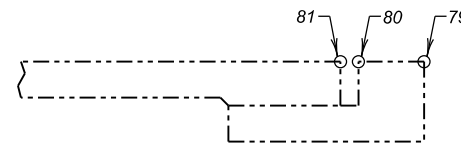
PARTIAL PLAN

* Labels for all the points at the joints are not shown for clarity. These points follow the same labeling sequence as the adjacent points. Details for these points locations are also shown in VIEW B - B.

Bridge Ends	
Location	Elevation
C	
D	

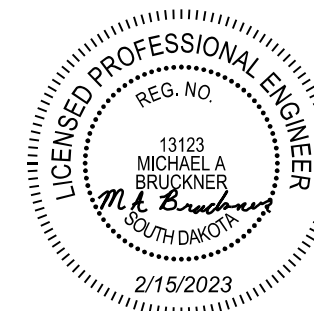
Benchmark Description:

B.M.
Location Description: X=2357320.976, Y=348022.839
Elevation: 1332.98



VIEW B - B

NOTE:
The As-Built elevations shall be based on the National Geodetic Survey North American Vertical Datum of 1988 and shall be recorded at the locations shown by the table on this sheet. The completed table shall be given to the Engineer who will forward a copy to the Bridge Maintenance Engineer in the Office of Bridge Design and the Senior Region Bridge Engineer.



AS-BUILT SURVEY (D)
FOR
245' - 5 1/4" CONT. COMP. GIRDER BRIDGE
40'-0" ROADWAY
OVER RAILROAD
STR. NO. 58-101-321
35° SKEW R.H.F.
SEC. 14-T115N-R64W
NH-P 0013(146)

SINK COUNTY
S. D. DEPT. OF TRANSPORTATION
MAY 2022

DESIGNED BY GAC/CCB	CK. DES. BY MAB	DRAFTED BY GAC	BRIDGE ENGINEER
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Table of Elevations - Bridge Deck									
Location	Elevation	Location	Elevation	Location	Elevation	Location	Elevation	Location	Elevation
26L		26M		26C		26N		26R	
27L		27M		27C		27N		27R	
		28M		28C		28N		28R	
				29C		29N		29R	
						30N		30R	
								31R	

Table of Elevations - Approach Roadway									
Location	Elevation	Location	Elevation	Location	Elevation	Location	Elevation	Location	Elevation
37L		37M		37C		37N		37R	
38L		38M		38C		38N		38R	
39L		39M		39C		39N		39R	
40L		40M		40C		40N		40R	
41L		41M		41C		41N		41R	
42L		42M		42C		42N		42R	
43L		43M		43C		43N		43R	
44L		44M		44C		44N		44R	
45L		45M		45C		45N		45R	
46L		46M		46C		46N		46R	
47L		47M		47C		47N		47R	
48L		48M		48C		48N		48R	
49L		49M		49C		49N		49R	
50L		50M		50C		50N		50R	
51L		51M		51C		51N		51R	
52L		52M		53C		52N		52R	
53L		53M		54C		53N		53R	
54L		54M		55C		54N		54R	
55L		55M		56C		55N		55R	
56L		56M		57C		56N		56R	
57L		57M		58C		57N		57R	

Table of Elevations - Approach Slab Joints (See SEC. B - B) and Approach Slab									
Location	Elevation	Location	Elevation	Location	Elevation	Location	Elevation	Location	Elevation
28L									
29L		29M							
30L		30M		30C					
31L		31M		31C		31N			
32L		32M		32C		32N		32R	
33L		33M		33C		33N		33R	
34L		34M		34C		34N		34R	
35L		35M		35C		35N		35R	
36L		36M		36C		36N		36R	

NOTE:
 The As-Built elevations shall be based on the National Geodetic Survey North American Vertical Datum of 1988 and shall be recorded at the locations shown by the table on this sheet. The completed table shall be given to the Engineer who will forward a copy to the Bridge Maintenance Engineer in the Office of Bridge Design and the Senior Region Bridge Engineer.



AS-BUILT SURVEY (E)
 FOR
245' - 5 1/4" CONT. COMP. GIRDER BRIDGE
 40'-0" ROADWAY 35° SKEW R.H.F.
 OVER RAILROAD SEC. 14-T115N-R64W
 STR. NO. 58-101-321 NH-P 0013(146)

SPINK COUNTY
 S. D. DEPT. OF TRANSPORTATION
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