### ESTIMATE OF STRUCTURE QUANTITIES

<table>
<thead>
<tr>
<th>DESCRIPTION</th>
<th>QUANTITY</th>
<th>UNIT</th>
<th>REMARKS</th>
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<tr>
<td>Bridge Elevation Survey</td>
<td>2417.2</td>
<td>Sqyd</td>
<td>See Special Provision</td>
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<td>Concrete Penetrating Sealer</td>
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<td>Incidental Work, Structure</td>
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<td>2″ Underdrain Pipe</td>
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<td>Waterproofing Membrane for Structure</td>
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<td>SqFt</td>
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### GENERAL CONSTRUCTION

1. All mild reinforcing steel shall conform to ASTM A615, Grade 60.
2. All exposed concrete corners and edges shall be chamfered 3/4″ unless noted otherwise.
3. Use 2" clear cover on all reinforcing steel except as shown.
4. Contractor shall imprint on the structure the date of new construction as specified and detailed on Standard Plate No. 460.02.
5. Barrier Curbs shall be built normal to the grade.
6. Request for construction joints or reseal joints 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 rootball.
7. The elevation of the bridge deck is 13.0″ above subgrade elevation.

### INCIDENTAL WORK, STRUCTURE

1. In place centerline Sta. 123+35.50 to centerline Sta. 127+42.50 is a 427.5′ span l-Beam Viaduct bridge with a 30′-0″ clear roadway.
2. The superstructure consists of a Steel I-Beams supporting a reinforced concrete slab with steel channel railing faced with steel Three beam continuous across the bridge. The deck has been overlaid with a 0.37 inches of rubberized asphalt chip seal. The substructure consists of six 2 column reinforced concrete bents with web walls and reinforced concrete sill type abutments on 6 concrete columns, all of which are supported on spread footings on rock.
3. Break down and remove the existing bridge, and approach/sleeper slabs if applicable, to the top of rock elevation, or as required to construct the new structure in accordance with Section 11b of the Specifications. All portions of the existing bridge shall be removed and disposed of by the Contractor on a site obtained by the Contractor and approved by the Engineer in accordance with the Environmental Commitments found in Section A.
4. During demolition of the structure, efforts shall be taken to prevent material from falling into the river. Under no circumstances is asphalt allowed to fall into the river.
5. The foregoing is a general description of the in-place bridge and should not be construed to be complete in all details. Before preparing the bid it shall be the responsibility of the Contractor to make a visual inspection of the structure to verify the extent of the work and materials involved. If desired by the original construction plans may be obtained from Bridge Design.

### NOTICE - LEAD BASED PAINT

Be advised that the paint on the steel surfaces of the existing structure contains lead. The Contractor should plan his/her operations accordingly, and inform his/her employees of the hazards of lead exposure.

### DESIGN MIX OF CONCRETE

1. All structural concrete shall be Class A45 unless otherwise indicated.
2. Type II cement is required, except Type III may be used for the prestressed beams.
3. Grout design mix shall be as specified in Section 460.2 K of the Specifications. A compressive strength of 2000 psi shall be attained by the grout prior to erection of any beams. Chamfer edges of grout pads 1/4″. The quantity of grout is included in and shall be paid for at the contract unit price per cubic yard for Class A45 Concrete, Bridge.

### ABUTMENTS

1. The bridge ends shall not be backfilled beyond the expansion joint until the deck concrete has attained a strength of 1200 psi when controlled by test, or 36 to 48 hours, and determined by the Engineer when controlled by time.
2. Backfill placed around the abutment backwalls shall be placed adjacent to both sides (front and back face) to approximately the same elevation at the same time to the berm elevation. Both abutments shall be backfilled simultaneously.
3. Abutments shall not be cast until slab form elevations have been completed and approved by the Bridge Construction Engineer.

### ABUTMENT BACKWALL COATING

The material for waterproofing the abutment backwall shall be one of the products from the approved products list. The acceptable abutment backwall coating suppliers are listed on the approved products list at the following Internet address:

http://apps.sd.gov/applications/HC66ApprovedProducts/ProductList.aspx

The cost of furnishing and applying the coating shall be incidental to the contract unit price per cubic yard for Class A45 Concrete, Bridge.

### SPECIFICATIONS FOR BRIDGE


### BRIDGE DESIGN LOADING

1. AASHTO HL-93.
2. Dead Load includes 22 psf for future wearing surface on the roadway.

### DESIGN MATERIAL STRENGTH

| Concrete | c = 4,500 psi |
| Reinf. Steel | y = 60,000 psi |

*For prestressed beams, see notes regarding Prestressed Girder.
WATERPROOFING MEMBRANE

1. A 24" wide waterproofing membrane shall be used to seal the abutment backwall at the locations shown in the plans.

2. The waterproofing membrane shall consist of two layers of rubberized mastic, a backing layer of woven polyethylene and an outside layer of impervious polyethylene similar to Mac Mac Seal Wrap or an approved equal. Mac Mac Seal Wrap is manufactured by the following company:

   Mar Mac Construction Products Co., Inc.
   PO Box 447 McBeek SC 29101
   Lee Murph Customer Service
   Phone: (877) 962-7622
   Company Phone: (843) 335-5814
   Fax: (843) 335-5909
   Website: www.marmac.com

3. The materials for the waterproofing membrane shall meet the following properties:

   a. Rubberized Mastic:
      - Minimum
      - Maximum
      - Ash-inert matter, %
        - 80
        - 15
      - Volatiles, %
        - 0.1
        - 2
      - Softening Temp., min, F
        - 175
      - Specific gravity
        - 0.95
        - 1.05
      - Penetration, dmm
        - 60
        - 90
      - Flow, mm
        - 10
        - 10

   b. Reinforcing Mesh Element:
      - Tensile strength min, b. in.
        - D1682
      - Warp 75
      - Fill 75
      - Elongation at break, min, %
        - Warp 20
        - Fill 20

   c. Polyethylene Backing:
      - Tensile strength, min, psi
        - 4000
      - Elongation at break, min %
        - 100
      - Tear resistance, min psi
        - 1500
      - Water absorption, max, %
        - 0.01
        - 0.01

4. Field measurement for Waterproofing Membrane for Structure will not be made. The plan quantity will be the quantity accepted for payment.

5. Waterproofing Membrane for Structure shall be paid for at the contract unit price per square foot. Payment shall be full compensation for labor, equipment, materials and incidentals for furnishing and installing the waterproofing membrane.

SPREAD FOOTING ON ROCK AT ABUTMENTS AND PIERS

1. The rock surface shall be cleared of all soil and debris prior to placing rock dowels and reinforcing steel for the spread footing. Cleaning shall be accomplished by water washing and/or air jetting. Material washed from the rock surface shall be directed into a sump or low area and physically removed from the exposed rock surface. The Geotechnical Engineer shall be contacted, once the rock has been cleaned, so that the rock may be inspected for condition and soundness.

2. If upon inspection, the Geotechnical Engineer determines that the material at the plan shown footing elevation is unsuitable for foundation support or if sound bedrock is encountered at an elevation other than the plan shown footing elevation, the Engineer shall order the footing elevation changed to an elevation approved by the Geotechnical Engineer. If the footing elevations are changed, the Office of Bridge Design shall be contacted prior to proceeding with construction to determine if a redesign of the substructure unit is required. If a redesign is required, a maximum of 5 working days may be required to perform this design. Any costs associated with delays within the 5 working day period for redesign shall be borne by the contractor at no additional cost to the State.

3. If the footing elevations are lowered due to bedrock conditions, the excavation below the plan shown footing elevation ordered by the Engineer will be paid for at the contract unit price per cubic yard for Structure Excavation, Bridge. The additional concrete and reinforcing steel required for construction will be paid for at the contract unit price per cubic yard for Class A45 Concrete, Bridge and contract unit price per pound for Reinforcing Steel, respectively.

4. The cost of cleaning the rock shall be included in the contract unit price per cubic yard for Structure Excavation, Bridge. Payment shall be considered full compensation for all materials, labor equipment and incidentals necessary to satisfactorily complete the work.

5. Due to the possibility of variance in the final elevations for the footings, the reinforcing steel in the abutments and piers shall not be ordered until final footing elevations have been approved by the Geotechnical Engineer.

COFFERDAMS

1. It is anticipated that cofferdams will be necessary at pier locations. Cofferdams shall be designed and constructed in accordance with Section 423 of the Specifications. Due to the irregular surface of the bedrock, additional effort will be required to seal the cofferdam.

2. The design of the Cofferdam must be done by Professional Engineers registered in South Dakota. Sealed calculations of both the original design and design check, performed by different engineers, shall be submitted with the cofferdam plans. The cofferdam plans, design, and check design shall be submitted to the Office of Bridge Design a minimum of 15 days prior to Cofferdam construction.

ROCK DOWELS

1. The steel dowels shall be deformed bars conforming to ASTM A615 Grade 60.

2. Following the engineering evaluation of the foundation rock, the Engineer may order the number of dowels and/or spacing to be increased or decreased in accordance with the Geotechnical Engineer's recommendations. Increases or decreases in quantity shall be at the contract unit price per foot for Install Dowel in Rock.

3. The steel dowel for use with the item Install Dowel in Rock is included in the Reinforcing Schedule and shall be paid for at the contract unit price per pound for Reinforcing Steel.

4. Dowel bond material shall be a fast set polyester resin rock anchoring system in a 40 mm (minimum) capsule from one of the following manufacturers: Dynadig Systems International (Fastloc), Minova (Locset), Williams Form Engineering Corp. The resin shall be suitable for bonding steel dowel bars to rock in the existing moisture conditions. The diameter of the hole, drilled into the rock, shall be a maximum of 3/8 inch larger than the diameter of the steel dowel, or as specified by the dowel bond material manufacturer. The drilled holes shall be blown out with compressed air using a device that will reach the bottom of the hole to ensure that all debris or loose material has been removed prior to epoxy injection. The Contractor shall submit dowel bonding material product data and installation plan to the Engineer for approval.

5. Install Dowel in Rock shall not be measured unless a change is ordered. Payment shall be for the linear foot of embedment into the rock, and shall be considered full compensation for all materials, labor, equipment and incidentals necessary to satisfactorily complete the work.

REQUIRED LIST

1. Title Block
2. Notes
3. Project Block

NOTES (CONTINUED) FOR 430 - 10 % PRESTR. GIRDER BRIDGE

STR. NO. 50-206-020 APRIL, 2016

DESIGNED BY CK DES BY CK CRAFTED BY CK
2" RIGID GALVANIZED STEEL CONDUIT

1. Anchor rods and bolting pattern for luminaire REL2 and REL3 to be mounted on Pier 2 and Pier 4 of the bridge shall be obtained and supplied by the Contractor to the Bridge Contractor as indicated in Section L of the plans. Payment for installing the anchor rods shall be incidental to the contract unit price per cubic yard for Class A45 Concrete, Bridge Deck.

2. The 2" rigid galvanized steel conduit for Luminaires REL2 and REL3 shall be placed under the Bridge Deck and over the Pier by the Bridge Contractor as shown in the plans.

SUPERSTRUCTURE

1. Girder lifting hooks shall be cut off before placement of concrete deck slab.

2. The diaphragms at the piers shall be poured integrally with the deck slab. Placement of diaphragms at the piers shall not slow down the rate of deck concrete placement and finishing. The Contractor shall place the concrete for the specified diaphragms ahead of the deck concrete in such a manner that advancement of the deck concrete reaches the diaphragm just as placement of concrete in the diaphragm is complete.

3. The deck-finishing machine shall be adjusted and operated in such a manner that the roller screed or screeds are parallel with the centerline of the bridge and the finish machine is parallel to the skew of the bridge. Concrete placement in front of the finish machine shall be kept parallel to the machine.

4. The bridge deck must be placed and finished continuously at a minimum rate of 55 ft. of deck per hour measured along Centerline Roadway. This rate is exclusive of concrete placed in the diaphragms. (See note 2 above.) If concrete cannot be placed and finished at this rate, the Engineer shall order a header installed and operations stopped. Notify the Bridge Construction Engineer if deck pour operations are stopped. Operations may resume only when the Engineer is satisfied that a rate of 55 ft. of deck per hour can be achieved and the concrete in the previously poured has attained a minimum compressive strength of 2000 psi.

5. Snap ties, if used in the barrier curb formwork, shall be epoxy coated. The epoxy coating shall be inert in concrete and compatible with the coating applied to the new epoxy coated reinforcing steel.

6. See Special Provision for Concres Penetrating Sealer

7. The ¼ diameter concrete inserts for conduit clamps shall be commercially available inserts threaded for use with a galvanized ¼" diameter A307 bolt. The inserts shall be capable of developing the strength of A307 bolt and shall be galvanized or stainless steel. The cost of furnishing and installing the inserts and the 2" diameter galvanized conduit in the barrier curb shall be incidental to the contract unit price per cubic yard for Class A45 Concrete, Bridge Deck.

PRES'RESSED GIRDERS

3. Minimum concrete compressive strength Fc = 8500 psi at 28 days for all girders, Fc ≥ 7000 psi for all Girders.

4. All mild reinforcing steel shall be deformed bars conforming to ASTM A416, Grade 60.

5. Individual tendons in all pretensioned sections shall consist of seven wire uncoated Type 270K Strands having a nominal diameter of 0.6" and a minimum ultimate strength of 58600 lbs. per cable. An initial tensile force of 43500 lbs. shall be applied to all 0.6" cables in all girders. All prestressing steel shall conform to AASHTO M203. (low lax strands)

6. All prestressed girders within a span shall be cast within an 8 day period. If not, the newest girder shall be at least 6 weeks old before the deck slab is poured. The girders shall be poured in all steel forms.

7. Prestressed concrete girders shall always be lifted by the devices provided in the top flanges near the ends of the girders. Types of lifting devices other than those shown on the plans may be used provided they are approved by the Office of Bridge Design. The design of the lifting devices shall be the responsibility of the Fabricator.

8. Each beam shall be marked showing structure number, casting date, and beam number. Marking shall be on the face of the beam near the end and so located that they will be exposed after the diaphragms have been cast. Facia beams shall be marked on an inscribed face. All beam designations of types and locations, see Erection Data and Slab Form Elevations (A) sheet.

9. The physical properties of the elastomeric bearing pads shall conform to the requirements of Section 18.2 of the AASHTO LRFD Bridge Construction Specification and the AASHTO Materials Specification M251. The elastomeric bearing pads shall conform to Grade 60 (durometer). The cost of the pads shall be incidental to the contract unit price per cubic yard for Class A45 Concrete, Bridge. Certification that pads are 60 durometer and meet the requirements of AASHTO LRFD Bridge Construction Specification Section 18.2 and AASHTO Materials Specification M251 shall be furnished to the Engineer with the shop drawings. No laminated bearing pads will be allowed.

10. All exposed corners shall be chamfered 3/4" or rounded to 3/4" radius.

11. Dead Load of girder taken as effective at transfer. Cut strands, except those extended and bent, flush with end of girder at a coat end of strands with mortar.

12. The Contractor shall be responsible for ensuring that transportation stresses, handling and erection do not cause damage to the girders.

13. Furnish and Install Inserts for T8 Rebars as shown in the plans. All costs involved shall be incidental to the contract unit price per foot of girder.

DECK DRAINS

1. Deck Drains shall be 4" diameter x 5'-8" Fiberglass Pipe conforming to the requirements of ASTM - D2996.

2. The Fiberglass Pipe Sleeve can be made from a 4 inch diameter Fiberglass Pipe Fitting. It shall be attached to the 4 inch diameter Fiberglass Pipe, as shown in the plans, per the manufacturer’s recommendation.

3. All fiberglass pipe and pipe fittings shall be handled and installed according to the guidelines and procedures recommended by the manufacturer. Pipe, pipe fittings, and adhesive must be from the same manufacturer.

4. Use fiberglass wear pads to protect against contact with supports or U-bolts.

5. The 1/2 inch Diameter U-bolts, nuts and washers shall conform to ASTM A307 Grade 36 and shall be galvanized in accordance with ASTM F2329.

6. The deck drain to girder connection as shown in the plans allows the deck drain location to be adjusted slightly to clear transverse slab steel.

7. All fiberglass pipes and pipe fittings shall be used pigmented resin throughout the wall. The color shall be an approved gray (Federal Standard 595B Color 26622).

8. Steel for the bent plates and washers shall conform to ASTM A709 Grade 36 and shall be galvanized in accordance with ASTM A123. Washers shall be plate washers or a continuous bar at least 5/16" thick with standard holes and shall have a size sufficient to completely cover the slot after installation.

9. The ½ inch diameter bolts and nuts shall conform to ASTM A307 and shall be galvanized in accordance with ASTM F2329 or ASTM A153 as applicable.

10. The ½ inch diameter concrete inserts shall be capable of developing the strength of the A307 bolts and shall be galvanized.

11. Maintain 2" clear cover between the back of the concrete inserts and the adjacent girder web.

12. Payment for deck drains shall be at the contract unit price per each for Deck Drain, Girder Bridge, and shall be full compensation for furnishing, fabricating, and installing the deck drains and all attaching hardware in accordance with the plans and specifications.

NOTES (CONTINUED)

FOR

430 - 10 ½" PRESTR. GIRDER BRIDGE

STR. NO. 50-206-020

APRIL 2016

DESIGNED BY

RX DESIGNED BY

CRCRAFTED BY

CX CRAFTED BY
BOLT TESTING
The certified mill test reports for all bolts used on the project shall include the test results for all of the testing specified in Section 922.2 D of the Specifications. Some of these tests are supplemental tests that must be requested at the time the bolts are ordered. It is the responsibility of the Contractor to notify the bolt supplier of these requirements.

FALSEWORK
The Contractor shall be required to include with the Falsework Plans, details for the construction of an adequate “Walk-Way” including railing.

FALL PROTECTION
1. The Contractor shall install a Fall Protection System conforming to OSHA Regulations. When working on the girders prior to decking installation, a Horizontal Lifeline – or other OSHA approved system shall be installed. The Contractor shall have one Personal Fall Arrest System (PFAS) available for use by a Department Inspector. The PFAS shall be compatible with the installed Fall Protection System.
2. Modifications to any bridge components used to accommodate the Fall Protection System shall be shown on the Falsework Plans and/or the appropriate Shop Plans. Field welding to bridge components will not be allowed. Field placed concrete inserts or drilled-in anchor bolts will be allowed if approved by the Engineer. All costs associated with providing the Fall Protection System shall be incidental to the other contract items.

CLASS B COMMERCIAL TEXTURE FINISH
1. A Class B commercial texture finish shall be applied to the following areas:
   a. *Abutments:* all exposed surfaces to an elevation 1-foot below finished ground line.
   b. Barrier Rail: all exposed surfaces (**front, *top and *back**).
   c. *Slab:* edge of slab.
   d. *Girder:* Outside face of fascia girders.
   e. *Piers:* All exposed surfaces.
   * Color shall be tan
   ** Color shall be Pearl White

2. The Class B commercial texture finish shall be applied in accordance with Section 460.3 L.1.c of the Specifications.
3. Where the Class B commercial texture finish is to be applied, concrete curing shall be accomplished with cotton or burlap mats and polyethylene sheeting. Curing shall continue for not less than seven days after placing concrete before the commercial texture finish is applied. The commercial texture finish shall be applied in accordance with the manufacturer’s recommendations. The commercial texture finish itself does not require a specific cure except for drying.
4. The cost of the Class B Commercial Texture Finish applied to the fascia girders shall be incidental to the contract unit price per cubic yard for Class A45 Concrete, Bridge Deck.

STEEL RAILING - SIDEWALK
1. All rail and chain link fence posts shall be built vertical.
2. All structural steel parts for railing shall conform to ASTM A500, Grade B. Material less than ¼” thick may be ASTM A1011 Grade 36. Rail post base plates shall conform to ASTM A709, Grade 36.
3. All anchor bolts and nuts for railing shall conform to ASTM A307. Washers shall conform to ASTM F436 and all components shall be galvanized in accordance with ASTM A153 or ASTM F2329, as applicable. The bolts shall be hex head "structural" type with heavy hex nuts and round washers.
4. All anchor bolts shall be tightened to a torque of 120 ft-lbs. (approximated without the use of a calibrated torque wrench).
5. The non-shrink grout used to fill the recess beneath the rail post base plates shall be a commercially available non-shrink grout containing no metallic particles and capable of attaining a 28 day compressive strength of 3000 psi. The non-shrink grout shall be mixed according to the manufacturer’s recommendations. The cost of furnishing and placing the non-shrink grout shall be incidental to the contract unit price per foot for Steel Pedestrian Railing on Sidewalk.
6. All steel railing shall be painted in accordance with Section 411 of the Specifications and the color shall be an approved brown (Federal Standard 595B Color 30045).
7. Welding & Weld Inspection shall be done in accordance with the current edition of AWS D1.1 Structural Welding Code-Steel.
8. The costs of structural steel, welding, weld inspection, painting and galvanizing shall be incidental to the contract unit price per foot for Steel Pedestrian Railing on Sidewalk.

CHAIN LINK FENCE
1. The chain link fence fabric and supports shall conform to Section 930 of the Specifications as modified by the following notes.
2. The chain link fence fabric, wire ties and miscellaneous hardware shall be galvanized and conform to AASHTO M181. The fence fabric shall be Type IV gauge wire woven in a 2 1/2 inch diamond mesh. Knurled selvage shall be used on the top and bottom of the fence fabric.
3. A brown (Federal Standard 595B Color 30045) thermally extruded polyvinyl coating shall be applied to the fence fabric, wire ties and all miscellaneous hardware.
4. The item Chain Link Fence for Bridge Sidewalk shall be paid for by the linear foot. This payment shall be full compensation for furnishing all material, labor, tools and equipment necessary or incidental to the construction of the chain link fence including chain link fence fabric, wire ties, miscellaneous hardware, painting and welding, all to satisfactorily complete this work.

Steel Pedestrian Railing on Sidewalk and Steel Pedestrian Railing on Concrete Barrier.
APPROACH SLABS

1. Sleeper slab riser shall be cast with the approach slab or cast after the approach slab is placed. Care shall be taken to ensure the correct grade is maintained across the joint.

2. 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 shall 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 shall submit proposed alternate details for approval.

3. The use of an approved finishing machine will be required during placement of Class A4S Concrete for the approach slabs. Concrete placement in front of the machine shall be kept parallel to the screed.

4. The concrete in the approach slab shall be tined normal or parallel to centerline roadway.

5. Concrete Approach Sleeper Slab for Bridge, whether cast-in-place or precast, will be paid for at the contract unit price per square yard. This payment shall be full compensation for all excavation, furnishing, hauling, and placing all materials including concrete and reinforcing steel; for disposal of all excavated material and surplus materials; and for labor, tools, equipment and any incidentalities necessary to complete this item of work.

6. Concrete Approach Slab for Bridge will be paid for at the contract unit price per square yard. This payment shall be full compensation for all excavation, furnishing, hauling, and placing all materials including concrete, asphalt paint or 4 mil polyethylene sheeting, elastic joint seal and reinforcing steel; for disposal of all excavated material and surplus materials and for labor, tools, equipment and any incidentalities necessary to complete this item of work.

AS - BUILT ELEVATION SURVEY

The Contractor shall be responsible for recording the as-built deck elevations and bridge survey marker elevations at the locations shown in the Table of As-Built Elevations shown in the plans. All costs associated with obtaining the elevations including all equipment, labor and any incidentalities required shall be incident to the contract lump sum price for Bridge Elevation Survey.

SIDEWALK APPROACH SLABS

1. The reinforced concrete sidewalks adjacent to the bridge shall be paid for at the contract unit price per square foot for 6" Reinforced Concrete Sidewalk. This payment will be full compensation for all excavation, furnishing, hauling and placing all materials including concrete, epoxy coated reinforcing steel, asphalt paint or 4 mil polyethylene sheeting, hot poured asphalt joint sealer; for disposal of all excavated and surplus materials; and for labor, tools, equipment and incidentalities necessary to complete this item of work.

REINFORCED GRANULAR EMBANKMENT

1. The geogrid will be a biaxial grid of single layer construction. Varibolt welded, integrally formed, or woven and coated geogrids will be acceptable. Grids with laser welded grid junctions will not be allowed. The geogrid will be certified by the supplier to meet the following specification prior to installation:

   - Geogrid will be paid for at the contract unit price per square yard for Geogrid Reinforcement. Payment quantities will be based on area covered plus 15%. Overlaps are accounted for by the additional 15%. Payment will be full compensation for furnishing and installing the geogrid only.

   - Granular Material will conform to the specification for Base Course in Section 882 of the Specifications. Granular Material will be paid for at the contract unit price per ton for Base Course. Payment will be full compensation for furnishing and placing this material.

   - The geogrid shall be placed on a level surface and overlapped a minimum of 2 feet.

   - The geogrid will be placed as taut as possible with minimal wrinkles. Placement will be done so that subsequent granular cover material does not choke, wrinkle or distort the in place geogrid. The overlaps will be shingled in a manner that assures granular material will not be forced under the geogrid during backfilling operations. The geogrid may be held in place with small piles of granular material or staples.

   - Base course will be dumped at least 20 feet behind the leading edge of the backfill and pushed into place with a loader or dozer from the covered areas to the uncover areas. No traffic will be allowed on the uncovered geogrid.

   - The base course and adjacent soil embankment shall be built simultaneously in horizontal layers. Base course shall be placed in 6 inch maximum lifts and compacted to 97 percent of maximum standard proctor dry density using a smooth face vibratory roller or vibratory plate compactor. Each layer of granular material shall be thoroughly watered prior to and during compaction.

   - Density tests within the berm limits shall consist of tests conducted both in the soil embankment and the base course according to the modified zone requirements below:

   - Zone Depth (ft.) Min. required tests
     1 0-1 1
     2 1-3 1
     3 3-5 1
     4 5 to Bottom 1 per 3 vertical feet

9. The zone requirement will be in force at both bridge berms.
Sioux Quartzite is pink to red, hard silica cemented sandstone. It is jointed, tectonic, and cross-bedded with thin red to purple pipestone shales and coarse conglomerate. Layers of poorly cemented sands may also be present. The surface of the quartzite is not flat. It may vary several feet vertically in a short horizontal distance.

The Geotechnical Engineering Activity has on file all of the boring logs for this project. These logs and additional results of laboratory test, if any, are available for review at the Central Office in Pierre.

All auger holes are drilled with a 4\(\frac{1}{2}\) inch diameter or 2\(\frac{1}{2}\) inch diameter continuous flight auger.

Boreholes from Station 124+40 to Station 126+80 were conducted through ice. The water table elevation at the time of investigation was approximately 1473.7. Borings conducted outside of this station range were dry at the time of investigation.

Sioux Quartzite is pink to red, hard silica cemented sandstone. It is jointed, tectonic, and cross-bedded with thin red to purple pipestone shales and coarse conglomerate. Layers of poorly cemented sands may also be present. The surface of the quartzite is not flat. It may vary several feet vertically in a short horizontal distance.

The Geotechnical Engineering Activity has on file all of the boring logs for this project. These logs and additional results of laboratory test, if any, are available for review at the Central Office in Pierre.

All auger holes are drilled with a 4\(\frac{1}{2}\) inch diameter or 2\(\frac{1}{2}\) inch diameter continuous flight auger.

Boreholes from Station 124+40 to Station 126+80 were conducted through ice. The water table elevation at the time of investigation was approximately 1473.7. Borings conducted outside of this station range were dry at the time of investigation.
REQUIRED LIST

1. Title Block  
2. Description Block  
3. North Arrow 
4. Plan View (Piling Layout)

FOOTING AND ROCK DOWEL LAYOUT

PLAN

DRILL LOCATION, FOOTING, AND ROCK DOWEL LAYOUT FOR 430'-10" PRESTR. GIRDER BRIDGE
42'-0" ROADWAY & 8'-0" SIDEWALK  39° LH SKEW
OVER BIG SIOUX RIVER  SEC. 9-T10N-R49W
STA. 123 + 18.74 TO 127 + 49.63  P 0115810104
STR. NO. 50-206-020  HL-93

MINnehaha COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016
Elevation views are cross sections along centerline of the proposed substructures.

Boreholes depicted in elevation views for Pier No. 3 and Pier No. 4 were conducted through ice. The water table elevation at the time of investigation was approximately 1473.7. Borings conducted for Abut. No. 1, Pier No. 2, and Abut. No. 5 were dry at the time of investigation.

Elevation views are cross sections along centerline of the proposed substructures.

Elevations as Required

Notes as Required

SUBSURFACE INVESTIGATION CROSS SECTIONS

430° - 10½° PRESTR. GIRDER BRIDGE
42° - 0° ROADWAY & 8’ - 0" SIDEWALK
39° LHF SKEW
OVER BIG SIOUX RIVER
SEC 9 T104N R69W
STA. 123 + 18.74 TO 127 + 49.63
P 0115(S)104
STR. NO. 50-206-020
HL-63

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016
REQUIRED LIST

1. Title Block
2. Project Block
3. Plan View as Required
ELEVATION - BACK FACE

ELEVATION - FRONT FACE

DETAIL "Z"

DETAIL "W"

ABUTMENT BACKWALL COATING AND WATERPROOFING MEMBRANE DETAILS

Waterproofing Membrane

ABUTMENT NO. 1 DETAILS (C)
FOR
430'-10" PRESTR. GIRDER BRIDGE
42'-0" ROADWAY & 8'-0" SIDEWALK
39° LHF SKEW
OVER BIG SIOUX RIVER
SEC. 9-T-104N-R45W
STA. 123 + 18.74 TO 127 + 49.63
P 0115(51)104
MINNEAPOLIS COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL, 2016

STATE OF
S. D. DEPT. OF TRANSPORTATION
PROJECT FOR

2016 WATERPROOFING MEMBRANE DETAILS

REINFORCING SCHEDULE

Required List

1 Title Block
2 Project Block
3 Reinforcing Schedule
4 Abutment Backwall Coating
5 Estimated Quantities
6 Details as Required
7 Sections as Required
8 Abutment Backwall Coating
9 Elevations Views as Req'd

ESTIMATED QUANTITIES

ITEM

Class A11 Concrete, Bridge
Reinforcing Steel
U bars
Randy Center Reinforcing Steel, Bridge
Stiffener, Reinforcement, Bridge
Concrete in Place
Waterproofing Membrane

CREASES

TOTAL

<table>
<thead>
<tr>
<th>ITEM</th>
<th>UNIT</th>
<th>LENGTH</th>
<th>TYPE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

NOTE:
Concrete shall be placed in the space under the beams (within the backwall walls) during the pour. Care shall be taken to get the concrete saturated into this area. Upon form removal from the sides, the contractor shall prime the remaining areas.

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ABUTMENT NO. 5 DETAILS (A)
FOR
430° - 10 1/2° PRESTR. GIRDER BRIDGE
42° - 0" ROADWAY & 8" SIDEWALK  39° LHF SKEW
OVER BIG SIOUX RIVER  SEC. 9-T104N-R49W
STA. 123 + 18.74 TO 127 + 49.63  P 0115(51)104
STR. NO. 50-206-020

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

REQUIRED LIST
1. Title Block
2. Project Block
3. Plan View as Required
4. Sections as Required
### TABLE OF ELEVATIONS

<table>
<thead>
<tr>
<th>Elev. 'G1'</th>
<th>Elev. 'G2'</th>
<th>Elev. 'G3'</th>
<th>Elev. 'G4'</th>
<th>Elev. 'G5'</th>
<th>Elev. 'G6'</th>
<th>Elev. 'G7'</th>
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</thead>
<tbody>
<tr>
<td>1464.00</td>
<td>1487.77</td>
<td>1487.90</td>
<td>1488.06</td>
<td>1488.23</td>
<td>1488.23</td>
<td>1488.37</td>
</tr>
</tbody>
</table>

**NOTE:**
- Top of Grout Pad shall be level and smooth.
- Elevations are Top of Grout Pad at centerline of pier.

- The portion of the N1 bar above the pier cap is to be coated with asphalt paint or wrapped with tar paper to a minimum thickness of 1". The portion of the N1 bar above the pier cap is to be coated L1.
- N1 bar may be shifted slightly off Pier to avoid top mat of resteel.
- 1" spaces @ 8" = 7'-4"
- 12 spaces @ 18" = 18'-0"

### ELEVATION

#### REQUIRED LIST
1. Title Block
2. Project Block
3. Sections as Required
4. Elevation View as Required
5. Table of Elevations

### PROJECT
- STR. NO. 50-206-020
- HL-93
- S. D. DEPT. OF TRANSPORTATION
- PIER NO. 2 DETAILS (B)

- APRIL 2016
- MINNEHAHA COUNTY
- S. D. DEPT. OF TRANSPORTATION

**FOR**

**430° - 10 ½° PRESTR. GIRDER BRIDGE**

42° - 0° ROADWAY & 8° - 0° SIDEWALK

OVER BIG SIOUX RIVER

SEC. 9-T10N-R49W

STA. 123 + 18.74 TO 127 + 49.63

P 0115(51)104

STR. NO. 50-206-020

HL-93

**DESIGNED BY**

**DK. DES. BY**

**DRAFTED BY**
REQUIRED LIST
1. Title Block
2. Estimated Quantities
3. Project Block
4. Sections as Required
5. Reinforcing Schedule

PIER NO. 2 DETAILS (C)
FOR
430' - 10 1/2" PRESTR. GIRDER BRIDGE
42' - 0" ROADWAY & 8' - 0" SIDEWALK
OVER BIG SIOUX RIVER 39° LHF SKEW
STATE 9-T-046-R49R
STA. 123 + 18.74 TO 127 + 49.63
P 0115\(51)104
STR. NO. 50-206-020

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL, 2016

DESIGNED BY
DRAFTED BY
CHECKED BY
PREPARED BY

REINFORCING SCHEDULE

STATE S. D.
OF TRANSPORTATION
PRESTR. GIRDER BRIDGE
8
50
430' - 10
OVER BIG SIOUX RIVER
42' - 0"
30° LHF SKEW
STA. 123 + 18.74 TO 127 + 49.63
MINNEHAHA COUNTY
APRIL 2016

PIER NO. 2 DETAILS (C)
FOR
430' - 10 1/2" PRESTR. GIRDER BRIDGE
42' - 0" ROADWAY & 8' - 0" SIDEWALK
OVER BIG SIOUX RIVER 39° LHF SKEW
STATE 9-T-046-R49R
STA. 123 + 18.74 TO 127 + 49.63
P 0115\(51)104
STR. NO. 50-206-020

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL, 2016

DESIGNED BY
DRAFTED BY
CHECKED BY
PREPARED BY

REINFORCING SCHEDULE

STATE S. D.
OF TRANSPORTATION
PRESTR. GIRDER BRIDGE
8
50
430' - 10
OVER BIG SIOUX RIVER
42' - 0"
30° LHF SKEW
STA. 123 + 18.74 TO 127 + 49.63
MINNEHAHA COUNTY
APRIL 2016
REQUIRED LIST

1. Title Block
2. Project Block
3. Reinforcing Schedule
4. Estimated Quantities
5. Sections as Required

REINFORCING SCHEDULE

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type 17</td>
<td>Cu. Yd.</td>
<td>199.8</td>
</tr>
<tr>
<td>Type 17</td>
<td>Cu. Yd.</td>
<td>31184</td>
</tr>
<tr>
<td>Type 1A</td>
<td>Lb.</td>
<td>270.2</td>
</tr>
</tbody>
</table>

NOTES:
- All dimensions are out to out of bars.
- Class A45 Concrete, Bridge Structure Excavation, Bridge Reinforcing Steel
- HP 14 X 73 Steel Pile
- Includes 0.4 Cu. Yds. for Grout Pads

ESTIMATED QUANTITIES

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>HP 14 X 73 Steel Pile</td>
<td>Cu. Yd.</td>
<td>759.8</td>
</tr>
<tr>
<td>HP 14 X 73 Steel Pile (Typ.)</td>
<td>Cu. Yd.</td>
<td>779.4</td>
</tr>
</tbody>
</table>

PIER NO. 3 DETAILS (C)
FOR
430' - 10 5/8" PRESTR. GIRDER BRIDGE
42' - 0" ROADWAY & 8' - 0" SIDEWALK
39° LHF SKEW
OVER BIG SIOUX RIVER
SEC. 9-T10N-R49W
STA. 123 + 18.74 TO 127 + 49.63
P 0115(51)104
STR. NO. 50-206-020
HL-63
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016
PIER NO. 4 DETAILS (A) FOR 430' - 10 1/2" PRESTR. GIRDER BRIDGE
FOR 42' - 0" ROADWAY & 8' - 0" SIDEWALK 39° LHF SKEW
OVER BIG SIOUX RIVER SEC 9 T'104N R49W
STA. 123 + 18.74 TO 127 + 49.63 P 0115(51)104
STR. NO. 50-206-020 HL-93
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

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PLAN

30° LHF SKEW

---

REQUIRED LIST
1. Title Block
2. Project Block
3. Plan View as Required
4. Details as Required

---

PIER NO. 4 DETAILS (A)

FOR 430' - 10 1/2" PRESTR. GIRDER BRIDGE
FOR 42' - 0" ROADWAY & 8' - 0" SIDEWALK 39° LHF SKEW
OVER BIG SIOUX RIVER SEC 9 T'104N R49W
STA. 123 + 18.74 TO 127 + 49.63 P 0115(51)104
STR. NO. 50-206-020 HL-93
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

---

PLAN (Footing Steel)
REQUIRED LIST

1. Title Block
2. Project Block
3. Reinforcing Schedule
4. Estimated Quantities
5. Sections as Required

PROJECT NO. SHEETS TOTAL
STATE S.D. OF
FOR STR. NO. 50-206-020
S. D. DEPT. OF TRANSPORTATION

STR.  NO. 50-206-020
HL-93
S. D. DEPT. OF TRANSPORTATION
OFFICE 0115(51)104
SEC. 9-T104N-R49W
MG
DESIGNED BY
BRIDGE ENGINEER
DRAFTED BY
CK. DES. BY

"PRESTR. GIRDER BRIDGE"
8
5
430' - 10"
OVER BIG SIOUX RIVER
42' - 0"
ROADWAY & 8' - 0"
SIDEWALK
30° LHF SKEW
STA. 123 + 18.74 TO 127 + 49.63
MINNEHAHA COUNTY
APRIL 2016
BB
PIER NO. 4 DETAILS (C)

REINFORCING SCHEDULE

ESTIMATED QUANTITIES

ITEM UNIT QUANTITY
Concr. A-B-C-1 Concrete, Bridge Cu. Yd. 193.0
Reinforcing Steel Lb. 33048
Structure Excavation, Bridge Cu. Yd. 270.5
Incl. Concrete in Rock Cu. Yd. 32.5

NOTES:
All dimensions are out to out of bars.

NOTE:
Includes 0.4 Cu. Yd. for Grout Pads

PIER NO. 4 DETAILS (C)
FOR
430' - 10 1/2"
PRESTR. GIRDER BRIDGE
42' - 0"
ROADWAY & 8' - 0"
SIDEWALK
39° LH SKEW
OVER BIG SIOUX RIVER
STA. 123 + 18.74 TO 127 + 49.63
P 0115(51)104
STR. NO. 50-206-020

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

DESIGN: 01
D. DES.: BY
GRAFTED: BY
Concrete shall be placed in the spaces under the beams at Piers 2, 3, & 4 (within the diaphragm wall) during the diaphragm pour. Upon form removal the space is to be compacted and consolidated, the contractor shall prove in the finishing work.

NOTE:

Bars not to be epoxy coated.

All reinforcing steel shall be epoxy coated except as noted.

See concrete slab for location of Z1 bars.

Bars not to be epoxy coated.

See SIDEWALK DETAILS for placement.

Bars not to be epoxy coated.
Required List:
1. Title Block
2. Project Block
3. Plan View
4. Elevation View
5. Details as Required
6. Sections as Required

DRAIN AND BARRIER DETAILS

BARRIER CURR & DECK DRAIN DETAILS
FOR
430' - 10 1/2" PRESTR. GIRDER BRIDGE
42' - 0" ROADWAY & 8' - 0" SIDEWALK
39° LHF SKEW
OVER BIG SIOUX RIVER
SEC. 9 T104N R49W
STA. 123 + 18.74 TO 127 + 49.63
OVER BIG SIOUX RIVER

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL, 2016

DESIGNED BY
DRAFTED BY
**ERECITION DATA AND SLAB FORM ELEVATIONS (A)**

FOR

430' - 10 ½" PRESTR. GIRDER BRIDGE

42' - 0" ROADWAY & 8' - 0" SIDEWALK 39° LHF SKEW

OVER BIG SIOUX RIVER  SEC. 9 T104N R49W

STA. 123 + 18.74 TO 127 + 49.63  P 0115(S1)104

STR. NO. 50-206-020  HL-93

MINNEHAHA COUNTY

S. D. DEPT. OF TRANSPORTATION

APRIL 2016

The Camber shown is the amount which has been added to the theoretical slab elevations to get slab elevations shown in the table of Slab Form Elevations and Calculations. Camber shown is for S. I. of slab, traffic barrier, and haunch, but does not include S. I. of beams.

- **REQUIRED LIST**
  1. Title Block
  2. Project Block
  3. Plan View
  4. Camber Diagram
### TABLE OF SLAB FORM ELEVATIONS AND CALCULATIONS

<table>
<thead>
<tr>
<th>Girder No.</th>
<th>Order No.</th>
<th>Sta.</th>
<th>Elev. ''M''</th>
<th>Elev. ''N''</th>
<th>Deflection</th>
</tr>
</thead>
<tbody>
<tr>
<td>Girder No.</td>
<td>Order No.</td>
<td>Sta.</td>
<td>Elev. ''M''</td>
<td>Elev. ''N''</td>
<td>Deflection</td>
</tr>
</tbody>
</table>

**NOTE**
- The table contains the information necessary to determine the depth of concrete over the girders at all points. Calculations for the deflection are also included for future structures of this type.
- The Office of Bridge Design of the South Dakota Dept. of Transportation shall be notified immediately. After the 'Table of Slab Form Elevation' has been reviewed and approved for deck forming, a copy shall be forwarded to the Office of Bridge Design for review and analysis for the purpose of securing information relative to upward growth in the slab, this information is necessary for preparing plans for future structures of this type.

**TABLE OF SLAB FORM ELEVATIONS AND CALCULATIONS**

<table>
<thead>
<tr>
<th>Order No.</th>
<th>Sta.</th>
<th>Elev. ''M''</th>
<th>Elev. ''N''</th>
<th>Deflection</th>
</tr>
</thead>
</table>

**REMARKS**
- Based on a "d" of 11", the E. of each abutment and 11% of the E. of the Pier Plan deck SDC-4200 (See Note). TABLE OF FORM FRESH CONCRETE DETAILS (A): It is anticipated that the required horizontal dimension "N" for each girder will be 3'-1". If, when computing the dimension in the table, it is found that any dimension "N" is less than 1" greater than 6", the Office of Bridge Design of the South Dakota Dept. of Transportation may ask for reconsideration. After the 'Table of Slab Form Elevation' has been reviewed and approved for deck forming, the Office of Bridge Design shall be notified and the plans should be forwarded to the Office of Bridge Design for review and analysis for the purpose of securing information relative to upward growth in the slab. This information is necessary for preparing plans for future structures of this type.

**ERECTING DATA AND SLAB FORM ELEVATIONS (B)**

FOR 430'-10 1/2" PRESTR. GIRDERS

42'-0" ROADWAY & 8'-0" SIDEWALK

OVERT BIG SIOUX RIVER

SEC. 9 T-10N-R-59W

STRA. 123 + 18.74 TO 127 + 49.63

MINnehA COUNTY

S. D. DEPT. OF TRANSPORTATION

APRIL, 2016

**REQUIRED LIST**
1. Title Block
2. Project Block
3. Haunch Detail and Notes

**DETAILED DRAWINGS**
- 3D Views with crown
- Elev. "M" (See Note)
- Elev. "N" (See Note)
PLATE WASHER DETAILS

DIRECT TENSION INDICATOR DETAIL

DIAPHRAGM SUPPORT PLATE

END VIEW BENT PLATE DIAPHRAGM

NOTES:
1. All steel for the diaphragms including plate washers shall conform to ASTM A36 and shall be galvanized in accordance with ASTM A123 or A153. A307 Bolts and hardware shall be galvanized in accordance with ASTM F2329. Direct Tension Indicators shall conform to Section 410 of the Specifications.
2. The steel diaphragms between adjacent girders shall be installed as soon as possible and in conjunction with girder erection.
3. All costs associated with furnishing, fabricating, assembly and installation of diaphragms shall be included in the lump sum price for Structural Steel, Miscellaneous.

REQUIRED LIST

1. Title Block
2. Project Block
3. Fill out remainder of Standard Base Sheet

ESTIMATED QUANTITIES

For informational purposes only, the estimated weight of structural steel is 1,127 lbs. for 24 diaphragms.

DIAPHRAGM DETAILS

FOR

430° - 10% PRESTR. GIRDER BRIDGE
42° - 0" ROADWAY & 8" - 0" SIDEWALK
39° LH SKEW
OVER BIG SIOUX RIVER
SEC. 9-T104N-R49W
STA. 123 + 18.74 TO 127 + 49.63
STR. NO. 50-206-020
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

MINNEHAHA COUNTY

DESIGNED BY
DAVE J. DESAI

DK. DES. BY
GRAFTED BY

DESIGNED BY
DAVE J. DESAI

DK. DES. BY
GRAFTED BY
**REQUIRED LIST**

1. **Title Block**
2. **Section A - A**
3. **Project Block**
4. **Detail "X"**
5. **Estimated Quantities**
6. **Spill Cone Detail**
7. **Plan View**

**ESTIMATED QUANTITIES**

<table>
<thead>
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<tr>
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<td>sq. yd.</td>
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**Notes:**
- Items 1 and 2 are approximate quantities contained in the Bridge End Embankment and are for information only.
- Items 3 and 4 are approximate quantities contained in the 4' Underdrain Pipe and are for information only.
- Items 5 and 6 are approximate quantities contained in the Granular Bridge End Backfill and are for information only.
- Shrinkage Factor of 1.25 Used.
- Payment quantities will be based on area covered plus 15% to account for overlaps.

**DETAILS OF BRIDGE END BACKFILL ADJACENT TO ABUTMENT NO. 1 (A)**

**Spill Cone Detail**

**PLAN**

- **Finishing Shoulder**
- **Top of Grade**
- **End of Approach Slab**

**SPILL CONE DETAIL AT EMBANKMENT**

**DETAIL "X"**

- **Type B Drainage Fabric**
- **Vertical Composite Drain**
- **Granular Bridge End Backfill**
- **Porous Backfill**
REQUIRED LIST

1. Title Block
2. Project Block
3. Detail "X"
4. Plan View
5. Section A - A
6. Spill Cone Detail
7. Spill Cone Detail at Embankment

SPILL CONE DETAIL AT EMBANKMENT

PLAN

(Bridge End Backfill shown adjacent to Abut. No. 5)

SECTION A - A

(After Approach Slab)

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

DESIGNED BY
DRAFTED BY
430° - 10 ½° PRESTR. GIRDER BRIDGE
OVER BIG SIOUX RIVER
SEC. 9-T10N-R49W
STA. 123 + 18.74 TO 127 + 49.63
P 0115(51)104
STR. NO. 50-206-020
HL-63

MINNESOTA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL, 2016

REQUIRED LIST
1. Title Block
2. Project Block
3. Sec. B - B
4. Sec. C - C
5. Sec. D - D
6. Sec. E - E
7. Sec. F - F

NOTE:
- Granular Bridge End Backfill
- Geogrid Reinforcement
- Type B Drainage Fabric
- 4'' dia. Slotted Corrugated
- Polyethylene Drainage Tubing
- Sleeper Slab
- Geogrid Reinforcement
- Base Course
- 8' - 0'' Sidewalk
- 10° LHF SKEW
- STA. 123 + 18.74 TO 127 + 49.63
- Roadway & 8' - 0'' SIDEWALK
- 30° LHF SKEW
- MINNEHAHA COUNTY
- APRIL, 2016

CH.
CA.
DS. DES. BY: MS.
GRAFTED BY:
Sleeper Slab

NOTE: Elevations Top

SEC. 123 + 49.63
T. S. @ Elev. = 1493.88

Sta. 122 + 84.13
T. S. at Elev. = 1494.20

Type B Drop Inlet

430' - 10 1/2" PRESTR. GIRDER BRIDGE
42' - 0" ROADWAY & 8' - 0" SIDEWALK 39' LHF SKEW
OVER BIG SIOUX RIVER
STA. 123 + 18.74 TO 127 + 49.63
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

430' - 10 1/2" PRESTR. GIRDER BRIDGE
42' - 0" ROADWAY & 8' - 0" SIDEWALK 39' LHF SKEW
OVER BIG SIOUX RIVER
STA. 123 + 18.74 TO 127 + 49.63
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H

VIEW F - F

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL 2016

PLAN

VIEW H - H
**APPROACH SLAB ADJACENT TO BRIDGE DETAILS (B)**

For 430° - 10° PRESTR. GIRDER BRIDGE

42° - 0° ROADWAY & 8° - 0° SIDEWALK

39° LH/SH SWJ

OVER BIG SIOUX RIVER

STA. 123 + 18.74 TO 127 + 49.63

P 0115(51)014

STR. NO. 50-206-020

HL-93

MINNEHAHA COUNTY

S. D. DEPT. OF TRANSPORTATION

APRIL 2016


---

**Reinforcing Schedule**

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<th>Item</th>
<th>Unit</th>
<th>Quantity</th>
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<tr>
<td>2.</td>
<td>Lbs. Epoxy Coated Rebar Steel in Approach Slabs</td>
<td>86.3</td>
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<tr>
<td>3.</td>
<td>Lbs. Epoxy Coated Rebar Steel in Sleeper Slabs</td>
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<tr>
<td>4.</td>
<td>Lbs. Epoxy Coated Rebar Steel in Tapered Barriers</td>
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<td>5.</td>
<td>Cu. Yd. Concrete in Sleeper Slabs</td>
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<td>6.</td>
<td>Cu. Yd. Concrete in Tapered Barriers</td>
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**Estimated Quantities**

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<tr>
<th>Item</th>
<th>Unit</th>
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<tbody>
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<td>1.</td>
<td>Cu. Yd. Concrete in Approach Slabs</td>
<td>205.3</td>
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<tr>
<td>2.</td>
<td>Cu. Yd. Concrete in Sleeper Slabs</td>
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**Sections as Required**

- **VIEW D - D**
- **VIEW E - E**
REINFORCING SCHEDULE

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<td>lbs. Epoxy Coated Re-Steel in Sidewalk Sleeper Slabs.</td>
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<tr>
<td>2.</td>
<td>lbs. Epoxy Coated Re-Steel in Sidewalk Approach Slabs.</td>
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<tr>
<td>5.</td>
<td>Sq. Ft. 6 mil Polyethylene sheeting under reinf. conc. sidewalk.</td>
<td></td>
</tr>
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</table>

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

ESTIMATED QUANTITIES

<table>
<thead>
<tr>
<th>Item</th>
<th>Unit</th>
<th>Quantity</th>
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<tbody>
<tr>
<td>5.</td>
<td>Sq. Ft. 6 mil Polyethylene sheeting under reinf. conc. sidewalk.</td>
<td></td>
</tr>
</tbody>
</table>

NOTE:
Items 1 thru 5 are approximate quantities contained in the above bid item and are for information only.

NOTE:
- The portion of the sleeper slab directly under the precast deck shall be smooth. Steel trowel and coat with asphalt paint or place 6 mil polyethylene sheeting to prevent bonding of concrete. (Typ.)
- A double thickness of plastic sheeting to prevent bond to bridge end backfill shall be placed between backfill and slab in this area. See BRIDGE END BACKFILL DETAILS sheets.

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

NOTE:
- The portion of the sleeper slab directly under the precast deck shall be smooth. Steel trowel and coat with asphalt paint or place 6 mil polyethylene sheeting to prevent bonding of concrete. (Typ.)
- A double thickness of plastic sheeting to prevent bond to bridge end backfill shall be placed between backfill and slab in this area. See BRIDGE END BACKFILL DETAILS sheets.

NOTE:
Items 1 thru 5 are approximate quantities contained in the above bid item and are for information only.
GENERAL NOTES

1. The Membrane Sealant shall be on the approved product list for Membrane Sealant Expansion Joints.

2. The manufacturer shall supply the membrane sealant in packaging that precompresses the membrane sealant. The precompressed dimension shall be as recommended by the sealant manufacturer, however, in no case shall the precompressed dimension exceed 75% of the joint opening width. The foam sealant shall be slowly self expanding to permit installation of the sealant in a minimum of 5 feet in length. The foam sealant shall be ultra-violet and ozone resistant.

3. 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.

4. The membrane sealant shall be installed to ensure the Contractor installs the joint to the manufacturers' recommendations.

5. The bonding adhesive used to attach the membrane sealant to the adjacent concrete shall be approved by the membrane sealant manufacturer.

6. Adhesive used to join adjacent pieces of the membrane sealant shall be as recommended by the manufacturer.

7. If styrofoam filler material is used in the construction, it shall be closed cell and water-tight as approved by the Engineer.

8. The minimum ambient air temperature at the time of joint installation and adhesive curing shall be 40°F.

9. An engineer's representative of the membrane sealant manufacturer shall be present at the time of the joint installation. The engineer's 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.

10. Surfaces that will be in contact with the membrane sealant shall be thoroughly cleaned by abrasive blasting to remove all debris and contamination (such as curing compounds, etc). From the surface to be coated, a surface angle of 1 to 2 inches of the surface will be required. Cleaning of the surfaces with solvents, wire brushing, or grinding shall not be permitted.

11. After abrasive blasting, but immediately prior to membrane joint installation, the entire joint contact surface shall be air blasted. The air compressor used for joint cleaning shall be equipped with trap devices capable of providing moisture-free and oil-free air at a recommended pressure of 90 psi. To clean complete bonding with the adhesive, the adjacent surfaces must be dry and clean. The contact surface for the joint shall be visually inspected by the Engineer immediately prior to joint installation to verify the surface is clean and dry.

12. Individual spliced sections shall be installed in accordance with the manufacturers' recommendations. The membrane joint sealant manufacturer shall submit a detailed installation procedure to the Engineer at least 5 days prior to joint installation for his review.

13. Traffic shall not be allowed on the joint until the bonding adhesive has had time to cure, as recommended by the manufacturer.

14. Use pigmented 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 spalling before any equipment is moved across the joint.

15. The Membrane Sealant Expansion Joint will be measured in feet to the nearest one-tenth foot, complete in place. Measurement will be made of the overall horizontal length. The Membrane Sealant Expansion Joint will be paid for at the contract unit price per foot complete in place. Measurement will be made of the nearest one-tenth foot, complete in place. The Membrane Sealant Expansion Joint shall be full compensation for forming 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 (A)

FOR
430' - 10 3/4" PRESTR. GIRDER BRIDGE
42° 0' ROADWAY & 8° 0' SIDEWALK
39° LH SKEW
OVER BIG SIOUX RIVER
SEC. 9-T106S-R46W
STA. 123 + 18.74 TO 127 + 49.63
P 0115(51)104
STR. NO. 50-206-020
HL-93

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
APRIL, 2016
The elevations shown on these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).
**Table of As-Built Elevations - Bridge Deck**

<table>
<thead>
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<th>Location</th>
<th>Elevation</th>
<th>Location</th>
<th>Elevation</th>
<th>Location</th>
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**Table of As-Built Elevations - Approach Roadway**

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**ESTIMATED QUANTITIES**

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<th>ITEM</th>
<th>UNIT</th>
<th>QUANTITY</th>
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<tbody>
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<td>Bridge Elevation Survey</td>
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**REQUIRED LIST**

1. Title Block
2. Project Block
3. Survey Datum Box
4. Plan View
5. Estimated Quantities
6. Table for Shot Elevations

**AS - BUILT ELEVATION SURVEY (B)**

**FOR**

430° - 10° 6" PRESTR. GIRDER BRIDGE

42° - 0° ROADWAY & 8° - 0° SIDEWALK

OVER BIG SIOUX RIVER

SEC. 9-T104N-R49W

STA. 123 + 18.74 TO 127 + 49.63

P 0115(51)104

STR. NO. 50-206-020

MINNEHAHA COUNTY

S. D. DEPT. OF TRANSPORTATION

APRIL, 2016
PROJECT NO. SHEETS TOTAL
SHEETS

STATE OF S.D. APRIL 2016
' PRESTR. GIRDER BRIDGE

YEAR PLATE DETAILS

GENERAL NOTES:
1. Year plate of the general dimensions shown shall be constructed on all three culverts and bridges. The year plates shall be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (1/2") inch in depth.
2. Year plates shall be located on structure (s) as follows:
   a. On cast-in-place box culverts, the year plate shall be four and one-half (4 1/2") inches below the top of the upstream pavement wall and centered laterally on the upstream face. On precast box culverts the year plate shall be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with the location, the year plate shall be centered in an adjacent tunnel.
   b. On bridges with six (6) inch curbs or "Jersey" shaped barriers with no embankments, the year plate shall be centered vertically on the curb face approximately 2.5", inches from the end of the bridge, or as designated by the Engineer. On bridges with "Jersey" shaped barrier embankments, the year plate shall be centered on the upper stepped portion of the barrier approximately 5'-6" from the end of the bridge, or as designated by the Engineer. There shall be one year plate at each end of the bridge on opposite sides.
   c. When the sheets specify that both the original date of construction and the date of reconstruction are to be shown, one date shall be placed as listed above and the other shall be 2.5" to the right of each end of the bridge on opposite sides.
3. There shall be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work shall be incidental to other contract items.

JERSEY BARRIER
(WITH ENDBLOCK)

JERSEY BARRIER

TYPE E CURB

ABUTMENT WITH "STRAIGHT" WINGS

ABUTMENT WITH "SWEPT BACK" WINGS

GENERAL NOTES:
1. Survey markers shall be located at each abutment on the same side of the bridge as the year plate. Place survey markers on abutment wings as shown. Two survey markers will be required at each bridge.
2. Survey markers shall be of a type intended for installation in concrete. Be made of solid brass or bronze. Have a braded top and be either a 2" top diameter (with a 1/2" 2 1/2' long braded shank), or a US Army Corps of Engineers Type C Disc with a 2 1/2" top diameter.
3. There will be no separate measurement or payment made for survey markers. All costs for this work shall be incidental to the other contract items.

Published Date: 1st Qtr. 2019

1. Title Block
2. Insert Required Standard Plate Sheets as Needed
3. Project Block

430'-10 3/4" PRESTR. GIRDER BRIDGE
STR. NO. 50-206-020
APRIL 2016

Sheet 1 of 1

20

50

460.02

460.05

June 26, 2019
GENERAL NOTES:

1. The fence and post details shown are for illustrative purpose only.
2. Eyebolts shall be placed on all of the bridge abutment wings.
3. Eyebolts shall be 5/8 inch diameter and shall conform to ASTM A327.
4. Eyebolts shall be galvanized in accordance with AASHTO M232 (A327-A153).
5. Eyebolts shall be installed on abutment wings in accordance with the American Society of Civil Engineers' (ASCE) recommendations.
6. The epoxy resin mixture shall be of a type for bonding steel to hardened concrete and shall conform to AASHTO M33 Type IV, Grade V (Equivalent to ASTM C881, Type IV, Grade V).
7. The diameter of the drilled holes shall not be less than 3/4 inch greater, nor more than 3/4 inch greater than the diameter of the eyebolts as per Manufacturer's recommendations.
8. The epoxy resin shall be applied to the eyebolts and apply to the concrete in accordance with the Manufacturer's recommendations.
9. The eyebolts shall be installed on the bridge abutment wings in accordance with the American Society of Civil Engineers' (ASCE) recommendations.
10. The cost for furnishing and installing the eyebolts shall be incidental to various contract items.