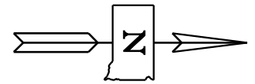
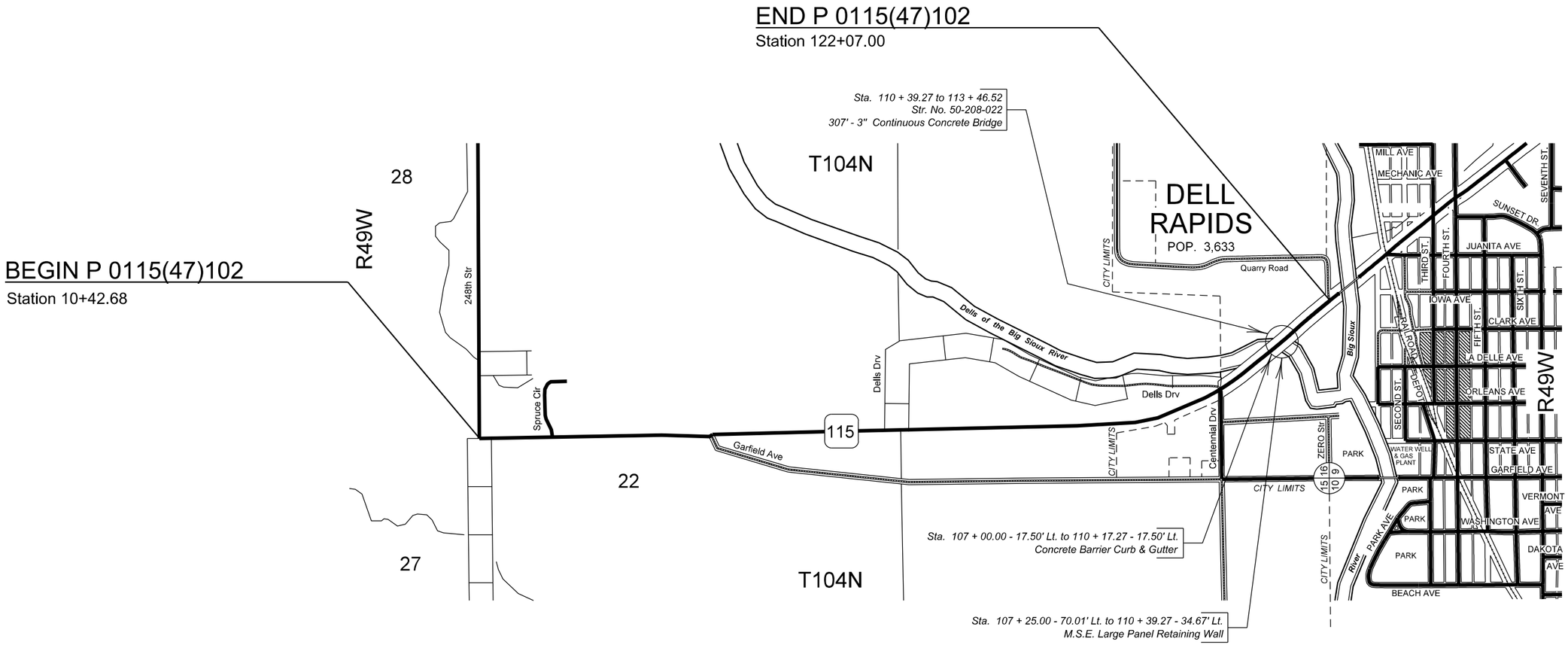
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E1 | E44 |

# Section E: Structure Plans

INDEX OF SHEETS -





Revised 01/26/2016

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# SECTION E - ESTIMATE OF STRUCTURE QUANTITIES

*Str. No. 50-208-022*
*307' - 3" Cont. Concrete Bridge*

| BID ITEM NUMBER | ITEM | QUANTITY | UNIT |
|---|---|---|---|
| 009E3310 | Bridge Elevation Survey | Lump Sum | LS |
| 009E5000 | Concrete Penetrating Sealer | 1,728.0 | SqYd |
| 250E0030 | Incidental Work, Structure | Lump Sum | LS |
| 260E1010 | Base Course | 991.2 | Ton |
| 410E2600 | Membrane Sealant Expansion Joint | 111.1 | Ft |
| 420E0100 | Structure Excavation, Bridge | 1,293 | CuYd |
| 430E0200 | Bridge End Embankment | 318 | CuYd |
| 430E0300 | Granular Bridge End Backfill | 105.7 | CuYd |
| 460E0030 | Class A45 Concrete, Bridge Deck | 950.0 | CuYd |
| 460E0050 | Class A45 Concrete, Bridge | 792.9 | CuYd |
| 460E0150 | Concrete Approach Slab for Bridge | 201.0 | SqYd |
| 460E0160 | Concrete Approach Sleeper Slab for Bridge | 70.4 | SqYd |
| 460E0382 | Install Dowel in Rock | 365.0 | Ft |
| 464E0100 | Controlled Density Fill | 7.1 | CuYd |
| 470E0120 | Steel Pedestrian Railing on Sidewalk | 349.0 | Ft |
| 470E0220 | Steel Pedestrian Railing on Concrete Barrier | 325.1 | Ft |
| 480E0100 | Reinforcing Steel | 122,273 | Lb |
| 480E0200 | Epoxy Coated Reinforcing Steel | 246,868 | Lb |
| 480E0504 | No. 4 Rebar Splice | 18 | Each |
| 480E0507 | No. 7 Rebar Splice | 112 | Each |
| 621E0300 | Chain Link Fence for Bridge Sidewalk | 349 | Ft |
| 635E8020 | 2" Rigid Galvanized Steel Conduit | 360 | Ft |
| 651E0160 | 6" Reinforced Concrete Sidewalk | 366 | SqFt |
| 680E0040 | 4" Underdrain Pipe | 156 | Ft |
| 680E2500 | Porous Backfill | 26.9 | Ton |
| 700E0210 | Class B Riprap | 953.9 | Ton |
| 831E0110 | Type B Drainage Fabric | 1,228 | SqYd |
| 831E1010 | Geogrid Reinforcement | 954 | SqYd |
| 900E7090 | Waterproofing Membrane for Structure | 220 | SqFt |

*M.S.E. Large Panel Retaining Wall and Concrete Barrier Curb & Gutter*

| BID ITEM NUMBER | ITEM | QUANTITY | UNIT |
|---|---|---|---|
| 250E0030 | Incidental Work, Structure | Lump Sum | LS |
| 420E0300 | Structure Excavation, Retaining Wall | 77 | CuYd |
| 530E0420 | MSE Large Panel Wall, Furnish | 5,264 | SqFt |
| 530E0422 | MSE Large Panel Wall, Install | 5,264 | SqFt |
| 530E0702 | Granular Backfill for MSE Large Panel Wall | 3,528.0 | CuYd |
| 650E2000 | Concrete Barrier Curb and Gutter | 296 | Ft |
| 650E2001 | Concrete Barrier Curb and Gutter End Section | 21 | Ft |

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 |
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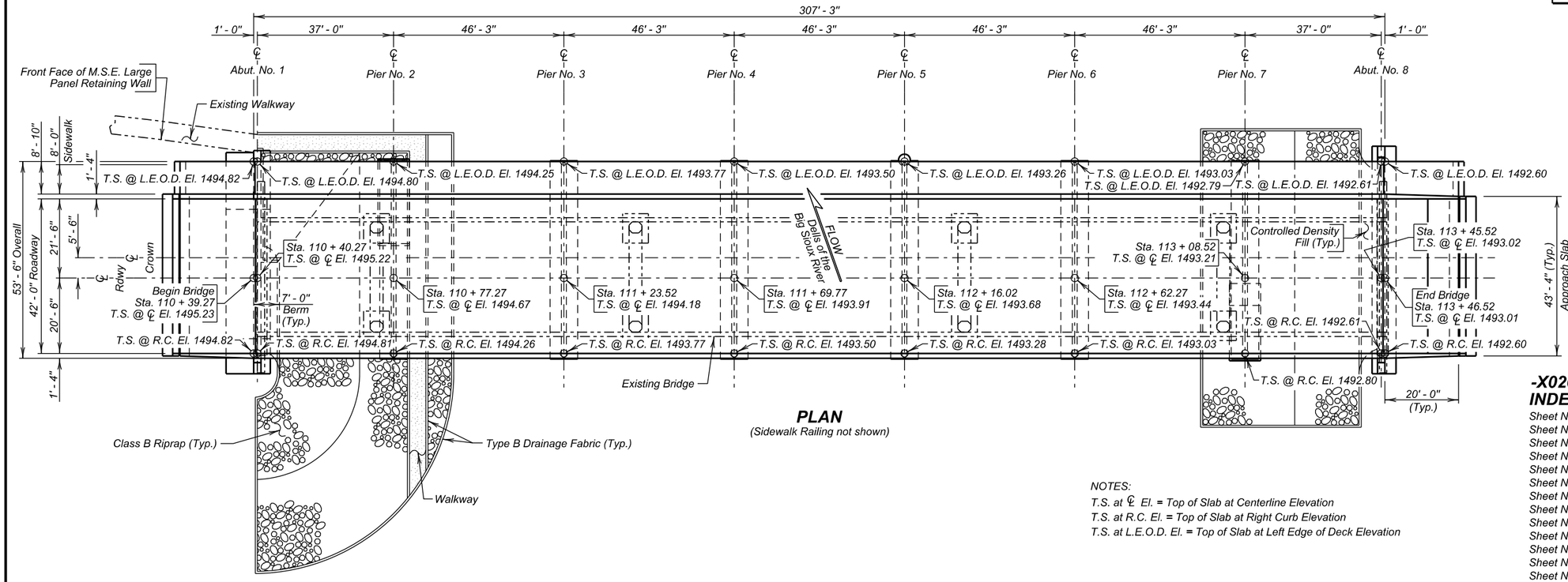
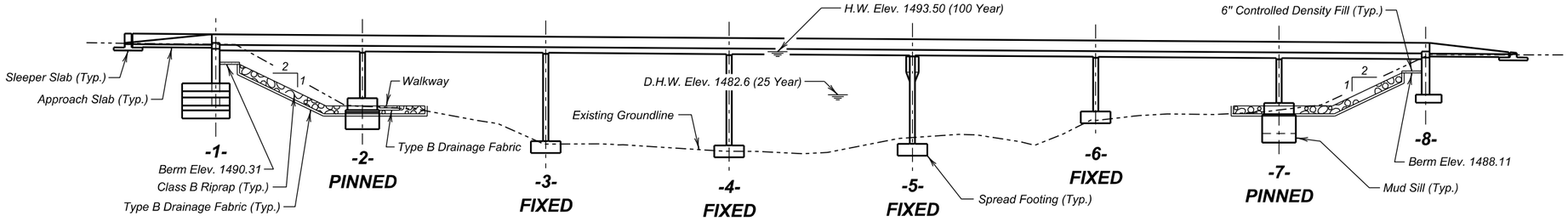



**PLAN**
(Sidewalk Railing not shown)

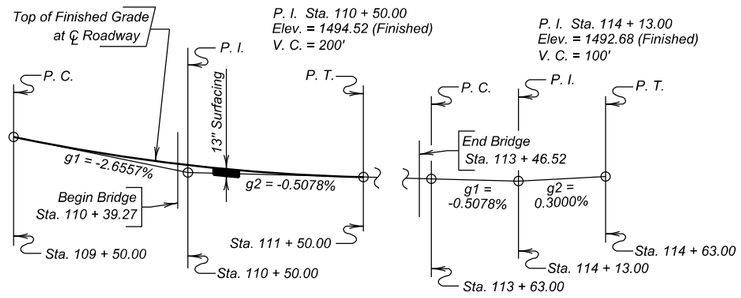
NOTES:
T.S. at ℄ El. = Top of Slab at Centerline Elevation
T.S. at R.C. El. = Top of Slab at Right Curb Elevation
T.S. at L.E.O.D. El. = Top of Slab at Left Edge of Deck Elevation

## -X020-
## INDEX OF BRIDGE SHEETS -






**ELEVATION**
(Sidewalk Railing not shown)




**VERTICAL CURVE DATA**

## HYDRAULIC DATA

| | |
|---|---|
| $Q_d$ | 5847 cfs |
| $A_d$ | 2166 sq. ft. |
| $V_d$ | 2.7 fps |
| $Q_F$ | 5847 cfs |
| $Q_{100}$ | 12760 cfs |
| $Q_{OT}$ | 12420 cfs |
| $V_{max}$ | 3.1 fps |

$Q_d$ = Design discharge for the proposed bridge based on 25 year frequency. El. 1482.6.
$Q_{OT}$ = Overtopping discharge and frequency 97 year recurrence interval. El. 1492.94. Sta. 114 + 25.00 (left curb).
$Q_F$ = Designated peak discharge for the basin approaching proposed project based on 25 year frequency.
$Q_{100}$ = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 1493.50.
$V_{max}$ = Maximum computed outlet velocity for the proposed bridge, based on 2 year frequency.

⚹ Topeka Shiner Stream

# GENERAL DRAWING
FOR
# 307' - 3" CONT. CONCRETE BRIDGE

42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
⚹ OVER DELLS OF THE BIG SIOUX RIVER — SEC. 16-T104N-R49W
P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022
PCN 025C

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015

-X020-

1 OF 36

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

| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| TB | BS | MG | Kevin N. Goeden |
| MINN025C | 025CGC01 | | BRIDGE ENGINEER |

# ESTIMATE OF STRUCTURE QUANTITIES

| DESCRIPTION | QUANTITY | UNIT | REMARKS |
|---|---|---|---|
| Bridge Elevation Survey | Lump Sum | LS | |
| Concrete Penetrating Sealer | 1728 | SqYd | See Special Provision |
| Incidental Work, Structure | Lump Sum | LS | |
| Base Course | 991.2 | Ton | |
| Membrane Sealant Expansion Joint | 111.1 | Ft | |
| Structure Excavation, Bridge | 1293.0 | CuYd | |
| Bridge End Embankment | 318 | CuYd | |
| Granular Bridge End Backfill | 105.7 | CuYd | |
| Class A45 Concrete, Bridge Deck | 950.0 | CuYd | |
| Class A45 Concrete, Bridge | 792.9 | CuYd | |
| Concrete Approach Slab for Bridge | 201.0 | SqYd | |
| Concrete Approach Sleeper Slab for Bridge | 70.4 | SqYd | |
| Install Dowel in Rock | 365 | Ft | |
| Controlled Density Fill | 7.1 | CuYd | |
| Steel Pedestrian Railing on Sidewalk | 349 | Ft | |
| Steel Pedestrian Railing on Concrete Barrier | 325.1 | Ft | |
| Reinforcing Steel | 122,273 | Lb | |
| Epoxy Coated Reinforcing Steel | 246,868 | Lb | |
| No. 4 Rebar Splice | 18 | Each | |
| No. 7 Rebar Splice | 112 | Each | |
| Chain Link Fence for Bridge Sidewalk | 349 | Ft | |
| 2" Rigid Galvanized Steel Conduit | 360 | Ft | |
| 6" Reinforced Concrete Sidewalk | 366 | SqFt | |
| 4" Underdrain Pipe | 156 | Ft | |
| Porous Backfill | 26.9 | Ton | |
| Class B Riprap | 953.9 | Ton | |
| Type B Drainage Fabric | 1228 | SqYd | |
| Geogrid Reinforcement | 954 | SqYd | |
| Waterproofing Membrane for Structure | 220 | SqFt | |

## SPECIFICATIONS FOR BRIDGE

1. Design Specifications: AASHTO LRFD Bridge Design Specifications, 2014 Edition with 2015 interims.
2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2015 Edition and required provisions, supplemental specifications, and special provisions as included in the proposal.

## BRIDGE DESIGN LOADING

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

## DESIGN MATERIAL STRENGTHS

| | |
|---|---|
| Concrete | f'c = 4,500 psi |
| Reinforcing Steel | fy = 60,000 psi |

## 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 and End blocks shall be built normal to the grade.
6. Request for construction joints or resteel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of resteel.
7. The elevation of the bridge deck is 13" above subgrade elevation.

## INCIDENTAL WORK, STRUCTURE

1. In place centerline Sta. 110+39.89 to centerline Sta. 113+47.39 is a 307.5' 5 span I-Beam Viaduct with a 30'-0" clear roadway. The superstructure consists of a Steel I-Beams supporting a reinforced concrete slab with steel channel railing faced with steel Thrie beam continuous across the bridge. The deck has been overlaid with 3/8" rubberized asphalt chip seal. The substructure consists of four 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.
2. 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 110 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 WASTE DISPOSAL NOTES found in Section A.
3. During demolition of the structure, efforts shall be taken to prevent material from falling into the Dells of the Big Sioux River. Under no circumstances is asphalt allowed to fall into the Dells of the Big Sioux River.
4. 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 Contractor, a copy of the original construction plans may be obtained through the Office of 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.
3. Coarse aggregate to be used in concrete shall consist of either crushed quartzite or other crushed ledge rock. If crushed ledge rock other than quartzite is to be used, it shall be from a source approved by the Engineer.

## ABUTMENTS

1. The bridge ends shall not be backfilled until the deck concrete has attained a strength of 1200psi when controlled by test, or 36 to 48 hours, as 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.

## PIERS

Substructure shoring shall remain in-place until Superstructure shoring is removed. The contractor is alerted that the pier walls at piers 2 and 7 are pinned on top and bottom and will not be stable until the superstructure concrete has reached design strength.

## SPREAD FOOTING ON ROCK AT ABUTMENTS AND PIERS

1. The rock surface shall be cleaned 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. Additional effort may be required to remove fractured quartzite to the limits required. It is anticipated that 99.2 cu. yds. of the Structure Excavation, Bridge quantity will be fractured quartzite.

**ESTIMATE OF STRUCTURE QUANTITIES AND NOTES**

FOR

307' - 3" CONT. CONCRETE BRIDGE

STR. NO. 50-208-022

OCTOBER 2015



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| PW | TB | PW | Kevin N. Goeden |
| MINN025C | 025CGC02 | | BRIDGE ENGINEER |

## SPREAD FOOTING ON ROCK AT ABUTMENTS AND PIERS (CONTINUED)

3. 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 to delays within the 5 working day period for redesign shall be borne by the contractor at no additional cost to the State.

4. 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.

5. Vertical fractures in the foundation rock that the Geotechnical Engineer determines to be detrimental to the integrity of the foundation shall be repaired. Designated fractures shall be repaired by cleaning to remove soil and other relatively weak material to a depth of 1.5 to 2 times the width of the fracture. The cleaned opening shall then be filled with grout or a lean concrete mix.

6. 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.

7. If cleaning and filling of rock fractures is ordered, the work shall be paid for as Extra Work, in accordance with Section 4.4 of the Specifications.

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

## 2" RIGID GALVANIZED STEEL CONDUIT

1. Anchor rods and bolting pattern for luminaire REL1 to be mounted on Pier 5 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 Luminaire REL1 shall be placed in the Bridge Deck and Pier by the Bridge Contractor as shown in the plans.

## 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. The Engineer may order Install Dowel in Rock to be deleted from the contract if the Geotechnical Engineer determines they are not necessary.

3. When Install Dowel in Rock is required, the steel dowel shall be rebar, and will be included in the Reinforcing Schedule. Increases, decreases, or deletion of the item Install Dowel in Rock, shall also include corresponding changes in the steel dowel.

4. Dowel bond material shall be suitable for bonding steel dowel bars to rock in the existing moisture conditions. The Contractor shall submit dowel bonding material product data to the Engineer for approval. Site mixed and cartridge resins shall be commercially available and manufactured for rock dowel installation in this particular rock type. 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.

5. Install Dowel in Rock shall not be measured unless a change is ordered. Payment shall be for the lineal 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.

6. 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 unit price bid for Reinforcing Steel.

## SUPERSTRUCTURE

1. Preplanned construction joints may be used in accordance with Section 460.3 of the Specifications. Contact the Office of Bridge Design for joint configuration and allowable location. Emergency slab construction joints shall be as shown with the superstructure details. If an emergency slab joint is used, contact the Office of Bridge Design before proceeding with deck pour.

2. 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.

3. Barrier curbs shall be poured after all the slab has been poured. Superstructure falsework shall not be removed until bridge deck concrete, including barrier curbs, has attained a strength of 2400 psi.

4. The bridge deck must be placed and finished continuously at a minimum rate of 25.5 ft. of deck per hour measured along centerline roadway. 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 minimum rate of 25.5 ft. of deck per hour can be achieved and the concrete in the previous pour has attained a minimum compressive strength of 2000 psi.

5. Snap ties, if used in 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.

## CLASS A45 CONCRETE, BRIDGE DECK

1. Concrete used in the bridge deck slab, sidewalk and barrier curbs shall be in accordance with the requirements for bridge deck concrete as specified in Section 460.3 A of the Specifications. In addition, the concrete used in the bridge deck, sidewalk and barrier curbs shall have Class F Modified Fly Ash substituted for a portion of the cement in accordance with Section 605 of the Specifications. The amount of cement to be replaced shall be 20 percent by weight. The ratio of substitution of fly ash to cement shall be 1:1 by weight.

2. See Special Provision for Concrete Penetrating Sealer.

**NOTES (CONTINUED)**

FOR

307' - 3" CONT. CONCRETE BRIDGE

STR. NO. 50-208-022

OCTOBER 2015



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| PW | TB | PW | Kevin N. Goeden |
| MINN025C | 025CGC03 | | BRIDGE ENGINEER |

## FALSEWORK

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

## 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) **Bents/Piers:** All exposed surfaces.

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.

## SHOP PLANS

Shop plans shall be required as specified by the Specifications.

## STEEL RAILING – SIDEWALK

1. All rail posts shall be built vertical. Anchor bolts shall be cast in place; drill and epoxy will not be allowed due to the proximity to the longitudinal steel in the deck.

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 South Dakota Standard 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 and Steel Pedestrian Railing on Concrete Barrier.

## CHAIN LINK FENCE

1. The chain link fence fabric 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 9 gauge wire woven in a 2 inch diamond mesh. Knuckled 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.

## 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 use of an approved finishing machine will be required during placement of Class A45 Concrete for the approach slabs. Concrete placement in front of the machine shall be kept parallel to the screed.

3. The concrete in the approach slab shall be tined normal to centerline roadway.

4. Concrete Approach Sleeper 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 and reinforcing steel; for disposal of all excavated material and surplus materials; and for labor, tools, equipment and any incidentals necessary to complete this item of work.

5. 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 sealer and reinforcing steel; for disposal of all excavated material and surplus materials and for labor, tools, equipment and any incidentals 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 incidentals required shall be incidental 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 elastic joint sealer; for disposal of all excavated and surplus materials; and for all labor, tools, equipment and incidentals necessary to complete this item of work.

2. The top of the sidewalk shall transition from the end of the bridge to the top of approach slab curb at the sidewalk expansion device.

3. All costs involved in furnishing and placing the sidewalk sleeper slabs shall be included in the contract unit price per square foot for 6” Reinforced Concrete Sidewalk.

**NOTES (CONTINUED)**

FOR

307' - 3" CONT. CONCRETE BRIDGE

STR. NO. 50-208-022

OCTOBER 2015



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| PW | TB | PW | Kevin N. Goeden BRIDGE ENGINEER |
| MINN025C | 025CGC04 | | |

## WATERPROOFING MEMBRANE

1. A 24 inch wide waterproofing membrane shall be used to seal the interface between the deck and the abutment backwall at the locations shown by the plans.

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

   Mar Mac Construction Products Co., Inc.
   PO Box 447 McBee 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, lb., in. | D1682<br>Warp 75<br>Fill 75 |
| Elongation at break, min, % | Warp 20<br>Fill 20 |

   c. Polyethylene Backing:

| | | |
|---|---|---|
| Tensile strength, min, psi | 4000 | D882, Method A |
| Elongation at break, min % | 100 | D882, Method A |
| Tear resistance, min psi | 1500 | D624, Die C |
| Water absorption, max % | 0.01 | D570 |

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 price per square foot. Payment shall be full compensation for labor, equipment, materials and incidentals for furnishing and installing the waterproofing membrane.

## REINFORCED GRANULAR EMBANKMENT

1. The geogrid will be a biaxial grid of single layer construction. Vibratory 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:

| Property | Test | MARV |
|---|---|---|
| Wide Width Strip Tensile Strength (Ultimate) | ASTM D 6637 Method B | 850lb/ft MD and XD |

2. 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.

3. 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.

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

5. The geogrid will be placed as taut as possible with minimal wrinkles. Placement will be done so that subsequent granular cover material does not shove, 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.

6. 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 uncovered areas. No traffic will be allowed on the uncovered geogrid.

7. 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.

8. 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 tests | Depth (ft.) | Min. required |
|---|---|---|
| 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.

## ABUTMENT ARMORING ASSEMBLY

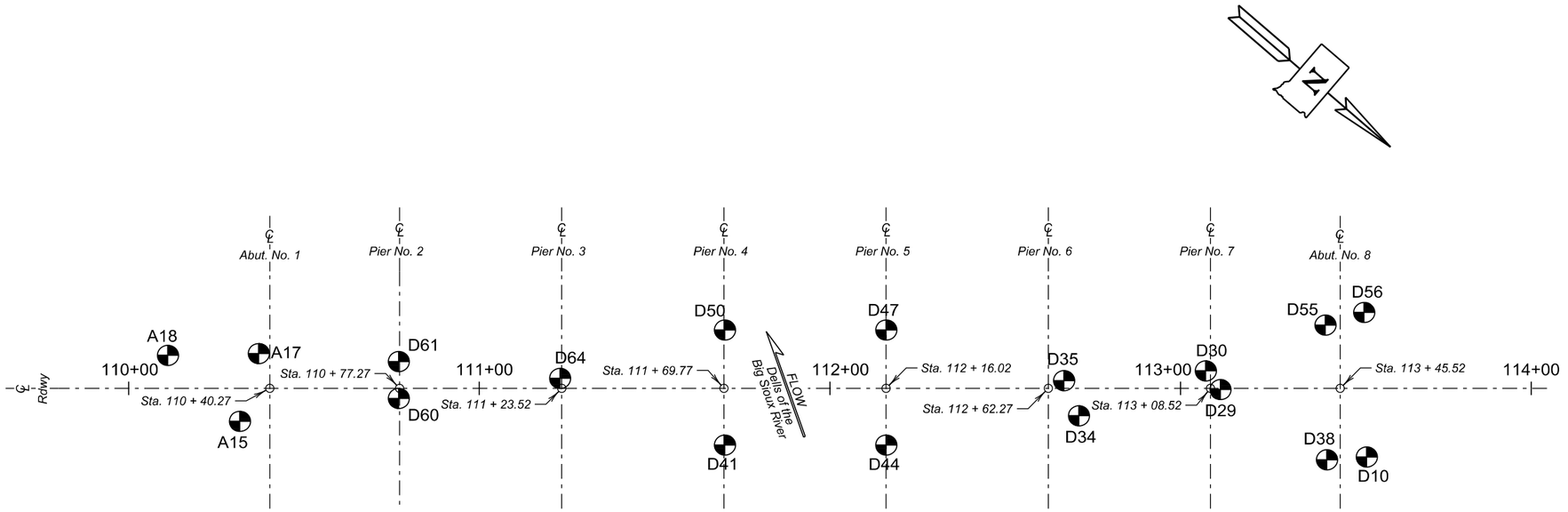
1. Steel for the Abutment Armoring Assembly shall conform to ASTM A709, Grade 36. The Automatic End Welded Deformed Bar Anchor Studs shall conform to ASTM A1064

2. Galvanize the Abutment Armoring and anything welded to it after all welding is completed. They shall be galvanized in accordance with AASHTO M111 (ASTM A123). If welded splices are used subsequent to galvanizing, the weld details and the procedures for preparing the surface for welding and repairing the galvanizing after welding shall be included with the shop plans. Repair of galvanizing shall be by the zinc-based solder method in conformance with ASTM A780.

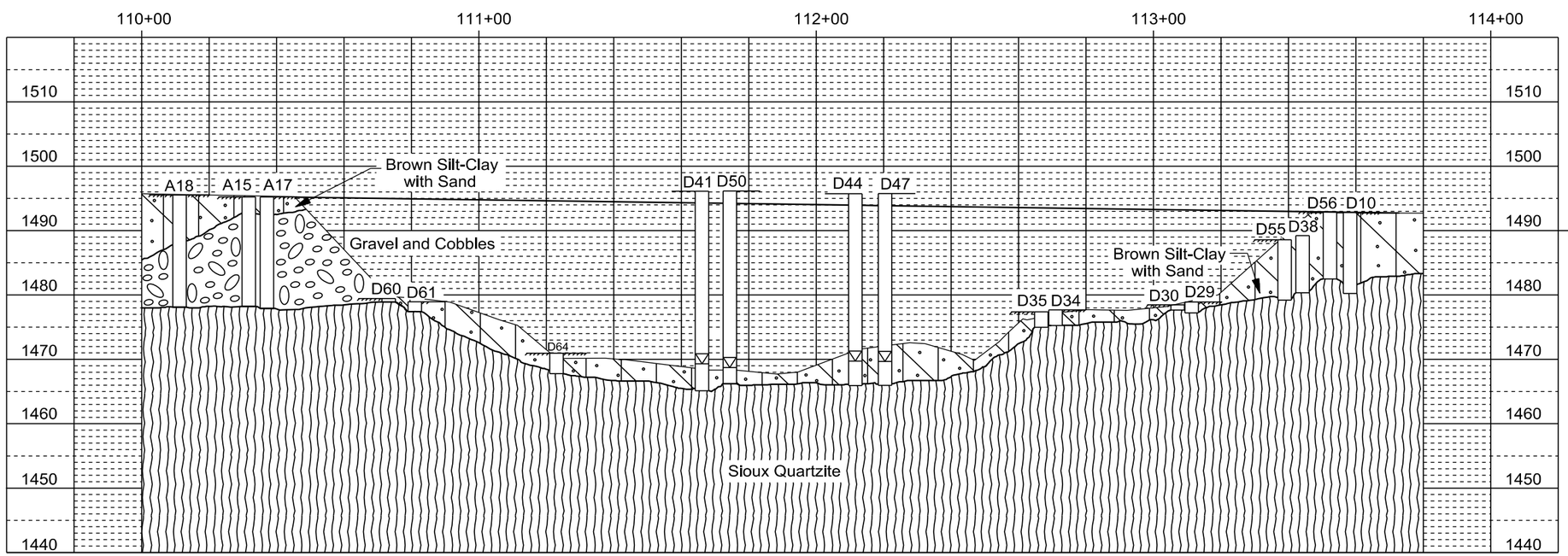
3. Welding for the Abutment Armoring Assembly shall be in accordance with AWS D1.1 Structural Welding Code - Steel.

4. The cost of the Abutment Armoring Assembly complete in-place including fabrication, welding, and galvanizing shall be incidental to the abutment contract items.

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E8 | E44 |




***PLAN***




Sioux Quartzite is pink to red, hard silica cemented sandstone. It is jointed, bedded, 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.

## LEGEND

Auger Test ▽ Water

All auger holes are drilled with a 4½ inch diameter or 2½ inch diameter continuous flight auger.

GROUND WATER ELEVATIONS
as of MARCH 2015

| | |
|---|---|
| D10 | (DRY) 1480.2 |
| D29 | (DRY) 1477.2 |
| D30 | (DRY) 1477.7 |
| D34 | (DRY) 1475.3 |
| D35 | (DRY) 1475.0 |
| D38 | (DRY) 1480.3 |
| D41 | 1469.3 |
| D44 | 1469.7 |
| D47 | 1469.7 |
| D50 | 1468.7 |
| D55 | (DRY) 1479.2 |
| D56 | (DRY) 1482.5 |
| D60 | (DRY) 1478.9 |
| D61 | (DRY) 1477.4 |
| D64 | (DRY) 1467.8 |

GROUND WATER ELEVATIONS
as of SEPTEMBER 2015

| | |
|---|---|
| A15 | (DRY) 1478.2 |
| A17 | (DRY) 1477.9 |
| A18 | (DRY) 1478.1 |

**SUBSURFACE INVESTIGATION**

FOR

## 307' - 3" CONT. CONCRETE BRIDGE

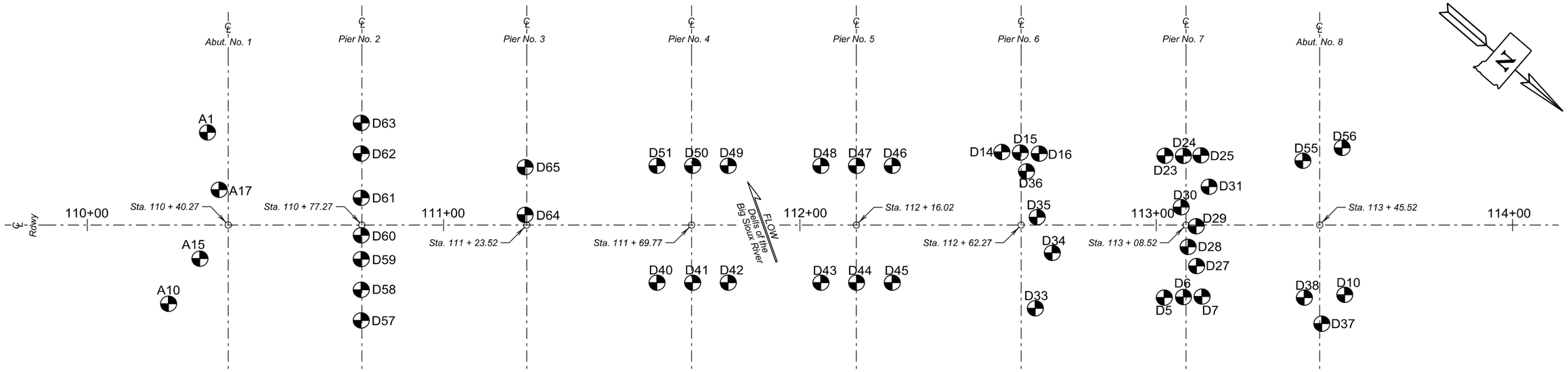
42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015

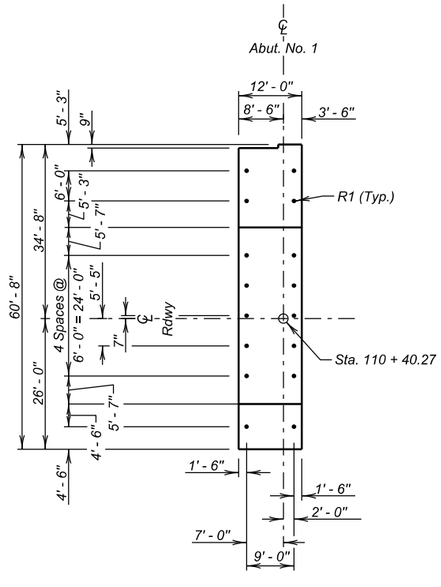


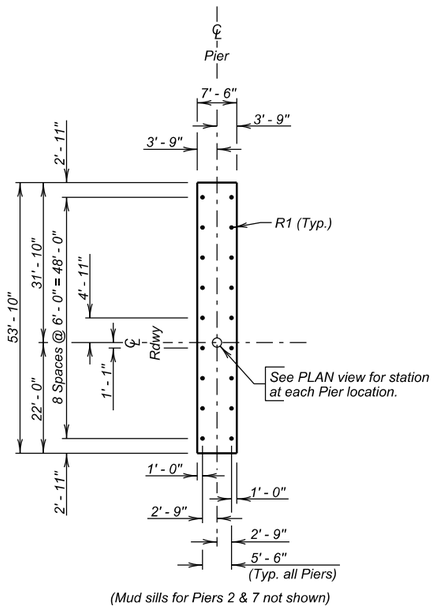
| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| JW | TB | JL/MG | Kevin N. Boeder |
| MINN025C | 025CGC06 | | BRIDGE ENGINEER |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E9 | E44 |

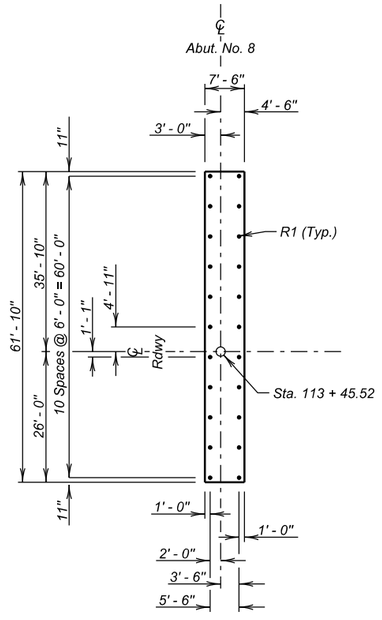



**PLAN**




(Mud sills for Piers 2 & 7 not shown)




(Mud sill not shown)

***FOOTING & ROCK DOWEL LAYOUT***

**DRILL LOCATION, FOOTING, AND ROCK DOWEL LAYOUT**

FOR

# 307' - 3" CONT. CONCRETE BRIDGE

42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

MINNEHAHA COUNTY

S. D. DEPT. OF TRANSPORTATION

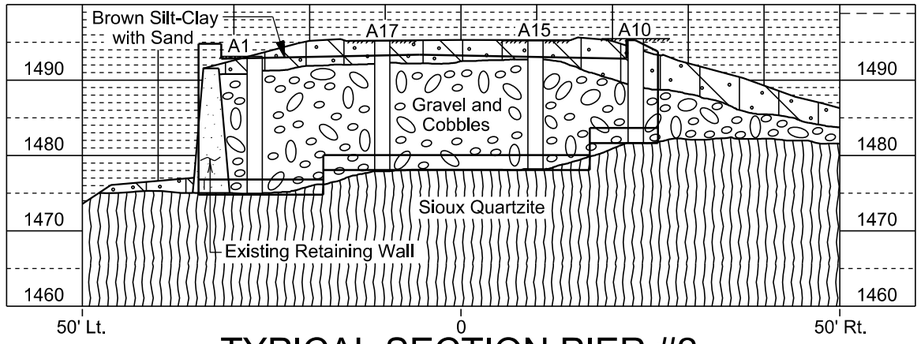
OCTOBER 2015



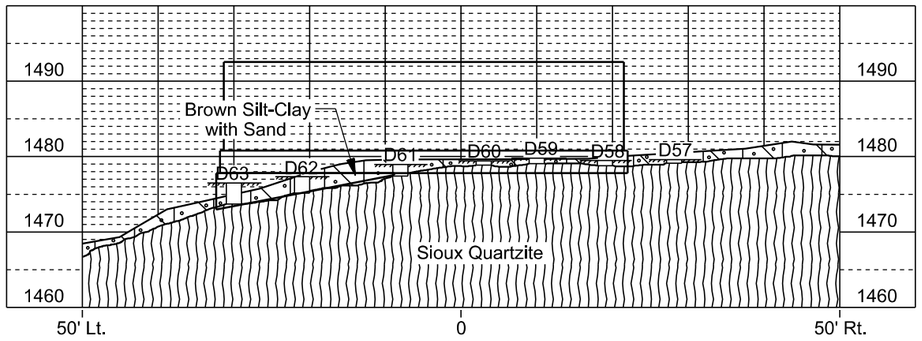
| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| JW | TB | JL/MG | Kevin N. Goeden |
| MINN025C | 025CGC07 | | BRIDGE ENGINEER |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E10 | E44 |

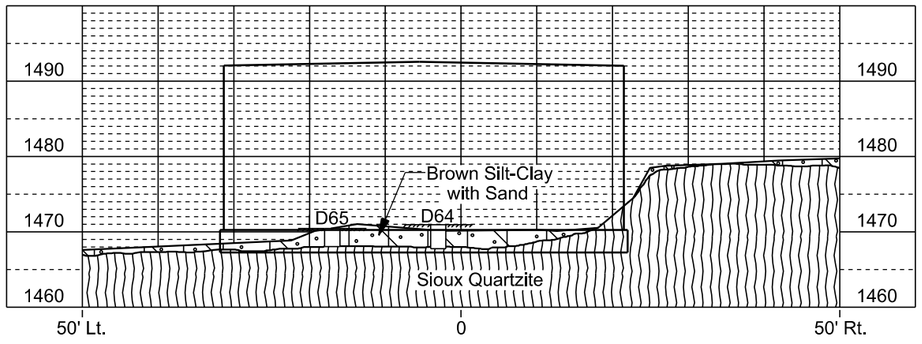
## TYPICAL SECTION ABUTMENT #1



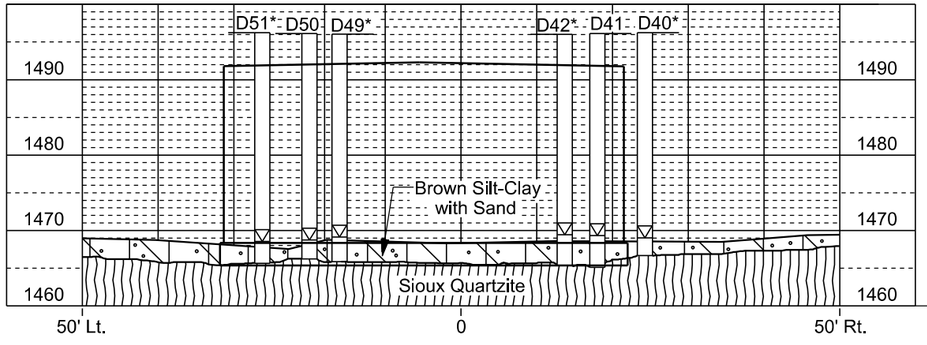

## TYPICAL SECTION PIER #2



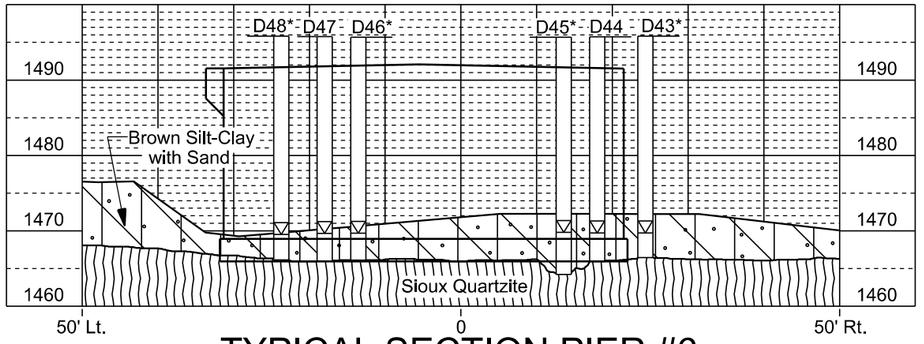

## TYPICAL SECTION PIER #3



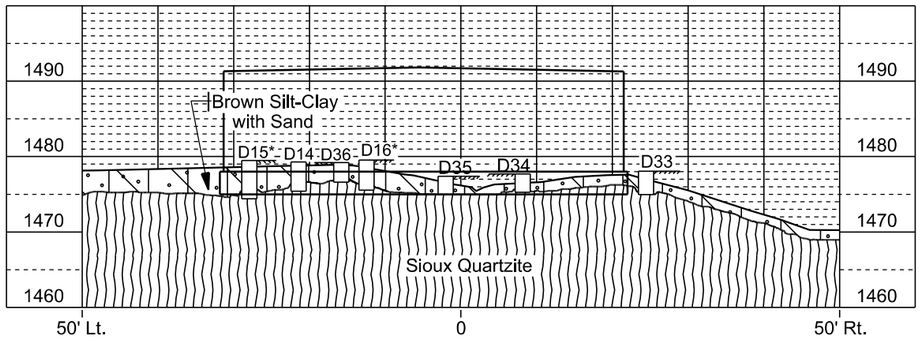

## TYPICAL SECTION PIER #4



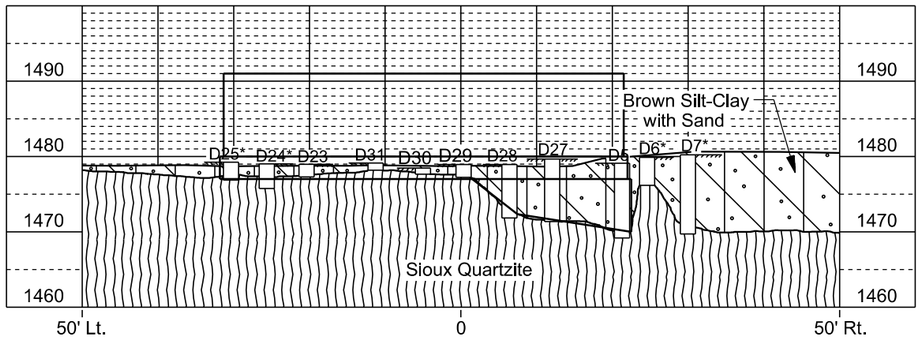

## TYPICAL SECTION PIER #5



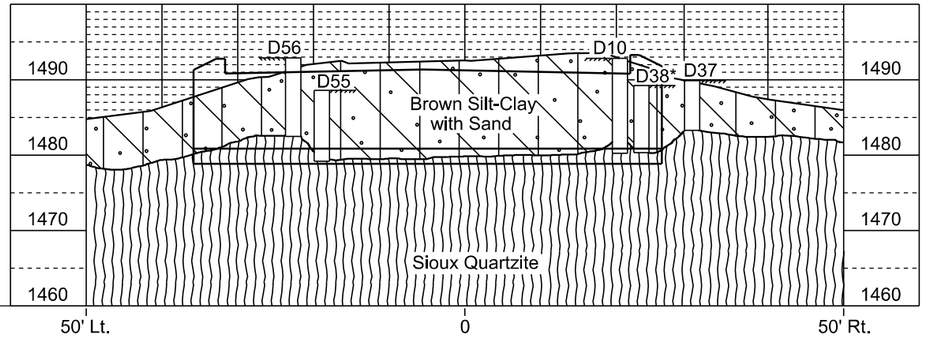

## TYPICAL SECTION PIER #6




## TYPICAL SECTION PIER #7




## TYPICAL SECTION ABUTMENT #8




Existing Groundlines shown are at centerline of each substructure unit.

GROUND WATER ELEVATIONS
as of MARCH 2015

| | |
|---|---|
| D10 | (DRY) 1480.2 |
| D29 | (DRY) 1477.2 |
| D30 | (DRY) 1477.7 |
| D34 | (DRY) 1475.3 |
| D35 | (DRY) 1475.0 |
| D38 | (DRY) 1480.3 |
| D40 | 1469.0 |
| D41 | 1469.3 |
| D42 | 1469.4 |
| D43 | 1469.7 |
| D44 | 1469.7 |
| D45 | 1469.8 |
| D46 | 1469.7 |
| D47 | 1469.7 |
| D48 | 1469.5 |
| D49 | 1469.1 |
| D50 | 1469.7 |
| D51 | 1469.5 |
| D55 | (DRY) 1479.2 |
| D56 | (DRY) 1482.5 |
| D60 | (DRY) 1478.9 |
| D61 | (DRY) 1477.4 |
| D64 | (DRY) 1467.8 |

GROUND WATER ELEVATIONS
as of SEPTEMBER 2015

| | |
|---|---|
| A1 | (DRY) 1475.0 |
| A10 | (DRY) 1481.7 |
| A15 | (DRY) 1478.2 |
| A17 | (DRY) 1477.9 |

**SUBSURFACE INVESTIGATION CROSS SECTIONS**

FOR

# 307' - 3" CONT. CONCRETE BRIDGE

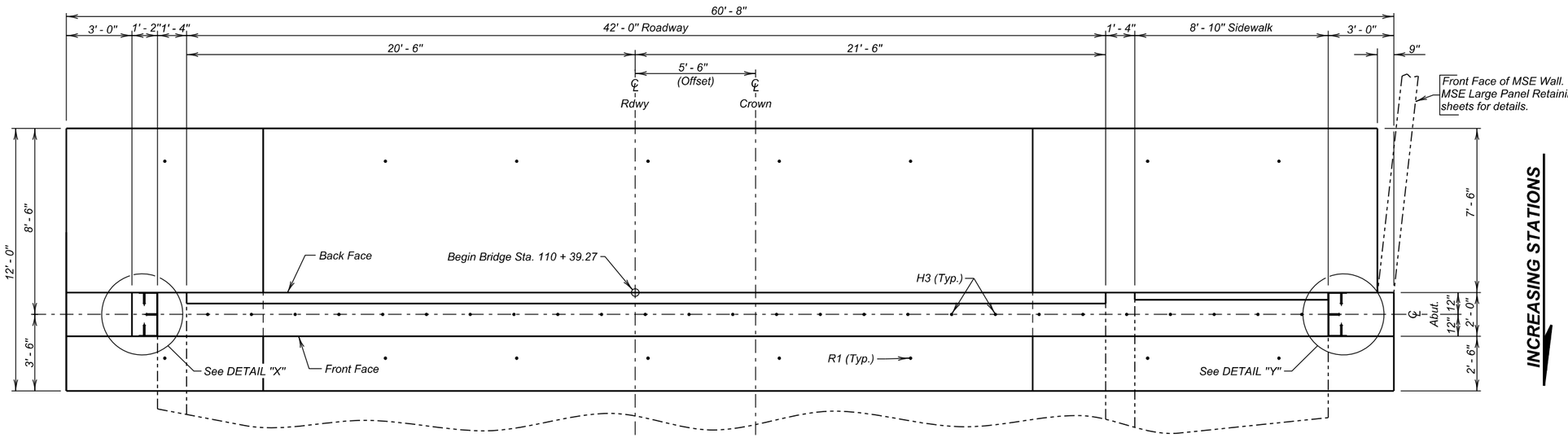
42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015

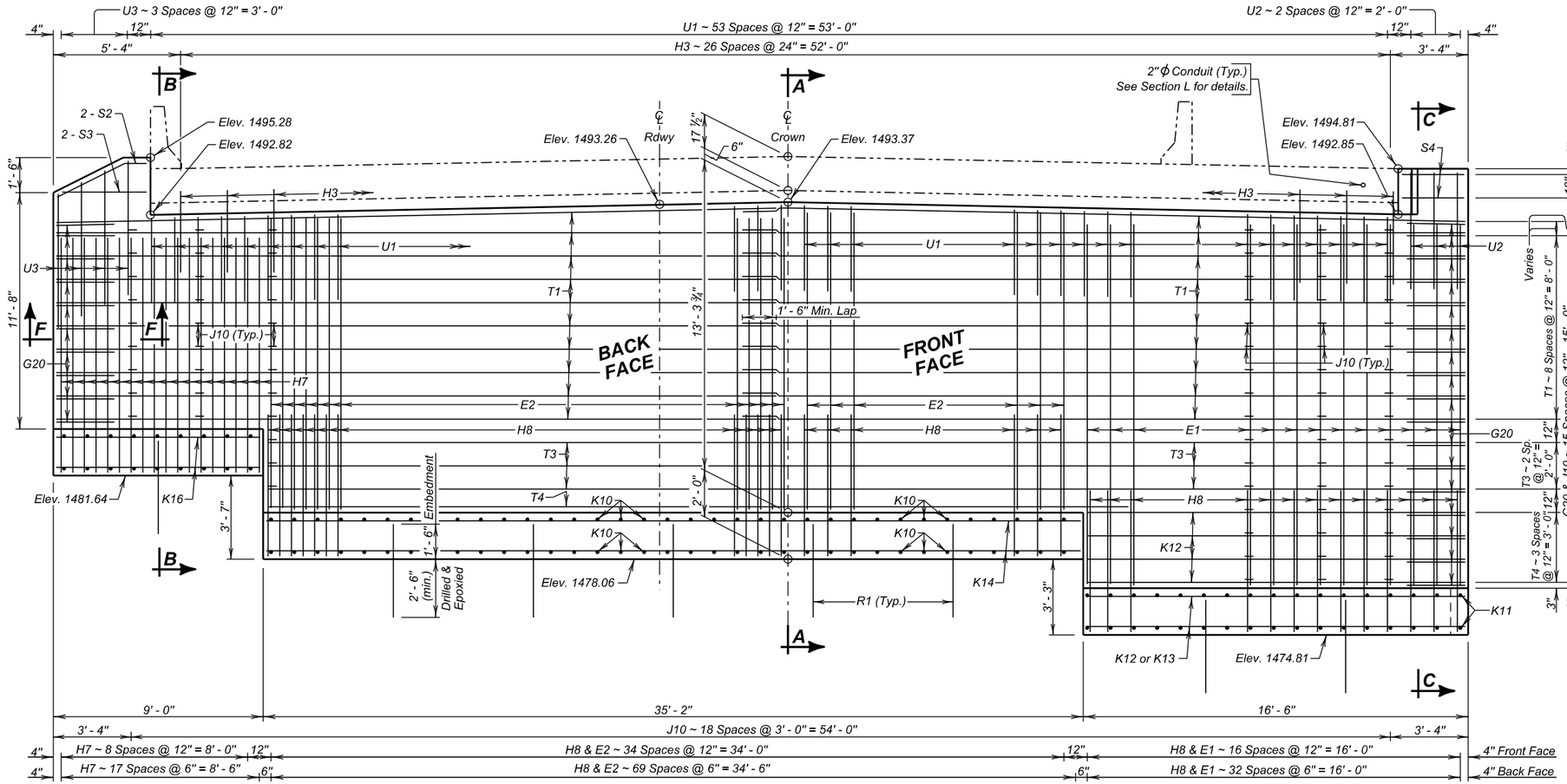


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| JW | TB | JL/MG | Kevin N. Goeden BRIDGE ENGINEER |
| MINN025C | 025CGC08 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E11 | E44 |




**PLAN**

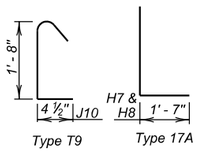


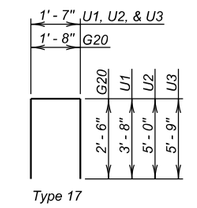

**ELEVATION**

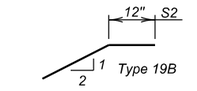
## REINFORCING SCHEDULE

| Mk. | No. | Size | Length | Type |
|---|---|---|---|---|
| E1 | 50 | 9 | 15' - 9" | Str. |
| E2 | 105 | 9 | 12' - 6" | Str. |
| G20 | 27 | 4 | 6' - 8" | 17 |
| Δ H3 | 27 | 7 | 4' - 0" | Str. |
| H7 | 27 | 9 | 11' - 8" | 17A |
| H8 | 155 | 9 | 7' - 8" | 17A |
| J10 | 223 | 4 | 2' - 5" | T9 |
| K10 | 120 | 8 | 11' - 6" | Str. |
| K11 | 2 | 8 | 4' - 3" | Str. |
| K12 | 18 | 4 | 16' - 3" | Str. |
| K13 | 14 | 4 | 15' - 6" | Str. |
| K14 | 2 | 4 | 34' - 11" | Str. |
| K16 | 24 | 4 | 8' - 9" | Str. |
| R1 | 16 | 11 | 4' - 0" | Str. |
| S2 | 2 | 4 | 4' - 3" | 19B |
| S3 | 2 | 4 | 3' - 6" | Str. |
| S4 | 4 | 4 | 2' - 9" | Str. |
| T1 | 20 | 4 | 31' - 0" | Str. |
| T3 | 8 | 4 | 51' - 5" | Str. |
| T4 | 2 | 4 | 37' - 0" | Str. |
| U1 | 54 | 9 | 8' - 11" | 17 |
| U2 | 3 | 9 | 11' - 7" | 17 |
| U3 | 4 | 9 | 13' - 1" | 17 |

Bending Details



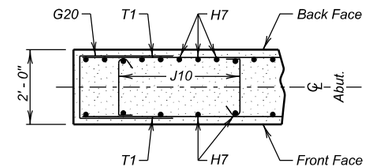




NOTES:
Δ Bars to be Epoxy Coated.
All dimensions are out to out of bars.

INCREASING STATIONS

## ESTIMATED QUANTITIES

| ITEM | UNIT | QUANTITY |
|---|---|---|
| Class A45 Concrete, Bridge | Cu. Yd. | 115.0 |
| Reinforcing Steel | Lb. | 19995 |
| Epoxy Coated Reinforcing Steel | Lb. | 221 |
| Structure Excavation, Bridge | Cu. Yd. | 543.6 |
| Install Dowel in Rock | Ft. | 40 |




**SEC. F - F**

**ABUTMENT NO. 1 DETAILS (A)**

FOR

307' - 3" CONT. CONCRETE BRIDGE

42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

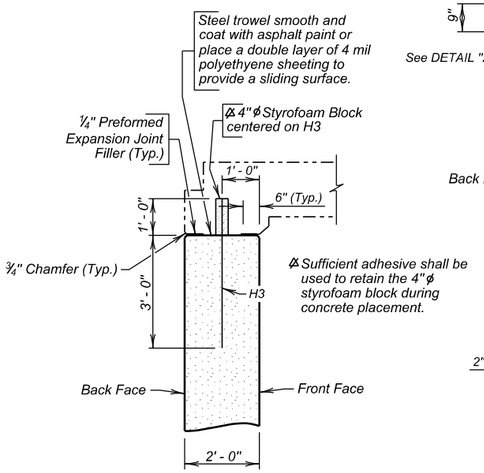
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| TB | BS | BT | Kevin N. Goeden BRIDGE ENGINEER |
| MINN025C | 025CGC09 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E12 | E44 |

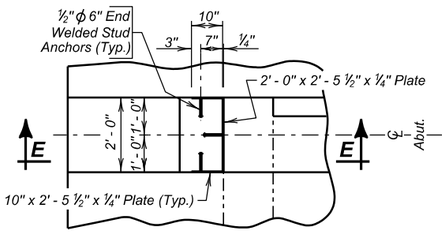
✳ NOTE:
Quantity for Z1 bars and Mechanical Splices are listed on the SUPERSTRUCTURE DETAILS Sheet.



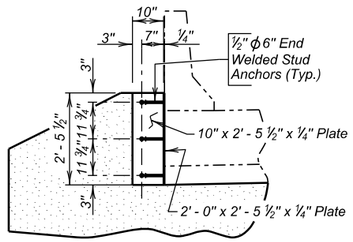

**DETAIL "Z"**



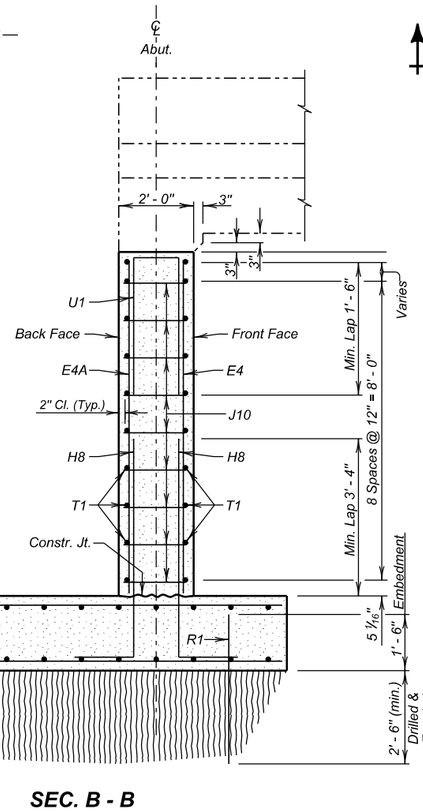

**SEC. A - A**



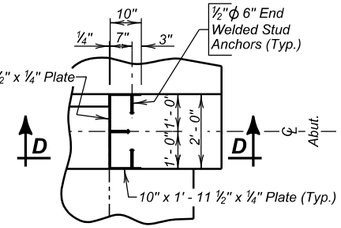

**DETAIL "X"**
(Abutment Armoring Assembly)



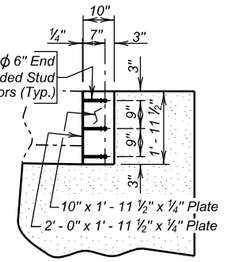

**SEC. E - E**



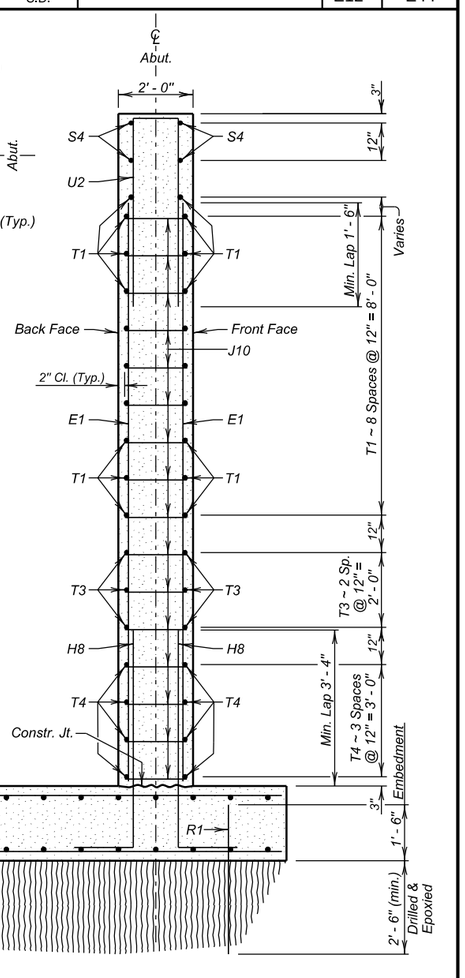

**SEC. B - B**



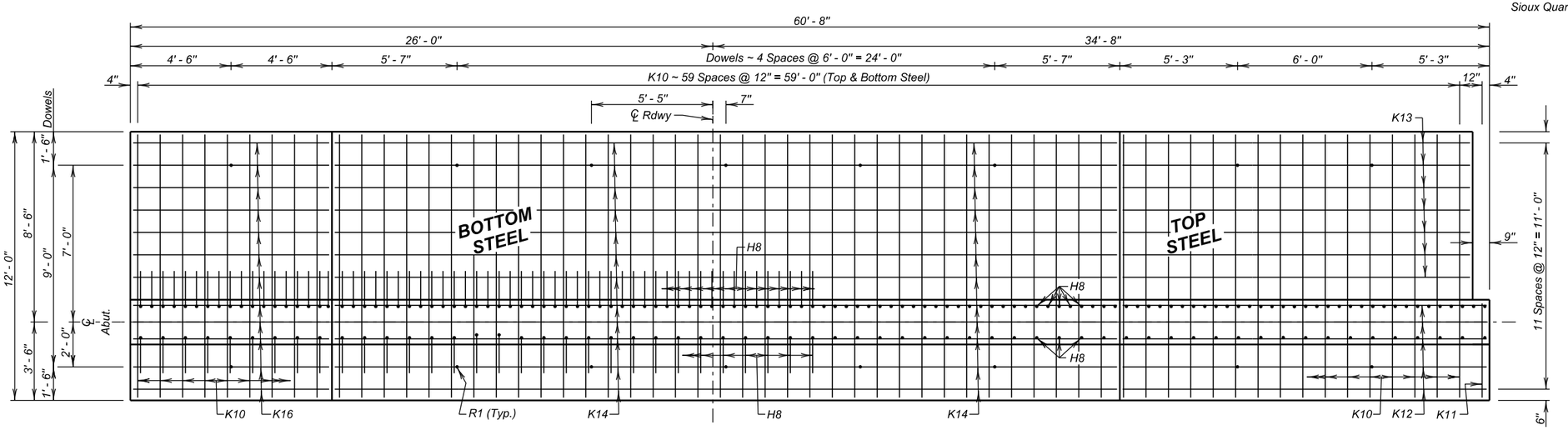

**DETAIL "Y"**
(Abutment Armoring Assembly)




**SEC. D - D**




**SEC. C - C**




**PLAN**
(Footing Steel)

**ABUTMENT NO. 1 DETAILS (B)**

FOR

## 307' - 3" CONT. CONCRETE BRIDGE

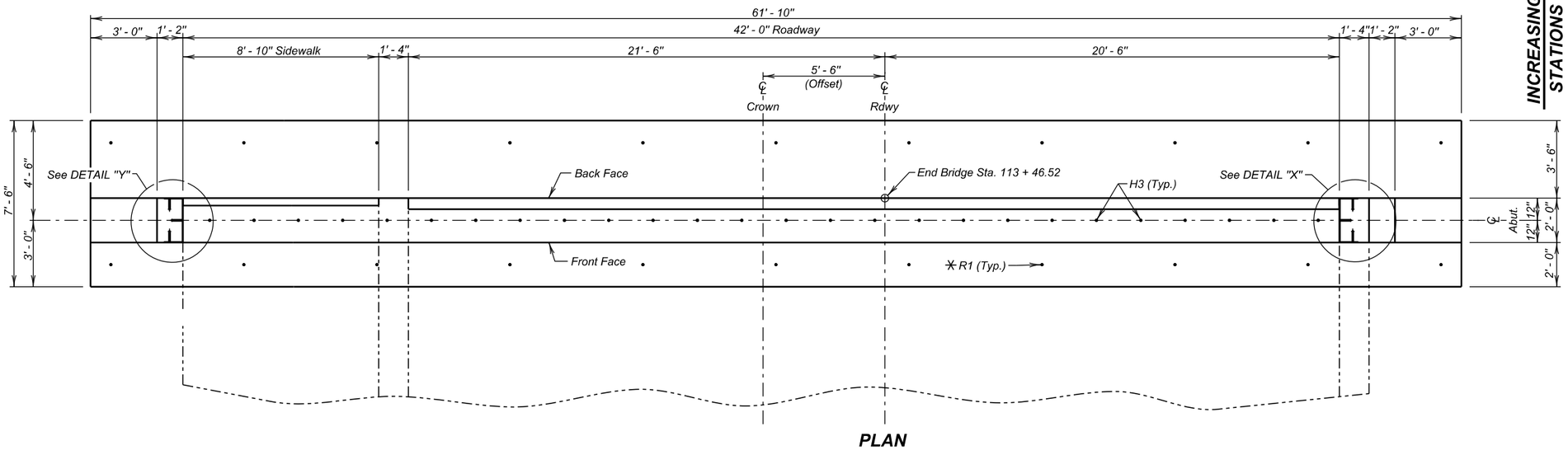
42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015

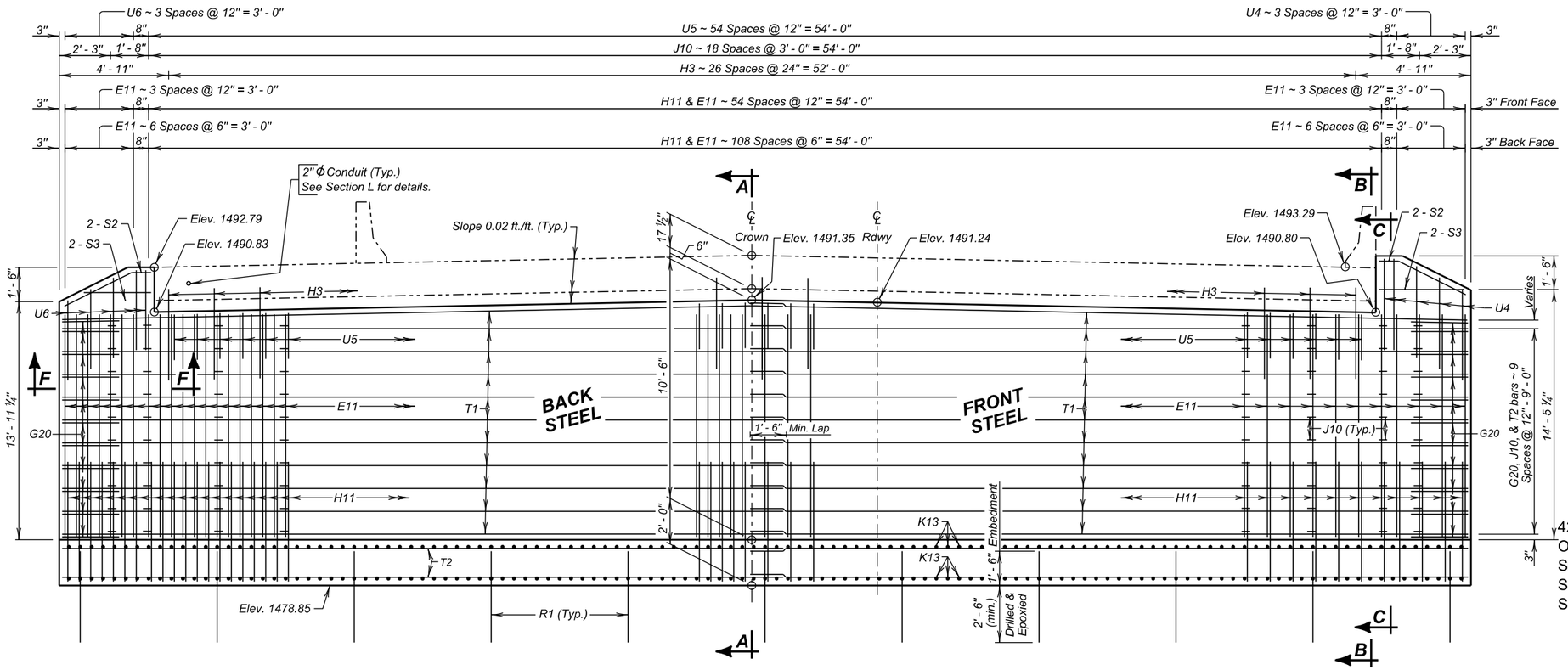
10 OF 36

| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| TB | BS | BT | Kevin N. Goeden |
| MINN025C | 025CGC10 | | BRIDGE ENGINEER |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E13 | E44 |



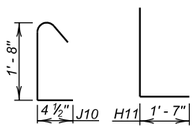

**PLAN**



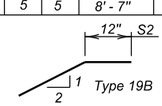

**ELEVATION**

## REINFORCING SCHEDULE

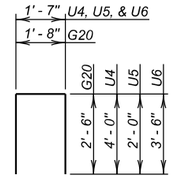
| Mk. | No. | Size | Length | Type | Bending Details |
|---|---|---|---|---|---|
| E11 | 186 | 5 | 9' - 9" | Str. | |
| G20 | 20 | 4 | 6' - 8" | 17 | |
| △ H3 | 27 | 7 | 4' - 0" | 17A | |
| H11 | 186 | 6 | 6' - 10" | 17A | |
| J10 | 210 | 4 | 2' - 5" | T9 | |
| K13 | 246 | 6 | 6' - 3" | Str. | |
| R1 | 22 | 11 | 4' - 0" | Str. | |
| S2 | 4 | 4 | 4' - 3" | 19B | |
| S3 | 4 | 4 | 3' - 6" | Str. | |
| T2 | 80 | 4 | 31' - 7" | Str. | |
| U4 | 5 | 5 | 9' - 7" | 17 | |
| U5 | 53 | 5 | 5' - 7" | 17 | |
| U6 | 5 | 5 | 8' - 7" | 17 | |




Type T9 Type 17A




Type 19B

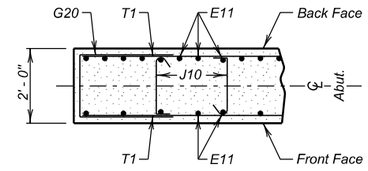



Type 17

NOTES:
△ Bars to be Epoxy Coated.
All dimensions are out to out of bars.

## ESTIMATED QUANTITIES

| ITEM | UNIT | QUANTITY |
|---|---|---|
| Class A45 Concrete, Bridge | Cu. Yd. | 82.1 |
| Reinforcing Steel | Lb. | 9950 |
| Epoxy Coated Reinforcing Steel | Lb. | 221 |
| Structure Excavation, Bridge | Cu. Yd. | 313.6 |
| Install Dowel in Rock | Ft. | 55 |




**SEC. F - F**

**ABUTMENT NO. 8 DETAILS (A)**

FOR

307' - 3" CONT. CONCRETE BRIDGE

42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

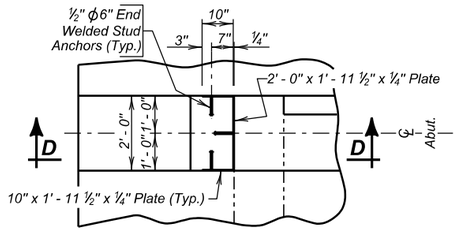
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015



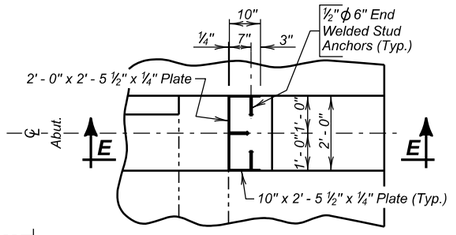
| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| TB | BS | BT | Kevin N. Goeden BRIDGE ENGINEER |
| MINN025C | 025CGC11 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E14 | E44 |

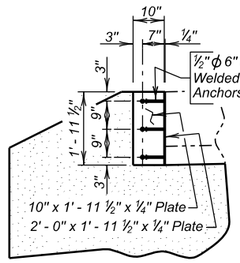
✳ NOTE:
Quantity for Z1 bars and Mechanical Splices are listed on the SUPERSTRUCTURE DETAILS Sheet.



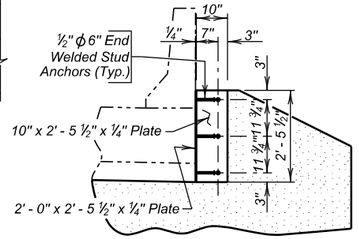

**DETAIL "Y"**
(Abutment Armoring Assembly)



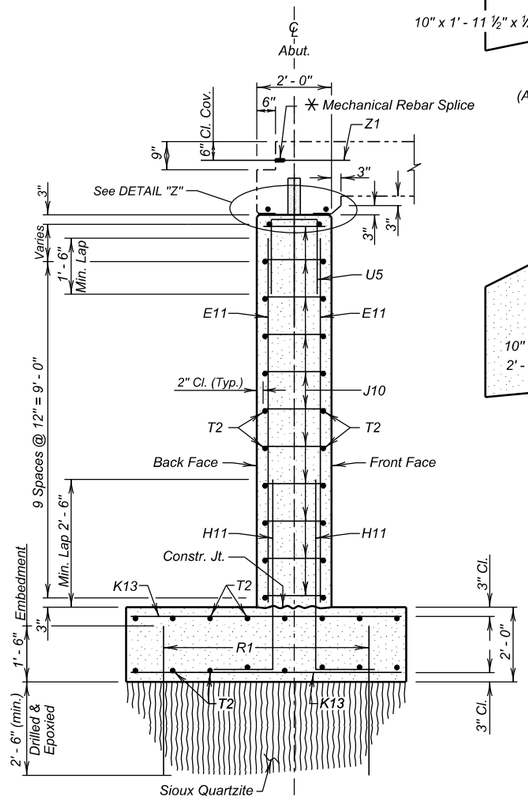

**DETAIL "X"**
(Abutment Armoring Assembly)



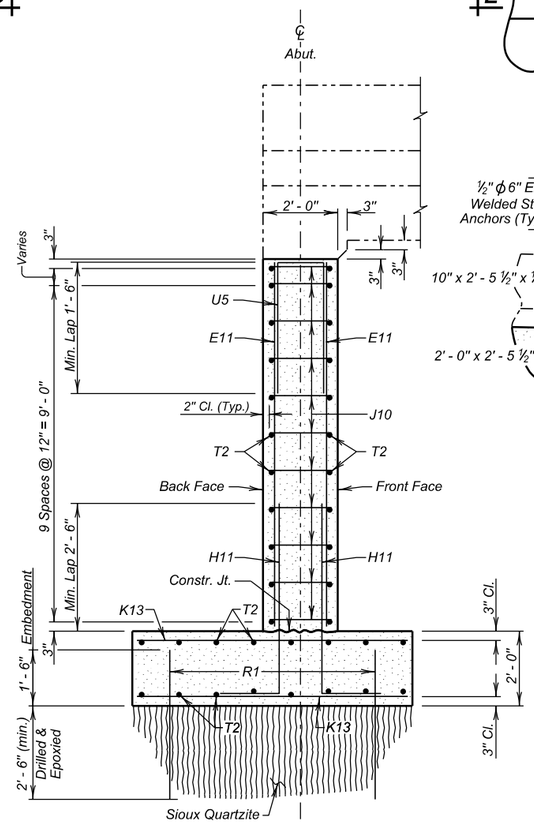

**SEC. D - D**



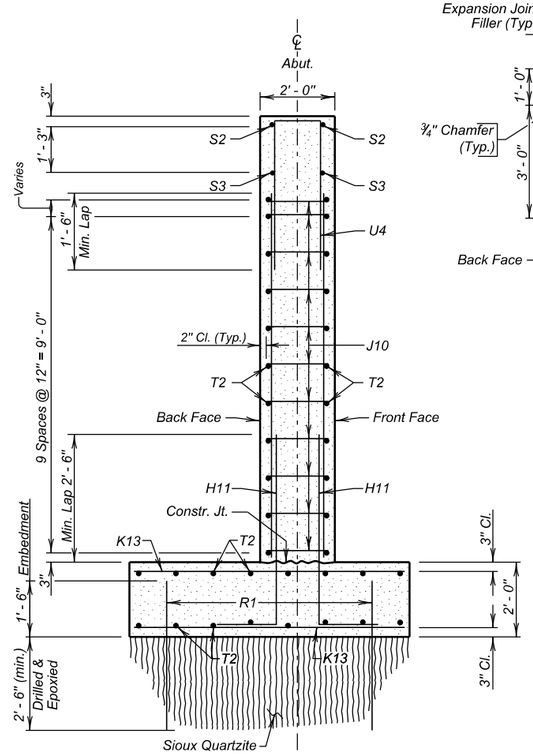

**SEC. E - E**



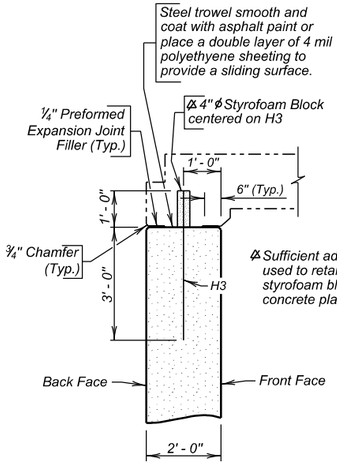

**SEC. A - A**



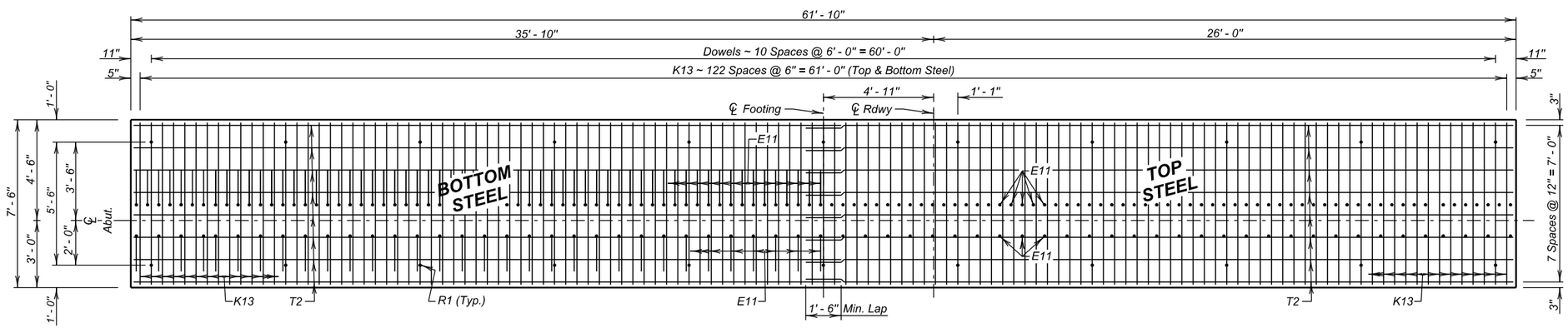

**SEC. B - B**




**SEC. C - C**




**DETAIL "Z"**




**PLAN**
(Footing Steel)

**ABUTMENT NO. 8 DETAILS (B)**

FOR

## 307' - 3" CONT. CONCRETE BRIDGE

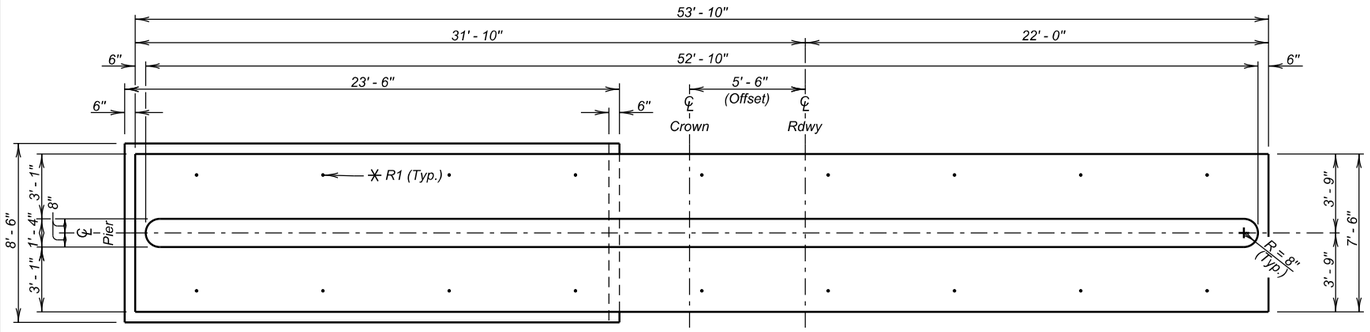
42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015

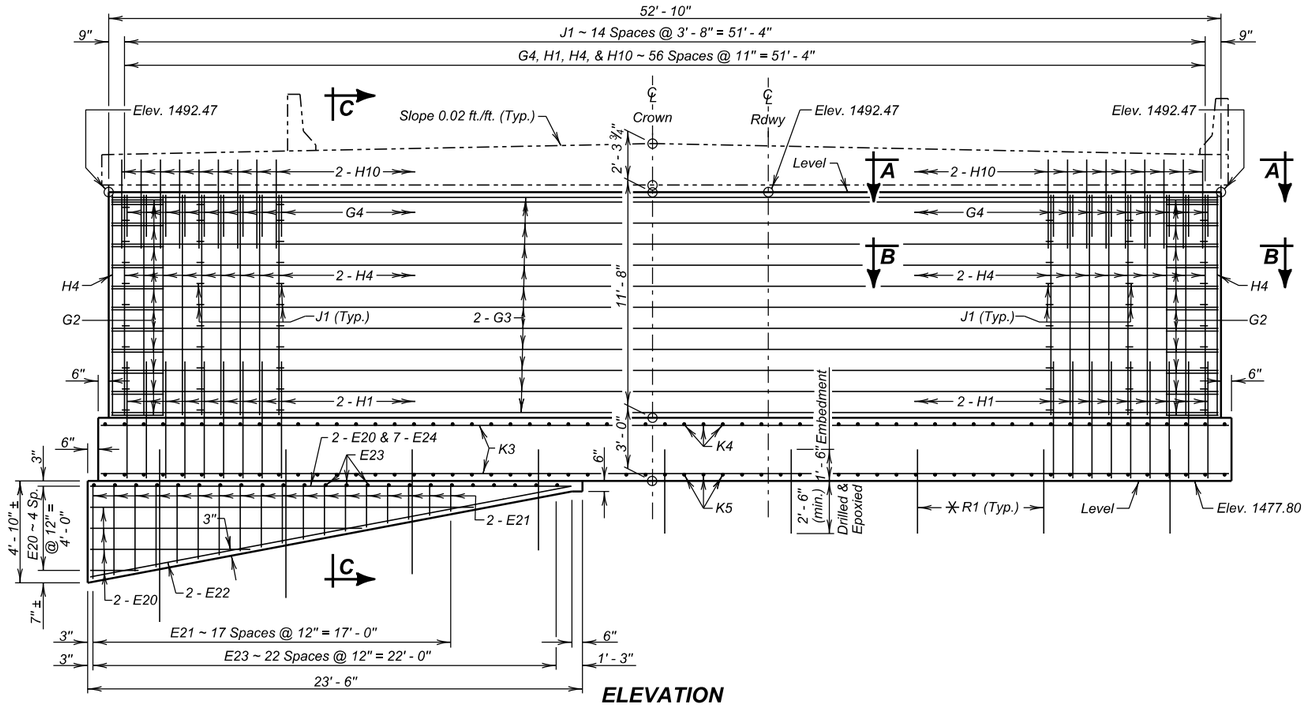
12 OF 36

| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| TB | BS | BT | Kevin N. Goeden BRIDGE ENGINEER |
| MINN025C | 025CGC12 | | |

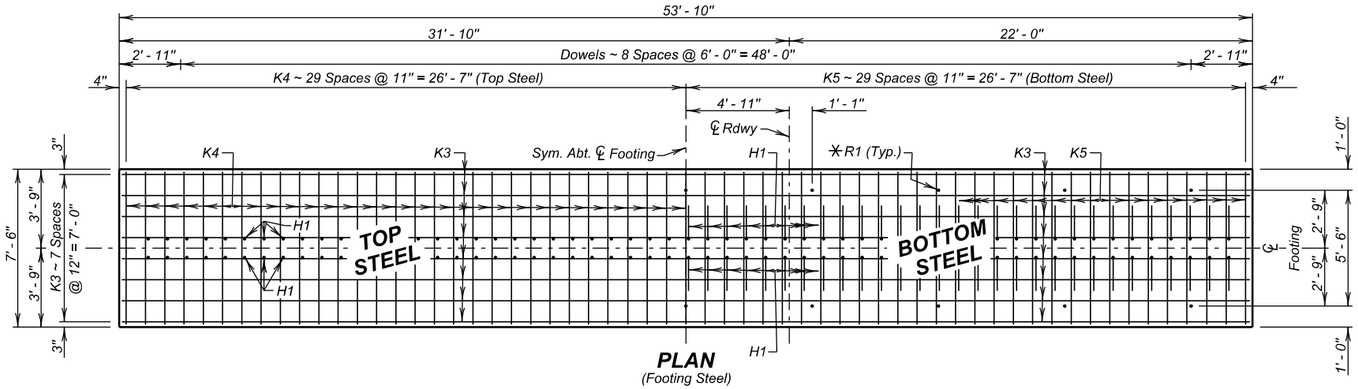
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E15 | E44 |




**PLAN**

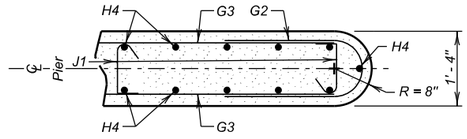



**ELEVATION**

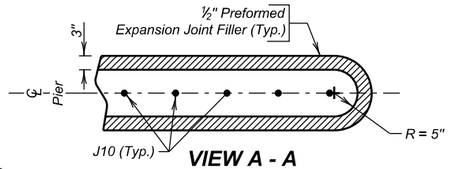



**PLAN**
(Footing Steel)

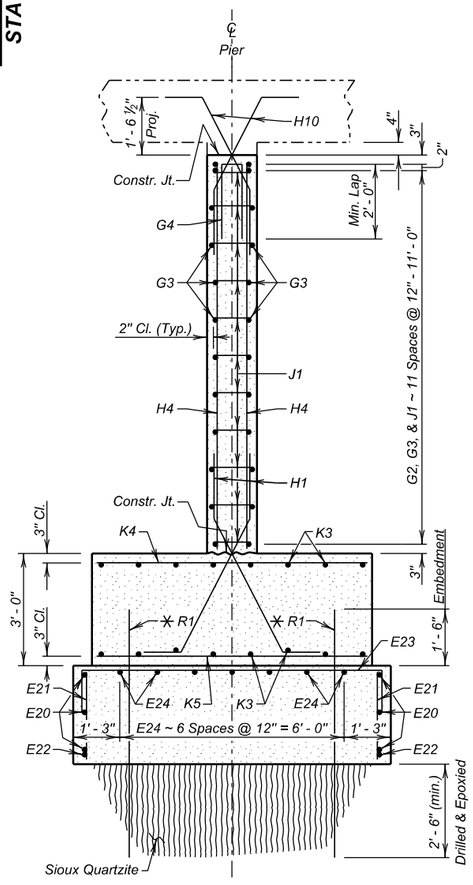
INCREASING STATIONS




**SEC. B - B**




**VIEW A - A**
(Resteel and Bridge Deck not shown)




**SEC. C - C**

## REINFORCING SCHEDULE

| | Mk. | No. | Size | Length | Type | Bending Details |
|---|---|---|---|---|---|---|
| ℄ | E20 | 5 | 4 | 25' - 3" | Str. | |
| ℄ | E21 | 18 | 4 | 5' - 9" | Str. | |
| | E22 | 2 | 4 | 23' - 3" | Str. | |
| | E23 | 23 | 4 | 10' - 0" | 17 | |
| | E24 | 7 | 4 | 22' - 10" | Str. | |
| | G2 | 26 | 4 | 6' - 0" | S11 | |
| | G3 | 26 | 4 | 51' - 6" | Str. | |
| | G4 | 57 | 9 | 4' - 11" | Str. | |
| | H1 | 114 | 9 | 6' - 9" | 14A | |
| | H4 | 116 | 9 | 11' - 7" | Str. | |
| △ | H10 | 114 | 9 | 5' - 6" | 14A | |
| | J1 | 165 | 4 | 1' - 9" | T9 | |
| | K3 | 16 | 4 | 53' - 4" | Str. | |
| | K4 | 59 | 4 | 7' - 0" | Str. | |
| | K5 | 59 | 6 | 7' - 0" | Str. | |
| ✳ | R1 | 18 | 11 | Varies | Str. | |

Type 17 (11", G4, 2' - 0")
Type S11 (12", G2, 2' - 6")
Type T9 (12", E23 8' - 0", 4 ½", J1, 12")
Type 17
Type 14A (1' - 0", H1, H10, 2' - 9", 4' - 0", 12, 6 3/16, 1' - 9")

| | E21 | E20 |
|---|---|---|
| Cut 5 | 4' - 5" | 22' - 10" |
| Cut 18 | 1' - 4" | 2' - 5" |

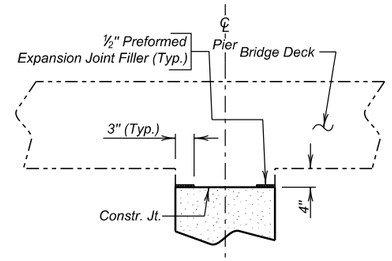
| | E20 | E21 |
|---|---|---|
| Cut 5 | 2' - 5" | 1' - 4" |
| Cut 18 | 22' - 10" | 4' - 5" |

NOTES:
℄ See cutting diagram.
All dimensions are out to out of bars.
✳ Embedment length to be a minimum of 2' - 6" into rock and 1' - 6" into footing.
△ Bars to be epoxy coated.

## ESTIMATED QUANTITIES

| | ITEM | UNIT | QUANTITY |
|---|---|---|---|
| | Class A45 Concrete, Bridge | Cu. Yd. | 95.3 |
| ⊛ | Reinforcing Steel | Lb. | 11747 |
| | Epoxy Coated Reinforcing Steel | Lb. | 2132 |
| | Structure Excavation, Bridge | Cu. Yd. | 48.4 |
| | Install Dowel in Rock | Ft. | 45 |

⊛ R1 rock dowels estimated total length = 92' - 0" and is included in the Reinforcing Steel bid item.




**DETAIL "X"**
(Resteel not shown)

**PIER NO. 2 DETAILS**
FOR
# 307' - 3" CONT. CONCRETE BRIDGE

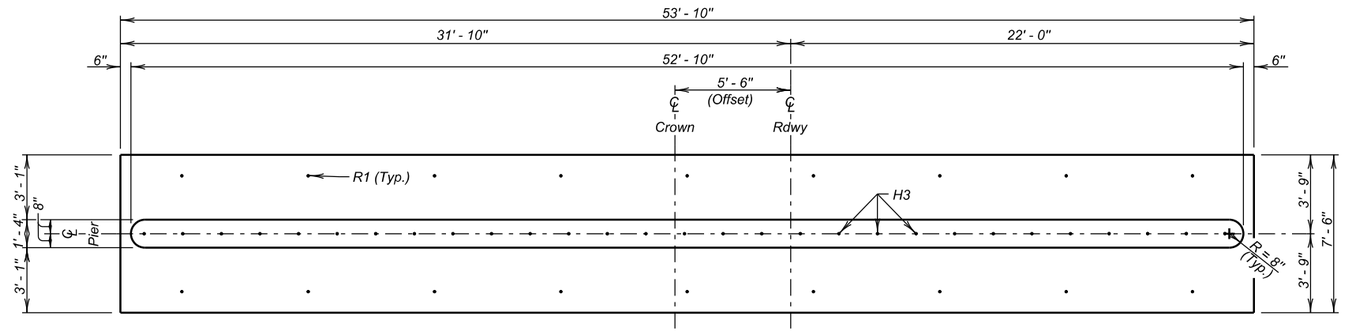
42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG SIOUX RIVER — SEC. 16-T104N-R49W
STA. 110 + 39.27 TO 113 + 46.52 — P 0115(47)102
STR. NO. 50-208-022 — HL-93

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015

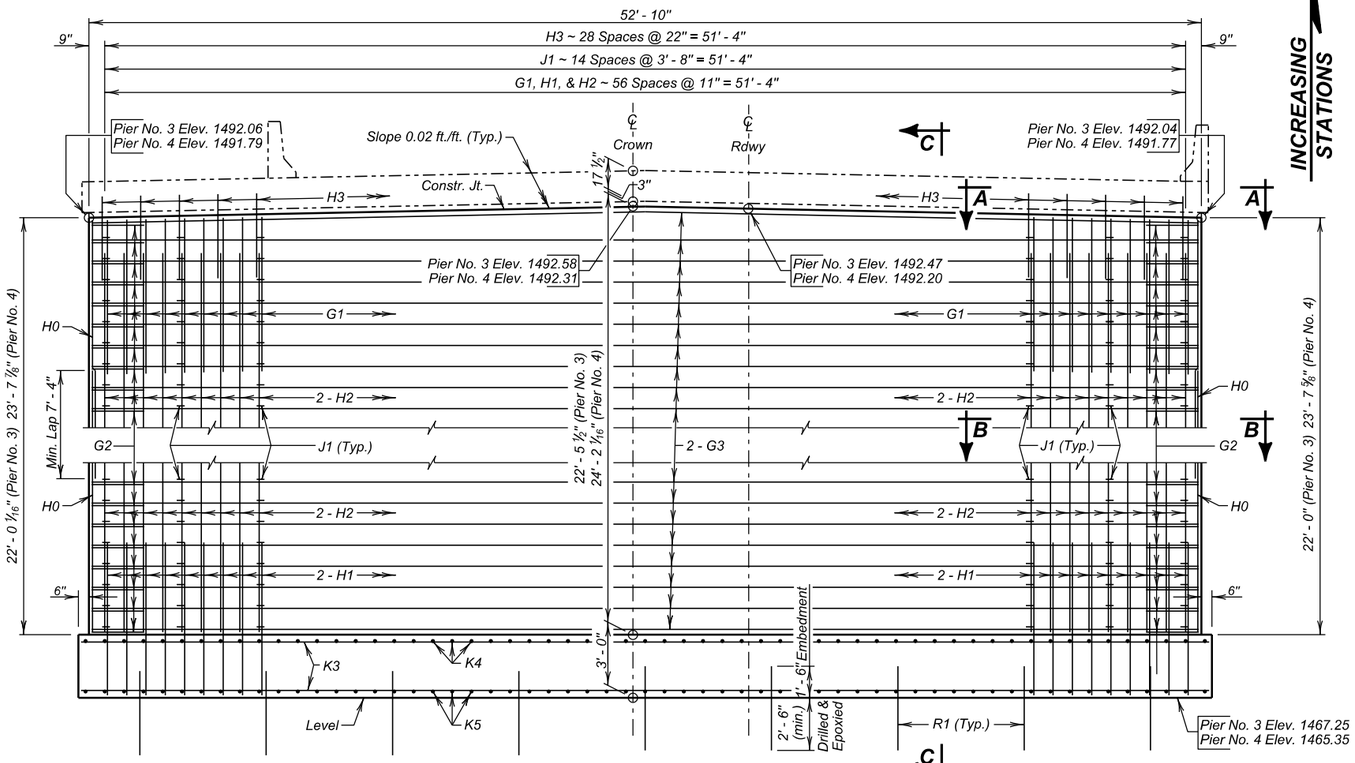
13 OF 36

| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| TB | BS | BT | Kevin N. Goeden |
| MINN025C | 025CGC13 | | BRIDGE ENGINEER |

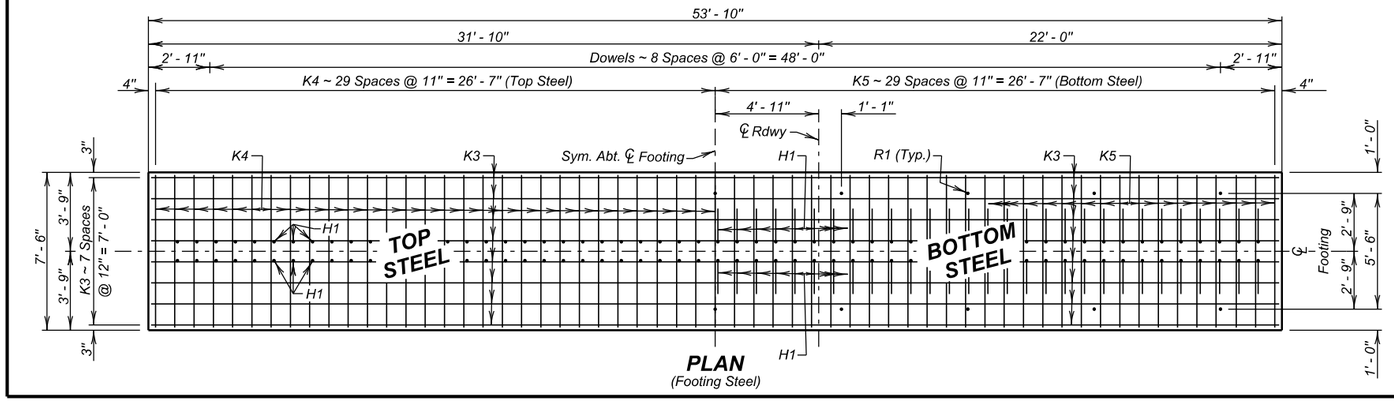
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E16 | E44 |



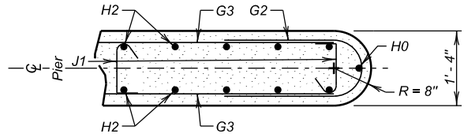

**PLAN**



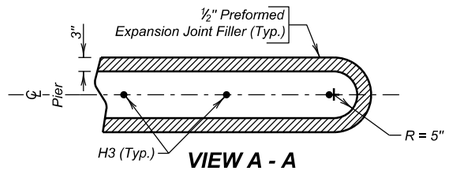

**ELEVATION**



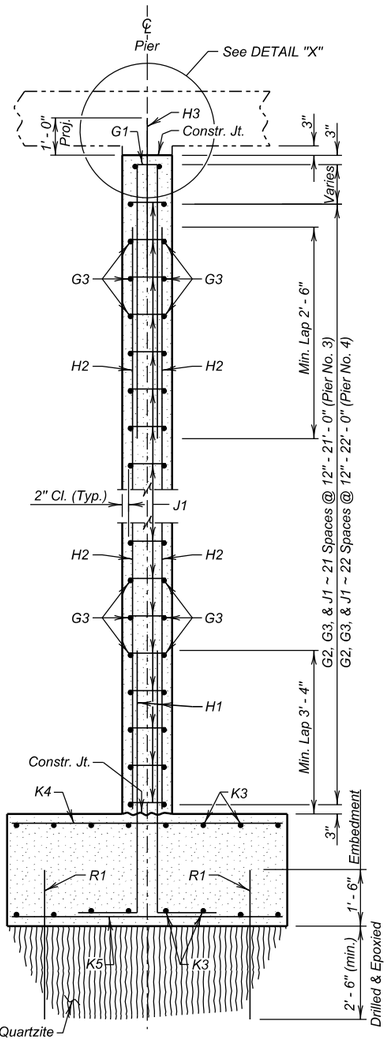

**PLAN**
(Footing Steel)




**SEC. B - B**



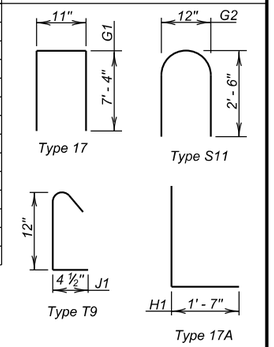

**VIEW A - A**
(Resteel and Bridge Deck not shown)




**SEC. C - C**

## REINFORCING SCHEDULE
(For One Pier - 2 Required)

| Mk. | No. | Size | Length | Type | Bending Details |
|---|---|---|---|---|---|
| G1 | 57 | 9 | 15' - 7" | 17 | |
| H0 | 4 | 9 | 14' - 5" | Str. | |
| H1 | 114 | 9 | 8' - 10" | 17A | |
| H2 | 114 | 9 | 20' - 0" | Str. | |
| △ H3 | 29 | 7 | 4' - 0" | Str. | |
| J1 | 345 | 4 | 1' - 9" | T9 | |
| K3 | 16 | 4 | 53' - 4" | Str. | |
| K4 | 59 | 4 | 7' - 0" | Str. | |
| K5 | 59 | 6 | 7' - 0" | Str. | |
| ⊛ R1 | 18 | 11 | 4' - 0" | Str. | |
| Pier No. 3 G2 | 46 | 4 | 6' - 0" | S11 | |
| Pier No. 3 G3 | 46 | 4 | 51' - 6" | Str. | |
| Pier No. 4 G2 | 50 | 4 | 6' - 0" | S11 | |
| Pier No. 4 G3 | 50 | 4 | 51' - 6" | Str. | |

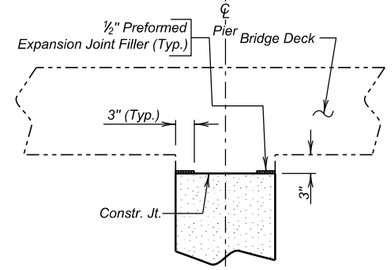



NOTES:
All dimensions are out to out of bars.
△ Bars to be epoxy coated.

## ESTIMATED QUANTITIES

| ITEM | UNIT | QUANTITY | |
|---|---|---|---|
| | | Pier No. 3 | Pier No. 4 |
| Class A45 Concrete, Bridge | Cu. Yd. | 102.4 | 107.1 |
| ⊛ Reinforcing Steel | Lb. | 18411 | 18565 |
| Epoxy Coated Reinforcing Steel | Lb. | 237 | 237 |
| Structure Excavation, Bridge | Cu. Yd. | 67.1 | 66.3 |
| Install Dowel in Rock | Ft. | 45 | 45 |

⊛ Includes R1 rock dowels.




**DETAIL "X"**
(Resteel not shown)

**PIER NO. 3 AND 4 DETAILS**

FOR

# 307' - 3" CONT. CONCRETE BRIDGE

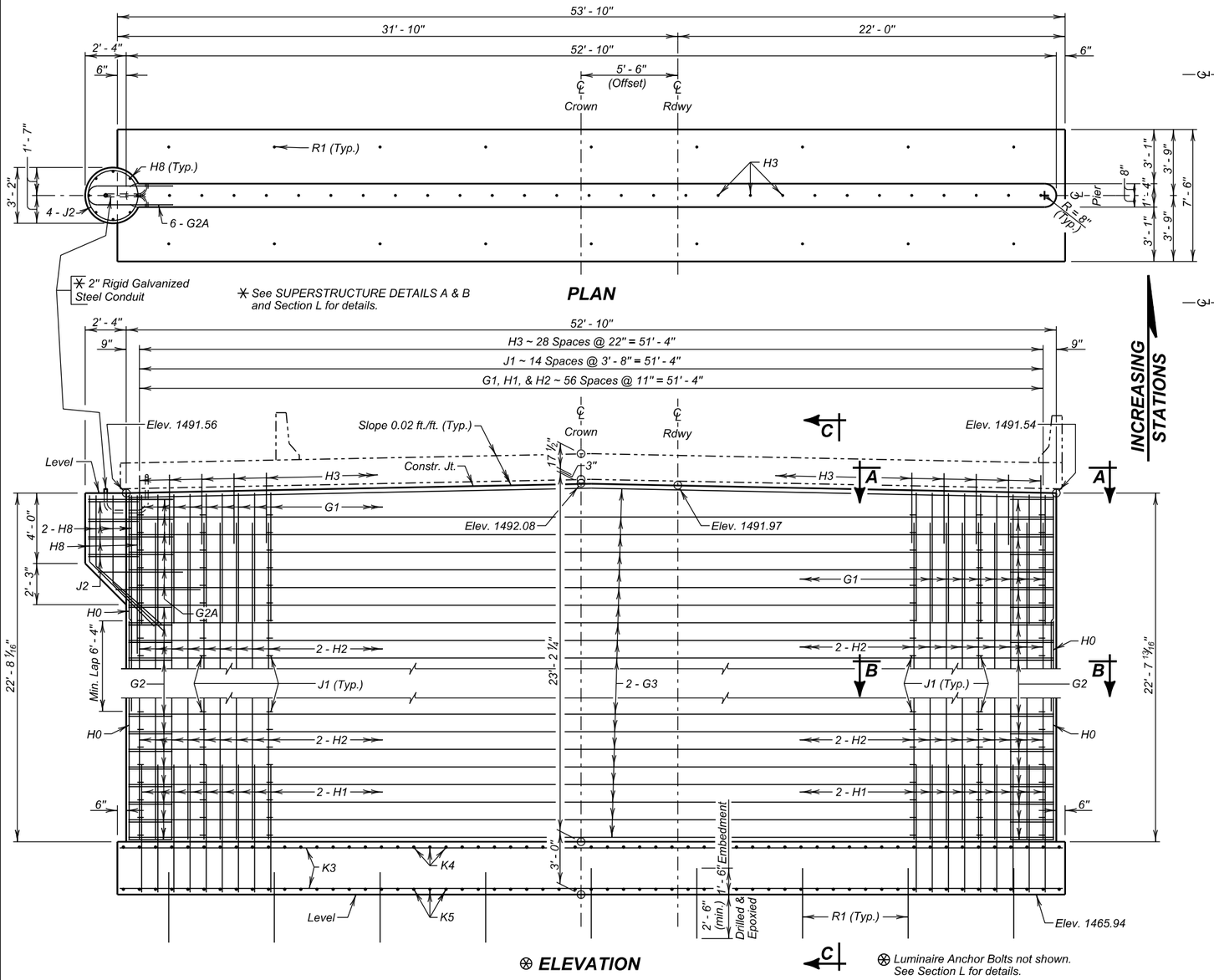
42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

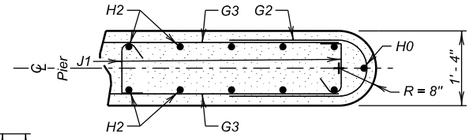
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015



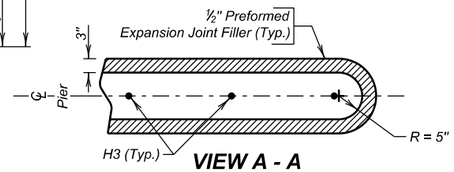
| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| TB | BS | BT | Kevin N. Goeden |
| MINN025C | 025CGC14 | | BRIDGE ENGINEER |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E17 | E44 |

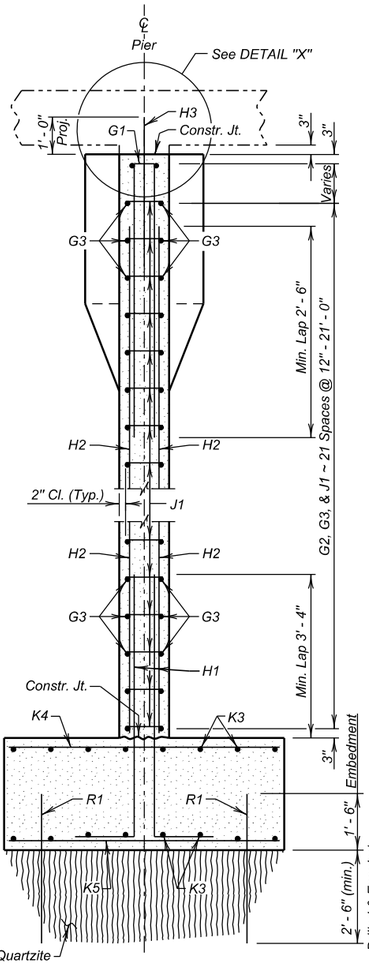


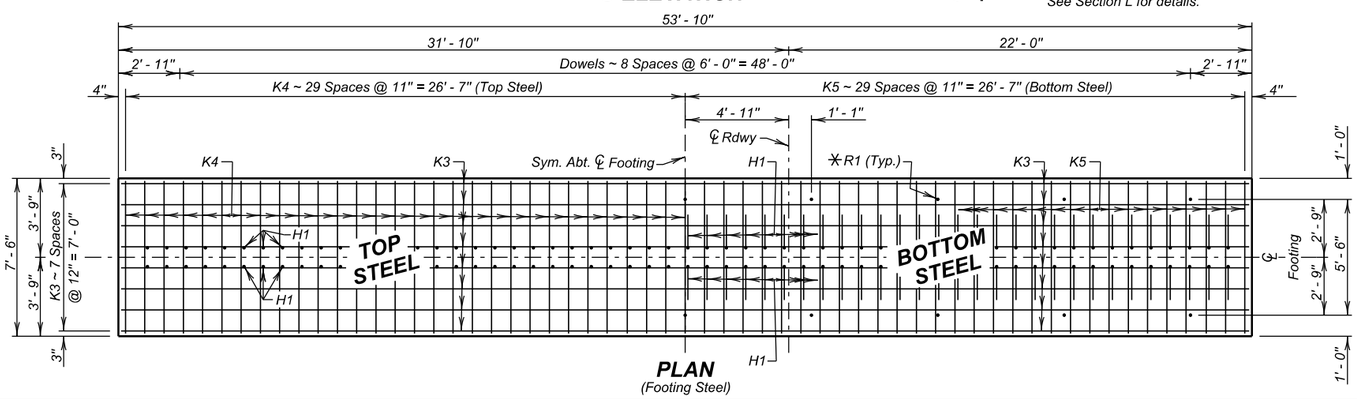

SEC. B - B




VIEW A - A
(Resteel and Bridge Deck not shown)



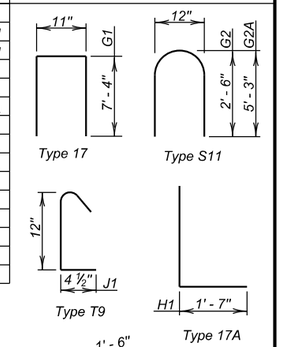

SEC. C - C




## REINFORCING SCHEDULE

| Mk. | No. | Size | Length | Type |
|---|---|---|---|---|
| G1 | 57 | 9 | 15' - 7" | 17 |
| G2 | 38 | 4 | 6' - 0" | S11 |
| G2A | 6 | 7 | 11' - 6" | S11 |
| G3 | 44 | 4 | 51' - 6" | Str. |
| H0 | 4 | 9 | 14' - 5" | Str. |
| H1 | 114 | 9 | 8' - 10" | 17A |
| H2 | 114 | 9 | 20' - 0" | Str. |
| H3 | 29 | 7 | 4' - 0" | Str. |
| H8 | 8 | 7 | 9' - 0" | Str. |
| J1 | 345 | 4 | 1' - 9" | T9 |
| J2 | 4 | 4 | 11' - 0" | T3 |
| K3 | 16 | 4 | 53' - 4" | Str. |
| K4 | 59 | 4 | 7' - 0" | Str. |
| K5 | 59 | 6 | 7' - 0" | Str. |
| R1 | 18 | 11 | 4' - 0" | Str. |

Bending Details

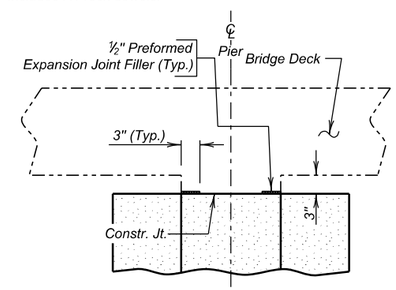



NOTES:
All dimensions are out to out of bars.
≠ Bend in field as necessary to fit.
△ Bars to be epoxy coated.

## ESTIMATED QUANTITIES

| ITEM | UNIT | QUANTITY |
|---|---|---|
| Class A45 Concrete, Bridge | Cu. Yd. | 105.0 |
| ⊛ Reinforcing Steel | Lb. | 18628 |
| Epoxy Coated Reinforcing Steel | Lb. | 237 |
| Structure Excavation, Bridge | Cu. Yd. | 111.5 |
| Install Dowel in Rock | Ft. | 45 |

⊛ Includes R1 rock dowels.




DETAIL "X"
(Resteel not shown)

**PIER NO. 5 DETAILS**
FOR
# 307' - 3" CONT. CONCRETE BRIDGE

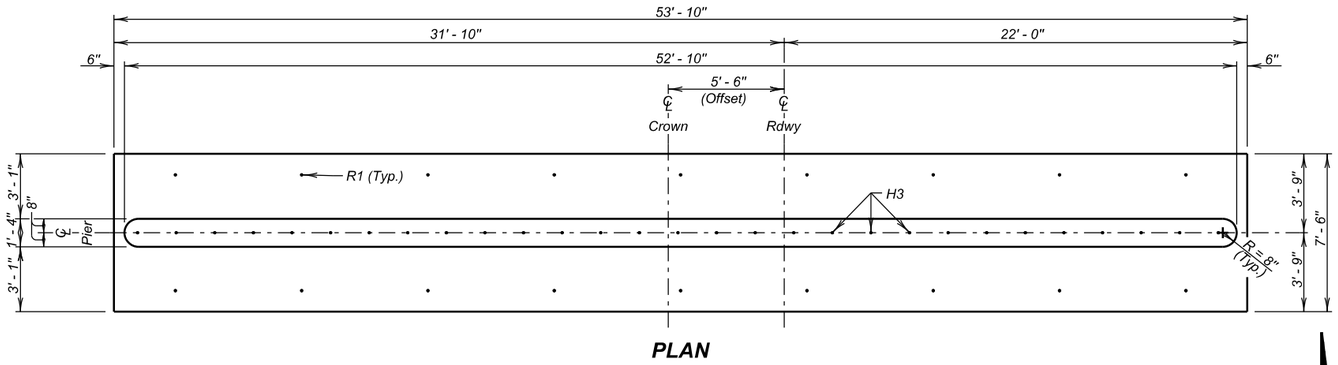
42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015

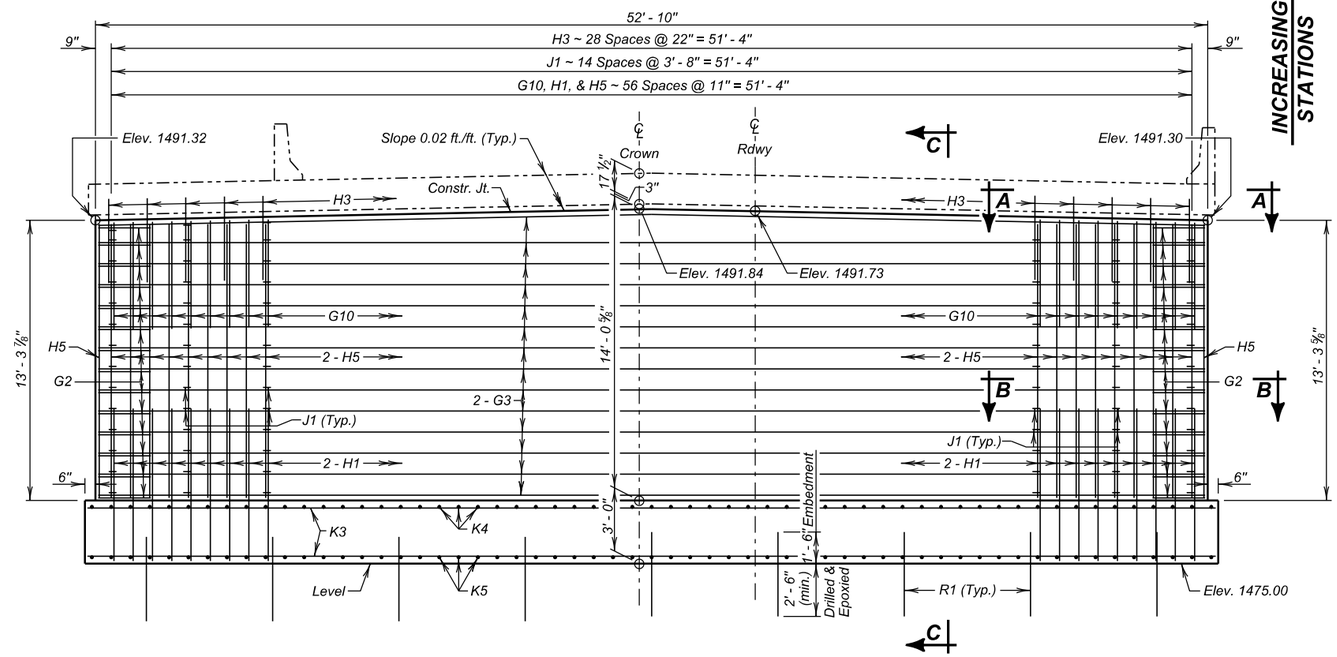


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| TB | BS | BT | Kevin N. Goeden BRIDGE ENGINEER |
| MINN025C | 025CGC15 | | |

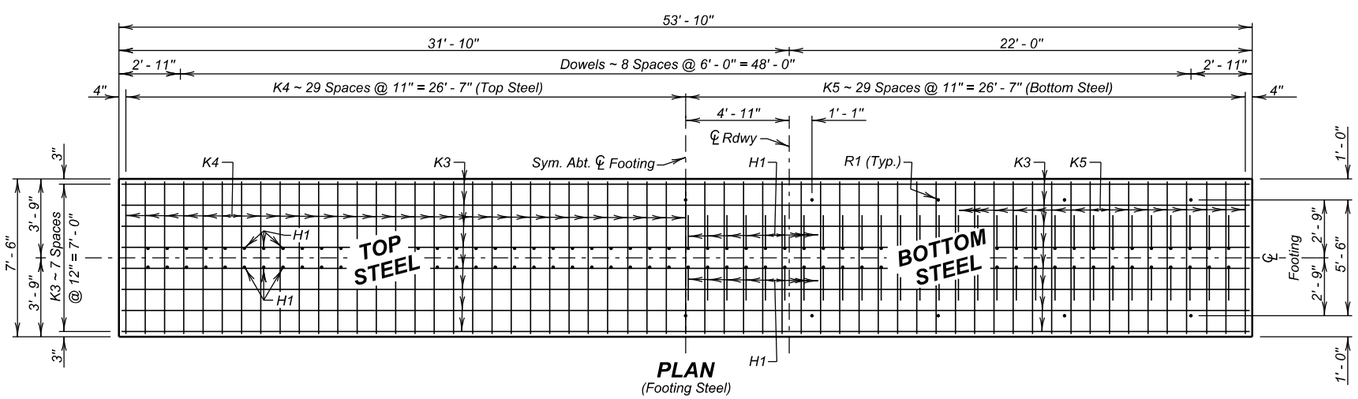
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E18 | E44 |



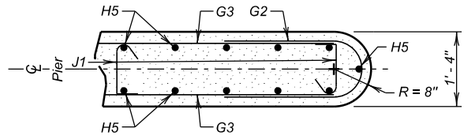

**PLAN**



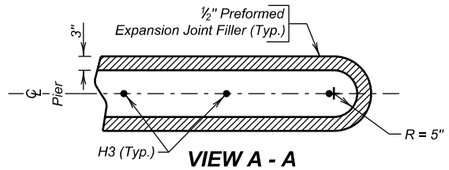

**ELEVATION**



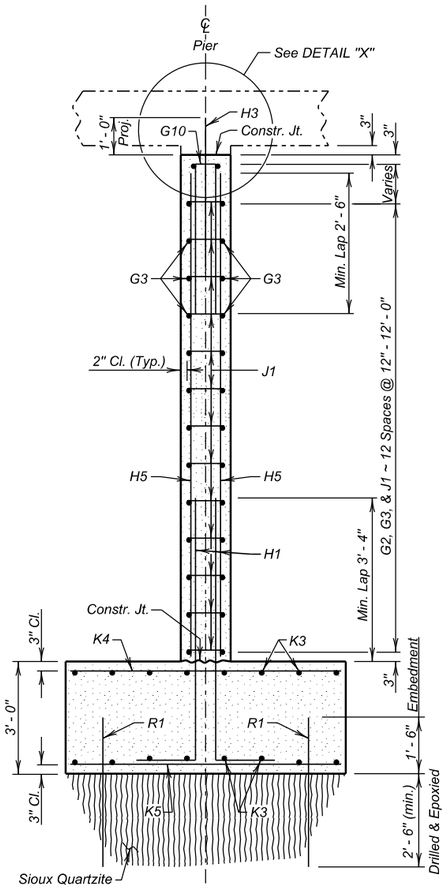

**PLAN**
(Footing Steel)




**SEC. B - B**




**VIEW A - A**
(Resteel and Bridge Deck not shown)

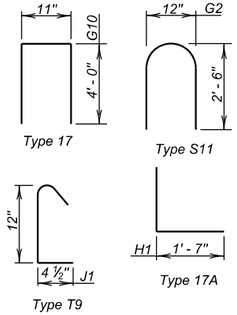



**SEC. C - C**

## REINFORCING SCHEDULE

| Mk. | No. | Size | Length | Type | Bending Details |
|---|---|---|---|---|---|
| G2 | 28 | 4 | 6' - 0" | S11 | |
| G3 | 28 | 4 | 51' - 6" | Str. | |
| G10 | 57 | 9 | 8' - 11" | 17 | |
| H1 | 114 | 9 | 8' - 10" | 17A | |
| H3 | 29 | 7 | 4' - 0" | Str. | |
| H5 | 116 | 9 | 13' - 0" | Str. | |
| J1 | 210 | 4 | 1' - 9" | T9 | |
| K3 | 16 | 4 | 53' - 4" | Str. | |
| K4 | 59 | 4 | 7' - 0" | Str. | |
| K5 | 59 | 6 | 7' - 0" | Str. | |
| R1 | 18 | 11 | 4' - 0" | Str. | |

△

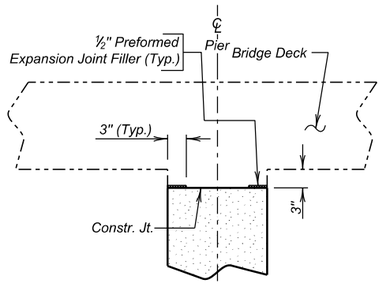



NOTES:
All dimensions are out to out of bars.
△ Bars to be epoxy coated.

## ESTIMATED QUANTITIES

| ITEM | UNIT | QUANTITY |
|---|---|---|
| Class A45 Concrete, Bridge | Cu. Yd. | 80.2 |
| ⊛ Reinforcing Steel | Lb. | 13449 |
| Epoxy Coated Reinforcing Steel | Lb. | 237 |
| Structure Excavation, Bridge | Cu. Yd. | 57.6 |
| Install Dowel in Rock | Ft. | 45 |

⊛ Includes R1 rock dowels.




**DETAIL "X"**
(Resteel not shown)

**PIER NO. 6 DETAILS**
FOR
## 307' - 3" CONT. CONCRETE BRIDGE

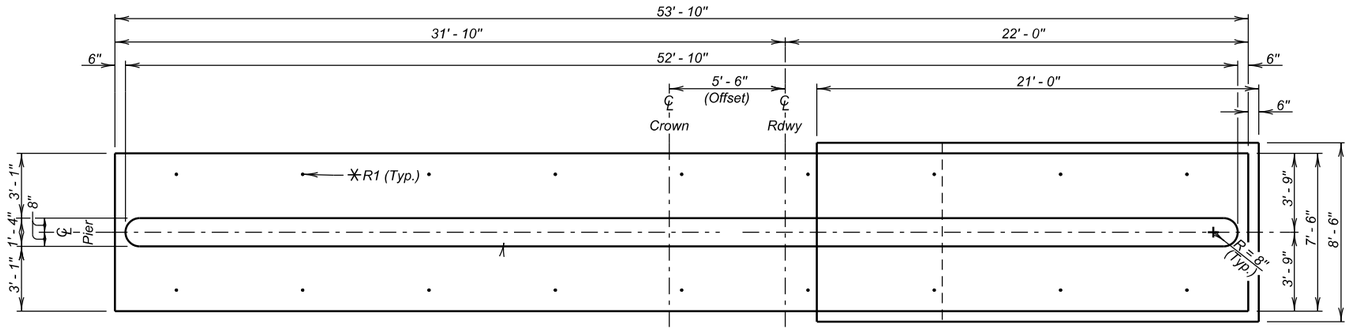
42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015

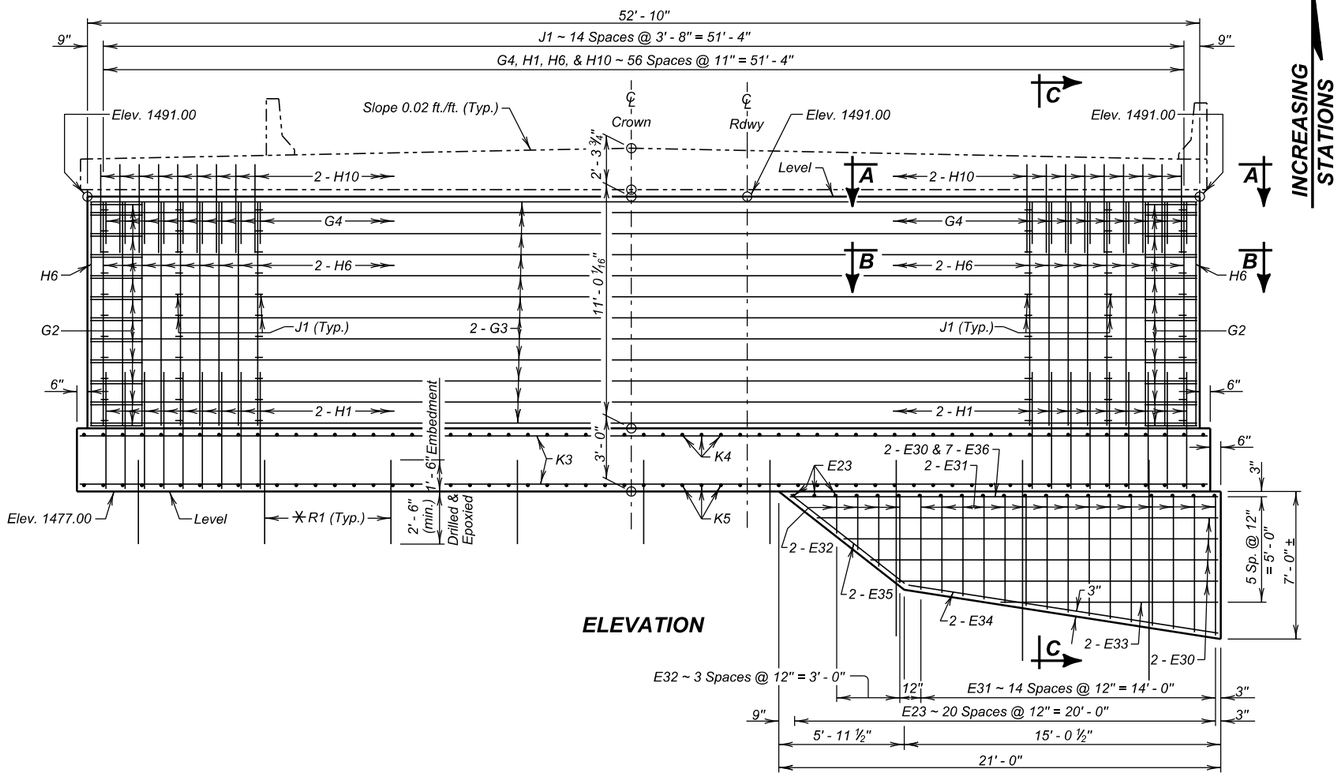


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| TB | BS | BT | Kevin N. Goeden |
| MINN025C | 025CGC16 | | BRIDGE ENGINEER |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E19 | E44 |

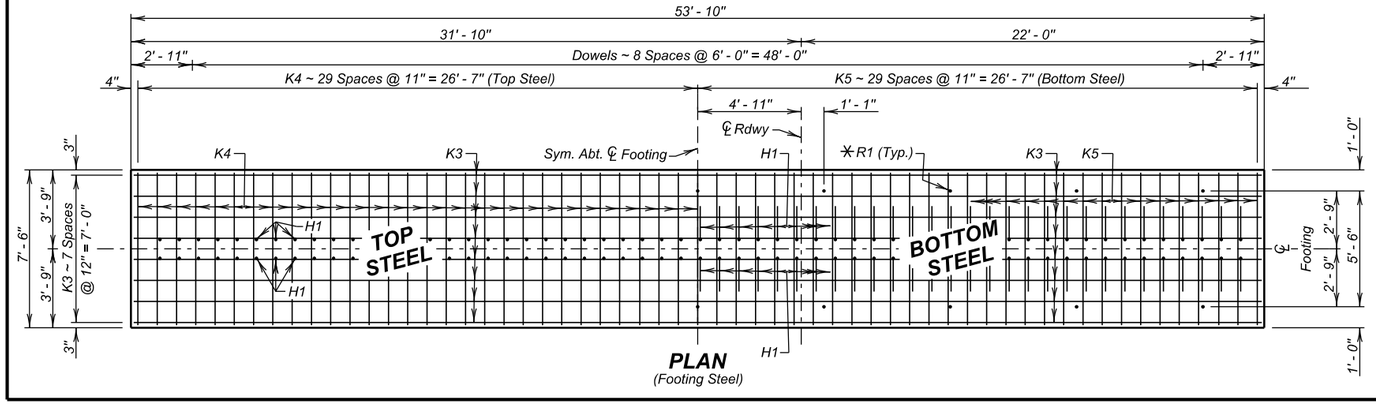



**PLAN**

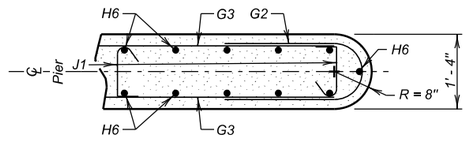



**ELEVATION**

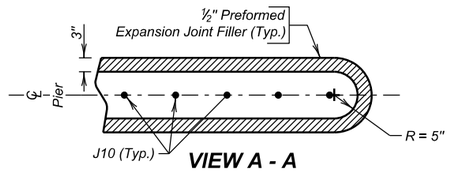
INCREASING STATIONS



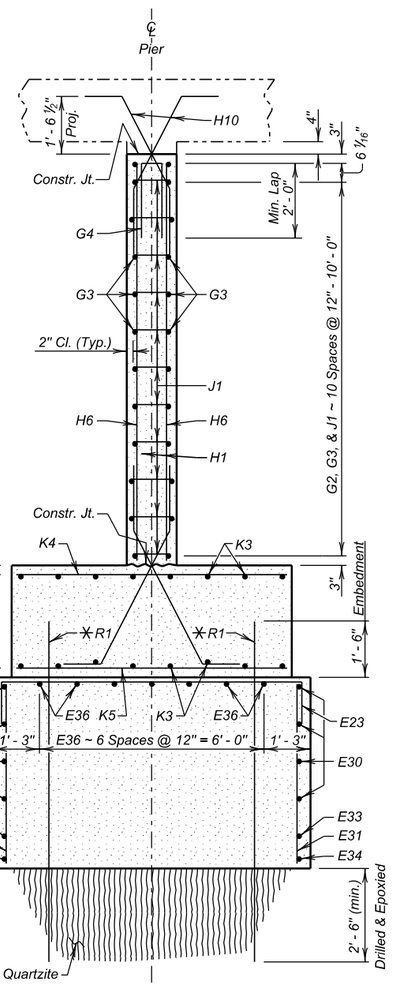

**PLAN**
(Footing Steel)




**SEC. B - B**



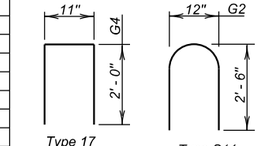

**VIEW A - A**
(Resteel and Bridge Deck not shown)

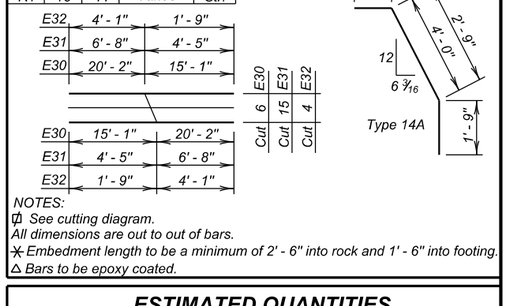



**SEC. C - C**

## REINFORCING SCHEDULE

| | Mk. | No. | Size | Length | Type | Bending Details |
|---|---|---|---|---|---|---|
| | E23 | 21 | 4 | 10' - 0" | 17 | |
| | E30 | 6 | 4 | 35' - 3" | Str. | |
| | E31 | 15 | 4 | 11' - 1" | Str. | |
| | E32 | 4 | 4 | 5' - 10" | Str. | |
| | E33 | 2 | 4 | 9' - 9" | Str. | |
| | E34 | 2 | 4 | 15' - 0" | Str. | |
| | E35 | 2 | 4 | 7' - 0" | Str. | |
| | E36 | 7 | 4 | 20' - 9" | Str. | |
| | G2 | 24 | 4 | 6' - 0" | S11 | |
| | G3 | 24 | 4 | 51' - 6" | Str. | |
| | G4 | 57 | 9 | 4' - 11" | Str. | |
| | H1 | 114 | 9 | 6' - 9" | 14A | |
| | H6 | 116 | 9 | 10' - 10" | Str. | |
| △ | H10 | 114 | 9 | 5' - 6" | 14A | |
| | J1 | 165 | 4 | 1' - 9" | T9 | |
| | K3 | 16 | 4 | 53' - 4" | Str. | |
| | K4 | 59 | 4 | 7' - 0" | Str. | |
| | K5 | 59 | 6 | 7' - 0" | Str. | |
| ✳ | R1 | 18 | 11 | Varies | Str. | |



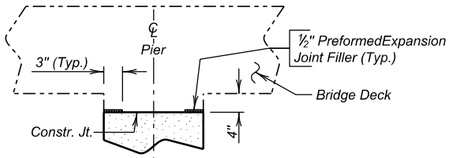




NOTES:
℄ See cutting diagram.
All dimensions are out to out of bars.
✳ Embedment length to be a minimum of 2' - 6" into rock and 1' - 6" into footing.
△ Bars to be epoxy coated.

## ESTIMATED QUANTITIES

| | ITEM | UNIT | QUANTITY |
|---|---|---|---|
| | Class A45 Concrete, Bridge | Cu. Yd. | 105.8 |
| ⊛ | Reinforcing Steel | Lb. | 11528 |
| | Epoxy Coated Reinforcing Steel | Lb. | 2132 |
| | Structure Excavation, Bridge | Cu. Yd. | 84.9 |
| | Install Dowel in Rock | Ft. | 45 |

⊛ R1 rock dowels estimated total length = 105' - 0" and is included in the Reinforcing Steel bid item.




**DETAIL "X"**
(Resteel not shown)

**PIER NO. 7 DETAILS**

FOR

# 307' - 3" CONT. CONCRETE BRIDGE

42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

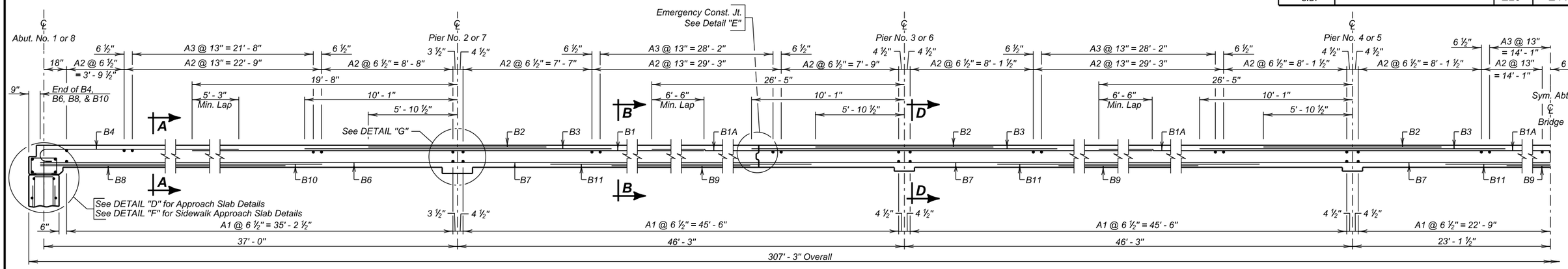
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015



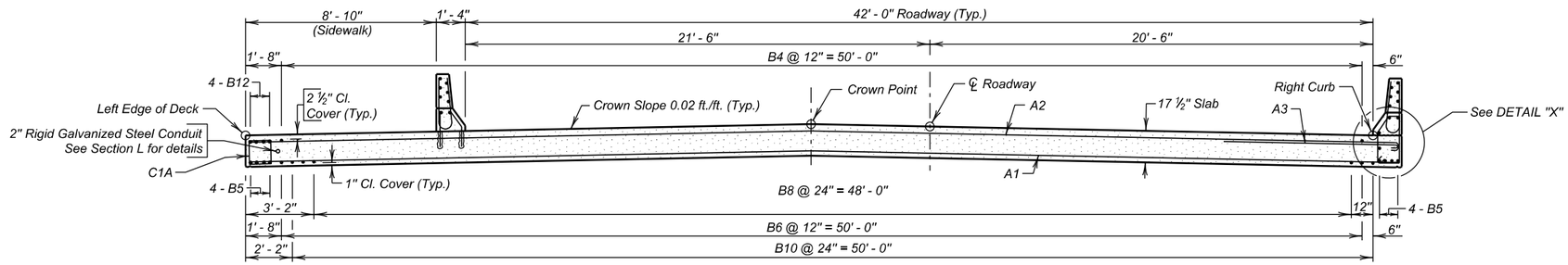
| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| TB | BS | BT | Kevin N. Boeder BRIDGE ENGINEER |
| MINN025C | 025CGC17 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E20 | E44 |

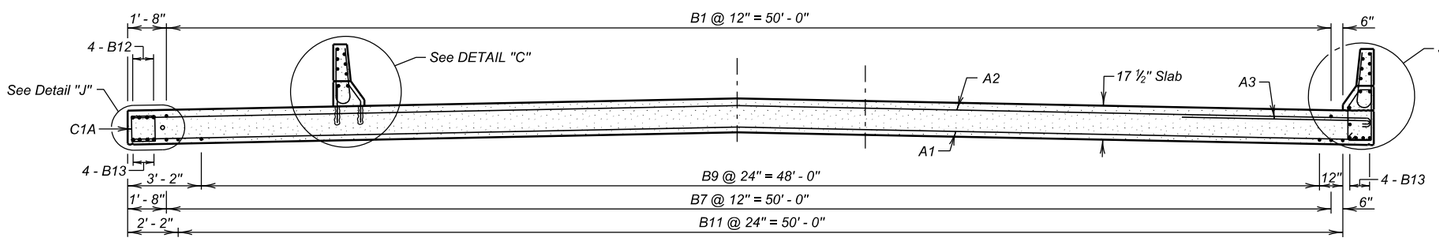
Note: Place B7, B9, and B11 bars symmetrically about center of interior spans.



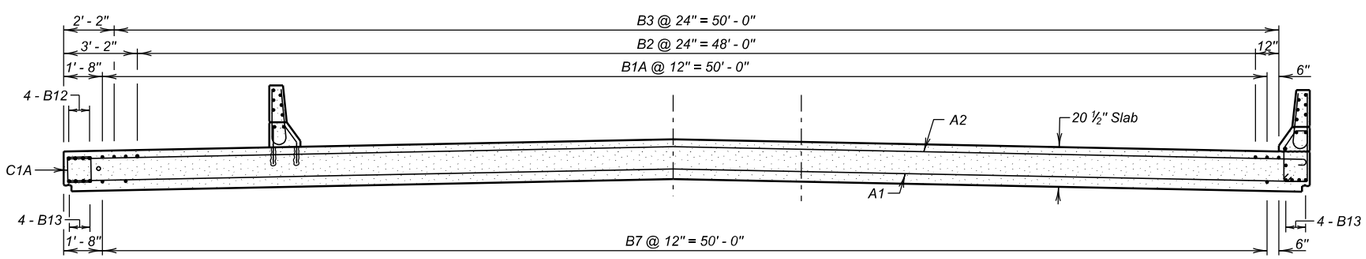

## HALF LONGITUDINAL SECTION VIEW




### SEC. A - A

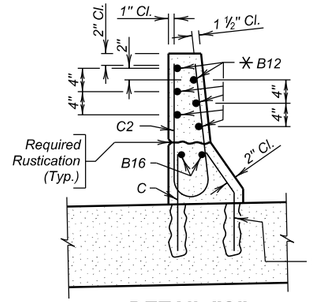



### SEC. B - B



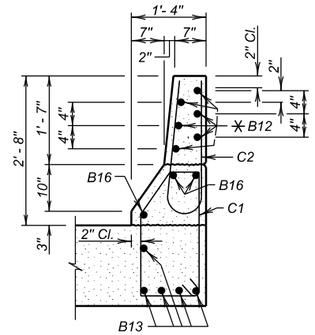

### SEC. D - D

NOTE:
For spacing of C bars see BARRIER CURB AND TAPERED BARRIER DETAILS (B) sheet.




### DETAIL "C"

✳ 3' - 0" Min. Lap




### DETAIL "D"

**SUPERSTRUCTURE DETAILS (A)**

FOR

## 307' - 3" CONT. CONCRETE BRIDGE

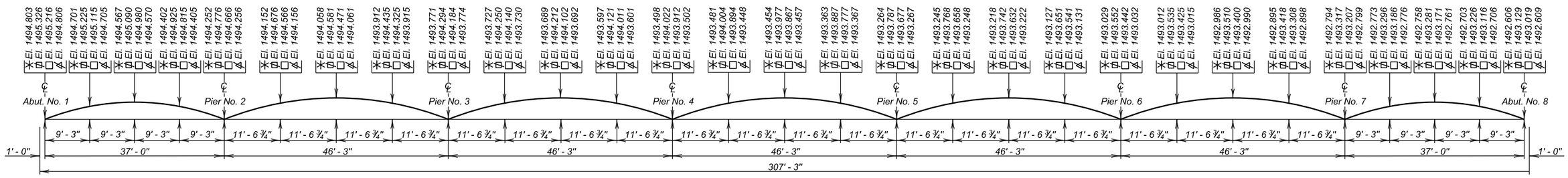
42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| TB | BS | MG | Kevin N. Goeden BRIDGE ENGINEER |
| MINN025C | 025CGC18 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E21 | E44 |




## CURB AND CENTERLINE ELEVATIONS

*Elevations with a ⌖ are Top of Finished Slab at Left Edge of Deck.*

*Elevations with a ⏢ are Top of Finished Slab at Crown Point.*

*Elevations with a □ are Top of Finished Slab at ℄ Roadway.*

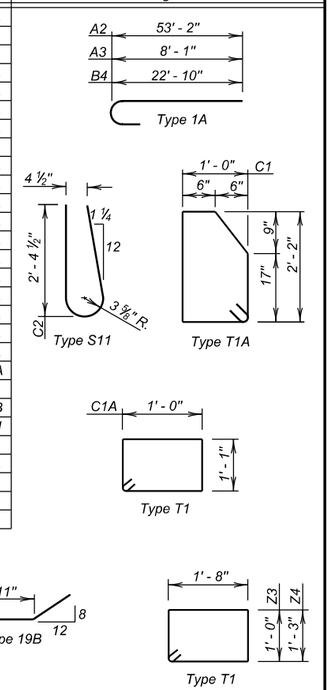
*Elevations with a ∢ are Top of Finished Slab at Right Curb.*

*Camber for Dead Load Plus Plastic Flow have been included in the Elevations shown above.*

## REINFORCING SCHEDULE

| Mk. | No. | Size | Length | Type |
|---|---|---|---|---|
| A1 | 557 | 5 | 53' - 2" | Str. |
| A2 | 380 | 4 | 53' - 8" | 1A |
| A3 | 354 | 4 | 8' - 7" | 1A |
| B1 | 102 | 10 | 46' - 0" | Str. |
| B1A | 204 | 10 | 52' - 10" | Str. |
| B2 | 150 | 9 | 11' - 9" | Str. |
| B3 | 156 | 10 | 20' - 2" | Str. |
| B4 | 102 | 9 | 24' - 1" | 1A |
| B5 | 16 | 5 | 37' - 3" | Str. |
| B6 | 102 | 9 | 37' - 3" | Str. |
| B7 | 255 | 9 | 46' - 3" | Str. |
| B8 | 50 | 8 | 25' - 11" | Str. |
| B9 | 125 | 8 | 25' - 11" | Str. |
| B10 | 52 | 8 | 28' - 4" | Str. |
| B11 | 130 | 8 | 34' - 0" | Str. |
| B12 | 96 | 5 | 46' - 6" | Str. |
| B13 | 50 | 5 | 46' - 3" | Str. |
| B16 | 35 | 4 | 44' - 9" | Str. |
| C | 155 | 5 | 1' - 8" | Str. |
| C1 | 308 | 5 | 6' - 11" | T1A |
| C1A | 308 | 5 | 5' - 2" | T1 |
| C1B | 308 | 5 | 1' - 10" | 19B |
| C2 | 616 | 5 | 5' - 1" | S11 |
| S0 | 8 | 9 | 53' - 3" | Str. |
| Z1 | 112 | 7 | 2' - 0" | Str. |
| Z2 | 18 | 4 | 2' - 0" | Str. |
| Z3 | 88 | 5 | 6' - 2" | T1 |
| Z4 | 18 | 5 | 6' - 8" | T1 |

Bending Details



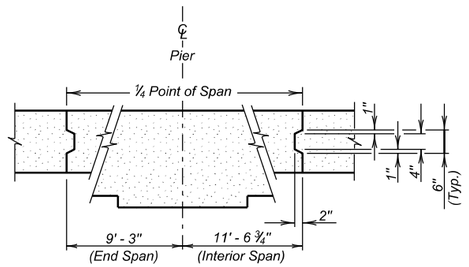

NOTES-

*All reinforcing steel shall be epoxy coated.*

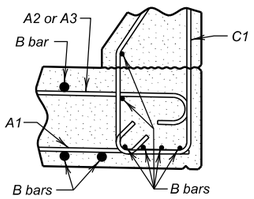
*All dimensions are out to out of bars.*

## ESTIMATED QUANTITIES

| ITEM | UNIT | QUANTITY |
|---|---|---|
| Class A45 Concrete, Bridge Deck | Cu. Yd. | 950.0 |
| Epoxy Coated Reinforcing Steel | Lb. | 241214 |
| No. 7 Rebar Splice | Each | 112 |
| No. 4 Rebar Splice | Each | 18 |
| Concrete Penetrating Sealer | Sq. Yd. | 1728 |
| 2" Rigid Galvanized Steel Conduit | Ft. | 354 |

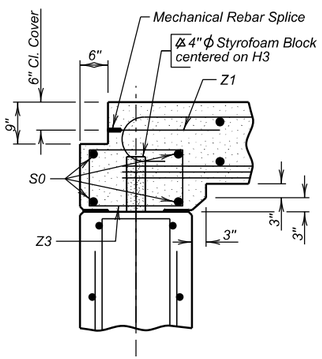



## DETAIL "E"



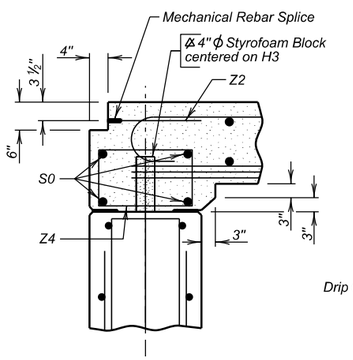

## DETAIL "X"

⌖ *Sufficient adhesive shall be used to retain the 4" ϕ styrofoam block during concrete placement.*




## DETAIL "D"

(Approach Slab)



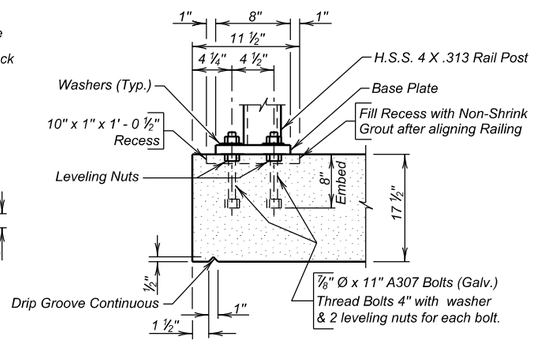

## DETAIL "F"

(Sidewalk Approach Slab)




## CAMBER DIAGRAM

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




## DETAIL "J"

**SUPERSTRUCTURE DETAILS (B)**

FOR

## 307' - 3" CONT. CONCRETE BRIDGE

42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW

OVER DELLS OF THE BIG — SEC. 16-T104N-R49W

SIOUX RIVER — P 0115(47)102

STA. 110 + 39.27 TO 113 + 46.52 — HL-93

STR. NO. 50-208-022

MINNEHAHA COUNTY

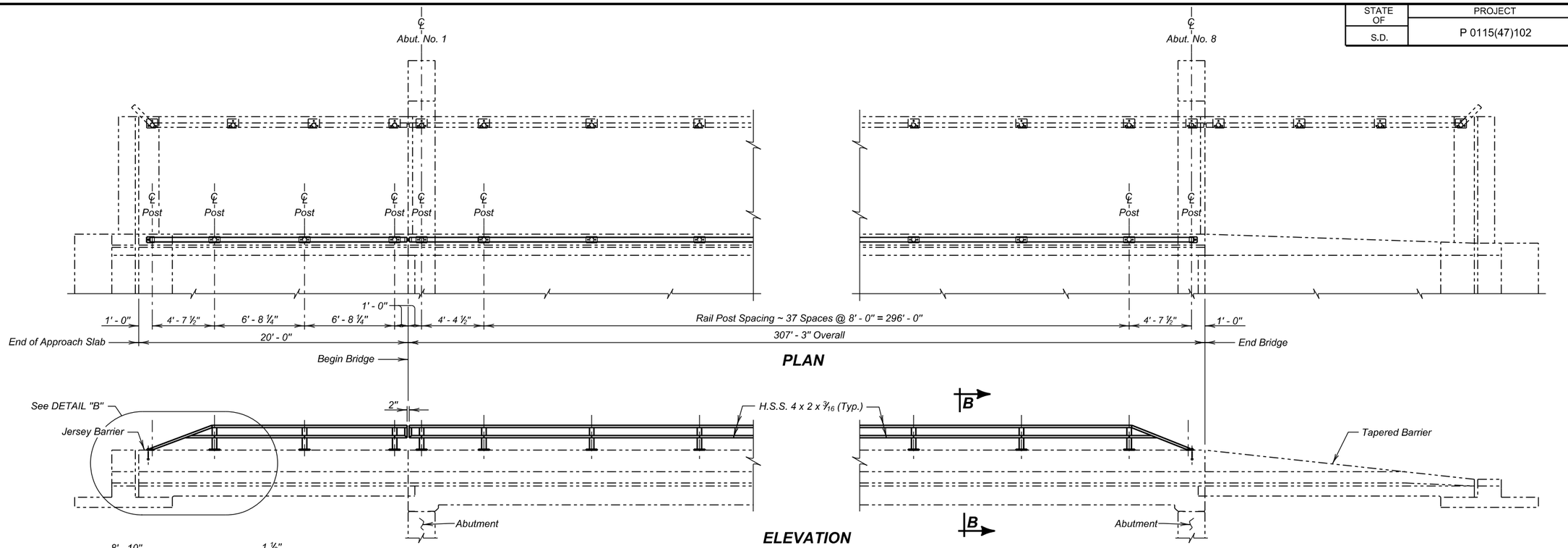
S. D. DEPT. OF TRANSPORTATION

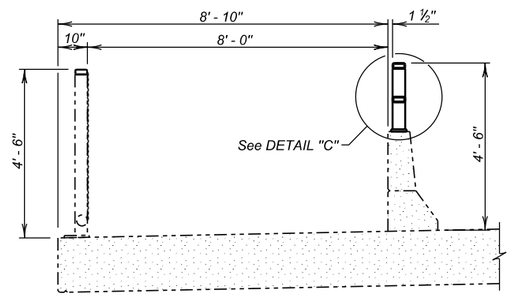
OCTOBER 2015

19 OF 36

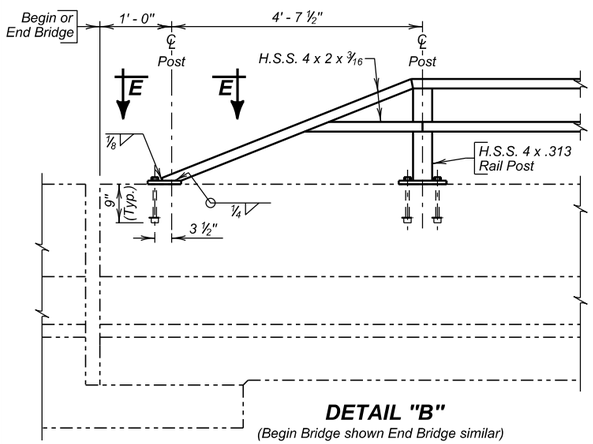
| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| TB | BS | MG | Kevin N. Coeden |
| MINN025C | 025CGC19 | | BRIDGE ENGINEER |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E22 | E44 |

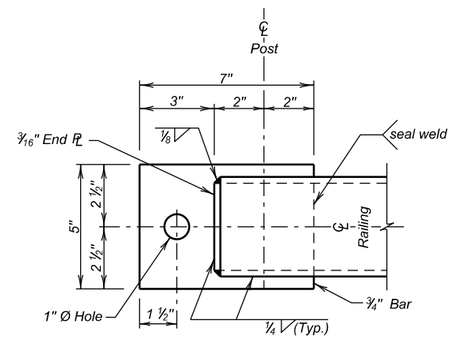


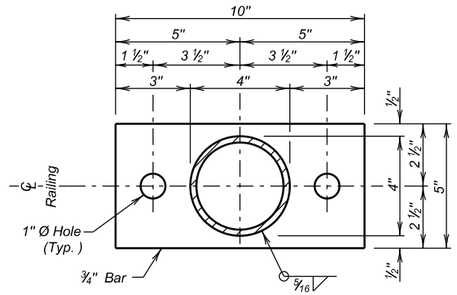

SEC. B - B



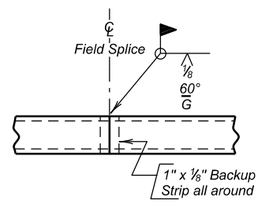

DETAIL "B"
(Begin Bridge shown End Bridge similar)



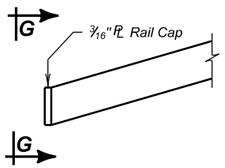

VIEW E - E




VIEW H - H

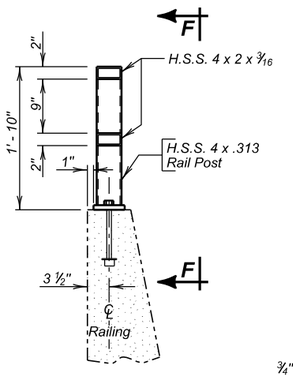



RAIL FIELD SPLICE

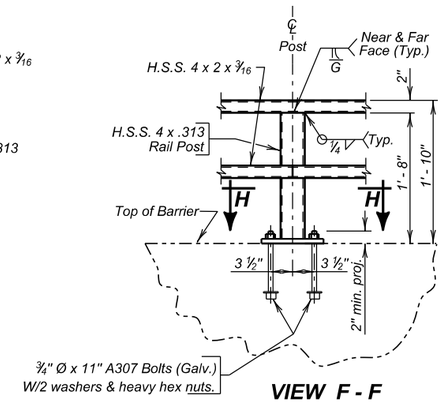



RAIL END CAP DETAIL


VIEW G - G




DETAIL "C"




VIEW F - F

## ESTIMATED QUANTITIES

| ITEM | UNIT | QUANTITY |
|---|---|---|
| Steel Pedestrian Railing on Concrete Barrier | Ft. | 325.1 |

**BARRIER CURB RAILING DETAILS**

FOR

## 307′ - 3″ CONT. CONCRETE BRIDGE

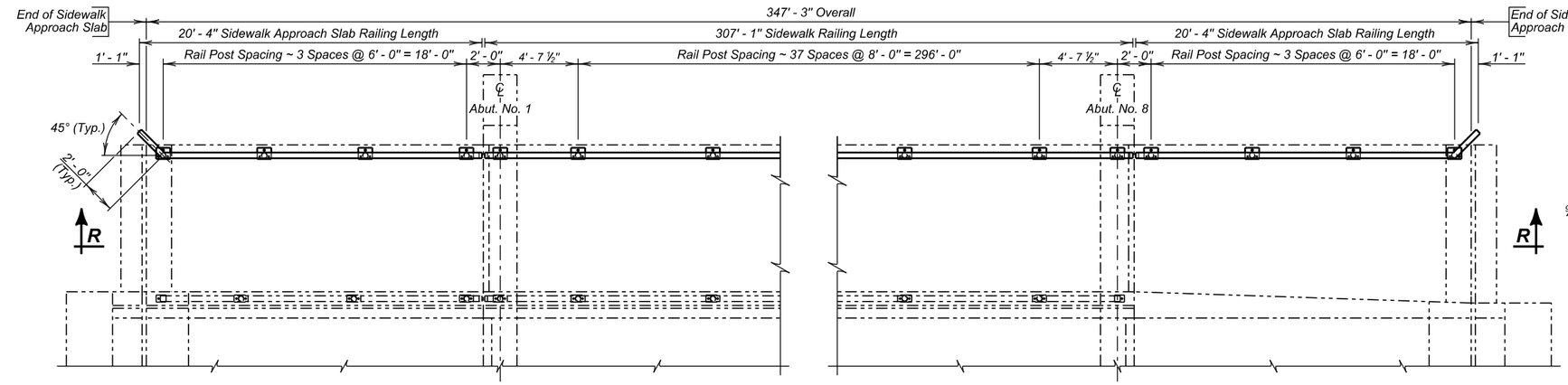
42′ - 0″ ROADWAY & 8′ - 0″ SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015

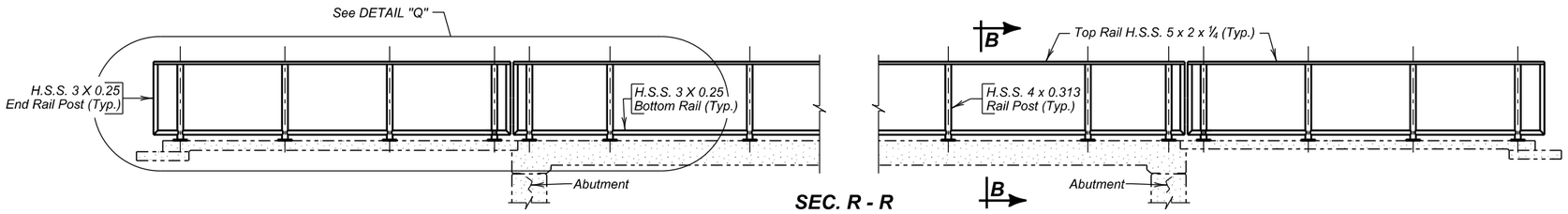


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| TB | PW | BT | Kevin N. Goeden BRIDGE ENGINEER |
| MINN025C | 025CGC20 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E23 | E44 |




## PLAN




## SEC. R - R

(Chainlink Fence Fabric NOT shown)




## SEC. B - B



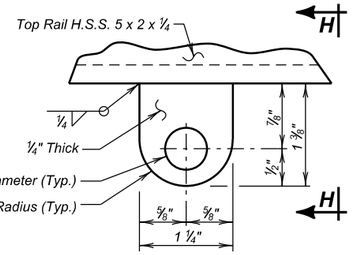

## RAIL FIELD SPLICE




## RAIL END CAP DETAIL

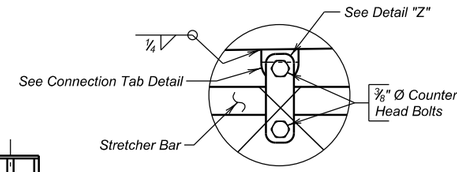



## VIEW G - G



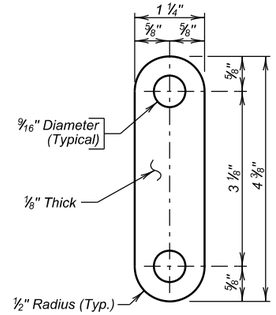

## CONNECTION TAB DETAIL

## VIEW H - H

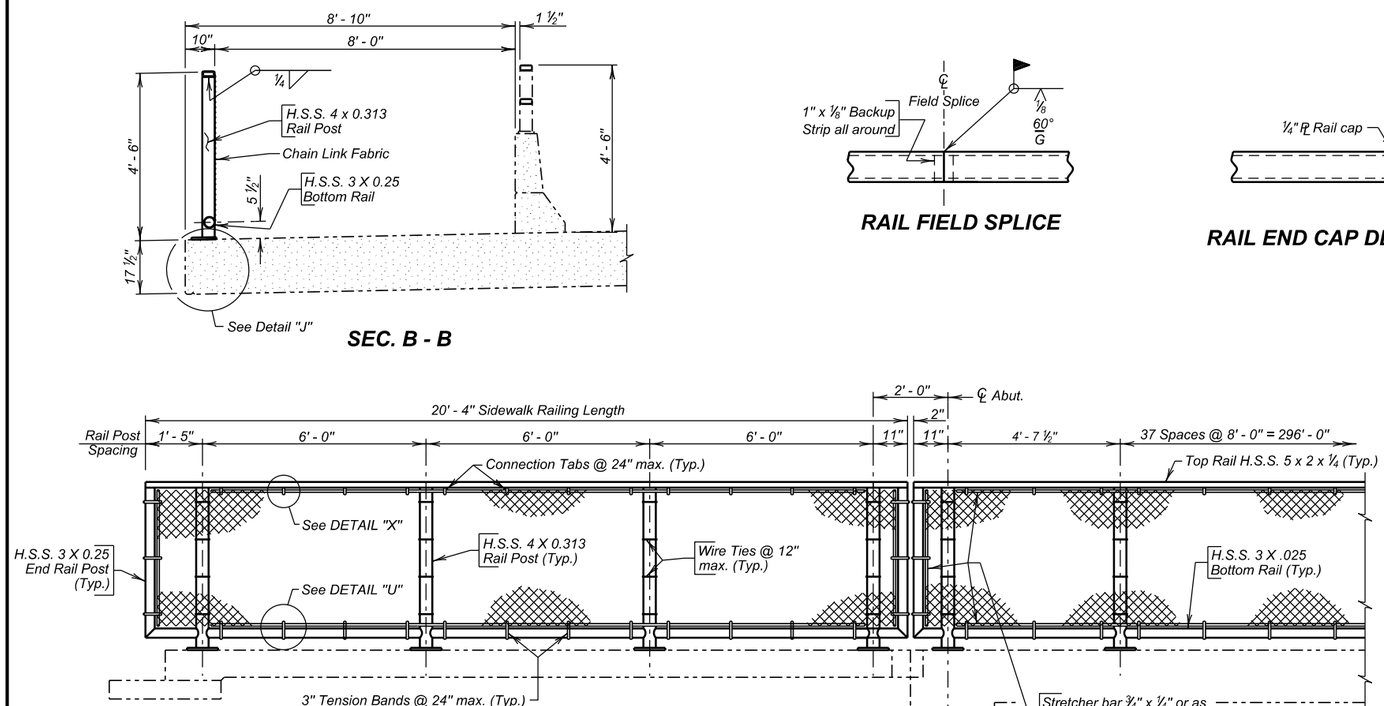



## DETAIL "X"

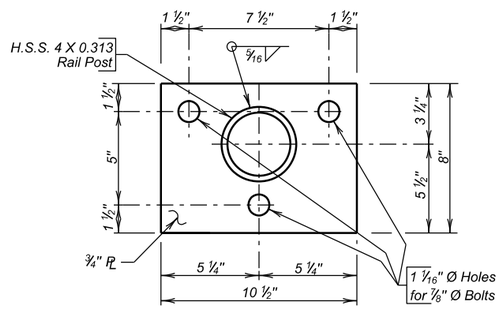
*NOTE:*
*Specific details of manufacture of component parts of the complete fence construction shall be subject to the approval of the Engineer. Commercially available items produced specifically for the use intended shall be used wherever possible in the construction of the rail.*



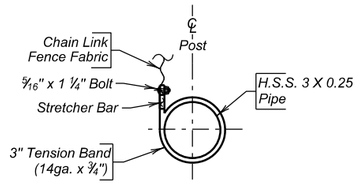

## DETAIL "Z"




## DETAIL "Q"




## BASE PLATE DETAIL




## DETAIL "U"

## ESTIMATED QUANTITIES

| ITEM | UNIT | QUANTITY |
|---|---|---|
| Steel Pedestrian Railing on Sidewalk | Ft. | 349 |
| Chain Link Fence for Bridge Sidewalk | Ft. | 349 |

**SIDEWALK RAILING WITH CHAIN LINK FENCE DETAILS**

FOR

## 307' - 3" CONT. CONCRETE BRIDGE

42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

MINNEHAHA COUNTY

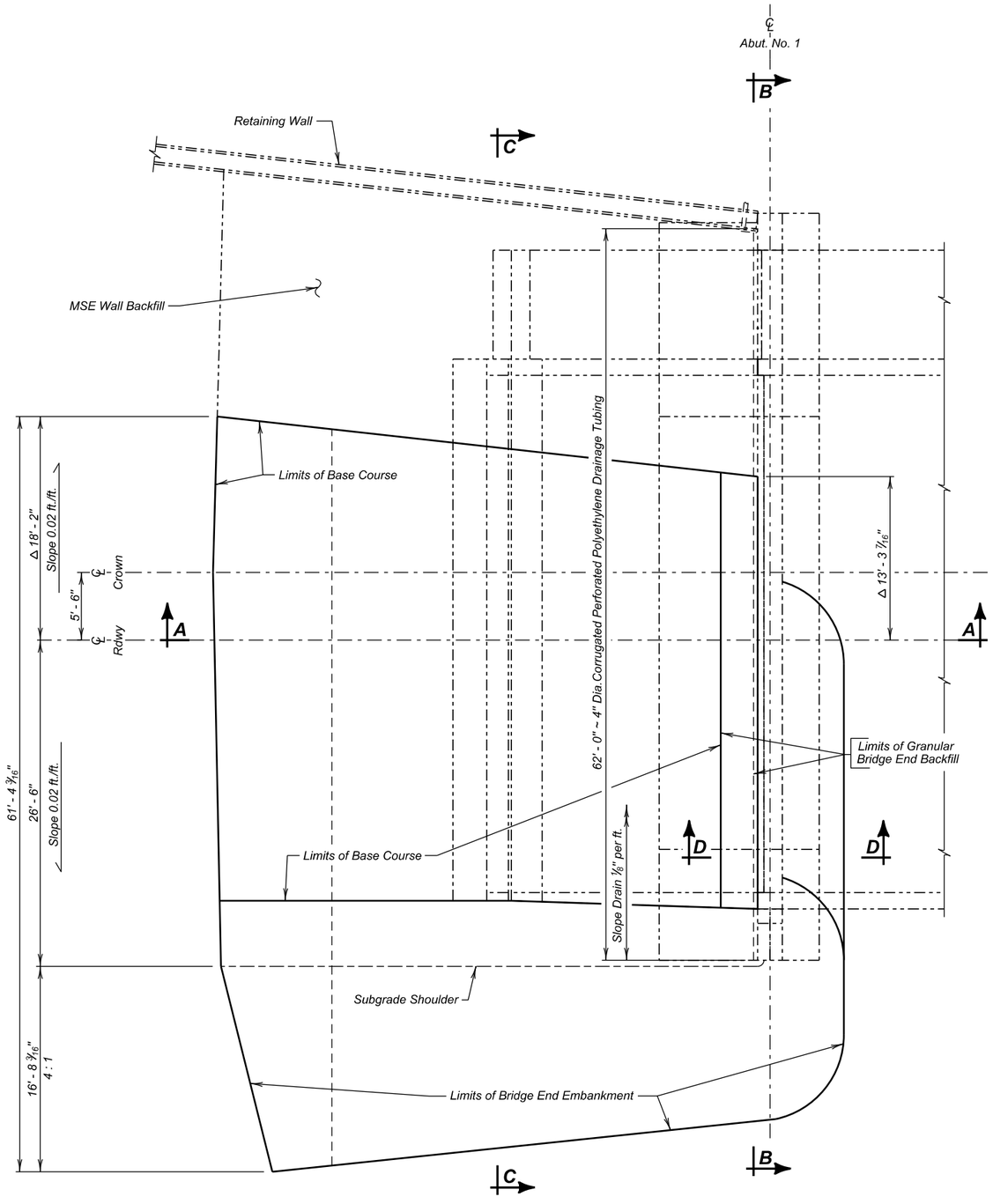
S. D. DEPT. OF TRANSPORTATION

OCTOBER 2015

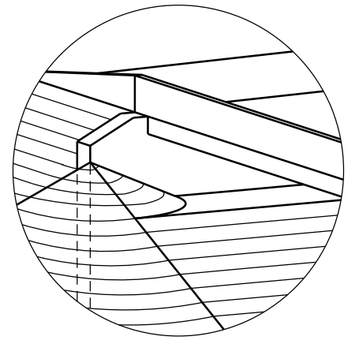


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| TB | PW | BT | Kevin N. Goeden BRIDGE ENGINEER |
| MINN025C | 025CGC21 | | |

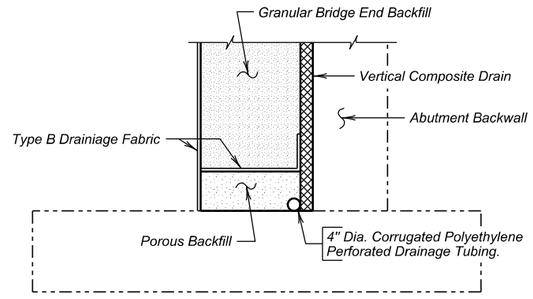
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E24 | E44 |




**PLAN**
*(Bridge End Backfill shown adjacent to Abut. No. 1)*



**SPILL CONE DETAIL AT EMBANKMENT**




**SEC. D - D**

△ *Quantities and dimensions shown are for bid letting purposes only. Actual quantities may vary based on MSE wall design. No additional measurement shall be made. Payment shall be for plans quantity only.*

**△ ESTIMATED QUANTITIES**

| | ITEM | UNIT | QUANTITY |
|---|---|---|---|
| | Granular Bridge End Backfill | Cu. Yd. | 47.9 |
| ⌀ | Bridge End Embankment | Cu. Yd. | 129 |
| ⏀ | Base Course | Ton | 460.0 |
| ⏀ | Porous Backfill | Ton | 15.8 |
| | 4" Underdrain Pipe | Ft. | 72 |
| ⟠ | Geogrid Reinforcement | Sq. Yd. | 406 |
| | Waterproofing Membrane for Structure | Sq. Ft. | 113 |

1. 69 ft. 4" dia. Corrugated Polyethylene Perforated Drainage Tubing.
2. 3 ft. 4" dia. Corrugated Polyethylene Drainage Tubing.
3. 845 sq. ft. Vertical Composite Drain

*Items 1 thru 3 are approximate quantities contained in the 4" Underdrain Pipe and are for information only.*

4. 1240 sq. ft. 6 mil Polyethylene Sheeting, not including laps.
5. 241 sq. yd. Type B Drainage Fabric.

*Items 4 and 5 are approximate quantities contained in the Granular Bridge End Backfill and are for information only.*

⏀ *For estimating purposes only, a factor of 1.89 tons/cu. yd. was used to convert cu. yds. to tons.*

⌀ *Shrinkage Factor of 1.25 Used.*

⟠ *Payment quanities will be based on area covered plus 15% to account for overlaps.*

**DETAILS OF BRIDGE END BACKFILL**
**ADJACENT TO ABUTMENT NO. 1 (A)**
FOR
## 307' - 3" CONT. CONCRETE BRIDGE

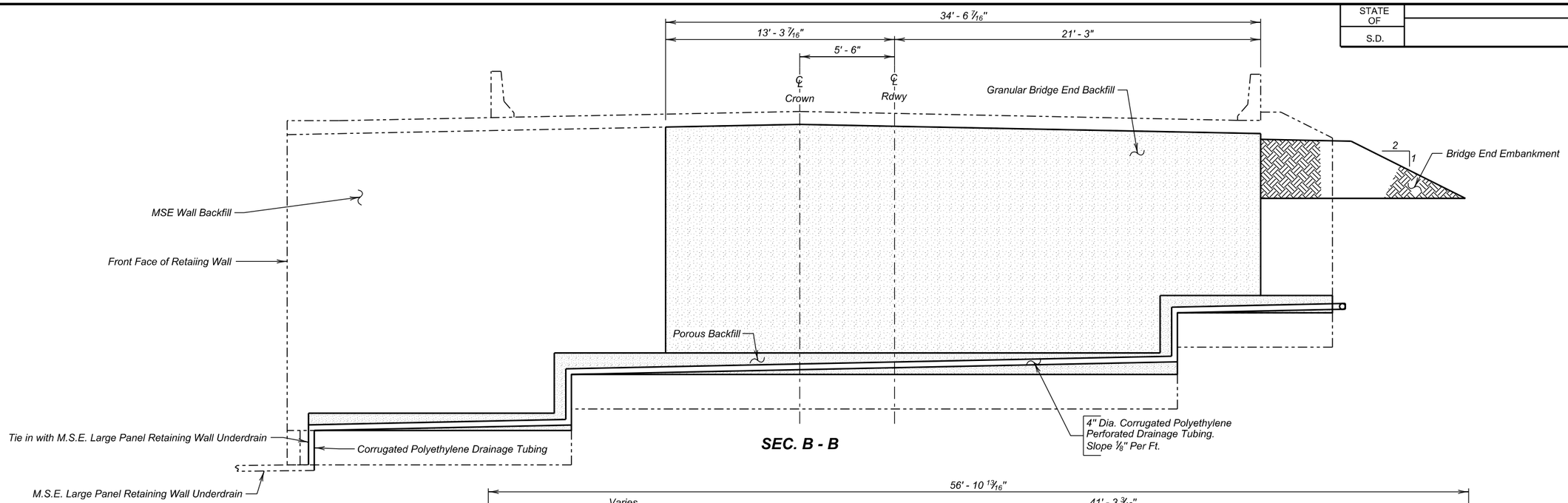
42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015

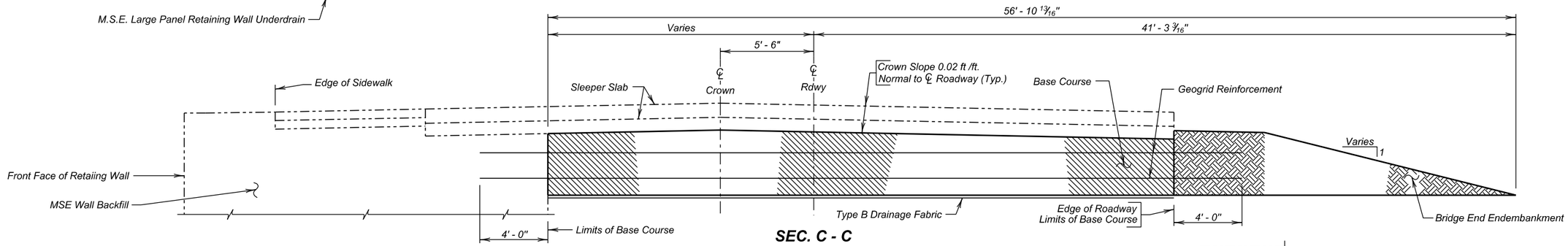


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| PW | BS | MG | Kevin N. Goeden BRIDGE ENGINEER |
| MINN025C | 025CGC22 | | |

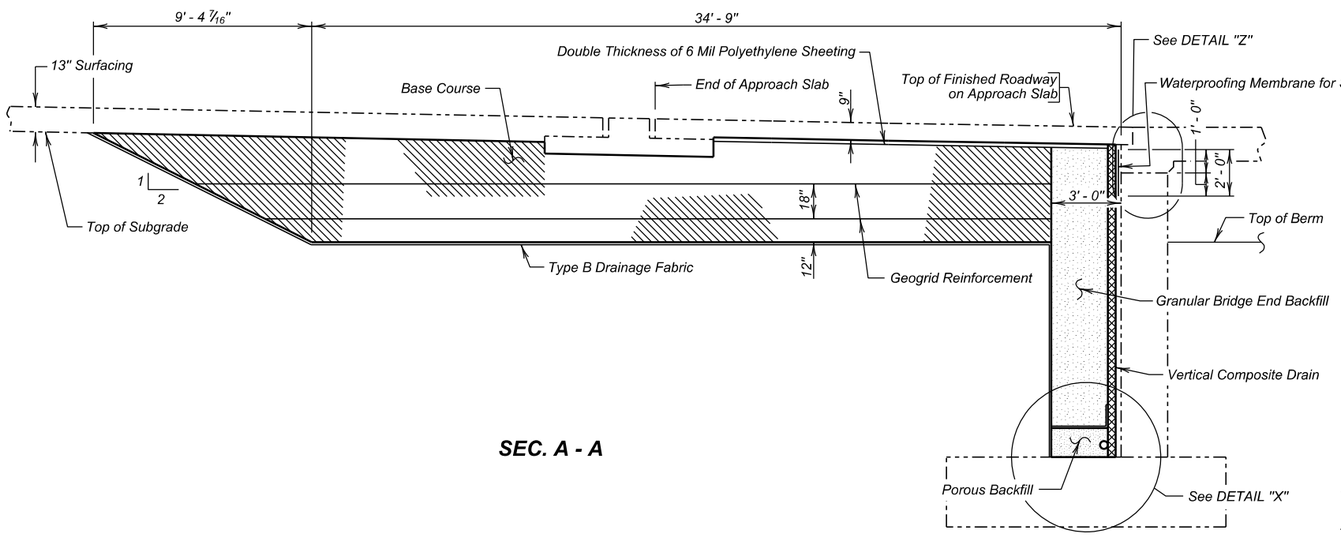
| STATE OF | | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | | E25 | E44 |



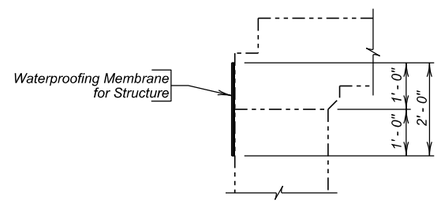

**SEC. B - B**



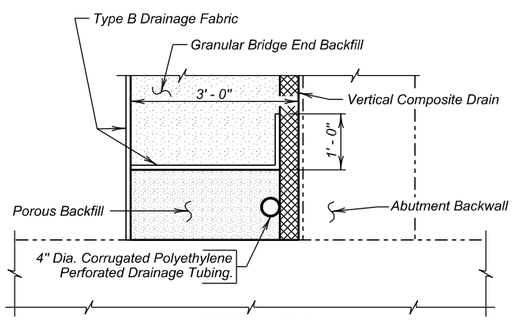

**SEC. C - C**




**SEC. A - A**




**DETAIL "Z"**
(Only Waterproofing Membrane shown)




**DETAIL "X"**

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

FOR

## 307' - 3" CONT. CONCRETE BRIDGE

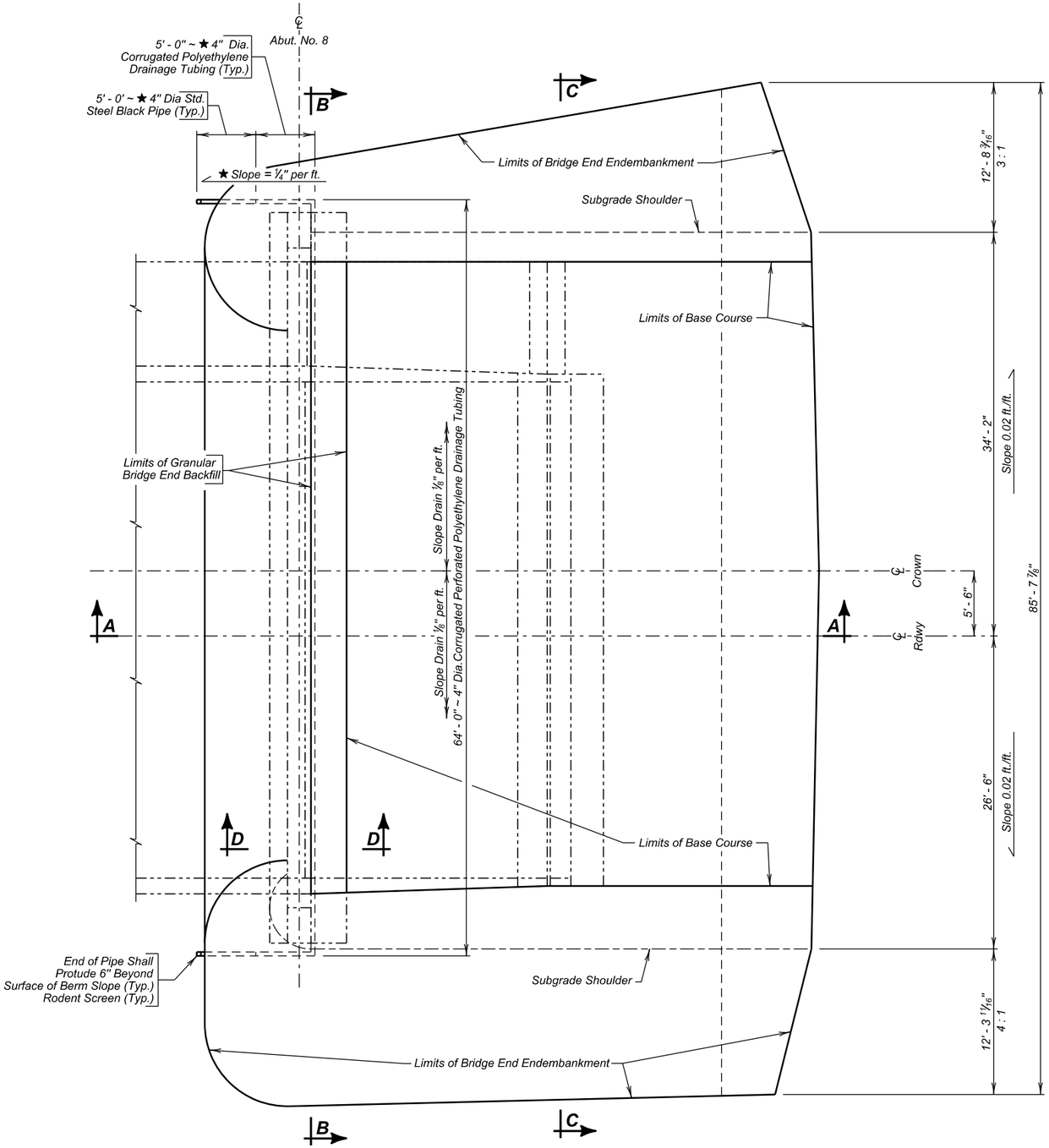
42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015

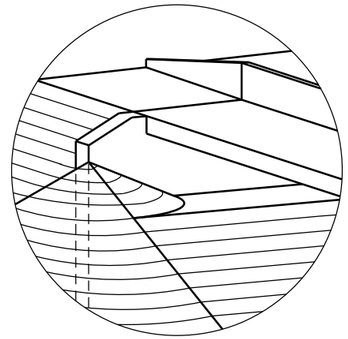


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| PW | BS | MG | Kevin N. Goeden |
| MINN025C | 025CGC23 | | BRIDGE ENGINEER |

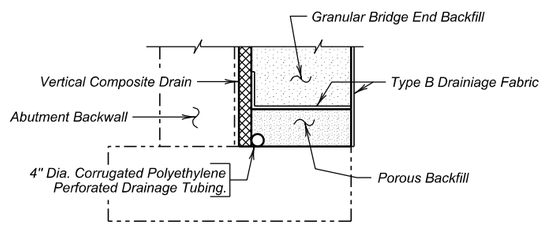
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E26 | E44 |




**PLAN**
*(Bridge End Backfill shown adjacent to Abut. No. 8)*



**SPILL CONE DETAIL AT EMBANKMENT**
*(Sidewalk railing not shown)*




**SEC. D - D**

## ESTIMATED QUANTITIES

| ITEM | UNIT | QUANTITY |
|---|---|---|
| Granular Bridge End Backfill | Cu. Yd. | 57.8 |
| ∡ Bridge End Embankment | Cu. Yd. | 189 |
| ⍁ Base Course | Ton | 531.2 |
| ⍁ Porous Backfill | Ton | 11.1 |
| 4" Underdrain Pipe | Ft. | 84 |
| ⟠ Geogrid Reinforcement | Sq. Yd. | 548 |
| Waterproofing Membrane for Structure | Sq. Ft. | 107 |

1. 64 ft. 4" dia. Corrugated Polyethylene Perforated Drainage Tubing.
2. 10 ft. 4" dia. Corrugated Polyethylene Drainage Tubing.
3. 10 ft. 4" dia. Std. Black Steel Pipe with Rodent Screens.
4. 574 sq. ft. Vertical Composite Drain

Items 1 thru 4 are approximate quantities contained in the 4" Underdrain Pipe and are for information only.

5. 1850 sq. ft. 6 mil Polyethylene Sheeting, not including laps.
6. 311 sq. yd. Type B Drainage Fabric.

Items 5 and 6 are approximate quantities contained in the Granular Bridge End Backfill and are for information only.

⍁ For estimating purposes only, a factor of 1.89 tons/cu. yd. was used to convert cu. yds. to tons.

∡ Shrinkage Factor of 1.25 Used.

⟠ Payment quanities will be based on area covered plus 15% to account for overlaps.

**DETAILS OF BRIDGE END BACKFILL ADJACENT TO ABUTMENT NO. 8 (A)**

FOR

## 307' - 3" CONT. CONCRETE BRIDGE

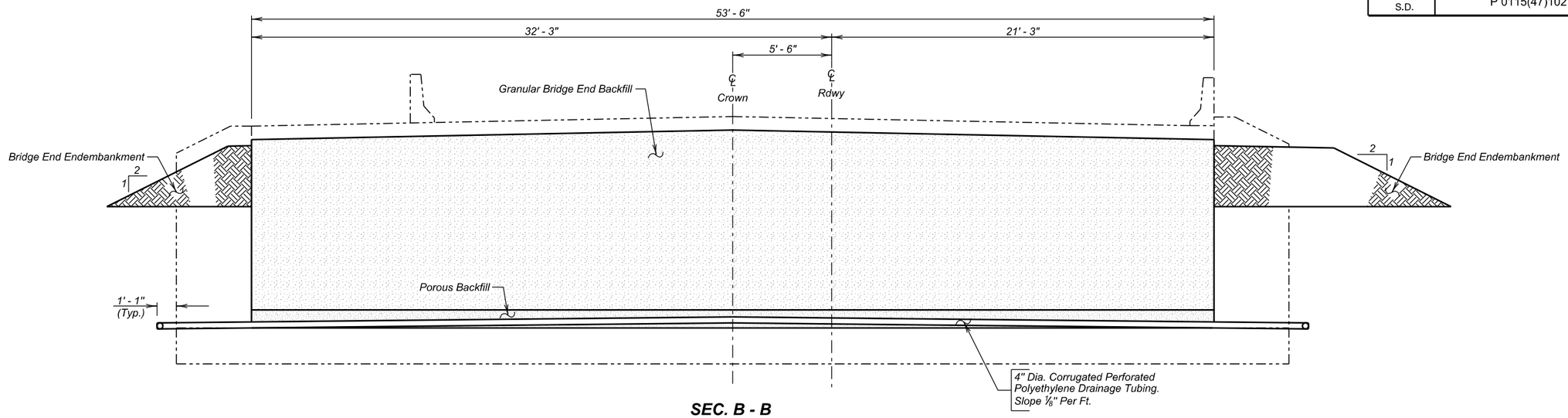
42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015

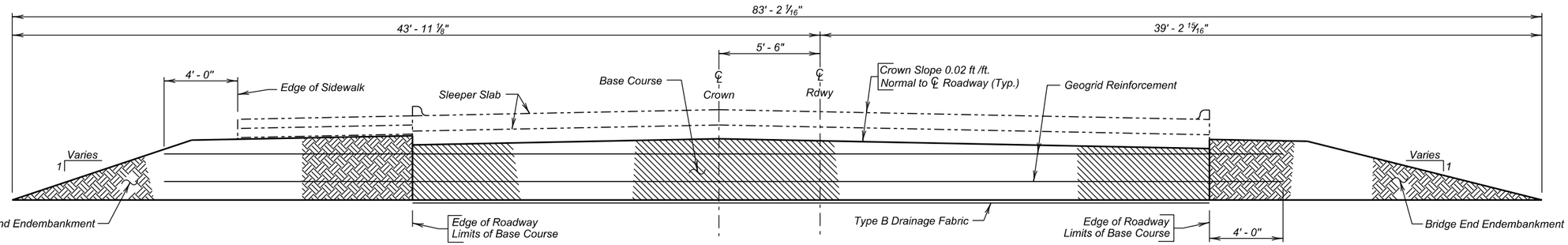


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| PW | BS | MG | Kevin N. Goeden BRIDGE ENGINEER |
| MINN025C | 025CGC24 | | |

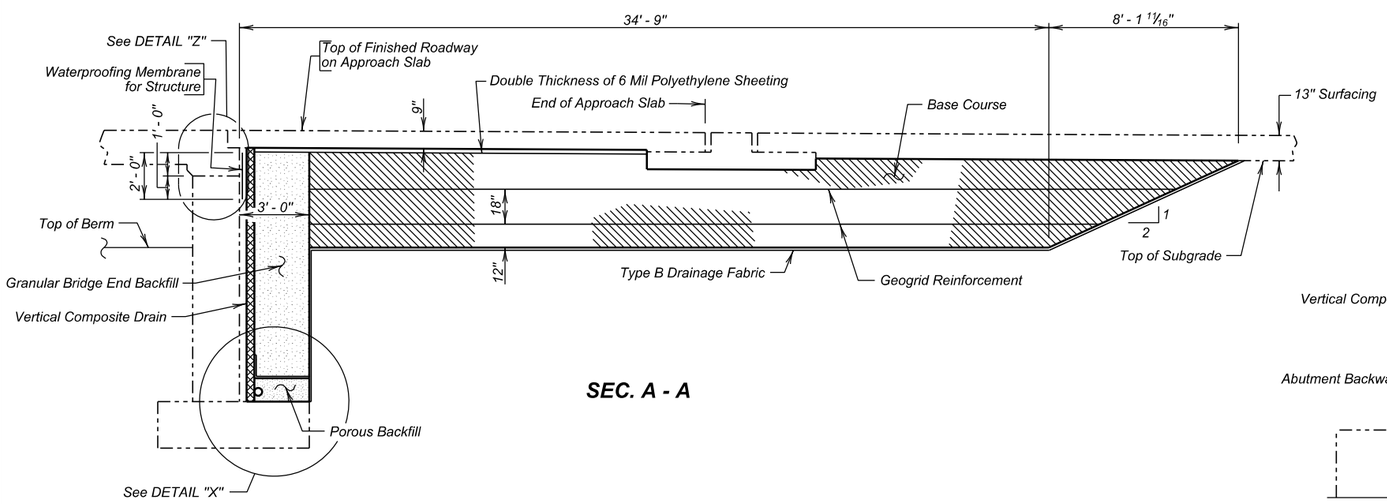
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E27 | E44 |



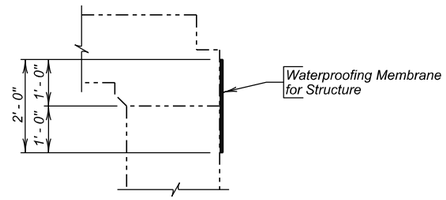

**SEC. B - B**



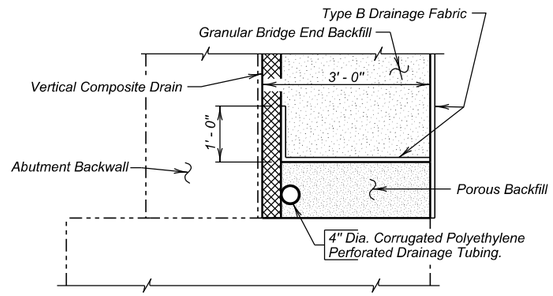

**SEC. C - C**




**SEC. A - A**




**DETAIL "Z"**
(Only Waterproofing Membrane shown)




**DETAIL "X"**

**DETAILS OF BRIDGE END BACKFILL**
**ADJACENT TO ABUTMENT NO. 8 (B)**

FOR

## 307' - 3" CONT. CONCRETE BRIDGE

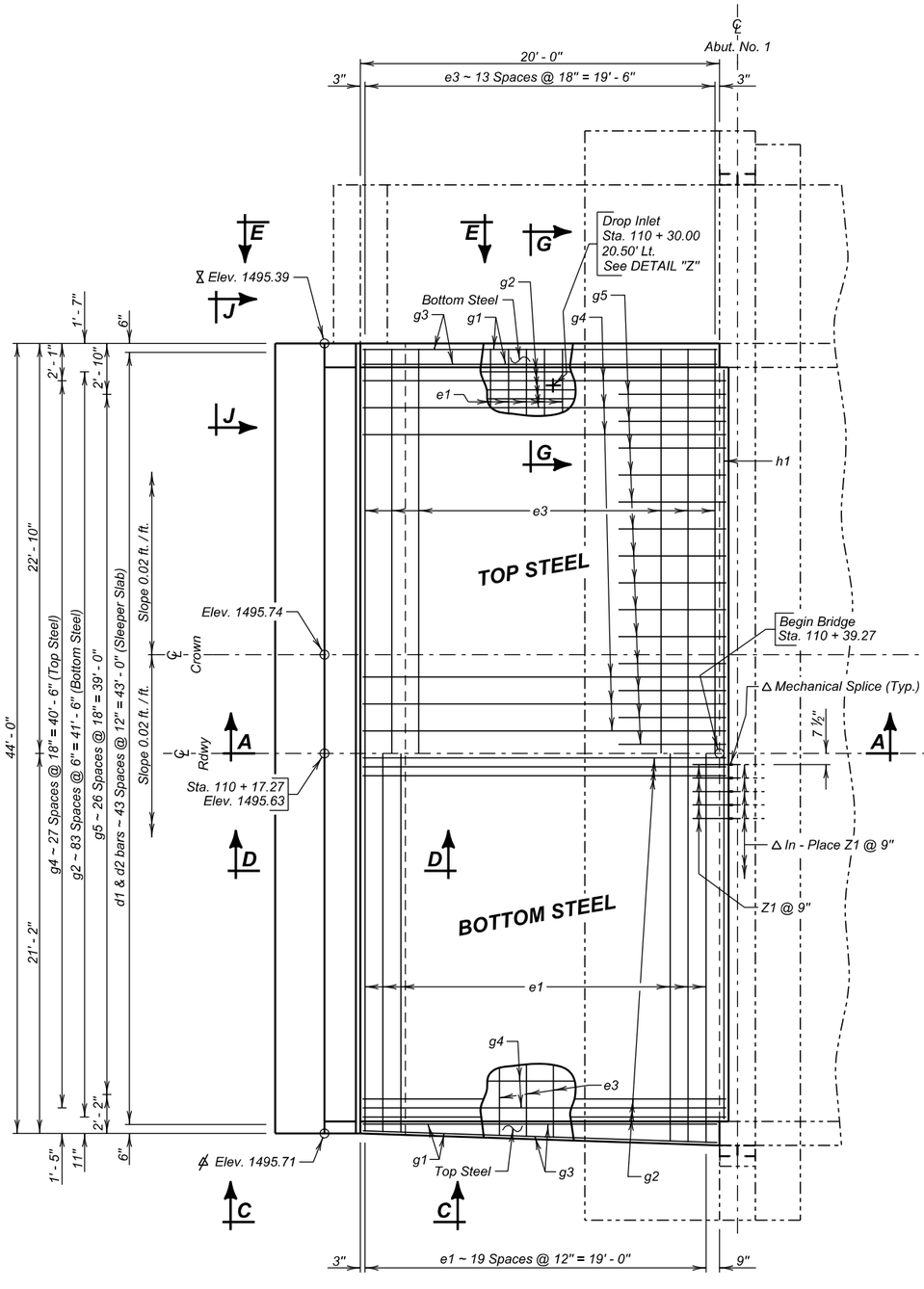
42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015

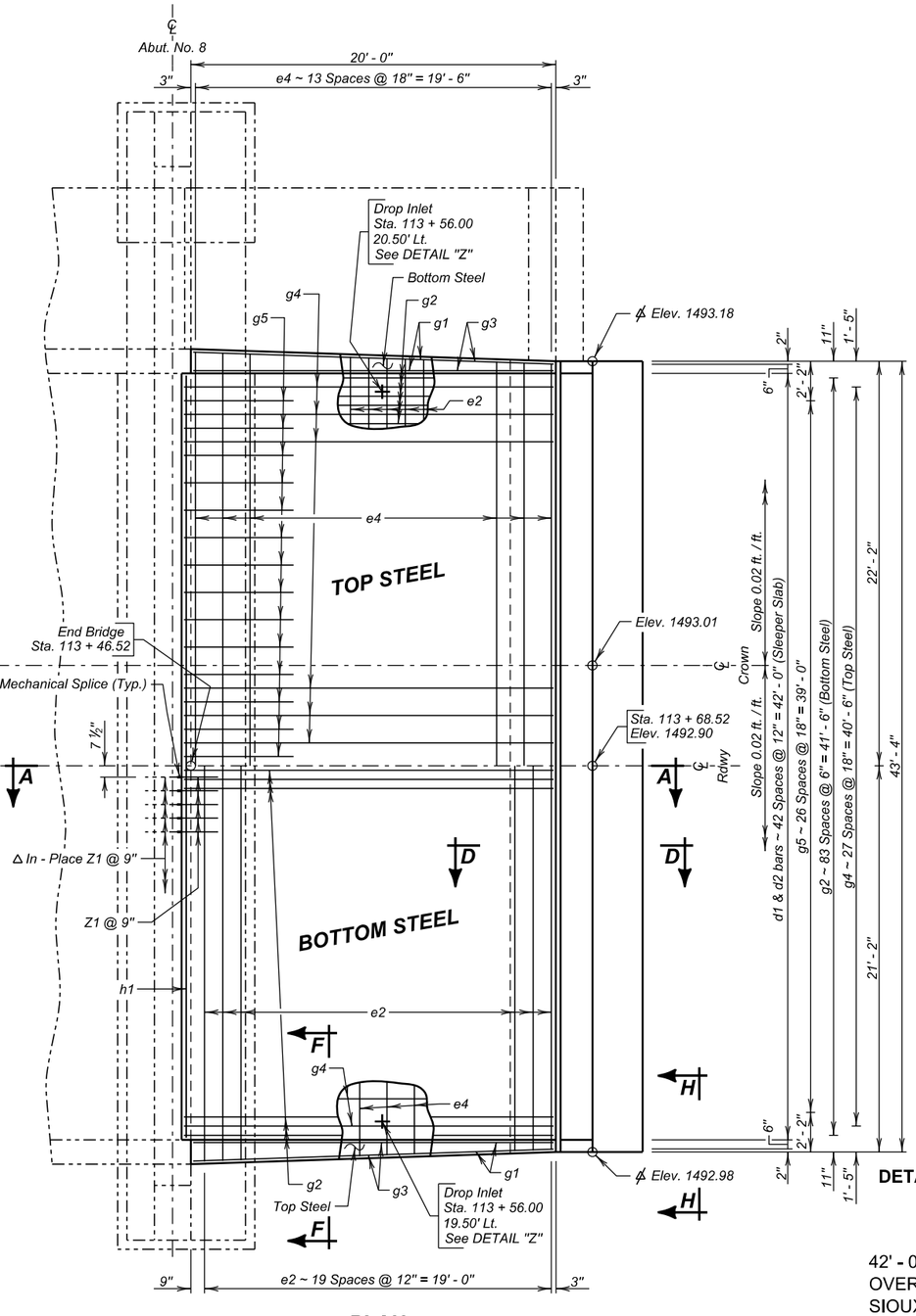


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| PW | BS | MG | Kevin N. Goeden BRIDGE ENGINEER |
| MINN025C | 025CGC25 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E28 | E44 |




**PLAN**
*(Adjacent to Abut. No. 1)*




**PLAN**
*(Adjacent to Abut. No. 8)*

Δ *In-place Z1 bars and Mechanical Splices are listed and included in superstructure quantities. See SUPERSTRUCTURE DETAILS sheet.*

## DETAILS OF APPROACH SLAB ADJACENT TO BRIDGE (A)

FOR

# 307' - 3" CONT. CONCRETE BRIDGE

42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

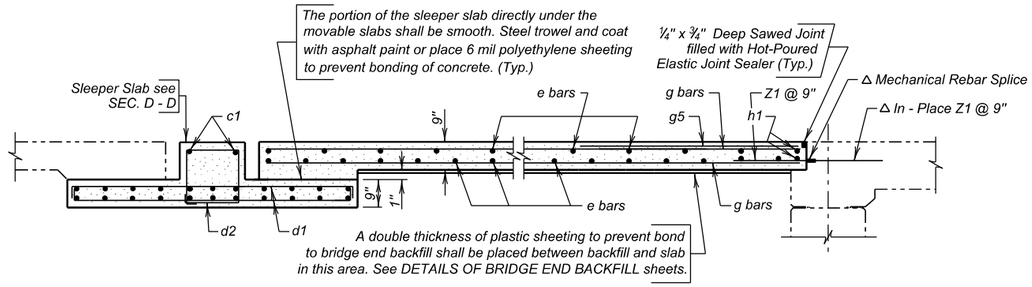
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015



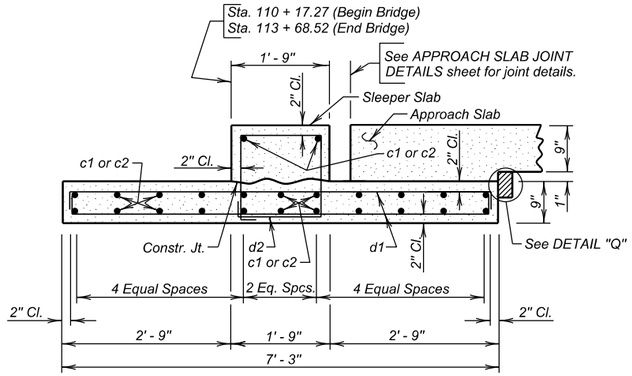
| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| SK | BS | MG | Kevin N. Goeden BRIDGE ENGINEER |
| MINN025C | 025CGC26 | | |

△ *In-place Z1 bars and Mechanical Splices are listed and included in superstructure quantities. See SUPERSTRUCTURE DETAILS sheet.*

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E29 | E44 |




**SEC. A - A**

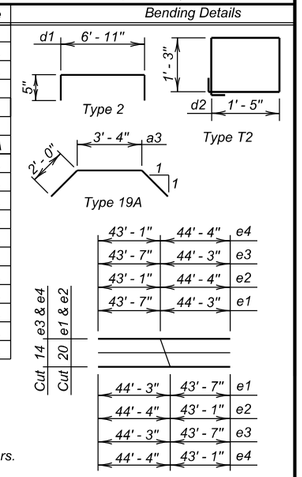



**SEC. D - D**
(Sleeper Slab)

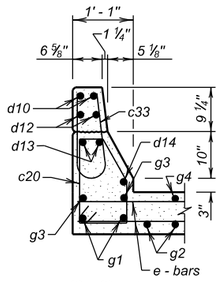
## REINFORCING SCHEDULE
(For Two Approach Slabs & Two Sleeper Slabs)

| Mk. | No. | Size | Length | Type |
|---|---|---|---|---|
| *Sleeper Slabs* | | | | |
| c1 | 24 | 5 | 43' - 9" | Str. |
| c2 | 24 | 5 | 43' - 1" | Str. |
| d1 | 178 | 4 | 7' - 9" | 2 |
| d2 | 89 | 4 | 6' - 1" | T2 |
| *Approach Slabs* | | | | |
| a3 | 12 | 4 | 7' - 4" | 19A |
| e1 | 20 | 6 | 87' - 10" | Str. |
| e2 | 20 | 6 | 87' - 5" | Str. |
| e3 | 14 | 4 | 87' - 10" | Str. |
| e4 | 14 | 4 | 87' - 5" | Str. |
| g1 | 8 | 8 | 19' - 9" | Str. |
| g2 | 168 | 8 | 20' - 3" | Str. |
| g3 | 8 | 4 | 19' - 9" | Str. |
| g4 | 56 | 4 | 20' - 3" | Str. |
| g5 | 54 | 4 | 6' - 0" | Str. |
| h1 | 4 | 6 | 41' - 9" | Str. |
| Z1 | 112 | 7 | 2' - 0" | Str. |

Bending Details



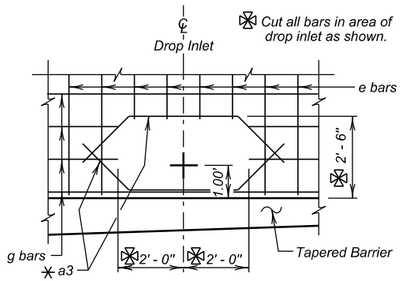

NOTE:
*All bars to be epoxy coated.*
*All dimensions are out to out of bars.*
⌀ *See cutting diagram.*



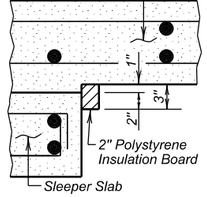

**SEC. F - F**

✳ *Add a3 bar at top and bottom layer of steel as shown.*

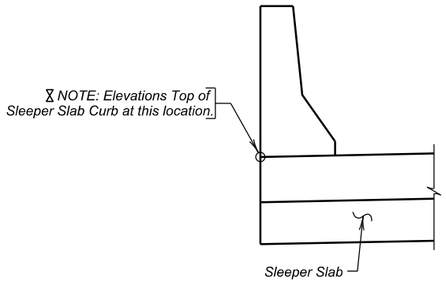
✠ *Cut all bars in area of drop inlet as shown.*



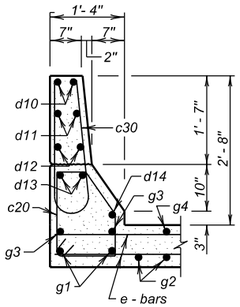

**DETAIL "Z"**
(Typical plan for steel when drop inlet is used.)




**DETAIL "Q"**




**VIEW J - J**



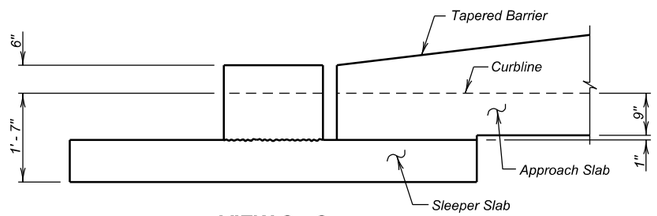

**SEC. G - G**
(Sidewalk Approach Slab not shown)

## ESTIMATED QUANTITIES
(For Two Approach Slabs and Two Sleeper Slabs)

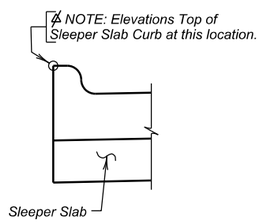
| ITEM | UNIT | QUANTITY |
|---|---|---|
| Concrete Approach Slab for Bridge | Sq. Yd. | 201.0 |
| Concrete Approach Sleeper Slab for Bridge | Sq. Yd. | 70.4 |

1. 50.9 Cu. Yds. Concrete in Approach Slabs.
2. 18256 Lbs. Epoxy Coated Re-Steel in Approach Slabs.
3. 22.3 Cu. Yds. Concrete in Sleeper Slabs.
4. 3457 Lbs. Epoxy Coated Re-Steel in Sleeper Slabs.
5. 22 Sq. Ft. of 2" Polystyrene Insulation Board.
6. 2.7 Cu. Yds. Concrete in Tapered Barriers.
7. 816 Lbs. Epoxy Coated Re-Steel in Tapered Barriers.
8. 1.8 Cu. Yds. Concrete in Barrier Curb.
9. 396 Lbs. Epoxy Coated Re-Steel in Barrier Curb.

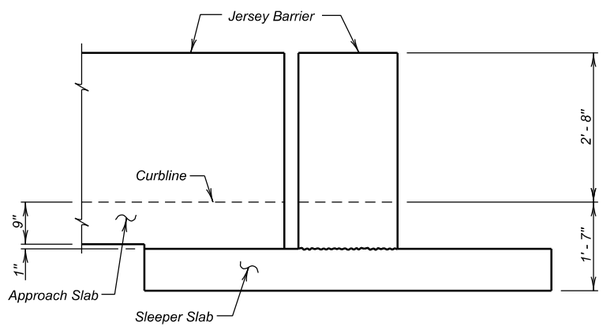
*Items 1 thru 9 are approximate quantities contained in the above bid items and are for information only.*




**VIEW C - C**




**VIEW H - H**




**VIEW E - E**

**DETAILS OF APPROACH SLAB ADJACENT TO BRIDGE (B)**

FOR

## 307' - 3" CONT. CONCRETE BRIDGE

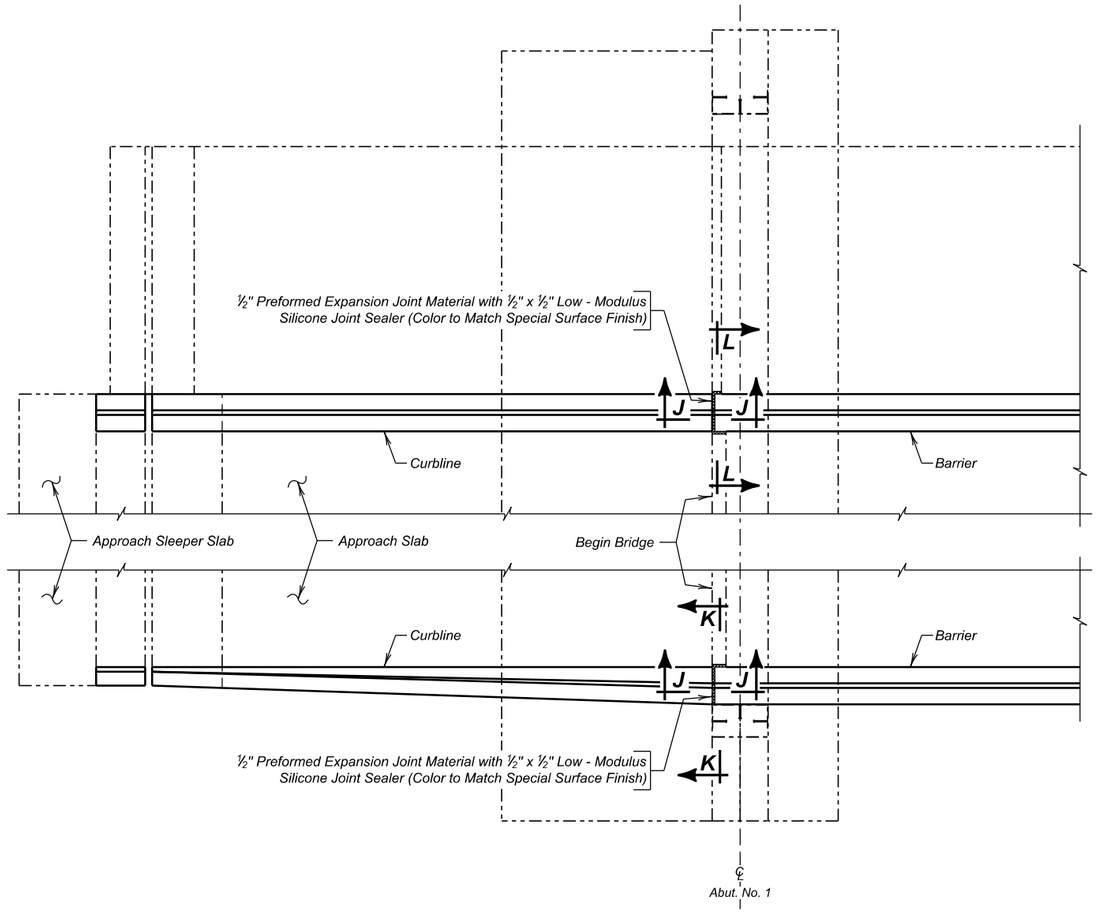
42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015

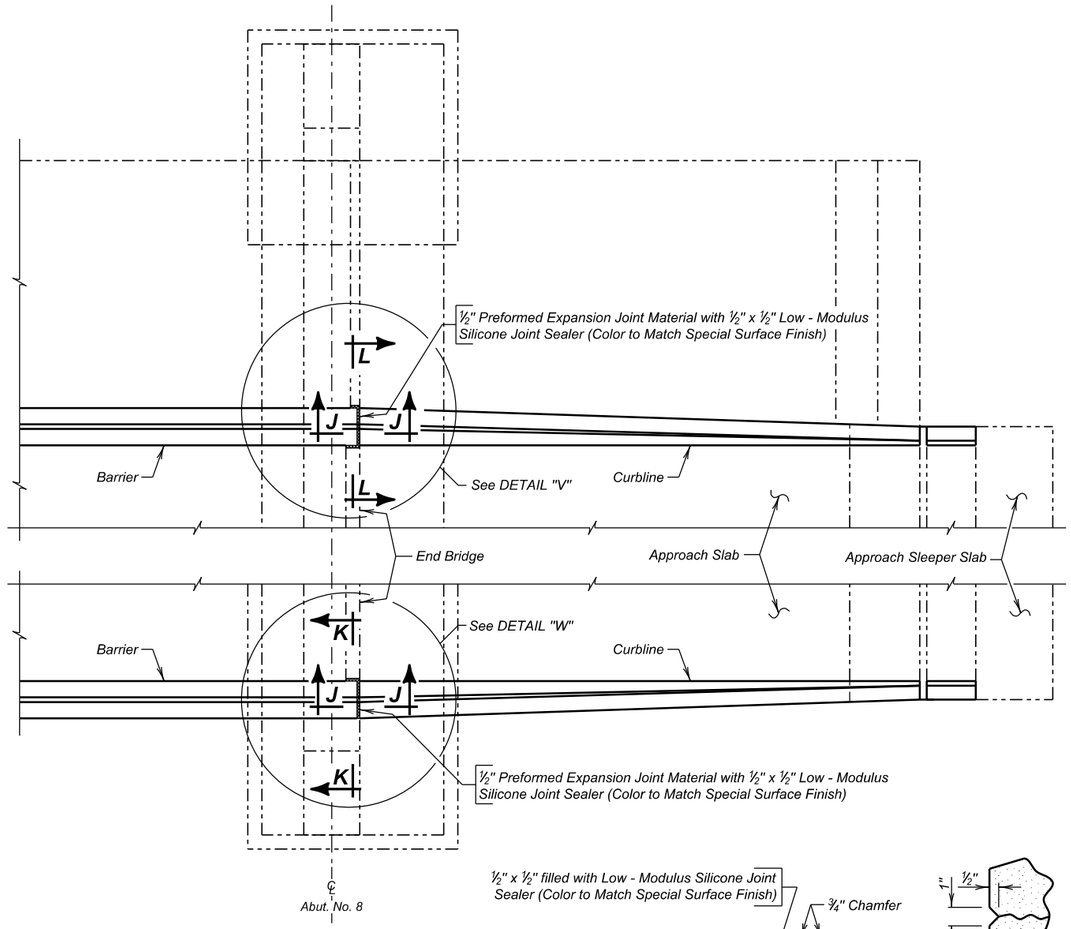
27 OF 36

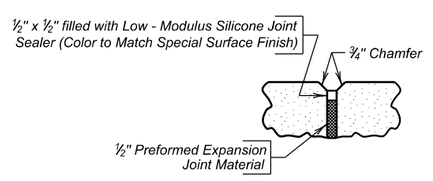
| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| SK | BS | MG | Kevin N. Goeden BRIDGE ENGINEER |
| MINN025C | 025CGC27 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E30 | E44 |




**PLAN**

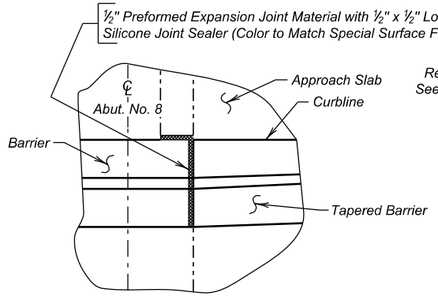


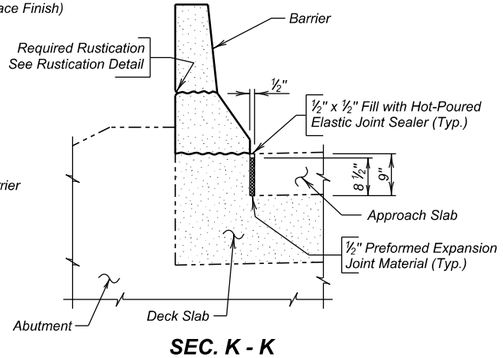

**SEC. J - J**



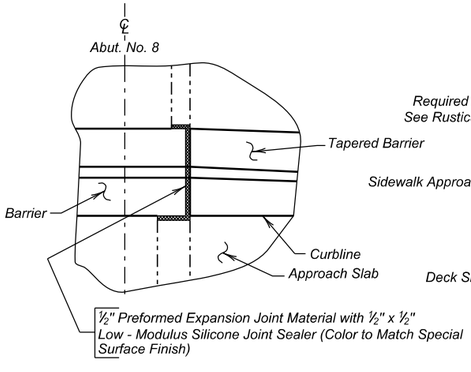

**RUSTICATION DETAIL**



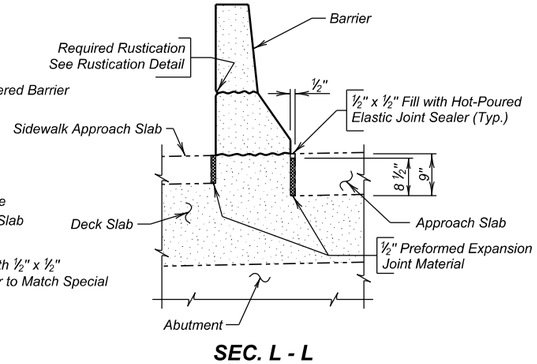

**DETAIL "W"**




**SEC. K - K**




**DETAIL "V"**




**SEC. L - L**

**BARRIER CURB AND TAPERED BARRIER DETAILS (A)**

FOR

## 307' - 3" CONT. CONCRETE BRIDGE

| | |
|---|---|
| 42' - 0" ROADWAY & 8' - 0" SIDEWALK | 0° SKEW |
| OVER DELLS OF THE BIG | SEC. 16-T104N-R49W |
| SIOUX RIVER | P 0115(47)102 |
| STA. 110 + 39.27 TO 113 + 46.52 | HL-93 |
| STR. NO. 50-208-022 | |

MINNEHAHA COUNTY

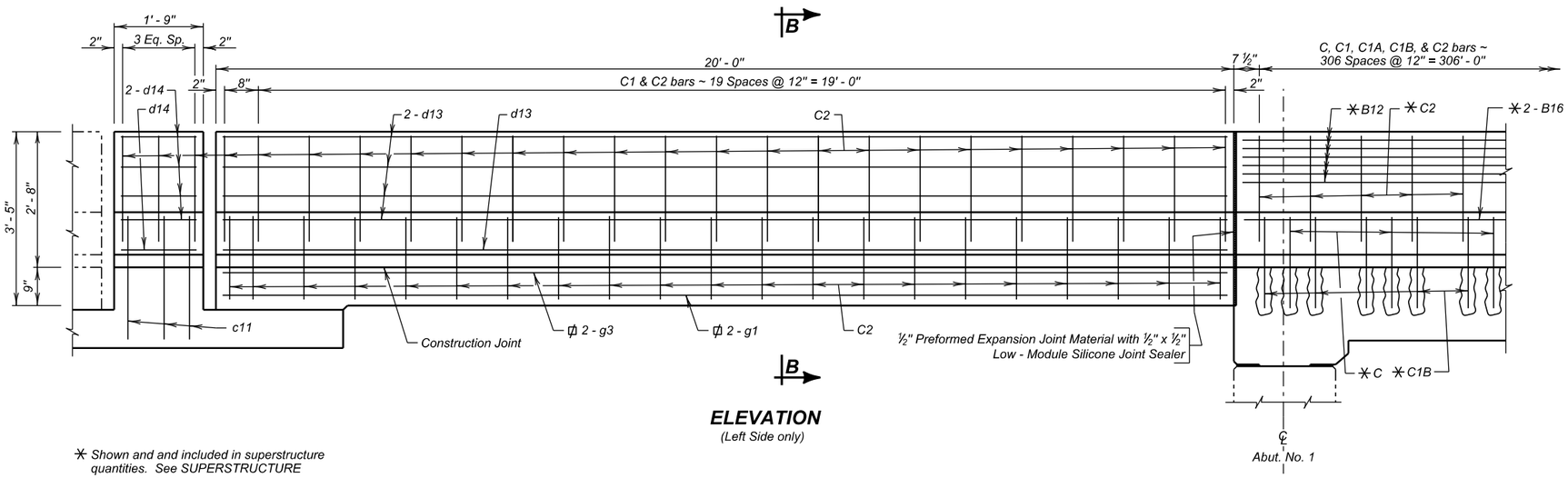
S. D. DEPT. OF TRANSPORTATION

OCTOBER 2015

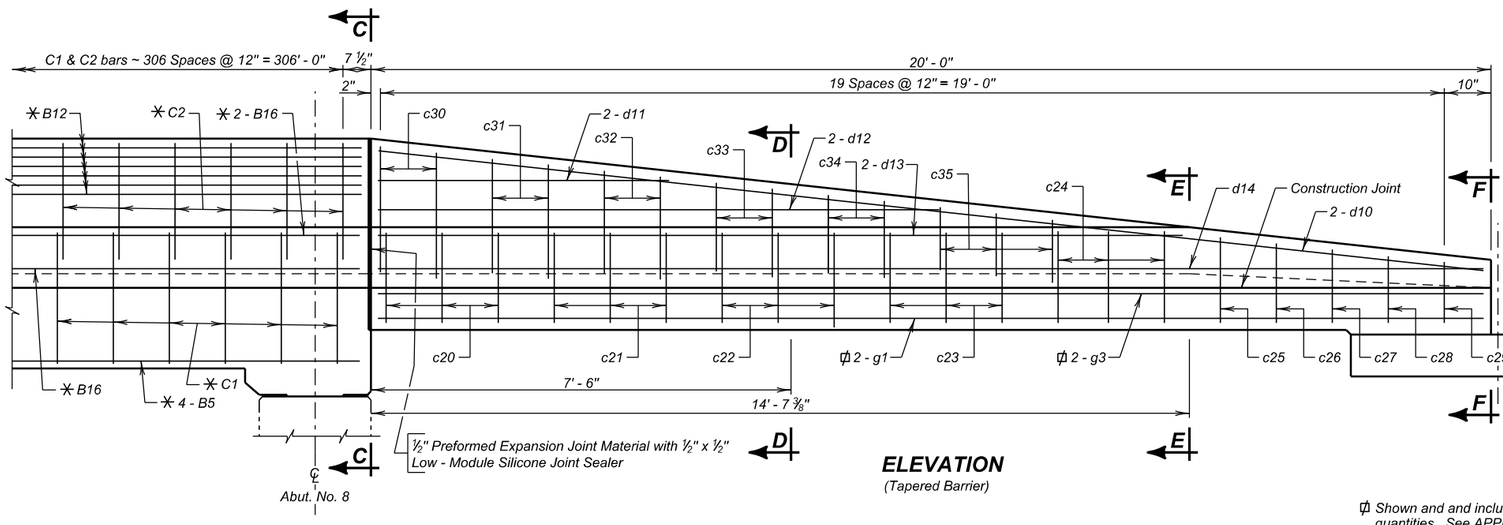


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| TB | BS | BT | Kevin N. Goeden |
| MINN025C | 025CGC28 | | BRIDGE ENGINEER |

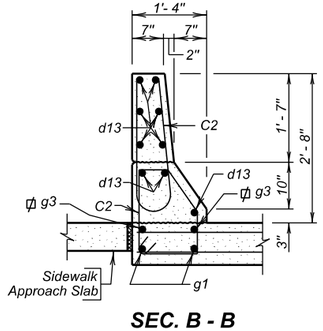
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E31 | E44 |



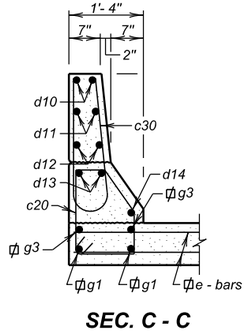

✳ Shown and and included in superstructure quantities. See SUPERSTRUCTURE DETAILS (B) sheet for details.



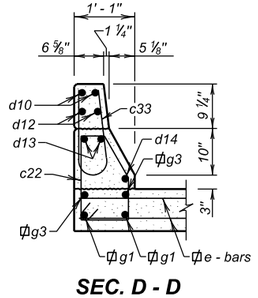

✠ Shown and and included in approach slab quantities. See APPROACH SLAB ADJACENT TO BRIDGE DETAILS (B) sheet for details.



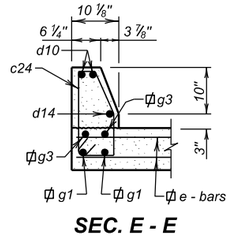

SEC. B - B



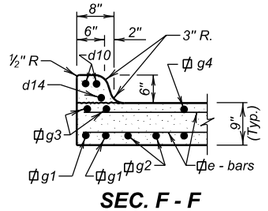

SEC. C - C




SEC. D - D




SEC. E - E

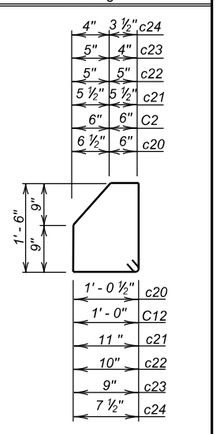



SEC. F - F

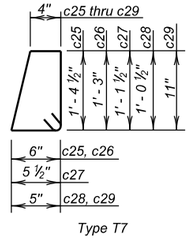
## REINFORCING SCHEDULE

| Mk. | No. | Size | Length | Type |
|---|---|---|---|---|
| 1 Tapered Barrier Curb (3 Required) | | | | |
| c20 | 3 | 5 | 5' - 8" | T1A |
| c21 | 3 | 5 | 5' - 5" | T1A |
| c22 | 3 | 5 | 5' - 3" | T1A |
| c23 | 3 | 5 | 5' - 1" | T1A |
| c24 | 3 | 5 | 4' - 11" | T1A |
| c25 | 1 | 5 | 4' - 6" | T7 |
| c26 | 1 | 5 | 4' - 3" | T7 |
| c27 | 1 | 5 | 4' - 0" | T7 |
| c28 | 1 | 5 | 3' - 9" | T7 |
| c29 | 1 | 5 | 3' - 6" | T7 |
| c30 | 2 | 5 | 4' - 10" | S11 |
| c31 | 2 | 5 | 4' - 5" | S11 |
| c32 | 2 | 5 | 4' - 0" | S11 |
| c33 | 2 | 5 | 3' - 6" | S11 |
| c34 | 2 | 5 | 3' - 1" | S11 |
| c35 | 3 | 5 | 2' - 7" | S11 |
| d10 | 2 | 5 | 20' - 0" | Str. |
| d11 | 2 | 5 | 5' - 3" | Str. |
| d12 | 2 | 5 | 11' - 0" | Str. |
| d13 | 2 | 5 | 14' - 6" | Str. |
| d14 | 1 | 4 | 19' - 10" | Str. |
| 1 Jersey Barrier Curb (1 Required) | | | | |
| C2 | 21 | 5 | 5' - 6" | T1A |
| c11 | 3 | 5 | 7' - 0" | T1A |
| C2 | 24 | 5 | 5' - 1" | S11 |
| d13 | 7 | 4 | 19' - 8" | Str. |
| d14 | 7 | 4 | 1' - 5" | Str. |

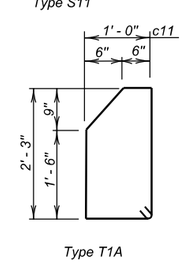
Bending Details




Type T1A



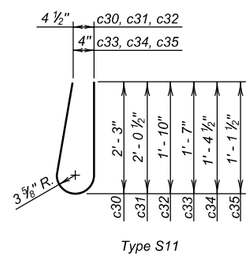

Type T7




Type S11




Type T1A




Type S11

NOTES:
All dimensions are out to out of bars.
All bars to be Epoxy Coated.

**BARRIER CURB AND TAPERED BARRIER DETAILS (B)**

FOR

## 307' - 3" CONT. CONCRETE BRIDGE

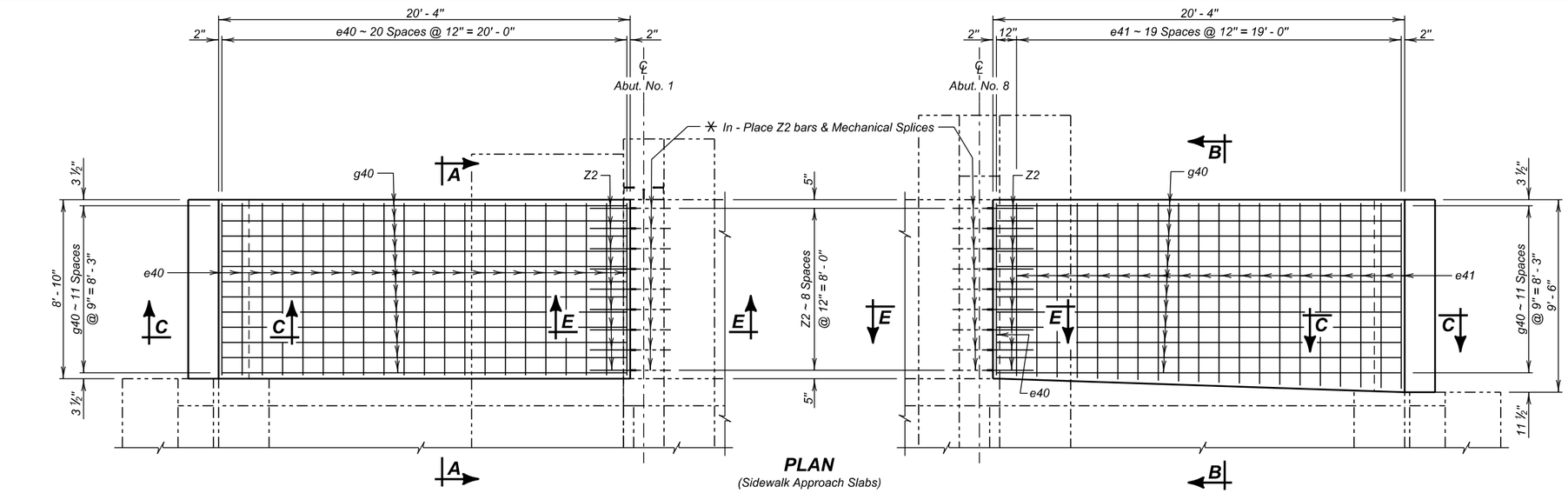
42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| TB | BS | BT | Kevin N. Goeden BRIDGE ENGINEER |
| MINN025C | 025CGC29 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E32 | E44 |

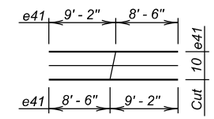



**PLAN**
(Sidewalk Approach Slabs)

⚹ *In-place Z2 bars and Mechanical Splices are listed and included in superstructure quantities. See SUPERSTRUCTURE DETAILS (B)*

## REINFORCING SCHEDULE
(For Two Sidewalk Approach Slabs and Two Sidewalk Sleeper Slabs)

| Mk. | No. | Size | Length | Type |
|---|---|---|---|---|
| c40 | 4 | 4 | 8' - 6" | Str. |
| c41 | 4 | 4 | 9' - 2" | Str. |
| d40 | 19 | 4 | 2' - 8" | Str. |
| e40 | 22 | 4 | 8' - 6" | Str. |
| e41 | 10 | 4 | 17' - 8" | Str. |
| g40 | 24 | 4 | 20' - 0" | Str. |
| Z2 | 18 | 4 | 2' - 0" | Str. |



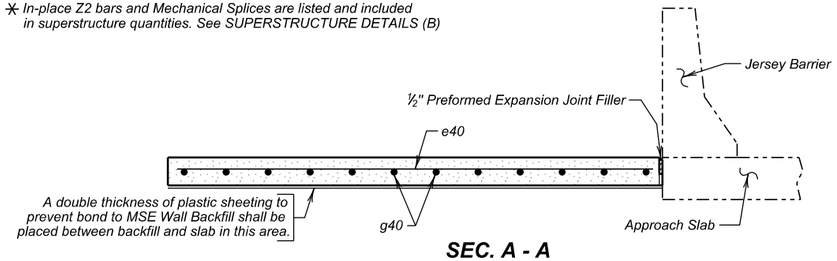

NOTE:
All bars to be Epoxy Coated.
All dimensions are out to out of bars.
⚠ See cutting diagram.

## ESTIMATED QUANTITIES
(For Two Sidewalk Approach Slabs)

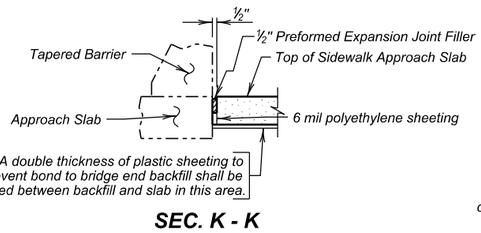
| ITEM | UNIT | QUANTITY |
|---|---|---|
| 6" Reinforced Concrete Sidewalk | Sq. Ft. | 366 |

1. 6.8 Cu. Yds. Concrete in Sidewalk Approach Slabs.
2. 588 Lbs. Epoxy Coated Re-Steel in Sidewalk Approach Slabs.
3. 1.0 Cu. Yds. Concrete in Sidewalk Sleeper Slabs.
4. 81 Lbs. Epoxy Coated Re-Steel in Sidewalk Sleeper Slabs.
5. 732 Sq. Ft. 6 mil Polyethylene sheeting under reinf. conc. sidewalk.
6. 41 Ft. of Expansion Joint adjacent to barriers.

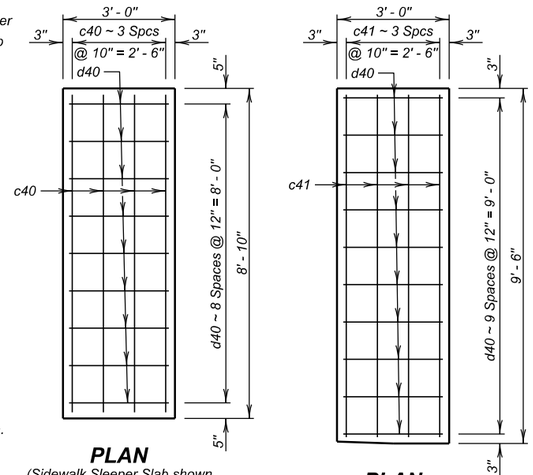
*Items 1 thru 6 are approximate quantities contained in the above bid item and are for information only.*




**SEC. A - A**

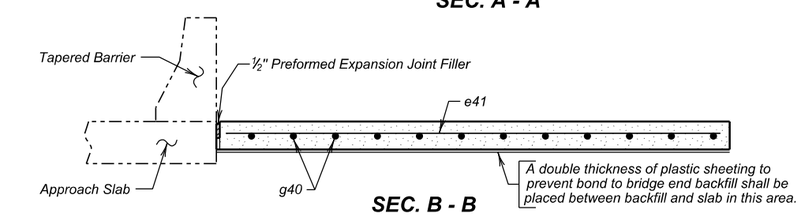



**SEC. K - K**

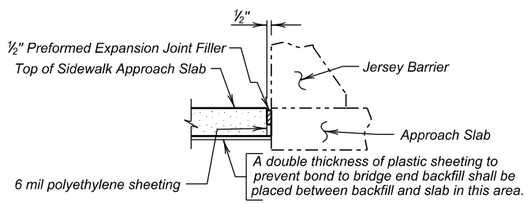



**PLAN**
(Sidewalk Sleeper Slab shown adjacent to Jersey Barrier)

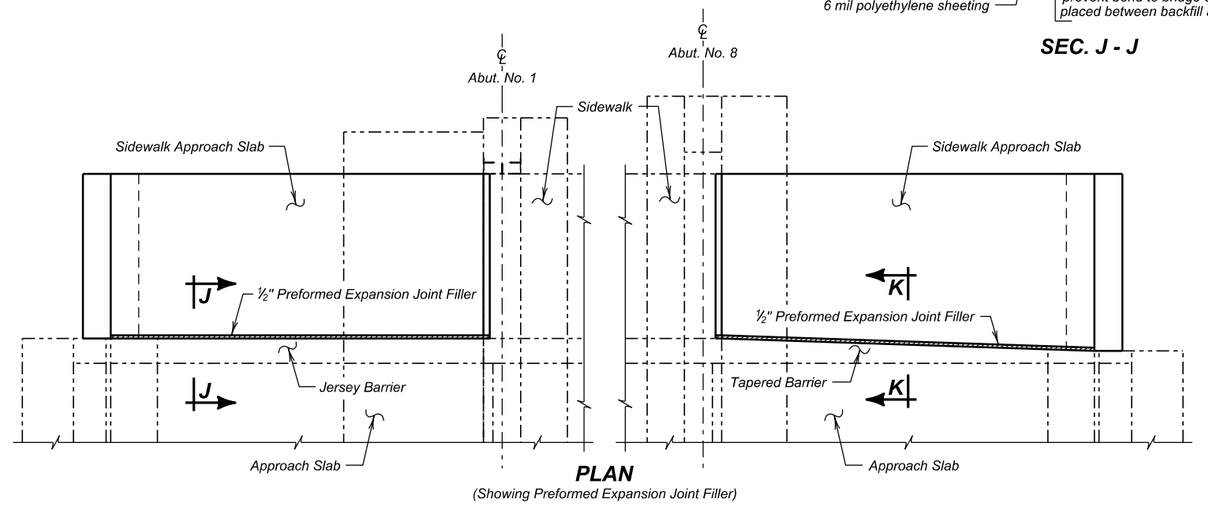
**PLAN**
(Sidewalk Sleeper Slab shown adjacent to Tapered Barrier)



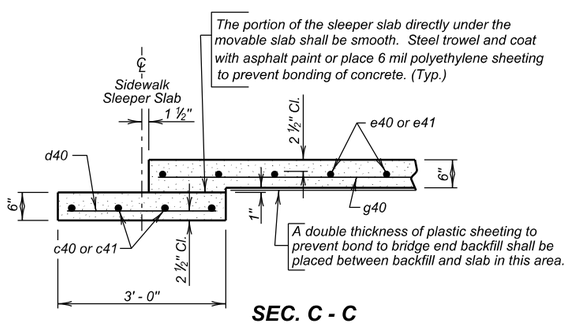

**SEC. B - B**



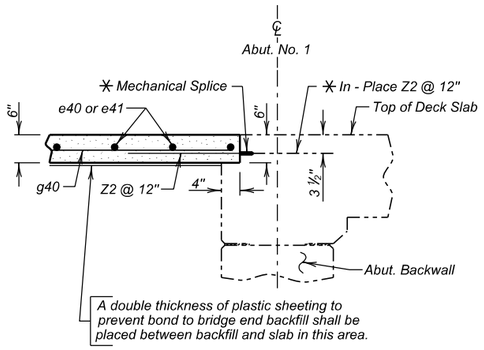

**SEC. J - J**




**PLAN**
(Showing Preformed Expansion Joint Filler)




**SEC. C - C**




**SEC. E - E**

## SIDEWALK APPROACH SLAB DETAILS
FOR
## 307' - 3" CONT. CONCRETE BRIDGE

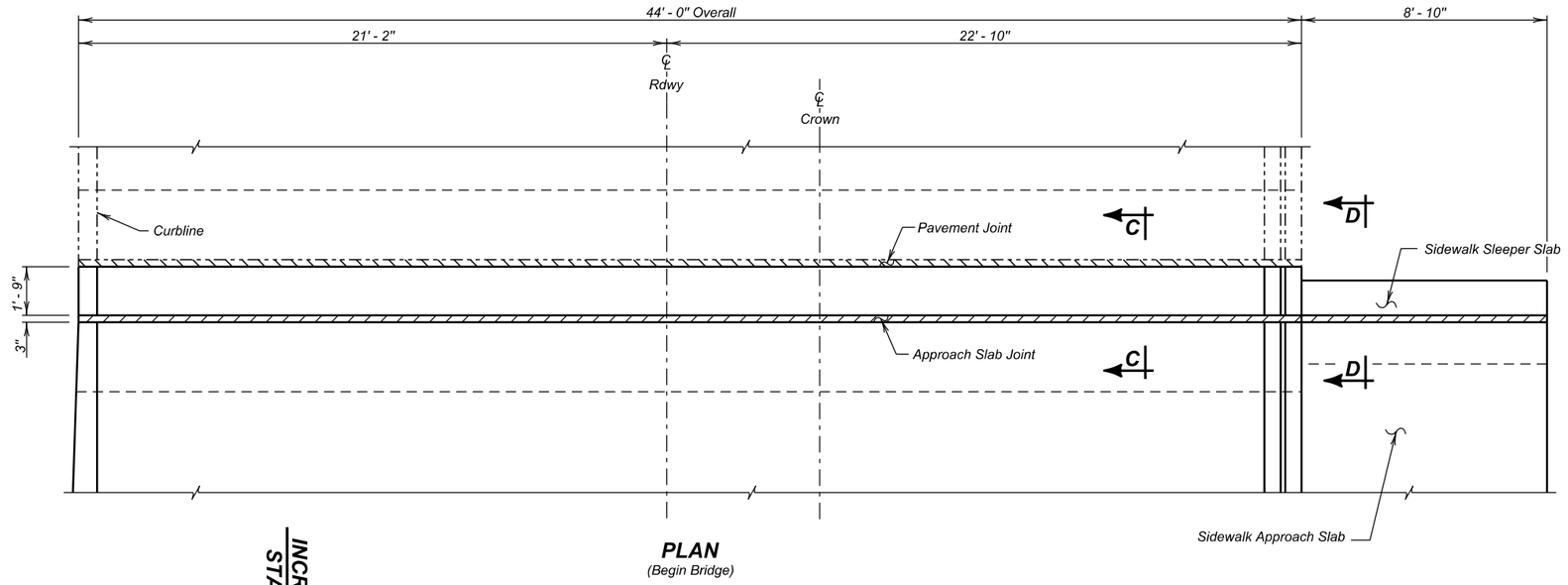
42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015



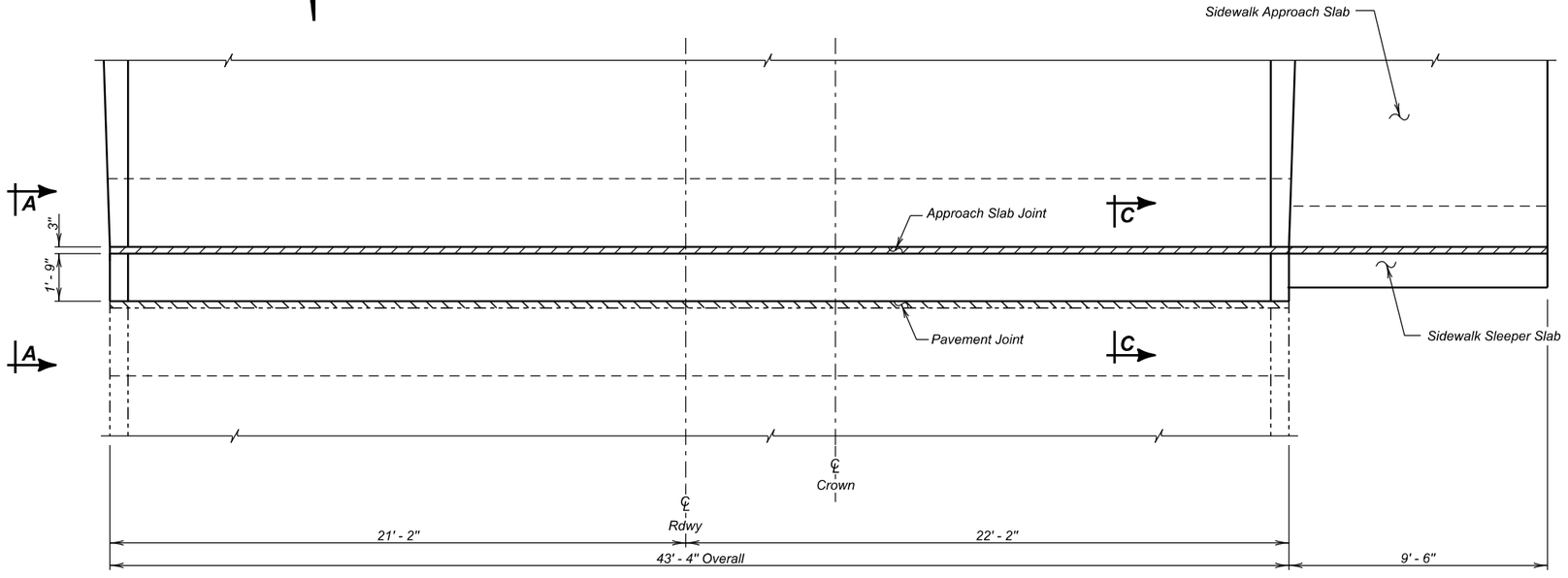
| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| SK | BS | MG | Kevin N. Goeden |
| MINN025C | 025CGC30 | | BRIDGE ENGINEER |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E33 | E44 |




**PLAN**
*(Begin Bridge)*

INCREASING STATIONS




**PLAN**
*(End Bridge)*

## GENERAL NOTES

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

## ESTIMATED QUANTITIES
*( For Two Approach Slabs )*

| ITEM | UNIT | QUANTITY |
|---|---|---|
| Membrane Sealant Expansion Joint | Ft. | 111.1 |

**APPROACH SLAB JOINT DETAILS (A)**

FOR

307' - 3" CONT. CONCRETE BRIDGE

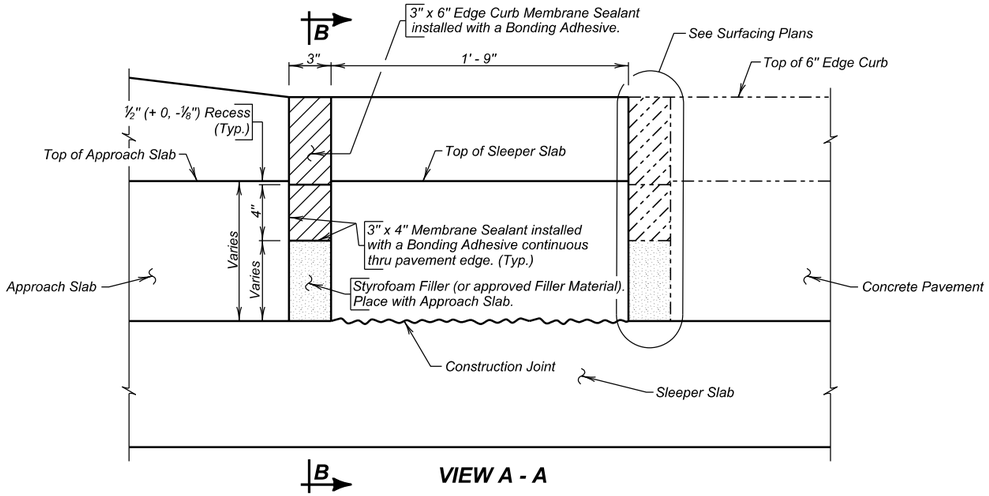
42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015

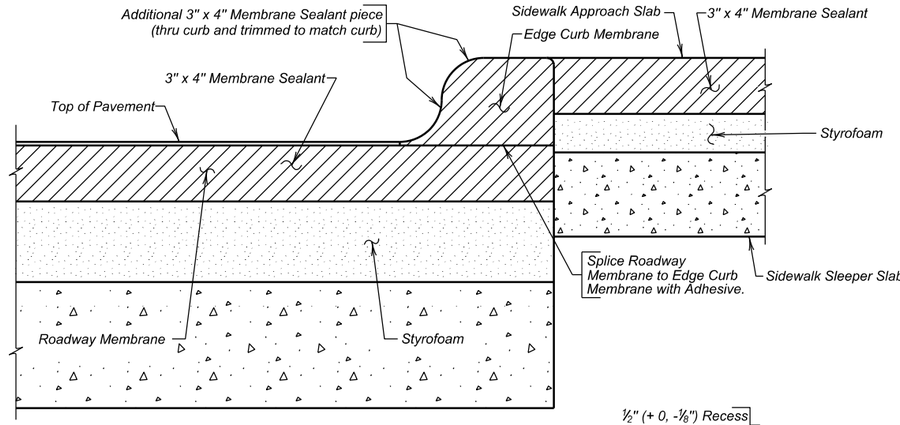


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| SK | BS | MG | Kevin N. Goeden BRIDGE ENGINEER |
| MINN025C | 025CGC31 | | |

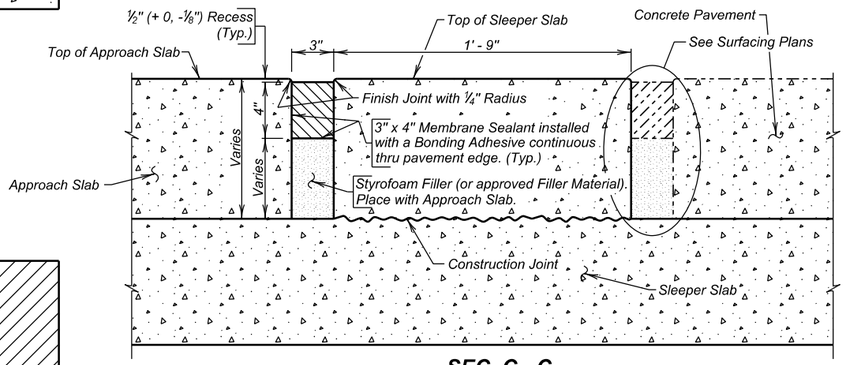
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E34 | E44 |




**VIEW A - A**




**SEC. B - B**

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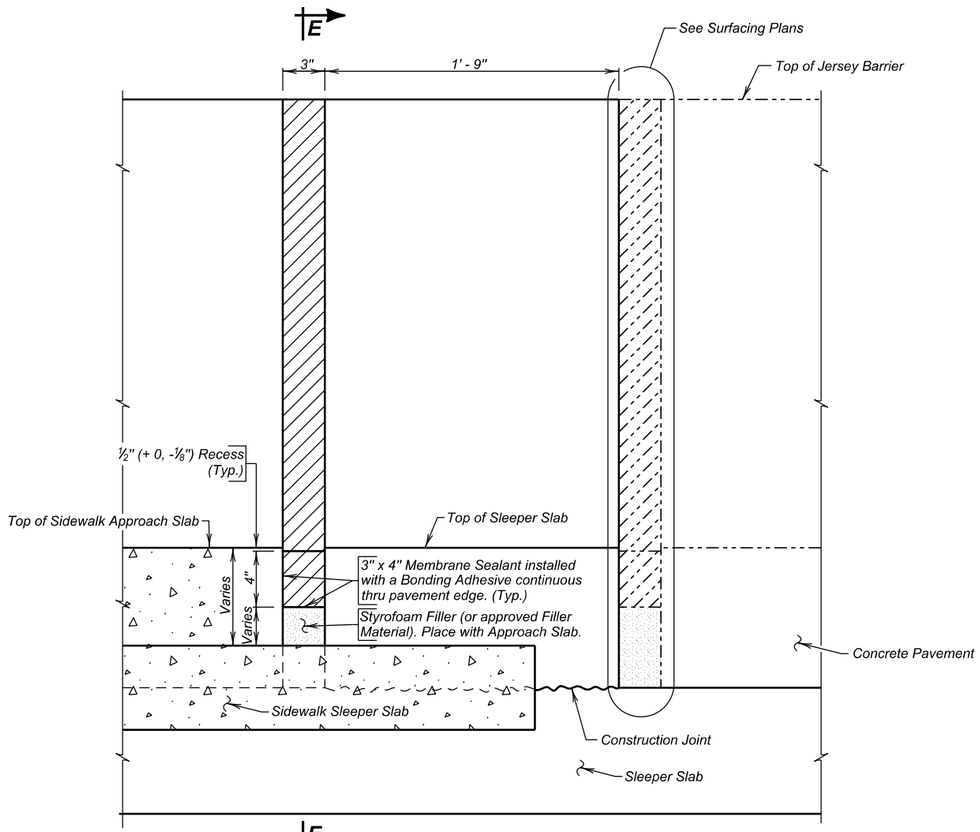


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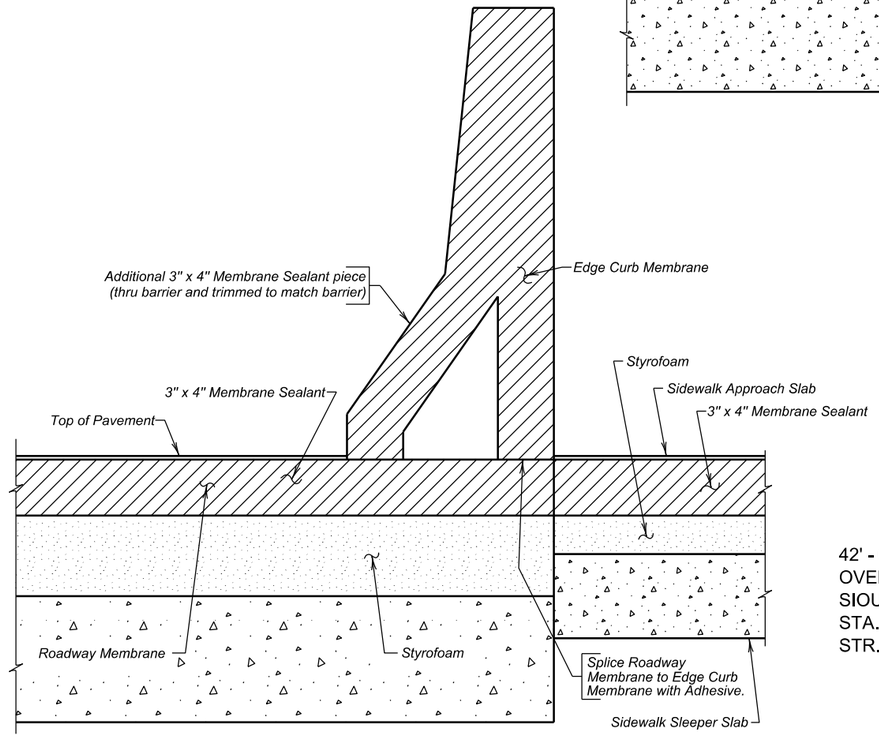



**SEC. E - E**

**APPROACH SLAB JOINT DETAILS (B)**

FOR

## 307' - 3" CONT. CONCRETE BRIDGE

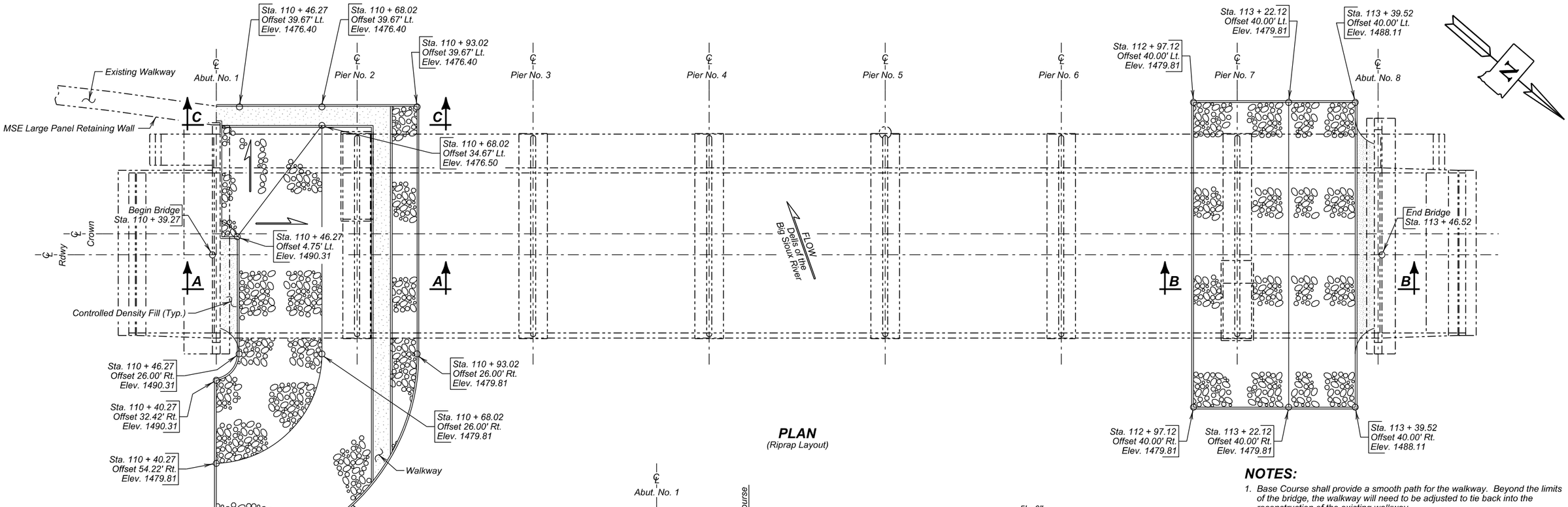
42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015

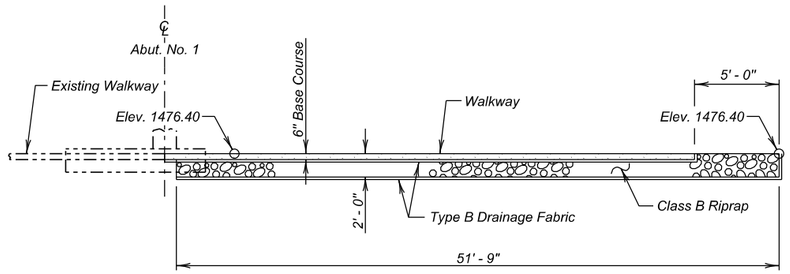


| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| SK | BS | MG | Kevin N. Goeden |
| MINN025C | 025CGC32 | | BRIDGE ENGINEER |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E35 | E44 |




## PLAN
(Riprap Layout)

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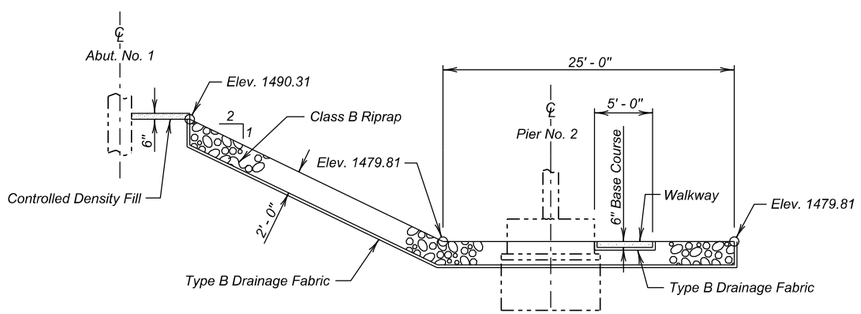
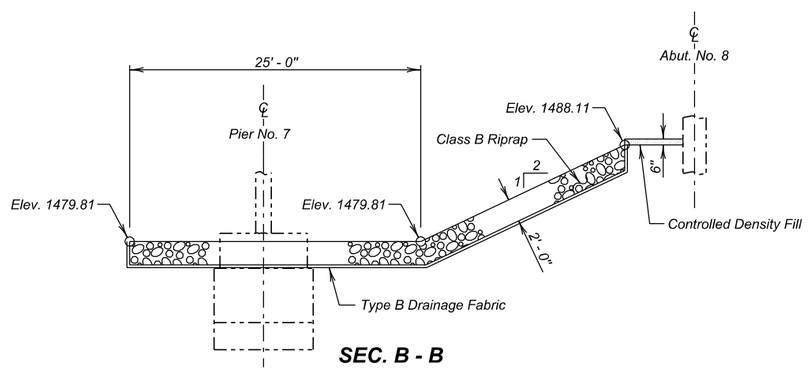



## SEC. A - A




## SEC. B - B

## NOTES:

1. Base Course shall provide a smooth path for the walkway. Beyond the limits of the bridge, the walkway will need to be adjusted to tie back into the reconstruction of the existing walkway.
2. Base Course is estimated using 12" of material to account for voids in the Class B Riprap.
3. All costs associated with supplying and placing Base Course for the walkway adjacent to the Pier No. 2 shall be incidental to the contract price per ton for Class B Riprap. The Base Course material shall comply with Section 882. Estimated Base Course quantity is 48 Tons.
4. During and after the placement of the riprap, care shall be taken to restore the channel and channel banks to the existing conditions. This may require a portion of the riprap to be buried.

## ESTIMATED QUANTITIES

| | ITEM | UNIT | QUANTITY |
|---|---|---|---|
| ≠ | Class B Riprap | Ton | 953.9 |
| | Type B Drainage Fabric | Sq. Yd. | 1228 |
| | Controlled Density Fill | Cu. Yd. | 7.1 |

≠ For estimating purposes only, a factor of 1.4 tons/cu.yd. was used to convert Cu. Yds. to Tons.

**RIPRAP DETAILS**

FOR

## 307' - 3" CONT. CONCRETE BRIDGE

42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

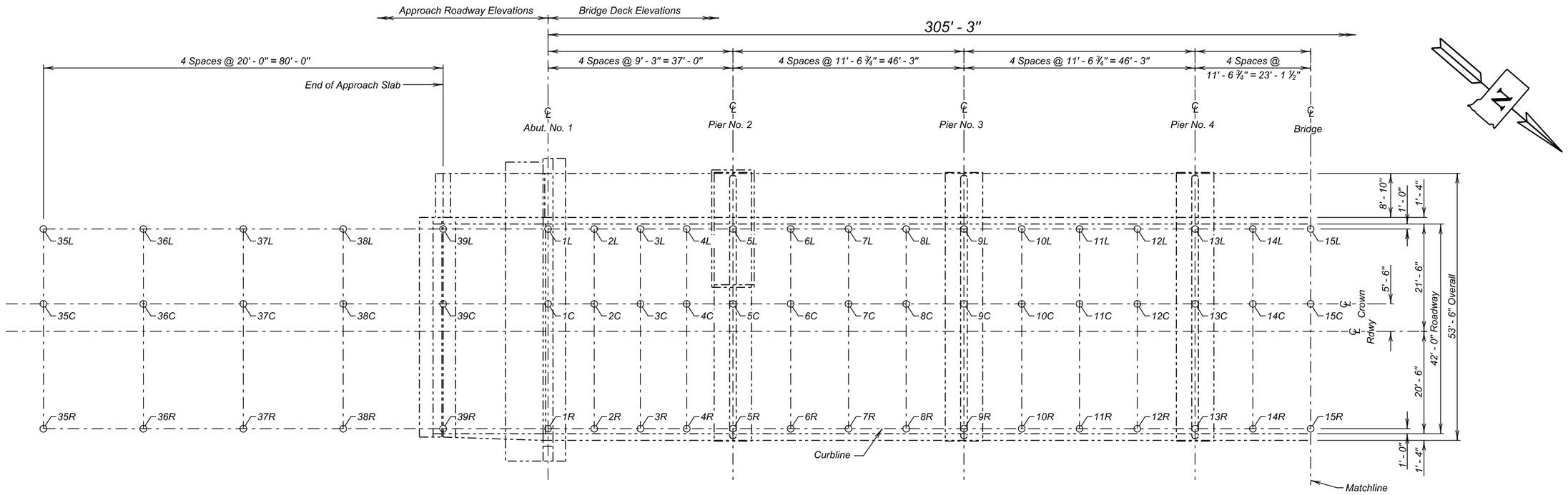
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015

33 OF 36

| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| TB | PW | MG/PW | Kevin N. Boeder |
| MINN025C | 025CGC33 | | BRIDGE ENGINEER |

*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. | P 0115(47)102 | E36 | E44 |




***PLAN***

| Table of As-Built Elevations - Bridge Deck | | | | | |
|---|---|---|---|---|---|
| **Location** | **Elevation** | **Location** | **Elevation** | **Location** | **Elevation** |
| 1L | | 1C | | 1R | |
| 2L | | 2C | | 2R | |
| 3L | | 3C | | 3R | |
| 4L | | 4C | | 4R | |
| 5L | | 5C | | 5R | |
| 6L | | 6C | | 6R | |
| 7L | | 7C | | 7R | |
| 8L | | 8C | | 8R | |
| 9L | | 9C | | 9R | |
| 10L | | 10C | | 10R | |
| 11L | | 11C | | 11R | |
| 12L | | 12C | | 12R | |
| 13L | | 13C | | 13R | |
| 14L | | 14C | | 14R | |
| 15L | | 15C | | 15R | |

| Table of As-Built Elevations - Approach Roadway | | | | | |
|---|---|---|---|---|---|
| **Location** | **Elevation** | **Location** | **Elevation** | **Location** | **Elevation** |
| 35L | | 35C | | 35R | |
| 36L | | 36C | | 36R | |
| 37L | | 37C | | 37R | |
| 38L | | 38C | | 38R | |
| 39L | | 39C | | 39R | |

| ELEVATION - BRIDGE SURVEY MARKER | | |
|---|---|---|
| **LOCATION** | **STATION - OFFSET** | **ELEVATION** |
| Begin Bridge | | |

| ESTIMATED QUANTITIES | | |
|---|---|---|
| ITEM | UNIT | QUANTITY |
| Bridge Elevation Survey | L. S. | Lump Sum |

*NOTE -*

*The Contractor shall be responsible for producing the As - Built Elevation Survey soon after construction is complete and before the bridge is opened to traffic. The As - Built Elevations of the Bridge shall be taken and 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 Office of Bridge Design and the Region Office.*

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

FOR

307' - 3" CONT. CONCRETE BRIDGE

42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

MINNEHAHA COUNTY

S. D. DEPT. OF TRANSPORTATION

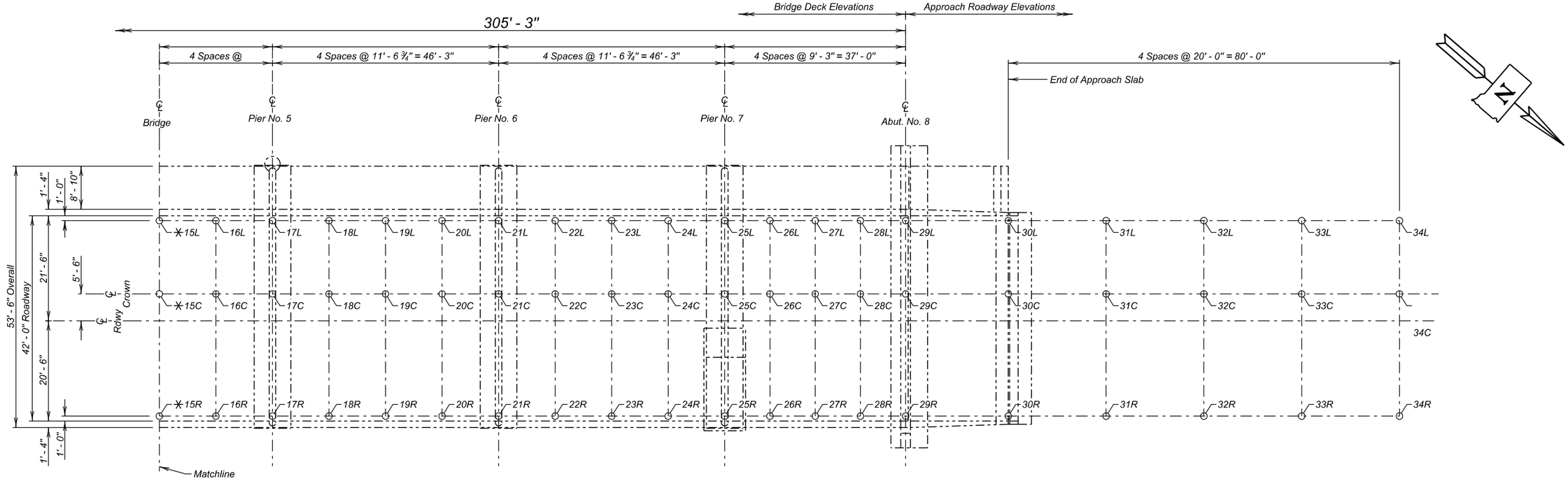
OCTOBER 2015



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| TB | BS | MG | Kevin N. Goeden BRIDGE ENGINEER |
| MINN025C | 025CGC34 | | |

*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. | P 0115(47)102 | E37 | E44 |




## PLAN

✳ *Included in AS-BUILT ELEVATION SURVERY (A).*

| Table of As-Built Elevations - Bridge Deck | | | | | |
|---|---|---|---|---|---|
| **Location** | **Elevation** | **Location** | **Elevation** | **Location** | **Elevation** |
| 15L | | 15C | | 15R | |
| 16L | | 16C | | 16R | |
| 17L | | 17C | | 1R | |
| 18L | | 18C | | 18R | |
| 19L | | 19C | | 19R | |
| 20L | | 20C | | 20R | |
| 21L | | 21C | | 21R | |
| 22L | | 22C | | 22R | |
| 23L | | 23C | | 23R | |
| 24L | | 24C | | 24R | |
| 25L | | 25C | | 25R | |
| 26L | | 26C | | 26R | |
| 27L | | 27C | | 27R | |
| 28L | | 28C | | 28R | |
| 29L | | 29C | | 29R | |

| Table of As-Built Elevations - Approach Roadway | | | | | |
|---|---|---|---|---|---|
| **Location** | **Elevation** | **Location** | **Elevation** | **Location** | **Elevation** |
| 30L | | 30C | | 30R | |
| 31L | | 31C | | 31R | |
| 32L | | 32C | | 32R | |
| 33L | | 33C | | 33R | |
| 34L | | 34C | | 34R | |

| ELEVATION - BRIDGE SURVEY MARKER | | |
|---|---|---|
| **LOCATION** | **STATION - OFFSET** | **ELEVATION** |
| End Bridge | | |

*NOTE -*
*The Contractor shall be responsible for producing the As - Built Elevation Survey soon after construction is complete and before the bridge is opened to traffic. The As - Built Elevations of the Bridge shall be taken and 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 Office of Bridge Design and the Region Office.*

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

FOR

307' - 3" CONT. CONCRETE BRIDGE

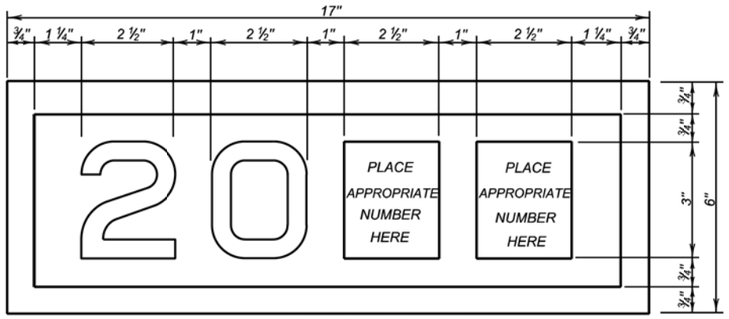
42' - 0" ROADWAY & 8' - 0" SIDEWALK — 0° SKEW
OVER DELLS OF THE BIG — SEC. 16-T104N-R49W
SIOUX RIVER — P 0115(47)102
STA. 110 + 39.27 TO 113 + 46.52 — HL-93
STR. NO. 50-208-022

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| TB | BS | MG | Kevin N. Goeden |
| MINN025C | 025CGC35 | | BRIDGE ENGINEER |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E38 | E44 |




## YEAR PLATE DETAILS

### GENERAL NOTES:

1. Year plates of the general dimensions shown shall be constructed on all box 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 (½) inch in depth.

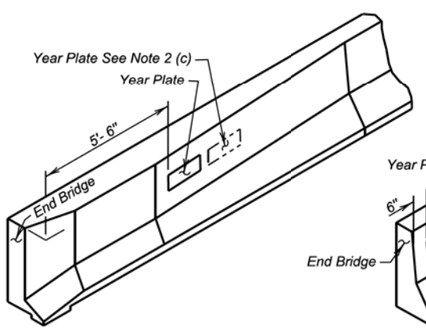
2. Year plates shall be located on structure (s) as follows:

   a. On cast-in-place box culverts the year plates shall be four and one - half (4 ½) inches below the top of the upstream parapet 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 this location, the year plate shall be centered in an adjacent barrel.

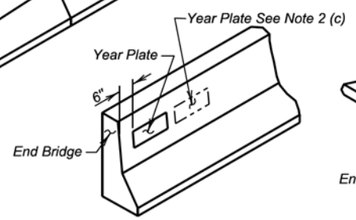
   b. On bridges with six (6) inch curbs or "Jersey" shaped barriers with no endblocks, the year plate shall be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with "Jersey" shaped barrier endblocks, the year plate shall be centered on the upper sloped 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 plans 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 located adjacent to it. Both year plates shall be shown at each end of the bridge on opposite sides.

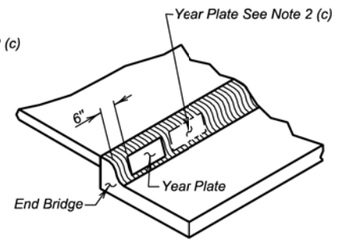
3. There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work shall be incidental to other contract items.




**JERSEY BARRIER**
(With Endblock)



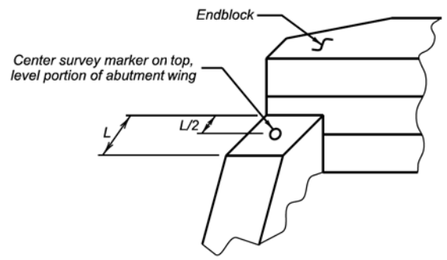

**JERSEY BARRIER**



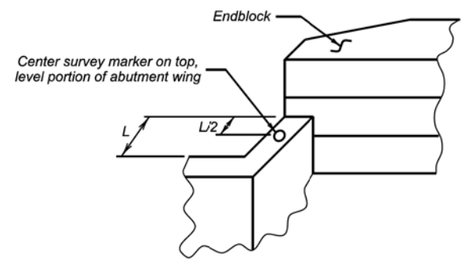

**TYPE B CURB**

June 26, 2012

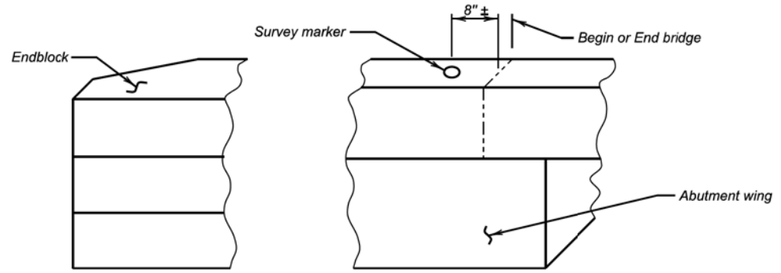
| | | | |
|---|---|---|---|
| Published Date: 1st Qtr. 2016 | SDDOT | YEAR PLATE DETAILS | PLATE NUMBER 460.02<br>Sheet 1 Of 1 |




**ABUTMENT WITH "STRAIGHT" WINGS**




**ABUTMENT WITH "SWEPT BACK" WINGS**




**ABUTMENT WITH "SWEPT BACK" WINGS**
*( Endblock on top of 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 domed top and be either a 3" top diameter (with a ¾" X 2" long ribbed shank), or a US Army Corps of Engineers Type C Disc with a 3 ½" 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.

June 26, 2012

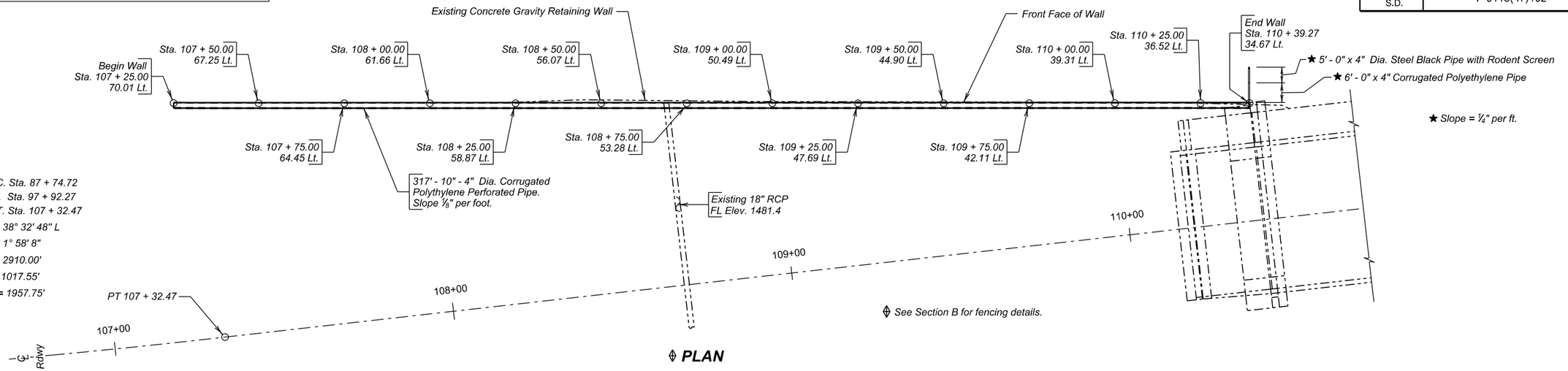
| | | | |
|---|---|---|---|
| Published Date: 1st Qtr. 2016 | SDDOT | BRIDGE SURVEY MARKER | PLATE NUMBER 460.05<br>Sheet 1 of 1 |

307' - 3" CONT. CONCRETE BRIDGE
STR. NO. 50-208-022
OCTOBER 2015

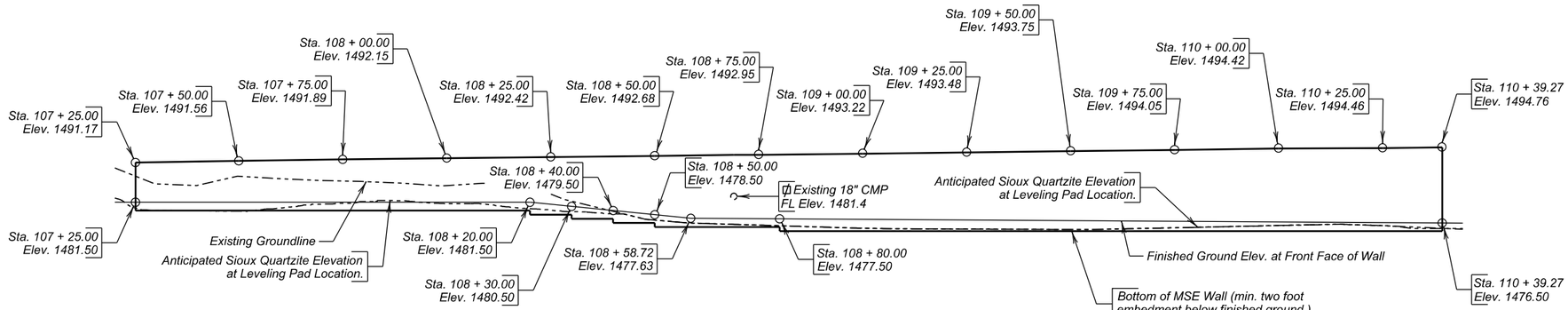
The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

REVISED DECEMBER 3, 2015 PW

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E39 | E44 |



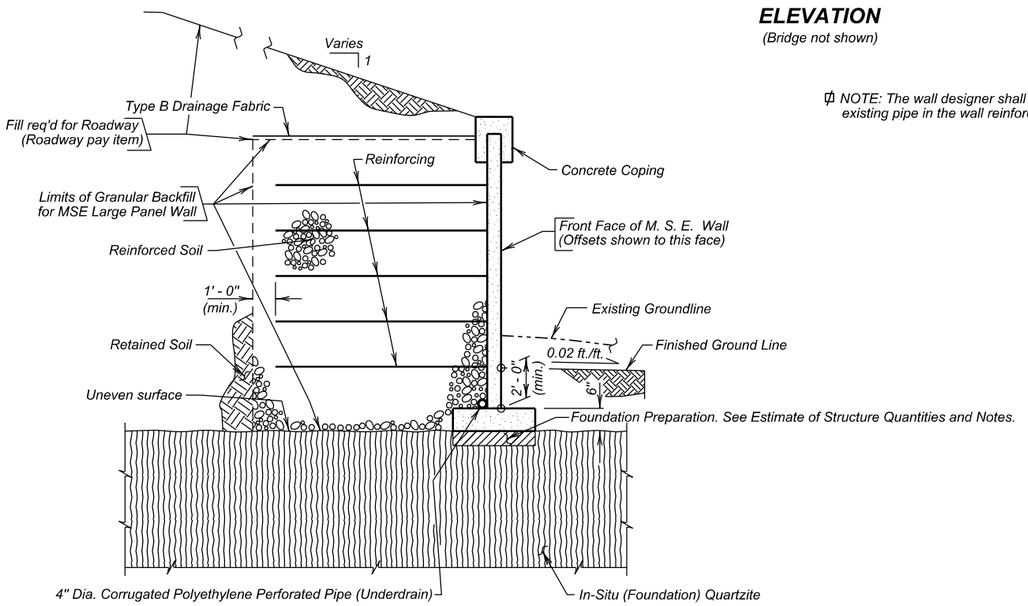

## ◈ PLAN




## ELEVATION

(Bridge not shown)

℄ NOTE: The wall designer shall account for the existing pipe in the wall reinforcement design.




## TYPICAL WALL SECTION

### INDEX OF SHEETS-



**GENERAL DRAWING**

FOR

# M.S.E. LARGE PANEL RETAINING WALL

ADJ. TO SD 115 SEC. 16-T104N-R49W
STA. 107 + 25.00 TO STA. 110 + 39.27 P 0115(47)102
PCN 025C

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015

1 OF 4

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

| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| PW | BB | PW | Kevin N. Goeden |
| MINN025C | 025CWC01 | | BRIDGE ENGINEER |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E40 | E44 |

## Δ ESTIMATE OF STRUCTURE QUANTITIES

| DESCRIPTION | QUANTITY | UNIT | REMARKS |
|---|---|---|---|
| MSE Large Panel Wall, Furnish | 5,264 | SqFt | See Spec. Provision |
| MSE Large Panel Wall, Install | 5,264 | SqFt | See Spec. Provision |
| Granular Backfill for MSE Large Panel Wall | 3,528 | CuYd | See Spec. Provision |
| Structure Excavation, Retaining Wall | 77 | CuYd | |
| Incidental Work, Structure | Lump Sum | LS | |

Δ Quantities shown are for bidding purposes only. Actual quantities are to be determined by the wall designer and shown on the shop plans.

## SPECIFICATIONS

1. Design Specifications: AASHTO LRFD Bridge Design Specifications, 2014 Edition with 2015 interims.

2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2015 Edition and required provisions, supplemental specifications and special provisions as included in the proposal.

## MSE RETAINING WALL GENERAL NOTES

1. The Mechanically Stabilized Earth (MSE) Large Panel Retaining Wall shall be on the current approved products list located at the following website address: http://apps.sd.gov/HC60ApprovedProducts/main.aspx.

2. See Special Provision for MECHANICALLY STABILIZED EARTH (LARGE PANEL) WALLS

3. The wall panel front face surface texture shall simulate a natural rock wall. Wall panels and coping shall be colored to blend with the surrounding landscape. Color may be achieved by the use of colored concrete or surface staining. A minimum of 3 colors shall be used to prevent a uniform appearance. Submit wall panel pattern, colors, and method of achieving colors to the Engineer for approval a minimum of 2 weeks prior to fabrication.

4. The minimum embedment depth to the bottom of the MSE Large Panel retaining wall shall be 2.0 ft.

5. The entire wall footprint including the leveling pad and reinforced soil shall be excavated to the rock surface.

6. The walls shall be placed on a non-reinforced concrete leveling pad. The thickness of the leveling pad shall be adjusted to accommodate the variation of the quartzite surface.

7. Horizontal dimensions shown are measured along the front face of the wall.

8. Top of wall elevations shown are at the top of the concrete coping.

9. The retaining wall shall be installed in accordance to the selected wall companies' instructions, specifications, and approved shop drawings.

10. If the designer of the MSE Large Panel Wall determines that "sliding" controls the reinforcement length during the design of the wall, the designer shall consult the Department's Geotechnical Engineering Activity for possible alternatives that may be more economical than lengthening the reinforcement.

11. A layer of Type B Drainage Fabric shall be placed over the top of the Granular Backfill for MSE Large Panel Wall prior to placing any soil over the granular backfill. The intent of the fabric is to act as a separator and keep fines from intruding into the granular material. All costs in furnishing and installing the Type B Drainage Fabric shall be incidental to the contract unit price per cubic yard for "Granular Backfill for MSE Large Panel Wall."

12. Estimated quantities based on reinforcement lengths equal to 80% of the wall height measured from the leveling pad to the top of the finished wall. It is requested the wall designer contact the Geotechnical Activity to discuss the reinforcement lengths prior to the submittal of shop drawings and design calculations.

13. The wall designer shall use the soil parameters provided in the plans unless prior communication and approval has been provided through the South Dakota Department of Transportation's Geotechnical Engineering Activity.

14. The wall designer shall use all necessary live loads and dead loads in the design of the wall reinforcement required by AASHTO. If the designer has any questions about what loads are needed for the wall design the Geotechnical Engineering Activity shall be contacted.

## UNDERDRAINS

1. An underdrain system shall be installed behind the wall as shown and detailed on the Typical Section. The underdrain system shall consist of 4 inch diameter slotted corrugated polyethylene tubing installed behind the wall and 4 inch diameter corrugated polyethylene tubing and 4 inch diameter black steel pipe from the end of the wall to the outlet as shown. Care shall be taken near the ends of the wall to ensure positive drainage.

2. The polyethylene tubing shall conform to Section 990 of the Specifications.

3. All costs in furnishing and installing the underdrains shall be incidental to the contract unit price per square foot for MSE Large Panel Wall, Install.

## FOUNDATION PREPARATION

1. Foundation preparation shall consist of excavating to the rock surface and removing all soil and debris prior to placing the leveling pad and granular backfill. The leveling pad location shall be cleaned by water washing and/or air jetting. Material washed from the rock surface shall be physically removed from the exposed rock surface.

2. Additional effort may be required to remove fractured quartzite to the limits required for the non-reinforced concrete leveling pad. It is anticipated that 20.5 cu. yds. of the Structure Excavation, Retaining Wall quantity will be fractured quartzite.

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

4. Construction of the wall shall begin at the lowest course and proceed upwards. The underdrain shall be placed prior to wall backfill placement. The underdrain shall also be functional to prevent water from backing up into the wall backfill. The lowest course must be placed and backfilled in its entirety prior to construction of any subsequent courses. Backfill placement must be placed in successive horizontal lifts.

## INCIDENTAL WORK, STRUCTURE

1. The in-place concrete gravity retaining wall from Sta. 108+20.61 59.61' Lt. to Sta. 110+73.13 19.68' Lt. is 258'-6" long. The top width is 2'-0" and the average height is 13.29 feet. The maximum bottom width is 8.14 feet and the minimum bottom width is 5.64 feet. The volume of concrete in the concrete gravity retaining wall is 626.5 cu. yds. and the concrete gravity retaining wall is NOT reinforced.

2. Break down and remove the existing concrete gravity retaining wall to the in-place quartzite or as required for construction of the MSE Large Panel Retaining Wall in accordance with Section 110 of the Specifications. All portions of the existing concrete gravity retaining wall shall be removed and disposed of by the Contractor on a site obtained by the Contractor and approved by the Engineer in accordance with COMMITMENT H: WASTE DISPOSAL SITE found in Section A.

3. The foregoing is a general description of the in-place concrete gravity retaining wall 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 concrete gravity retaining wall to verify the extent of the work and materials involved. If desired by the Contractor, a copy of the original construction plans may be obtained through the Office of Bridge Design.

4. Disturbance of in-place quartzite should be kept to a minimum during the removal of the existing concrete gravity wall.

**ESTIMATE OF STRUCTURE QUANTITIES AND NOTES**

FOR

M.S.E. LARGE PANEL RETAINING WALL

OCTOBER 2015



| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| PW | BB | PW | Kevin N. Goeden BRIDGE ENGINEER |
| MINN025C | 025CWC02 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E41 | E44 |

N

**Foundation Soil Parameters (Sioux Quartzite):**

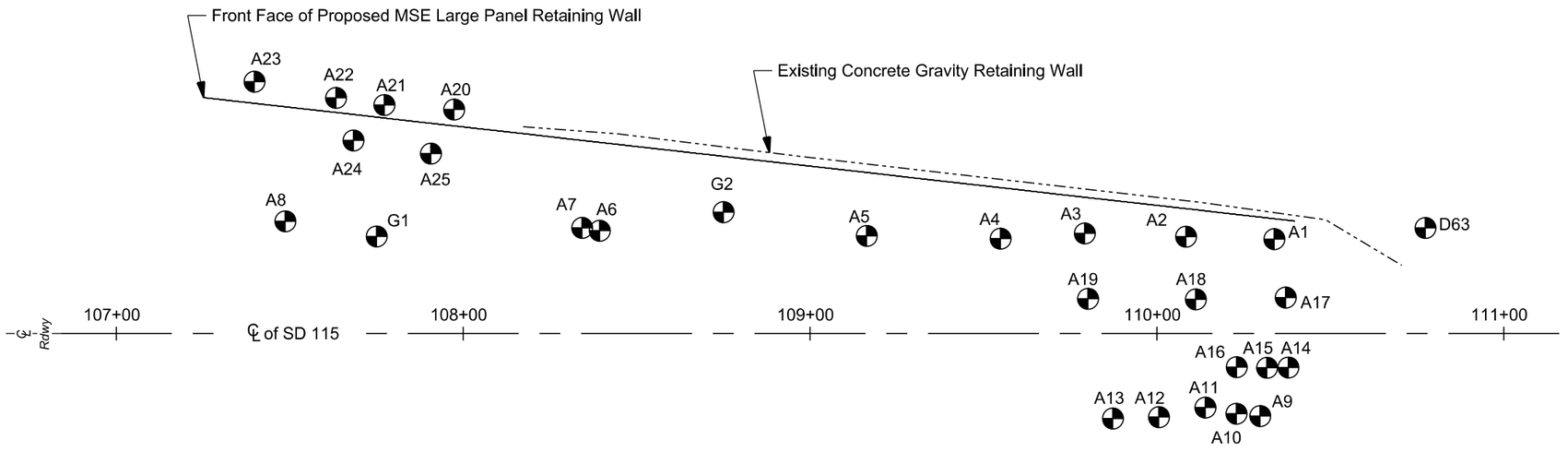
| | | |
|---|---|---|
| Factored Bearing Resistance | $R_r$ = | 6,000 psf |
| Friction Angle | $\Phi$ = | 35° |
| Cohesion | c = | 10,000 psf |
| Wet Unit Weight | $Y_w$ = | 140 pcf |

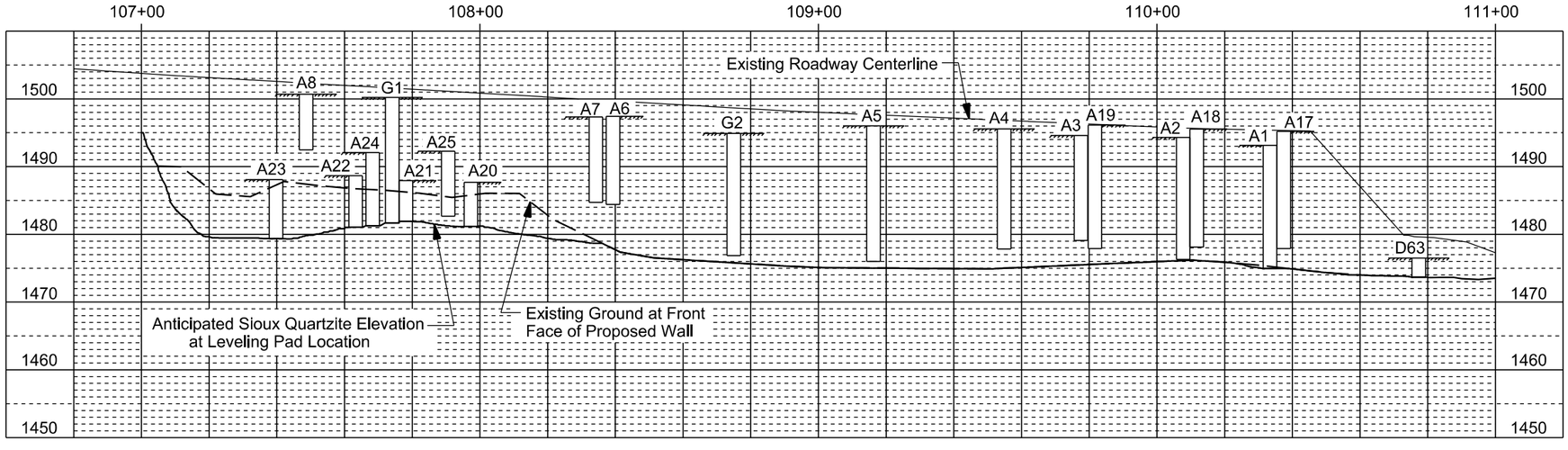
**Retained Soil Parameters:**

| | | |
|---|---|---|
| Friction Angle | $\Phi$ = | 24° |
| Cohesion | c = | 130 psf |
| Wet Unit Weight | $Y_w$ = | 120 pcf |

**Reinforced Soil Parameters:**

| | | |
|---|---|---|
| Friction Angle | $\Phi$ = | 34° |
| Cohesion | c = | 0 psf |
| Wet Unit Weight | $Y_w$ = | 105 pcf |




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.

## LEGEND

Auger Test

Auger holes were drilled with either a 4 ½ inch diameter continuous flight auger or a 2 ½ inch diameter continuous flight auger to determine the depth to in-place Sioux Quartzite. All borings were dry at the time of the investigaiton.

Sioux Quartzite is pink to red, hard silica cemented sandstone. It is jointed, bedded, 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 surface of the Sioux Quartzite in this area is dipping from east to west. See the associated cross-sections for anticipated rock surface at the wall location.

The bottom of the borings shown in the profile represent where refusal on in-place Sioux Quartzite occurred. Borings A9 through A16 are not shown in profile.

**SUBSURFACE INVESTIGATION**

FOR

# M.S.E. LARGE PANEL RETAINING WALL

ADJ. TO SD 115 — SEC. 16-T104N-R49W

STA. 107 + 25.00 TO STA. 110 + 39.27 — P 0115(47)102

MINNEHAHA COUNTY

S. D. DEPT. OF TRANSPORTATION

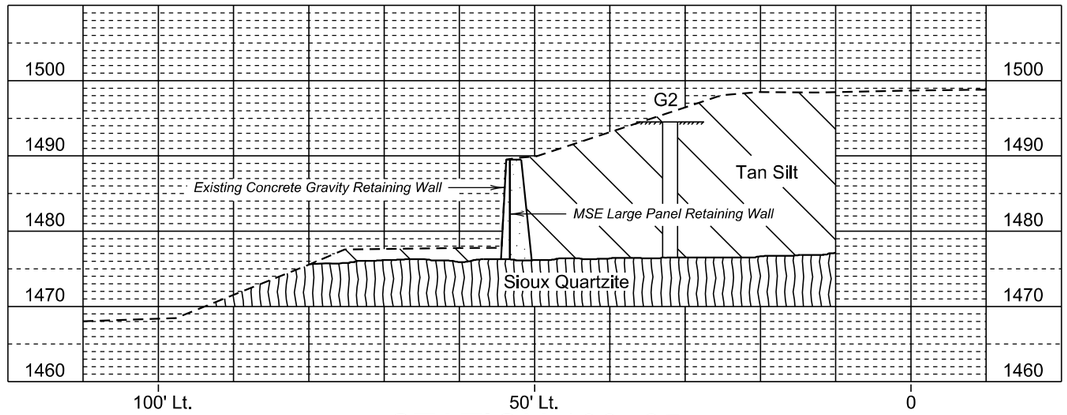
OCTOBER 2015

3 OF 4

| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| PW | BB | PW | Kevin N. Goeden BRIDGE ENGINEER |
| MINN025C | 025CWC03 | | |

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E42 | E44 |

## STATION 108+75

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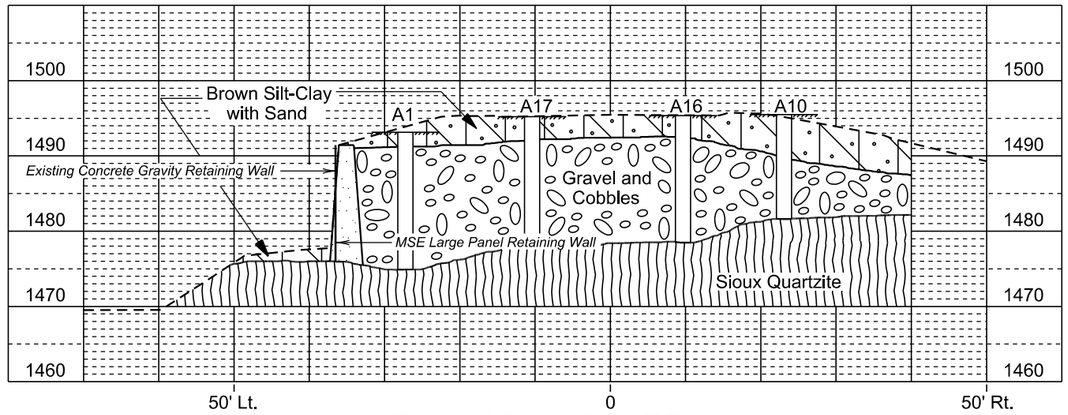


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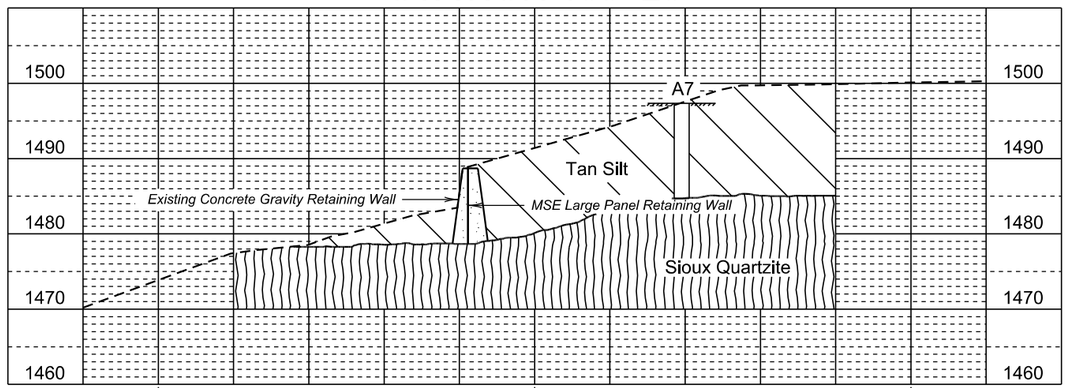


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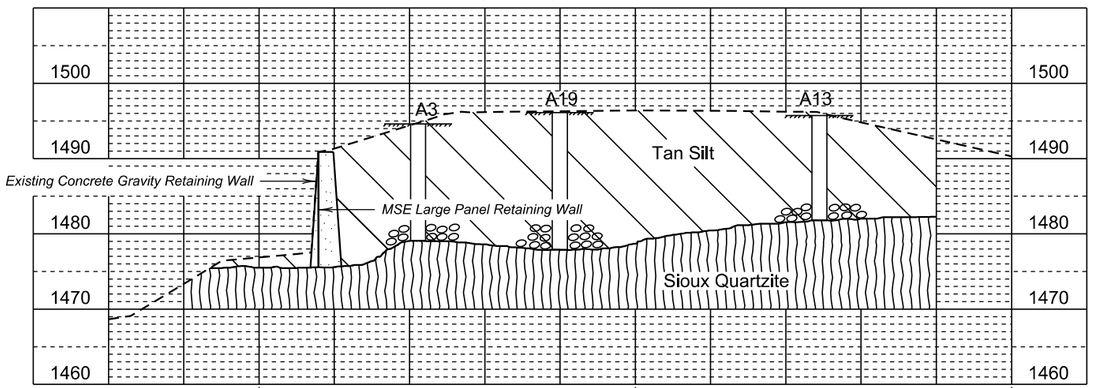


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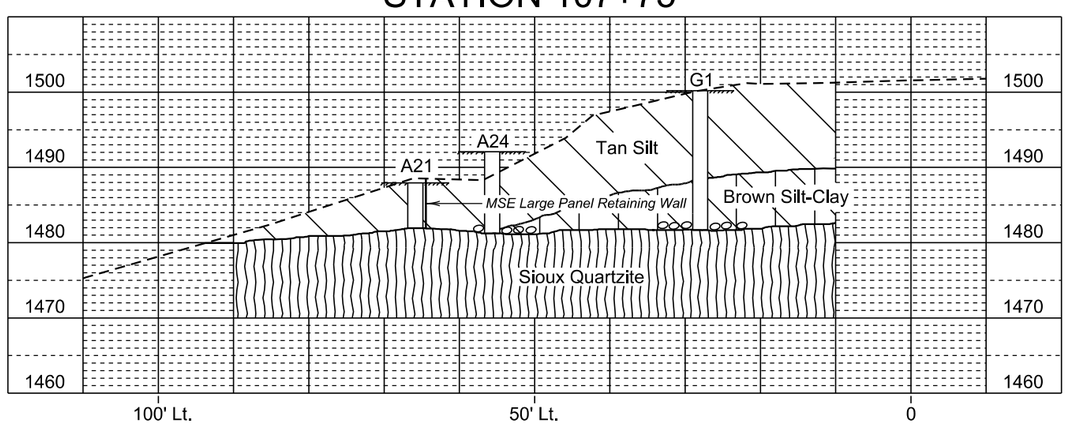


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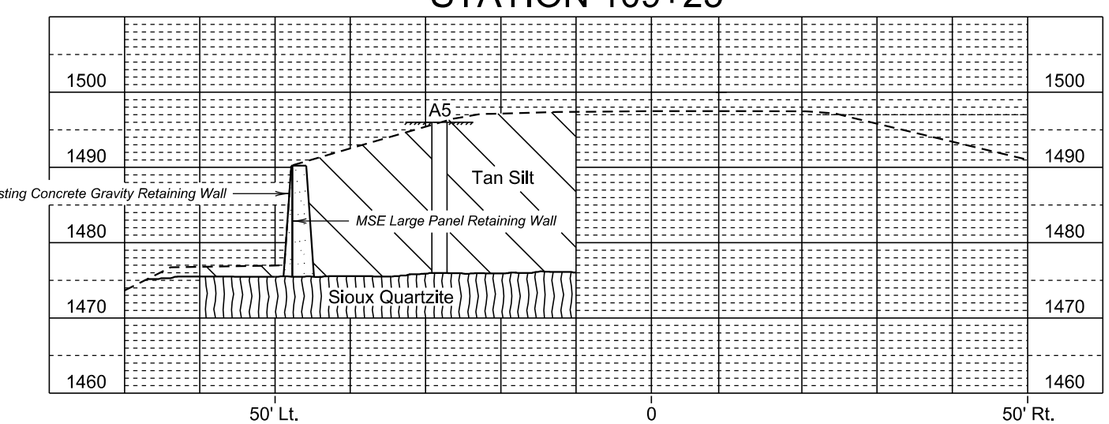



**SUBSURFACE INVESTIGATION (CONTINUED)**

FOR

# M.S.E. LARGE PANEL RETAINING WALL

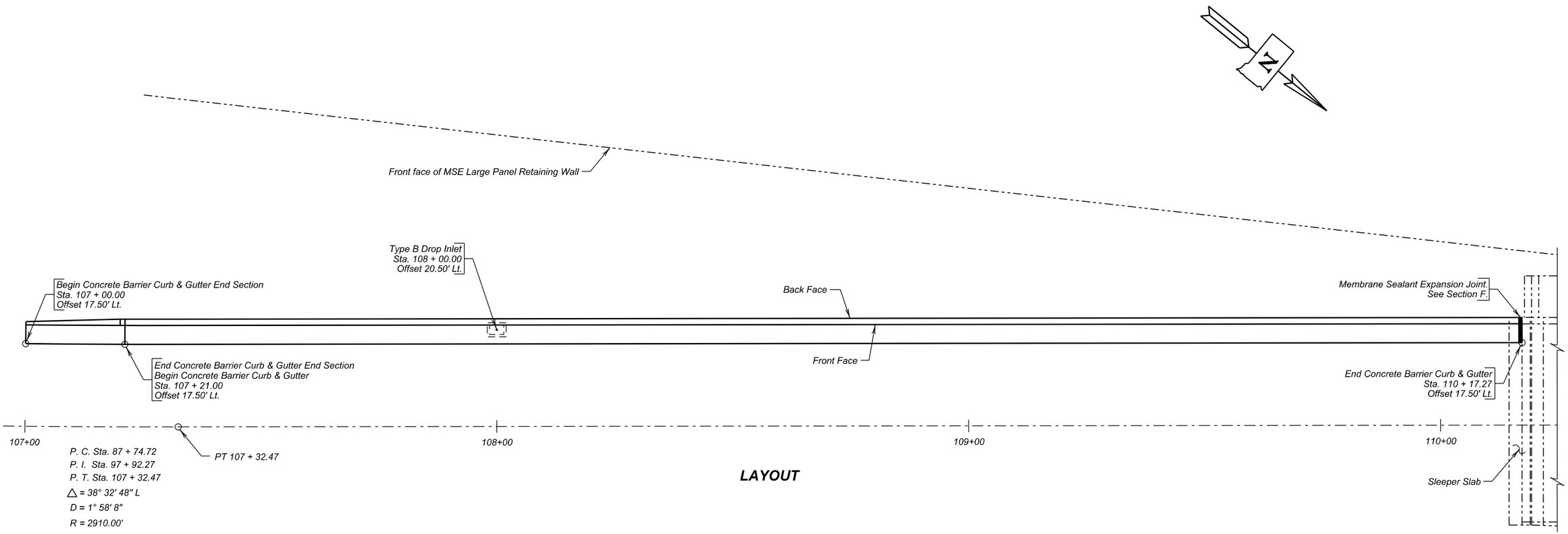
OCTOBER 2015

4 OF 4

| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| PW | BB | PW | Kevin N. Goeden |
| MINN025C | 025CWC04 | | BRIDGE ENGINEER |

REVISED DECEMBER 3, 2015 PW

| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E43 | E44 |




P. C. Sta. 87 + 74.72
P. I. Sta. 97 + 92.27
P. T. Sta. 107 + 32.47
△ = 38° 32' 48" L
D = 1° 58' 8"
R = 2910.00'
T = 1017.55'
Lc = 1957.75'

## LAYOUT

## SPECIFICATIONS

1. Design Specifications: AASHTO LRFD Bridge Design Specifications, 2014 with 2015 interims.
2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2015 Edition and required provisions, supplemental specifications, and special provisions as included in the proposal.

## GENERAL NOTES

1. Concrete shall be Class A45 in accordance with Section 460.
2. Design Material Strengths: Concrete f'c = 4,500 psi
   Reinforcing Steel fy = 60,000 psi
3. Reinforcing steel shall conform to ASTM A615, Grade 60.
4. Use 1" of clear cover on all reinforcing steel except as shown.
5. All exposed concrete corners and edges shall be chamfered ¾" unless noted otherwise.
6. The Concrete Barrier Curb may be either cast-in-place or slipformed. If slipformed, the finished Concrete Barrier Curb shall be true to the specified line and grade within a tolerance of ± ¼" in 10 feet.
7. The transverse sawed or formed joints in the Concrete Barrier Curb and Gutter shall align with the transverse joints in the the PCC pavement. The joint groove may either be formed or saw cut. If saw cut, the concrete shall have attained a compressive strength of 2,000 psi prior to sawing. Keyed joints shall be used between concrete barrier curb and gutter and concrete barrier curb and gutter end section and between separate pours. Saw cut and seal same as adjacent PCC pavement.
8. Snap ties, if used, shall be epoxy coated. the epoxy coating shall be inert in concrete and compatiable with the coating applied to the new epoxy coated reinforcing steel.
9. The contract unit price per foot for Concrete Barrier Curb and Gutter and Concrete Barrier Curb and Gutter End Section shall include the cost of all materials, labor, equipment, and incidentals necessary to furnish the barrier complete in place in accordance with these plans and specifications.

## COMMERCIAL TEXTURE FINISH

1. A commercial texture finish shall be applied to the front, top, and back face of the barrier curbs.
2. The commercial texture finish used shall be on the Department's approved list.
3. The commercial texture finish shall be applied in accordance with Section 460.3 L.1.c
4. Where the commercial texture finish is to be applied, 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. Various commercial texture finish products require that the concrete be 28 days old before application. Therefore the commercial texture surface 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.
5. No separate payment will be made for the commercial texture finish. All costs for the surface preparation, furnishings, and installing the commercial texture finish shall be incidental to the Concrete Curb and Gutter and Concrete Curb and Gutter, End Section items to which the finish is applied.
6. The color of the back face shall be "Tan" to match the barrier on the bridge.
7. The color of the top and front face shall be "Pearl Gray", Federal Standard No. 26622 to match the barrier on the bridge.

## INDEX OF SHEETS-



**LAYOUT AND NOTES**

FOR

# CONCRETE BARRIER CURB & GUTTER

ADJ. TO SD 115 SEC. 16-T104N-R49W
STA. 107 + 00.00 TO STA. 110 + 17.27 P 0115(47)102
PCN 025C

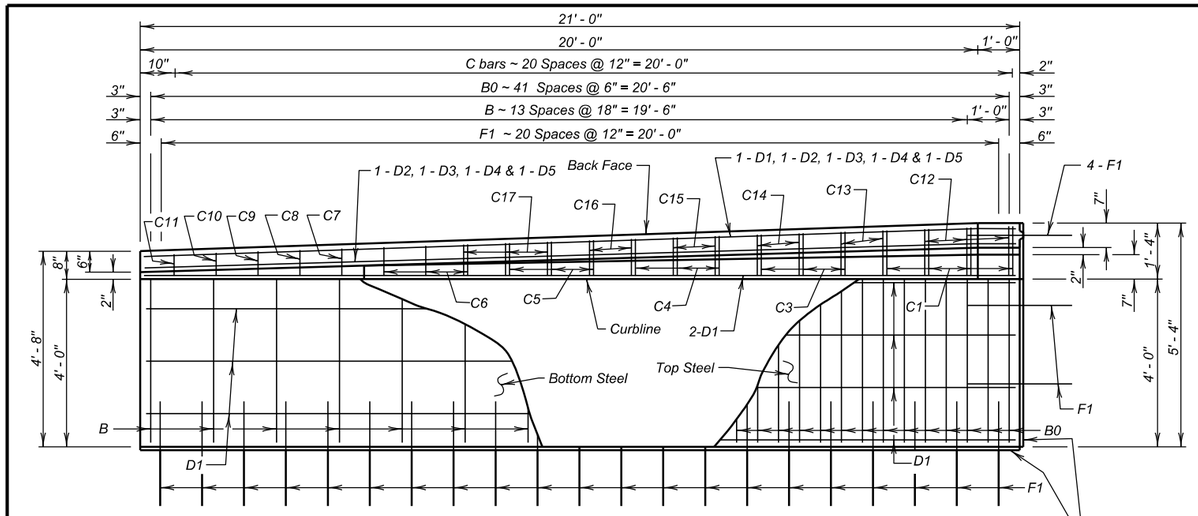
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015

1 OF 2

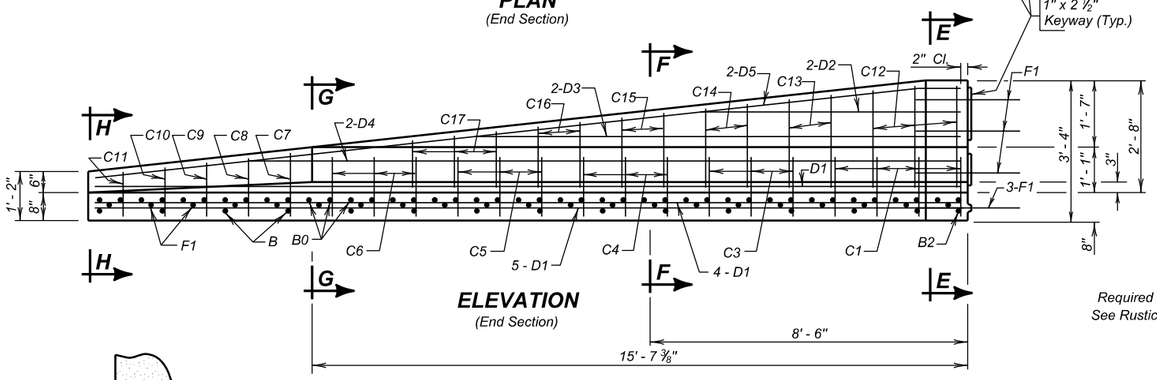
PLANS BY :
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| PW | BB | PW | Kevin N. Goeden |
| MINN025C | 025CWA01 | | BRIDGE ENGINEER |

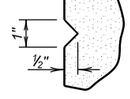
| STATE OF | PROJECT | SHEET NO. | TOTAL SHEETS |
|---|---|---|---|
| S.D. | P 0115(47)102 | E44 | E44 |



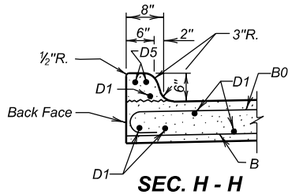

## PLAN
(End Section)



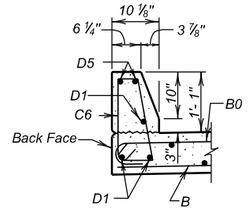

## ELEVATION
(End Section)



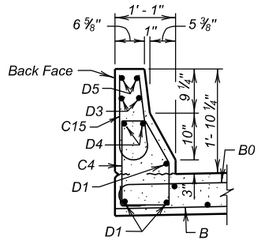

## RUSTICATION DETAIL



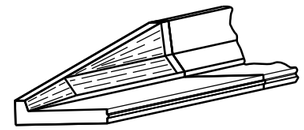

## SEC. H - H



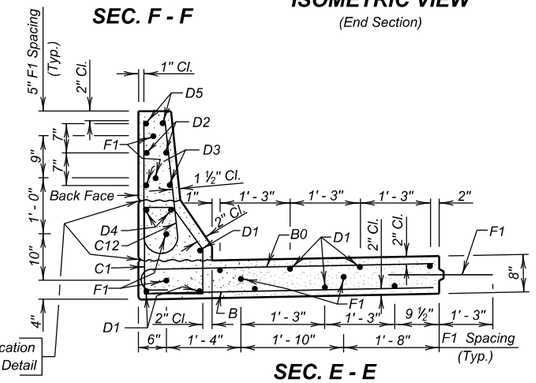

## SEC. G - G




## SEC. F - F

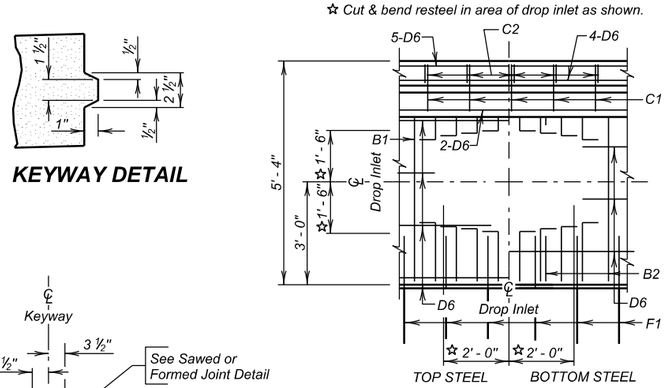


## ISOMETRIC VIEW
(End Section)

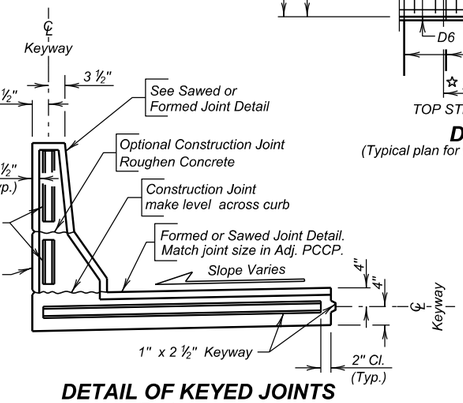



## SEC. E - E

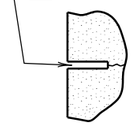
☆ Cut & bend resteel in area of drop inlet as shown.



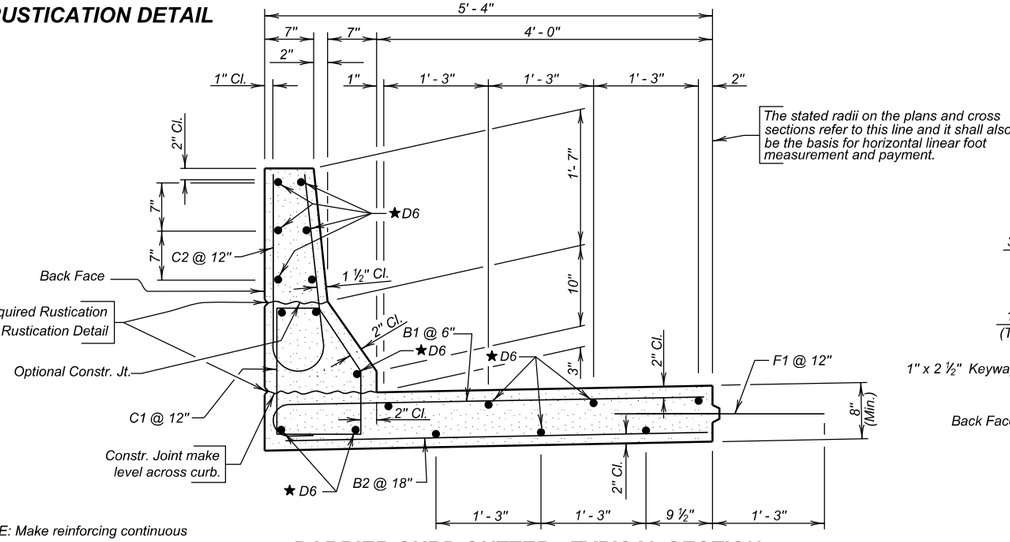

## DETAIL "Z"
(Typical plan for steel revision at Drop Inlets)




## DETAIL OF KEYED JOINTS
(Typ. between pours)




## SAWED OR FORMED JOINT DETAIL




★ NOTE: Make reinforcing continuous by lapping 12" min. (Typ.)

The stated radii on the plans and cross sections refer to this line and it shall also be the basis for horizontal linear foot measurement and payment.

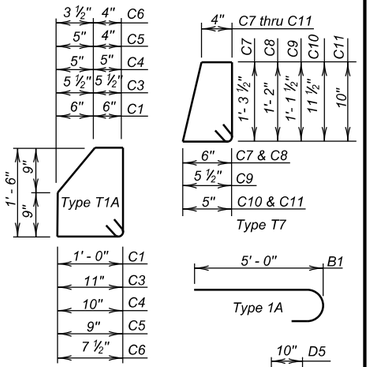
## BARRIER CURB GUTTER - TYPICAL SECTION




## KEYWAY DETAIL

## REINFORCING SCHEDULE

| | Mk. | No. | Size | Length | Type | Bending Details |
|---|---|---|---|---|---|---|
| For Typ. Sec. | B1 | 592 | 6 | 5' - 8" | 1A | |
| | B2 | 198 | 4 | 5' - 0" | Str. | |
| | C1 | 296 | 5 | 5' - 7" | T1A | |
| | C2 | 296 | 5 | 5' - 1" | S11 | |
| | D6 | 108 | 4 | 50' - 2" | Str. | |
| | F1 | 296 | 5 | 2' - 6" | Str. | |
| For 1 Tapered Barrier End Section | B | 7 | 4 | 9' - 4" | Str. | |
| | B0 | 21 | 6 | 10' - 8" | 1A | |
| | B2 | 1 | 4 | 5' - 0" | Str. | |
| | C1 | 4 | 5 | 5' - 7" | T1A | |
| | C3 | 3 | 5 | 5' - 5" | T1A | |
| | C4 | 3 | 5 | 5' - 3"" | T1A | |
| | C5 | 3 | 5 | 5' - 1" | T1A | |
| | C6 | 3 | 5 | 4' - 11" | T1A | |
| | C7 | 1 | 5 | 4' - 4" | T7 | |
| | C8 | 1 | 5 | 4' - 1" | T7 | |
| | C9 | 1 | 5 | 3' - 10" | T7 | |
| | C10 | 1 | 5 | 3' - 7" | T7 | |
| | C11 | 1 | 5 | 3' - 4" | T7 | |
| | C12 | 3 | 5 | 4' - 10" | S11 | |
| | C13 | 2 | 5 | 4' - 5" | S11 | |
| | C14 | 2 | 5 | 4' - 0" | S11 | |
| | C15 | 2 | 5 | 3' - 6" | S11 | |
| | C16 | 2 | 5 | 3' - 1" | S11 | |
| | C17 | 3 | 5 | 2' - 7" | S11 | |
| | D1 | 10 | 4 | 20' - 8" | Str. | |
| | D2 | 2 | 4 | 6' - 3" | Str. | |
| | D3 | 2 | 4 | 12' - 0" | Str. | |
| | D4 | 2 | 4 | 15' - 6" | Str. | |
| | D5 | 2 | 4 | 20' - 8" | 19A | |
| Ø | F1 | 27 | 5 | 2' - 6" | Str. | |




NOTES-
All reinforcing steel shall be epoxy coated.
All dimensions are out to out of bars.
℄ See Cutting Diagram

## ESTIMATED QUANTITIES

| ITEM | UNIT | QUANTITY |
|---|---|---|
| Concrete Barrier Curb and Gutter | Ft. | 296 |
| Conc. Barrier Curb and Gutter End Section | Ft. | 21 |

1. 3.7 Cu. Yds. Concrete in one Tapered Barrier End Section.
2. 827 Lbs. Epoxy Coated Re-Steel in one Tapered Barrier End Section.
3. 0.22 Cu. Yds. of Concrete per foot in Regular Barrier Section.
4. 45.21 Lbs. Epoxy Coated Re-Steel per foot of Regular Barrier Section, not including laps.

*Items 1 and 4 are approximate quantities contained in the above bid items and are for information only.*

**DETAILS AND QUANTITIES**
FOR
# CONCRETE BARRIER CURB & GUTTER

ADJ. TO SD 115 — SEC. 16-T104N-R49W
STA. 107 + 00.00 TO STA. 110 + 17.27 — P 0115(47)102

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
OCTOBER 2015

2 OF 2

| DESIGNED BY | CK. DES. BY | DRAFTED BY | |
|---|---|---|---|
| PW | BB | PW | Kevin N. Goeden BRIDGE ENGINEER |
| MINN025C | 025CWA02 | | |