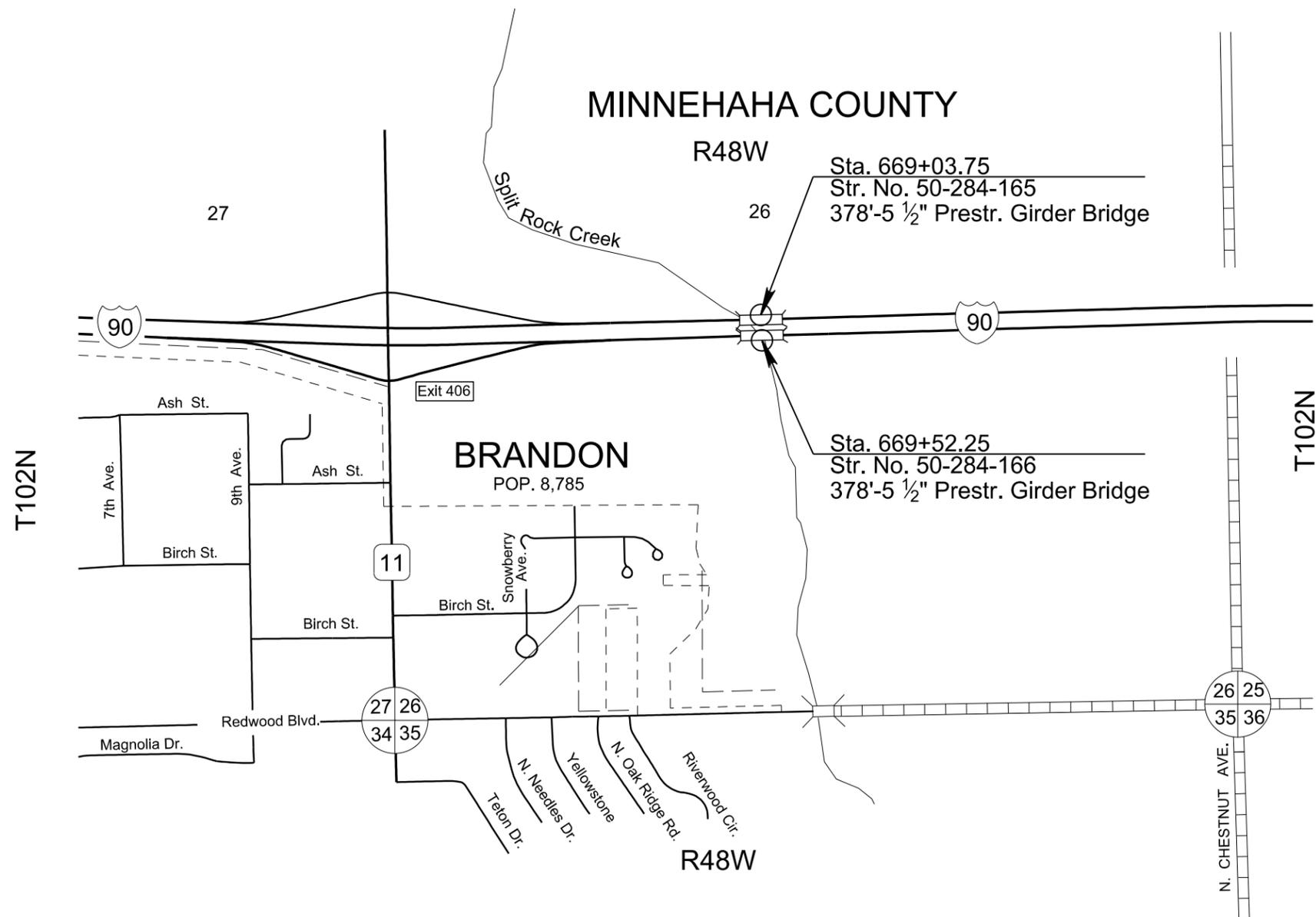


STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
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Section E: Structure Plans

INDEX OF SHEETS

E1	General Layout W/Index
E2	Estimate of Structure Quantities
E3-E32	Westbound Structure No. 50-284-165 378'-5 1/2" Prestr. Girder Bridge
E33-E62	Eastbound Structure No. 50-284-166 378'-5 1/2" Prestr. Girder Bridge



SECTION E – ESTIMATE OF STRUCTURE QUANTITIES

Str. No. 50-284-165
375' – 5 ½" Prestressed Girder Bridge
Sta. 667 + 14.52 to Sta. 670 + 92.98

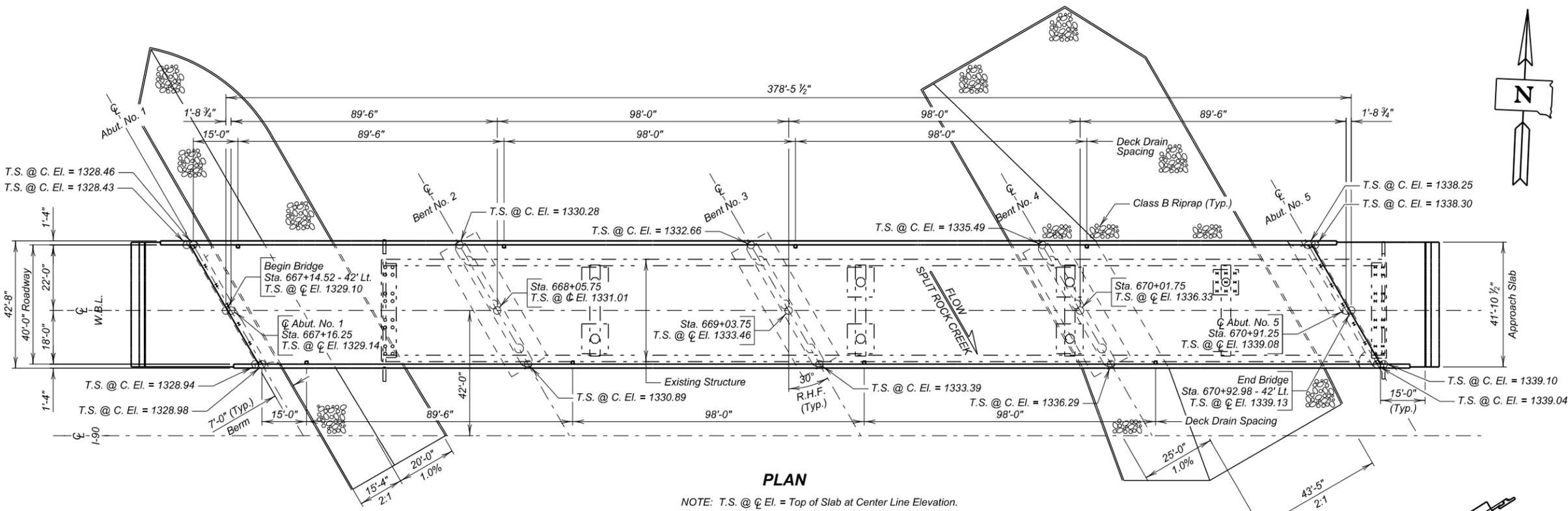
BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E3310	Bridge Elevation Survey	Lump Sum	LS
009E5000	Concrete Penetrating Sealer	1,955.0	SqYd
250E0030	Incidental Work, Structure	Lump Sum	LS
410E0030	Structural Steel, Miscellaneous	Lump Sum	LS
410E2600	Membrane Sealant Expansion Joint	83.8	Ft
420E0100	Structure Excavation, Bridge	1,524	CuYd
430E0200	Bridge End Embankment	180	CuYd
430E0300	Granular Bridge End Backfill	98.0	CuYd
430E0510	Approach Slab Underdrain Excavation	6.0	CuYd
430E0700	Precast Concrete Headwall for Drain	2	Each
460E0030	Class A45 Concrete, Bridge Deck	606.2	CuYd
460E0050	Class A45 Concrete, Bridge	512.2	CuYd
460E0150	Concrete Approach Slab for Bridge	247.0	SqYd
460E0160	Concrete Approach Sleeper Slab for Bridge	67.5	SqYd
460E0500	Deck Drain, Girder Bridge	8	Each
480E0100	Reinforcing Steel	81,571	Lb
480E0200	Epoxy Coated Reinforcing Steel	135,399	Lb
480E0507	No. 7 Rebar Splice	108	Each
510E0300	Preboring Pile	160	Ft
510E3130	HP 12 Pile Tip Reinforcement	16	Each
510E3401	HP 12x53 Steel Test Pile, Furnish and Drive	80	Ft
510E3405	HP 12x53 Steel Bearing Pile, Furnish and Drive	490	Ft
560E8045	45" Minnesota Shape Prestressed Concrete Beam	1,865	Ft
680E0040	4" Underdrain Pipe	238	Ft
680E2500	Porous Backfill	28.0	Ton
700E0210	Class B Riprap	2,147.5	Ton
831E0110	Type B Drainage Fabric	2,118	SqYd

Str. No. 50-284-166
375' – 5 ½" Prestressed Girder Bridge
Sta. 667 + 63.02 to Sta. 671 + 41.48

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E3310	Bridge Elevation Survey	Lump Sum	LS
009E5000	Concrete Penetrating Sealer	2,376.0	SqYd
250E0030	Incidental Work, Structure	Lump Sum	LS
410E0030	Structural Steel, Miscellaneous	Lump Sum	LS
410E2600	Membrane Sealant Expansion Joint	103.8	Ft
420E0100	Structure Excavation, Bridge	2,066	CuYd
430E0200	Bridge End Embankment	226	CuYd
430E0300	Granular Bridge End Backfill	128.0	CuYd
430E0510	Approach Slab Underdrain Excavation	8.0	CuYd
430E0700	Precast Concrete Headwall for Drain	2	Each
460E0030	Class A45 Concrete, Bridge Deck	730.5	CuYd
460E0050	Class A45 Concrete, Bridge	631.5	CuYd
460E0150	Concrete Approach Slab for Bridge	339.3	SqYd
460E0160	Concrete Approach Sleeper Slab for Bridge	83.6	SqYd
460E0500	Deck Drain, Girder Bridge	8	Each
480E0100	Reinforcing Steel	104,171	Lb
480E0200	Epoxy Coated Reinforcing Steel	160,997	Lb
480E0507	No. 7 Rebar Splice	134	Each
510E0300	Preboring Pile	180	Ft
510E3130	HP 12 Pile Tip Reinforcement	18	Each
510E3401	HP 12x53 Steel Test Pile, Furnish and Drive	80	Ft
510E3405	HP 12x53 Steel Bearing Pile, Furnish and Drive	560	Ft
560E8045	45" Minnesota Shape Prestressed Concrete Beam	2,238	Ft
680E0040	4" Underdrain Pipe	281	Ft
680E2500	Porous Backfill	36.0	Ton
700E0210	Class B Riprap	2,823.4	Ton
831E0110	Type B Drainage Fabric	2,818	SqYd

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

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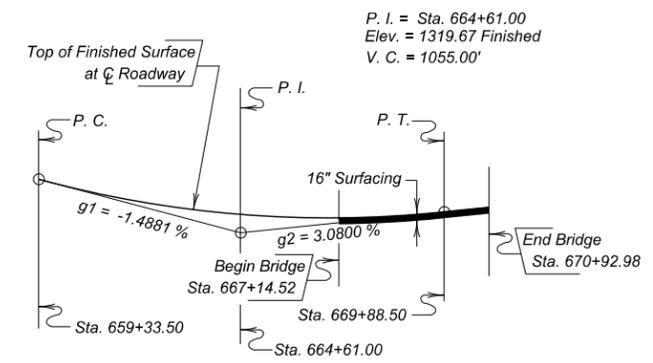


PLAN

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

**-X081-
INDEX OF BRIDGE SHEETS -**

- Sheet No. 1 - General Drawing
- Sheet No. 2 - Estimate of Structure Quantities & Notes
- Sheet No. 3 - Notes (Cont.)
- Sheet No. 4 - Notes (Cont.)
- Sheet No. 5 - Notes (Cont.)
- Sheet No. 6 - Riprap Details
- Sheet No. 7 - Site Plan & Subsurface Profile (A)
- Sheet No. 8 - Site Plan & Subsurface Profile (B)
- Sheet No. 9 - Subsurface Investigation Elevation Views
- Sheet No. 10 - Abutment No. 1 Details
- Sheet No. 11 - Abutment No. 5 Details
- Sheet No. 12 - Abutment Details (Cont.)
- Sheet No. 13 - Bent Details
- Sheet No. 14 - Superstructure Details (A)
- Sheet No. 15 - Superstructure Details (B)
- Sheet No. 16 - End Block, Barrier Curb & Deck Drain Details
- Sheet No. 17 - Girder Details
- Sheet No. 18 - Erection Data and Slab Form Elevations (A)
- Sheet No. 19 - Erection Data and Slab Form Elevations (B)
- Sheet No. 20 - Diaphragm Details
- Sheet No. 21 - Details of Bridge End Backfill
- Sheet No. 22 - Details of Approach Slab Adjacent to Bridge (A)
- Sheet No. 23 - Details of Approach Slab Adjacent to Bridge (B)
- Sheet No. 24 - Approach Slab Joint Details
- Sheet No. 25 - As-Built Elevation Survey (A)
- Sheet No. 26 - As-Built Elevation Survey (B)
- Sheet No. 27 - Details of Standard Plate No's. 460.02 & 460.05
- Sheet No. 28 - Details of Standard Plate No's. 510.30 & 510.40
- Sheet No. 29 - Details of Standard Plate No's. 620.19 & 630.92
- Sheet No. 30 - Details of Standard Plate No. 680.01

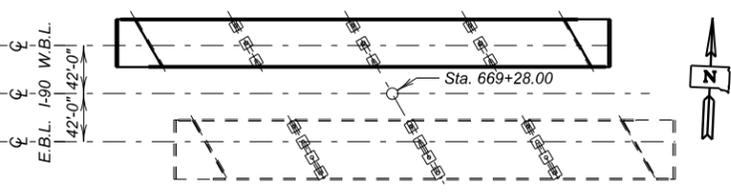


VERTICAL CURVE DATA

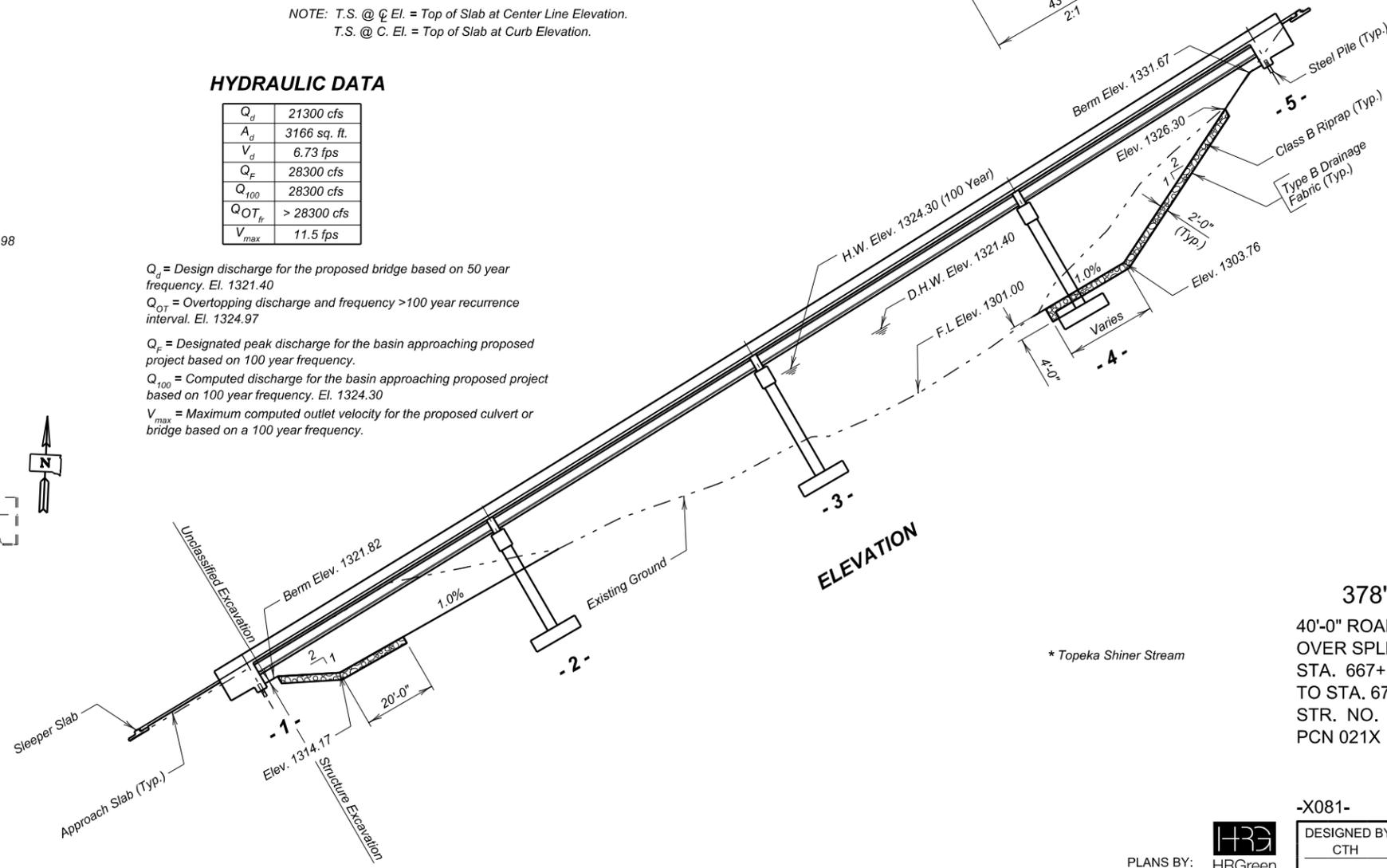
HYDRAULIC DATA

Q_d	21300 cfs
A_d	3166 sq. ft.
V_d	6.73 fps
Q_F	28300 cfs
Q_{100}	28300 cfs
Q_{OT}	> 28300 cfs
V_{max}	11.5 fps

Q_d = Design discharge for the proposed bridge based on 50 year frequency. El. 1321.40
 Q_{OT} = Overtopping discharge and frequency >100 year recurrence interval. El. 1324.97
 Q_p = Designated peak discharge for the basin approaching proposed project based on 100 year frequency.
 Q_{100} = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 1324.30
 V_{max} = Maximum computed outlet velocity for the proposed culvert or bridge based on a 100 year frequency.



LAYOUT



ELEVATION



GENERAL DRAWING
FOR
WEST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
40'-0" ROADWAY OVER SPLIT ROCK CREEK * 30° R.H.F. SKEW
STA. 667+14.52 TO STA. 670+92.98 SEC. 26-T102N-R48W
STR. NO. 50-284-165 IM 0909(81)406
PCN 021X MINNEHAHA COUNTY HL-93 + ALT
S. D. DEPT. OF TRANSPORTATION
MAY 2016

DESIGNED BY CTH	CK. DES. BY KJB	DRAFTED BY CTH	BRIDGE ENGINEER
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PLANS BY: HRGreen

ESTIMATE OF STRUCTURE QUANTITIES

DESCRIPTION	QUANTITY	UNIT	REMARKS
Bridge Elevation Survey	Lump Sum	LS	
Concrete Penetrating Sealer	1955	Sq Yd	See Special Provision
Bridge End Embankment	180	Cu Yd	
Incidental Work, Structure	Lump Sum	LS	
Structural Steel, Miscellaneous	Lump Sum	LS	
Membrane Sealant Expansion Joint	83.8	Ft	
Structure Excavation, Bridge	1524	Cu Yd	
Granular Bridge End Backfill	98	Cu Yd	
Approach Slab Underdrain Excavation	6	Cu Yd	
Class A45 Concrete, Bridge Deck	606.2	Cu Yd	
Class A45 Concrete, Bridge	512.2	Cu Yd	
Concrete Approach Slab for Bridge	247.0	Sq Yd	
Concrete Approach Sleeper Slab for Bridge	67.5	Sq Yd	
Deck Drain, Girder Bridge	8	Each	
Reinforcing Steel	81,571	Lb	
Epoxy Coated Reinforcing Steel	135,399	Lb	
No. 7 Rebar Splice	108	Each	
Preboring Pile	160	Ft	
HP 12 Pile Tip Reinforcement	16	Each	
HP 12x53 Steel Test Pile, Furnish and Drive	80	Ft	
HP 12x53 Steel Bearing Pile, Furnish and Drive	490	Ft	
45" Minnesota Shape Prestressed Concrete Beam	1865	Ft	
4" Underdrain Pipe	238	Ft	
Precast Concrete Headwall for Drain	2	Each	
Porous Backfill	28.0	Ton	
Type B Drainage Fabric	2118	Sq Yd	
Class B Riprap	2147.5	Ton	

SPECIFICATIONS FOR BRIDGE

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

- AASHTO HL-93.
- 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
Piling (ASTM A572 Grade 50) $fy = 50,000$ psi

*For prestressed beams, see notes regarding Prestressed Girders.

GENERAL CONSTRUCTION

- All mild reinforcing steel shall conform to ASTM A615, Grade 60.
- All exposed concrete corners and edges shall be chamfered 3/4" unless noted otherwise.
- Use 2" clear cover on all reinforcing steel except as shown.
- Contractor shall imprint on the structure the date of new construction as specified and detailed on Standard Plate No. 460.02.
- Barrier Curbs and End blocks shall be built normal to the grade.
- 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.
- The elevation of the bridge deck is 16" above subgrade elevation.

INCIDENTAL WORK, STRUCTURE

- In place centerline Sta. 667+68.00 to centerline Sta. 671+05.00 is a 337'-0", 5-span steel I-beam viaduct bridge built in 1960 with a 30'-0" clear roadway. The beams are continuous across the western three spans, while the beams supporting the eastern two spans are simply supported. The superstructure consists of a composite reinforced concrete slab with a concrete barrier curb continuous across the bridge. The concrete barrier curb replaced the original Type C aluminum railing. The concrete substructure consists of 2 column reinforced concrete bents and reinforced concrete stub abutments. The abutments are supported on timber piling. The easternmost bent is supported on steel piling and the other 3 bents are supported on spread footings.
- Break down and remove the existing bridge, and approach/sleeper slabs if applicable, to 1 foot below finished groundline, or as required to construct the new structure in accordance with Section 110 of the Specifications. All portions of the existing bridge not salvaged for future highway related use shall be removed and disposed of by the Contractor on a site obtained by the Contractor and approved by the Engineer in accordance with the Environmental Commitments found in Section A.
- The existing drainage trough in front of each existing abutment shall be salvaged for future highway related use. The salvaged drainage troughs shall be stockpiled on-site for the Senior Region Bridge Engineer to pick-up. Care shall be taken during the dismantling, transporting and stockpiling operations not to damage the structural properties of the salvaged items.
- 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.



ESTIMATE OF STRUCTURE QUANTITIES AND NOTES FOR 378' - 5 1/2" PRESTR. GIRDER BRIDGE

Str. No. 50-284-165

MAY 2016

2

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DESIGNED BY: KJB	DRAWN BY: KJB	CHECKED BY: CTH/TOR	BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(81)406	E5	E62

DESIGN MIX OF CONCRETE

1. All structural concrete shall be Class A45 unless otherwise indicated.
2. Type II cement is required, except Type III may be used for the prestressed beams.
3. 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.
4. Grout design mix shall be as specified in Section 460.2 K of the Specifications. A compressive strength of 2000 psi shall be attained by the grout prior to erection of any beams. Chamfer edges of grout pads ¾". The quantity of grout is included in and shall be paid for at the contract unit price per cubic yard for Class A45 Concrete, Bridge.

ABUTMENTS

1. Preboring piling at each abutment is required to whichever is greater, ten feet or to natural ground.
2. The HP 12x53 Piling were designed using a factored bearing resistance of 98 tons per pile. Piling shall develop a field verified nominal bearing resistance of 245 tons per pile.
3. One test pile shall be driven at each abutment and will become part of the pile group.
4. The contractor shall have sufficient pile splice material on hand before pile driving is started. See Standard Plate No. 510.40.
5. Piles shall not be driven out of position by more than three inches in the direction normal to the abutment centerline. A pile-driving template shall be used to insure this accuracy.
6. Abutment backwalls above the construction joint may be cast separately from the deck slab. The concrete used for the backwalls and wings shall be Class A45 Concrete, Bridge. All abutment and bridge deck concrete shall have attained design strength prior to backfilling. Abutment wing walls shall not be cast until after the deck has been poured.
7. Each finished abutment shall include a Bridge Survey Marker. See Standard Plate No. 460.05.
8. Pile tip reinforcement will be required. See Standard Plate No. 510.30.
9. Fence anchors shall be provided on both sides of each abutment. See Standard Plate No. 620.19.

ABUTMENT BACKWALL COATING

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

<http://apps.sd.gov/applications/HC60ApprovedProducts/ProductList.aspx>

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

PILE DRIVING

1. A drivability analysis was performed using the wave equation analysis program (GRLWEAP). The pile hammers listed below were evaluated and found to produce acceptable driving stresses:

Delmag D19-32	Delmag D19-42
MVE M-19	APE D19-42

2. Pile hammers not listed will require evaluation and approval prior to use from the Geotechnical Engineering Activity.
3. The HP 12x53 piling will obtain bearing on the Split Rock Creek Formation bedrock. This material can be extremely hard and impenetrable by nature. The Site Plan & Subsurface Profile sheets and Subsurface Investigation Elevation Views should be reviewed to obtain the approximate Split Rock Creek Formation elevation prior to pile driving operations. Extreme care should be taken during pile driving operations not to over-stress the piles when the tips encounter the Split Rock Creek Formation bedrock.

BENTS

1. Spiral reinforcement may be fabricated from cold drawn wire conforming to ASTM A1064 or hot rolled plain or deformed bars conforming to the strength requirements of ASTM A615, Grade 60.
2. It is anticipated that cofferdams will be necessary. Cofferdams shall be designed and constructed in accordance with Section 423 of the Specifications.
3. The design of the Cofferdam must be done by Professional Engineers registered in South Dakota. Sealed calculations of both the original design and design check, performed by different engineers, shall be submitted with the cofferdam plans. The cofferdam plans, design, and check design shall be submitted to the Office of Bridge Design a minimum of 15 days prior to initiating Cofferdam construction.

SPREAD FOOTING ON ROCK

1. The spread footings shall be neat lined into sound bedrock. The rock surface shall be cleaned of all soil and debris prior to placing the spread footing. Cleaning shall be accomplished by water washing and/or air jetting. Material washed from the rock surface shall be directed into a sump or low area and physically removed from the exposed rock surface. The Geotechnical Engineer shall be contacted, once the rock has been cleaned, so that the rock may be inspected for condition and soundness.
2. If upon inspection, the Geotechnical Engineer determines that the material at the plan shown footing elevation is unsuitable for foundation support or if sound bedrock is encountered at an elevation other than the plan shown footing elevation, the Engineer shall order the footing elevation changed to an elevation approved by the Geotechnical Engineer. If the footing elevations are changed, the Office of Bridge Design shall be contacted prior to proceeding with construction to determine if a redesign of the substructure unit is required. If a redesign is required, a maximum of 5 working days may be required to perform this design. Any costs associated with delays within the 5 working day period for redesign shall be borne by the contractor at no additional cost to the State.
3. If the footing elevations are lowered due to bedrock conditions, the excavation below the plan shown footing elevation ordered by the Engineer will be paid for at the contract unit price per cubic yard for Structure Excavation, Bridge. The additional concrete and reinforcing steel required for bent construction will be paid for at the contract unit price per cubic yard for Class A45 Concrete, Bridge and contract unit price per pound for Reinforcing Steel, respectively.
4. The cost of cleaning the rock shall be included in the contract unit price per cubic yard for Structure Excavation, Bridge. Payment shall be considered full compensation for all materials, labor equipment and incidentals necessary to satisfactorily complete the work.
5. Due to the possibility of variance in the final elevations for the bent footings, the reinforcing steel in the bents shall not be ordered until final footing elevations have been approved by the Geotechnical Engineer.



**NOTES (CONTINUED)
FOR
378' – 5 1/2" PRESTR. GIRDER BRIDGE**

Str. No. 50-284-165

MAY 2016

3

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DESIGNED BY: KJB	DRAWN BY: KJB	CHECKED BY: CTH/TOR	BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(81)406	E6	E62

PRESTRESSED GIRDERS

1. Minimum concrete compressive strength $f'c = 8000$ psi at 28 days and $f'ci = 6500$ psi for all girders.
2. All mild reinforcing steel shall be deformed bars conforming to ASTM A615, Grade 60.
3. Individual tendons in all pretensioned sections shall consist of seven wire uncoated Type 270K Strands having a nominal diameter of 0.6" and a minimum ultimate strength of 58600 lbs. per cable. An initial tensile force of 43500 lbs. shall be applied to all 0.6" cables in all girders. All prestressing steel shall conform to AASHTO M203. (low lax strands).
4. All prestressed girders within a span shall be cast within an 8 day period. If not, the newest girder shall be at least 6 weeks old before the deck slab is poured. The girders shall be poured in all steel forms.
5. Prestressed concrete girders shall always be lifted by the devices provided in the top flanges near the ends of the girders. Types of lifting devices other than those shown on the plans may be used provided they are approved by the Office of Bridge Design. The design of the lifting devices shall be the responsibility of the Fabricator.
6. Each beam shall be marked showing structure number, casting date, and beam number. Marking shall be on the face of the beam near the end and so located that they will be exposed after the diaphragms have been cast. Fascia beams shall be marked on an inside face. All markings shall be stenciled and clearly legible. For beam designations and locations, see superstructure layout plan and Erection Data sheet.
7. The physical properties of the elastomeric bearing pads shall conform to the requirements of Section 18.2 of the AASHTO LFRD Bridge Construction Specification and the AASHTO Materials Specification M251. The elastomeric bearing pads shall conform to Grade 70 (durometer). The cost of the pads shall be incidental to the contract unit price per cubic yard for Class A45 Concrete, Bridge. Certification that pads are 70 durometer and meet the requirements of AASHTO LFRD Bridge Construction Specification Section 18.2 and AASHTO Materials Specification M251 shall be furnished to the Engineer with the shop drawings. No laminated bearing pads will be allowed.
8. All exposed corners shall be chamfered 3/4" or rounded to 3/4" radius.
9. Dead Load of girder taken as effective at transfer. Cut strands, except those extended and bent, flush with end of girder and coat end of strands with mortar.
10. The Contractor shall be responsible for ensuring that transportation stresses, handling and erection do not cause damage to the girders.
11. Furnish and Install Inserts for T6 Rebars as shown in the plans. All costs involved shall be incidental to the contract unit price per foot of girder.

SUPERSTRUCTURE

1. Girder lifting hooks shall be cut off before placement of concrete deck slab.
2. The diaphragms at the bents shall be poured integrally with the deck slab. Placement of diaphragms at the bents shall not slow down the rate of deck concrete placement and finishing. The Contractor shall place the concrete for the specified diaphragms ahead of the deck concrete in such a manner that advancement of the deck concrete reaches the diaphragm just as placement of concrete in the diaphragm is complete.
3. The deck-finishing machine shall be adjusted and operated in such a manner that the roller screed or screeds are parallel with the centerline of the bridge and the finish machine is parallel to the skew of the bridge. Concrete placement in front of the finish machine shall be kept parallel to the machine.
4. The bridge deck must be placed and finished continuously at a minimum rate of 40 ft. of deck per hour measured along Centerline Roadway. This rate is exclusive of concrete placed in the diaphragms. (See note 3 above.) If concrete cannot be placed and finished at this rate, the Engineer shall order a header installed and operations stopped. Notify the Bridge Construction Engineer if deck pour operations are stopped. Operations may resume only when the Engineer is satisfied that a rate of 40 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 the barrier curb formwork, shall be epoxy coated. The epoxy coating shall be inert in concrete and compatible with the coating applied to the new epoxy coated reinforcing steel.

CLASS A45 CONCRETE, BRIDGE DECK

See Special Provision for Concrete Penetrating Sealer.



DECK DRAINS

1. Deck Drains shall be 4" diameter x 5'-0" Fiberglass Pipe conforming to the requirements of ASTM - D2996.
2. The Fiberglass Pipe Sleeve can be made from a 4 inch diameter Fiberglass Pipe Fitting. It shall be attached to the 4 inch diameter Fiberglass Pipe, as shown in the plans, per the manufacturer's recommendation.
3. All fiberglass pipe and pipe fittings shall be handled and installed according to the guidelines and procedures recommended by the manufacturer. Pipe, pipe fittings, and adhesive must be from the same manufacturer.
4. Use fiberglass wear pads to protect against contact with supports or U-bolts.
5. The 1/2 inch diameter U-bolts, nuts and washers shall conform to ASTM F1554 Grade 36 and shall be galvanized in accordance with ASTM F2329.
6. The deck drain to girder connection as shown in the plans allows the deck drain location to be adjusted slightly to clear transverse slab steel.
7. All fiberglass pipes and pipe fittings shall use pigmented resin throughout the wall. The color shall be an approved gray (Federal Standard 595B Color 26622).
8. Steel for the bent plates and washers shall conform to ASTM A709 Grade 36 and shall be galvanized in accordance with ASTM A123. Washers shall be plate washers or a continuous bar at least 5/16" thick with standard holes and shall have a size sufficient to completely cover the slot after installation.
9. The 1/2 inch diameter bolts and nuts shall conform to ASTM A307 and shall be galvanized in accordance with ASTM F2329 or ASTM A153 as applicable.
10. The 1/2 inch diameter concrete inserts shall be capable of developing the strength of the A307 bolts and shall be galvanized.
11. Maintain 2" clear cover between the back of the concrete inserts and the adjacent girder web.
12. Payment for deck drains shall be at the contract unit price per each for Deck Drains, Girder Bridge, and shall be full compensation for furnishing, fabricating, and installing the deck drains and all attaching hardware in accordance with the plans and specifications.

**NOTES (CONTINUED)
FOR
378' - 5 1/2" PRESTR. GIRDER BRIDGE**

Str. No. 50-284-165

MAY 2016

4

30

DESIGNED BY: KJB	DRAWN BY: KJB	CHECKED BY: CTH/TOR	BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(81)406	E7	E62

BOLT TESTING

The certified mill test reports for all bolts used on the project shall include the test results for all of the testing specified in Section 972.2 D of the Specifications. Some of these tests are supplemental tests that must be requested at the time the bolts are ordered. It is the responsibility of the Contractor to notify the bolt supplier of these requirements.

SHOP PLANS

The fabricator shall submit shop plans in accordance with the Specifications. Send shop plan submittals to HR Green, Inc., 431 N. Phillips Avenue, Sioux Falls, SD 57104 (kbrehm@hrgreen.com). After review, corrections (if necessary), and approval by HR Green, Inc., the Office of Bridge Design will review the submittals, authorize fabrication, arrange for fabrication inspection, and distribute the shop drawings.

FALSEWORK

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

FALL PROTECTION

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

CLASS B COMMERCIAL TEXTURE FINISH

1. A Class B commercial texture finish shall be applied to the following areas:
 - a. **Barrier Rail:** all exposed surfaces (front, top and back).
 - b. **Slab:** edge of slab.
2. The Class B commercial texture finish shall be applied in accordance with Section 460.3L.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.

APPROACH SLABS

1. Sleeper slab riser shall be cast with the approach slab or cast after the approach slab is placed. Care shall be taken to ensure the correct grade is maintained across the joint.
2. The portion of the sleeper slab below the construction joint may be precast. If the bottom portion of the sleeper slab is precast, the Contractor shall submit proposed lifting and setting plans to the Bridge Construction Engineer for approval. In addition, if reinforcing or other details differ from those shown in the plans, the Contractor shall submit proposed alternate details for approval.
3. The use of an approved finishing machine will be required during placement of Class A45 Concrete for the approach slabs. Concrete placement in front of the machine shall be kept parallel to the screed.
4. The concrete in the approach slab shall be tined normal to centerline roadway.
5. Concrete Approach Sleeper Slab for Bridge, whether cast-in-place or precast, will be paid for at the contract unit price per square yard. This payment shall be full compensation for all excavation, furnishing, hauling, and placing all materials including concrete and reinforcing steel; for disposal of all excavated material and surplus materials; and for labor, tools, equipment and any incidentals necessary to complete this item of work.
6. Concrete Approach Slab for Bridge will be paid for at the contract unit price per square yard. This payment shall be full compensation for all excavation, furnishing, hauling and placing all materials including concrete, asphalt paint or 4 mil polyethylene sheeting, elastic joint 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.

CHANNEL WORK

In order to assure the Hydraulic capacity of the bridge, the finished ground under the bridge shall be shaped to match the upstream channel and flood plain. The existing low water channel shall be maintained as near as practical to the existing location. Bridge berms shall be built as shown on the General Drawing sheet.



**NOTES (CONTINUED)
FOR
378' – 5 1/2" PRESTR. GIRDER BRIDGE**

Str. No. 50-284-165

MAY 2016

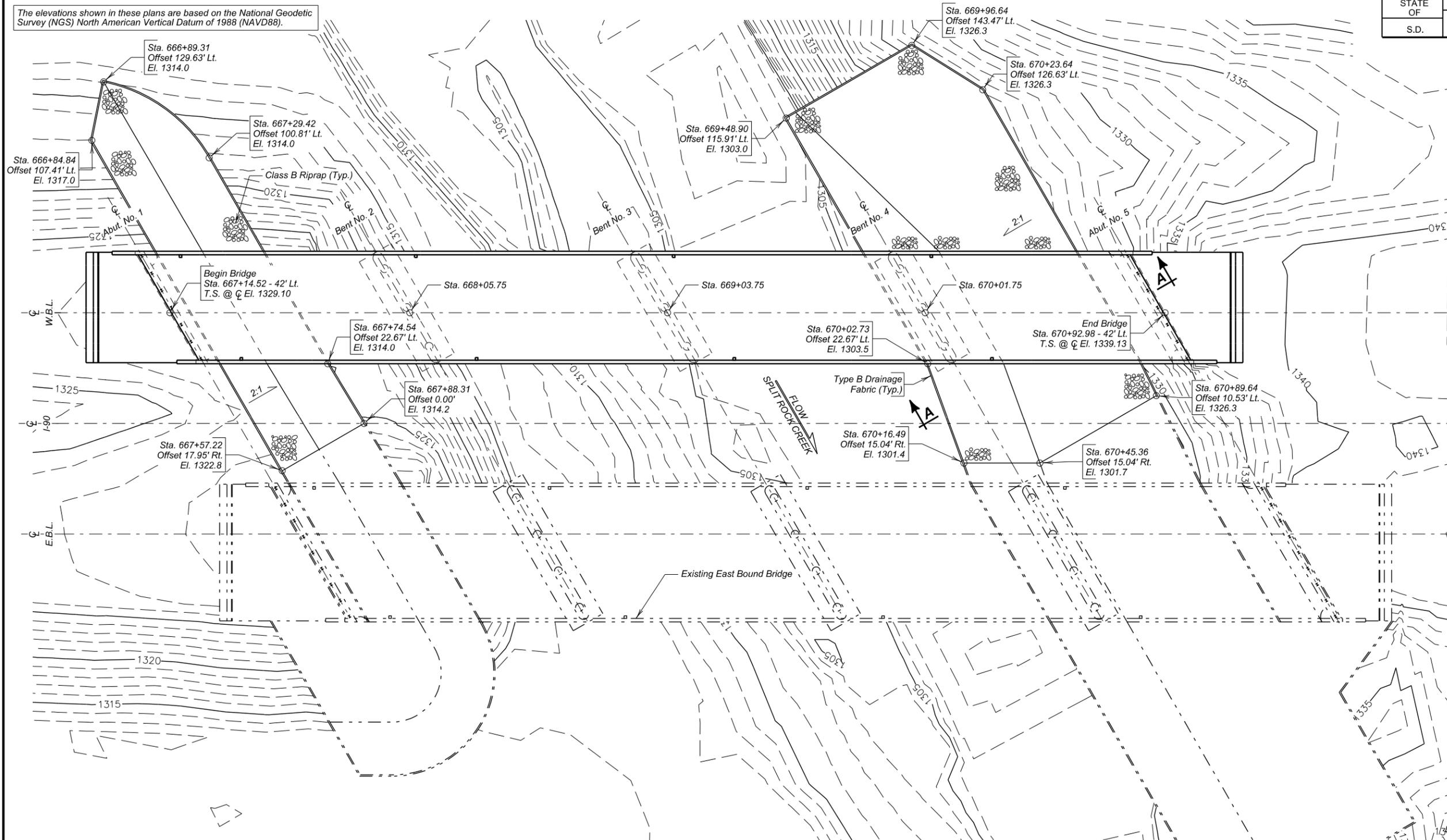
5

30

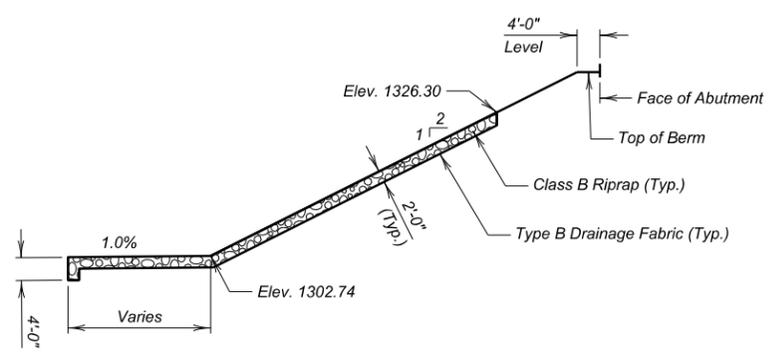
DESIGNED BY: KJB	DRAWN BY: KJB	CHECKED BY: CTH/TOR	BRIDGE ENGINEER
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The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(81)406	E8	E62



ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Type B Drainage Fabric	Sq. Yd.	2118
Class B Riprap	Ton	2147.5



SEC. A - A

RIPRAP DETAILS FOR WEST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
 40'-0" ROADWAY OVER SPLIT ROCK CREEK
 30° R.H.F. SKEW
 STA. 667+14.52 TO STA. 670+92.98
 STR. NO. 50-284-165
 SEC. 26-T102N-R48W
 IM 0909(81)406
 HL-93 + ALT
 MINNEHAHA COUNTY
 S. D. DEPT. OF TRANSPORTATION
 MAY 2016

DESIGNED BY MJR	CK. DES. BY KJB	DRAFTED BY CTH	BRIDGE ENGINEER
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The Split Rock Creek Formation consists of layers of silica cemented coarse conglomerates, siltstone, claystone, and sandstone that are interbedded with coal seams, poorly cemented sands, and thin soil layers. The surface of the formation can be highly variable and may change 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

- Penetration Test
- ⊙ Coring Test
- ⊕ Auger Test
- ▽ Water
- ⊖ Caved
- Sample Zone
- ▨ Continuous Sample

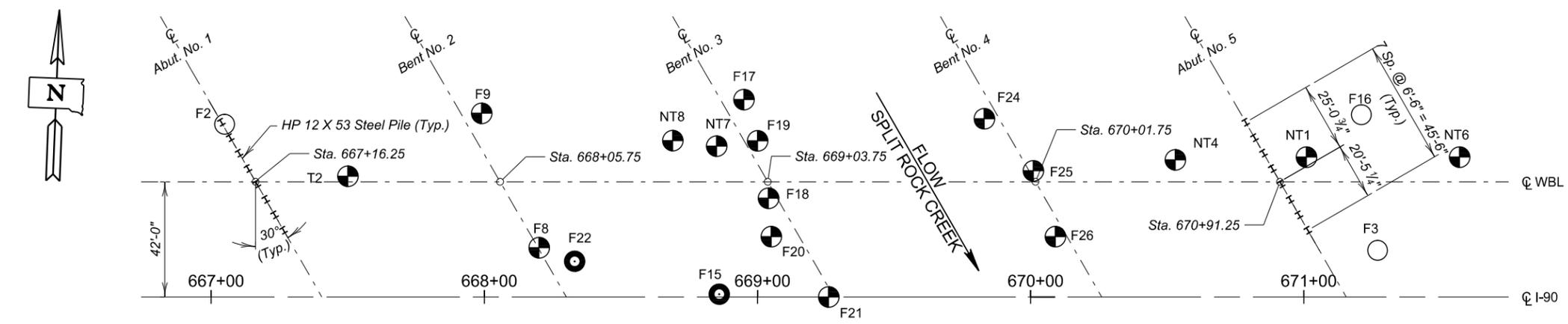
Penetration test holes are drilled with a 6⁵/₈ inch diameter hollow stem auger. Penetration tests are conducted by dropping a 140 pound hammer 30 inches to obtain 2 inch nominal diameter samples and to measure the resistance to penetration of the soil.

Core test holes are drilled with a 6⁵/₈ inch diameter hollow stem auger to bedrock. Core tests are conducted with NQ core barrels to obtain 1⁷/₈ inch nominal diameter samples for observation.

All auger holes are drilled with a 2¹/₂ inch diameter continuous flight auger.

GROUND WATER ELEVATIONS as of MAY, JUNE, & OCTOBER 2015

F2	(DRY)	1304.1	F22	1305.0
F3		1329.1	F24	1303.1
F8		1304.4	F25	1302.8
F9		1304.4	F26	(DRY) 1308.2
F15		1306.3		
F16		1310.3		
F17	(DRY)	1304.3		
F18		1300.6		
F19	(DRY)	1302.6		
F20	(DRY)	1302.0		
F21	(DRY)	1301.0		



PILING LAYOUT



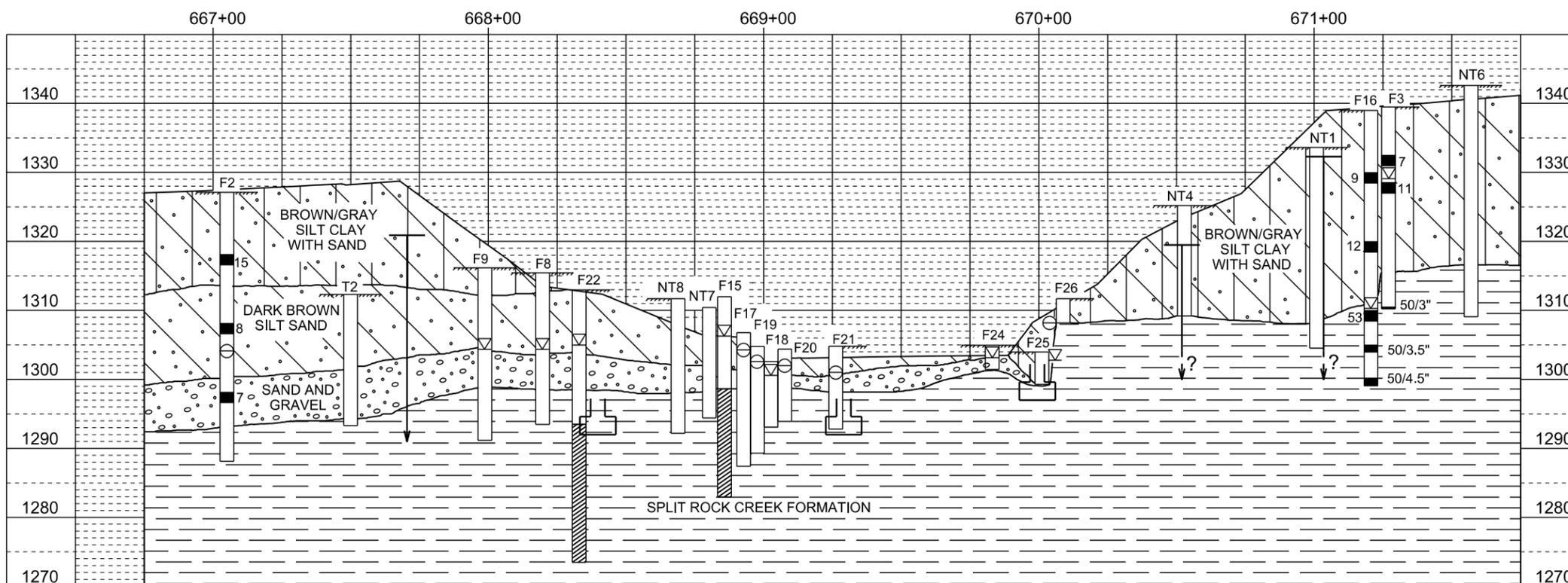
Hole Number	F2	F2	F3	F16
Station	667+05	667+05	671+27	671+21
Depth	10.2 ft	20.2 ft	10.2 ft	20.5 ft
Soil Color	Brown/Gray	Brown	Brown/Gray	Tan/Gray
Classification	Clay Silt	Sandy Clay	Sandy Clay	Sandy Clay
Strength (Qu)	1,415 psf	829 psf	855 psf	5,157 psf
Dry Density	112.5 pcf	99.9 pcf	99.7 pcf	106.1 pcf
Wet Density	131.7 pcf	115 pcf	122.7 pcf	125.9 pcf
Moisture	17.1 %	15.1 %	23.2 %	18.6 %
Pass No. 10	97.7 %	97.5 %	97.8 %	95.3 %
Pass No. 40	87.5 %	75.4 %	83.3 %	88.1 %
Pass No. 200	64.6 %	32.3 %	62.2 %	67.6 %
Sand Content	33.2 %	65.2 %	35.5 %	27.7 %
Silt Content	35.2 %	1.1 %	23.1 %	33.7 %
Clay Content	29.3 %	31.2 %	39.1 %	33.9 %

Original construction plans bottom of footing elevations. Actual elevations may vary.

Original construction plans piling lengths. Actual tip elevations unknown.

Sample Zone 48 Blows Per Foot

Penetration Test results are listed as uncorrected "N" values. Blows over inches are listed if refusal is achieved, which is 50 blows within one 6 inch set.



SITE PLAN & SUBSURFACE PROFILE (A)

FOR
WEST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE

40'-0" ROADWAY OVER SPLIT ROCK CREEK
TO STA. 670+92.98
STR. NO. 50-284-165

30° R.H.F. SKEW
SEC. 26-T102N-R48W
IM 0909(81)406
HL-93 + ALT

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION

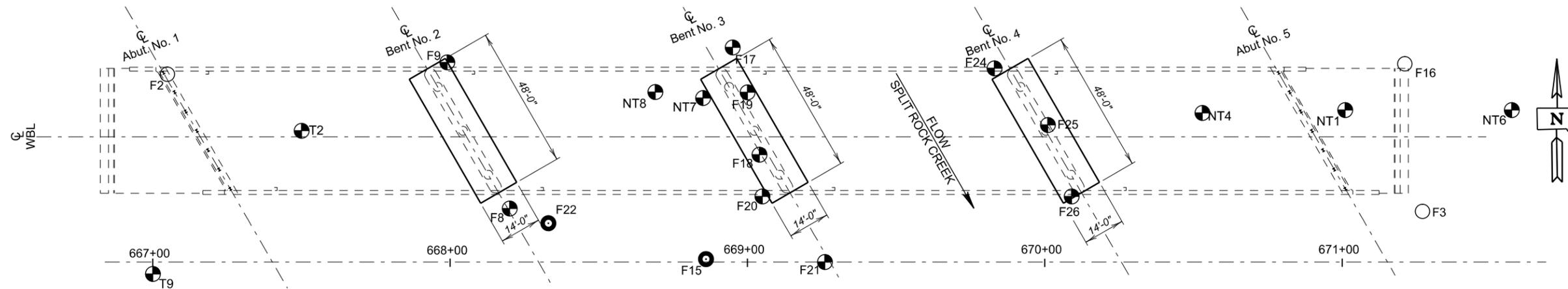
MAY 2016

7 OF 30

DESIGNED BY	CK. DES. BY	DRAFTED BY	
	JW	HK	

BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(81)406	E10	E62



PLAN



SITE PLAN & SUBSURFACE PROFILE (B)

FOR

WEST BOUND LANES

378' - 5 1/2" PRESTR. GIRDER BRIDGE

40'-0" ROADWAY OVER SPLIT ROCK CREEK
 STA. 667+14.52 TO STA. 670+92.98
 STR. NO. 50-284-165

30° R.H.F. SKEW
 SEC. 26-T102N-R48W
 IM 0909(81)406
 HL-93 + ALT

MINNEHAHA COUNTY

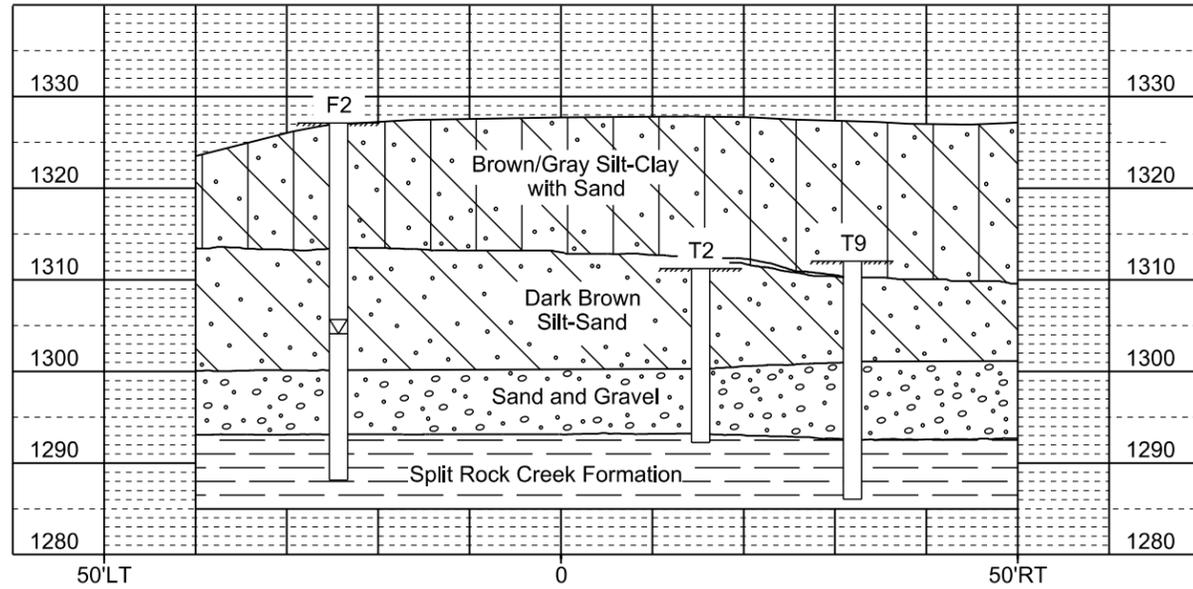
S. D. DEPT. OF TRANSPORTATION

MAY 2016

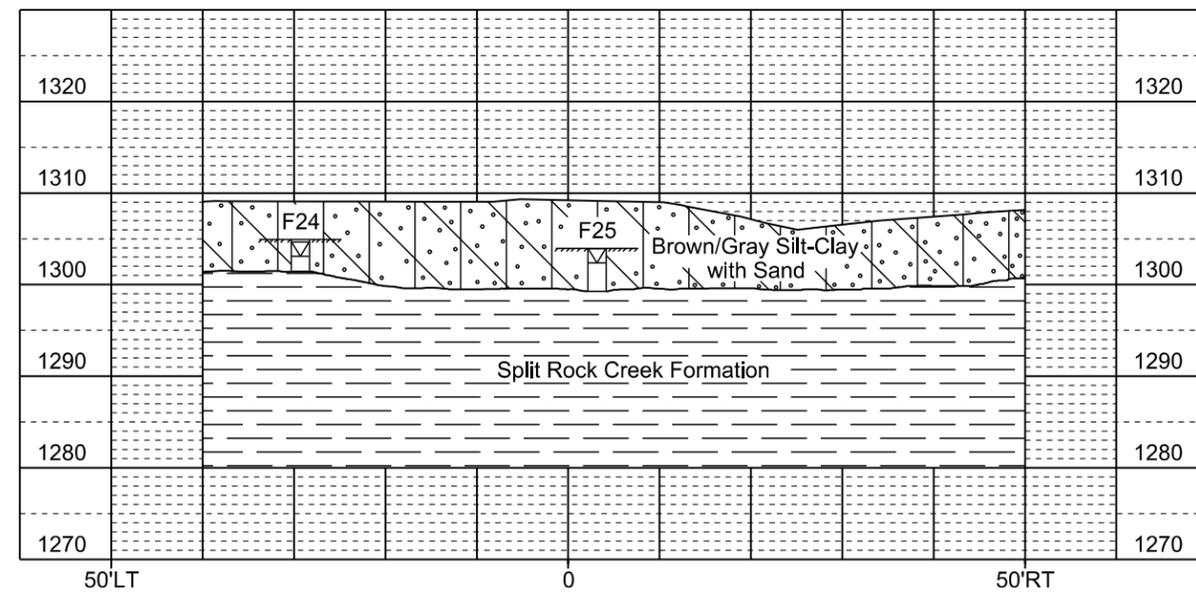
8 OF 30

DESIGNED BY	CK. DES. BY	DRAFTED BY	
	JW	HK	BRIDGE ENGINEER

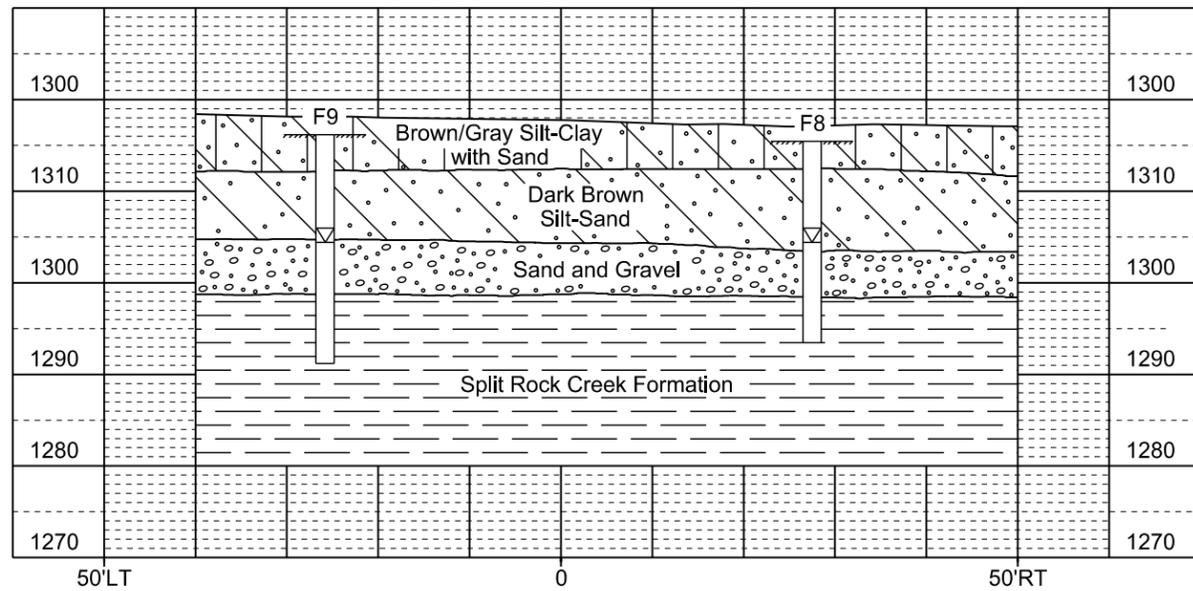
Elevation View Abut. No. 1



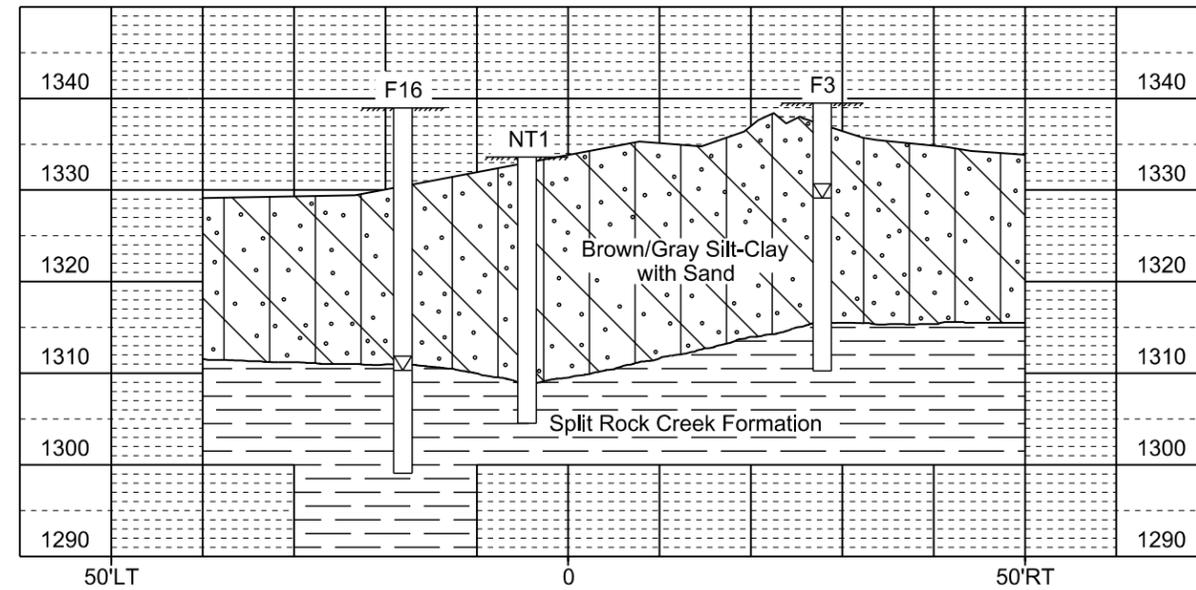
Elevation View Bent No. 4



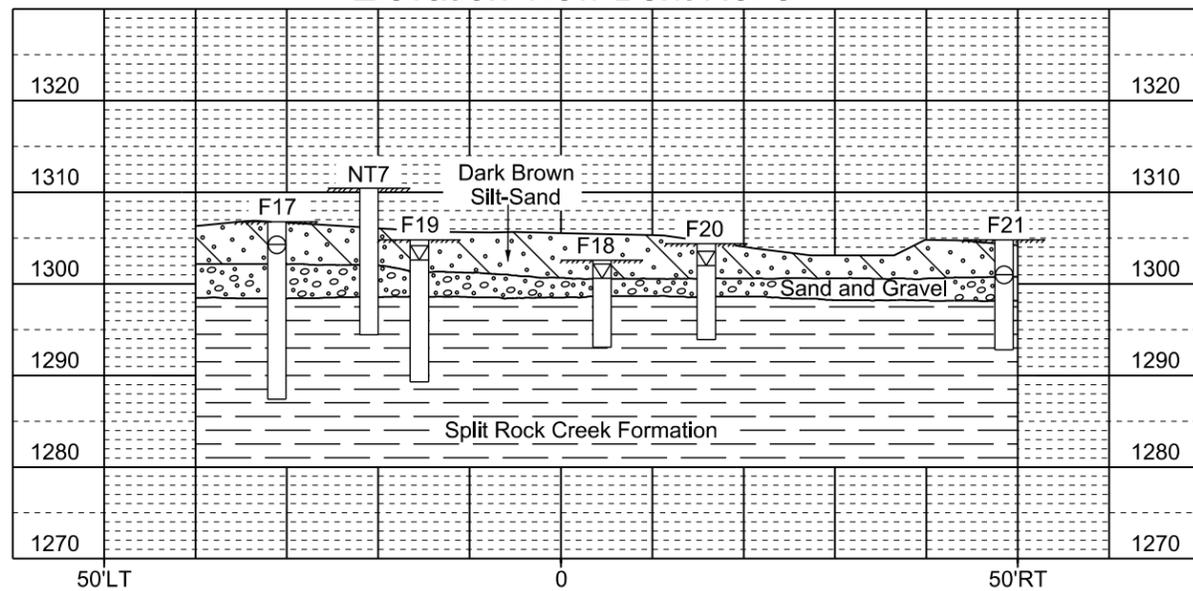
Elevation View Bent No. 2



Elevation View Abut. No. 5



Elevation View Bent No. 3



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

Groundwater elevations for 'F' borings are listed on the Site Plan and Subsurface Profile (A) Sheet.



SUBSURFACE INVESTIGATION ELEVATION VIEWS FOR

WEST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE

40'-0" ROADWAY OVER SPLIT ROCK CREEK
30° R.H.F. SKEW
STA. 667+14.52 TO STA. 670+92.98
STR. NO. 50-284-165
SEC. 26-T102N-R48W
IM 0909(81)406
HL-93 + ALT

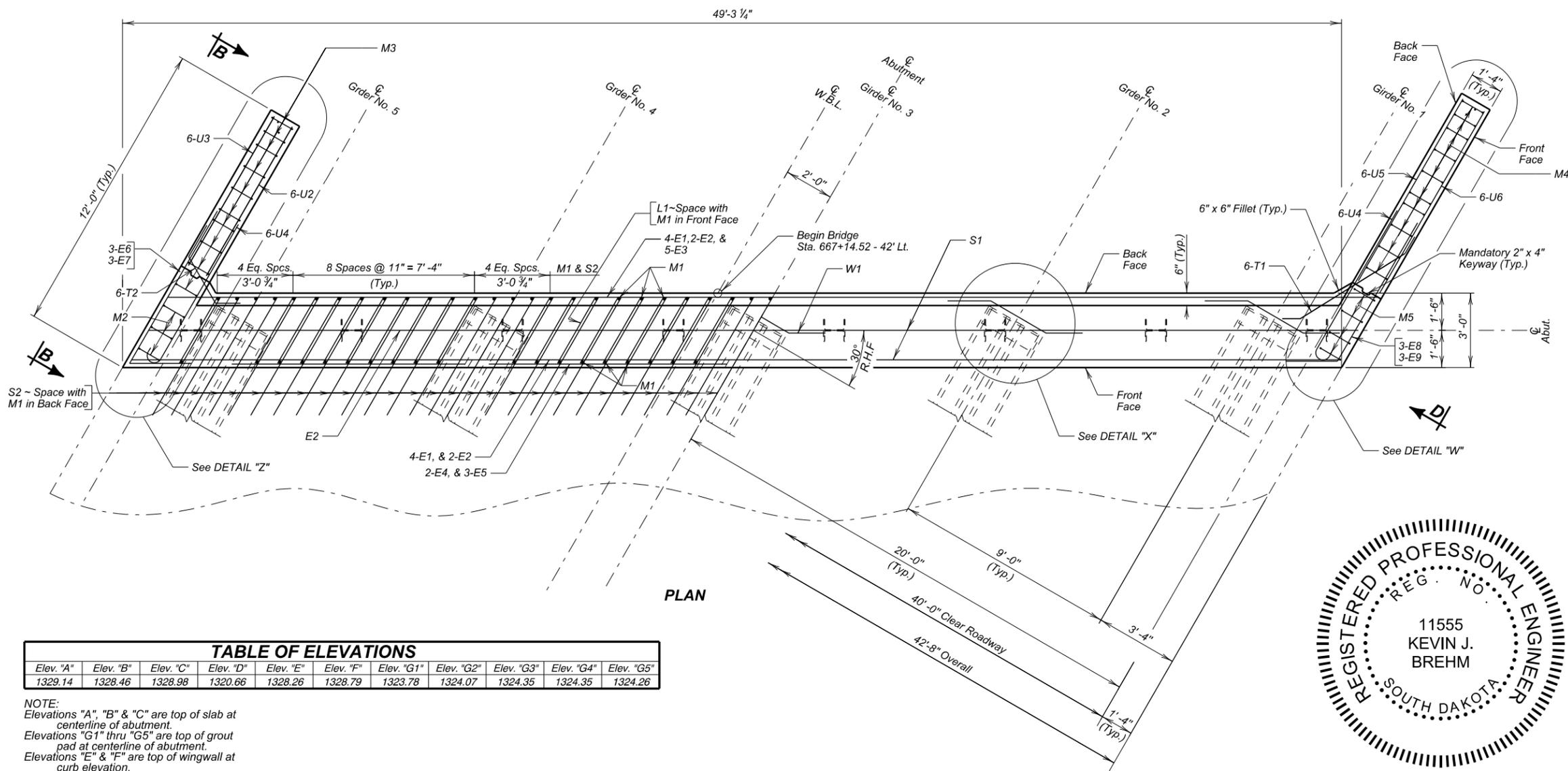
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION

MAY 2016

9 OF 30

DESIGNED BY	CK. DES. BY	DRAFTED BY	
	JW	HK	BRIDGE ENGINEER

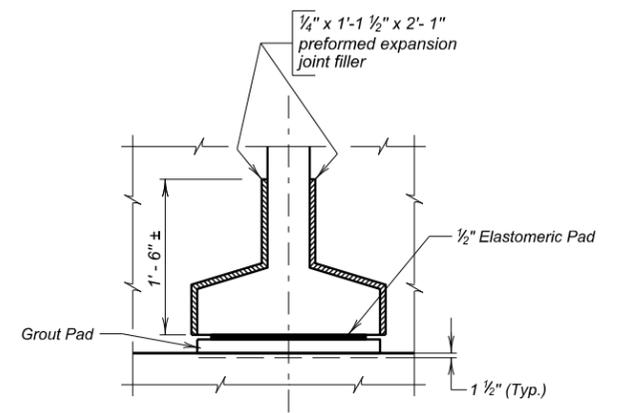
NOTE:
This sheet is to be used in conjunction with Sheet No. 12 of 30.



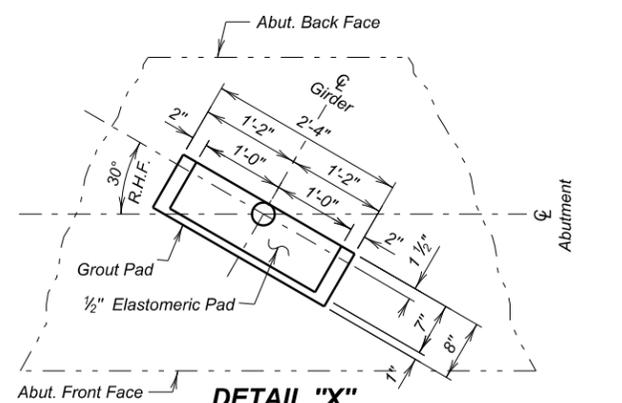
INCREASING STATIONS

Elev. "A"	Elev. "B"	Elev. "C"	Elev. "D"	Elev. "E"	Elev. "F"	Elev. "G1"	Elev. "G2"	Elev. "G3"	Elev. "G4"	Elev. "G5"
1329.14	1328.46	1328.98	1320.66	1328.26	1328.79	1323.78	1324.07	1324.35	1324.35	1324.26

NOTE:
Elevations "A", "B" & "C" are top of slab at centerline of abutment.
Elevations "G1" thru "G5" are top of grout pad at centerline of abutment.
Elevations "E" & "F" are top of wingwall at curb elevation.
Top of Grout Pad shall be level and smooth



DETAIL "Y"
(Typical at girder ends; abutments only)



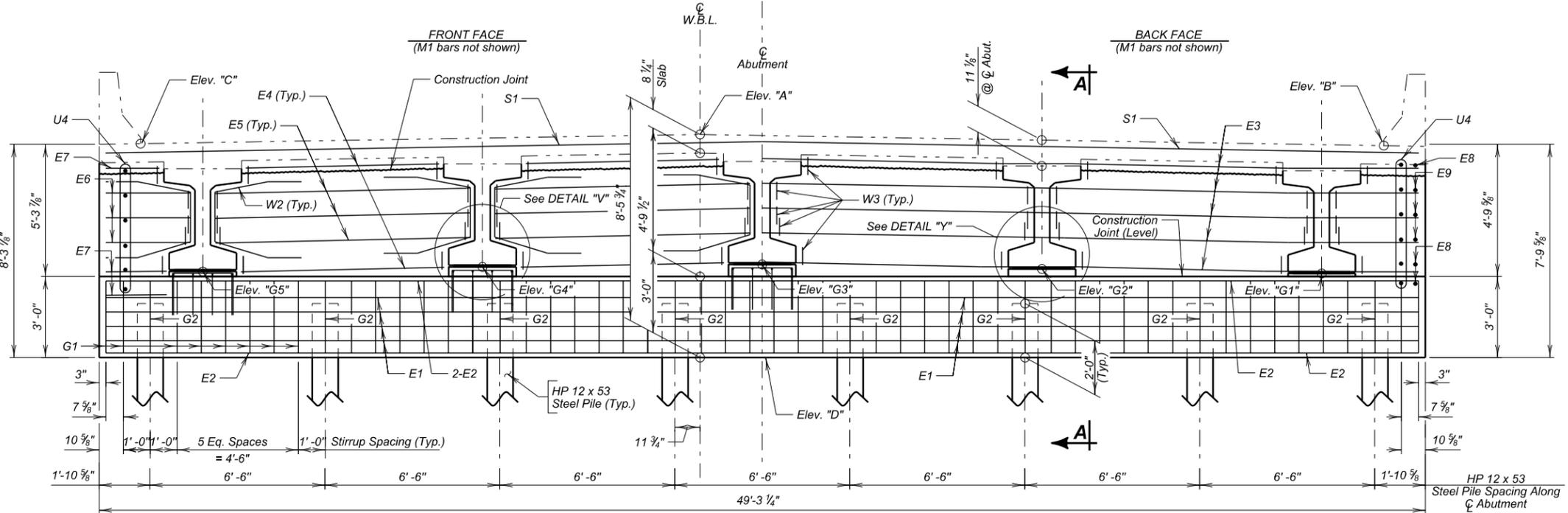
DETAIL "X"

ABUTMENT NO. 1 DETAILS FOR WEST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE

40'-0" ROADWAY OVER SPLIT ROCK CREEK
30° R.H.F. SKEW
STA. 667+14.52 SEC. 26-T102N-R48W
TO STA. 670+92.98 IM 0909(81)406
STR. NO. 50-284-165 HL-93 + ALT

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION

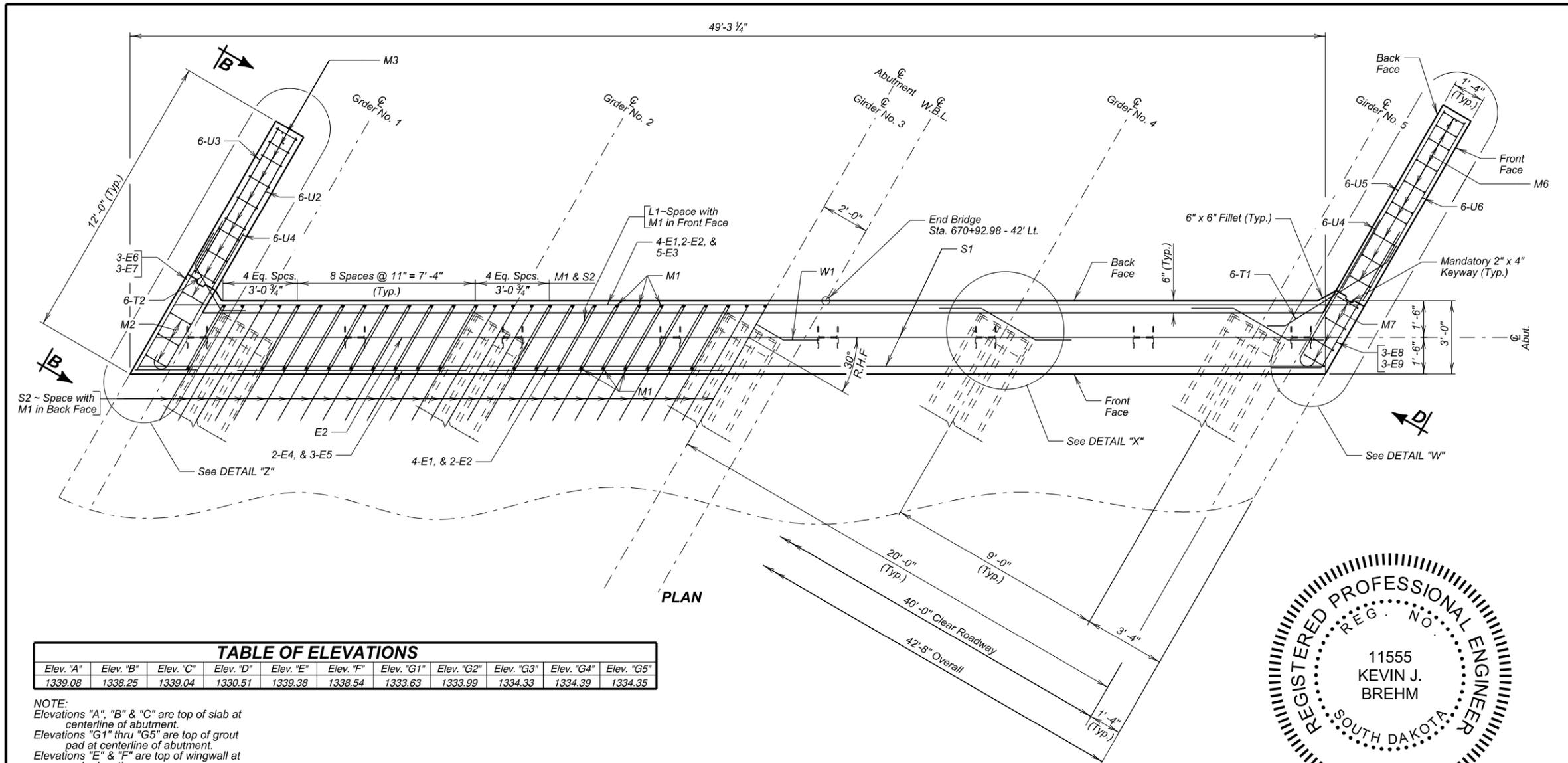
MAY 2016



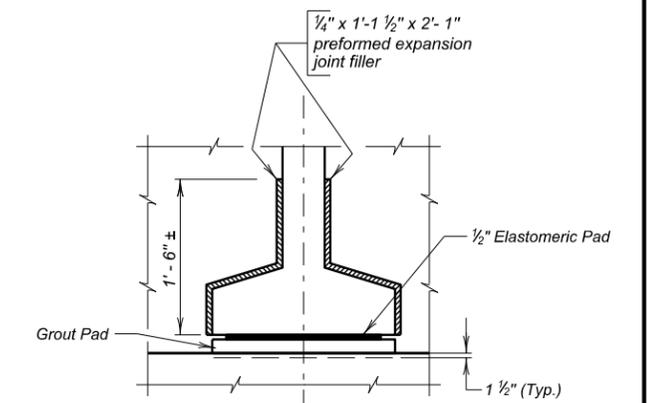
ELEVATION

DESIGNED BY JRM	CK. DES. BY KJB	DRAFTED BY EBS	BRIDGE ENGINEER
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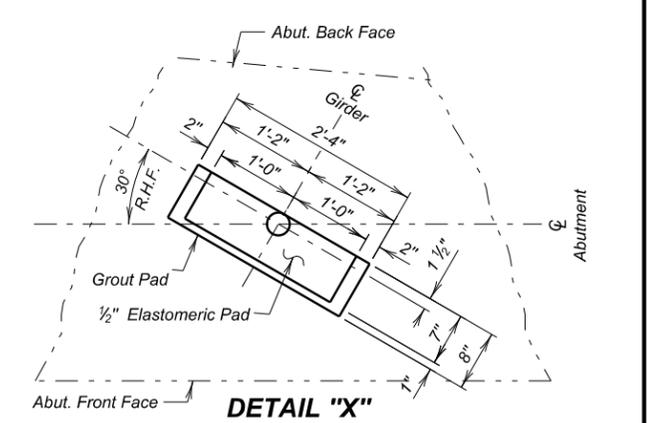
NOTE:
This sheet is to be used in conjunction with Sheet No. 12 of 30.



INCREASING STATIONS



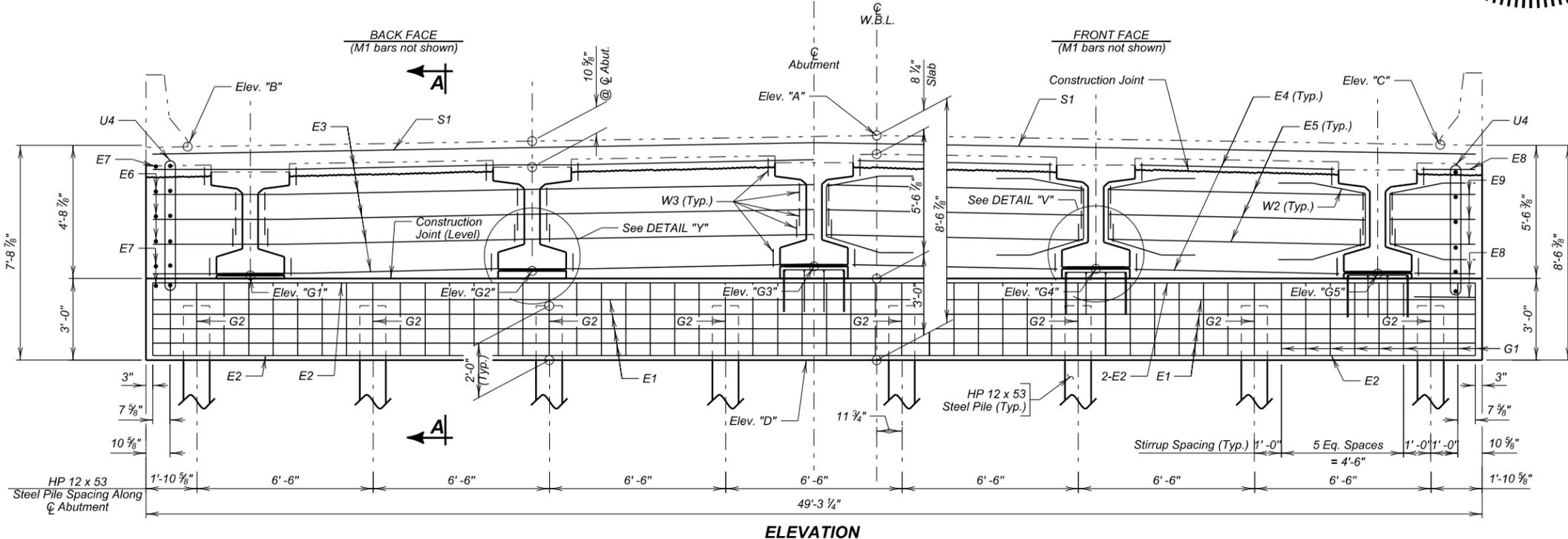
DETAIL "Y"
(Typical at girder ends; abutments only)



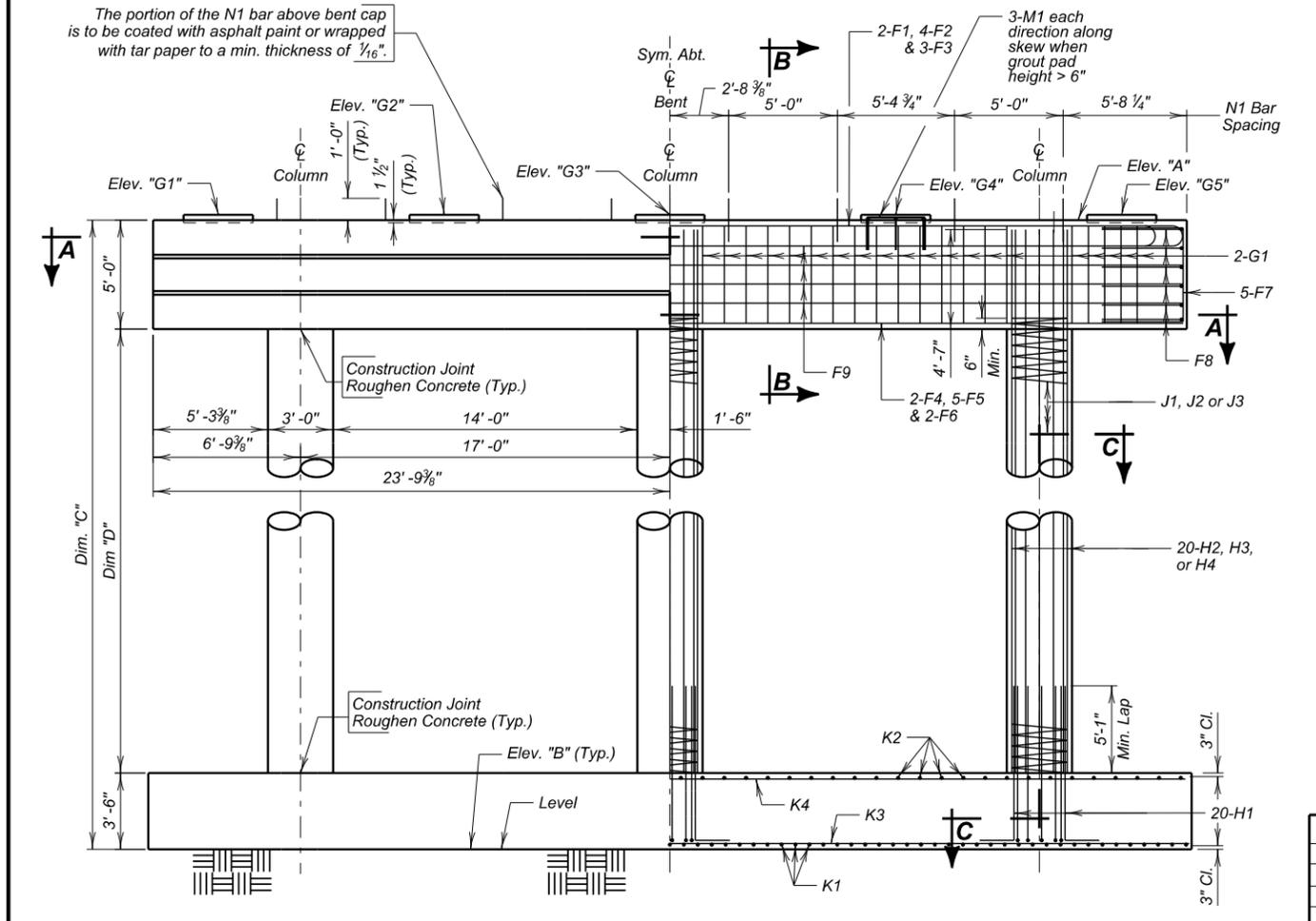
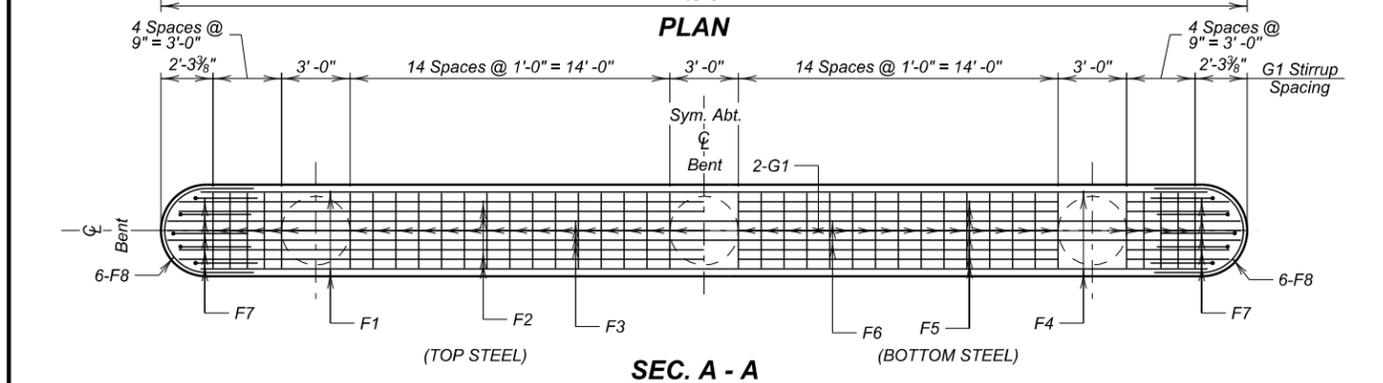
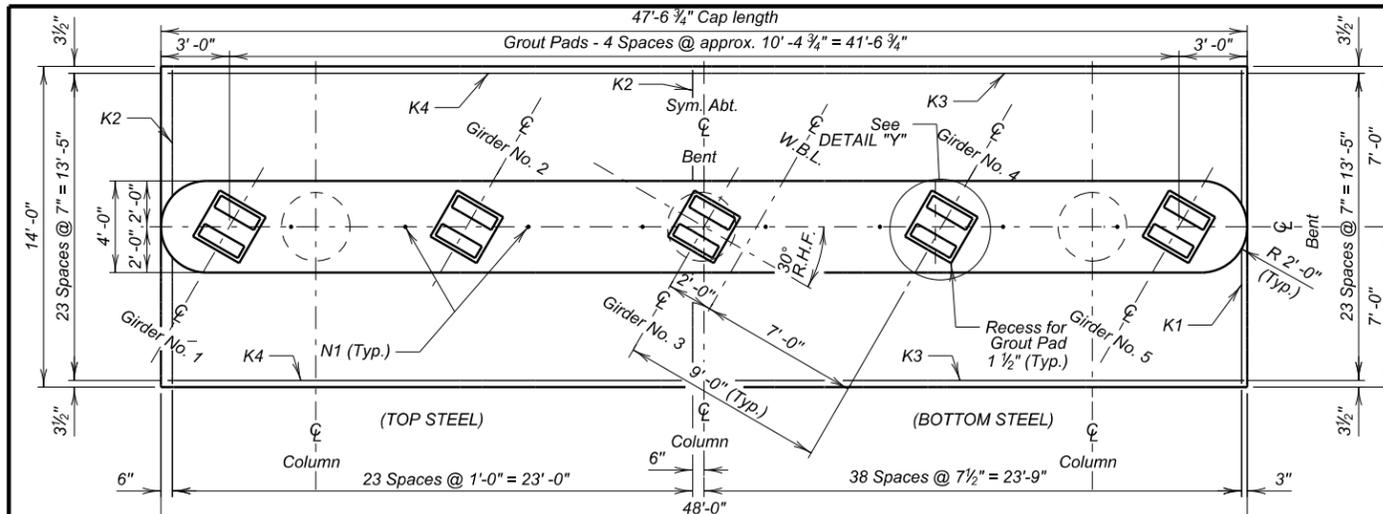
DETAIL "X"

TABLE OF ELEVATIONS										
Elev. "A"	Elev. "B"	Elev. "C"	Elev. "D"	Elev. "E"	Elev. "F"	Elev. "G1"	Elev. "G2"	Elev. "G3"	Elev. "G4"	Elev. "G5"
1339.08	1338.25	1339.04	1330.51	1339.38	1338.54	1333.63	1333.99	1334.33	1334.39	1334.35

NOTE:
Elevations "A", "B" & "C" are top of slab at centerline of abutment.
Elevations "G1" thru "G5" are top of grout pad at centerline of abutment.
Elevations "E" & "F" are top of wingwall at curb elevation.
Top of Grout Pad shall be level and smooth

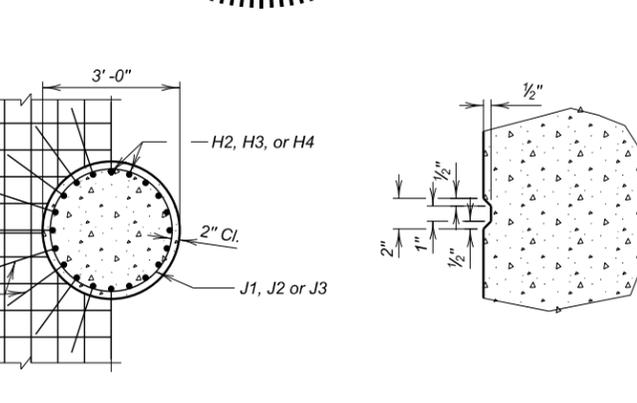
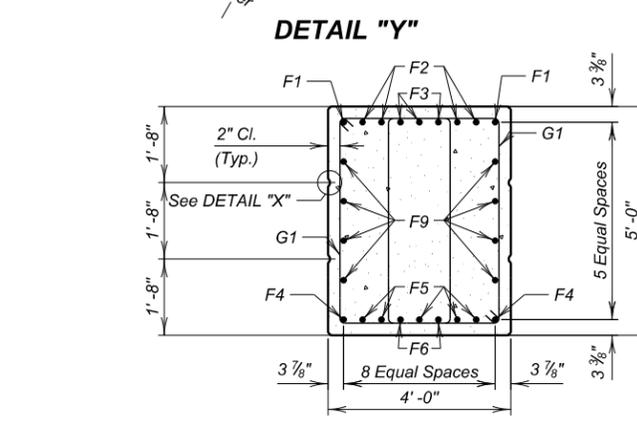
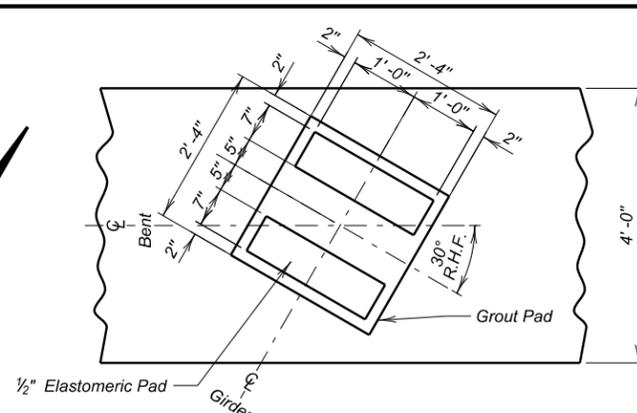


ABUTMENT NO. 5 DETAILS
FOR
WEST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
40'-0" ROADWAY OVER SPLIT ROCK CREEK
30° R.H.F. SKEW
SEC. 26-T102N-R48W
STA. 667+14.52 TO STA. 670+92.98
IM 0909(81)406
HL-93 + ALT
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
MAY 2016



ELEVATION

INCREASING STATIONS



SEC. C - C

Bent No.	Elev. "A"	Elev. "B"	Dim. "C"	Dim. "D"	Elev. "G1"	Elev. "G2"	Elev. "G3"	Elev. "G4"	Elev. "G5"
2	1325.50	1292.00	33'-6"	25'-0"	1325.62	1325.93	1326.23	1326.25	1326.17
3	1327.95	1292.00	35'-11 3/8"	27'-5 3/8"	1328.07	1328.41	1328.73	1328.77	1328.71
4	1330.75	1296.00	34'-9"	26'-3"	1330.87	1331.23	1331.57	1331.63	1331.59

Elev. "G1", "G2", "G3", "G4" and "G5" are on top of grout pads at \bar{C} Bent. Top of grout pads shall be level and smooth.

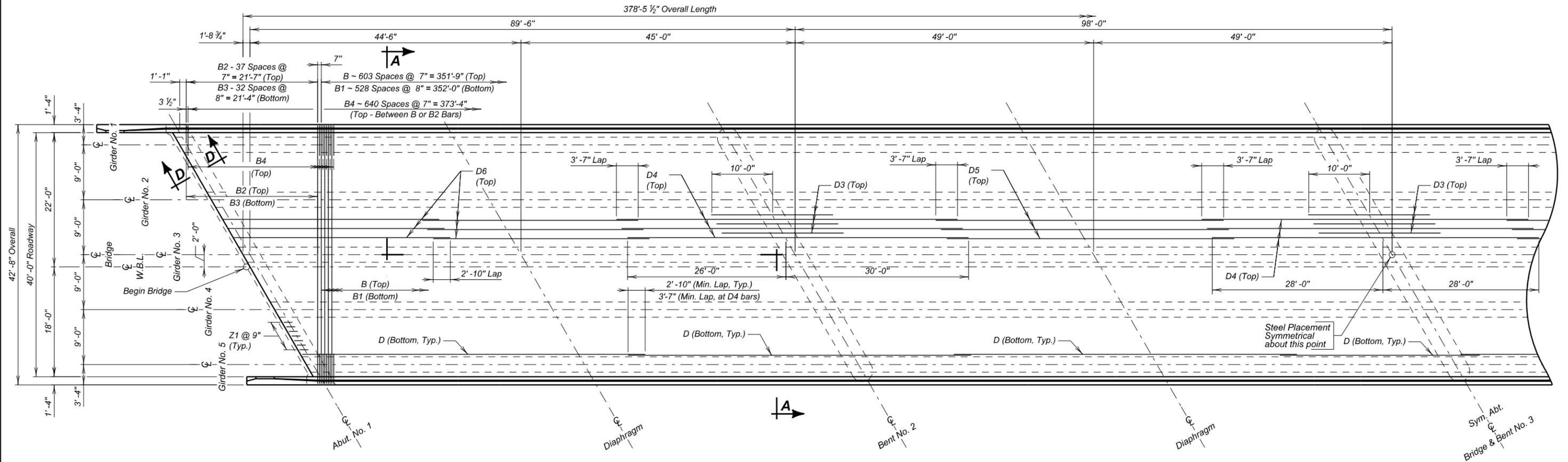
Mk.	No.	Size	Length	Type
F1	2	10	46'-11"	1
F2	4	10	48'-10"	1
F3	3	10	49'-10"	1
F4	2	10	44'-1"	Str.
F5	10	10	14'-0"	Str.
F6	2	10	47'-0"	Str.
F7	10	5	13'-11"	17
F8	12	5	14'-10"	S11
F9	8	5	43'-9"	Str.
G1	80	5	15'-1"	T1
H1	60	9	9'-10"	17A
H2	60	9	29'-6"	Str.
H3	60	9	31'-11"	Str.
H4	60	9	30'-9"	Str.
J1	3	5	653'-0"	Spiral
J2	3	5	713'-4"	Spiral
J3	3	5	683'-10"	Spiral
K1	77	7	13'-8"	Str.
K2	48	6	13'-8"	Str.
K3	24	7	47'-8"	Str.
K4	24	6	47'-8"	Str.
M1	18	5	6'-0"	17
N1	8	8	2'-0"	Str.

ITEM	UNIT	Bent No. 2	Bent No. 3	Bent No. 4
Class A45 Concrete, Bridge	Cu. Yd.	141.9	143.9	142.9
Reinforcing Steel	Lb.	22,828	23,510	23,180
Structure Excavation, Bridge	Cu. Yd.	694	435	244

* Includes 185 lbs. for spacer bars at each Bent. Each Spacer bar is computed at 3/4 lbs. per lin. ft. regardless of type furnished.
 † Includes 0.6 Cu. Yds. for grout pads at each Bent.

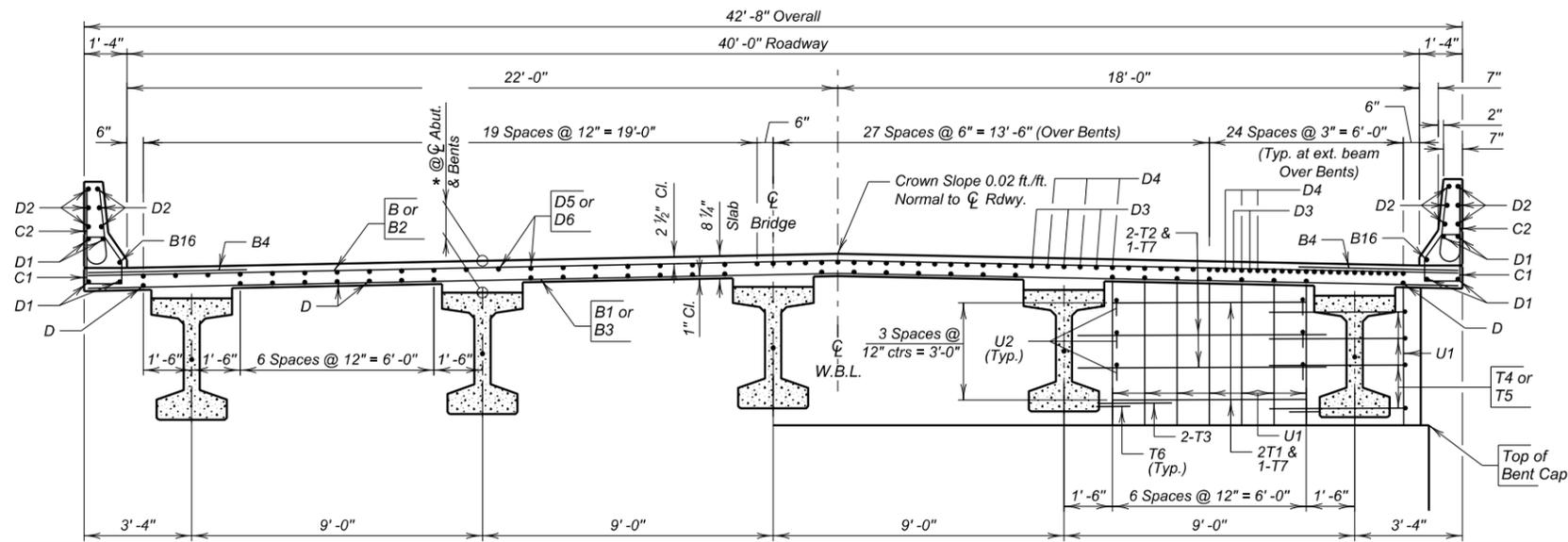
BENT DETAILS FOR WEST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
 40'-0" ROADWAY OVER SPLIT ROCK CREEK
 STA. 667+14.52 TO STA. 670+92.98
 STR. NO. 50-284-165
 MINNEHAHA COUNTY
 S. D. DEPT. OF TRANSPORTATION
 MAY 2016





HALF PLAN

NOTES:
This sheet is to be used in conjunction with Superstructure Details (B).
See Details of Approach Slab Adjacent to Bridge (A) for Z1 bar layout.



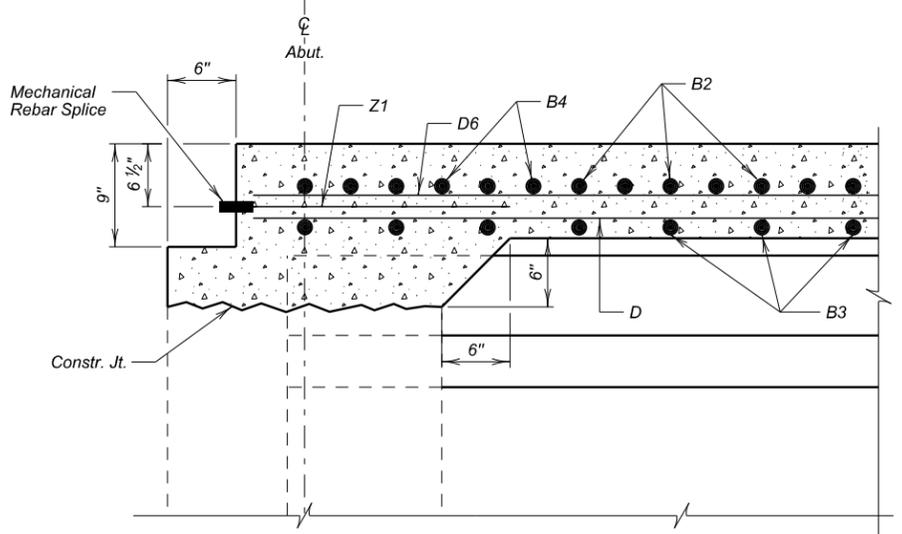
SEC. A-A

* 11 1/8" at Abutment No. 1
11 1/8" at Bent No. 2
10 3/8" at Bent No. 3
10 5/8" at Bent No. 4
10 3/8" at Abutment No. 5



SUPERSTRUCTURE DETAILS (A)

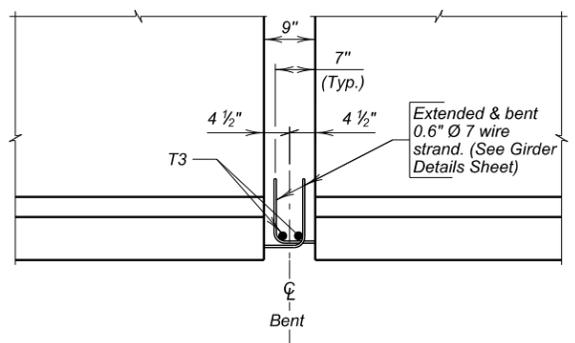
FOR
WEST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
40'-0" ROADWAY OVER SPLIT ROCK CREEK
30° R.H.F. SKEW
SEC. 26-T102N-R48W
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MINNEHAHA COUNTY
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MAY 2016



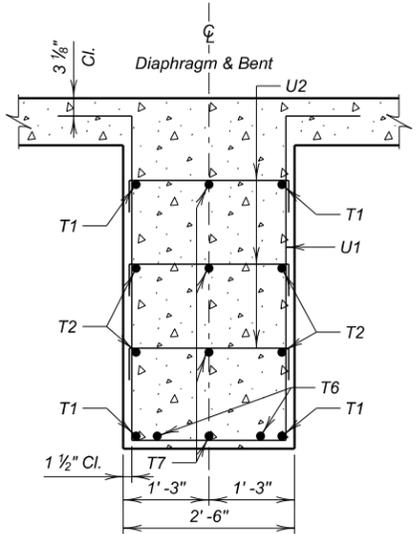
SEC. D - D

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Class A45 Concrete, Bridge Deck	Cu. Yd.	606.2
Epoxy Coated Reinforcing Steel	Lb.	133,333
Reinforcing Steel	Lb.	2,246
No. 7 Rebar Splice	Each	108
45" Minnesota Shape Prestressed Concrete Beam	Ft.	1,865
Concrete Penetrating Sealer	Sq. Yd.	1,955
Deck Drain, Girder Bridge	Each	8

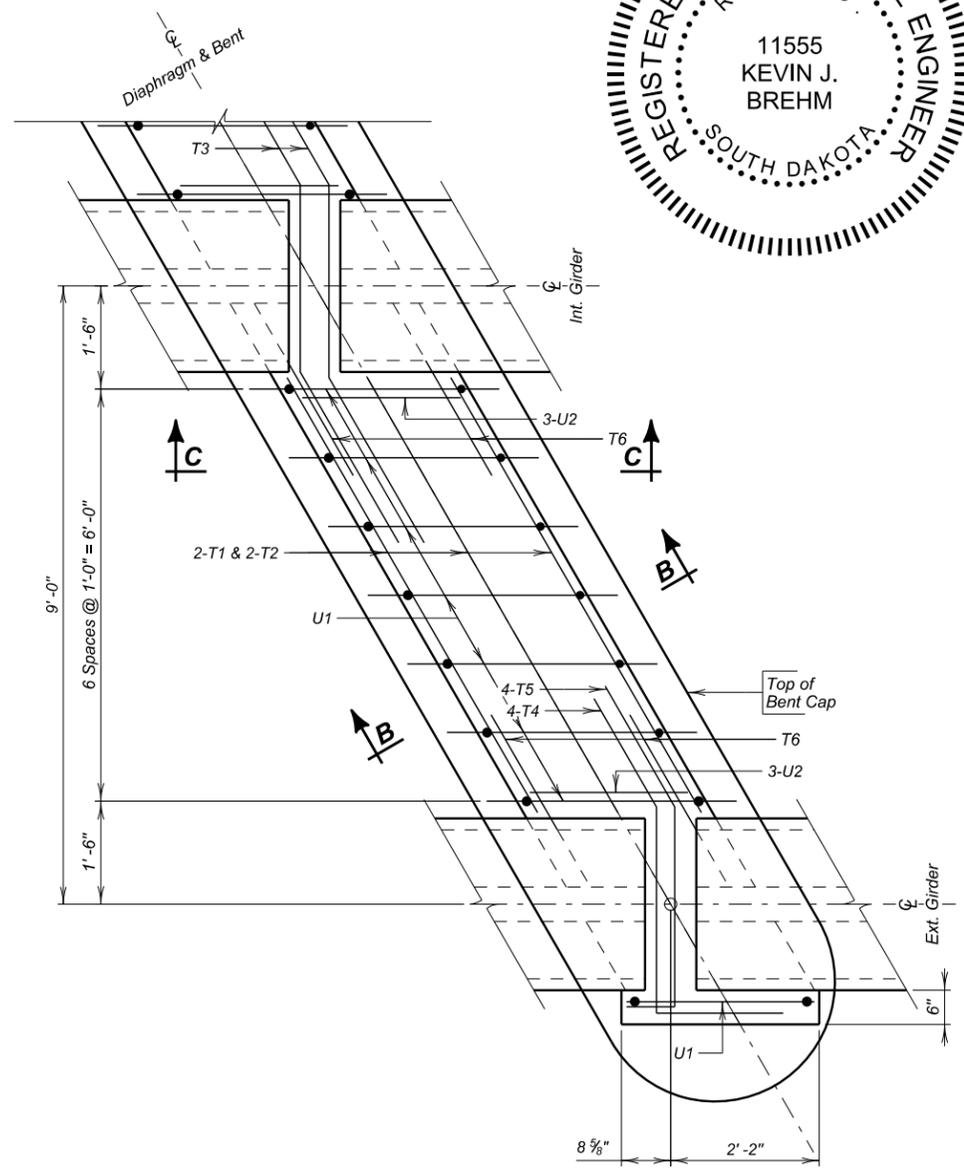
⊞ Includes quantities for Barrier Curbs and Slab.
 ⊞ Includes quantities for Abutment Backwall and Wing Walls above Construction Joint, Barrier Curb, Slab, Diaphragms and Haunch (Average depth of 3" used for Haunch Quantity). Concrete Quantity for Barrier Curbs is 0.0842 Cu. Yd/Ft. Concrete Quantity per 12' End Block is 1.1659 Cu. Yds.



SEC. C - C
 (Showing extended and bent strand detail and T3 bar placement at Bent, T4 & T5 similar at exterior girder.)



SEC. B - B
 (Girders not Shown This View.)



BENT DIAPHRAGMS
 (Slab Not Shown This View.)

REINFORCING SCHEDULE				
Mk.	No.	Size	Length	Type
B	604	5	42'-4"	Str.
B1	529	5	42'-4"	Str.
B2	38	5	43'-6"	Str.
B3	33	5	43'-6"	Str.
B4	1282	5	6'-0"	Str.
B15	12	5	14'-6"	Str.
B16	16	4	50'-6"	Str.
B17	8	4	8'-6"	19B
B18	12	8	4'-3"	19B
B19	12	5	2'-4"	Str.
B20	(See Abut. Details)			
C1	774	5	5'-7"	T1A
C2	746	5	5'-1"	S11
C3	4	5	5'-0"	S11
C4	4	5	5'-0"	S11
C5	4	5	5'-0"	S11
C6	4	5	6'-8"	T1
C7	4	5	6'-9"	T1
C8	4	5	6'-11"	T1
C9	4	5	7'-0"	T1
C10	16	6	5'-10"	T1A
C11	16	5	7'-1"	T1
C12	4	6	5'-6"	17
C13	4	5	5'-3"	17
D	210	5	56'-4"	Str.
D1	56	5	58'-10"	Str.
D2	96	4	49'-0"	Str.
D3	153	8	20'-0"	Str.
D4	156	8	56'-0"	Str.
D5	80	5	47'-2"	Str.
D6	160	5	35'-6"	Str.
D7	8	5	11'-8"	Str.
T1	48	5	7'-2"	Str.
T2	48	5	9'-5"	Str.
T3	18	5	6'-2"	19C
T4	24	5	7'-0"	17C
T5	24	5	5'-7"	17C
T6	48	5	2'-6"	Str.
T7	12	5	45'-3"	Str.
U1	90	5	13'-5"	S4
U2	72	5	3'-11"	17
Z1	108	7	2'-6"	Str.

Bending Details

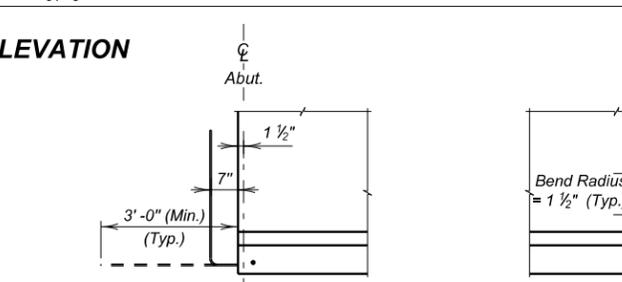
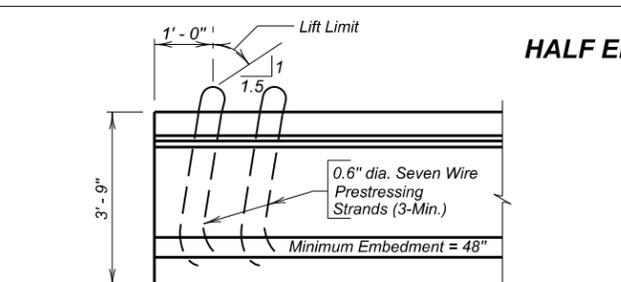
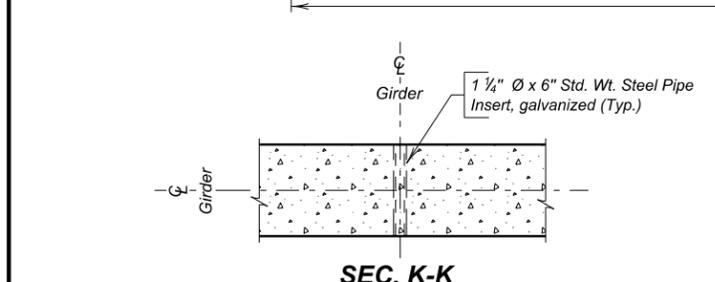
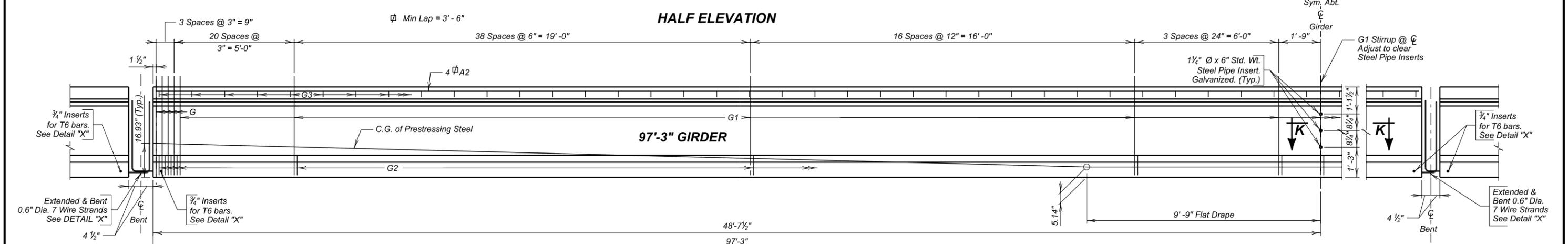
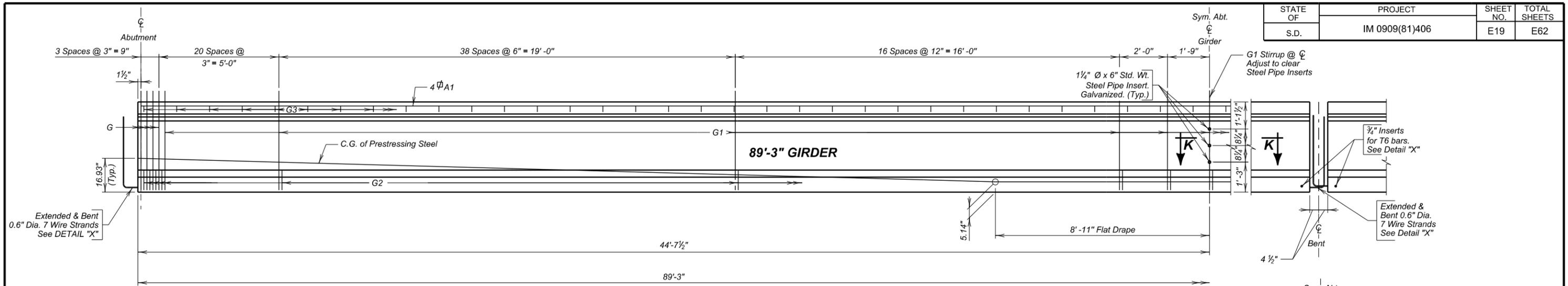
NOTES:

All dimensions are out to out of bars.
 All reinforcing steel shall be epoxy coated except as noted.
 * Bars not to be epoxy coated. ⊞ See cutting diagram.

NOTES:
 Concrete shall be placed in the space under the beams at Bents 2, 3, & 4 (within the diaphragm width) during the diaphragm pour. If upon form removal the space is not completely filled and consolidated, the contractor shall grout in the remaining voids.

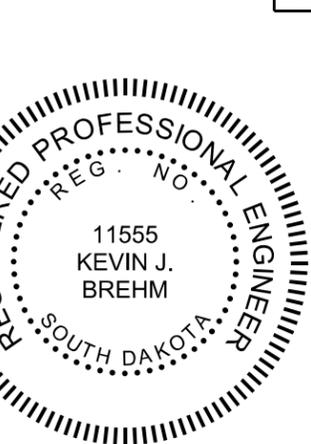
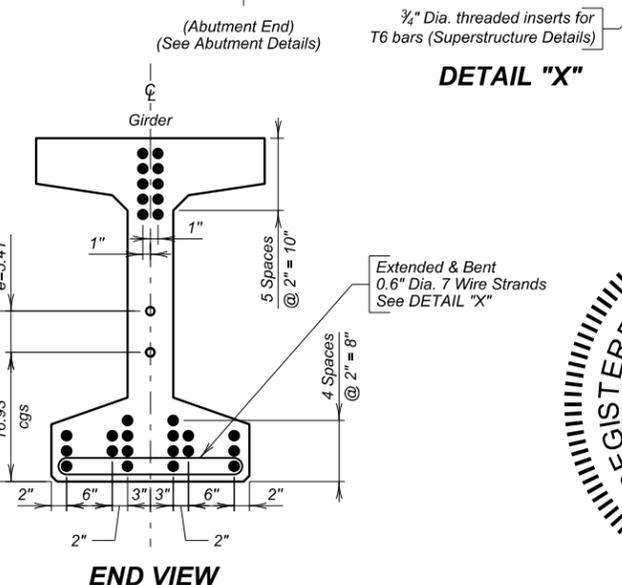
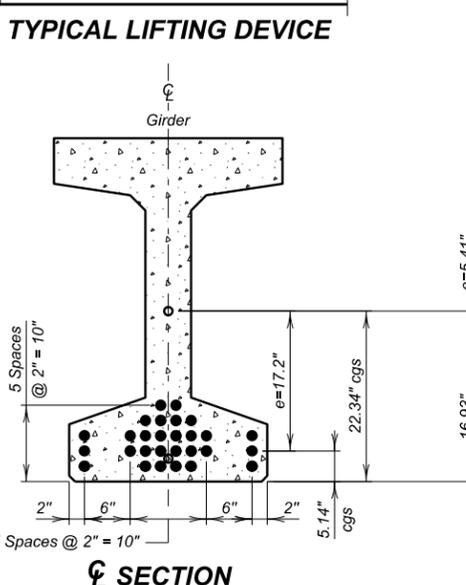
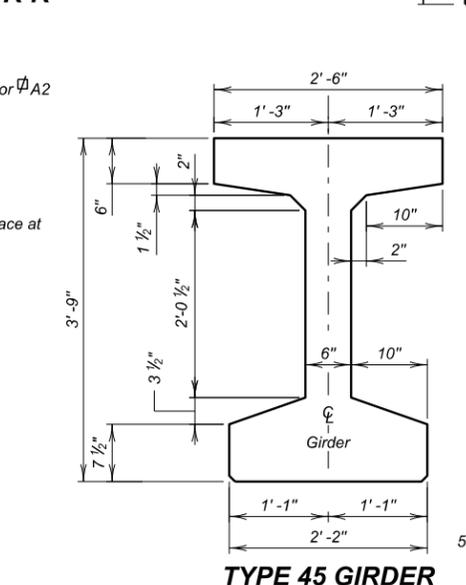
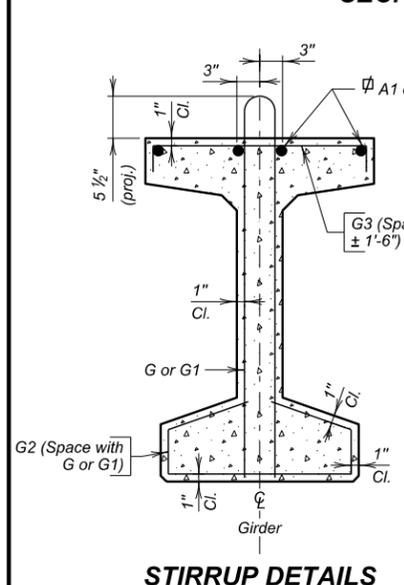
SUPERSTRUCTURE DETAILS (B)
 FOR
 WEST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
 40'-0" ROADWAY OVER SPLIT ROCK CREEK
 30° R.H.F. SKEW
 STA. 667+14.52 TO STA. 670+92.98
 STR. NO. 50-284-165
 MINNEHAHA COUNTY
 S. D. DEPT. OF TRANSPORTATION
 MAY 2016

DESIGNED BY SLS	CK. DES. BY KJB	DRAFTED BY WJH
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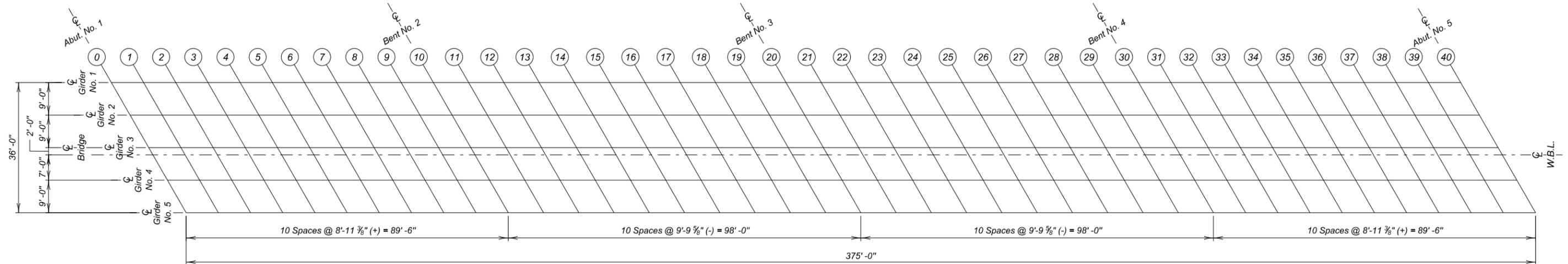


REINFORCING SCHEDULE					Bending Details	
Mk.	No.	Size	Length	Type		
89'-3" Grdr.	A1	8	7	46'-3"	Str.	G3 2'-2"
	G	8	5	8'-5"	S11	
	G1	151	4	8'-5"	S11	Type 17
	G2	159	4	4'-10"	S3A	
97'-3" Grdr.	A2	8	7	50'-3"	Str.	Type S3A
	G	8	5	8'-5"	S11	
	G1	155	4	8'-5"	S11	Type S11
	G2	163	4	4'-10"	S3A	
G3	66	4	2'-8"	17		

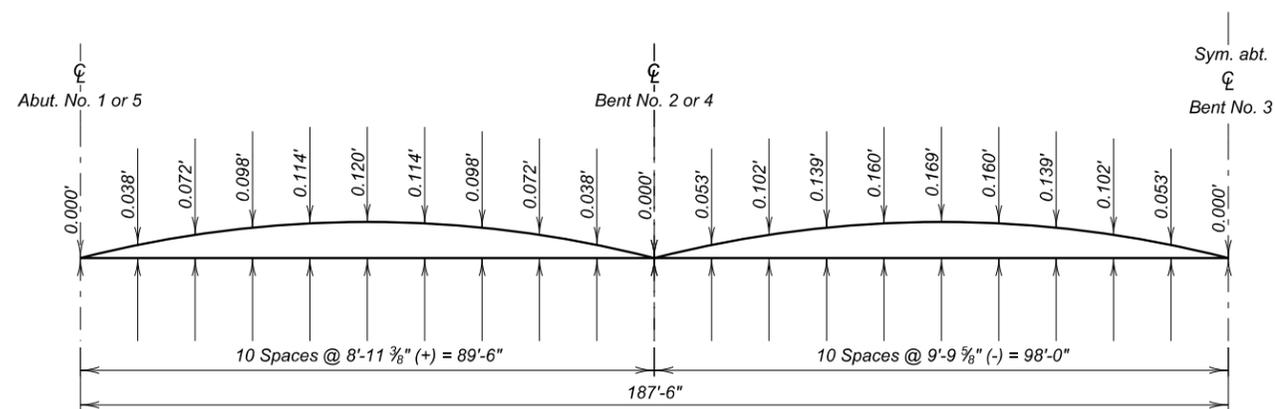
All dimensions are out to out of bars.



GIRDER DETAILS FOR WEST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
 40'-0" ROADWAY OVER SPLIT ROCK CREEK
 STA. 667+14.52 TO STA. 670+92.98
 STR. NO. 50-284-165
 30° R.H.F. SKEW
 SEC. 26-T102N-R48W
 IM 0909(81)406
 HL-93 + ALT
 MINNEHAHA COUNTY
 S. D. DEPT. OF TRANSPORTATION
 MAY 2016



GIRDER LAYOUT



CAMBER DIAGRAM

The Camber shown is the amount which has been added to the theoretical slab elevations to get slab elevations shown in the table of Slab Form Elevations and Calculations. Camber shown is for D.L. of slab, traffic barrier, and camber growth, but does not include initial beam camber at erection and D.L. of beams.



ERECTION DATA AND SLAB FORM ELEVATIONS (A)

FOR
WEST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
 40'-0" ROADWAY OVER SPLIT ROCK CREEK
 TO STA. 670+92.98
 STR. NO. 50-284-165

30° R.H.F. SKEW
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 HL-93 + ALT

MINNEHAHA COUNTY
 S. D. DEPT. OF TRANSPORTATION

MAY 2016

DESIGNED BY SLS	CK. DES. BY KJB	DRAFTED BY WJH	BRIDGE ENGINEER
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TABLE OF SLAB FORM ELEVATIONS AND CALCULATIONS

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Girder No. 1	Elev. "M"	1328.520	1328.725	1328.930	1329.131	1329.324	1329.511	1329.690	1329.863	1330.028	1330.189	1330.350	1330.624	1330.899	1331.165	1331.421	1331.668	1331.902	1332.126	1332.340	1332.546	1332.752
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 2	Elev. "M"	1328.797	1329.004	1329.211	1329.414	1329.609	1329.798	1329.979	1330.154	1330.321	1330.484	1330.647	1330.924	1331.200	1331.469	1331.727	1331.976	1332.212	1332.439	1332.654	1332.863	1333.071
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 3	Elev. "M"	1329.074	1329.283	1329.493	1329.698	1329.895	1330.086	1330.269	1330.446	1330.615	1330.780	1330.945	1331.224	1331.503	1331.774	1332.034	1332.285	1332.523	1332.752	1332.970	1333.181	1333.391
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 4	Elev. "M"	1329.074	1329.285	1329.496	1329.703	1329.902	1330.095	1330.280	1330.459	1330.631	1330.797	1330.964	1331.245	1331.526	1331.800	1332.062	1332.315	1332.556	1332.787	1333.007	1333.220	1333.432
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 5	Elev. "M"	1328.994	1329.207	1329.420	1329.629	1329.830	1330.026	1330.213	1330.393	1330.567	1330.736	1330.905	1331.188	1331.471	1331.747	1332.011	1332.266	1332.509	1332.743	1332.965	1333.180	1333.395
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					

NOTE -

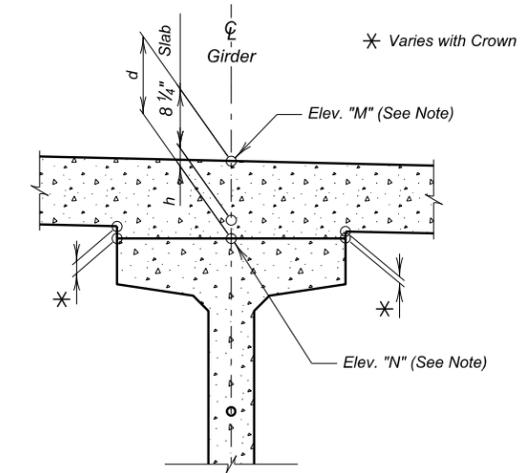
Based on a "d" of 11 1/8" at the C of Abutment No. 1, 11 1/8" at the C of Bent No. 2, 10 3/8" at the C of Bent No. 3, 10 3/8" at the C of Bent No. 4, and 10 3/8" at the C of Abutment No. 5 (see SEC. A-A Superstructure Details), it is anticipated that the midspan haunch dimension "h" over the C of each girder will be 1 1/2". If when computing the dimensions in the table, it is found that any dimension "h" is less than zero or greater than 4 1/2" the Office of Bridge Design of the South Dakota Department of Transportation shall be notified immediately. After the "Table of Slab Form Elevations and Calculations" has been completely filled out and approved for deck forming, a copy must be forwarded to the Office of Bridge Design for review and analysis for the purpose of securing information relative to camber growth in the beams. This information is necessary for preparing plans for future structures of this type.

NOTE -

The table contains the information necessary to determine the depth of concrete over the girders at points shown. Calculations may be carried in the spaces provided. Elev. "M" is the design elevation of the top of slab before any concrete has been poured. This elevation includes correction for camber and dead load deflection. Elev. "N" is a field measured elevation taken on top of girders at the points shown with the girders in their positions. This elevation must be taken after erection is completed, but prior to placing any of the deck concrete. Girders shall not be supported between bearings when elevations are taken.

TABLE OF SLAB FORM ELEVATIONS AND CALCULATIONS

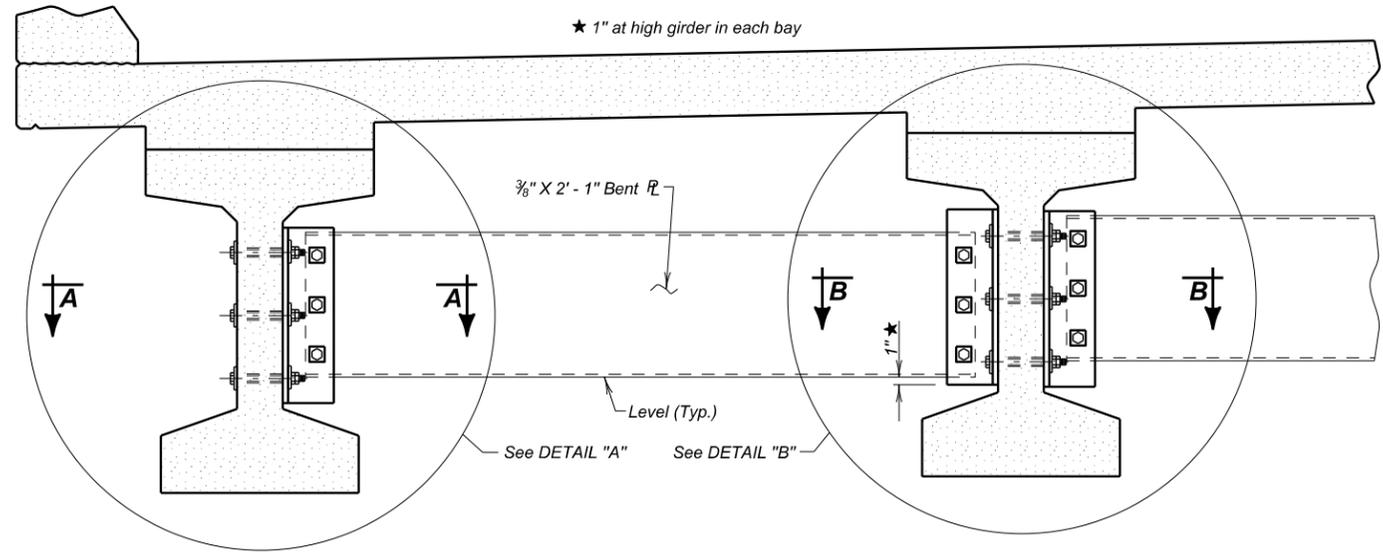
		20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Girder No. 1	Elev. "M"	1332.752	1333.068	1333.384	1333.692	1333.989	1334.277	1334.553	1334.819	1335.074	1335.322	1335.569	1335.883	1336.193	1336.495	1336.786	1337.067	1337.337	1337.597	1337.847	1338.088	1338.326
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 2	Elev. "M"	1333.071	1333.389	1333.707	1334.018	1334.317	1334.607	1334.885	1335.154	1335.411	1335.661	1335.909	1336.223	1336.533	1336.835	1337.126	1337.407	1337.677	1337.937	1338.187	1338.428	1338.666
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 3	Elev. "M"	1333.391	1333.711	1334.032	1334.344	1334.646	1334.938	1335.218	1335.489	1335.749	1336.001	1336.250	1336.563	1336.873	1337.175	1337.466	1337.748	1338.017	1338.277	1338.527	1338.768	1339.006
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 4	Elev. "M"	1333.432	1333.755	1334.077	1334.392	1334.696	1334.991	1335.273	1335.546	1335.808	1336.061	1336.310	1336.623	1336.933	1337.235	1337.526	1337.808	1338.077	1338.338	1338.587	1338.828	1339.066
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 5	Elev. "M"	1333.395	1333.720	1334.044	1334.361	1334.668	1334.964	1335.249	1335.524	1335.788	1336.041	1336.290	1336.603	1336.913	1337.215	1337.506	1337.788	1338.057	1338.318	1338.567	1338.808	1339.046
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					



ERECTION DATA AND SLAB FORM ELEVATIONS (B)

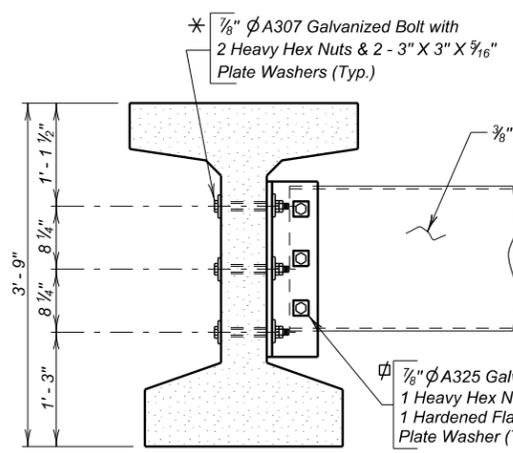
FOR
 WEST BOUND LANES
 378' - 5 1/2" PRESTR. GIRDER BRIDGE
 40'-0" ROADWAY OVER SPLIT ROCK CREEK
 STA. 667+14.52 TO STA. 670+92.98
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 MINNEHAHA COUNTY
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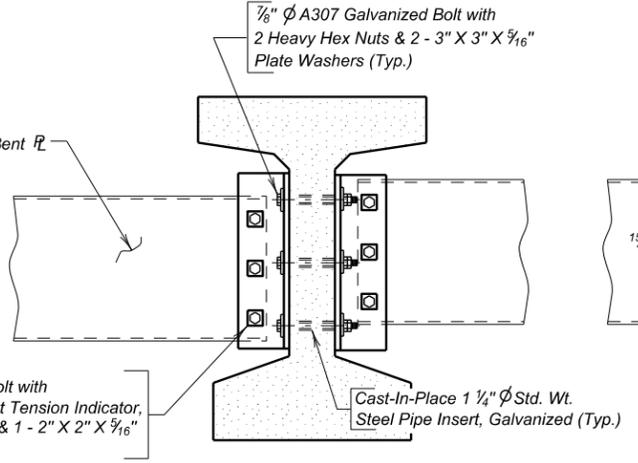


SECTION AT DIAPHRAGM

* Bolt head shall be adjacent to the Exterior Face of the Exterior Girder.



DETAIL "A"
(Typ. Exterior Girder)



DETAIL "B"
(Typ. Interior Girder)

∅ Bolt Head and Direct Tension Indicator shall be adjacent to 1 5/16" ∅ holes in Bent Plate Diaphragm.

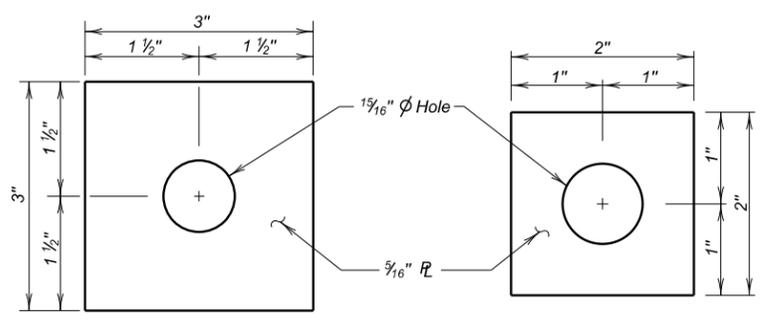
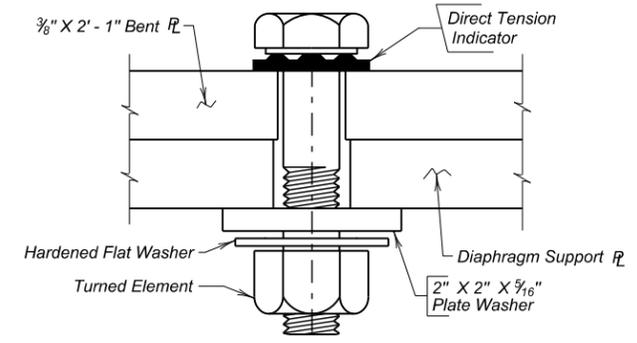
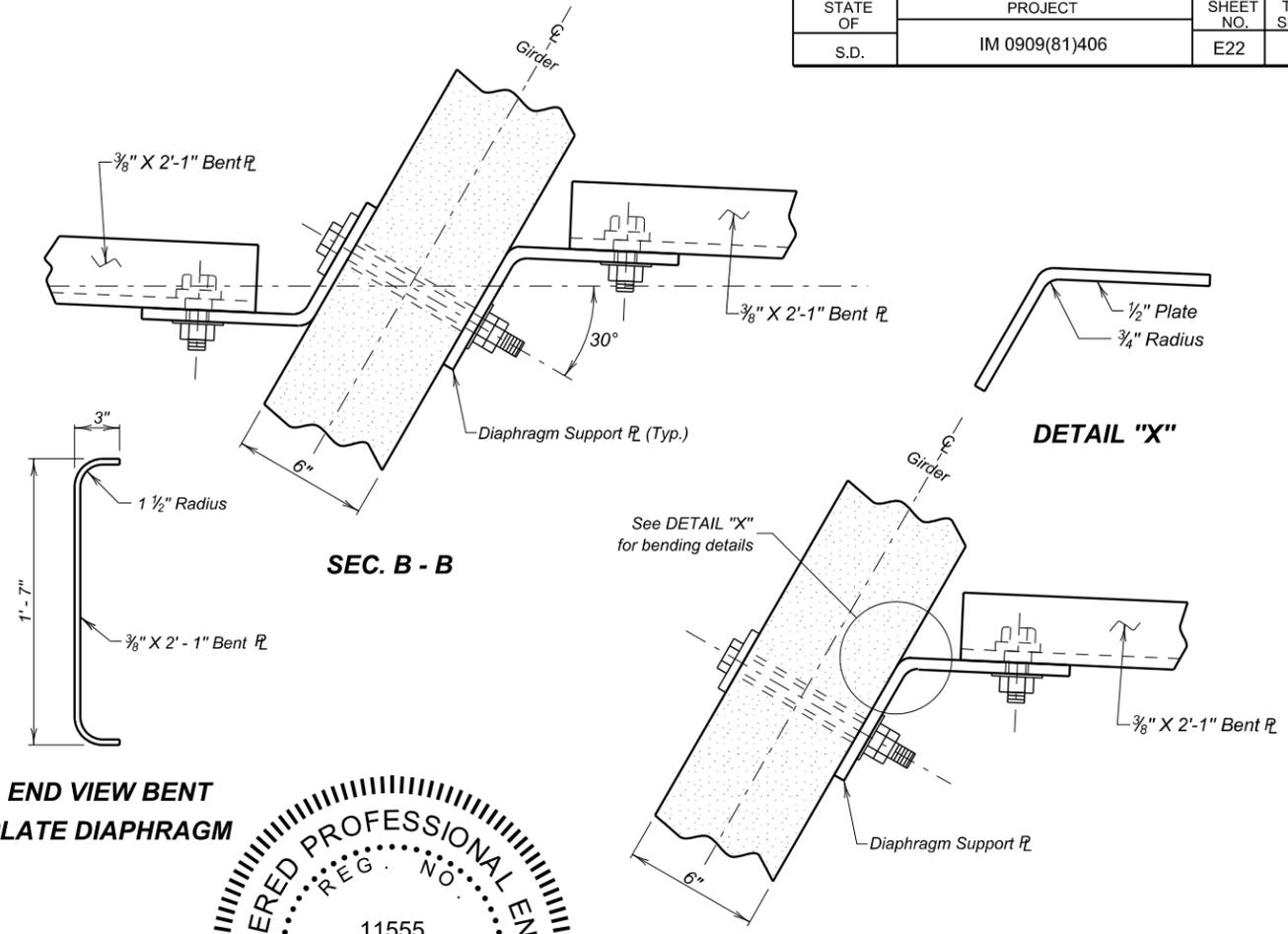


PLATE WASHER DETAILS



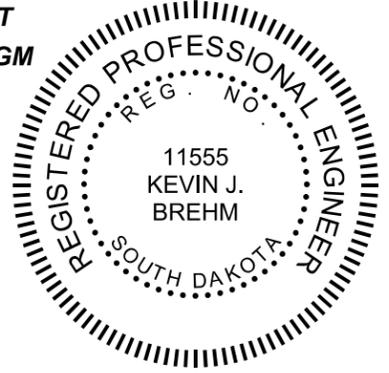
DIRECT TENSION INDICATOR DETAIL



SEC. B - B

SEC. A - A

END VIEW BENT PLATE DIAPHRAGM

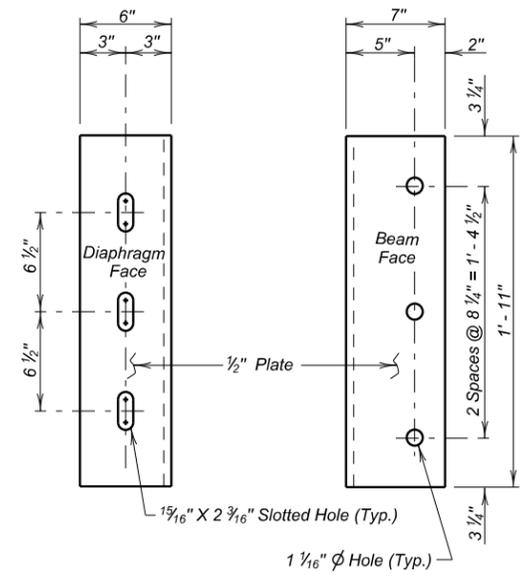


NOTES:

- All steel for the diaphragms including plate washers shall conform to ASTM A36 and shall be galvanized in accordance with ASTM A123 or A153. Bolts, nuts, and washers shall be galvanized in accordance with ASTM F2329. Direct Tension Indicators shall conform to Section 972 of the Specifications.
- The steel diaphragms between adjacent girders shall be installed as soon as possible and in conjunction with girder erection.
- All costs associated with furnishing, fabricating, assembly and installation of diaphragms shall be included in the lump sum price for Structural Steel, Miscellaneous.

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Structural Steel, Miscellaneous	L.S.	Lump Sum

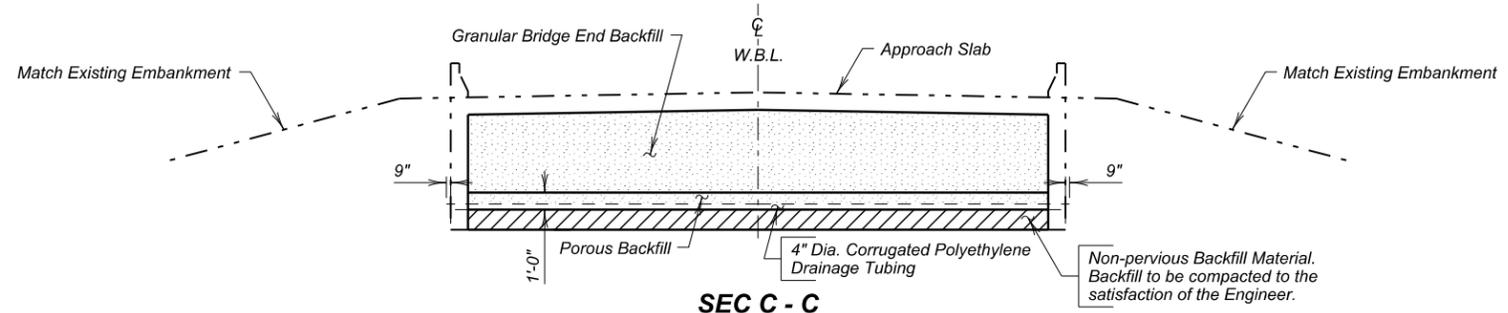
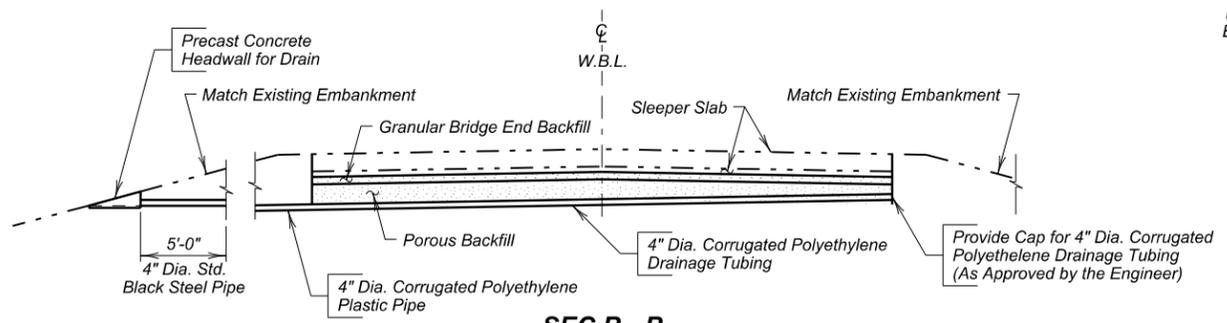
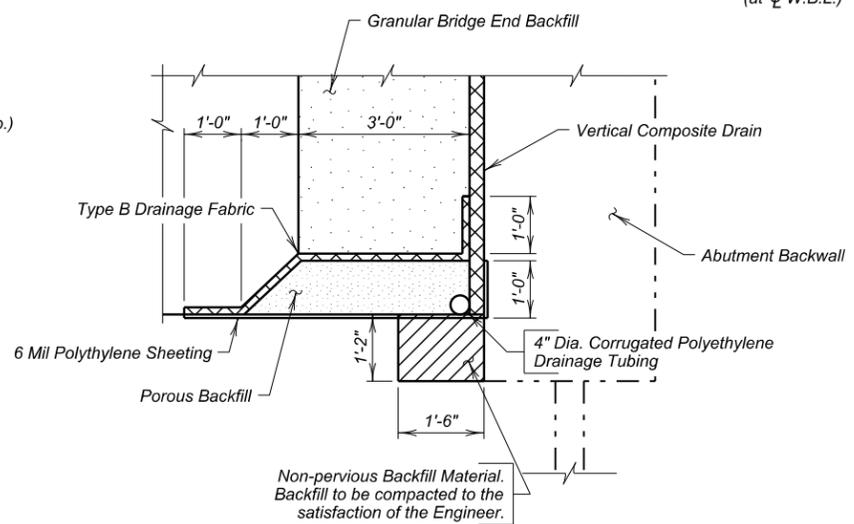
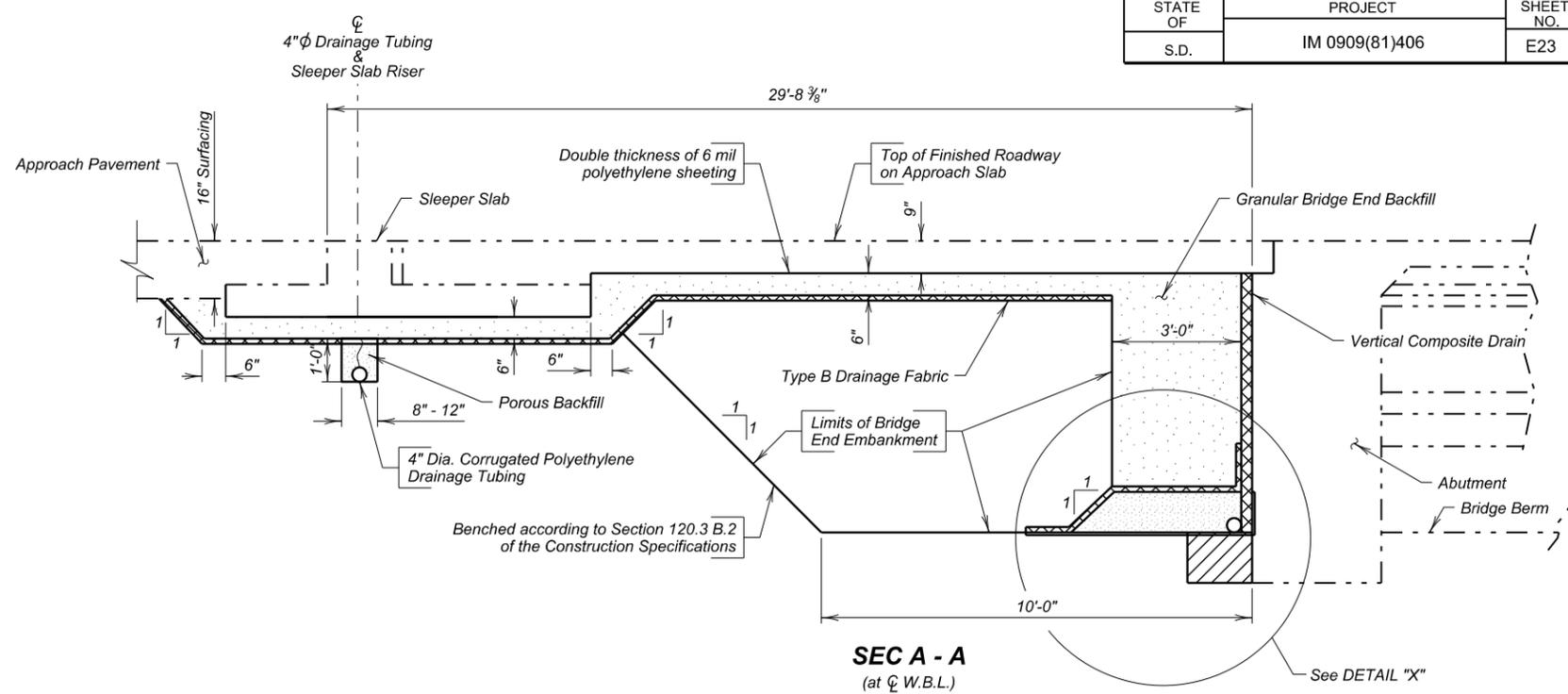
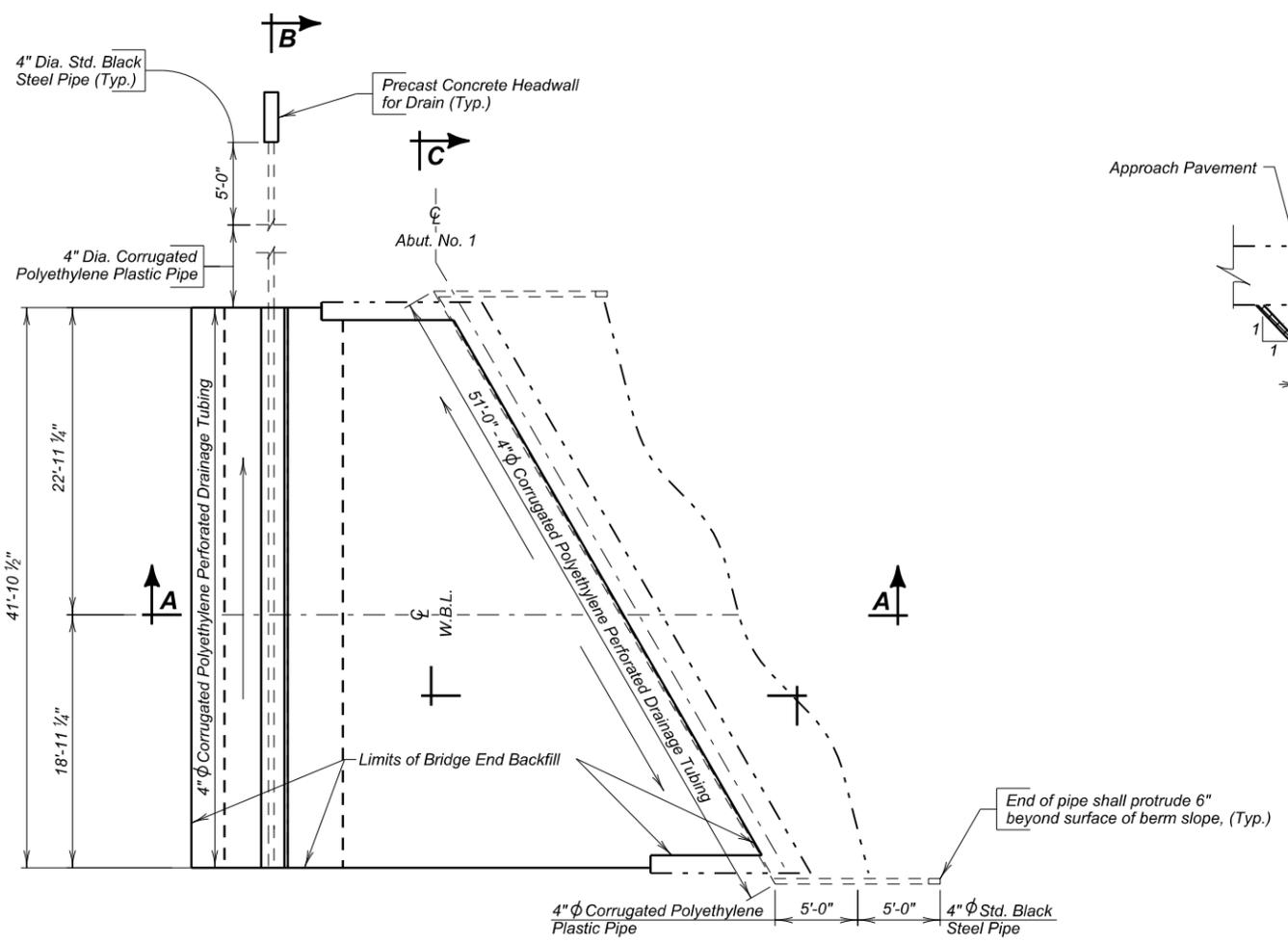
∆ For informational purposes only, the estimated weight of structural steel is 3,980 Lbs. for 16 diaphragms.



DIAPHRAGM SUPPORT PLATE

DIAPHRAGM DETAILS FOR WEST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
 40'-0" ROADWAY OVER SPLIT ROCK CREEK
 STA. 667+14.52 TO STA. 670+92.98
 STR. NO. 50-284-165
 MINNEHAHA COUNTY
 S. D. DEPT. OF TRANSPORTATION
 MAY 2016

DESIGNED BY SLS	CK. DES. BY KJB	DRAFTED BY WJH	BRIDGE ENGINEER
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ESTIMATED QUANTITIES (for 2 abutments)		
ITEM	UNIT	QUANTITY
Granular Bridge End Backfill	Cu. Yd.	98
Bridge End Embankment	Cu. Yd.	180
Porous Backfill	Ton	28
Approach Slab Underdrain Excavation	Cu. Yd.	6
4" Underdrain Pipe	Ft.	238
Precast Concrete Headwall for Drain	Each	2

ϕ Includes 186 ft. of 4" ϕ Corrugated Polyethylene Perforated Drainage Tubing, 22 ft. of 4" dia. Corrugated Polyethylene Drainage Tubing, 577 sq. ft. of vertical composite Drain and 30 ft. of 4" ϕ Std. Black Steel Pipe.

Δ Includes 554 sq. ft. of 6 mil Polyethylene Sheeting (not including laps) and 327 sq. yds. of Type B Drainage Fabric.

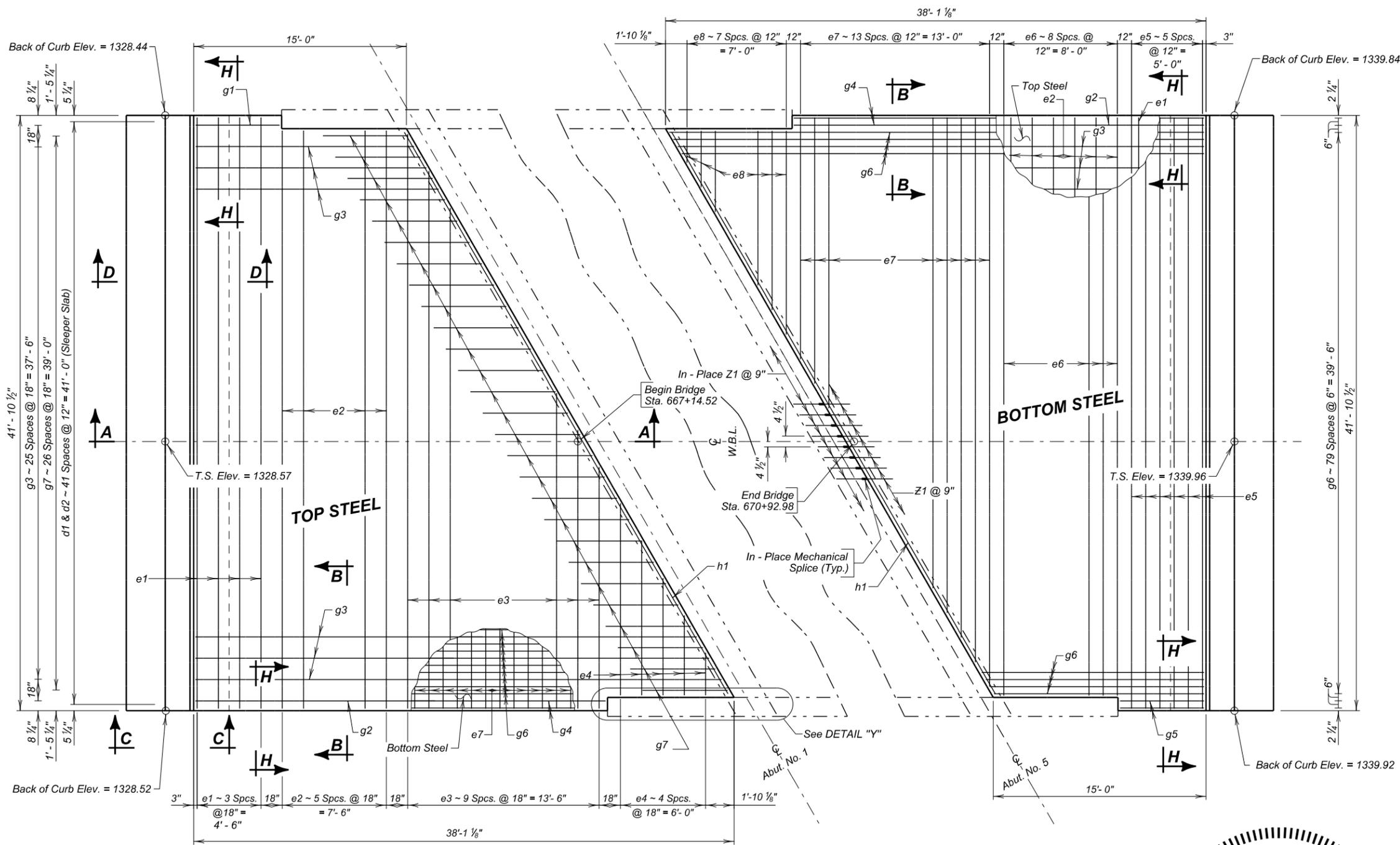
\star Quantity based on 1'-0" deep X 1'-0" wide trench. For estimating purposes only, a factor of 1.89 tons/cu. yd. was used to convert Cu. Yds. to Tons.



DETAILS OF BRIDGE END BACKFILL
FOR
WEST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
40'-0" ROADWAY OVER SPLIT ROCK CREEK
TO STA. 670+92.98
STR. NO. 50-284-165

30° R.H.F. SKEW
SEC. 26-T102N-R48W
IM 0909(81)406
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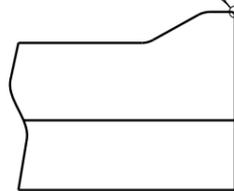
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
MAY 2016



PLAN
(Abut. No. 1)

PLAN
(Abut. No. 5)

NOTE: Elevations Back of Curb at this location.



SEC. H - H

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

Mk.	No.	Size	Length	Type	Bending Details
Sleeper Slabs					
c1	48	5	41'-7"	Str.	
d1	168	4	7'-9"	2	
d2	84	4	6'-1"	T2	
Approach Slabs					
e1	8	4	41'-7"	Str.	
e2	12	4	40'-8"	Str.	
e3	10	4	56'-9"	Str.	
e4	5	4	15'-11"	Str.	
e5	12	6	41'-7"	Str.	
e6	18	6	40'-8"	Str.	
e7	14	6	57'-7"	Str.	
e8	8	6	17'-7"	Str.	
g1	2	4	5'-7"	Str.	
g2	2	4	28'-8"	Str.	
g3	26	4	52'-6"	Str.	
g4	4	8	28'-8"	Str.	
g5	4	8	5'-7"	Str.	
g6	80	8	52'-6"	Str.	
g7	54	4	6'-0"	Str.	
h1	4	6	45'-10"	Str.	
Z1	108	7	2'-6"	Str.	

ITEM	UNIT	QUANTITY
Cut. 80, g6		14'-10"
Cut. 26, g3		15'-5"
Cut. 8, e8		2'-9"
Cut. 14, e7		17'-6"
Cut. 5, e4		2'-9"
Cut. 10, e3		16'-8"
		37'-8"
		37'-1"
		14'-10"
		40'-1"
		13'-2"
		40'-1"
		14'-10"
		37'-1"
		15'-5"
		37'-8"
		14'-10"

ESTIMATED QUANTITIES
(For Two Approach Slabs & Two Sleeper Slabs)

ITEM	UNIT	QUANTITY
Concrete Approach Slab for Bridge	Sq. Yd.	247.0
Concrete Approach Sleeper Slab for Bridge	Sq. Yd.	67.5

- 62.3 Cu. Yds. Concrete in Approach Slabs.
 - 17,833 Lbs. Epoxy coated Re-Steel in Approach Slabs.
 - 21.4 Cu. Yds. Concrete in Sleeper Slabs.
 - 3,293 Lbs. Epoxy coated Re-Steel in Sleeper Slab.
 - 21 Sq. Ft. of 2" Polystyrene Insulation Board
- Items 1 thru 5 are approximate quantities contained in the above bid items and are for information only.

DETAILS OF APPROACH SLAB ADJACENT TO BRIDGE (A)

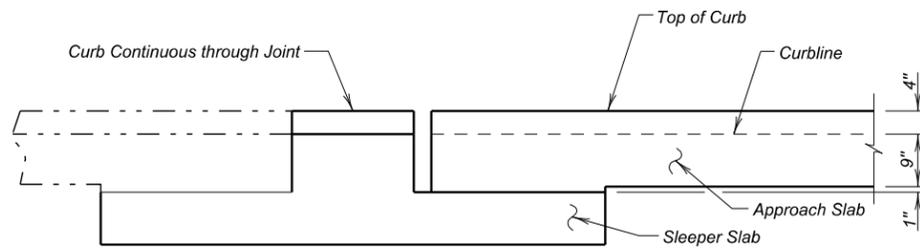
FOR
WEST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE

40'-0" ROADWAY
OVER SPLIT ROCK CREEK
STA. 667+14.52
TO STA. 670+92.98
STR. NO. 50-284-165

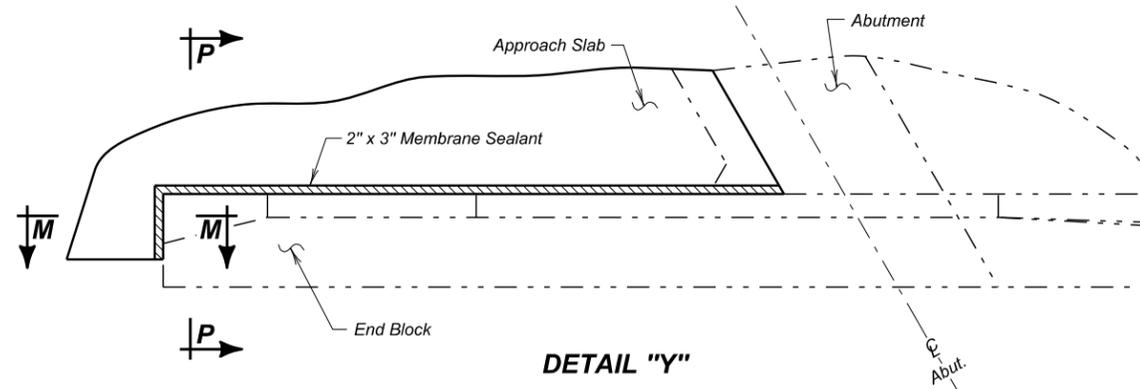
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MAY 2016



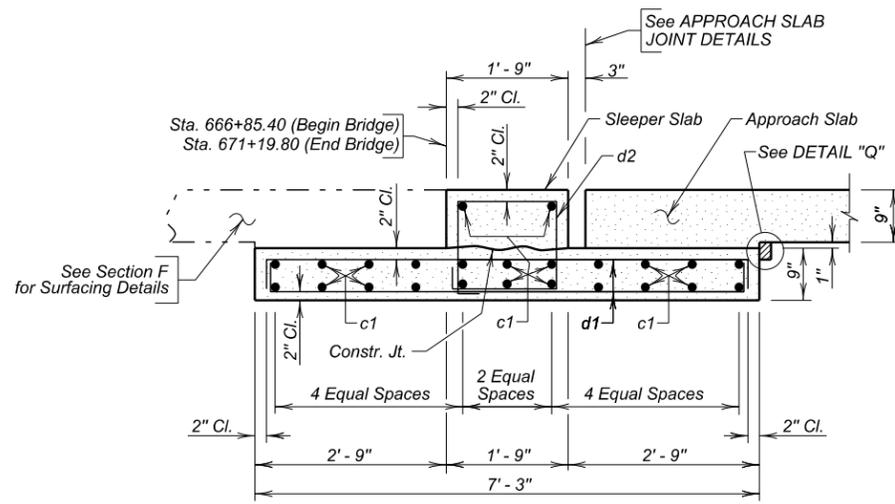


VIEW C - C

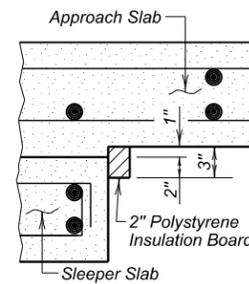


DETAIL "Y"

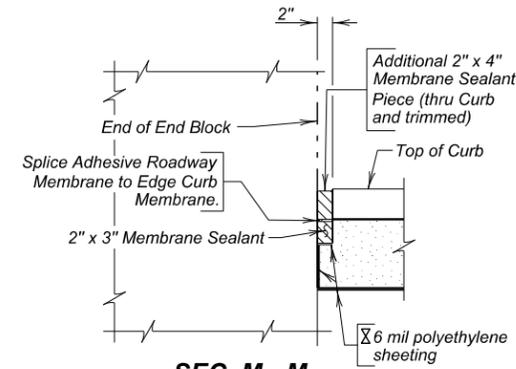
NOTE:
See APPROACH SLAB JOINT DETAILS sheet for notes regarding Membrane Sealant Expansion Joint.



SEC. D - D
(Sleeper Slab)

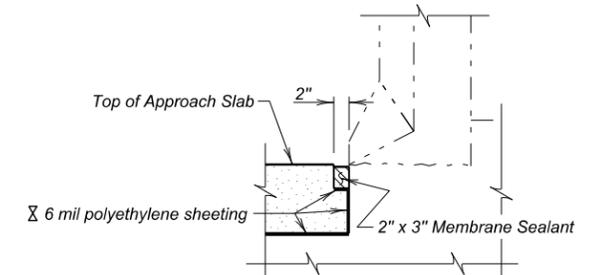


DETAIL "Q"

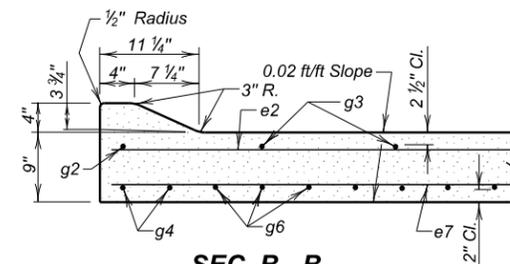


SEC. M - M

6 mil polyethylene sheeting shall not interfere with the bond between the Membrane Sealant and the approach slab.



SEC. P - P



SEC. B - B

DETAILS OF APPROACH SLAB ADJACENT TO BRIDGE (B)
FOR

WEST BOUND LANES
378' - 5 1/2' PRESTR. GIRDER BRIDGE

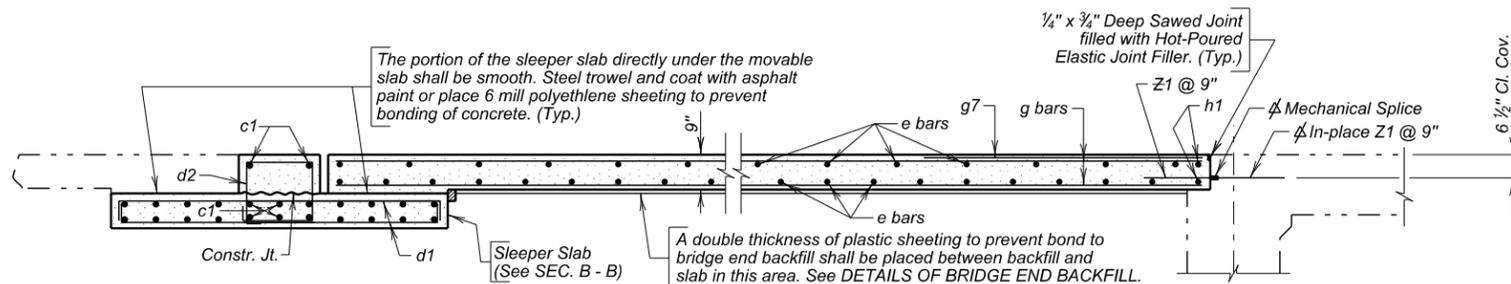
40'-0" ROADWAY OVER SPLIT ROCK CREEK
STA. 667+14.52 TO STA. 670+92.98
STR. NO. 50-284-165

30° R.H.F. SKEW
SEC. 26-T102N-R48W
IM 0909(81)406
HL-93 + ALT

MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION

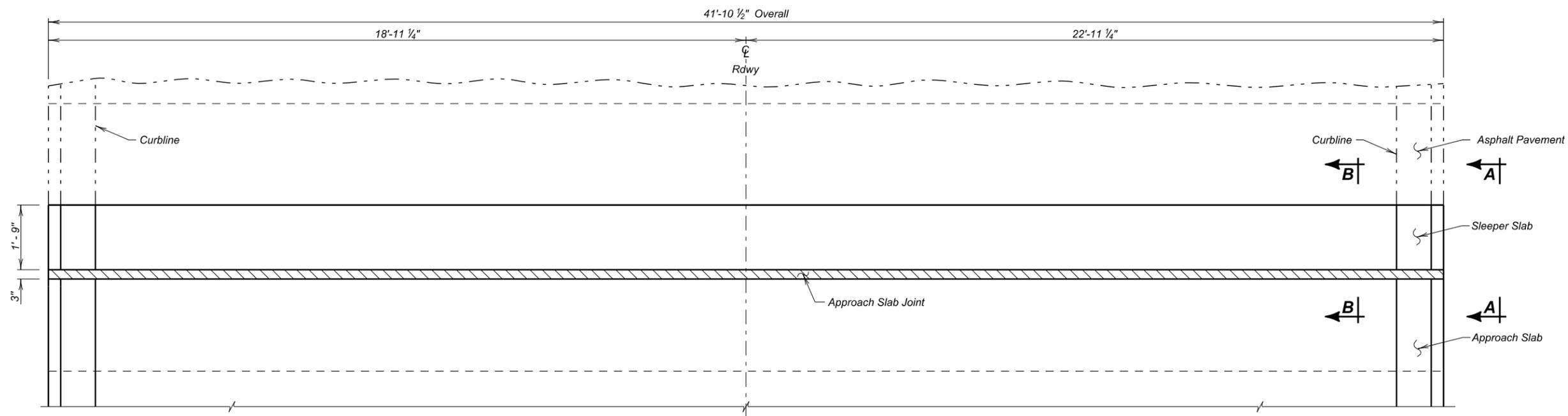
MAY 2016

23 OF 30



SEC. A - A

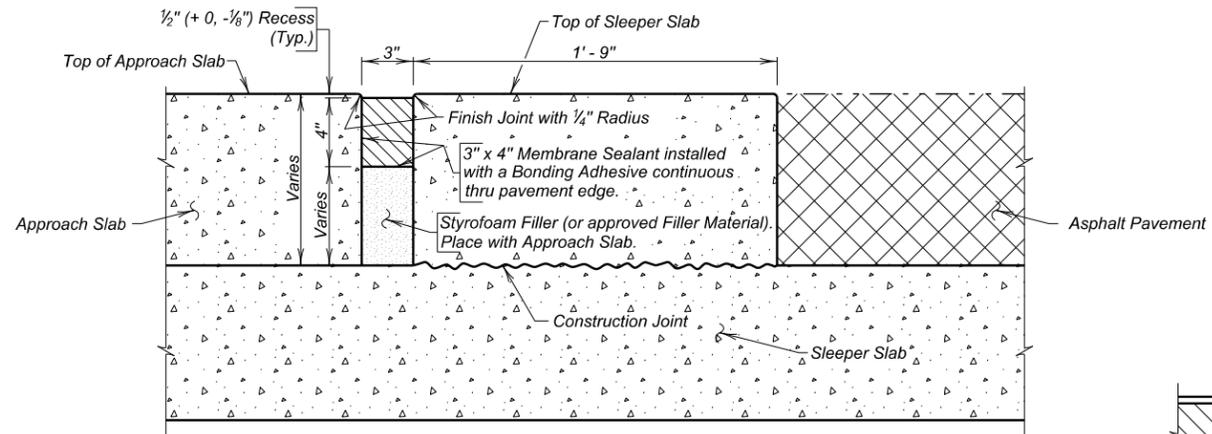
In-place Z1 bars and Mechanical Splices are listed and included in superstructure quantities. See SUPERSTRUCTURE DETAILS (B).



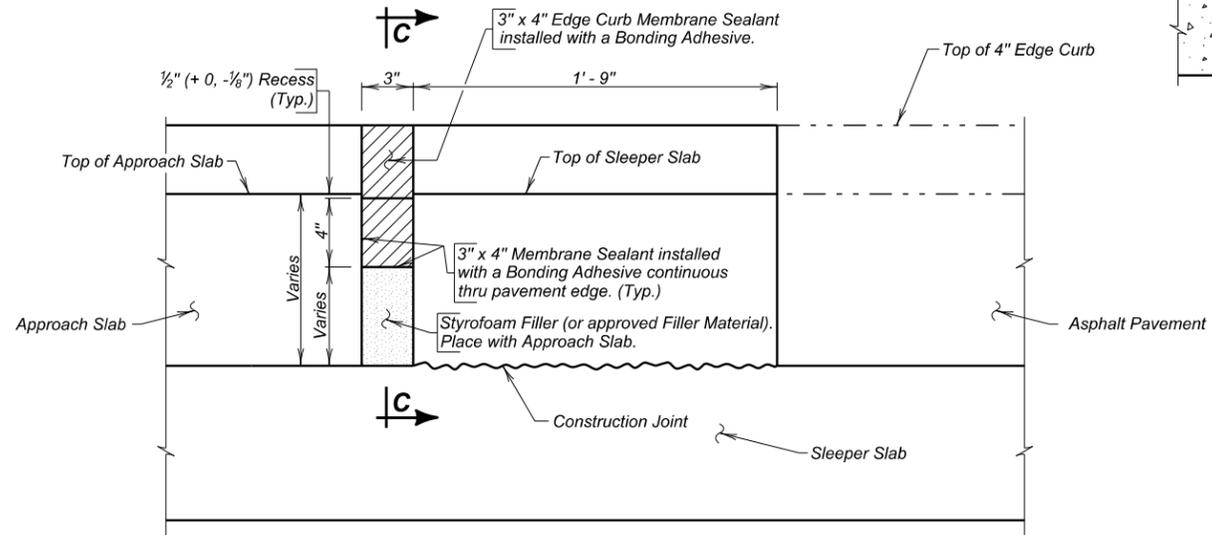
GENERAL NOTES

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

PLAN

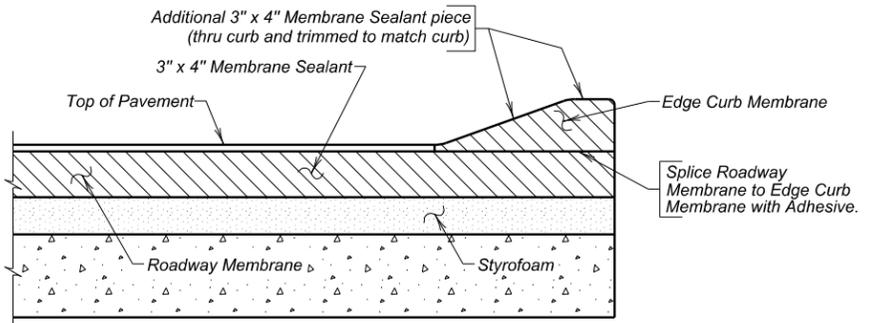


SEC. B - B



VIEW A - A

ESTIMATED QUANTITIES (For Two Approach Slabs)		
ITEM	UNIT	QUANTITY
Membrane Sealant Expansion Joint	Ft.	83.8



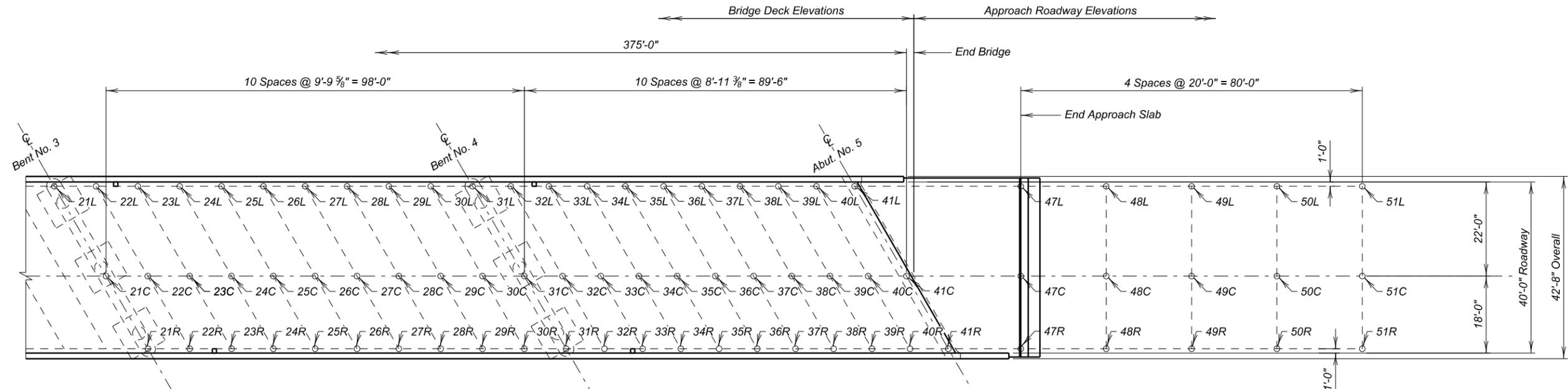
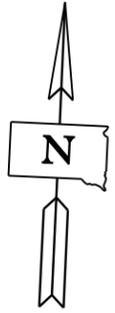
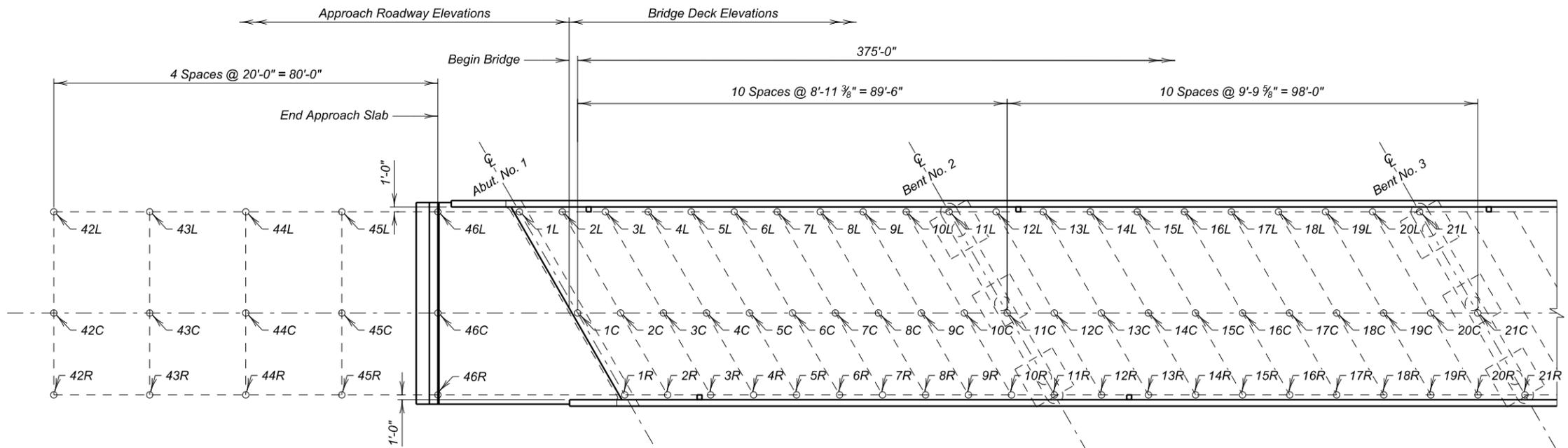
SEC. C - C

APPROACH SLAB JOINT DETAILS

FOR
WEST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
40'-0" ROADWAY OVER SPLIT ROCK CREEK
TO STA. 670+92.98
STR. NO. 50-284-165
30° R.H.F. SKEW
SEC. 26-T102N-R48W
IM 0909(81)406
HL-93 + ALT
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
MAY 2016

DESIGNED BY TOR	CK. DES. BY KJB	DRAFTED BY WJH	BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(81)406	E27	E62



PLAN



AS - BUILT ELEVATION SURVEY (A)
 FOR
 WEST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
 40'-0" ROADWAY 30° R.H.F. SKEW
 OVER SPLIT ROCK CREEK SEC. 26-T102N-R48W
 STA. 667+14.52 TO STA. 670+92.98 IM 0909(81)406
 STR. NO. 50-284-165 HL-93 + ALT
 MINNEHAHA COUNTY
 S. D. DEPT. OF TRANSPORTATION
 MAY 2016

DESIGNED BY JRM	CK. DES. BY KJB	DRAFTED BY EBS	BRIDGE ENGINEER
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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	
16L		16C		16R	
17L		17C		17R	
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	
30L		30C		30R	
31L		31C		31R	
32L		32C		32R	
33L		33C		33R	
34L		34C		34R	
35L		35C		35R	
36L		36C		36R	
37L		37C		37R	
38L		38C		38R	
39L		39C		39R	
40L		40C		40R	
41L		41C		41R	

Table of As-Built Elevations - Approach Roadway					
Location	Elevation	Location	Elevation	Location	Elevation
42L		42C		42R	
43L		43C		43R	
44L		44C		44R	
45L		45C		45R	
46L		46C		46R	
47L		47C		47R	
48L		48C		48R	
49L		49C		49R	
50L		50C		50R	
51L		51C		51R	

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

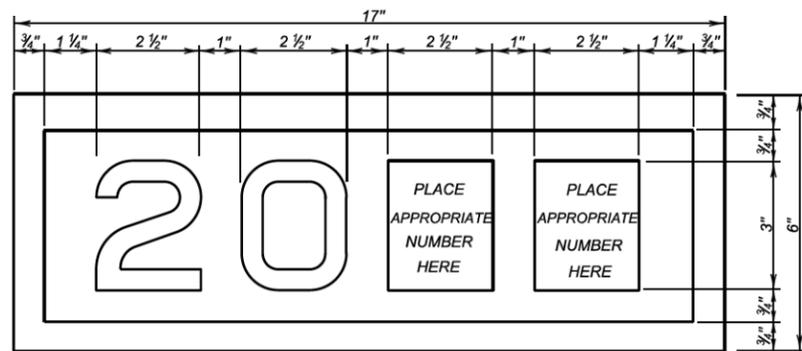
NOTE -
The Contractor shall be responsible for producing the As - Built Elevation Survey soon after construction is complete and before the bridge is opened to traffic. The As - Built Elevations of the Bridge shall be taken and recorded at the locations shown by the table on this sheet. The completed table shall be given to the Engineer who will forward a copy to the Office of Bridge Design and the Region Office.

The elevations to be recorded in these tables shall be based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

Table of Elevations - Bridge Survey Markers		
Location	Station - Offset	Elevation
Begin Bridge		
End Bridge		



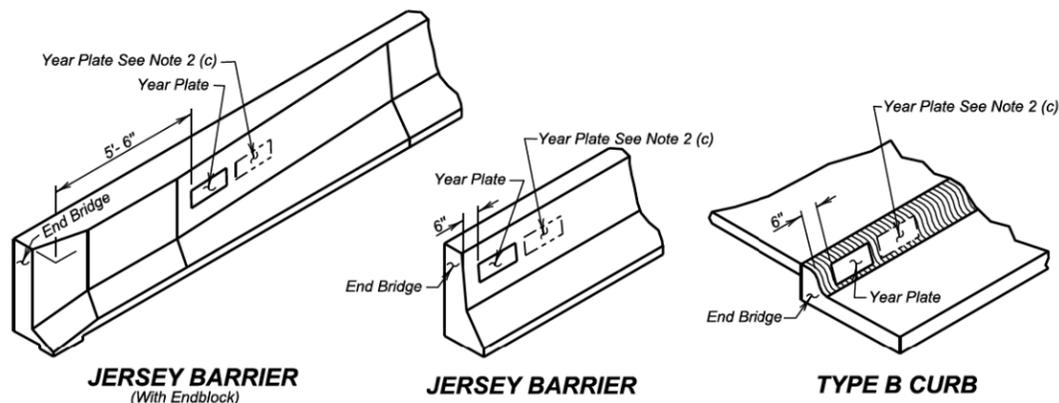
AS - BUILT ELEVATION SURVEY (B)
FOR
WEST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
40'-0" ROADWAY 30° R.H.F. SKEW
OVER SPLIT ROCK CREEK SEC. 26-T102N-R48W
STA. 667+14.52 IM 0909(81)406
TO STA. 670+92.98 HL-93 + ALT
STR. NO. 50-284-165
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
MAY 2016



YEAR PLATE DETAILS

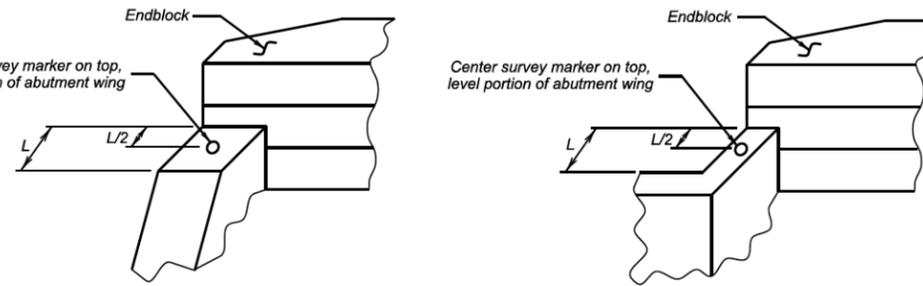
GENERAL NOTES:

- 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 (1/2) inch in depth.
- Year plates shall be located on structure (s) as follows:
 - On cast-in-place box culverts the year plates shall be four and one-half (4 1/2) 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.
 - 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.
 - 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.
- 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.



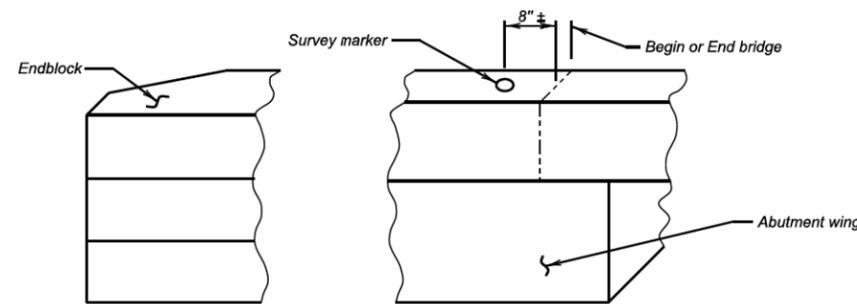
June 26, 2012

Published Date: 1st Qtr. 2016	S D D O T	YEAR PLATE DETAILS	PLATE NUMBER
			460.02
			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:

- 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.
- 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 3/4" X 2" long ribbed shank), or a US Army Corps of Engineers Type C Disc with a 3 1/2" top diameter.
- 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	S D D O T	BRIDGE SURVEY MARKER	PLATE NUMBER
			460.05
			Sheet 1 of 1

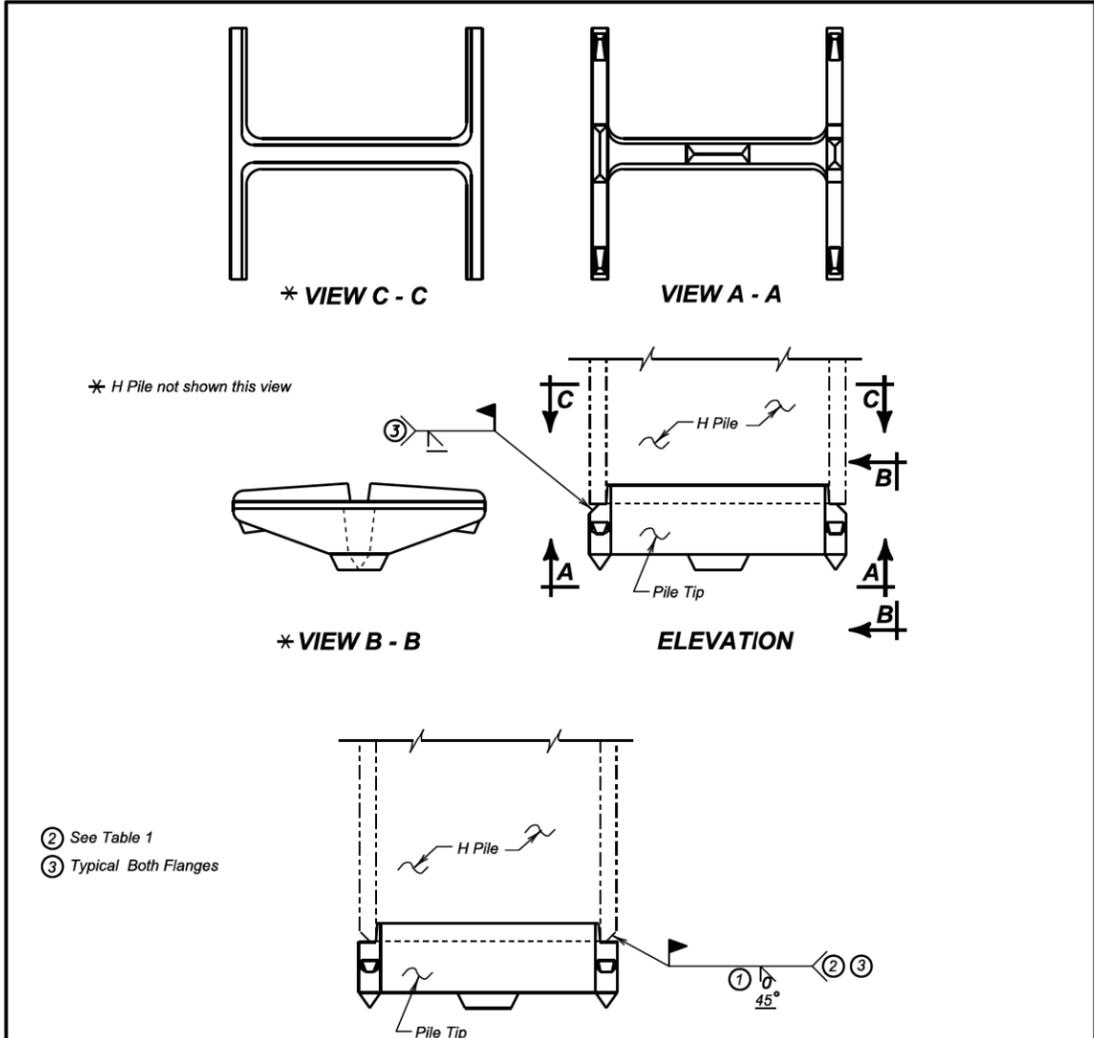


WEST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE

STR. NO. 50-284-165
MINNEHAHA COUNTY

S. D. DEPT. OF TRANSPORTATION

MAY 2016



- ② See Table 1
- ③ Typical Both Flanges

ALTERNATE WELD ATTACHMENT

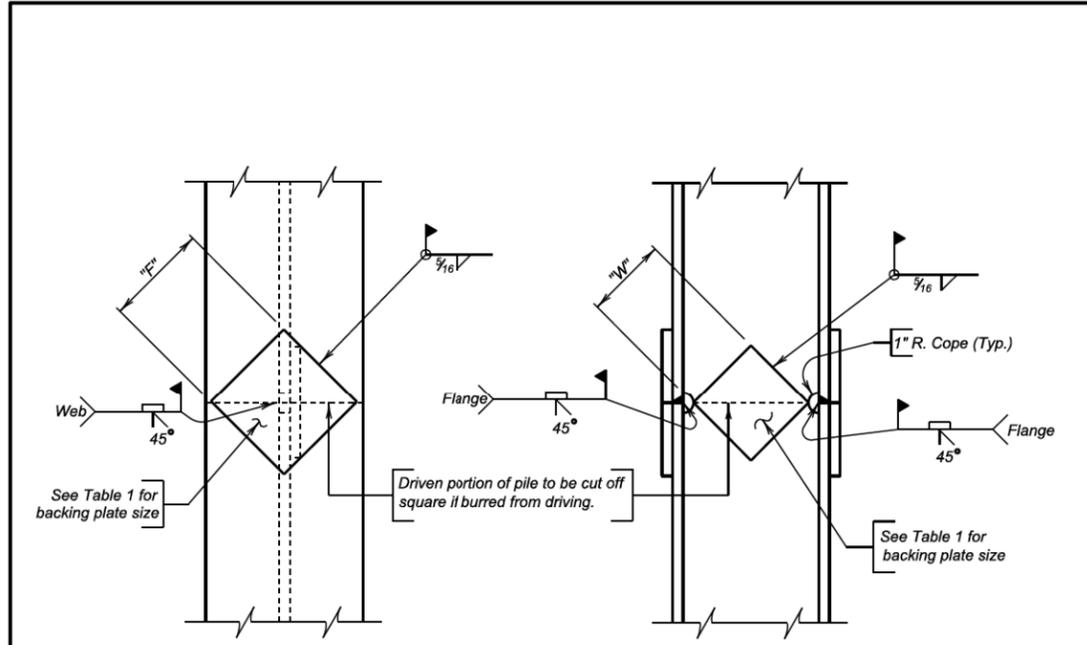
① DEPTH OF PREPARATION	PILE
3/8"	HP 14 X 102 HP 14 X 89 HP 12 X 74
5/16"	HP 14 X 73 HP 12 X 63 HP 10 X 57
1/4"	HP 12 X 53 HP 10 X 42 HP 8 X 36

GENERAL NOTES:

- Pile tip reinforcement shall be one-piece cast steel points commercially available and produced by a manufacturer who regularly produces pile points as a production item available to the public.
- Material for pile points shall conform to ASTM A27, Grade 65-35, Class 2.
- Pile points shall contain teeth designed to dig into obstructions and bearing materials in order to develop the maximum carrying capacity of the materials encountered.
- Welding and weld inspection shall be in conformance with AWS D1.5 - (Current Year) Bridge Welding Code - Steel.

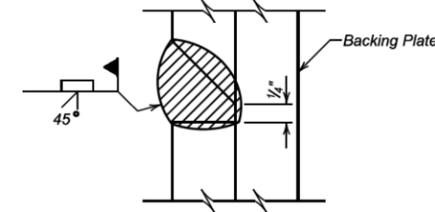
December 23, 2012

Published Date: 1st Qtr. 2016	S D D O T	H PILE TIP REINFORCEMENT	PLATE NUMBER 510.30
			Sheet 1 of 1



NOTE:
Prepare joint surfaces lower end of upper section on the ground and weld on backing plates; then place upper section on lower section and weld.

COMPLETE JOINT PENETRATION WELD DETAIL



GENERAL NOTES:

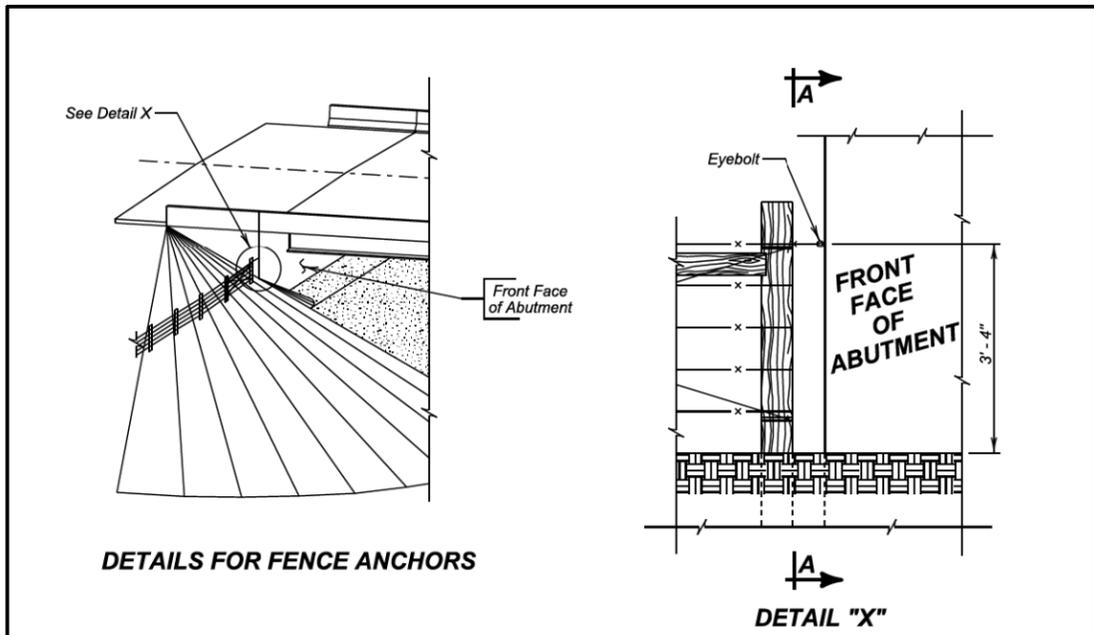
- Steel for backing plates shall conform to ASTM A709 Grade 50.
- Welding and weld inspection shall be in conformance with AWS D1.5 (Current Year) Bridge Welding Code - Steel.
- Welder must be certified and registered with the SDDOT.
- Backing plate shall at a minimum be as thick as the web of the pile being spliced.
- Web must be coped with 1 inch radius.
- Submit Welding Procedure Specification (WPS) to Bridge Construction Engineer for approval prior to pile driving.

PILE	10"	12"	14"
"F" FLANGE	6 1/2"	8"	10"
"W" WEB	4 3/4"	6 1/4"	7 1/2"

December 23, 2012

Published Date: 1st Qtr. 2016	S D D O T	STEEL PILE SPLICE DETAILS	PLATE NUMBER 510.40
			Sheet 1 of 1

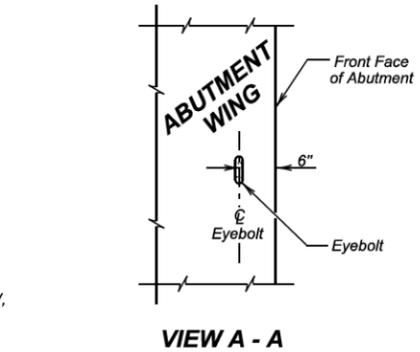




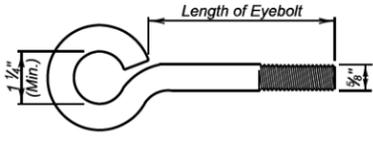
DETAILS FOR FENCE ANCHORS

GENERAL NOTES:

- The fence and post details shown are for illustrative purpose only. The fence shall be as specified elsewhere in the plans.
- Eyebolts shall be placed on all of the bridge abutment wings.
- Eyebolts shall be 5/8 inch diameter and shall conform to ASTM A307.
- Eyebolts shall be galvanized in accordance with AASHTO M232 (ASTM A153).
- Eyebolts shall be installed after abutment wings are backfilled and berm construction is complete. Drill-in and epoxy eyebolts into abutment such that the eye of the bolt is flush with the concrete surface.
- The epoxy resin mixture shall be of a type for bonding steel to hardened concrete and shall conform to AASHTO M235 Type IV, Grade 3 (Equivalent to ASTM C881, Type IV, Grade 3).
- The diameter of the drilled holes shall not be less than 1/8 inch greater, nor more than 3/8 inch greater than the diameter of the eyebolts or as per Manufacturer's recommendations. The drilled holes shall be blown out with compressed air using a device that will reach the back of the hole to be sure that all debris or loose material has been removed prior to epoxy injection.
- Mix epoxy resin as recommended by the Manufacturer and apply by an injection method as approved by the Engineer. Beginning at the back of the drilled holes, fill the holes 1/2 to 2/3 full of epoxy, or as recommended by the Manufacturer, prior to insertion of the eyebolts. Care shall be taken to prevent epoxy from flowing out of the horizontal holes prior to eyebolt insertion. Rotate the eyebolt during installation to eliminate voids and ensure complete bonding of the bolt. Insertion of the eyebolts by the dipping or painting method will not be allowed.
- Loads shall not be applied to the epoxy grouted eyebolts until the epoxy resin has had sufficient time to cure as specified by the epoxy resin manufacturer.
- The cost for furnishing and installing the eyebolts shall be incidental to various contract items.



VIEW A - A

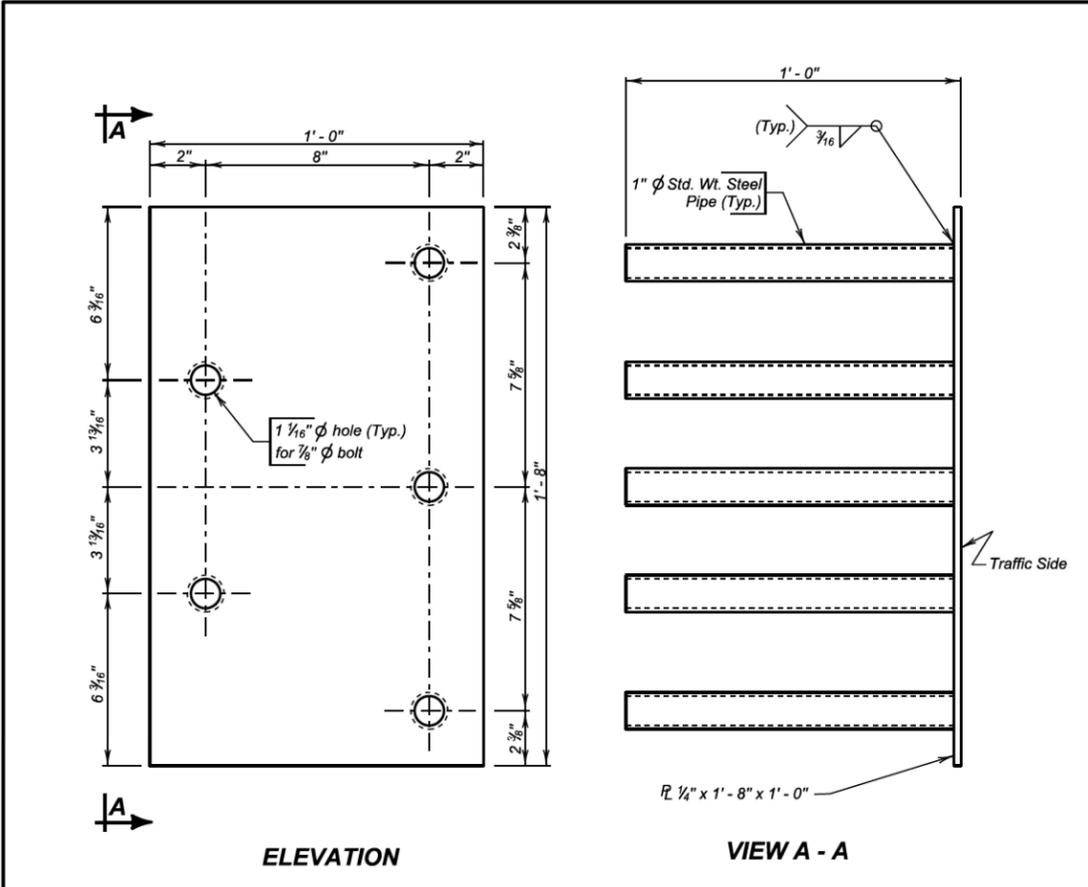


EYEBOLT DETAILS

December 23, 2012

S D D T	FENCE ANCHORS FOR BRIDGE ABUTMENTS (SWEEP BACK WINGS)	PLATE NUMBER 620.19
		Sheet 1 of 1

Published Date: 1st Qtr. 2016



ELEVATION

VIEW A - A

GENERAL NOTES:

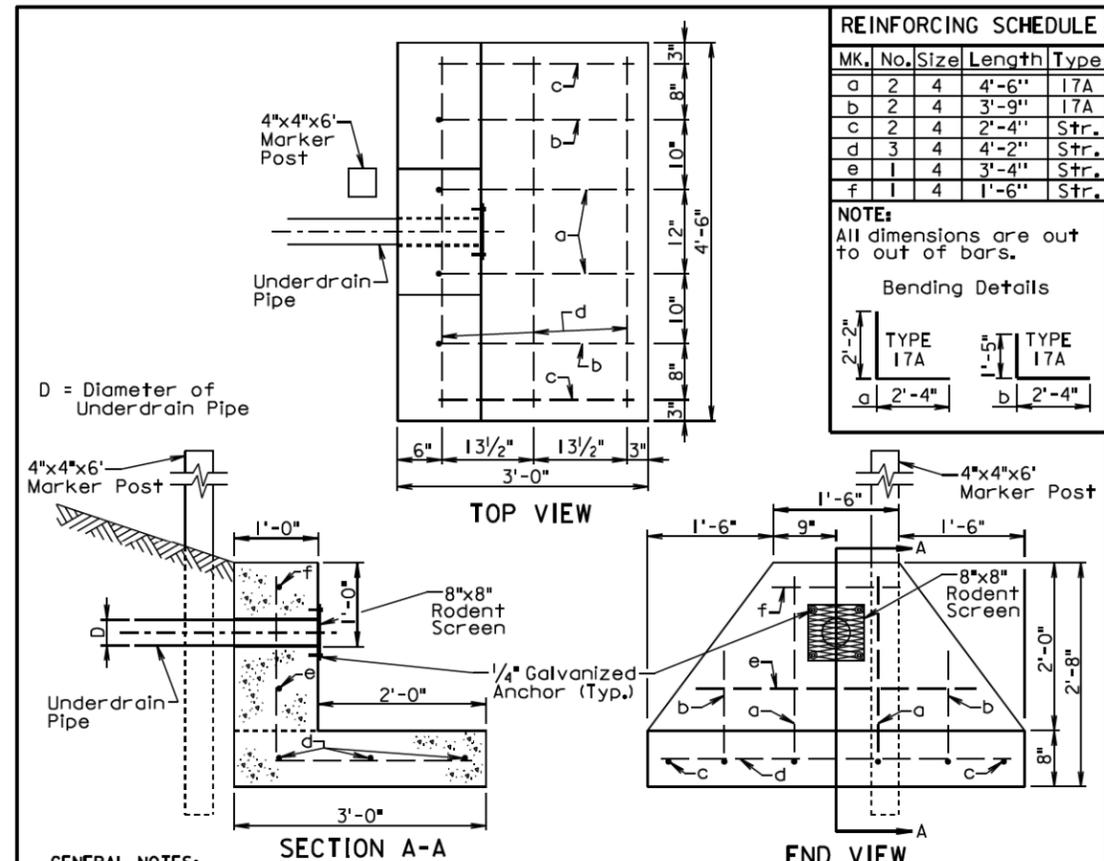
- Steel plate for the insert assembly shall conform to ASTM A709 Grade 36. The steel pipes shall conform to ASTM A53 or ASTM A500 Grade B.
- Welding and weld inspection shall be in conformance with AWS D1.1 - (Current Year) Structural Welding Code - Steel.
- After fabrication, galvanize in accordance with AASHTO M111 (ASTM A123).
- Bolts, nuts, and washers shall be provided with each assembly. Bolts shall be galvanized and conform to the requirements of ASTM A307, A325, or A449. Plain washers shall be galvanized and conform to ASTM F844.
- Bolt heads shall be placed on the traffic side of the endblock. Bolt projection at the back side of the insert shall not exceed 1 inch beyond the nut.
- The cost of the 5 bolt insert plate assembly complete in place including welding and galvanizing shall be incidental to the contract unit price per Cubic Yard for "Class A45 Concrete, Miscellaneous", "Class A45 Concrete, Bridge Deck", or "Class A45 Concrete, Bridge Repair", as applicable.

December 23, 2013

S D D T	5 BOLT INSERT PLATE ASSEMBLY	PLATE NUMBER 630.92
		Sheet 1 of 1

Published Date: 1st Qtr. 2016





GENERAL NOTES:

The concrete shall be Class M6. The concrete shall conform to the requirements of Section 462 of the Specifications except the minimum curing time shall be 72 hours. It is estimated that 0.55 cubic yards of concrete is required for each unit.

Four cast-in-place or drilled-in 1/4" galvanized anchors shall be placed in the headwall. Each galvanized anchor shall be placed approximately 1" from the outside corner of the rodent screen. It is preferred that the anchor location be centered at an opening in the rodent screen.

All reinforcing steel shall conform to ASTM A615 Grade 60. It is estimated that 25.7 pounds of reinforcing steel is required for each unit.

The underdrain pipe shall be placed in the concrete headwall with the pipe end flush with the concrete surface adjacent to the rodent screen.

The 8"x8" rodent screen shall be galvanized 13 Ga. steel with a diamond shaped flattened mesh pattern. The size shall be 1/2". The size refers to the measurement across the smallest diamond shaped opening measured from the centers of the wires. The rodent screen shall be centered about the hole in the headwall and fastened to the headwall with the appropriate bolts or nuts with washers.

A 4"x4"x6" marker post shall be placed at the approximate location as depicted in the above drawings for each concrete headwall. The marker post shall project 3" above the ground line. The marker post shall be cedar or treated with a wood preservative and shall be painted with two coats of white paint.

All costs for furnishing and installing the concrete headwall including equipment, labor, and materials including concrete, reinforcing steel, rodent screen, anchors, and marker post shall be incidental to the contract unit price per each for "Concrete Headwall for Underdrain".

June 26, 2015

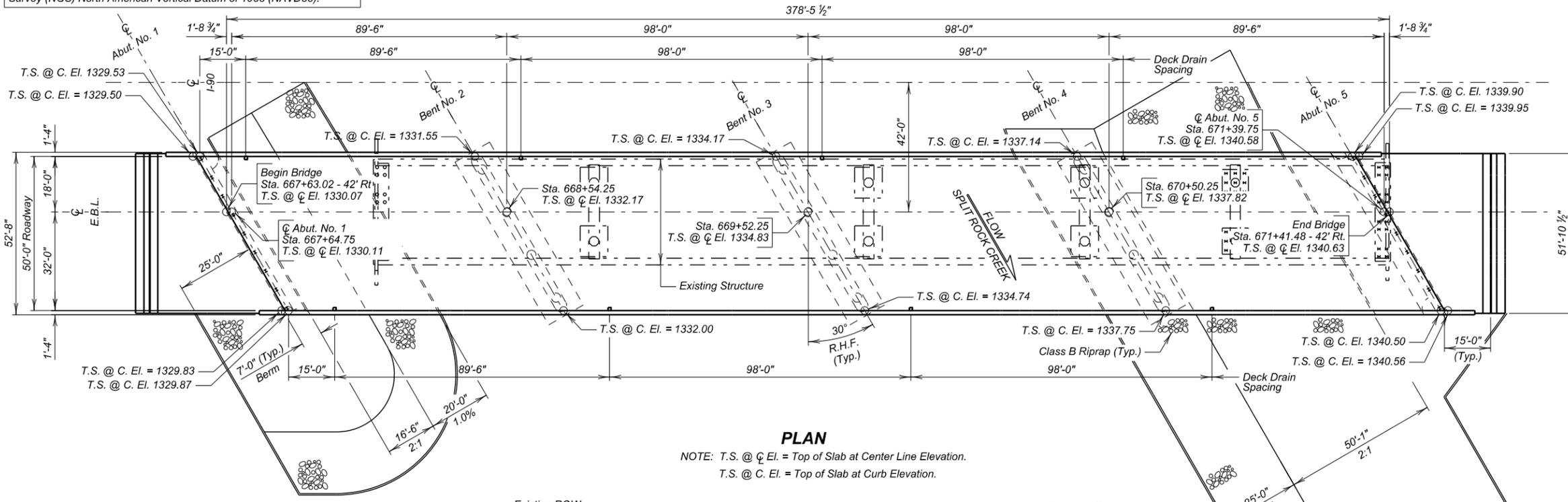
S D D O T	CONCRETE HEADWALL FOR UNDERDRAIN	PLATE NUMBER 680.01
	Published Date: 1st Qtr. 2016	Sheet 1 of 1



WEST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
 STR. NO. 50-284-165
 MINNEHAHA COUNTY
 S. D. DEPT. OF TRANSPORTATION
 MAY 2016

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.	IM 0909(81)406	E33	E62

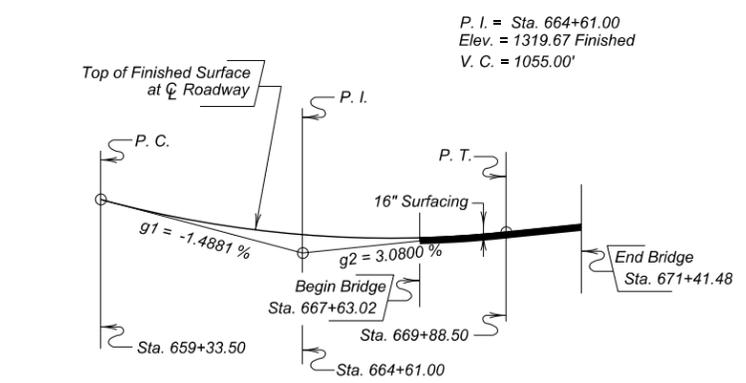


PLAN

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

**-X081-
INDEX OF BRIDGE SHEETS -**

- Sheet No. 1 - General Drawing
- Sheet No. 2 - Estimate of Structure Quantities & Notes
- Sheet No. 3 - Notes (Cont.)
- Sheet No. 4 - Notes (Cont.)
- Sheet No. 5 - Notes (Cont.)
- Sheet No. 6 - Riprap Details
- Sheet No. 7 - Site Plan & Subsurface Profile (A)
- Sheet No. 8 - Site Plan & Subsurface Profile (B)
- Sheet No. 9 - Subsurface Investigation Elevation Views
- Sheet No. 10 - Abutment No. 1 Details
- Sheet No. 11 - Abutment No. 5 Details
- Sheet No. 12 - Abutment Details (Cont.)
- Sheet No. 13 - Bent Details
- Sheet No. 14 - Superstructure Details (A)
- Sheet No. 15 - Superstructure Details (B)
- Sheet No. 16 - End Block, Barrier Curb & Deck Drain Details
- Sheet No. 17 - Girder Details
- Sheet No. 18 - Erection Data and Slab Form Elevations (A)
- Sheet No. 19 - Erection Data and Slab Form Elevations (B)
- Sheet No. 20 - Diaphragm Details
- Sheet No. 21 - Details of Bridge End Backfill
- Sheet No. 22 - Details of Approach Slab Adjacent to Bridge (A)
- Sheet No. 23 - Details of Approach Slab Adjacent to Bridge (B)
- Sheet No. 24 - Approach Slab Joint Details
- Sheet No. 25 - As-Built Elevation Survey (A)
- Sheet No. 26 - As-Built Elevation Survey (B)
- Sheet No. 27 - Details of Standard Plate No's. 460.02 & 460.05
- Sheet No. 28 - Details of Standard Plate No's. 510.30 & 510.40
- Sheet No. 29 - Details of Standard Plate No's. 620.19 & 630.92
- Sheet No. 30 - Details of Standard Plate No. 680.01

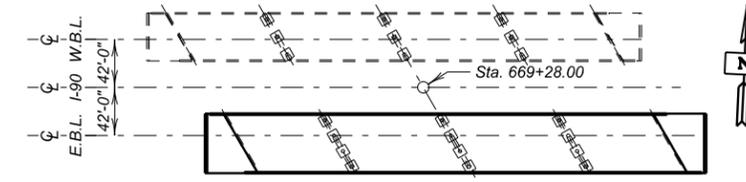


VERTICAL CURVE DATA

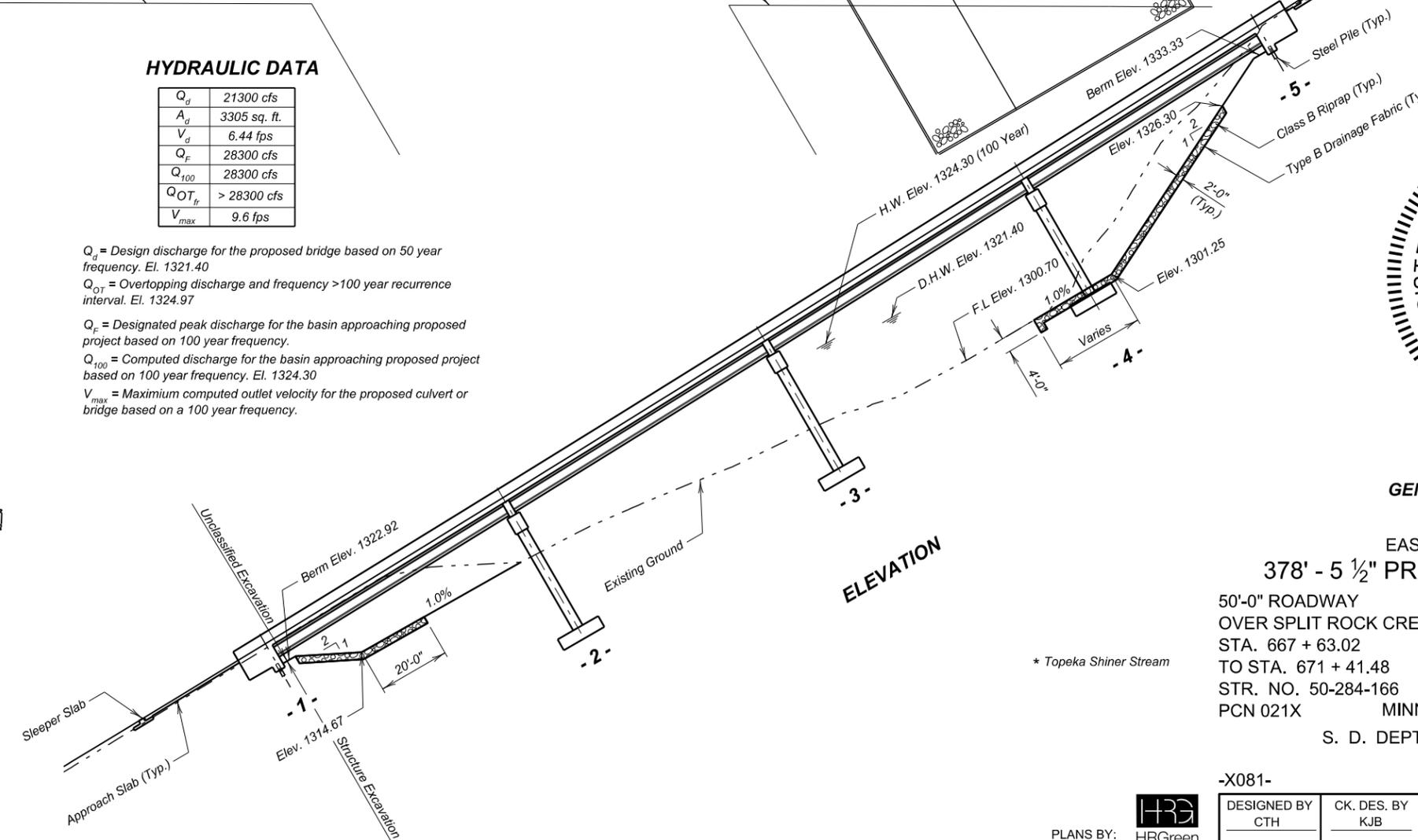
HYDRAULIC DATA

Q_d	21300 cfs
A_d	3305 sq. ft.
V_d	6.44 fps
Q_F	28300 cfs
Q_{100}	28300 cfs
$Q_{OT_{100}}$	> 28300 cfs
V_{max}	9.6 fps

Q_d = Design discharge for the proposed bridge based on 50 year frequency. El. 1321.40
 $Q_{OT_{100}}$ = Overtopping discharge and frequency >100 year recurrence interval. El. 1324.97
 Q_F = Designated peak discharge for the basin approaching proposed project based on 100 year frequency.
 Q_{100} = Computed discharge for the basin approaching proposed project based on 100 year frequency. El. 1324.30
 V_{max} = Maximum computed outlet velocity for the proposed culvert or bridge based on a 100 year frequency.



LAYOUT



ELEVATION



GENERAL DRAWING
FOR
EAST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
50'-0" ROADWAY OVER SPLIT ROCK CREEK * 30° R.H.F. SKEW
STA. 667 + 63.02 SEC. 26-T102N-R48W
TO STA. 671 + 41.48 IM 0909(81)406
STR. NO. 50-284-166 HL-93 + ALT
PCN 021X MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
MAY 2016

DESIGNED BY CTH	CK. DES. BY KJB	DRAFTED BY CTH	BRIDGE ENGINEER
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PLANS BY: HRGreen

ESTIMATE OF STRUCTURE QUANTITIES

DESCRIPTION	QUANTITY	UNIT	REMARKS
Bridge Elevation Survey	Lump Sum	LS	
Concrete Penetrating Sealer	2376	Sq Yd	See Special Provision
Bridge End Embankment	226	Cu Yd	
Incidental Work, Structure	Lump Sum	LS	
Structural Steel, Miscellaneous	Lump Sum	LS	
Membrane Sealant Expansion Joint	103.8	Ft	
Structure Excavation, Bridge	2066	Cu Yd	
Granular Bridge End Backfill	128	Cu Yd	
Approach Slab Underdrain Excavation	8	Cu Yd	
Class A45 Concrete, Bridge Deck	730.5	Cu Yd	
Class A45 Concrete, Bridge	631.5	Cu Yd	
Concrete Approach Slab for Bridge	339.3	Sq Yd	
Concrete Approach Sleeper Slab for Bridge	83.6	Sq Yd	
Deck Drain, Girder Bridge	8	Each	
Reinforcing Steel	104,171	Lb	
Epoxy Coated Reinforcing Steel	160,997	Lb	
No. 7 Rebar Splice	134	Each	
Preboring Pile	180	Ft	
HP 12 Pile Tip Reinforcement	18	Each	
HP 12x53 Steel Test Pile, Furnish and Drive	80	Ft	
HP 12x53 Steel Bearing Pile, Furnish and Drive	560	Ft	
45" Minnesota Shape Prestressed Concrete Beam	2238	Ft	
4" Underdrain Pipe	281	Ft	
Precast Concrete Headwall for Drain	2	Each	
Porous Backfill	36.0	Ton	
Type B Drainage Fabric	2818	Sq Yd	
Class B Riprap	2823.4	Ton	

SPECIFICATIONS FOR BRIDGE

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

- AASHTO HL-93.
- 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
Piling (ASTM A572 Grade 50) $fy = 50,000$ psi

*For prestressed beams, see notes regarding Prestressed Girders.

GENERAL CONSTRUCTION

- All mild reinforcing steel shall conform to ASTM A615, Grade 60.
- All exposed concrete corners and edges shall be chamfered 3/4" unless noted otherwise.
- Use 2" clear cover on all reinforcing steel except as shown.
- Contractor shall imprint on the structure the date of new construction as specified and detailed on Standard Plate No. 460.02.
- Barrier Curbs and End blocks shall be built normal to the grade.
- 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.
- The elevation of the bridge deck is 16" above subgrade elevation.

INCIDENTAL WORK, STRUCTURE

- In place centerline Sta. 668+12.00 to centerline Sta. 671+42.00 is a 330'-0", 5-span steel I-beam viaduct bridge built in 1960 with a 30'-0" clear roadway. The beams are continuous across the western three spans, while the beams supporting the eastern two spans are simply supported. The superstructure consists of a composite reinforced concrete slab with a concrete barrier curb continuous across the bridge. The concrete barrier curb replaced the original Type C aluminum railing. The concrete substructure consists of 2 column reinforced concrete bents and reinforced concrete stub abutments. The abutments are supported on timber piling. The easternmost bent is supported on steel piling and the other 3 bents are supported on spread footings.
- Break down and remove the existing bridge, and approach/sleeper slabs if applicable, to 1 foot below finished groundline, or as required to construct the new structure in accordance with Section 110 of the Specifications. All portions of the existing bridge not salvaged for future highway related use shall be removed and disposed of by the Contractor on a site obtained by the Contractor and approved by the Engineer in accordance with the Environmental Commitments found in Section A.
- The existing drainage trough in front of each existing abutment shall be salvaged for future highway related use. The salvaged drainage troughs shall be stockpiled on-site for the Senior Region Bridge Engineer to pick-up. Care shall be taken during the dismantling, transporting and stockpiling operations not to damage the structural properties of the salvaged items.
- 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.



ESTIMATE OF STRUCTURE QUANTITIES AND NOTES FOR 378' - 5 1/2" PRESTR. GIRDER BRIDGE

Str. No. 50-284-166

MAY 2016

2

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DESIGNED BY: KJB	DRAWN BY: KJB	CHECKED BY: CTH/TOR	BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(81)406	E35	E62

DESIGN MIX OF CONCRETE

- All structural concrete shall be Class A45 unless otherwise indicated.
- Type II cement is required, except Type III may be used for the prestressed beams.
- 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.
- Grout design mix shall be as specified in Section 460.2 K of the Specifications. A compressive strength of 2000 psi shall be attained by the grout prior to erection of any beams. Chamfer edges of grout pads ¾". The quantity of grout is included in and shall be paid for at the contract unit price per cubic yard for Class A45 Concrete, Bridge.

ABUTMENTS

- Preboring piling at each abutment is required to whichever is greater, ten feet or to natural ground.
- The HP 12x53 Piling were designed using a factored bearing resistance of 98 tons per pile. Piling shall develop a field verified nominal bearing resistance of 245 tons per pile.
- One test pile shall be driven at each abutment and will become part of the pile group.
- The contractor shall have sufficient pile splice material on hand before pile driving is started. See Standard Plate No. 510.40.
- Piles shall not be driven out of position by more than three inches in the direction normal to the abutment centerline. A pile-driving template shall be used to insure this accuracy.
- Abutment backwalls above the construction joint may be cast separately from the deck slab. The concrete used for the backwalls and wings shall be Class A45 Concrete, Bridge. All abutment and bridge deck concrete shall have attained design strength prior to backfilling. Abutment wing walls shall not be cast until after the deck has been poured.
- Each finished abutment shall include a Bridge Survey Marker. See Standard Plate No. 460.05.
- Pile tip reinforcement will be required. See Standard Plate No. 510.30.
- Fence anchors shall be provided on both sides of each abutment. See Standard Plate No. 620.19.

ABUTMENT BACKWALL COATING

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

<http://apps.sd.gov/applications/HC60ApprovedProducts/ProductList.aspx>

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

PILE DRIVING

- A drivability analysis was performed using the wave equation analysis program (GRLWEAP). The pile hammers listed below were evaluated and found to produce acceptable driving stresses:

Delmag D19-32	Delmag D19-42
MVE M-19	APE D19-42

- Pile hammers not listed will require evaluation and approval prior to use from the Geotechnical Engineering Activity.
- The HP 12x53 piling will obtain bearing on the Split Rock Creek Formation bedrock. This material can be extremely hard and impenetrable by nature. The Site Plan & Subsurface Profile sheets and Subsurface Investigation Elevation Views should be reviewed to obtain the approximate Split Rock Creek Formation elevation prior to pile driving operations. Extreme care should be taken during pile driving operations not to over-stress the piles when the tips encounter the Split Rock Creek Formation bedrock.

BENTS

- Spiral reinforcement may be fabricated from cold drawn wire conforming to ASTM A1064 or hot rolled plain or deformed bars conforming to the strength requirements of ASTM A615, Grade 60.
- It is anticipated that cofferdams will be necessary. Cofferdams shall be designed and constructed in accordance with Section 423 of the Specifications.
- The design of the Cofferdam must be done by Professional Engineers registered in South Dakota. Sealed calculations of both the original design and design check, performed by different engineers, shall be submitted with the cofferdam plans. The cofferdam plans, design, and check design shall be submitted to the Office of Bridge Design a minimum of 15 days prior to initiating Cofferdam construction.

SPREAD FOOTING ON ROCK

- The spread footings shall be neat lined into sound bedrock. The rock surface shall be cleaned of all soil and debris prior to placing 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.
- If upon inspection, the Geotechnical Engineer determines that the material at the plan shown footing elevation is unsuitable for foundation support or if sound bedrock is encountered at an elevation other than the plan shown footing elevation, the Engineer shall order the footing elevation changed to an elevation approved by the Geotechnical Engineer. If the footing elevations are changed, the Office of Bridge Design shall be contacted prior to proceeding with construction to determine if a redesign of the substructure unit is required. If a redesign is required, a maximum of 5 working days may be required to perform this design. Any costs associated with delays within the 5 working day period for redesign shall be borne by the contractor at no additional cost to the State.
- 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 bent 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.
- 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.
- Due to the possibility of variance in the final elevations for the bent footings, the reinforcing steel in the bents shall not be ordered until final footing elevations have been approved by the Geotechnical Engineer.



**NOTES (CONTINUED)
FOR
378' – 5 ½" PRESTR. GIRDER BRIDGE**

Str. No. 50-284-166

MAY 2016

3

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DESIGNED BY: KJB	DRAWN BY: KJB	CHECKED BY: CTH/TOR	BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(81)406	E36	E62

PRESTRESSED GIRDERS

- Minimum concrete compressive strength $f'c = 8000$ psi at 28 days and $f'ci = 6500$ psi for all girders.
- All mild reinforcing steel shall be deformed bars conforming to ASTM A615, Grade 60.
- Individual tendons in all pretensioned sections shall consist of seven wire uncoated Type 270K Strands having a nominal diameter of 0.6" and a minimum ultimate strength of 58600 lbs. per cable. An initial tensile force of 43500 lbs. shall be applied to all 0.6" cables in all girders. All prestressing steel shall conform to AASHTO M203. (low lax strands).
- All prestressed girders within a span shall be cast within an 8 day period. If not, the newest girder shall be at least 6 weeks old before the deck slab is poured. The girders shall be poured in all steel forms.
- Prestressed concrete girders shall always be lifted by the devices provided in the top flanges near the ends of the girders. Types of lifting devices other than those shown on the plans may be used provided they are approved by the Office of Bridge Design. The design of the lifting devices shall be the responsibility of the Fabricator.
- Each beam shall be marked showing structure number, casting date, and beam number. Marking shall be on the face of the beam near the end and so located that they will be exposed after the diaphragms have been cast. Fascia beams shall be marked on an inside face. All markings shall be stenciled and clearly legible. For beam designations and locations, see superstructure layout plan and Erection Data sheet.
- The physical properties of the elastomeric bearing pads shall conform to the requirements of Section 18.2 of the AASHTO LFRD Bridge Construction Specification and the AASHTO Materials Specification M251. The elastomeric bearing pads shall conform to Grade 70 (durometer). The cost of the pads shall be incidental to the contract unit price per cubic yard for Class A45 Concrete, Bridge. Certification that pads are 70 durometer and meet the requirements of AASHTO LFRD Bridge Construction Specification Section 18.2 and AASHTO Materials Specification M251 shall be furnished to the Engineer with the shop drawings. No laminated bearing pads will be allowed.
- All exposed corners shall be chamfered 3/4" or rounded to 3/4" radius.
- Dead Load of girder taken as effective at transfer. Cut strands, except those extended and bent, flush with end of girder and coat end of strands with mortar.
- The Contractor shall be responsible for ensuring that transportation stresses, handling and erection do not cause damage to the girders.
- Furnish and Install Inserts for T6 Rebars as shown in the plans. All costs involved shall be incidental to the contract unit price per foot of girder.

SUPERSTRUCTURE

- Girder lifting hooks shall be cut off before placement of concrete deck slab.
- The diaphragms at the bents shall be poured integrally with the deck slab. Placement of diaphragms at the bents shall not slow down the rate of deck concrete placement and finishing. The Contractor shall place the concrete for the specified diaphragms ahead of the deck concrete in such a manner that advancement of the deck concrete reaches the diaphragm just as placement of concrete in the diaphragm is complete.
- 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.
- The bridge deck must be placed and finished continuously at a minimum rate of 40 ft. of deck per hour measured along Centerline Roadway. This rate is exclusive of concrete placed in the diaphragms. (See note 3 above.) If concrete cannot be placed and finished at this rate, the Engineer shall order a header installed and operations stopped. Notify the Bridge Construction Engineer if deck pour operations are stopped. Operations may resume only when the Engineer is satisfied that a rate of 40 ft. of deck per hour can be achieved and the concrete in the previous pour has attained a minimum compressive strength of 2000 psi.
- Snap ties, if used in the barrier curb formwork, shall be epoxy coated. The epoxy coating shall be inert in concrete and compatible with the coating applied to the new epoxy coated reinforcing steel.

CLASS A45 CONCRETE, BRIDGE DECK

See Special Provision for Concrete Penetrating Sealer.



DECK DRAINS

- Deck Drains shall be 4" diameter x 5'-0" Fiberglass Pipe conforming to the requirements of ASTM - D2996.
- The Fiberglass Pipe Sleeve can be made from a 4 inch diameter Fiberglass Pipe Fitting. It shall be attached to the 4 inch diameter Fiberglass Pipe, as shown in the plans, per the manufacturer's recommendation.
- All fiberglass pipe and pipe fittings shall be handled and installed according to the guidelines and procedures recommended by the manufacturer. Pipe, pipe fittings, and adhesive must be from the same manufacturer.
- Use fiberglass wear pads to protect against contact with supports or U-bolts.
- The 1/2 inch diameter U-bolts, nuts and washers shall conform to ASTM F1554 Grade 36 and shall be galvanized in accordance with ASTM F2329.
- The deck drain to girder connection as shown in the plans allows the deck drain location to be adjusted slightly to clear transverse slab steel.
- All fiberglass pipes and pipe fittings shall use pigmented resin throughout the wall. The color shall be an approved gray (Federal Standard 595B Color 26622).
- Steel for the bent plates and washers shall conform to ASTM A709 Grade 36 and shall be galvanized in accordance with ASTM A123. Washers shall be plate washers or a continuous bar at least 5/16" thick with standard holes and shall have a size sufficient to completely cover the slot after installation.
- The 1/2 inch diameter bolts and nuts shall conform to ASTM A307 and shall be galvanized in accordance with ASTM F2329 or ASTM A153 as applicable.
- The 1/2 inch diameter concrete inserts shall be capable of developing the strength of the A307 bolts and shall be galvanized.
- Maintain 2" clear cover between the back of the concrete inserts and the adjacent girder web.
- Payment for deck drains shall be at the contract unit price per each for Deck Drains, Girder Bridge, and shall be full compensation for furnishing, fabricating, and installing the deck drains and all attaching hardware in accordance with the plans and specifications.

**NOTES (CONTINUED)
FOR**

378' - 5 1/2" PRESTR. GIRDER BRIDGE

Str. No. 50-284-166

MAY 2016

4

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DESIGNED BY: KJB	DRAWN BY: KJB	CHECKED BY: CTH/TOR	BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(81)406	E37	E62

BOLT TESTING

The certified mill test reports for all bolts used on the project shall include the test results for all of the testing specified in Section 972.2 D of the Specifications. Some of these tests are supplemental tests that must be requested at the time the bolts are ordered. It is the responsibility of the Contractor to notify the bolt supplier of these requirements.

SHOP PLANS

The fabricator shall submit shop plans in accordance with the Specifications. Send shop plan submittals to HR Green, Inc., 431 N. Phillips Avenue, Sioux Falls, SD 57104 (kbrehm@hrgreen.com). After review, corrections (if necessary), and approval by HR Green, Inc., the Office of Bridge Design will review the submittals, authorize fabrication, arrange for fabrication inspection, and distribute the shop drawings.

FALSEWORK

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

FALL PROTECTION

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

CLASS B COMMERCIAL TEXTURE FINISH

1. A Class B commercial texture finish shall be applied to the following areas:
 - a. **Barrier Rail:** all exposed surfaces (front, top and back).
 - b. **Slab:** edge of slab.
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.

APPROACH SLABS

1. Sleeper slab riser shall be cast with the approach slab or cast after the approach slab is placed. Care shall be taken to ensure the correct grade is maintained across the joint.
2. The portion of the sleeper slab below the construction joint may be precast. If the bottom portion of the sleeper slab is precast, the Contractor shall submit proposed lifting and setting plans to the Bridge Construction Engineer for approval. In addition, if reinforcing or other details differ from those shown in the plans, the Contractor shall submit proposed alternate details for approval.
3. The use of an approved finishing machine will be required during placement of Class A45 Concrete for the approach slabs. Concrete placement in front of the machine shall be kept parallel to the screed.
4. The concrete in the approach slab shall be tined normal to centerline roadway.
5. Concrete Approach Sleeper Slab for Bridge, whether cast-in-place or precast, will be paid for at the contract unit price per square yard. This payment shall be full compensation for all excavation, furnishing, hauling, and placing all materials including concrete and reinforcing steel; for disposal of all excavated material and surplus materials; and for labor, tools, equipment and any incidentals necessary to complete this item of work.
6. Concrete Approach Slab for Bridge will be paid for at the contract unit price per square yard. This payment shall be full compensation for all excavation, furnishing, hauling and placing all materials including concrete, asphalt paint or 4 mil polyethylene sheeting, elastic joint 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.

CHANNEL WORK

In order to assure the Hydraulic capacity of the bridge, the finished ground under the bridge shall be shaped to match the upstream channel and flood plain. The existing low water channel shall be maintained as near as practical to the existing location. Bridge berms shall be built as shown on the General Drawing sheet.



**NOTES (CONTINUED)
FOR
378' – 5 1/2" PRESTR. GIRDER BRIDGE**

Str. No. 50-284-166

MAY 2016

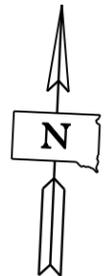
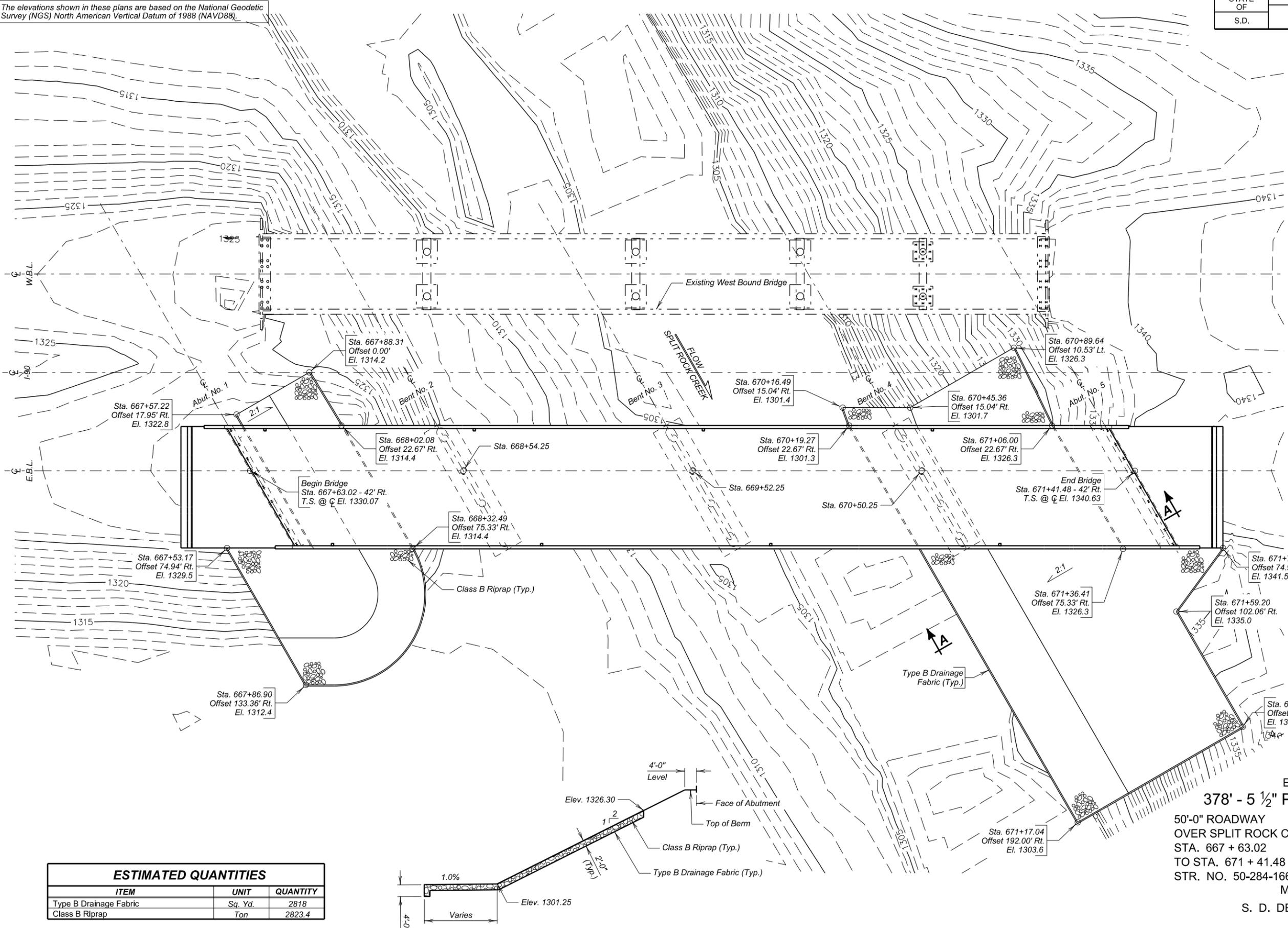
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DESIGNED BY: KJB	DRAWN BY: KJB	CHECKED BY: CTH/TOR	BRIDGE ENGINEER
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The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

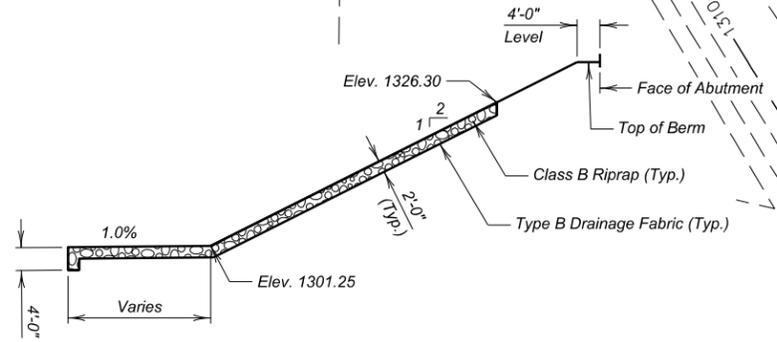
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(81)406	E38	E62



RIPRAP DETAILS
 FOR
378' - 5 1/2" PRESTR. GIRDER BRIDGE
 50'-0" ROADWAY
 OVER SPLIT ROCK CREEK
 STA. 667 + 63.02
 TO STA. 671 + 41.48
 STR. NO. 50-284-166

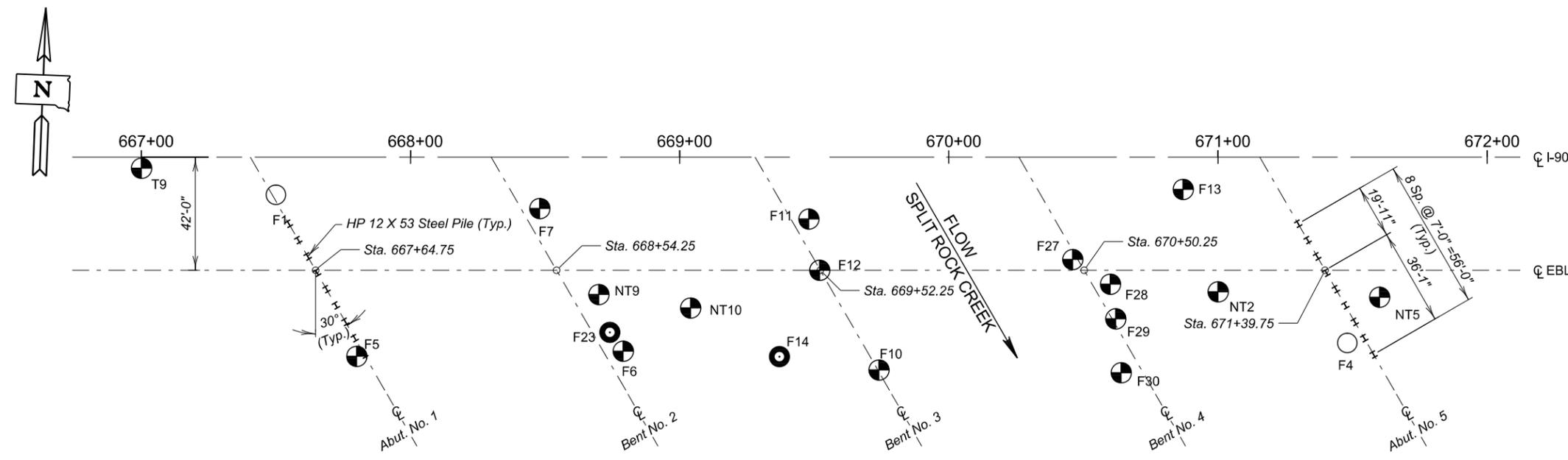
30° R.H.F. SKEW
 SEC. 26-T102N-R48W
 IM 0909(81)406
 HL-93 + ALT

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Type B Drainage Fabric	Sq. Yd.	2818
Class B Riprap	Ton	2823.4



DESIGNED BY MJR	CK. DES. BY KJB	DRAFTED BY CTH	BRIDGE ENGINEER
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MINNEHAHA COUNTY
 S. D. DEPT. OF TRANSPORTATION
 MAY 2016



PILING LAYOUT

The Split Rock Creek Formation consists of layers of silica cemented coarse conglomerates, siltstone, claystone, and sandstone that are interbedded with coal seams, poorly cemented sands, and thin soil layers. The surface of the formation can be highly variable and may change 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

- Penetration Test
- Coring Test
- ⊗ Auger Test
- ▽ Water
- ⊖ Caved
- ▭ Sample Zone
- ▨ Continuous Sample

Penetration test holes are drilled with a 6⁵/₈ inch diameter hollow stem auger. Penetration tests are conducted by dropping a 140 pound hammer 30 inches to obtain 2 inch nominal diameter samples and to measure the resistance to penetration of the soil.

Core test holes are drilled with a 6⁵/₈ inch diameter hollow stem auger to bedrock. Core tests are conducted with NQ core barrels to obtain 1¹/₈ inch nominal diameter samples for observation.

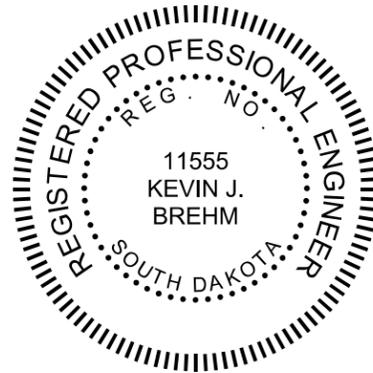
All auger holes are drilled with a 2¹/₂ inch diameter continuous flight auger.

Original construction plans bottom of footing elevations. Actual elevations may vary.

Original construction plans piling lengths. Actual tip elevations unknown.

Sample Zone 48 Blows Per Foot

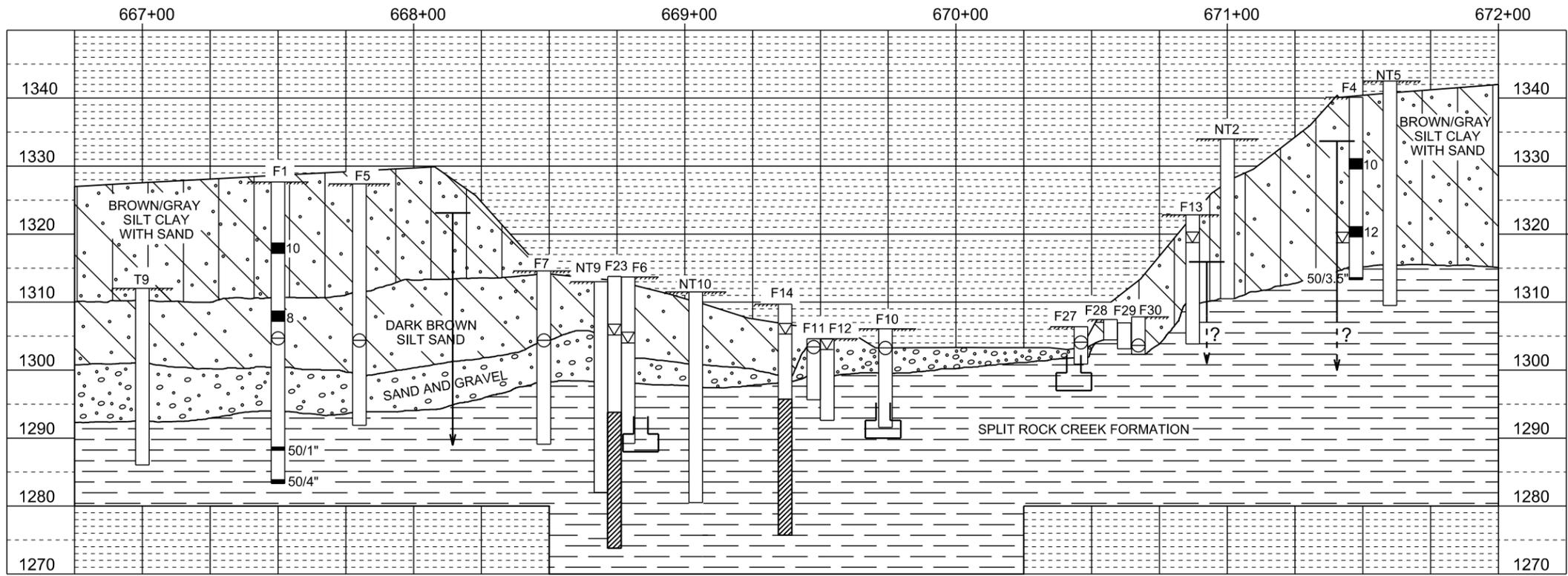
Penetration Test results are listed as uncorrected "N" values. Blows over inches are listed if refusal is achieved, which is 50 blows within one 6 inch set.



Hole Number	F1	F1	F4	F4
Station	667+50	667+50	671+48	671+48
Depth	10.5 ft	20.5 ft	10.5 ft	20.2 ft
Soil Color	Brown/Gray	Brown	Brown/Gray	Brown/Gray
Classification	Sandy Clay	Silty Sand	Silty Clay Sand	Sandy Clay
Strength (Qu)	1,989 psf	981 psf	4,501 psf	5,629 psf
Dry Density	109.7 pcf	96.3 pcf	106.6 pcf	102.6 pcf
Wet Density	130.3 pcf	110.7 pcf	126 pcf	124 pcf
Moisture	18.8 %	14.9 %	18.2 %	20.8 %
Pass No. 10	99.2 %	98.1 %	62 %	94 %
Pass No. 40	87.2 %	86.2 %	58.8 %	84 %
Pass No. 200	59.9 %	32 %	49.6 %	65.3 %
Sand Content	39.3 %	66.1 %	12.5 %	28.7 %
Silt Content	26.2 %	20.2 %	19.8 %	25.8 %
Clay Content	33.7 %	11.8 %	29.8 %	39.5 %

GROUND WATER ELEVATIONS
as of MAY, JUNE, & OCTOBER 2015

F1	(DRY)	1304.7	F27	(DRY)	1303.8
F4		1318.8	F28	(DRY)	1303.9
F5	(DRY)	1304.4	F29	(DRY)	1303.1
F6		1304.0	F30	(DRY)	1303.6
F7	(DRY)	1304.1			
F10	(DRY)	1303.3			
F11	(DRY)	1303.4			
F12		1303.2			
F13		1323.7			
F14		1304.3			
F23		1305.2			



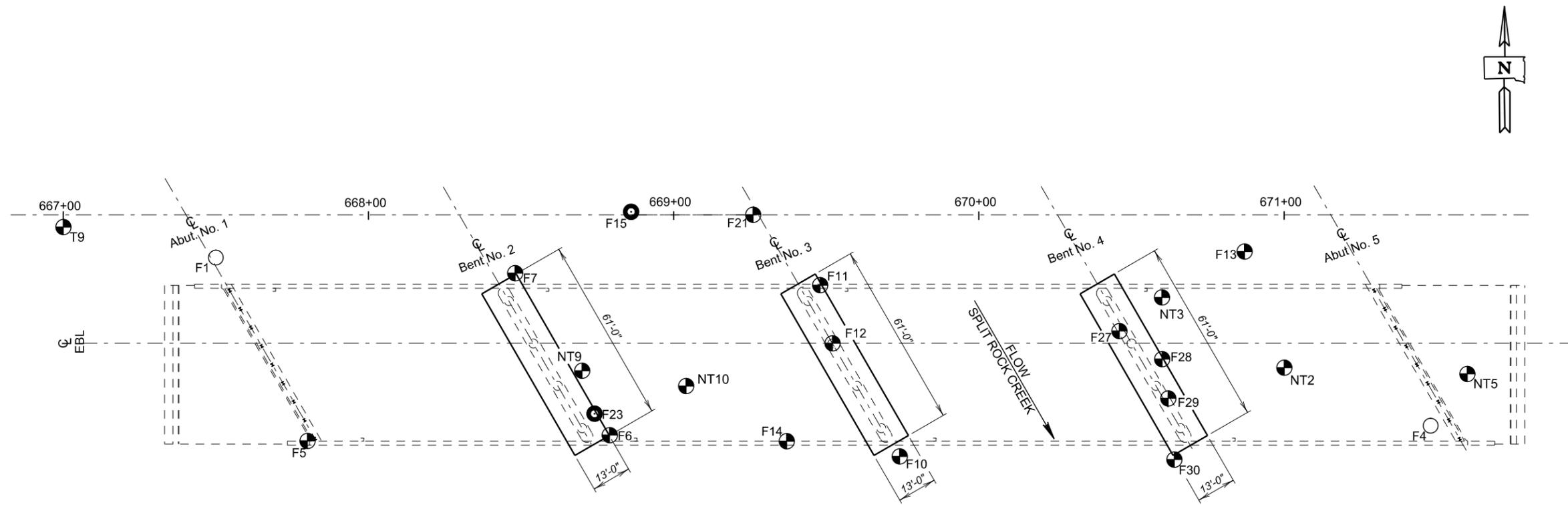
SITE PLAN & SUBSURFACE PROFILE (A)
FOR
EAST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE

50'-0" ROADWAY OVER SPLIT ROCK CREEK
30° R.H.F. SKEW
SEC. 26-T102N-R48W
STA. 667 + 63.02
TO STA. 671 + 41.48
STR. NO. 50-284-166

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

DESIGNED BY	CK. DES. BY	DRAFTED BY	
	JW	HK	

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(81)406	E40	E62



PLAN

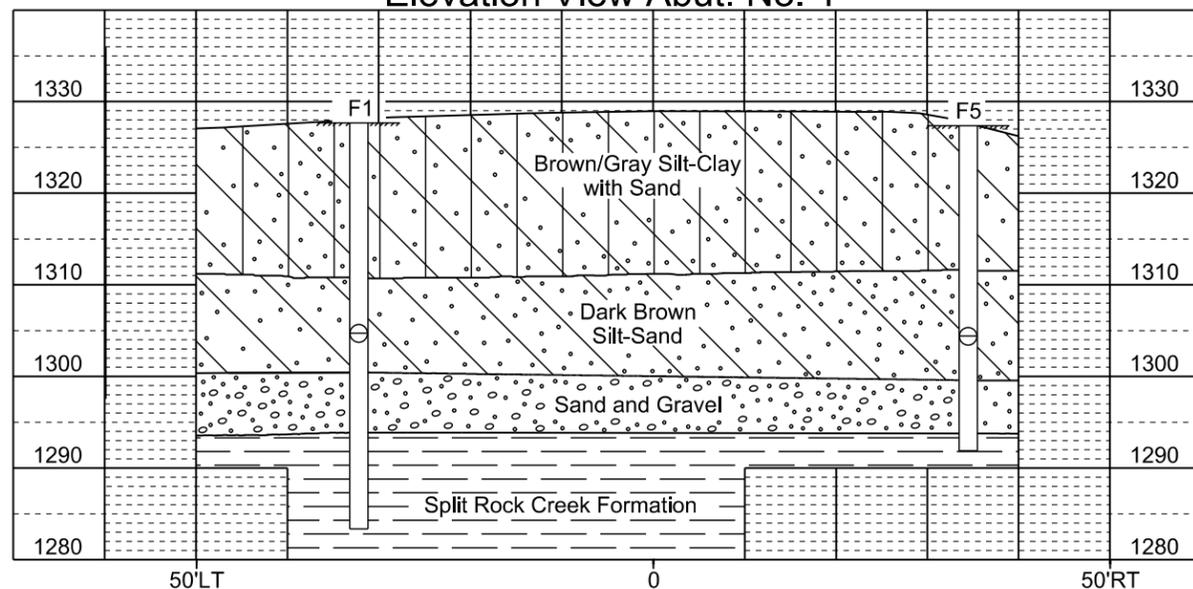


SITE PLAN & SUBSURFACE PROFILE (B)
 FOR
 EAST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
 50'-0" ROADWAY 30° R.H.F. SKEW
 OVER SPLIT ROCK CREEK SEC. 26-T102N-R48W
 STA. 667 + 63.02 IM 0909(81)406
 TO STA. 671 + 41.48 HL-93 + ALT
 STR. NO. 50-284-166
 MINNEHAHA COUNTY
 S. D. DEPT. OF TRANSPORTATION
 MAY 2016

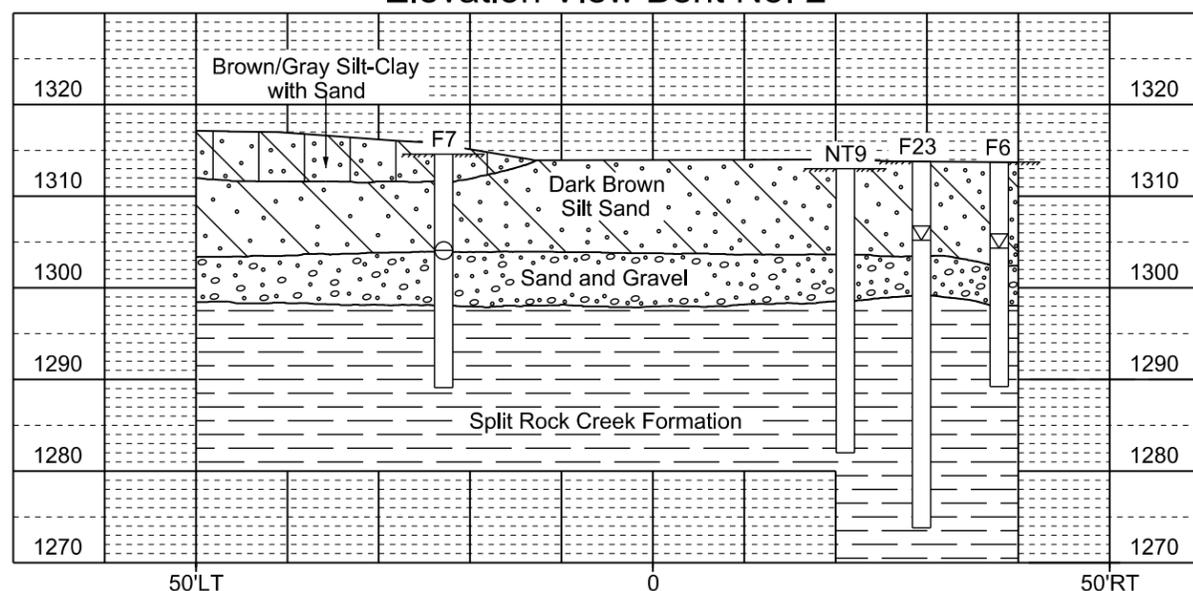
DESIGNED BY	CK. DES. BY	DRAFTED BY	
	JW	HK	

BRIDGE ENGINEER

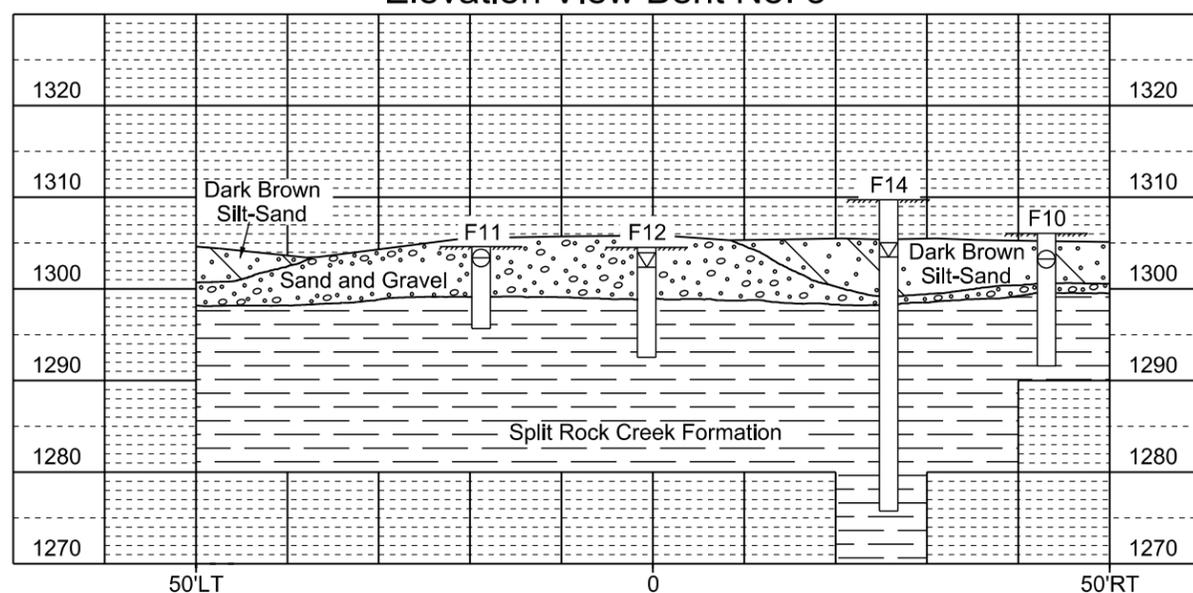
Elevation View Abut. No. 1



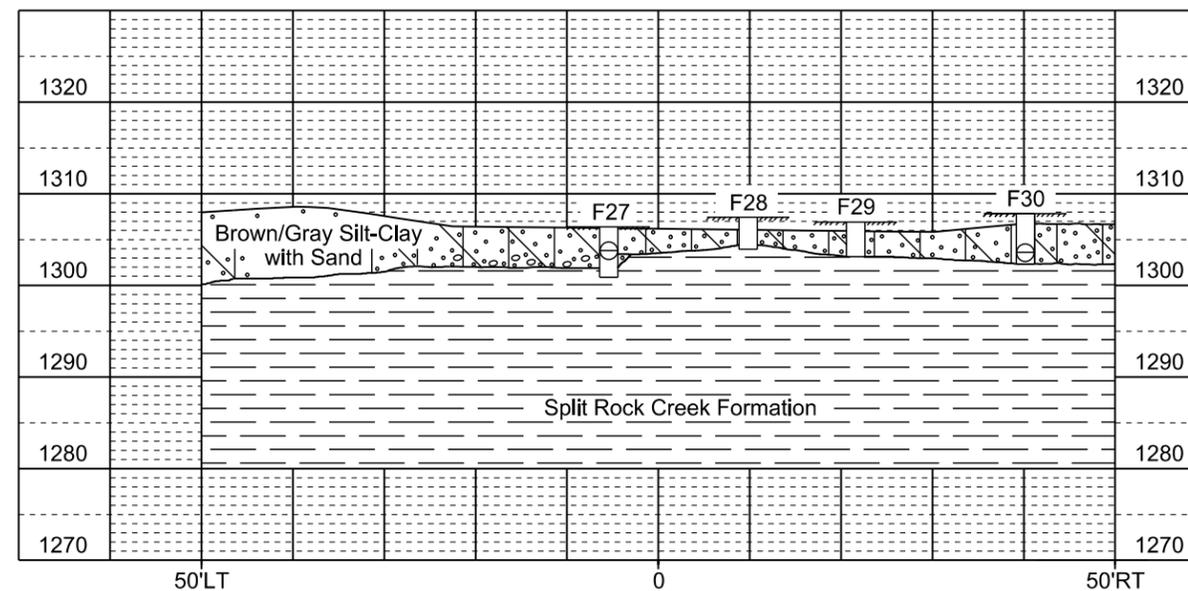
Elevation View Bent No. 2



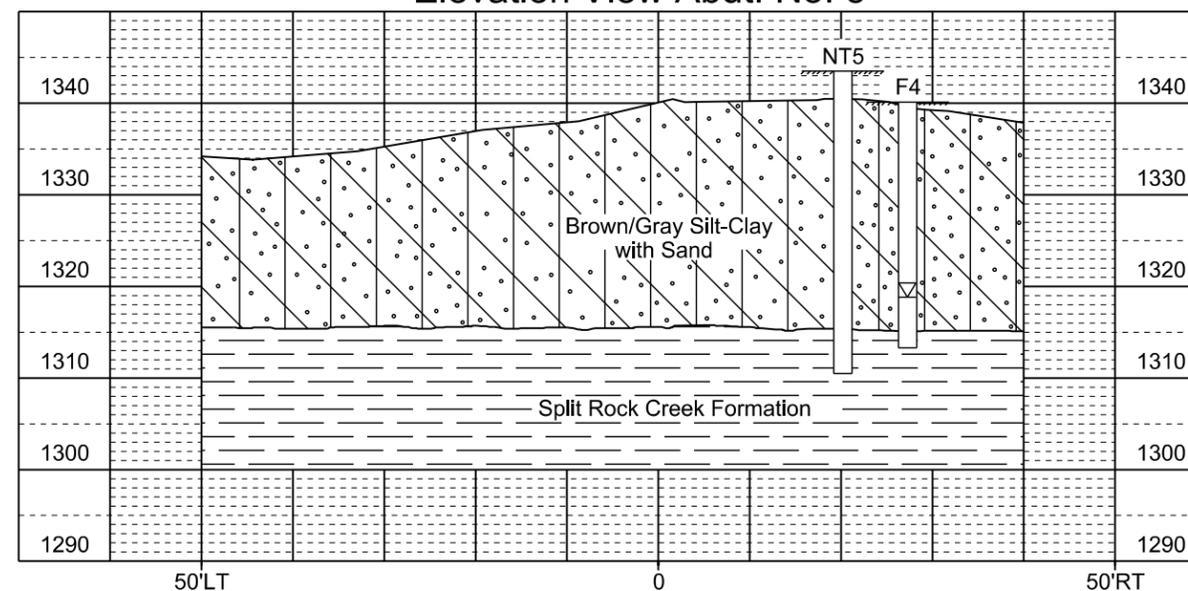
Elevation View Bent No. 3



Elevation View Bent No. 4



Elevation View Abut. No. 5



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

Groundwater elevations for 'F' borings are listed on the Site Plan and Subsurface Profile (A) Sheet.

SUBSURFACE INVESTIGATION ELEVATION VIEWS FOR

EAST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE

50'-0" ROADWAY OVER SPLIT ROCK CREEK
STA. 667 + 63.02 TO STA. 671 + 41.48
STR. NO. 50-284-166

30° R.H.F. SKEW
SEC. 26-T102N-R48W
IM 0909(81)406
HL-93 + ALT

MINNEHAHA COUNTY

S. D. DEPT. OF TRANSPORTATION

MAY 2016

9 OF 30



DESIGNED BY	CK. DES. BY	DRAFTED BY	
	JW	HK	

BRIDGE ENGINEER

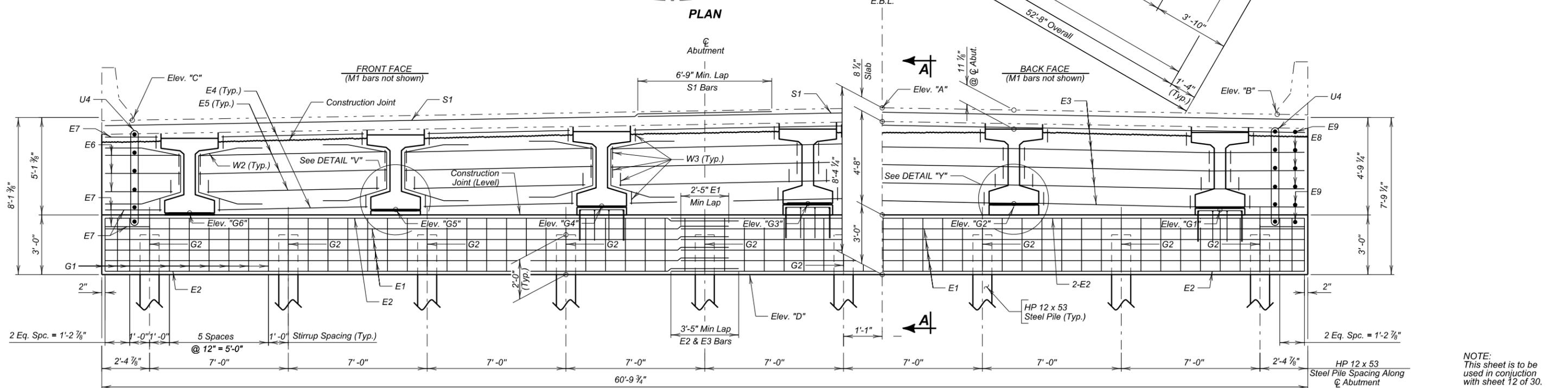
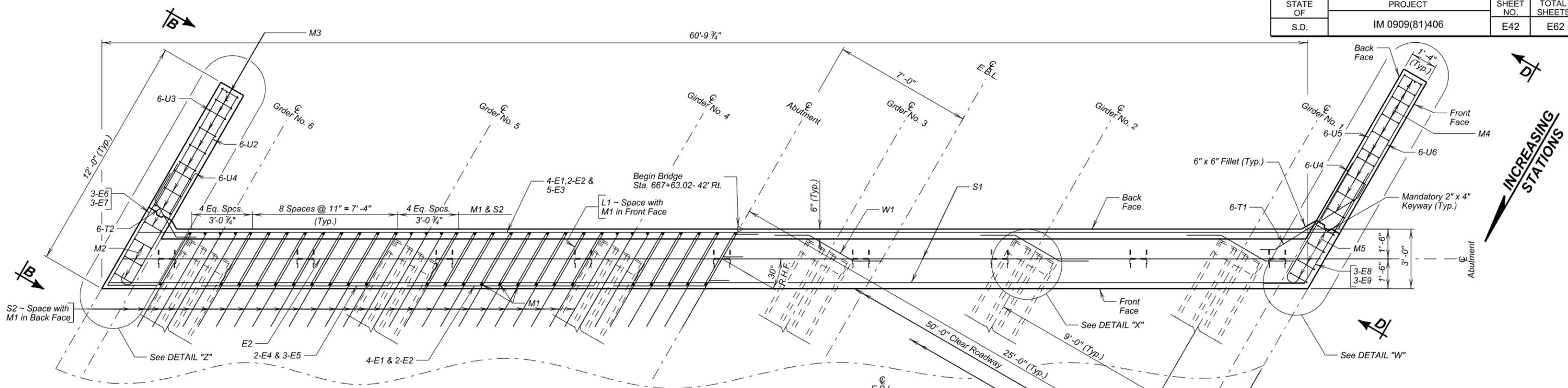
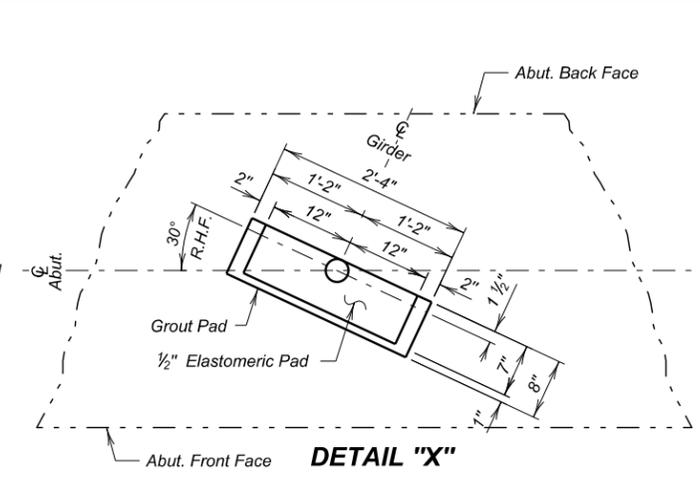
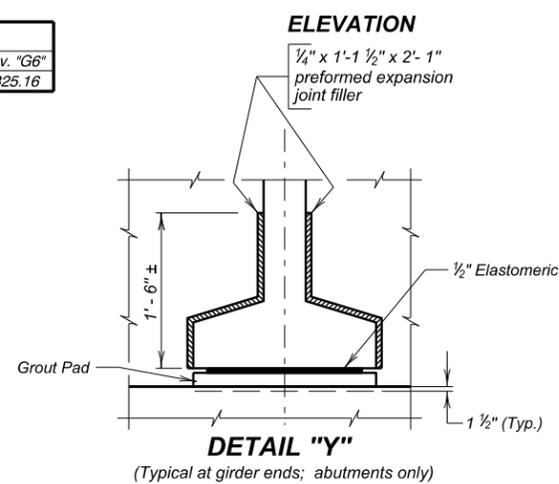


TABLE OF ELEVATIONS

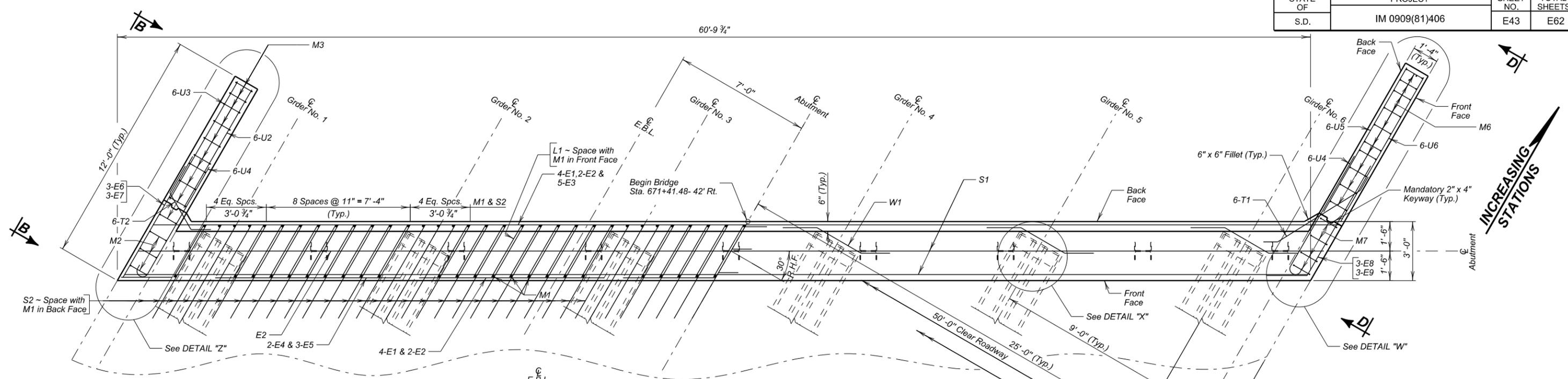
Elev. "A"	Elev. "B"	Elev. "C"	Elev. "D"	Elev. "E"	Elev. "F"	Elev. "G1"	Elev. "G2"	Elev. "G3"	Elev. "G4"	Elev. "G5"	Elev. "G6"
1330.11	1329.53	1329.87	1321.76	1329.31	1329.66	1324.88	1325.18	1325.37	1325.30	1325.23	1325.16

NOTE:
 Elevations "A", "B" & "C" are top of slab at centerline of abutment.
 Elevations "G1" thru "G6" are top of grout pad at centerline of abutment.
 Elevations "E" & "F" are top of wingwall at curb elevation.
 Top of Grout Pad shall be level and smooth

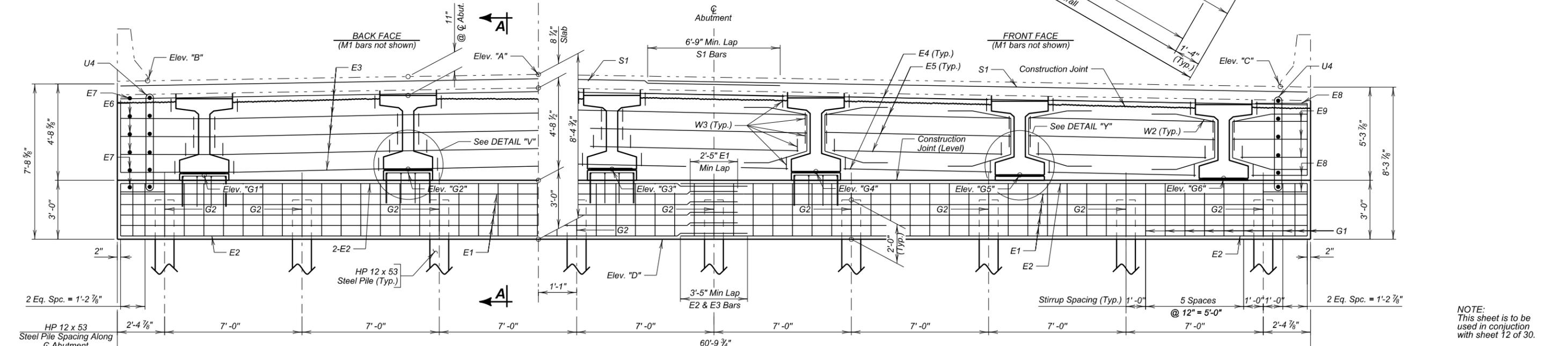


ABUTMENT NO. 1 DETAILS

FOR
378' - 5 1/2" PRESTR. GIRDER BRIDGE
 50'-0" ROADWAY OVER SPLIT ROCK CREEK
 STA. 667 + 63.02 TO STA. 671 + 41.48
 STR. NO. 50-284-166
 30° R.H.F. SKEW
 SEC. 26-T102N-R48W
 IM 0909(81)406
 HL-93 + ALT
 MINNEHAHA COUNTY
 S. D. DEPT. OF TRANSPORTATION
 MAY 2016



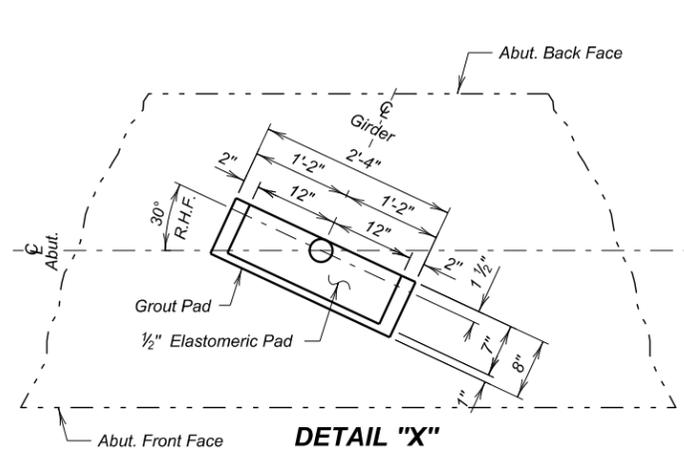
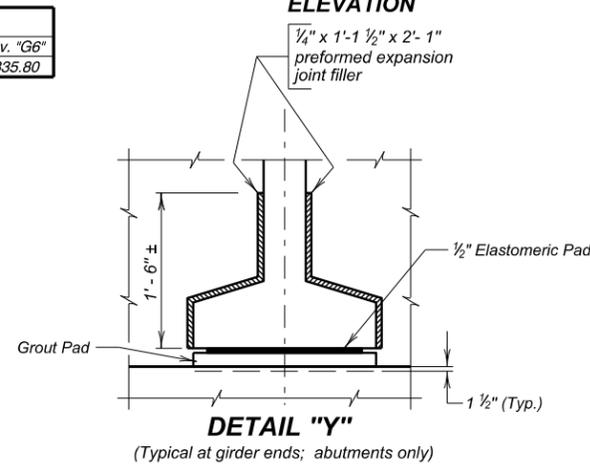
PLAN



ELEVATION

Elev. "A"	Elev. "B"	Elev. "C"	Elev. "D"	Elev. "E"	Elev. "F"	Elev. "G1"	Elev. "G2"	Elev. "G3"	Elev. "G4"	Elev. "G5"	Elev. "G6"
1340.58	1339.90	1340.50	1332.18	1340.84	1340.19	1335.30	1335.63	1335.86	1335.84	1335.82	1335.80

NOTE:
 Elevations "A", "B" & "C" are top of slab at centerline of abutment.
 Elevations "G1" thru "G6" are top of grout pad at centerline of abutment.
 Elevations "E" & "F" are top of wingwall at curb elevation.
 Top of Grout Pad shall be level and smooth

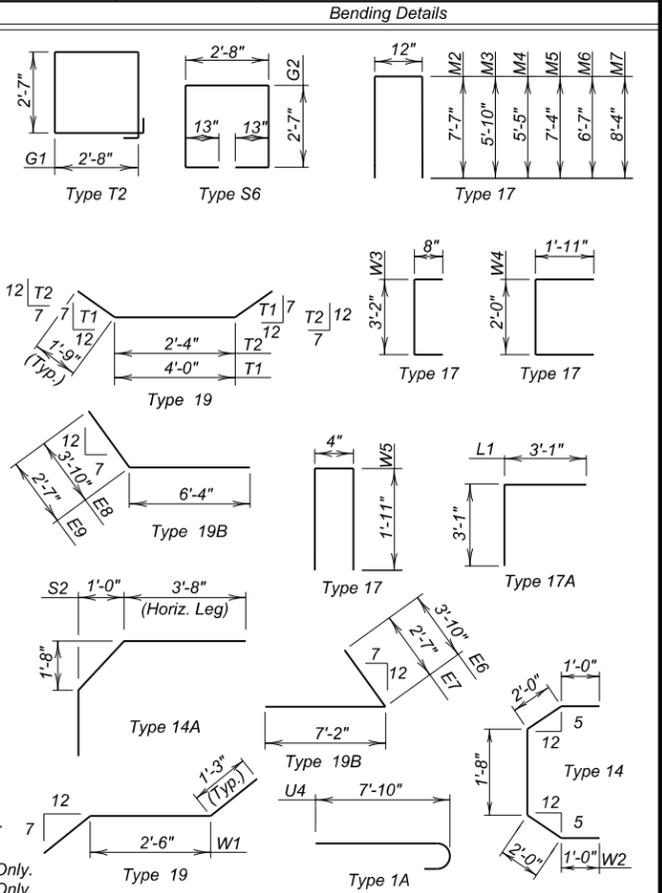


ABUTMENT NO. 5 DETAILS
 FOR
378' - 5 1/2" PRESTR. GIRDER BRIDGE
 50'-0" ROADWAY OVER SPLIT ROCK CREEK
 STA. 667 + 63.02 TO STA. 671 + 41.48
 STR. NO. 50-284-166
 30° R.H.F. SKEW
 SEC. 26-T102N-R48W
 IM 0909(81)406
 HL-93 + ALT
 MINNEHAHA COUNTY
 S. D. DEPT. OF TRANSPORTATION
 MAY 2016

NOTE:
 This sheet is to be used in conjunction with sheet 12 of 30.

REINFORCING SCHEDULE (for One Abutment)

Mk.	No.	Size	Length	Type	
△	B20	6	3'-11"	Str.	
△	E1	16	5	31'-5"	Str.
△	E2	10	7	31'-11"	Str.
△	E3	10	8	32'-6"	Str.
△	E4	10	5	7'-2"	Str.
△	E5	15	6	9'-6"	Str.
△	E6	3	7	10'-5"	19B
△	E7	3	7	9'-9"	19B
△	E8	3	7	10'-2"	19B
△	E9	3	7	8'-11"	19B
△	G1	54	5	11'-6"	T2
△	G2	9	5	10'-0"	S6
△	L1	65	4	6'-2"	17A
△	M1	112	5	6'-4"	Str.
△	M2	3	5	16'-2"	17
△	M3	10	5	12'-8"	17
△	M4	10	5	11'-10"	17
△	M5	4	5	15'-8"	17
△	M6	10	5	14'-2"	17
△	M7	4	5	17'-8"	17
△	S1	4	9	33'-7"	Str.
△	S2	65	5	8'-1"	14A
△	T1	6	6	7'-6"	19
△	T2	6	6	5'-10"	19
△	U2	6	7	7'-3"	Str.
△	U3	6	7	7'-3"	Str.
△	U4	12	7	8'-8"	1A
△	U5	6	7	8'-9"	Str.
△	U6	6	7	8'-9"	Str.
△	W1	6	5	5'-0"	19
△	W2	12	4	7'-8"	14
△	W3	60	5	4'-6"	17
△	W4	4	5	5'-10"	17
△	W5	8	5	5'-10"	17
△	W5	8	5	4'-2"	17
△	W5	16	5	4'-2"	17



NOTES:
 All dimensions are out to out of bars.
 △ Bars to be Epoxy Coated.
 □ Bars included in Abutment No. 1 Only.
 ○ Bars included in Abutment No. 5 Only.

ESTIMATED QUANTITIES

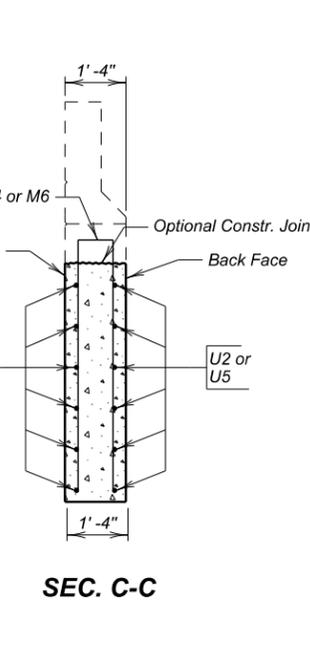
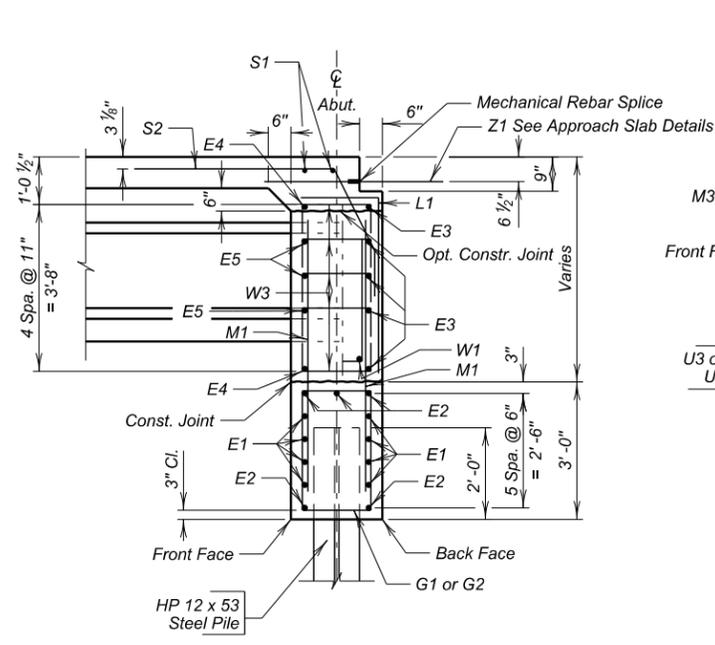
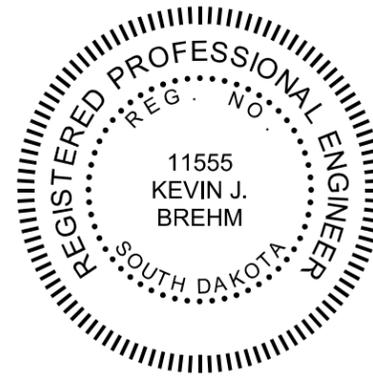
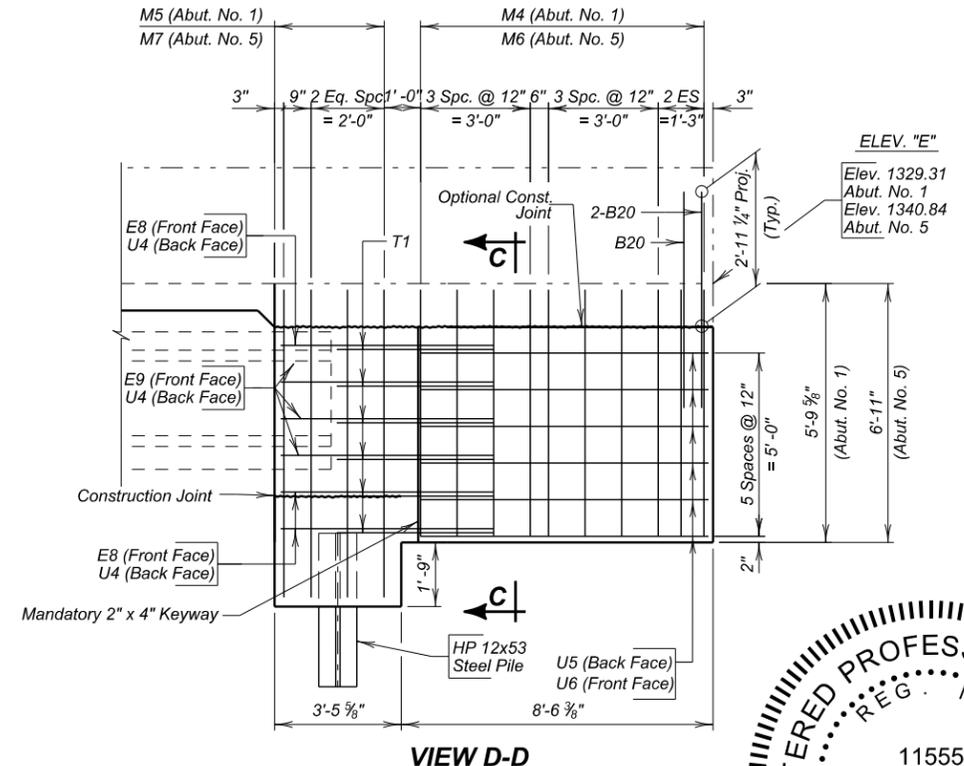
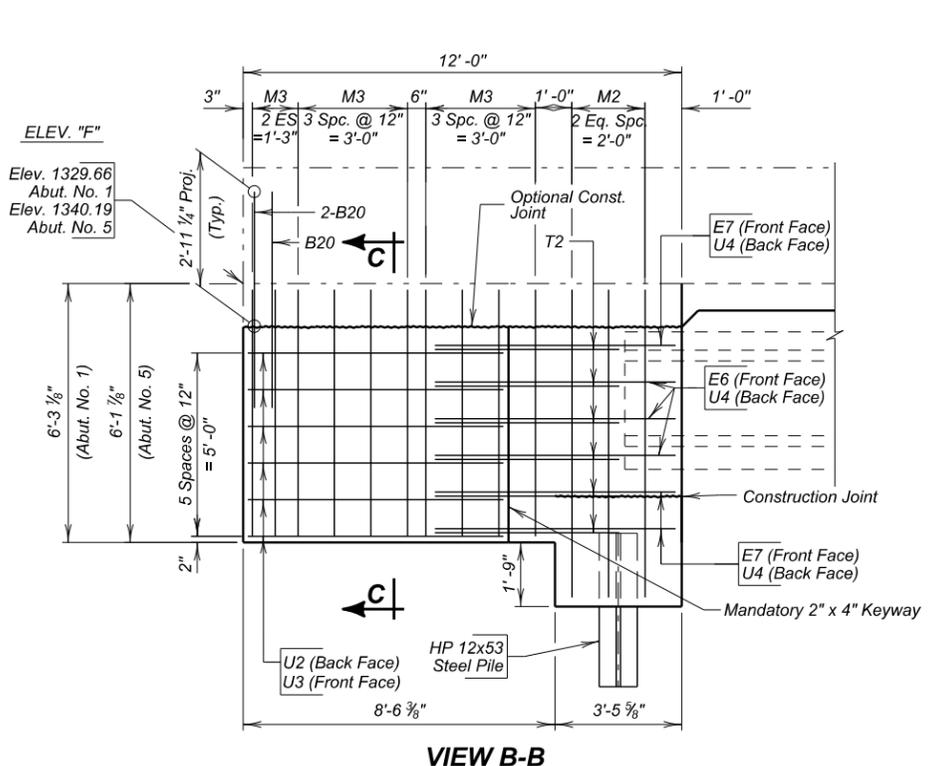
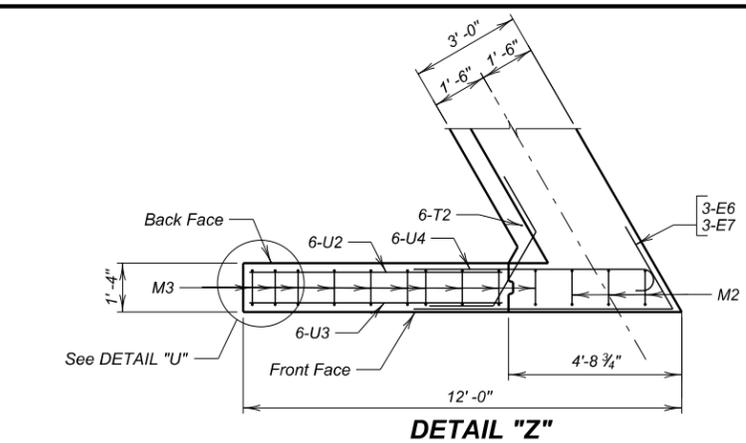
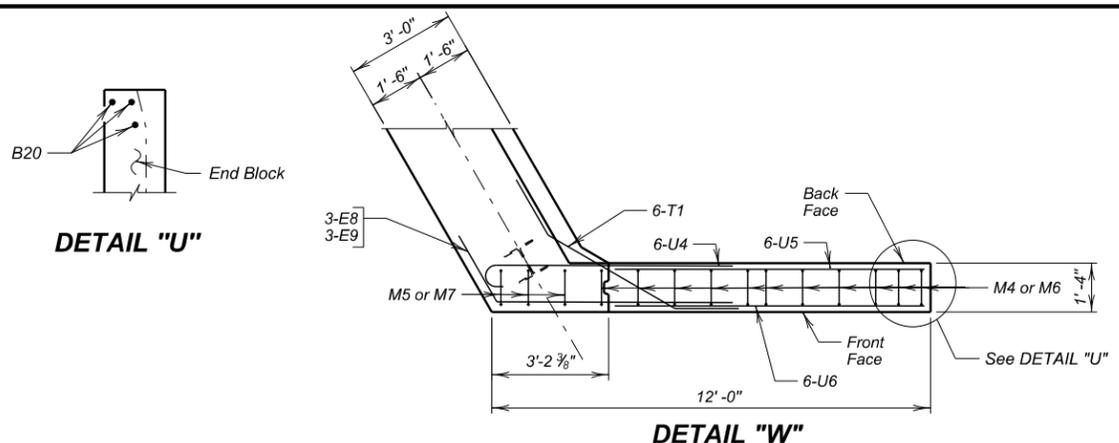
ITEM	UNIT	QUANTITY	
		Abut. No. 1	Abut. No. 5
Class A45 Concrete, Bridge	Cu. Yd.	49.0	49.8
Reinforcing Steel	Lb.	5,586	5,680
Epoxy Coated Reinforcing Steel	Lb.	1,308	1,308
Structure Excavation, Bridge	Cu. Yd.	101	109
HP 12 X 53 Steel Test Pile, Furnish and Drive	Ft.	1 @ 45' = 45'	1 @ 35' = 35'
HP 12 X 53 Steel Bearing Pile, Furnish and Drive	Ft.	8 @ 40' = 320'	8 @ 30' = 240'
Preboring Pile	Ft.	9 @ 10' = 90'	9 @ 10' = 90'
HP 12 Pile Tip Reinforcement	Each	9	9

Quantities for Pile Cap, Abutment Backwall and Wingwalls below construction joint. Also includes 0.2 Cu. Yd. for grout pads at each Abutment.
 NOTE:
 Concrete shall be placed in the space under the beams (within the backwall width) during the pour. Care shall be taken to get the concrete vibrated into this area. If upon form removal the space is not completely filled and consolidated, the contractor shall grout in the remaining voids.

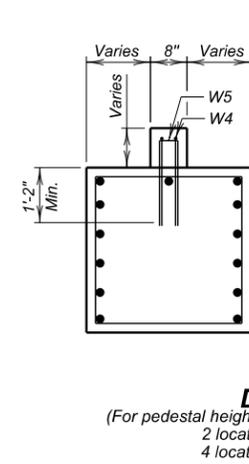
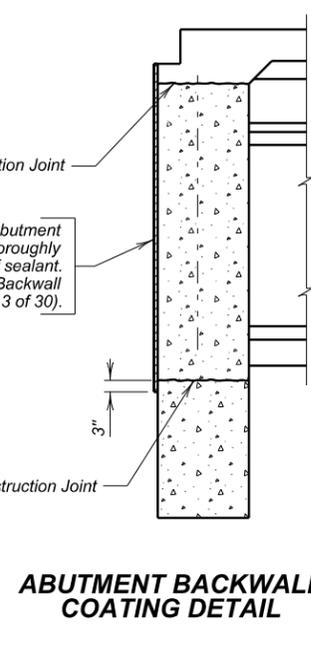
ABUTMENT DETAILS (CONTINUED)

FOR
378' - 5 1/2" PRESTR. GIRDER BRIDGE
 50'-0" ROADWAY OVER SPLIT ROCK CREEK
 STA. 667 + 63.02 TO STA. 671 + 41.48
 STR. NO. 50-284-166
 30° R.H.F. SKEW
 SEC. 26-T102N-R48W
 IM 0909(81)406
 HL-93 + ALT
 MINNEHAHA COUNTY
 S. D. DEPT. OF TRANSPORTATION
 MAY 2016

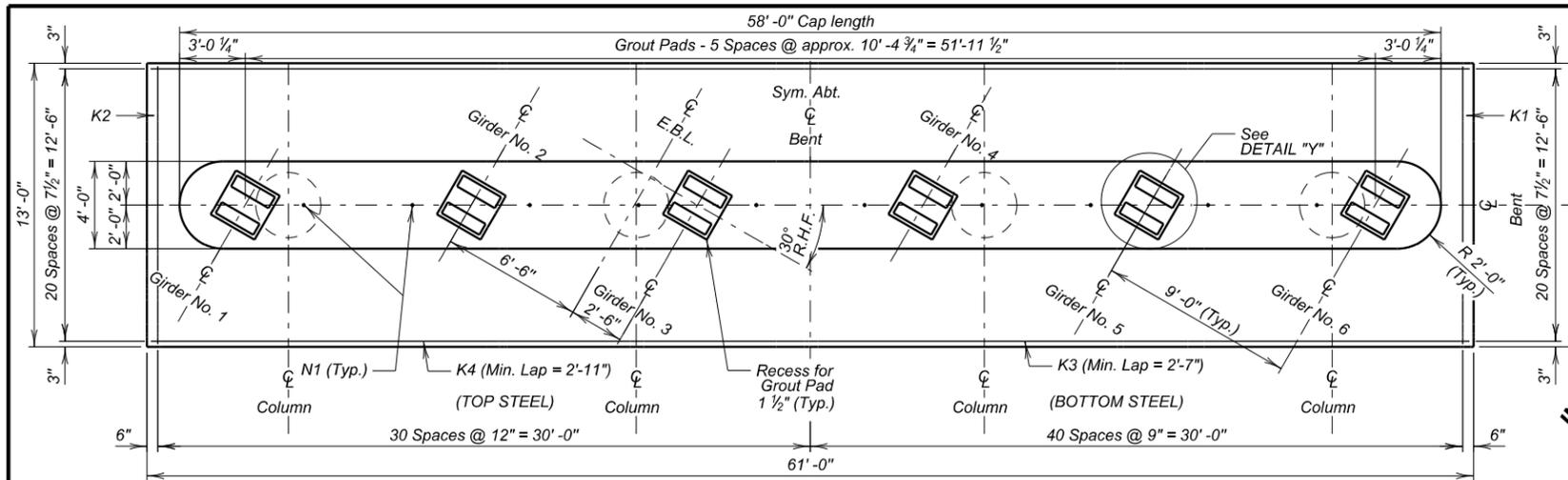
DESIGNED BY JRM	CK. DES. BY KJB	DRAFTED BY EBS	BRIDGE ENGINEER
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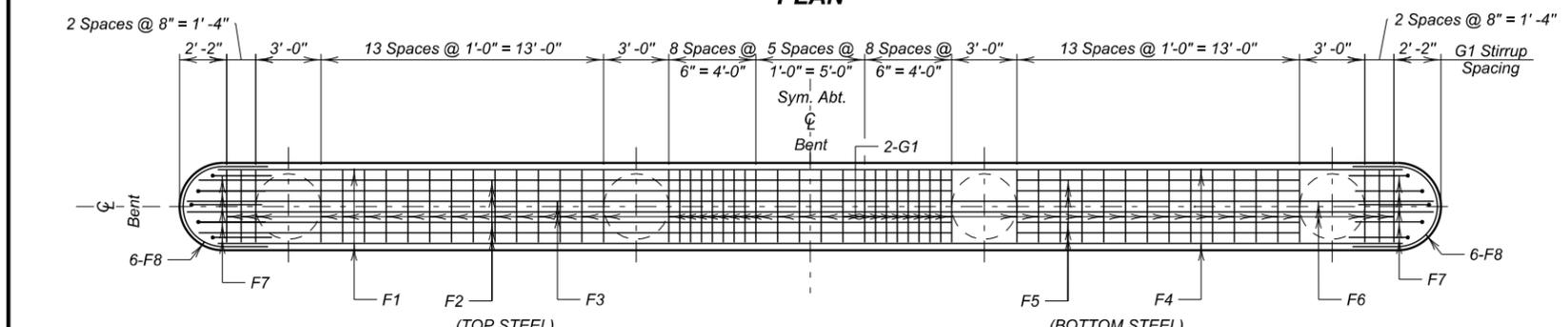
The face on the back side of the abutment between the abut. wings shall be thoroughly coated with an approved waterproof sealant. (See Notes Regarding Abutment Backwall Coating on Sheet 3 of 30).



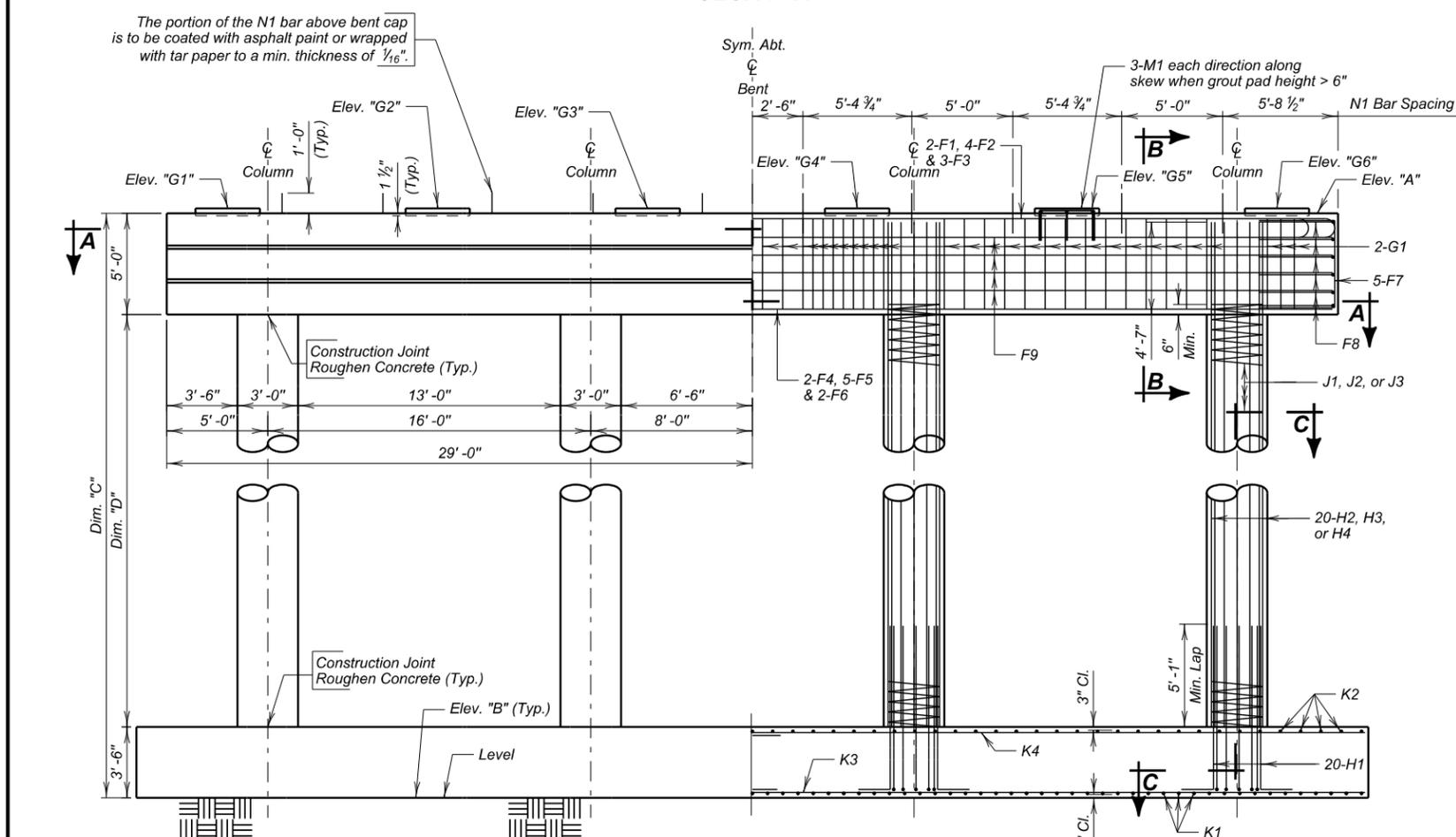
DETAIL 'V'
 (For pedestal height from 6" min. to less than 10" max.)
 2 locations at Abutment No. 1
 4 locations at Abutment No. 5



PLAN

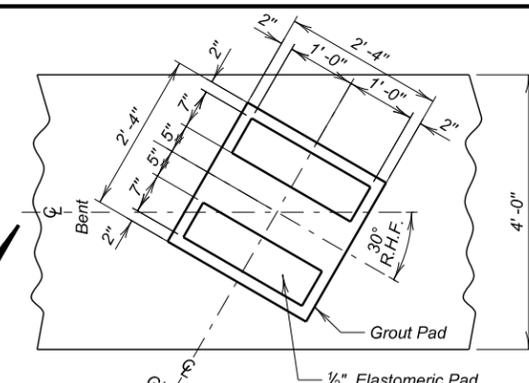


SEC. A - A

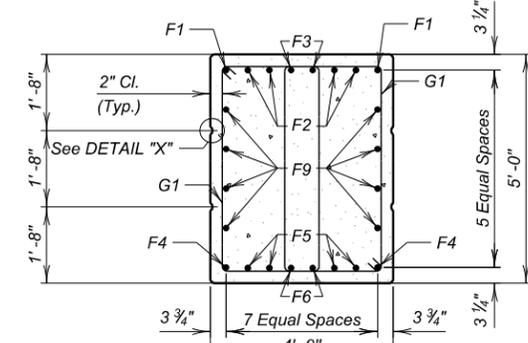


ELEVATION

INCREASING STATIONS



DETAIL "Y"



SEC. B - B

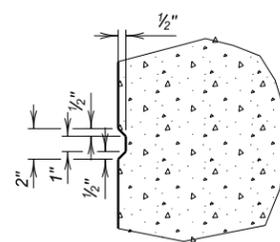
REINFORCING SCHEDULE					Bending Details	
(For One Bent)						
Mk.	No.	Size	Length	Type		
F1	2	10	57'-4"	1		
F2	4	10	59'-1"	1		
F3	2	10	60'-0"	1		
F4	2	10	54'-6"	Str.		
F5	12	10	13'-0"	Str.		
F6	2	10	57'-4"	Str.		
F7	10	5	13'-11"	17		
F8	12	5	14'-10"	S11		
F9	8	5	54'-2"	Str.		
G1	112	5	14'-7"	T1		
H1	80	9	9'-10"	17A		
H2	80	9	35'-9"	Str.		
H3	80	9	36'-6"	Str.		
H4	80	9	32'-5"	Str.		
J1	4	5	808'-1"	Spiral		
J2	4	5	825'-0"	Spiral		
J3	4	5	725'-8"	Spiral		
K1	81	7	12'-8"	Str.		
K2	61	6	12'-8"	Str.		
K3	42	7	31'-8"	Str.		
K4	42	6	31'-10"	Str.		
M1	24	5	6'-0"	17		
N1	10	8	2'-0"	Str.		

TABLE OF ELEVATIONS AND DIMENSIONS										
Bent No.	Elev. "A"	Elev. "B"	Dim. "C"	Dim. "D"	Elev. "G1"	Elev. "G2"	Elev. "G3"	Elev. "G4"	Elev. "G5"	Elev. "G6"
2	1326.79	1287.00	39'-9 1/2"	31'-3 1/2"	1326.91	1327.23	1327.44	1327.39	1327.34	1327.29
3	1329.48	1289.00	40'-5 3/4"	31'-11 1/2"	1329.60	1329.95	1330.18	1330.15	1330.13	1330.09
4	1332.45	1296.00	36'-5 3/8"	27'-11 3/8"	1332.57	1332.93	1333.17	1333.15	1333.14	1333.11

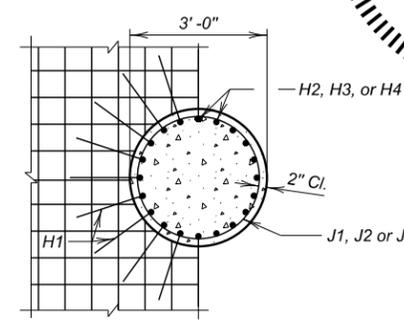
Elev. "G1", "G2", "G3", "G4", "G5" and "G6" are on top of grout pads at ϕ Bent. Top of grout pads shall be level and smooth.

ESTIMATED QUANTITIES				
ITEM	UNIT	Bent No. 2	Bent No. 3	Bent No. 4
Class A45 Concrete, Bridge	Cu. Yd.	178.5	179.2	175.0
Reinforcing Steel	Lb.	30,379	30,654	29,128
Structure Excavation, Bridge	Cu. Yd.	1022	638	196

* Includes 275 lbs. for spacer bars at each Bent. Each Spacer bar is computed at 3/4 lbs. per lin. ft. regardless of type furnished.
 ϕ Includes 0.6 Cu. Yds. for grout pads at each Bent.



DETAIL "X"

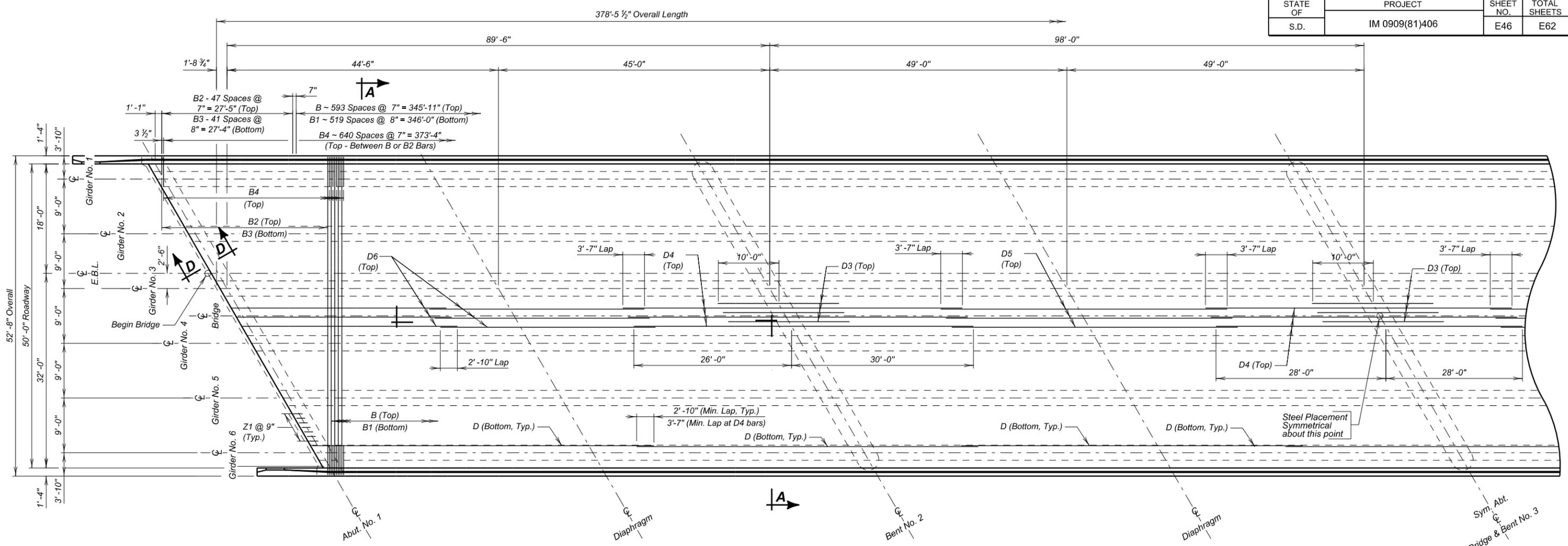


SEC. C - C



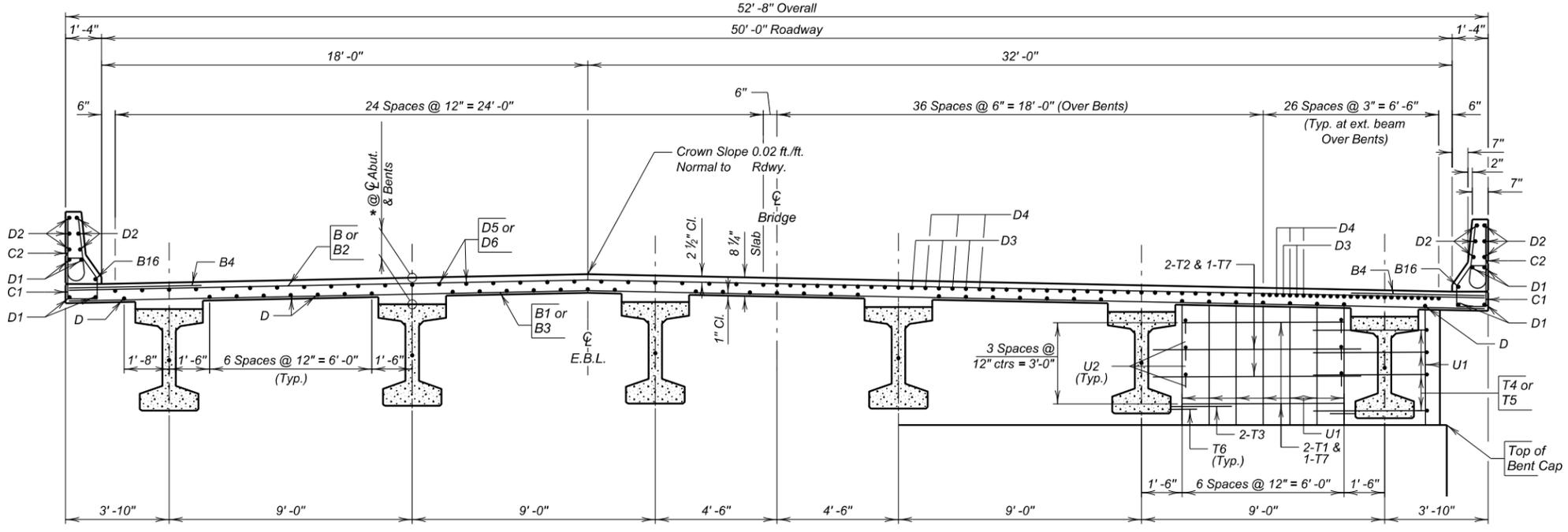
BENT DETAILS
 FOR
EAST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
 50'-0" ROADWAY OVER SPLIT ROCK CREEK
 STA. 667 + 63.02 TO STA. 671 + 41.48
 STR. NO. 50-284-166
 MINNEHAHA COUNTY
 S. D. DEPT. OF TRANSPORTATION
 MAY 2016

DESIGNED BY TOR	CK. DES. BY CTH	DRAFTED BY WJH	
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HALF PLAN

NOTES:
 This sheet is to be used in conjunction with Superstructure Details (B).
 See Details of Approach Slab Adjacent to Bridge (A) for Z1 bar layout.



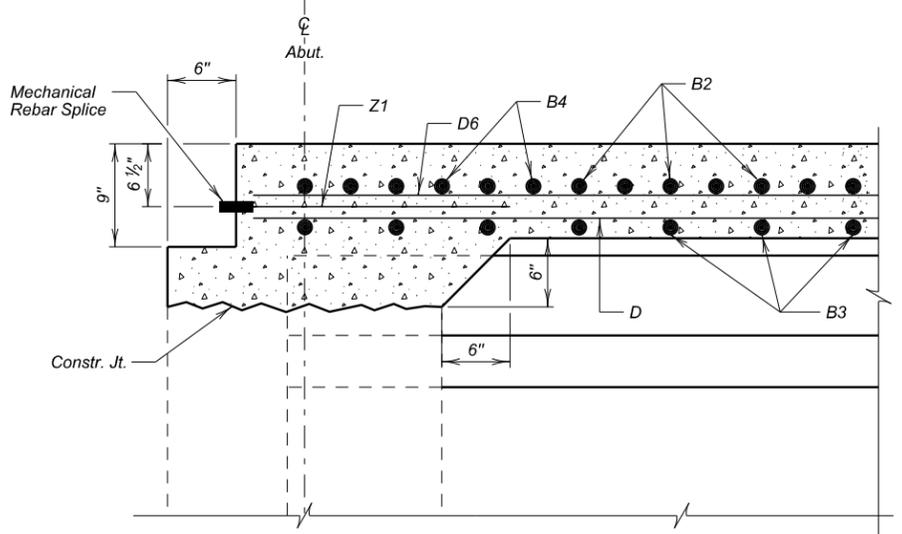
SEC. A-A

* 11 1/8" at Abutment No. 1
 11 1/8" at Bent No. 2
 10 1/4" at Bent No. 3 & Bent No. 4
 11" at Abutment No. 5

SUPERSTRUCTURE DETAILS (A)
 FOR
 EAST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
 50'-0" ROADWAY
 OVER SPLIT ROCK CREEK
 STA. 667 + 63.02
 TO STA. 671 + 41.48
 STR. NO. 50-284-166
 MINNEHAHA COUNTY
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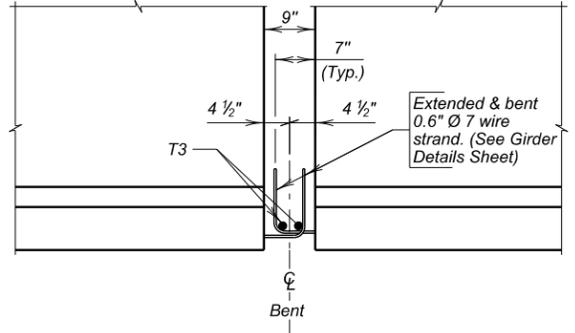
DESIGNED BY SLS	CK. DES. BY KJB	DRAFTED BY WJH	
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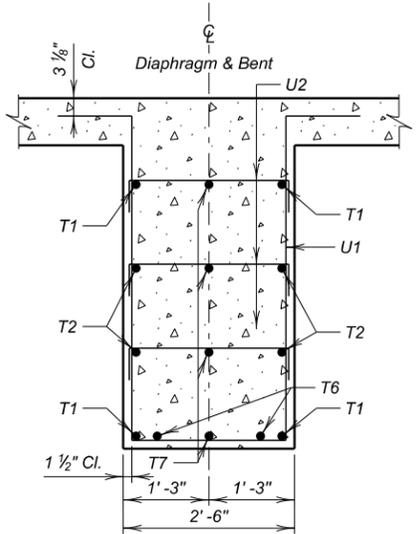
SEC. D - D

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Class A45 Concrete, Bridge Deck	Cu. Yd.	730.5
Epoxy Coated Reinforcing Steel	Lb.	158,381
Reinforcing Steel	Lb.	2,744
No. 7 Rebar Splice	Each	134
45" Minnesota Shape Prestressed Concrete Beam	Ft.	2,238
Concrete Penetrating Sealer	Sq. Yd.	2,376
Deck Drain, Girder Bridge	Each	8

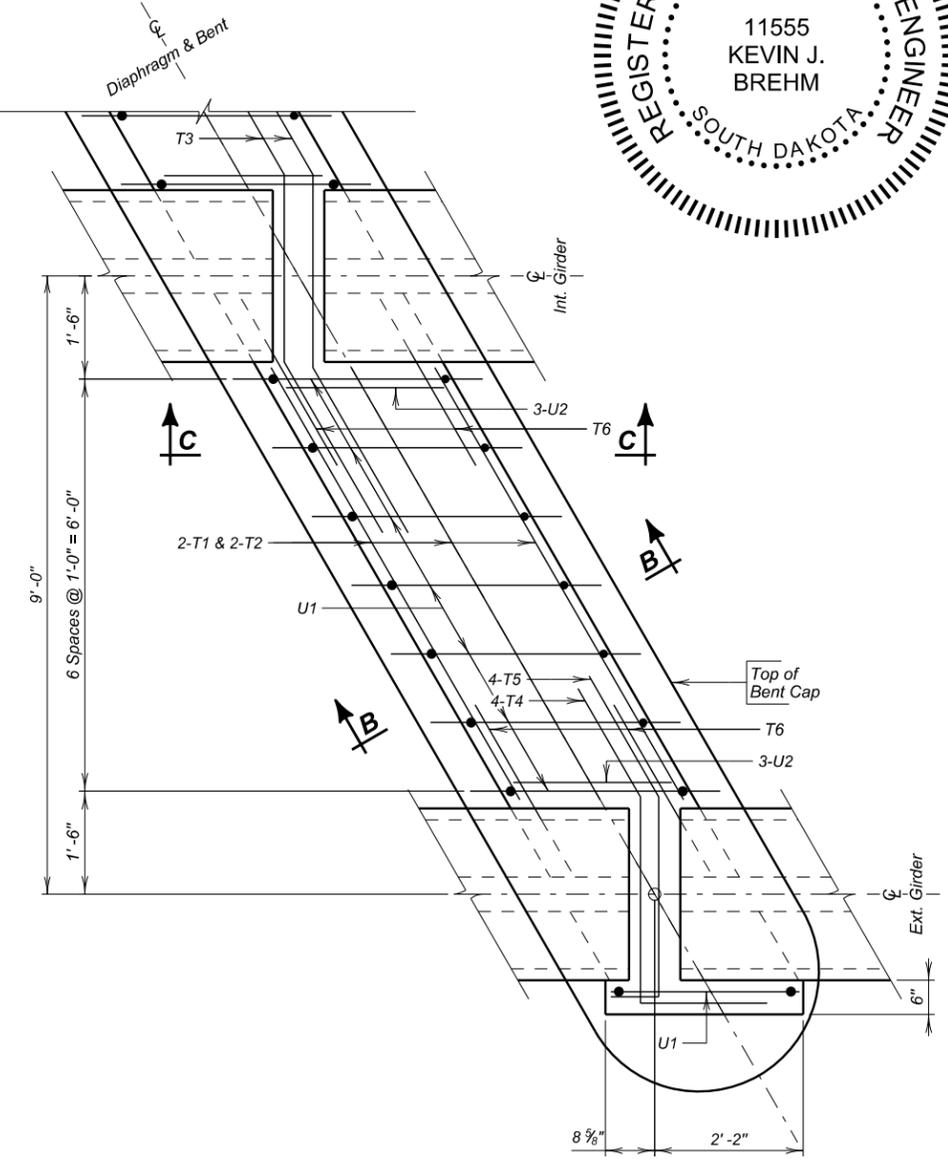
⊞ Includes quantities for Barrier Curbs and Slab.
 ⊞ Includes quantities for Abutment Backwall and Wing Walls above Construction Joint, Barrier Curb, Slab, Diaphragms and Haunch (Average depth of 3" used for Haunch Quantity). Concrete Quantity for Barrier Curbs is 0.0842 Cu. Yd/Ft. Concrete Quantity per 12' End Block is 1.1659 Cu. Yds.



SEC. C - C
 (Showing extended and bent strand detail and T3 bar placement at Bent, T4 & T5 similar at exterior girder.)

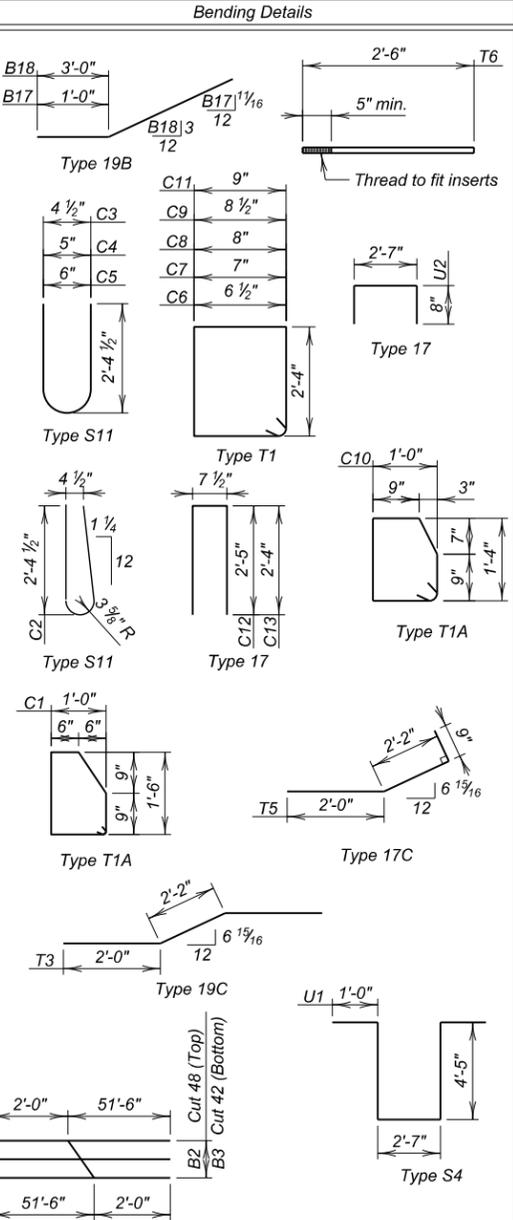


SEC. B - B
 (Girders not Shown This View.)



BENT DIAPHRAGMS
 (Slab Not Shown This View.)

REINFORCING SCHEDULE				
Mk.	No.	Size	Length	Type
B	594	5	52'-4"	Str.
B1	520	5	52'-4"	Str.
B2	48	5	53'-6"	Str.
B3	42	5	53'-6"	Str.
B4	1282	5	6'-0"	Str.
B15	12	5	14'-6"	Str.
B16	16	4	50'-6"	Str.
B17	8	4	8'-6"	19B
B18	12	8	4'-3"	19B
B19	12	5	2'-4"	Str.
B20			(See Abut. Details)	
C1	774	5	5'-7"	T1A
C2	746	5	5'-1"	S11
C3	4	5	5'-0"	S11
C4	4	5	5'-0"	S11
C5	4	5	5'-0"	S11
C6	4	5	6'-8"	T1
C7	4	5	6'-9"	T1
C8	4	5	6'-11"	T1
C9	4	5	7'-0"	T1
C10	16	6	5'-10"	T1A
C11	16	5	7'-1"	T1
C12	4	6	5'-6"	17
C13	4	5	5'-3"	17
D	259	5	56'-4"	Str.
D1	56	5	58'-10"	Str.
D2	96	4	49'-0"	Str.
D3	186	8	20'-0"	Str.
D4	189	8	56'-0"	Str.
D5	100	5	47'-2"	Str.
D6	200	5	35'-6"	Str.
D7	8	5	11'-8"	Str.
T1	60	5	7'-2"	Str.
T2	60	5	9'-5"	Str.
T3	24	5	6'-10"	19C
T4	24	5	7'-0"	17C
T5	24	5	5'-7"	17C
T6	60	5	2'-6"	Str.
T7	12	5	55'-8"	Str.
U1	111	5	13'-5"	S4
U2	90	5	3'-11"	17
Z1	134	7	2'-6"	Str.



NOTES:
 All dimensions are out to out of bars.
 All reinforcing steel shall be epoxy coated except as noted.
 * Bars not to be epoxy coated. ⊞ See cutting diagram.

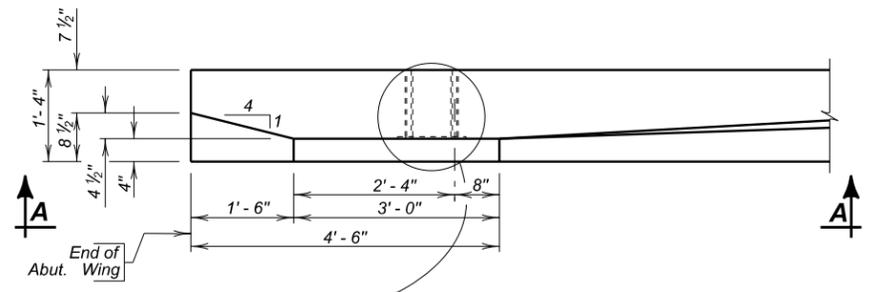
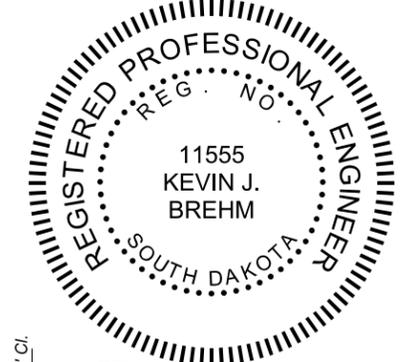
NOTES:
 Concrete shall be placed in the space under the beams at Bents 2, 3, & 4 (within the diaphragm width) during the diaphragm pour. If upon form removal the space is not completely filled and consolidated, the contractor shall grout in the remaining voids.

SUPERSTRUCTURE DETAILS (B)
 FOR
 EAST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
 50'-0" ROADWAY
 OVER SPLIT ROCK CREEK
 STA. 667 + 63.02
 TO STA. 671 + 41.48
 STR. NO. 50-284-166

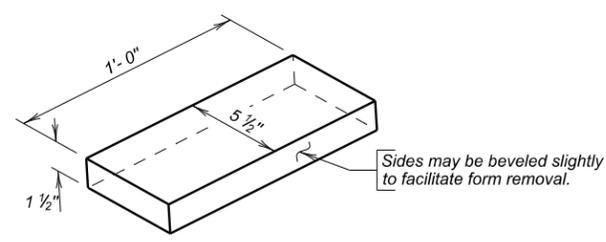
30° R.H.F. SKEW
 SEC. 26-T102N-R48W
 IM 0909(81)406
 HL-93 + ALT

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

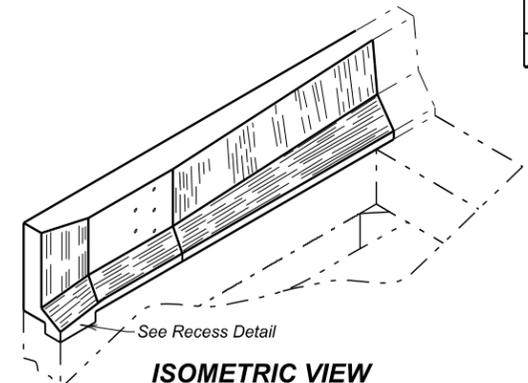
DESIGNED BY SLS	CK. DES. BY KJB	DRAFTED BY WJH
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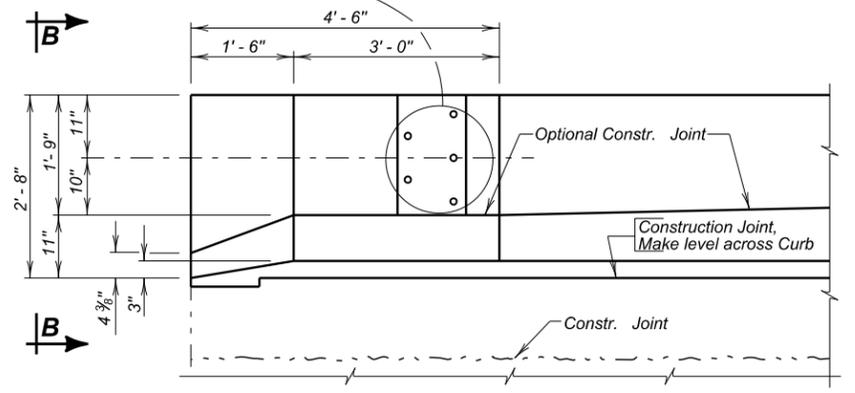
PART PLAN



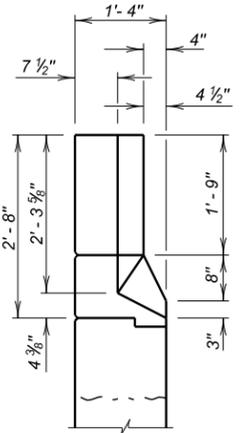
RECESS DETAIL



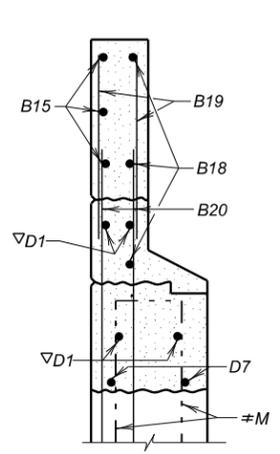
ISOMETRIC VIEW



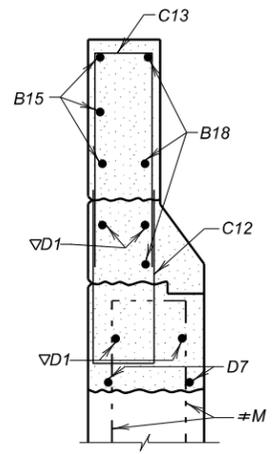
VIEW A - A



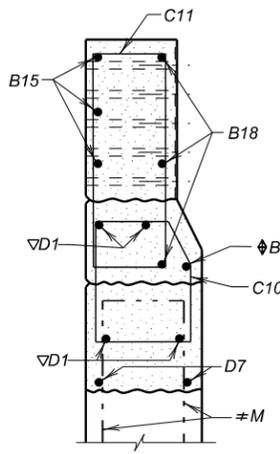
VIEW B - B



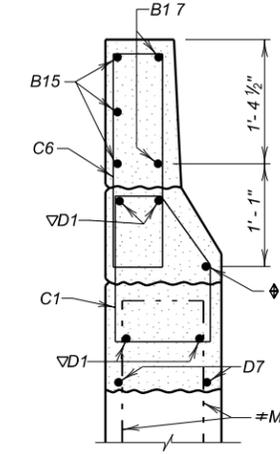
SEC. C - C



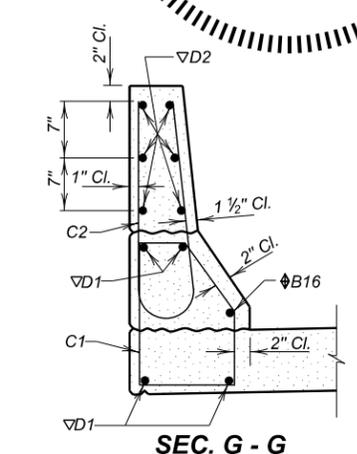
SEC. D - D



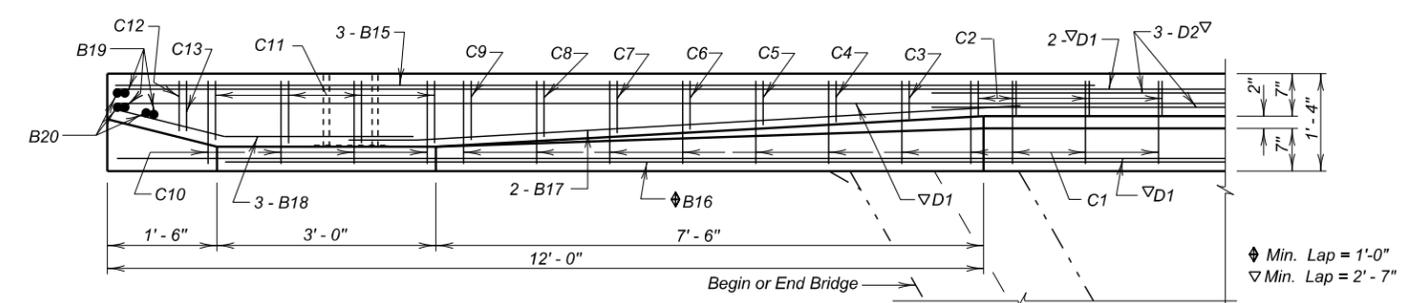
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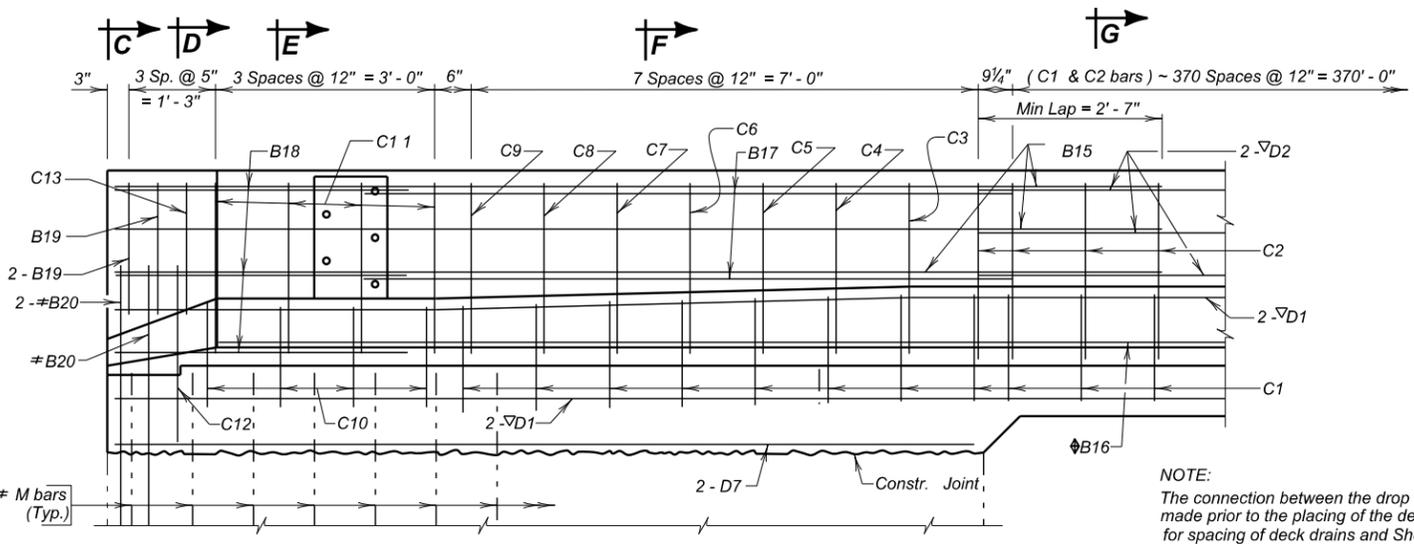
SEC. F - F



SEC. G - G



PLAN

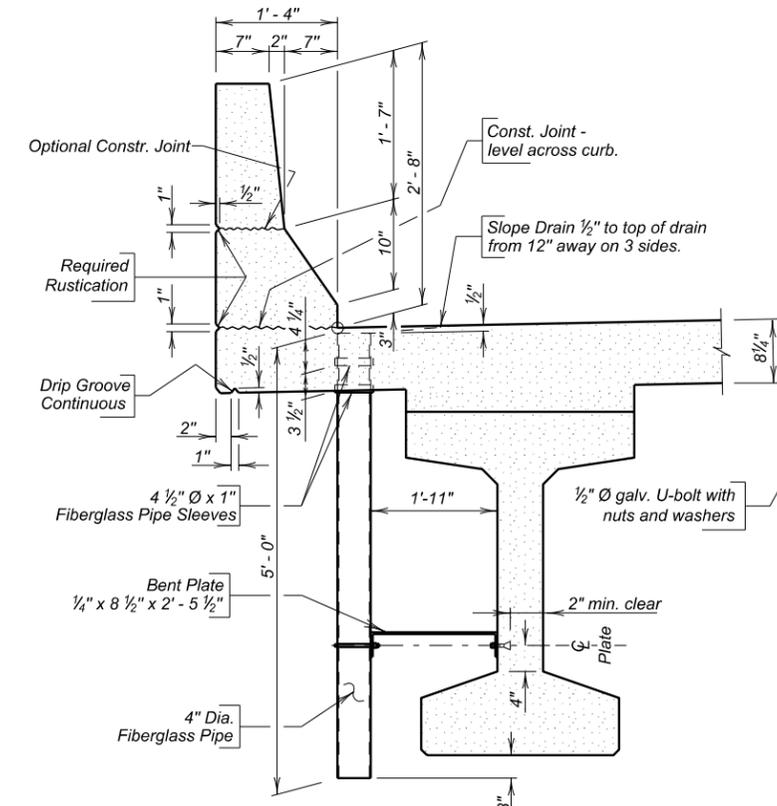


ELEVATION

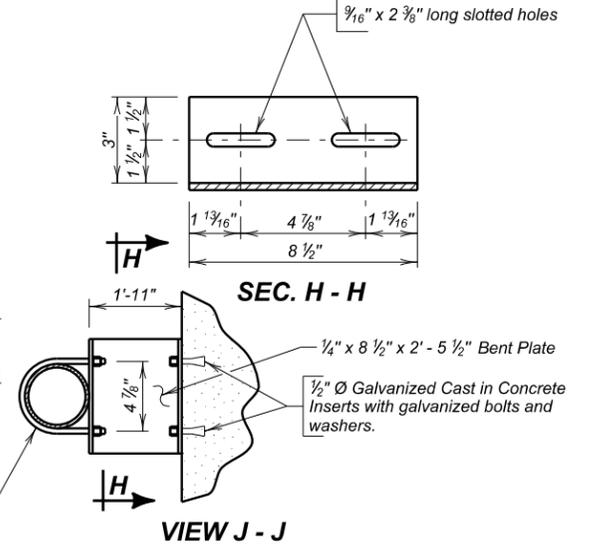
NOTE:
The connection between the drop tube and girder flange shall be made prior to the placing of the deck slab. (See GENERAL DRAWING for spacing of deck drains and Sheet No. 5 of 30 for notes regarding deck drains.)

NOTE:
For listing of re-bars, see Reinforcing Schedule in Superstructure Details.

≠ See Abutment Details



BARRIER & DECK DRAIN DETAILS



VIEW J - J

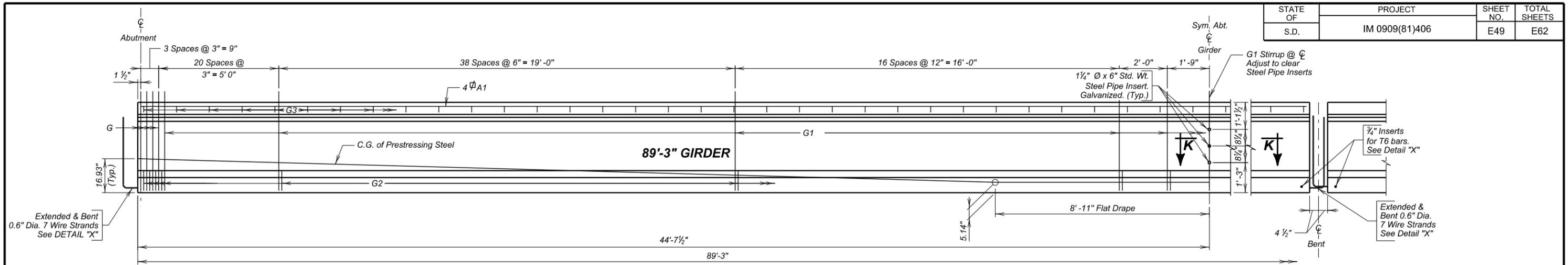
END BLOCK, BARRIER CURB & DECK DRAIN DETAILS

FOR
EAST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
50'-0" ROADWAY
OVER SPLIT ROCK CREEK
STA. 667 + 63.02
TO STA. 671 + 41.48
STR. NO. 50-284-166

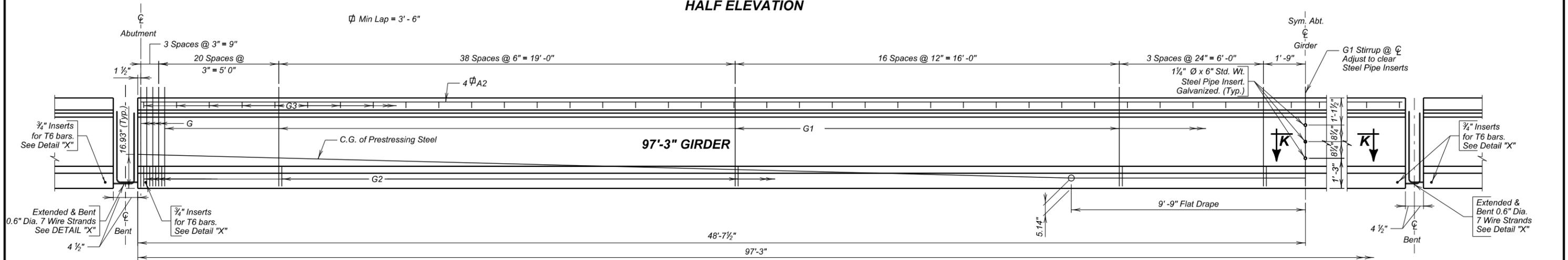
30" R.H.F. SKEW
SEC. 26-T102N-R48W
IM 0909(81)406
HL-93 + ALT

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

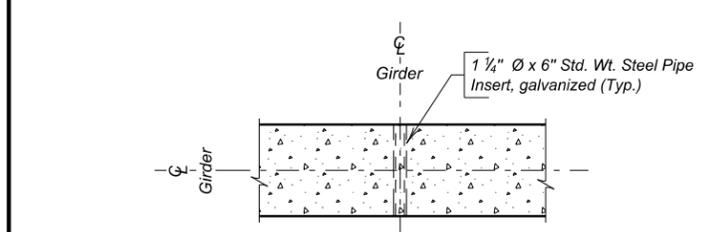
DESIGNED BY TOR	CK. DES. BY KJB	DRAFTED BY WJH	BRIDGE ENGINEER
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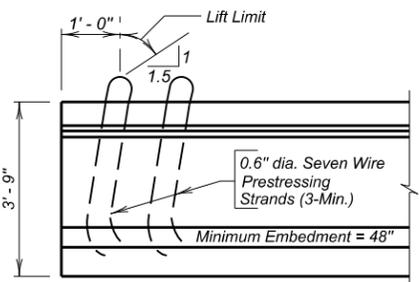
HALF ELEVATION



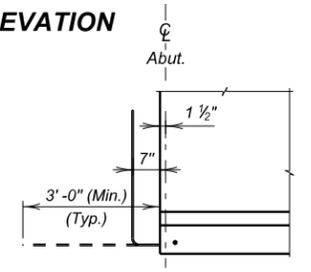
HALF ELEVATION



SEC. K-K



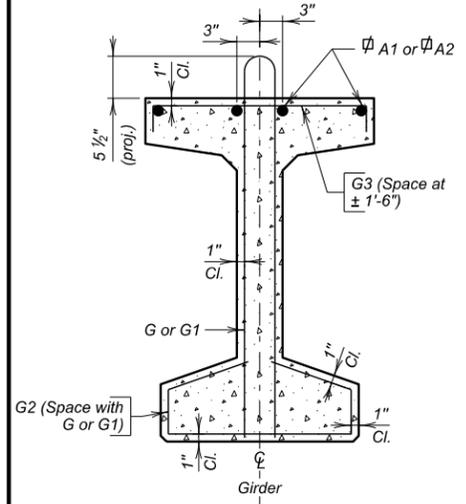
TYPICAL LIFTING DEVICE



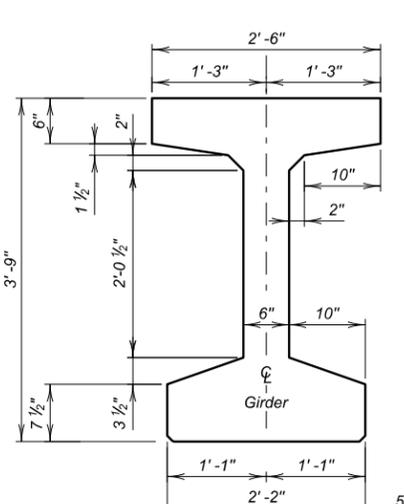
DETAIL "X"

REINFORCING SCHEDULE					Bending Details	
Mk.	No.	Size	Length	Type		
89'-3" Grdr.					Type 17	
A1	8	7	46'-3"	Str.	G3	2'-2"
G	8	5	8'-5"	S11		
G1	151	4	8'-5"	S11		
G2	159	4	4'-10"	S3A		
G3	61	4	2'-8"	17		
97'-3" Grdr.					Type S3A	
A2	8	7	50'-3"	Str.		
G	8	5	8'-5"	S11		
G1	155	4	8'-5"	S11		
G2	163	4	4'-10"	S3A		
G3	66	4	2'-8"	17		

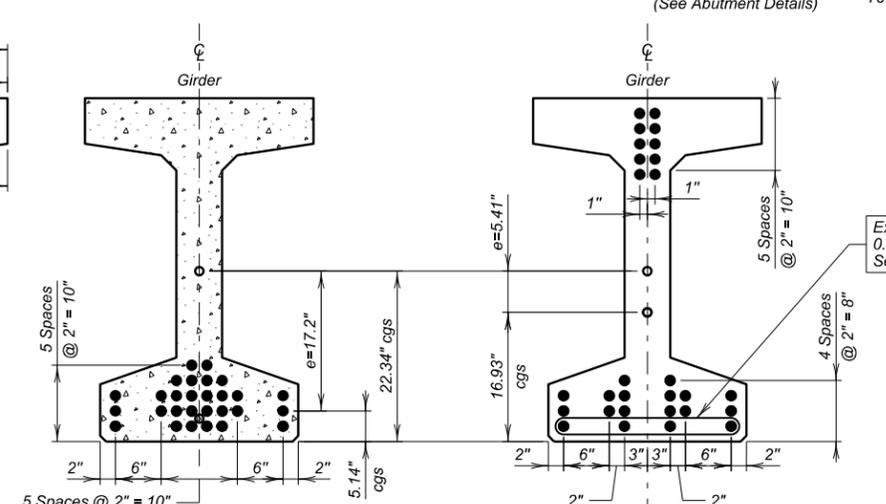
All dimensions are out to out of bars.



STIRRUP DETAILS



TYPE 45 GIRDER



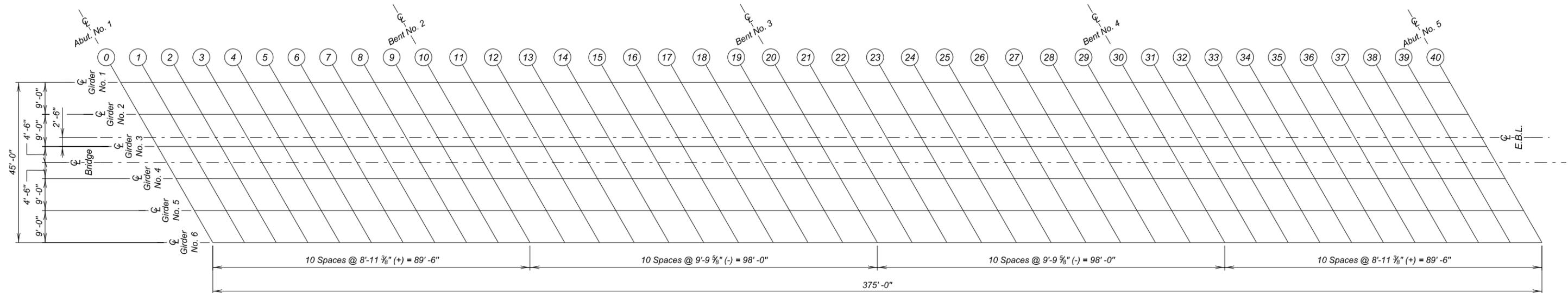
END VIEW

89'-3" & 97'-3" GIRDERS
(28 - 0.6" Dia. Type 270K Low Lax Strands)

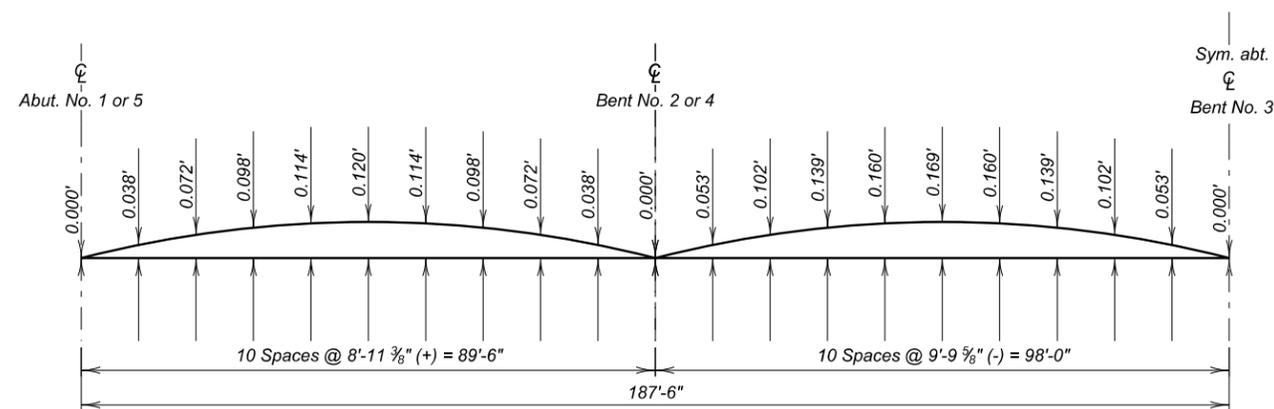


GIRDER DETAILS FOR EAST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
 50'-0" ROADWAY OVER SPLIT ROCK CREEK
 STA. 667 + 63.02 TO STA. 671 + 41.48
 STR. NO. 50-284-166
 30° R.H.F. SKEW
 SEC. 26-T102N-R48W
 IM 0909(81)406
 HL-93 + ALT
 MINNEHAHA COUNTY
 S. D. DEPT. OF TRANSPORTATION
 MAY 2016

DESIGNED BY SLS	CK. DES. BY CTH	DRAFTED BY WJH	BRIDGE ENGINEER
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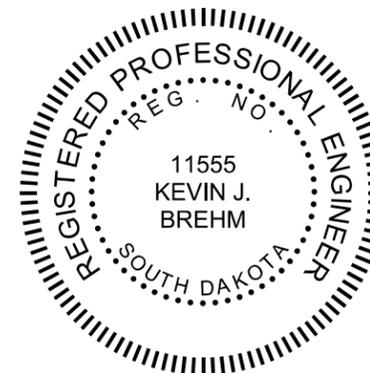


GIRDER LAYOUT



CAMBER DIAGRAM

The Camber shown is the amount which has been added to the theoretical slab elevations to get slab elevations shown in the table of Slab Form Elevations and Calculations. Camber shown is for D.L. of slab, traffic barrier, and camber growth, but does not include initial beam camber at erection and D.L. of beams.



ERECTION DATA AND SLAB FORM ELEVATIONS (A)

FOR
EAST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
 50'-0" ROADWAY
 OVER SPLIT ROCK CREEK
 STA. 667 + 63.02
 TO STA. 671 + 41.48
 STR. NO. 50-284-166

30° R.H.F. SKEW
 SEC. 26-T102N-R48W
 IM 0909(81)406
 HL-93 + ALT

MINNEHAHA COUNTY
 S. D. DEPT. OF TRANSPORTATION

MAY 2016

DESIGNED BY SLS	CK. DES. BY KJB	DRAFTED BY WJH	BRIDGE ENGINEER
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TABLE OF SLAB FORM ELEVATIONS AND CALCULATIONS

		0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Girder No. 1	Elev. "M"	1329.612	1329.837	1330.062	1330.283	1330.496	1330.703	1330.901	1331.094	1331.279	1331.460	1331.640	1331.937	1332.233	1332.521	1332.798	1333.066	1333.322	1333.568	1333.804	1334.032	1334.259
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 2	Elev. "M"	1329.900	1330.127	1330.355	1330.577	1330.792	1331.001	1331.202	1331.396	1331.584	1331.766	1331.949	1332.247	1332.545	1332.836	1333.116	1333.386	1333.644	1333.892	1334.130	1334.360	1334.590
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 3	Elev. "M"	1330.090	1330.319	1330.548	1330.772	1330.990	1331.200	1331.403	1331.600	1331.789	1331.974	1332.158	1332.459	1332.759	1333.052	1333.334	1333.606	1333.867	1334.117	1334.357	1334.589	1334.821
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 4	Elev. "M"	1330.021	1330.251	1330.483	1330.709	1330.928	1331.141	1331.346	1331.544	1331.736	1331.922	1332.109	1332.412	1332.715	1333.010	1333.294	1333.568	1333.831	1334.083	1334.325	1334.560	1334.794
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 5	Elev. "M"	1329.952	1330.185	1330.418	1330.647	1330.868	1331.083	1331.290	1331.490	1331.684	1331.872	1332.061	1332.366	1332.671	1332.968	1333.254	1333.531	1333.796	1334.051	1334.295	1334.532	1334.768
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 6	Elev. "M"	1329.885	1330.120	1330.355	1330.586	1330.809	1331.026	1331.235	1331.437	1331.633	1331.823	1332.014	1332.321	1332.628	1332.928	1333.216	1333.495	1333.762	1334.019	1334.266	1334.504	1334.743
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					

NOTE -
Based on a "d" of 11 1/8" at the C of Abutment No. 1, 11 1/8" at the C of Bent No. 2, 10 1/4" at the C of Bent No. 3 & Bent No. 4, and 11" at the C of Abutment No. 5 (see SEC. A-A Superstructure Details), it is anticipated that the midspan haunch dimension "h" over the C of each girder will be 1 1/2". If when computing the dimensions in the table, it is found that any dimension "h" is less than zero or greater than 4 1/2" the Office of Bridge Design of the South Dakota Department of Transportation shall be notified immediately. After the "Table of Slab Form Elevations and Calculations" has been completely filled out and approved for deck forming, a copy must be forwarded to the Office of Bridge Design for review and analysis for the purpose of securing information relative to camber growth in the beams. This information is necessary for preparing plans for future structures of this type.

NOTE -
The table contains the information necessary to determine the depth of concrete over the girders at points shown. Calculations may be carried in the spaces provided. Elev. "M" is the design elevation of the top of slab before any concrete has been poured. This elevation includes correction for camber and dead load deflection. Elev. "N" is a field measured elevation taken on top of girders at the points shown with the girders in their positions. This elevation must be taken after erection is completed, but prior to placing any of the deck concrete. Girders shall not be supported between bearings when elevations are taken.

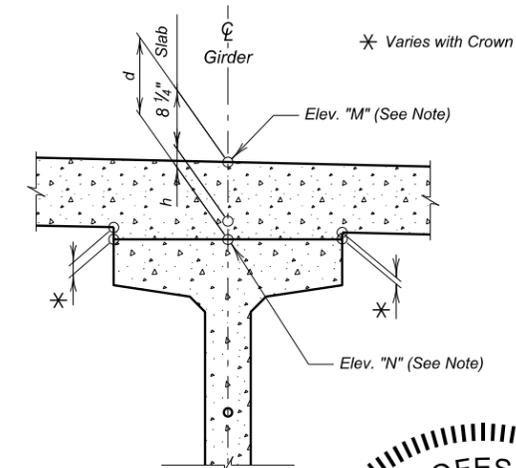


TABLE OF SLAB FORM ELEVATIONS AND CALCULATIONS

		20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
Girder No. 1	Elev. "M"	1334.259	1334.597	1334.934	1335.264	1335.583	1335.893	1336.186	1336.466	1336.731	1336.984	1337.233	1337.547	1337.857	1338.159	1338.450	1338.731	1339.001	1339.261	1339.511	1339.752	1339.990
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 2	Elev. "M"	1334.590	1334.930	1335.269	1335.601	1335.923	1336.233	1336.526	1336.806	1337.071	1337.324	1337.573	1337.887	1338.197	1338.499	1338.790	1339.071	1339.341	1339.601	1339.851	1340.092	1340.240
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 3	Elev. "M"	1334.821	1335.163	1335.505	1335.840	1336.163	1336.473	1336.766	1337.046	1337.311	1337.565	1337.813	1338.127	1338.437	1338.739	1339.030	1339.311	1339.581	1339.841	1340.091	1340.332	1340.570
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 4	Elev. "M"	1334.794	1335.138	1335.483	1335.819	1336.143	1336.453	1336.746	1337.026	1337.291	1337.545	1337.793	1338.107	1338.417	1338.719	1339.010	1339.291	1339.561	1339.821	1340.071	1340.312	1340.550
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 5	Elev. "M"	1334.768	1335.115	1335.461	1335.799	1336.123	1336.433	1336.726	1337.007	1337.271	1337.525	1337.773	1338.087	1338.397	1338.699	1338.990	1339.271	1339.541	1339.801	1340.051	1340.292	1340.530
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 6	Elev. "M"	1334.743	1335.092	1335.440	1335.779	1336.103	1336.413	1336.707	1336.987	1337.251	1337.505	1337.753	1338.067	1338.377	1338.679	1338.970	1339.251	1339.521	1339.781	1340.031	1340.272	1340.510
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					

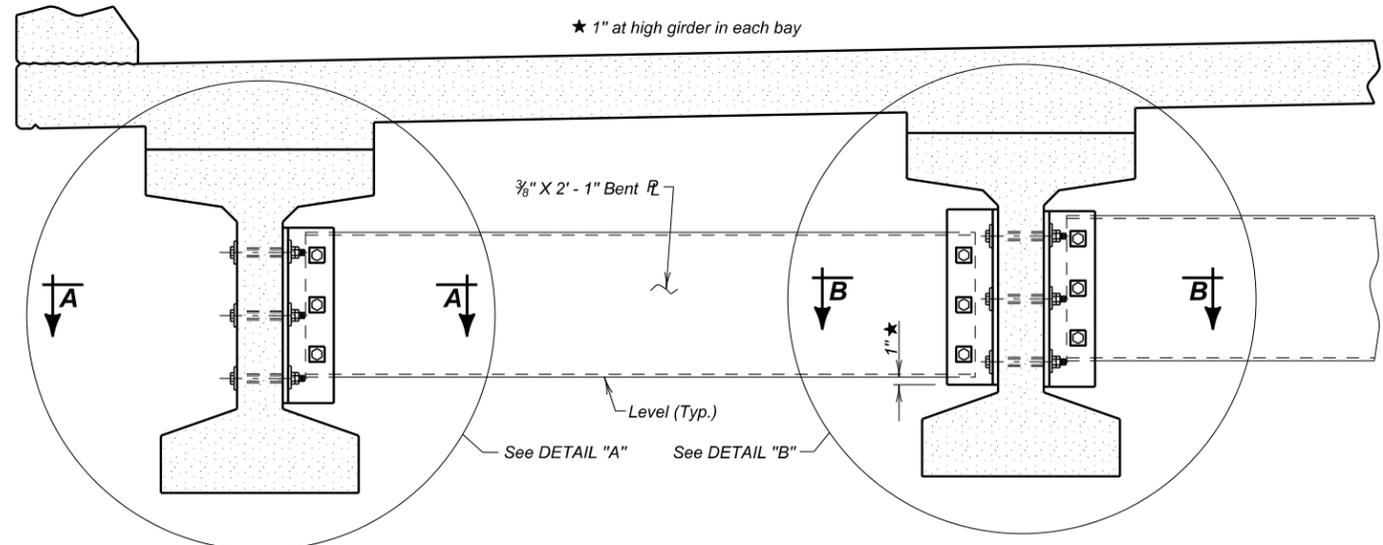


ERECTION DATA AND SLAB FORM ELEVATIONS (B)

FOR
EAST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
50'-0" ROADWAY OVER SPLIT ROCK CREEK 30° R.H.F. SKEW
SEC. 26-T102N-R48W
STA. 667 + 63.02 IM 0909(81)406
TO STA. 671 + 41.48 HL-93 + ALT
STR. NO. 50-284-166

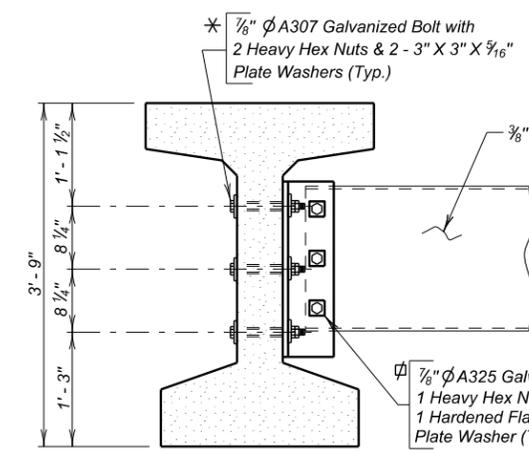
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION

DESIGNED BY SLS	CK. DES. BY KJB	DRAFTED BY WJH	BRIDGE ENGINEER
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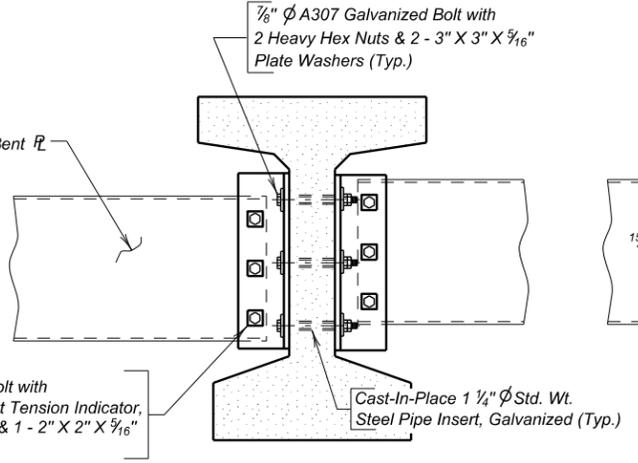


SECTION AT DIAPHRAGM

* Bolt head shall be adjacent to the Exterior Face of the Exterior Girder.



DETAIL "A"
(Typ. Exterior Girder)



DETAIL "B"
(Typ. Interior Girder)

∅ Bolt Head and Direct Tension Indicator shall be adjacent to 1 5/16 inch diameter holes in Bent Plate Diaphragm.

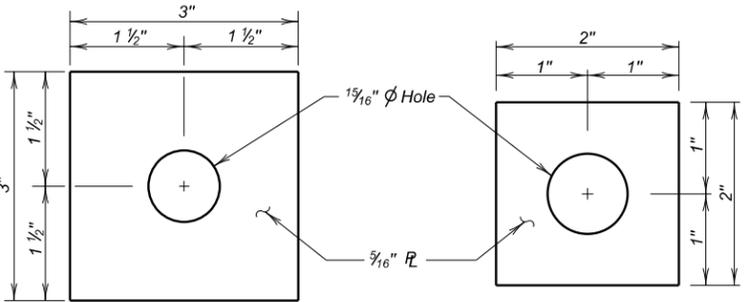
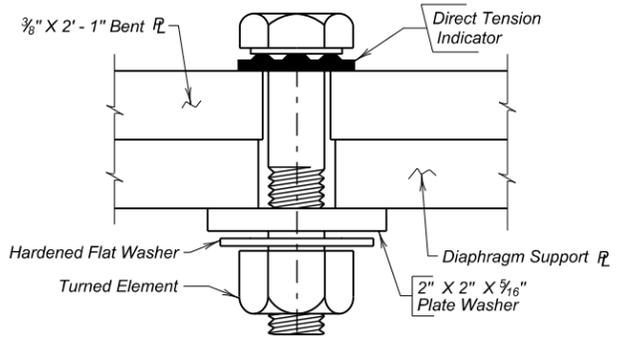
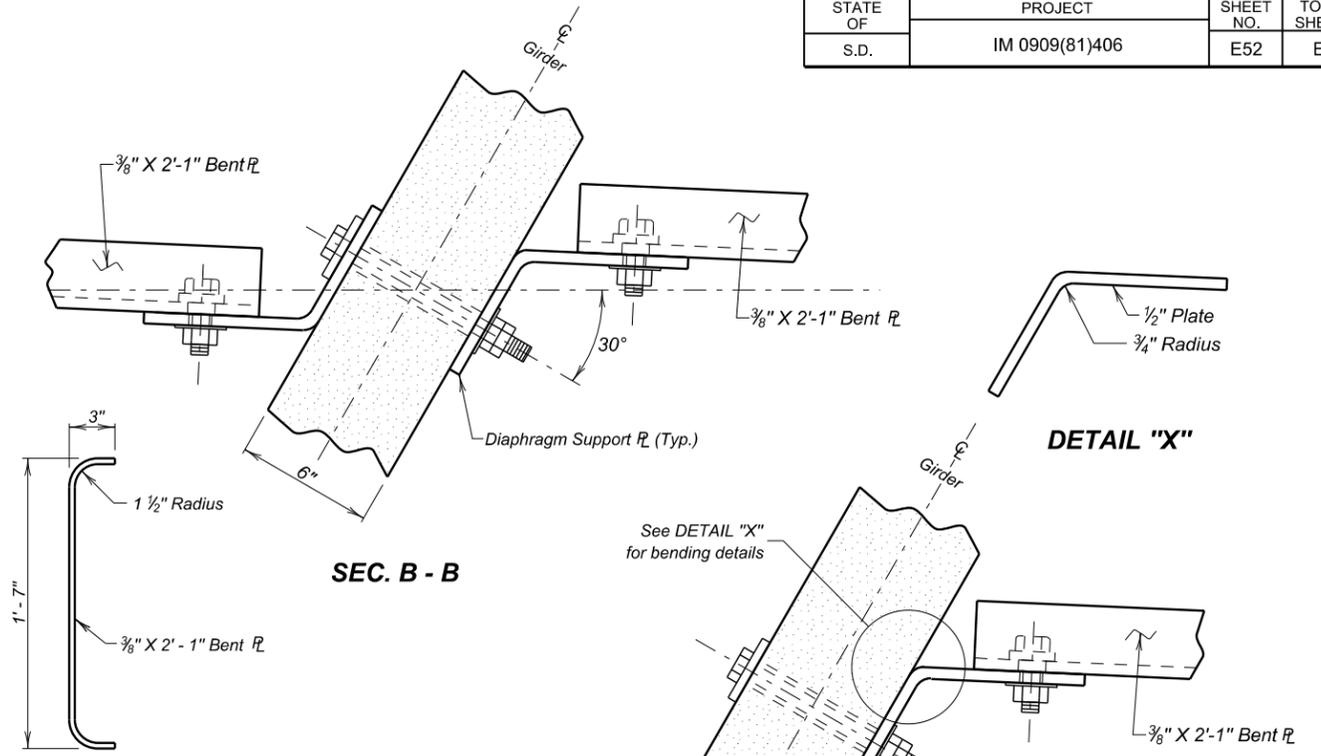


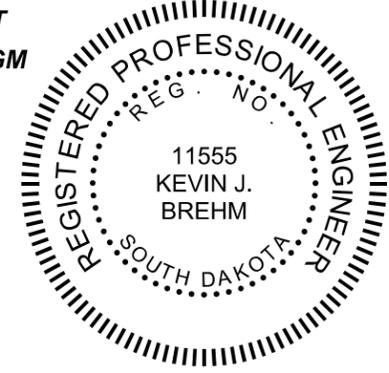
PLATE WASHER DETAILS



DIRECT TENSION INDICATOR DETAIL



END VIEW BENT PLATE DIAPHRAGM

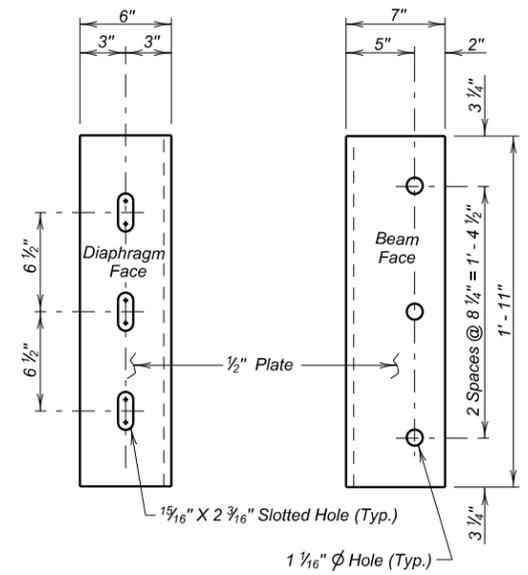


NOTES:

- All steel for the diaphragms including plate washers shall conform to ASTM A36 and shall be galvanized in accordance with ASTM A123 or A153. Bolts, nuts, and washers shall be galvanized in accordance with ASTM F2329. Direct Tension Indicators shall conform to Section 972 of the Specifications.
- The steel diaphragms between adjacent girders shall be installed as soon as possible and in conjunction with girder erection.
- All costs associated with furnishing, fabricating, assembly and installation of diaphragms shall be included in the lump sum price for Structural Steel, Miscellaneous.

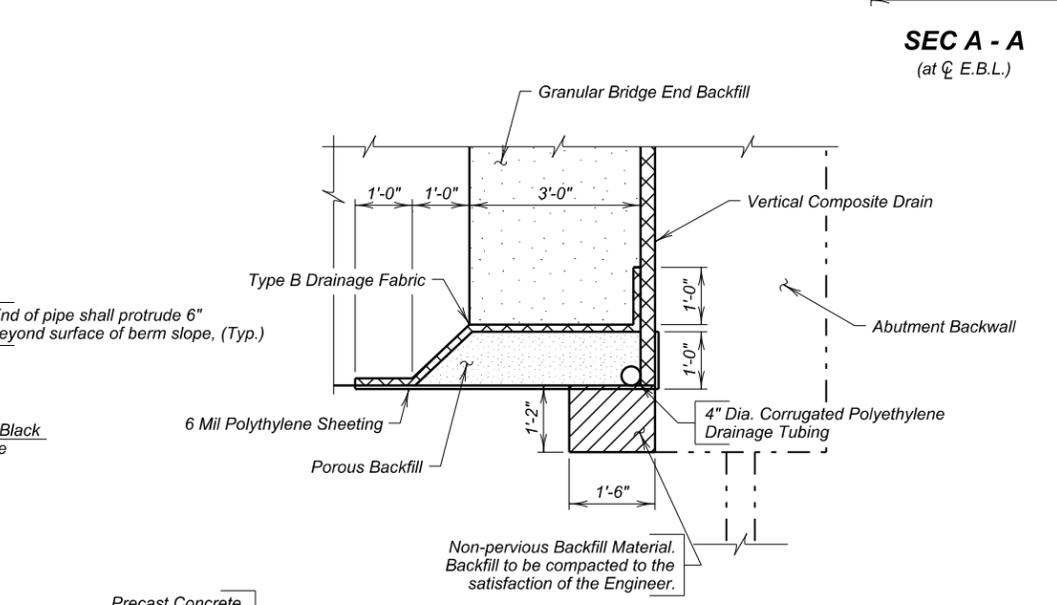
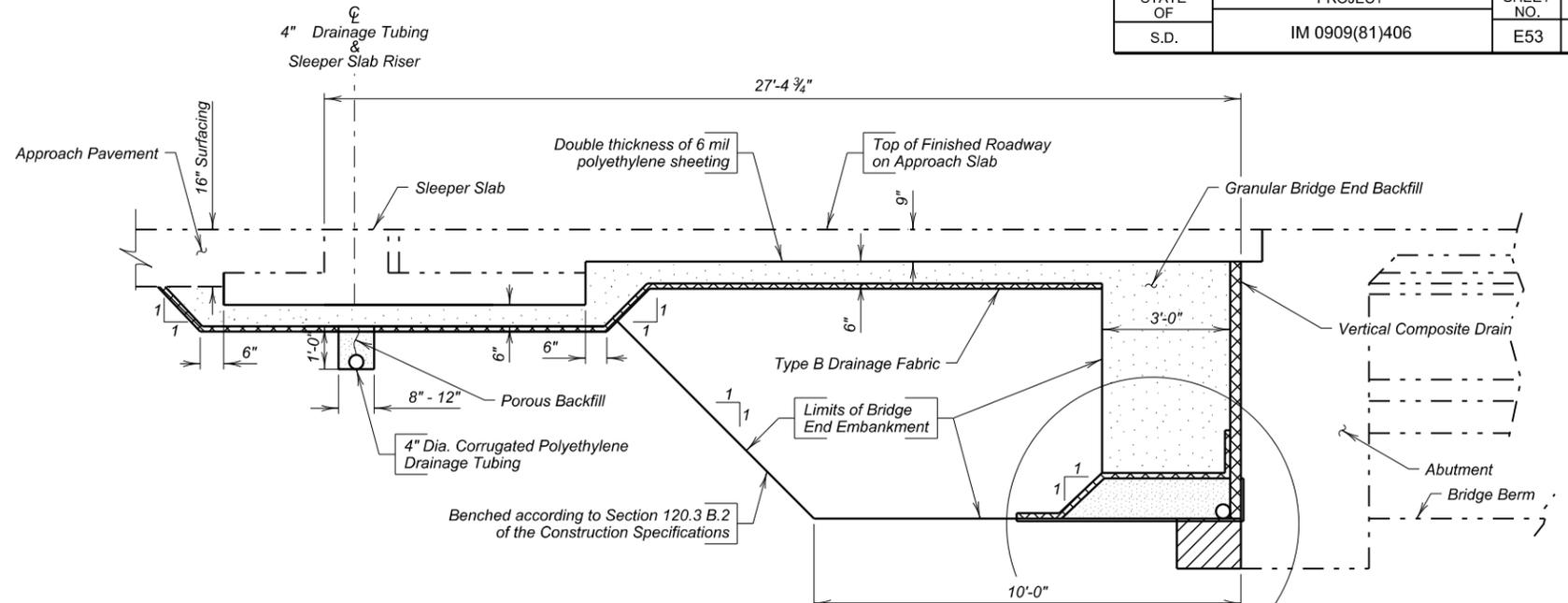
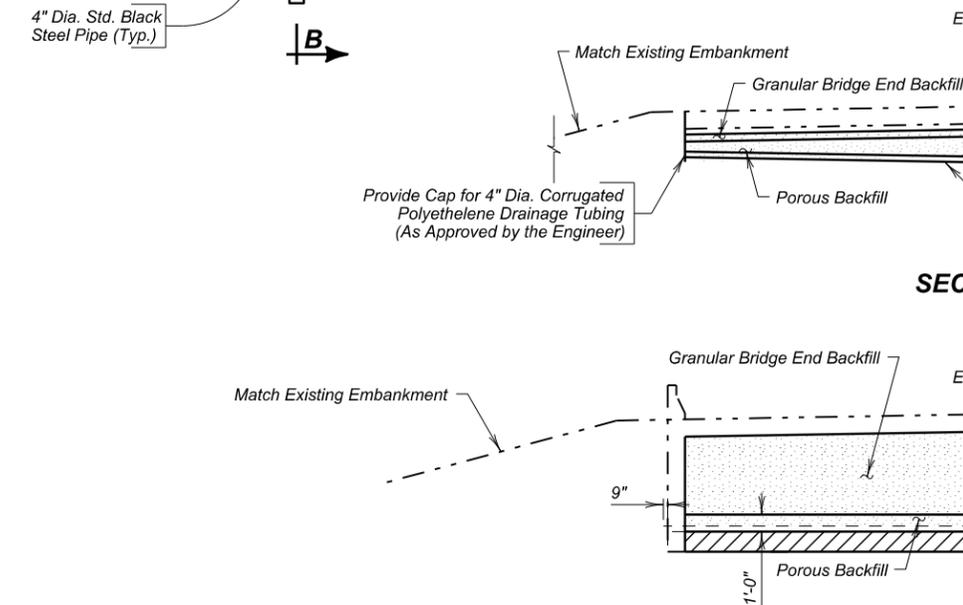
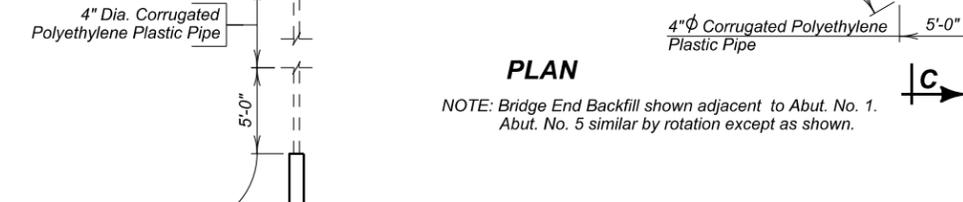
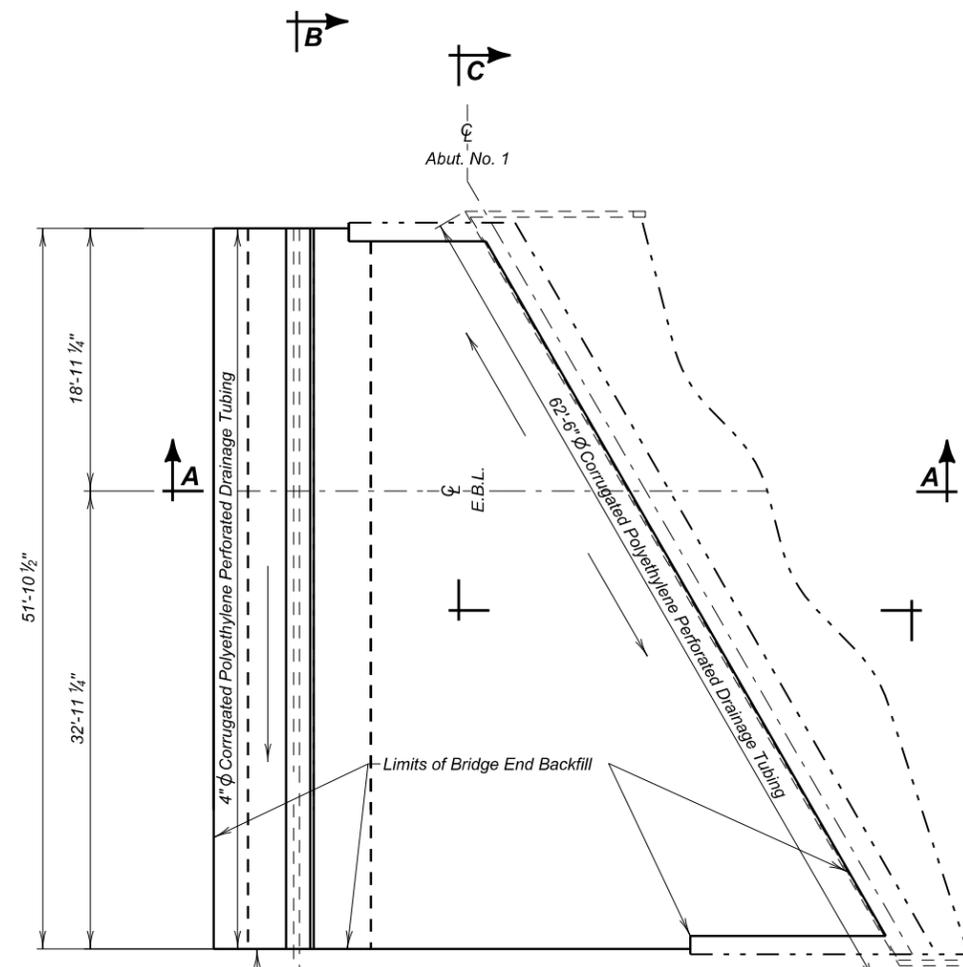
ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Δ Structural Steel, Miscellaneous	L.S.	Lump Sum

Δ For informational purposes only, the estimated weight of structural steel is 4,970 Lbs. for 20 diaphragms.



DIAPHRAGM SUPPORT PLATE

DIAPHRAGM DETAILS FOR EAST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
 50'-0" ROADWAY OVER SPLIT ROCK CREEK
 STA. 667 + 63.02 TO STA. 671 + 41.48
 STR. NO. 50-284-166
 30° R.H.F. SKEW
 SEC. 26-T102N-R48W
 IM 0909(81)406
 HL-93 + ALT
 MINNEHAHA COUNTY
 S. D. DEPT. OF TRANSPORTATION
 MAY 2016



ESTIMATED QUANTITIES (for 2 abutments)		
ITEM	UNIT	QUANTITY
Granular Bridge End Backfill	Cu. Yd.	128
Bridge End Embankment	Cu. Yd.	226
Porous Backfill	Ton	36
Approach Slab Underdrain Excavation	Cu. Yd.	8
4" Underdrain Pipe	Ft.	281
Precast Concrete Headwall for Drain	Each	2

ϕ Includes 229 ft. of 4" ϕ Corrugated Polyethylene Perforated Drainage Tubing, 22 ft. of 4" dia. Corrugated Polyethylene Drainage Tubing, 708 sq. ft. of vertical composite Drain and 30 ft. of 4" ϕ Std. Black Steel Pipe.

∇ Includes 693 sq. ft. of 6 mil Polyethylene Sheeting (not including laps) and 436 sq. yds. of Type B Drainage Fabric.

\star Quantity based on 1'-0" deep X 1'-0" wide trench. For estimating purposes only, a factor of 1.89 tons/cu. yd. was used to convert Cu. Yds. to Tons.

DETAILS OF BRIDGE END BACKFILL

FOR
EAST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
50'-0" ROADWAY
OVER SPLIT ROCK CREEK
STA. 667 + 63.02
TO STA. 671 + 41.48
STR. NO. 50-284-166

30° R.H.F. SKEW
SEC. 26-T102N-R48W
IM 0909(81)406
HL-93 + ALT

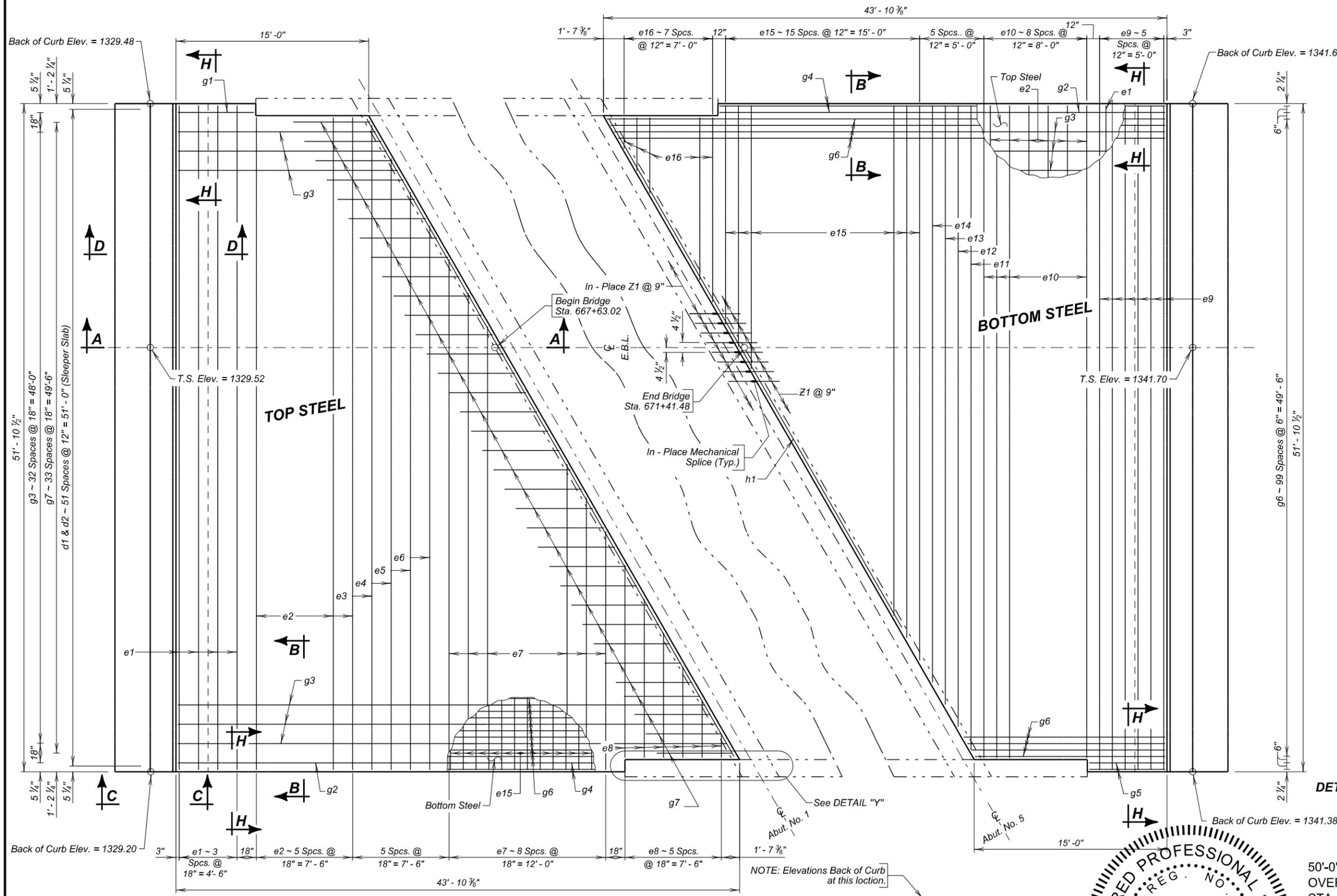
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION

MAY 2016



DESIGNED BY	CK. DES. BY	DRAFTED BY	
	KJB		

BRIDGE ENGINEER



PLAN
(Abut. No. 1)

PLAN
(Abut. No. 5)



SEC. H - H

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

Mk.	No.	Size	Length	Type	Bending Details
Sleeper Slabs					
c1	48	5	51'-7"	Str.	
d1	208	4	7'-9"	2	
d2	104	4	6'-1"	T2	
Approach Slabs					
e1	8	4	51'-7"	Str.	
e2	12	4	50'-8"	Str.	
e3	2	4	50'-1"	Str.	
e4	2	4	47'-5"	Str.	
e5	2	4	44'-10"	Str.	
e6	2	4	42'-3"	Str.	
e7	9	4	58'-6"	Str.	
e8	6	4	17'-8"	Str.	
e9	12	6	51'-7"	Str.	
e10	18	6	50'-8"	Str.	
e11	2	6	50'-1"	Str.	
e12	2	6	48'-4"	Str.	
e13	2	6	46'-7"	Str.	
e14	2	6	44'-10"	Str.	
e15	16	6	60'-0"	Str.	
e16	8	6	16'-10"	Str.	
g1	2	4	5'-7"	Str.	
g2	2	4	34'-6"	Str.	
g3	33	4	58'-3"	Str.	
g4	4	8	34'-6"	Str.	
g5	4	8	5'-7"	Str.	
g6	100	8	58'-3"	Str.	
g7	68	4	6'-0"	Str.	
h1	4	6	57'-5"	Str.	
Z1	134	7	2'-6"	Str.	

ITEM	UNIT	QUANTITY
Concrete Approach Slab for Bridge	Sq. Yd.	339.3
Concrete Approach Sleeper Slab for Bridge	Sq. Yd.	83.6

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

ESTIMATED QUANTITIES
(For Two Approach Slabs & Two Sleeper Slabs)

ITEM	UNIT	QUANTITY
Concrete Approach Slab for Bridge	Sq. Yd.	339.3
Concrete Approach Sleeper Slab for Bridge	Sq. Yd.	83.6

- 85.3 Cu. Yds. Concrete in Approach Slabs.
 - 24,486 Lbs. Epoxy coated Re-Steel in Approach Slabs.
 - 26.5 Cu. Yds. Concrete in Sleeper Slabs.
 - 4,082 Lbs. Epoxy coated Re-Steel in Sleeper Slab.
 - 26 Sq. Ft. of 2" Polystyrene Insulation Board
- Items 1 thru 5 are approximate quantities contained in the above bid items and are for information only.

DETAILS OF APPROACH SLAB ADJACENT TO BRIDGE (A)
FOR

EAST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE

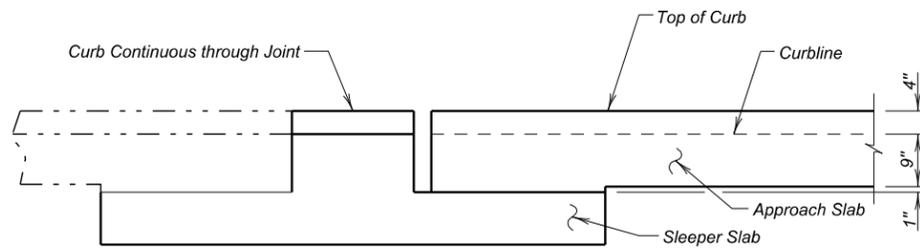
50'-0" ROADWAY OVER SPLIT ROCK CREEK
STA. 667 + 63.02 TO STA. 671 + 41.48
STR. NO. 50-284-166

30° R.H.F. SKEW
SEC. 26-T102N-R48W
IM 0909(81)406
HL-93 + ALT

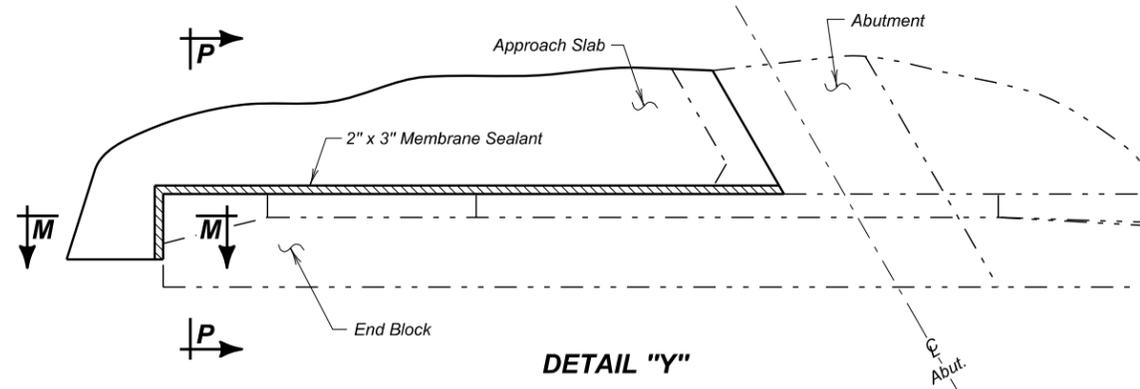


MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
MAY 2016

DESIGNED BY TOR	CK. DES. BY KJB	DRAFTED BY WJH	BRIDGE ENGINEER
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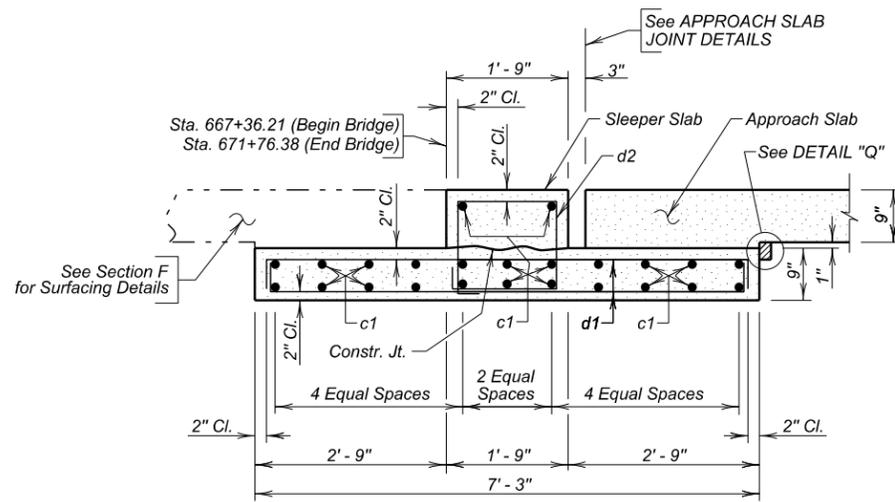


VIEW C - C

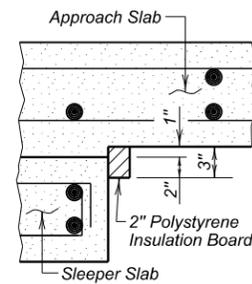


DETAIL "Y"

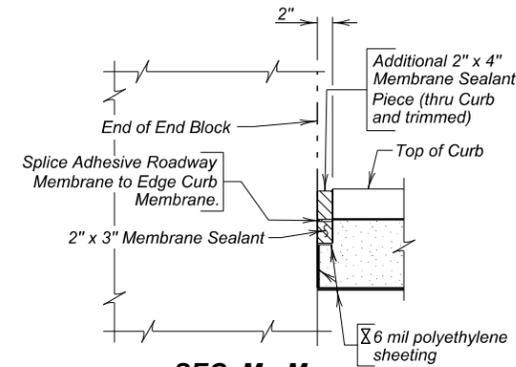
NOTE:
See APPROACH SLAB JOINT DETAILS sheet for notes regarding Membrane Sealant Expansion Joint.



SEC. D - D
(Sleeper Slab)

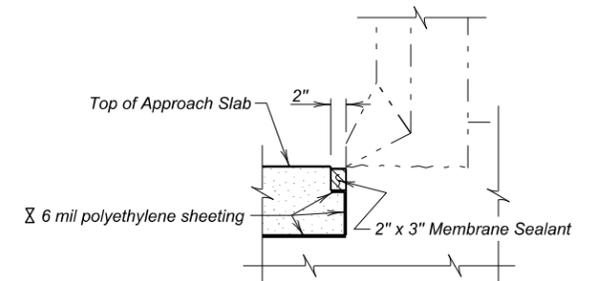


DETAIL "Q"

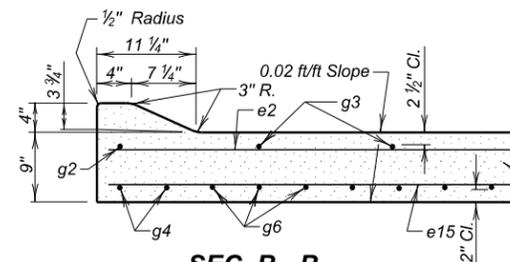


SEC. M - M

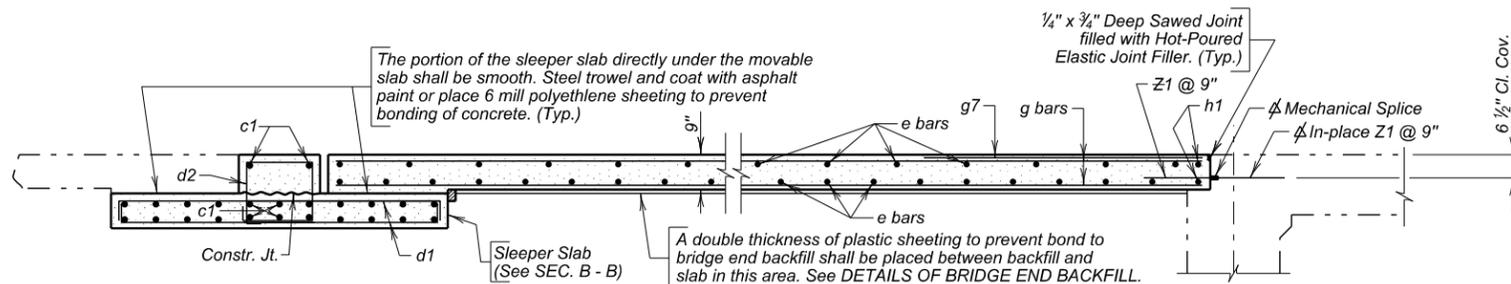
6 mil polyethylene sheeting shall not interfere with the bond between the Membrane Sealant and the approach slab.



SEC. P - P



SEC. B - B



SEC. A - A



DETAILS OF APPROACH SLAB ADJACENT TO BRIDGE (B)

FOR

EAST BOUND LANES

378' - 5 1/2" PRESTR. GIRDER BRIDGE

50'-0" ROADWAY

30° R.H.F. SKEW

OVER SPLIT ROCK CREEK

SEC. 26-T102N-R48W

STA. 667 + 63.02

IM 0909(81)406

TO STA. 671 + 41.48

HL-93 + ALT

STR. NO. 50-284-166

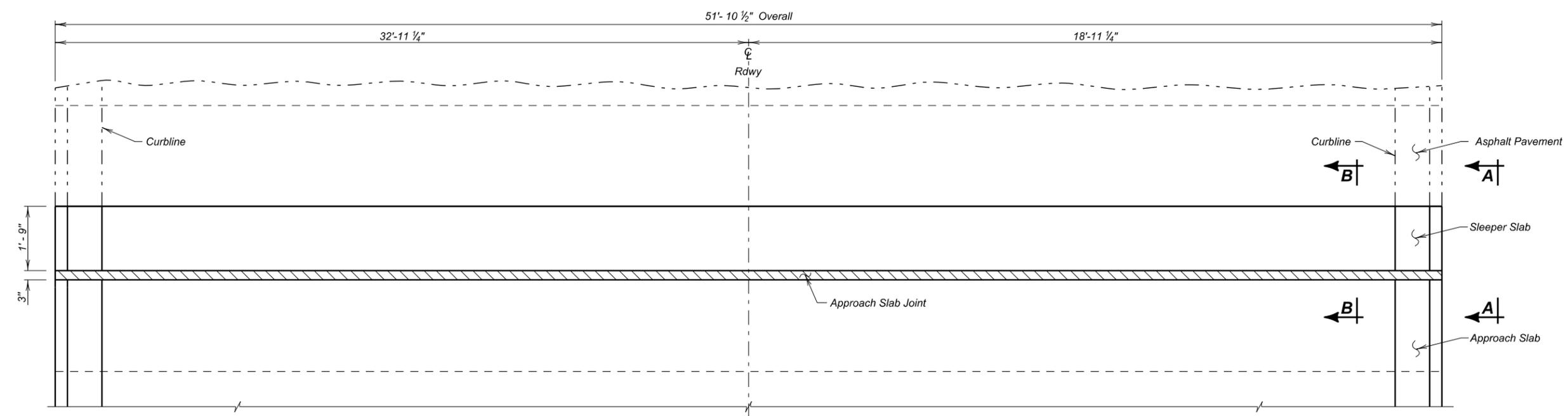
MINNEHAHA COUNTY

S. D. DEPT. OF TRANSPORTATION

MAY 2016

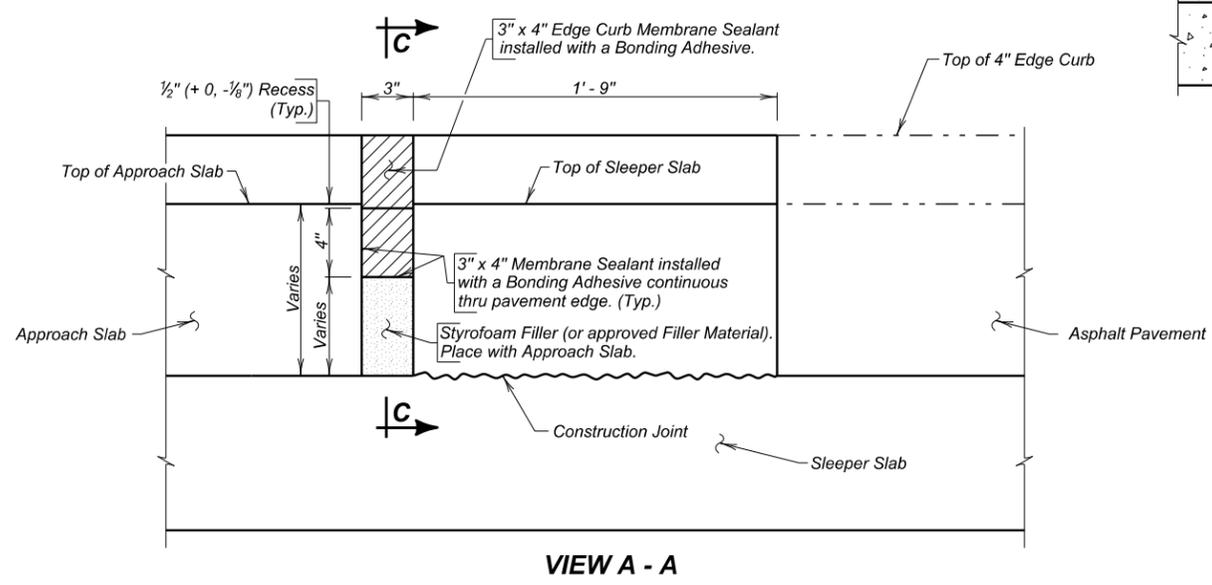
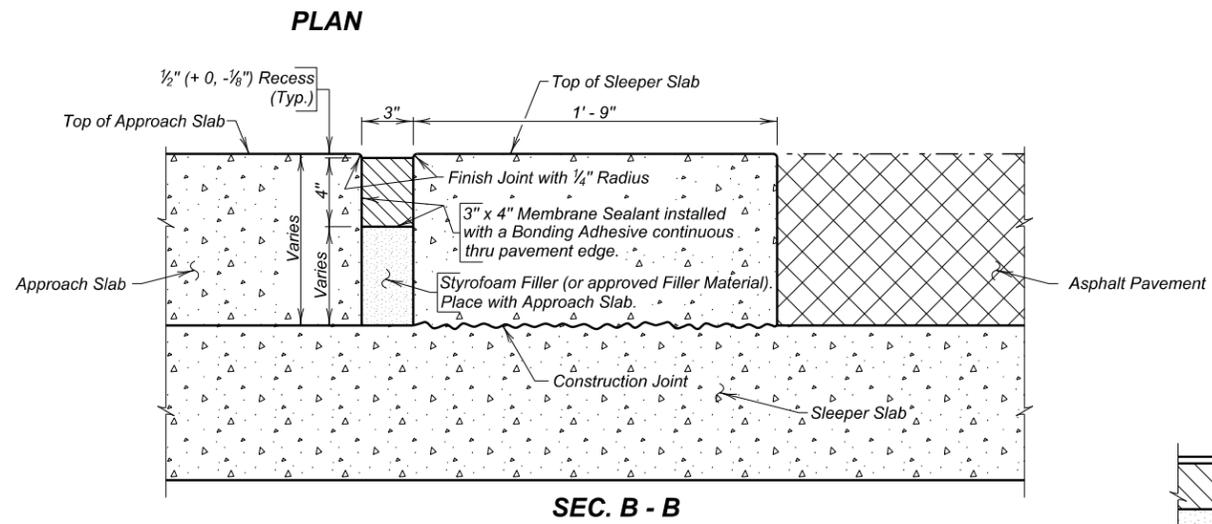
23 OF 30

DESIGNED BY TOR	CK. DES. BY KJB	DRAFTED BY WJH	BRIDGE ENGINEER
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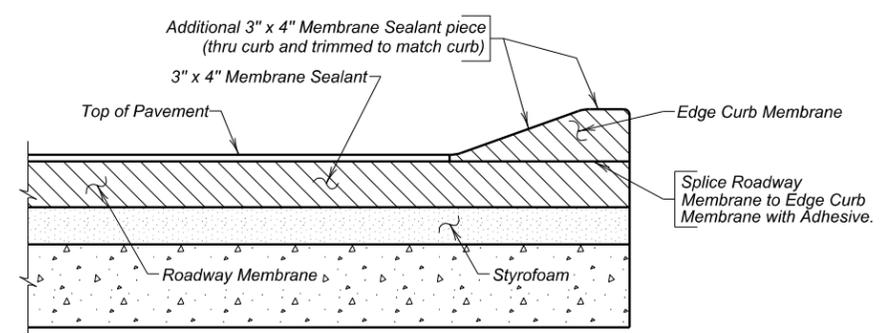


GENERAL NOTES

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



ESTIMATED QUANTITIES		
(For Two Approach Slabs)		
ITEM	UNIT	QUANTITY
Membrane Sealant Expansion Joint	Ft.	103.8

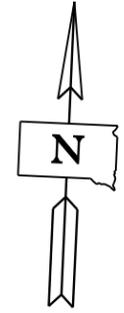
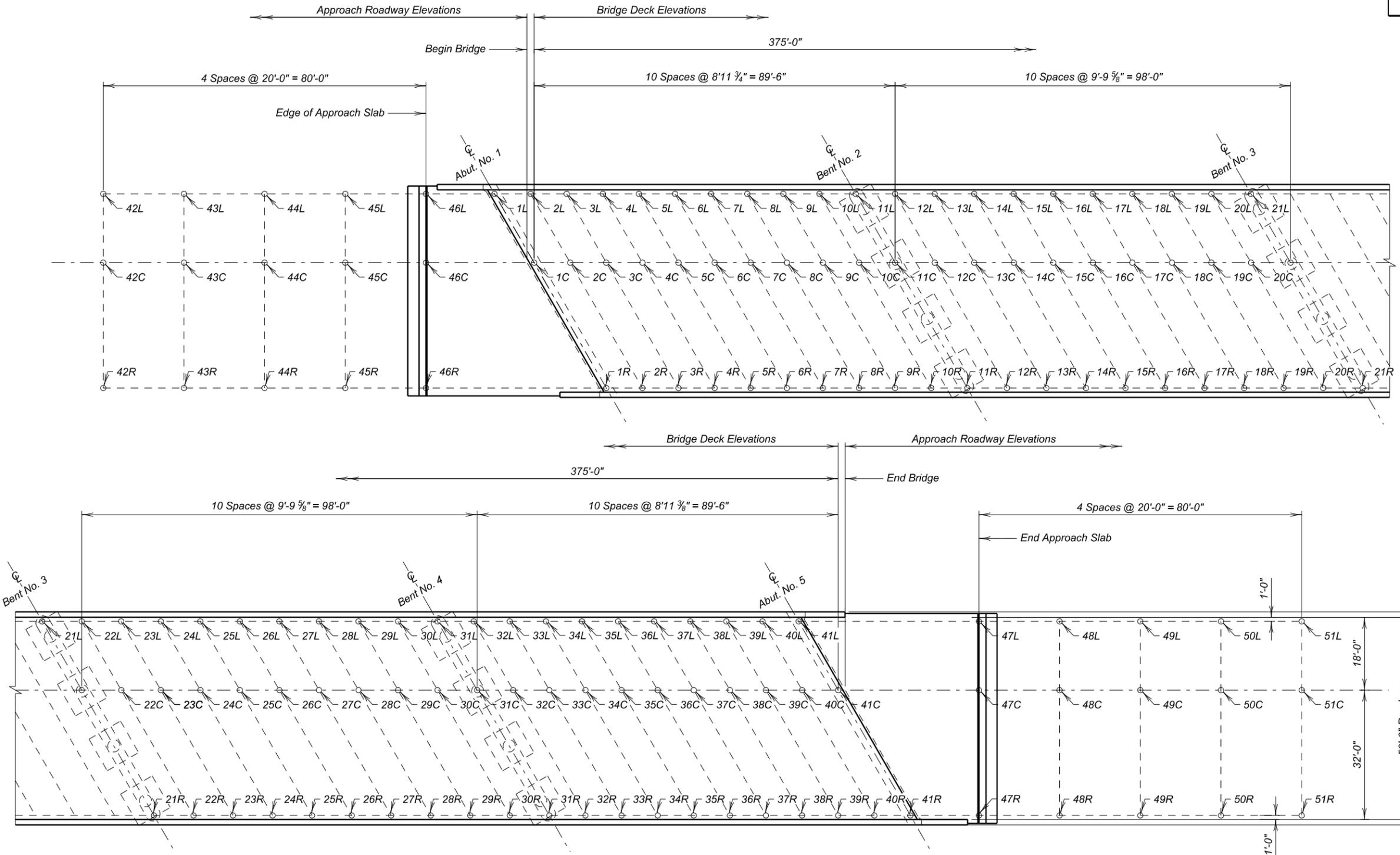


SEC. C - C
APPROACH SLAB JOINT DETAILS

FOR
EAST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
50'-0" ROADWAY OVER SPLIT ROCK CREEK
TO STA. 671 + 41.48
STR. NO. 50-284-166
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
MAY 2016

DESIGNED BY TOR	CK. DES. BY KJB	DRAFTED BY WJH	BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 0909(81)406	E57	E62



PLAN

AS - BUILT ELEVATION SURVEY (A)
 FOR
EAST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
 50'-0" ROADWAY 30° R.H.F. SKEW
 OVER SPLIT ROCK CREEK SEC. 26-T102N-R48W
 STA. 667 + 63.02 IM 0909(81)406
 TO STA. 671 + 41.48 HL-93 + ALT
 STR. NO. 50-284-166
 MINNEHAHA COUNTY
 S. D. DEPT. OF TRANSPORTATION
 MAY 2016

DESIGNED BY SLS	CK. DES. BY KJB	DRAFTED BY WJH	BRIDGE ENGINEER
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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	
16L		16C		16R	
17L		17C		17R	
18L		18C		18R	
19L		19C		19R	
20L		20C		20R	
21L		21C		21R	
22L		22C		22R	
23L		23C		23R	
24L		24C		24R	
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27L		27C		27R	
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29L		29C		29R	
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32L		32C		32R	
33L		33C		33R	
34L		34C		34R	
35L		35C		35R	
36L		36C		36R	
37L		37C		37R	
38L		38C		38R	
39L		39C		39R	
40L		40C		40R	
41L		41C		41R	

Location	Elevation	Location	Elevation	Location	Elevation
42L		42C		42R	
43L		43C		43R	
44L		44C		44R	
45L		45C		45R	
46L		46C		46R	
47L		47C		47R	
48L		48C		48R	
49L		49C		49R	
50L		50C		50R	
51L		51C		51R	

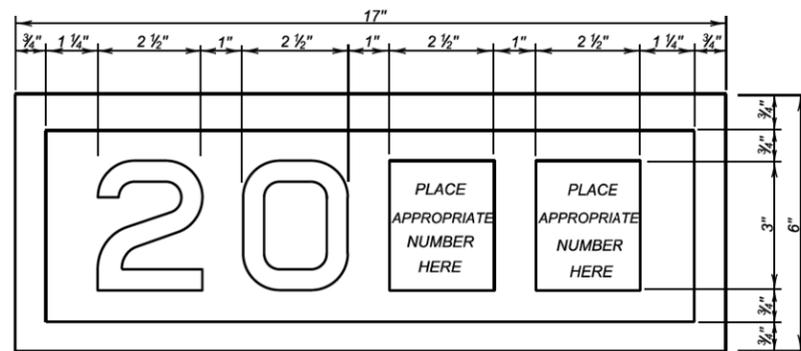
ITEM	UNIT	QUANTITY
Bridge Elevation Survey	L.S.	Lump Sum

Location	Station - Offset	Elevation
Begin Bridge		
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.

The elevations to be recorded in these tables shall be based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

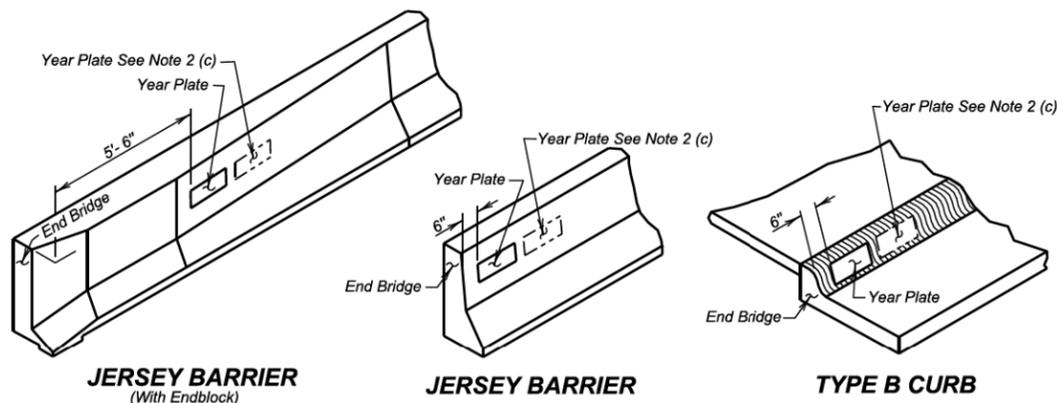
AS - BUILT ELEVATION SURVEY (B)
FOR
EAST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
50'-0" ROADWAY 30° R.H.F. SKEW
OVER SPLIT ROCK CREEK SEC. 26-T102N-R48W
STA. 667 + 63.02 IM 0909(81)406
TO STA. 671 + 41.48 HL-93 + ALT
STR. NO. 50-284-166
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
MAY 2016



YEAR PLATE DETAILS

GENERAL NOTES:

- 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 (1/2) inch in depth.
- Year plates shall be located on structure (s) as follows:
 - On cast-in-place box culverts the year plates shall be four and one-half (4 1/2) 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.
 - 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.
 - 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.
- 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.



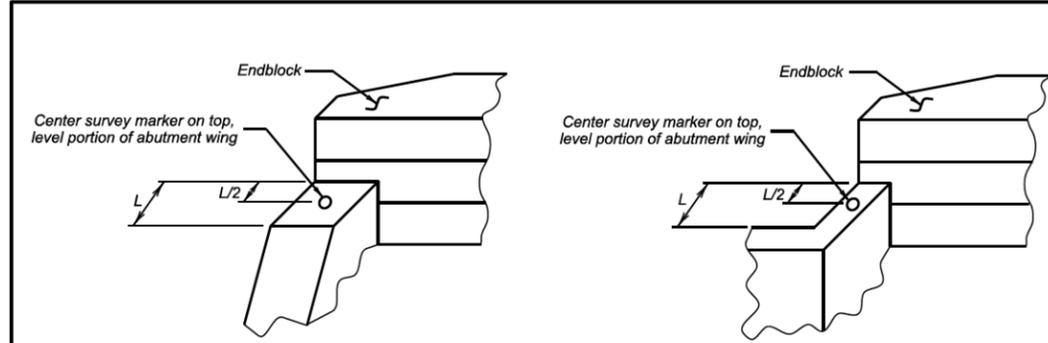
JERSEY BARRIER
(With Endblock)

JERSEY BARRIER

TYPE B CURB

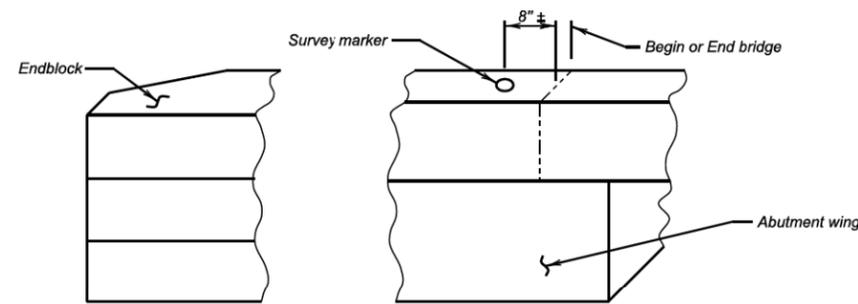
June 26, 2012

Published Date: 1st Qtr. 2016	S D D O T	YEAR PLATE DETAILS	PLATE NUMBER
			460.02
			Sheet 1 Of 1



ABUTMENT WITH "STRAIGHT" WINGS

ABUTMENT WITH "SWEEP BACK" WINGS



ABUTMENT WITH "SWEEP BACK" WINGS
(Endblock on top of wings)

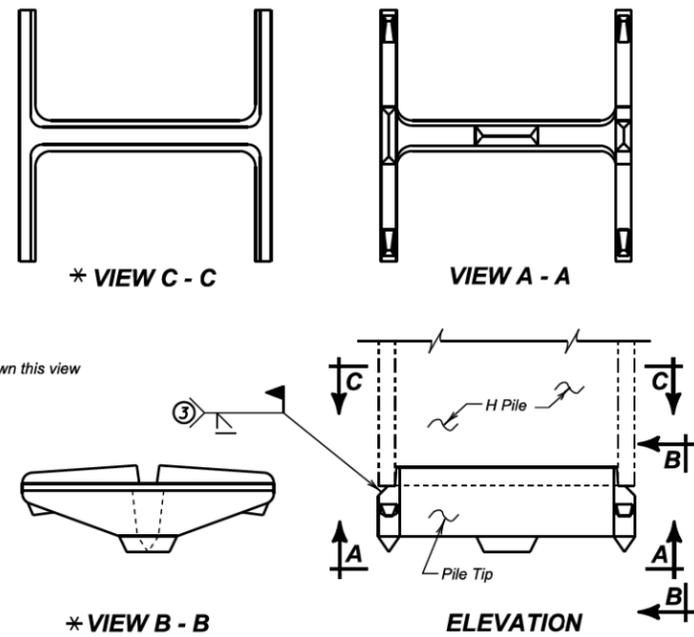
GENERAL NOTES:

- 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.
- 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 3/4" X 2" long ribbed shank), or a US Army Corps of Engineers Type C Disc with a 3 1/2" top diameter.
- There will be no separate measurement or payment made for survey markers. All costs for this work shall be incidental to the other contract items.

Published Date: 1st Qtr. 2016	S D D O T	BRIDGE SURVEY MARKER	PLATE NUMBER
			460.05
			Sheet 1 of 1



EAST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
STR. NO. 50-284-166
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
MAY 2016



* H Pile not shown this view

- ② See Table 1
- ③ Typical Both Flanges

ALTERNATE WELD ATTACHMENT

TABLE 1

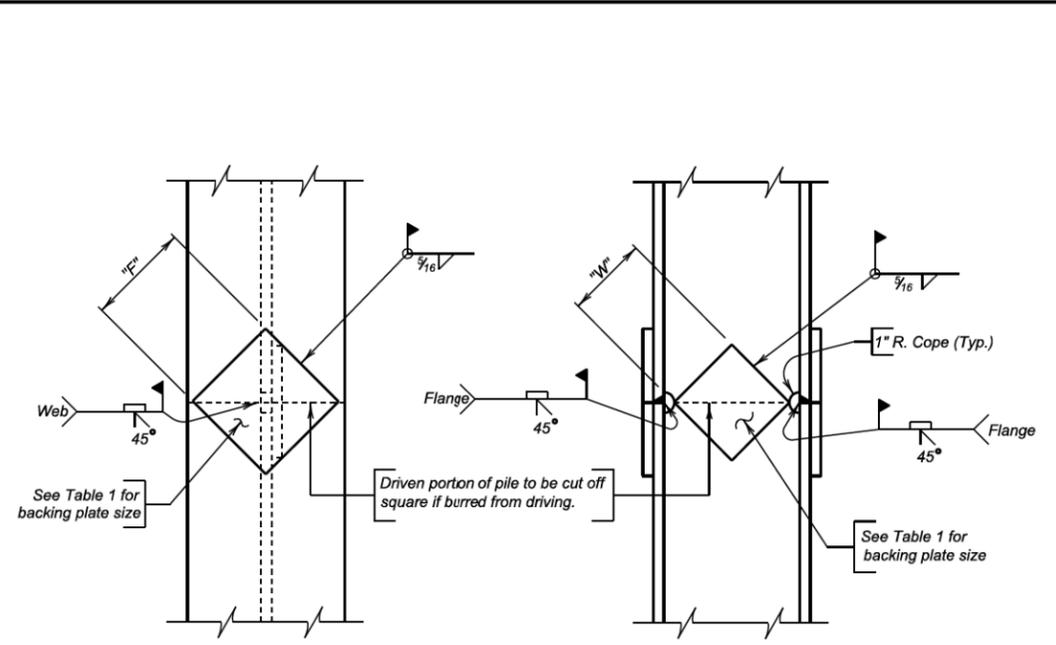
① DEPTH OF PREPARATION	PILE
3/8"	HP 14 X 102 HP 14 X 89 HP 12 X 74
5/16"	HP 14 X 73 HP 12 X 63 HP 10 X 57
1/4"	HP 12 X 53 HP 10 X 42 HP 8 X 36

GENERAL NOTES:

- Pile tip reinforcement shall be one-piece cast steel points commercially available and produced by a manufacturer who regularly produces pile points as a production item available to the public.
- Material for pile points shall conform to ASTM A27, Grade 65-35, Class 2.
- Pile points shall contain teeth designed to dig into obstructions and bearing materials in order to develop the maximum carrying capacity of the materials encountered.
- Welding and weld inspection shall be in conformance with AWS D1.5 - (Current Year) Bridge Welding Code - Steel.

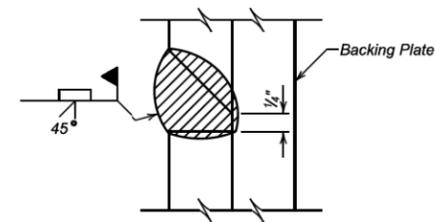
December 23, 2012

Published Date: 1st Qtr. 2016	S D D O T	H PILE TIP REINFORCEMENT	PLATE NUMBER
			510.30
			Sheet 1 of 1



NOTE:
Prepare joint surfaces lower end of upper section on the ground and weld on backing plates; then place upper section on lower section and weld.

COMPLETE JOINT PENETRATION WELD DETAIL



GENERAL NOTES:

- Steel for backing plates shall conform to ASTM A709 Grade 50.
- Welding and weld inspection shall be in conformance with AWS D1.5 (Current Year) Bridge Welding Code - Steel.
- Welder must be certified and registered with the SDDOT.
- Backing plate shall at a minimum be as thick as the web of the pile being spliced.
- Web must be coped with 1 inch radius.
- Submit Welding Procedure Specification (WPS) to Bridge Construction Engineer for approval prior to pile driving.

TABLE 1
(BACKING PLATES)

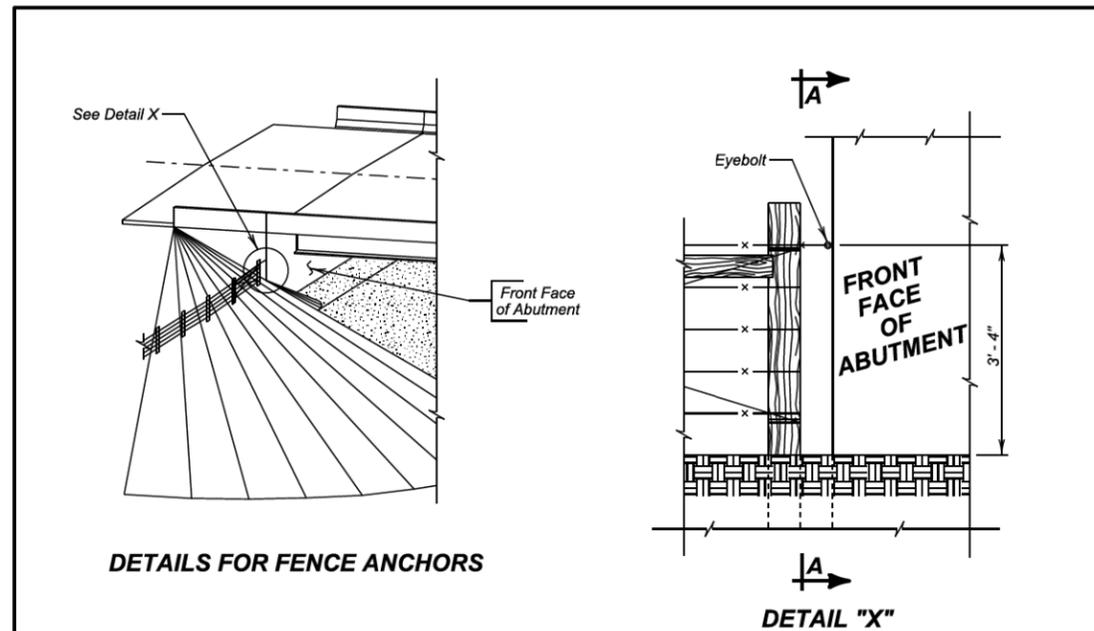
PILE	10"	12"	14"
"F" FLANGE	6 1/2"	8"	10"
"W" WEB	4 3/4"	6 1/4"	7 1/2"

December 23, 2012

Published Date: 1st Qtr. 2016	S D D O T	STEEL PILE SPLICE DETAILS	PLATE NUMBER
			510.40
			Sheet 1 of 1



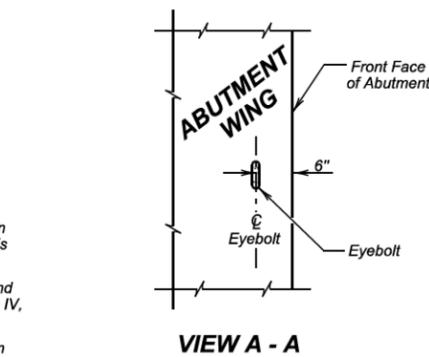
EAST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
STR. NO. 50-284-166
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
MAY 2016



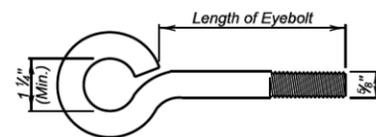
DETAILS FOR FENCE ANCHORS

GENERAL NOTES:

- The fence and post details shown are for illustrative purpose only. The fence shall be as specified elsewhere in the plans.
- Eyebolts shall be placed on all of the bridge abutment wings.
- Eyebolts shall be $\frac{5}{8}$ inch diameter and shall conform to ASTM A307.
- Eyebolts shall be galvanized in accordance with AASHTO M232 (ASTM A153).
- Eyebolts shall be installed after abutment wings are backfilled and berm construction is complete. Drill-in and epoxy eyebolts into abutment such that the eye of the bolt is flush with the concrete surface.
- The epoxy resin mixture shall be of a type for bonding steel to hardened concrete and shall conform to AASHTO M235 Type IV, Grade 3 (Equivalent to ASTM C881, Type IV, Grade 3).
- The diameter of the drilled holes shall not be less than $\frac{1}{8}$ inch greater, nor more than $\frac{3}{8}$ inch greater than the diameter of the eyebolts or as per Manufacturer's recommendations. The drilled holes shall be blown out with compressed air using a device that will reach the back of the hole to be sure that all debris or loose material has been removed prior to epoxy injection.
- Mix epoxy resin as recommended by the Manufacturer and apply by an injection method as approved by the Engineer. Beginning at the back of the drilled holes, fill the holes $\frac{1}{2}$ to $\frac{2}{3}$ full of epoxy, or as recommended by the Manufacturer, prior to insertion of the eyebolts. Care shall be taken to prevent epoxy from flowing out of the horizontal holes prior to eyebolt insertion. Rotate the eyebolt during installation to eliminate voids and ensure complete bonding of the bolt. Insertion of the eyebolts by the dipping or painting method will not be allowed.
- Loads shall not be applied to the epoxy grouted eyebolts until the epoxy resin has had sufficient time to cure as specified by the epoxy resin manufacturer.
- The cost for furnishing and installing the eyebolts shall be incidental to various contract items.



VIEW A - A

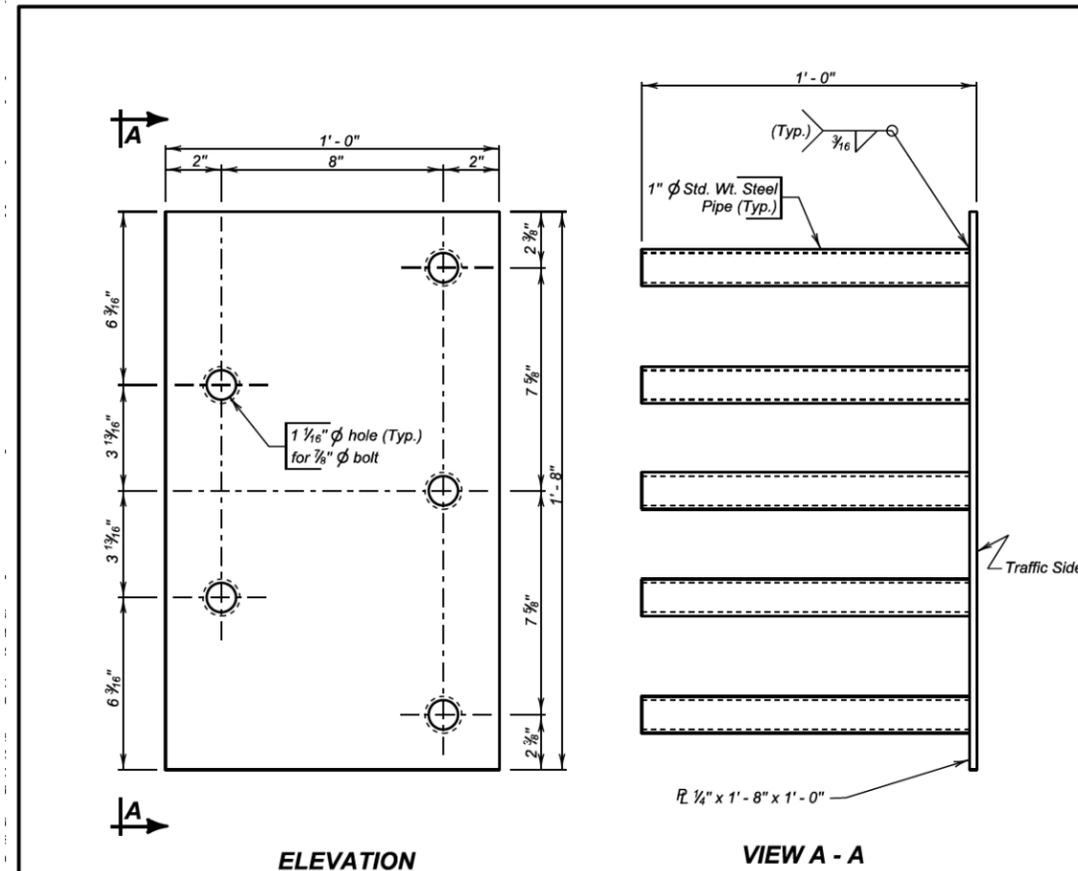


EYEBOLT DETAILS

December 23, 2012

S D D O T	FENCE ANCHORS FOR BRIDGE ABUTMENTS (SWEEP BACK WINGS)	PLATE NUMBER 620.19
		Sheet 1 of 1

Published Date: 1st Qtr. 2016



ELEVATION

VIEW A - A

GENERAL NOTES:

- Steel plate for the insert assembly shall conform to ASTM A709 Grade 36. The steel pipes shall conform to ASTM A53 or ASTM A500 Grade B.
- Welding and weld inspection shall be in conformance with AWS D1.1 - (Current Year) Structural Welding Code - Steel.
- After fabrication, galvanize in accordance with AASHTO M111 (ASTM A123).
- Bolts, nuts, and washers shall be provided with each assembly. Bolts shall be galvanized and conform to the requirements of ASTM A307, A325, or A449. Plain washers shall be galvanized and conform to ASTM F844.
- Bolt heads shall be placed on the traffic side of the endblock. Bolt projection at the back side of the insert shall not exceed 1 inch beyond the nut.
- The cost of the 5 bolt insert plate assembly complete in place including welding and galvanizing shall be incidental to the contract unit price per Cubic Yard for "Class A45 Concrete, Miscellaneous", "Class A45 Concrete, Bridge Deck", or "Class A45 Concrete, Bridge Repair", as applicable.

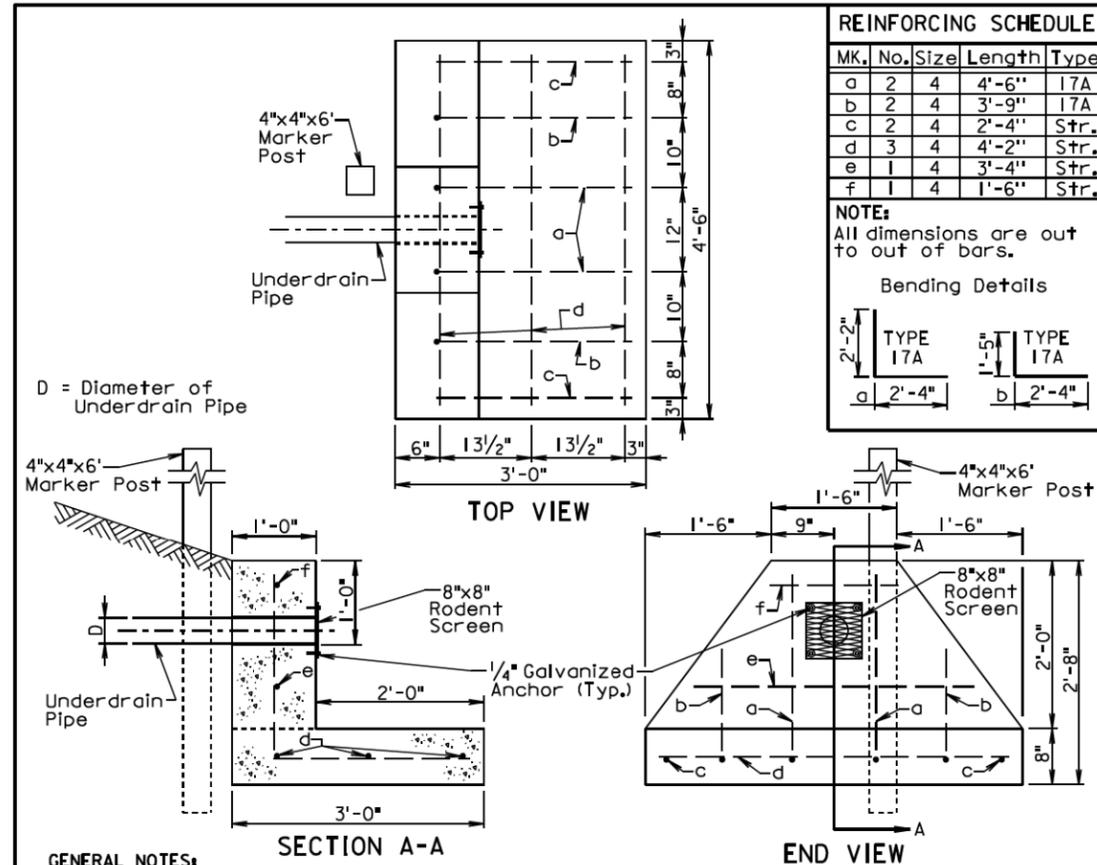
December 23, 2013

S D D O T	5 BOLT INSERT PLATE ASSEMBLY	PLATE NUMBER 630.92
		Sheet 1 of 1

Published Date: 1st Qtr. 2016



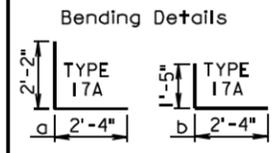
EAST BOUND LANES
378' - 5 1/2" PRESTR. GIRDER BRIDGE
STR. NO. 50-284-166
MINNEHAHA COUNTY
S. D. DEPT. OF TRANSPORTATION
MAY 2016



REINFORCING SCHEDULE

MK.	No.	Size	Length	Type
a	2	4	4'-6"	17A
b	2	4	3'-9"	17A
c	2	4	2'-4"	Str.
d	3	4	4'-2"	Str.
e	1	4	3'-4"	Str.
f	1	4	1'-6"	Str.

NOTE:
All dimensions are out to out of bars.



GENERAL NOTES:

The concrete shall be Class M6. The concrete shall conform to the requirements of Section 462 of the Specifications except the minimum curing time shall be 72 hours. It is estimated that 0.55 cubic yards of concrete is required for each unit.

Four cast-in-place or drilled-in 1/4" galvanized anchors shall be placed in the headwall. Each galvanized anchor shall be placed approximately 1" from the outside corner of the rodent screen. It is preferred that the anchor location be centered at an opening in the rodent screen.

All reinforcing steel shall conform to ASTM A615 Grade 60. It is estimated that 25.7 pounds of reinforcing steel is required for each unit.

The underdrain pipe shall be placed in the concrete headwall with the pipe end flush with the concrete surface adjacent to the rodent screen.

The 8"x8" rodent screen shall be galvanized 13 Ga. steel with a diamond shaped flattened mesh pattern. The size shall be 1/2". The size refers to the measurement across the smallest diamond shaped opening measured from the centers of the wires. The rodent screen shall be centered about the hole in the headwall and fastened to the headwall with the appropriate bolts or nuts with washers.

A 4"x4"x6" marker post shall be placed at the approximate location as depicted in the above drawings for each concrete headwall. The marker post shall project 3'± above the ground line. The marker post shall be cedar or treated with a wood preservative and shall be painted with two coats of white paint.

All costs for furnishing and installing the concrete headwall including equipment, labor, and materials including concrete, reinforcing steel, rodent screen, anchors, and marker post shall be incidental to the contract unit price per each for "Concrete Headwall for Underdrain".

June 26, 2015

S D D O T	CONCRETE HEADWALL FOR UNDERDRAIN	PLATE NUMBER 680.01
	Published Date: 1st Qtr. 2016	Sheet 1 of 1



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