

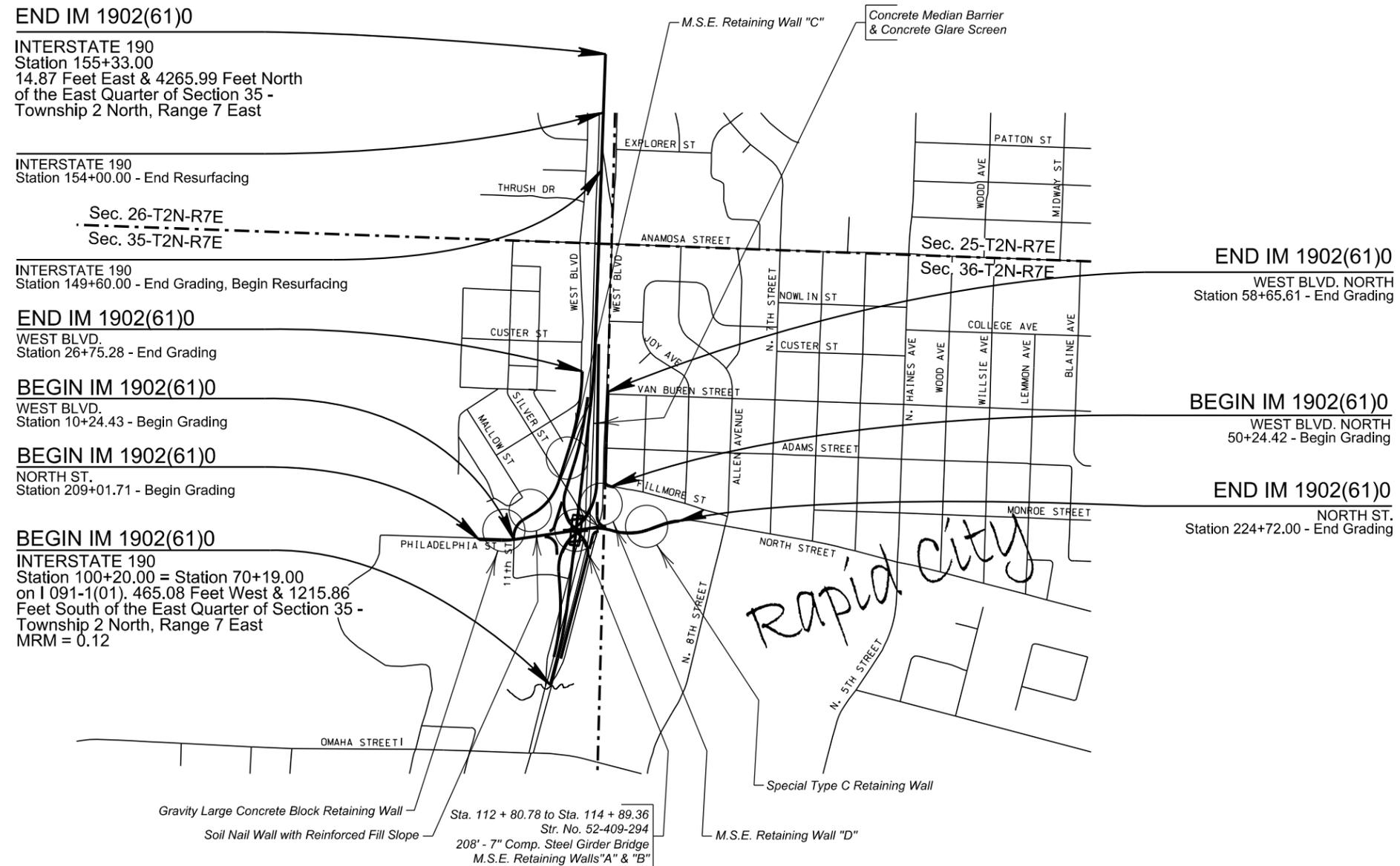
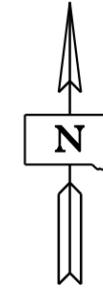
FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E1	E74

Section E: Structure Plans

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FOR BIDDING PURPOSES ONLY

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SECTION E - ESTIMATE OF STRUCTURE QUANTITIES

IM 1902(61)0
Str. No. 52-409-294
208' - 7" Composite Steel Girder Bridge

IM 1902(61)0
Retaining Walls

Bid Item Number	Item	Quantity	Unit
009E3310	Bridge Elevation Survey	Lump Sum	LS
009E5000	Concrete Penetrating Sealer	1,891.0	SqYd
250E0030	Incidental Work, Structure	Lump Sum	LS
260E1010	Base Course	5,123.0	Ton
410E0020	Structural Steel	Lump Sum	LS
410E2600	Membrane Sealant Expansion Joint	171.8	Ft
411E0100	Bridge Painting	Lump Sum	LS
430E0300	Granular Bridge End Backfill	204.0	CuYd
460E0030	Class A45 Concrete, Bridge Deck	513.7	CuYd
460E0050	Class A45 Concrete, Bridge	211.5	CuYd
460E0150	Concrete Approach Slab for Bridge	515.4	SqYd
460E0160	Concrete Approach Sleeper Slab for Bridge	138.4	SqYd
480E0380	Install Dowel in Concrete	18	Each
480E0100	Reinforcing Steel	16,486	Lb
480E0507	No. 7 Rebar Splice	224	Each
510E3531	HP 14x89 Steel Test Pile, Furnish and Drive	126	Ft
510E3535	HP 14x89 Steel Bearing Pile, Furnish and Drive	2,477	Ft
734E2020	Bridge Berm Slope Protection, Crushed Aggregate	168.0	SqYd
831E1010	Geogrid Reinforcement	4,271	SqYd

Bid Item Number	Item	Quantity	Unit
120E7052	Granular Material for Reinforced Embankment	3,950.0	Ton
230E0020	Placing Contractor Furnished Topsoil	290	CuYd
420E0300	Structure Excavation, Retaining Wall	12,665	CuYd
421E1000	Footing Undercut	985	CuYd
530E0310	Special Type C Concrete Retaining Wall	1,619	SqFt
530E0360	1.5' x 1.5' Welded Wire Form	3,640.0	Ft
530E0420	MSE Large Panel Wall Furnish	20,261	SqFt
530E0422	MSE Large Panel Wall Install	20,261	SqFt
530E0602	Soil Nail	8,410.0	Ft
530E0603	Soil Nail Verification Test	2	Each
530E0702	Granular Backfill for MSE Large Panel Wall	17,252.0	CuYd
530E2010	Shotcrete Flashcoat/Leveling Course	140.0	CuYd
530E2020	Reinforced Shotcrete Face	6,040	SqFt
734E0103	Type 3 Erosion Control Blanket	3,110	SqYd
831E1010	Geogrid Reinforcement	3,151	SqYd
831E2010	Slope Reinforcement Geogrid	7,300	SqYd
900E2030	Miscellaneous Work	1	Site

IM 1902(61)0
Median Barrier

IM 1902(61)0
Str. No. 52-409-294
208' - 7" Composite Steel Girder Bridge
Alternate A

Bid Item Number	Item	Quantity	Unit
480E0300	Stainless Reinforcing Steel	98,807	Lb

Bid Item Number	Item	Quantity	Unit
410E0030	Structural Steel, Miscellaneous	Lump Sum	LS
460E0100	Class A45 Concrete, Miscellaneous	152.9	CuYd
462E0100	Class M6 Concrete	57.9	CuYd
480E0100	Reinforcing Steel	11,671	Lb
480E0200	Epoxy Coated Reinforcing Steel	29,269	Lb
628E1000	Straight Concrete Barrier	2,793	Ft
628E1010	Curved Concrete Barrier	536	Ft
628E1100	Movable F Shape Concrete Barrier, Interior Section	3	Each
628E1300	Straight Glare Screen for Concrete Barrier	2,793	Ft
628E1310	Curved Glare Screen for Concrete Barrier	536	Ft
634E0700	Traffic Control Movable Concrete Barrier	35	Each
634E0775	Temporary Concrete Barrier Glare Screen	458	Ft

IM 1902(61)0
Str. No. 52-409-294
208' - 7" Composite Steel Girder Bridge
Alternate B

Bid Item Number	Item	Quantity	Unit
480E0250	Zinc and Epoxy Dual-Coated Reinforcing Steel	98,807	Lb

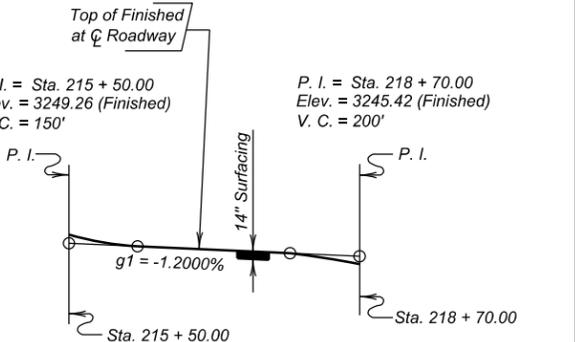
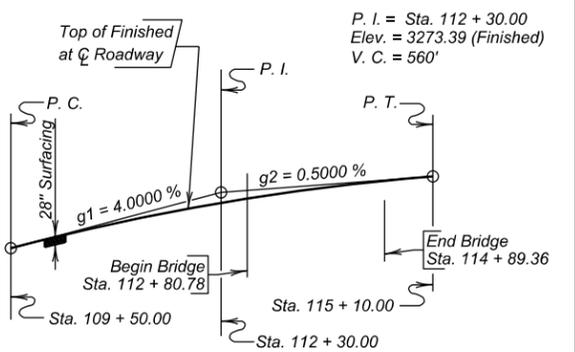
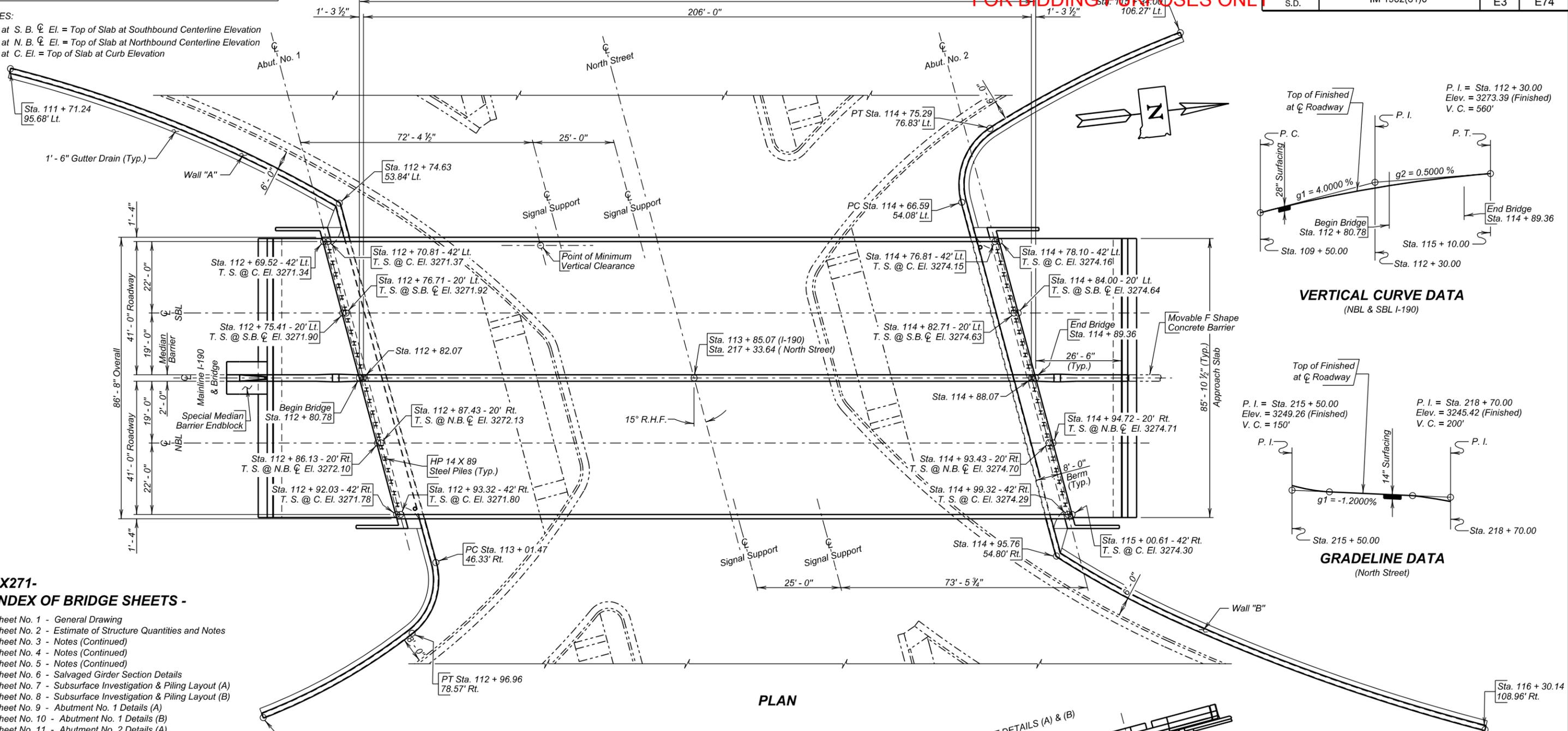
The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
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NOTES:

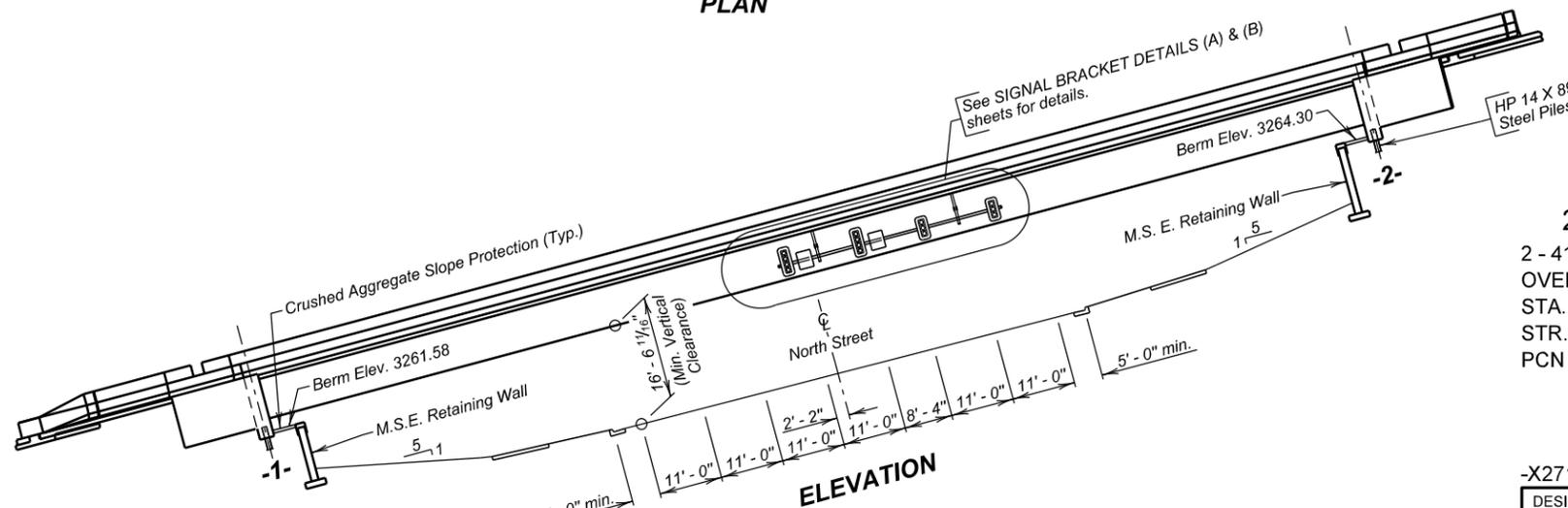
- T. S. at S. B. ∇ El. = Top of Slab at Southbound Centerline Elevation
- T. S. at N. B. ∇ El. = Top of Slab at Northbound Centerline Elevation
- T. S. at C. El. = Top of Slab at Curb Elevation



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- Sheet No. 2 - Estimate of Structure Quantities and Notes
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- Sheet No. 5 - Notes (Continued)
- Sheet No. 6 - Salvaged Girder Section Details
- Sheet No. 7 - Subsurface Investigation & Piling Layout (A)
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- Sheet No. 31 - As-Built Elevation Survey
- Sheet No. 32 - Standard Plate No's. 460.02 and 460.05
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- Sheet No. 34 - Standard Plate No. 630.92

PLAN



ELEVATION

GENERAL DRAWING

FOR
208' - 7" COMP. STEEL GIRDER BRIDGE
2 - 41' - 0" ROADWAYS
OVER NORTH STREET
STA. 112 + 80.78 TO STA. 114 + 89.36
STR. NO. 52-409-294
PCN 1162

15° R.H.F. SKEW
SEC. 35-T2N-R7E
IM 1902(61)0
HL-93

PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION

SEPTEMBER 2013

-X271-

DESIGNED BY BAF/DM PENN1162	CK. DES. BY PW 1162TA01	DRAFTED BY BT	Kevin N. Coeden BRIDGE ENGINEER
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PLANS BY:
OFFICE OF BRIDGE DESIGN, SOUTH DAKOTA DEPARTMENT OF TRANSPORTATION

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E4	E74

ESTIMATE OF STRUCTURE QUANTITIES

DESCRIPTION	QUANTITY	UNIT	REMARKS
Bridge Elevation Survey	Lump Sum	LS	
Concrete Penetrating Sealer	1,891	SqYd	See Special Provision
Incidental Work, Structure	Lump Sum	LS	
Base Course	5,123	Ton	
Structural Steel	Lump Sum	LS	See Special Provision
Membrane Sealant Expansion Joint	171.8	Ft	
Granular Bridge End Backfill	204	Cu Yd	
Class A45 Concrete, Bridge Deck	513.7	Cu Yd	See Special Provision
Class A45 Concrete, Bridge	211.5	Cu Yd	
Concrete Approach Slab for Bridge	515.4	SqYd	
Concrete Approach Sleeper Slab for Bridge	138.4	SqYd	
Reinforcing Steel	16,486	Lb	
Epoxy Coated Reinforcing Steel	1,148	Lb	
No. 7 Rebar Splice	224	Ea.	
HP 14x89 Steel Test Pile, Furnish and Drive	126	Ft	
HP 14x89 Steel Bearing Pile, Furnish and Drive	2,477	Ft	
Bridge Berm Slope Protection, Crushed Aggregate	168	Sq Yd	
Geogrid Reinforcement	4,271	Sq Yd	
Install Dowell in Concrete	18	Ea	
Bridge Painting	Lump Sum	L.S.	

ALTERNATE A

Stainless Reinforcing Steel	98,807	Lb	See Special Provision
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ALTERNATE B

Zinc and Epoxy Dual Coated Reinforcing Steel	98,807	Lb	
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SPECIFICATIONS FOR BRIDGE

- Design Specifications: AASHTO LRFD Bridge Design Specifications, 2012 Edition with 2013 interims.
- Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2004 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
Structural Steel (ASTM A709 Gr. 50WT2)	fy = 50,000 psi
Structural Steel (ASTM A709 Gr. 36T2)	fy = 36,000 psi

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 28" above subgrade elevation.

INCIDENTAL WORK, STRUCTURE

- In place centerline Sta. 112+29.57 - 83.59' Rt. to centerline Sta. 116+47.75 - 71.44' Rt. and in place centerline Sta. 112+24.26 - 123.22' Rt. to centerline Sta. 116+16.81 - 114.38' Rt. are a 421' 7 span and a 394' 6-span continuous steel girder bridge with 30'-0" clear roadway; the superstructures consist of 6" reinforced concrete slabs supported on 4 lines of girders. Steel channel rail faced with steel W-beam guardrail runs the length of the bridges. The decks have been overlaid with 2 inches of low slump dense concrete. The substructures consists of 2 column reinforced concrete bents and reinforced concrete vertical abutments, all of which are supported on timber piling.
- Break down and remove the existing bridges, including the concrete slope protection 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 bridges 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 COMMITMENT H: WASTE DISPOSAL SITE found in Section A.
- The existing guardrail and posts shall be salvaged for future highway related use. The salvaged guardrail and posts shall be stockpiled at the SDDOT Rapid City Area South Maintenance Yard at 5801 South Highway 79 in Rapid City, SD. Coordinate delivery with Maintenance Supervisor Bob Smith, (605) 394-1646. Care shall be taken during the dismantling, transporting, and stockpiling operations not to damage the structural properties of the salvaged items.
- A 6 ft. section of girder shall be salvaged from the existing southbound structure from the eastern exterior girder. The portion to be salvaged is located approximately 40' - 7 1/4" south of Bent No. 2. The salvaged section shall be centered about the bolted splice repair at the location. The salvaged girder section shall be stockpiled at the SDDOT Rapid City Area South Maintenance Yard at 5801 South Highway 79 in Rapid City, SD. Coordinate delivery with Maintenance Supervisor Bob Smith, (605) 394-1646. 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 bridges 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 structures to verify the extent of the work and materials involved. If desired by the Contractor, a copy of the original construction plans may be obtained through the Office of Bridge Design.

NOTICE - LEAD BASED PAINT

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

DESIGN MIX OF CONCRETE

- All structural concrete shall be Class A45 unless otherwise indicated.
- Type II cement conforming to Section 750 is required except, Type III cement is required in the abutments. Type III cement shall contain a maximum 8% Tricalcium Aluminate (C₃A) and a maximum 0.6% Alkalies (Na₂O + 0.658K₂O).
- 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 460.3 S. 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 3/4". The quantity of grout is included in and shall be paid for at the contract unit price per cubic yard for Class A45 Concrete, Bridge.

ABUTMENTS

- The HP 14x89 Piling were designed using a factored bearing resistance of 165 tons per pile. Piling shall develop a field verified nominal bearing resistance of 412 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 two inches in the direction parallel to the girder centerline. A pile-driving template shall be used to insure this accuracy.
- Each finished abutment shall include a Bridge Survey Marker. See Standard Plate No. 460.05
- Abutment wings shall not be cast until after the deck has been poured.

**ESTIMATE OF STRUCTURE QUANTITIES AND NOTES
FOR
208' - 7" COMP. STEEL GIRDER BRIDGE**

STR. NO. 52-409-294

SEPTEMBER 2013

DESIGNED BY PW PENN1162	CK. DES. BY DM 1162TA02	DRAFTED BY BT	<i>Kevin N. Goeden</i> BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
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ABUTMENTS (CONTINUED)

7. All piling within the Granular MSE Backfill limits shall be encased with a 24" minimum inside diameter steel casing. The steel casing shall be of sufficient strength to withstand all forces, including those from earth pressure and shall be approved by the Engineer. The pile shall be encased the entire height of the backfill to an elevation of 3 inches below the bottom of abutment. See MSE Retaining Wall plans for measurement and payment of casing.
8. The Contractor shall drive the pile and then place the casings. The Contractor shall take the necessary precautions to prevent displacement of the casings during placement and compaction of the backfill. Backfill material within 3 ft. of the casing shall be placed in small lifts and compacted in such a manner that the required density is achieved, without causing displacement or damage to the steel casing. The Contractor shall coordinate casing installation with the MSE wall installation.
9. After the piles are driven, the steel casings installed and the backfill placed, the steel casings shall be filled with coarse dry sand to a depth of 6 feet from the top of the casing. The sand shall be compacted to prevent bridging. The top 6 feet of the casing shall be filled with natural bentonite slurry. The slurry shall consist of a polymer free sodium bentonite designed for sealing wells and bore holes. The bentonite material shall be a granular bentonite with 1/4" or larger particles. The bentonite particles shall be poured directly into the casing and hydrated with water in 2 ft. lifts. The quantity of water used shall be determined according to the manufacturer's recommendations for a solution of approximately 20% solids.
10. After filling the casings with bentonite, the top of each casing shall be covered and sealed with a layer of plywood covered with a minimum of 2-inch thick polystyrene, as approved by the Engineer.
11. All costs associated with filling the steel casings with sand and bentonite slurry shall be incidental to the contract unit price per foot for the steel pile.

CONNECTION OF GIRDER TO PILE

1. Cut off pile at elevation shown in the plans and weld bearing plate to pile. Adjust as necessary to make bearing plate level, and to permit proper position of girder. If piles are driven out of position to the extent that bearing plates will not fit, the Contractor shall submit his method of correction to the Engineer for approval. Piles shall not be pulled into position.
2. All girder erection shall be complete with the splices fully bolted and diaphragms in place, before welding girders to bearing plates. (Diaphragms need not be secured with more than temporary bolting, prior to pile to girder connection).
3. An alternate connection, capable of transmitting a direct load of 8000 lbs. to the pile and developing 30,000 lbs. horizontal force, may be submitted to the Office of Bridge Design for prior approval.
4. This connection shall not be made when the temperature is greater than 70 degrees F or less than 30 degrees F.
5. Steel for the bearing plates shall conform to ASTM A709 Gr. 50.
6. Payment for furnishing and installing the bearing plates shall be incidental to the contract lump sum price for Structural Steel.

PLACEMENT OF ABUTMENT CONCRETE

1. Abutment concrete shall be placed, as directed by the Engineer, at a time when a relatively stable temperature can be expected. A relatively stable temperature is defined as an air temperature deviation of not more than 30 degrees F within 12 hours of completing the abutment pour from the air temperature at the time when the abutment concrete is placed.
2. The forms shall be secured to the girders in such a manner that they will be free to move longitudinally with the expansion or contraction of the girder.
3. The girders shall be braced near the abutments in such a manner that their lateral movement or rotation will be prevented during the placing of concrete. Include details for this bracing with the falsework plans.

SUPERSTRUCTURE

1. Structural Steel shall conform to ASTM A709 Gr. 50WT2. Angles in the diaphragms shall conform to ASTM A588 Grade 50. Shear connectors shall conform to Section 7.3 Type B of the AASHTO/AWS D1.5 Bridge Welding Code.
2. Bolts, nuts, and washers shall conform to ASTM A325 Type 3.
3. Shear Connectors shall be field welded to the girders in accordance with the Shear Connector Field Installation Special Provision.
4. All butt welded girder splices shall be ultrasonically inspected. See notes regarding Welding and Weld inspection.
5. Cost of welding and weld inspection shall be included in the contract lump sum price for Structural Steel.
6. The exterior face and bottom of the bottom flange of the exterior girders shall be painted in accordance with Section 411 of the Specifications. The top coat shall be an approved brown (Federal Standard 595B Color 30045) to match the weathering color of the steel.
7. See Diaphragm Details for notes concerning diaphragms.
8. Structural Steel used in all girder web plates, girder flanges, and girder splice plates shall comply with the Charpy-V-Notch toughness requirements set forth in Section 971 of the Specifications. Material greater than 1 1/2 inches in thickness shall require frequency (P) testing in lieu of heat lot (H) testing. See Girder Layout for location of tension and stress reversal areas of girder flanges.
9. 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 skew of the bridge to equally distribute loads to the girders.

10. The concrete bridge deck shall be placed and finished at a minimum rate of 90 ft. of deck per hour measured along centerline roadway. If concrete cannot be placed and finished at this rate, the Engineer shall order a header installed and operations stopped. If a header is required sometime during the pour operation, its location shall be at or as near as possible to the three quarter point of the span. Notify the Bridge Construction Engineer if deck pour operations are stopped. Operations may resume only when the Engineer is satisfied that a rate of 90 ft. per hour can be maintained and the concrete has attained a minimum compressive strength of 2000 psi.
11. Dead Load camber shall be cut into the girder webs. Do not induce or correct camber in plate girders by local heating without prior approval from the Engineer.
12. All structural steel surfaces of the superstructure shall be blast cleaned to a commercial finish, in accordance with SSPC SP6, at the fabricator's shop. Abrasives used for blast cleaning shall be clean dry sand, steel shot, mineral grit, or manufactured grit. Fins, tears, slivers, and burred or sharp edges shall be removed by grinding and then re-blasted to achieve the specified finish.
13. Snap ties, if used in the barrier curb formwork, shall be epoxy coated. The epoxy coating shall be inert in concrete. If Alternate B is chosen, the epoxy coating shall be compatible with the coating applied to the new Zinc and Epoxy Dual Coated Reinforcing Steel.
14. The Contractor shall submit a detailed girder erection plan 30 days prior to girder erection. The plan shall include complete sequencing details, splice bolt up procedures, girder pick point locations, temporary shoring details, and temporary bracing details. The girder erection plan shall be stamped by a Professional Engineer registered in South Dakota.
15. All single girder segments shall be adequately braced or held in position until the adjacent girder segment is placed and all diaphragms between the segments are fully connected. Single girder segments will not be allowed to remain in place beyond the end of a work shift without connection to an adjacent girder segment with all diaphragms between the segments fully connected. At no time will a single girder segment be allowed over traffic.
16. If Alternative A is chosen for reinforcing steel, see Special Provision for Stainless Reinforcing Steel. If Alternative B is chosen, reinforcing steel shall conform to ASTM 1055. Mixing of reinforcing types will not be allowed.

NOTES (CONTINUED)

FOR
208' - 7" COMP. STEEL GIRDER BRIDGE

STR. NO. 52-409-294

SEPTEMBER 2013

DESIGNED BY PW PENN1162	CK. DES. BY DM 1162TA03	DRAFTED BY BT	 BRIDGE ENGINEER
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SHOP PLANS

Shop plans shall be required as specified by the Specifications. Shop plans must be submitted electronically in Adobe PDF. Send shop plan submittals to the Office of Bridge Design.

CLASS A45 CONCRETE, BRIDGE DECK

1. Concrete used in the bridge deck slab and barrier curbs shall be in accordance with the requirements for bridge deck concrete as specified in Section 460.3 A. of the Specifications. In addition, the concrete used in the bridge deck and barrier curbs shall have Class F Modified Fly Ash substituted for a portion of the cement in accordance with Section 605 of the Specifications. The amount of cement to be replaced shall be 20 percent by weight. The ratio of substitution of fly ash to cement shall be 1:1 by weight.
2. The bridge deck concrete, excluding the barrier curbs, shall be placed and cured in accordance with the Special Provision for Bridge Deck Curing and Finishing.
3. See Special Provision for Concrete Penetrating Sealer.

FIELD BOLTED GIRDER SPLICES

1. Steel for splice and filler plates shall conform to ASTM A709 Gr. 50WT2.
2. Bolts in flange splices shall be placed with the heads down.
3. Bolts in web splice of exterior girders shall be placed with heads on exterior face of girders.
4. All bolts shall be fully tightened prior to removing temporary supports.

WELDING AND WELD INSPECTION

Main members referred to in Section 6.7 Nondestructive Testing of Bridge Welding Code are identified as follows: Girder webs, girder flanges, and bearing stiffeners. Ultrasonic testing of groove welds shall be used in lieu of radiography. See Girder Layout for stress categories and their locations along the girder.

FALSEWORK

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

FALL PROTECTION

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

CLASS B COMMERCIAL TEXTURE FINISH

1. A Class B commercial texture finish shall be applied to the following areas:
 - a) ***Abutments:** all exposed surfaces to an elevation 1-foot below finished ground line.
 - b) **Barrier Rail:** all exposed surfaces (**front, **top and *back).
 - c) ***Slab:** edge of slab.
 - * Color shall be Tammscoat Adobe or an approved tan.
 - ** Color shall be "Pearl Gray" Federal Standard No. 26622.
2. The Class B commercial texture finish shall be applied in accordance with Section 460.3M.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.

SIGNAL BRACKETS

1. Steel for plates and bars shall conform to ASTM A709 Gr. 36. Shear connectors shall conform to Section 7.3 Type B of the ANSI/AASHTO/AWS D1.5-02 Bridge Welding Code. Pipe shall conform to ASTM A53 Grade B.
2. Brackets and/or bracket components shall be painted in accordance with Section 411 of the Specifications. The finish coat of paint color shall be brown as approved by the Engineer and shall match the color of the exterior girders.
3. Payment for painting, furnishing, and installing the signal brackets shall be incidental to the contract lump sum price for Structural Steel.

PILE DRIVING

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

Delmag D-30-32 SPI D-30

The following hammers were evaluated and found to produce acceptable driving stresses at the second fuel setting:

Delmag D-46-32

If during actual driving operations an adequate hammer drop to obtain design bearing is not achieved, contact the Geotechnical Engineering Activity prior to increasing the fuel setting.

3. Pile hammers not listed will require evaluation and approval prior to use from the Geotechnical Engineering Activity.

SDDOT's LRFD PILE DRIVING EQUATIONS

To determine the field verified nominal pile bearing resistance of driven piles the SDDOT uses the formulas below for timber, concrete, steel H-piling and shell type piles.

For single action steam or air hammers and open cylinder top diesel hammers:

$$Q \text{ (drive)} = \frac{10.5WH}{S + 0.1} \times \frac{W}{W + M}$$

Where:

- Q = the field verified nominal pile bearing resistance in tons.
- W = the weight of the ram of an energy hammer in tons.
- H = the height of free fall of the hammer or ram in feet.
- M = the weight in tons of the driven mass and shall include the weight of the pile, the weight of the driving cap, and the weight of the anvil, if used.
- E = the energy per blow in foot-tons.
- S = the average penetration in inches of the pile per blow for the last 10 blows for energy hammers.

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.

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.

NOTES (CONTINUED)

FOR
208' - 7" COMP. STEEL GIRDER BRIDGE

STR. NO. 52-409-294

SEPTEMBER 2013

DESIGNED BY PW PENN1162	CK. DES. BY DM 1162TA04	DRAFTED BY BT	 BRIDGE ENGINEER
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REINFORCED GRANULAR EMBANKMENT

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

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

- Geogrid will be paid for at the contract unit price per square yard for Geogrid Reinforcement. Payment quantities will be based on area covered plus 15%. Overlaps are accounted for by the additional 15%. Payment will be full compensation for furnishing and installing the geogrid only. Granular backfill materials will be paid for under a different bid item.
- Granular Material will conform to the specification for Aggregate Base Course in Section 882 of the Specifications. Granular Material will be paid for at the contract unit price per cubic yard for Aggregate Base Course. Payment will be full compensation for furnishing and placing this material.
- The geogrid shall be placed on a level surface and overlapped a minimum of 2 feet.
- The geogrid will be placed as taut as possible with minimal wrinkles. Placement will be done so that subsequent granular cover material does not shove, wrinkle or distort the in place geogrid. The overlaps will be shingled in a manner that assures granular material will not be forced under the geogrid during backfilling operations. The geogrid may be held in place with small piles of granular material or staples.
- Aggregate base course will be dumped at least 20 feet behind the leading edge of the backfill and pushed into place with a loader or dozer from the covered areas to the uncovered areas. No traffic will be allowed on the uncovered geogrid.
- The aggregate base course and adjacent soil embankment shall be built simultaneously in horizontal layers. Aggregate base course shall be placed in 6 inch maximum lifts and compacted to 97 percent of maximum standard proctor dry density using a smooth face vibratory roller or vibratory plate compactor. Each layer of granular material shall be thoroughly watered prior to and during compaction.
- Density tests within the berm limits shall consist of tests conducted both in the soil embankment and the granular bridge end backfill according to the modified zone requirements below:

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

- The zone requirement will be in force for all phases of staged construction. For example, if the berm on the west side of centerline is constructed separately from the east side, testing by zone will be required on both sides of centerline.

APPROACH SLABS

- 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.
- 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.
- The concrete in the approach slab shall be tined normal to centerline roadway.
- Concrete Approach Sleeper Slab for Bridge will be paid for at the contract unit price per square yard. This payment shall be full compensation for all excavation, furnishing, hauling, and placing all materials including concrete and reinforcing steel; for disposal of all excavated material and surplus materials; and for labor, tools, equipment, and any incidentals necessary to complete this item of work.
- 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.

BARRIER EXPANSION DEVICES

- Steel for plates and bars shall conform to ASTM A709 Gr. 36. The end welded deformed bar anchors shall conform to ASTM A496.
- All steel components shall be galvanized after shop welding in accordance with AASHTO M111 (ASTM A123).
- The plain ferrule inserts in the expansion device shall be 3/4" dia. commercially available regular steel inserts to be positioned by welding onto the plate of the expansion device as shown on these plans.
- The bolts used to attach the sliding plates to the expansion device shall be 3/4" dia., Group 2, Type 316 stainless steel socket countersunk head flat screws furnished with a thread type compatible with the thread type in the plain ferrule inserts of the expansion joints. All bolts are to be coated with a liquid thread locking material that is intended to allow for future removal.
- Payment for furnishing and installing the barrier expansion joints shall be incidental to the contract lump sum price for Structural Steel.

CRUSHED AGGREGATE SLOPE PROTECTION

- This work shall consist of paving the bridge berm slopes with crushed aggregate slope protection for control and prevention of berm erosion.
- The aggregate used in the crushed aggregate slope protection shall conform to the requirements of Section 820 of the Specifications for coarse aggregate for Class A Concrete (size no. 1).
- The asphalt material used in the crushed aggregate slope protection shall be either Asphalt Type MC-70 or MC-250, or emulsified Asphalt Type RS-1, RS-2, CRS-1 or CRS-2 meeting the requirements of Section 890 of the Specifications and AASHTO M81, AASHTO M140, and AASHTO M208 respectively.

- The surface upon which the slope protection is to be placed shall be smooth, uniform, and free from foreign material. The top surface of the slope protection shall conform to the dimensions, elevations, and slopes shown in the plans.
- The crushed aggregate shall be shaped and compacted to provide a stable, smooth, and uniform surface.
- The asphalt material shall be applied at a rate sufficient to assure penetration and binding of the aggregate in the upper 2 inches of the slope protection. (Estimated Rate = 1.3 gallons per square yard.) The surfaces of the adjacent structure shall be protected from spattering or discoloration from the asphalt material.
- Payment for crushed aggregate slope protection shall be at the contract unit price per square yard for Bridge Berm Slope Protection, Crushed Aggregate and shall be full compensation for slope paving, including furnishing all materials, labor, and equipment necessary or incidental to the satisfactory completion of this work. Payment will be for plans quantity.

NOTES (CONTINUED)

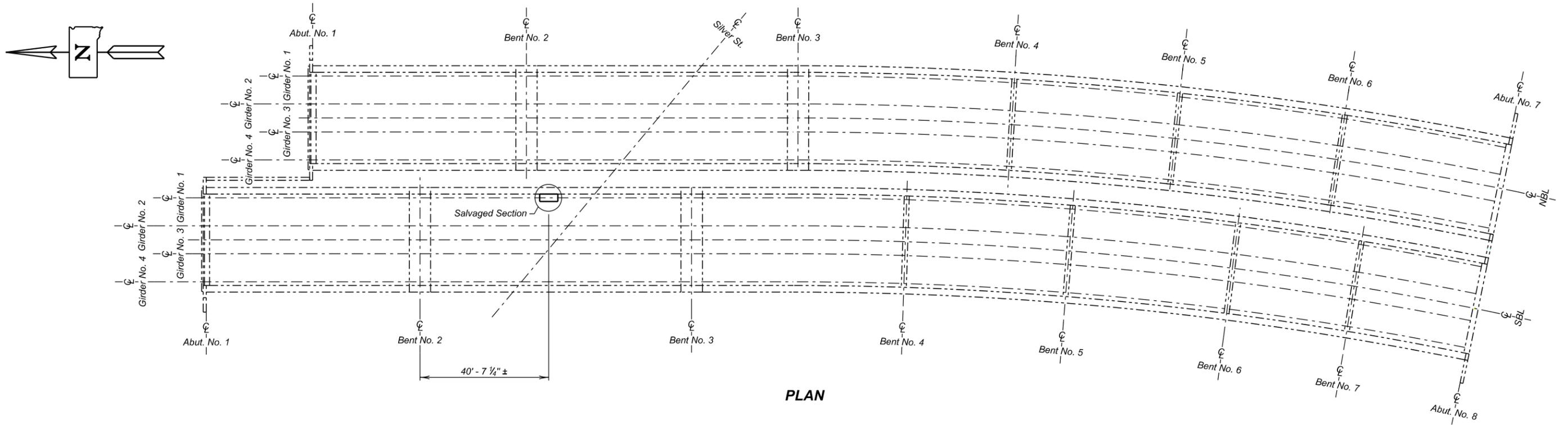
FOR
208' - 7" COMP. STEEL GIRDER BRIDGE

STR. NO. 52-409-294

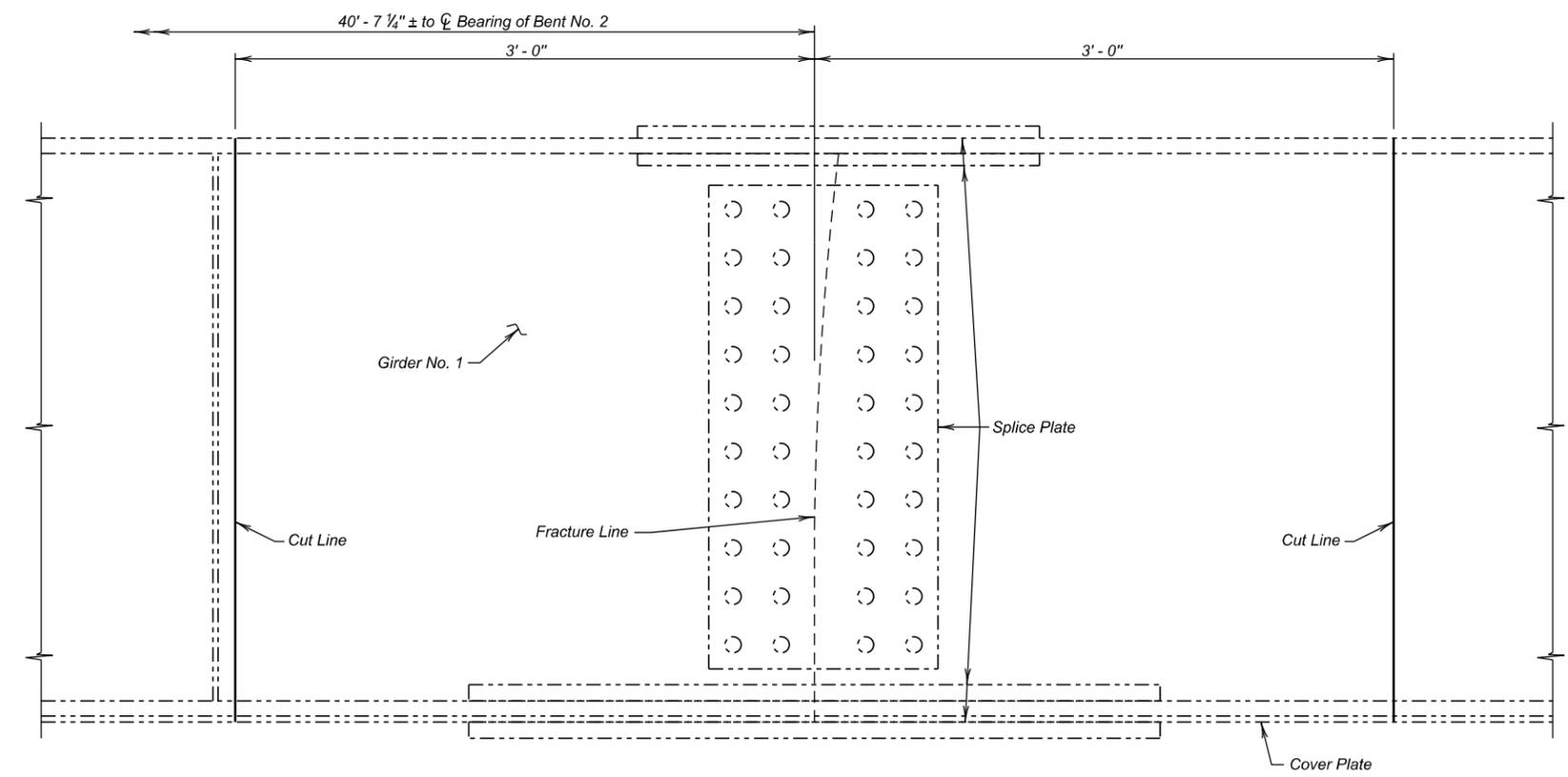
SEPTEMBER 2013

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E8	E74



PLAN



ELEVATION AT SALVAGE SECTION

SALVAGED GIRDER SECTION DETAILS
 FOR
208' - 7" COMP. STEEL GIRDER BRIDGE
 2 - 41' - 0" ROADWAYS
 OVER NORTH STREET
 STA. 112 + 80.78 TO STA. 114 + 89.36
 STR. NO. 52-409-294

15° R.H.F. SKEW
 SEC. 35-T2N-R7E
 IM 1902(61)0
 HL-93

PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION
 SEPTEMBER 2013

DESIGNED BY BAF/DM PENN1162	CK. DES. BY PW 1162TA06	DRAFTED BY BT	<i>Kevin N. Goeden</i> BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E9	E74

FOR BIDDING PURPOSES ONLY

Hole Number	1
Station	112+72
Depth	45 ft
Soil Color	Gray
Classification	Sand Clay
Strength (Q _u)	4,034 psf
Dry Density	98.4 pcf
Wet Density	121.8 pcf
Moisture	23.8 %
Pass No. 10	99.1 %
Pass No. 40	99.1 %
Pass No. 200	66.2 %
Sand Content	32.9 %
Silt Content	30.3 %
Clay Content	35.9 %

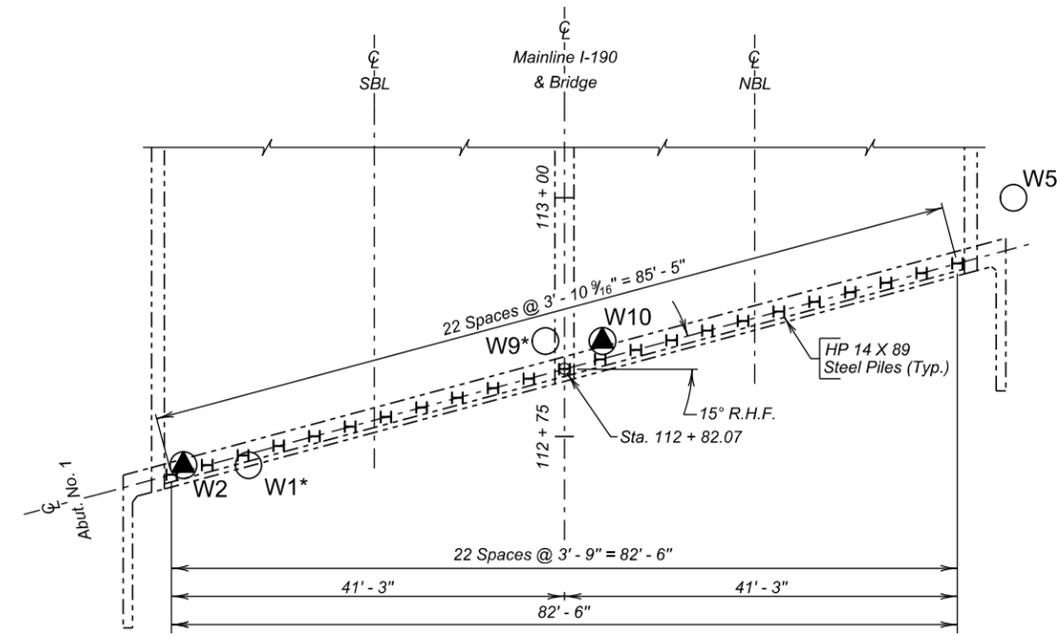
Hole Number	5
Station	113+00
Depth	60.5 ft
Soil Color	Gray
Classification	Silt Clay
Strength (Q _u)	8,723 psf
Dry Density	97.9 pcf
Wet Density	119.6 pcf
Moisture	22.2 %
Pass No. 10	98.6 %
Pass No. 40	98.6 %
Pass No. 200	76.9 %
Sand Content	21.7 %
Silt Content	33.3 %
Clay Content	43.6 %

Hole Number	5
Station	113+00
Depth	18 ft
Soil Color	Brown/Gray
Classification	Sand Clay
Strength (Q _u)	2,149 psf
Dry Density	102.3 pcf
Wet Density	122.3 pcf
Moisture	19.5 %
Pass No. 10	83.4 %
Pass No. 40	76.6 %
Pass No. 200	67.9 %
Sand Content	15.5 %
Silt Content	22.7 %
Clay Content	45.2 %

Hole Number	6
Station	112+97
Depth	32 ft
Soil Color	Gray
Classification	Clay
Strength (Q _u)	28,110 psf
Dry Density	118.9 pcf
Wet Density	136.0 pcf
Moisture	14.4 %
Pass No. 10	99.2 %
Pass No. 40	99.2 %
Pass No. 200	98.2 %
Sand Content	1.1 %
Silt Content	34.5 %
Clay Content	63.7 %

Hole Number	9
Station	112+85
Depth	13 ft
Soil Color	Brown
Classification	Clay
Strength (Q _u)	8,328 psf
Dry Density	104.6 pcf
Wet Density	123.6 pcf
Moisture	18.4 %
Pass No. 10	98.6 %
Pass No. 40	96.7 %
Pass No. 200	85.9 %
Sand Content	12.7 %
Silt Content	32.4 %
Clay Content	53.4 %

Hole Number	9
Station	112+85
Depth	20.17 ft
Soil Color	Brown
Classification	Clay
Strength (Q _u)	3,843 psf
Dry Density	95.0 pcf
Wet Density	118.2 pcf
Moisture	24.4 %
Pass No. 10	98.2 %
Pass No. 40	94.1 %
Pass No. 200	90.6 %
Sand Content	7.6 %
Silt Content	25.6 %
Clay Content	65.0 %



PILING LAYOUT

* Values represent uncorrected "N" values from Penetration Test.

Sample Zone 48 Blows Per Foot

If refusal of the penetration test was achieved based on 50 blows within one of the 6 inch sets. The number of blows over inches is listed.

Mowry Shale is a marine shale with a textural classification that varies from silt-clay to clay-silt. Color varies from gray to black. Bentonite zones may be encountered throughout. Nonweathered Mowry Shale is considered to be "Soft Rock".

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
- ◐ Drive Test
- ▽ Water
- ⊖ Caved
- Sample Zone

Drive test are conducted by dropping a 490 pound hammer 30 inches to drive a 2 7/8 inch drill stem with attached retractable plug sampler for taking samples and to measure the resistance to penetration of the soil.

Penetration test holes are drilled with a 6 5/8 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.

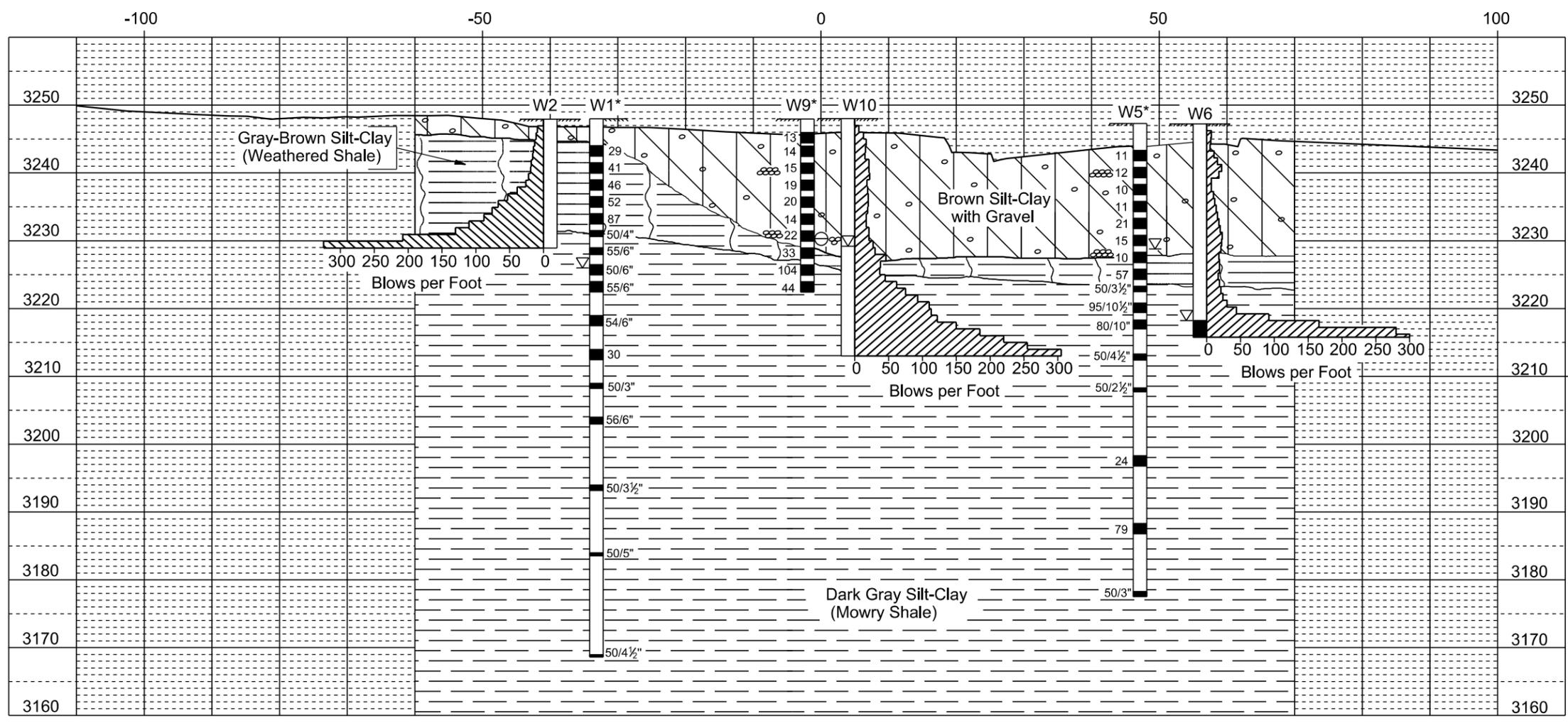
GROUND WATER ELEVATIONS

as of FEBRUARY 2013

W1	3226.0
W2	DRY
W5	3228.8
W6	3218.2
W9	(DRY) 3230.5
W10	3229.3

MEASURED SKIN FRICTION

	ELEV.	PSF
W2	3228.9	3111
W6	3215.8	1445
W10	3213.1	1255



SUBSURFACE INVESTIGATION AND PILING LAYOUT (A)

FOR ABUTMENT NO. 1

208' - 7" COMP. STEEL GIRDER BRIDGE
 2 - 41' - 0" ROADWAYS OVER NORTH STREET
 STA. 112 + 80.78 TO STA. 114 + 89.36
 STR. NO. 52-409-294

15° R.H.F. SKEW
 SEC. 35-T2N-R7E
 IM 1902(61)0
 HL-93

PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION
 SEPTEMBER 2013

DESIGNED BY PW PENN1162	CK. DES. BY DM 1162TA07	DRAFTED BY BT/JL	Kevin N. Goeden BRIDGE ENGINEER
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Hole Number	3	Hole Number	3
Station	114+78	Station	114+78
Depth	5.5 ft	Depth	50.5 ft
Soil Color	Brown	Soil Color	Clay
Classification	Sand Gravel	Classification	Gray
Strength (Q _u)	---	Strength (Q _u)	3,224 psf
Dry Density	---	Dry Density	102.2 pcf
Wet Density	---	Wet Density	124.9 pcf
Moisture	3.7 %	Moisture	22.3 %
Pass No. 10	44.0 %	Pass No. 10	99.3 %
Pass No. 40	36.9 %	Pass No. 40	99.3 %
Pass No. 200	14.8 %	Pass No. 200	97.2 %
Sand Content	29.2 %	Sand Content	2.1 %
Silt Content	8.7 %	Silt Content	27.7 %
Clay Content	6.2 %	Clay Content	69.5 %

Hole Number	3	Hole Number	4
Station	114+78	Station	114+67
Depth	13 ft	Depth	26 ft
Soil Color	Brown	Soil Color	Gray
Classification	Clay Sand	Classification	Silt Clay
Strength (Q _u)	3,153 psf	Strength (Q _u)	7,641 psf
Dry Density	109.1 pcf	Dry Density	110.2 pcf
Wet Density	129.6 pcf	Wet Density	128.5 pcf
Moisture	18.8 %	Moisture	16.6 %
Pass No. 10	97.1 %	Pass No. 10	99.4 %
Pass No. 40	94.7 %	Pass No. 40	99.4 %
Pass No. 200	58.1 %	Pass No. 200	72.6 %
Sand Content	39.0 %	Sand Content	26.8 %
Silt Content	32.9 %	Silt Content	32.9 %
Clay Content	25.3 %	Clay Content	39.8 %

Hole Number	7	Hole Number	7
Station	114+97	Station	114+97
Depth	34.83 ft	Depth	13 ft
Soil Color	Gray	Soil Color	Brown
Classification	Clay	Classification	Gr Sand Clay
Strength (Q _u)	6,489 psf	Strength (Q _u)	906 psf
Dry Density	104.9 pcf	Dry Density	102.5 pcf
Wet Density	125.4 pcf	Wet Density	124.3 pcf
Moisture	19.6 %	Moisture	21.3 %
Pass No. 10	98.7 %	Pass No. 10	78.5 %
Pass No. 40	98.7 %	Pass No. 40	73.9 %
Pass No. 200	96.6 %	Pass No. 200	56.8 %
Sand Content	2.1 %	Sand Content	21.8 %
Silt Content	31.5 %	Silt Content	23.8 %
Clay Content	65.2 %	Clay Content	33.0 %

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E10	E74

Mowry Shale is a marine shale with a textural classification that varies from silt-clay to clay-silt. Color varies from gray to black. Bentonite zones may be encountered throughout. Nonweathered Mowry Shale is considered to be "Soft Rock".

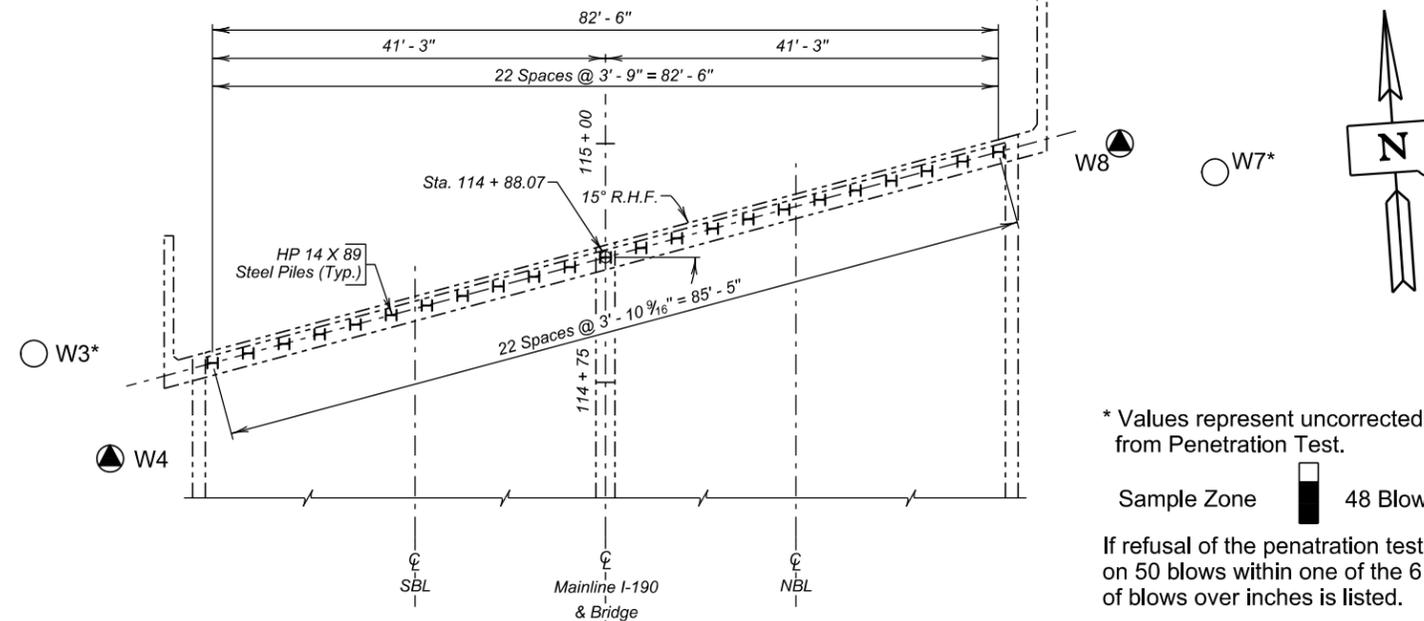
The Geotechnical Engineering Activity has on file all of the boring logs for this project. These logs and additional results of laboratory test, if any, are available for review at the Central Office in Pierre.

LEGEND

- Penetration Test
- ⊖ Caved
- ⊕ Sample Zone
- ▽ Water

Drive test are conducted by dropping a 490 pound hammer 30 inches to drive a 2 7/8 inch drill stem with attached retractable plug sampler for taking samples and to measure the resistance to penetration of the soil.

Penetration test holes are drilled with a 6 5/8 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.

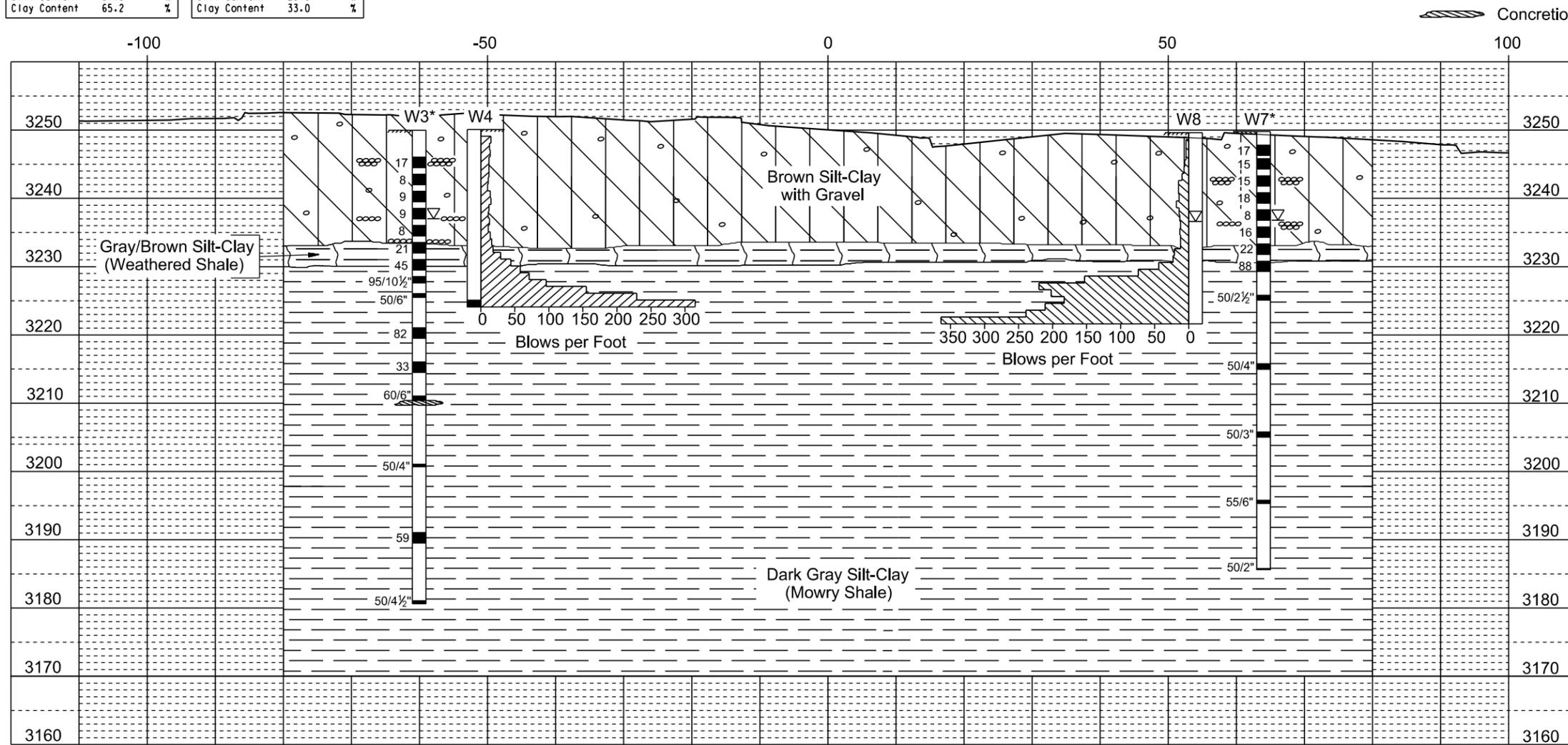


* Values represent uncorrected "N" values from Penetration Test.

Sample Zone 48 Blows Per Foot

If refusal of the penetration test was achieved based on 50 blows within one of the 6 inch sets. The number of blows over inches is listed.

PILING LAYOUT



GROUND WATER ELEVATIONS

as of FEBRUARY 2013

W3	3237.0
W4	DRY
W7	3236.8
W8	3236.8

MEASURED SKIN FRICTION

	ELEV.	PSF
W4	3224.1	1493
W8	3221.6	1852

SUBSURFACE INVESTIGATION AND PILING LAYOUT (B)

FOR ABUTMENT NO. 2

208' - 7" COMP. STEEL GIRDER BRIDGE

2 - 41' - 0" ROADWAYS
OVER NORTH STREET
STA. 112 + 80.78 TO STA. 114 + 89.36
STR. NO. 52-409-294

15° R.H.F. SKEW
SEC. 35-T2N-R7E
IM 1902(61)0
HL-93

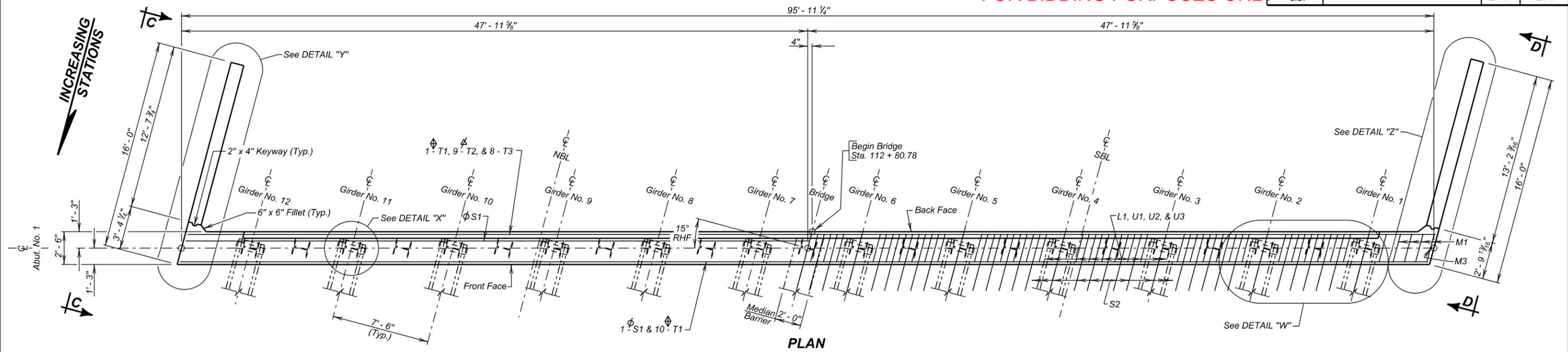
PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION

SEPTEMBER 2013

DESIGNED BY PW	CK. DES. BY DM	DRAFTED BY BT/JL	Kevin N. Goeden BRIDGE ENGINEER
PENN1162	1162TA08		

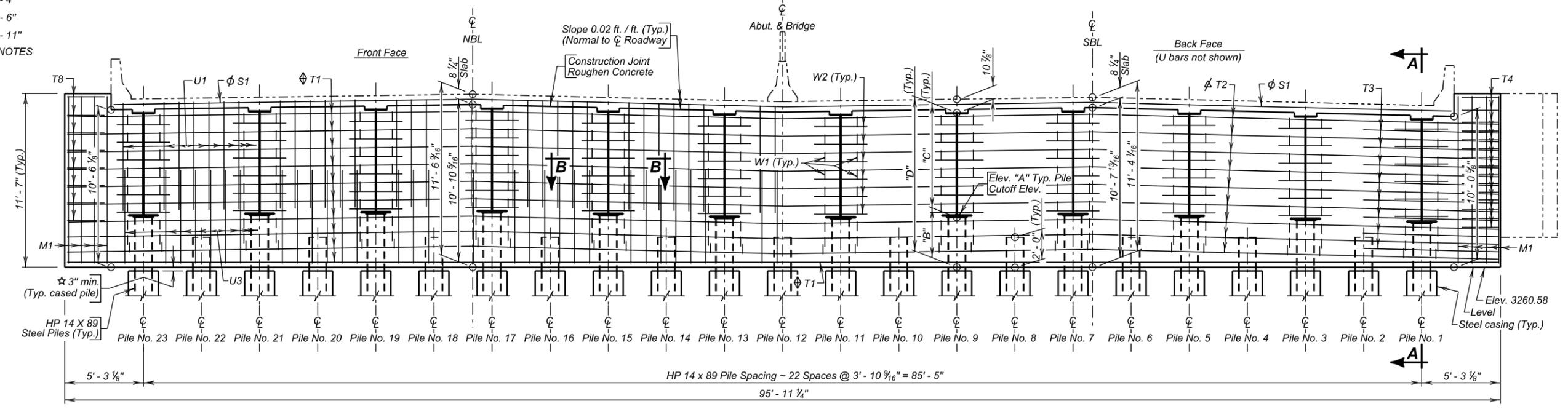
FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E11	E74



PLAN

- ⊕ Minimum Lap = 2' - 4"
- ⊕ Minimum Lap = 3' - 6"
- ⊕ Minimum Lap = 4' - 11"
- ☆ See ABUTMENT NOTES

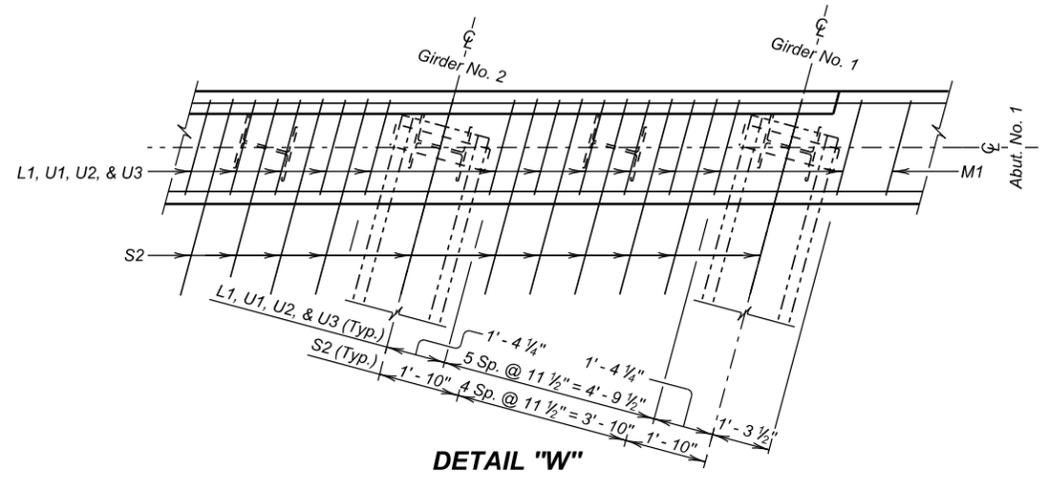


ELEVATION

(Dimensions & elevations are along \bar{C} Abutment)

TABLE OF ELEV. & DIMENSIONS				
Pile No.	Elev. "A"	"B" (Ft.)	"C" (Ft.)	"D" (Ft.)
1	3263.50	2.91	6.98	9.89
2	3262.58	2.00	—	—
3	3263.69	3.10	6.98	10.08
4	3262.58	2.00	—	—
5	3263.88	3.30	6.98	10.28
6	3262.58	2.00	—	—
7	3264.02	3.43	6.98	10.41
8	3262.58	2.00	—	—
9	3263.91	3.32	6.98	10.30
10	3262.58	2.00	—	—
11	3263.80	3.21	6.98	10.19
12	3262.58	2.00	—	—

TABLE OF ELEV. & DIMENSIONS				
Pile No.	Elev. "A"	"B" (Ft.)	"C" (Ft.)	"D" (Ft.)
13	3263.84	3.25	6.98	10.23
14	3262.58	2.00	—	—
15	3264.02	3.44	6.98	10.42
16	3262.58	2.00	—	—
17	3264.21	3.63	6.98	10.61
18	3262.58	2.00	—	—
19	3264.15	3.57	6.98	10.55
20	3262.58	2.00	—	—
21	3264.04	3.45	6.98	10.43
22	3262.58	2.00	—	—
23	3263.93	3.34	6.98	10.32



DETAIL "W"

ABUTMENT NO. 1 DETAILS (A)

FOR
208' - 7" COMP. STEEL GIRDER BRIDGE
 2 - 41' - 0" ROADWAYS
 OVER NORTH STREET
 STA. 112 + 80.78 TO STA. 114 + 89.36
 STR. NO. 52-409-294

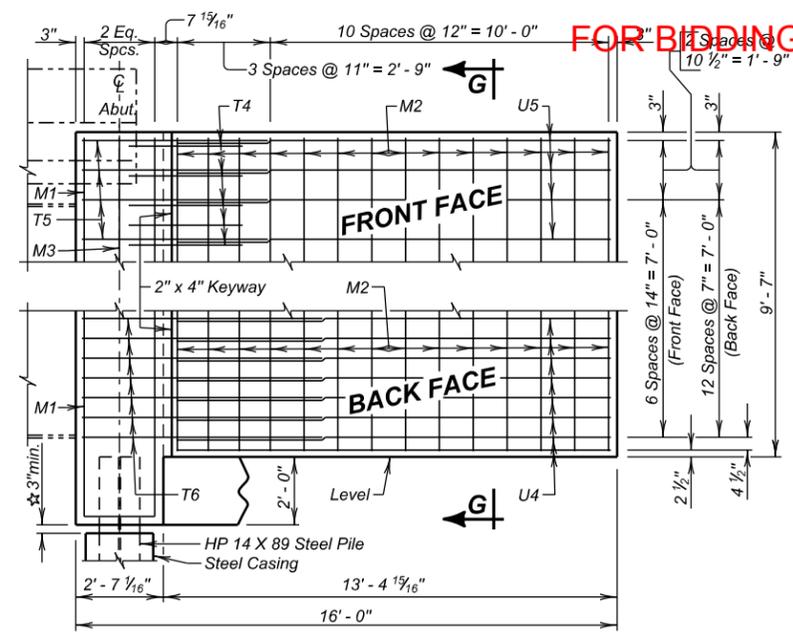
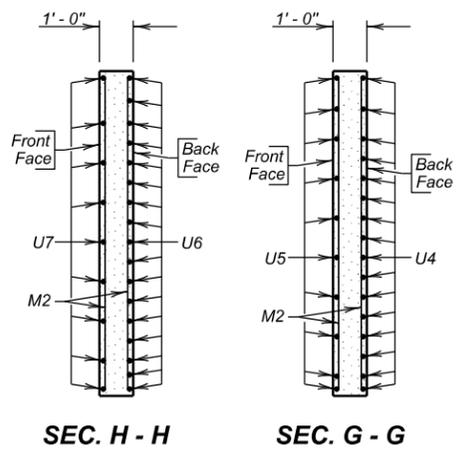
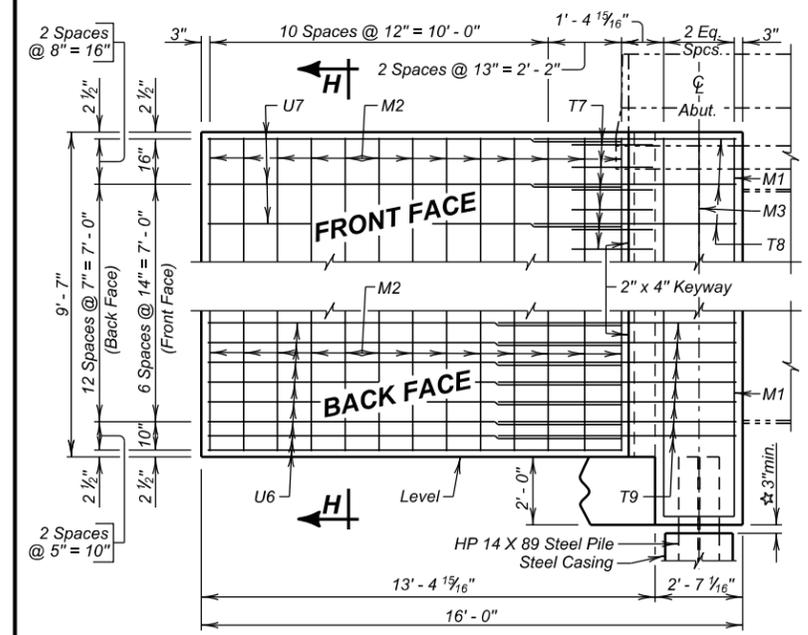
15° R.H.F. SKEW
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 HL-93

PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION

SEPTEMBER 2013

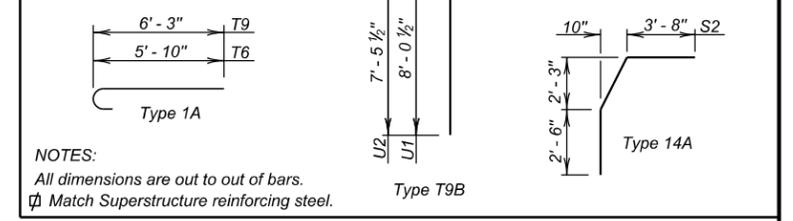
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FOR BIDDING PURPOSES ONLY



REINFORCING SCHEDULE
(For One Abutment)

Mk.	No.	Size	Length	Type
L1	68	4	3'-11"	17A
M1	8	5	24'-7"	17
M2	52	5	9'-2"	Str.
M3	2	5	11'-2"	Str.
S1	4	9	47'-2"	Str.
S2	67	6	8'-7"	14A
T1	22	4	49'-1"	Str.
T2	18	6	49'-8"	Str.
T3	16	6	9'-0"	Str.
T4	15	6	8'-3"	19
T5	9	5	7'-11"	19B
T6	15	6	6'-6"	1A
T7	16	6	7'-1"	19
T8	9	5	8'-4"	19B
T9	16	6	6'-11"	1A
U1	68	5	8'-6"	T9B
U2	68	5	7'-11"	T9B
U3	68	5	14'-9"	17
U4	16	6	12'-10"	Str.
U5	10	5	12'-10"	Str.
U6	17	6	12'-3"	Str.
U7	9	5	12'-3"	Str.
W1	216	5	3'-7"	17
W2	72	8	5'-0"	13A



NOTES:
All dimensions are out to out of bars.
Match Superstructure reinforcing steel.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Class A45 Concrete, Bridge	Cu. Yd.	103.3
Reinforcing Steel	Lb.	8251
HP 14 X 89 Steel Test Pile, Furnish & Drive	Ft.	1 @ 66' = 66'
HP 14 X 89 Steel Bearing Pile, Furnish & Drive	Ft.	1267'

* 7 @ 61', 7 @ 60', 4 @ 55', and 4 @ 50'

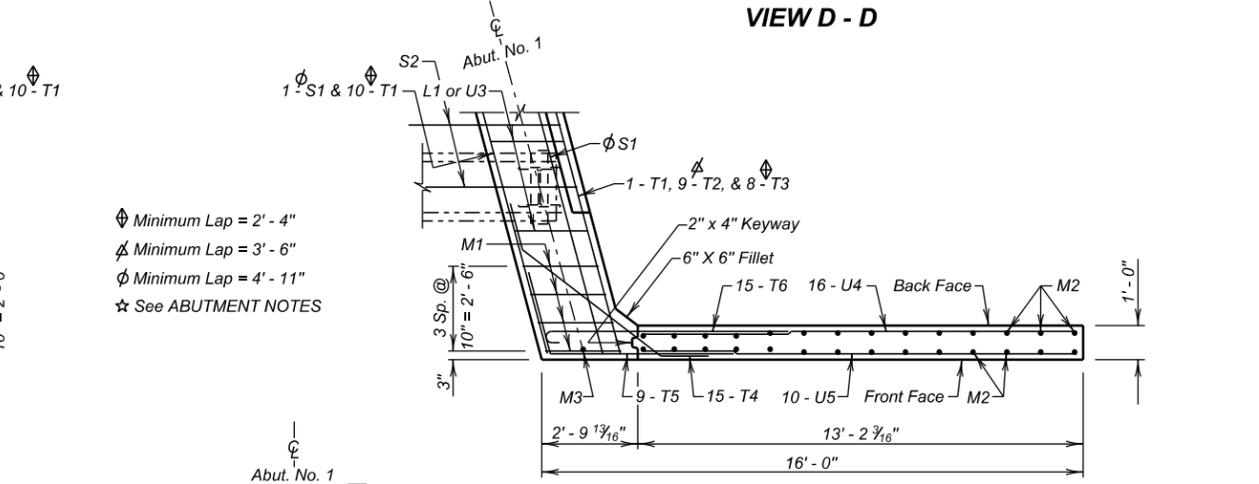
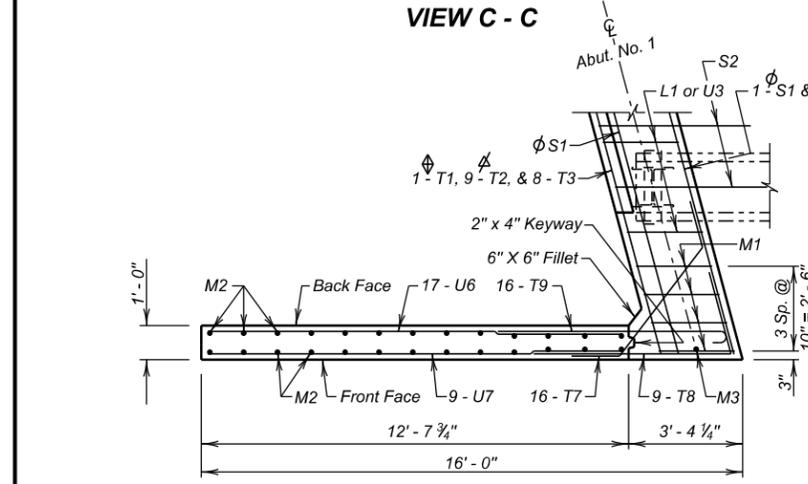
ALTERNATE A

ITEM	UNIT	QUANTITY
Stainless Reinforcing Steel	Lb.	2108

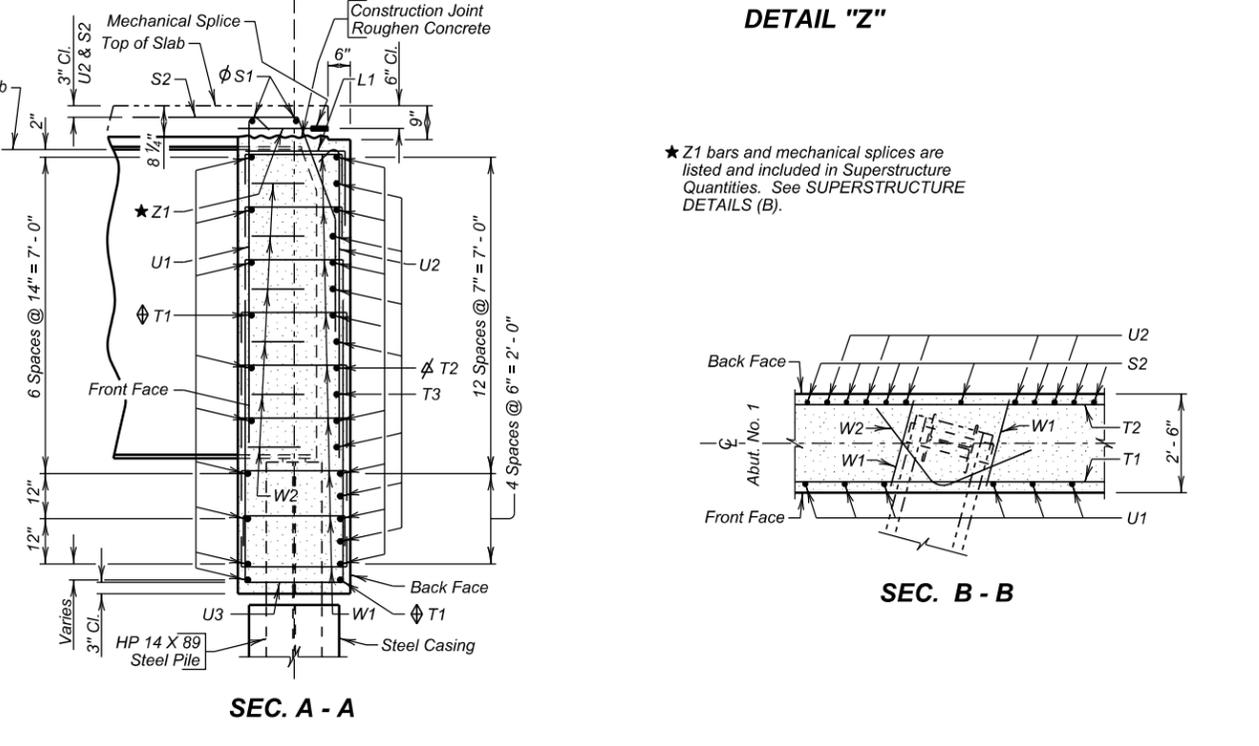
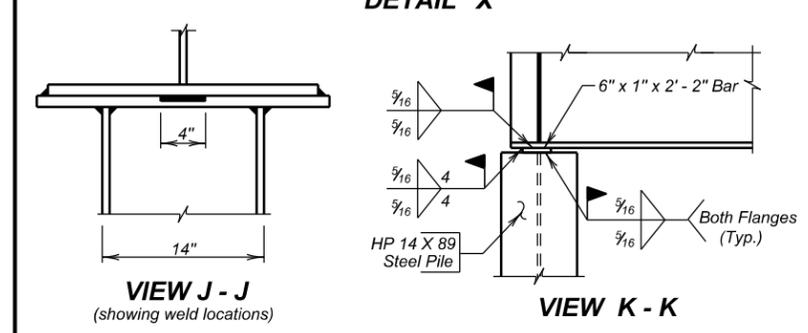
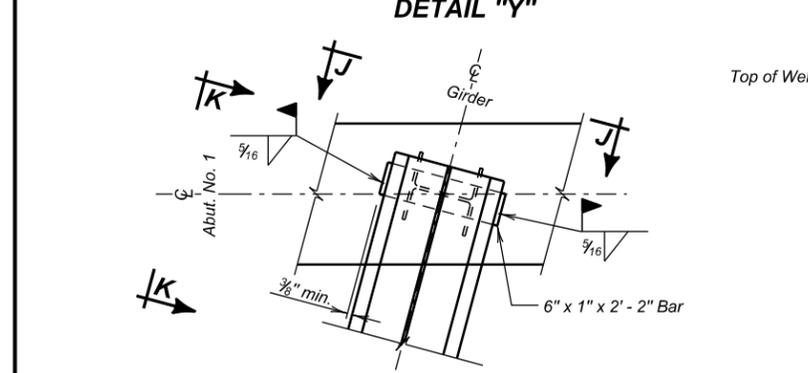
ALTERNATE B

ITEM	UNIT	QUANTITY
Zinc and Dual Coated Reinforcing Steel	Lb.	2108

Match Superstructure reinforcing steel.



Minimum Lap = 2'-4"
Minimum Lap = 3'-6"
Minimum Lap = 4'-11"
See ABUTMENT NOTES



* Z1 bars and mechanical splices are listed and included in Superstructure Quantities. See SUPERSTRUCTURE DETAILS (B).

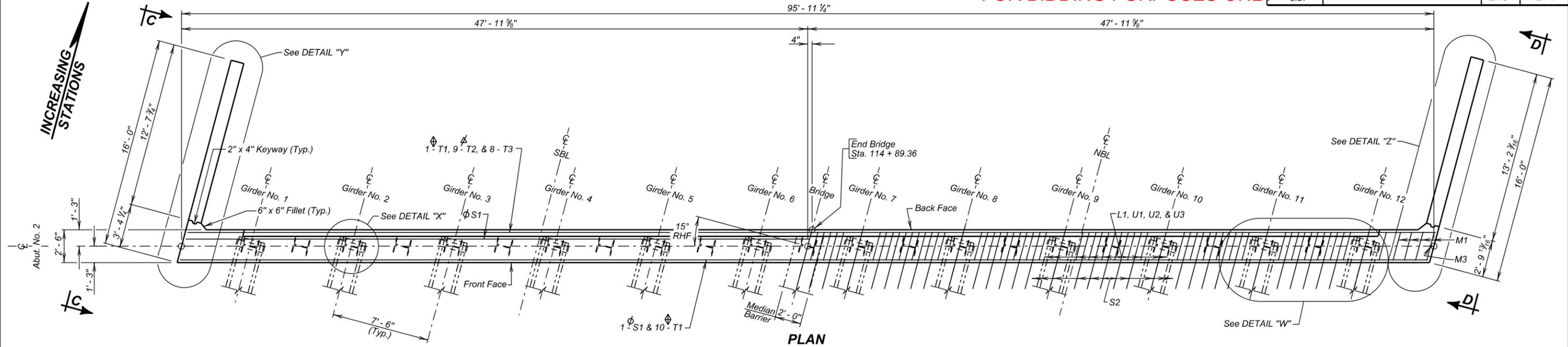
ABUTMENT NO. 1 DETAILS (B)
FOR
208' - 7" COMP. STEEL GIRDER BRIDGE
2 - 41' - 0" ROADWAYS
OVER NORTH STREET
STA. 112 + 80.78 TO STA. 114 + 89.36
STR. NO. 52-409-294

15° R.H.F. SKEW
SEC. 35-T2N-R7E
IM 1902(61)0
HL-93

PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2013

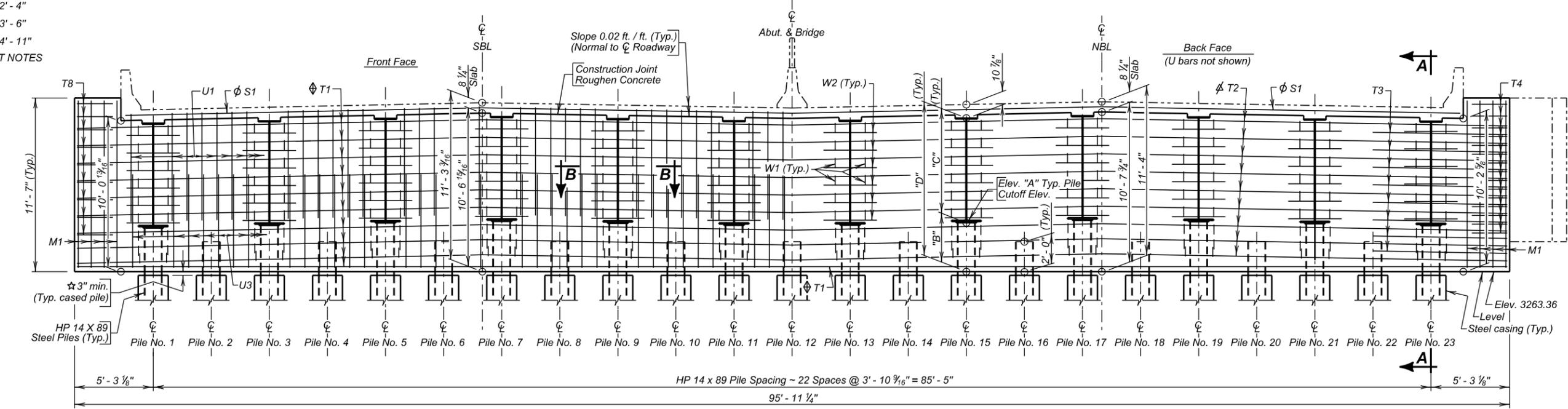
FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E13	E74



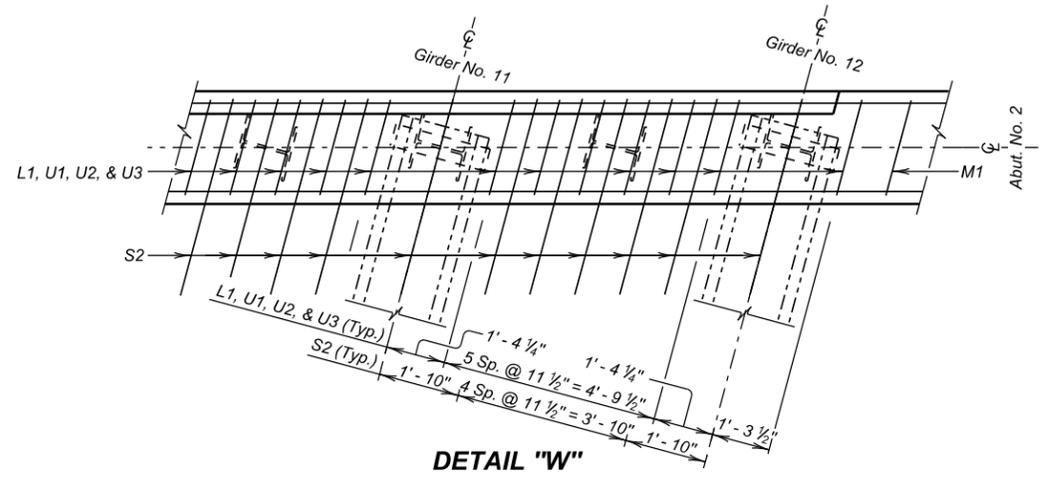
PLAN

- ⊕ Minimum Lap = 2' - 4"
- ⊕ Minimum Lap = 3' - 6"
- ⊕ Minimum Lap = 4' - 11"
- ☆ See ABUTMENT NOTES



ELEVATION

(Dimensions & elevations are along C Abutment)



DETAIL "W"

TABLE OF ELEV. & DIMENSIONS				
Pile No.	Elev. "A"	"B" (Ft.)	"C" (Ft.)	"D" (Ft.)
1	3266.28	2.92	6.98	9.90
2	3265.36	2.00		
3	3266.44	3.08	6.98	10.06
4	3265.36	2.00		
5	3266.61	3.24	6.98	10.22
6	3265.36	2.00		
7	3266.72	3.36	6.98	10.34
8	3265.36	2.00		
9	3266.59	3.22	6.98	10.20
10	3265.36	2.00		
11	3266.45	3.08	6.98	10.06
12	3265.36	2.00		

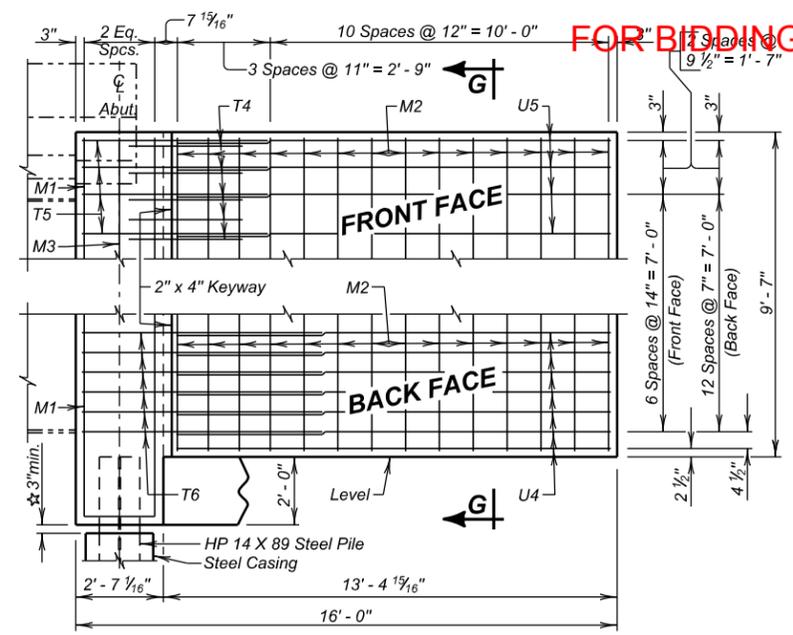
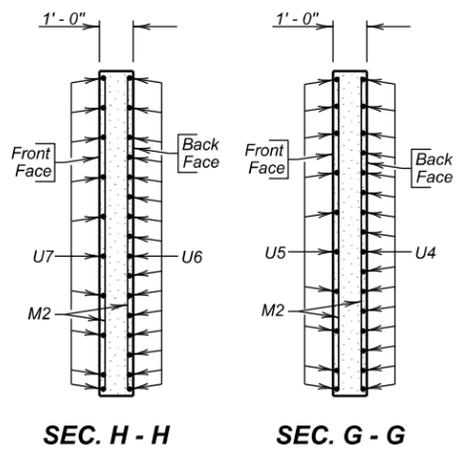
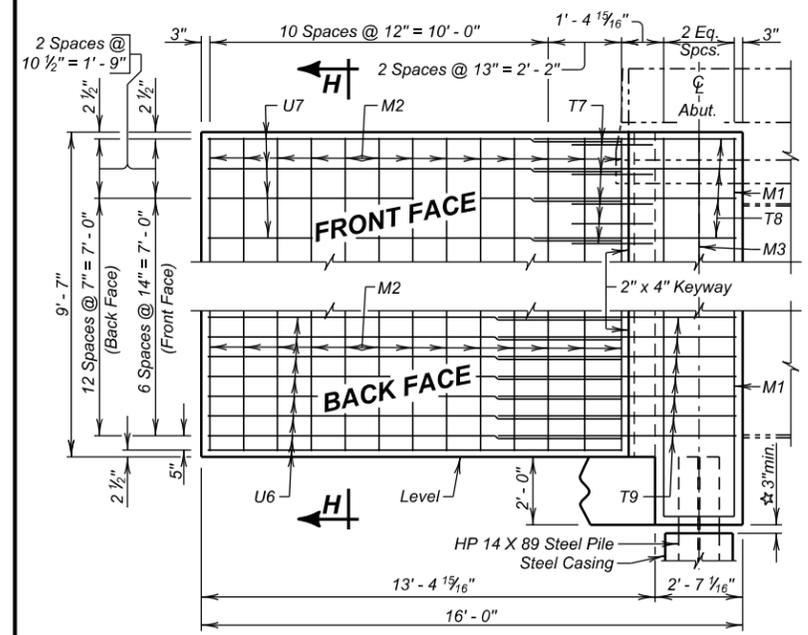
TABLE OF ELEV. & DIMENSIONS				
Pile No.	Elev. "A"	"B" (Ft.)	"C" (Ft.)	"D" (Ft.)
13	3266.46	3.10	6.98	10.08
14	3265.36	2.00		
15	3266.62	3.26	6.98	10.24
16	3265.36	2.00		
17	3266.79	3.42	6.98	10.40
18	3265.36	2.00		
19	3266.70	3.33	6.98	10.31
20	3265.36	2.00		
21	3266.56	3.20	6.98	10.18
22	3265.36	2.00		
23	3266.42	3.06	6.98	10.04

ABUTMENT NO. 2 DETAILS (A)
 FOR
208' - 7" COMP. STEEL GIRDER BRIDGE
 2 - 41' - 0" ROADWAYS
 OVER NORTH STREET
 STA. 112 + 80.78 TO STA. 114 + 89.36
 STR. NO. 52-409-294

15° R.H.F. SKEW
 SEC. 35-T2N-R7E
 IM 1902(61)0
 HL-93

PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION
 SEPTEMBER 2013

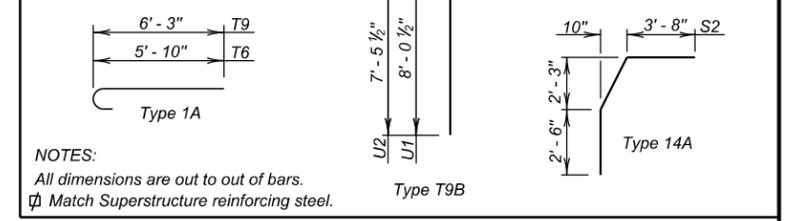
FOR BIDDING PURPOSES ONLY



REINFORCING SCHEDULE

(For One Abutment)

Mk.	No.	Size	Length	Type
L1	68	4	3'-11"	17A
M1	8	5	24'-7"	17
M2	52	5	9'-2"	Str.
M3	2	5	11'-2"	Str.
S1	4	9	47'-2"	Str.
S2	67	6	8'-7"	14A
T1	22	4	49'-1"	Str.
T2	18	6	49'-8"	Str.
T3	16	6	9'-0"	Str.
T4	15	6	8'-3"	19
T5	9	5	7'-11"	19B
T6	15	6	6'-6"	1A
T7	16	6	7'-1"	19
T8	9	5	8'-4"	19B
T9	15	6	6'-11"	1A
U1	68	5	8'-6"	T9B
U2	68	5	7'-11"	T9B
U3	68	5	14'-9"	17
U4	16	6	12'-10"	Str.
U5	10	5	12'-10"	Str.
U6	16	6	12'-3"	Str.
U7	10	5	12'-3"	Str.
W1	216	5	3'-7"	17
W2	72	8	5'-0"	13A



NOTES:
 All dimensions are out to out of bars.
 Match Superstructure reinforcing steel.

ESTIMATED QUANTITIES

ITEM	UNIT	QUANTITY
Class A45 Concrete, Bridge	Cu. Yd.	102.1
Reinforcing Steel	Lb.	8235
HP 14 X 89 Steel Test Pile, Furnish & Drive	Ft.	1 @ 60' = 60'
HP 14 X 89 Steel Bearing Pile, Furnish & Drive	Ft.	22 @ 55' = 1210'

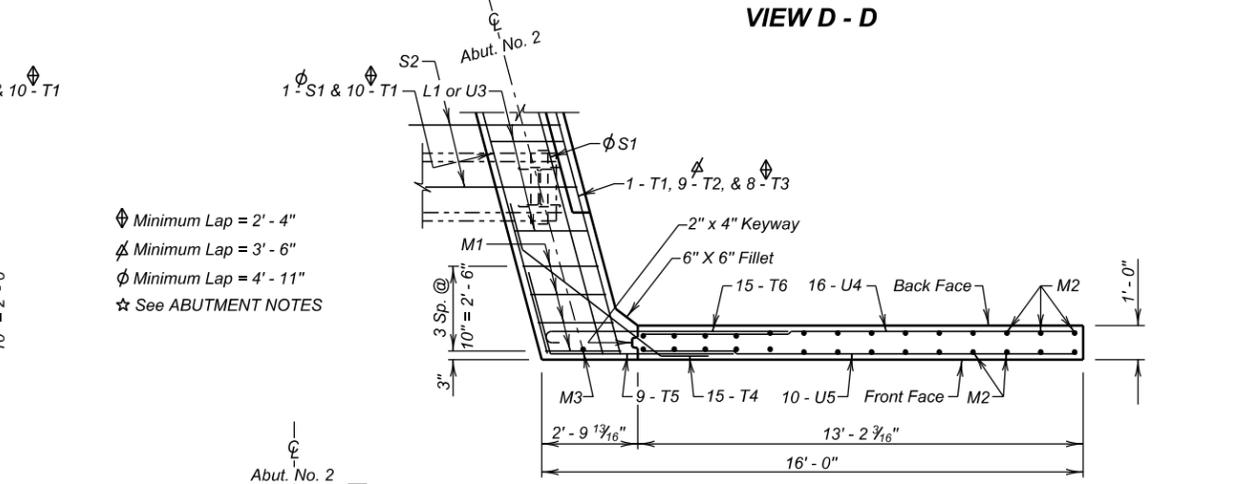
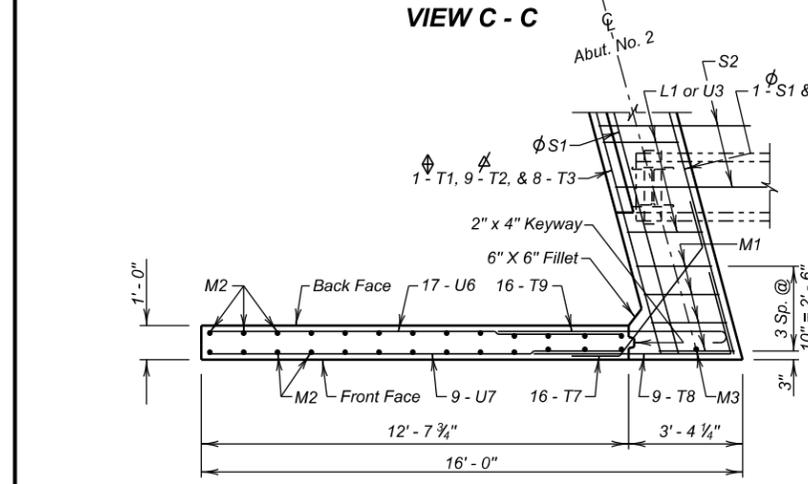
ALTERNATE A

ITEM	UNIT	QUANTITY
Stainless Reinforcing Steel	Lb.	2108

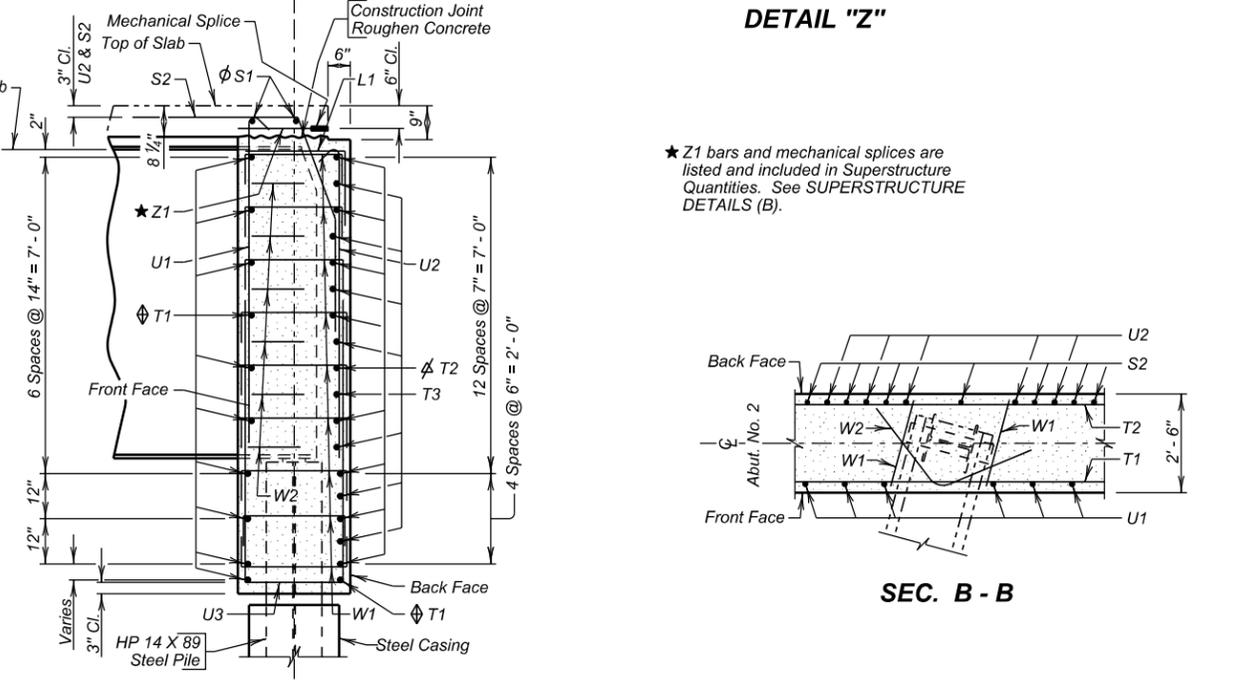
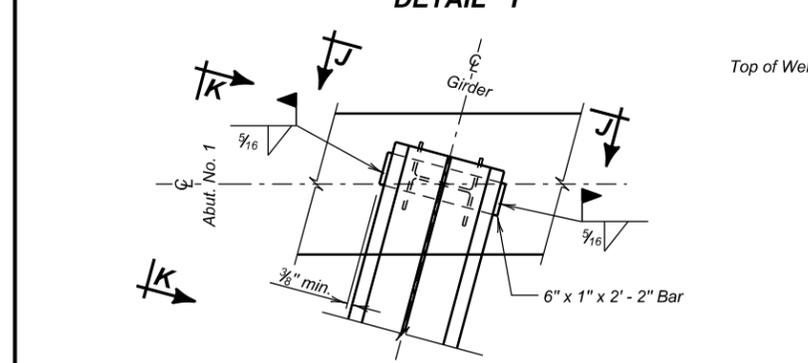
ALTERNATE B

ITEM	UNIT	QUANTITY
Zinc and Dual Coated Reinforcing Steel	Lb.	2108

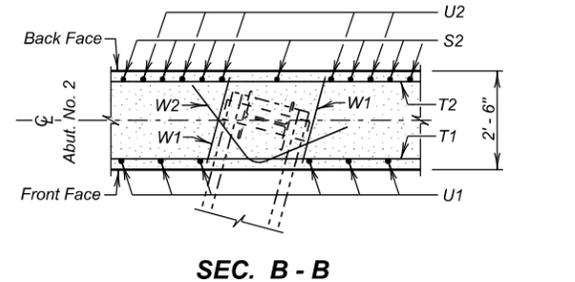
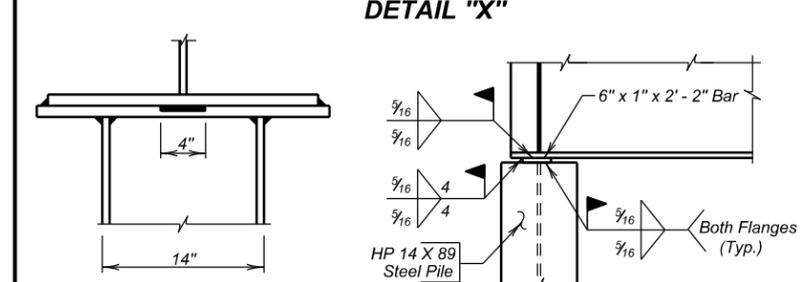
Match Superstructure reinforcing steel.



Minimum Lap = 2'-4"
 Minimum Lap = 3'-6"
 Minimum Lap = 4'-11"
 See ABUTMENT NOTES



* Z1 bars and mechanical splices are listed and included in Superstructure Quantities. See SUPERSTRUCTURE DETAILS (B).



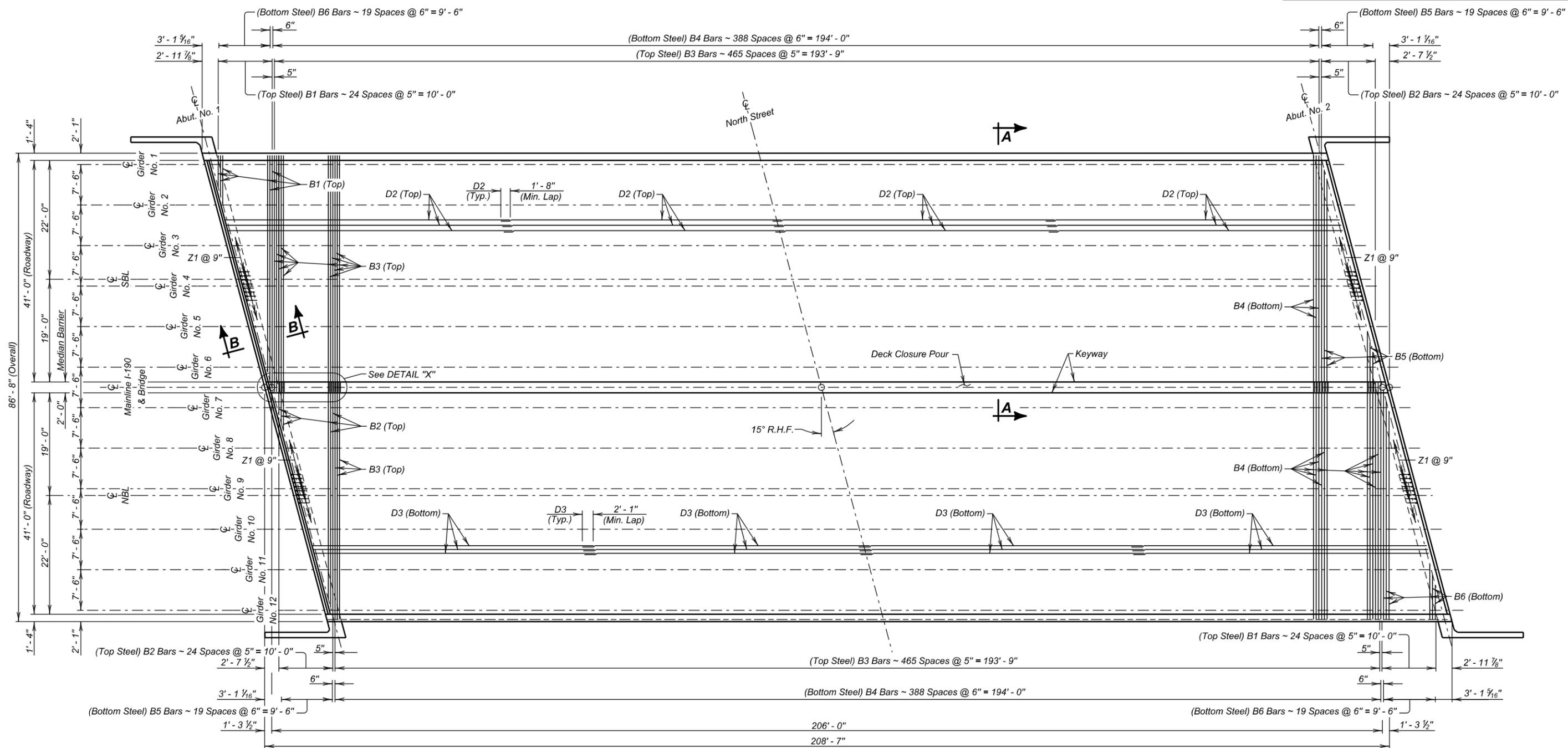
ABUTMENT NO. 2 DETAILS (B)
 FOR
208' - 7" COMP. STEEL GIRDER BRIDGE
 2 - 41' - 0" ROADWAYS
 OVER NORTH STREET
 STA. 112 + 80.78 TO STA. 114 + 89.36
 STR. NO. 52-409-294

15° R.H.F. SKEW
 SEC. 35-T2N-R7E
 IM 1902(61)0
 HL-93

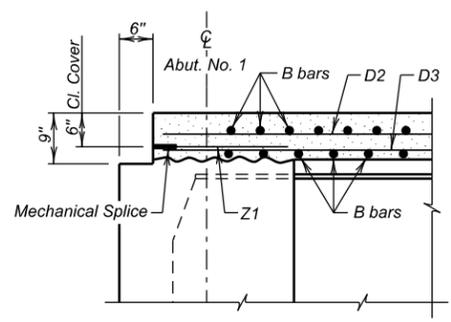
PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION
 SEPTEMBER 2013

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E15	E74



PLAN



SEC. B - B

SUPERSTRUCTURE DETAILS (A)

FOR
208' - 7" COMP. STEEL GIRDER BRIDGE
 2 - 41' - 0" ROADWAYS
 OVER NORTH STREET
 STA. 112 + 80.78 TO STA. 114 + 89.36
 STR. NO. 52-409-294

15° R.H.F. SKEW
 SEC. 35-T2N-R7E
 IM 1902(61)0
 HL-93

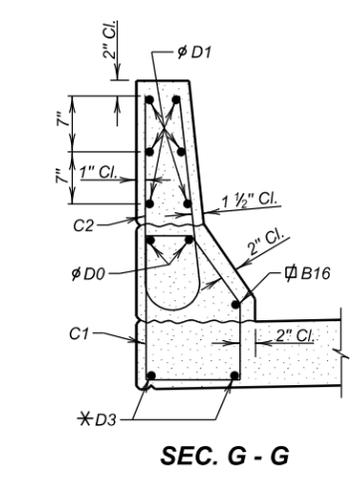
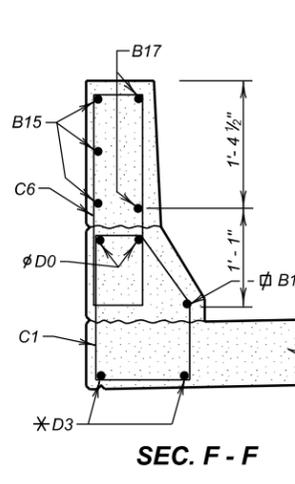
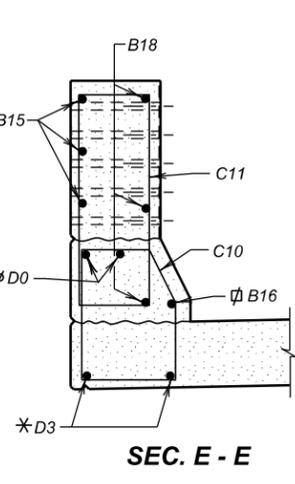
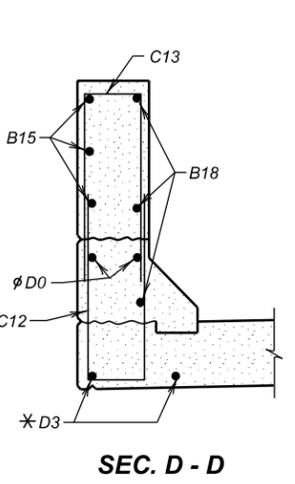
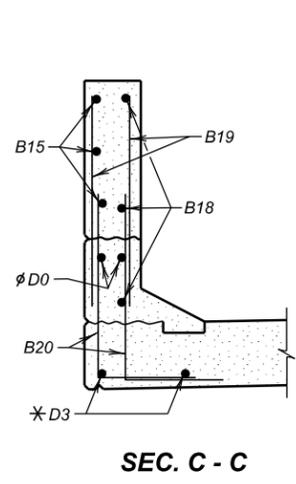
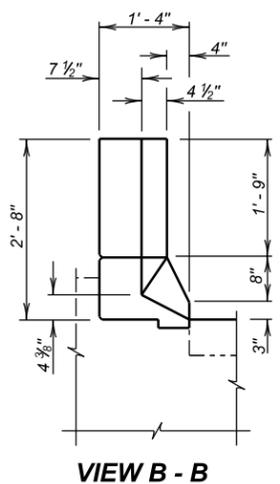
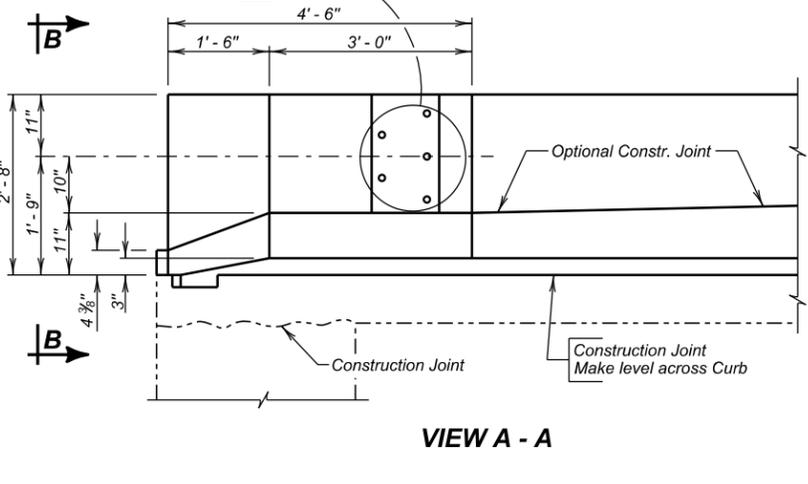
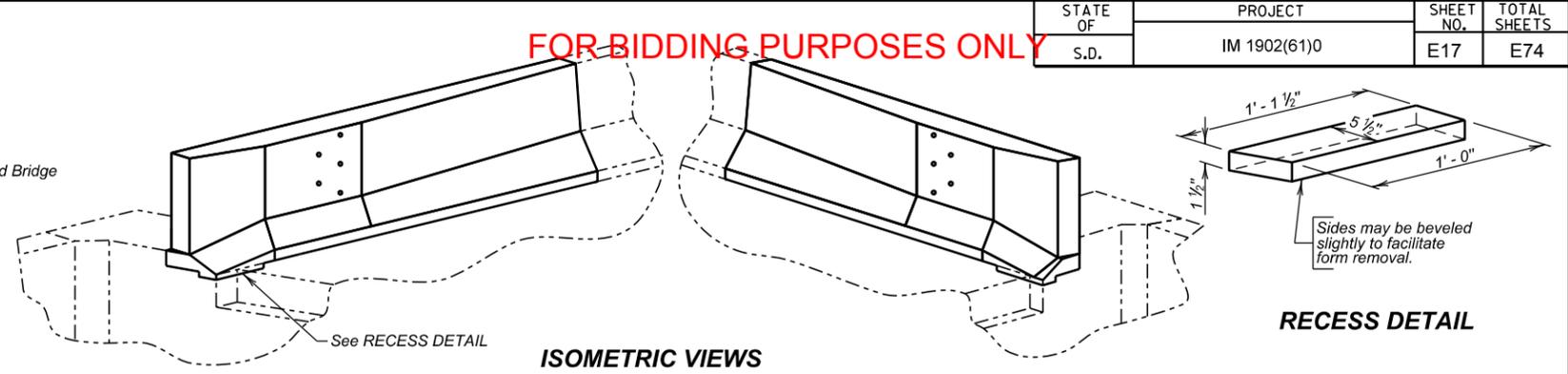
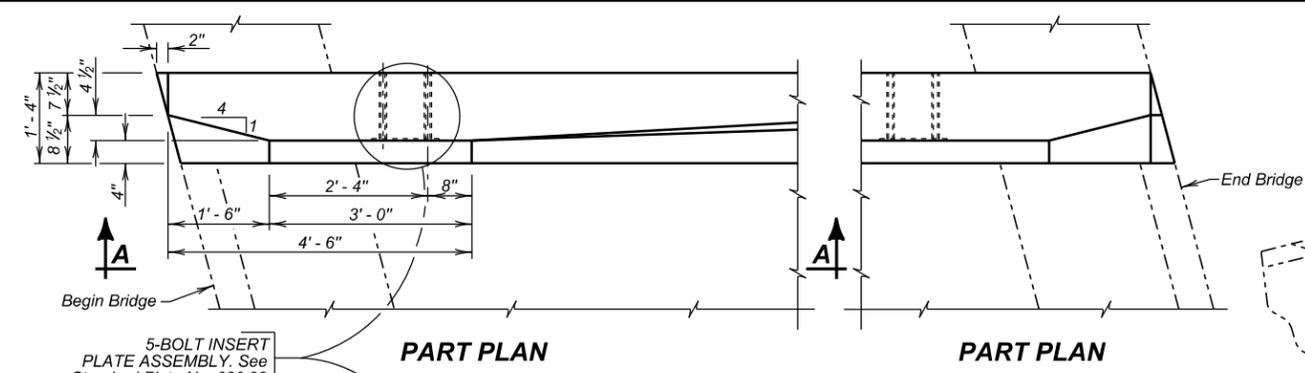
PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION

SEPTEMBER 2013

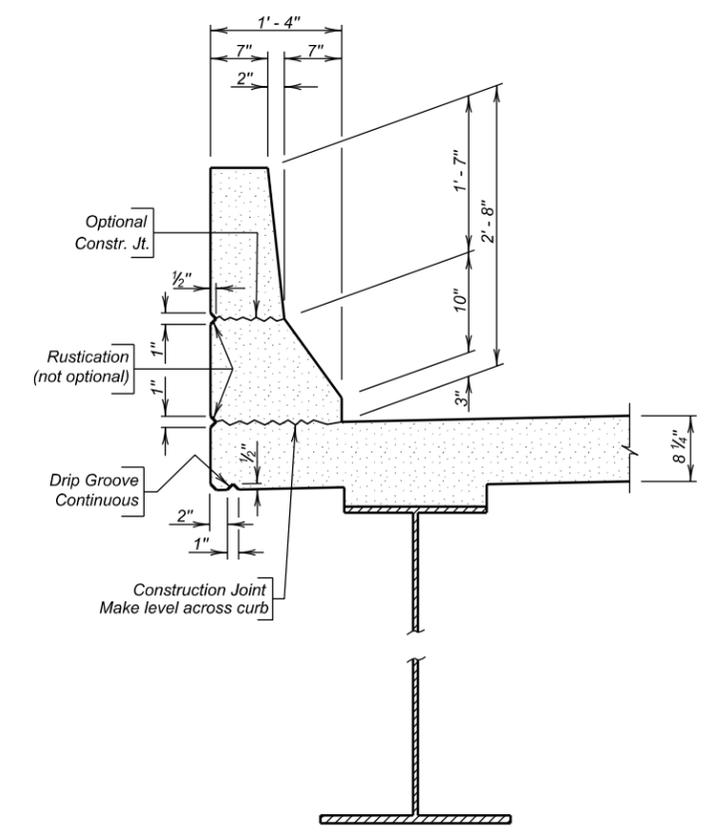
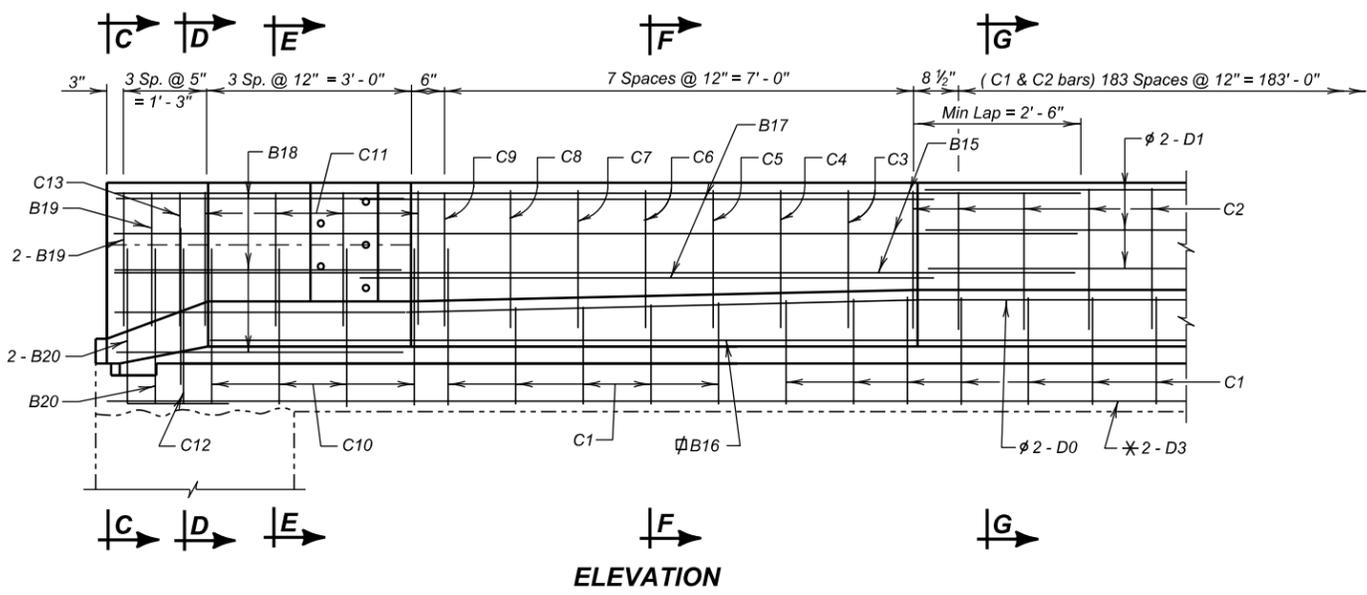
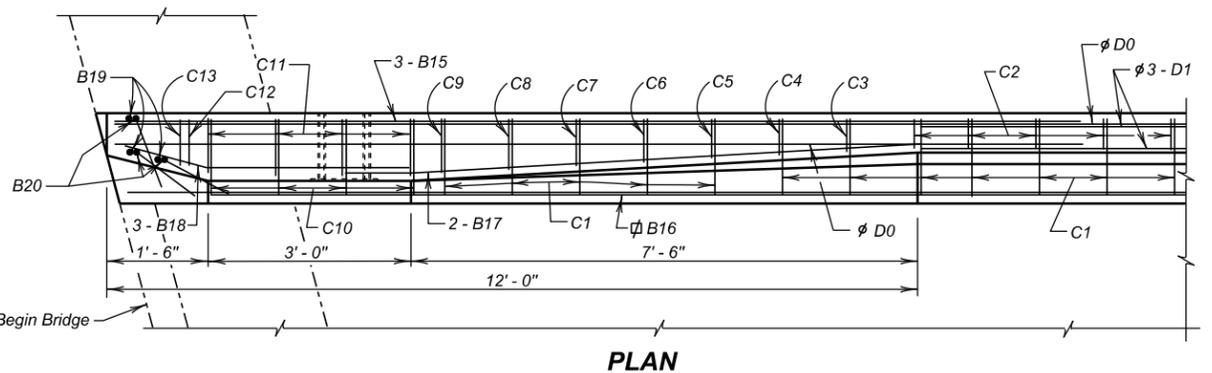
DESIGNED BY BAF/DM PENN1162	CK. DES. BY PW 1162TA13	DRAFTED BY BT	Kevin N. Goeden BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E17	E74

FOR BIDDING PURPOSES ONLY



∅ Min. Lap = 2' - 11"
 * Min. Lap = 2' - 1"
 ∅ Min. Lap = 1' - 0"



END BLOCK & BARRIER CURB DETAILS

FOR
208' - 7" COMP. STEEL GIRDER BRIDGE
 2 - 41' - 0" ROADWAYS
 OVER NORTH STREET
 STA. 112 + 80.78 TO STA. 114 + 89.36
 STR. NO. 52-409-294

15° R.H.F. SKEW
 SEC. 35-T2N-R7E
 IM 1902(61)0
 HL-93

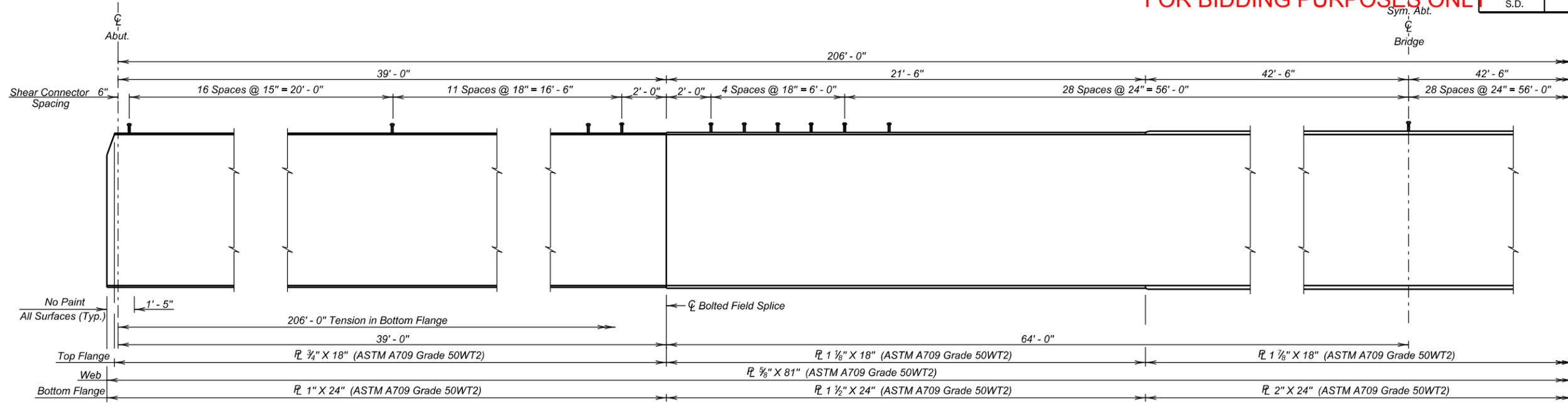
PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION

SEPTEMBER 2013 (15) OF (34)

DESIGNED BY BAF/DM PENN1162	CK. DES. BY PW 1162TA15	DRAFTED BY BT	Kevin N. Goeden BRIDGE ENGINEER
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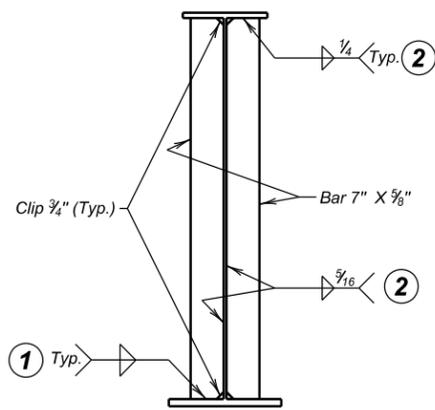
FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E18	E74



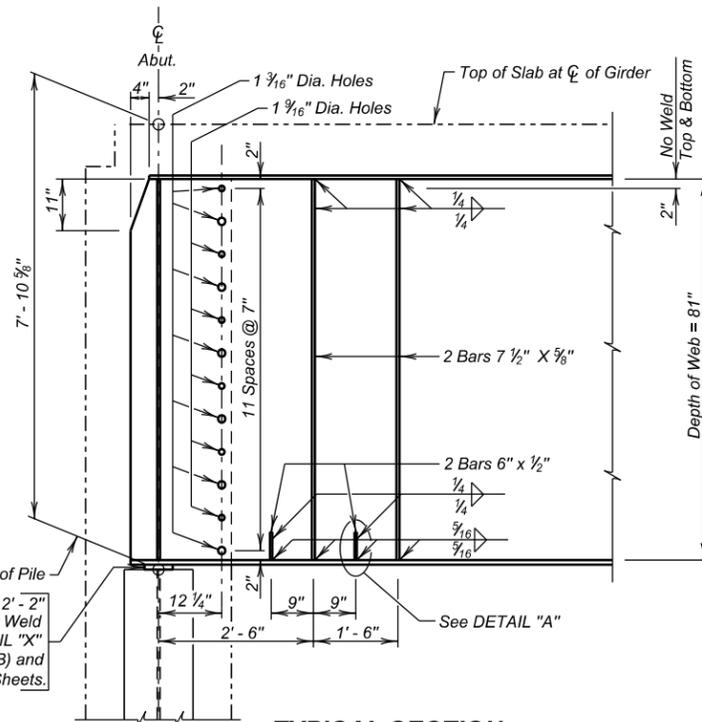
GIRDER LAYOUT

NOTE: All fillet welds shall terminate 1/2" from edge of stiffener, edge of flange, or clip as appropriate, except weld from clip to edge of stiffener at top flange.

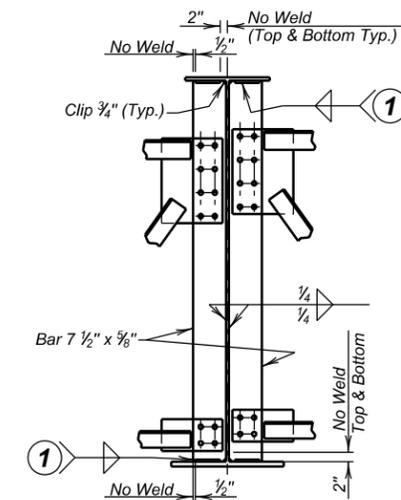
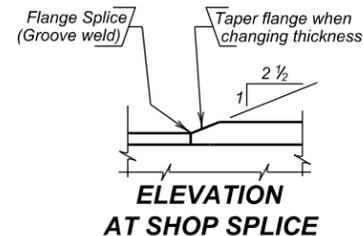


END VIEW

Bar 6" x 1" x 2' - 2" Ship loose for Field Weld See DETAIL "X" on ABUTMENT NO. 1 DETAILS (B) and on ABUTMENT NO. 2 DETAILS (B) Sheets.

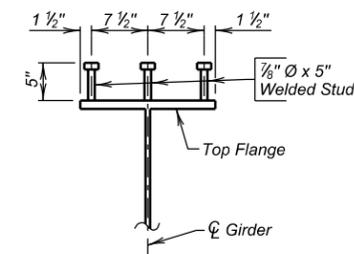


TYPICAL SECTION AT ABUTMENTS (Parallel to ϕ Girders)



DETAILS OF STIFFENERS AT INTERMEDIATE DIAPHRAGMS (Interior Girder shown)

NOTE: All fillet welds attaching diaphragm or bearing stiffeners to girder flanges, shall terminate 1/2" from edge of stiffener, edge of flange, or clip as appropriate. Weld size to be as indicated in the table of Flange to Web Welds.



SHEAR CONNECTOR DETAILS

Welded Stud Shear Connectors are spaced as shown on Girder Layout. Payment for Field Installing Shear Connectors will be included in the Lump Sum bid for Structural Steel. 363 Shear Connectors per Girder.

Flange Thickness	Fillet Welds
3/4"	1/4"
1"	5/16"
1 1/8"	5/16"
1 1/2"	5/16"
1 7/8"	5/16"
2"	5/16"

- NOTES:
- See DIAPHRAGM DETAILS Sheet for Diaphragm Details.
 - See FRAMING DIAGRAM, CAMBER, AND ERECTION DATA Sheet for spacing of Diaphragms, Stiffeners, and Girder Camber.
 - All dimensions shown are horizontal or vertical.
 - All Stiffeners and Girder Ends shall be made normal to flanges, except bearing stiffeners at abutments shall be vertical.
 - Stiffeners to have tight fit top and bottom.
 - Dimensions shown are for steel temperature of 45° F.

GIRDER LAYOUT DETAILS

FOR 208' - 7" COMP. STEEL GIRDER BRIDGE

2 - 41' - 0" ROADWAYS 15° R.H.F. SKEW OVER NORTH STREET SEC. 35-T2N-R7E

STA. 112 + 80.78 TO STA. 114 + 89.36 IM 1902(61)0

STR. NO. 52-409-294 HL-93

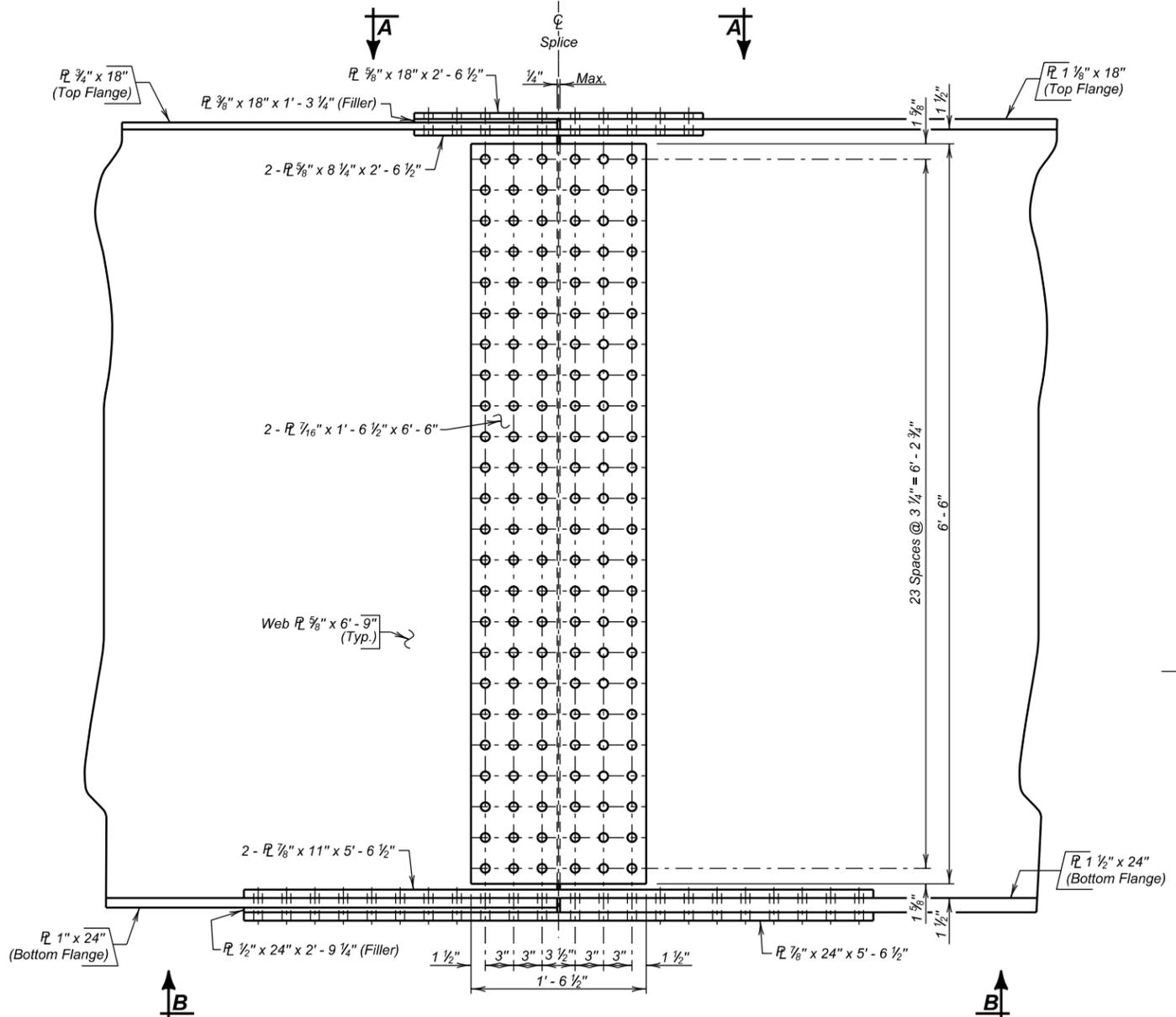
PENNINGTON COUNTY S. D. DEPT. OF TRANSPORTATION

SEPTEMBER 2013 16 OF 34

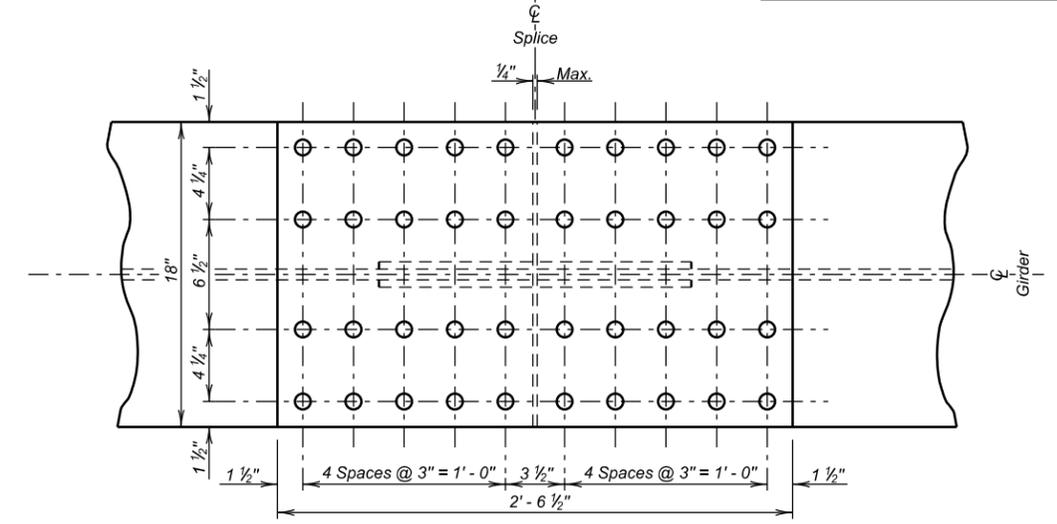
DESIGNED BY BAF/DM PENN1162	CK. DES. BY PW 1162TA16	DRAFTED BY BT	Kevin N. Coeden BRIDGE ENGINEER
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FOR BIDDING PURPOSES ONLY

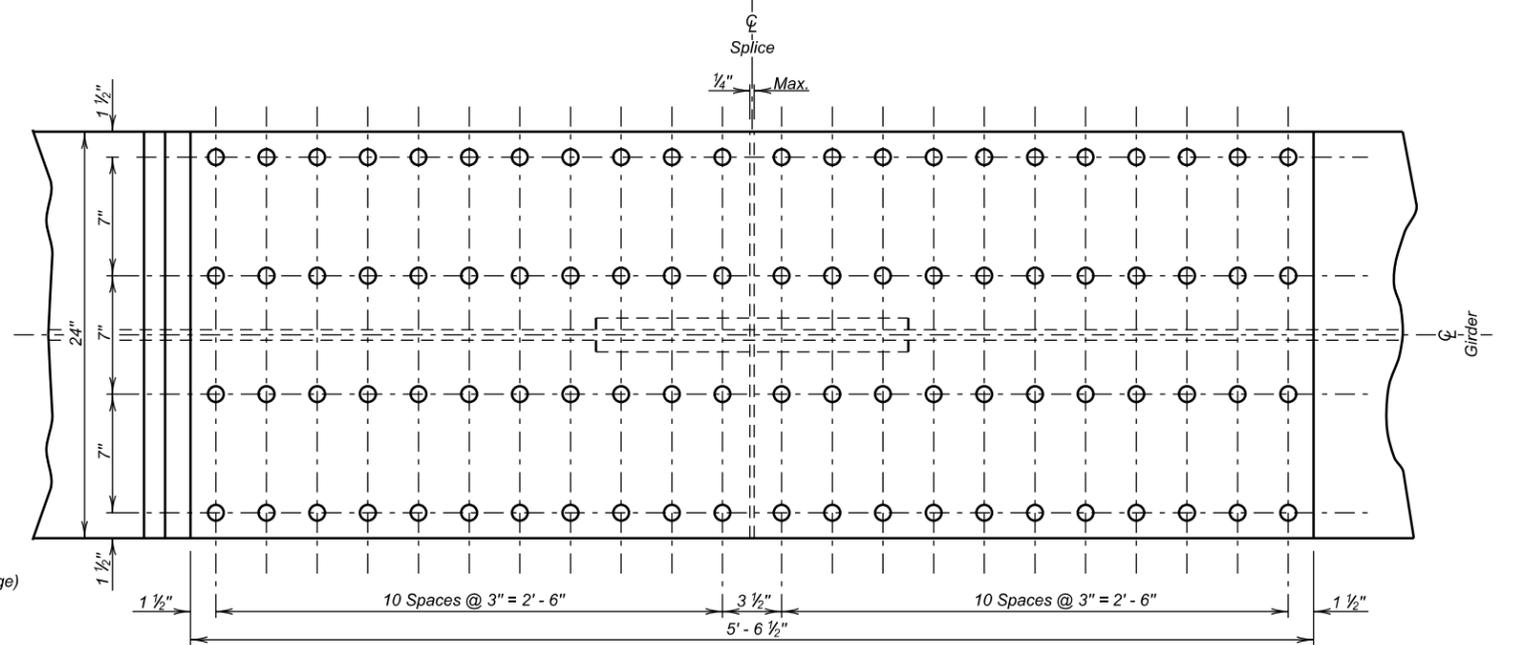
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E19	E74



FIELD BOLTED SPLICE DETAIL (Typ.)



TOP FLANGE (VIEW A - A)



BOTTOM FLANGE (VIEW B - B)

NOTE:
All bolts in splices shall be 7/8" A325 High Strength Bolts. (See DIAPHRAGM DETAILS sheet for DIRECT TENSION INDICATOR DETAIL.)

DETAILS OF BOLTED FIELD SPLICES FOR

208' - 7" COMP. STEEL GIRDER BRIDGE
 2 - 41' - 0" ROADWAYS
 OVER NORTH STREET
 STA. 112 + 80.78 TO STA. 114 + 89.36
 STR. NO. 52-409-294

15° R.H.F. SKEW
 SEC. 35-T2N-R7E
 IM 1902(61)0
 HL-93

PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION
 SEPTEMBER 2013

DESIGNED BY BAF/DM PENN1162	CK. DES. BY PW 1162TA17	DRAFTED BY BT	Kevin N. Goeden BRIDGE ENGINEER
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FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E21	E74

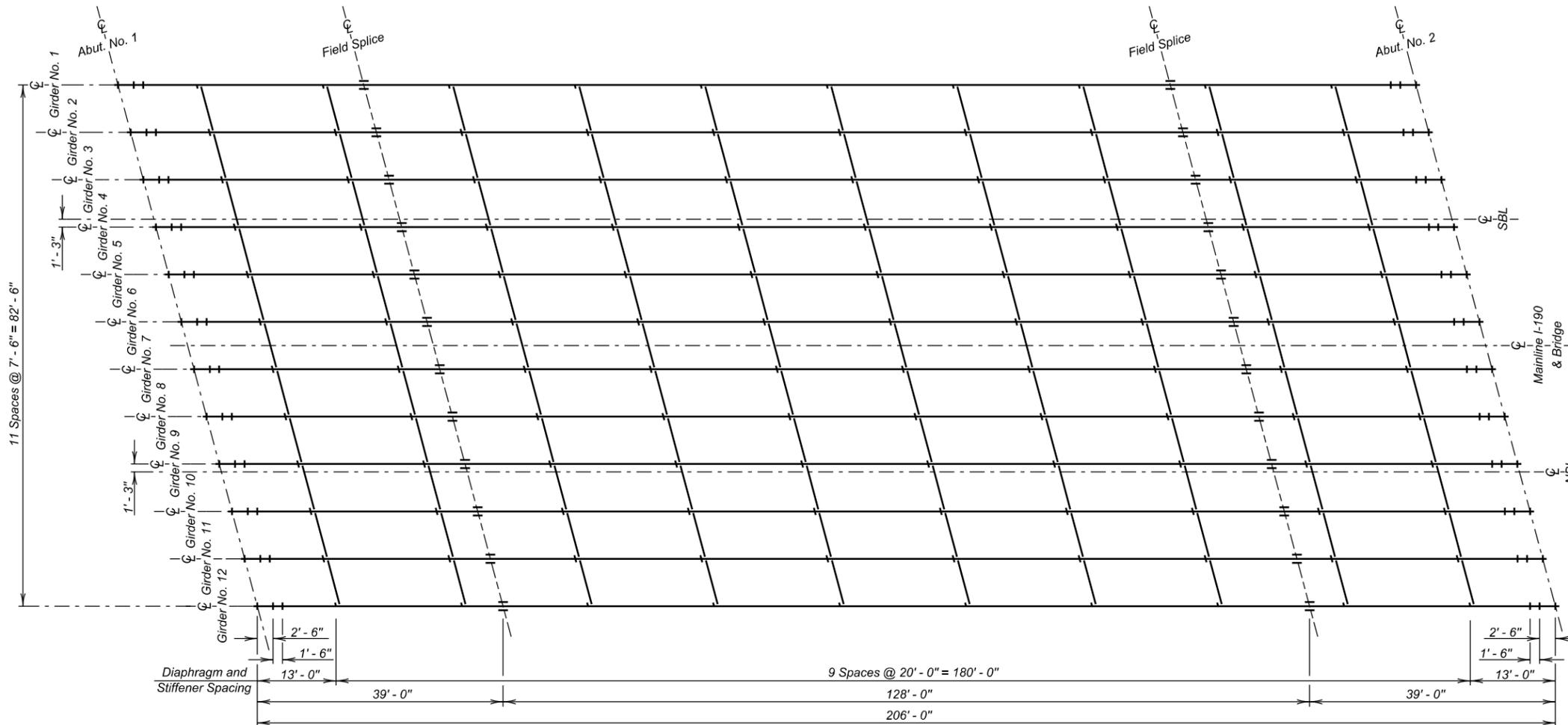
∅ These elevations occur at a time after girder erection is completed but prior to any placement of concrete.

Girder No.	ELEVATIONS (Top of Girder)			
	"A"	"B"	"C"	"D"
1	3270.479	3271.670	3273.400	3273.260
2	3270.669	3271.885	3273.567	3273.424
3	3270.859	3272.040	3273.736	3273.588
4	3270.998	3272.175	3273.855	3273.701
5	3270.887	3272.059	3273.723	3273.565
6	3270.776	3271.944	3273.591	3273.428
7	3270.815	3271.977	3273.609	3273.440
8	3271.003	3272.161	3273.776	3273.603
9	3271.192	3272.344	3273.943	3273.765
10	3271.129	3272.277	3273.860	3273.677
11	3271.017	3272.160	3273.727	3273.539
12	3270.904	3272.042	3273.593	3273.401

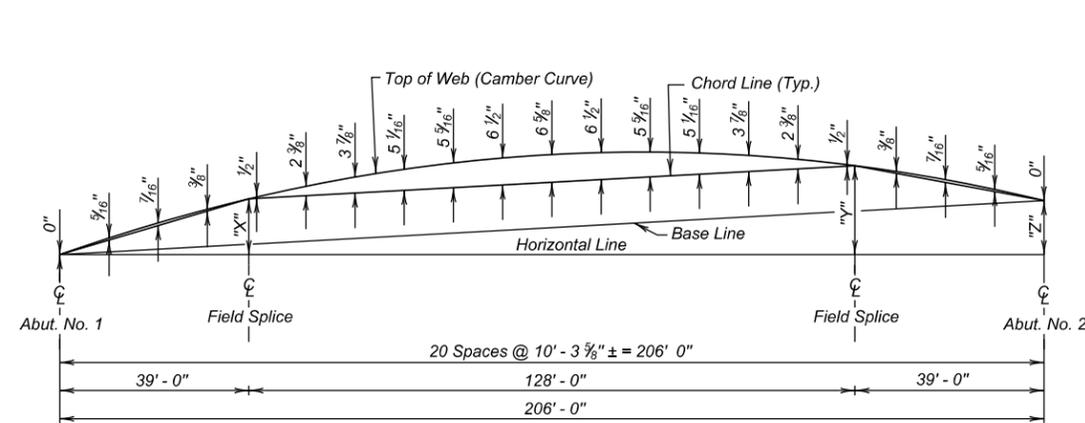
∅ These slopes occur at a time after girder erection is completed but prior to any placement of concrete. Slopes shown are an imaginary straight line between points (top of web) at beam ends and are (+) towards increasing stations.

Girder No.	SLOPES (%)		
	a	b	c
1	2.975	1.352	-0.276
2	2.962	1.337	-0.288
3	2.950	1.325	-0.301
4	2.938	1.312	-0.314
5	2.926	1.300	-0.326
6	2.913	1.287	-0.339
7	2.900	1.275	-0.351
8	2.887	1.262	-0.364
9	2.875	1.249	-0.376
10	2.862	1.237	-0.389
11	2.850	1.224	-0.401
12	2.837	1.212	-0.414

Girder No.	CAMBER DIMENSIONS		
	"X"	"Y"	"Z"
1	1.370'	3.100'	2.781'
2	1.365'	3.077'	2.755'
3	1.360'	3.056'	2.729'
4	1.355'	3.035'	2.703'
5	1.350'	3.014'	2.677'
6	1.346'	2.993'	2.651'
7	1.340'	2.972'	2.626'
8	1.336'	2.951'	2.600'
9	1.331'	2.930'	2.574'
10	1.326'	2.909'	2.548'
11	1.321'	2.888'	2.522'
12	1.316'	2.867'	2.496'

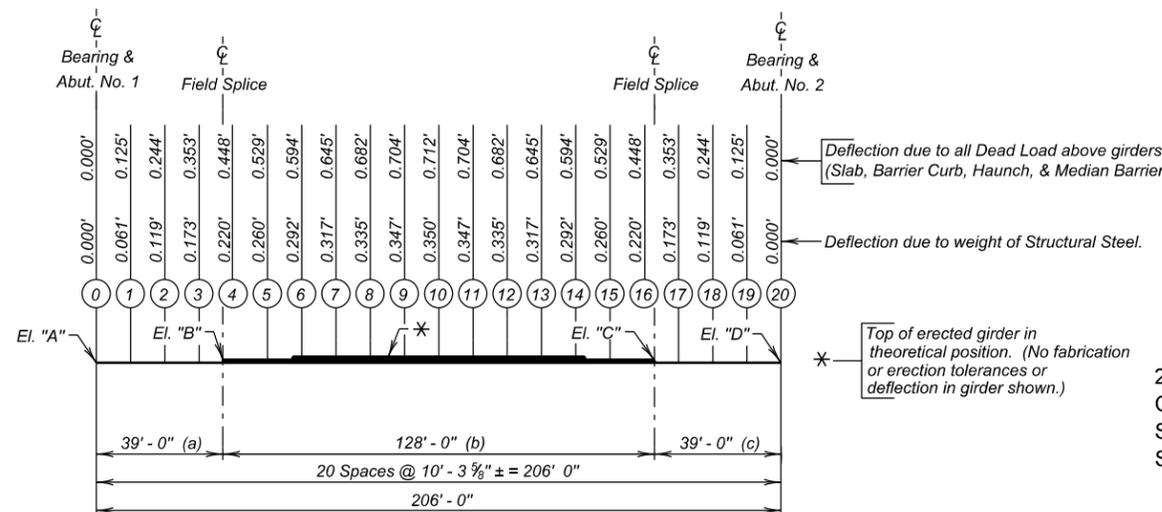


FRAMING DIAGRAM



CAMBER CUTTING DIAGRAM
(Cut camber into webs of all girders as shown)

Camber Diagram shown is for beams in unloaded position and provides for all dead load deflections. Baselines are straight lines from ∅ Bearing to ∅ Bearing at top of web. Chord lines are straight lines between ends of beam segments at top of web.



GIRDER ERECTION DIAGRAM

FRAMING DIAGRAM, CAMBER, & ERECTION DATA

FOR
208' - 7" COMP. STEEL GIRDER BRIDGE
 2 - 41' - 0" ROADWAYS
 OVER NORTH STREET
 STA. 112 + 80.78 TO STA. 114 + 89.36
 STR. NO. 52-409-294

15° R.H.F. SKEW
 SEC. 35-T2N-R7E
 IM 1902(61)0
 HL-93

PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION
 SEPTEMBER 2013

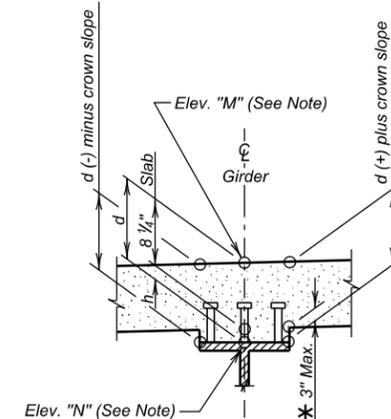
DESIGNED BY BAF/DM PENN1162	CK. DES. BY PW 1162TA19	DRAFTED BY BT	Kevin N. Goeden BRIDGE ENGINEER
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FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E22	E74

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"	3271.385	3271.713	3272.028	3272.327	3272.605	3272.861	3273.095	3273.309	3273.501	3273.673	3273.823	3273.951	3274.058	3274.143	3274.208	3274.252	3274.273	3274.273	3274.253	3274.215	3274.166
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 2	Elev. "M"	3271.575	3271.901	3272.215	3272.513	3272.789	3273.045	3273.278	3273.489	3273.681	3273.851	3274.000	3274.127	3274.232	3274.316	3274.380	3274.422	3274.442	3274.441	3274.419	3274.381	3274.330
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 3	Elev. "M"	3271.765	3272.090	3272.402	3272.696	3272.974	3273.228	3273.460	3273.670	3273.860	3274.029	3274.177	3274.302	3274.406	3274.489	3274.551	3274.592	3274.611	3274.609	3274.586	3274.546	3274.494
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 4	Elev. "M"	3271.904	3272.228	3272.539	3272.834	3273.108	3273.361	3273.591	3273.801	3273.989	3274.157	3274.303	3274.427	3274.530	3274.611	3274.672	3274.712	3274.730	3274.726	3274.702	3274.661	3274.608
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 5	Elev. "M"	3271.794	3272.116	3272.426	3272.719	3272.992	3273.243	3273.473	3273.681	3273.868	3274.035	3274.179	3274.302	3274.404	3274.484	3274.544	3274.582	3274.598	3274.593	3274.568	3274.525	3274.471
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 6	Elev. "M"	3271.683	3272.003	3272.312	3272.604	3272.876	3273.126	3273.354	3273.560	3273.747	3273.912	3274.055	3274.177	3274.277	3274.356	3274.414	3274.452	3274.467	3274.460	3274.433	3274.390	3274.334
	(-) Elev. "N"																					
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	(-) 0.688'																					
	(=) h																					
Girder No. 7	Elev. "M"	3271.721	3272.041	3272.348	3272.639	3272.909	3273.158	3273.385	3273.590	3273.775	3273.939	3274.081	3274.201	3274.300	3274.378	3274.435	3274.471	3274.485	3274.477	3274.449	3274.404	3274.347
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 8	Elev. "M"	3271.910	3272.228	3272.534	3272.824	3273.093	3273.340	3273.565	3273.770	3273.953	3274.116	3274.257	3274.376	3274.473	3274.549	3274.605	3274.640	3274.651	3274.643	3274.614	3274.568	3274.509
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 9	Elev. "M"	3272.098	3272.415	3272.720	3273.008	3273.276	3273.522	3273.746	3273.949	3274.131	3274.292	3274.432	3274.550	3274.646	3274.721	3274.775	3274.809	3274.820	3274.810	3274.779	3274.731	3274.672
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 10	Elev. "M"	3272.036	3272.351	3272.655	3272.942	3273.208	3273.453	3273.676	3273.877	3274.059	3274.219	3274.357	3274.473	3274.568	3274.642	3274.695	3274.727	3274.737	3274.725	3274.693	3274.644	3274.584
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 11	Elev. "M"	3271.923	3272.238	3272.540	3272.826	3273.091	3273.334	3273.556	3273.756	3273.936	3274.094	3274.232	3274.347	3274.440	3274.513	3274.565	3274.595	3274.604	3274.591	3274.558	3274.508	3274.445
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					
Girder No. 12	Elev. "M"	3271.811	3272.124	3272.425	3272.709	3272.973	3273.215	3273.436	3273.634	3273.813	3273.970	3274.106	3274.220	3274.312	3274.383	3274.434	3274.463	3274.471	3274.457	3274.422	3274.370	3274.307
	(-) Elev. "N"																					
	(=) d																					
	(-) 0.688'																					
	(=) h																					



* If during construction, it is found that this dimension will be exceeded or is less than zero, corrective measures must be taken as approved by the Engineer.

NOTES:

This Table contains the necessary information to determine the depth of concrete, in feet, over the girders at the points shown. All calculations can be carried out in the space provided. Elevation "M" is theoretical top of slab elevation before any concrete has been poured. This elevation includes correction for deflection due to Dead Load above girders. Elevation "N" is a field measured elevation taken on top of girders at points shown. This elevation must be taken after girder erection is complete, but prior to placing any of the slab concrete. Girders shall not be supported by construction shoring while elevations are taken. This sheet is to be used in conjunction with FRAMING DIAGRAM, CAMBER, & ERECTION DATA Sheet.

SLAB FORM ELEVATIONS

FOR

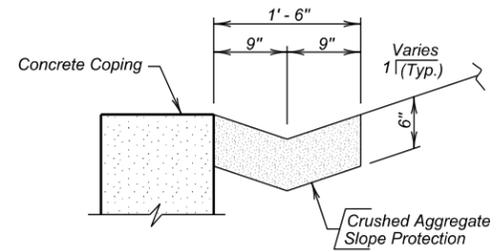
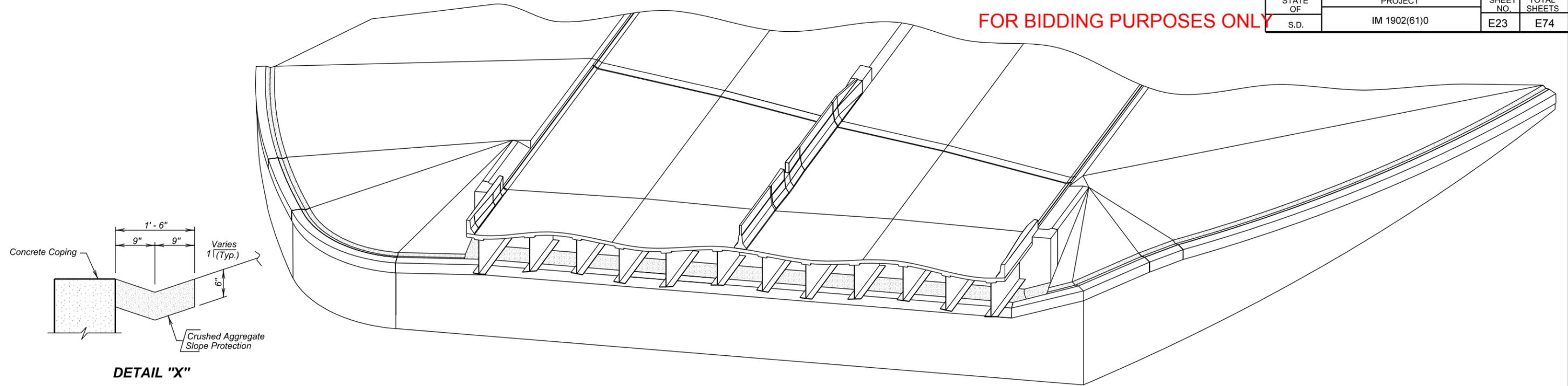
208' - 7" COMP. STEEL GIRDER BRIDGE
 2 - 41' - 0" ROADWAYS
 OVER NORTH STREET
 STA. 112 + 80.78 TO STA. 114 + 89.36
 STR. NO. 52-409-294

15° R.H.F. SKEW
 SEC. 35-T2N-R7E
 IM 1902(61)0
 HL-93

PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION
 SEPTEMBER 2013

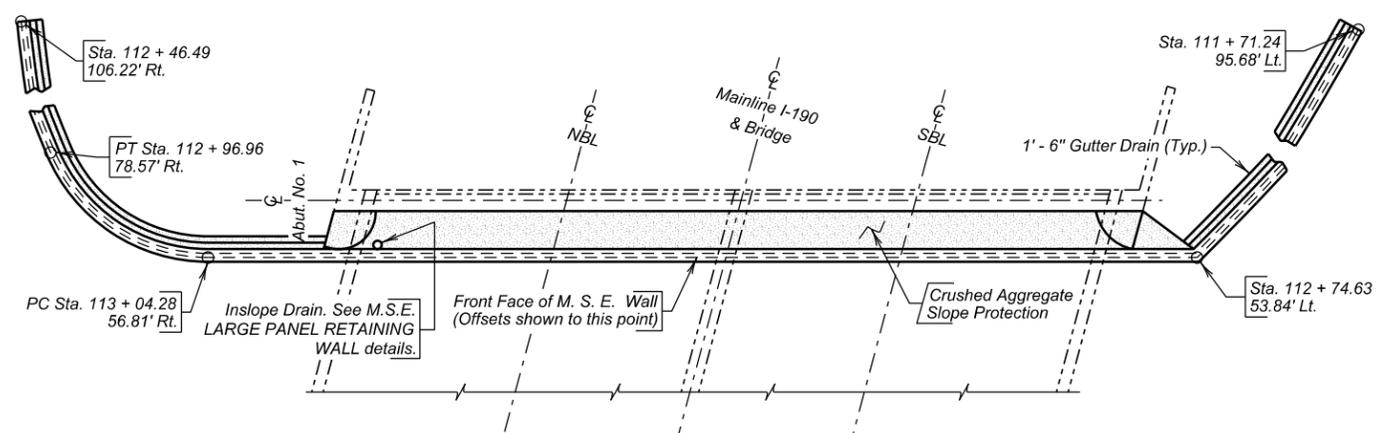
FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E23	E74

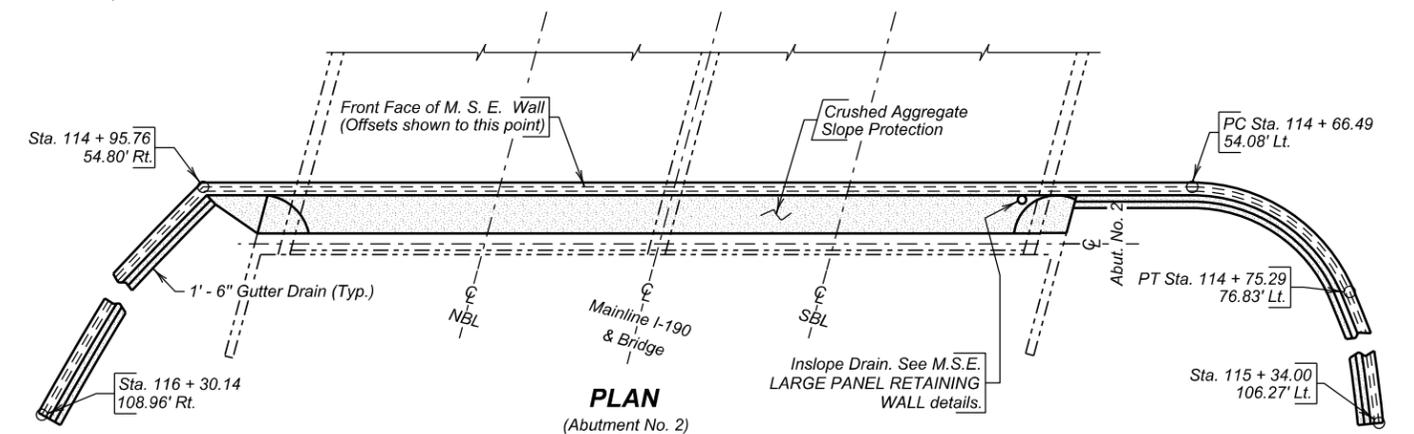


DETAIL "X"

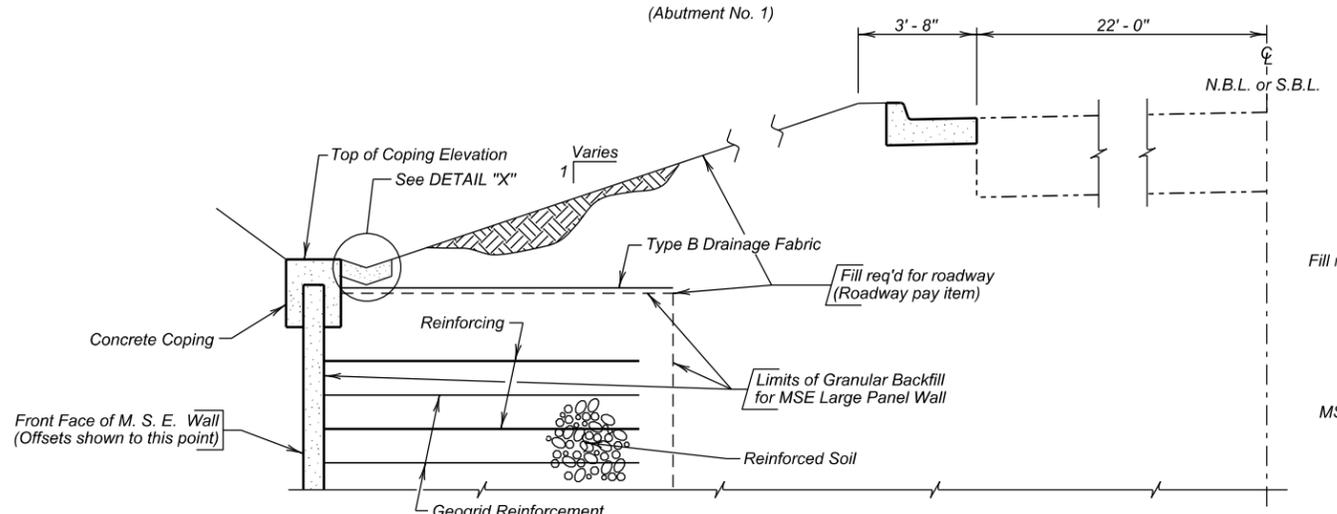
ISOMETRIC VIEW
(Abutment No. 1 shown)



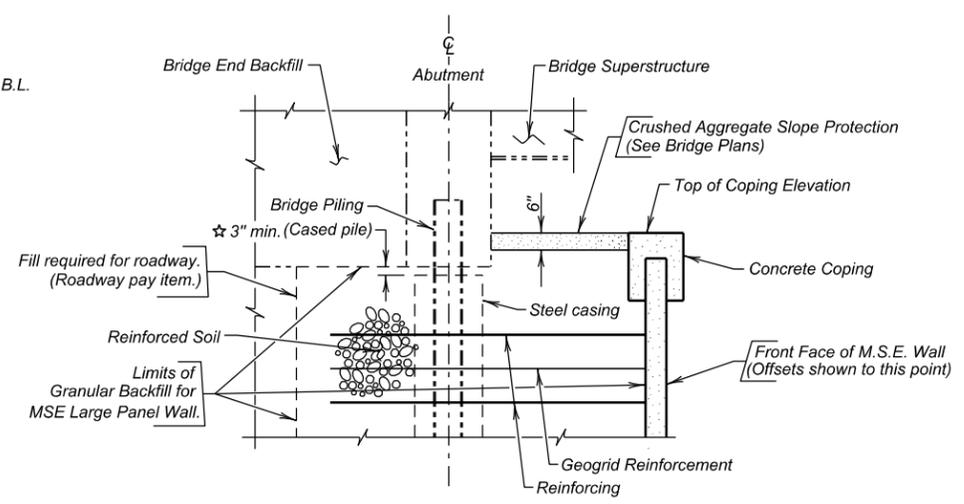
PLAN
(Abutment No. 1)



PLAN
(Abutment No. 2)



TYPICAL SECTION
(Perpendicular to Roadway at Bridge)



TYPICAL SECTION
(Parallel to Roadway at Bridge)

ESTIMATED QUANTITIES		
(For Two Abutments)		
ITEM	UNIT	QUANTITY
Bridge Berm Slope Protection, Crushed Aggregate	Sq. Yd.	168

SLOPE PROTECTION DETAILS
FOR
208' - 7" COMP. STEEL GIRDER BRIDGE
2 - 41' - 0" ROADWAYS
OVER NORTH STREET
STA. 112 + 80.78 TO STA. 114 + 89.36
STR. NO. 52-409-294

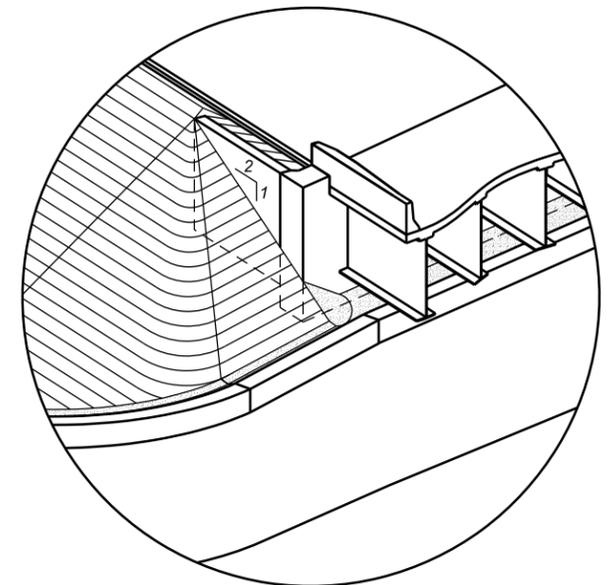
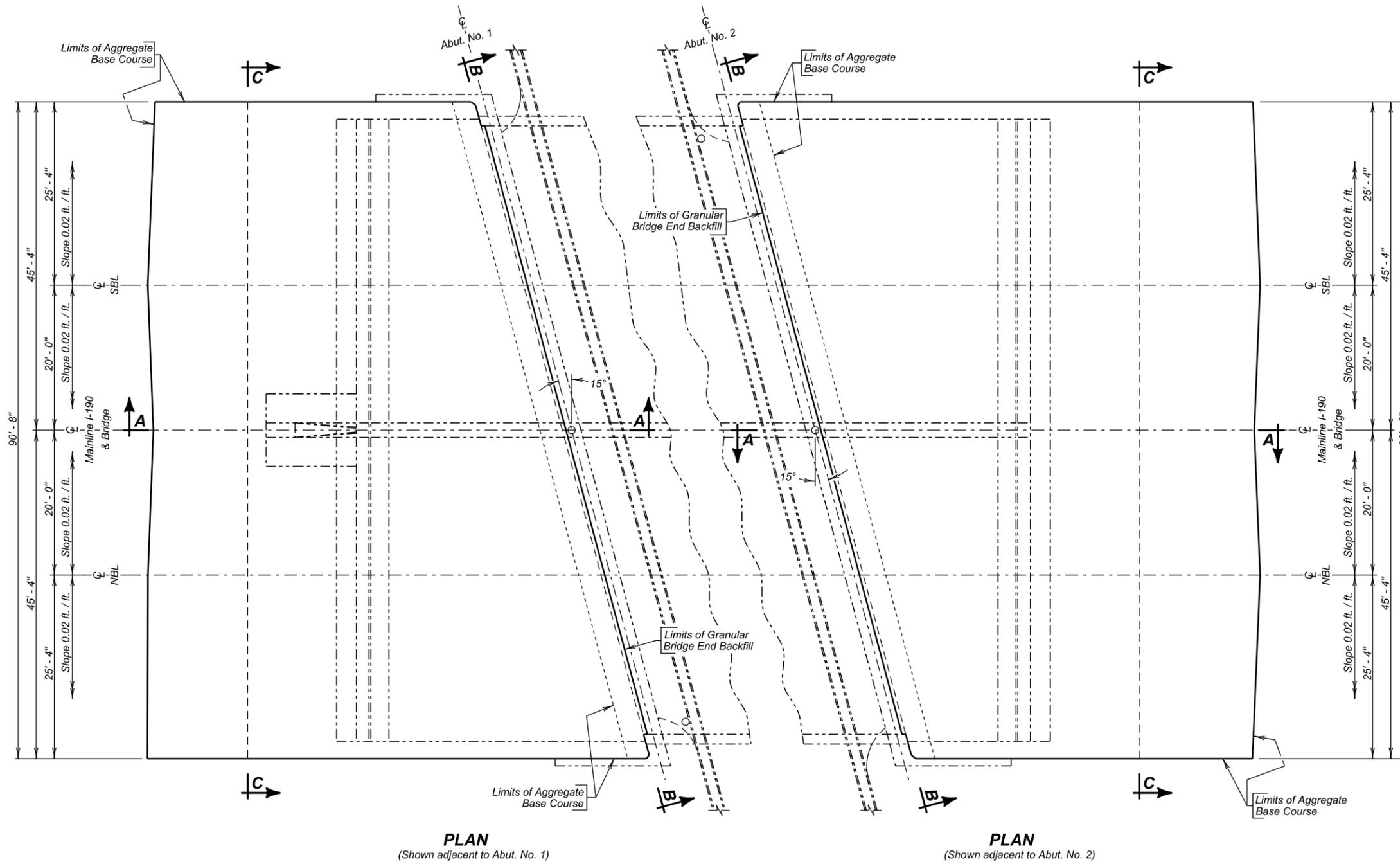
15° R.H.F. SKEW
SEC. 35-T2N-R7E
IM 1902(61)0
HL-93

PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
SEPTEMBER 2013

DESIGNED BY BAF/DM PENN1162	CK. DES. BY PW 1162TA21	DRAFTED BY BT	Kevin N. Coeden BRIDGE ENGINEER
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FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E24	E74



SPILL CONE DETAIL AT EMBANKMENT

ESTIMATED QUANTITIES (For Two Abutments)		
ITEM	UNIT	QUANTITY
Geogrid Reinforcement	Sq. Yd.	4271
Base Course	Ton	5123
Granular Bridge End Backfill	Cu. Yd.	204

- 1776 sq. ft. Vertical Composite Drain
 - 1269 sq. yd. Type B Drainage Fabric.
 - 8713 sq. ft. 6 mil Polyethylene Sheeting, not including laps.
- Items 1 and 3 are approximate quantities contained in the Granular Bridge End Backfill and are for information only.
- ★ For estimating purposes only, a factor of 1.89 tons/cu. yd. was used to convert cu. yds. to tons.

DETAILS OF BRIDGE END BACKFILL (A)

FOR
208' - 7" COMP. STEEL GIRDER BRIDGE
 2 - 41' - 0" ROADWAYS
 OVER NORTH STREET
 STA. 112 + 80.78 TO STA. 114 + 89.36
 STR. NO. 52-409-294

15° R.H.F. SKEW
 SEC. 35-T2N-R7E
 IM 1902(61)0
 HL-93

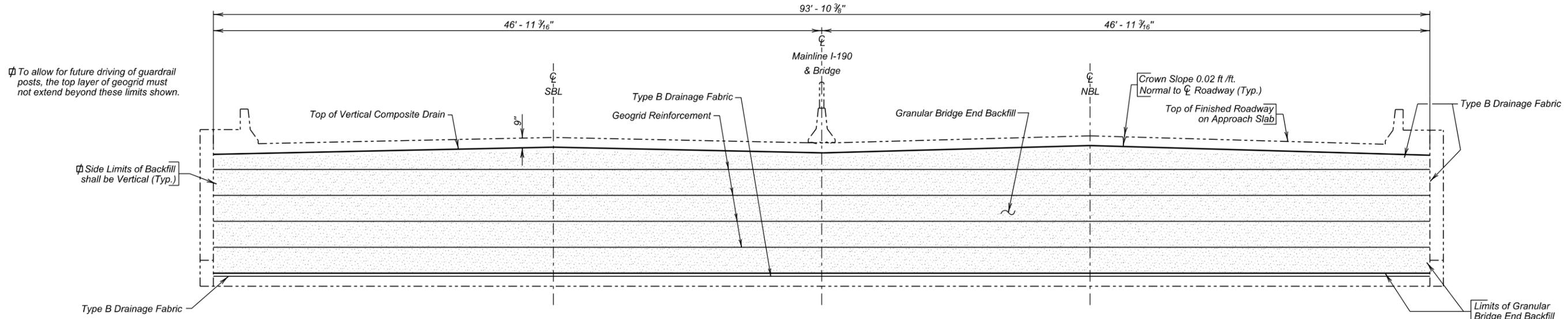
PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION
 SEPTEMBER 2013

DESIGNED BY BAF/DM PENN1162	CK. DES. BY PW 1162TA22	DRAFTED BY BT	Kevin N. Goeden BRIDGE ENGINEER
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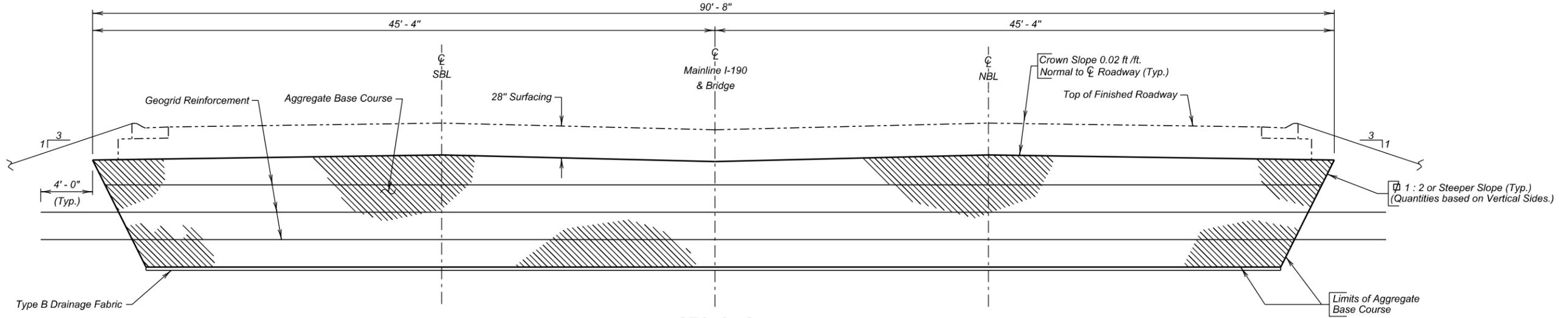
FOR BIDDING PURPOSES ONLY

Revised June 9, 2015 PW

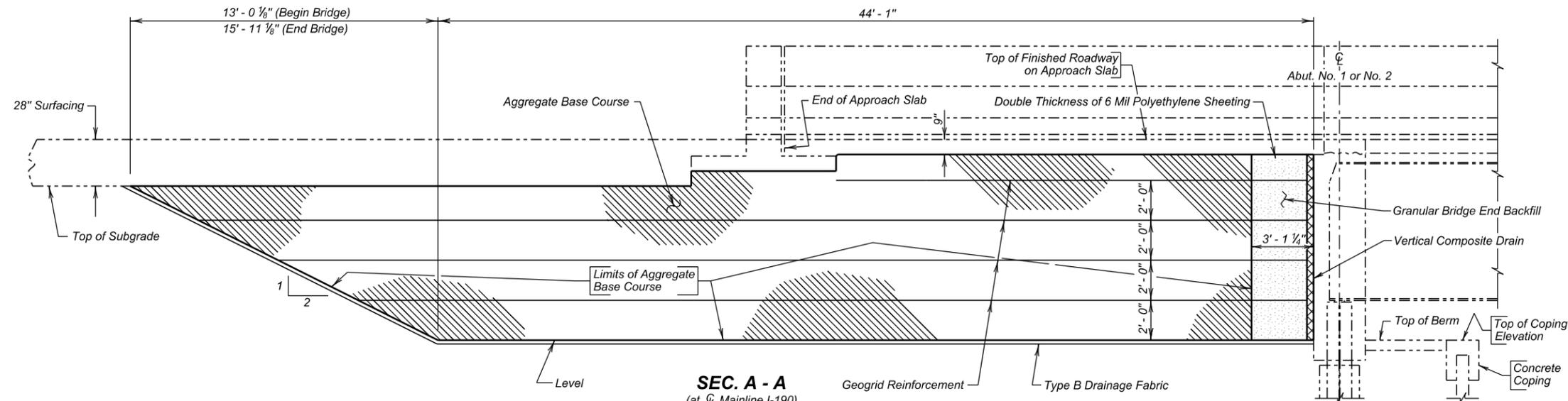
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E25	E74



SEC. B - B



SEC. C - C



SEC. A - A
(at \bar{C} Mainline I-190)

DETAILS OF BRIDGE END BACKFILL (B)

FOR
208' - 7" COMP. STEEL GIRDER BRIDGE
 2 - 41' - 0" ROADWAYS
 OVER NORTH STREET
 STA. 112 + 80.78 TO STA. 114 + 89.36
 STR. NO. 52-409-294

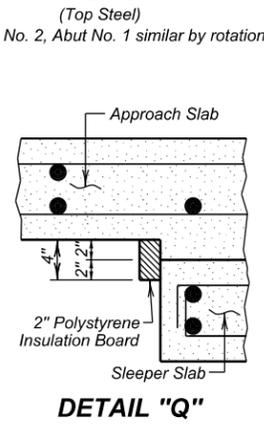
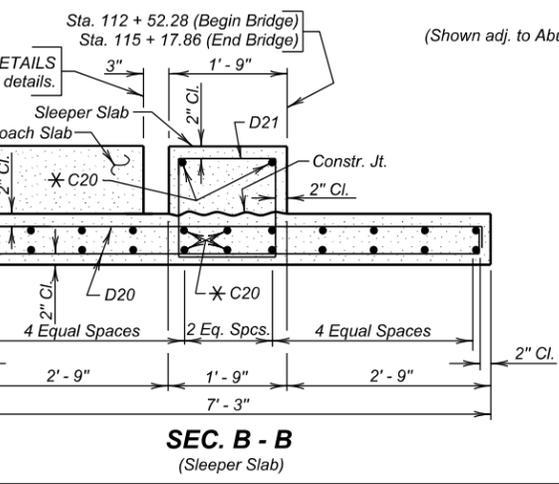
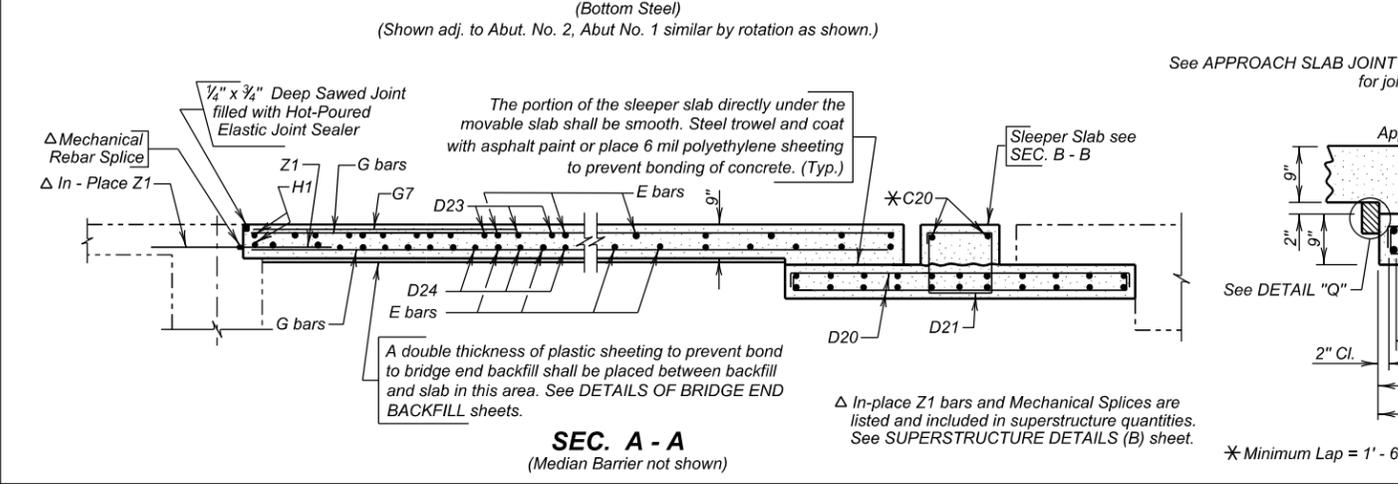
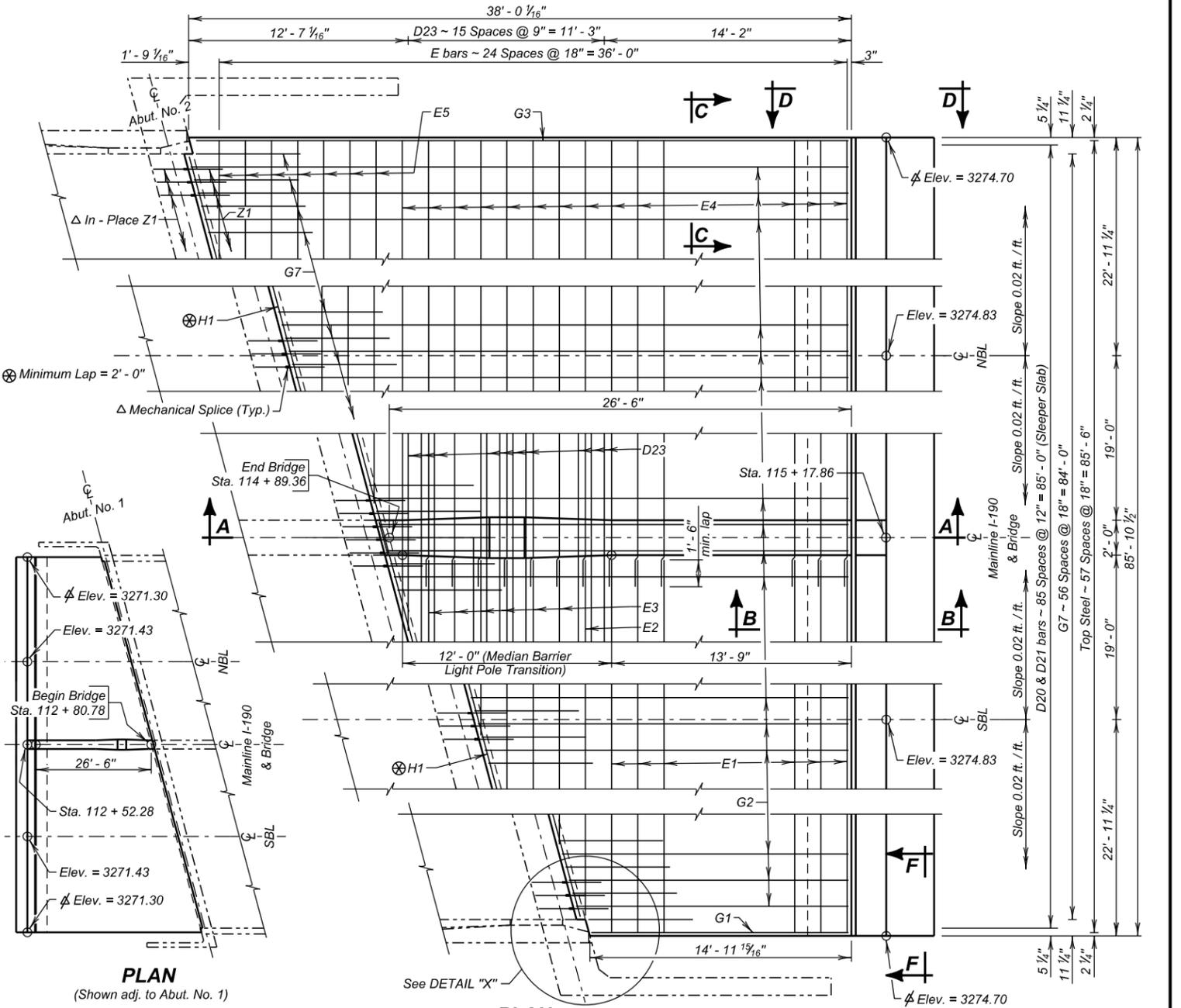
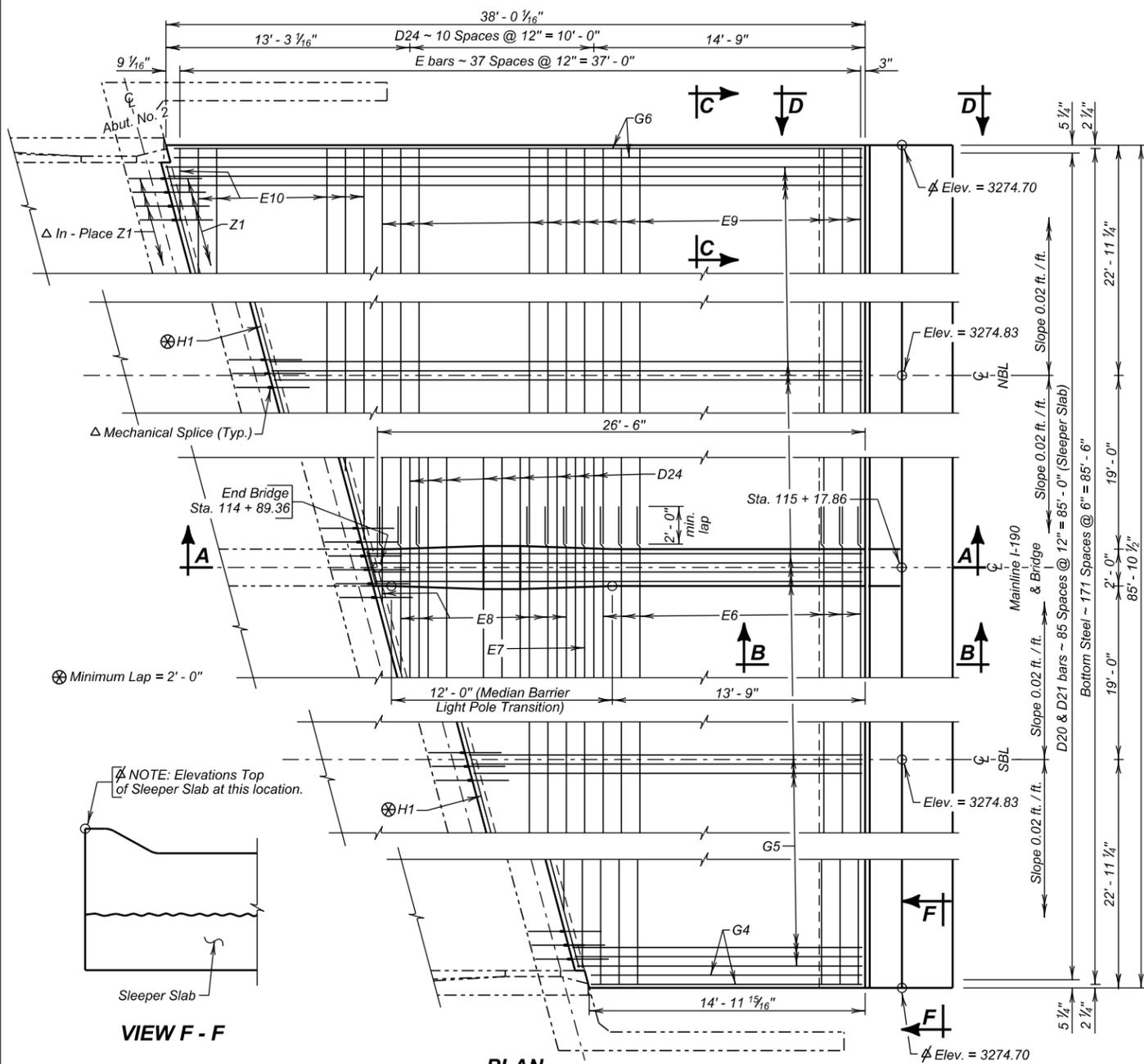
15° R.H.F. SKEW
 SEC. 35-T2N-R7E
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PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION
 SEPTEMBER 2013

DESIGNED BY BAF/DM PENN1162	CK. DES. BY PW 1162TA23	DRAFTED BY BT	Kevin N. Coeden BRIDGE ENGINEER
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FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E26	E74



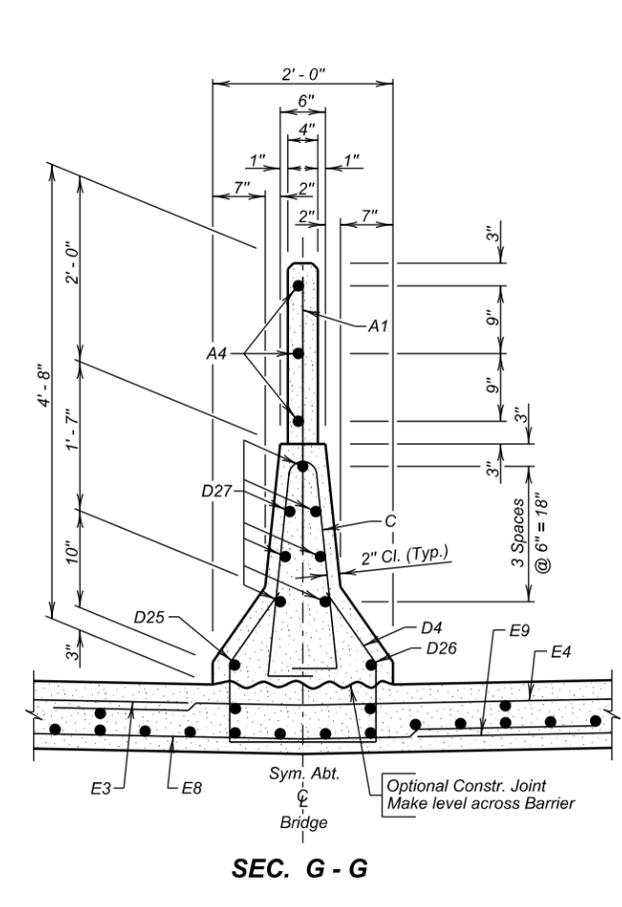
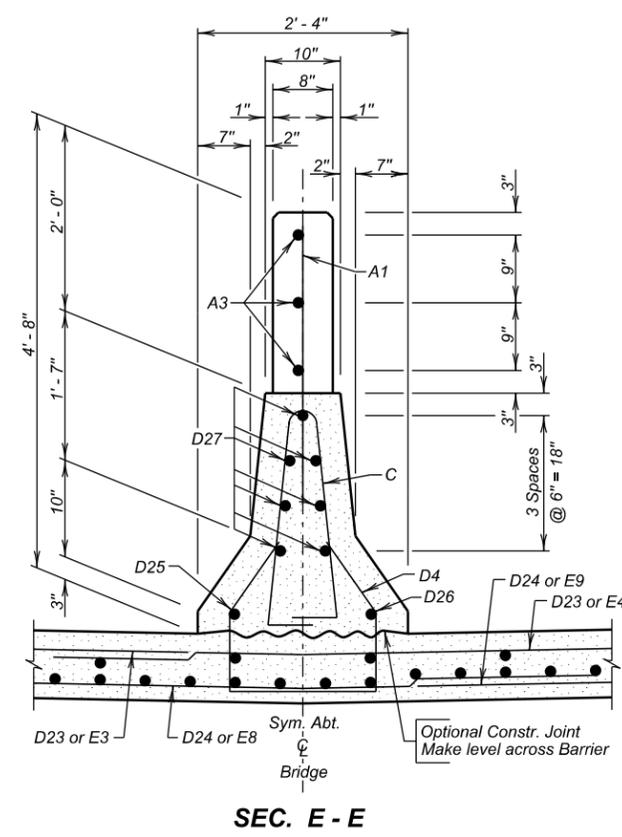
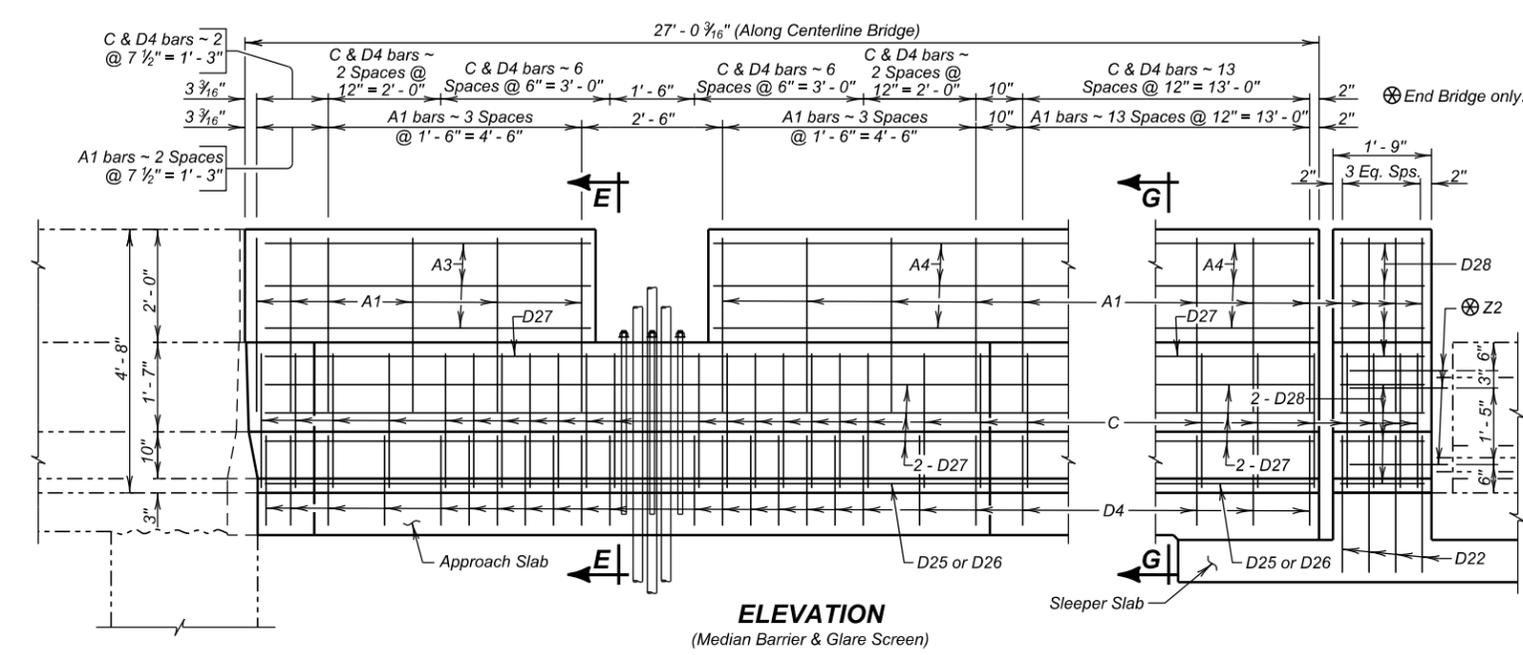
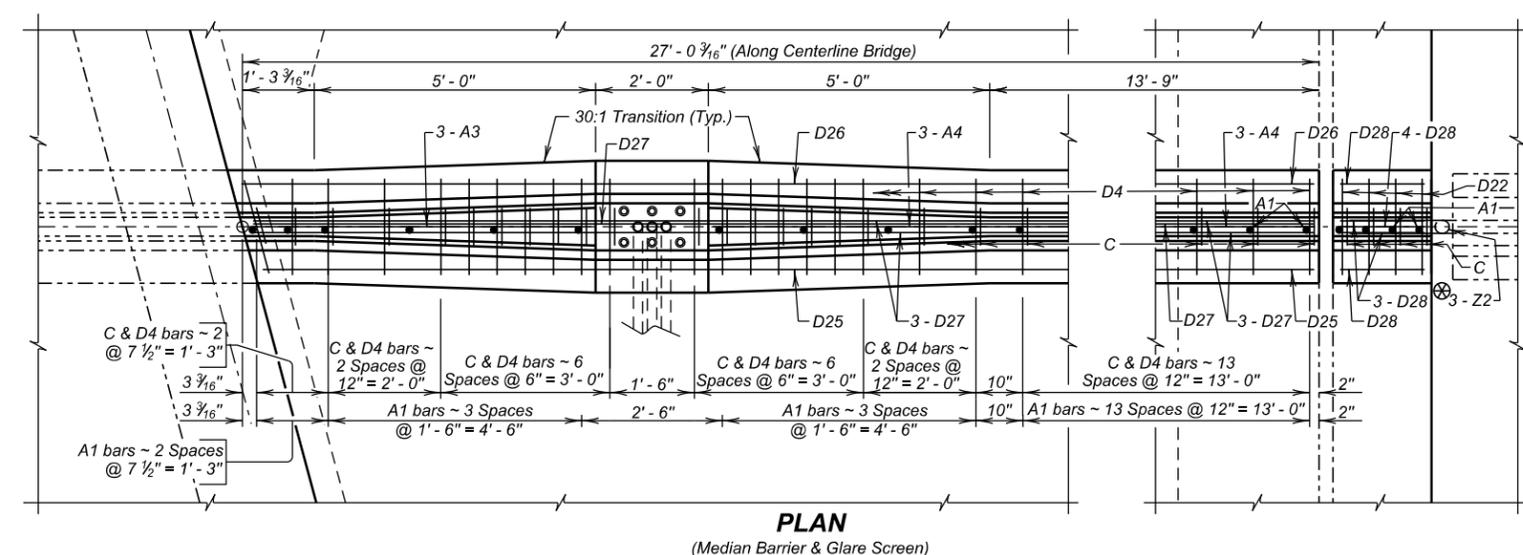
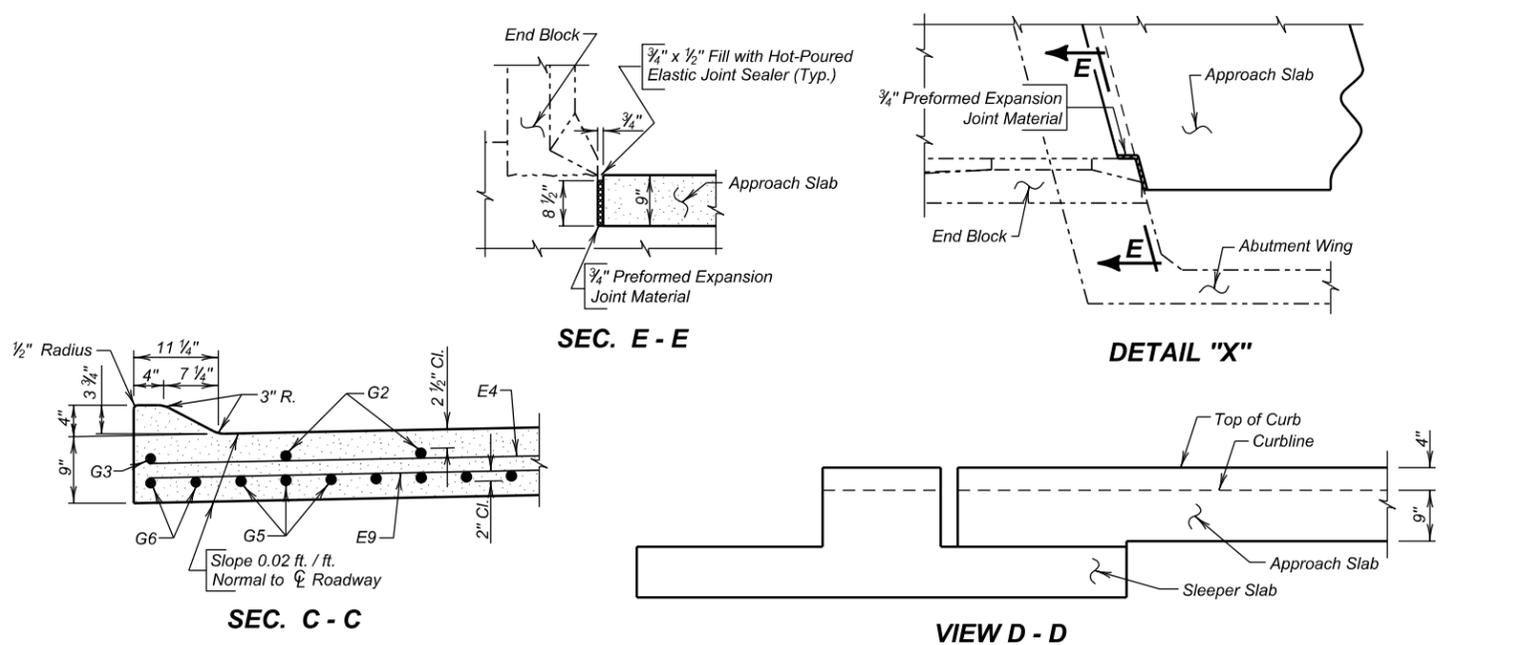
DETAILS OF APPROACH SLAB ADJACENT TO BRIDGE (A)
 FOR
208' - 7" COMP. STEEL GIRDER BRIDGE
 2 - 41' - 0" ROADWAYS
 OVER NORTH STREET
 STA. 112 + 80.78 TO STA. 114 + 89.36
 STR. NO. 52-409-294

15° R.H.F. SKEW
 SEC. 35-T2N-R7E
 IM 1902(61)0
 HL-93

PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION
 SEPTEMBER 2013

DESIGNED BY DM PENN1162	CK. DES. BY PW 1162TA24	DRAFTED BY BT	Kevin N. Coeden BRIDGE ENGINEER
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FOR BIDDING PURPOSES ONLY



REINFORCING SCHEDULE					Bending Details	
(For Two Approach Slabs and Two Sleeper Slabs)						
Mk.	No.	Size	Length	Type		
Sleeper Slabs					Type 2	
C20	96	5	43' - 7"	Str.	D20 6' - 11"	
D20	344	4	7' - 9"	2	5"	
D21	172	4	6' - 1"	T2	1' - 5" D21	
D22	8	5	6' - 7"	14A	Type S11	
Approach Slabs					Type T2B	
D4	68	5	5' - 1"	14A	Type 14A	
D23	16	7	15' - 9"	Str.	37' - 10" 15' - 6" G5	
D24	11	4	15' - 9"	Str.	37' - 8 1/2" 15' - 7 1/2" G2	
E1	20	4	41' - 6"	Str.	15' - 7 1/2" 37' - 8 1/2" G2	
E2	2	4	40' - 6"	Str.	15' - 6" 37' - 10" G5	
E3	6	4	44' - 8"	Str.	41' - 5 1/2" 4' - 1 1/2" E10	
E4	36	4	45' - 7"	Str.	42' - 11 1/2" 15' - 7 1/2" E8	
E5	7	4	48' - 10"	Str.	41' - 5 1/2" 7' - 10 1/2" E5	
E6	30	6	46' - 1"	Str.	36' - 7" 8' - 7" E3	
E7	2	6	45' - 1"	Str.	8' - 7" 36' - 7" E3	
E8	11	6	48' - 1"	Str.	7' - 10 1/2" 41' - 5 1/2" E5	
E9	54	6	41' - 6"	Str.	5' - 7 1/2" 42' - 11 1/2" E8	
E10	11	6	45' - 1"	Str.	4' - 1 1/2" 41' - 5 1/2" E10	
G1	2	4	14' - 8"	Str.		
G2	56	4	53' - 4"	Str.		
G3	2	4	37' - 8"	Str.		
G4	4	8	14' - 8"	Str.		
G5	168	8	53' - 4"	Str.		
G6	4	8	37' - 5"	Str.		
G7	114	4	6' - 0"	Str.		
H1	4	6	44' - 4"	Str.		
Z1	224	7	2' - 0"	Str.		
Median Barriers						
A1	56	4	3' - 1"	Str.		
A3	6	4	6' - 0"	Str.		
A4	6	4	18' - 6"	Str.		
C	76	5	5' - 10"	T2B		
D25	2	5	26' - 6"	Str.		
D26	2	5	26' - 10"	Str.		
D27	14	5	26' - 8"	Str.		
D28	24	5	1' - 6"	Str.		
Z2	3	6	4' - 2"	S11		

NOTES:
 All bars to be epoxy coated.
 All dimensions are out to out of bars.
 See cutting diagram.

ESTIMATED QUANTITIES		
(For Two Approach Slabs and Two Sleeper Slabs)		
ITEM	UNIT	QUANTITY
Concrete Approach Slab for Bridge	Sq. Yd.	515.4
Concrete Approach Sleeper Slab for Bridge	Sq. Yd.	138.4
1. 131.0 Cu. Yds. Concrete in Approach Slabs.		
2. 38404 Lbs. Epoxy coated Re-Steel in Approach Slabs.		
3. 43.9 Cu. Yds. Concrete in Sleeper Slabs.		
4. 6899 Lbs. Epoxy coated Re-Steel in Sleeper Slab.		
5. 57.2 Sq. Ft. of 2" Polystyrene Insulation Board		
6. 7.9 Cu. Yds. Concrete in Median Barriers.		
7. 1233 Lbs. Epoxy coated Re-Steel in Median Barriers.		

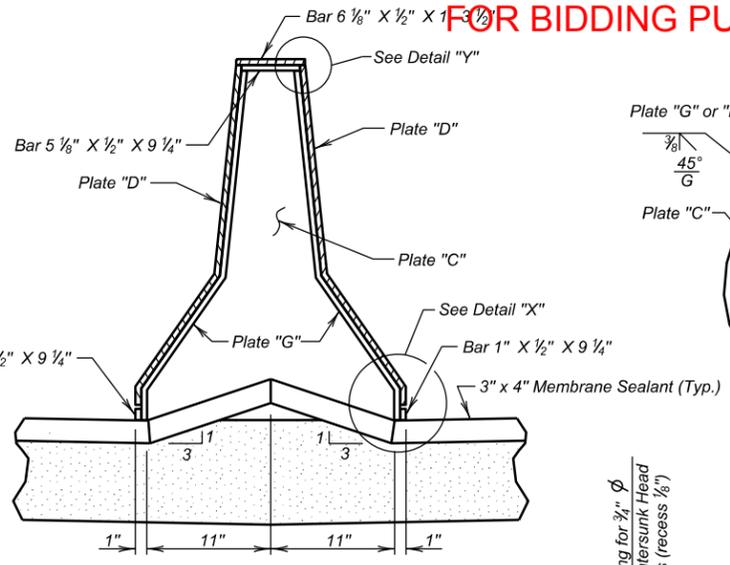
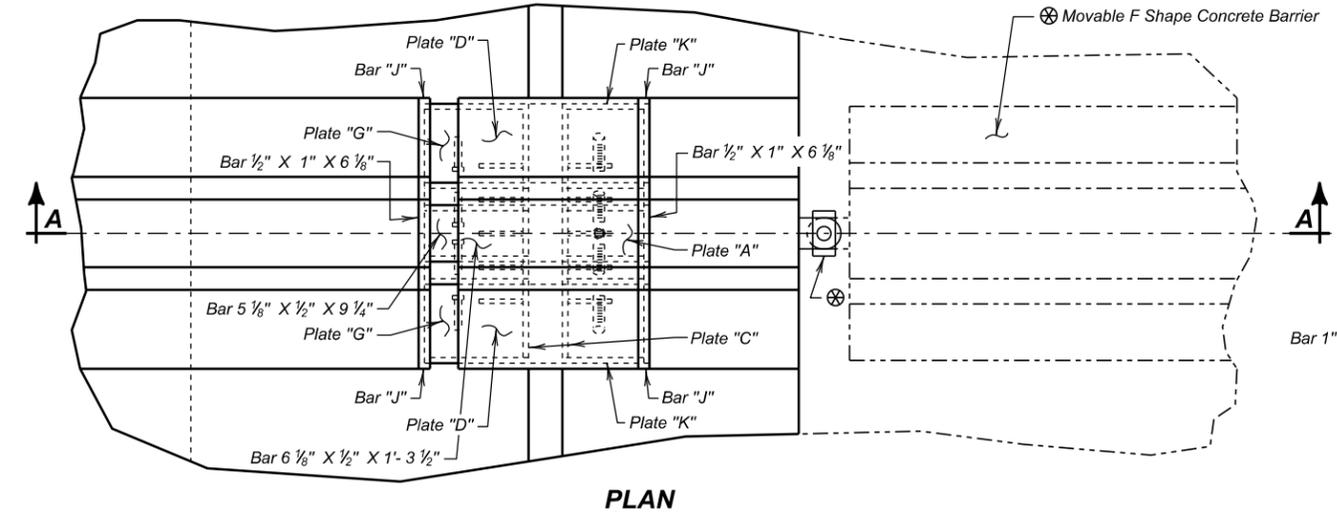
Items 1 thru 7 are approximate quantities contained in the above bid items and are for information only.

DETAILS OF APPROACH SLAB ADJACENT TO BRIDGE (B)
 FOR
208' - 7" COMP. STEEL GIRDER BRIDGE
 2 - 41' - 0" ROADWAYS
 15° R.H.F. SKEW
 OVER NORTH STREET
 SEC. 35-T2N-R7E
 STA. 112 + 80.78 TO STA. 114 + 89.36
 STR. NO. 52-409-294
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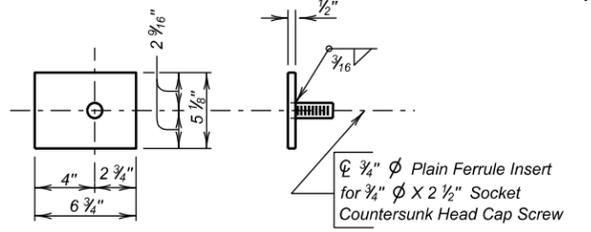
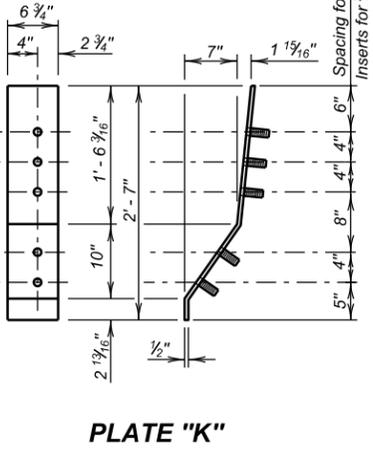
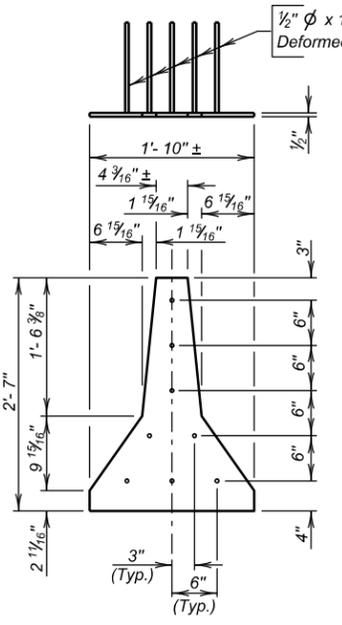
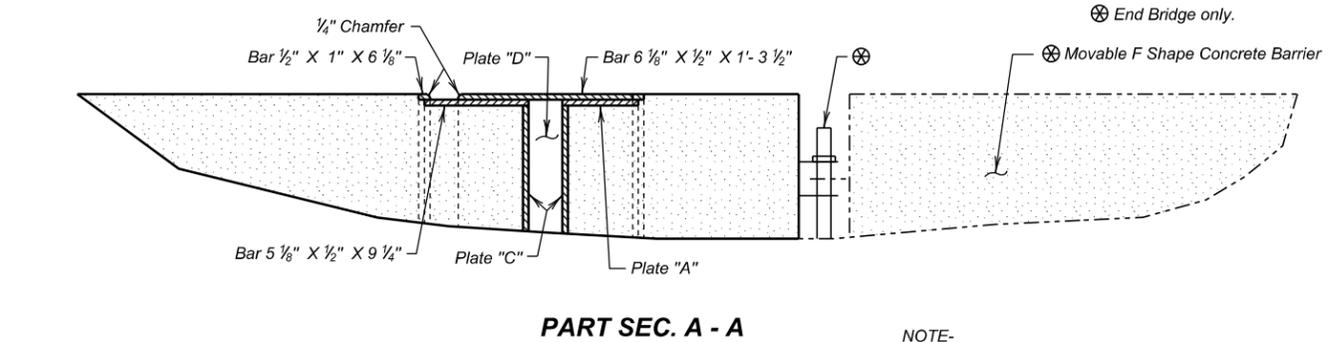
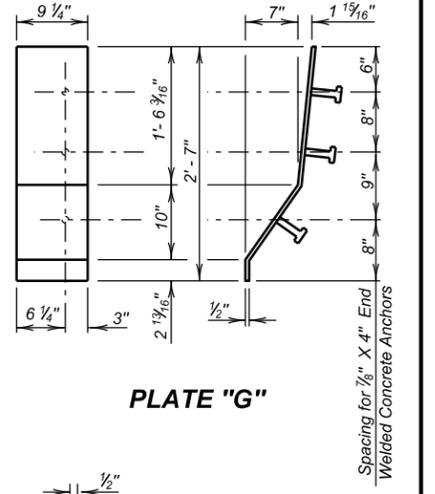
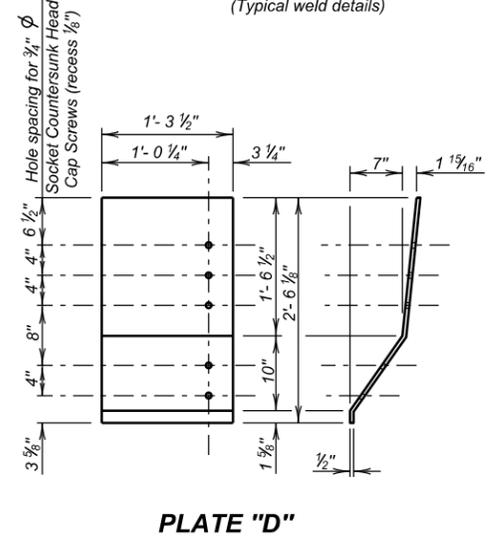
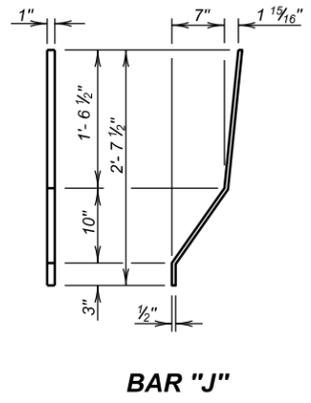
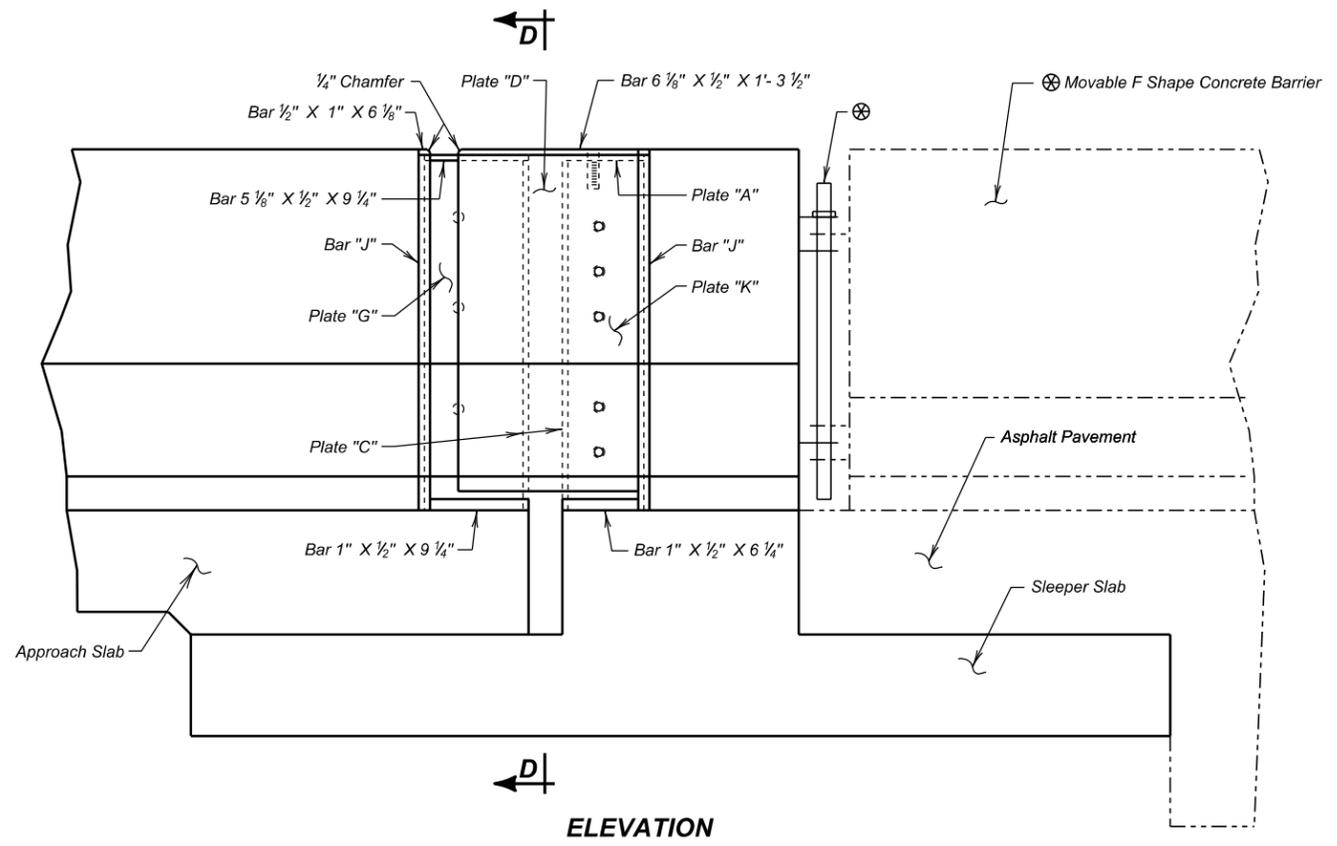
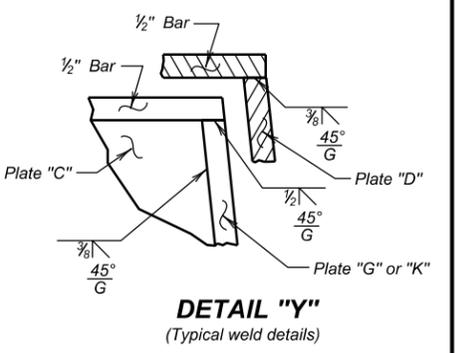
PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION
 SEPTEMBER 2013

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E28	E74

FOR BIDDING PURPOSES ONLY



DETAIL "X"
(Typical weld details)



MEDIAN BARRIER EXPANSION DEVICE DETAILS

FOR
208' - 7" COMP. STEEL GIRDER BRIDGE
 2 - 41' - 0" ROADWAYS
 OVER NORTH STREET
 STA. 112 + 80.78 TO STA. 114 + 89.36
 STR. NO. 52-409-294

15° R.H.F. SKEW
 SEC. 35-T2N-R7E
 IM 1902(61)0
 HL-93

PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION

SEPTEMBER 2013 **(26)** OF **(34)**

NOTE-
 This sheet is to be used in conjunction with DETAILS OF
 APPROACH SLAB ADJACENT TO BRIDGE (A) & (B) sheets.

DESIGNED BY DM PENN1162	CK. DES. BY PW 1162TA26	DRAFTED BY BT	Kevin N. Coeden BRIDGE ENGINEER
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FOR BIDDING PURPOSES ONLY

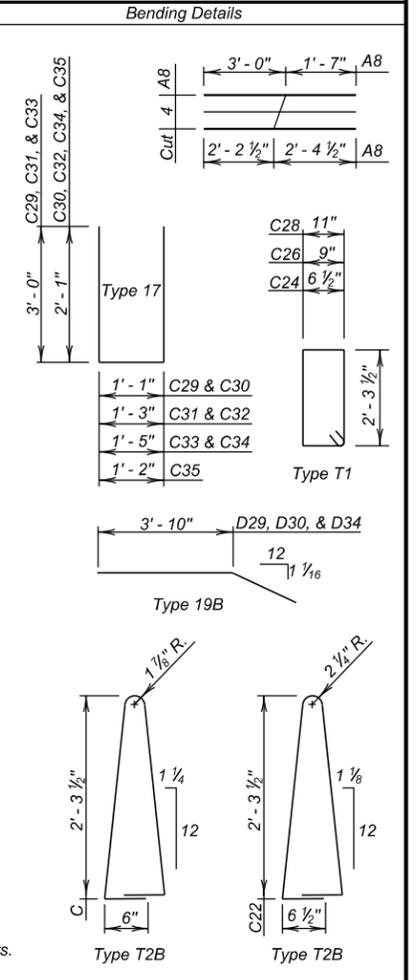
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E29	E74

INSTALLING DOWELS IN CONCRETE

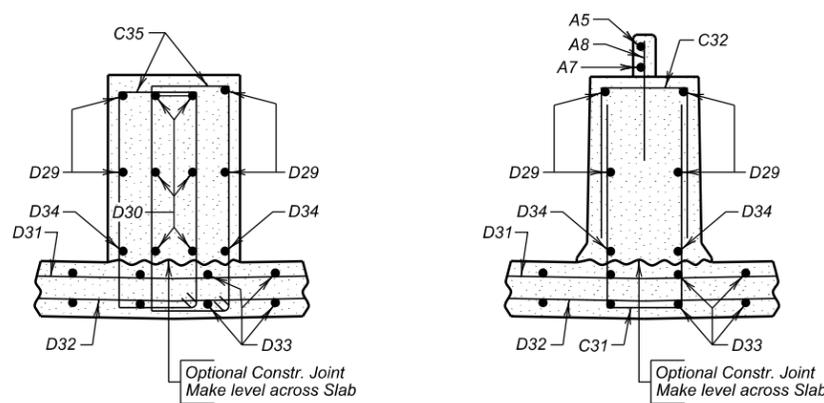
- The epoxy resin mixture shall be of a type for bonding steel to hardened concrete and shall conform to AASHTO M235 Type IV, Grade 3 (Equivalent to ASTM C881, Type IV, Grade 3).
- The diameter of the drilled holes shall not be less than 1/8 inch greater, nor more than 3/8 inch greater than the diameter of the dowels or as per the Manufacturer's recommendations. Holes shall not be drilled using core bits. The drilled holes shall be blown out with compressed air using a device that will reach the back of the hole to ensure that all debris or loose material has been removed prior to epoxy injection.
- Mix epoxy resin as recommended by the Manufacturer and apply by an injection method as approved by the Engineer. Beginning at the back of the drilled holes, fill the holes 1/2 to 1/2 full of epoxy, or as recommended by the Manufacturer, prior to insertion of the steel bar. Care shall be taken to prevent epoxy from running out of the horizontal holes prior to steel bar insertion. Rotate the steel bar during installation to eliminate voids and ensure complete bonding of the bar. Insertion of the bars by the dipping or painting methods will not be allowed.
- No loads shall be applied to the epoxy grouted dowel bars until the epoxy resin has had sufficient time to cure as specified by the epoxy resin manufacturer.
- Embed Z3 dowels 7" into existing concrete.
- Z3 dowel bars shall be #6 deformed bars conforming to ASTM A615 Grade 60.
- The cost of drilling holes, epoxy resin, dowels, installation and other incidental items shall be included in the contract unit price per each for Install Dowel in Concrete.

REINFORCING SCHEDULE
(For One Special Median Barrier Endblock)

Mk.	No.	Size	Length	Type
A5	1	4	7'-3"	Str.
A6	1	4	3'-8"	Str.
A7	1	4	7'-1"	Str.
A8	4	4	4'-7"	Str.
C	1	5	5'-10"	T2B
C21	1	5	5'-6"	14A
C22	1	5	6'-0"	T2B
C23	2	5	5'-5"	14A
C24	1	5	6'-7"	T1
C25	1	5	5'-4"	14A
C26	1	5	7'-0"	T1
C27	1	5	5'-3"	14A
C28	1	5	7'-4"	T1
C29	1	5	7'-1"	17
C30	1	5	5'-3"	17
C31	1	5	7'-3"	17
C32	1	5	5'-5"	17
C33	1	5	7'-5"	17
C34	1	5	5'-7"	17
C35	20	4	5'-4"	17
D29	4	5	12'-2"	19B
D30	6	5	5'-0"	19B
D31	23	7	9'-8"	Str.
D32	30	4	9'-8"	Str.
D33	20	4	12'-2"	Str.
D34	2	5	7'-2"	19B
D35	2	5	4'-3"	Str.
Z3	18	6	1'-3"	Str.

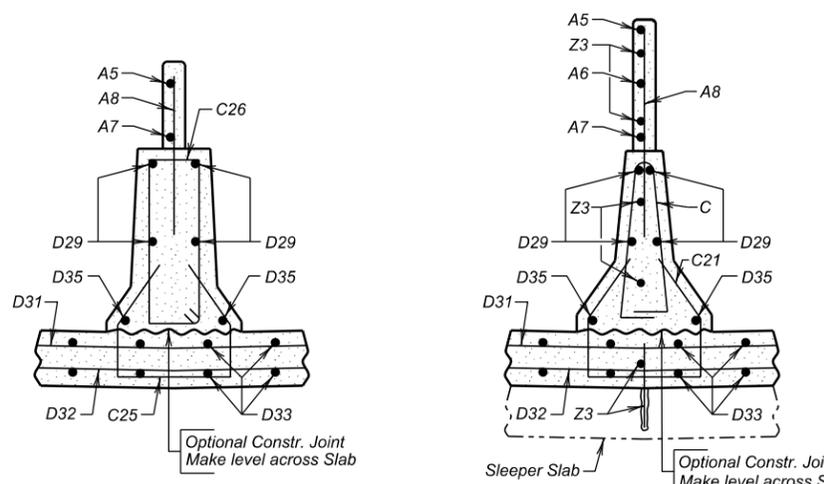


NOTES:
All bars to be epoxy coated.
All dimensions are out to out of bars.
See cutting diagram.



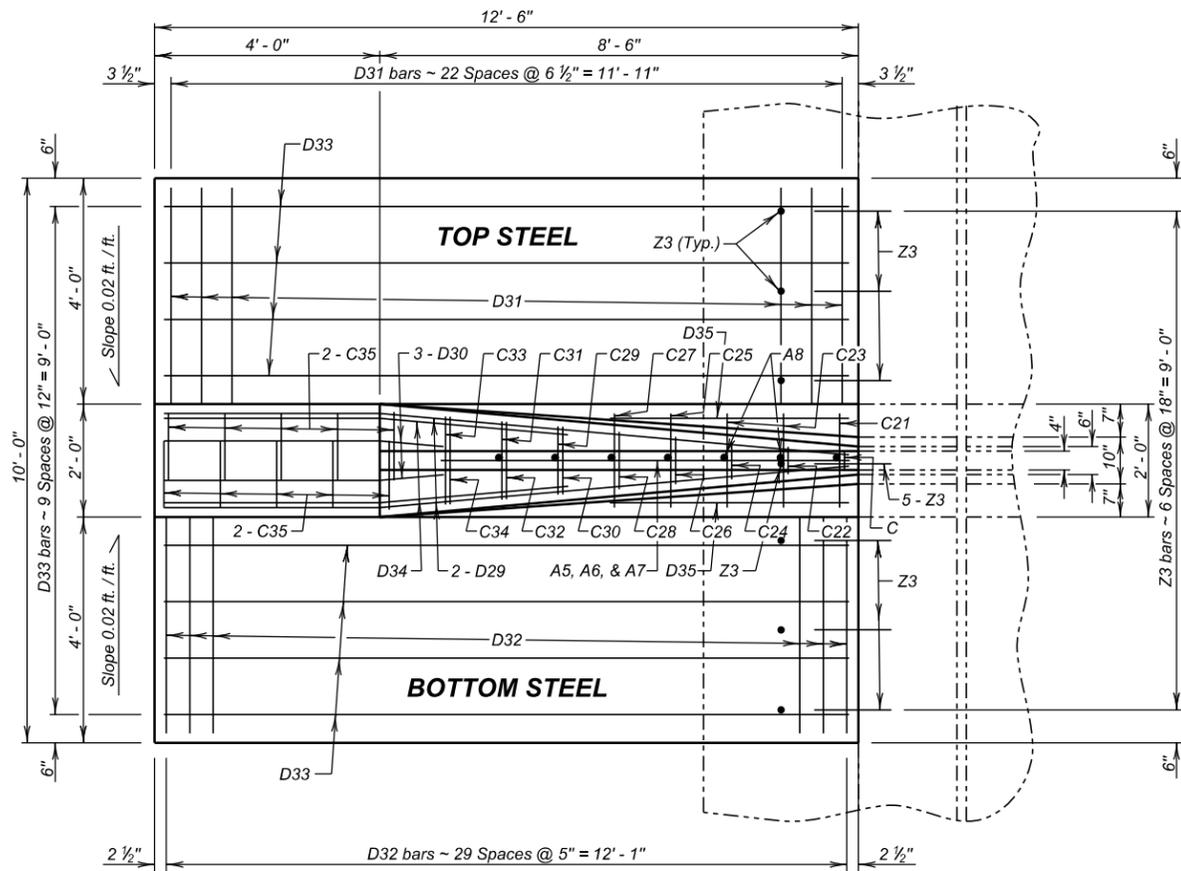
SEC. A - A

SEC. B - B

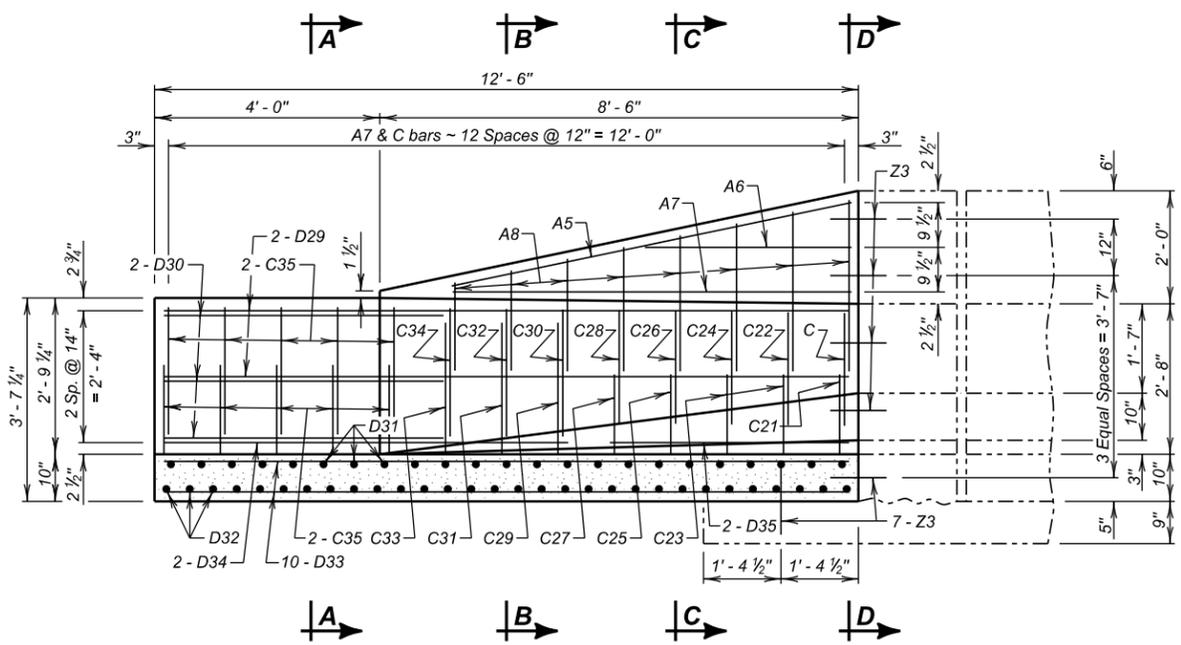


SEC. C - C

SEC. D - D



PLAN



ELEVATION

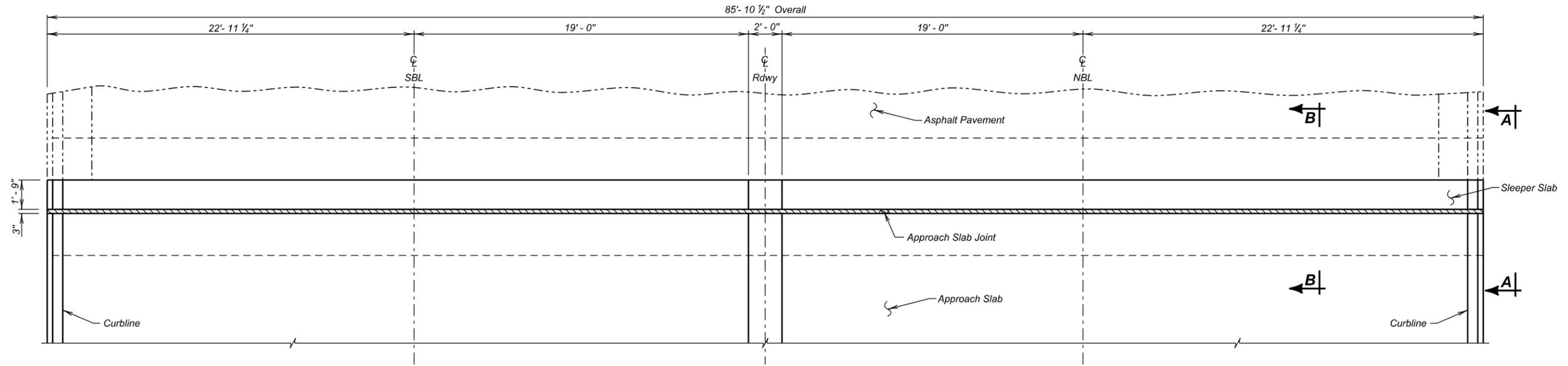
NOTE:
Special Median Barrier Endblock is at Begin Bridge only.

ITEM	UNIT	QUANTITY
Class A45 Concrete, Bridge	Cu. Yd.	6.1
Epoxy Coated Reinforcing Steel	Lb.	1148
Install Dowel in Concrete	Each	18

SPECIAL MEDIAN BARRIER ENDBLOCK DETAILS
FOR
208' - 7" COMP. STEEL GIRDER BRIDGE
2 - 41' - 0" ROADWAYS
15° R.H.F. SKEW
OVER NORTH STREET
SEC. 35-T2N-R7E
STA. 112 + 80.78 TO STA. 114 + 89.36
STR. NO. 52-409-294
IM 1902(61)0
HL-93

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E30	E74

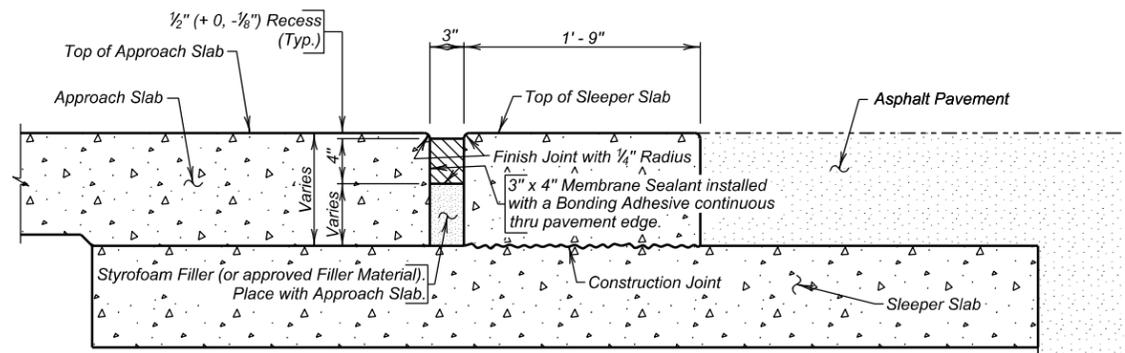


PLAN
(End Bridge Shown)

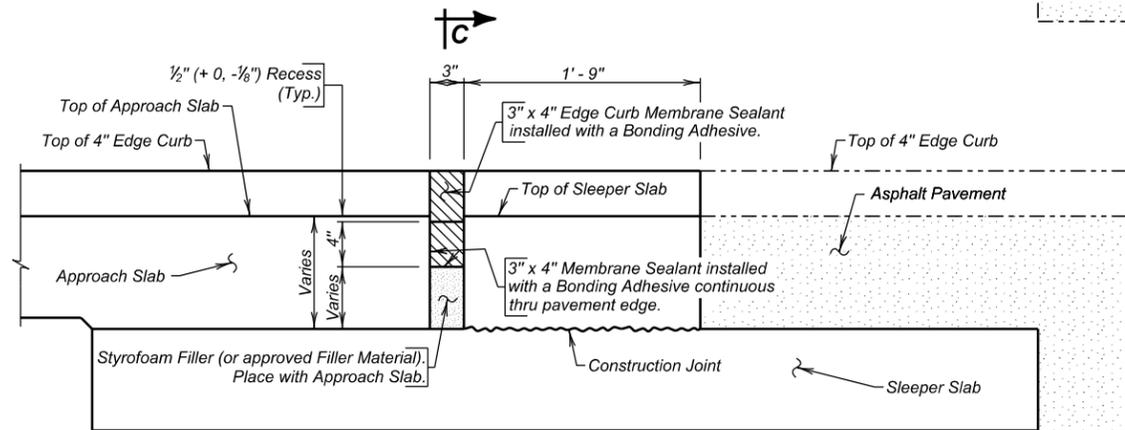
GENERAL NOTES

- 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.

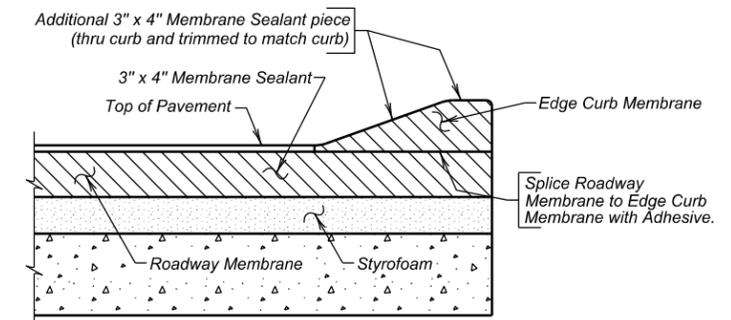
ESTIMATED QUANTITIES		
(For Two Approach Slabs)		
ITEM	UNIT	QUANTITY
Membrane Sealant Expansion Joint	Ft.	171.8



SEC. B - B



VIEW A - A



SEC. C - C

APPROACH SLAB JOINT DETAILS
FOR
208' - 7\"/>

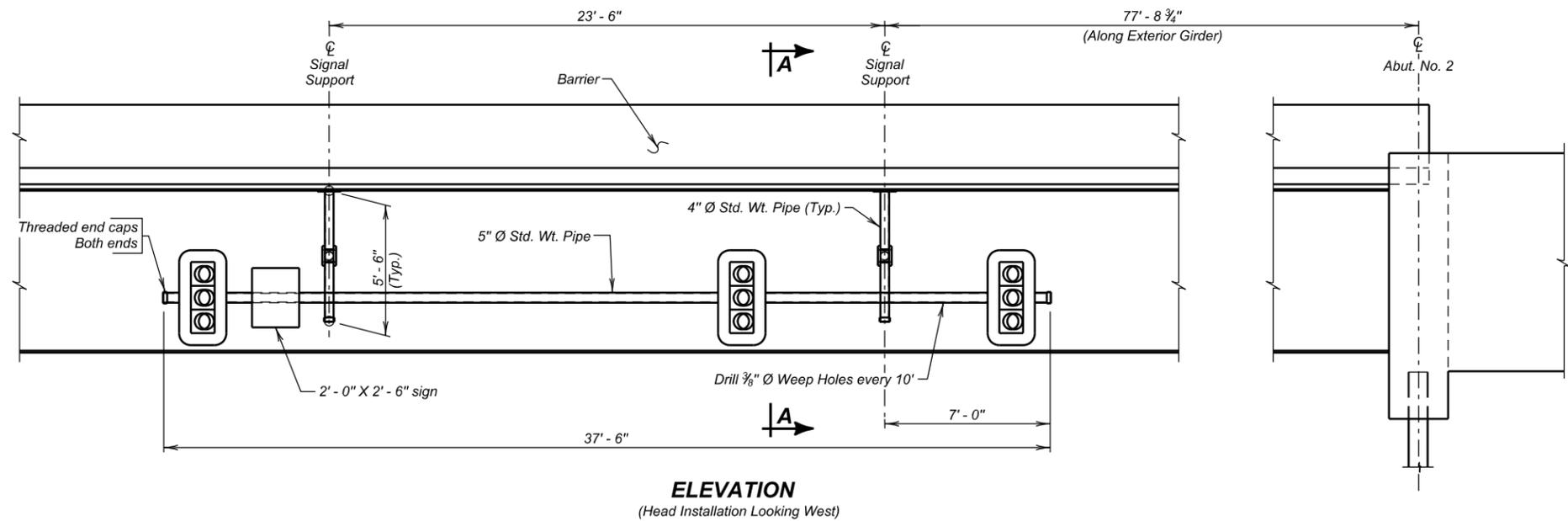
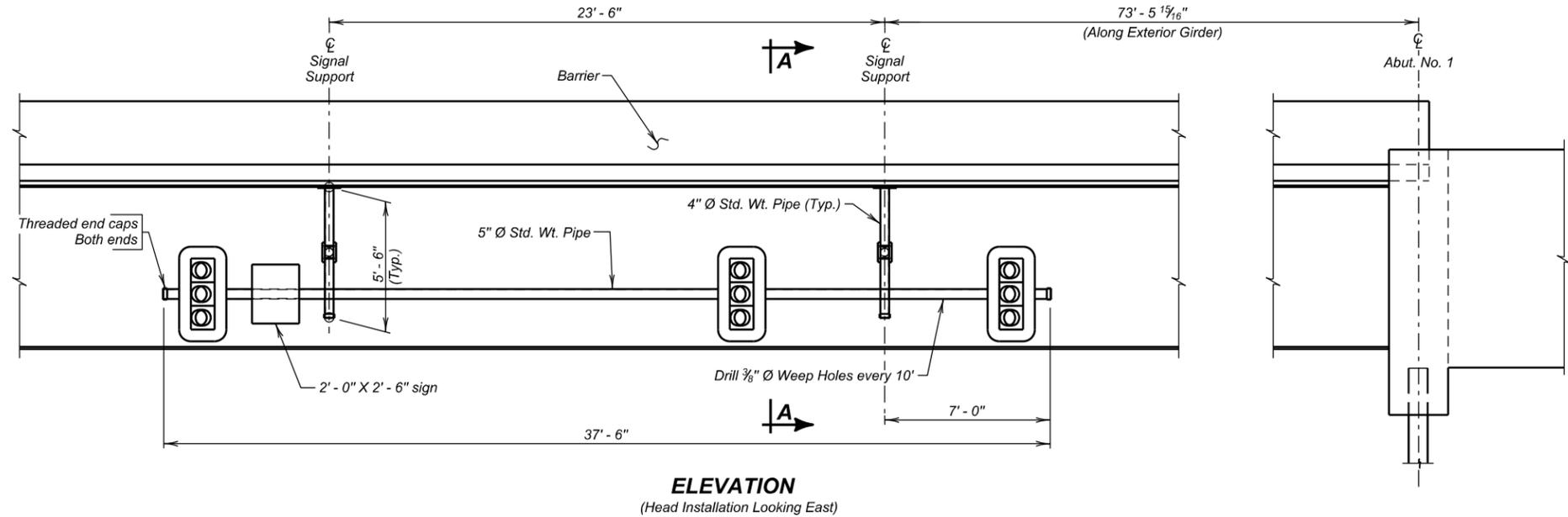
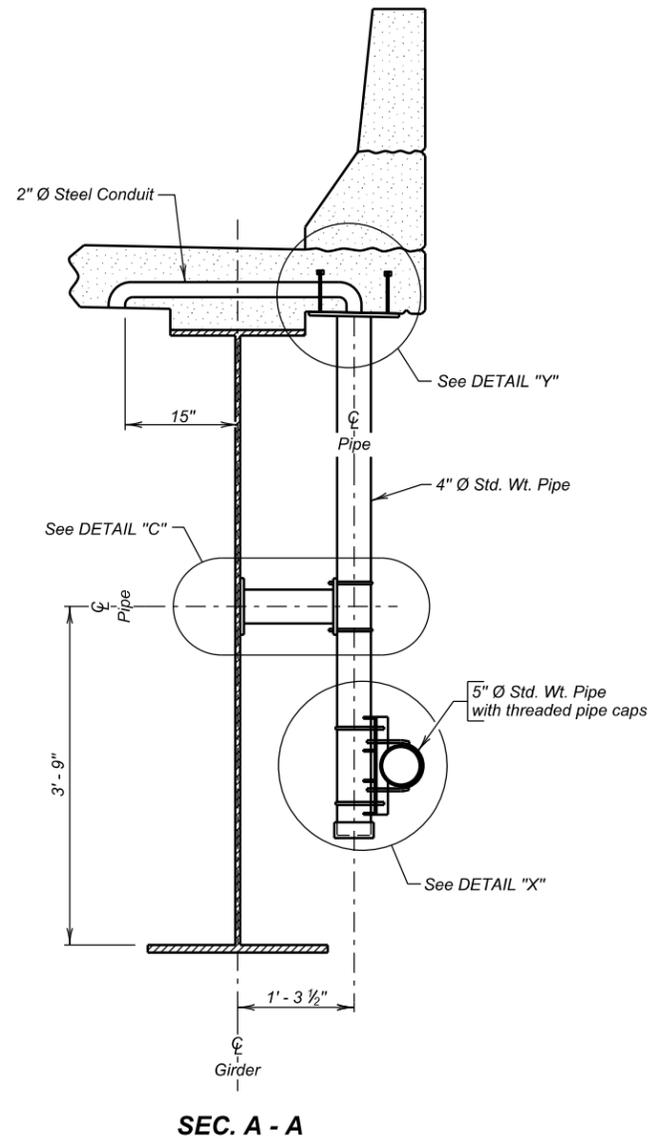
2 - 41' - 0" ROADWAYS
OVER NORTH STREET
STA. 112 + 80.78 TO STA. 114 + 89.36
STR. NO. 52-409-294

15° R.H.F. SKEW
SEC. 35-T2N-R7E
IM 1902(61)0
HL-93

DESIGNED BY DM PENN1162	CK. DES. BY PW 1162TA28	DRAFTED BY BT	Kevin N. Coeden BRIDGE ENGINEER
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FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E31	E74



SIGNAL BRACKET DETAILS (A)
FOR

208' - 7" COMP. STEEL GIRDER BRIDGE
 2 - 41' - 0" ROADWAYS
 OVER NORTH STREET
 STA. 112 + 80.78 TO STA. 114 + 89.36
 STR. NO. 52-409-294

15° R.H.F. SKEW
 SEC. 35-T2N-R7E
 IM 1902(61)0
 HL-93

NOTES:

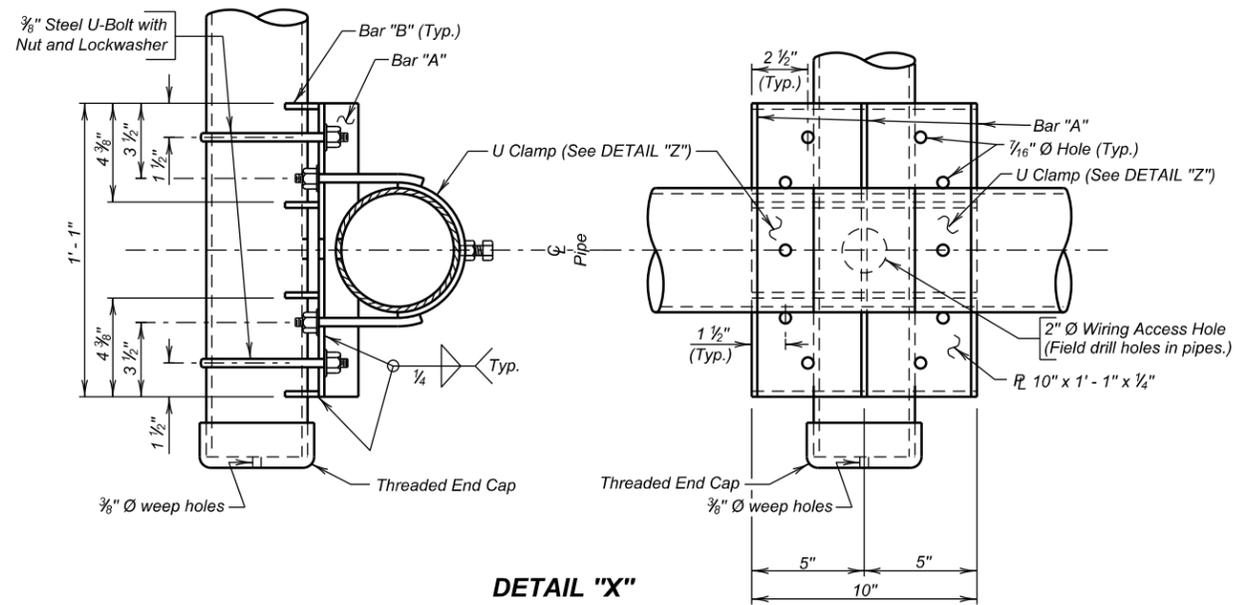
1. See Section L for signal & sign locations.
2. For informational purposes only, the estimated weight of Structural Steel is 1671 lbs.
3. Install bolt head adjacent to the 1/16" holes in the web. Install direct tension indicators under the bolt heads.

PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION
 SEPTEMBER 2013

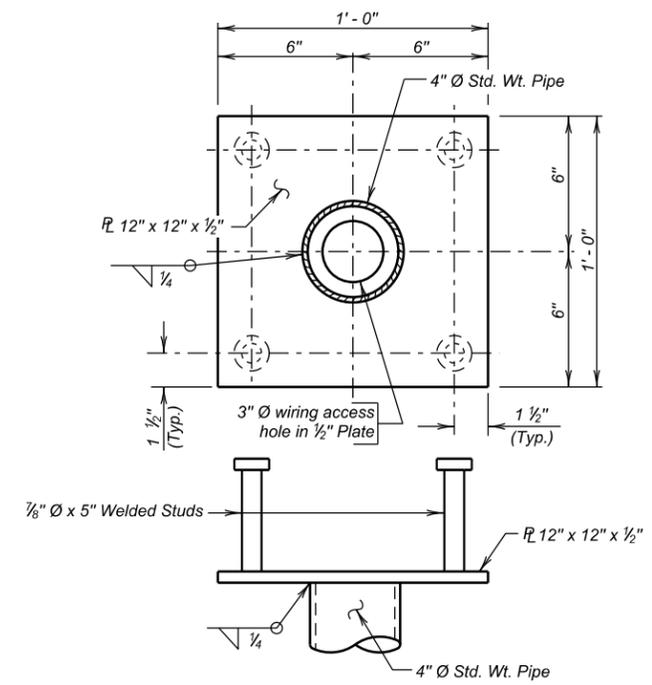
DESIGNED BY PW PENN1162	CK. DES. BY DM 1162TA29	DRAFTED BY BT	Kevin N. Goeden BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E32	E74

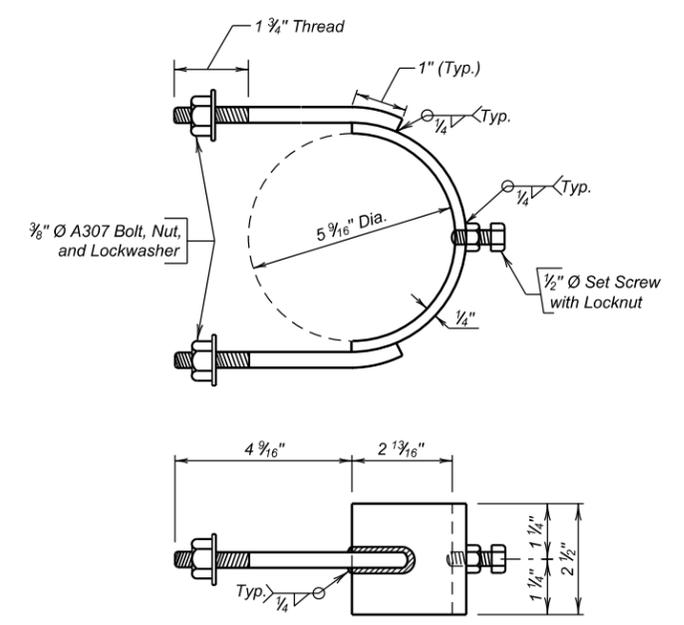
FOR BIDDING PURPOSES ONLY



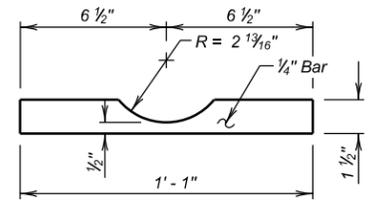
DETAIL "X"



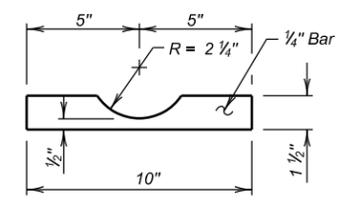
DETAIL "Y"



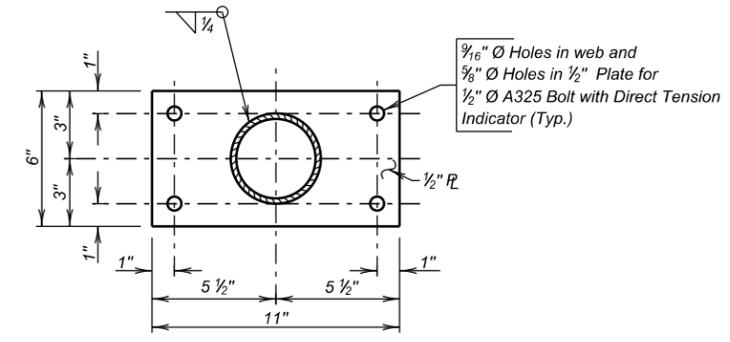
DETAIL "Z"



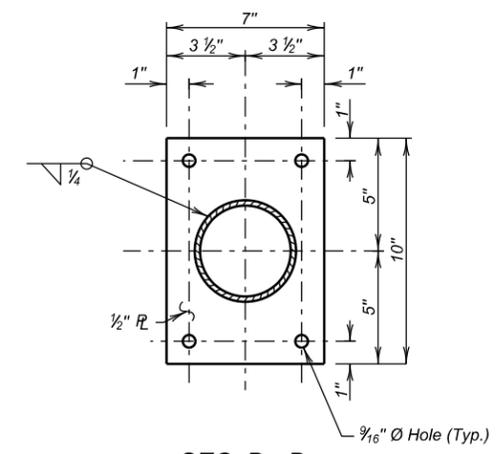
BAR "A"



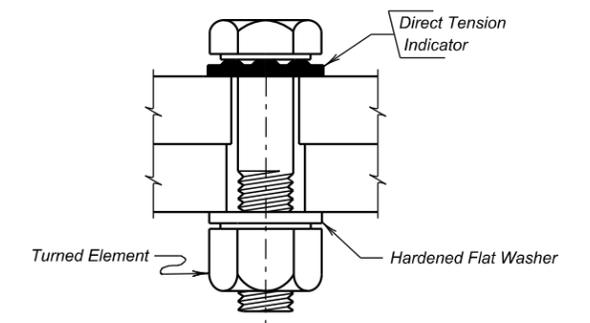
BAR "B"



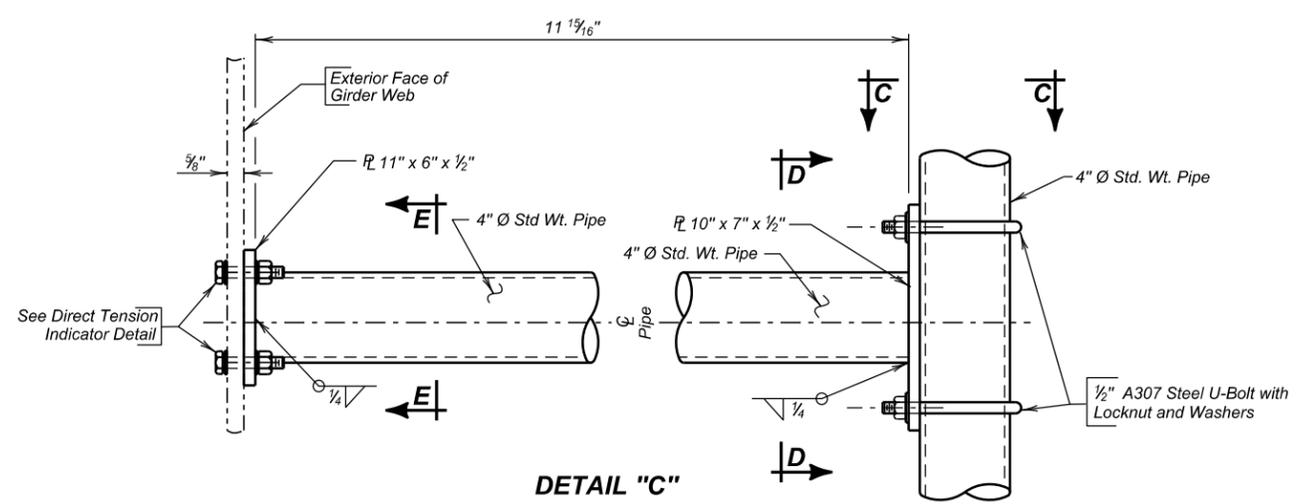
SEC. E - E



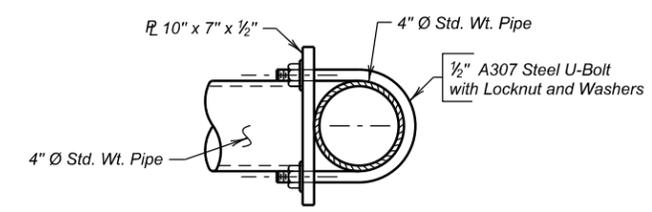
SEC. D - D



DIRECT TENSION INDICATOR DETAIL



DETAIL "C"



SEC. C - C

SIGNAL BRACKET DETAILS (B)
 FOR
208' - 7" COMP. STEEL GIRDER BRIDGE
 2 - 41' - 0" ROADWAYS
 OVER NORTH STREET
 STA. 112 + 80.78 TO STA. 114 + 89.36
 STR. NO. 52-409-294

15° R.H.F. SKEW
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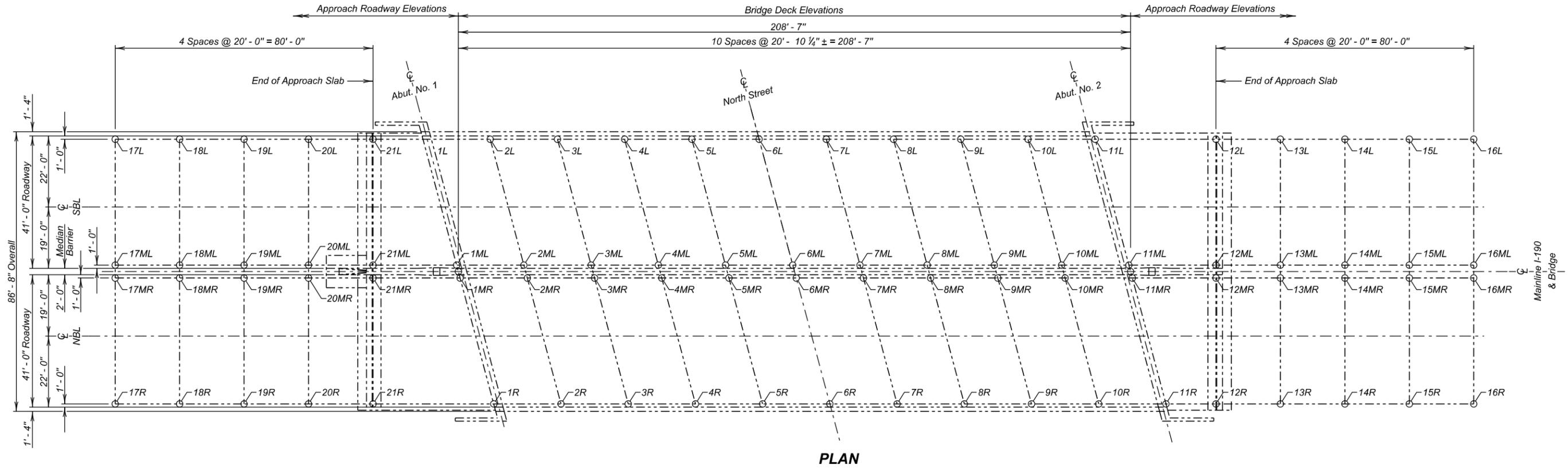
PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION
 SEPTEMBER 2013

DESIGNED BY PW PENN1162	CK. DES. BY DM 1162TA30	DRAFTED BY BT	Kevin N. Coeden 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).

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E33	E74



Location	Elevation	Location	Elevation	Location	Elevation	Location	Elevation
1L		1ML		1MR		1R	
2L		2ML		2MR		2R	
3L		3ML		3MR		3R	
4L		4ML		4MR		4R	
5L		5ML		5MR		5R	
6L		6ML		6MR		6R	
7L		7ML		7MR		7R	
8L		8ML		8MR		8R	
9L		9ML		9MR		9R	
10L		10ML		10MR		10R	
11L		11ML		11MR		11R	

Location	Elevation	Location	Elevation	Location	Elevation	Location	Elevation
12L		12ML		12MR		12R	
13L		13ML		13MR		13R	
14L		14ML		14MR		14R	
15L		15ML		15MR		15R	
16L		16ML		16MR		16R	
17L		17ML		17MR		17R	
18L		18ML		18MR		18R	
19L		19ML		19MR		19R	
20L		20ML		20MR		20R	
21L		21ML		21MR		21R	

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.

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

LOCATION	STATION - OFFSET	ELEVATION
Begin Bridge		
End Bridge		

AS-BUILT ELEVATION SURVEY
 FOR
208' - 7" COMP. STEEL GIRDER BRIDGE
 2 - 41' - 0" ROADWAYS
 OVER NORTH STREET
 STA. 112 + 80.78 TO STA. 114 + 89.36
 STR. NO. 52-409-294

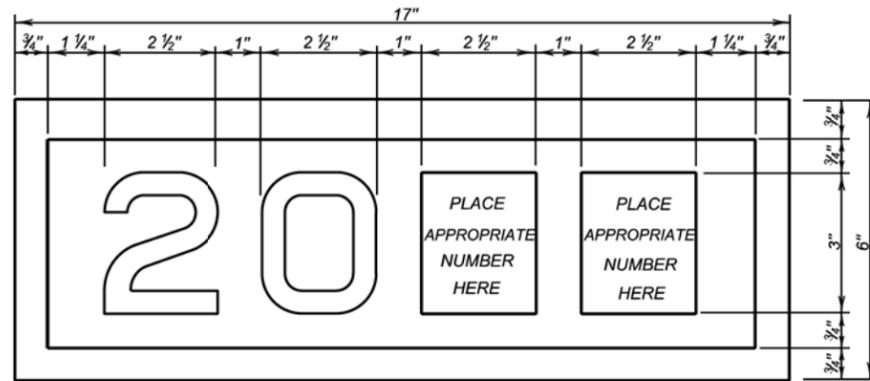
15° R.H.F. SKEW
 SEC. 35-T2N-R7E
 IM 1902(61)0
 HL-93

PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION
 SEPTEMBER 2013

DESIGNED BY: DM
 CK. DES. BY: PW
 DRAFTED BY: BT

Kevin N. Coeden
 BRIDGE ENGINEER

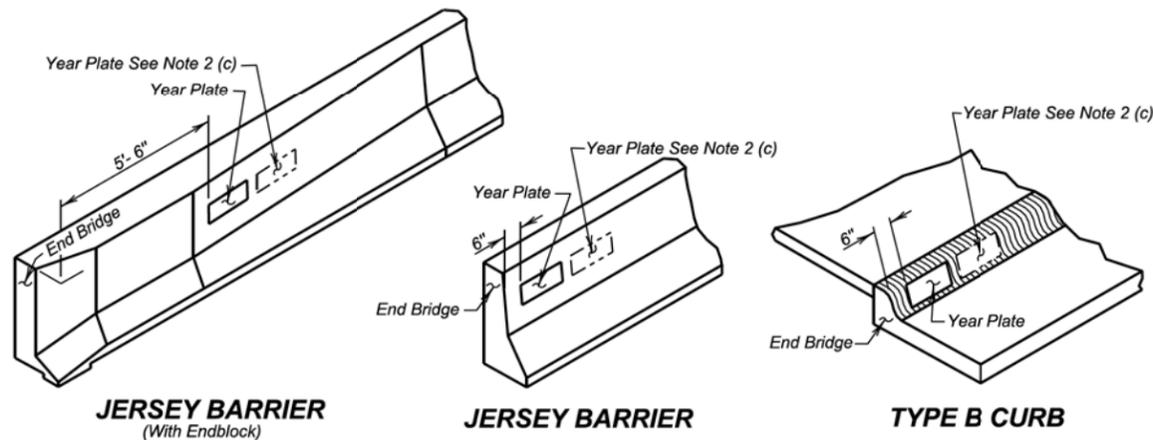
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E34	E74



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.



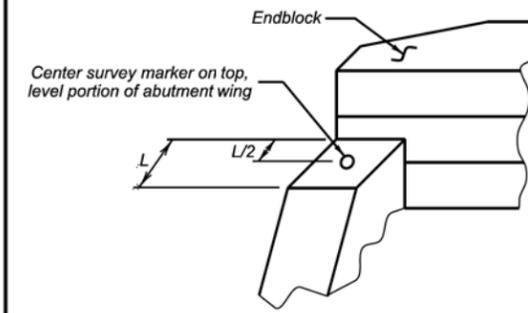
JERSEY BARRIER
(With Endblock)

JERSEY BARRIER

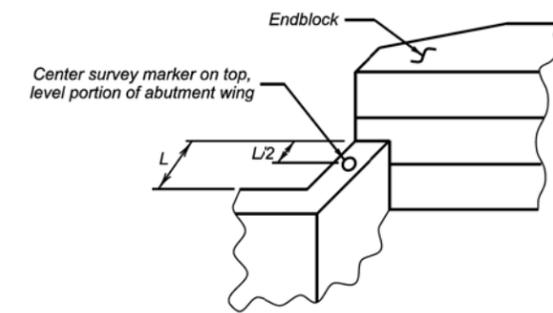
TYPE B CURB

June 26, 2012

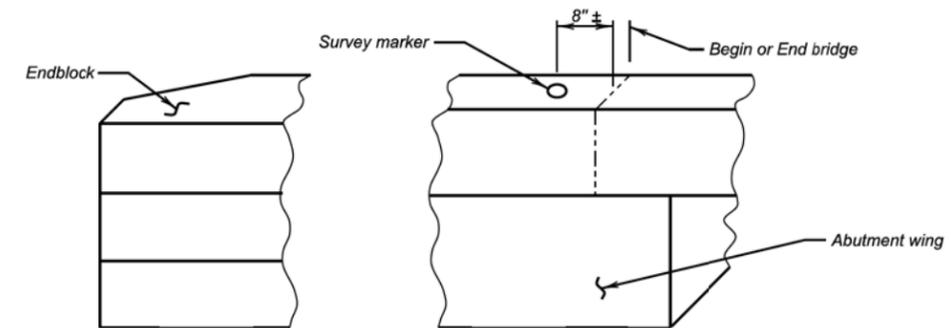
S D D O T	YEAR PLATE DETAILS	PLATE NUMBER 460.02
	Published Date: 2nd Qtr. 2015	Sheet 1 of 1



ABUTMENT WITH "STRAIGHT" WINGS



ABUTMENT WITH "SWEEP BACK" WINGS



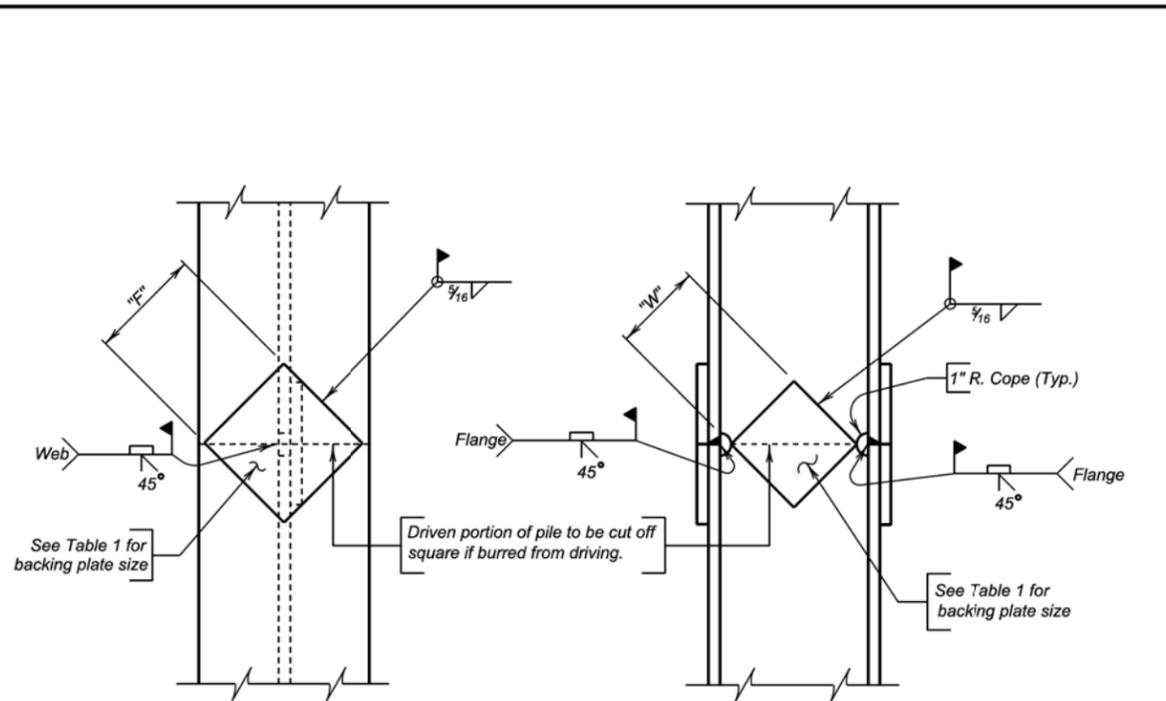
ABUTMENT WITH "SWEEP BACK" WINGS
(Endblock on top of wings)

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.

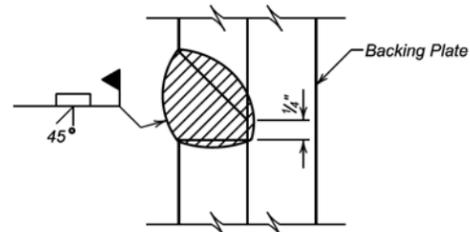
June 26, 2012

S D D O T	BRIDGE SURVEY MARKER	PLATE NUMBER 460.05
	Published Date: 2nd Qtr. 2015	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



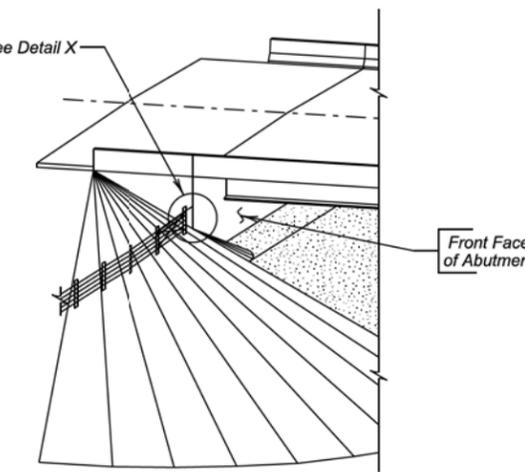
GENERAL NOTES:

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

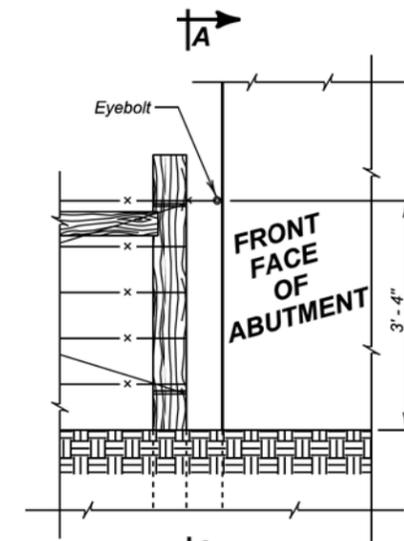
PILE	10"	12"	14"
"F" FLANGE	6 1/2"	8"	10"
"W" WEB	4 3/4"	6 1/4"	7 1/2"

December 23, 2012

S D D O T	STEEL PILE SPLICE DETAILS	PLATE NUMBER 510.40
	Published Date: 2nd Qtr. 2015	Sheet 1 of 1



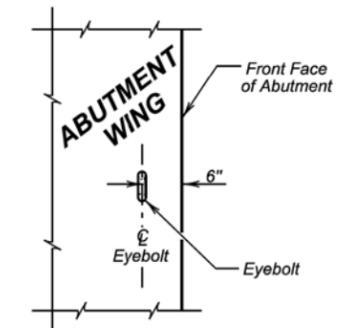
DETAILS FOR FENCE ANCHORS



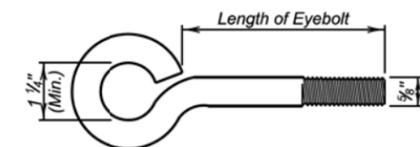
DETAIL "X"

GENERAL NOTES:

1. The fence and post details shown are for illustrative purpose only. The fence shall be as specified elsewhere in the plans.
2. Eyebolts shall be placed on all of the bridge abutment wings.
3. Eyebolts shall be 3/8 inch diameter and shall conform to ASTM A307.
4. Eyebolts shall be galvanized in accordance with AASHTO M232 (ASTM A153).
5. 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.
6. 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).
7. 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.
8. Mix epoxy resin as recommended by the Manufacturer and apply by an injection method as approved by the Engineer. Beginning at the back of the drilled holes, fill the holes 1/3 to 1/2 full of epoxy, or as recommended by the Manufacturer, prior to insertion of the 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.
9. 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.
10. The cost for furnishing and installing the eyebolts shall be incidental to various contract items.



VIEW A - A

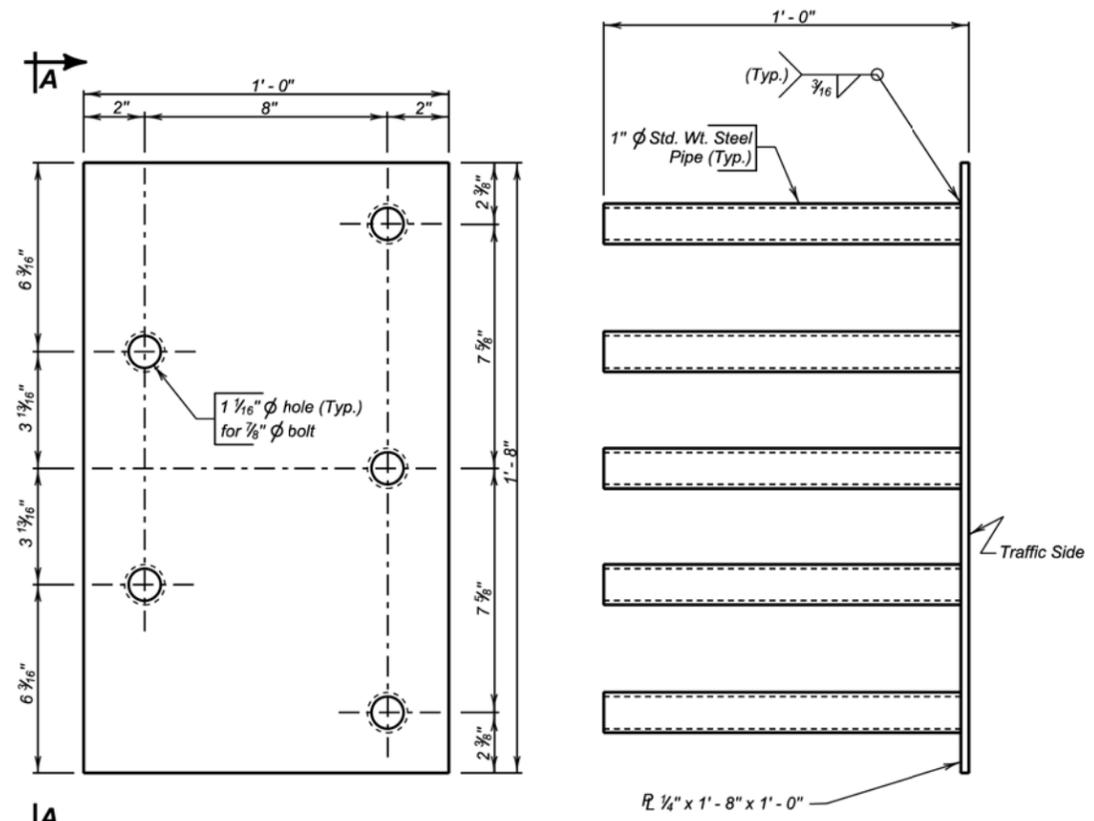


EYEBOLT DETAILS

December 23, 2012

S D D O T	FENCE ANCHORS FOR BRIDGE ABUTMENTS (SWEEP BACK WINGS)	PLATE NUMBER 620.19
	Published Date: 2nd Qtr. 2015	Sheet 1 of 1

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E36	E74



ELEVATION

VIEW A - A

GENERAL NOTES:

1. 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.
2. Welding and weld inspection shall be in conformance with AWS D1.1 - (Current Year) Structural Welding Code - Steel.
3. After fabrication, galvanize in accordance with AASHTO M111 (ASTM A123).
4. 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.
5. 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.
6. 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

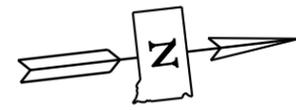
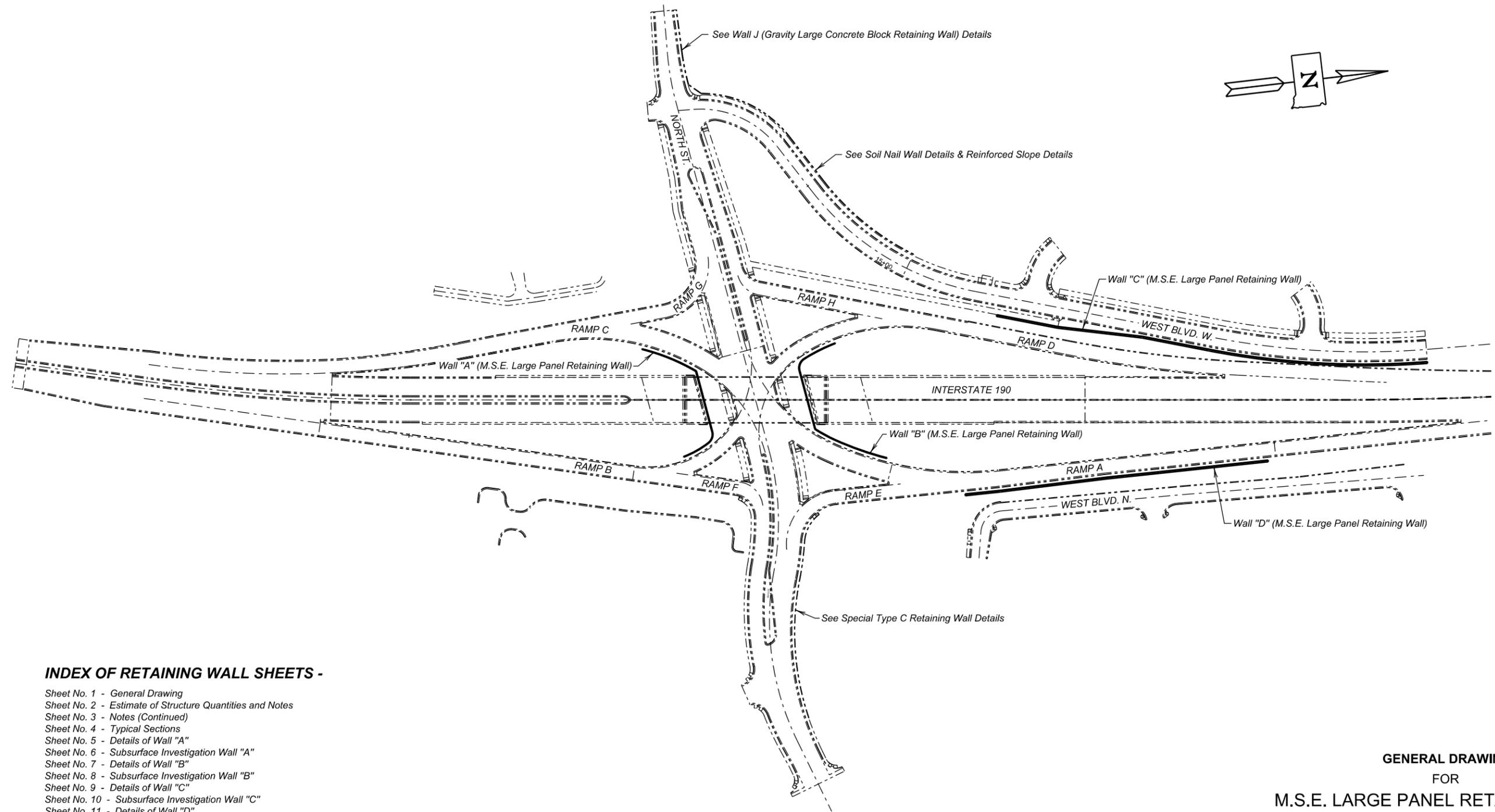
S D D O T	5 BOLT INSERT PLATE ASSEMBLY	PLATE NUMBER 630.92
		Sheet 1 of 1

Published Date: 2nd Qtr. 2015

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

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E37	E74



INDEX OF RETAINING WALL SHEETS -

- Sheet No. 1 - General Drawing
- Sheet No. 2 - Estimate of Structure Quantities and Notes
- Sheet No. 3 - Notes (Continued)
- Sheet No. 4 - Typical Sections
- Sheet No. 5 - Details of Wall "A"
- Sheet No. 6 - Subsurface Investigation Wall "A"
- Sheet No. 7 - Details of Wall "B"
- Sheet No. 8 - Subsurface Investigation Wall "B"
- Sheet No. 9 - Details of Wall "C"
- Sheet No. 10 - Subsurface Investigation Wall "C"
- Sheet No. 11 - Details of Wall "D"
- Sheet No. 12 - Subsurface Investigation Wall "D"

WALL LAYOUT

GENERAL DRAWING
 FOR
M.S.E. LARGE PANEL RETAINING WALLS
 ADJ. TO I-190 SEC. 35-T2N-R7E
 PCN 1162 IM 1902(61)0

PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION
 DECEMBER 2014

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

DESIGNED BY PW PENN1162	CK. DES. BY BB 1162TA01	DRAFTED BY BT	<i>Kevin N. Coeden</i> BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E38	E74

Δ ESTIMATE OF STRUCTURE QUANTITIES

DESCRIPTION	QUANTITY	UNIT	REMARKS
MSE Large Panel Wall, Furnish	20,261	SqFt	See Spec. Provision
MSE Large Panel Wall, Install	20,261	SqFt	See Spec. Provision
Granular Backfill for MSE Large Panel Wall	17,250	CuYd	See Spec. Provision
Footing Undercut	965	CuYd	See Spec. Provision
Geogrid Reinforcement	3,151	Sq Yd	
Structure Excavation, Retaining Wall	9,975	CuYd	

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

SPECIFICATIONS

- Design Specifications: AASHTO LRFD Bridge Design Specifications, 2014 Edition.
- Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2004 Edition and required provisions, supplemental Specifications and special provisions as included in the proposal.

MSE RETAINING WALL GENERAL NOTES

- The MSE Large Panel Retaining Walls shall be on the current approved products list located at the following website address: <http://apps.sd.gov/HC60ApprovedProducts/main.aspx>.
- The wall panel front face surface texture shall simulate a natural rock wall. Panel color shall be Davis Color Number 641 "Flagstone Brown." The wall coping color shall match the color on the coping at the intersection of I-90 and E. North St. Color may be achieved by the use of colored concrete or surface staining. Submit wall panel pattern, colors, and method of achieving colors to the Area Engineer for approval a minimum of 2 weeks prior to fabrication.
- The minimum embedment depth to the bottom of the MSE Large Panel retaining wall shall be 2.0 ft.
- Horizontal dimensions shown are measured along front face of retaining wall.
- Top of wall elevations shown are at top of precast concrete coping.
- The retaining wall shall be installed in accordance to the selected wall companies' instructions, specifications, and approved shop drawings.
- A 24-inch (minimum inside diameter) steel casing shall be installed at abutment pile locations prior to the placing and compacting of fill for construction of the proprietary walls. 46 casings are required. See bridge plans for pile and casing locations. The Contractor's method of installing casing shall be submitted to the Engineer for approval a minimum of 2 weeks prior to construction. Casings shall be cut off 3" below the bottom of the abutment. The type of casing proposed by the Contractor shall be of sufficient strength to withstand all forces including those from earth pressure and shall be approved by the Engineer. The cost of furnishing and installing the casings shall be incidental to the contract unit price per cubic yard for Granular Backfill for MSE Large Panel Wall.

- The Contractor shall take necessary precautions to prevent displacement of the casings during placing and compacting fill material within close proximity of the casings. Granular Backfill material within three feet of the casings shall be placed in lifts and compacted as directed by the Engineer to obtain required density.
- If the Designer of the MSE Large Panel Wall determines that "sliding" controls the reinforcement length during the design of the wall, the Designer shall consult the Department's Geotechnical Engineering Activity for possible alternatives that may be more economical than lengthening the reinforcement.
- A structural extension of the connection of the wall panel to the soil reinforcement shall be used whenever necessary to avoid the cutting or excessive skewing (greater than 15 degrees) of the soil reinforcements at pile casings. Soil reinforcement shall be placed a minimum of 3 inches from the steel H-pile casings.
- The required minimum reinforcement length shall be 8 feet or 80% of the wall height measured from the leveling pad to the top of the finished wall including any additional height of retained fill above the wall. The wall designer shall contact the Geotechnical Engineering Activity if the reinforcement lengths are shorter than 21 feet for Wall "A", 22 feet for Wall "B", 10 feet for Wall "C", or 18.5 feet for Wall "D".
- A layer of Type B Drainage Fabric shall be placed over the top of the Granular Backfill for MSE Large Panel Wall prior to placing any soil over the granular backfill. The intent of this fabric is to act as a separator and keep fines from intruding into the granular material. All costs in furnishing and installing the Type B Drainage Fabric shall be incidental to the contract unit price per cubic yard for Granular Backfill for MSE Large Panel Wall.
- The wall designer shall use the soil parameters provided in the plans unless prior communication and approval has been provided through the South Dakota Department of Transportation's Geotechnical Engineering Activity.
- The wall designer shall use all necessary live loads and dead loads in the design of the wall reinforcement required by AASHTO. If the designer has any questions about what loads are needed for the wall design the Geotechnical Engineering Activity shall be contacted.

UNDERDRAINS

- An underdrain system shall be installed behind the wall as shown and detailed on the Typical Sections sheet. The underdrain system shall consist of 4 inch diameter slotted corrugated polyethylene tubing installed behind the wall and 4 inch diameter corrugated polyethylene tubing from the end of the wall to the outlet as shown. Care shall be taken near the ends of the wall to ensure positive drainage.
- All costs in furnishing and installing the underdrains shall be incidental to the contract unit price per square foot for MSE Large Panel Wall, Install.

GEOGRID

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

Property	Test	MARV
Wide Width Strip		
Tensile Strength (Ultimate)	ASTM D 6637 Method B	850lb/ft MD and XD
- Geogrid will be paid for at the contract unit price per sq. yd. for Geogrid Reinforcement. Payment quantities will be based on area covered plus 15%. Overlaps are accounted for by the additional 15%. Payment will be full compensation for furnishing and installing the geogrid only. Granular backfill materials will be paid for under a different bid item.
- The geogrid shall be placed on a level surface and overlapped a minimum of 2 feet.
- The geogrid will be placed as taut as possible with minimal wrinkles. Placement will be done so that subsequent granular cover material does not shove, wrinkle or distort the in place geogrid. The overlaps will be shingled in a manner that assures granular material will not be forced under the geogrid during backfilling operations. The geogrid may be held in place with small piles of granular material or staples.
- Granular MSE backfill will be dumped at least 20 feet behind the leading edge of the backfill and pushed into place with a loader or dozer from the covered areas to the uncovered areas. No traffic will be allowed on the uncovered geogrid.
- The geogrid is not part of the M.S.E. Wall reinforcement.

ESTIMATE OF STRUCTURE QUANTITIES AND NOTES
FOR
M.S.E. LARGE PANEL RETAINING WALLS

DECEMBER 2014

2 OF 12

DESIGNED BY PW PENN1162	CK. DES. BY BB 1162TA02	DRAFTED BY BT	<i>Kevin N. Boeden</i> BRIDGE ENGINEER
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FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E39	E74

WALL "C" FOUNDATION PREPARATION

1. Foundation preparation shall consist of undercutting the MSE Large Panel Retaining Wall system as shown on the typical section. Prior to placement of the granular backfill all spoil or loose material shall be removed and the area wetted then proof rolled to ensure adequate density. The undercut shall be backfilled with granular material conforming to the specifications for aggregate base course in Section 882 of the Specifications.
2. Compaction of the material shall be governed by the Specified Density Method.
3. All costs for equipment, labor, tools, and incidentals required for the undercutting and use or disposal of the excavated material and for furnishing, placing, watering, and compacting the granular material used in the foundation preparation shall be paid for at the contract unit price per cubic yard for Footing Undercut.

WALL "D" FOUNDATION PREPARATION

1. The retaining wall will be constructed in front of an existing local roadway with buried utilities that may be affected by the retaining wall excavation.
2. Excavation for the retaining wall shall be kept to the minimum required to construct the wall. Construction of the wall shall take place as soon as possible after the excavation is completed to minimize the potential for failure of the backslope. The sequence of the construction activities shall be setup to minimize the amount of time the temporary backslope is left exposed and unsupported.
3. Excavations into the shale shall be constructed upon within a reasonable time period. If the excavation is left open to the elements (rain, sun, wind, etc.), the shale will desiccate and lose bearing and frictional capacities.
4. Based on slope stability analysis, a 0.5:1 slope for the temporary construction backslope should be stable for the duration of time required to construct the MSE retaining wall provided measures are taken to divert runoff away from the slope. The limits of the excavation should be kept to the minimum distance required to complete the work.
5. The subgrade undercut, storm sewer undercut and placement, and any additional utility work to be done in front of the wall need to take place either before or at the same time as the excavation and undercut for the MSE retaining wall. The area in front of the wall shall be backfilled to the top of the subgrade prior to construction of the MSE retaining wall.
6. Any utility work to be done behind the wall within the area of the anticipated excavation backslope shall be coordinated with the construction of the retaining wall to mitigate any possible undermining during construction of the MSE retaining wall.
7. Foundation preparation shall consist of undercutting the MSE Large Panel Retaining Wall system as shown on the typical section. Prior to placement of the granular backfill all spoil or loose material shall be removed and the area proof rolled to ensure adequate density. The undercut shall be backfilled with granular material conforming to the specifications for aggregate base course in Section 882 of the Specifications.
8. Compaction of the material shall be governed by the Specified Density Method.

9. All costs for equipment, labor, tools, and incidentals required for the undercutting and use or disposal of the excavated material and for furnishing, placing, watering, and compacting the granular material used in the foundation preparation shall be paid for at the contract unit price per cubic yard for Footing Undercut.

LATERAL RETAINMENT

The MSE wall backfill will need to be retained laterally at the construction joint locations shown in the plans during phase construction. Lateral retention shall be as shown in the plans. Payment for materials, equipment, and labor necessary to construct the lateral retention shall be incidental to the contract unit price for Granular Backfill for MSE Large Panel Wall.

NOTES (CONTINUED)
FOR

M.S.E. LARGE PANEL RETAINING WALLS

DECEMBER 2014

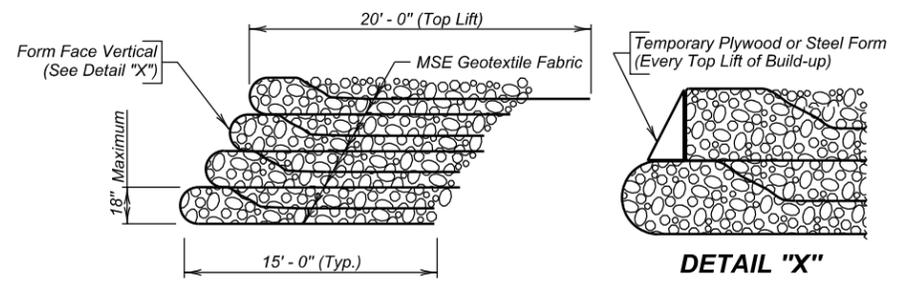
3 OF 12

DESIGNED BY PW PENN1162	CK. DES. BY BB 1162TA03	DRAFTED BY BT	<i>Kevin N. Coeden</i> BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E40	E74

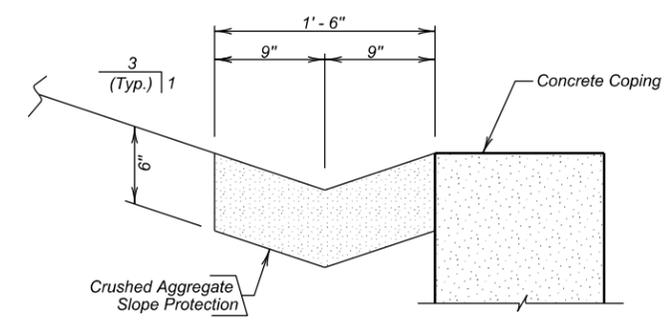
FOR BIDDING PURPOSES ONLY

NOTE: Geotextile Fabric shall not be placed on MSE reinforcing strips/mesh.

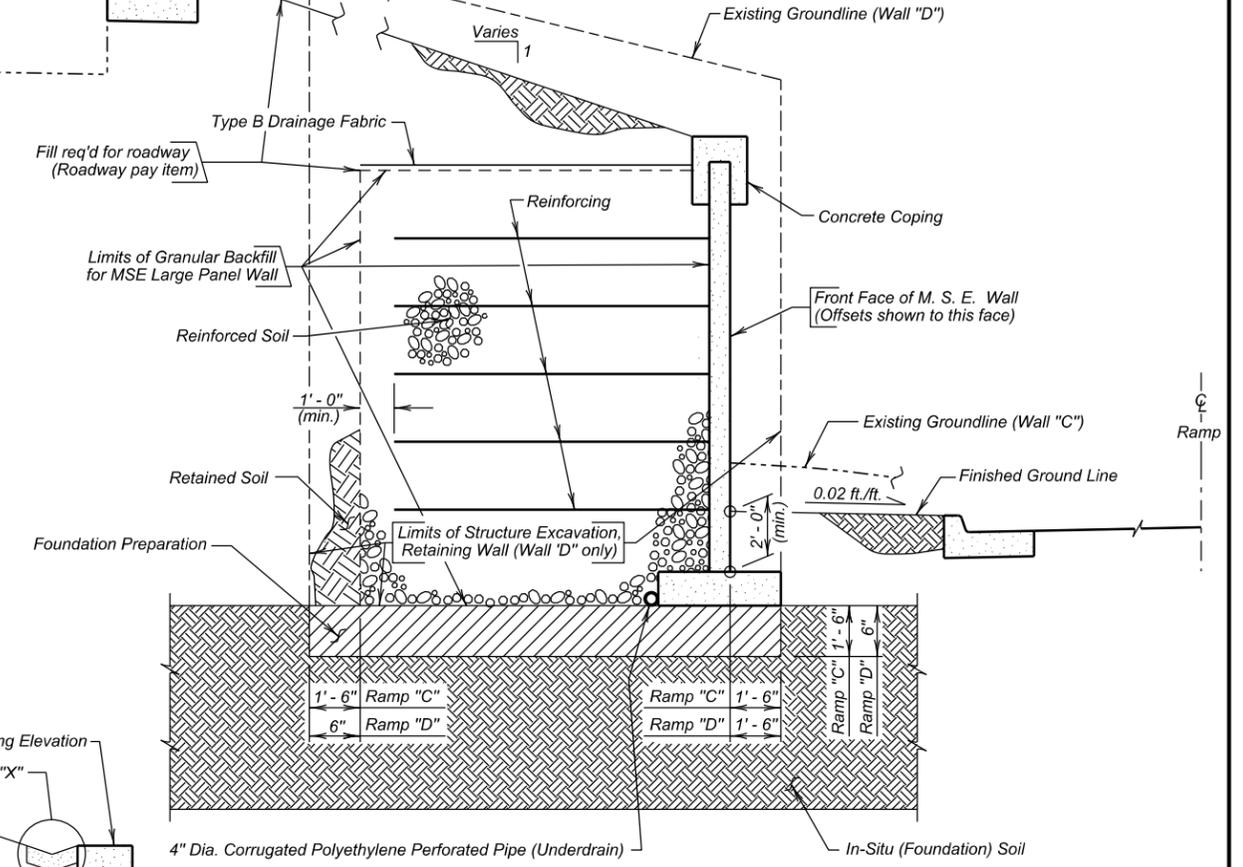


LATERAL RETAINMENT DETAIL
(For Phase Construction)

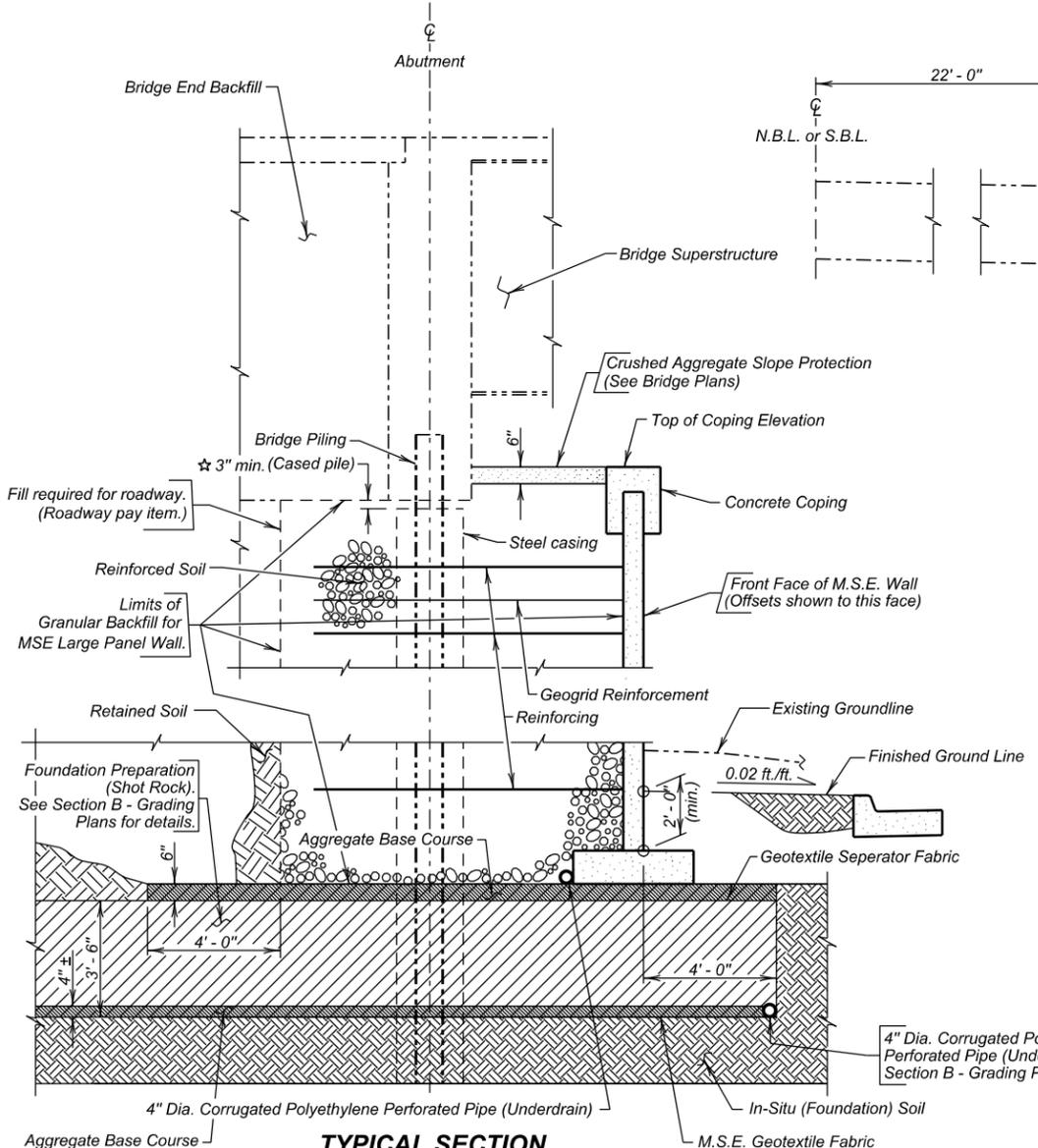
☆ See M.S.E. LARGE PANEL RETAINING WALL NOTES



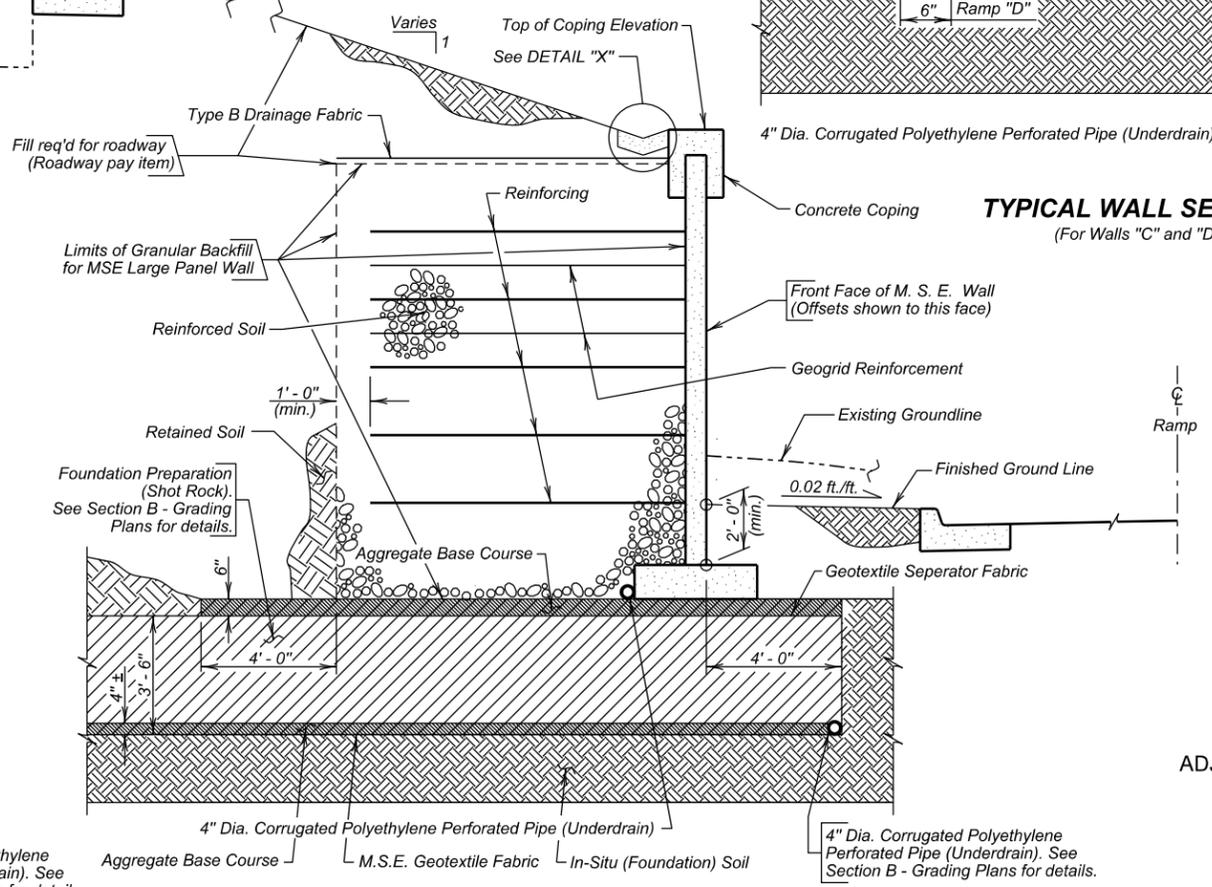
DETAIL "X"



TYPICAL WALL SECTION
(For Walls "C" and "D" only)



TYPICAL SECTION
(Parallel to Roadway at Bridge)
(For Walls "A" and "B" only)



TYPICAL WALL SECTION
(For Walls "A" and "B" only)

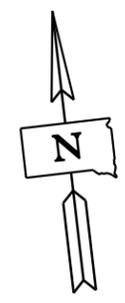
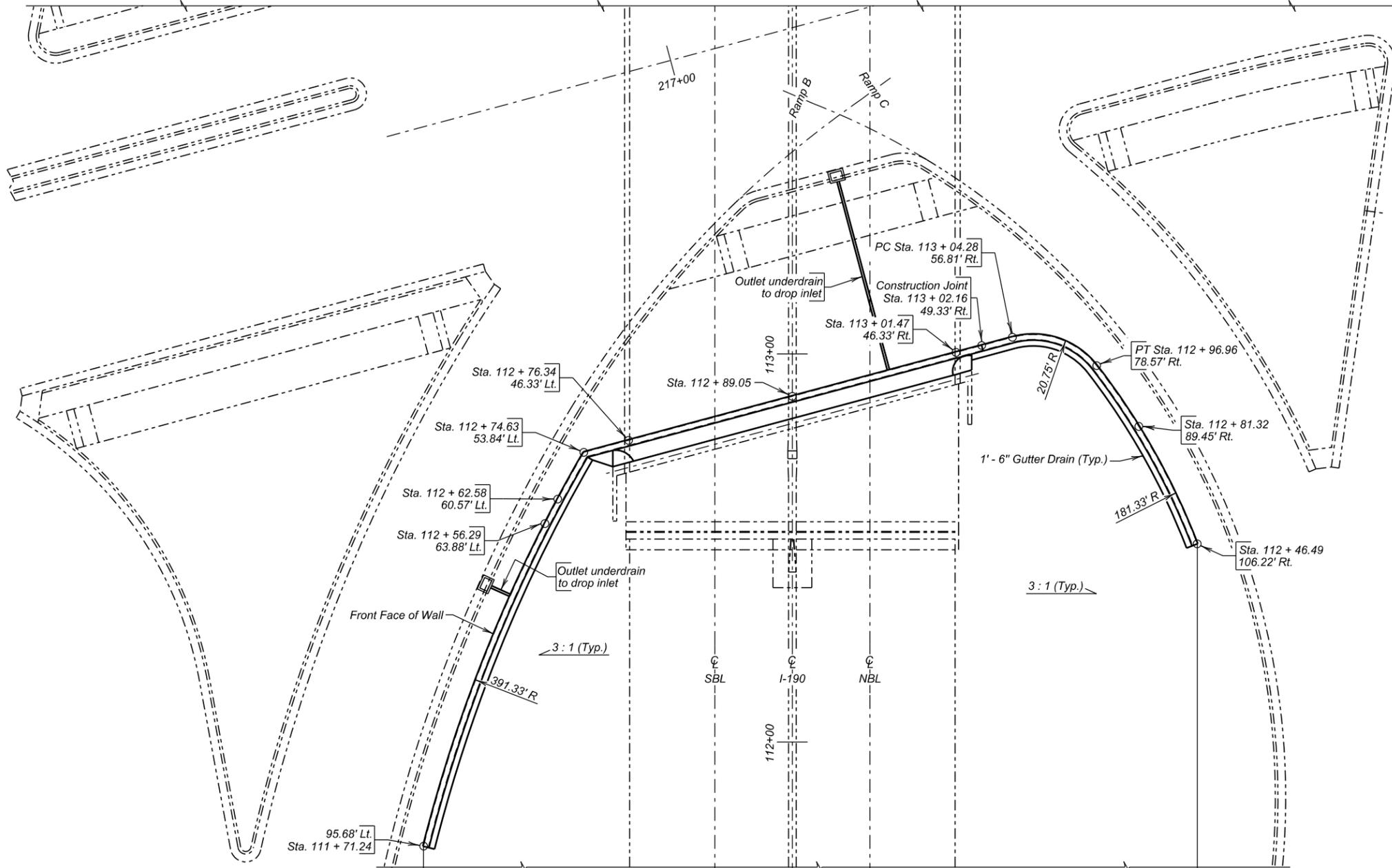
TYPICAL SECTIONS FOR M.S.E. LARGE PANEL RETAINING WALLS
ADJ. TO I-190 SEC. 35-T2N-R7E IM 1902(61)0

PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2014

DESIGNED BY PW PENN1162	CK. DES. BY BB 1162TA04	DRAFTED BY BT	Kevin N. Goeden BRIDGE ENGINEER
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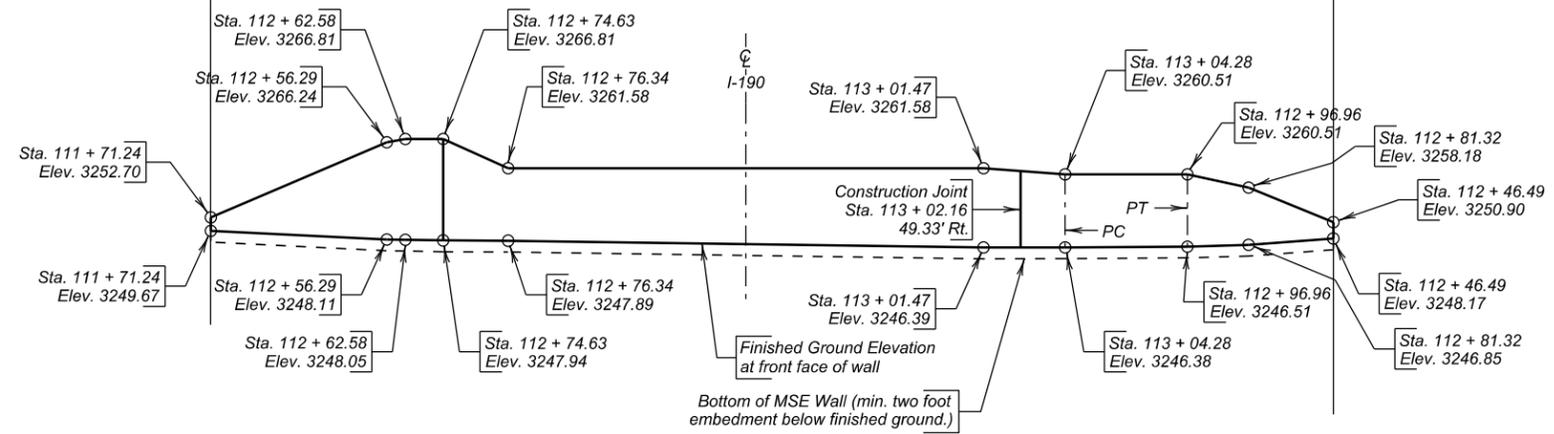
FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E41	E74



ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
MSE Large Panel Wall, Furnish	Sq. Ft.	3883
MSE Large Panel Wall, Install	Sq. Ft.	3883
Granular Backfill for MSE Large Panel Wall	Cu. Yd.	3667
Geogrid Reinforcement	Sq. Yd.	1440

PLAN



ELEVATION

DETAILS OF WALL "A"
 FOR
 M.S.E. LARGE PANEL RETAINING WALLS
 ADJ. TO I-190 SEC. 35-T2N-R7E
 STA. 111 + 71.24 TO STA. 113 + 04.28 IM 1902(61)0

PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION
 DECEMBER 2014

DESIGNED BY PW PENN1162	CK. DES. BY BB 1162TA05	DRAFTED BY BT	Kevin N. Coeden BRIDGE ENGINEER
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FOR BIDDING PURPOSES ONLY

Retained Soil Parameters:

Friction Angle $\Phi = 24^\circ$
 Cohesion $c = 50$ psf
 Wet Unit Weight $\gamma_w = 128$ psf

Reinforced Soil Parameters:

Friction Angle $\Phi = 34^\circ$
 Cohesion $c = 0$ psf
 Wet Unit Weight $\gamma_w = 105$ psf

Shot Rock Soil Parameters:

Friction Angle $\Phi = 40^\circ$
 Cohesion $c = 0$ psf
 Wet Unit Weight $\gamma_w = 125$ psf

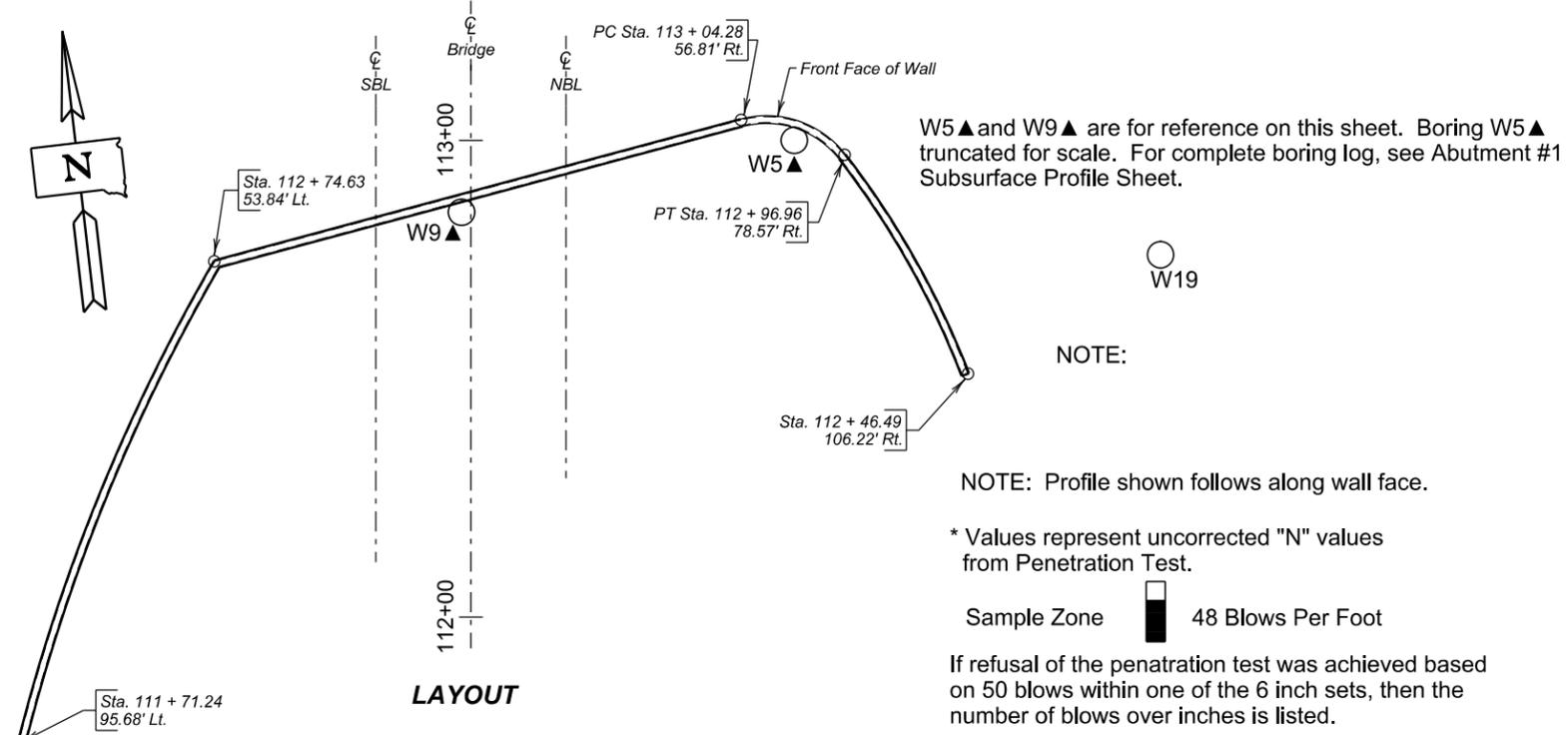
Aggregate Base Course Parameters:

Friction Angle $\Phi = 32^\circ$
 Cohesion $c = 0$ psf
 Wet Unit Weight $\gamma_w = 135$ psf

Foundation Soil Parameters (Alluvium):

Factored Bearing Resistance $R_r = 5,000$ psf
 Friction Angle $\Phi = 28^\circ$
 Cohesion $c = 300$ psf
 Wet Unit Weight $\gamma_w = 110$ psf

Hole Number	Station	Depth	Soil Color	Classification	Strength (Q _u)	Dry Density	Wet Density	Moisture	Pass No. 10	Pass No. 40	Pass No. 200	Sand Content	Silt Content	Clay Content
W11	111+98	5.2 ft	Gray/Brown	Clay	-----	-----	-----	18.0 %	99.7 %	99.7 %	96.2 %	3.6 %	23.8 %	72.4 %
W9	112+85	7.7 ft	Brown	Silt-Clay	-----	-----	-----	13.3 %	99.8 %	98.9 %	78.0 %	21.8 %	39.9 %	38.1 %
W9	112+85	13.0 ft	Brown	Clay	8,328	104.6	123.8	18.4 %	98.6 %	96.7 %	85.9 %	12.7 %	32.4 %	53.4 %
W5	113+00	5.5 ft	Brown	Silt-Sand	-----	-----	-----	5.4 %	74.2 %	67.4 %	28.1 %	46.1 %	17.6 %	10.5 %
W5	113+00	10.5 ft	Brown	Clay-Silt	1,216	96.4	111.9	16.0 %	100.0 %	99.7 %	66.6 %	33.3 %	38.4 %	28.2 %
W19	113+00	5.2 ft	Brown	Clay-Silt	-----	-----	-----	6.6 %	93.8 %	91.0 %	62.5 %	31.3 %	39.4 %	23.1 %



W5▲ and W9▲ are for reference on this sheet. Boring W5▲ truncated for scale. For complete boring log, see Abutment #1 Subsurface Profile Sheet.

NOTE:

NOTE: Profile shown follows along wall face.

* Values represent uncorrected "N" values from Penetration Test.

Sample Zone 48 Blows Per Foot

If refusal of the penetration test was achieved based on 50 blows within one of the 6 inch sets, then the number of blows over inches is listed.

Mowry Shale is a marine shale with a textural classification that varies from silt-clay to clay-silt. Color varies from gray to black. Bentonite zones may be encountered throughout. Nonweathered Mowry Shale is considered to be "Soft Rock".

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

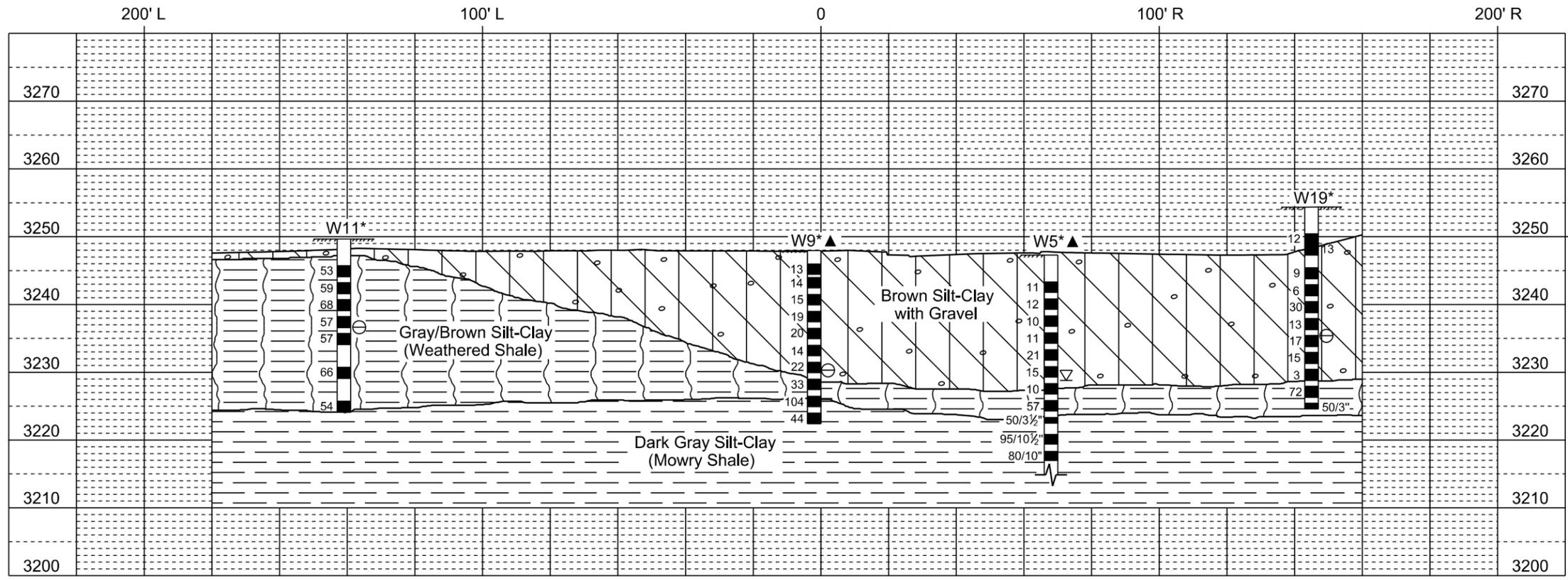
- Penetration Test
- ▽ Water
- ⊖ Caved
- Sample Zone

Penetration test holes are drilled with a 6 5/8 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.

GROUND WATER ELEVATIONS

as of MARCH 2013

W5	3228.8
W9	(DRY) 3230.5
W11	(DRY) 3236.7
W19	(DRY) 3235.4



SUBSURFACE INVESTIGATION WALL "A"

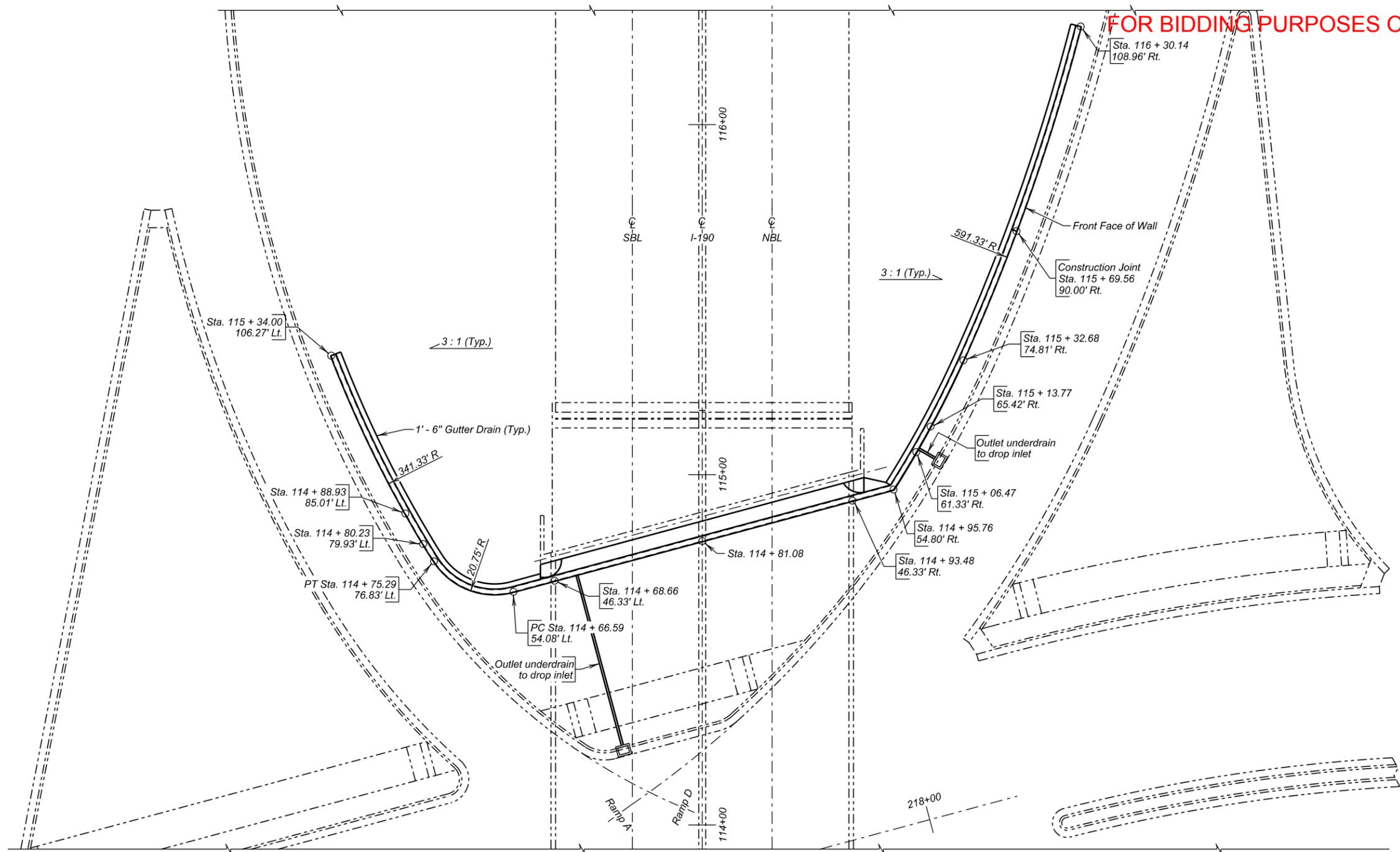
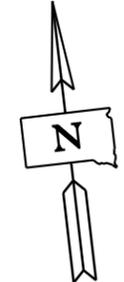
FOR
M.S.E. LARGE PANEL RETAINING WALLS
 ADJ. TO I-190 SEC. 35-T2N-R7E
 STA. 111 + 71.24 TO STA. 113 + 04.28 IM 1902(61)0

PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION

DECEMBER 2014 6 OF 12

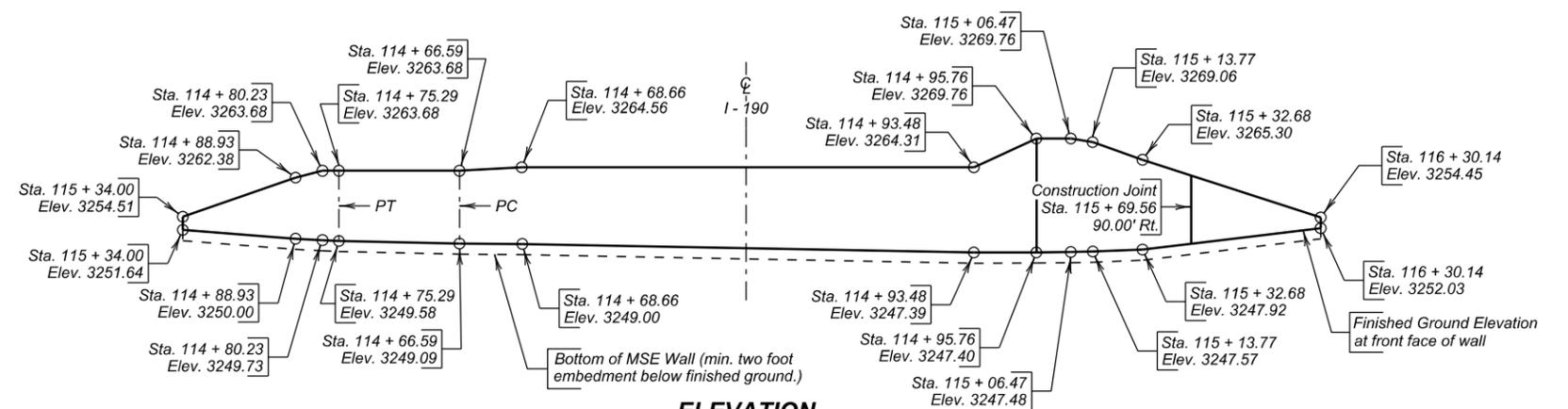
DESIGNED BY PW PENN1162	CK. DES. BY BB 1162TA06	DRAFTED BY BT	<i>Kevin N. Goeden</i> BRIDGE ENGINEER
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FOR BIDDING PURPOSES ONLY



PLAN

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
MSE Large Panel Wall, Furnish	Sq. Ft.	4717
MSE Large Panel Wall, Install	Sq. Ft.	4717
Granular Backfill for MSE Large Panel Wall	Cu. Yd.	4615
Geogrid Reinforcement	Sq. Yd.	1711



ELEVATION

DETAILS OF WALL "B"
 FOR
M.S.E. LARGE PANEL RETAINING WALLS
 ADJ. TO I-190 SEC. 35-T2N-R7E
 STA. 114 + 66.59 TO STA. 116 + 30.14 IM 1902(61)0

PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION
 DECEMBER 2014

DESIGNED BY PW PENN1162	CK. DES. BY BB 1162TB07	DRAFTED BY BT	<i>Kevin N. Coeden</i> BRIDGE ENGINEER
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FOR BIDDING PURPOSES ONLY

Hole Number	W18	Hole Number	W3	Hole Number	W3
Station	115+12	Station	114+78	Station	114+78
Depth	7.0 ft	Depth	5.5 ft	Depth	8.0 ft
Soil Color	Brown	Soil Color	Brown	Soil Color	Brown
Classification	Silt-Sand	Classification	Sand Gravel	Classification	Silt-Clay
Strength (Q _u)	----- psf	Strength (Q _u)	----- psf	Strength (Q _u)	----- psf
Dry Density	----- pcf	Dry Density	----- pcf	Dry Density	----- pcf
Wet Density	----- pcf	Wet Density	----- pcf	Wet Density	----- pcf
Moisture	4.6 %	Moisture	3.7 %	Moisture	21.2 %
Pass No. 10	95.8 %	Pass No. 10	44.0 %	Pass No. 10	99.9 %
Pass No. 40	94.1 %	Pass No. 40	36.9 %	Pass No. 40	99.8 %
Pass No. 200	34.7 %	Pass No. 200	14.8 %	Pass No. 200	81.7 %
Sand Content	61.1 %	Sand Content	29.2 %	Sand Content	18.3 %
Silt Content	22.6 %	Silt Content	8.7 %	Silt Content	39.7 %
Clay Content	12.1 %	Clay Content	6.2 %	Clay Content	42.0 %

Hole Number	W7	Hole Number	W7	Hole Number	W25
Station	114+97	Station	114+97	Station	116+38
Depth	5.2 ft	Depth	13.0 ft	Depth	25.5 ft
Soil Color	Brown/Gray	Soil Color	Reddish Brown	Soil Color	Brown
Classification	Sand-Clay	Classification	Sand-Clay	Classification	Sand-Clay
Strength (Q _u)	----- psf	Strength (Q _u)	906.5 psf	Strength (Q _u)	4,960 psf
Dry Density	----- pcf	Dry Density	102.5 pcf	Dry Density	106.2 pcf
Wet Density	----- pcf	Wet Density	124.3 pcf	Wet Density	123.7 pcf
Moisture	16.9 %	Moisture	21.3 %	Moisture	16.5 %
Pass No. 10	78.1 %	Pass No. 10	78.5 %	Pass No. 10	80.3 %
Pass No. 40	69.2 %	Pass No. 40	73.9 %	Pass No. 40	76.2 %
Pass No. 200	55.6 %	Pass No. 200	56.8 %	Pass No. 200	61.8 %
Sand Content	22.5 %	Sand Content	21.8 %	Sand Content	18.4 %
Silt Content	15.0 %	Silt Content	23.8 %	Silt Content	24.4 %
Clay Content	40.6 %	Clay Content	33.0 %	Clay Content	37.4 %

Mowry Shale is a marine shale with a textural classification that varies from silt-clay to clay-silt. Color varies from gray to black. Bentonite zones may be encountered throughout. Nonweathered Mowry Shale is considered to be "Soft Rock".

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
- ▽ Water
- ⊖ Caved
- Sample Zone

Penetration test holes are drilled with a 6 5/8 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.

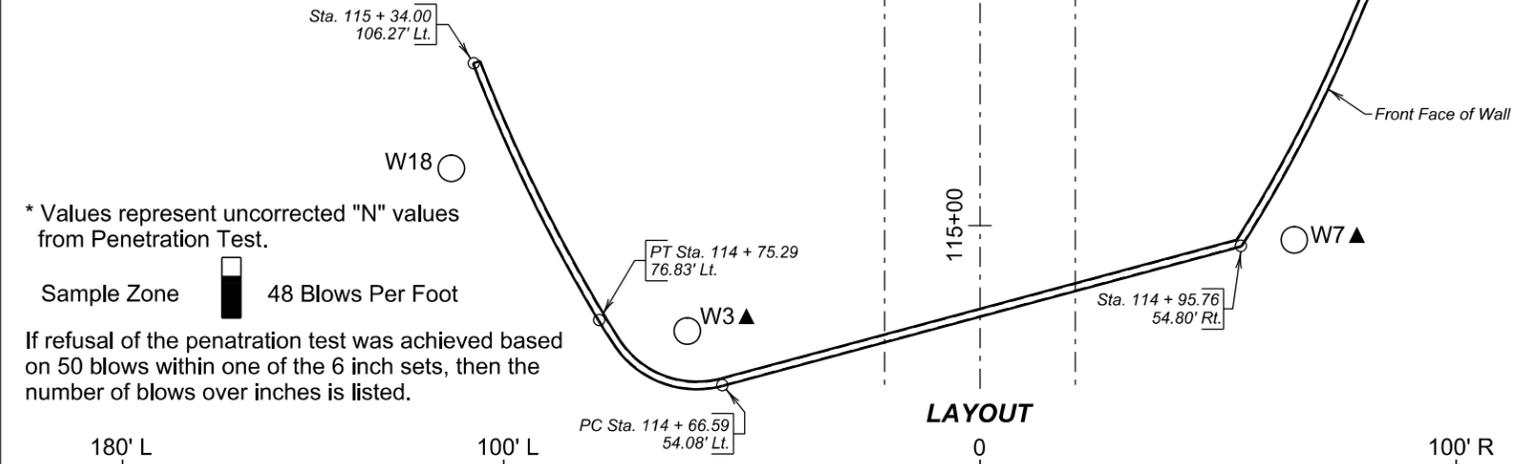
GROUND WATER ELEVATIONS

as of MARCH 2013

W3	3237.0
W7	3236.8
W18	3237.1
W25	(DRY) 3241.6

NOTE: W3▲ and W7▲ are for reference on this sheet. Borings truncated for scale. For complete boring log, see Abutment #2 Subsurface Profile Sheet.

NOTE: Profile shown follows along wall face.



Retained Soil Parameters:

Friction Angle	Φ = 24°
Cohesion	c = 50 psf
Wet Unit Weight	Y _w = 128 psf

Reinforced Soil Parameters:

Friction Angle	Φ = 34°
Cohesion	c = 0 psf
Wet Unit Weight	Y _w = 105 psf

Aggregate Base Course Parameters:

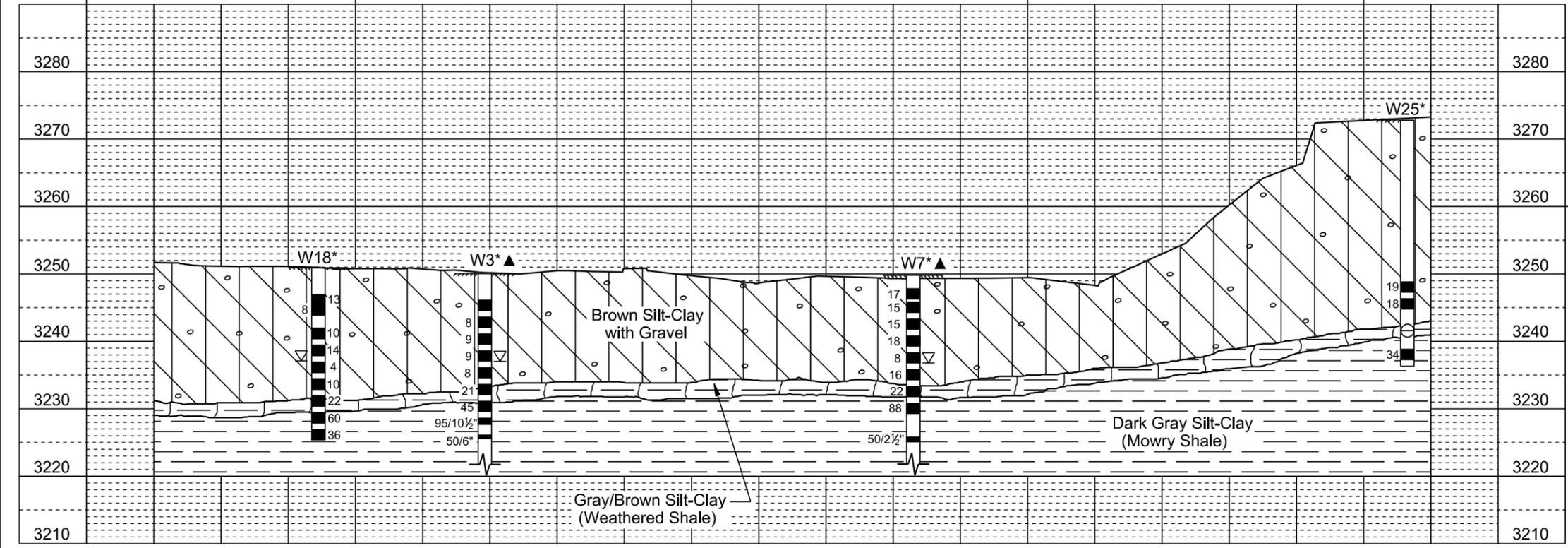
Friction Angle	Φ = 32°
Cohesion	c = 0 psf
Wet Unit Weight	Y _w = 135 psf

Shot Rock Soil Parameters:

Friction Angle	Φ = 40°
Cohesion	c = 0 psf
Wet Unit Weight	Y _w = 125 psf

Foundation Soil Parameters (Alluvium):

Factored Bearing Resistance	R _r = 5,000 psf
Friction Angle	Φ = 28°
Cohesion	c = 300 psf
Wet Unit Weight	Y _w = 110 psf



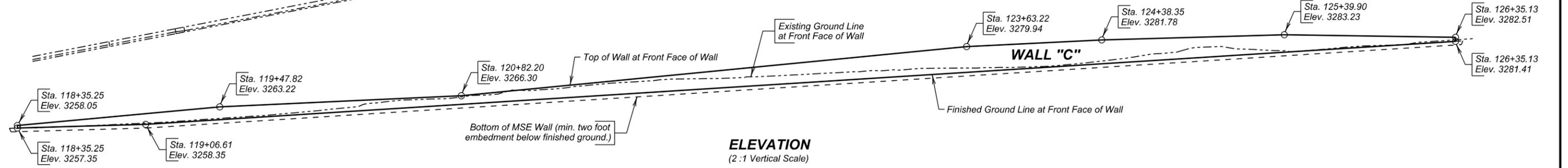
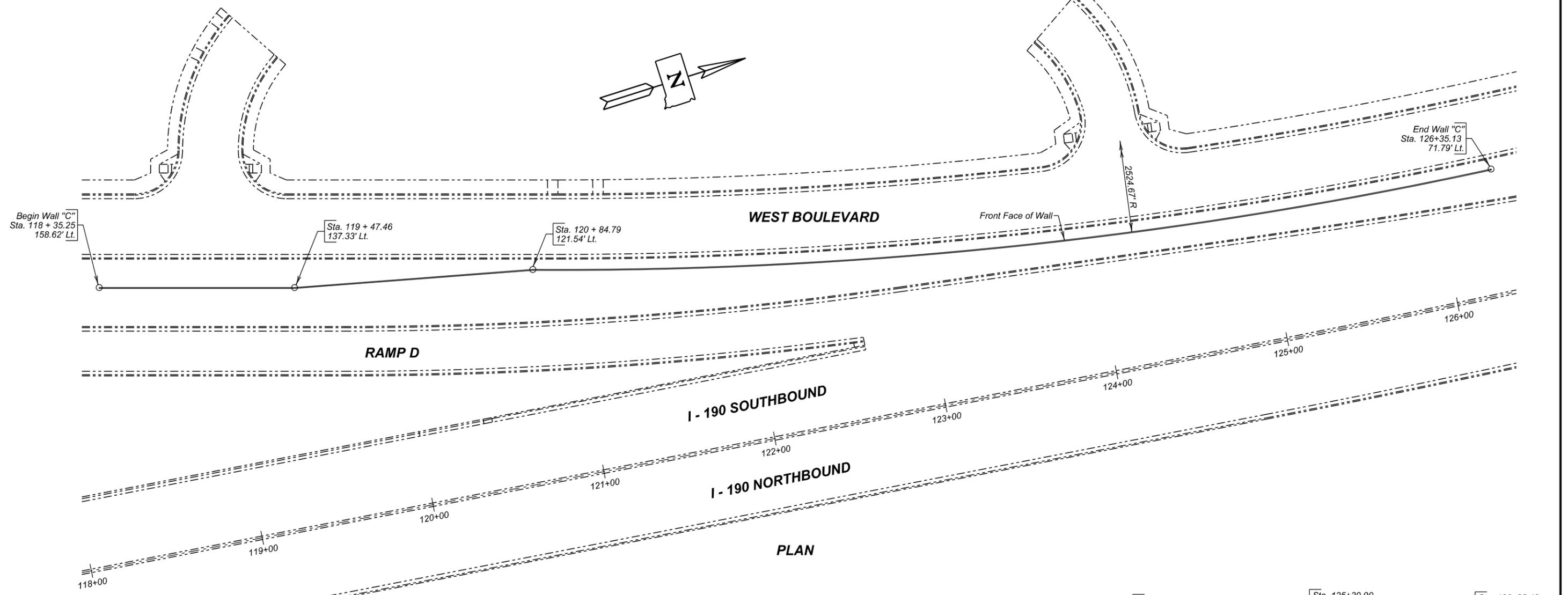
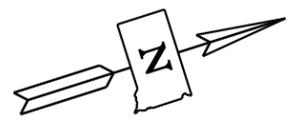
SUBSURFACE INVESTIGATION WALL "B"

FOR
M.S.E. LARGE PANEL RETAINING WALLS
 ADJ. TO I-190 SEC. 35-T2N-R7E
 STA. 114 + 66.59 TO STA. 116 + 30.14 IM 1902(61)0

PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION
 DECEMBER 2014

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E45	E74

FOR BIDDING PURPOSES ONLY



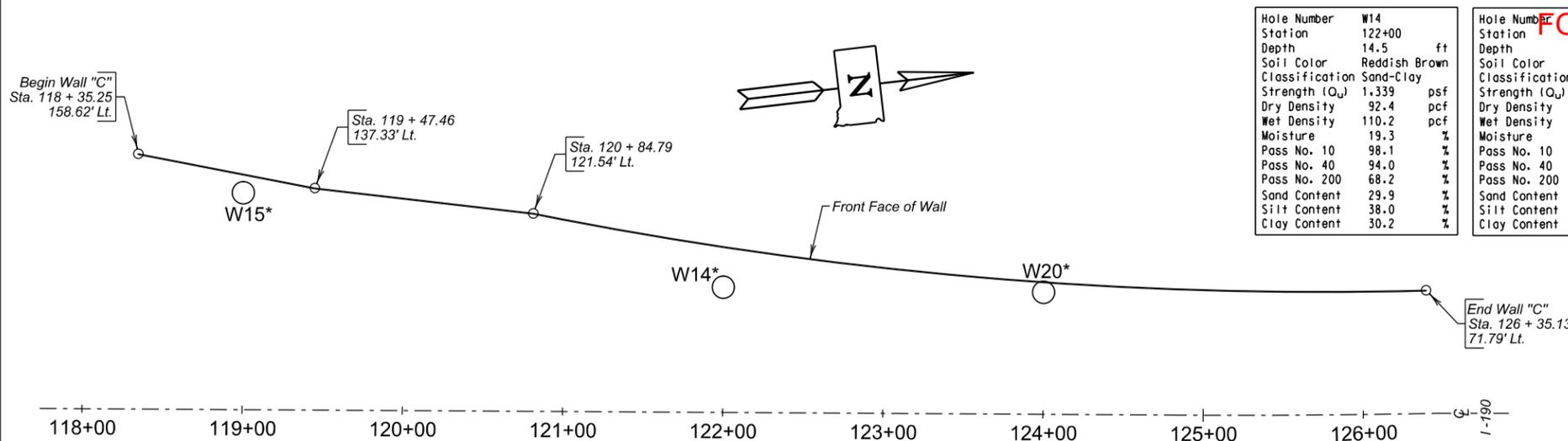
ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
MSE Large Panel Wall, Furnish	Sq. Ft.	3398
MSE Large Panel Wall, Install	Sq. Ft.	3398
Granular Backfill for MSE Large Panel Wall	Cu. Yd.	2040
Footing Undercut	Cu. Yd.	684

DETAILS OF WALL "C"
 FOR
M.S.E. LARGE PANEL RETAINING WALLS
 ADJ. TO I-190 SEC. 35-T2N-R7E
 STA. 118 + 35.25 TO STA. 126 + 35.13 IM 1902(61)0

PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION
 DECEMBER 2014

DESIGNED BY PW PENN1162	CK. DES. BY BB 1162C09	DRAFTED BY BT	Kevin N. Coeden BRIDGE ENGINEER
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FOR BIDDING PURPOSES ONLY



Hole Number	Station	Depth	Soil Color	Classification	Strength (Q _u)	Dry Density	Wet Density	Moisture	Pass No. 10	Pass No. 40	Pass No. 200	Sand Content	Silt Content	Clay Content
W14	122+00	14.5 ft	Reddish Brown	Sand-Clay	1,339 psf	92.4 pcf	110.2 pcf	19.3 %	98.1 %	94.0 %	68.2 %	29.9 %	38.0 %	30.2 %
W15	119+00	6.7 ft	Brown	Sand-Clay	2,172 psf	99.6 pcf	114.6 pcf	3.4 %	89.9 %	84.2 %	55.1 %	34.8 %	23.8 %	31.3 %
W20	124+00	5.5 ft	Tan/Brown	Sand Gravel	----- psf	----- pcf	----- pcf	3.4 %	43.8 %	37.2 %	21.1 %	22.7 %	12.0 %	9.1 %

Retained Soil Parameters:

Friction Angle	Φ =	24°
Cohesion	c =	50 psf
Wet Unit Weight	Y _w =	128 psf

Reinforced Soil Parameters:

Friction Angle	Φ =	34°
Cohesion	c =	0 psf
Wet Unit Weight	Y _w =	105 psf

* Values represent uncorrected "N" values from Penetration Test.

Sample Zone 48 Blows Per Foot

If refusal of the penetration test was achieved based on 50 blows within one of the 6 inch sets, then the number of blows over inches is listed.

Foundation Soil Parameters (Alluvium):

Factored Bearing Resistance	R _r =	2,800 psf
Friction Angle	Φ =	28°
Cohesion	c =	300 psf
Wet Unit Weight	Y _w =	110 psf

Aggregate Base Course Parameters:

Friction Angle	Φ =	32°
Cohesion	c =	0 psf
Wet Unit Weight	Y _w =	135 psf

Mowry Shale is a marine shale with a textural classification that varies from silt-clay to clay-silt. Color varies from gray to black. Bentonite zones may be encountered throughout. Nonweathered Mowry Shale is considered to be "Soft Rock".

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

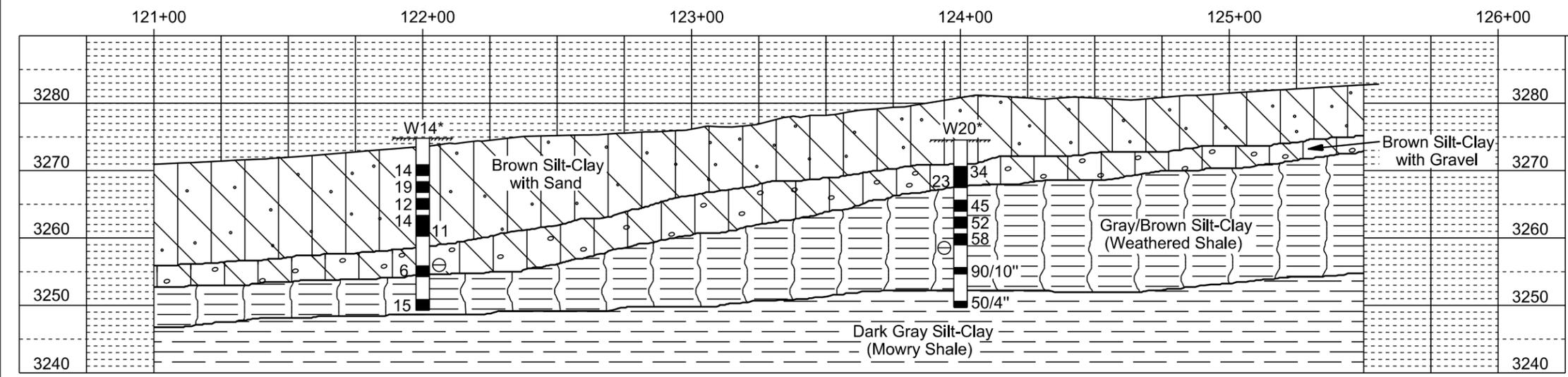
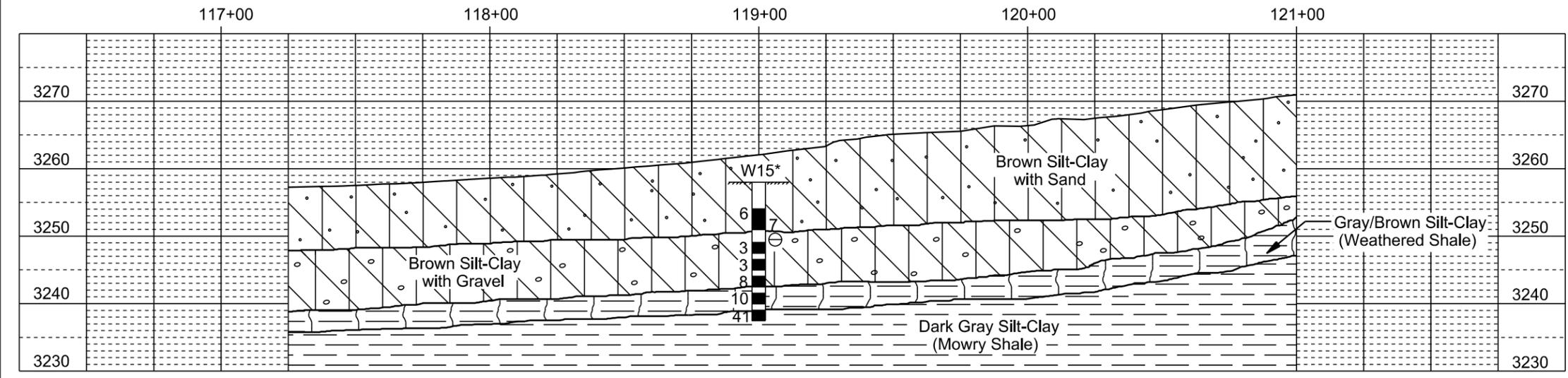
- Penetration Test
- Water
- Caved
- Sample Zone

Penetration test holes are drilled with a 6 5/8 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.

GROUND WATER ELEVATIONS

as of MARCH 2013

W14	(DRY)	3256.0
W15	(DRY)	3249.5
W20	(DRY)	3258.6

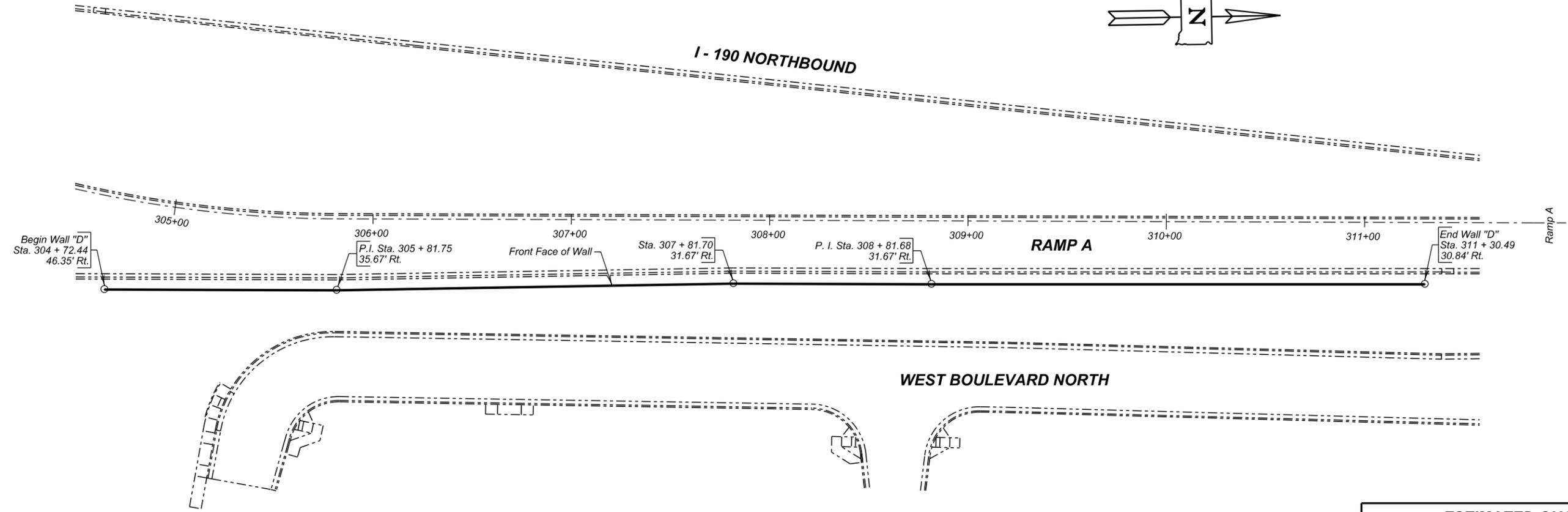
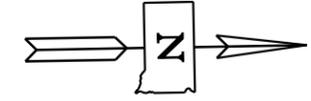


SUBSURFACE INVESTIGATION WALL "C"
FOR
M.S.E. LARGE PANEL RETAINING WALLS
ADJ. TO I-190 SEC. 35-T2N-R7E
STA. 118 + 35.25 TO STA. 126 + 35.13 IM 1902(61)0

PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2014 10 OF 12

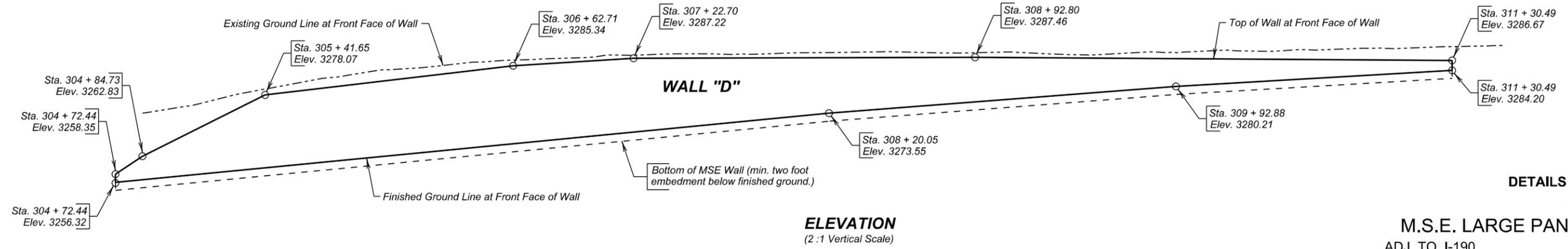
FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E47	E74



PLAN

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
MSE Large Panel Wall, Furnish	Sq. Ft.	8263
MSE Large Panel Wall, Install	Sq. Ft.	8263
Granular Backfill for MSE Large Panel Wall	Cu. Yd.	6930
Footing Undercut	Cu. Yd.	281



ELEVATION
(2 :1 Vertical Scale)

DETAILS OF WALL "D"
FOR
M.S.E. LARGE PANEL RETAINING WALLS
ADJ. TO I-190 SEC. 35-T2N-R7E
STA. 304 + 72.44 TO STA. 311 + 30.49 IM 1902(61)0

PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2014

DESIGNED BY PW PENN1162	CK. DES. BY BB 1162TD11	DRAFTED BY BT	Kevin N. Goeden BRIDGE ENGINEER
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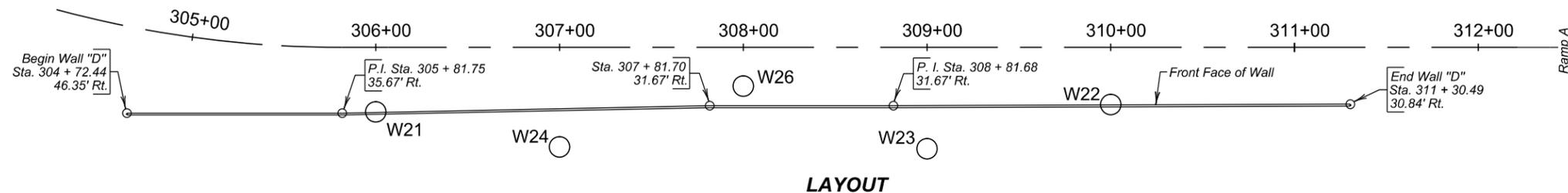
Hole Number	W21	Hole Number	W22	Hole Number	W26
Station	16+00	Station	20+00	Station	18+00
Depth	27.8 ft	Depth	13.5 ft	Depth	17.5 ft
Soil Color	Dark Gray	Soil Color	Dark Gray	Soil Color	Dark Gray
Classification	Clay	Classification	Clay	Classification	Silt-Clay
Strength (Q _u)	17.790 psf	Strength (Q _u)	13.670 psf	Strength (Q _u)	----- psf
Dry Density	104.6 pcf	Dry Density	103.2 pcf	Dry Density	----- pcf
Wet Density	120.3 pcf	Wet Density	124.4 pcf	Wet Density	----- pcf
Moisture	15.3 %	Moisture	20.6 %	Moisture	13.9 %
Pass No. 10	98.5 %	Pass No. 10	99.5 %	Pass No. 10	96.4 %
Pass No. 40	98.5 %	Pass No. 40	99.5 %	Pass No. 40	96.4 %
Pass No. 200	95.5 %	Pass No. 200	96.0 %	Pass No. 200	90.3 %
Sand Content	2.9 %	Sand Content	3.5 %	Sand Content	6.1 %
Silt Content	41.8 %	Silt Content	37.7 %	Silt Content	47.3 %
Clay Content	53.8 %	Clay Content	58.3 %	Clay Content	43.0 %

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E48	E74

Mowry Shale is a marine shale with a textural classification that varies from silt-clay to clay-silt. Color varies from gray to black. Bentonite zones may be encountered throughout. Nonweathered Mowry Shale is considered to be "Soft Rock".

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.



LAYOUT

Aggregate Base Course Parameters:

Friction Angle	$\Phi = 32^\circ$
Cohesion	$c = 0$ psf
Wet Unit Weight	$\gamma_w = 135$ psf

Retained Soil Parameters:

Friction Angle	$\Phi = 24^\circ$
Cohesion	$c = 50$ psf
Wet Unit Weight	$\gamma_w = 128$ psf

Foundation Soil Parameters (Mowry Shale):

Factored Bearing Resistance	$R_r = 4,200$ psf
Friction Angle	$\Phi = 17^\circ$
Cohesion	$c = 700$ psf
Wet Unit Weight	$\gamma_w = 120$ psf

Reinforced Soil Parameters:

Friction Angle	$\Phi = 34^\circ$
Cohesion	$c = 0$ psf
Wet Unit Weight	$\gamma_w = 105$ psf

* Values represent uncorrected "N" values from Penetration Test.

Sample Zone 48 Blows Per Foot

If refusal of the penetration test was achieved based on 50 blows within one of the 6 inch sets, then the number of blows over inches is listed.

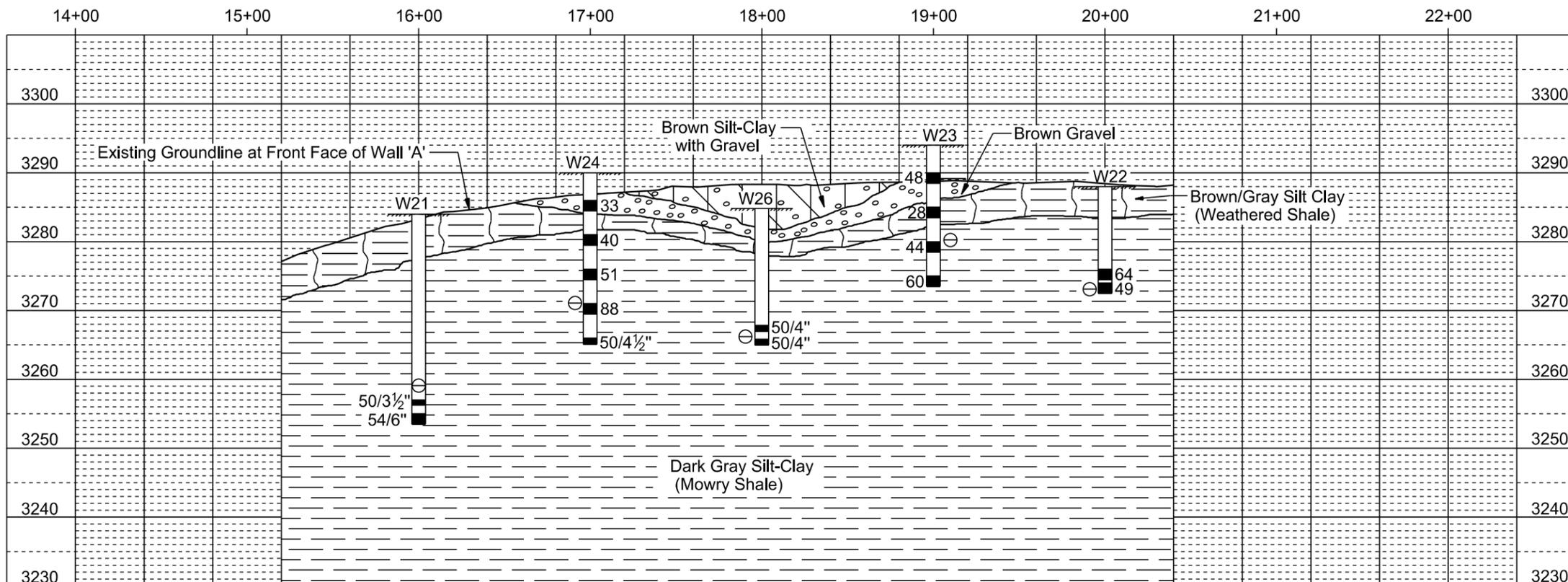
LEGEND

	Penetration Test		Water		Sample Zone
	Caved				

Penetration test holes are drilled with a 6 5/8 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.

GROUND WATER ELEVATIONS as of MARCH 2013

W21	(DRY) 3259.1
W22	(DRY) 3273.1
W23	(DRY) 3280.3
W24	(DRY) 3271.1
W26	(DRY) 3266.2



SUBSURFACE INVESTIGATION WALL "D"

FOR
M.S.E. LARGE PANEL RETAINING WALLS
 ADJ. TO I-190 SEC. 35-T2N-R7E
 STA. 304 + 72.44 TO STA. 311 + 30.49 IM 1902(61)0

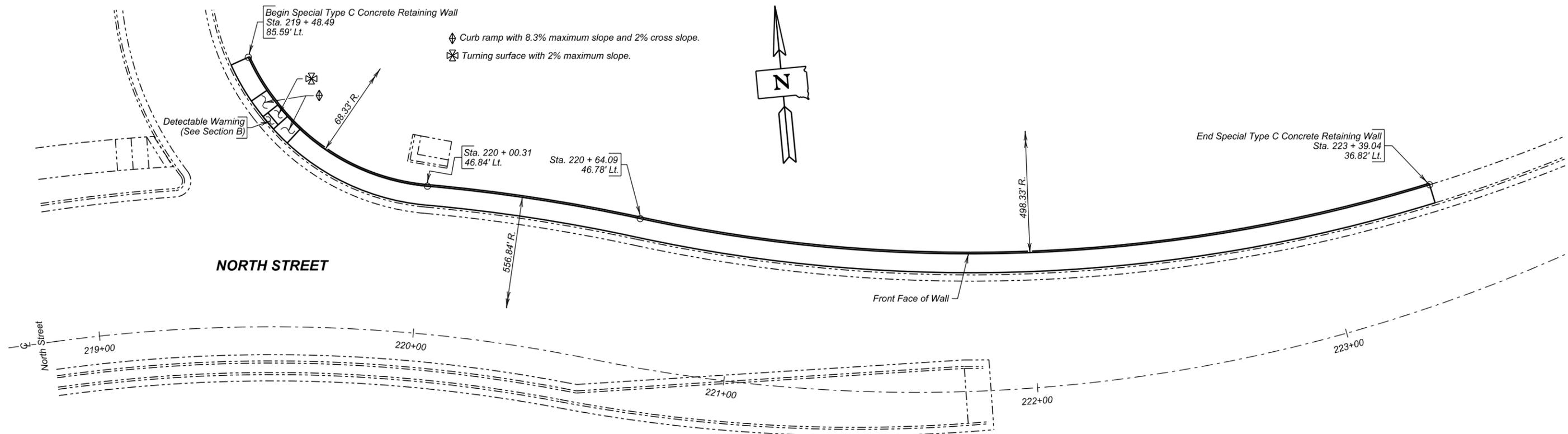
PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION
 DECEMBER 2014

DESIGNED BY PW PENN1162	CK. DES. BY BB 1162TD12	DRAFTED BY BT	<i>Kevin N. Goeden</i> BRIDGE ENGINEER
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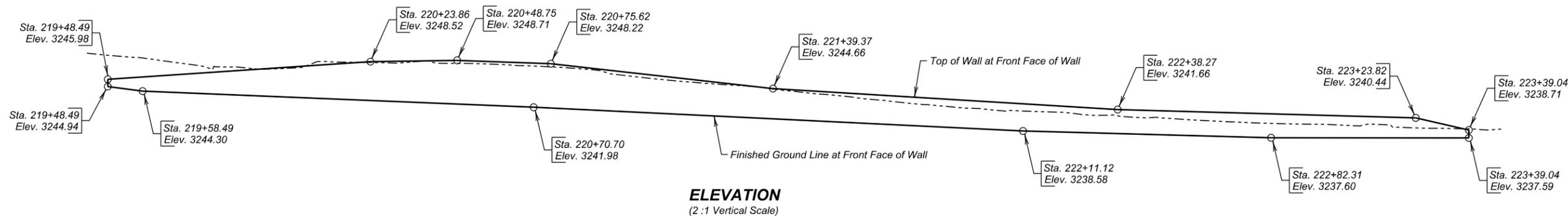
The elevations shown in these plans are based on the National Geodetic Survey (NGS) North American Vertical Datum of 1988 (NAVD88).

FOR BIDDING PURPOSES ONLY

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E49	E74



PLAN



ELEVATION
(2 : 1 Vertical Scale)

INDEX OF SPECIAL TYPE C CONCRETE RETAINING WALL SHEETS -

Sheet No. 1 - General Layout and Quantities
Sheet No. 2 - Notes and Wall Details

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Special Type C Concrete Retaining Wall	Sq. Ft.	1619

GENERAL LAYOUT AND QUANTITIES FOR SPECIAL TYPE C CONCRETE RETAINING WALL

ADJ. TO NORTH STREET SEC. 36-T2N-R7E
PCN 1162 IM 1902(61)0

PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
JANUARY 2015

DESIGNED BY PW PENN1162	CK. DES. BY BB 1162TA01	DRAFTED BY BT <i>Kevin N. Goeden</i> BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E50	E74

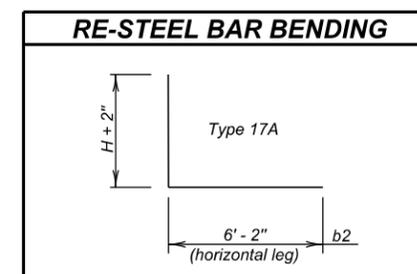
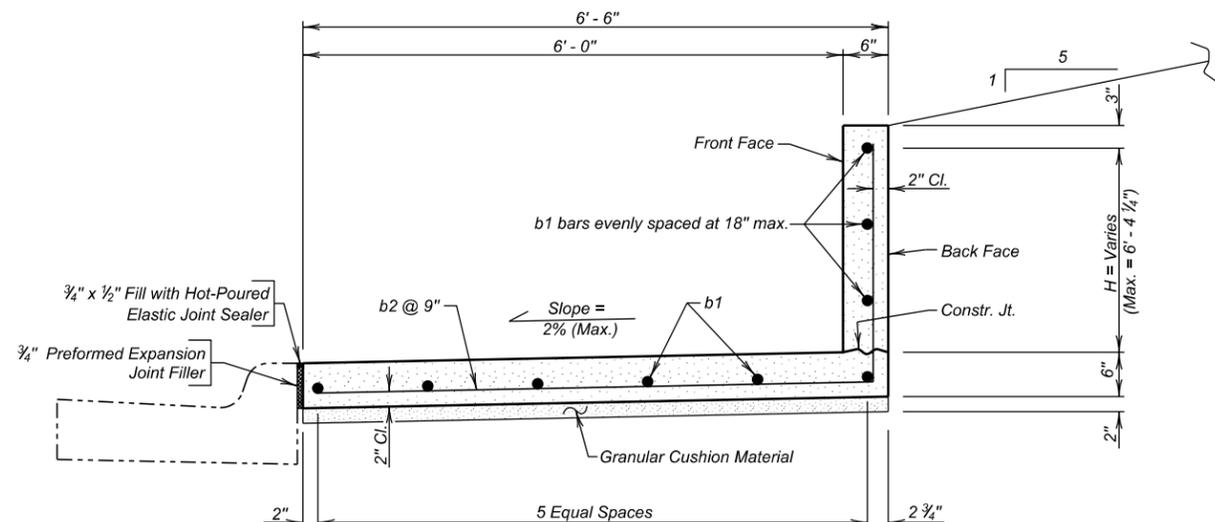
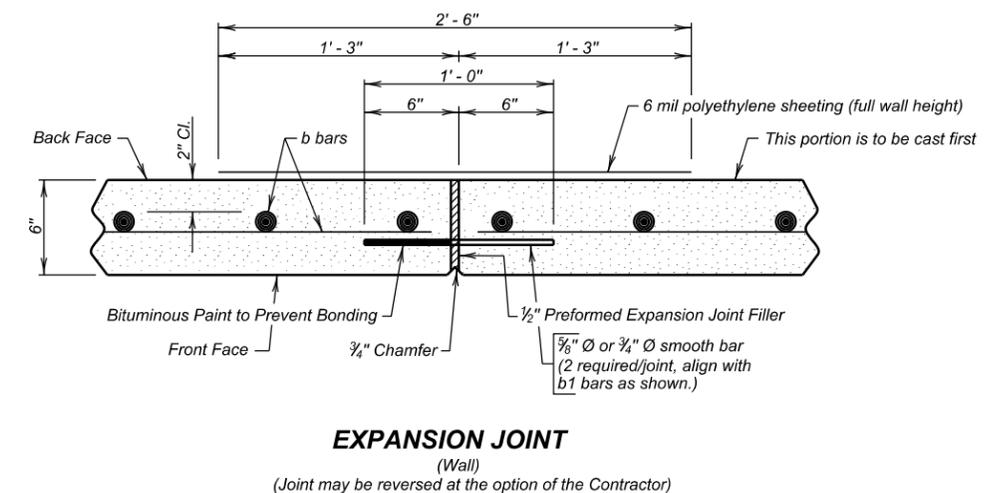
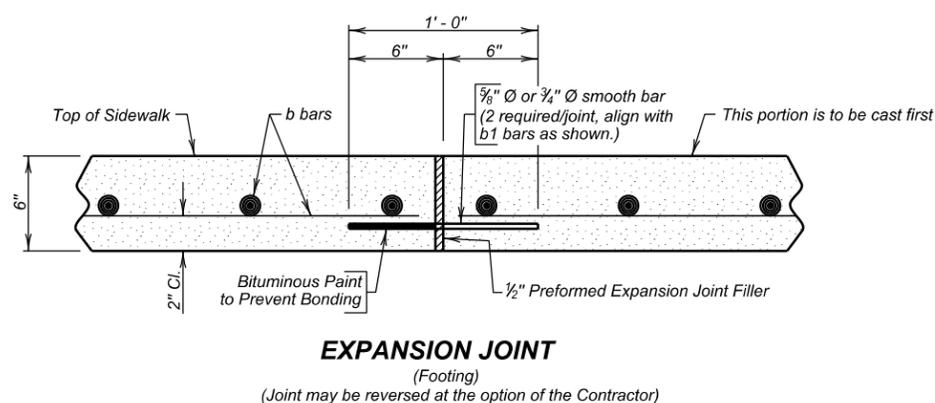
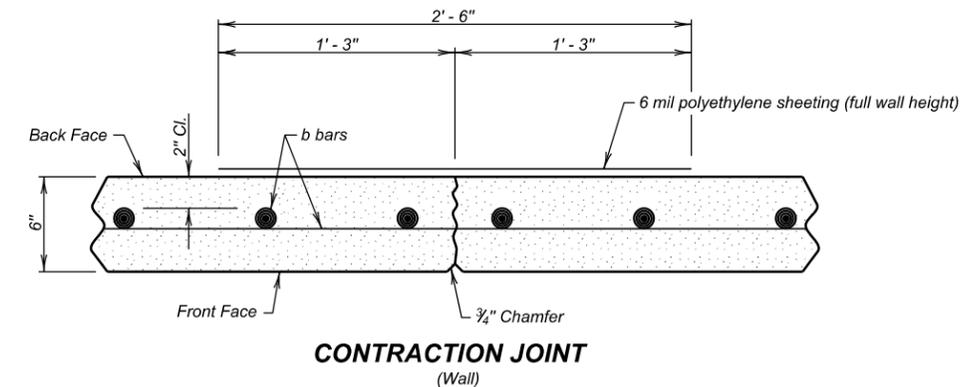
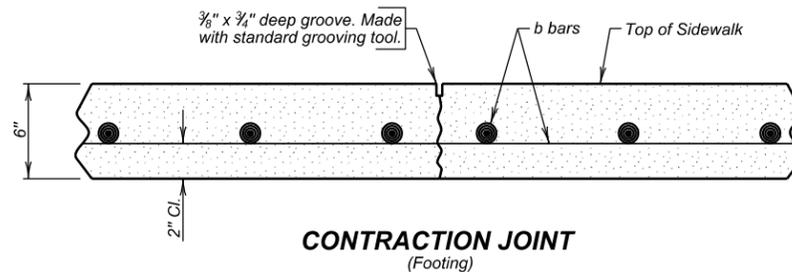
FOR BIDDING PURPOSES ONLY

SPECIFICATIONS

1. Design Specifications: AASHTO LRFD Bridge Design Specifications, 2014 Edition.
2. Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2004 Edition and required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

GENERAL NOTES

1. The Type C Concrete Retaining Wall shall be placed adjacent to pavement or curb and gutter as shown in the typical section.
2. In the areas where the retaining wall footing is to be placed, a 2 inch thickness of cushion material shall be placed and compacted. The cushion material shall conform to Section 651.2 C of the Specifications.
3. All concrete shall be Class M6 and conform to Section 462 of the Specifications.
4. All reinforcing steel shall be epoxy coated, deformed #4 bars, and shall conform to ASTM A615, Grade 60. The smooth bar may conform to ASM A615, Grade 40. The epoxy coating shall conform to ASTM A775.
5. The top b1 bar shall be placed parallel to the top of the wall.
6. The b1 bars shall be lapped a minimum of 12 inches.
7. A 3/4 inch chamfer shall be provided on all exposed retaining wall edges.
8. The maximum expansion joint spacing shall be 90 feet and the maximum contraction joint spacing shall be 30 feet. The contraction and expansion joints shall be placed to match pavement or curb joints where possible.
9. The exposed retaining wall surfaces shall receive a finish in accordance with 460.3 M of the Specifications. The exposed surface of the retaining wall footing shall receive a broom finish.
10. The Type C Concrete Retaining Wall shall be measured to the nearest square foot of front face area.
11. A Class B commercial texture finish shall be applied to the front face of the Special Type C Retaining Wall. The color shall be Davis Color Number 641 "Flagstone Brown."
12. The Class B commercial texture finish shall be applied in accordance with Section 460.3M.1.c of the Specifications.
13. 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.
14. All costs for excavation, furnishing and placing backfill and cushion material, labor, equipment, reformed expansion joint filler, all reinforcing steel including the smooth bars, and all concrete shall be incidental to the contract unit price per square foot for Special Type C Concrete Retaining Wall.



NOTES AND WALL DETAILS FOR SPECIAL TYPE C CONCRETE RETAINING WALL
 ADJ. TO NORTH STREET SEC. 36-T2N-R7E
 IM 1902(61)0

PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION
 DECEMBER 2014

DESIGNED BY PW PENN1162	CK. DES. BY BB 1162TA02	DRAFTED BY BT	Kevin N. Goeden BRIDGE ENGINEER
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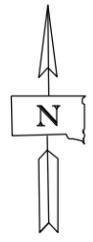
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 1902(61)0	E51	E74

Plotting Date: 04-23-2015

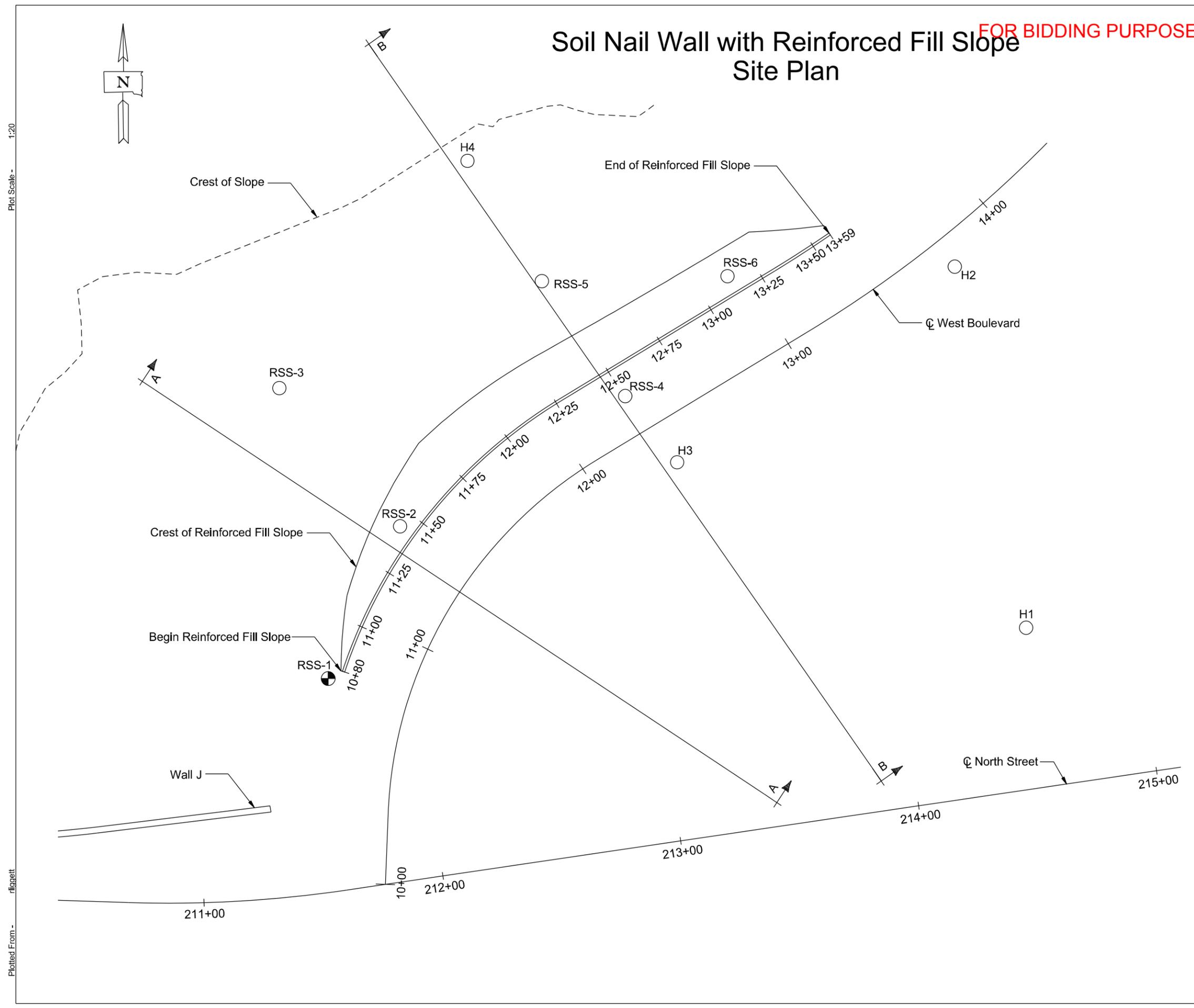
FOR BIDDING PURPOSES ONLY

Soil Nail Wall with Reinforced Fill Slope Site Plan

Plot Scale - 1:20



Plotted From - rjggett



LEGEND

- Penetration Test
- ⊗ Auger Test

Site Plan FOR SOIL NAIL WALL WITH REINFORCED FILL SLOPE

ADJ. TO WEST BOULEVARD SEC. 36-T2N-R7E
PENNINGTON COUNTY IM 1902(61)0
S.D.DEPT.OF TRANSPORTATION

APRIL 2015 ① OF ⑮

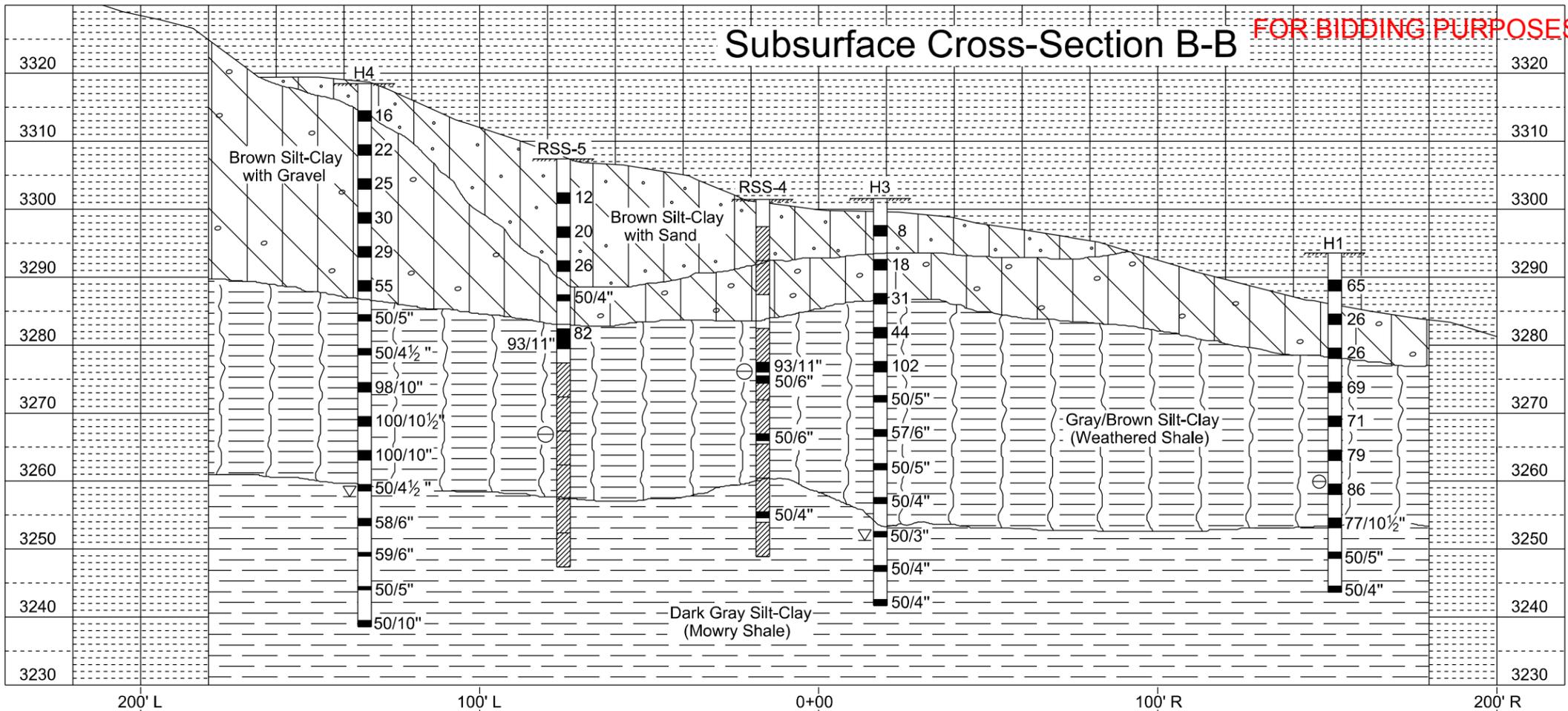
DESIGNED BY	DRAWN BY JL	CHECKED BY JW	
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File - ...I:\Penn1162_West Blvd Wall.dgn

Plotting Date: 04-23-2015

Subsurface Cross-Section B-B

FOR BIDDING PURPOSES ONLY



Mowry Shale is a marine shale with a textural classification that varies from silt-clay to clay-silt. Color varies from gray to black. Bentonite zones may be encountered throughout. Nonweathered Mowry Shale is considered to be "Soft Rock".

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
- ⊖ Auger Test
- ▽ Water
- ⊖ Caved
- Sample Zone
- ▨ Continuous Sampler

Samples collected with the continuous sampler may be collected with or without a fiberglass clear liner. The nominal size of the sample within the sampler is 2 1/4 inch diameter. Zones were either the full 5 feet of the sampler or 2 1/2 feet depending on the material being sampled.

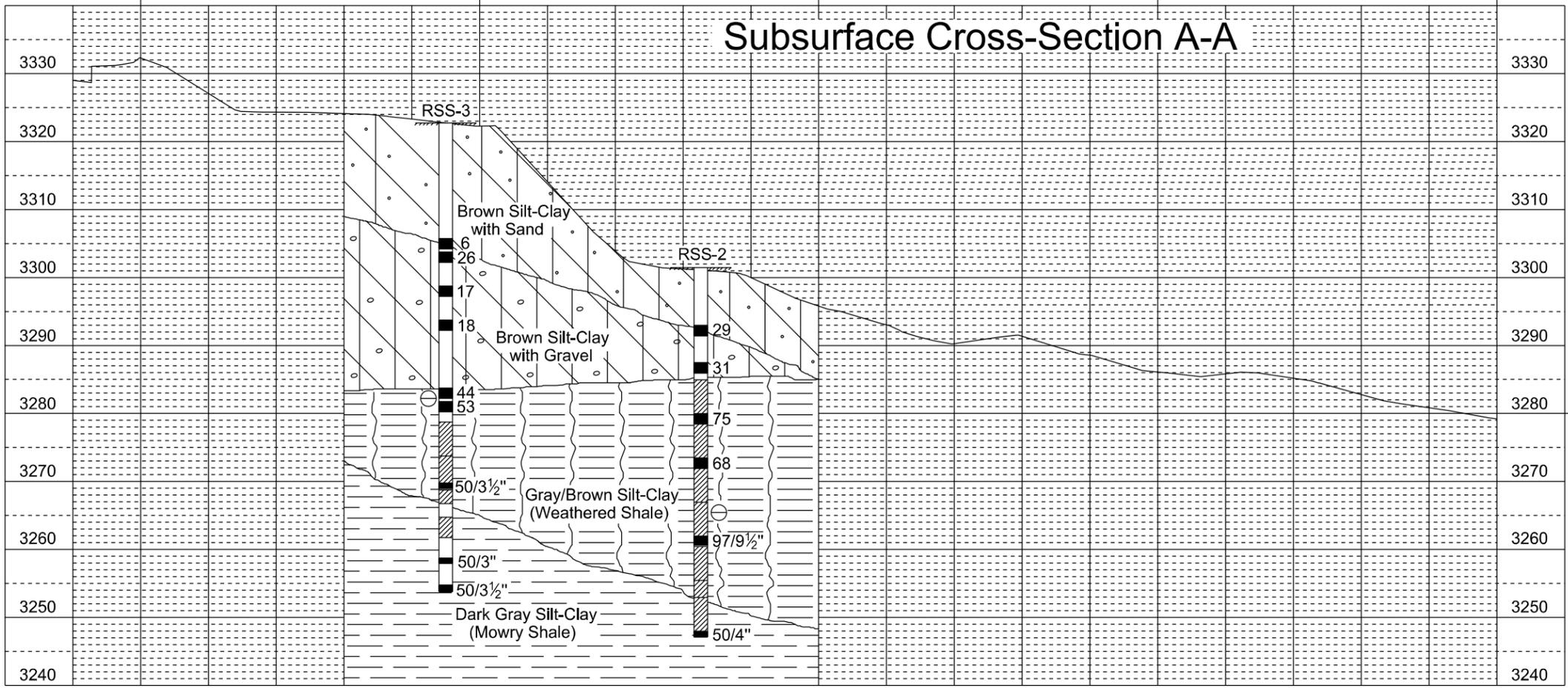
Penetration test holes are drilled with a 6 5/8 inch outer diameter (3.25 inch ID) hollow stem auger. Penetration tests are conducted by dropping a 140 pound hammer 30 inches to obtain 2 inch nominal diameter samples and to measure the resistance to penetration of the soil.

All auger holes are drilled with a 4 1/2 inch diameter continuous flight auger.

GROUND WATER ELEVATIONS as of AUGUST 2014

RSS-2	(DRY)	3265.4
RSS-3	(DRY)	3282.2
RSS-4	(DRY)	3276.2
RSS-5	(DRY)	3266.9
H1	(DRY)	3260.0
H3		3251.3
H4		3257.7

Subsurface Cross-Section A-A



Subsurface Cross-Sections FOR SOIL NAIL WALL WITH REINFORCED FILL SLOPE

ADJ. TO WEST BOULEVARD SEC. 36-T2N-R7E
PENNINGTON COUNTY IM 1902(61)0
S.D.DEPT.OF TRANSPORTATION
APRIL 2015

2 OF 15

DESIGNED BY	DRAWN BY JL	CHECKED BY JW
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Plot Scale - 1:20

Plotted From - rliggett

File - ...I:\Penn1162_West Blvd Wall.dgn

Soil Nail Wall with Reinforced Fill Slope Typical Section 10+86.91 to 13+58.53

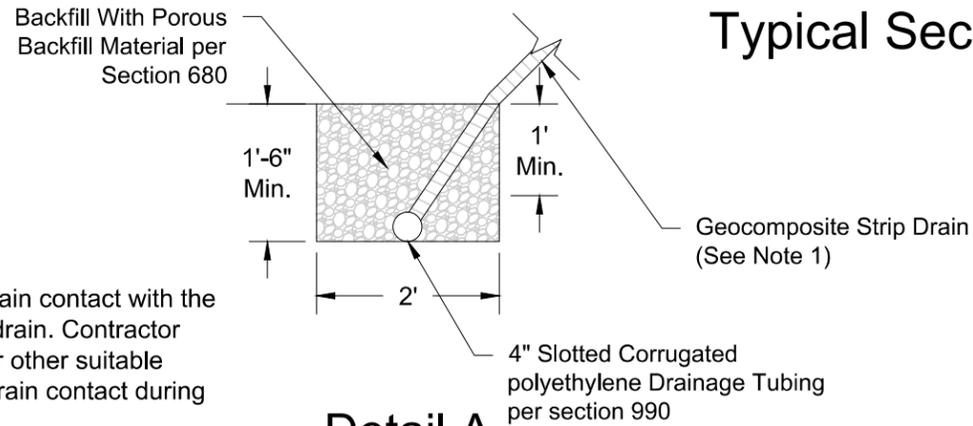
FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT IM 1902(61)0	SHEET E53	TOTAL SHEETS E74
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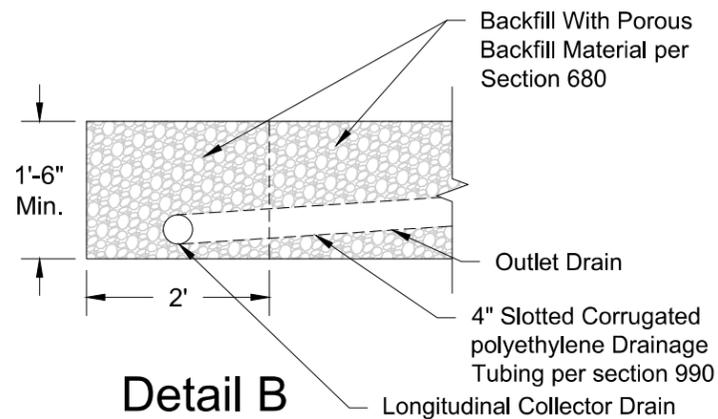
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Plot Scale - ViewportScale

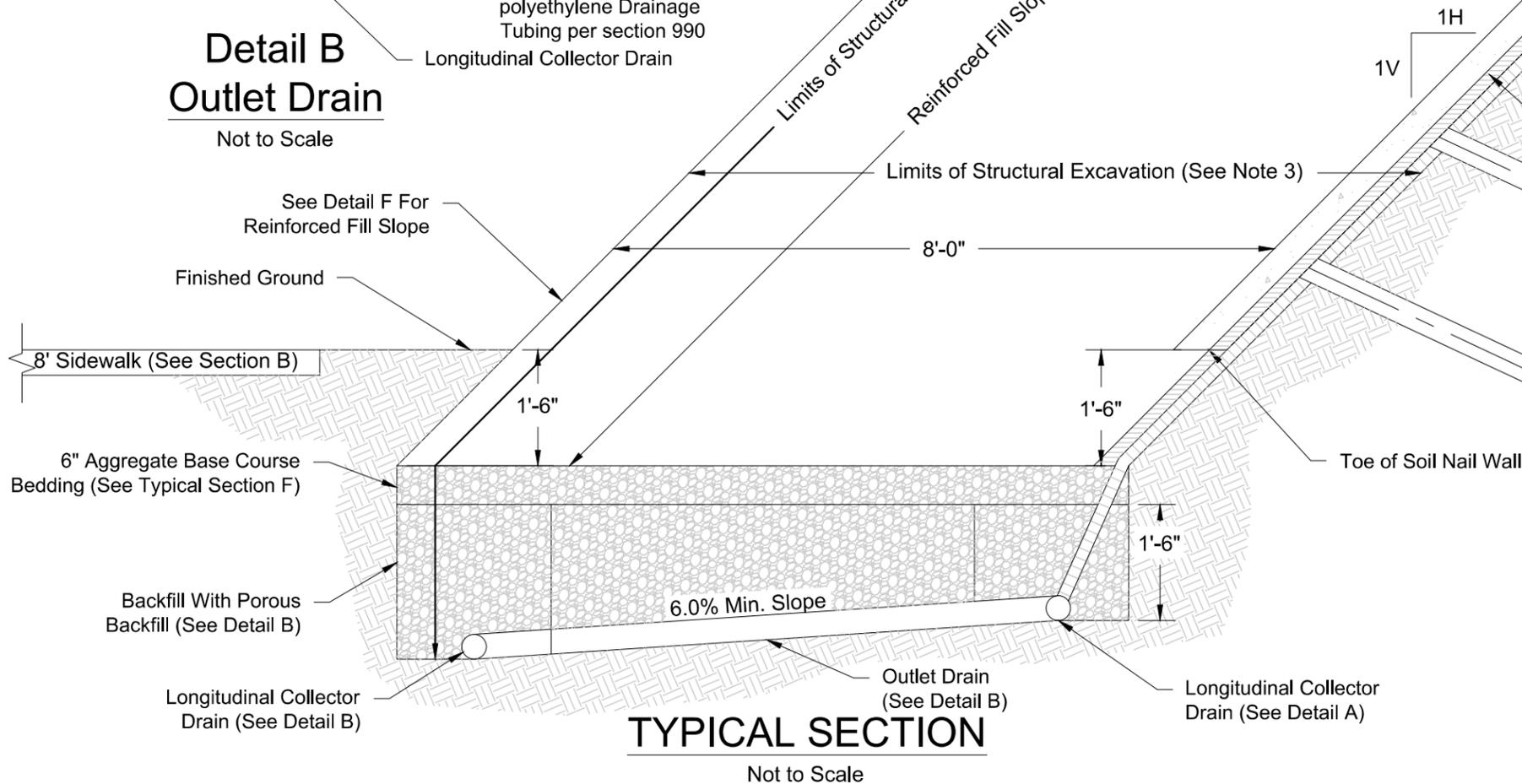
- Notes:
- Strip drain shall maintain contact with the longitudinal collector drain. Contractor may use fitting tape or other suitable material to maintain drain contact during backfill placement.



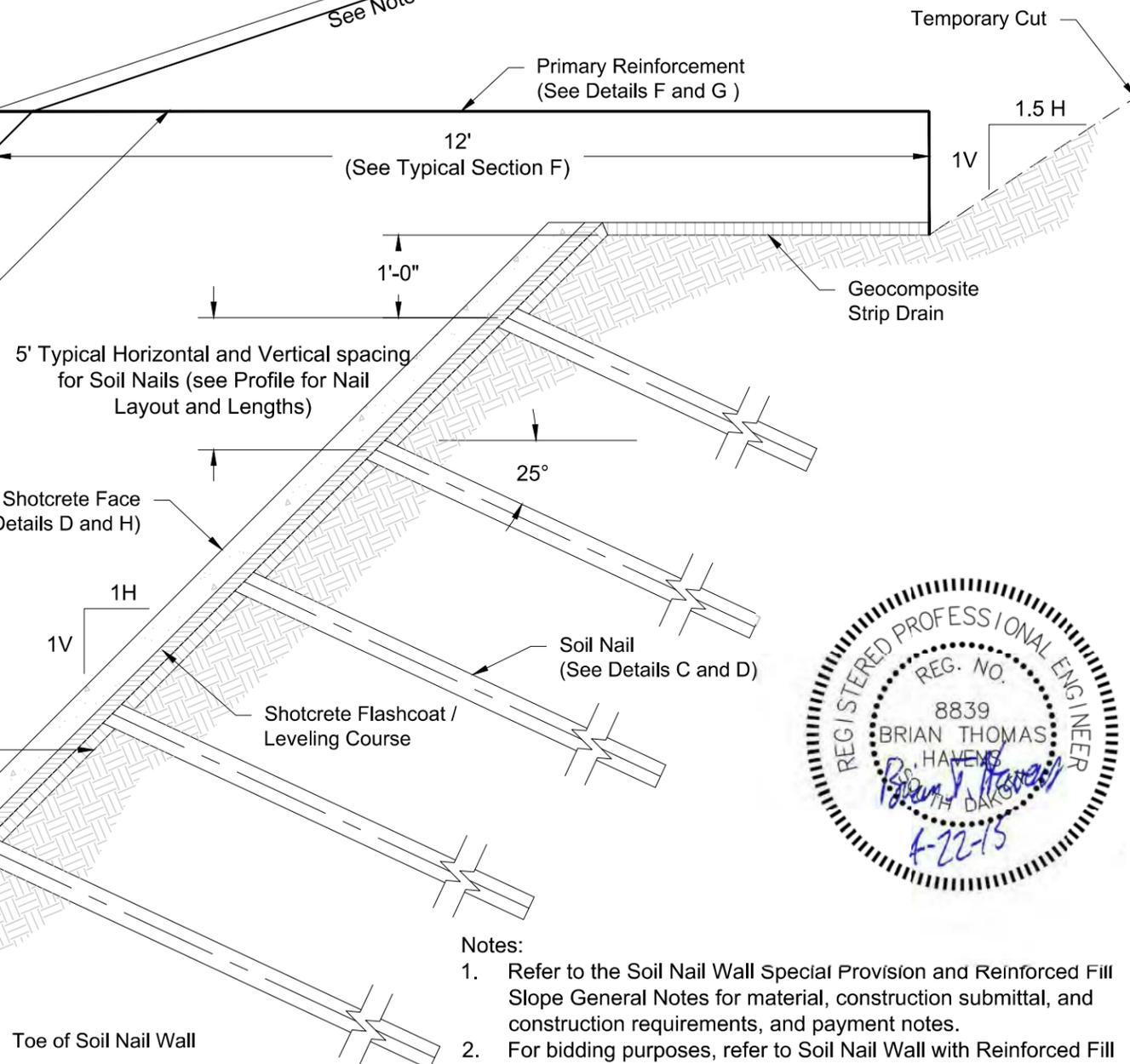
Detail A
Longitudinal Collector Drain
Not to Scale



Detail B
Outlet Drain
Not to Scale



TYPICAL SECTION
Not to Scale



Notes:

- Refer to the Soil Nail Wall Special Provision and Reinforced Fill Slope General Notes for material, construction submittal, and construction requirements, and payment notes.
- For bidding purposes, refer to Soil Nail Wall with Reinforced Fill Slope Quantities on Soil Nail Wall Detail Sheet and Reinforced Fill Slope General Notes.
- Refer to Section X for Limits of Structural Excavation for the Soil Nail Wall. Excavation beyond these limits is Unclassified Excavation.
- Allowable Pullout Resistance for Soil Nails = 1.1 kips per foot.



ADJ. TO WEST BOULEVARD

SEC. 36-T2N-R7E
IM 1902(61)0

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3 OF 15

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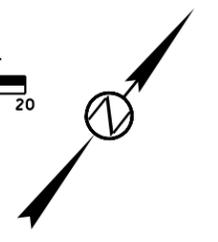
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Soil Nail Wall with Reinforced Fill Slope Drainage Plan

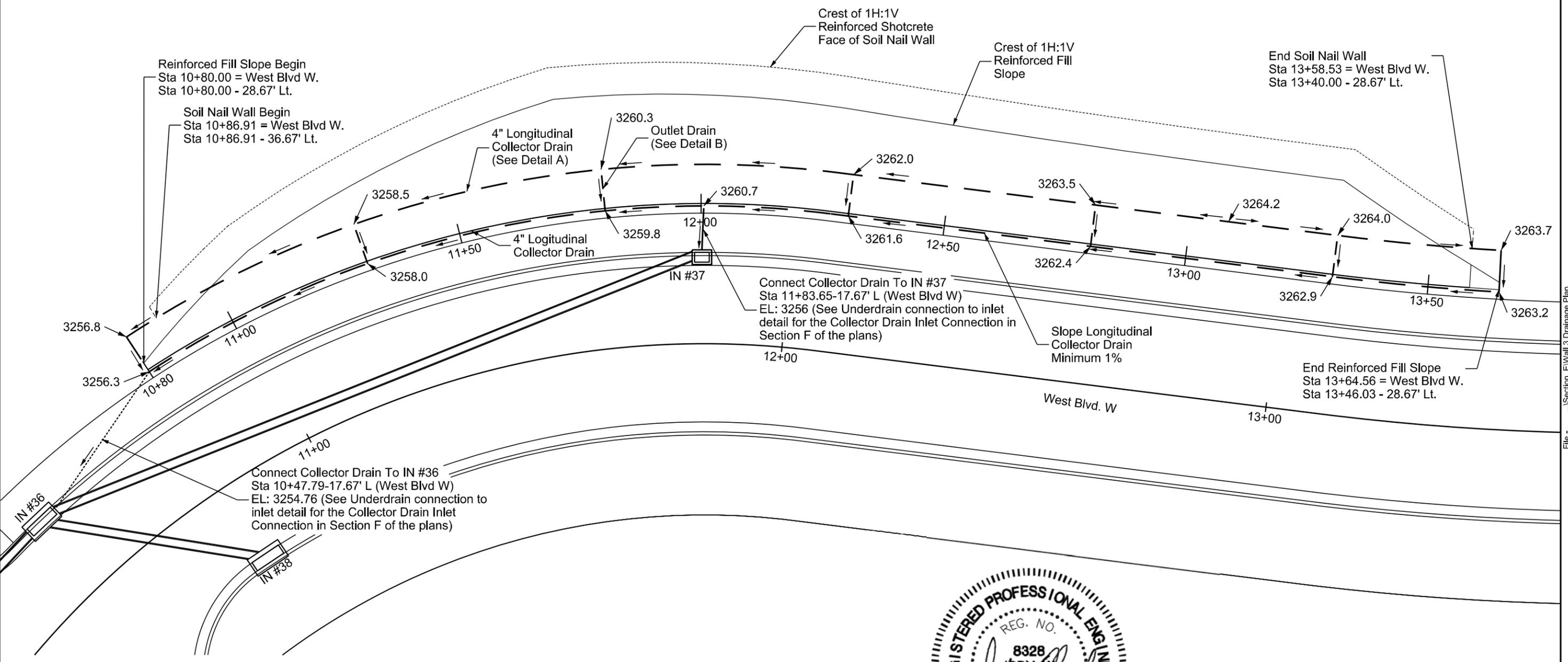
FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT IM 1902(61)0	SHEET E54	TOTAL SHEETS E74
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Plotting Date: 04-23-2015



Plot Scale - 1:20
Plotted From - rloggett



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PENNINGTON COUNTY IM 1902(61)0
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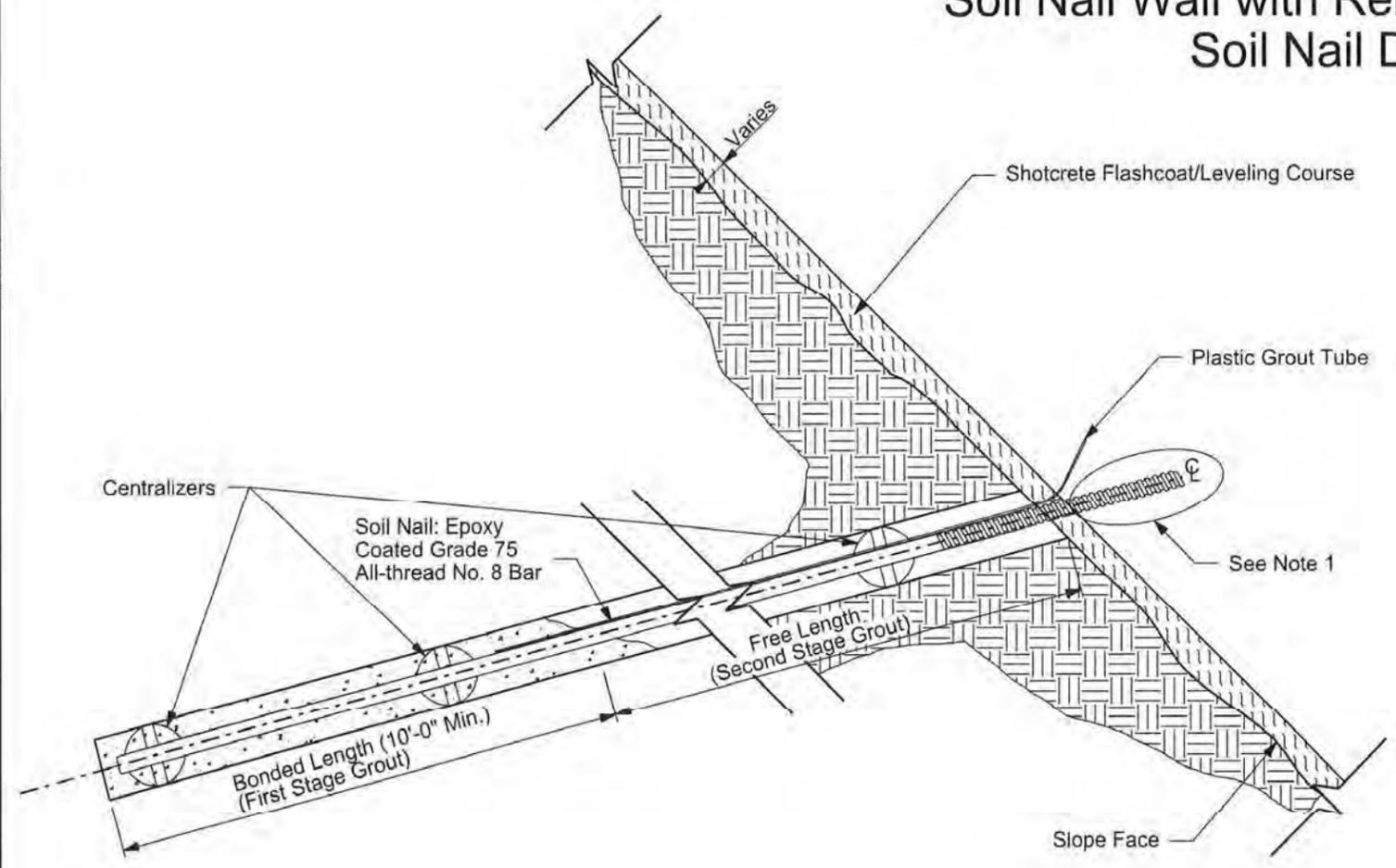
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File - ...Section_EIWall 3 Drainage Plan

Plotting Date: 05-06-2015

Soil Nail Wall with Reinforced Fill Slope Soil Nail Details

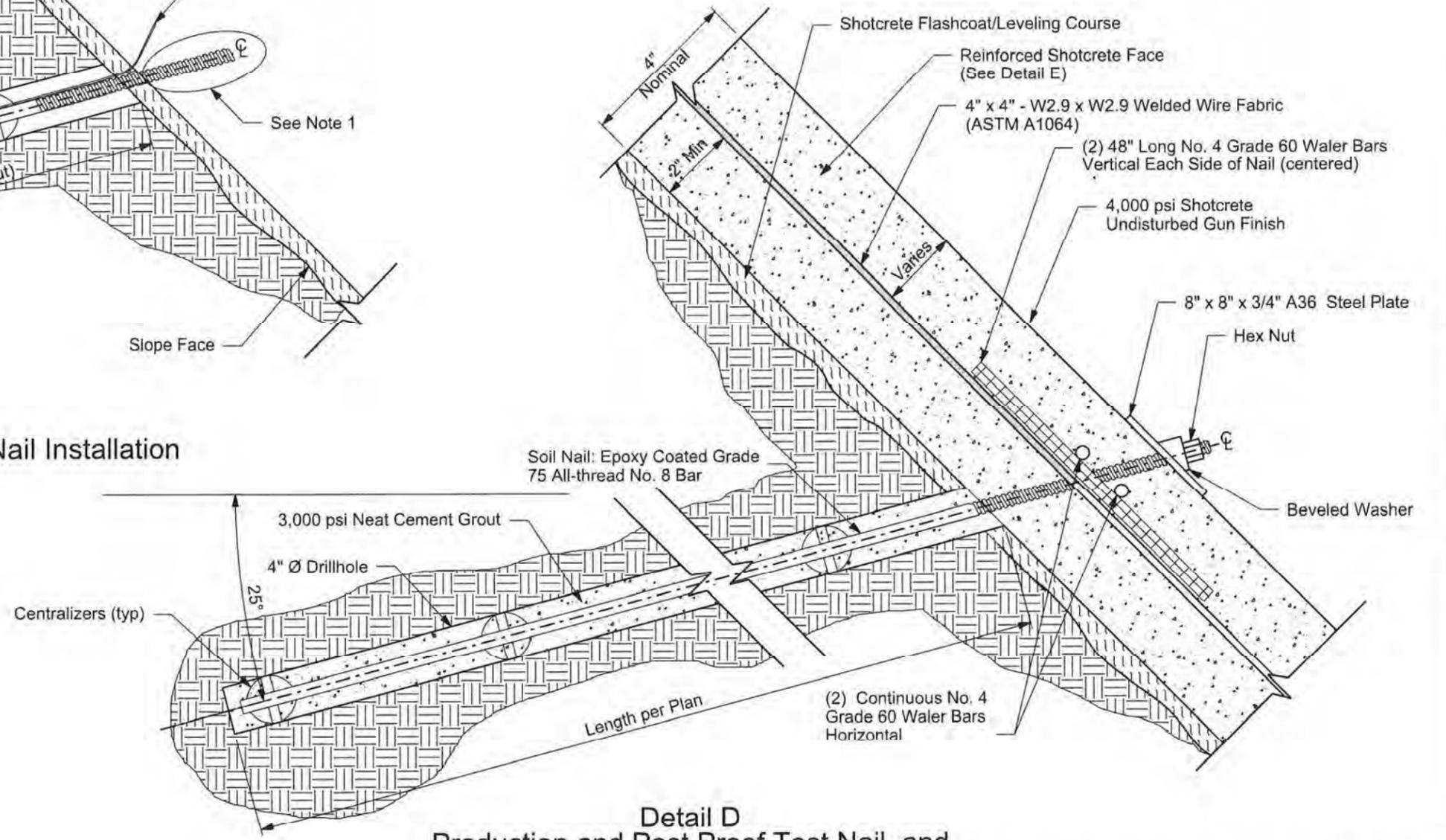
FOR BIDDING PURPOSES ONLY



Detail C
Pre-Verification and Pre-Proof Test Nail Installation
(Not To Scale)

Notes:
1. Nail testing apparatus not shown on detail. Contractor shall provide proposed test method, reaction load system capacity, equipment setup, and types and accuracy of apparatus to be used for applying and measuring the test loads. Nail testing and contractor submittal requirements are specified in the Soil Nail Wall Special Provision.

ESTIMATED SOIL NAIL WALL QUANTITIES		
Bid Item	Item	Quantity
420E0300	Structure Excavation, Retaining Wall	2,690 CuYd
530E0602	Soil Nail	8,410 FT
530E0603	Soil Nail Verification Test	2 Ea
530E2010	Shotcrete Flashcoat/Leveling Course	140 CuYd
530E2020	Reinforced Shotcrete Face	6,040 SqFt



Detail D
Production and Post Proof Test Nail, and
Reinforced Shotcrete Face Installation
(Not To Scale)

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PENNINGTON COUNTY IM 1902(61)0
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APRIL 2015 (5) OF (15)

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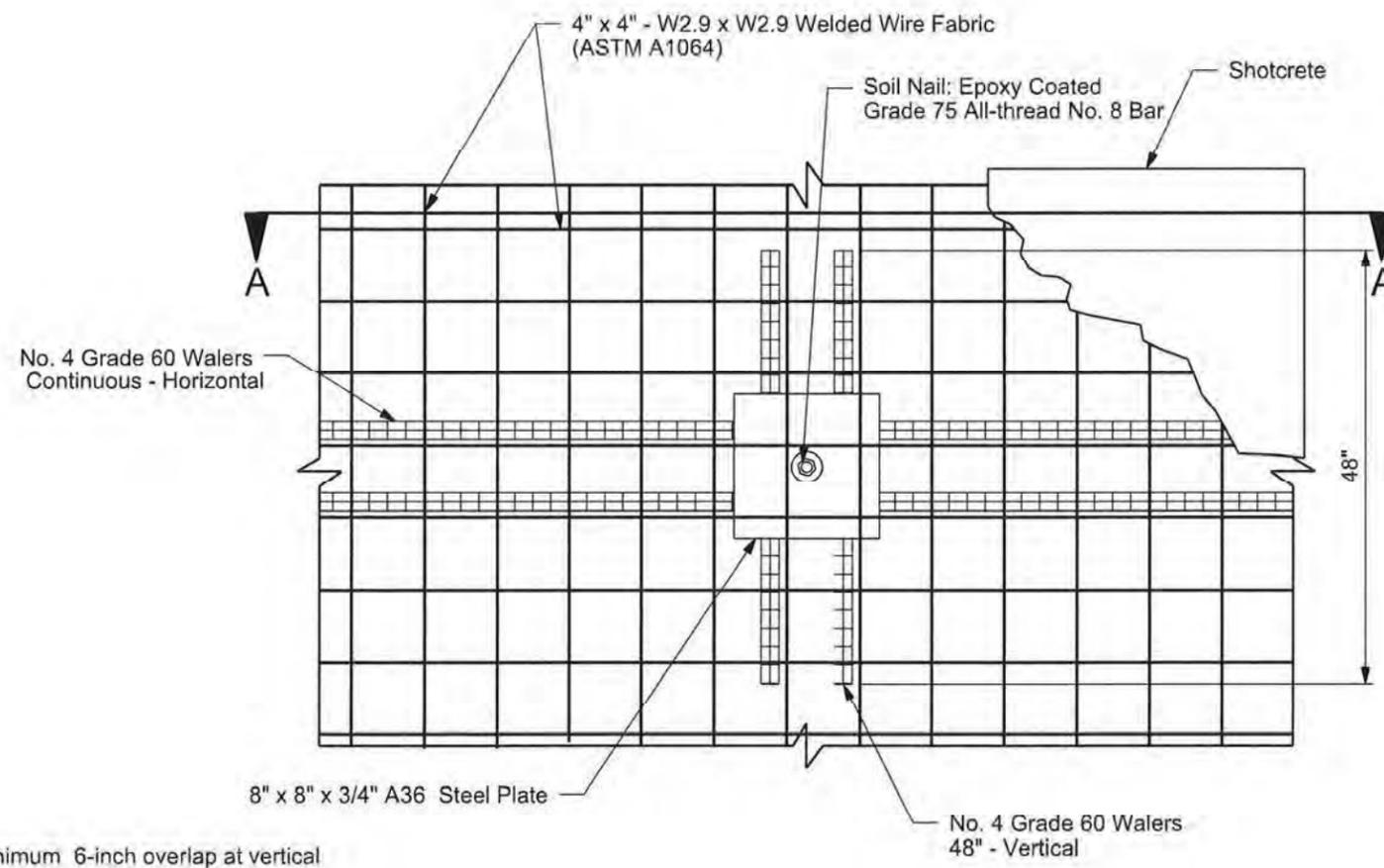
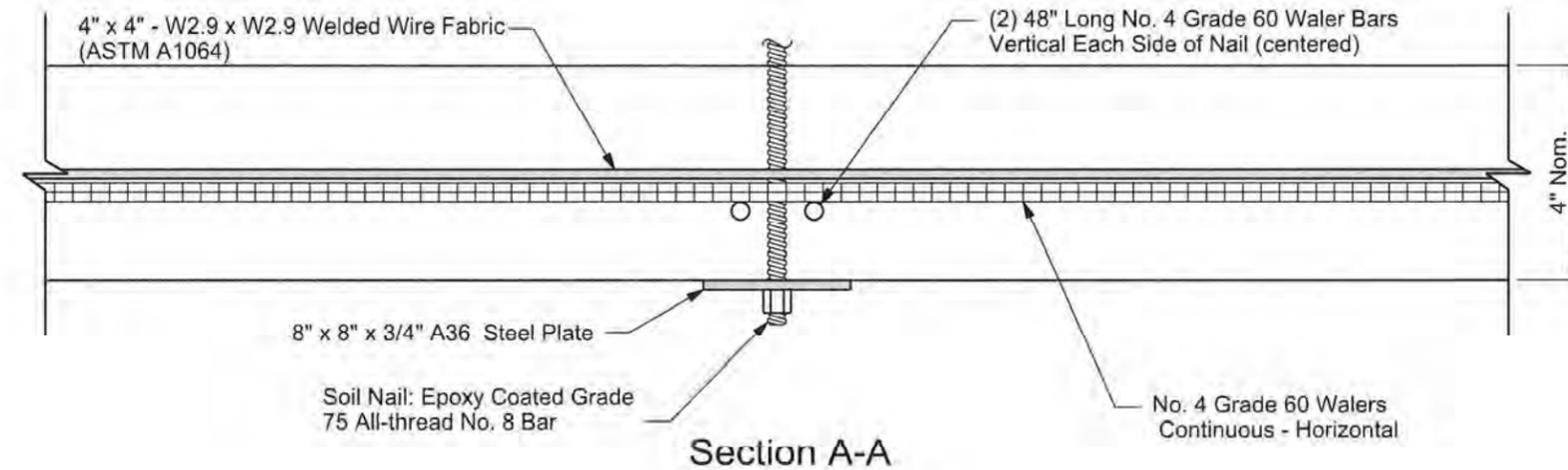


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Soil Nail Wall with Reinforced Fill Slope Shotcrete Face Detail and Section View

FOR BIDDING PURPOSES ONLY



- Notes:**
1. Welded wire fabric splices shall consist of a minimum 6-inch overlap at vertical and horizontal joints. Contractor shall use wire ties as necessary to maintain slices prior to shotcrete application.
 2. Waler bar splices shall consist of a minimum 15-inch overlap at horizontal joints. Contractor shall use wire ties as necessary to maintain slices prior to shotcrete applications.
 3. Epoxy coating is not required on welded wire fabric, waler bars, bearing plate, and nut.
 4. Contractor shall use non-degradable welded wire support devices consisting of plastic or steel to maintain the welded wire location within the reinforced shotcrete face.
 5. Contractor shall adjust vertical walers as necessary to be within the reinforced shotcrete face per plan and to provide a minimum 1-inch cover.



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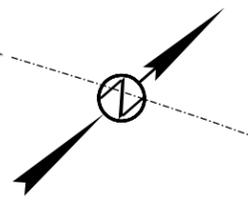
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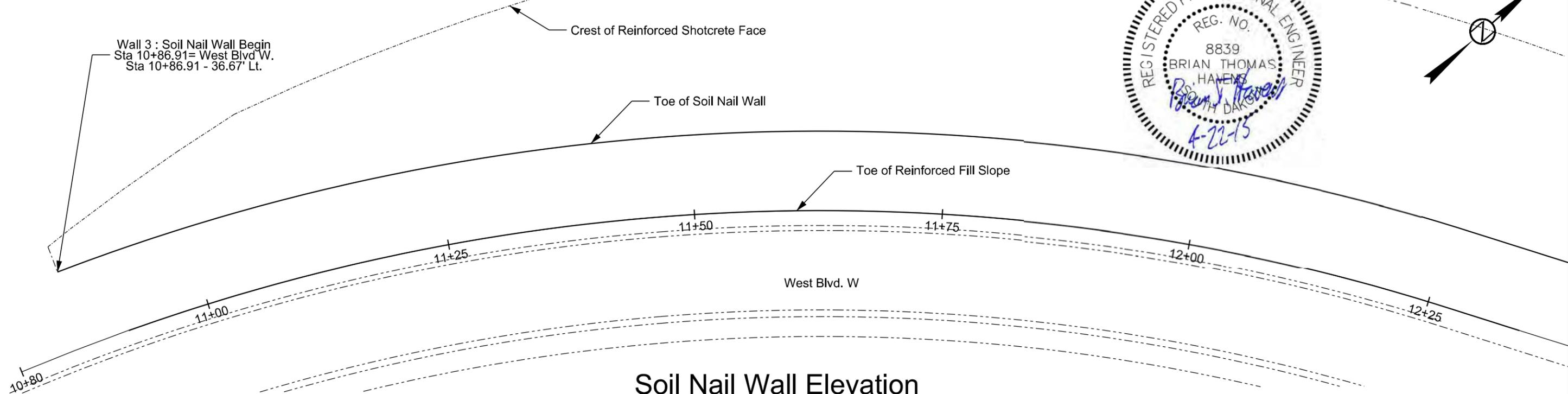
Soil Nail Wall with Reinforced Fill Slope

Soil Nail Wall Plan

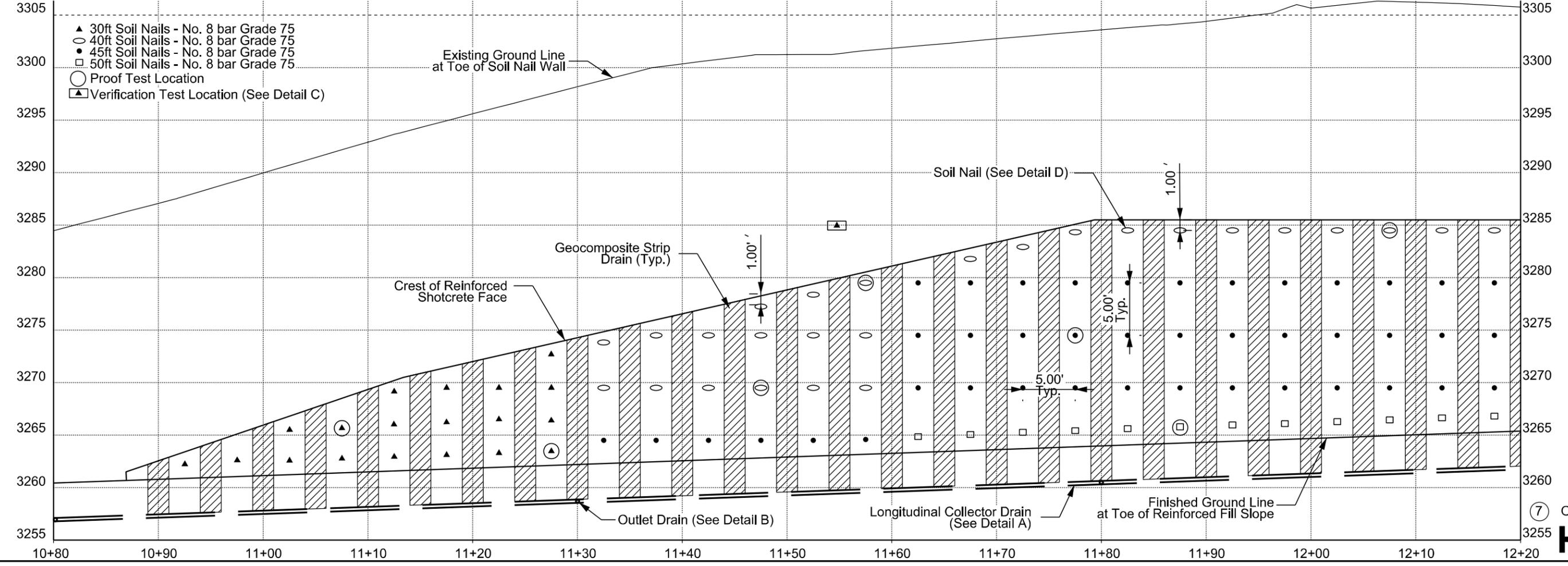
FOR BIDDING PURPOSES ONLY



Plot Scale - 1:9,999



Soil Nail Wall Elevation



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Plotted From - r10geat

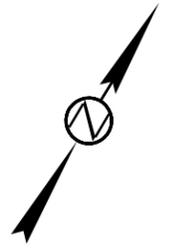
FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 1902(61)0	E58	E74

Plotting Date: 04-22-15

Soil Nail Wall with Reinforced Fill Slope Soil Nail Wall Plan

Plot Scale - 1:9.99998



Crest of Reinforced Shotcrete Face

Wall 3 : Soil Nail Wall End
Sta 13+58.53 = West Blvd W.
Sta 13+40.00 - 36.67' Lt.

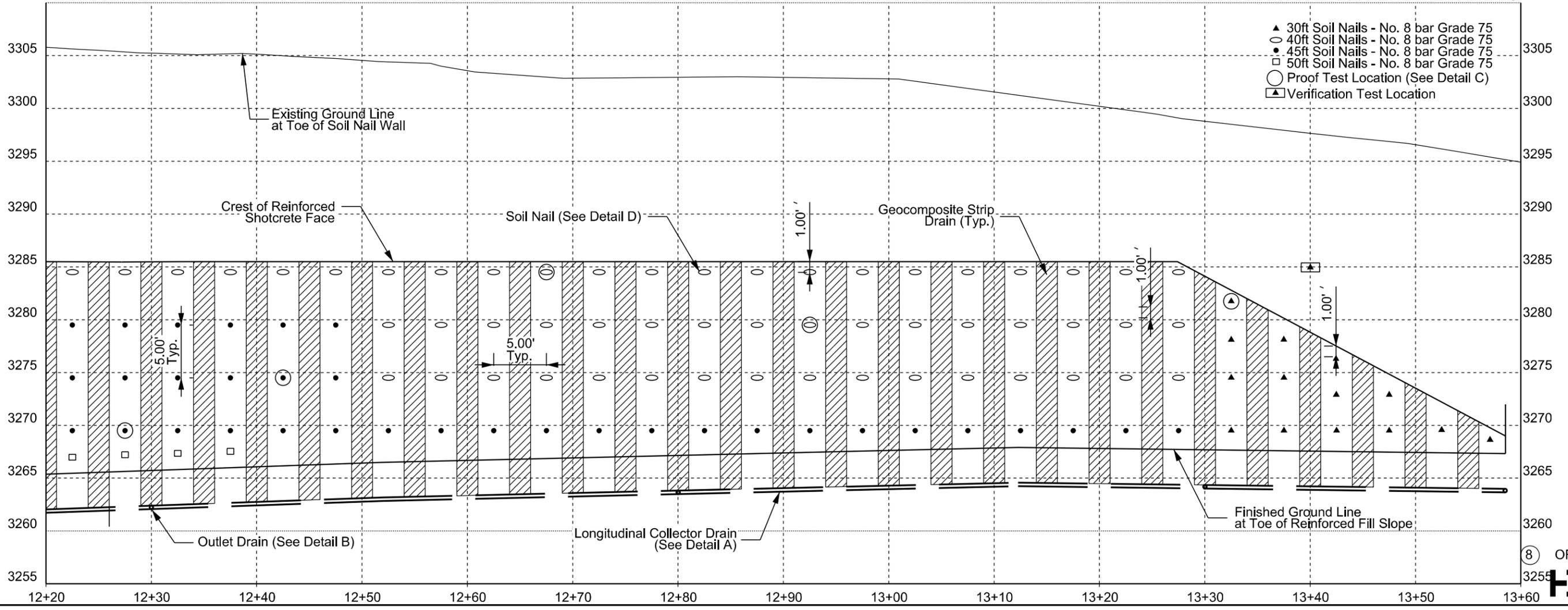
Toe of Soil Nail Wall

Toe of Reinforced Fill Slope

12+25 12+50 12+75 13+00 13+25 13+50 13+59

West Blvd. W

Soil Nail Wall Elevation



- ▲ 30ft Soil Nails - No. 8 bar Grade 75
- 40ft Soil Nails - No. 8 bar Grade 75
- 45ft Soil Nails - No. 8 bar Grade 75
- 50ft Soil Nails - No. 8 bar Grade 75
- Proof Test Location (See Detail C)
- ▲ Verification Test Location

Plotted From - r10ageit

File - ...IRSS Nail Plan 10 Scale.dgn



Soil Nail Wall with Reinforced Fill Slope

Reinforced Fill Slope General Notes

DESCRIPTION

The Contractor shall provide all labor, equipment, materials, and coordination to construct the Reinforced Fill Slope in accordance with the plans. The reinforced fill slope shall be installed according to the plans and the SDDOT Standard Specifications.

1. Work shall consist of excavation of in-situ material for preparation of foundation bearing surface, furnishing and installing welded wire forms, geogrid reinforcement, compacted granular backfill, erosion blanket liner, topsoil, and erosion control blanket as shown on these plans.
2. Identify, store and handle reinforcement in accordance with ASTM D4873. Reinforcement with defects, flaws, deterioration or damage will be rejected. Do not unwrap reinforcement until just before installation. Do not leave reinforcement exposed for more than 7 days before covering with granular backfill material.

PROJECT REFERENCES

Standard Specifications for Roads and Bridges, 2004 Edition and Required Provisions, Supplemental Specifications, and Special Provisions as included in the Proposal.

MATERIALS

1. Geogrid reinforcement and erosion control liner shall equal or exceed the requirements in the table below:

Element	Description	Requirements
Geogrid Reinforcement Properties	Material	PVC coated Polyester or Polyethylene Uniaxial Geogrid
	Ultimate Tensile Strength (ASTM D6637)	3,500 lbs/ft in the machine direction
	Tensile Strength at 5% Strain (ASTM D6637)	1,000 lbs/ft in the machine direction
	Creep Reduced Strength (ASTM D5262)	2,200 lbs/ft in the machine direction
	Long Term Allowable Design Load (GRI GG-4(b))	1,900 lbs/ft in the machine direction
	Maximum aperture in non-machine direction	1-inch
Erosion Blanket Liner	Materials	Straw Fiber/Coconut Fiber with Degradable Netting with functional longevity of 2 years
	Type 3 Erosion Control Blanket	Per approved SDDOT product list: http://sddot.com/business/certification/products/Default.aspx

2. Granular backfill materials should meet or exceed the requirements in the table below.

Element	Description	Requirements
Granular Material Properties	Gradation per Section 882	Aggregate Base Course
	Minimum In-place density	95% Max. Dry Density +/-2% Optimum Moisture Content
	Maximum Uncompacted Lift Thickness	6 inches

3. Welded wire form facing shall meet or exceed the requirements in the table below

Element	Description	Requirements
Wire Basket Face	Material	Welded Wire Forms per ASTM A1064
	Welded Wire Opening Dimensions	4-inch x 4-inch
	Dimensions	1.5-foot x 1.5-foot x 10-foot
	Minimum Overlap Splice	4-inches

EXCAVATION FOR REINFORCED FILL SLOPE CONSTRUCTION

Excavation of the existing slopes will be required to construct the Reinforced Fill Slope as shown on the plans. Excavation for reinforced fill slope of the 1H:1V backslope will largely be completed as part of the structure excavation for the Soil Nail Wall construction. Additional structure excavation will be required for the drainage system for the Soil Nail Wall, and for preparation of the reinforced fill slope embedment and foundation bearing surface below the Soil Nail Wall. This excavation quantity is included as "Structure Excavation, Retaining Wall" per cubic yard as specified in the Soil Nail Wall Special Provision.

The Reinforced Fill Slope will be constructed adjacent and flush (tight contact) with the reinforced shotcrete face of the Soil Nail Wall. The 1H:1V excavation within the weathered shale is anticipated to vary locally along the slope face. This will impact the finished grade of the reinforced shotcrete face. Therefore, additional granular material may be required between the reinforced fill and reinforced shotcrete face to complete the reinforced fill slope construction as required. This quantity was estimated to be approximately 530 tons. The placement and compaction of the additional granular material shall be paid at the contract unit price per ton of Granular Material for Reinforced Embankment.

REINFORCED FILL SLOPE FOUNDATION CONSTRUCTION

The Reinforced Fill Slope construction shall not begin until the following has occurred in the specified order:

1. The heave monitoring has been completed and approved by the Engineer following the Soil Nail Wall construction.
2. Structure excavation for the 2-foot slope embedment has been completed.

3. All unsuitable foundation materials within the weathered shale have been excavated from geogrid reinforcement footprint, backfilled, and proof-rolled to the satisfaction of the Engineer.
4. The drainage system has been installed and backfilled for the Soil Nail Wall.

Any foundation material found to be unsuitable should be removed and replaced with granular material conforming to Aggregate Base Course per Section 882 or other material approved by the Engineer. A suitable foundation consists of in-place weathered shale or compacted granular material, which does not pump, rut, or otherwise displace when traveled over with construction equipment. A footing undercut quantity has been provided to allow the contractor to complete the foundation undercut excavation and backfill as required. This quantity was estimated to be approximately 20 cubic yard, which assumes approximately 15% of the geogrid reinforcement foundation footprint will have an average undercut of 1.5 feet.

The excavation of the Reinforced Fill Slope embedment is incidental to the "Structure Excavation, Retaining Wall" item for the Soil Nail Wall. The undercut excavation for the foundation, and placement and compaction of the granular material shall be paid for at the contract unit price per cubic yard of Footing Undercut. The limits of undercut shall be field verified and approved by the Engineer prior to backfilling.

GENERAL REINFORCEMENT FILL SLOPE CONSTRUCTION

1. At each reinforcement level, the backfill area should be level before placing the reinforcement.
2. Geogrid reinforcements shall be placed at locations and elevations shown on the plans and the Geogrid Reinforcement Table. Geogrid reinforcement shall be placed level and perpendicular to the slope alignment. The correct orientation of the geogrid reinforcement shall be verified by the Engineer before backfilling and compaction.
3. Each layer of geogrid reinforcement should have slack removed before placement of the granular backfill. No changes to the reinforcement layout, including but not limited to strength, type, or length, shall be made without approval of the Engineer.
4. Permanent wire baskets shall be utilized to maintain 1H:1V slope face as specified in the plans (See Detail G). Construction equipment shall not be operated directly on the reinforcement. A minimum lift thickness of 6" uncompacted granular material is required for operating construction equipment over the reinforcement.



Soil Nail Wall with Reinforced Fill Slope Reinforced Fill Slope General Notes

5. Granular material shall be compacted to 95% of the maximum dry density at +/- 2% of optimum moisture content and rolled until a uniform, stable surface is obtained. Self-propelled compactor or walk-behind vibratory plate compactors shall be utilized within the reinforcement to meet required in-place density. In-place density testing shall be performed at a minimum of 1 test every 500 square feet per lift with representative coverage across the slope or a minimum of 1 test per lift when less than 500 square feet of granular material is placed per day. The maximum dry density shall be determined by SD 104, Method 4. The in-place density shall be determined by SD 105 or SD 114.
6. Welded wire forms will be used to form the wrapped face of the slope. These forms are designed to be left in place after construction. Wire forms will be 1.5 feet in height and extend into the reinforced slope at least 1.5 feet (see Detail H).
7. The outer most portion of the geogrid reinforcement wrap inside the weld wire forms will be backfilled with topsoil and seeded. This topsoil will be retained by an erosion control blanket lining inside the geogrid reinforcement wrap (see Detail G and D sheets).
8. Topsoil shall be placed on the outside of the welded wire forms and shaped to form an overall 1H:1V slope. The topsoil shall be seeded and an erosion control blanket shall be installed for the full height of the 1H:1V slope per plan.
9. At the end of each day's operation, the contractor shall shape the last lift of reinforced backfill to maintain adequate drainage and prevent ponding.

REINFORCED FILL SLOPE CONSTRUCTION TOLERANCE

The geogrid reinforcement shall be placed within 2 inches of the specified lengths, widths and elevations on plans at the time of installation. It is the responsibility of the contractor to verify by survey methods the reinforcement elevations, lengths and widths per plans during construction of each lift of the Reinforced Fill Slope. Contractor shall rectify any discrepancies prior to proceeding with construction at no additional cost to the owner.

REINFORCED FILL SLOPE TRANSITIONS

At the ends of the Reinforced Fill Slope, fill slopes will be required to transition from the reinforced fill slope and adjacent cut slopes. The transition fill slopes shall be constructed at a maximum 2H:1V slope and consist of unclassified excavation materials and topsoil. The unclassified excavation and topsoil shall be benched into the adjacent cut slopes and placed in accordance with Section 120. A Type 3 erosion control blanket shall be placed over the transition fill slopes. The construction of the transition fill slopes and placement of the Type 3 erosion control blanket shall be considered incidental to the Unclassified Excavation beyond the plan limits of the Reinforced Fill Slope.

ESTIMATED REINFORCED FILL SLOPE QUANTITIES

Item Number	Item	Quantity
120E7052	Granular Material for Reinforced Embankment	3950 Ton
831E2010	Slope Reinforcement Geogrid	7300 SqYd
421E1000	Footing Undercut	20 CuYd
530E0360	1.5' x 1.5' Welded Wire Form	3640 Ft
734E0103	Type 3 Erosion Control Blanket	3110 SqYd
230E0020	Placing Contractor Furnished Topsoil	290 CuYd



GEOGRID REINFORCEMENT TABLE

Geogrid Reinforcement Layer	Geogrid Reinforcement Elevation (ft)	Wall 3 Begin Station	Wall 3 End Station	12-foot Embedment Width: Reinforcement Length Along Slope Face (ft) ¹	8-foot Embedment Width: Reinforcement Length Along Slope Face (ft) ¹	Total Length of Reinforcement Along Slope Face (ft)
A-1	3260.0	10+80.0	11+10.3	0	31	30
A-2	3261.5	10+80.0	11+52.8	7	66	73
A-3	3263.0	10+82.7	11+95.3	8	104	113
A-4	3264.5	10+86.9	12+37.6	8	143	151
A-5	3266.0	10+91.0	13+64.5	12	212	274
A-6	3267.5	10+95.2	13+64.5	12	258	270
A-7	3269.0	10+99.3	13+64.2	14	251	265
A-8	3270.5	11+03.4	13+61.4	16	243	258
A-9	3272.0	11+07.6	13+58.5	18	233	251
A-10	3273.5	11+13.3	13+55.7	19	224	243
A-11	3275.0	11+20.0	13+52.8	19	214	233
A-12	3276.5	11+26.6	13+50.0	19	205	224
A-13	3278.0	11+33.2	13+47.2	19	195	214
A-14	3279.5	11+39.8	13+44.4	19	186	205
A-15	3281.0	11+46.4	13+41.6	19	177	196
A-16	3282.5	11+52.9	13+38.7	19	167	186
A-17	3284.0	11+59.6	13+35.7	19	157	177
A-18	3285.5	11+66.2	13+33.0	167	0	167
A-19	3287.0	11+72.7	13+30.2	158	0	158

1. Embedment is perpendicular to the slope face (into the slope). Length is parallel to the slope face.

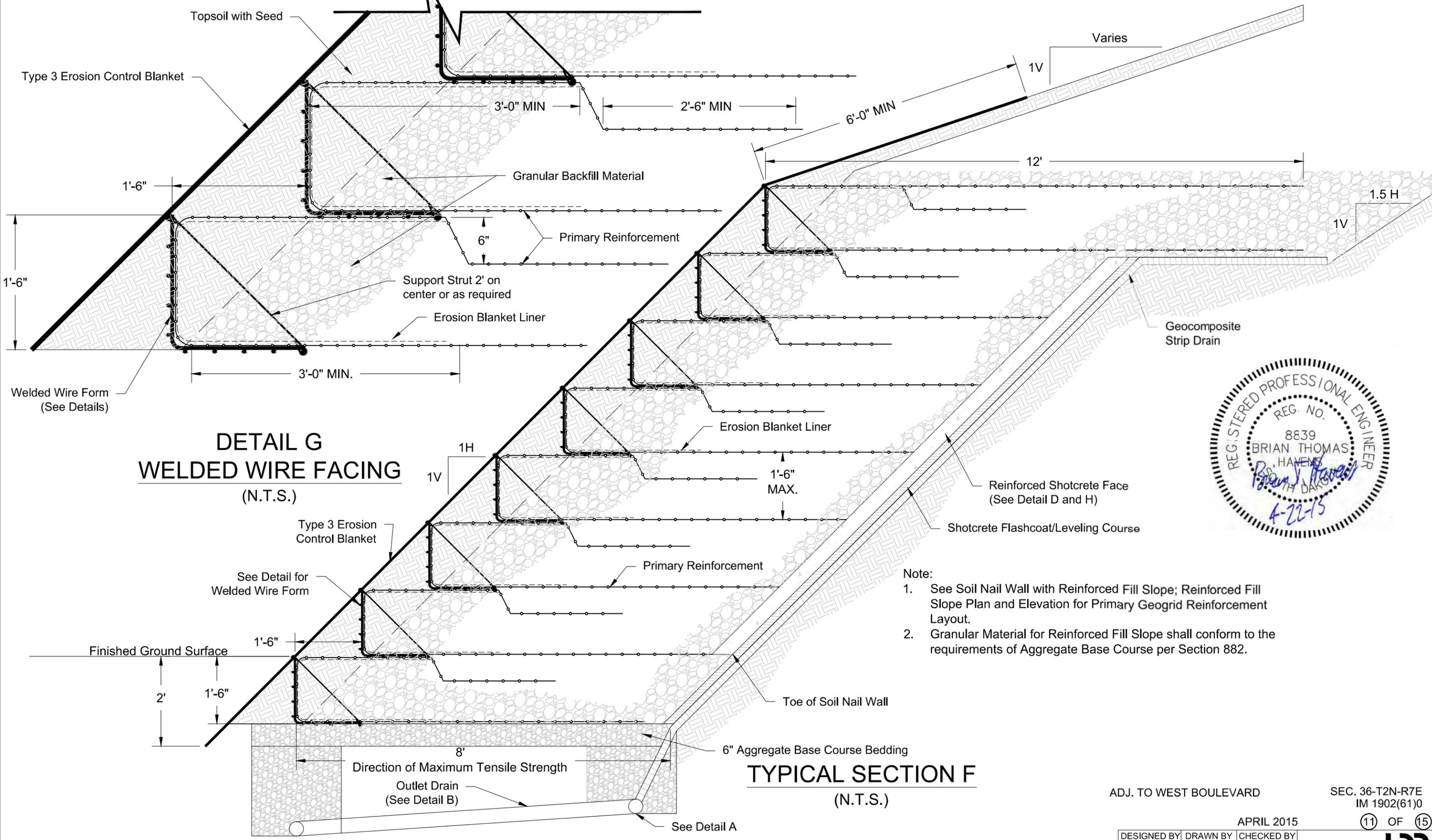
Soil Nail Wall with Reinforced Fill Slope Reinforced Fill Slope Detail and Typical Section

FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT IM 1902(61)0	SHEET E61	TOTAL SHEETS E74
Plotting Date: 04-22-15			

Plot Scale - ViewportScale

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**DETAIL G
WELDED WIRE FACING
(N.T.S.)**

**TYPICAL SECTION F
(N.T.S.)**



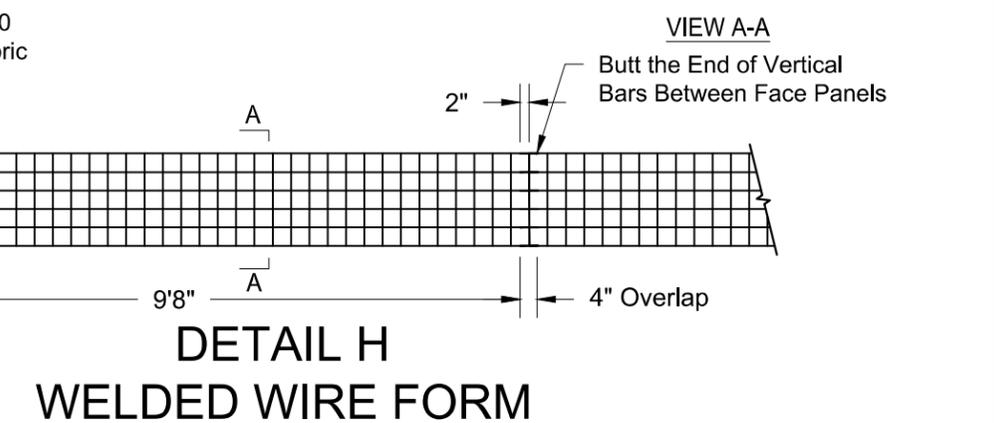
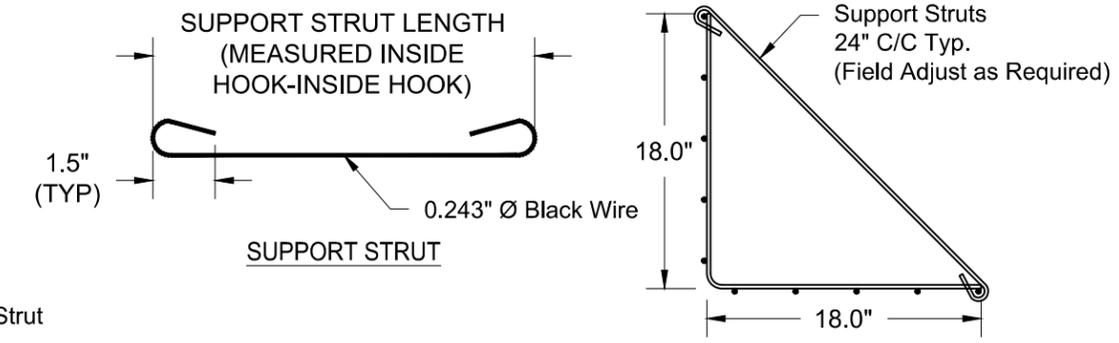
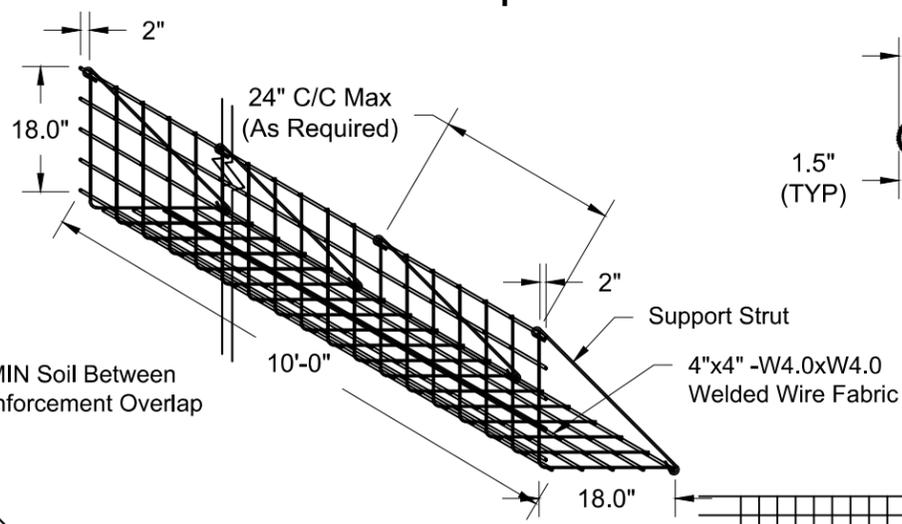
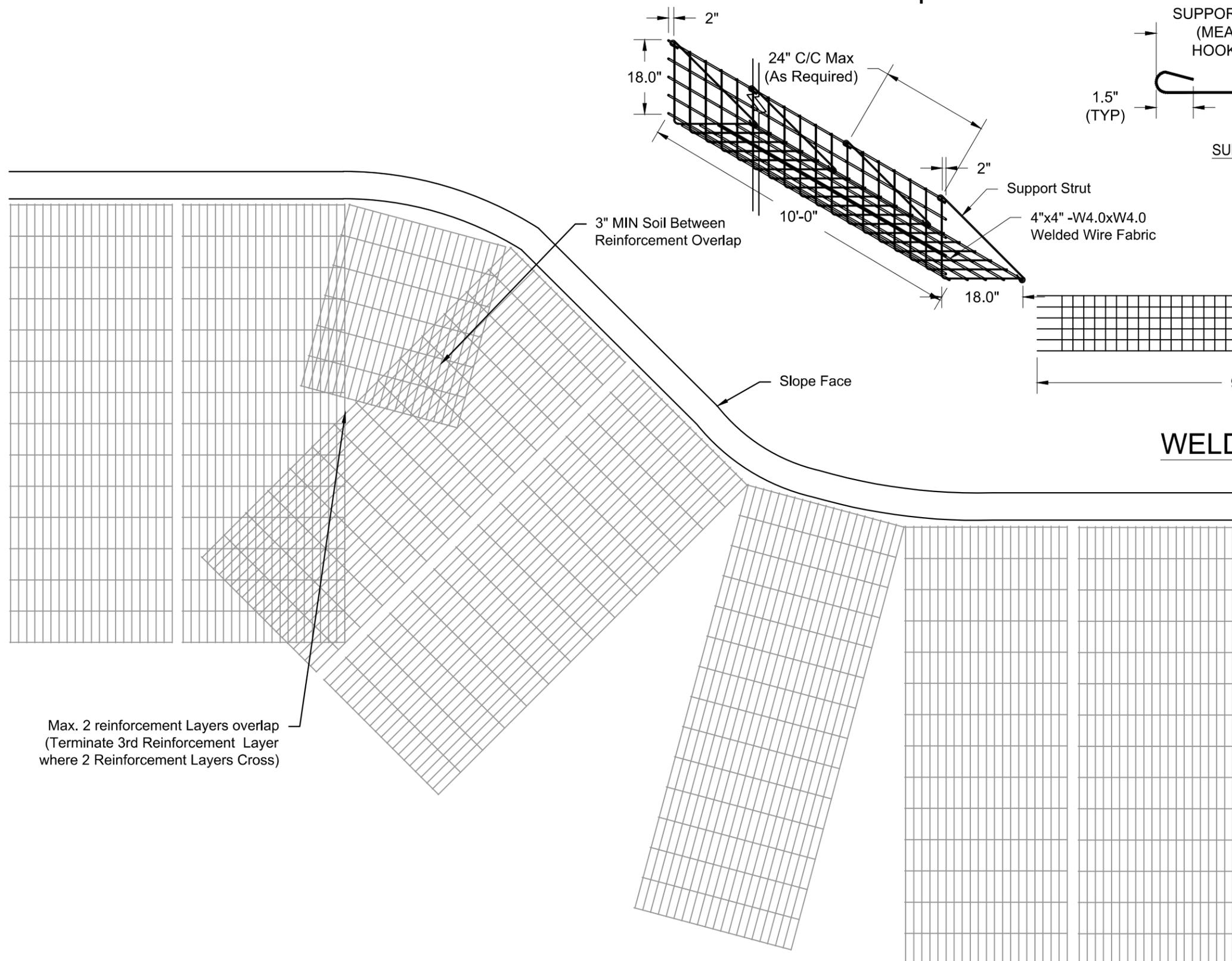
- Note:**
1. See Soil Nail Wall with Reinforced Fill Slope; Reinforced Fill Slope Plan and Elevation for Primary Geogrid Reinforcement Layout.
 2. Granular Material for Reinforced Fill Slope shall conform to the requirements of Aggregate Base Course per Section 882.

Soil Nail Wall with Reinforced Fill Slope Reinforced Fill Slope Details

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STATE OF SOUTH DAKOTA	PROJECT IM 1902(61)0	SHEET E62	TOTAL SHEETS E74
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Plotting Date: 04-22-15



- NOTES:**
1. FACING TO CONSIST OF PREFABRICATED WWF 4" x 4" - W4.0 x W4.0 FORMS.
 2. ALL FORMS AND STRUTS WILL BE FABRICATED WITH BLACK WIRE.
 3. OVERALL LENGTH OF WIRE FORMS IS 10'-0". EFFECTIVE CONSTRUCTED WIDTH IS 9'-8" WITH 4" OVER LAPPING AT ENDS.

Max. 2 reinforcement Layers overlap
(Terminate 3rd Reinforcement Layer
where 2 Reinforcement Layers Cross)



GEOGRID REINFORCEMENT PLACEMENT ON CURVES DETAIL (N.T.S)

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Plot Scale - ViewportScale

Plotted From - RUGGETT

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Soil Nail Wall with Reinforced Fill Slope Reinforced Fill Slope Plan

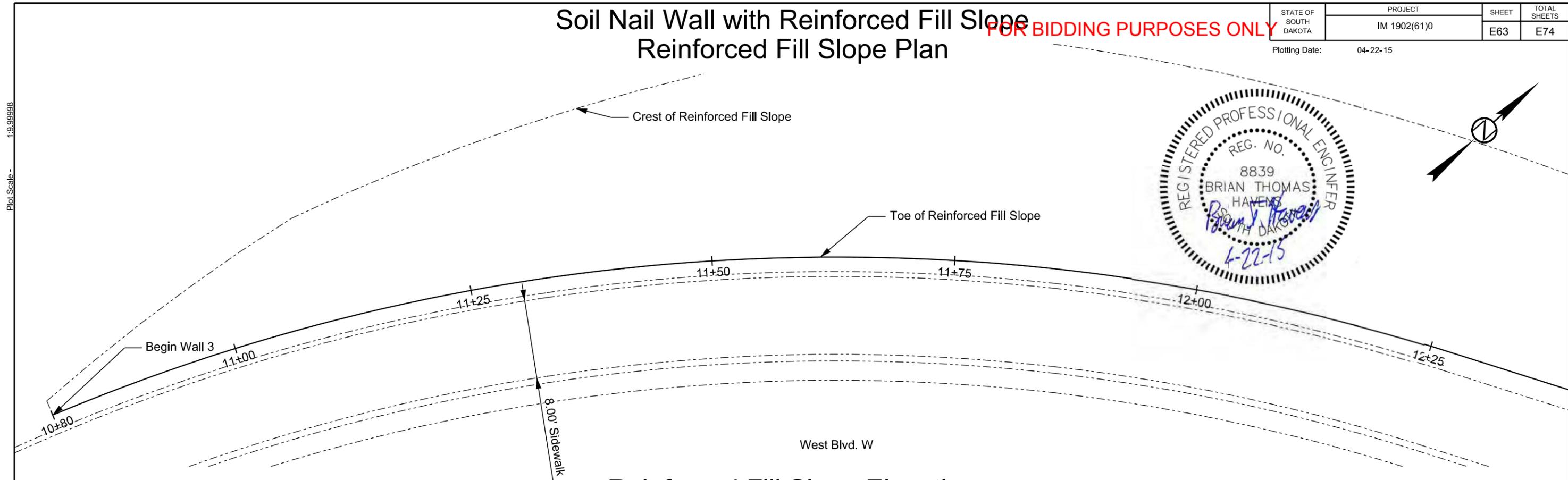
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STATE OF SOUTH DAKOTA	PROJECT IM 1902(61)0	SHEET E63	TOTAL SHEETS E74
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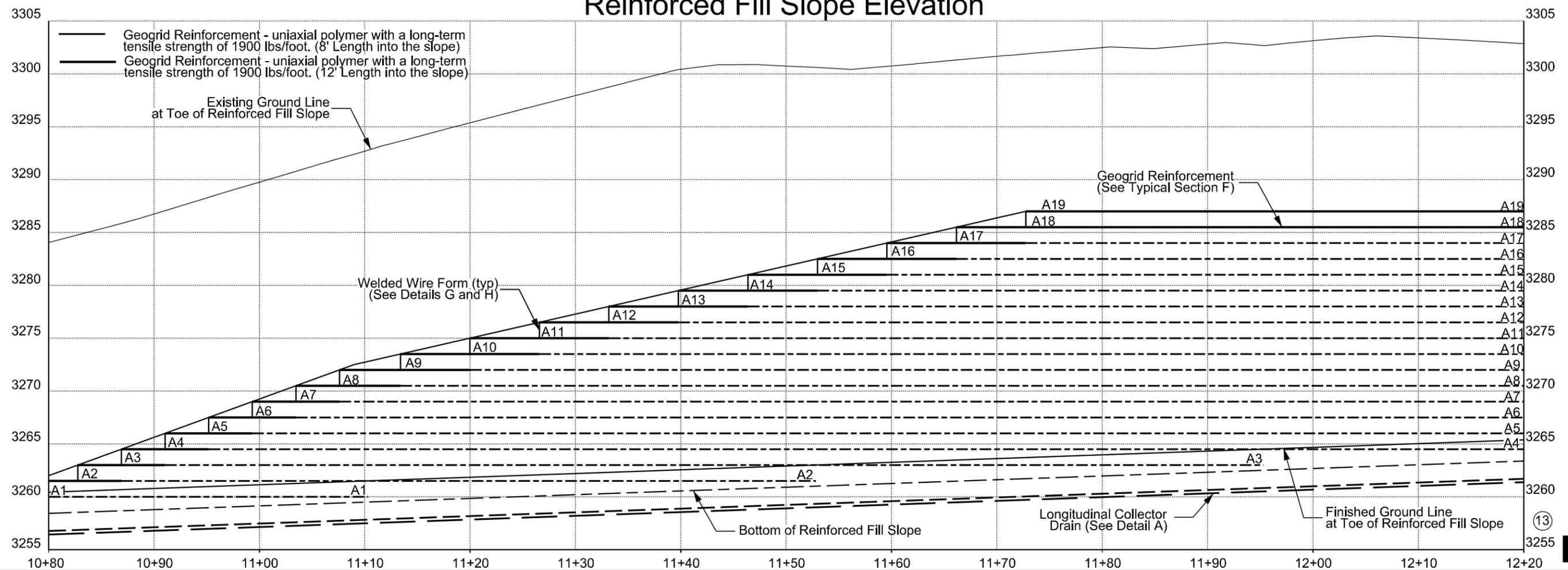
Plotting Date: 04-22-15

Plot Scale - 1:9,999

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Reinforced Fill Slope Elevation



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Soil Nail Wall with Reinforced Fill Slope FOR BIDDING PURPOSES ONLY

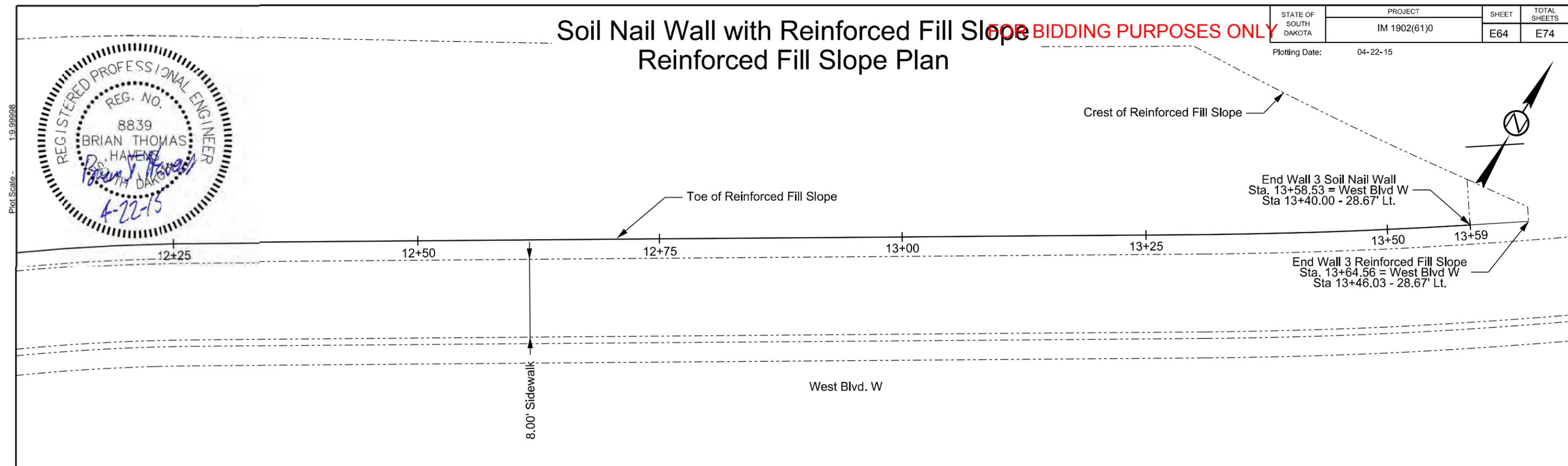
Reinforced Fill Slope Plan

STATE OF SOUTH DAKOTA	PROJECT IM 1902(61)0	SHEET E64	TOTAL SHEETS E74
Plotting Date: 04-22-15			

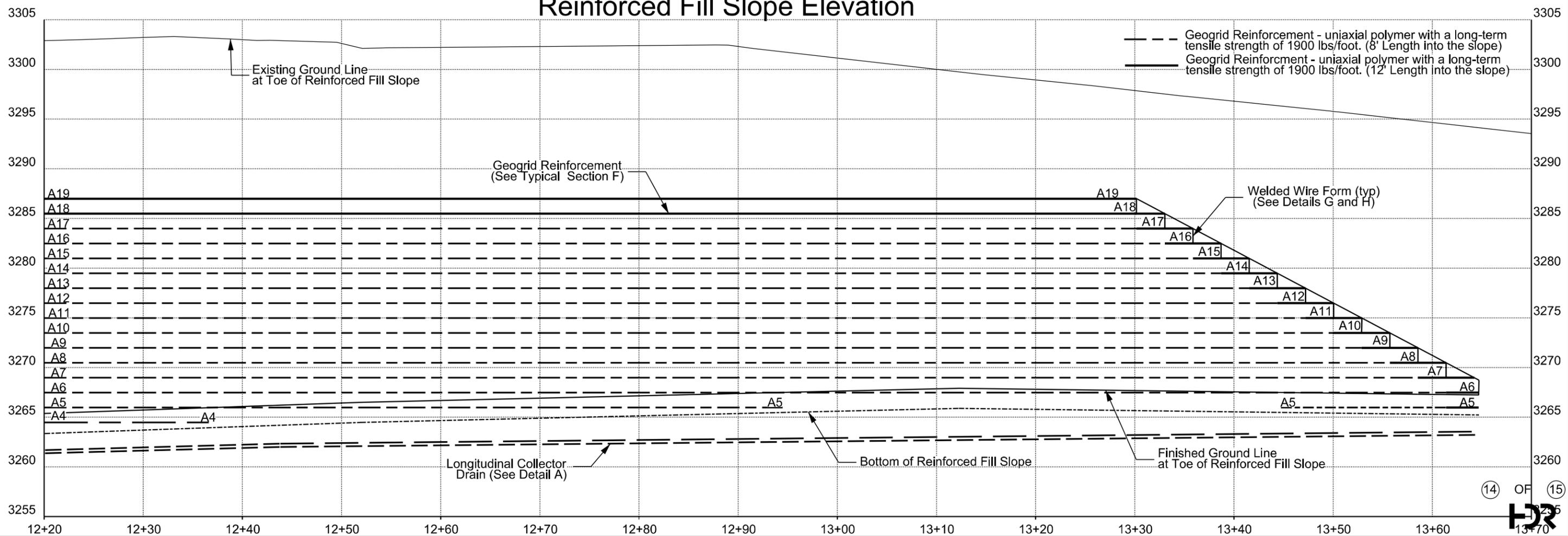


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Reinforced Fill Slope Elevation



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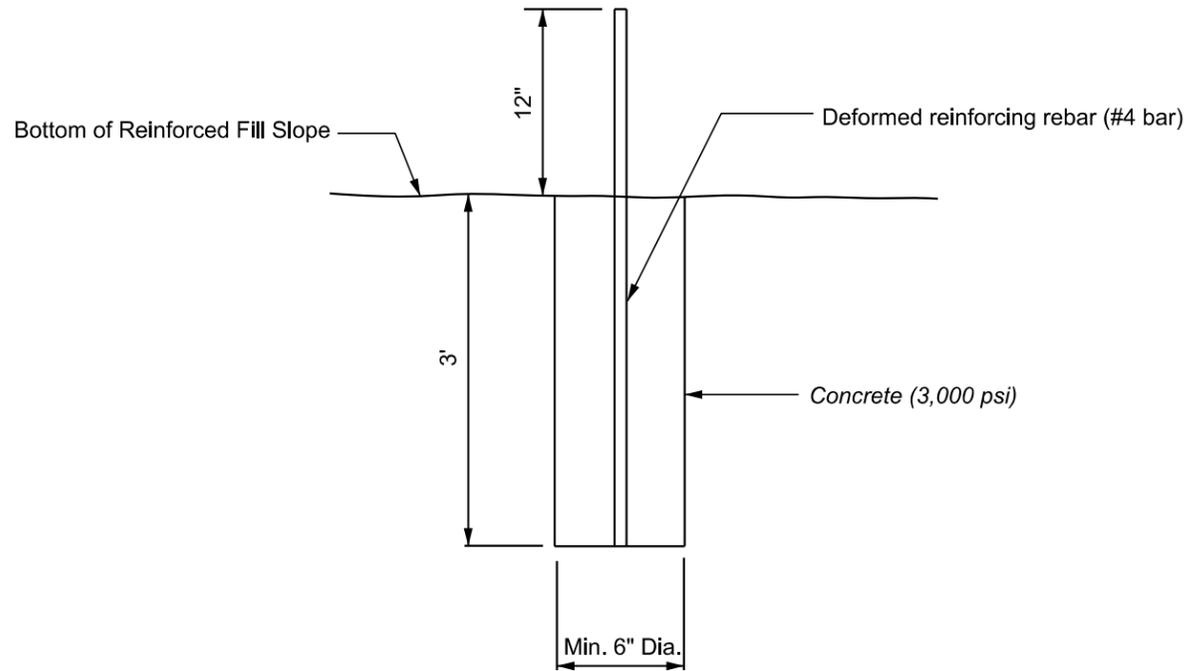
Soil Nail Wall with Reinforced Fill Slope Heave Monitoring Monument Detail

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STATE OF SOUTH DAKOTA	PROJECT IM 1902(61)0	SHEET E65	TOTAL SHEETS E74
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Rev. 05/18/2015 AJF

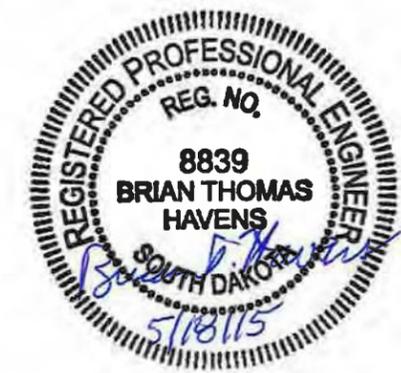
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1. Install monuments at bottom of the reinforced fill slope at the following locations:

STATION (Wall 3)	OFFSET/DIRECTION
10+80	2' RT
11+20	6' LT
11+70	2' RT
12+20	6' LT
12+70	2' RT
13+20	6' LT
13+58	2' RT

2. Protect each monument with a 3-foot high, fluorescent plastic mesh placed at a 3-foot radius from the monument
3. Survey the monuments twice per week for the first month and then weekly beyond a month
4. Continue survey of monuments throughout the 6 month rebound period.
5. Construction of the Reinforced Fill Slope shall not begin until the 6 month rebound period has lapsed.
6. Remove the portion of the monuments which extends above Reinforced Fill Slope foundation grade and mesh fence upon completion of the monitoring.
7. The cost for materials, installation, and monitoring of the monuments shall be incidental to structural excavation for the soil nail wall.



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Plotted From - rflaget

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

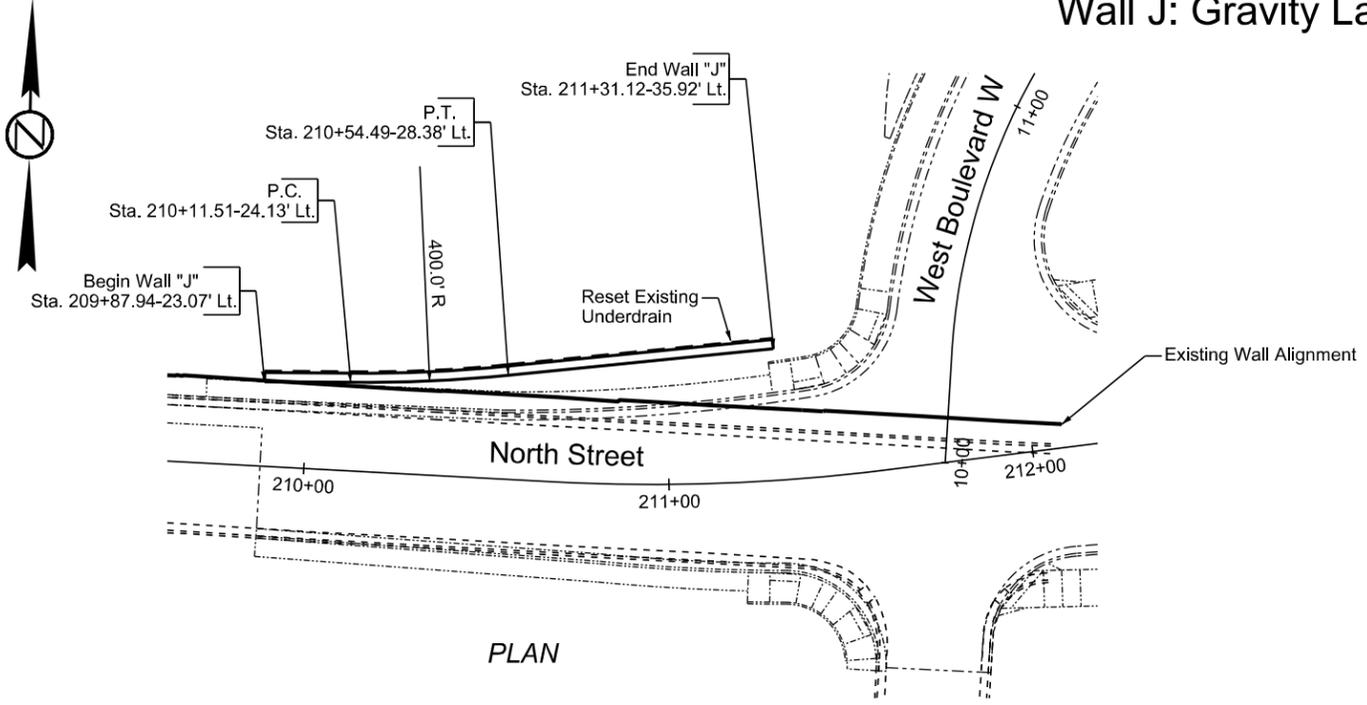
FOR BIDDING PURPOSES ONLY

STATE OF SOUTH DAKOTA	PROJECT IM 1902(61)0	SHEET E66	TOTAL SHEETS E74
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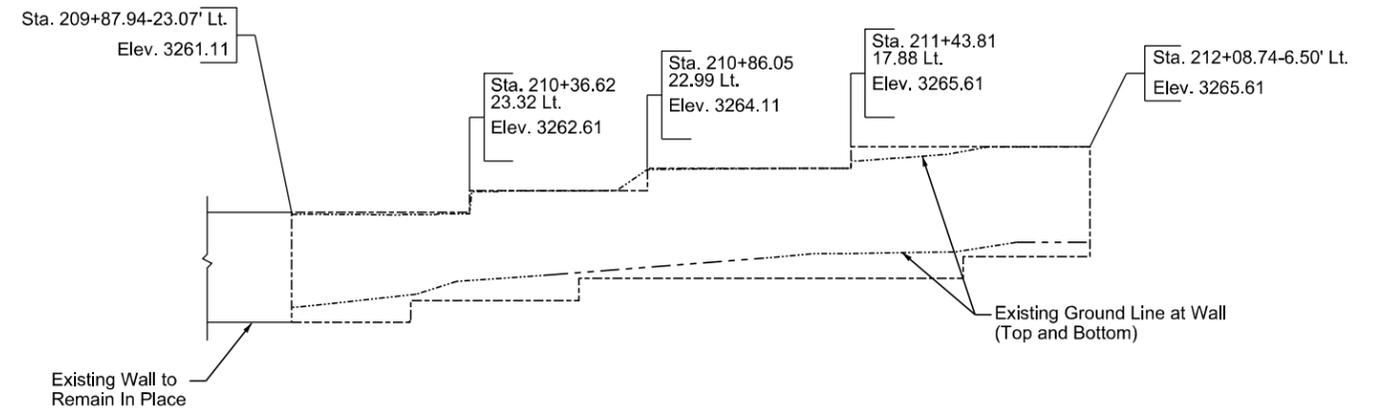
Plotting Date: 05-06-2015

Wall J: Gravity Large Concrete Block Retaining Wall

Plot Scale - 1:50



PLAN



ELEVATION - EXISTING WALL

ESTIMATED QUANTITIES		
ITEM	UNIT	QUANTITY
Miscellaneous Work	Site	1

- 1161 Sq. Ft. Remove Gravity Large Concrete Block Wall for Reset
 - 471 Sq. Ft. Remove Gravity Large Concrete Block Wall
 - 1161 Sq. Ft. Reset Gravity Large Concrete Block Wall
 - 140 Ft. Reset Underdrain
 - 18.1 Cu. Yd. Footing Undercut
- Items 1 thru 5 are approximate quantities contained in the above bid item and are for information only.

GENERAL NOTES

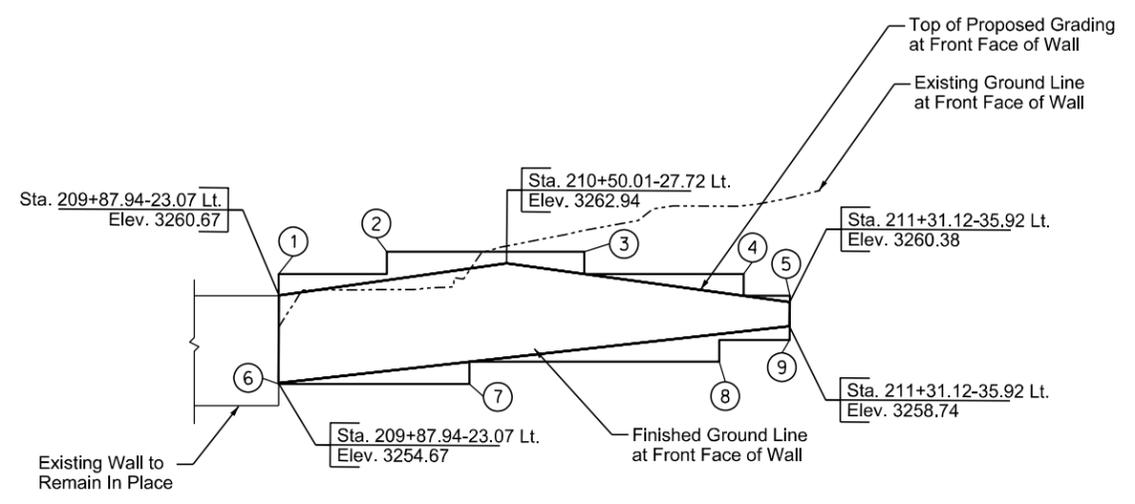
- A section of the existing gravity large concrete block retaining wall adjacent to Philadelphia Street shall be removed for reset, and reset along a different alignment with a new surface profile at the top and bottom of the wall as shown.
- The Contractor is responsible for verifying and coordinating with the manufacturer of the existing wall (Redi-Rock by Pete Lien & Sons). The wall shall be reset per the manufacturer's installation requirements.
- The embankment and retaining wall shall be brought up in horizontal lifts simultaneously. Compaction behind the retaining wall shall be in accordance with Section 120 of the Specification.
- The slope shall be monitored regularly for instability during construction. Construction activities shall be sequenced to minimize the amount of time the temporary backslope is left exposed and unsupported. If stability of the backslope becomes a concern, the construction backslope shall be flattened as approved by the Engineer.

UNDERDRAIN

There is an existing underdrain system behind the wall. A portion of the existing underdrain shall be reset per wall manufacturer's recommendations.

MEASUREMENT AND PAYMENT

- The Estimated Quantities have been included for reference. All costs associated with removing, resetting and disposal of blocks shall be incidental to the contract unit price per site for Miscellaneous Work. Inclusive to the Miscellaneous Work item shall be all excavation, backfilling, undercutting, labor, materials and incidentals related to the work described herein.
- The extra concrete blocks which are not reset shall become the property of the Contractor. They shall be removed from the site and disposed of at a location as approved by the Engineer.



ELEVATION - FRONT FACE OF WALL "J"

WALL LAYOUT		
NOTE	STATION	ELEVATION
①	209+87.94-23.07' Lt.	3262.61
②	210+17.48-24.44' Lt.	3264.11
③	210+71.28-30.93' Lt.	3264.11
④	211+17.73-35.38' Lt.	3262.61
⑤	211+31.12-35.92' Lt.	3261.11
⑥	209+87.94-23.07' Lt.	3255.11
⑦	210+40.00-26.42' Lt.	3255.11
⑧	211+10.53-34.96' Lt.	3256.61
⑨	211+31.12-35.92' Lt.	3258.11



NOTES AND DETAILS FOR GRAVITY LARGE CONCRETE BLOCK RETAINING WALL

ADJ TO NORTH STREET SEC. 36-T2N-R7E
 PENNINGTON COUNTY IM 1902(61)0
 S.D.DEPT.OF TRANSPORTATION
 APRIL 2015 ① OF ①

DESIGNED BY AF	DRAWN BY RL	CHECKED BY AF	APPROVED
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Plotted From - rloggett

File - ...:\design\Section_E\Wall J Layout

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E67	E74

FOR BIDDING PURPOSES ONLY

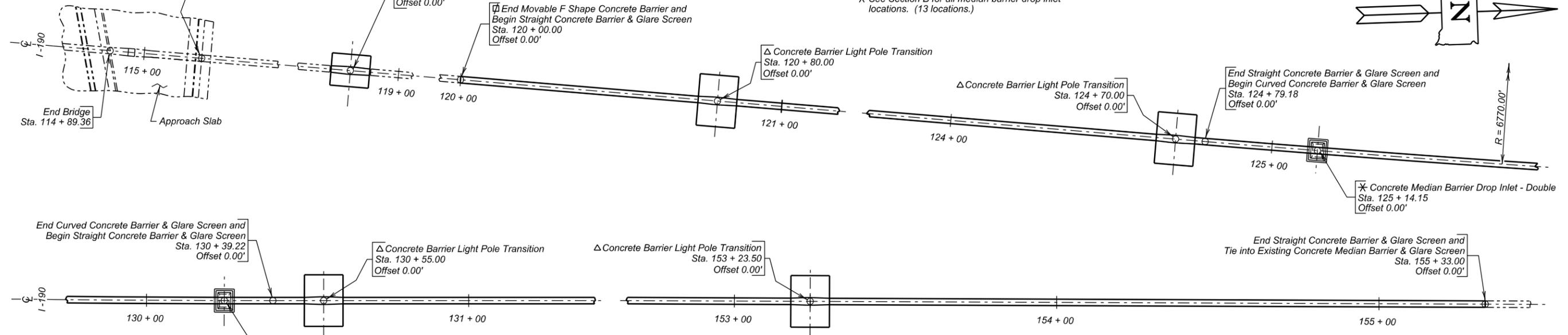
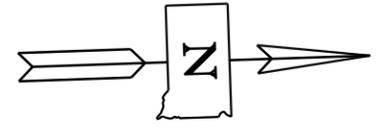
⊠ A shorter length of Movable F Shape Barrier may need to be fabricated to fit. See SPECIAL MOVABLE F SHAPE INTERIOR SECTION CONCRETE BARRIER DETAILS sheet.

⊠ Attach to Concrete Median Barrier & Glare Screen on the Sleeper Slab
Start Movable F Shape Concrete Barrier
Sta. 115 + 17.87
Offset 0.00'

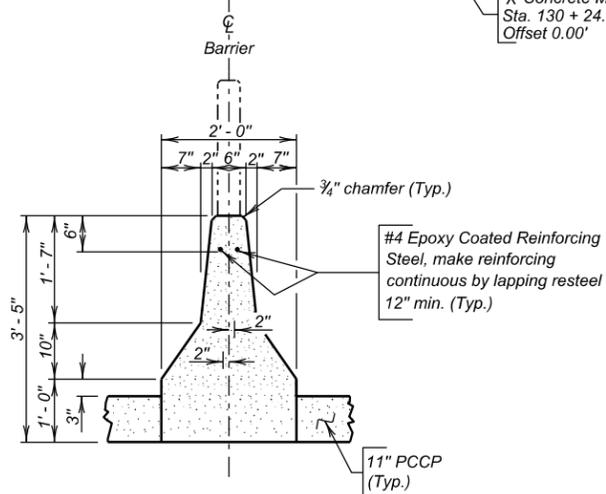
Concrete Barrier Light Pole Transition (Movable F Shape Concrete Barrier)
Sta. 118 + 85.00 (also at Sta. 116 + 90.00)
Offset 0.00'

⊠ End Movable F Shape Concrete Barrier and Begin Straight Concrete Barrier & Glare Screen
Sta. 120 + 00.00
Offset 0.00'

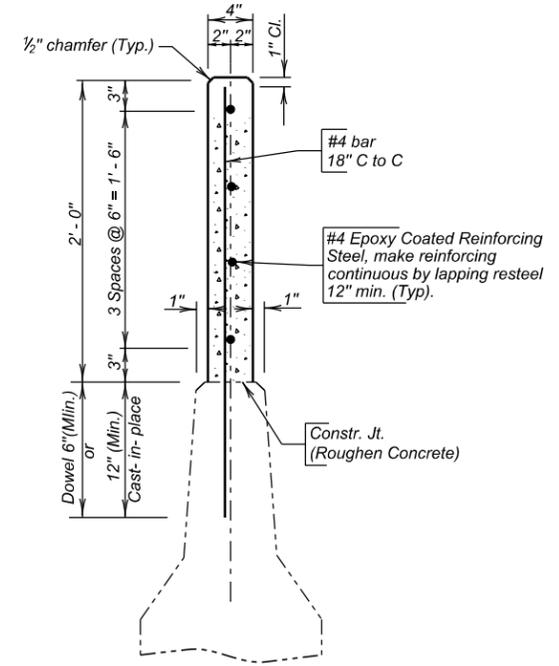
△ See Section L for all light pole locations. (18 locations.)
* See Section B for all median barrier drop inlet locations. (13 locations.)



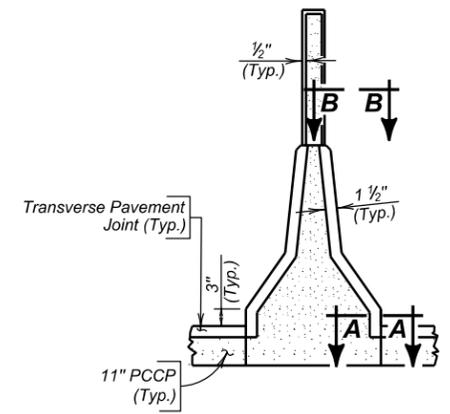
LAYOUT



CONCRETE MEDIAN BARRIER TYPICAL SECTION



GLARE SCREEN TYPICAL SECTION

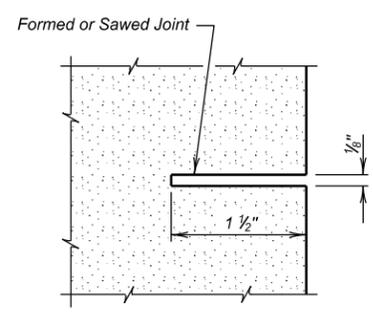


CONTRACTION JOINT

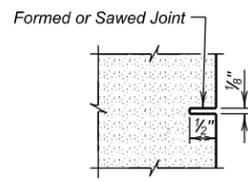
INDEX OF SHEETS-

- Sheet No. 1 - Layout & Details for Concrete Median Barrier & Concrete Glare Screen
- Sheet No. 2 - Estimate of Structure Quantities & Notes
- Sheet No. 3 - Notes (Continued)
- Sheet No. 4 - Details for Concrete Median Barrier Light Pole Transition
- Sheet No. 5 - Details for Concrete Median Barrier Light Pole Transition (Movable F Shape Concrete Barrier)
- Sheet No. 6 - Details for Concrete Median Barrier Drop Inlet - Double
- Sheet No. 7 - Special Movable F Shaped Interior Section Concrete Barrier Details
- Sheet No. 8 - Standard Plate No. 628.01

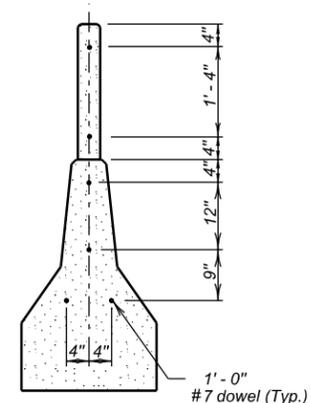
NOTE:
For informational purposes:
Each foot of Concrete Barrier contains 0.1461 Cu. Yds. of Concrete and 1.34 lbs. of No. 4 Epoxy Coated Reinforcing Steel.
Each foot of glare screen contains 0.0247 Cu. Yds. of concrete and 3.97 lbs. of No. 4 Epoxy Coated Reinforcing Steel.



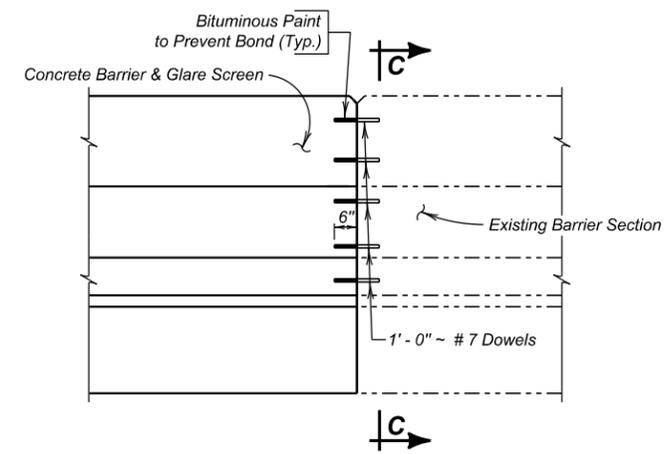
SEC. A - A



SEC. B - B



SEC. C - C



ELEVATION - TIE TO EXISTING BARRIER

LAYOUT & DETAILS FOR CONCRETE MEDIAN BARRIER & CONCRETE GLARE SCREEN

I-190
PCN 1162

PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION

DECEMBER 2014

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

DESIGNED BY PW PENN1162	CK. DES. BY BB 1162TA01	DRAFTED BY BT	Kevin N. Coeden BRIDGE ENGINEER
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STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E69	E74

SLIPFORM CONSTRUCTION

- The Concrete Glare Screen may not be constructed using slipform equipment.
- Concrete barrier may be constructed using slipform equipment provided that the finished concrete barrier is true to the specified line and grade within a tolerance of + or - 1/4 inch in 10 ft.
- The concrete barrier shall present a smooth, uniform appearance in its final position, and shall conform to horizontal and vertical lines shown in the plans or as directed by the Engineer. The surfaces shall be free from humps, sags, or other irregularities. Should a section of the concrete barrier prove to be unsatisfactory in the judgement of the Engineer, that section shall be removed and reconstructed at the Contractor's expense.
- The concrete shall be vibrated, rammed, tamped or worked with suitable appliances until the concrete has been consolidated to the maximum practical density, free of rock pockets, and snug against the form surfaces. The concrete shall be of such consistency after slipforming that it will maintain the shape of the concrete barrier without support. Prior to the beginning of operations, the Contractor shall insure that a continuous deposit of concrete can be made at the slipform machine to minimize starting and stopping.
- The grade for the top of the concrete barrier shall be indicated by an offset guideline set by the Contractor from survey marks established by the Engineer. The forming portion of the slipform machine shall be readily adjustable vertically during the forward motion of the machine to conform to the predetermined grade line. The slipform machine shall be guided by horizontal sensors that ride along a wire line. A grade line gauge or pointer shall be attached to the machine in such a manner that a continual comparison can be made between the barrier being placed and the established grade line. The slipform machine shall not exceed the speed recommended by the manufacturer.
- In lieu of the above method for maintaining the barrier grade, the slipform machine may be operated on rails or forms set at uniform depth below the predetermined finished top of the barrier grade, or on existing pavement.
- Compensation for concrete barrier slump may be made by running the machine slightly higher and reducing the size of the forming area so that the end result is equivalent to the design section and acceptable to the Engineer. Concrete that is furnished to the slipform machine shall not exceed 3/4 inch slump, unless directed otherwise by the Engineer, to further minimize the barrier slump.

CONCRETE MEDIAN BARRIER LIGHT POLE TRANSITION

- The epoxy coating on resteel cut or bent to allow junction box placement shall be repaired as required, and the cut ends epoxy coated. The epoxy coating shall be inert in concrete and compatible with the coating applied to the new epoxy coated reinforcing steel. This coating shall be the epoxy touch up coating material supplied by an epoxy coating manufacturer who supplies coating material for new epoxy coated reinforcing steel. The reinforcing steel shall be coated promptly and before detrimental oxidation occurs. The coating shall be allowed to cure for 24 hours or as per the manufacturer's recommendations, whichever is more stringent, before concrete can be placed.

- The cost of cleaning and epoxy coating the cut reinforcing steel shall be included in the various bid items. All costs for furnishing and installing the Preformed Expansion Joint Filler, Low Modulus Silicon joint Sealer, Bituminous Paint, and Dowel Bars used in the expansion joints shall be incidental to the contract unit price per cubic yard for Class A45 Concrete, Misc.

SHOP PLANS

The fabricator shall initially submit three (3) copies of the Shop Plans to the Office of Bridge Design for review. One reviewed copy will be sent to the fabricator who will then make the necessary changes, if any, and then send the Office of Bridge Design six (6) final approved copies for distribution. This requirement shall apply for both the luminaire anchorage system and the fabricated steel items.

TWO COMPONENT COAL TAR EPOXY PAINT

- A coating of Two Component (Self-Curing) Coal Tar Epoxy Paint conforming to Steel Structures Painting Council Specification SSPCPaint, No. 16, Coal Tar Epoxy-Polyimide Black Paint shall be shop applied (as per the manufacturer's recommendations) to the entire outer surface of each W4x13 beam and 6"x6"x1/2" angle prior to installation as detailed in notes 2 through 8 below.
- Steel surfaces which are to receive this coating shall be prepared by blast cleaning to near white, grade SSPC 10. The Coal Tar Epoxy Paint shall be applied before rusting occurs and in no case later than 24 hours after blast cleaning.
- The coating may be applied by spray or brush. If the application is by brush, apply with a stiff brush heavily loaded with paint; apply quickly and smoothly and avoid excessive brushing.
- The coating shall be applied in two coats to a total dry film thickness of 15 mils at its thinnest spot.
- Drying time between coats shall be a minimum of 12 hours and a maximum of 72 hours under normal painting conditions. Long drying times between coats will cause poor intercoat adhesion and it is advisable in warm weather to reduce the maximum interval between coats. In very hot weather it may be necessary to limit the intercoat drying period to 24 hours or less.
- At normal temperatures the coating dries dust free in about four hours and becomes thoroughly hardened after 3 to 5 days of curing.
- The coating shall not be applied when the receiving surfaces or ambient temperatures are below 50 degrees Fahrenheit unless it can reasonably be anticipated that the average ambient temperature will be 50 degrees Fahrenheit or higher for the 5 day period following the application of any coat.
- Steel members which are welded after coating shall receive two coats of the coating applied to the weld heat affected zones.
- After placement, the areas of the beams and angles where the coating has been damaged shall be touched up.
- The cost of furnishing and applying the coating shall be incidental to the contract lump sum price for Structural Steel, Miscellaneous.

PAYMENT

- Plans quantity will be the basis of payment for Class M6 Concrete, Reinforcing Steel, Epoxy Coated Reinforcing Steel and Structural Steel, Miscellaneous.
- All bolts, nuts, washers and wedge anchors shall be included in the contract lump sum price for Structural Steel, Miscellaneous.
- Preformed Expansion Joint Filler shall be included in the contract price per cubic yard for Class M6 Concrete.

TEMPORARY GLARE SCREEN

- Temporary Glare Screens shall be installed on the movable F shape concrete barriers
- Temporary Glare Screens shall be from one of the following companies or equivalent:
 - Carsonite Composites
19845 U.S. Highway 76
Newberry, South Carolina 29108
(800) 648-7916
<http://www.carsonite.com/>
 - Safe-Hit, A Division of Energy Absorption Systems, Inc.
70 W Madison Street, Suite 2350
Chicago, IL 60602
(800) 537-8958
<http://www.safehitx.com/>
 - Flexstake, Inc.
2150 Andrea Lane
Fort Myers, FL. 33912
(800) 348-9839
<http://www.flexstake.com/>
- All temporary glare screens and hardware shall be handled and installed according to the guidelines and procedures recommended by the manufacturer.
- Payment for temporary glare screens including furnishing, fabricating, and installing the temporary glare screens and all attaching hardware in accordance with the plans and specifications and shall be paid for at the contract unit price per foot for Temporary Concrete Barrier Glare Screen.

NOTES (CONTINUED)
FOR

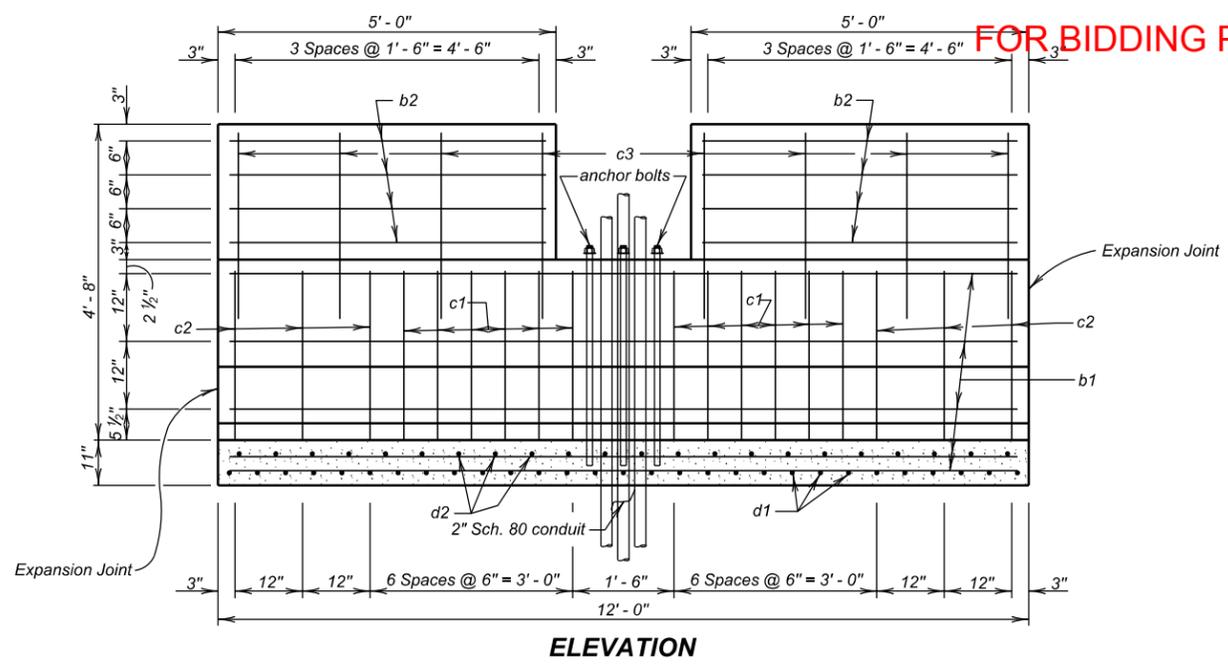
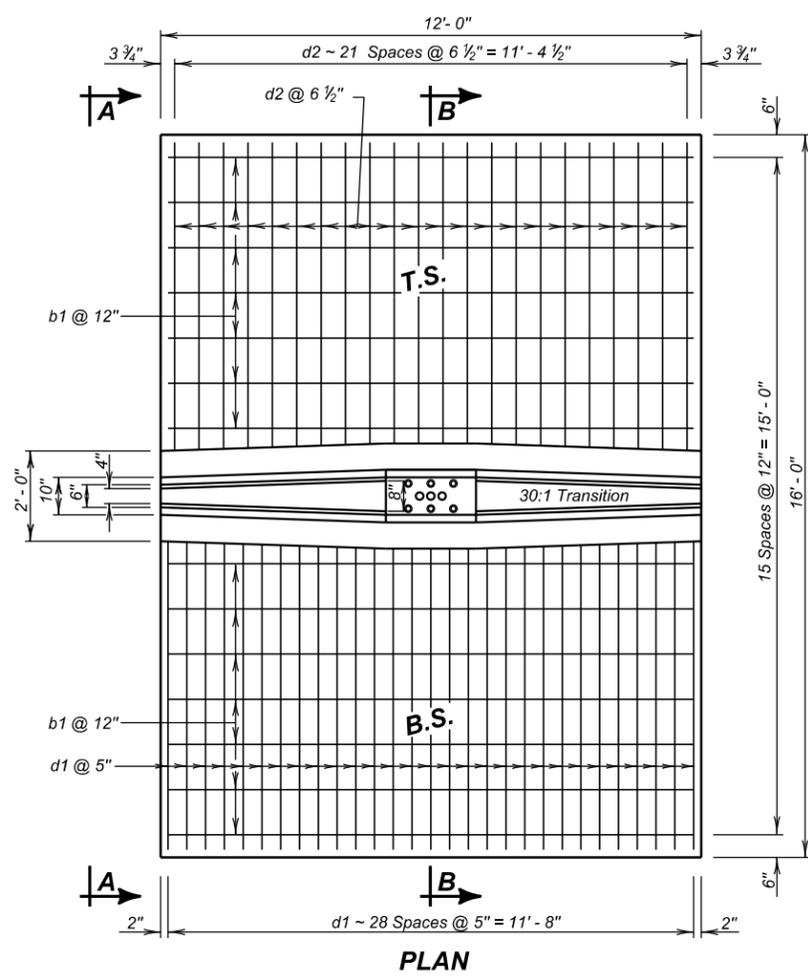
CONCRETE MEDIAN BARRIER
& CONCRETE GLARE SCREEN

DECEMBER 2014

3 OF 8

DESIGNED BY PW PENN1162	CK. DES. BY BB 1162TA03	DRAFTED BY BT	<i>Kevin N. Boeden</i> BRIDGE ENGINEER
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FOR BIDDING PURPOSES ONLY



REINFORCING SCHEDULE				
(For One Transition)				
Mk.	No.	Size	Length	Type
b1	38	4	11'-8"	Str.
b2	8	4	4'-8"	Str.
c1	12	5	8'-0"	S11B
c2	12	4	4'-0"	17A
d1	29	4	15'-9"	Str.
d2	22	7	15'-9"	Str.
d3	8	Ø	1'-0"	Str.

Bending Details	

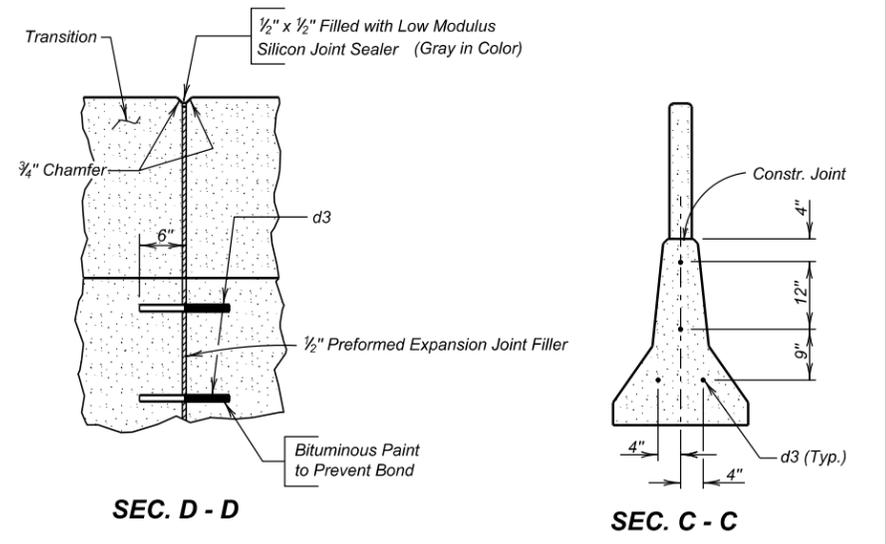
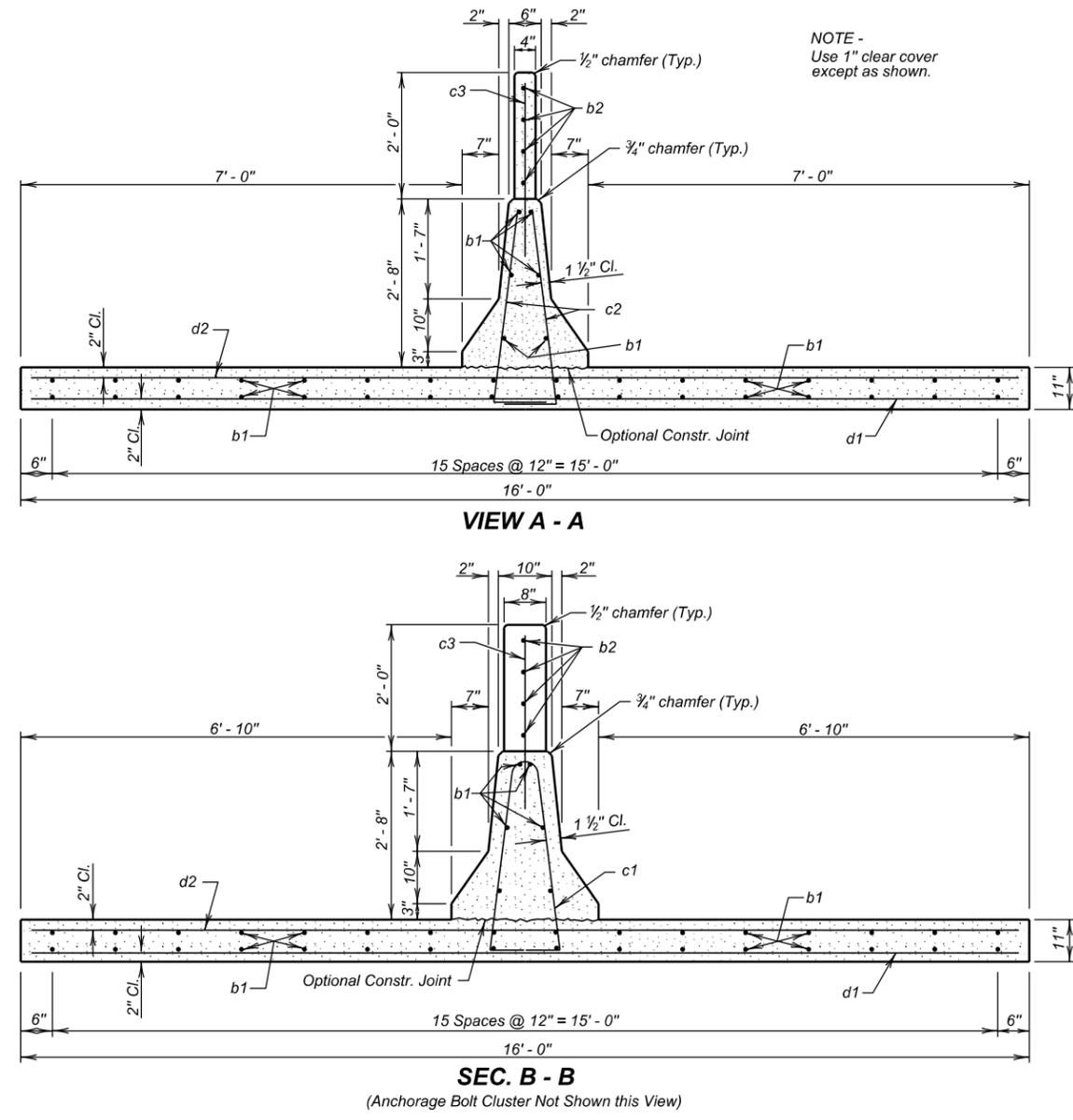
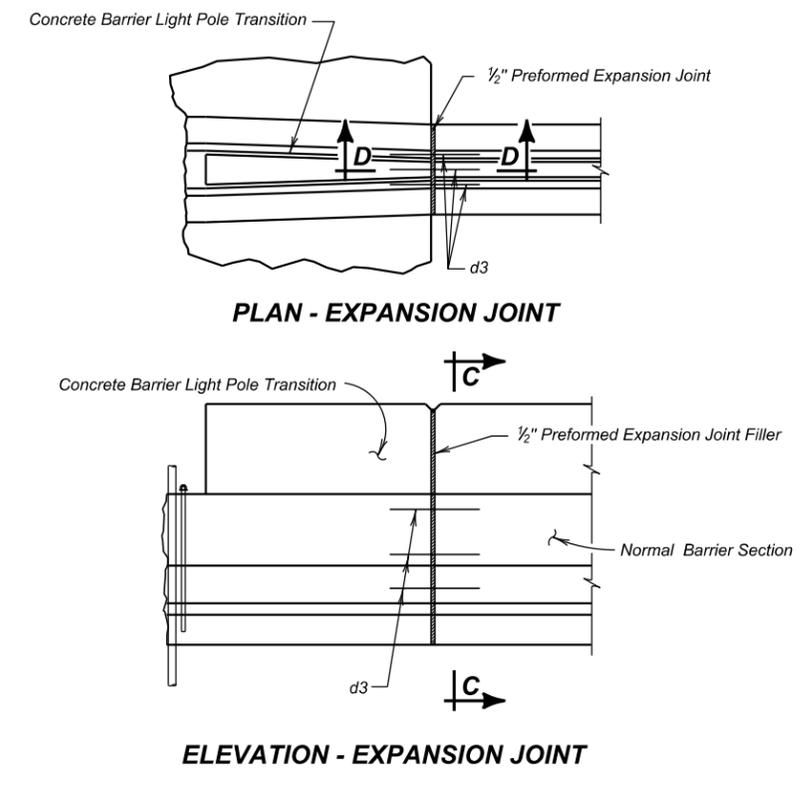
NOTES:
 All dimensions are out to out of bars.
 All resteel shall be epoxy coated.
 Ø A36 5/8" diameter smooth bars.

ESTIMATED QUANTITIES		
(For One Transition)		
ITEM	UNIT	QUANTITY
Class A45 Concrete, Misc.	Cu. Yd.	8.3
Epoxy Coated Reinforcing Steel	Lb.	1497

LEGEND FOR PLACING RE-STEEL

T.S. - Top of Slab
 B.S. - Bottom of Slab

NOTE:
 1. Use for luminaires IL11 - IL27.
 2. The 2" Sch. 80 conduit and anchor bolts required to install the luminaire poles shall be incidental to the cost of the contract bid items for the Concrete Median Barrier Light Pole Transition.

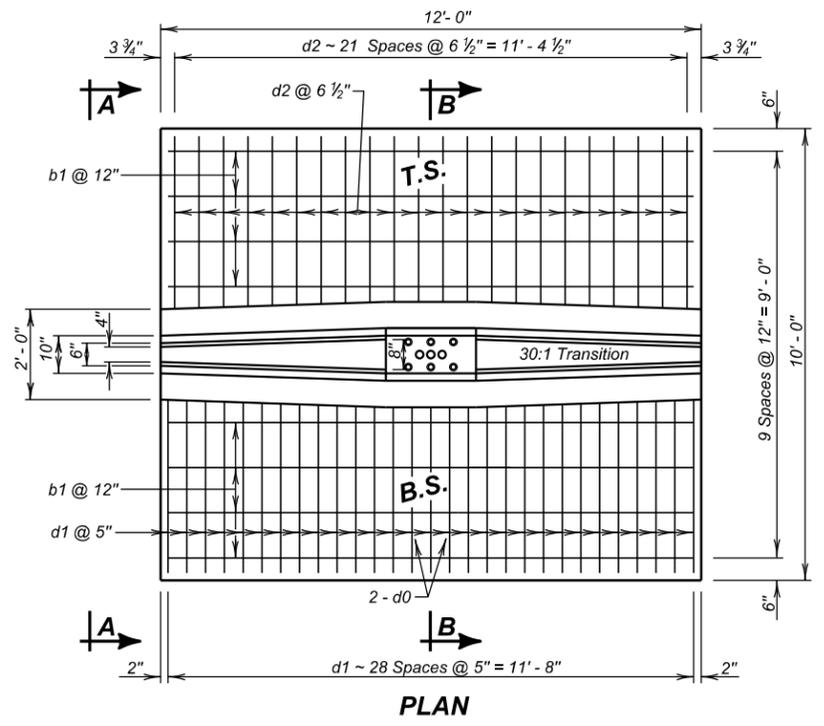


DETAILS FOR
CONCRETE MEDIAN BARRIER LIGHT POLE TRANSITION
 I-190
 PENNINGTON COUNTY
 S. D. DEPT. OF TRANSPORTATION
 DECEMBER 2014

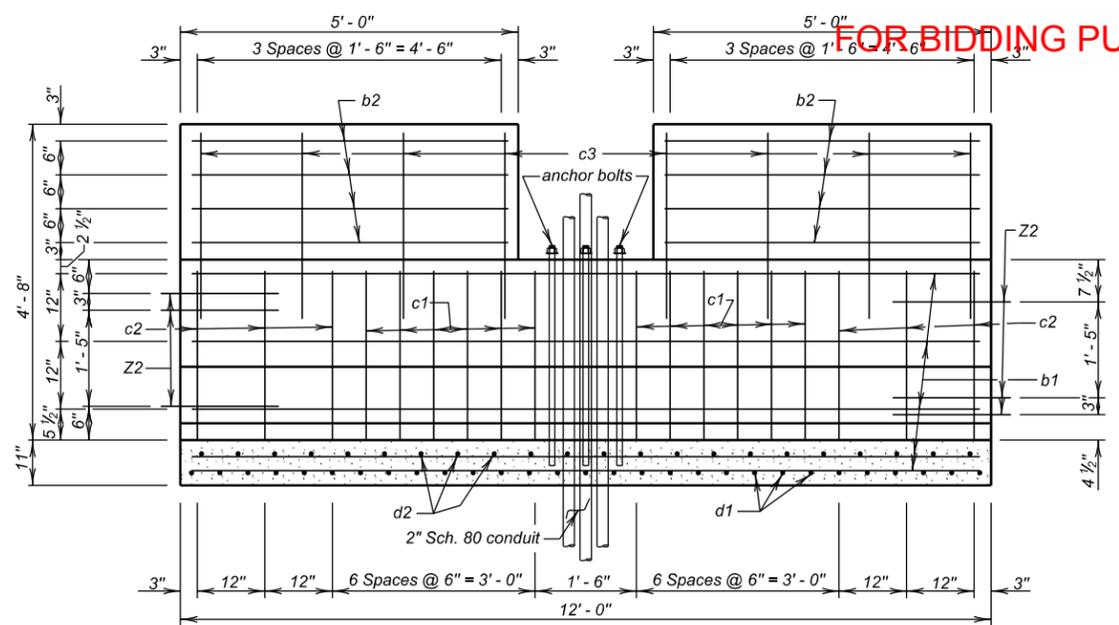
DESIGNED BY PW PENN1162	CK. DES. BY BB 1162TA04	DRAFTED BY BT	Kevin N. Goeden BRIDGE ENGINEER
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FOR BIDDING PURPOSES ONLY

Revised May 27, 2015 PW



PLAN

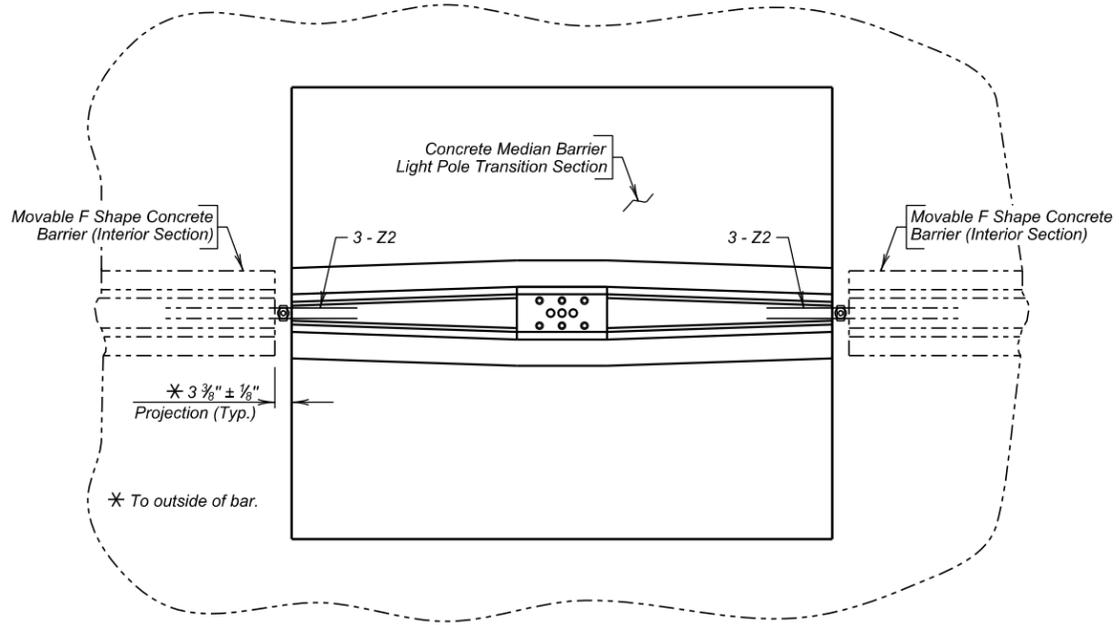


ELEVATION

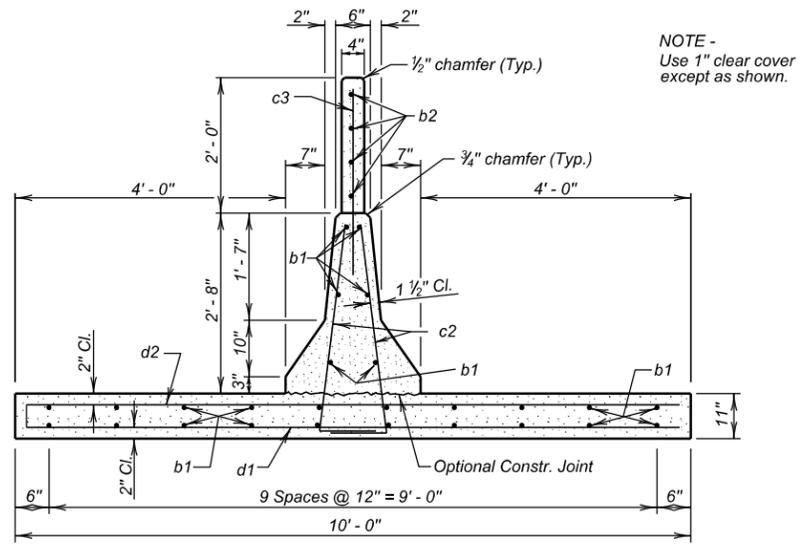
REINFORCING SCHEDULE				
(For One Transition)				
Mk.	No.	Size	Length	Type
b1	26	4	11'-8"	Str.
b2	8	4	4'-8"	Str.
c1	12	5	8'-0"	S11B
c2	12	4	4'-0"	17A
c3	8	4	2'-9"	Str.
d1	29	4	9'-9"	Str.
d2	22	7	9'-9"	Str.
Z2	6	6	4'-2"	S11

Bending Details	
	Type S11
	Type 17A
	Type S11B

NOTES:
All dimensions are out to out of bars.
All resteel shall be epoxy coated.

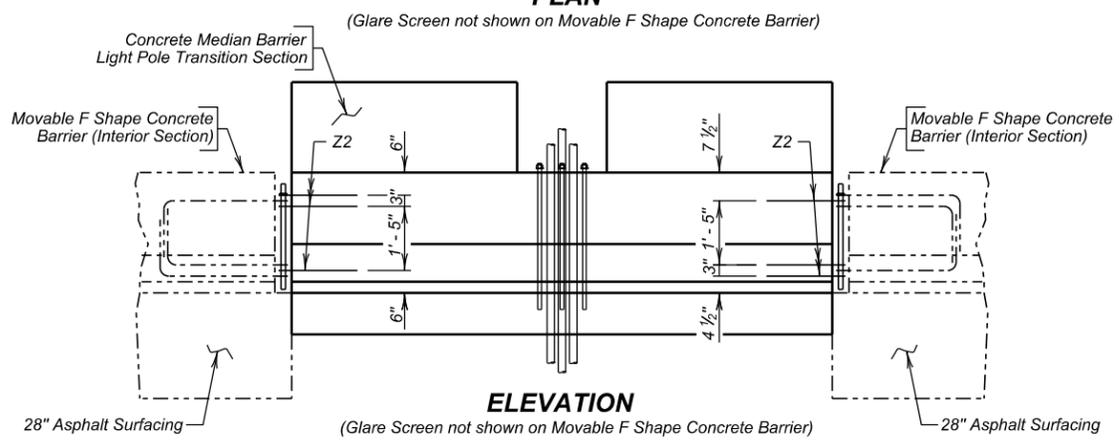


PLAN

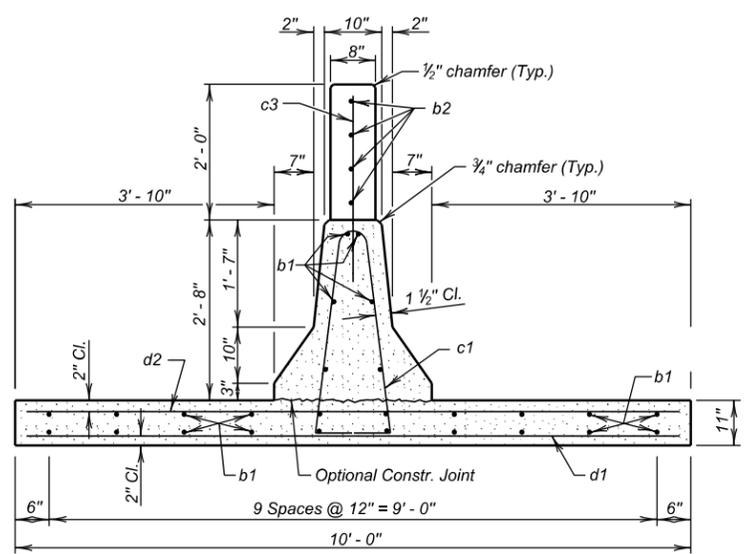


VIEW A - A

NOTE -
Use 1" clear cover except as shown.



ELEVATION



SEC. B - B

(Anchorage Bolt Cluster Not Shown this View)

ESTIMATED QUANTITIES		
(For One Transition)		
ITEM	UNIT	QUANTITY
Class A45 Concrete, Misc.	Cu. Yd.	5.9
Epoxy Coated Reinforcing Steel	Lb.	1039

LEGEND FOR PLACING RE-STEEL	
T.S.	- Top of Slab
B.S.	- Bottom of Slab

NOTE:
1. Use for luminaires IL9 and IL10.
2. The 2" Sch. 80 conduit and anchor bolts required to install the luminaire poles shall be incidental to the cost of the contract bid items for the Concrete Median Barrier Light Pole Transition.

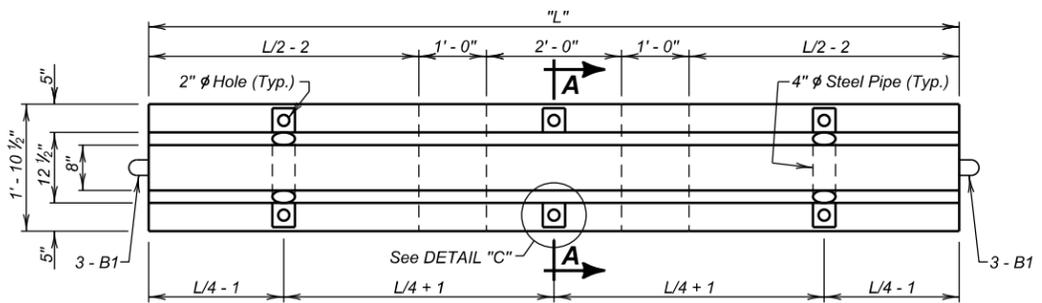
DETAILS FOR
CONCRETE MEDIAN BARRIER LIGHT POLE TRANSITION
(MOVABLE F SHAPED CONCRETE BARRIER)

I-190
PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2014

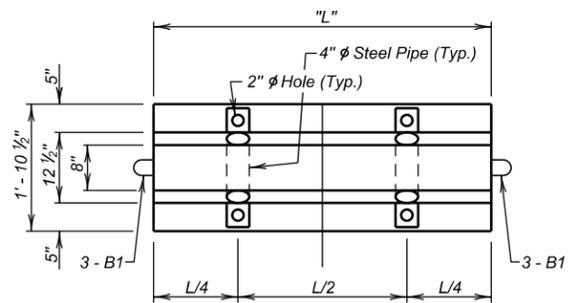
DESIGNED BY PW PENN1162	CK. DES. BY BB 1162TA05	DRAFTED BY BT	Kevin N. Coeden BRIDGE ENGINEER
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FOR BIDDING PURPOSES ONLY

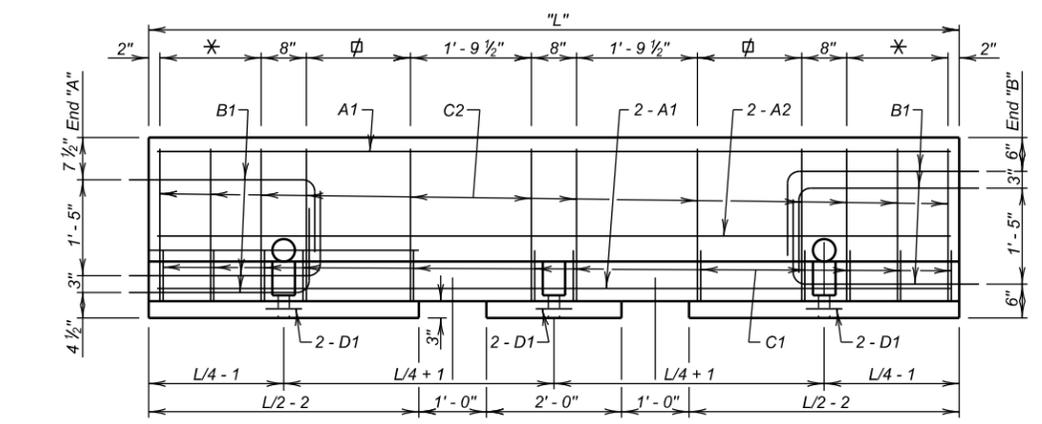
Revised May 27, 2015 PW



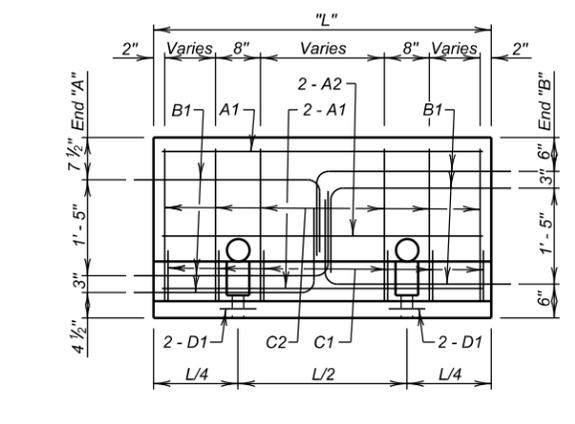
PLAN
(When 5' - 0" < "L" < 12' - 6")



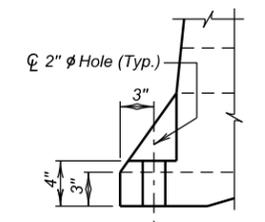
PLAN
(When 3' - 0" ≤ "L" ≤ 5' - 0")



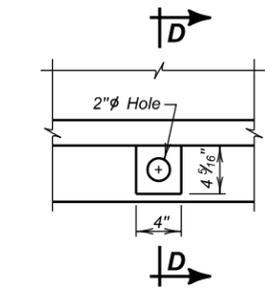
ELEVATION
(When 5' - 0" < "L" < 12' - 6")



ELEVATION
(When 3' - 0" ≤ "L" ≤ 5' - 0")



SEC. D - D



DETAIL 'C'

REINFORCING SCHEDULE					Bending Details	
Mk.	No.	Size	Length	Type		
A1	3	5	L - 4"	Str.		
A2	2	4	L - 4"	Str.		
B1	6	6	8' - 3"	S11B		
C1	4	4	2' - 9"	13A		
C2	4	4	4' - 6"	S11A		
D1	6	6	3' - 0"	S11		

NOTES:
All dimensions are out to out of bars.
All radii are to inside of bars.

GENERAL NOTES

- Concrete shall be Class M6 in accordance with Section 462 of the Standard Specifications. Type I, II, or III cement shall be used.
- All reinforcing steel shall conform to ASTM A 615, Grade 60, except B1 bars. The B1 loop bars shall be 3/4 inch smooth steel bars with a minimum yield of 60 ksi, a tensile strength of not less than 1.25 times the yield strength but a minimum of 80 ksi, an 8 inch elongation of 14%, and passing a 180 degree bend test using a 3.5D pin bend diameter. The loops shall be installed within 1/8 inch of the plan dimensions.
- Steel for pins shall conform to ASTM A36. Pipe shall be galvanized and conform to ASTM A53.
- Galvanize the connecting pin assembly after the fabrication in accordance with ASTM A123. Paint exposed portions of the loop assembly B1 bars with a zinc rich galvanizing paint.
- All exposed edges shall be chamfered 3/4 inch.
- Use 2 inch clear cover on all reinforcing steel EXCEPT as shown.
- Each movable concrete barrier section is detailed to provide End "A" to End "B" connection by insertion of a pin through loops formed by re-bars "B1".
- It is anticipated that three (3) special movable F shape interior section concrete barriers will be required with lengths of 3.64', 8', and 9'. The contractor shall field verify the number of sections and the length of the sections.
- All costs for materials, labor, equipment, and incidentals necessary for furnishing the complete movable barrier interior section including one connecting pin assembly shall be incidental to the contract unit price per each for "Movable F Shape Concrete Barrier, Interior Section".
- For informational purposes only, the estimated quantities for Special Movable F Shape Interior Section Concrete Barrier lengths ("L") are given below.

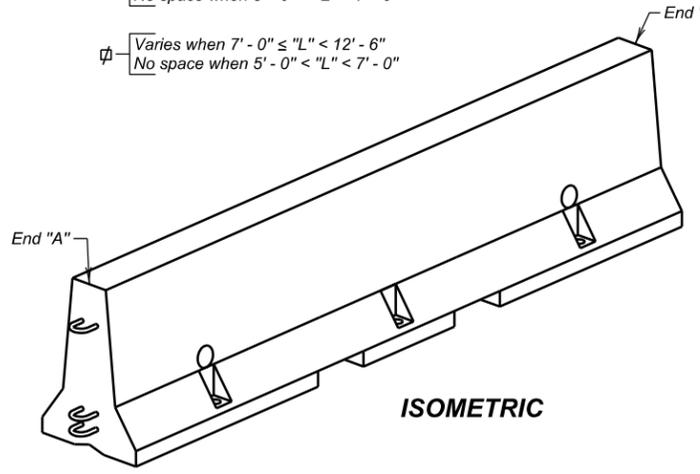
"L"	Class "M6" Concrete	Reinforcing Steel
3' - 0" ≤ "L" < 5' - 0"	0.106L - 0.010 Cu. Yd.	4.465L + 119.944 Lb.
5' - 0" ≤ "L" < 7' - 0"	0.106L - 0.048 Cu. Yd.	4.465L + 128.956 Lb.
7' - 0" ≤ "L" < 10' - 0"	0.106L - 0.048 Cu. Yd.	4.465L + 148.328 Lb.
10' - 0" ≤ "L" < 12' - 6"	0.106L - 0.048 Cu. Yd.	4.465L + 158.014 Lb.

SPECIAL MOVABLE F SHAPE INTERIOR SECTION CONCRETE BARRIER DETAILS

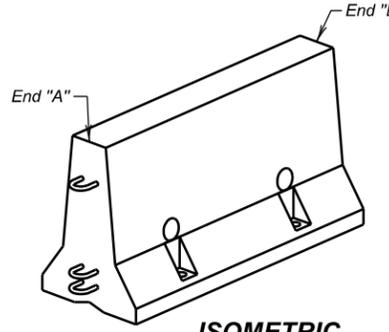
I-190
PENNINGTON COUNTY
S. D. DEPT. OF TRANSPORTATION
DECEMBER 2014

* 2 Equal Spaces (9" max.) when 10' - 0" ≤ "L" < 12' - 6"
Varies when 7' - 0" ≤ "L" < 10' - 0"
No space when 5' - 0" < "L" < 7' - 0"

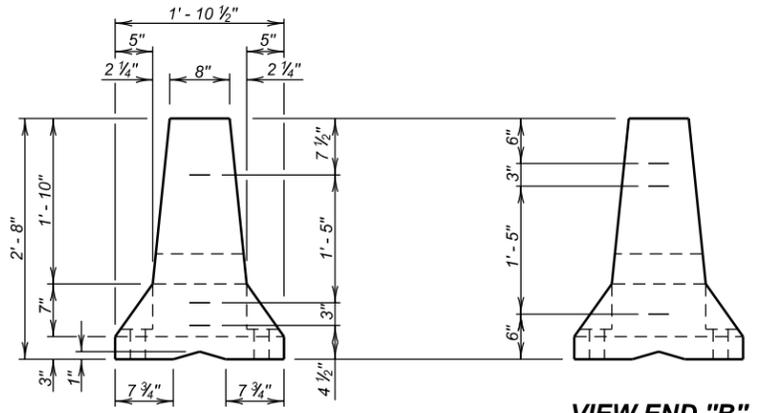
∅ Varies when 7' - 0" ≤ "L" < 12' - 6"
No space when 5' - 0" < "L" < 7' - 0"



ISOMETRIC

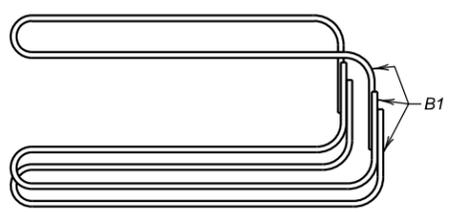


ISOMETRIC



VIEW END 'A'

VIEW END 'B'



LOOP ASSEMBLY DETAILS

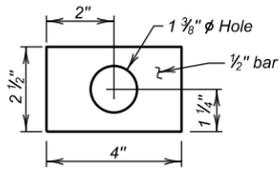
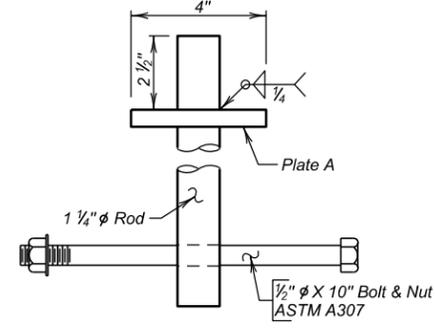
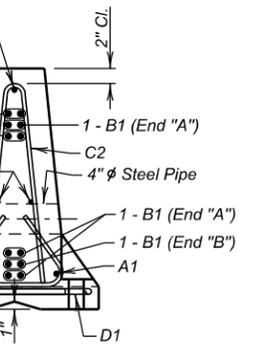


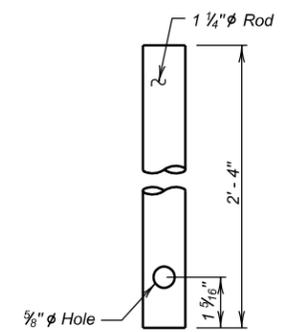
PLATE A



ASSEMBLED CONNECTING PIN

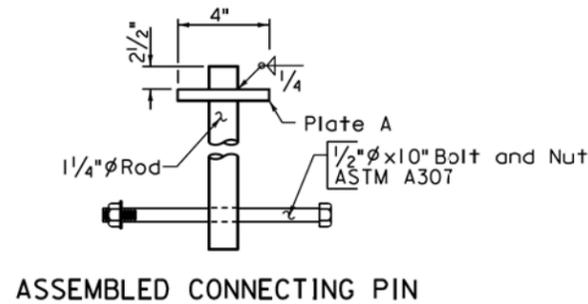
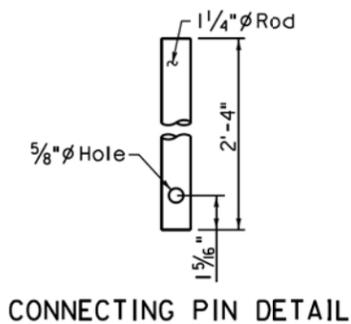
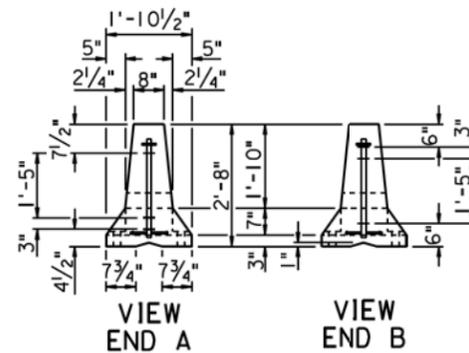
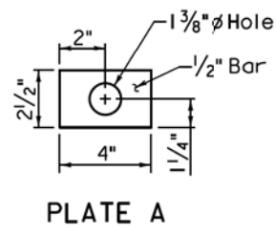
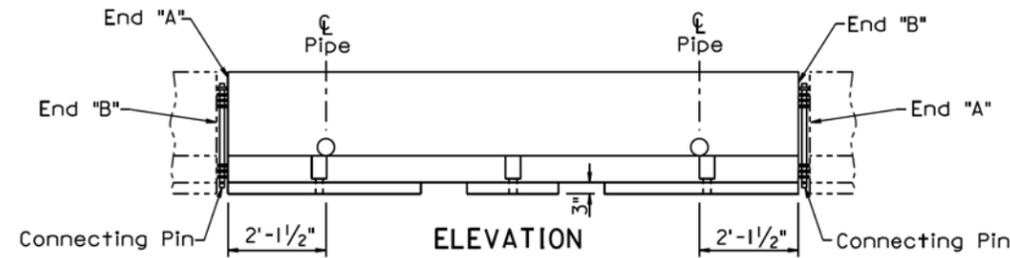
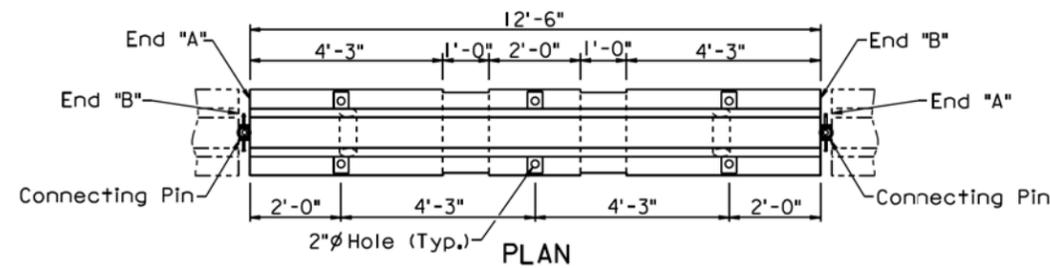


SEC. A - A



CONNECTING PIN DETAIL

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	IM 1902(61)0	E74	E74



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GENERAL NOTES:

The detailed drawings are for illustrative purpose and depicts the current version of the F shape concrete barrier. If new movable concrete barriers are requested on a project, they shall be constructed according to the F shape movable concrete barrier details on standard plate 628.10.

Each movable concrete barrier section weighs 5030 ± pounds.

Each movable concrete barrier section is detailed to provide end "A" to end "B" connection by insertion of a pin through steel loops.

The Jersey shape or any version of the F shape traffic control movable concrete barriers may be used on a project, however, only the same type or version shall be used for each run of barriers.

Movable concrete barrier sections shall be placed to provide uniform bearing of the sections with the paved surface as approved by the Engineer.

Movable concrete barrier sections shall never be moved or lifted using the end loops.

Movable concrete barrier sections that have been damaged shall not be used. Barrier sections are considered damaged if the loops are end welded onto existing damaged loops, loops are fractured, or there is exposed rebar from fractured concrete.

All cost for transporting the barriers from the specified location to the project site, installing, and returning the barriers to the specified location shall be incidental to the contract unit price per each for "Traffic Control Movable Concrete Barrier".

If the concrete barriers need to be moved and reset on the project, requiring the barriers to be transported by truck, all cost for removing, transporting, and resetting the barriers shall be incidental to the contract unit price per each for "Remove and Reset Traffic Control Movable Concrete Barrier". All cost for small shifts in alignment of the barriers, not requiring the barriers to be transported by truck, shall be incidental to various contract items.

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