

PLOT SCALE - 1"=10000'

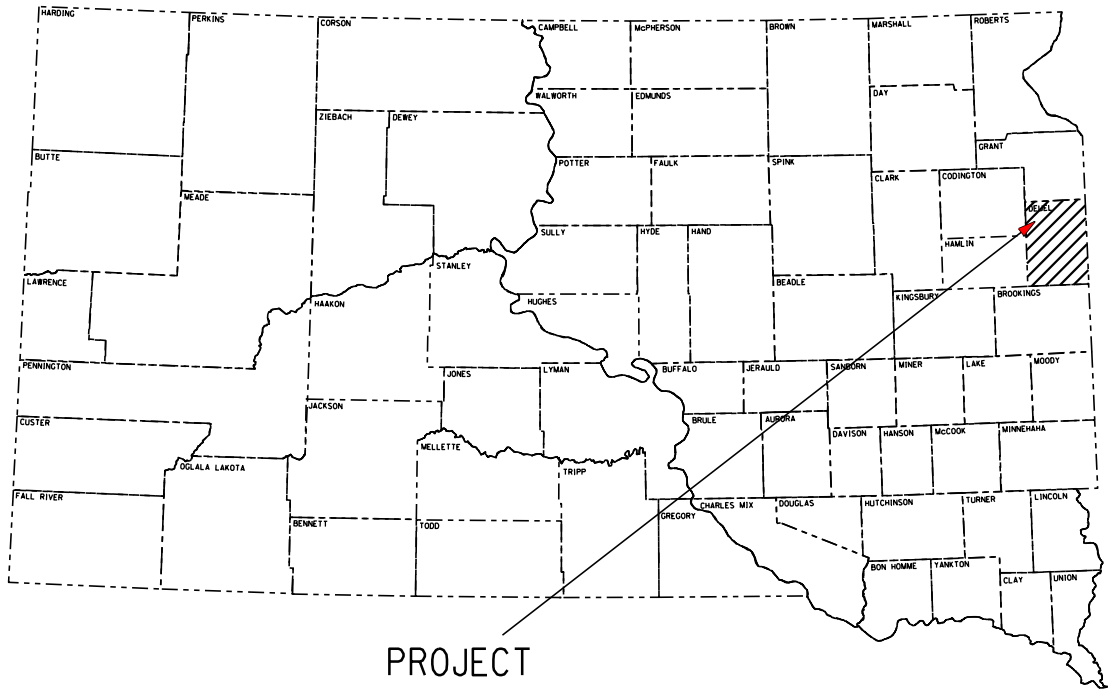
PLOTTED FROM - TRAB10200

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED
PROJECT 029 S-168
INTERSTATE 29
DEUEL COUNTY
Overheight Vehicle Impact Repair
PCN 14FN

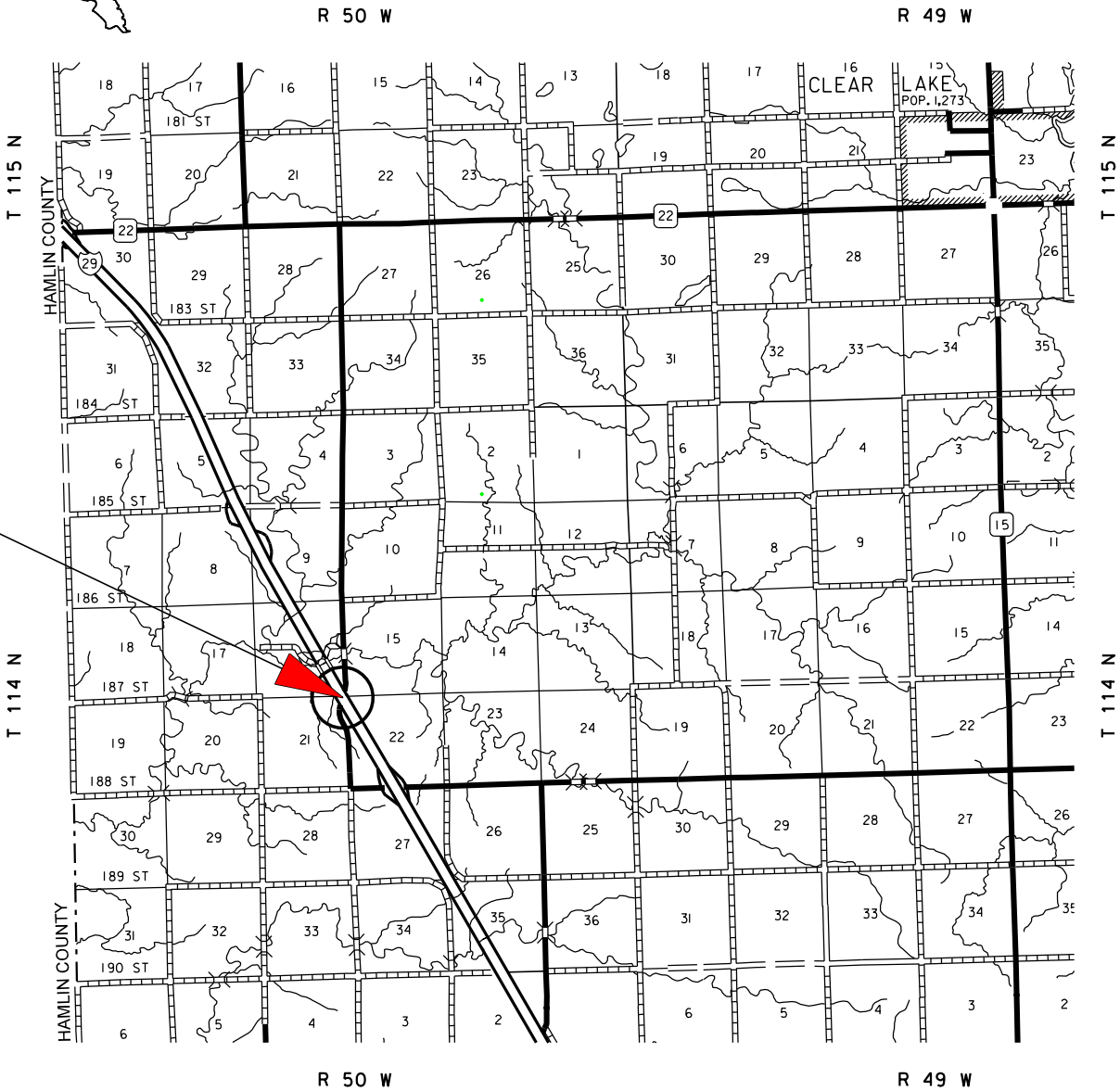
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	029 S-168	1	16
Plotting Date: 07/28/2016			

INDEX OF SHEETS

SHEET NO. 1	TITLE SHEET
SHEET NO. 2	ESTIMATE OF QUANTITIES
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PROJECT



Project Location
Str. No. 20-029-211
I-29 SBL at MRM 158.74



DESIGN DESIGNATION

ADT (2015)	3570
ADT (2035)	4434
DHV	541
D	50%
T DHV	10.3%
T ADT	22.7%
V	80 MPH

STORM WATER PERMIT

None Required

PLOT NAME - 1

FILE - ... \DEUL14FN\14FN TITLE PAGE.DGN

ESTIMATE OF QUANTITIES

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
250E0030	Incidental Work, Structure	Lump Sum	LS
410E0250	Heat Straighten Steel Member(s)	Lump Sum	LS
410E3010	Magnetic Particle Weld Inspection	496	In
410E3030	Magnetic Particle Weld Inspection, Impact Damage Repair	99	SqIn
412E0100	Bridge Repainting, Class I	Lump Sum	LS
634E0010	Flagging	20.0	Hour
634E0110	Traffic Control Signs	359.4	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0280	Type 3 Barricade, 8' Single Sided	2	Each
634E0420	Type C Advance Warning Arrow Board	1	Each
634E0600	4" Temporary Pavement Marking Tape Type I	3,304	Ft

SPECIFICATIONS

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

ENVIRONMENTAL COMMITMENTS

An Environmental Commitment is a measure that SDDOT commits to implement in order to avoid, minimize, and/or mitigate a real or potential environmental impact. Environmental commitments to various agencies and the public have been made to secure approval of this project. An agency mentioned below with permitting authority can influence a project if perceived environmental impacts have not been adequately addressed. Unless otherwise designated, the Contractor's primary contact regarding matters associated with these commitments will be the Project Engineer. These environmental commitments are not subject to change without prior written approval from the SDDOT Environmental Office. The environmental commitments associated with this project are as follows:

COMMITMENT E: STORM WATER

Construction activities constitute less than 1 acre of disturbance.

Action Taken/Required:

At a minimum and regardless of project size, appropriate erosion and sediment control measures must be installed to control the discharge of pollutants from the construction site.

COMMITMENT H: WASTE DISPOSAL SITE

The Contractor shall furnish a site(s) for the disposal of construction and/or demolition debris generated by this project.

Action Taken/Required:

Construction and/or demolition debris may not be disposed of within the Public ROW. The waste disposal site(s) shall be managed and reclaimed in accordance with the following from the General Permit for Construction/Demolition Debris Disposal Under the South Dakota Waste Management Program issued by the Department of Environment and Natural Resources.

The waste disposal site(s) shall not be located in a wetland, within 200 feet of surface water, or in an area that adversely affects wildlife, recreation, aesthetic value of an area, or any threatened or endangered species, as approved by the Project Engineer.

If the waste disposal site(s) is located such that it is within view of any ROW, the following additional requirements shall apply:

- Construction and/or demolition debris consisting of concrete, asphalt concrete, or other similar materials shall be buried in a trench completely separate from wood debris. The final cover over the construction and/or demolition debris shall consist of a minimum of 1 foot of soil capable of supporting vegetation. Waste disposal sites provided outside of the Public ROW shall be seeded in accordance with Natural Resources Conservation Service recommendations. The seeding recommendations may be obtained through the appropriate County NRCS Office. The Contractor shall control the access to waste disposal sites not within the Public ROW through the use of fences, gates, and placement of a sign or signs at the entrance to the site stating “No Dumping Allowed”.
- Concrete and asphalt concrete debris may be stockpiled within view of the ROW for a period of time not to exceed the duration of the project. Prior to project completion, the waste shall be removed from view of the ROW or buried and the waste disposal site reclaimed as noted above.

The above requirements will not apply to waste disposal sites that are covered by an individual solid waste permit as specified in SDCL 34A-6-58, SDCL 34A-6-1.13, and ARSD 74:27:10:06.

Failure to comply with the requirements stated above may result in civil penalties in accordance with South Dakota Solid Waste Law, SDCL 34A-6-1.31.

All costs associated with furnishing waste disposal site(s), disposing of waste, maintaining control of access (fence, gates, and signs), and reclamation of the waste disposal site(s) shall be incidental to the various contract items.

COMMITMENT I: HISTORICAL PRESERVATION OFFICE CLEARANCES

The SDDOT has obtained concurrence with the State Historical Preservation Office (SHPO or THPO) for all work included within the project limits and all department designated sources and designated option material sources, stockpile sites, storage areas, and waste sites provided within the plans.

Action Taken/Required:

All earth disturbing activities not designated within the plans require review of cultural resources impacts. This work includes, but is not limited to: Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas.

The Contractor shall arrange and pay for a cultural resource survey and/or records search. The Contractor has the option to contact the state

Archaeological Research Center (ARC) at 605-394-1936 or another qualified archaeologist, to obtain either a records search or a cultural resources survey. A record search might be sufficient for review; however, a cultural resources survey may need to be conducted by a qualified archaeologist.

The Contractor shall provide ARC with the following: a topographical map or aerial view on which the site is clearly outlined, site dimensions, project number, and PCN. If applicable, provide evidence that the site has been previously disturbed by farming, mining, or construction activities with a landowner statement that artifacts have not been found on the site.

The Contractor shall submit the records search or cultural resources survey report and if the location of the site is within the current geographical or historic boundaries of any South Dakota reservation to SDDOT Environmental Engineer, 700 East Broadway Avenue, Pierre, SD 57501-2586 (605-773-3180). SDDOT will submit the information to the appropriate SHPO/THPO. Allow **30 Days** from the date this information is submitted to the Environmental Engineer for SHPO/THPO review.

If evidence for cultural resources is uncovered during project construction activities, then such activities shall cease and the Project Engineer shall be immediately notified. The Project Engineer will contact the SDDOT Environmental Engineer in order to determine an appropriate course of action.

SHPO/THPO review does not relieve the Contractor of the responsibility for obtaining any additional permits and clearances for Contractor furnished material sources, material processing sites, stockpile sites, storage areas, plant sites, and waste areas that affect wetlands, threatened and endangered species, or waterways. The Contractor shall provide the required permits and clearances to the Project Engineer at the preconstruction meeting.

SEQUENCE OF OPERATIONS & TRAFFIC CONTROL

The following sequence of operations will be followed unless an alternate sequence is submitted in writing to the Area Engineer two weeks prior to the preconstruction meeting and approved.

1. Install traffic control devices to close one lane of the County Road as well as the right lane of I-29 SB. The lane to be closed on the County Road shall coincide with where heat straightening and superstructure repair is located.
2. Switch traffic control on the County Road to the opposite lane. Retain closure of I-29 SB.
3. Remove traffic control devices once the superstructure repairs are completed.

GENERAL MAINTENANCE OF TRAFFIC

Standard Plate 634.25 shall be used when an overnight or longer lane closure is required. The length of the closure shall be kept to a minimum so as to allow the maximum amount of sight distance. Standard Plate 634.23 has been included in the plans and may be utilized as an alternate lane closure, as approved by the Engineer.

I-29 Traffic may not be stopped at any time to facilitate the Contractor's operation.

A 16' lane of travel must be maintained on the County Road.

All closures that are not being used shall be removed. If a lane closure is not needed when workers are not present it shall be removed.

Flagger(s) will be required where work activity and/or equipment may encroach into a lane open to traffic.

4" Temporary Pavement Marking Tape Type I shall be used to make the 24" stop bars on the County Road.

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	200	25
35 - 40	350	25
45	500	25
50	500	50
55	750	50
60 - 65	1000	50

- Flagger
- Channelizing Device

For low-volume traffic situations with short work zones on straight roadways where the flagger is visible to road users approaching from both directions, a single flagger may be used.

The ROAD WORK AHEAD and the END ROAD WORK signs may be omitted for short duration operations (1 hour or less).

For tack and/or flush seal operations, when flaggers are not being used, the FRESH OIL sign (W21-2) shall be displayed in advance of the liquid asphalt areas.

Flashing warning lights and/or flags may be used to call attention to the advance warning signs.

The channelizing devices shall be drums or 42" cones.

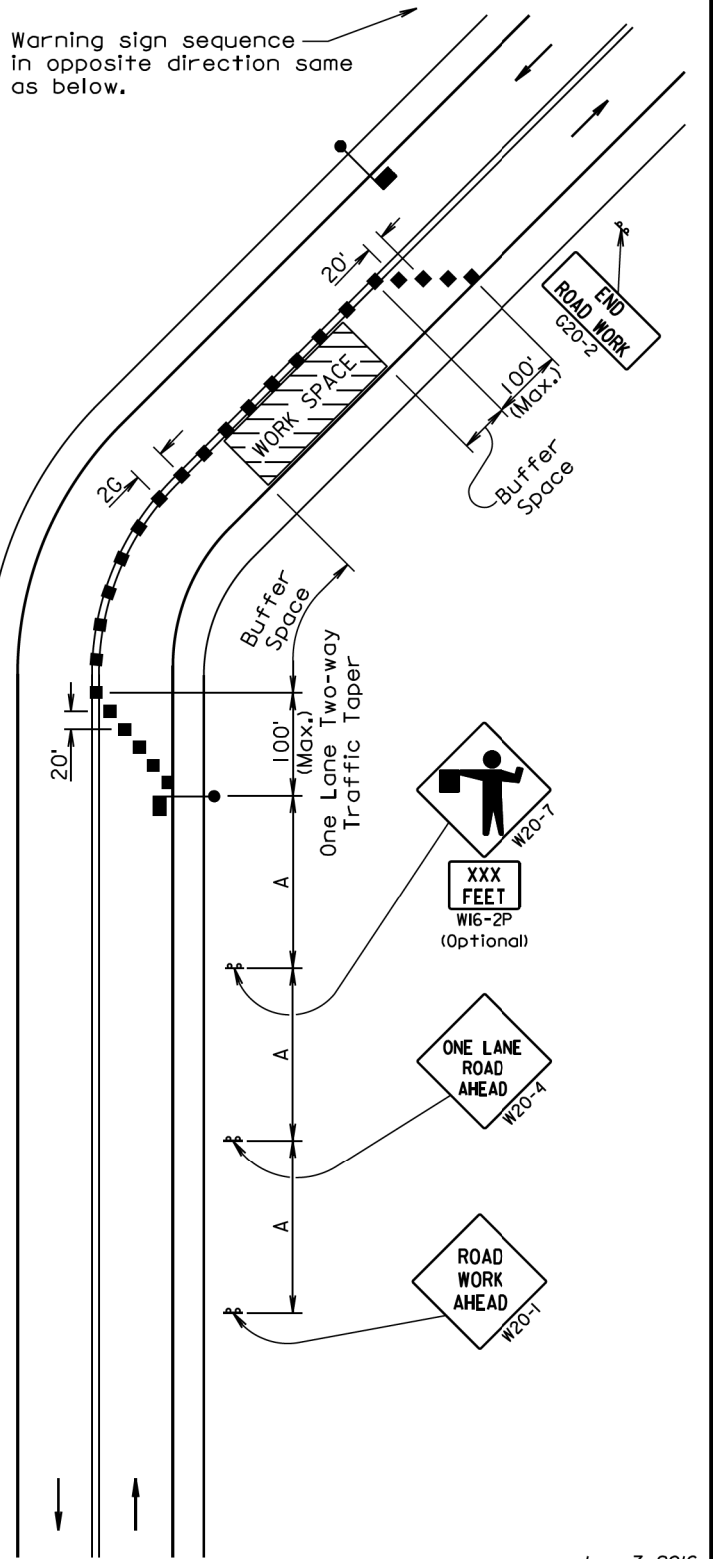
Channelizing devices are not required along the centerline adjacent to work area when pilot cars are utilized for escorting traffic through the work area.

Channelizing devices and flaggers shall be used at intersecting roads to control intersecting road traffic as required.

The buffer space should be extended so that the two-way traffic taper is placed before a horizontal or vertical curve to provide adequate sight distance for the flagger and queue of stopped vehicles.

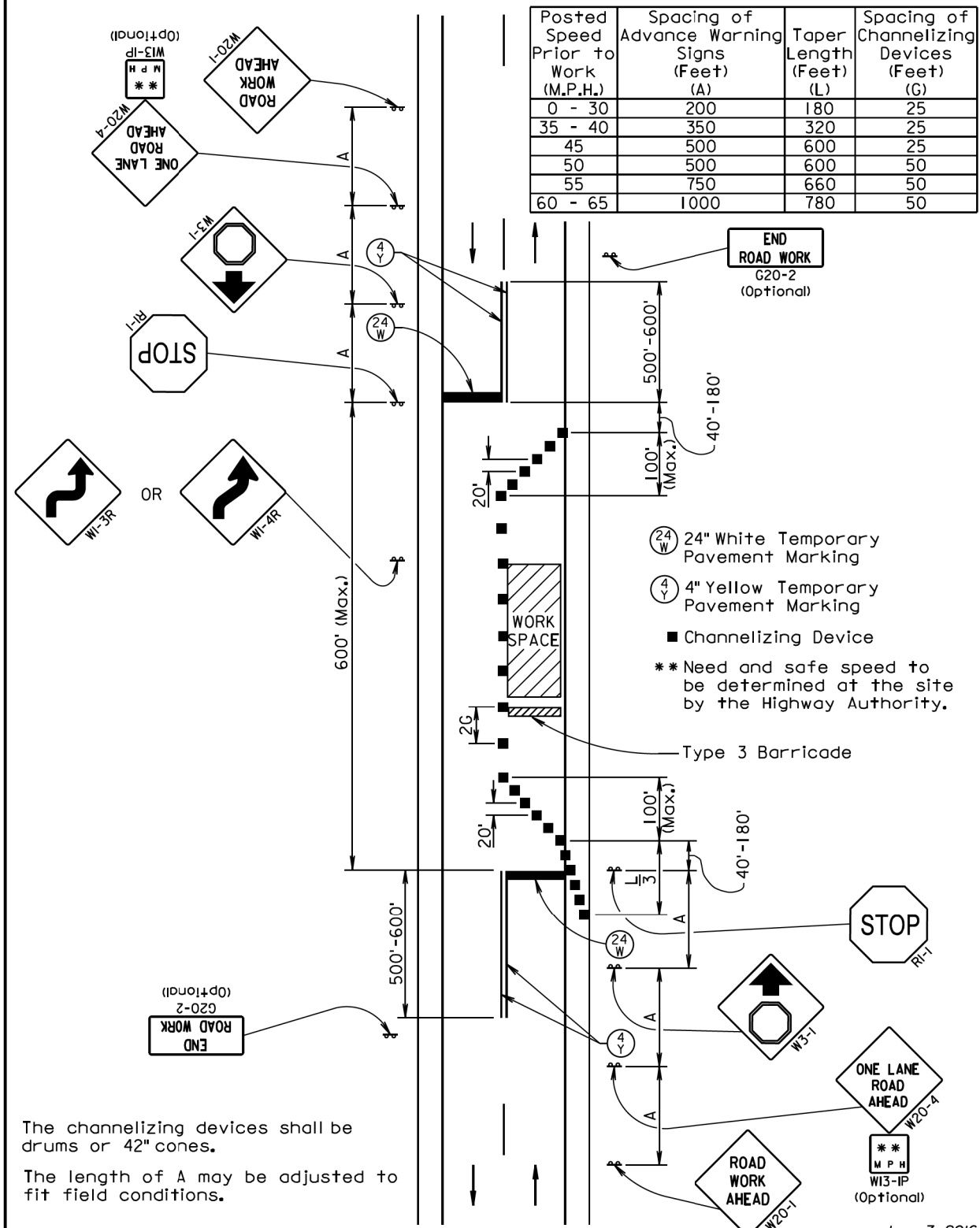
The length of A may be adjusted to fit field conditions.

Warning sign sequence in opposite direction same as below.



June 3, 2016

Published Date: 3rd Qtr. 2016	S D D O T	GUIDES FOR TRAFFIC CONTROL DEVICES LANE CLOSURE WITH FLAGGER PROVIDED	PLATE NUMBER 634.23
		Sheet 1 of 1	



The channelizing devices shall be drums or 42" cones.
The length of A may be adjusted to fit field conditions.

June 3, 2016

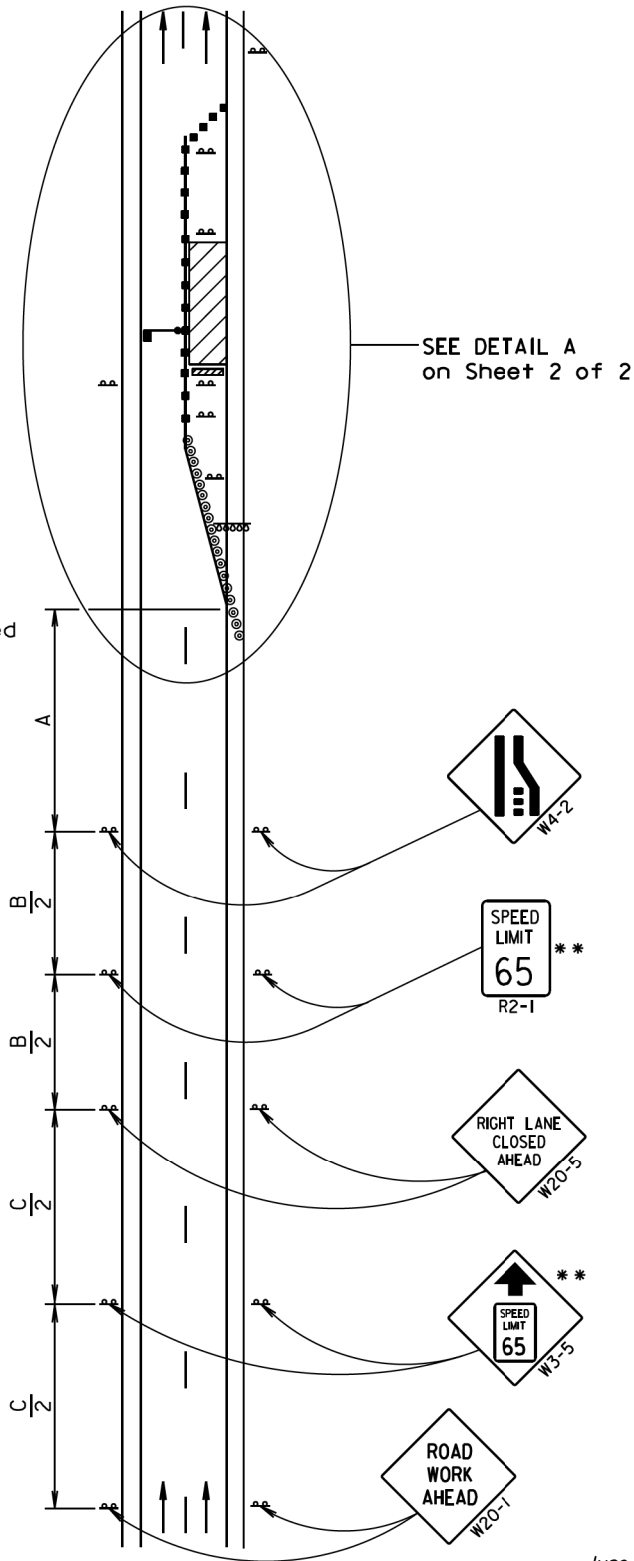
Published Date: 3rd Qtr. 2016	S D D O T	GUIDES FOR TRAFFIC CONTROL DEVICES LANE CLOSURE USING STOP SIGNS	PLATE NUMBER 634.25
		Sheet 1 of 1	

Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A) (B) (C)		
0 - 30	200		
35 - 40	350		
45 - 50	500		
55	750		
60 - 65	1000		
	(A)	(B)	(C)
70 - 80	1000	1500	2640

- ** Speed appropriate for location.
- Reflectorized Drum
 - Channelizing Device

ROAD WORK AHEAD sign is only required in advance of the first lane closure.

High speed is defined as having a posted speed limit greater than 45 mph.



June 3, 2016

Published Date: 3rd Qtr. 2016	S D D O T	WORK ZONE SPEED REDUCTION FOR INTERSTATE AND HIGH SPEED MULTI-LANE HIGHWAYS	PLATE NUMBER 634.63
		Sheet 1 of 2	

Posted Speed Prior to Work (M.P.H.)	Spacing of Channelizing Devices (Feet) (G)	Taper Length (Feet) (L)
0 - 30	25	180
35 - 40	25	320
45	25	600
50	50 *	600
55	50 *	660
60 - 65	50 *	780
70 - 80	50 *	960

- * Spacing is 40' for 42" cones.
- ** Speed appropriate for location.
- *** Use speed limit designated for the condition when workers are present in the work space. Signs shall be covered or removed when workers are not present.

- Flagger (As Necessary)
- Reflectorized Drum
- Channelizing Device

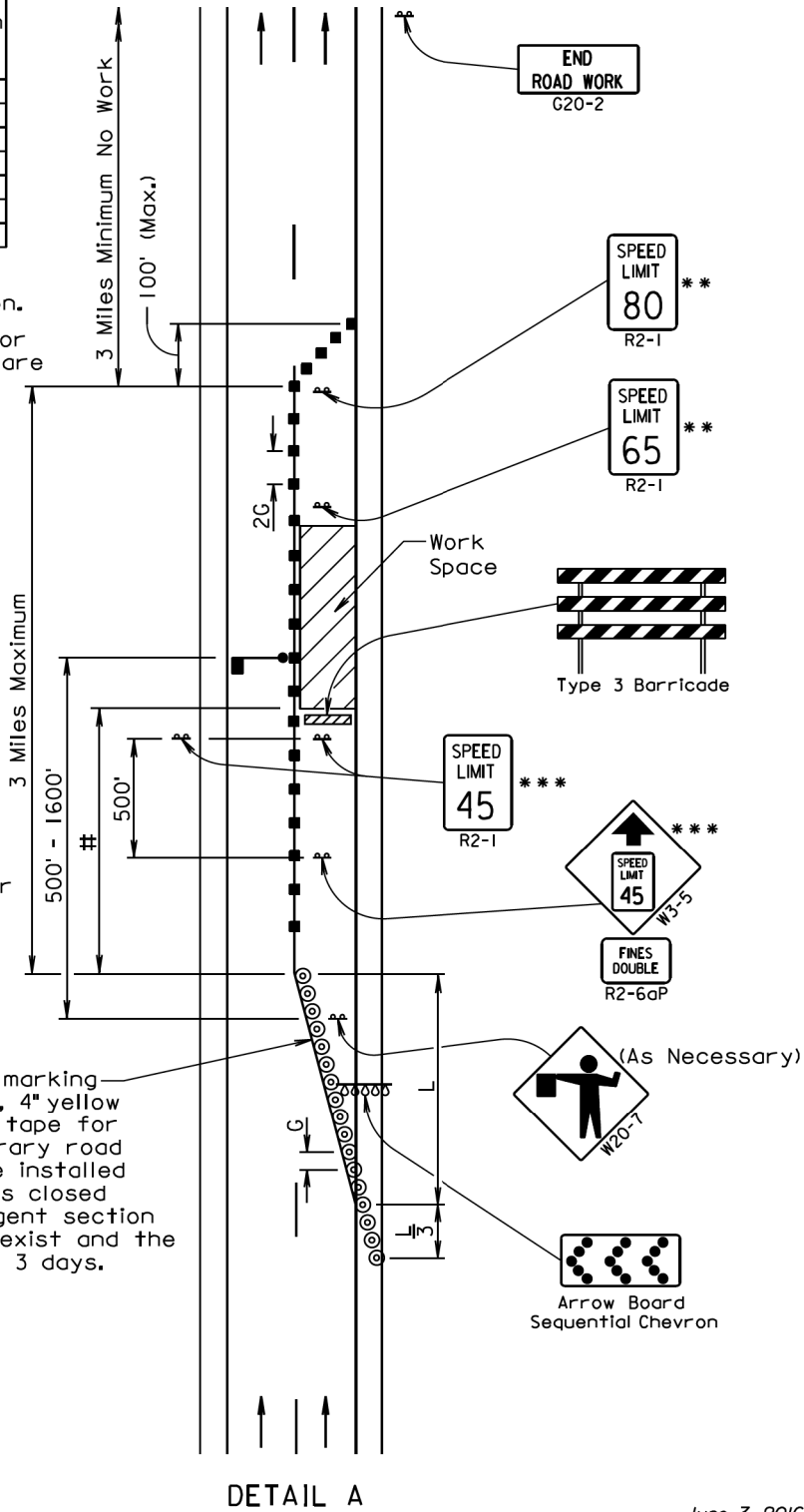
The Work Space shall be a minimum of 500' from the end of the taper.

The FLAGGER sign shall be used whenever there is a Flagger present.

The channelizing devices shall be 42" cones or drums.

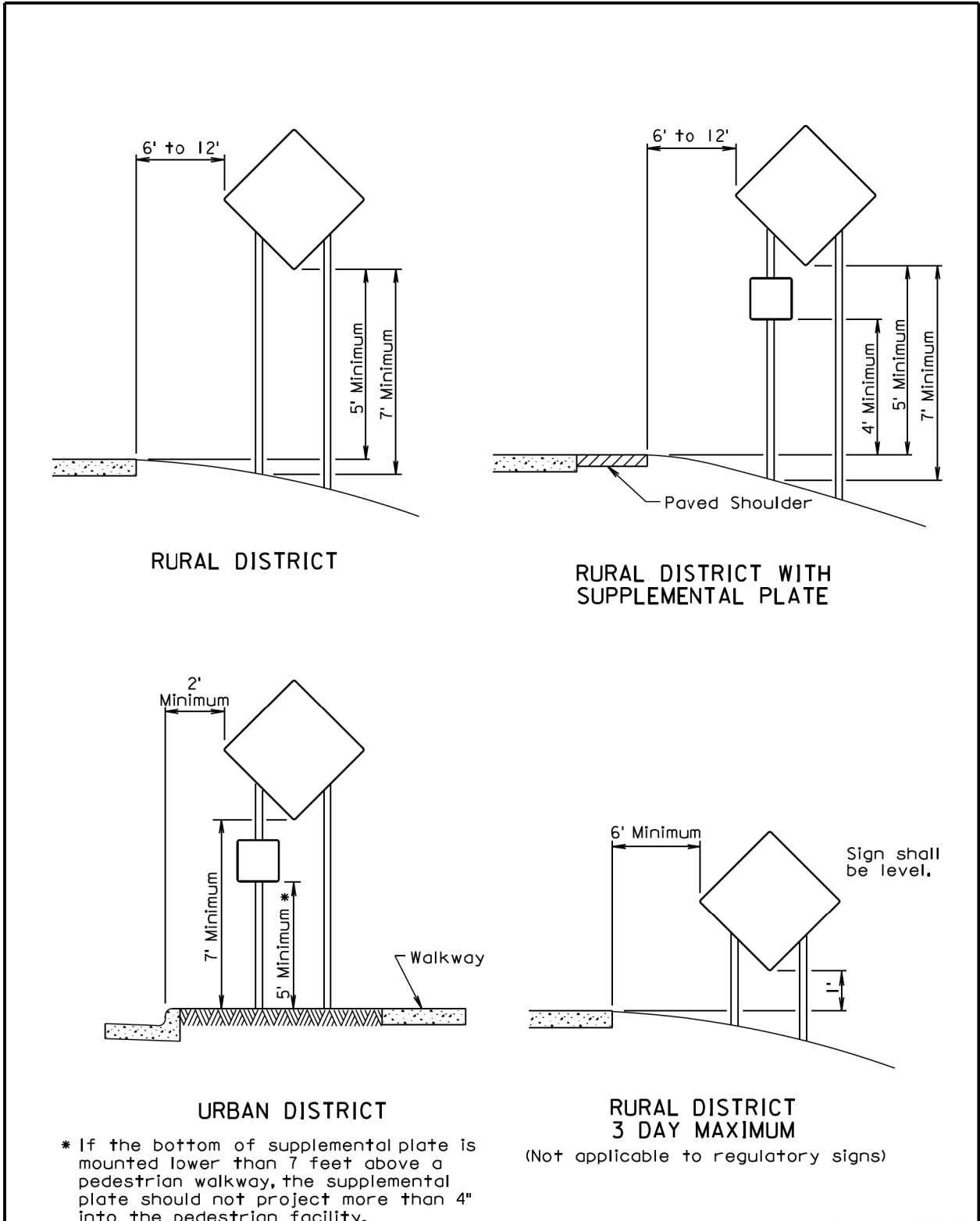
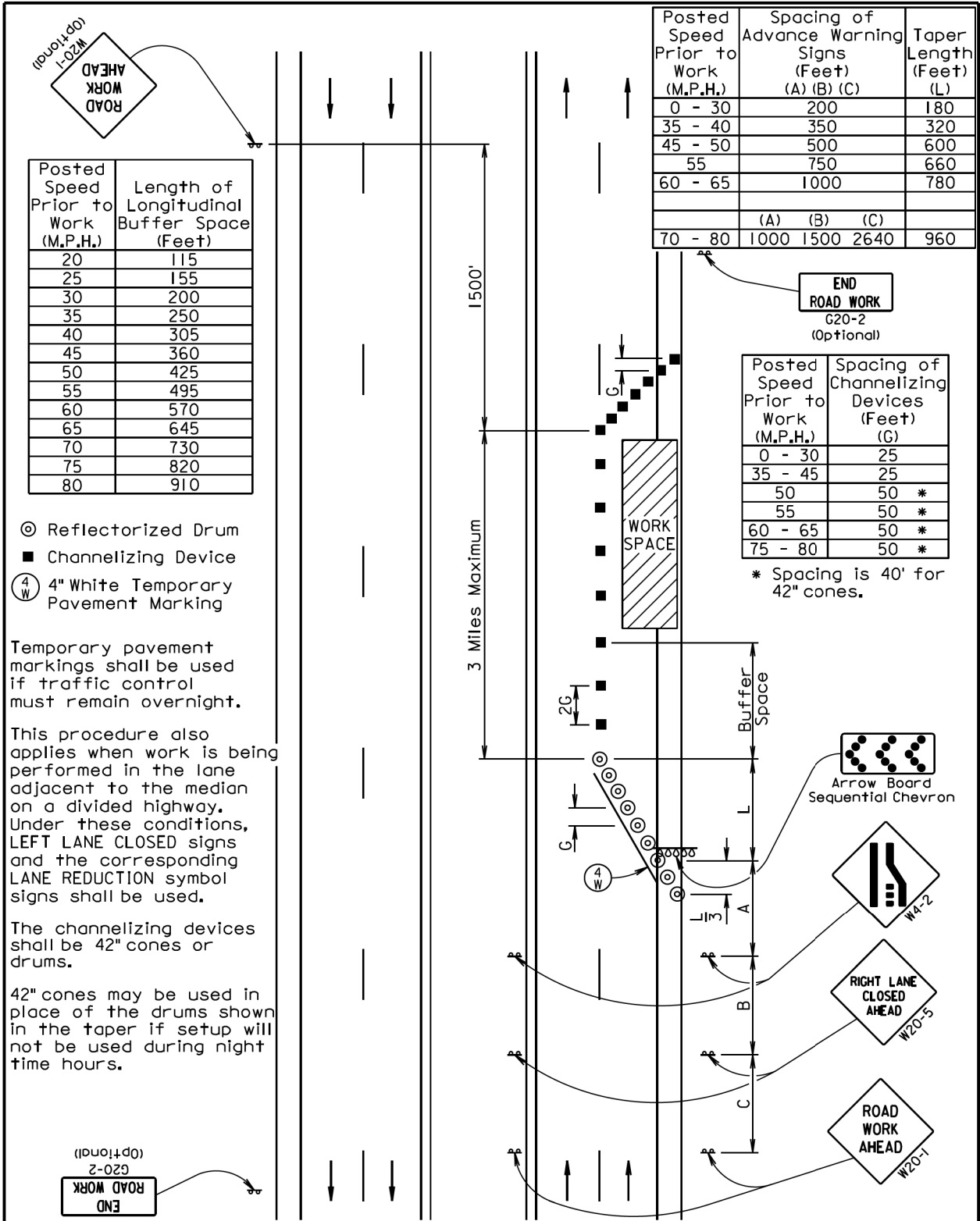
42" cones may be used in place of the drums shown in the taper if setup will not be used during night time hours.

4" white temporary pavement marking tape for right lane closures, 4" yellow temporary pavement marking tape for left lane closures, or temporary road markers at 5' spacing shall be installed in the taper when the lane is closed overnight, and along the tangent section where the skip lines do not exist and the lane is closed for more than 3 days.



June 3, 2016

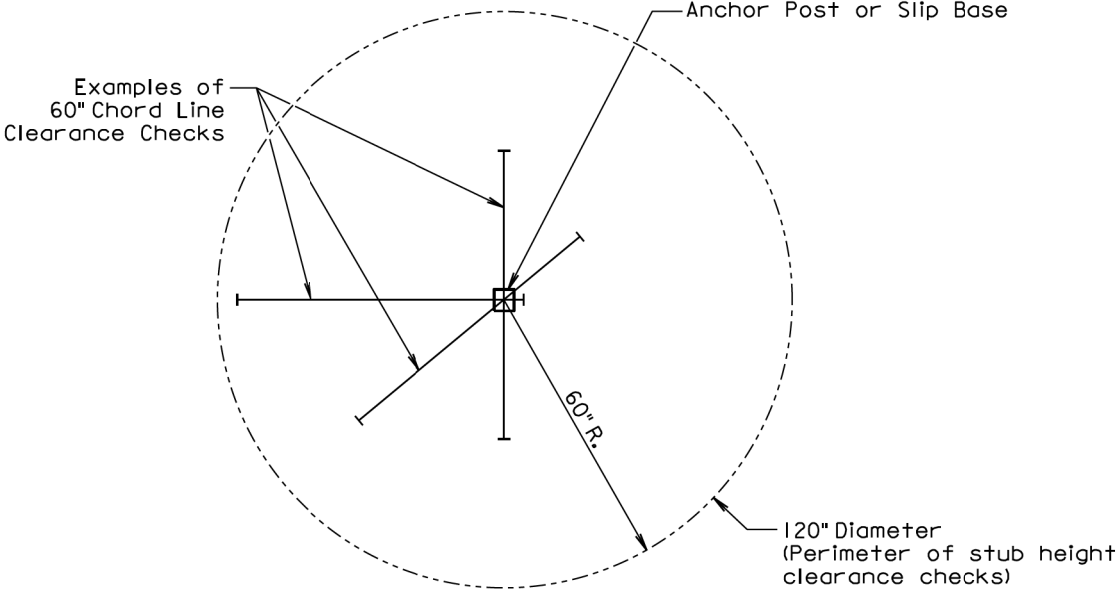
Published Date: 3rd Qtr. 2016	S D D O T	WORK ZONE SPEED REDUCTION FOR INTERSTATE AND HIGH SPEED MULTI-LANE HIGHWAYS	PLATE NUMBER 634.63
		Sheet 2 of 2	



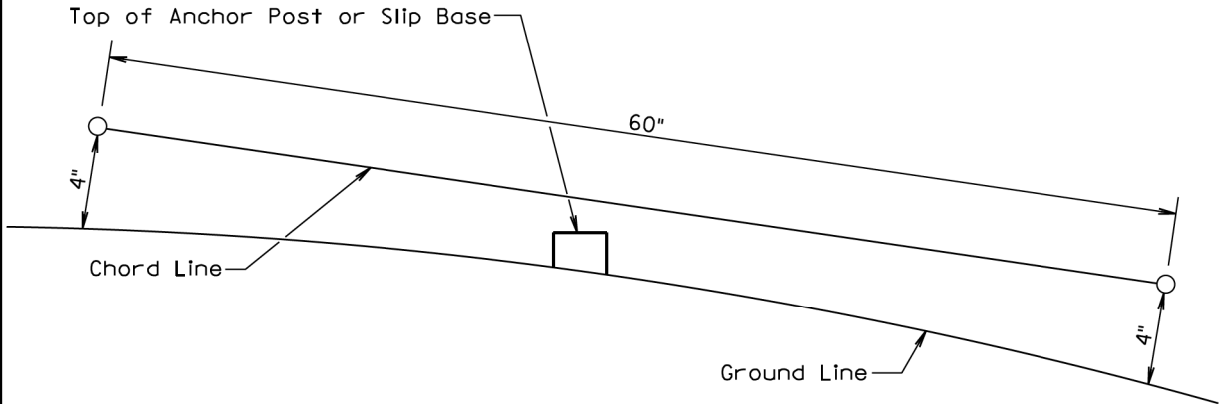
PLOT SCALE - 1:200

-PLOTTED FROM - TRAB10200

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	029 S-168	7	16
Plotting Date: 07/28/2016			



PLAN VIEW
(Examples of stub height clearance checks)



ELEVATION VIEW

GENERAL NOTES:
The top of anchor posts and slip bases SHALL NOT extend above a 60" chord line within a 120" diameter circle around the post with ends 4" above the ground.
At locations where there is curb and gutter adjacent to the breakaway sign support, the stub height shall be a maximum of 4" above the ground line at the localized area adjacent to the breakaway support stub.
The 4" stub height clearance is not necessary for U-channel lap splices where the support is designed to yield (bend) at the base.

July 1, 2005

Published Date: 3rd Qtr. 2016	S D D O T	BREAKAWAY SUPPORT STUB CLEARANCE	PLATE NUMBER 634.99
			Sheet 1 of 1

PLOT NAME - 3

FILE - ... \PRJ\DEUL14FN\TRAFFIC2.DGN

ITEMIZED LIST FOR TRAFFIC CONTROL SIGNS

SIGN CODE	SIGN DESCRIPTION	CONVENTIONAL ROAD				EXPRESSWAY / INTERSTATE			
		NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT	NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
R1-1	STOP	2	30"	5.2	10.4		36"	7.5	
R2-1	SPEED LIMIT 45		24" x 30"	5.0		2	36" x 48"	12.0	24.0
R2-1	SPEED LIMIT 65		30" x 36"	7.5		3	36" x 48"	12.0	36.0
R2-1	SPEED LIMIT 80		36" x 48"	12.0		1	48" x 60"	20.0	20.0
R2-6aP	FINES DOUBLE (plaque)		24" x 18"	3.0		2	36" x 24"	6.0	12.0
W1-4	REVERSE CURVE (L or R)	1	48" x 48"	16.0	16.0		48" x 48"	16.0	
W3-1	STOP AHEAD (symbol)	2	48" x 48"	16.0	32.0		48" x 48"	16.0	
W3-5	SPEED REDUCTION AHEAD (65 MPH)		48" x 48"	16.0		2	48" x 48"	16.0	32.0
W4-2	LEFT or RIGHT LANE ENDS (symbol)		48" x 48"	16.0		2	48" x 48"	16.0	32.0
W20-1	ROAD WORK AHEAD	2	48" x 48"	16.0	32.0	2	48" x 48"	16.0	32.0
W20-4	ONE LANE ROAD AHEAD	2	48" x 48"	16.0	32.0		48" x 48"	16.0	
W20-7	FLAGGER (symbol)	1	48" x 48"	16.0	16.0		48" x 48"	16.0	
G20-2	END ROAD WORK	2	36" x 18"	4.5	9.0	1	48" x 24"	8.0	8.0
		CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT 147.4				EXPRESSWAY / INTERSTATE TRAFFIC CONTROL SIGNS SQFT 212.0			

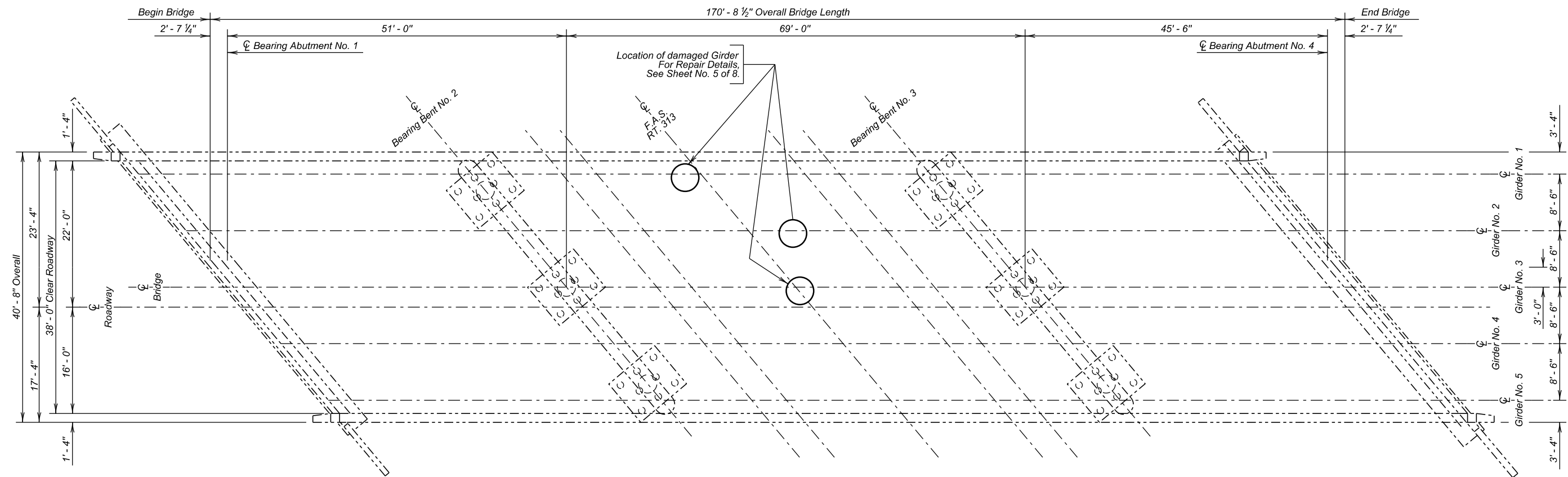
TYPE 3 BARRICADES

ITEM DESCRIPTION	QUANTITY
Type 3 Barricade, 8' Single Sided	2 Each

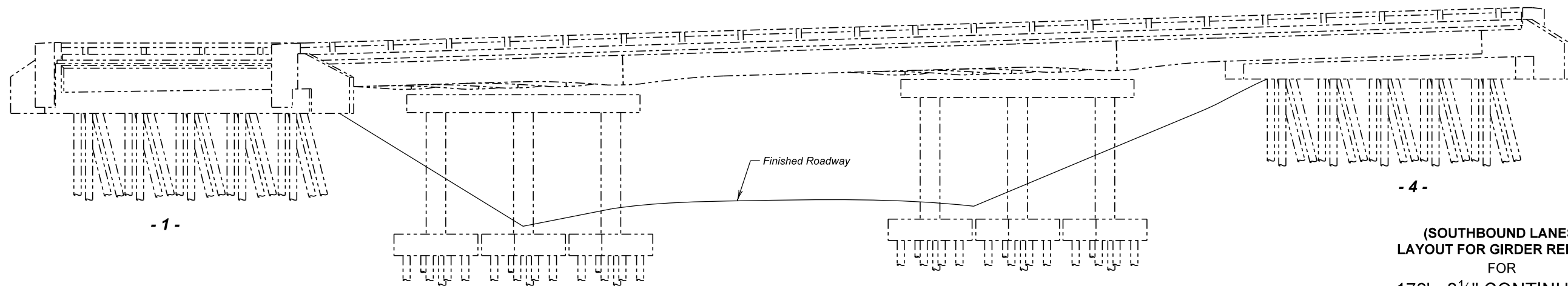
ARROW BOARDS

ITEM DESCRIPTION	QUANTITY
Type C Advance Warning Arrow Board	1 Each

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	029 S-168	9	16



PLAN



ELEVATION

INDEX OF BRIDGE SHEETS -

- Sheet No. 1 - Layout for Upgrading
- Sheet No. 2 - Estimate of Structure Quantities and Notes
- Sheet No. 3 - Notes (Continued)
- Sheet No. 4 - Notes (Continued)
- Sheet No. 5 - Repair Details
- Sheet No. 6 thru 8 - Original Construction Plans

**(SOUTHBOUND LANES)
LAYOUT FOR GIRDER REPAIRS**

**FOR
170' - 8 1/2" CONTINUOUS
COMPOSITE GIRDER BRIDGE**

38' - 0" ROADWAY
OVER COUNTY ROAD
STR. NO. 20-029-211
PCN I4FN

40° SKEW R.H.F.
SEC. 21 - T114N - R50W
029 S-168

DEUEL COUNTY

S. D. DEPT. OF TRANSPORTATION

JULY 2016

1 OF 8

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

DESIGNED BY MM DUEL14FN	CK. DES. BY KSK 14FNRB01	DRAFTED BY KR	Steve A. Johnson BRIDGE ENGINEER
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ESTIMATE OF STRUCTURE QUANTITIES

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
250E0030	Incidental Work, Structure	Lump Sum	LS
410E0250	Heat Straighten Steel Member(s)	Lump Sum	LS
410E3010	Magnetic Particle Weld Inspection	496	In
410E3030	Magnetic Particle Weld Inspection, Impact Damage Repair	99	Sq. In
412E0120	Bridge Repainting, Class I	Lump Sum	LS

SPECIFICATIONS

- Design Specifications: AASHTO Standard Specifications for Highway Bridges 17th Edition using Working Stress Design.
- Construction Specifications: South Dakota Standard Specifications for Roads and Bridges, 2015 Edition and Required Provisions, Supplemental Specifications and Special Provisions as included in the Proposal.
- All Welding and Welding Inspection shall be in conformance with the AASHTO/AWS Bridge Welding Code D1.5M/D1.5:2015 unless otherwise noted in this plan set.

PRE-CONSTRUCTION MEETING

A pre-construction meeting is required prior to beginning the repair work. The purpose of the meeting is to review the plans and procedures because of the specialty work involved. At a minimum, a representative from the Contractor and all Subcontractors shall attend this meeting along with Department personnel from the Area Office and Bridge Office. The contractor must notify the Bridge Construction Engineer and the Area Office at least three days prior to the meeting.

DETAILS AND DIMENSIONS OF EXISTING BRIDGE

All details and dimensions of the existing bridge, contained in these plans, are based on the original construction plans and shop plans. It is the Contractor's responsibility to inspect and verify the actual field conditions and any necessary as-built dimensions affecting the satisfactory completion of the work required for this project.

SHOP PLANS

Shop plans shall be required as specified by Section 410.3 A. of the Construction Specifications.

GENERAL CONSTRUCTION

Welder certification shall be in accordance with section 410.3 D of the Construction Specifications.

NOTICE - LEAD BASED PAINT

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

SCOPE OF BRIDGE WORK & SEQUENCE OF OPERATIONS

All work on this structure shall be accomplished with the traffic control shown in the plans. Alternate sequence of operations may be submitted by the Contractor for approval by the Engineer a minimum of two weeks prior to the pre-construction meeting.

- No traffic shall be allowed above girders during heat straightening.
- Nondestructively Test fillet welds, and potential crack tips at the locations shown in the plans prior to heat straightening.
- Repair crack tips and weld flaws found by Nondestructive Testing prior to heat straightening.
- Heat straighten damaged bottom flange on girders G3, G4, and G5 as shown in this plan set.
- Nondestructively Test fillet welds, and potential crack tips at the locations shown in the plans after heat straightening and after repairs are complete.
- Repair crack tips and weld flaws found by Nondestructive Testing after heat straightening.
- Paint all work affected area in Fall of 2016 or Spring of 2017.

WELD INSPECTION & NONDESTRUCTIVE TESTING (NDT)

- The Contractor shall be responsible for retaining a qualified Testing Agency to perform Visual, Magnetic Particle (MT), and Ultrasonic (UT) inspection of existing and new welds and to locate existing and potential crack tips. Inspectors performing Visual, MT and UT inspection and crack tip location shall be certified in accordance with Section 410.3 D of the Construction Specifications. The Contractor shall submit the Testing Agency to the Department at the Preconstruction meeting for approval by the Bridge Construction Engineer.
- All Nondestructive Testing (NDT) and inspection shall be done in accordance with Clause 6 of the Bridge Welding Code. The MT inspection shall be performed by the yoke method using half-wave rectified direct or alternating current. Existing paint shall be removed from the steel surfaces that require NDT. MT inspection results shall be reported on Form O-7 of Annex O and UT results shall be reported on Form F-4 of Annex F of the Bridge Welding Code.
- The existing fillet welds noted below shall be 100% visually inspected and 100% magnetic particle inspected. In addition, all of the structural steel elements in the length of girder shown in the heat straightening area of the plans shall be visually inspected for possible cracks. Defects shall be clearly marked on the girder in accordance with the Bridge Welding Code and a written record of the defects shall be given to the Engineer for transmittal to the Bridge Construction Engineer. Any suspected cracks shall be verified by magnetic particle inspection with the crack tips located. Crack tip locations shall be clearly marked on the girder and a written record of the crack tip location shall be given to the Engineer for transmittal to the Bridge Construction Engineer. Notify the Bridge Construction Engineer if any cracks or crack tips are located in the girder flange.

Testing for defects and crack tips shall be made prior to any heat straightening. Repair options for the defects and crack tips shall be determined by the Bridge Construction Engineer. Repairs shall be made prior to any heat straightening.

ESTIMATE OF STRUCTURE QUANTITIES AND NOTES
FOR
170' - 8½" CONTINUOUS
COMPOSITE GIRDER BRIDGE
STR. NO. 20-029-211
JULY 2016

WELD INSPECTION & NONDESTRUCTIVE TESTING (NDT) CONTINUED

4. Existing bottom flange plate and fillet weld MT testing locations

Girder 1:

- a. Test the bottom flange to web weld on both sides in the area being heat straightened for an estimated 141 linear inches.
- b. Test both sides of the bottom 6 inches on adjacent stiffeners to web and to bottom flange for an estimated 24 linear inches.
- c. In the impact area of the bottom flange, test the bottom flange for an estimated 33 square inches. This area is an estimate and may be adjusted in the field as approved by the Bridge Construction Engineer.

Girder 2:

- a. Test the bottom flange to web weld on both sides in the area being heat straightened for an estimated 130 linear inches.
- b. Test both sides of the bottom 6 inches on adjacent stiffeners to web and to bottom flange for an estimated 36 linear inches.
- a. In the impact area of the bottom flange, test the bottom flange for an estimated 33 square inches. This area is an estimate and may be adjusted in the field as approved by the Bridge Construction Engineer.

Girder 3

- a. Test the bottom flange to web weld on both sides in the area being heat straightened for an estimated 141 linear inches.
- b. Test both sides of the bottom 6 inches on adjacent stiffeners to web and to bottom flange for an estimated 24 linear inches.
- c. In the impact area of the bottom flange, test the bottom flange for an estimated 33 square inches. This area is an estimate and may be adjusted in the field as approved by the Bridge Construction Engineer.

- 5. After heat straightening, secondary cracks that develop will require MT weld inspection. The areas listed above shall be retested to ensure no additional cracks have developed. The estimated weld length and area for re-testing is 496 linear inches and 99 square inches
- 6. All costs including labor, equipment and any incidentals necessary to perform the visual inspection, magnetic particle inspection and crack tip location shall be incidental to the contract unit price per inch for MAGNETIC PARTICLE WELD INSPECTION.
- 7. All costs including labor, equipment and any incidentals necessary to perform the visual inspection, magnetic particle inspection and crack tip location shall be incidental to the contract unit price per square inch for MAGNETIC PARTICLE WELD INSPECTION, IMPACT DAMAGE REPAIR.

- 8. All costs to remove the paint and clean all fillet welds to be non destructive tested and remove the paint and clean all visible or potential crack tip locations shall be incidental to the contract unit price per inch for MAGNETIC PARTICLE WELD INSPECTION or contract unit price per square inch for MAGNETIC PARTICLE WELD INSPECTION, IMPACT DAMAGE REPAIR.
- 9. The total plans quantity for MT weld inspection is only an estimate. The weld inspection will be measured and paid for as MAGNETIC PARTICLE WELD INSPECTION.

HEAT STRAIGHTENING

This Contract includes heat straightening of steel girders including bottom flange, web, transverse stiffeners and diaphragms. Heat straightening is considered specialty work for which only the following contractors are allowed. Contact:

Judd Holt
International Straightening Incorporated
901 E. Bristol Drive
Bismarck, ND 58501
Telephone (701) 223-5972 or (701) 751-1683
Fax (701) 751-1683
E-mail isisteel@gmail.com
www.steelstraightening.com

Darryl Thomas
Flame On, Inc.
4415 Tom Marks Road
Snohomish, WA 98290
Telephone (425) 397-7039
Fax (425) 397-7002
Cellular (425) 501-9855
www.flameoninc.com

- 1. Heat Straightening requires nondestructive testing of both new and existing welds. The Contractor shall use a qualified testing agency subject to the approval by the Bridge Construction Engineer. The Contractor shall submit the testing agency to the Department at the Preconstruction meeting for approval by the Bridge Construction Engineer. See Weld Inspection & Nondestructive Testing notes elsewhere in these plans.
- 2. The equipment used for heat straightening shall be an oxygen-fuel combination. The fuel shall be propane or acetylene. The application of heat shall be by single or multiple orifice tips only. The size of the tip shall be proportional to the thickness of the heated material. As a guide, the following table shows the recommended tip sizes.

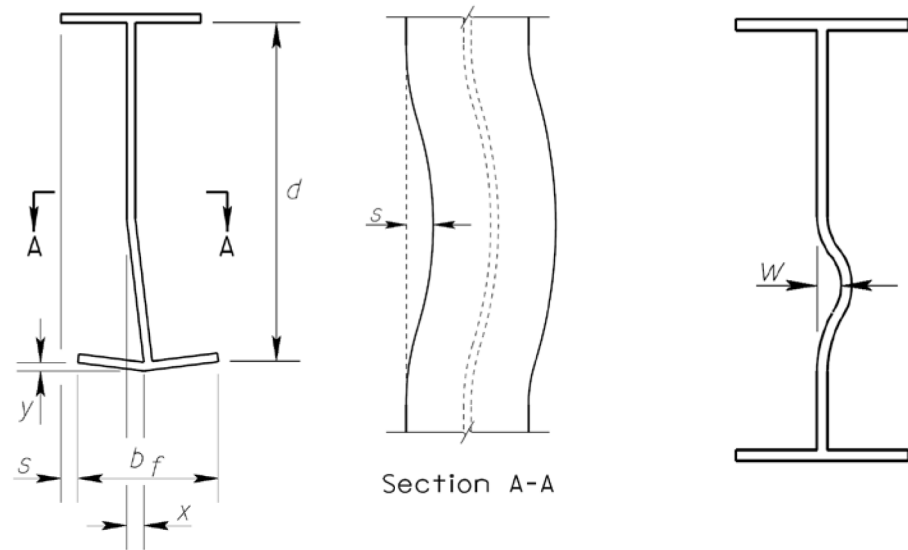
Steel Thickness (in)	Orifice Type	Size
< 1/4	Single	3
3/8	Single	4
1/2	Single	5
5/8	Single	7
3/4	Single	8
1	Single	8
	Rosebud	3
2	Single	8
	Rosebud	4
3	Rosebud	5
>4	Rosebud	5

- 3. The temperature of all steel during heat straightening shall not exceed 1,200°F. The Contractor shall use one or more of the following methods for verifying temperatures during heat straightening:
 - a. Temperature sensitive crayons
 - b. Pyrometer
 - c. Infrared non-contact thermometerMaterial should be heated in a single pass and shall be allowed to air cool to below 250°F prior to re-heating.
- 4. Hot Mechanical Straightening and Hot Working will NOT be allowed.

NOTES (CONTINUED)
FOR
170' - 8½" CONTINUOUS
COMPOSITE GIRDER BRIDGE
STR. NO. 20-029-211
JULY 2016

HEAT STRAIGHTENING -CONTINUED

5. The final dimensions of heat straightened structural members shall conform to the following tolerances:



d = original depth of web
b_f = original width of flange
x = final displacement of web ≤ maximum of $\frac{d}{100}$ or $\frac{1}{4}$ "
y = final displacement of edge of flange ≤ $\frac{1}{4}$ "
w = maximum final local deformation in web ≤ $\frac{1}{4}$ "
s = sweep of flange from original edge of flange ≤ $\frac{1}{2}$ " over 20 ft

6. All labor, materials, equipment, and any incidentals necessary to perform the required heat straightening shall be incidental to the contract lump sum price for HEAT STRAIGHTEN STEEL MEMBER(S).

BRIDGE REPAINTING, CLASS I

1. All new and existing structural steel in work affected areas shall be painted. The exact area to be painted will not be known until all heat straightening is completed. The intent in the heat straightened area is to paint the entire girder surface for a distance of 6 inches outside of the outer edges of the heat straightening. The finished girder in the heat straightened area shall have a uniform paint appearance as approved by the Engineer. For informational purposes, the approximate total area under this item of repair is 20 square feet. The actual work affected area will only be known after all of the nondestructive testing and heat straightening is complete.
2. All work affected areas and all new structural steel shall be painted in accordance with Section 412 of the Standard Specifications and in accordance with SSPC Standard PA1.
3. Paint color

Top Coat - The paint color shall be an approved green color to match the existing paint. Prior to ordering the paint, a paint chip of the green color shall be submitted to the Department for color approval.

Primer or Intermediate Coats - Colors shall sharply contrast with each other and with the top coat.

INCIDENTAL WORK, STRUCTURE

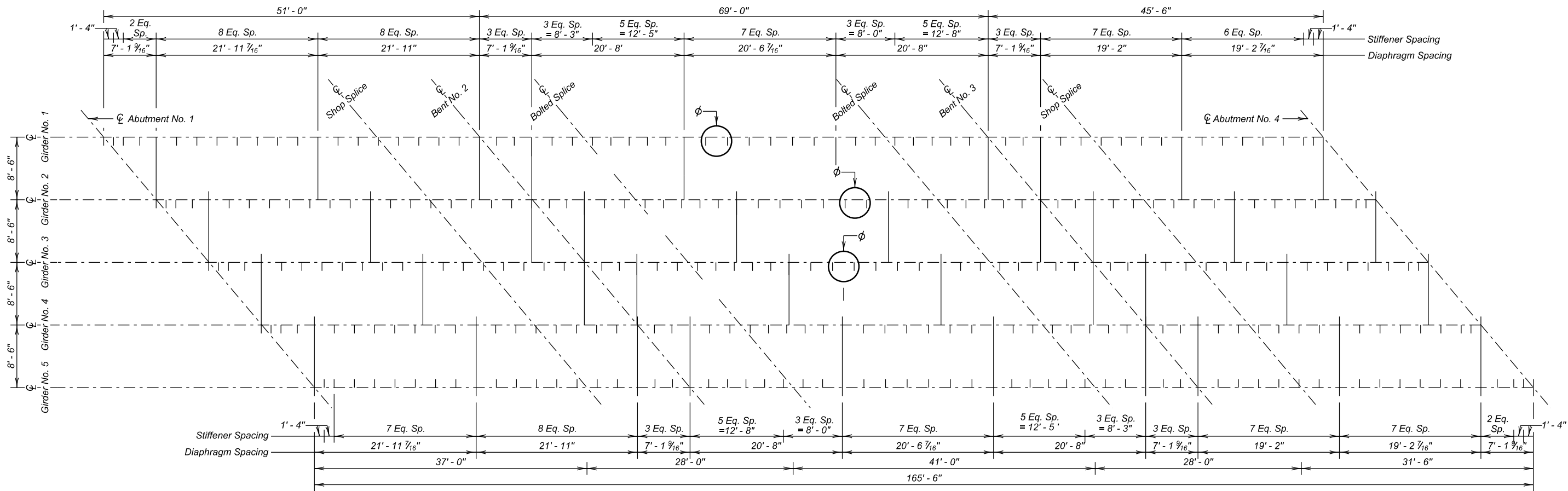
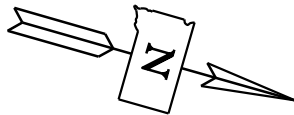
1. Power tool cleaning shall be performed by the Contractor in preparation for Nondestructive Testing. Power tool cleaning shall be in accordance with SSPC SP-3.
2. All materials, labor, and equipment necessary to perform work that is described in the notes above on the impact area shall be included in the contract lump sum price for "Incidental Work, Structure".

NOTES (CONTINUED)
FOR
170' - 8½" CONTINUOUS
COMPOSITE GIRDER BRIDGE
STR. NO. 20-029-211

JULY 2016

4 OF 8

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	029 S-168	13	16



FRAMING DIAGRAM

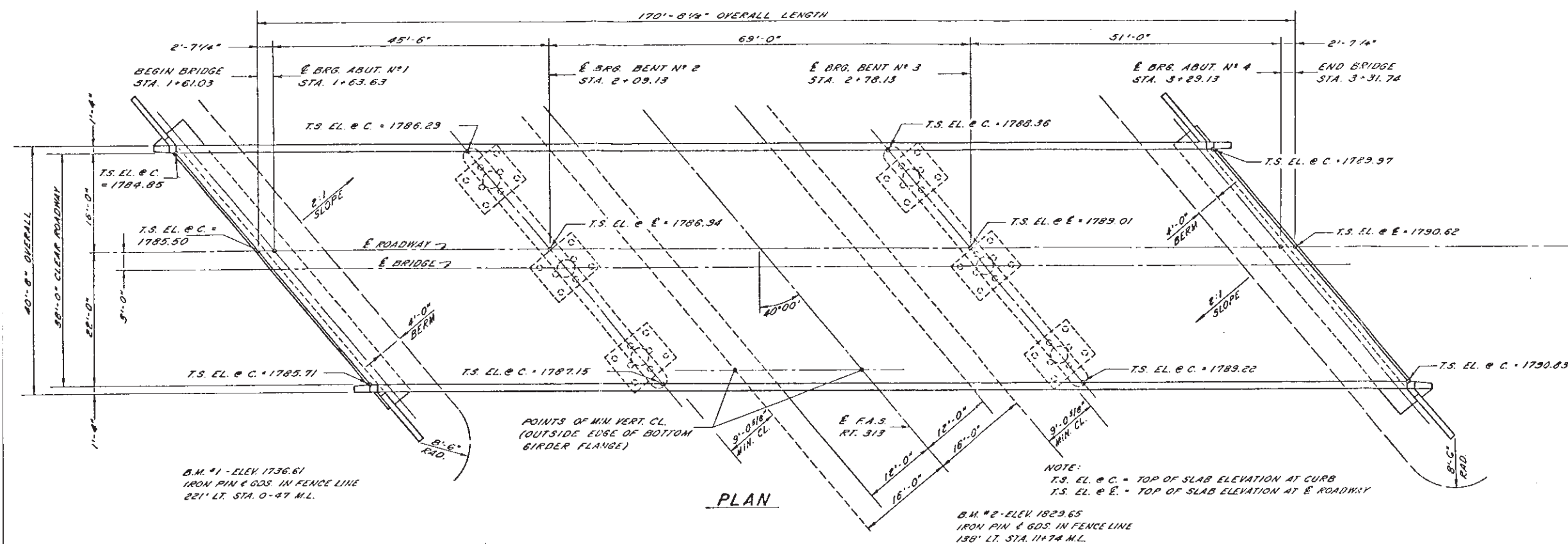
Ø Heat straighten girder bottom flange.
Girder web and stiffeners will
be heat straightened as necessary.

(SOUTHBOUND LANES)
REPAIR DETAILS
FOR
170' - 8½" CONTINUOUS
COMPOSITE GIRDER BRIDGE

38' - 0" ROADWAY
OVER COUNTY ROAD
STR. NO. 20-029-211
40° SKEW R.H.F.
SEC. 21 - T114N - R50W
029 S-168

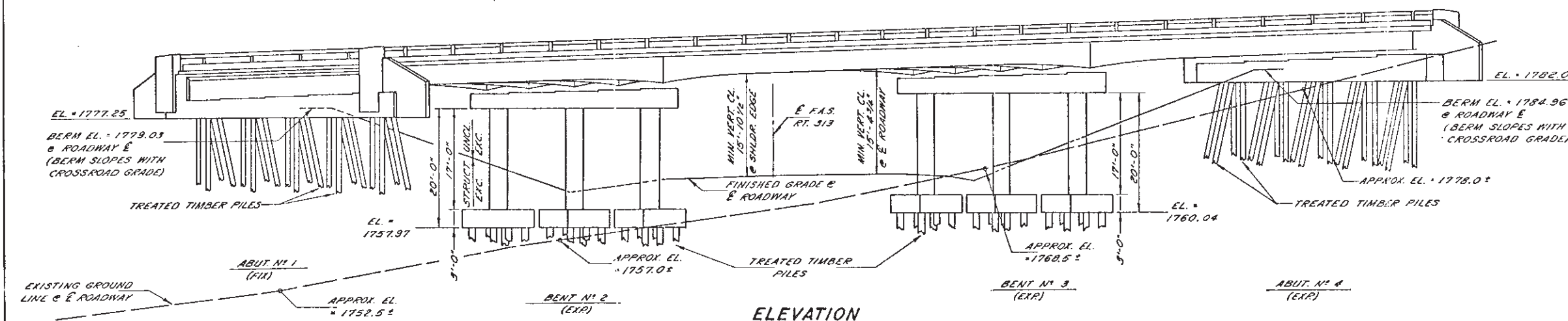
DEUEL COUNTY
S. D. DEPT. OF TRANSPORTATION
JULY 2016

DESIGNED BY MM DUEL4FN	CK. DES. BY KSK 14FNRB05	DRAFTED BY KR	Steve A. Johnson BRIDGE ENGINEER
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GENERAL PILE NOTES:

1. PREBORE PILING THROUGH THE FILL EMBANKMENT TO THE NATURAL GROUND LINE. MINIMUM DIAMETER = 16". (ABUTMENTS N° 1 AND N° 4, AND BENT N° 2.)
2. PILING SHALL DEVELOP A MINIMUM BEARING VALUE OF 24 TONS PER PILE.
3. PREBORED HOLES FOR PILES SHALL BE BACKFILLED WITH SAND OR GRANULAR MATERIAL ACCEPTABLE TO THE ENGINEER, AND COMPACTED AS SPECIFIED BY THE ENGINEER. THE COST OF GRANULAR MATERIAL IN PLACE SHALL BE INCLUDED IN THE UNIT PRICE BID FOR THE PILES.
4. THE CONTRACTOR SHALL HAVE SUFFICIENT PILE SPLICE MATERIAL ON HAND BEFORE PILE DRIVING IS STARTED. SEE STANDARD PLATE N° 303.1, SHEET 18 FOR SPLICE DETAILS.
5. SEE STANDARD PLATE N° 301, SHEET 18 FOR PILE SHOE DETAILS.
6. Piling for Abut. N° 1 shall be prebored.



ORIGINAL CONSTRUCTION PLANS

(SOUTH BOUND LANES) GENERAL DRAWING & QUANTITIES FOR 170'-8 1/2" CONT. COMP GIRDER VIADUCT

GRADE SEPARATION
38'-0" ROADWAY
OVER F.A.S. ROUTE 313 - STA. 11+14.98
I.S. 29 STA. 1 + 61.03 TO 3 + 31.74

SEC. 21-T114N-R50W
40° SKEW R.H.F.
I-29-6 () 151

STR. NO. 20-029-211

DEUEL COUNTY
SOUTH DAKOTA

PREPARED BY:
J.T. BANNER & ASSOCIATES, INC.
CONSULTING ENGINEERS
BROOKINGS, SOUTH DAKOTA
MARCH 1969

HS 20-44
& ALTERNATE

6 OF 8

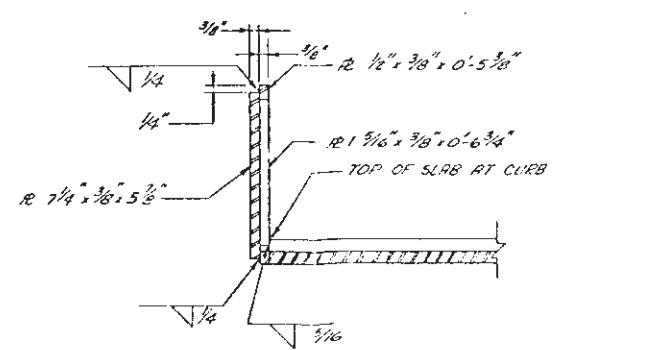
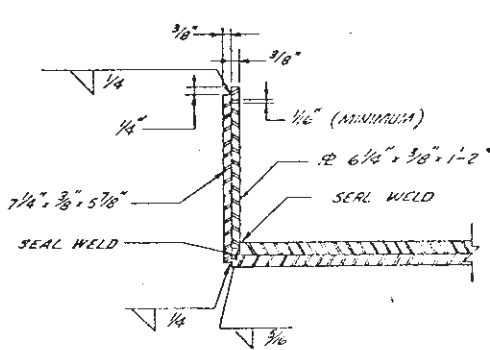
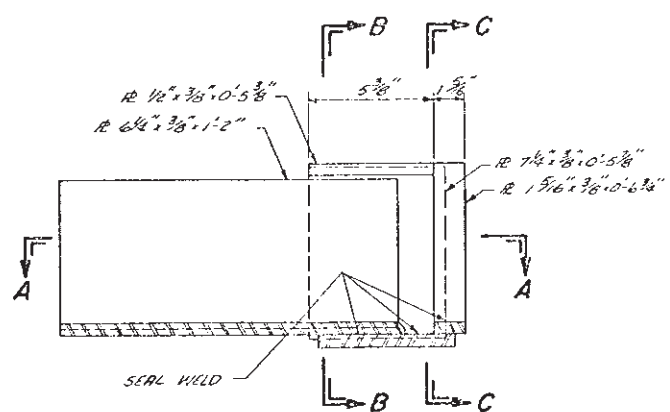
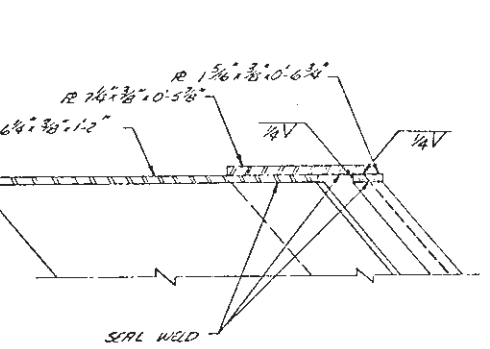
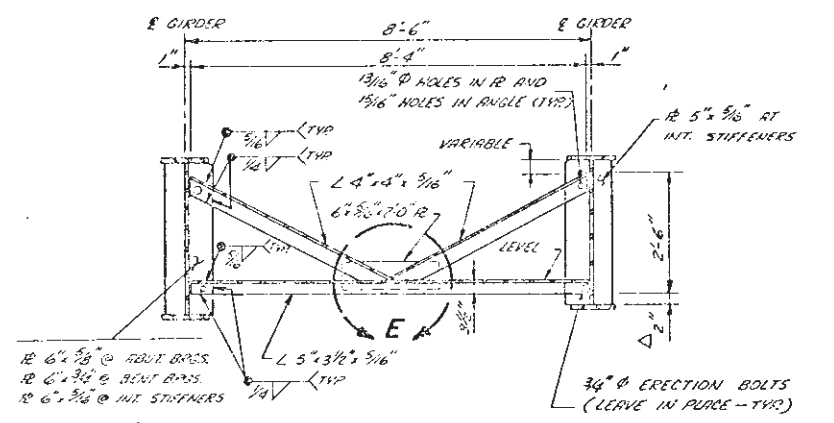
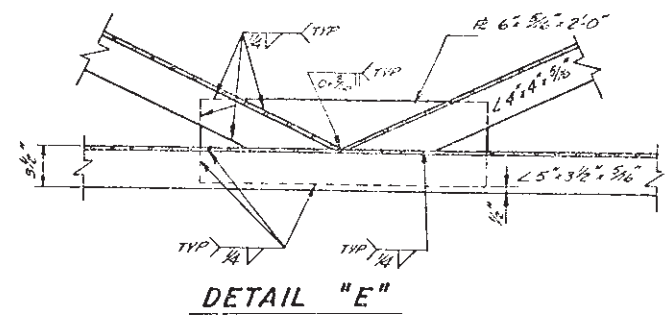
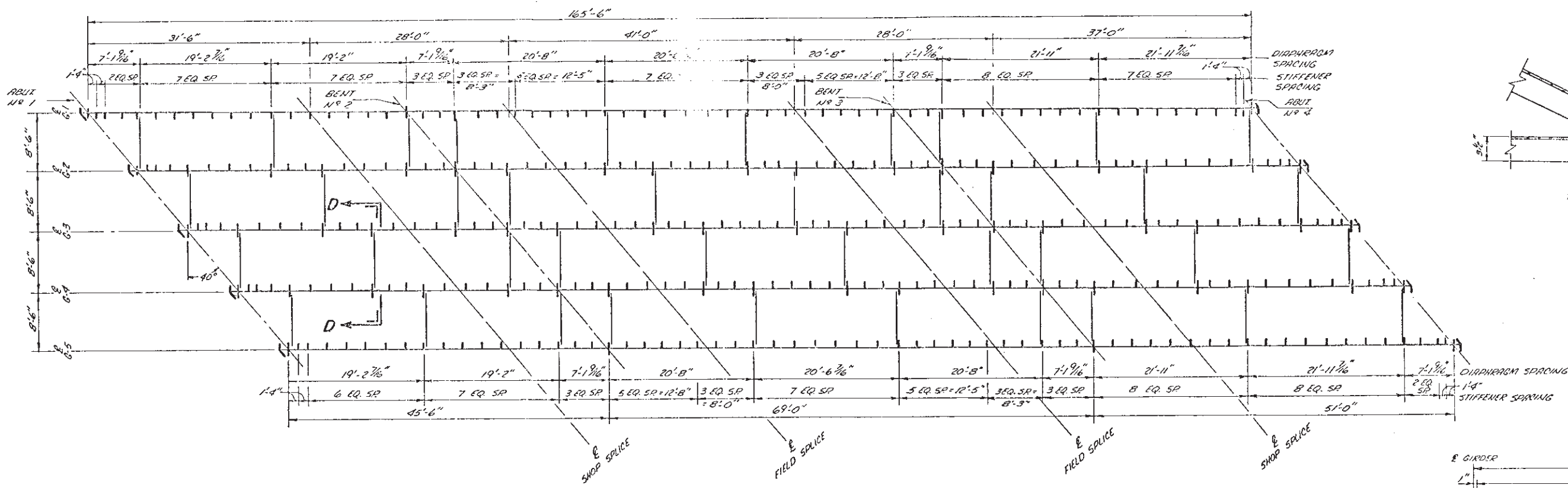
DESIGNED BY:	DRAWN BY:	CHECKED BY:	APPROVED:
F.J.R.	C.M.L.	F.L.N.	BRIDGE ENGINEER

TOTAL ESTIMATED QUANTITIES										
BID ITEM N°	CONCRETE CLASS #1 (BRIDGE)		STEEL		TYPE RT. 313 RAILING		TIMBER PILES		STRUCTURE EXCAVATION (BRIDGE)	
ITEM	CU YDS	LBS	CU YDS	LBS	LN FT	LN FT	CU YDS	CU YDS	CU YDS	LUMP SUM
SUPERSTRUCTURE 170'-8 1/2" CONT UNIT	178.8	64,345	105,213	341						
ABUTMENT N° 1	59.5	6,445	10							
BENT N° 2	52.7	10,547								
BENT N° 3	52.7	10,547								
ABUTMENT N° 4	59.5	6,445	10							
TOTAL	403.2	78,445	105,233	341						

ONE TREATED TIMBER TEST PILE SHALL BE DRIVEN AT ABUTMENTS N° 1 AND N° 4 AND AT BENTS N° 2 AND N° 3 BEFORE THE REMAINING PILES ARE ORDERED.
TO BE DONE BY OTHERS.
FOR INFORMATION ONLY, THE APPROXIMATE VOLUME GRANULAR BACKFILL WILL BE 290 CU. YDS. IN PLACE, AND THE LENGTH OF THE 6" PERFORATED METAL PIPE WILL BE 204 LN. FT. COMPLETE FOR THE TWO ABUTMENTS.

STR. EAC	Tim Pile	Tim Cutoff	Test Pile	Test Cutoff	splice
16.2	39.4	7.2	4.0	2.1	1
59.5	11.5	1.5	1.5	1.5	1
52.7	11.5	1.5	1.5	1.5	1
52.7	11.5	1.5	1.5	1.5	1
59.5	11.5	1.5	1.5	1.5	1
TOTAL	130.7	13.2	1.5	1.5	1

20-005



GENERAL SUPERSTRUCTURE NOTES:

- DESIGN SPECIFICATIONS: A.A.S.H.O. SPECIFICATIONS FOR HIGHWAY BRIDGES 1965, WITH INTERIM SPECIFICATIONS FOR 1966 - 1967.
- DESIGN LOADING: HS 20-44 A.A.S.H.O. AND ALTERNATE LOADING AS DESIGNATED IN R.P.M. 20-4, SEC. 4C.
- UNIT STRESSES: RE-STEEL $f_s = 20,000$ P.S.I. CONCRETE $f_c = 4,000$ P.S.I. SLAB DECK $f_c = 1,350$ P.S.I.
- STRUCTURAL STEEL MEMBERS SHALL CONFORM TO A.S.T.M. A-36 STEEL. STEEL PRODUCED UNDER OTHER SPECIFICATIONS, BUT SHOWN TO POSSESS THE CHEMICAL AND PHYSICAL PROPERTIES OF A-36 STEEL WILL BE ACCEPTED FOR USE WHERE THE LATTER IS SPECIFIED.
- STRUCTURAL STEEL FOR BEARINGS AND COPPER ALLOY BEARING PLATES SHALL BE AS SPECIFIED ON BEARING SHEET.
- ALL REINFORCING STEEL BARS SHALL CONFORM TO A.S.T.M. SPECIFICATIONS A-305 AND A-15 INTERMEDIATE GRADE.
- COST OF WELDING SHALL BE INCLUDED IN THE UNIT PRICE BID FOR STRUCTURAL STEEL.
- COST OF CANVAS AND RED LEAD OR PREFORMED FABRIC PADS UNDER BEARING PLATES SHALL BE INCLUDED IN THE UNIT PRICE BID FOR STRUCTURAL STEEL.
- SHOP BUTTWELDED GIRDER SPLICES SHALL BE RADIOGRAPHICALLY INSPECTED.
- ALL EXPOSED CONCRETE EDGES SHALL BE CHAMFERED 1" UNLESS OTHERWISE NOTED.
- SEE RAILING SHEET FOR DETAILS OF TUBE RAILS AND CURB.
- ALL SHEDGE BOLTS ARE LISTED AS STRUCTURAL STEEL IN THE SUPERSTRUCTURE QUANTITIES.
- ERECTION BOLTS LEFT IN PLACE AT DIAPHRAGMS SHALL BE INCLUDED IN THE STRUCTURAL STEEL QUANTITY FOR PAYMENT.
- THE COST OF PAINTING SHALL BE INCLUDED IN THE UNIT PRICE BID FOR STRUCTURAL STEEL.
- FILET WELDS SHALL BE SUBJECTED TO MAGNETIC PARTICLE INSPECTION.
- STRUCTURAL STEEL SHALL BE PAINTED WITH ONE SHOP COAT OF RED LEAD PAINT (A.A.S.H.O. DESIGNATION M-72 TYPE I) OR RED LEAD IRON OXIDE PAINT (A.A.S.H.O. DESIGNATION M-72 TYPE III), AND SHALL BE FIELD PAINTED WITH ONE COAT OF GRAY PAINT FOLLOWED BY A COAT OF GREEN PAINT.

ORIGINAL CONSTRUCTION PLANS

(SOUTH BOUND LANES)
FRAMING PLAN, DIAPHRAGM AND CURB PLATE DETAILS
FOR
170'-8 1/2" CONT. COMP GIRDER VIADUCT

GRADE SEPARATION
38'-0" ROADWAY
OVER F.A.S. ROUTE 313 - STA. 11+14.98
I.S. 29 STA. 11+61.03 TO 3+31.74

SEC 21 - T114 N - R50 W
40° SKEW R.H.F.
I-29-6 () 151

DEUEL COUNTY
SOUTH DAKOTA

STR. NO. 20-029-211

PREPARED BY:
J.T. BANNER & ASSOCIATES, INC.
CONSULTING ENGINEERS
BROOKINGS, SOUTH DAKOTA
MARCH 1969

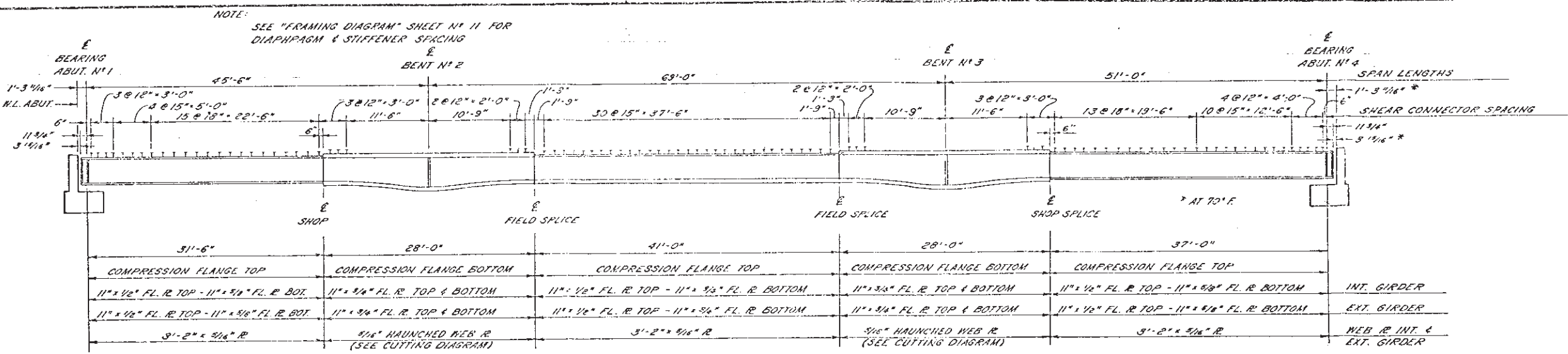
HS 20-44
& ALTERNATE

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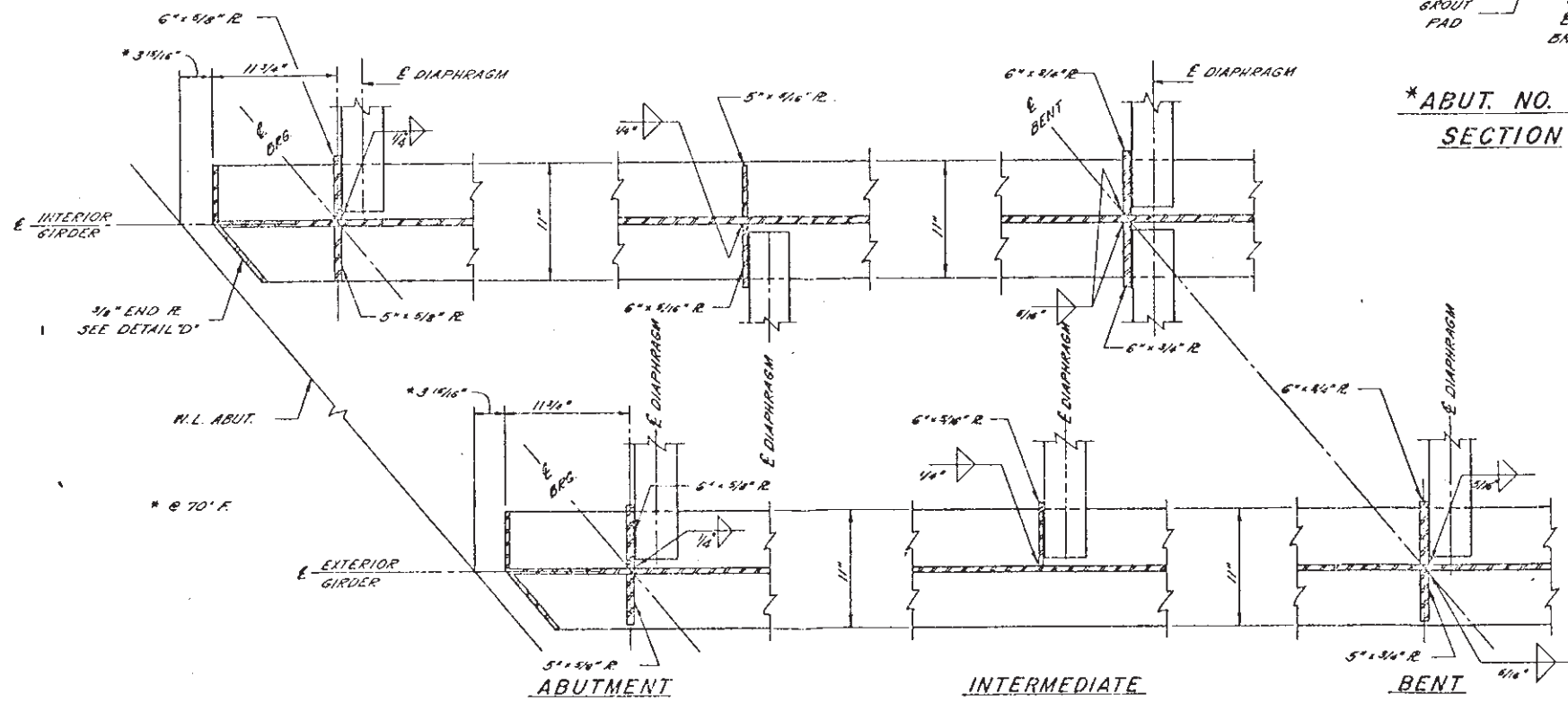
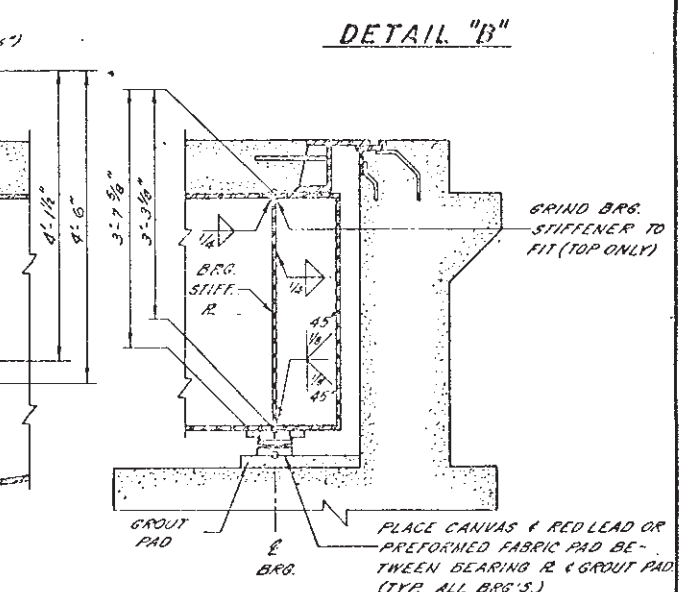
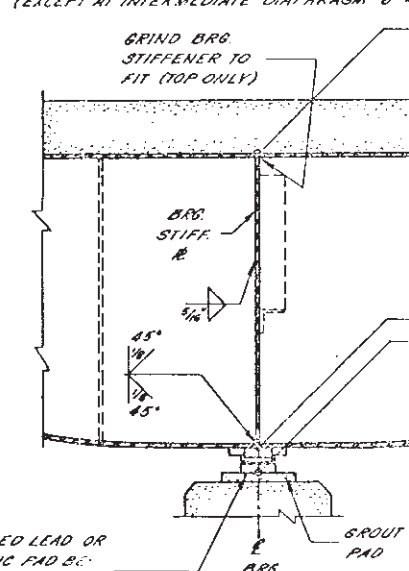
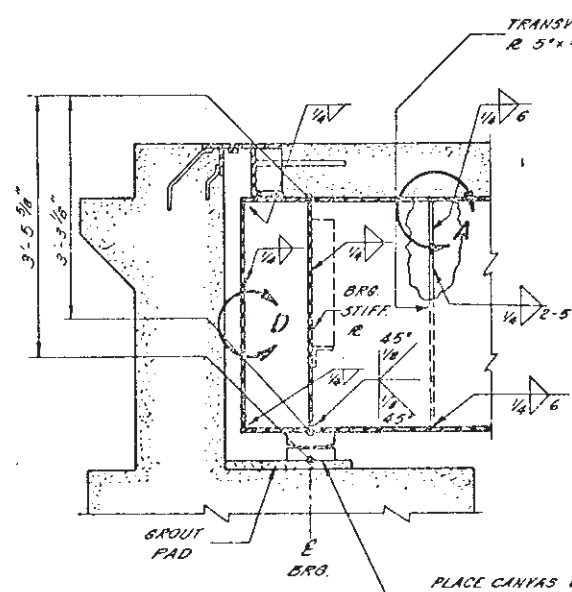
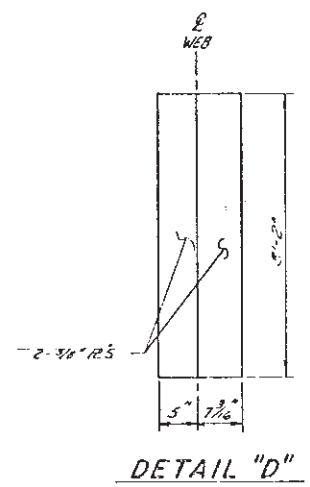
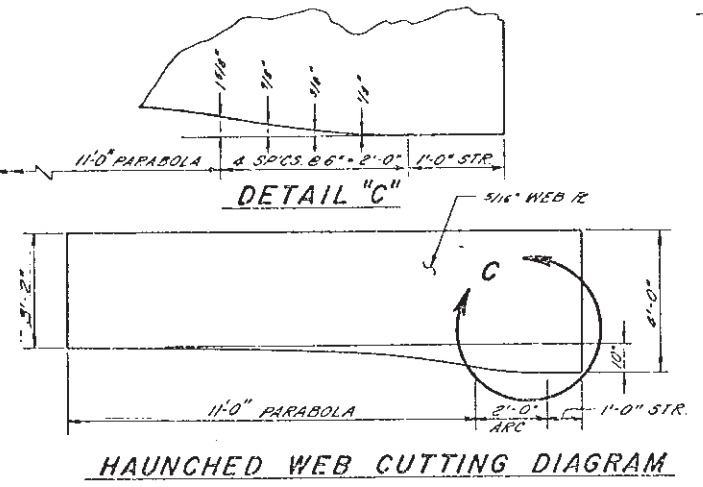
DESIGNED BY:	DRAWN BY:	CHECKED BY:	APPROVED:
F.J.R.	K.H.J.	F.L.M.	BRIDGE ENGINEER

EXPANSION DEVICE CURB PLATE DETAILS

20-005



GIRDER LAYOUT
(SLAB NOT SHOWN)
(OUTSIDE FACE OF EXTERIOR GIRDER SHOWN)



STIFFENER PLATES AT BEARINGS AND DIAPHRAGM

FLANGE TO WEB WELDS	
FLANGE THICKNESS	FILLET WELDS
1/2", 5/8", 1 1/4"	1/4"

- NOTES FOR SHEAR CONNECTORS:**
- WELDED STUD CONNECTORS ARE SPACED AS SHOWN ON GIRDER LAYOUT.
 - SHEAR CONNECTORS WILL BE PAID FOR AS STRUCTURAL STEEL BASED ON THE WEIGHT OF THE STUDS. EACH STUD IS COMPUTED AT .81 LBS. EACH.

- GENERAL NOTES:**
- SEE SHT. 13 FOR DETAILS OF FIELD SPLICE.
 - SEE SHT. 11 FOR DIAPHRAGM DETAILS.
 - ALL DIMENSIONS SHOWN ARE HORIZONTAL AND VERTICAL.
 - ALL STIFFENERS AND GIRDER ENDS SHALL BE MADE VERTICAL.

ORIGINAL CONSTRUCTION PLANS

(SOUTH BOUND LANES)
GIRDER LAYOUT & STIFFENER DETAILS
FOR
170'-8 1/2" CONT. COMP. GIRDER VIADUCT

GRADE SEPARATION 38'-0" ROADWAY OVER F.A.S. ROUTE 313 - STA. 11+14.98 TO 3+31.74
SEC. 21-T114 N-R50W 40° SKEW R.H.F. I-29-6 () 151

DEUEL COUNTY SOUTH DAKOTA
STR. NO. 20-029-211

PREPARED BY: J.T. BANNER & ASSOCIATES, INC. CONSULTING ENGINEERS
BROOKINGS, SOUTH DAKOTA
MARCH 1969

DESIGNED BY:	DRAWN BY:	CHECKED BY:	APPROVED:
F.J.R.	C.H.L.	F.L.N.	BRIDGE ENGINEER