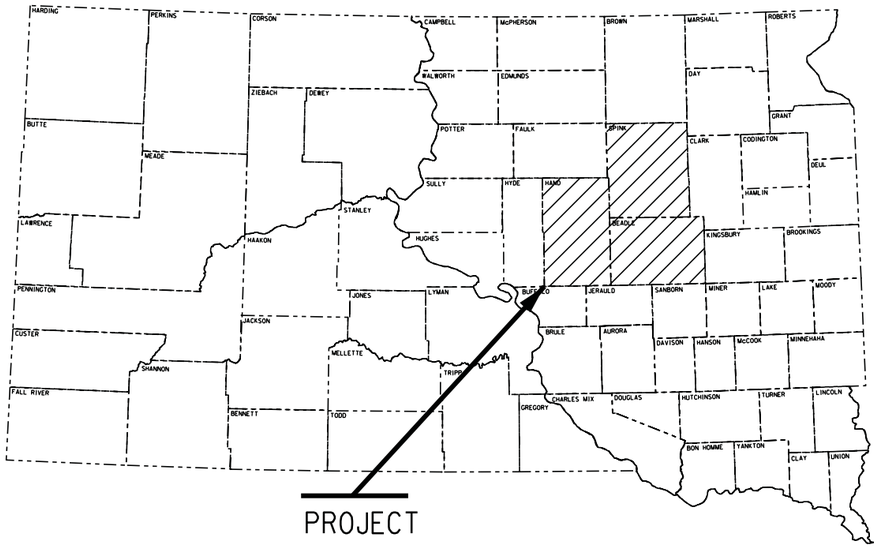
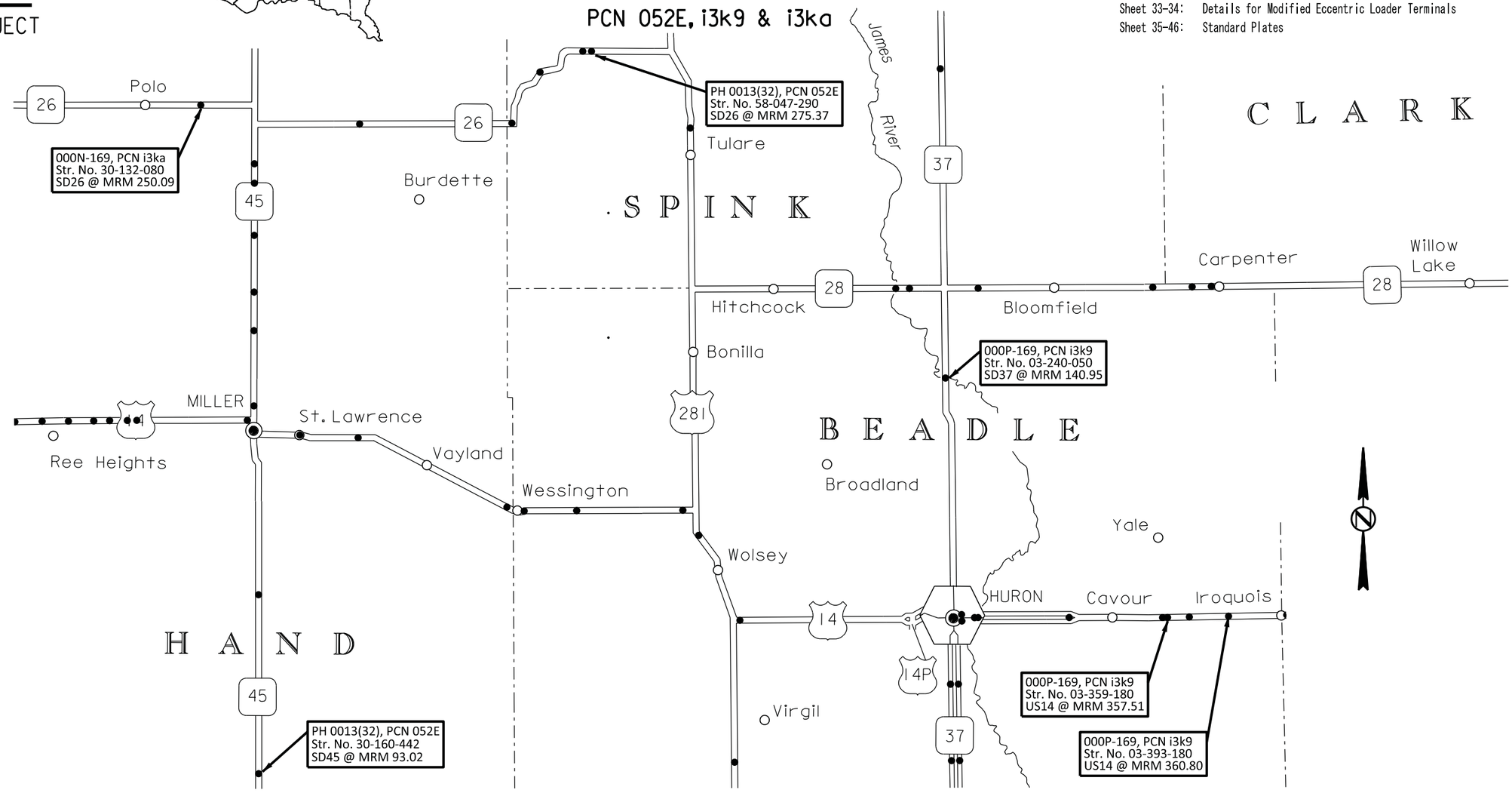
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	PH 0013(32), 000P-169, 000N-169	1	46
Plotting Date: 07/18/2014			

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED

PROJECT PH 0013(32), 000P–169 & 000N–169
US HIGHWAY 14
SD HIGHWAYS 26, 37 & 45
BEADLE, HAND & SPINK COUNTIES

BRIDGE RAIL REPLACEMENT,
GUARDRAIL REPLACEMENT AND REPAIR
PCN 052E, i3k9 & i3ka





STORM WATER PERMIT
(None Required)

INDEX OF SHEETS

ESTIMATE OF QUANTITIES

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	PH 0013(32), 000P-169, 000N-169	2	46

GUARDRAIL & BRIDGE RAIL REPLACEMENT

PH 0013(32), PCN 052E

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E0730	Remove Beam Guardrail	825.0	Ft
110E1000	Remove Asphalt Concrete Pavement	Lump Sum	LS
110E1690	Remove Sediment	1.0	CuYd
120E0100	Unclassified Excavation, Digouts	50	CuYd
120E0600	Contractor Furnished Borrow	601	CuYd
260E1010	Base Course	322.0	Ton
320E1200	Asphalt Concrete Composite	249.0	Ton
332E0010	Cold Milling Asphalt Concrete	1,449	SqYd
630E0110	Straight Double Class A Thrie Beam Guardrail with Wood Posts	50.0	Ft
630E1010	Straight Class A W Beam Guardrail with Wood Posts	150.0	Ft
630E1050	Straight Class B W Beam Guardrail with Wood Posts	50.0	Ft
630E1150	Straight Double Class B W Beam Guardrail with Wood Posts	50.0	Ft
630E2000	W Beam to Thrie Beam Guardrail Transition	4	Each
630E2015	W Beam Guardrail Flared End Terminal	8	Each
632E2220	Guardrail Delineator	32	Each
633E1400	Pavement Marking Paint, 4" White	900	Ft
633E1405	Pavement Marking Paint, 4" Yellow	100	Ft
634E0010	Flagging	50	Hour
634E0100	Traffic Control	1,072	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0610	4" Temporary Pavement Marking Tape Type 2	2,350	Ft
634E0630	Temporary Pavement Marking	0.2	Mile
734E0010	Erosion Control	Lump Sum	LS
734E0154	12" Diameter Erosion Control Wattle	150	Ft

STR. NO. 30-160-442 (SD 45 @ MRM 93.02) BRIDGE RAIL REPLACEMENT

Bid Item Number	Item	Quantity	Unit
110E0020	Remove Bridge Railing	195	Ft
460E0070	Class A45 Concrete, Bridge Repair	16.0	CuYd
460E0300	Breakout Structural Concrete	4.4	CuYd
460E0380	Install Dowel in Concrete	136	Each
480E0200	Epoxy Coated Reinforcing Steel	1,052	Lb
480E5004	Galvanic Strip Anode	167	Ft

GUARDRAIL REPAIR

000P-169, PCN i3k9

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
629E0450	Retension 3 Cable Guardrail	4	Each
629E1102	3 Cable Guardrail Intermediate Post	4	Each
629E1114	3 Cable Guardrail J Hook Bolt	10	Each
629E1120	W Beam to 3 Cable Transition Bracket	2	Each
630E2105	Beam Guardrail Block	2	Each
630E2110	Beam Guardrail Post and Block	2	Each
634E0010	Flagging	10	Hour
634E0100	Traffic Control	306	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS

000N-169, PCN i3ka

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E0730	Remove Beam Guardrail	25.0	Ft
250E0010	Incidental Work	Lump Sum	LS
629E0200	Reset 3 Cable Guardrail	70	Ft
629E0450	Retension 3 Cable Guardrail	2	Each
629E1102	3 Cable Guardrail Intermediate Post	15	Each
629E1114	3 Cable Guardrail J Hook Bolt	10	Each
629E1120	W Beam to 3 Cable Transition Bracket	8	Each
630E1250	Straight Double Class A W Beam Rail	25.0	Ft
630E2105	Beam Guardrail Block	4	Each
630E2110	Beam Guardrail Post and Block	15	Each
630E5520	Drive Down Beam Guardrail Post	16	Each
634E0010	Flagging	25	Hour
634E0100	Traffic Control	306	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
900E2030	Miscellaneous Work	4	Site

SPECIFICATIONS

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

ENVIRONMENTAL COMMITMENTS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	PH 0013(32), 000P-169, 000N-169	3	46

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 B: FEDERALLY THREATENED, ENDANGERED, AND PROTECTED SPECIES

COMMITMENT B2: WHOOPING CRANE

The Whooping Crane is a spring and fall migratory bird in South Dakota that is about 5 feet tall and typically stops on wetlands, rivers, and agricultural lands along their migration route. An adult Whooping Crane is white with a red crown and a long, dark, pointed bill. Immature Whooping Cranes are cinnamon brown. While in flight, their long necks are kept straight and their long dark legs trail behind. Adult Whooping Cranes' black wing tips are visible during flight.

Action Taken/Required:

Harassment or other measures to cause the Whooping Crane to leave the site is a violation of the Endangered Species Act. If a Whooping Crane is sighted roosting in the vicinity of the project, borrow pit, or staging site associated with the project, cease construction activities in the affected area until the Whooping Crane departs and contact the Project Engineer. The Project Engineer will contact the Environmental Office so that the sighting can be reported to USFWS.

COMMITMENT C: WATER SOURCE

The Contractor shall not withdraw water with equipment previously used outside the State of South Dakota without prior approval from the SDDOT Environmental Office. Thoroughly wash all construction equipment before entering South Dakota to reduce the risk of invasive species introduction into the project vicinity.

The Contractor shall not withdraw water directly from streams of the James, Big Sioux, and Vermillion watersheds without prior approval from the SDDOT Environmental Office.

Action Taken/Required:

The Contractor shall obtain the necessary permits from the regulatory agencies such as the Department of Environment and Natural Resources (DENR) and the United States Army Corps of Engineers (COE) prior to executing water extraction activities.

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 State ROW.

The waste disposal site(s) shall be managed and reclaimed in accordance with the following from the General Permit for Highway, Road, and Railway 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:

1. 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 State 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 State ROW through the use of fences, gates, and placement of a sign or signs at the entrance to the site stating "No Dumping Allowed".

2. 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 designated option borrow 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: staging areas, borrow sites, waste disposal sites, and all material processing sites.

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.

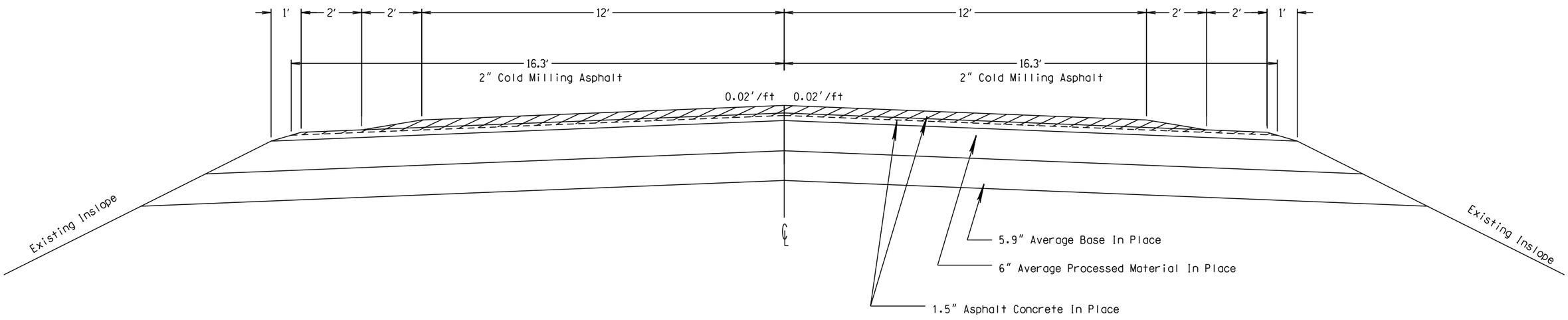
SHPO/THPO review does not relieve the Contractor of the responsibility for obtaining any additional permits and clearances for staging areas, borrow sites, waste disposal sites, or material processing sites that affect wetlands, threatened and endangered species, or waterways. The Contractor shall provide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

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	PH 0013(32), 000P-169, 000N-169	4	46
Plotting Date: 07/16/2014			

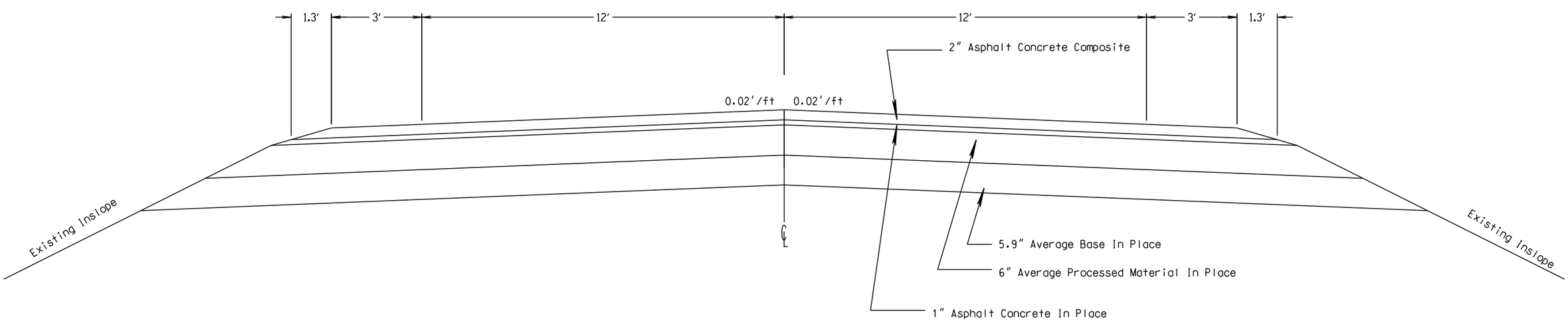
TYPICAL RESURFACING SECTION

SD 45
Str. No. 30-160-442
MRM 93.02

In Place & Cold Milling Section



Resurfacing Section



PLOT SCALE - 1:3.33333

PLOTTED FROM - TRAB17982

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	PH 0013(32), 000P-169, 000N-169	5	46

TABLE OF QUANTITIES

(For Information Only)

Bid Item Number	Item	Unit	PH 0013(32), PCN 052E	000P-169, PCN i3k9	000N-169, PCN i3ka	Total Quantity
009E0010	Mobilization	LS	Lump Sum	Lump Sum	Lump Sum	Lump Sum
110E0200	Remove Bridge Railing	Ft	195			195
110E0730	Remove Beam Guardrail	Ft	825		25	850
110E1000	Remove Asphalt Concrete Pavement	LS	Lump Sum			Lump Sum
110E1690	Remove Sediment	CuYd	1			1
120E0100	Unclassified Excavation, Digouts	CuYd	50			50
120E0600	Contractor Furnished Borrow	CuYd	601			601
250E0010	Incidental Work	LS			Lump Sum	Lump Sum
260E1010	Base Course	Ton	322			322
320E1200	Asphalt Concrete Composite	Ton	249			249
332E0010	Cold Milling Asphalt Concrete	SqYd	1449			1449
460E0070	Class A45 Concrete, Bridge Repair	CuYd	16			16
460E0300	Breakout Structural Concrete	CuYd	4.4			4.4
460E0380	Install Dowel in Concrete	Each	136			136
480E0200	Epoxy Coated Reinforcing Steel	Lb	1052			1052
480E5004	Galvanic Strip Anode	Ft	167			167
629E0200	Reset 3 Cable Guardrail	Ft			70	70
629E0450	Retension 3 Cable Guardrail	Each		4	2	6
629E1102	3 Cable Guardrail Intermediate Post	Each		4	15	19
629E1114	3 Cable Guardrail J Hook Bolt	Each		10	10	20
629E1120	W Beam to 3 Cable Transition Bracket	Each		2	8	10
630E0010	Straight Double Class A Thrie Beam Guardrail with Wood Posts	Ft	50			50
630E1010	Straight Class A W Beam Guardrail with Wood Posts	Ft	150			150
630E1050	Straight Class B W Beam Guardrail with Wood Posts	Ft	50			50
630E1150	Straight Double Class B W Beam Guardrail with Wood Posts	Ft	50			50
630E1250	Straight Double Class A W Beam Rail	Ft			25	25
630E2000	W Beam to Thrie Beam Guardrail Transition	Each	4			4
630E2015	W Beam Guardrail Flared End Terminal	Each	8			8
630E2105	Beam Guardrail Block	Each		2	4	6
630E2110	Beam Guardrail Post and Block	Each		2	15	17
630E5520	Drive Down Beam Guardrail Post	Each			16	16
632E2220	Guardrail Delineator	Each	32			32
633E1400	Pavement Marking Paint, 4” White	Ft	900			900
633E1405	Pavement Marking Paint, 4” Yellow	Ft	100			100
634E0010	Flagging	Hour	50	10	25	85
634E0100	Traffic Control	Unit	1072	306	306	1684
634E0120	Traffic Control, Miscellaneous	LS	Lump Sum	Lump Sum	Lump Sum	Lump Sum
634E0610	4” Temporary Pavement Marking Tape, Type 2	Ft	2350			2350
634E0630	Temporary Pavement Marking	Mile	0.2			0.2
734E0010	Erosion Control	LS	Lump Sum			Lump Sum
734E0154	12” Diameter Erosion Control Wattle	Ft	150			150
900E2030	Miscellaneous Work	Site			4	4

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	PH 0013(32), 000P-169, 000N-169	6	46

PH 0013(32), PCN 052E - TABLE OF GUARDRAIL REPLACEMENT

Str. No.	Route	MRM	Corner of Bridge	Remove Beam Guardrail (FT)	Straight Dbl. Cl. A Thrie Beam GR W/ Wood Posts (FT)	Straight Class A W Beam Guardrail W/ Wood Posts (FT)	Straight Class B W Beam Guardrail W/ Wood Posts (FT)	Straight Dbl. Cl. B W Beam Guardrail W/ Wood Posts (FT)	W Beam to Thrie Beam Guardrail Transition (Each)	W Beam Guardrail Flared End Terminal (Each)	Comments
58-047-290	SD 26	275.37	SW	75.0		12.5	12.5	12.5		1	Remove and replace all w beam railing.
			SE	75.0		12.5	12.5	12.5		1	
			NE	75.0		12.5	12.5	12.5		1	
			NW	75.0		12.5	12.5	12.5		1	
30-160-442	SD 45	93.02	SW	100.0	12.5	25.0			1	1	Remove and replace all beam railing.
			SE	162.5	12.5	25.0			1	1	
			NE	100.0	12.5	25.0			1	1	
			NW	162.5	12.5	25.0			1	1	
			TOTAL	**825.0**	**50.0**	**150.0**	**50.0**	**50.0**	**4**	**8**	

Notes:

The above quantities are included in the Estimate of Quantities.

PH 0013(32), PCN 052E - TABLE OF GUARDRAIL EMBANKMENT, SURFACING AND DELINEATION FOR GUARDRAIL REPLACEMENT LOCATIONS

Str. No.	Route	MRM	Corner of Bridge	Remove Asphalt Concrete Pavement (Lump Sum)	Contractor Furnished Borrow CuYd)	Base Course (Ton)	Asphalt Concrete Composite (Ton)	Cold Milling Asphalt Concrete (Each)	Guardrail Delineator (Each)	Comments
58-047-290	SD 26	275.37	SW	Lump Sum	78	32	11	-	4	Remove asphalt surfacing from the existing guardrail embankment, expand existing guardrail embankment as indicated on detail sheet, place base course and surface the entire guardrail embankment with Asphalt Concrete Composite prior to installing new guardrail.
			SE	Lump Sum	105	32	11	-	4	
			NE	Lump Sum	78	32	11	-	4	
			NW	Lump Sum	65	32	11	-	4	
30-160-442	SD 45	93.02	SW	Lump Sum	25	10	9	-	4	Remove asphalt surfacing from the existing guardrail embankment, expand existing guardrail embankment as indicated on detail sheet, place base course and surface the entire guardrail embankment with Asphalt Concrete Composite prior to installing new guardrail.
			SE	Lump Sum	93	38	9	-	4	
			NE	Lump Sum	33	10	9	-	4	
			NW	Lump Sum	124	38	9	-	4	
			North Approach	-	-	-	85	724	-	Cold Mill Asphalt Concrete for a length of 200 feet at each end of the bridge. Depth of cold milling to be 2 inches. Width of cold milling based upon 32.6 feet.
			South Approach	-	-	-	85	724	-	
			TOTAL	**Lump Sum**	**601**	**222**	**249**	**1449**	**32**	

Notes:

The above quantities are included in the Estimate of Quantities.

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	PH 0013(32), 000P-169, 000N-169	8	46

000P-169, PCN i3k9 - TABLE OF GUARDRAIL REPAIR

(Sorted by route and then MRM)

Str. No.	Route	MRM	Corner of Bridge	Retension 3 Cable Guardrail (Each)	3 Cable Guardrail Intermediate Post (Each)	3 Cable Guardrail J Hook Bolt (Each)	W Beam to 3 Cable Transition Bracket (Each)	Beam Guardrail Block (Each)	Beam Guardrail Post and Block (Each)	Comments
03-359-180	US 14	357.51	SW	1						Retension 3 Cable Guardrail. In place rail length approximately 174'.
			NE	1						Retension 3 Cable Guardrail. In place rail length approximately 174'.
03-393-180	US 14	360.80	SW	1						Retension 3 Cable Guardrail. In place rail length approximately 190'.
			NE	1						Retension 3 Cable Guardrail. In place rail length approximately 190'.
Additional Quantity - See Notes below					4	10	2	2	2	
			TOTAL	**4**	**4**	**10**	**2**	**2**	**2**	

Notes:

The above quantities are included in the Estimate of Quantities.

A quantity of 4 3 Cable Guardrail Intermediate Posts has been included in the Estimate of Quantities to account for any missing or damaged posts on guardrail sites that are being repaired. Actual quantity is likely to vary significantly.

A quantity of 10 3 Cable Guardrail J Hook Bolts has been included in the Estimate of Quantities to replace any damaged or missing J hook bolts on guardrail sites that are being repaired. Actual quantity is likely to vary significantly.

A quantity of 2 W Beam to 3 Cable Transition Brackets has been included in the Estimate of Quantities to account for any missing or damaged brackets on guardrail sites that are being repaired. Actual quantity is likely to vary significantly.

A quantity of 2 Beam Guardrail Blocks has been included in the Estimate of Quantities to account for any missing or damaged blocks on guardrail sites that are being repaired. Actual quantity is likely to vary significantly.

A quantity of 2 Beam Guardrail Post and Blocks has been included in the Estimate of Quantities to account for any missing or damaged posts on guardrail sites that are being repaired. Actual quantity is likely to vary significantly.

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	PH 0013(32), 000P-169, 000N-169	9	46

000N-169, PCN i3ka - TABLE OF GUARDRAIL REPAIR

(Sorted by route and then MRM)

Str. No.	Route	MRM	Corner of Bridge	Remove Beam Guardrail (Ft)	Reset 3 Cable Guardrail (Ft)	Retension 3 Cable Guardrail (Each)	3 Cable Guardrail Inter-mediate Post (Each)	3 Cable Guardrail J Hook Bolt (Each)	W Beam to 3 Cable Transition Bracket (Each)	Straight Double Class A W Beam Rail (Ft)	Beam Guardrail Block (Each)	Beam Guardrail Post and Block (Each)	Drive Down Beam Guard-rail Post (Each)	Miscel-laneous Work (Site)	Comments
30-132-080	SD 26	250.09	NW									4			Replace 4 old posts and blocks
				25						25					Replace the 12.5' section of doubled rail off the end of the bridge and the 12.5' section of doubled railing at the end of the bridge railing
			NE									4			Replace 4 old posts and blocks
			SW									2			Replace 2 old wood posts near bridge end.
			SE									1			Replace 1 old wood post
03-240-050	SD 37	140.95	NW		70										Existing 3 Cable Guardrail needs to be raised.
						1									Retension 3 Cable Guardrail. In place rail length approximately 190'.
													6		2 Steel Tube footing of the MELT and 4 wood line posts of the MELT. 4 line posts not attached to W-beam railing
									2						Replace both of the brackets
							2								Install two 3 cable guardrail posts along the face of the MELT to decrease the post spacing from 8' to 4'
															Reset/realign the "End Post Cap" on both(2) End Posts of the 3 Cable Guardrail anchor section. (Incidental Work)
															Tighten the Cable on the MELT End Terminal. (Incidental Work)
															Realign and re-nail wood spacer blocks that are not properly orientated. (Incidental Work)
														1	Drill bolt slot holes in beam rail where beam rail is attached to wood posts.
			NE										6		Drive down W-Beam railing posts starting with post at the end of the W Beam to Thrie Beam Transition Section
															Add 16" x 16" Fluorescent Yellow super or very high intensity sheeting to the head of the Flared End Terminal. (Incidental Work)
															Tighten the Cable on the Flared End Terminal. (Incidental Work)
														1	Drill bolt slot holes in beam rail where beam rail is attached to wood posts.
			SW												Add 16" x 16" Fluorescent Yellow super or very high intensity sheeting to the head of the Flared End Terminal. (Incidental Work)
															Tighten the Cable on the Flared End Terminal. (Incidental Work)
														1	Drill bolt slot holes in beam rail where beam rail is attached to wood posts.
			SE										4		4 wood line posts of the MELT. 4 line posts not attached to W-beam railing
						1									Retension 3 Cable Guardrail. Clean debris off of both the concrete 3 Cable Anchor footings. In place rail length approximately 455'.
									2						Replace both of the brackets
							3								Install three 3 cable guardrail posts along the face of the MELT to decrease the post spacing from 8' to 4'
															Tighten the Cable on the MELT End Terminal. (Incidental Work)
														1	Drill bolt slot holes in beam rail where beam rail is attached to wood posts.
Additional Quantity - See Notes below							10	10	4		4	4			
			TOTAL	**25.0**	**70**	**2**	**15**	**10**	**8**	**25.0**	**4**	**15**	**16**	**4**	

Notes:

The above quantities are included in the Estimate of Quantities.

The quantity of 3 Cable Guardrail Intermediate Posts has been increased by a quantity of 10 to account for any missing or damaged posts on guardrail sites that are being repaired. Actual quantity is likely to vary significantly.

A quantity of 10 3 Cable Guardrail J Hook Bolts has been included in the Estimate of Quantities to replace any damaged or missing J hook bolts on guardrail sites that are being repaired. Actual quantity is likely to vary significantly.

The quantity of W Beam to 3 Cable Transition Brackets has been increased by a quantity of 4 to account for any missing or damaged brackets on guardrail sites that are being repaired. Actual quantity is likely to vary significantly.

A quantity of 4 Beam Guardrail Blocks has been included in the Estimate of Quantities to account for any missing or damaged blocks on guardrail sites that are being repaired. Actual quantity is likely to vary significantly.

A quantity of 4 Beam Guardrail Post and Blocks has been included in the Estimate of Quantities to account for any missing or damaged posts on guardrail sites that are being repaired. Actual quantity is likely to vary significantly.

SCOPE OF WORK

Work on this project involves replacement of guardrail at 2 bridge sites in addition to repairing guardrail at several sites. One bridge site (SD 45 @ MRM 93.02) requires the replacement of the bridge rail.

SEQUENCE OF OPERATIONS

Once work starts at a guardrail repair or replacement location the work shall be vigorously pursued to complete the work in the shortest amount of time necessary. Work shall be coordinated so as to cause the least amount of traffic interruption at each work site.

One lane of traffic in each direction shall be maintained at all times. On 2 way traffic roadways where only guardrail repairs are required the use of Flaggers shall be required any time the work space extends into a lane of travel.

When performing guardrail repairs, guardrail repairs shall be conducted such that the guardrail installation is fully functioning before leaving the work site each day. Leaving guardrail partially disassembled overnight will not be allowed.

When performing guardrail replacement, guardrail replacement shall be limited to one side of the roadway at a time. All guardrail work shall be completed on one side of the roadway prior to starting work on the other side of the roadway.

There is an erosion repair project scheduled in 2015 at Str. No. 30-160-442 (SD45 at MRM 93.02). The project number of the erosion repair project is P 0045(45)82, PCN 029L. Coordination of work may be needed at this site location. The Contractor is encouraged to contact Brad Letcher, Engineering Supervisor, Huron Area Office (605-353-7140) prior to starting work at this location.

The Contractor shall be responsible for maintaining over width vehicles up to 16 feet in width through all the work sites.

REPLACEMENT PARTS

All proprietary replacement parts for the guardrail end terminals on this contract shall be obtained from the company that furnished the original guardrail components.

Replacement parts shall have the same protective coating as the original components.

UTILITIES

Utilities are not planned to be affected on this project. If utilities are identified near the improvement area through the SD One Call Process as required by South Dakota Codified Law 49-7A and Administrative Rule Article 20:25, the Contractor shall contact the Project Engineer to determine modifications that will be necessary to avoid utility impacts.

TRAFFIC CONTROL

Traffic control shall be per the standard plates included in this set of plans. Flaggers shall be utilized as necessary.

At the 2 guardrail replacement sites Standard Plate 634.25 shall be used as the traffic control plan. Type III Barricades shall be placed in the lanes closed to traffic.

A maximum of **2** sets of work zone signing will be measured and paid for when replacing guardrail and **1** sets of work zone signing will be measured and paid for when repairing guardrail.

Removing, relocating, covering, salvaging and resetting of existing traffic control devices, including delineation, shall be the responsibility of the Contractor. Cost of this work shall be incidental to the various contract items unless otherwise specified in the plans. Delineators and signs damaged or lost shall be replaced by the Contractor at no cost to the State.

Storage of vehicles and equipment shall be as near the right-of-way line as possible. Contractor's employees should mobilize at a location off the right-of-way and arrive at the work sites in a minimum number of vehicles necessary to perform the work. Indiscriminate driving and parking of vehicles within the right-of-way will not be permitted. Any damage to the vegetation, surfacing, embankment, delineators and existing signs resulting from such indiscriminate use shall be repaired and/or restored by the Contractor, at no expense to the State, and to the satisfaction of the Engineer.

Work activities during non-daylight hours are subject to prior approval.

Traffic approaching the project from intersecting roadways, streets, and approaches must be adequately accommodated. Major intersections or large commercial entrances may require additional signing, flaggers, and channelizing devices on a temporary basis until work activities pass these areas.

The bottom of signs on portable or temporary supports shall not be less than seven feet above the pavement in urban areas and one foot above the pavement in rural areas. Portable sign supports may be used as long as the duration is less than 3 days. If the duration is more than 3 days the signs shall be on fixed location, ground mounted, breakaway supports.

The Contractor shall provide documentation that all breakaway sign supports comply with FHWA NCHRP Report 350 or MASH crash-worthy requirements. The Contractor shall provide installation details at the preconstruction meeting for all breakaway sign support assemblies.

Equipment and vehicles entering or exiting the roadway, traveling on the shoulders or driving lanes at low speeds or working within the right-of-way shall display a flashing amber light visible for a minimum distance of 1/4 mile in all directions.

Traffic Control units, as shown in the Estimate of Quantities, are estimates. Contractor's operation may require adjustments in quantities, either more or less. Payment will be for those signs actually ordered by the Engineer and used.

4" TEMPORARY PAVEMENT MARKING TAPE ,TYPE 2 SD 45 MRM 93.02 PH 0013(32), PCN 052E

The 4" Temporary Pavement Marking Tape Type 2 shall be used to mark the No Passing Zones and Stop Bars as indicated by the Standard Plate 634.25.

Removable road markers may be used in place of the temporary pavement marking tape to mark the No Passing Zones.

CLEAN DEBRIS FROM 3 CABLE GUARDRAIL ANCHOR

Debris shall be cleaned from the 3 cable guardrail anchors. The Contractor shall remove all visible debris from the top of the concrete anchor and also all debris from the metal components such as the anchor bracket, rods, turnbuckle end assembly and the spring cable end assembly.

If there is a buildup of debris around the 3 cable guardrail concrete anchor such that water may pond on the concrete footing then the area around the concrete anchor shall be shaped such that there is a means of positive drainage from the concrete anchor into the roadway ditch.

All costs associated with cleaning debris from the 3 cable guardrail anchors shall be incidental to the contract unit price for RETENSION 3 CABLE GUARDRAIL.

RETENSION 3 CABLE GUARDRAIL

Retension 3 Cable Guardrail shall include all costs to adjust the tension in a length of 3 Cable Guardrail. The tension shall be as shown on Standard Plate 629.01 (1 of 6). Measurement for payment will be per each run of 3 Cable Guardrail and shall include all 3 cables and both anchor ends that make up a run of 3 Cable Guardrail. Retension 3 Cable Guardrail may include cutting and shortening of cables at the anchors to allow for the proper retensioning.

RESET 3 CABLE GUARDRAIL

The contract item Reset 3 Cable Guardrail will be utilized on this contract at locations where the height of the 3 Cable Guardrail needs to be raised. All costs associated with raising a section of 3 Cable Guardrail shall be incidental to the contract unit price per foot for RESET 3 CABLE GUARDRAIL.

DRILL BOLT SLOT HOLE IN BEAM RAIL

The Tables of Guardrail Repair indicates several installation locations where bolt slot holes need to be drilled in the beam rail. At these installation locations a round hole was drilled into the beam guardrail to allow attachment of the beam rail to the wood post. These round holes need to be lengthened to be 2 ½" long. The bolt slot holes shall be as shown on Standard Plate 630.03, and 630.33.

A hole shall be drilled at each end of the 2 ½" long slot and the material between the holes shall be removed. An Oxy-Acetylene cutting torch or plasma cutter shall not be used when creating the 2 ½" long bolt slot.

On Thrie Beam railing 2 bolt slot holes need to be installed for each post location.

The location of the bolt slot holes that need to be created are typically within the 25' of each end of the bridge where the post spacing is less than 6'-3". Many of the bolt slot holes that need to be created are located in beam railing that is nested (doubled).

Drilling of holes shall not damage the attached wood post or block. Beam guardrail removal may be required to accomplish the bolt slot hole creation.

All costs for installing the bolt slot hole including dismantling and reinstallation of the railing shall be incidental to the contract unit price per site for MISCELLANEOUS WORK. Each individual guardrail run will be measured and paid for as 1 site. (Each corner of the bridge requiring the installation of the bolt slot holes will constitute 1 site.)

As an alternative to drilling the slotted holes, the Contractor may furnish and install new beam railing with predrilled holes. If the Contractor elects to furnish and install new beam railing, the railing class (gauge thickness) shall match the in place beam rail. Likewise any nested (doubled) beam rail shall be replaced with nested beam rail. All costs associated with furnishing and installing new beam railing shall be incidental to the contract unit price per site for MISCELLANEOUS WORK. Each individual guardrail run will be measured and paid for as 1 site. (Each corner of the bridge where beam rail is being replaced will constitute 1 site.)

DRIVE DOWN BEAM GUARDRAIL POST

Drive Down Beam Guardrail Post shall include all costs for adjusting the height of a steel beam guardrail post. All costs to disassemble the steel beam guardrail shall be incidental to this contract item.

TIGHTEN CABLE ASSEMBLY ON BEAM GUARDRAIL END TERMINALS

The Tables of Guardrail Repair indicates several locations where the cable assembly needs to be properly tensioned. The tensioning for Breakaway Cable Terminals (BCT) shall be as shown on Standard Plate 630.47. The tensioning for Modified Eccentric Loader Terminals (MELT) shall be as shown on Modified Eccentric Loader Terminals (MELT) original detail drawings. For Flared and Tangent End Terminals that tensioning shall be as recommended by the product manufacture installation drawing and instructions. The SDDOT uses the following Flared and Tangent End Terminals:

End Terminal Type	Product Name	Manufacturer
W Beam Guardrail Flared End Terminal	Fleat 350	Road System, Inc. Big SpringTX (432)263-2435 http://www.roadsystems.com
W Beam Guardrail Flared End Terminal	SRT-350 (6-Post System)	Trinity Industries Co. (SYRO Inc.) DallasTX (800)644-7976 http://www.trinitycpg.com
W Beam Guardrail Tangent End Terminal	ET-2000 Plus	Trinity Industries Co. (SYRO Inc.) DallasTX (800)644-7976 http://www.trinitycpg.com
W Beam Guardrail Tangent End Terminal	SKT 350	Road System, Inc. Big SpringTX (432)263-2435 http://www.roadsystems.com

Prior to tightening the cable the bearing plate shall be properly aligned based upon the previously indicated noted plates or product drawings and installation details.

All costs associated with tightening the cable assembly on the end terminals shall be incidental to the contract lump sum price for INCIDENTAL WORK.

INCIDENTAL WORK

The Table of Guardrail Repair indicates several items of work that shall be part of the contract item Incidental Work. In the Table of Guardrail Repair the incidental work is identified in the Comments column and the item of work is indicated in a gray shaded box. Items considered Incidental Work are as follows:

- -Tighten the cable assembly on the beam guardrail end terminals. See plan notes for this item of work located immediately prior.
- -Straighten wood beam guardrail block and nail blocks as per Standard Plate 630.31.
- -Shape gravel that is located under the guardrail installation to allow water to drain down the inslope. This may involve removal of excess material which has accumulated under the guardrail.
- -Resetting or realigning of the "End Post Cap" on the 3 Cable Guardrail Anchor. Refer to Sheet 6 of 6 on Standard Plates 629.01.
- -Installation of 16" x 16" Fluorescent Yellow super or very high intensity sheeting to the head of the Flared End Terminal.

CONTRACTOR FURNISHED BORROW PH 0013(32), PCN 052E

The Contractor shall provide a suitable site for Contractor furnished borrow material. The Contractor is responsible for obtaining all required permits and clearances for the borrow site.

Restoration of the Contractor furnished borrow site shall be the responsibility of the Contractor.

GUARDRAIL EMBANKMENT SURFACE

Existing guardrail embankment shall be satisfactorily cleared of vegetation, shaped, and compacted prior to placement of new or additional surfacing. This work will be considered incidental to other contract items. Separate measurement and payment will not be made.

GUARDRAIL EMBANKMENT

Prior to placing the Contractor Furnished Borrow for construction of new embankment, the Contractor shall remove and stockpile 3 inches of in place topsoil from the construction areas. On completion of construction operations this salvaged topsoil shall be spread evenly over the newly constructed embankment inslopes. The Contractor is responsible for arranging an agreement with the landowner for topsoil replacement in borrow areas. Removal and replacement of topsoil will not be measured for payment but shall be incidental to the contract unit price per cubic yard for CONTRACTOR FURNISHED BORROW.

Fill material used for guardrail embankment shall be obtained from Contractor furnished sources and approved by the Engineer.

Compaction of inslope embankments shall be to the satisfaction of the Engineer.

It is not anticipated that water for compaction will be required. However, if in the opinion of the Engineer the fill material is extremely dry, water may be ordered and placed to the satisfaction of the Engineer. All costs for any added water shall be incidental to the contract unit price per cubic yard for CONTRACTOR FURNISHED BORROW.

Excavation quantities are computed using the volume of embankment plus **40**% for shrinkage. Basis of payment will be plans quantity of CONTRACTOR FURNISHED BORROW. No separate field measurements will be taken. All material used for embankment shall be approved by the Engineer.

Haul of embankment material on established traveled roadways shall be limited to trucks or small scrapers hauling legal loads and which do not sustain damage to the roadway, as approved by the Engineer. Hauling of material in the roadway ditches will not be allowed.

Additional excavation may be required to ensure positive ditch drainage along any area of inslope work. Excavated material shall be incorporated into the guardrail embankment.

The Contractor shall be responsible for restoration of any areas disturbed outside the limits of the work area.

SAWING IN EXISTING SURFACING

Where new Asphalt Concrete Pavement is placed adjacent to existing asphalt concrete the existing asphalt concrete shall be sawed full depth to a true line with a vertical face. No separate payment shall be made for sawing.

REMOVE ASPHALT CONCRETE PAVEMENT PH 0013(32), PCN 052E

Removal of the asphalt concrete pavement is required at Str. No. 58-047-290 and 30-160-442. Removal shall consist of removing the asphalt surfacing on the guardrail embankment to allow for the installation of 2 inches of new asphalt surfacing. The removal limits along the edge of the mainline roadway shall be sawcut full depth prior to asphalt concrete removal. All costs associated with the removal and disposal of the asphalt concrete pavement shall be incidental to the contract lump sum price for REMOVE ASPHALT CONCRETE PAVEMENT.

Refer to the Guardrail Embankment Layouts for the two structures which shows the approximate limits of the in place guardrail embankment surfacing.

COLD MILLING ASPHALT CONCRETE SD 45 MRM 93.02 PH 0013(32), PCN 052E

The placement of asphalt concrete shall begin within **5** working days after completion of cold milling of mainline asphalt concrete.

Cold Milling Asphalt Concrete shall be done according to the typical section. In areas where maintenance patches have raised and/or widened the road, additional asphalt concrete shall be milled to provide a uniform typical section from centerline to the edge of the finished shoulder. Milling shall be daylighted to the outside edge of the roadway. Any additional costs associated with this additional cold milling shall be incidental to the contract unit price per square yard for COLD MILLING ASPHALT CONCRETE.

Cold Milling of Asphalt shall consist of removing the in place asphalt to an average depth of **2"**. This material is to be removed at a constant slope of **0.02 FT/FT**. from the in place shoulder elevation to centerline of the roadway. The width to be milled is approximately **16.3'** from centerline of roadway to the shoulder.

Cold millings obtained from the cold milled asphalt concrete may be utilized for guardrail embankment surfacing per the Base Course plan notes. Remaining cold milled material shall become the property of the Contractor and shall be properly disposed. Gradation testing of the cold milled material shall be required if utilized anywhere on the projects, or if deemed necessary by the Engineer.

All costs associated with cold milling asphalt concrete including the disposal of the cold milled asphalt material shall be incidental to the contract unit price per square yard for COLD MILLING ASPHALT CONCRETE. Basis of payment will be plans quantity unless additional area of cold milling is required.

EXCAVATION OF UNSTABLE MATERIAL PH 0013(32), PCN 052E

Included in the Estimate of Quantities are **50** Cubic Yards of Unclassified Excavation, Digouts for the necessary removal of unstable material.

Backfill shall be Base Course paid for at the contract unit price per ton.

The digout shall be extended to the shoulder and the granular material backfill shall daylight to the inslope to allow water to escape the subgrade.

BASE COURSE PH 0013(32), PCN 052E

Aggregate for Base Course shall conform to the Specifications, except that the compaction shall be to the satisfaction of the Engineer.

With the approval of the Engineer, the cold milled material from the mainline roadway on SD45 @ MRM 93.02 may be used in place of Base Course on the guardrail embankment surfacing at this same location. If allowed to be utilized, the cold milled material may be used without further testing, provided the material meets the requirements of Section 332.2 of the Specifications. There shall be no adjustment in the contract unit price per ton for Base Course if cold milled material is used.

Included in the Estimate of Quantities for PH 0013(32), PCN 052E are **100** tons of Base Course for the project for backfill of Unclassified Excavation, Digouts.

WATER FOR COMPACTION OF GRANULAR MATERIALS

Cost of water for compaction of the granular material shall be incidental to the contract unit price for the various contract items. Six percent, plus or minus, moisture will be required at the time of compaction unless otherwise directed by the Engineer.

ASPHALT CONCRETE COMPOSITE PH 0013(32), PCN 052E

Mineral aggregate for the Asphalt Concrete Composite shall conform to the requirements of the Specifications for Class E, Type 1.

All other requirements in the Specifications for Asphalt Concrete Composite shall apply.

The asphalt binder used in the mixture shall be a PG 58-28, PG 58-34, PG 64-22, PG 64-28, or PG 64-34 Asphalt Binder.

Asphalt Concrete Composite shall be paver laid in lifts not exceeding 2" in depth. Asphalt Concrete Composite placed on the guardrail embankment shall be placed with a paver.

It can be anticipated that hand work will be required to shape the asphalt concrete for the guardrail installation.

STANDARD PLATES (3 CABLE AND BEAM GUARDRAIL)

Various Standard Plates for 3 cable and beam guardrail are included in these plans to provided information on how the various guardrail items are to be constructed and the materials required for construction. The inclusion of these Standard Plates in the plans does not necessary indicate all these items are to be furnished under this contract.

MYCORRHIZAL INOCULUM PH 0013(32), PCN 052E

Mycorrhizal inoculum shall consist of mycorrhizal fungi spores and mycorrhizal fungi-infected root fragments in a solid carrier. The carrier may include organic materials, calcinated clay, or other materials consistent with application and good plant growth. The supplier shall provide certification of the fungal species claimed and the live propagule count. The inoculum shall include the following fungal species:

Glomus intraradices	25%
Glomus aggregatu	25%
Glomus mosseae	25%
Glomus etunicatum	25%

All seed shall be inoculated with a minimum of 100,000 live propagules of mycorrhizal fungi per acre. All costs of inoculating the seed shall be incidental to the contract lump sum price for EROSION CONTROL.

The mycorrhizal inoculum shall be from the list below or an approved equal:

Product	Manufacturer
MycoApply	Mycorrhizal Applications, Inc. Grants Pass, OR Phone: 1-866-476-7800 http://www.mycorrhizae.com/

DRILLS PH 0013(32), PCN 052E

In addition to the drills specified in Section 730 of the Specifications, other types of drills including no-till drills will be allowed as long as they have baffles, partitions, agitators, or augers which keep the seed distributed throughout the seed box and the seed is planted at a depth of ¼" to ½".

PERMANENT SEEDING PH 0013(32), PCN 052E

The areas to be seeded consist of areas where guardrail embankment work is required. The total disturbed area to seed at the 2 structure locations is estimated at **1** acre.

All permanent seed shall be planted in the topsoil at a depth of ¼" to ½".

All seed broadcast must be raked or dragged in (incorporated) within the top ¼" to ½" of topsoil when possible. This requirement may be waived by the Engineer during construction when raking or dragging is deemed not feasible by conventional methods.

The varieties listed for seed mixtures are preferred varieties.

Native harvest seed will be allowed.

Type C Permanent Seed Mixture shall consist of the following:

Grass Species	Variety	Pure Live Seed (PLS) (Pounds/Acre)
Western Wheatgrass	Flintlock, Rodan, Rosana	16
Canada Wildrye	Mandan	2
	Total:	18

All costs associated with furnishing and placing the Type C Permanent Seed Mixture shall be incidental to the contract lump sum price for EROSION CONTROL.

MULCHING (GRASS HAY OR STRAW) PH 0013(32), PCN 052E

Bales with noxious weed contamination will be rejected and the Contractor will be required to remove the contaminated bales from the project.

All costs associated with Mulching shall be incidental to the contract lump sum price for EROSION CONTROL.

EROSION CONTROL WATTLE PH 0013(32), PCN 052E

Erosion control wattles for restraining the flow of runoff and sediment shall be installed at locations determined by the Engineer during construction. Refer to Standard Plate 734.06 for details. A quantity of 150 feet of 12" Diameter Erosion Control Wattle has been included in the Estimate of Quantities.

The Contractor shall provide certification that the erosion control wattles do not contain noxious weed seeds.

Erosion control wattles shall remain on the project to decompose.

The erosion control wattle provided shall be from the approved product list. The approved product list for erosion control wattle may be viewed at the following internet site:

http://sddot.com/business/certification/products/Default.aspx

TEMPORARY PAVEMENT MARKINGS SD 45 MRM 93.02
PH 0013(32), PCN 052E

The total length of no passing zone on this project is estimated to be **0.0** miles.

Temporary road markers shall be used to mark dashed centerline. **Paint will not be allowed for Temporary Pavement Marking on the Asphalt Concrete Composite.**

Quantities of Temporary Pavement Markings consist of marking for the new 200 feet long segments of asphalt surfacing at the ends of the bridge on SD45 at MRM 93.02 as follows:

One pass on top of the cold milled surface.
One pass on top of the 2" Lift of Asphalt Concrete.

Temporary Road Markers (tabs) may be used as detailed in the Specifications. Covers on the tabs shall be sufficiently secured to prevent traffic from dislodging the cover and when removed the covers shall be properly disposed. The Contractor shall remove and properly dispose of the tabs after Permanent Pavement Marking is applied. Method of removal shall be nondestructive to the road surface and shall be accomplished within one week of completion of the Permanent Pavement Marking.

Cost for furnishing, applying, removing and disposing of the Temporary Road Markers shall be included in the contract unit price per mile for TEMPORARY PAVEMENT MARKING.

PERMANENT PAVEMENT MARKING SD 45 MRM 93.02
PH 0013(32), PCN 052E

Permanent pavement markings consist of marking for the new 200 foot long segments of asphalt surfacing at the ends of the bridge on SD45 at MRM 93.02. Quantities of paint have been increased slightly to account for additional pavement markings that may need to be replaced at this location.

Traffic Control shall be incidental to the cost of application. The striper and advance or trailing warning vehicle shall be equipped with flashing amber lights or advance warning arrow panel.

All materials shall be applied as per manufacturer's recommendations.

Glass beads shall be applied on the wet paint line at a minimum of eight pounds of glass beads per gallon of paint.

The application of Permanent Pavement Marking paint may not begin until 7 calendar days following completion of final surfacing (including Flush Seal if applied) and shall be completed within 14 calendar days following completion of the final surfacing.

For each working day the application of permanent pavement marking paint remains uncompleted beyond the time limits described in the preceding paragraph, the Contractor will be assessed liquidated damages at the rate of $250.00 per day.

The liquidated damages shall apply up to the Contract Completion Date, as extended. After the completion date, liquidated damages will be assessed in accordance with Sec. 8.7 of the Standard Specifications, until the permanent pavement marking is completed, even though the project may be open to traffic.

COLD WEATHER, WATERBORNE PAINT PH 0013(32), PCN 052E

Waterborne paint applied after October 15 shall be formulated as cold weather, waterborne paint, and shall be applied in accordance with manufacturer's recommendations, including minimum temperature requirements.

There shall be no adjustment in the contract unit prices should cold weather waterborne paint be required.

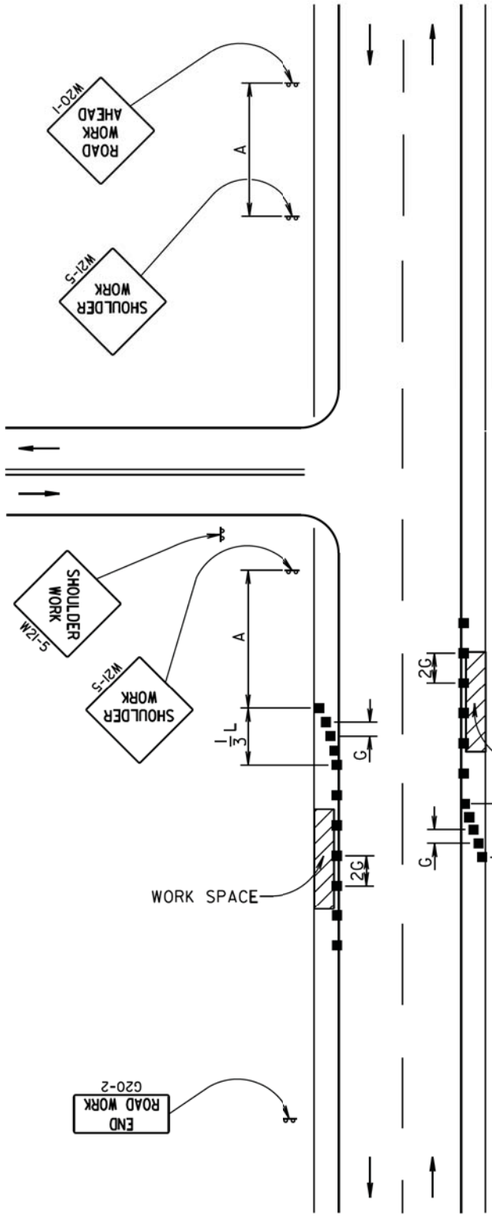
Cold weather, waterborne paint shall conform to Section 980 of the Specifications except for the following:

980.1 A - Resin Binder shall be Fastrack XSR manufactured by Dow, or approved equal.

980.1.1 Quantitative Requirements:

The Pigment, Percent By Weight for white: 60.0 – 63.0, and for yellow: 58.5-61.5.

The Pigment, Percent By Weight when tested in accordance with ASTM D3723 for white: 60.0-63.0 and for yellow: 56.1-59.2.



Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A)	Taper Length (Feet) (L)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	100 - 200	180	25
35 - 40	350	320	25
45 - 50	500	600	50
55	750	660	50
60 - 65	1000	780	50

■ Channelizing Device

The channelizing devices shall be drums or 42" cones if traffic control must remain overnight or longer.

For short duration operations (1 hour or less) all signs and channelizing devices may be eliminated if a vehicle with an activated flashing or revolving yellow light is used.

Worker signs (W21-1 or W21-1a) may be used instead of SHOULDER WORK signs.

A SHOULDER WORK sign should be placed on the left side of a divided or one-way roadway only if the left shoulder is affected.

The SHOULDER WORK sign on an intersecting roadway is not required if drivers emerging from that roadway will encounter another advance warning sign before they reach a work activity area.

February 14, 2011

Published Date: 2nd Qtr. 2014	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES WORK ON SHOULDERS	PLATE NUMBER 634.03 Sheet 1 of 1

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 - 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.

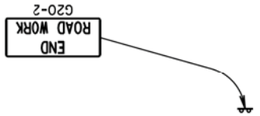
The ROAD WORK AHEAD and the END ROAD WORK signs may be omitted for short duration operations (1 hour or less).

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.

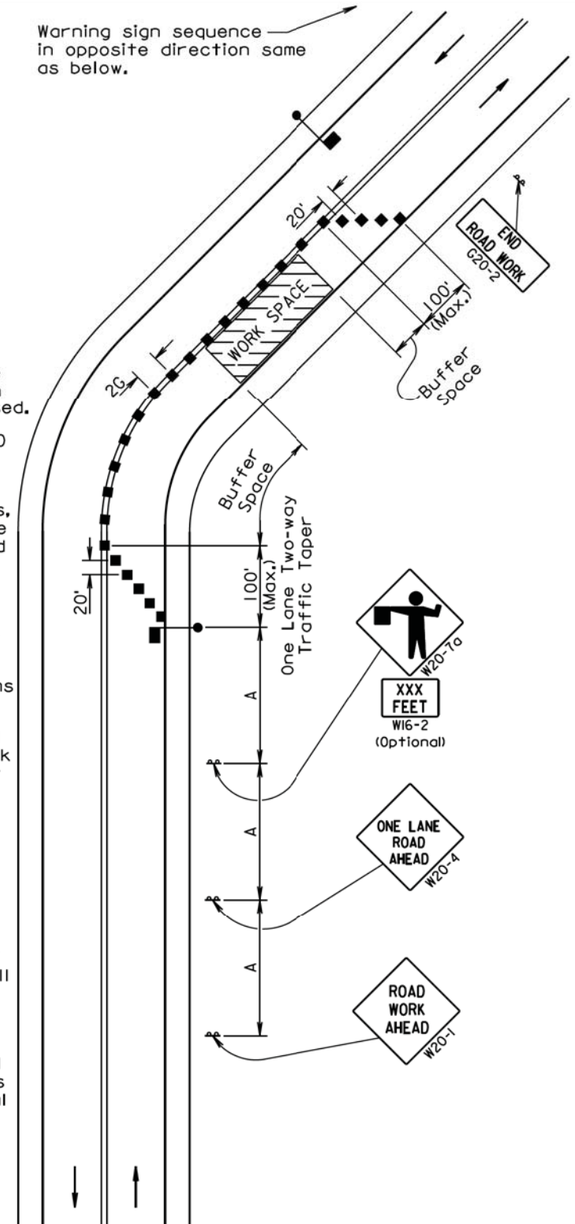
The channelizing devices shall be drums or 42" cones.

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.



February 14, 2011

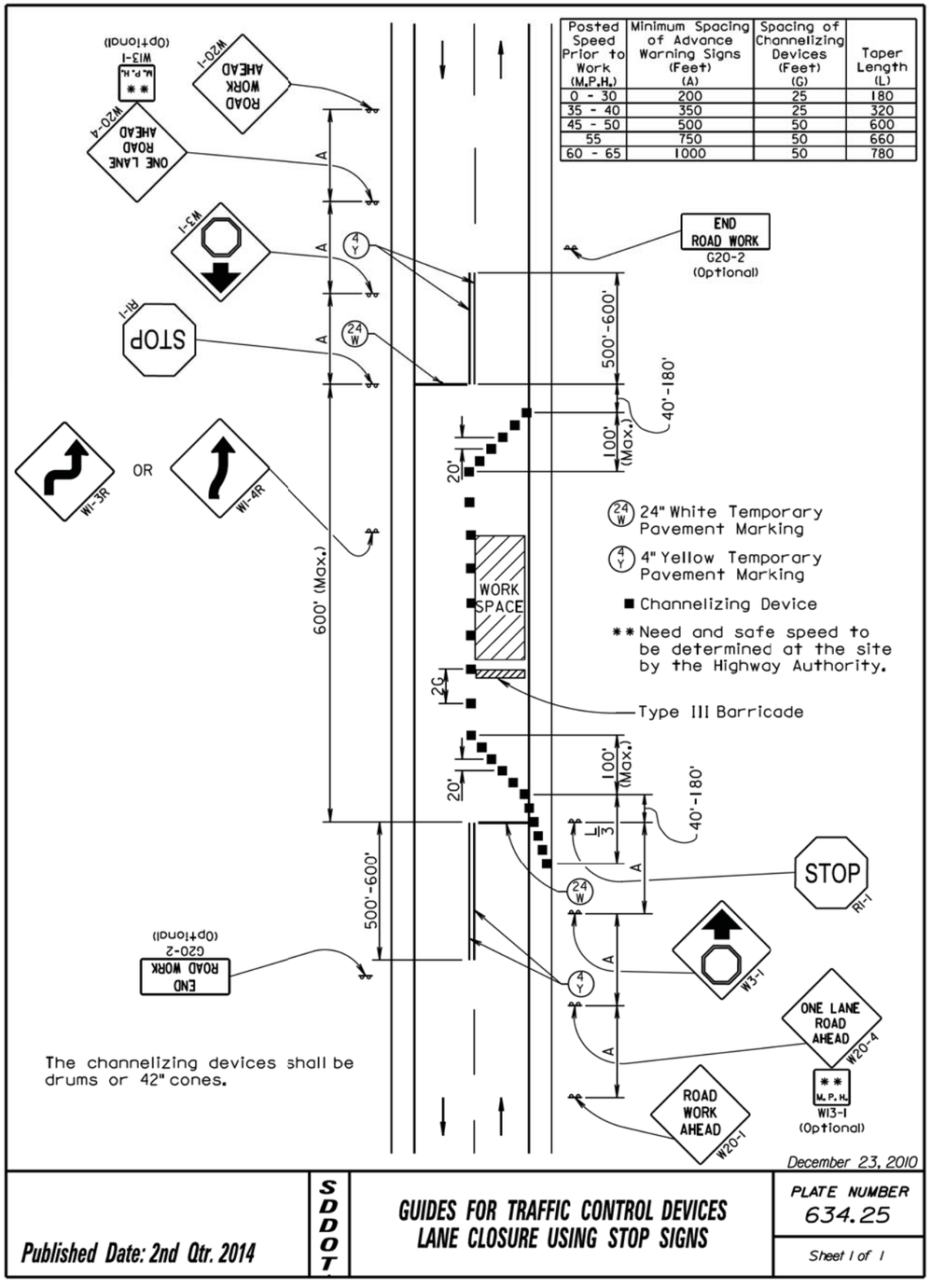
Published Date: 2nd Qtr. 2014	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES LANE CLOSURE WITH FLAGGER PROVIDED	PLATE NUMBER 634.23 Sheet 1 of 1

PLOT SCALE - 1:200

PLOT NAME - 1

FILE - ...\63403 & 63423.DGN

-PLOTTED FROM - TRAB17882



Posted Speed Prior to Work (M.P.H.)	Minimum Spacing of Advance Warning Signs (Feet) (A)	Spacing of Channelizing Devices (Feet) (G)	Taper Length (L)
0 - 30	200	25	180
35 - 40	350	25	320
45 - 50	500	50	600
55	750	50	660
60 - 65	1000	50	780

December 23, 2010

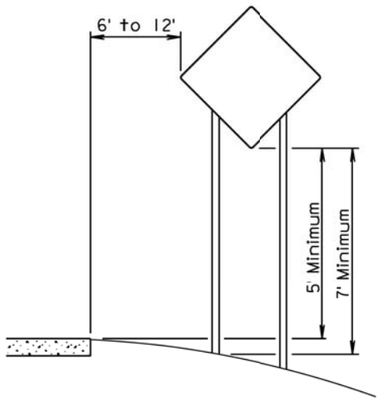
Published Date: 2nd Qtr. 2014	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES LANE CLOSURE USING STOP SIGNS	PLATE NUMBER 634.25
			Sheet 1 of 1

PLOT SCALE - 1:200

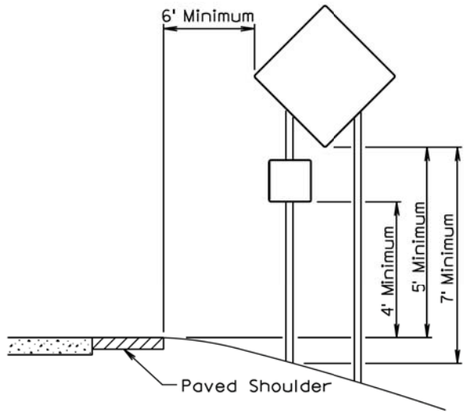
PLOTTED FROM - TRAB17882

PLOT NAME - 2

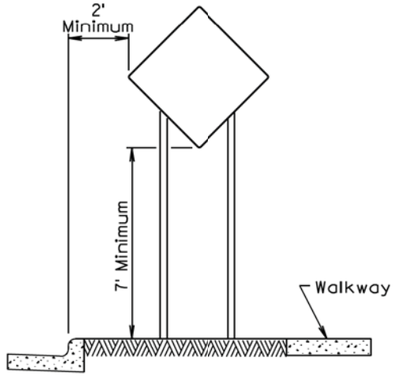
FILE - ...\63425 & 63464.DGN



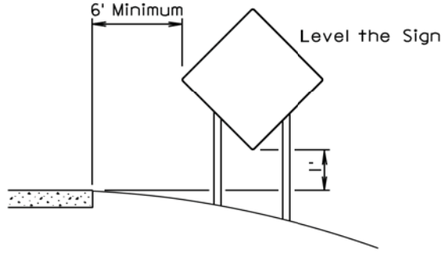
RURAL DISTRICT



RURAL DISTRICT WITH SUPPLEMENTAL PLATE



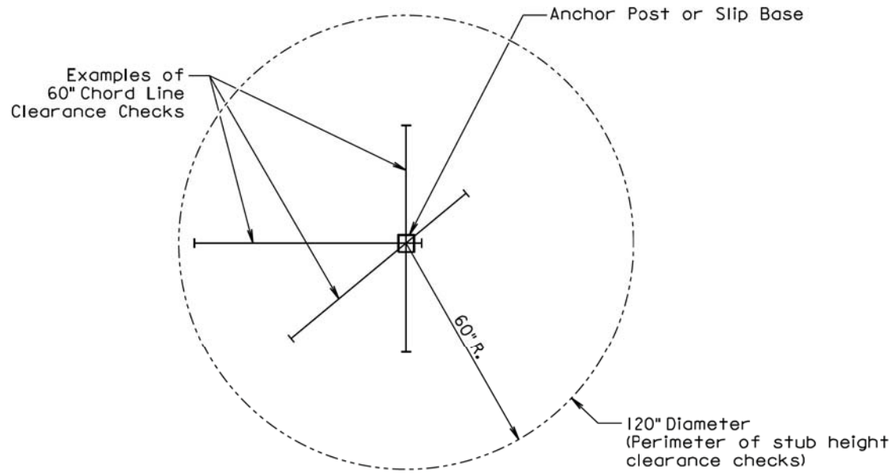
URBAN DISTRICT



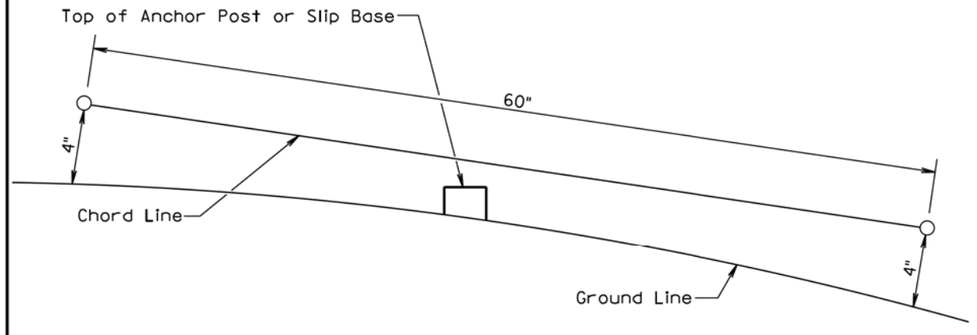
RURAL DISTRICT
3 DAY MAXIMUM

February 14, 2011

Published Date: 2nd Qtr. 2014	SDDOT	CRASHWORTHY SIGN SUPPORTS (Typical Construction Signing)	PLATE NUMBER 634.85
			Sheet 1 of 1



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: 2nd Qtr. 2014	SDDOT	BREAKAWAY SUPPORT STUB CLEARANCE	PLATE NUMBER 634.99
			Sheet 1 of 1

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	PH 0013(32), 000P-169, 000N-169	17	46

ITEMIZED LIST FOR TRAFFIC CONTROL - PH 0013(32), PCN 052E

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2	36" x 18"	END ROAD WORK	4	17	68
R1-1	30" x 30"	STOP	4	21	84
W1-3	48" x 48"	REVERSE TURN SIGN (LEFT OR RIGHT)	2	34	68
W3-1	48" x 48"	STOP AHEAD (SYMBOL)	4	34	136
W13-1P	30" x 30"	ADVISORY SPEED PLATE	4	21	84
W20-1	48" x 48"	ROAD WORK #### FT. OR AHEAD	4	34	136
W20-4	48" x 48"	ONE LANE ROAD #### FT. OR AHEAD	4	34	136
W20-7	48" x 48"	FLAGGER (SYMBOL)	4	34	136
*****		TYPE 3 BARRICADE - 8 FT. DOUBLE SIDED	4	56	224
				TOTAL UNITS	**1072**

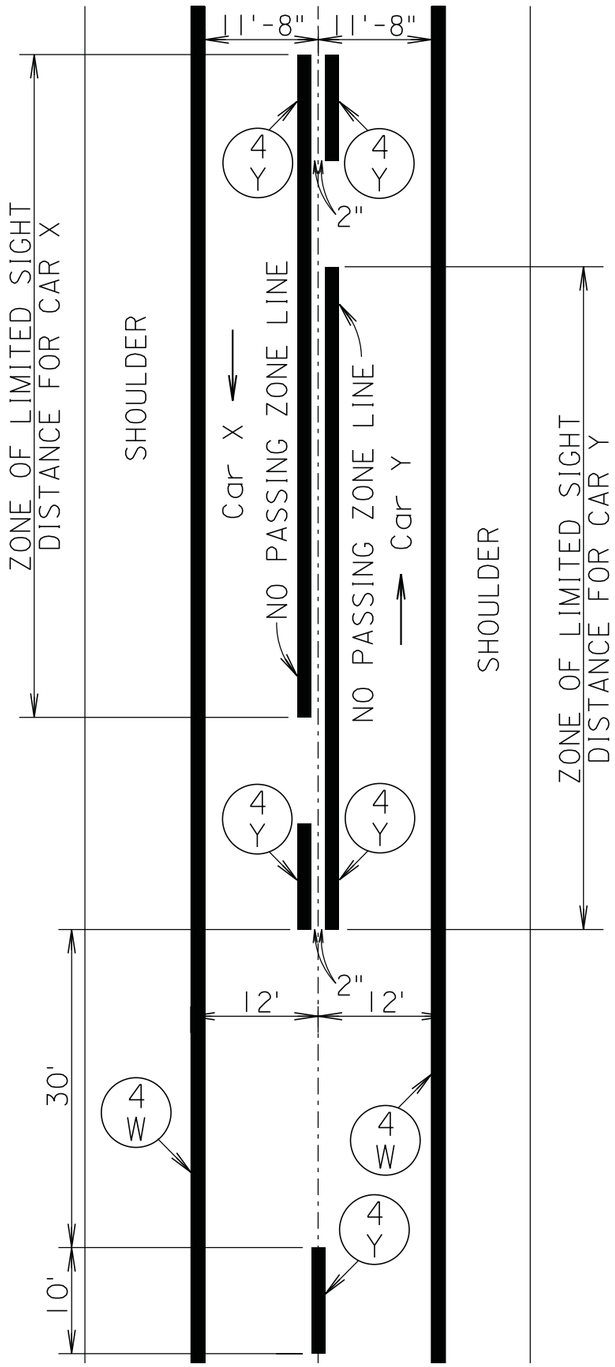
ITEMIZED LIST FOR TRAFFIC CONTROL - 000P-169, PCN i3k9

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2	36" x 18"	END ROAD WORK	2	17	34
W20-1	48" x 48"	ROAD WORK #### FT. OR AHEAD	2	34	68
W20-4	48" x 48"	ONE LANE ROAD #### FT. OR AHEAD	2	34	68
W20-7	48" x 48"	FLAGGER (SYMBOL)	2	34	68
W21-5	48" x 48"	SHOULDER WORK	2	34	68
				TOTAL UNITS	**306**

ITEMIZED LIST FOR TRAFFIC CONTROL - 000N-169, PCN i3ka

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2	36" x 18"	END ROAD WORK	2	17	34
W20-1	48" x 48"	ROAD WORK #### FT. OR AHEAD	2	34	68
W20-4	48" x 48"	ONE LANE ROAD #### FT. OR AHEAD	2	34	68
W20-7	48" x 48"	FLAGGER (SYMBOL)	2	34	68
W21-5	48" x 48"	SHOULDER WORK	2	34	68
				TOTAL UNITS	**306**

PAVEMENT MARKING DETAILS FOR SD 45 AT MRM 93.02



KEY	ITEM
4 W	4" White
4 Y	4" Yellow

FURNISHING AND APPLYING PAVEMENT MARKING PAINT

1. The pavement marking paint and glass beads will be furnished and applied by the Contractor. Material shall meet the requirements of Sections 980 and 981 of the Specifications.

2. Construction requirements, methods of measurement, and basis of payment shall conform to the requirements of Section 633 of the Specifications.

3. The approximate paint application rates shall be as follows:

   Undivided Roadway

   Yellow Centerline
   12± Gallons/Pass-Mile
   (Includes No-passing lines)

   White Edgeline
   16.90 Gallons/Pass-Mile
   (Solid Line)

4. The typical pavement markings as shown on this sheet shall be applied throughout the entire length of the project.

5. Exact location of the NO PASSING ZONE lines will be determined in the field by the Engineer. A dash of white paint will mark the beginning and end of all no passing zones. NO PASSING ZONE signs and the ending post in fence lines, if present, shall not be used as the beginning and ending NO PASSING ZONE lines.

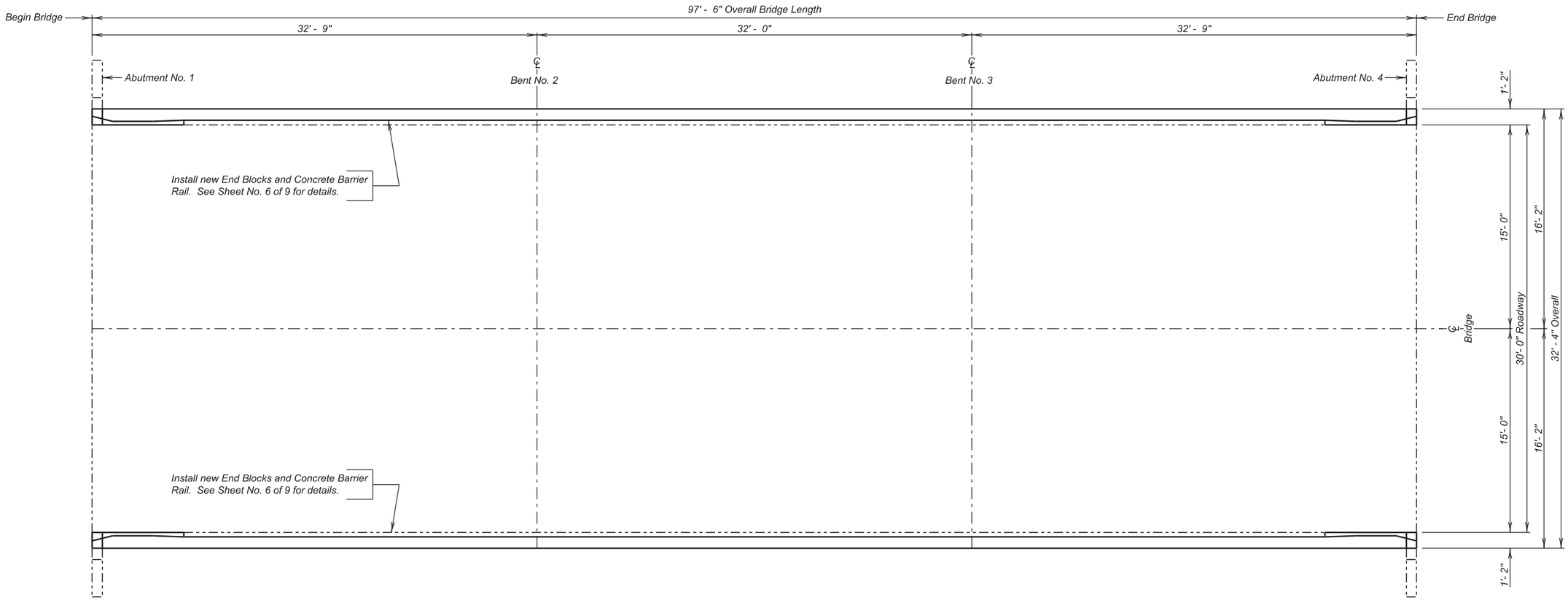
6. Traffic Control shall be incidental to the cost of application. The striper and advance or trailing warning vehicle shall be equipped with flashing amber lights or advance warning arrow panel.

PLOT NAME - 8

FILE - ...\02PM_PAVEMENT MARKING DETAILS.DGN

PLOTTED FROM -

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	PH 0013(32)	19	46



PLAN

INDEX OF BRIDGE SHEETS -

LAYOUT FOR UPGRADING

FOR

97' - 6" I BEAM BRIDGE

30' - 0" ROADWAY
OVER CROW CREEK
STR. NO. 30-160-442
PCN 052E

0° SKEW
SEC. 14/15-T109N-R68W
PH 0013(32)

HAND COUNTY

S. D. DEPT. OF TRANSPORTATION

FEBRUARY 2014

1 OF 9

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

DESIGNED BY	CK. DES. BY	DRAFTED BY	
EJA	KSK	EJA	Kevin N. Goeden BRIDGE ENGINEER
HAND052E	052ERA01		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	PH 0013(32)	20	46

ESTIMATE OF STRUCTURE QUANTITIES

ITEM NO.	DESCRIPTION	QUANTITY	UNIT
110E0020	Remove Bridge Railing	195	Ft
460E0070	Class A45 Concrete, Bridge Repair	16.0	CuYd
460E0300	Breakout Structural Concrete	4.4	CuYd
460E0380	Install Dowel in Concrete	136	Each
480E0200	Epoxy Coated Reinforcing Steel	1052	Lb
480E5004	Galvanic Strip Anode	168	Ft

SPECIFICATIONS

1. Design Specifications: AASHTO Standard Specifications for Highway Bridges 17th Edition using Working Stress Design.

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.

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 and are provided as information only. 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.

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 at the pre-construction meeting.

1. Remove existing bridge rail for the first phase of construction.

2. Modify the bridge curb and place a new concrete barrier with end blocks for the first phase of construction.

3. Repeat steps 1 and 2 for the second phase of construction.

GENERAL CONSTRUCTION - BRIDGE

1. All mild reinforcing steel shall conform to ASTM A615, Grade 60.

2. All exposed concrete corners and edges shall be chamfered ¾" unless noted otherwise in the plans. Match existing chamfer if the existing chamfer differs.

3. Use 2" clear cover on all reinforcing steel except as shown otherwise.

4. The Contractor shall only imprint one year plate on the structure. The year plate shall contain the date the existing bridge was built and shall be located as specified and detailed on Standard Plate No. 460.03.

5. Barrier Curbs and End Blocks shall be built normal to the grade.

6. Request for construction joints or resteel splices at points other than those shown, must be submitted to the Engineer for prior approval. If additional splices are approved, no payment will be allowed for the added quantity of reinforcing steel.

7. Surfaces of fresh concrete at construction joints shall be rough floated sufficiently to consolidate the surface. All construction joints shall be cleaned of surface laitance, curing compounds and other foreign materials prior to placing fresh concrete against the joint.

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

9. The concrete barriers shall be cured in accordance with Section 460.3.N of the Construction Specifications except that no curing compounds shall be allowed.

CONCRETE BREAKOUT

1. The existing bridge curbs and end blocks shall be broken out to the limits shown on the plans. Breakout limits shall be defined with a 3/4" deep sawcut (unless specified otherwise in these plans), where practical, as approved by the Engineer. Reinforcing steel that is exposed and is scheduled for use in the new construction shall be cleaned and straightened to the satisfaction of the Engineer. Care shall be taken not to damage the existing reinforcing steel that is to be reused in the new construction during concrete breakout. Any reinforcing steel that is damaged during concrete breakout shall be replaced or repaired, as approved by the Engineer, by the Contractor at no cost to the Department. The existing reinforcing steel that is to be reused in the new construction and that is exposed during concrete breakout shall be epoxy coated in accordance with the "Epoxy Coating Existing Reinforcing Steel" notes.

2. All broken out concrete, discarded reinforcing bars shall be disposed of by the Contractor. Any disposal of discarded material shall be in accordance with the Environmental Commitments.

3. The contract unit price per cubic yard for "Breakout Structural Concrete" shall include breaking out concrete, cleaning, straightening existing reinforcing steel, and disposal of all broken out material.

EPOXY COATING EXISTING REINFORCING STEEL

1. The existing resteel in the bridge end blocks that is exposed during concrete breakout, and is to be reused, shall be epoxy coated in the field.

2. The reinforcing steel shall be abrasive blasted clean and then 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 abrasive blasted 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. These bars shall be clean and free from all surface contaminants before coating.

3. The cost of cleaning and epoxy coating the existing reinforcing steel shall be incidental to the various bid items.

ESTIMATE OF STRUCTURE QUANTITIES AND NOTES

FOR

97' - 6" I BEAM BRIDGE

STR. NO. 30-160-442

FEBRUARY 2014

2 OF 9

DESIGNED BY	CK. DES. BY	DRAFTED BY	
EJA	KSK	EJA	Kevin N. Goeden
HAND052E	052ENOTA		BRIDGE ENGINEER

CURB REPAIR

1. Curb repair will consist of breaking out the entire face of the existing curb between end blocks, cleaning existing reinforcing steel, installing galvanic strip anodes, and placing new Class A45 Concrete in the breakout area so that the new curbline between end blocks is one inch closer to the bridge centerline.

2. Concrete shall be broken out to the limits shown in this plan set or until sound concrete is reached. At no time will the limits of concrete breakout be less than the amount to achieve a minimum of two inches of clear cover between the broken out concrete and the back face of the existing reinforcing steel.

3. Areas of Curb Repair shall be wet cured a minimum of seven days before any additional work shall be allowed. This includes any drilling and installing of dowels in the concrete.

4. All costs associated with blasting, cleaning, and coating of the existing reinforcing steel shall be paid for under the contract unit price per cubic yard for "Breakout Structural Concrete."

GALVANIC ANODE

1. The contractor shall place galvanic strip anodes in the concrete repair areas of the curb.

2. The galvanic strip anodes used in the curb repair areas shall be supplied as the following or an approved equivalent as approved by the Office of Bridge Design:

   Galvashield DAS
   Vector Corrosion Technologies
   474 Dovercourt Drive
   Winnipeg, MB, Canada, R3Y 1G4
   Phone: (204) 489-6300
   Website: www.vector-corrosion.com

3. The anodes shall be placed in accordance with the manufacturer's recommendations and as approved by the Engineer. The anodes have not been shown on the drawings. The Contractor shall provide shop drawings of the galvanic anode installation including locations of the individual anodes.

4. The anodes shall be placed with a minimum ¾" cover. The anodes shall be fully encased in the concrete repair material. Where adequate cover does not exist, a concrete pocket shall be chipped out behind the anode to provide sufficient cover. The Contractor may need to chip around the reinforcing bar locally at the anode installation to make the electrical connection. The reinforcing steel at the connection location shall be cleaned per the manufacturer's recommendations to provide sufficient electrical connection and mechanical bond.

5. The electrical continuity of the electrical connections and reinforcing steel shall be confirmed per the manufacturer's recommendations.

6. The Contractor shall provide manufacturer's product literature, shop drawings and installation instructions.

7. All costs associated with placing galvanic strip anodes including labor, equipment, materials and incidentals shall be included in the contract unit price per foot for "Galvanic Strip Anode".

REMOVAL OF EXISTING BRIDGE RAIL

1. The existing rail and rail posts on the bridge shall be completely removed by the Contractor and disposed of in accordance with the Environmental Commitments. If the Contractor elects to salvage the rail and rail posts for his own use, they must be removed from view of the ROW to the satisfaction of the Engineer prior to project completion.

2. The existing rail anchor bolts protruding from the concrete shall be cut off and ground flush with the concrete surface as approved by the Engineer. The exposed ends shall be coated with a zinc-rich galvanizing paint in conformance with ASTM A780.

3. The cost of all labor, tools, materials, and incidentals necessary to cut and remove the steel rail, cut off the anchor bolts, and paint their exposed ends shall be incidental to the contract price per foot for "Remove Bridge Railing".

INSTALLING DOWELS IN CONCRETE

1. Holes drilled in the existing concrete shall be true and normal or as shown in the plans. Drilling holes using a core drill shall not be allowed. Care shall be taken not to damage the existing reinforcing steel. It is likely that some of the existing reinforcing steel shown in the original construction plans may have been placed out of position during original construction. Therefore, prior to the start of drilling any holes in the concrete, an effort will be made by Department forces to mark on the concrete surface where practical any locations of the in-place reinforcing steel. In spite of this precaution, the Contractor can still expect to encounter and have to drill through reinforcing steel or shift the dowel spacing as approved by the Engineer to miss the existing reinforcing steel. If the Contractor shifts the dowel spacing, the unused drill holes shall be completely filled with the epoxy resin specified in note number 2 under "Installing Dowels in Concrete" as approved by the Engineer.

2. The epoxy resin mixture shall be of a type for bonding steel to hardened concrete and shall conform to AASHTO M235 Type IV, Grade 1, 2 or 3.

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 dowel or as per the 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 ensure that all debris or loose material has been removed prior to epoxy injection.

4. Mix epoxy resin as recommended by the Manufacturer and apply by an injection method as approved by the Engineer. Beginning in 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 steel bar. 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 method will not be allowed.

5. 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.

6. Dowel bars shall be deformed bars conforming to ASTM A615, Grade 60.

7. The cost of epoxy resin, dowels, installation and other incidental items shall be incidental to the contract unit price per each for "Install Dowel in Concrete".

SURFACE FINISH

1. All surfaces of the new concrete barrier curb in the area of the barrier reconstruction, the endblocks and the reconstructed curb shall be given a Class A Commercial Texture Finish in accordance with Section 460.3.M.1.c. of the Construction Specifications.

2. The concrete surfaces requiring the application of the Commercial Texture Finish shall be prepared in accordance with the manufacturer's recommendations. The Contractor shall submit a product data sheet, or an approved equal, documenting all pertinent information with regard to preparation of the concrete surfaces, materials and equipment required, mixing requirements, and application procedures to the Engineer in advance of the application of the Commercial Texture Finish for review and approval.

3. For informational purposes the amount of surface area requiring the Class A Commercial Texture Finish is 1147 square feet.

4. Any damage to the commercial texture finish during the construction including abrasion from traffic due to the traffic control shall be repaired by the Contractor, as approved by the Engineer, at no expense to the Department.

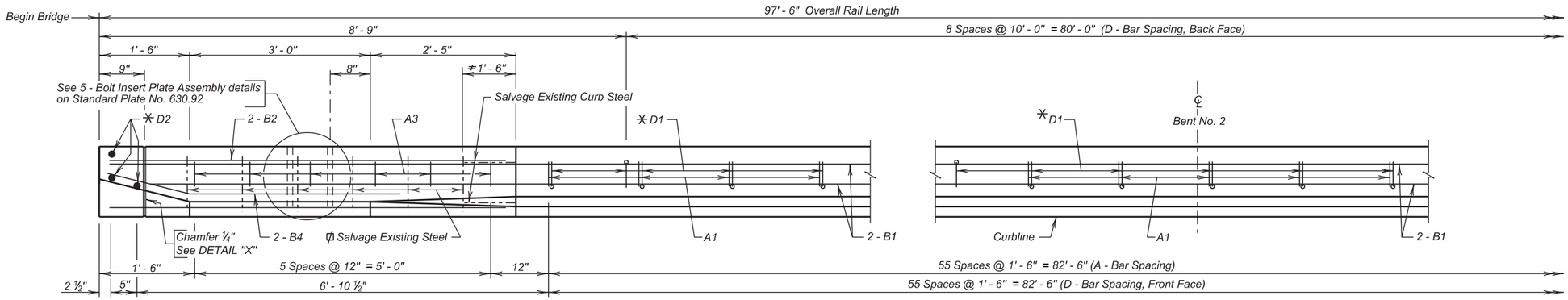
5. The cost of the commercial texture finish shall be included in the contract price per cubic yard for "Class A45 Concrete, Bridge Repair". This payment shall be full compensation for furnishing all materials, labor, tools and equipment necessary or incidental to the application of this finish.

NOTES (CONTINUED)
FOR
97' - 6" I BEAM BRIDGE

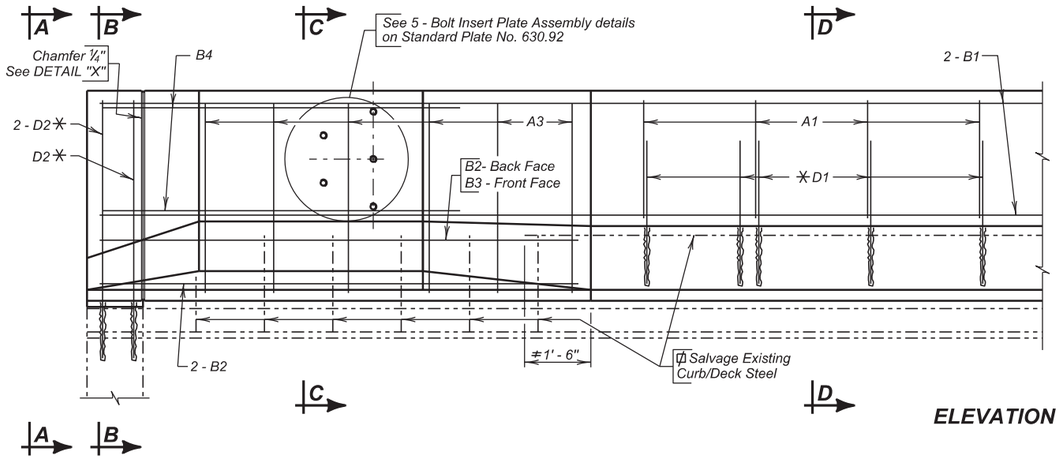
STR. NO. 30-160-442
FEBRUARY 2014

DESIGNED BY	CK. DES. BY	DRAFTED BY	
EJA	KSK	EJA	Kevin N. Goeden
HAND052E	052ENOTA		BRIDGE ENGINEER

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	PH 0013(32)	22	46

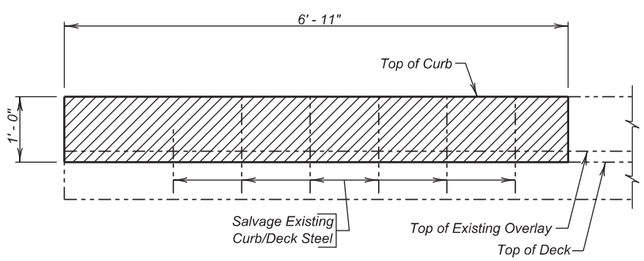


PLAN



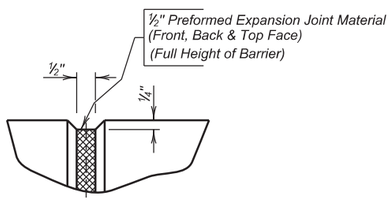
ELEVATION

℄ Bend existing C bars where necessary to maintain 2" clear cover.
D1 and D2 Dowels are to be drilled in and grouted with epoxy.
≠ Extend existing B bars into new section (1'- 6")

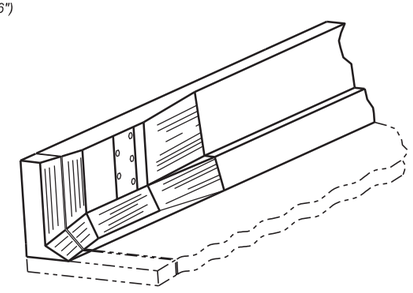


PARTIAL ELEVATION

(Showing Curb Breakout for New Endblock at Abut. No. 1)



DETAIL "X"



ISOMETRIC VIEW

END BLOCK AND RAIL REPLACEMENT LAYOUT

FOR

97' - 6" I BEAM BRIDGE

30' - 0" ROADWAY
OVER CROW CREEK
STR. NO. 30-160-442

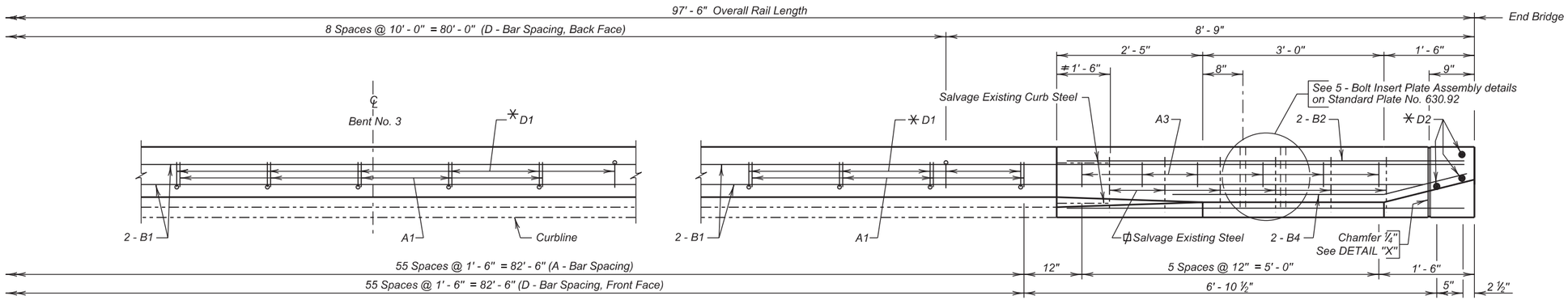
0° SKEW
SEC. 14/15-T109N-R68W
PH 0013(32)

HAND COUNTY
S. D. DEPT. OF TRANSPORTATION
FEBRUARY 2014

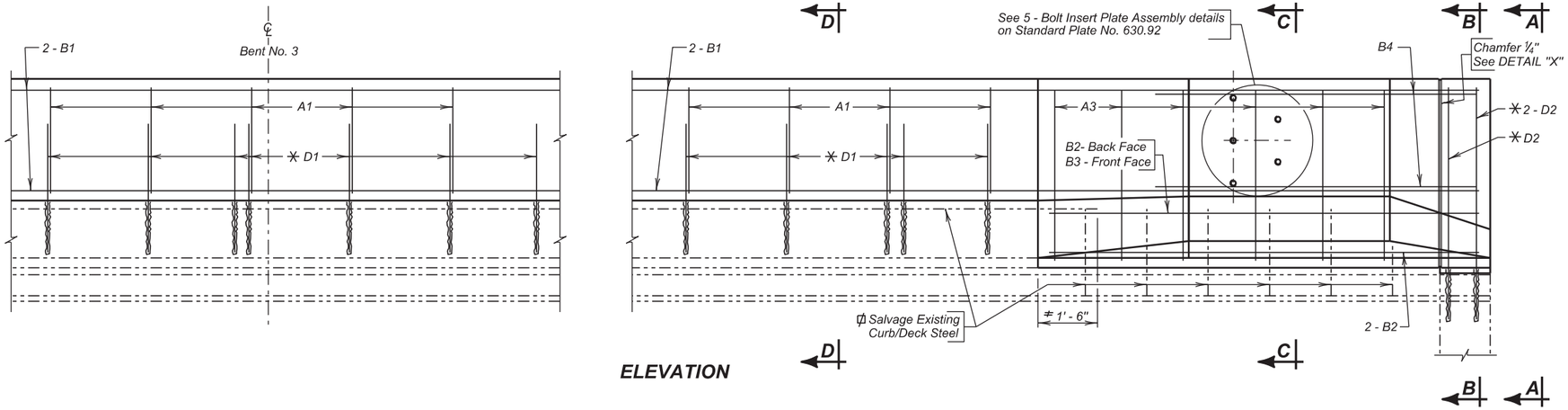
4 OF 9

DESIGNED BY	CK. DES. BY	DRAFTED BY	
EJA	KSK	EJA	Kevin N. Goeden BRIDGE ENGINEER
HAND052E	052ERA04		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	PH 0013(32)	23	46

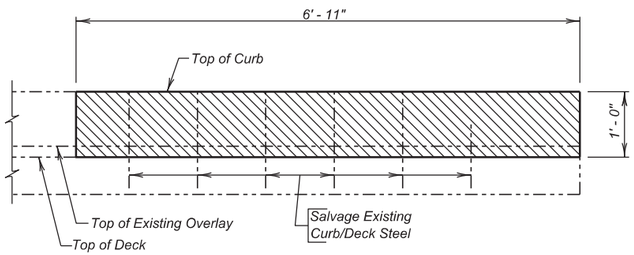


PLAN



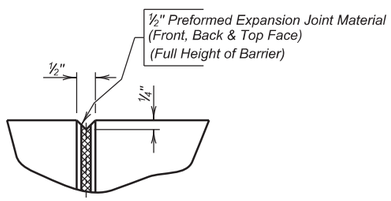
ELEVATION

℄ Bend existing C bars where necessary to maintain 2" clear cover.
⚹ D1 and D2 Dowels are to be drilled in and grouted with epoxy.
≠ Extend existing B bars into new section (1'- 6")

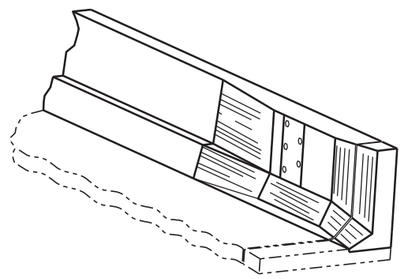


PARTIAL ELEVATION

(Showing Curb Breakout for New Endblock at Abut. No. 4)



DETAIL "X"



ISOMETRIC VIEW

END BLOCK AND RAIL REPLACEMENT LAYOUT (CONTINUED)

FOR

97' - 6" I BEAM BRIDGE

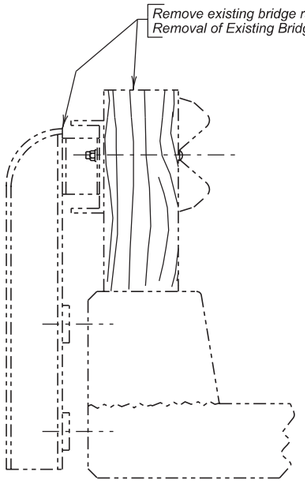
30' - 0" ROADWAY
OVER CROW CREEK
STR. NO. 30-160-442

0° SKEW
SEC. 14/15-T109N-R68W
PH 0013(32)

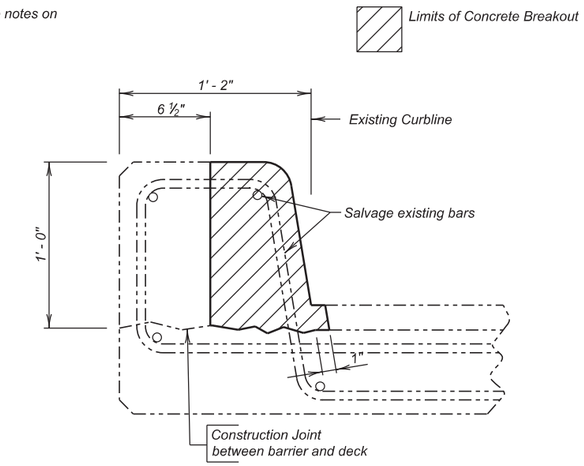
HAND COUNTY
S. D. DEPT. OF TRANSPORTATION
FEBRUARY 2014

DESIGNED BY	CK. DES. BY	DRAFTED BY	
EJA	KSK	EJA	Kevin N. Goeden BRIDGE ENGINEER
HAND052E	052ERA05		

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	PH 0013(32)	24	46

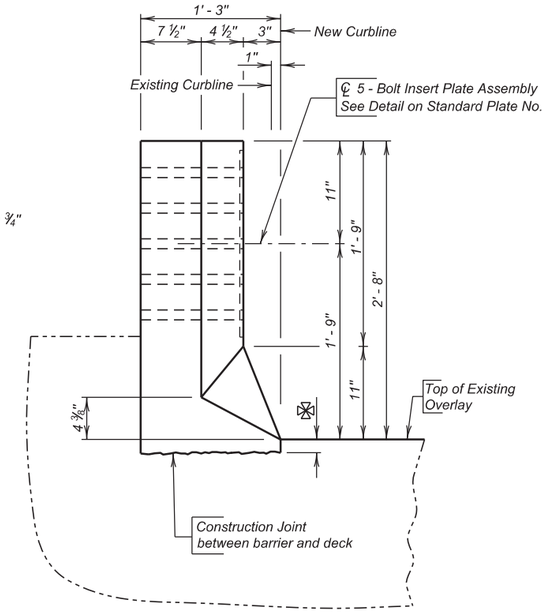


EXISTING CURB & RAIL



EXISTING CURB
(Showing removal limits)
(Entire curb face between end blocks on both curbs shall be repaired.)

Approximately 1 ¾"

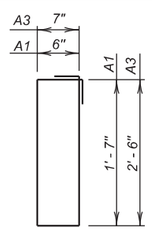


VIEW A - A

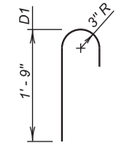
Bend existing C bars where necessary to maintain 2" clear cover.
D1 and D2 Dowels are to be drilled in and grouted with epoxy.
Extend existing B bars into new section (1'- 6")
Min. Lap = 1' - 3"

REINFORCING SCHEDULE

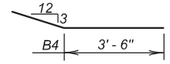
	Mk.	No.	Size	Length	Type
Phase 1	A1	56	4	4' - 11"	T2
	A3	12	4	6' -11"	T2
	◈ B1	12	4	30' - 0"	Str.
	B2	6	4	6' - 5"	Str.
	B3	2	4	5' - 5"	Str.
	B4	4	4	4' - 10"	19A
	△ D1	65	6	2' - 6"	1A
	△ D2	6	6	3' - 5"	Str.
Phase 2	A1	56	4	4' - 11"	T2
	A3	12	4	6' -11"	T2
	◈ B1	12	4	30' - 0"	Str.
	B2	6	4	6' - 5"	Str.
	B3	2	4	5' - 5"	Str.
	B4	4	4	4' - 10"	19A
	△ D1	65	6	2' - 6"	1A
	△ D2	6	6	3' - 5"	Str.



Type T2



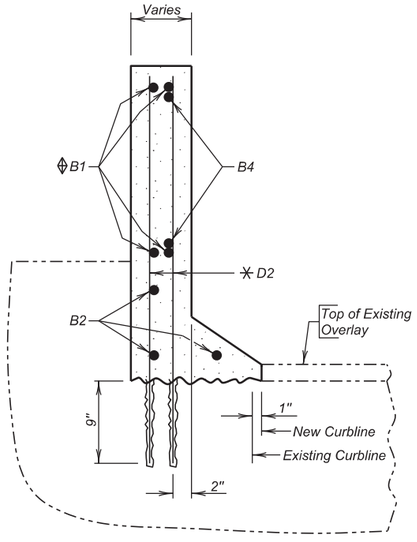
Type 1A



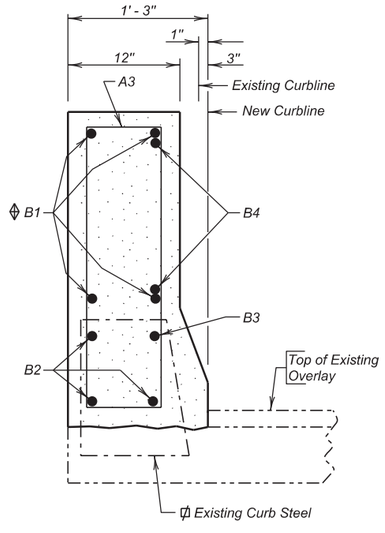
Type 19A

NOTES :

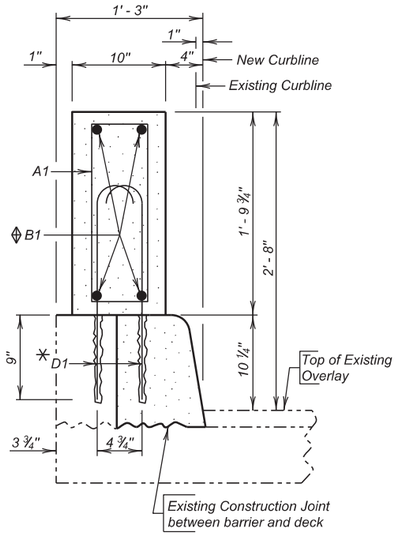
△ Dowels
All bars are epoxy coated.
All dimensions are out to out of bars.



SEC. B - B



SEC. C - C



SEC. D - D

ESTIMATED QUANTITIES

	ITEM	UNIT	QUANTITY PHASE I	QUANTITY PHASE 2
	Remove Bridge Railing	Ft.	97.5	97.5
	Class A45 Concrete, Bridge Repair	Cu.Yd.	8.0	8.0
	Breakout Structural Concrete	Cu.Yd.	2.2	2.2
	Install Dowel in Concrete	Each	68	68
★	Epoxy Coated Reinforcing Steel	Lb.	526	526
	Galvanic Strip Anode	Ft.	84	84

★ Does not include the following quantities for D1 & D2 bars as these are paid for in the Bid Item "Install Dowel in Concrete".

PHASE I	PHASE 2
267 Lb.	267 Lb.

NOTES:
Use this sheet in conjunction with Sheet Nos. 4 & 5 of 9.

If existing steel is struck while drilling holes for D1 or D2 dowels, the spacing can be shifted 2" longitudinally, 1" transversely, or as approved by the Engineer to miss existing steel.

END BLOCK AND RAIL REPLACEMENT DETAILS

FOR

97' - 6" I BEAM BRIDGE

30' - 0" ROADWAY
OVER CROW CREEK
STR. NO. 30-160-442

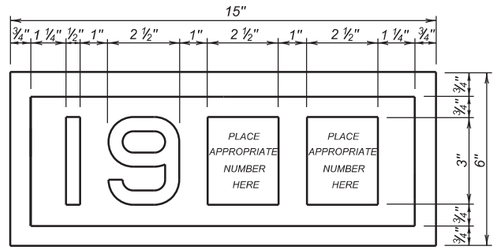
0° SKEW
SEC. 14/15-T109N-R68W
PH 0013(32)

HAND COUNTY
S. D. DEPT. OF TRANSPORTATION
FEBRUARY 2014

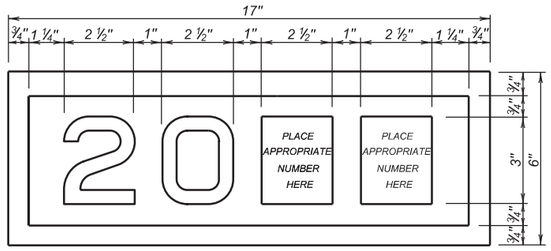
6 OF 9

DESIGNED BY	CK. DES. BY	DRAFTED BY	
EJA	KSK	EJA	Kevin N. Goeden
HAND052E	052ERA06		BRIDGE ENGINEER

YEAR PLATE DETAILS FOR ORIGINAL CONSTRUCTION

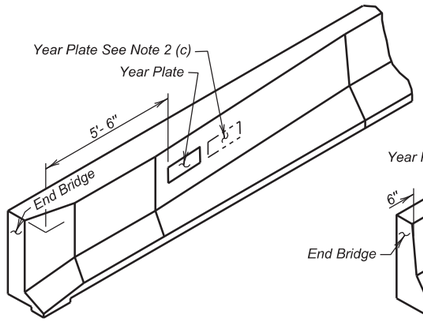


YEAR PLATE DETAILS FOR NEW CONSTRUCTION

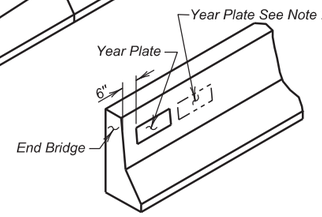


GENERAL NOTES:

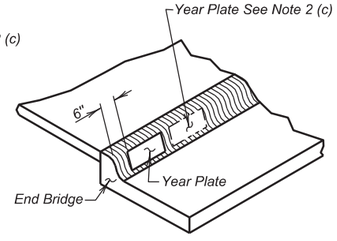
1. Year plates of the general dimensions shown shall be constructed on all box culverts and bridges. The year plates shall be constructed in reverse and attached to the forms in such a manner that the finished imprint in the concrete does not exceed one-half (½) inch in depth.
2. Year plates shall be located on structure(s) as follows:
   a. On cast-in-place box culverts the year plates shall be four and one - half (4 ½) inches below the top of the upstream parapet wall and centered laterally on the upstream face. On precast box culverts the year plate shall be centered laterally on the upstream face of the top slab. Where an extended interior wall interferes with this location, the year plate shall be centered in an adjacent barrel.
   b. On bridges with six (6) inch curbs or "Jersey" shaped barriers with no endblocks, the year plate shall be centered vertically on the curb face approximately six (6) inches from the end of the bridge, or as designated by the Engineer. On bridges with "Jersey" shaped barrier endblocks, the year plate shall be centered on the upper sloped portion of the barrier approximately 5'- 6" from the end of the bridge, or as designated by the Engineer. There shall be one year plate at each end of the bridge on opposite sides.
   c. When the plans specify that both the original date of construction and the date of reconstruction are to be shown, one date shall be placed as listed above and the other located adjacent to it. Both year plates shall be shown at each end of the bridge on opposite sides.
3. There will be no separate measurement or payment made for year plates on box culverts and bridges. All costs for this work shall be incidental to other contract items.



JERSEY BARRIER
(With Endblock)



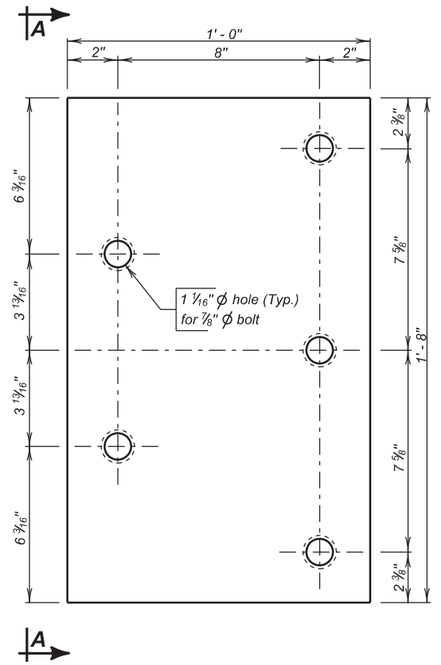
JERSEY BARRIER



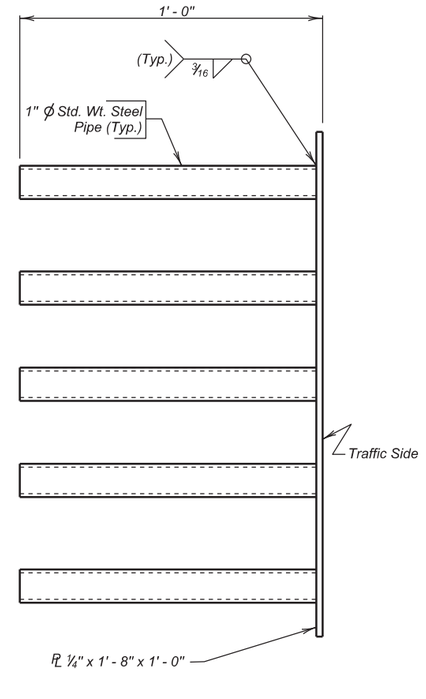
TYPE B CURB

June 26, 2012

Published Date: 1st Qtr. 2014	SDDOT	DUAL DATE YEAR PLATE DETAILS	PLATE NUMBER 460.03
			Sheet 1 of 1



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.

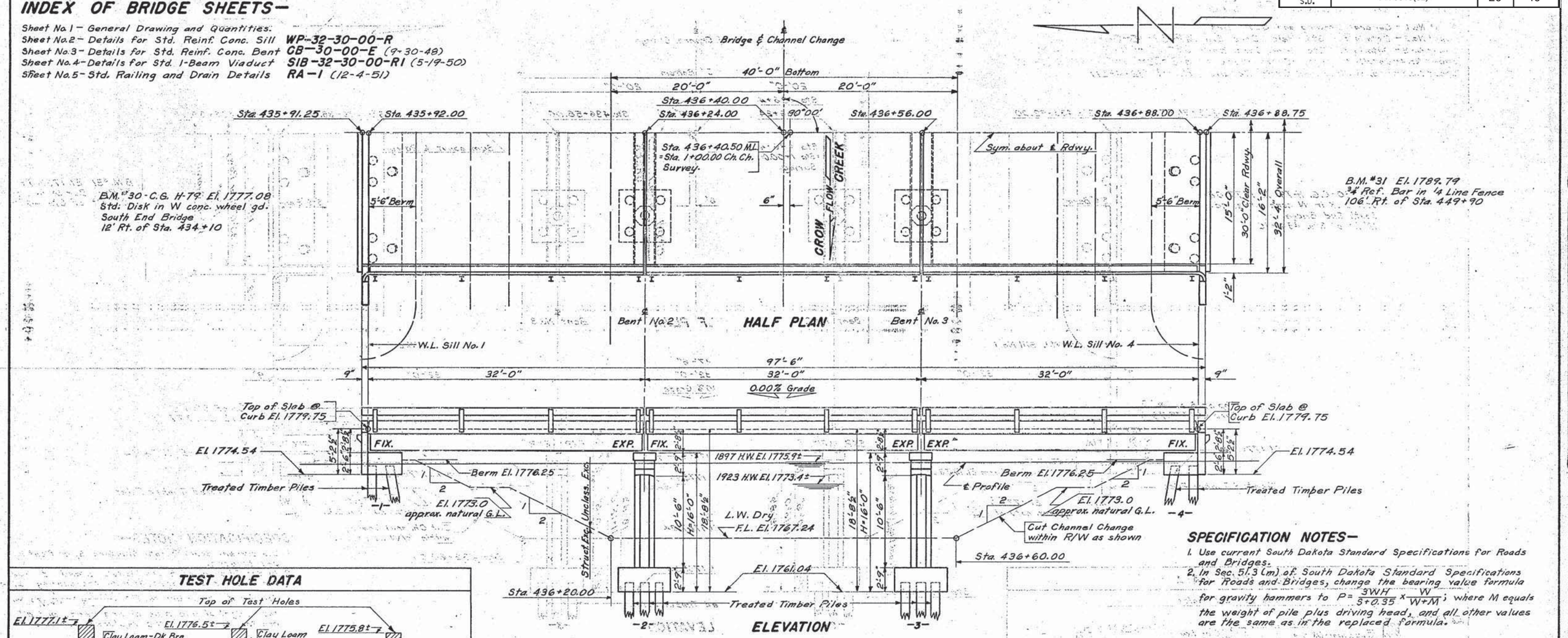
December 23, 2013

Published Date: 1st Qtr. 2014	SDDOT	5 BOLT INSERT PLATE ASSEMBLY	PLATE NUMBER 630.92
			Sheet 1 of 1

-X031-

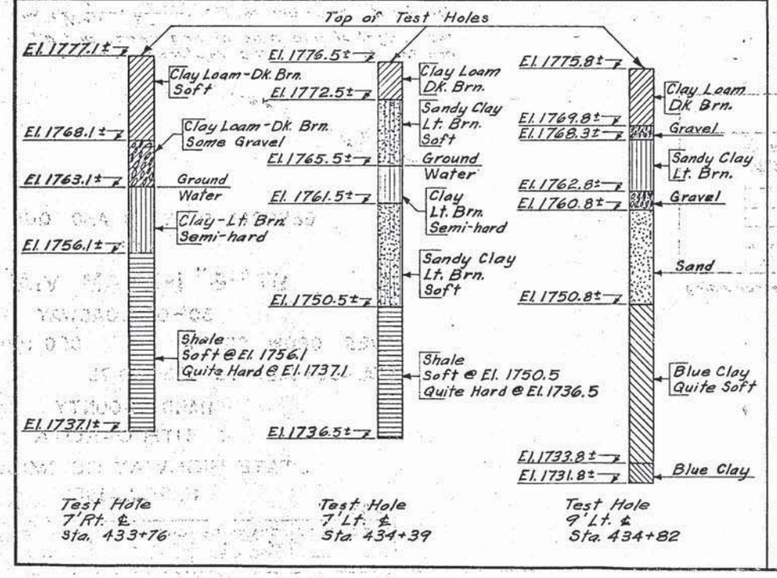
INDEX OF BRIDGE SHEETS-

STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	PH 0013(32)	26	46



ELEVATION

TEST HOLE DATA



ESTIMATED QUANTITIES

ITEM	Conc. Cl. "P" Cu. Yds.	Steel - Lbs. Struct.	Steel - Lbs. Reinf.	Rolling Lin. Ft.	Treated Timber Piles - #/Lin. Ft.	Excavation - Cu. Yds. Struct.	Excavation - Cu. Yds. Unclass.
Superstructure - 3-32' Comp. Spans	86.0	40,860	14,545	197.2			
Substructure - Sills No. 1 & No. 4	36.4		3,680		24 @ 35' = 840	30	
Substructure - Bents No. 2 & No. 3	34.6		5,780		20 @ 25' = 500	60	
Totals	137.0	40,860	24,055	197.2	#1340	90	#1272

One Treated Timber Test Pile shall be driven at Sills No. 1 & No. 4 and at Bent No. 3 before remaining piles are ordered.

Δ See Grading Plans for Unclassified Excavation.

SPECIFICATION NOTES-

1. Use current South Dakota Standard Specifications for Roads and Bridges.
2. In Sec. 51.3 (m) of South Dakota Standard Specifications for Roads and Bridges, change the bearing value formula for gravity hammers to $P = \frac{3WH}{S+0.35} \times \frac{W}{W+M}$ where M equals the weight of pile plus driving head, and all other values are the same as in the replaced formula.

ORIGINAL CONSTRUCTION PLANS

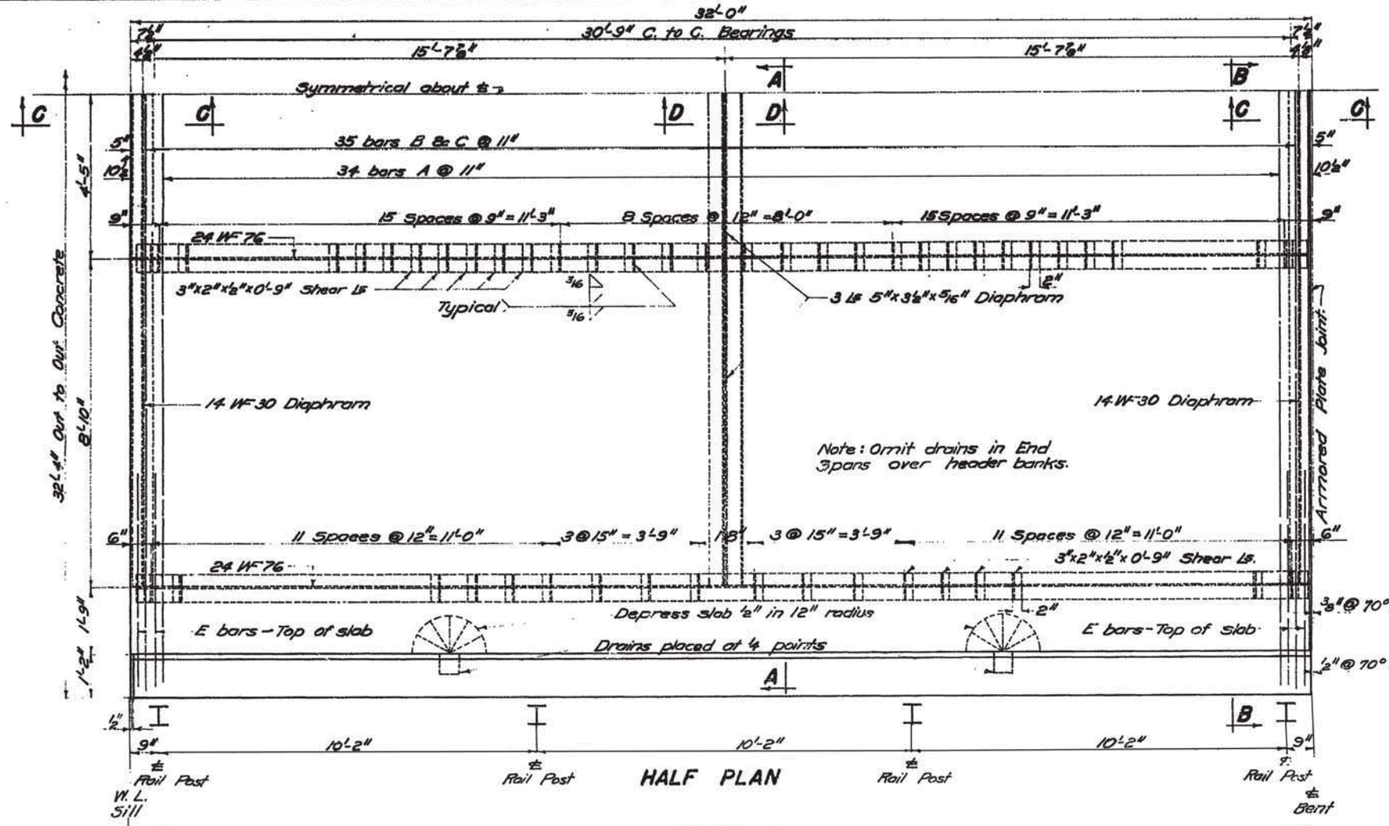
GENERAL DRAWING AND QUANTITIES
FOR
97'-6" I-BEAM VIADUCT
30'-0" ROADWAY
OVER CROW CREEK SEC. 14/15-T109N-R68W
STA. 435+91.25 TO 436+88.75 S 194 (10)
HAND COUNTY
SOUTH DAKOTA H20-44
STATE HIGHWAY COMMISSION
MARCH 1955 (8) OF (9)

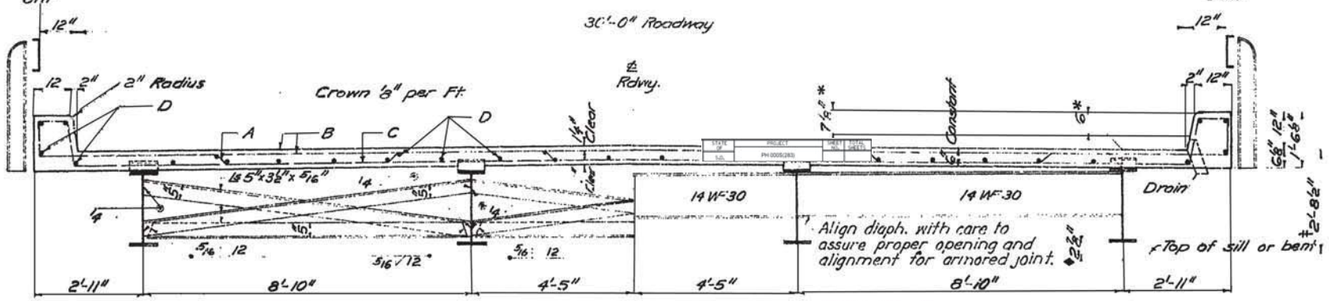
-X031-

DESIGNED BY	DRAWN BY	CHECKED BY	APPROVED
		R.K.	BRIDGE ENGINEER

Str. No. 30-160-442

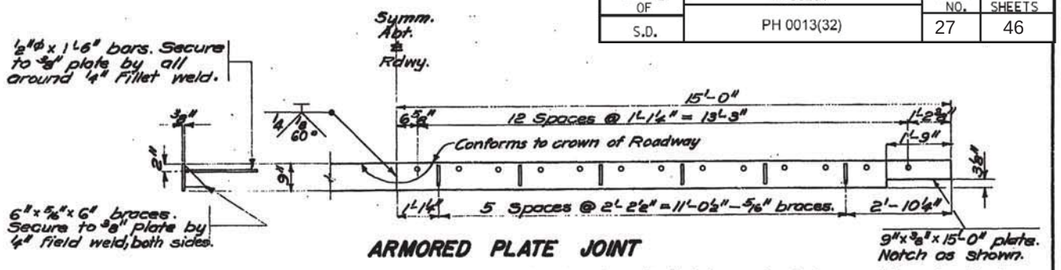
STATE OF	PROJECT	SHEET NO.	TOTAL SHEETS
S.D.	PH 0013(32)	27	46





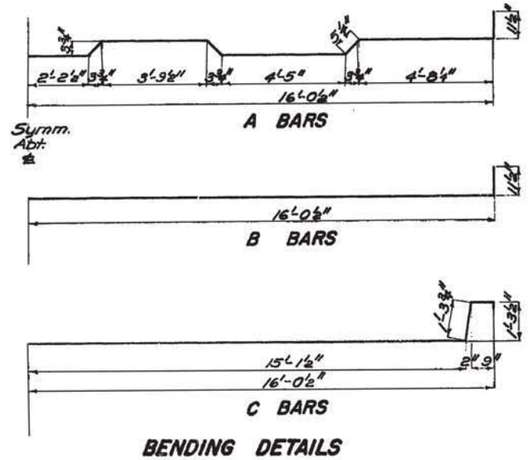
SEC. A-A **SEC. B-B**

* Dimensions shown apply only at ℄ of bearings. Intermediate points must be increased for ordinates shown in DEAD LOAD DEFLECTION DIAGRAM plus or minus any irregularity or deflection in beam when erected.



ARMORED PLATE JOINT

Armor plate shall be adjusted to grade before welding to diaphram.



BENDING DETAILS

Note: Dimensions are out to out of bars.

REINF. STEEL			
MARK	No.	SIZE	LENGTH
A	34	⅝"ϕ	34'-9"
B	35	⅝"ϕ	34'-0"
C	33	⅝"ϕ	34'-9"
D	32	⅝"ϕ	31'-6"
E	8	¾"ϕ	6'-0"

ESTIMATED QUANTITIES			
ITEM		1 ABUT. SPAN	1 INTERMED. SPAN.
Concrete, Cl. "A"	Cu Yds.	22.0	22.0
Steel, Reinforcing	Lbs.	4865	4865
Steel, Structural	Lbs.	13,490	13,880
Railing	Lin Ft.	66.6	64.0

* See sheet of "Special Details" for these dimensions if bridge is on other than level grade.

♦ Vary this dimension in accordance with variation of dimensions marked *.

GENERAL NOTES:

Cost of welding shall be absorbed in the unit price bid for structural steel.

Lead plates and lead washers shall be paid for under the item of structural steel.

All exposed steel surfaces shall be painted one shop coat of red lead paint and two field coats of aluminum or other approved paint.

Beams do not require mill cambering.

Cost of canvas and red lead under bearing plates shall be absorbed in the unit price bid for Cl. "A" Concrete.

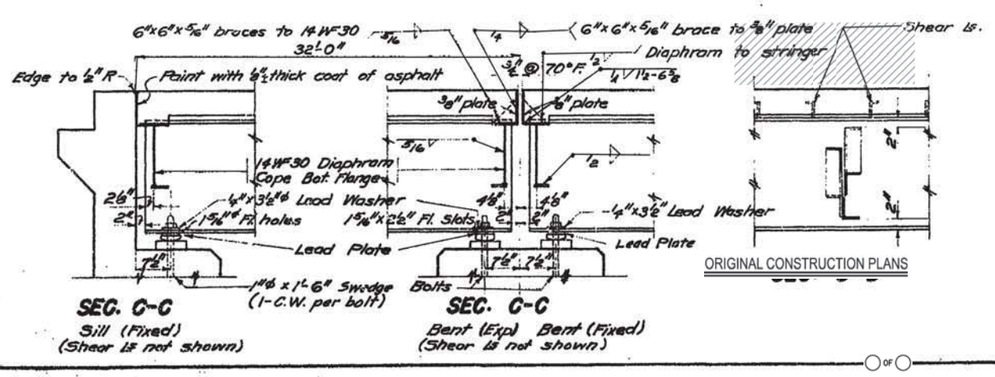
All exposed concrete edges shall be chamfered 1" unless otherwise noted.

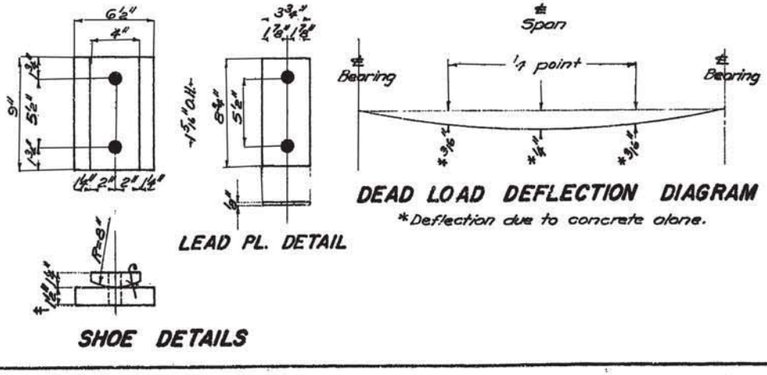
See Standard Railing Sheet for details of handrails and drains.

Design Loading: H20-44 (T-3-45) A.A.S.H.O.

Unit Stresses: Re-steel fs = 20,000 p.s.i. (Intermed. Gr. steel)
Concrete fc = 1350 p.s.i.

Class "A" Concrete shall develop a minimum allowable compressive strength of 4000 p.s.i. at 28 days.





ORIGINAL CONSTRUCTION PLANS

DETAILS FOR

STANDARD I-BEAM VIADUCT

COMPOSITE SECTION

30'-0" ROADWAY 32'-0" SPAN

SOUTH DAKOTA

STATE HIGHWAY COMMISSION

1947

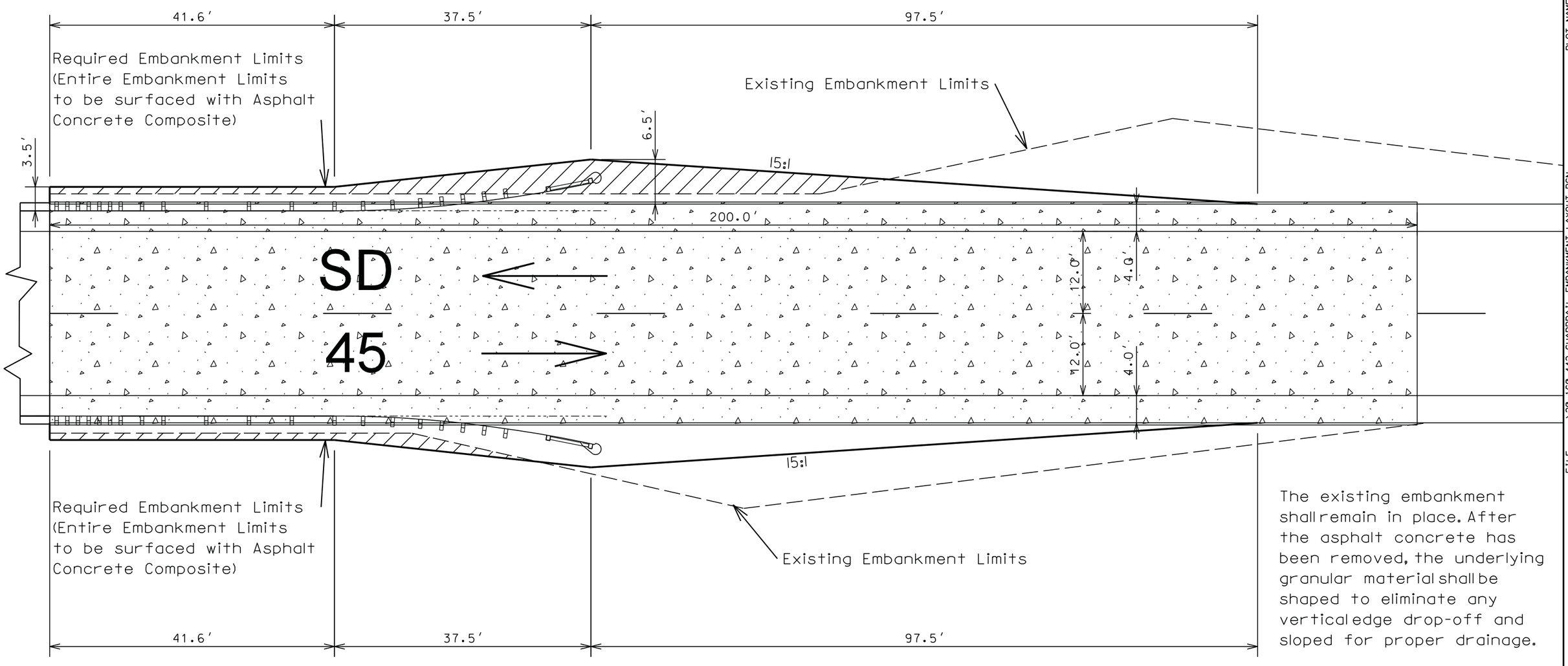
9 OF 9

Rev. 5-19-50 Rev. 10-21-49 Rev. 9-29-49 Rev. 9-23-48 Rev. 7-21-48	DESIGNED BY J.S.H. & R.W.J.	DRAWN BY R.W.J.	CHECKED BY J.S.H.	APPROVED BRIDGE ENGINEER

SIB-32-30-00-RI

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	PH 0013(32), 000P-169, 000N-169	28	46
Plotting Date: 07/30/2014			

GUARDRAIL EMBANKMENT LAYOUT
STR. NO. 30-160-442
SD 45 @ MRM 93.02
(Guardrail Embankment Identical at Both Ends of the Bridge)

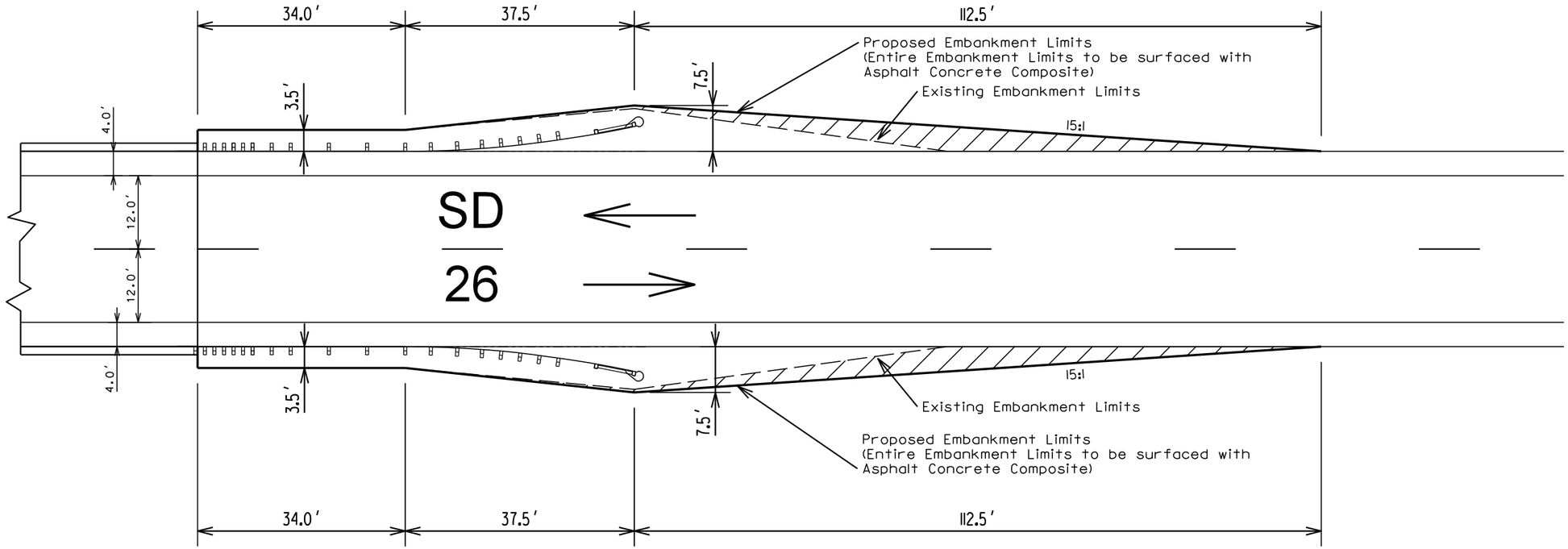


Indicates area where Contractor Furnish Borrow, Base Course and Asphalt Concrete Composite shall be placed

Indicates Cold Milling

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	PH 0013(32), 000P-169, 000N-169	29	46
Plotting Date: 07/16/2014			

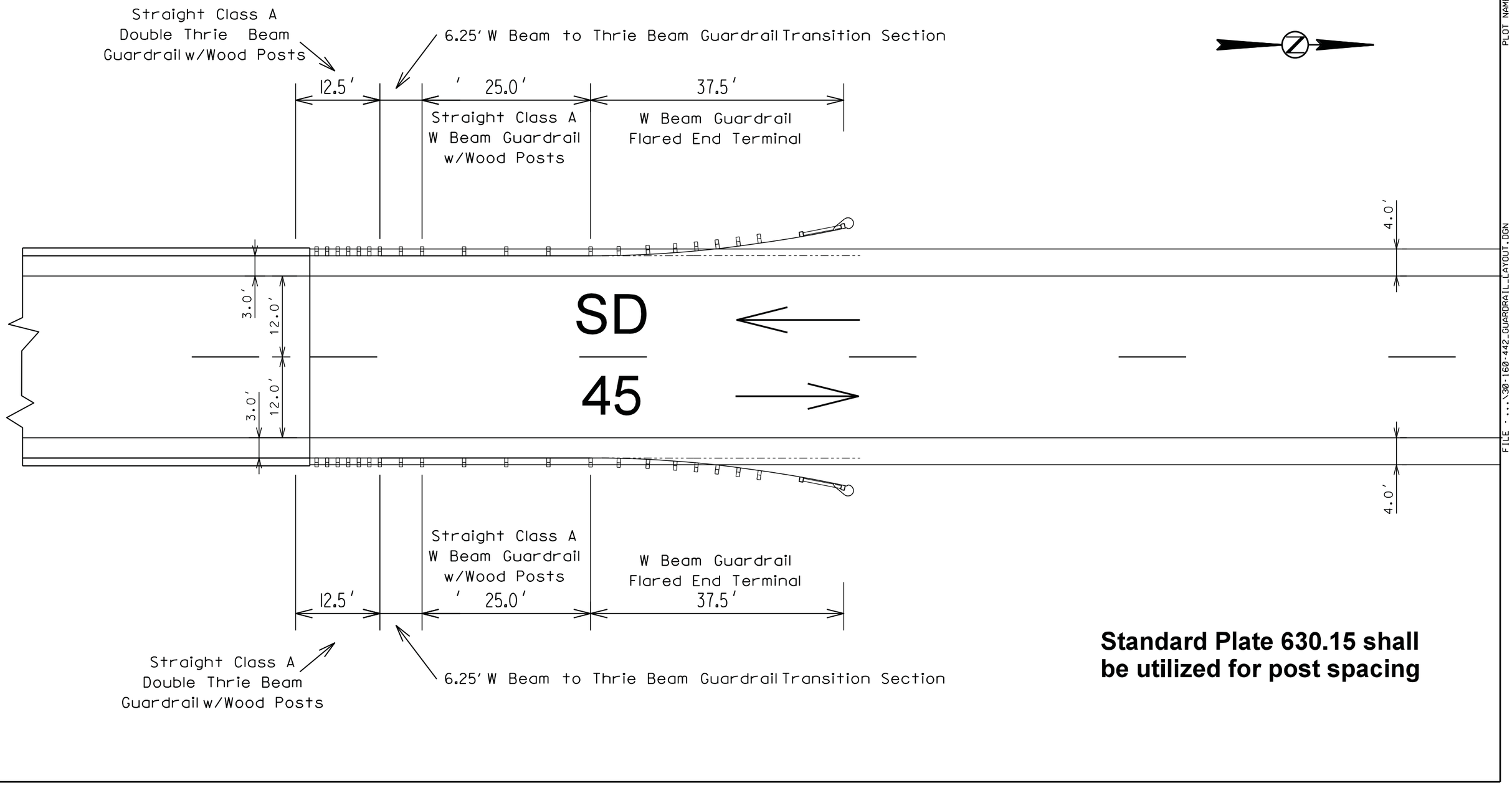
GUARDRAIL EMBANKMENT LAYOUT
STR. NO. 58-047-290
SD 26 @ MRM 275.37
(Guardrail Embankment identical at both ends of the bridge)



Indicates area where Contractor Furnish Borrow, Base Course and Asphalt Concrete Composite shall be placed

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	PH 0013(32), 000P-169, 000N-169	30	46
Plotting Date: 07/16/2014			

GUARDRAIL LAYOUT
STR. NO. 30-160-442
SD 45 @ MRM 93.02
(Guardrail Identical at both ends of the bridge)



Standard Plate 630.15 shall be utilized for post spacing

PLOT SCALE - 1:14

PLOT NAME - 5

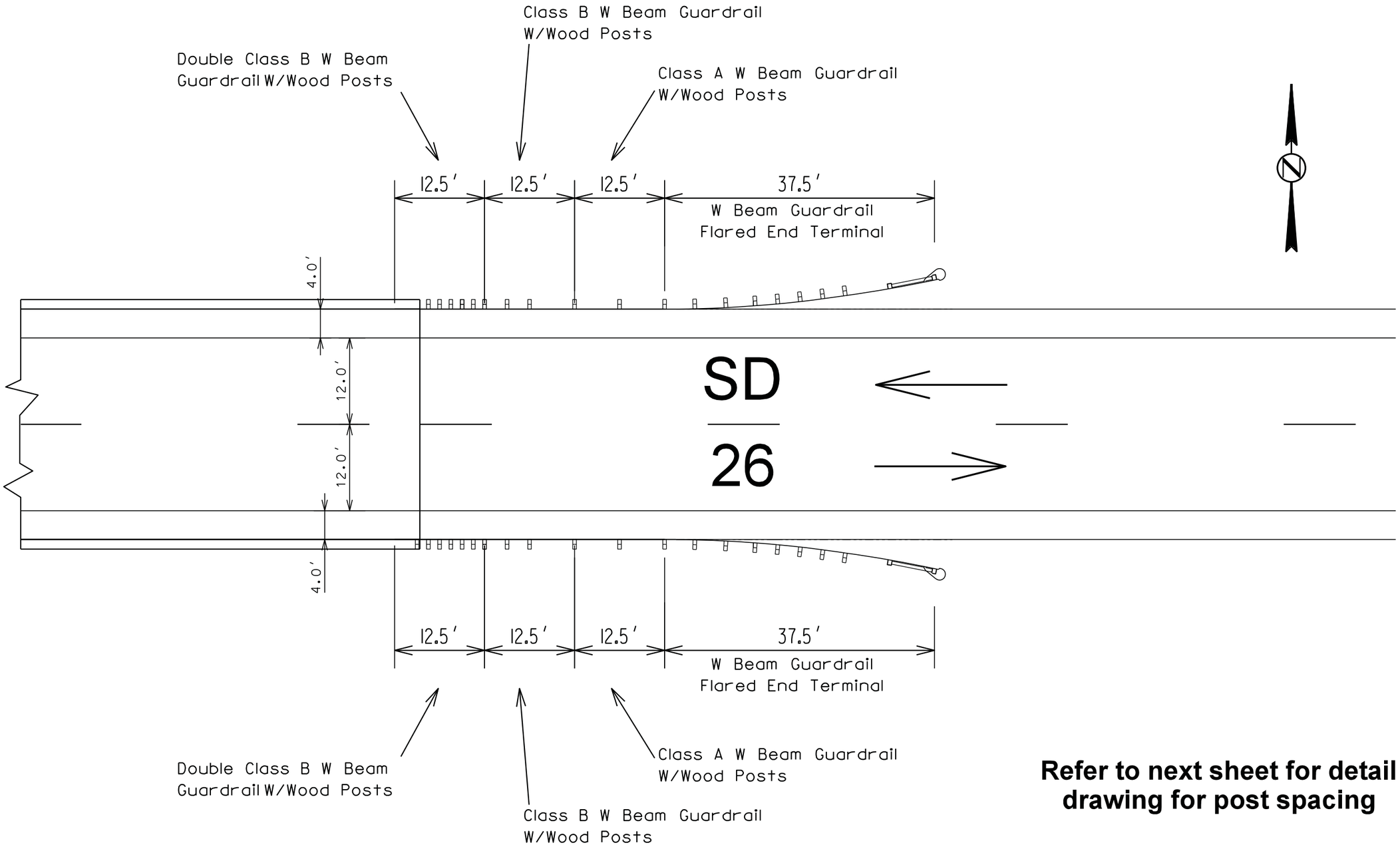
FILE - ...\30-160-442_GUARDRAIL_LAYOUT.DGN

PLOTTED FROM - TRAB17882

PLOT SCALE - 1:14
PLOT NAME - 6
FILE - ...\58-047-290_GUARDRAIL_LAYOUT.DGN
PLOTTED FROM - TRAB17982

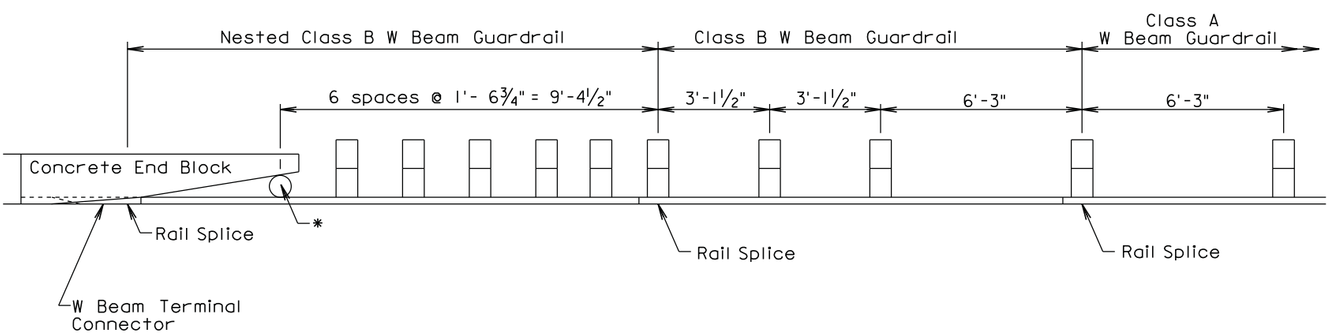
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	PH 0013(32), 000P-169, 000N-169	31	46
Plotting Date: 07/16/2014			

GUARDRAIL LAYOUT
STR. NO. 58-047-290
SD 26 @ MRM 275.37
(Guardrail identical at both ends of the bridge)



Refer to next sheet for detail drawing for post spacing

POST SPACING ARRANGEMENT FOR W BEAM GUARDRAIL AT BRIDGE END
STR. NO. 58-047-290



* Install a 6" I.D. x 9" long schedule 40 galvanized pipe. Fasten to nested rails with 2" button head bolt with nut, rectangular plate washer, and ⅝" bolt washer.

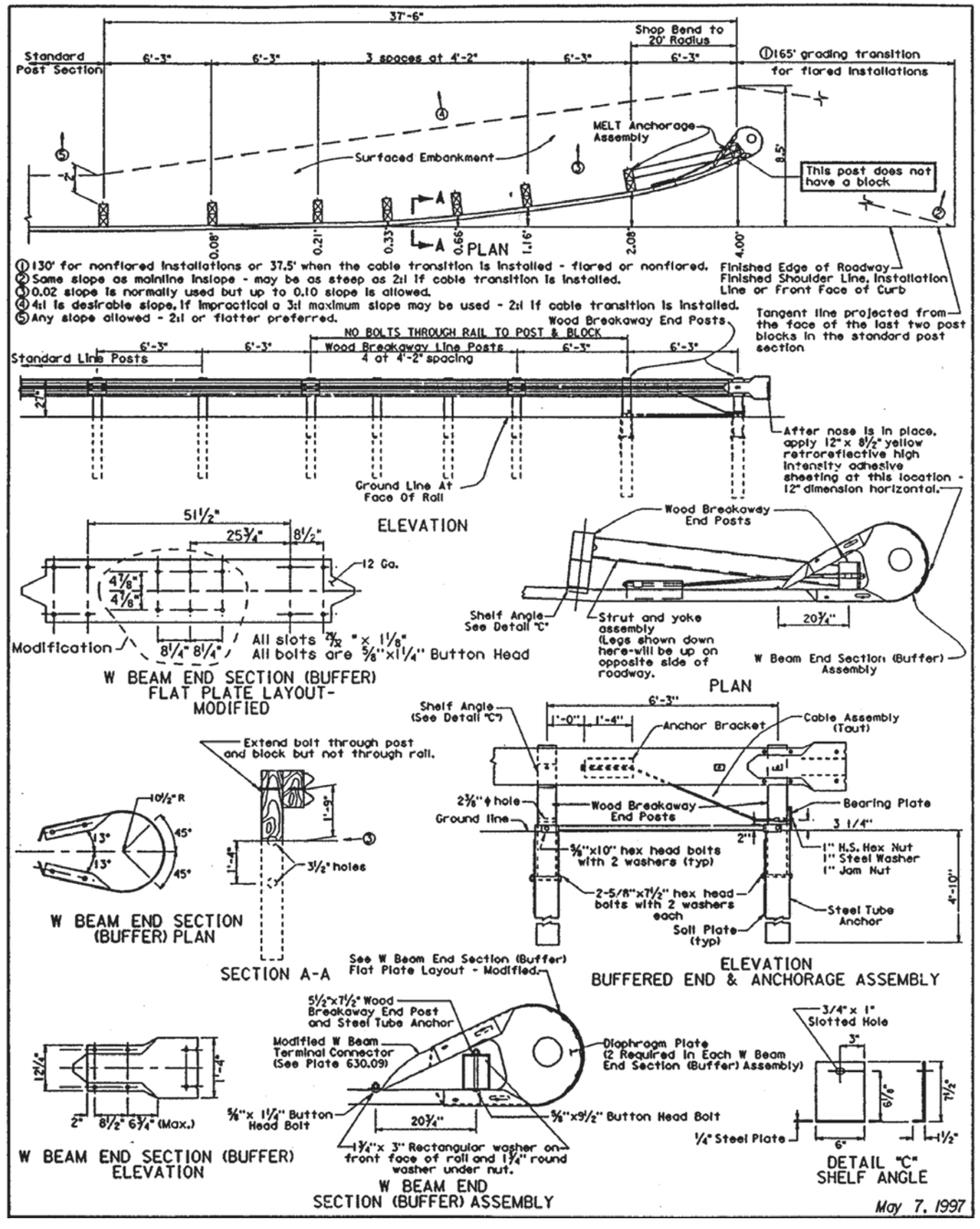
* All costs incurred to furnish and install the pipe shall be incidental to the contract unit prices for the various guardrail items

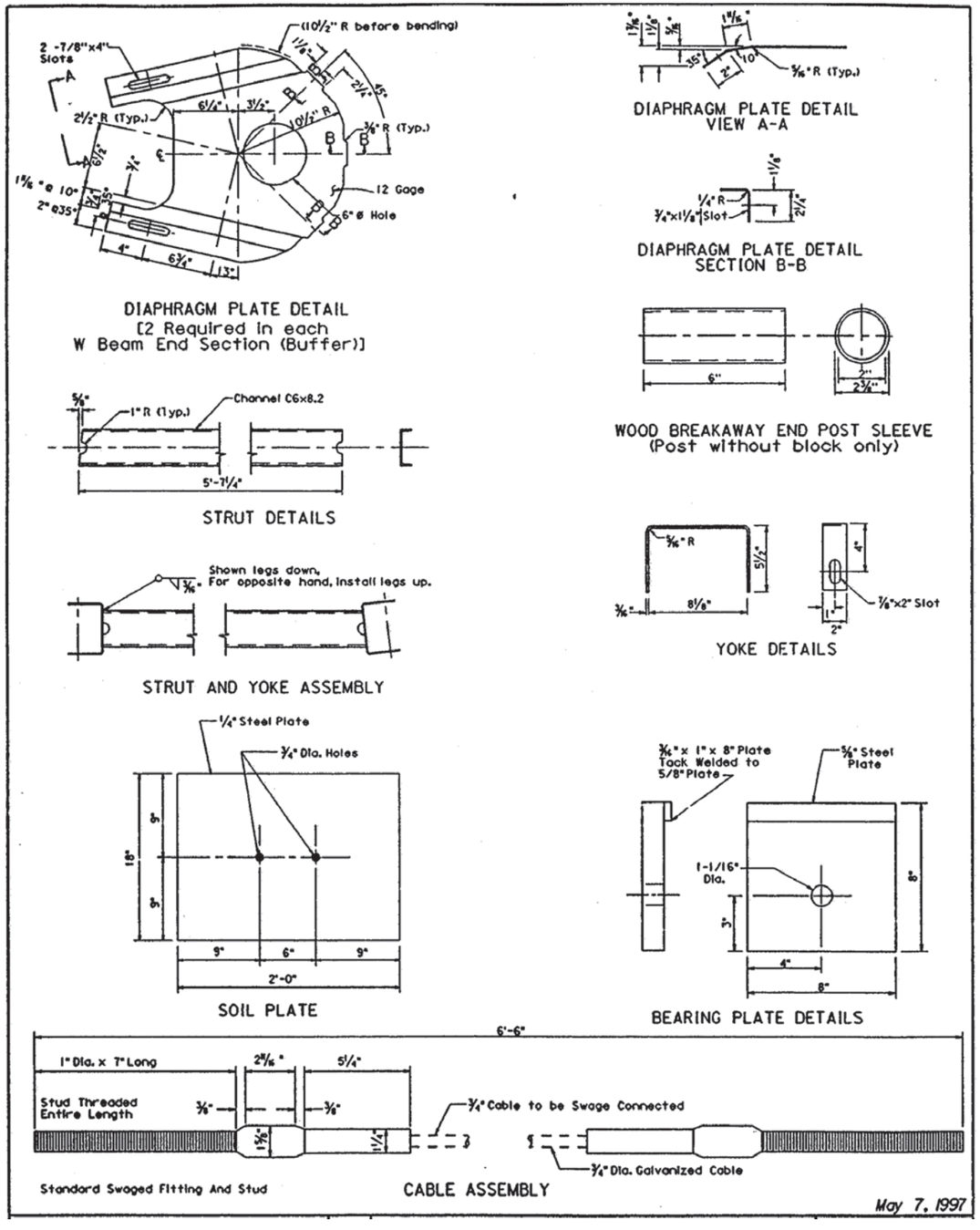
STATE OF SOUTH DAKOTA	
PROJECT	PH 000S(283), 0001-169 000P-169, 000N-169
SHEET NO.	32
TOTAL SHEETS	46

Plotting Date: 07/17/2014

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	PH 000S(283)	33	46

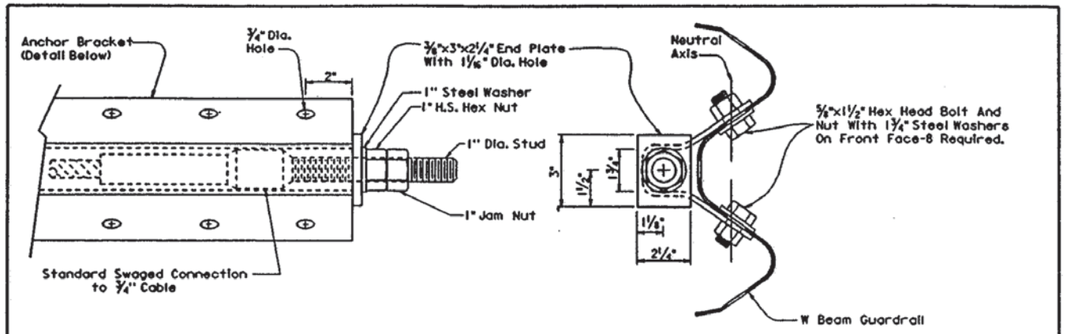
MODIFIED ECCENTRIC LOADER TERMINAL (MELT)
(DETAIL IS ONLY FOR USE TO MAKE REPAIRS TO EXISTING INSTALLATIONS)



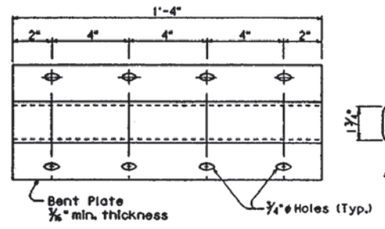


STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	PH 000S(283)	34	46

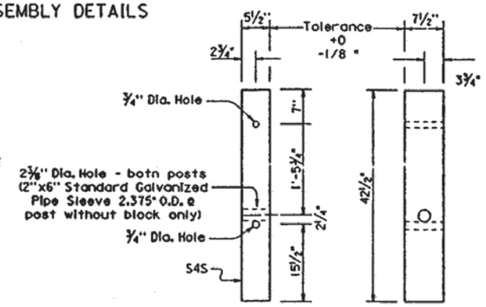
MODIFIED ECCENTRIC LOADER TERMINAL (MELT)
(DETAIL IS ONLY FOR USE TO MAKE REPAIRS TO EXISTING INSTALLATIONS)



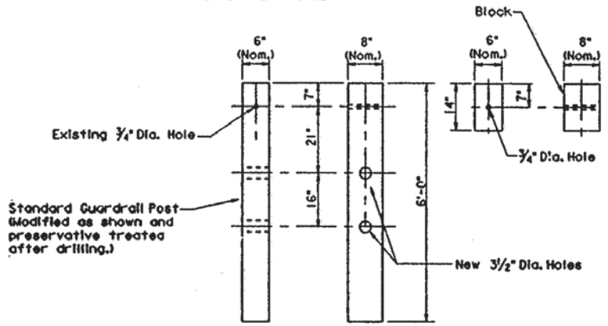
ANCHOR BRACKET ASSEMBLY DETAILS



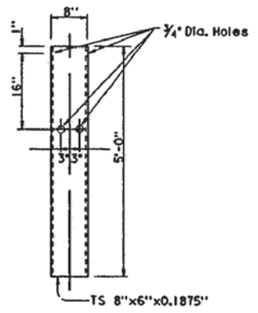
ANCHOR BRACKET



WOOD BREAKAWAY END POST



WOOD BREAKAWAY LINE POST AND BLOCK



STEEL TUBE ANCHOR

GENERAL NOTES:

1. All angles, channels, and plates shall conform to the requirements of A.S.T.M. A36 and structural tubing to A.S.T.M. A500 or A.S.T.M. A513, Grade 1008. Diaphragm plate shall conform to A.S.T.M. A36 or AASHTO M180. Welding shall meet the current requirements of the American Welding Society Structural Welding Code ANSI/AASHTO/AWS D1.5. All structural steel shall be galvanized in accordance with A.S.T.M. A123. No punching, cutting, or drilling will be permitted after galvanizing. All hardware shall be galvanized according to ASTM A153.

2. The two (2) Wood Breakaway End Posts shall be made of S4S timber with a stress grade of 1200 psi and shall be grademarked or certified by a recognized association or agency which is certified by the Board of Review, American Lumber Standards Committee, to grade the species. They shall receive a preservative treatment in accordance with AASHTO designation M133.

3. The post offset dimensions are given to the center of the traffic face of the blockouts, except at the first post, where the dimension is to the center of the traffic face of the post. Offset points are to be located by chord measurements at the back of rail equal to the nominal post spacings shown. Posts are to be set approximately radial to the railing at each post location.

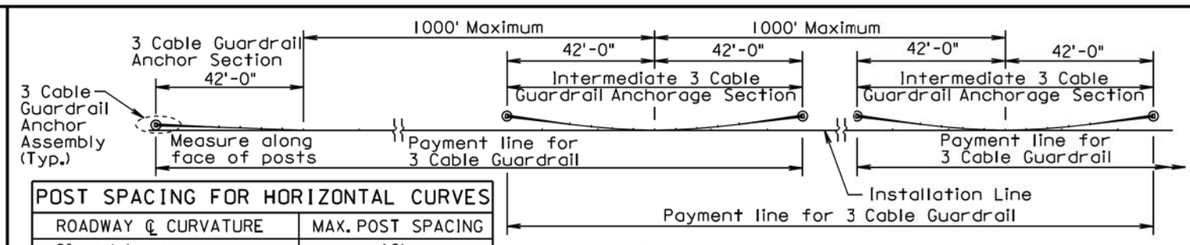
4. The contract unit price per each for W BEAM GUARDRAIL MODIFIED ECCENTRIC LOADER TERMINAL is to include the anchor bracket, cable assembly, steel tube anchors with soil plates, bearing plate, wood breakaway end post sleeve, modified W beam terminal connector, diaphragm plates, strut, W beam end section, retroreflective adhesive sheeting, shelf angle and all hardware and labor to attach the above to the W beam guardrail. The wood breakaway end posts, wood breakaway line posts, the cost of shop bending the last half of the end section containing the anchor bracket to a 20' radius, and the guardrail will be paid for at the contract unit price per linear foot for W BEAM GUARDRAIL STRAIGHT, CLASS A, WOOD POSTS.

May 7, 1997

Published Date: 2nd Qtr. 2014

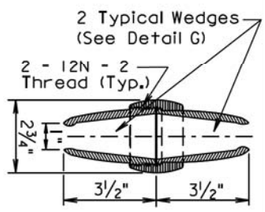
SDDOT

3 CABLE GUARDRAIL



PLAN

POST SPACING FOR HORIZONTAL CURVES	
ROADWAY ℄ CURVATURE	MAX. POST SPACING
8° and Less	16'
Greater than 8° to 13°	12'
Greater than 13°	NOT ALLOWED



CABLE SPLICE

GENERAL NOTES:

Either flanged channel steel posts or S3x5.7 steel I beam posts shall be used, but post type shall be consistent thoughout the project. The S3x5.7 Steel I Beam post shall be used for the end posts when the flanged channel steel post is used as line posts.

All costs associated with furnishing and constructing the 3 cable guardrail anchor assembly including the concrete anchor, cable anchor bracket, compensating device, steel turnbuckle cable assembly, and necessary hardware shall be incidental to the contract unit price per Each for "3 Cable Guardrail Anchor Assembly".

All costs associated with furnishing and constructing the 3 cable guardrail including posts, cable, cable splices, and hardware shall be incidental to the contract unit price per Ft for "3 Cable Guardrail".

The following table and criteria shall apply to the arrangement of the Spring Cable End Assemblies (Compensation Devices) and Turnbuckle Cable End Assemblies:

LENGTH OF CABLE RUN	CRITERIA FOR ARRANGEMENT OF THE SPRING CABLE END ASSEMBLIES (COMPENSATION DEVICES) AND TURNBUCKLE CABLE END ASSEMBLIES
To 500'	Use turnbuckle on the approaching traffic end and compensating device on the other end of each individual cable, except in the W Beam to 3 Cable Transition where all compensating devices shall be provided at the bridge ends.
Greater than 500' to 1000'	Use compensating device on each end of each individual cable.
Greater than 1000'	Start new run by interlacing at last parallel post as shown above.

All Compensating Devices shall be attached to the cable anchor bracket when one end of the run is attached to a bridge.

Compensating Devices must have a spring rate of 450 ± 50 Lbs. per inch and shall have a total available travel of 6" minimum.

The cable shall be retensioned after the initial 2 week pretension period in accordance with the following table:

Temperature Range (Deg.)	120 to 110	109 to 100	99 to 90	89 to 80	79 to 70	69 to 60	59 to 50	49 to 40	39 to 30	29 to 20	19 to 10	9 to 0	-1 to -10	-11 to -20
Spring Compression (In.)	1	1¼	1½	1¾	2	2¼	2½	2¾	3	3¼	3½	3¾	4	4¼

PLATE NUMBER 629.01

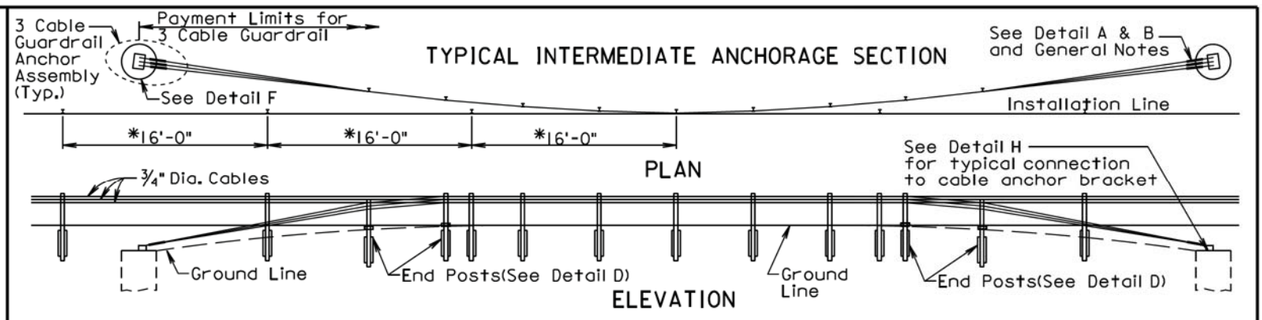
Sheet 1 of 6

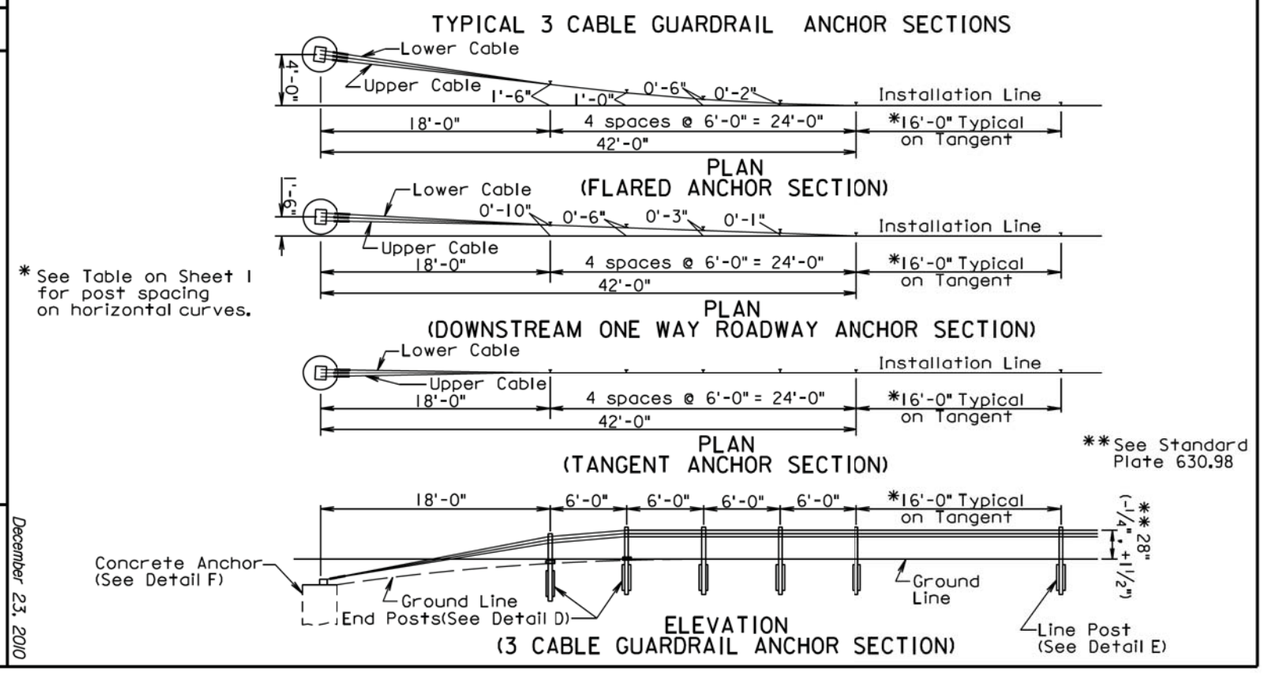
December 23, 2010

Published Date: 2nd Qtr. 2014

SDDOT

3 CABLE GUARDRAIL





* See Table on Sheet 1 for post spacing on horizontal curves.

PLATE NUMBER 629.01

Sheet 2 of 6

December 23, 2010

Plotting Date: 07/17/2014

STATE OF SOUTH DAKOTA

PROJECT PH 0013(32), 000P-169 & 000N-169

SHEET 35

TOTAL SHEETS 46

Published Date: 2nd Qtr. 2014

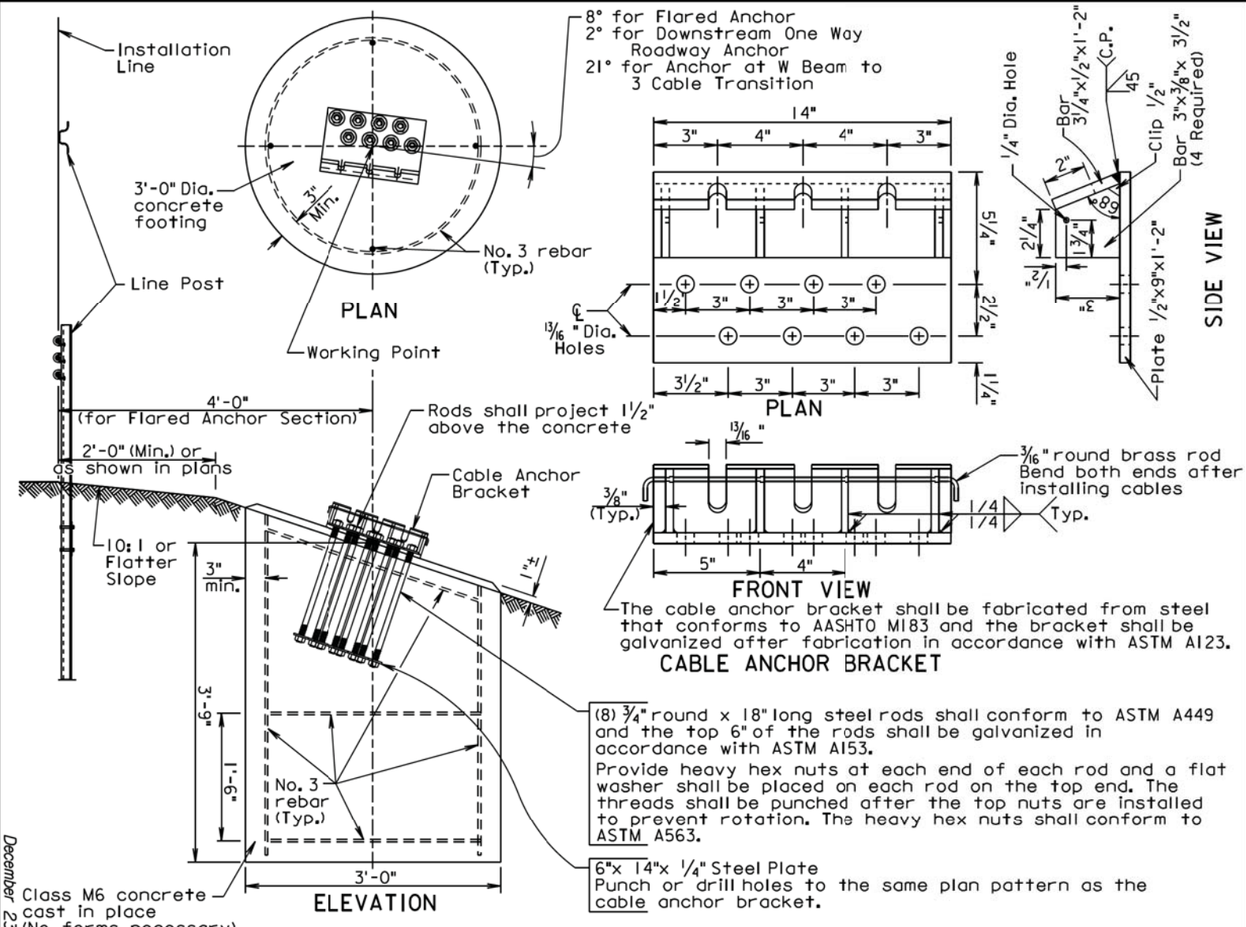
SDDOT

3 CABLE GUARDRAIL

PLATE NUMBER 629.01

Sheet 3 of 6

December 23, 2010



DETAIL F
(CONCRETE ANCHOR AND CABLE ANCHOR BRACKET)

Published Date: 2nd Qtr. 2014

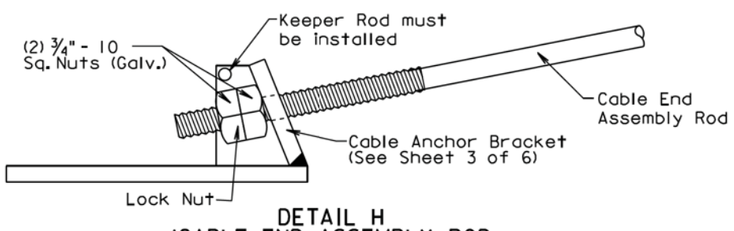
SDDOT

3 CABLE GUARDRAIL

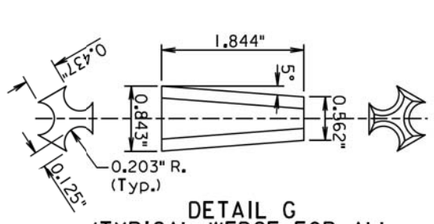
PLATE NUMBER 629.01

Sheet 4 of 6

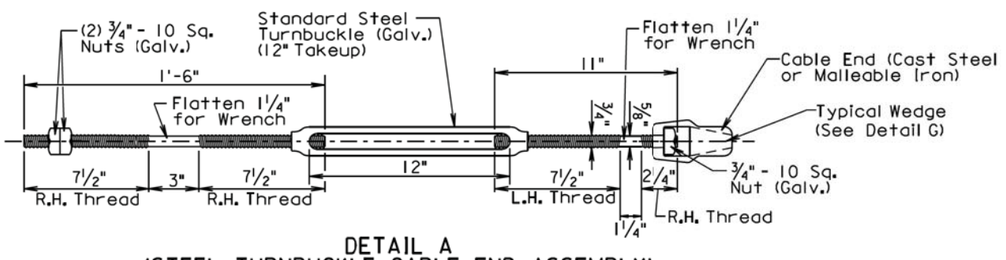
December 23, 2010



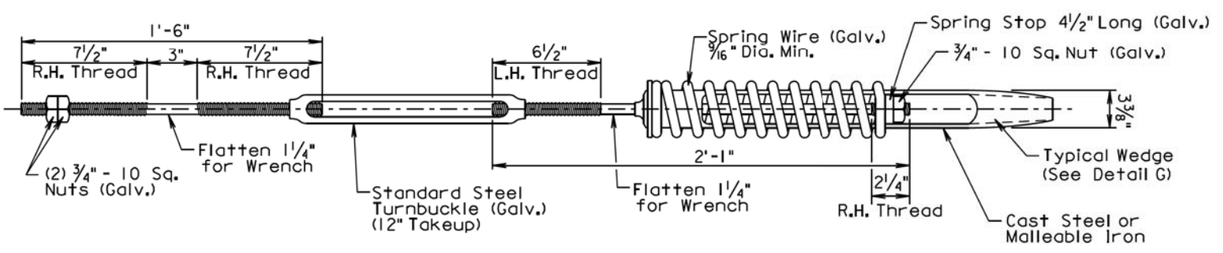
DETAIL H
(CABLE END ASSEMBLY ROD CONNECTION TO CABLE ANCHOR BRACKET)



DETAIL G
(TYPICAL WEDGE FOR ALL SPLICES AND CABLE FITTINGS)



DETAIL A
(STEEL TURNBUCKLE CABLE END ASSEMBLY)
Minimum Tensile Strength = 25,000 Lbs.



DETAIL B
(SPRING CABLE END ASSEMBLY WITH TURNBUCKLE)
(COMPENSATING DEVICE)

STATE OF SOUTH DAKOTA

PROJECT PH 0013(321), 000P-169 & 000N-169

SHEET 36

TOTAL SHEETS 46

Plotting Date: 07/17/2014

Published Date: 2nd Qtr. 2014

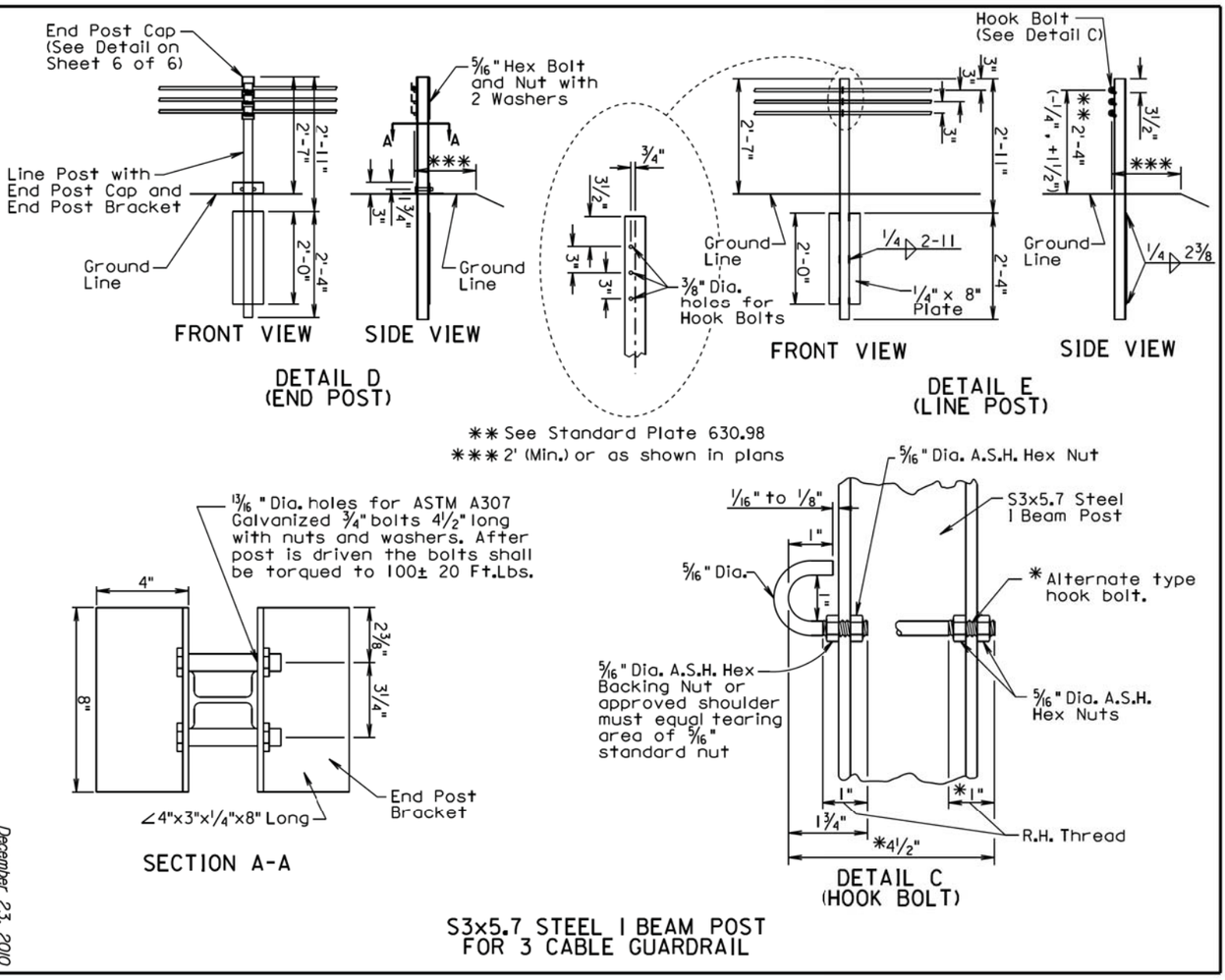
SDDOT

3 CABLE GUARDRAIL

PLATE NUMBER 629.01

Sheet 5 of 6

December 23, 2010



S3x5.7 STEEL I BEAM POST FOR 3 CABLE GUARDRAIL

Published Date: 2nd Qtr. 2014

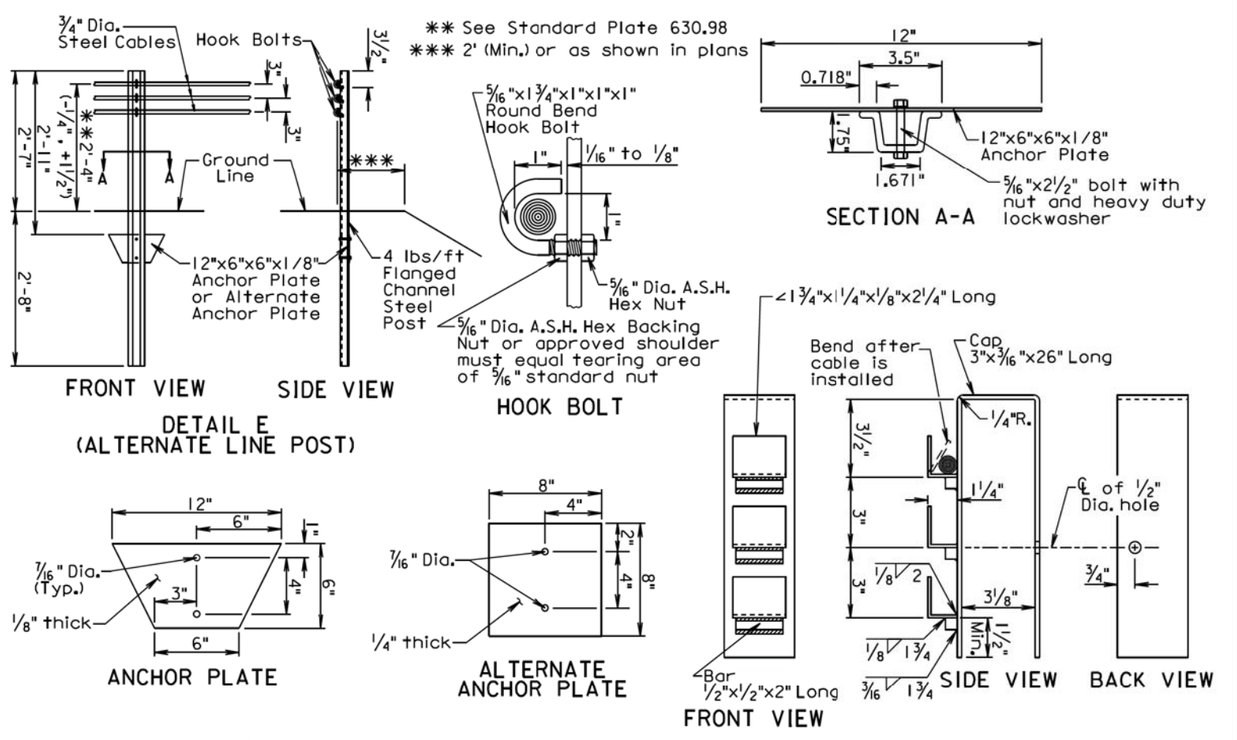
SDDOT

3 CABLE GUARDRAIL

PLATE NUMBER 629.01

Sheet 6 of 6

December 23, 2010



FLANGED CHANNEL STEEL POST FOR 3 CABLE GUARDRAIL

GENERAL NOTES:

Flanged channel steel posts shall be produced from high strength steel in accordance with ASTM A499 Grade 60.
Anchor plate shall be carbon steel sheet.
Alternate anchor plate shall be ASTM A36 steel.
Bolt shall be in conformance with ASTM A354 Grade BD or BC. Nut shall be in conformance with ASTM A563 Grade DH.
Bolt shall be Cadmium plated per ASTM A165-80 Type OS except using clear chromate.
Finish for the post and anchor plate shall be a high quality dark green outdoor acrylic enamel.
Alternate anchor plate may be unfinished.

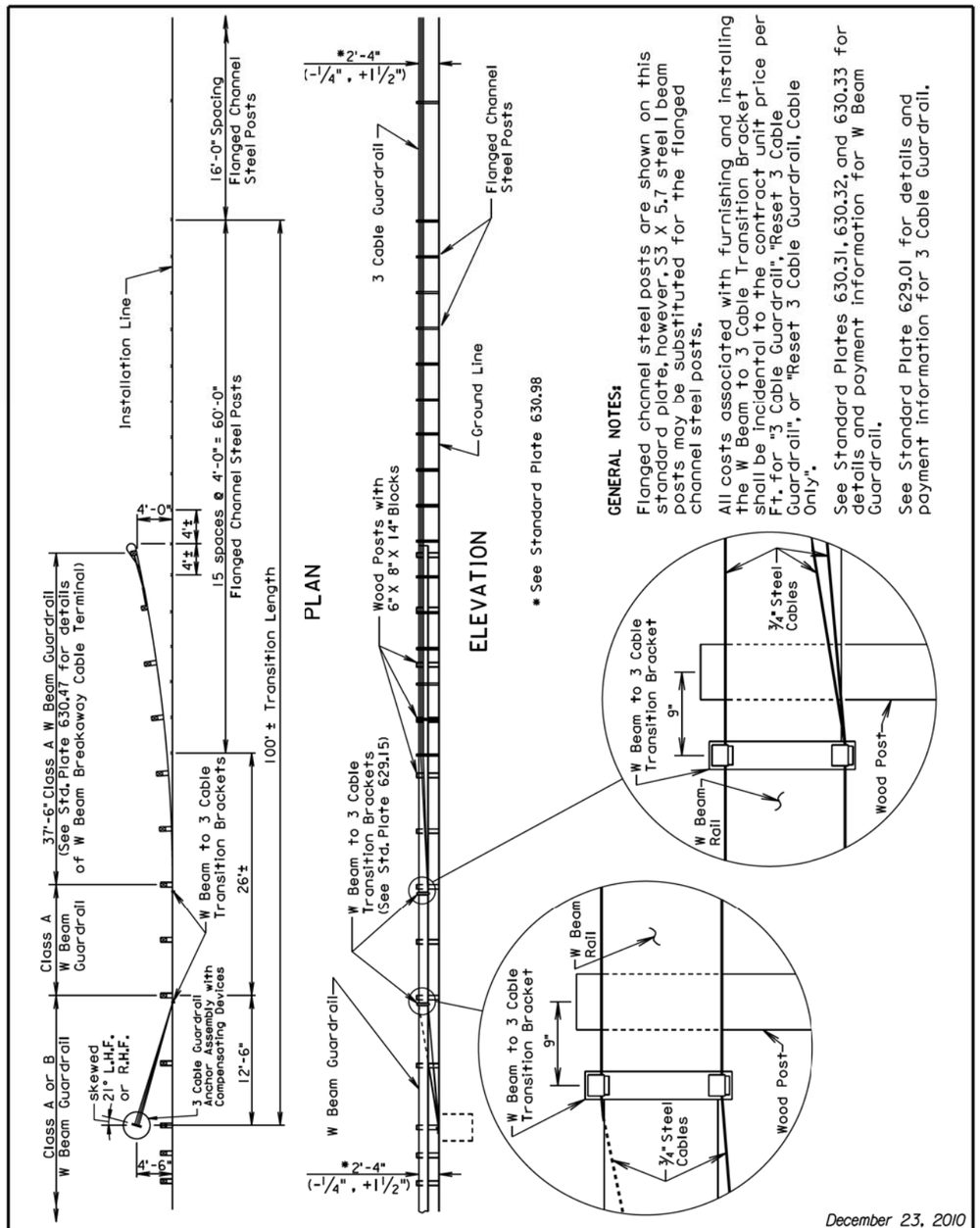
STATE OF SOUTH DAKOTA

PROJECT PH 0013(332), 000P-169 & 000N-169

SHEET 37

TOTAL SHEETS 46

Plotting Date: 07/17/2014



GENERAL NOTES:

Flanged channel steel posts are shown on this standard plate, however, S3 X 5.7 steel I beam posts may be substituted for the flanged channel steel posts.

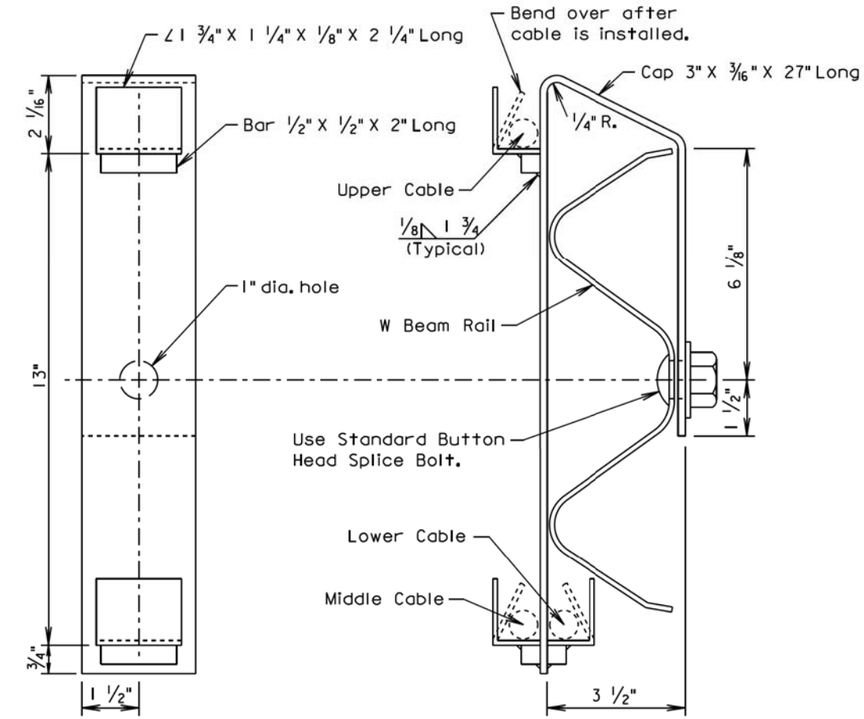
All costs associated with furnishing and installing the W Beam to 3 Cable Transition Bracket shall be incidental to the contract unit price per Ft. for "3 Cable Guardrail", "Reset 3 Cable Guardrail", or "Reset 3 Cable Guardrail, Cable Only".

See Standard Plates 630.31, 630.32, and 630.33 for details and payment information for W Beam Guardrail.

See Standard Plate 629.01 for details and payment information for 3 Cable Guardrail.

December 23, 2010

Published Date: 2nd Qtr. 2014	SDDOT	W BEAM TO 3 CABLE TRANSITION	PLATE NUMBER 629.05 Sheet 1 of 1



ELEVATION
(TRANSITION BRACKET)

END VIEW
(W BEAM RAIL AND TRANSITION BRACKET)

GENERAL NOTES:

Steel used in the fabrication of the bracket shall conform to ASTM A36 and the bracket shall be galvanized after fabrication in accordance with ASTM A123.

March 31, 2000

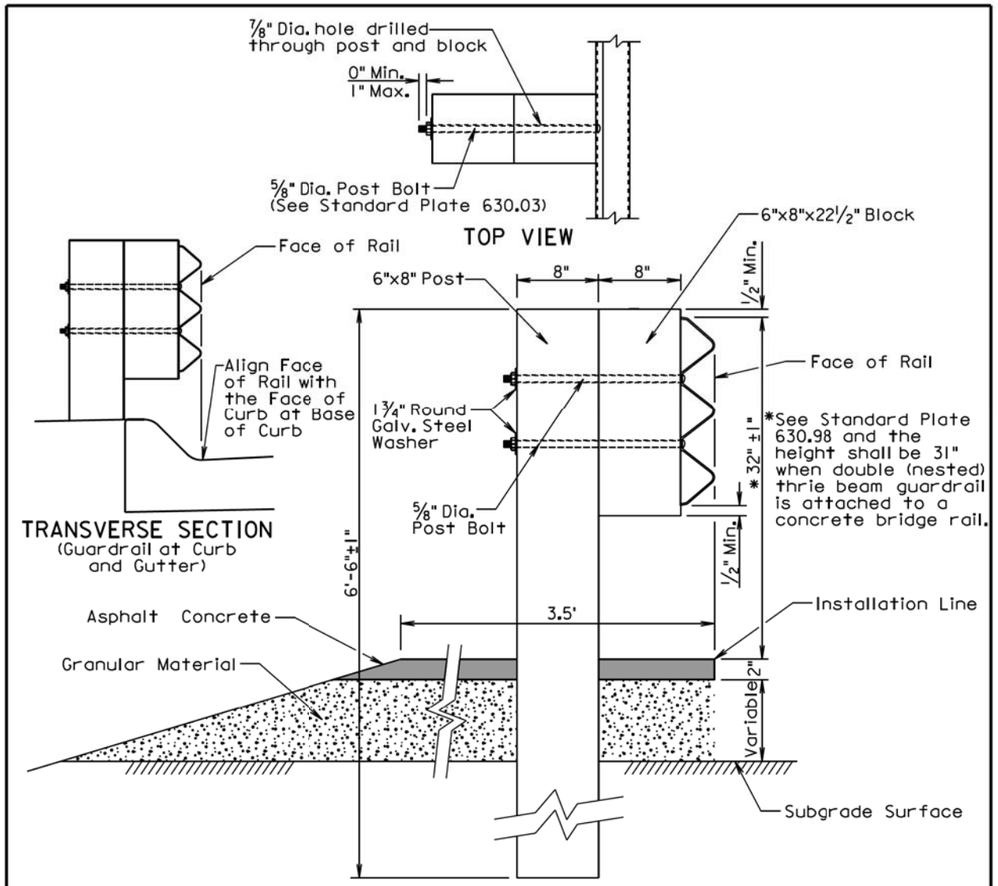
Published Date: 2nd Qtr. 2014	SDDOT	W BEAM TO 3 CABLE TRANSITION BRACKET	PLATE NUMBER 629.15 Sheet 1 of 1

PLOT SCALE - 1:200

PLOT NAME - 7

FILE - ...\62905 & 62915.DGN

PLOTTED FROM - TRAB17882



GENERAL NOTES:

Asphalt concrete shall be the same type used elsewhere on the project or shall be as specified in the plans. If asphalt concrete is not specified in the plans, the asphalt concrete shall conform to the SD Standard Specifications for "Asphalt Concrete Composite." For informational purposes, the Rate of Materials for the 3.5' wide section of asphalt concrete as shown above shall be 4.80 Tons per Station.

Granular material shall be the same type used elsewhere on the project or shall be as specified in the plans. If granular material type is not specified in the plans, the material shall conform to the SD Standard Specifications for "Base Course". The granular material shall be placed the same thickness as the mainline surfacing or as specified in the plans.

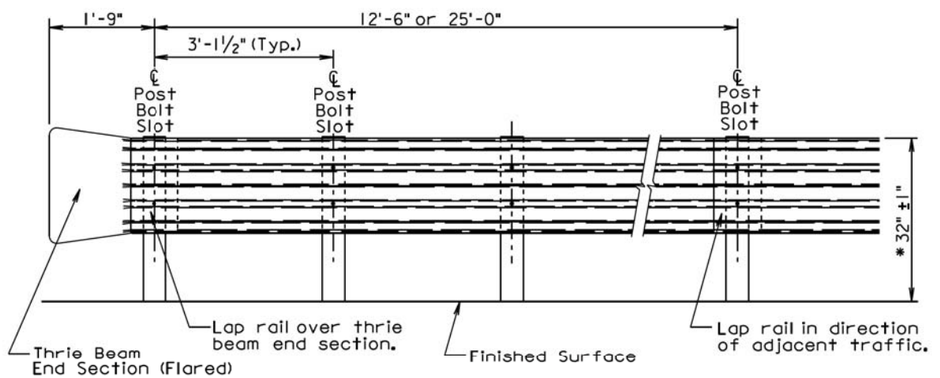
Surfacing and embankment quantities will be paid for separately and will NOT be incidental to the "Thrie Beam Guardrail" bid item.

The cross slope for the surfacing and subgrade surface shall be as specified in the plans (See Typical Sections and/or Cross Sections).

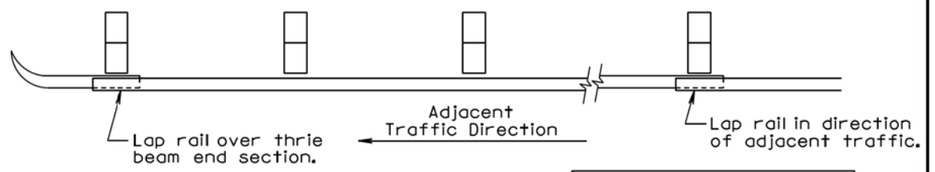
The top of posts and top of block shall have a true square cut. The top of post and top of block shall be flush.

December 23, 2010

Published Date: 2nd Qtr. 2014	SDDOT	***THRIE BEAM GUARDRAIL POST INSTALLATION***	***PLATE NUMBER*** 630.01 *Sheet 1 of 1*



* See Standard Plate 630.98 and the height shall be 31" when double (nested) thrie beam guardrail is attached to a concrete bridge rail.



THRIE BEAM GUARDRAIL DEFLECTION CRITERIA	
POST SPACING	MAXIMUM DEFLECTION
6'-3"	2'-6"
3'-1½"	1'-9"

For Informational Purposes Only

GENERAL NOTES:

All thrie beam rail shall be Type 1.

There will be no separate payment for furnishing and installing Thrie Beam End Sections (Flared) and Thrie Beam Terminal Connectors. All costs for the Thrie Beam End Sections (Flared) and Thrie Beam Terminal Connectors shall be incidental to the contract unit price per foot for the respective "Thrie Beam Guardrail" bid item.

Thrie beam rail section lengths may be 12'-6" and/or 25'-0". The combination of section lengths used shall be compatible with the total length of rail per site as shown in the plans.

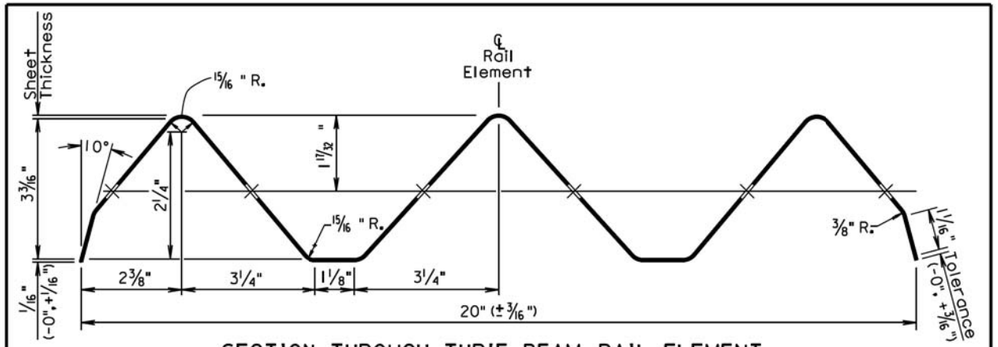
Thrie Beam End Sections (Flared) shall only be used in a one way traffic situation. See Standard Plate 630.80 for Thrie Beam End Section (Flared) in the Beam Guardrail Trailing End Terminal.

All costs for constructing thrie beam guardrail including labor, equipment, and materials including all posts, blocks, steel beam rail, and hardware shall be incidental to the contract unit price per foot for the respective "Thrie Beam Guardrail" bid item.

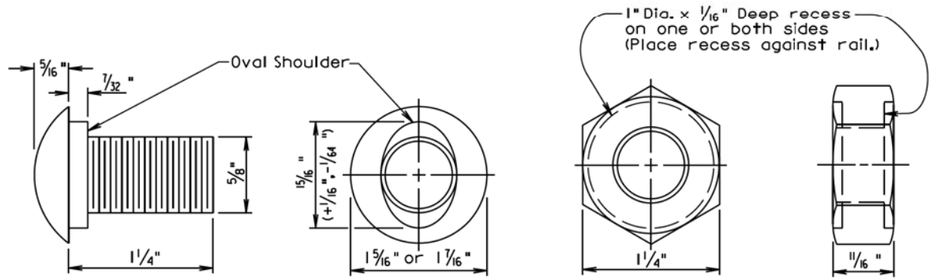
Surfacing and embankment quantities will be paid for separately and will NOT be incidental to the "Thrie Beam Guardrail" bid item.

December 23, 2010

Published Date: 2nd Qtr. 2014	SDDOT	***THRIE BEAM GUARDRAIL INSTALLATION***	***PLATE NUMBER*** 630.02 *Sheet 1 of 1*

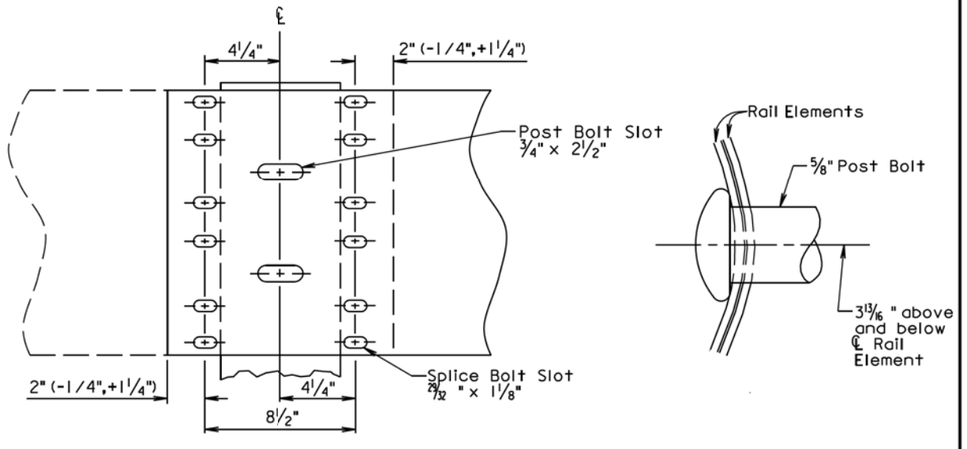


SECTION THROUGH THRIE BEAM RAIL ELEMENT



The Post Bolt is similar except the post bolt is 18" long.

SPLICE BOLT
(5/8" BUTTON HEAD BOLT AND RECESS NUT)

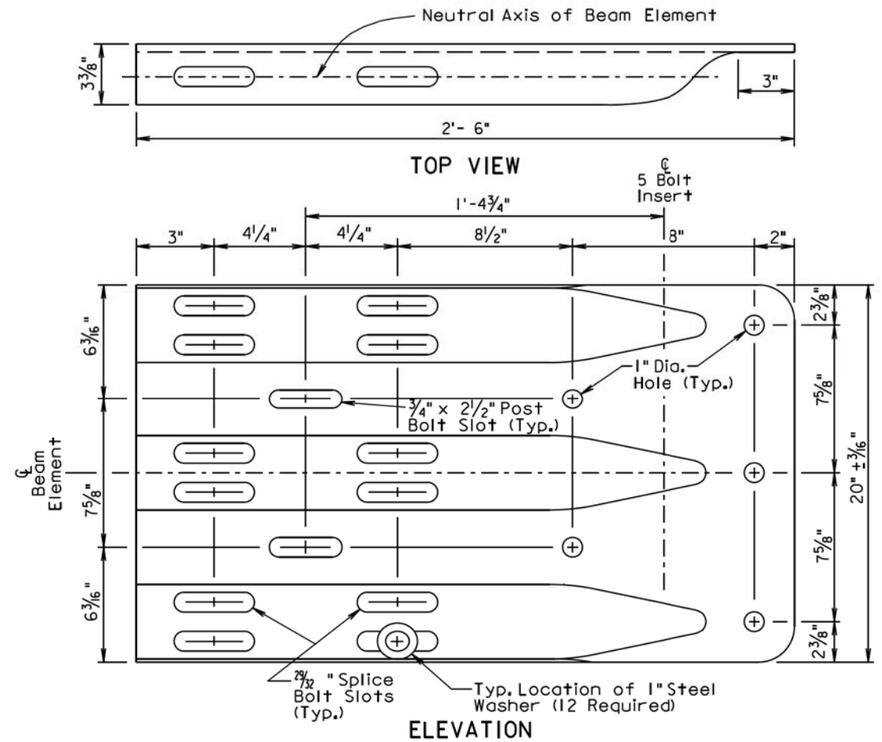


Lap in direction of traffic.

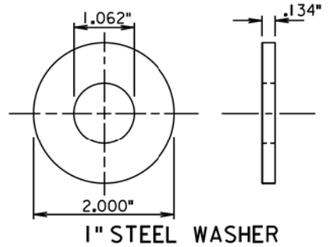
RAIL SPLICE

March 31, 2000

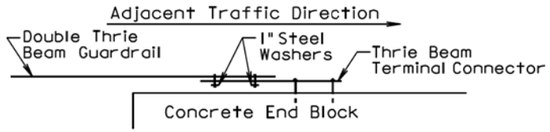
Published Date: 2nd Qtr. 2014	SDDOT	THRIE BEAM RAIL, RAIL SPLICE, AND HARDWARE	PLATE NUMBER 630.03
			Sheet 1 of 1

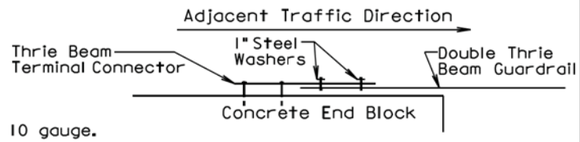


ELEVATION
THRIE BEAM TERMINAL CONNECTOR



1" STEEL WASHER





GENERAL NOTES:

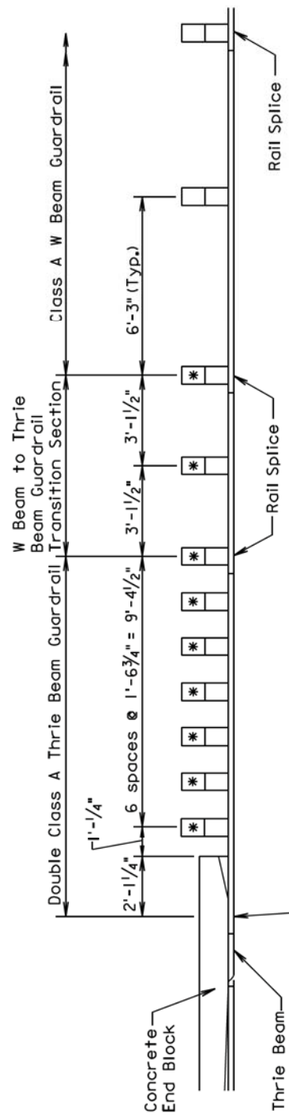
Thrie Beam Terminal Connectors shall be 10 gauge.

When the thrie beam terminal connector is used to connect the rail to the bridge, 1" steel washers shall be used at the lap splice and the washers shall be in direct contact with the 3" slots of the thrie beam terminal connector. See the drawings above for the typical locations of the 1" steel washers.

There will be no separate payment for furnishing and installing the Thrie Beam Terminal Connector. All costs for the Thrie Beam Terminal Connector shall be incidental to the contract unit price per foot for the respective "Thrie Beam Guardrail" bid item.

September 14, 2001

Published Date: 2nd Qtr. 2014	SDDOT	THRIE BEAM TERMINAL CONNECTOR AND 1" STEEL WASHER	PLATE NUMBER 630.05
			Sheet 1 of 1

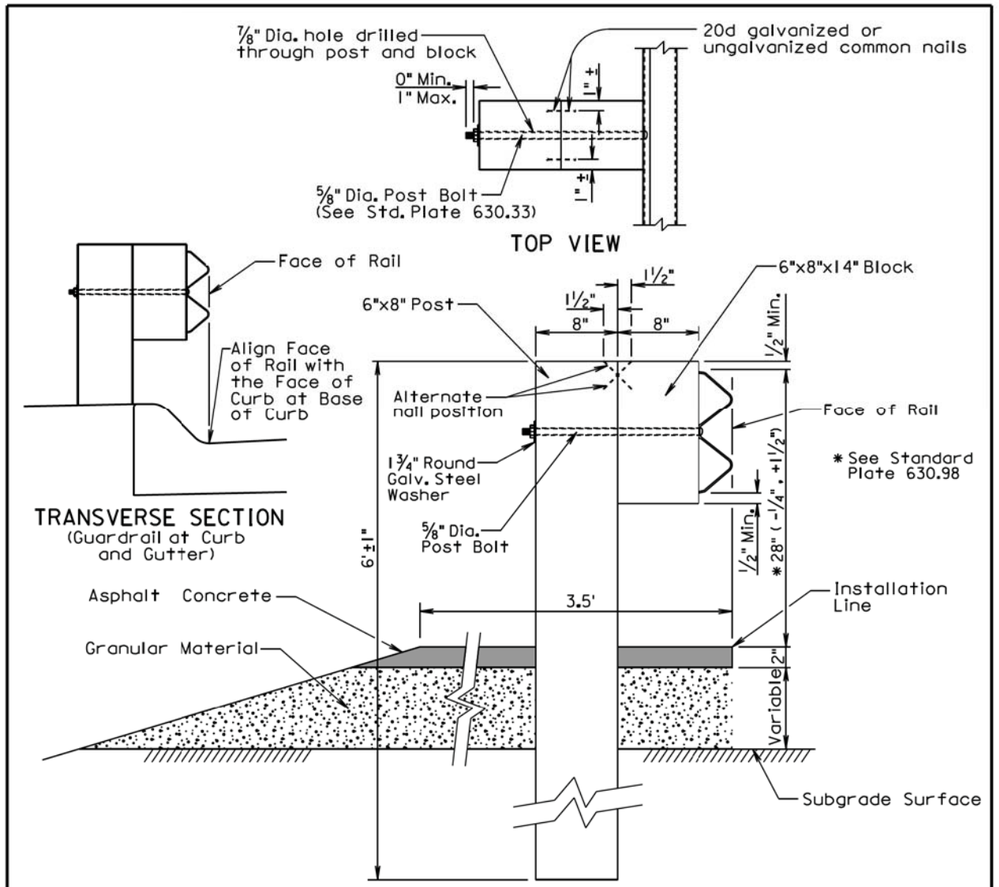


* 6" x 8" x 7' posts shall be used at these locations.

POST SPACING ARRANGEMENT FOR THRIE BEAM GUARDRAIL AT BRIDGE END

December 23, 2002

Published Date: 2nd Qtr. 2014	SDDOT	POST SPACING ARRANGEMENT FOR THRIE BEAM GUARDRAIL AT BRIDGE END	PLATE NUMBER 630.15 Sheet 1 of 1



GENERAL NOTES:

Asphalt concrete shall be the same type used elsewhere on the project or shall be as specified in the plans. If asphalt concrete is not specified in the plans, the asphalt concrete shall conform to the SD Standard Specifications for "Asphalt Concrete Composite." For informational purposes, the Rate of Materials for the 3.5' wide section of asphalt concrete as shown above shall be 4.80 Tons per Station.

Granular material shall be the same type used elsewhere on the project or shall be as specified in the plans. If granular material type is not specified in the plans, the material shall conform to the SD Standard Specifications for "Base Course". The granular material shall be placed the same thickness as the mainline surfacing or as specified in the plans.

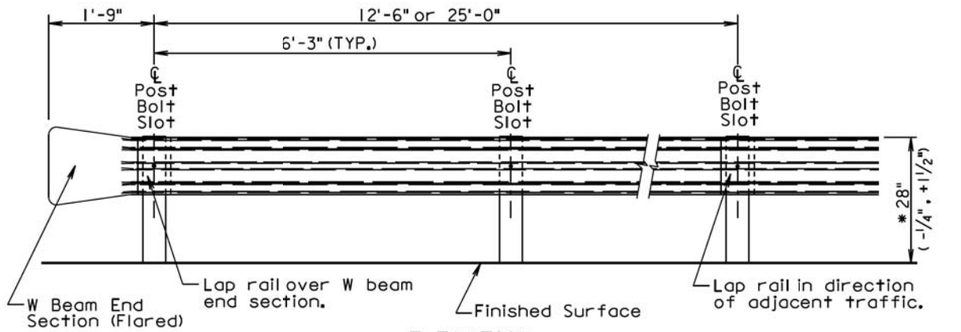
Surfacing and embankment quantities will be paid for separately and will NOT be incidental to the "W Beam Guardrail" bid item.

The cross slope for the surfacing and subgrade surface shall be as specified in the plans (See Typical Sections and/or Cross Sections).

The top of posts and top of block shall have a true square cut. The top of post and top of block shall be flush.

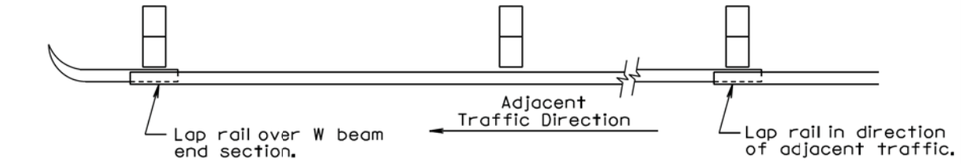
December 23, 2010

Published Date: 2nd Qtr. 2014	SDDOT	W BEAM GUARDRAIL POST INSTALLATION	PLATE NUMBER 630.31 Sheet 1 of 1



ELEVATION

*See Standard Plate 630.98



PLAN

W BEAM GUARDRAIL DEFLECTION CRITERIA	
POST SPACING	MAXIMUM DEFLECTION
6'-3"	3'-3"
3'-1 1/2"	2'-0"

For Informational Purposes Only

GENERAL NOTES:

All W beam rail shall be Type I.

There will be no separate payment for furnishing and installing W Beam End Sections (Flared) and W Beam Terminal Connectors. All costs for the W Beam End Sections (Flared) and W Beam Terminal Connectors shall be incidental to the contract unit price per foot for the respective "W Beam Guardrail" bid item.

W beam rail section lengths may be 12'-6" and/or 25'-0". The combination of section lengths used shall be compatible with the total length of rail per site as shown in the plans.

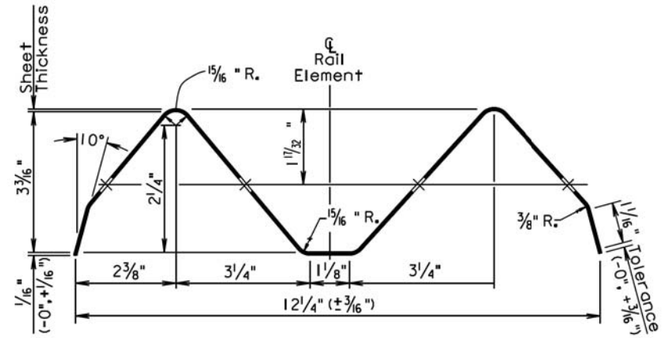
W Beam End Sections (Flared) shall only be used in a one way traffic situation. See Standard Plate 630.80 for W Beam End Section (Flared) in the Beam Guardrail Trailing End Terminal.

All costs for constructing W beam guardrail including labor, equipment, and materials including all posts, blocks, steel beam rail, and hardware shall be incidental to the contract unit price per foot for the respective "W Beam Guardrail" bid item.

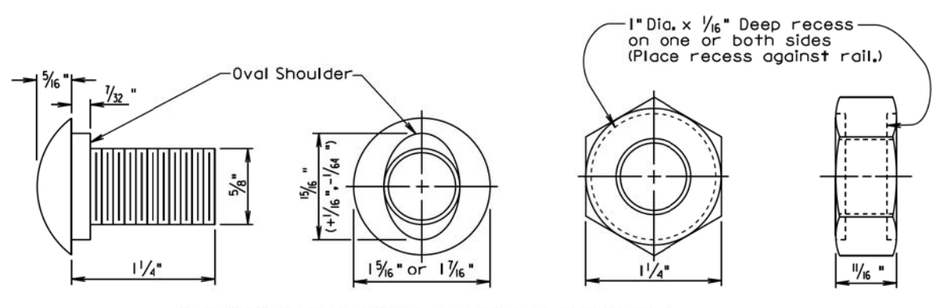
Surfacing and embankment quantities will be paid for separately and will NOT be incidental to the "W Beam Guardrail" bid item.

December 23, 2010

Published Date: 2nd Qtr. 2014	SDDOT	W BEAM GUARDRAIL INSTALLATION	PLATE NUMBER 630.32
			Sheet 1 of 1

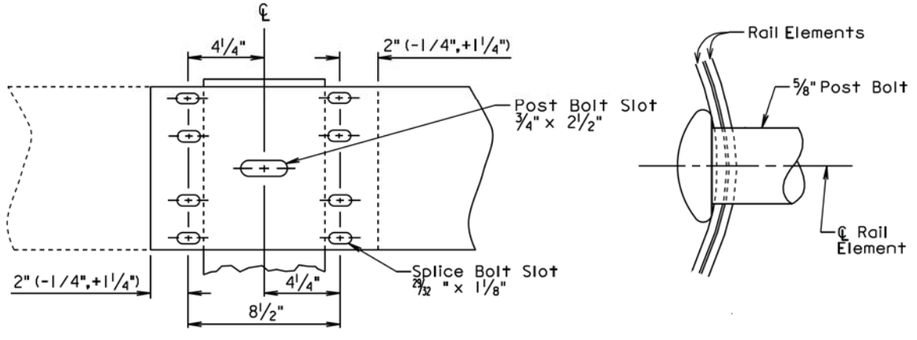


SECTION THROUGH W BEAM RAIL ELEMENT



The Post Bolt is similar except the post bolt is 18" long.

SPLICE BOLT
(5/8" BUTTON HEAD BOLT AND RECESS NUT)



Lap in direction of traffic.

RAIL SPLICE

December 23, 2004

Published Date: 2nd Qtr. 2014	SDDOT	W BEAM RAIL, RAIL SPLICE, AND HARDWARE	PLATE NUMBER 630.33
			Sheet 1 of 1

Published Date: 2nd Qtr. 2014

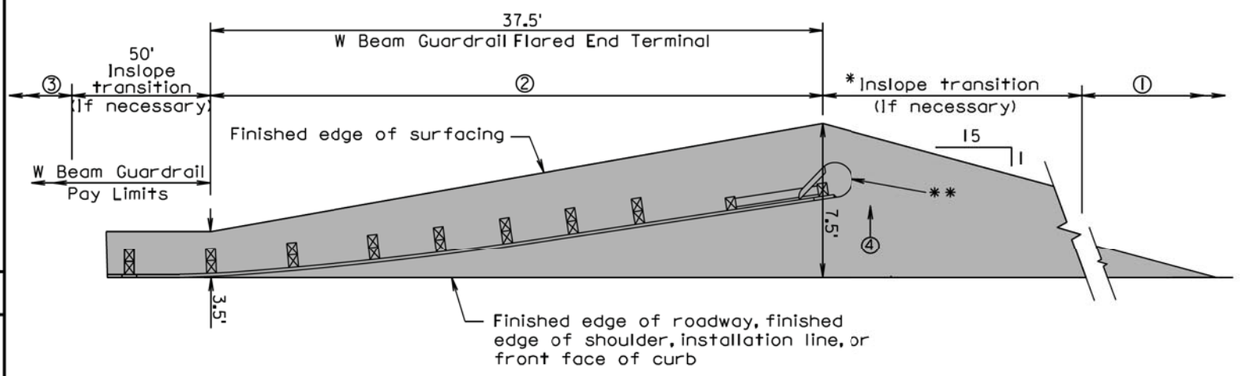
SDDOT

EMBANKMENT AND SURFACING FOR W BEAM GUARDRAIL FLARED END TERMINAL

PLATE NUMBER 630.45

Sheet 1 of 1

September 6, 2009



PLAN

2" Asphalt concrete surfacing with variable thickness granular material

① Same inslope as mainline inslope

② 4:1 inslope

③ 2:1 inslope or flatter, or inslope as specified in plans

④ Same slope as roadway cross slope

* The length of inslope transition varies with the amount of change between inslopes. The length of the transition shall change 100' for every whole number change in the inslope. For Example: If the inslope changes from a 5:1 to a 4:1 the length of the inslope transition would be 100'. If the inslope changes from a 6:1 to a 4:1 the length of the inslope transition would be 200'.

GENERAL NOTES:

The W beam guardrail flared end terminal shall be installed according to the manufacturer's installation instructions.

** An adhesive object marker shall be placed on the end section buffer or extruder after placement of the end section buffer or extruder. The adhesive object marker dimensions may be 16" x 16" or other variation due to the shape of the end section buffer or extruder. A minimum of 256 square inches of object marker reflective sheeting area is required. The reflective sheeting shall be fluorescent yellow super or very high intensity. All costs for furnishing and installing the adhesive object marker shall be incidental to various contract items.

Asphalt concrete shall be the same type used elsewhere on the project or shall be as specified in the plans. If asphalt concrete is not specified in the plans, the asphalt concrete shall conform to the SD Standard Specifications for "Asphalt Concrete Composite."

Granular material shall be the same type used elsewhere on the project or shall be as specified in the plans. If granular material type is not specified in the plans, the material shall conform to the SD Standard Specifications for "Base Course". The granular material shall be placed the same thickness as the mainline surfacing or as specified in the plans.

Published Date: 2nd Qtr. 2014

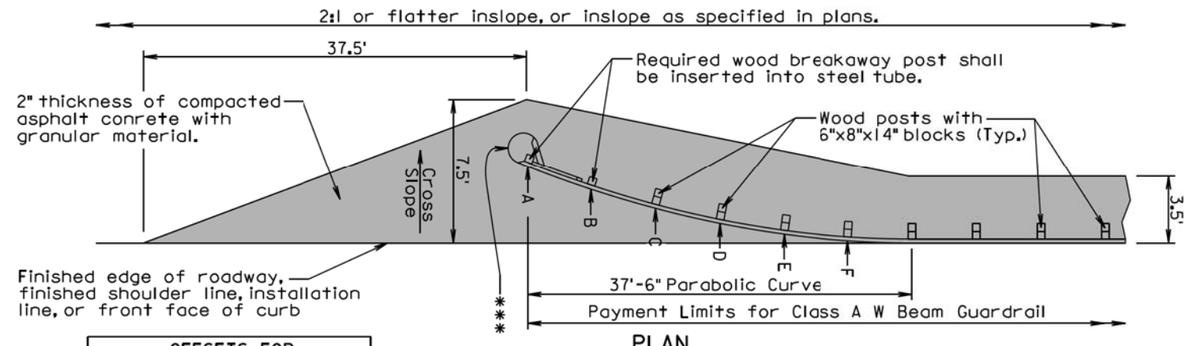
SDDOT

W BEAM GUARDRAIL BREAKAWAY CABLE TERMINAL

PLATE NUMBER 630.47

Sheet 1 of 3

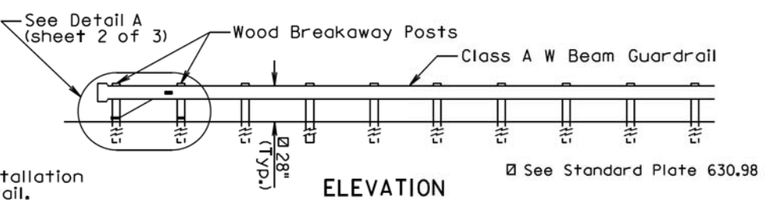
June 26, 2010



PLAN

OFFSETS FOR BREAKAWAY CABLE TERMINAL	
POST	OFFSET
A	4.00'
B	2.79'
C	1.79'
D	1.01'
E	0.45'
F	0.11'

Offsets shall be measured from the installation line to the face of the W beam guardrail.



ELEVATION

Ø See Standard Plate 630.98

GENERAL NOTES:

The finished embankment surfacing cross slope shall match the roadway cross slope; however, if a steeper cross slope is necessary the steepest allowable cross slope is 10:1.

Asphalt concrete shall be the same type used elsewhere on the project or shall be as specified in the plans. If asphalt concrete is not specified in the plans, the asphalt concrete shall conform to the SD Standard Specifications for "Asphalt Concrete Composite."

Granular material shall be the same type used elsewhere on the project or shall be as specified in the plans. If granular material type is not specified in the plans, the material shall conform to the SD Standard Specifications for "Base Course". The granular material shall be placed the same thickness as the mainline surfacing or as specified in the plans.

*** An adhesive object marker shall be placed on the end section buffer after placement of the end section buffer. The adhesive object marker dimensions may be 16" x 16" or other variation due to the shape of the end section buffer. A minimum of 256 square inches of object marker reflective sheeting area is required. The reflective sheeting shall be fluorescent yellow super or very high intensity. All costs for furnishing and installing the adhesive object marker shall be incidental to various contract items.

Costs for constructing the W Beam Guardrail Breakaway Cable Terminal including labor, equipment, and materials including the anchor bracket, cable assembly, steel tubes, soil plates, bearing plate, pipe sleeve, W beam end section(buffer), modified W beam terminal connector, and all necessary hardware shall be incidental to the contract unit price per each for "W Beam Guardrail Breakaway Cable Terminal".

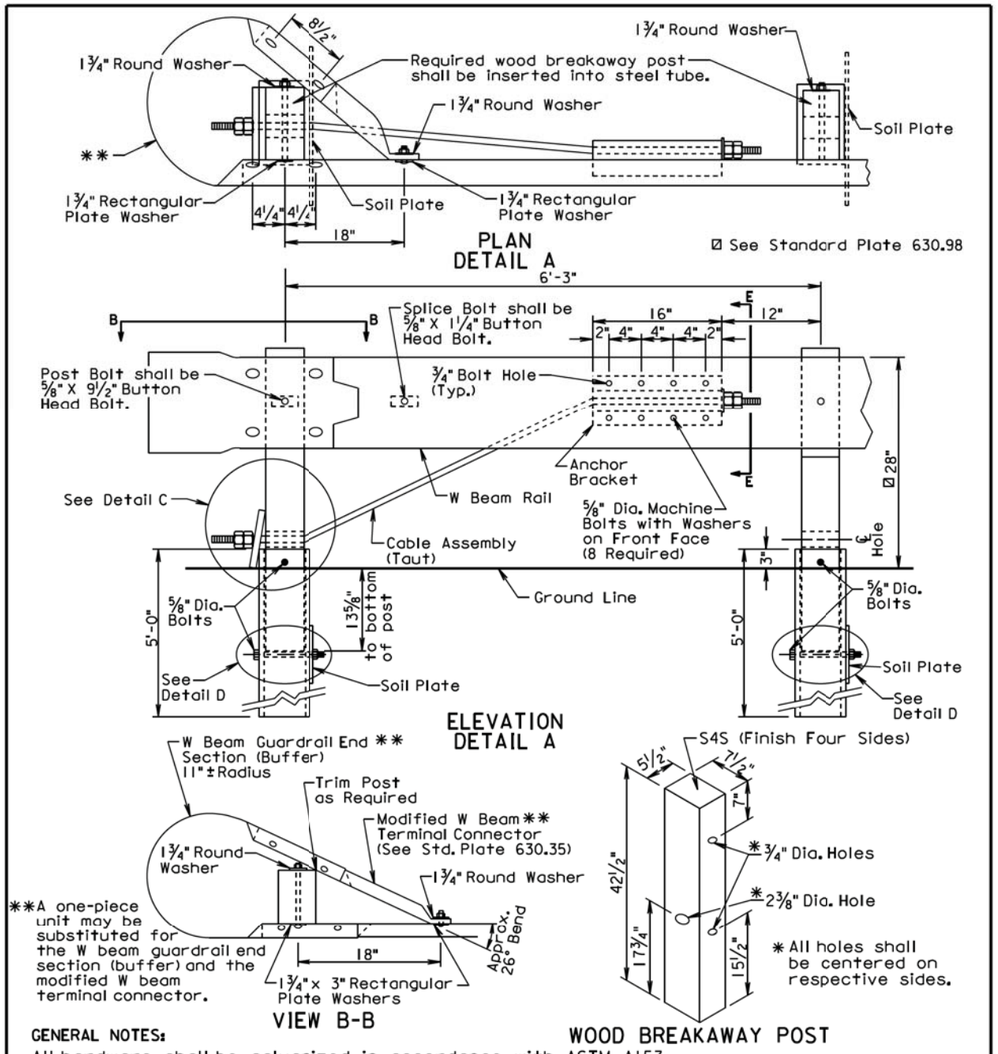
STATE OF SOUTH DAKOTA

PROJECT PH 0013(332), 000P-169 & 000N-169

SHEET 43

TOTAL SHEETS 46

Plotting Date: 07/17/2014



GENERAL NOTES:

All hardware shall be galvanized in accordance with ASTM A153.

The steel tubes shall meet the requirements of ASTM Specification A500, Grade B, and shall be galvanized after fabrication in accordance with the requirements of AASHTO Specification M111.

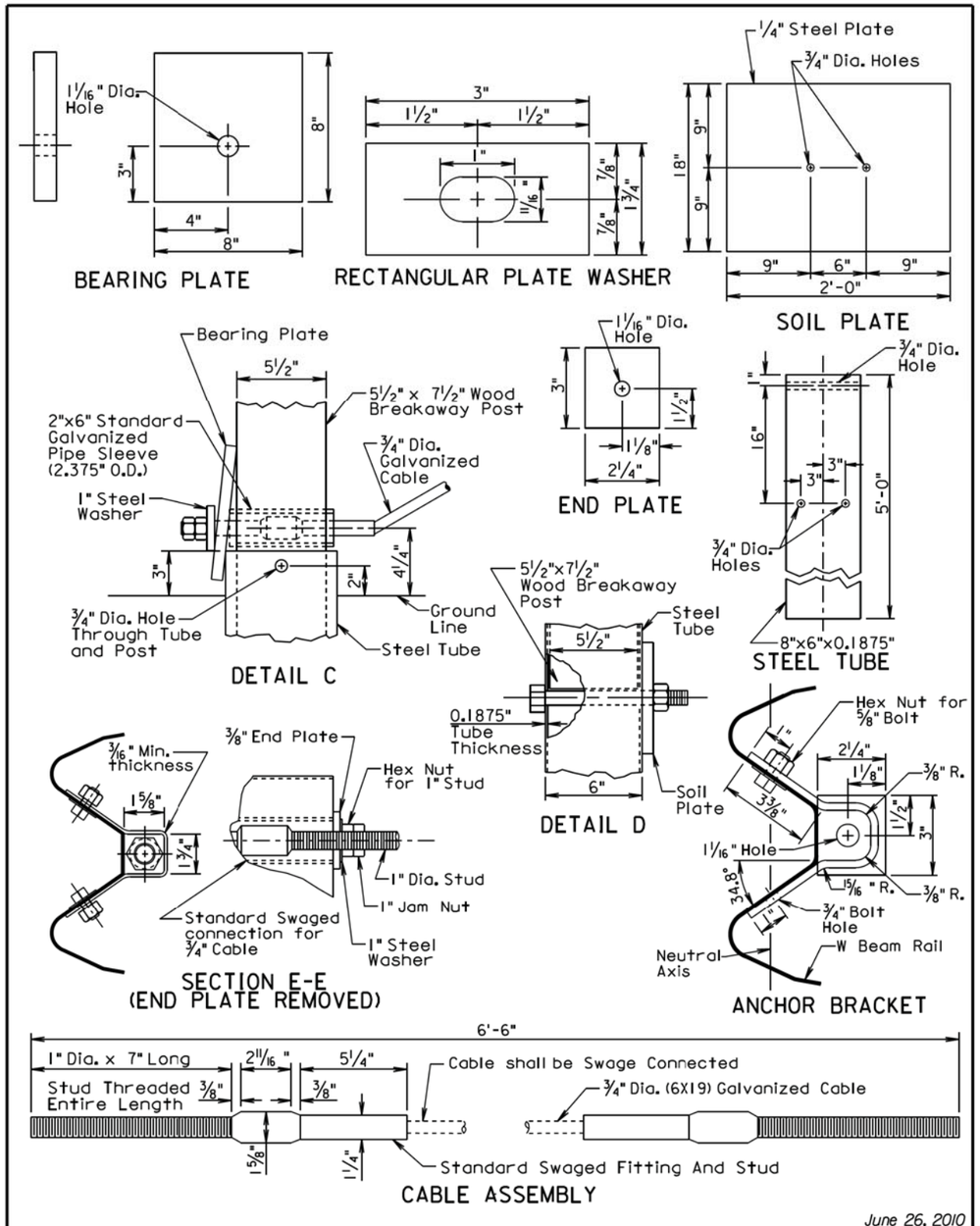
The anchor bracket, soil plate, and bearing plate shall be fabricated from steel that meets ASTM A36 Specifications. They shall be galvanized after fabrication in accordance with ASTM A123.

The W Beam End Section (Buffer) shall be 12 gage galvanized steel.

The cable shall be ¾", Type II, with Class A coating in conformance with AASHTO M30.

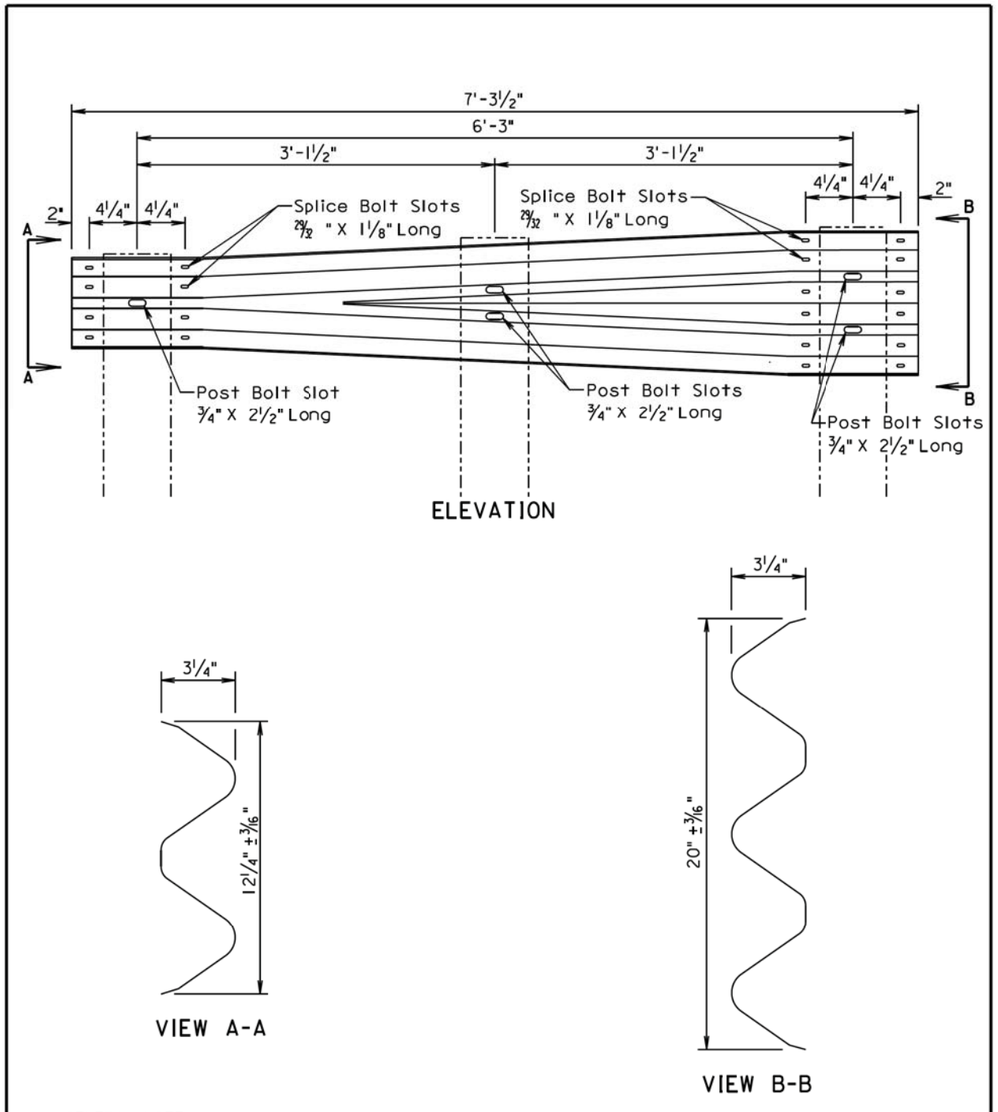
June 26, 2010

Published Date: 2nd Qtr. 2014	SDDOT	W BEAM GUARDRAIL BREAKAWAY CABLE TERMINAL	PLATE NUMBER 630.47
			Sheet 2 of 3



June 26, 2010

Published Date: 2nd Qtr. 2014	SDDOT	W BEAM GUARDRAIL BREAKAWAY CABLE TERMINAL	PLATE NUMBER 630.47
			Sheet 3 of 3

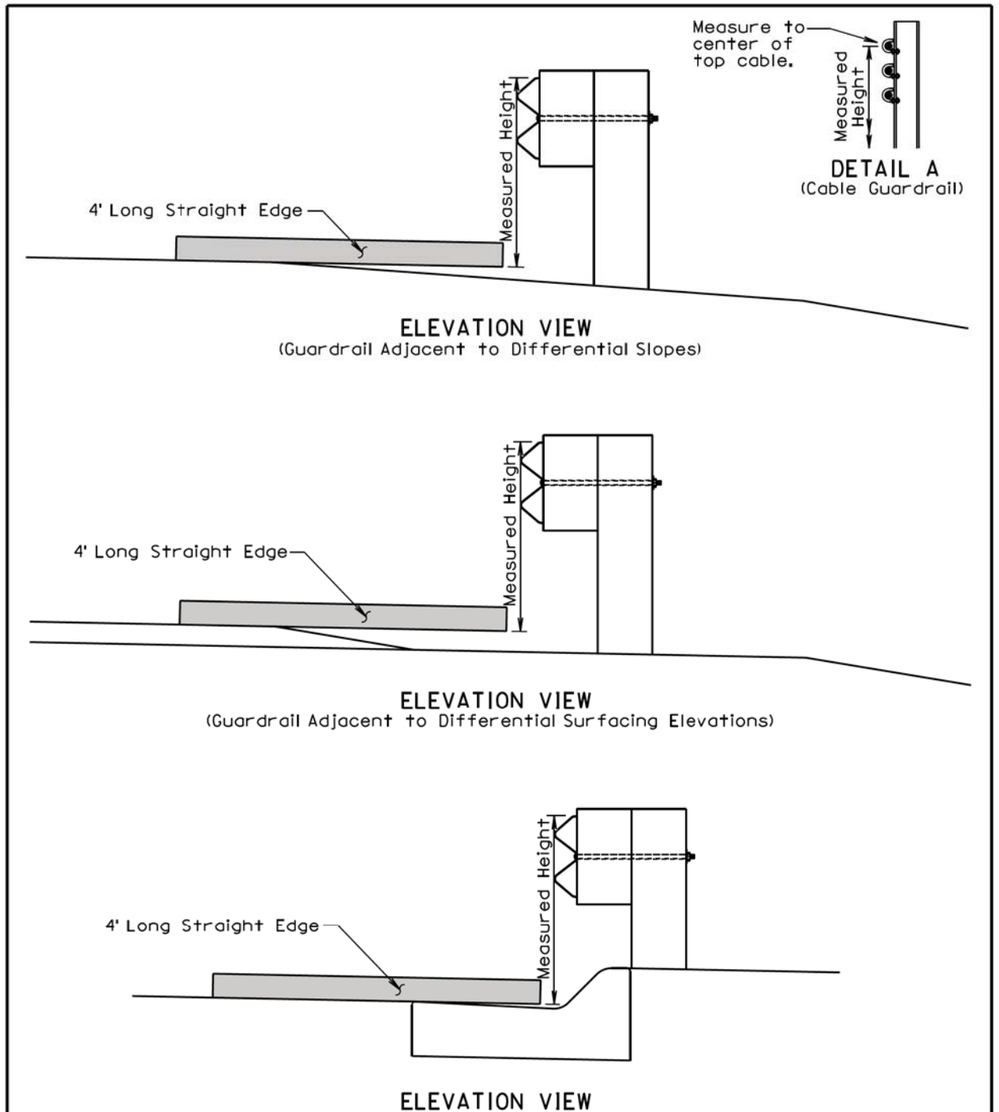


GENERAL NOTE:

All costs for constructing the W Beam to Thrie Beam Guardrail Transition including labor, equipment, and materials including two posts, two blocks, W beam to thrie beam transition section, and hardware shall be incidental to the contract unit price per each for "W Beam to Thrie Beam Guardrail Transition".

March 31, 2000

Published Date: 2nd Qtr. 2014	SDDOT	W BEAM TO THRIE BEAM GUARDRAIL TRANSITION SECTION	PLATE NUMBER 630.82
			Sheet 1 of 1



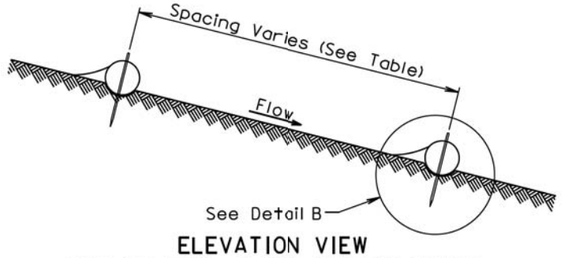
GENERAL NOTES:

The W Beam guardrail shown is for illustrative purpose. The guardrail height for all types of guardrail systems shall be measured in accordance with this standard plate.

When measuring height of cable guardrail or cable barrier the height shall be measured to the center of the top cable. See Detail A.

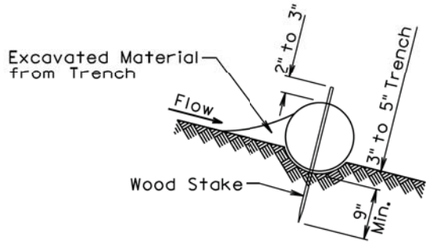
June 26, 2010

Published Date: 2nd Qtr. 2014	SDDOT	MEASURING GUARDRAIL HEIGHT	PLATE NUMBER 630.98
			Sheet 1 of 1

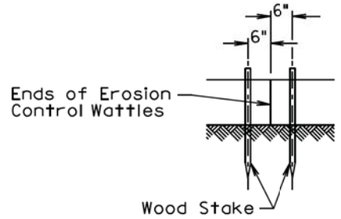


ELEVATION VIEW
CUT OR FILL SLOPE INSTALLATION

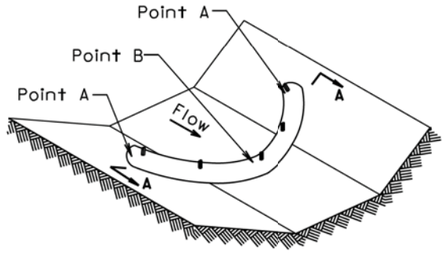
CUT OR FILL SLOPE INSTALLATION	
Slope	Spacing (Ft)
1:1	10
2:1	20
3:1	30
4:1	40



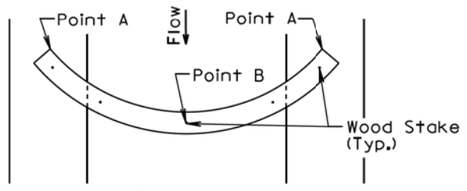
DETAIL B
(TYPICAL OF ALL INSTALLATIONS)



DETAIL C

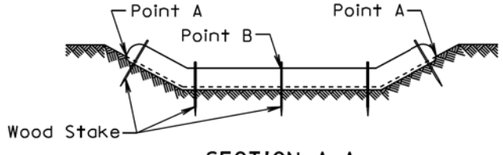


ISOMETRIC VIEW
DITCH INSTALLATION



PLAN VIEW
DITCH INSTALLATION

DITCH INSTALLATION	
Grade	Spacing (Ft)
2%	150
3%	100
4%	75
5%	50



SECTION A-A

December 23, 2004

Published Date: 2nd Qtr. 2014	SDDOT	EROSION CONTROL WATTLE	PLATE NUMBER 734.06
			Sheet 1 of 2

GENERAL NOTES:

At cut or fill slope installations, wattles shall be installed along the contour and perpendicular to the water flow.

At ditch installations, point A must be higher than point B to ensure that water flows over the wattle and not around the ends.

The Contractor shall dig a 3" to 5" trench, install the wattle tightly in the trench so that daylight can not be seen under the wattle, and then compact the soil excavated from the trench against the wattle on the uphill side. See Detail B.

The stakes shall be 1"x2" or 2"x2" wood stakes, however, other types of stakes such as rebar may be used only if approved by the Engineer. The stakes shall be placed 6" from the ends of the wattles and the spacing of the stakes along the wattles shall be 3' to 4'.

Where installing running lengths of wattles, the Contractor shall butt the second wattle tightly against the first and shall not overlap the ends. See Detail C.

The Contractor and Engineer shall inspect the erosion control wattles once every week and within 24 hours after every rainfall event greater than ½". The Contractor shall remove, dispose, or reshape the accumulated sediment when necessary as determined by the Engineer.

Sediment removal, disposal, or necessary shaping shall be as directed by the Engineer. All costs for removing accumulated sediment, disposal of sediment, and necessary shaping shall be incidental to the contract unit price per cubic yard for "Remove Sediment".

All costs for furnishing and installing the erosion control wattles including labor, equipment, and materials shall be incidental to the contract unit price per foot for the corresponding erosion control wattle bid item.

All costs for removing the erosion control wattle from the project including labor, equipment, and materials shall be incidental to the contract unit price per foot for "Remove Erosion Control Wattle".

December 23, 2004

Published Date: 2nd Qtr. 2014	SDDOT	EROSION CONTROL WATTLE	PLATE NUMBER 734.06
			Sheet 2 of 2