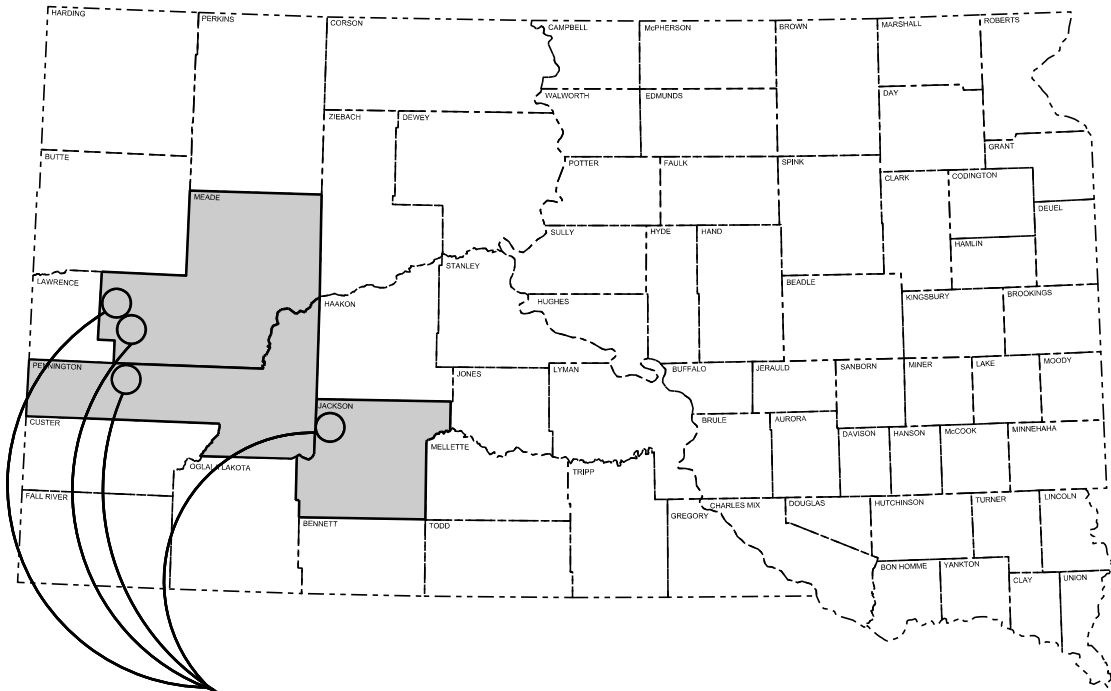


Plot Scale - 1:200

trc12808

Plotted From -



PROJECTS

DESIGN DESIGNATION PCN i4cm

ADT (2015)	7385
ADT (2035)	10381
DHV	1424
D	51%
T DHV	7.1%
T ADT	15.5%
V	75 mph

DESIGN DESIGNATION PCN i4cn

ADT (2015)	9045
ADT (2035)	11460
DHV	1570
D	51%
T DHV	6.6%
T ADT	14.4%
V	75 mph

DESIGN DESIGNATION PCN i4dj MRM 63.090 - 63.710

ADT (2015)	13610
ADT (2035)	17571
DHV	1916
D	51%
T DHV	4.8%
T ADT	10.6%
V	75 mph

DESIGN DESIGNATION PCN i4cp MRM 125.47 - 125.53

ADT (2015)	13610
ADT (2035)	17571
DHV	1915
D	51%
T DHV	4.8%
T ADT	10.6%
V	80 mph

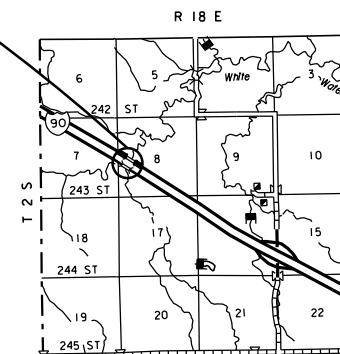
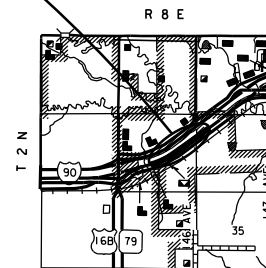
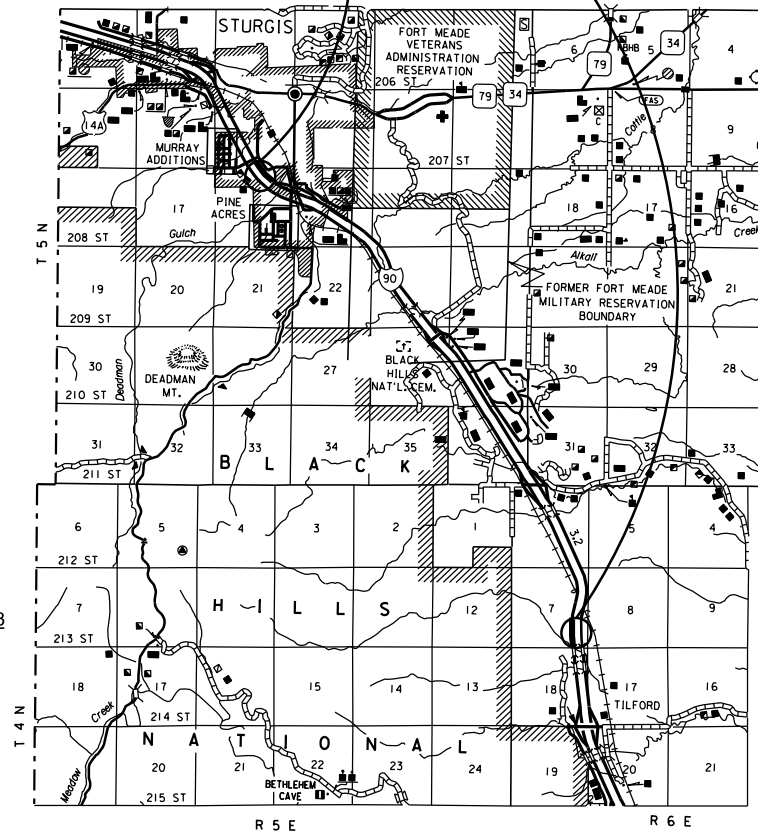
STORM WATER PERMIT
None Required

I90 WB MRM 31.474 - 31.476

I90 EB MRM 39.320 - 39.330

I90 WB MRM 125.47 - 125.53

I90 EB MRM 63.090 - 63.710



STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED
**PROJECT 090W-451,
090E-451, 090E-452,
& 090W-452**
INTERSTATE 90
**MEADE, PENNINGTON,
AND JACKSON**
COUNTIES
CONCRETE REPAIR & DIAMOND GRINDING
PCN i4cm, i4cn, i4dj, & i4cp

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090W-451, etc.	1	25

Plotting Date: 05/10/2016

INDEX OF SHEETS

Sheet No.	1:	Title and Index
Sheets No	2 - 9:	Plans Estimate, Notes, & Tables
Sheets No	10 - 13:	Special Details
Sheets No	14 - 25:	Standard Plates

File - ...title.dgn

ESTIMATE OF QUANTITIES

PCN i4cm I90 WB 31.474 - 31.476

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
380E5030	Nonreinforced PCC Pavement Repair	31.1	SqYd
380E6110	Insert Steel Bar in PCC Pavement	32	Each
633E0010	Cold Applied Plastic Pavement Marking, 4"	10	Ft
633E1400	Pavement Marking Paint, 4" White	20	Ft
633E5000	Grooving for Cold Applied Plastic Pavement Marking, 4"	10	Ft
634E0010	Flagging	40.0	Hour
634E0110	Traffic Control Signs	220.0	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0285	Type 3 Barricade, 8' Double Sided	2	Each
634E0420	Type C Advance Warning Arrow Board	1	Each

PCN i4cn I90 EB MRM 39.320 - 39.330

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
380E5030	Nonreinforced PCC Pavement Repair	146.7	SqYd
380E6000	Dowel Bar	36	Each
380E6110	Insert Steel Bar in PCC Pavement	88	Each
633E0010	Cold Applied Plastic Pavement Marking, 4"	20	Ft
633E1400	Pavement Marking Paint, 4" White	60	Ft
633E1405	Pavement Marking Paint, 4" Yellow	60	Ft
633E5000	Grooving for Cold Applied Plastic Pavement Marking, 4"	20	Ft
634E0010	Flagging	40.0	Hour
634E0110	Traffic Control Signs	220.0	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0285	Type 3 Barricade, 8' Double Sided	2	Each
634E0420	Type C Advance Warning Arrow Board	1	Each

PCN i4dj I90 EB MRM 63.090 – 63.710

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
380E5030	Nonreinforced PCC Pavement Repair	115.6	SqYd
380E6110	Insert Steel Bar in PCC Pavement	64	Each
633E0010	Cold Applied Plastic Pavement Marking, 4"	20	Ft
633E1400	Pavement Marking Paint, 4" White	40	Ft
633E1405	Pavement Marking Paint, 4" Yellow	40	Ft
633E5000	Grooving for Cold Applied Plastic Pavement Marking, 4"	20	Ft
634E0010	Flagging	40.0	Hour
634E0110	Traffic Control Signs	220.0	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0285	Type 3 Barricade, 8' Double Sided	2	Each
634E0420	Type C Advance Warning Arrow Board	1	Each

PCN i4cp I90 WB MRM 125.47 – 125.53

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
110E6200	Remove Double Thrie Beam Guardrail for Reset	25.0	Ft
110E6230	Remove W Beam Guardrail for Reset	125.0	Ft
110E6240	Remove W Beam to Thrie Beam Guardrail Transition for Reset	2	Each
110E6260	Remove W Beam Guardrail Breakaway Cable Terminal for Reset	2	Each
380E5030	Nonreinforced PCC Pavement Repair	84.4	SqYd
380E6110	Insert Steel Bar in PCC Pavement	28	Each
380E6510	Grinding PCC Pavement	985.6	SqYd
410E2600	Membrane Sealant Expansion Joint	40.0	Ft
630E5110	Reset Double Thrie Beam Guardrail with Wood Posts	25.0	Ft
630E5140	Reset W Beam Guardrail with Wood Posts	125.0	Ft
630E5180	Reset W Beam Guardrail Breakaway Cable Terminal	2	Each
630E5190	Reset W Beam to Thrie Beam Guardrail Transition	2	Each
633E0010	Cold Applied Plastic Pavement Marking, 4"	100	Ft
633E1400	Pavement Marking Paint, 4" White	400	Ft
633E1405	Pavement Marking Paint, 4" Yellow	400	Ft
633E5000	Grooving for Cold Applied Plastic Pavement Marking, 4"	100	Ft
634E0010	Flagging	40.0	Hour
634E0110	Traffic Control Signs	220.0	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0285	Type 3 Barricade, 8' Double Sided	2	Each
634E0420	Type C Advance Warning Arrow Board	1	Each

SPECIFICATIONS

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

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090W-451, etc.	2	25

SEQUENCE OF OPERATIONS

1. Set up traffic control.
2. Repair PCC Pavement.
3. Install Temporary Pavement Marking.
4. Switch traffic control to close adjacent lane.
5. Repair PCC Pavement.
6. Install Temporary Pavement Marking.
7. Install Permanent Pavement Marking.
8. Remove traffic control.

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 H: WASTE DISPOSAL SITE

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

Action Taken/Required:

Construction and/or demolition debris may not be disposed of within the Public ROW.

The waste disposal site(s) shall be managed and reclaimed in accordance with the following from the General Permit for Construction/Demolition Debris Disposal Under the South Dakota Waste Management Program issued by the Department of Environment and Natural Resources.

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

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

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 Public ROW shall be seeded in accordance with Natural Resources Conservation Service recommendations. The seeding recommendations may be obtained through the appropriate County NRCS Office. The Contractor shall control the access to waste disposal sites not within the Public ROW through the use of fences, gates, and placement of a sign or signs at the entrance to the site stating "No Dumping Allowed".
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 department designated sources and designated option material sources, stockpile sites, storage areas, and waste sites provided within the plans.

Action Taken/Required:

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

The Contractor shall arrange and pay for a cultural resource survey and/or records search. The Contractor has the option to contact the state Archaeological Research Center (ARC) at 605-394-1936 or another qualified archaeologist, to obtain either a records search or a cultural resources survey. A record search might be sufficient for review; however, a cultural resources survey may need to be conducted by a qualified archaeologist.

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

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

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

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

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090W-451, etc.	3	25

RESTORATION OF GRAVEL CUSHION

An inspection of the gravel cushion subgrade shall be made after removing concrete from each pavement replacement area. Areas of excess moisture shall be dried to the satisfaction of the Engineer. Loose and excess material shall be removed. Each replacement area shall be leveled and compacted to the satisfaction of the Engineer.

If additional gravel cushion material is required, the Contractor shall furnish, place and compact gravel cushion to the satisfaction of the Engineer.

All costs associated with this work shall be incidental to the contract unit price per square yard for Nonreinforced PCC Pavement Repair.

EXISTING PCC PAVEMENT

The existing pavement from I-90, WB Driving Lane MRM 31.474 is 11.5" Nonreinforced PCC Pavement with limestone aggregate. The longitudinal steel is a #5 deformed steel bar spaced 48" center to center. The transverse steel is 1 ¼" steel dowel bars spaced 12" center to center.

The existing pavement for I-90, Eastbound Driving and Passing Lanes is 9" Nonreinforced PCC Pavement The longitudinal steel is a #5 deformed steel bar spaced 16" center to center. The transverse steel is 1 ¼" steel dowel bars spaced 12" center to center.

The existing pavement for I-90, WB MRM 125.0 is 10.5" Nonreinforced PCC Pavement with limestone aggregate. The longitudinal and transverse steel is 1 ¼" steel dowel bars spaced 12" center to center.

The existing pavement from I-90, EB MRM MRM 63.090 - 63.710 is 11" Nonreinforced PCC Pavement with limestone aggregate. The longitudinal steel is a #5 deformed steel bar spaced 48" center to center. The transverse steel is 1 ¼" steel dowel bars spaced 12" center to center.

NONREINFORCED PCC PAVEMENT REPAIR

Locations and size (length or width) of concrete repair areas are subject to change in the field, at the discretion of the Engineer. There will be no increase in the contract unit price bid for these changes. Payment will be based on the actual area replaced.

Existing concrete pavement shall be sawed full depth at the beginning and end of the PCCP repair areas. When either the beginning or end of a PCCP repair area falls close to an existing joint or crack, the PCCP repair area shall be extended to eliminate the existing joint or crack. Where possible, new working joints shall be adjacent to existing working joints.

Existing concrete pavement in the replacement areas shall be removed by the lift out method or by means that minimize damage to the base and sides of remaining in place concrete. All removed material shall be removed from within the right-of-way by the end of the workday. Damage to adjacent concrete caused by the Contractor's operations shall be removed and replaced at the Contractor's expense.

If the pavement replacement area is entirely on either side of the existing contraction joint, the location of one of the working joints will be at the original location.

Upon removal of the concrete, the Engineer shall inspect for existing tie bars along longitudinal joint to determine if tie bar installation will be required.

Concrete placed adjacent to asphalt shoulders shall be formed full depth to match the width of existing concrete pavement. Asphalt shoulders adjacent to concrete pavement replacements shall be repaired with Asphalt Concrete Composite. If rumble strips exist, they shall be formed in the asphalt to match existing.

At repair locations where the new working joint is not opposite the existing working joint, the Contractor shall place a ¼ inch preformed asphalt expansion joint material along the longitudinal joint from the existing working joint to the new working joint. The expansion joint material shall meet the requirements of AASHTO M33. Cost for this material shall be incidental to the contract unit price per square yard for "Nonreinforced PCC Pavement Repair".

All joints (longitudinal and transverse) through and around the repair areas shall be sawed and sealed with Hot Poured Elastic Joint Sealer.

Saw cuts that extend beyond the repair area shall be minimized and filled with Hot Pour Elastic Joint Sealant at the Contractor's expense.

New pavement thickness shall match existing pavement thickness.

The slump requirement will be limited to 3" maximum after water reducer is added and the concrete shall contain 4.5% to 7.0% entrained air. Coarse aggregate shall be crushed ledge rock, Size No. 1, unless an alternative gradation is approved by the concrete engineer as part of the mix design submittal. The concrete mixture shall contain a minimum of 50% coarse aggregate by weight. The concrete mix shall contain at least 600 lbs. of type I, II or III cement per cubic yard. The minimum 28 day compressive strength shall be 4,000 psi. The Contractor is responsible for the mix design used. The Contractor may need to modify the mix design to meet contract time requirements on the project. The Contractor shall submit a mix design and supporting documentation for approval at least 2 weeks prior to use.

The use of a high range water reducer at manufacturer's recommended dosage will be required.

Concrete shall be cured with white pigmented curing compound (AASHTO M148, Type 2) applied as soon as practical at a rate of 125 square feet per gallon. Concrete shall be cured for a minimum of 48 hours before opening to traffic. The 48 hours is based upon a concrete surface temperature of 60 degrees Fahrenheit or higher throughout the cure period. If the concrete temperature falls below 60 degrees Fahrenheit, the cure time shall be extended or other measures shall be taken, at no additional cost to the State. In addition to the curing requirements, strength of 4,000 psi must be obtained prior to opening to traffic.

The initial contraction joint sawing shall be performed as soon practical to avoid random cracking.

All costs for performing this work including sawing and removing concrete, furnishing and placing concrete, #5 tie bars cast in place, curing, sawing and sealing joints, repairing asphalt shoulders, labor, tools and equipment shall be incidental to the contract unit price per square yard for "Nonreinforced PCC Pavement Repair".

ALKALI SILICA REACTIVITY

Fine aggregate shall conform to Section 800.2 D. Alkali Silica Reactivity (ASR) Requirements.

Below is a list of known fine aggregate sources and the average corresponding 14 day expansion values:

Source	Location	Expansion Value
Bachman	Winner, SD	0.335*
Bitterman	Delmont, SD	0.316*
Concrete Materials	Corson, SD	0.170
Croell	Hot Springs, SD	0.089
Croell	Wasta, SD	0.212
Emme Sand & Gravel	Oneil, NE	0.217
Fisher S&G - Mickelson Pit	E of Nisland, SD	0.129
Fisher S&G - Vallery Pit	Nisland, SD	0.110
Fisher S&G	Rapid City, SD	0.092
Fisher S&G	Spearfish, SD	0.053
Fisher S&G	Wasta, SD	0.159
Fuchs	Pickstown, SD	0.275*
Higman	Akron, IA	0.203
Higman	Hudson, SD	0.187
Hilde	Madison, SD	0.116
Jensen	Herried, SD	0.276*
L.G. Everist	Brookings, SD	0.186
L.G. Everist	Hawarden, IA	0.166
L.G. Everist	Summit, SD	0.178
Morris	Blunt, SD	0.192
Morris - Richards Pit	Onida, SD	0.188
Morris - Shawn's Pit	E of Sturgis, SD	0.168
Myrl & Roys - Ode Pit	E Sioux Falls, SD	0.214
Myrl & Roys - Nelson Pit	NE Sioux Falls, SD	0.156
Northern Concrete Agg.	Rauville, SD	0.113
Northern Concrete Agg.	Luverne, MN	0.133
Opperman - Gunvordahl Pit	Burke, SD	0.362*
Opperman - Cahoy Pit	Herrick, SD	0.307*
Opperman - Jones Pit	Burke, SD	0.321*
Opperman - Randall Pit	Pickstown, SD	0.239
Pete Lien & Sons	Creston, SD	0.158
Pete Lien & Sons	Oral, SD	0.129
Pete Lien & Sons	Wasta, SD	0.192
Thorpe Pit	Britton, SD	0.098
Wagner Building Supplies	Pickstown (Wagner), SD	0.241
Winter Brothers- Whitehead Pit	Brookings, SD	0.197

* These sources will require Type V cement in the concrete mix design and Class F (Modified) fly ash as specified.

The Department will use the running average of the last three known expansion test results or less for determining acceptability of source and the required Type of cement. These expansion results are reported in the preceding table. Additional testing, when requested by the Contractor, will be performed by the Department at the Contractor's expense.

The values listed in the table are intended for use in bidding. If a previously tested pit by SDDOT with acceptable test values (less than 0.250) is discovered after letting to require Type V cement (greater than 0.250) the Department will accept financial responsibility for the change from Type II to Type V cement.

Type II or Type V cement will not change the requirement for the fly ash. The cost for either type of cement shall be subsidiary to the contract item.

STEEL BAR INSERTION

Locations and quantities of concrete repair are subject to change in the field at the discretion of the Engineer. The Contractor will be responsible for ordering the actual quantity of steel bars necessary to complete the work.

A rigid frame or mechanical device will be required to guide the drill to ensure proper horizontal and vertical alignment of the steel bars in the drilled holes.

SAWING EXISTING ASPHALT CONCRETE

Where new PCC pavement or new AC pavement is placed adjacent to existing AC or PCC pavement, the existing pavement shall be sawed full depth to a true line with a vertical face.

No separate payment shall be made for sawing and shall be incidental to the various bid items on the project

TABLE OF PCCP REPAIR

Table of Nonreinforced PCC Pavement Repair									
MRM	Direction	Lane	Width	Length	Nonreinforced PCC Pavement Repair	Plain Round Dowel Bar	#5 Bar	Insert Steel Bar in PCC Pavement	Dowel Bar
I90			Ft	Ft	SqYd	Each	Each	Each	Each
PCN i4cm									
31.474	WB	D	14	20	31.1	24	8	32	
				Totals	31.1	24.0	8.0	32.0	
PCN i4cn									
39.320	EB	D	14	60	93.3	24	24	48	24
39.320	EB	P	12	40	53.3	24	16	40	12
				Totals	146.7	48.0	40.0	88.0	36.0
PCN i4dj									
63.090	EB	D/P	26	20	57.8	24	8	32	
63.710	EB	D/P	26	20	57.8	24	8	32	
				Totals	115.6	48.0	16.0	64.0	
PCN i4cp									
152.530	WB	D	22	20	48.9	12	8	20	
153.530	WB	P	16	20	35.6		8	8	
				Totals	84.4	12.0	16.0	28.0	

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090W-451, etc.	5	25

The 10 foot straightedge shall be used to test the pavement surface.

The Contractor shall grind in accordance with Section 380.3 O with the following modifications:

- Reestablishment of tining will not be required
- Pavement marking will be replaced with the quantities provided in these plans

The Contractor shall daylight the outside edge, to remove any vertical lips and assure that positive drainage is maintained.

All transverse and longitudinal joints shall be resealed with Hot Poured Elastic Joint Sealer. The cost for this work shall be incidental to the contract unit price per square yard for “Grinding PCC Pavement Grinding”.

TABLE OF PCC PAVEMENT GRINDING

Table of Grinding PCC Pavement				
			Width	Grinding PCC Pavement
MRM	MRM		Ft	SqYd
PCN i4cp				
125.526	125.556	WB	24	422.4
125.446	125.486	WB	24	563.2
			Total	985.6

MEMBRANE SEALANT EXPANSION JOINT

1. Install all membrane sealant expansion joints at the plan shown locations in conformance to the following notes.
2. The Membrane Sealant shall be one of membrane sealant types from the approved product list for Membrane Sealant Expansion Joints.
3. The manufacturer shall supply the membrane sealant in packaging that precompresses the membrane sealant. The precompressed dimension shall be as recommended by the sealant manufacturer to provide a water tight seal throughout a joint movement range of + 25% (minimum) from the specified joint opening dimension. In no case shall the precompressed dimension exceed 75% of the joint opening width. The foam sealant shall be slowly self expanding to permit workers ample time to install the membrane sealant before the membrane sealant exceeds the joint opening width.
4. The membrane sealant shall be supplied in pieces 5 feet in length or longer. The foam sealant shall be ultra-violet and ozone resistant.
5. The bonding adhesive used to attach the membrane sealant to the adjacent concrete shall be approved by the membrane sealant manufacturer.
6. Adhesive used to join adjacent pieces of the membrane sealant shall be as recommended by the manufacturer.
7. If Styrofoam filler material is used in the construction, it shall be closed cell and water-tight as approved by the Engineer.

8. The minimum ambient air temperature at the time of joint installation and adhesive curing shall be 40° F.

9. A technical representative of the membrane sealant manufacturer shall be present at the jobsite during installation. The technical representative shall be knowledgeable in the correct procedures for the preparation and installation of the joint material to insure the Contractor installs the joint to the Manufacturers recommendations.

10. The joint opening shall be constant width and shall have smooth vertical sides. Surfaces of material adjacent to the joint shall be at the correct grade and crown as approved by the Engineer.

11. Concrete surfaces that will be in contact with the membrane sealant shall be thoroughly cleaned by abrasive blasting to remove all laitance and contaminants (such as oil, curing compounds, etc.) from the concrete surface. At a minimum two passes of abrasive blasting with the nozzle held at an angle to within 1 to 2 inches of the a concrete surface will be required. Cleaning of the concrete surfaces with solvents, wire brushing, or grinding shall not be permitted.

12. After abrasive blasting, but immediately prior to membrane joint installation, the entire joint contact surface shall be air blasted. The air compressor used for joint cleaning shall be equipped with trap devices capable of providing moisture-free and oil-free air at a recommended pressure of 90 psi. To obtain complete bonding with the adhesive, the adjacent concrete surfaces must be dry and clean. The contact surfaces for the joint shall be visually inspected by the Engineer immediately prior to joint installation to verify the surface is dry and clean.

13. Individual spliced sections shall be installed as per the manufacturers' recommendations. The membrane joint sealant manufacturer shall submit a detailed installation procedure to the Engineer at least 5 days prior to joint installation for his review.

14. Traffic shall not be allowed on the joint for a minimum 3 hours unless otherwise directed by the Engineer.

15. The Membrane Sealant Expansion Joint will be measured in feet to the nearest one-tenth foot, complete in place. Measurement will be made of the overall horizontal length. The Membrane Sealant Expansion Joint will be paid for at the contract unit price per foot complete in place. Payment for this item shall be full compensation for furnishing all the required materials in place, inclusive of labor, equipment and incidentals necessary to complete the work in accordance with the plans and the foregoing specifications.

TRAFFIC CONTROL – GENERAL NOTES

1. Requests to deviate from the sequence of operations shall be submitted in writing to the Engineer for review. Approval of an alternate sequence of operations will only be allowed when the proposed changes meet with the Department’s intent for traffic control and sequencing of the work. An alternate sequence shall be submitted for review a minimum of one week prior to potential implementation.
2. Unless otherwise stated in these plans, no work will be allowed during hours of darkness.

3. Indiscriminate driving and parking of vehicles within the right-of-way will not be permitted. Any damage of 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.

4. Existing guide, route, informational logo, regulatory, warning signs and delineation shall be temporarily reset and maintained during construction as directed by the Engineer. Removing, relocating, salvaging and resetting of the above items shall be the responsibility of the Contractor.

5. Any delineators and signs damaged or lost shall be replaced by the Contractor at no cost to the State.

6. All materials and equipment shall be stored a minimum distance of 30’ from the traveled way during nonworking hours.

7. All haul trucks shall be equipped with a second flashing amber light that is visible from the backside of the haul truck. The costs for the flashing amber lights shall be incidental to the various related contract bid items.

8. All construction operations shall be conducted in the general direction of traffic movement.

9. If there is a discrepancy between the traffic control plans, standard plates, and the MUTCD – whichever is more stringent shall be used, as determined by the Engineer.

10. Temporary Flexible Vertical Markers (Tabs) shall be used for lane closure tapers or lane shift tapers and shall be installed at 5’ spacing. Tabs used for tapers and shifts will not be measured for payment. All costs associated to furnish, install, maintain (including replacement as required by the Engineer at no added cost to the Department), and remove all markers will be incidental to the contract lump sum price for Traffic Control, Miscellaneous.

REFLECTORIZED SHEETING REQUIREMENTS FOR TEMPORARY TRAFFIC CONTROL DEVICES

Delete the first paragraph of Section 984.1 and replace with the following:

Temporary traffic control devices, including signs, drums, cones, tubular markers, barricades, vertical panels, and direction indicator barricades shall be reflectorized with sheeting applied to a satisfactory backing. Flat surfaced temporary traffic control devices including, but not limited to; signs, barricades, vertical panels, and direction indicator barricades shall be reflectorized with super/very high intensity reflectorized sheeting meeting the standards of Type XI as defined by AASHTO M 268 (ASTM D4956). Round surfaced temporary traffic control devices including, but not limited to; drums, cones, and tubular markers shall be reflectorized with high intensity reflectorized sheeting meeting the standards of Type IV as defined by AASHTO M 268 (ASTM D4956). All orange colored material shall be fluorescent.

INVENTORY OF TRAFFIC CONTROL DEVICES

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090W-451, etc.	7	25

PCN i4cm

SIGN CODE	SIGN DESCRIPTION	EXPRESSWAY / INTERSTATE			
		NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
R2-1	SPEED LIMIT __	5	36" x 48"	12	60
W3-5	SPEED REDUCTION AHEAD (__ MPH)	3	48" x 48"	16	48
W4-2	LEFT or RIGHT LANE ENDS (symbol)	2	48" x 48"	16	32
W20-1	ROAD WORK AHEAD	2	48" x 48"	16	32
W20-5	LEFT or RIGHT LANE CLOSED AHEAD	2	48" x 48"	16	32
W20-7	FLAGGER (symbol)	1	48" x 48"	16	16
		EXPRESSWAY / INTERSTATE TRAFFIC CONTROL SIGNS SQFT 220			

TYPE 3 BARRICADES

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

ARROW BOARDS

ITEM DESCRIPTION	QUANTITY
Type C Arrow Board	1 Each

PCN i4cn

SIGN CODE	SIGN DESCRIPTION	EXPRESSWAY / INTERSTATE			
		NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
R2-1	SPEED LIMIT __	5	36" x 48"	12	60
W3-5	SPEED REDUCTION AHEAD (__ MPH)	3	48" x 48"	16	48
W4-2	LEFT or RIGHT LANE ENDS (symbol)	2	48" x 48"	16	32
W20-1	ROAD WORK AHEAD	2	48" x 48"	16	32
W20-5	LEFT or RIGHT LANE CLOSED AHEAD	2	48" x 48"	16	32
W20-7	FLAGGER (symbol)	1	48" x 48"	16	16
		EXPRESSWAY / INTERSTATE TRAFFIC CONTROL SIGNS SQFT 220			

TYPE 3 BARRICADES

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

ARROW BOARDS

ITEM DESCRIPTION	QUANTITY
Type C Arrow Board	1 Each

PCN i4dj

SIGN CODE	SIGN DESCRIPTION	EXPRESSWAY / INTERSTATE			
		NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
R2-1	SPEED LIMIT __	5	36" x 48"	12	60
W3-5	SPEED REDUCTION AHEAD (__ MPH)	3	48" x 48"	16	48
W4-2	LEFT or RIGHT LANE ENDS (symbol)	2	48" x 48"	16	32
W20-1	ROAD WORK AHEAD	2	48" x 48"	16	32
W20-5	LEFT or RIGHT LANE CLOSED AHEAD	2	48" x 48"	16	32
W20-7	FLAGGER (symbol)	1	48" x 48"	16	16
		EXPRESSWAY / INTERSTATE TRAFFIC CONTROL SIGNS SQFT 220			

TYPE 3 BARRICADES

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

ARROW BOARDS

ITEM DESCRIPTION	QUANTITY
Type C Arrow Board	1 Each

PCN i4cp

SIGN CODE	SIGN DESCRIPTION	EXPRESSWAY / INTERSTATE			
		NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
R2-1	SPEED LIMIT __	5	36" x 48"	12	60
W3-5	SPEED REDUCTION AHEAD (__ MPH)	3	48" x 48"	16	48
W4-2	LEFT or RIGHT LANE ENDS (symbol)	2	48" x 48"	16	32
W20-1	ROAD WORK AHEAD	2	48" x 48"	16	32
W20-5	LEFT or RIGHT LANE CLOSED AHEAD	2	48" x 48"	16	32
W20-7	FLAGGER (symbol)	1	48" x 48"	16	16
		EXPRESSWAY / INTERSTATE TRAFFIC CONTROL SIGNS SQFT 220			

TYPE 3 BARRICADES

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

ARROW BOARDS

ITEM DESCRIPTION	QUANTITY
Type C Arrow Board	1 Each

TABLE OF GUARDRAIL

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090W-451, etc.	8	25

Table of Guardrail									
Location	Left Side/ Median	Remove Double Thrie Beam Guardrail for Reset	Remove W Beam Guardrail for Reset	Remove W Beam to Thrie Beam Guardrail Transition for Reset	Remove W Beam Guardrail Breakaway Cable Terminal for Reset	Reset Double Thrie Beam Rail	Reset W Beam Rail	Reset W Beam Guardrail Breakaway Cable Terminal	Reset W Beam to Thrie Beam Guardrail Transition
		Ft	Ft	Each	Each	Ft	Ft	Each	Each
I90 WESTBOUND									
Str. No. 36-071-076	L	12.5	62.5	1	1	12.5	62.5	1	1
MRM 125.53	M	12.5	62.5	1	1	12.5	62.5	1	1
TOTALS:		25	125	2	2	25	125	2	2

GUARDRAIL DELINEATORS

Guardrail delineators currently exist on the w beam guardrail to be removed and reset. The Contractor shall remove and reset these Guardrail delineators. All costs associated with the removal and resetting of guardrail delineators shall be incidental to the various bid items on the project.

COLD APPLIED PLASTIC PAVEMENT MARKING

The Contractor shall apply the Cold Applied Plastic Pavement Marking material as per manufacturer's instructions.

Cold applied plastic pavement markings shall be placed into recessed grooves on the surface.

GROOVE PAVEMENT FOR PAVEMENT MARKING

The grooving shall be completed within the following tolerance:

Depth of Groove: 100 mils, tolerance of + 10 mils.

Existing grooves that do not meet the 100 mil depth requirement shall be re-grooved. In areas where the existing groove depth meets the 100 mil depth requirements and portions of the existing markings are still in place, the existing markings shall be removed. All costs for materials, labor, and equipment necessary to remove the existing markings shall be incidental to the contract unit price per foot for Grooving for Cold Applied Plastic Marking, 4"; Grooving for Cold Applied Plastic Marking, 24", per each for Grooving for Cold Applied Plastic Marking, Arrow, and per square foot for Grooving for Cold Applied Plastic Pavement Marking, Area.

Markings that fall outside of the groove shall be removed (at least 90%) using additional methods approved by the Engineer. All costs for materials, labor, and equipment necessary to remove the existing markings shall be incidental to the contract unit price per foot for Grooving for Cold Applied Plastic Marking, 4"; Grooving for Cold Applied Plastic Marking, 24", per each for Grooving for Cold Applied Plastic Marking, Arrow, and per square foot for Grooving for Cold Applied Plastic Pavement Marking, Area.

The Contractor shall dispose of grooving residue in accordance with Federal, State and Local regulations. No payment will be made for disposal of residue. Disposal of residue shall be incidental to the associated Grooving Pavement bid item.

The Contractor shall establish a positive means for the removal of the grinding and/or grooving residue. Residue from dry grooving shall be vacuumed. Solid residue shall be removed from the pavement surfaces before being blown by traffic action or wind. Residue from wet grooving shall not be permitted to flow across lanes being used by public traffic or into gutter or drainage facilities. Residue, whether in solid or slurry form, shall be disposed of in a manner that will prevent it from reaching any waterway in a concentrated state. All costs for removal of grinding and/or grooving residue shall be included in the contract unit price per foot for Grooving for Cold Applied Plastic Pavement Marking.

PERMANENT PAVEMENT MARKINGS

All surfaces have existing markings and the Contractor is encouraged to review this route prior to bidding.

All areas to be painted shall be thoroughly broomed prior to placement of any permanent paint to the satisfaction of the Engineer.

All markings shall be of High Grade Polymer Paint and grooved in.

PAVEMENT MARKING PAINT WITH HIGH GRADE POLYMER

This material shall consist of a durable high build, low VOC, fast drying, waterborne traffic paint with a 100% acrylic polymer (DOW DT-400 or DOW HD-21A or equivalent) and with reflective media adhered to the paint. The reflective media shall consist of glass beads as well as bonded core reflective elements.

The bonded core reflective elements shall contain either clear or yellow tinted microcrystalline ceramic beads bonded to the outer surface. All microcrystalline ceramic beads bonded to reflective elements shall have a minimum index of refraction of 1.8 when tested using the liquid oil immersion method.

The Department will take retro-reflectivity readings on the pavement marking lines no sooner than 3 days and no later than 30 days after the completion of all line applications required for an individual highway route using a portable retro-reflectometer conforming to 30-meter geometry. Retro-reflectivity readings will be taken on a test location with cleaning being limited to light hand brooming.

Pavement markings not conforming to the Retro-reflectivity requirements shall be removed and replaced. If replacement of markings cannot be applied within the same year, the Contractor shall schedule subject work to be completed no later than June 15th in the following year. Upon replacement, the retro-reflectivity testing process will be done again requiring new readings.

The Department will randomly select one test location per mile of each edge line including ramps and one test location per mile of centerline (solid and/or skip line will be considered as one centerline). Three retro-reflectivity readings will be taken at each test location. The three readings will be averaged and become the reading for that test location.

Initial Readings (within 3 - 30 days of the line application):

Pavement Marking Color	Minimum Value
White	350 mcd/m2/lux
Yellow	275 mcd/m2/lux

All pavement markings not conforming to the requirements provided in these plans will be considered deficient and shall be removed and replaced. Additional retro-reflectivity readings will be taken by the Department to determine the limits of removal. The removal shall be accomplished using suitable sand blasting or grinding equipment unless the Engineer authorizes other means. The removal process shall remove at least 90% of the deficient line, with no excessive scarring of the existing pavement. The removal width shall be one inch wider all around the nominal width of the pavement marking to be removed. Removal and replacement of the pavement markings shall be at Contractor's expense, with no cost incurred by the State.

RATES OF MATERIALS FOR HIGH GRADE POLYMER PAINT

Solid 4" Line = 27.8 Gals/Mile
Glass Beads – 5.3 Lbs/Gal
Composite Reflective Elements – 2.1 Lbs/Gal

All cost for materials, labor, and equipment necessary to furnish and install the pavement markings shall be incidental to the contract unit price per gallon for Pavement Marking Paint, 4" White or 4" Yellow.

Table of Pavement Marking					
MRM	Direction	Pavement Marking Paint, 4" White	Cold Applied Plastic Pavement Marking, 4"	Grooving For Cold Applied Plastic Pavement Marking, 4"	Pavement Marking Paint, 4" Yellow
I90		(Ft)	(Ft)	(Ft)	(Ft)
PCN i4cm					
31.474	WB	20	10	10	
Total		20	10	10	
PCN i4cn					
39.320	EB	60	20	20	60
Total		60	20	20	60
PCN i4dj					
63.090	EB	20	10	10	20
63.710	EB	20	10	10	20
Total		40	20	20	40
PCN i4cp					
152.530	WB	400	100	100	400
Total		400	100	100	400

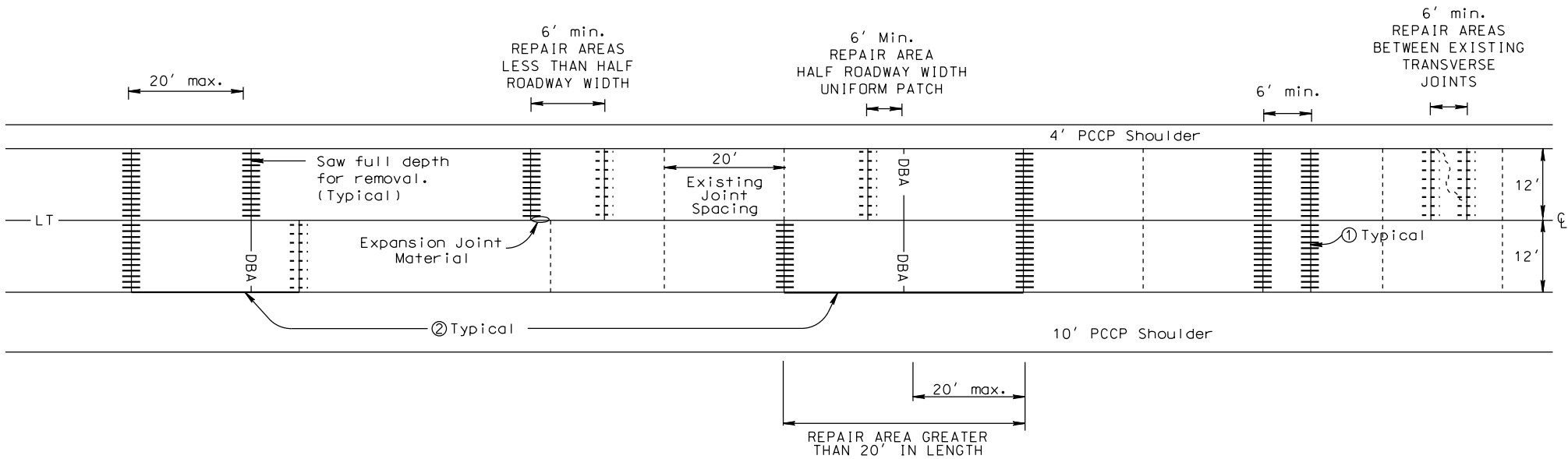
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090W-451, etc.	9	25

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090W-451, etc.	10	25

Plotting Date: 05/10/2016

NONREINFORCED PCC PAVEMENT REPAIR

TYPICAL REPAIR AREAS (PCCP SHOULDERS)



NOTES:

- ① Where possible, transverse joints shall be constructed full roadway width.
- ② All edges of repair areas that are adjacent to asphalt concrete shall be formed to match the width of the existing concrete pavement and replaced with new asphalt

Legend:

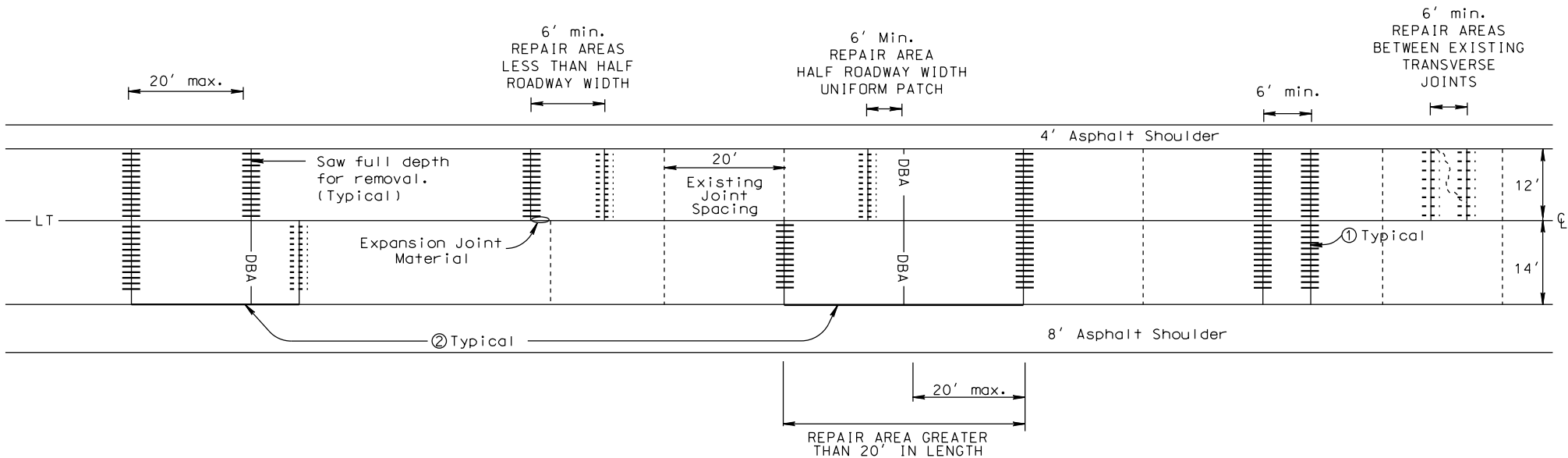
- Drilled in 1 1/4 " x 18" epoxy coated plain round dowel bar
- - - Drilled in No. 9 x 18" epoxy coated deformed tie bars
- DBA Dowel Bar Assembly (for repair areas greater than 20' in length)
- L — Longitudinal Construction Joint Without Tie Bars (Keyway Joint)
- LT — Longitudinal Construction Joint With Tie Bars (Do not tie more than 48' width of pavement)

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090W-451, etc.	11	25

Plotting Date: 05/10/2016

NONREINFORCED PCC PAVEMENT REPAIR

TYPICAL REPAIR AREAS



NOTES:

- ① Where possible, transverse joints shall be constructed full roadway width.
- ② All edges of repair areas that are adjacent to asphalt concrete shall be formed to match the width of the existing concrete pavement and replaced with new asphalt

Legend:

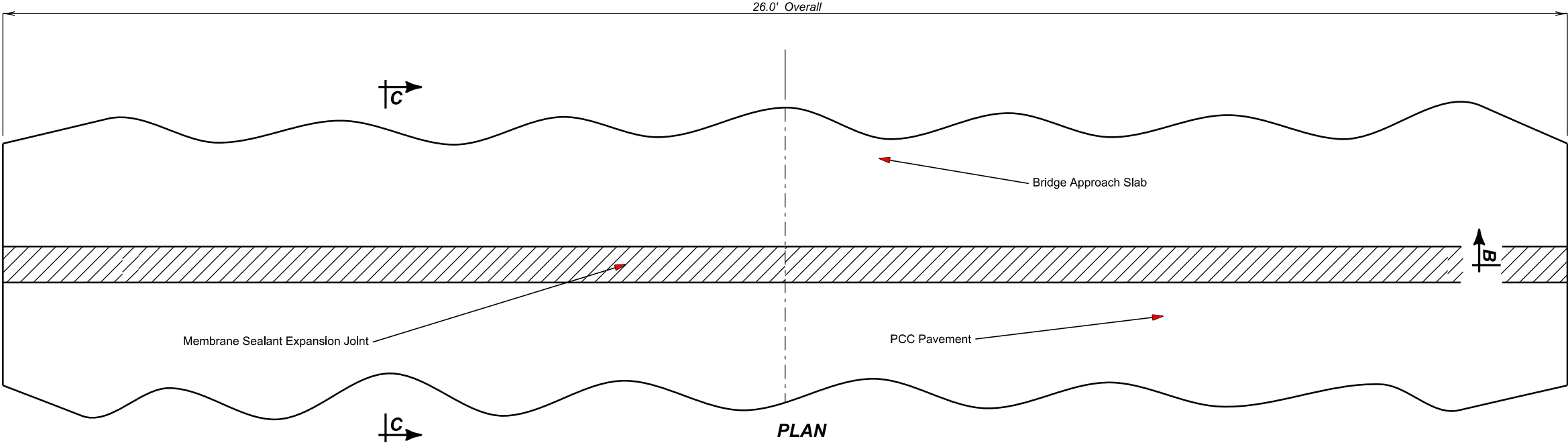
- Drilled in 1 1/4 " x 18" epoxy coated plain round dowel bar
- - - Drilled in No. 9 x 18" epoxy coated deformed tie bars
- DBA Dowel Bar Assembly (for repair areas greater than 20' in length)
- L — Longitudinal Construction Joint Without Tie Bars (Keyway Joint)
- LT — Longitudinal Construction Joint With Tie Bars (Do not tie more than 48' width of pavement)

PLOT SCALE - 1=0.168244

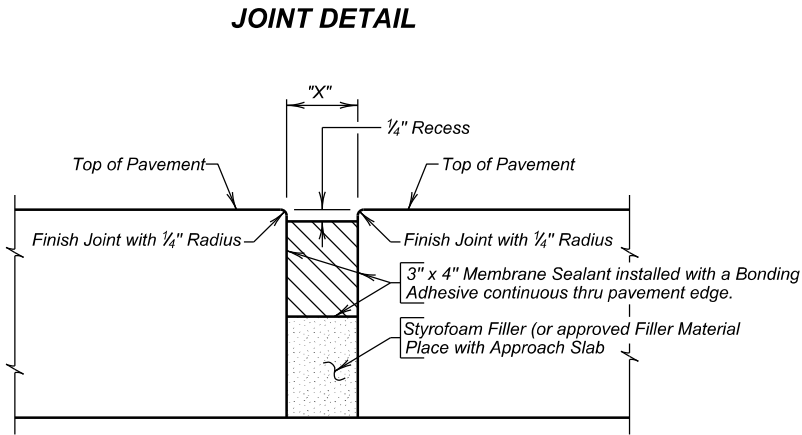
PLOTTED FROM - TRRC12608

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090W-451, etc.	12	25

Plotting Date: 05/10/2016



TEMP.	DIMENSION "X"
30°	3 1/8"
40°	3"
50°	2 7/8"
60°	2 3/4"
70°	2 11/16"
80°	2 9/16"
90°	2 7/16"



ELEVATION
SECTION C - C

MEMBRANE SEALANT EXPANSION JOINT
DETAILS FOR
JOINT BETWEEN SLEEPER SLAB
OR APPROACH SLAB
AND PCC PAVEMENT

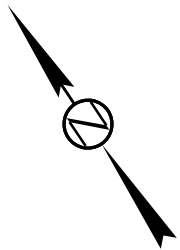
S. D. DEPT. OF TRANSPORTATION

GUARDRAIL LAYOUT

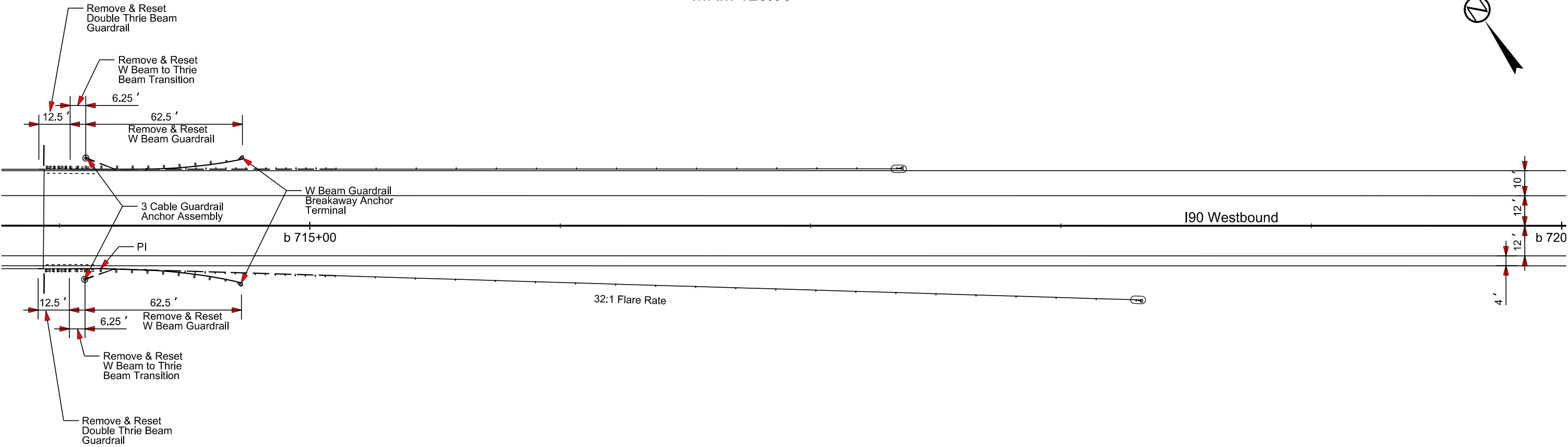
STR. NO. 36-071-076
MRM 125.53

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	090W-451, etc.	13	25

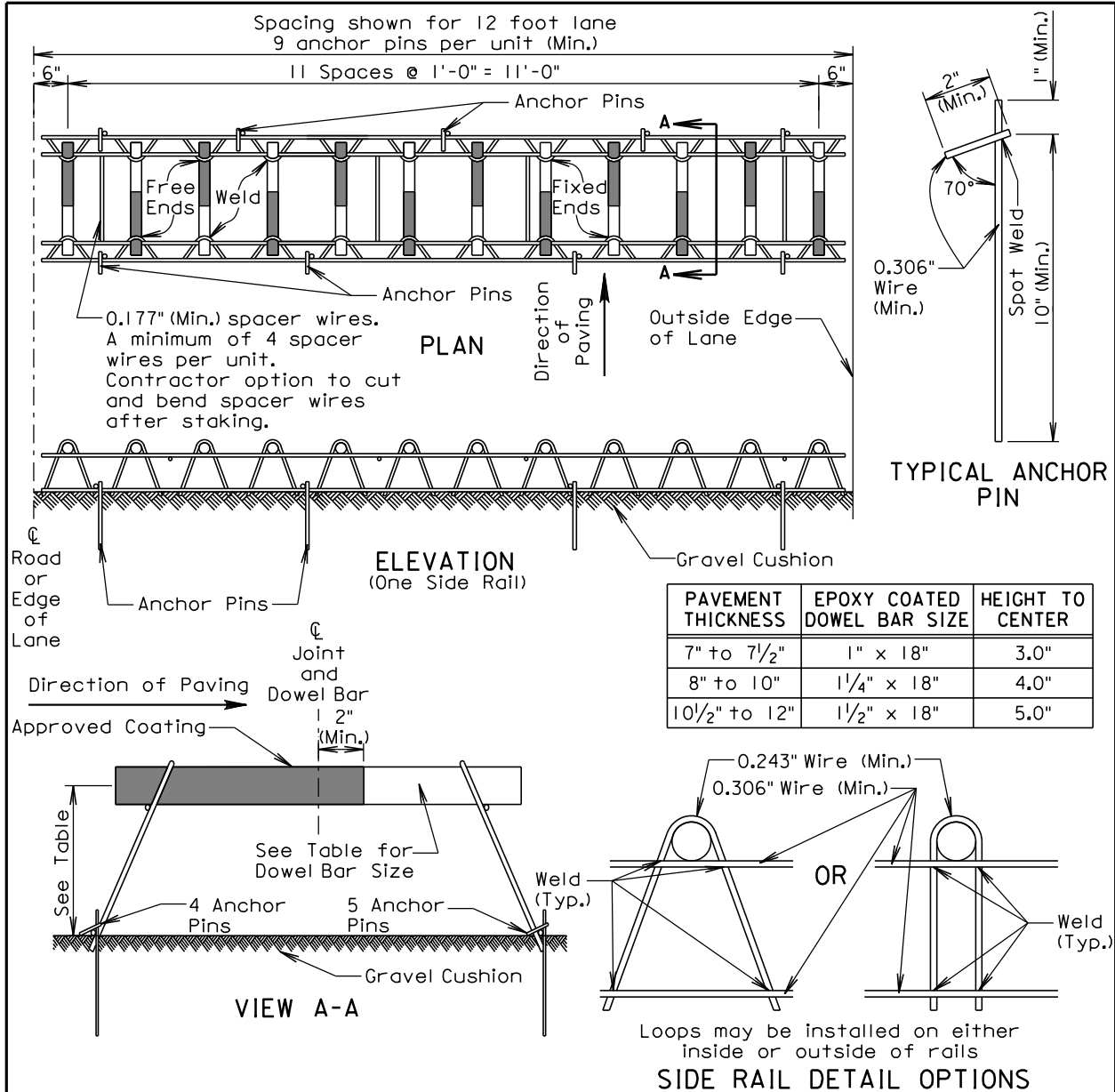
Plotting Date: 05/10/2016



Plot Scale -
1"=40'



Plotted From -
trc12808

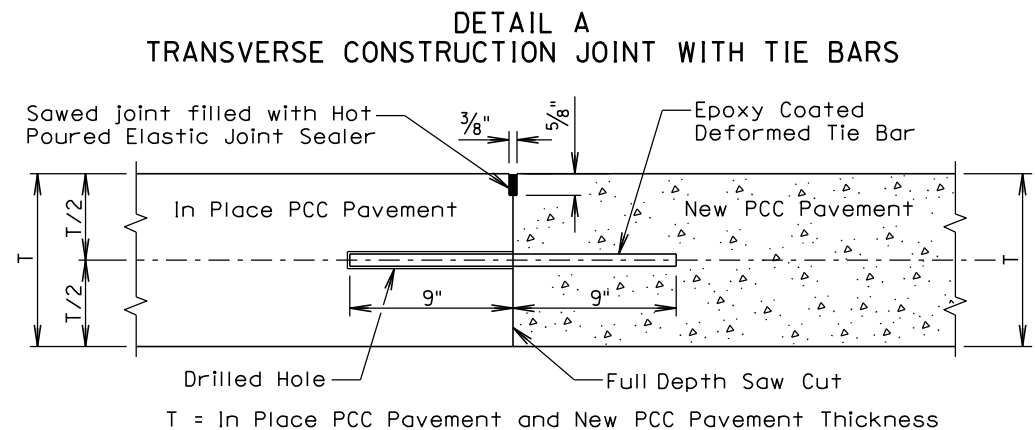


GENERAL NOTES:

- Longitudinal joint tie bars shall be placed a minimum of 15 inches from the transverse contraction joint.
- Centerline of individual dowel bars shall be parallel to top of subgrade $\pm 1/8$ inch in 18 inches and to all other dowel bars in the assembly $\pm 1/16$ inch in 18 inches.
- Centerline of individual dowel bars shall be parallel to the centerline of the roadway $\pm 1/2$ inch in 18 inches.
- The transverse contraction joints shall be sawed perpendicular to the centerline of the roadway and the dowel bars shall be centered on the sawed joint ± 1 inch.
- Supporting devices as shown on this sheet, or equivalent as approved by the Engineer, shall be used to maintain proper horizontal and vertical alignment of the dowel bars.

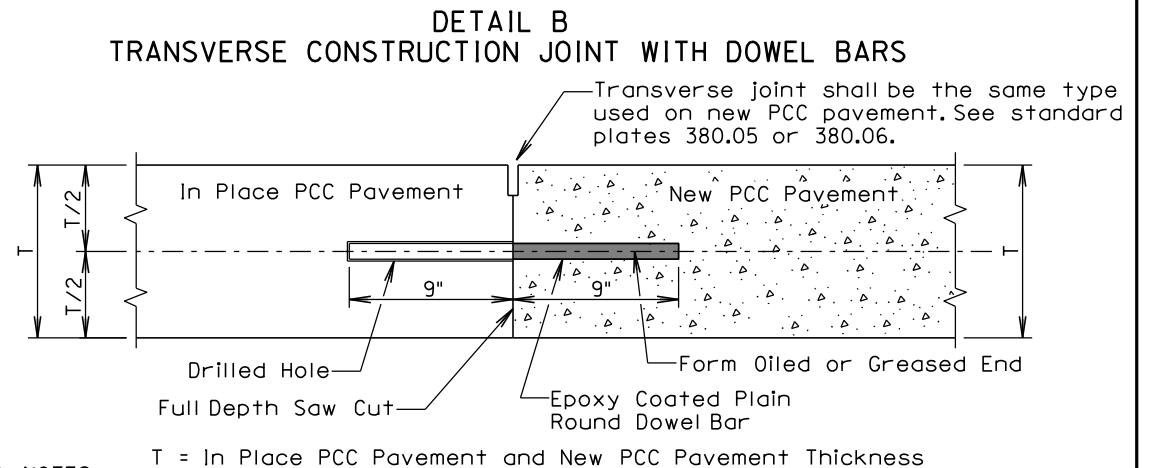
August 30, 2013

Published Date: 2nd Qtr. 2016	S D D O T	PCC PAVEMENT DOWEL BAR ASSEMBLY FOR TRANSVERSE CONTRACTION JOINTS 12 Bar Assembly on Granular Base Material	PLATE NUMBER 380.01
			Sheet 1 of 1



GENERAL NOTES:

- The term "In Place PCC Pavement" in the above drawing indicates that the in place PCC pavement was placed on a previous project.
- See sheet 2 of 2 of this standard plate to determine if Detail A shall be used.
- The tie bars shall be embedded a minimum depth of 9 inches into the in place PCC pavement and anchored with an epoxy resin adhesive.
- No. 9 epoxy coated deformed tie bars shall be used in 10 inch thickness and less PCC Pavement and No. 11 epoxy coated deformed tie bars shall be used in 10.5 inch thickness and greater PCC Pavement. The tie bar spacing shall be 18 inches center to center and shall be a minimum of 3 inches and a maximum of 9 inches from the pavement edges.

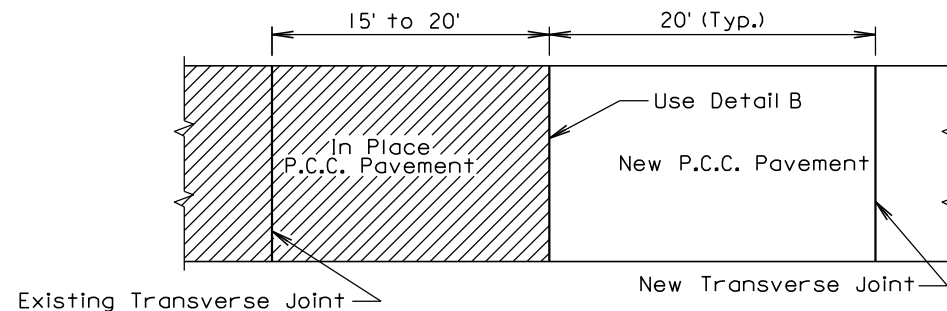
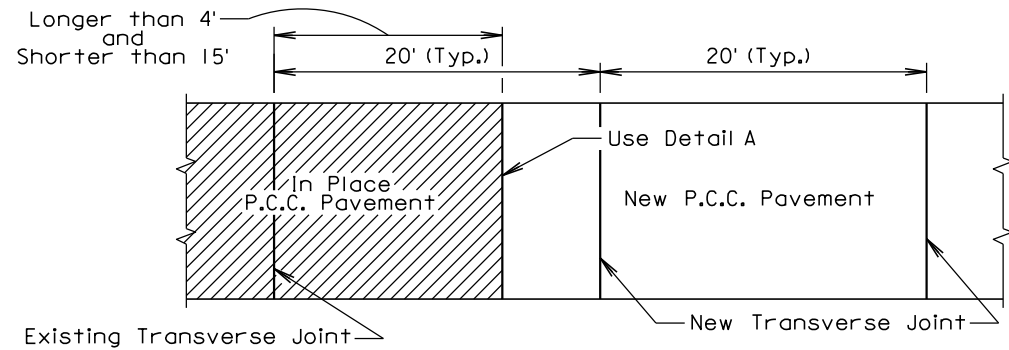


GENERAL NOTES:

- The term "In Place PCC Pavement" in the above drawing indicates that the in place PCC pavement was placed on a previous project or current project.
- See sheet 2 of 2 of this standard plate to determine if Detail B shall be used.
- The plain round dowel bars shall be embedded a minimum depth of 9 inches into the in place PCC pavement and anchored with an epoxy resin adhesive.
- The epoxy coated plain round dowel bar size, number, and spacing shall be the same as detailed on the corresponding dowel bar assembly standard plate (380.01, 380.02, 380.03, or 380.04). The epoxy coated plain round dowel bars shall be a minimum of 3 inches and a maximum of 6 inches from the pavement edges.

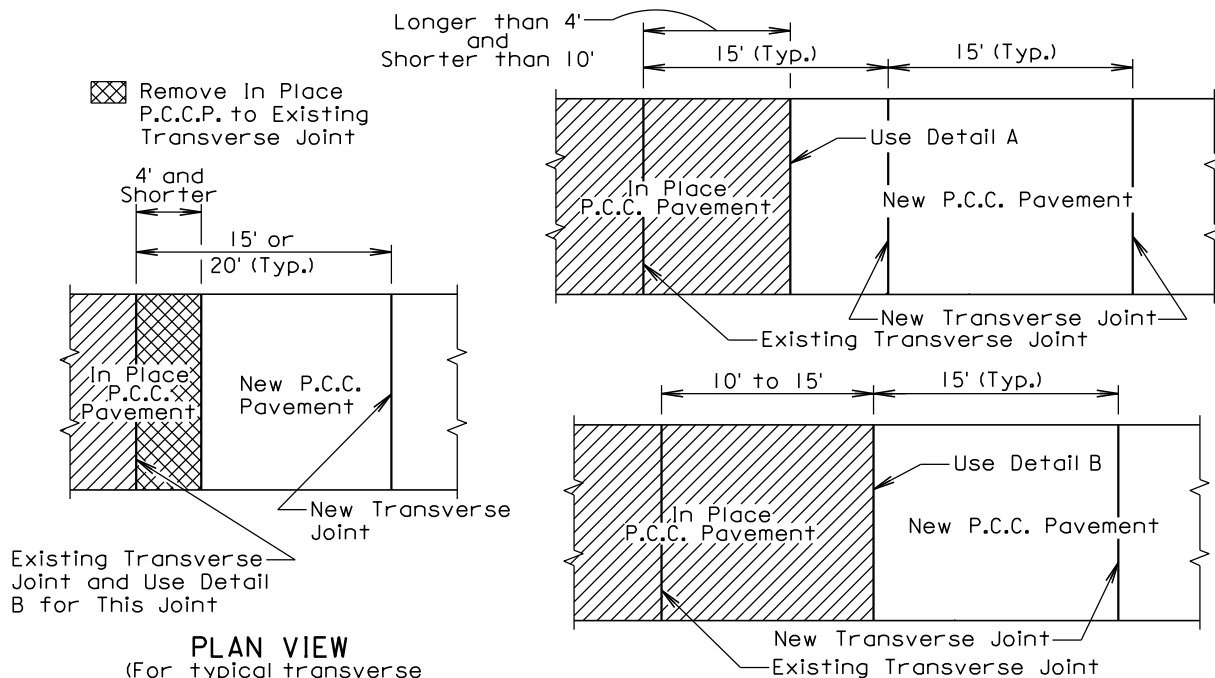
September 6, 2013

Published Date: 2nd Qtr. 2016	S D D O T	PCC PAVEMENT TRANSVERSE CONSTRUCTION JOINTS WITH TIE BARS OR DOWEL BARS	PLATE NUMBER 380.08
			Sheet 1 of 2



PLAN VIEW

(For typical transverse joint spacing of 20' on the current project)



PLAN VIEW

(For typical transverse joint spacing of 15' or 20' on the current project)

PLAN VIEW

(For typical transverse joint spacing of 15' on the current project)

September 6, 2013

Published Date: 2nd Qtr. 2016

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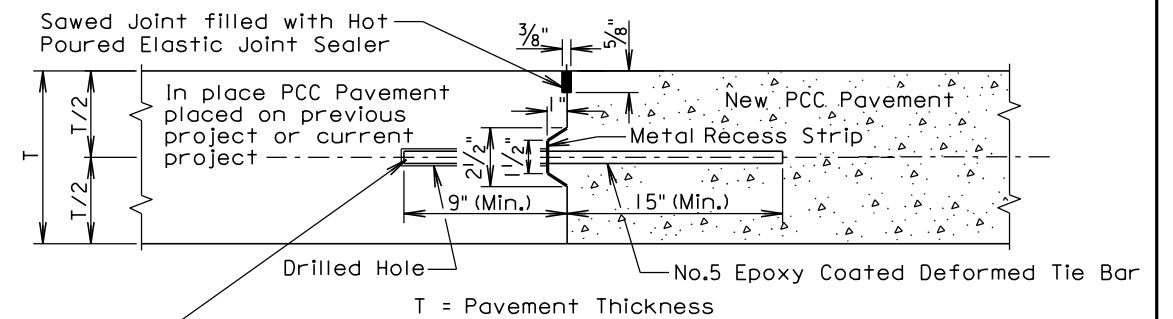
PCC PAVEMENT TRANSVERSE CONSTRUCTION
JOINTS WITH TIE BARS OR DOWEL BARS

PLATE NUMBER
380.08

Sheet 2 of 2

LONGITUDINAL CONSTRUCTION JOINT WITH TIE BARS

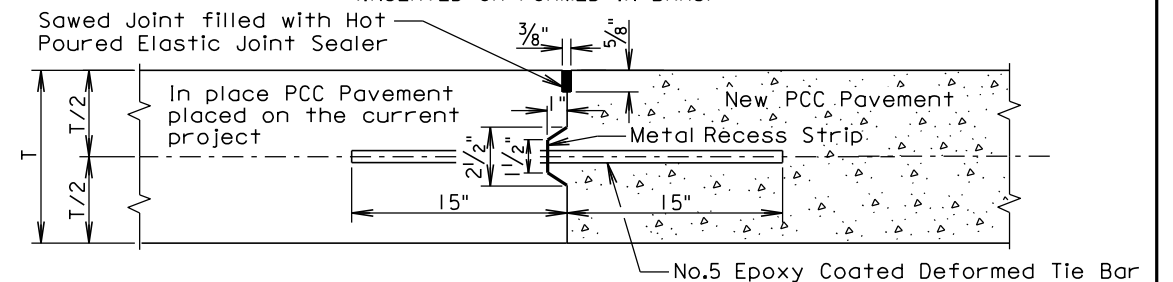
(DRILLED IN BARS)



The tie bars shall be embedded a minimum depth of 9 inches into the in place PCC pavement and anchored with an epoxy resin adhesive.

LONGITUDINAL CONSTRUCTION JOINT WITH TIE BARS

(INSERTED OR FORMED IN BARS)



GENERAL NOTES (For the details above):

The epoxy coated deformed tie bars shall be spaced in accordance with the following tables:

Tie Bar Spacing 48" Maximum	
Transverse Contraction Joint Spacing	Number of Tie Bars
6.5' to 10'	2
10.5' to 14'	3
14.5' to 18'	4
18.5' to 22'	5

Tie Bar Spacing 30" Maximum	
Transverse Contraction Joint Spacing	Number of Tie Bars
5' to 7'	2
7.5' to 9.5'	3
10' to 12'	4
12.5' to 14.5'	5
15' to 17'	6
17.5' to 19.5'	7
20' to 22'	8

The tie bars shall be placed a minimum of 15 inches from transverse contraction joints.

The required number of tie bars as shown in the table shall be uniformly spaced within each panel. The uniformly spaced tie bars shall be spaced a maximum of 48 inches center to center for a female keyway and shall be spaced a maximum of 30 inches center to center for a vertical face and male keyway. The maximum tie bar spacing shall apply to tie bars within each panel.

The keyway illustrated in the above details depict a female keyway.

The keyway is optional and is not required. When concrete pavement is formed and a keyway is provided, a metal recess strip shall be used. When concrete pavement is slip formed, a metal recess strip is not required.

August 31, 2013

Published Date: 2nd Qtr. 2016

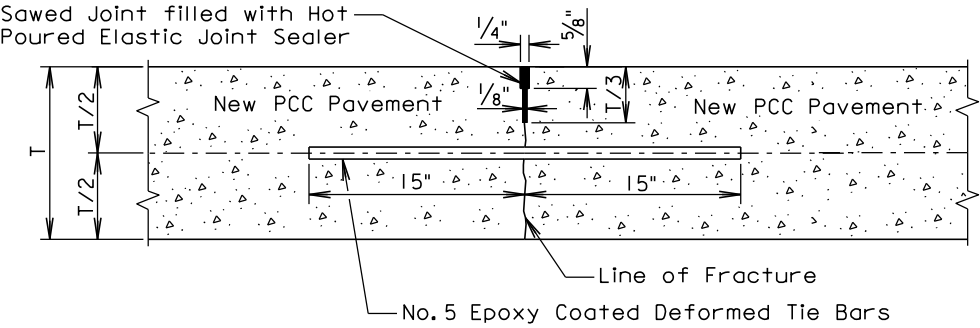
S
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PCC PAVEMENT LONGITUDINAL
JOINTS WITH TIE BARS

PLATE NUMBER
380.10

Sheet 1 of 2

SAWED LONGITUDINAL JOINT WITH TIE BARS
(POURED MONOLITHICALLY)



T = Pavement Thickness

GENERAL NOTES (For the detail above):

The epoxy coated deformed tie bars shall be spaced in accordance with the following table:

Tie Bar Spacing 48" Maximum	
Transverse Contraction Joint Spacing	Number of Tie Bars
6.5' to 10'	2
10.5' to 14'	3
14.5' to 18'	4
18.5' to 22'	5

The tie bars shall be placed a minimum of 15 inches from the transverse contraction joints.

The required number of tie bars as shown in the table shall be uniformly spaced within each panel with a maximum space of 48 inches center to center. The maximum tie bar spacing shall apply to tie bars within each panel.

The first saw cut to control cracking shall be a minimum of 1/3 the thickness of the pavement. Additional sawing for widening the saw cut to provide the width for the installation of the hot poured elastic joint sealer is necessary.

August 31, 2013

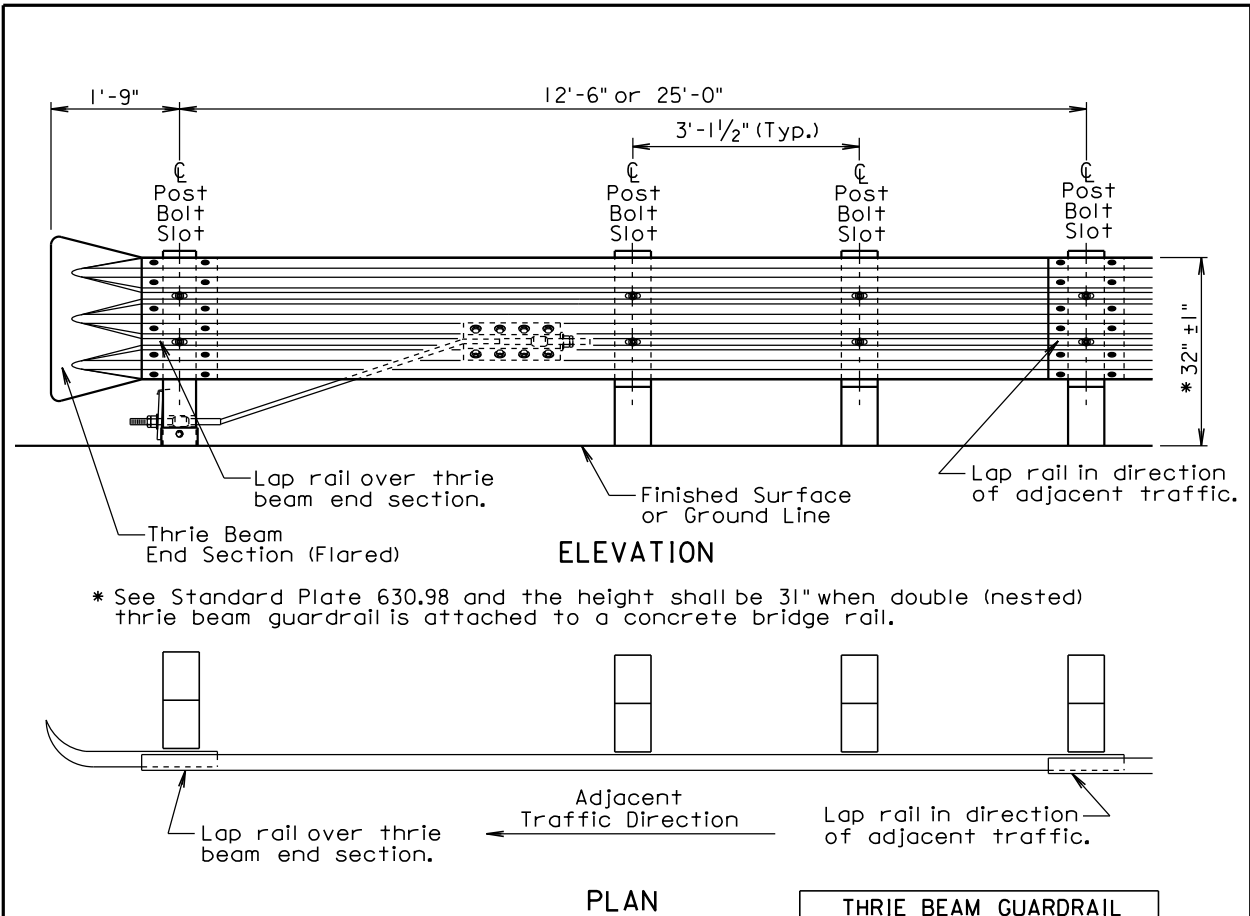
Published Date: 2nd Qtr. 2016

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PCC PAVEMENT LONGITUDINAL
JOINTS WITH TIE BARS

PLATE NUMBER
380.10

Sheet 2 of 2



GENERAL NOTES:

All thrie beam rail shall be Type I.

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.

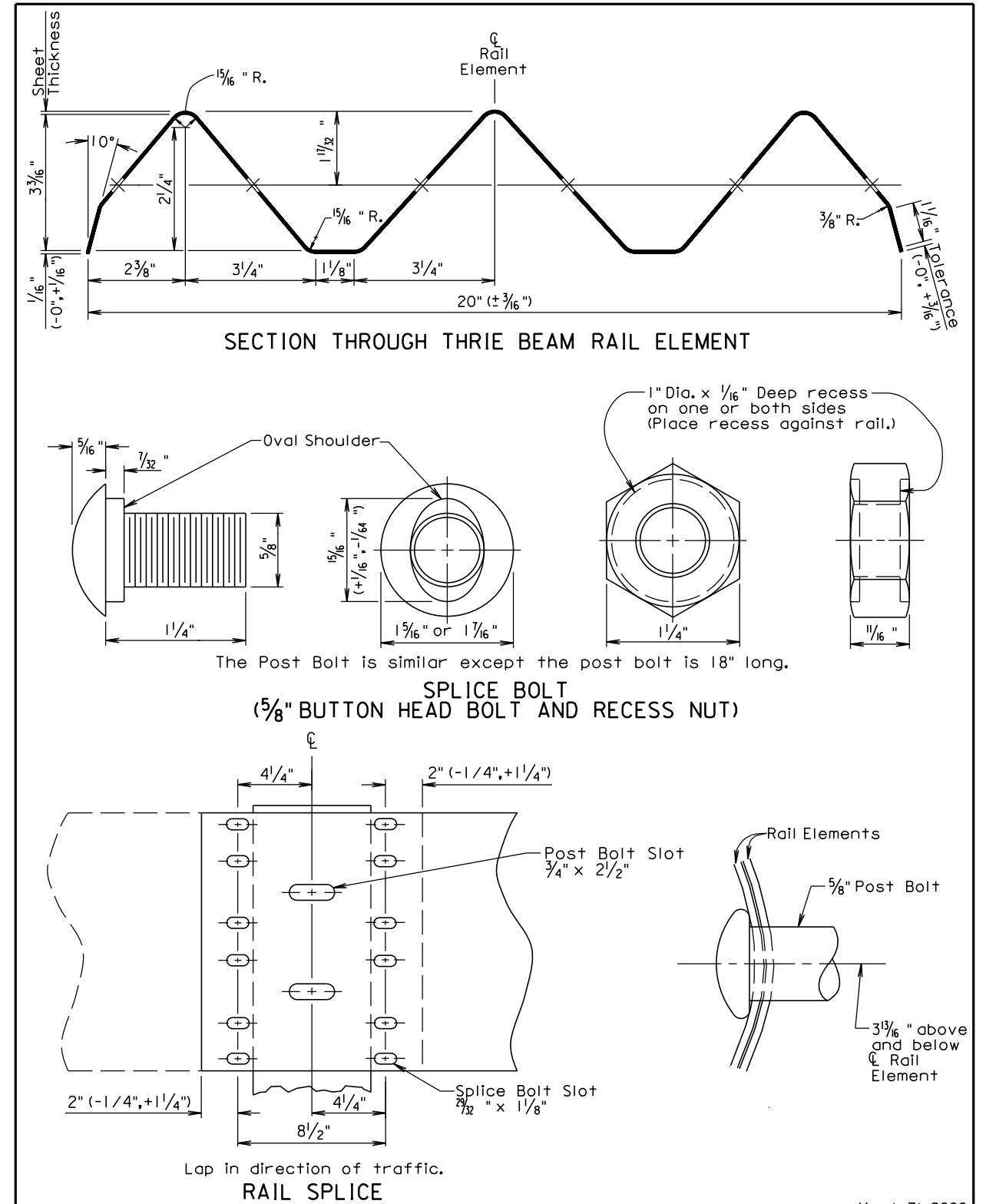
All costs for constructing thrie beam guardrail including labor, equipment, and materials including all posts, blocks, steel beam rail, and hardware shall be incidental to the contract unit price per foot for the respective "Thrie Beam Guardrail" bid item.

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

For Informational Purposes Only

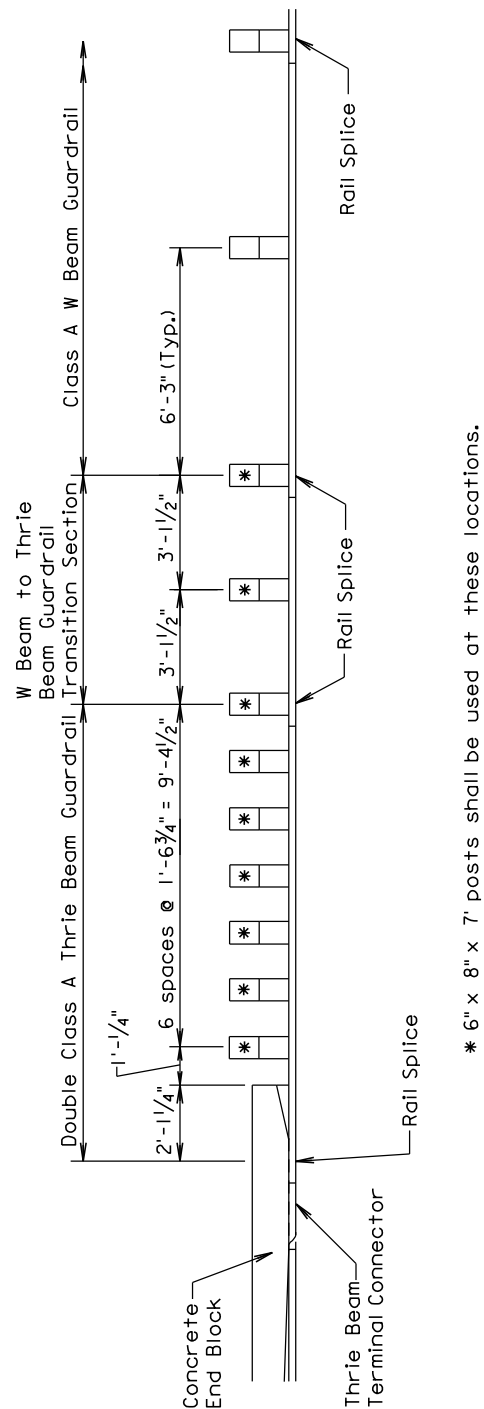
June 26, 2015

Published Date: 2nd Qtr. 2016	S D D O T	THRIE BEAM GUARDRAIL INSTALLATION	PLATE NUMBER 630.02
			Sheet 1 of 1



March 31, 2000

Published Date: 2nd Qtr. 2016	S D D O T	THRIE BEAM RAIL, RAIL SPLICE, AND HARDWARE	PLATE NUMBER 630.03
			Sheet 1 of 1



POST SPACING ARRANGEMENT FOR THRIE BEAM GUARDRAIL AT BRIDGE END

December 23, 2002

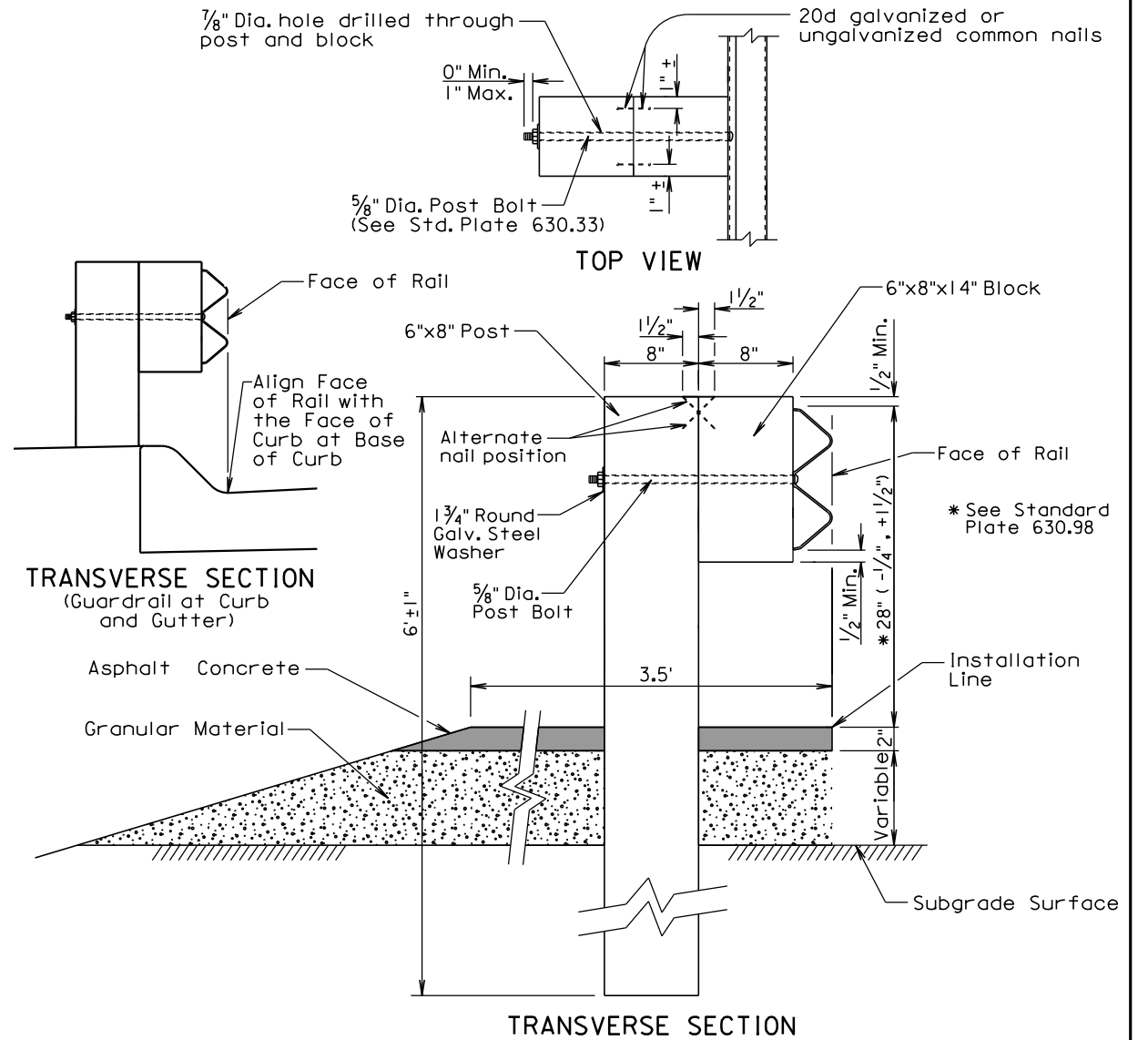
Published Date: 2nd Qtr. 2016

SDOT

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 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 Specifications for "Base Course". The granular material shall be placed the same thickness as the mainline surfacing or as specified in the plans.

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 post and top of block shall have a true square cut. The top of block shall be ±1 inch from the top of the post.

June 26, 2015

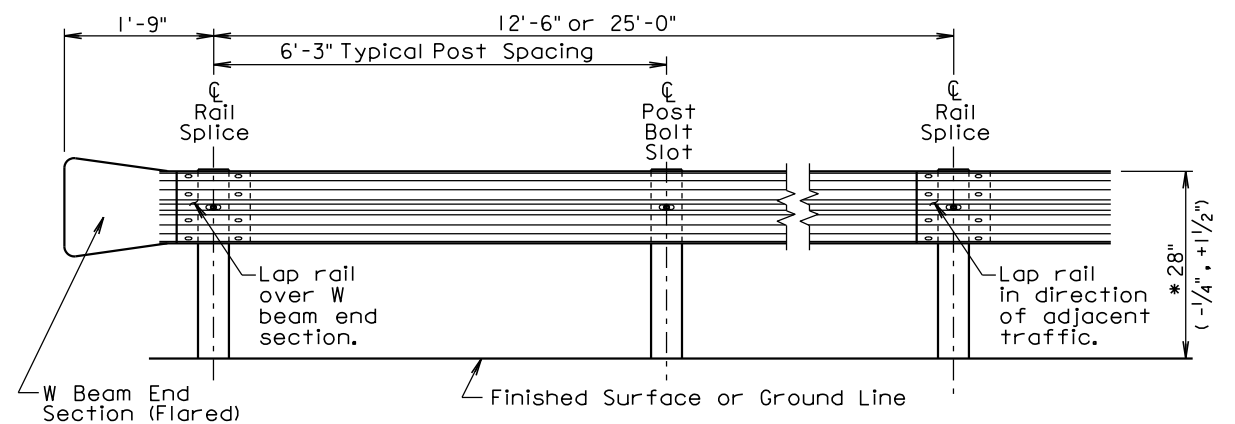
Published Date: 2nd Qtr. 2016

SDOT

W BEAM GUARDRAIL POST INSTALLATION

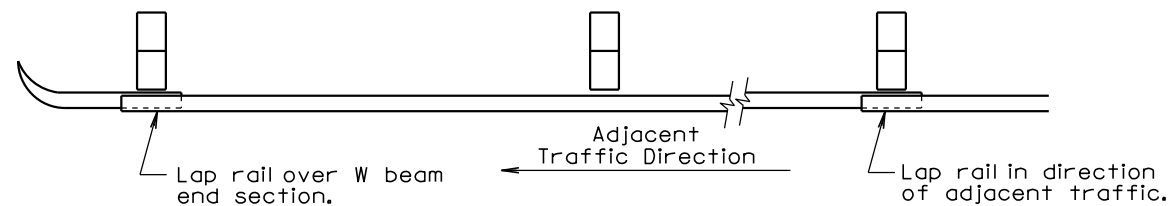
PLATE NUMBER
630.31

Sheet 1 of 1



ELEVATION

*See Standard Plate 630.98



PLAN

W BEAM GUARDRAIL DEFLECTION CRITERIA	
POST SPACING	MAXIMUM DEFLECTION
6'-3"	5'-0"
3'-1 1/2"	3'-9"

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.

June 26, 2015

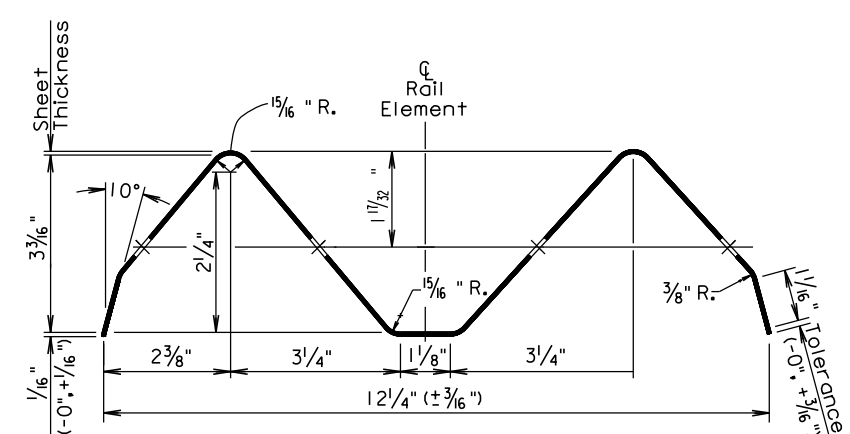
Published Date: 2nd Qtr. 2016

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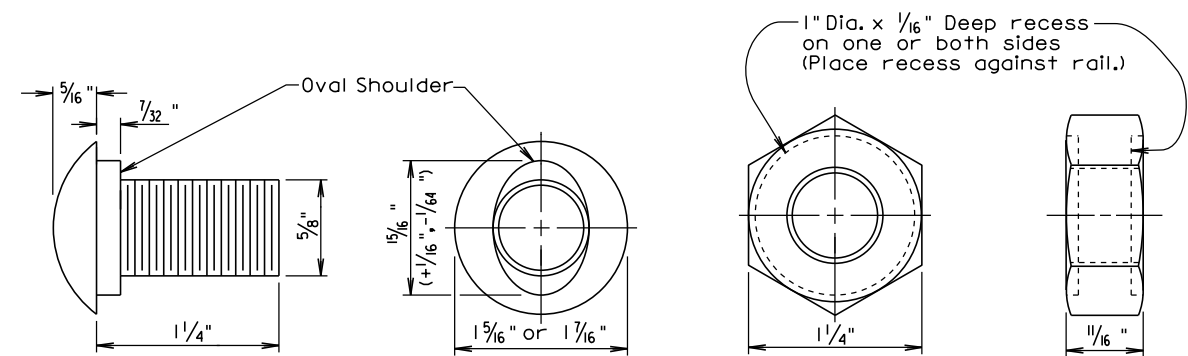
W BEAM GUARDRAIL INSTALLATION

PLATE NUMBER
630.32

Sheet 1 of 1

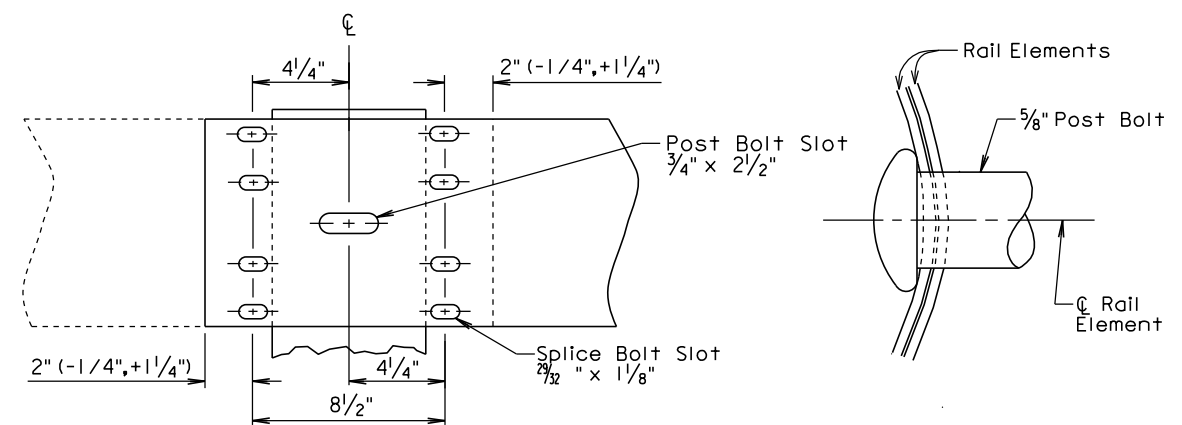


SECTION THROUGH W BEAM RAIL ELEMENT



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

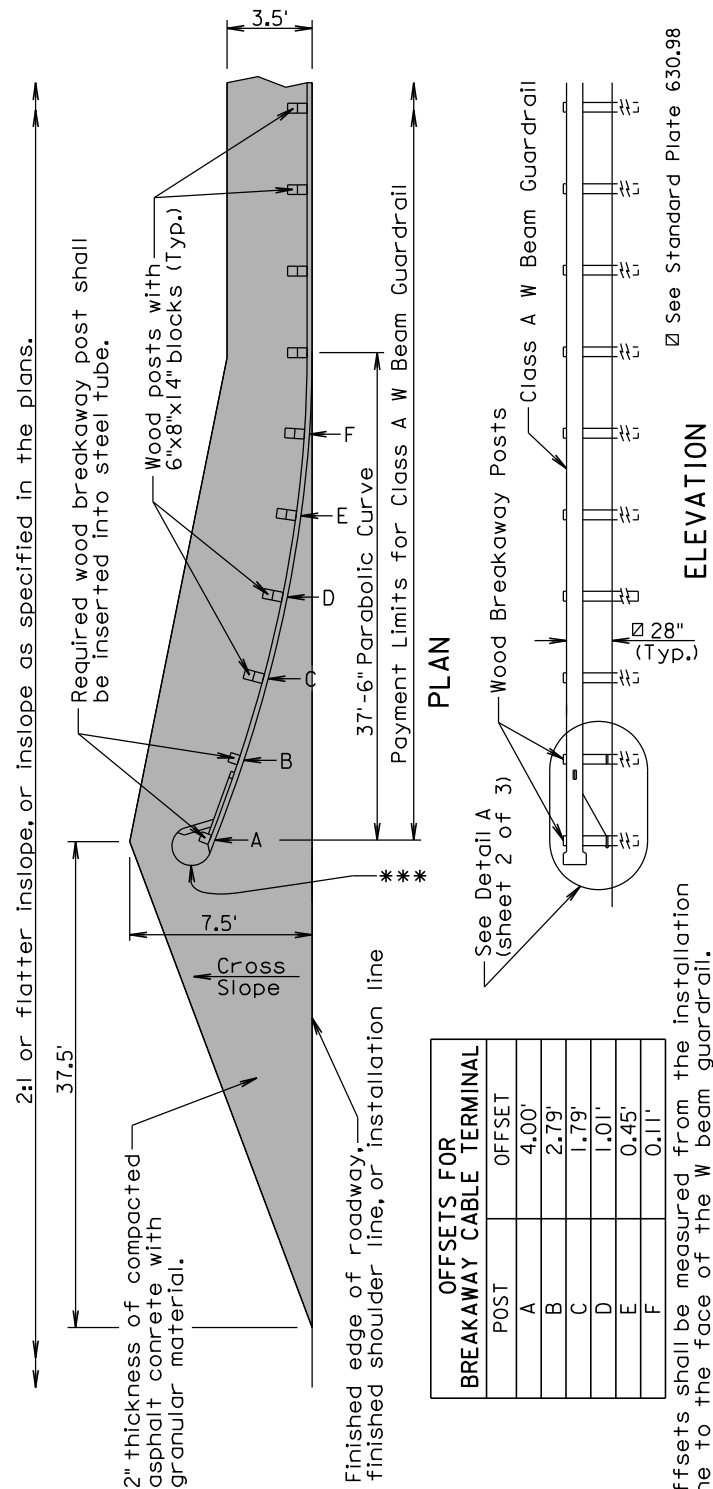
Published Date: 2nd Qtr. 2016

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W BEAM RAIL, RAIL SPLICE, AND HARDWARE

PLATE NUMBER
630.33

Sheet 1 of 1



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 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 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".

December 16, 2014

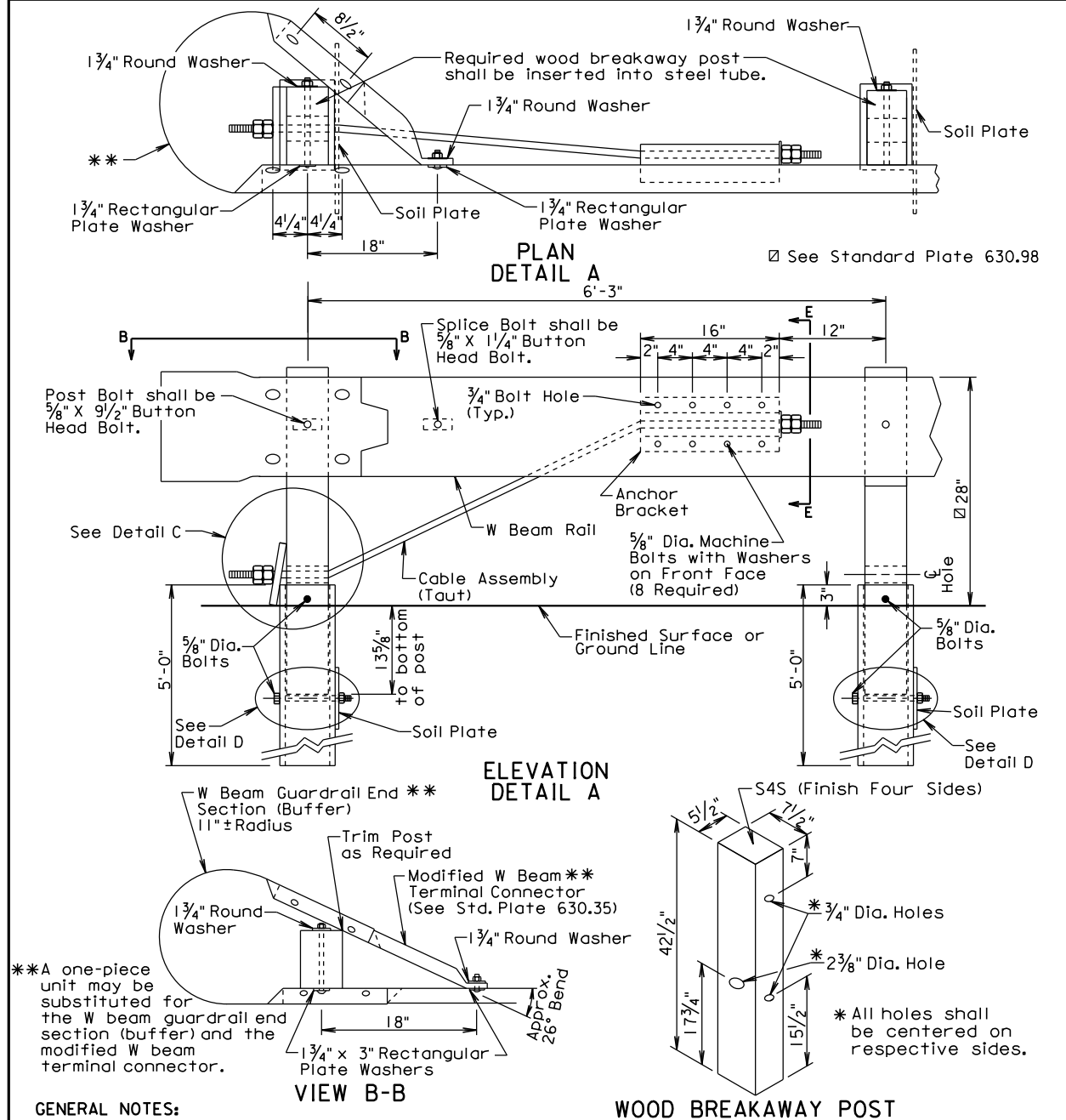
Published Date: 2nd Qtr. 2016

SDOT

W BEAM GUARDRAIL
BREAKAWAY CABLE TERMINAL

PLATE NUMBER
630.47

Sheet 1 of 3



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 3/4", Type II, with Class A coating in conformance with AASHTO M30.

December 16, 2014

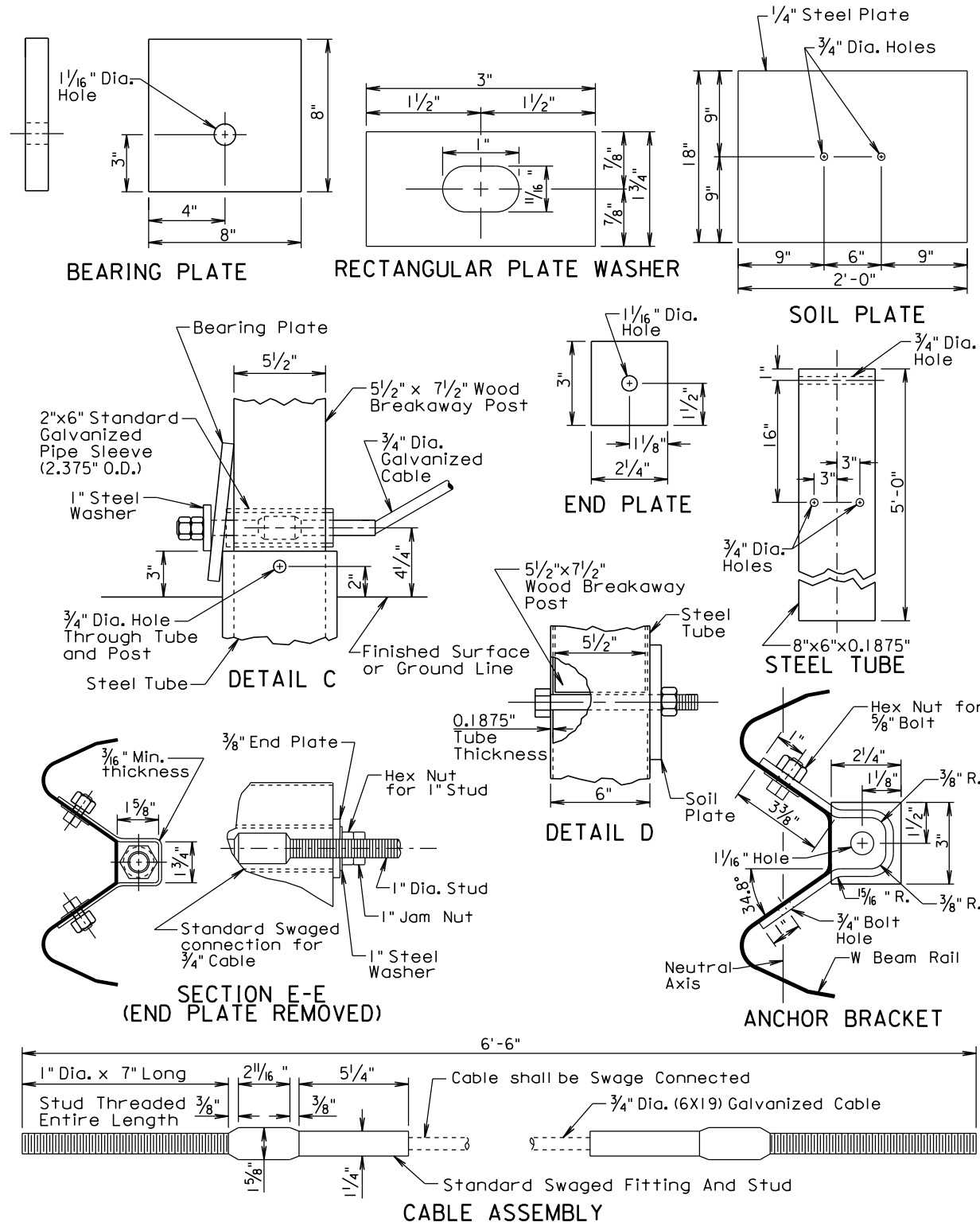
Published Date: 2nd Qtr. 2016

SDOT

W BEAM GUARDRAIL
BREAKAWAY CABLE TERMINAL

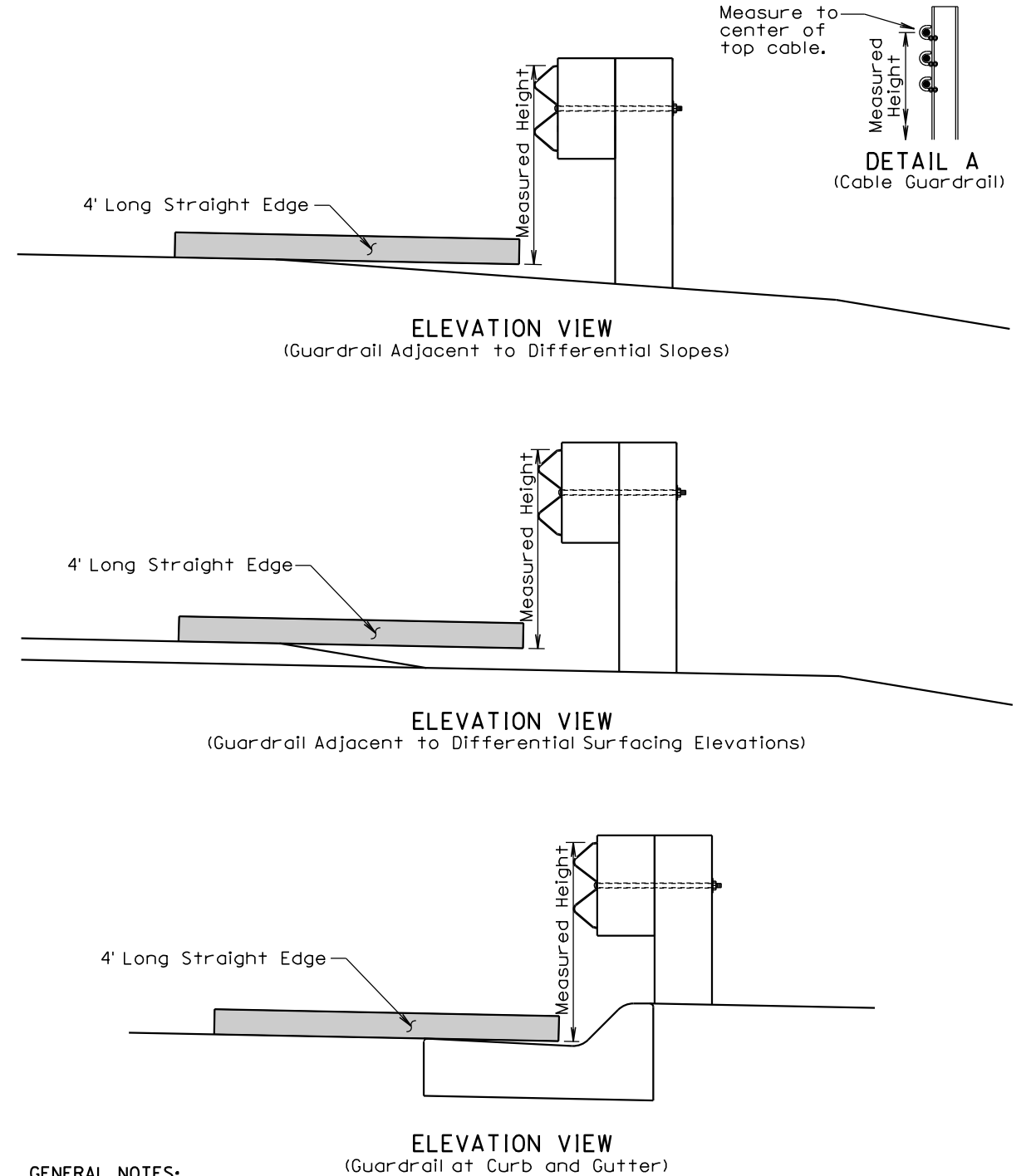
PLATE NUMBER
630.47

Sheet 2 of 3



December 16, 2014

Published Date: 2nd Qtr. 2016	S D D O T	W BEAM GUARDRAIL BREAKAWAY CABLE TERMINAL	PLATE NUMBER 630.47
			Sheet 3 of 3



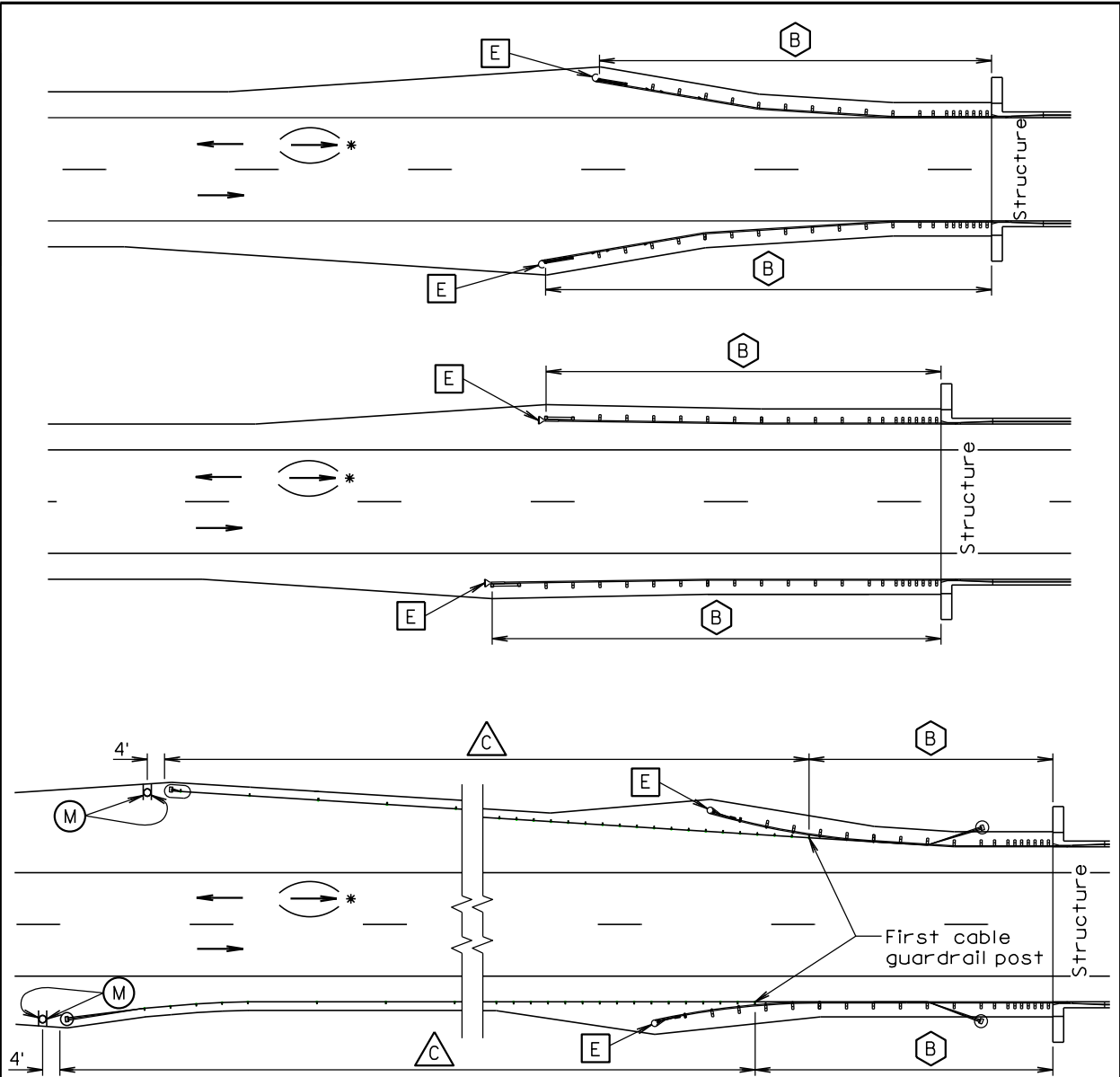
GENERAL NOTES:

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. 2016	S D D O T	MEASURING GUARDRAIL HEIGHT	PLATE NUMBER 630.98
			Sheet 1 of 1



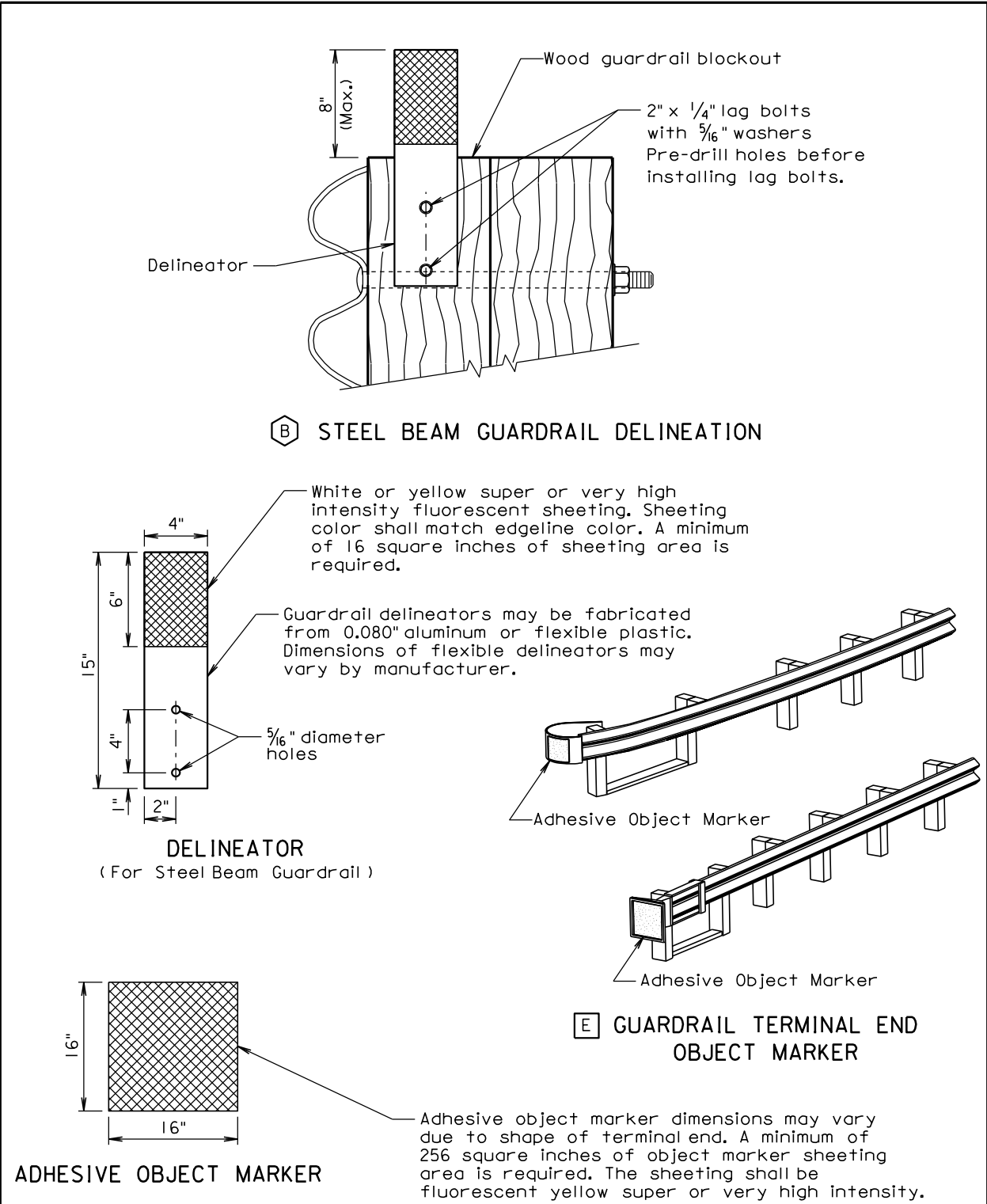
TYPICAL GUARDRAIL LAYOUTS

- (B) Steel Beam Guardrail Delineation
- (E) Guardrail Terminal End Object Marker
- (C) 3 Cable Guardrail Delineation
- (M) Type 2 Object Marker

*For two-way traffic,install delineation at the opposite end of structure the same as shown. Back-to-back delineation is required for two-way traffic,single-sided delineation for one-way traffic.

June 26, 2011

Published Date: 2nd Qtr. 2016	S D D O T	DELINEATION OF GUARDRAIL AT BRIDGES	PLATE NUMBER
			632.40
			Sheet 1 of 4



(B) STEEL BEAM GUARDRAIL DELINEATION

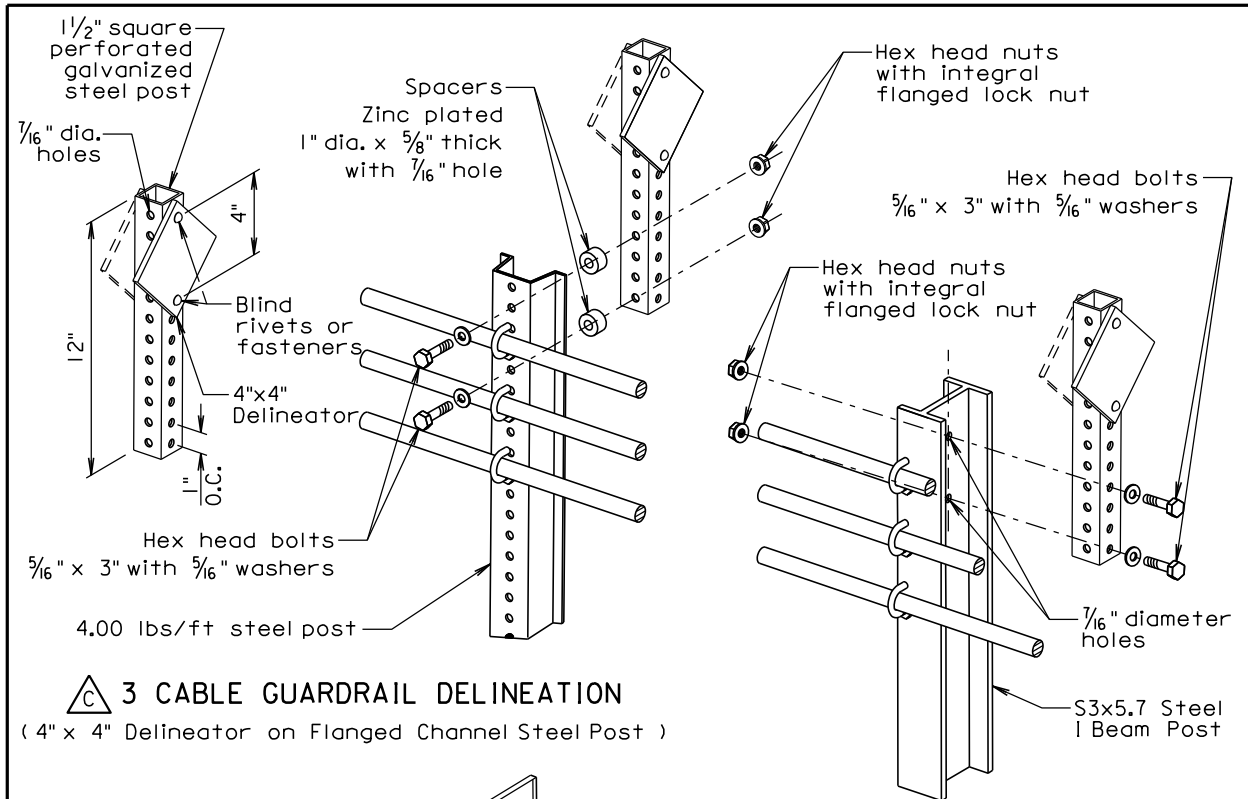
DELINEATOR
(For Steel Beam Guardrail)

ADHESIVE OBJECT MARKER

(E) GUARDRAIL TERMINAL END
OBJECT MARKER

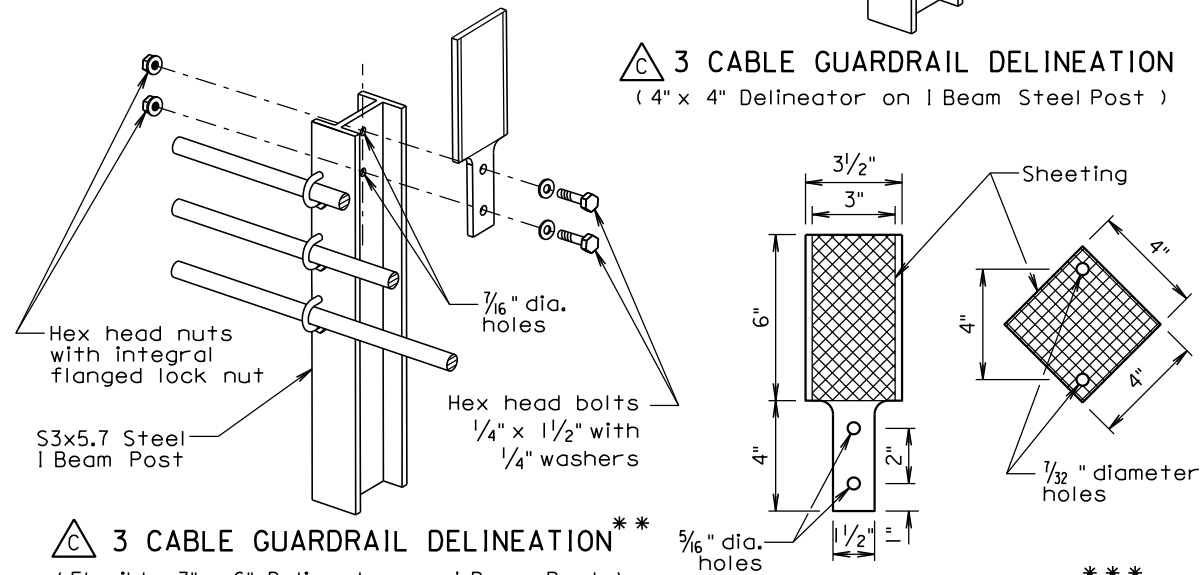
June 26, 2011

Published Date: 2nd Qtr. 2016	S D D O T	DELINEATION OF GUARDRAIL AT BRIDGES	PLATE NUMBER
			632.40
			Sheet 2 of 4



△ 3 CABLE GUARDRAIL DELINEATION

(4" x 4" Delineator on Flanged Channel Steel Post)



△ 3 CABLE GUARDRAIL DELINEATION

(4" x 4" Delineator on I Beam Steel Post)

△ 3 CABLE GUARDRAIL DELINEATION**

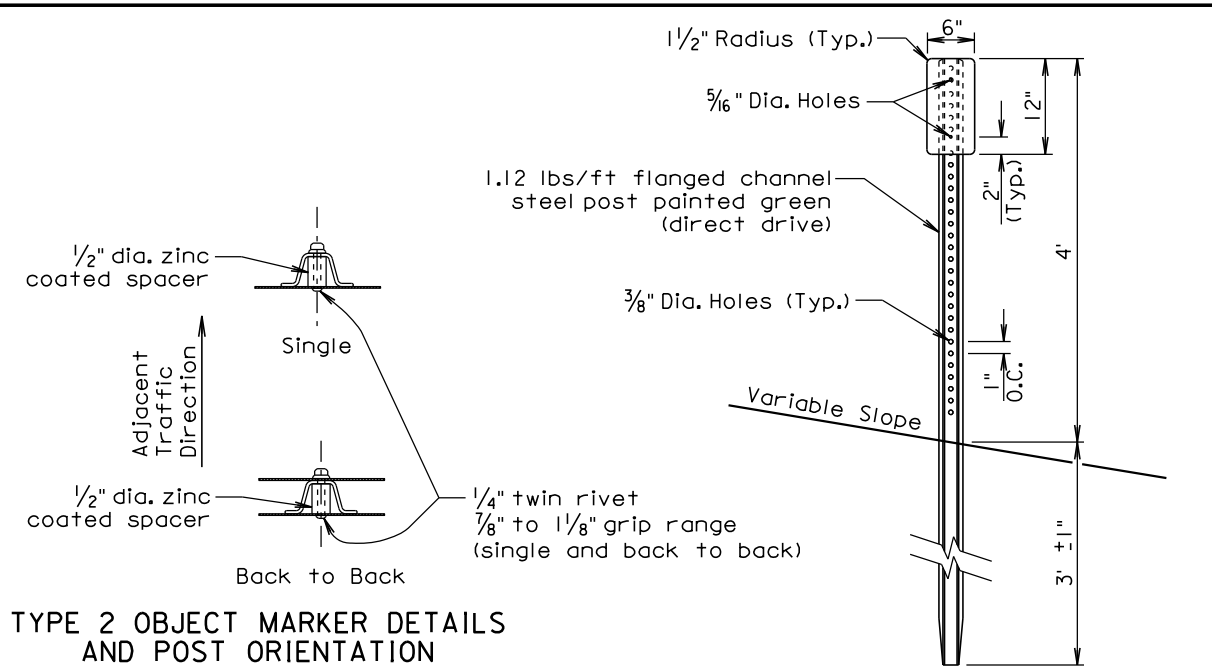
(Flexible 3" x 6" Delineator on I Beam Post)

** Flexible delineators may be attached to post with manufacturer approved adhesive instead of bolts.

*** Dimensions of flexible delineators may vary by manufacturer. A minimum of 16 square inches of sheeting area is required. The sheeting shall be white or yellow super or very high intensity fluorescent sheeting. The sheeting color shall match the edgeline color.

June 26, 2011

Published Date: 2nd Qtr. 2016	S D D O T	DELINEATION OF GUARDRAIL AT BRIDGES	PLATE NUMBER 632.40
			Sheet 3 of 4



TYPE 2 OBJECT MARKER DETAILS AND POST ORIENTATION

Ⓜ TYPE 2 OBJECT MARKER

(For Marking 3 Cable Guardrail Anchor)

GENERAL NOTES:

The delineators shall be covered with a minimum of 16 square inches of reflective sheeting. The reflective sheeting shall be of either very high intensity or super high intensity material. For bridges along two-way roadways the sheeting shall be on both sides of the delineator and shall be white in color. For one-way roadways the sheeting will only be required on the side facing traffic and the color will be the same as the nearest pavement marking, yellow on the left side of the roadway and white on the right side.

The first delineator shall be attached to the post nearest the bridge with additional delineators spaced in advance of the bridge at approximately 50 foot intervals. At bridges with short lengths of guardrail, less than 200 feet, a minimum of 4 delineators shall be placed in addition to the yellow object marker. The spacing between the delineators shall be approximately one third of the length of the guardrail. This will provide for a shorter spacing. At bridges with longer lengths of guardrail, greater than 200 feet, including bridges that have cable guardrail transitioning into the steel beam guardrail, the delineators will be placed at a spacing of approximately 50 feet. Delineation shall extend throughout the length of the guardrail system.

All costs for furnishing and installing single or back to back guardrail delineation shall be included in the contract unit price per each for "Guardrail Delineator".

An adhesive object marker shall be placed on the end of the W beam guardrail end terminal. The adhesive object marker dimensions may vary due to the shape of the terminal end. 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.

A type 2 object marker shall be placed adjacent to the 3 cable guardrail anchor at the location noted on sheet 1 of this standard plate. The type 2 object marker (6" x 12") shall have a fluorescent yellow very high or super high intensity reflective sheeting. All costs for furnishing and installing the type 2 object marker including the steel post, 6" x 12" reflective panel, and hardware shall be included in the contract unit price per each for "Type 2 Object Marker" for single-sided and "Type 2 Object Marker Back to Back" for back to back type 2 object markers.

June 26, 2011

Published Date: 2nd Qtr. 2016	S D D O T	DELINEATION OF GUARDRAIL AT BRIDGES	PLATE NUMBER 632.40
			Sheet 4 of 4

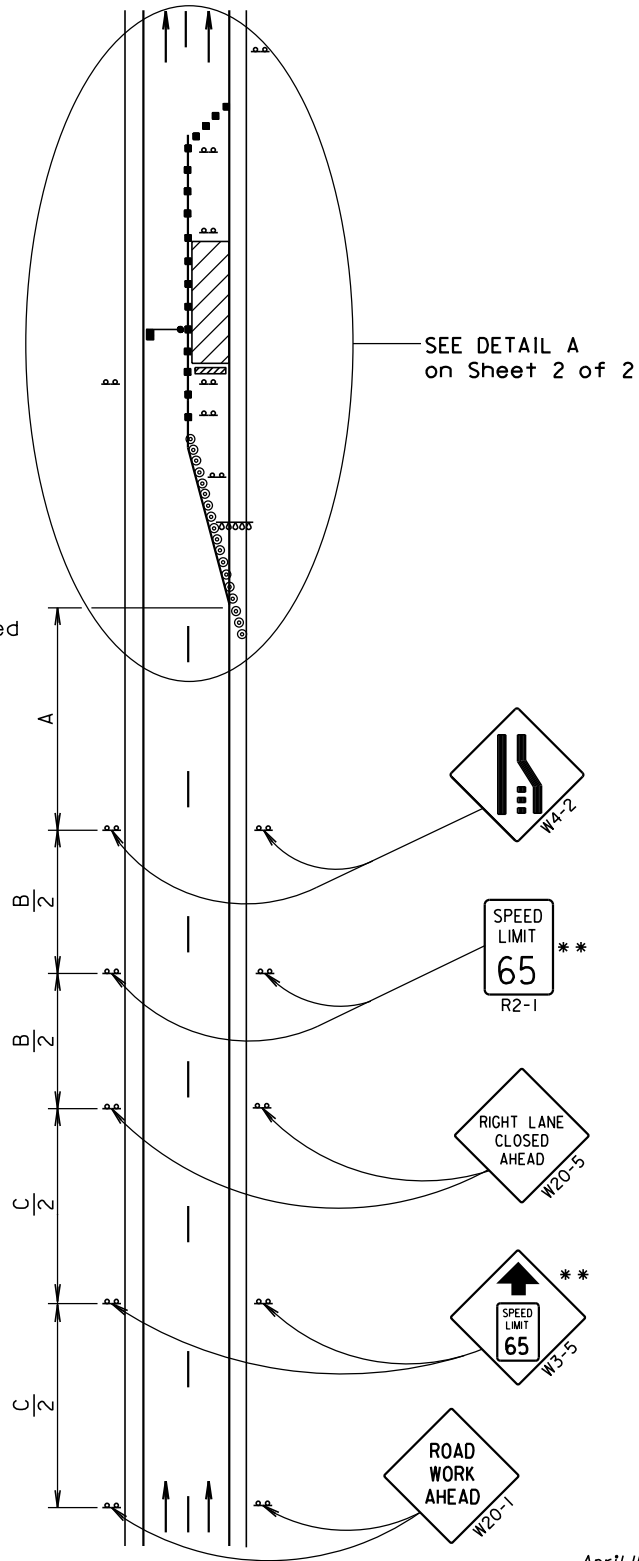
Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet)		
	(A)	(B)	(C)
0 - 30	200		
35 - 40	350		
45 - 50	500		
55	750		
60 - 65	1000		
	(A)	(B)	(C)
70 - 80	1000	1500	2640

** Speed appropriate for location.

- Reflectorized Drum
- Channelizing Device

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

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



April 15, 2015

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

* Spacing is 40' for 42" cones.

** Speed appropriate for location.

*** Use speed limit designated for the condition when workers are present in the work space. Signs shall be covered or removed when workers are not present.

● Flagger (As Necessary)

- Reflectorized Drum
- Channelizing Device

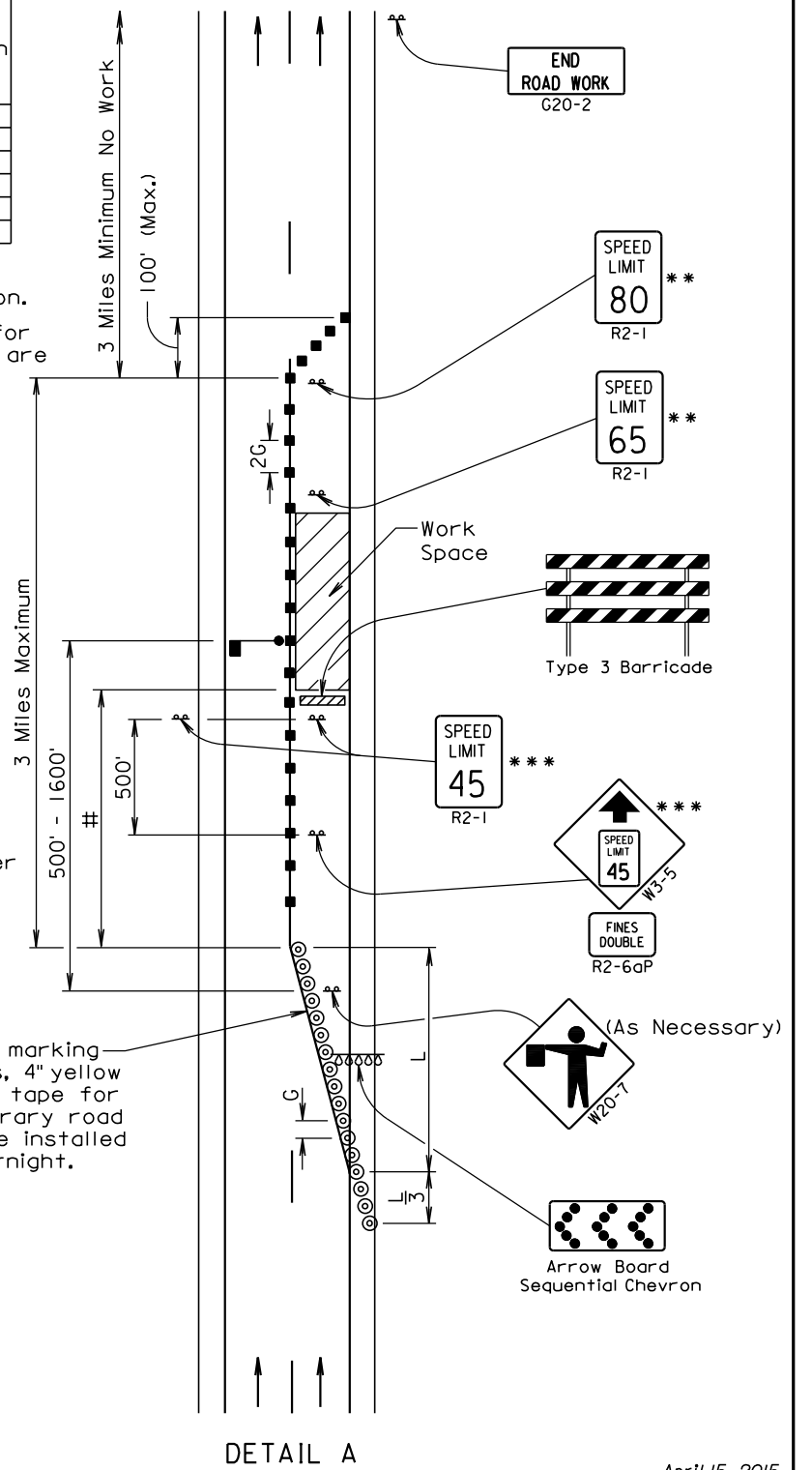
The Work Space shall be a minimum of 500' from the end of the taper.

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

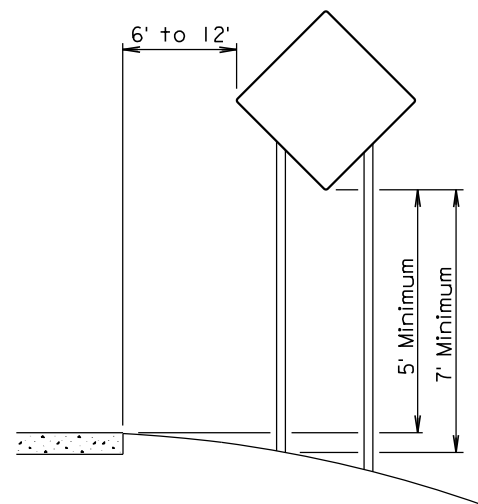
The channelizing devices shall be 42" cones or drums.

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

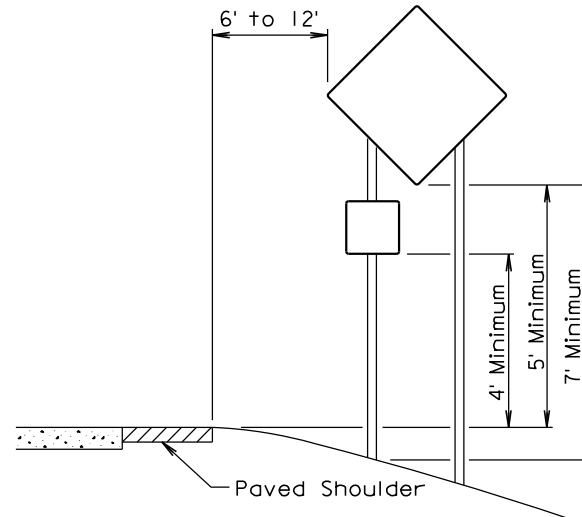
4" white temporary pavement marking tape for right lane closures, 4" yellow temporary pavement marking tape for left lane closures, or temporary road markers at 5' spacing shall be installed when the lane is closed overnight.



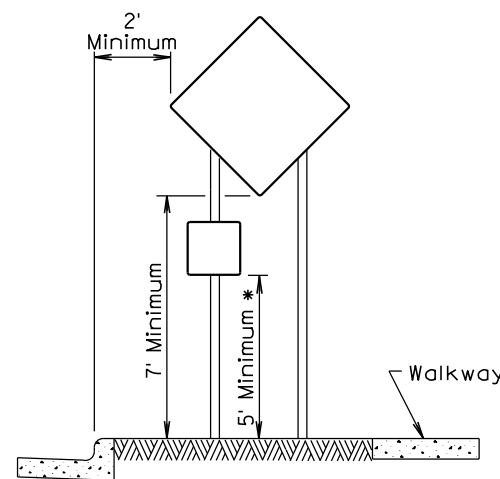
April 15, 2015



RURAL DISTRICT

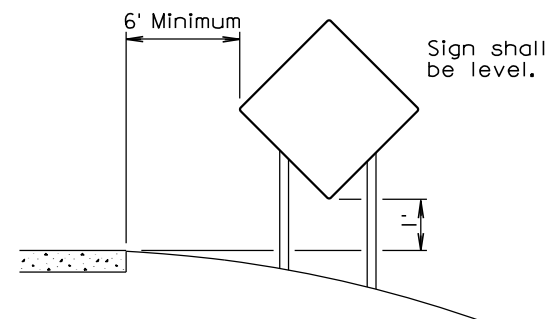


RURAL DISTRICT WITH
SUPPLEMENTAL PLATE



URBAN DISTRICT

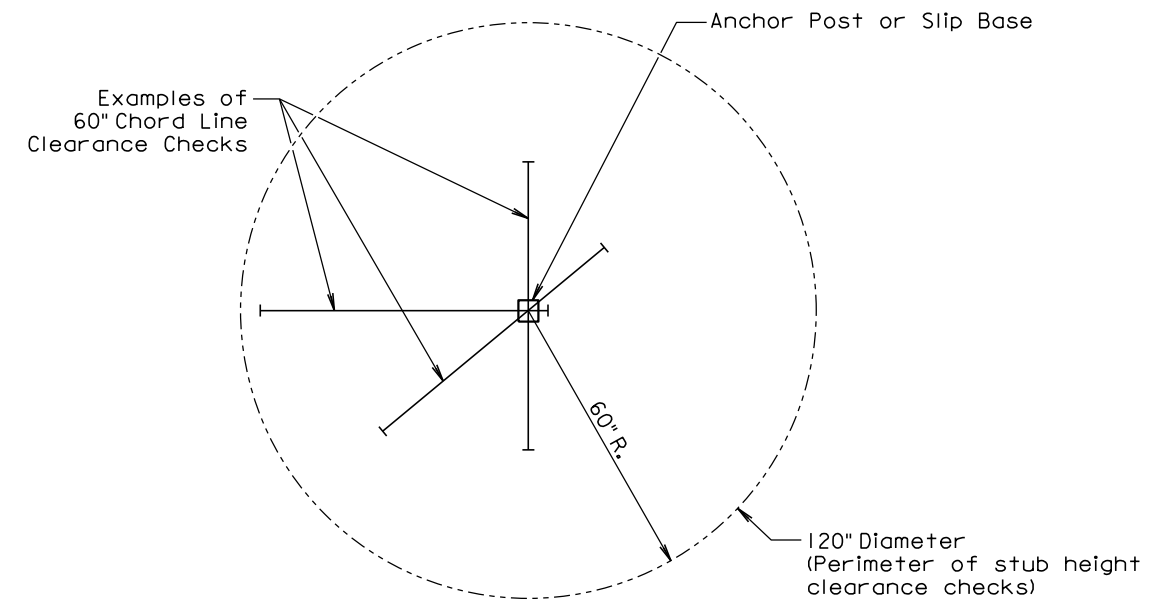
* If the bottom of supplemental plate is mounted lower than 7 feet above a pedestrian walkway, the supplemental plate should not project more than 4" into the pedestrian facility.



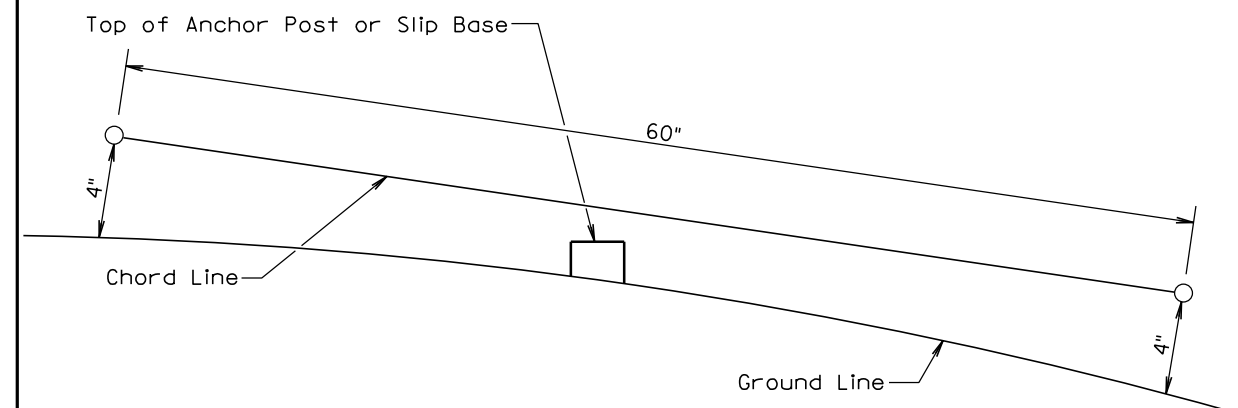
RURAL DISTRICT
3 DAY MAXIMUM
(Not applicable to regulatory signs)

September 22, 2014

Published Date: 2nd Qtr. 2016	S D D O T	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. 2016	S D D O T	BREAKAWAY SUPPORT STUB CLEARANCE	PLATE NUMBER 634.99
			Sheet 1 of 1