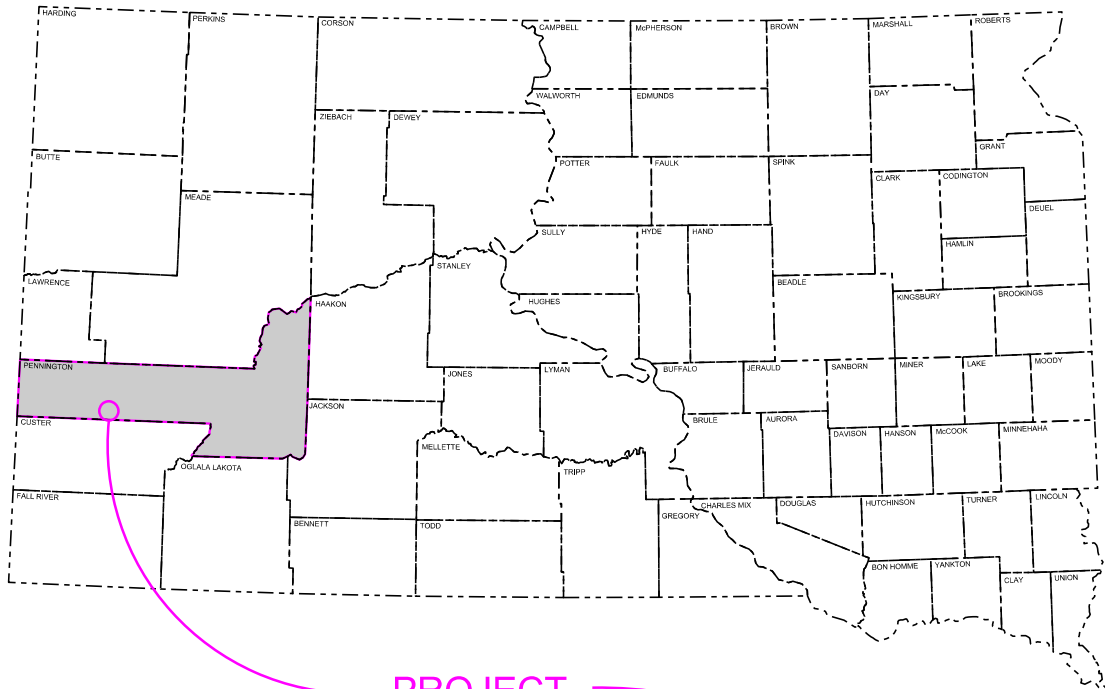


Plot Scale - 1:200

Plotted From - TRRC12608



PROJECT
US Highway 16
MRM 49 - MRM 49.7

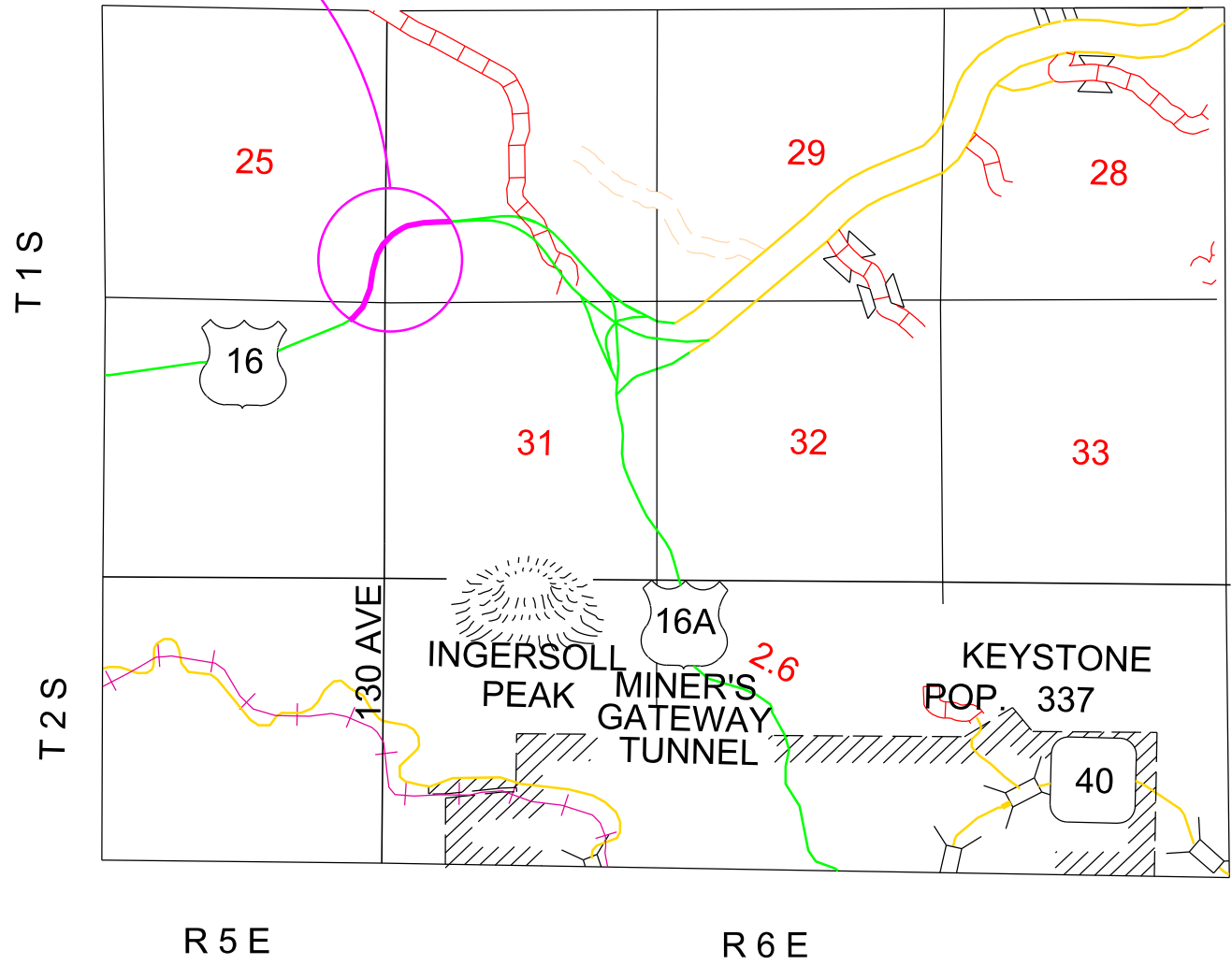
STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED
PROJECT 016-491
US HIGHWAY 16
PENNINGTON COUNTY
PAVEMENT REPAIR
PCN i71q

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	016-491	1	18

Plotting Date: 03/02/2023

INDEX OF SHEETS

1	General Layout with Index
2-6	Estimate with General Notes & Tables
7-10	Special Details
11-18	Standard Plates



DESIGN DESIGNATION

AADT (2021)	6155
AADT (041)	9706
DHV	1590
D	51%
DHV T%	7.4%
AADT T%	16.3%
V	55 mph

STORM WATER PERMIT

None Required

File - ...title.dgn

ESTIMATE OF QUANTITIES

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
380E5030	Nonreinforced PCC Pavement Repair	510.0	SqYd
380E6000	Dowel Bar	110	Each
380E6110	Insert Steel Bar in PCC Pavement	239	Each
390E0200	Repair Type A Spall	1.5	SqFt
633E0010	Cold Applied Plastic Pavement Marking, 4"	306	Ft
633E1220	High Build Waterborne Pavement Marking Paint, 4" White	306	Ft
633E5000	Grooving for Cold Applied Plastic Pavement Marking, 4"	306	Ft
633E5100	Grooving for Durable Pavement Marking, 4"	306	Ft
634E0010	Flagging	600.0	Hour
634E0110	Traffic Control Signs	165.0	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0275	Type 3 Barricade	6	Each
634E0600	4" Temporary Pavement Marking Tape Type I	2,344	Ft
634E0640	Temporary Pavement Marking	1,200	Ft
634E0900	Portable Temporary Traffic Control Signal	2	Unit
634E1260	Truck/Trailer Mounted Attenuator	2	Each

SPECIFICATIONS

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

ENVIRONMENTAL COMMITMENTS

The SDDOT is committed to protecting the environment and uses Environmental Commitments as a communication tool for the Engineer and Contractor to ensure that attention is given to avoid, minimize, and/or mitigate an environmental impact. Environmental commitments to various agencies and the public have been made to secure approval of this project. An agency with permitting authority can delay a project if identified 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. During construction, the Project Engineer will verify that the Contractor has met Environmental Commitment requirements. These environmental commitments are not subject to change without prior written approval from the SDDOT Environmental Office.

Additional guidance on SDDOT's Environmental Commitments can be accessed through the Environmental Procedures Manual found at: <<https://dot.sd.gov/media/documents/EnvironmentalProceduresManual.pdf>>

For questions regarding change orders in the field that may have an effect on an Environmental Commitment, the Project Engineer will contact the Environmental Engineer at 605-773-3180 or 605-773-4336 to determine whether an environmental analysis and/or resource agency coordination is necessary.

Once construction is complete, the Project Engineer will review all environmental commitments for the project and document their completion.

COMMITMENT B: FEDERALLY THREATENED, ENDANGERED, AND PROTECTED SPECIES

COMMITMNT 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 pits, or staging areas associated with the project, cease construction activities in the affected area until the Whooping Crane departs and immediately contact the Project Engineer. The Project Engineer will contact the Environmental Office so that the sighting can be reported to USFWS.

COMMITMENT B4: BALD EAGLE

Bald eagles are known to occur in this area.

Action Taken/Required:

If a nest is observed within one mile of the project site, notify the Project Engineer immediately so that he/she can consult with the Environmental Office for an appropriate course of action.

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 will 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) will 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 Agriculture and Natural Resources.

The waste disposal site(s) will 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 Environmental Office and the Project Engineer.

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

1. Construction and/or demolition debris consisting of concrete, asphalt concrete, or other similar materials will be buried in a trench separate from wood debris. The final cover over the construction and/or demolition debris will consist of a minimum of 1 foot of soil capable of supporting vegetation. Waste disposal sites provided outside of the Public ROW will be seeded in accordance with Natural Resources Conservation Service recommendations. The seeding recommendations may be obtained through the appropriate County NRCS Office. The Contractor will control the access to waste disposal sites not within the Public ROW with 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 not to exceed the duration of the project. Prior to project completion, the waste will 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) will be incidental to the various contract items.

COMMITMENT I: HISTORIC PRESERVATION OFFICE CLEARANCES

The SDDOT has obtained concurrence with the State Historic 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 a cultural resource review prior to scheduling the pre-construction meeting. 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 will arrange and pay for a record search and when necessary, a cultural resource survey. 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 if the site was previously surveyed; however, a cultural resources survey may need to be conducted by a qualified archaeologist.

The Contractor will provide ARC with the following: a topographical map or aerial view in 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 will submit the cultural resources survey report to SDDOT Environmental Office, 700 East Broadway Avenue, Pierre, SD 57501-2586. 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.

In the event of an inadvertent discovery of human remains, funerary objects, or if evidence of cultural resources is identified during project construction activities, then such activities within 100 feet of the inadvertent discovery will immediately cease and the Project Engineer will be immediately notified. The Project Engineer will contact the SDDOT Environmental Office, who will contact the appropriate SHPO/THPO within 48 hours of the discovery 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 will not utilize a site known or suspected of having contaminated soil or water. The Contractor will provide the required permits and clearances to the Project Engineer at the preconstruction meeting.

COMMITMENT S: FIRE PREVENTION IN THE BLACK HILLS AREA

This project is located within the Black Hills Forest Fire Protection Boundary.

Action Taken/Required:

The Contractor will adhere to the “Special Provision for Fire Plan”.

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 will contact the Engineer to determine modifications that will be necessary to avoid utility impacts.

EXISTING PCC PAVEMENT

US 16 - The existing pavement on US16 is 8” Nonreinforced PCC Pavement with limestone aggregate. Longitudinal joints are reinforced with Dowel Bars spaced 36” center to center. The transverse joints are skewed and spaced 15’. The transverse joints have 1½” diameter 18” steel bars spaced 12” apart, three to each wheel path. The existing transverse contraction joints are spaced at approximately 15 feet and have transverse joints that are skewed 2.5 feet in 15 feet.

REPAIR TYPE A SPALL

Locations and size (length or width) of concrete spall repair areas are subject to change in the field, at the discretion of the Engineer, at no additional cost to the state. The minimum dimension of the repair area will be 6”. Payment will be based on actual area replaced.

Concrete patch material will be from the Approved Products List for Dowel Bar Retrofit Patch Material.

If shrinkage cracking is occurring, the Contractor will stop work and adjust the patching mix as needed to ensure the water/cementious ratio eliminates any shrinkage cracking.

As an alternative, the Contractor may remove concrete by milling, provided it produces results similar to the sawing and chipping process described in the Specifications. Milling is typically the preferred method for longer spall repair locations.

NONREINFORCED PCC PAVEMENT REPAIR

Concrete will meet the requirements stated in Section 380 of the specifications, except as modified by the following notes:

The fine aggregate will be screened over a one-inch square-opening screen just prior to introduction into the concrete paving mix if required by the Engineer.

The slump requirement will be limited to 3" maximum after water reducer is added and the concrete will contain 4.5% to 7.0% entrained air. The concrete will contain a minimum of 50% coarse aggregate by weight. Coarse aggregate will 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 mix design will contain at least 650 lbs of Type I or II cement or 600 lbs of Type III cement per cubic yard. The minimum 28-day compressive strength will be 4,000 psi. The Contractor is responsible for the mix design used. The Contractor will submit a mix design and supporting documentation for approval at least 2 weeks prior to use.

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

Concrete will 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 will be cured for a minimum of 48 hours before opening to traffic. The 48 hours is based upon a concrete surface temperature of 60°F or higher throughout the cure period. If the concrete temperature falls below 60°F, the cure time will be extended, or other measures taken, at no additional cost to the State. A strength of 3,000 psi must be attained prior to opening to traffic.

Upon placement of the concrete, repair areas will be straight edged to ensure a smooth riding surface and will be textured longitudinally with the pavement by finishing with a stiff broom. Repair areas will then be checked with a 10’ foot straight edge. The permissible longitudinal and transverse surface deviation will be 1/8” in 10’.

Concrete will be covered with suitable insulation blanket consisting of a layer of closed cell polystyrene foam protected by at least one layer of plastic. Insulation blanket will have an R-value of at least 0.5, as rated by the manufacturer. Insulation blanket will be left in place, except for joint sawing operations, until the 3,000 psi is attained. Insulation blanket will be overlapped on to the existing concrete by 4’. This requirement for covering repair areas with insulation blankets may be waived during periods of hot weather upon approval of the Engineer.

Asphalt shoulders along PCCP will be removed 1 foot wide. 6 inches of Asphalt Concrete Composite will be used to repair asphalt shoulders. Existing granular base material will be used for the base of the asphalt shoulder repair.

Cost for performing the aforementioned work including sawing and removing concrete, furnishing and placing concrete, sawing and sealing joints, repairing gravel and asphalt concrete shoulders, labor, tools and equipment will be included in the contract unit price per square yard for Nonreinforced PCC Pavement Repair.

The contractor will form rumble strips into the concrete when it's plastic to match existing conditions on centerline and edgeline. All costs for this work will be incidental to the unit price per square yard for Nonreinforced PCC Pavement Repair.

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RESTORATION OF GRAVEL CUSHION

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

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

STEEL BAR INSERTION

The Contractor will insert the Steel Bars (No. 9 x 18 inch epoxy coated deformed tie bars transverse, No. 5 x 30 inch epoxy coated deformed tie bars longitudinally and 1 ¼" Bars transverse) into drilled holes in the existing concrete pavement. An epoxy resin adhesive must be used to anchor the steel bar in the drilled hole.

The steel bars will be cut to the specified length by sawing or shearing and will be free from burring or other deformations.

Epoxy coated plain round steel bars will be inserted on 12-inch centers in the transverse joint. The first steel bar will be placed a minimum of 3 inches and a maximum of 6 inches from the outside edge of the slab.

Epoxy coated deformed steel bars will be inserted on 18-inch centers in the transverse joint. The first steel bar will be placed a minimum of 3 inches and a maximum of 9 inches from the outside edge of the slab.

Epoxy coated deformed steel bars will be inserted on 30-inch centers in the longitudinal joint and will be placed a minimum of 15 inches from the existing transverse contraction joint.

COLD APPLIED PLASTIC PAVEMENT MARKING

All material will be applied as per the manufacturer's recommendations.

Cold Applied Plastic Pavement Markings will be 3M Series 380 IES or an approved equal.

GROOVING FOR COLD APPLIED PLASTIC PAVEMENT MARKING

The Contractor will establish a positive means for the removal of the grinding and/or grooving residue. Residue from dry grooving will be vacuumed. Solid residue will be removed from the pavement surfaces before being blown by traffic action or wind. The Contractor will conduct this work to control and minimize airborne dust and similar debris that may become a hazard to motor vehicle operation or nuisance to property owners. Residue from wet grooving will 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, will be disposed of in a manner that will prevent it from reaching any waterway in a concentrated state. The cleaning of the residue for grooving will be to the satisfaction of the Engineer and may require more than one pass to adequately remove material. All costs for removal of grinding and/or grooving residue will be included in the contract unit price per foot, square foot, each, or word for Grooving for Cold Applied Plastic Pavement Marking contract items.

HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT

All materials will be applied as per manufacturer's recommendations. High build waterborne pavement marking paint will conform to the supplemental specifications for Section 980.1 B.

Reflective media will consist of glass beads.

High Build Waterborne Pavement Marking Paint applied after October 15 must be formulated as cold-weather waterborne paint. Cold weather waterborne paint will meet the requirements of Section 980.1 C.

RATES OF MATERIALS FOR HIGH BUILD WATERBORNE PAVEMENT MARKING PAINT

Solid 4" line = 22.5 Gals/Mile
Dashed 4" line = 6.2 Gal/Mile
Glass Beads = 8 Lbs/Gal.

All cost for materials, labor and equipment necessary to furnish and install the pavement markings will be incidental to the contract unit price for the respective High Build Waterborne Pavement Marking Paint items.

SEQUENCE OF OPERATIONS

The Contractor will submit a sequence of operations for approval two weeks prior to the preconstruction meeting. If changes to the sequence of operations are proposed during the project, these must be submitted for review a minimum of one week prior to potential implementation. Approval for changes to the 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.

GENERAL TRAFFIC CONTROL

Existing guide, route, informational logo, regulatory, and warning signs will be temporarily reset and maintained during construction. Removing, relocating, covering, salvaging, and resetting of existing traffic control devices, including delineation, will be the responsibility of the Contractor. Cost for this work will be incidental to the contract unit prices for the various items unless otherwise specified in the plans. Any delineators and signs damaged or lost will be replaced by the Contractor at no cost to the State.

All temporary traffic control sign locations will be set in the field by the Contractor and verified by the Engineer prior to installation.

All temporary speed limit signs will have a minimum mounting height of 5 feet in rural locations, even when mounted on portable supports.

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

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

Unless otherwise stated in these plans, work will not be allowed during hours of darkness.

Fixed location signing placed more than 4 calendar days prior to the start of construction will be covered or laid down until the time of construction. The covers must be approved by the Engineer prior to installation. The cost of materials, labor, and equipment necessary to complete this work will be incidental to other contract items. No separate payment will be made.

All fixed location signs, sign posts, and breakaway bases will be removed within 7 calendar days following pavement marking.

All haul trucks will be equipped with an additional flashing amber light that is visible from the backside of the haul truck. The costs for the flashing amber lights will be incidental to the various related contract items.

A Type 3 Barricade will be installed at the end of a lane closure taper.

Temporary flexible road markers (tabs) will be used for lane closure tapers or lane shift tapers that are left up overnight and shall be installed at 5' spacing. Due to the unknown amount of lane closure set ups to complete the work on this project, tabs used for tapers and shifts. 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 unit price per foot for Temporary Pavement Marking.

All excavations below the existing pavement thickness will be backfilled prior to the end of the workday.

TRAFFIC CONTROL FOR PCCP REPAIRS AND SPALL REPAIRS

Each mainline concrete repair location, from which the in-place concrete has been removed, will be marked with a Type 3 Barricade.

Access to approaches will be maintained at all times.

When work is in progress within an intersection, Flaggers will be required to direct traffic.

Holes adjacent to centerline in the lane open to traffic created during removal and replacement of PCC pavement repair areas will be filled with gravel cushion material.

Routing traffic onto the mainline shoulders during any phase of the construction will not be allowed.

Damage to the shoulders, median, or ditch due to the Contractor's operations will be repaired by the Contractor to the satisfaction of the Engineer at no expense to the State. This includes the apparent routing of traffic onto the shoulders around the work zones.

Holes in the gravel and asphalt concrete shoulders created during removal and replacement of PCC pavement repair areas will be filled with gravel cushion material and hot-mix asphalt concrete (to match the shoulder surfacing) prior to opening the lane to traffic

PORTABLE TEMPORARY TRAFFIC CONTROL SIGNAL

The Contractor will furnish, install, operate, and maintain a portable temporary traffic control signal during construction phases as determined by the Engineer. There will be one controller and one slave unit per location.

The portable temporary traffic control signal will be set up to dwell in red. Detection will be video, microwave, or radar. The green time may be adjusted as needed. The initial timings for the construction sites are given below:

The timings above are based on 1200 feet between opposing stop lines.

The Contractor will contact the Region Traffic Engineer for the timing sequences.

All vehicle signal heads will have backplates with retroreflective border. The vehicle signal head backplates will have a factory applied 3-inch wide yellow retroreflective border. Sheeting for the border will be Type IX or Type XI in conformance with ASTM D4956.

Signal backplates will be polycarbonate, aluminum, or aluminum-composite. Minimum material thicknesses are:

- Polycarbonate, 0.10-inch
- Aluminum, 0.06-inch
- Aluminum-Composite, 0.08-inch

Signal backplates will extend not less than 5 inches from the edge of the signal head at the top, bottom, and sides.

All traffic signal equipment and materials will meet the requirements of Sections 635 and 985 of the Specifications except the controller requirements.

All costs involved with constructing the portable temporary traffic control signal as specified above and on the plans, will be included in the contract unit price per unit for Portable Temporary Traffic Control Signal.

TEMPORARY PAVEMENT MARKING TAPE, TYPE I

Temporary pavement marking for stop lines will consist of 4" Temporary Pavement Marking Tape Type I. Placement of each 24" white stop line will be accomplished by placing six pieces of 4" x 12' tape adjacent to one another. The workspace requires two stop lines which is an equivalent of approximately 144' of 4" tape. Temporary pavement marking on centerline will consist of temporary flexible vertical markers (tabs) and will be used as depicted on standard plate 634.26 when the stop condition must remain in place during nighttime hours, 9:00 pm to 6:00 am (One workspace remaining during nighttime hours x 2,200' per workspace = 2200'). Temporary tape will be removed upon completion of the project.

CONTRACTOR FURNISHED PORTABLE CHANGEABLE MESSAGE SIGN

One week prior to starting work affecting the traveling public, portable changeable message signs (PCMS) will be installed at locations as directed by the Engineer to notify drivers of the upcoming construction. The Contractor will program the portable changeable message signs with the following message:

ROAD WORK
STARTS (Date)

When work begins that will affect traffic patterns, the Contractor will re-program the PCMS with the messages as directed by the Engineer.

TRUCK/TRAILER MOUNTED ATTENUATOR

The Contractor will furnish truck or trailer mounted attenuator(s) to be used for the duration of the project. Truck or trailer mounted attenuators (TMAs) will meet the crashworthy requirements of NCHRP 350 or MASH Test Level 3. TMAs will be used and maintained in accordance with the manufacturers' recommendations.

The TMAs should be utilized on the project where workers and/or equipment are working next to the centerline of the roadway with live traffic in the adjacent lane, or as directed by the Engineer. The TMAs will be removed from the roadway at the end of each working day. The TMAs will remain the property of the Contractor at the end of the project.

The TMAs will be paid for at the contract unit price per each for Truck/Trailer Mounted Attenuator. Payment will be full compensation for furnishing, maintaining, relocating and removing as many times as required by the Engineer and the Contractor's operations.

In the event a TMA is hit while in service, the manufacturer will assess the TMA and make a recommendation as to whether it can be repaired or needs to be replaced. The Department will reimburse the Contractor for repairs as documented by invoices or pay for another TMA to be deployed to the project as needed.

TMAs will be placed at active work sites and removed from the roadway during non-working hours.

ITEMIZED LIST OF TRAFFIC CONTROL DEVICES

		CONVENTIONAL ROAD			
SIGN CODE	SIGN DESCRIPTION	NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
R10-6	STOP HERE ON RED	2	24" x 36"	6.0	12.0
W1-4	REVERSE CURVE (L or R)	1	48" x 48"	16.0	16.0
W3-3	SIGNAL AHEAD (symbol)	2	48" x 48"	16.0	32.0
W20-1	ROAD WORK AHEAD	2	48" x 48"	16.0	32.0
W20-4	ONE LANE ROAD AHEAD	2	48" x 48"	16.0	32.0
W20-7	FLAGGER (symbol)	2	48" x 48"	16.0	32.0
G20-2	END ROAD WORK	2	36" x 18"	4.5	9.0
		CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT			
		165.0			

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PRESS RELEASE ANNOUNCEMENTS

The SDDOT will prepare a press release to be released 5 days prior to any phase change or any other major change that affects traffic flow. The SDDOT will be responsible to keep law enforcement, emergency services, and the traveling public notified of changes in project access. The Contractor will provide the Engineer with pertinent information 7 days prior to any phase change or any other major change that affects traffic flow.

Table of Material Quantities																			
Route	Direction	MRM	to	MRM	L	W	Notes	Number of Spalls	Repair Type A Spall	No. 5 Deformed Tie Bar	No. 9 Deforme d Tie Bar	1 ¼" Bar	Insert Steel Bar in PCC Pavement	Dowel Bar	Nonreinforced PCC Pavement Repair	Cold Applied Plastic Pavement Marking, 4"	Grooving for Cold Applied Plastic Pavement Marking, 4"	High Build Waterborne Pavement Marking Paint, 4" White	Grooving for Durable Pavement Marking, 4"
US 16					(Ft)	(Ft)			(SqFt)	(Each)	(Each)	(Each)	(Each)	(Each)	(SqYd)	(Ft)	(Ft)	(Ft)	(Ft)
	WB	49.218		49.238	105	15	Panel Repair - 7 Panels			35	15	15	65	30	175.0	105	105	105	105
	WB	49.243			15	15	Panel Repair - 1 Panel			5	15	15	35	15	25.0	15	15	15	15
	WB	49.268		49.283	90	15	Panel Repair - 6 Panels			30	15	15	60	25	150.0	90	90	90	90
	WB	49.318			6	15	Panel Repair - Panel Joint			4	15		19	15	10.0	6	6	6	6
	WB	49.321			0.5	0.5	Spall	1	0.3										
	WB	49.326		49.341	90	15	Panel Repair - 6 Panels			30	15	15	60	25	150.0	90	90	90	90
	WB	49.341			0.5	0.5	Spall	4	1.2										
								Total	1.5	104.0	75.0	60.0	239.0	110.0	510.0	306.0	306.0	306.0	306.0

PLOT SCALE - 1:200

PLOTTED FROM - TRRC12608

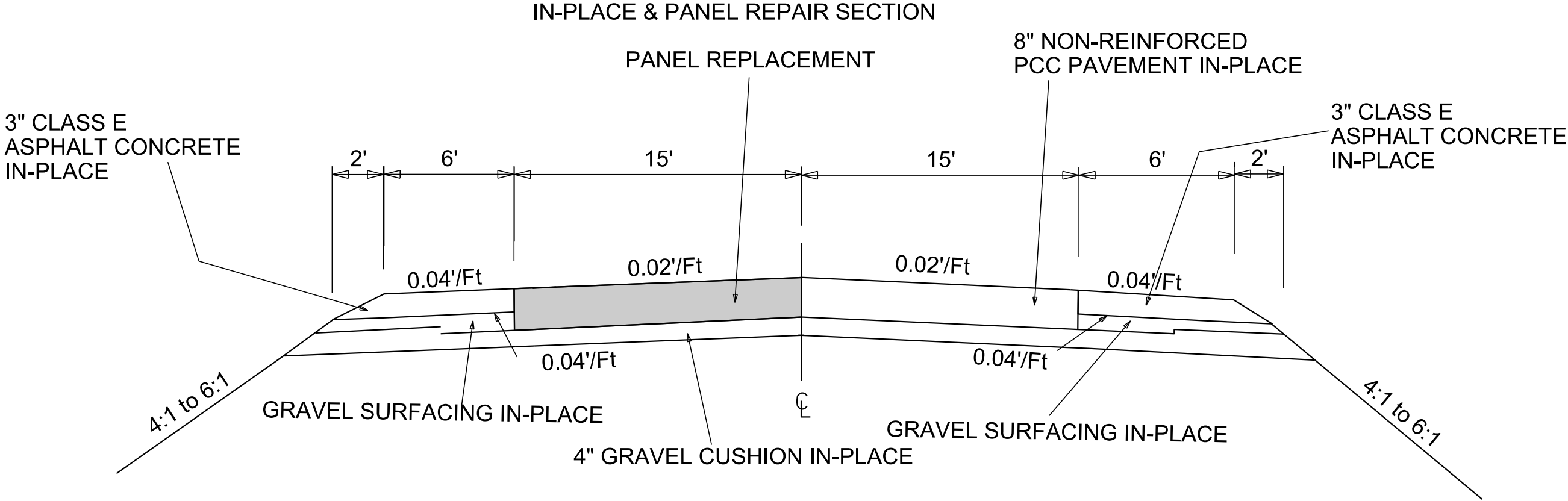
US16
MRM 49 to MRM 49.69

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	016-491	7	18

Plotting Date: 03/02/2023

PLOT NAME - 2

FILE - ... \TYP.DGN

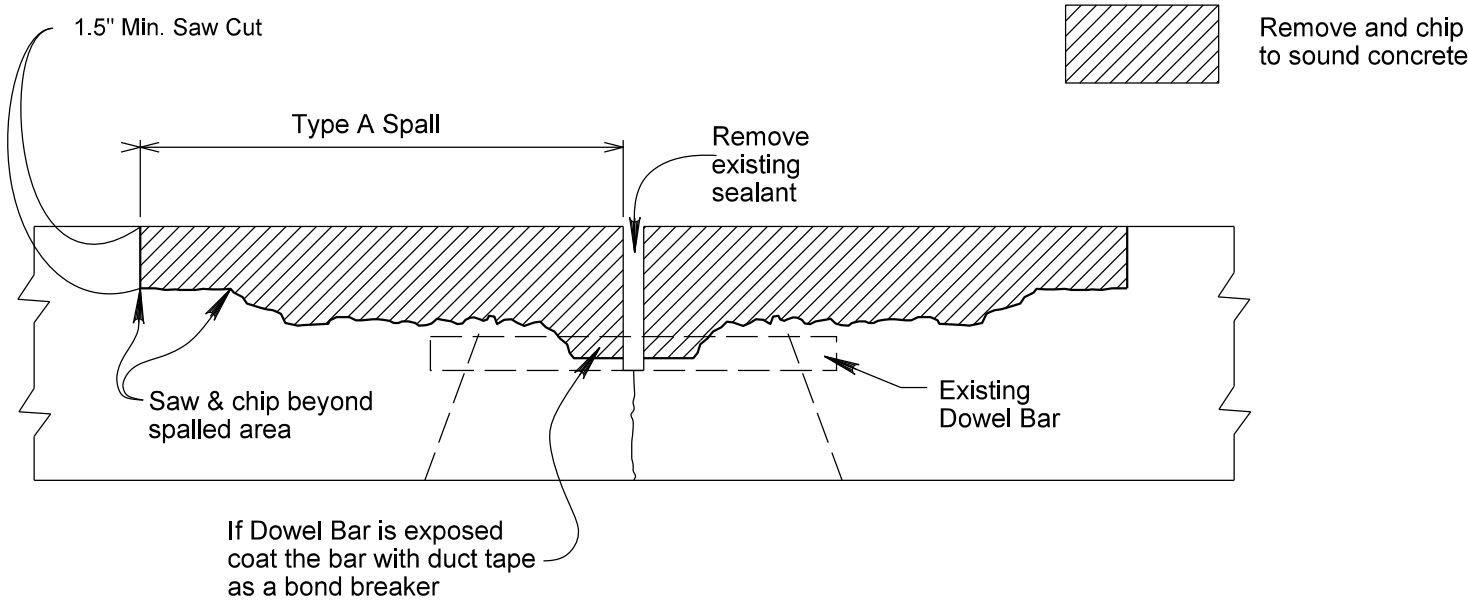


STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
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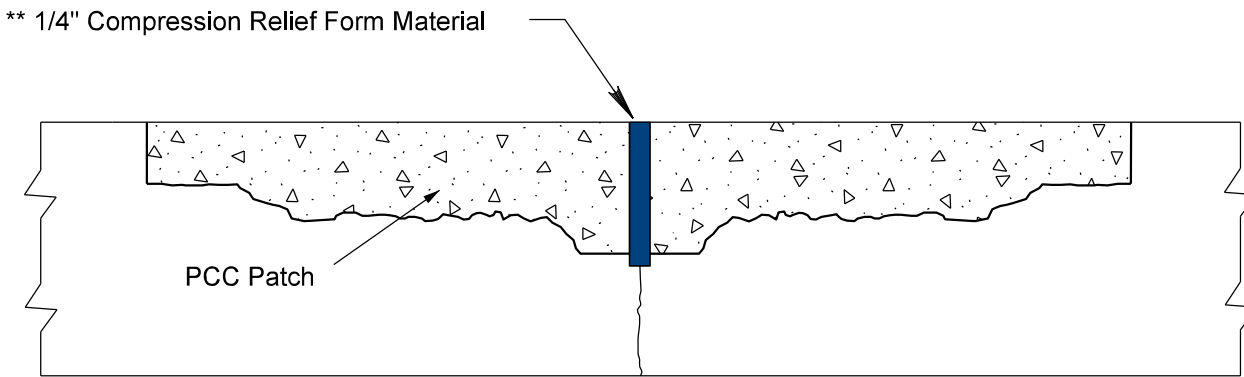
Plotting Date: 03/02/2023

REPAIR OF TYPE A SPALLS

SPALL REMOVAL

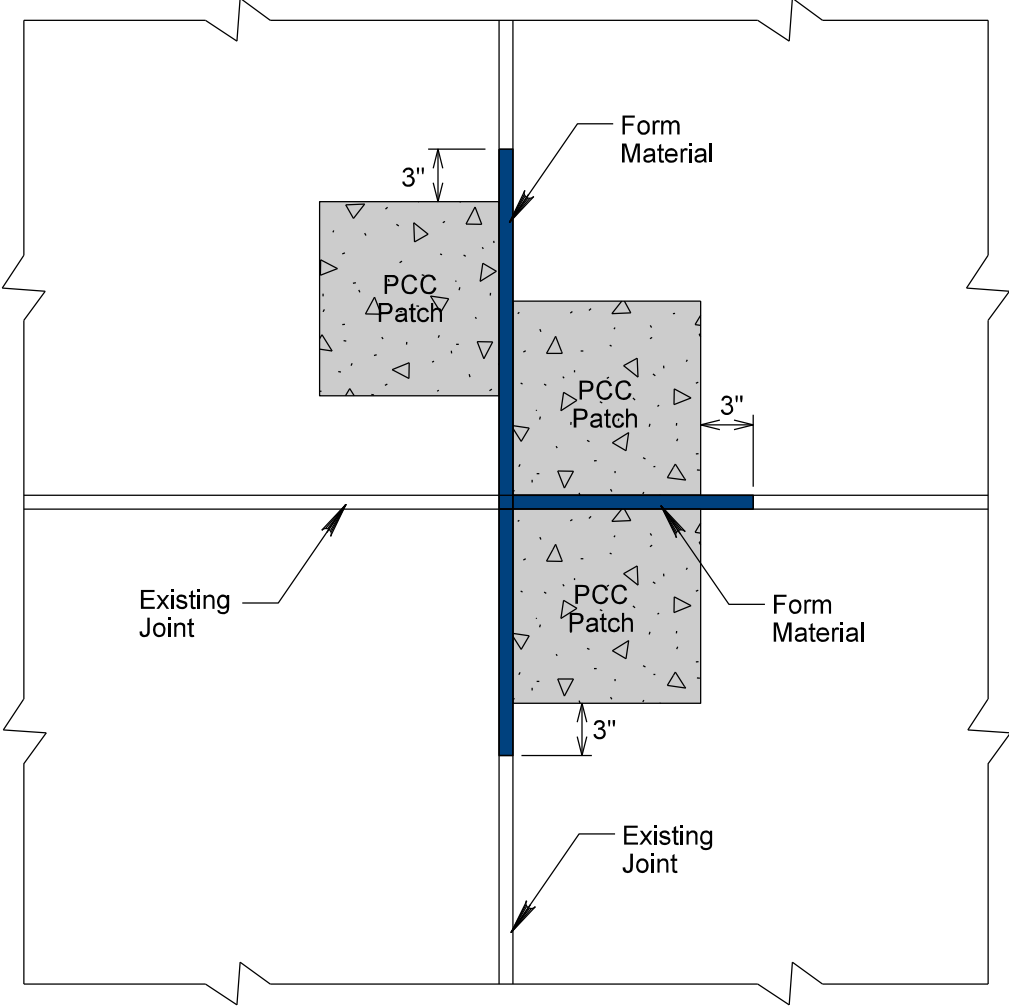


SPALL PATCH



** Compression Relief Form Material will be removed by sawing or other means approved by the Engineer.
Spall repaired joints will be sealed with Hot Poured Elastic Joint Sealer.

SPALL PATCHES (PLAN VIEW)

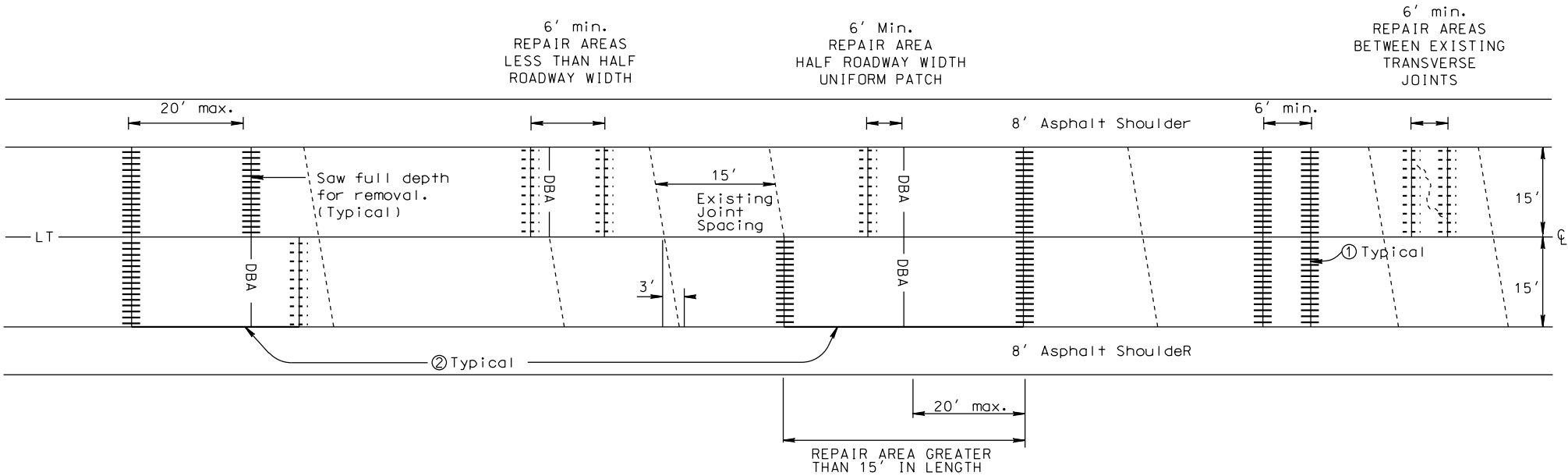


STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	016-491		

Plotting Date: 03/02/2023

NONREINFORCED SKEWED PCC PAVEMENT REPAIR

TYPICAL REPAIR AREAS



NOTES:

- ① Where possible, transverse joints will be constructed full roadway width.
- ② All edges of repair areas that are adjacent to asphalt concrete will 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)

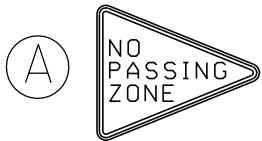
TYPICAL PAVEMENT MARKING LAYOUT

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	016-491	10	18

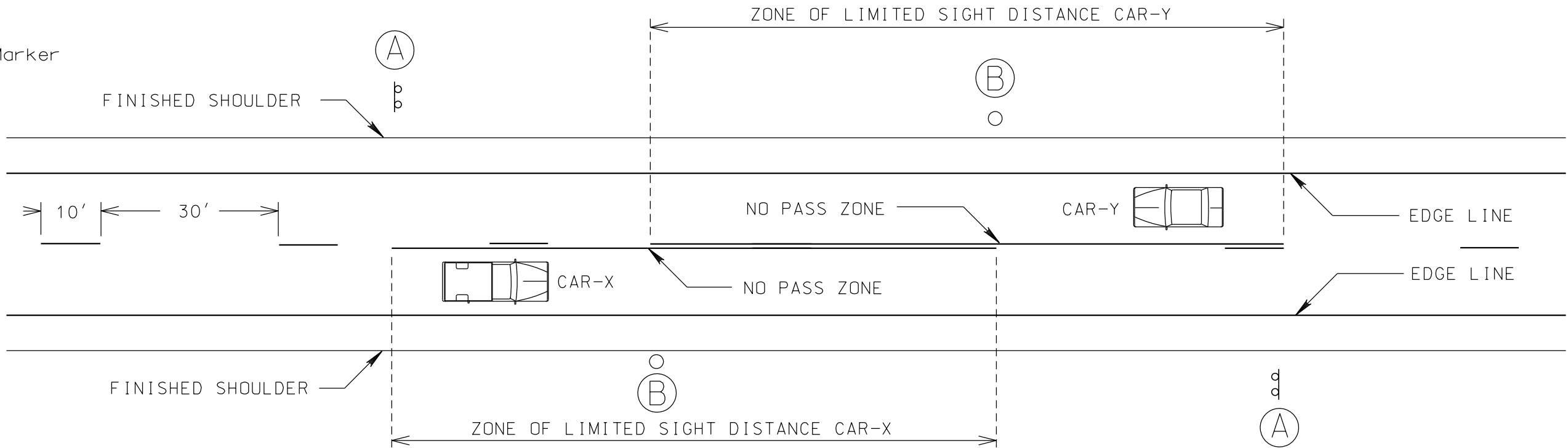
Plotting Date: 03/02/2023

Plot Scale - 1:20

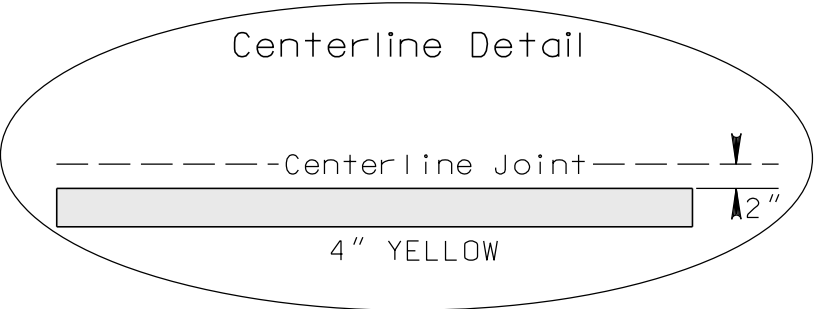
Plotted From - TRRC12608



(B) End of Zone Marker



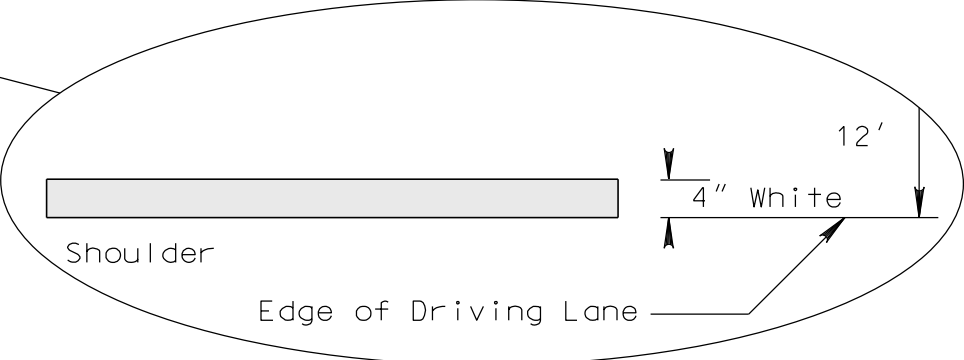
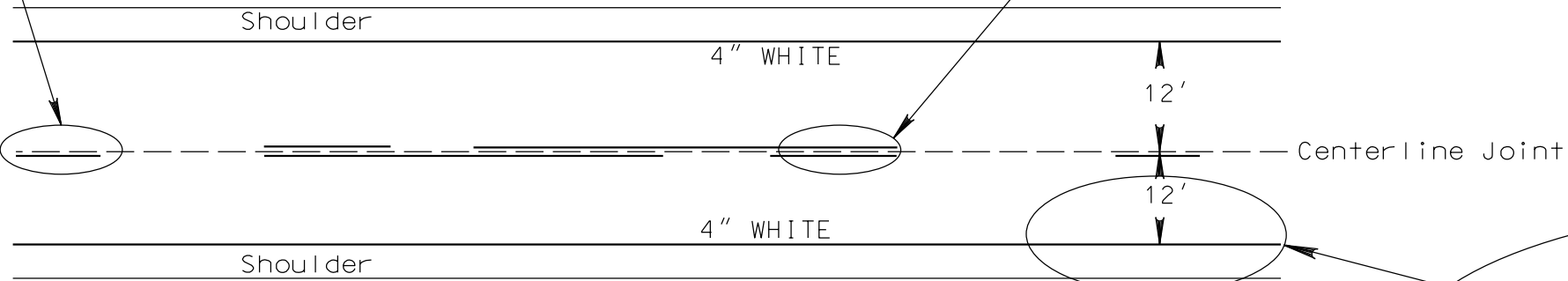
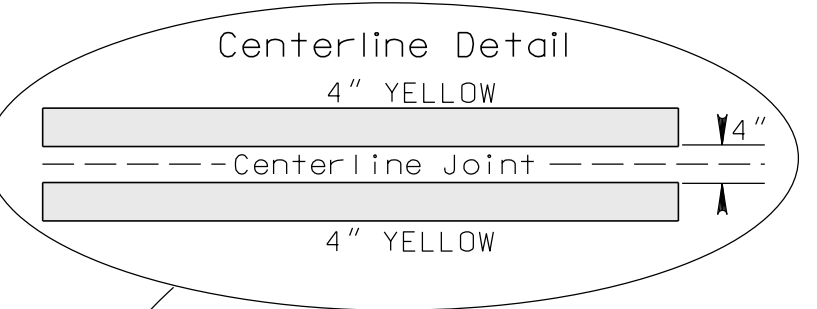
Centerline Detail



NOTE: A TWO "GUN" SYSTEM WILL BE USED TO OBTAIN THIS PATTERN.

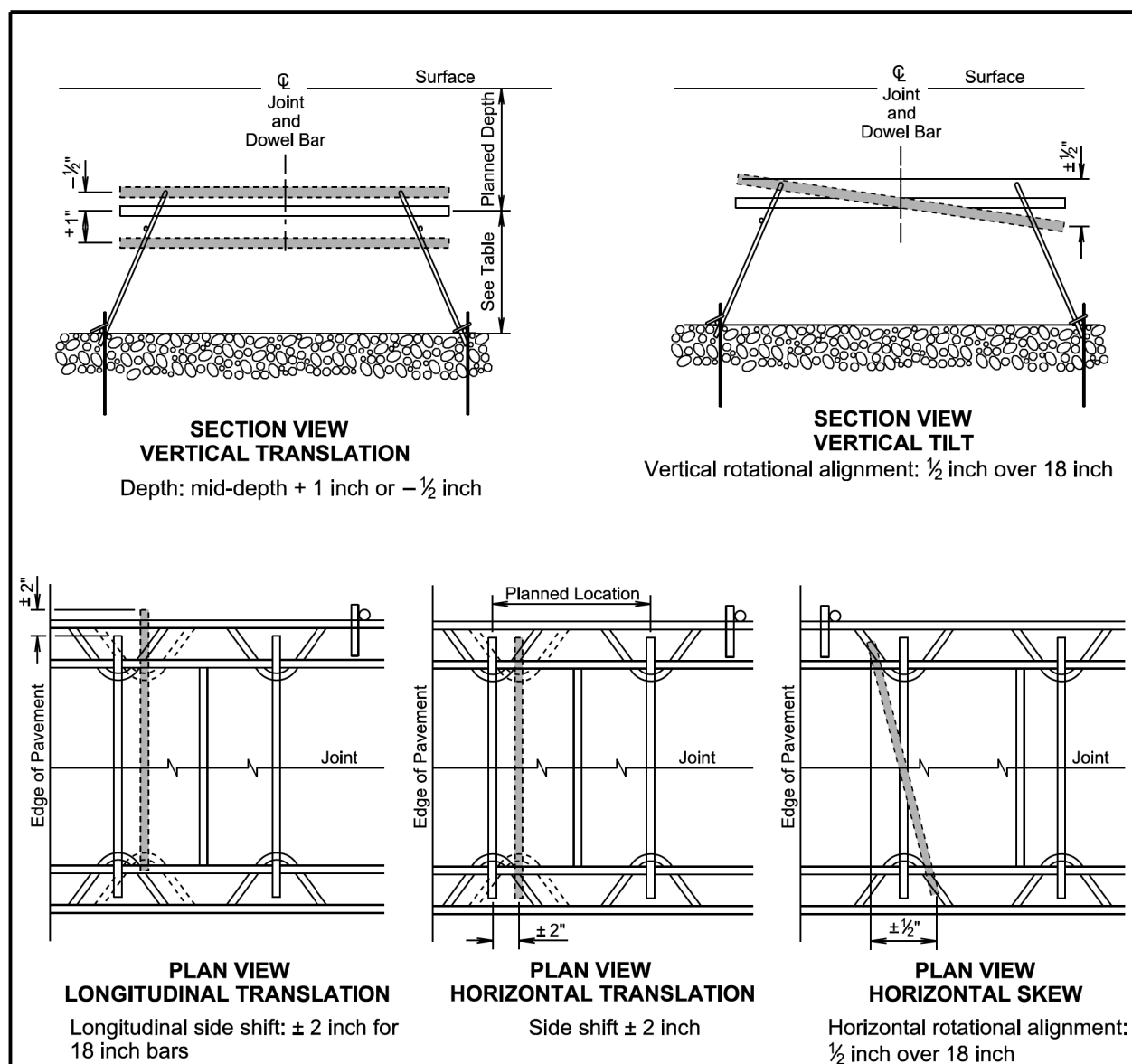
WHEN A SINGLE SKIP LINE EXISTS, THE SKIP WILL BE PLACED TO THE SOUTH OR EAST OF THE CENTERLINE JOINT.

Centerline Detail



File - ...PavementMarkingDetails.dgn

Plotting Date: 03/02/2023



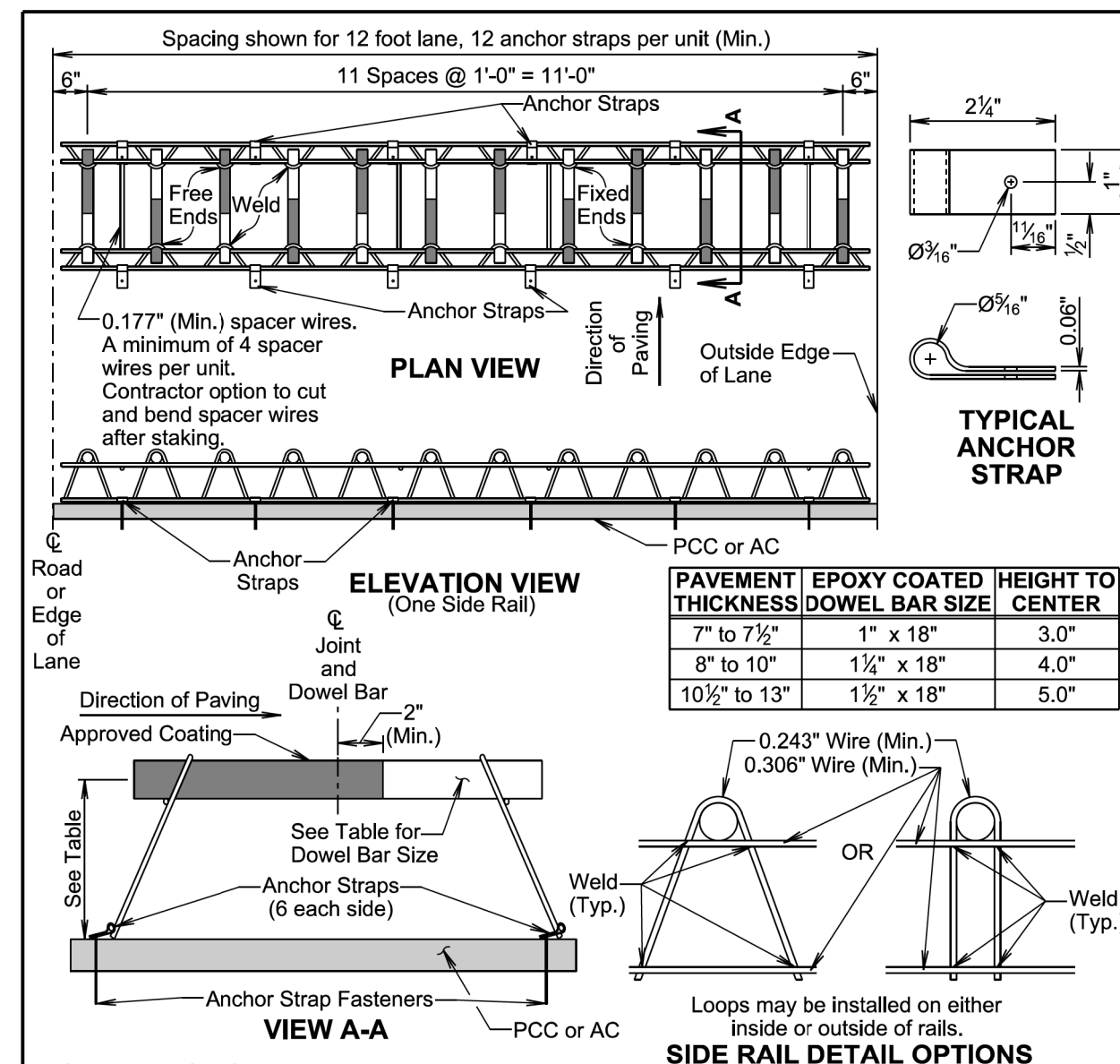
PAVEMENT THICKNESS	EPOXY COATED DOWEL BAR SIZE	HEIGHT TO CENTER
7" to 7½"	1" x 18"	3.0"
8" to 10"	1¼" x 18"	4.0"
10½" to 13"	1½" x 18"	5.0"

GENERAL NOTE:

The tolerances shown above represent the maximum deviation for acceptance of dowel bar placement.

November 19, 2022

Published Date: 1st Qtr. 2023	S D D O T	PCC PAVEMENT DOWEL BAR ALIGNMENT TOLERANCES	NOVEMBER 1ST, 2022
			PLATE NUMBER 380.01 Sheet 1 of 1



GENERAL NOTES:

Longitudinal joint tie bars will be placed a minimum of 15 inches from the transverse contraction joint.

The transverse contraction joints will be sawed perpendicular to the centerline of the roadway. The transverse sawed joint will be centered over the dowel bars.

Supporting devices as shown on this sheet, or equivalent as approved by the Engineer, will be used to maintain proper horizontal and vertical alignment of the dowel bars.

Appropriate anchor strap fasteners will be used to prevent movement of the dowel bar assemblies during the paving operation.

All dowel bar alignment tolerances will be as shown in the PCC Pavement Dowel Bar Alignment Tolerances standard plate.

November 19, 2022

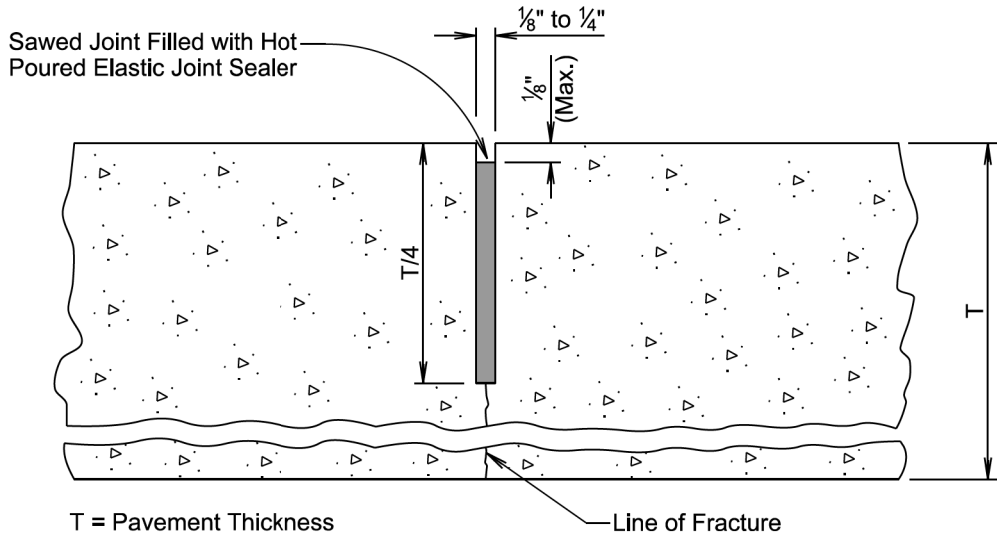
Published Date: 1st Qtr. 2023	S D D O T	PCC PAVEMENT DOWEL BAR ASSEMBLY FOR TRANSVERSE CONTRACTION JOINTS	PLATE NUMBER 380.05
		12 Bar Assembly on Hard Surfaced Base Material	Sheet 1 of 1

Plot Scale - 1:200

Plotted From - TRRC12608

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	016-491	12	18

Plotting Date: 03/02/2023



GENERAL NOTES:

If an early entrance saw cut does not develop the full transverse crack, then the saw cut to control cracking will be a minimum $\frac{1}{4}$ of the thickness of the pavement.

All hot poured elastic joint sealer material spilled on the surface of the concrete pavement will be removed as soon as the material has cooled. The extent of removal of material will be to the satisfaction of the Engineer. All costs for removal of the spilled joint sealer material will be borne by the Contractor.

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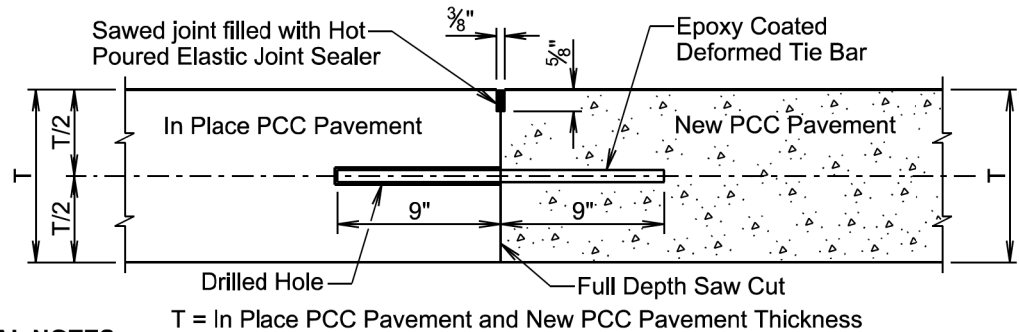
<i>Published Date: 1st Qtr. 2023</i>	S D D O T	PCC PAVEMENT TRANSVERSE CONTRACTION JOINT WITH OR WITHOUT DOWEL BAR ASSEMBLY	PLATE NUMBER 380.12
			Sheet 1 of 1

File - ...Standard Plates\380-2.dgn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	016-491	13	18

Plotting Date: 03/02/2023

DETAIL A
TRANSVERSE CONSTRUCTION JOINT WITH TIE BARS



GENERAL NOTES:

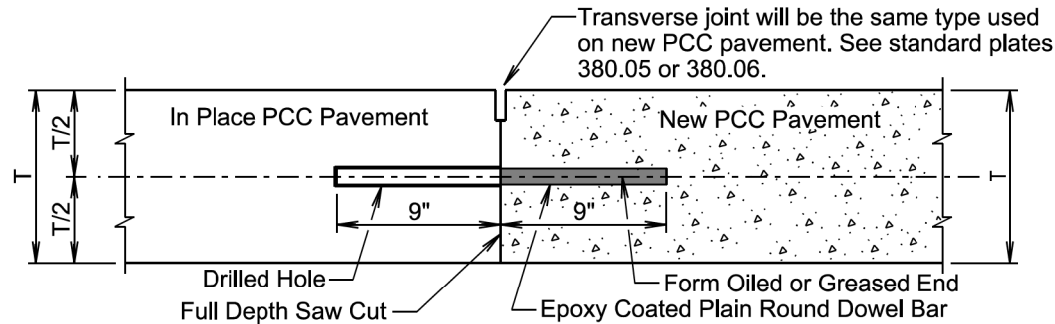
The term "In Place PCC Pavement" in the above drawing indicates that the in place PCC pavement was placed on a previous project.

See sheet 2 of 2 of this standard plate to determine if Detail A will be used.

The tie bars will be embedded a minimum depth of 9 inches into the in place PCC pavement and anchored with an epoxy resin adhesive or a non-shrink grout.

No. 9 epoxy coated deformed tie bars will be used in 10 inch thickness and less PCC Pavement and No. 11 epoxy coated deformed tie bars will be used in 10.5 inch thickness and greater PCC Pavement. The tie bar spacing will be 18 inches center to center and will be a minimum of 3 inches and a maximum of 9 inches from the pavement edges.

DETAIL B
TRANSVERSE CONSTRUCTION JOINT WITH DOWEL BARS



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.

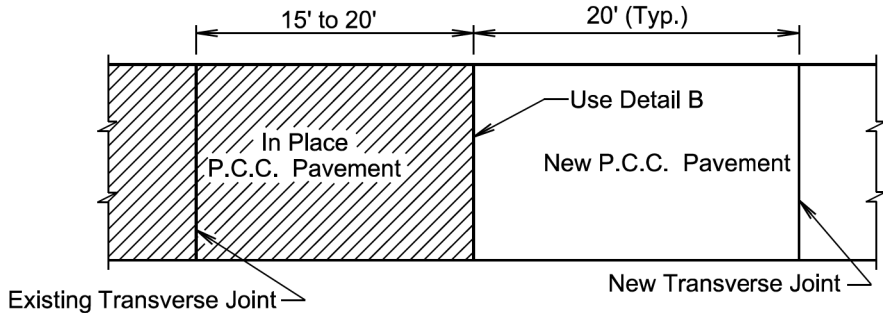
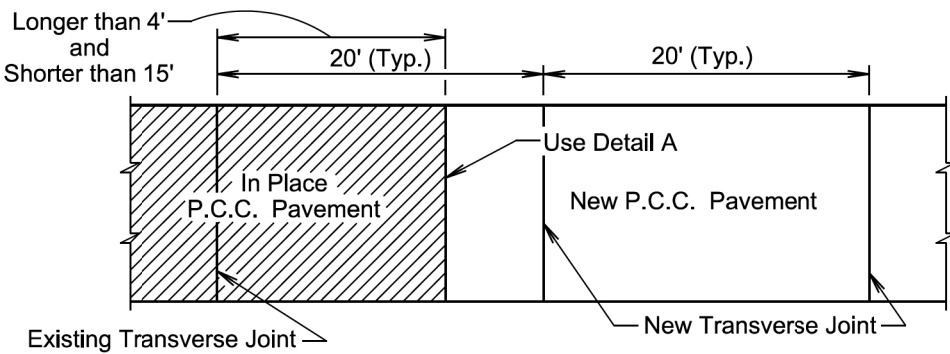
See sheet 2 of 2 of this standard plate to determine if Detail B will be used.

The plain round dowel bars will be embedded a minimum depth of 9 inches into the in place PCC pavement and anchored with an epoxy resin adhesive or a non-shrink grout.

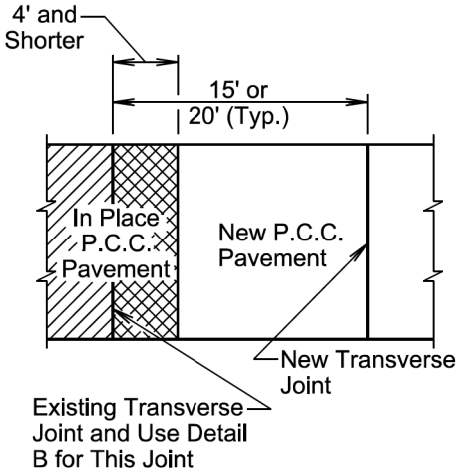
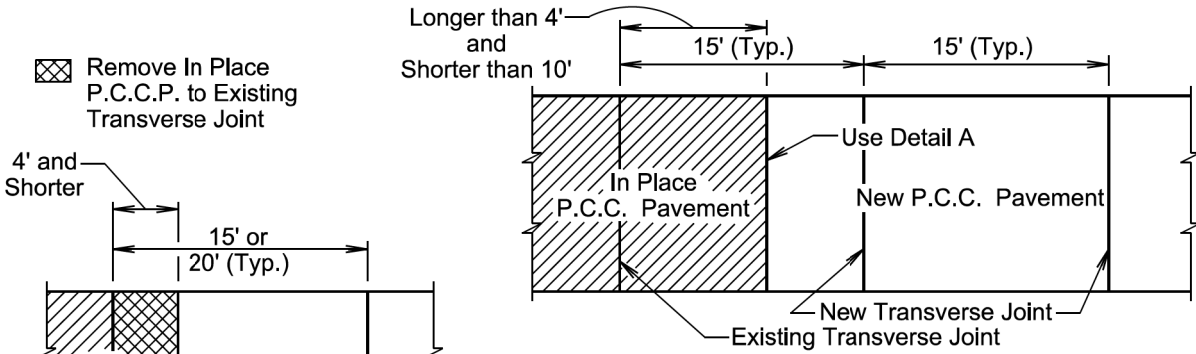
The epoxy coated plain round dowel bar size, number, and spacing will be the same as detailed on the corresponding dowel bar assembly standard plate (380.01, 380.02, 380.03, or 380.04). The epoxy coated plain round dowel bars will be a minimum of 3 inches and a maximum of 6 inches from the pavement edges.

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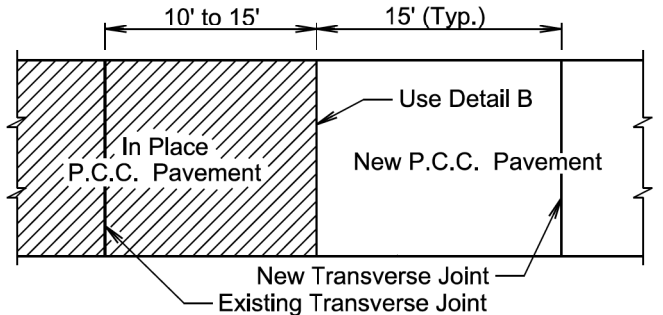
Published Date: 1st Qtr. 2023	S D D O T	PCC PAVEMENT TRANSVERSE CONSTRUCTION JOINTS WITH TIE BARS OR DOWEL BARS	PLATE NUMBER 380.15
			Sheet 1 of 2



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)

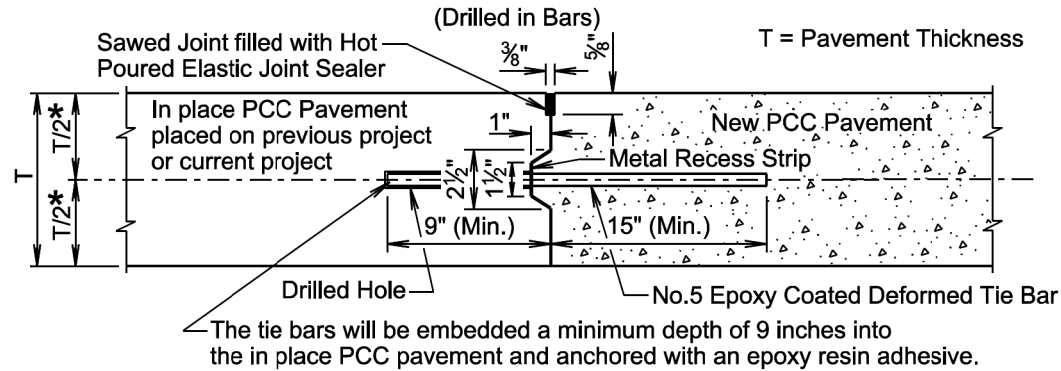
November 19, 2022

Published Date: 1st Qtr. 2023	S D D O T	PCC PAVEMENT TRANSVERSE CONSTRUCTION JOINTS WITH TIE BARS OR DOWEL BARS	PLATE NUMBER 380.15
			Sheet 2 of 2

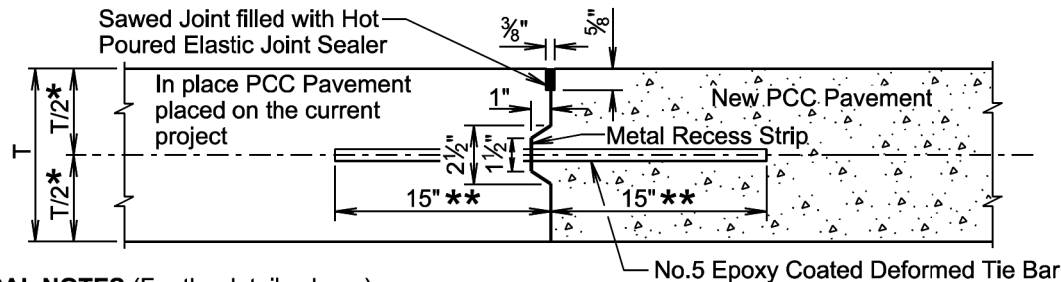
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	016-491	14	18

Plotting Date: 03/02/2023

LONGITUDINAL CONSTRUCTION JOINT WITH TIE BARS



LONGITUDINAL CONSTRUCTION JOINT WITH TIE BARS
(Inserted or Formed in Bars)



GENERAL NOTES (For the details above):

The epoxy coated deformed tie bars will 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 will be placed a minimum of 15 inches from transverse contraction joints.

The required number of tie bars as shown in the table will be uniformly spaced within each panel. The uniformly spaced tie bars will be spaced a maximum of 48 inches center to center for a female keyway and will be spaced a maximum of 30 inches center to center for a vertical face and male keyway. The maximum tie bar spacing will 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 will be used. When concrete pavement is slip formed, a metal recess strip is not required.

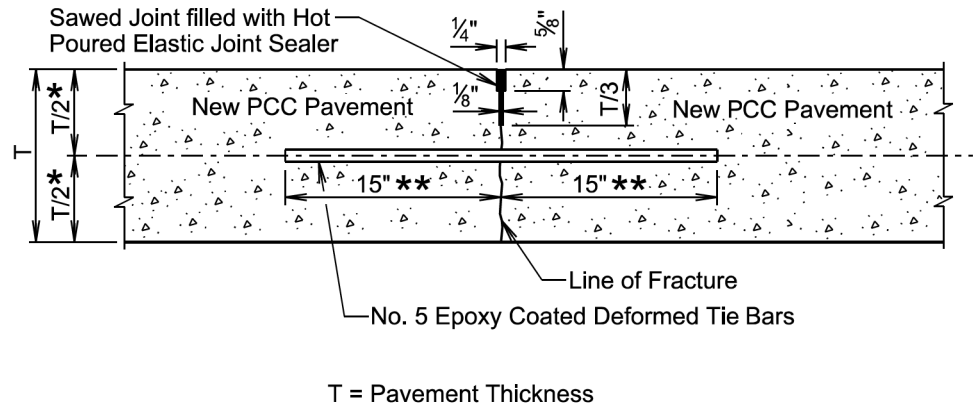
* The vertical placement tolerance for any part of the tie bar will be $\pm T/6$.

** The transverse placement (side shift) tolerance will be ± 3 inches when measured perpendicular to the longitudinal joint line.

November 19, 2022

Published Date: 1st Qtr. 2023	S D D O T	PCC PAVEMENT LONGITUDINAL JOINTS WITH TIE BARS	PLATE NUMBER 380.20
			Sheet 1 of 2

SAWED LONGITUDINAL JOINT WITH TIE BARS
(Poured Monolithically)



GENERAL NOTES (For the detail above):

The epoxy coated deformed tie bars will 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 will be placed a minimum of 15 inches from the transverse contraction joints.

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

The first saw cut to control cracking will 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.

* The vertical placement tolerance for any part of the tie bar will be $\pm T/6$.

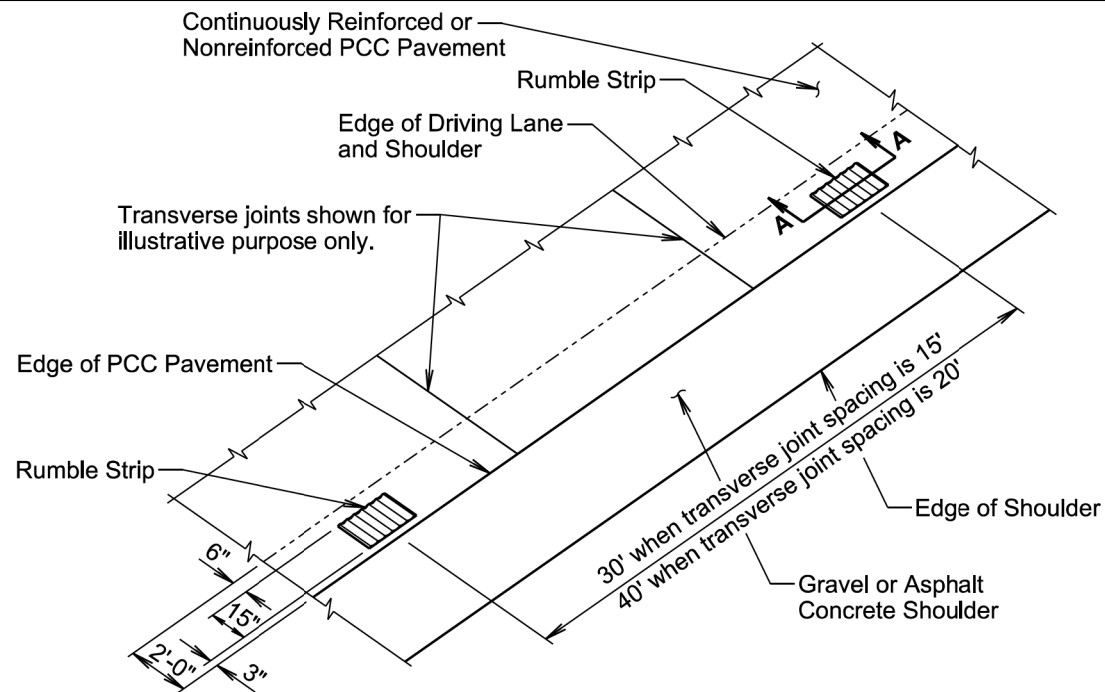
** The transverse placement (side shift) tolerance will be ± 3 inches when measured perpendicular to the longitudinal joint line.

November 19, 2022

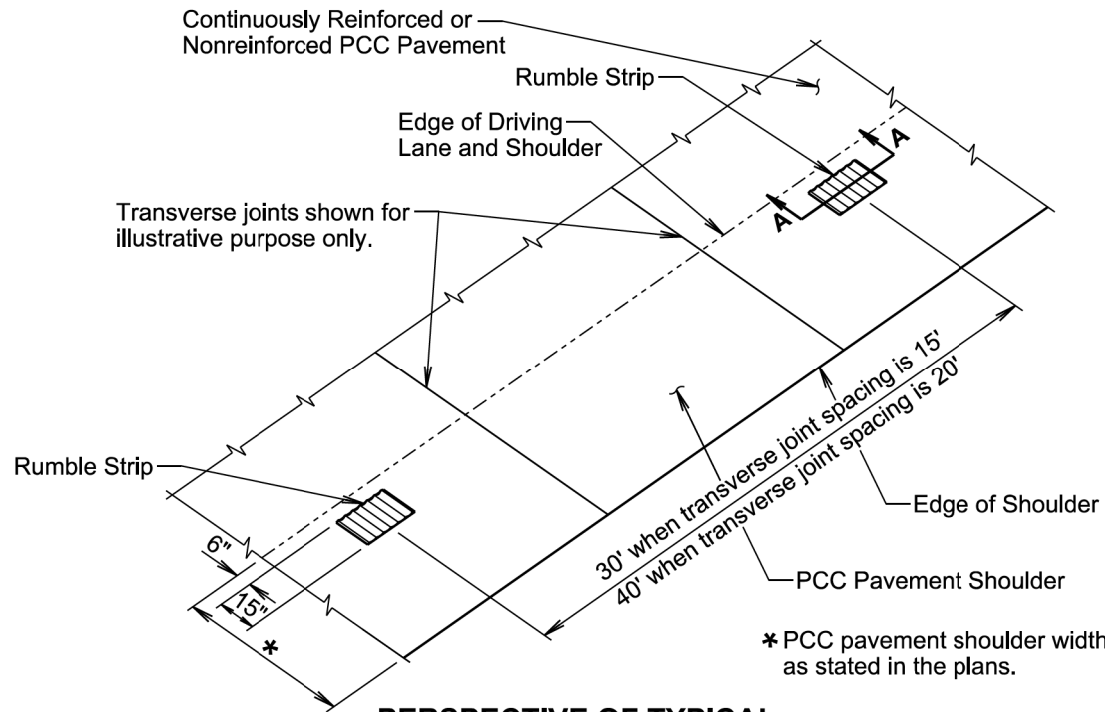
Published Date: 1st Qtr. 2023	S D D O T	PCC PAVEMENT LONGITUDINAL JOINTS WITH TIE BARS	PLATE NUMBER 380.20
			Sheet 2 of 2

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	016-491	15	18

Plotting Date: 03/02/2023



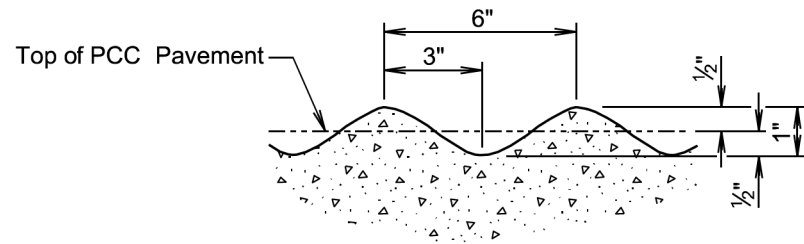
PERSPECTIVE OF TYPICAL RUMBLE STRIPS ON PCC PAVEMENT SHOULDER ADJACENT TO GRAVEL OR ASPHALT CONCRETE SHOULDER



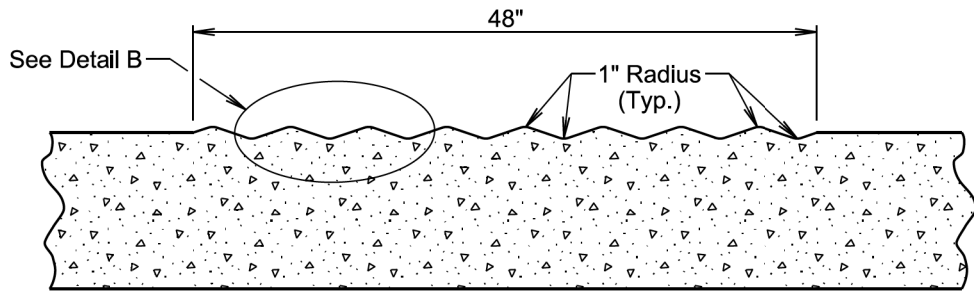
PERSPECTIVE OF TYPICAL RUMBLE STRIPS ON PCC PAVEMENT SHOULDER

November 19, 2022

Published Date: 1st Qtr. 2023	S D D O T	RUMBLE STRIP ON PCC PAVEMENT SHOULDER	PLATE NUMBER 380.53
			Sheet 1 of 2



DETAIL B



SECTION A-A

GENERAL NOTES:

The rumble strips will be evenly spaced and will not coincide with any transverse contraction joints.

The rumble strips will NOT be placed along areas adjacent to entrance ramps, exit ramps, and gore areas.

Payment for constructing the PCC Pavement Rumble Strips will be incidental to the contract unit price per square yard for the corresponding PCC Pavement contract item.

November 19, 2022

Published Date: 1st Qtr. 2023	S D D O T	RUMBLE STRIP ON PCC PAVEMENT SHOULDER	PLATE NUMBER 380.53
			Sheet 2 of 2

* Messages on signs will vary depending on the operation being conducted.

Vehicle-mounted signs will be mounted in a manner such that they are not obscured by equipment or supplies. Sign legends on vehicle-mounted signs will be covered or turned from view when work is not in progress.

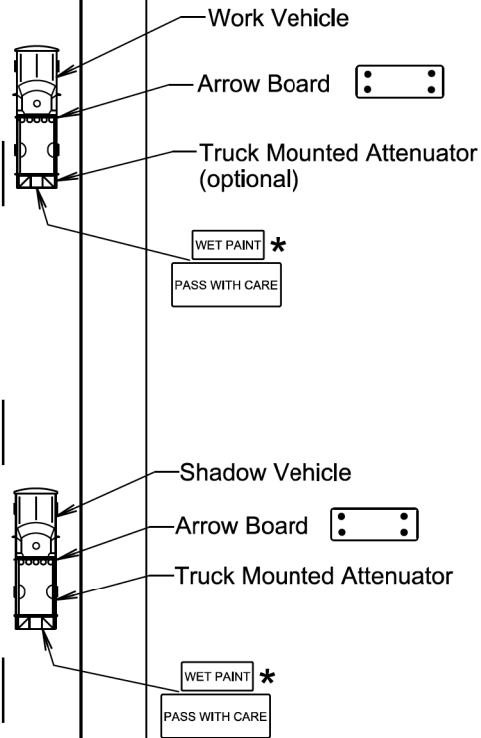
Shadow and Work vehicles will display high-intensity rotating, flashing, oscillating, or strobe lights, flags, signs, or arrow boards.

Vehicle hazard warning signals will not be used instead of the vehicle's high-intensity rotating, flashing, oscillating, or strobe lights.

When an arrow board is used, it will be used in the caution mode. Marching Diamonds are acceptable.

Arrow boards will, as a minimum, be Type B, with a size of 60" x 30".

All costs associated with the traffic control for mobile operation including signs, arrow boards and equipment will be incidental to the contract lump sum price for "Traffic Control, Miscellaneous".



January 22, 2021

Published Date: 1st Qtr. 2023	S D D O T	MOBILE OPERATIONS ON 2-LANE ROAD	PLATE NUMBER 634.06
			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	500	25
50	500	50
55	750	50
60 - 65	1000	50

- Flagger
- Channelizing Device

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

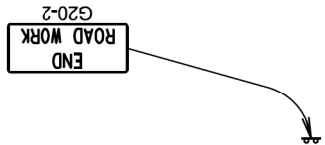
The ROAD WORK AHEAD and the END ROAD WORK signs may be omitted for short duration operations (1 hour or less).

For tack and/or flush seal operations, when flaggers are not being used, the FRESH OIL sign (W21-2) will 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 will 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.

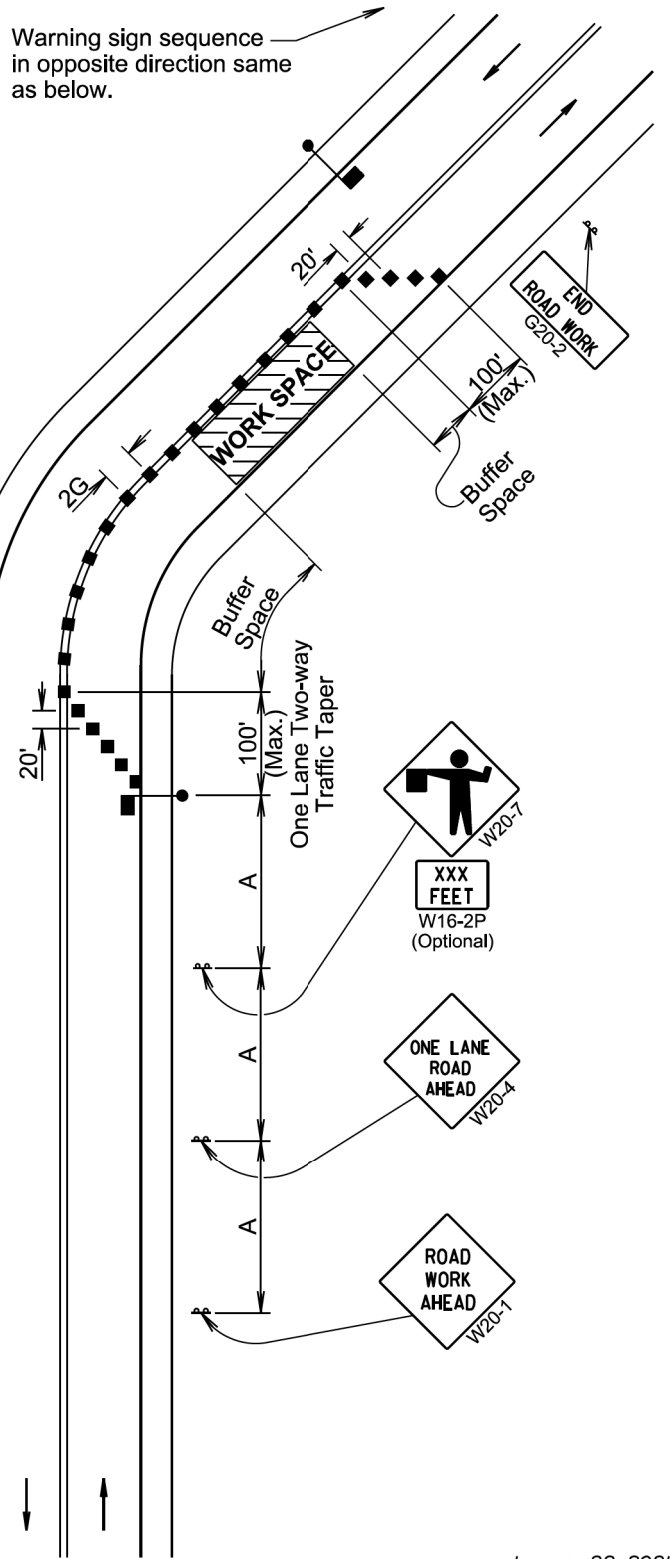


Channelizing devices and flaggers will be used at intersecting roads to control intersecting road traffic as required.

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

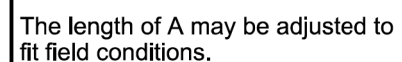
The length of A may be adjusted to fit field conditions.

Warning sign sequence in opposite direction same as below.



January 22, 2021

Published Date: 1st Qtr. 2023	S D D O T	LANE CLOSURE WITH FLAGGER PROVIDED	PLATE NUMBER 634.23
			Sheet 1 of 1



END ROAD WORK
G20-2

24" W 24" White Temporary Pavement Marking

4" W 4" White Temporary Pavement Marking

4" Y 4" Yellow Temporary Pavement Marking

■ Channelizing Device

● Traffic Signal

★ Lighting (Optional)

** Need and safe speed to be determined at the site by the Engineer.

50'

40'-180'

100' (Max.)

January 22, 2021

LANE CLOSURE USING TRAFFIC SIGNALS

PLATE NUMBER
634.26

Sheet 1 of 1

Published Date: 1st Qtr. 2023



(Not applicable to regulatory signs)

*** 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.**

January 22, 2021

CRASHWORTHY SIGN SUPPORTS (Typical Construction Signing)

PLATE NUMBER
634.85

Sheet 1 of 1

Published Date: 1st Qtr. 2023

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	016-491	18	18

Plotting Date: 03/02/2023

