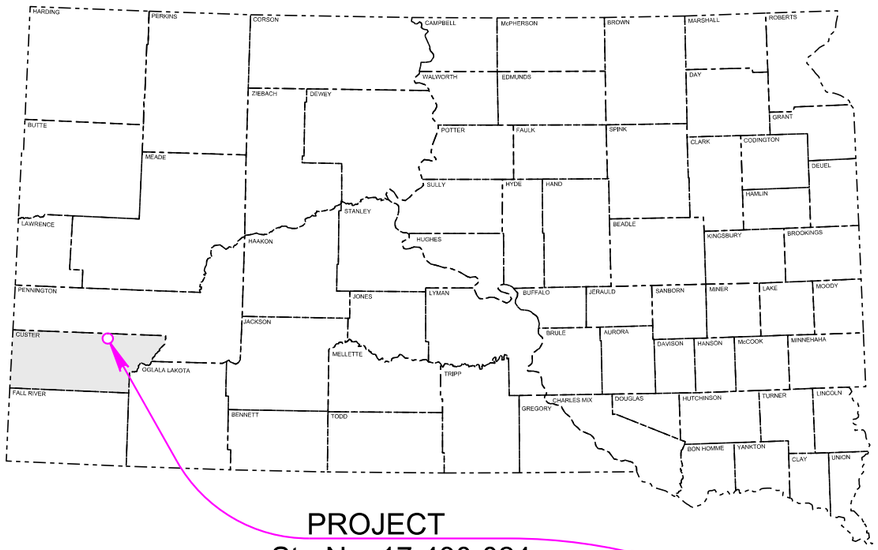


PROJECT
Str. No. 17-430-024
Cont. Concrete Bridge
159'-6"
SD79 MRM 60.13

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION

PLANS FOR PROPOSED

PROJECT 079-492
SD HIGHWAY 79
CUSTER COUNTY

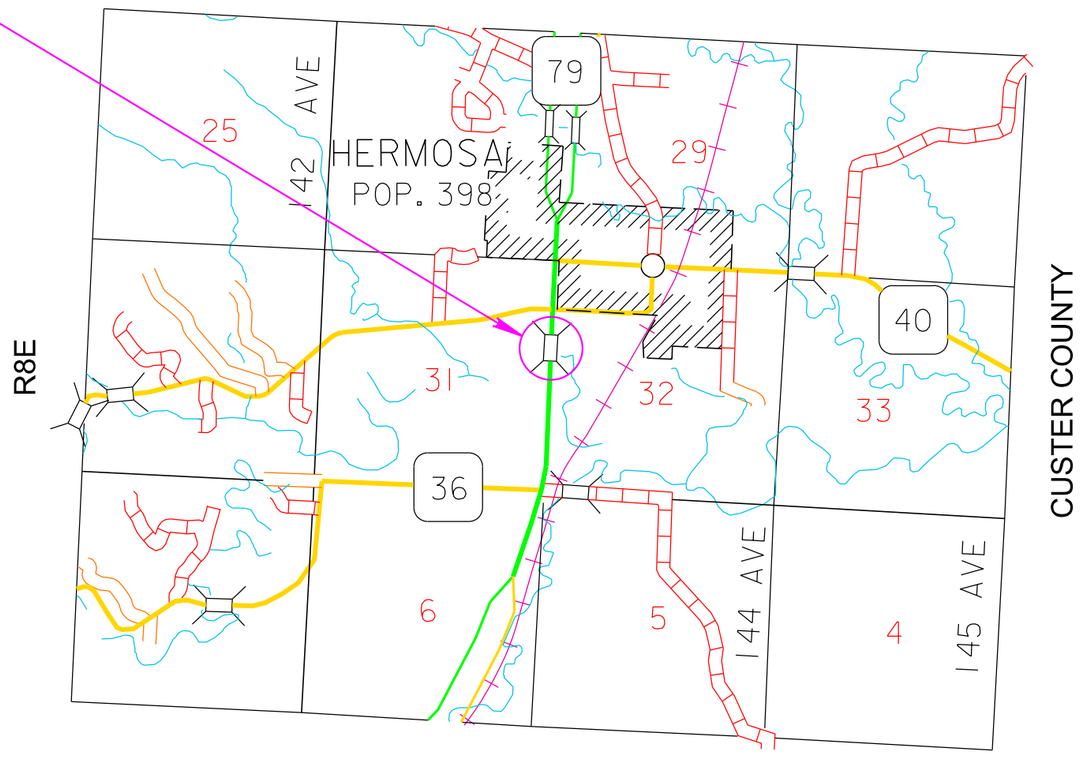
PCCP JOINT REPAIR
PCN i4pn

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	079-492	1	16

Plotting Date: 04/12/2017

INDEX OF SECTIONS

T2S



DESIGN DESIGNATION

ADT (2016)	6110
ADT (2036)	7424
DHV	906
D	50%
T DHV	5.3%
T ADT	11.7%
V	70 mph

STORM WATER PERMIT

(None Required)

ESTIMATE OF QUANTITIES

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
380E5030	Nonreinforced PCC Pavement Repair	131.0	SqYd
380E6110	Insert Steel Bar in PCC Pavement	112	Each
410E2600	Membrane Sealant Expansion Joint	104.0	Ft
633E0010	Cold Applied Plastic Pavement Marking, 4"	21	Ft
633E1200	Waterborne Pavement Marking Paint with High Grade Polymer, White	1	Gal
633E1205	Waterborne Pavement Marking Paint with High Grade Polymer,Yellow	1	Gal
633E5000	Grooving for Cold Applied Plastic Pavement Marking, 4"	21	Ft
634E0010	Flagging	80.0	Hour
634E0110	Traffic Control Signs	169.0	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0285	Type 3 Barricade, 8' Double Sided	6	Each
634E0420	Type C Advance Warning Arrow Board	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

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

COMMITMENT E: STORM WATER

Construction activities constitute less than 1 acre of disturbance.

Action Taken/Required:

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

COMMITMENT H: WASTE DISPOSAL SITE

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

Action Taken/Required:

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

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

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

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

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.

COMMITMENT R: FIRE PREVENTION IN THE BLACK HILLS AREA

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

Action Taken/Required:

The Contractor shall adhere to the "Special Provision for Fire Plan".

UTILITIES

The Contractor shall contact the involved utility companies through South Dakota One Call (1-800-781-7474) prior to starting work. It shall be the responsibility of the Contractor to coordinate work with the utility owners to avoid damage to existing facilities.

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

EXISTING PCC PAVEMENT

The existing pavement for SD79, PCN i4pn, is 52 feet wide 9.5" Nonreinforced PCC Pavement and a 16 feet Asphalt Concrete median. The transverse joints are spaced at 20' apart.

The Contractor shall dispose of the concrete pavement at a site approved by the Engineer in accordance with the environmental commitment notes.

REMOVE POLYMER MODIFIED ASPHALT GROWTH JOINT

All costs to remove the polymer modified asphalt growth joints shall be incidental to the contract unit price per square yard for "Nonreinforced PCC Pavement Repair".

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".

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 and median pavement shall be formed full depth to match the width of existing concrete pavement. Asphalt shoulders and median pavement 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, removing polymer modified asphalt growth joint, 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".

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.

TABLE OF NONREINFORCED PAVEMENT REPAIR

Location	No. 5 Deformed Tie Bar (Each)	Epoxy Coated Plain Round Dowel Bar (Each)	9.5" Reinforced PCC Pavement Repair (SqYd)
76+86.70 to 76+97.78	8	48	65.5
78+97.77 to 79+08.85	8	48	65.5
Totals:	16	96	131.0

MEMBRANE SEALANT EXPANSION JOINT

Install all membrane sealant expansion joints at the plan shown locations in conformance to the following notes.

The Membrane Sealant shall be one of membrane sealant types from the approved product list for “Membrane Sealant Expansion Joints”.

The manufacturer shall supply the membrane sealant in packaging that precompresses the membrane sealant. The precompressed dimension shall be as recommended by the sealant manufacturer 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.

Membrane Sealant Expansion Joints shall have a factory installed silicone applied to the top of the sealant.

The membrane sealant shall be supplied in pieces 5 feet in length or longer. The foam sealant shall be ultra-violet and ozone resistant.

The bonding adhesive used to attach the membrane sealant to the adjacent concrete shall be approved by the membrane sealant manufacturer.

Adhesive used to join adjacent pieces of the membrane sealant shall be as recommended by the manufacturer.

If Styrofoam filler material is used in the construction, it shall be closed cell and water-tight as approved by the Engineer.

Use plywood or other material to protect concrete adjacent to the joint from spalling before any equipment is moved across the joint. Any spall areas will be repaired at the Contractor’s expense by breaking out and replacing adjacent concrete, as approved by the Engineer.

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

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

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.

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.

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.

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

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

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

TABLE OF MEMBRANE SEALANT EXPANSION JOINT

Location	Quantity (Ft)
Beginning of Bridge (Sta. 76+97.78)	52
End of Bridge (Sta. 78+97.52)	52
Total:	104

PERMANENT PAVEMENT MARKING – GENERAL NOTES

The Contractor shall survey and mark the location of no passing zones prior to covering pavement marking.

The Contractor shall repaint all the existing pavement marking paint including centerline, edge line, lane lines, arrows, gore areas, etc. The Contractor will be required to inventory and mark, with appropriately colored tabs, the extent and location of the existing word messages, turn arrows, stop bars, railroad crossings, pedestrian crossings, gore areas, etc. before the markings are obliterated. Locations of pavement marking tape shall be masked. The Contractor shall provide a copy of the pavement marking inventory to the Engineer. All costs associated with this work shall be incidental to the various pavement marking bid items.

Application of permanent pavement marking may begin 7 calendar days following completion of the fog seal and shall be completed within 14 calendar days following completion of the fog seal.

Striper and advance and trailing warning vehicles shall be equipped with flashing amber or arrow panel warning lights.

TABLE OF PAVEMENT MARKING QUANTITIES

Station	to	Station	Segment Length (Ft)	Cold Applied Plastic Pavement Marking, White 4" (Ft)	Waterborne Pavement Marking Paint with High Grade Polymer, White (Gal)	Waterborne Pavement Marking Paint with High Grade Polymer, Yellow (Gal)	Grooving for Cold Applied Plastic Pavement Marking, 4" (Ft)
76+86.70		76+98.03	11.3	13.0	0.1	0.1	13.0
78+97.52		79+08.85	11.3	8.0	0.1	0.1	8
			Totals:	21.0	1.0	1.0	21.0

WATERBORNE PAVEMENT MARKING PAINT WITH HIGH GRADE POLYMER

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

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). The Contractor shall provide certification that the material is one of the following products or an equivalent as approved by the Operations Traffic Engineer:

Diamond Vogel's Waterborne High Build Polymer Marking Paint
Ennis-Flint's High Build Polymer Marking Paint

No further testing of this material will be required. Reflective media consisting of glass beads as well as bonded core reflective elements shall be adhered to the paint.

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 retroreflectivity 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 retroreflectometer conforming to 30-meter geometry. Retroreflectivity readings will be taken on a test location with cleaning being limited to light hand brooming.

Pavement markings not conforming to the retroreflectivity 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 retroreflectivity 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 retroreflectivity readings will be taken at each test location. The three readings will be averaged and become the reading for that test location.

Initial readings:

Pavement Marking Color	Minimum Value
White	350 mc/m^2/lux
Yellow	275 mc/m^2/lux

All pavement markings not conforming to the requirements provided in these plans will be considered deficient and shall be removed and replaced. Additional retroreflectivity 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 the Contractor's expense, with no cost incurred by the State.

RATES OF MATERIALS FOR WATERBORNE PAVEMENT MARKING PAINT WITH HIGH GRADE POLYMER

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 "Waterborne Pavement Marking Paint with High Grade Polymer, White or Yellow".

The grooving shall be completed within the following tolerances:

Depth of Groove:	70 mils ± 5 mils
Width of 4" Groove:	5" to 6"
Length of Skip Lines:	10'-6" with tolerance of ± 3"
Tapers at Begin/End Lines:	6" to 9"

The equipment shall be capable of the following:

- Grooving the total width of the groove in one pass or uniform depths with multiple passes.
- Grooving without causing damage to the pavement joints or joint sealant material.
- Providing uniform alignment and depth.
- Moving continuously to permit a mobile traffic work operation.

If damage to joints, joint sealant material, backer rod, etc. occurs, the grooving operation shall be stopped and modifications shall be made to the grooving operation to prevent further damage. The Contractor may be required to use specially prepared circular diamond blade cutting heads to prevent damage at the joints. Damage caused to joints, the joint sealant material, backer rod, etc. shall be repaired or replaced by the Contractor, as directed by the Engineer. No additional payment will be made for the repair work or any reapplication of the pavement marking in the area of the repair.

Grooving on bridge decks will not be required. The Contractor shall not damage bridge joints near any pavement marking grooving. Markings on bridge decks shall be surface applied.

COLD APPLIED PLASTIC PAVEMENT MARKING

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

Final locations of markings will be determined by Engineer.

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

GROOVING FOR COLD APPLIED PLASTIC PAVEMENT MARKING

The grooving shall be completed within the following tolerance:

Depth of Groove: 100 mils, ± 10 mils.

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".

Grooving on bridge decks will not be required. The Contractor shall not damage bridge joints near any pavement marking grooving. Markings on bridge decks shall be surface applied.

TRAFFIC CONTROL – GENERAL NOTES

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.

Unless otherwise stated in these plans, no work will be allowed during hours of darkness.

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.

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.

All non-applicable existing signing and temporary traffic control devices shall be covered or removed during periods of inactivity. Periods of inactivity shall be defined as no work taking place for a period of more than 48 hours. The cost of removing or covering non-applicable signs and temporary traffic control devices shall be incidental to the contract lump sum price for Traffic Control, Miscellaneous.

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

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

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

The Contractor shall be required to have a person available 24 hour/day, 7 days/week to maintain traffic control devices. The name and cellular telephone number of this individual shall be given to the Engineer at the preconstruction meeting.

Vehicles working in traffic or alongside traffic shall be equipped with a flashing amber light visible from all directions. The amber light shall be mounted on the uppermost part of the Contractor's vehicle. Lights must have peak intensity within the range of 40 to 400 candelas and must flash at 75 ± 15 flashes per minute. Vehicle flasher/hazard lights are not acceptable. 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.

All construction operations shall 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 shall be used, as determined by the Engineer.

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.

INVENTORY OF TRAFFIC CONTROL DEVICES

		CONVENTIONAL ROAD			
SIGN CODE	SIGN DESCRIPTION	NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
W4-2	LEFT or RIGHT LANE ENDS (symbol)	4	48" x 48"	16.0	64.0
W20-1	ROAD WORK AHEAD	2	48" x 48"	16.0	32.0
W20-5	LEFT or RIGHT LANE CLOSED 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			169.0

TYPE 3 BARRICADES

ITEM DESCRIPTION	QUANTITY
Type 3 Barricade, 8' Double Sided	6 Each

ARROW BOARDS

ITEM DESCRIPTION	QUANTITY
Type C Advance Warning Arrow Board	2 Each

SEQUENCE OF OPERATIONS

1. Set up traffic control.
2. Complete P.C.C. Pavement joint repair.
3. Apply permanent pavement markings.

TYPE C ADVANCE WARNING ARROW BOARD

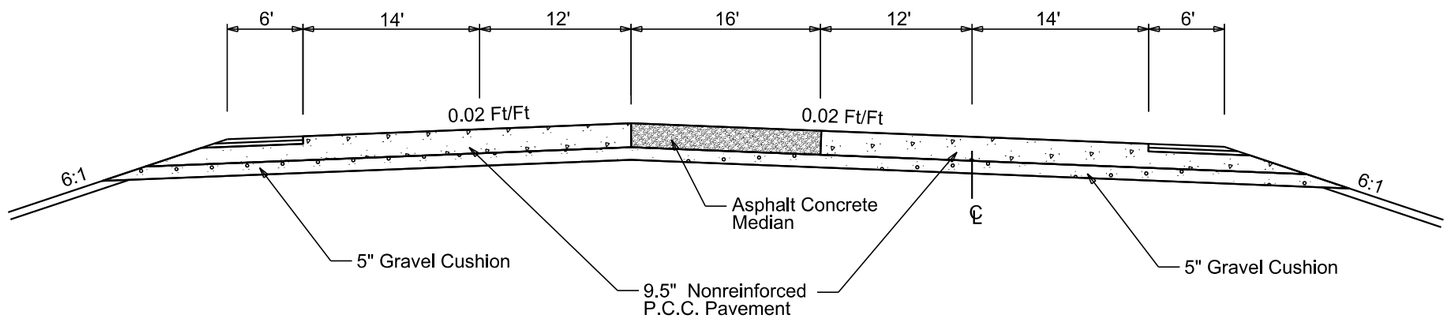
The quantity of Type C Advance Warning Arrow Boards paid will be the most installations in place at any one time regardless of the number of setups on the project.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	079-492	7	16

Plotting Date: 04/12/2017

TYPICAL SECTION

P 0079(53)59



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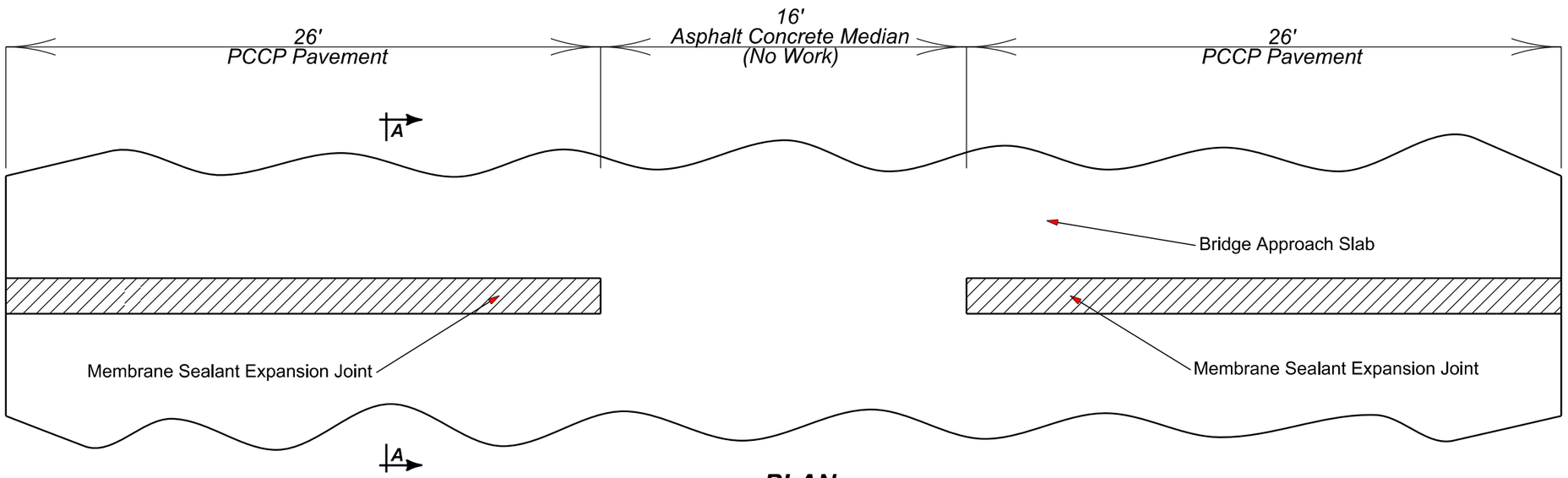
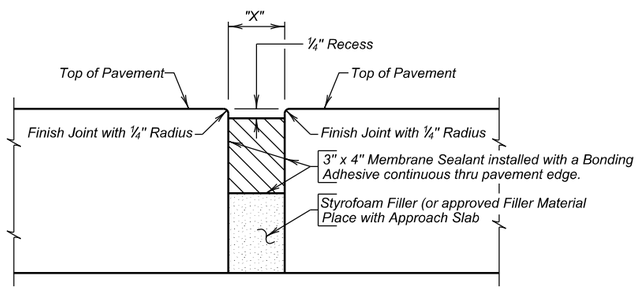


PLAN

JOINT DETAIL



ELEVATION

SECTION A - A

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"

MEMBRANE SEALANT EXPANSION JOINT

DETAILS FOR
JOINT BETWEEN SLEEPER SLAB
AND PCC PAVEMENT

CUSTER COUNTY

S. D. DEPT. OF TRANSPORTATION

PAVEMENT LAYOUT

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	079-492	9	16

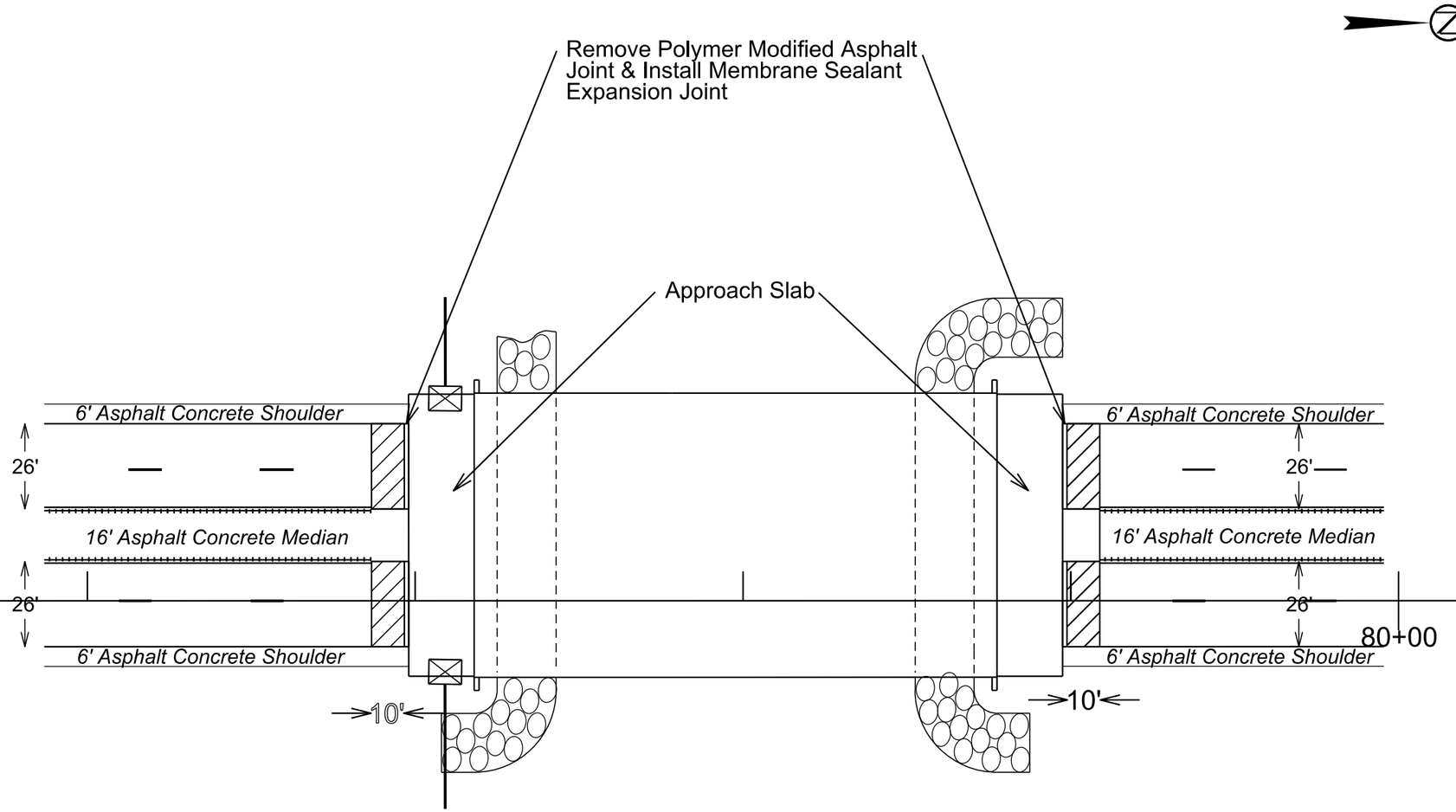
Plotting Date: 04/12/2017

Remove Concrete Pavement
at the following locations:
76+86.70 to 76+98.03
78+97.52 to 79+08.85

Nonreinforced PCC Pavement Repair
at the following locations:
76+86.70 to 76+97.78
78+97.77 to 79+08.85

Remove Polymer Modified Asphalt Growth Joint
at the following locations:
76+96.70 to 76+98.03
78+97.52 to 78+98.85

Install Membrane Sealant Expansion Joint
at the following locations:
76+97.78
78+97.52



Remove Concrete Pavement

Plot Scale - 1:40

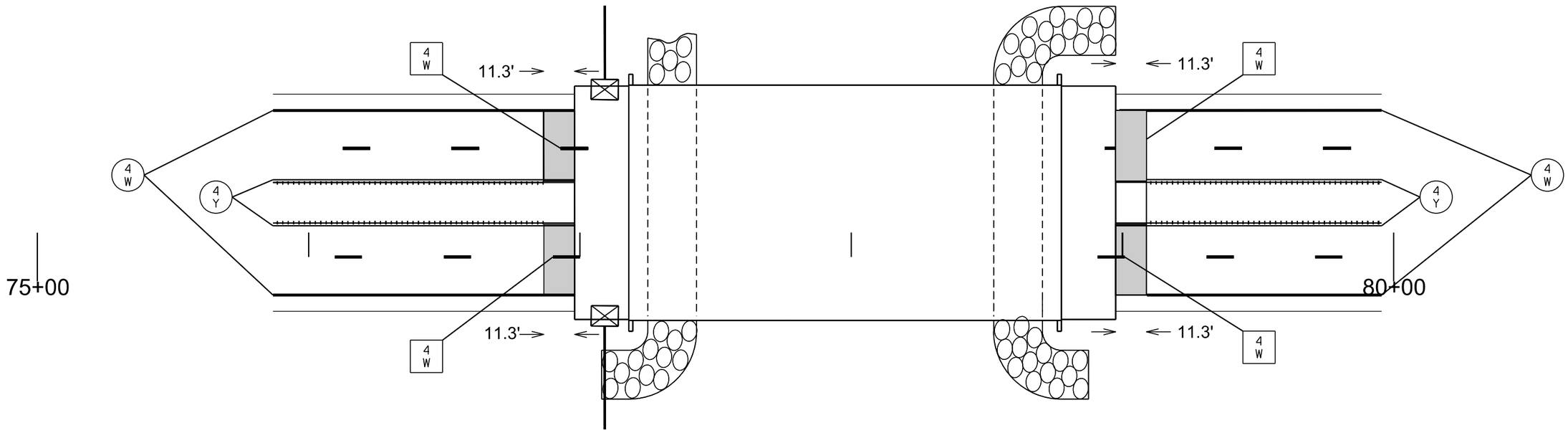
Plotted From - trnc11626

File - ...\Pavement Removal.dgn

PAVEMENT MARKING LAYOUT

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	079-492	10	16

Plotting Date: 04/12/2017



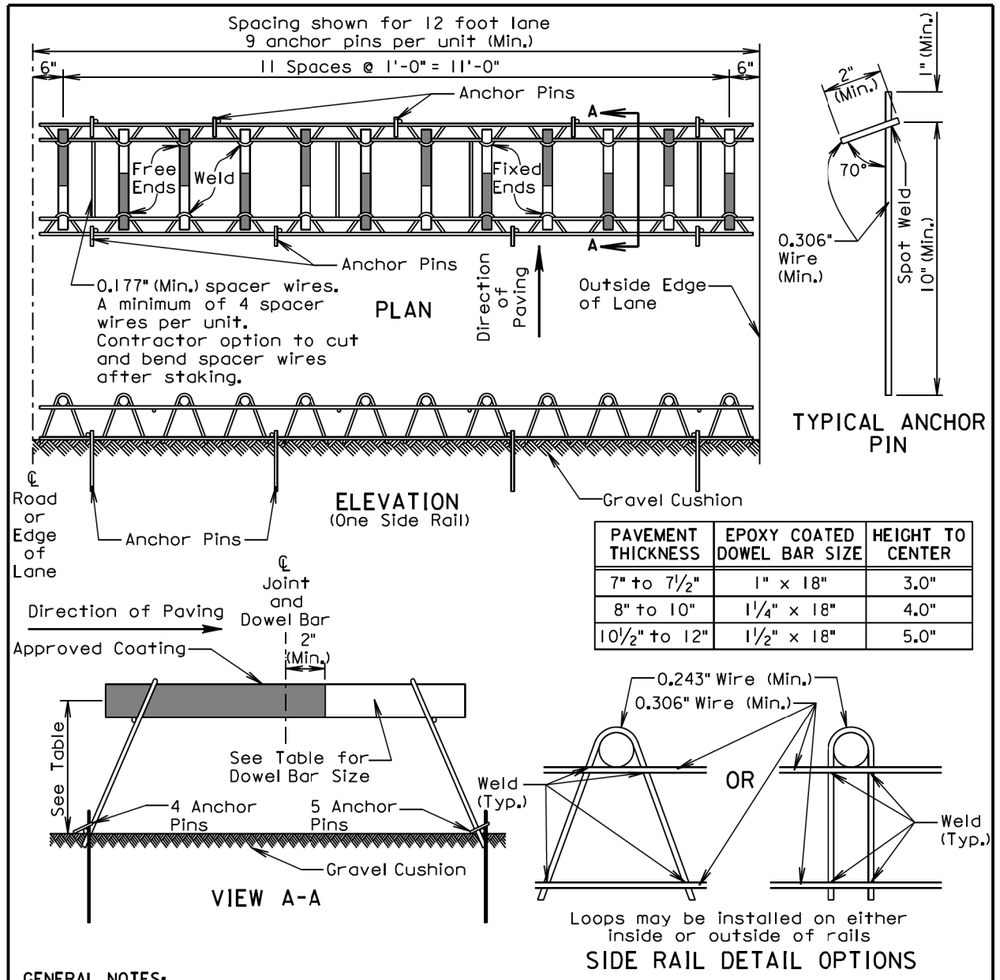
Joint/Pavement Repair Work Limits

		ESTIMATED QTY	UNITS
4 W	4" WHITE WATERBORNE PAVEMENT MARKING PAINT WITH HIGH GRADE POLYMER	1.0	GAL
4 Y	4" YELLOW WATERBORNE PAVEMENT MARKING PAINT WITH HIGH GRADE POLYMER	1.0	GAL
4 W	4" WHITE GROOVED IN, COLD APPLIED PLASTIC PAVEMENT MARKING TAPE	21.0	FT

Plot Scale - 1:40

Plotted From - trrc11626

File - ...\Pavement Removal.dgn



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 12"	1½" x 18"	5.0"

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 ±1/8 inch in 18 inches and to all other dowel bars in the assembly ±1/16 inch in 18 inches.

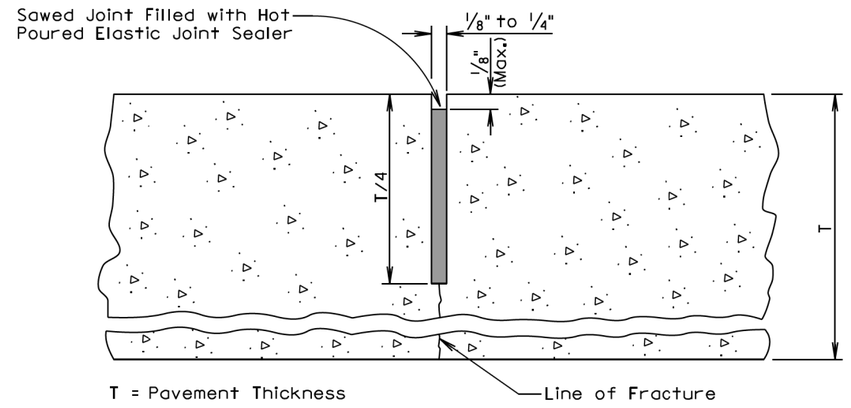
Centerline of individual dowel bars shall be parallel to the centerline of the roadway ±1/2 inch in 18 inches.

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: 1st Qtr. 2017	SDDOT	***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:

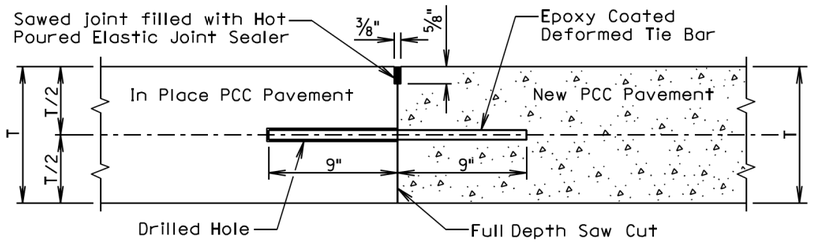
If an early entrance sawcut does not develop the full transverse crack, then the saw cut to control cracking shall be a minimum of ¼ the thickness of the pavement.

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

June 26, 2015

Published Date: 1st Qtr. 2017	SDDOT	***PCC PAVEMENT TRANSVERSE CONTRACTION JOINT WITH OR WITHOUT DOWEL BAR ASSEMBLY***	*PLATE NUMBER* 380.05 *Sheet 1 of 1*

DETAIL A
TRANSVERSE CONSTRUCTION JOINT WITH TIE BARS



T = In Place PCC Pavement and New PCC Pavement Thickness

GENERAL NOTES:

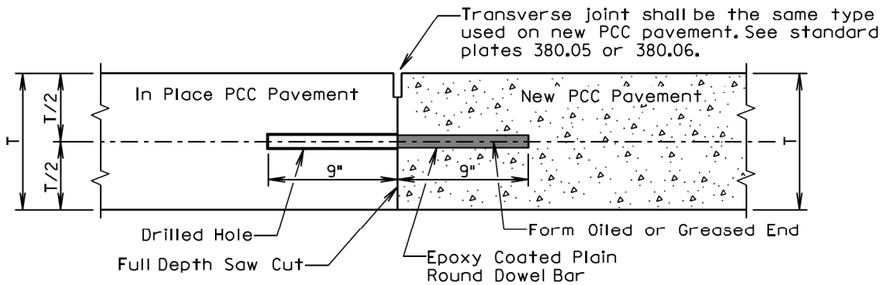
The term "In Place PCC Pavement" in the above drawing indicates that the in place PCC pavement was placed on a previous project.

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.

DETAIL B
TRANSVERSE CONSTRUCTION JOINT WITH DOWEL BARS



T = In Place PCC Pavement and New PCC Pavement Thickness

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.

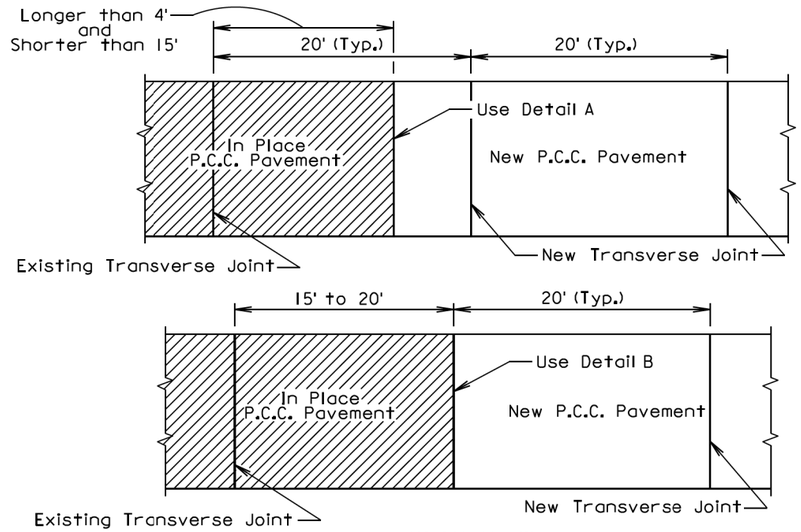
See sheet 2 of 2 of this standard plate to determine if Detail B shall be used.

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.

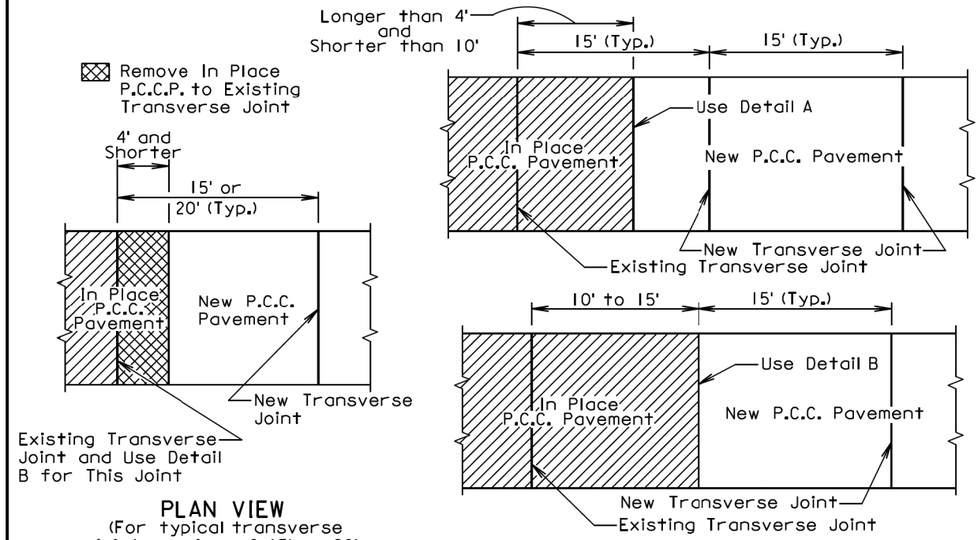
The epoxy coated plain round dowel bar size, number, and spacing shall be the same as detailed on the corresponding dowel bar assembly standard plate (380.01, 380.02, 380.03, or 380.04). The epoxy coated plain round dowel bars shall be a minimum of 3 inches and a maximum of 6 inches from the pavement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

September 6, 2013

Published Date: 1st Qtr. 2017	SDDOT	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)



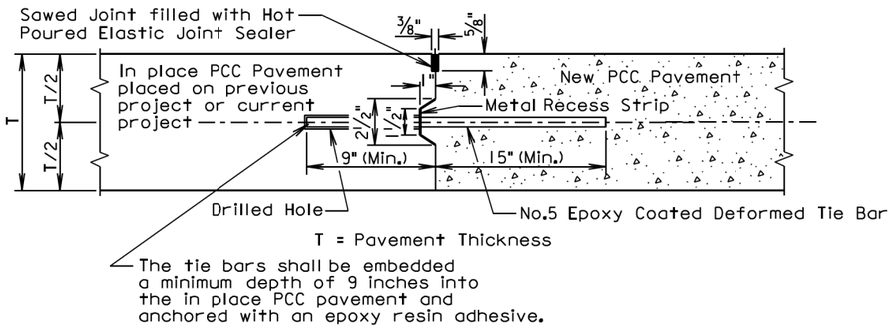
PLAN VIEW
(For typical transverse joint spacing of 20' or 15' on the current project)

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

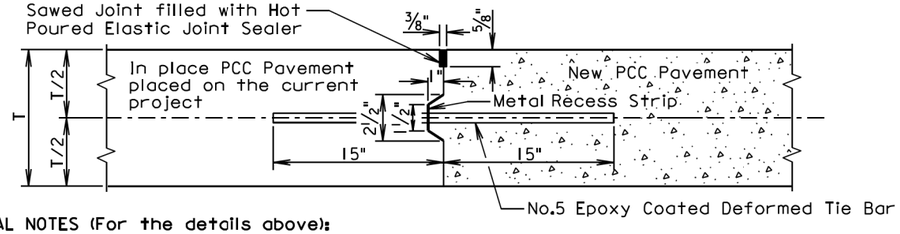
September 6, 2013

Published Date: 1st Qtr. 2017	SDDOT	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)



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.

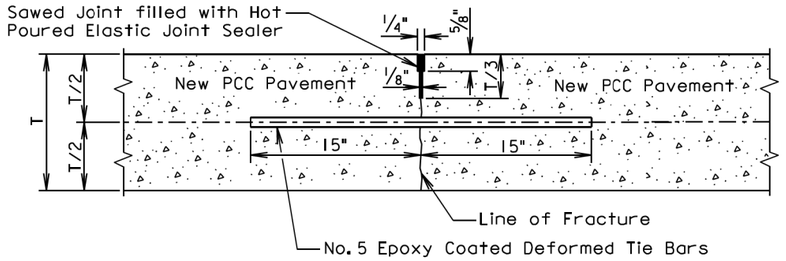
The keyway illustrated in the above details depict a female keyway.

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: 1st Qtr. 2017	SDDOT	*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: 1st Qtr. 2017	SDDOT	*PCC PAVEMENT LONGITUDINAL JOINTS WITH TIE BARS*	*PLATE NUMBER* 380.10
			Sheet 2 of 2

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

Flagger

Channelizing Device

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

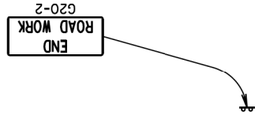
The ROAD WORK AHEAD and the END ROAD WORK signs may be omitted for short duration operations (1 hour or less).

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

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

The channelizing devices shall be drums or 42" cones.

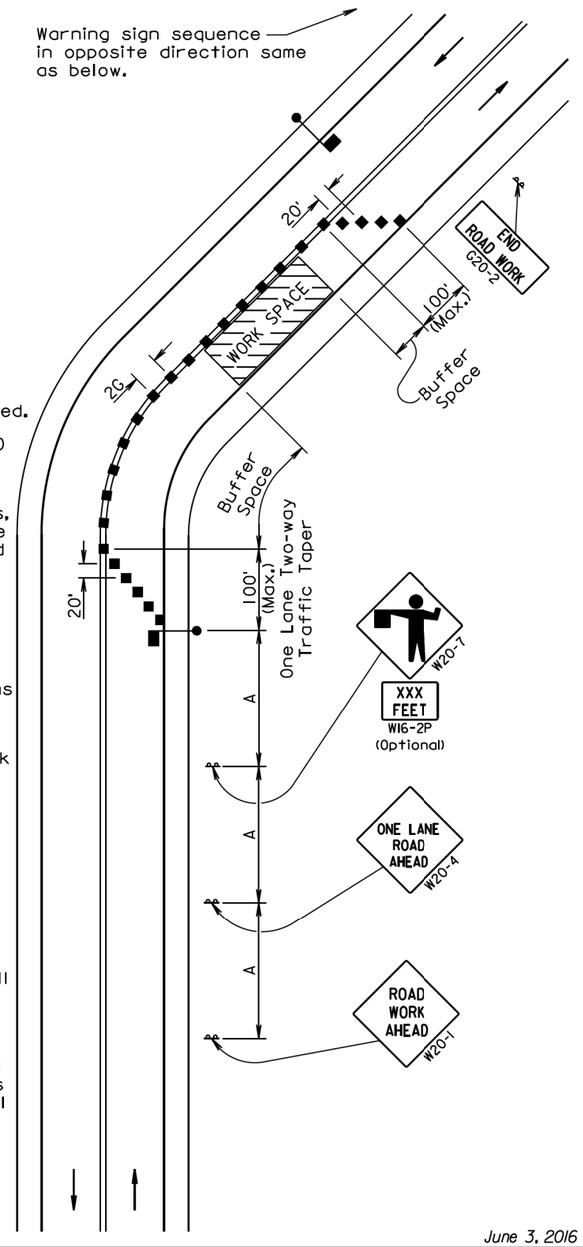
Channelizing devices are not required along the centerline adjacent to work area when pilot cars are utilized for escorting traffic through the work area.



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

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

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



June 3, 2016

Published Date: 1st Qtr. 2017	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES LANE CLOSURE WITH FLAGGER PROVIDED	PLATE NUMBER 634.23 Sheet 1 of 1

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

Posted Speed Prior to Work (M.P.H.)	Spacing of Channelizing Devices (Feet) (G)
0 - 30	25
35 - 45	25
50	50 *
55	50 *
60 - 65	50 *

END ROAD WORK G20-2 (Optional)

* Spacing is 40' for 42" cones.

◎ Reflectorized Drum

■ Channelizing Device

(4Y) 4" Yellow Temporary Pavement Marking

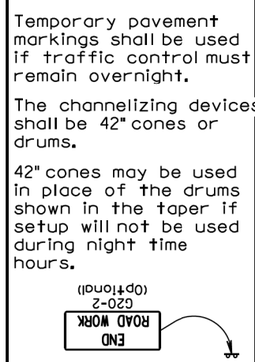
Urban areas and intersecting streets may limit sign spacing.

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

Temporary pavement markings shall be used if traffic control must remain overnight.

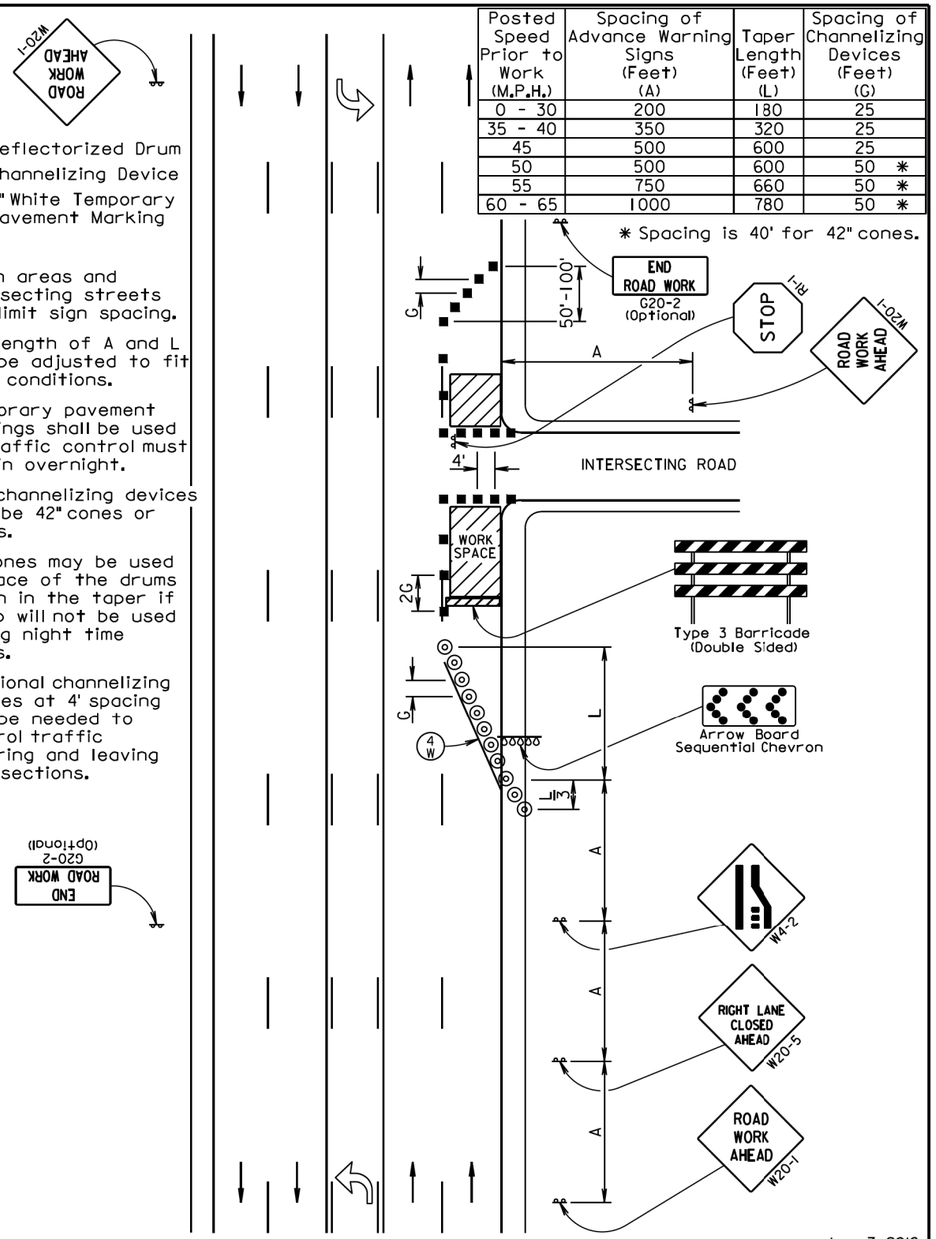
The channelizing devices shall be 42" cones or drums.

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



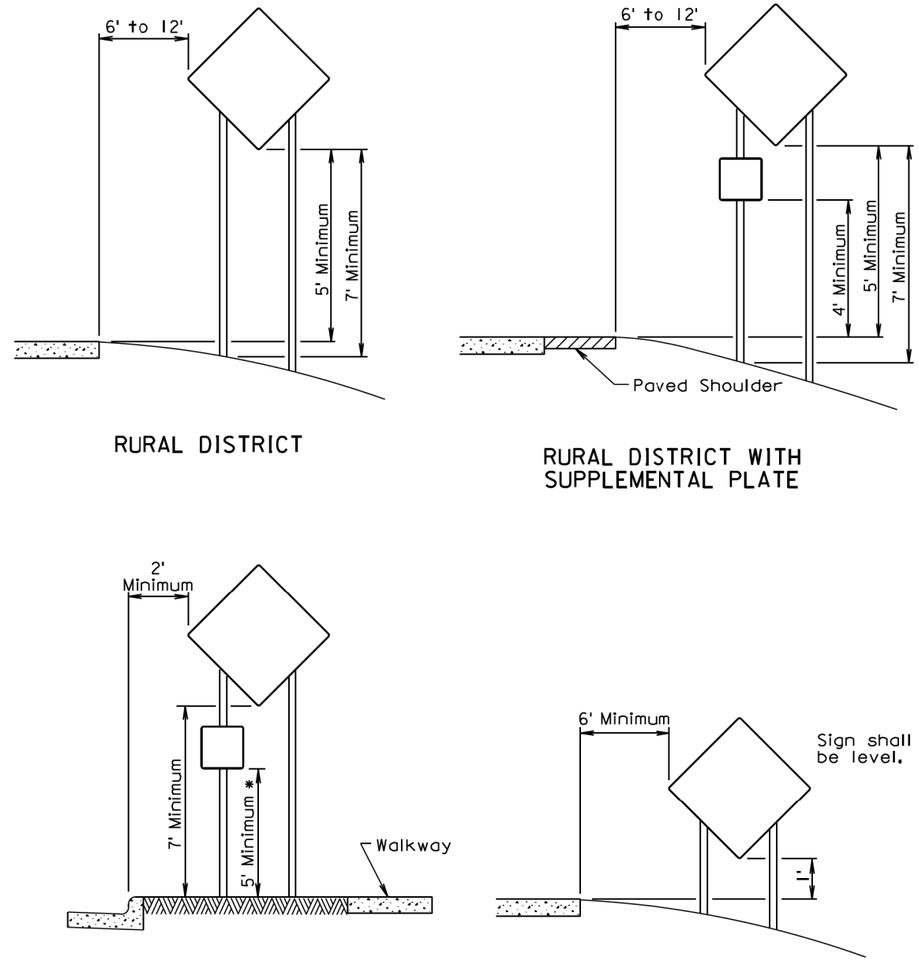
June 3, 2016

Published Date: 1st Qtr. 2017	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES 5-LANE, CENTER 3 LANES CLOSED	PLATE NUMBER 634.57 Sheet 1 of 1



June 3, 2016

Published Date: 1st Qtr. 2017	SDDOT	GUIDES FOR TRAFFIC CONTROL DEVICES 5-LANE, OUTSIDE LANE CLOSED	PLATE NUMBER 634.60 Sheet 1 of 1

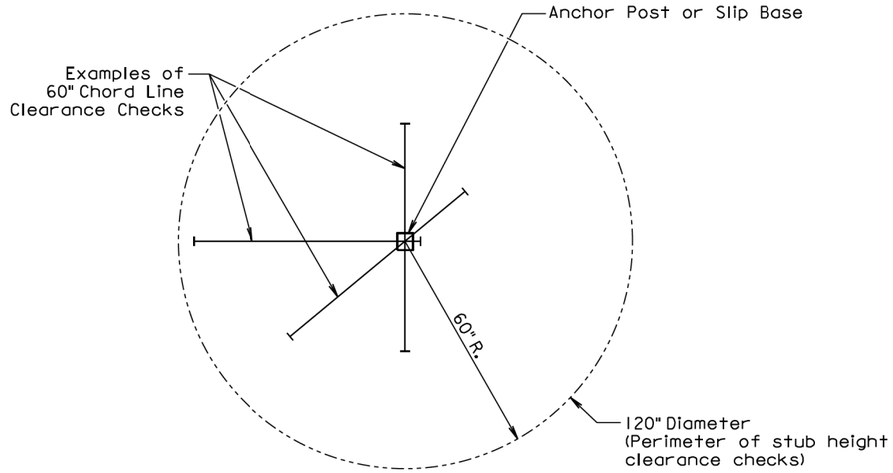


September 22, 2014

Published Date: 1st Qtr. 2017	SDDOT	CRASHWORTHY SIGN SUPPORTS (Typical Construction Signing)	PLATE NUMBER 634.85 Sheet 1 of 1

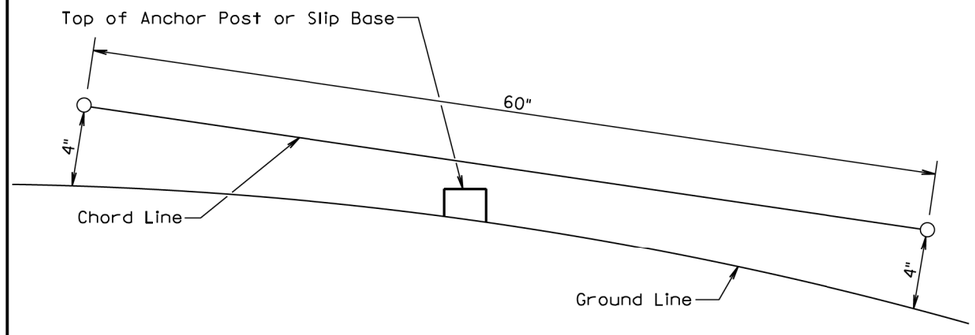
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	079-492	16	16

Plotting Date: 04/12/2017



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: 1st Qtr. 2017	SDDOT	***BREAKAWAY SUPPORT STUB CLEARANCE***	*PLATE NUMBER* 634.99
			Sheet 1 of 1