

PLOT SCALE - 1"=200'

PLOTTED FROM - TRCU10208

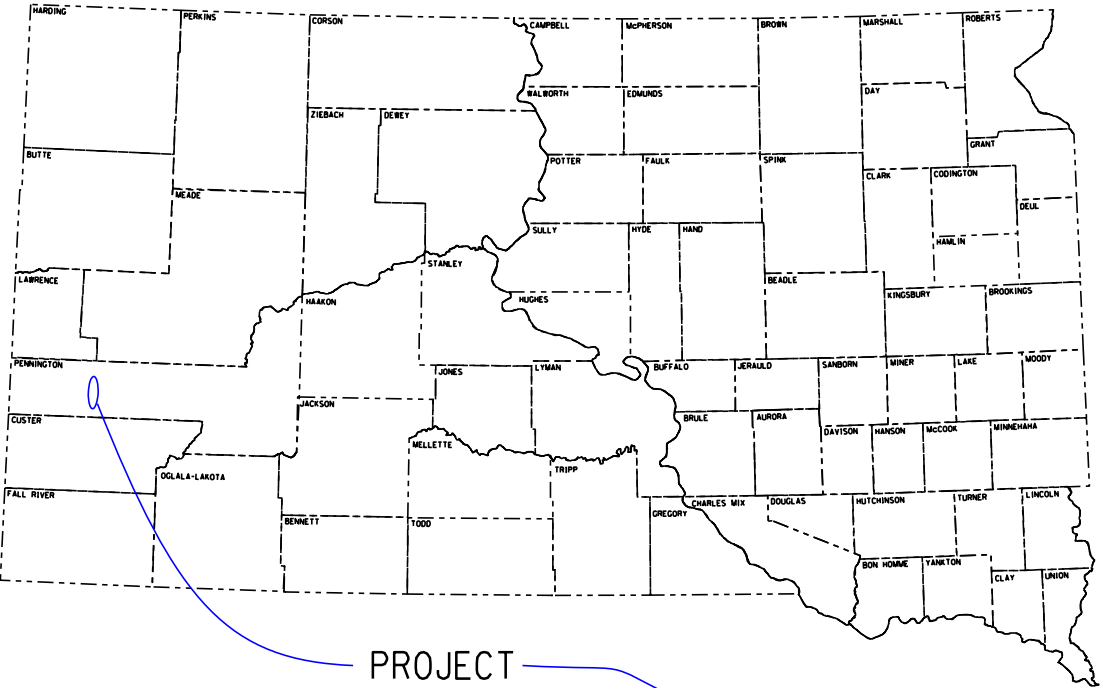
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	385-491	1	17

Plotting Date: 04/28/2016

STATE OF SOUTH DAKOTA
DEPARTMENT OF TRANSPORTATION
PLANS FOR PROPOSED
PROJECT 385-491
US HIGHWAY 385
PENNINGTON COUNTY
PCC PAVEMENT REPAIR
PCN i44Y

INDEX OF SHEETS

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Sheets 2-6: Estimate of Quantities
& Plan Notes
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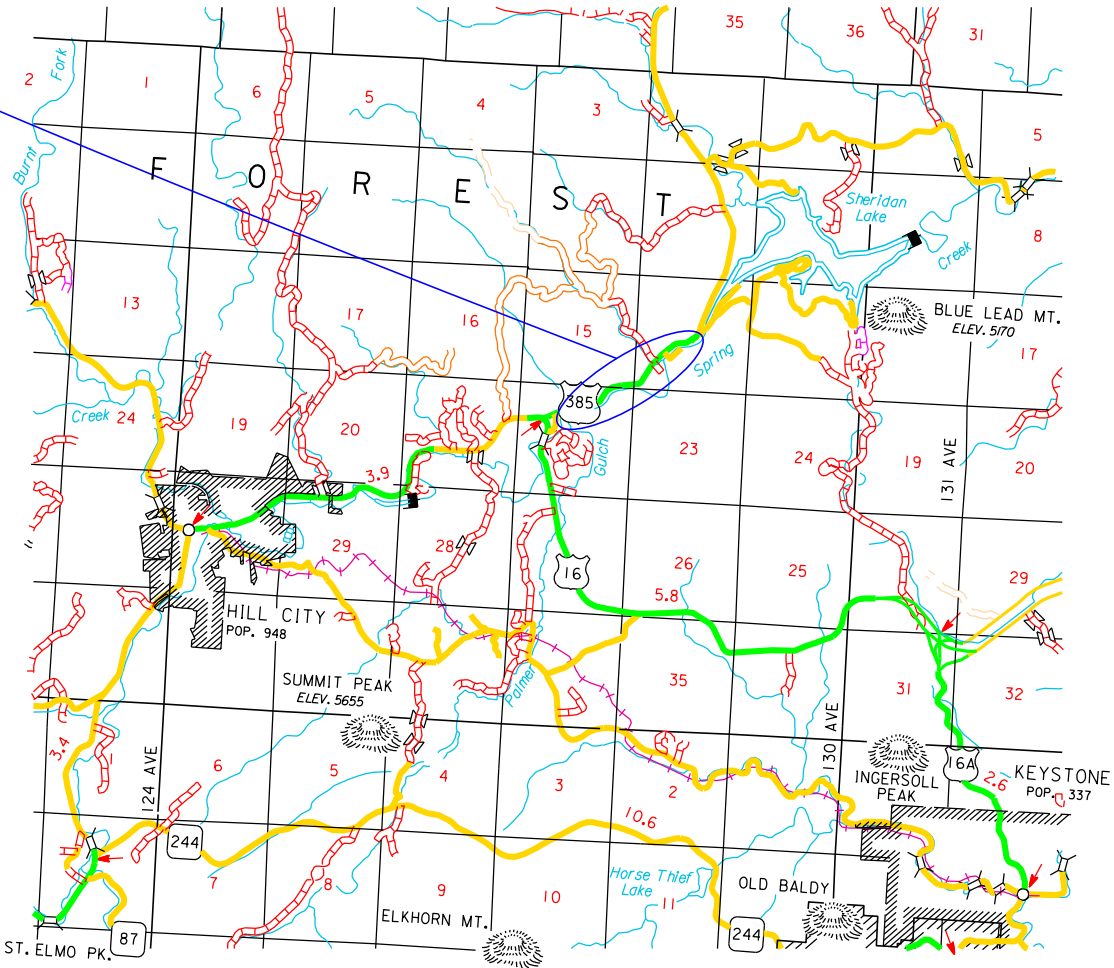


PROJECT
PROJECT 385-491
MRM 85.51 to MRM 87.00

US 385 DESIGN DESIGNATION

ADT (2015)	2163
ADT (2035)	3139
DHV	496
D	51%
T DHV	2.2%
T ADT	4.8%
V	55

Storm Water Permit
No Permit Required



Gross Length	7867.2 FEET	1.49 MILES
Length of Exceptions	0.00 FEET	0.000 MILES
Net Length	7867.2 FEET	1.49 MILES



PLOT NAME - 3

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ESTIMATE OF QUANTITIES

009E0010	Mobilization	1	LS
120E0100	Unclassified Excavation, Digouts	50	CuYd
260E2010	Gravel Cushion	50.0	Ton
260E5000	Shot Rock	50.0	Ton
320E1200	Asphalt Concrete Composite	8.0	Ton
380E5030	Nonreinforced PCC Pavement Repair	200.7	SqYd
380E6000	Dowel Bar	26	Each
380E6110	Insert Steel Bar in PCC Pavement	271	Each
380E6200	Tie Bar Retrofit, Stitching	335	Each
380E6302	Reseal PCC Pavement Joint - Hot Pour	540	Ft
380E6310	Seal Random Cracks in PCC Pavement	1,719	Ft
390E0200	Repair Type A Spall	52.0	SqFt
430E0700	Precast Concrete Headwall for Drain	2	Each
634E0010	Flagging	300.0	Hour
634E0110	Traffic Control Signs	727.0	SqFt
634E0120	Traffic Control, Miscellaneous	1	LS
634E0285	Type 3 Barricade, 8' Double Sided	6	Each
680E0240	4" Corrugated Polyethylene Drainage Tubing	60	Ft
831E0300	Reinforcement Fabric (MSE)	186	SqYd

SPECIFICATIONS

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

SEQUENCE OF OPERATIONS

1. Set up traffic control to close one lane.
2. Complete single lane Concrete Repair.
3. Switch traffic control to close adjacent lane.
4. Complete adjacent lane Concrete Repair
5. Install Permanent Pavement Marking.
6. Remove traffic control.

COORDINATION WITH ASPHALT SHOULDER REPAIR PROJECT

An Asphalt Shoulder Repair (Micro-Surfacing) project could be in progress within the limits and during the same timeframe as this project. The Department and the Contractor will need to communicate in an effort to minimize or eliminate conflicts

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 State ROW.

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

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

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

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

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

Failure to comply with the requirements stated above may result in civil penalties in accordance with South Dakota Solid Waste Law, SDCL 34A-6-1.31. All costs associated with furnishing waste disposal site(s), disposing of waste, maintaining control of access (fence, gates, and signs), and reclamation of the waste disposal site(s) shall be incidental to the various contract items.

COMMITMENT I: HISTORICAL PRESERVATION OFFICE CLEARANCES

The SDDOT has obtained concurrence with the State Historical Preservation Office (SHPO or THPO) for all work included within the project limits and all 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”.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
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EXISTING PCC PAVEMENT

The existing pavement on US 385 is 8” Nonreinforced PCC Pavement with limestone aggregate. Longitudinal joints are reinforced with No. 5x30” deformed tie bars spaced 48” center to center.

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 for these changes. Payment will be based on the actual area replaced.

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

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

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

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

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

At repair locations where the new working joint is not opposite the existing working joint, the Contractor shall place a ¼ inch preformed asphalt expansion joint material along the longitudinal joint from the existing working joint to the new working joint. The expansion joint material shall meet the requirements of AASHTO M33. Cost for this material shall be incidental to the contract unit price per square yard for Nonreinforced PCC Pavement Repair. All joints (longitudinal and transverse) through and around the repair areas shall be sawed and sealed with Hot Poured Elastic Joint Sealer.

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 shall 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 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.

Concrete shall be covered with suitable insulation blanket consisting of a layer of closed cell polystyrene foam protected by at least one layer of plastic at the direction of the Engineer. Insulation blanket shall have an R-value of at least 0.5, as rated by the manufacturer. Insulation blanket shall be left in place until the concrete has obtained strength of 4,000 psi. The initial contraction joint sawing shall be performed as soon practical to avoid random cracking. Insulation blanket shall be overlapped on to the existing concrete.

All costs for performing this work including sawing and removing concrete, furnishing and placing concrete, #5 tie bars cast in place, curing, sawing and sealing joints, 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.

The Contractor shall insert the steel bars (1¼” x 18” epoxy coated plain round dowel bars and No. 9 x 18” epoxy coated deformed tie bars for transverse joints and No. 5 x 24” epoxy coated deformed tie bars for longitudinal joints) into drilled holes in the existing concrete pavement.

Steel bars shall be cut to the specified length by sawing and shall be free from burring or other deformations. Shearing will not be permitted.

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.

Cost for the epoxy resin adhesive, steel bars, drilling of holes, inserting the steel bars into the drilled holes and all other items incidental to the insertion of the steel bars shall be included in the contract unit price per each for Insert Steel Bar In PCC Pavement.

ASPHALT CONCRETE COMPOSITE

A Flush Seal will not be required on the asphalt concrete patching.

Locations and quantities of asphalt repair are subject to change. The exact locations will be determined in the field by the Engineer. The Engineer reserves the right to adjust quantities and/or add locations at no additional cost to the state.

SHOT ROCK

Shot Rock shall consist of broken or crushed ledge rock produced from blasting or quarrying operations. Shot Rock material utilized in subgrade stabilization shall be less than 8” in diameter with a nominal size of 4”. Gypsum may not be used as Shot Rock.

Compaction shall be to the satisfaction of the Engineer. Acceptance of Shot Rock material shall be visually inspected and may be used without further testing as directed by the Engineer.

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.

SUBGRADE REPAIR

Included in the Estimate of Quantities is Unclassified Excavation, Digouts for the necessary removal of unstable material. These locations shall be determined by the Engineer.

Backfill shall be Shot Rock and Gravel Cushion installed in accordance with the detail for Subgrade Repair.

The MSE Geotextile Fabric shall be placed on the bottom and the sides of the excavated subgrade. Additional fabric shall be provided to allow for wrapping the top of the shot rock backfill. Shot rock shall be placed in lifts not to exceed 8 inches. The shot rock shall be watered and compacted by at least 4 complete vibratory roller passes per lift.

When the shot rock backfill has reached a compacted depth of 1.5 feet, the shot rock shall be covered with MSE Geotextile Fabric. Gravel Cushion shall be placed on top of the MSE Geotextile Fabric.

The Contactor shall saw cut the asphalt shoulder for installation of the drainage tubing. The drainage tubing shall be backfilled with material that was removed from the trench. 6” of Gravel Cushion shall be placed on top of the trench backfill. 3” of Asphalt Concrete Composite shall be placed on top of the Gravel Cushion. All costs associated with installation of the drainage tubing through the shoulder shall be incidental to the contract unit price per foot “4” Corrugated Polyethylene Drainage Tubing”.

TABLE OF PCCP REPAIR

Sta. (Joint) to	Sta. (Joint)	Lane	"L" (Ft.)	"W" (Ft.)	Nonreinforced PCC Pavement (Sq. Yds.)	#5 Bar Each	#9 Def. Bar Each	1 1/4" Bar Each	Dowel Bar Each	Insert Steel Bar Each
47+30	47+70	SB	31	14	48.22	8	13	13	13	34
51+60	51+80	SB	6	14	9.33	2	13	13	0	28
52+90	53+30	SB	40	14	62.22	15	13	13	13	41
54+40	54+60	NB	10	14	15.56	2	13	13	0	28
54+40	54+60	SB	10	14	15.56	2	13	13	0	28
74+40	74+60	NB	6	14	9.33	2	13	13	0	28
74+60	74+80	NB	10	14	15.56	2 *	13	13	0	26
74+60	74+80	SB	10	14	15.56	2 *	13	13	0	28
84+80	85+00	SB	6	14	9.33	2	13	13	0	28
			Total:		200.67	33	117	117	26	269

* Incidental to PCCP Pavement Repair

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. The minimum dimension of the repair area shall be 6”. Payment will be based on actual area replaced.

Type A Spalls shall conform to Section 390 with the following exceptions:

The concrete patching material used for spall repair shall be a bagged MNDOT 3U18 patching material that includes Air Entraining Agent. The product shall be submitted and be approved by the Concrete Engineer. A product known to meet this requirement is Spec Mix/TCC Materials “Air Entrained Concrete Patching Mix”.

Grout for bonding the concrete patching material to the existing concrete shall consist of two parts by weight of Portland Cement and one part sand, mixed with sufficient water to form a creamy slurry. Grout shall be applied on all of the existing concrete surfaces within the removal area immediately prior to placement of the concrete patching material. The grout shall be scrubbed into the surface with a stiff bristle brush in a thin and uniform coat. Care shall be taken to ensure that excess grout does not collect in low areas, that the grout is confined only to the immediate area in which concrete patching material is to be placed, and that the rate of application is limited to an amount such that the grout will be covered with concrete patching material before the grout dries.

The concrete patching material shall be mixed and placed in accordance with the manufacturer's technical data sheet. The Contractor shall provide a manufacturer's technical data sheet to the Engineer prior to performing the work. The concrete patching material shall be maintained at or above 45°F (7°C) for at least 72 hours after placement.

Patched areas shall be sprayed with curing compound as per Section 390. An additional coat of curing compound shall be applied not less than 20 minutes and not more than 1 hour after the first application.

Repair areas can be opened to traffic once the repair material meets 3,000 psi as long as the above requirement for temperature can be met.

An initial cylinder shall be made and the Engineer shall calibrate a Swiss Hammer to it. All subsequent strength tests shall be by Swiss Hammer.

The Engineer will test the repair areas after an initial cure period by Swiss Hammer. No section is to be opened to traffic without the permission of the Engineer.

No additional work zones will be set up until strength requirement is met. If strength requirement has not been met by 36 hours after placement, the patches shall be removed and replaced at no cost to the State.

Material used to form the joint shall be a foam core board, waxed cardboard, or other stiff material capable of standing without deflection. The Contractor shall fill the area (with the foam core board or other approved material in place) with an approved patching material. The patching material shall be vibrated with a small hand held vibrator capable of thoroughly consolidating the patching compound into the area. The top surface of the filled area shall be trowel finished and cured.

After screeding and finishing, the same bonding grout shall be used to paint the edges of the repair. Any saw cuts that extend beyond the patch perimeter

shall be filled with patching material and must also have the surface painted with bonding grout.

After removal of the form material, the repaired length of the joint(s) shall be sealed. Cost for removing the form material and sealing the joint(s) shall be incidental to the contract unit price per square foot for Repair Type A Spall.

Spalls which are repaired according to plans and specifications and exhibit partial re-spalling or cracking, shall be repaired to the satisfaction of the Engineer at no additional cost to the Department.

TABLE OF TYPE A SPALL REPAIR

Sta. (Joint) to	Sta. (Joint)	NBL /SBL	Spall Repair (SF.)
5+00	7+20	SB	6
26+40	27+20	NB/SB	2
29+40		NB	2
30+60	31+30	NB	3
33+60		NB	2
34+20		NB	3
36+00		SB	3
51+00	51+60	SB	3
52+50	53+50	NB/SB	3
54+40	55+40	NB	2
69+40		NB	3
72+40	72+60	NB	1
73+20	76+60	NB/SB	6
74+40	74+60	NB	1
75+20	76+80	NB	3
84+40	85+60	SB	3
87+00	87+20	NB	3
87+40	87+60	NB	3
		Total:	52

RETROFITTING TIE BARS (STITCHING)

The Contractor shall install No. 5 epoxy coated deformed tie bars into drilled holes in the existing concrete pavement. An epoxy resin adhesive must be used to anchor the steel bar in the drilled hole. A rotary drill or other approved drill shall be used that will not damage the concrete surface. The diameter of the disturbed surface from drilling shall be less than 2 inches. A rigid frame or mechanical device will be required to guide the drill to ensure the proper angle of the steel bars in the drilled holes.

The steel bars shall be cut to the specified length by sawing and shall be free from burring or other deformations. Shearing will not be permitted.

Epoxy resin adhesive shall be of the type intended for horizontal applications, and shall conform to the requirements of ASTM C 881, Type IV, Grade 3 (equivalent to AASHTO M235, Type IV, Grade 3).

The diameter of the drilled holes in the existing concrete pavement for the steel bars shall not be less than 1/8 inch nor more than 3/8 inch greater than the overall diameter of the steel bar. The holes shall be drilled at an angle alternating from opposite sides of the joint to produce a cross-stitching pattern. The drilled holes shall be blown out with compressed air using a device that will reach to the back of the hole to ensure that all debris or loose material has been removed prior to epoxy injection. Damage to pavement shall be repaired to the satisfaction of the Engineer at the Contractor's expense.

Mix the epoxy resin as recommended by the manufacturer and apply by an injection method approved by the Engineer. If an epoxy pump is utilized, it shall be capable of metering the components at the manufacturers designated rate and be equipped with an automatic shut-off. The pump shall shut-off when any of the components are not being metered at the designated rate. Fill the drilled holes sufficiently with epoxy prior to the insertion of the tie bar such that the epoxy will be level with the top of the concrete pavement after insertion of the tie bar. Rotate the steel bar during installation to eliminate voids and ensure complete bonding of the bar. Insertion of the bars by the dipping method will not be allowed. The top of the drilled hole shall be filled with epoxy or excess epoxy removed such that the epoxy is level with the existing pavement. The epoxy shall harden sufficiently prior to opening to traffic.

No bars shall be installed within 15” of an existing transverse contraction joint. Any bars not functioning or damaged shall be repaired or replaced at the Contractor's expense.

Cost for the epoxy resin adhesive, drilling of holes, debris or loose material removal, applying the adhesive, installing the tie bars into the drilled holes and all other items incidental to the installation of the tie bars shall be included in the contract unit price per each for "Tie Bar Retrofit, Stitching". The tie bars for tie bar stitching shall be furnished to the Contractor by the State.

SEAL RANDOM CRACKS IN PCC PAVEMENT

Each random crack shall be routed and the joint and roadway surface immediately cleaned by flushing with water or compressed air. The use of a concrete saw to route the crack will not be allowed. If there is any existing joint filler remaining in the cracks following routing, it shall be satisfactorily removed prior to sealing.

Just prior to sealing, the sides of the routed crack shall be cleaned by sandblasting and the routed reservoir blown clean with compressed air. The groove shall be formed with a saw or router designed for that purpose.

The maximum width of the routed reservoir shall not be greater than ¾” and over sawing will not be allowed.

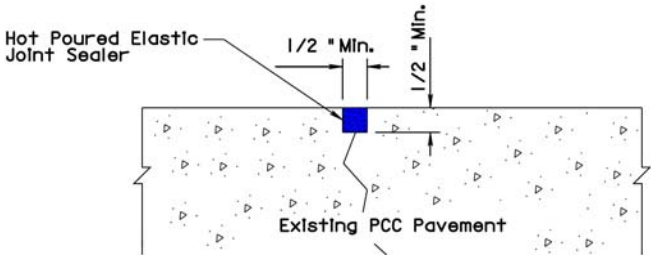
Random cracks wider than ½ inch will not require widening.

Sealing Random Cracks shall be done in accordance with Sec. 380.3 R of the Standard Specifications.

The sealant shall be placed in the routed reservoir with equipment and by methods that insure complete and uniform filling.

Sealing Random Cracks will be measured by the foot to the nearest 0.1 foot of random cracks sealed and accepted on the project.

All costs associated with this work shall be incidental to the contract unit price per foot for “Seal Random Cracks in PCC Pavement”. Payment shall be full compensation for all labor, equipment, materials and incidentals required for crack routing, cleaning, furnishing and placing sealant and removing routed and foreign material from the roadway.



RESEAL PCC PAVEMENT JOINT

Transverse and longitudinal joints shall be sealed with Hot Poured Elastic Joint Sealer. The width of the joint is approximately 3/8” to ½” wide. It is the Contractor's responsibility to inspect and verify the actual field conditions of the joint dimensions for the satisfactory completion of the work. All costs associated with removing, cleaning, and resealing the transverse and longitudinal joints shall be incidental to the contract unit price per foot for “Reseal PCC Pavement Joint-Hot Pour”.

TABLE OF RE-SEAL JOINTS IN PCC PAVEMENT

Sta. (Joint) to	Sta. (Joint)	Repair Type	NBL /SBL	Seal "L"
85+60	91+00	SEAL	NB/CL	540
			Total:	540

Note: Additional joints may be resealed at the direction of the engineer.

TABLE OF PCCP TIE BAR RETROFIT (STITCHING) AND RANDOM CRACK SEALING

Sta. (Joint) to	Sta. (Joint)	Repair Type	NBL /SBL	Tiebar Retrofit (Stitching) Each	Seal "L" Ft.
0+20	2+00	SEAL/STITCH	NBDL & RAD	20	150
0+20	2+00	SEAL	SBDL	8	50
0+00	2+00	SEAL/STITCH	SBRTL & RAD	60	160
2+00	4+00	SEAL	NB	0	30
2+00	4+00	SEAL	SB	0	30
4+00	4+20	SEAL	NB	0	65
5+00	7+00	SEAL	NB/SB	0	35
7+80	9+20	SEAL	SB	0	20
9+40	10+40	SEAL	NB/SB	0	50
12+60	23+60	SEAL	SB	0	30
25+40	25+60	SEAL	SB	0	20
26+40	27+20	SEAL/STITCH	NB/SB	15	45
30+60	31+30	SEAL/STITCH	NB	30	60
32+00	33+00	SEAL	NB/SB	0	23
35+00	36+00	SEAL	NB/SB	0	5
36+40	42+00	SEAL	NB	0	20
43+60	44+40	SEAL/STITCH	NB/SB	10	25
45+00	46+80	SEAL	SB	0	15
47+10	48+50	SEAL/STITCH	NB/SB	3	30
50+20	55+40	SEAL/STITCH	NB/SB	97	283
60+40	60+60	SEAL/STITCH	SB	9	18
58+80	64+00	SEAL	NB/SB	0	100
66+40	67+20	SEAL	NB/SB	0	20
74+40	76+80	SEAL/STITCH	NB	26	81
77+40	84+00	SEAL	NB/SB	0	55
84+40	85+60	SEAL/STITCH	SB	57	114
88+60	89+40	SEAL	NB	0	40
88+60	89+00	SEAL	NBTL/INT.	0	80
89+80	90+40	SEAL	NB	0	65
Totals				335	1719

Note: Tie Bar Retrofit quantities figured using total length of random crack (to be stitched) / 2.

TRAFFIC CONTROL – GENERAL NOTES

1. Requests to deviate from the sequence of operations shall be submitted in writing to the Engineer for review. Approval of an alternate sequence of operations will only be allowed when the proposed changes meet with the Department’s intent for traffic control and sequencing of the work. An alternate sequence shall be submitted for review a minimum of one week prior to potential implementation.
2. Unless otherwise stated in these plans, no work will be allowed during hours of darkness.
3. 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.
4. All materials and equipment shall be stored a minimum distance of 30’ from the traveled way during nonworking hours.
5. The Contractor shall provide installation details at the preconstruction meeting for all breakaway sign support assemblies.
6. 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.
7. All construction operations shall be conducted in the general direction of traffic movement.
8. 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.
9. 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.
10. At no time shall mainline traffic be exposed to differential elevations in traveling lanes due either to milling or paving operations. All lanes that are milled or paved shall be left closed until the adjacent lane is completed in a similar manner with no drop offs. All transitions shall be paved for a smooth ride as approved by the Engineer..
11. The Contractor shall keep the portion of the project being used by public traffic in a condition that will adequately and safely accommodate traffic.
12. Road Work Ahead (W20-1) signs shall be placed at applicable intersecting roads and as directed by the Engineer.

13. The maximum closure distance, distance between stop signs, in Standard Plate 634.25 will be dictated by the sight distance between stop signs. The maximum distance may need to be less than the 600’ stated on Standard Plate 634.25 based on this sight distance at different locations on the project.

PERMANENT PAVEMENT MARKINGS

Existing pavement markings are grooved in tape. New pavement markings shall be Waterborne Pavement Marking with High Grade Polymer. Grooving will not be required.

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

WATEROURNE PAVEMENT MARKING PAINT WITH HIGH GRADE POLYMER

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

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

Pavement Marking Paint will be accepted based on certification and visual inspection. No further testing will be required.

RATES OF MATERIALS FOR HIGH GRADE POLYMER PAINT

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

All cost for materials, labor, and equipment necessary to furnish and install the pavement markings shall be incidental to the contract lump sum price for Traffic Control, Miscellaneous.

REFLECTORIZED SHEETING REQUIREMENTS FOR TEMPORARY TRAFFIC CONTROL DEVICES

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

Temporary traffic control devices, including signs, drums, cones, tubular markers, barricades, vertical panels, and direction indicator barricades shall be reflectORIZED with sheeting applied to a satisfactory backing. For all temporary traffic control warning signs, the reflective sheeting shall meet or exceed the standards of Type VII, Type VIII, Type IX, or Type XI as defined by AASHTO M 268 (ASTM D4956). For all other temporary traffic control signs, the reflective sheeting shall meet or exceed the standards of Type IV, Type V, Type VII, Type VIII, Type IX, or Type XI as defined by AASHTO M 268 (ASTM D4956). For barricades, vertical panels, and direction indicator barricades; the reflective sheeting shall meet or exceed the standards of Type III as defined by AASHTO M 268 (ASTM D4956). Round surfaced temporary traffic control devices including, but not limited to; drums, cones, and tubular markers shall be reflectORIZED with reflectORIZED sheeting meeting or exceeding the standards of Type IV as defined by AASHTO M 268 (ASTM D4956). All orange colored material shall be fluorescent.

ITEMIZED LIST OF TRAFFIC CONTROL DEVICES

SIGN CODE	SIGN DESCRIPTION	NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
R1-1	STOP	6	30" x 30"	6	36
W1-3	REVERSE TURN (L or R)	3	48" x 48"	16	48
W3-1	STOP AHEAD (symbol)	6	48" x 48"	16	96
W13-1P	ADVISORY SPEED (plaque) 45 mph	6	30" x 30"	6	36
W20-1	ROAD WORK AHEAD	11	48" x 48"	16	176
W20-4	ONE LANE ROAD AHEAD	8	48" x 48"	16	128
W20-7	FLAGGER (symbol)	2	48" x 48"	16	32
G20-2	END ROAD WORK	3	36" x 18"	5	15
		CONVENTIONAL ROAD TRAFFIC CONTROL SIGNS SQFT			567

TYPE 3 BARRICADES

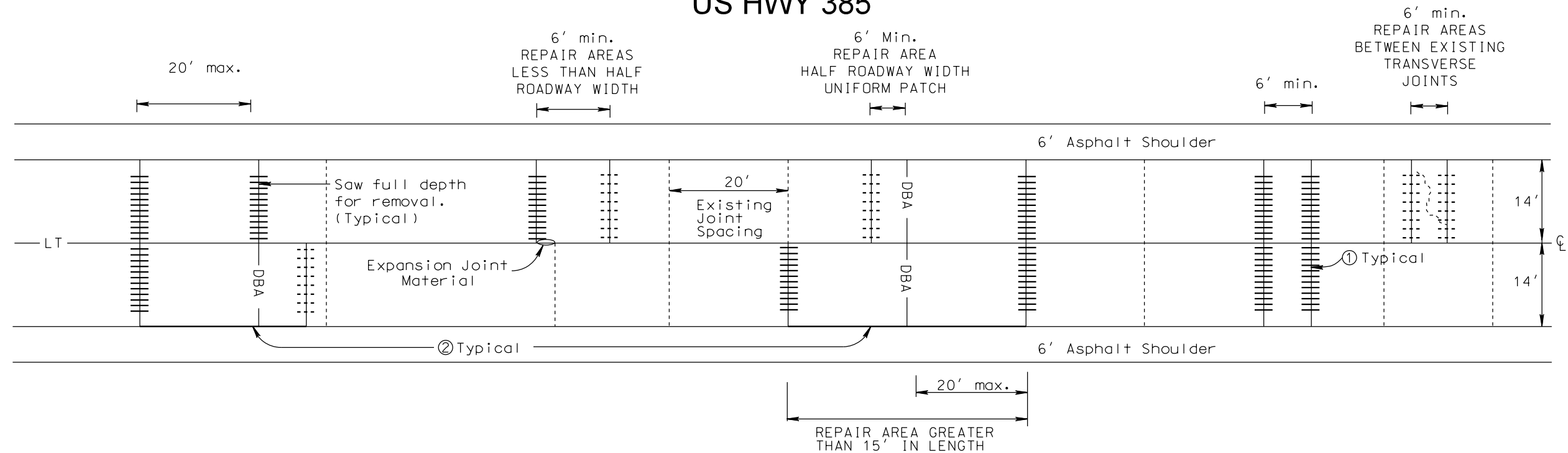
ITEM DESCRIPTION	QUANTITY
Type 3 Barricade, 8' Double Sided	6 Each

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	385-491	7	17

NONREINFORCED PCC PAVEMENT REPAIR

TYPICAL REPAIR AREAS

US HWY 385



NOTES:

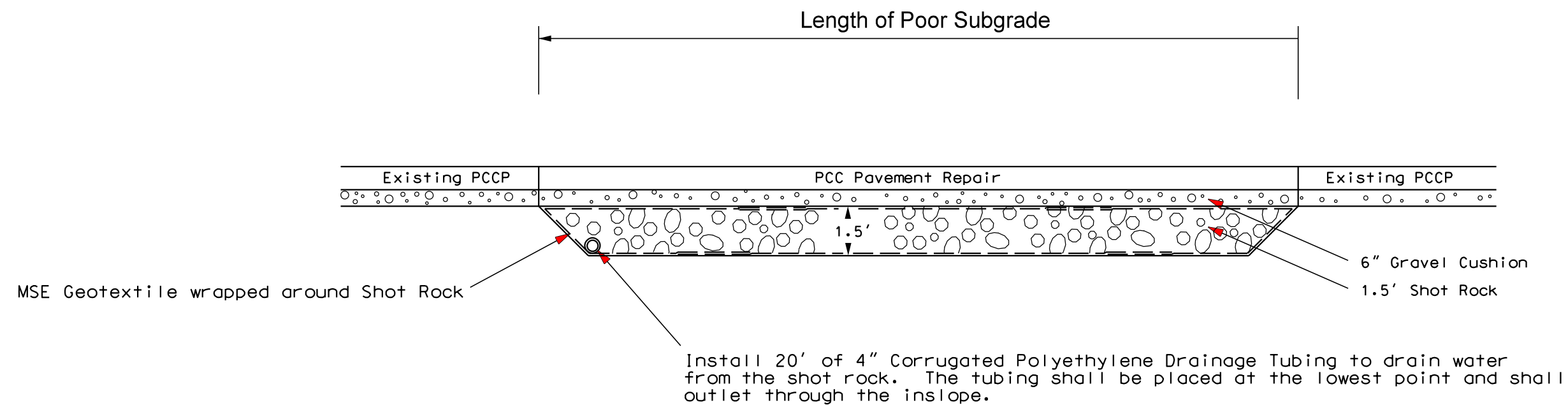
- ① Where possible, transverse joints shall be constructed full roadway width.
- ② All edges of repair areas that are adjacent to asphalt concrete shall be formed to match the depth of the existing concrete pavement and replaced with new asphalt.

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)

Subgrade Repair Detail

LONGITUDINAL SECTION ALONG CENTERLINE

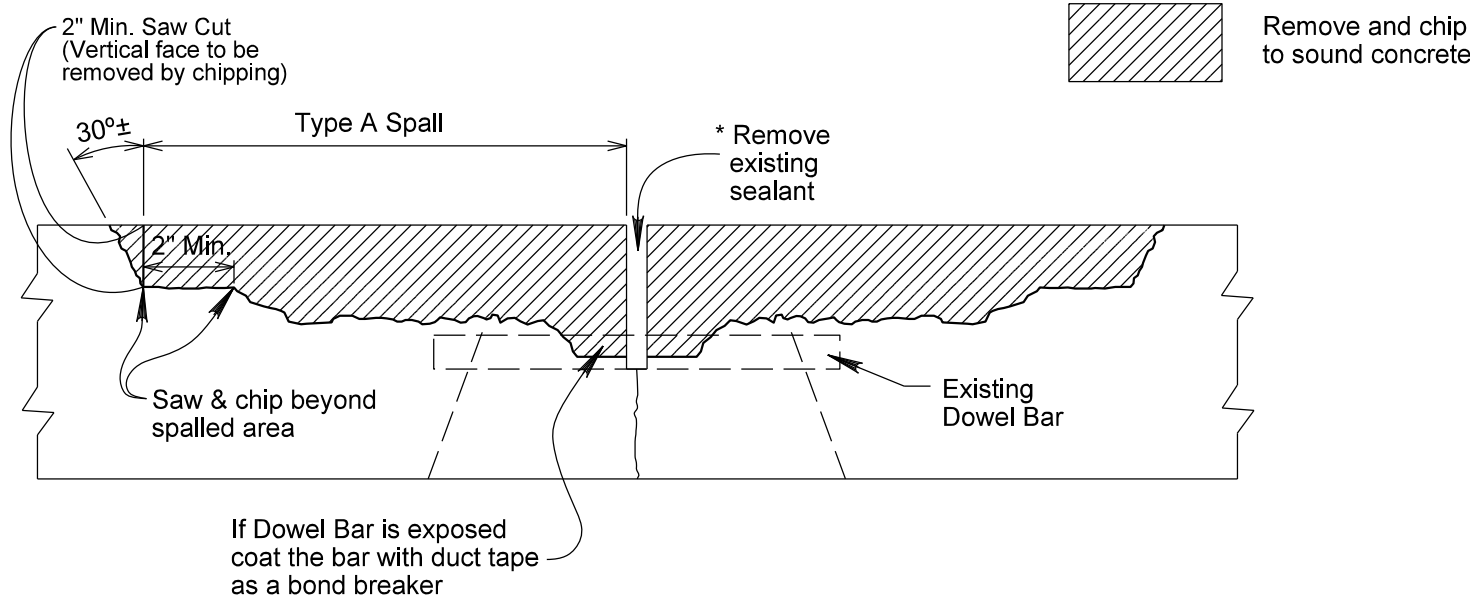


STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	385-491	9	17

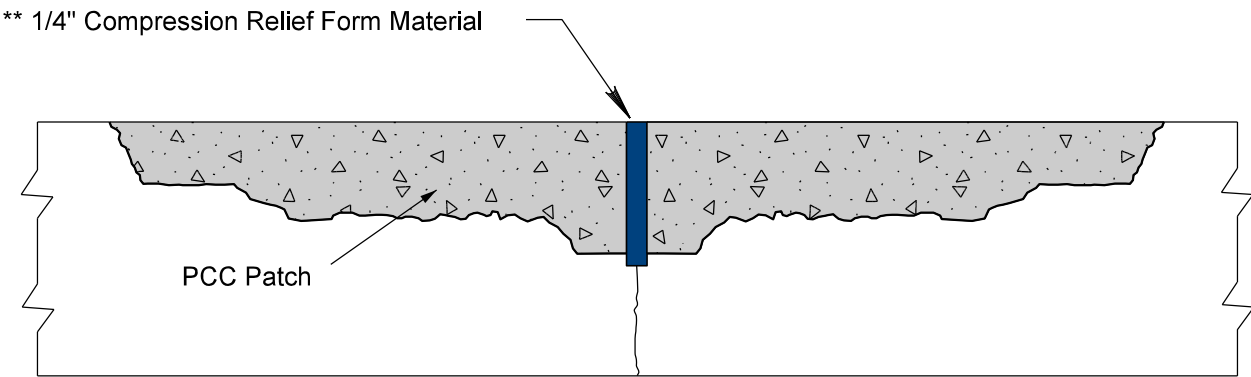
Plotting Date: 04/13/2016

REPAIR OF TYPE A SPALLS

SPALL REMOVAL



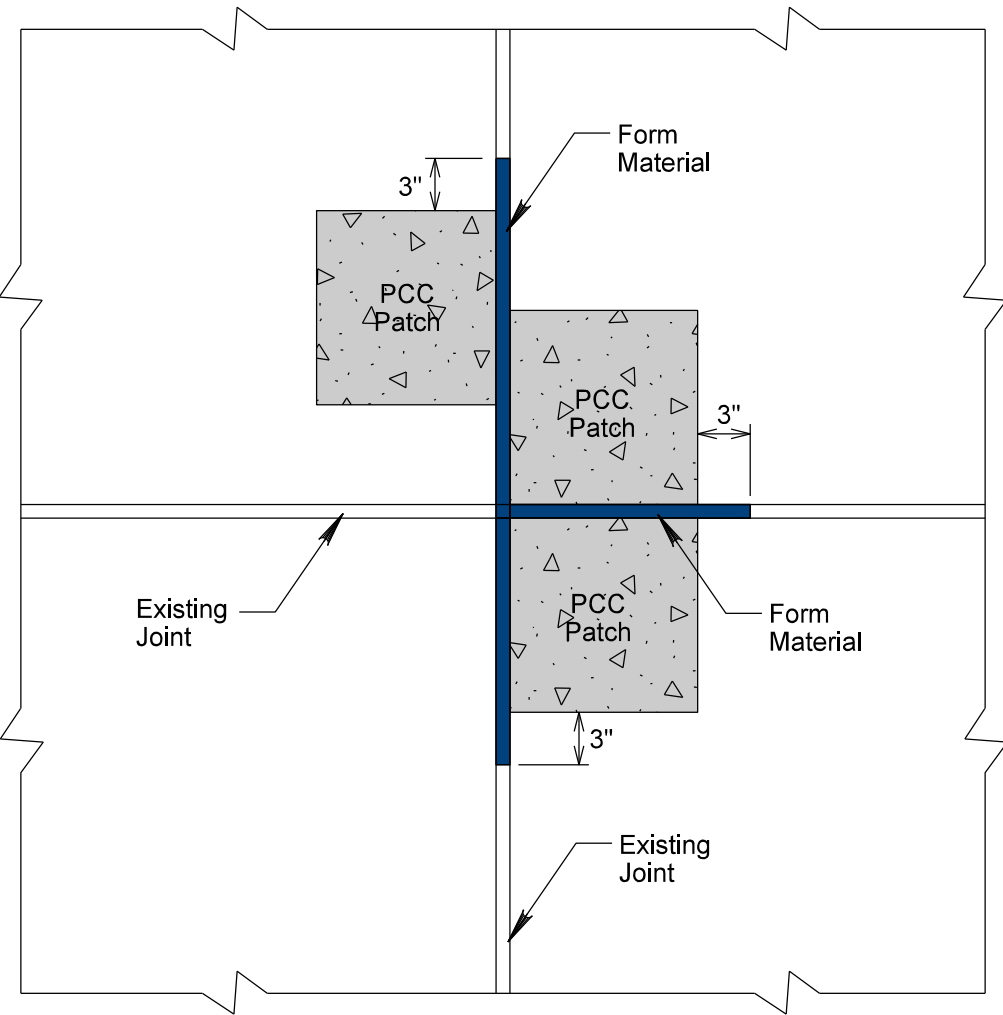
SPALL PATCH



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

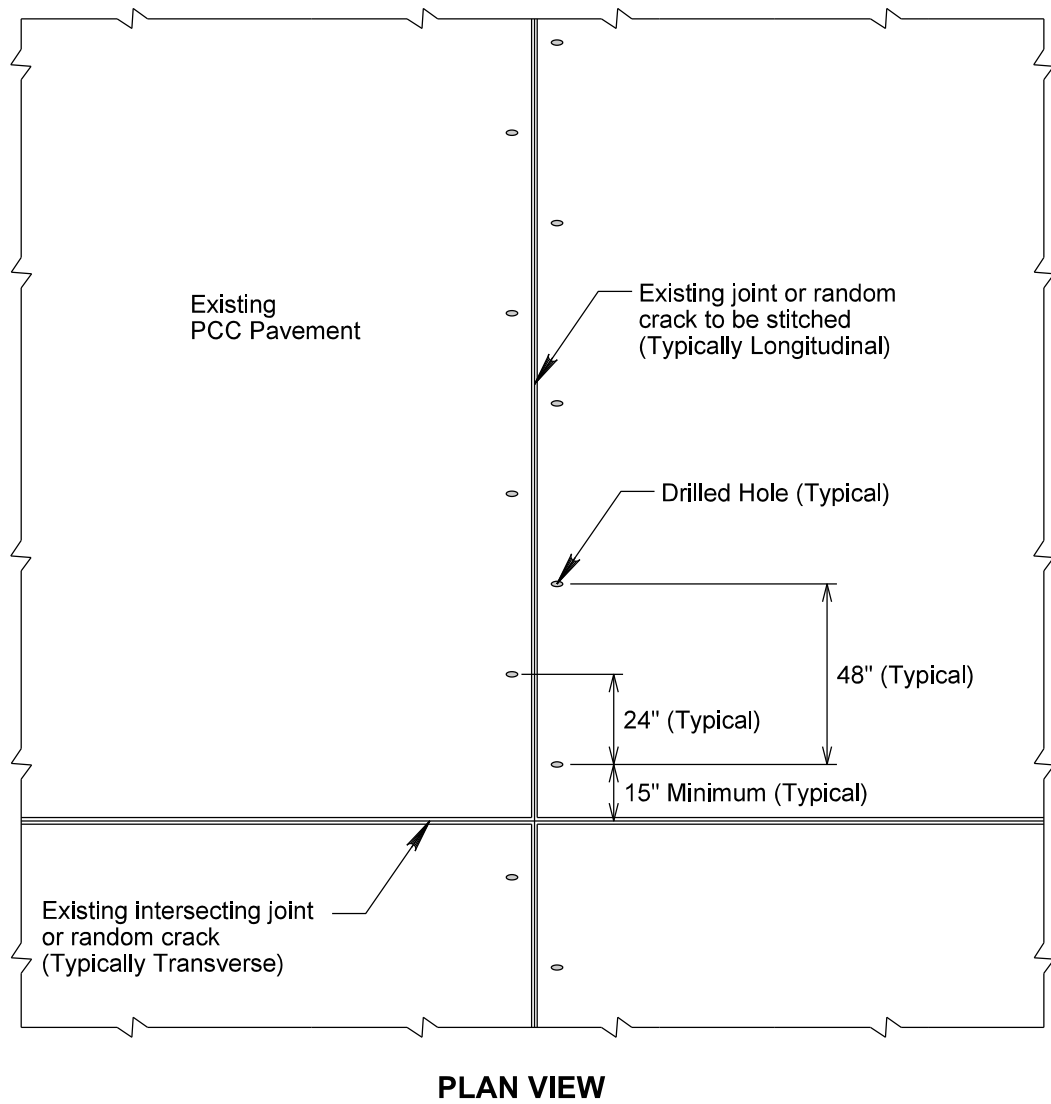
REPAIR OF TYPE A SPALLS

SPALL PATCHES (PLAN VIEW)



STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	385-491	10	17

TIE BAR RETROFIT (STITCHING)



TIE BAR RETROFIT (STITCHING)

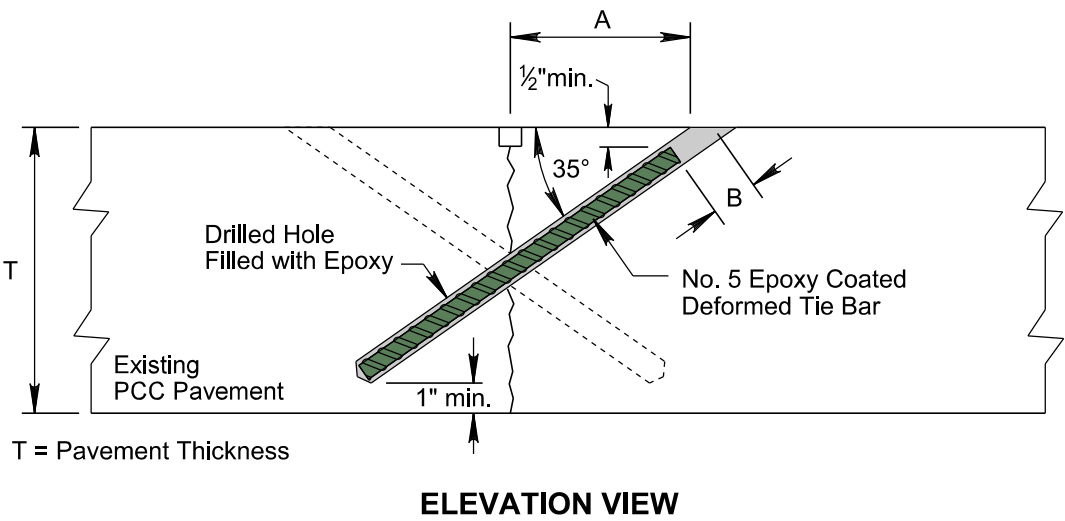


TABLE OF STITCHING DIMENSIONS			
T	A	B	Length of Tie Bar
8"	5"	1 1/2" ±	10"
8 1/2"	5 1/4"	1 3/8" ±	11"
9"	5 5/8"	1 1/4" ±	12"
9 1/2"	6"	1 5/8" ±	12 1/2"
10"	6 3/8"	1 1/2" ±	13 1/2"
10 1/2"	6 3/4"	1 3/8" ±	14 1/2"
11"	7"	1 1/4" ±	15 1/2"
11 1/2"	7 3/8"	1 3/8" ±	16"
12"	7 3/4"	1 3/8" ±	16 1/2"
12 1/2"	8 1/8"	1 1/4" ±	17 1/2"

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	385-491	11	17

Vehicle-mounted signs shall be mounted in a manner such that they are not obscured by equipment or supplies.

Sign legends on vehicle-mounted signs shall be covered or turned from view when work is not in progress.

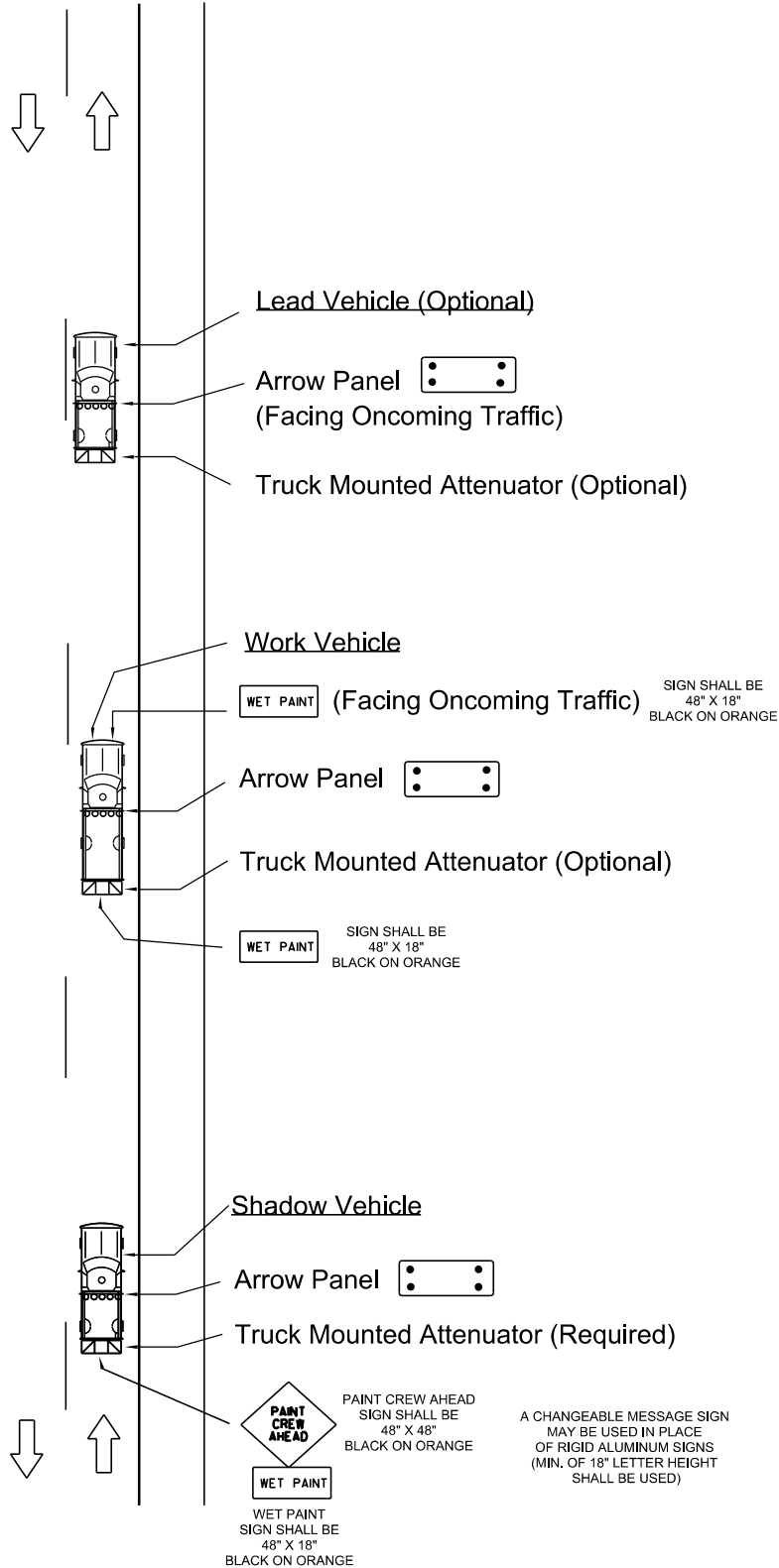
Shadow and Work vehicles shall display high-intensity rotating, flashing, oscillating, or strobe lights, flags, signs, or arrow panels.

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

When an arrow panel is used, it shall be used in the caution mode.

Marching Diamonds are acceptable.

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



GUIDES FOR TRAFFIC CONTROL DEVICES
MOBILE OPERATIONS ON 2-LANE ROAD

MOBILE: Intermittent & Continuous Moving

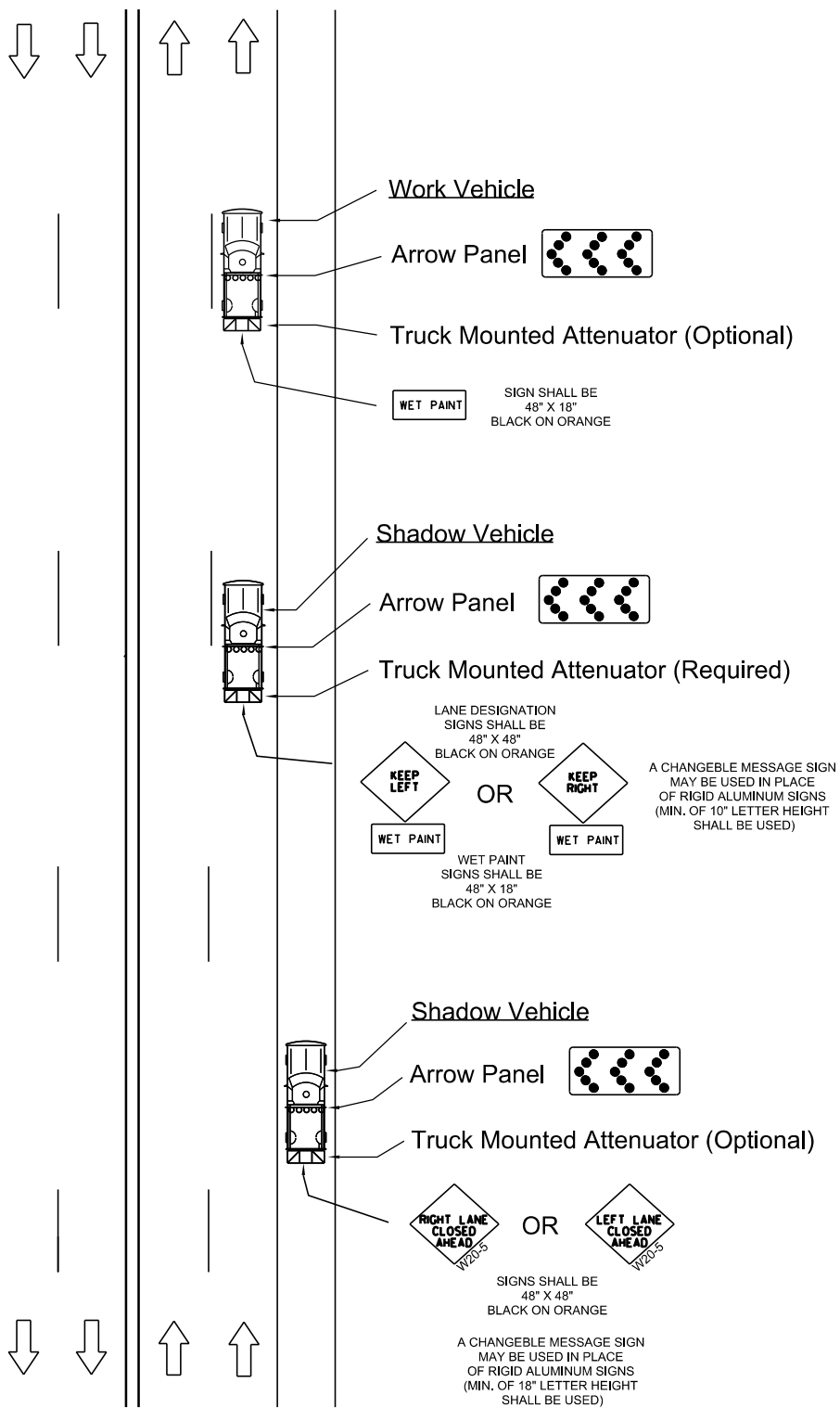
Vehicle-mounted signs shall be mounted in a manner such that they are not obscured by equipment or supplies.

Sign legends on vehicle-mounted signs shall be covered or turned from view when work is not in progress.

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

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

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



GUIDES FOR TRAFFIC CONTROL DEVICES
MOBILE OPERATIONS ON 4-LANE DIVIDED

MOBILE: Intermittent & Continuous Moving

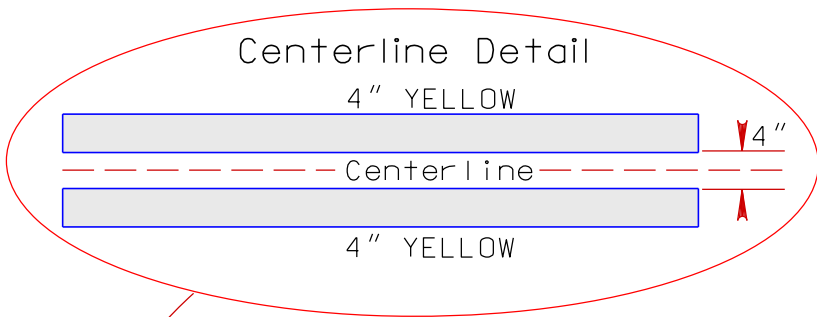
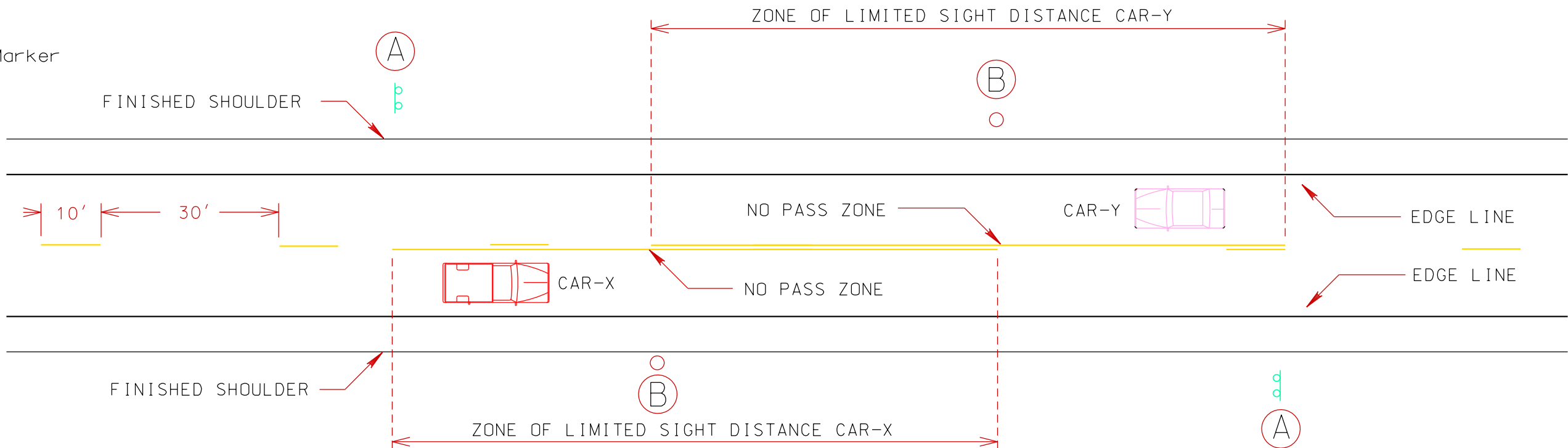
TYPICAL PAVEMENT MARKING LAYOUT

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	385-491	12	17

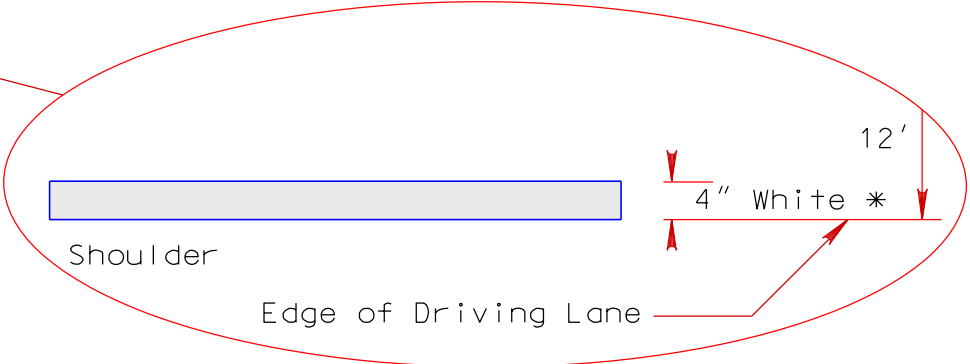
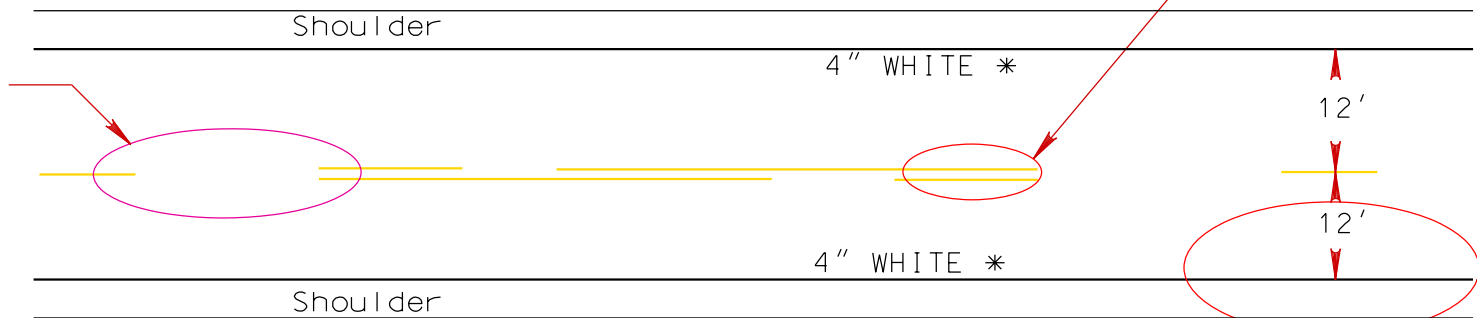
Plotting Date: 04/05/2016



(B) End of Zone Marker



NOTE: A THREE "GUN" SYSTEM SHALL BE USED TO OBTAIN THIS PATTERN.



* 8" WHITE - As per locations in plans with shoulders less than 2' width.

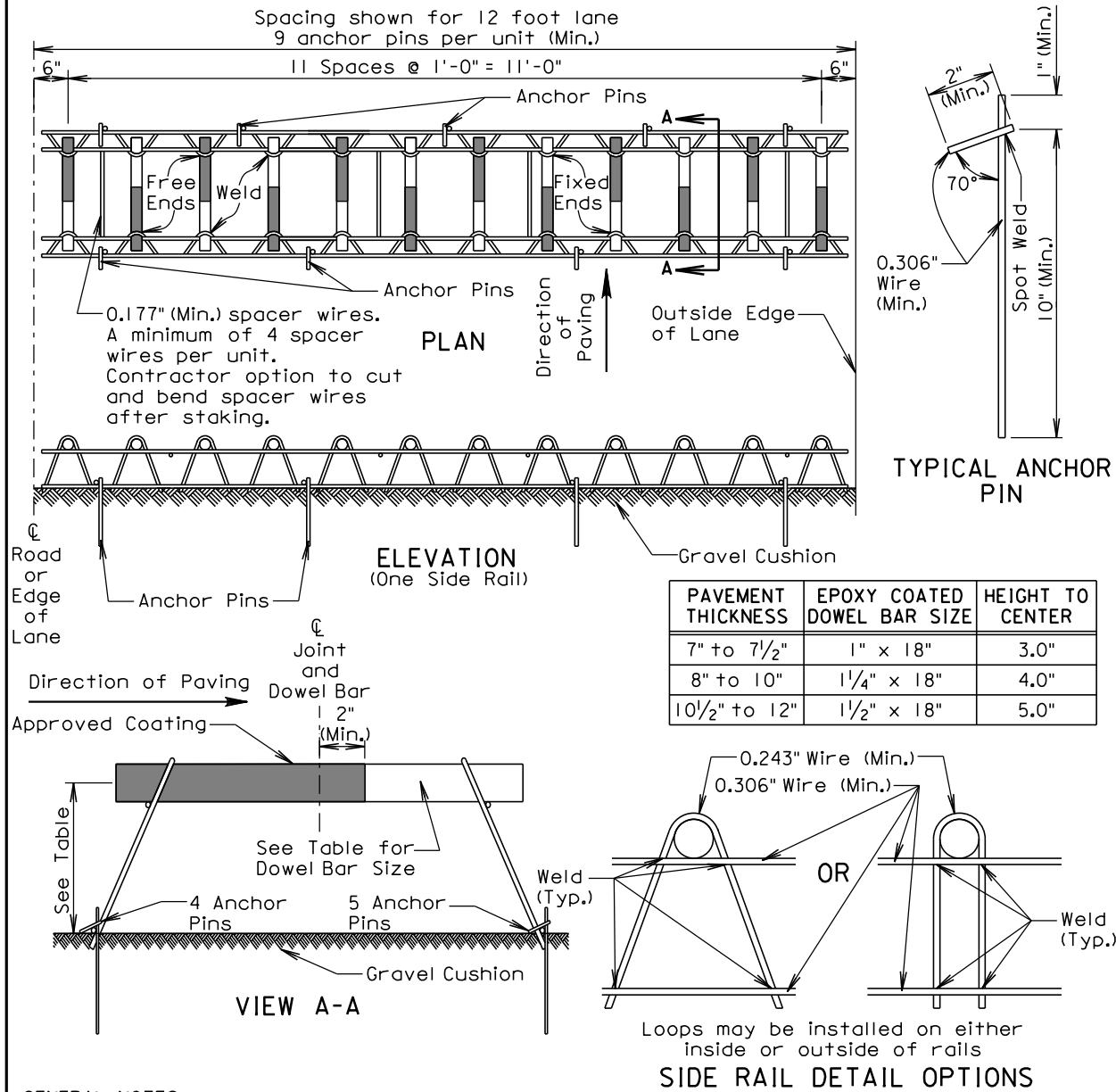
1:20

Plot Scale -

trac10208

Plotted From -

File - ...\\44Y PavementMarkingDetails.dgn



GENERAL NOTES:

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

Centerline of individual dowel bars shall be parallel to top of subgrade $\pm 1/8$ inch in 18 inches and to all other dowel bars in the assembly $\pm 1/16$ inch in 18 inches.

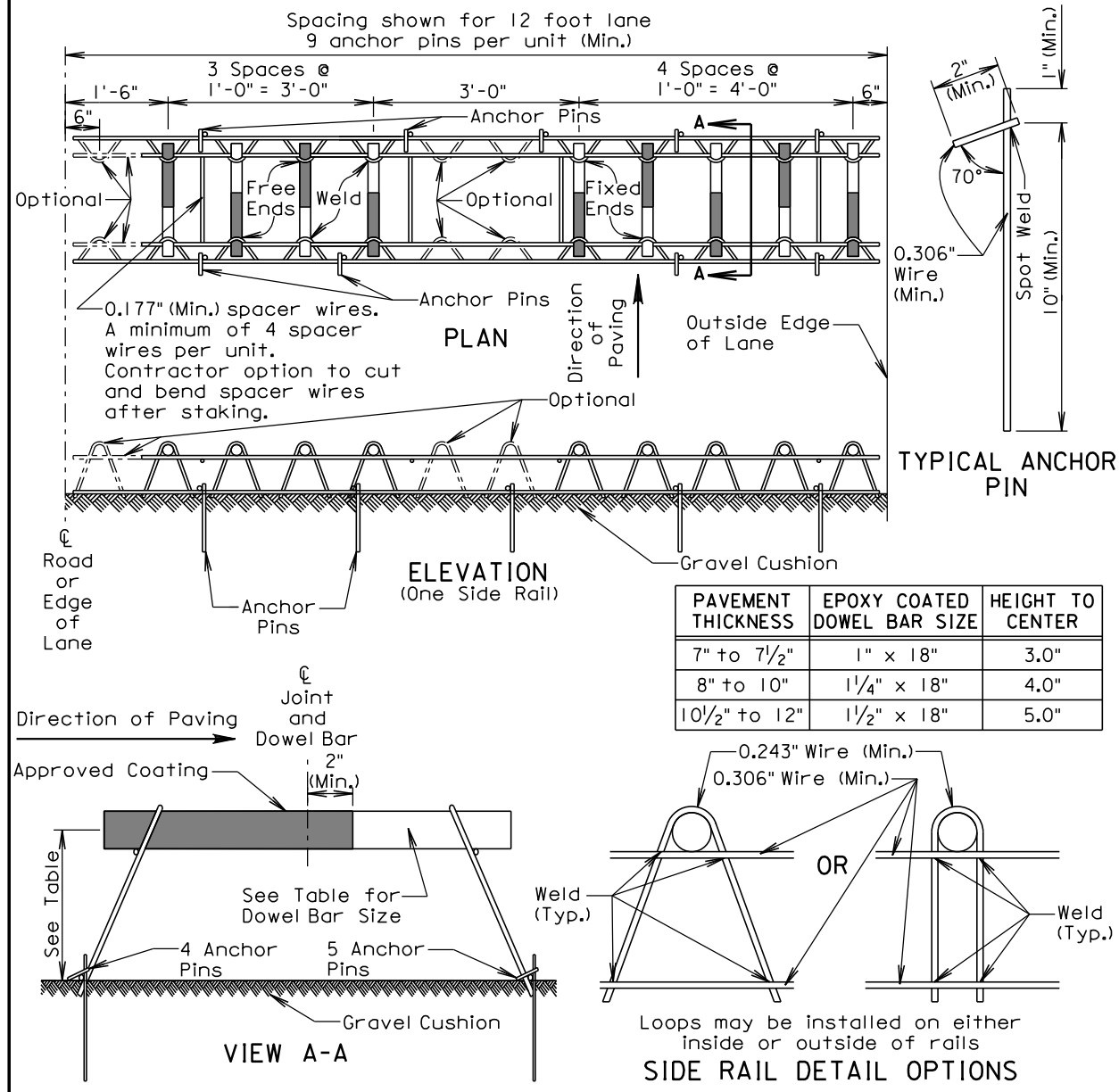
Centerline of individual dowel bars shall be parallel to the centerline of the roadway $\pm 1/2$ inch in 18 inches.

The transverse contraction joints shall be sawed perpendicular to the centerline of the roadway and the dowel bars shall be centered on the sawed joint ± 1 inch.

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

August 30, 2013

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



GENERAL NOTES:

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

Centerline of individual dowel bars shall be parallel to top of subgrade $\pm 1/8$ inch in 18 inches and to all other dowel bars in the assembly $\pm 1/16$ inch in 18 inches.

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

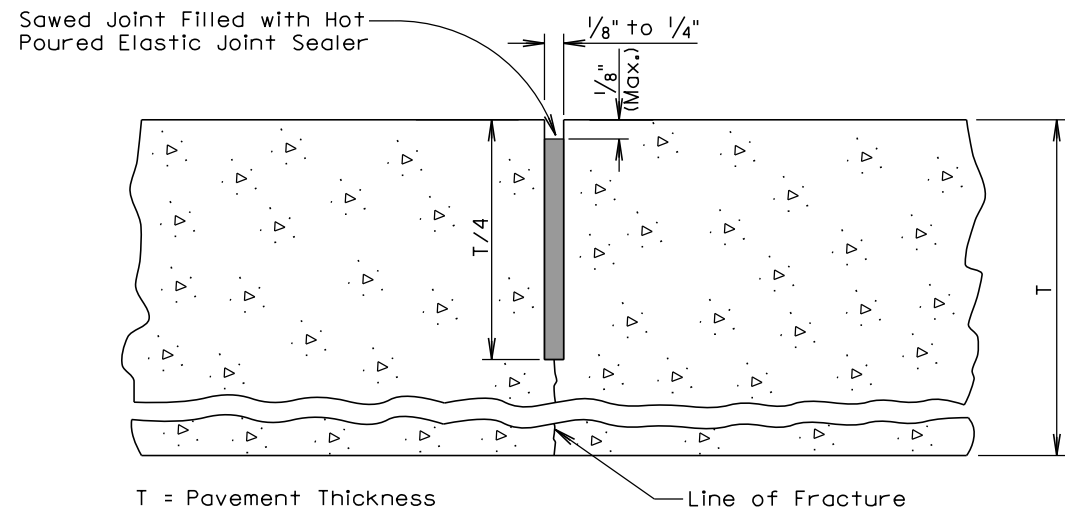
The transverse contraction joints shall be sawed perpendicular to the centerline of the roadway and the dowel bars shall be centered on the sawed joint ± 1 inch.

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

August 30, 2013

Published Date: 1st Qtr. 2016	S D O T	PCC PAVEMENT DOWEL BAR ASSEMBLY FOR TRANSVERSE CONTRACTION JOINTS 9 Bar Assembly on Granular Base Material	PLATE NUMBER 380.03
			Sheet 1 of 1

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	385-491	14	17



GENERAL NOTES:

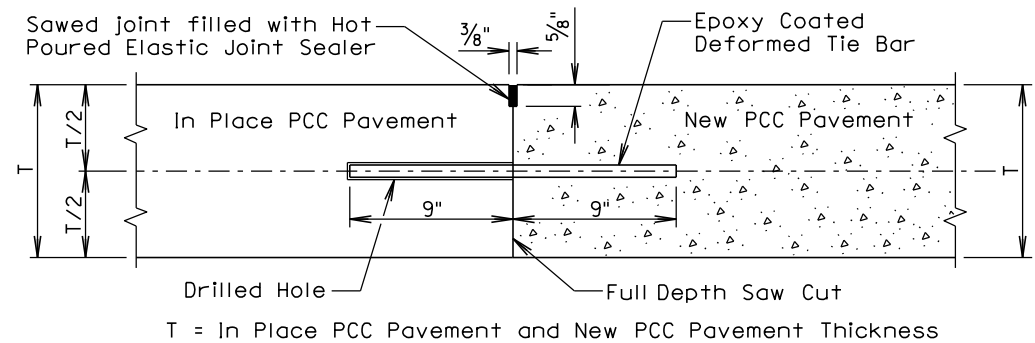
If an early entrance sawcut does not develop the full transverse crack, then the saw cut to control cracking shall be a minimum of $\frac{1}{4}$ the thickness of the pavement.

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. 2016	S D D O T	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



GENERAL NOTES:

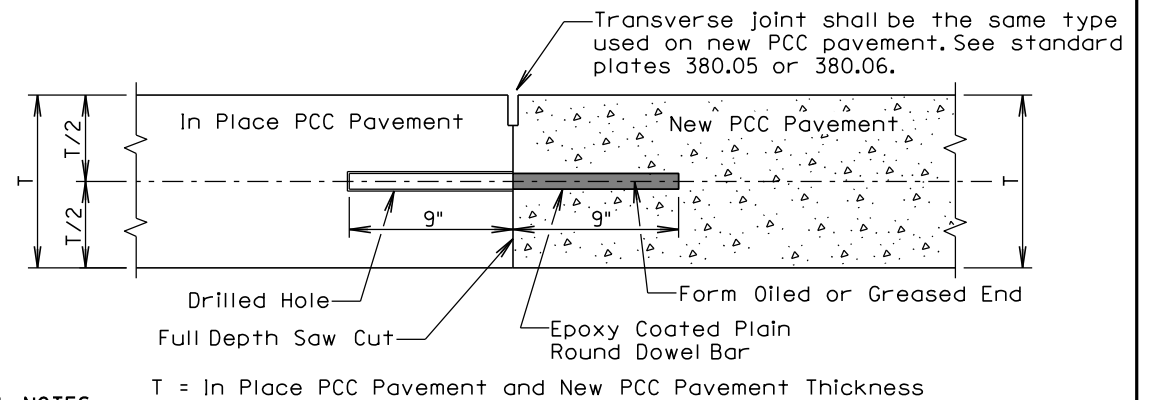
The term "In Place PCC Pavement" in the above drawing indicates that the in place PCC pavement was placed on a previous project.

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



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

PLOT SCALE - 1:200

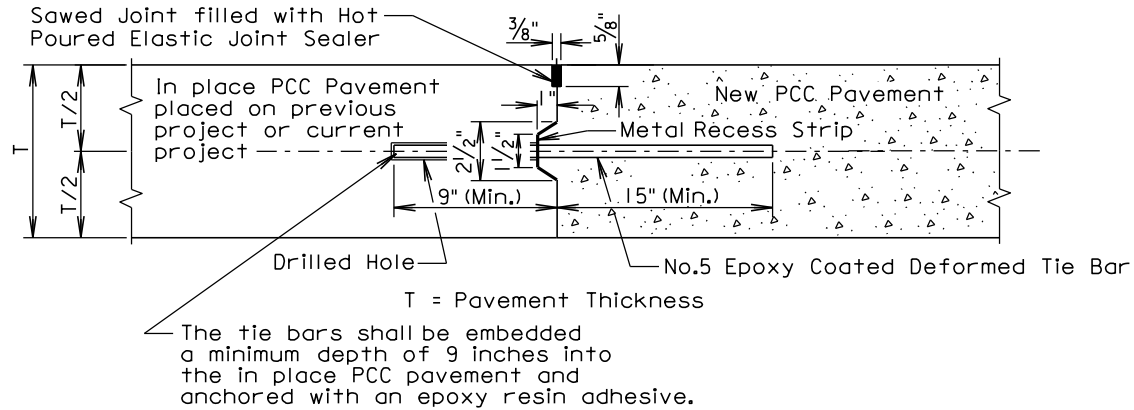
PLOTTED FROM - TRCU10208

STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	385-491	15	17

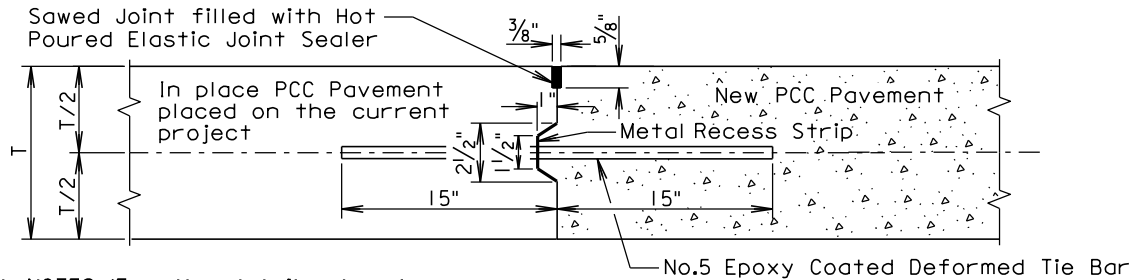
PLOT NAME - 4

FILE - ... \144Y PLANS.DGN

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. 2016	S D D O T	PCC PAVEMENT LONGITUDINAL JOINTS WITH TIE BARS	PLATE NUMBER 380.10
			Sheet 1 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 - 50	500	50
55	750	50
60 - 65	1000	50

- Flagger
- Channelizing Device

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

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

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

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

The channelizing devices shall be drums or 42" cones.

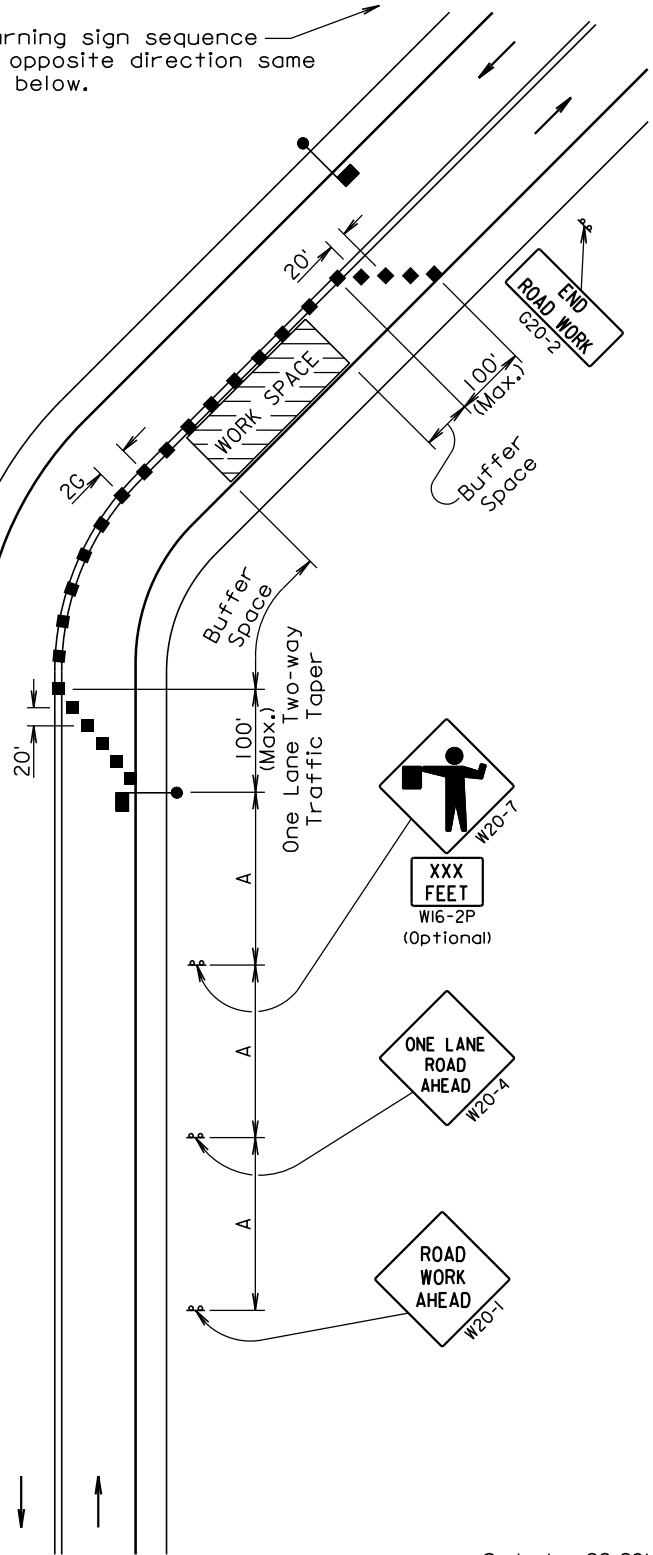
Channelizing devices are not required along the centerline adjacent to work area when pilot cars are utilized for escorting traffic through the work area.

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

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

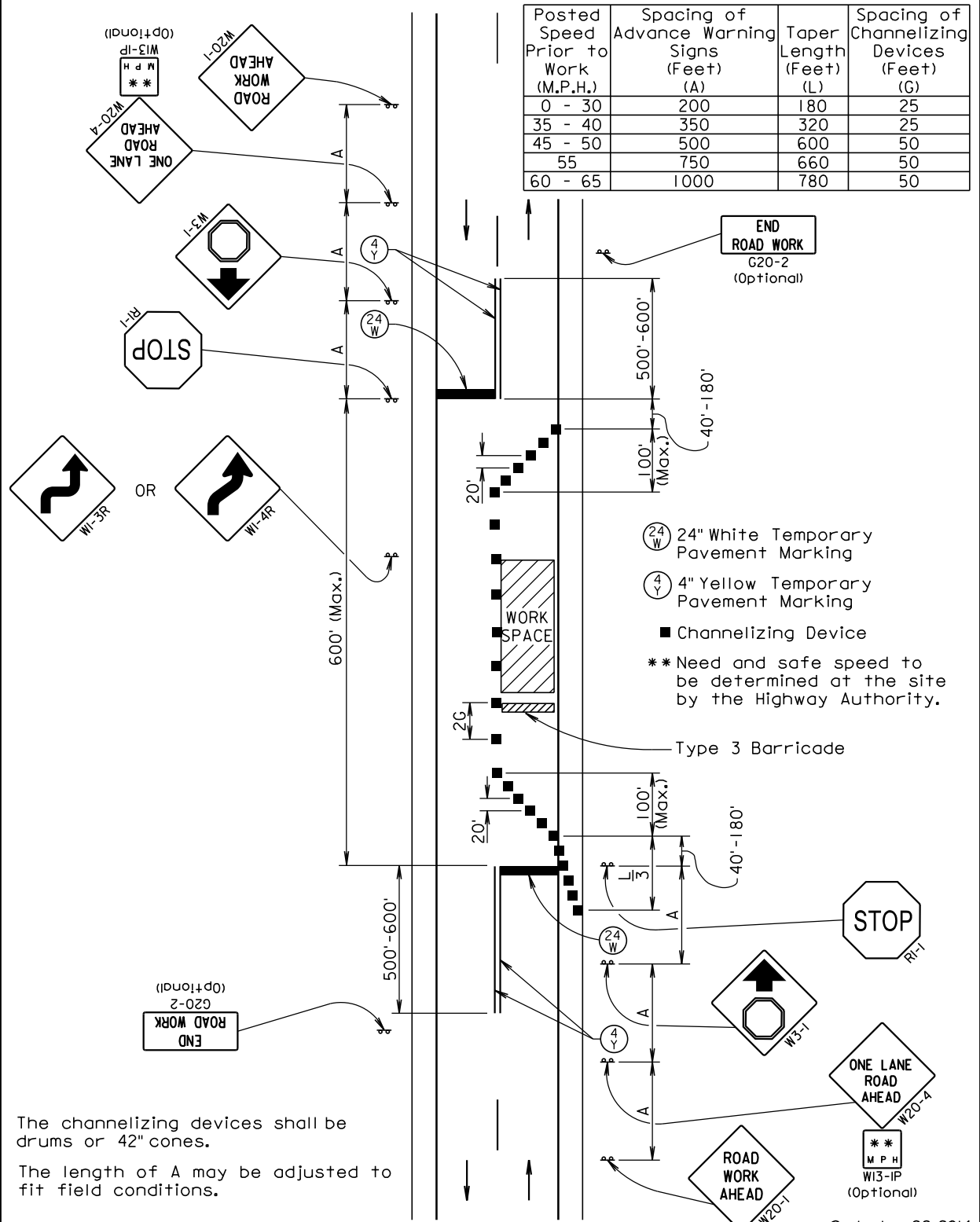
The length of A may be adjusted to fit field conditions.

Warning sign sequence in opposite direction same as below.



September 22, 2014

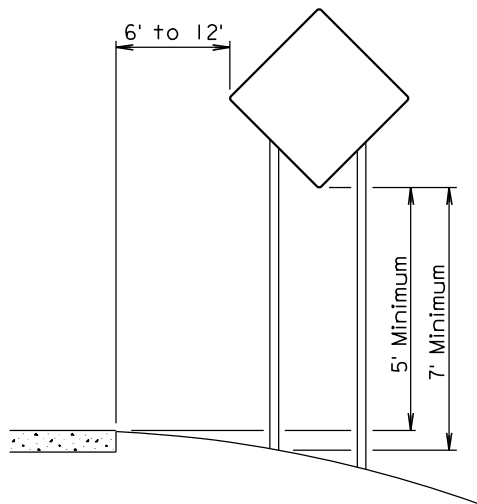
Published Date: 1st Qtr. 2016	S D D O T	GUIDES FOR TRAFFIC CONTROL DEVICES LANE CLOSURE WITH FLAGGER PROVIDED	PLATE NUMBER 634.23
			Sheet 1 of 1



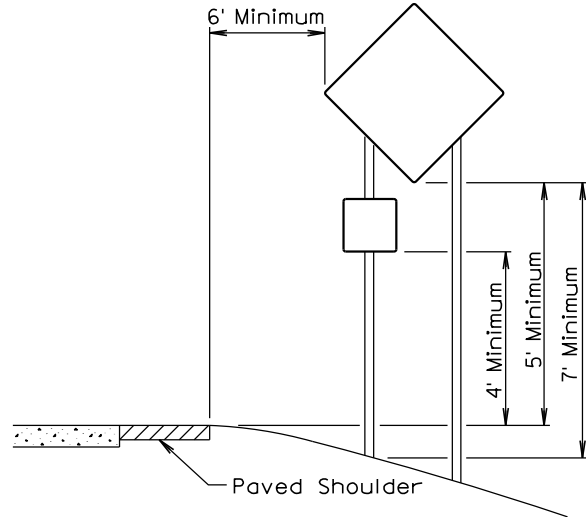
September 22, 2014

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

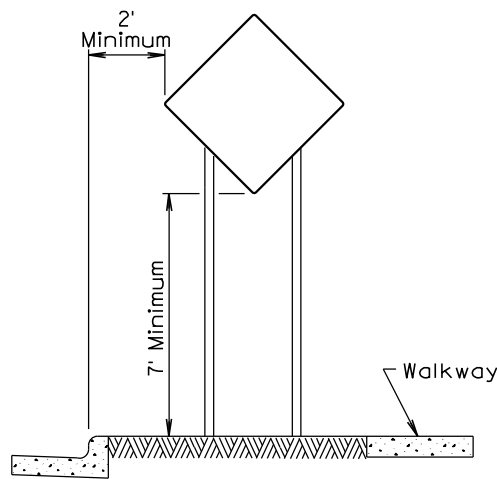
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
	385-491	17	17



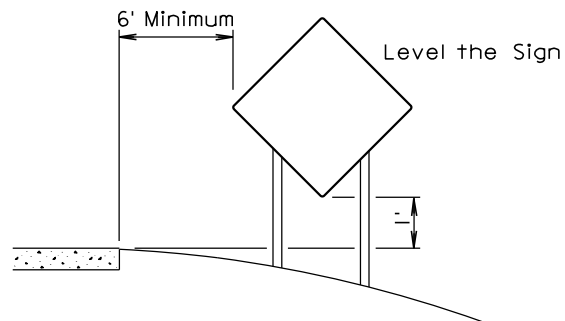
RURAL DISTRICT



RURAL DISTRICT WITH
SUPPLEMENTAL PLATE



URBAN DISTRICT



RURAL DISTRICT
3 DAY MAXIMUM

February 14, 2011

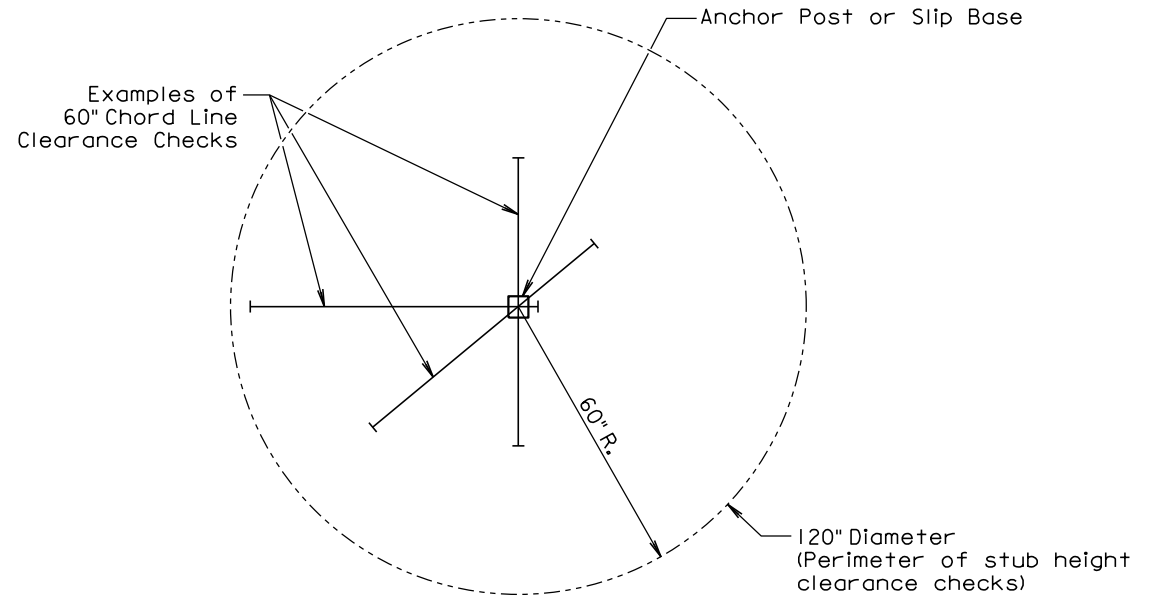
Published Date: 1st Qtr. 2014

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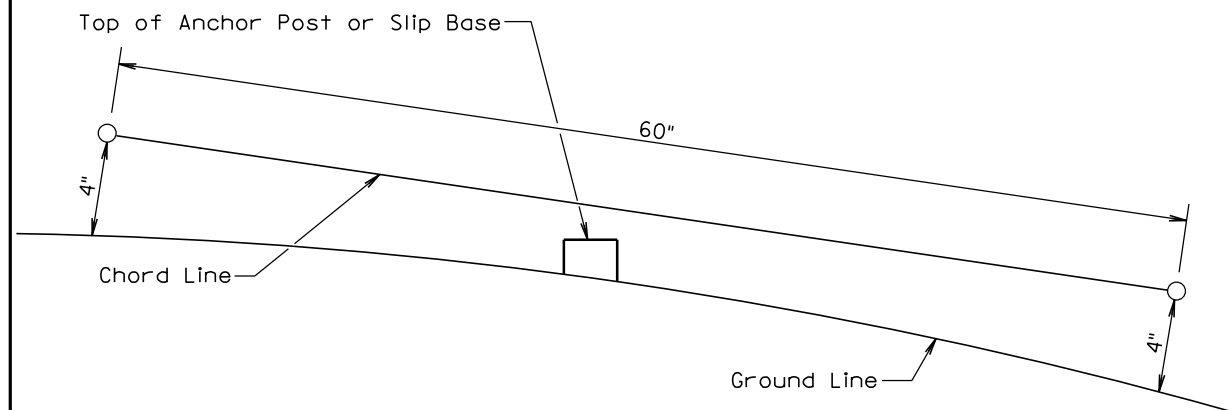
CRASHWORTHY SIGN SUPPORTS
(Typical Construction Signing)

PLATE NUMBER
634.85

Sheet 1 of 1



PLAN VIEW
(Examples of stub height clearance checks)



ELEVATION VIEW

GENERAL NOTES:

The top of anchor posts and slip bases SHALL NOT extend above a 60" chord line within a 120" diameter circle around the post with ends 4" above the ground.

At locations where there is curb and gutter adjacent to the breakaway sign support, the stub height shall be a maximum of 4" above the ground line at the localized area adjacent to the breakaway support stub.

The 4" stub height clearance is not necessary for U-channel lap splices where the support is designed to yield (bend) at the base.

July 1, 2005

Published Date: 1st Qtr. 2016

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BREAKAWAY SUPPORT STUB CLEARANCE

PLATE NUMBER
634.99

Sheet 1 of 1