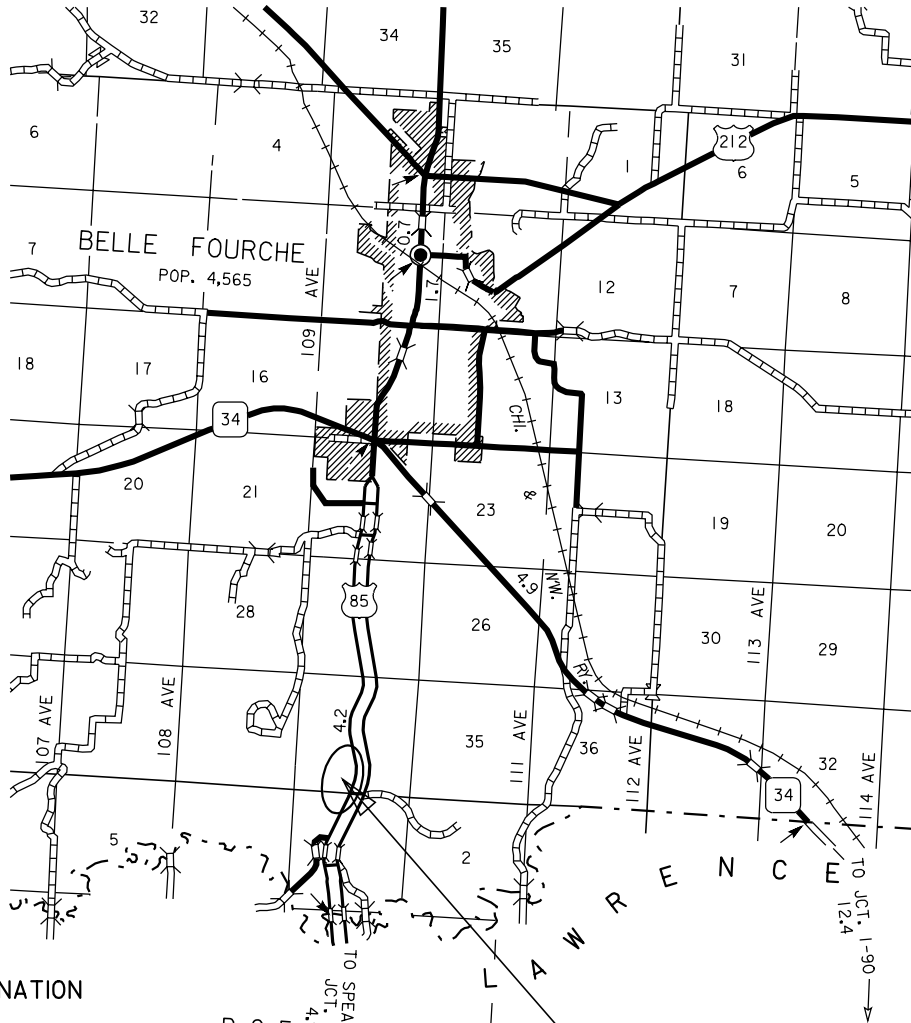


STATE OF SOUTH DAKOTA
 DEPARTMENT OF TRANSPORTATION
 PLANS FOR PROPOSED

PROJECT 085S-471
 US HIGHWAY 85 SOUTH BOUND
 BUTTE COUNTY

CROSS STITCHING AND SEALING OF PCC PAVEMENT

PCN I1AQ



DESIGN DESIGNATION

2007: 7000
 2027: 8485
 DHV: I255
 d: 50%
 T DHV: 10.9%
 T ADT: 23.9%

R 2 E
 TO SPEARFISH &
 JCT. I-90
 4.9

103° 50'

PROJECT LOCATION

085-471
 MRM 51.2 TO MRM 51.4

ESTIMATE OF QUANTITIES

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
380E6200	Tie Bar Retrofit, Stitching	384	Each
380E6330	Seal Random Cracks in PCC Pavement (Epoxy)	132.0	Gal
634E0010	Flagging	40	Hour
634E0100	Traffic Control	445	Unit
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0420	Type C Advance Warning Arrow Panel	1	Each
734E0845	Sediment Control at Inlet with Frame and Grate	3	Each

SPECIFICATIONS

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

WORK DESCRIPTION

Work shall proceed in accordance with the Sequence of Operations. Work consists of the following:

1. Seal Random Crack in PCC Pavement with Epoxy the full depth of the random cracks on Hwy 85 at the locations shown in the plans.
2. Cross Stitching Random Crack in PCC Pavement at the locations shown in the plans.

STITCHING AND SEALING - GENERAL

The existing pavement on Hwy 85 is 8.5" Non-Reinforced PCC Pavement.

Locations and size of repair areas are subject to change in the field, at the discretion of the Engineer. Payment will be based on the field measured quantity.

RETROFITTING TIE BARS (STITCHING)

The Contractor shall drill holes in the existing PCC pavement and install No. 5 epoxy coated deformed tie bars. An epoxy resin adhesive must be used to anchor the steel bar in the drilled hole. The drill used shall be hydraulic percussive type and not a hand held.

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.

No bars shall be installed within 9" of an existing transverse contraction joint. In areas where the crack is within 9" of an existing longitudinal joint tie bars and their locations will be at the discretion of the engineer. Any bars not functioning or damaged shall be repaired or replaced at the Contractor's expense.

Cost for the epoxy resin adhesive, tie bars, 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 "Retrofitting Tie Bars (Stitching)".

TABLE OF RETROFITTING TIE BARS (STITCHING)

Location	Length	Quantity	Units
Station 283+34 to 286+61	327 ft	165	Each
Station 286+98 to 290+83	385 ft	193	Each
Station 293+22 to 293+72	50 ft	26	Each
Totals	762 ft	384	Each

SEAL RANDOM CRACKS IN PCC PAVEMENT (EPOXY)

Random cracks shall be repaired in accordance with the detail for Sealing Random Cracks In Concrete Pavement (Epoxy). Reservoir dimensions may vary slightly from the details, due to the nature of this operation. However, any variance due to Contractor negligence will be repaired at the Contractor's expense.

Only those random cracks in the existing concrete pavement that are open and accept water and incompressible materials as selected by the Engineer shall be prepared and sealed with Epoxy Joint Sealant.

Prior to sealing, each random crack less than a 1/2" in width shall be routed 1/2" wide by 1/2" deep. Routing shall be performed with a saw or router designed for that purpose. The maximum width of the routed reservoir shall not be greater than 3/4" and over-sawing will not be allowed.

Cracks wider than a 1/2" in width shall not be routed.

Prior to sealing, all cracks shall be thoroughly cleaned with sandblasting and compressed air.

The placement of backer rod prior to sealing random cracks shall not be allowed, as the intent of the Epoxy Joint Sealant is to seal the full depth of the crack for the purpose of generating load transfer for the cross stitching. Quantities for the sealant were estimated assuming a 3/8" wide crack full depth of the slab or 8.5".

Sealant shall be placed in the routed reservoir with equipment and by methods that insure complete and uniform filling. Sealant shall be placed level with the driving surface of the concrete. Any excess or overrun of sealant shall be removed by the Contractor at no additional cost to the state. Upon completion of placing the Sealant the surface of the sealed joint shall receive a coating of sand for texture. Once the Epoxy is cured the excess sand shall be swept from the roadway. The sand shall be dry, conform to the following gradation requirements, and shall be incidental to the cost of Seal Random Cracks in PCC Pavement (Epoxy).

Passing 3/8 inch sieve.....	100%
Passing No. 4 sieve.....	95 – 100%
Passing No. 16 sieve.....	45 – 85%
Passing No. 50 sieve.....	10 – 30%
Passing No. 100 sieve.....	0 – 10%

Seal Random Cracks in PCC Pavement (Epoxy) will be paid for at the contract unit price per gallon measured for payment. Payment shall be full compensation for all labor, equipment, material and incidentals required for crack routing, cleaning, furnishing and placing sealant and removing routed and foreign material from the roadway.

The material used for Seal Random Cracks in PCC Pavement (Epoxy) shall be TK Products TK-9000 or an approved alternate. Any proposals to use a different product shall be submitted a minimum of two weeks prior to the start of work. The sales rep for TK Products is Mike Boulka and he can be reached by phone at 800-441-2129 or by email at mboulka@tkproducts.com.

Due to the low viscosity of the epoxy the Contractor will be responsible for ensuring that the installation methods minimize any excess or overrun of sealant. Placement of the epoxy shall only start when surface and air temps are 40 degrees and rising. Operations shall be coordinated to ensure the surface and air temperatures remain at or above 40 degrees for a minimum of 4 hours for cure time.

DETAIL OF SEAL RANDOM CRACKS IN PCC PAVEMENT (EPOXY)

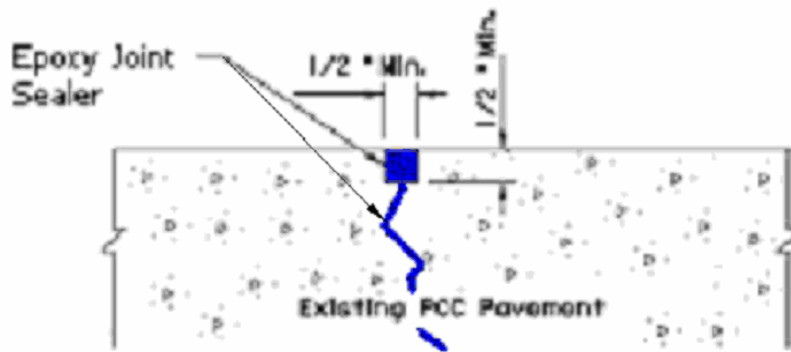


TABLE OF SEAL RANDOM CRACKS IN PCC PAVEMENT

Location	Length	Quantity	Units
Station 283+34 to 286+61	327	54	Gallons
Station 284+46 DL, PL, & SH	36	6	Gallons
Station 286+98 to 290+83	385	64	Gallons
Station 293+22 to 293+72	50	8	Gallons
Totals	798	132	Gallons

SEDIMENT CONTROL AT INLET WITH FRAMES AND GRATES

This type of sediment control device should be used where there is pavement in the vicinity of the drop inlets and storm water or sediment could possibly enter the frame and grate. Sediment Control at Inlets with Frame and Grates shall be installed prior to working in the vicinity of the drop inlets.

The Contractor shall be responsible for maintaining and repairing the sediment control devices for the duration of the project for which sediment control measures are required. Maintenance shall be scheduled to prevent storm water from backing up into the driving lane.

“Sediment Control at Inlets with Frames and Grates” will be paid for one time at each location, regardless of the number of times the sediment control devices are installed, inspected, cleaned, removed, repaired, or replaced. All costs associated with furnishing, installing, inspecting, maintaining, cleaning, sediment removal, and repairing Sediment Control at Inlets with Frames and Grates shall be incidental to the contract unit price per each for “Sediment Control at Inlet with Frame and Grate”.

Sediment collection devices shall be:

A sediment control device as shown on Standard Plate 734.10. Filter fabric used for constructing the sediment control at inlets with frames and grates shall be the same type of fabric that is used in high flow silt fence from the approved product list. The approved product list may be viewed at the following internet site: <http://www.state.sd.us/Applications/HC54ApprovedProducts/main.asp>

TABLE OF SEDIMENT CONTROL AT INLETS WITH FRAMES AND GRATES

Station	L/R	Quantity (Each)
279+82	Lt.	1
284+30	Lt.	1
295+10	Lt.	1
Total:		3

SEQUENCE OF OPERATIONS – GENERAL

1. The intent of the plan sequence of operations is to have the least amount of impact on the traveling public and adjacent landowners. 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 two weeks prior to potential implementation.
2. All vehicles, equipment and material shall be located in the half of the roadway which is closed to traffic. Temporary parking or material storage within the half of the roadway used by traffic shall not be permitted.

SEQUENCE OF OPERATIONS

Variations from this sequence shall be submitted to the Engineer for approval.

1. Set up Traffic Control.
2. Install Sediment Control.
3. Epoxy Seal random cracks.
4. Cross Stitch random cracks.
5. Remove Sediment Control.
6. Remove Traffic Control.

MAINTENANCE OF APPROACHES DURING OPERATIONS

Operations shall be conducted such that access to individual entrances shall be maintained at all times throughout the project.

TRAFFIC CONTROL – GENERAL

1. Removing, relocating, covering, salvaging and resetting of existing traffic control devices, including delineation, shall be the responsibility of the Contractor. Cost for this work shall be incidental to the contract unit prices for the various items unless otherwise specified in the plans. Any delineators and signs damaged or lost shall be replaced by the Contractor at no cost to the State.
2. Non-applicable signing will be covered or removed and reset during periods of in-activity. All costs to do this work shall be incidental to the contract lump sum price for Traffic Control, Miscellaneous.
3. During non-working hours, storage of vehicles and equipment shall be outside the clear zone and as near as possible to the right-of-way line. Contractor's employees should mobilize at a location off the right-of-way and arrive at the work sites in a minimum number of vehicles necessary to perform the work.
4. Indiscriminate driving and parking of vehicles within the right-of-way will not be permitted. Any damage to the vegetation, surfacing, embankment, delineators and existing signs resulting from such indiscriminate use shall be repaired and/or restored by the Contractor, at no expense to the State, and to the satisfaction of the Engineer.

TRAFFIC CONTROL – GENERAL (Continued)

5. The Contractor will be assessed a payment deduction of \$100.00 for non-conformance with Traffic Control requirements that are not corrected within 2 hours of notification to the contractor. Any infraction not corrected within an additional 2 hours may be considered an additional infraction. The Engineer will inform the Contractor of each infraction of the above provisions for which the assessed deduction will be invoked. Other Traffic Control Plan requirement violations as noted by the Engineer are also subject to price adjustments.
6. The Contractor or designated traffic control subcontractor shall make night (after dark) inspections at the initial set up of traffic control and every week thereafter to ensure the adequacy, legibility and reflectivity of each sign and device. A written summary of each inspection shall be given to the Engineer within 24 hours after completion of the inspection. The cost for the nighttime inspection work shall be incidental to the related contract items.
7. Construction signing that remains in the same location for more than 3 days shall be mounted on fixed supports, unless otherwise stated in these plans or with the prior approval of the Engineer.
8. All equipment and vehicles entering and exiting closed lanes of traffic shall display a flashing amber light visible from all directions a minimum distance of ¼ mile.
9. The Contractor shall provide documentation that all breakaway sign supports comply with FHWA 350 crash-worthy requirements. The Contractor shall provide installation details at the preconstruction meeting for all breakaway sign support assemblies.
10. Use detail for Manned Work Space Signing for Divided and Undivided Highways to safely control traffic through the work zone. The use of a flagger(s) will be required where work activity and/or equipment encroach into a lane open to traffic.
11. Work activities shall only be during daylight hours. Daylight hours are considered to be ½ hour before sunrise until ½ hour after sunset.

SIGN INVENTORY

SIGN CODE	SIGN SIZE	DESCRIPTION	NUMBER REQUIRED	UNITS PER SIGN	UNITS
G20-2	36" x 18"	END ROAD WORK	1	17	17
R2-1	30" x 36"	SPEED LIMIT ##	2	23	46
W3-5	48" x 48"	SPEED REDUCTION	2	34	68
W4-2	48" x 48"	LEFT OR RIGHT LANE ENDS (SYMBOL)	2	34	68
W20-1	48" x 48"	ROAD WORK #### FT. OR AHEAD	2	34	68
W20-5	48" x 48"	LT. OR RT. LANE CLOSED #### FT. OR AHEAD	2	34	68
W20-7a	48" x 48"	FLAGGER	1	34	34
SPECIAL	30" x 24"	FINES DOUBLED	2	18	36
*****	*****	TYPE III BARRICADE - 8 FT. SINGLE SIDED	1	40	40
TOTAL UNITS				445	

If a sign is required on a project and not listed in the above inventory, the units per sign will be determined as follows:

SIGN SIZE	CALCULATED UNITS	ROUNDING
<=24" X <24"	2.167*Area (sq in)/144	nearest whole number
<24" X >=48"	1.167*Area (sq in)/144 + 15	nearest whole number
<24" X >=36"	2.167*Area (sq in)/144 + 7	nearest whole number
<=36" X <=36"	2.167*Area (sq in)/144 + 7	nearest whole number
<=84" X <=84"	1.167*Area (sq in)/144 + 15	nearest whole number
>84" X >84"	1.167*Area (sq in)/144 + 22	nearest 10

Posted Speed Prior to Work (M.P.H.)	Spacing of Channelizing Devices (Feet) (G)	Taper Length (Feet) (L)
0 - 30	25	180
35 - 40	25	320
45 - 50	50	600
55	50	660
60 - 65	50	780
70 - 75	50	900

■ Channelizing Device

* Speed appropriate for location.

4" white temporary pavement marking tape for right lane closures and 4" yellow temporary pavement marking tape for left lane closures or temporary road markers at 5' spacing shall be installed when the lane is closed for a period of 24 hours or more.

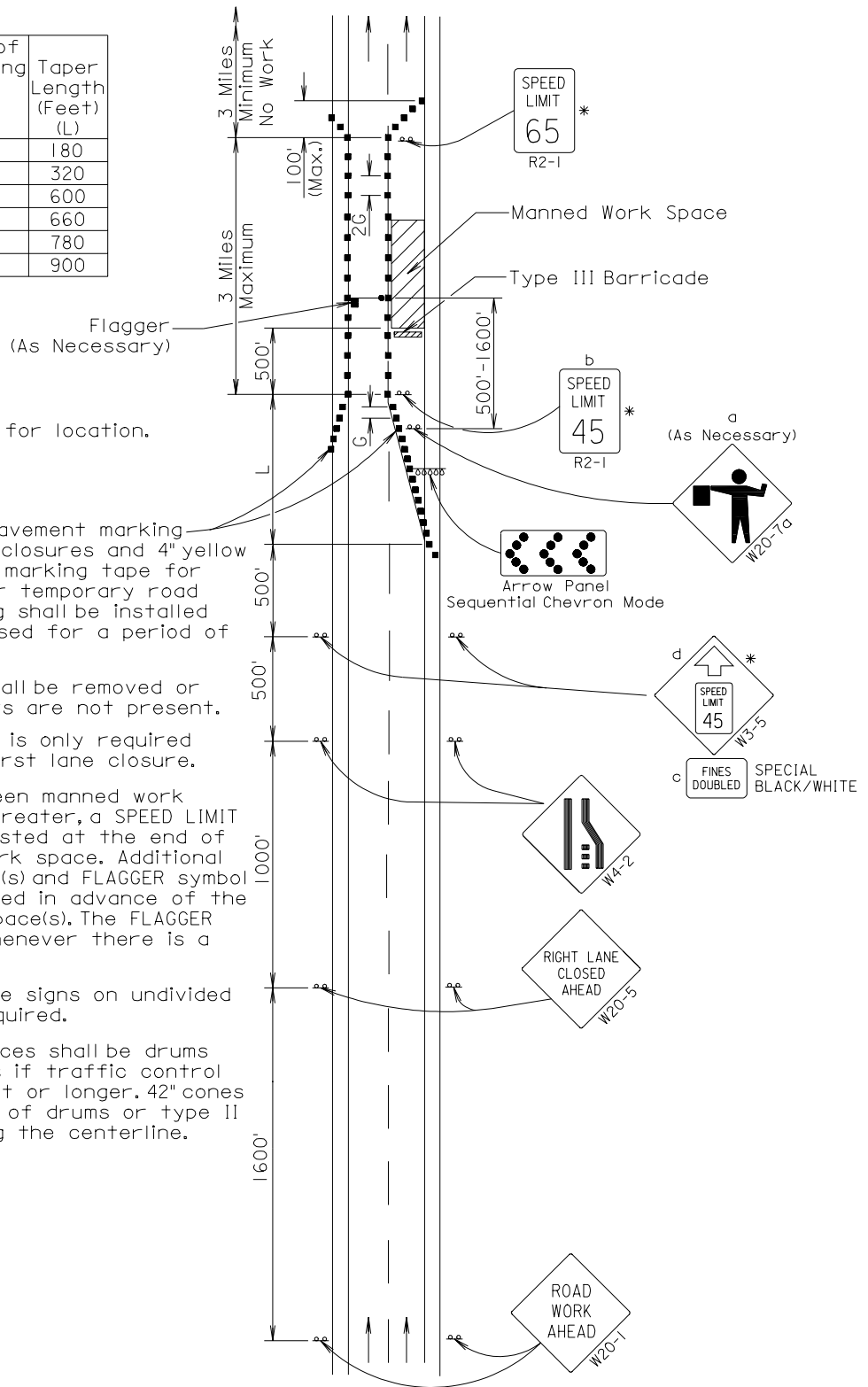
Signs a, b, c, and d shall be removed or covered when workers are not present.

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

If the spacing between manned work spaces is 1 mile or greater, a SPEED LIMIT 65(*) sign shall be posted at the end of the first manned work space. Additional SPEED LIMIT 45(*) sign(s) and FLAGGER symbol sign(s) shall be installed in advance of the next manned work space(s). The FLAGGER sign shall be used whenever there is a Flagger present.

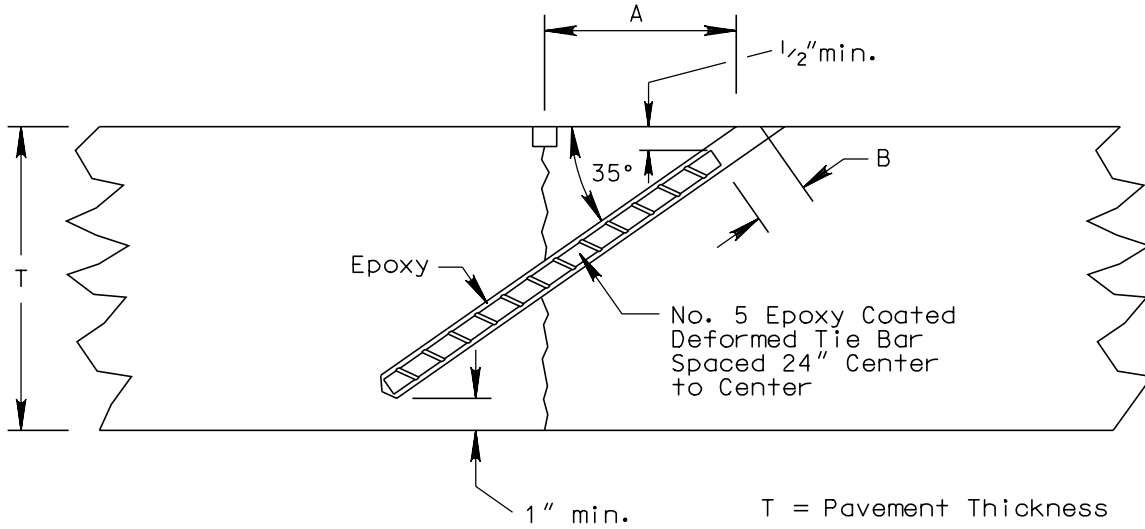
Left mounted advance signs on undivided highways are not required.

The channelizing devices shall be drums or type II barricades if traffic control must remain overnight or longer. 42" cones may be used in lieu of drums or type II barricades only along the centerline.



**MANNED WORK SPACE SIGNING
FOR DIVIDED AND UNDIVIDED HIGHWAYS**

STITCHING DETAIL



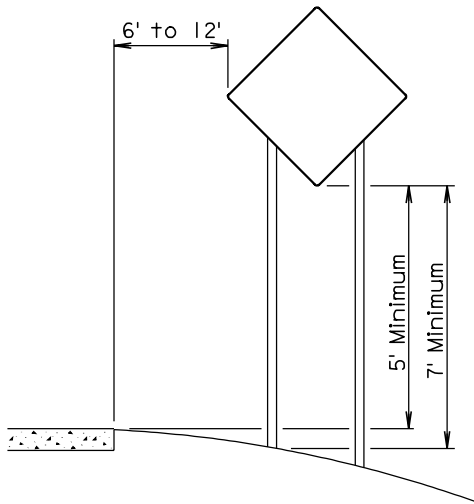
T	A	B	Length of Tie Bar
8"	5"	1 1/2" +/-	10"
8 1/2"	5 1/4"	1 3/8" +/-	11"
9"	5 5/8"	1 1/4" +/-	12"
9 1/2"	6"	1 5/8" +/-	12 1/2"
10"	6 3/8"	1 1/2" +/-	13 1/2"
10 1/2"	6 3/4"	1 3/8" +/-	14 1/2"
11"	7"	1 1/4" +/-	15 1/2"
12"	7 3/4"	1 3/8" +/-	16 1/2"
12 1/2"	8 1/8"	1 1/4" +/-	17 1/2"

GENERAL NOTES:

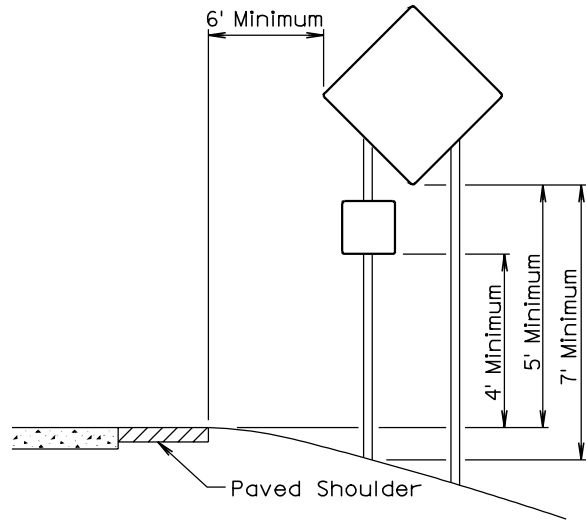
The tie bars shall alternate from opposite sides of the joint to produce a cross-stitching pattern

December 31, 1997

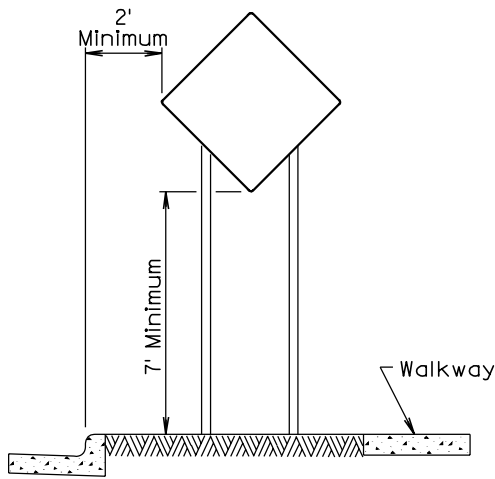
S D D O T	RETROFIT TIE BAR (STITCHING) INSTALLATION IN JOINT (REHABILITATION)	PLATE NUMBER SPECIAL
		Sheet 1 of 1



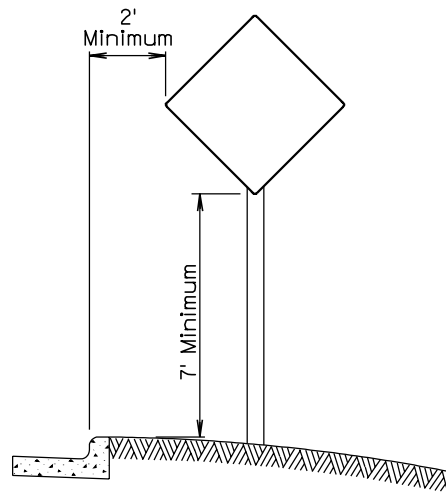
RURAL DISTRICT



RURAL DISTRICT WITH
SUPPLEMENTAL PLATE



URBAN DISTRICT



URBAN DISTRICT

December 23, 2003

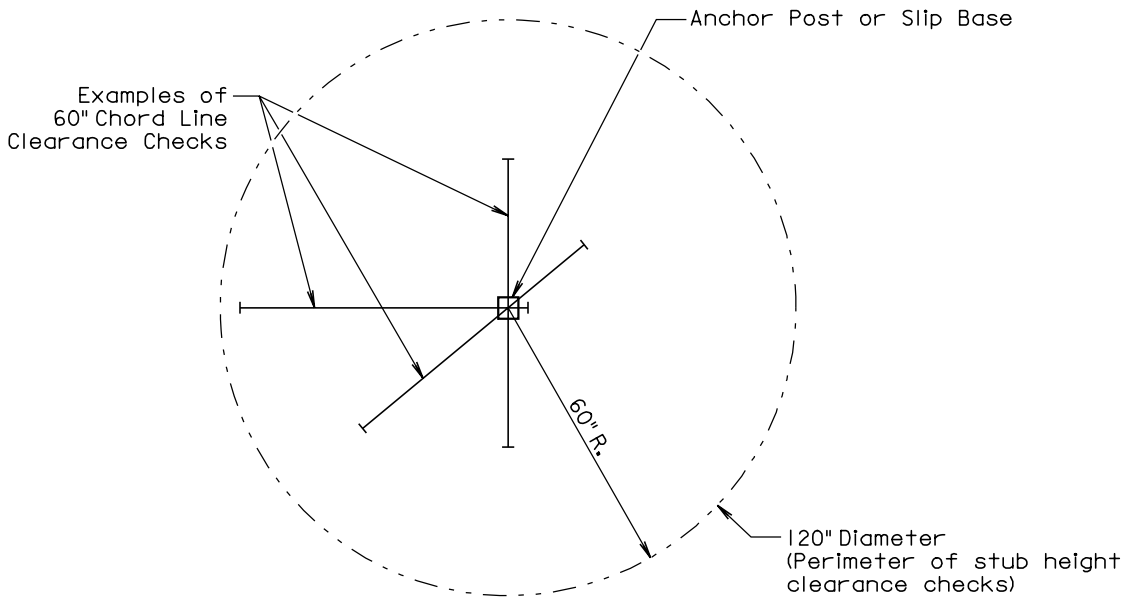
Published Date: 3rd Qtr. 2008

**S
D
D
O
T**

BREAKAWAY SIGN SUPPORTS
(Typical Construction Signing)

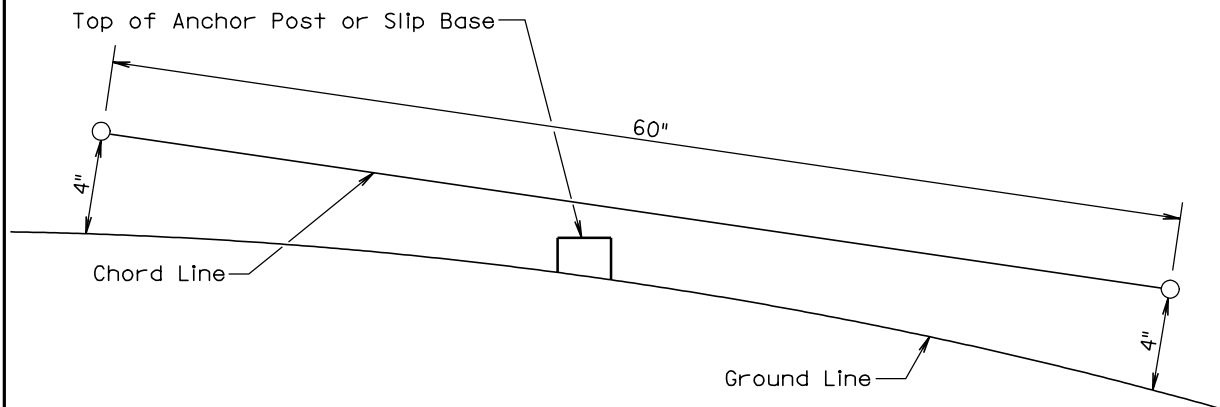
PLATE NUMBER
634.85

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: 3rd Qtr. 2008

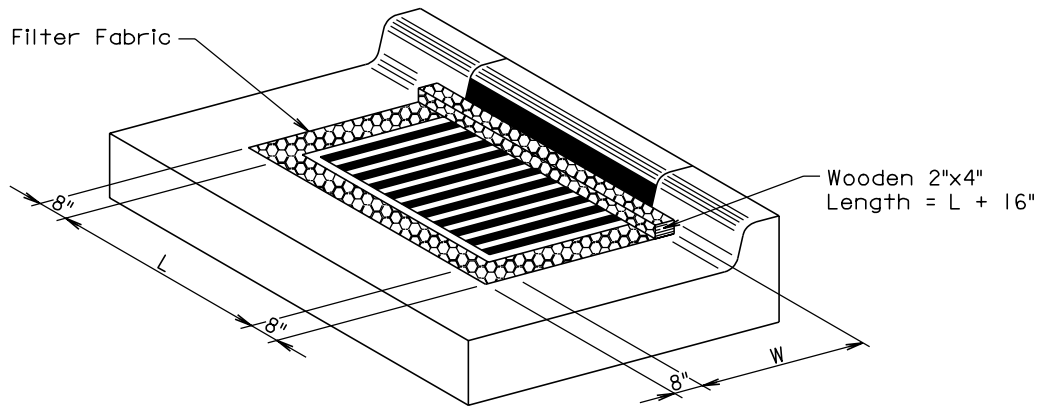
**S
D
D
O
T**

BREAKAWAY SUPPORT STUB CLEARANCE

**PLATE NUMBER
634.99**

Sheet 1 of 1

L = Length of Grate
 W = Width of Grate



ISOMETRIC VIEW

GENERAL NOTES:

The grate and curb and gutter shown are for illustrative purposes only.

The sediment control at inlet with frame and grate shall be placed at locations stated in the plans or at locations determined by the Engineer.

The filter fabric shall be the type specified in the plans.

The filter fabric shall be placed in the inlet opening prior to placing the grate. Approximately 18 inches of excess filter fabric shall be wrapped around the 2"x4" and stapled securely to the 2"x4" after the grate has been placed.

The Contractor shall inspect and maintain the sediment control device once every week and within 24 hours after every rainfall event. The Contractor shall maintain the sediment control device by removing accumulated sediment and replacing torn filter fabric with new filter fabric.

The removed sediment shall be placed at a location away from the drop inlet where the sediment will not be washed back into the drop inlet or other storm sewer system.

All costs for furnishing, installing, inspecting, maintaining, removing, and replacing the sediment control device at the inlet including labor, equipment, and materials shall be incidental to the contract unit price per each for "Sediment Control at Inlet with Frame and Grate".

September 14, 2005

Published Date: 3rd Qtr. 2008

**S
D
D
O
T**

**SEDIMENT CONTROL AT INLETS
WITH FRAMES AND GRATES**

**PLATE NUMBER
734.10**

Sheet 1 of 1