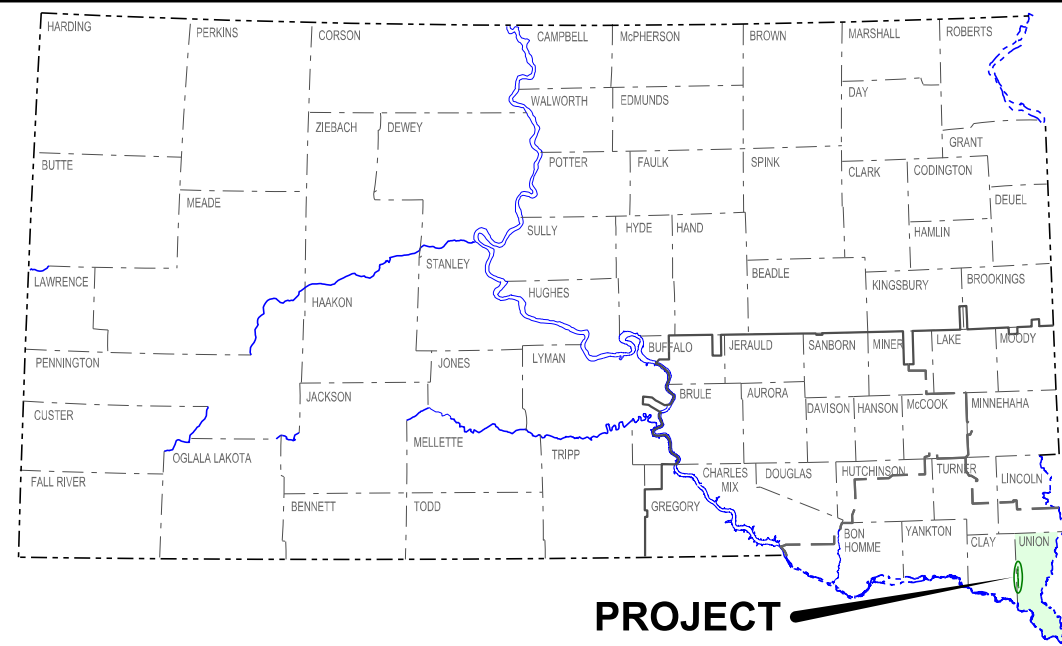


PLOT SCALE - 1:8750

PLOTTED FROM - TRM11NT15



STATE OF SOUTH DAKOTA  
DEPARTMENT OF TRANSPORTATION  
PLANS FOR PROPOSED  
**PROJECT 029S-291**  
INTERSTATE 29S  
UNION COUNTY  
CRC PAVEMENT REPAIR  
PCN I4LP

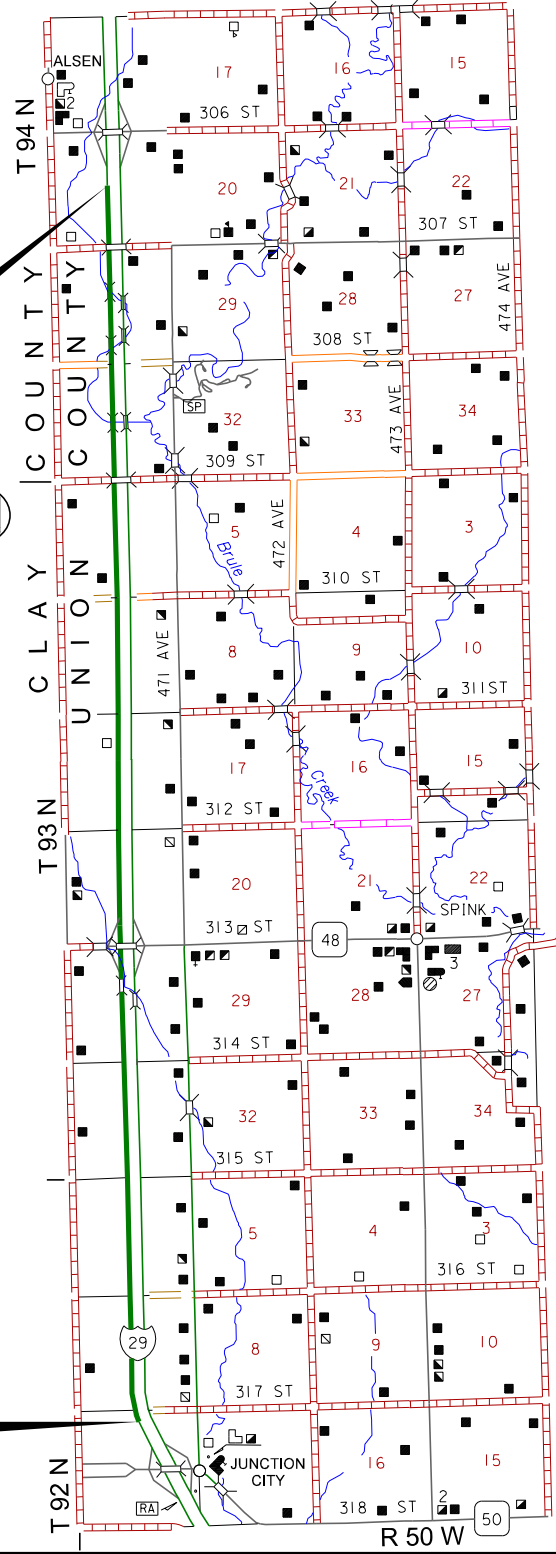
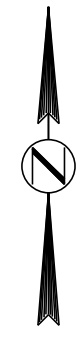
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	029S-291	1	17

Plotting Date: 03/03/2017

INDEX OF SHEETS

Sheet 1	Title Sheet
Sheet 2	Estimate of Quantities & Environmental Commitments
Sheet 3	Table for Pavement Repair
Sheets 4 & 5	Plan Notes
Sheets 6 - 8	Traffic Control
Sheets 9 - 17	CRC Pavement Repair Details

**END 029S-291**  
MRM 38.00 +0.000  
MILEAGE 37.913



**STORM WATER PERMIT**  
(None required)

**I29S ADT (2016) 6,084**

**BEGIN 029S-291**  
MRM 27.00 +0.000  
MILEAGE 26.902

**PROJECT LENGTH**  
Length: **11.011 Miles**

FILE - ... \2017PCCRPAINT\T14LP.DGN PLOT NAME - 1

# ESTIMATE OF QUANTITIES AND ENVIRONMENTAL COMMITMENTS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	029S-291	2	17

## ESTIMATE OF QUANTITIES

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
380E5100	Continuously Reinforced PCC Pavement Repair	111.6	SqYd
380E6110	Insert Steel Bar in PCC Pavement	134	Each
634E0010	Flagging	20.0	Hour
634E0110	Traffic Control Signs	476.0	SqFt
634E0120	Traffic Control, Miscellaneous	Lump Sum	LS
634E0280	Type 3 Barricade, 8' Single Sided	7	Each
634E0310	Temporary Flexible Vertical Markers (Tabs)	2,880	Ft
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 B2: WHOOPING CRANE

The Whooping Crane is a spring and fall migratory bird in South Dakota that is about 5 feet tall and typically stops on wetlands, rivers, and agricultural lands along their migration route. An adult Whooping Crane is white with a red crown and a long, dark, pointed bill. Immature Whooping Cranes are cinnamon brown. While in flight, their long necks are kept straight and their long dark legs trail behind. Adult Whooping Cranes' black wing tips are visible during flight.

#### Action Taken/Required:

Harassment or other measures to cause the Whooping Crane to leave the site is a violation of the Endangered Species Act. If a Whooping Crane is sighted roosting in the vicinity of the project, borrow pit, or staging site associated with the project, cease construction activities in the affected area until the Whooping Crane departs and contact the Project Engineer. The Project Engineer will contact the Environmental Office so that the sighting can be reported to USFWS.

### 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.

Cost 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.

TABLE FOR CRC PAVEMENT REPAIR ON 029S-291 - PCN I4LP

MRM	DISP	SB DRIVING LANE		SB PASSING LANE		CRCP REPAIR SqYds
		L Ft	W Ft	L Ft	W Ft	
30.00	0.768	6	14			9.3
36.00	0.544	10	14			15.6
36.00	0.885			6	6	4.0
36.00	0.892	6	6			4.0
36.00	0.904			50	12	66.7
36.00	0.999			6	6	4.0
37.00	0.025			6	6	4.0
37.00	0.135	6	6			4.0
TOTALS:						111.6

		REINFORCING STEEL (CRCP) FOR SB DRIVING LANE (STEEL FOR CRCP IS NOT A BID ITEM - ACTUAL STEEL QUANTITIES WILL VARY DUE TO LOCATION AND SIZE OF INDIVIDUAL REPAIR AREAS)																INSERT STEEL BAR IN PCC PAVEMENT (CRCP) SB DRIVING LANE									
		No. 6 Longitudinal Bars to be lap spliced with existing bars				Lap Splice	Lap Stagger & Cutoff	No. 6 Longitudinal Bars to be spliced together between every other existing longitudinal bar				Lap Splice	Lap Stagger & Cutoff	No. 6 Longitudinal Bars to be spliced together between every other existing longitudinal bar				Lap Splice	Lap Stagger & Cutoff	No. 4 Transverse Bars to be lap spliced with No. 5 x 24" bars		New Trans Bar Spacing	Reinforcing Steel Lbs	No. 6 LONG. BARS Each	INSERT No. 5 x 24" TIE BARS Each	INSERT BAR TOTAL Each	
MRM	DISP	# bars @ length	Length	Length	Cutoff	# bars @ length	Length	Length	Cutoff	# bars @ length	Length	Length	Cutoff	# bars @ length	Length	Length	Cutoff	# bars @ length	Length	Spacing	Lbs						
30.00	0.768	26 bars @ 62" =	134.33'	19"	-	13 bars @ 55" =	59.58'	19"	-	13 bars @ 55" =	59.58'	19"	-	3 bars @ 162" =	40.50'	2'		407.796				26	3		29		
36.00	0.544	26 bars @ 101" =	218.83'	25"	11"	13 bars @ 77" =	83.42'	25"	12"	13 bars @ 86" =	93.17'	25"	12"	4 bars @ 162" =	54.00'	2'		629.993				26	4		30		
36.00	0.892	11 bars @ 62" =	56.83'	19"	-									3 bars @ 66" =	16.50'	2'		96.381					6		6		
37.00	0.135	11 bars @ 62" =	56.83'	19"	-									3 bars @ 66" =	16.50'	2'		96.381					6		6		
TOTALS:		74 bars	467'	82"	11"	26 bars	143'	44"	12"	26 bars	153'	44"	12"	13 bars	128'	8'		1231 Lbs				52	19		71		

MRM	DISP	REINFORCING STEEL (CRCP) FOR SB PASSING LANE (STEEL FOR CRCP IS NOT A BID ITEM - ACTUAL STEEL QUANTITIES WILL VARY DUE TO LOCATION AND SIZE OF INDIVIDUAL REPAIR AREAS)																INSERT STEEL BAR IN PCC PAVEMENT (CRCP) SB PASSING LANE		
		No. 6 Longitudinal Bars to be lap spliced with existing bars				Lap Splice	Lap Stagger & Cutoff	No. 6 Longitudinal Bars to be spliced together between every other existing longitudinal bar				Lap Splice	Lap Stagger & Cutoff	No. 4 Transverse Bars to be lap spliced with No. 5 x 24" bars		New Trans Bar Spacing	Reinforcing Steel Lbs	No. 6 LONG. BARS Each	INSERT No. 5 x 24" TIE BARS Each	INSERT BAR TOTAL Each
		# bars @ length	Length	Length	Cutoff	# bars @ length	Length	Length	Cutoff	# bars @ length	Length	Length	Cutoff	# bars @ length	Length					
36.00	0.885	11 bars @ 62" =	56.83'	19"	-								3 bars @ 66" =	16.50'	2'	96.381		6	6	
36.00	0.904	22 bars @ 573" =	1050.50'	25"	19"	11 bars @ 322" =	295.17'	25"	Var.	11 bars @ 322" =	295.17'	25"	Var.	23 bars @ 138" =	264.50'	2'	2641.228	22	23	45
36.00	0.999	11 bars @ 62" =	56.83'	19"	-								3 bars @ 66" =	16.50'	2'	96.381		6	6	
37.00	0.025	11 bars @ 62" =	56.83'	19"	-								3 bars @ 66" =	16.50'	2'	96.381		6	6	
TOTALS:		55 bars	1221'	82"	19"	11 bars	295'	25"	0"	11 bars	295'	25"	0"	32 bars	314'	8'	2930 Lbs	22	41	63

NOTES

\* In Full Width CRCP Repair Areas, where the repair area length L is greater than or equal to 16', the inserted longitudinal bars shall be of variable length to facilitate random staggering of the lap splices.  
The length given here is an average and does not represent the actual bar length (it is used only for establishing the total bar length needed) . Refer to the details for CRC PAVEMENT REPAIR for actual bar lengths.

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, the Contractor shall contact the Project Engineer to determine modifications that will be necessary to avoid utility impacts.

SCOPE OF WORK

This project consists of full depth replacement of Continuously Reinforced Concrete Pavement (CRCP) in areas where major failures have occurred. Full depth areas may vary in length and width; however the minimum length is typically 4 feet for partial lane width repair areas and the minimum length is typically 4.5 feet for full lane width repair areas

Joints shall be sawed and sealed where sealant has failed.

EXISTING CRC PAVEMENT

The existing pavement is 10” x 26’ CRC Pavement. The longitudinal reinforcing steel consists of No. 6 deformed bars spaced 6 1/2” center to center, and the transverse reinforcing steel consists of No. 4 deformed bars spaced 42” center to center.

The aggregate in the existing CRC Pavement is quartzite.

RESTORATION OF GRAVEL CUSHION

An inspection of the gravel cushion 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 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 place and compact gravel cushion to the satisfaction of the Engineer at no additional cost to the State. Additional gravel cushion can be obtained from the Department of Transportation Maintenance shop located in Junction City.

Cost for this work shall be incidental to the contract unit price per square yard for Continuously Reinforced PCC Pavement Repair.

CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR

New pavement thickness shall equal existing pavement thickness (T<sub>N</sub> = T).

Locations and size (length or width) of pavement repair areas are subject to change in the field, at the discretion of the Engineer, at no additional cost to the State. Payment will be based on actual area replaced.

The Engineer will mark the location of the area to be repaired on construction. Where repair crosses both lanes, the passing lane should be repaired first.

Full Lane Width Repair and Partial Lane Width Repair

The Contractor shall saw the in place concrete transversely at four locations for each repair area. Two saw cuts shall be full depth. The other two saw cuts shall be partial depth saw cuts and shall be made to a depth just above the in place reinforcing steel, and be placed outside of the previous full depth saw cuts. The outside cuts shall be a minimum of 6” from the nearest tight crack outside of the patch.

The Contractor shall lift out or break out the center section (including reinforcing steel). Light chipping hammers (not exceeding 15 pounds) shall be used to remove the remaining concrete at each end of the repair area, leaving the reinforcing steel in place.

CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR (CONTINUED)

Small Repair – Existing Steel Retained

The Contractor shall saw the in place concrete around the periphery of each repair area to a depth of 2” (above the in place reinforcing steel). The cuts shall be a minimum of 6” from the nearest tight crack outside of the patch.

Light chipping hammers (not exceeding 15 pounds) shall be used to remove the concrete from the repair area, leaving all of the reinforcing steel in place.

Saw cuts that extend beyond the repair area shall be minimized and filled with a non-shrinkage mortar mix at the Contractor’s expense.

Care shall be taken not to cut, bend or otherwise damage the in place reinforcing steel. Damage to in place reinforcing steel or to in place concrete beyond the repair area will be replaced at the Contractor’s expense, to the satisfaction of the Engineer.

The Contractor shall remove and dispose of the in place concrete and in place asphalt concrete.

Existing exposed reinforcing steel and concrete faces shall be cleaned by sandblasting and compressed air to remove dirt and debris prior to placement of concrete.

Place reinforcing steel according to the notes for REINFORCING STEEL and STEEL BAR INSERTION.

Concrete placed adjacent to asphalt concrete shoulders shall be formed full depth to match the width of existing concrete pavement. The excavated area of the asphalt concrete shoulder adjacent to repair areas shall be filled with asphalt concrete.

Concrete shall not be placed in the repair areas before 12:00pm and should be placed in the late afternoon. Temperature of the concrete at the time of placement shall be between 50°F and 90°F. The temperature of the concrete shall be maintained above 40°F during the curing period.

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

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

The slump requirement will be limited to 3" maximum after water reducer is added and the concrete shall contain 4.5% to 7.0% entrained air. The concrete shall contain a minimum of 50% coarse aggregate by weight. 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 mix design shall contain at least 650 lbs of Type I or II cement or 600 lbs of Type III cement per cubic yard. The minimum 28 day compressive strength 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 a minimum of 48 hours before opening to traffic. The 48 hours is based upon a concrete surface temperature of 60°F or higher throughout the cure period. If the concrete temperature falls below 60°F, the cure time shall be extended or other measures taken, at no additional cost to the State. A strength of 4,000 psi must be obtained prior to opening to traffic.

CONTINUOUSLY REINFORCED PCC PAVEMENT REPAIR (CONTINUED)

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. Insulation blanket shall have an R-value of at least 0.5, as rated by the manufacturer. Insulation blanket shall be left in place, except for joint sawing operations. Insulation blanket shall be overlapped on to the existing concrete by 4’. This requirement for covering repair areas with insulation blankets may be waived during periods of hot weather upon approval of the Engineer.

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

Cost for performing the aforementioned work including sawing, chipping and removing concrete, sandblasting, cleaning, furnishing and placing concrete and reinforcing steel, finishing and curing, replacing asphalt concrete shoulders, labor and equipment shall be included in the contract unit price per square yard for Continuously Reinforced PCC Pavement Repair.

REINFORCING STEEL

Reinforcing steel shall conform to Section 1010.

After removal of the in place concrete and repair of the gravel cushion subgrade, new reinforcing steel shall be installed. Refer to the CRC Pavement Repair Area layouts for details.

1. New longitudinal bars shall be lap spliced with the preserved in place longitudinal bars (New bar diameter to match in place bar diameter).
2. At full lane width repair areas, additional longitudinal bars shall be centered between every other set of two spliced longitudinal bars throughout the width of the repair area. The additional longitudinal bars shall overlap into the existing concrete 9” on both sides of the repair area. Drilled holes will be required and the additional longitudinal bars shall be inserted in accordance with the notes for STEEL BAR INSERTION. The additional longitudinal bars shall then be lap spliced.
3. Additional transverse bars shall be centered between the in place transverse bars throughout the length of the repair area. The spacing of transverse bars in the completed repair area should be half the spacing of the in place transverse reinforcing steel.

The additional transverse bars shall be lap spliced with No. 5 x 24” epoxy coated deformed tie bars inserted 9” into the existing concrete. Drilled holes will be required. Tie bars shall be inserted according to the notes for STEEL BAR INSERTION.

Cost for this work, including reinforcing steel, ties, labor and equipment shall be incidental to the contract unit price per square yard for Continuously Reinforced PCC Pavement Repair.

**STEEL BAR INSERTION**

Steel bars shall conform to Section 1010.

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.

Longitudinal deformed tie bars shall be inserted 9 inches into the in place concrete at the transverse joint and centered between every other set of two spliced longitudinal bars throughout the width of the repair area. Transverse deformed bars shall be lap spliced with deformed tie bars which are inserted 9 inches into the in place concrete at the longitudinal joint throughout the length of the repair area. Refer to the notes for REINFORCING STEEL. An epoxy resin adhesive must be used to anchor the steel bar in the drilled hole as per Section 380.3 C.1.

Holes drilled into the existing concrete pavement shall be located at mid-depth of the slab and true and normal except that in transverse joints, the drilled in longitudinal steel bar angle will be slightly under 90° to allow for centering of the lap splice between existing longitudinal steel.

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 reinforcing steel (except the inserted No. 5 x 24” epoxy coated deformed tie bars) shall be incidental to the contract unit price per square yard for Continuously Reinforced PCC Pavement Repair.

Cost for drilling holes, furnishing and applying epoxy resin adhesive, furnishing and inserting No. 5 x 24” epoxy coated deformed tie bars into the drilled holes and inserting all other reinforcing steel bars into the drilled holes, and any incidentals necessary to complete the work shall be included in the contract unit price per each for Insert Steel Bar in PCC Pavement.

**SAW AND SEAL LONGITUDINAL JOINTS**

Longitudinal joints (in line with existing longitudinal joints) at concrete repair areas shall be sawed and sealed.

Joint sealing shall conform to Section 380.3 P.

Longitudinal joints shall be sealed with Low Modulus Silicone Sealant or Hot Poured Elastic Joint Sealer.

Acceptance of the Low Modulus Silicone Sealant and Hot Poured Elastic Joint Sealer will be based on visual inspection by the Engineer.

Cost for sawing and sealing of the longitudinal construction joint shall be incidental to the contract unit price per square yard for Continuously Reinforced PCC Pavement Repair.

**TEMPORARY PAVEMENT MARKING**

Temporary pavement marking on lane closure tapers shall consist of temporary flexible vertical markers (tabs) or raised pavement markers. (Estimated three workspaces with 960’ tapers)

Cost shall be included in the contract unit price per foot for Temporary Flexible Vertical Markers (Tabs).

**GENERAL MAINTENANCE OF TRAFFIC**

Sufficient traffic control devices have been included in these plans to sign two workspaces. If the Contractor elects to work on additional sites simultaneously, the cost for additional traffic control devices shall be incidental to the contract unit price per square foot for Traffic Control Signs.

**MAINTENANCE OF TRAFFIC – PCC PAVEMENT REPAIR**

A Type 3 Barricade shall be installed at the end of a lane closure taper as detailed in these plans. Additional Type 3 Barricades shall be installed facing traffic within the closed lane at a spacing of 1/4 mile.

Each mainline concrete repair location from which the in place concrete has been removed shall be marked with a minimum of two reflectorized drums. In areas containing numerous concrete repair locations, two reflectorized drums should be installed at a spacing of 660’ alternating with the Type 3 Barricades.

Construction workspaces on divided roadways shall be limited to 3 miles in length. The distance between the closest points of any two construction workspaces, including channeling devices, shall not be less than 3 miles

Holes in the gravel and asphalt concrete shoulders created during removal and replacement of PCC Pavement Repair areas shall be filled with gravel cushion material and hot-mix asphalt concrete (to match the shoulder surfacing) prior to opening the lane to traffic. Gravel cushion material can be obtained from the Department of Transportation Maintenance shop located in Junction City. Hot-mix asphalt concrete shall be furnished by the Contractor or gravel cushion material and hot-mix asphalt concrete shall be furnished and installed by the Contractor at no additional cost to the State.

Cost for furnishing, hauling and placing gravel cushion material and asphalt concrete shall be incidental to the contract unit price per square yard for Continuously Reinforced PCC Pavement Repair.

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

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

Extra care shall be taken to protect the in place asphalt concrete shoulders. In all workspaces in these areas, flexible delineators will be required on the shoulders and shall also be placed in locations to adequately keep traffic completely off these shoulders. Continuous maintenance will be required to keep them in place.

Work activities shall not be conducted simultaneously on the median and outside shoulders of the same directional set of lanes.

The use of interstate maintenance crossovers will not be permitted.

ITEMIZED LIST FOR TRAFFIC CONTROL SIGNS

		EXPRESSWAY / INTERSTATE			
SIGN CODE	SIGN DESCRIPTION	NUMBER	SIGN SIZE	SQFT PER SIGN	SQFT
R2-1	SPEED LIMIT 45	4	36" x 48"	12.0	48.0
R2-1	SPEED LIMIT 65	6	36" x 48"	12.0	72.0
R2-1	SPEED LIMIT 80	2	48" x 60"	20.0	40.0
R2-6aP	FINES DOUBLE (plaque)	2	36" x 24"	6.0	12.0
W3-5	SPEED REDUCTION AHEAD (45 MPH)	2	48" x 48"	16.0	32.0
W3-5	SPEED REDUCTION AHEAD (65 MPH)	4	48" x 48"	16.0	64.0
W4-2	LEFT or RIGHT LANE ENDS (symbol)	4	48" x 48"	16.0	64.0
W20-1	ROAD WORK AHEAD	4	48" x 48"	16.0	64.0
W20-5	LEFT or RIGHT LANE CLOSED AHEAD	4	48" x 48"	16.0	64.0
G20-2	END ROAD WORK	2	48" x 24"	8.0	16.0
		EXPRESSWAY / INTERSTATE TRAFFIC CONTROL SIGNS SQFT			
		476.0			

TYPE 3 BARRICADES

ITEM DESCRIPTION	QUANTITY
Type 3 Barricade, 8' Single Sided	7 Each

ARROW BOARDS

ITEM DESCRIPTION	QUANTITY
Type C Advance Warning Arrow Board	2 Each

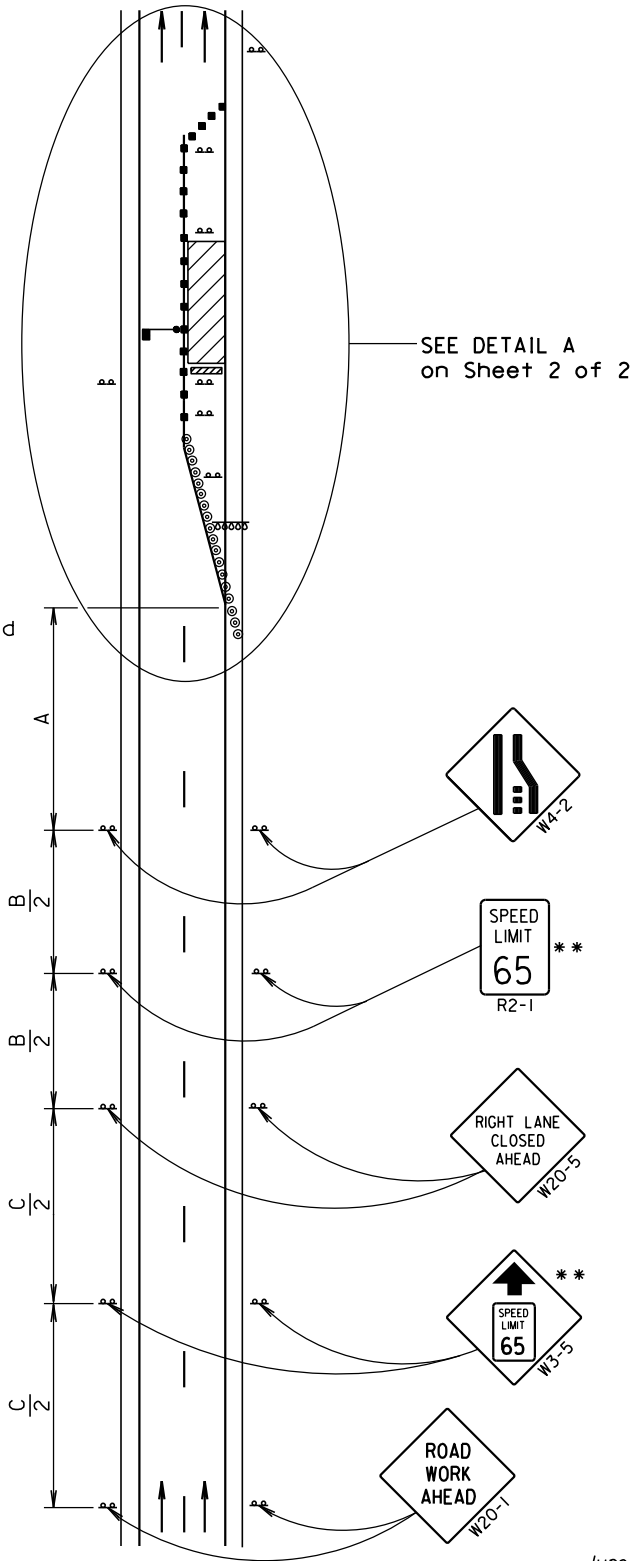
Posted Speed Prior to Work (M.P.H.)	Spacing of Advance Warning Signs (Feet) (A) (B) (C)		
0 - 30	200		
35 - 40	350		
45 - 50	500		
55	750		
60 - 65	1000		
	(A)	(B)	(C)
70 - 80	1000	1500	2640

\*\* Speed appropriate for location.

- Reflectorized Drum
- Channelizing Device

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

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



June 3, 2016

Published Date: 1st Qtr. 2017

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WORK ZONE SPEED REDUCTION  
FOR INTERSTATE AND HIGH  
SPEED MULTI-LANE HIGHWAYS

PLATE NUMBER  
634.63

Sheet 1 of 2

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	25	600
50	50 *	600
55	50 *	660
60 - 65	50 *	780
70 - 80	50 *	960

\* Spacing is 40' for 42" cones.

\*\* Speed appropriate for location.

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

● Flagger (As Necessary)

- Reflectorized Drum
- Channelizing Device

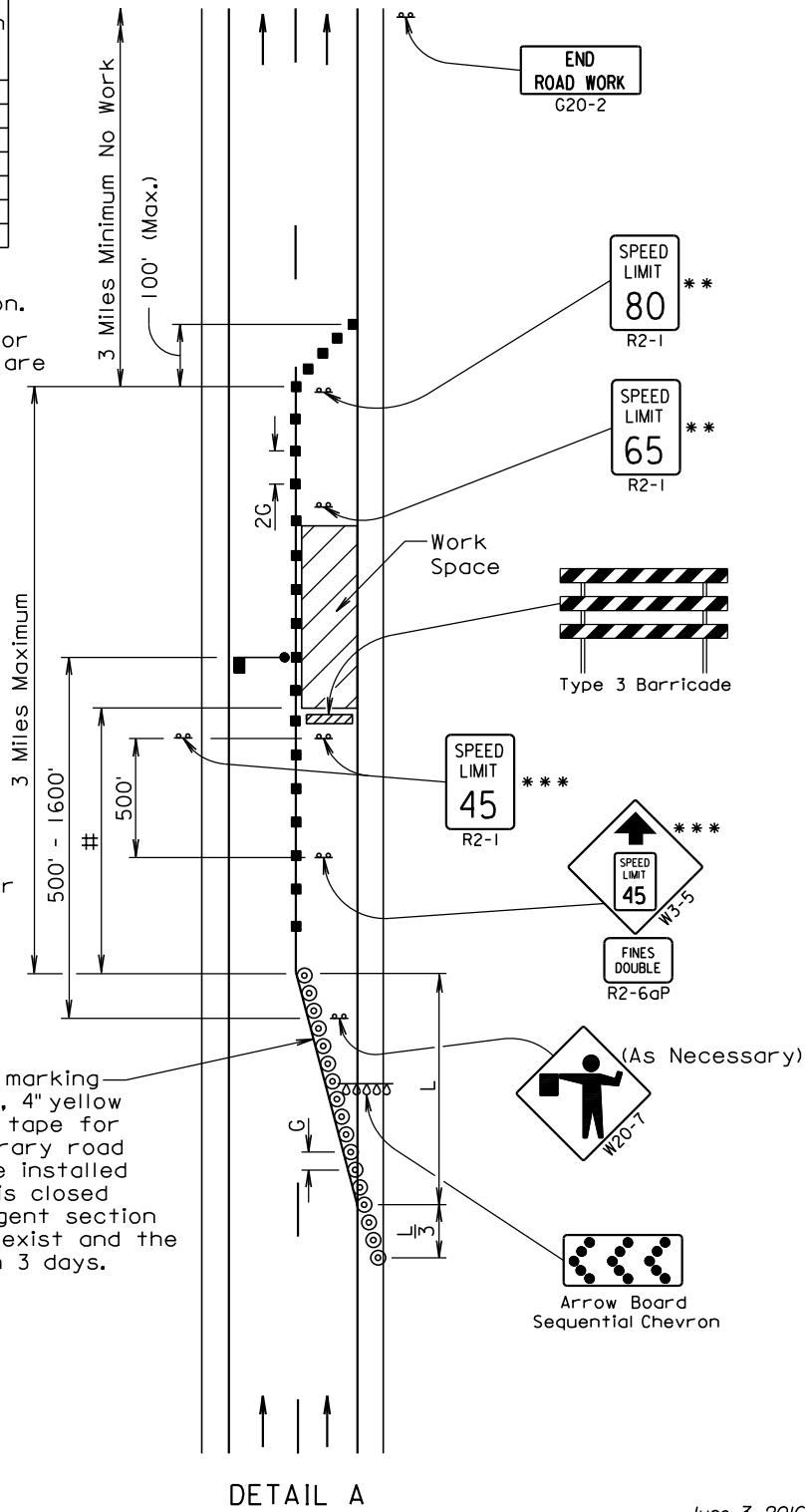
# The Work Space shall be a minimum of 500' from the end of the taper.

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

The channelizing devices shall be 42" cones or drums.

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

4" white temporary pavement marking tape for right lane closures, 4" yellow temporary pavement marking tape for left lane closures, or temporary road markers at 5' spacing shall be installed in the taper when the lane is closed overnight, and along the tangent section where the skip lines do not exist and the lane is closed for more than 3 days.



June 3, 2016

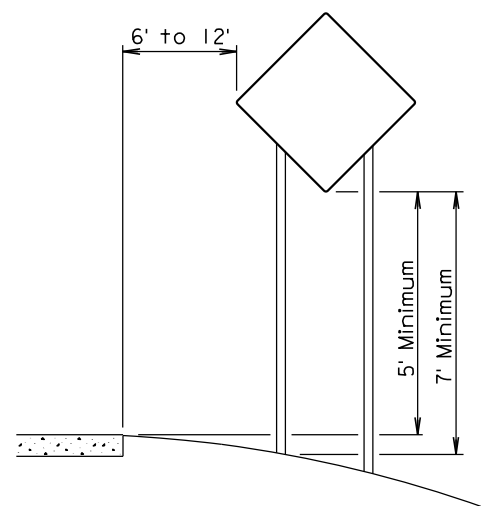
Published Date: 1st Qtr. 2017

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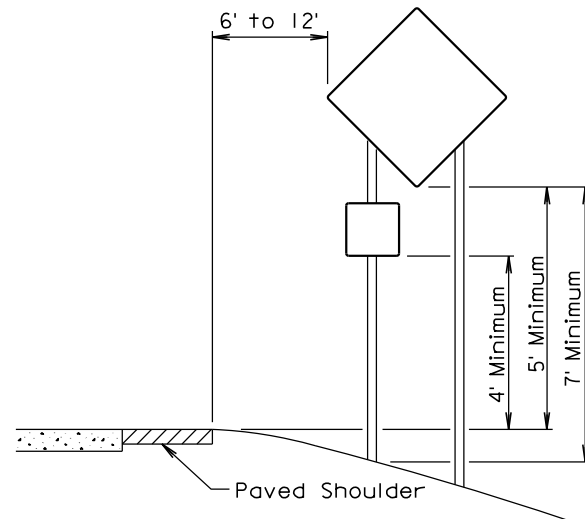
WORK ZONE SPEED REDUCTION  
FOR INTERSTATE AND HIGH  
SPEED MULTI-LANE HIGHWAYS

PLATE NUMBER  
634.63

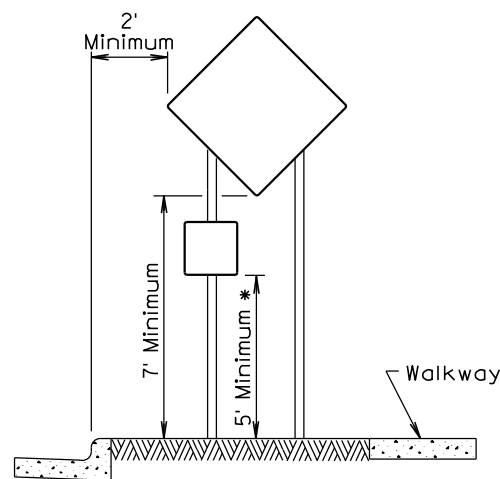
Sheet 2 of 2



RURAL DISTRICT

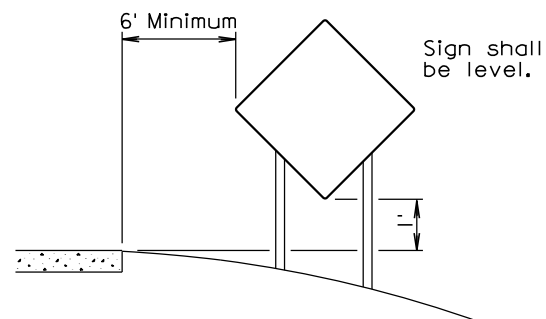


RURAL DISTRICT WITH  
SUPPLEMENTAL PLATE



URBAN DISTRICT

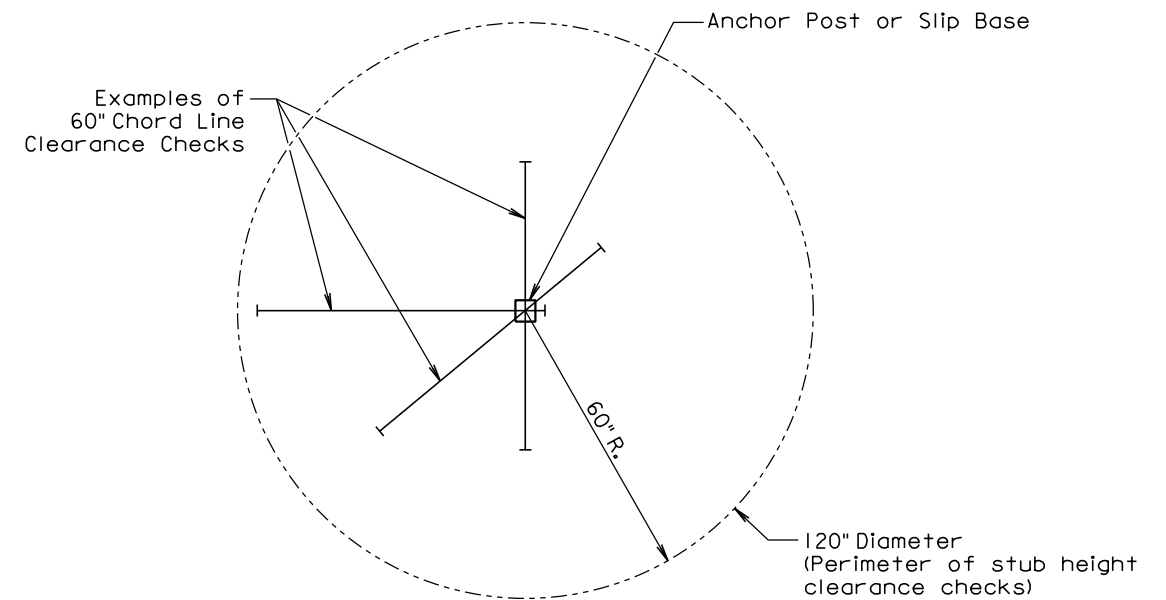
\* If the bottom of supplemental plate is mounted lower than 7 feet above a pedestrian walkway, the supplemental plate should not project more than 4" into the pedestrian facility.



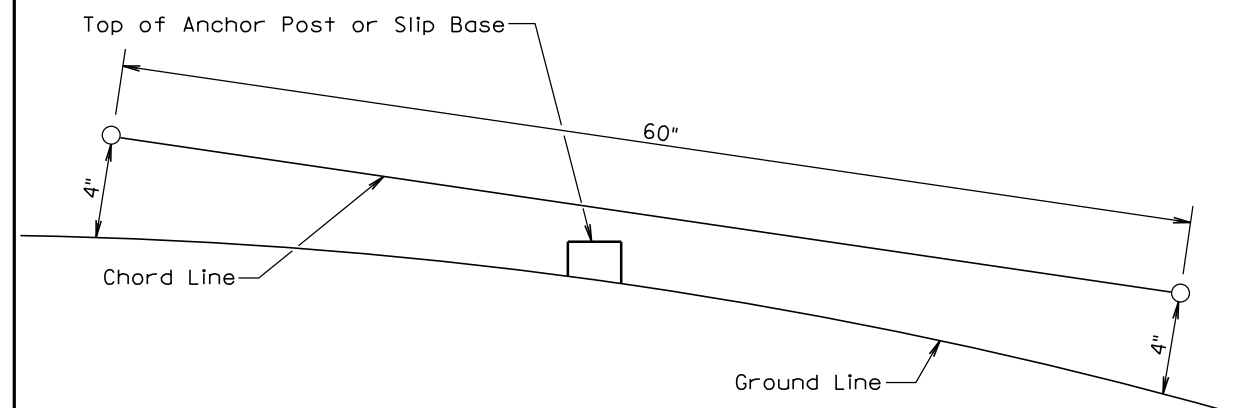
RURAL DISTRICT  
3 DAY MAXIMUM  
(Not applicable to regulatory signs)

September 22, 2014

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



PLAN VIEW  
(Examples of stub height clearance checks)



ELEVATION VIEW

#### GENERAL NOTES:

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

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

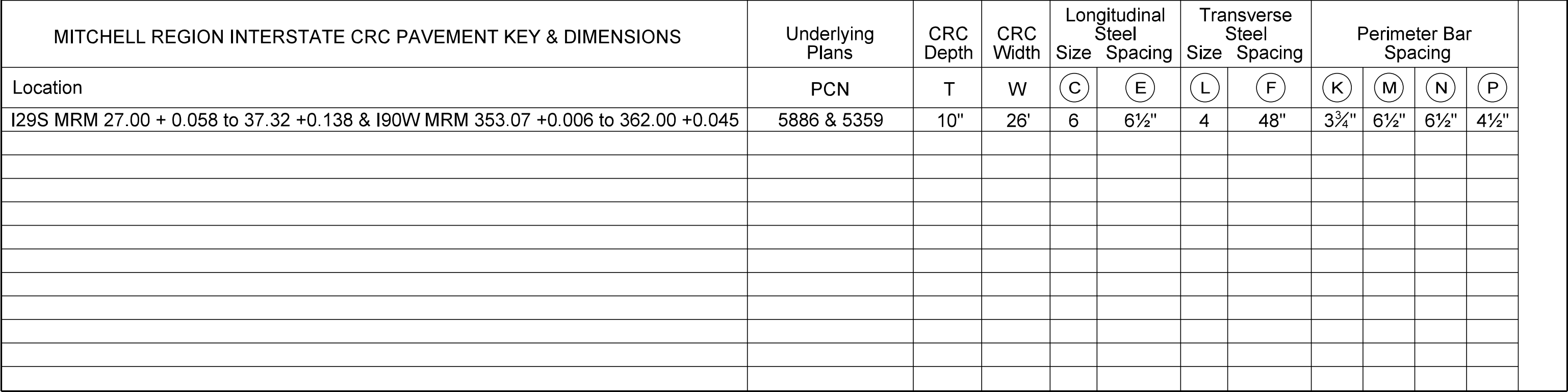
The 4" stub height clearance is not necessary for U-channel lap splices where the support is designed to yield (bend) at the base.

July 1, 2005

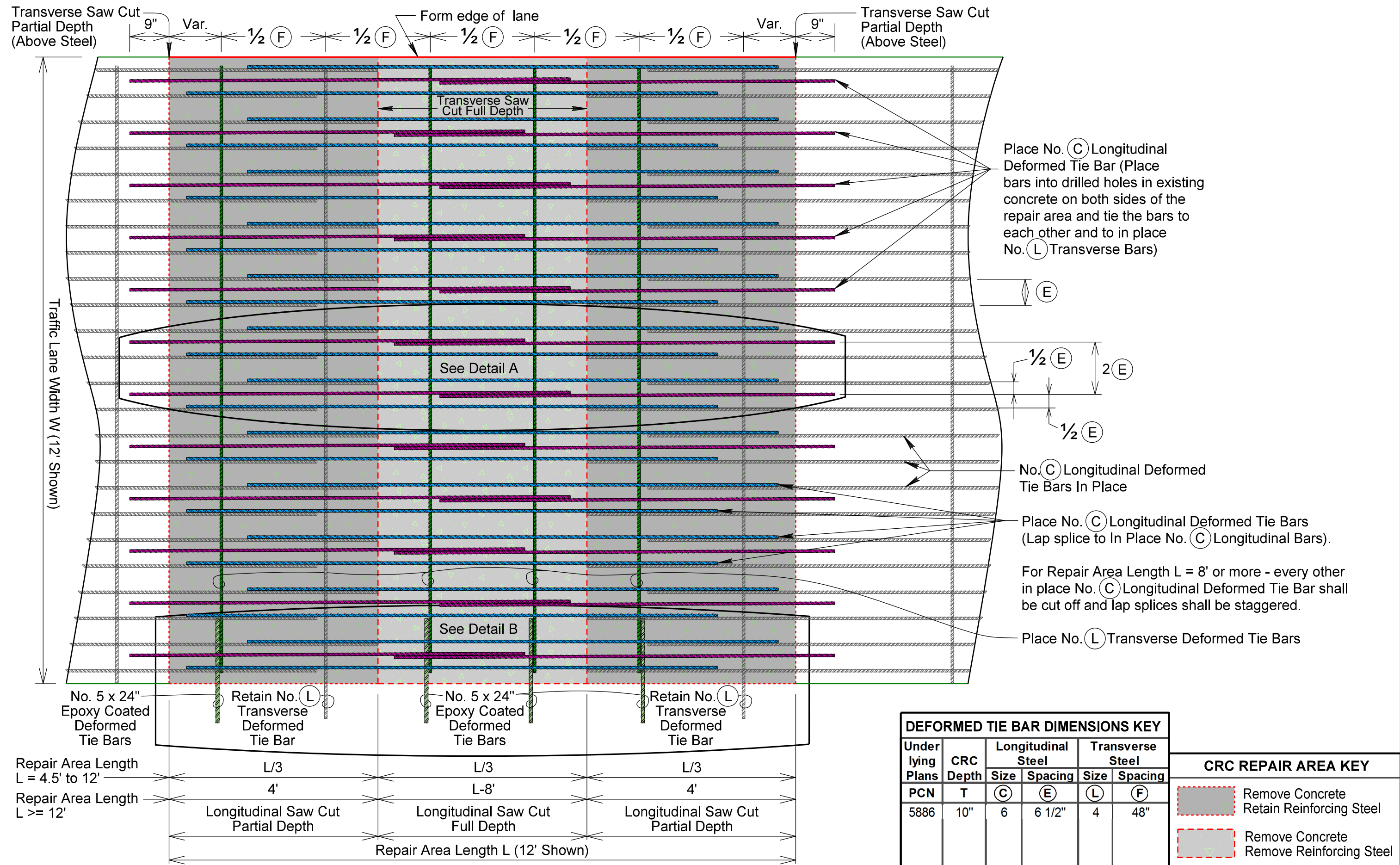
Published Date: 1st Qtr. 2017	S D D O T	BREAKAWAY SUPPORT STUB CLEARANCE	PLATE NUMBER 634.99
			Sheet 1 of 1



STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	029S-291	9	17

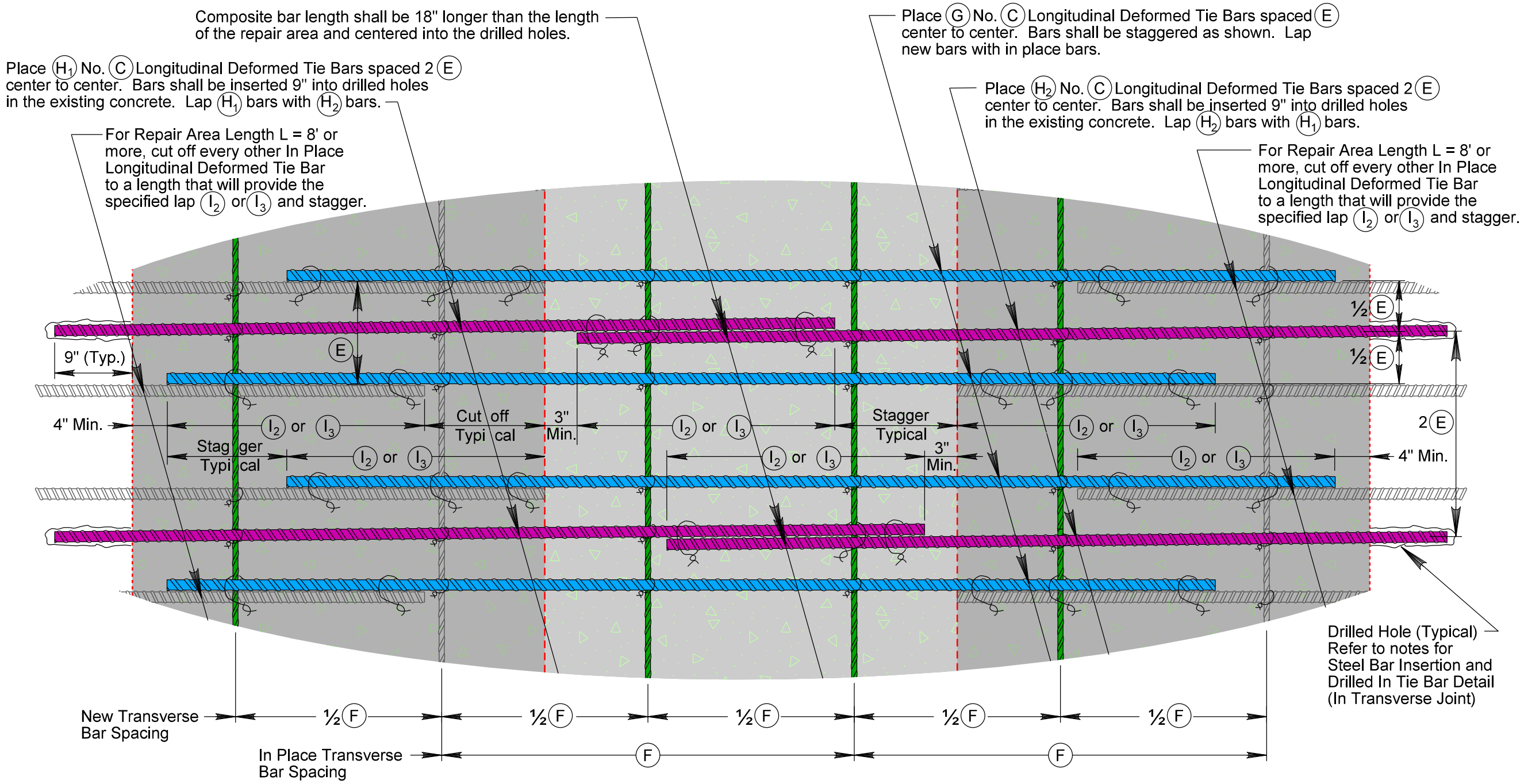


# CRC PAVEMENT REPAIR (FULL LANE WIDTH) - TYPICAL



# CRC PAVEMENT REPAIR (FULL LANE WIDTH)

## Detail A



### DEFORMED TIE BAR KEY

No. (C) Longitudinal Deformed Tie Bar In Place (Retain)	No. (L) Transverse Deformed Tie Bar In Place (Retain)
Place No. (C) Longitudinal Deformed Tie Bar (Tie to In Place No. (C) Longitudinal Bars)	
Place No. (C) Longitudinal Deformed Tie Bar (Place bars into drilled holes in existing concrete on both sides of the repair area and tie the bars to each other and to No. (L) Transverse Bars)	Place No. (L) Transverse Deformed Tie Bar (Tie to No. (C) Longitudinal Bars)

### DEFORMED TIE BAR DIMENSIONS KEY

Underlying Plans	CRC Depth	Longitudinal Steel		Transverse Steel	
		Size	Spacing	Size	Spacing
PCN	T	(C)	(E)	(L)	(F)
5886	10"	6	6 1/2"	4	48"

Note: All lapped bars shall have a minimum of two ties per lap.

### LAP SPLICE LENGTH KEY

(I <sub>1</sub> )	Lap Splice length for Repair Area Length L < 4.5' (Not Available).
(I <sub>2</sub> )	Lap Splice length for Repair Area Length L = 4.5' to 8'.
(I <sub>3</sub> )	Lap Splice length for Repair Area Length L > 8'.

See CRC Pavement Repair - Reinforcing Steel Details for Longitudinal Bar Counts:

(G), (H<sub>1</sub>) & (H<sub>2</sub>)

### CRC REPAIR AREA KEY

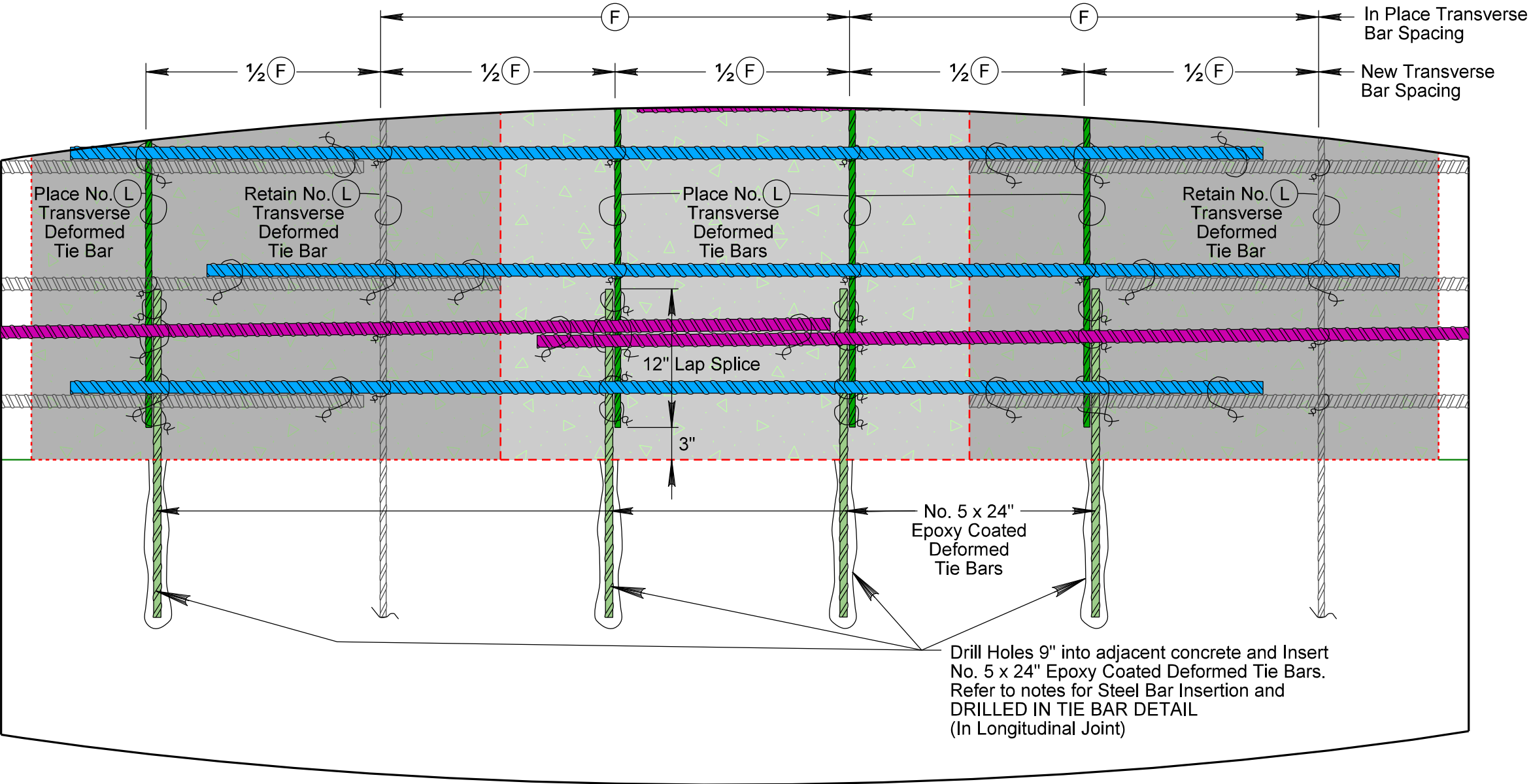
	Remove Concrete Retain Reinforcing Steel
	Remove Concrete Remove Reinforcing Steel



# CRC PAVEMENT REPAIR (FULL LANE WIDTH)

## Detail B

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	029S-291	12	17



### DEFORMED TIE BAR KEY

No. (C) Longitudinal Deformed Tie Bar In Place (Retain)	No. (L) Transverse Deformed Tie Bar In Place (Retain)
Place No. (C) Longitudinal Deformed Tie Bar (Tie to In Place No. (C) Longitudinal Bars)	Place No. (L) Transverse Deformed Tie Bar (Tie to No. (C) Longitudinal Bars)
Place No. (C) Longitudinal Deformed Tie Bar (Place bars into drilled holes in existing concrete on both sides of the repair area and tie the bars to each other and to No. (L) Transverse Bars)	

### DEFORMED TIE BAR DIMENSIONS KEY

Under lying Plans	CRC Depth	Longitudinal Steel		Transverse Steel	
		Size	Spacing	Size	Spacing
PCN	T	(C)	(E)	(L)	(F)
5886	10"	6	6 1/2"	4	48"

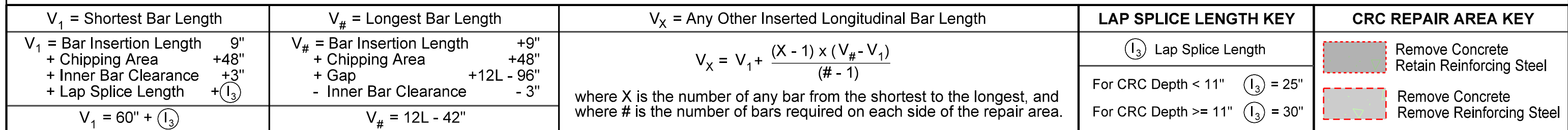
### CRC REPAIR AREA KEY

Remove Concrete Retain Reinforcing Steel
Remove Concrete Remove Reinforcing Steel

Note: All lapped bars shall have a minimum of two ties per lap.

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	029S-291	13	17

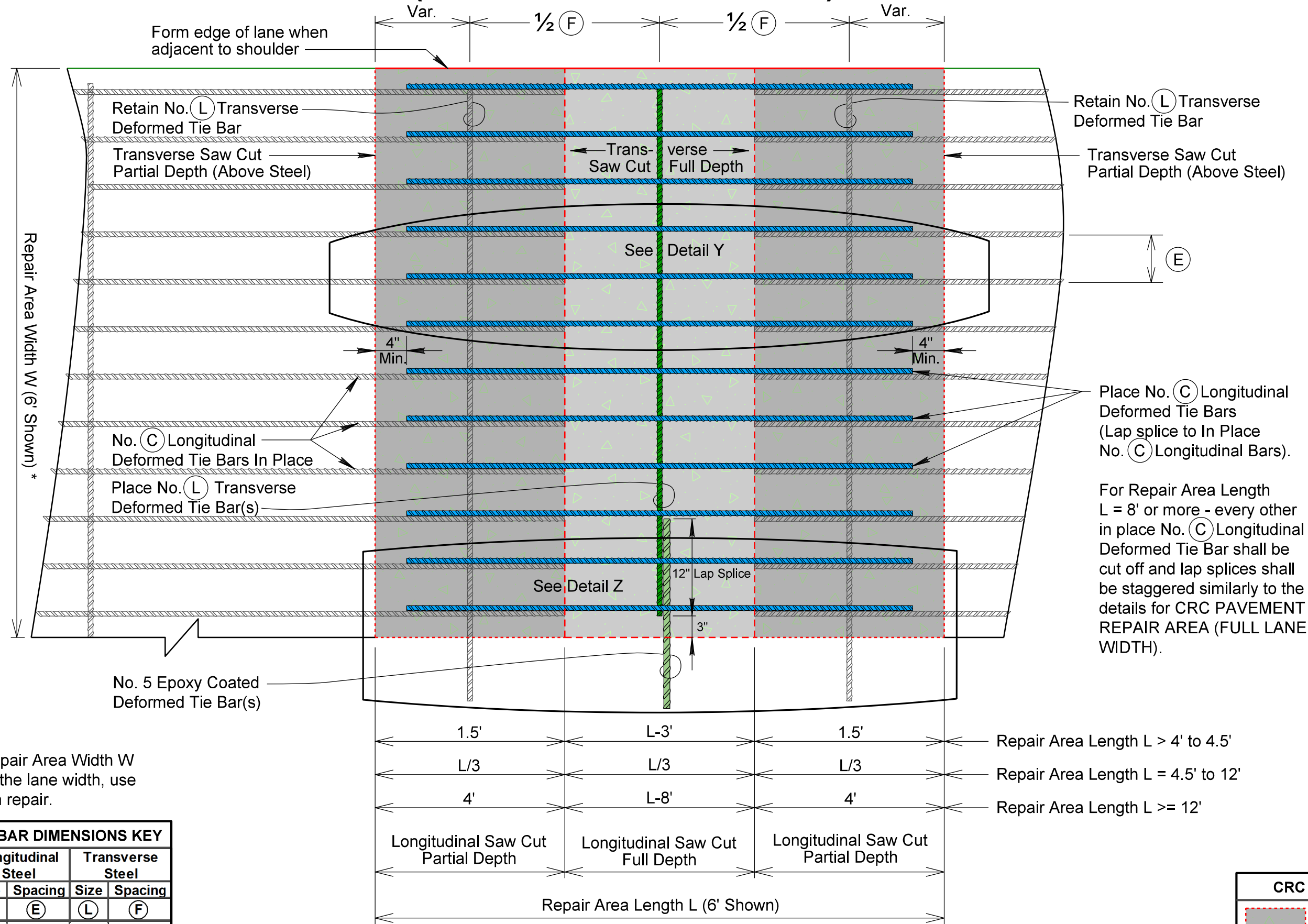
\* In order to minimize concentration of steel, bar lengths shall be cut to the lengths specified and lap splices shall be randomly staggered in the gap area. No specific stagger pattern is required.





# CRC PAVEMENT REPAIR (PARTIAL LANE WIDTH) - TYPICAL

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	029S-291	14	17



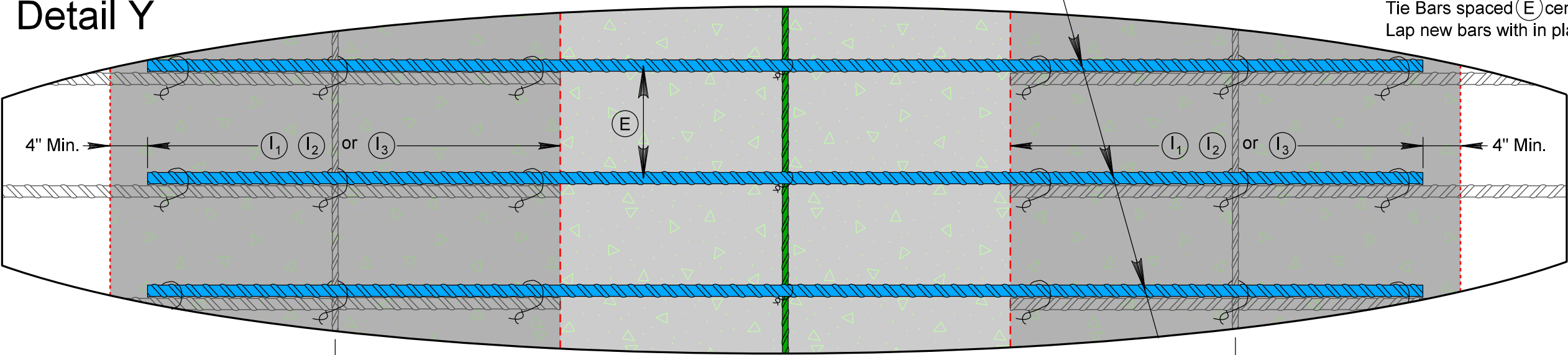
\* When the Repair Area Width W exceeds half the lane width, use full lane width repair.

DEFORMED TIE BAR DIMENSIONS KEY					
Under lying Plans	CRC Depth	Longitudinal Steel		Transverse Steel	
		Size	Spacing	Size	Spacing
PCN	T	$\textcircled{C}$	$\textcircled{E}$	$\textcircled{L}$	$\textcircled{F}$
5886	10"	6	6 1/2"	4	48"

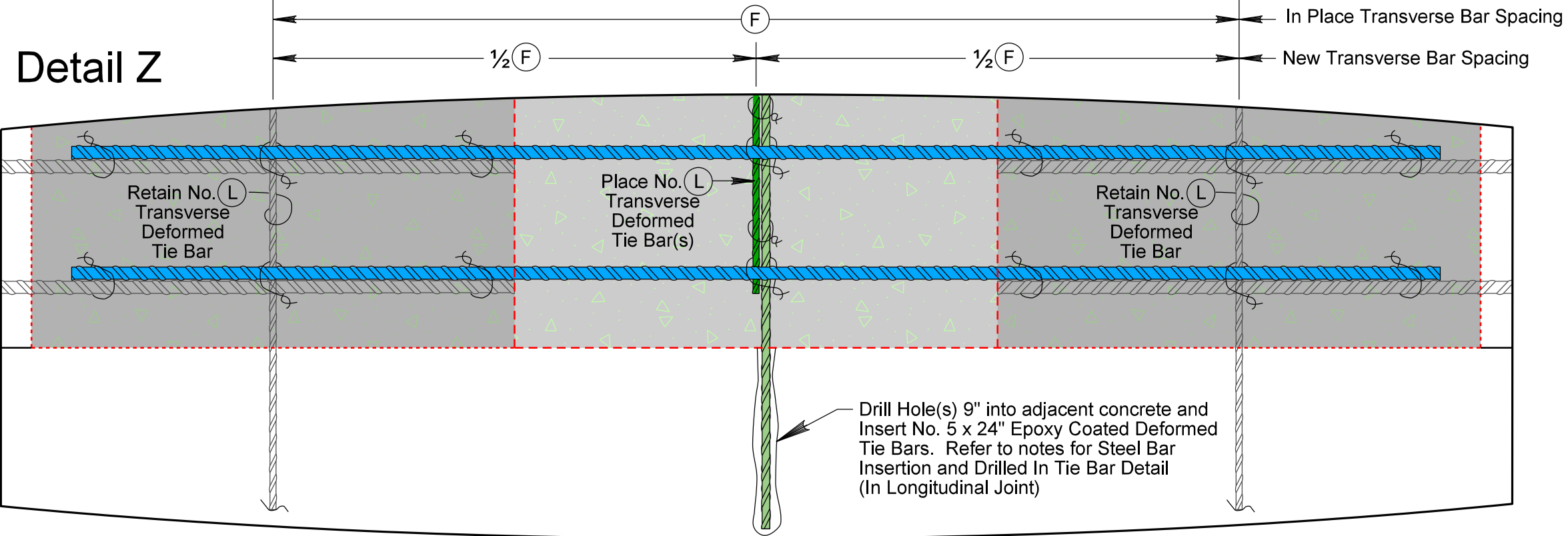
CRC REPAIR AREA KEY	
	Remove Concrete Retain Reinforcing Steel
	Remove Concrete Remove Reinforcing Steel

CRC PAVEMENT REPAIR (PARTIAL LANE WIDTH)

Detail Y



Detail Z



DEFORMED TIE BAR DIMENSIONS KEY

		Under lying Plans	CRC Depth T	Longitudinal Steel		Transverse Steel	
				Size	Spacing	Size	Spacing
				C	E	L	F
No. L Transverse Deformed Tie Bar In Place (Retain)	Place No. C Longitudinal Deformed Tie Bar (Tie to In Place No. C Longitudinal Bars)	PCN	5886	6	6 1/2"	4	48"

LAP SPLICE LENGTH KEY

I <sub>1</sub>	Lap Splice length for Repair Area Length L = 4' to 4.5'.
I <sub>2</sub>	Lap Splice length for Repair Area Length L = 4.5' to 8'.
I <sub>3</sub>	Lap Splice length for Repair Area Length L > 8'.

Note: All lapped bars shall have a minimum of two ties per lap.

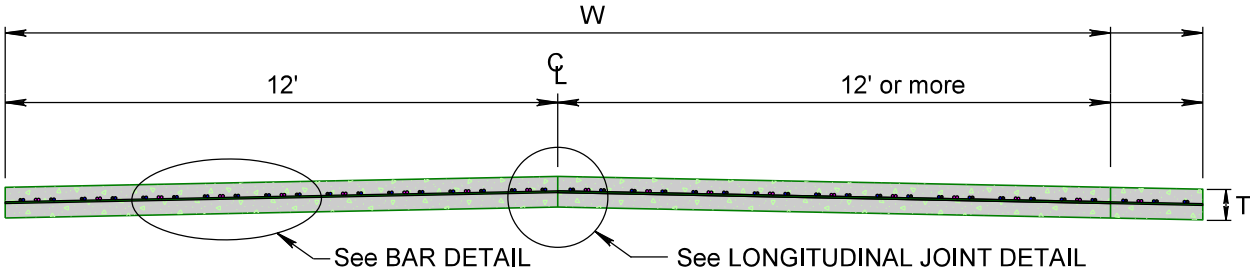
CRC REPAIR AREA KEY

	Remove Concrete Retain Reinforcing Steel
	Remove Concrete Remove Reinforcing Steel

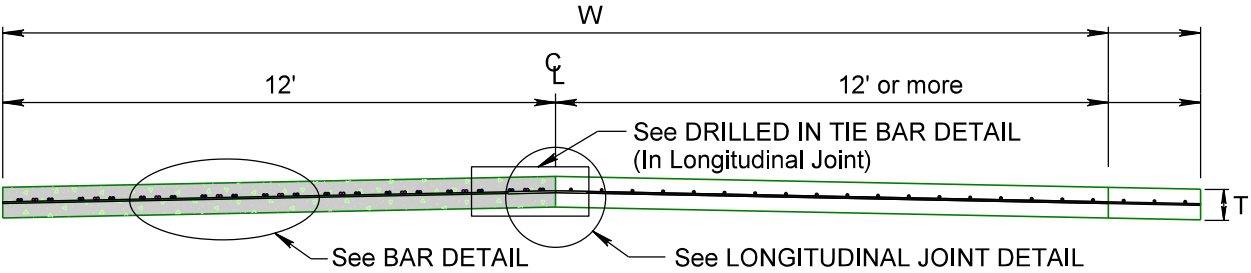
CRC PAVEMENT REPAIR - REINFORCING STEEL DETAILS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	029S-291	16	17

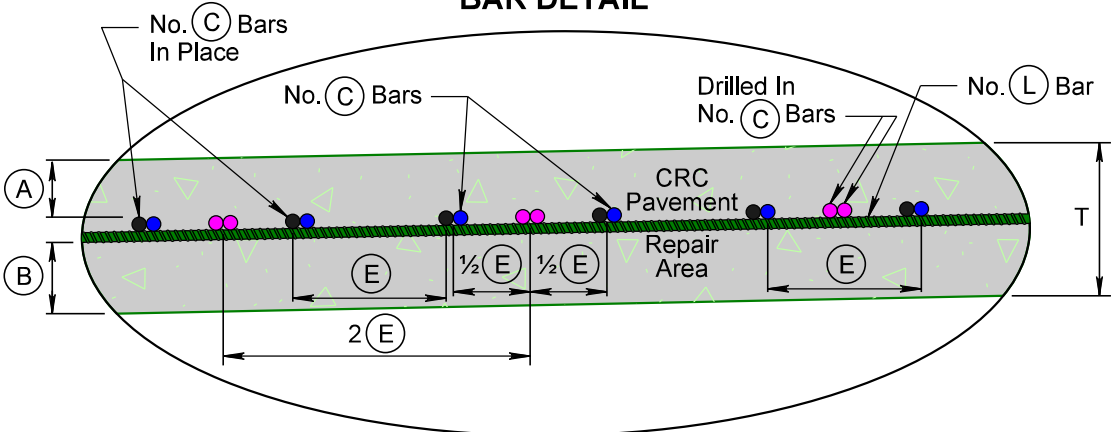
TRANSVERSE SECTION SHOWING STEEL PLACEMENT



TRANSVERSE SECTION SHOWING STEEL PLACEMENT



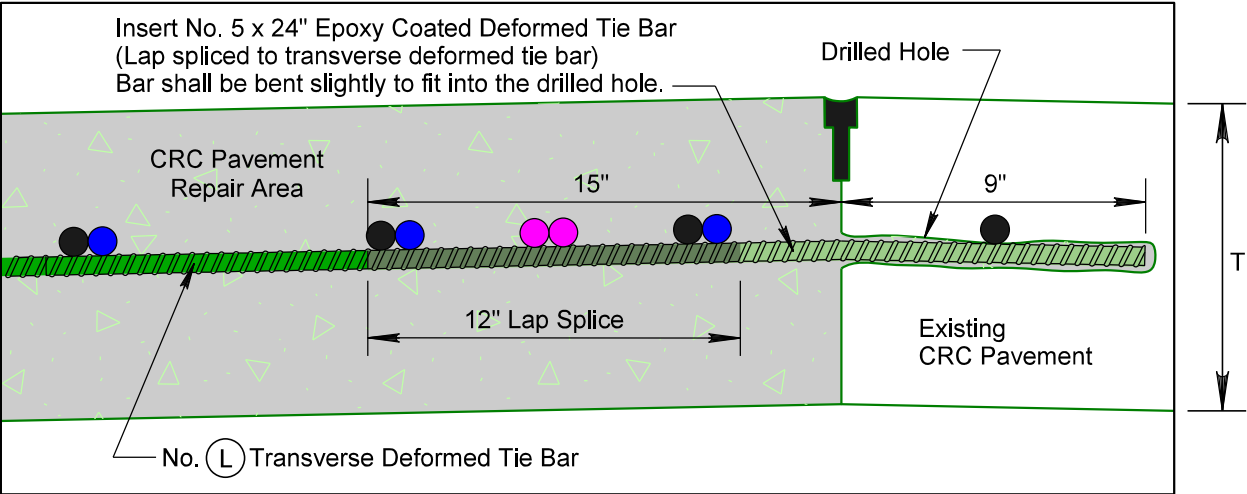
BAR DETAIL



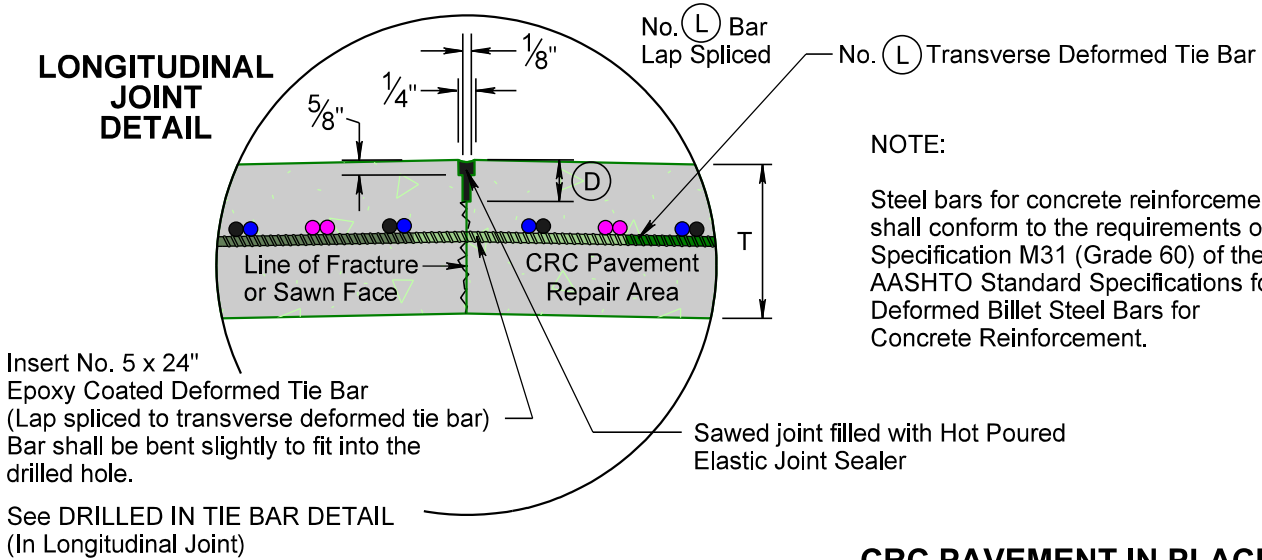
Placement of longitudinal steel bars may vary from +1/2" to -1/2" vertically and 3/4" horizontally. Placement of transverse steel bars may vary from +1/2" to -1/2" vertically and 2" horizontally.

The transverse deformed steel bars will be positioned on acceptable chairs.

DRILLED IN TIE BAR DETAIL  
(In Longitudinal Joint)



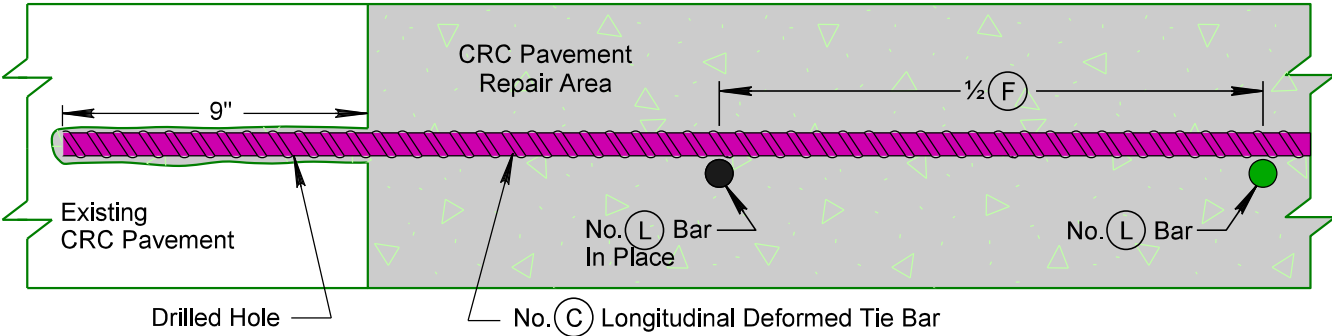
LONGITUDINAL  
JOINT  
DETAIL



NOTE:

Steel bars for concrete reinforcement shall conform to the requirements of Specification M31 (Grade 60) of the AASHTO Standard Specifications for Deformed Billet Steel Bars for Concrete Reinforcement.

LONGITUDINAL SECTION SHOWING STEEL PLACEMENT  
DRILLED IN TIE BAR DETAIL  
(In Transverse Joint)



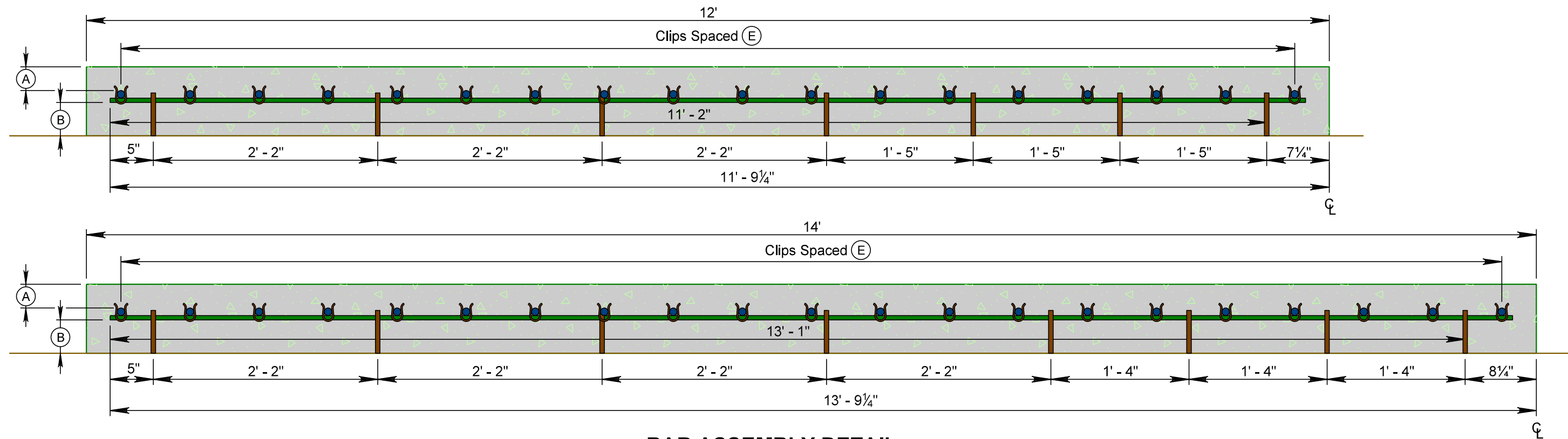
CRC PAVEMENT IN PLACE & CRC PAVEMENT REPAIR KEY & DIMENSIONS

Location	Under lying Plans	CRC Depth	CRC Width	Clearance		Longitudinal Steel		Saw Cut Depth	Transverse Steel		Longitudinal Bar Count (full lane width repair)						Lap Splice Length (for Repair Length L)			Not Assign ed	Perimeter Bar Spacing				Chair Width
	PCN	T	W	Top	Bottom	Size	Spacing		Size	Spacing	12' Wide Slab		14' Wide Slab				L<4.5'	L=4.5' to 8'9"	L>=8'9"	-	(K)	(M)	(N)	(P)	(R)
				(A)	(B)	(C)	(E)	(D)	(L)	(F)	(G)	(H <sub>1</sub> )	(H <sub>2</sub> )	(G)	(H <sub>1</sub> )	(H <sub>2</sub> )	(I <sub>1</sub> )	(I <sub>2</sub> )	(I <sub>3</sub> )	-					
I29S MRM 27.00 + 0.058 to MRM 37.32 +0.138	5886	10"	26'	3 1/2"	5 1/4"	6	6 1/2"	2 1/2"	4	48"	22	11	11	26	13	13	14"	14" to 25"	25"	-	3 3/4"	6 1/2"	6 1/2"	4 1/2"	5"

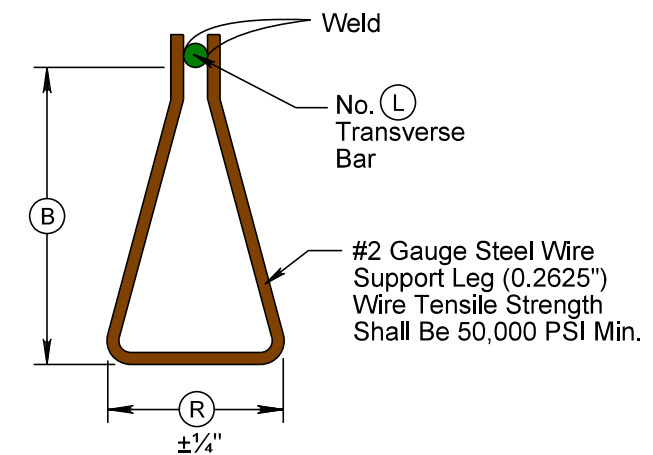
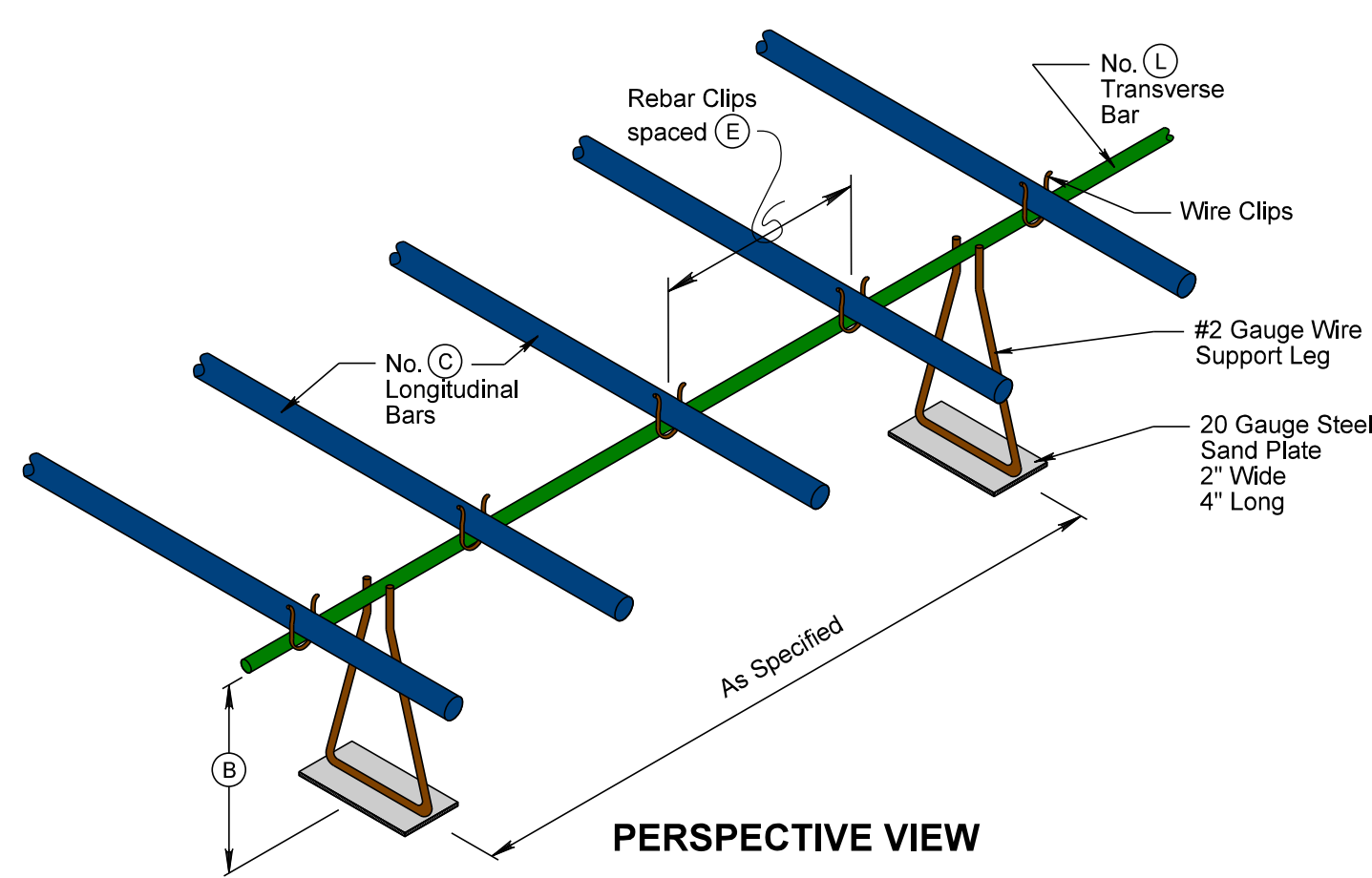


CRC PAVEMENT CHAIR DETAILS

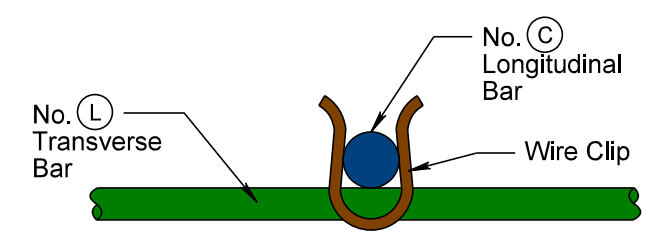
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	029S-291	17	17



BAR ASSEMBLY DETAIL



CHAIR DETAIL



CLIP DETAIL

DEFORMED TIE BAR DIMENSIONS KEY										
Under lying Plans	CRC Depth	CRC Width	Clearance		Longitudinal Steel		Saw Cut Depth	Transverse Steel		Chair Width
			Top	Bottom	Size	Spacing		Size	Spacing	
PCN	T	W	(A)	(B)	(C)	(E)	(D)	(L)	(F)	(R)
5886	10"	26'	3 1/2"	5 1/4"	6	6 1/2"	2 1/2"	4	48"	5"