

# Section F: Surfacing Plans

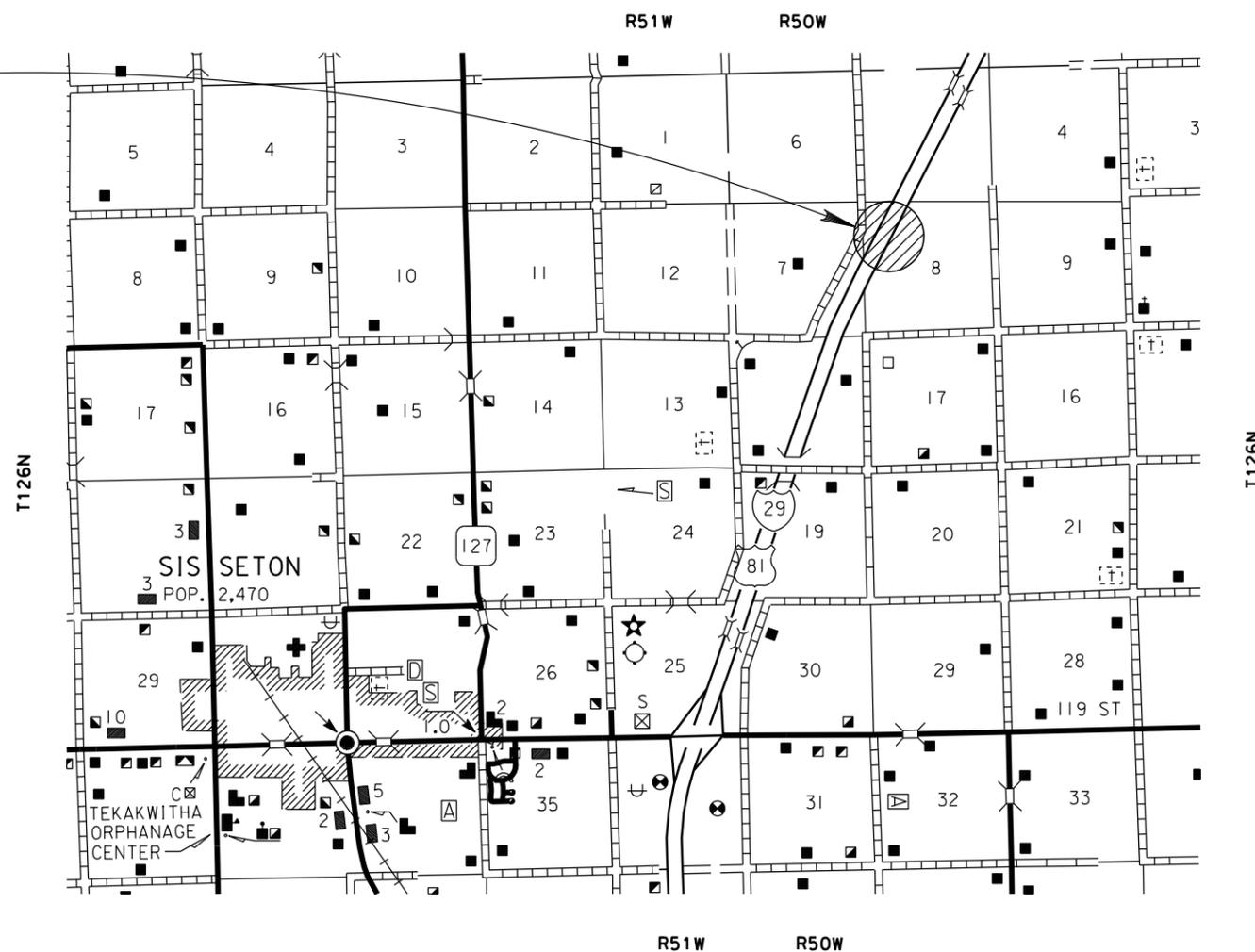
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0299(74)235	F1	F27

Plotting Date: 04/17/2014

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Project Location  
Approx. MRM 236



**SECTION F ESTIMATE OF QUANTITIES**

Bid Item Number	Item	Quantity	Unit
009E0010	Mobilization	Lump Sum	LS
110E0700	Remove 3 Cable Guardrail	590	Ft
110E0740	Remove 3 Cable Guardrail Anchor Assembly	2	Each
110E0745	Remove 3 Cable Guardrail Slip Base Anchor Assembly	2	Each
110E1100	Remove Concrete Pavement	3,375.4	SqYd
120E0010	Unclassified Excavation	4,132	CuYd
120E6200	Water for Granular Material	74.4	MGal
230E0100	Remove and Replace Topsoil	Lump Sum	LS
260E1010	Base Course	6,203.2	Ton
380E0100	10.5" Nonreinforced PCC Pavement	2,913.2	SqYd
380E6000	Dowel Bar	1,672	Each
380E6110	Insert Steel Bar in PCC Pavement	96	Each
380E6510	Grinding PCC Pavement	1,680.0	SqYd
380E6545	Grind 12" Rumble Strip or Stripe in PCC Pavement	0.3	Mile
629E0100	3 Cable Guardrail	660	Ft
629E0300	3 Cable Guardrail Slip Base Anchor Assembly	2	Each
629E0400	3 Cable Guardrail Anchor Assembly	2	Each
629E1102	3 Cable Guardrail Intermediate Post	9	Each
734E0010	Erosion Control	Lump Sum	LS
734E0154	12" Diameter Erosion Control Wattle	100	Ft

**UTILITIES**

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

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

**SURFACING THICKNESS DIMENSIONS**

Plans tonnage will be applied even though the thickness may vary from that shown on the plans.

At those locations where material must be placed to achieve a required elevation, plans tonnage may be varied to achieve the required elevation.

**SAWING IN EXISTING SURFACING**

Where new asphalt concrete or new PCC Pavement is placed adjacent to existing asphalt concrete or existing PCC Pavement, the existing pavement shall be sawed full depth to a true, straight vertical face. No separate payment shall be made for sawing.

**LOCATION OF CONCRETE PAVEMENT JOINTS**

The location of joints, as shown on the "PCC Pavement Layout" sheets, are only approximate locations to be used as a guide in the final location of joints and to afford bidders a basis for estimating the construction costs of the joints. The final locations of the joints are to be designated by the Engineer during construction.

**UNCLASSIFIED EXCAVATION**

Unclassified Excavation consisting of earth embankment and/or granular base material shall be removed from the locations listed in the following Table of Unclassified Excavation.

Unclassified excavation shall be used for inslope construction as directed by the Engineer.

Payment will be based on plans quantity. Further measurements will not be made unless there is a change made to the limits of work.

**TABLE OF UNCLASSIFIED EXCAVATION**

Location	Volume (CuYd)
Mainline NBL	
Sta. 394+77 to Sta. 398+22	1,890
Mainline SBL	
Sta. 393+70 to Sta. 397+15	2,242
Total:	4,132

**REMOVAL OF EXISTING PCC PAVEMENT**

**STA. 394+77.00 to STA. 398+22.00 NBL and STA. 393+70.00 to STA. 397+15.00 SBL**

The existing asphalt concrete that was placed as part of additional guardrail widening and the existing concrete WIM vaults are included in the quantity for "Remove Concrete Pavement". The Contractor shall dispose of the concrete pavement and asphalt concrete at a site approved by the Engineer.

The existing 9.5 inch PCC mainline pavement is typically 24 feet wide with a 4' wide PCC pavement median shoulder and a 10' wide PCC pavement outside shoulder.

The existing contraction joints are spaced at approximately 15 feet and have a 9.5 degree skew.

The aggregate in the existing PCC pavement is Gravel, Crushed Gravel or Crushed Rock.

The in place loops will be removed with the PCC pavement and will become the property of the Contractor. All costs associated with removing the in place loops shall be incidental to the price for "Remove Concrete Pavement".

**TABLE OF CONCRETE PAVEMENT REMOVAL**

Location	Remove Concrete Pavement (SqYd)
I-29 Mainline	
Northbound Lanes Sta. 394+77 to Sta. 398+22	1,456.7
Southbound Lanes Sta. 393+70 to Sta. 397+15	1,918.7
Total:	3,375.4

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**ALKALI SILICA REACTIVITY**

Fine aggregate shall conform to Section 800.2.D Alkali Silica Reactivity (ASR) Requirements.

Below is a list of known fine aggregate sources and the average corresponding 14 day expansion values:

Source	Location	Expansion Value
Bachman	Winner, SD	0.335*
Bitterman	Delmont, SD	0.316*
Concrete Materials	Corson, SD	0.170
Croell	Quinn, SD	0.089
Emme Sand & Gravel	Oneil, NE	0.217
Fisher S&G - Vallery Pit	Nisland, SD	0.110
Fisher S&G	Rapid City, SD	0.092
Fisher S&G	Spearfish, SD	0.053
Fisher S&G	Wasta, SD	0.159
Fuchs	Pickstown, SD	0.275*
Higman	Akron, IA	0.198
Higman	Hudson, SD	0.187
Hilde	Madison, SD	0.116
Jensen	Herried, SD	0.276*
L.G. Everist	Brookings, SD	0.186
L.G. Everist	Hawarden, IA	0.166
L.G. Everist	Summit, SD	0.178
Morris	Blunt, SD	0.192
Morris - Richards Pit	Onida, SD	0.188
Myrl & Roys Paving- Nelson Pit	Sioux Falls, SD	0.156
Northern Concrete Agg.	Rauville, SD	0.113
Northern Concrete Agg.	Luverne, MN	0.133
Opperman - Gunvordahl Pit	Burke, SD	0.362*
Opperman - Cahoy Pit	Herrick, SD	0.307*
Opperman - Jones Pit	Burke, SD	0.321*
Opperman - Randall Pit	Pickstown, SD	0.239
Pete Lien & Sons	Creston, SD	0.158
Pete Lien & Sons	Oral, SD	0.129
Pete Lien & Sons	Wasta, SD	0.192
Thorpe Pit	Britton, SD	0.098
Wagner Building Supplies	Pickstown (Wagner), SD	0.241
Winter Brothers- Whitehead Pit	Brookings, SD	0.197

\* These sources will require Type V cement in the concrete mix design and Class F (Modified) fly ash as specified.

The Department will use the running average of the last three known expansion test results or less for determining acceptability of source and the required Type of cement. These expansion results are reported in the preceding table. Additional testing, when requested by the Contractor, will be performed by the Department at the Contractor's expense.

The values listed in the table are intended for use in bidding. If a previously tested pit by SDDOT with acceptable test values (less than 0.250) is discovered after letting to require Type V cement (greater than 0.250) the Department will accept financial responsibility for the change from Type II to Type V cement.

Type II or Type V cement will not change the requirement for the fly ash. The cost for either type of cement shall be subsidiary to the contract item.

**10.5" NONREINFORCED PCC PAVEMENT**

The fine aggregate may require screening as determined by the Engineer.

Fine aggregate shall conform to Section 800.2.D Alkali Silica Reactivity (ASR) Requirements of the specifications.

The concrete used in the Portland Cement Concrete Pavement shall conform to section 380, shall contain a minimum of 600 lbs of cement and fly ash at 20%. The concrete shall contain at least 55% coarse aggregate. The use of a water reducer at manufacturer's recommendations will be required. The concrete shall obtain 4,000 psi at 28 days. The contractor is responsible for the mix design used. The contractor shall submit a mix design for approval at least 2 weeks prior to use.

Formed and Slipformed paving methods will be allowed. No tinning of the PCC pavement will be required due to the surface grinding being performed after paving. Surface smoothness checks will not be done until after the grinding PCC Pavement has been completed. The surface of the mainline and shoulder paving shall be finished with a heavy carpet drag only.

There will be no direct payment for trimming of the base course for PCC pavement. In lieu of an automatic subgrader operating from a preset line, a motor grader or other suitable equipment may be used to bring the base course to final grade prior to placement of concrete.

Automatic dowel bar inserters will not be allowed on this project.

A construction joint will be sawed whenever new concrete pavement is placed adjacent to existing concrete pavement.

The median and outside shoulders may be poured monolithic with the mainline pavement. The shoulder slope of 0.04 foot per foot must be maintained for the outside shoulder and 0.02 foot per foot must be maintained for the median shoulder. The shoulder slopes shall transition to 0.03 foot per foot as noted in the Typical Surfacing Sections.

If the shoulders are poured monolithic with the mainline pavement a sawed joint with tie bars will be constructed between the mainline pavement and the shoulders.

The transverse contraction joints shall be perpendicular to the centerline as detailed in the standard plates 380.01 and 380.08. In multilane areas the transverse contraction joints shall be perpendicular to the centerline and be in a straight line across the width of the pavement. In special situations the Engineer may pre-approve transverse contraction joints that do not meet these requirements. All nonconforming transverse contraction joints that are not pre-approved shall be removed at the Contractor's expense. Any method of placement that cannot produce these requirements shall not be allowed to continue.

In addition to traditional field inspection of reinforcement, a Ground Penetrating Radar (GPR) unit may be used to verify reinforcement locations in the hardened concrete. The GPR may be used anytime prior to the Acceptance of Field Work being issued. All costs related to corrective measures, including but not limited to concrete removal or cutting of reinforcement, price deducts, and delays to the project schedule shall be the responsibility of the Contractor.

Rumble Strips shall be constructed a minimum of 1 foot wide, 6 inches from the outside edge of the driving lane. Payment for constructing rumble strips including labor, materials and incidentals shall be incidental to the contract unit price per mile for "GRIND 12" RUMBLE STRIP OR STRIPE IN PCC PAVEMENT".

**TABLE OF PCC PAVEMENT**

Location (Including shoulders)	10.5 Inch Nonreinforced PCC Pavement (SqYd)
Northbound Lanes Sta. 394+77 to Sta. 398+22	1,456.6
Southbound Lanes Sta. 393+70 to Sta. 397+15	1,456.6
Total:	2,913.2

**GRINDING PCC PAVEMENT**

Grinding of the PCC pavement shall be done on the Weigh-In-Motion System located at Sta. 394+92 to Sta. 398+07 Northbound Lanes and Sta. 393+85 to Sta. 397+00 Southbound Lanes. The Contractor shall grind the concrete roadway with a minimum width 48-inch grinder to ensure that the roadway meets ASTM E 1318-09 requirements.

The Contractor shall establish a positive means for the removal of the grinding and/or grooving residue. Solid residue shall be removed from the pavement surfaces before being blown by traffic action or wind. Residue shall not be permitted to flow across lanes used by public traffic. Residue shall be disposed of in a manner that will prevent residue, whether in solid or slurry form, from reaching any waterway in a concentrated state.

The Contractor shall satisfactorily remove grinding material or wastes prior to returning traffic to the roadway. If a significant amount of residue remains after grinding, the Engineer may require flushing be done in a manner and in sufficient quantity to assure that liquids, solids, or other materials produced by the pavement grinding is not deposited on vehicles. The Contractors proposed method of flushing the roadway should produce acceptable results, which will be based on a driving surface that will not create a nuisance for the public. All costs for flushing roadway shall be incidental to the contract unit price per square yard for "Grinding PCC Pavement".

Residue may continuously flow on adjacent vegetated roadway slopes or ditches within the right-of-way. A flexible drag hose shall be attached to the discharge end of the slurry pipe to minimize splashing of slurry placed on roadway slopes or ditches.

If the Engineer determines that the slurry is going to enter a waterway, drainage facility, or curb & gutter section, the slurry shall be placed in storage tanks and deposited in settling basins, spread over flat vegetated areas, or filtered by other means approved by the Engineer at no additional cost.

**TABLE OF GRINDING PCC PAVEMENT**

Location	Length (Ft)	Width (Ft)	Area (SqYd)
Weigh-In-Motion System			
Northbound Lanes			
Sta. 394+92 to Sta. 398+07	315	24	840.0
Southbound Lanes			
Sta. 393+85 to Sta. 397+00	315	24	840.0
Total:			1,680.0

**JOINT SEALANT**

Transverse joints shall be sealed with Low Modulus Silicone Sealant.

**TIE BARS AND LONGITUDINAL JOINTS**

The use of automatic tie bar inserters will only be allowed on the vertical edge of longitudinal construction joints. The use of automatic tie bar inserters will not be allowed on sawed longitudinal joints.

Tie bars shall be held in the specified position parallel to the slab surface and perpendicular to the centerline by a supporting device. Tie bars or tie bar baskets shall be securely staked to the roadbed and shall hold the bar at the correct spacing, alignment, and elevation. Tie bars shall be tied to at least one stake.

Tie bars will not require supports if inserted into the side of the pavement during slip form paving of the longitudinal construction joint operation. Failure to acquire the correct tie bar locations or position in the construction joint shall require the bars to be corrected and a change made to the operation which may include drilling and epoxy bars or other methods as approved by the engineer.

The final position of each tie bar shall be within the following tolerances:

-- Vertical Placement:  $\pm T/6$  for any part of the tie bar (T = slab thickness)

-- Transverse Placement (side shift):  $\pm 3$  inches when measured perpendicular to the longitudinal joint line

If the tie bar does not meet the requirements and tolerances specified, corrective action shall be performed at the Contractor's expense to the satisfaction of the Engineer.

**STEEL BAR INSERTION**

The Contractor shall insert the Steel Bars (1 1/2 inch x 18 inch epoxy coated plain round dowel 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.

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

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. Holes drilled into the existing concrete pavement shall be located at mid-depth of the slab and true and normal. 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.

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 manufacturer's 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 1/3 to 1/2 full of epoxy, or as recommended by the manufacturer, prior to insertion of the steel bar. Care shall be taken to prevent epoxy from running out of the horizontal holes prior to steel bar insertion. Rotate the steel bar during insertion to eliminate voids and ensure complete bonding of the bar. Insertion of the bars by the dipping method will not be allowed.

Cost for the epoxy resin adhesive, steel bars, drilling of holes, applying the adhesive, inserting the steel bars into the drilled holes and all other items incidental to the insertion of the steel bars shall be incidental to the contract unit price per each for INSERT STEEL BAR IN PCC PAVEMENT.

Epoxy coated plain round steel bars shall be inserted on 12 inch centers in the transverse joint.

The first steel bar shall be placed a minimum of 3 inches and a maximum of 6 inches from the outside edge of the slab.

**TABLE OF STEEL BAR INSERTION**

LOCATION	1-1/2" x 18" Plain Round Dowel Bars
Mainline NBL	
Sta. 394+77	24
Sta. 398+22	24
Mainline SBL	
Sta. 393+70	24
Sta. 397+15	24
<b>Total:</b>	<b>96</b>

**TABLE OF DOWEL BARS**

Location	1 1/2" Bars
Mainline NBL	
Bars in Mainline	836
Mainline SBL	
Bars in Mainline	836
<b>Total Dowel Bars:</b>	<b>1,672</b>

**CONTROL OF ACCESS**

If a Contractor's operations would require access to the ROW in any locations not currently designated as public access, prior approval must be obtained from the Department. All requests will be reviewed on the basis of safety and construction sequencing. A Contractor shall not assume that all requests will be granted.

The Contractor shall be responsible for all safety control and signing measures.

The request for access shall be provided in writing to the Project Engineer two weeks in advance of any proposed break in control of access.

**REMOVE AND REPLACE TOPSOIL**

Prior to beginning resurfacing operations, a 4" depth of topsoil shall be bladed down the respective inslopes and left in a windrow 16'+/- from the subgrade shoulder on both sides of the roadway. Following completion of resurfacing operations, topsoil shall be bladed back up the inslope to the point indicated on the typical section.

The estimated amount of topsoil to be removed and replaced is 270 CuYd.

All cost associated with removing and replacing the topsoil along areas to be resurfaced shall be incidental to the lump sum price for "Remove and Replace Topsoil".

**EROSION CONTROL**

Fertilizing, mycorrhizal inoculum, permanent seeding, and mulching shall be paid at the lump sum price for "Erosion Control". The estimated area to seed and fertilize is 21,780 SqFt.

**FERTILIZING**

The Contractor shall apply an all-natural slow release fertilizer prior to seeding or placing sod. The all-natural fertilizer shall have a minimum guaranteed analysis of 4-6-4 and be USDA Certified BioBased. It should provide a minimum of 4% (N) nitrogen with a minimum water insoluble nitrogen (WIN) fraction of 3.2%, a minimum of 6% (P2O5) available phosphate, a minimum of 4% (K2O) soluble potash, and a maximum carbon to nitrogen ratio (C:N ratio) of 5:1. The all-natural fertilizer shall be free of weed-seed and pathogens accomplished through thermophilic composting, and not mechanical or chemical sterilization, to assure presence of beneficial soil microbiology. The fertilizer shall have a near neutral pH, a low salt index, a low biological oxygen demand, contain organic humic and fulvic acids, and have high aerobic organism counts. The fertilizer shall also be stable, free of bad odors, and be unattractive as a food source for animals. It should also be in a granular form that is easily spread.

The all-natural slow release fertilizer shall be applied according to the manufacturer's application recommendations.

The application rate is 1,000 pounds per acre.

The all-natural slow release fertilizer shall be from the list below or an approved equal:

<u>Product</u>	<u>Manufacturer</u>
Sustane	Sustane Corporate Headquarters Cannon Falls, Minnesota Phone: 1-800-352-9245 <a href="http://www.sustane.com/">http://www.sustane.com/</a>

**DRILLS**

In addition to the drills specified in Section 730 of the specifications, other types of drills including no-till drills will be allowed as long as they have baffles, partitions, agitators, or augers which keep the seed distributed throughout the seed box and the seed is planted at a depth of 1/4" to 1/2".

**MYCORRHIZAL INOCULUM**

Mycorrhizal inoculum shall consist of mycorrhizal fungi spores and mycorrhizal fungi-infected root fragments in a solid carrier. The carrier may include organic materials, calcinated clay, or other materials consistent with application and good plant growth. The supplier shall provide certification of the fungal species claimed and the live propagule count. The inoculum shall include the following fungal species:

<i>Glomus intraradices</i>	25%
<i>Glomus aggregatu</i>	25%
<i>Glomus mosseae</i>	25%
<i>Glomus etunicatum</i>	25%

All seed shall be inoculated by the seed supplier with a minimum of 100,000 live propagules of mycorrhizal fungi per acre. All costs of inoculating the seed shall be incidental to the contract lump sum price for "Erosion Control".

The mycorrhizal inoculum shall be from the list below or an approved equal:

<u>Product</u>	<u>Manufacturer</u>
MycoApply	Mycorrhizal Applications, Inc. Grants Pass, OR Phone: 1-866-476-7800 <a href="http://www.mycorrhizae.com/">http://www.mycorrhizae.com/</a>

**PERMANENT SEEDING**

The areas to be seeded consist of all newly graded areas within the project limits except for the top of roadways and temporary easements under cultivation.

All permanent seed shall be planted in the topsoil at a depth of ¼” to ½”.

All seed broadcast must be raked or dragged in (incorporated) within the top ¼” to ½” of topsoil when possible. This requirement may be waived by the Engineer during construction when raking or dragging is deemed not feasible by conventional methods.

The varieties listed for seed mixtures are preferred varieties.

Native harvest seed will be allowed.

Type C Permanent Seed Mixture shall consist of the following:

Grass Species	Variety	Pure Live Seed (PLS) (Pounds/Acre)
Western Wheatgrass	Flintlock, Rodan, Rosana	16
Canada Wildrye	Mandan	2
Total:		18

**MULCHING (GRASS HAY OR STRAW)**

Bales with noxious weed contamination will be rejected and the Contractor will be required to remove the contaminated bales from the project.

**EROSION CONTROL WATTLE**

Erosion control wattles for restraining the flow of runoff and sediment shall be installed at locations determined by the Engineer during construction, such as around pipe inlets, in channels to reduce erosion and capture sediment, and on steep slopes. Refer to Standard Plate 734.06 for details.

The Contractor shall provide certification that the erosion control wattles do not contain noxious weed seeds.

Erosion control wattles shall remain on the project to decompose.

The erosion control wattle provided shall be from the approved product list. The approved product list for erosion control wattle may be viewed at the following internet site:

<http://sddot.com/business/certification/products/Default.aspx>

**TABLE OF GUARDRAIL AND RELATED ITEMS**

Location	Remove 3 Cable Guardrail	Remove 3 Cable Guardrail Anchor Assembly	Remove 3 Cable Guardrail Slip Base Anchor Assembly	3 Cable Guardrail	3 Cable Guardrail intermediate Post	3 Cable Guardrail Anchor Assembly	3 Cable Guardrail Slip Base Anchor Assembly	Comments
SBL	(Ft)	(Each)	(Each)	(Ft)	(Each)	(Each)	(Each)	
Weigh-in-Motion Site Sta. 395+95								
Outside Shoulder	340	2	0	364	6	2	0	Remove and Replace Guardrail
Median Shoulder	250	0	2	296	3	0	2	Remove and Replace Guardrail
<b>TOTALS:</b>	590	2	2	660	9	2	2	

**TABLE OF ADDITIONAL QUANTITIES**

LOCATION	WATER FOR GRANULAR MATERIAL	BASE COURSE
	(MGal)	(Ton)
Northbound Lanes Sta. 394+77 to Sta. 398+22	33.2	2,768.9
Southbound Lanes Sta. 393+70 to Sta. 397+15 including Guardrail Embankment	41.2	3,434.4
Totals:	74.4	6,203.2

# TYPICAL SURFACING SECTIONS

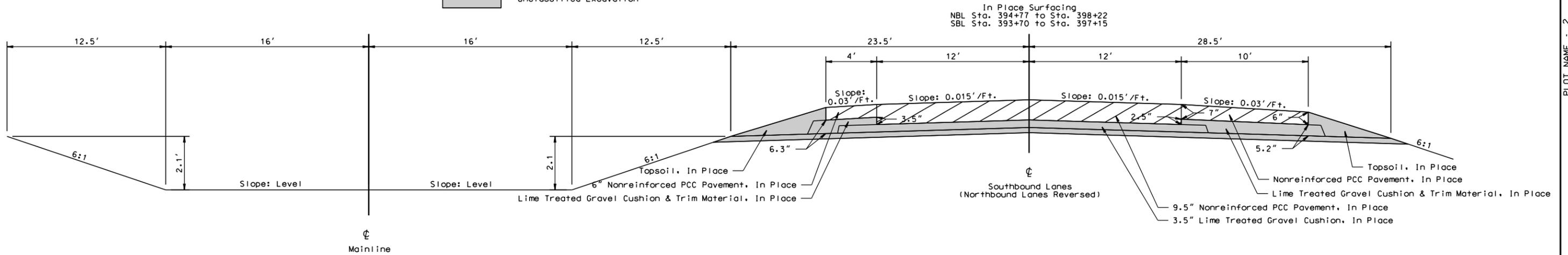
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Plotting Date: 04/17/2014

PLOT SCALE - 1" = 7.74123'

PLOT NAME - 2

-  Remove Concrete Pavement
-  Unclassified Excavation



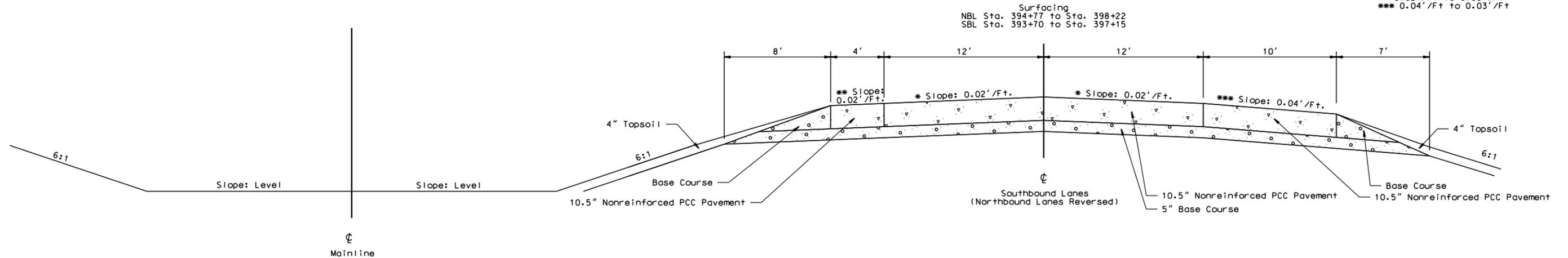
**Cross Slope Transitions**

NBL  
 Sta. 394+77 to Sta. 394+92  
 \* 0.015'/Ft. to 0.02'/Ft.  
 \*\* 0.03'/Ft. to 0.02'/Ft.  
 \*\*\* 0.03'/Ft. to 0.04'/Ft.

Sta. 398+07 to Sta. 398+22  
 \* 0.02'/Ft. to 0.015'/Ft.  
 \*\* 0.02'/Ft. to 0.03'/Ft.  
 \*\*\* 0.04'/Ft. to 0.03'/Ft.

SBL  
 Sta. 393+70 to Sta. 393+85  
 \* 0.015'/Ft. to 0.02'/Ft.  
 \*\* 0.03'/Ft. to 0.02'/Ft.  
 \*\*\* 0.03'/Ft. to 0.04'/Ft.

Sta. 397+00 to Sta. 397+15  
 \* 0.02'/Ft. to 0.015'/Ft.  
 \*\* 0.02'/Ft. to 0.03'/Ft.  
 \*\*\* 0.04'/Ft. to 0.03'/Ft.



**Note:**  
 The Unclassified Excavation and the 5" of Base Course shown in the Typical Sections is a minimum. There will be additional stair-stepped excavation within these limits (Up to 4.5' at WIM site) in order to provide a stable base and to install the Weigh-In-Motion equipment. (See Profile Details)

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# PCC PAVEMENT JOINT LAYOUT

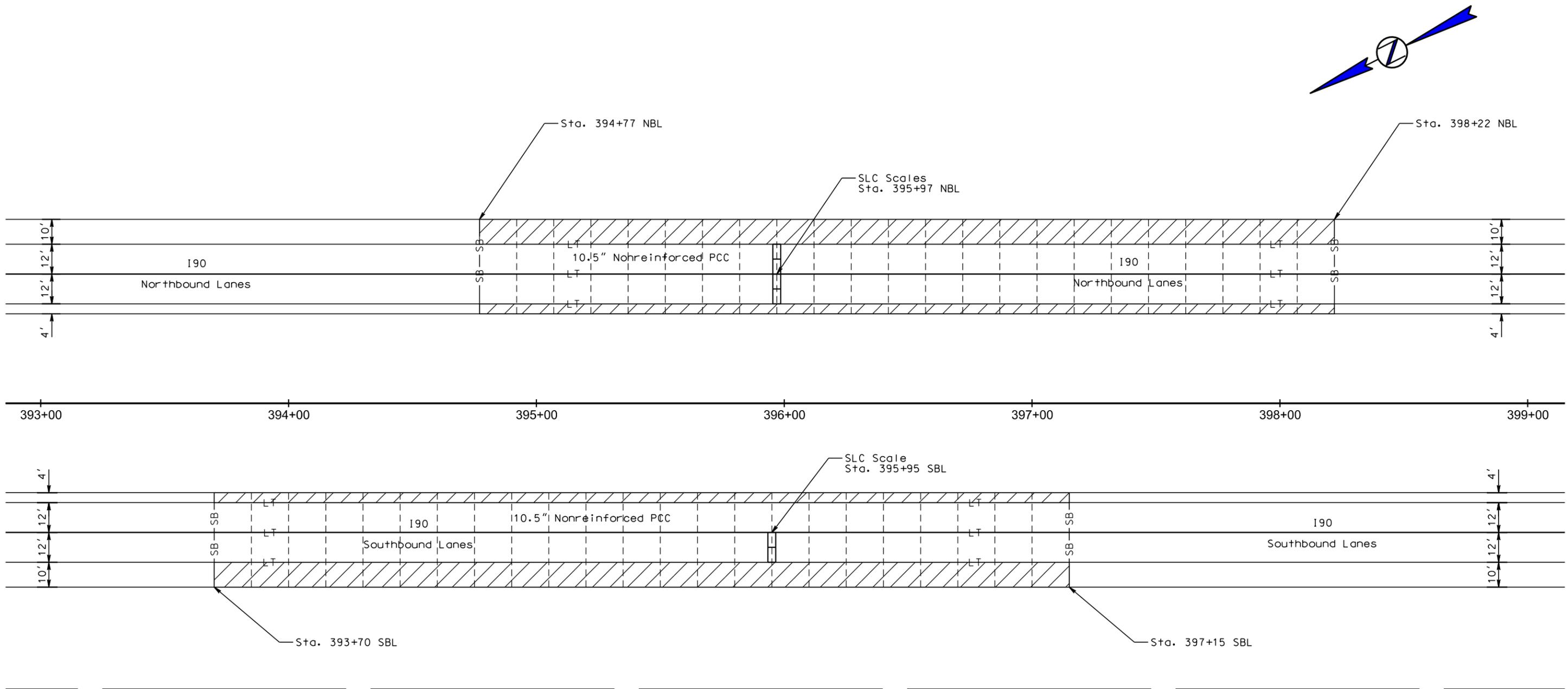
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
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Scale 1 Inch = 40 Feet  
Sheet 1 of 1 Sheets

PLOT SCALE - 1:40

PLOT NAME - 3



**LEGEND:**

- Longitudinal Joint Without Tie Bars (Construction or Sawed) ——— L ——— L ———
- Longitudinal Joint With Tie Bars (Construction or Sawed) ——— LT ——— LT ———
- Transverse Contraction Joint ——— - - - - -
- Steel Bar Installation in Longitudinal or Transverse Joint ——— SB ——— SB ———

Transverse contraction joints within these areas shall not have dowel bar assemblies. All other transverse contraction joints shall have dowel bar assemblies.

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# CONSTRUCTION PHASE LAYOUTS

## Southbound Lanes

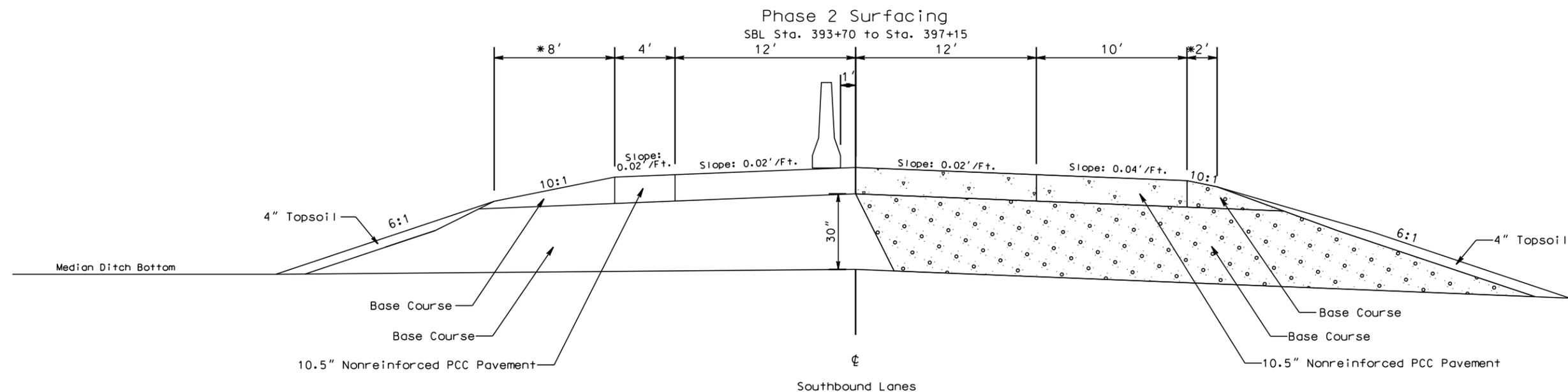
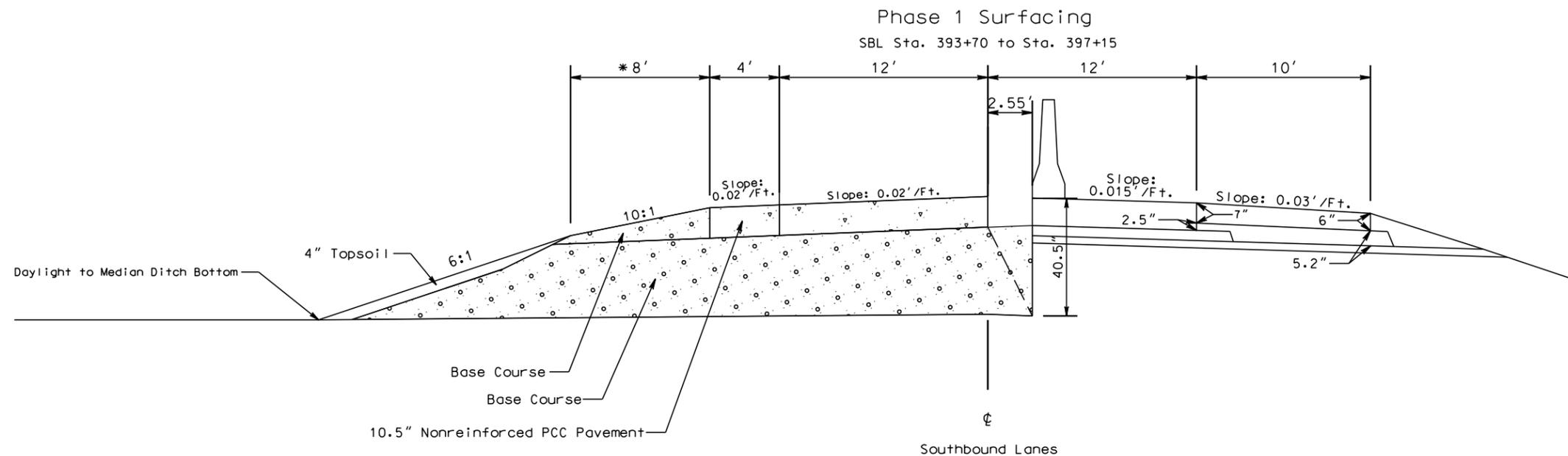
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\* See Additional Embankment for Guardrail Layouts for limits

PLOT SCALE - 1" = 7.74121'

PLOT NAME - 4



PLOTTED FROM - TRPR18387

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# CONSTRUCTION PHASE LAYOUTS

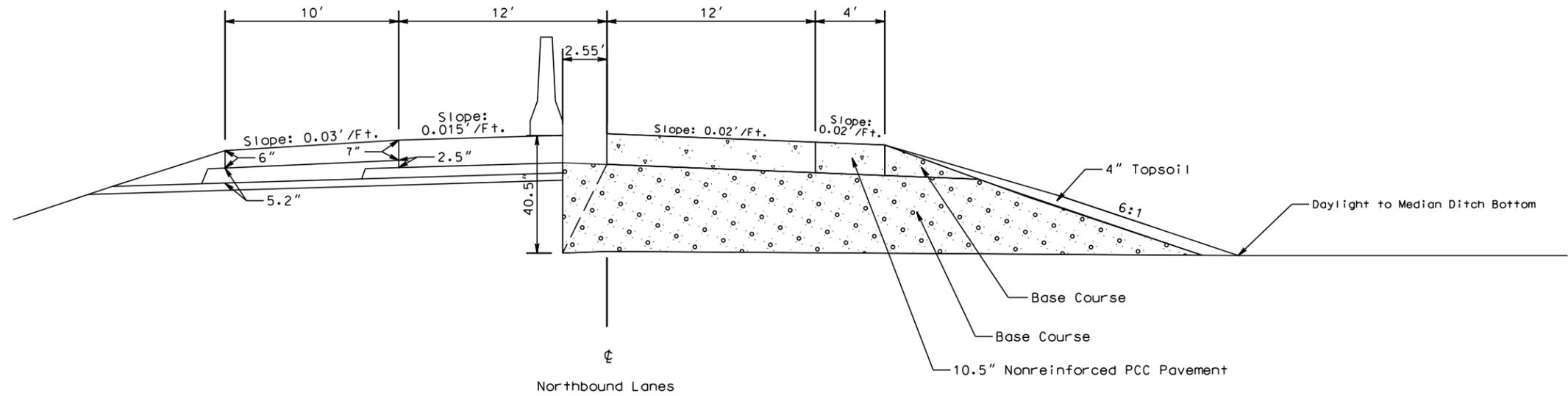
STATE OF SOUTH DAKOTA	PROJECT	SHEET NO.	TOTAL SHEETS
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Plotting Date: 04/17/2014

## Northbound Lanes

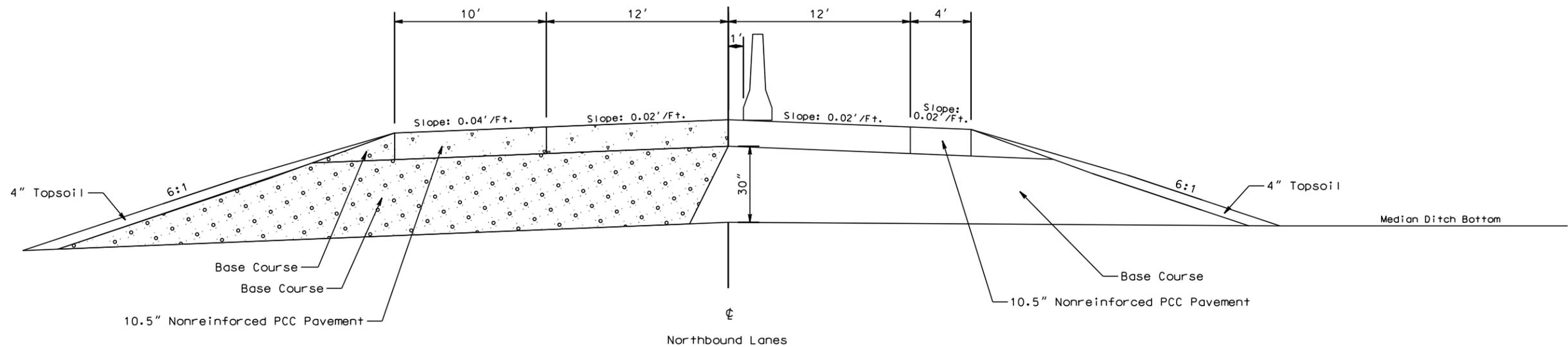
### Phase 1 Surfacing

NBL Sta. 394+77 to Sta. 398+22



### Phase 2 Surfacing

NBL Sta. 394+77 to Sta. 398+22



PLOT SCALE - 1/4" = 1'-0"

PLOTTED FROM - TRPR18387

PLOT NAME - 5

FILE - ... \PRJ\ROBT04UK\PHASE LAYOUTS.DGN

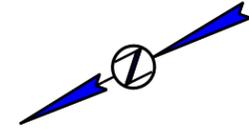


# CONSTRUCTION PROFILE DETAILS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0299(74)235	F12	F27

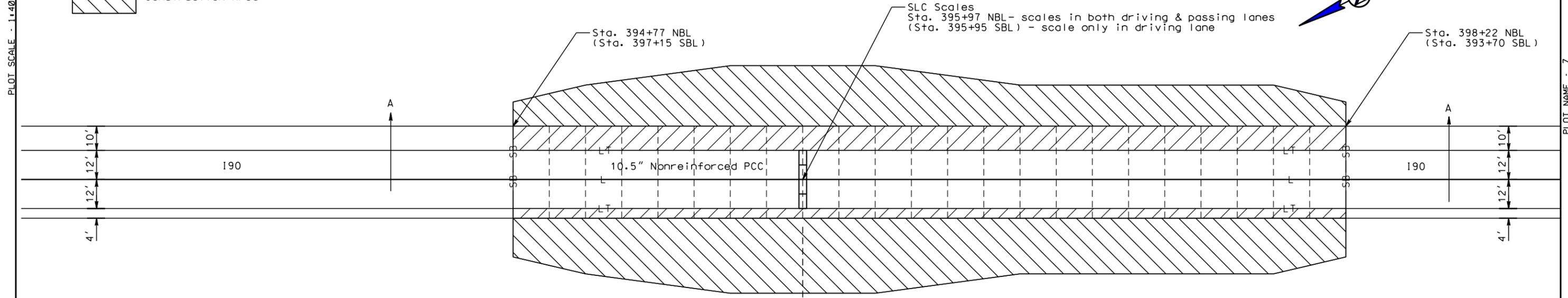
Plotting Date: 04/17/2014

Scale 1 Inch = 40 Feet  
Sheet 1 of 1 Sheets

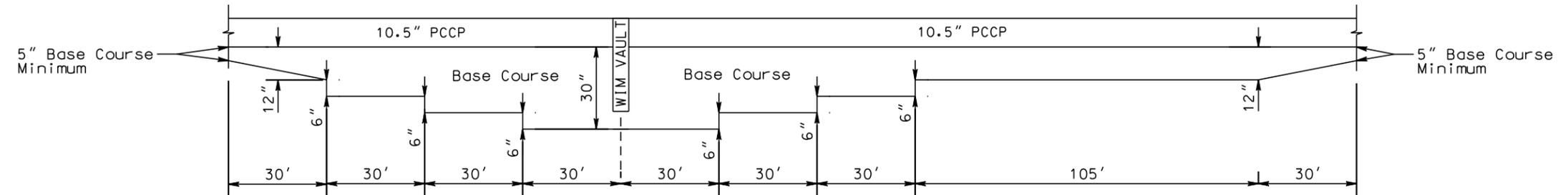


PLOT SCALE - 1:40

PLOT NAME - 7



**Note:**  
The top 6" of subgrade will be compacted after excavation in accordance with Section 210.3 B prior to placement of the granular material.



Section A-A

Northbound Lanes Shown  
(Southbound Lanes Reversed)

PLOTTED FROM - IRPR18387

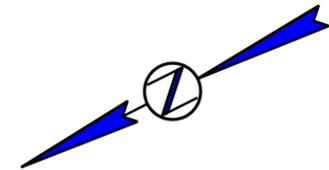
FILE - ... \EXCAVATION PROFILE DETAIL.DGN

# GUARDRAIL LAYOUT

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0299(74)235	F13	F27

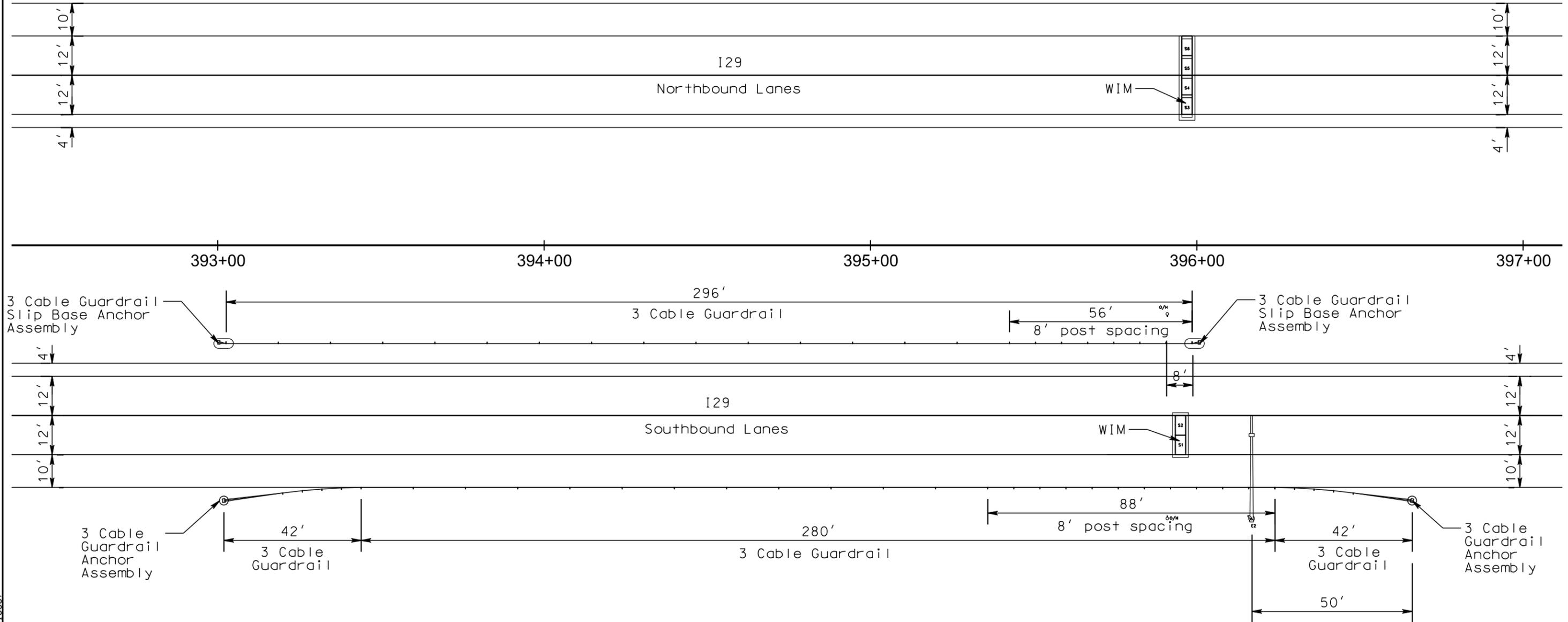
Plotting Date: 04/17/2014

Scale 1 Inch = 30 Feet  
Sheet 1 of 1 Sheets



PLOT SCALE - 1:30

PLOT NAME - 8



PLOTTED FROM - IRPR18387

FILE - ... \ROBT04UK\GUARDRAIL LAYOUTS.DGN

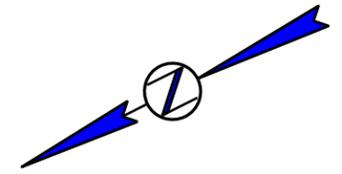
# ADDITIONAL EMBANKMENT FOR GUARDRAIL

STATE OF SOUTH DAKOTA	PROJECT IM 0299(74)235	SHEET F14	TOTAL SHEETS F27
-----------------------	---------------------------	--------------	---------------------

Plotting Date: 04/17/2014

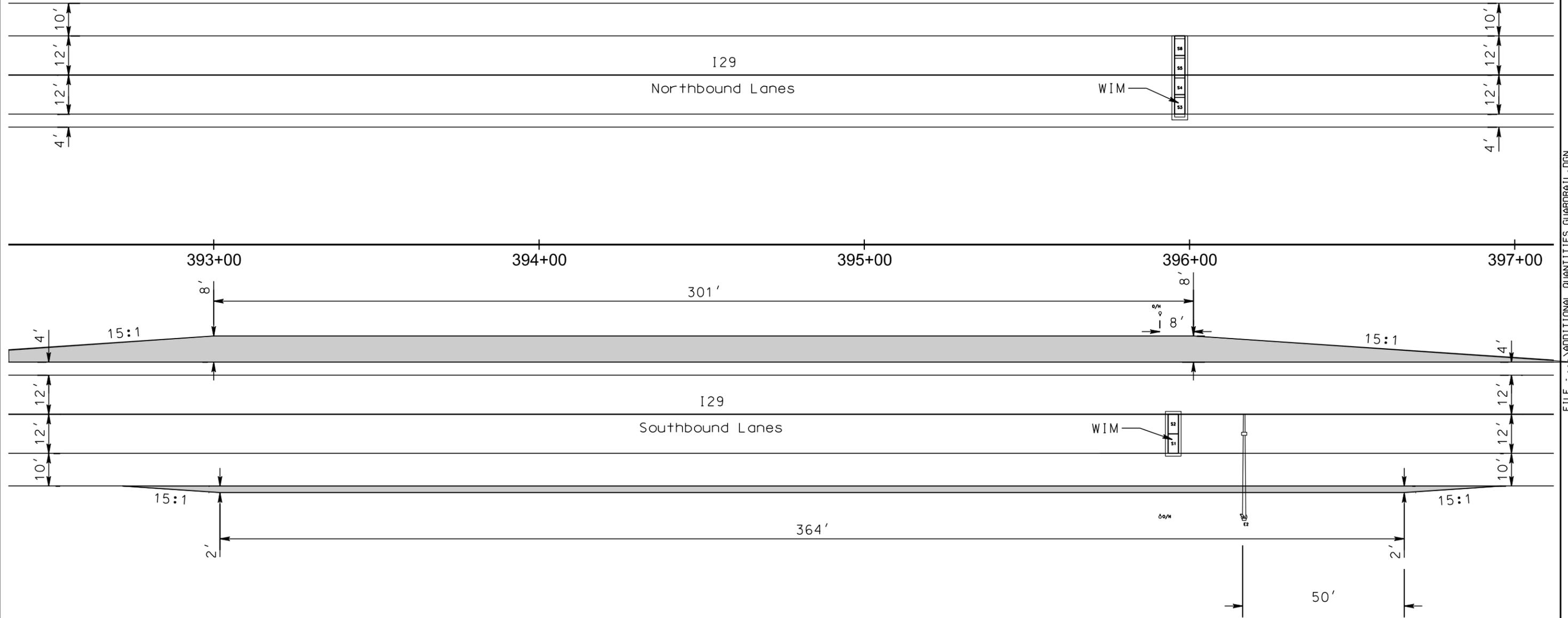
Scale 1 Inch = 30 Feet  
Sheet 1 of 1 Sheets

Area to be Surfaced with Base Course  
 (Depth adjacent to edge of shoulder = 10.5")  
 Surfacing Cross Slope, 10:1 or flatter



PLOT SCALE - 1:30

PLOT NAME - 9



PLOTTED FROM - IRPR18387

FILE - ... \ADDITIONAL QUANTITIES GUARDRAIL.DGN

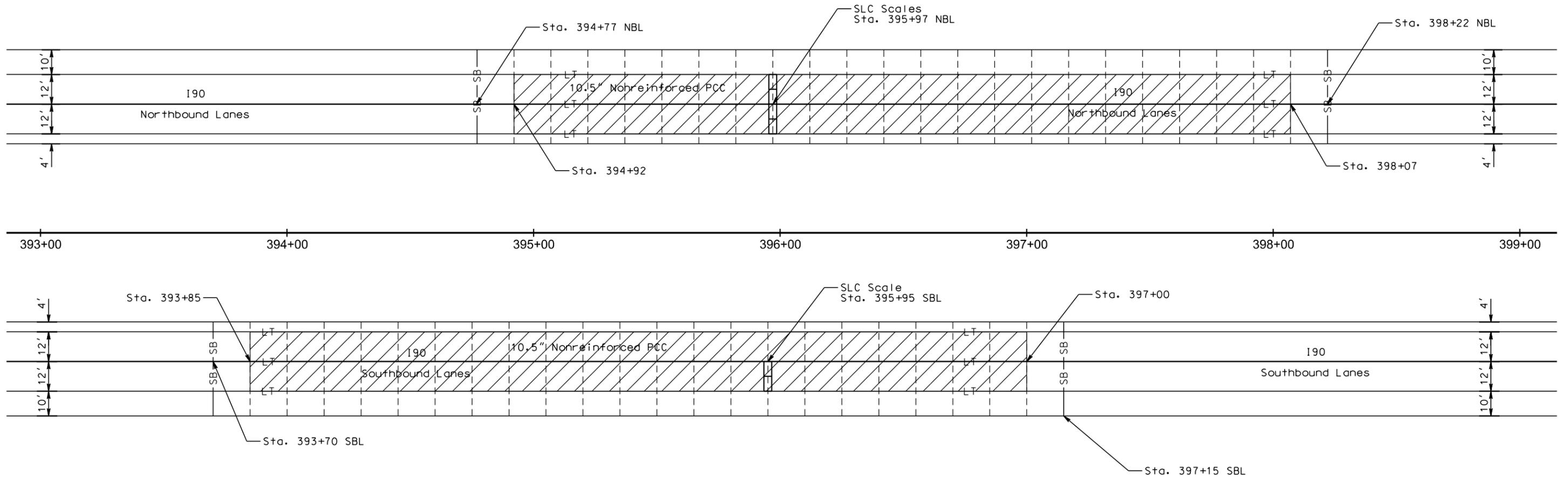
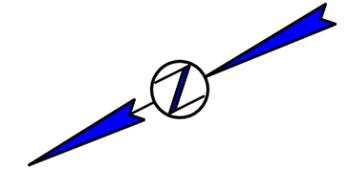
# GRINDING PCC PAVEMENT LAYOUT

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0299(74)235	F15	F27

Plotting Date: 04/17/2014

Scale 1 Inch = 40 Feet  
Sheet 1 of 1 Sheets

Note: See plan notes for grinding details



 PCC Pavement Grinding Limits

PLOT SCALE - 1:40

PLOT NAME - 10

FILE - ... \PCC GRINDING LAYOUT.DGN

PLOTTED FROM - TRPR18387

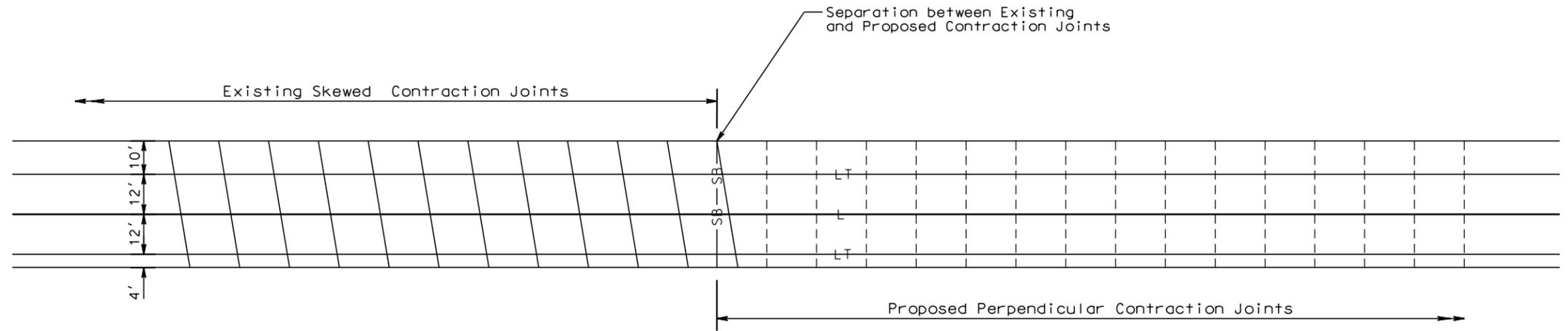
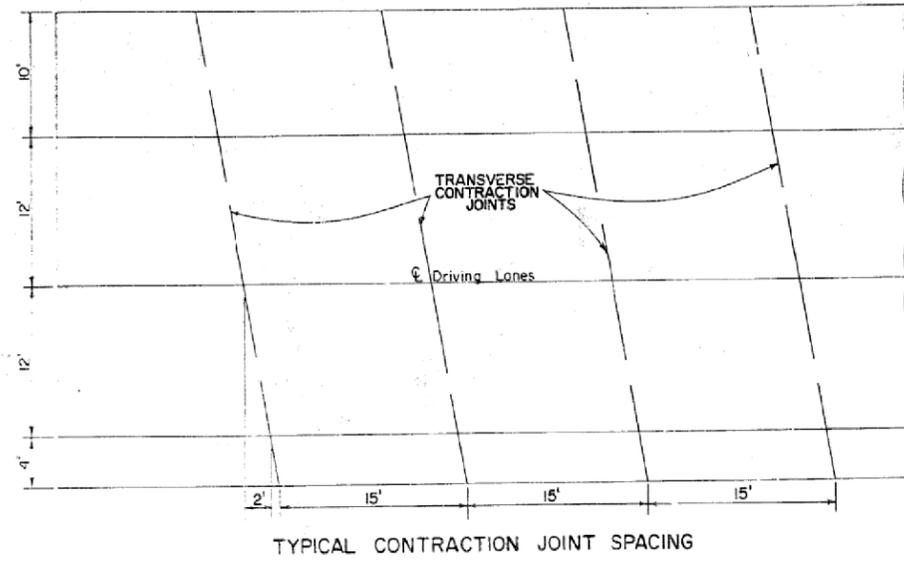
# JOINT TIE IN LAYOUT

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0299(74)235	F16	F27

Plotting Date: 04/17/2014

Scale 1 Inch = 40 Feet  
Sheet 1 of 1 Sheets

Original Contraction Joint Spacing Layout



PLOT SCALE - 1:40

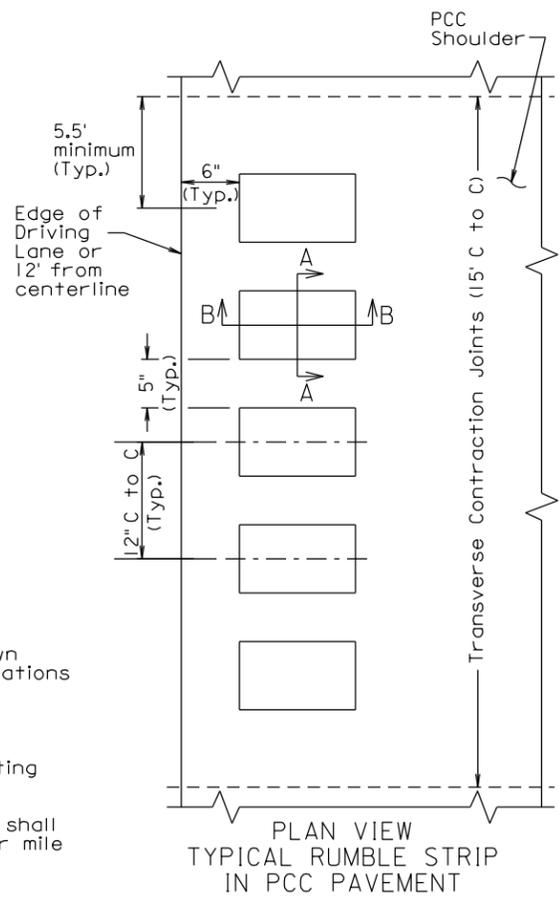
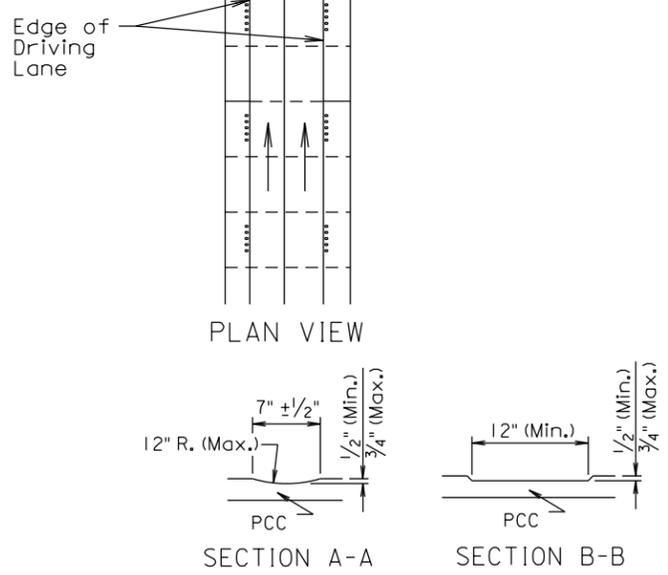
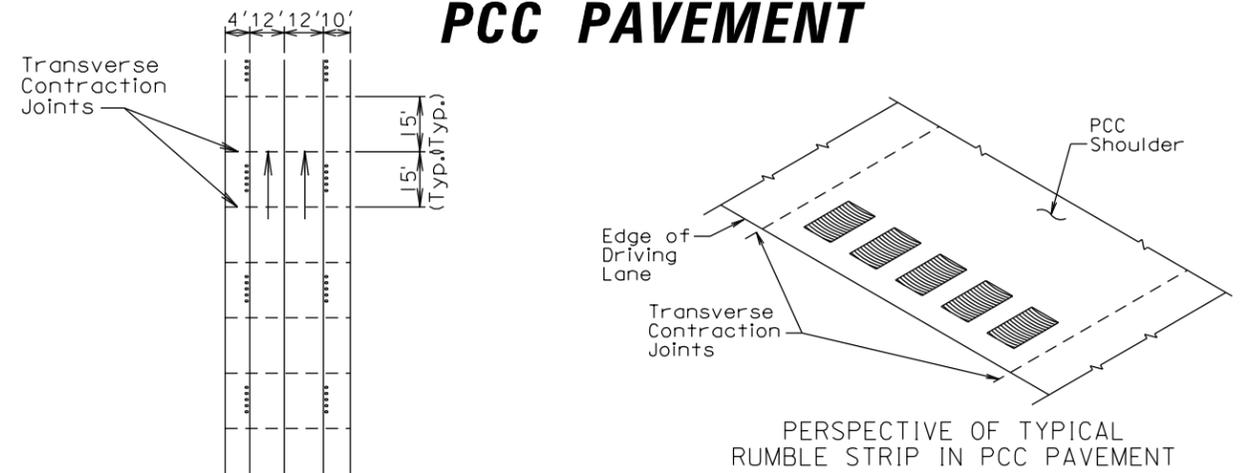
PLOT NAME - 11

FILE - ... \JOINT TIE IN LAYOUT.DGN

PLOTTED FROM - TRPR18387

# SPECIAL DETAILS

## 12" RUMBLE STRIP ON PCC PAVEMENT



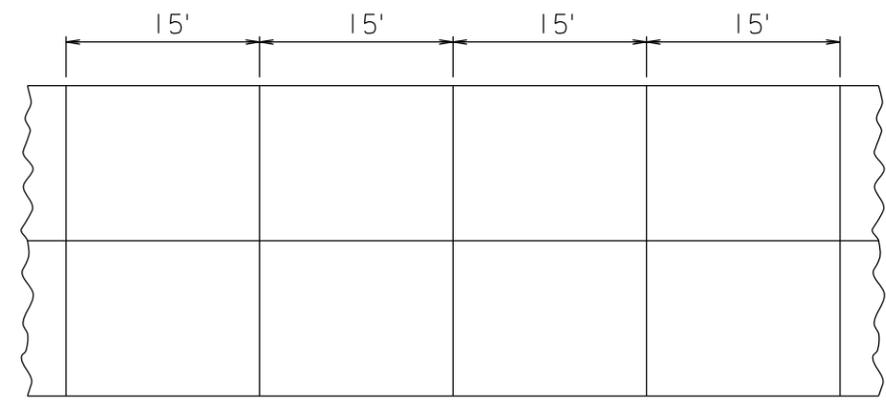
**GENERAL NOTES:**

A rumble strip shall be constructed as shown in the details by grinding continuous indentations in the PCC Pavement.

Prior to constructing the rumble strip the Contractor shall submit to the Engineer, for approval, the proposed method of constructing the rumble strip.

Payment for constructing the rumble strip shall be incidental to the contract unit price per mile for "GRIND 12" RUMBLE STRIP OR STRIPE IN PCC PAVEMENT"

## PCC PAVEMENT TRANSVERSE CONTRACTION JOINT SPACING



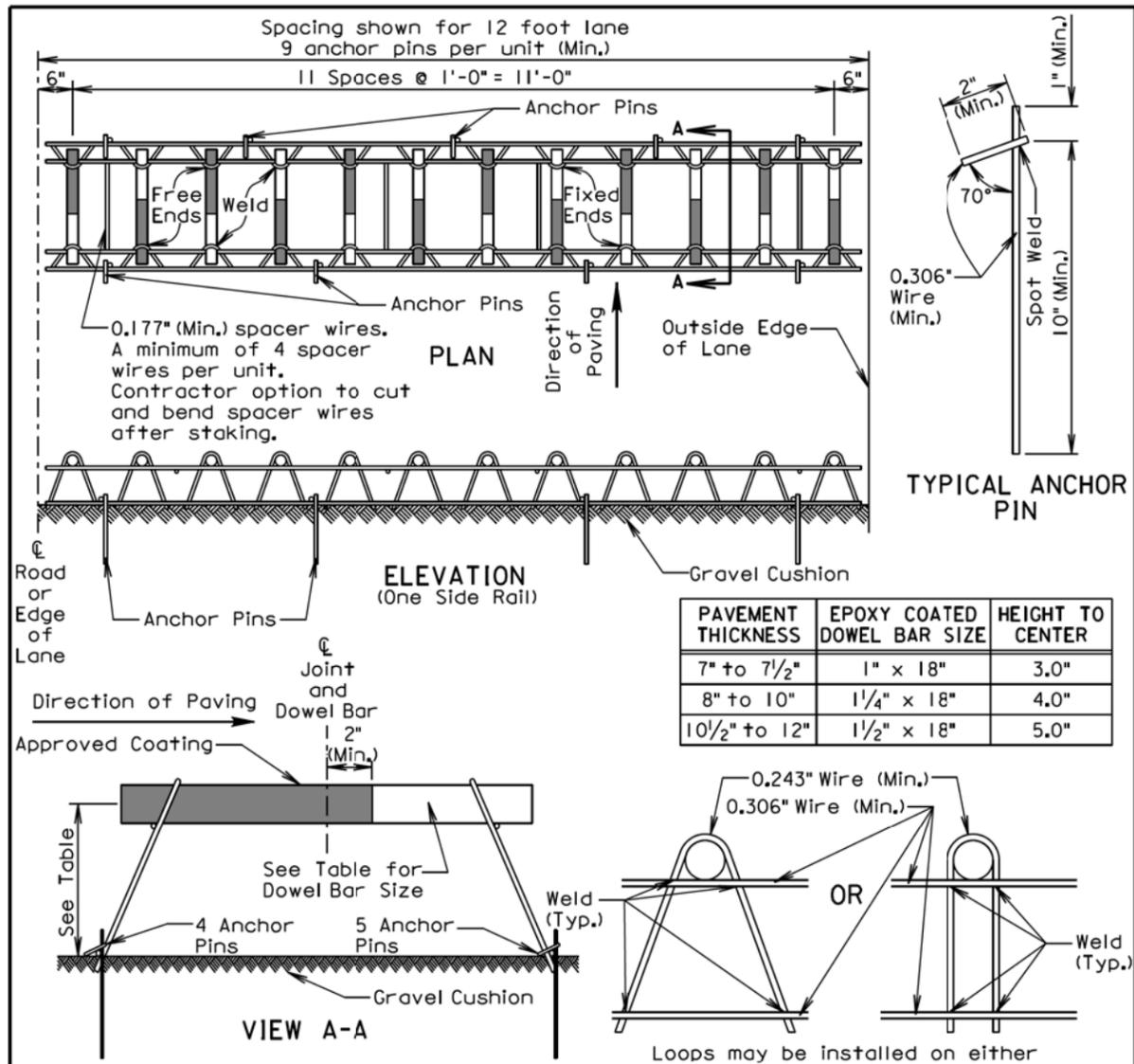
PLOT SCALE - 1:212.56

PLOTTED FROM - TRPR18387

PLOT NAME - 12

FILE - ... \ROBT04UK\SPECIAL DETAILS.DGN

Plotting Date: 04/17/2014



**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.

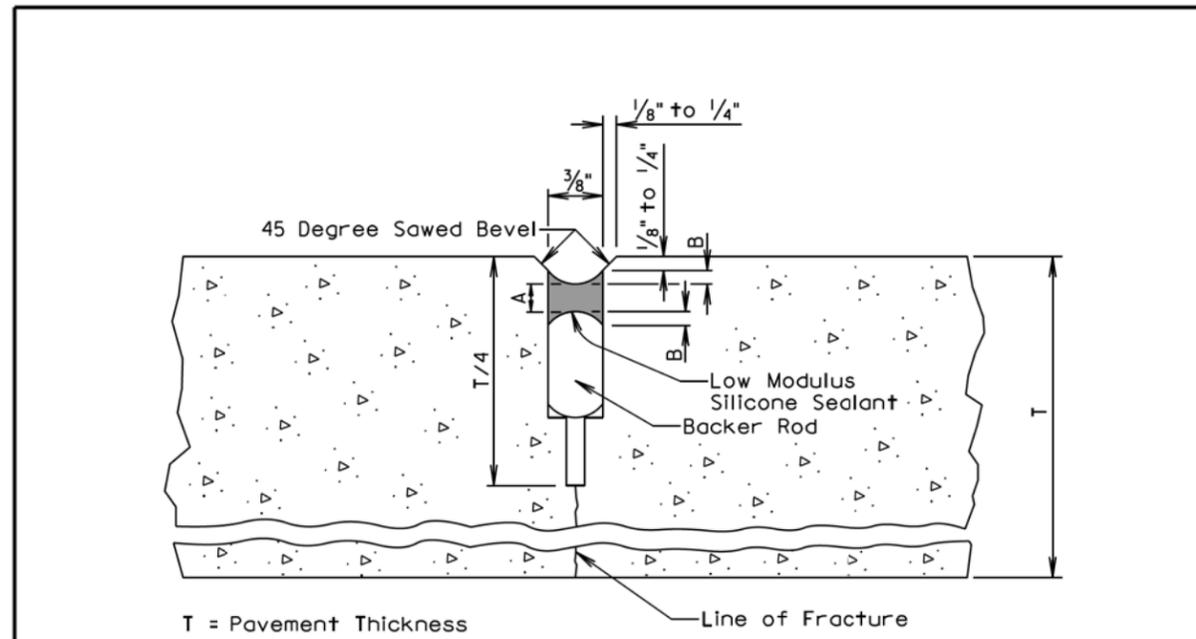
The transverse contraction joints shall be sawed perpendicular to the centerline of the roadway and the dowel bars shall be centered on the sawed joint  $\pm 1$  inch.

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

<b>S D D O T</b>	<b>PCC PAVEMENT DOWEL BAR ASSEMBLY FOR TRANSVERSE CONTRACTION JOINTS</b>	PLATE NUMBER <b>380.01</b>
	<b>12 Bar Assembly on Granular Base Material</b>	Sheet 1 of 1

Published Date: 1st Qtr. 2014



LOW MODULUS SILICONE SEALANT ALLOWABLE CONSTRUCTION TOLERANCES			
A (Min.) (In.)	A (Max.) (In.)	B (Min.) (In.)	B (Max.) (In.)
3/16	5/16	1/8	1/4

**GENERAL NOTES:**

The first saw cut to control cracking shall be a minimum of 1/4 the thickness of the pavement. Additional sawing for widening the saw cut to provide the width for the installation of the low modulus silicone joint sealant will be necessary.

The backer rod shall be a nonmoisture absorbing resilient material approximately 25% larger in diameter than the width of the joint to be sealed.

June 26, 2013

<b>S D D O T</b>	<b>PCC PAVEMENT BEVELED TRANSVERSE CONTRACTION JOINT WITH OR WITHOUT DOWEL BAR ASSEMBLY</b>	PLATE NUMBER <b>380.06</b>
	<b>12 Bar Assembly on Granular Base Material</b>	Sheet 1 of 1

Published Date: 1st Qtr. 2014

PLOT SCALE - 1:200

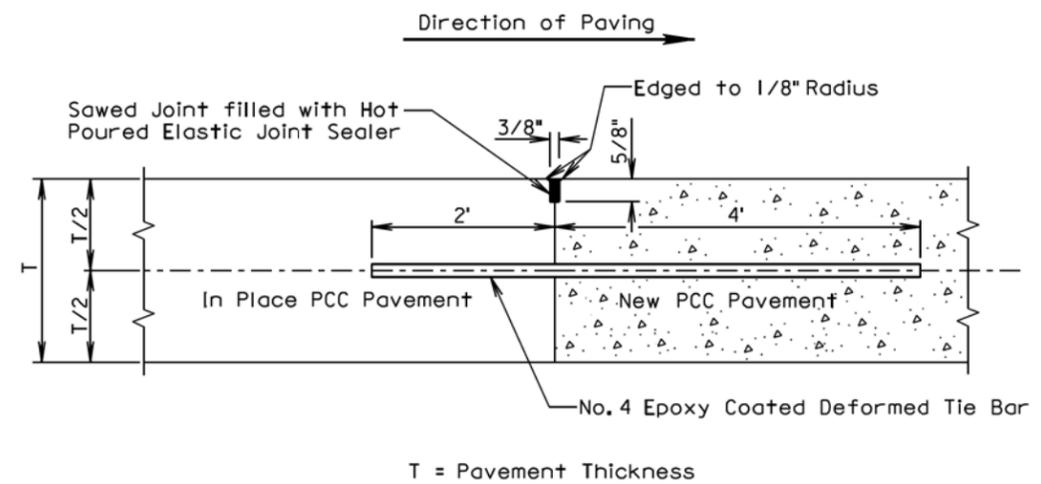
-PLOTTED FROM - TRPR18387

PLOT NAME - 13

FILE - ... \STANDARD PLATES\SP1.DGN

PLOT SCALE - 1:200

PLOT NAME - 14



T = Pavement Thickness

**GENERAL NOTES:**

No. 4 epoxy coated deformed tie bars shall be spaced 12 inches center to center and shall be a minimum of 3 inches and a maximum of 6 inches from the pavement edges.

The minimum distance between a transverse construction joint with tie bars and an adjacent transverse contraction joint shall be 5 feet.

When a transverse construction joint is made, paving will not be allowed in this area for 12 hours.

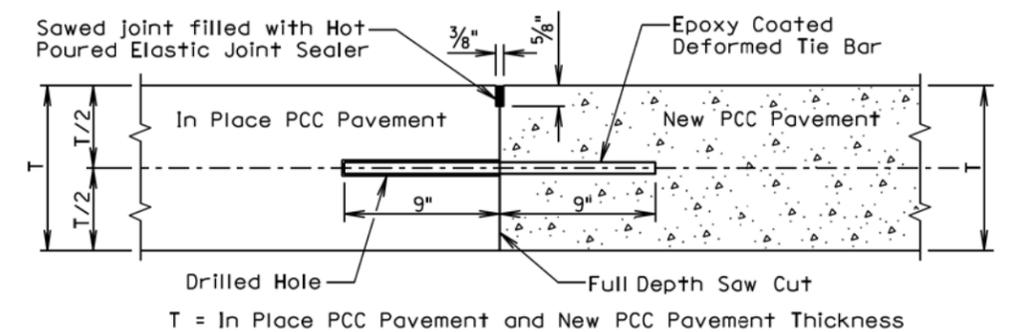
A transverse construction joint may be placed in lieu of the transverse contraction joint when shown in the plans.

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

June 26, 2013

<b>S D D O T</b>	<b>PCC PAVEMENT MID PANEL TRANSVERSE CONSTRUCTION JOINT</b>	PLATE NUMBER <b>380.07</b>
	<i>Published Date: 1st Qtr. 2014</i>	Sheet 1 of 1

**DETAIL A  
TRANSVERSE CONSTRUCTION JOINT WITH TIE BARS**



T = In Place PCC Pavement and New PCC Pavement Thickness

**GENERAL NOTES:**

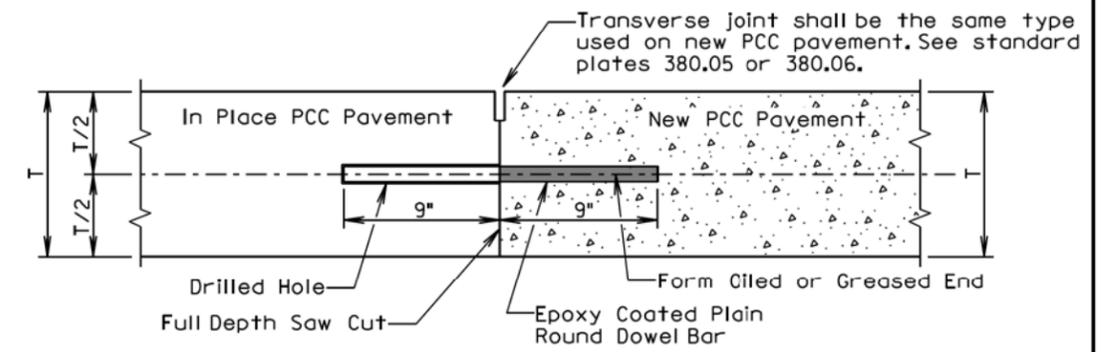
The term "In Place PCC Pavement" in the above drawing indicates that the in place PCC pavement was placed on a previous project.

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

The tie bars shall be embedded a minimum depth of 9 inches into the in place PCC pavement and anchored with an epoxy resin adhesive.

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

**DETAIL B  
TRANSVERSE CONSTRUCTION JOINT WITH DOWEL BARS**



T = In Place PCC Pavement and New PCC Pavement Thickness

**GENERAL NOTES:**

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

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

The plain round dowel bars shall be embedded a minimum depth of 9 inches into the in place PCC pavement and anchored with an epoxy resin adhesive.

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

September 6, 2013

<b>S D D O T</b>	<b>PCC PAVEMENT TRANSVERSE CONSTRUCTION JOINTS WITH TIE BARS OR DOWEL BARS</b>	PLATE NUMBER <b>380.08</b>
	<i>Published Date: 1st Qtr. 2014</i>	Sheet 1 of 2

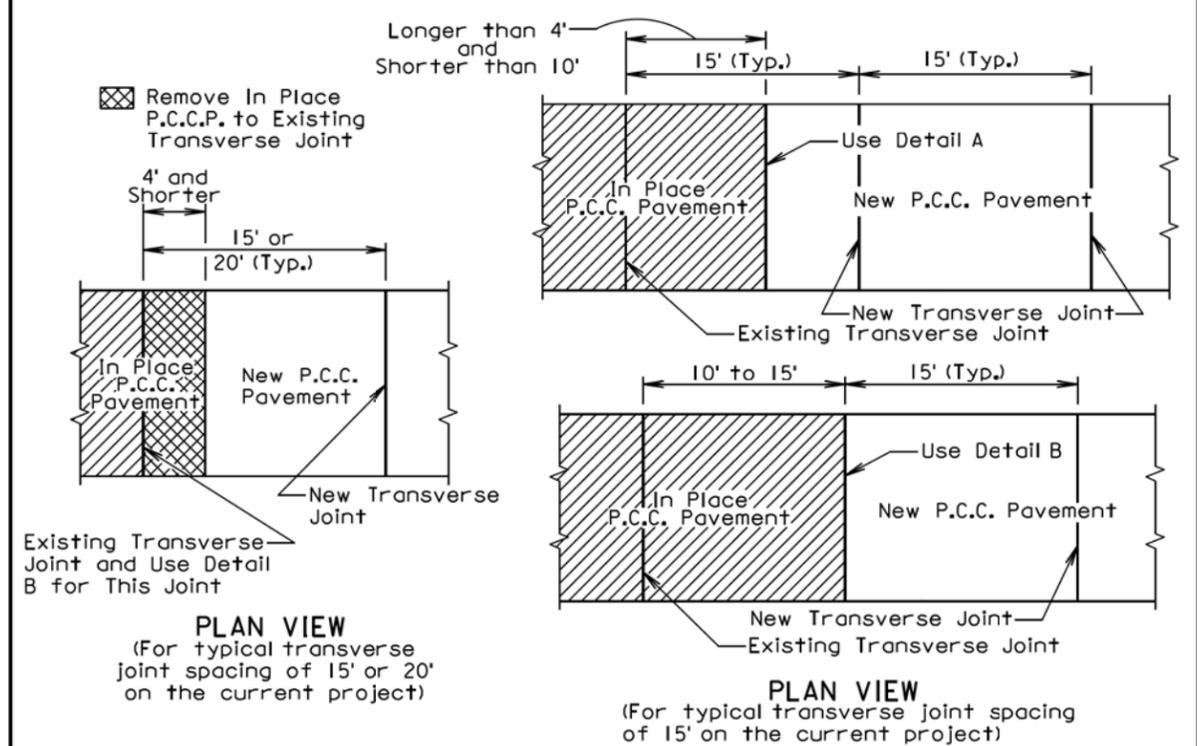
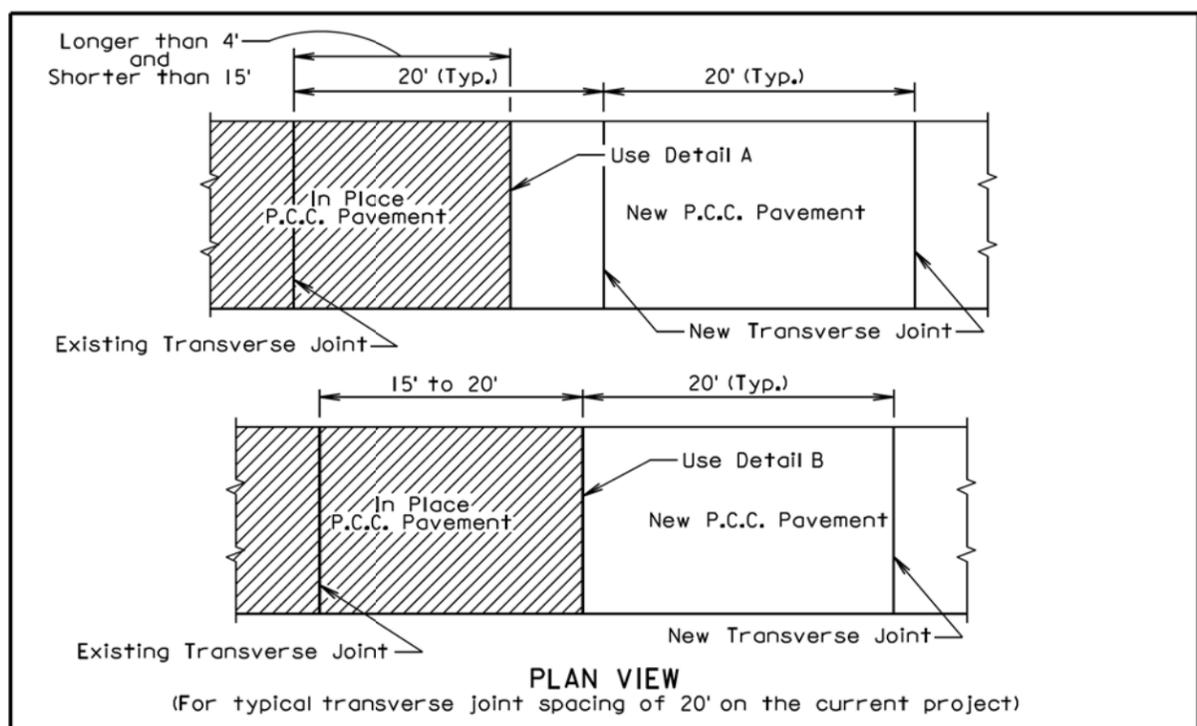
PLOTTED FROM - TRPR18387

FILE - ... \STANDARD PLATES\SP2.DGN

PLOT SCALE - 1:200

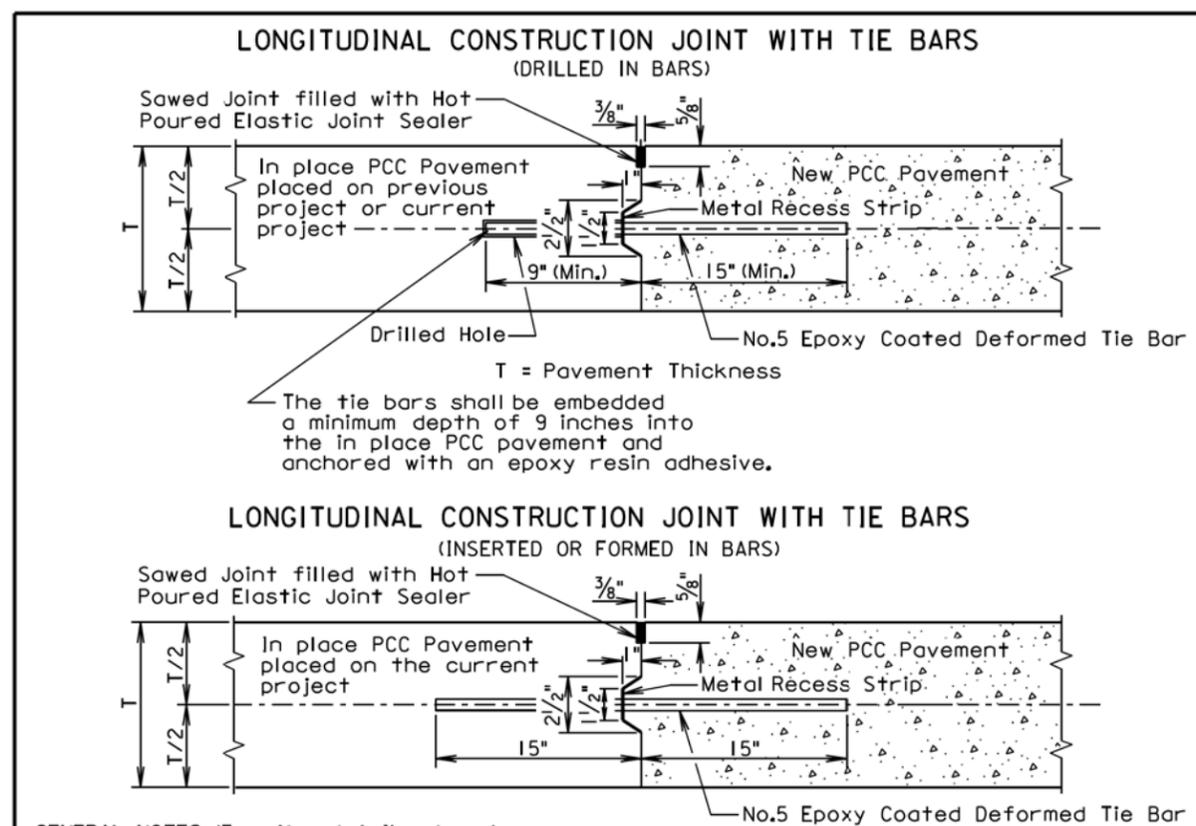
PLOT NAME - 15

FILE - ... \STANDARD PLATES\SP3.DGN



September 6, 2013

Published Date: 1st Qtr. 2014	S D D O T	PCC PAVEMENT TRANSVERSE CONSTRUCTION JOINTS WITH TIE BARS OR DOWEL BARS	PLATE NUMBER 380.08
			Sheet 2 of 2



**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.

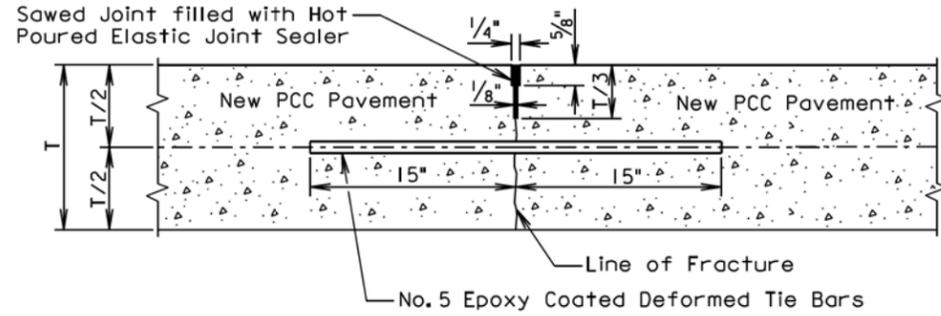
The keyway illustrated in the above details depict a female keyway.

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. 2014	S D D O T	PCC PAVEMENT LONGITUDINAL JOINTS WITH TIE BARS	PLATE NUMBER 380.10
			Sheet 1 of 2

**SAWED LONGITUDINAL JOINT WITH TIE BARS**  
(POURED MONOLITHICALLY)



T = Pavement Thickness

**GENERAL NOTES (For the detail above):**

The epoxy coated deformed tie bars shall be spaced in accordance with the following table:

Tie Bar Spacing 48" Maximum	
Transverse Contraction Joint Spacing	Number of Tie Bars
6.5' to 10'	2
10.5' to 14'	3
14.5' to 18'	4
18.5' to 22'	5

The tie bars shall be placed a minimum of 15 inches from the transverse contraction joints.

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

The first saw cut to control cracking shall be a minimum of 1/3 the thickness of the pavement. Additional sawing for widening the saw cut to provide the width for the installation of the hot poured elastic joint sealer is necessary.

August 31, 2013

<b>S D D O T</b>	<b>PCC PAVEMENT LONGITUDINAL JOINTS WITH TIE BARS</b>	PLATE NUMBER <b>380.10</b>
	Published Date: 1st Qtr. 2014	Sheet 2 of 2

**PLAN**

**CABLE SPLICE**

**POST SPACING FOR HORIZONTAL CURVES**

ROADWAY CURVATURE	MAX. POST SPACING
8° and Less	16'
Greater than 8° to 13°	12'
Greater than 13°	NOT ALLOWED

**GENERAL NOTES:**  
 Either flanged channel steel posts or 3x5.7 steel beam posts shall be used, but post type shall be consistent throughout the project. The 3x5.7 Steel Beam post shall be used for the end posts when the flanged channel steel post is used as line posts. All costs associated with furnishing and constructing the 3 cable guardrail anchor assembly including the concrete anchor, cable anchor bracket, compensating device, steel turnbuckle cable assembly, and necessary hardware shall be incidental to the contract unit price per Each for "3 Cable Guardrail Anchor Assembly".  
 All costs associated with furnishing and constructing the 3 cable guardrail including posts, cable, cable splices, and hardware shall be incidental to the contract unit price per Ft for "3 Cable Guardrail".  
 The following table and criteria shall apply to the arrangement of the Spring Cable End Assemblies (Compensation Devices) and Turnbuckle Cable End Assemblies:

LENGTH OF CABLE RUN	CRITERIA FOR ARRANGEMENT OF THE SPRING CABLE END ASSEMBLIES (COMPENSATION DEVICES) AND TURNBUCKLE CABLE END ASSEMBLIES
To 500'	Use turnbuckle on the approaching traffic end and compensating device on the other end of each individual cable, except in the W Beam to 3 Cable Transition where all compensating devices shall be provided at the bridge ends.
Greater than 500' to 1000'	Use compensating device on each end of each individual cable.
Greater than 1000'	Start new run by interlacing at last parallel post as shown above.

All Compensating Devices shall be attached to the cable anchor bracket when one end of the run is attached to a bridge.  
 Compensating Devices must have a spring rate of 450 ± 50 Lbs. per inch and shall have a total available travel of 6" minimum.

The cable shall be retensioned after the initial 2 week pretension period in accordance with the following table:

Temperature Range (Deg.)	120 to 110	109 to 100	99 to 90	89 to 80	79 to 70	69 to 60	59 to 50	49 to 40	39 to 30	29 to 20	19 to 10	9 to 0	-1 to -10	-11 to -20
Spring Compression (In.)	1	1 1/4	1 1/2	1 3/4	2	2 1/4	2 1/2	2 3/4	3	3 1/4	3 1/2	3 3/4	4	4 1/4

December 23, 2010

**S  
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D  
O  
T**

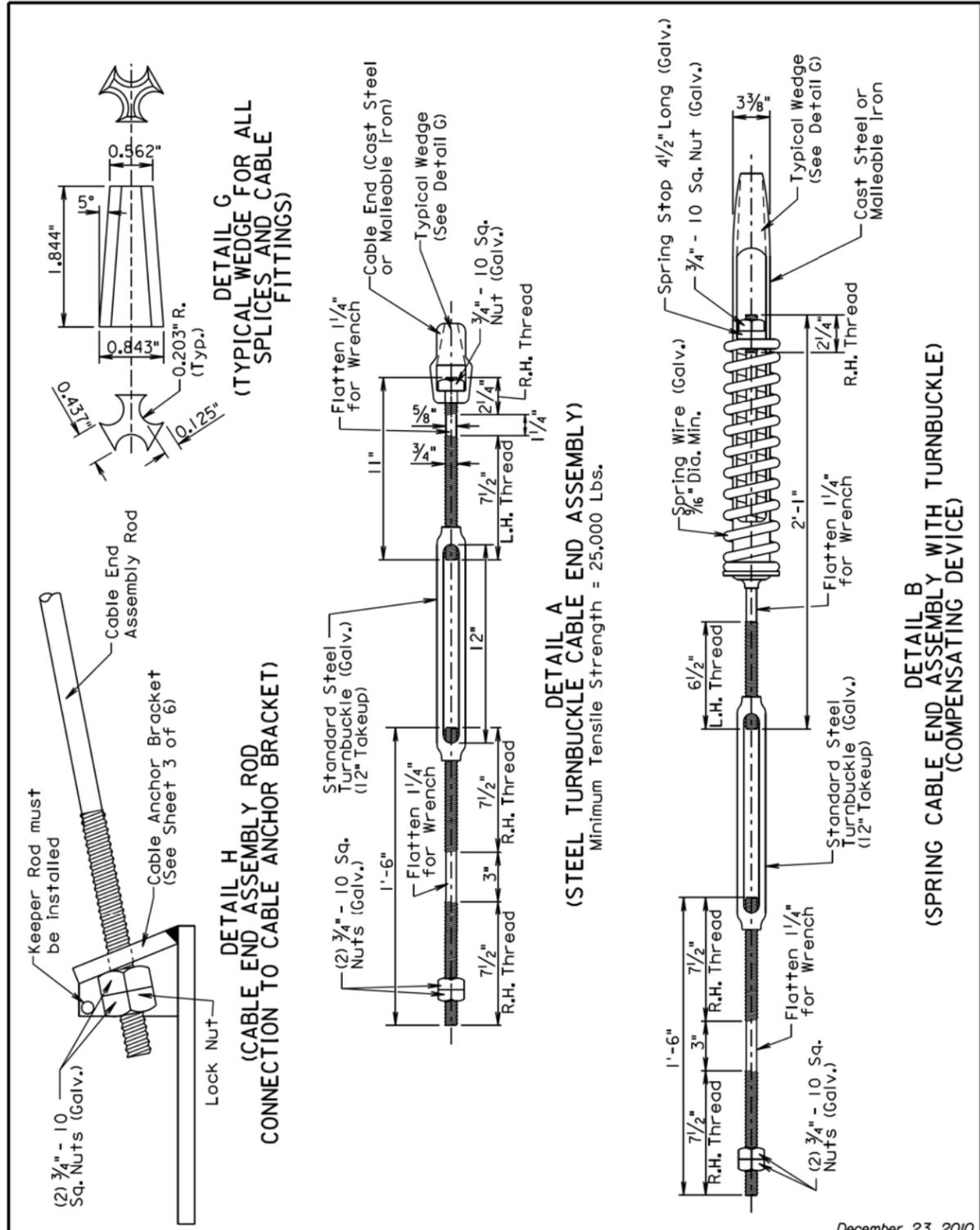
**3 CABLE GUARDRAIL**

Published Date: 1st Qtr. 2014

PLATE NUMBER  
**629.01**

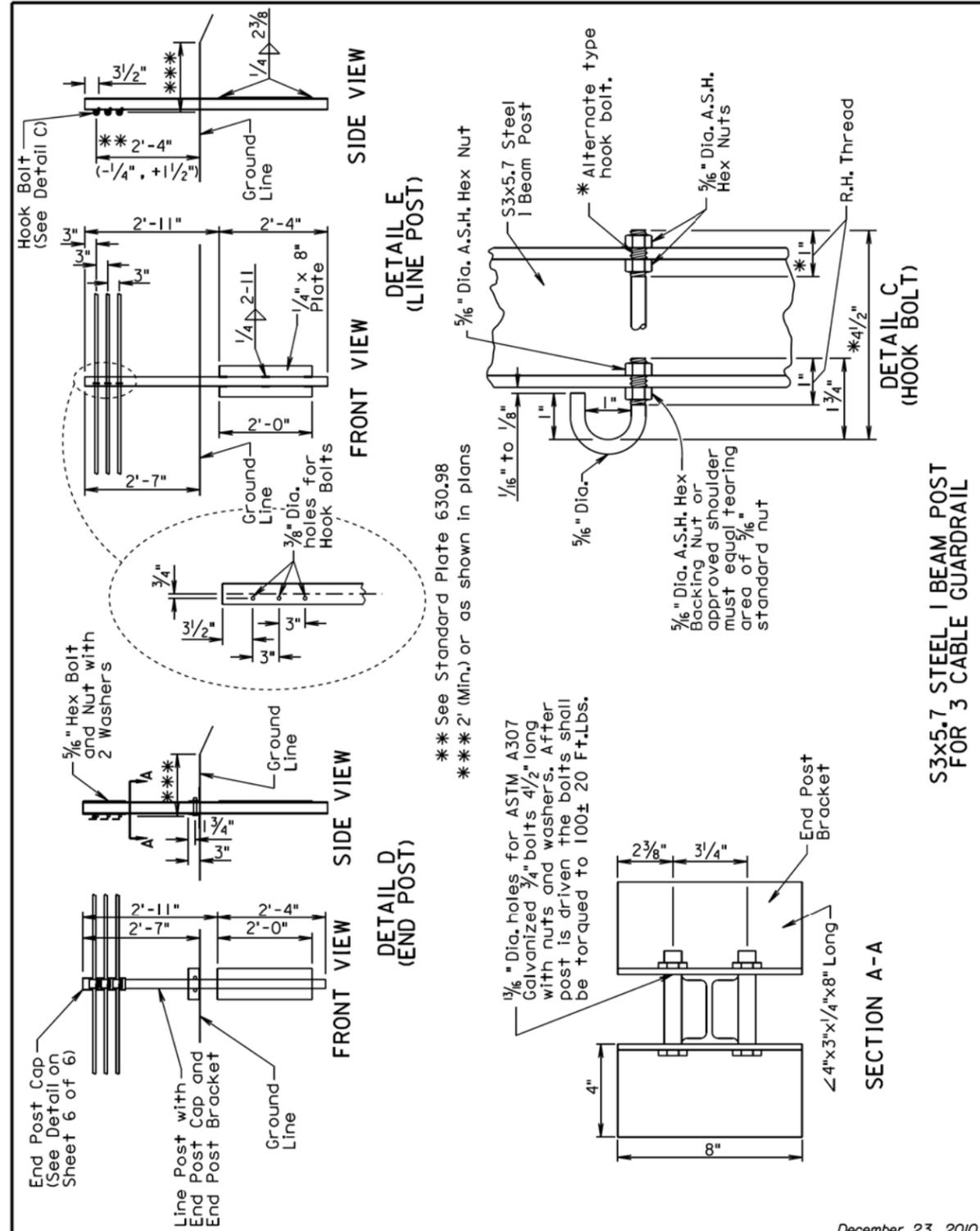
Sheet 1 of 6





December 23, 2010

<b>S D D T</b>	<b>3 CABLE GUARDRAIL</b>	PLATE NUMBER <b>629.01</b>
	Published Date: 1st Qtr. 2014	Sheet 4 of 6



December 23, 2010

<b>S D D T</b>	<b>3 CABLE GUARDRAIL</b>	PLATE NUMBER <b>629.01</b>
	Published Date: 1st Qtr. 2014	Sheet 5 of 6

**SECTION A-A**

**END POST CAP**

**HOOK BOLT**

**ANCHOR PLATE**

**FRONT VIEW SIDE VIEW**

**ALTERNATE ANCHOR PLATE**

**FRONT VIEW SIDE VIEW (ALTERNATE LINE POST)**

**ANCHOR PLATE**

**GENERAL NOTES:**

Flanged channel steel posts shall be produced from high strength steel in accordance with ASTM A499 Grade 60. Anchor plate shall be carbon steel sheet. Alternate anchor plate shall be ASTM A36 steel. Bolt shall be in conformance with ASTM A354 Grade BD or BC. Nut shall be in conformance with ASTM A563 Grade DH. Bolt shall be Cadmium plated per ASTM A165-80 Type 0S except using clear chromate. Finish for the post and anchor plate shall be a high quality dark green outdoor acrylic enamel. Alternate anchor plate may be unfinished.

**SDOT**

Published Date: 1st Qtr. 2014

**3 CABLE GUARDRAIL**

PLATE NUMBER  
629.01

Sheet 6 of 6

December 23, 2010

**FRONT VIEW SIDE VIEW**

**POST SPACING FOR DEFLECTION CONTROL**

X (Ft)	POST SPACING PRIOR TO OBSTACLE
7.0 to 7.9	8 @ 4'-0"
8.0 to 9.4	6 @ 8'-0"
9.5 to 10.9	4 @ 12'-0"
11.0 and Greater	16'-0" (Typ.)

**GENERAL NOTE:**

\* Post spacings for control of deflection shall continue to one post past the obstacle for one way traffic. Post spacings for control of deflection shall be provided on both sides of the obstacle for two way traffic.

**SDOT**

Published Date: 1st Qtr. 2014

**3 CABLE GUARDRAIL POST SPACING FOR DEFLECTION CONTROL**

PLATE NUMBER  
629.02

Sheet 1 of 1

March 31, 2000

**3 CABLE GUARDRAIL SLIP BASE ANCHOR ASSEMBLY**

*Published Date: 1st Qtr. 2014*

**ELEVATION (ANCHOR)**

**PLAN (ANCHOR)**

**ISOMETRIC VIEW**

**DETAIL A**

**ANCHOR CONSTRUCTION NOTES:**

1. Auger two 3' diameter by 3'-9" deep holes tangent to each other.
2. Clean out the top 6 inches of soil between the holes.
3. Place concrete in holes with anchor bolts and slip base stub post in place.
4. For informational purposes the neat line concrete volume of the anchor is 1.9 cu. yds.

June 26, 2010

**PLATE NUMBER**  
629.10

**Sheet 1 of 3**

**3 CABLE GUARDRAIL SLIP BASE ANCHOR ASSEMBLY**

*Published Date: 1st Qtr. 2014*

**EXTERNAL STIFFENER PLATE**

**INTERNAL STIFFENER PLATE**

**SIDE VIEW**

**PLAN**

**FRONT VIEW**

**DETAIL B (TYPICAL WEDGE FOR ALL SPLICES AND CABLE FITTINGS)**

**CABLE ANCHOR BRACKET**

**CABLE END ASSEMBLY ROD CONNECTION TO CABLE ANCHOR BRACKET**

June 26, 2010

**PLATE NUMBER**  
629.10

**Sheet 2 of 3**



STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	IM 0299(74)235	F27	F27

Plotting Date: 04/17/2014

PLOT SCALE - 1:200

PLOT NAME - 22

FILE - ... \STANDARD PLATES\SP10.DGN

**GENERAL NOTES:**

At cut or fill slope installations, wattles shall be installed along the contour and perpendicular to the water flow.

At ditch installations, point A must be higher than point B to ensure that water flows over the wattle and not around the ends.

The Contractor shall dig a 3" to 5" trench, install the wattle tightly in the trench so that daylight can not be seen under the wattle, and then compact the soil excavated from the trench against the wattle on the uphill side. See Detail B.

The stakes shall be 1"x2" or 2"x2" wood stakes, however, other types of stakes such as rebar may be used only if approved by the Engineer. The stakes shall be placed 6" from the ends of the wattles and the spacing of the stakes along the wattles shall be 3' to 4'.

Where installing running lengths of wattles, the Contractor shall butt the second wattle tightly against the first and shall not overlap the ends. See Detail C.

The Contractor and Engineer shall inspect the erosion control wattles once every week and within 24 hours after every rainfall event greater than 1/2". The Contractor shall remove, dispose, or reshape the accumulated sediment when necessary as determined by the Engineer.

Sediment removal, disposal, or necessary shaping shall be as directed by the Engineer. All costs for removing accumulated sediment, disposal of sediment, and necessary shaping shall be incidental to the contract unit price per cubic yard for "Remove Sediment".

All costs for furnishing and installing the erosion control wattles including labor, equipment, and materials shall be incidental to the contract unit price per foot for the corresponding erosion control wattle bid item.

All costs for removing the erosion control wattle from the project including labor, equipment, and materials shall be incidental to the contract unit price per foot for "Remove Erosion Control Wattle".

December 23, 2004

<i>Published Date: 1st Qtr. 2014</i>	<b>S D D O T</b>	<b>EROSION CONTROL WATTLE</b>	PLATE NUMBER 734.06
			Sheet 2 of 2

-PLOTTED FROM - TRPR18387