

# SECTION F: SURFACING PLANS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0012(298)106	F1	F36

Plotting Date: 02/26/2024

Revised: 28Feb24, RML

## INDEX OF SHEETS

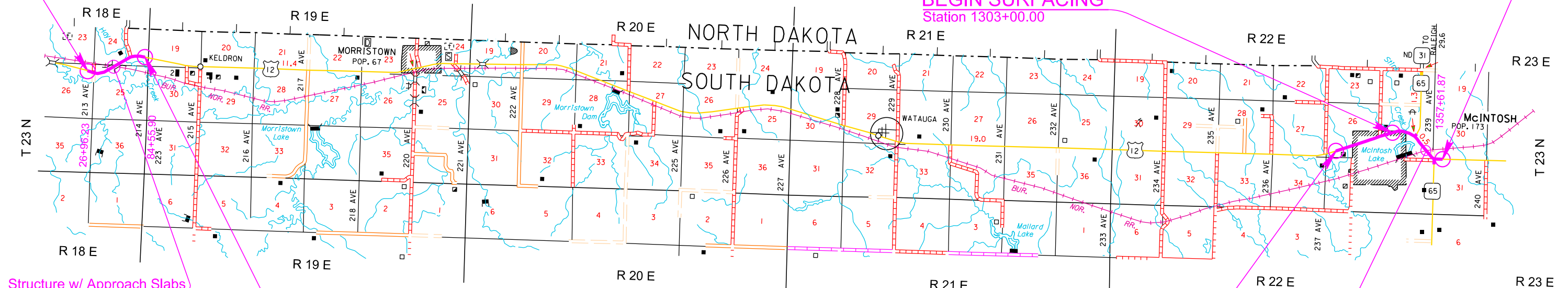
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**BEGIN NH 0012(298)106  
BEGIN SURFACING**  
Station 21+00.00 = Station 339+72.30 on WPGH 267-A located 916.22 feet South and 598.60 feet West of the Northeast corner of Section 26 - Township 23 North - Range 18 East of the B.H.M. MRM 106.34 +0.648

**END NH 0012(298)106  
END SURFACING**  
Station 1367+00.00 = Station 1659+48.76 on F 044-2(6) located 76.34 feet North and 925.99 feet East of the Southwest corner of Section 30 - Township 23 North - Range 23 East of the B.H.M. MRM 132.64+0.162

**END COLD MILLING/RESURFACING  
BEGIN SURFACING**  
Station 1303+00.00



**Structure w/ Approach Slabs**  
Str. No. 16 - 083 - 011  
Begin Station 48+09.4  
End Station 51+19.9  
MRM 107.55

**END SURFACING**  
Station 83+00.00

**BEGIN COLD MILLING/RESURFACING**  
Station 1249+75.0 = Station 466+00.0 on NH 0012(185)121  
MRM 130.00 + 0.554

**Structure w/ Approach Slabs**  
Str. No. 16 - 328 - 018  
Begin Station 1344+68.5  
End Station 1347+22.4  
MRM 132.45

Plot Scale - 1:200

Plotted From - TRPR16032

**SECTION F – ESTIMATE OF QUANTITIES**

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
009E0010	Mobilization	Lump Sum	LS
009E3200	Construction Staking	Lump Sum	LS
009E3301	Engineer Directed Surveying/Staking	40.0	Hour
009E3320	Checker	Lump Sum	LS
100E0020	Clear and Grub Tree	2	Each
110E1010	Remove Asphalt Concrete Pavement	75.0	SqYd
110E6410	Remove Type 1 MGS for Reset	875.0	Ft
110E6500	Remove Type 1 Guardrail Transition for Reset	8	Each
110E6619	Remove MGS MASH Tangent End Terminal for Reset	8	Each
110E7500	Remove Pipe for Reset	30	Ft
110E7510	Remove Pipe End Section for Reset	4	Each
120E0010	Unclassified Excavation	603	CuYd
120E0100	Unclassified Excavation, Digouts	164	CuYd
120E0600	Contractor Furnished Borrow Excavation	30	CuYd
120E6200	Water for Granular Material	159.7	MGal
210E1005	Surface Preparation	2,279	Mile
260E1010	Base Course	149.8	Ton
260E1030	Base Course, Salvaged	1,139.7	Ton
270E0110	Salvage and Stockpile Granular Material	1,139.7	Ton
320E1200	Asphalt Concrete Composite	25.0	Ton
320E3000	Compaction Sample	9	Each
320E7012	Grind 12" Rumble Strip or Stripe in Asphalt Concrete	5.4	Mile
330E0010	MC-70 Asphalt for Prime	81.1	Ton
330E0100	SS-1h or CSS-1h Asphalt for Tack	43.7	Ton
330E0210	SS-1h or CSS-1h Asphalt for Flush Seal	19.0	Ton
330E1000	Blotting Sand for Prime	214.1	Ton
330E2000	Sand for Flush Seal	206.1	Ton
332E0010	Cold Milling Asphalt Concrete	21,596	SqYd
450E8300	Culvert Joint Cleaning	176.4	Ft
450E8305	Repair Culvert Joint	176.4	Ft
* 450E8900	Cleanout Pipe Culvert	2	Each
450E9000	Reset Pipe	30	Ft
450E9001	Reset Pipe End Section	4	Each
600E0300	Type III Field Laboratory	1	Each
630E2100	Beam Guardrail Post	276	Each
630E5010	Reset Type 1 MGS	875.0	Ft
630E5204	Reset MGS MASH Tangent End Terminal	8	Each
630E5300	Reset Type 1 Guardrail Transition	8	Each
632E2220	Guardrail Delineator	44	Each
720E1015	Bank and Channel Protection Gabion	6.0	CuYd
831E0110	Type B Drainage Fabric	19	SqYd

\* - Denotes Non-Participating

**SECTION F – ESTIMATE OF QUANTITIES – ALTERNATE A**

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
320E0005	PG 58-34 Asphalt Binder	1,019.7	Ton
320E1050	Class E Asphalt Concrete	17,590.6	Ton

**SECTION F – ESTIMATE OF QUANTITIES – ALTERNATE B**

BID ITEM NUMBER	ITEM	QUANTITY	UNIT
320E0005	PG 58-34 Asphalt Binder	903.1	Ton
320E1050	Class E Asphalt Concrete	18,063.7	Ton

**SURFACING THICKNESS DIMENSIONS**

The plans shown spread rates will be applied even though the thickness may vary from that shown in the plans.

At those locations where material must be placed to achieve a required elevation, the depth/quantity may be varied to achieve the required elevation.

**UTILITIES**

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

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 will contact the Engineer to determine modifications that will be necessary to avoid utility impacts.

**TYPE III FIELD LABORATORY**

Substitution of a cellular telephone for the hard-wired touch-tone telephone is not allowed, as state personnel need the ability to download information over direct phone lines. The phone is intended for state personnel usage only. Contractor personnel are prohibited from using this phone unless pre-approved by the Project Engineer. Reimbursement will not be made for fees associated with the purchase, installation, disconnection, monthly line charges, and incidentals involved in the installation, maintenance, and disconnection of the phone (including attachments). These items will be incidental to the contract unit price per each for "Type III Field Laboratory".

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	NH 0012(298)106	F2	F36

Revised: 24Oct23, RML

**COLD MILLING ASPHALT CONCRETE**

The Los Angeles Abrasion Loss value on the aggregate used for the in-place asphalt concrete was 18. This value was obtained from testing during construction of the in-place asphalt concrete.

Cold milling asphalt concrete will be done according to the typical section(s). In areas where maintenance patches have raised and/or widened the road, additional asphalt concrete will be milled to provide a uniform typical section from centerline to the edge of the finished shoulder. These areas also include farm, residential, field entrances and intersecting roads. Milling will be daylighted to the outside edge of the roadway. Any additional costs associated with this additional cold milling will be incidental to the contract unit price per square yard for Cold Milling Asphalt Concrete.

Cold milling asphalt is estimated to produce 1110.6 tons of cold milled asphalt concrete material. The cold milling operation will be 36.5' wide from Sta. 1249+75 to Sta. 1303+00, estimated quantity of cold milling equals 21,595.8 Sq.Yds.

The milled asphalt concrete material produced by cold milling will be become the property of the Contractor for disposal and may not be reused on the project.

**SALVAGE AND STOCKPILE GRANULAR MATERIAL**

An estimated 1,139.7 tons (603.1 Cubic Yards) of granular material will be salvaged from the existing highway at the beginning/end of surfacing sections and the bridge ends and stockpiled at a site furnished by the Contractor and satisfactory to the Engineer. Salvaged granular material will be reused as Base Course, Salvaged on this project.

Salvaged material will be processed to meet the requirements of Section 884.2 D.2 prior to stockpiling. The Contractor will ensure that no vegetation, topsoil, subgrade, or other foreign material is incorporated into the salvaged granular material.

The salvaged material not used on the project will be stockpiled or disposed of as directed by the Engineer.

The quantity of salvaged granular base material may vary from the plans.

Table for Salvage and Stockpile Granular Base Material

Location	Salvaged Granular Material (Tons)	Unclassified Excavation (Cu.Yds.)
Sta. 21+00.0 to Sta. 23+40.0	109.2	57.8
Sta. 45+69.4 to Sta. 48+09.4	181.8	96.2
Sta. 51+19.9 to Sta. 53+59.9	181.8	96.2
Sta. 80+60.0 to Sta. 83+00.0	109.2	57.8
Sta. 1303+00.0 to Sta.1305+40.0	84.9	44.9
Sta. 1342+28.5 to Sta.1344+68.5.	181.8	96.2
Sta. 1347+22.4 to Sta.1349+62.4.	181.8	96.2
Sta. 1364+60.0 to Sta.1367+00.0.	109.2	57.8
TOTAL =	1,139.7	603.1

### TRANSITION SECTION

The existing granular material will be shaped to allow for the placement of asphalt concrete.

Cost for the shaping which includes removing and placing the existing granular material, adding granular material if needed and compacting the granular material will be incidental to the contract unit price per ton for Salvage and Stockpile Granular Base Material.

Table for Salvage and Stockpile Granular Base Material

Location	Granular Removal Depth (Inches)	Depth of Asphalt Concrete (Inches)
Sta. 21+00.0 to Sta. 23+40.0	4.5" to 0"	4.5"
Sta. 45+69.4 to Sta. 48+09.4	1.5" to 6"	6"
Sta. 51+19.9 to Sta. 53+59.9	6" to 1.5"	6"
Sta. 80+60.0 to Sta. 83+00.0	0" to 4.5"	4.5"
Sta. 1303+00.0 to Sta.1305+40.0	3.5" to 0"	4.5"
Sta. 1342+28.5 to Sta.1344+68.5.	1.5" to 6"	6"
Sta. 1347+22.4 to Sta.1349+62.4.	6" to 1.5"	6"
Sta. 1364+60.0 to Sta.1367+00.0.	0" to 4.5"	4.5"

### UNCLASSIFIED EXCAVATION, DIGOUTS

The locations and extent of digout areas will be determined in the field by the Engineer.

Included in the Estimate of Quantities are 50 cubic yards of Unclassified Excavation, Digouts per mile for the removal of unstable material throughout the project. Estimated quantity = 164 cu.yds.

Included in the Estimate of Quantities is 100 tons of Base Course per mile for backfill of Unclassified Excavation, Digouts. Estimated quantity = 328.8 tons of Base Course or Base Course Salvaged and 3.9 MGal of Water for Granular Material

Table for Unclassified Excavation, Digouts and Backfill of Digouts

Location	Length (miles)
Sta. 21+00.0 to Sta. 48+09.4	0.513
Sta. 51+19.9 to Sta. 83+00.0	0.602
Sta. 1249+75.0 to Sta.1344+68.5	1.798
Sta. 1347+22.4 to Sta. 1367+00.0	0.375
TOTAL =	3.288

Included in the Estimate of Quantities is 75 square yards of Remove Asphalt Concrete Pavement for the removal of unstable asphalt for Section 3.

Included in the Estimate of Quantities is 25 tons of Asphalt Concrete Composite for the backfill of Unclassified Excavation, Digouts for Section 3.

Table for Remove Asphalt Concrete and Asphalt Concrete Backfill

Location	Length (miles)
Sta. 1249+75.0 to Sta. 1303+00.0	1.009

The digouts will be extended through the shoulder and backfilled with granular material that will daylight to the inslope to allow water to escape the subsurface.

### SURFACE PREPARATION

Prior to placement of the Class E Asphalt Concrete, the Contractor will be required to prepare the existing surface according to the Surface Preparation specifications provided in Section 210, at locations determined by the Engineer.

The locations provided on the typical sections for Asphalt Surface Treatment, In Place, represent the locations where an asphalt surface treatment is anticipated to be in place at the time of construction. The Contractor is advised that locations and dimensions of actual Asphalt Surface Treatment, In Place, may vary from that given on the typical sections. There will be no increase in the payment for Surface Preparation based on the actual surface treatment in place at the time of construction.

Quantities for Surface Preparation have been provided for the entire length of the asphalt surfacing. Actual limits to receive Surface Preparation ahead of Class E Asphalt Concrete placement will be limited to particular project conditions and will be subject to approval by the Engineer. In no case will Surface Preparation operations ahead of Class E Asphalt Concrete placement operations exceed fourteen calendar days.

Included in the Estimate of Quantities is 144.4 MGal of Water for Granular Material for compaction during the Surface Preparation operation.

Table for Surface Preparation

Location	Length (miles)
Sta. 21+00.0 to Sta. 48+09.4	0.513
Sta. 51+19.9 to Sta. 83+00.0	0.602
Sta. 1303+00.0 to Sta.1344+68.5	0.789
Sta. 1347+22.4 to Sta. 1367+00.0	0.375
TOTAL =	2.279

### EXISTING ASPHALT CONCRETE REPAIR QUANTITIES

Included in the Estimate of Quantities are 100 tons of Class E Asphalt Concrete, 1.0 tons of Hydrated Lime, 5.8 tons of PG 58-34 Asphalt Binder per mile for Alt A and 100 tons of Class E Asphalt Concrete, 1.0 ton of Hydrated Lime, and 5.0 tons of PG 58-34 Asphalt Binder per mile for Alt. B for spot leveling, strengthening, and repair of the existing surface for Section 3 (Sta. 1249+75.0 to Sta. 1303+00.0). Estimated length = 1.009 miles.

Included in the Estimate of Quantities is 0.3 tons of SS-1h or CSS-1h Emulsified Asphalt for Tack (Rate = 0.06 Gal./Sq.Yd.) for repair and leveling areas for Section 3 (Sta. 1249+75.0 to Sta. 1303+00.0).

### CHECKING SPREAD RATES

The Contractor will be responsible for checking the Class E Asphalt Concrete, Base Course and Base Course, Salvaged spread rates and taking the weigh delivery tickets as the surfacing material arrives on the project and is placed onto the roadway.

The Contractor will compute the required spread rates for each typical surfacing section and create a spread chart prior to the start of material delivery and placement. The Engineer will review and check the Contractor's calculations and spread charts. The station to station spread will be written on each ticket as the surfacing material is delivered to the roadway.

At the end of each day's shift, the Contractor will verify the following:

- All tickets are present and accounted for,
- The quantity summary for each item is calculated,
- The amount of material wasted if any,
- Each day's ticket summary is marked with the corresponding 'computed by',
- The ticket summary is initialed and certified that the delivered and placed quantity is correct.

All daily tickets and the summary by item will be given to the Engineer no later than the following morning.

If the checker is not properly and accurately performing the required duties, the Contractor will correct the problem or replace the checker with an individual capable of performing the duties to the satisfaction of the Engineer. Failure to do so will result in suspension of the work.

The Department will perform depth checks. The Contractor will be responsible for placement of material to the correct depth unless otherwise directed by the Engineer. If the placed material is not within a tolerance of  $\pm 1/2$  inch of the plan shown depth, the Contractor will correct the problem at no additional cost to the Department. Excess material above the tolerance will not be paid for. Achieving the correct depth may require picking up and moving material or other action as required by the Engineer. All costs for providing the Contractor furnished checker and performing all related duties will be incidental to the contract lump sum price for the CHECKER. No allowances will be made to the contract lump sum price for CHECKER due to authorized quantity variations unless the quantities for the material being checked vary above or below the estimated quantities by more than 25 percent. Payment for the Checker will then be increased or decreased by the same proportion as the placed material quantity bears to the estimated material quantity.

**BASE COURSE, SALVAGED**

Base Course, Salvaged will be obtained from the stockpile site(s) provided by the Contractor from the salvaged material produced on this project and may be used without further gradation testing.

All other requirements for Base Course, Salvaged will apply.

**CLASS E ASPHALT CONCRETE**

Mineral Aggregate for Class E Asphalt Concrete - Alternate A will conform to the requirements for Class E, Type 1.

Mineral Aggregate for Class E Asphalt Concrete - Alternate B will consist of a minimum of eighty percent crushed limestone ledge rock and will conform to the requirements for Class E, Type 1.

When directed by the Engineer, the Contractor will saw and remove a total of three undamaged compaction cores (4" dia. min.) per asphalt concrete lift from designated area(s) and repair the hole(s) to the satisfaction of the Engineer. All costs associated with the compaction cores will be incidental to the contract unit price per each for Compaction Sample.

All other requirements for Class E will apply.

**GRIND RUMBLE STRIPS IN ASPHALT CONCRETE**

Asphalt concrete rumble strips will be constructed on the shoulders. Rumble strips will be paid for at the contract unit price per mile for Grind 12" Rumble Strip or Stripe in Asphalt Concrete. It is estimated that 5.4 miles of asphalt concrete rumble strips will be required.

**ASPHALT CONCRETE RUMBLE STRIP**

Location	* Rumble Strip Length
	Mile
US 12	
Sta. 21+00.0 to Sta. 48+09.4	1.0
Sta. 51+19.9 to Sta. 83+00.0	1.2
Sta. 1249+75.0 to a Sta. 1270+95.0	0.8
Sta. 1300+49.0 to a Sta. 1344+68.5	1.6
Sta. 1347+22.4 to a Sta. 1367+00.0	0.8
TOTALS:	5.4

\* Length includes both shoulders

Rumble strip installation will be completed prior to application of the flush seal and permanent pavement markings. In the event the flush seal is eliminated from the contract, the Contractor will still be required to apply a flush seal to the newly installed 12" rumble strips at a width of 18" and at the same rate as specified in this plan set. No adjustment in payment will be made and SS-1h or CSS-1h Asphalt for Flush Seal will be paid at the contract unit price per ton.

**COMPACTION FOR CLASS E ASPHALT CONCRETE – ALT. A**

Location	With Specified Density Compaction Ton/Lift	Without Specified Density Compaction Ton
<b>US 12</b>		
Sta. 21+00.0 to Sta. 45+69.4	1381.1 / 1168.7	
Sta. 45+69.4 to Sta. 48+09.4	85.5 / 142.5 / 114.0	
Sta. 51+19.9 to Sta. 53+59.9	85.5 / 142.5 / 114.0	
Sta. 53+59.9 to Sta. 83+00.0	1644.6 / 1391.6	
Sta. 1249+75.0 to Sta. 1303+00.0	2397.3	
Sta. 1303+00.0 to Sta. 1322+48.0	1089.4 / 921.9	
Sta. 1322+48.0 to Sta. 1336+20.0	946.0 / 792.4	
Sta. 1336+20.0 to Sta. 1342+28.5	340.3 / 288.0	
Sta. 1342+28.5 to Sta. 1344+68.5	85.5 / 142.5 / 114.0	
Sta. 1347+22.4 to Sta. 1349+62.4	85.5 / 142.5 / 114.0	
Sta. 1349+62.4 to Sta. 1354+52.0	273.8 / 231.7	
Sta. 1354+52.0 to Sta. 1359+62.5	411.1 / 342.0	
Sta. 1359+62.5 to Sta. 1367+00.0	412.5 / 349.0	
<b>Miscellaneous Areas</b>		
Intersecting Streets/ Entrances		1642.2
Guardrail Areas		98.1
Spot Leveling/Strengthening/Repair		100.9
TOTAL =	15749.4	1841.2

**COMPACTION FOR CLASS E ASPHALT CONCRETE – ALT. B**

Location	With Specified Density Compaction Ton/Lift	Without Specified Density Compaction Ton
<b>US 12</b>		
Sta. 21+00.0 to Sta. 45+69.4	1418.5 / 1200.4	
Sta. 45+69.4 to Sta. 48+09.4	87.8 / 146.3 / 117.0	
Sta. 51+19.9 to Sta. 53+59.9	87.8 / 146.3 / 117.0	
Sta. 53+59.9 to Sta. 83+00.0	1689.2 / 1429.5	
Sta. 1249+75.0 to Sta. 1303+00.0	2461.7	
Sta. 1303+00.0 to Sta. 1322+48.0	1119.0 / 946.9	
Sta. 1322+48.0 to Sta. 1336+20.0	971.7 / 813.7	
Sta. 1336+20.0 to Sta. 1342+28.5	349.5 / 295.8	
Sta. 1342+28.5 to Sta. 1344+68.5	87.8 / 146.3 / 117.0	
Sta. 1347+22.4 to Sta. 1349+62.4	87.8 / 146.3 / 117.0	
Sta. 1349+62.4 to Sta. 1354+52.0	281.2 / 238.0	
Sta. 1354+52.0 to Sta. 1359+62.5	422.2 / 351.3	
Sta. 1359+62.5 to Sta. 1367+00.0	423.6 / 358.5	
<b>Miscellaneous Areas</b>		
Intersecting Streets/ Entrances		1686.9
Guardrail Areas		100.8
Spot Leveling/Strengthening/Repair		100.9
TOTAL =	16175.1	1888.6

**BLOTTING SAND FOR PRIME**

Included in the Estimate of Quantities are 5 tons of Blotting Sand for Prime to be used where necessary for maintenance of traffic as directed by the Engineer, (Rate = 10 pounds per square yard).

**FLUSH SEAL**

Application of flush seal will be completed within 10 working days following completion of the asphalt concrete surfacing.

Application of flush seal may be eliminated by the Engineer. If the paved surface remains tight, the Engineer will notify the Contractor as soon as possible that the flush seal is unnecessary.

**SAND FOR FLUSH SEAL**

The sand application will be placed 11' wide in each lane, leaving 12" on center line and 6" on each edge line free of sand.

**ASPHALT CONCRETE COMPOSITE**

Section 324 will apply except that Class E Asphalt Concrete as specified elsewhere in the plans may be used as Asphalt Concrete Composite.

Plans specified locations for Asphalt Concrete Composite will be paid for at the contract unit price per ton for Asphalt Concrete Composite regardless of the class of asphalt concrete used at such locations.

**INTERSECTING ROADS AND ENTRANCES**

In areas where granular material has been placed adjacent to the existing asphalt concrete, the Contractor will be required to remove the granular material to a depth below the existing asphalt concrete to allow for the placement of the new asphalt concrete. New asphalt concrete will be placed flush with the existing asphalt concrete. The existing granular material removed may be placed on the entrances, intersecting roads or other locations as directed by the Engineer.

All costs to remove the granular material including labor, equipment and incidentals will be incidental to the various related contract items.

**TABLE OF SUPERELEVATION – Mainline**

Station	to	Station	
21+00		21+78.70	- Normal Crown Section
21+78.70		24+18.70	- Superelevation Transition
24+18.70		41+12.99	- 2100' Radius Curve Left 0.06'/' Superelevation Rate Point of Rotation at Centerline
41+12.99		43+52.99	- Superelevation Transition
43+52.99		61+45.01	- Normal Crown Section
61+45.01		63+85.01	- Superelevation Transition
63+85.01		78+55.94	- 2100' Radius Curve Right 0.06'/' Superelevation Rate Point of Rotation at Centerline
78+55.94		80+95.94	- Superelevation Transition
80+95.94		83+00.00	- Normal Crown Section
1303+03.00		1306+28.47	- Normal Crown Section
1306+28.47		1308+51.47	- Superelevation Transition
1308+51.47		1329+08.05	- 1800' Radius Curve Right 0.06'/' Superelevation Rate Point of Rotation at Centerline
1329+08.05		1331+31.05	- Superelevation Transition
1331+31.05		1347+85.44	- Normal Crown Section
1347+85.44		1350+08.44	- Superelevation Transition
1350+08.44		1363+13.89	- 1660' Radius Curve Right 0.06'/' Superelevation Rate Point of Rotation at Centerline
1363+13.59		1365+95.94	- Superelevation Transition
1365+95.94		1367+00.00	- Normal Crown Section

**TABLE OF SUPERELEVATION – SD65 N (Int Hwy at 1329+36)**

Station	to	Station	
10+00		11+09.70	- Normal Crown Section
11+09.70		11+59.70	- Cross Slope Transition
11+59.70		11+95.90	- 0.028'/' Cross Slope to match Mainline Longitudinal Slope
11+95.90		12+45.90	- Cross Slope Transition
12+45.90		13+98.00	- Normal Crown Section

**TABLE OF SUPERELEVATION – SD65 S (Int Hwy at 1357+70)**

Station	to	Station	
1+00		4+04.50	- Normal Crown Section
4+04.50		4+93.50	- Cross Slope Transition
4+93.50		5+31.63	- 0.029'/' Cross Slope to match Mainline Longitudinal Slope
5+31.63		6+20.63	- Cross Slope Transition
6+20.63		6+82.67	- Normal Crown Section

**TABLE OF SUPERELEVATION – XR1358B (Railway Street E)**

Station	to	Station	
0+00		1+38.43	- Rural Crown Section
1+38.43		3+30.43	- Cross Slope Transition
3+30.43		3+48.43	- 0.049'/' Cross Slope to match Mainline Longitudinal Slope

**RATES OF MATERIALS**

The Estimate of Surfacing Quantities is based on the following quantities of materials per **station**.

**US12 SURFACING SECTIONS**

**Sta. 21+00.0 to Sta. 45+69.4**  
**Sta. 53+59.9 to Sta. 83+00.0**  
**Sta. 1303+00.0 to Sta. 1322+48.0**  
**Sta. 1336+20.0 to Sta. 1342+28.5**  
**Sta. 1349+62.4 to Sta. 1354+52.0**  
**Sta. 1359+62.5 to Sta. 1367+00.0**

MC-70 Asphalt for Prime at the rate of 0.57 ton applied 43.0 feet wide (Rate = 0.30 gallon per square yard).

Blotting Sand for Prime at the rate of 1.33 tons applied 24 feet wide (Rate = 10 lbs. per square yard).

SS-1h or CSS-1h Asphalt for Tack at the rate of 0.12 ton applied 42.0 feet wide (Rate = 0.06 gallon per square yard).

**CLASS E ASPHALT CONCRETE – 1<sup>ST</sup> Lift**

	Alt. A	Alt. B
Crushed Aggregate	52.86 tons	54.75 tons
PG 58-34 Asphalt Binder	3.25 tons	2.88 tons
<b>Total</b>	<b>56.11 tons</b>	<b>57.63 tons</b>

SS-1h or CSS-1h Asphalt for Tack at the rate of 0.12 ton applied 42.0 feet wide (Rate = 0.06 gallon per square yard).

**CLASS E ASPHALT CONCRETE – 2<sup>ND</sup> Lift**

	Alt. A	Alt. B
Crushed Aggregate	44.73 tons	46.33 tons
PG 58-34 Asphalt Binder	2.75 tons	2.44 tons
<b>Total</b>	<b>47.48 tons</b>	<b>48.77 tons</b>

**FLUSH SEAL**

SS-1h or CSS-1h Asphalt for Flush Seal at the rate of 0.10 ton applied 41.0 feet wide (Rate = 0.05 gallon per square yard).

Sand for Flush Seal at the rate of 0.98 ton applied 22.0 feet wide (Rate = 8 lbs. per square yard).

The exact proportions of these materials will be determined on construction.

**US12 RESURFACING SECTIONS**

**Sta. 1249+75.0 to Sta. 1303+00.0**

SS-1h or CSS-1h Asphalt for Tack at the rate of 0.17 ton applied 39.0 feet wide (Rate = 0.09 gallon per square yard).

**CLASS E ASPHALT CONCRETE**

	Alt. A	Alt. B
Crushed Aggregate	42.41 tons	43.92 tons
PG 58-34 Asphalt Binder	2.61 tons	2.31 tons
<b>Total</b>	<b>45.02 tons</b>	<b>46.23 tons</b>

**FLUSH SEAL**

SS-1h or CSS-1h Asphalt for Flush Seal at the rate of 0.09 ton applied 38.0 feet wide (Rate = 0.05 gallon per square yard).

Sand for Flush Seal at the rate of 0.98 ton applied 22.0 feet wide (Rate = 8 lbs. per square yard).

The exact proportions of these materials will be determined on construction.

**TABLE OF ADDITIONAL QUANTITIES**

LOCATION	WATER FOR GRANULAR MATERIAL	BASE COURSE OR BASE COURSE, SALVAGE	CLASS E ASPHALT CONCRETE – ALT. A	PG 58-34 ASPHALT BINDER – ALT. A	CLASS E ASPHALT CONCRETE – ALT. B	PG 58-34 ASPHALT BINDER – ALT. B	MC-70 ASPHALT FOR PRIME	BLOTTING SAND FOR PRIME	SS-1h OR CSS-1h ASPHALT FOR TACK	SS-1h OR CSS-1h ASPHALT FOR FLUSH SEAL	SAND FOR FLUSH SEAL
	MGal	Ton	Ton / Lift	Ton / Lift	Ton / Lift	Ton / Lift	Ton	Ton	Ton / Lift	Ton	Ton
<b>Mainline Vertical Transitions</b>											
Sta. 45+69.4 to Sta. 48+09.4			85.5 / 142.5 / 114.0	5.0 / 8.3 / 6.6	87.8 / 146.3 / 117.0	4.4 / 7.3 / 5.9	1.4	3.2	0.3 / 0.3 / 0.3	0.2	2.3
Sta. 51+19.9 to Sta. 53+59.9			85.5 / 142.5 / 114.0	5.0 / 8.3 / 6.6	87.8 / 146.3 / 117.0	4.4 / 7.3 / 5.9	1.4	3.2	0.3 / 0.3 / 0.3	0.2	2.3
Sta. 1342+28.5 to Sta. 1344+68.5			85.5 / 142.5 / 114.0	5.0 / 8.3 / 6.6	87.8 / 146.3 / 117.0	4.4 / 7.3 / 5.9	1.4	3.2	0.3 / 0.3 / 0.3	0.2	2.3
Sta. 1347+22.4 to Sta. 1349+62.4			85.5 / 142.5 / 114.0	5.0 / 8.3 / 6.6	87.8 / 146.3 / 117.0	4.4 / 7.3 / 5.9	1.4	3.2	0.3 / 0.3 / 0.3	0.2	2.3
<b>Turning Lane Transitions</b>											
Sta. 1322+48.0 to Sta. 1336+20.0			946.0 / 792.4	54.8 / 46.0	971.7 / 813.7	48.6 / 40.6	9.3	24.6	2.0 / 2.0	1.7	18.0
Sta. 1354+52.0 to Sta. 1359+62.5			411.1 / 342.0	23.8 / 19.8	422.2 / 351.3	21.1 / 17.6	3.9	11.3	0.8 / 0.8	0.8	8.3
<b>Guardrail Surfacing</b>											
Str. # 16-083-011											
Begin Bridge Right	0.3	26.1	13.8	0.8	14.2	0.7	0.1	0.6			
Begin Bridge Left	0.3	21.9	11.6	0.7	11.9	0.6	0.1	0.5			
End Bridge Right	0.3	21.7	11.5	0.7	11.8	0.6	0.1	0.5			
End Bridge Left	0.3	26.2	13.8	0.8	14.2	0.7	0.1	0.6			
Str. # 16-328-018											
Begin Bridge Right	0.3	24.7	13.1	0.8	13.4	0.7	0.1	0.6			
Begin Bridge Left	0.2	20.2	10.7	0.6	11.0	0.5	0.1	0.5			
End Bridge Right	0.2	20.2	10.7	0.6	11.0	0.5	0.1	0.5			
End Bridge Left	0.3	24.5	12.9	0.7	13.3	0.7	0.1	0.6			
<b>Int. Rds. / Streets / Entrances</b>											
Sta. 1329+35 Rt.	1.0	85.2	25.4 / 20.3	1.5 / 1.2	26.1 / 20.9	1.3 / 1.0	0.2	0.8			0.7
Sta. 1329+35 Lt.			257.0 / 205.6	14.9 / 11.9	263.9 / 211.2	13.2 / 10.6	2.3	7.6	0.5 / 0.5	0.4	7.2
Sta. 1357+63 Lt.			85.6 / 68.5	5.0 / 4.0	88.0 / 70.4	4.4 / 3.5	0.8	2.7	0.2 / 0.2	0.1	2.2
Sta. 1357+69 Rt.			280.5 / 224.4	16.3 / 13.0	288.1 / 230.5	14.4 / 11.5	2.5	9.6	0.5 / 0.5	0.5	7.7
Int. Roads – 4 each	1.2	100.0	125.5	7.3	128.9	6.4	0.9	3.5	0.2	0.2	2.8
Int. Streets – 6 each	1.8	150.0	205.9	11.9	211.5	10.6	1.5	5.8	0.3	0.3	4.7
Entrances w/ AC – 7 each	1.7	140.0	143.5	8.3	147.4	7.4	1.1	4.1	0.2	0.2	3.3
Entrances w/o AC – 15 each	3.6	300.0									
<b>TOTAL =</b>	<b>11.5</b>	<b>960.7</b>	<b>5599.8</b>	<b>325.0</b>	<b>5751.0</b>	<b>287.6</b>	<b>28.9</b>	<b>87.2</b>	<b>12.3</b>	<b>5.0</b>	<b>64.1</b>

Application Rates: PG 58-34 Asphalt Binder for Class E Asphalt Concrete at 5.8% for Alt. A  
PG 58-34 Asphalt Binder for Class E Asphalt Concrete at 5.0% for Alt. B  
MC-70 Asphalt for Prime rate = 0.30 gallon per square yard  
Blotting Sand for Prime rate = 10.00 lbs. per square yard  
SS-1h or CSS-1h Asphalt for Tack rate = 0.06 gallon per square yard for Surfacing Sections  
SS-1h or CSS-1h Asphalt for Tack rate = 0.09 gallon per square yard for Resurfacing Section  
SS-1h or CSS-1h Asphalt for Flush Seal rate = 0.05 gallon per square yard  
Sand for Flush Seal rate = 8.00 lbs. per square yard

**Surfacing for Intersecting Roads, Streets and Entrances**

Intersecting Roads	Intersecting Streets	Entrances			
3" asphalt concrete & granular material	3" asphalt concrete & granular material	3" asphalt concrete & granular material	Granular material only		
Sta. 26+93 Lt. Sta. 26+93 Rt. Sta. 67+49 Lt. Sta. 3+24 Lt., SD65 So.	Sta. 1276+51 Rt. Sta. 1280+07 Rt. Sta. 1283+78 Rt. Sta. 1287+55 Rt. Sta. 1293+63 Rt. Sta. 1294+10 Lt.	Sta. 1281+93 Rt. Sta. 1283+70 Lt. Sta. 1285+83 Lt. Sta. 1287+55 Lt. Sta. 1288+39 Rt. Sta. 1289+28 Rt. Sta. 1297+30 Lt.	Sta. 39+25 Lt. Sta. 39+25 Rt. Sta. 67+49 Rt. Sta. 1250+23 Lt. Sta. 1250+23 Rt. Sta. 1268+87 Rt.	Sta. 1266+00 Lt. Sta. 1277+88 Rt. Sta. 1291+93 Lt. Sta. 1303+36 Rt. Sta. 1306+00 Lt. Sta. 1314+25 Rt.	Sta. 1366+16 Lt. Sta. 1366+16 Rt. Sta. 3+24 Rt., SD65 So.

## REINFORCED CONCRETE PIPE JOINT REPAIR AND VOID GROUTING

The Contractor will provide a notarized statement, from the Manufacturer, that the products used for culvert joint repair meet the specified requirements, along with the Manufacturer's current product specification and installation instructions.

The Contractor will be an Approved Contractor of the Manufacturer of the specified product and will provide written certification from the Manufacturer attesting to their Approved Contractor status.

All product documentation and Contractor submittals must be submitted to the Engineer prior to or at the preconstruction conference. The Contractor must have the Engineer's approval prior to commencing any of this work.

The Contractor will follow the Manufacturer's installation instructions and specifications throughout the repair process

Temperature of the specified products is critical from the point of pumping to the point of injection. All polyurethanes react faster at higher temperatures. Drum heaters and heated hoses are required when ambient or ground temperatures are below 70 degrees Fahrenheit. The optimum hose temperature will vary with the weather conditions and the particular job site conditions with the minimum hose temperature being 75 degrees Fahrenheit and the maximum hose temperature being 95 degrees Fahrenheit and the drum temperature not to exceed 90 degrees Fahrenheit.

The Contractor will provide worker and inspector safety protective gear in accordance with the manufacturer, including but not limited to chemical goggles, face shields, eye wash system and NBR gloves.

The Contractor will provide safe storage and handling of materials prior to delivery and at the project site. All material installation, handling and storage will be in accordance with the Manufacturer's recommendations.

The Contractor will visit the project to determine the extent of culvert joints to be cleaned and filled, prior to bidding.

Culvert Joint Cleaning and Repair Culvert Joint quantities will be based upon the following table showing circumference of joints based upon culvert size and shape.

Pipe Diameter (In)	Round Pipe Circumference per Joint (Ft)	Arch Pipe Circumference per Joint (Ft)
36	9.4	
42	11.0	11.0
48	12.6	
54	14.1	
60	15.7	
66	17.3	
72	18.8	19.0
78	20.4	
84	22.0	

## Culvert Joint Cleaning

This work will consist of cleaning of the culvert joints, washing the entire culvert and joints with a high-pressure washer, and if needed, wire brush cleaning of each joint to be repaired as directed by the Engineer. The entire culvert will be clean and dry and most notably the specified joints will be thoroughly cleaned to the satisfaction of the Engineer using a power washer with water pressure of at least 2500 psi. The culvert must be in a clean condition so that no deleterious material is trapped in the joints that are being repaired. The Contractor will dispose of all debris removed from the culverts during the cleaning operation as approved by the Engineer.

All costs for equipment, material and labor for the culvert joint cleaning work will be incidental to the contract unit price per foot for Culvert Joint Cleaning. Culvert Pipe Cleaning will be measured to the nearest 0.1 foot of joint which is cleaned for joint repair.

Location	Size	Culvert Joint Cleaning (Ft)
1259+88.7	Twin 48" RCP	* 176.4

\* Includes both culverts.

## Repair Culvert Joint

The culvert joints will be repaired in accordance with the Chemical Grout Manufacturer's directions to prevent future infiltration/exfiltration of soils and water and to keep the chemical grout from expanding back into the structure during injection.

The culvert joint will be repaired with a sealant comprised of water reactive hydrophilic polyurethane resin and dry oil free oakum. All grout will be injected under such pressure so as not to damage the existing drainage structure or roadway structure.

The Contractor will submit to the Engineer for approval a detailed procedure for the installation of the polyurethane grout.

The work will include, but is not limited to sealing each pipe joint with a hydrophilic polyurethane grout meeting the following specifications:

GEL FOAM II (Saturated Oakum Rope Joint Packing) as manufactured by Green Mountain International, LLC or equal.

ULTRA (Single Component Grout for Joint Injection) as manufactured by Green Mountain International, LLC or equal.

Excess grout and oakum will be trimmed from the interior face of the joint prior to applying the UV Protection (Gel Coat). The epoxy gel coat compound will be as recommended by the Manufacturer for both surface sealing and protecting the hydrophilic grout from UV exposure. The epoxy gel compound will be mixed and handled in accordance with the Manufacturer's recommendations and will meet the following requirements:

Epoxy gel sealant compounds manufactured by Green Mountain Grouts, LLC or equal.

All costs for all equipment, material and labor required to complete the work will be incidental to the contract unit price per foot for Repair Culvert Joint. Completion of the work includes initial saturated oakum rope packing of each joint, follow up injection of grout into the back side of each joint, trimming the excess grout and oakum from the interior face of the joint, application of the epoxy gel coat and site clean-up. Payment will be made per 0.1 foot of culvert joint repaired.

Location	Size	Repair Culvert Joint (Ft)
1259+88.7	Twin 48" RCP	* 176.4

\* Includes both culverts.

**TABLE OF CULVERT REPAIR**

Station	Approx. MRM	Existing Culvert	Contractor Furnished Borrow Excavation	Remove & Reset Pipe End Section	Remove & Reset Pipe	Cleanout Pipe Culvert	Culvert Joint Cleaning	Repair Culvert Joint	Bank and Channel Protection Gabion	Type B Drainage Fabric	Clear and Grub Tree	Comments
			CuYds	Each	Ft	Each	Ft	Ft	CuYds	SqYds	Each	
			Lt. / Rt.	Lt. / Rt.	Lt. / Rt.				Lt. / Rt.	Lt. / Rt.	Lt. / Rt.	
1259+88.70	130.00+0.945	Twin 48" RCP & 4 Flared Ends					176.4	176.4				
1266+22.60	130.00+1.051	36" RCP & 2 Flared Ends	--- / 5	--- / 1	--- / 6	1						
1279+20.50	131.00+0.179	36" RCP & 2 Flared Ends	--- / 10	--- / 1	--- / 12							
1289+54.90	131.00+0.375	30" RCP & 2 Flared Ends	5 / 10	1 / 1	6 / 6	1			--- / 6.0	--- / 19.0	--- / 2	Temporary Easement - Rt. Side
		TOTALS =	30	4	30	2	176.4	176.4	6.0	19.0	2	

Any pipe or end section removed and reset will have Tie Bolts installed

**REMOVE AND RESET BEAM GUARDRAIL**

Steel beam rail, end terminals, steel posts, wood blockouts for wood posts and hardware items will be removed and reset according to specifications and standard plates. In place wood posts will become the property of the Contractor and will be removed from the project limits. Payment to remove wood posts will be incidental to various guardrail Remove for Reset bid items.

Payment for new wood posts will be incidental to the contract unit price per each for "Beam Guardrail Post". See Guardrail Table for post size.

**TABLE OF GUARDRAIL QUANTITIES**

Location	Remove Type 1 MGS for Reset  (Ft)	Remove Type 1 Guardrail Transition for Reset  (Each)	Remove MGS MASH Tangent End Terminal for Reset  (Each)	Reset Type 1 MGS  (Ft)	Reset MGS MASH Tangent End Terminal  (Each)	Reset Type 1 Guardrail Transition  (Each)	Beam Guardrail Post		Guardrail Delineator  (Each)	Comments
							6"x8"x7' Wood Post  (Each)	6"x8"x6' Wood Post  (Each)		
Str. # 16-083-011										
Begin Bridge Right	150.0	1	1	150.0	1	1	6	35	6	
Begin Bridge Left	87.5	1	1	87.5	1	1	6	25	5	
End Bridge Right	87.5	1	1	87.5	1	1	6	25	5	
End Bridge Left	150.0	1	1	150.0	1	1	6	35	6	
Str. # 16-328-018										
Begin Bridge Right	125.0	1	1	125.0	1	1	6	31	6	
Begin Bridge Left	75.0	1	1	75.0	1	1	6	23	5	
End Bridge Right	75.0	1	1	75.0	1	1	6	23	5	
End Bridge Left	125.0	1	1	125.0	1	1	6	31	6	
	Subtotals =						48	228		
	Totals =	875.0	8	8	875.0	8	8	276	44	



**TABLE OF CONSTRUCTION STAKING**

(See Special Provision for Contractor Staking)

All cost to perform the following items will be incidental to the contract lump sum price for Construction Staking.

Roadway and Description	Begin Station	End Station	Length  (Ft)	Length  (Mile)	Miscellaneous Staking Quantity  (Mile)	Centerline Offset and Stationing Stakes Quantity  (Mile)
US 12	21+00	83+00	6200	1.174	1.174	1.174
US 12	1249+75	1367+00	11725	2.221	2.221	2.221
SD 65 N Intersection	10+00	13+98	398	0.075	0.075	0.075
SD 65 S Intersection	1+00	6+83	583	0.110	0.110	0.110
XR1358B Intersection	0+00	3+48	348	0.066	0.066	0.066
TOTALS =					3.646	3.646

# IN PLACE TYPICAL SECTIONS

STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0012(298)106	F10	F36

Plotting Date: 09/28/2023

PLOT SCALE - 1+6.00001

PLOTTED FROM - TRPR16032

PLOT NAME - 2

FILE - ... \TYPICAL SECTIONS 08M8.DGN

## Section 3

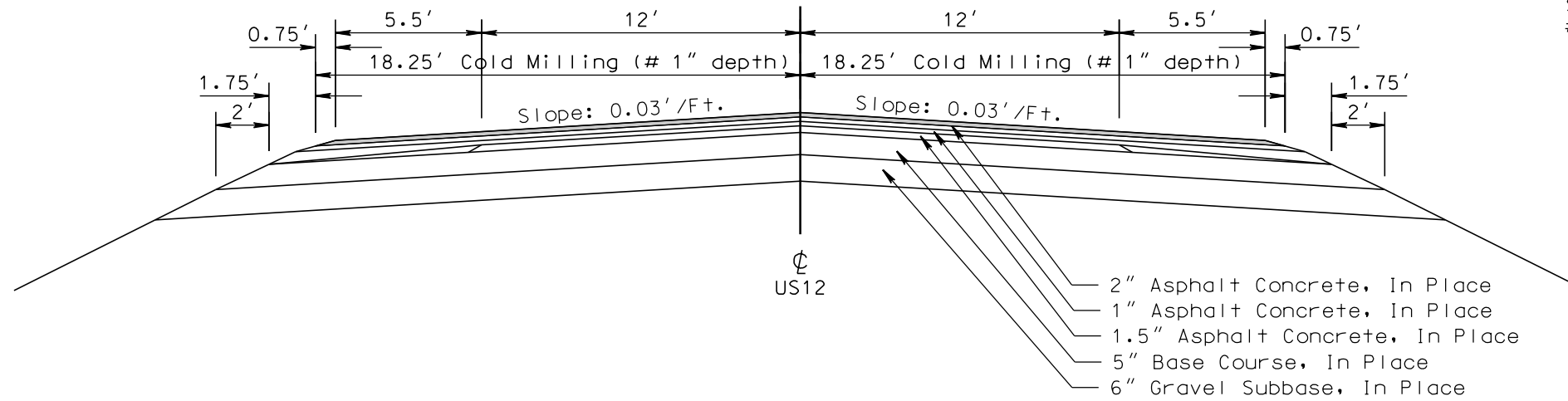
US 12

Sta. 1249+75.0 to Sta. 1303+00.0

 Cold Mill Asphalt Concrete

Transitions:

Sta. 1249+75.0 to Sta. 1250+15.0  
# 2" to 1"



 Salvaged and Stockpile Granular Base Material

Transitions:

Sta. 21+00.0 to Sta. 23+40.0  
Sta. 45+69.4 to Sta. 48+09.4  
Sta. 51+19.9 to Sta. 53+59.9  
Sta. 80+60.0 to Sta. 83+00.0  
Sta. 1303+00.0 to Sta. 1305+40.0  
Sta. 1342+28.5 to Sta. 1344+68.5  
Sta. 1347+22.4 to Sta. 1349+62.4  
Sta. 1364+60.0 to Sta. 1367+00.0

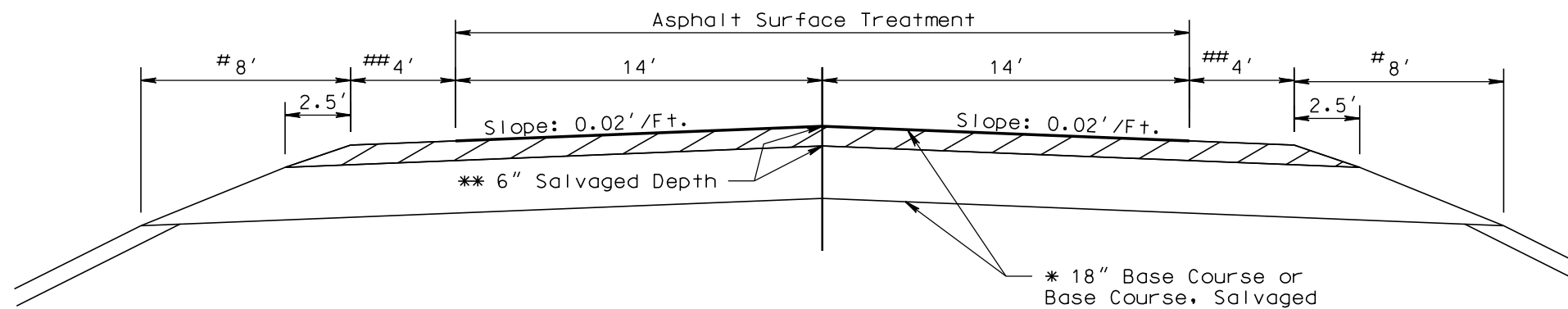
Sta. 21+00.0 to Sta. 23+40.0  
\* 18" to 12"  
\*\* 4.5" to 0"  
# 8' to 5.5'  
## 4' to 6.5'

Sta. 51+19.9 to Sta. 53+59.9  
Sta. 1347+22.4 to Sta. 1349+62.4  
\* 18" to 12"  
\*\* 6" to 1.5"  
# 8' to 5.5'  
## 4' to 6.5'

Sta. 1303+00.0 to Sta. 1305+40.0  
\* 18" to 12"  
\*\* 3.5" to 0"  
# 8' to 5.5'  
## 4' to 6.5'

Sta. 45+69.4 to Sta. 48+09.4  
Sta. 1342+28.5 to Sta. 1344+68.5  
\* 12" to 18"  
\*\* 1.5" to 6"  
# 5.5' to 8'  
## 6.5' to 4'

Sta. 80+60.0 to Sta. 83+00.0  
Sta. 1364+60.0 to Sta. 1367+00.0  
\* 12" to 18"  
0" to 4.5"  
# 5.5' to 8'  
## 6.5' to 4'



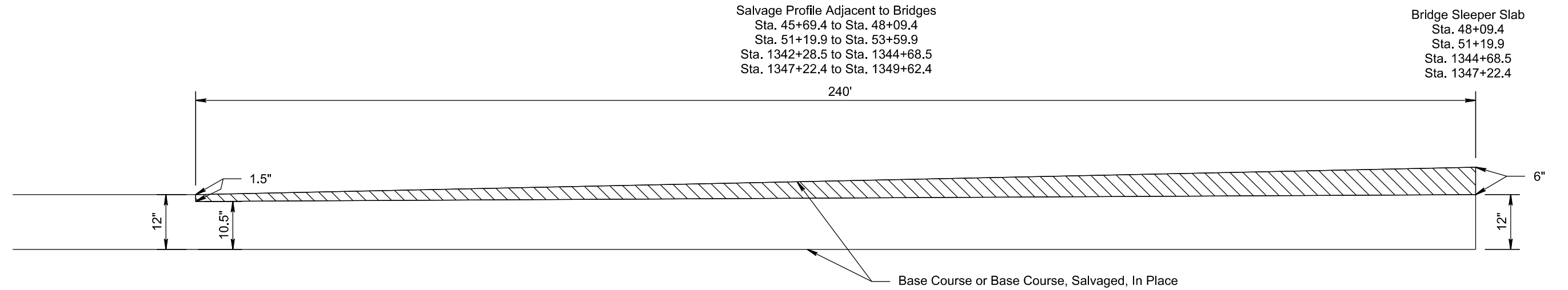
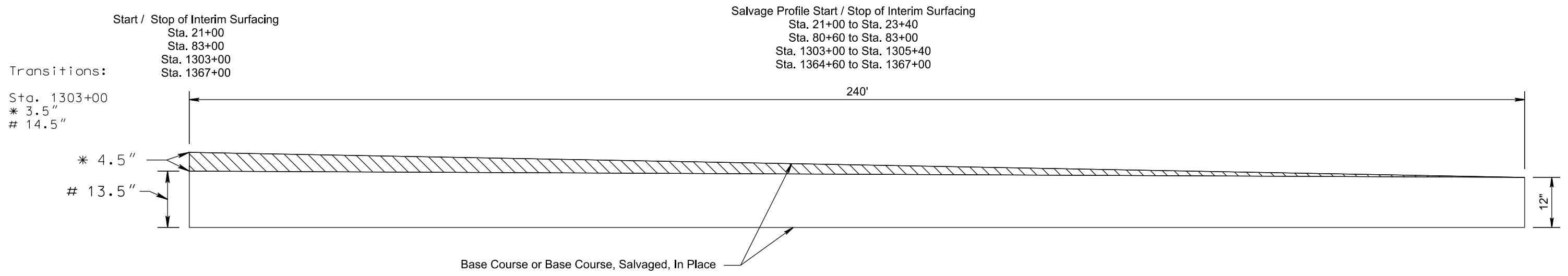
# IN PLACE SALVAGE PROFILE

STATE OF SOUTH DAKOTA	PROJECT NH 0012(298)106	SHEET F11	TOTAL SHEETS F36
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Plotting Date: 09/28/2023

PLOT SCALE - 1+6.00001

PLOT NAME - 3



PLOTTED FROM - IRPR16032

FILE - ... \TYPICAL SECTIONS 08M8.DGN

# TYPICAL SURFACING SECTIONS

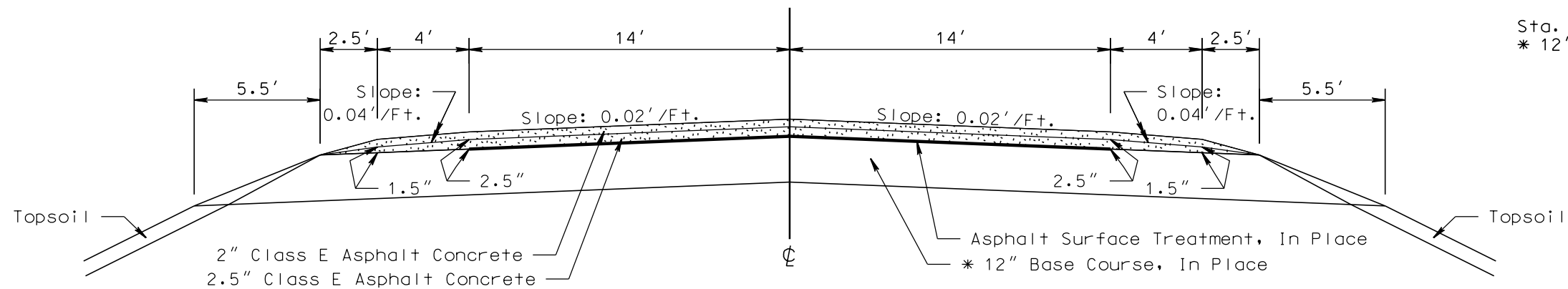
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0012(298)106	F12	F36

Plotting Date: 09/28/2023

## Section 1

US12

Sta. 21+00.0 to Sta. 45+69.4  
Sta. 53+59.4 to Sta. 83+00.0



Transitions:

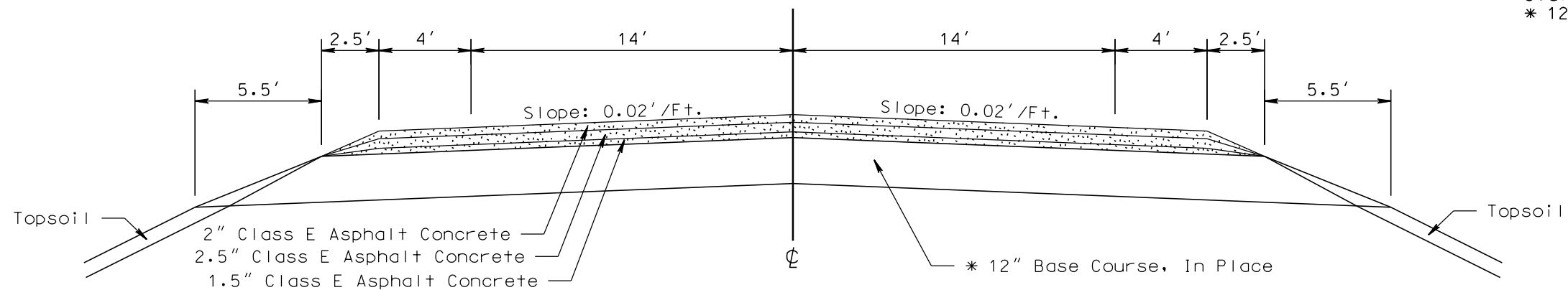
Sta. 21+00.0 to Sta. 23+40.0  
\* 13.5" to 12"

Sta. 80+60.0 to Sta. 83+00.0  
\* 12" to 13.5"

## Section 2

US12

Sta. 45+69.4 to Sta. 48+09.4  
Sta. 51+19.9 to Sta. 53+59.9



Transitions:

Sta. 45+69.4 to Sta. 48+09.4  
\* 10.5" to 12"

Sta. 51+19.9 to Sta. 53+59.9  
\* 12" to 10.5"

PLOT SCALE - 1:6.00001

PLOTTED FROM - TRPR16032

PLOT NAME - 4

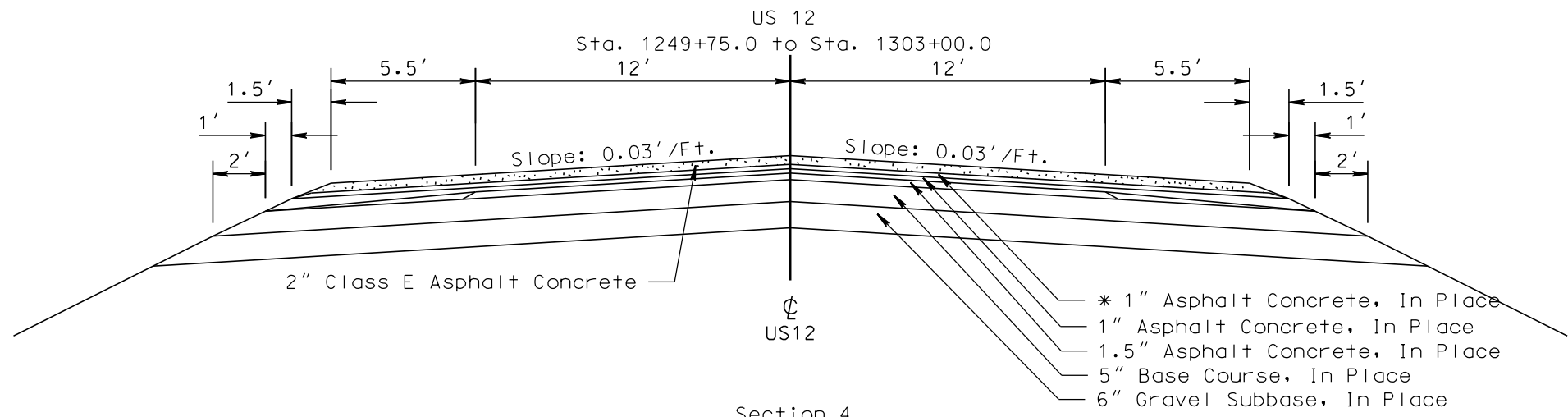
FILE - ... \TYPICAL SECTIONS 08M8.DGN

# TYPICAL SURFACING SECTIONS

STATE OF SOUTH DAKOTA	PROJECT NH 0012(298)106	SHEET F13	TOTAL SHEETS F36
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Plotting Date: 09/28/2023

## Section 3



Transitions:

Sta. 1249+75.0 to Sta. 1250+15.0  
\* 0" to 1"

Transitions:

Sta. 1322+48.0 to Sta. 1326+68.0  
\*\* 14' to 20'  
\*\*\* 14' to 20'

Sta. 1326+68.0 to Sta. 1332+00.0  
\*\* 20'  
\*\*\* 20'

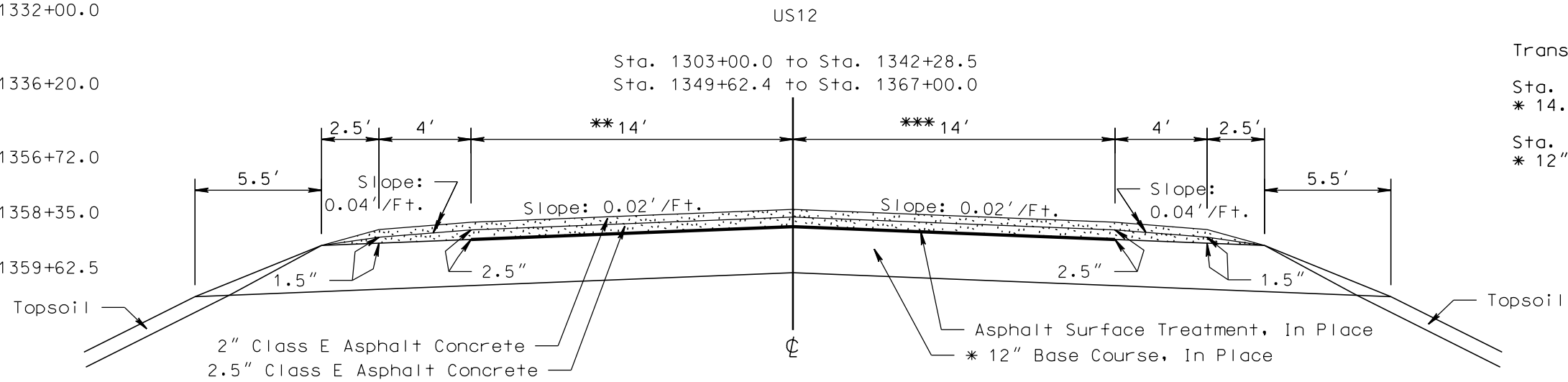
Sta. 1332+00.0 to Sta. 1336+20.0  
\*\* 20' to 14'  
\*\*\* 20' to 14'

Sta. 1354+52.0 to Sta. 1356+72.0  
\*\*\* 14' to 38'

Sta. 1356+72.0 to Sta. 1358+35.0  
\*\*\* 38'

Sta. 1358+35.0 to Sta. 1359+62.5  
\*\*\* 38' to 14'

## Section 4

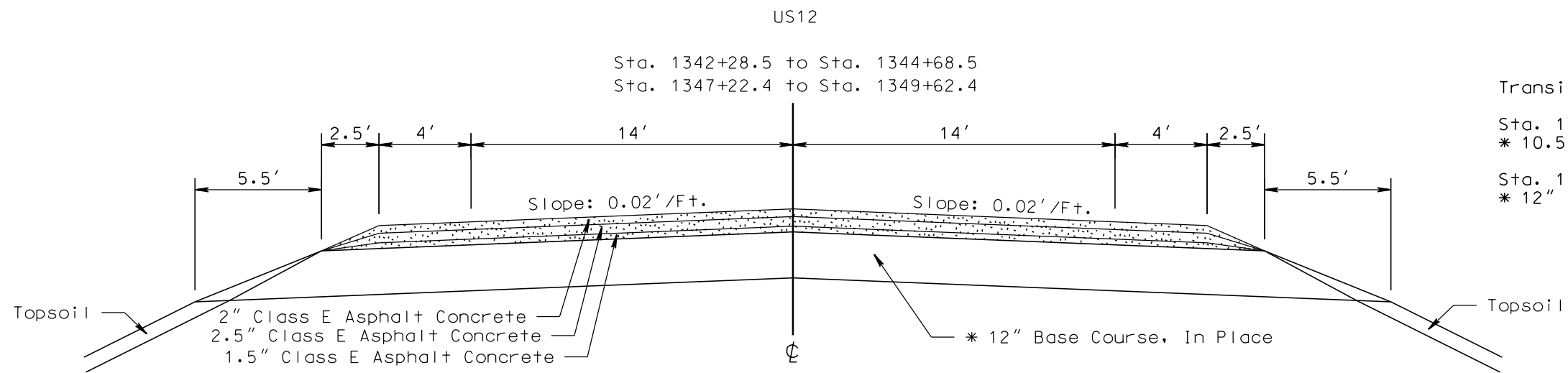


Transitions:

Sta. 1303+00.0 to Sta. 1305+40.0  
\* 14.5" to 12"

Sta. 1364+60.0 to Sta. 1367+00.0  
\* 12" to 13.5"

## Section 5



Transitions:

Sta. 1342+28.5 to Sta. 1344+68.5  
\* 10.5" to 12"

Sta. 1347+22.4 to Sta. 1349+62.4  
\* 12" to 10.5"

PLOT SCALE - 1:6,000

PLOTTED FROM - TRPR16032

PLOT NAME - 5

FILE - ... \TYPICAL SECTIONS 08M8.DGN

# TYPICAL SURFACING SECTIONS

STATE OF SOUTH DAKOTA	PROJECT NH 0012(298)106	SHEET F14	TOTAL SHEETS F36
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Plotting Date: 09/28/2023

PLOT SCALE - 1+6.00001

PLOT NAME - 6

## Section 6

### Cross Roads

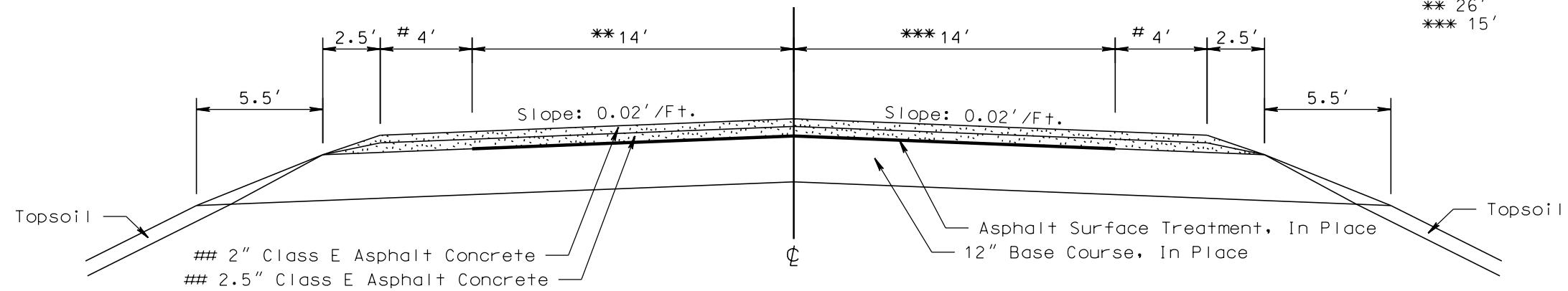
## 4.5" of Base Course will be placed from Sta. 10+00.0 to Sta. 11+15.9 XR65 North. Asphalt concrete will begin at Sta. 11+15.9.

Sta. 10+00.0 to Sta. 11+53.7 XR65 North  
 Sta. 12+02.0 to Sta. 13+98.0 XR65 North  
 Sta. 1+00.0 to Sta. 4+68.1 XR65 South  
 Sta. 5+31.6 to Sta. 6+83.0 XR65 South

### Transitions:

Sta. 10+00.0 to Sta. 11+15.9 XR65 North  
 Sta. 11+15.9 to Sta. 11+53.7 XR65 North  
 Sta. 5+31.6 to Sta. 6+83.0 XR65 South  
 # 0'

Sta. 12+02.0 to Sta. 13+98.0 XR65 North  
 \*\* 26'  
 \*\*\* 15'



PLOTTED FROM - TRPR16032

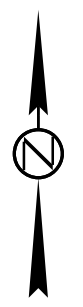
FILE - ... \TYPICAL SECTIONS 08M8.DGN

# TEMPORARY EASEMENT

STATE OF SOUTH DAKOTA	PROJECT NH 0012(298)106	SHEET F14a	TOTAL SHEETS F36
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Plotting Date: 03/08/2024

Revised: 8Mar24, RML

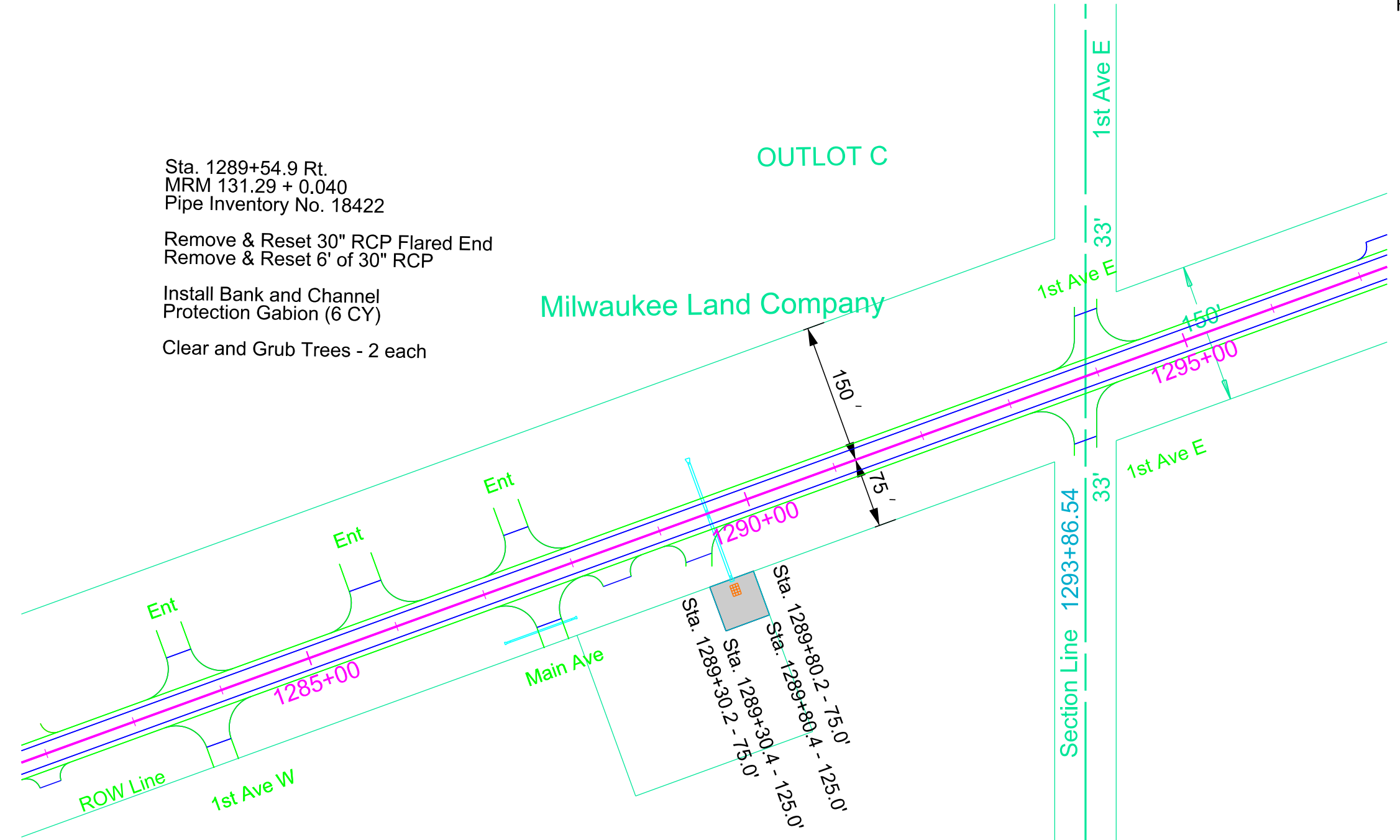


Sta. 1289+54.9 Rt.  
MRM 131.29 + 0.040  
Pipe Inventory No. 18422

Remove & Reset 30" RCP Flared End  
Remove & Reset 6' of 30" RCP

Install Bank and Channel  
Protection Gabion (6 CY)

Clear and Grub Trees - 2 each



**Parcel 1**  
0.06 ac, Temporary Easement  
(2500 sq ft), more or less

John Edinger Jr., Jamie Edinger, & Justin Edinger  
Parcel of Land situated in Lot 2 of Outlet C, Milwaukee Land Company's Plat of Outlets of the Town, now City of McIntosh, commencing at a point on the Southerly line of 6th Street, McIntosh, South Dakota, extended in an Easterly direction 100 feet easterly of the northeast corner of Block 1, Northeast Townsite, to the point of beginning, thence at right angles to the extended south line of 6th Street in a northerly direction 66 feet, thence at right angles in an easterly direction to a distance of 200 feet, thence at right angles in a southerly direction a distance of 182 feet, thence at right angles in a westerly direction a distance of 200 feet, thence at right angles in a northerly direction a distance of 116 feet to the point of beginning.

Plot Scale - 1:128

Plotted From - TRPR16032

File - ...Acors08M8Strip Map 08M8.dgn

# GUARDRAIL LAYOUTS

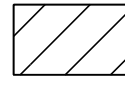
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0012(298)106	F15	F36

Plotting Date: 09/28/2023

Scale 1 Inch = 40 Feet  
Sheet 1 of 4 Sheets

- ① Remove & Reset MGS Mash Tangent End Terminal (New Wood Posts)
- ② Remove & Reset Type 1 MGS (New Wood Posts)
- ③ Remove & Reset Type 1 Guardrail Transition (New Wood Posts)

Str. No. 16-083-011  
MRM 107.55

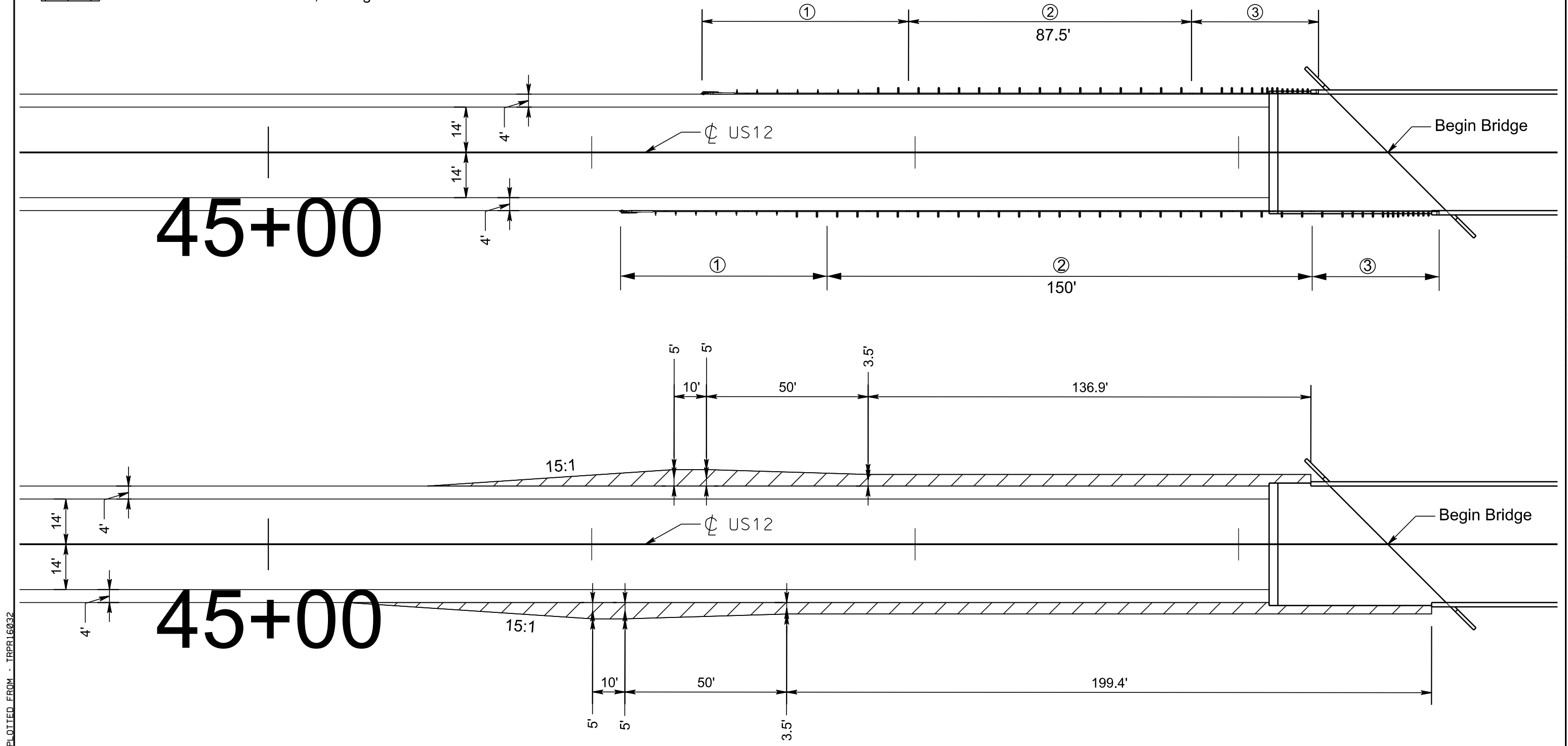
 2" Class E Asphalt Concrete & Base Course or Base Course, Salvaged



PLOT SCALE - 1:30.0391

PLOT NAME - 7

FILE - ... \08MB\_GUARDRAIL\_LAYOUTS.DGN



PLOTTED FROM - IRPR16032



# GUARDRAIL LAYOUTS

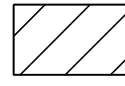
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0012(298)106	F16	F36

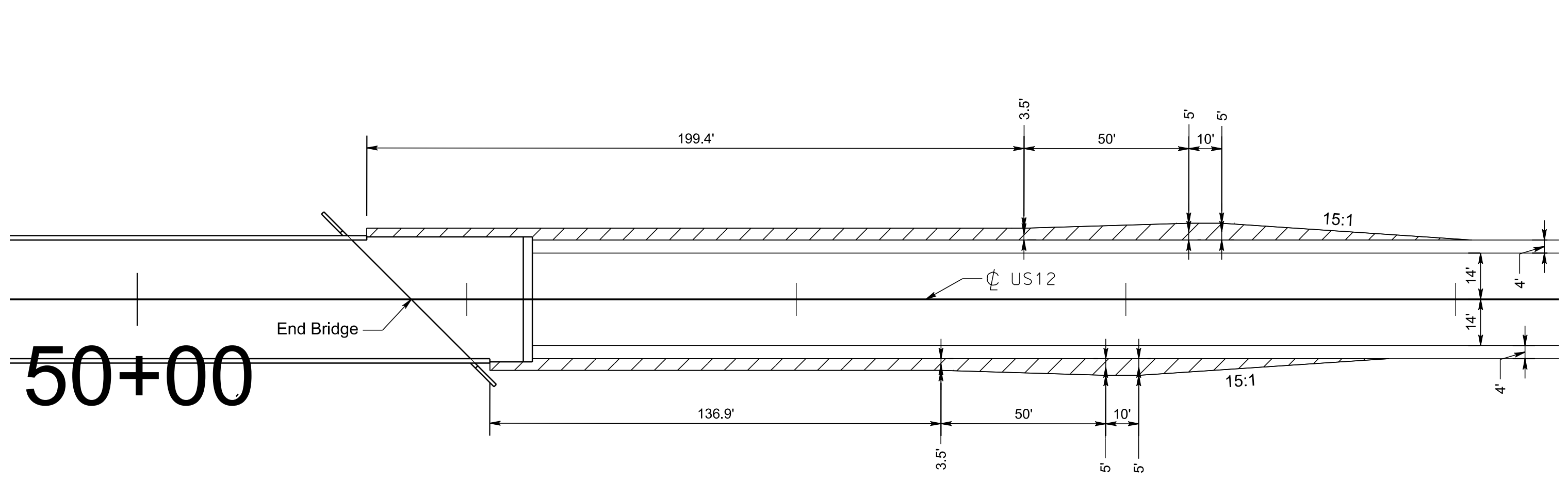
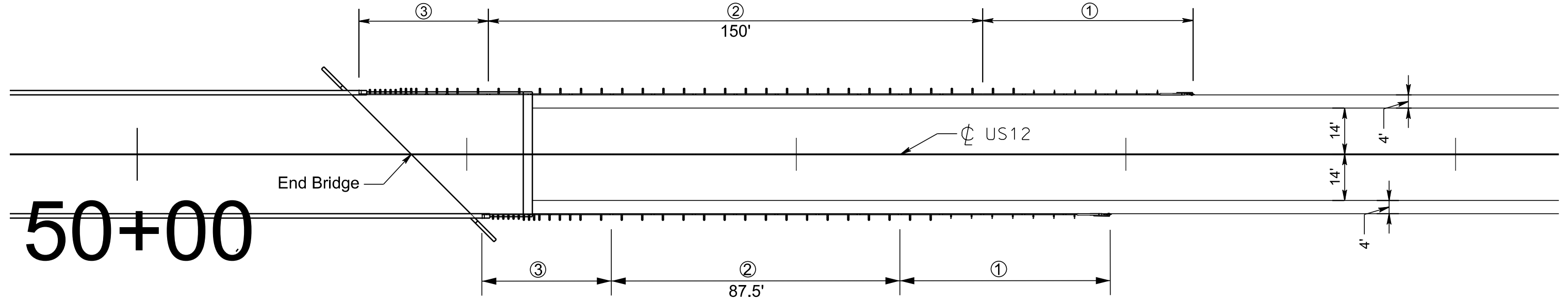
Plotting Date: 09/28/2023

Scale 1 Inch = 40 Feet  
Sheet 2 of 4 Sheets

- ① Remove & Reset MGS Mash Tangent End Terminal (New Wood Posts)
- ② Remove & Reset Type 1 MGS (New Wood Posts)
- ③ Remove & Reset Type 1 Guardrail Transition (New Wood Posts)

Str. No. 16-083-011  
MRM 107.55

 2" Class E Asphalt Concrete & Base Course or Base Course, Salvaged



PLOT SCALE - 1:30,0391

PLOTTED FROM - TRPR16032

PLOT NAME - 8

FILE - ... \08MB\_GUARDRAIL\_LAYOUTS.DGN

# GUARDRAIL LAYOUTS

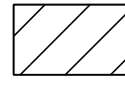
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0012(298)106	F17	F36

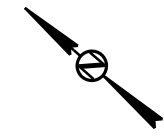
Plotting Date: 09/28/2023

Scale 1 Inch = 40 Feet  
Sheet 3 of 4 Sheets

- ① Remove & Reset MGS Mash Tangent End Terminal (New Wood Posts)
- ② Remove & Reset Type 1 MGS (New Wood Posts)
- ③ Remove & Reset Type 1 Guardrail Transition (New Wood Posts)

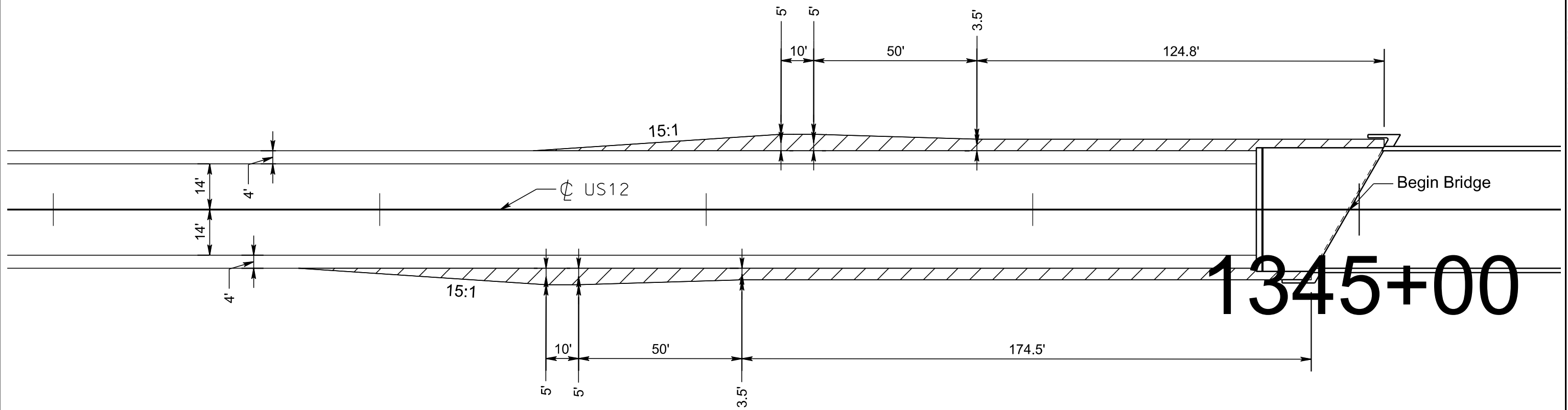
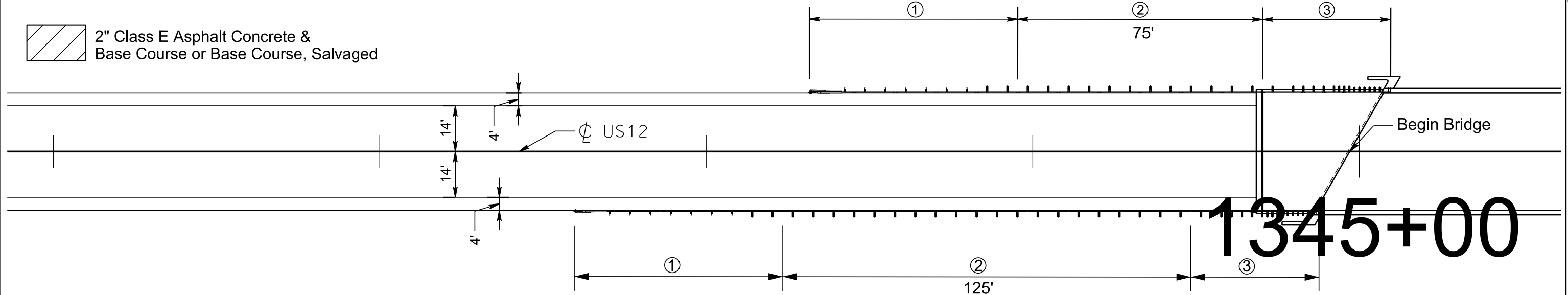
Str. No. 16-328-018  
MRM 132.45

 2" Class E Asphalt Concrete & Base Course or Base Course, Salvaged



PLOT SCALE - 1:30.0391

PLOT NAME - 9



PLOTTED FROM - IRPR16032

FILE - ... \08MB\_GUARDRAIL\_LAYOUTS.DGN

# GUARDRAIL LAYOUTS

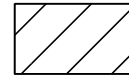
STATE OF SOUTH DAKOTA	PROJECT	SHEET	TOTAL SHEETS
	NH 0012(298)106	F18	F36

Plotting Date: 09/28/2023

① Remove & Reset MGS Mash Tangent End Terminal (New Wood Posts)

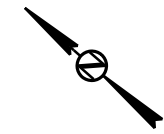
② Remove & Reset Type 1 MGS (New Wood Posts)

③ Remove & Reset Type 1 Guardrail Transition (New Wood Posts)

 2" Class E Asphalt Concrete & Base Course or Base Course, Salvaged

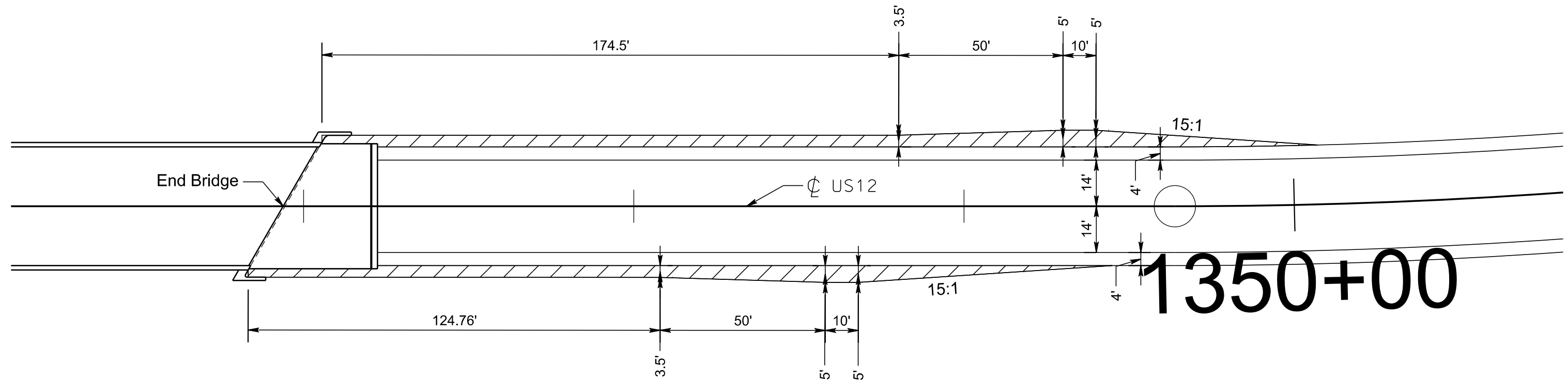
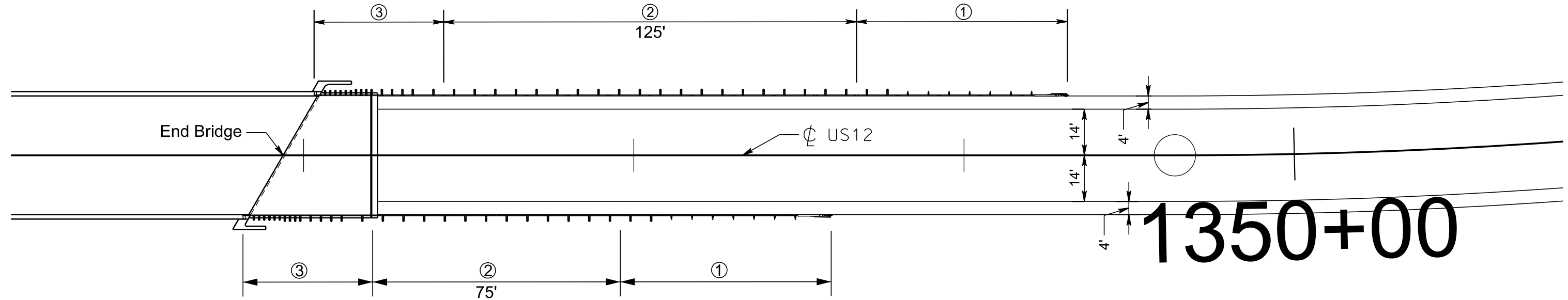
Scale 1 Inch = 40 Feet  
Sheet 4 of 4 Sheets

Str. No. 16-328-018  
MRM 132.45



PLOT SCALE - 1:30.0391

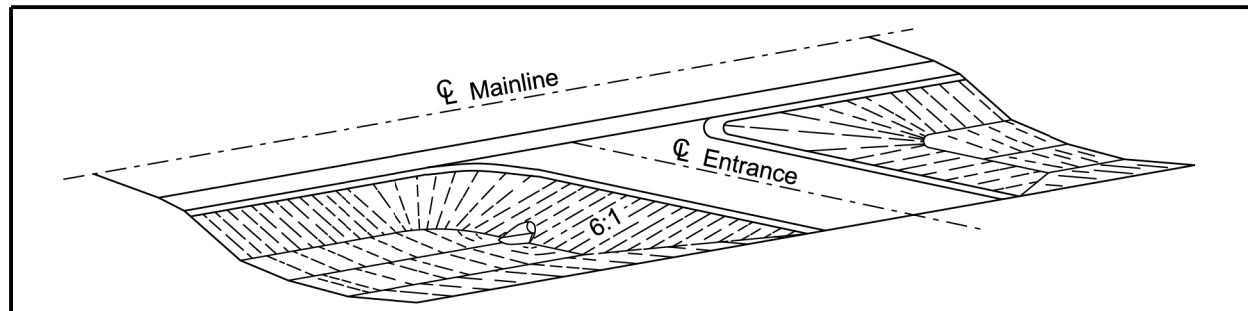
PLOT NAME - 10



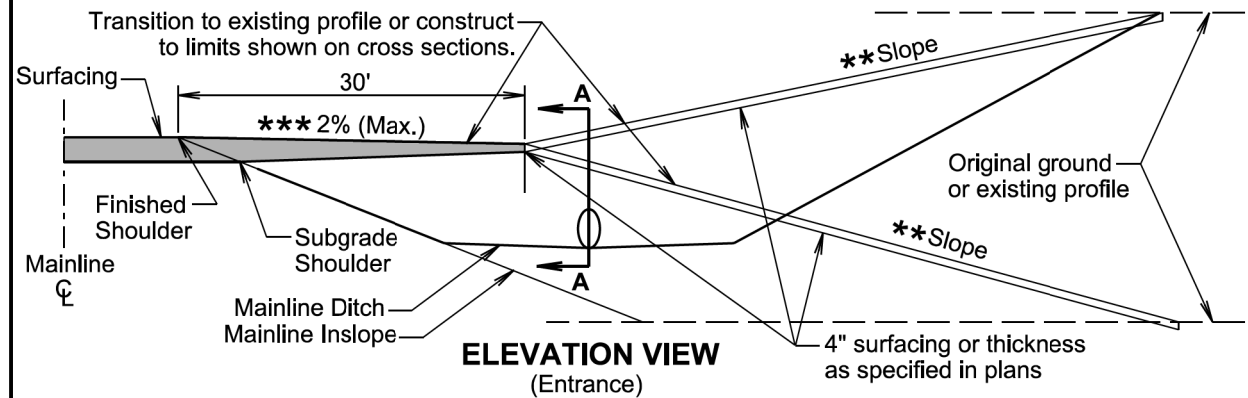
PLOTTED FROM - TRPR16032

FILE - ... \08MB\_GUARDRAIL\_LAYOUTS.DGN

Plot Scale - 1:200

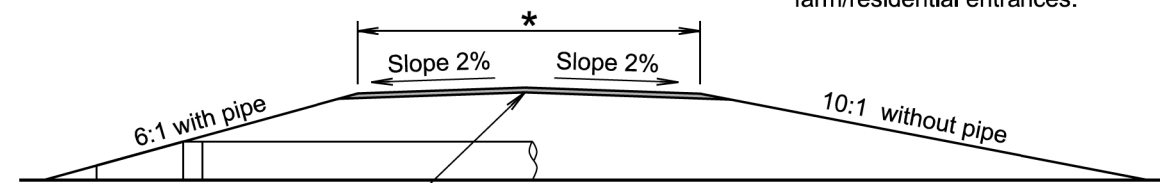


**PERSPECTIVE OF ENTRANCE**



\*\*\* 2% When on the inside of superelevation and 0% or flat when on outside of superelevation.

\*\* Entrance maximum slope is typically 10:1 for field entrances and 15:1 for farm/residential entrances.



\* The finished surfacing width is stated elsewhere in the plans. The subgrade width is 4' wider than the finished surfacing width unless stated otherwise in the plans.

**GENERAL NOTES:**

The ditch section shown above in the perspective view is only for illustrative purpose.

The elevation view above is typical for either a ditch cut or fill section. Entrances that vary from above should be specified in the plans.

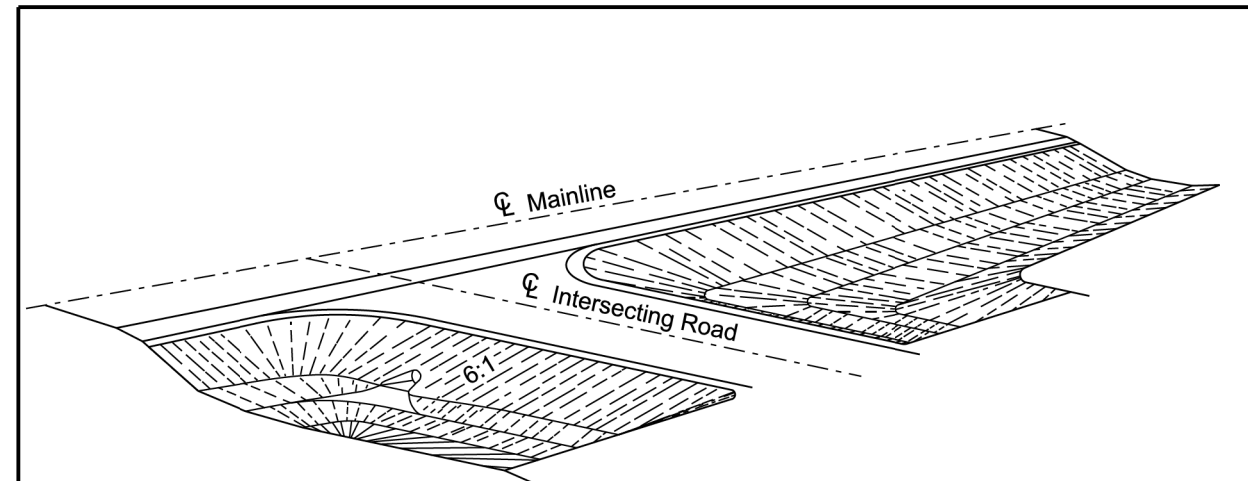
Pipe length will be adjusted if necessary during construction to obtain the 6:1 slope. For grading projects, the pipe length is estimated typically using a 4" thickness of surfacing directly over the subgrade above the pipe.

The transition area between the mainline inslope and the entrance or intersecting road inslope will be rounded to eliminate an abrupt transition.

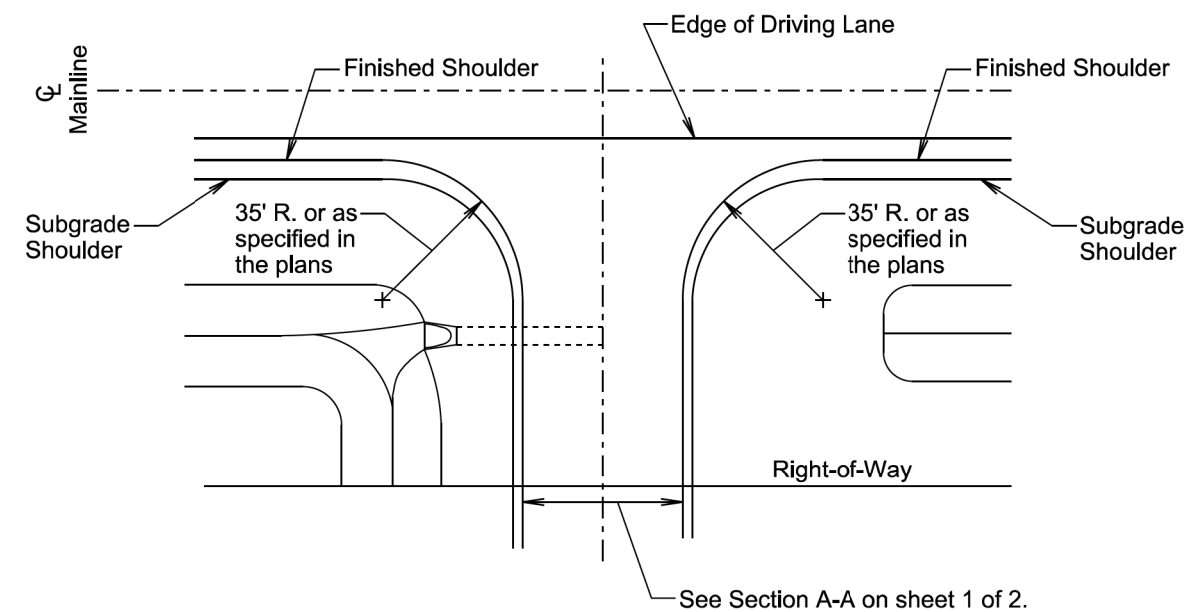
The turning radii will be 35' for intersecting roads and entrances unless stated otherwise in the plans.

November 19, 2021

<b>Published Date: 2024</b>	<b>S D D O T</b>	<b>INTERSECTING ROADS AND ENTRANCES</b>	PLATE NUMBER 120.01
			Sheet 1 of 2



**PERSPECTIVE OF INTERSECTING ROAD**



**GENERAL NOTES:**

The 6:1 or 10:1 intersecting road inslope will transition to the existing intersecting road inslope near the right-of-way or at a location as determined by the Engineer.

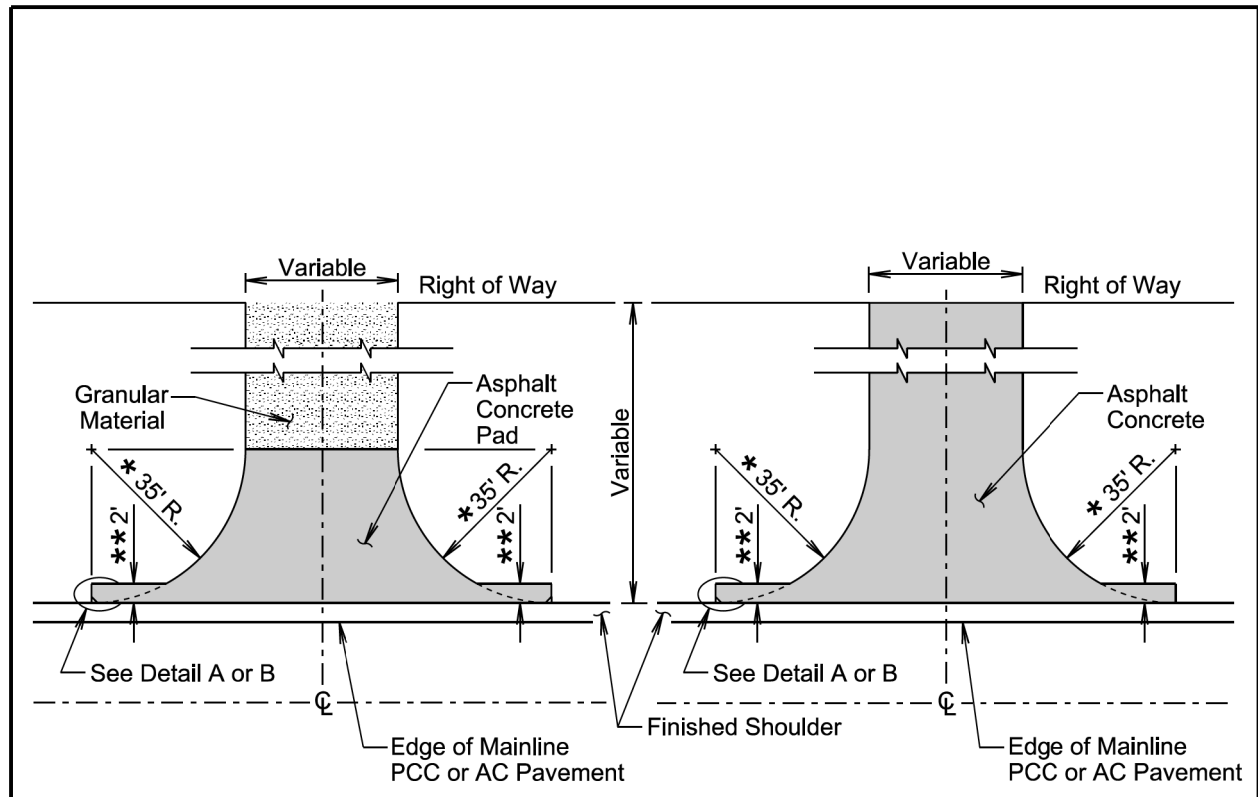
November 19, 2021

<b>Published Date: 2024</b>	<b>S D D O T</b>	<b>INTERSECTING ROADS AND ENTRANCES</b>	PLATE NUMBER 120.01
			Sheet 2 of 2

Plotted From - TRPR16032

File - ... \acors08M8\Std Plate 08M8.dgn

Plot Scale - 1:200



**PLAN VIEW**  
(Intersecting Road)  
(No Asphalt Concrete Surfacing  
Beyond Right of Way)

**PLAN VIEW**  
(Intersecting Road)  
(Asphalt Concrete Surfacing  
Beyond Right of Way)

**GENERAL NOTES:**

The precise construction limits for situations other than shown above will be determined by the Engineer during construction.

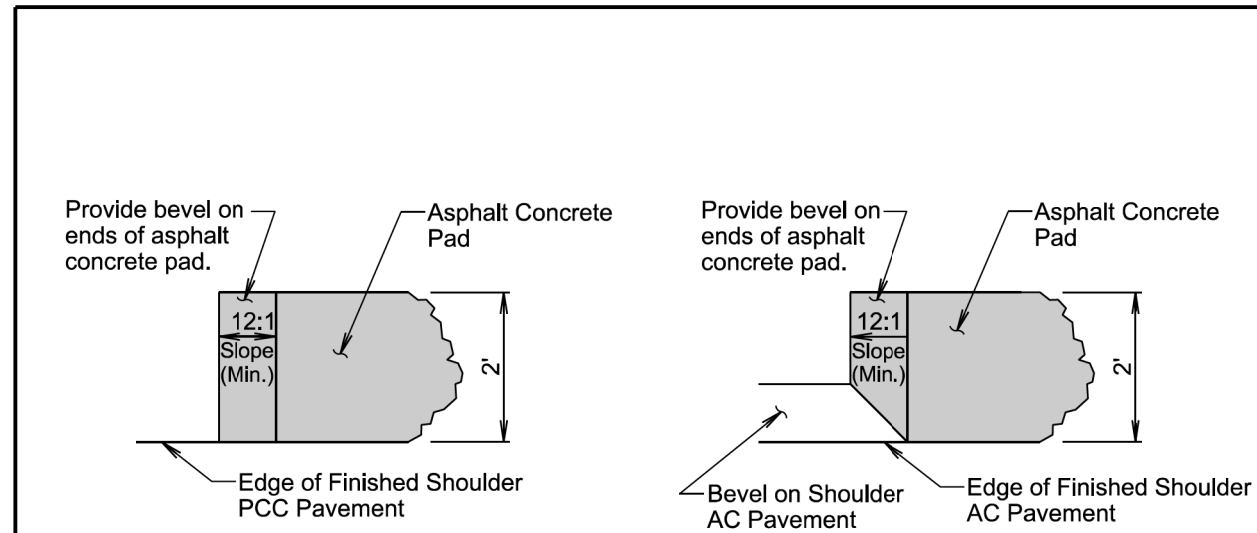
\* For new construction, 35' radius typical or as specified in the plans. For resurfacing projects, radius is variable depending on existing conditions.

\*\* The Contractor may adjust the screed of the paver during mainline paving operations to provide the 2-foot asphalt concrete pad or the Contractor may provide the 2-foot asphalt concrete pad during paving of the intersecting roads as shown above. The Engineer may eliminate the 2-foot asphalt concrete pads if the Engineer, in the Engineer's sole discretion, determines the pads are infeasible to construct due to site specific reasons including, but not limited to; existing inslope configuration, borrow and material availability, and right-of-way constraints.

August 27, 2020

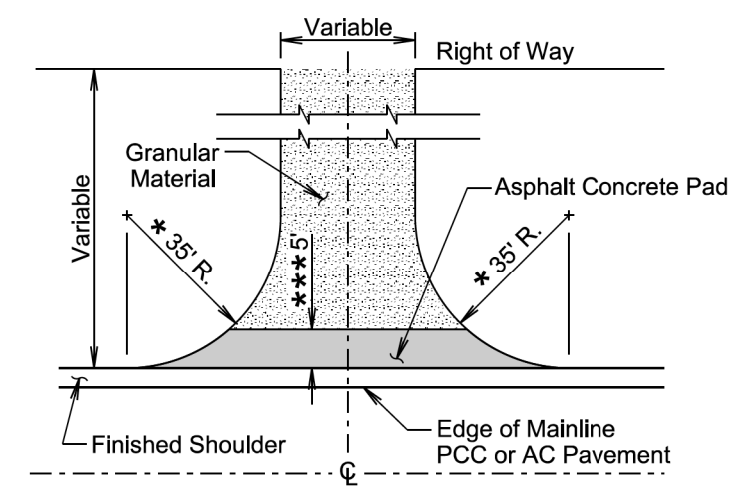
<b>S D D O T</b>	<b>SURFACING OR RESURFACING OF INTERSECTING ROADS AND ENTRANCES (MAINLINE AND SHOULDERS: PCC OR AC PAVEMENT)</b>	PLATE NUMBER 320.04
		Sheet 1 of 2

Published Date: 2024



**DETAIL A**  
(Typ. for Projects with PCC Pavement on Shoulder)

**DETAIL B**  
(Typ. for Projects with AC Pavement on Shoulder)



**PLAN VIEW**  
(Entrance)

\*\*\* Not required if finished shoulder width is 4' or greater.

August 27, 2020

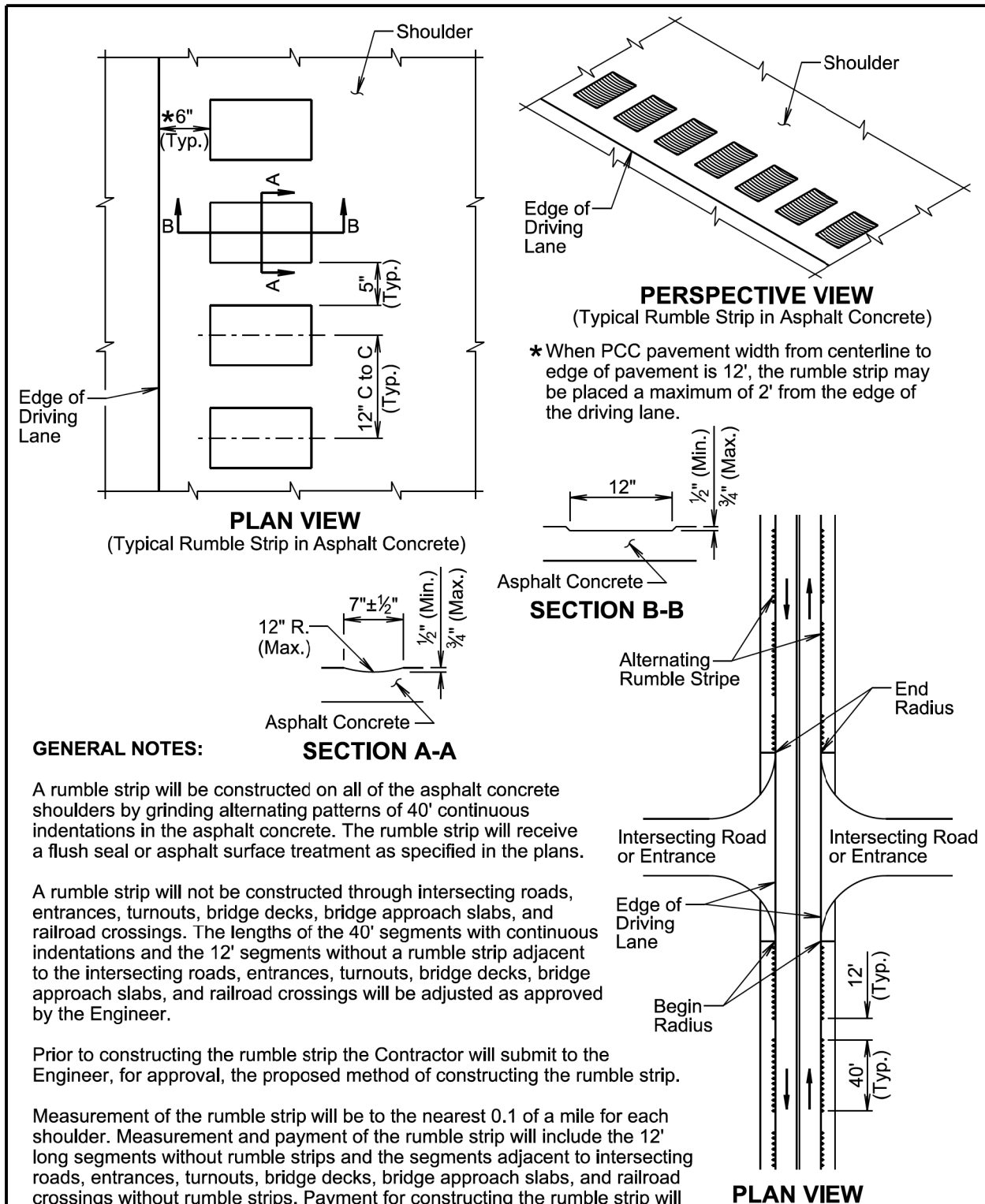
<b>S D D O T</b>	<b>SURFACING OR RESURFACING OF INTERSECTING ROADS AND ENTRANCES (MAINLINE AND SHOULDERS: PCC OR AC PAVEMENT)</b>	PLATE NUMBER 320.04
		Sheet 2 of 2

Published Date: 2024

Plotted From - TRPR16032

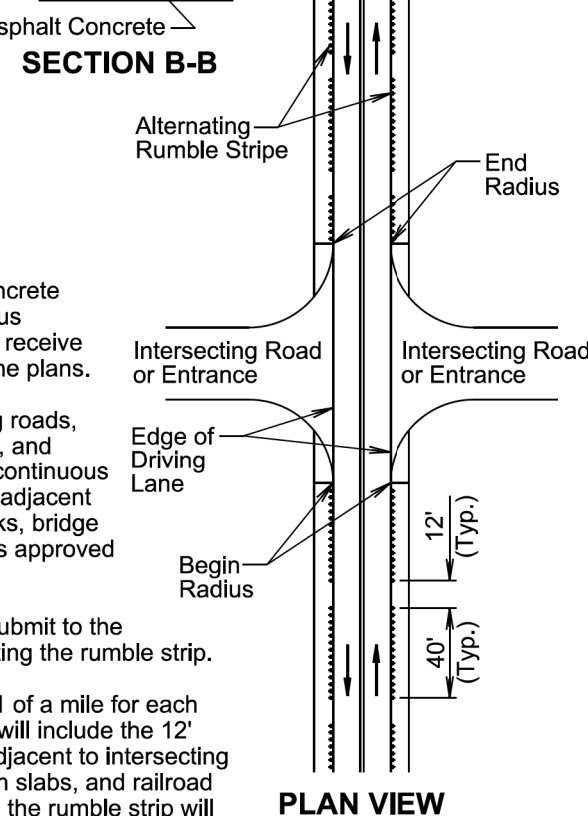
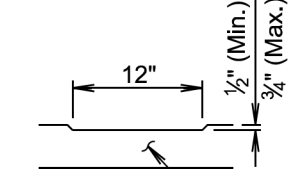
File - ... \cours0818\Std Plate 08MB.dgn

Plot Scale - 1:200



**PERSPECTIVE VIEW**  
(Typical Rumble Strip in Asphalt Concrete)

\* When PCC pavement width from centerline to edge of pavement is 12', the rumble strip may be placed a maximum of 2' from the edge of the driving lane.



**GENERAL NOTES:**

A rumble strip will be constructed on all of the asphalt concrete shoulders by grinding alternating patterns of 40' continuous indentations in the asphalt concrete. The rumble strip will receive a flush seal or asphalt surface treatment as specified in the plans.

A rumble strip will not be constructed through intersecting roads, entrances, turnouts, bridge decks, bridge approach slabs, and railroad crossings. The lengths of the 40' segments with continuous indentations and the 12' segments without a rumble strip adjacent to the intersecting roads, entrances, turnouts, bridge decks, bridge approach slabs, and railroad crossings will be adjusted as approved by the Engineer.

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

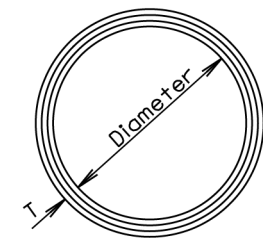
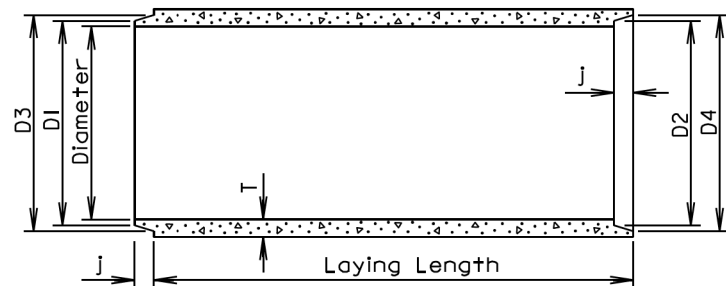
Measurement of the rumble strip will be to the nearest 0.1 of a mile for each shoulder. Measurement and payment of the rumble strip will include the 12' long segments without rumble strips and the segments adjacent to intersecting roads, entrances, turnouts, bridge decks, bridge approach slabs, and railroad crossings without rumble strips. Payment for constructing the rumble strip will be at the contract unit price per mile for "Grind 12" Rumble Strip or Stripe in Asphalt Concrete".

September 14, 2019

<b>S D D O T</b>	<b>12" RUMBLE STRIP IN ASPHALT CONCRETE ON NONDIVIDED HIGHWAY SHOULDERS</b>	PLATE NUMBER 320.24
		Sheet 1 of 1
Published Date: 2024		

**TOLERANCES IN DIMENSIONS**

Diameter:  $\pm 1.5\%$  for 24" Dia. or less and  $\pm 1\%$  or  $3/8"$  whichever is more for 27" Dia. or greater.  
 Diameters at joints:  $\pm 3/16"$  for 30" Dia. or less and  $\pm 1/4"$  for 36" or greater.  
 Length of joint (J):  $\pm 1/4"$ .  
 Wall thickness (T): not less than design T by more than 5% or  $3/16"$ , whichever is greater.  
 Laying length: shall not underrun by more than  $1/2"$ .



**LONGITUDINAL SECTION**

**END VIEW**

**GENERAL NOTES:**

Construction of R.C.P. shall conform to the requirements of Section 990 of the Specifications.

Not more than 2 four-foot sections shall be permitted near the ends of any culvert. Four-foot lengths shall be used only to secure the required length of culvert.

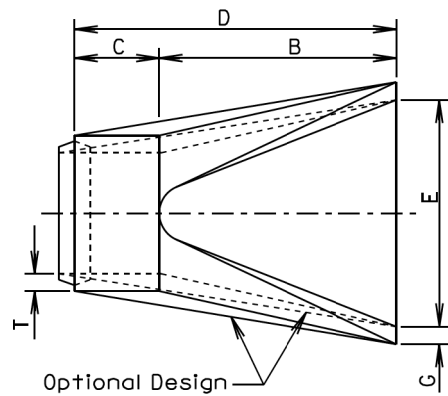
Diam. (in.)	Approx. Wt. /Ft. (lb.)	T (in.)	J (in.)	D1 (in.)	D2 (in.)	D3 (in.)	D4 (in.)
12	92	2	1 3/4	13 1/4	13 5/8	13 3/8	14 1/4
15	127	2 1/4	2	16 1/2	16 7/8	17 1/4	17 5/8
18	168	2 1/2	2 1/4	19 5/8	20	20 3/8	20 3/4
21	214	2 3/4	2 1/2	22 7/8	23 1/4	23 3/4	24 1/8
24	265	3	2 3/4	26	26 3/8	27	27 3/8
27	322	3 1/4	3	29 1/4	29 5/8	30 1/4	30 5/8
30	384	3 1/2	3 1/4	32 3/8	32 3/4	33 1/2	33 3/8
36	524	4	3 3/4	38 3/4	39 1/4	40	40 1/2
42	685	4 1/2	4	45 1/8	45 5/8	46 1/2	47
48	867	5	4 1/2	51 1/2	52	53	53 1/2
54	1070	5 1/2	4 1/2	57 7/8	58 3/8	59 3/8	59 7/8
60	1296	6	5	64 1/4	64 3/4	66	66 1/2
66	1542	6 1/2	5 1/2	70 5/8	71 1/8	72 1/2	73
72	1810	7	6	77	77 1/2	79	79 1/2
78	2098	7 1/2	6 1/2	83 3/8	83 7/8	85 5/8	86 1/8
84	2410	8	7	89 3/4	90 1/4	92 1/8	92 5/8
90	2740	8 1/2	7	95 3/4	96 1/4	98 1/8	98 5/8
96	2950	9	7	102 1/8	102 5/8	104 1/2	105
102	3075	9 1/2	7 1/2	109	109 1/2	111 1/2	112
108	3870	10	7 1/2	115 1/2	116	118	118 1/2

June 26, 2015

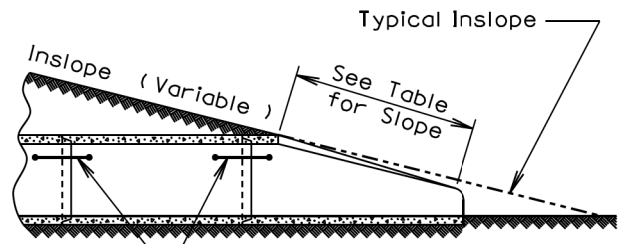
<b>S D D O T</b>	<b>REINFORCED CONCRETE PIPE</b>	PLATE NUMBER 450.01
		Sheet 1 of 1
Published Date: 2024		

Plotted From: TRPR16032

File: ... \scors08M8\Std Plate 08M8.dgn



TOP VIEW

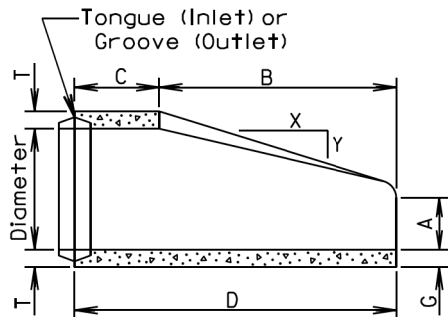


SLOPE DETAIL

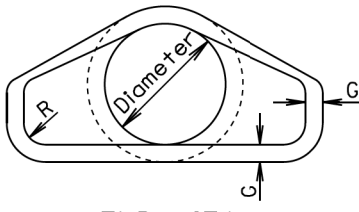
**GENERAL NOTES:**

Lengths of concrete pipe shown on plan sheets are between flared ends only.

Construction of R.C.P. Flared End shall conform to the requirements of Section 990 of the Specifications.



LONGITUDINAL SECTION



END VIEW

Dia. (in.)	Approx. Wt. of Section (lbs.)	Approx. Slope (X to Y)	T (in.)	A (in.)	B (in.)	C (in.)	D (in.)	E (in.)	G (in.)	R (in.)
12	530	2.4:1	2	4	24	48 1/8	72 7/8	24	2	1 1/2
15	740	2.4:1	2 1/4	6	27	46	73	30	2 1/4	1 1/2
18	990	2.3:1	2 1/2	9	27	46	73	36	2 1/2	1 1/2
21	1280	2.4:1	2 3/4	9	36	37 1/2	73 1/2	42	2 3/4	1 1/2
24	1520	2.5:1	3	9 1/2	43 1/2	30	73 1/2	48	3	1 1/2
27	1930	2.5:1	3 1/4	10 1/2	49 1/2	24	73 1/2	54	3 1/4	1 1/2
30	2190	2.5:1	3 1/2	12	54	19 3/4	73 3/4	60	3 1/2	1 1/2
36	4100	2.5:1	4	15	63	34 3/4	97 3/4	72	4	1 1/2
42	5380	2.5:1	4 1/2	21	63	35	98	78	4 1/2	1 1/2
48	6550	2.5:1	5	24	72	26	98	84	5	1 1/2
54	8240	2:1	5 1/2	27	65	33 1/4	98 1/4	90	5 1/2	1 1/2
60	8730	1.9:1	6	35	60	39	99	96	5	1 1/2
66	10710	1.7:1	6 1/2	30	72	27	99	102	5 1/2	1 1/2
72	12520	1.8:1	7	36	78	21	99	108	6	1 1/2
78	14770	1.8:1	7 1/2	36	90	21	111	114	6 1/2	1 1/2
84	18160	1.6:1	8	36	90 1/2	21	111 1/2	120	6 1/2	1 1/2
90	20900	1.5:1	8 1/2	41	87 1/2	24	111 1/2	132	6 1/2	6

June 26, 2015

<b>S D D O T</b>	<b>R. C. P. FLARED ENDS</b>	PLATE NUMBER <b>450.10</b>
	Published Date: 2024	Sheet 1 of 1

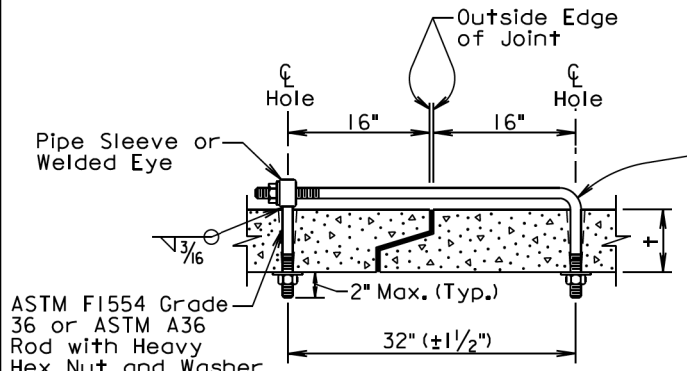
Wall "t" (in.)	Rod Dia. (in.)	Pipe Sleeve Dia. (nominal)
≤ 3/4	5/8	3/4
3/2-6/2	3/4	1
≥ 7	1	1 1/4

**GENERAL NOTES:**

Tie bolts shall conform to ASTM F1554 Grade 36 or ASTM A36. Nuts shall be heavy hex conforming to ASTM A563. Washers shall conform to ASTM F436.

Pipe Sleeve shall conform to ASTM A500 or A53, Grade B.

Galvanize adjustable eye bolt tie assembly in accordance with ASTM A153.



ADJUSTABLE EYE BOLT TIE

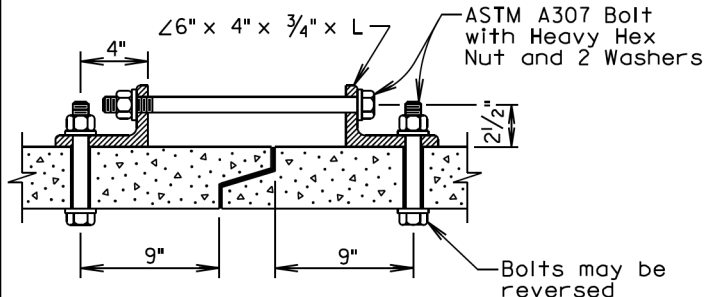
Pipe Dia. (in.)	"L" (in.)	Bolt Dia. (in.)
≤ 48	4	3/4
> 48	6	1

**GENERAL NOTES:**

Angles shall conform to ASTM A36.

Bolts shall conform to ASTM A307. Nuts shall be heavy hex conforming to ASTM A563. Washers shall conform to ASTM F436.

Galvanize angles, bolts, nuts, and washers in accordance with ASTM A153.



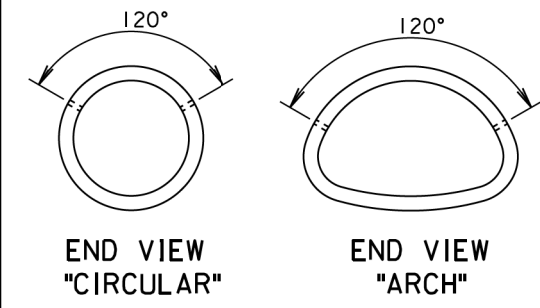
ANGLE AND BOLT TIE

**GENERAL NOTES:**

In lieu of the tie bolts detailed above other types of tie bolt connections may be installed as approved by the Office of Bridge Design.

All pipe sections of R.C.P. and R.C.P. Arch shall be tied with tie bolts except for pipe located between drop inlets, manholes, and junction boxes. All pipe sections of pipes that only enter or exit drop inlets, manhole, and junction boxes shall be tied with tie bolts.

There will be no separate measurement or payment for the tie bolts. The cost for furnishing and installing the tie bolts shall be incidental to the contract unit price per foot for the corresponding bid item for R.C.P. or R.C.P. Arch.



END VIEW "CIRCULAR"

END VIEW "ARCH"

February 28, 2013

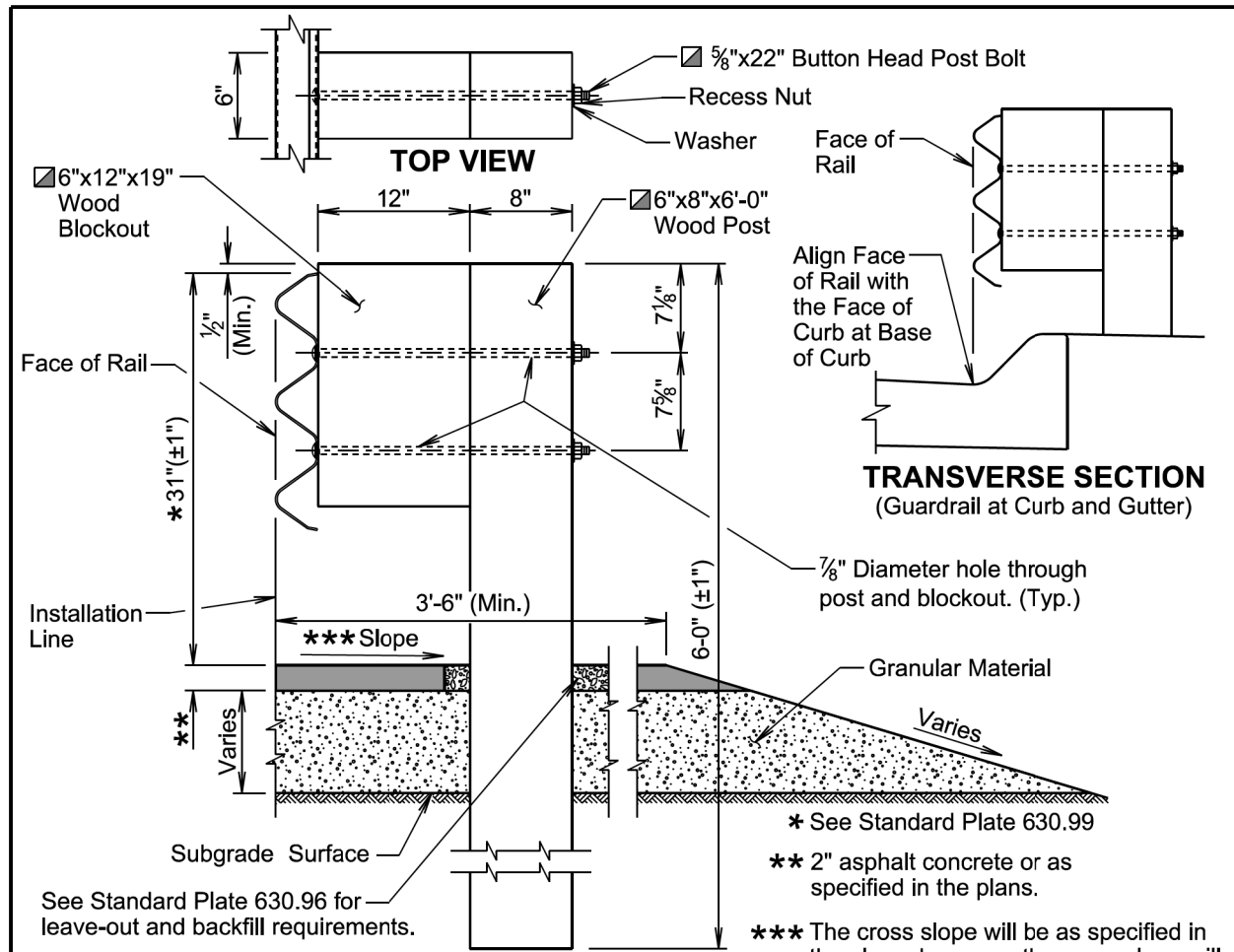
<b>S D D O T</b>	<b>TIE BOLTS FOR R.C.P. AND R.C.P. ARCH</b>	PLATE NUMBER <b>450.18</b>
	Published Date: 2024	Sheet 1 of 1

Plot Scale - 1:200

Plotted From - TRPR16032

File - ... \cours08M8\Std Plate 08M8.dgn

Plot Scale - 1:200



**GENERAL NOTES:**

**TRANSVERSE SECTION**

Asphalt concrete will be the same type used elsewhere on the project or will be as specified in the plans. If asphalt concrete is not specified in the plans, the asphalt concrete will conform to the Specifications for "Asphalt Concrete Composite."

Granular material will be the same type used elsewhere on the project or will be as specified in the plans. If granular material type is not specified in the plans, the material will conform to the Specifications for "Base Course". The granular material will be placed the same thickness as the mainline surfacing or as specified in the plans.

Topsoil is not shown in the transverse section drawing.

☑ The post and blockout illustrated above is typical for single thrie beam guardrail. When other variations of posts and blockouts are specified on other standard plates (e.g. transitions) then the posts and blockouts will be as specified on the other standard plates or as specified in the plans.

Slots in the rails will be provided as specified in the plans and by the manufacturer. A drilled hole through the rail is not allowed as a replacement for a slot. If the Contractor must create a slot, a cutting torch or plasma cutter is not allowed. The slot edges will be smooth and free of burrs or notches.

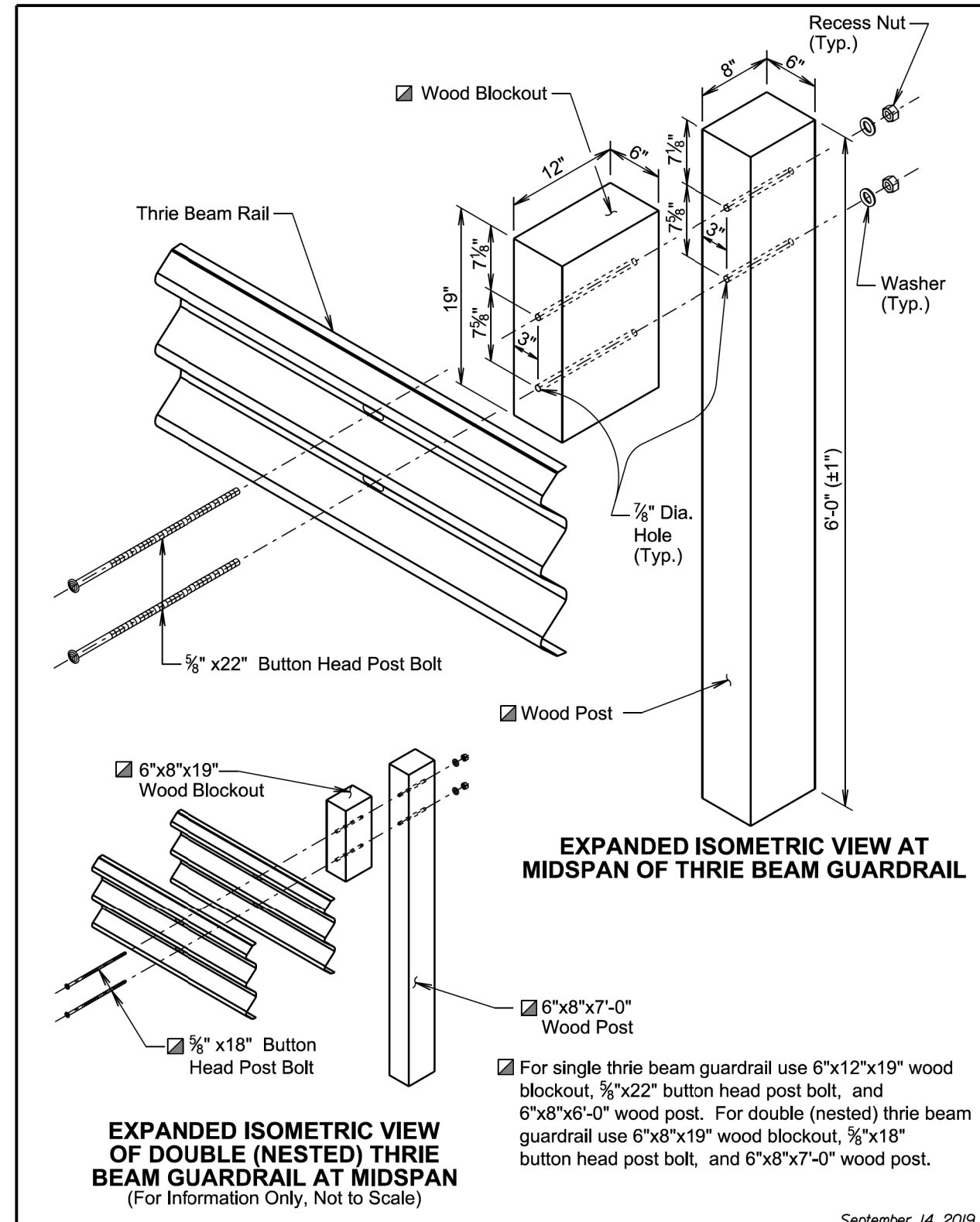
The top of post and top of block will have a true square cut. The top of block will be a maximum of  $\pm\frac{1}{2}$  inch from the top of the post.

\* See Standard Plate 630.99  
 \*\* 2" asphalt concrete or as specified in the plans.  
 \*\*\* The cross slope will be as specified in the plans; however, the cross slope will not be steeper than a 10:1 slope.

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<b>S D D O T</b>	<b>THRIE BEAM GUARDRAIL</b>	PLATE NUMBER <b>630.01</b>
		Sheet 1 of 5

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September 14, 2019

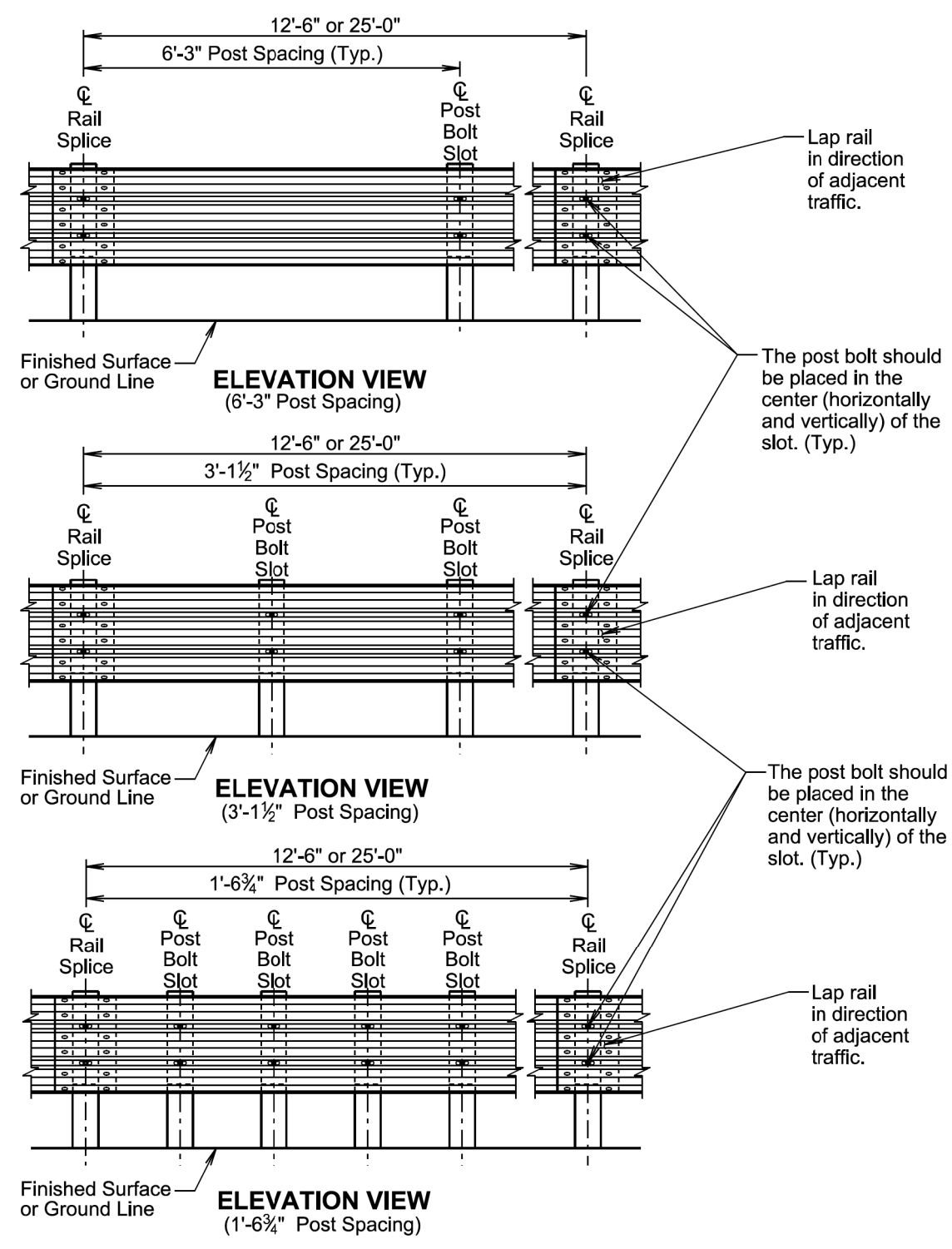
<b>S D D O T</b>	<b>THRIE BEAM GUARDRAIL</b>	PLATE NUMBER <b>630.01</b>
		Sheet 2 of 5

Published Date: 2024

File - ... \cours08M8\Std Plate 08M8.dgn

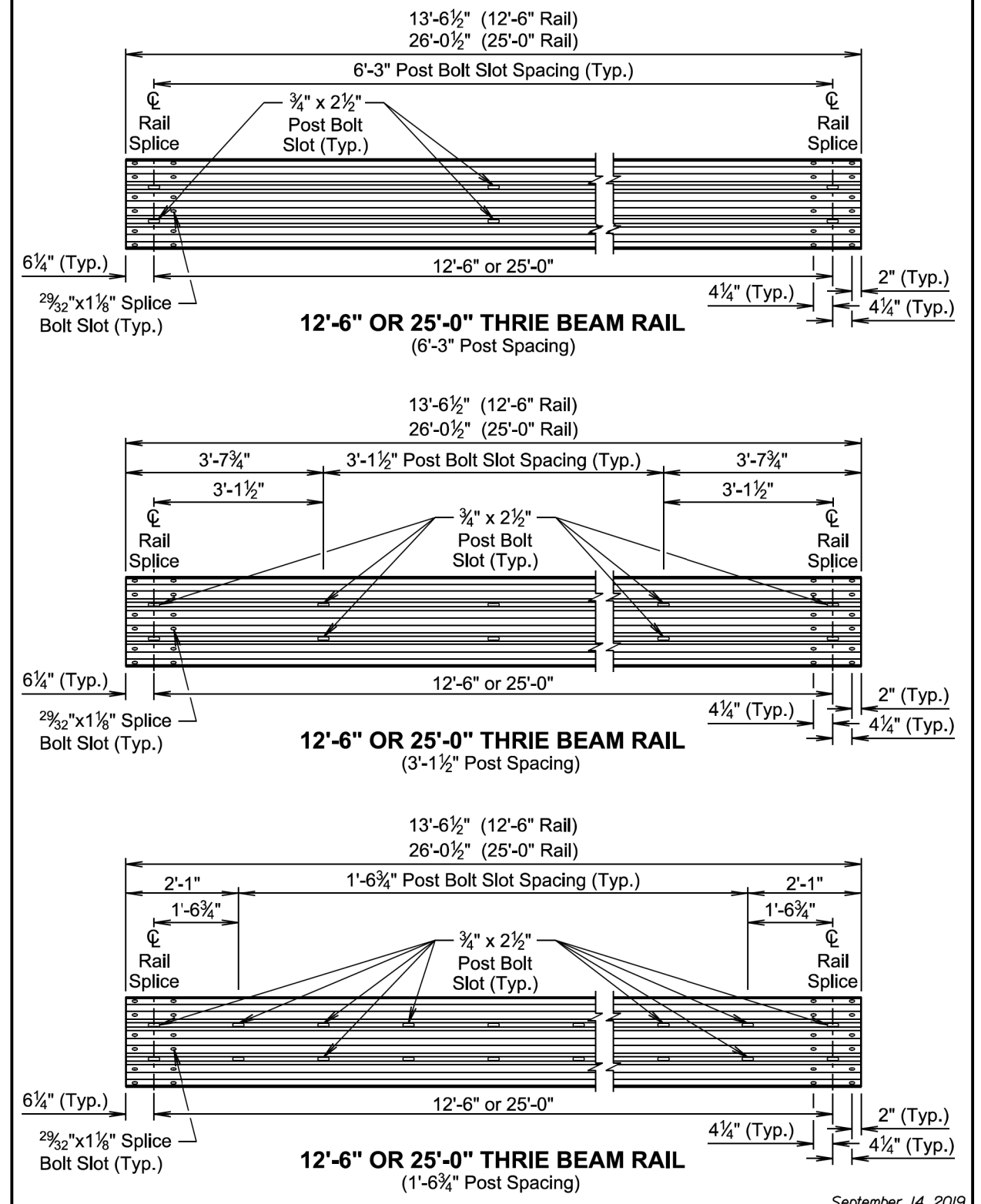
Plotted From - TRPR16032





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<b>Published Date: 2024</b>	<b>S D D O T</b>	<b>THRIE BEAM GUARDRAIL</b>	PLATE NUMBER 630.01
			Sheet 3 of 5



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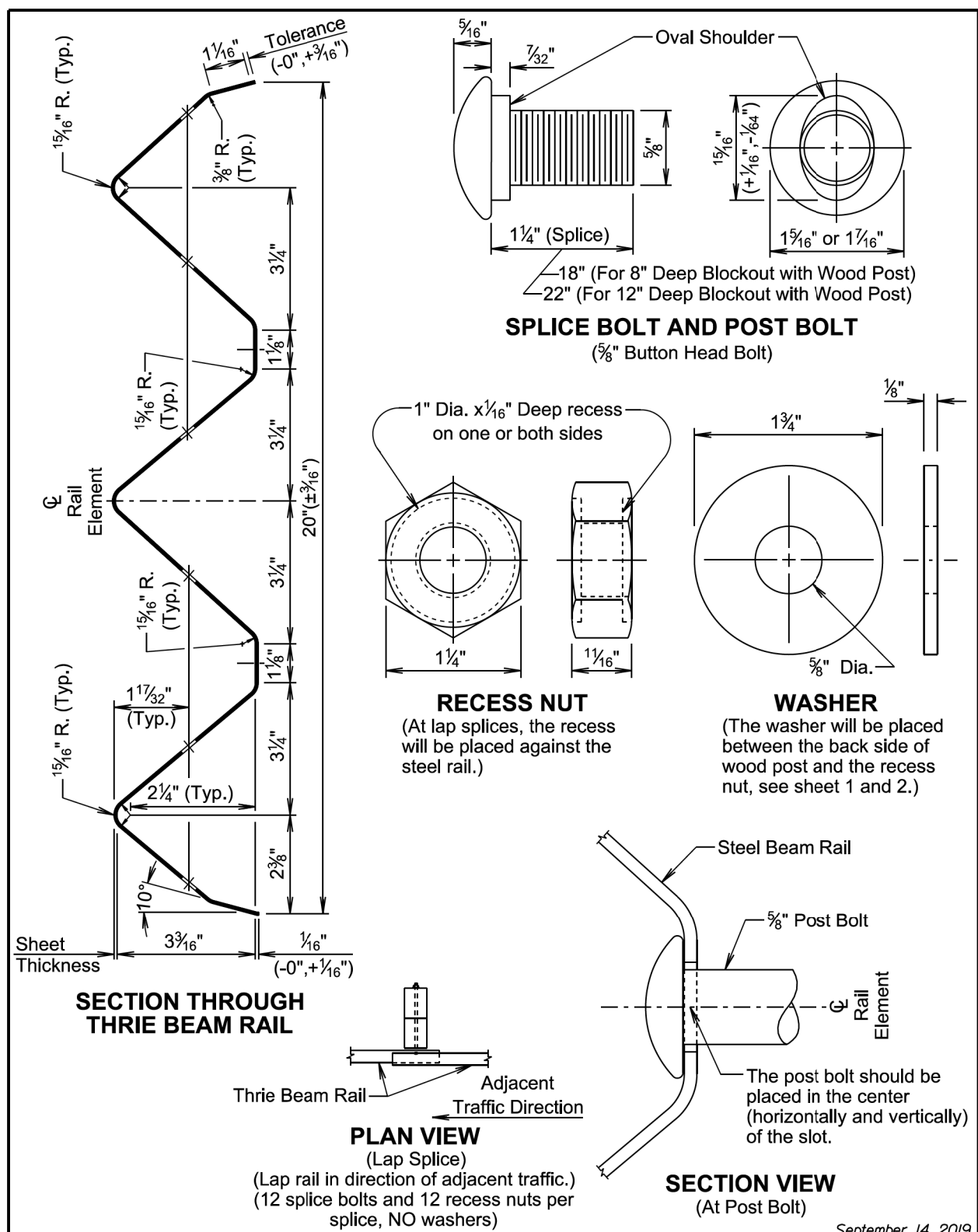
<b>Published Date: 2024</b>	<b>S D D O T</b>	<b>THRIE BEAM GUARDRAIL</b>	PLATE NUMBER 630.01
			Sheet 4 of 5

Plot Scale - 1:200

Plotted From - TRPR16032

File - ...acors08M8\Std Plate 08M8.dgn

Plot Scale - 1:200



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Published Date: 2024	S D D O T	THRIE BEAM GUARDRAIL	PLATE NUMBER 630.01
			Sheet 5 of 5

TYPE AND DETAILS OF MGS						
Type of MGS	W Beam Rail Single or Double (Nested)	Blockout Size	Blockout Material	Post Size	Post Material	Post Spacing
1	Single	6"x12"x14"	Wood	6"x8"x6'-0"	Wood	6'-3"
1C	Single	6"x12"x14"	Wood	6"x8"x7'-6"	Wood	6'-3"
2	Single	6"x12"x14"	Wood	6"x8"x6'-0"	Wood	3'-1 1/2"
3	Single	6"x12"x14"	Wood	6"x8"x6'-0"	Wood	1'-6 3/4"
4	Double	6"x12"x14"	Wood	6"x8"x6'-0"	Wood	6'-3"

STANDARD PLATE REFERENCE	
Type of MGS	See Standard Plate(s)
1	630.20, 630.22
1C	630.20, 630.25
2	630.20
3	630.20
4	630.20

**GENERAL NOTES:**

Asphalt concrete will be the same type used elsewhere on the project or will be as specified in the plans. If asphalt concrete is not specified in the plans, the asphalt concrete will conform to the Specifications for "Asphalt Concrete Composite".

Granular material will be the same type used elsewhere on the project or will be as specified in the plans. If granular material type is not specified in the plans, the material will conform to the Specifications for "Base Course". The granular material will be placed the same thickness as the mainline surfacing or as specified in the plans.

Topsoil is not shown in the transverse section drawing on sheet 2 of 6.

All W beam rail will be Type 1 and Class A (12 Ga.) unless specified otherwise in the plans.

W beam rail section lengths may be 12'-6" and/or 25'-0". The combination of section lengths used will be compatible with the total length of rail per site as shown in the plans.

Slots in the rails will be provided as specified in the plans and by the manufacturer. A drilled hole through the rail is not allowed as a replacement for a slot. If the Contractor must create a slot, a cutting torch or plasma cutter is not allowed. The slot edges will be smooth and free of burrs or notches.

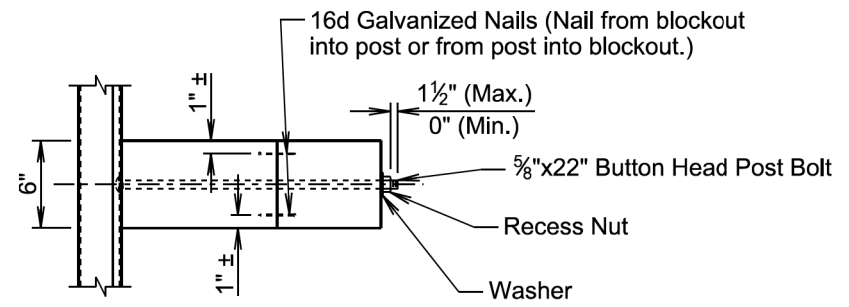
All costs for constructing the MGS including labor, equipment, and materials including all posts, blockouts, steel beam rail, and hardware will be incidental to the contract unit price per foot for the respective MGS contract item.

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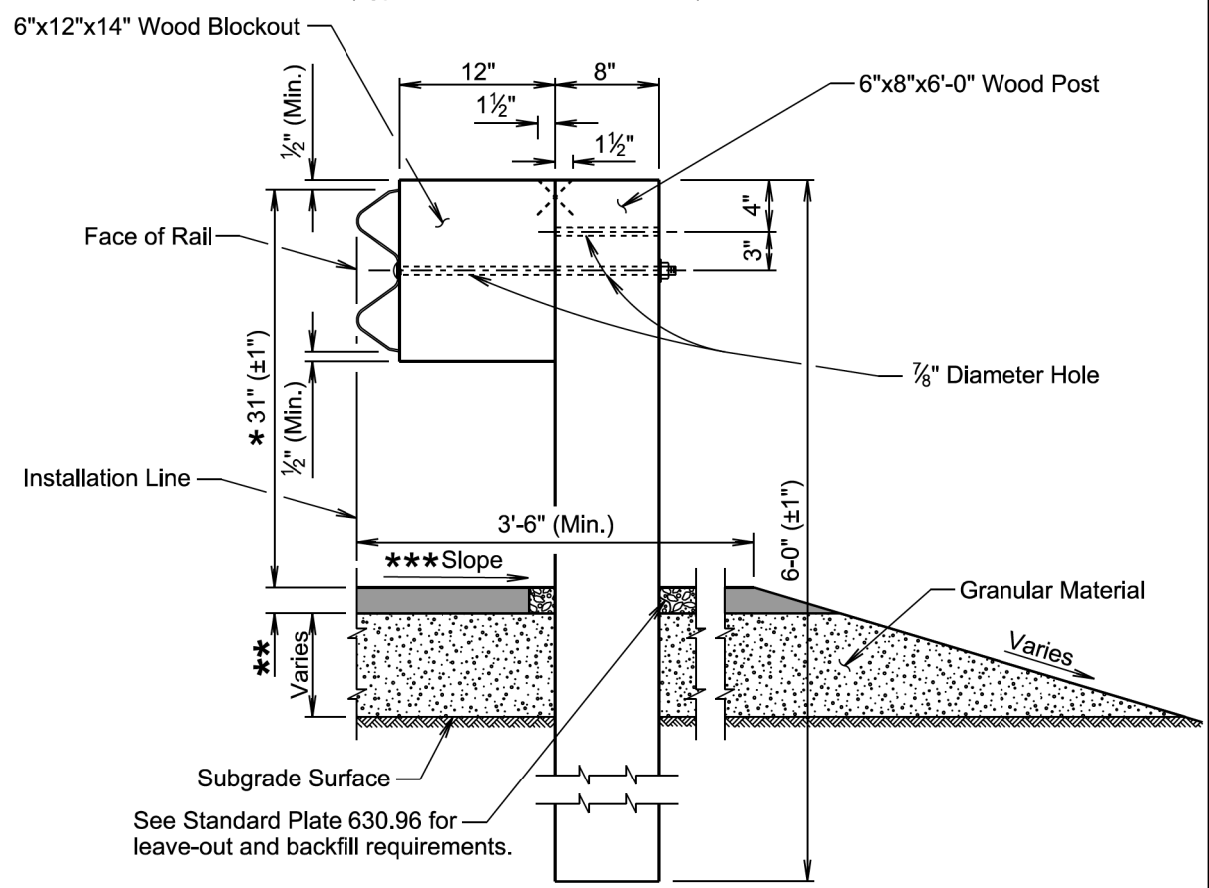
Published Date: 2024	S D D O T	MIDWEST GUARDRAIL SYSTEM (MGS)	PLATE NUMBER 630.20
			Sheet 1 of 6

Plotted From: TRPR16032

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**TOP VIEW**  
(Type 1, 2, or 3 MGS Installation)

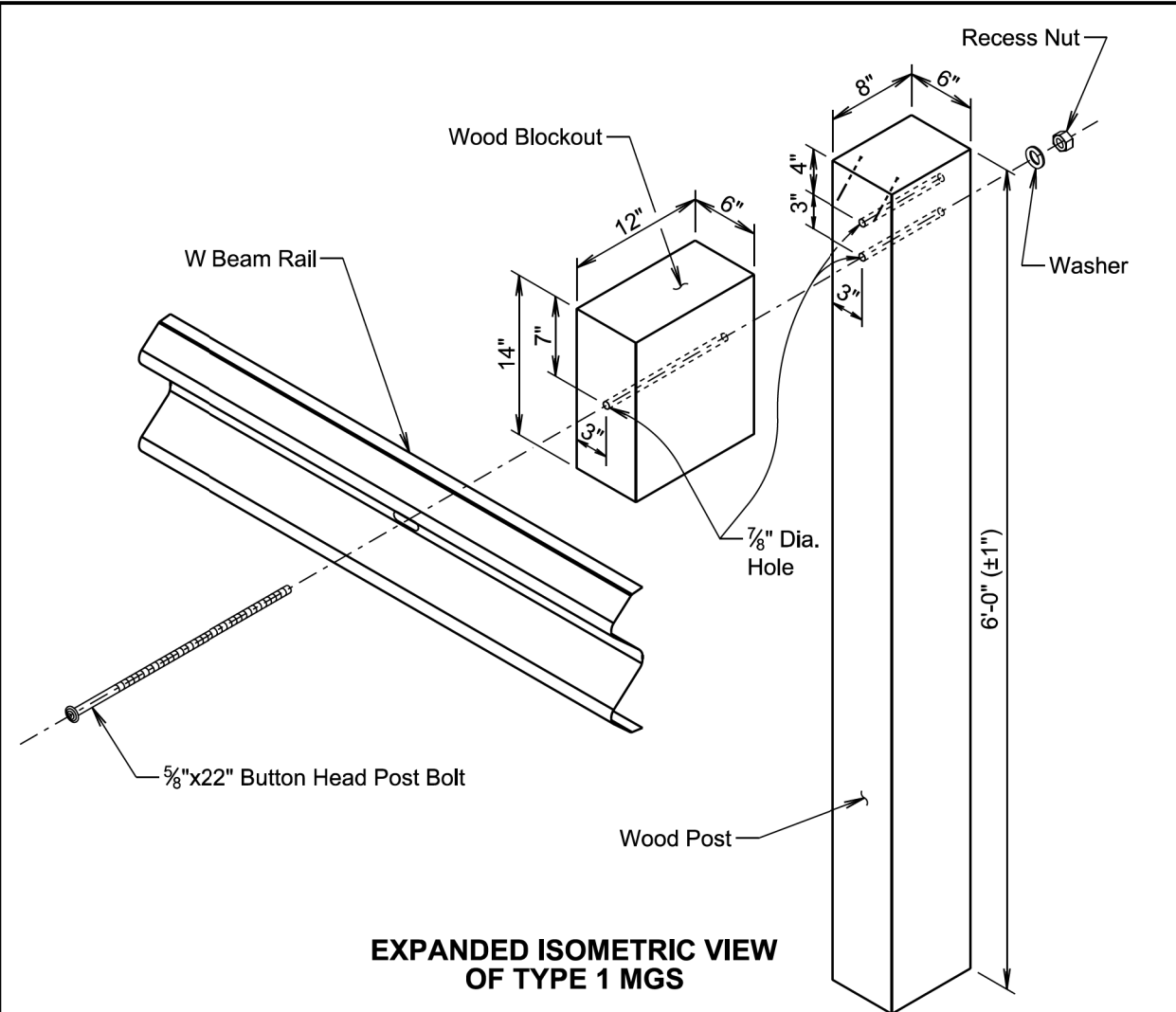


**TRANSVERSE SECTION**  
(Type 1, 2, or 3 MGS Installation)

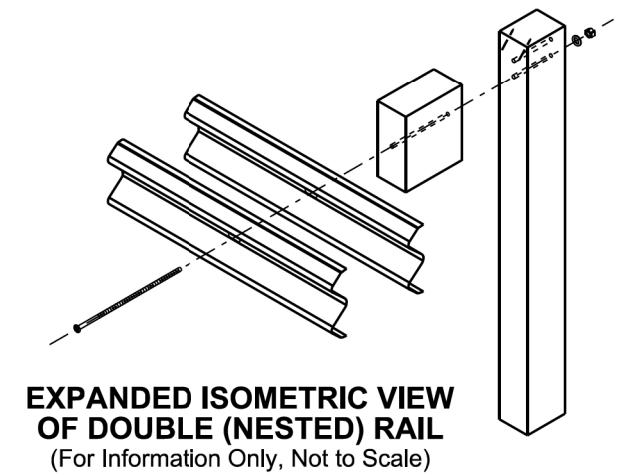
- \* See Standard Plate 630.99
- \*\* 2" asphalt concrete or as specified in the plans.
- \*\*\* The cross slope will be as specified in the plans; however, the cross slope will not be steeper than a 10:1 slope.

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<b>Published Date: 2024</b>	<b>S D D O T</b>	<b>MIDWEST GUARDRAIL SYSTEM (MGS)</b>	PLATE NUMBER <b>630.20</b>
			Sheet 2 of 6



**EXPANDED ISOMETRIC VIEW OF TYPE 1 MGS**



**EXPANDED ISOMETRIC VIEW OF DOUBLE (NESTED) RAIL**  
(For Information Only, Not to Scale)

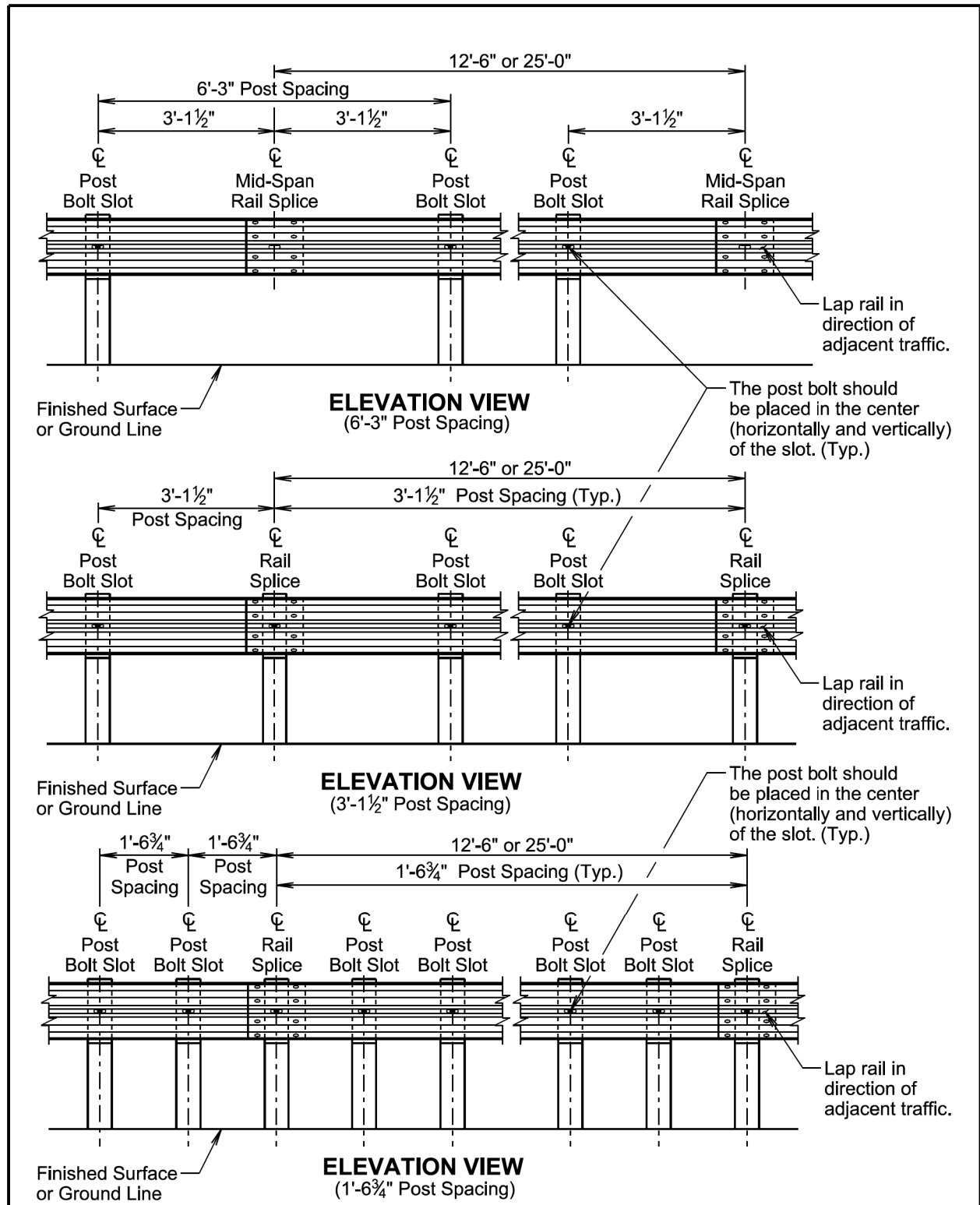
September 14, 2019

<b>Published Date: 2024</b>	<b>S D D O T</b>	<b>MIDWEST GUARDRAIL SYSTEM (MGS)</b>	PLATE NUMBER <b>630.20</b>
			Sheet 3 of 6

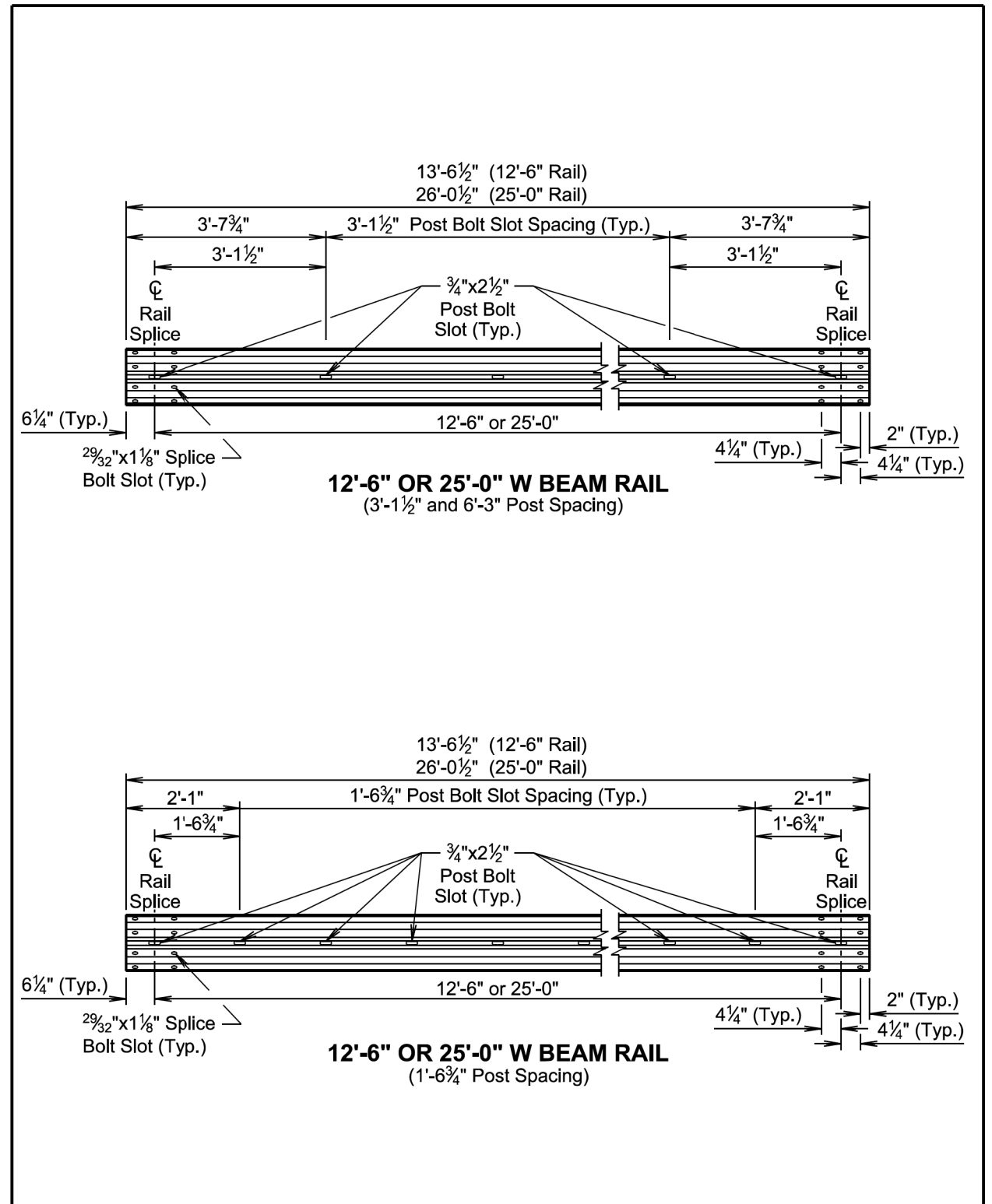
Plot Scale - 1:200

Plotted From - TRPR16032

File - ...acors08M8\Std Plate 08M8.dgn



Published Date: 2024	S D D O T	MIDWEST GUARDRAIL SYSTEM (MGS)	September 14, 2019
			PLATE NUMBER 630.20
			Sheet 4 of 6



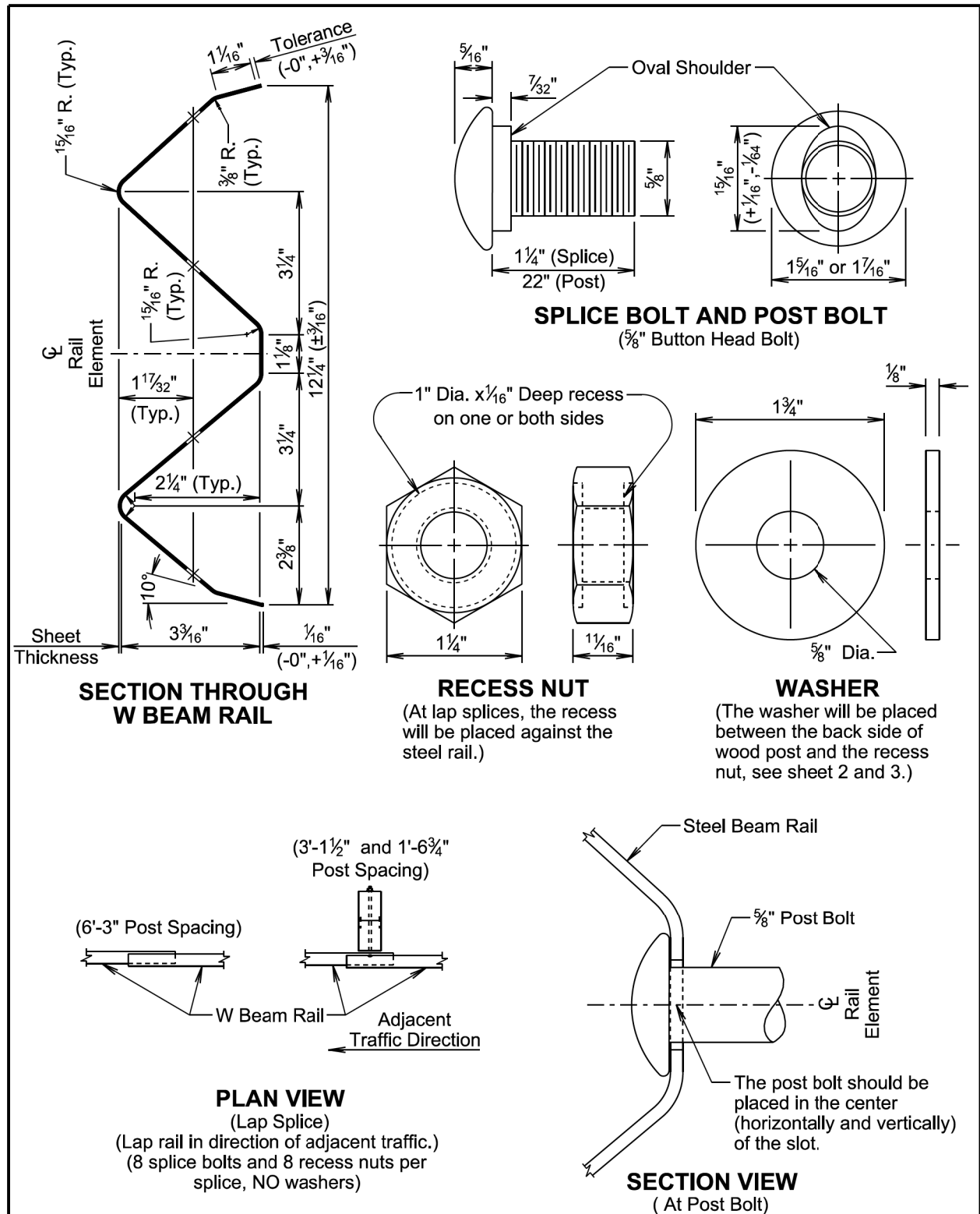
Published Date: 2024	S D D O T	MIDWEST GUARDRAIL SYSTEM (MGS)	September 14, 2019
			PLATE NUMBER 630.20
			Sheet 5 of 6

Plot Scale - 1:200

Plotted From - TRPR16032

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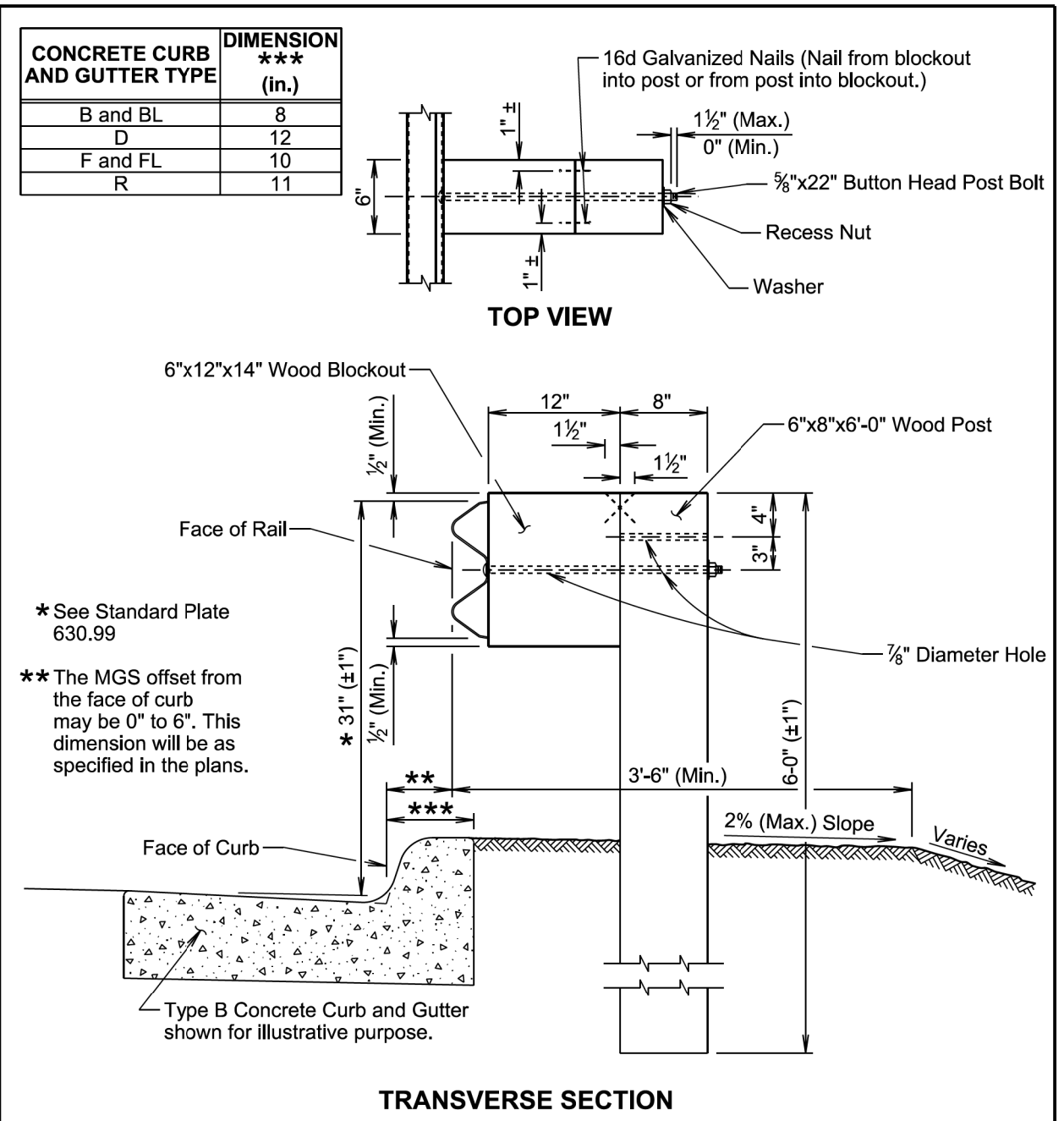
Plot Scale - 1:200



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<b>S D D O T</b>	<b>MIDWEST GUARDRAIL SYSTEM (MGS)</b>	PLATE NUMBER <b>630.20</b>
		Sheet 6 of 6

Published Date: 2024



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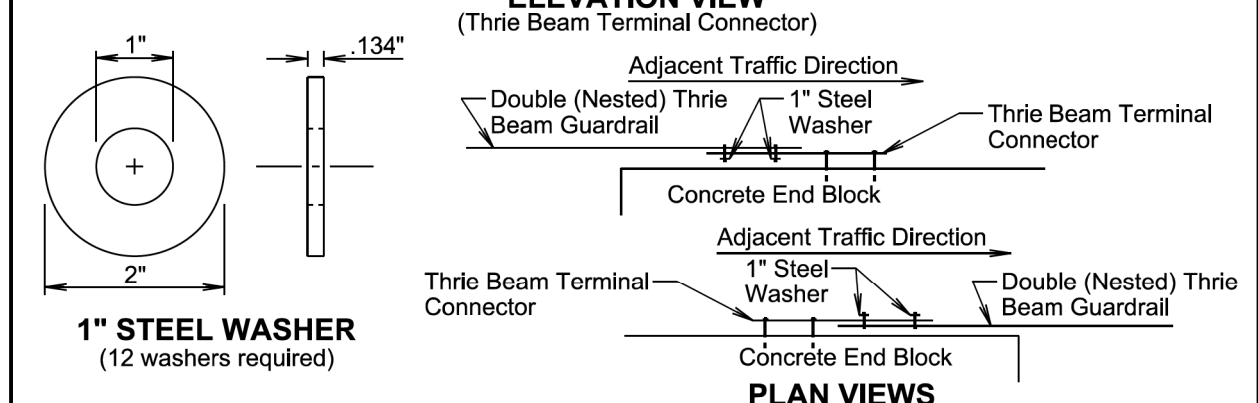
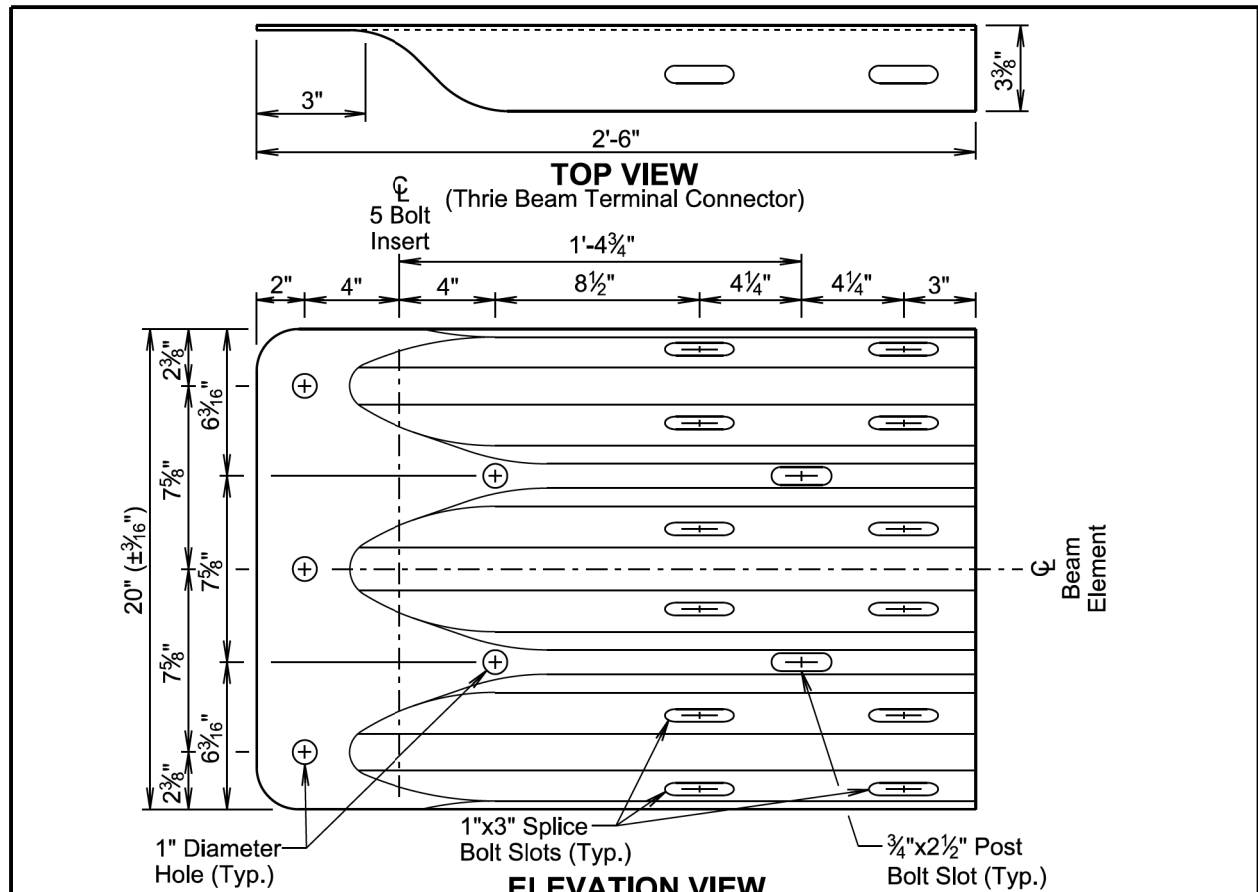
<b>S D D O T</b>	<b>MIDWEST GUARDRAIL SYSTEM (MGS) AT CURB AND GUTTER</b>	PLATE NUMBER <b>630.22</b>
		Sheet 1 of 1

Published Date: 2024

Plotted From - TRPR16032

File - ...acors08M8\Std Plate 08M8.dgn

Plot Scale - 1:200



**GENERAL NOTES:**

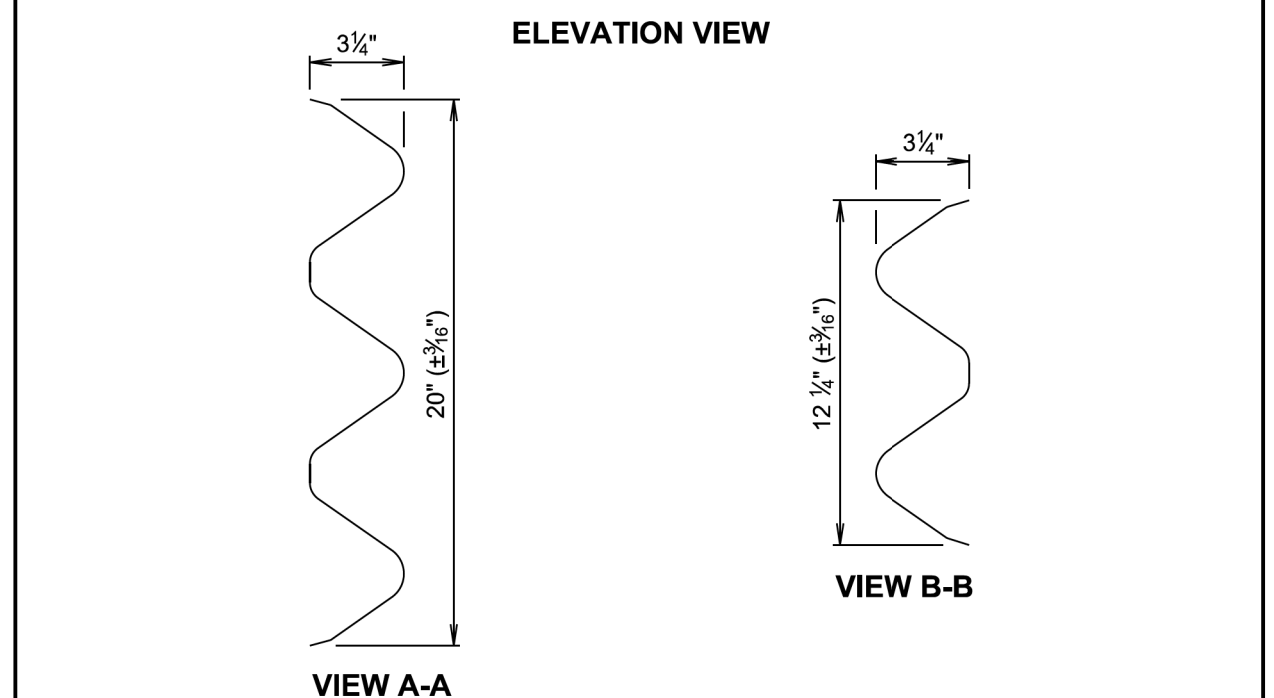
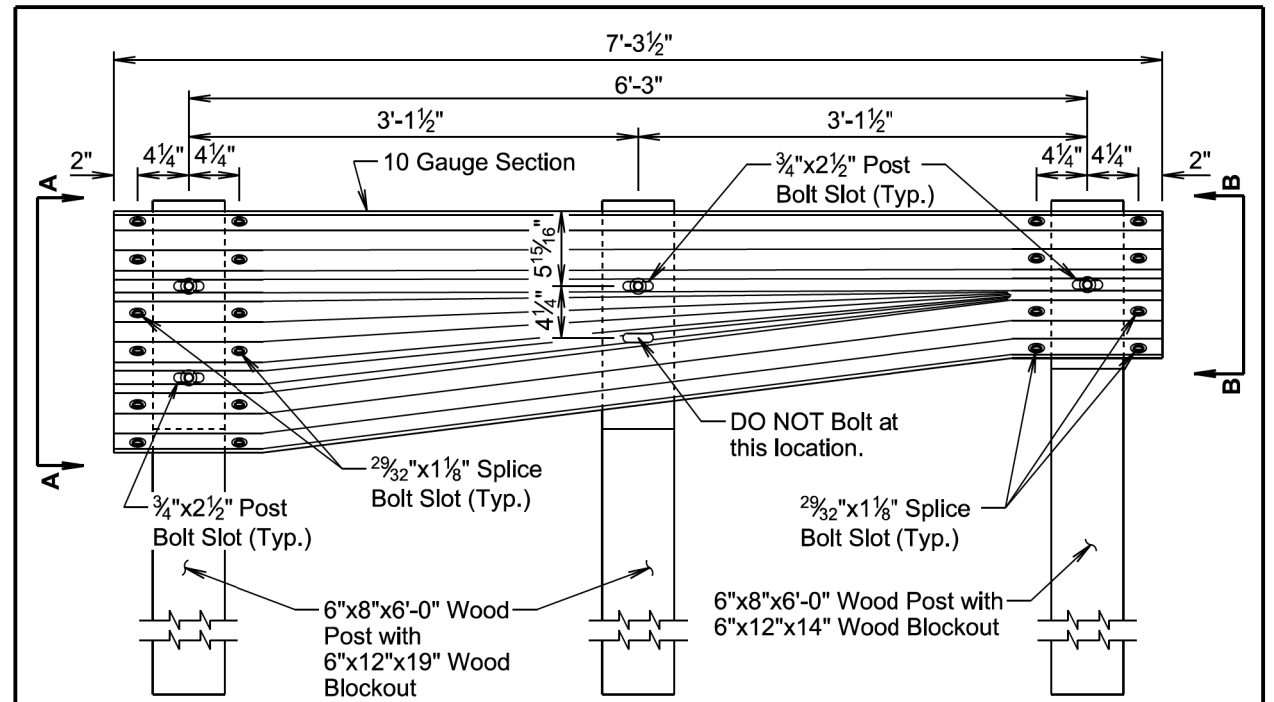
Thrie Beam Terminal Connectors will be 10 gauge.

When the thrie beam terminal connector is used to connect the rail to the bridge or concrete end block, 1" steel washers will be used at the lap splice and the washers will be in direct contact with the 3" slots of the thrie beam terminal connector. See the drawings above for the typical locations of the 1" steel washers.

There will be no separate payment for furnishing and installing the thrie beam terminal connector. All costs for furnishing and installing the thrie beam terminal connector will be incidental to the contract unit price of the respective guardrail item it is attached to.

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<b>S D D O T</b>	<b>THRIE BEAM TERMINAL CONNECTOR</b>	PLATE NUMBER <b>630.47</b>
	Published Date: 2024	Sheet 1 of 1



**GENERAL NOTES:**

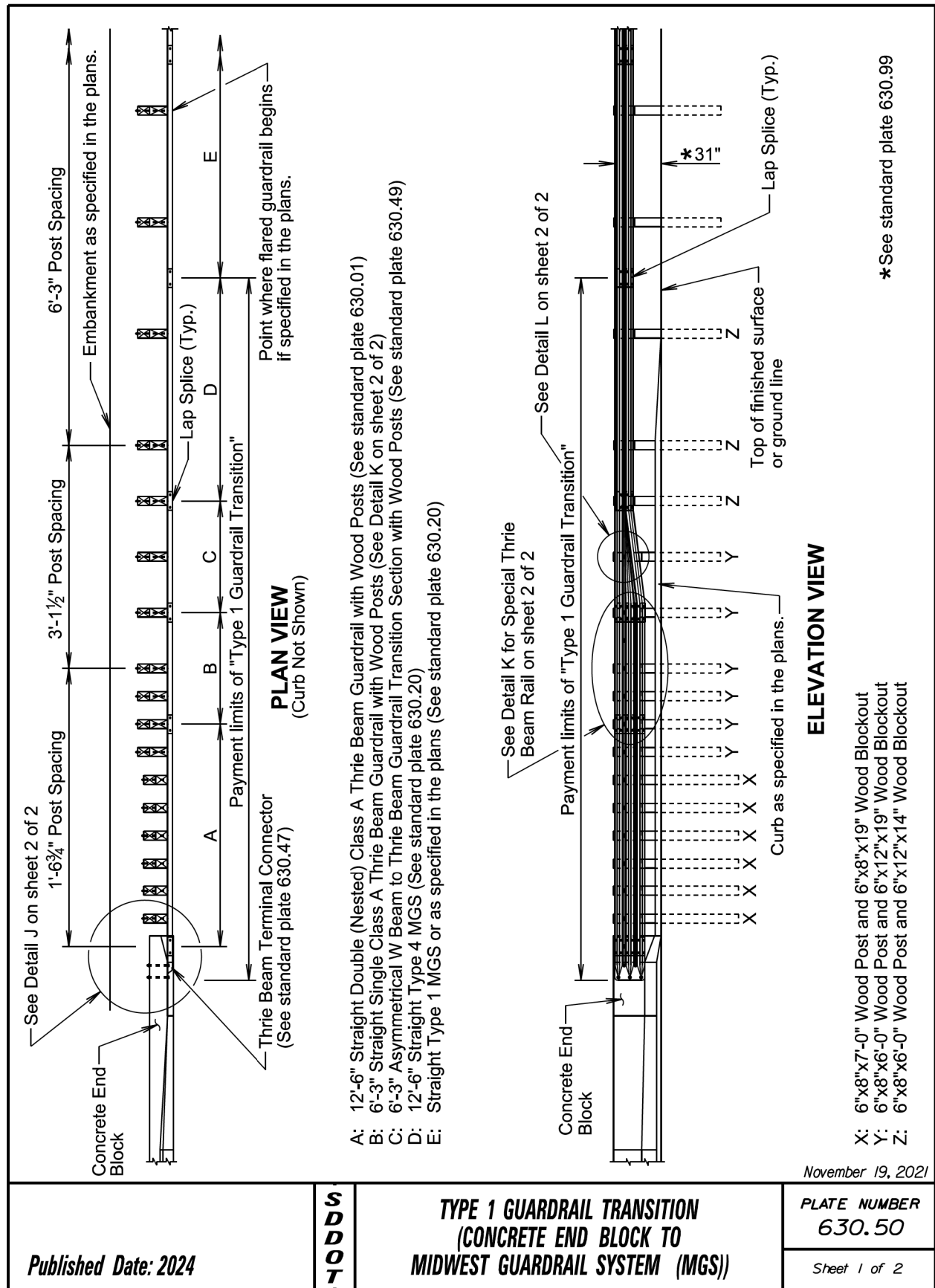
All costs for furnishing and installing the asymmetrical W beam to thrie beam guardrail transition including labor, equipment, and materials including two posts, two blocks, asymmetrical W beam to thrie beam transition section, and hardware will be incidental to the contract unit price per each for the corresponding guardrail transition contract item.

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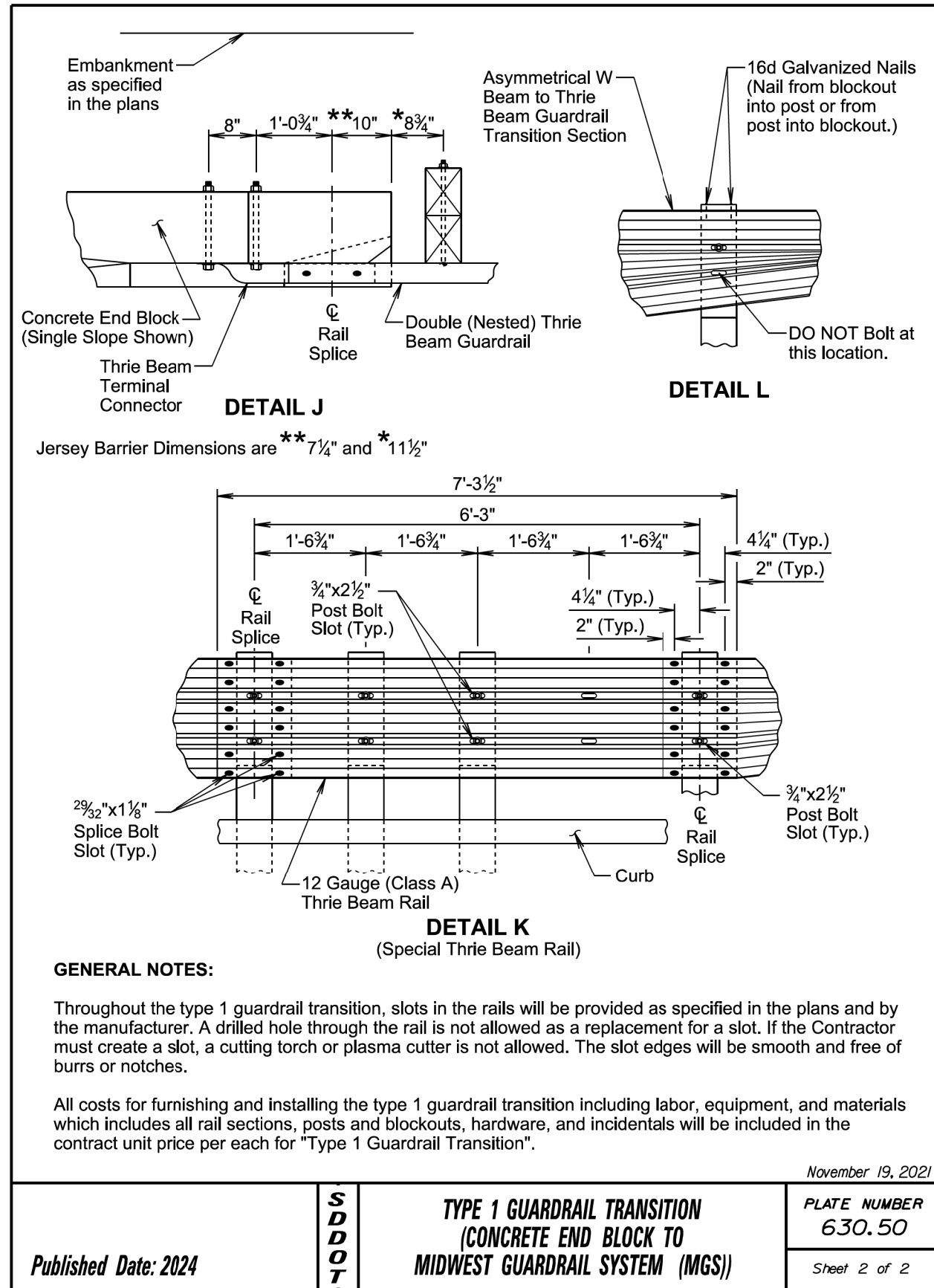
<b>S D D O T</b>	<b>ASYMMETRICAL W BEAM TO THRIE BEAM GUARDRAIL TRANSITION SECTION</b>	PLATE NUMBER <b>630.49</b>
	Published Date: 2024	Sheet 1 of 1

Plotted From - TRPR16032

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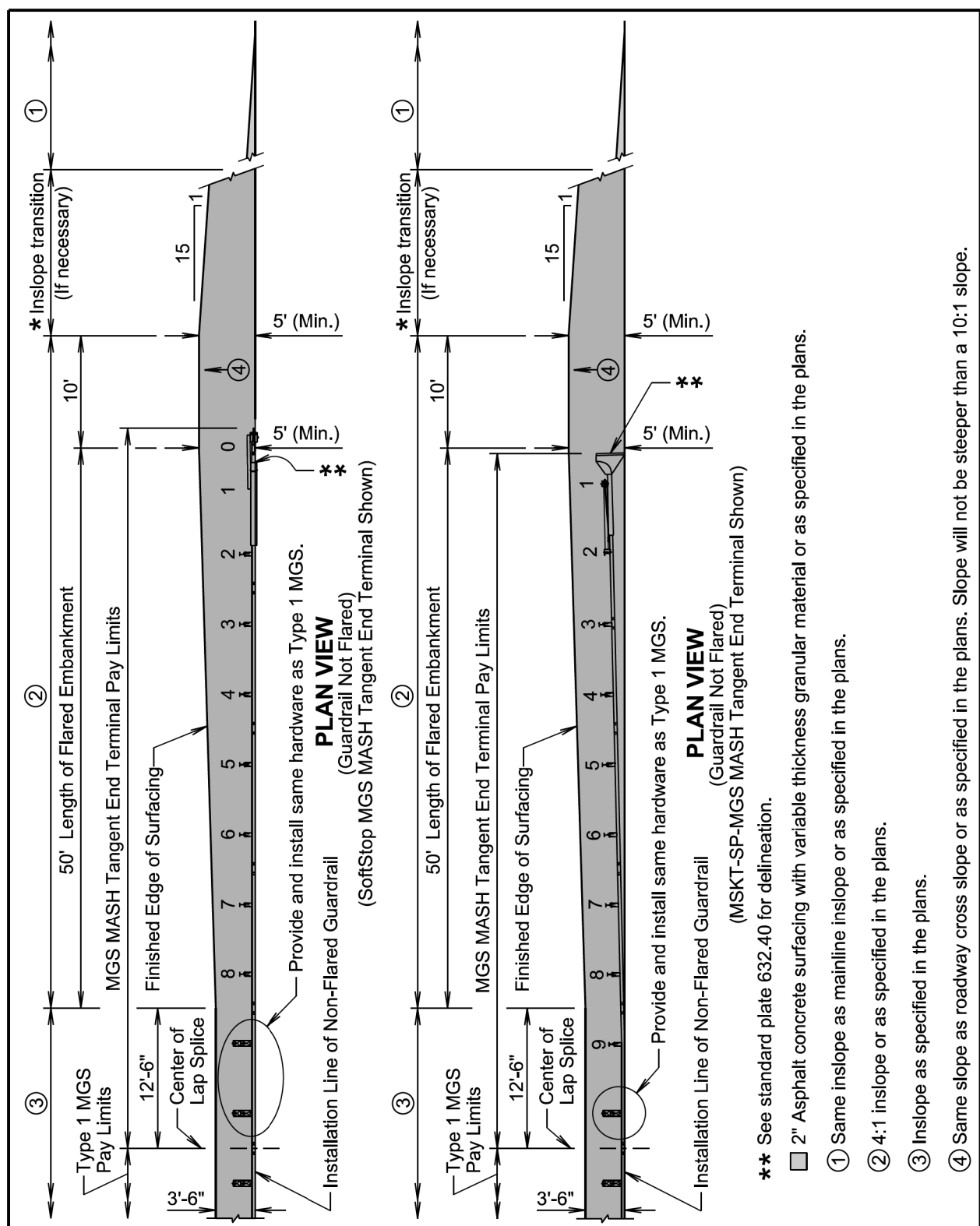


Published Date: 2024	SDDOT	<b>TYPE 1 GUARDRAIL TRANSITION (CONCRETE END BLOCK TO MIDWEST GUARDRAIL SYSTEM (MGS))</b>	PLATE NUMBER 630.50
			Sheet 1 of 2



Published Date: 2024	SDDOT	<b>TYPE 1 GUARDRAIL TRANSITION (CONCRETE END BLOCK TO MIDWEST GUARDRAIL SYSTEM (MGS))</b>	PLATE NUMBER 630.50
			Sheet 2 of 2

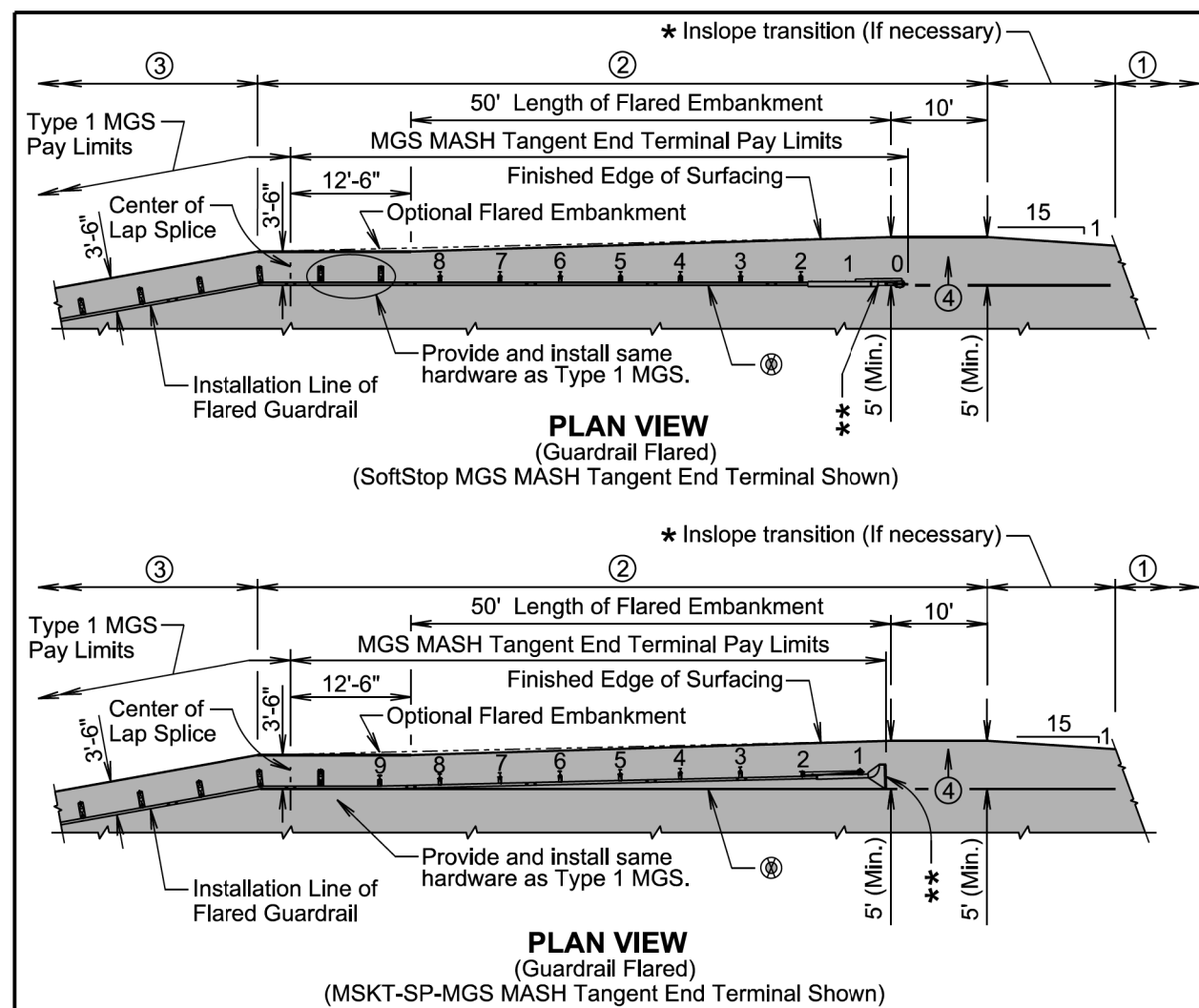
Plot Scale - 1:200



- \*\* See standard plate 632.40 for delineation.
- 2" Asphalt concrete surfacing with variable thickness granular material or as specified in the plans.
  - ① Same inslope as mainline inslope or as specified in the plans.
  - ② 4:1 inslope or as specified in the plans.
  - ③ Inslope as specified in the plans.
  - ④ Same slope as roadway cross slope or as specified in the plans. Slope will not be steeper than a 10:1 slope.

November 19, 2021

Published Date: 2024	SDDOT	EMBAKMENT, SURFACING, AND PAYMENT LIMITS FOR MGS MASH TANGENT END TERMINAL	PLATE NUMBER 630.89
			Sheet 1 of 2



- GENERAL NOTES:**
- The MGS MASH tangent end terminals above are for illustrative purpose only. Pay limit length of the MGS MASH tangent end terminal is 62'-6".
- \* The length of inslope transition varies with the amount of change between inslopes. The length of the transition will change 100' for every whole number change in the inslope. For Example: If the inslope changes from a 5:1 to a 4:1 the length of the inslope transition would be 100'. If the inslope changes from a 6:1 to a 4:1 the length of the inslope transition would be 200'.
- Ⓢ The installation reference line for MGS MASH tangent end terminals will always be parallel to the roadway.
- Asphalt concrete will be the same type used elsewhere on the project or will be as specified in the plans. If asphalt concrete is not specified in the plans, the asphalt concrete will conform to the Specifications for "Asphalt Concrete Composite."
- Granular material will be the same type used elsewhere on the project or will be as specified in the plans. If granular material type is not specified in the plans, the material will conform to the Specifications for "Base Course". The granular material will be placed the same thickness as the mainline surfacing or as specified in the plans.

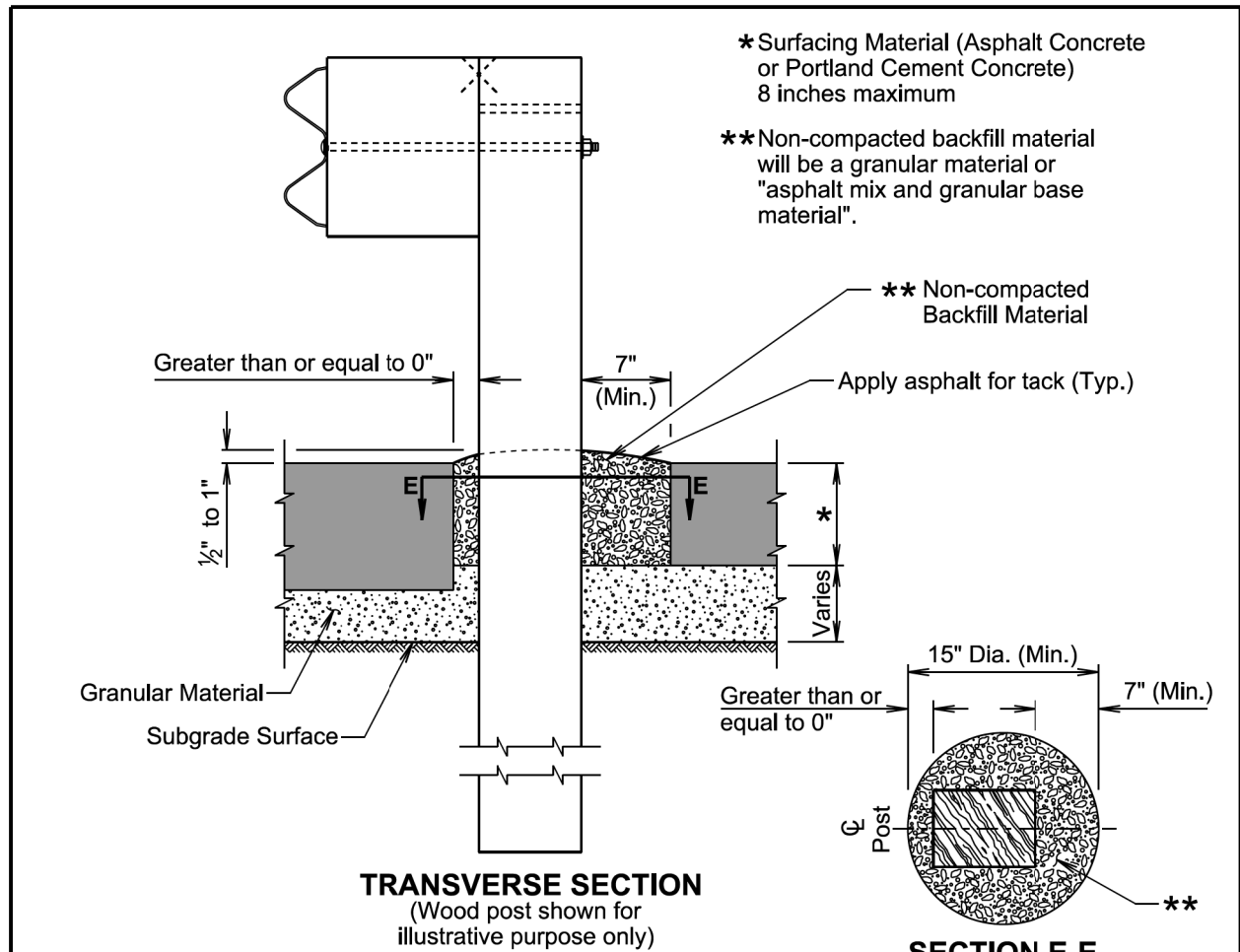
November 19, 2021

Published Date: 2024	SDDOT	EMBAKMENT, SURFACING, AND PAYMENT LIMITS FOR MGS MASH TANGENT END TERMINAL	PLATE NUMBER 630.89
			Sheet 2 of 2

File - ...:\cours08M8\Std Plate 08M8.dgn

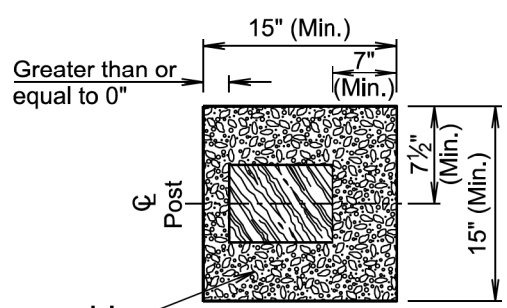


Plot Scale - 1:200



**TRANSVERSE SECTION**  
(Wood post shown for illustrative purpose only)

**SECTION E-E**  
(Round option for leave-out and backfill limits)  
(Wood post shown for illustrative purpose only)



**SECTION E-E**  
(Square option for leave-out and backfill limits)  
(Wood post shown for illustrative purpose only)

**GENERAL NOTES:**

The leave-out limits may be increased to accommodate construction equipment and tolerances.

When posts are installed in augured or dug holes, the backfill material will be compacted to the bottom of the pavement surfacing material to the satisfaction of the Engineer. The backfill material for the thickness of the pavement surfacing material will be non-compacted.

The backfill material will be mounded 1/2 inch to 1 inch above the top of the adjacent surfacing as illustrated above.

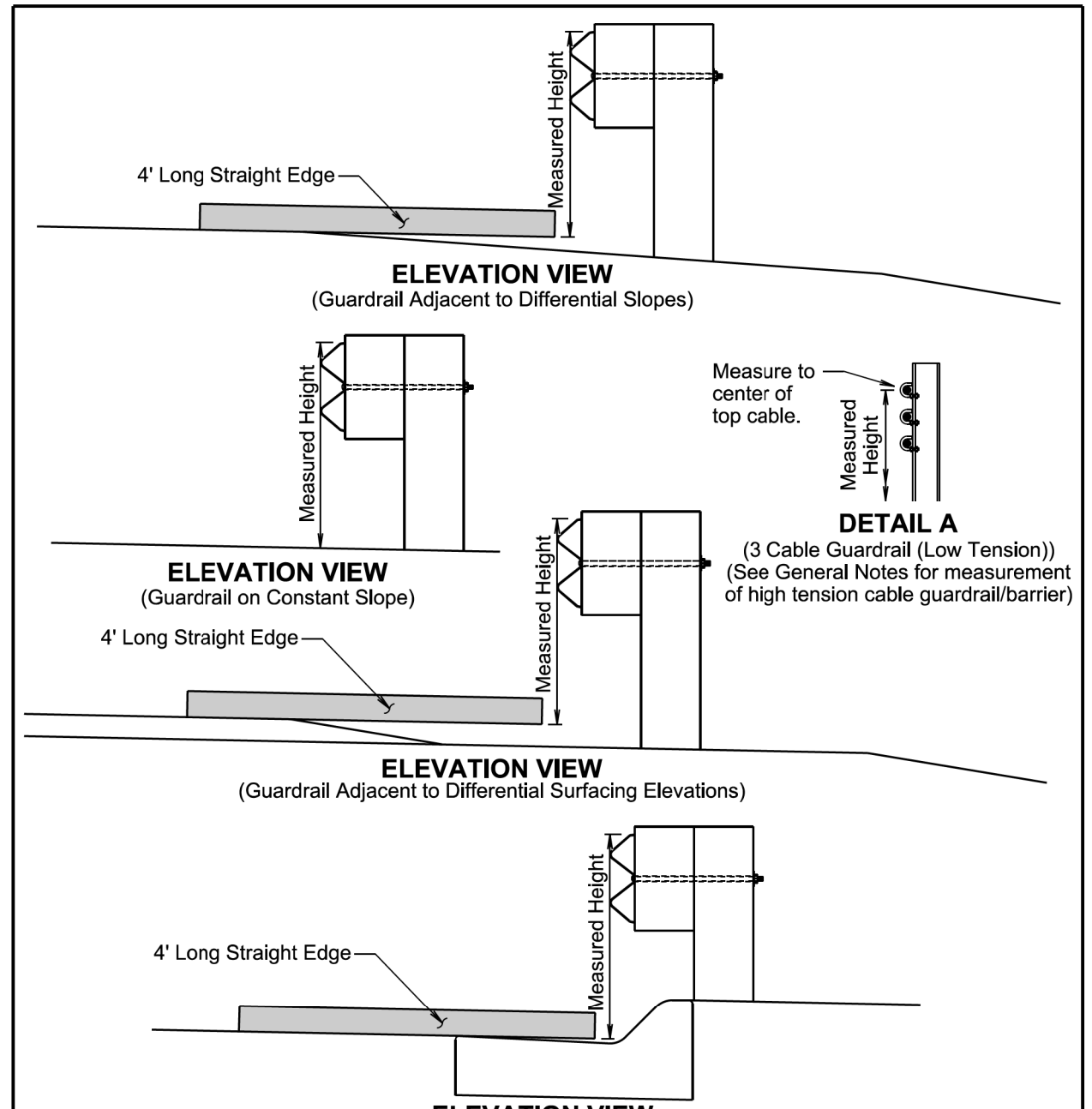
Asphalt for tack will be applied to the surface of the backfill material at the rate of 0.15 to 0.20 gallons per square yard.

All costs for constructing the leave-out including labor, equipment, and materials which includes the backfill material and tack coat will be incidental to the contract unit price for the respective guardrail contract item.

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<b>S D D O T</b>	<b>GUARDRAIL POST INSTALLED IN ASPHALT CONCRETE OR PORTLAND CEMENT CONCRETE</b>	PLATE NUMBER <b>630.96</b>
		Sheet 1 of 1

Published Date: 2024



**ELEVATION VIEW**  
(Guardrail Adjacent to Differential Slopes)

**ELEVATION VIEW**  
(Guardrail on Constant Slope)

**ELEVATION VIEW**  
(Guardrail Adjacent to Differential Surfacing Elevations)

**ELEVATION VIEW**  
(Guardrail at Curb and Gutter)

**DETAIL A**

(3 Cable Guardrail (Low Tension))  
(See General Notes for measurement of high tension cable guardrail/barrier)

**GENERAL NOTES:**

The W Beam guardrail shown is for illustrative purpose. The guardrail height for all types of guardrail systems except for high tension cable guardrail/barrier will be measured in accordance with this standard plate.

When measuring height of 3 cable guardrail (low tension) the height will be measured to the center of the top cable. See Detail A.

The height of high tension cable guardrail/barrier will be measured in accordance with the Manufacturer's installation instructions.

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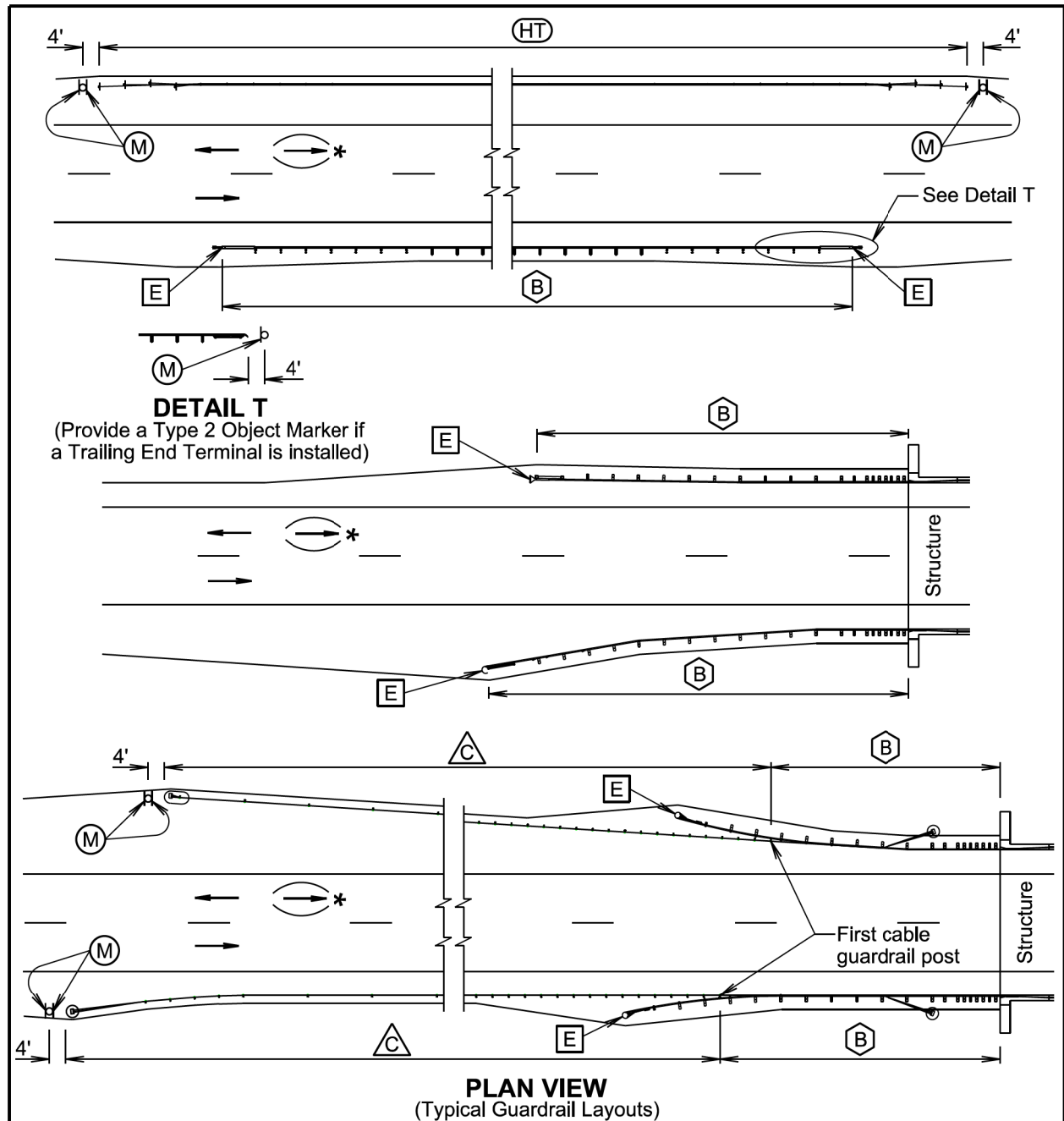
<b>S D D O T</b>	<b>MEASURING GUARDRAIL HEIGHT</b>	PLATE NUMBER <b>630.99</b>
		Sheet 1 of 1

Published Date: 2024

Plotted From: TRPR16032

File: ...acors08M8\Std Plate 08M8.dgn

Plot Scale - 1:200



**PLAN VIEW**  
(Typical Guardrail Layouts)

- B Steel Beam Guardrail Delineation
- E Guardrail End Terminal Object Marker
- C 3 Cable Guardrail (Low Tension) Delineation
- HT High Tension Cable Guardrail Delineation
- M Type 2 Object Marker

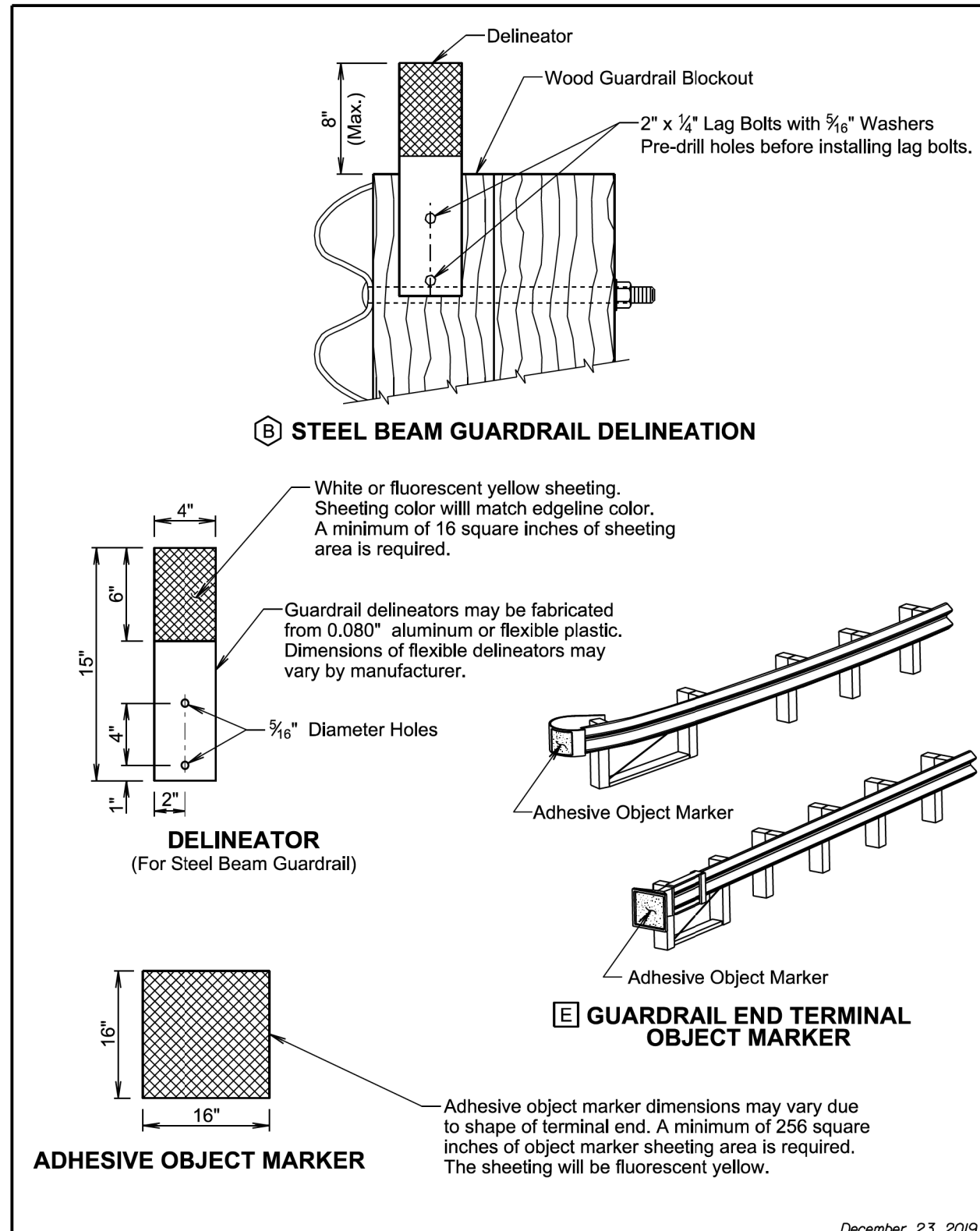
\*For two-way traffic, install delineation at the opposite end of structure the same as shown. Back-to-back delineation is required for two-way traffic, single-sided delineation for one-way traffic.

December 23, 2019

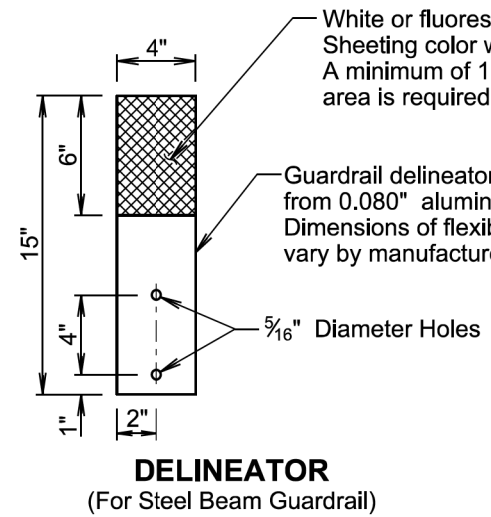
<b>S D D O T</b>	<b>DELINEATION OF GUARDRAIL</b>	PLATE NUMBER <b>632.40</b>	
		Sheet 1 of 4	

Published Date: 2024

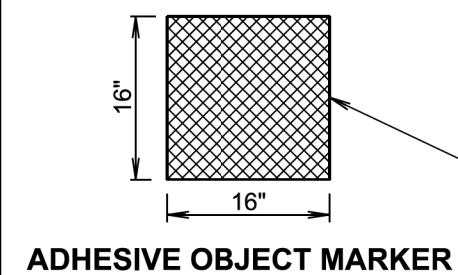
Plotted From - TRPR16032



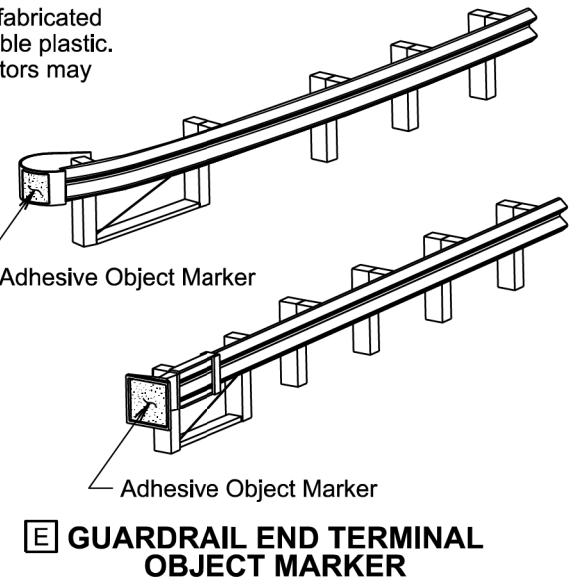
**B STEEL BEAM GUARDRAIL DELINEATION**



**DELINEATOR**  
(For Steel Beam Guardrail)



**ADHESIVE OBJECT MARKER**



**E GUARDRAIL END TERMINAL OBJECT MARKER**

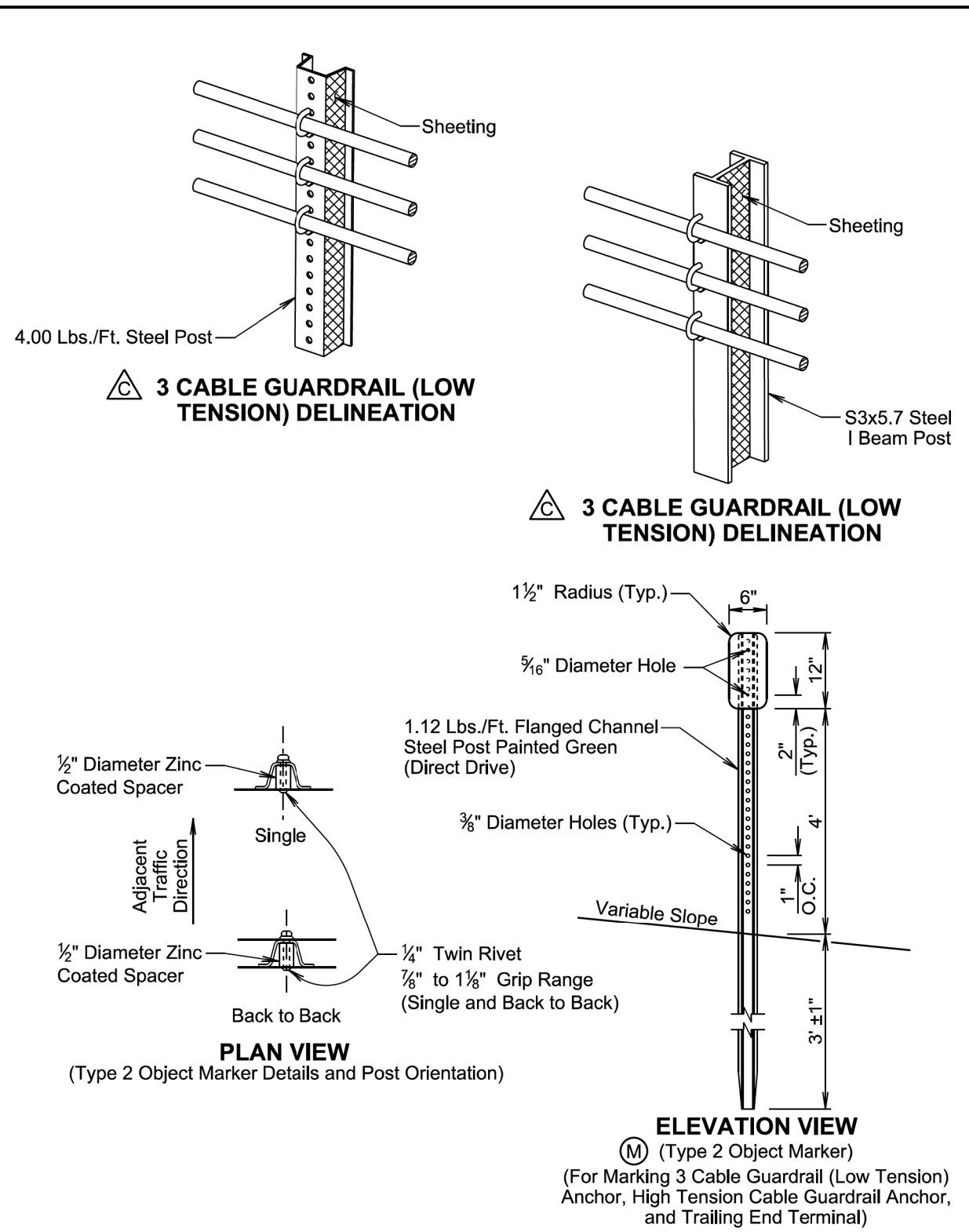
Adhesive object marker dimensions may vary due to shape of terminal end. A minimum of 256 square inches of object marker sheeting area is required. The sheeting will be fluorescent yellow.

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<b>S D D O T</b>	<b>DELINEATION OF GUARDRAIL</b>	PLATE NUMBER <b>632.40</b>	
		Sheet 2 of 4	

Published Date: 2024

File - ...acors08M8\Std Plate 08M8.dgn

1:200  
Plot Scale -


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Published Date: 2024	S D D O T	DELINEATION OF GUARDRAIL	PLATE NUMBER 632.40
			Sheet 3 of 4

**GENERAL NOTES:**

The delineation of high tension cable guardrail will be reflective sheeting placed back to back on every other post cap or cable spacer. The sheeting will be type XI in conformance with ASTM D4956. The color of the reflective sheeting shall be the same as the nearest pavement marking.

The delineators for steel beam guardrail and sheeting on 3 cable guardrail (low tension) posts will be covered with a minimum of 16 square inches of reflective sheeting. The reflective sheeting will be type XI in conformance with ASTM D4956. Along two-way roadways the sheeting will be on both sides of the delineators and guardrail posts and will be white in color. For one-way roadways the sheeting will only be required on the side facing traffic and the color will be the same as the nearest pavement marking, yellow on the left side of the roadway and white on the right side.

When steel beam guardrail is attached to a bridge the first delineator will be attached to the post nearest the bridge.

At bridges with guardrail less than 200 feet in length, a minimum of 4 delineators will be placed in addition to the end terminal yellow object marker. The spacing between the delineators will be approximately one third of the length of the guardrail.

At bridges with guardrail 200 feet and greater in length, including bridges that have steel beam guardrail transitioning to 3 cable guardrail (low tension), the delineators will be placed at a spacing of approximately 50 feet. Delineation will extend throughout the length of the guardrail system.

Steel beam guardrail that is not attached to a bridge and is less than 200 feet in length, a minimum of 4 delineators will be placed in addition to the end terminal yellow object markers. The spacing between the delineators will be approximately one third of the length of the guardrail.

Steel beam guardrail that is not attached to a bridge and is 200 feet and greater in length, including steel beam guardrail transitioning to 3 cable guardrail (low tension), the delineators will be placed at a spacing of approximately 50 feet. Delineation will extend throughout the length of the guardrail system.

All costs for furnishing and installing single or back to back guardrail delineation on 3 cable guardrail and steel beam guardrail will be included in the contract unit price per each for "Guardrail Delineator".

All costs for furnishing and installing the reflective sheeting on the cable spacers or post caps for the high tension cable guardrail will be incidental to the respective high tension cable guardrail contract item.

An adhesive object marker will be placed on the end of the W beam guardrail or MGS end terminal. The adhesive object marker dimensions may vary due to the shape of the terminal end. A minimum of 256 square inches of object marker reflective sheeting area is required. The reflective sheeting will be fluorescent yellow type XI sheeting in conformance with ASTM D4956. All costs for furnishing and installing the adhesive object marker will be incidental to various contract items.

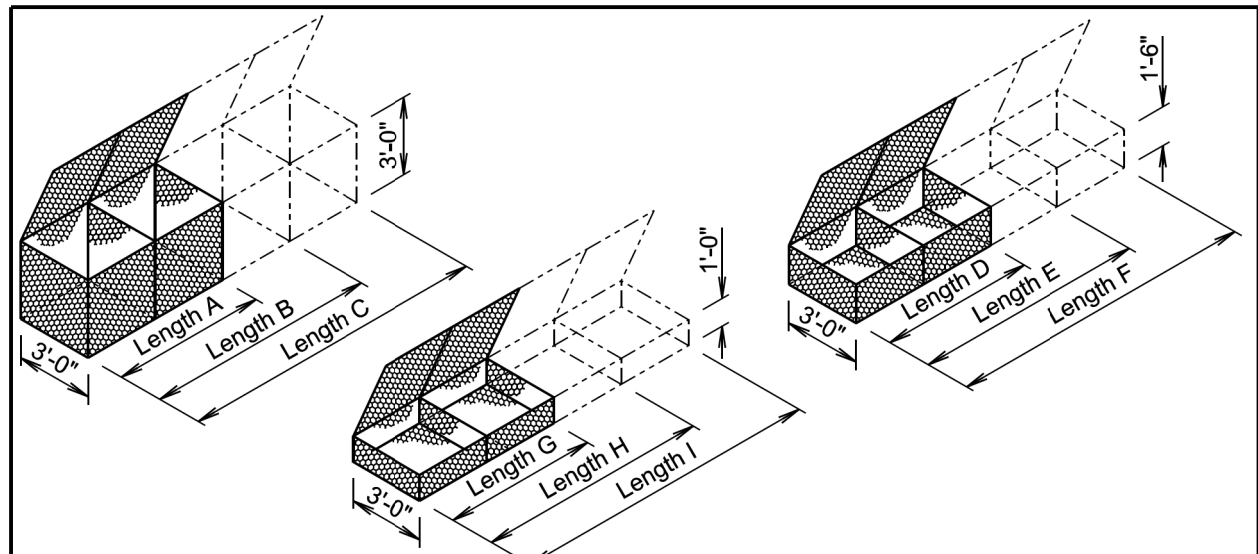
A type 2 object marker will be placed adjacent to the 3 cable guardrail (low tension) anchor, high tension cable guardrail anchor, and trailing end terminal at the location noted on sheet 1 of this standard plate. The type 2 object marker (6" x 12") will have fluorescent yellow type XI sheeting in conformance with ASTM D4956. All costs for furnishing and installing the type 2 object marker including the steel post, 6" x 12" reflective panel, and hardware will be included in the contract unit price per each for "Type 2 Object Marker" for single-sided and "Type 2 Object Marker Back to Back" for back to back type 2 object markers.

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Published Date: 2024	S D D O T	DELINEATION OF GUARDRAIL	PLATE NUMBER 632.40
			Sheet 4 of 4

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**GABION DETAILS**

STANDARD SIZES					
SIZE	LENGTH	WIDTH	HEIGHT	NUMBER OF CELLS	CAPACITY (Cu. Yd.)
A	6'-0"	3'-0"	3'-0"	2	2.0
B	9'-0"	3'-0"	3'-0"	3	3.0
C	12'-0"	3'-0"	3'-0"	4	4.0
D	6'-0"	3'-0"	1'-6"	2	1.0
E	9'-0"	3'-0"	1'-6"	3	1.5
F	12'-0"	3'-0"	1'-6"	4	2.0
G	6'-0"	3'-0"	1'-0"	2	0.7
H	9'-0"	3'-0"	1'-0"	3	1.0
I	12'-0"	3'-0"	1'-0"	4	1.3

**GENERAL NOTES:**

Above dimensions subject to mill tolerances.

Lacing and internal connecting wire will be 0.0866 inch diameter steel wire ASTM A641, Class 3 soft temper measured after galvanizing and for PVC coated gabions will be 0.0866 inch diameter steel wire measured after galvanizing but before PVC coating.

The lacing procedure is as follows:

1. Cut a length of lacing wire approximately 1½ times the distance to be laced but not exceeding 5 feet.
2. Secure the wire terminal at the corner by looping and twisting.
3. Proceed lacing with alternating single and double loops at a spacing not to exceed 6 inches.
4. Securely fasten the other lacing wire terminal.

Wire lacing or interlocking type fasteners will be used for gabion assembly and final construction of gabion structures. Interlocking fasteners for galvanized gabions will be high tensile 0.120 inch diameter galvanized steel wire measured after galvanizing. The galvanizing will conform to ASTM A641-92, Class 3 coating. Fasteners will also be in accordance with ASTM A764, Class II, Type III.

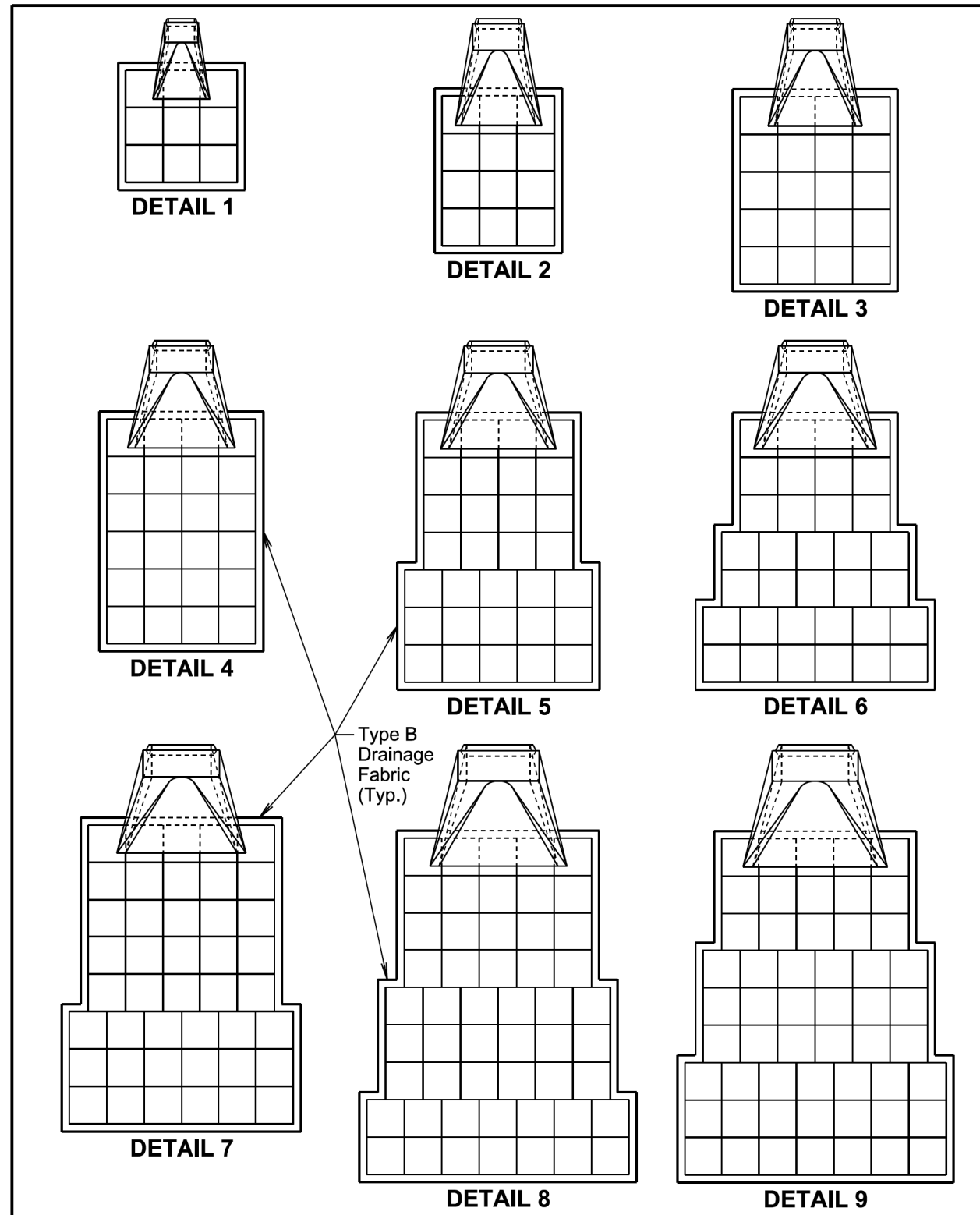
Interlocking fasteners for PVC coated gabions will be high tensile 0.120 inch diameter stainless steel wire conforming to ASTM A313, Type 302, Class 1. The spacing of the interlocking fasteners during all phases of assembly and construction will not exceed 6 inches.

All fasteners will be placed where the mesh weaves around the selvage wire at the vertical and horizontal joints.

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* ESTIMATED QUANTITIES			
Detail	Pipe Diameter (Inches)	Gabion (Cu. Yd.)	Type B Drainage Fabric (Sq. Yd.)
RCP, RCP Arch, CMP, and CMP Arch	1	12, 18, and 24	4.5
	2	30 and 36	6.0
	3	42	10.0
	4	48 and 54	12.0
	5	60	15.5
	6	66	17.0
	7	72	21.5
	8	78	26.0
	9	84	27.0

**GENERAL NOTES:**

Gabions at outlets of CMP and RCP will be placed under the end section a distance of 2 feet from the outlet end. For CMP end section installations, the upper fabric of the gabions will be modified to accommodate the metal end section as approved by the Engineer.

- \* Gabion and type B drainage fabric quantities on this standard plate are based on standard gabion sizes D, E, and F as depicted on standard plate 720.01.

Type B drainage fabric will be placed under the gabions and around the exterior sides (perimeter) of the gabions as approved by the Engineer. The type B drainage fabric will be in conformance with Section 831 of the Specifications. Measurement and payment of the type B drainage fabric will be in conformance with Section 720 of the Specifications.

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