Docusign Envelope ID: 24E87D87-4729-80A1-8122-E0E29248315B

DESIGN DATA				
Traffic	Average Daily			
Current 2024	Pass: 4,410	Trucks: 1,580	Total: 5,990	
Preventive Maintenance				

	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	IM-8-094(117)315	24111	1	1

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

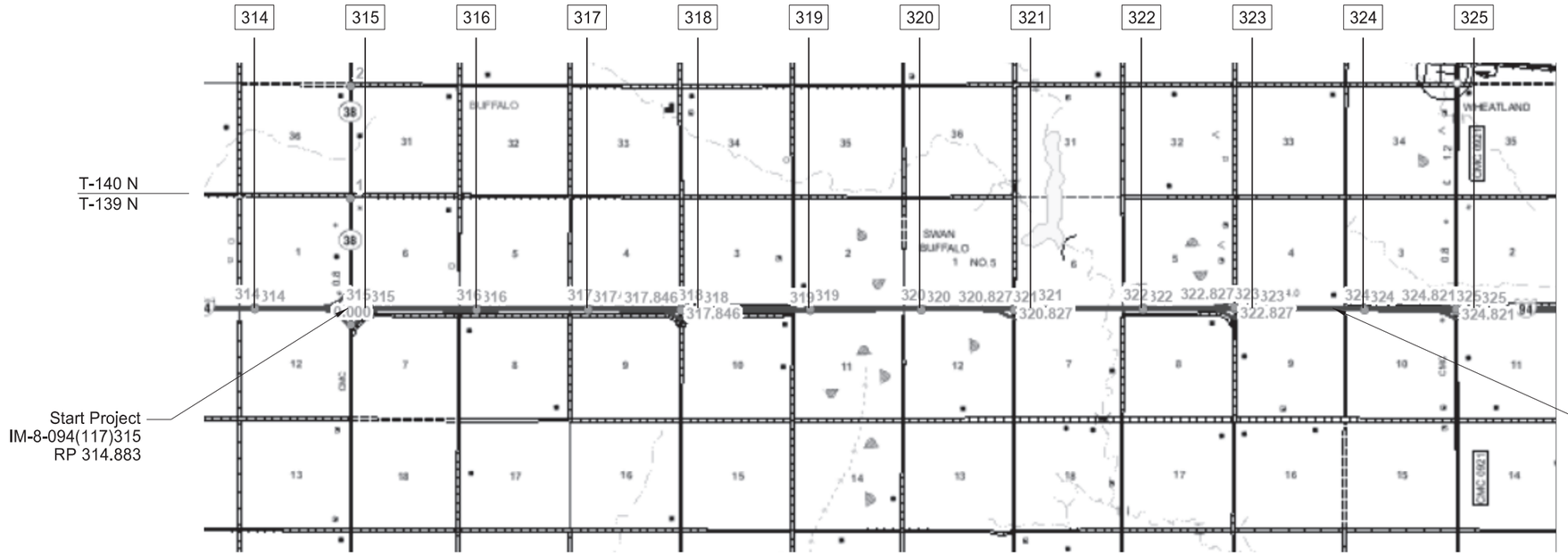
IM-8-094(117)315

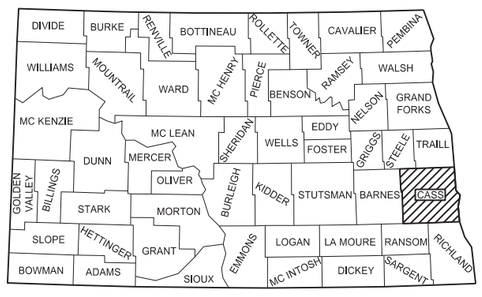
Cass
I94 EB & WB
Buffalo E to Wheatland
Concrete Pavement Repair
Hot Bit. Surf on Cross Roads, Ramps & I-94 EB Shoulders

GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	7/1/2025
Supplemental Specifications	NONE

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
IM-8-094(117)315	8.863	8.863

N





STATE COUNTY MAP

DESIGNER
Justin Oss, PE
DESIGNER
Noah Jembere
DESIGNER
-

ND DEPARTMENT OF TRANSPORTATION
Fargo District

Joe Peyerl
08/27/26

NDDOT Fargo District
REGISTERED PROFESSIONAL ENGINEER
JUSTIN OSS
PE-7124
DATE 08/27/26
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-8-094(117)315	2	1

TABLE OF CONTENTS

PLAN SECTIONS

Section	Page(s)	Description
1	1	Title Sheet
2	1	Table of Contents
4	1	Scope of Work
6	1	Notes
8	1	Quantities
10	1 - 2	Basis of Estimate
11	1 - 12	Data Tables
20	1 - 8	General Details
30	1 - 12	Typical Sections
40	1 - 3	Removals
90	1 - 3	Paving Layouts
100	1 - 3	Work Zone Traffic Control
120	1 - 3	Pavement Marking

LIST OF STANDARD DRAWINGS

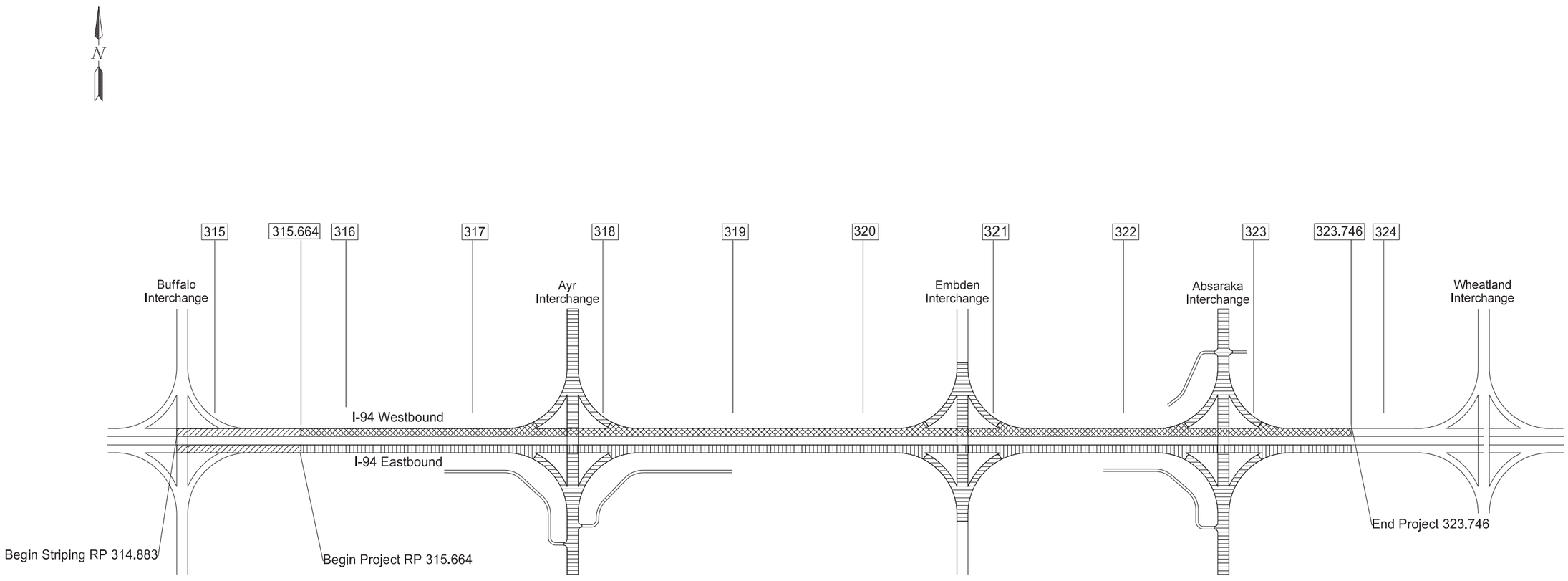
Number	Description
D-101-1, 2-4	NDDOT Abbreviations
D-101-10	NDDOT Utility Company and Organization Abbreviations
D-101-20, 21	Line Styles
D-101-30, 31-33	Symbols
D-550-2	Longitudinal Joint Details
D-550-3	Transverse Contraction Joint Details
D-704-1	Attenuation Device
D-704-2	Traffic Control For Coring Of Hot Bituminous Pavement
D-704-7	Breakaway Systems For Construction Zone Signs - Perforated Tube
D-704-8	Breakaway Systems For Construction Zone Signs - U-Channel Post
D-704-9	Construction Sign Details - Terminal And Guide Signs
D-704-10	Construction Sign Details - Regulatory Signs
D-704-11, 11A	Construction Sign Details - Warning Signs
D-704-13	Barricade And Channelizing Device Details
D-704-15	Road Closure Layouts
D-704-35	Sign Layout For One Lane Closure - Interstate System
D-762-2	Interstate Pavement Marking 4 Lane Divided Highway
D-762-4	Pavement Marking
D-762-11	Short-Term Pavement Marking

SPECIAL PROVISIONS

Number	Description
SSP 4	Longitudinal Joint Density
SSP 10	E-Ticketing

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Concrete Pavement Repair/Striping

Mill/HBP Overlay/Striping

EB I-94 CPR/ Shoulder Mill/HBP Overlay/Striping

Striping Only

Scope of Work

I-94 EB & WB

RP 314.883 to RP 323.746

REGISTERED PROFESSIONAL ENGINEER
JUSTIN OSS
PE-7124
DATE 08/27/26
NORTH DAKOTA

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-8-094(117)315	6	1

NOTES

GENERAL NOTES

430-P01 REMOVE AND SALVAGE BITUMINOUS SURFACING: Remove and salvage 1-inch Bituminous surfacing at the interchanges as specified in the plans, also remove and salvage 1.5-inch bituminous shoulders on the EB roadway from RP 315.664 to RP 323.746.

430-P02 HOT BITUMINOUS PAVEMENT: Pave 2-inch Hot Bituminous Pavement at Absaraka, Embden, and Ayr interchanges as shown in the plans. Pave 1.5 inches of Hot Bituminous Pavement on shoulders of the EB roadway from RP 315.664 to 323. 746.Use the PG 58S-34 asphalt cement. Compact in accordance with section 430.04.I.3 (ordinary compaction) of the standard specifications.

570-P01 CONCRETE PAVEMENT REPAIR: An additional 20% has been added to the quantities for CONCRETE PAVEMENT REPAIR – FULL DEPTH – DOWELED, DOWELED, CONTRACTION JOINT ASSEMBLIES, RANDOM PCC CRACK CLEANING AND SEALING and the associated quantity shown for dowel bars. Include all costs for labor, materials, and equipment to be installed as directed by the Engineer in the bid price Concrete Pavement Repair – Full Depth.

570-P02 TRANSVERSE AND LONGITUDINAL JOINTS CLEANING AND SEALING: Include all costs for labor, materials, and equipment to saw, clean, and seal the described joints in the unit bid price for Concrete Pavement Repair – Full Depth and Spall Repair – Partial Depth, as shown the detail plan sheets.

704-P01 MAINTENANCE & PROTECTION OF TRAFFIC FOR CONCRETE PAVEMENT REPAIRS: Place stackable vertical panels in full depth removal area spaced at 10 feet on the centerline roadway until concrete has been replaced. Use a minimum of two stackable vertical panels at each full depth removal area.

Place Type I Barricades in front of each open area or as directed by the Engineer.

Place barricades so they do not encroach into the adjacent lane.

Complete the concrete pavement repairs and any other associated items (striping, sealing, incidental grinding etc.) for the entire length of one lane closure before starting any work in the adjacent lane.

If the contractor would like to operate in a manner other than as herein provided, provide a complete traffic control layout and program to the engineer for review and approval.

704-P02 TRAFFIC ROUTING DURING CONSTRUCTION: Provide one lane for traffic. Drive in the same direction as the traffic in the adjacent lane. Do not drive against traffic. Maintain the ramp traffic all times during the pavement removal and replacement.

704-P03 CONSTRUCTION TRAFFIC: Construction access to the site is restricted to interchanges. Do not access the site from the median or the opposite roadway. Do not allow construction traffic in the median.

704-P04 TRAFFIC CONTROL FOR CONCRETE REPAIRS: The traffic control device list is based on two 4-mile lane closures, one in each direction and the following list:

1. Standard D-704-15 Type A
2. Standard D-704-35

Quantities of Type I barricades and vertical panels are based on the number of full-depth repairs locations and 3 vertical panels per location. The department will pay for additional barricades and panels at the contract unit price.

704-P05 TRAFFIC CONTROL PHASING:
Phase 1: This phase consists of one lane closure on the outside lane for the removal of the spalls and the full depths for the CPR repairs from RP 319.725 to RP 323.746 for both EB and WB.

Phase 2: This phase consists of one lane closure on the inside lanes for the removal of the spalls and the full depths for the CPR repairs from RP 319.725 to RP 323.746 for both EB and WB.

Phase 3: This phase consists of one lane closure on the outside lane for the removal of the spalls
and the full depths for the CPR repairs from RP 315.664 to RP 319.725 for both EB abs WB.

Phase 4: This phase consists of one lane closure on the inside lane for the removal of the spalls and the full depths for the CPR repairs from RP 315.664 to RP 319.725 for both EB and WB.

Phase 5: This phase consists of maintaining a minimum travel width of 12 feet at all times when milling and overlaying the crossroads and ramps at the Absaraka, Embden and Ayr interchanges.

762-P01 PAVEMENT MARKING: Use 6-inch Epoxy Pavement Marking Wet Reflective Grooved as specified in section 880.02 of the standard specifications for the striping of both EB and WB I-94 from RP 314.883 to 323.746.

REGISTERED PROFESSIONAL ENGINEER
JUSTIN OSS
PE-7124
DATE 09/23/26
NORTH DAKOTA

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-8-094(117)315	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
103	0100	CONTRACT BOND	L SUM	1	1
401	0050	TACK COAT	GAL	2,165.63	2,165.63
411	0112	MILLING PAVEMENT SURFACE - 1 INCH	SY	43,318.67	43,318.67
430	0042	SUPERPAVE FAA 42	TON	4,909.45	4,909.45
430	1000	CORED SAMPLE	EA	32	32
430	5815	PG 58S-34 ASPHALT CEMENT	TON	230.74	230.74
570	0240	DOWELED CONTRACTION JOINT ASSEMBLY	LF	979	979
570	0649	CONCRETE PAVEMENT REPAIR-FULL DEPTH	SY	2,484	2,484
570	0966	RANDOM PCC CRACK CLEANING & SEALING	LF	2,194	2,194
570	1512	SPALL REPAIR-PARTIAL DEPTH	SF	542	542
702	0100	MOBILIZATION	L SUM	1	1
704	0100	FLAGGING	MHR	500	500
704	1000	TRAFFIC CONTROL SIGNS	UNIT	2,199	2,199
704	1050	TYPE I BARRICADE	EA	22	22
704	1052	TYPE III BARRICADE	EA	18	18
704	1060	DELINEATOR DRUMS	EA	206	206
704	1067	TUBULAR MARKERS	EA	530	530
704	1080	STACKABLE VERTICAL PANELS	EA	62	62
704	1087	SEQUENCING ARROW PANEL-TYPE C	EA	2	2
762	0110	EPOXY PVMT MK 4IN LINE-GROOVED	LF	1,816	1,816
762	1106	PVMT MK PAINTED 6IN LINE	LF	37,710	37,710

ESTIMATE NUMBER: 25371 ESTIMATE TYPE: FINAL FINALIZED: Y RUN DATE: 09/22/2026 TIME: 15:13:17

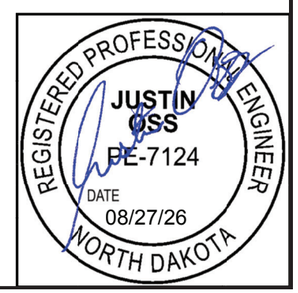
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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-8-094(117)315	10	1

BASIS OF ESTIMATE

Concrete Pavement Repair Totals					
	Full Depth (SY)	Dowel Bars (EA)	Dowel Contr. Joint Assembly (LF)	Spall Repair (SF)	Random Crack (LF)
Westbound	1106	600	396	230	404
Eastbound	946	600	420	190	64
Ramps	18	0	0	32	1360
20%	414	260	163	96	366
Total	2484	1460	984	542	2194

Permanent Pavement Marking		
Location - Type	Basis	Quantity
I-94 Eastbound		
Centerline – Pvmt MK 6 IN Line – Grooved Epoxy	Centerline Skips	11,710.00 LF
Edge Lines-Pvmt MK 6 IN Line - Grooved Epoxy	White Edge Lines	42,130.00 LF
Edge Lines – Pvmt MK 6 IN Line - Grooved Epoxy	Yellow Edge Lines	46,800.00 LF
Edge Lines-Pvmt MK 6 IN Line - Grooved Epoxy	Edge Line Mini Skips	1,160.00 LF
I-94 Westbound		
Centerline –Pvmt MK 6 IN Line – Grooved Epoxy	Centerline Skips	11,710.00 LF
Edge Lines – Pvmt MK 6 IN Line - Grooved Epoxy	White Edge Lines	42,130.00 LF
Edge Lines-Pvmt MK 6 IN Line - Grooved Epoxy	Yellow Edge Lines	46,800.00 LF
Edge Line-Pvmt MK 6 IN Line - Grooved Epoxy	Edge Line Mini Skips	1,160.00 LF
Ayr Crossroads & Ramps		
Centerline - Paint	Double Yellow Line	2,430 LF
Edge lines - Paint	White Edge Lines and Yellow Edge Lines	19,540.00 LF
Embden Crossroads & Ramps		
Centerline - Paint	Double Yellow Line	3,440 LF
Edge lines - Paint	White Edge Lines and Yellow Edge Lines	15,380.00 LF
Absaraka Crossroads & Ramps		
Centerline - Paint	Double Yellow Line	3,140 LF
Edge lines - Paint	White Edge Lines and Yellow Edge Lines	14,890.00 LF



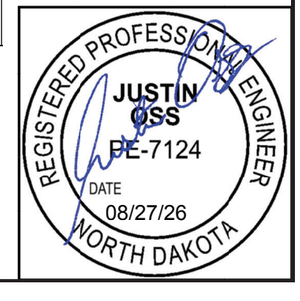
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BASIS OF ESTIMATE

HMA CORED SAMPLES

		A	B		C	D		
Location	Specification Section	Distance (Ft)/1000	Lanes	Joints	Lifts	Sublots (A x B x C)	Quantity (1 per mile)	Unit
Ayr Interchange Ramps	430.04 I.2.b (1), “General”	3	1	-	1	3	N/A	EA
	430.04 I.2.b(2), “Longitudinal Joint Density SSP 4”	3	-	1	1	3	N/A	EA
	430.04 I.2.b(3), “Pavement Thickness Determination Cores”	-	-	-	-	-	1	EA
Ayr Interchange Crossroads	430.04 I.2.b(1), “General”	1	2	1	1	2	N/A	EA
	430.04 I.2.b(2), “Longitudinal Joint Density SSP 4”	1	-	1	1	1	N/A	EA
	430.04 I.2.b(3), “Pavement Thickness Determination Cores”	-	-	-	-	-	1	EA
Embden Interchange Ramps	430.04 I.2.b(1) “General”	3	1	-	1	3	N/A	EA
	430.04 I.2.b(2) “Longitudinal Joint Density SSP 4”	3	-	1	1	3	N/A	EA
	430.04 I.2.b(3) “Pavement Thickness Determination Cores”	-	-	-	-	-	1	EA
Embden Interchange Crossroads	430.04 I.2.b(1), “General”	1	2	1	1	2	N/A	EA
	430.04 I.2.b(2), “Longitudinal Joint Density SSP 4”	1	-	1	1	1	N/A	EA
	430.04 I.2.b(3), “Pavement Thickness Determination Cores”	-	-	-	-	-	1	EA
Absaraka Interchange Ramps	430.04 I.2.b(1), “General”	3	1	-	1	3	N/A	EA
	430.04 I.2.b(2), “Longitudinal Joint Density SSP 4”	3	-	1	1	3	N/A	EA
	430.04 I.2.b(3), “Pavement Thickness Determination Cores”	-	-	-	-	-	1	EA
Absaraka Interchange Crossroads	430.04 I.2.b(1), “General”	1	2	1	1	2	N/A	EA
	430.04 I.2.b(2), “Longitudinal Joint Density SSP 4”	1	-	1	1	1	N/A	EA
	430.04 I.2.b(3), “Pavement Thickness Determination Cores”	-	-	-	-	1	1	EA
					Total	28	4	EA

ITEM	UNIT	AYR INTERCHANGE (All Ramps & Crossroads) SUBTOTAL	EMBDEN INTERCHANGE (All Ramps & Crossroads) SUBTOTAL	ABSARAKA INTERCHANGE (All Ramps & Crossroads) SUBTOTAL	EB I-94 Shoulder SUBTOTAL	TOTAL
Milling Pavement Surface	SY	13,726.34	15,041.78	14,550.55	43,932.58	87,251.25
Tack Coat 0.05 Gal/SY	GAL	686.32	752.09	727.53	2,196.63	4,362.57
RAP Superpave FAA42 @ 2 TON/CY (2” Asphalt for the interchanges & 1.5” Asphalt for the shoulders)	TON	1372.64	1504.18	1455.06	4393.26	8,725.14
PG 58S-34 Asphalt Cement 4.7% of Superpave	TON	64.51	70.70	68.39	206.48	410.08



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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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Reference Point(RP)	Dist. From RP (FT)	Lane	Full Depth Repair (ft) Length	X	Width	SY	Dowel Bars	Doweled Contr. Joint Assembly (LF)	Spall Repair (ft) Length	X	Width	SF	Random Cracks (LF)	Comments
323.739		PL											14	
323.671		PL							4	x	1	4		
323.52		DL							1	x	2	2		
323.488		10FT SHLDR	15	x	10	16.7								
323.478		DL	21	x	12	28.0	20	12						
323.461		DL	51	x	12	68.0	20	48						
323.457		PL							1	x	2	2		
323.411		DL							1	x	2	2		
323.085		DL							1	x	2	2		
Mile 323 Totals						**112.7**	**40**	**60**				**12**	**14**	
322.973		DL	21	x	12	28.0	20	12						
322.973		10FT SHLDR	21	x	10	23.3								
322.851		10FT SHLDR	155	x	10	172.2								
322.841		DL							1	x	3	3		
322.834		DL							1	x	4	4		
322.830		DL							4	x	1	4		
322.822		10FT SHLDR	10	x	10	11.1								
322.762		PL							1	x	1	1		
322.759		PL							1	x	1	1		
322.725		DL							1	x	1	1		
322.242		DL							1	x	1	1		
322.213		DL							1	x	2	2		
322.143		PL	21	x	16	37.3	20	12						
322.129		PL							1	x	2	2		
322.026		DL							1	x	1	1		
Mile 322 Totals						**272.0**	**40**	**24**				**20**	**-**	

Westbound

Data Table

RP 323.739 to RP 322.026

REGISTERED PROFESSIONAL ENGINEER
JUSTIN OSS
PE-7124
DATE 08/27/26
NORTH DAKOTA

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-8-094(117)315	11	2

Reference Point(RP)	Dist. From RP (FT)	Lane	Full Depth Repair (ft) Length	X	Width	SY	Dowel Bars	Doweled Contr. Joint Assembly (LF)	Spall Repair (ft) Length	X	Width	SF	Random Cracks (LF)	Comments
321.964		DL							1	x	2	2		
321.942		DL							1	x	1	1		
321.876		DL							2	x	1	2		
321.860		10FT SHLDR	10	x	10	11.1								
321.859		PL	36	x	16	64.0	20	36						
321.839		10FT SHLDR	15	x	10	16.7								
321.832		PL	21	x	16	37.3	20	12						
321.827		DL							1	x	1	1		
321.772		PL							1	x	2	2		
321.741		DL							1	x	1	1		
321.719		DL							1	x	2	2		
321.649		10FT SHLDR	15	x	10	16.7								
321.615		PL							1	x	1	1		
321.615		PL							1	x	1	1		
321.615		PL							3	x	1	3		
321.605		PL							2	x	1	2		
321.594		DL	21	x	12	28.0	20	12						
321.554		DL							1	x	3	3		
321.418		DL							1	x	2	2		
321.398		10FT SHLDR							1	x	1	1		
321.222		10FT SHLDR							1	x	1	1		
321.088		PL							1	x	2	2		
321.072		DL							4	x	2	8		
321.066		DL							8	x	2	16		
Mile 321 Totals						**173.8**	**60**	**60**				**51**	-	

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Data Table

RP 321.964 to RP 321.066

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-8-094(117)315	11	3

Reference Point(RP)	Dist. From RP (FT)	Lane	Full Depth Repair (ft) Length	X	Width	SY	Dowel Bars	Doweled Contr. Joint Assembly (LF)	Spall Repair (ft) Length	X	Width	SF	Random Cracks (LF)	Comments
320.824		PL											100	
320.669		PL							1	x	2	2		
320.479		PL							3	x	1	3		
320.375		PL							1	x	1	1		
320.346		DL							1	x	1	1		
320.319		DL							3	x	1	3		
320.267		10FT SHLDR							1	x	1	1		
320.159		DL							1	x	1	1		
320.133		DL							1	x	1	1		
320.065		DL							1	x	1	1		
Mile 320 Totals						**-**	**-**	**-**				**14**	**100**	
319.982		DL							4	x	3	12		
319.935		DL							1	x	2	2		
319.890		PL							2	x	1	2		
319.887		PL							1	x	1	1		
319.735		PL							4	x	2	8		
319.617		PL							1	x	1	1		
319.579		PL											205	
319.390		DL							1	x	2	2		
319.330		DL	21	x	12	28.0	20	12						
319.330		PL	21	x	16	37.3	20	12						
319.140		DL	22	x	12	29.3	20	12						
319.140		PL	22	x	16	39.1	20	12						
319.028		PL							1	x	1	1		
Mile 319 Totals						**133.8**	**80**	**48**				**29**	**205**	

Westbound

Data Table

RP 320.824 to RP 319.028

REGISTERED PROFESSIONAL ENGINEER
JUSTIN
OSS
PE-7124
DATE
08/27/26
NORTH DAKOTA

Docusign Envelope ID: 24E87D87-4729-80A1-8122-E0E29248315B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-8-094(117)315	11	4

Reference Point(RP)	Dist. From RP (FT)	Lane	Full Depth Repair (ft) Length	X	Width	SY	Dowel Bars	Doweled Contr. Joint Assembly (LF)	Spall Repair (ft) Length	X	Width	SF	Random Cracks (LF)	Comments
318.841		DL							1	x	2	2		
318.806		DL	15	x	12	20.0	20	12						
318.806		10FT SHLDR	10	x	10	11.1								
318.763		DL							1	x	2	2		
318.666		DL							1	x	1	1		
318.666		DL							1	x	3	3		
318.566		DL	8	x	12	10.7	20	12						
318.566		10FT SHLDR	10	x	10	11.1								
318.545		DL							1	x	1	1		
318.517		PL							1	x	1	1		
318.513		10FT SHLDR							1	x	1	1		
318.501		PL							1	x	1	1		
318.486		10FT SHLDR	8	x	10	8.9								
318.489		DL							3	x	2	6		
318.489		PL							2	x	1	2		
318.435		PL	36	x	16	64.0	20	36						
318.434		DL							1	x	2	2		
318.434		DL							1	x	2	2		
318.414		PL							1	x	2	2		
318.398		DL							1	x	2	2		
318.369		10FT SHLDR											10	
318.132		DL							2	x	1	2		
318.107		DL							2	x	1	2		
Mile 318 Totals						**125.8**	**60**	**60**				**32**	**10**	

Westbound

Data Table

RP 318.841 to RP 318.107

REGISTERED PROFESSIONAL ENGINEER
JUSTIN
OSS
PE-7124
DATE
08/27/26
NORTH DAKOTA

Docusign Envelope ID: 24E87D87-4729-80A1-8122-E0E29248315B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-8-094(117)315	11	5

Reference Point(RP)	Dist. From RP (FT)	Lane	Full Depth Repair (ft) Length	X	Width	SY	Dowel Bars	Doweled Contr. Joint Assembly (LF)	Spall Repair (ft) Length	X	Width	SF	Random Cracks (LF)	Comments
317.932		DL							1	x	2	2		
317.822		DL							1	x	2	2		
317.709		DL							1	x	2	2		
317.628		DL							1	x	2	2		
317.573		PL							1	x	2	2		
317.381		PL							1	x	1	1		
317.381		PL							1	x	1	1		
317.372		PL											75	
317.349		DL							4	x	3	12		
317.315		DL							1	x	1	1		
317.189		DL							2	x	2	4		
317.046		DL							1	x	2	2		
Mile 317 Totals						**-**	**-**	**-**				**31**	**75**	
316.995		DL							1	x	1	1		
316.904		PL	36	x	16	64.0	20	36						
316.886		PL	36	x	16	64.0	20	36						
316.884		DL	21	x	12	28.0	20	24						
316.797		10FT SHLDR							3	x	1	3		
316.795		10FT SHLDR							1	x	1	1		
316.795		DL							2	x	2	4		
316.795		10FT SHLDR							1	x	1	1		
316.795		DL							2	x	2	4		
316.527		PL							1	x	2	2		
316.524		DL							2	x	2	4		
316.524		10FT SHLDR	10	x	10	11.1								
316.519		10FT SHLDR	10	x	10	11.1								
316.519		DL							4	x	2	8		
316.491		DL	22	x	12	29.3	20	24						
316.491		10FT SHLDR	10	x	10	11.1								
316.105		DL							1	x	2	2		
316.050		PL	6	x	16	10.7	20							
Mile 316 Totals						**229.3**	**100**	**120**				**25**	**-**	

Westbound

Data Table

RP 317.932 to RP 316.050

REGISTERED PROFESSIONAL ENGINEER
JUSTIN
OSS
PE-7124
DATE
08/27/26
NORTH DAKOTA

Docusign Envelope ID: 24E87D87-4729-80A1-8122-E0E29248315B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-8-094(117)315	11	6

Reference Point(RP)	Dist. From RP (FT)	Lane	Full Depth Repair (ft) Length	X	Width	SY	Dowel Bars	Doweled Contr. Joint Assembly (LF)	Spall Repair (ft) Length	X	Width	SF	Random Cracks (LF)	Comments
315.977		PL	7	x	16	12.4	20							
315.977		DL							1	x	2	2		
315.970		DL							3	x	1	3		
315.970		DL							2	x	1	2		
315.959		PL							3	x	1	3		
315.880		DL							1	x	1	1		
315.845		DL							1	x	1	1		
315.841		DL							1	x	1	1		
315.823		DL							1	x	1	1		
315.814		DL							2	x	1	2		
315.683		DL	21	x	12	28.0	20	24						
315.682		DL	14	x	12	18.7	20							
Mile 315 Totals						**59.1**	**60**	**24**				**16**	-	

Westbound

Data Table

RP 315.977 to RP 315.682

REGISTERED PROFESSIONAL ENGINEER
JUSTIN OSS
PE-7124
DATE 08/27/26
NORTH DAKOTA

Docusign Envelope ID: 24E87D87-4729-80A1-8122-E0E29248315B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-8-094(117)315	11	7

Reference Point(RP)	Dist. From RP (FT)	Lane	Full Depth Repair (ft) Length	X	Width	SY	Dowel Bars	Doweled Contr. Joint Assembly (LF)	Spall Repair (ft) Length	X	Width	SF	Random Cracks (LF)	Comments
315.664		DL							2	x	2	4		STRAIGHT JOINTS
315.978		PL							1	x	2	2		
mile 315 Totals												**6**		
316.076		DL							1	x	2	2		
316.151		DL	21	x	14	32.7	20	14						
316.151		PL	21	x	14	32.7	20	14						
316.162		PL							3	x	3	9		
316.164		PL							2	x	1	2		
316.258		DL	6	x	14	9.3	20							
316.258		PL	6	x	14	9.3	20							
316.296		PL											16	
316.303		DL							1	x	2	2		
316.765									1	x	1	1		
Mile 316 Totals						**84.0**	**80**	**28**				**16**	**16**	
317.103		DL							1	x	2	2		
317.107		DL							1	x	2	2		
317.216		DL	36	x	14	56.0	20	28						
317.217		PL							3	x	3	9		
317.301		DL	21	x	14	32.7	20	14						
317.301		PL	21	x	14	32.7	20	14						
317.382		DL							1	x	1	1		
317.301		PL	21	x	14	32.7	20	14						
317.382		DL							1	x	1	1		
317.507		DL							3	x	2	6		
317.552		DL							1	x	2	2		
317.570		DL							2	x	1	2		
317.575		DL							2	x	1	2		
317.592		DL							2	x	1	2		
317.592		RAMP							1	x	1	1		
317.595		DL							5	x	2	10		
317.597		RAMP							1	x	1	1		
317.636		RAMP							4	x	1	4		
317.644		DL							2	x	1	2		
317.864		DL											30	
317.870		DL							2	x	4	8		
317.979		DL	36	x	14	56.0	20	28						
317.979		PL	36	x	14	56.0	20	28						
Mile 317 Totals						**233.3**	**100**	**112**				**54**	**30**	

Eastbound

Data Table

RP 315.664 to RP 317.979

REGISTERED PROFESSIONAL ENGINEER
JUSTIN
OSS
PE-7124
DATE
08/27/26
NORTH DAKOTA

Docusign Envelope ID: 24E87D87-4729-80A1-8122-E0E29248315B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-8-094(117)315	11	8

Reference Point(RP)	Dist. From RP (FT)	Lane	Full Depth Repair (ft) Length	X	Width	SY	Dowel Bars	Doweled Contr. Joint Assembly (LF)	Spall Repair (ft) Length	X	Width	SF	Random Cracks (LF)	Comments
318.186		DL							1	x	1	1		
318.217		DL							1	x	1	1		
318.370		DL	9	x	14	14.0	20							
318.370		PL	9	x	14	14.0	20							
318.422		PL							1	x	2	2		
318.507		PL	52	x	14	80.9	20	42						
318.517		DL	21	x	14	32.7	20	14						
318.601		DL							2	x	1	2		
318.692		PL							1	x	2	2		
318.738		DL							2	x	5	10		
318.984		DL							1	x	1	1		
Mile 318 Totals						**141.6**	**80**	**56**				**19**	**-**	
319.004		DL							1	x	1	1		
319.061		DL							1	x	1	1		
319.109		DL							1	x	2	2		
319.265		DL							1	x	1	1		
319.672		DL							2	x	4	8		
319.719		DL	21	x	14	32.7	20	14						
319.719		PL	21	x	14	32.7	20	14						
Mile 319 Totals						**65.3**	**40**	**28**				**13**	-	

Eastbound

Data Table

RP 318.186 to RP 319.719

REGISTERED PROFESSIONAL ENGINEER
JUSTIN
OSS
PE-7124
DATE
08/27/26
NORTH DAKOTA

Docusign Envelope ID: 24E87D87-4729-80A1-8122-E0E29248315B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-8-094(117)315	11	9

Reference Point(RP)	Dist. From RP (FT)	Lane	Full Depth Repair (ft) Length	X	Width	SY	Dowel Bars	Doweled Contr. Joint Assembly (LF)	Spall Repair (ft) Length	X	Width	SF	Random Cracks (LF)	Comments
320.035		PL							1	x	3	3		
320.131		DL							1	x	2	2		
320.162		DL							1	x	2	2		
320.316		PL							1	x	4	4		
320.341		DL							1	x	2	2		
320.677		DL							1	x	1	1		
320.677		PL							2	x	1	2		
320.717		DL							1	x	2	2		
320.752		DL	21	x	14	32.7	20	14						
320.752		PL	21	x	14	32.7	20	14						
320.819		DL							1	x	2	2		
320.839		DL							1	x	2	2		
320.875		DL							1	x	3	3		
320.958		DL							1	x	1	1		
320.970		DL							6	x	1	6		
320.980		DL	6	x	14	9.3	20							
Mile 320 Totals						**74.7**	**60**	**28**				**32**	-	
321.652		DL	35	x	14	54.4	20	28						OVER BOX CULVERT
321.652		PL	29	x	14	45.1	20	28						OVER BOX CULVERT
321.664		DL											18	
321.668		PL	8	x	14	12.4	20	14						
Mile 321 Totals						**112.0**	**60**	**70**				-	**18**	
322.104		PL							1	x	2	2		
322.341		PL							1	x	2	2		
322.620		DL							1	x	2	2		
322.762		PL							1	x	2	2		
322.839		DL							1	x	4	4		
322.839		PL							1	x	4	4		
Mile 322 Totals						-	-	-				**16**	-	

Eastbound

Data Table

RP 320.035 to RP 322.839

REGISTERED PROFESSIONAL ENGINEER
JUSTIN
OSS
PE-7124
DATE
08/27/26
NORTH DAKOTA

Docusign Envelope ID: 24E87D87-4729-80A1-8122-E0E29248315B

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-8-094(117)315	11	10

Reference Point(RP)	Dist. From RP (FT)	Lane	Full Depth Repair (ft) Length	X	Width	SY	Dowel Bars	Doweled Contr. Joint Assembly (LF)	Spall Repair (ft) Length	X	Width	SF	Random Cracks (LF)	Comments
323.211		PL	6	x	14	9.3	20	14						
323.319		DL	13	x	14	20.2	20							
323.319		PL	6	x	14	9.3	20							
323.387		DL	21	x	14	32.7	20	14						
323.422		PL							3	x	2	6		
323.426		PL							3	x	2	6		
323.428		PL							3	x	2	6		
323.430		PL							3	x	2	6		
323.432		PL							3	x	2	6		
323.435		PL	21	x	14	32.7	20	14						
323.435		DL	21	x	14	32.7	20	14						
323.469		DL	21	x	14	32.7	20	14						
323.489		PL	21	x	14	32.7	20	14						
323.492		DL	21	x	14	32.7	20	14						
323.493		PL							1	x	2	2		
323.722		DL							2	x	1	2		
Mile 323 Totals						**234.9**	**180**	**98**				**34**	-	

Eastbound

Data Table

RP 323.211 to RP 323.722

REGISTERED PROFESSIONAL ENGINEER
JUSTIN GSS
PE-7124
DATE 08/27/26
NORTH DAKOTA

Docusign Envelope ID: 24E87D87-4729-80A1-8122-E0E29248315B

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-8-094(117)315	11	11

Reference Point (RP)	Dist. From RP	Lane	Full Depth Repair (ft) Length	X	Width	SY	Dowel Bars	Doweled Contr. Joint Assembly	Spall Repair (ft) Length	X	Width	SF	Random Cracks	Comments
EB EXIT 317 OFF RAMP	460								1	x	1	1.0		
EB EXIT 317 OFF RAMP	490								3	x	1	3.0		
EB EXIT 317 OFF RAMP	640								1	x	1	1.0		
EB EXIT 317 OFF RAMP	697								4	x	1	4.0		
EB EXIT 317 OFF RAMP	711								2	x	1	2.0		
EB EXIT 317 OFF RAMP	768								1	x	3	3.0		
EB EXIT 317 OFF RAMP TOTALS						-	-	-				**14.0**	-	
EB EXIT 317 ON RAMP														
EB EXIT 317 ON RAMP TOTALS						-	-	-				-	-	
EB EXIT 320 OFF RAMP														
EB EXIT 320 OFF RAMP TOTALS						-	-	-				-	-	
EB EXIT 320 ON RAMP														
EB EXIT 320 ON RAMP TOTALS						-	-	-				-	-	
EB EXIT 322 OFF RAMP	915								1	x	1	1.0		
EB EXIT 322 OFF RAMP TOTALS						-	-	-				**1.0**	-	
EB EXIT 322 ON RAMP	914		11	x	6	7.3								ON SHOULDER
EB EXIT 322 ON RAMP TOTALS						**7.3**	-	-				-	-	

Eastbound Ramps

Data Table

Exit 317 Ramp to Exit 322 Ramp

REGISTERED PROFESSIONAL ENGINEER
JUSTIN OSS
PE-7124
DATE 08/27/26
NORTH DAKOTA

Docusign Envelope ID: 24E87D87-4729-80A1-8122-E0E29248315B

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-8-094(117)315	11	12

Reference Point (RP)	Dist. From RP	Lane	Full Depth Repair (ft) Length	X	Width	SY	Dowel Bars	Doweled Contr. Joint Assembly	Spall Repair (ft) Length	X	Width	SF	Random Cracks	Comments
WB EXIT 322 ON RAMP	333												30	
WB EXIT 322 ON RAMP	364		8	x	12	10.7	20							
WB EXIT 322 ON RAMP	560								1	**x**	2	2.0		
WB EXIT 322 ON RAMP TOTALS						**10.7**	**20**	**-**				**2.0**	**30**	
WB EXIT 320 OFF RAMP	38								2	x	2	4.0		
WB EXIT 320 OFF RAMP	166								4	x	1	4.0		
WB EXIT 320 OFF RAMP	407												175	
WB EXIT 320 OFF RAMP	715												20	
WB EXIT 320 OFF RAMP	715												15	
WB EXIT 320 OFF RAMP	824								1	x	1	1.0		
WB EXIT 320 OFF RAMP	841								1	x	1	1.0		
WB EXIT 320 OFF RAMP	841								1	x	2	2.0		
WB EXIT 320 OFF RAMP	894								1	x	1	1.0		
WB EXIT 320 OFF RAMP	894								1	x	2	2.0		
WB EXIT 320 OFF RAMP TOTALS						**-**	**-**	**-**				**15.0**	**210**	
WB EXIT 320 ON RAMP	314												15	
WB EXIT 320 ON RAMP	790												60	
WB EXIT 320 ON RAMP TOTALS						**-**	**-**	**-**				**-**	**75**	
WB EXIT 317 OFF RAMP	245												50	
WB EXIT 317 OFF RAMP	353												400	
WB EXIT 317 OFF RAMP	660												30	
WB EXIT 317 OFF RAMP TOTALS						**-**	**-**	**-**				**-**	**480**	
WB EXIT 317 ON RAMP	342												20	
WB EXIT 317 ON RAMP	364												100	
WB EXIT 317 ON RAMP	439												120	
WB EXIT 317 ON RAMP	472												75	
WB EXIT 317 ON RAMP	656												130	
WB EXIT 317 ON RAMP	814												120	
WB EXIT 317 ON RAMP TOTALS						**-**	**-**	**-**				**-**	**565**	

Westbound Ramps

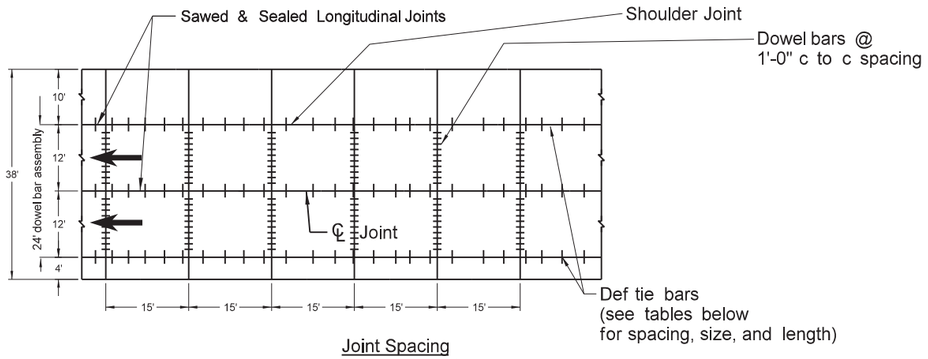
Data Table

Exit 322 Ramp to Exit 317 Ramp

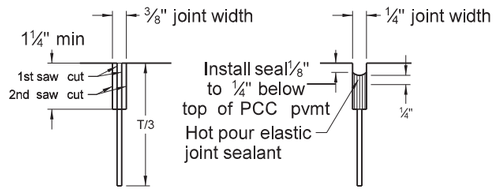
REGISTERED PROFESSIONAL ENGINEER
JUSTIN OSS
PE-7124
DATE 08/27/26
NORTH DAKOTA

Docusign Envelope ID: 24E87D87-4729-80A1-8122-E0E29248315B

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-8-094(117)315	20	1

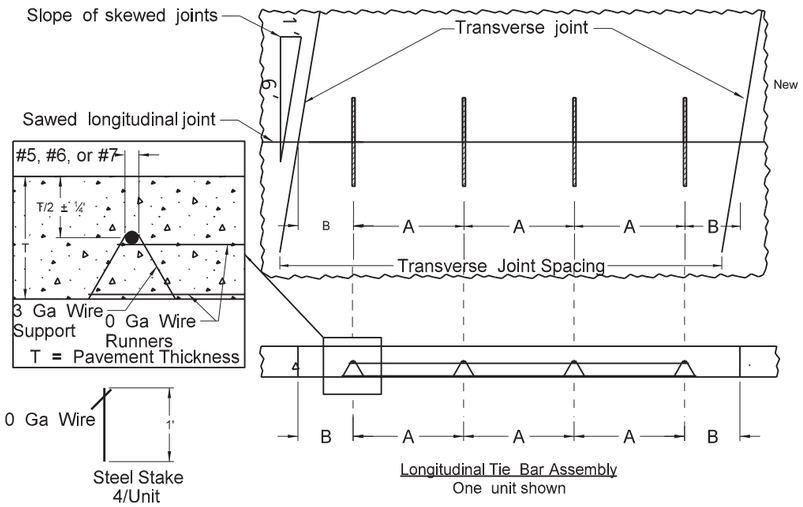


Joint Spacing
Mainline Joints Straight
Uniform Joint spacing 15'
*Same average spacing for skewed joints

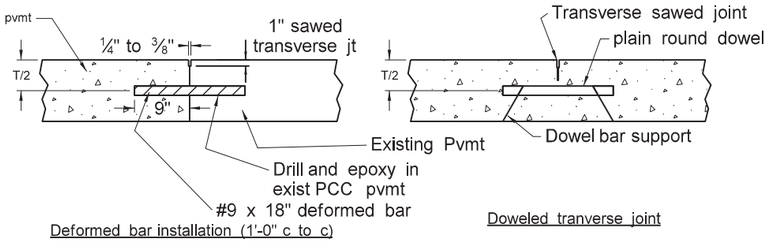


Transverse Jt sawing

Transverse Jt sealing

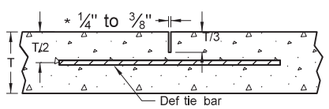


Longitudinal Tie Bar Assembly
One unit shown

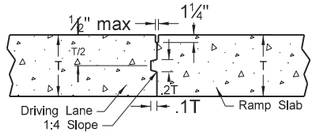


Deformed bar installation (1'-0" c to c)

Doweled tranverse joint



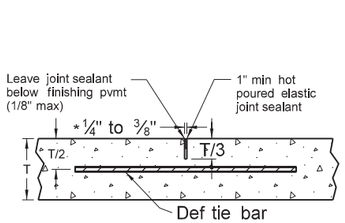
Joint sawing detail (all sawed and tied joints)



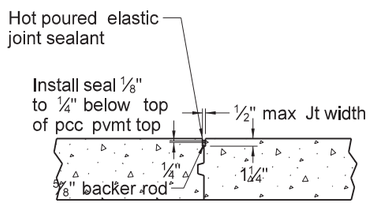
Longitudinal construction joint
(at ramps - non-tied keyed joints)

Longitudinal Joint Tie Bar Size and Length					
Pavement Depth	8"	9"	10"	11"	12"
℄ ML & Ramps	#6 x 3'-0"			#7 x 3'-0"	
10' SHLDR	#5 x 2'-6"				

Longitudinal Joint Uniform Tie Bar Spacing			
Joint Spacing	Distance A	Distance B	No. of Bars/Assembly
15'	45"	22½"	4



Joint sealing detail (all sawed and tied joints)

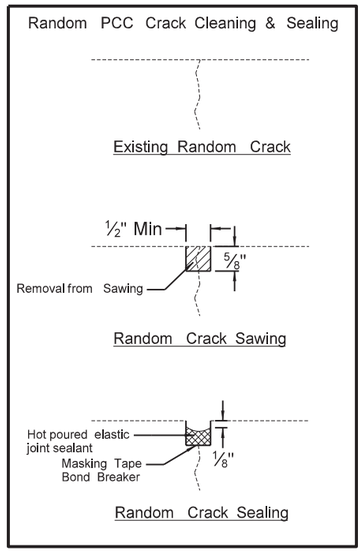


Longitudinal joint silicone seal
(non-tied keyed joints)

Notes:

1. T = Pavement Thickness
2. Dowel bars shall be 1¼" x 18" when T = 10" or less and shall be 1½" x 18" when T is greater than 10".
3. The ramp tapers shall also be doweled

*Width requirement for top 1" only. Bottom portion of saw cut may be narrower.



PCC Pavement Joint Details

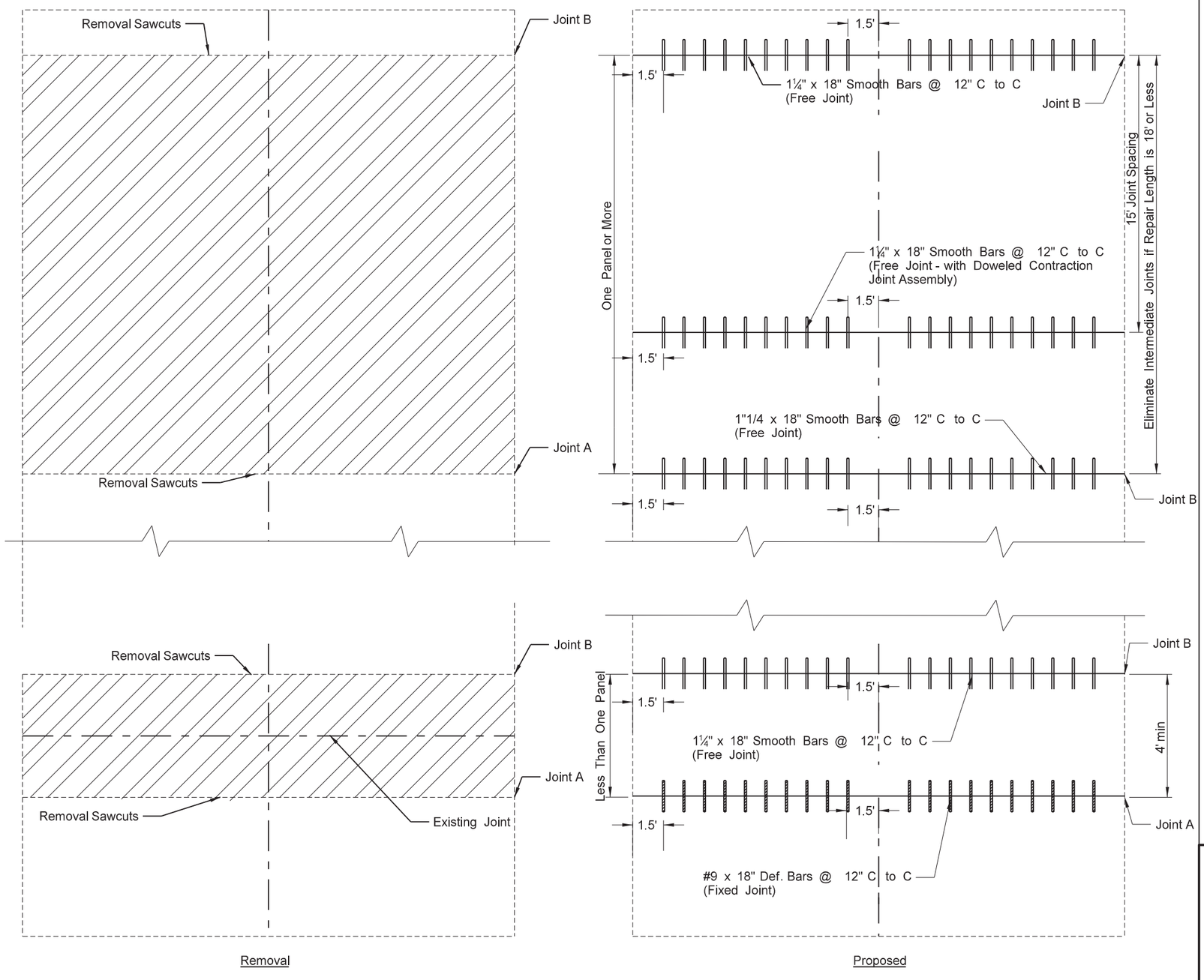
With Uniform Spacing

I-94 EB & WB

REGISTERED PROFESSIONAL ENGINEER
JUSTIN OSS
PE-7124
DATE 08/27/26
NORTH DAKOTA

Docusign Envelope ID: 24E87D87-4729-80A1-8122-E0E29248315B

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-8-094(117)315	20	2



Removal

Proposed



PCC Removal

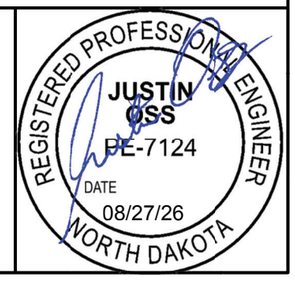
Notes:

1. Joint A (Fixed Joint) shall be the new joint with the shortest distance to the next transverse joint or working random crack. The saw cut will be made at 90° to the centerline. The deformed bars shall be placed perpendicular to the face of the saw cut.
2. Joint B (Free Joint) shall be the new joint with the greatest distance to the next transverse joint or working random crack. The smooth bars shall be installed within the tolerances shown on the "Dowel Bar Placement- Full Depth Repair" detail sheet.
3. When the distance to the next transverse joint or working random crack is equal for both new joints, the free joint (joint B) shall be placed on the approach side of the repair.
4. If greater than one panel in length, a Doweled Contraction Joint Assembly shall be installed at transverse contraction joints.
5. In repair areas which are not the entire roadway width, joints shall be placed to match the existing pavement wherever possible.
6. The joints at the beginning and end of a full depth repair section can be either a Joint B or Joint A depending on the existing joint.

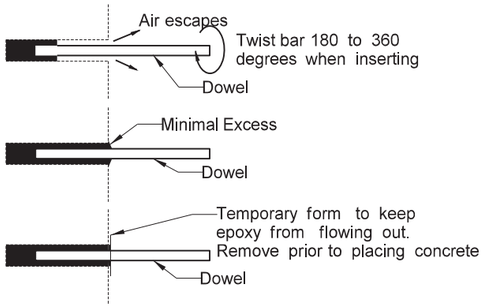
Removal of Concrete & Dowel Bar

Placement-Full Depth Repair
Straight Joint

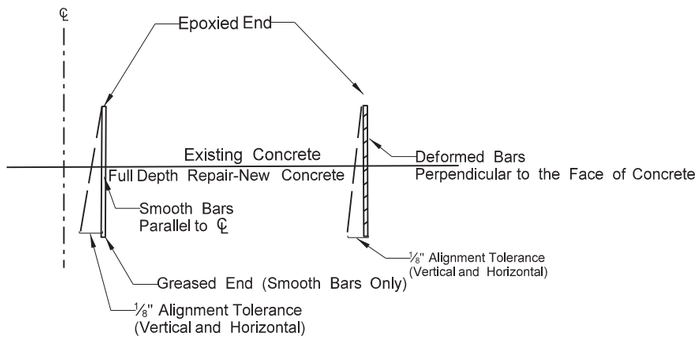
I-94 EB WB



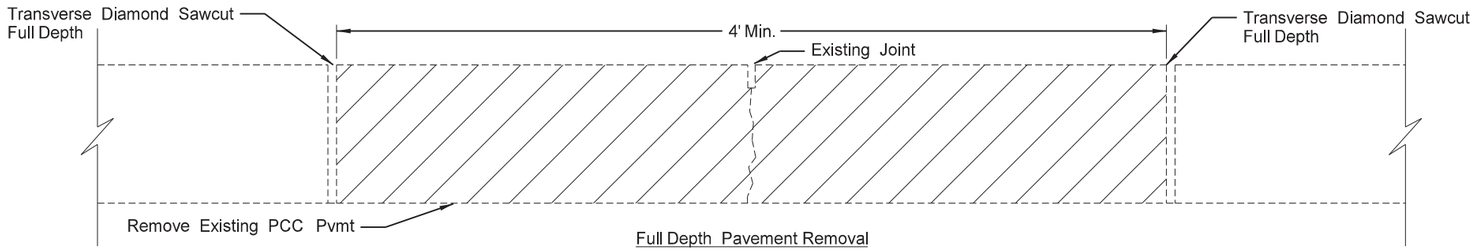
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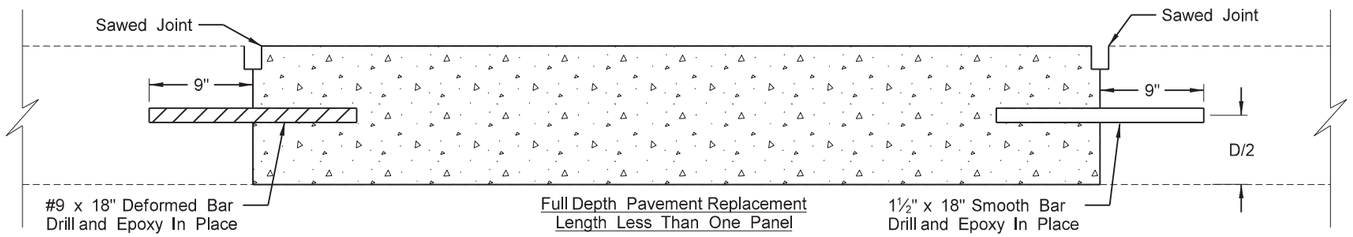
Dowel & Epoxy Installation
(Smooth or Deformed Bars)



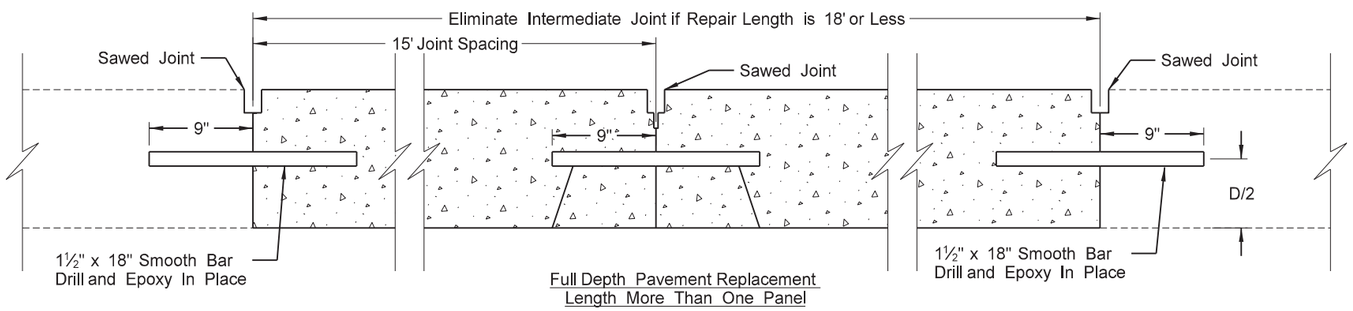
Dowel Alignment Tolerance



Full Depth Pavement Removal



Full Depth Pavement Replacement
Length Less Than One Panel



Full Depth Pavement Replacement
Length More Than One Panel

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Notes:

1. Variables:
   D = Depth of Pavement
2. Removal and replacement also applies to full depth repairs at cracks.
3. Place smooth dowel bars in repair joint which is farthest away from the next transverse joint or working random crack. If distance is equal for both repair joints, place smooth dowels on approach side of patch.
4. In full depth repair areas that fall within 3' of an existing joint, the repair area shall go beyond the joint by 3' to ensure all old doweled bars are removed.

Concrete Pavement Repair-Full Depth

Non-Reinforced PCC Pavement

I-94 EB & WB

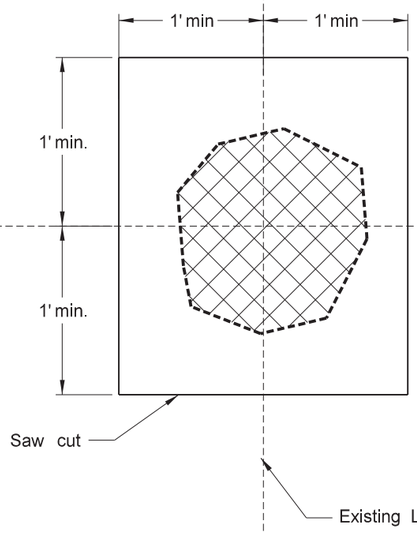
REGISTERED PROFESSIONAL ENGINEER
JUSTIN
OSS
PE-7124
DATE
08/27/26
NORTH DAKOTA

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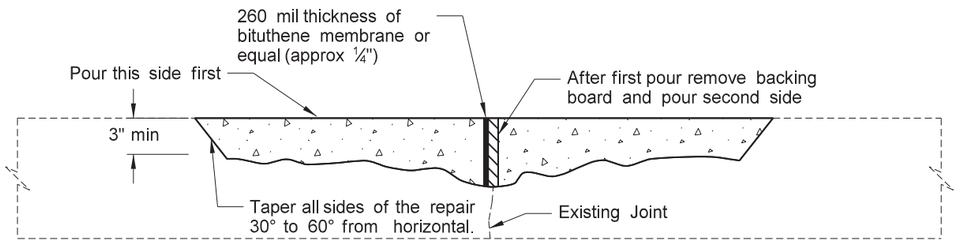
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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*Surveyed quantites in the plans are based on a minimum size spall of 1' by 1'. Actual size varies as per direction of the engineer with 1' being the minimum amount removed as shown.

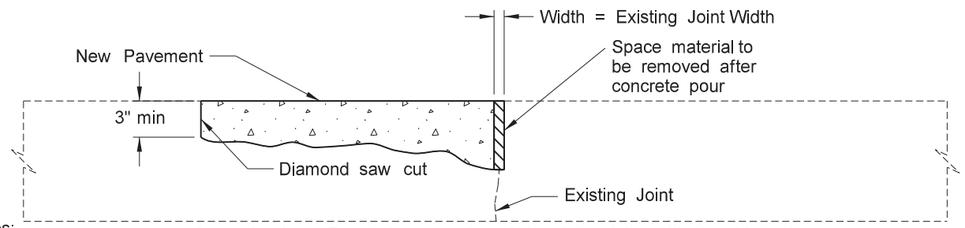
Plan View (not to scale)



Spall Repair



Cross Section - Repair Area on Both Sides of the Joint (Milling Method)



Cross Section - Repair Area on One Side of the Joint (Chipping Method)

Notes:

1. Existing concrete will be removed with a chipping hammer or other methods as approved by the engineer. The maximum size chipping hammer allowed will be 15 pounds. A milling machine may be used, as approved by the engineer, chipping will still be required to finish the removal and establish a 30° to 60° taper from vertical on all sides of the repair.
2. Grout shall be applied to the sides, and bottom of the repair area, excluding joint faces.
3. A spacer material, as approved by the engineer, shall be placed on the joint face to maintain the joint during repair. The material shall have the capability of maintaining a width equal to that of the existing joint, and being easily removed after the pour. In the case of repair on both sides of the transverse joint each side shall be poured separately.
4. In the case of repair on both sides of the joint, if deemed necessary by the engineer, a bituthene waterproofing membrane will be placed on the face of the newly poured joint in lieu of the spacer material prior to the concrete pour. The material shall be a minimum of 260 Mil (approximately ¼") thick or equal to the width of the existing joint, whichever is larger. The material shall be cut to fit over the entire face of the existing joint. The material shall be placed to provide for expansion and to prevent water from entering the existing joint through the sides or bottom. The material shall be hand pressed into place to conform to the face of the existing joint. In the case of repair on both sides of the joint a backer board material, as approved by the engineer shall be placed over the bituthene material on the side facing the second pour prior to the 2nd pour. The backer board shall be removed after the repair is completed.

   In the case of repair on one side of the joint, if deemed necessary by the engineer, a bituthene waterproofing membrane will be placed on the face of the existing joint in lieu of the spacer material and prior to the concrete pour.
5. For spall repairs in areas where the joints are at 90°, the 2' min. sawcuts shall be perpendicular to the longitudinal and transverse joints.
6. All joints shall be sealed according to NDDOT specification
7. All costs for cleaning and sealing joints and any bituthene installment shall be covered under the bid item " Spall Repair - Partial Depth."

Spall

Concrete Removal Area

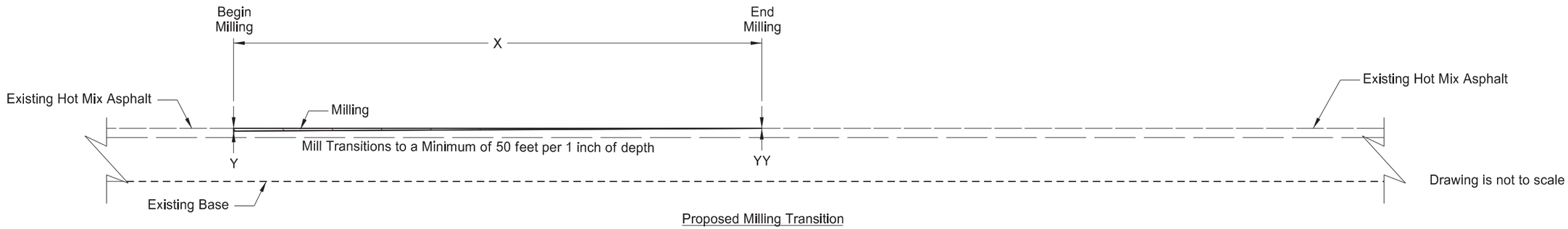
Spall Repair Detail

I-94 EB & WB

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Proposed Milling Transition

Milling Transitions

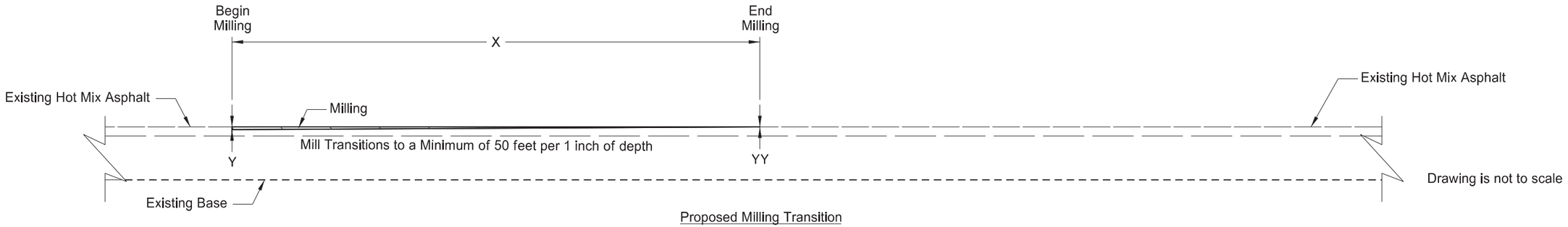
Location	X	Begin Milling/Paving Station	Y	YY	End Milling Station
Ayr N. Side Cross Road	50 ft	102+67	2 in	1 in	103+17
Ayr S. Side Cross Road	50 ft	97+28	2 in	1 in	96+78
Embden N. Side Cross Road	50 ft	17+63	2 in	1 in	18+13
Embden S. Side Cross Road	50 ft	12+32	2 in	1 in	11+82
Absaraka N. Side Cross Road	50 ft	17+63	2 in	1 in	18+13
Absaraka S. Side Cross Road	50 ft	12+34	2 in	1 in	11+84

Milling and Paving Transition

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-8-094(117)315	20	6



Proposed Milling Transition

Milling Transitions

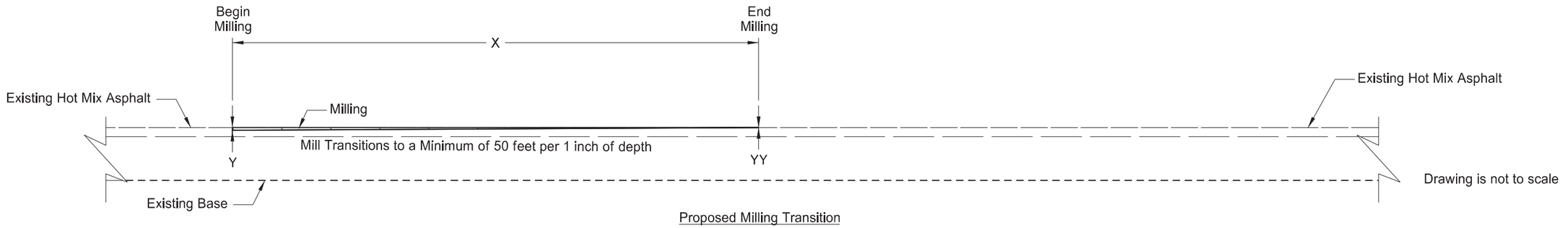
Location	X	Begin Milling/Paving Station	Y	YY	End Milling Station
Ayr NE Ramp	50 ft	8+38	2 in	1 in	7+88
Ayr NW Ramp	50 ft	13+27	2 in	1 in	13+77
Ayr SE Ramp	50 ft	8+99	2 in	1 in	8+49
Ayr SW Ramp	50 ft	9+82	2 in	1 in	10+32
Embden NE Ramp	50 ft	8+17	2 in	1 in	7+67
Embden NW Ramp	50 ft	13+19	2 in	1 in	13+69

Milling And Paving Transition

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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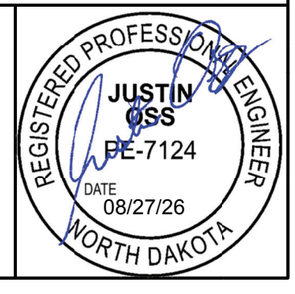


Proposed Milling Transition

Milling Transitions

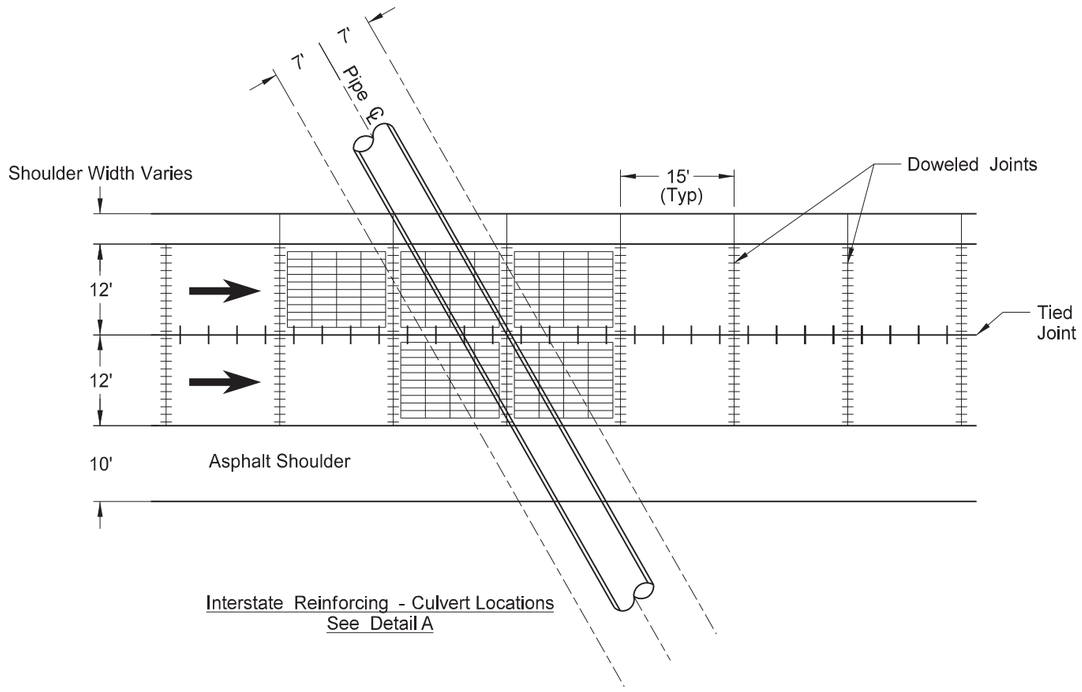
Location	X	Begin Milling/Paving Station	Y	YY	End Milling Station
Embden SE Ramp	50 ft	8+39	2 in	1 in	7+89
Embden SW Ramp	50 ft	9+83	2 in	1 in	10+33
Absaraka NE Ramp	50 ft	8+62	2 in	1 in	8+12
Absaraka NW Ramp	50 ft	13+30	2 in	1 in	13+80
Absaraka SE Ramp	50 ft	8+31	2 in	1 in	7+81
Absaraka SW ramp	50 ft	9+83	2 in	1 in	10+33

Milling and Paving End Transition

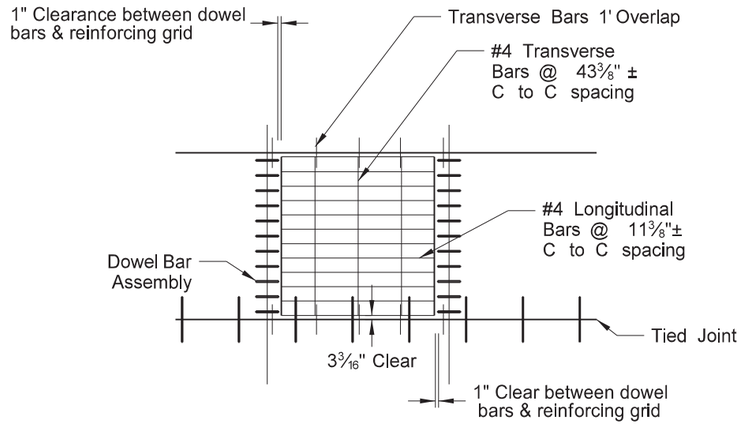


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Interstate Reinforcing - Culvert Locations
See Detail A



Detail A Reinforcing Layout

Longitudinal Bar Spacings		
Panel Width	Longitudinal Bar Spacing	Bar Clearance, From Long. Joint
12'	11 3/8"	3 1/2"
14'	11 1/2"	3 1/4"
16'	11 1/2"	3 3/4"

NOTES:
1. Place reinforcing steel above dowel bars and longitudinal centerline tie bars.
2. Provide a 1 foot minimum overlap of transverse reinforcing steel across the longitudinal tied joints.
3. Reinforce the complete panel if any part of the panel lies within 7 feet of the pipe centerline.
4. Include all costs to furnish and install the reinforcing steel as shown in the price bid for "10 IN CONCRETE PAVEMENT REPAIR-FULL DEPTH-DOWELED".

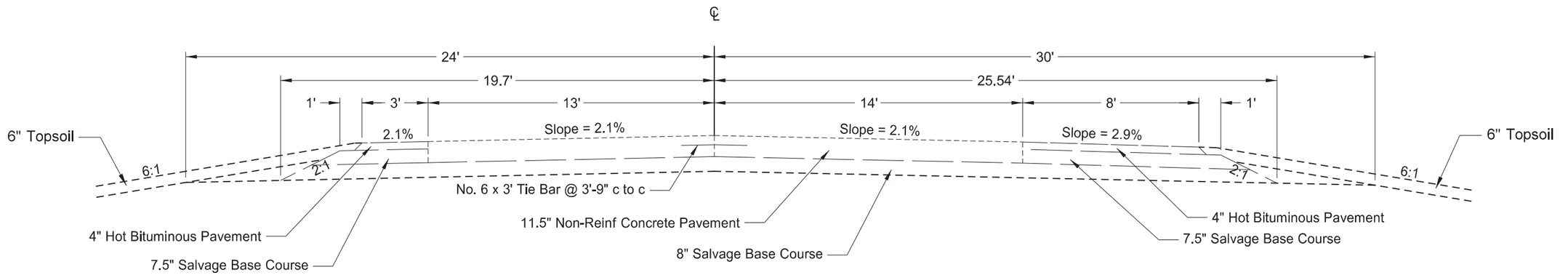
Concrete Reinforcement Detail at Culvert Locations

I-94 EB & WB RP 320.035 to RP 322.83

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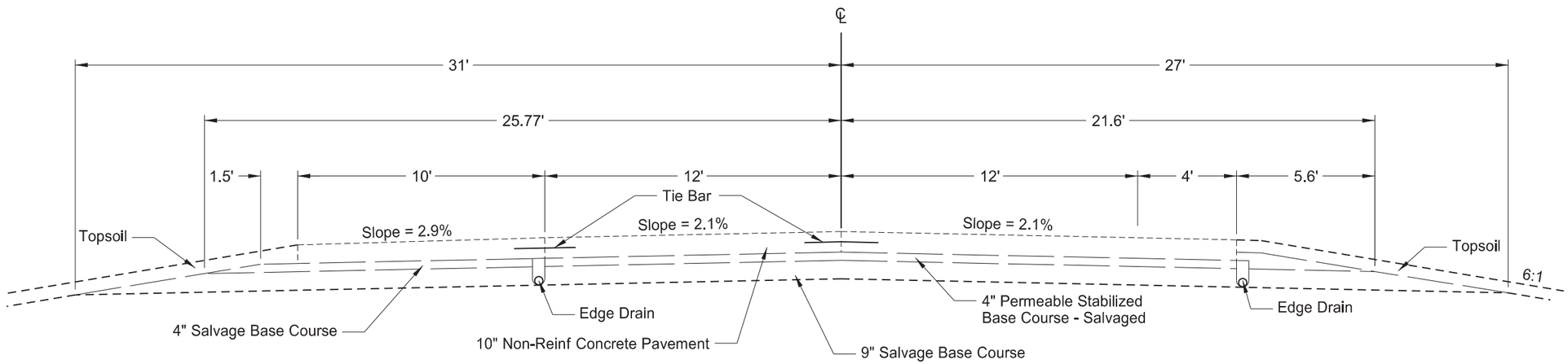
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Typical Section 1

Eastbound Roadway - RP 315.664 to RP 323.746



Typical Section 2

Westbound Roadway - RP 315.664 to RP 323.746

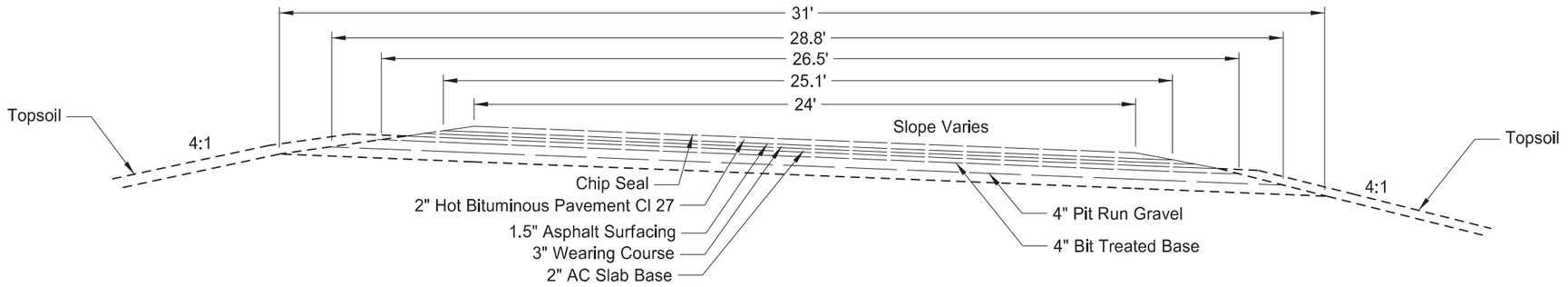
Existing Typical Sections

I-94 EB & WB Roadway

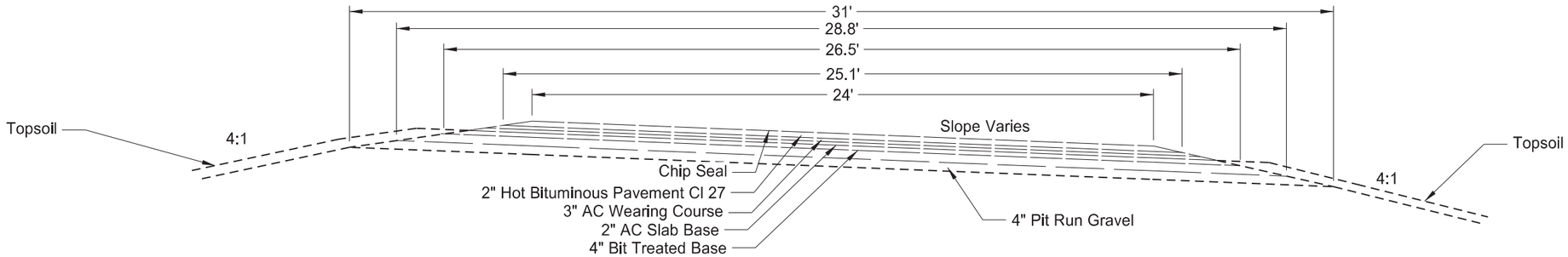
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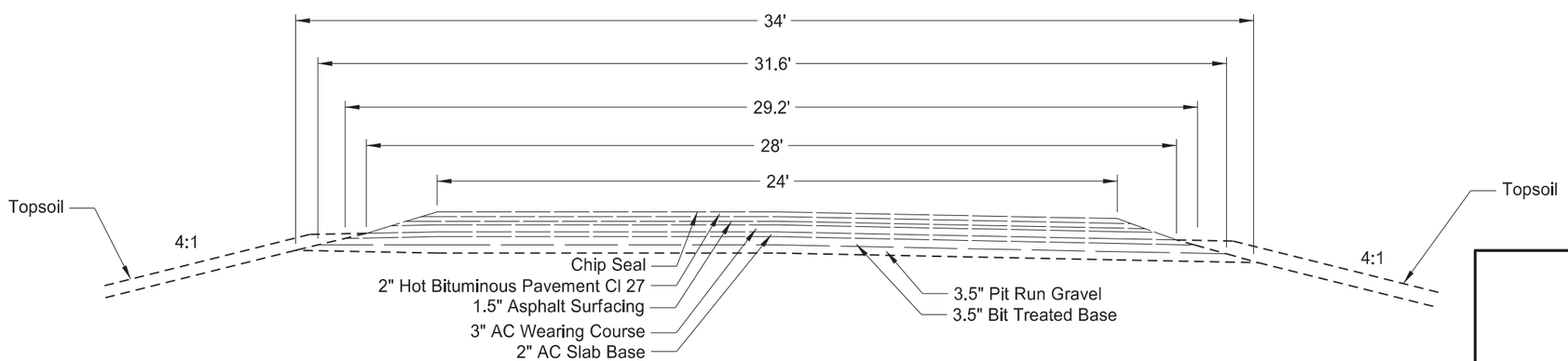
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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Ayr Ramps
NW Sta 15+79 to Sta 21+66
NE Sta 0+12 to Sta 6+24



Ayr Ramps
SW Sta 8+75 to Sta 18+55
SE Sta 0+12 to Sta 10+63



Ayr Crossroad
6+00 to 13+50
16+00 to 24+71

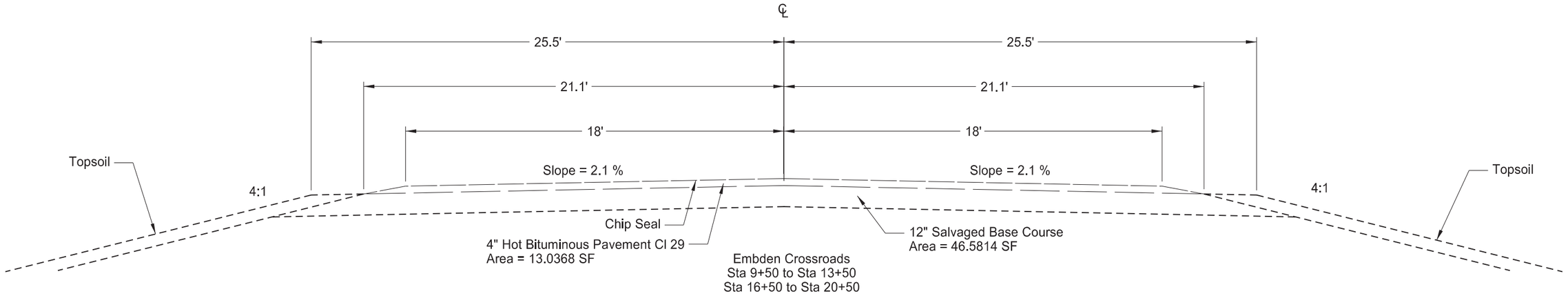
Existing Typicals

Ayr Interchange

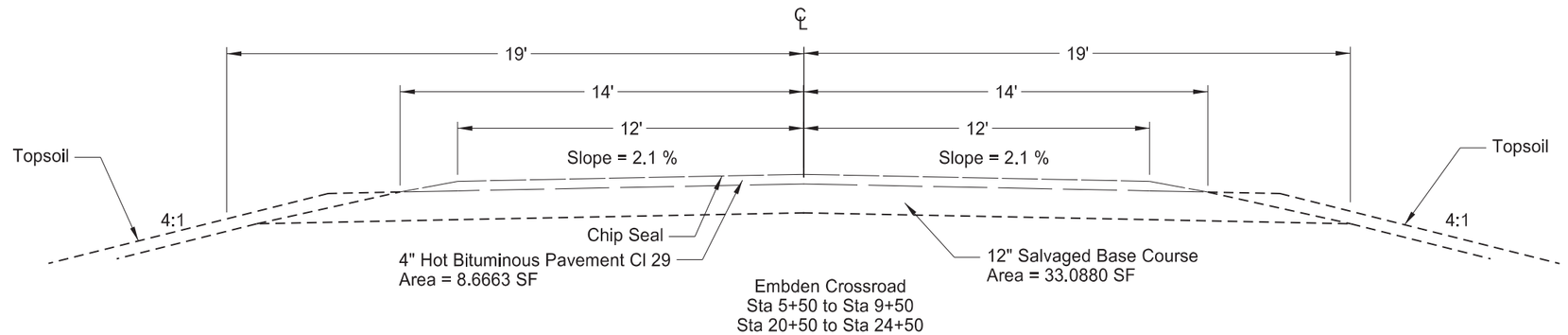
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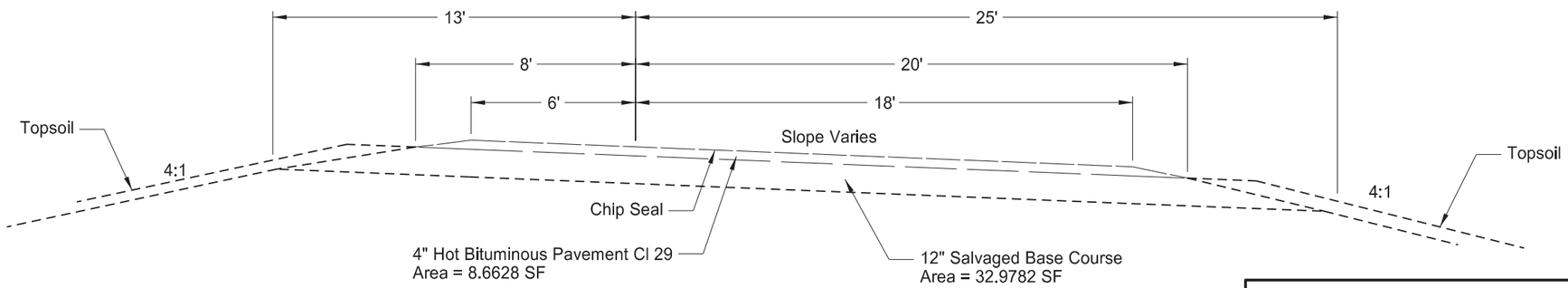
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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Embden Crossroads
Sta 9+50 to Sta 13+50
Sta 16+50 to Sta 20+50



Embden Crossroad
Sta 5+50 to Sta 9+50
Sta 20+50 to Sta 24+50



Embden Ramps
SW Sta 9+30 to Sta 18+03
SE Sta 0+00 to Sta 8+39
NW Sta 13+19 to Sta 21+64.29
NE sta 0+00 to Sta 8+17

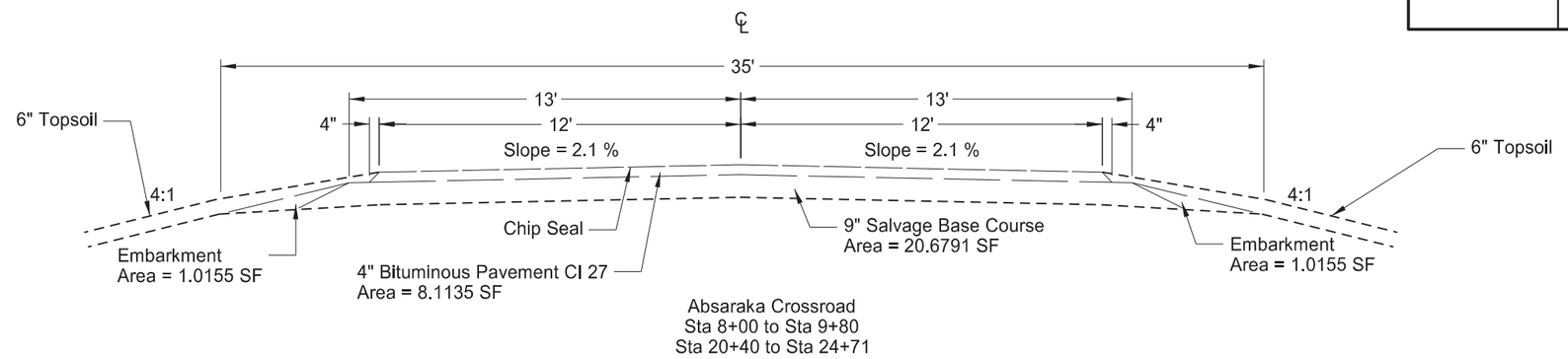
Existing Typical Sections

Embden Interchange

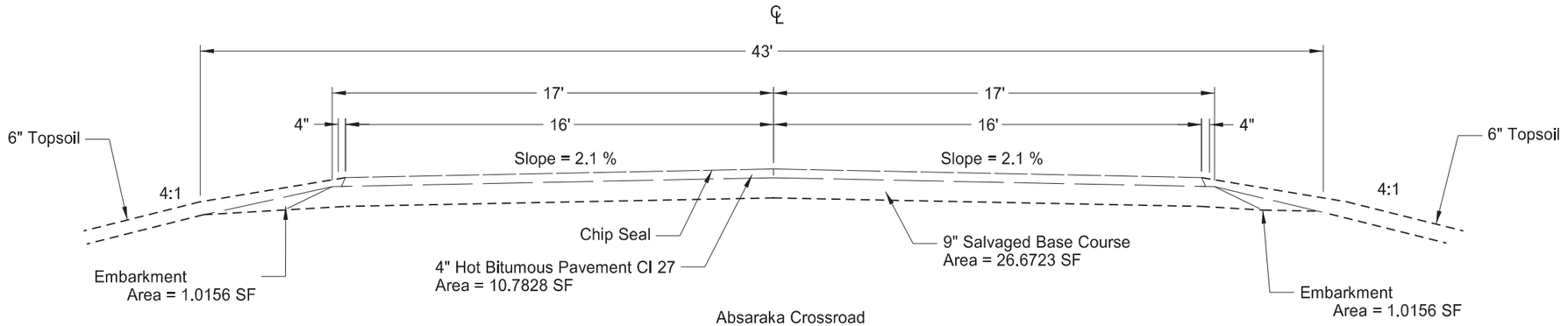
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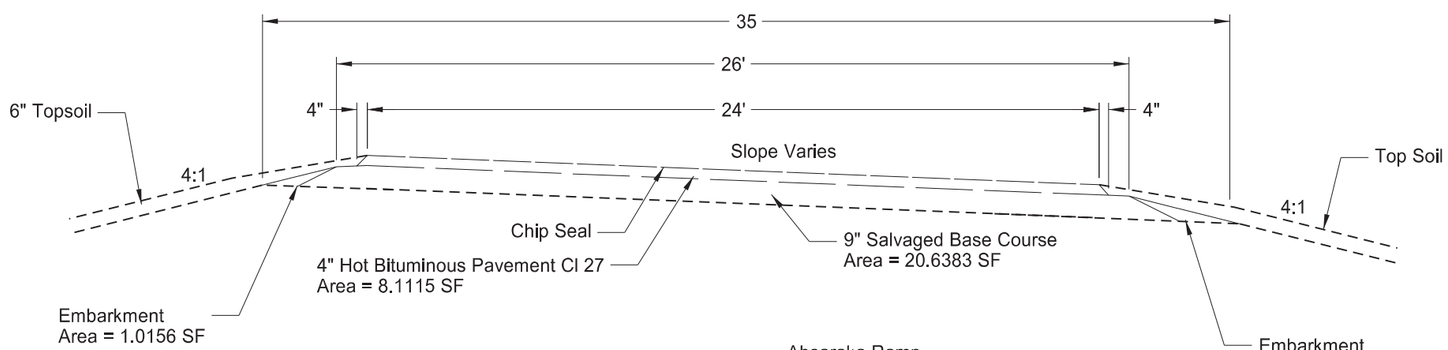
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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Absaraka Crossroad
Sta 8+00 to Sta 9+80
Sta 20+40 to Sta 24+71



Absaraka Crossroad
Sta 9+80 to Sta 13+50
Sta 18+50 to 20+40



Absaraka Ramp
NW Sta 13+29 to Sta 20+58
NE Sta 0+18 to Sta 8+62
SW Sta 9+83 to Sta 17+77
SE Sta 0+18 to Sta 8+30

Existing Typical Sections

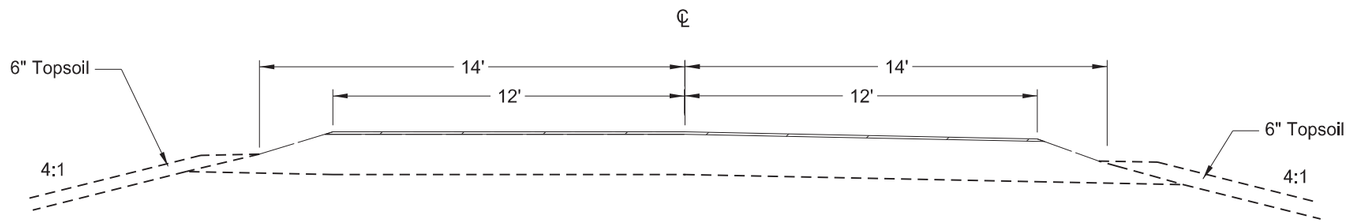
Absaraka Interchange

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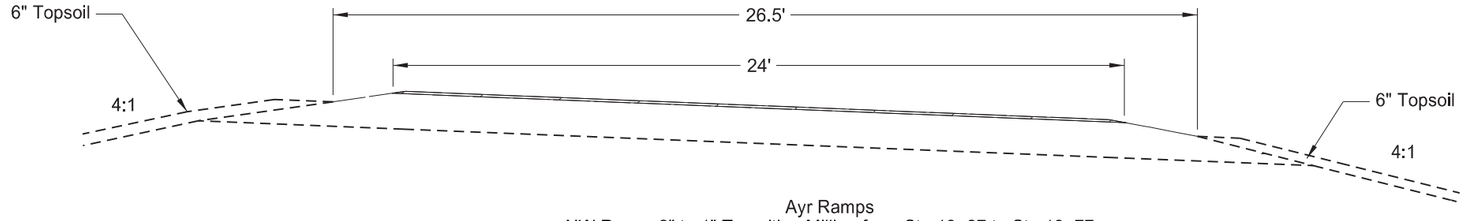
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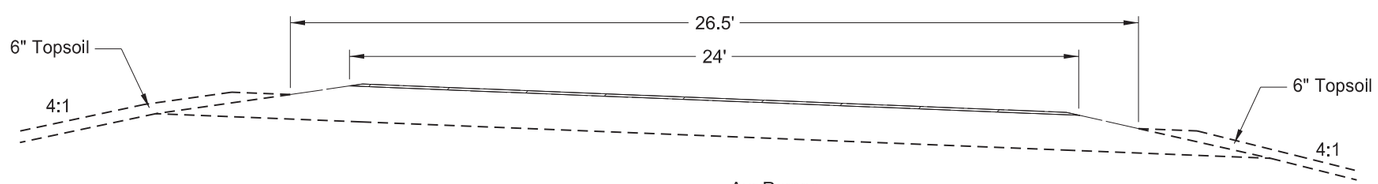
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-8-094(117)315	30	5



Ayr Crossroads
1" Milling from Sta 92+55 to Sta 96+78
1" to 2" Transition Milling from Sta 96+78 to 97+28
2" Milling from Sta 97+28 to Sta 98+69
2" Milling from Sta 101+30 to sta 102+67
2" to 1" Transition Milling from Sta 102+67 to 103+17
1" Milling from Sta 103+17 to 107+05



Ayr Ramps
NW Ramp: 2" to 1" Transition Milling from Sta 13+27 to Sta 13+77
NW Ramp: 1" Milling from Sta 13+77 to Sta 21+66
NE Ramp: 1" Milling from Sta 0+12 to Sta 7+88
NE Ramp: 1" to 2" Transition Milling from Sta 7+88 to sta 8+38



Ayr Ramps
SW Ramp: 2" to 1" Transition Milling from Sta 9+82 to Sta 10+32
SW Ramp: 1" Milling from Sta 10+32 to Sta Sta 18+55
SE Ramp: 1" Milling from Sta 0+12 to Sta 8+49
SE Ramp: 1" to 2" Transition Milling from Sta 8+49 to Sta 8+99

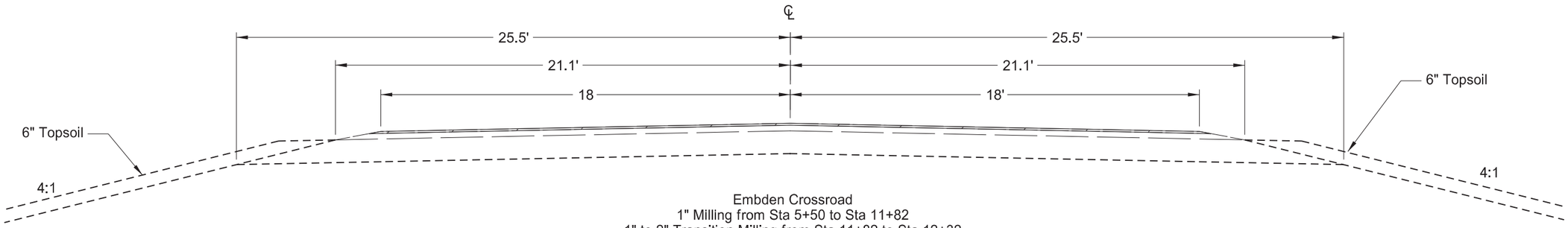
Removal Typical Sections

Ayr Interchange

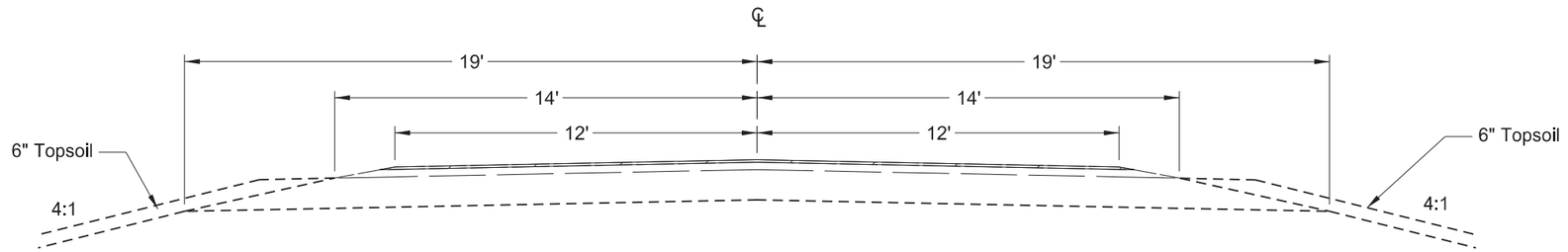
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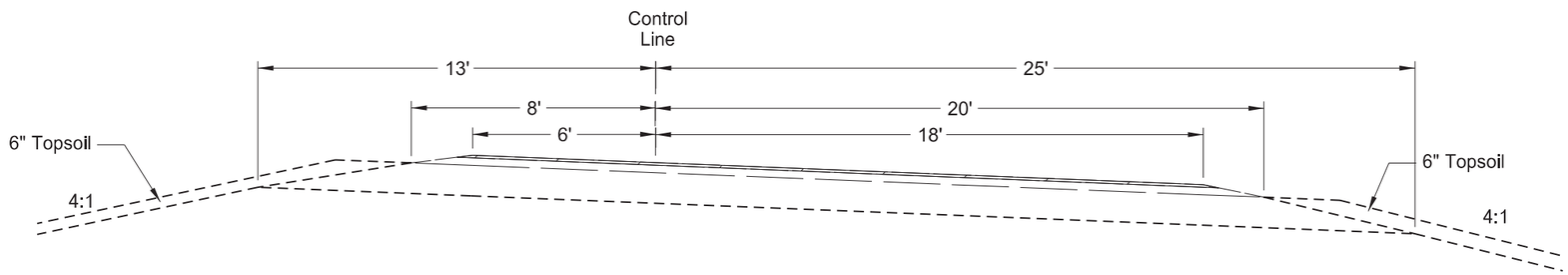
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-8-094(117)315	30	6



Embden Crossroad
1" Milling from Sta 5+50 to Sta 11+82
1" to 2" Transition Milling from Sta 11+82 to Sta 12+32
2" Milling from Sta 12+32 to Sta 13+50



Embden Crossroad
2" Milling from Sta 16+50 to Sta 17+63
2" to 1" Transition Milling from Sta 17+63 to Sta 18+13
1" Milling from Sta 18+13 to Sta 24+50



Embden Ramps
NW: 2" to 1" Transition Milling from Sta 13+19 to Sta 13+69
NW: 1" Milling from Sta 13+69 to Sta 21+46
NE: 1" Milling from Sta 0+18 to Sta 7+67
NE: 1" to 2" Transition Milling from Sta 7+67 to Sta 8+17
SW: 2" to 1" Transition Milling from Sta 8+87 to Sta 9+37
SW: 1" Milling from Sta 9+37 to Sta 17+87
SE: 1" Milling from Sta 0+16 to Sta 7+89
SE: 1" to 2" Transition Milling from Sta 7+89 to Sta 8+39

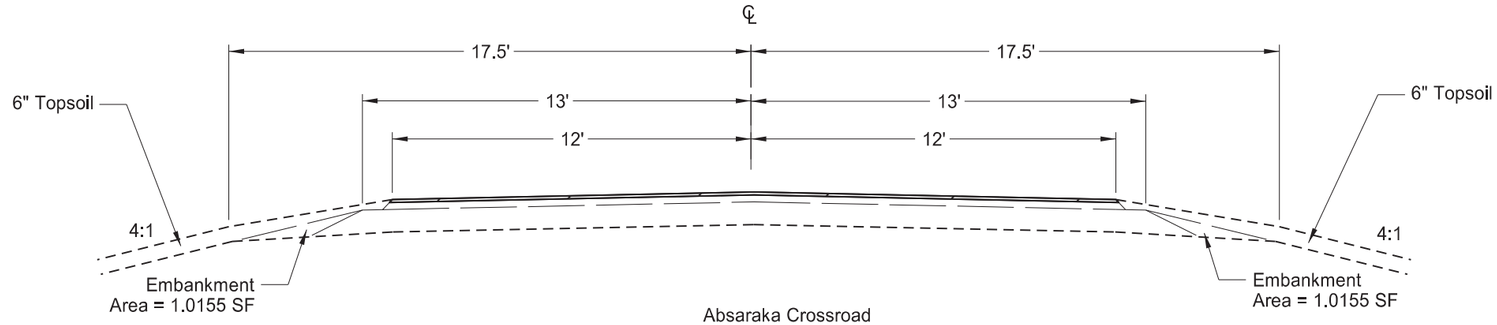
Removal Typical Sections

Embden Interchange

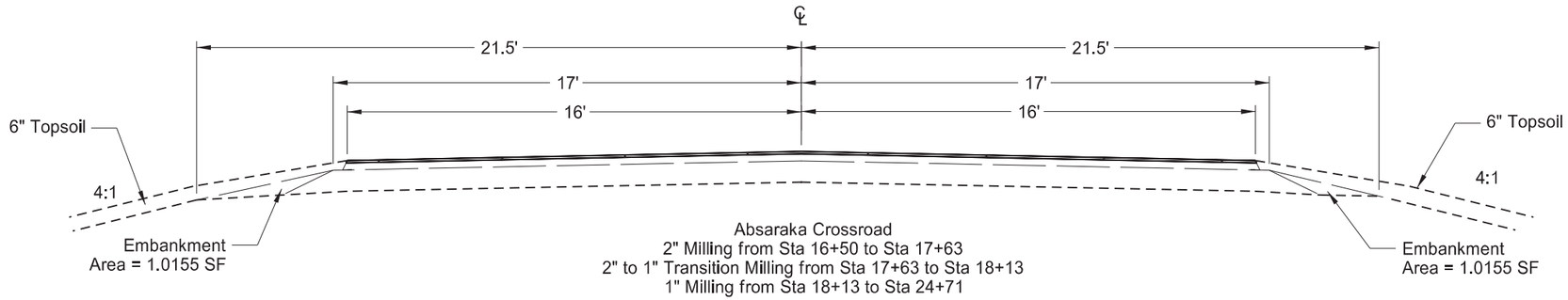
REGISTERED PROFESSIONAL ENGINEER
JUSTIN
OSS
PE-7124
DATE
08/27/26
NORTH DAKOTA

Docusign Envelope ID: 24E87D87-4729-80A1-8122-E0E29248315B

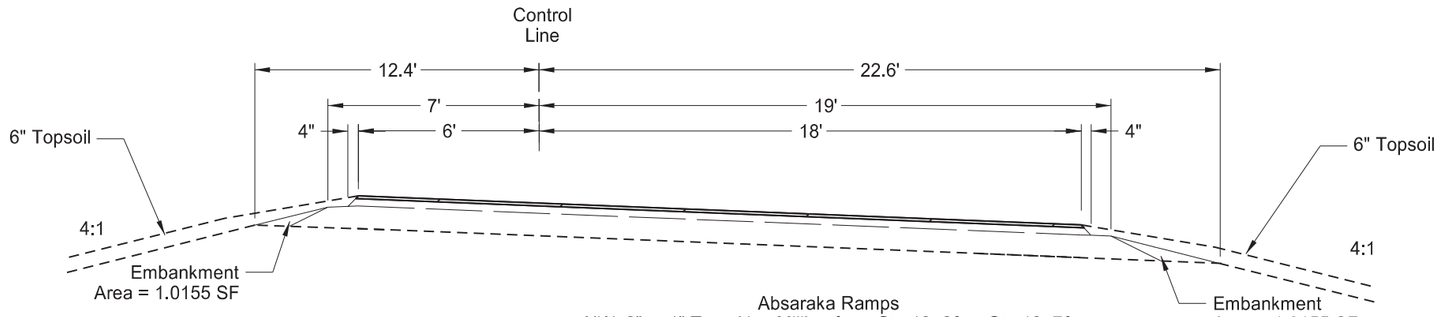
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-8-094(117)315	30	7



Absaraka Crossroad
1" Milling from sta 6+00 to Sta 11+84
1" to 2" Transition Milling from Sta 11+84 to Sta 12+34
2" Milling from Sta 12+34 13+50



Absaraka Crossroad
2" Milling from Sta 16+50 to Sta 17+63
2" to 1" Transition Milling from Sta 17+63 to Sta 18+13
1" Milling from Sta 18+13 to Sta 24+71



Absaraka Ramps
NW: 2" to 1" Transition Milling from Sta 13+29 to Sta 13+79
NW: 1" Milling from Sta 13+79 to Sta 20+56
NE: 1" Milling from Sta 0+18 to Sta 8+12
NE: 1" to 2" transition Milling from Sta 8+12 to Sta 8+62
SW: 2" to 1" Transition Milling from Sta 9+83 to sta 10+33
SW: 1" Milling from Sta 10+33 to Sta 17+77
SE: 1" Milling from Sta 0+18 to Sta 7+81
SE: 1" to 2" Transition Milling From Sta 7+81 to Sta 8+31

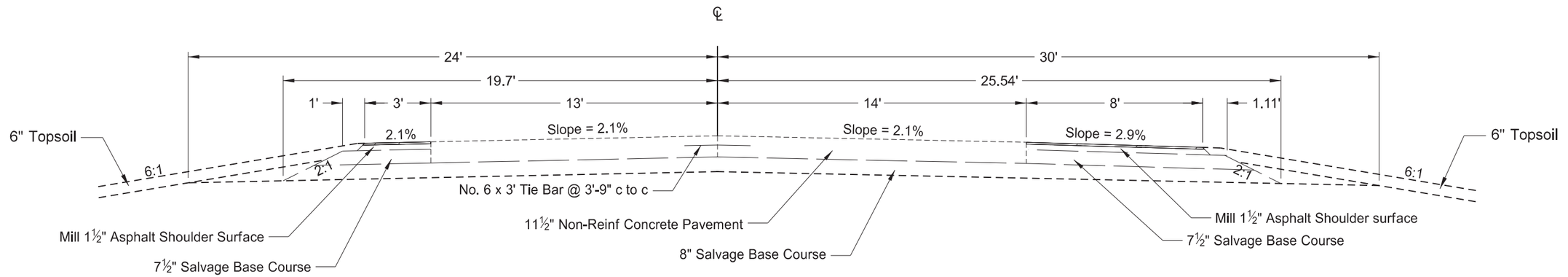
Removal Typical Sections

Absaraka Interchange

REGISTERED PROFESSIONAL ENGINEER
JUSTIN
OSS
PE-7124
DATE
08/27/26
NORTH DAKOTA

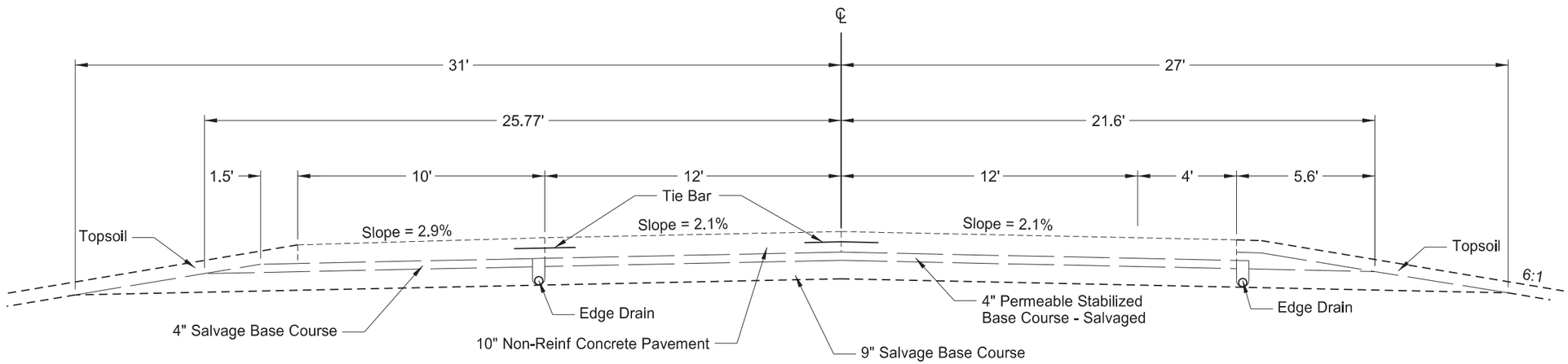
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-8-094(117)315	30	8



Typical Section 1

Eastbound Roadway - RP 315.664 to RP 323.746



Typical Section 2

Westbound Roadway - RP 315.664 to RP 323.746

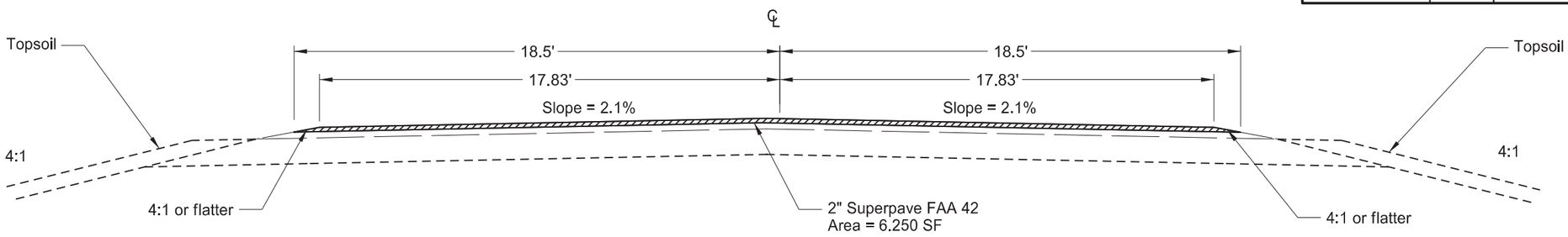
Removal Typical Sections

Milling I-94 EB Shoulders

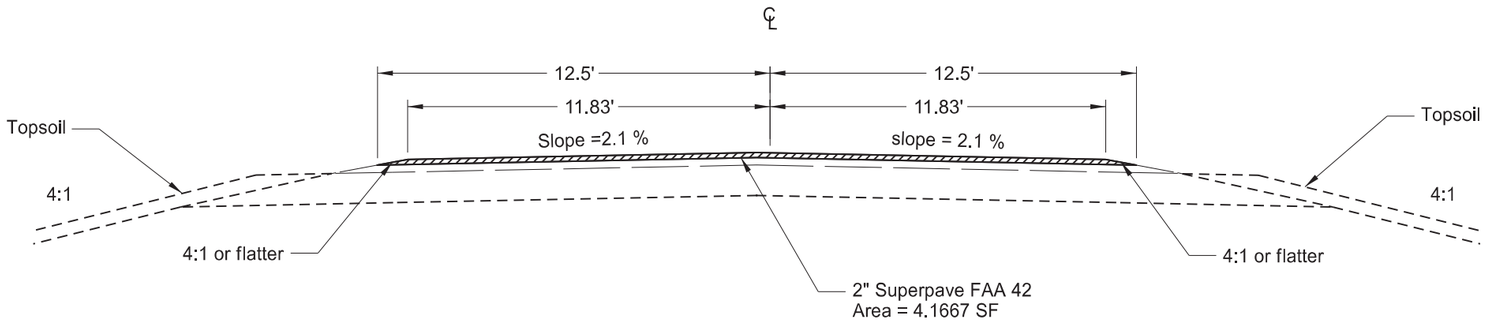
REGISTERED PROFESSIONAL ENGINEER
JUSTIN
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Docusign Envelope ID: 24E87D87-4729-80A1-8122-E0E29248315B

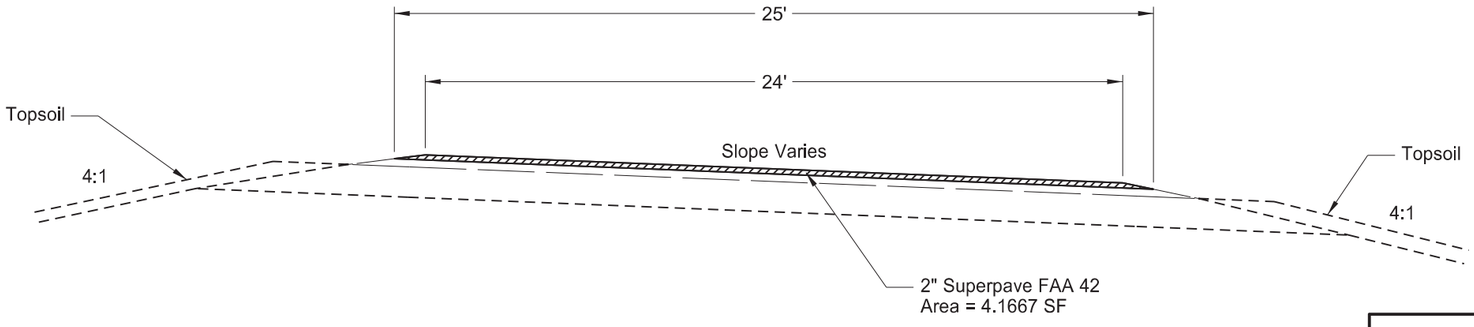
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-8-094(117)315	30	9



Embden Crossroad
Sta 9+50 to 13+50
Sta 16+50 to Sta 20+50



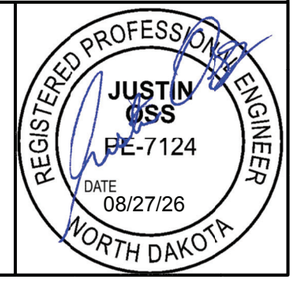
Embden Crossroad
Sta 5+25 to Sta 9+50
Sta 20+50 to Sta 24+50



Embden Ramps
NW Sta 13+19 to 21+46
NE Sta 0+18 to 8+17
SW 8+87 to 17+87
SE Sta 0+16 to 8+39

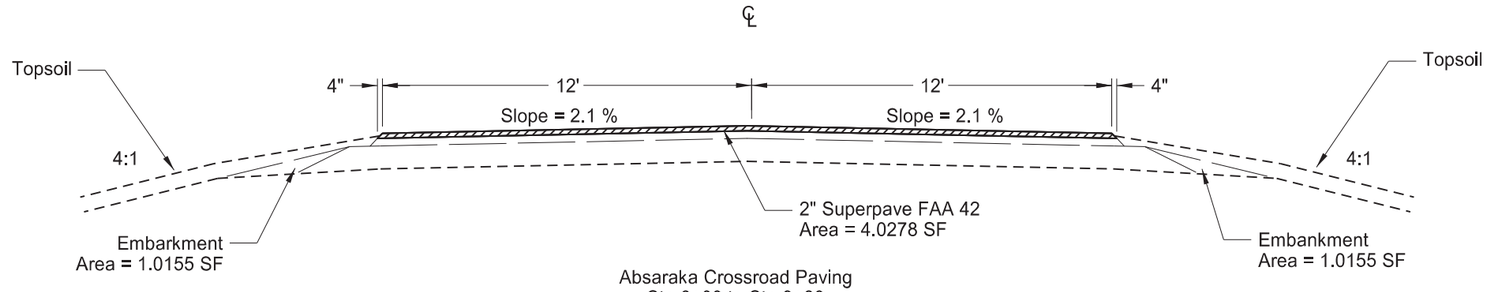
Proposed Typical Sections

Embden Interchange

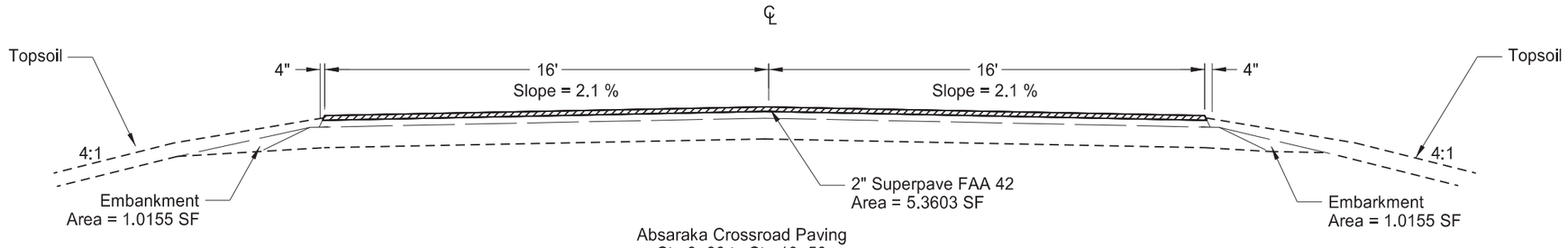


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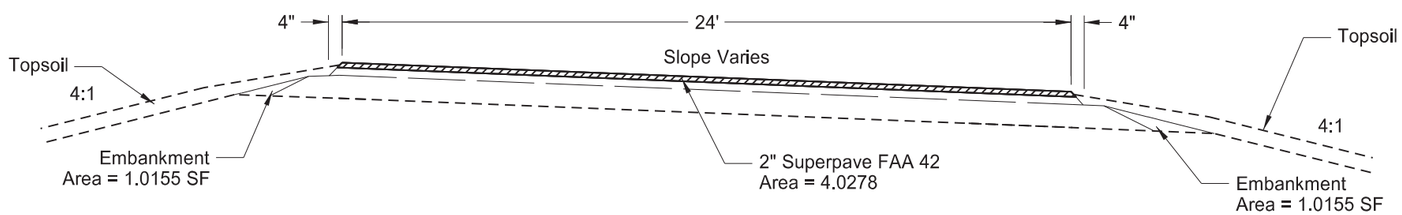
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-8-094(117)315	30	10



Absaraka Crossroad Paving
Sta 6+00 to Sta 9+80
Sta 20+40 to Sta 24+71



Absaraka Crossroad Paving
Sta 9+80 to Sta 13+50
Sta 16+50 to Sta 20+40



Absaraka Ramp Paving
NW Sta 13+29 to Sta 20+58
NE Sta 0+18 to 8+62
SW Sta 9+83 to Sta 17+17
SE Sta 0+18 to Sta 8+30

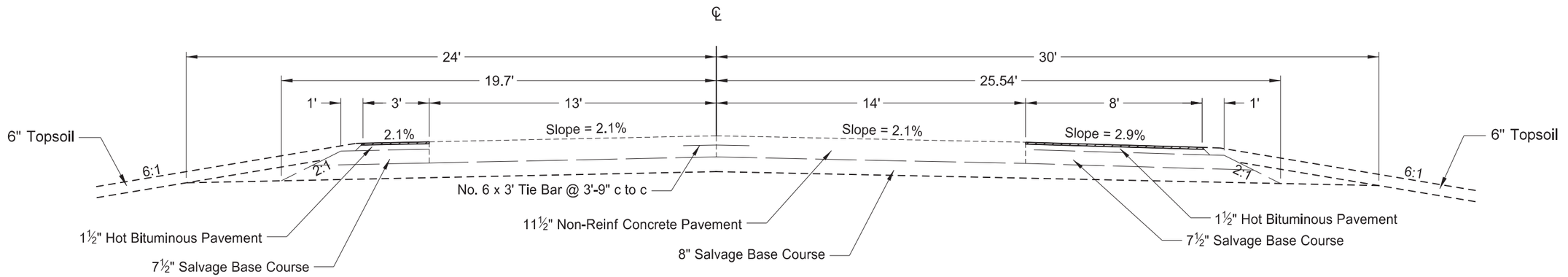
Proposed Typical Sections

Absaraka Interchange

REGISTERED PROFESSIONAL ENGINEER
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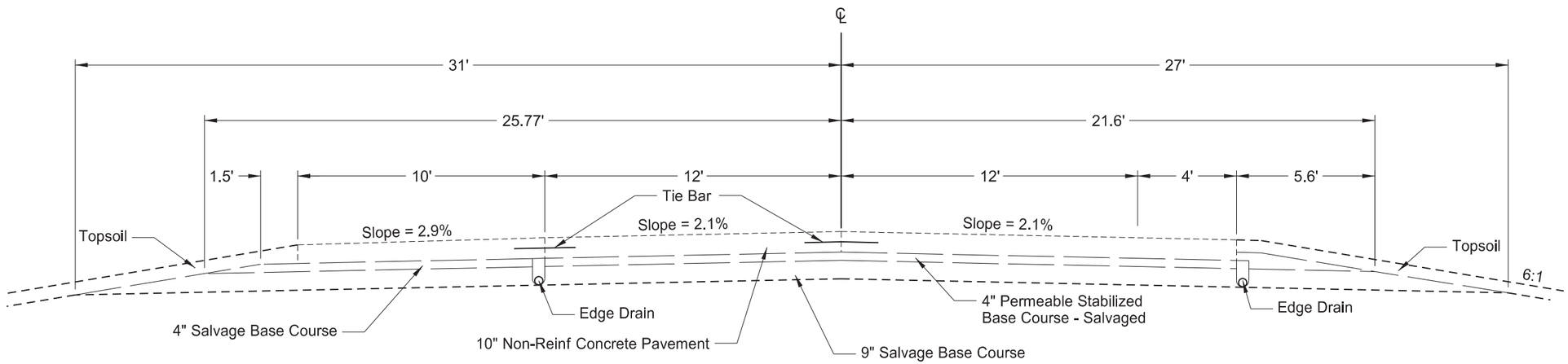
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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-8-094(117)315	30	11



Typical Section 1

Eastbound Roadway - RP 315.664 to RP 323.746



Typical Section 2

Westbound Roadway - RP 315.664 to RP 323.746

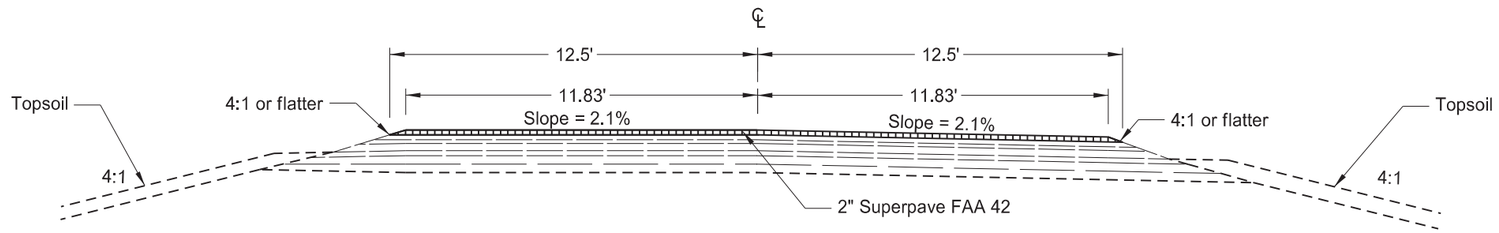
Proposed Typical Sections

WB I-94 Asphalt Shoulders

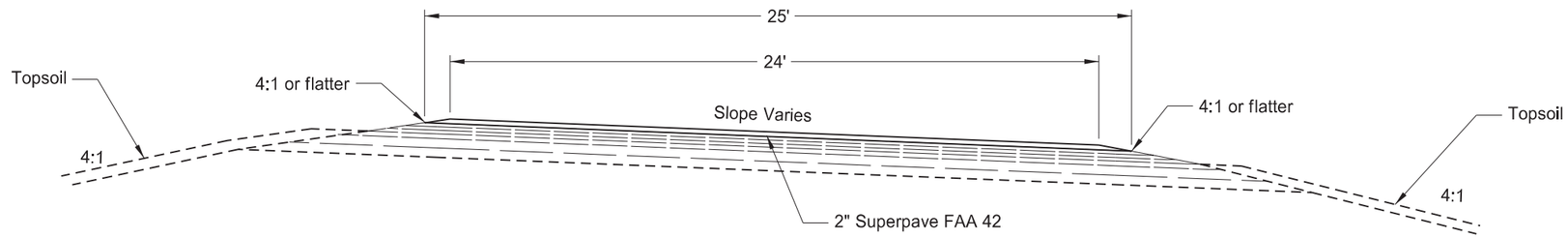
REGISTERED PROFESSIONAL ENGINEER
JUSTIN OSS
PE-7124
DATE 08/27/26
NORTH DAKOTA

Docusign Envelope ID: 24E87D87-4729-80A1-8122-E0E29248315B

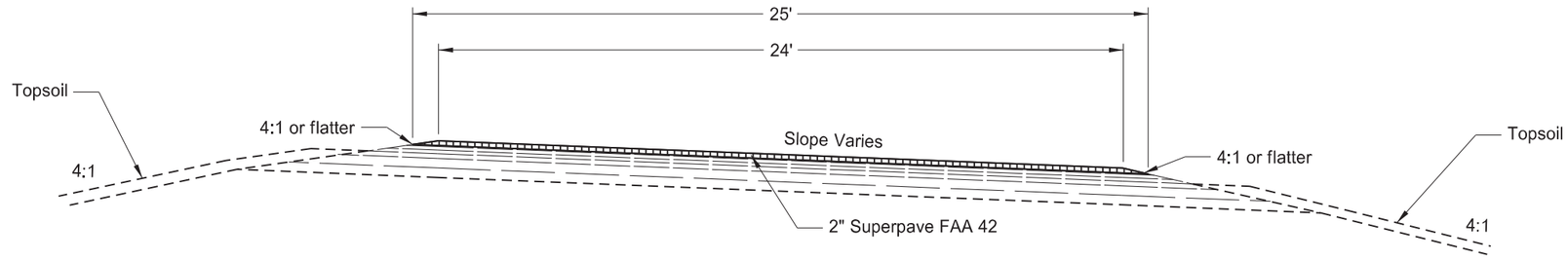
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-8-094(117)315	30	12



Ayr Crossroad
Sta 92+55 to 98+69
Sta 101+30 to 107+05



Ayr Ramps
NW Sta 15+79 to Sta 21+66
NE Sta 0+12 to sta 6+24



Ayr Ramps
SW Sta 8+75 to Sta 18+55
SE Sta 0+12 to sta 10+63

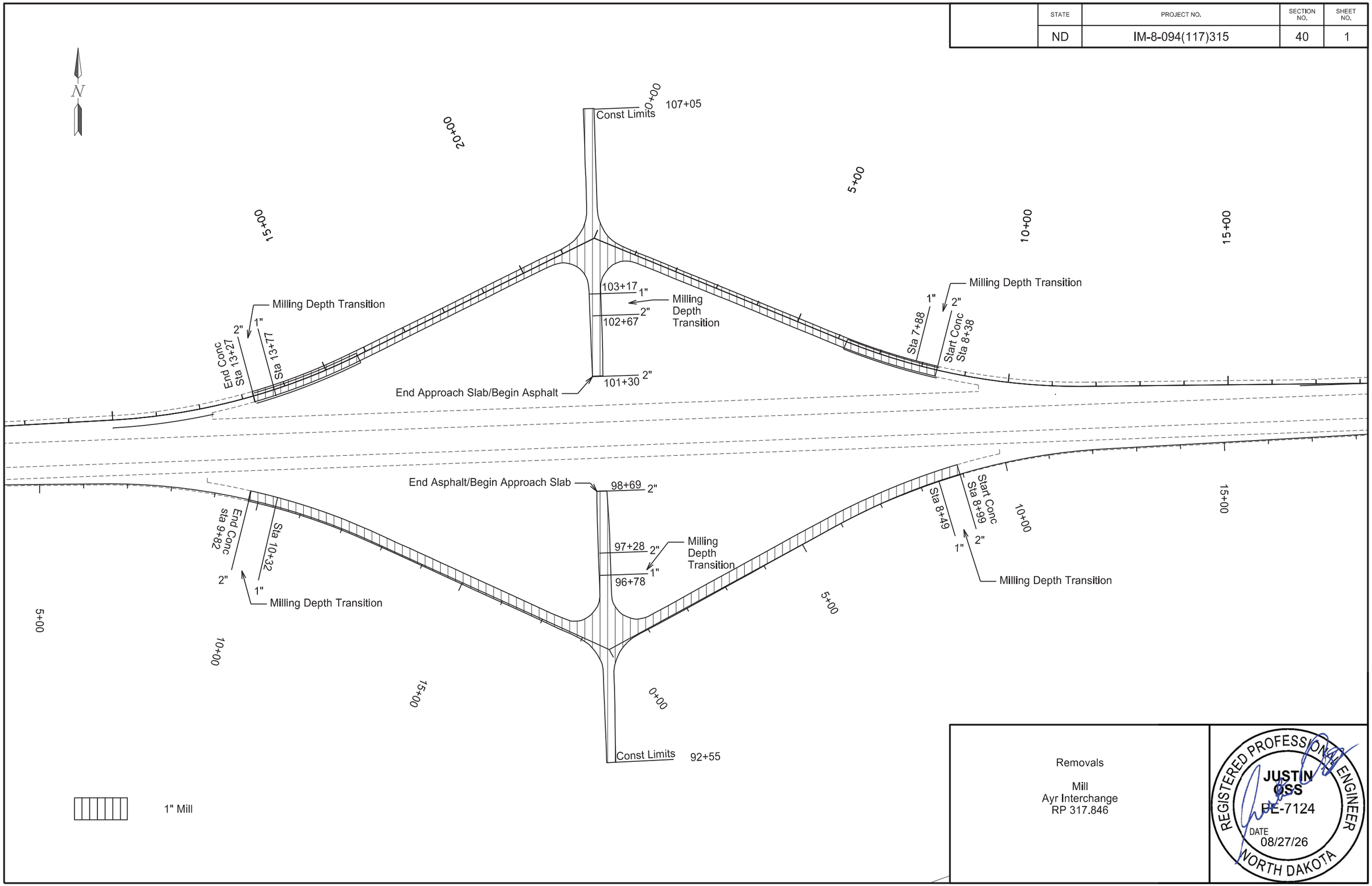
Proposed Typical Sections

Ayr Interchange

REGISTERED PROFESSIONAL ENGINEER
JUSTIN
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PE-7124
DATE
08/27/26
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Docusign Envelope ID: 24E87D87-4729-80A1-8122-E0E29248315B

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-8-094(117)315	40	1



Removals

Mill
Ayr Interchange
RP 317.846

REGISTERED PROFESSIONAL ENGINEER
JUSTIN
OSS
PE-7124
DATE
08/27/26
NORTH DAKOTA

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Docusign Envelope ID: 24E87D87-4729-80A1-8122-E0E29248315B

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-8-094(117)315	40	2

N

Const Limits
Sta 24+85

25+00

0+00

20+00

5+00

10+00

15+00

Milling Depth Transition

2" 1"

End Concrete
Sta 13+19

Sta 13+69

18+13 1"

17+63 2"

Milling
Depth
Transition

16+50 2"

End Approach Slab/begin Asphalt

Milling Depth Transition

1" 2"

Sta 7+67

Beg Concrete
Sta 8+17

15+00

End Asphalt/Begin Approach Slab

13+50 2"

End Concrete
Sta 9+83

2"

Sta 10+33

1"

Milling Depth Transition

12+32 2"

11+82 1"

Milling
Depth
Transition

Sta 7+89

Beg Concrete
Sta 8+39

1" 2"

Milling Depth Transition

1" Mill

Const Limits
Sta 5+25

Removals

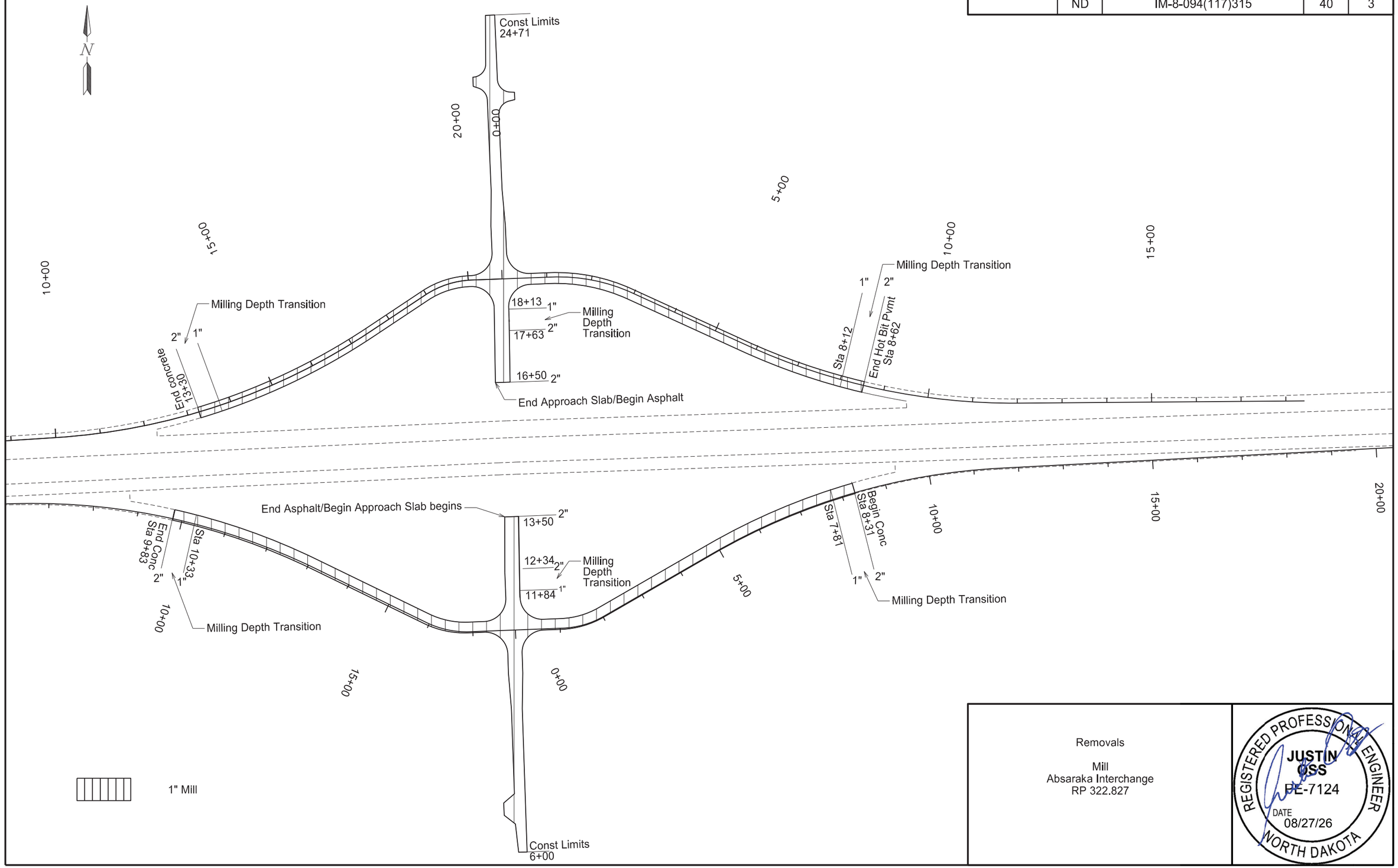
Mill
Embden Interchange
RP 320.827

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JUSTIN
OSS
PE-7124
DATE
08/27/26
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-8-094(117)315	40	3



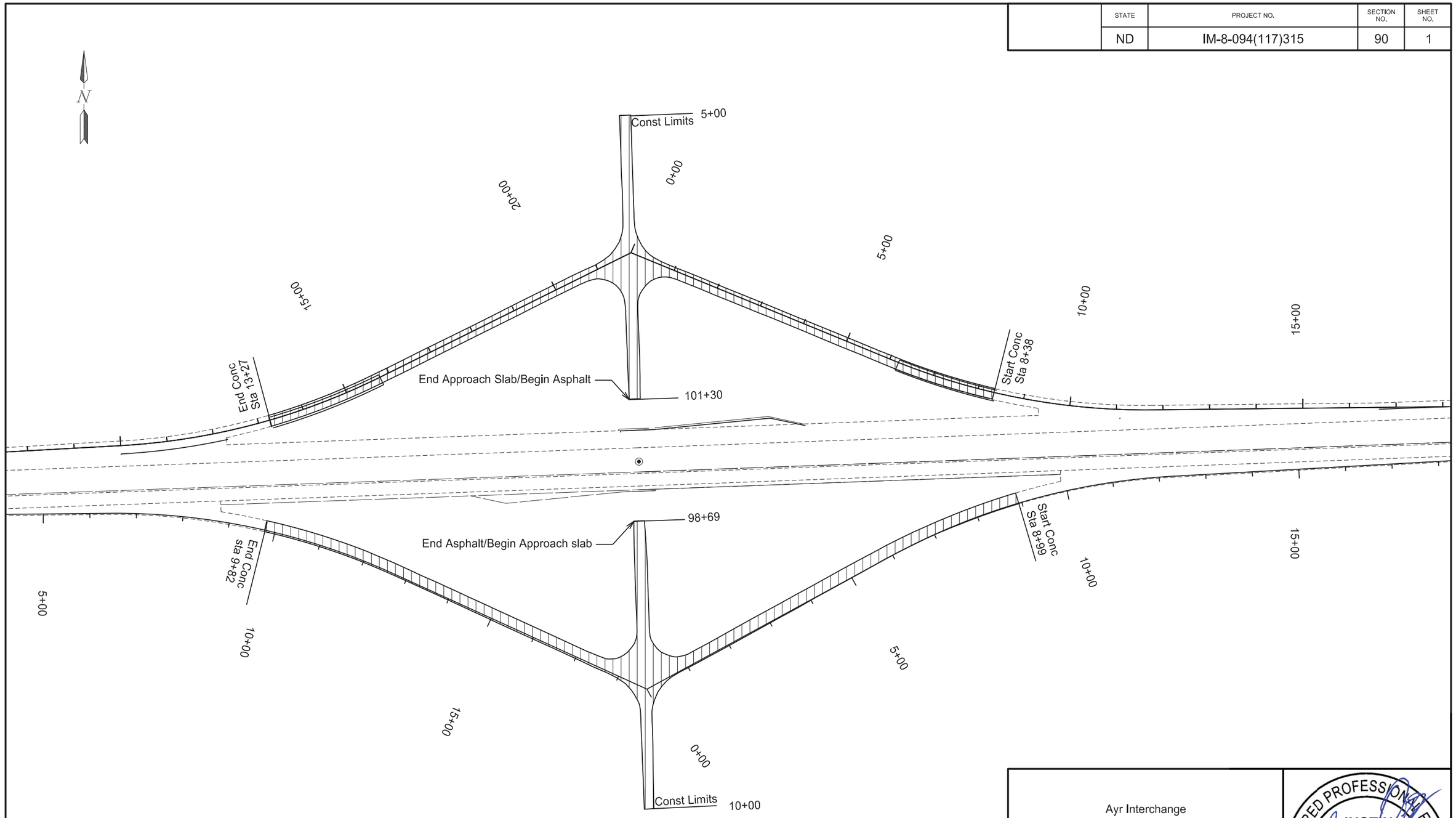
Removals

Mill
Absaraka Interchange
RP 322.827

REGISTERED PROFESSIONAL ENGINEER
JUSTIN
OSS
PE-7124
DATE
08/27/26
NORTH DAKOTA

Docusign Envelope ID: 24E87D87-4729-80A1-8122-E0E29248315B

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-8-094(117)315	90	1



Ayr Interchange

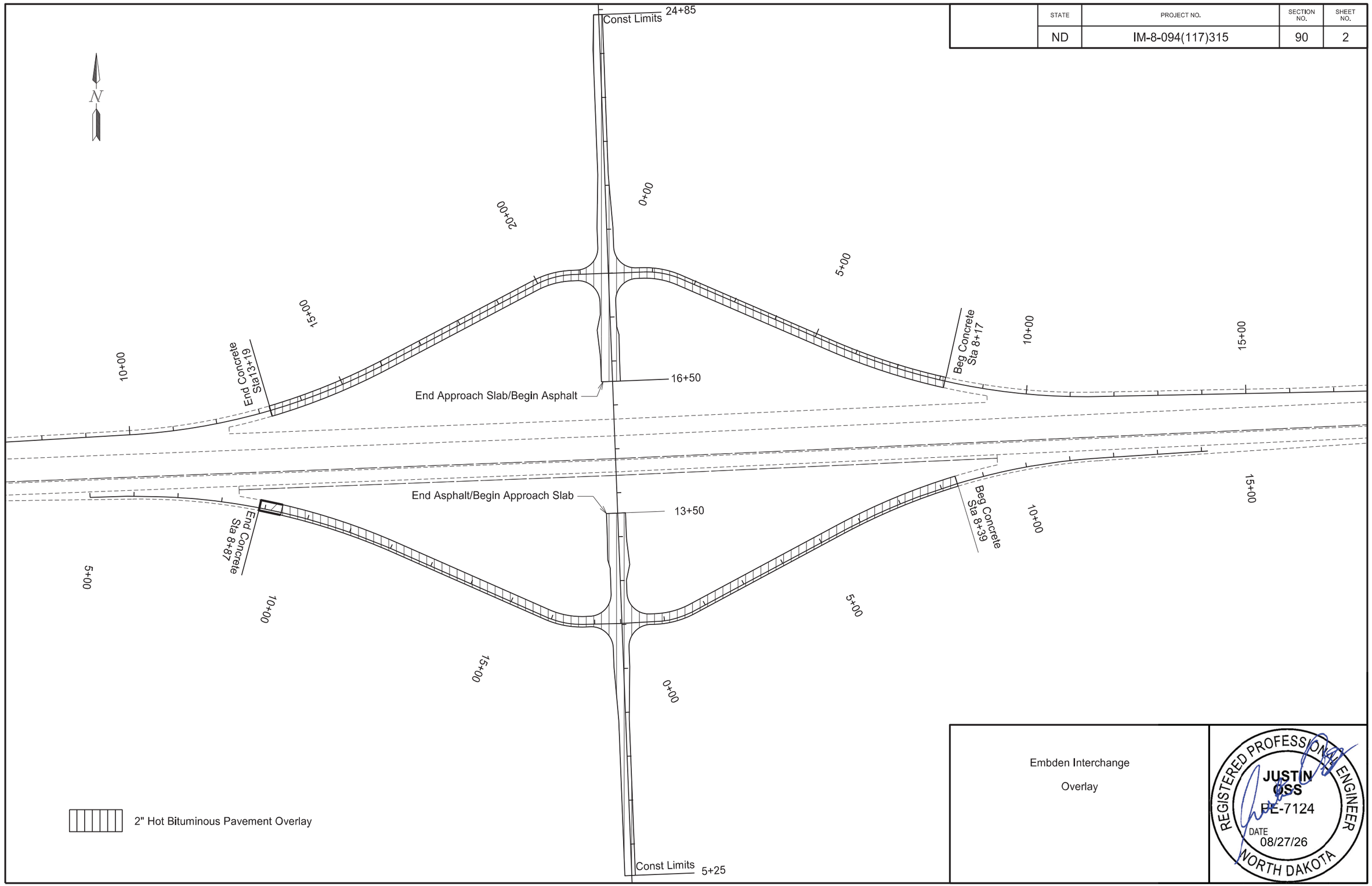
Overlay

REGISTERED PROFESSIONAL ENGINEER
JUSTIN
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PE-7124
DATE
08/27/26
NORTH DAKOTA

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Docusign Envelope ID: 24E87D87-4729-80A1-8122-E0E29248315B

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-8-094(117)315	90	2



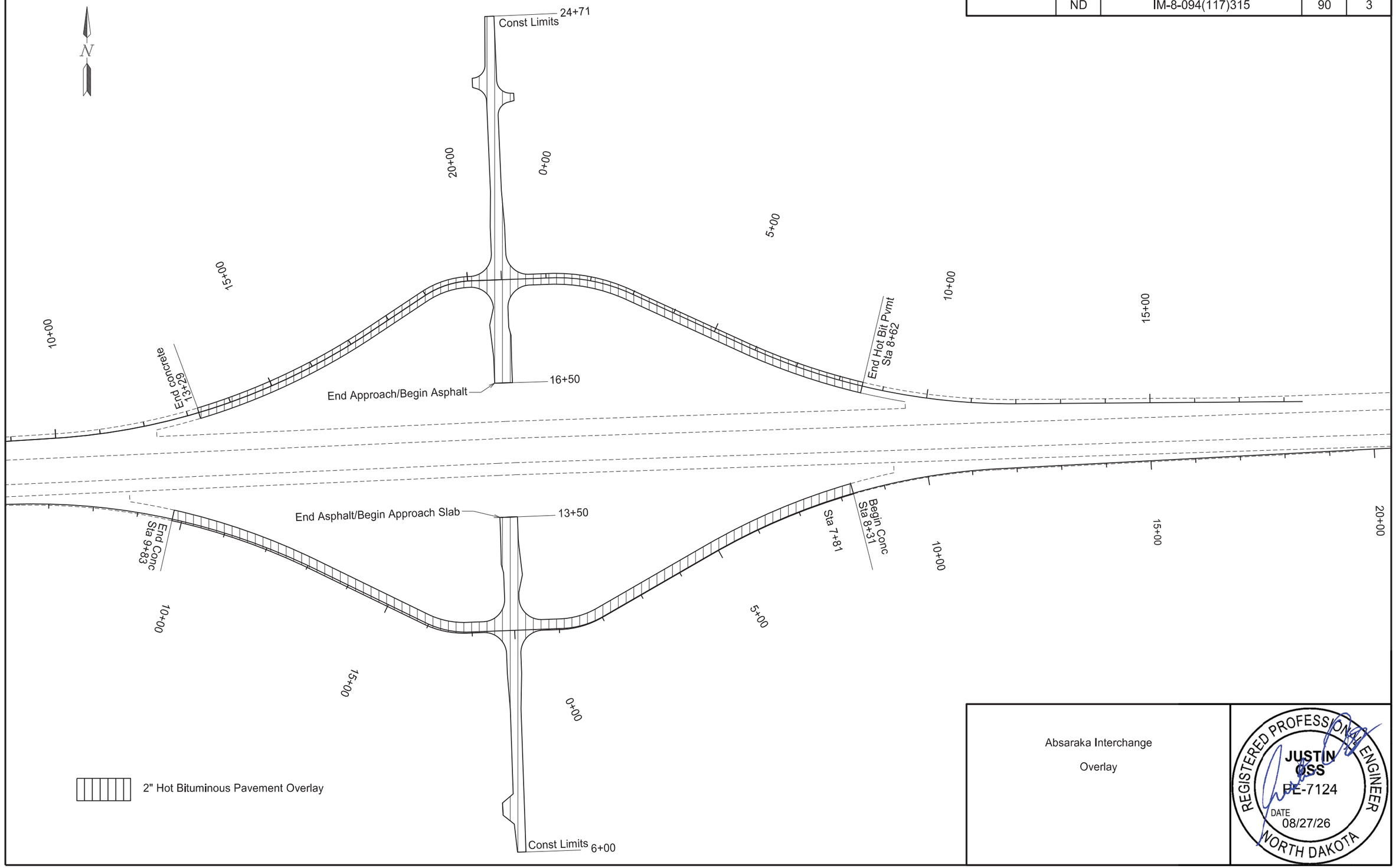
Embden Interchange

Overlay

REGISTERED PROFESSIONAL ENGINEER
JUSTIN OSS
PE-7124
DATE 08/27/26
NORTH DAKOTA

Docusign Envelope ID: 24E87D87-4729-80A1-8122-E0E29248315B

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-8-094(117)315	90	3



Absaraka Interchange

Overlay

REGISTERED PROFESSIONAL ENGINEER
JUSTIN
OSS
PE-7124
DATE
08/27/26
NORTH DAKOTA

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-8-094(117)315	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED BY PHASE NO. 1	2	3	4	5	TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	**48"x48"**	**EXIT GORE**		**2**		**4**		**4**	**35**	**140**
G20-1-60	60"x24"	ROAD WORK NEXT __ MILES							28	
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)							18	
G20-2-48	**48"x24"**	**END ROAD WORK**	**6**	**6**	**8**	**8**		**8**	**26**	**208**
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)							18	
G20-4b-36	36"x30"	WAIT FOR PILOT CAR							18	
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS							43	
G20-52a-72	72"x24"	ROAD WORK NEXT __ MILES RT or LT ARROW							36	
G20-55-96	**96"x48"**	**SPEED LIMIT ENFORCED - MINIMUM FEE $150 WHEN WORKERS PRESENT**	**4**	**4**	**4**	**4**		**4**	**59**	**236**
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)							11	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)							10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)							10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)							7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)							7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)							7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)							7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)							7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT							15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)							7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)							7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)							9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)							7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)							9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)							7	
R1-1-48	48"x48"	STOP							32	
R1-2-60	**60"x60"**	**YIELD**	**2**	**2**	**4**	**4**		**4**	**29**	**116**
R2-1-36	**36"x48"**	**SPEED LIMIT __ (Portable only)**	**6**	**6**	**8**	**8**	**4**	**8**	**30**	**240**
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**8**	**8**	**8**	**8**		**8**	**39**	**312**
R2-1aP-24	**24"x18"**	**MINIMUM FEE $150 (Mounted on Speed Limit post)**	**10**	**10**	**12**	**12**	**2**	**12**	**10**	**120**
R3-2-48	48"x48"	NO LEFT TURN							35	
R4-1-48	48"x60"	DO NOT PASS							39	
R4-7-48	48"x60"	KEEP RIGHT							39	
R5-1-48	48"x48"	DO NOT ENTER							35	
R6-1-54	54"x18"	ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)							14	
R7-1-12	12"x18"	NO PARKING ANY TIME							11	
R10-6-24	24"x36"	STOP HERE ON RED							16	
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)							12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)							12	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)							15	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)							15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)							15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT							35	
W1-4-48	48"x48"	REVERSE CURVE RIGHT or LEFT							35	
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT							35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW							26	
W3-1-48	48"x48"	STOP AHEAD							35	
W3-3-48	48"x48"	SIGNAL AHEAD							35	
W3-4-48	**48"x48"**	**BE PREPARED TO STOP**					**2**	**2**	**35**	**70**
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**4**	**4**	**4**	**4**	**3**	**4**	**35**	**140**
W4-2-48	**48"x48"**	**LANE ENDS RIGHT or LEFT**	**4**	**4**	**4**	**4**		**4**	**35**	**140**
W5-1-48	48"x48"	ROAD NARROWS							35	
W5-4-48	**48"x48"**	**RAMP NARROWS**					**2**	**2**	**35**	**70**
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE							35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW							35	
W6-3-48	48"x48"	TWO WAY TRAFFIC							35	
W8-1-48	48"x48"	BUMP							35	
W8-3-48	48"x48"	PAVEMENT ENDS							35	
W8-7-48	48"x48"	LOOSE GRAVEL							35	
W8-11-48	48"x48"	UNEVEN LANES							35	
W8-12-48	48"x48"	NO CENTER LINE							35	
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL							35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY							35	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or __ FT or _ MILE							35	
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __ FT or _ MILE							35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY							35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL							35	
W13-1P-30	30"x30"	__ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)							14	
W13-4P-36	**36"x36"**	**ON RAMP**					**2**	**2**	**26**	**52**
W14-3-64	64"x48"	NO PASSING ZONE							28	
W16-2P-30	30"x24"	__ FEET PLAQUE (Mounted on warning sign post)							10	
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**4**	**4**	**4**	**4**	**4**	**4**	**35**	**140**
W20-2-48	48"x48"	DETOUR AHEAD or __ FT or _ MILE							35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT or _ MILE							35	
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or __ FT or _ MILE							35	
W20-5-48	**48"x48"**	**RIGHT or CENTER or LEFT LANE CLOSED AHEAD or __ FT or _ MILE**	**4**	**4**	**4**	**4**		**4**	**35**	**140**
W20-7-48	**48"x48"**	**FLAGGER**	**2**	**2**	**2**	**2**	**2**	**2**	**35**	**70**
W20-8-18	**18"x18"**	**STOP - SLOW PADDLE Back to Back**	**1**					**1**	**5**	**5**
W20-52P-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)							12	
W21-1-48	48"x48"	WORKERS							35	
W21-2-48	48"x48"	FRESH OIL							35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT or _ MILE							35	
W21-5-48	48"x48"	SHOULDER WORK							35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED BY PHASE NO. 1	2	3	4	5	TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED							35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT or _ MILE							35	
W21-6-48	48"x48"	SURVEY CREW							35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT							35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY							35	
W21-52-48	48"x48"	PAVEMENT BREAKS							35	
W21-53-48	48"x48"	RUMBLE STRIPS AHEAD							35	
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK							35	
W24-1-48	48"x48"	DOUBLE REVERSE CURVE							35	

SPECIAL SIGNS

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS 2199**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY BY PHASE NO. 1	2	3	4	5	TOTAL QUANTITY
704-0100	**FLAGGING**	MHR	**100**	**100**	**100**	**100**	**100**	**500**
704-1048	PORTABLE RUMBLE STRIPS	EACH						
704-1050	**TYPE I BARRICADES**	EACH	**13**	**22**	**11**	**21**		**22**
704-1052	**TYPE III BARRICADES**	EACH	**18**	**4**	**18**	**8**		**18**
704-1060	**DELINEATOR DRUMS**	EACH	**46**	**126**	**46**	**206**		**206**
704-1065	TRAFFIC CONES	EACH						
704-1067	**TUBULAR MARKERS**	EACH		**530**	**530**	**530**	**170**	**530**
704-1070	DELINEATOR	EACH						
704-1072	FLEXIBLE DELINEATORS	EACH						
704-1080	**STACKABLE VERTICAL PANELS**	EACH	**43**	**56**	**32**	**62**		**62**
704-1081	VERTICAL PANELS - BACK TO BACK	EACH						
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH						
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH						
704-1087	**SEQUENCING ARROW PANEL - TYPE C**	EACH	**2**	**2**	**2**	**2**		**2**
704-1500	OBLITERATION OF PVMT MK	SF						
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF						
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH						
762-0200	RAISED PAVEMENT MARKERS	EACH						
762-0420	SHORT TERM 4IN LINE - TYPE R	LF						
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF						

NOTE:
If additional signs are required, units will be calculated using the formula from Section III-18.06 of the Design Manual.
http://www.dot.nd.gov/

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Traffic Control Devices List

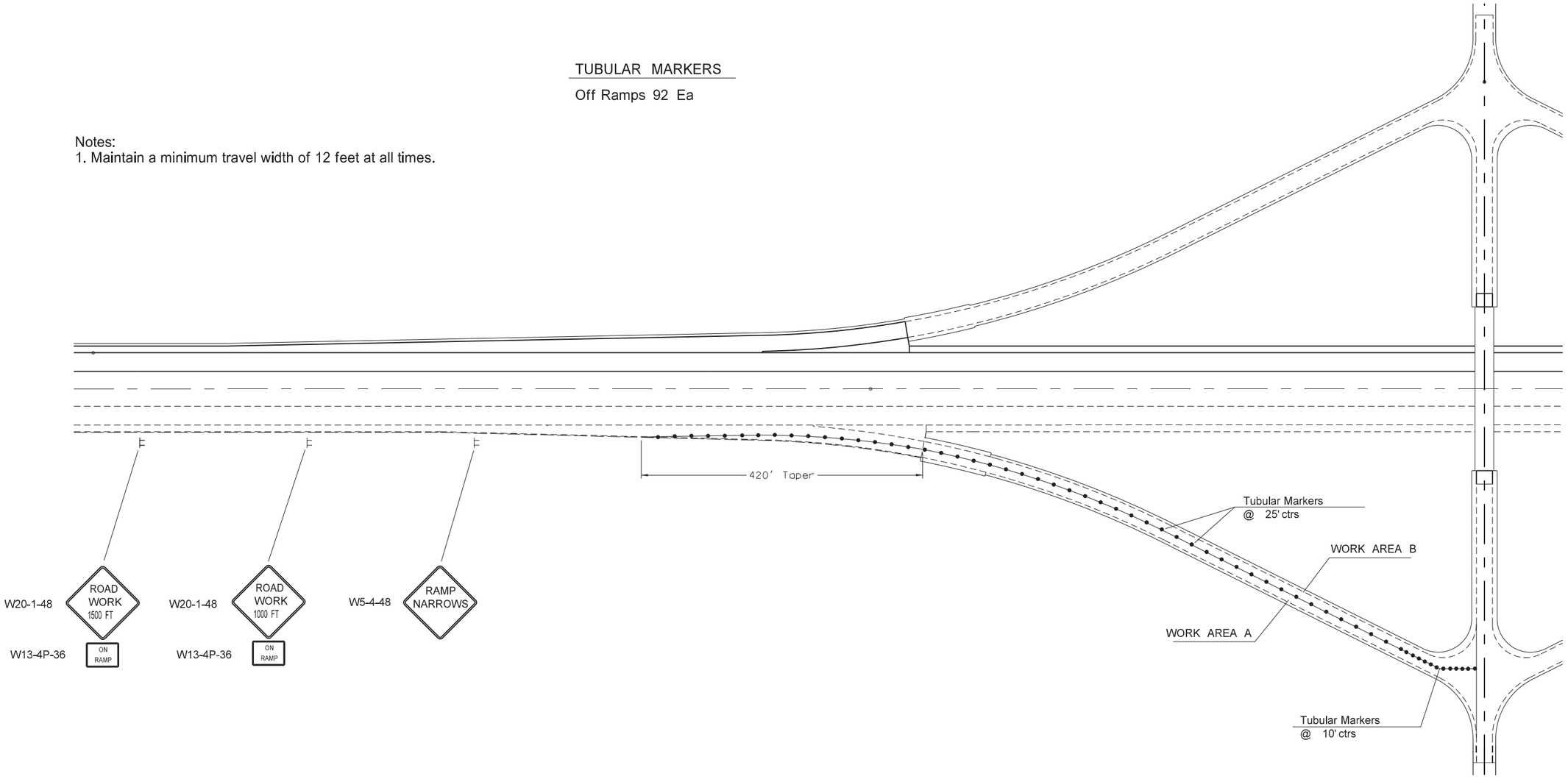
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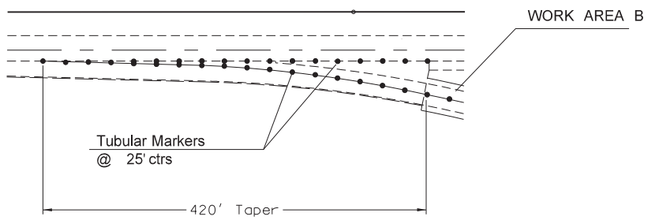
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	ND	IM-8-094(117)315	100	2

TUBULAR MARKERS

Off Ramps 92 Ea

Notes:
1. Maintain a minimum travel width of 12 feet at all times.





Work Zone Traffic Control
Off Ramps

Interchanges

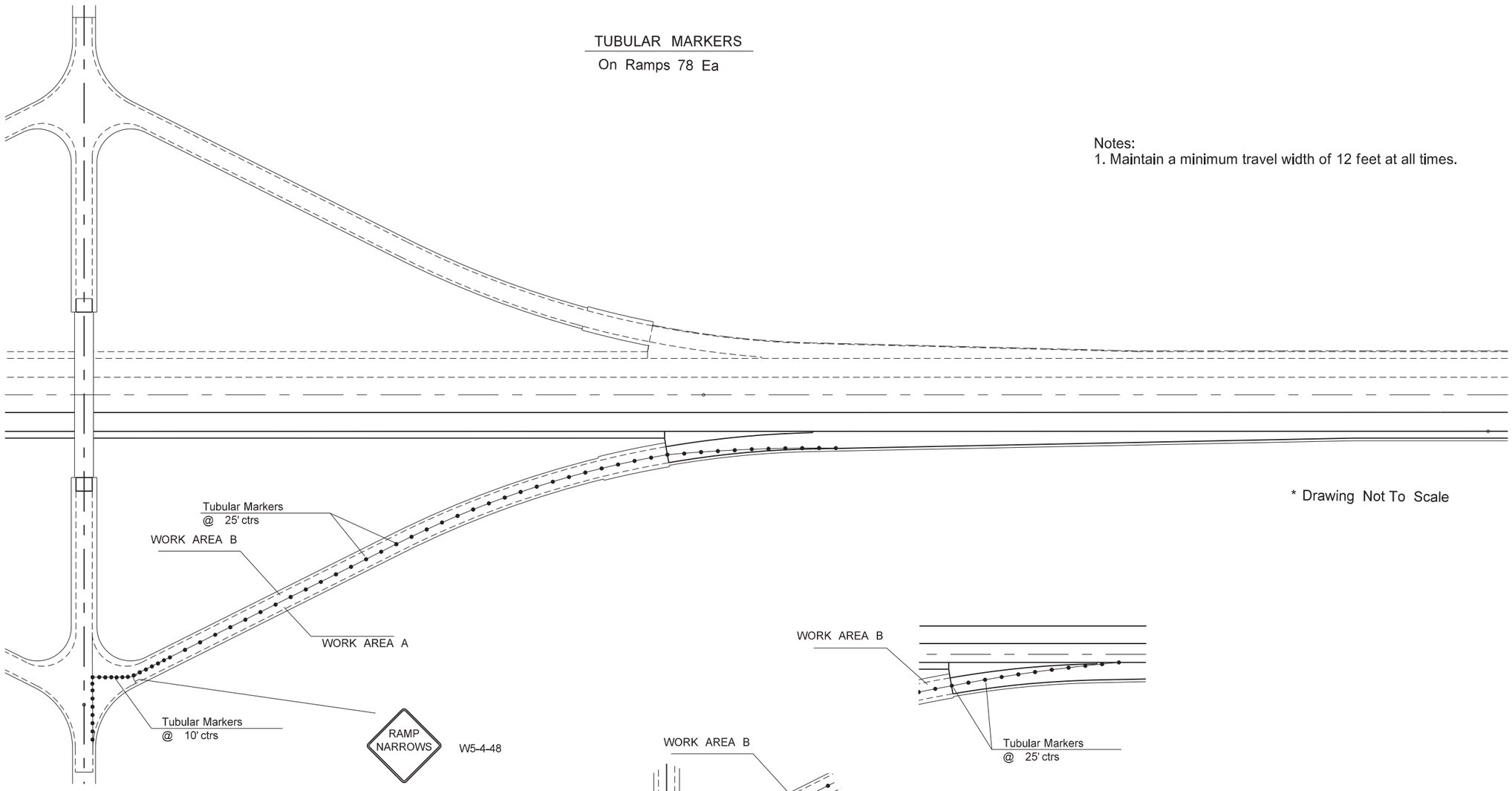
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-8-094(117)315	100	3

TUBULAR MARKERS
On Ramps 78 Ea

Notes:
1. Maintain a minimum travel width of 12 feet at all times.



* Drawing Not To Scale

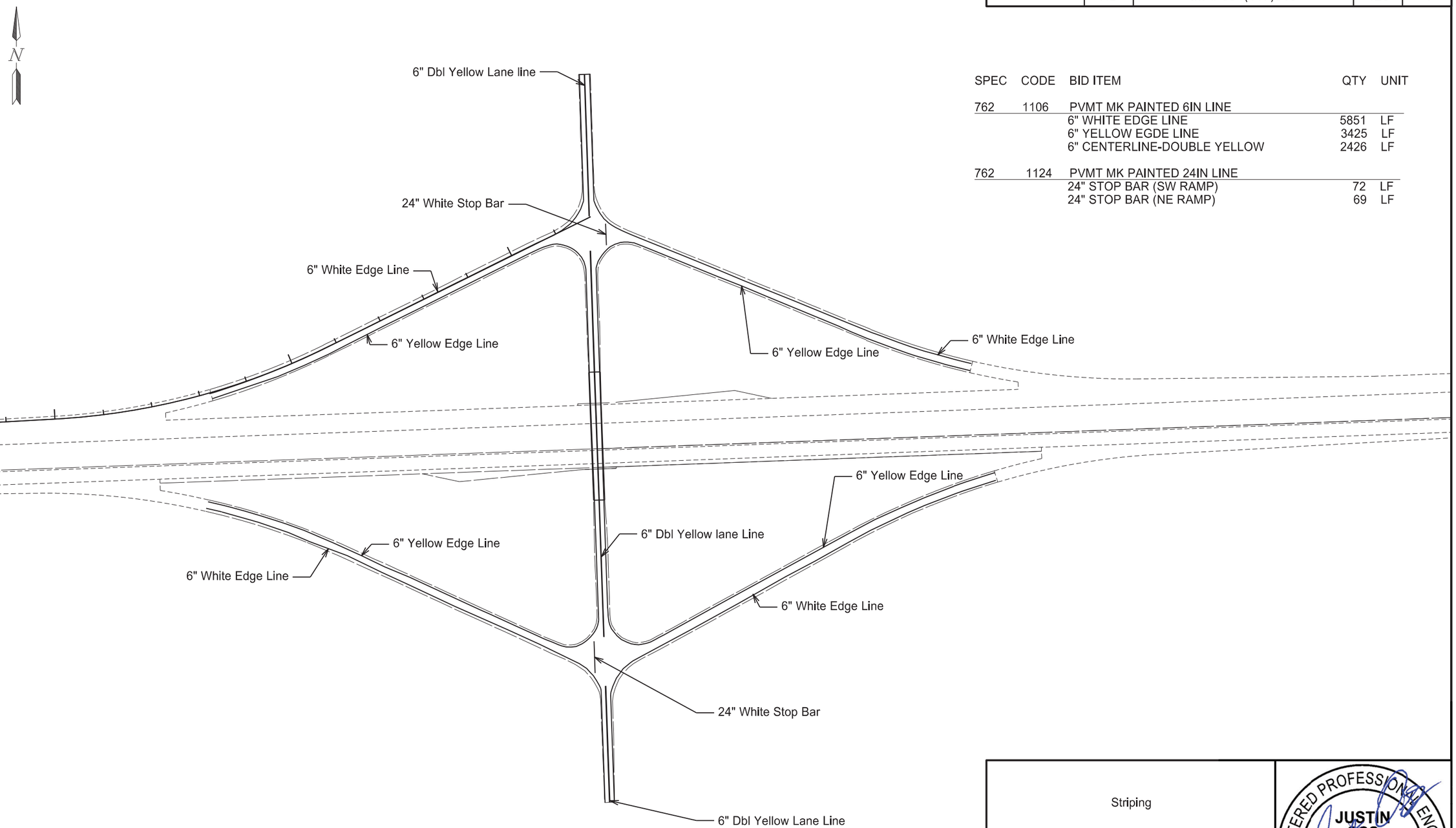
Work Zone Traffic Control
On Ramps

Interchanges

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-8-094(117)315	120	1



SPEC	CODE	BID ITEM	QTY	UNIT
762	1106	PVMT MK PAINTED 6IN LINE		
		6" WHITE EDGE LINE	5851	LF
		6" YELLOW EGDE LINE	3425	LF
		6" CENTERLINE-DOUBLE YELLOW	2426	LF
762	1124	PVMT MK PAINTED 24IN LINE		
		24" STOP BAR (SW RAMP)	72	LF
		24" STOP BAR (NE RAMP)	69	LF

Striping

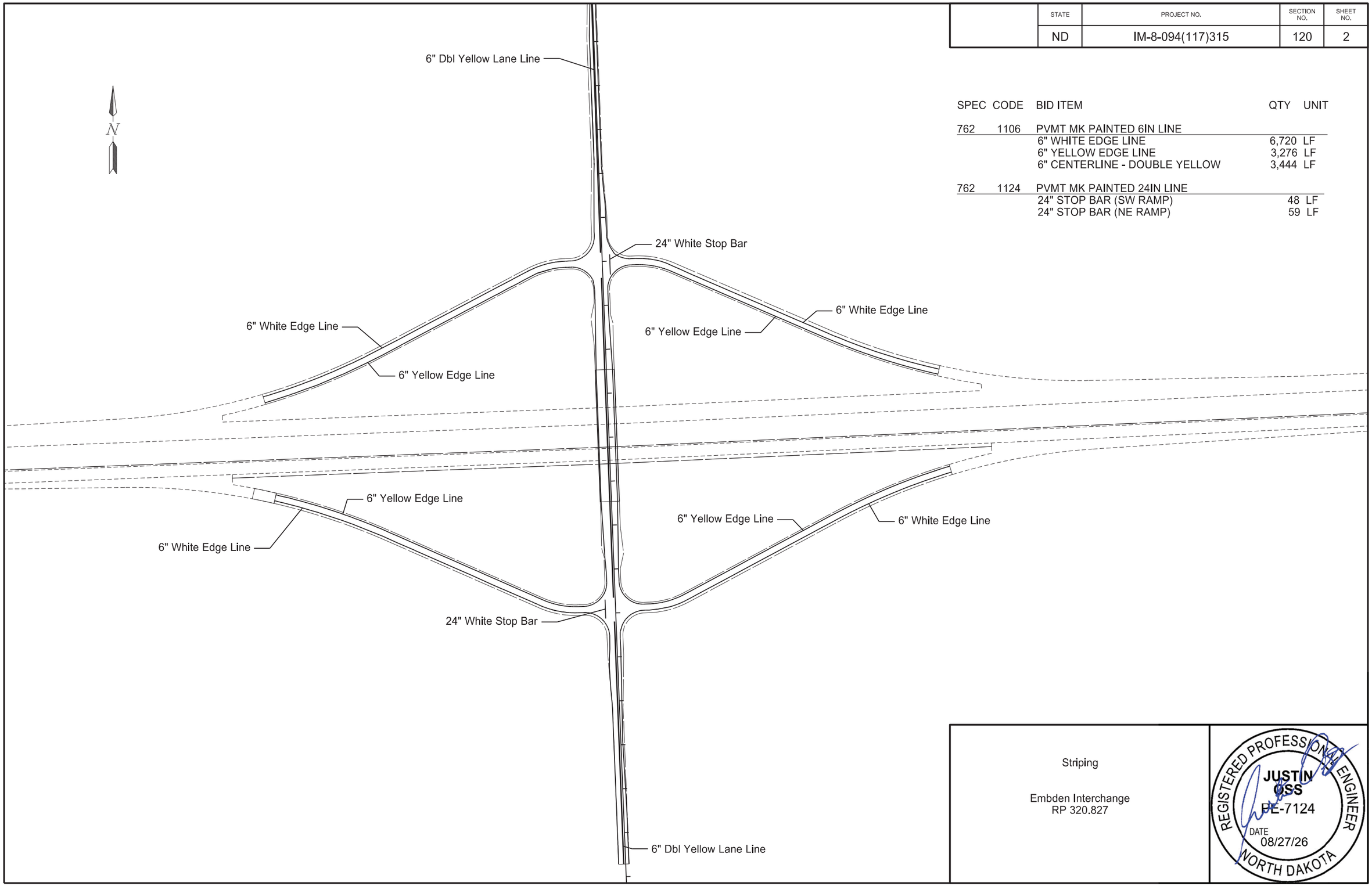
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-8-094(117)315	120	2

SPEC	CODE	BID ITEM	QTY	UNIT
762	1106	PVMT MK PAINTED 6IN LINE		
		6" WHITE EDGE LINE	6,720	LF
		6" YELLOW EDGE LINE	3,276	LF
		6" CENTERLINE - DOUBLE YELLOW	3,444	LF
762	1124	PVMT MK PAINTED 24IN LINE		
		24" STOP BAR (SW RAMP)	48	LF
		24" STOP BAR (NE RAMP)	59	LF



Striping

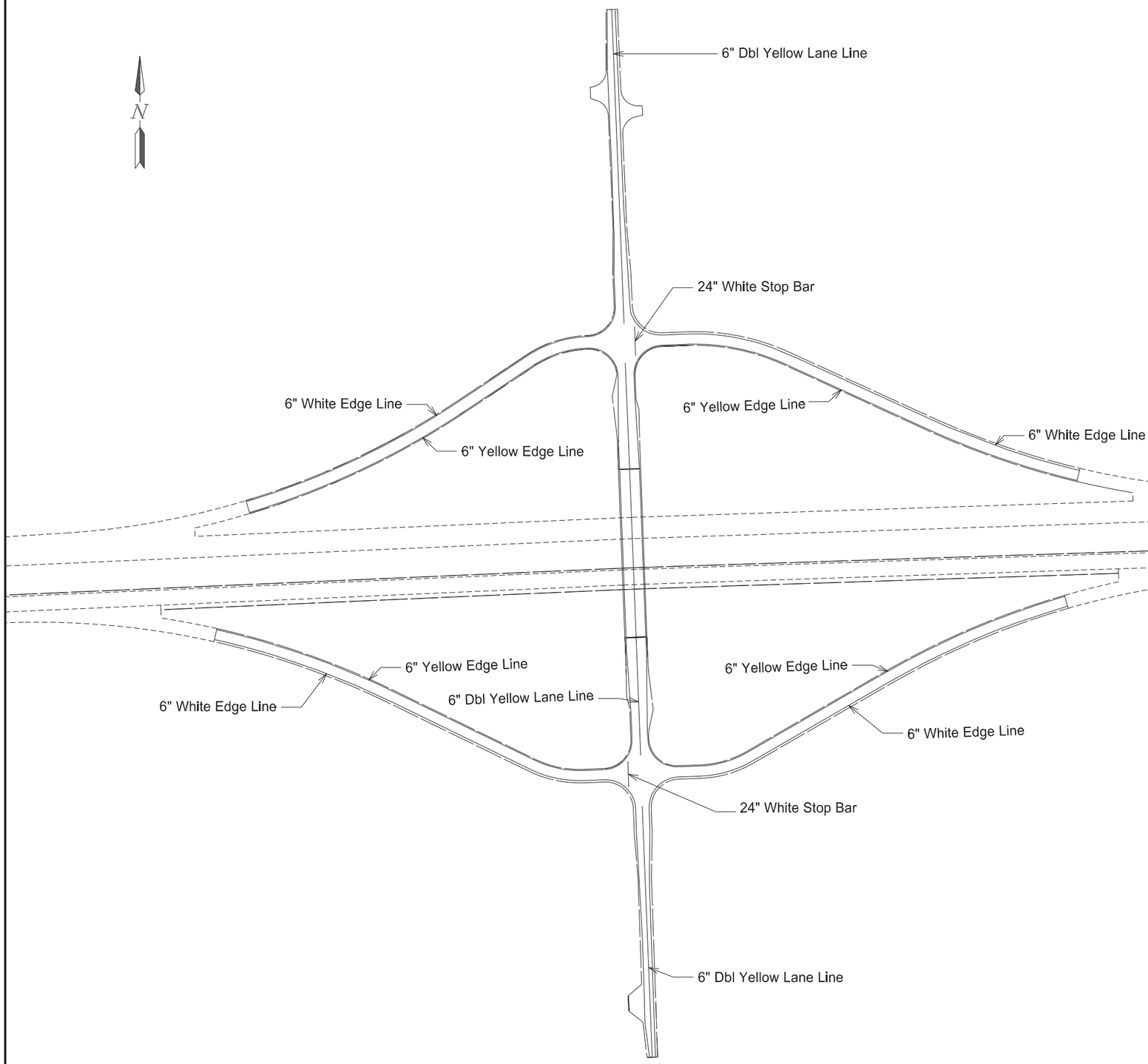
Embden Interchange
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-8-094(117)315	120	3



SPEC	CODE	BID ITEM	QTY	UNIT
762	1100	PVMT MK PAINTED 6IN LINE		
		6" WHITE EDGE LINE	6,384	LF
		6" YELLOW EDGE LINE	3,244	LF
		6" CENTERLINE - DOUBLE YELLOW	3,140	LF
762	1124	PVMT MK PAINTED 24IN LINE		
		24" STOP BAR (SW RAMP)	41	LF
		24" STOP BAR (NE RAMP)	54	LF

Striping

Absaraka Interchange
RP 322.827

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NDDOT ABBREVIATIONS

D-101-1

?	This is a special text character used in the labeling of existing features. It indicates a feature that has an unknown characteristic, potentially based on: lack of description, location accuracy or purpose.
Abn	abandoned
Abut	abutment
Adj	adjusted
Aggr	aggregate
Ahd	ahead
ARV	air release valve
Align	alignment
Al	alley
Alt	alternate
Alum	aluminum
ADA	Americans with Disabilities Act
&	and
Appr	approach
Approx	approximate
ACP	asbestos cement pipe
Asph	asphalt
AC	asphalt cement
Assmd	assumed
@	at
Atten	attenuation
ATR	automatic traffic recorder
Ave	Avenue
Avg	average
ADT	average daily traffic
Bk	back
BF	back face
Balc	balcony
B Wire	barbed wire
Barr	barricade
Btry	battery
BI	beehive inlet
Beg	begin
BG	below grade
BM	bench mark
Bkwy	bikeway
Bit	bituminous
Blk	block
BH	bore hole
Bot	bottom
Blvd	Boulevard
Bndry	boundary
Brkwy	breakaway
Br	bridge
Bldg	building
Bus.	business
BV	butterfly valve
Byp	bypass
C Gdrl	cable guardrail
Calc	calculate
CIP	cast iron pipe
CB	catch basin
CRS	cationic rapid setting
C Gd	cattle guard
C To C	center to center
CL or ℄	centerline
Ch	chain
Chnlk	chain-link
Ch Blk	channel block
Ch Ch	channel change
Chk	check
Chsld	chiseled
Cir	circle
Cl	class
Clnt	clean-out
Clr	clear
Cl&gr	clearing & grubbing
Comb.	combination
Coml	commercial
Compr	compression
CADD	computer aided drafting & design
Conc	concrete
CECB	concrete erosion control blanket
Cond	conductor
Const	construction
Cont	continuous
CSB	continuous split barrel sample
Contr	contraction
Contr	contractor
CP	control point
Coord	coordinate
Cor	corner
Corr	corrected
CAES	corrugated aluminum end section
CAP	corrugated aluminum pipe
CMES	corrugated metal end section
CMP	corrugated metal pipe
CPVCP	corrugated poly-vinyl chloride pipe
CSES	corrugated steel end section
CSFES	corrugated steel flared end section
CSP	corrugated steel pipe
CSTES	corrugated steel traversable end section
Co	County
Crse	course
Ct	Court
Xarm	cross arm
Xbuck	cross buck
Xsec	cross sections
Xing	crossing
Xrd	crossroad
Crn	crown
Culv	culvert
C&G	curb & gutter
CI	curb inlet
CR	curb ramp
C	cut
Dd Ld	dead load
Defl	deflection
Defm	deformed
Dlnt	delineate
Dlntr	delineator
Depr	depression
Desc	description
Det	detail
DWP	detectable warning panel
Dtr	detour
Dia or ø	diameter
Dir	direction
Dist	distance
DM	disturbed material
DB	ditch block
DG	ditch grade
Dbl	double
Dn	down
Dwg	drawing
Dr	drive
Drwy	driveway
DI	drop inlet
D	dry density
Ea	each
Esmt	easement
E	East
EB	Eastbound
Elast	elastomeric
EL	electric locker
E Mtr	electric meter
Elec	electric/al
EDM	electronic distance meter
Elev or El	elevation
Ellipt	elliptical
Emb	embankment
Emuls	emulsion/emulsified
ES	end section
Engr	engineer
ESS	environmental sensor station
Eq	equal
Evgr	evergreen
Exc	excavation
Exst	existing
Exp	expansion
Expy	Expressway
E	external of curve
Extru	extruded
FOS	factor of safety
Fed	Federal
FP	feed point
Fn	fence
Fn P	fence post
FO	fiber optic
FD	field drive
F	fill
FAA	fine aggregate angularity
FH	fire hydrant
Fl	flange
Flrd	flared
FES	flared end section
F Bcn	flashing beacon
FA	flight auger sample
FL	flow line
Ftg	footing
FM	force main
Fnd	found
Fdn	foundation
Frac	fractional
Frwy	freeway
Frt	front
FF	front face
F Disp	fuel dispenser
FFP	fuel filler pipes
FLS	fuel leak sensor
Furn	furnish/ed

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NDDOT ABBREVIATIONS

D-101-2

Galv	galvanized
Gar	garage
Gs L	gas line
G Reg	gas line regulator
GMV	gas main valve
G Mtr	gas meter
GSV	gas service valve
GVP	gas vent pipe
GV	gate valve
Ga	gauge
Gov	government
Grd	graded/grade
Grnd	ground
GWM	ground water monitor
Gdrl	guardrail
Gtr	gutter
H Plg	H piling
Hdwl	headwall
Ht	height
Hel	helical
HDPE	high density polyethylene
HM	high mast
HP	high pressure
HPS	high pressure sodium
HTCG	high tension cable guardrail
Hwy	highway
Hor	horizontal
HBP	hot bituminous pavement
HMA	hot mix asphalt
Hyd	hydrant
Ph	hydrogen ion content
Id	identification
Incl	inclinometer tube
IMH	inlet manhole
ID	inside diameter
Inst	instrument
Intchg	interchange
Intmdt	intermediate
Intscn	intersection
Inv	invert
IP	iron pipe
Jt	joint
Jct	junction
Ln	lane
Lg	large
Lat	latitude
Lt	left
Lens	lenses
Lvl	level
Lvlng	leveling
Lht	light
LP	light pole
Ltg	lighting
Liq	liquid
LL	liquid limit
Loc	location
Long.	longitude
Lp	loop
LD	loop detector
Lum	luminaire
Mb	mailbox
ML	main line
MH	manhole
Mkd	marked
Mkr	marker
Mkg	marking
MA	mast arm
Matl	material
Max	maximum
MC	meander corner
Meas	measure
Mdn	median
MD	median drain
MC	medium curing
MGS	Midwest Guardrail System
MM	mile marker
MP	mile post
Min	minimum
Misc	miscellaneous
Mon	monument
Mnd	mound
Mtbl	mountable
Mtd	mounted
Mtg	mounting
Mk	muck
Neop	neoprene
Ntwk	network
N	North
NE	North East
NW	North West
NB	Northbound
No. or #	number
Obsc	obscure(d)
Ocpd	occupied
Ocpy	occupy
O/s	offset
OC	on center
C	one dimensional consolidation
OC	organic content
Orig	original
O To O	out to out
OD	outside diameter
OH	overhead
PMT	pad mounted transformer
Pg	pages
Pntd	painted
Pr	pair
Pnl	panel
Pk	park
PSD	passing sight distance
Pvmt	pavement
Ped	pedestal
Ped	pedestrian
PPP	pedestrian pushbutton post
Pen.	penetration
Perf	perforated
Per.	perimeter
Perm	permanent
PL	pipeline
Pl	place
P&P	plan & profile
PL	plastic limit
Pl or ℙ	plate
Pt	point
PE	polyethylene
PVC	polyvinyl chloride
PCC	Portland Cement concrete
PP	power pole
Preempt	preemption
Prefab	prefabricated
Prfmd or Pref	preformed
Prep	preperation
Press.	pressure
PRV	pressure relief valve
Prestr	prestressed
Pvt	private
PD	private drive
Prod.	production/produce
Prog	programmed
Prop.	property
Prop Ln	property line
Ppsd	proposed
PB	pull box
Qty	quantity
Qtr	quarter
Rad or R	radius
RR	railroad
Rlwy	railway
Rsd	raised
RC	rapid curing
Rec	record
Rcy	recycle
RAP	recycled asphalt pavement
RPCC	recycled portland cement concrete
Ref	reference
R Mkr	reference marker
RM	reference monument
RP	reference point
Refl	reflectorized
RCB	reinforced concrete box
RCES	reinforced concrete end section
RCFES	reinforced concrete flared end section
RCP	reinforced concrete pipe
RCPS	reinforced concrete pipe sewer
RCTES	reinforced concrete traversable end section
Reinf	reinforcement
Res	reservation
Res	residence
Ret	retaining
Rev	reverse
Rt	right
R/W	right of way
Riv	river
Rd	road
Rdbd	road bed
Rdwy	roadway
RWIS	roadway weather information system
Rk	rock
Rt	route

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NDDOT ABBREVIATIONS

Salv	salvage(d)
San	sanitary sewer line
Sec	section
SL	section line
Sep	separation
Seq	sequence
Serv	service
Sht	sheet
Shtng	sheeting
Shldr	shoulder
Sw or Sdwk	sidewalk
SD	sight distance
SN	sign number
Sig	signal
Sgl	single
SRCP	slotted reinforced concrete pipe
SC	slow curing
SS	slow setting
Sm	small
S	South
SE	South East
SW	South West
SB	Southbound
Sp	spaces
Spcl	special
SA	special assembly
SP	special provisions
G	specific gravity
Spk	spike
SB	split barrel sample
SH	sprinkler head
SV	sprinkler valve
Sq	square
Stk	stake
Std	standard
N	standard penetration test
Std Specs	standard specifications
Stm L	steam line
SEC	steel encased concrete
SMA	stone matrix asphalt
SSD	stopping sight distance
SD	storm drain
St	street
SPP	structural plate pipe
SPPA	structural plate pipe arch
Str	structure
Subd	subdivision
Sub	subgrade
Sub Prep	subgrade preperation
Ss	subsoil
SS	supplement specification
Supp	supplemental
Surf	surfacing
Surv	survey
Sym	symmetrical

Tel	telephone
Tel B	Telephone Booth
Tel P	telephone pole
Tv	television
Temp	temperature
Temp	temporary
TBM	temporary bench mark
T	thinwall tube sample
Ts	topsoil
Traf	traffic
TSCB	traffic signal control box
Tr	trail
Transf	transformer
Trans	transition
TT	transmission tower
TES	traversable end section
Trans	transverse
Trtd	treated
Trmt	treatment
Qc	triaxial compression
TERO	tribal employment rights ordinance
Tpl	triple
Typ	typical
Qu	unconfined compressive strength
Ugrnd	underground
Util	utility
VG	valley gutter
Vap	vapor
Vert	vertical
VCP	vitrified clay pipe
Vol	volume
VSFS	vehicle speed feedback sign
Wkwy	walkway
W	water content
WGV	water gate valve
WL	water line
WM	water main
WMV	water main valve
W Mtr	water meter
WSV	water service valve
WW	water well
Wrng	wearing
WIM	weigh in motion
W	west
WB	westbound
Wrng	wiring
W/	with
W/o	without
WC	witness corner

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NDDOT ABBREVIATIONS

MEASUREMENTS

ac	acres
A	ampere
Bd Ft	board feet
Cd	candela
cm	centimeter
C	coulomb
CF	cubic feet
m3	cubic meter
m3/s	cubic meters per second
CY	cubic yard
CY/mi	cubic yards per mile
D or Deg	degree
F	Fahrenheit
F	farad
ft	feet/foot
Gal	gallon
G	giga
Ha	hectare
H	henry
Hz	hertz
hr	hour(s)
in	inch
J	joule
K	kelvin
kN	kilo newton
kPa	kilo pascal
kg	kilogram
kg/m3	kilogram per cubic meter
km	kilometer
K	Kip(s)
LF	linear foot
L	litre
Lm	lumen
L sum	lump sum
Lx	lux
M Hr	man hour
M	mega
m	meter
m/s	meters per second
mi	mile
mL	milliliter
mm	millimeter
mm/hr	millimeters per hour
n	nano
N	newton
Pa	pascal
lb	pounds
sec	seconds
S	siemens
SF	square feet
km2	square kilometer
m2	square meter
SY	square yard
Sta Yd	station yards
SI	Systems International
T	tesla
T/mi	tons per mile
V	volt
W	watt
Wb	weber

SURVEY DESCRIPTIONS

Az	azimuth
Bs	backsight
Brg	bearing
BP Cap	blue plastic cap
BS	both sides
BC	brass cap
CS	curve to spiral
Eq	equation
E	external of curve
FS	far side
FB	field book
Fs	foresight
Geod	geodetic
GIS	Geographical Information System
GPS	Global Positioning System
HI	height of instrument
IM	iron monument
I Pn	iron pin
LS	Land Surveyor (licensed)
LSIT	Land Surveyor In Training
L	length of curve
LC	long chord
LB	level book
Mer	meridian
M	mid ordinate of curve
NGS	National Geodetic Survey
NS	near side
Obsn	observation
Off Loc	office location
OP Cap	orange plastic cap
PK	Parker-Kalon nail
P Cap	plastic cap
PP Cap	pink plastic cap
PCC	point of compound curve
PC	point of curve
PI	point of intersection
PRC	point of reverse curvature
PT	point of tangent
POC	point on curve
POT	point on tangent
RTP	random traverse point
Rge	range
RP Cap	red plastic cap
SC	spiral to curve
ST	spiral to tangent
Sta	station
SE	superelevation
Tan	tangent
T	tangent (semi)
TS	tangent to spiral
Twp	township
TB	transit book
TP	traverse point
TP	turning point
USC&G	US Coast & Geodetic Survey
USGS	US Geologic Survey
VC	vertical curve
WGS	World Geodetic System
YP Cap	yellow plastic cap
Z	zenith

SOIL TYPES

Cl	clay
Cl F	clay fill
Cl Hvy	clay heavy
Cl Lm	clay loam
Co S	coal slack
C Gr	coarse gravel
CS	coarse sand
FS	fine sand
Gr	gravel
Lig Co	lignite coal
Lig Sl	lignite slack
Lm	loam
Rk	rock
Sd	sand
Sdy Cl	sandy clay
Sdy Cl Lm	sandy clay loam
Sdy Fl	sandy fill
Sdy Lm	sandy loam
Sc	scoria
Sh	shale
Si Cl	silt clay
Si Cl Lm	silty clay loam
Si Lm	silty loam

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

702COM	702 Communications
ACCENT	Accent Communications
AGASSIZ WU	Agassiz Water Users Incorporated
AGC	Assiociated General Contractors of America
ALL PL	Alliance Pipeline
ALL SEAS WU	All Seasons Water Users Association
AMOCO PI	Amoco Pipeline Company
AMRDA HESS	Amerada Hess Corporation
AT&T	AT&T Corporation
B PAW	Bear Paw Energy Incorporated
BAKER ELEC	Baker Electric
BASIN ELEC	Basin Electric Cooperative Incorporated
BEK TEL	Bek Communications Cooperative
BELLE PL	Belle Fourche Pipeline Company
BLM	Bureau of Land Management
BNSF	Burlington Northern Santa Fe Railway
BOEING	Boeing
BRNS RWD	Barnes Rural Water District
BURK-DIV ELEC	Burke-Divide Electric Cooperative
BURL WU	Burleigh Water Users
CABLE ONE	Cable One
CABLE SERV	Cable Services
CAP ELEC	Capital Electric Cooperative Incorporat
CASS CO ELEC	Cass County Electric Cooperative
CASS RWU	Cass Rural Water Users Incorporated
CAV ELEC	Cavalier Rural Electric Cooperative
CBLCOM	Cablecom Of Fargo
CENEX PL	Cenex Pipeline
CENT PL WATER DIST	Central Pipe Line Water District
CENT PWR ELEC	Central Power Electric Cooperative
CENTURYLINK	CenturyLink
COE	Corps of Engineers
CONS TEL	Consolidated Telephone
CONT RES	Continental Resource Inc
CPR	Canadian Pacific Railway
D O E	Department Of Energy
DAK CARR	Dakota Carrier Network
DAK CENT TEL	Dakota Central Telephone
DAK RWD	Dakota Rural Water District
DGC	Dakota Gasification Company
DICKEY R NET	Dickey Rural Networks
DICKEY RWU	Dickey Rural Water Users Association
DICKEY TEL	Dickey Telephone
DNRR	Dakota Northern Railroad
DOME PL	Dome Pipeline Company
DVELEC	Dakota Valley Electric Cooperative
DVMW	Dakota, Missouri Valley & Western
ENBRDG	Enbridge Pipelines Incorporated
ENVENTIS	Enventis Telephone
EQUINOR	Equinor Pipeline
FALK MNG	Falkirk Mining Company
FHWA	Federal Highway Administration
G FKS-TRL WD	Grand Forks-traill Water District
GETTY TRD & TRAN	Getty Trading & Transportation
GLDN W ELEC	Golden West Electric Cooperative
GRGS CO TEL	Griggs County Telephone
GTR RAMSEY WD	Greater Ramsey Water District
GT PLNS NAT GAS	Great Plains Natural Gas Company
HALS TEL	Halstad Telephone Company
IDEA1	Idea1
INT-COMM TEL	Inter-Community Telephone Company
KANEB PL	Kaneb Pipeline Company
KEM ELEC	Kem Electric Cooperative Incorporated
KOCH GATH SYS	Koch Gathering Systems Incorporated
LKHD PL	Lakehead Pipeline Company
LNGDN RWU	Langdon Rural Water Users Incorporated
LWR YELL R ELEC	Lower Yellowstone Rural Electric
MCKNZ CON	McKenzie Consolidated Telcom
MCKNZ ELEC	McKenzie Electric Cooperative
MCKNZ WRD	McKenzie County Water Resource District
MCLEOD	McLeod USA
MCLN ELEC	McLean Electric Cooperative
MCLN-SHRDN R WAT	McLean-Sheridan Rural Water
MDU	Montana-dakota Utilities
MIDCO	MidContinent Communications
MIDSTATE TEL	Midstate Telephone Company
MINOT CABLE	Minot Cable Television
MINOT TEL	Minot Telephone Company
MISS VALL COMM	Missouri Valley Communications
MISS W W S	Missouri West Water System
MNKOTA PWR	Minnkota Power
MOR-GRAN-SOU ELEC	Mor-gran-sou Electric Cooperative
MOUNT-WILLI ELEC	Mountrail-williams Electric Cooperative
MRE LBTY TEL	Moore & Liberty Telephone
MUNICIPAL	City Water And Sewer
MUNICIPAL	City Of '.....'
N CENT ELEC	North Central Electric Cooperative
N VALL W DIST	North Valley Water District
ND PKS & REC	North Dakota Parks And Recreation
ND TEL	North Dakota Telephone Company
NDDOT	North Dakota Department of Transportation
NDSU SOIL SCI DEPT	NDSU Soil Science Department
NEMONT TEL	Nemont Telephone
NODAK R ELEC	Nodak Rural Electric Cooperative
NOON FRMS TEL	Noonan Farmers Telephone Company
NPR	Northern Plains Railroad
NSP	Northern States Power
NTH PRAIR RW	Northern Prairie Rural Water Association
NTHN BRDR PL	Northern Border Pipeline
NTHN PLNS ELEC	Northern Plains Electric Cooperative Incorporated
NTHWSTRN REF	Northwestern Refinery Company
NW COMM	Northwest Communication Cooperation
NWRWD	Northwest Rural Water District
ONEOK	Oneok gas
OSHA	Occupational Safety and Health Administration
OTTR TL PWR	Otter Tail Power Company
PAAP	Plains All American Pipeline
P L E M	Prairielands Energy Marketing
POLAR COM	Polar Communications
PVT ELEC	Private Electric
QWEST	Qwest Communications
R&T W SUPPLY	R & T Water Supply Association
RED RIV COMM	Red River Rural Communications
RESVTN TEL	Reservation Telephone
ROBRTS TEL	Roberts Company Telephone
R-RIDER ELEC	Roughrider Electric Cooperative
RRVW	Red River Valley & Western Railroad
S CENT REG WD	South Central Regional Water District
S E W U	South East Water Users Incorporated
SCOTT CABLE	Scott Cable Television Dickinson
SHERDN ELEC	Sheridan Electric Cooperative
SHEYN VLY ELEC	Sheyenne Valley Electric Cooperative
SKYTECH	Skyland Technologies Incorporated
SLOPE ELEC	Slope Electric Cooperative Incorporated
SOURIS RIV TELCOM	Souris River Telecommunications
ST WAT COMM	State Water Commission
STATE LN WATER	State Line Water Cooperative
STER ENG	Sterling Energy
STUT RWU	Stutsman Rural Water Users
SW PL PRJ	Southwest Pipeline Project
T M C	Turtle Mountain Communications
TCI	TCI of North Dakota
TESORO HGH PLNS PL	Tesoro High Plains Pipeline
TRI-CNTY WU	Tri-County Water Users Incorporated
TRL CO RWU	Traill County Rural Water Users
UNTD TEL	United Telephone
UPPR SOUR WUA	Upper Souris Water Users Association
US SPRINT	U.S. Sprint
USAF MSL CABLE	U.S.A.F. Missile Cable
USFWS	US Fish and Wildlife Service
USW COMM	U.S. West Communications
VRNDRY ELEC	Verendrye Electric Cooperative
W RIV TEL	West River Telephone Incorporated
WAPA	Western Area Power Administration
WAWSA	Western Area Water Supply Authority
WEB	W. E. B. Water Development Association
WILLI RWA	Williams Rural Water Association
WILSTN BAS PL	Williston Basin Interstate Pipeline Company
WLSH RWD	Walsh Water Rural Water District
WOLVRTN TEL	Wolverton Telephone
XLENER	Xcel Energy
YSVR	Yellowstone Valley Railroad

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
04-23-18	General Revisions
09-20-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions

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08/16/22

LINE STYLES

D-101-20

Existing Topography

- Existing Ground Void
- Existing Cemetary Boundary
- Existing Box Culvert Bridge
- Existing Concrete Surface
- Existing Drainage Structure
- Existing Gravel Surface
- Existing Riprap
- Existing Dirt Surface
- Existing Asphalt Surface
- Existing Tie Point Line
- Existing Railroad Centerline
- Existing Guardrail Cable
- Existing Guardrail Metal
- Existing Edge of Water
- Existing Fence
- Existing Railroad
- Existing Field Line
- Exst Flow
- Existing Curb
- Existing Valley Gutter
- Existing Driveway Gutter
- Existing Curb and Gutter
- Existing Mountable Curb and Gutter

- Existing 3-Cable w Posts
- Site Boundary
- Existing Berm, Dike, Pit, or Earth Dam
- Existing Ditch Block
- Existing Tree Boundary
- Existing Brush or Shrub Boundary
- Existing Retaining Wall
- Existing Planter or Wall
- Existing W-Beam Guardrail with Posts
- Existing Railroad Switch
- Gravel Pit - Borrow Area
- Existing Wet Area-Vegetation Break
- Existing High Tension Cable Guardrail
- Existing High Tension Cable Guardrail with Posts

Proposed Topography

- 3-Cable w Posts
- Flow
- Fence
- Remove Line
- Wall
- Retaining Wall (Plan View)
- W-Beam w Posts
- High Tension Cable Guardrail with Posts

Existing Utilities

- Existing Electrical
- Existing Fiber Optic Line
- Existing TV Fiber Optic
- Existing Gas Pipe
- Existing Overhead Utility Line
- Existing Power
- Existing Fuel Pipeline
- Existing Undefined Above Ground Pipe Line
- Existing Sanitary Sewer
- Existing Sanitary Force Main
- Existing Storm Drain
- Existing Storm Drain Force Main
- Existing Culvert
- Existing Telephone Line
- Existing TV Line
- Existing Water or Steam Line
- Existing Under Drain
- Existing Slotted Drain
- Existing Conduit
- Existing Conductor
- Existing Down Guy Wire Down Guy
- Existing Underground Vault or Lift Station

Proposed Utilities

- 24 Inch Pipe
- Reinforced Concrete Pipe
- Under Drain
- Edge Drain

Traffic Utilities

- Conductor
- Fiber Optic
- Existing Loop Detector
- Existing Double Micro Loop Detector
- Micro Loop Detector Double
- Existing Micro Loop Detector
- Micro Loop Detector
- Signal Head with Mast Arm
- Existing Signal Head with Mast Arm

Sign Structures

- Existing Overhead Sign Structure
- Existing Overhead Sign Structure Cantilever
- Overhead Sign Structure Cantilever

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

07-01-14

REVISIONS

DATE	CHANGE
09-23-16 12-18-20	Added and Revised Items, Organized by Functional Groups General Revisions

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12 18 2020

LINE STYLES

D-101-21

Right Of Way

- Easement
- Existing Easement
- Right of Way
- Existing Right of Way
- Existing Right of Way Railroad
- Existing Right of Way Not State Owned
- Existing Government Lot Line
- Existing Adjacent Block Lines
- Existing Adjacent Lot Lines
- Existing Adjacent Property Line
- Existing Adjacent Subdivision Lines
- Sight Distance Triangle Line
- Dimension Leader

Boundary Control

- Existing City Corporate Limits or Reservation Boundary
- Existing State or International Line
- Existing Township
- Existing County
- Existing Section Line
- Existing Quarter Section Line
- Existing Sixteenth Section Line
- Existing Centerline
- Tangent Line

Cross Sections and Typicals

- Existing Ground
- Existing Topsoil (Cross Section View)
- Existing Ground Void (Not Surveyed) (void — void — void — v)
- Existing Concrete
- Existing Aggregate (Cross Section View)
- Existing Curb and Gutter (Cross Section View)
- Existing Asphalt (Cross Section View)
- Existing Reinforcement Rebar

Geotechnical

- Geotextile Fabric Type D (D — D)
- Geogrid (Geo — Geo)
- Geotextile Fabric Type R (R — R)
- Geotextile Fabric Type R1 (R — R)
- Geotextile Fabric Type RR (RR — RR)
- Geotextile Fabric Type S (S — S)
- Subgrade Reinforcement
- Failure Line

Countours

- Depression Contours
- Supplemental Contour

Profile

- Subgrade, Subcut or Ditch Grade
- Topsoil Profile

Striping

- Centerline Pavement Marking
- Barrier with Centerline Pavement Marking
- Barrier Pavement Marking
- Stripe 4 IN Dotted Extension White
- Stripe 8 IN Dotted Extension White
- Stripe 8 IN Lane Drop

Pavement Joints

- Doweled Joint
- Tie Bar 30 Inch 4 Foot Center to Center
- Tie Bar 18 Inch 3 Foot Center to Center
- Tie Bar at Random Spacing

Bridge Details

- Small Hidden Object
- Large Hidden Object
- Phantom Object
- Existing Conditions Object
- Centerline Main
- Centerline Secondary
- Excavation Limits
- Proposed Ground
- Sheet Piling

Erosion Control

- Limits of Const Transition Line
- Bale Check
- Rock Check
- Floating Silt Curtain (S — S)
- Silt Fence (SF — SF)
- Excavation Limits
- Fiber Rolls

Environmental

- Wetland Mitigation
- Existing Wetland Easement USFWS
- Existing Wetland Jurisdictional
- Existing Wetland
- Tree Row

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
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DATE	CHANGE
09-23-16 12-18-20	Added and Revised Items, Organized by Functional Groups General Revisions

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SYMBOLS

D-101-30

North Arrow (Half Scale)

Alignment Data Point

Alignment Monument

Spot Elevation

Existing Miscellaneous Spot

Existing Access Control Arrow

Existing Benchmark

Reset USGS Marker

Iron Monument Found

Iron Pin R/W Monument

Property Corner

Iron Pin Reference Monument

Right of Way Marker (Exst, Ppsd, Reset)

Existing Federal Reference Corner

Existing Section Corner (Full, Quarter, Sixteenth, Meander)

Existing Witness Corner

Existing Control Point (CP, GPS-RTK, TRI)

Existing Traverse PI Aerial Panel

Existing Reference Marker Point NGS

Existing EFB Misc

Existing Bush or Shrub

Existing Large Evergreen Tree

Existing Small Evergreen Tree

Existing Large Tree

Existing Small Tree

Existing Tree Trunk

Cairn or Stone Circle

Existing Artifact

Existing Satellite Dish

Existing Weather Station

Existing Windmill or Tower

Reinforced Pavement

CSB Continuous Split Barrel Sample

FA Flight Auger Sample

SB Split Barrel Sample

T Thinwall Tube Sample

N Standard Penetration Test

Incl Inclinometer Tube

Excavation Unit

Existing Ground Water Well Bore Hole

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
12-18-20	General Revisions

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12 18 2020

SYMBOLS

D-101-31

- Flexible Delineator
- Flexible Delineator Type A (Exst, Ppsd)
- Flexible Delineator Type B (Exst, Ppsd)
- Flexible Delineator Type C (Exst, Ppsd)
- Flexible Delineator Type D (Exst, Ppsd)
- Flexible Delineator Type E (Exst, Ppsd)
- Delineator Type A (Exst, Ppsd, Diamond Grade-Reset)
- Delineator Type B (Exst, Ppsd, Diamond Grade-Reset)
- Delineator Type C (Exst, Ppsd, Diamond Grade)
- Delineator Type D (Exst, Ppsd, Diamond Grade)
- Delineator Type E (Exst, Ppsd, Diamond Grade)
- Barricade (Type I, Type II, Type III}
- Arrow Panel (Caution Mode, Double Direction, Left Directional, Right Directional, Sequencing, Truck Mounted)
- Attenuation Device
- Truck Mounted Attenuator
- Delineator Drums
- Flagger
- Tubular Marker
- Traffic Cone
- Back to Back Vertical Panel Sign

- Highway Sign (Exst, Ppsd)
- Mile Post Type A (Exst-Ppsd-Reset)
- Mile Post Type B (Exst, Ppsd)
- Mile Post Type C (Exst, Ppsd)
- Object Marker Type I (Exst, Ppsd)
- Object Marker Type II (Exst, Ppsd)
- Object Marker Type III (Exst, Ppsd)
- Existing Reference Marker
- Road Closure Gate 18 Ft (Exst, Ppsd)
- Road Closure Gate 28 Ft (Exst, Ppsd)
- Road Closure Gate 40 Ft (Exst, Ppsd)
- Existing Railroad Battery Box
- Existing RR Profile Spot
- Existing Railroad Crossbuck
- Existing Railroad Frog
- Existing Mailbox (Private, Federal)

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

07-01-14

REVISIONS

DATE	CHANGE
12-18-20	General Revisions

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SYMBOLS

D-101-32

- Existing Luminaire
- Luminaire LED
- Existing Light Standard Luminaire
- Relocate Light Standard
- Light Standard Light LED Luminaire
- Light Standard 35 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 50 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 70 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 100 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 150 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 200 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 250 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 310 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 400 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 700 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire
- Emergency Vehicle Detector
- Video Detection Camera

- High Mast Light Standard 3 Luminaire (Exst, Ppsd)
- High Mast Light Standard 4 Luminaire (Exst, Ppsd)
- High Mast Light Standard 5 Luminaire (Exst, Ppsd)
- High Mast Light Standard 6 Luminaire (Exst, Ppsd)
- High Mast Light Standard 7 Luminaire (Exst, Ppsd)
- High Mast Light Standard 8 Luminaire (Exst, Ppsd)
- High Mast Light Standard 9 Luminaire (Exst, Ppsd)
- High Mast Light Standard 10 Luminaire (Exst, Ppsd)
- Overhead Sign Structure Load Center (Exst, Ppsd)
- Traffic Signal Controller (Exst, Ppsd)
- Pad Mounted Traffic Signal Controller (Exst, Ppsd)
- Flashing Beacon (Exst, Ppsd)
- Concrete Foundation (Exst, Ppsd)
- Pipe Mounted Flasher (Exst, Ppsd)
- Pad Mounted Feed Point (Exst, Ppsd)
- Pipe Mounted Feed Point with Pad (Exst, Ppsd)
- Pole Mounted Feed Point (Exst, Ppsd)
- Junction Box (Exst, Ppsd)
- Existing Pedestrian Head with Number
- Existing Signal Head
- Pole Mounted Head
- Existing Lighting Standard Pole

- Existing Traffic Signal Standard
- Pull Box (Exst-Ppsd-Undefined)
- Intelligent Transportation Pull Box (Exst, Ppsd)
- Transformer (Exst, Ppsd)
- Power Pole (Exst-Ppsd-with Transformer)
- Wood Pole (Exst, Ppsd)
- Pedestrian Push Button Post (Exst, Ppsd)
- Existing Pole
- Existing Telephone Pole
- Existing Post
- Connection Conductor (Ground, Neutral, Phase 1, Phase 2)

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
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DATE	CHANGE
12-18-20	General Revisions

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SYMBOLS

D-101-33

Existing Manhole (Electrical, Gas, Telephone)

Water Manhole (Exst, Exst with Valve)

Sanitary Sewer Manhole (Exst, Ppsd, Exst with Valve)

Sanitary Force Main Manhole (Exst, Ppsd, Exst with Valve)

Storm Drain Manhole (Exst, Ppsd, Exst with Inlet, Ppsd with Inlet)

Force Main Storm Drain Manhole (Exst, Exst with Valve)

Manhole (Ppsd, Ppsd 48 Inch, Exst Undefined)

Existing Water Appurtenance

Sprinkler Head (Exst, Ppsd)

Fire Hydrant (Exst, Ppsd)

Cleanout (Exst Sanitary, Underdrain)

Existing Catch Basin Inlet (Round, Square)

Existing Curb Inlet (Round, Square)

Existing Slotted Reinforced Concrete Pipe

Catch Basin (Riser 30 Inch, Beehive, Type A)

Inlet Mountable Curb (Type A, Type B)

Inlet Saddle Base (Type 1, Type 2)

Inlet Special (Catch Basin, Type 1, Type A)

Inlet (Tee, Type 1, Type 2, Type 2 Double)

Median Drain

Headwall (Exst, Ppsd, Ppsd Single with Vegitation Barrier, Ppsd Double with Vegitation Barrier)

Cap or Stub
Exst Gas, Exst Sanitary, Exst Storm Drain, Ppsd Storm Drain, Exst Water

Existing Pedestal
Electrical, Telephone, Fiber Optic Telephone, TV, Fiber Optic TV, Undefined

Existing Pipe Vent
Gas, Fuel, Sanitary, Storm Drain, Water, Undefined

Valve
Exst Gas, Exst Water, Ppsd Water, Exst Undefined

Pump
Sanitary, Storm Drain, Exst Water

Corrugated Metal End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)

Reinforced Concrete End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)

Existing Utility Marker

Existing Meter

Existing Fuel Dispensers

Existing Fuel Filler Pipes

Existing Fuel Leak Sensors

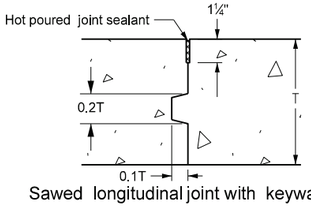
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
12-18-20	General Revisions Sheet added - Continued from D-101-32

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12 18 2020

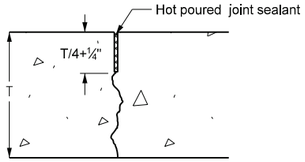
LONGITUDINAL JOINT DETAILS

D-550-2

UNTIED JOINTS

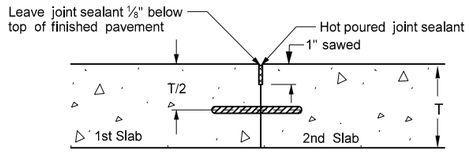


Sawed longitudinal joint with keyway



Sawed longitudinal joint without keyway

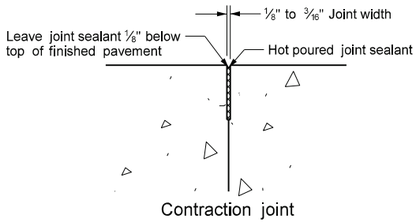
TIED JOINTS



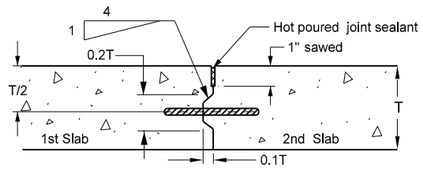
Longitudinal construction joint (tied butt joint)

Notes:

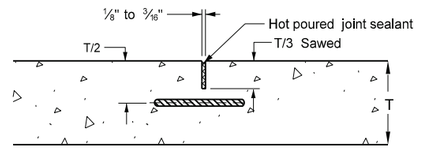
1. Provide hot poured joint sealant meeting the requirements of Section 826.02A.2 of the Standard Specifications.
2. Include all costs of the longitudinal joint and seal in the price bid for the PCC pavement.
3. Do not place tie bars within 18 inches of a transverse skewed joint.
4. Use Grade 40 steel for tie bars installed bent and later straightened.
5. Increase the tie bar spacing up to 10%, when necessary to facilitate construction.
6. Place tie Bars at a 48 inch maximum spacing.
7. A "Warp" joint is a sawed joint or a construction joint with a keyway.
8. A "Butt joint" is a construction joint with no keyway.



Contraction joint



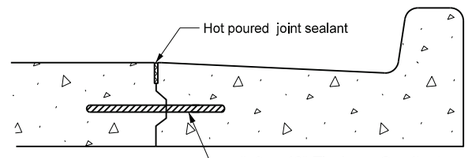
Longitudinal construction joint (tied keyed joint)



Sawed longitudinal joint

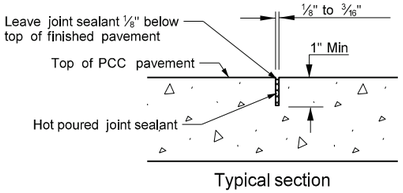
TIEBAR SPACINGS (In)

DIST TO FREE EDGE (FT) / BAR SIZE / GRADE STEEL / BAR LENGTH / JOINT TYPE / PVMT THICKNESS		# 3 BAR										# 4 BAR												# 5 BAR												# 6 BAR											
		GRADE 40				GRADE 60						GRADE 40					GRADE 60							GRADE 40						GRADE 60						GRADE 40						GRADE 60					
		24"				30"						24"					36"							30"						42"						36"						48"					
		4	6	8	10	4	6	8	10	12	14	8	10	12	14	16	8	10	12	14	16	22	24	10	12	14	16	22	24	10	12	14	16	22	24	10	12	14	16	19	22	24	10	12	14	16	19	22	24
6"	WARP		48	39			48	48				48					48																															
	BUTT		37	27			48	42				48					48																															
8"	WARP	48	39	29	24	48	48	44	35	29	25	48	42	35	30	26	48	48	48	45	39	28	26	48	48	47	41	30	27	48	48	48	48	45	41	48	48	48	48	48	43	39	48	48	48	48	48	48	48
	BUTT	42	27			48	42	31	25			37	29	24			48	44	37	32	27			46	39	33	29			48	48	48	43	32	29	48	48	48	48	35	30	27	48	48	48	48	48	45	41
8½"	WARP	48	37	28		48	48	42	33	28	24	48	39	33	28	24	48	48	48	42	37	27	24	48	48	44	38	28	25	48	48	48	48	42	38	48	48	48	48	47	40	37	48	48	48	48	48	48	48
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9"	WARP	48	35	26		48	48	39	31	26		47	37	31	26		48	48	47	40	35	25		48	48	42	36	26	24	48	48	48	48	40	36	48	48	48	48	44	38	35	48	48	48	48	48	48	48
	BUTT	37	24			48	37	27				33	26				48	40	33	28	25			41	34	29	25			48	48	44	39	28	25	48	48	42	37	31	26	24	48	48	48	48	47	40	37
9½"	WARP	48	33	25		48	48	37	30	25		44	35	29	25		48	48	44	38	33	24		48	46	39	34	25		48	48	48	48	38	34	48	48	48	48	42	36	33	48	48	48	48	48	48	48
	BUTT	35				48	35	26				31	25				47	37	31	27				39	32	27	25			48	48	42	37	27	24	48	47	40	35	29	25		48	48	48	48	44	38	35
10"	WARP	47	31			48	47	35	28			42	34	28	24		48	48	42	36	31			48	44	37	33	24		48	48	48	48	36	33	48	48	48	48	40	34	31	48	48	48	48	48	48	47
	BUTT	33				48	33	25				29	24				45	36	29	25				37	31	26	24			48	46	40	35	25		48	45	38	33	28	24		48	48	48	48	42	36	33
10½"	WARP	45	30			48	45	34	27			40	32	26			48	48	40	34	30			48	42	36	31			48	48	48	47	34	31	48	48	48	48	45	38	33	30	48	48	48	48	48	48	45
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11"	WARP	43	28			48	43	32	26			38	31	25			48	46	38	33	28			48	40	34	30			48	48	48	45	32	30	48	48	48	43	36	31	28	48	48	48	48	48	47	43
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11½"	WARP	41	27			48	41	31	24			36	29	24			48	44	36	31	27			46	38	32	28			48	48	48	43	31	28	48	48	47	41	34	30	27	48	48	48	48	48	45	41
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12"	WARP	39	26			48	39	29				35	28				48	42	35	30	26			44	36	31	28			48	48	47	41	30	27	48	48	45	40	33	28	26	48	48	48	48	48	43	39
	BUTT	27				42	27					25					37	30	25					31	25					46	39	33	29			45	37	32	28				48	48	48	42	35	30	27
12½"	WARP	38	25			48	38	28				33	27				48	40	33	29	25			42	35	30	26			48	48	45	39	28	26	48	48	43	38	32	27	25	48	48	48	48	48	41	38
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13"	WARP	36	24			48	36	27				32	26				48	39	32	27	24			40	33	29	25			48	48	43	38	27	25	48	48	41	36	30	26	24	48	48	48	48	46	40	36
	BUTT	25				38	25					24					34	27						28						42	35	30	27			41	34	29	25				48	48	44	38	32	28	25
13½"	WARP	35				48	35	26				31	25				47	37	31	26				39	32	28	24			48	48	42	36	26	24	48	47	40	35	29	25		48	48	48	48	44	38	35
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14"	WARP	34				48	34	25				30	24				45	36	30	25				37	31	27				48	47	40	35	25		48	45	38	34	28	24		48	48	48	48	43	37	34
	BUTT	24				35	24					23					32	25						26						39	33	28	25			38	32	27	24				48	47	40	35	30	26	
14½"	WARP	32				48	32	24				29					43	35	29	25				36	30	26				48	45	39	34	24		48	43	37	32	27			48	48	48	48	41	35	32
	BUTT					34											30	25						25						38	32	27	24			36	30	26					48	46	39	34	29	25	
15"	WARP	31				47	31					28					42	33	28	24				35	29	25				48	44	37	33	24		48	42	36	31	26			48	48	48	47	40	34	31
	BUTT					33											29							25						37	31	26				35	29	25					48	44	38	33	28	24	



Curb and gutter sections

JOINT SEALER DETAILS



Typical section

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-15-2010

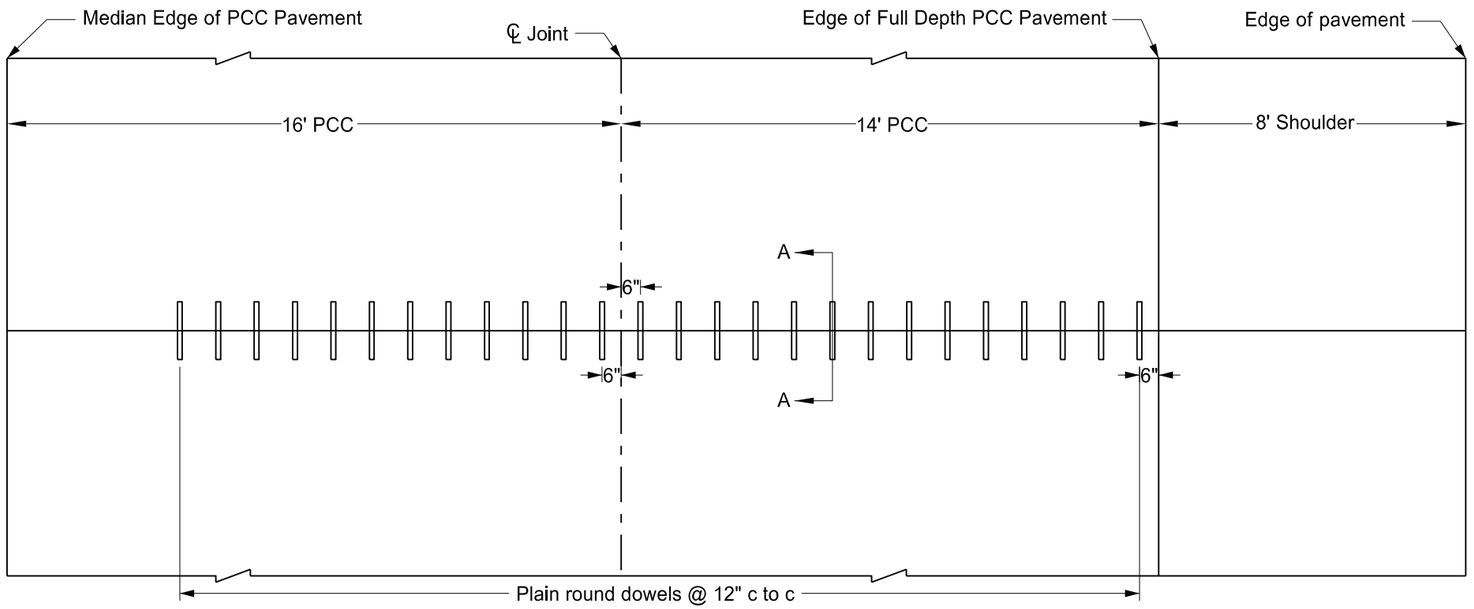
REVISIONS

DATE	CHANGE
10/23/2012	Expanded Tie Bar Table
03/16/2016	Updated Jt Details & notes
10/25/2019	Corrected "Typo" in Note 3

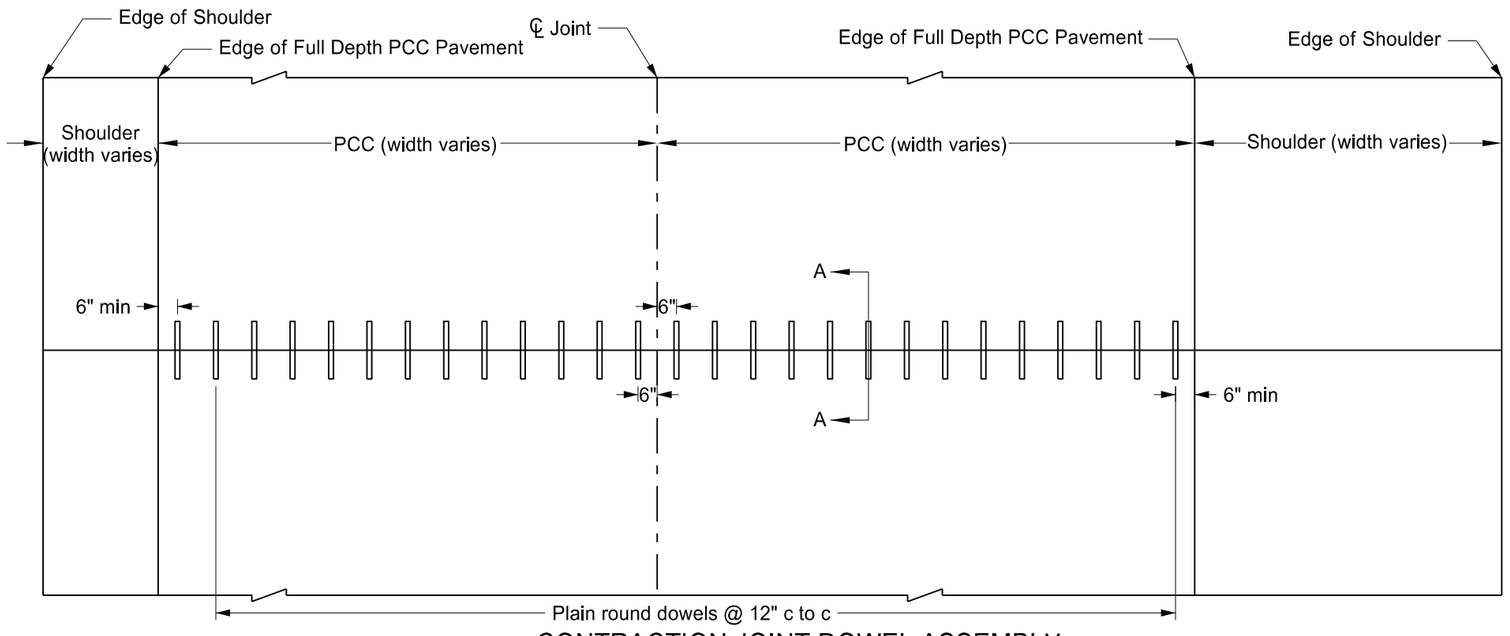
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TRANSVERSE CONTRACTION JOINT DETAILS

D-550-3



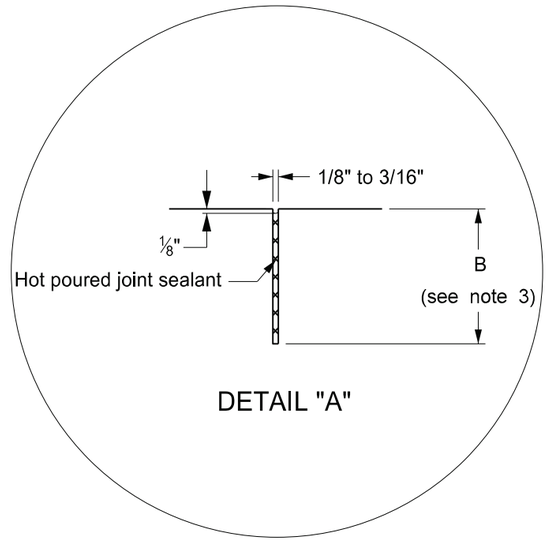
CONTRACTION JOINT DOWEL ASSEMBLY
INTERSTATE



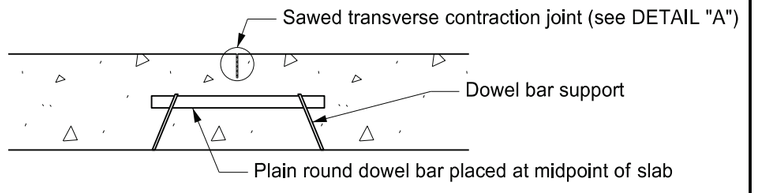
CONTRACTION JOINT DOWEL ASSEMBLY
NON-INTERSTATE

Notes

1. The joint seal details apply to both doweled and non-doweled (plain) transverse joints.
2. T = Thickness of pavement.
3. B = T/4 + ¼" for AE or YE for non-dowelled concrete pavement or
   B = T/3 for AAE or dowelled concrete pavement



DETAIL "A"



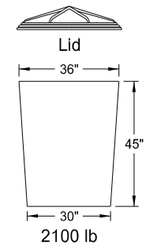
SECTION A-A

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-15-10	
REVISIONS	
DATE	CHANGE
6/23/2014	Removed dowel size reference
3/16/2016	Revised Joint Details and notes
10/25/2019	Expanded Details for clarity

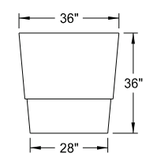
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ATTENUATION DEVICE

D-704-1

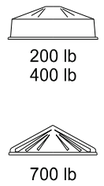


2100 lb



200, 400, 700 and 1400 lb

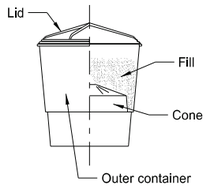
Outer Containers



200 lb
400 lb

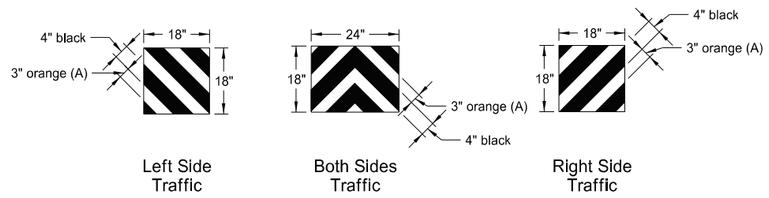
700 lb

Cones



Typical Assembly

Typical Module Construction Detail



Left Side Traffic

Both Sides Traffic

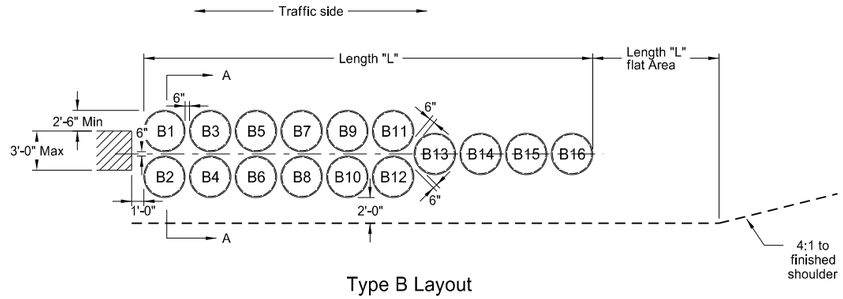
Right Side Traffic

Reflective Sheet Detail

Note:
Apply Type IV reflective sheeting (as specified in the NDDOT Standard Specifications) directly to the outer container of the last attenuation device facing traffic, following the details above. Or apply the sheet to a metallic sheet and attach it to the container with approved fasteners.

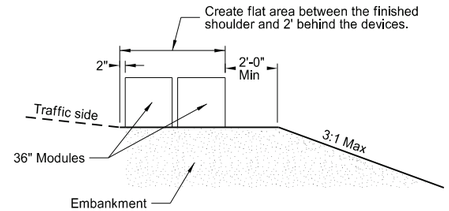
(A) Use 3" orange sheeting for temporary installations, and 3" yellow sheeting for permanent installations.

Fill Chart					
	Module Weights (LBS)				
	200	400	700	1400	2100
Distance from top edge	8½"	5"	4"	3"	0"



Type B Layout

Note:
Angle attenuation devices 10 degrees towards traffic when placed at piers offset from roadway.



Section A-A
(Type B Layout)

Type B Attenuation Device											
Module Number	Dash Number										
	75	70	65	60	55	50	45	40	35	30	25
	Module Weights (LBS)										
B1	2100										
B2	2100										
B3	2100	2100	2100	2100	2100	2100	2100	2100	2100		
B4	2100	2100	2100	2100	2100	2100	2100	2100	2100		
B5	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B6	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B7	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B8	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B9	700	700	700	700	700	700	700	700	700	700	700
B10	700	700	700	700	700	700	700	700	700	700	700
B11	700	700	700	700	700	700	700	700	700	700	700
B12	700	700	700	700	700	700	700	700	700	700	700
B13	700	700	700	700	700	700	700	700	700	700	700
B14	400	400	400	400	400	400	400	400	400	400	400
B15	400	400	400	400	400	400	400	400	400	400	400
B16	200	200	200	200	200	200	200	200	200	200	200
Length (L)	34.2'	30.7'	30.7'	30.7'	30.7'	30.7'	30.7'	30.7'	30.7'	27.2'	27.2'
Module Weights (LBS)	Replacement Module										
2100	1	1	1	1	1	1	1	1	1		
1400	1	1	1	1	1	1	1	1	1	1	1
700	2	2	2	2	2	2	2	2	2	2	2
400	1	1	1	1	1	1	1	1	1	1	1
200	2	2	2	1	1	1	1	1	1	1	1

Notes:

1. Materials
   A) Use modules manufactured from frangible polyethylene material which shatters upon impact.
   B) Fill modules with class 43 aggregate meeting NDDOT Standard Specifications aggregate requirements. Use fill with a unit weight of at least 100 pounds per cubic foot. Use fill with a moisture content of 2% or less when left over winter.

2. Modules
   Provide modules in two sizes containing volumes of either 2, 4, 7, 14, or 21 cubic feet minimum.
   A) Provide three components for 2, 4, or 7 cubic foot module containers:
      1) A 14 C.F., yellow outer container.
      2) A black lid securely locking over the top lip of the container.
      3) A variable cone-shaped supporting insert capable of supporting 200, 400, or 700 pounds of sand mass to allow for three sizes of modules. Place cone inserts inside the 14 cubic foot container.
   B) Provide two components for the 14 cubic foot module container:
      1) A 14 C.F., yellow outer container.
      2) A black lid securely locking over the top lip of the container.
   C) Provide two components for the 21 cubic foot module container:
      1) A 36" height X 36" width yellow outer container.
      2) A black lid which locks securely over the top of the container.

3. For temporary installations use Energite or Fitch attenuation barrels manufactured by Energy Absorption Systems of Chicago, IL, TrafFix barrels manufactured by TrafFix Devices, Inc. of San Clemente, CA, or approved equal modules. As an option, place attenuation devices on 3½" maximum thickness pallets to facilitate maintenance.

4. For permanent installations use Barrel Attenuation Device consisting of one-piece outer sand container modules with separate detachable lid. Energite attenuation barrels manufactured by Energy Absorption Systems of Chicago, IL, TrafFix barrels manufactured by TrafFix Devices, Inc. of San Clemente, CA, or approved equal meet these requirements.

5. The Typical Module Construction Detail and Type B Layout are based on the Energite Crash Cushion manufactured by Energy Absorption. Provide any required layouts and details from other sand filled attenuation module manufacturers which differ from those shown here.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE
7-18-14	Revised sheeting in reflective sheet detail
9-27-17	Update to active voice
10-03-19	New Design Engr PE Stamp

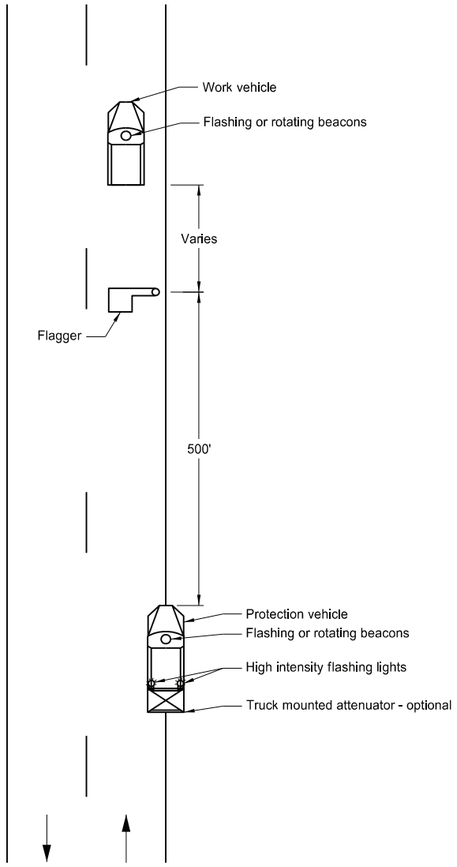
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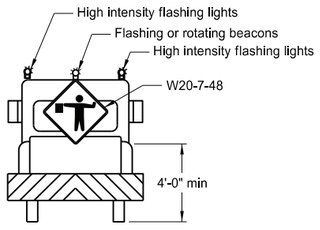
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TRAFFIC CONTROL FOR CORING OF HOT BITUMINOUS PAVEMENT

D-704-2

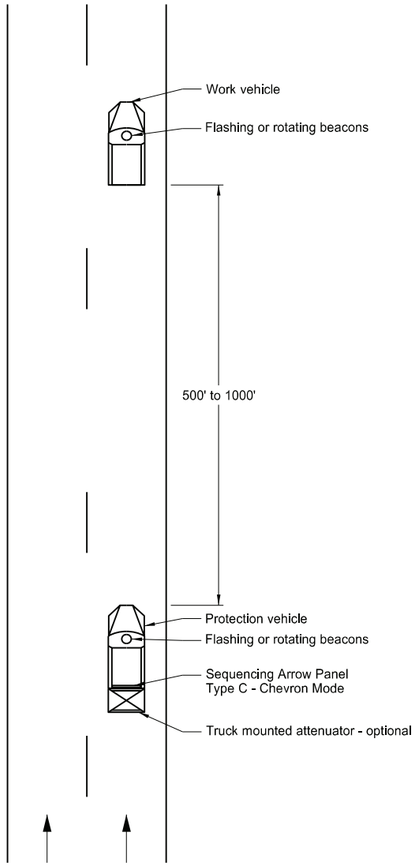
Two Lane, Two Way Roadways

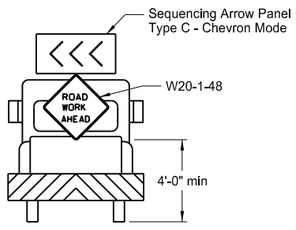




Typical Protection Vehicle

Multilane Roadways





Typical Protection Vehicle

Notes:

1. Display a 360 degree rotating, flashing, oscillating or strobe light on the working vehicle.

2. Display a 360 degree rotating, flashing, oscillating or strobe light on the shadow vehicle. Operate a sequencing arrow panel Type C in chevron mode on the shadow vehicle for Multilane Roadway.

3. Use these layouts during daylight hours and in areas of good visibility only.

4. Use flagger to protect the work area and warn oncoming traffic for two lane, two way roadway.

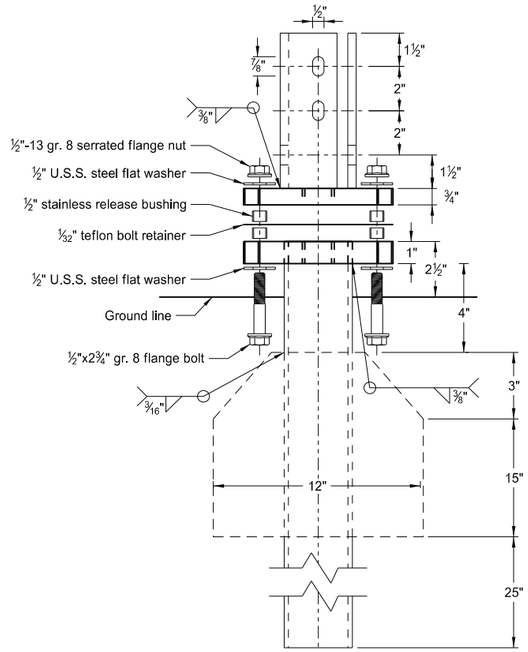
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp
8-01-24	Electronic Stamp/Signature

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/01/24

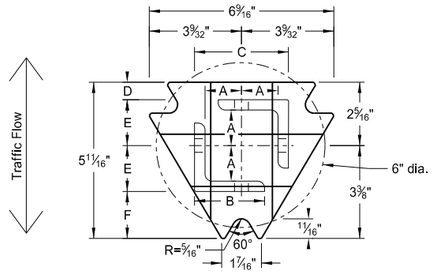
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

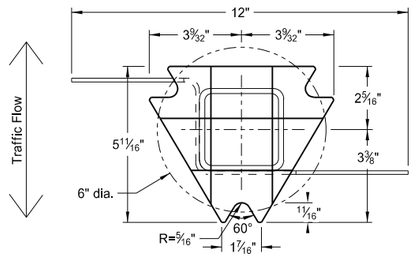


Multi-Directional
Slip Base Assembly

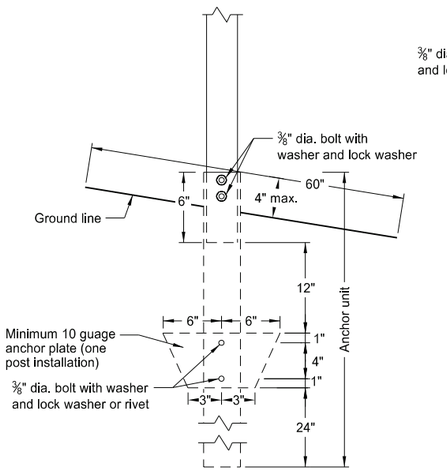
Perforated Tube



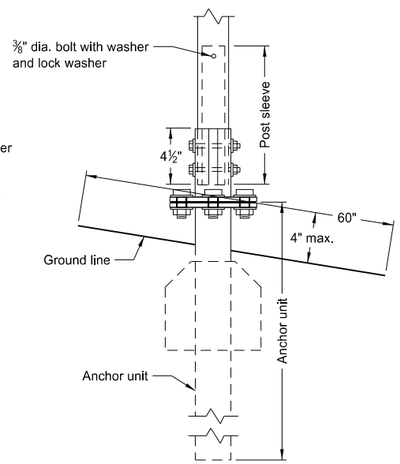
Top Post Receiver
Plate - ASTM A572 grade 50
Angle Receiver - 2½"x2½"x⅜" ASTM A36 structural angle



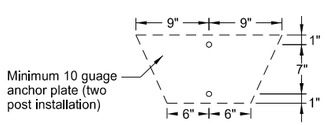
Bottom Soil Stub
Tube - 3"x3"x7 gauge ASTM A500 grade B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A1011
Plate - ASTM A572 grade 50

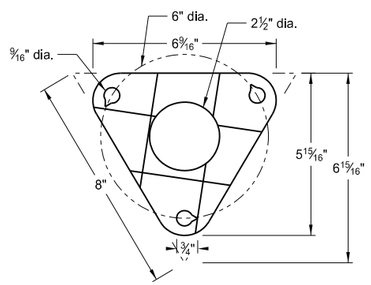


Anchor Unit and Post Assembly



Multi-Directional
Slip Base Anchor Unit
and Post Sleeve Assembly





Bolt Retainer for Base Connection
Bolt Retainer- 1/32" Reprocessed Teflon

Notes:

1. Torque slip base bolts as specified by manufacturer.
2. Use anchor with 43.9 KSI yield strength and 59.3 KSI tensile strength.
3. Provide 4" vertical clearance for anchor or breakaway base. Measure the 4"x60" measurement above and below post location and back and ahead of post.
4. In concrete sidewalk, use same anchor without wings.
5. Provide more than 7' between the first and fourth posts of a four post sign.

Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thick-ness Gauge	Sleeve Size in.	Wall Thick-ness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2¼
1	2¼	12			No	2½
1	2½	12			(A)	3
1	2½	10			Yes	
1	2¼	12	2	12	Yes	
1	2½	12	2¼	12	Yes	
2	2	12			No	2¼
2	2¼	12			No	2½
2	2½	12			Yes	
2	2½	12			Yes	
2	2¼	10	2	12	Yes	
2	2½	12	2¼	12	Yes	
3 & 4	2½	12			Yes	
3 & 4	2½	10			Yes	
3 & 4	2½	12	2¼	12	Yes	
3 & 4	2¼	12	2	12	Yes	
3 & 4	2½	10	2 3/16	10	Yes	

Properties of Telescoping Perforated Tube						
Tube Size in.	Wall Thickness in.	U.S. Standard Gauge	Weight per Foot lbs.	Moment of Inertia in.⁴	Cross Sec. Area in.²	Section Modulus in.³
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643
2½ x 2½	0.135	10	4.006	0.979	1.010	0.785

Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2 3/16"x10 ga.	1 9/64"	2½"	3 1/32"	25/32"	1 33/64"	1⅞"
2½"x10 ga.	1 9/32"	2½"	3 5/16"	⅝"	1 21/32"	1¾"

(A) Use breakaway base when support is placed in weak soils. Engineer determines if soils are weak.

(B) For additional wind load, insert the 2 3/16"x10 ga. into 2½"x10 ga.

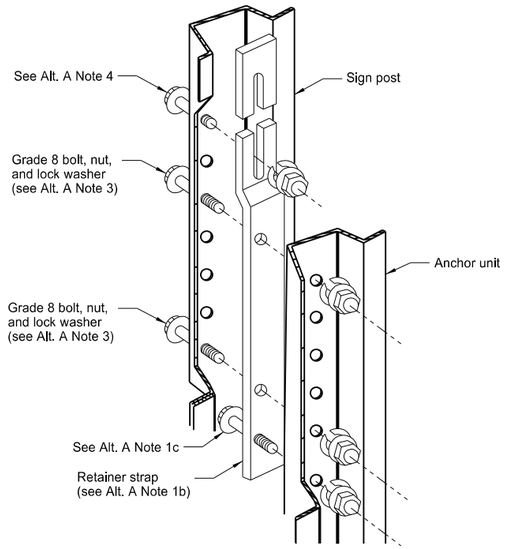
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 10/03/19 and the original document is stored at the North Dakota Department of Transportation

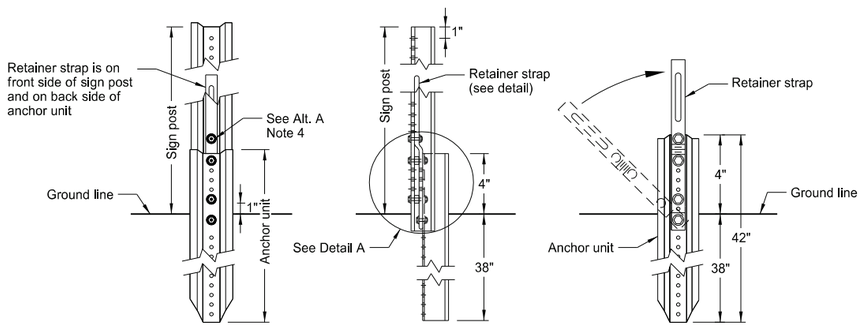
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



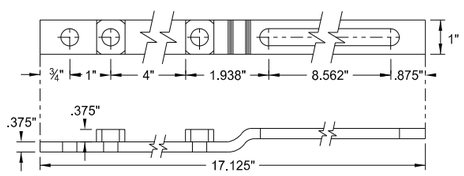
Detail A



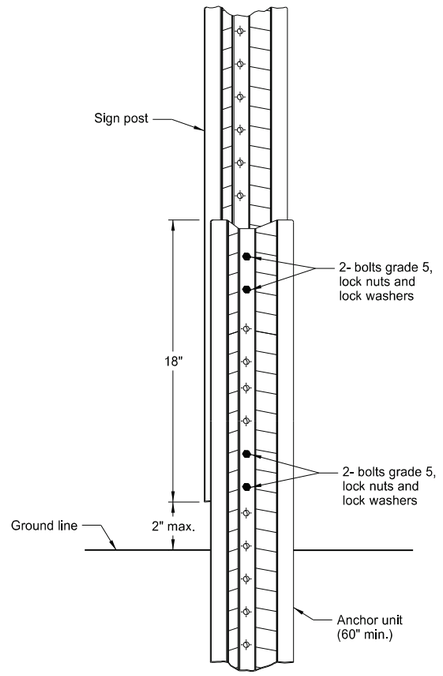
Front View Side View Back View

Breakaway U-Channel Detail
Alternate A

Install a maximum of 2 posts within 7'.

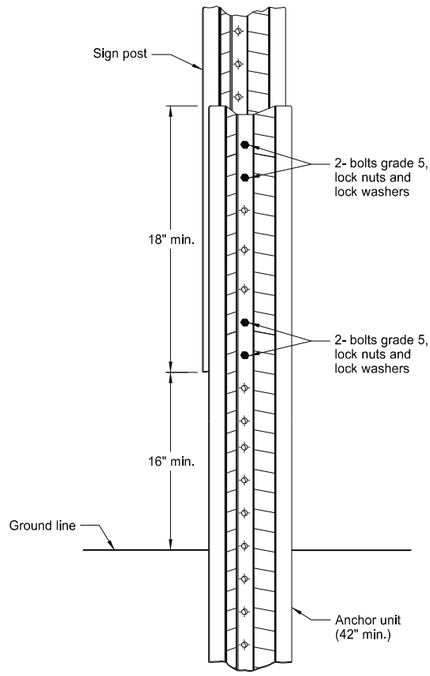


Retainer Strap Detail



Breakaway U-Channel Splice Detail
Alternate B
(2.5 and 3 lb/ft)

Install a maximum of 3 posts within 7'.



Breakaway U-Channel Splice Detail
Alternate C
(2.5 and 3 lb/ft)

Install a maximum of 3 posts within 7'.

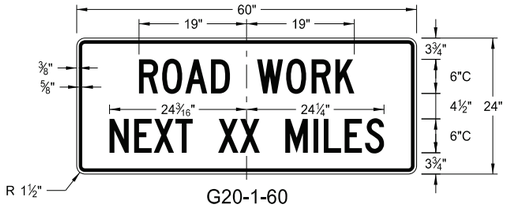
Alternate A Steps of Installation:

1. a) Drive anchor unit to within 12" of ground level.
   b) Establish proper assembly by lining up bottom hole of retainer strap with 6th hole from the top of the anchor unit.
   c) Assemble strap to back of anchor unit using 5/16"x2" bolt, lock washer and nut.
   d) Rotate strap 90° to left.
2. a) Drive anchor unit to 4" above ground.
   b) Rotate strap to vertical position.
3. a) Place 5/16"x2" bolt, lock washer and nut in bottom of sign post to facilitate alignment of sign post with proper hole in anchor unit.
   b) Alternately tighten two connector bolts.
4. Complete assembly by tightening 5/16"x2" bolt (this fastens sign post to retainer strap).
5. Properly nest base post, strap, and sign post. Proper nesting occurs when all flat surfaces of the base post, strap, and sign post at the bolts have full contact across the entire width.

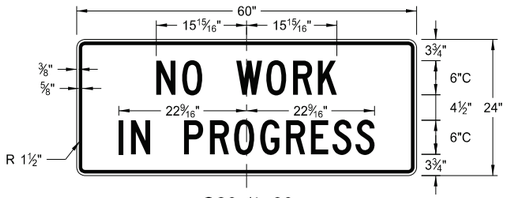
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp

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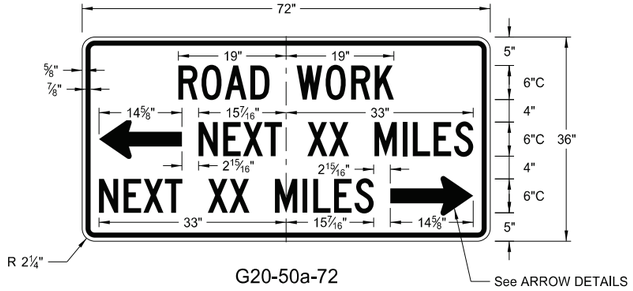
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



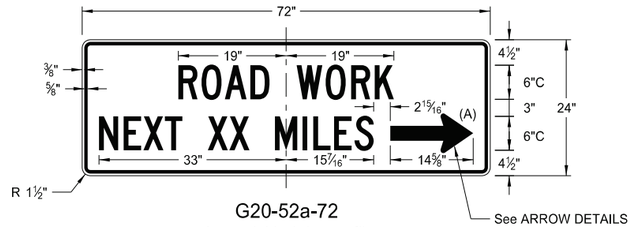
G20-1-60
Legend: black (non-refl)
Background: orange



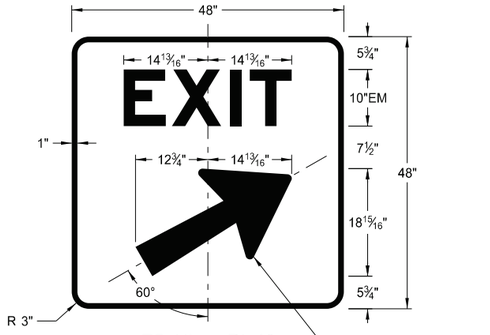
G20-1b-60
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Background: orange



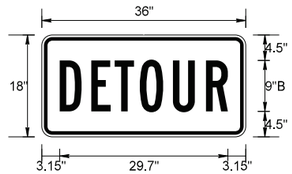
G20-50a-72
Legend: black (non-refl)
Background: orange



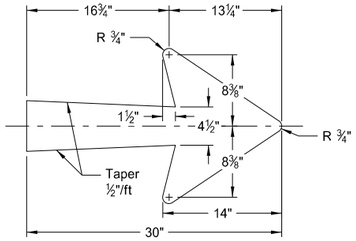
G20-52a-72
Legend: black (non-refl)
Background: orange



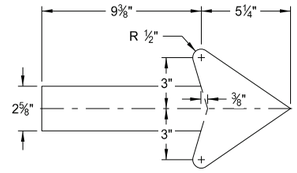
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



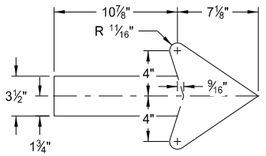
M4-8-36
Legend: black (non-refl)
Background: orange



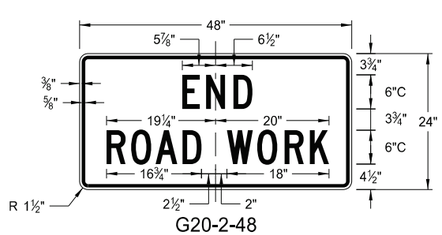
E5-1-48



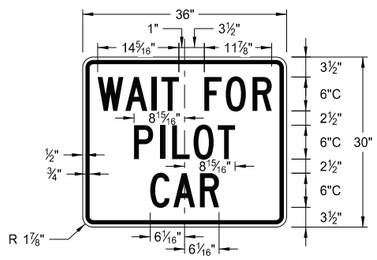
G20-50a-72
G20-52a-72



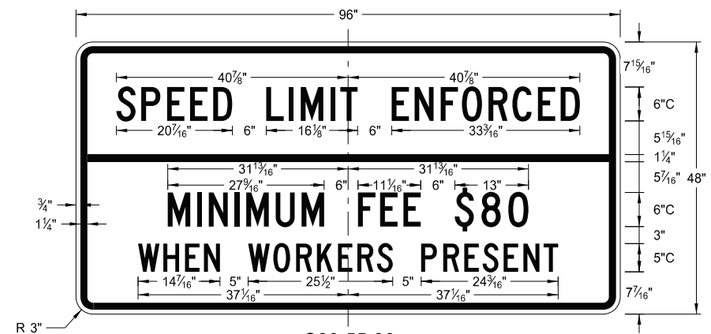
M4-9(L or R)-30
Right or Left



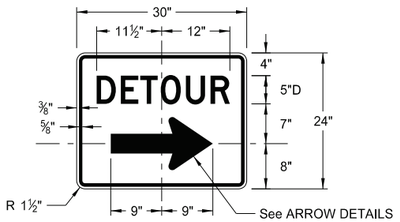
G20-2-48
Legend: black (non-refl)
Background: orange



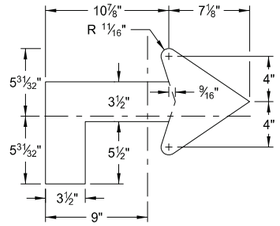
G20-4b-36
Legend: black (non-refl)
Background: orange



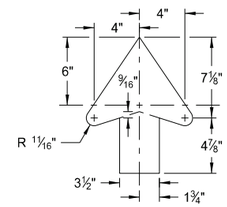
G20-55-96
Legend: black (non-refl)
Background: orange



M4-9(L or R)-30 &
M4-9-30
Legend: black (non-refl)
Background: orange



M4-9(L or R)-30
Advanced Right or Left



M4-9-30
Straight

ARROW DETAILS

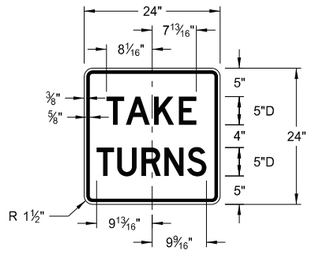
NOTES:

(A) Arrow may be right or left of the legend to indicate construction to the right or left.

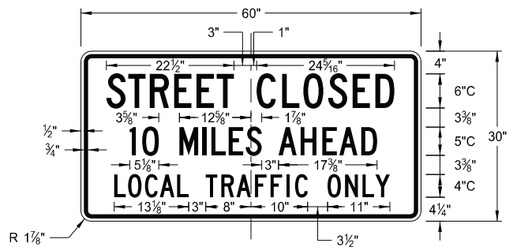
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17 10-03-19	Added sign & background color New Design Engineer PE Stamp

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 10/03/19 and the original document is stored at the North Dakota Department of Transportation

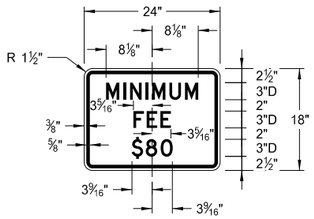
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



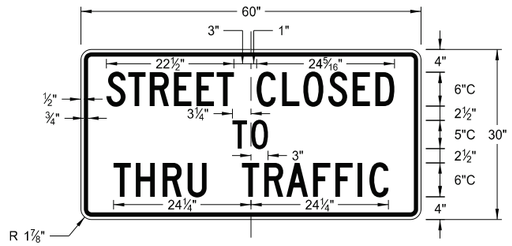
R1-50P-24
Legend: black (non-refl)
Background: white



R11-3c-60
Legend: black (non-refl)
Background: white



R2-1aP-24
Legend: black (non-refl)
Background: white



R11-4a-60
Legend: black (non-refl)
Background: white

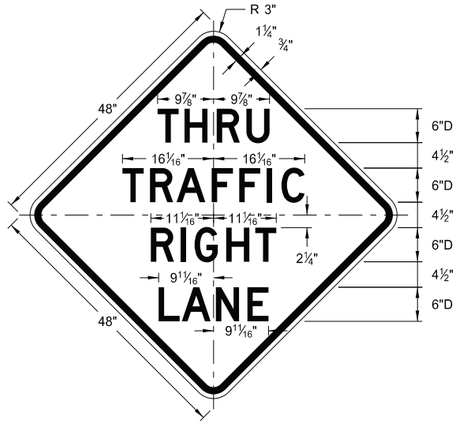


R11-2a-48
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Background: white

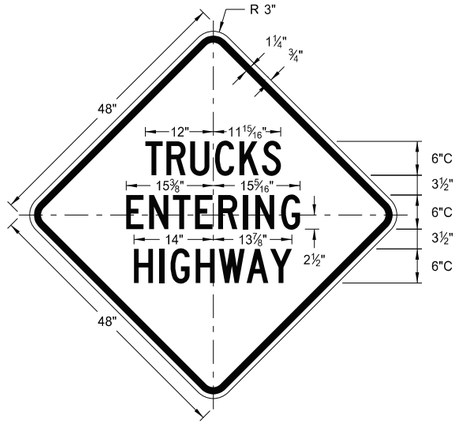
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Revised sign number
10-03-19	New Design Engineer PE Stamp

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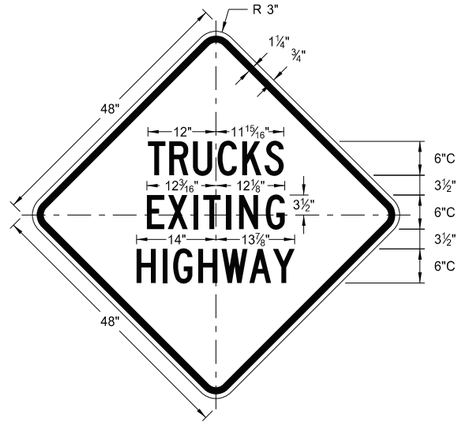
CONSTRUCTION SIGN DETAILS
WARNING SIGNS



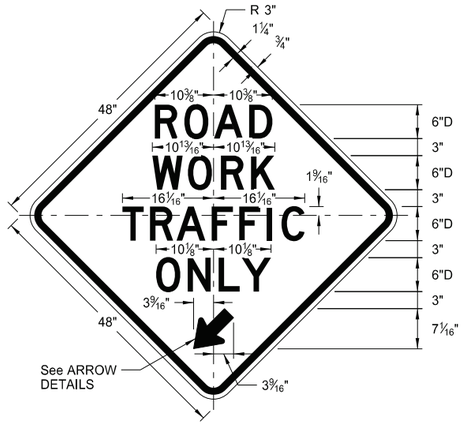
W5-8-48
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Background: orange



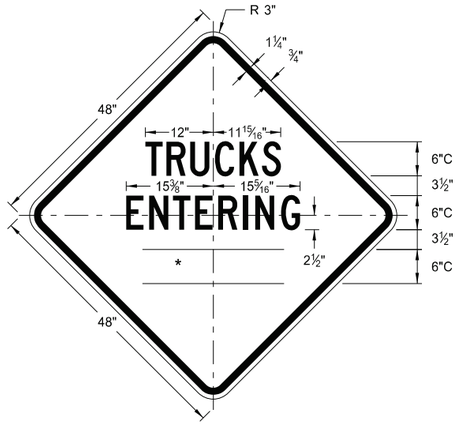
W8-53-48
Legend: black (non-refl)
Background: orange



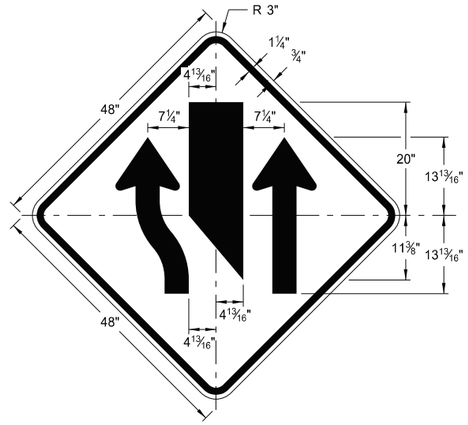
W8-56-48
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Background: orange



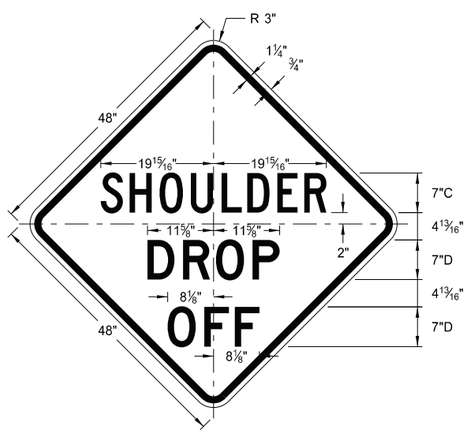
W5-9-48
Legend: black (non-refl)
Background: orange



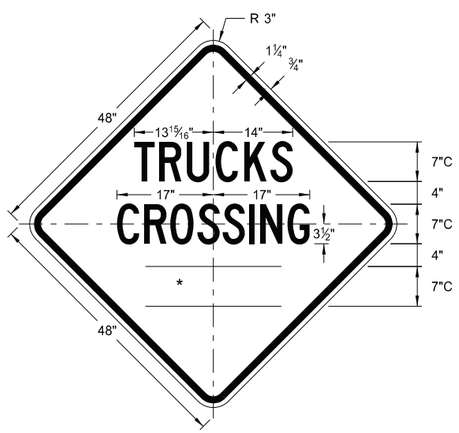
W8-54-48
Legend: black (non-refl)
Background: orange



W9-3a-48
Legend: black (non-refl)
Background: orange



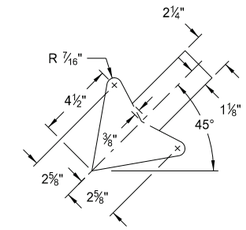
W8-9a-48
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Background: orange



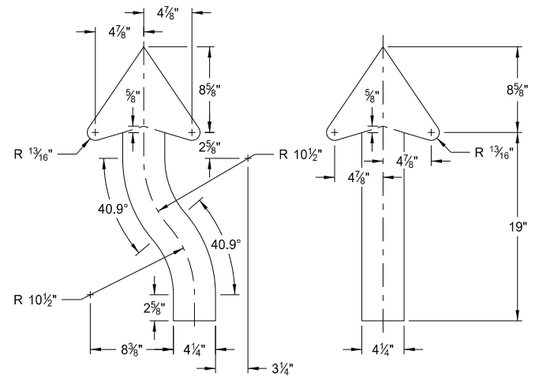
W8-55-48
Legend: black (non-refl)
Background: orange

WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
½ MILE	Reduce 50%
1 MILE	Standard

* DISTANCE MESSAGES



W5-9-48



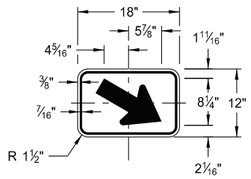
W9-3a-48

ARROW DETAILS

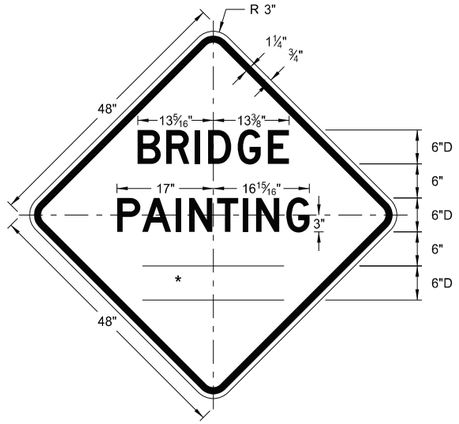
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated sign number
5-31-18	Revised sign and arrow details
10-03-19	New Design Engineer PE Stamp

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 10/03/19 and the original document is stored at the North Dakota Department of Transportation

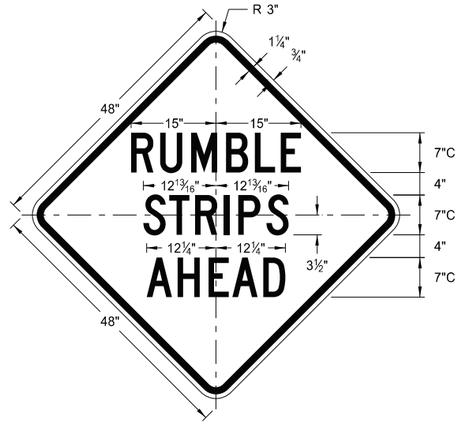
CONSTRUCTION SIGN DETAILS
WARNING SIGNS



W16-7aP-18
Legend: black (non-refl)
Background: orange



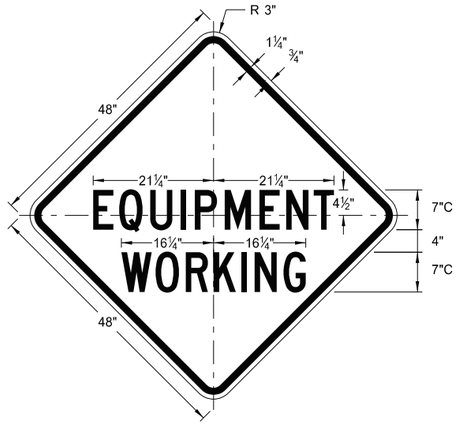
W21-50-48
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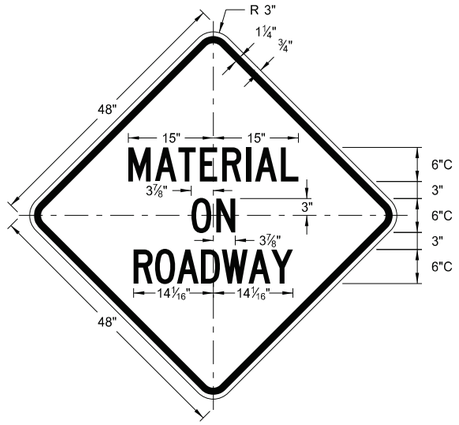
W21-53-48
Legend: black (non-refl)
Background: orange

WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
½ MILE	Reduce 50%
1 MILE	Standard

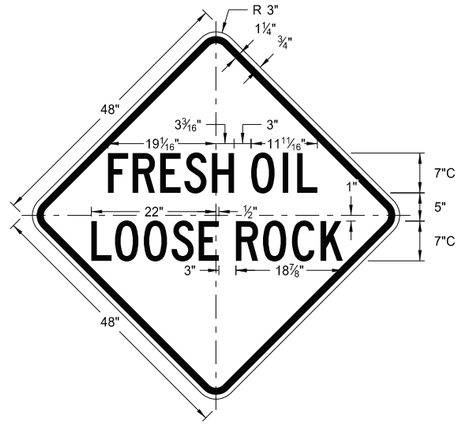
* DISTANCE MESSAGES



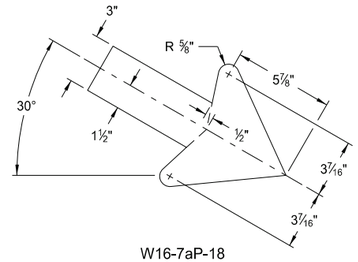
W20-51-48
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Background: orange



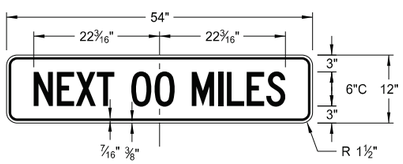
W21-51-48
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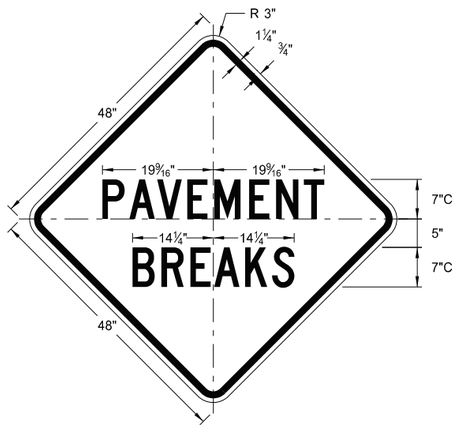
W22-8-48
Legend: black (non-refl)
Background: orange



W16-7aP-18



W20-52P-54
Legend: black (non-refl)
Background: orange



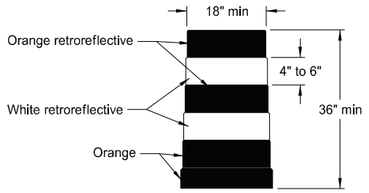
W21-52-48
Legend: black (non-refl)
Background: orange

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
5-31-18	
REVISIONS	
DATE	CHANGE
11-01-19	Added details for sign W16-7aP-18.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 11/1/19 and the original document is stored at the North Dakota Department of Transportation

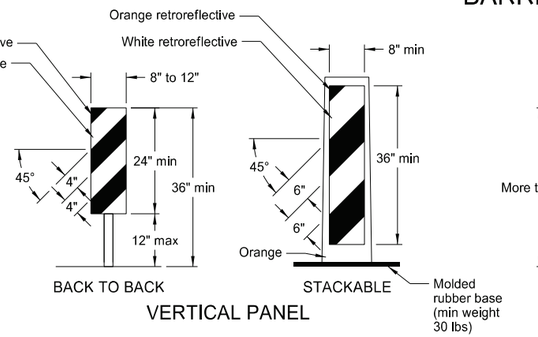
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



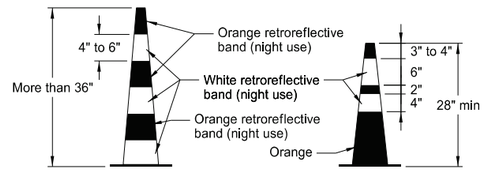
DELINEATOR DRUM

Provide horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide for drum markings. Use a minimum of two orange and two white stripes with the top stripe being orange for each drum. Do not exceed 3" nonretroreflectorized spaces between the horizontal orange and white stripes. Avoid placement of stripes on drum ribs or indentations. Use closed top drums that will not allow collection of debris. Do not place ballast on the top of drum.



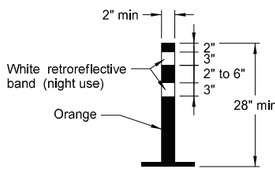
VERTICAL PANEL

Provide alternating orange and white retroreflective stripes, sloping downward in direction vehicular traffic is to pass. Place retroreflective sheeting on both sides of panel with a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective material on the vertical panel is 36 inches or more, use a stripe width of 6 inches.



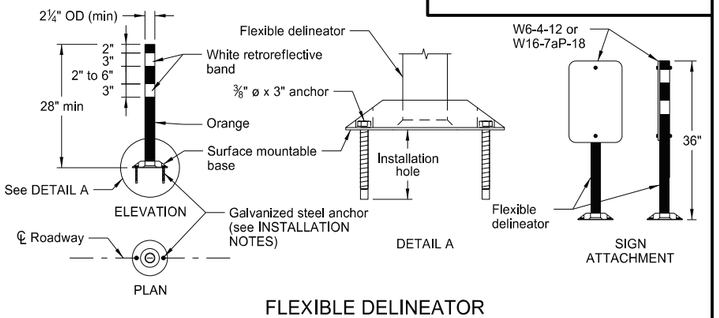
TRAFFIC CONE

Provide retroreflectorization of cones more than 36" in height by alternating orange and white retroreflective stripes. Use a minimum of two orange and two white stripes for each cone with the top stripe being orange. Use maximum 3" nonretroreflectorized space between the orange and white stripes.



TUBULAR MARKER

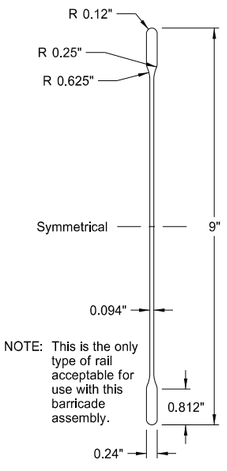
Provide retroreflectorization of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



FLEXIBLE DELINEATOR

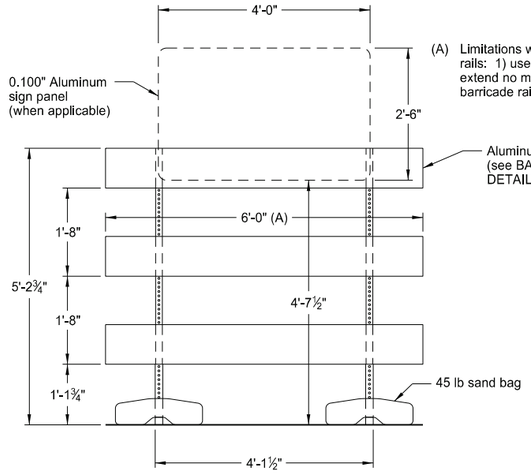
INSTALLATION NOTES:

1. Drill installation holes to diameter and depth required by manufacturer's specifications.
2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
3. In lieu of bolted down base, use an 8" x 8" butyl pad or hot melt butyl. Remove butyl as close as possible to pavement surface.



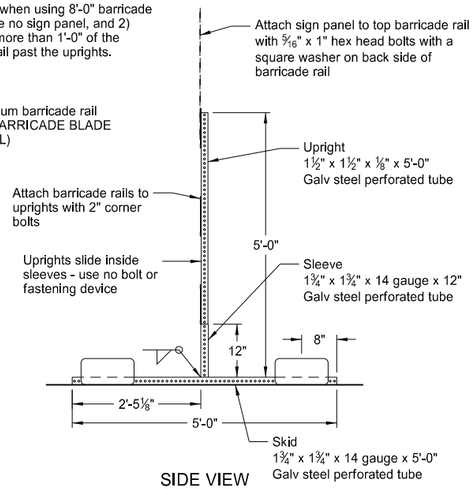
NOTE: This is the only type of rail acceptable for use with this barricade assembly.

BARRICADE BLADE DETAIL



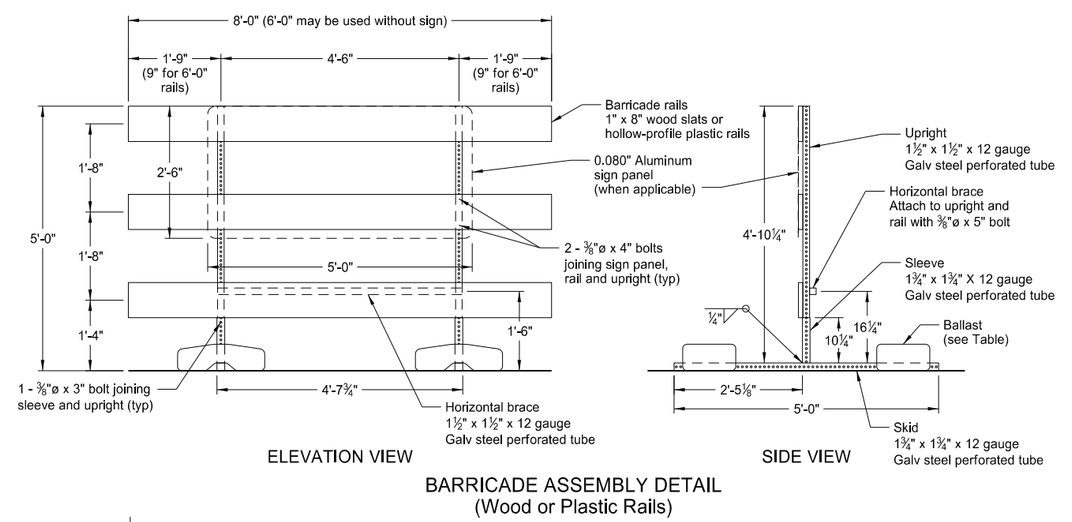
(A) Limitations when using 8'-0" barricade rails: 1) use no sign panel, and 2) extend no more than 1'-0" of the barricade rail past the uprights.

ELEVATION VIEW



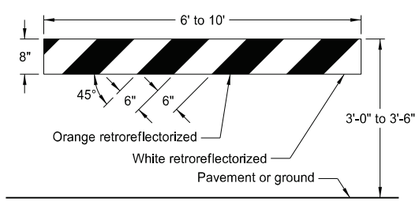
SIDE VIEW

BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

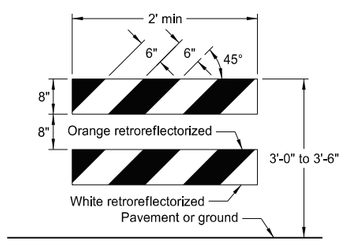


BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

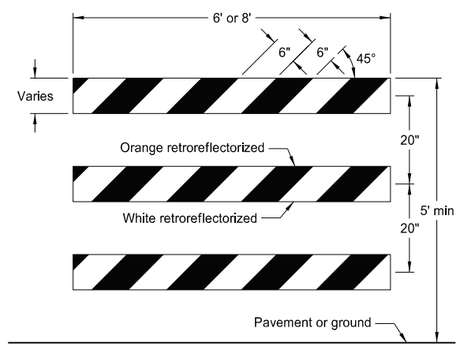
NOTE: For barricade markings use alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Place retroreflective sheeting on both sides of the rails with a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the barricade length is less than 36", use a rail stripe width of 4".



TYPE I BARRICADE

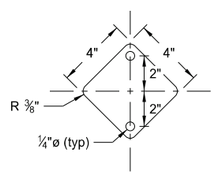


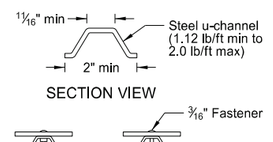
TYPE II BARRICADE

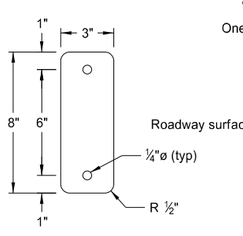


TYPE III BARRICADE

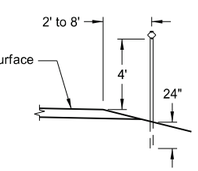
BARRICADE RAIL DETAILS







REFLECTOR DETAIL



ELEVATION

DELINEATORS

MINIMUM BALLAST
(For each side of barricade support)

Without Sign	4 - 25 lb sandbags
With Sign	6 - 25 lb sandbags

Note: Number of sandbags based on a wind speed of 55 MPH. Sandbags assumed to be placed at or near the ends of the skids.

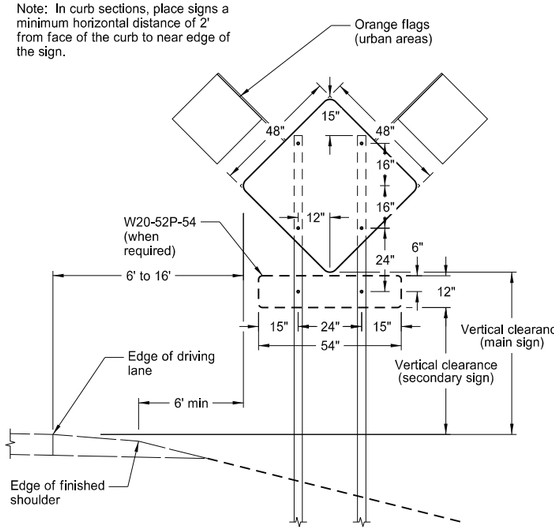
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17 11-01-19	Updated to active voice Revised details for Flexible Delineator

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 11/1/19 and the original document is stored at the North Dakota Department of Transportation

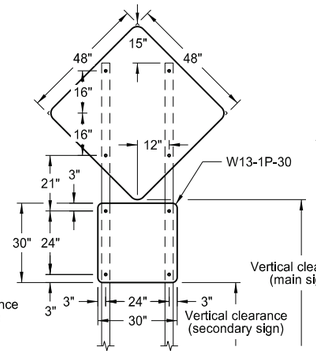
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

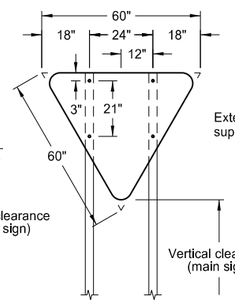
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



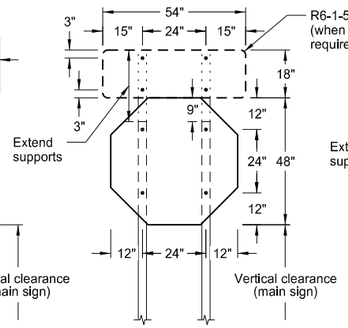
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



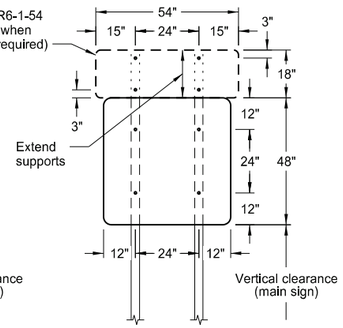
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



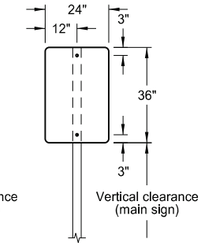
R1-2-60 - YIELD SIGN



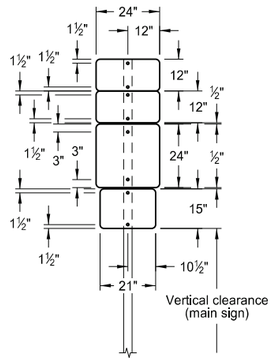
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



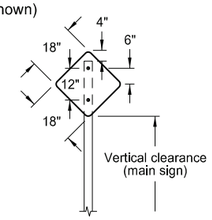
48" x 48" SIGN
(with R6-1-54 sign as required)



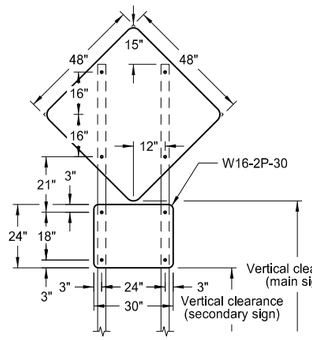
24" x 36" SIGN



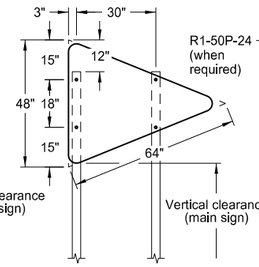
24" x 24"
ROUTE MARKER
ASSEMBLY



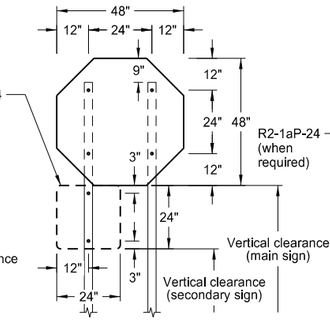
18" x 18"
DIAMOND SIGN



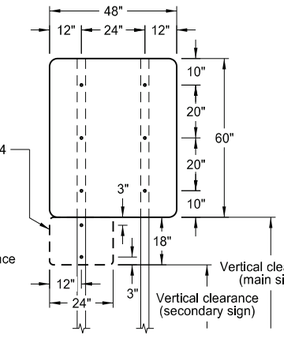
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



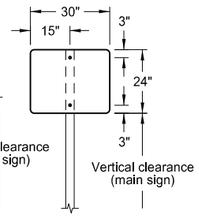
W14-3-64 - PENNANT SIGN



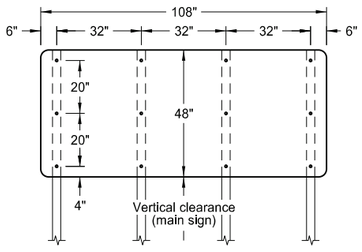
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



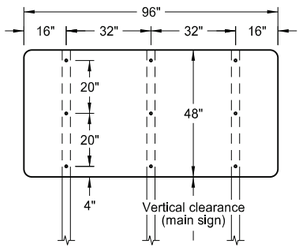
48" x 48" SIGN
(with R2-1aP-24 sign as required)



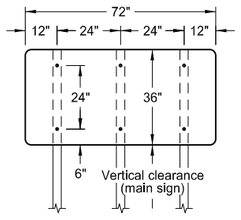
30" x 24" SIGN



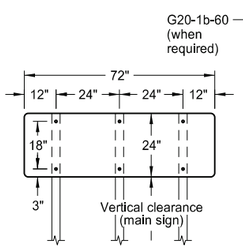
108" x 48" SIGN



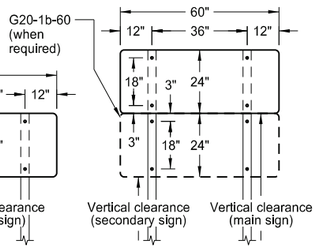
96" x 48" SIGN



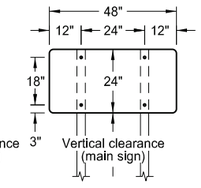
72" x 36" SIGN



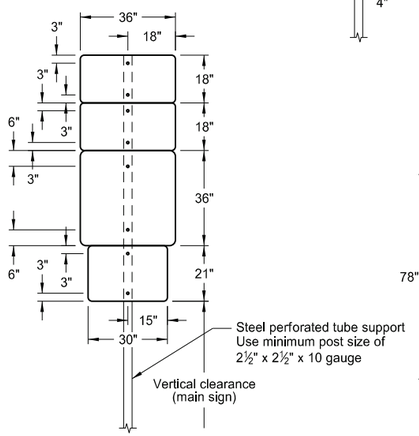
72" x 24" SIGN



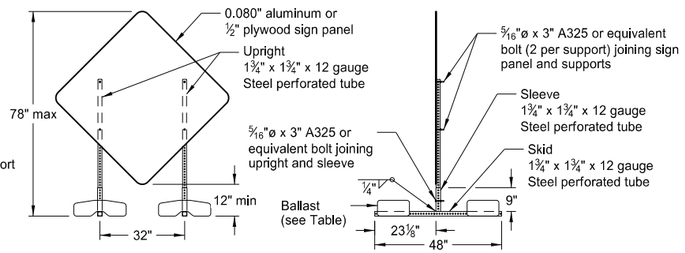
60" x 24" SIGN



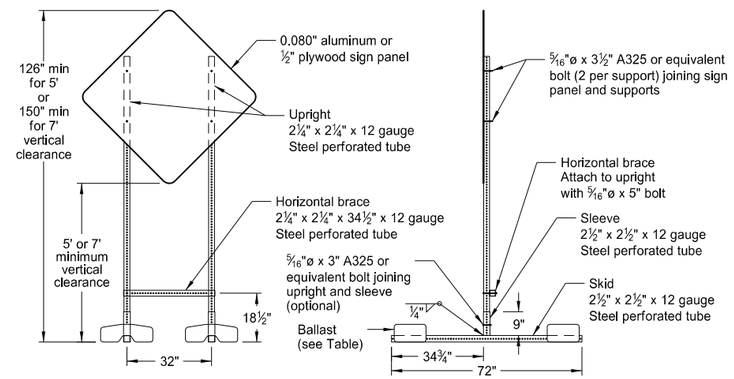
48" x 24" SIGN



36" x 36"
ROUTE MARKER
ASSEMBLY



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

1. Sign Supports: Galvanize or paint supports. Minimum post sizes are 2.5 lb/ft u-channel or 2" x 2" x 12 gauge steel perforated tube, except where noted. When installing signs on u-channel, minimum post size for assemblies containing a secondary sign is 3.0 lb/ft. Post sizes based on a wind speed of 55 MPH.

   Place signs over 50 square feet on 2½" x 2½" perforated tube supports as a minimum.

   Do not attach guy wires to sign supports. Attach wind beams behind sign panels when used with u-posts.

2. Sign Panels: Provide sign panels made of 0.100" aluminum, ½" plywood, or other approved material, except where noted. Punch all holes round for ⅜" bolts.

3. Alternate Messages: Install and remove alternate message signs on reflectorized plate (without borders) as required. (i.e. "Left" and "Right" message on lane closure sign)

4. Route Marker Auxiliary Signs: Provide route marker auxiliary signs, such as the cardinal direction and directional arrows, with a background and legend that match the route marker they are used with:

   Interstate - white legend on blue background
   Interstate Business Loop - white legend on green background
   US and State - black legend on white background
   County - yellow legend on blue background

5. Vertical Clearance: Install signs with a vertical clearance of 5'-0" (see TYPICAL SECTION.) In areas where parking or pedestrian movements are likely or the view of the sign may be obstructed, install signs with a vertical clearance of 7'-0" from the top of the curb or from the near edge of the driving lane in absence of a curb.

   The vertical clearance to secondary signs is 1'-0" less than the vertical clearance stated above.

   Provide a minimum clearance of 7'-0" from the ground at the post for signs with an area exceeding 50 square feet.

6. Portable Signs: Provide portable signs that meet the vertical clearance stated above when it is necessary to place signs within the pavement surface.

   Use of low-mounting height (minimum 12" vertical clearance) portable signs for 5 days or less, is allowed as long as the view of the sign is not obstructed. Time delays caused by unforseen circumstances, such as equipment breakdown, rain, subgrade failures, etc., will not accrue towards the 5 day period. Use of R9-8 through R9-11a series, W1-6 through W1-8 series, M4-10, and E5-1 is allowed for longer than 5 days.

   Restrict signs mounted on portable sign supports shown in the LOW-MOUNTING HEIGHT and HIGH-MOUNTING HEIGHT details to a maximum surface area of 16 square feet.

MINIMUM BALLAST
(For each side of sign support base)

Sign Panel Mounting Height (ft)	Number of 25 lb sandbags for 4' x 4' sign panel
1'	6
5'	8
7'	10

Note: The number of sandbags are based on a wind speed of 55 MPH. Place sandbags at or near the ends of skids.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE
11-14-13	Revised Note 6
9-27-17	Updated to active voice
11-01-19	Revised 60"x24" sign detail

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 11/1/19 and the original document is stored at the North Dakota Department of Transportation

Docusign Envelope ID: E17899F0-B912-4482-BF85-7148763D5F5D

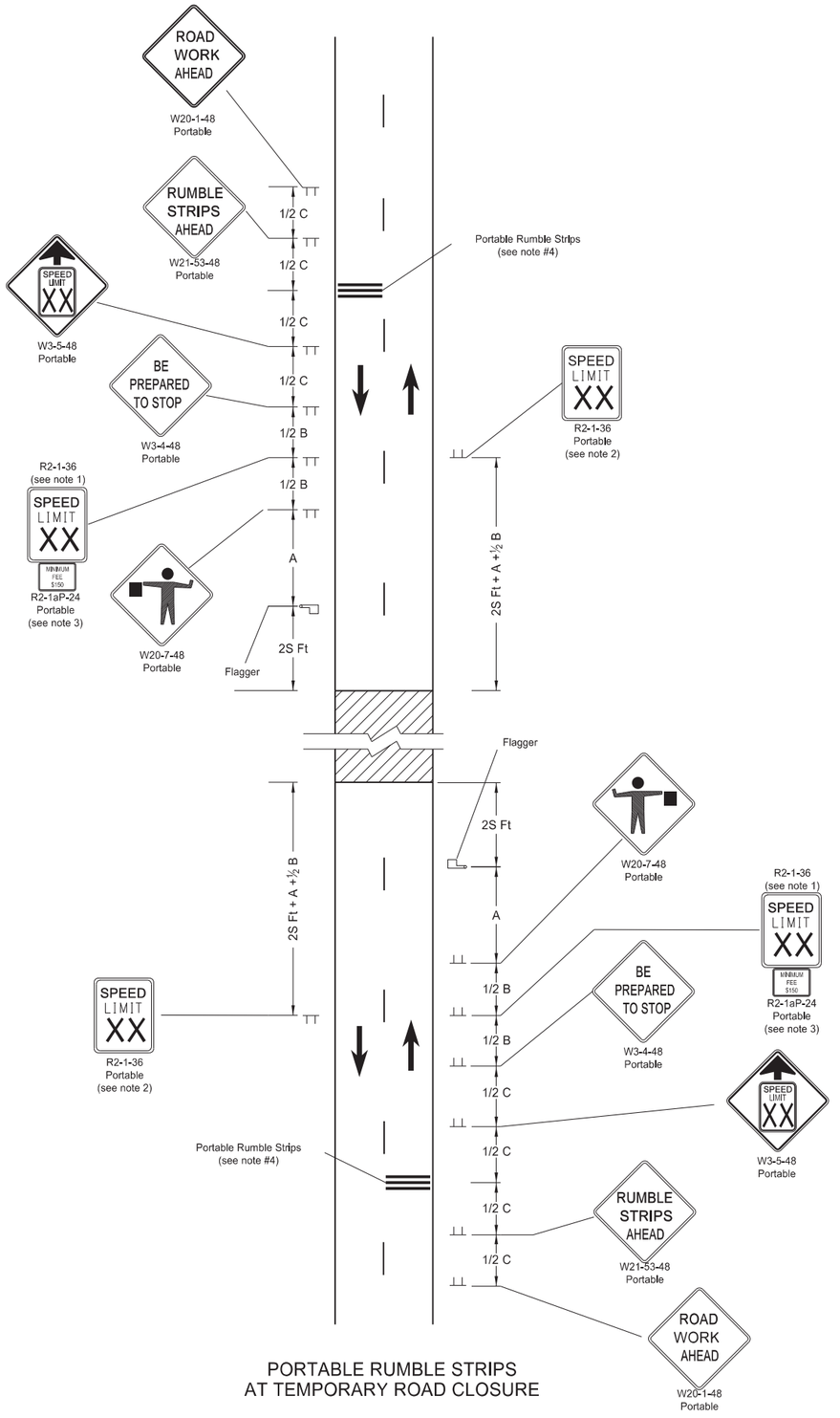
Two-Lane Roadway Portable Rumble Strips

KEY

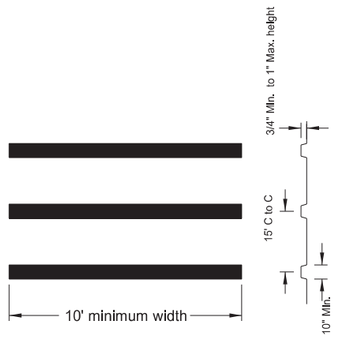
- Work area
- Flagger
- Sign

S = Numerical value of speed limit or 85th percentile.

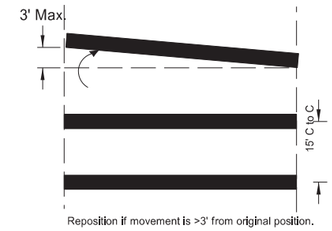
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - High Speed (over 45 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720



PORTABLE RUMBLE STRIPS AT TEMPORARY ROAD CLOSURE

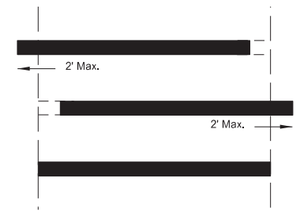


PORTABLE RUMBLE STRIPS ARRAY DETAIL



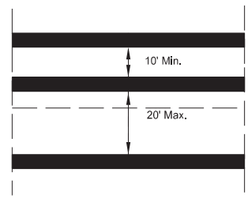
Reposition if movement is >3' from original position.

Skewing



Reposition if movement is >2' from original position.

Lateral



Reposition if distance between strips is <10' or >20'.

Perpendicular to Travel with or against traffic

PORTABLE RUMBLE STRIPS ARRAY TYPES OF MOVEMENT AND MAXIMUM ALLOWANCES

Notes:

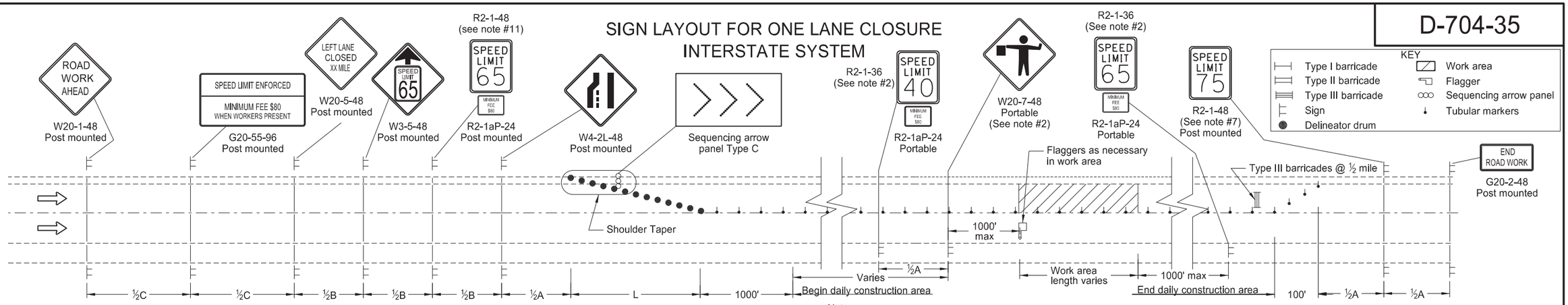
1. Determine speed in the field based on location and conditions.
2. Re-establish the speed limit. Determine the exact speed limit in the field, dependent on location and conditions.
3. Sign R2-1aP-24 is not required when pilot car operation is used.
4. Do not use rumble strips on a non paved surface or in a pre-construction speed zone of 45 mph or less.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
02-22-22	
REVISIONS	
DATE	CHANGE
03-07-23	Use changed to min 45 mph
06-30-25	Legislative Changes

KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 06/30/25 ENGINEER NORTH DAKOTA

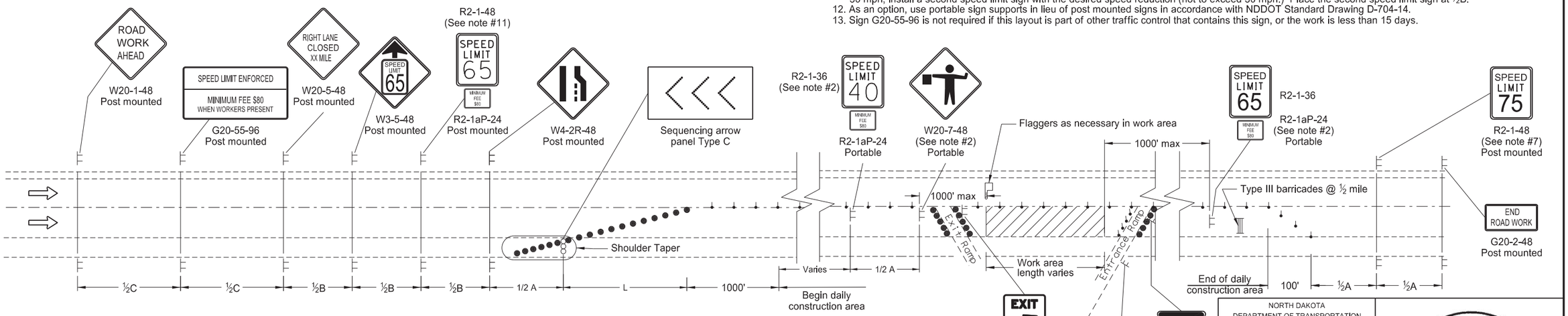
D-704-35

SIGN LAYOUT FOR ONE LANE CLOSURE INTERSTATE SYSTEM



LEFT LANE CLOSED
WORKERS IN WORK AREA

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min (ft)		
	A	B	C
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500



RIGHT LANE CLOSED
WORKERS IN WORK AREA

Notes:

1. Install advance signs for flagging when flaggers are flagging.
2. Move the advanced flagger sign and the speed limit signs as the work area moves through the construction zone. When the work area is not visible from the flagger, move the flagger station so the work area is visible. Space the 40 mph speed limit sign at ½A in advance of the flagger sign and move the 65 mph speed limit sign. Cover or remove the 40 mph speed limit and Minimum Fee $80 signs and the 65 mph speed limit sign upon completion of the work day or when workers are not present.
3. RAMPS: When the work area encompasses an entrance ramp, install a 40 mph speed limit sign on the ramp and cover any existing yield sign. Install new yield sign as necessary. Remove the ramp speed limit sign when the main line 40 mph speed zone is moved past the ramp.
4. Variables:
   S=Numerical value of speed limit or 85th percentile
   W=The width of taper.
   L=Minimum length of taper, or SxW for freeways, expressways, and all other roads with speeds of 45 mph or greater, or
   WxSxS/60 for urban, residential, and other streets with speeds of 40 mph or less.
5. Space delineator drums for tapering traffic at the dimension "S". Space tubular markers used for tangents at 2 times dimension "S".
6. Place sequencing arrow panels at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the work area and place on the roadway surface.
   Use Type C on roadways with high traffic speeds and volumes (over 40 mph or 5000 ADT or greater).
7. Re-establish the speed limit. Determine the exact speed limit in the field, dependent on location and conditions.
8. Cover existing speed limit signs within a reduced speed zone.
9. Upon approval, the Engineer will measure obliterated or covered pavement marking as Obliteration of Pavement Marking.
10. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the diamond sign, and at such a distance above the edge that the flag does not touch the sign when limp.
11. Determine the reduced speed limit dependent on the in place speed limit before construction. When speed limits are to be reduced more than 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½B.
12. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
13. Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or the work is less than 15 days.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-7-2012

REVISIONS

DATE	CHANGE
06-23-14	Revised Note 12
03-15-16	Removed Do Not Pass signs & updated notes
08-17-17	Moved speed signs & added note
10-17-17	Corrected spelling of "shoulder"
11-01-19	Revised tubular Mrkrs symbols
12-08-21	Switched order of Road Work Ahead and Spd Limit Enforced, added Dollars At Work, & removed table
11-29-22	Removed Dollars At Work

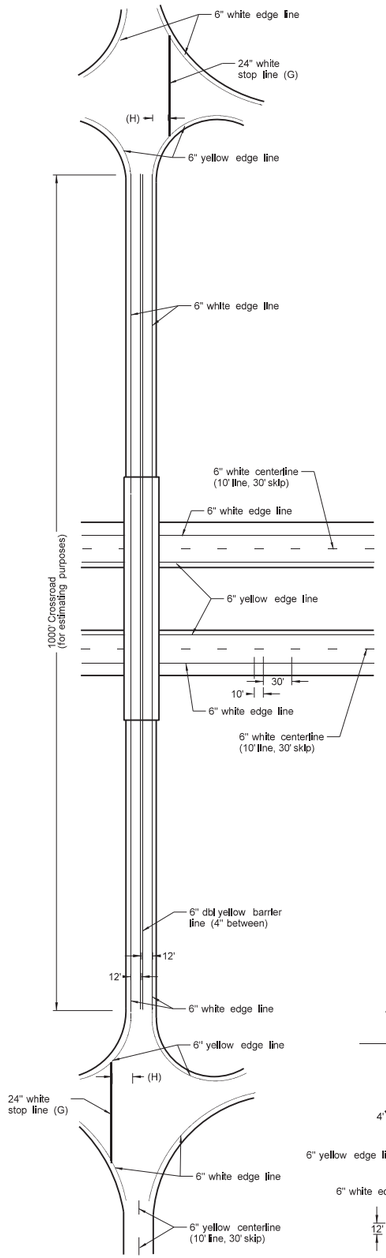
KIRK J. HOFF
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PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

11/29/22

DocuSign Envelope ID: 09EA856C-BD61-42B6-B726-BC2420A5CEC1

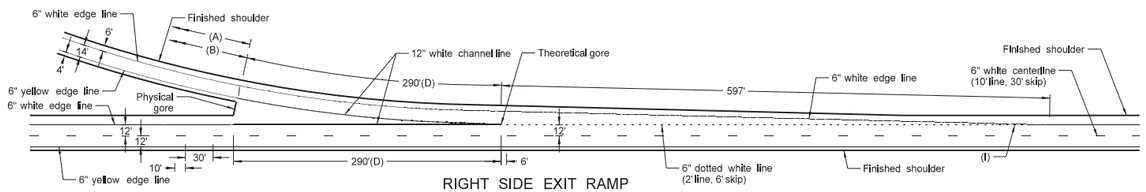
INTERSTATE PAVEMENT MARKING
4 LANE DIVIDED HIGHWAY

D-762-2

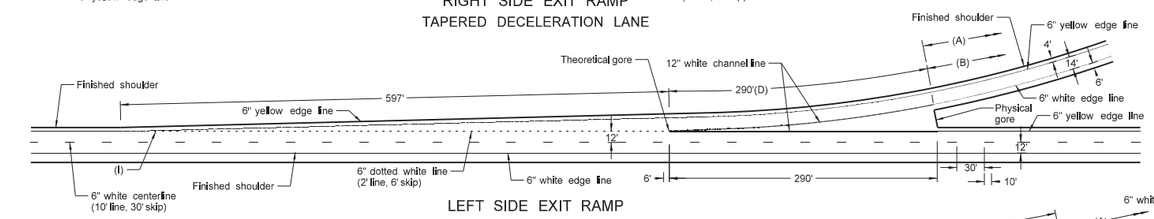


CROSS-ROAD & STRUCTURE

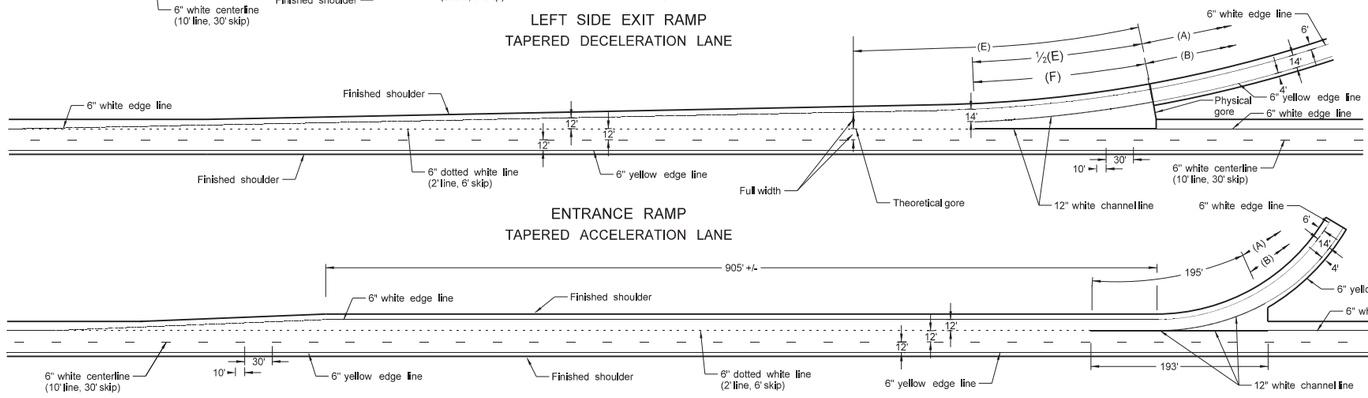
Engineer will determine length striped.



RIGHT SIDE EXIT RAMP
TAPERED DECELERATION LANE

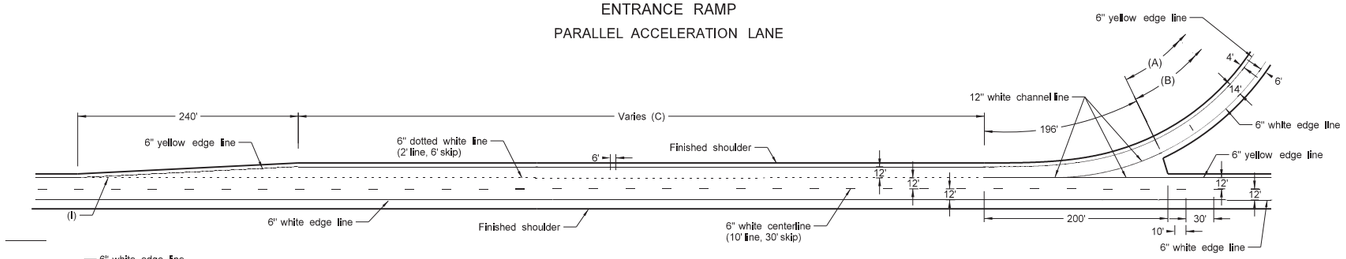


LEFT SIDE EXIT RAMP
TAPERED DECELERATION LANE

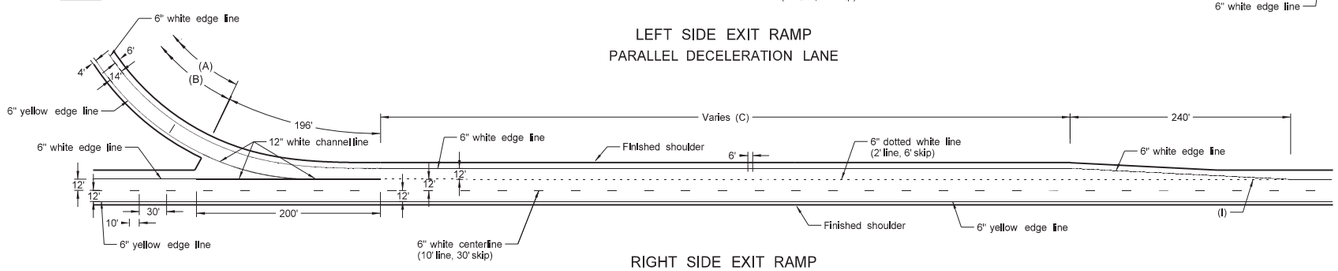


ENTRANCE RAMP
TAPERED ACCELERATION LANE

ENTRANCE RAMP
PARALLEL ACCELERATION LANE



LEFT SIDE EXIT RAMP
PARALLEL DECELERATION LANE



RIGHT SIDE EXIT RAMP
PARALLEL DECELERATION LANE

NOTE:

(A) Normal width white edge line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.

Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.

(B) Normal width yellow edge line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.

Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.

(C) Assume "varies" equals 790' for purpose of estimate. Place pavement marking from beginning of taper to the 12" line.
(D) Beginning of physical gore to theoretical gore.
(E) If the distace is less than 350' extend the 12" channel line to the theoretical gore, otherwise use 195'.
(F) Use 195' for estimating purposes.
(G) Not required for gravel surface crossroad approaches.
(H) 4' minimum, 15' maximum from nearest edge of intersection traveled way.
(I) Extend dotted line until it touches the edgeline.

BASIS OF ESTIMATE		
LOCATION	ITEM	
Right or Left Side Exit Ramp TAPERED	12" White channel line	580 LF
	24" White stop line	60 LF
	6" White dotted line	148 LF
	6" White edge line	1115 LF
	6" Yellow edge line	1075 LF
Entrance Ramp TAPERED	12" White channel line	390 LF
	6" White dotted line	258 LF
	6" White edge line	1270 LF
	6" Yellow edge line	1075 LF
Right or Left Side Exit Ramp PARALLEL	12" White channel line	396 LF
	24" White stop line	60 LF
	6" White dotted line (C)	258 LF
	6" White edge line	1115 LF
	6" Yellow edge line	1075 LF
Entrance Ramp PARALLEL	12" White channel line	388 LF
	6" White dotted line	283 LF
	6" White edge line	1275 LF
	6" Yellow edge line	1075 LF
Main Line (Both Roadways)	6" White lane line, 10' line, 30' skip	2640 LF/MI
	6" White edge line	10,560 LF/MI
	6" Yellow edge line	10,560 LF/MI
Cross Road	6" White edge line	2000 LF
	6" Dbl yellow barrier line (4" between)	2000 LF

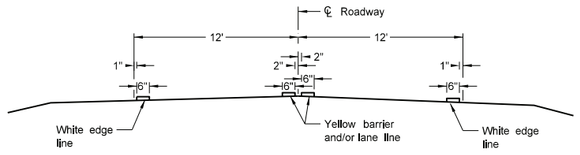
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-3-11	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice
10-25-19	Replaced 2' Max dim with Note (I)
11-05-21	Revised labels
11-22-23	Revised pvmt marking widths
1-17-24	Revised wide pvmt marking width

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PE-4683
01/17/24
ENGINEER
NORTH DAKOTA

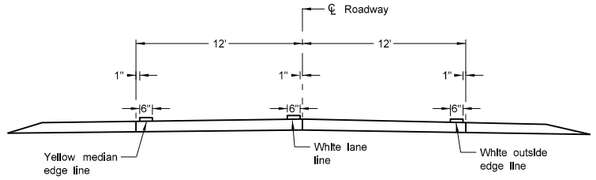
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PAVEMENT MARKING

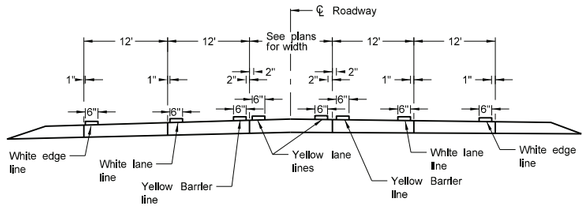
D-762-4



Two Lane Two Way
RURAL ROADWAY



Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



RURAL FIVE LANE ROADWAY
Concrete Section

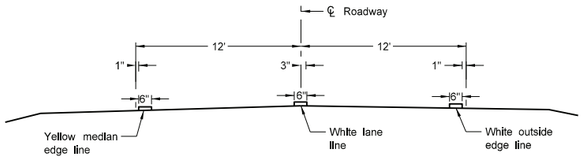
NOTES:

1. Continue edge lines through private drives and field drives. Break edge lines for intersections.

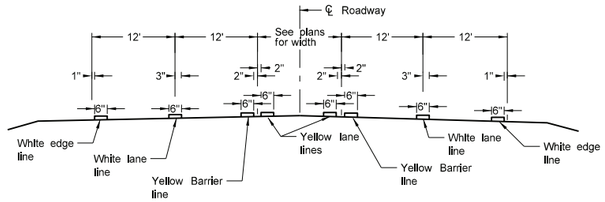
   For section lines, county roads, and street approaches, stripe the radii and edge lines of the paved surface within the right of way except where curb and gutter is present.

2. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph,

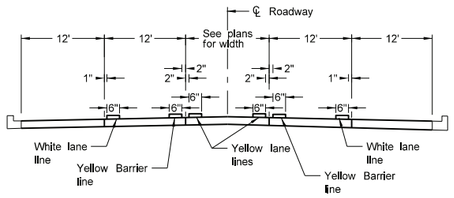
3. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits < 40 mph.



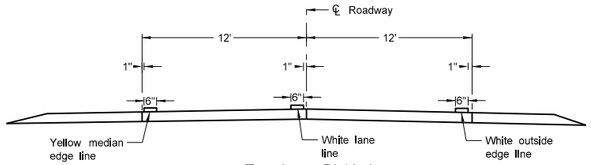
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



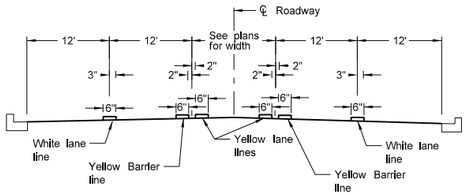
RURAL FIVE LANE ROADWAY
Asphalt Section



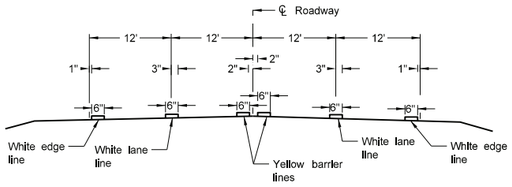
URBAN FIVE LANE SECTION
Concrete Section



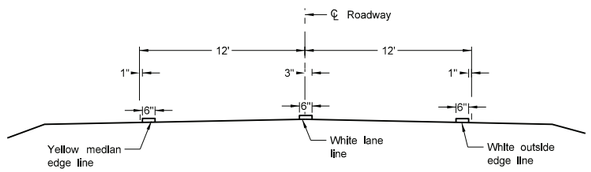
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



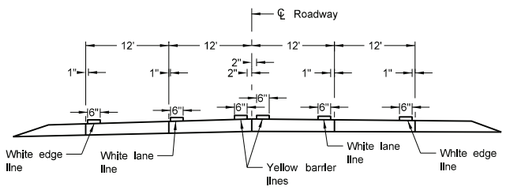
URBAN FIVE LANE SECTION
Asphalt Section



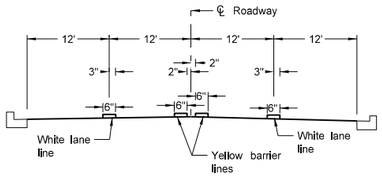
RURAL FOUR LANE ROADWAY
Asphalt Section



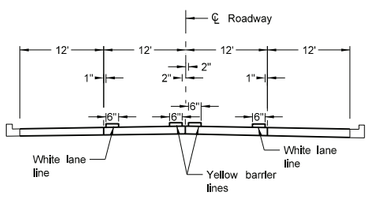
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



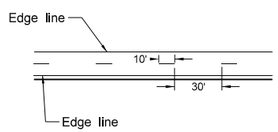
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

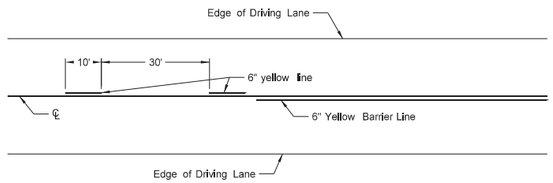
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.
11-22-23	Revised pavement marking widths.
07-09-24	Modified Note 1.

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07/09/24
ENGINEER
NORTH DAKOTA

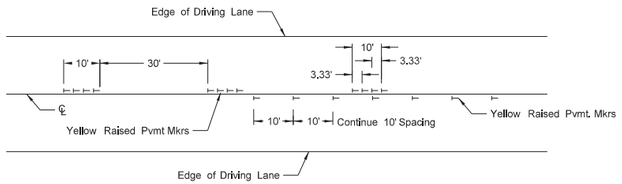
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SHORT-TERM PAVEMENT MARKING

D-762-11

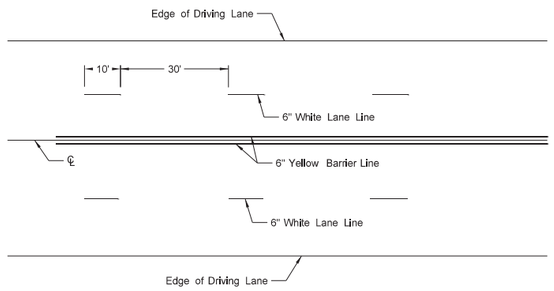


Painted or Tape Lines

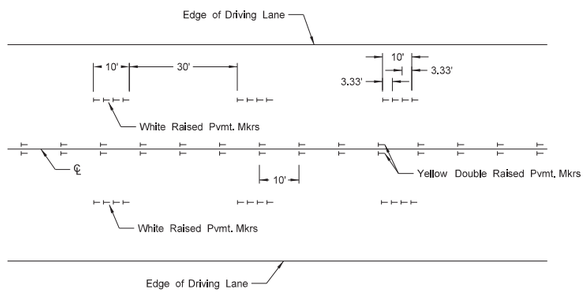


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

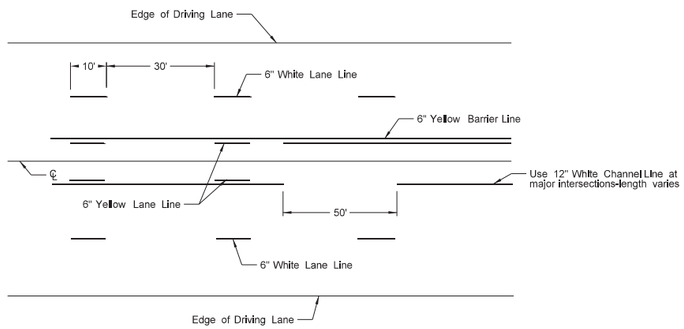


Painted or Tape Lines

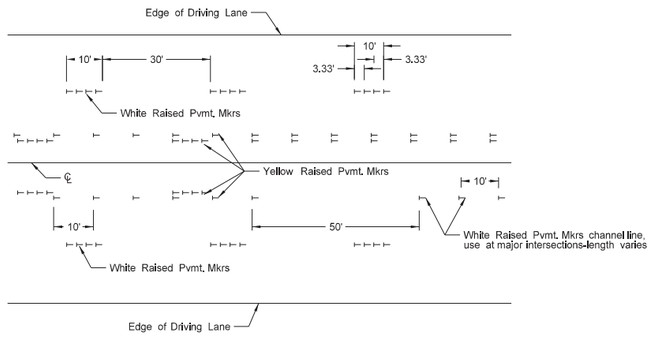


Raised Pavement Markers

FOUR LANE ROADWAY

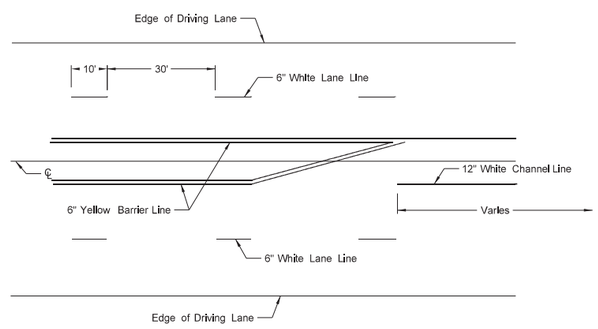


Painted or Tape Lines

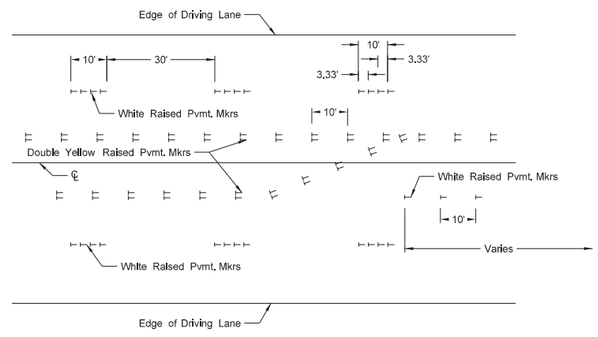


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

NOTES:

1. Place no passing zones on two-lane two-way roadways as shown. In lieu of short term no passing zone pavement markings, place no passing zone signs. Replace no passing zone signs with short term no passing zone pavement marking within three days.
2. Place short term center line stripe (paint) on top lift to match exact placement of permanent stripe.
3. Remove raised markers and tape markings after permanent pavement marking is installed.
4. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
5. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.
6. Wide lines - 8 inches wide if 4 inch normal width lines are used and 12 inches wide if 6 inch normal width lines are used.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
3-29-16	Re-numbered to be D-762-11 (previously was D-762-6)
10-17-17	Updated to active voice.
8-27-19	New Design Engineer PE Stamp.
11-22-23	Revised pavement marking widths.
1-17-24	Revised wide pvmt marking width.

KIRK J. HOFF
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PROFESSIONAL
PE-4683
01/17/24
ENGINEER
NORTH DAKOTA