

DESIGN DATA			
Traffic	Average Daily		
Current	Pass: 6405	Trucks: 1520	Total: 7925
Preventative Maintenance			

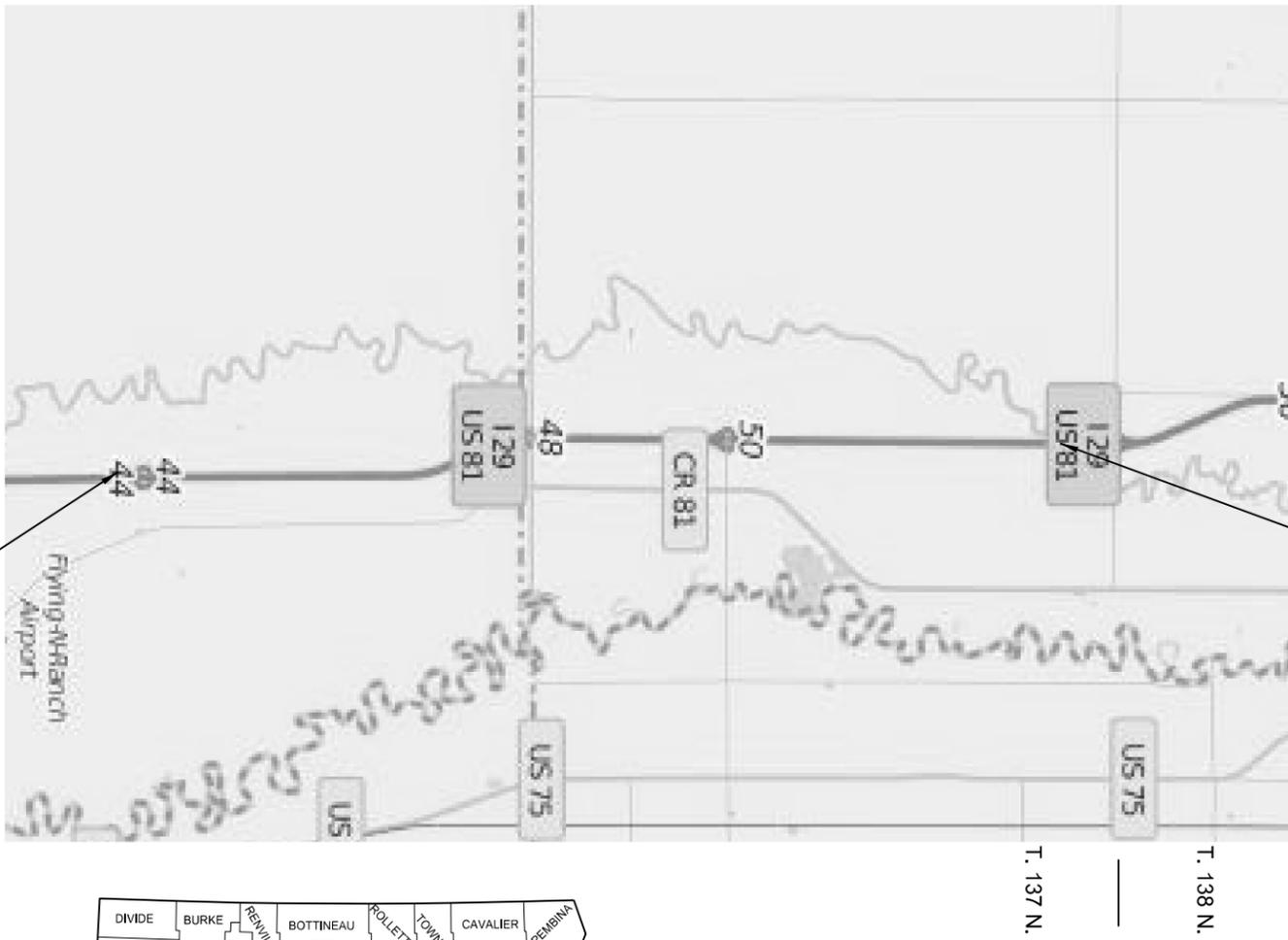
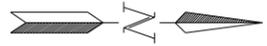
STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	SIM-8-029(134)044	18987	1	1

JOB # 18
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

SIM-8-029(134)044
 Cass / Richland County
 Concrete Pavement Repair
 Christine to Wild Rice River NB

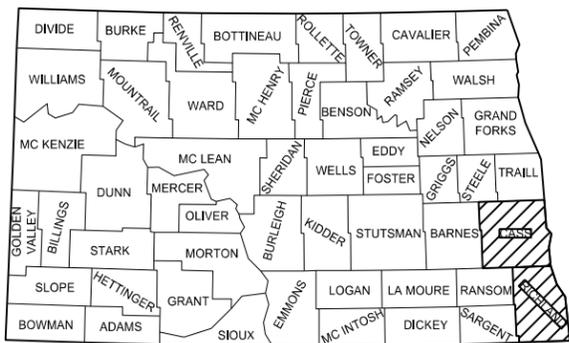
GOVERNING SPECIFICATIONS:
 2014 Standard Specifications adopted by the North Dakota
 Department of Transportation and the Supplemental Specifications
 effective on the date the project is advertised.

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
SIM-8-029(134)044	9.770	9.770



Begin Project SIM-8-029(134)044
 RP 44.044

End Project SIM-8-029(134)044
 RP 53.814



STATE COUNTY MAP

DESIGNERS
 Justin Oss, P.E.

 Tim Steinberg

APPROVED DATE 3/24/16

 Kevin Gorder, P.E.
 NDDOT Fargo District
 ND DEPARTMENT OF TRANSPORTATION

I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of ND.
 APPROVED DATE 3/24/16

 Justin Oss, P.E.
 NDDOT DIV-DIST OR CONSULTANT FIRM

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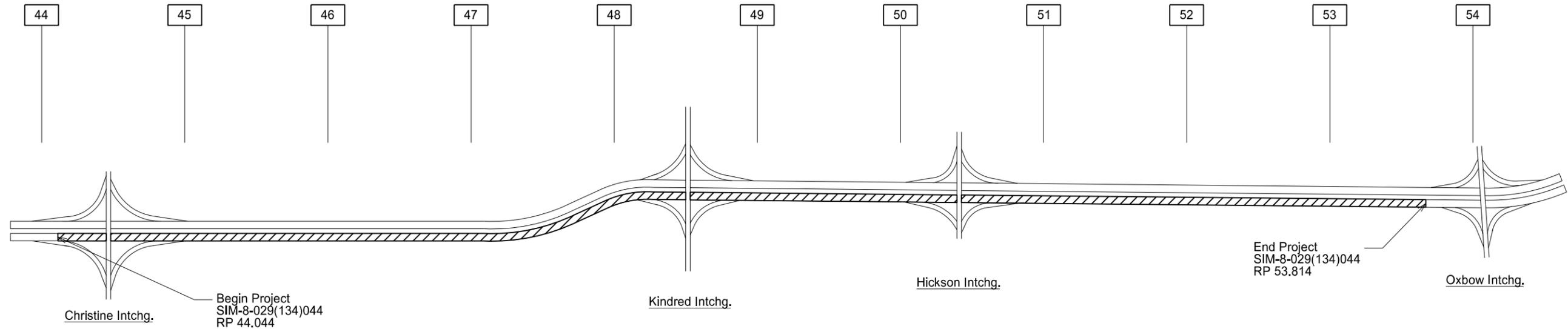
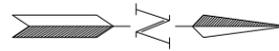
PLAN SECTIONS

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	Basis of Estimate
11	1-7	Data Tables
20	1-5	General Details
30	1	Typical Sections
100	1	Work Zone Traffic Control

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D-101-10	NDDOT Utility Company and Organization Abbreviations
D-101-20, 21	Line Styles
D-101-30, 31,32	Symbols
D-550-2	Longitudinal Joint Details
D-550-3	Transverse Contraction Joint Details
D-550-4	Transverse Expansion Joint Detail
D-704-5	Construction Sign Detail
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	Construction Sign Details - Warning Signs
D-704-12	Shoulder Closure Tapers
D-704-13	Barricade and Channelizing Device Details
D-704-14	Construction Sign Punching and Mounting Details
D-704-35	Sign Layout for One Lane Closure - Interstate System
D-762-2	Interstate Pavement Marking 4 Lane Divided Highway

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SIM-8-029(134)044	4	1



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Scope of Work
I-29 Christine to Wild Rice River NB

NOTES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-8-029(134)044	6	1

GENERAL NOTES

570-P01 CONCRETE PAVEMENT REPAIR: An additional 20% has been added to the quantities for CONCRETE PAVEMENT REPAIR – FULL DEPTH – DOWELED, DOWEL BARS, SPALL REPAIR – PARTIAL DEPTH, RANDOM PCC CRACK CLEANING AND SEALING, and CONC PVMT REPAIR-SPOT FULL DEPTH to be used as directed by the engineer.

570-P02 CONCRETE PAVEMENT REPAIRS: Use Salvaged Base Course to repair areas where existing base material is removed with the concrete. Place base course so that the base layer is level and uniform. Restoring the grade, if impacted, will not be paid separately, but will be included in 570 bid items.

704-P01 TRAFFIC CONTROL DEVICES: The traffic control devices list has been developed using the following layouts on the Standard Drawing for traffic control:

D-704-35, for one lane closure on the Interstate System

The required traffic control signs and devices for the interstate closure will be measured and paid for at the Contract Unit Price for each device. Lane closures will be limited to 5 miles. All costs associated with relocating the lane closures between sites, phases, and additional devices required to accommodate the contractor's operation, will be at the contractor's expense.

704-P02 MAINTENANCE & PROTECTION OF TRAFFIC FOR CONCRETE PAVEMENT REPAIRS: In full depth removal areas vertical panels will be spaced at 10 feet on centerline roadway until the concrete has been replaced. A minimum of two vertical panels will be used at each full depth removal area.

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

The concrete pavement repairs and striping must be completed for the entire length of one lane closure before starting any work in the adjacent lane or next phase.

704-P03 CONSTRUCTION TRAFFIC: The contractor's construction traffic required for concrete pavement repair will be limited to access at interchanges only. Construction traffic will not be permitted to operate in the median nor will access from one roadway to the other roadway, through the median, be permitted.

762-P01 PERMANENT STRIPING: All permanent striping will be along the same alignment and offset as the existing striping to ensure all existing striping is obliterated. Any existing striping remaining after the grooving operation for permanent striping has been completed will be obliterated at the contractor's expense. All labor, materials, and equipment used to install new centerline striping in this manner will be included in the unit bid price for "PREFORMED PATTERNED PVMT MK 4IN LINE – GROOVED."

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ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-8-029(134)044	8	1

SPEC CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
-----	-----	-----	-----	-----
103	0100 CONTRACT BOND	L SUM	1	1
570	0240 DOWELED CONTRACTION JOINT ASSEMBLY	LF	187	187
570	0424 DOWEL BARS	EA	173	173
570	0700 CONC PVMT REPAIR-SPOT FULL DEPTH	SF	131	131
570	0710 10IN CONC PVMT REPAIR-FULL DEPTH-DOWELED	SY	239	239
570	0966 RANDOM PCC CRACK CLEANING & SEALING	LF	54	54
570	1512 SPALL REPAIR-PARTIAL DEPTH	SF	1,603	1,603
702	0100 MOBILIZATION	L SUM	1	1
704	0100 FLAGGING	MHR	200	200
704	1000 TRAFFIC CONTROL SIGNS	UNIT	1,081	1,081
704	1050 TYPE I BARRICADE	EA	8	8
704	1052 TYPE III BARRICADE	EA	10	10
704	1060 DELINEATOR DRUMS	EA	44	44
704	1067 TUBULAR MARKERS	EA	186	186
704	1080 STACKABLE VERTICAL PANELS	EA	30	30
704	1087 SEQUENCING ARROW PANEL-TYPE C	EA	1	1
762	1104 PVMT MK PAINTED 4IN LINE	LF	103,172	103,172
762	1305 PREFORMED PATTERNED PVMT MK 4IN LINE-GROOVED	LF	12,897	12,897

BASIS OF ESTIMATE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-8-029(134)044	10	1

Permanent Pavement Marking

EB 331.231 to 342.835		
Type	Basis	Quantity (LF)
CL - Preformed Patterned Pvmt MK 4IN Line - Grooved	Skips @ 1,320 LF/MI	12,897
Edgelines - Pvmt MK Painted 4IN Line	10,560LF/MI/ Direction	103,172

CPR Data

Pav. Thickness	FULL DEPTH(SY)	SPOT FULL DEPTH (SF)	DB (Ea)	BASKET (LF)	SPALL (SF)	RC (LF)
10"	199	109.25	144	156	1,336	45
20% Overrun	239	131	173	187	1,603	54

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SIM-8-029(134)044	011	1

Reference Point	Dist. From RP	Lane	Full Depth Repair (ft)			SY	Sawcut	Dowel Bars	Doweled Contr. Joint Assembly (LF)	Spall Repair (ft)			SF	Random Cracks (LF)	Comments
			Length	X	Width					Length	X	Width			
44.044	232	DL		X		0	0			2	X	2	4		WHEEL PATH
44.068	359	DL		X		0	0			2	X	2	4		CORNER BREAK
44.083	438	DL		X		0	0			4	X	2	8		CORNER BREAK
44.088	465	DL		X		0	0			4	X	2	8		CORNER BREAK
44.142	750	SHOULDER		X		0	0			2	X	2	4		10' SHOULDER
44.171	903	PL		X		0	0			2	X	2	4		CORNER BREAK
44.194	1024	DL		X		0	0			2	X	2	4		CORNER BREAK
44.219	1156	DL		X		0	0			4	X	2	8		CORNER BREAK
44.228	1204	DL		X		0	0			2	X	2	4		CORNER BREAK
44.242	1278	DL		X		0	0			2	X	2	4		CORNER BREAK
44.248	1309	DL		X		0	0			2	X	2	4		CORNER BREAK
44.259	1368	DL		X		0	0			2	X	2	4		CORNER BREAK
44.274	1447	DL		X		0	0			2	X	2	4		LONG JOINT
44.282	1489	DL		X		0	0			4	X	2	8		CORNER BREAK
44.336	1774	DL		X		0	0			2	X	2	4		WHEEL PATH
44.348	1837	DL		X		0	0			2	X	2	4		CORNER BREAK
44.359	1896	DL		X		0	0			2	X	2	4		CORNER BREAK
44.471	2487	DL		X		0	0			2	X	2	4		WHEEL PATH
44.495	2614	DL		X		0	0			2	X	2	4		WHEEL PATH
44.553	2917	DL		X		0	0			2	X	2	4		CORNER BREAK
44.548	2893	DL	19	X	2	4	42	2			X		-		LONG JOINT REPAIR
44.563	2973	DL		X		0	0			2	X	2	4		CORNER BREAK
44.567	2994	DL		X		0	0			4	X	2	8		CORNER BREAK
44.602	3179	DL		X		0	0			2	X	2	4		CORNER BREAK
44.616	3252	DL		X		0	0			2	X	2	4		CORNER BREAK
44.630	3326	DL		X		0	0			2	X	2	4		CORNER BREAK
44.677	3575	DL		X		0	0			2	X	2	4		CORNER BREAK
44.685	3617	DL		X		0	0			2	X	2	4		CORNER BREAK
44.687	3627	DL		X		0	0			2	X	2	4		CORNER BREAK
44.702	3707	DL		X		0	0			2	X	2	4		CORNER BREAK
44.733	3870	DL		X		0	0			2	X	2	4		CORNER BREAK
44.742	3918	DL		X		0	0			2	X	2	4		CORNER BREAK
44.768	4055	DL		X		0	0			2	X	2	4		CORNER BREAK
44.773	4081	DL		X		0	0			4	X	2	8		CORNER BREAK
44.775	4092	DL	10	X	3.5	4	27	6			X		-		CORNER BREAK
44.781	4124	DL		X		0	0				X		-	12	ROUTE AND SEAL
44.781	4124	DL		X		0	0			4	X	2	8		CORNER BREAK
44.812	4287	DL		X		0	0			2	X	2	4		CORNER BREAK
44.841	4440	DL		X		0	0			2	X	2	4		CORNER BREAK
44.855	4514	DL		X		0	0			2	X	2	4		CORNER BREAK
44.881	4652	DL		X		0	0			4	X	2	8		CORNER BREAK
44.884	4668	DL		X		0	0			4	X	2	8		CORNER BREAK
44.887	4683	DL		X		0	0			2	X	2	4		CORNER BREAK

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Data Sheets
I-29 Christine to Wild Rice River NB
RP 44.044 to RP 44.887

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-8-029(044)134	011	2

Reference Point	Dist. From RP	Lane	Full Depth Repair (ft)			SY	Sawcut	Dowel Bars	Doweled Contr. Joint Assembly (LF)	Spall Repair (ft)			SF	Random Cracks (LF)	Comments
			Length	X	Width					Length	X	Width			
44.573	3025	DL		X		0	0			4	X	2	8		CORNER BREAK
44.926	4889	DL		X		0	0			4	X	2	8		CORNER BREAK
44.981	5180	DL		X		0	0			2	X	2	4		CORNER BREAK
44.990	5227	DL		X		0	0			2	X	2	4		CORNER BREAK
44.992	5238	DL		X		0	0			2	X	2	4		CORNER BREAK
SUBTOTAL						8	69	8	0				224	12	SUBTOTAL FOR MILE 44
45.262	1383	DL		X		0	0			2	X	2	4		WHEEL PATH
45.269	1420	DL		X		0	0			2	X	2	4		CORNER BREAK
45.285	1505	DL		X		0	0			2	X	2	4		CORNER BREAK
45.301	1589	DL		X		0	0			2	X	2	4		CORNER BREAK
45.328	1732	DL		X		0	0			2	X	2	4		CORNER BREAK
45.351	1853	DL		X		0	0			2	X	2	4		CORNER BREAK
45.359	1896	DL		X		0	0			2	X	2	4		CORNER BREAK
45.408	2154	DL		X		0	0			2	X	2	4		CORNER BREAK
45.439	2318	DL		X		0	0			2	X	2	4		CORNER BREAK
45.448	2365	DL		X		0	0			2	X	2	4		CORNER BREAK
45.546	2883	DL		X		0	0			2	X	2	4		ALONG LONG JOINT
45.571	3015	DL		X		0	0			4	X	2	8		ALONG LONG JOINT
45.623	3289	DL		X		0	0			5	X	2	10		ALONG LONG JOINT
45.635	3353	DL		X		0	0			6	X	2	12		ALONG LONG JOINT
45.643	3395	PL		X		0	0			2	X	3	6		MID PANEL
45.649	3427	DL		X		0	0			20	X	2	40		ALONG LONG JOINT
45.656	3464	DL		X		0	0			2	X	2	4		CORNER BREAK
45.660	3485	DL		X		0	0			2	X	2	4		MID PANEL
45.664	3506	DL		X		0	0			2	X	2	4		MID PANEL
45.674	3559	DL		X		0	0			5	X	2	10		ALONG LONG JOINT
45.696	3675	DL		X		0	0			2	X	2	4		CORNER BREAK
45.709	3744	DL		X		0	0			8	X	2	16		ALONG LONG JOINT
45.730	3854	DL		X		0	0			4	X	2	8		CORNER BREAK
45.800	4224	PL		X		0	0			2	X	2	4		CORNER BREAK
45.816	4308	DL		X		0	0			6	X	2	12		ALONG LONG JOINT
45.867	4578	SHOULDER		X		0	0			2	X	2	4		10' SHOULDER
45.872	4604	SHOULDER		X		0	0			2	X	4	8		10' SHOULDER
45.952	5027	DL	6	X	12	8	36	20	12		X		-		TRANSVERSE JOINT REPAIR
45.965	5095	DL		X		0	0			4	X	2	8		CORNER BREAK
SUBTOTAL						8	36	20	12				206	0	SUBTOTAL FOR MILE 45
46.221	1167	DL		X		0	0			2	X	2	4		CORNER BREAK
46.322	1700	DL		X		0	0			2	X	2	4		CORNER BREAK
46.332	1753	DL		X		0	0			2	X	2	4		CORNER BREAK
46.340	1795	DL		X		0	0			2	X	2	4		WHEEL PATH
46.346	1827	DL		X		0	0			2	X	2	4		CORNER BREAK
46.477	2519	DL		X		0	0			2	X	2	4		CORNER BREAK
46.780	4118	DL		X		0	0			4	X	2	8		CORNER BREAK
46.573	3025	DL		X		0	0			2	X	2	4		CORNER BREAK

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Data Sheets
I-29 Christine to Wild Rice River NB
RP 44.573 to RP 46.573

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-8-029(044)134	011	3

Reference Point	Dist. From RP	Lane	Full Depth Repair (ft)			SY	Sawcut	Dowel Bars	Doweled Contr. Joint Assembly (LF)	Spall Repair (ft)			SF	Random Cracks (LF)	Comments
			Length	X	Width					Length	X	Width			
46.692	3654	DL		X		0	0			2	X	2	4		CORNER BREAK
46.700	3696	DL		X		0	0			2	X	2	4		CORNER BREAK
46.709	3744	DL		X		0	0			2	X	2	4		CORNER BREAK
46.720	3802	DL		X		0	0			2	X	2	4		CORNER BREAK
46.723	3817	DL		X		0	0			2	X	2	4		CORNER BREAK
46.728	3844	DL		X		0	0			2	X	2	4		CORNER BREAK
46.748	3949	DL		X		0	0			2	X	2	4		CORNER BREAK
46.768	4055	DL		X		0	0			4	X	2	8		CORNER BREAK
46.778	4108	DL		X		0	0			5	X	2	10		ALONG LONG JOINT
46.780	4118	DL	6	X	12	8	36	20	12		X		-		TRANSVERSE JOINT REPAIR
46.788	4161	DL		X		0	0			4	X	2	8		CORNER BREAK
46.797	4208	DL		X		0	0			4	X	2	8		CORNER BREAK
46.920	4858	DL		X		0	0			2	X	2	4		CORNER BREAK
46.953	5032	DL		X		0	0			2	X	2	4		CORNER BREAK
SUBTOTAL						8	36	20	12				106	0	SUBTOTAL FOR MILE 46
47.094	496	DL		X		0	0			2	X	2	4		CORNER BREAK
47.244	1288	DL		X		0	0			2	X	2	4		CORNER BREAK
47.281	1484	DL		X		0	0			2	X	2	4		CORNER BREAK
47.296	1563	DL		X		0	0			2	X	2	4		CORNER BREAK
47.415	2191	DL	21	X	12	28	66	20	24		X		-		FULL DEPTH
47.415	2191	SHOULDER	21	x	10	23	62				X		-		10' SHOULDER
47.415	2191	PL	21	X	12	28	66	20	24		X		-		FULL DEPTH
47.477	2519	DL		X		0	0			2	X	2	4		CORNER BREAK
47.512	2703	DL		X		0	0			2	X	2	4		CORNER BREAK
47.532	2809	DL		X		0	0			2	X	2	4		CORNER BREAK
47.563	2973	PL		X		0	0			2	X	2	4		WHEEL PATH
47.572	3020	DL		X		0	0			2	X	2	4		CORNER BREAK
47.577	3047	DL		X		0	0			2	X	2	4		ALONG LONG JOINT
47.614	3242	SHOULDER		X		0	0			2	X	2	4		10' SHOULDER
47.619	3268	SHOULDER		X		0	0			2	X	2	4		10' SHOULDER
47.665	3511	DL		X		0	0			2	X	2	4		CORNER BREAK
47.788	4161	DL		X		0	0			2	X	2	4		WHEEL PATH
47.842	4446	DL		X		0	0			2	X	2	4		CORNER BREAK
47.856	4520	SHOULDER		X		0	0			2	X	2	4		10' SHOULDER
47.864	4562	SHOULDER		X		0	0			2	X	2	4		10' SHOULDER
47.889	4694	DL		X		0	0			2	X	2	4		CORNER BREAK
47.904	4773	DL		X		0	0			2	X	2	4		CORNER BREAK
47.926	4889	DL		X		0	0			2	X	2	4		CORNER BREAK
47.940	4963	DL		X		0	0			4	X	2	8		CORNER BREAK
47.950	5016	DL		X		0	0			5	X	2	10		CORNER BREAK
47.956	5048	DL		X		0	0			4	X	2	8		CORNER BREAK
47.959	5064	DL		X		0	0			2	X	2	4		CORNER BREAK
47.962	5079	DL		X		0	0			2	X	2	4		CORNER BREAK
47.965	5095	DL		X		0	0			6	X	2	12		CORNER BREAK
47.968	5111	DL		X		0	0			2	X	2	4		CORNER BREAK

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Data Sheets
I-29 Christine to Wild Rice River NB
RP 46.692 to RP 47.968

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-8-029(044)134	011	4

Reference Point	Dist. From RP	Lane	Full Depth Repair (ft)			SY	Sawcut	Dowel Bars	Doweled Contr. Joint Assembly (LF)	Spall Repair (ft)			SF	Random Cracks (LF)	Comments
			Length	X	Width					Length	X	Width			
47.979	5169	DL		X		0	0			2	X	2	4		CORNER BREAK
47.984	5196	DL		X		0	0			4	X	2	8		CORNER BREAK
SUBTOTAL						79	194	40	48				142	0	SUBTOTAL FOR MILE 47
48.015	79	DL		X		0	0			2	X	2	4		CORNER BREAK
48.020	106	DL		X		0	0			4	X	2	8		CORNER BREAK
48.029	153	DL		X		0	0			4	X	2	8		CORNER BREAK
48.039	206	PL	36	X	12	48	96	20	36		X		-		TWO JOINTS
48.039	206	DL	36	X	12	48	96	20	36		X		-		FULL DEPTH REPAIR
48.091	480	PL		X		0	0			2	X	2	4		CORNER BREAK
48.254	1341	DL		X		0	0			2	X	2	4		CORNER BREAK
48.282	1489	DL		X		0	0			2	X	2	4		WHEEL PATH
48.282	1489	DL		X		0	0			2	X	2	4		WHEEL PATH
48.307	1621	DL		X		0	0			2	X	2	4		CORNER BREAK
48.325	1716	PL		X		0	0			2	X	2	4		CORNER BREAK
48.336	1774	DL		X		0	0			2	X	2	4		CORNER BREAK
48.562	2967	DL		X		0	0			2	X	2	4		CORNER BREAK
48.568	2999	SHOULDER		X		0	0			2	X	2	4		10' SHOULDER
48.658	3474	DL		X		0	0			3	X	2	6		ALONG LONG JOINT
48.710	3749	DL		X		0	0			2	X	2	4		CORNER BREAK
48.741	3912	DL		X		0	0			2	X	2	4		CORNER BREAK
48.885	4673	DL		X		0	0				X		-	25	ROUTE AND SEAL
48.963	5085	DL		X		0	0			2	X	2	4		ALONG LONG JOINT
48.965	5095	DL		X		0	0			2	X	2	4		CORNER BREAK
48.967	5106	DL		X		0	0			2	X	2	4		CORNER BREAK
SUBTOTAL						96	192	40	72				82	25	SUBTOTAL FOR MILE 48
49.012	63	DL		X		0	0			2	X	2	4		CORNER BREAK
49.015	79	DL		X		0	0			2	X	2	4		CORNER BREAK
49.163	861	DL		X		0	0			2	X	2	4		CORNER BREAK
49.206	1088	DL		X		0	0			2	X	2	4		CORNER BREAK
49.223	1177	DL		X		0	0			2	X	2	4		CORNER BREAK
49.226	1193	DL	3.5	X	3.5	1	14	4			X		-		SPOT FULL CORNER BREAK
49.255	1346	DL		X		0	0			2	X	2	4		CORNER BREAK
49.268	1415	PL		X		0	0			2	X	2	4		WHEEL PATH
49.292	1542	DL	6	X	12	8	36	10	12		X		-		TRANSVERSE JOINT REPAIR
49.299	1580	PL		X		0	0			2	X	2	4		CORNER BREAK
49.306	1616	DL		X		0	0			2	X	2	4		CORNER BREAK
49.453	2392	DL		X		0	0			2	X	2	4		CORNER BREAK
49.615	3247	DL		X		0	0			2	X	2	4		CORNER BREAK
49.619	3268	DL		X		0	0			2	X	2	4		CORNER BREAK
49.647	3416	DL		X		0	0			2	X	2	4		CORNER BREAK
49.685	3617	DL		X		0	0				X		-	8	ROUTE AND SEAL
49.778	4108	DL		X		0	0			4	X	2	8		CORNER BREAK
49.798	4213	DL		X		0	0			2	X	2	4		CORNER BREAK
49.798	4213	SHOULDER		X		0	0			2	X	2	4		10' SHOULDER

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Data Sheets
I-29 Christine to Wild Rice River NB
RP 47.979 to RP 49.798

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-8-029(044)134	011	5

Reference Point	Dist. From RP	Lane	Full Depth Repair (ft)			SY	Sawcut	Dowel Bars	Doweled Contr. Joint Assembly (LF)	Spall Repair (ft)			SF	Random Cracks (LF)	Comments
			Length	X	Width					Length	X	Width			
49.815	4303	DL		X		0	0			2	X	2	4		CORNER BREAK
49.815	4303	SHOULDER		X		0	0			2	X	2	4		CORNER BREAK
49.829	4377	DL		X		0	0			4	X	2	8		CORNER BREAK
49.872	4604	DL		X		0	0			2	X	2	4		CORNER BREAK
49.899	4747	DL		X		0	0			2	X	2	4		CORNER BREAK
49.900	4752	DL		X		0	0			2	X	2	4		CORNER BREAK
49.906	4784	DL		X		0	0			4	X	2	8		CORNER BREAK
49.910	4805	DL		X		0	0			2	X	2	4		CORNER BREAK
49.916	4836	DL		X		0	0			2	X	2	4		CORNER BREAK
49.926	4889	DL		X		0	0			2	X	2	4		CORNER BREAK
49.929	4905	DL		X		0	0			2	X	2	4		CORNER BREAK
49.932	4921	DL		X		0	0			2	X	2	4		CORNER BREAK
49.935	4937	DL		X		0	0			2	X	2	4		CORNER BREAK
49.957	5053	DL		X		0	0			2	X	2	4		CORNER BREAK
49.972	5132	DL		X		0	0			4	X	2	8		CORNER BREAK
49.975	5148	DL		X		0	0			2	X	2	4		CORNER BREAK
49.981	5180	DL		X		0	0			2	X	2	4		CORNER BREAK
SUBTOTAL						9	50	14	12				148	8	SUBTOTAL FOR MILE 49
50.003	16	DL		X		0	0			2	X	2	4		CORNER BREAK
50.021	111	DL		X		0	0			2	X	2	4		CORNER BREAK
50.027	143	DL		X		0	0			2	X	2	4		CORNER BREAK
50.040	211	DL		X		0	0			2	X	2	4		CORNER BREAK
50.044	232	DL		X		0	0			4	X	2	8		CORNER BREAK
50.072	380	DL		X		0	0			2	X	2	4		MID PANEL
50.119	628	DL		X		0	0			2	X	2	4		CORNER BREAK
50.144	760	DL		X		0	0			2	X	2	4		CORNER BREAK
50.150	792	DL		X		0	0			5	X	2	10		CORNER BREAK
50.152	803	DL		X		0	0			4	X	2	8		CORNER BREAK
50.176	929	DL		X		0	0			4	X	2	8		CORNER BREAK
50.179	945	DL		X		0	0			2	X	2	4		MID PANEL
50.179	945	DL		X		0	0			2	X	2	4		ALONG LONG JOINT
50.181	956	DL		X		0	0			2	X	2	4		CORNER BREAK
50.195	1030	DL	12	X	2	3	28	2			X		-		LONG JOINT REPLACEMENT
50.376	1985	DL		X		0	0			2	X	2	4		CORNER BREAK
50.485	2561	DL		X		0	0			2	X	2	4		CORNER BREAK
50.485	2561	DL		X		0	0			2	X	4	8		ALONG LONG JOINT
50.509	2688	DL		X		0	0			2	X	2	4		ALONG LONG JOINT
50.536	2830	DL		X		0	0			2	X	2	4		ALONG LONG JOINT
50.573	3025	DL		X		0	0			2	X	2	4		CORNER BREAK
50.615	3247	DL		X		0	0			2	X	2	4		ALONG LONG JOINT
50.660	3485	DL		X		0	0			2	X	2	4		ALONG LONG JOINT
50.678	3580	DL		X		0	0			2	X	2	4		CORNER BREAK
50.713	3765	DL		X		0	0			2	X	2	4		ALONG LONG JOINT
50.724	3823	DL		X		0	0			2	X	2	4		ALONG LONG JOINT
50.766	4044	PL		X		0	0			2	X	2	4		CORNER BREAK

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Data Sheets
I-29 Christine to Wild Rice River NB
RP 49.815 to RP 50.776

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-8-029(134)044	011	6

Reference Point	Dist. From RP	Lane	Full Depth Repair (ft)			SY	Sawcut	Dowel Bars	Doweled Contr. Joint Assembly (LF)	Spall Repair (ft)			SF	Random Cracks (LF)	Comments
			Length	X	Width					Length	X	Width			
50.932	4921	DL		X		0	0			2	X	2	4		CORNER BREAK
SUBTOTAL						3	28	2	0				130	0	SUBTOTAL FOR MILE 50
51.008	42	DL		X		0	0			4	X	2	8		ALONG LONG JOINT
51.065	343	DL		X		0	0			4	X	2	8		CORNER BREAK
51.105	554	DL		X		0	0			2	X	2	4		ALONG LONG JOINT
51.268	1415	DL		X		0	0			4	X	2	8		CORNER BREAK
51.269	1420	DL		X		0	0			2	X	2	4		CORNER BREAK
51.271	1431	DL		X		0	0			4	X	2	8		CORNER BREAK
51.272	1436	DL		X		0	0			2	X	2	4		ALONG LONG JOINT
51.376	1985	DL		X		0	0			2	X	2	4		CORNER BREAK
51.382	2017	DL		X		0	0			2	X	2	4		CORNER BREAK
51.385	2033	DL		X		0	0			2	X	2	4		CORNER BREAK
51.401	2117	DL		X		0	0			2	X	2	4		CORNER BREAK
51.428	2260	DL		X		0	0			2	X	2	4		CORNER BREAK
51.431	2276	DL		X		0	0			2	X	2	4		CORNER BREAK
51.733	3870	DL		X		0	0			2	X	2	4		WHEEL PATH
51.820	4330	DL		X		0	0			2	X	2	4		CORNER BREAK
SUBTOTAL						0	0	0	0				76	0	SUBTOTAL FOR MILE 51
52.149	787	DL		X		0	0			2	X	2	4		CORNER BREAK
52.218	1151	PL		X		0	0			2	X	2	4		CORNER BREAK
52.227	1199	PL		X		0	0			2	X	2	4		CORNER BREAK
52.233	1230	DL		X		0	0			2	X	2	4		CORNER BREAK
52.255	1346	DL		X		0	0			2	X	2	4		CORNER BREAK
52.279	1473	PL		X		0	0			2	X	2	4		CORNER BREAK
52.304	1605	DL		X		0	0			3	X	2	6		ALONG LONG JOINT
52.407	2149	PL		X		0	0			2	X	2	4		CORNER BREAK
52.448	2365	DL		X		0	0			2	X	2	4		ALONG LONG JOINT
52.472	2492	PL		X		0	0			2	X	2	4		CORNER BREAK
52.505	2666	PL		X		0	0			2	X	2	4		CORNER BREAK
52.674	3559	DL		X		0	0			2	X	2	4		CORNER BREAK
52.685	3617	DL		X		0	0			2	X	2	4		CORNER BREAK
52.688	3633	DL		X		0	0			2	X	2	4		CORNER BREAK
52.691	3648	DL		X		0	0			2	X	2	4		CORNER BREAK
52.728	3844	DL		X		0	0			2	X	2	4		CORNER BREAK
52.743	3923	DL		X		0	0			2	X	2	4		CORNER BREAK
52.754	3981	DL		X		0	0			4	X	2	8		CORNER BREAK
52.759	4008	DL		X		0	0			2	X	2	4		CORNER BREAK
52.872	4604	DL		X		0	0			2	X	2	4		CORNER BREAK
52.920	4858	DL		X		0	0			4	X	2	8		CORNER BREAK
SUBTOTAL						0	0	0	0				94	0	SUBTOTAL FOR MILE 52
53.004	21	DL		X		0	0			2	X	2	4		CORNER BREAK
53.039	206	DL		X		0	0			4	X	2	8		CORNER BREAK
53.039	206	PL		X		0	0			4	X	2	8		CORNER BREAK
53.042	222	DL		X		0	0			4	X	2	8		CORNER BREAK
53.042	222	PL		X		0	0			4	X	2	8		CORNER BREAK

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Data Sheets
I-29 Christine to Wild Rice River NB
RP 50.932 to RP 53.042

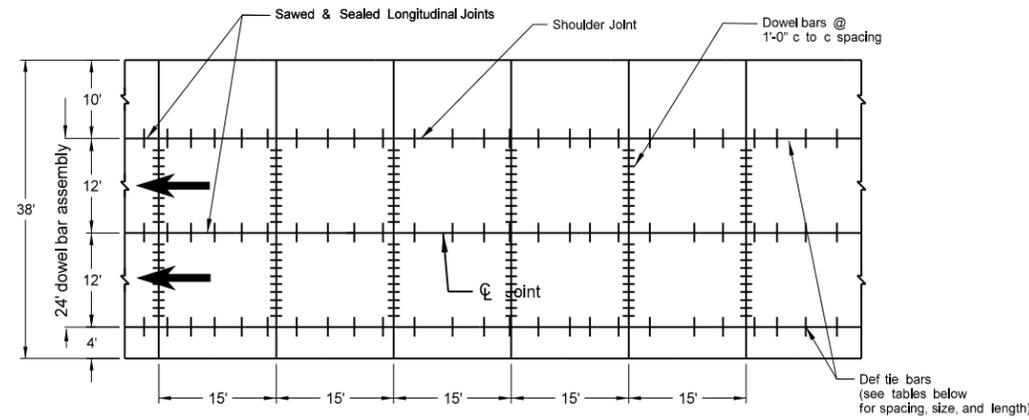
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SIM-8-029(134)044	011	7

Reference Point	Dist. From RP	Lane	Full Depth Repair (ft)			SY	Sawcut	Dowel Bars	Doweled Contr. Joint Assembly (LF)	Spall Repair (ft)			SF	Random Cracks (LF)	Comments
			Length	X	Width					Length	X	Width			
53.086	454	DL		X		0	0			2	X	2	4		CORNER BREAK
53.176	929	DL		X		0	0			2	X	2	4		CORNER BREAK
53.248	1309	DL		X		0	0			2	X	2	4		CORNER BREAK
53.320	1690	DL		X		0	0			2	X	2	4		ALONG LONG JOINT
53.393	2075	DL		X		0	0			2	X	2	4		CORNER BREAK
53.396	2091	DL		X		0	0			2	X	2	4		CORNER BREAK
53.408	2154	DL		X		0	0			2	X	2	4		CORNER BREAK
53.419	2212	DL		X		0	0			2	X	2	4		CORNER BREAK
53.424	2239	DL		X		0	0			2	X	2	4		CORNER BREAK
53.433	2286	DL		X		0	0			2	X	2	4		CORNER BREAK
53.436	2302	DL		X		0	0			2	X	2	4		CORNER BREAK
53.439	2318	DL		X		0	0			2	X	2	4		CORNER BREAK
53.468	2471	PL		X		0	0			2	X	2	4		CORNER BREAK
53.474	2503	PL		X		0	0			2	X	2	4		CORNER BREAK
53.476	2513	DL		X		0	0			2	X	2	4		CORNER BREAK
53.485	2561	PL		X		0	0			2	X	2	4		CORNER BREAK
53.485	2561	DL		X		0	0			2	X	2	4		CORNER BREAK
53.490	2587	DL		X		0	0			2	X	2	4		CORNER BREAK
53.496	2619	DL		X		0	0			2	X	2	4		CORNER BREAK
53.496	2619	PL		X		0	0			2	X	2	4		CORNER BREAK
53.646	3411	DL		X		0	0			2	X	2	4		CORNER BREAK
53.793	4187	DL		X		0	0			2	X	2	4		CORNER BREAK
53.801	4229	DL		X		0	0			2	X	2	4		CORNER BREAK
53.814	4298			X		0	0				X		-		APPROACH PANEL
SUBTOTAL						0	0	0	0				128	0	SUBTOTAL FOR MILE 53

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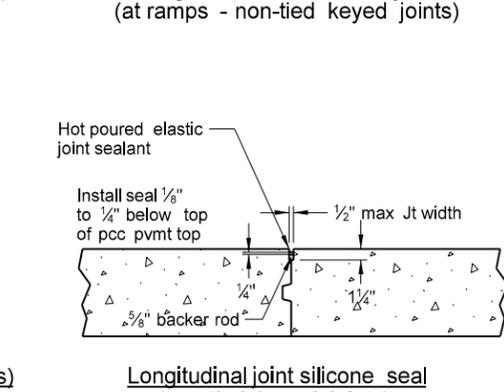
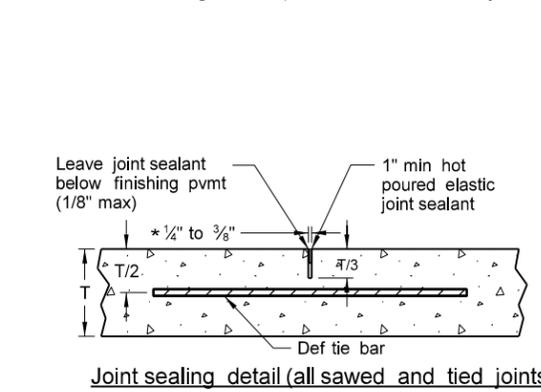
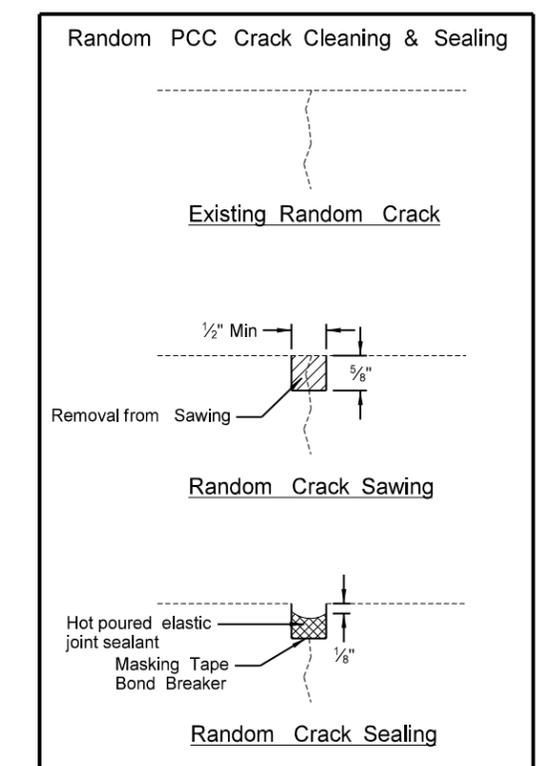
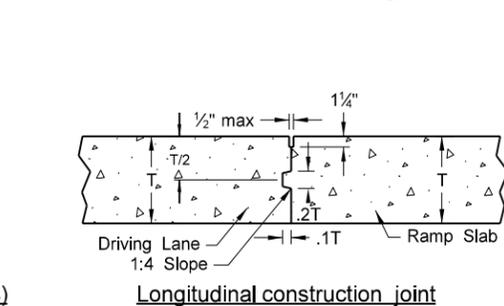
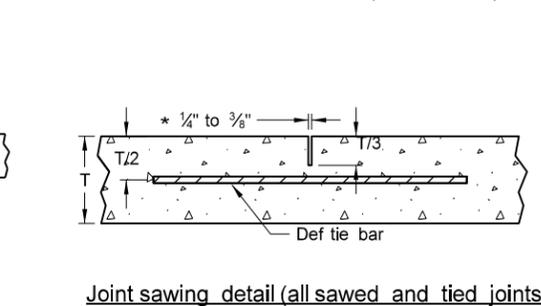
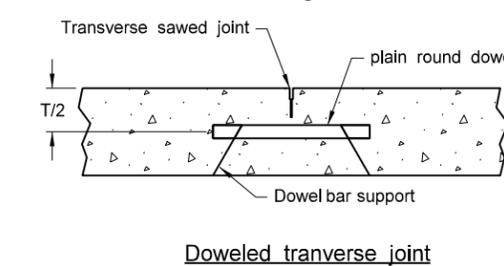
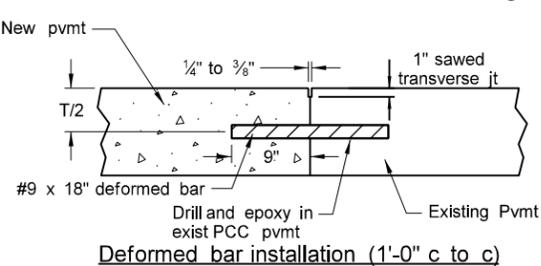
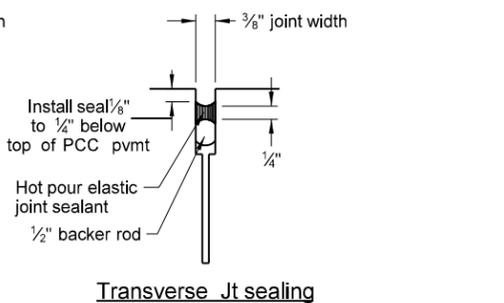
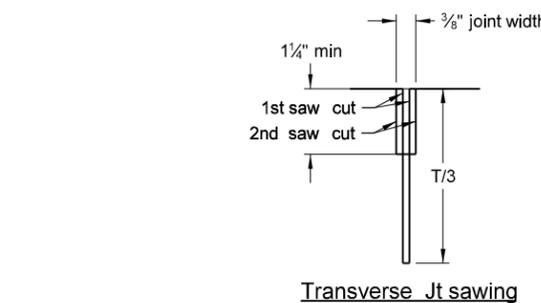
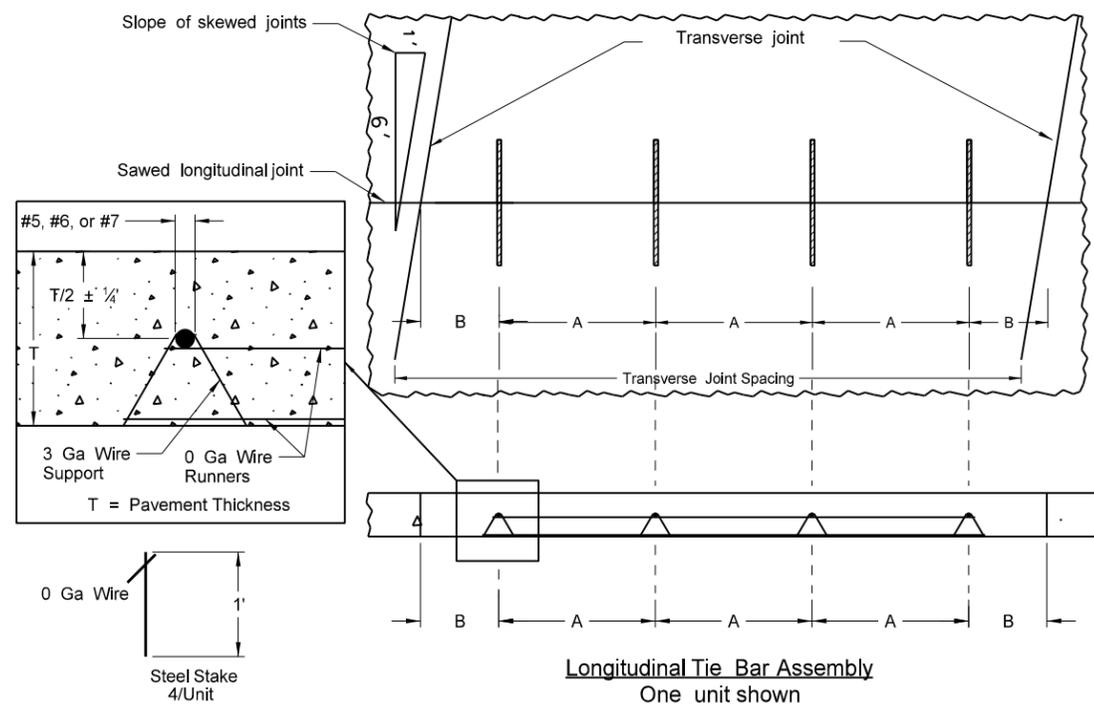
Data Sheets
I-29 Christine to Wild Rice River NB
RP 53.086 to RP 53.814

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-8-029(134)044	20	1



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

- Notes:
1. T = Pavement Thickness
 2. Dowel bars shall be 1 1/4" x 18" when T = 10" or less and shall be 1/2" 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.



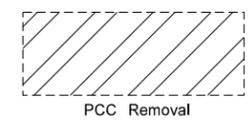
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PCC Pavement Joint Details
With Uniform Spacing
I-29 Northbound

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"				

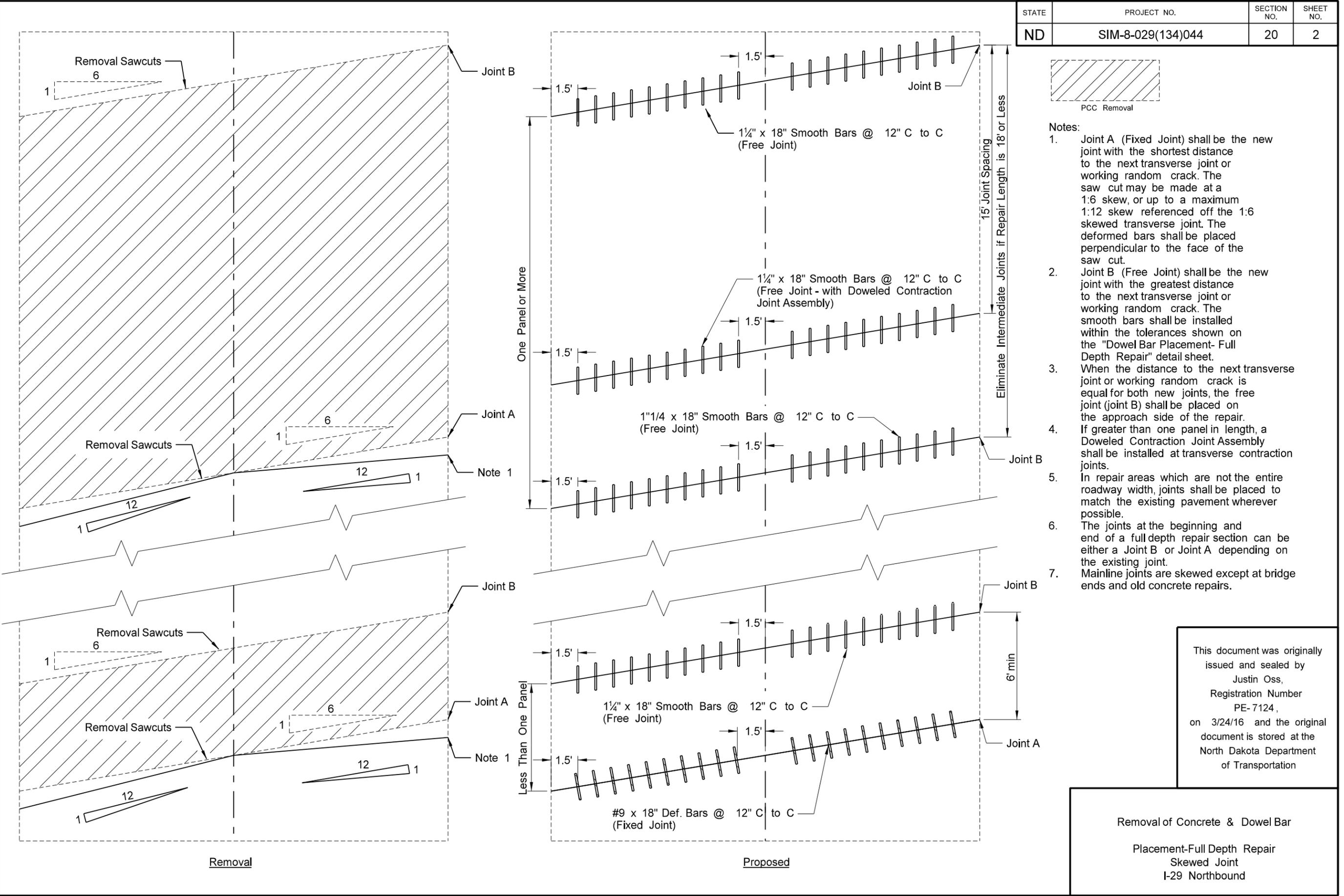
Longitudinal Joint Uniform Tie Bar Spacing			
Joint Spacing	Distance A	Distance B	No. of Bars/Assembly
15'	45"	22 1/2"	4

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-8-029(134)044	20	2



Notes:

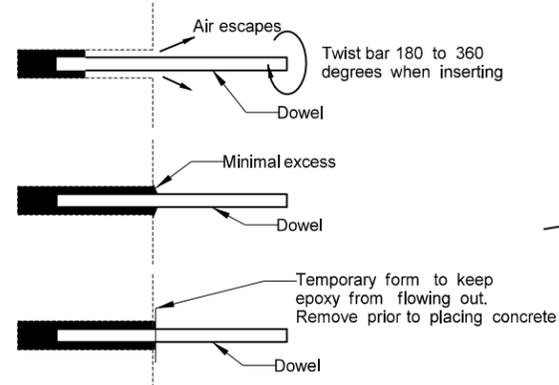
1. Joint A (Fixed Joint) shall be the new joint with the shortest distance to the next transverse joint or working random crack. The saw cut may be made at a 1:6 skew, or up to a maximum 1:12 skew referenced off the 1:6 skewed transverse joint. The deformed bars shall be placed perpendicular to the face 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.
7. Mainline joints are skewed except at bridge ends and old concrete repairs.



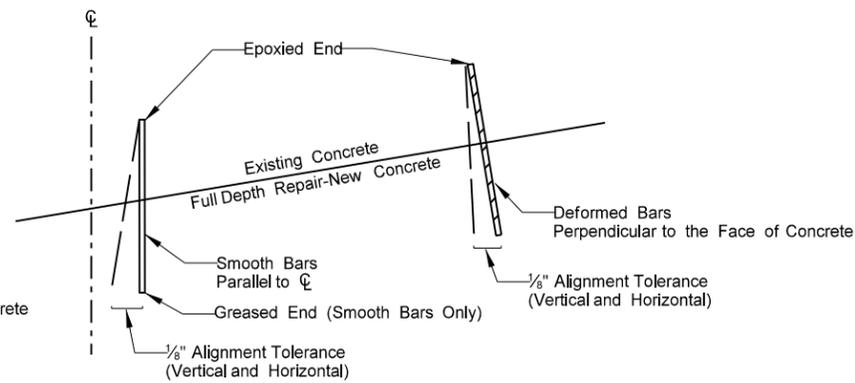
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Removal of Concrete & Dowel Bar
Placement-Full Depth Repair
Skewed Joint
I-29 Northbound

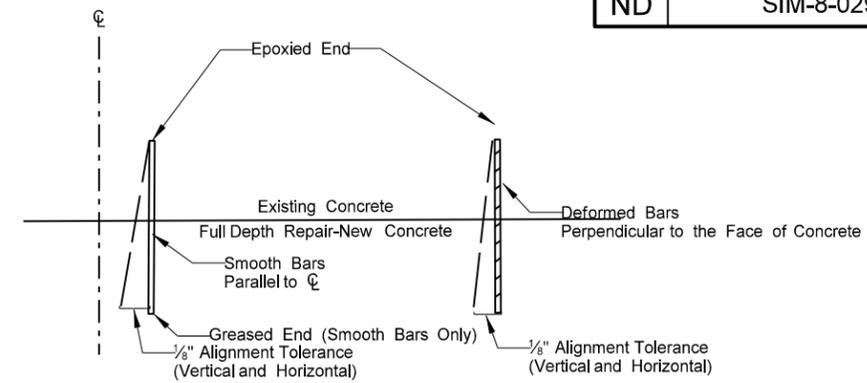
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-8-029(134)044	20	3



Dowel & Epoxy Installation
(Smooth or Deformed Bars)



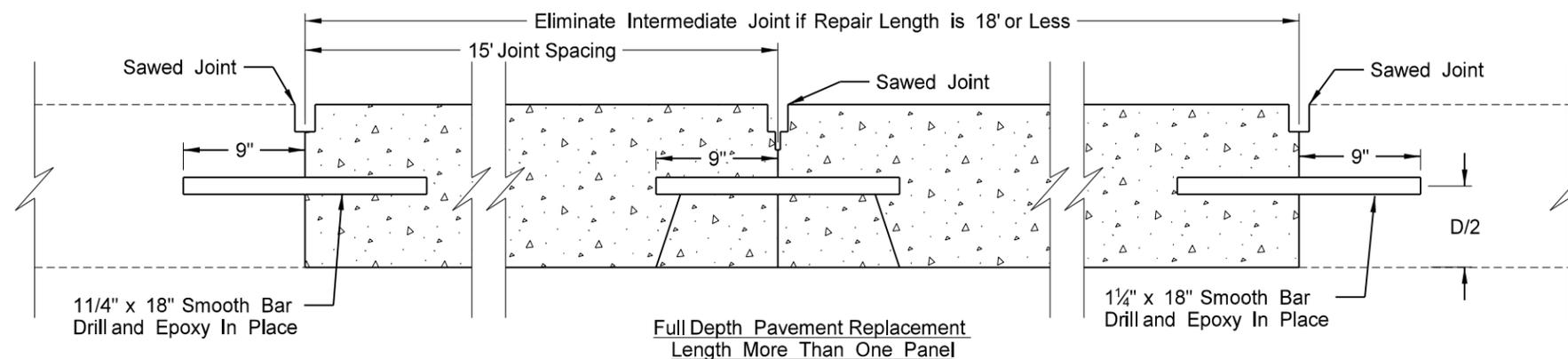
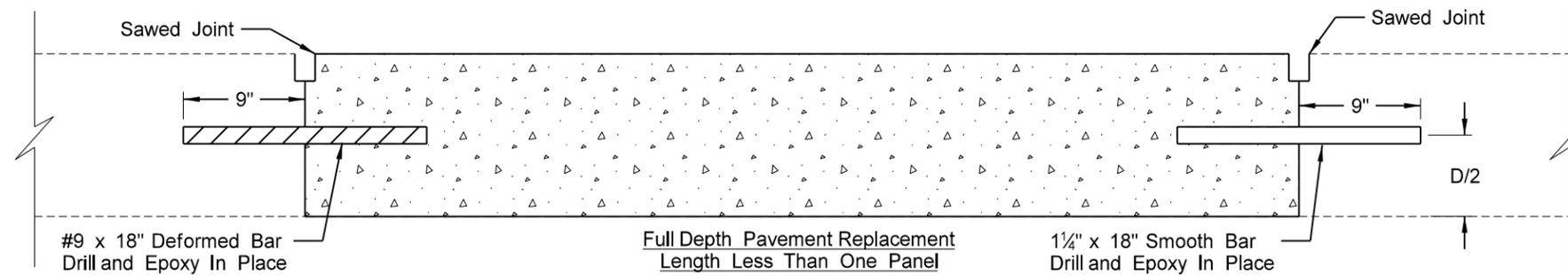
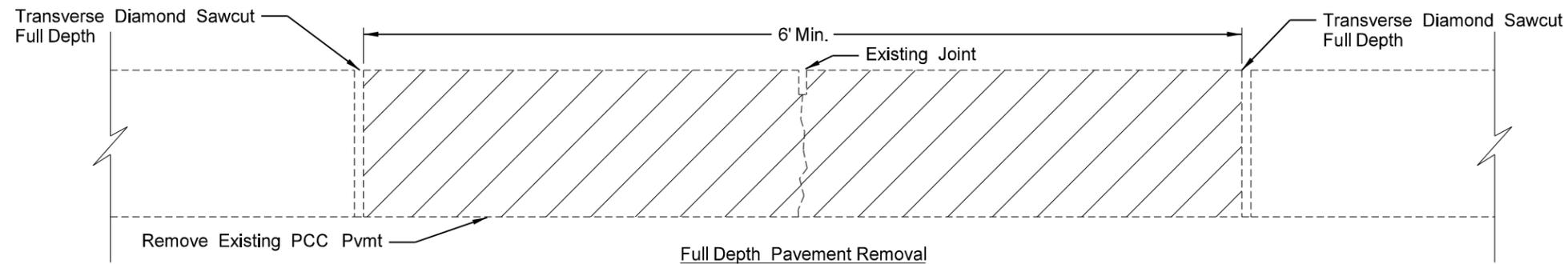
Dowel Alignment Tolerance



Dowel Alignment Tolerance

Notes:

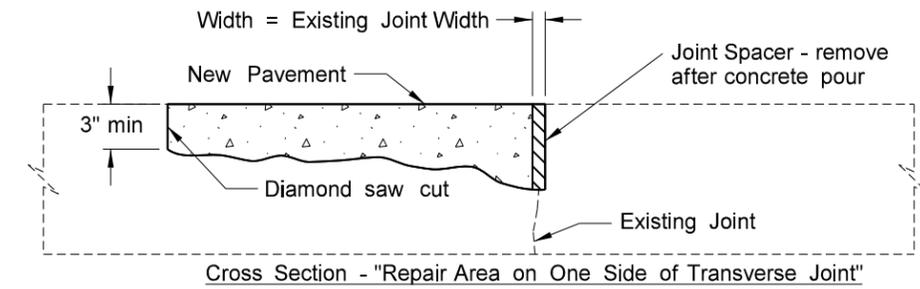
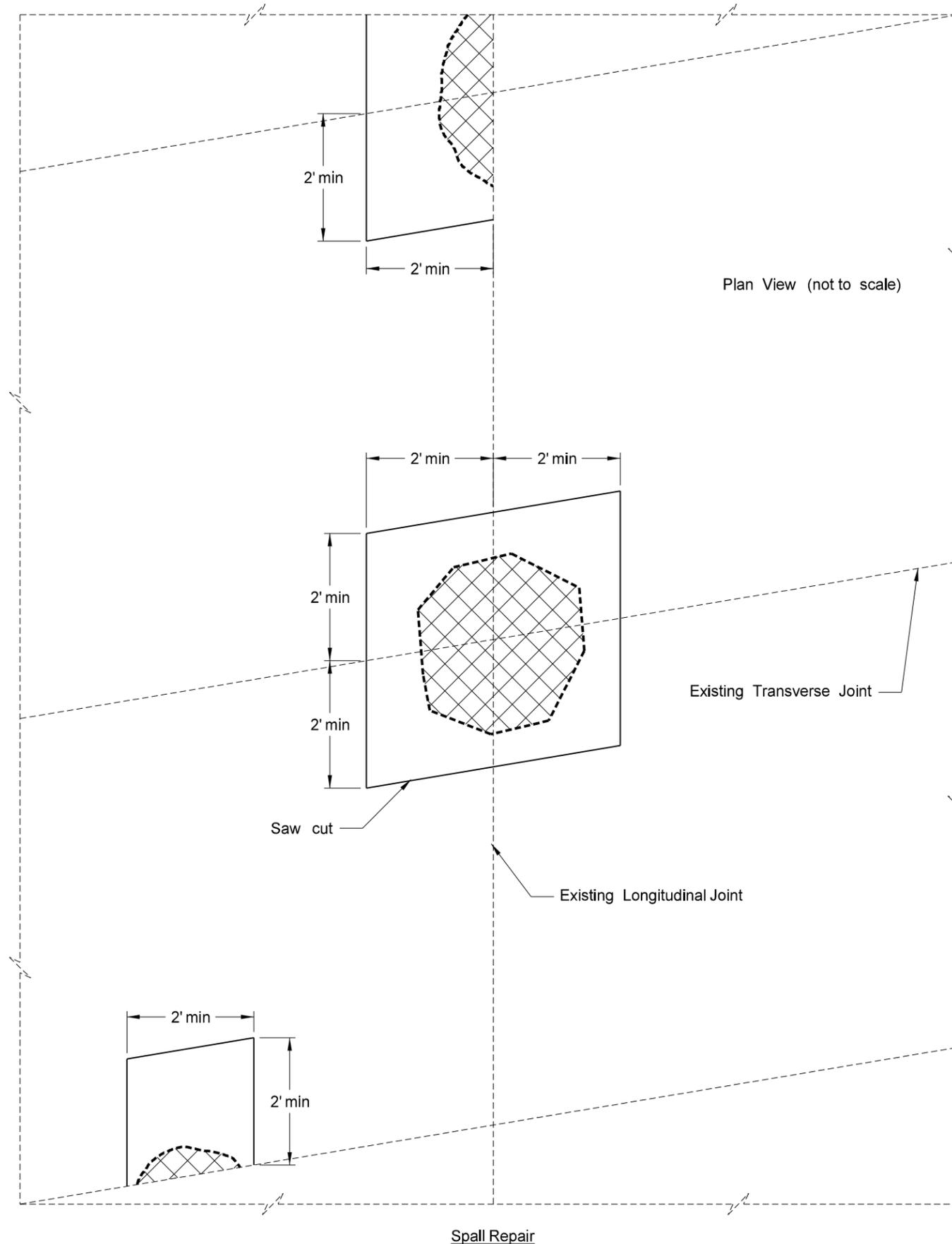
- Variables:
D = Depth of Pavement
- Removal and replacement also applies to full depth repairs at cracks.
- Place smooth dowel bars in repair joint which is farthest away from the next transverse joint or working random crack. If distance is equal for both repair joints, place smooth dowels on approach side of patch.
- 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.



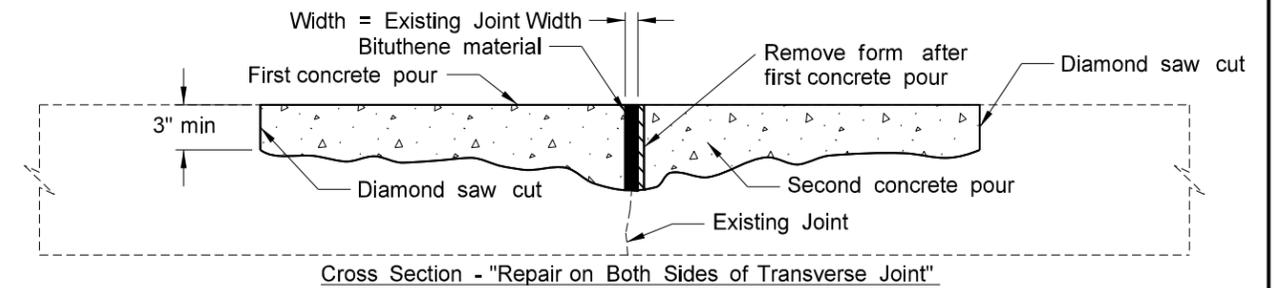
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Concrete Pavement Repair-Full Depth
Non-Reinforced PCC Pavement
I-29 Northbound

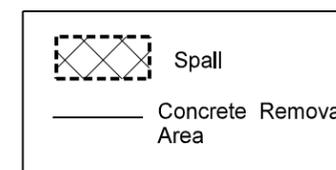
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-8-029(134)044	20	4



Note:
Place a spacer material on the transverse joint face to maintain the joint during repair. The spacer material shall have the capability of maintaining a width equal to that of the existing joint and being easily removed after the pour. A bituthene waterproofing material may be used for this purpose. It shall be a minimum of 260 mil (approximately 1/4") thick or equal to the width of the existing joint, whichever is greater. Cut it to fit over the entire face of the existing joint to provide for expansion and prevent water from entering the existing joint through the sides or bottom. Press it into place to conform to the face of the existing joint.

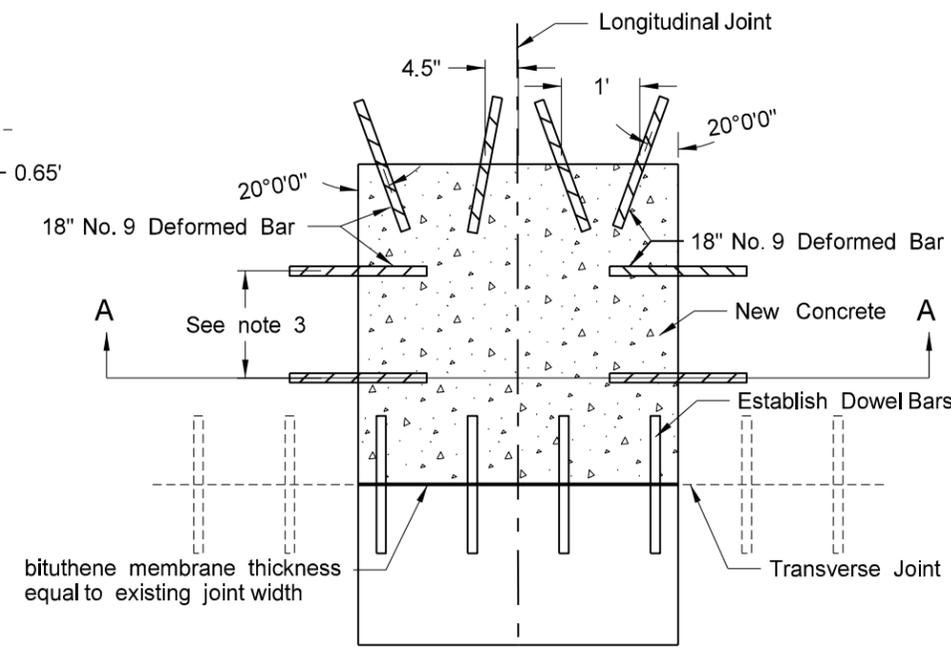
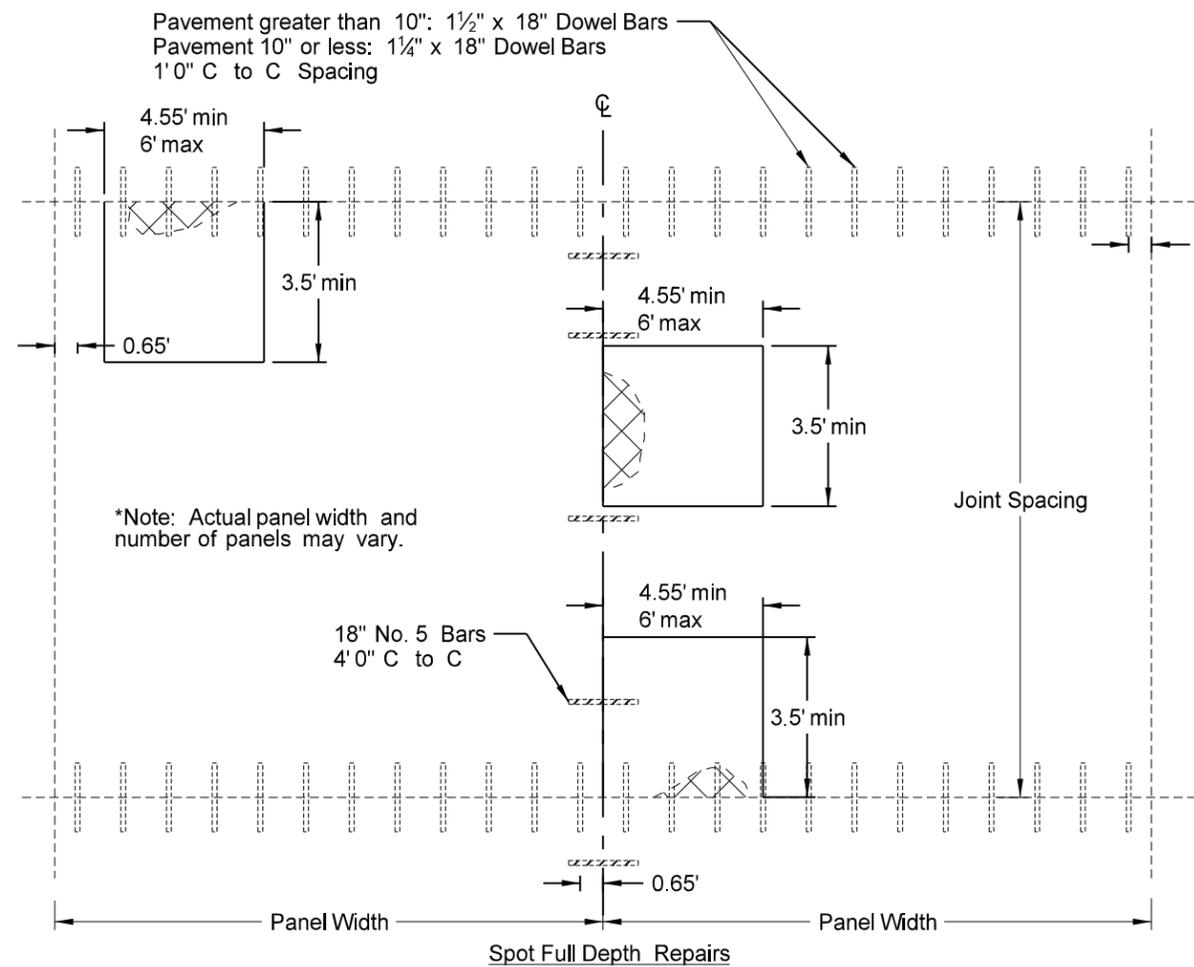


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Jointed Non-Reinforced PCC Pavement
Spall Repair Detail
I-29 Northbound

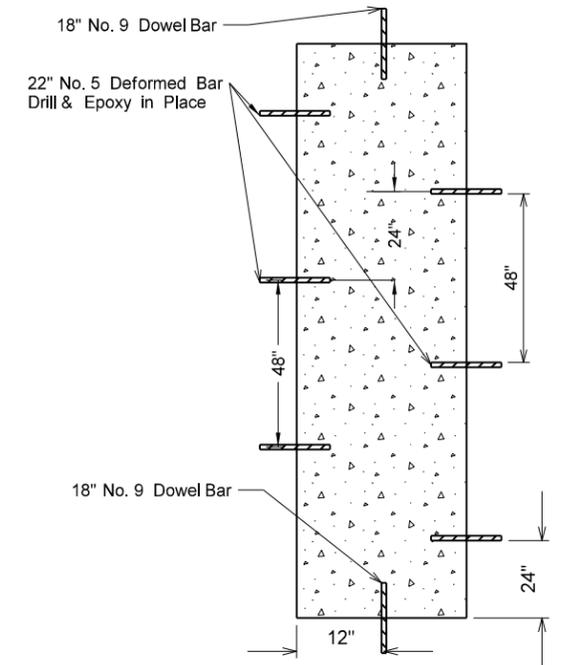
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SIM-8-029(134)044	20	5



Bar Placement-Repair Across Transverse Joint

Work to be Performed - Spot Repair

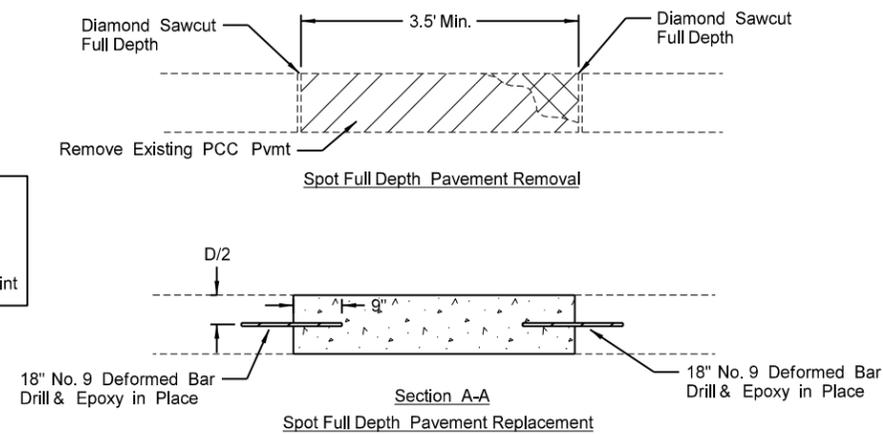
- Order of operations follow Longitudinal Repairs.
- Bar Placement:
- Furnish and install 18" No. 9 deformed bars.
- Transverse Edges: 12" c to c and skewed 20° from the face of the joint.
- Longitudinal Edges: Parallel to the joint. If the repair is 2' or less in length from a transverse joint then use one bar centered on the repair. If 2' to 4' in length from a transverse joint use two bars evenly spaced. If longer than 4' space at 24" c to c.
- Substitute smooth dowel bar if on existing transverse joint.



Longitudinal Spot Full Depth Repair Area
Edge of Driving Lane

*Only transverse tie bars will be required in the shoulder spot full depth repairs

Corner Spot Full Depth Repairs



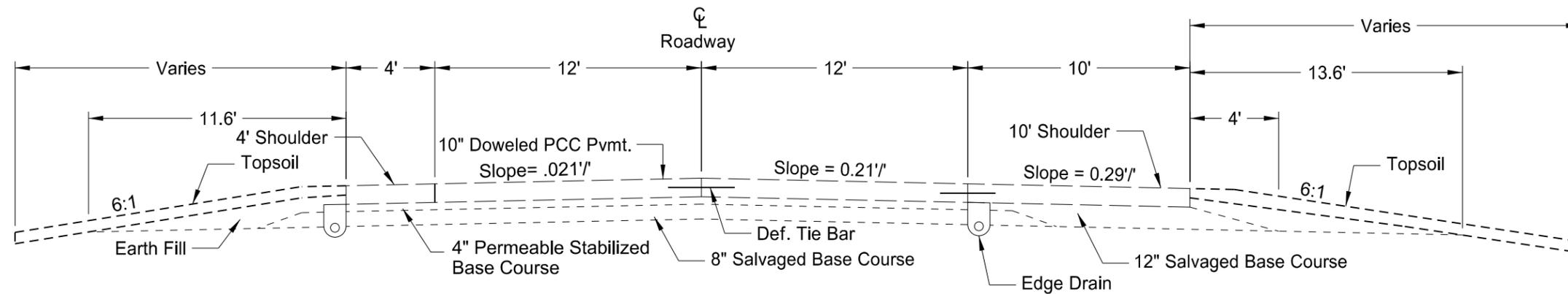
Work to be Performed - Longitudinal Repair

- Sawcut the marked removal area.
- Remove concrete full depth. Restore in place base if disturbed.
- Furnish and install 22" long No. 5 deformed bars. The spacing and layout shall be as follows:
- Transverse Edges: 12" c to c
- Longitudinal Edges: Parallel to the longitudinal joint. If 2' to 4' in length from a transverse joint, use two bars evenly spaced. If longer than 4' space at 48" c to c, staggered on each side of the repair as shown.
- Restore dowel bars if necessary. Use partial dowel bar assembly or drill holes as appropriate.
- Clean and wet exposed surface of in place concrete prior to placing new concrete.
- Place, consolidate, finish, and cure concrete.
- Restore transverse and longitudinal joints.
- Clean and seal restored longitudinal and transverse joints, all work stated here in to be included in the bid price for SPOT FULL DEPTH.

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Spot Full Depth Pavement Replacement Detail
I-29 Northbound

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ND	SIM-8-029(134)044	030	1



RP 44.044 to RP 53.814

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Concrete Pavement Repair
Existing Typical Section
I-29 Christine to Wild Rice River NB

NDDOT ABBREVIATIONS

? 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
 Ac acres
 Adj adjusted
 Aggr aggregate
 Ahd ahead
 ARV air release valve
 Align alignment
 Al alley
 Alt alternate
 Alum aluminum
 ADA Americans with Disabilities Act
 A ampere
 & 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
 Az azimuth
 Bk back
 BF back face
 Bs backsight
 Balc balcony
 B Wire barbed wire
 Barr barricade
 Btry battery
 Brg bearing
 BI beehive inlet
 Beg begin
 BM bench mark
 Bkwy bikeway
 Bit bituminous
 Blk block
 Bd Ft board feet
 BH bore hole
 BS both sides
 Bot bottom
 Blvd Boulevard
 Bndry boundary
 BC brass cap
 Brkwy breakaway
 Br bridge
 Bldg building

BV butterfly valve
 Byp bypass
 C Gdrl cable guardrail
 Calc calculate
 Cd candela
 CIP cast iron pipe
 CB catch basin
 CRS cationic rapid setting
 C Gd cattle guard
 C To C center to center
 Cl or C centerline
 Cm centimeter
 Ch chain
 Chnlk chain-link
 Ch Blk channel block
 Ch Ch channel change
 Chk check
 Chsld chiseled
 Cir circle
 Cl class
 Cl clay
 Cl F clay fill
 Cl Hvy clay heavy
 Cl Lm clay loam
 Clnt clean-out
 Clr clear
 Cl&gr clearing & grubbing
 Co S coal slack
 Comb. combination
 Coml commercial
 Compr compression
 CADD computer aided drafting & design
 Conc concrete
 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
 CSP corrugated steel pipe
 C coulomb
 Co County
 Crse course
 C Gr course gravel
 CS course sand

Ct Court
 Xarm cross arm
 Xbuck cross buck
 Xsec cross sections
 Xing crossing
 Xrd Crossroad
 Crn crown
 CF cubic feet
 M3 cubic meter
 M3/s cubic meters per second
 CY cubic yard
 Cy/mi cubic yards per mile
 Culv culvert
 C&G curb & gutter
 CI curb inlet
 CR curb ramp
 CS curve to spiral
 C cut
 Dd Ld dead load
 Defl deflection
 Defm deformed
 Deg or D degree
 DInt delineate
 DIntr delineator
 Depr depression
 Desc description
 Det detail
 DWP detectable warning panel
 Dtr detour
 Dia 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
 Eq equation
 Evgr evergreen
 Exc excavation
 Exst existing
 Exp expansion
 Expy Expressway
 E external of curve
 Extru extruded
 FOS factor of safety
 F Fahrenheit
 FS far side
 F farad
 Fed Federal
 FP feed point
 Ft feet/foot
 Fn fence
 Fn P fence post
 FO fiber optic
 FB field book
 FD field drive
 F fill
 FAA fine aggregate angularity
 FS fine sand
 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
 Fs foresight
 Fnd found
 Fdn foundation
 Frac fractional
 Frwy freeway
 Frt front
 FF front face
 F Disp fuel dispenser

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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NDDOT ABBREVIATIONS

D-101-2

FFP	fuel filler pipes	IPn	Iron Pin	MC	medium curing	Ped	pedestal
FLS	fuel leak sensor	IP	iron Pipe	M	mega	Ped	pedestrian
Furn	furnish/ed	Jt	joint	Mer	meridian	PPP	pedestrian pushbutton post
Gal	gallon	J	joule	M	meter	Pen.	penetration
Galv	galvanized	Jct	junction	M/s	meters per second	Perf	perforated
Gar	garage	K	kelvin	M	mid ordinate of curve	Per.	perimeter
Gs L	gas line	Kn	kilo newton	Mi	mile	PL	pipeline
G Reg	gas line regulator	Kpa	kilo pascal	MM	mile marker	PI	place
GMV	gas main valve	Kg	kilogram	MP	mile post	P&P	plan & profile
G Mtr	gas meter	Kg/m3	kilogram per cubic meter	MI	milliliter	PL	plastic limit
GSV	gas service valve	Km	kilometer	Mm	millimeter	PI	plate
GVP	gas vent pipe	K	Kip(s)	Mm/hr	millimeters per hour	Pt	point
GV	gate valve	LS	Land Surveyor (licensed)	Min	minimum	PCC	point of compound curve
Ga	gauge	LSIT	Land Surveyor In Training	Misc	miscellaneous	PC	point of curve
Geod	geodetic	Ln	lane	Mon	monument	PI	point of intersection
GIS	Geographical Information System	Lg	large	Mnd	mound	PRC	point of reverse curvature
G	giga	Lat	latitude	Mtbl	mountable	PT	point of tangent
GPS	Global Positioning System	Lt	left	Mtd	mounted	POC	point on curve
Gov	government	L	length of curve	Mtg	mounting	POT	point on tangent
Grd	graded/grade	Lens	lenses	Mk	muck	PE	polyethylene
Gr	gravel	Lvl	level	Mun	municipal	PVC	polyvinyl chloride
Grnd	ground	LB	level book	N	nano	PCC	Portland Cement concrete
GWM	ground water monitor	Lvng	leveling	NGS	National Geodetic Survey	Lb or #	pounds
Gdrl	guardrail	Lht	light	NS	near side	PP	power pole
Gtr	gutter	LP	light pole	Neop	neoprene	Preempt	preemption
H Plg	H piling	Ltg	lighting	Ntwk	network	Prefab	prefabricated
Hdwl	headwall	Lig Co	lignite coal	N	newton	Prfmd	performed
Ha	hectare	Lig Sl	lignite slack	N	North	Prep	preparation
Ht	height	LF	linear foot	NE	North East	Press.	pressure
HI	height of instrument	Liq	liquid	NW	North West	PRV	pressure relief valve
Hel	helical	LL	liquid limit	NB	Northbound	Prestr	prestressed
H	henry	L	litre	No. or #	number	Pvt	private
HZ	hertz	Lm	loam	Obsc	obscure(d)	PD	private drive
HDPE	high density polyethylene	Loc	location	Obsn	observation	Prod.	production/produce
HM	high mast	LC	long chord	Ocpd	occupied	Prog	programmed
HP	high pressure	Long.	longitude	Ocpy	occupy	Prop.	property
HPS	high pressure sodium	Lp	loop	Off Loc	office location	Prop Ln	property line
Hwy	highway	LD	loop detector	O/s	offset	Ppsd	proposed
Hor	horizontal	Lm	lumen	OC	on center	PB	pull box
HBP	hot bituminous pavement	Lum	luminaire	C	one dimensional consolidation		
HMA	hot mix asphalt	L Sum	lump sum	OC	organic content		
Hr	hour(s)	Lx	lux	Orig	original		
Hyd	hydrant	ML	main line	O To O	out to out		
Ph	hydrogen ion content	M Hr	man hour	OD	outside diameter		
Id	identification	MH	manhole	OH	overhead		
In or "	inch	Mkd	marked	PMT	pad mounted transformer		
Incl	inclinometer tube	Mkr	marker	Pg	pages		
IMH	inlet manhole	Mkg	marking	Pntd	painted		
ID	inside diameter	MA	mast arm	Pr	pair		
Inst	instrument	Matl	material	Pnl	panel		
Intchg	interchange	Max	maximum	Pk	park		
Intmdt	intermediate	MC	meander corner	PK	Parker-Kalon nail		
Intscn	intersection	Meas	measure	Pa	pascal		
Inv	invert	Mdn	median	PSD	passing sight distance		
IM	iron monument	MD	median drain	Pvmt	pavement		

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08-03-15	General Revisions

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NDDOT ABBREVIATIONS

D-101-3

Qty	quantity	SN	sign number	Tan	tangent	Wb	weber
Qtr	quarter	Sig	signal	T	tangent (semi)	WIM	weigh in motion
Rad or R	radius	Si Cl	silt clay	TS	tangent to spiral	W	west
RR	railroad	Si Cl Lm	silty clay loam	Tel	telephone	WB	westbound
Rlwy	railway	Si Lm	silty loam	Tel B	Telephone Booth	Wrng	wiring
Rsd	raised	Sgl	single	Tel P	telephone pole	W/	with
RTP	random traverse point	SC	slow curing	Tv	television	W/o	without
Rge or R	range	SS	slow setting	Temp	temperature	WC	witness corner
RC	rapid curing	Sm	small	Temp	temporary	WGS	world geodetic system
Rec	record	S	South	TBM	temporary bench mark	Z	zenith
Rcy	recycle	SE	South East	T	tesla		
RAP	recycled asphalt pavement	SW	South West	T	thinwall tube sample		
RPCC	recycled portland cement concrete	SB	Southbound	T/mi	tons per mile		
Ref	reference	Sp	spaces	Ts	topsoil		
R Mkr	reference marker	Spcl	special	Twp or T	township		
RM	reference monument	SA	special assembly	Traf	traffic		
Refl	reflectorized	SP	special provisions	TSCB	traffic signal control box		
RCB	reinforced concrete box	G	specific gravity	Tr	trail		
RCES	reinforced concrete end section	Spk	spike	Transf	transformer		
RCP	reinforced concrete pipe	SC	spiral to curve	TB	transit book		
RCPS	reinforced concrete pipe sewer	ST	spiral to tangent	Trans	transition		
Reinf	reinforcement	SB	split barrel sample	TT	transmission tower		
Res	reservation	SH	sprinkler head	Trans	transverse		
Ret	retaining	SV	sprinkler valve	Trav	traverse		
Rev	reverse	Sq	square	TP	traverse point		
Rt	right	SF	square feet	Trtd	treated		
R/W	right of way	Km2	square kilometer	Trmt	treatment		
Riv	river	M2	square meter	Qc	triaxial compression		
Rd	road	SY	square yard	TERO	tribal employment rights ordinance		
Rdbd	road bed	Stk	stake	Tpl	triple		
Rdwy	roadway	Std	standard	TP	turning point		
RWIS	roadway weather information system	N	standard penetration test	Typ	typical		
Rk	rock	Std Specs	standard specifications	Qu	unconfined compressive strength		
Rt	route	Sta	station	Ugrnd	underground		
Salv	salvage(d)	Sta Yd	station yards	USC&G	US Coast & Geodetic Survey		
Sd	sand	Stm L	steam line	USGS	US Geologic Survey		
Sdy Cl	sandy clay	SEC	steel encased concrete	Util	utility		
Sdy Cl Lm	sandy clay loam	SMA	stone matrix asphalt	VG	valley gutter		
Sdy Fl	sandy fill	SSD	stopping sight distance	Vap	vapor		
Sdy Lm	sandy loam	SD	storm drain	Vert	vertical		
San	sanitary sewer line	St	street	VC	vertical curve		
Sc	scoria	SPP	structural plate pipe	VCP	vitrified clay pipe		
Sec	seconds	SPPA	structural plate pipe arch	V	volt		
Sec	section	Str	structure	Vol	volume		
SL	section line	Subd	subdivision	Wkwy	walkway		
Sep	separation	Sub	subgrade	W	water content		
Seq	sequence	Sub Prep	subgrade preperation	WGV	water gate valve		
Serv	service	Ss	subsoil	WL	water line		
Sh	shale	SE	superelevation	WM	water main		
Sht	sheet	SS	supplement specification	WMV	water main valve		
Shtng	sheeting	Supp	supplemental	W Mtr	water meter		
Shldr	shoulder	Surf	surfacing	WSV	water service valve		
Sw	sidewalk	Surv	survey	WW	water well		
S	siemens	Sym	symmetrical	W	watt		
SD	sight distance	SI	systems international	Wrng	wearing		

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

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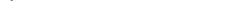
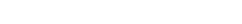
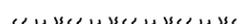
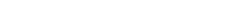
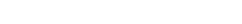
Line Styles

.....	Limits of Const Transition Line	—— s —— s ——	Floating Silt Curtain	—— ——— ———	Existing Aggregate (Cross Section View)	- - - - -	Existing Centerline
.....	Bale Check	—— ——— T ——	Existing Telephone Line	—— ——— ———	Existing Curb and Gutter (Cross Section View)	- - - - -	Supplemental Contour
.....	Rock Check	—— ——— TV ——	Existing TV Line	—— ——— ———	Existing Riprap	—— - - - - -	Right of Way
.....	Sight Distance Triangle Line	Void — void — void — v	Existing Assumed Ground (Not Surveyed)	—— ——— ———	Existing Underground Vault or Lift Station	—— - - - - -	Existing Right of Way
- - - - -	Small Hidden Object	Void — void — void — v	Tentative Ground Line	—— ——— ———	Tangent Line	—— - - - - -	Existing Right of Way Railroad
- - - - -	Dimension Leader	—— ——— w ——	Existing Water or Steam Line	- - - - -	Hidden Object	- - - - -	Failure Line
- - - - -	Existing Ground	=====	Existing Under Drain	—— ——— ———	Existing Dirt Surface	- - - - -	Existing Conditions
- - - - -	Existing Topsoil (Cross Section View)	=====	Under Drain	—— ——— ———	Existing Conduit	- - - - -	Existing Ground (Details)
—— ——— ———	Large Hidden Object	=====	Wall	—— ——— ———	Topsoil Profile	—— - - - - -	Existing Sixteenth Section Line
—— ——— ———	Edge Drain	=====	Existing Slotted Drain	- - - - -	Existing Conductor	- - - - -	Existing Right of Way Not State Owned
—— D —— D ——	Geotextile Fabric Type D	—— + —— + ——	Existing Cemetary Boundary	- - - - -	Conductor	- - - - -	Phantom Object
—— ——— E ——	Existing Electrical	—— ——— ———	Centerline Pavement Marking	- - - - -	Fiber Optic	- - - - -	Centerline Main
—— ——— FO ——	Existing Fiber Optic Line	=====	Barrier with Centerline Pavement Marking	- - - - -	Existing Loop Detector	-	Existing Guardrail Cable
—— ——— FO ——	Existing TV Fiber Optic	=====	Barrier Pavement Marking	- - - - -	Subgrade, Subcut or Ditch Grade	— . — . — . — .	Existing Guardrail Metal
—— ——— G ——	Existing Gas Pipe	- - - - -	Stripe 4 IN Dotted Extension White	—— ——— ———	Existing Asphalt Surface	—— . ——— . ——— .	Existing Edge of Water
—— Geo —— Geo ——	Geogrid	- - - - -	Stripe 8 IN Dotted Extension White	—— ——— ———	Existing Asphalt (Cross Section View)	- - - - -	Excavation Limits
—— ——— OH ——	Existing Overhead Utility Line	- - - - -	Stripe 8 IN Lane Drop	—— ——— ———	Existing Reinforcement Rebar	——	Existing Government Lot Line
—— ——— P ——	Existing Power	—— v v v v ——	Wetland Mitigation	—— ——— ———	Existing Tie Point Line	Existing Adjacent Block Lines
—— ——— PL ——	Existing Fuel Pipeline	- - - - -	Existing Box Culvert Bridge	—— ——— ———	Existing State or International Line	Existing Adjacent Lot Lines
—— ——— PL ——	Existing Undefined Above Ground Pipe Line	- - - - -	Existing Concrete Surface	—— ——— ———	Existing Quarter Section Line	Existing Adjacent Property Line
—— ——— R —— R ——	Geotextile Fabric Type R	- - - - -	Existing Drainage Structure	—— ——— ———	Existing County	Existing Adjacent Subdivision Lines
—— ——— R —— R ——	Geotextile Fabric Type R1	- - - - -	Easement	—— ——— ———	Existing Section Line		
—— REMOVE —— REMOVE ——	Remove Line	- - - - -	Existing Concrete	—— ——— ———	Existing Township		
—— RR —— RR ——	Geotextile Fabric Type RR	- - - - -	Existing Easement	—— ——— ———	Existing Railroad Centerline		
—— S —— S ——	Geotextile Fabric Type S	—— ——— ———	Existing Gravel Surface	—— - - - - -	Centerline		

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07-01-14	
REVISIONS	
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Line Styles

	Subgrade Reinforcement		Existing Railroad Switch		Sheet Piling
	Existing Down Guy Wire Down Guy		Overhead Sign Structure Cantilever		W-Beam w Posts
	Existing Fence		24 Inch Pipe		Existing W-Beam Guardrail with Posts
	Existing Railroad		Reinforced Concrete Pipe		Exst Wet Area-Vegetation Break
	Existing Sanitary Sewer		Signal Head with Mast Arm		Existing Wetland Delineated
	Existing Sanitary Force Main		Existing Signal Head with Mast Arm		
	Existing Storm Drain		Tie Bar at Random Spacing		
	Existing Storm Drain Force Main		3-Cable w Posts		
	Fence		Existing 3-Cable w Posts		
	Silt Fence		Site Boundary		
	Existing Field Line		Fiber Rolls		
	Exst Flow		Doweled Joint		
	Flow		Tie Bar 30 Inch 4 Foot Center to Center		
	Existing Culvert		Tie Bar 18 Inch 3 Foot Center to Center		
	Existing Curb		Existing Berm, Dike, Pit, or Earth Dam		
	Existing Valley Gutter		Existing Ditch Block		
	Existing Driveway Gutter		Depression Contours		
	Existing Curb and Gutter		Existing City Corporate Limits or Reservation Boundary		
	Existing Mountable Curb and Gutter		Gravel Pit - Borrow Area		
	Existing Double Micro Loop Detector		Existing Tree Boundary		
	Micro Loop Detector Double		Tree Row		
	Existing Overhead Sign Structure		Existing Brush or Shrub Boundary		
	Existing Micro Loop Detector		Existing Retaining Wall		
	Micro Loop Detector		Existing Planter or Wall		
	Existing Overhead Sign Structure Cantilever		Retaining Wall (Plan View)		

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Symbols

	North Arrow (Half Scale)		Attenuation Device		Existing Railroad Battery Box		Existing Delineator Type E
	Truck Mounted Attenuator		Diamond Grade Delineator Type A		Existing Bush or Shrub		Existing EFB Misc
	Type I Barricade		Diamond Grade Delineator Type B		Existing Gas Cap or Stub		Existing Flashing Beacon
	Type II Barricade		Diamond Grade Delineator Type C		Existing Sanitary Cap or Stub		Existing Pipe Mounted Flasher
	Type III Barricade		Diamond Grade Delineator Type D		Existing Storm Drain Cap or Stub		Existing Pad Mounted Feed Point
	Catch Basin		Diamond Grade Delineator Type E		Existing Water Cap or Stub		Existing Pipe Mounted Feed Point with Pad
	Cairn or Stone Circle		Flexible Delineator		Existing Sanitary Cleanout		Existing Pole Mounted Feed Point
	Video Detection Camera		Flexible Delineator Type A		Existing Concrete Foundation		Existing Railroad Frog
	Storm Drain Cap or Stub		Flexible Delineator Type B		Existing Traffic Signal Controller		Existing Snow Gate 18
	Corrugated Metal End Section 18 Inch		Flexible Delineator Type C		Existing Pad Mounted Signal Controller		Existing Snow Gate 28
	Corrugated Metal End Section 24 Inch		Flexible Delineator Type D		Existing Sixteenth Section Corner		Existing Snow Gate 40
	Corrugated Metal End Section 30 Inch		Flexible Delineator Type E		Existing Quarter Section Corner		Existing Headwall
	Corrugated Metal End Section 36 Inch		Delineator Type A		Existing Section Corner		Existing Pedestrian Head with Number
	Corrugated Metal End Section 42 Inch		Delineator Type A Reset		Existing Railroad Crossbuck		Existing Signal Head
	Corrugated Metal End Section 48 Inch		Delineator Type B		Existing Satellite Dish		Existing Sprinkler Head
	Concrete Foundation		Delineator Type B Reset		Existing Fuel Dispensers		Existing Fire Hydrant
	Ground Connection Conductor		Delineator Type C		Existing Flexible Delineator Type A		Existing Catch Basin Drop Inlet
	Neutral Connection Conductor		Delineator Type D		Existing Flexible Delineator Type B		Existing Curb Inlet
	Phase 1 Connection Conductor		Delineator Type E		Existing Flexible Delineator Type C		Existing Manhole Inlet
	Phase 2 Connection Conductor		Delineator Drums		Existing Flexible Delineator Type D		Existing Junction Box
	Traffic Cone		Spot Elevation		Existing Flexible Delineator Type E		
	Signal Controller		Existing Access Control Arrow		Existing Delineator Type A		
	Pad Mounted Signal Controller		Existing Artifact		Existing Delineator Type B		
	Alignment Data Point		Existing Flashing Beacon		Existing Delineator Type C		
	Emergency Vehicle Detector		Existing Benchmark		Existing Delineator Type D		

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Symbols

	Existing Light Standard		Existing Manhole with Valve Water		Existing Telephone Pole		Existing Undefined Manhole
	Existing High Mast Light Standard 10 Luminaire		Existing Water Manhole		Existing Wood Pole		Existing Undefined Pull Box
	Existing High Mast Light Standard 3 Luminaire		Existing Mile Post Type A		Existing Post		Existing Undefined Pedestal
	Existing High Mast Light Standard 4 Luminaire		Existing Mile Post Type B		Existing Pedestrian Push Button Post		Existing Undefined Valve
	Existing High Mast Light Standard 5 Luminaire		Existing Mile Post Type C		Existing Control Point CP		Existing Undefined Pipe Vent
	Existing High Mast Light Standard 6 Luminaire		Existing Reference Marker		Existing Control Point GPS-RTK		Existing Gas Valve
	Existing High Mast Light Standard 7 Luminaire		Existing RW Marker		Existing Control Point TRI		Existing Water Valve
	Existing High Mast Light Standard 8 Luminaire		Existing Utility Marker		Existing Reference Marker Point NGS		Existing Fuel Pipe Vent
	Existing High Mast Light Standard 9 Luminaire		Iron Monument Found		Existing Pull Box		Existing Gas Pipe Vent
	Existing Overhead Sign Structure Load Center		Iron Pin R/W Monument		Existing Intelligent Transportation Pull Box		Existing Sanitary Pipe Vent
	Existing Luminaire		Existing Object Marker Type I		Existing Water Pump		Existing Storm Drain Pipe Vent
	Existing Light Standard Luminaire		Existing Object Marker Type II		Existing Slotted Reinforced Concrete Pipe		Existing Water Pipe Vent
	Existing Federal Mailbox		Existing Object Marker Type III		Existing RR Profile Spot		Existing Weather Station
	Existing Private Mailbox		Existing Electrical Pedestal		Existing Fuel Leak Sensors		Existing Ground Water Well Bore Hole
	Existing Meander Section Corner		Existing Telephone Pedestal		Existing Highway Sign		Existing Windmill or Tower
	Existing Meter		Existing Fiber Optic Telephone Pedestal		Existing Miscellaneous Spot		Existing Witness Corner
	Existing Electrical Manhole		Existing TV Pedestal		Existing Lighting Standard Pole		Flashing Beacon
	Existing Gas Manhole		Existing Fiber Optic TV Pedestal		Existing Traffic Signal Standard		Flagger
	Existing Sanitary Manhole		Existing Fuel Filler Pipes		Existing Transformer		Pipe Mounted Flasher
	Existing Sanitary Force Main Manhole		Existing Traverse PI Aerial Panel		Existing Large Evergreen Tree		Sanitary Force Main with Valve
	Existing Sanitary Manhole with Valve		Existing Pole		Existing Small Evergreen Tree		
	Existing Storm Drain Manhole		Existing Power Pole		Existing Large Tree		
	Existing Force Main Storm Drain Manhole		Existing Power Pole with Transformer		Existing Small Tree		
	Existing Force Main Storm Drain Manhole with Valve				Existing Tree Trunk		
	Existing Telephone Manhole				Existing Pad Mounted Traffic Signal Control Box		

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Symbols

D-101-32

 Pad Mounted Feed Point  Pipe Mounted Feed Point with Pad  Pole Mounted Feed Point  Headwall  Double Headwall with Vegetation Barrier  Single Headwall with Vegetation Barrier  Pole Mounted Head  Sprinkler Head  Fire Hydrant  Inlet Type 1  Inlet Type 2  Double Inlet Type 2  Inlet Gate Type 2  Junction Box  High Mast Light Standard 10 Luminaire  High Mast Light Standard 3 Luminaire  High Mast Light Standard 4 Luminaire  High Mast Light Standard 5 Luminaire  High Mast Light Standard 6 Luminaire  High Mast Light Standard 7 Luminaire  High Mast Light Standard 8 Luminaire  High Mast Light Standard 9 Luminaire  Relocate Light Standard  Overhead Sign Structure Load Center  Light Standard 100 Watt High Pressure Sodium Vapor Luminaire	 Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire  Light Standard 150 Watt High Pressure Sodium Vapor Luminaire  Light Standard 175 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 35 Watt High Pressure Sodium Vapor Luminaire  Light Standard 400 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 700 Watt High Pressure Sodium Vapor Luminaire  Manhole  Manhole 48 Inch  Sanitary Force Main Manhole  Sanitary Sewer Manhole  Storm Drain Manhole  Storm Drain Manhole with Inlet  Reset Mile Post  Mile Post Type A  Mile Post Type B  Mile Post Type C  Right of Way Marker  Tubular Marker  Alignment Monument  Iron Pin Reference Monument	 Object Marker Type I  Object Marker Type II  Object Marker Type III  Caution Mode Arrow Panel  Back to Back Vertical Panel Sign  Double Direction Arrow Panel  Left Directional Arrow Panel  Right Directional Arrow Panel  Sequencing Arrow Panel  Truck Mounted Arrow Panel  Power Pole  Wood Pole  Pedestrian Push Button Post  Property Corner  Pull Box  Intelligent Transportation Pull Box  Sanitary Pump  Storm Drain Pump  Reinforced Pavement  Reinforced Concrete End Section 15 Inch  Reinforced Concrete End Section 18 Inch  Reinforced Concrete End Section 24 Inch  Reinforced Concrete End Section 30 Inch  Reinforced Concrete End Section 36 Inch  Reinforced Concrete End Section 42 Inch	 Reinforced Concrete End Section 48 Inch  Reinforced Concrete End Section 54 Inch  Reset Right of Way Marker  Reset USGS Marker  Right of Way Markers  Riser 30 Inch  Continuous Split Barrel Sample  Flight Auger Sample  Split Barrel Sample  Thinwall Tube Sample  Highway Sign  SNOW GATE 18 FT  SNOW GATE 28 FT  SNOW GATE 40 FT  Standard Penetration Test  Transformer  Inclinometer Tube  Underdrain Cleanout  Excavation Unit  Water Valve
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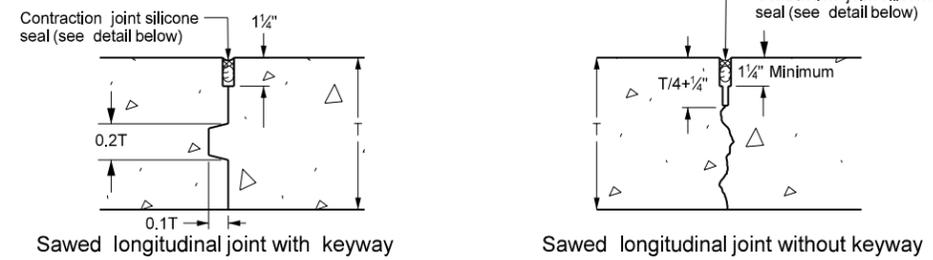
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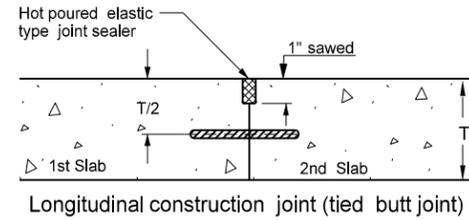
LONGITUDINAL JOINT DETAILS

D-550-2

UNTIED JOINTS (silicone seal)

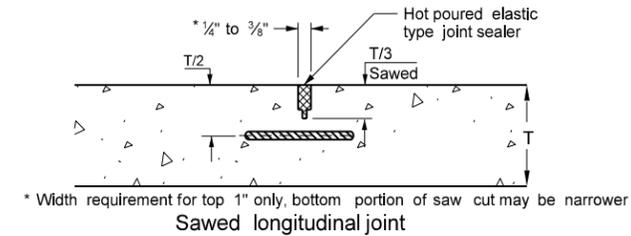
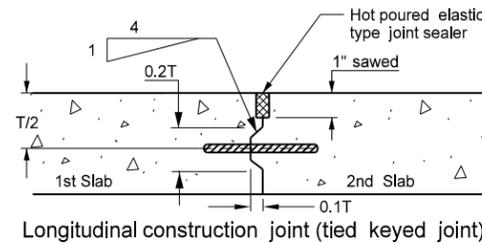
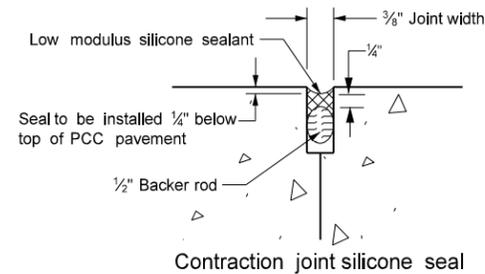


TIED JOINTS (hot poured elastic seal)



Notes:

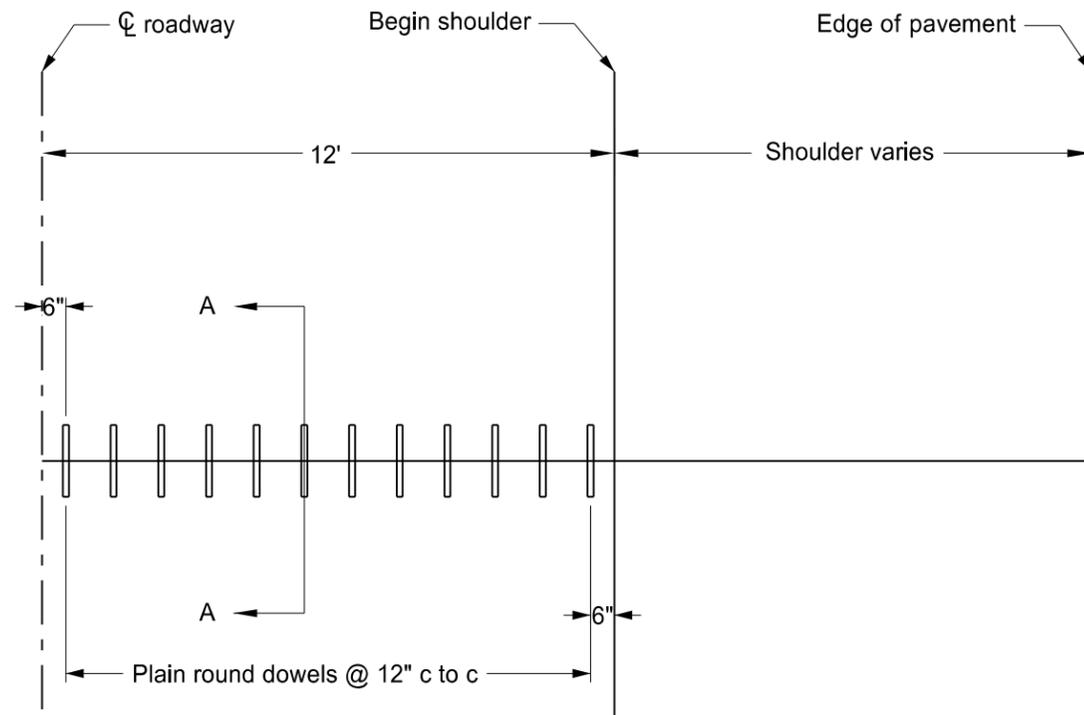
1. The hot poured elastic type joint sealer shall be in accordance with Section 826.02A.2 of the Standard Specifications.
2. The longitudinal joint and seal shall be included in the price bid for the P.C.C. pavement.
3. Tie bars shall not be placed within 18 inches of a transverse skewed joint.
4. Where tie bars are installed bent and later straightened, Grade 40 steel shall be used.
5. Tie bar spacing can be increased up to 10% to facilitate construction.
6. Tie Bars shall be 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.



TIEBAR SPACINGS (In)

DIST TO FREE EDGE (FT)	JOINT TYPE	P.V.M.T THICKNESS	GRADE 40		GRADE 60				GRADE 40				GRADE 60				GRADE 40				GRADE 60																																				
																									# 3 BAR		# 4 BAR		# 5 BAR		# 6 BAR																										
			24"		30"		24"		36"		30"		42"		36"		48"																																								
		4	6	8	10	4	6	8	10	12	14	8	10	12	14	16	22	24	8	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	48	39	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								
6"	BUTT	37	27			48	42					48					48							48						48						48						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								
8"	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								
8 1/2"	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								
8 1/2"	BUTT	39	26			44	39	29				35	27				48	48	47	41	30	27		44	36	31	27			48	48	47	41	30	27	48	48	45	39	33	28	26	48	48	48	48	48	48	42	39							
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	40	36		48	48	48	48	44	38	35	48	48	48	48	48	48	48								
9"	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								
9 1/2"	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								
9 1/2"	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	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	48								
10"	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	48	48	48	48	48	48	48	48	48	48	
10 1/2"	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	45	38	33	30	48	48	48	48	48	48	48								
10 1/2"	BUTT	32				48	32	24				28					42	34	28	24				35	29	25				48	44	38	33	24			48	42	36	32	27			48	48	48	48	40	34	31	48	48	48	48	48	48	48
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	48	48								
11"	BUTT	30				46	30					27					40	32	27					34	28	24				48	42	36	32			48	40	35	30	25			48	48	48	46	38	33	30	48	48	48	48	48	48	48	
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11 1/2"	BUTT	29				44	29					25					39	31	25					32	27					48	40	35	30			46	39	33	29	24			48	48	48	48	44	37	31	29							
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	48	48								
12"	BUTT	27				42	27					25					37	30	25					31	25					48	46	39	33	29			45	37	32	28				48	48	48	48	48	48	48							
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12 1/2"	BUTT	27				40	27					27					35	28						29	25					48	44	37	32	27			42	35	30	27				48	48	45	40	34	29	26							
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	48	46	40								
13"	BUTT	25				38	25					26					34	27						28						48	42	35	30	27			41	34	29	25				48	48	44	38	32	28	25							
13 1/2"	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								
13 1/2"	BUTT	25				37	25					25					33	26						27						48	41	34	29	25			39	33	28	25				48	48	42	37	31	27	24							
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							
14"	BUTT	24				35	24					25					32	25						26						48	39	33	28	25			38	32	27	24				48	47	40	35	30	26								
14 1/2"	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							
14 1/2"	BUTT					34						29					30	25						25						48	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																							

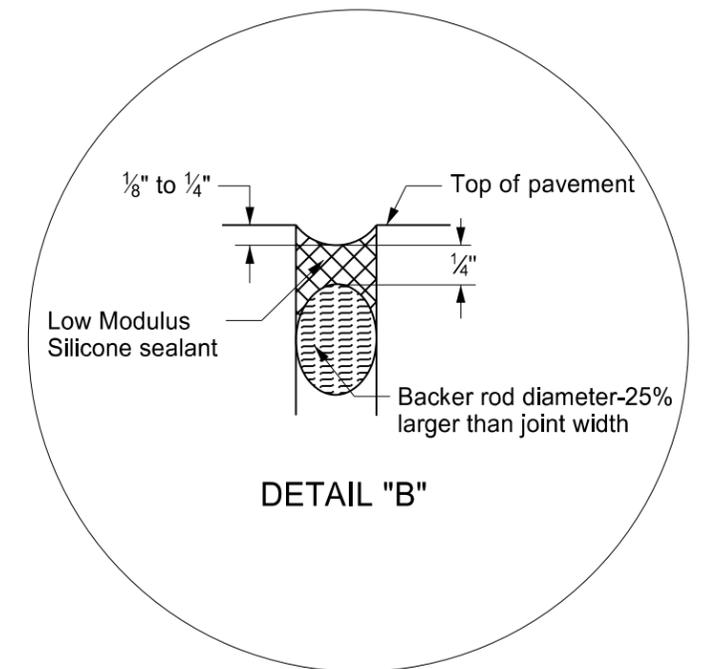
TRANSVERSE CONTRACTION JOINT DETAILS



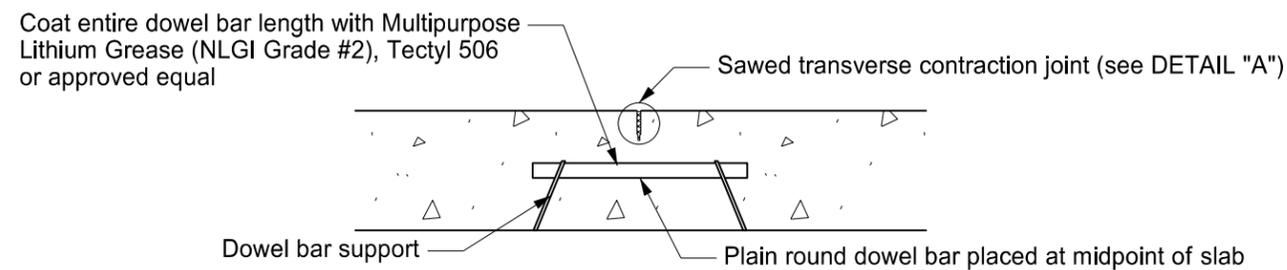
CONTRACTION JOINT DOWEL ASSEMBLY
(1/2 roadway shown)

Notes

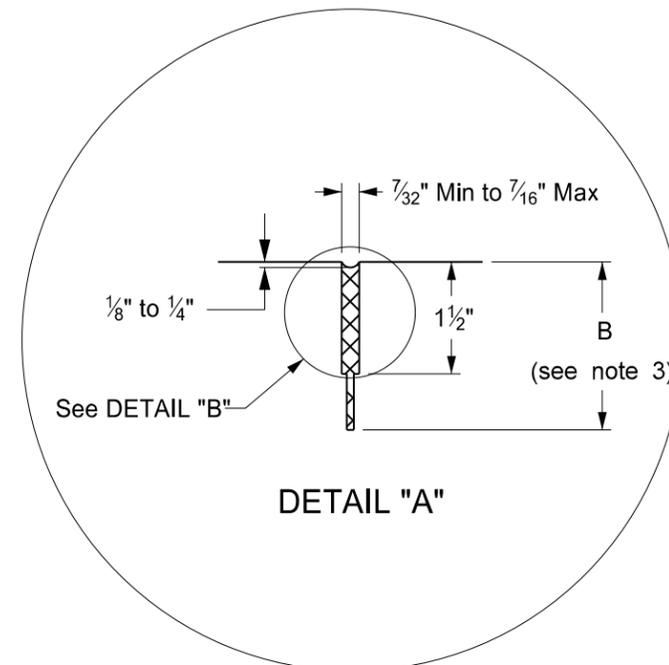
1. The joint seal details apply to both doweled and non-doweled (plain) transverse joints.
2. T = Thickness of pavement.
3. $B = T/4 + 1/4"$ for AE or YE for non-dowelled concrete pavement or $B = T/3$ for high early or dowelled concrete pavement



DETAIL "B"



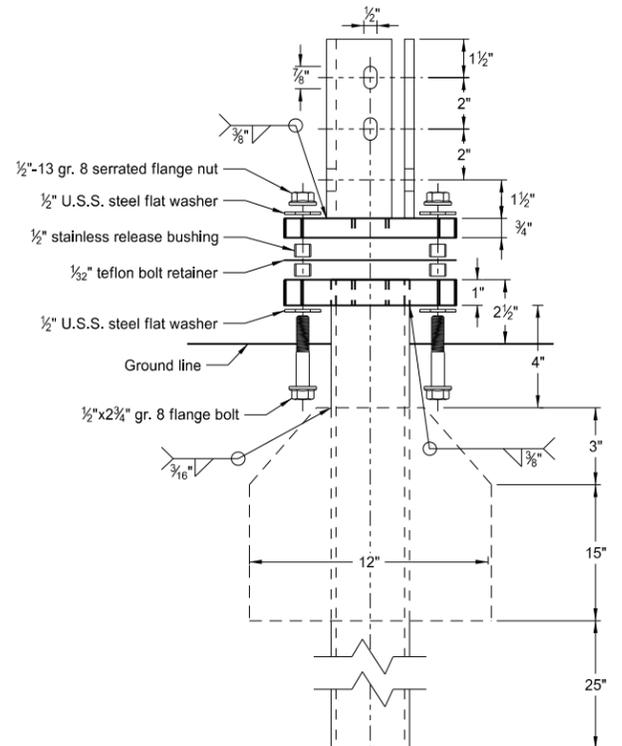
SECTION A-A



DETAIL "A"

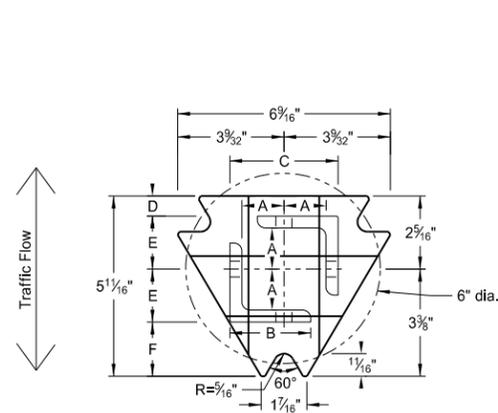
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-15-2010	
REVISIONS	
DATE	CHANGE
6/23/2014	Removed dowel size reference

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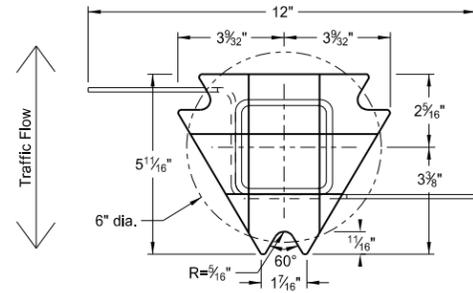


Multi-Directional Slip Base Assembly

Perforated Tube



Top Post Receiver
Plate - ASTM A572 grade 50
Angle Receiver - 2 1/2"x2 1/2"x3/8" 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

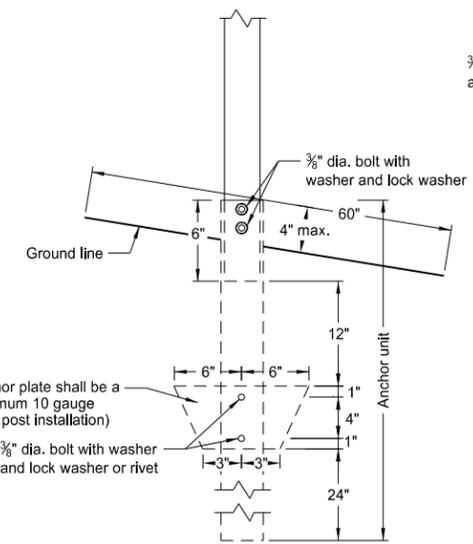
Notes:

1. Slip base bolts shall be torqued as specified by the manufacturer.
2. Anchor shall have a yield strength of 43.9 KSI and tensile strength of 59.3 KSI.
3. The 4" vertical clearance is required for the anchor or breakaway base. The 4"x60" measurement shall be made above and below post location and also back and ahead of the post.
4. When used in concrete sidewalk, anchor shall be same except without the wings.
5. Four post signs shall have over 7' between the first and the fourth posts.

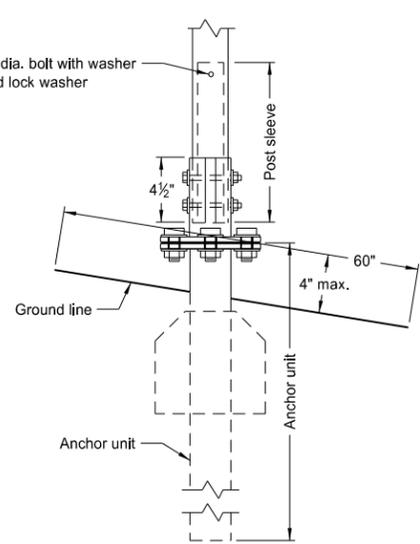
Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thickness Gauge	Sleeve Size in.	Wall Thickness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2 1/4
1	2 1/4	12			No	2 1/2
1	2 1/2	12			(A)	3
1	2 1/2	10			Yes	
1	2 1/4	12	2	12	Yes	
1	2 1/2	12	2 1/4	12	Yes	
2	2	12			No	2 1/4
2	2 1/4	12			No	2 1/2
2	2 1/2	12			Yes	
2	2 1/2	12			Yes	
2	2 1/4	10	2	12	Yes	
2	2 1/2	12	2 1/4	12	Yes	
3 & 4	2 1/2	12			Yes	
3 & 4	2 1/2	10			Yes	
3 & 4	2 1/2	12	2 1/4	12	Yes	
3 & 4	2 1/4	12	2	12	Yes	
3 & 4	2 1/2	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
1 1/2 x 1 1/2	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
2 1/4 x 2 1/4	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
2 1/2 x 2 1/2	0.105	12	3.141	0.804	0.803	0.643
2 1/2 x 2 1/2	0.135	10	4.006	0.979	1.010	0.785

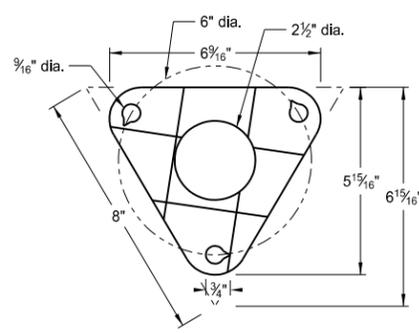
Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2 3/16"x10 ga.	1 9/64"	2 1/2"	3 1/32"	2 5/32"	1 33/64"	1 1/8"
2 1/2"x10 ga.	1 9/32"	2 1/2"	3 5/16"	5/8"	1 21/32"	1 3/4"



Anchor Unit and Post Assembly

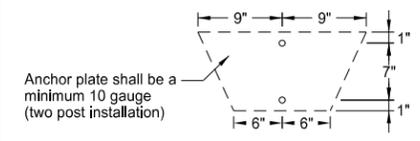


Multi-Directional Slip Base Anchor Unit and Post Sleeve Assembly



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

- (A) The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak.
- (B) The 2 3/16"x10 ga. may be inserted into 2 1/2"x10 ga. for additional wind load.

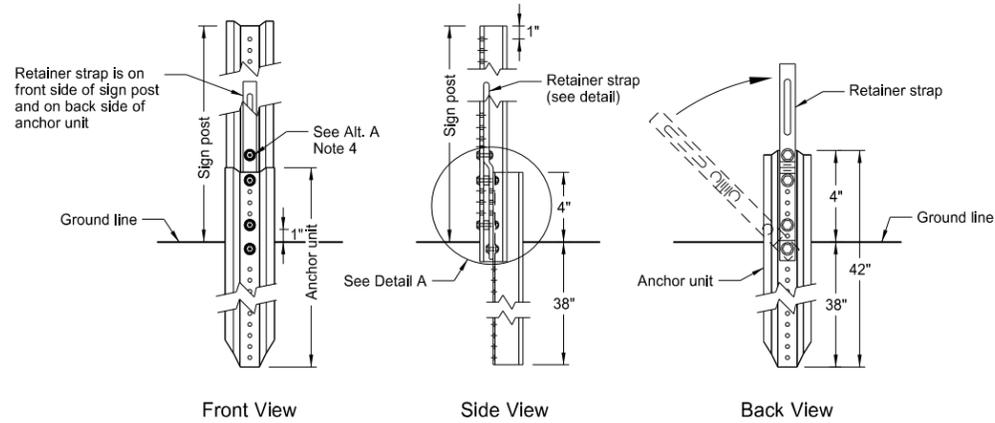
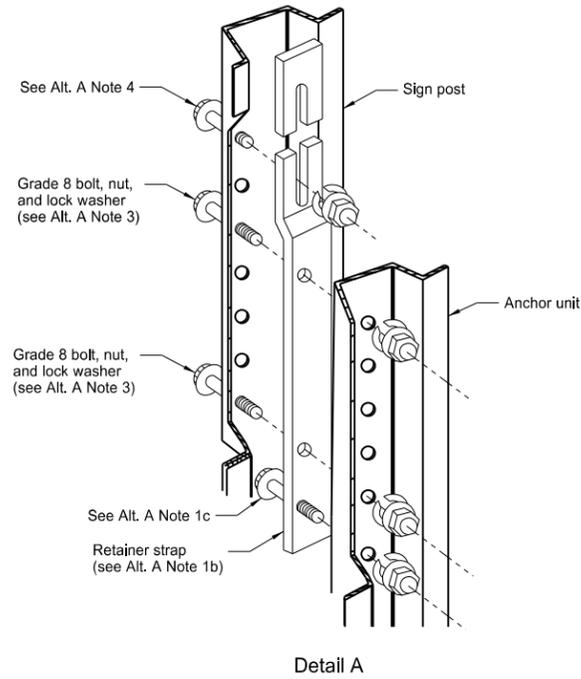


Anchor plate shall be a minimum 10 gauge (two post installation)

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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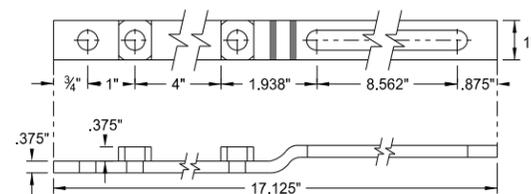
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U-Channel Post

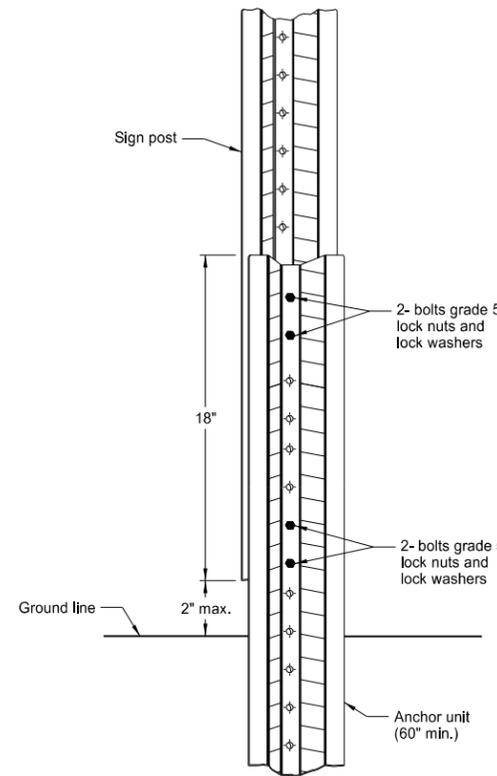


Breakaway U-Channel Detail Alternate A

A maximum of 2 posts shall be installed within 7'.

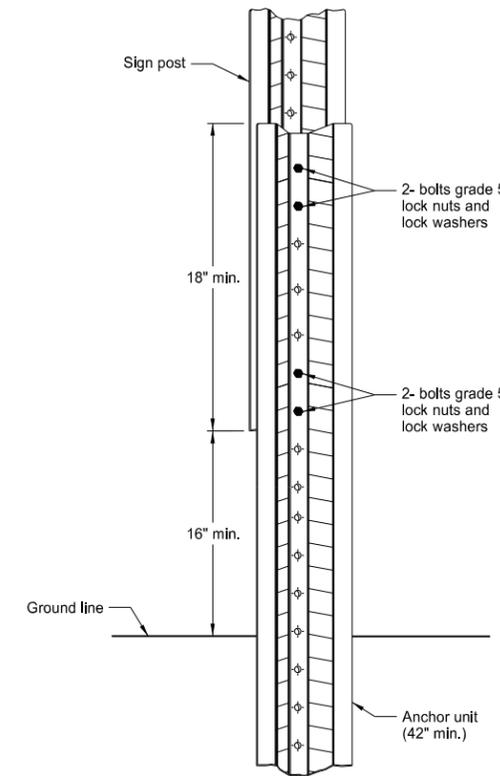


Retainer Strap Detail



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

A maximum of 3 posts shall be installed within 7'.



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

A maximum of 3 posts shall be installed within 7'.

Alternate A Steps of Installation:

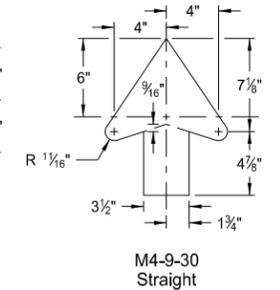
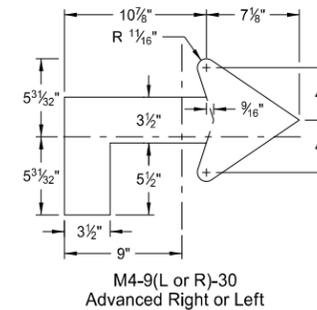
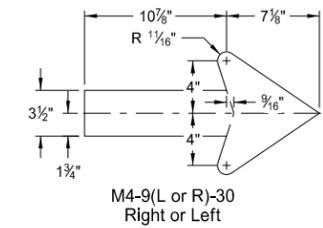
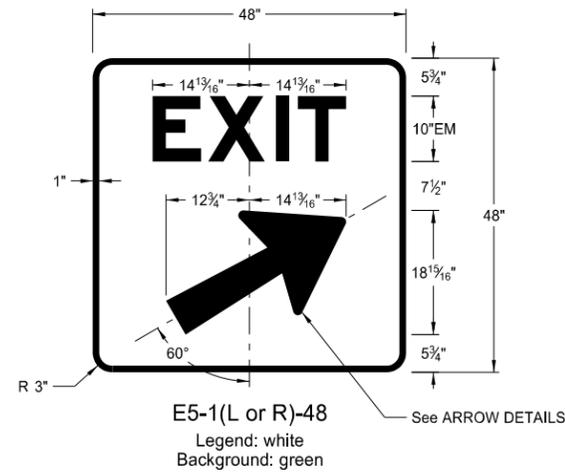
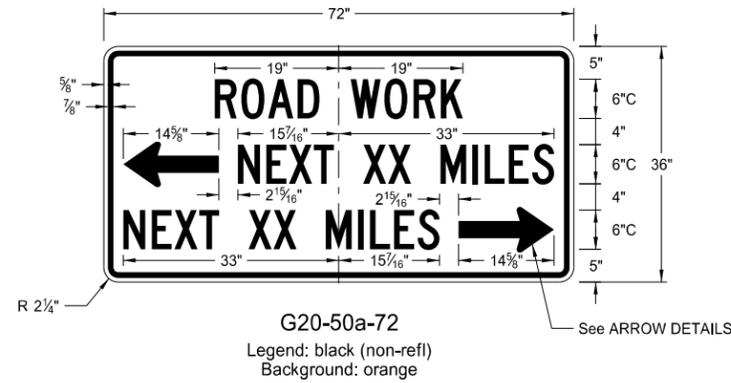
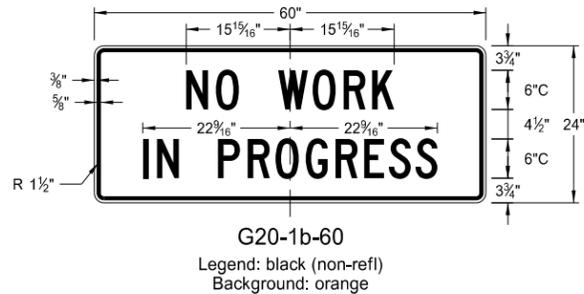
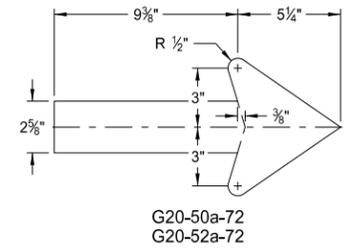
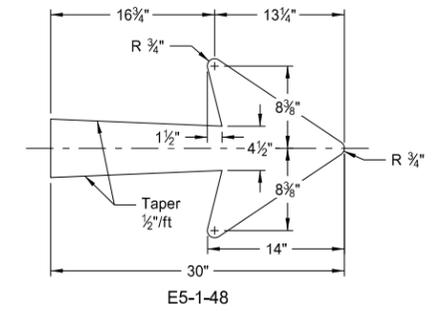
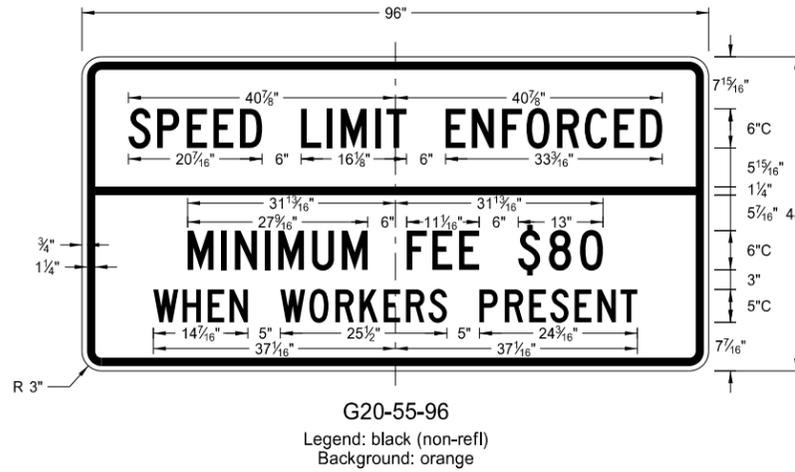
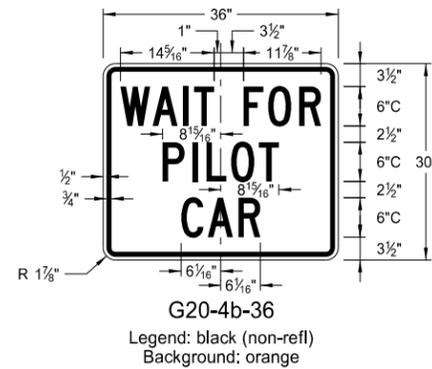
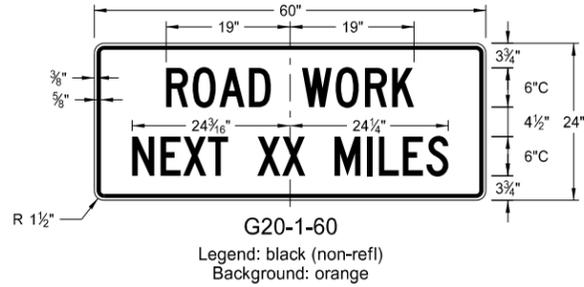
1. a) Drive anchor unit to within 12" of ground level.
b) Proper assembly established by lining up the bottom hole of retainer strap with the 6th hole from the top of the anchor unit.
c) Assemble strap to back of anchor unit using 5/16"x2" bolt, lock washer and nut.
d) Rotate strap 90° to left.
2. a) 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. The base post, strap and sign post shall be properly nested. 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.

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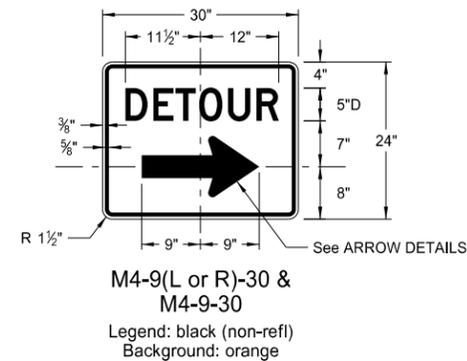
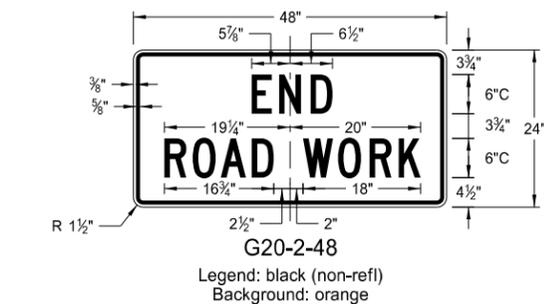
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CONSTRUCTION SIGN DETAILS
 TERMINAL AND GUIDE SIGNS

D-704-9



ARROW DETAILS



NOTES:

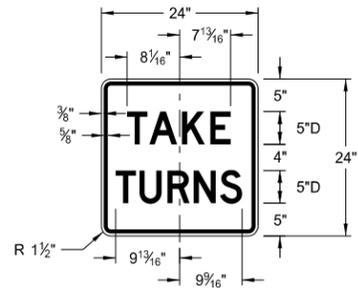
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

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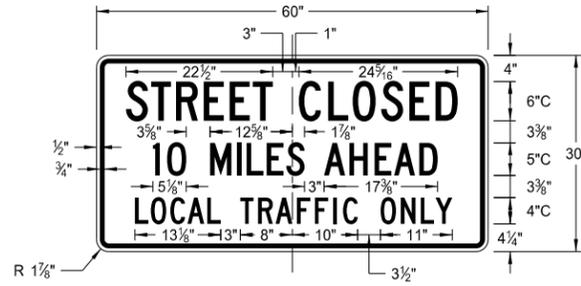
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CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS

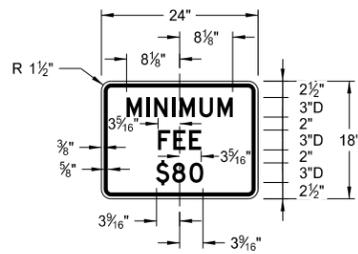
D-704-10



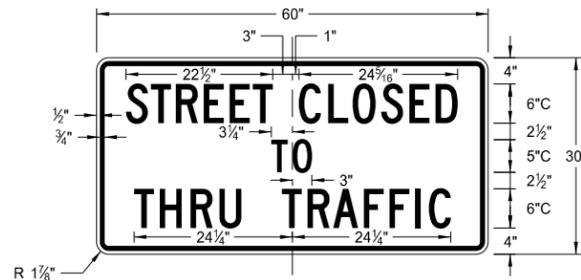
R1-50-24
Legend: black (non-refl)
Background: white



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



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



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



R11-2a-48
Legend: black (non-refl)
Background: white

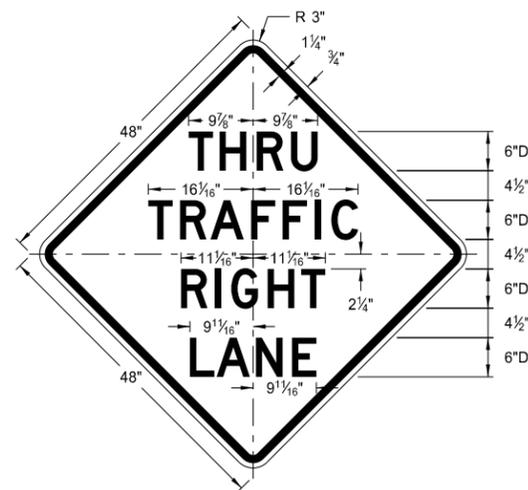
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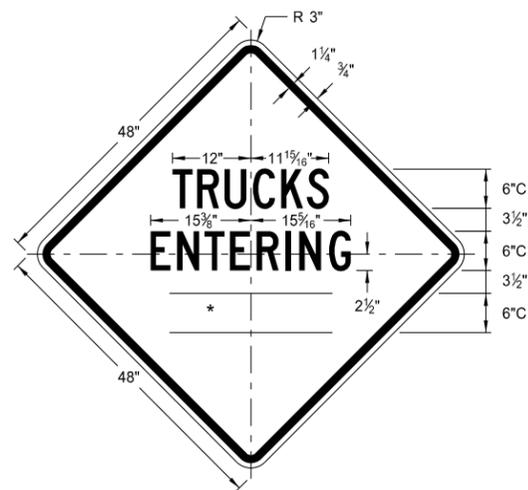
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

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

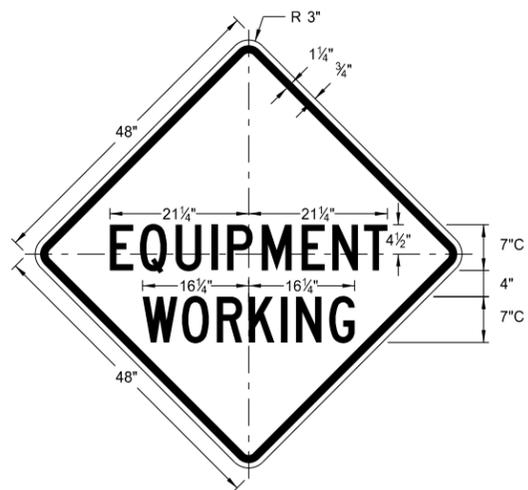
* DISTANCE MESSAGES



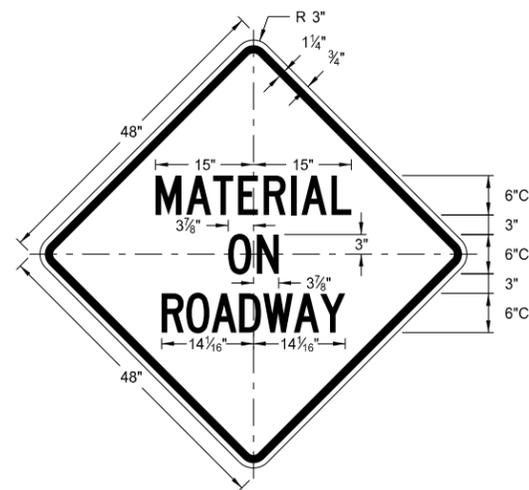
W5-8-48
Legend: black (non-refl)
Background: orange



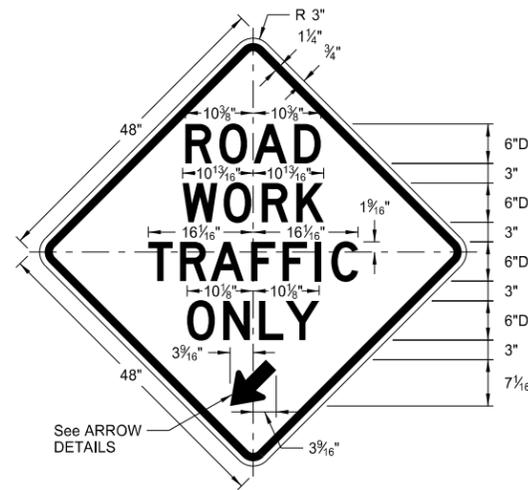
W8-54-48
Legend: black (non-refl)
Background: orange



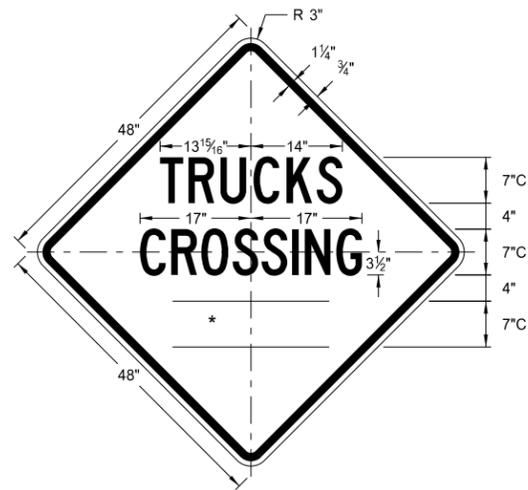
W20-51-48
Legend: black (non-refl)
Background: orange



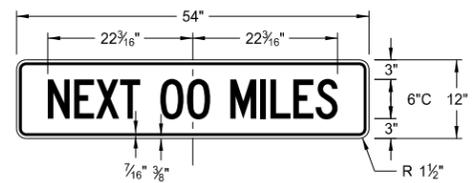
W21-51-48
Legend: black (non-refl)
Background: orange



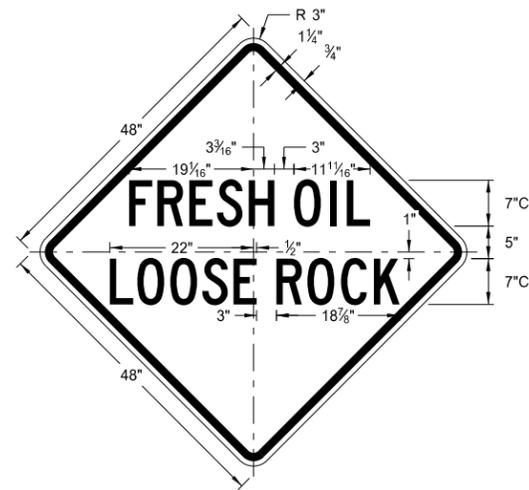
W5-9-48
Legend: black (non-refl)
Background: orange



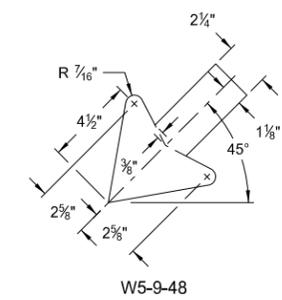
W8-55-48
Legend: black (non-refl)
Background: orange



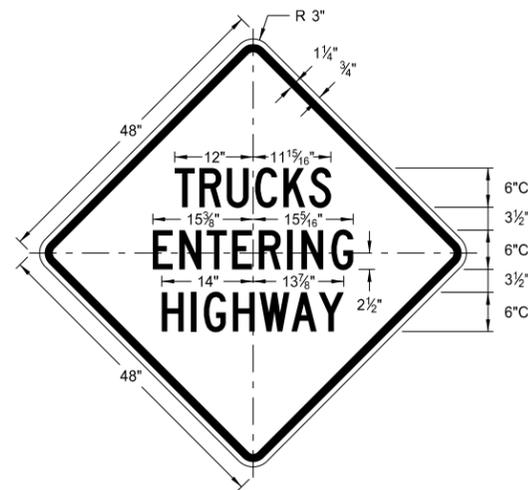
W20-52-54
Legend: black (non-refl)
Background: orange



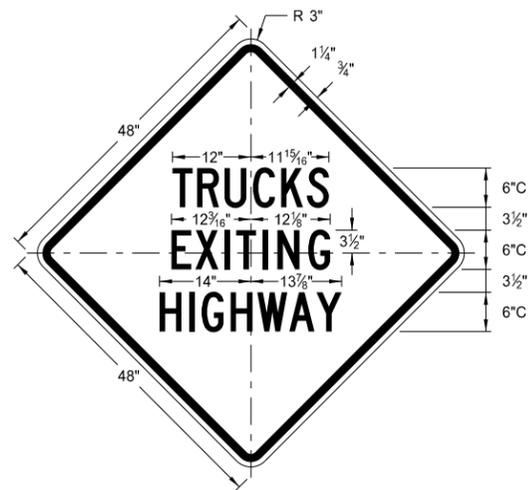
W22-8-48
Legend: black (non-refl)
Background: orange



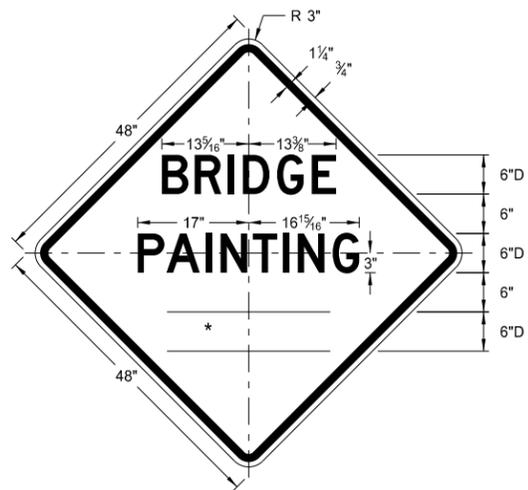
W5-9-48
ARROW DETAILS



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



W8-56-48
Legend: black (non-refl)
Background: orange



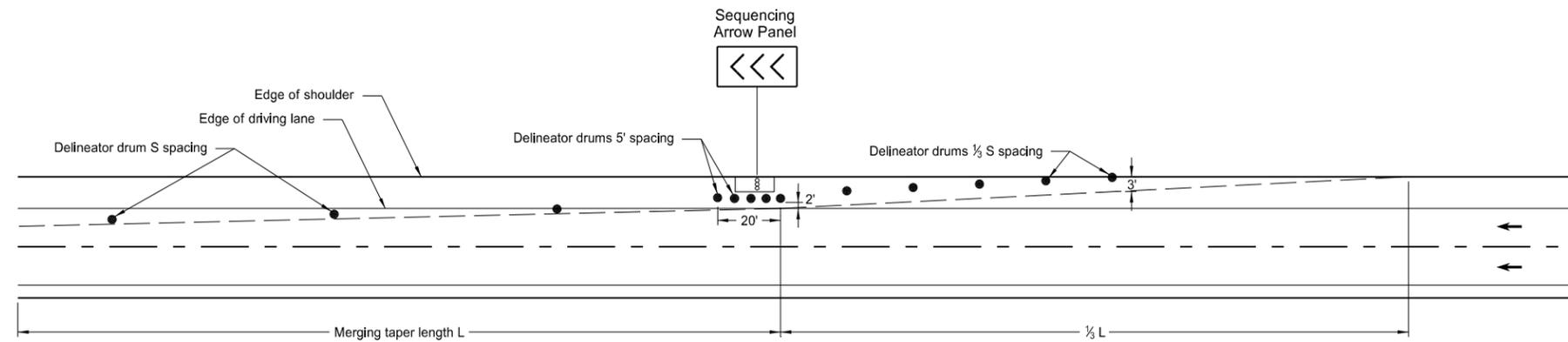
W21-50-48
Legend: black (non-refl)
Background: orange

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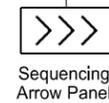
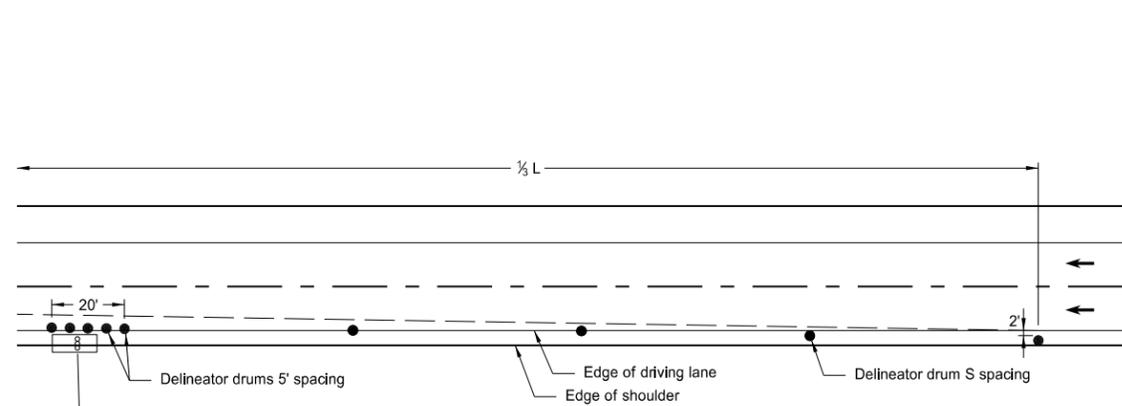
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SHOULDER CLOSURE TAPERS

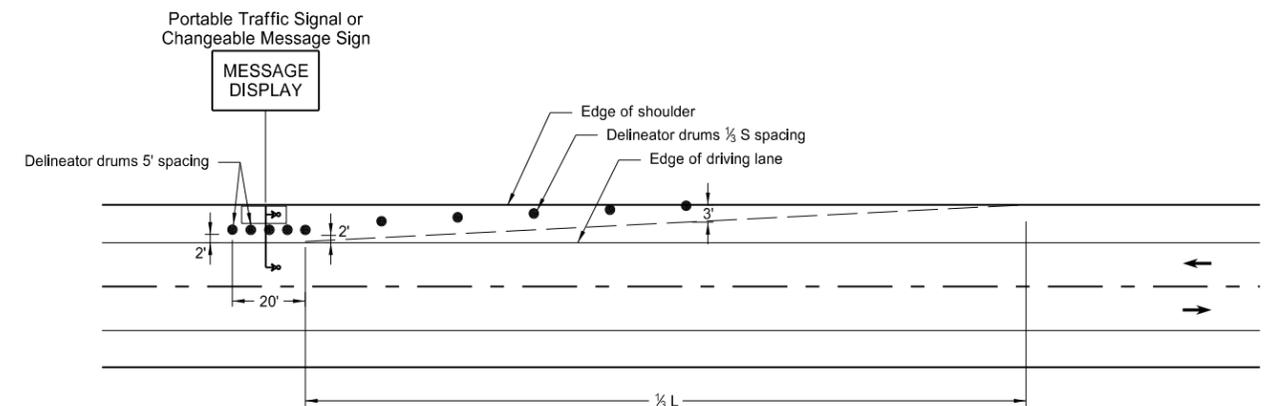
D-704-12



SHOULDER CLOSURE WITH LANE CLOSURE
(when shoulder is 8' or wider)



SHOULDER CLOSURE USED WITH LANE CLOSURE
(when shoulder is less than 8' wide)



PORTABLE TRAFFIC SIGNAL OR CHANGEABLE MESSAGE SIGN ON SHOULDER

KEY	
● Delineator Drum	∞ Sequencing Arrow Panel
• Message Display	↳ Portable Traffic Signal

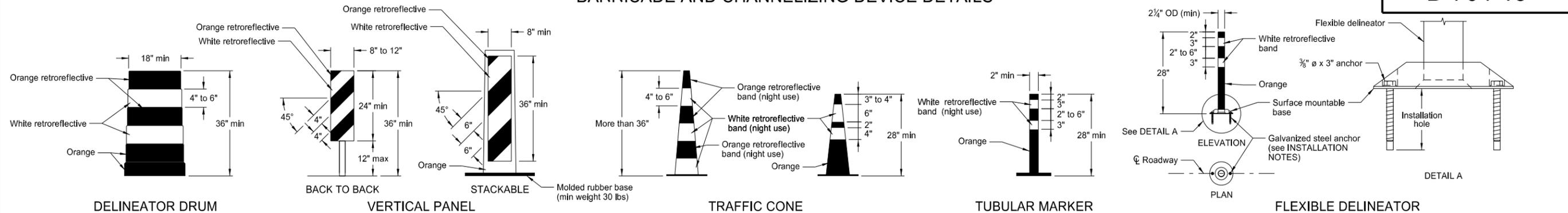
Notes:

- S = Posted Speed Limit in mph
W = Width of offset in feet
L = Taper length in feet
L = WS²/60 (40mph or less)
L = WS (45mph or more)
- If a shoulder taper is used, it should have a length of approximately 1/3 L. If a shoulder is used as a travel lane, a normal merging or shifting taper should be used.
- When paved shoulders of 8 foot width or more are closed, channelizing devices shall be used to close the shoulder in advance to delineate the beginning of the work space and direct vehicular traffic to remain within the traveled way.

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BARRICADE AND CHANNELIZING DEVICE DETAILS



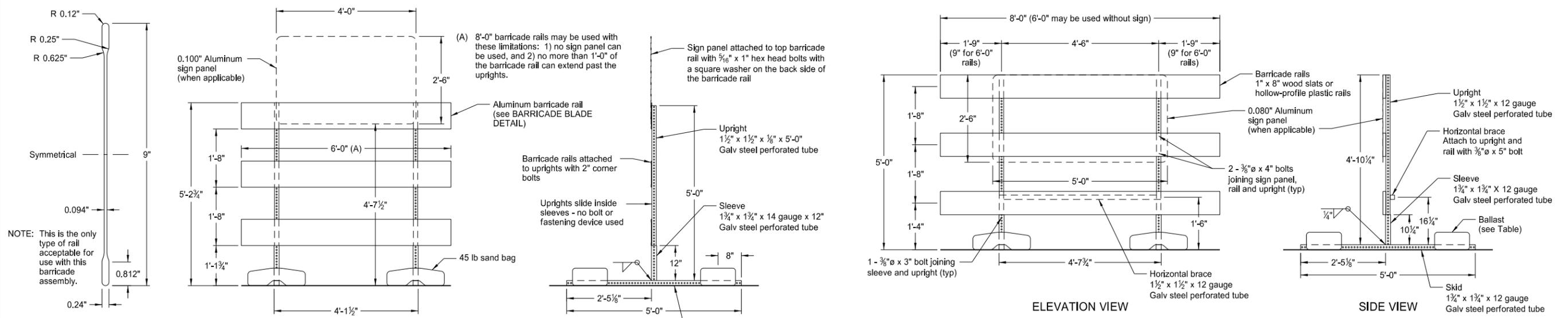
- INSTALLATION NOTES:**
1. Drill installation holes to diameter and depth as required by manufacturer's specifications.
 2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
 3. In lieu of bolted down base, the contractor may use an 8" x 8" butyl pad or hot melt butyl. Butyl shall be removed as close as possible to pavement surface.

The markings on drums shall be horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide. Each drum shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectORIZED spaces between the horizontal orange and white stripes shall not exceed 3" wide. Stripes shall not be placed on ribs or indentations in the drum. Drums shall have closed tops that will not allow collection of construction debris or other debris. Ballast shall not be placed on the top of a drum.

Markings for vertical panels shall be alternating orange and white retroreflective stripes, sloping downward in the direction vehicular traffic is to pass. Retroreflective sheeting shall be placed on both sides of panel and shall have 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, a stripe width of 6 inches shall be used.

RetroreflectORIZATION of cones more than 36" in height shall be provided by alternating orange and white retroreflective stripes. Each cone shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectORIZED space between the orange and white stripes shall not exceed 3" wide.

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



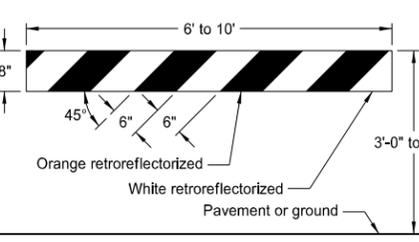
BARRICADE BLADE DETAIL

BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

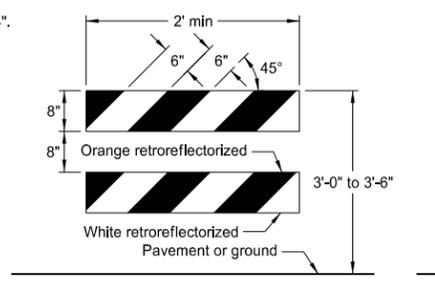
BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

BARRICADE RAIL DETAILS

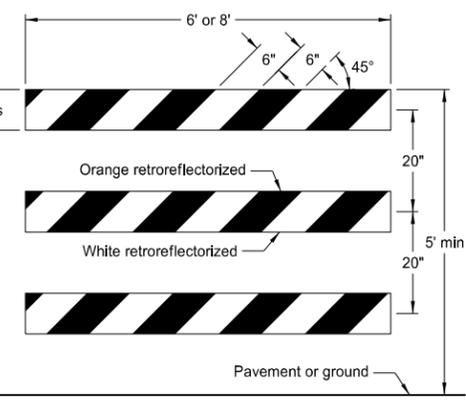
NOTE: Markings for barricades shall be alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Retroreflective sheeting shall be placed on both sides of the rails and shall have a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the barricade length is less than 36", the rail stripe width shall be 4".



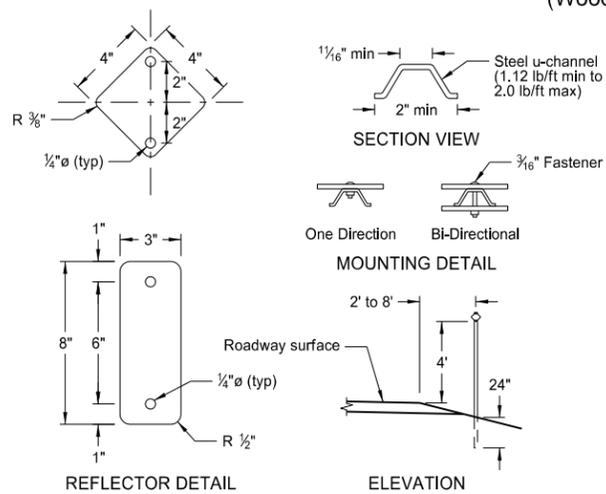
TYPE I BARRICADE



TYPE II BARRICADE



TYPE III BARRICADE



REFLECTOR DETAIL

ELEVATION

DELINEATORS

MINIMUM BALLAST (For each side of barricade support)

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

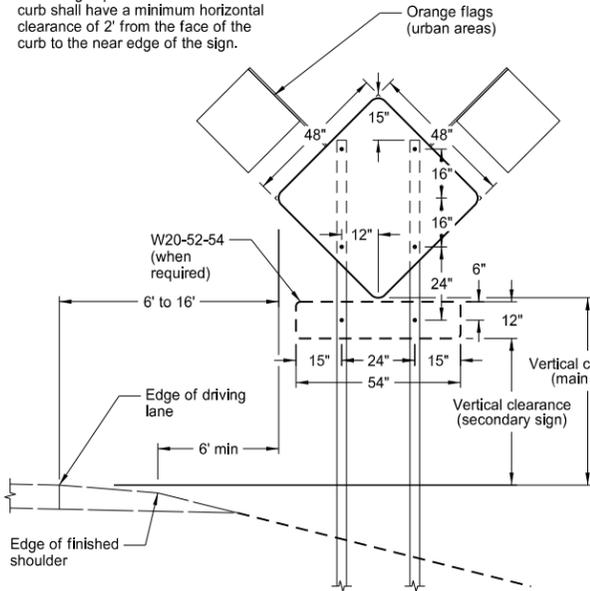
Note: The number of sandbags are based on a wind speed of 55 MPH. The sandbags are assumed to be placed at or near the ends of the skids.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE

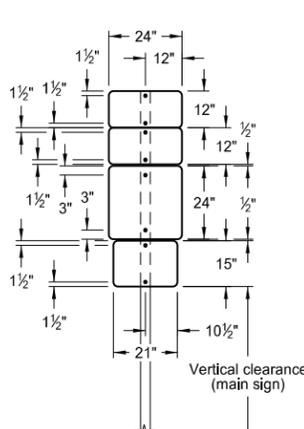
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CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

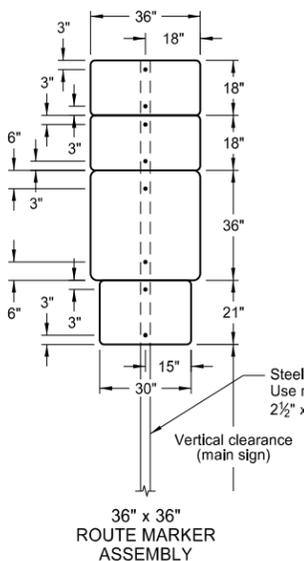
Note: Signs placed in sections with curb shall have a minimum horizontal clearance of 2' from the face of the curb to the near edge of the sign.



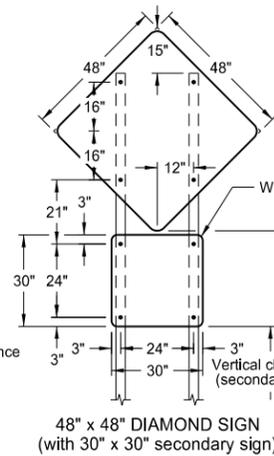
TYPICAL SECTION (48" x 48" diamond warning sign shown)



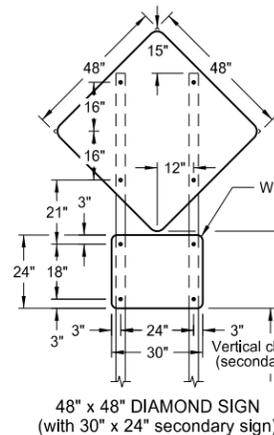
24" x 24" ROUTE MARKER ASSEMBLY



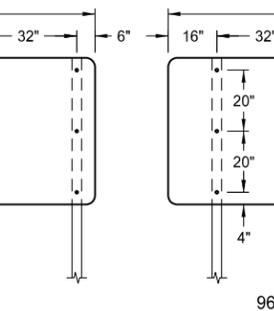
36" x 36" ROUTE MARKER ASSEMBLY



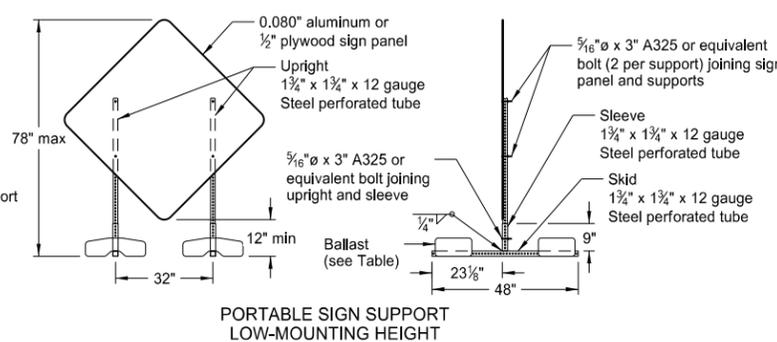
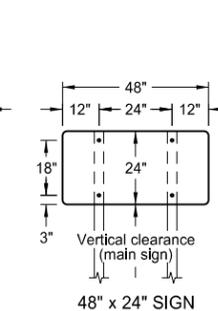
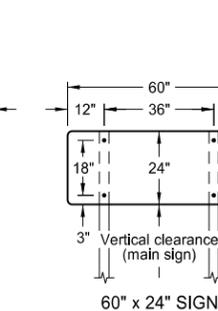
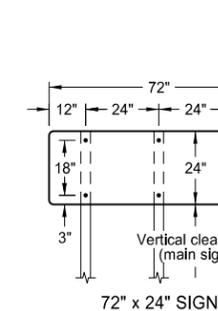
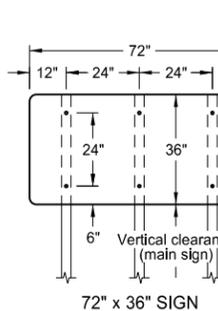
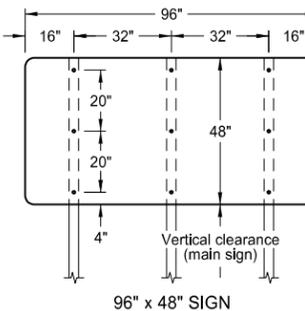
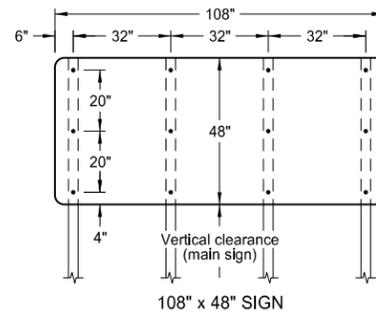
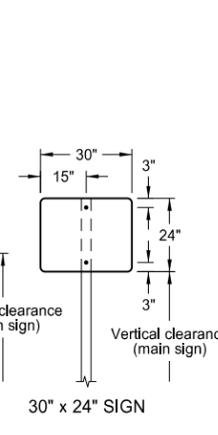
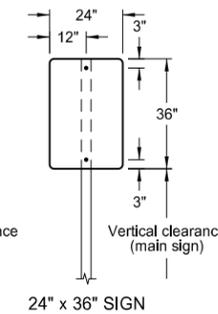
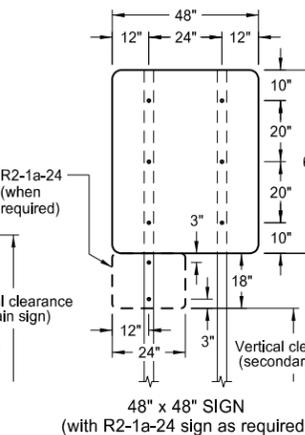
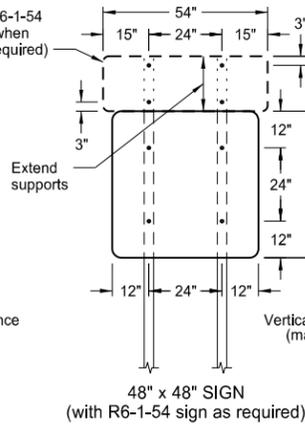
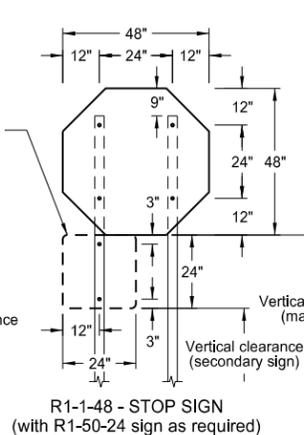
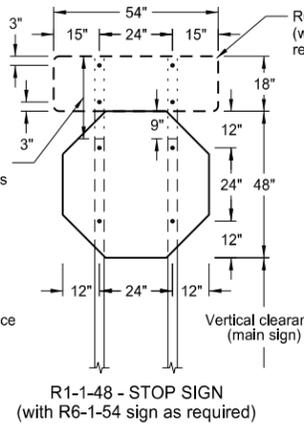
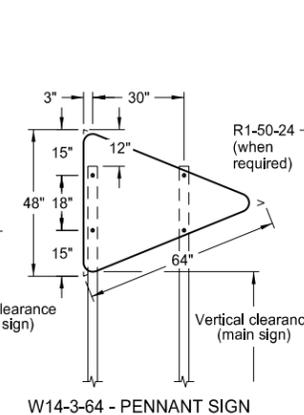
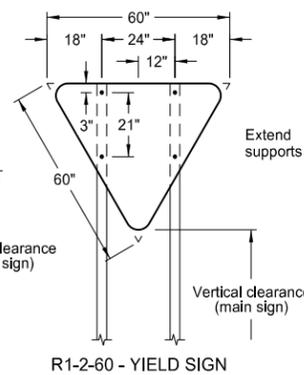
48" x 48" DIAMOND SIGN (with 30" x 30" secondary sign)



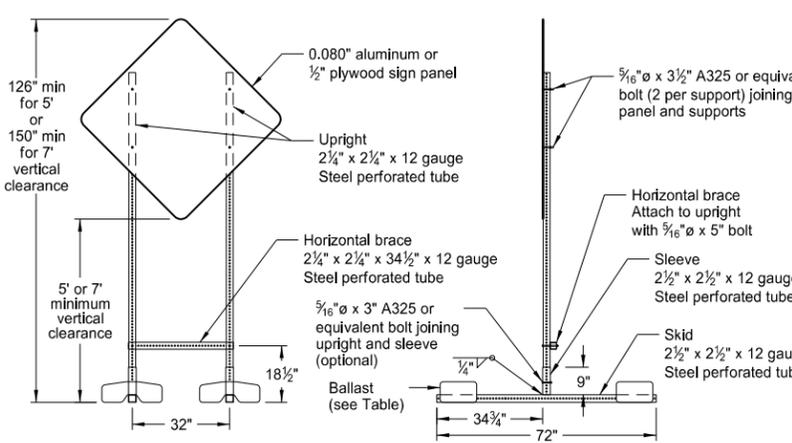
18" x 18" DIAMOND SIGN



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



PORTABLE SIGN SUPPORT LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT HIGH-MOUNTING HEIGHT

- NOTES:
- Sign Supports: Supports shall be galvanized or painted. 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, the minimum post size for assemblies containing a secondary sign is 3.0 lb/ft. Post sizes are based on a wind speed of 55 MPH.
Signs over 50 square feet should be installed on 2 1/2" x 2 1/2" perforated tube supports as a minimum.
Guy wires shall not be attached to sign supports. Wind beams may be attached to u-posts behind the sign panels.
 - Sign Panels: Provide sign panels made of 0.100" aluminum, 1/2" plywood, or other approved material, except where noted. All holes to be punched round for 3/8" bolts.
 - Alternate Messages: The signs that have alternate messages may have these alternate messages placed on a reflectorized plate (without a border) and installed and removed as required. (i.e. "Left" and "Right" message on a lane closure sign)
 - 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
 - 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 as stated above.
Large signs having an area exceeding 50 square feet shall have a minimum clearance of 7'-0" from the ground at the post.
 - Portable Signs: Provide portable signs that meet the vertical clearance as stated above. Use portable signs when it is necessary to place signs within the pavement surface.
When portable signs are used for 5 days or less, low-mounting height (minimum 12" vertical clearance) sign supports may be used as long as the view of the sign is not obstructed. Time delays caused by unforeseen circumstances, such as equipment breakdown, rain, subgrade failures, etc., will not accrue towards the 5 day period. The R9-8 through R9-11a series, W1-5 through W1-8 series, M4-10, and E5-1 may be used for longer than 5 days.
Signs mounted to the portable sign supports shown in the LOW-MOUNTING HEIGHT and HIGH-MOUNTING HEIGHT Details shall have a maximum surface area of 16 square feet.

MINIMUM BALLAST (For each side of sign support base)

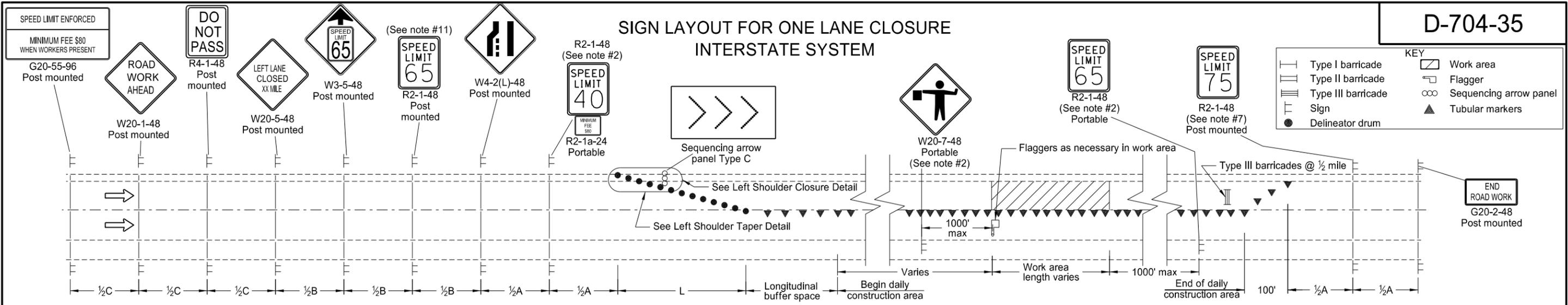
Sign Panel Mounting Height (ft)	Number of 25 lb sandbags for 4' x 4' sign panel
1'	6
5'	8
7'	10

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

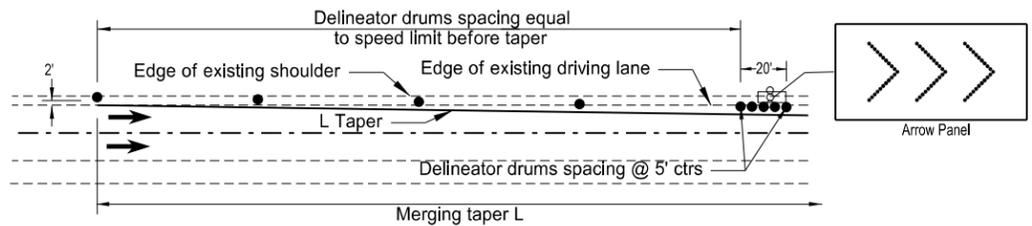
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE
11-14-13	Revised Note 6.

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SIGN LAYOUT FOR ONE LANE CLOSURE INTERSTATE SYSTEM



LEFT LANE CLOSED WORKERS IN WORK AREA

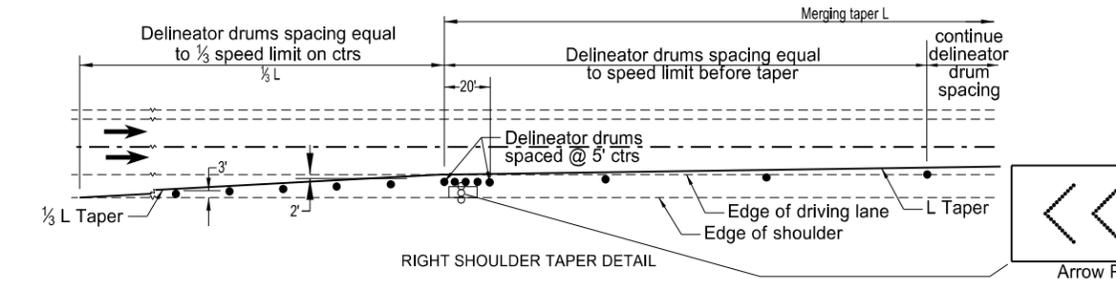
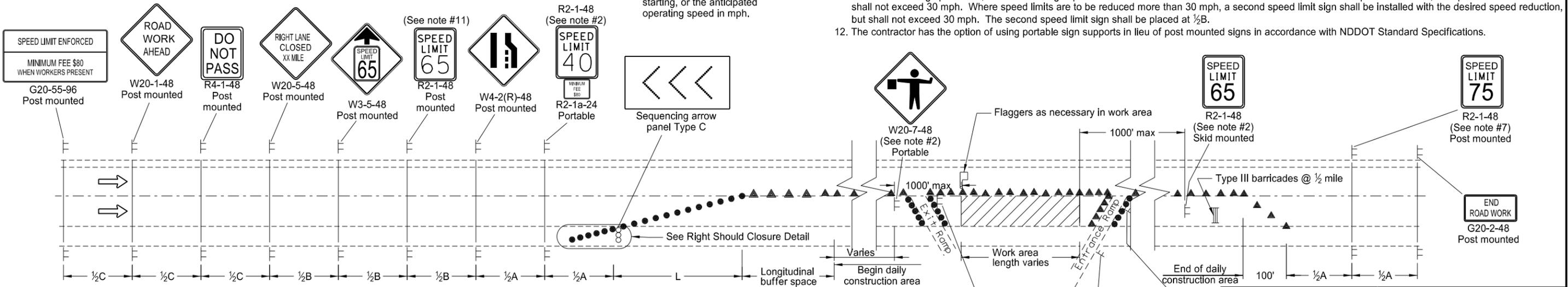


Speed (mph)*	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

*Posted speed, off-peak 85th percentile speed prior to work starting, or the anticipated operating speed in mph.

- Notes:
- Advance signs for flagging shall be installed when flaggers are flagging.
 - The advanced flagger sign and the speed limit signs shall be moved as the work area moves through the construction zone. When the work area is not visible from the flagger, the flagger station shall be placed so the work area is visible. The 65 mph speed limit and the 40 mph speed limit sign shall be spaced at 1/2A in advance of the flagger sign. The 65 mph speed limit sign shall also be moved. Upon completion of the work day or when workers are not present, the 65 mph speed limit, 40 mph speed limit, and the Minimum Fee \$80 signs shall be covered or removed.
 - RAMPS: When the work area encompasses an entrance ramp, the ramp shall be controlled by installing a 40 mph speed limit sign and covering any existing yield sign. Install new yield sign as necessary. When the main line 40 mph speed zone is moved past the ramp, the ramp speed limit sign shall be removed.
 - 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.
 - Delineator drums, used for tapering traffic shall be spaced at the dimension "S". Tubular markers used for tangents shall be spaced at 2 times dimension "S".
 - Sequencing arrow panels should normally be placed at the beginning of the taper. Where shoulder width does not provide sufficient room, the panel should be moved closer to the work area so that it can be placed on the roadway surface.
 - Type C shall be used on roadways with high traffic speeds and volumes (over 40 mph or 5000 ADT or greater).
 - The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
 - Existing speed limit signs within a reduced speed zone shall be covered.
 - Obliterated or covered pavement marking shall be paid for as Obliteration of Pavement Marking. The covering shall be approved by the engineer.
 - When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
 - The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 mph. Where speed limits are to be reduced more than 30 mph, a second speed limit sign shall be installed with the desired speed reduction, but shall not exceed 30 mph. The second speed limit sign shall be placed at 1/2B.
 - The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Specifications.

RIGHT LANE CLOSED WORKERS IN WORK AREA



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-7-2012	
REVISIONS	
DATE	CHANGE
6/23/2014	Revised Note 12

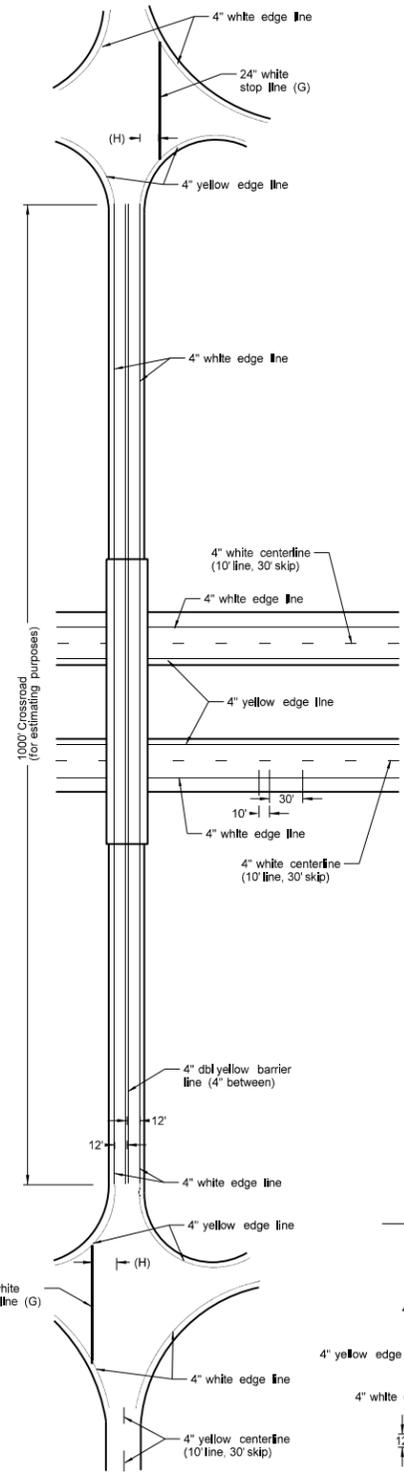
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INTERSTATE PAVEMENT MARKING 4 LANE DIVIDED HIGHWAY

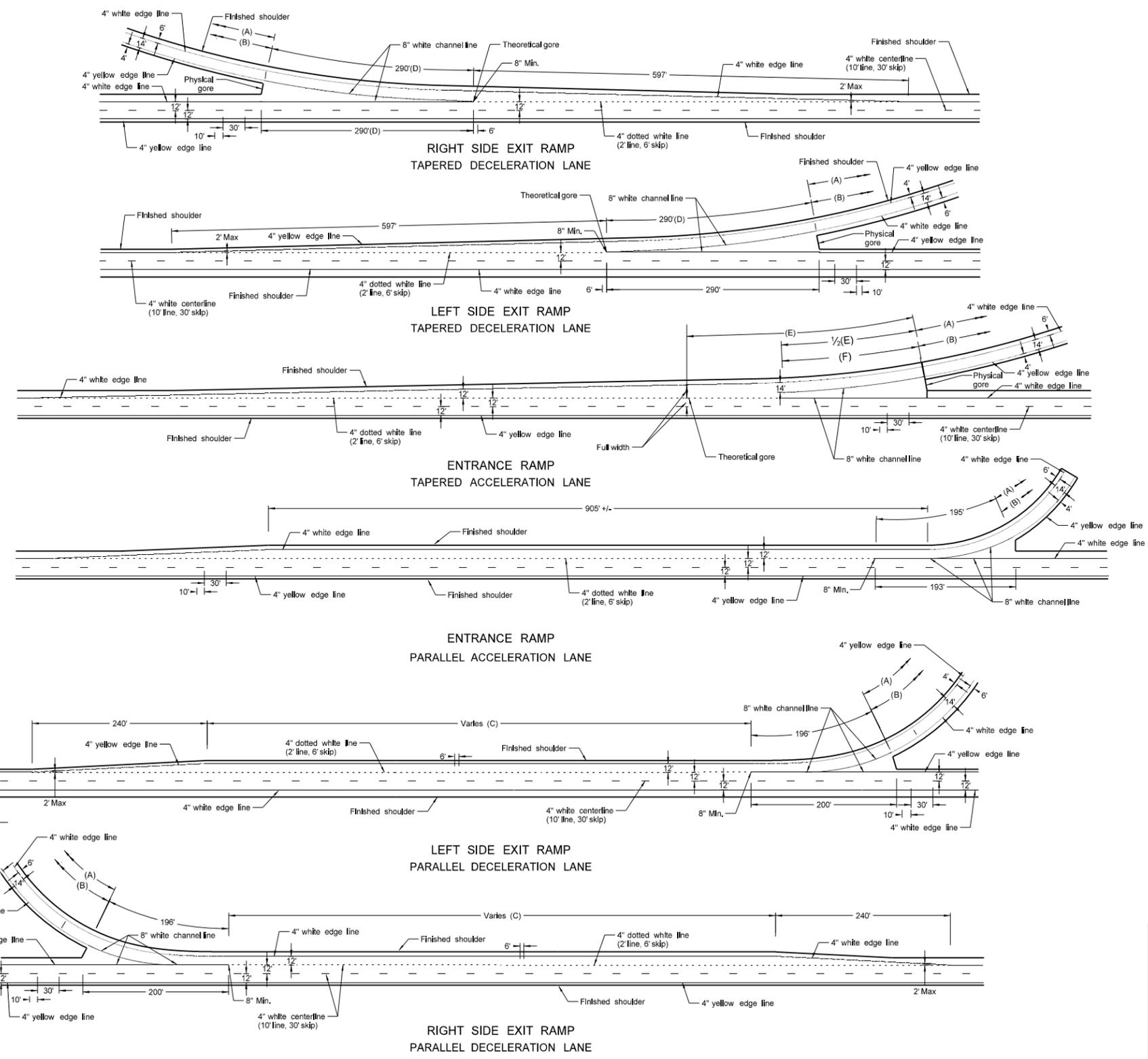
D-762-2

NOTE:

- (A) 4" White edge line
- (B) 4" Yellow edge line
- (C) Assume "varies" to equal 790' for purpose of estimate. The pavement marking shall begin at the beginning of the taper and end at the 8" line.
- (D) Beginning of physical gore to theoretical gore.
- (E) If the distance is less than 350' then extend the 8" channel line to the theoretical gore, otherwise use 195'.
- (F) 195' was used for estimating purposes.
- (G) Not required when crossroad approaches have gravel surface.
- (H) 4' minimum, 15' maximum from the nearest edge of the intersection traveled way.



CROSS-ROAD & STRUCTURE
The engineer in the field shall determine the length to be striped.



BASIS OF ESTIMATE		
LOCATION	ITEM	
Right or Left Side Exit Ramp TAPERED	8" White channel line	580 LF
	24" White stop line	60 LF
	4" White dotted line	148 LF
	4" White edge line	1115 LF
	4" Yellow edge line	1075 LF
Entrance Ramp TAPERED	8" White channel line	390 LF
	4" White dotted line	258 LF
	4" White edge line	1270 LF
	4" Yellow edge line	1075 LF
Right or Left Side Exit Ramp PARALLEL	8" White channel line	396 LF
	24" White stop line	60 LF
	4" White dotted line (C)	258 LF
	4" White edge line	1115 LF
	4" Yellow edge line	1075 LF
Entrance Ramp PARALLEL	8" White channel line	388 LF
	4" White dotted line	283 LF
	4" White edge line	1275 LF
	4" Yellow edge line	1075 LF
Main Line (Both Roadways)	4" White line, 10' line, 30' skip	2840 LF/M
	4" White edge line	10,560 LF/M
	4" Yellow edge line	10,560 LF/M
Cross Road	4" White edge line	2000 LF
	4" Dotted yellow barrier line (4" between)	2000 LF

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-3-11	
REVISIONS	
DATE	CHANGE

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