

DESIGN DATA				
Traffic	Average Daily			
Current 2024	Pass: 1,666	Trucks: 388	Total: 2,054	
Preventive Maintenance				

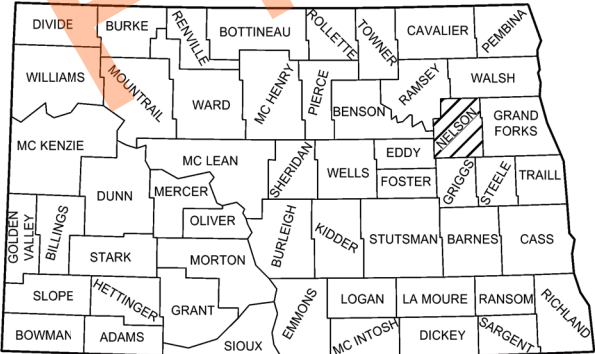
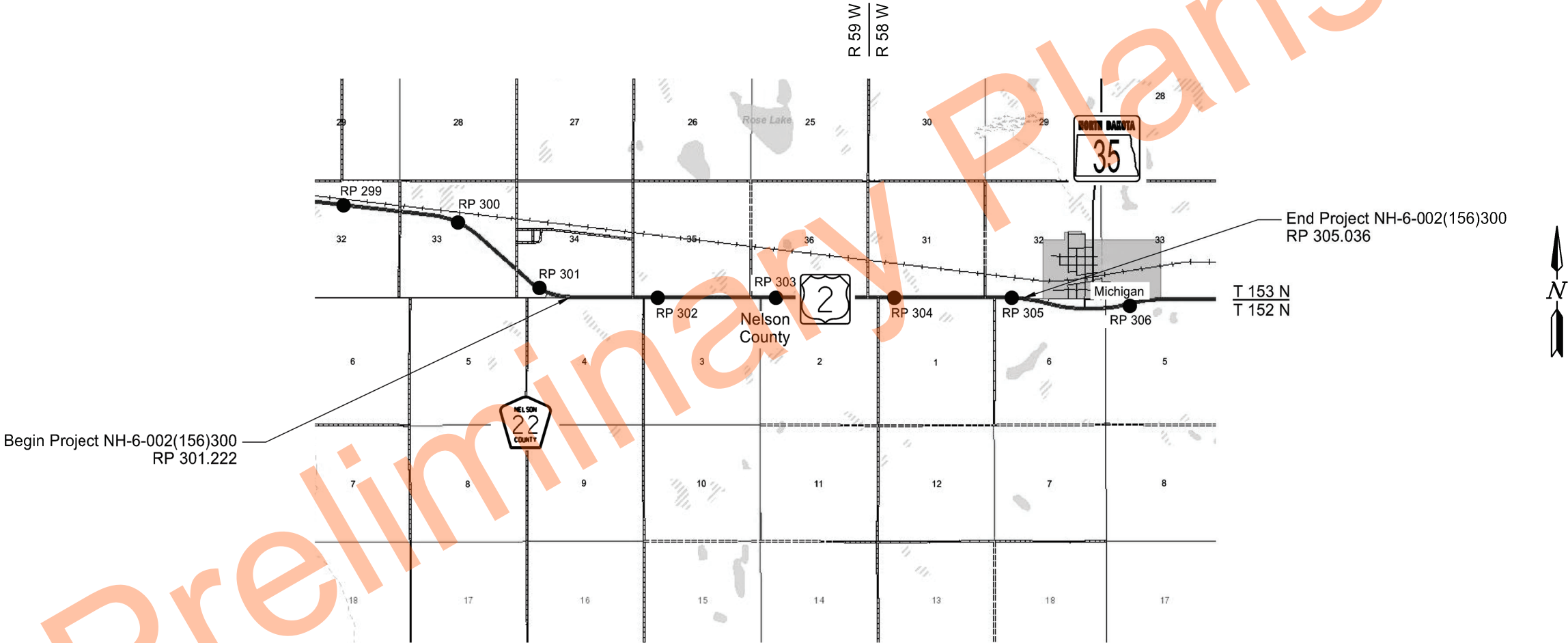
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

NH-6-002(156)300
Nelson County
5.3 Mi. E of ND 1 to Michigan Bypass - WB
Concrete Pavement Repair, Grinding

	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	NH-6-002(156)300	24716	1	1

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

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
NH-6-002(156)300	3.814	3.814



DESIGNER Adam Gorecki
DESIGNER Brian Ward
DESIGNER

STATE COUNTY MAP

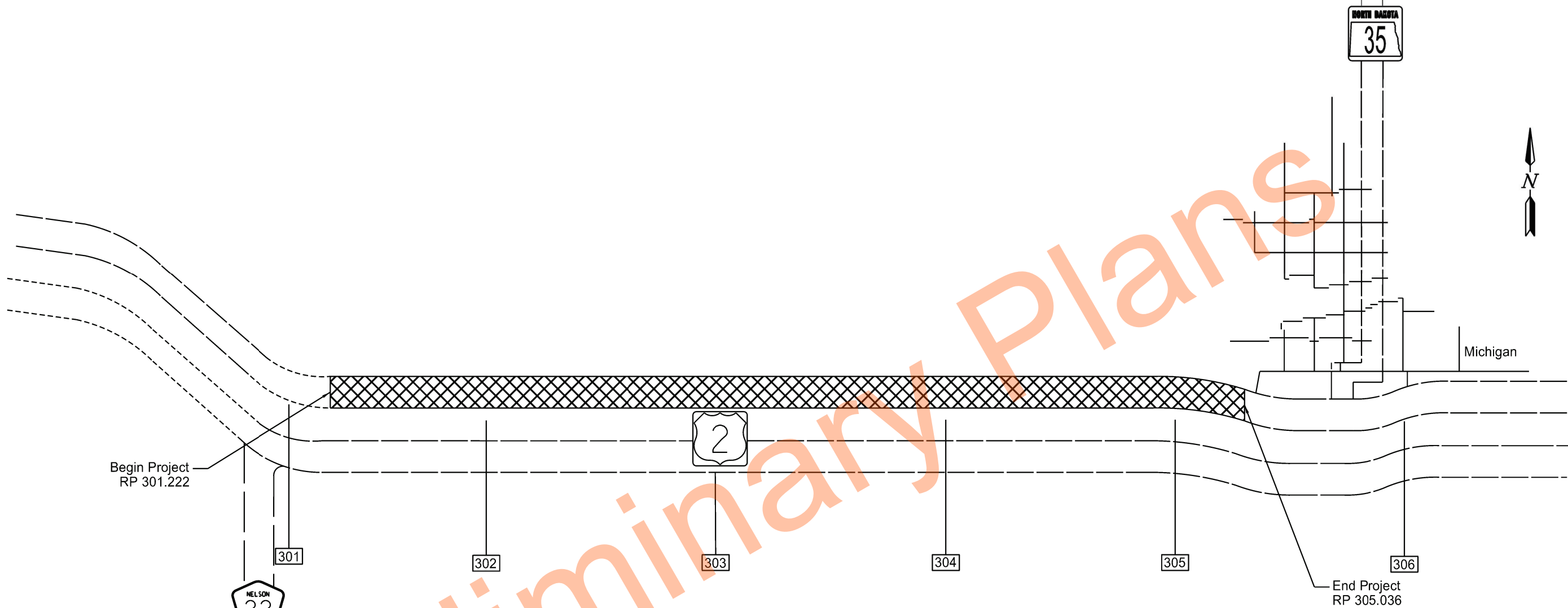
ND DEPARTMENT OF TRANSPORTATION
GRAND FORKS DISTRICT
[Signature] /05/26

GRAND FORKS DISTRICT

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 03/04/26
NORTH DAKOTA

TABLE OF CONTENTS						STATE	PROJECT NO.	SECTION NO.	SHEET NO.
						ND	NH-6-002(156)300	2	1
PLAN SECTIONS					LIST OF STANDARD DRAWINGS				
Section	Page(s)	Description	Number	Description					
1	1 - 1	Title Sheet	D-101-1, 2,3,4	NDDOT Abbreviations					
2	1 - 1	Table of Contents	D-101-10	NDDOT Utility Company and Organization Abbreviations					
4	1 - 1	Scope of Work	D-101-20, 21	Line Styles					
6	1 - 1	Notes	D-101-30, 31,32,33	Symbols					
8	1 - 1	Quantities	D-550-2	Longitudinal Joint Details					
10	1 - 1	Basis of Estimate	D-550-3	Transverse Contraction Joint Details					
11	1 - 6	Data Tables	D-704-7	Breakaway Systems For Construction Zone Signs - Perforated Tube					
20	1 - 6	General Details	D-704-8	Breakaway Systems For Construction Zone Signs - U-Channel Post					
30	1 - 1	Typical Sections	D-704-9	Construction Sign Details - Terminal And Guide Signs					
100	1 - 2	Work Zone Traffic Control	D-704-10	Construction Sign Details - Regulatory Signs					
			D-704-11, 11A	Construction Sign Details - Warning Signs					
			D-704-13	Barricade And Channelizing Device Details					
			D-704-14	Construction Sign Punching And Mounting Details					
			D-704-20	Terminal And Seal Coat Sign Layouts					
			D-704-22	Construction Truck And Temporary Detour Layouts					
			D-704-26	Miscellaneous Sign Layouts					
			D-704-27	Mobile Operation (Pavement Marking)					
			D-704-34, 34A	Sign Layout For One Lane Closure					
			D-704-50	Portable Sign Support Assembly					
			D-762-1	Pavement Marking Message Details					
			D-762-4	Pavement Marking					
			D-762-5	Pavement Marking for Standard 90 Degree Flared Intersection-(No Center Left Turn Lane on Major Road)					
			D-762-11	Short-Term Pavement Marking					

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-6-002(156)300	4	1



Begin Project
RP 301.222

End Project
RP 305.036

CPR and Grinding

Scope of Work

CPR and Grinding
5.3 Mi. E of ND 1 to Michigan Bypass - WB



NOTES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-6-002(156)300	6	1

105-P01 PAVEMENT SWEEPING: Sweep paved areas that were used by construction traffic before opening these areas to public traffic.

570-P01 CONCRETE PAVEMENT REPAIR: An additional 25% has been added to the quantities for "DOWELED CONTRACTION JOINT ASSEMBLY," "CONCRETE PAVEMENT REPAIR-FULL EPTH DOWELED," and "SPALL REPAIR-PARTIAL DEPTH" to be used as directed by the Engineer.

570-PO2 PCC PAVEMENT GRINDING: Complete a 1' feather pass on the driving lane shoulder and passing Lane as noted in section 10 sheet 1. This note overrides Spec 570.04 D.2.

704-100 TRAFFIC CONTROL SUPERVISOR: Provide a Traffic Control Supervisor.

704-P01 TRAFFIC CONTROL FOR CONCRETE PAVEMENT REPAIR: Provide traffic control consisting of a temporary lane closure and flagging.

Place vertical panels on the roadway centerline adjacent to full depth repair areas. Place panels every 10 feet and use a minimum of two panels at each full depth repair area.

Place Type I barricades in front of each full depth removal area. Position barricades so that they do not encroach into the traffic lane.

The traffic control device list is based on one lane closure whose total is the length of the project or less, and the following list:

- 1. Standard D-704-20, Type G;
- 2. Standard D-704-34 – quantities include {50} delineator drums for approaches;
- 3. Standard D-704-34A.

The Department will pay for delineator drums used for approach access within the work zone at the contract unit price.

Quantities of Type I barricades and vertical panels are based on {33} full depth repair locations and 2 vertical panels per location. The Department will pay for additional barricades and panels at the contract unit price for the devices.

Remove or shorten lane closures after new concrete has reached the required strength for opening to traffic specified in Section 570.04 A.1.b, "Full Depth Repairs".

762-050 PAVEMENT MARKING: If the Engineer and Contractor agree, plan quantity will be used as the measurement for payment for pavement markings.



ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-6-002(156)300	8	1

SPEC CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
103	0100 CONTRACT BOND	L SUM	0.2	0.2
570	0210 PCC PAVEMENT GRINDING	SY	31,326	31,326
570	0240 DOWELED CONTRACTION JOINT ASSEMBLY	LF	153	153
570	0650 CONCRETE PAVEMENT REPAIR-FULL DEPTH-DOWELED	SY	309	309
570	0966 RANDOM PCC CRACK CLEANING & SEALING	LF	4,555	4,555
570	1512 SPALL REPAIR-PARTIAL DEPTH	SF	1,729	1,729
570	1600 EPOXY COATED DEFORMED BARS	EA	1,708	1,708
702	0100 MOBILIZATION	L SUM	0.2	0.2
704	0100 FLAGGING	MHR	288	288
704	1000 TRAFFIC CONTROL SIGNS	UNIT	1,212	1,212
704	1050 TYPE I BARRICADE	EA	20	20
704	1052 TYPE III BARRICADE	EA	10	10
704	1060 DELINEATOR DRUMS	EA	50	50
704	1067 TUBULAR MARKERS	EA	175	175
704	1080 STACKABLE VERTICAL PANELS	EA	50	50
704	1087 SEQUENCING ARROW PANEL-TYPE C	EA	1	1
706	0500 AGGREGATE LABORATORY	EA	0.5	0.5
762	0131 EPOXY PVMT MK 6IN LINE-GROOVED	LF	5,035	5,035
762	0432 SHORT TERM 6IN LINE-TYPE NR	LF	5,035	5,035
762	1106 PVMT MK PAINTED 6IN LINE	LF	40,276	40,276

BASIS OF ESTIMATE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-6-002(156)300	10	1

PCC Pavement Grinding	
Basis	Quantity
RP 301.222 to RP 305.036	
12' Driving Lane & 1' feather pass on each side: Total 14'	31,326 SY

Temporary Pavement Marking		
Location	Basis	Quantity
RP 301.222 to RP 305.036		
Short Term 6IN Line - Type NR	1,320 LF/Mi	5,035 LF

Permanent Pavement Marking		
Location	Basis	Quantity
RP 301.222 to RP 305.036		
Epoxy Pvmt Mk Painted 6IN Line-Grooved (10' Line 30' Skip)	1,320 LF/Mi	5,035 LF
Pvmt Mk Painted 6IN White Edge Line	5,280 LF/Mi	20,138 LF
Pvmt Mk Painted 6IN Yellow Edge Line	5,280 LF/Mi	20,138 LF

Total 6IN Pavement Marking		
	White	Yellow
Short Term 6IN Line - Type NR	5,035 LF	
Pvmt Mk Painted 6IN Line	20,138 LF	20,138 LF
Epoxy Pvmt Mk Painted 6IN Line-Grooved	5,035 LF	

Estimated Flagging Hours		
Operation	Basis	Flagging
Concrete Pavement Repair	10 Days x 12 HR/Day x 2 Flaggers	240 MHR
PCC Pavement Grinding	4 Days x 12 HR/Day x 1 Flagger	48 MHR



													STATE	PROJECT NO.	SECTION NO.	SHEET NO.		
													ND	NH-6-002(156)300	11	1		
STATION	LANE	8IN CONCRETE PAVEMENT REPAIR- FULL DEPTH-DOWELED - WB RP 305.036 to RP 301.222					SPALL REPAIR					RANDOM PCC CRACK CLEANING AND SEALING		COMMENTS				
		DIMENSIONS			CONCRETE PAVEMENT REPAIR - FULL DEPTH - DOWELED	*SAW CONCRETE	*DEFORMED DOWEL BARS	*SMOOTH DOWEL BARS	DOWELED JOINT CONTRACTION ASSEMBLY	*TIE BARS	DIMENSIONS				AREA			
		L	x	W							L	x	W			LENGTH	STITCHING BARS	
		FT	x	FT	SY	LF	EA	EA	LF	EA	FT	x	FT	SF	LF	EA		
0+61	Driving	6	x	6	4.0	24					x			0				
0+61	Center	x									2	x	2	4				
1+71	Center	x									2	x	2	4				
2+26	Center	x									2	x	2	4				
4+30	Driving	x									2	x	2	4				
4+45	Driving	x									3	x	2	6				
4+45	passing	x									2	x	4	8				
4+58	Driving	6	x	12	8.0	36	10	10	4.0	1.0	x			0				
4+58	passing	6	x	12	8.0	36	10	10	4.0	1.0	x			0				
4+70	Driving	6	x	12	8.0	36	10	10	4.0	1.0	x			0				
4+70	Center	x									4	x	2	8				
4+70	Center	x									2	x	4	8				
4+83	Center	x									2	x	4	8				
4+93	Center	x									2	x	2	4				
5+05	Center	x									10	x	3	30				
5+13	Driving	6	x	12	8.0	36	10	10	4.0	1.0	x			0				
5+13	passing	6	x	12	8.0	36	10	10	4.0		x			0				
7+76	Center	x								1.0	2	x	2	4				
8+31	Center	x									2	x	2	4				
9+68	Driving	6	x	6	4.0	24	8		4.0	1.0	x			0				
11+88	Center	x									2	x	2	4				
12+54	Center	x									2	x	2	4				
12+95	Driving	6	x	12	8.0	36	10	10		1.0	x			0	24		24' Crack Seal	
13+24	Center	x									2	x	5	10				
15+59	Center	x									2	x	2	4				
16+16	Center	x									2	x	2	4				
16+82	Driving	x									2	x	2	4				
19+17	Driving	x									2	x	4					
19+73	Center	x									2	x	4	8				
19+88	Driving	x									2	x	2	4				
20+18	Driving	x									x			0	13	9		
20+33	Driving	x									2	x	2	4				
20+47	Driving	x									12	x	2	24				
20+58	Driving	x									12	x	2	24				
20+75	Driving	x									x				13	9		
20+91	Driving	x									2	x	2	4				
20+91	Driving	x									x			0	13	9		
21+49	Driving	x									x			0	12	8		
21+59	Driving	x									2	x	2	4				
22+14	Driving	x									2	x	2	4				
23+25	Driving	x									2	x	2	4				
23+37	Center	x									2	x	2	4				
23+51	Center	x									2	x	2					
23+93	Center	x									2	x	2					
24+36	Center	x									2	x	4					
24+49	Center	x									2	x	2					
24+72	Center	x									2	x	2	4				
26+02	Center	x									2	x	2	4				
26+13	Center	x									2	x	2	4				
26+28	Center	x									2	x	2	4				
26+83	Center	x									2	x	2	4				
26+99	Center	x									2	x	2	4				
27+27	Center	x									2	x	2	4				
27+39	Center	x									2	x	2	4				
27+56	Center	x									3	x	2	6				
												CPR Data Tables					REGISTERED PROFESSIONAL ENGINEER DUSTIN LANG PE-6394 DATE 02/27/26 NORTH DAKOTA	
												CPR and Grinding 5.3 Mi. E of ND 1 to Michigan Bypass - WB						

													STATE	PROJECT NO.	SECTION NO.	SHEET NO.	
													ND	NH-6-002(156)300	11	2	
STATION	LANE	8IN CONCRETE PAVEMENT REPAIR- FULL DEPTH-DOWELED - WB RP 305.036 to RP 301.222								SPALL REPAIR			RANDOM PCC CRACK CLEANING AND SEALING		COMMENTS		
		DIMENSIONS			CONCRETE PAVEMENT REPAIR - FULL DEPTH - DOWELED	*SAW CONCRETE	*DEFORMED DOWEL BARS	*SMOOTH DOWEL BARS	DOWELED JOINT CONTRACTION ASSEMBLY	*TIE BARS	DIMENSIONS			AREA		LENGTH	STITCHING BARS
		L	x	W							L	x	W				
		FT	x	FT	SY	LF	EA	EA	LF	EA	FT	x	FT	SF	LF	EA	
27+56	Center		x								2	x	2	4			
27+69	Center		x								2	x	2	4			
27+96	Passing		x								2	x	13	26			
28+28	Center		x								2	x	2	4			
29+89	Center		x								2	x	2	4	13	9	
30+46	Center		x								2	x	2	4			
31+13	Center		x								2	x	2	4	13	9	
32+09	Center		x								2	x	2	4	13	9	
32+22	Center		x								2	x	2	4	13	9	
34+67	Center		x								2	x	2	4			
34+83	Center		x								2	x	2	4	13	9	
35+51	Passing	10	x	12	13.3	44	20		8.0	1.0	x			0	39	20	
35+75	Passing	6	x	6	4.0	24	4	4		1.0	x			0			
35+75	Driving	6	x	6	4.0	24	4	4		1.0	x			0			
35+94	Center		x								2	x	2	4	26	14	
37+16	Center		x								2	x	2	4			
40+90	Center		x								2	x	2	4			
46+55	Center		x								2	x	3	6	13	9	
48+60	Center		x								2	x	3	6			
49+41	Center		x								x			0			
49+41	Driving		x								2	x	2	4	13	9	
49+55	Driving		x								x			0			
49+55	Driving		x								x			0			
49+71	Driving		x								x			0	13	9	
49+84	Driving		x								2	x	2	4			
49+95	Driving		x								x			0	10	5	
49+95	Driving		x								x			0			
50+29	Driving		x								2	x	2				
51+76	Driving		x								2	x	2	4			
52+46	Driving		x								x			0			
52+46	Driving		x								2	x	2	4			
52+70	Center		x								2	x	3	6	13	9	
53+14	Driving		x								x			0			
53+14	Driving	6	x	6	4.0	24	4		4.0	1.0	x			0			
53+37	Center		x								2	x	2		16	11	
53+94	Driving		x								x			0			
54+64	Driving		x								13	x	2	26			
54+78	Center		x								2	x	3	6			
56+13	Center		x								x			0	13	9	
56+29	Driving		x								2	x	2	4			
56+41	Driving		x								x			0			
56+41	Driving		x								2	x	2	4			
56+52	Passing	15	x	6	10.0	42	20		4.0	2.0	x						
56+80	Center		x								2	x	2				
56+82	Center		x								2	x	2				
56+95	Center		x								2	x	2				
57+50	Center		x								x			0			
57+50	Driving		x								2	x	2	4			
57+62	Center		x								2	x	2	4			
57+62	Center		x								x			0			
57+62	Driving		x								2	x	2	4			
57+67	Center		x								2	x	2	4			
57+77	Center		x								3	x	4	12			
57+77	Center		x								x			0			
57+77	Driving		x								2	x	2	4			

CPR Data Tables

CPR and Grinding
5.3 Mi. E of ND 1 to Michigan Bypass - WB

REGISTERED PROFESSIONAL ENGINEER

DUSTIN LANG

PE-6394

DATE 02/27/26

NORTH DAKOTA

											STATE	PROJECT NO.		SECTION NO.	SHEET NO.		
											ND	NH-6-002(156)300		11	3		
STATION	LANE	8IN CONCRETE PAVEMENT REPAIR- FULL DEPTH-DOWELED - WB RP 305.036 to RP 301.222							SPALL REPAIR				RANDOM PCC CRACK CLEANING AND SEALING		COMMENTS		
		DIMENSIONS			CONCRETE PAVEMENT REPAIR - FULL DEPTH - DOWELED	*SAW CONCRETE	*DEFORMED DOWEL BARS	*SMOOTH DOWEL BARS	DOWELED JOINT CONTRACTION ASSEMBLY	*TIE BARS	DIMENSIONS			AREA		LENGTH	STITCHING BARS
		L	x	W							L	x	W				
		FT	x	FT	SY	LF	EA	EA	LF	EA	FT	x	FT	SF	LF	EA	
57+90	center		x								2	x	2	4			
57+90	center		x								2	x	2	4			
57+90	driving		x									x		0	13	9	
58+16	center		x								2	x	2	4			
58+16	center		x								2	x	2	4			
58+17	driving		x									x		0	26	18	
58+31	center		x								2	x	2	4			
58+43	center		x								2	x	2	4			
58+43	center		x								2	x	2	4			
58+43	driving		x									x		0	13	9	
58+56	center		x								2	x	2	4			
58+72	Passing	8	x	12	10.7	44	20		6.0	1.0		x		0			
59+42	Passing		x								2	x	2	4			
59+81	driving		x								2	x	2	4			
60+10	center		x								2	x	2	4			
60+22	center		x								2	x	2	4			
61+44	center		x								2	x	2	4			
63+48	center		x								2	x	2	4			
64+58	center		x									x		0	13	9	
64+71	center		x								2	x	2	4			
64+71	driving		x								2	x	2	4			
64+72	driving		x									x		0	84	56	
65+00	driving		x								2	x	2	4			
66+23	driving		x								2	x	2	4			
69+65	driving		x								2	x	4	8			
69+77	driving	13	x	8	11.6	50	15		6.0	1.0		x		0			
70+22	driving		x								2	x	2	4			
70+22	driving		x									x		0	26	18	
70+47	driving	6	x	6	4.0	24	4		4.0	1.0		x		0			
77+32	driving		x								2	x	2	4			
83+09	driving		x								2	x	6	12			
85+28	center		x								2	x	2	4			
89+32	driving		x								2	x	2	4			
90+11	driving		x								2	x	2	4			
90+25	center		x								2	x	2				
90+66	driving		x								2	x	2	4			
91+89	driving		x								2	x	2	4			
93+28	center		x								2	x	2	4			
93+84	center		x								2	x	2	4			
94+80	driving		x								2	x	2	4			
96+15	driving		x								2	x	2	4			
97+55	driving		x								2	x	2	4			
97+55	Passing		x								3	x	2				
97+55	center		x									x		0	26	18	
98+09	center		x								2	x	2				
98+23	center		x								2	x	2				
99+65	center		x									x		0	10	8	
99+75	driving		x								3	x	4	12			
99+75	center		x									x		0	13	9	
99+89	center		x									x		0	163	109	
101+53	driving		x								5	x	3	15			
101+57	center		x									x		0	33	22	
101+91	center		x								6	x	2	12			
101+95	center		x									x		0	135	90	
103+30	driving	6	x	12	8.0	36	20		10.0	1.0		x		0			

CPR Data Tables

CPR and Grinding
5.3 Mi. E of ND 1 to Michigan Bypass - WB

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 02/27/26
NORTH DAKOTA

STATION	LANE	8IN CONCRETE PAVEMENT REPAIR- FULL DEPTH-DOWELED - WB RP 305.036 to RP 301.222								SPALL REPAIR			RANDOM PCC CRACK CLEANING AND SEALING		COMMENTS	
		DIMENSIONS			CONCRETE PAVEMENT REPAIR - FULL DEPTH - DOWELED	*SAW CONCRETE	*DEFORMED DOWEL BARS	*SMOOTH DOWEL BARS	DOWELED JOINT CONTRACTION ASSEMBLY	*TIE BARS	DIMENSIONS					AREA
		L	x	W							L	x	W			
		FT	x	FT	SY	LF	EA	EA	LF	EA	FT	x	FT	SF	LF	EA
103+33	Driving		x									x		0	37	25
103+95	Center		x									4 x 3		12		
103+97	Driving		x									x		0	69	50
104+69	Passing	10	x	12	13.3	44	10		10.0	2.0		x		0		
104+82	Driving		x									x		0	324	216
108+88	Driving		x									3 x 4		12		
109+07	Driving		x									x		0	204	136
112+91	Center		x									2 x 2		4		
112+91	Driving		x									x		0	10	6
113+06	Center		x									2 x 2		4		
116+77	Passing		x									2 x 13		26		
116+77	Center		x									2 x 2		4		
116+91	Driving		x									x		0	30	18
117+16	Center		x									4 x 4		16		
117+29	Driving	6	x	10	6.7	32	6		4.0	1.0		x		0		
118+69	Driving	6	x	6	4.0	24	4		4.0	1.0		x		0		Mainly on shoulder
121+52	Center		x									2 x 2		4		
122+04	Driving		x									x		0	36	24
124+77	Driving		x									x		0	15	10
125+04	Center		x									2 x 2		4		
127+23	Center		x									2 x 2		4		
127+53	Driving		x									x		0	26	16
127+78	Center		x									4 x 2		8		
127+78	Driving		x									x		0	130	87
129+12	Driving	6	x	6	4.0	24	4		4.0	1.0		x		0		
129+21	Driving		x									x		0	36	24
129+56	Center		x									2 x 5		10		
130+28	Driving		x									x		0	23	18
131+18	Driving		x									x		0	5	3
131+28	Driving		x									x		0	50	35
132+02	Passing		x									4 x 2		8		
132+02	Driving		x									x		0	10	6
132+16	Center		x									2 x 2		4		
132+16	Driving		x									x		0	10	6
132+30	Driving		x									4 x 4				
132+47	Driving	15	x	6	10.0	42	10	10		1.0		x		0		
132+57	Driving		x									x		0	13	9
132+72	Driving		x									2 x 15		30		
132+87	Driving		x									x		0	80	80' Crack Seal
133+80	Center		x									2 x 2		4		
134+52	Driving		x									x		0	80	60
134+65	Center		x									2 x 2				
135+20	Center		x									2 x 2				
136+70	Center		x									2 x 2				
136+96	Center		x									2 x 2				
136+96	Driving		x									x		0	30	20
143+56	Driving		x									x		0	26	26' Crack Seal
144+01	Driving		x									x		0	13	13' Crack Seal
144+23	Driving		x									x		0	26	26' Crack Seal
147+68	Center		x									2 x 2		4		
178+48	Center		x									2 x 3		6		
150+66	Center		x									2 x 2		4		
151+01	Driving	6	x	6	4.0	24	4		4.0	1.0		x		0		
151+31	Driving		x										x		15	15' Crack Seal

Preliminary Plans

CPR Data Tables

CPR and Grinding
5.3 Mi. E of ND 1 to Michigan Bypass - WB



STATE

PROJECT NO.

SECTION NO.

SHEET NO.

ND

NH-6-002(156)300

11

5

STATION	LANE	DIMENSIONS			CONCRETE PAVEMENT REPAIR - FULL DEPTH - DOWELED	*SAW CONCRETE	*DEFORMED DOWEL BARS	*SMOOTH DOWEL BARS	DOWELED JOINT CONTRACTION ASSEMBLY	*TIE BARS	DIMENSIONS			AREA	RANDOM BCC		COMMENTS
		L	x	W							L	x	W		LENGTH	STITCHING BARS	
		FT	x	FT		LF	EA	EA	LF	EA	FT	x	FT	SF	LF	EA	
151+31	Passing		x											0	15		15' Crack Seal
153+76	Driving		x											0	32		32' Crack Seal
153+85	Driving		x											0	26		26' Crack Seal
154+12	Center		x								2	x	2	4			
154+29	Driving		x											0	13		13' Crack Seal
154+44	Passing		x								15	x	2	30			
155+36	Driving		x											0	80		80' Crack Seal
155+36	Driving		x											0	20	9	
155+53	Driving		x								2	x	2	4			
155+55	Driving		x											0	18		18' Crack Seal
155+74	Center		x								4	x	2	8			
155+78	Driving		x											0	7		7' Crack Seal
155+85	Driving		x								7	x	2	14			
156+20	Center		x								13	x	2	26			
156+32	Passing		x								5	x	2	10			
156+36	Driving		x											0	63	50	
157+02	Driving		x								3	x	2	6			
157+15	Driving		x											0	85		85' Crack Seal
158+03	Center		x								4	x	4	16			
158+92	Driving		x											0	30		30' Crack Seal
158+92	Center		x								3	x	2	6			
159+24	Driving		x											0	13		13' Crack Seal
159+34	Center		x								13	x	2	26			
159+47	Driving		x											0	13		13' Crack Seal
159+60	Driving		x								3	x	4	12			
159+74	Driving		x											0	130	87	
159+75	Driving		x											0	26	18	
163+09	Driving		x											0	26		26' Crack Seal
163+33	Driving		x											0	13	9	
163+62	Driving		x								2	x	2	4			
167+06	Driving		x								2	x	2	4			
167+06	Driving		x											0	7	9	
167+06	Driving		x								2	x	2	4			
167+16	Driving		x								3	x	2	6			
167+16	Driving		x											0	13	11	
167+29	Center		x								2	x	2	4			
173+28	Passing	6	x	6	4.0	24	4		4.0	1.0				0			
173+45	Driving		x								2	x	2	4			
175+52	Driving		x											0	7		7' Crack Seal
175+61	Driving	13	x	12	17.3	50	20	20	10.0	2.0				0			
175+70	Passing	18	x	12	24.0	60	20	20	10.0	3.0				0			
176+16	Driving		x								2	x	2	4			
176+16	Driving		x											0	26		26' Crack Seal
176+42	Driving		x								4	x	2				
176+42	Passing		x											0	13		
179+87	Driving		x											0	50		50' Crack seal
180+11	Driving		x								2	x	2	4			
180+69	Passing		x											0	36		36' Crack Seal
181+11	Passing		x											0	13		
181+38	Passing		x											0	45		45' Crack Seal
182+49	Center		x								13	x	2	26			
182+68	Center	6	x	12	8.0	36	20	20		1.0				0			
182+68	Center	7	x	12	9.3	38	20	20		1.0				0			
183+05	Driving		x											0	13		13' Crack Seal
183+16	Driving		x											0	13	9	

CPR Data Tables

CPR and Grinding
5.3 Mi. E of ND 1 to Michigan Bypass - WB



											STATE	PROJECT NO.	SECTION NO.	SHEET NO.
											ND	NH-6-002(156)300	11	6

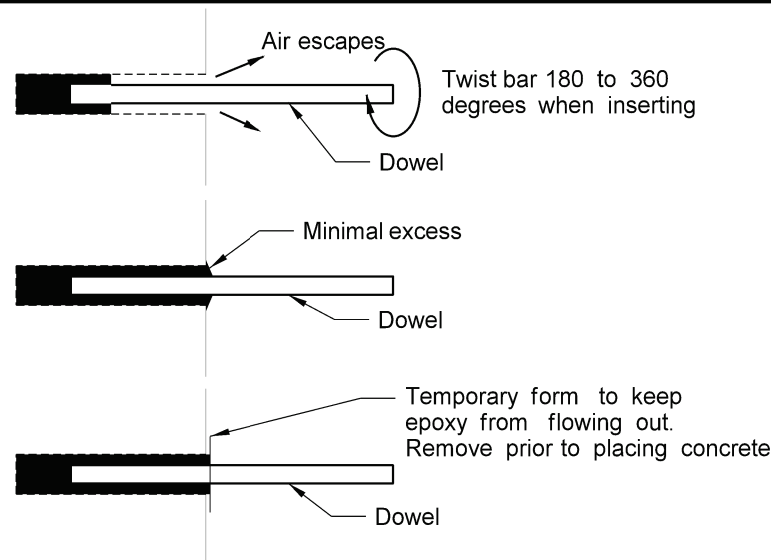
STATION	LANE	8IN CONCRETE PAVEMENT REPAIR- FULL DEPTH-DOWELED - WB RP 305.036 to RP 301.222								SPALL REPAIR		RANDOM PCC CRACK CLEANING AND SEALING		COMMENTS			
		DIMENSIONS			CONCRETE PAVEMENT REPAIR - FULL DEPTH - DOWELED	*SAW CONCRETE	*DEFORMED DOWEL BARS	*SMOOTH DOWEL BARS	DOWELED JOINT CONTRACTION ASSEMBLY	*TIE BARS	DIMENSIONS		AREA				
		L	x	W							L	x			W	LENGTH	STITCHING BARS
		FT	x	FT	SY	LF	EA	EA	LF	EA	FT	x	FT	SF	LF	EA	
183+69	Central		x								2	x	2	4			
183+81	Driving	6	x	12	8.0	36	9	9		1.0		x		0			
183+95	Passing	10	x	12	13.3	44	9	9	8.0	2.0		x		0			
184+38	Driving		x									x		0	212		212' Crack Seal
186+57	Driving	12	x	12	16.0	48	9	9	8.0	2.0		x		0			
186+57	Driving	6	x	6	4.0	24	4		4.0	1.0		x		0			
186+72	Driving		x									x		0	26		26' Crack Seal
186+98	Central		x								13	x	2	26			
187+14	Central		x								13	x	2	26			
187+25	Driving		x									x		0	13		13' Crack Seal
187+42	Central		x								2	x	2	4			
187+53	Driving		x									x		0	203		203' Crack Seal
189+88	Driving		x									x		0	46		46' Crack Seal
190+39	Central		x								4	x	3	12			
190+43	Driving		x									x		0	50		50' Crack Seal
190+95	Driving		x									x		0	13	9	
191+93	Central		x								2	x	2	4			
192+04	Driving		x									x		0	13		13' Crack Seal
195+21	Passing		x								2	x	2	4			
197+42	Driving		x									x		0	13	9	
197+70	Shoulder/Driving	7	x	6	4.7	26	4		4.0	1.0		x		0			
197+71	Driving		x									x		0	13		13' Crack Seal
197+92	Driving		x									x		0	47		47' Crack Seal

WESTBOUND CPR TOTALS									
CONCRETE PAVEMENT REPAIR 8IN						SPALL REPAIR		RANDOM PCC CRACK CLEANING AND SEALING	
CONCRETE PAVEMENT REPAIR - FULL DEPTH - DOWELED	*SAW CONCRETE	*DEFORMED DOWEL BARS	*SMOOTH DOWEL BARS	DOWELED CONTRACTION JOINT ASSEMBLY	*TIE BARS	AREA		LENGTH	STITCHING BARS
SY	LF	EA	EA	LF	EA	SF		LF	EA
248	1058	289	113	122	37	1383		3644	1366
Total + 25%	309	1323	361	141	46	1729		4555	1708

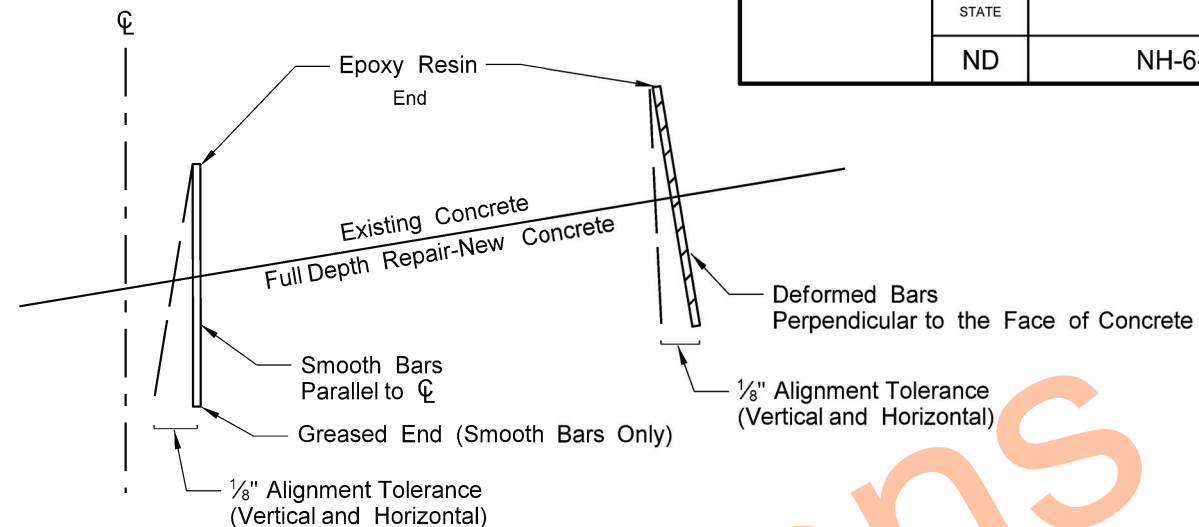
*Note: Saw Concrete, Deformed Dowel Bars, Smooth Dowel Bars, and Tie Bars will not be measured and paid for separately, but included in Bid Item 570-0650

CPR Data Tables	REGISTERED PROFESSIONAL ENGINEER DUSTIN LANG PE-6394 DATE 02/27/26 NORTH DAKOTA
CPR and Grinding 5.3 Mi. E of ND 1 to Michigan Bypass - WB	

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-6-002(156)300	20	1



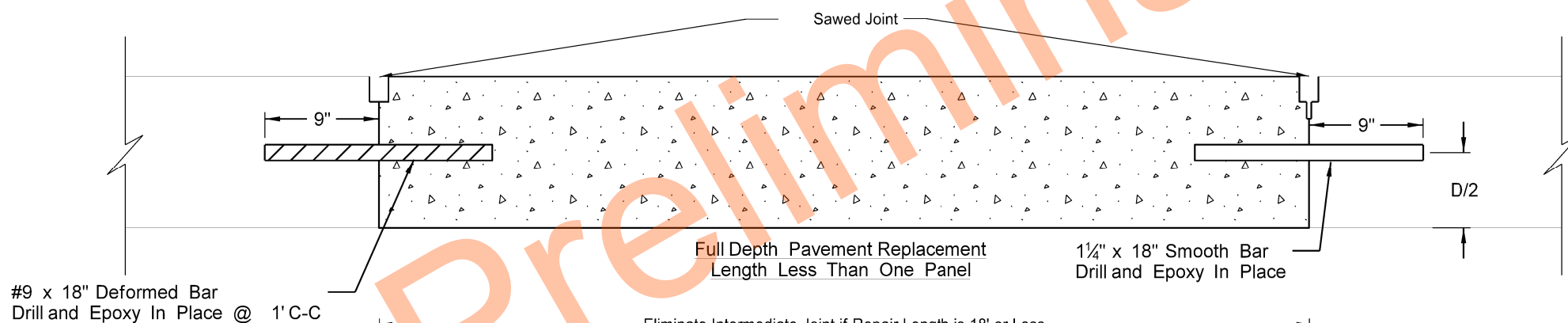
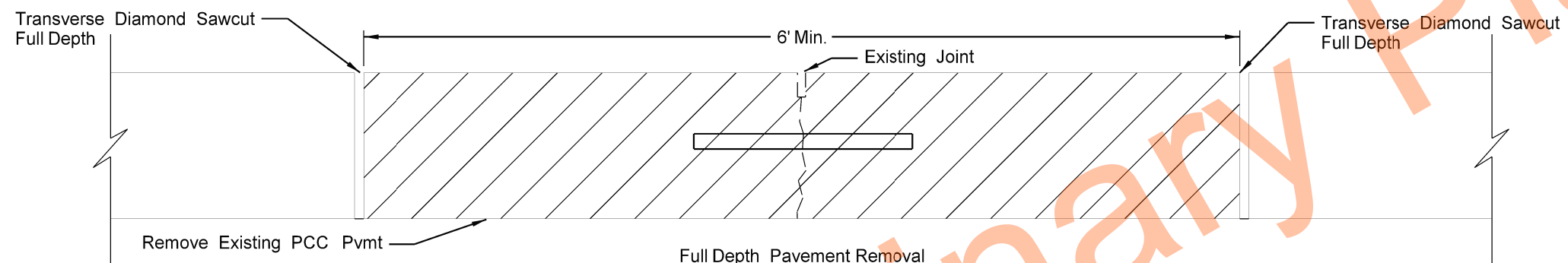
Dowel & Epoxy Installation
(Smooth or Deformed Bars)



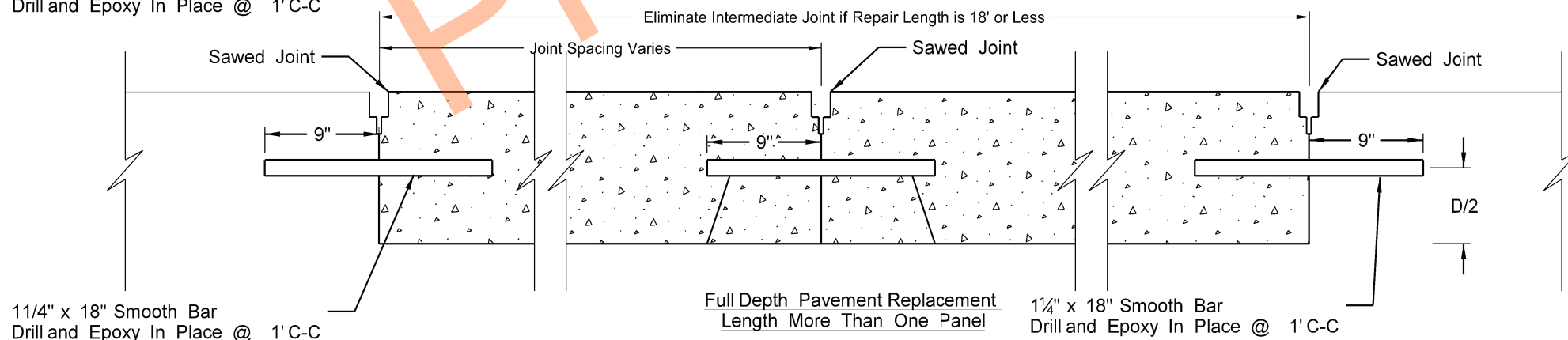
Dowel Alignment Tolerance

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.
- Dowel / Deformed Bars, or Baskets shall be spaced @ 1' C-C and 18" from longitudinal joints; total of 10 bars per 12' lane.
- Exposed end of 1 1/4" x 18" smooth bar will be greased.



#9 x 18" Deformed Bar
Drill and Epoxy In Place @ 1' C-C



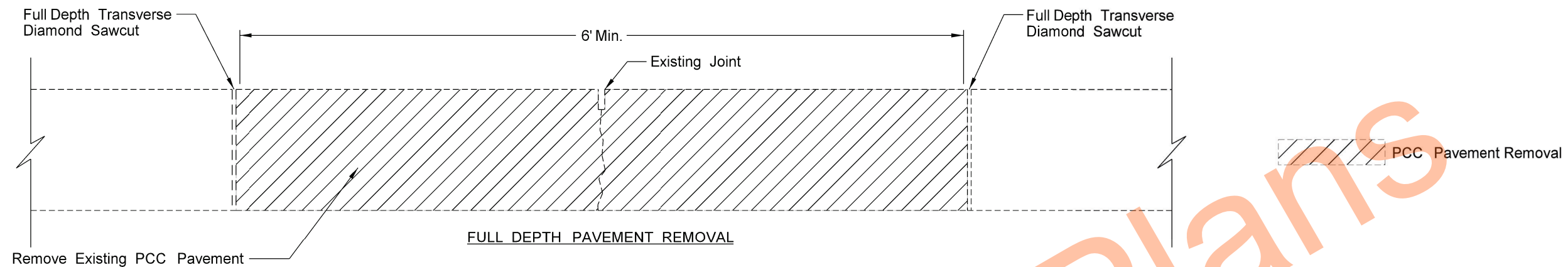
1 1/4" x 18" Smooth Bar
Drill and Epoxy In Place @ 1' C-C

Jointed Concrete Pavement Repair
Full-Depth, Non-Reinforced PCC Pavement
(Longitudinal Length One Panel or Longer)

CPR and Grinding
5.3 Mi. E of ND 1 to Michigan Bypass - WB

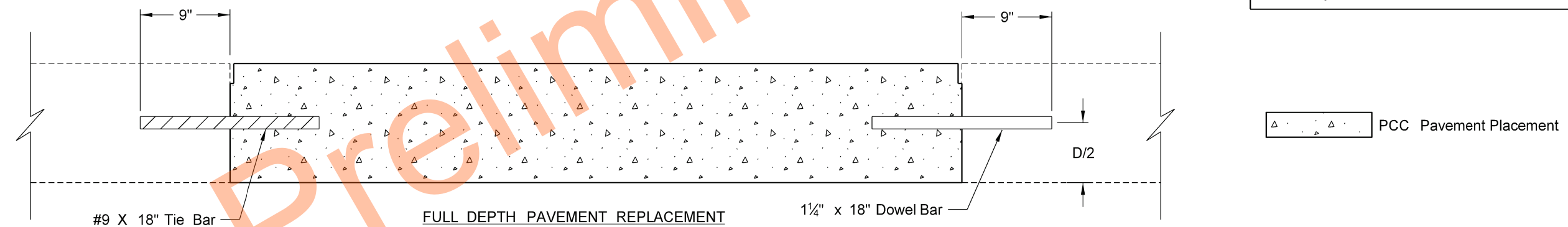


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-6-002(156)300	20	2



Notes:

- Variables: D = Depth of Pavement
- Removal and replacement also applies to full depth repairs at cracks.
- Place dowel bars in new joint with the greatest distance to the next transverse joint or working random crack. Place dowels on approach side of repair when distance to next transverse joint or working random crack is equal for both new joints.

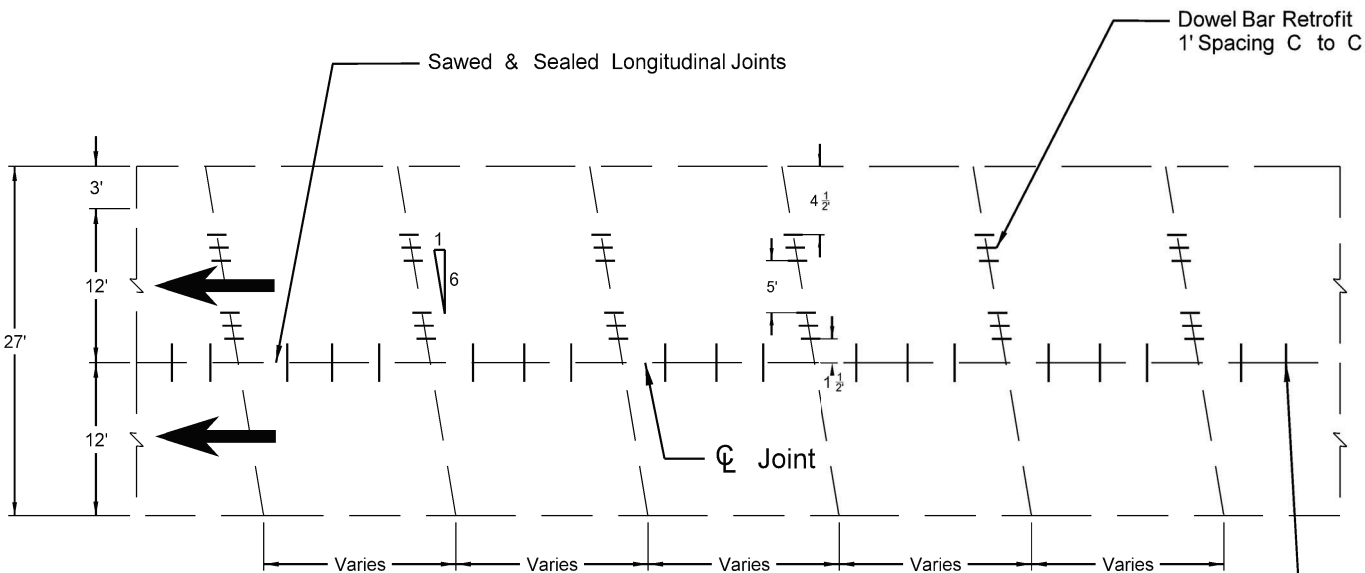


Full Depth Repair Detail

CPR and Grinding
5.3 Mi. E of ND 1 to Michigan Bypass - WB

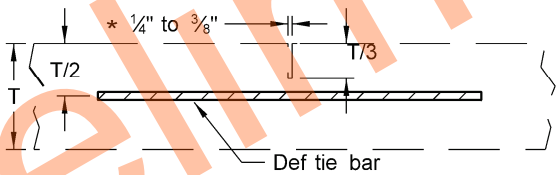


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-6-002(156)300	20	3

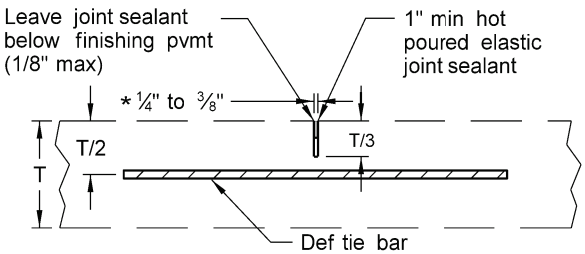


Joint Spacing
Mainline Joints
Varied Joint spacing 12' to 15'

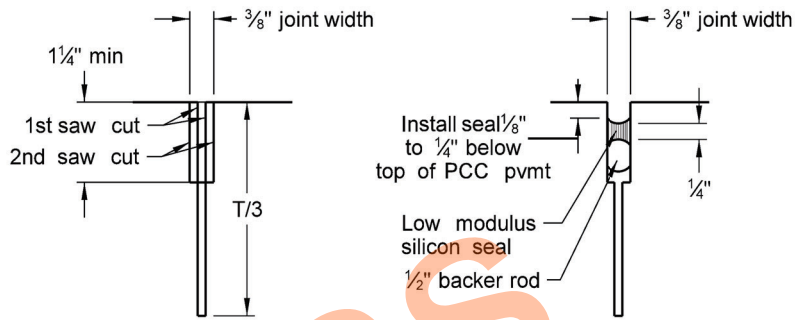
Longitudinal Joint Tie Bar Size and Length		Spacing
Pavement Depth	8"	8"
CL Mainline	#5 x 2' - 6"	4' - 0" C to C



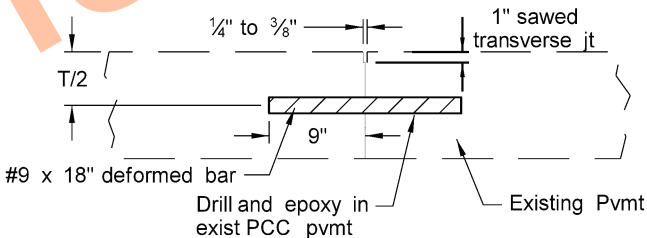
Joint sawing detail (all sawed and tied joints)



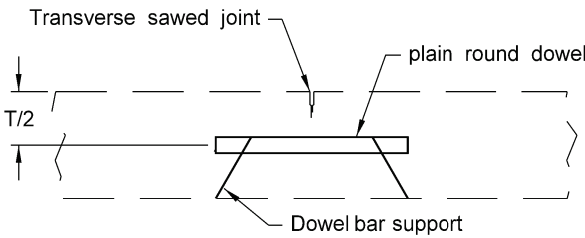
Joint sealing detail (all sawed and tied joints)



Transverse Joint sawing Transverse Joint sealing



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



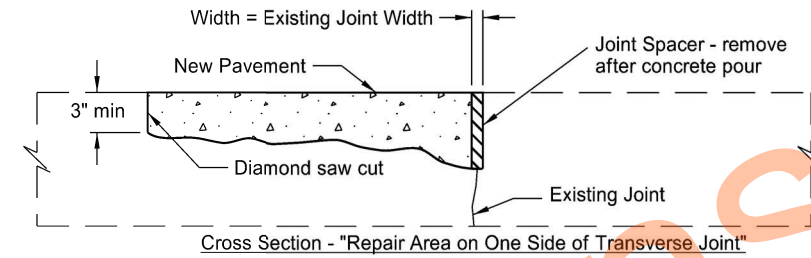
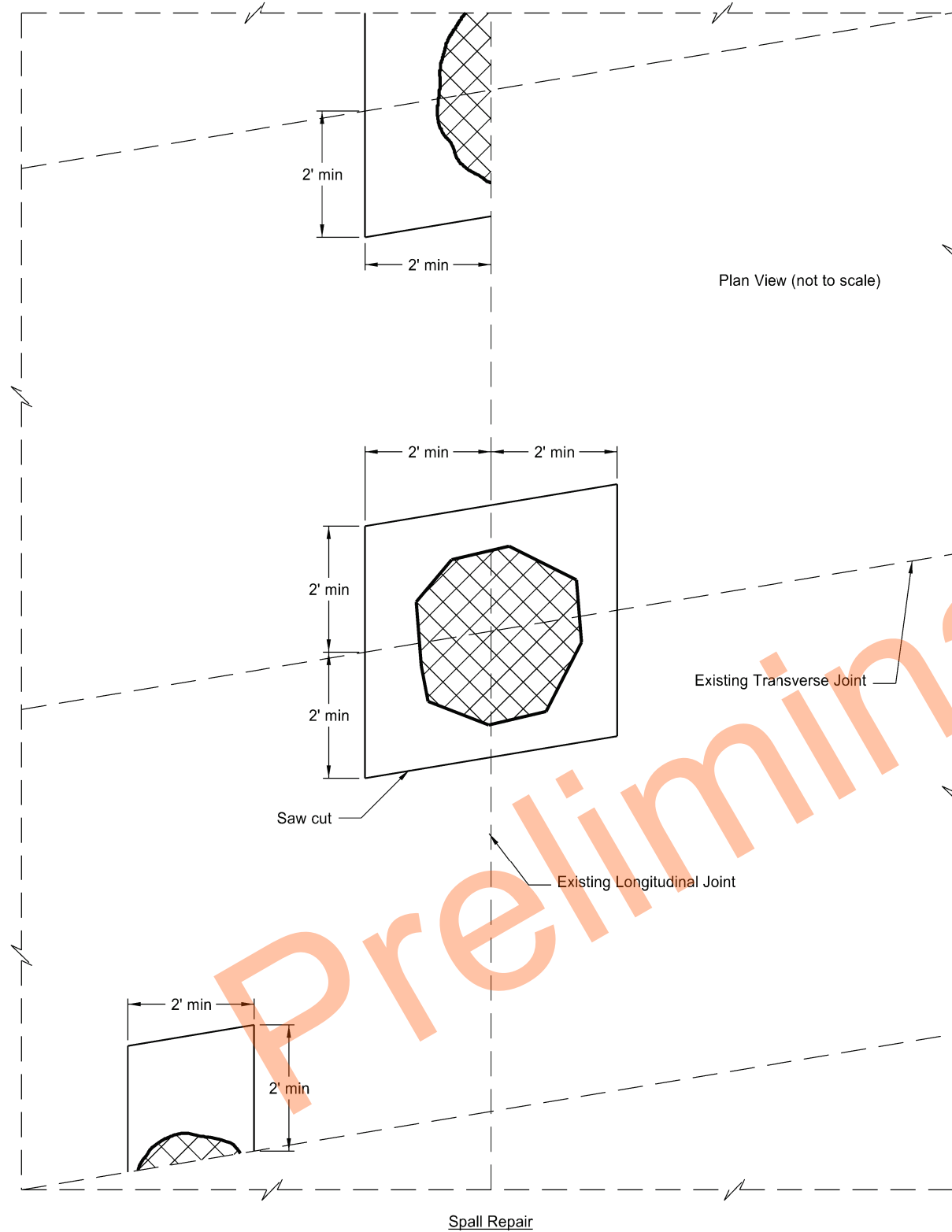
Doweled transverse joint

Existing PCC Pavement Joint Details
Skewed with Uniform Joint Spacing

CPR and Grinding
5.3 Mi. E of ND 1 to Michigan Bypass - WB

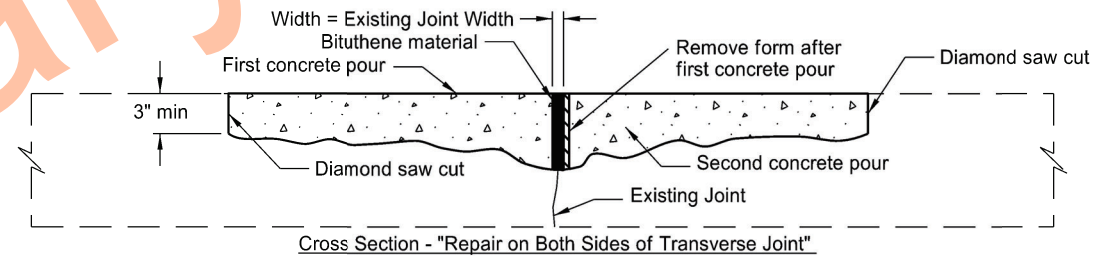


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-6-002(156)300	20	4



Notes:

1. Place a spacer material, that is easily removable after the pour, on the transverse joint face to maintain the width of the existing transverse joint during repair. A bituthene waterproofing material a minimum 260 mil (approximately 1/4") thick or equal to the width of the existing joint, whichever is greater, may be used for this purpose. 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.
2. Diamond saw cut not mandatory when using milling machine for spall repair removals.

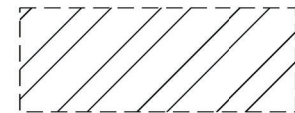
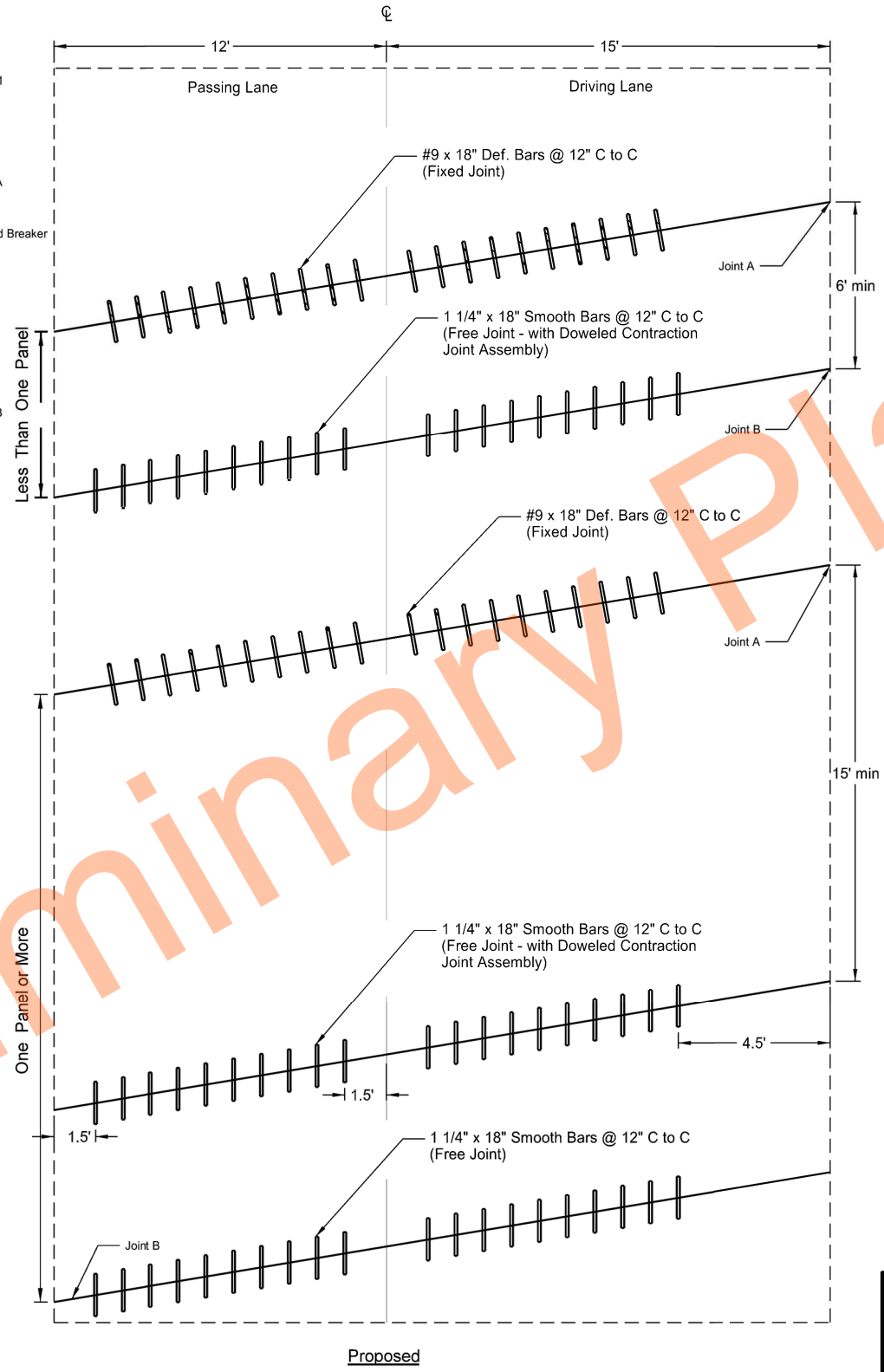
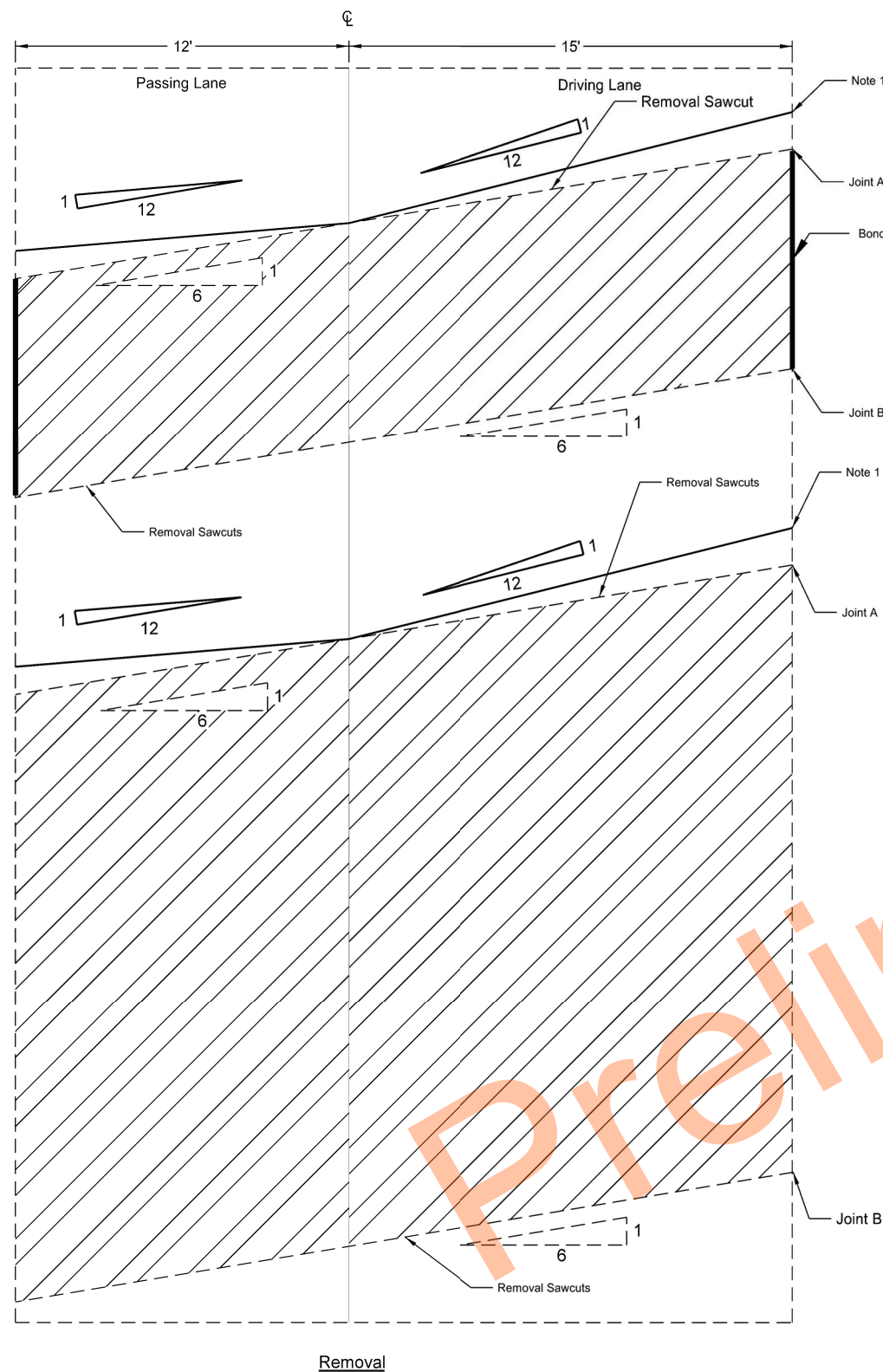


Jointed Non-Reinforced PCC Pavement
Spall Repair Detail

CPR and Grinding
5.3 Mi. E of ND 1 to Michigan Bypass - WB



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-6-002(156)300	20	5



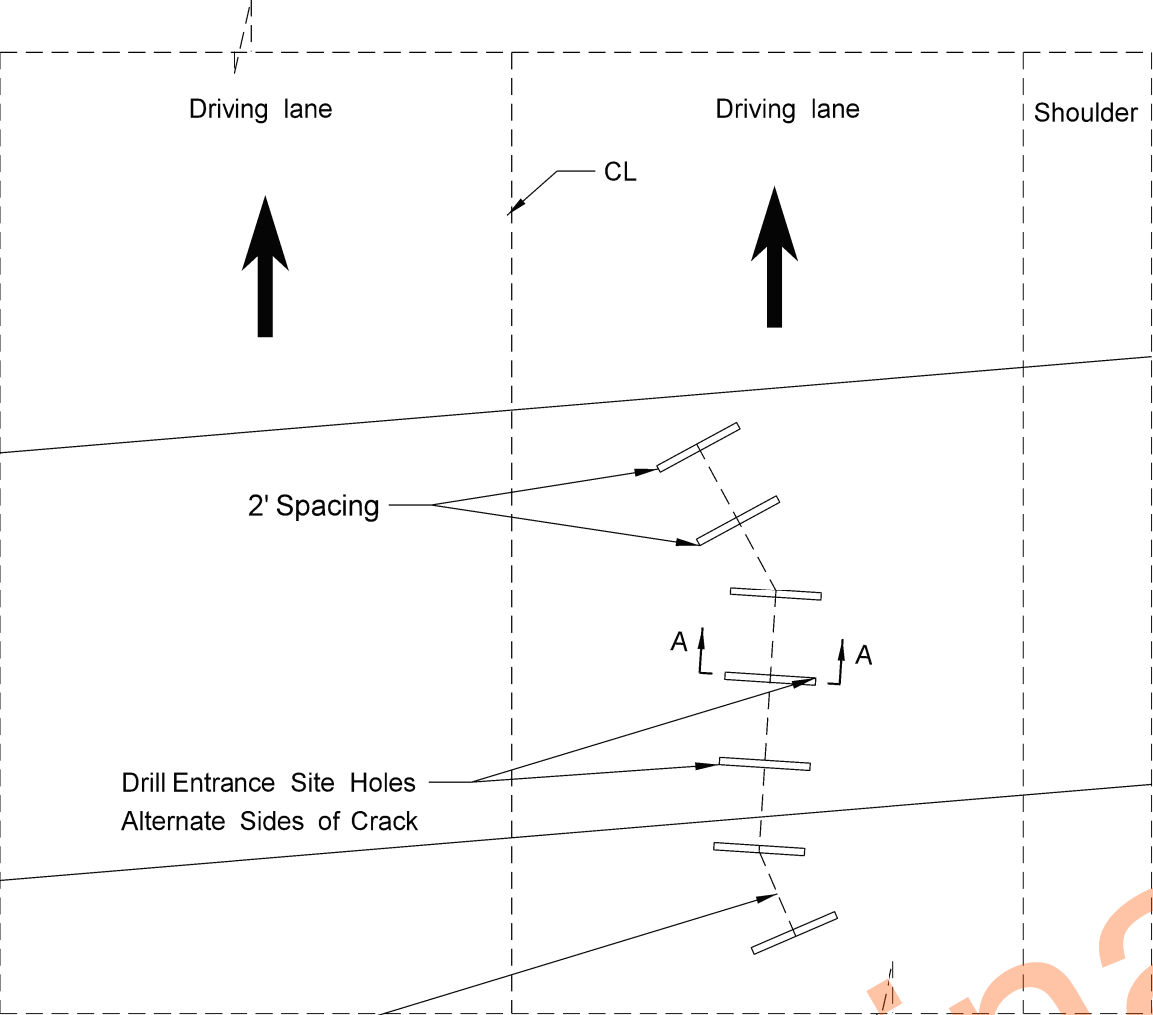
- Notes:
- Joint A (Fixed Joint) shall be the new joint with the shortest distance to the next transverse joint or working random crack. The saw cut may be made at a 1:6 skew, or up to a maximum 1:12 skew referenced off the 1:6 skewed transverse joint. The deformed bars shall be placed perpendicular to the face of the saw cut.
 - 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.
 - 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.
 - If greater than one panel in length, a Doweled Contraction Joint Assembly shall be installed at transverse contraction joints.
 - In repair areas which are not the entire roadway width, joints shall be placed to match the existing pavement wherever possible.
 - 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.

Concrete Pavement Repair For Skewed Joints
Full-Depth, Non-Reinforced PCC Pavement

CPR and Grinding
5.3 Mi. E of ND 1 to Michigan Bypass - WB



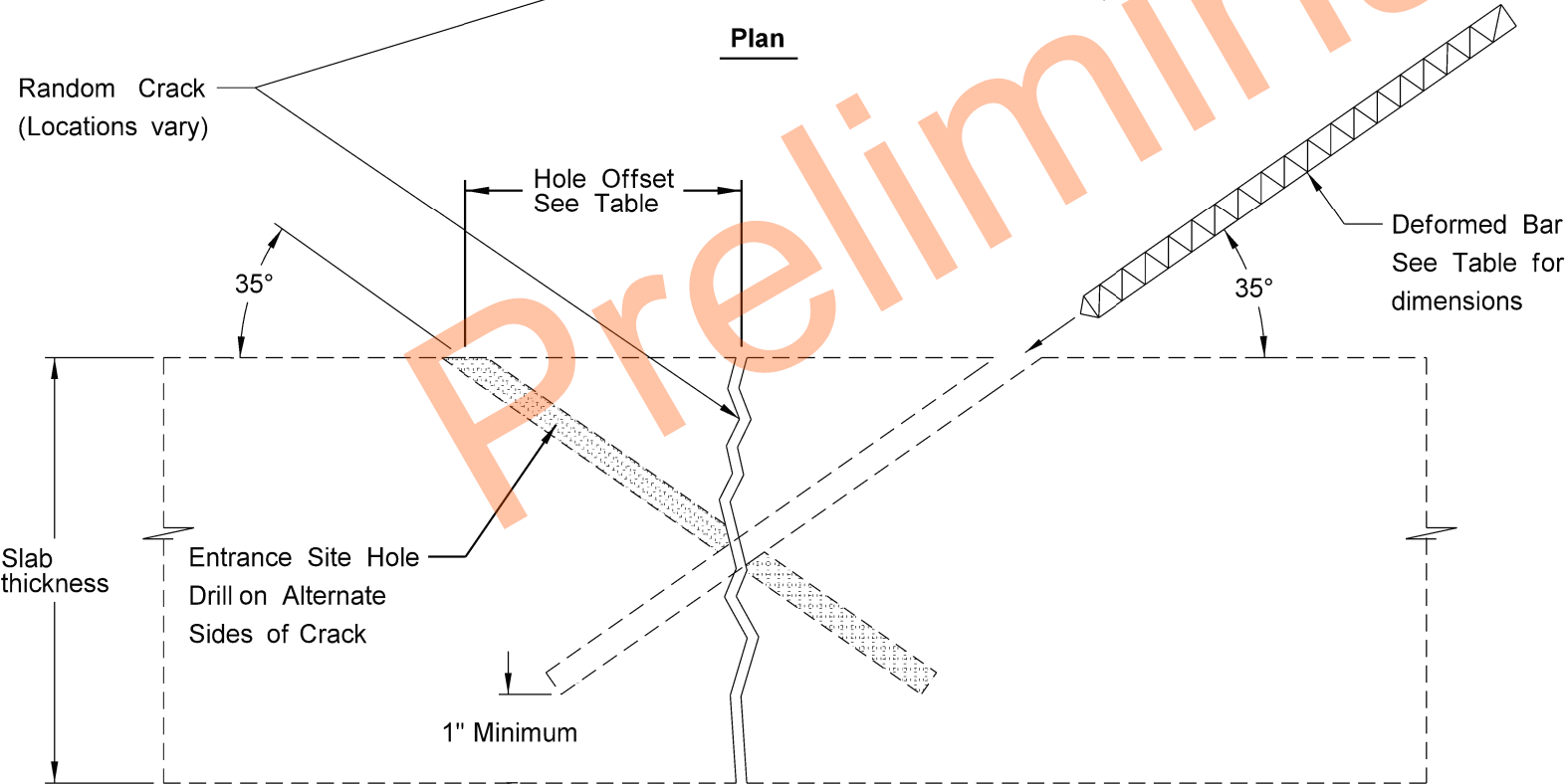
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-6-002(156)300	20	6



Plan

Cross Stitching Bar Dimensions & Hole Locations (No 6 Bars)		
Slab Thickness (inches)	Hole Offset (inches)	Bar Length (inches)
8	5.75	9.50

Random Crack
(Locations vary)



Section A-A

Notes:

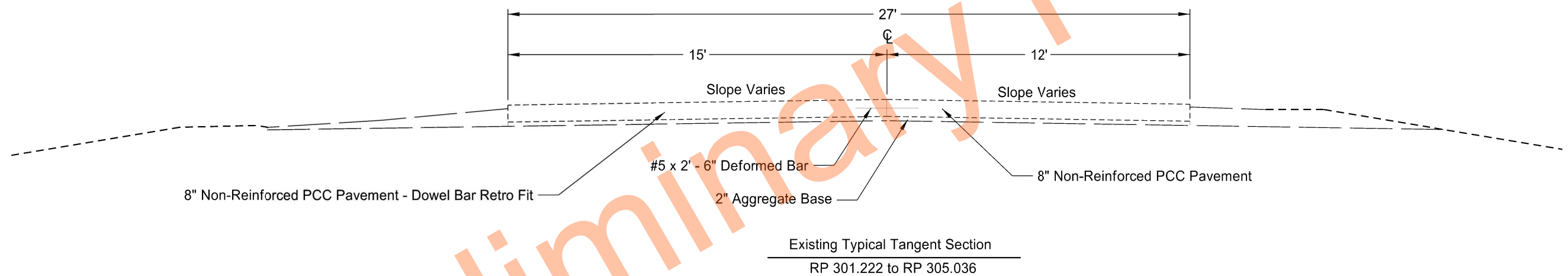
1. Epoxy deformed bar into hole. Length shown in table provides 1-inch cover at surface and assume drilling per note 2.
2. Do not drill hole completely through slab. Stop drilling so epoxy/grout will not run out of the bottom when filling.

Stitching Detail

CPR and Grinding
5.3 Mi. E of ND 1 to Michigan Bypass - WB



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-6-002(156)300	30	1

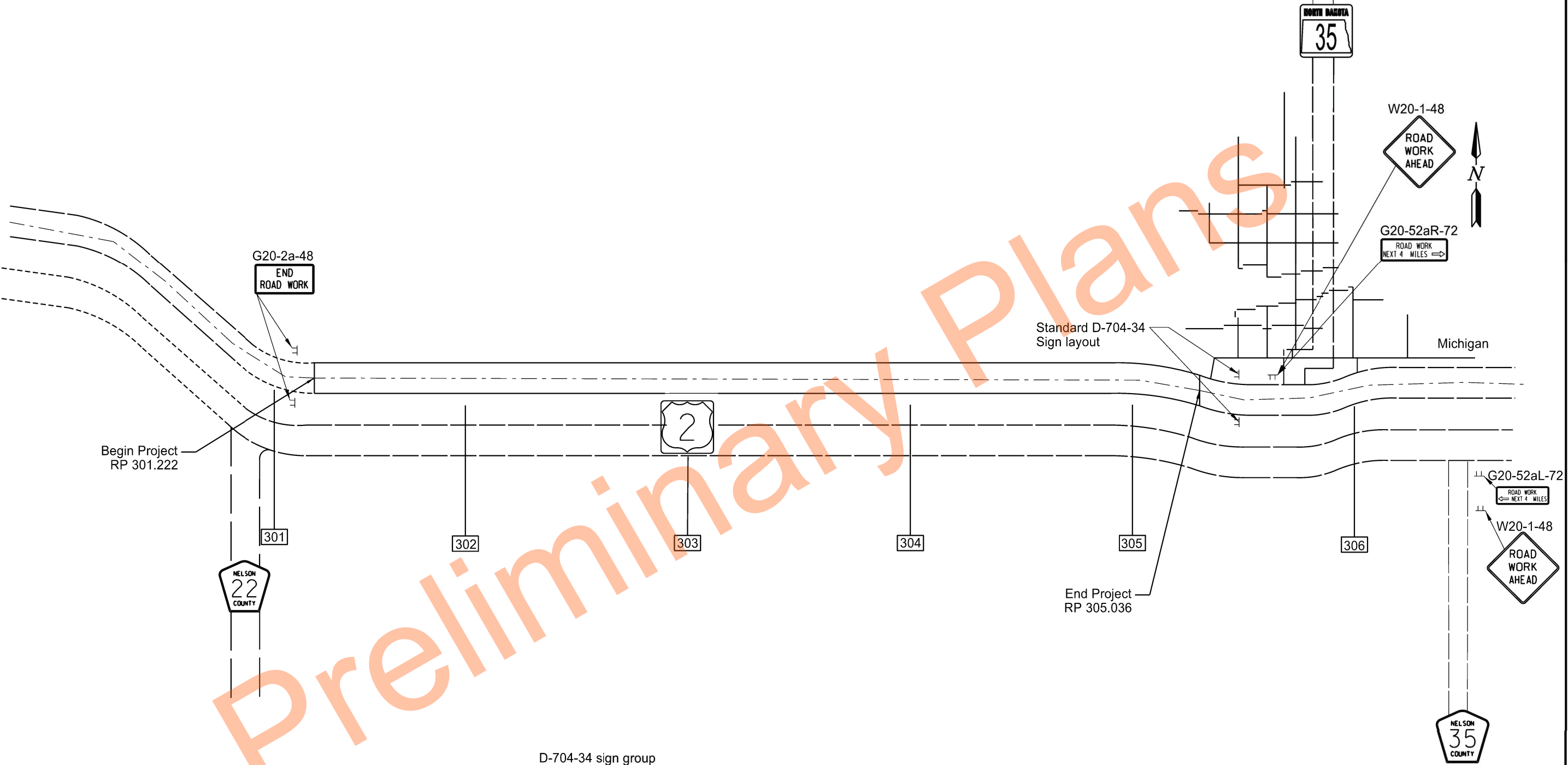


Typical Section

CPR and Grinding
5.3 Mi. E of ND 1 to Michigan Bypass - WB



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-6-002(156)300	100	2



D-704-34 sign group

W20-1-48

G20-55-96

W20-5-48

W3-5-48

R2-1-48

R2-1aP-24

W4-2R-48

Sequencing Arrow
Panel Type C

Work Zone Traffic Control

5.3 Mi. E of ND 1 to Michigan Bypass - WB
CPR and Grinding

REGISTERED PROFESSIONAL ENGINEER
DUSTIN LANG
PE-6394
DATE 03/04/26
NORTH DAKOTA

NDDOT ABBREVIATIONS

D-101-1

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
04-23-18	General Revisions
09-20-18	General Revisions
12-16-20	General Revisions
08-16-22	General Revisions
04-14-25	General Revisions



NORTH DAKOTA	
DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
08-03-15	General Revisions
04-23-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions
04-14-25	General Revisions

NDDOT ABBREVIATIONS

D-101-3

Salv	salvage(d)	Tel	telephone
San	sanitary sewer line	Tel B	Telephone Booth
Sec	section	Tel P	telephone pole
SL	section line	Tv	television
Sep	separation	Temp	temperature
Seq	sequence	Temp	temporary
Serv	service	TBM	temporary bench mark
Sht	sheet	T	thinwall tube sample
Shtng	sheeting	Ts	topsoil
Shldr	shoulder	Traf	traffic
Sw or Sdwk	sidewalk	TSCB	traffic signal control box
SD	sight distance	Tr	trail
SN	sign number	Transf	transformer
Sig	signal	Trans	transition
Sgl	single	TT	transmission tower
SRCP	slotted reinforced concrete pipe	TES	traversable end section
SC	slow curing	Trans	transverse
SS	slow setting	Trtd	treated
Sm	small	Trmt	treatment
S	South	Qc	triaxial compression
SE	Southeast	TERO	tribal employment rights ordinance
SW	Southwest	Tpl	triple
SB	Southbound	Typ	typical
Sp	spaces		
Spcl	special	Qu	unconfined compressive strength
SA	special assembly	Ugrnd	underground
SP	special provisions	Util	utility
G	specific gravity		
Spk	spike	VG	valley gutter
SB	split barrel sample	Vap	vapor
SH	sprinkler head	Vert	vertical
SV	sprinkler valve	VCP	vitrified clay pipe
Sq	square	Vol	volume
Stk	stake	VSFS	vehicle speed feedback sign
Std	standard		
N	standard penetration test	Wkwy	walkway
Std Specs	standard specifications	W	water content
Stm L	steam line	WGV	water gate valve
SEC	steel encased concrete	WL	water line
SMA	stone matrix asphalt	WM	water main
SSD	stopping sight distance	WMV	water main valve
SD	storm drain	W Mtr	water meter
St	street	WSV	water service valve
SPP	structural plate pipe	WW	water well
SPPA	structural plate pipe arch	Wrng	wearing
Str	structure	WIM	weigh in motion
Subd	subdivision	W	west
Sub	subgrade	WB	westbound
Sub Prep	subgrade preperation	Wrng	wiring
Ss	subsoil	W/	with
SS	supplement specification	W/o	without
Supp	supplemental		
Surf	surfacing		
Surv	survey		
Sym	symmetrical		

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
09-03-15	General Revisions
04-23-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions
04-14-25	General Revisions



NDDOT ABBREVIATIONS

D-101-4

MEASUREMENTS

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

T	tesla
T/mi	tons per mile
V	volt
W	watt
Wb	weber

SURVEY DESCRIPTIONS

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

SOIL TYPES

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
12-18-20	Sheet Added
4-14-25	- Continued from D-101-3 General Revisions



NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

702COM
ACCENT
AGASSIZ WU
AGC
ALL PL
ALL SEAS WU
AMOCO PI
AMRDA HESS
AT&T
B PAW
BAKER ELEC
BASIN ELEC
BEK TEL
BELLE PL
BLM
BNSF
BOEING
BRNS RWD
BURK-DIV ELEC
BURL WRD
CABLE ONE
CABLE SERV
CAP ELEC
CASS CO ELEC
CASS RWU
CAV ELEC
CBLCOM
CENEX PL
CENT PL WATER DIST
CENT PWR ELEC
CENTURYLINK
COE
CONS COMM
CONS TELCOM
CONT RES
CPR
D O E
DAK CARR
DAK CENT TEL
DAK RWD
DGC
DICKY R NET
DICKY WRD
DICKY TEL
DNRR
DOME PL
DVELEC
DVMW
E CENT REG WD
ENBRDG
ENVENTIS
EQUINOR
FALK MNG
FHWA
G FKS-TRL WD
GETTY TRD & TRAN
GLDN W ELEC

702 Communications
Accent Communications
Agassiz Water Users District
Associated General Contractors of America
Alliance Pipeline
All Seasons Water Users District
Amoco Pipeline Company
Amerada Hess Corporation
AT&T Corporation
Bear Paw Energy Incorporated
Baker Electric
Basin Electric Cooperative Incorporated
Bek Communications Cooperative
Belle Fourche Pipeline Company
Bureau of Land Management
Burlington Northern Santa Fe Railway
Boeing
Barnes Rural Water District
Burke-Divide Electric Cooperative
Burleigh County Water Resource District
Cable One
Cable Services
Capital Electric Cooperative Incorporated
Cass County Electric Cooperative
Cass Rural Water Users District
Cavalier Rural Electric Cooperative
Cablecom Of Fargo
Cenex Pipeline
Central Pipe Line Water District
Central Power Electric Cooperative
CenturyLink
Corps of Engineers
Consolidated Communications
Consolidated Telcom
Continental Resource Inc
Canadian Pacific Railway
Department Of Energy
Dakota Carrier Network
Dakota Central Telephone
Dakota Rural Water District
Dakota Gasification Company
Dickey Rural Networks
Dickey County Water Resource District
Dickey Telephone
Dakota Northern Railroad
Dome Pipeline Company
Dakota Valley Electric Cooperative
Dakota, Missouri Valley & Western
East Central Water District
Enbridge Pipelines Incorporated
Enventis Telephone
Equinor Pipeline
Falkirk Mining Company
Federal Highway Administration
Grand Forks-traill Water District
Getty Trading & Transportation
Golden West Electric Cooperative

GTR RAMSEY WD
GT PLNS NAT GAS
HALS TEL
IDEA1
INT-COMM TEL
KANEB PL
KEM ELEC
KOCH GATH SYS
LKHD PL
LWR YELL R ELEC
LUMEN
MCKNZ CON
MCKNZ ELEC
MCKNZ WRD
MCLEOD
MCLN ELEC
MCLN-SHRDN R WAT
MDU
MIDCO
MIDSTATE TEL
MINOT CABLE
MINOT TEL
MISS VALL COMM
MISS W W S
MINKOTA PWR
MOR-GRAN-SOU ELEC
MOUNT-WILLI ELEC
MLGC
MUNICIPAL
MUNICIPAL
N CENT ELEC
N PRAIR REG WD
ND PKS & REC
ND TEL
NDDOT
NE REG WD
NDSU SOIL SCI DEPT
NEMONT TEL
NODAK R ELEC
NOON FRMS TEL
NPR
NSP
NTHN BRDR PL
NTHN PLNS ELEC
NTHWSTRN REF
NW COMM
NWRWD
ONEOK
OSHA
OTTR TL PWR
PAAP
P L E M
POLAR COM
PVT ELEC
QWEST
R&T REG WD

Greater Ramsey Water District
Great Plains Natural Gas Company
Halstad Telephone Company
Idea1
Inter-Community Telephone Company
Kaneb Pipeline Company
Kem Electric Cooperative Incorporated
Koch Gathering Systems Incorporated
Lakehead Pipeline Company
Lower Yellowstone Rural Electric
Lumen Technologies Incorporated
McKenzie Consolidated Telcom
McKenzie Electric Cooperative
McKenzie County Water Resource District
McLeod USA
McLean Electric Cooperative
McLean-Sheridan Rural Water District
Montana-dakota Utilities
MidContinent Communications
Midstate Telephone Company
Minot Cable Television
Minot Telephone Company
Missouri Valley Communications Incorporated
Missouri West Water System
Minnkota Power
Mor-gran-sou Electric Cooperative
Mountrail-williams Electric Cooperative
Moore & Liberty - Griggs County
City Water And Sewer
City Of '.....'
North Central Electric Cooperative
North Prairie Regional Water District
North Dakota Parks And Recreation
North Dakota Telephone Company
North Dakota Department of Transportation
Northeast Regional Water District
NDSU Soil Science Department
Nemont Telephone
Nodak Rural Electric Cooperative
Noonan Farmers Telephone Company
Northern Plains Railroad
Northern States Power
Northern Border Pipeline
Northern Plains Electric Cooperative Incorporated
Northwestern Refinery Company
Northwest Communication Cooperation
Northwest Rural Water District
Oneok gas
Occupational Safety and Health Administration
Otter Tail Power Company
Plains All American Pipeline
Praeliands Energy Marketing
Polar Communications
Private Electric
Qwest Communications
R & T Water District

RED RIV COMM
RESVTN TEL
ROBRTS TEL
R-RIDER ELEC
RRVW
S CENT REG WD
SE W U
SCOTT CABLE
SHERDN ELEC
SHEYN VLY ELEC
SKYTECH
SLOPE ELEC
SOURIS RIV TELCOM
ST WAT COMM
STATE LN WATER
STER ENG
STUT RWD
SW PL PRJ
SWWA
SUNOCO
T M C
TCI
TESORO GHG PLNS PL
TRI-CNTY WU
TRL CO WRD
UNTD TEL
UPPR SOUR WD
US SPRINT
USAF MSL CABLE
USFWS
USW COMM
VRNDRY ELEC
W RIV TEL
WAPA
WAWSA
WEB
WILLI WRD
WILSTN BAS PL
WLSH RWD
WOLVRTN TEL
XLENER
YSVR

Red River Communications
Reservation Telephone
Roberts Company Telephone
Roughrider Electric Cooperative
Red River Valley & Western Railroad
South Central Regional Water District
Southeast Water Users Incorporated
Scott Cable Television Dickinson
Sheridan Electric Cooperative
Sheyenne Valley Electric Cooperative
Skyland Technologies Incorporated
Slope Electric Cooperative Incorporated
Souris River Telecommunications
State Water Commission
State Line Water Cooperative
Sterling Energy
Stutsman Rural Water District
Southwest Pipeline Project
Southwest Water Authority
Sunoco LP
Turtle Mountain Communications
TCI of North Dakota
Tesoro High Plains Pipeline
Tri-County Water Users Incorporated
Traill County Water Resource District
United Telephone
Upper Souris Water District
U.S. Sprint
U.S.A.F. Missile Cable
US Fish and Wildlife Service
U.S. West Communications
Verendrye Electric Cooperative
West River Telephone Incorporated
Western Area Power Administration
Western Area Water Supply Authority
W. E. B. Water Development Association
Williams County Water Resource District
Williston Basin Interstate Pipeline Company
Walsh Water Rural Water District
Wolverton Telephone
Xcel Energy
Yellowstone Valley Railroad

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
04-23-18	General Revisions
09-20-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions
04-14-25	General Revisions



LINE STYLES

D-101-20

Existing Topography

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

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

Proposed Topography

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

Existing Utilities

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

Proposed Utilities

	24 Inch Pipe
	Reinforced Concrete Pipe
	Under Drain
	Edge Drain

Traffic Utilities

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

Sign Structures

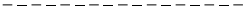
	Existing Overhead Sign Structure
	Existing Overhead Sign Structure Cantilever
	Overhead Sign Structure Cantilever

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

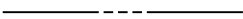
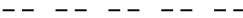
LINE STYLES

D-101-21

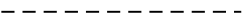
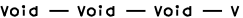
Right Of Way

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

Boundary Control

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

Cross Sections and Typicals

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

Geotechnical

	Geotextile Fabric Type D
	Geogrid
	Geotextile Fabric Type R
	Geotextile Fabric Type R1
	Geotextile Fabric Type RR
	Geotextile Fabric Type S

	Subgrade Reinforcement
	Failure Line

Countours

	Depression Contours
	Supplemental Contour

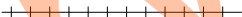
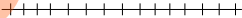
Profile

	Subgrade, Subcut or Ditch Grade
	Topsoil Profile

Striping

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

Pavement Joints

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

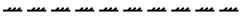
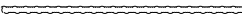
Bridge Details

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

Erosion Control

	Limits of Const Transition Line
	Bale Check
	Rock Check
	Floating Silt Curtain
	Silt Fence
	Excavation Limits
	Fiber Rolls

Environmental

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

07-01-14

REVISIONS

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

KIRK J. HOFF

REGISTERED

PROFESSIONAL

PE-4683

ENGINEER

NORTH DAKOTA

12 18 2020

SYMBOLS

D-101-30

	North Arrow (Half Scale)		Existing Bush or Shrub		Continuous Split Barrel Sample
	Alignment Data Point		Existing Large Evergreen Tree		Flight Auger Sample
	Alignment Monument		Existing Small Evergreen Tree		Split Barrel Sample
	Spot Elevation		Existing Large Tree		Thinwall Tube Sample
	Existing Miscellaneous Spot		Existing Small Tree		Standard Penetration Test
	Existing Access Control Arrow		Existing Tree Trunk		Inclinometer Tube
	Existing Benchmark		Cairn or Stone Circle		Excavation Unit
	Reset USGS Marker		Existing Artifact		Existing Ground Water Well Bore Hole
	Iron Monument Found		Existing Satellite Dish		
	Iron Pin R/W Monument		Existing Weather Station		
	Property Corner		Existing Windmill or Tower		
	Iron Pin Reference Monument		Reinforced Pavement		
	Right of Way Marker (Exst, Ppsd, Reset)				
	Existing Federal Reference Corner				
	Existing Section Corner (Full, Quarter, Sixteenth, Meander)				
	Existing Witness Corner				
	Existing Control Point (CP, GPS-RTK, TRI)				
	Existing Traverse PI Aerial Panel				
	Existing Reference Marker Point NGS				
	Existing EFB Misc				

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

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
12 18 2020

SYMBOLS

D-101-31

				Flexible Delineator					Highway Sign (Exst, Ppsd)
				Flexible Delineator Type A (Exst, Ppsd)					Mile Post Type A (Exst-Ppsd-Reset)
				Flexible Delineator Type B (Exst, Ppsd)					Mile Post Type B (Exst, Ppsd)
				Flexible Delineator Type C (Exst, Ppsd)					Mile Post Type C (Exst, Ppsd)
				Flexible Delineator Type D (Exst, Ppsd)					Object Marker Type I (Exst, Ppsd)
				Flexible Delineator Type E (Exst, Ppsd)					Object Marker Type II (Exst, Ppsd)
				Delineator Type A (Exst, Ppsd, Diamond Grade-Reset)					Object Marker Type III (Exst, Ppsd)
				Delineator Type B (Exst, Ppsd, Diamond Grade-Reset)					Existing Reference Marker
				Delineator Type C (Exst, Ppsd, Diamond Grade)					Road Closure Gate 18 Ft (Exst, Ppsd)
				Delineator Type D (Exst, Ppsd, Diamond Grade)					Road Closure Gate 28 Ft (Exst, Ppsd)
				Delineator Type E (Exst, Ppsd, Diamond Grade)					Road Closure Gate 40 Ft (Exst, Ppsd)
				Barricade (Type I, Type II, Type III)					Existing Railroad Battery Box
				Arrow Panel (Caution Mode, Double Direction, Left Directional, Right Directional, Sequencing, Truck Mounted)					Existing RR Profile Spot
				Attenuation Device					Existing Railroad Crossbuck
				Truck Mounted Attenuator					Existing Railroad Frog
				Delineator Drums					Existing Mailbox (Private, Federal)
				Flagger					
				Tubular Marker					
				Traffic Cone					
				Back to Back Vertical Panel Sign					

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

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
12 18 2020

SYMBOLS

D-101-32

	Existing Luminaire			High Mast Light Standard 3 Luminaire (Exst, Ppsd)		Existing Traffic Signal Standard			
	Luminaire LED			High Mast Light Standard 4 Luminaire (Exst, Ppsd)				Pull Box (Exst-Ppsd-Undefined)	
	Existing Light Standard Luminaire			High Mast Light Standard 5 Luminaire (Exst, Ppsd)				Intelligent Transportation Pull Box (Exst, Ppsd)	
	Relocate Light Standard			High Mast Light Standard 6 Luminaire (Exst, Ppsd)				Transformer (Exst, Ppsd)	
	Light Standard Light LED Luminaire			High Mast Light Standard 7 Luminaire (Exst, Ppsd)				Power Pole (Exst-Ppsd-with Transformer)	
	Light Standard 35 Watt High Pressure Sodium Vapor Luminaire			High Mast Light Standard 8 Luminaire (Exst, Ppsd)				Wood Pole (Exst, Ppsd)	
	Light Standard 50 Watt High Pressure Sodium Vapor Luminaire			High Mast Light Standard 9 Luminaire (Exst, Ppsd)				Pedestrian Push Button Post (Exst, Ppsd)	
	Light Standard 70 Watt High Pressure Sodium Vapor Luminaire			High Mast Light Standard 10 Luminaire (Exst, Ppsd)				Existing Pole	
	Light Standard 100 Watt High Pressure Sodium Vapor Luminaire			Overhead Sign Structure Load Center (Exst, Ppsd)				Existing Telephone Pole	
	Light Standard 150 Watt High Pressure Sodium Vapor Luminaire			Traffic Signal Controller (Exst, Ppsd)				Existing Post	
	Light Standard 200 Watt High Pressure Sodium Vapor Luminaire			Pad Mounted Traffic Signal Controller (Exst, Ppsd)					Connection Conductor (Ground, Neutral, Phase 1, Phase 2)
	Light Standard 250 Watt High Pressure Sodium Vapor Luminaire			Flashing Beacon (Exst, Ppsd)					
	Light Standard 310 Watt High Pressure Sodium Vapor Luminaire			Concrete Foundation (Exst, Ppsd)					
	Light Standard 400 Watt High Pressure Sodium Vapor Luminaire			Pipe Mounted Flasher (Exst, Ppsd)					
	Light Standard 700 Watt High Pressure Sodium Vapor Luminaire			Pad Mounted Feed Point (Exst, Ppsd)					
	Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire			Pipe Mounted Feed Point with Pad (Exst, Ppsd)					
	Emergency Vehicle Detector			Pole Mounted Feed Point (Exst, Ppsd)					
	Video Detection Camera			Junction Box (Exst, Ppsd)					
				Existing Pedestrian Head with Number					
				Existing Signal Head					
				Pole Mounted Head					
				Existing Lighting Standard Pole					

NORTH DAKOTA

DEPARTMENT OF TRANSPORTATION

07-01-14

REVISIONS

DATE	CHANGE
12-18-20	General Revisions

KIRK J. HOFF

REGISTERED



PROFESSIONAL

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		
07-01-14		
REVISIONS		
DATE	CHANGE	
12-18-20	General Revisions	12 18 2020

SYMBOLS

D-101-33

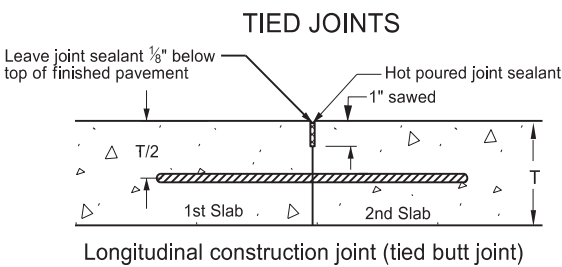
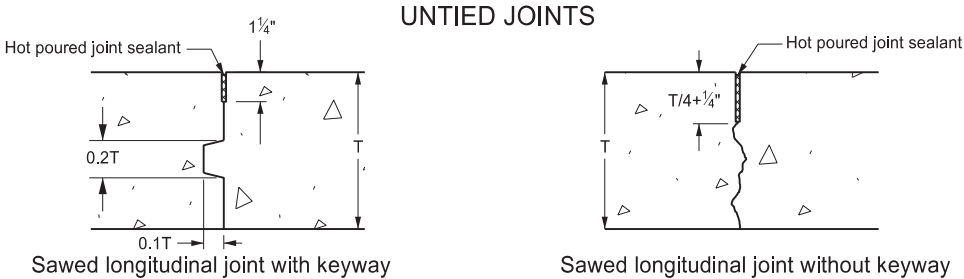
			Existing Manhole (Electrical, Gas, Telephone)		Cap or Stub Exst Gas, Exst Sanitary, Exst Storm Drain, Ppsd Storm Drain, Exst Water
			Water Manhole (Exst, Exst with Valve)		Existing Pedestal Electrical, Telephone, Fiber Optic Telephone, TV, Fiber Optic TV, Undefined
			Sanitary Sewer Manhole (Exst, Ppsd, Exst with Valve)		Existing Pipe Vent Gas, Fuel, Sanitary, Storm Drain, Water, Undefined
			Sanitary Force Main Manhole (Exst, Ppsd, Exst with Valve)		Valve Exst Gas, Exst Water, Ppsd Water, Exst Undefined
			Storm Drain Manhole (Exst, Ppsd, Exst with Inlet, Ppsd with Inlet)		Pump Sanitary, Storm Drain, Exst Water
			Force Main Storm Drain Manhole (Exst, Exst with Valve)		Corrugated Metal End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)
			Manhole (Ppsd, Ppsd 48 Inch, Exst Undefined)		Reinforced Concrete End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)
			Existing Water Appurtenance		Existing Utility Marker
			Sprinkler Head (Exst, Ppsd)		Existing Meter
			Fire Hydrant (Exst, Ppsd)		Existing Fuel Dispensers
			Cleanout (Exst Sanitary, Underdrain)		Existing Fuel Filler Pipes
			Existing Catch Basin Inlet (Round, Square)		Existing Fuel Leak Sensors
			Existing Curb Inlet (Round, Square)		
			Existing Slotted Reinforced Concrete Pipe		
			Catch Basin (Riser 30 Inch, Beehive, Type A)		
			Inlet Mountable Curb (Type A, Type B)		
			Inlet Saddle Base (Type 1, Type 2)		
			Inlet Special (Catch Basin, Type 1, Type A)		
			Inlet (Tee, Type 1, Type 2, Type 2 Double)		
			Median Drain		
			Headwall (Exst, Ppsd, Ppsd Single with Vegetation Barrier, Ppsd Double with Vegetation Barrier)		

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

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
12 18 2020

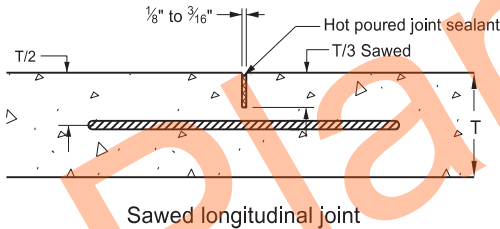
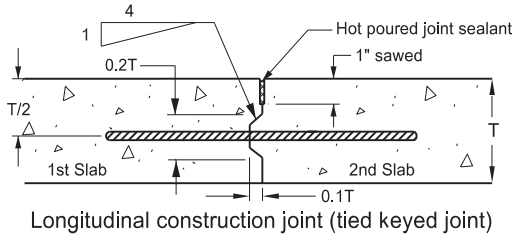
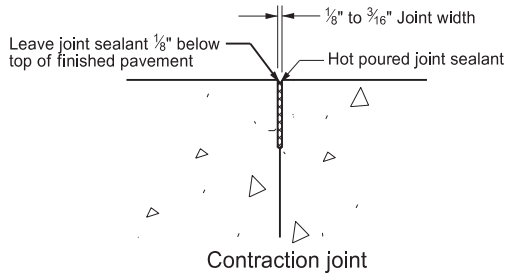
LONGITUDINAL JOINT DETAILS

D-550-2



Notes:

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

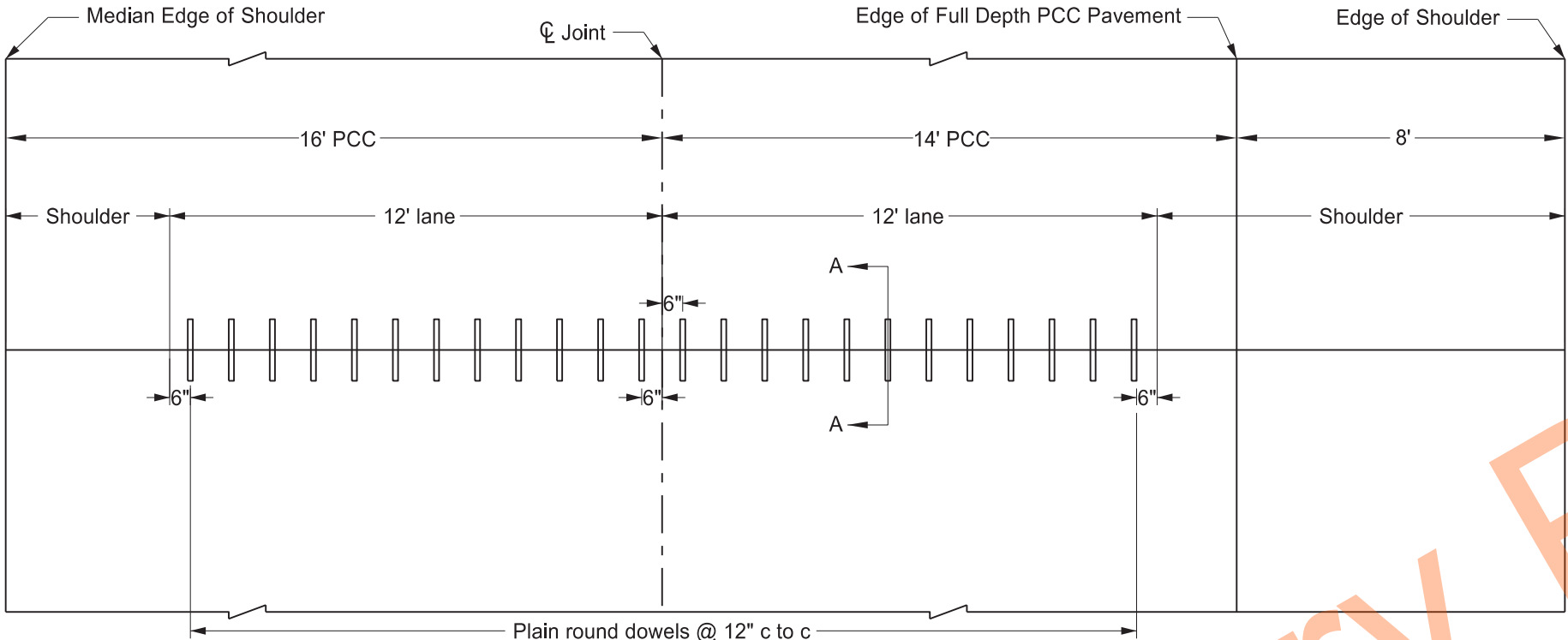


		TIEBAR SPACINGS (In)*																																															
TIE BARS	STEEL GRADE SIZE & LENGTH	40				60						40						60						40						60						40						60							
		#3x24" BARS				#3x30" BARS						#4x24" BARS						#4x36" BARS						#5x30" BARS						#5x42" BARS						#6x36" BARS						#6x48" BARS							
DIST TO NEAREST FREE EDGE		4	6	8	10	4	6	8	10	12	14	16	8	10	12	14	16	22	24	10	12	14	16	22	24	10	12	14	16	22	24	10	12	14	16	19	22	24	10	12	14	16	19	22	24				
PCC PVMT DEPTH JOINT TYPE																																																	
6"	WARP			48	39									48																																			
	BUTT			37	27									48																																			
8"	WARP	48	39	29	24	48	48	44	35	29	25	48	42	35	30	26	48	48	48	45	39	28	26	48	48	47	41	30	27	48	48	48	48	45	41	48	48	48	48	48	43	39	48	48	48	48	48	48	48
	BUTT	42	27			48	42	31	25			37	29	24			48	44	37	32	27		46	39	33	29			48	48	48	43	32	29	48	48	48	48	48	35	30	27	48	48	48	48	48	45	41
8½"	WARP	48	37	28		48	48	42	33	28	24	48	39	33	28	24	48	48	48	42	37	27	24	48	48	44	38	28	25	48	48	48	48	42	38	48	48	48	48	47	40	37	48	48	48	48	48	48	48
	BUTT	39	26			44	39	29				35	27				48	42	35	29	26		44	36	31	27			48	48	47	41	30	27	48	48	45	39	33	28	26	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	48	40	36	48	48	48	48	44	38	35	48	48	48	48	48	48	48
	BUTT	37	24			48	37	27				33	26				48	40	33	28	25		41	34	29	25			48	48	44	39	28	25	48	48	42	37	31	26	24	48	48	48	48	47	40	37	
9½"	WARP	48	33	25		48	48	37	30	25		44	35	29	25		48	48	48	38	33	24		48	46	39	34	25		48	48	48	48	38	34	48	48	48	48	42	36	33	48	48	48	48	48	48	48
	BUTT	35				48	35	26				31	25				47	37	31	27				39	32	27	25			48	48	42	37	27	24	48	47	40	35	29	25		48	48	48	48	44	38	35
10"	WARP	47	31			48	47	35	28			42	34	28	24		48	48	42	36	31			48	44	37	33	24		48	48	48	48	36	33	48	48	48	48	40	34	31	48	48	48	48	48	48	47
	BUTT	33				48	33	25				29	24				45	36	29	25				37	31	26	24			48	46	40	35	25		48	45	38	33	28	24		48	48	48	48	42	36	33
10½"	WARP	45	30			48	45	34	27			40	32	26			48	48	40	34	30			48	42	36	31			48	48	48	47	34	31	48	48	48	45	38	33	30	48	48	48	48	48	48	45
	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		
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	47	43	
	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			
11½"	WARP	41	27			48	41	31	24			36	29	24			48	44	36	31	27			46	38	32	28			48	48	48	43	31	28	48	48	47	41	34	30	27	48	48	48	48	45	41	
	BUTT	29				44	29					25					39	31	25				32	27				48	40	35	30			46	39	33	29	24		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	43	39
	BUTT	27				42	27					25					37	30	25				31	25				48	46	39	33	29			45	37	32	28		48	48	48	42	35	30	27			
12½"	WARP	38	25			48	38	28				33	27				48	40	33	29	25			42	35	30	26			48	48	45	39	28	26	48	48	43	38	32	27	25	48	48	48	48	41	38	
	BUTT	27				40	27					35	28				35	28					29	25				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	46	40	36
	BUTT	25				38	25					34	27				34	27					28					42	35	30	27			41	34	29	25		48	48	44	38	32	28	25				
13½"	WARP	35				48	35	26				31	25				47	37	31	26				39	32	28	24			48	48	42	36	26	24	48	47	40	35	29	25		48	48	48	44	38	35	
	BUTT	25				37	25					33	26				33	26					27					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	
	BUTT	24				35	24					32	25				32	25					26					39	33	28	25			38	32	27	24		48	47	40	35	30	26					
14½"	WARP	32				48	32	24				29					43	35	29	25				36	30	26			48	45	39	34	24		48	43	37	32	27		48	48	48	48	41	35	32		
	BUTT					34						30	25				30	25					25					38	32	27	24			36	30	26		48	46	39	34	29	25						
15"	WARP	31				47	31					28					42	33	28	24				35	29	25			48	48	47	33	24		48	42	36	31	26		48	48	48	47	40	34	31		
	BUTT					33						29					29						25					37	31	26			35	29	25		48	44	38	33	28	24							

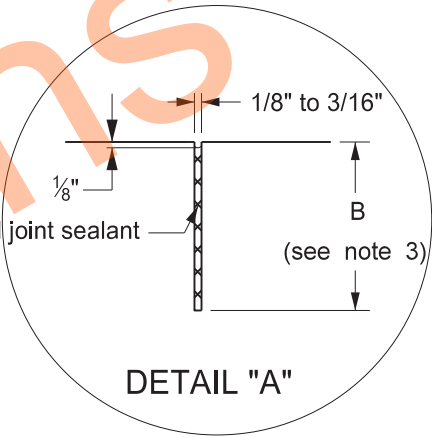
TRANSVERSE CONTRACTION JOINT DETAILS

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 non-doweled concrete pavement or
 $B = T/3$ for AAE or doweled concrete pavement

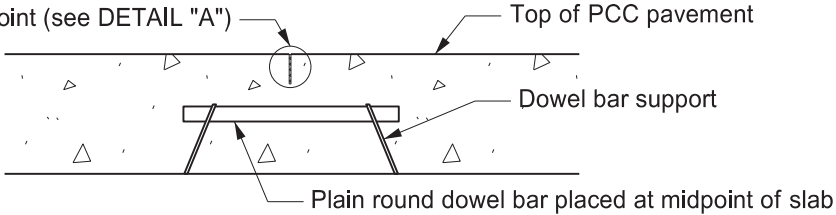


CONTRACTION JOINT DOWEL ASSEMBLY
INTERSTATE

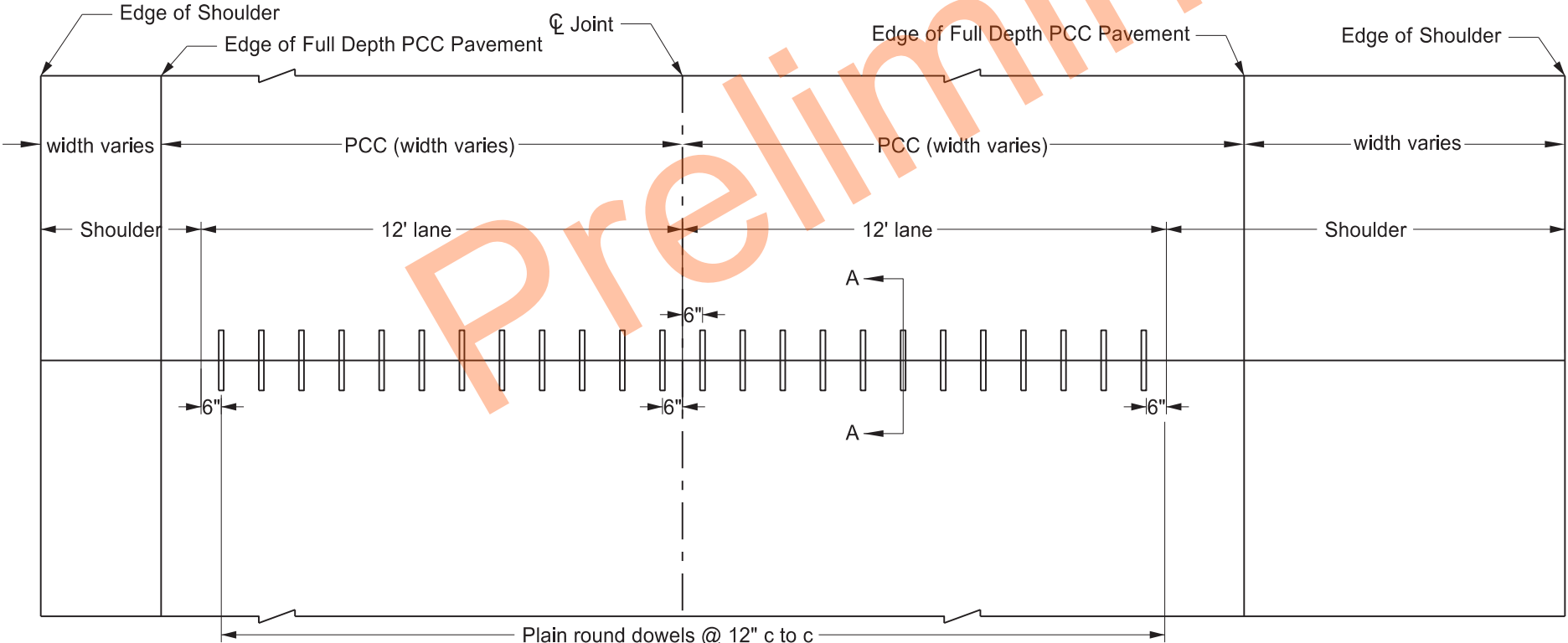


DETAIL "A"

Sawed and sealed transverse contraction joint (see DETAIL "A")



SECTION A-A



CONTRACTION JOINT DOWEL ASSEMBLY
NON-INTERSTATE

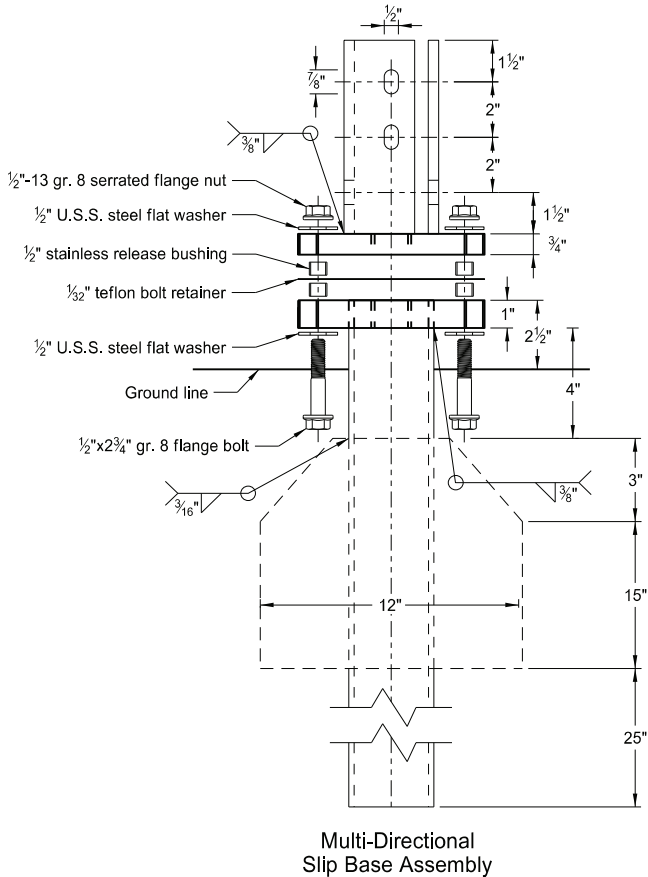
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-15-10	
REVISIONS	
DATE	CHANGE
6/23/2014	Removed dowel size reference
3/16/2016	Revised Joint Details and notes
10/25/2019	Expanded Details for clarity
03/13/2025	Revised # of Dowels & Note 3.



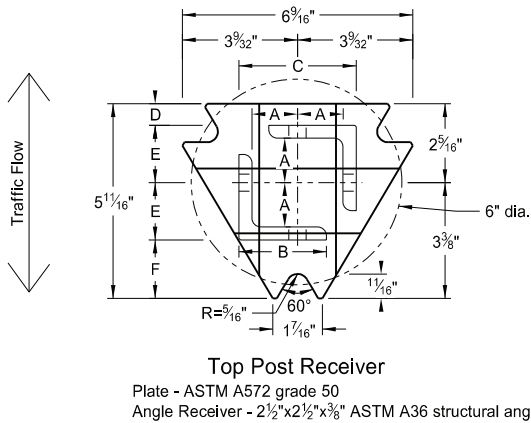
03/13/25

BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7



Perforated Tube



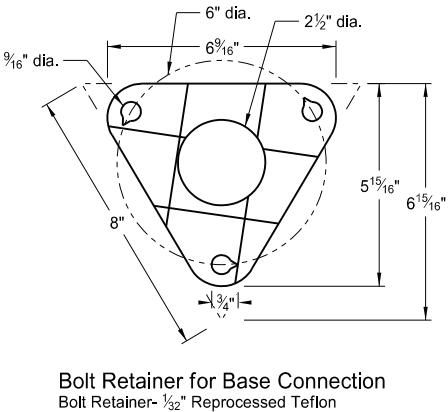
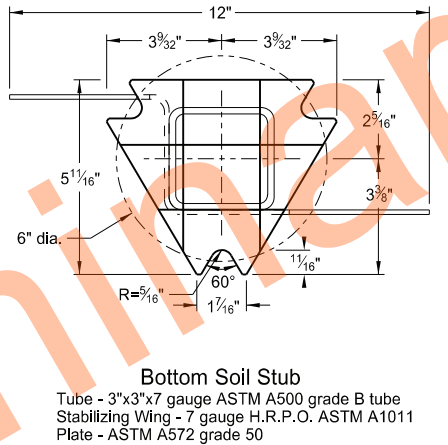
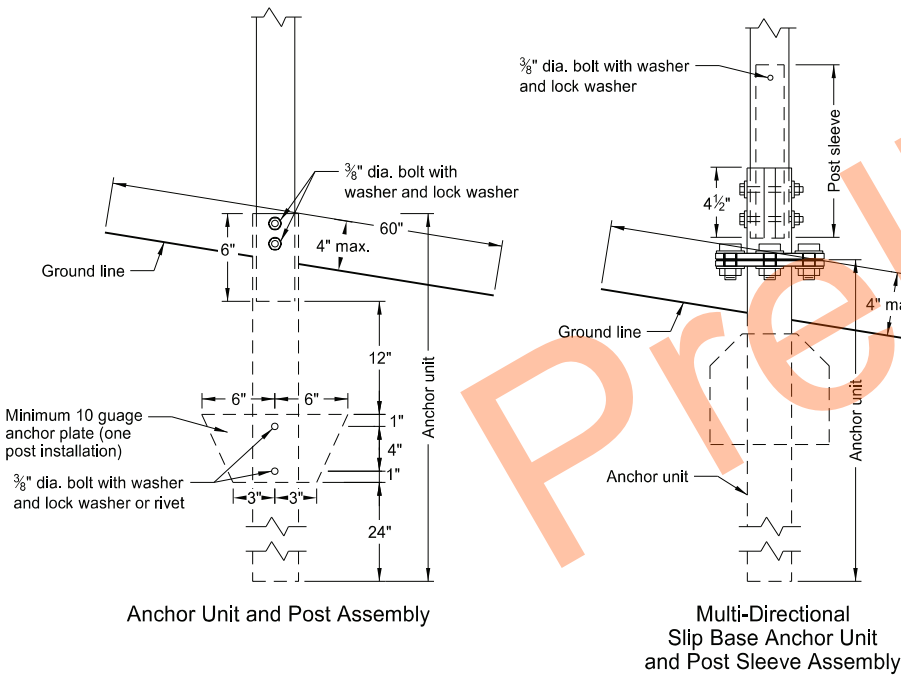
- Notes:
1. Torque slip base bolts as specified by manufacturer.
 2. Use anchor with 43.9 KSI yield strength and 59.3 KSI tensile strength.
 3. Provide 4" vertical clearance for anchor or breakaway base. Measure the 4"x60" measurement above and below post location and back and ahead of post.
 4. In concrete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

Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall 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 5/16"	2 1/2"	3 1/32"	2 5/32"	1 33/64"	1 7/8"
2 1/2"x10 ga.	1 5/32"	2 1/2"	3 5/16"	5/8"	1 21/32"	1 3/4"

- (A) Use breakaway base when support is placed in weak soils. Engineer determines if soils are weak.
- (B) For additional wind load, insert the 2 3/16"x10 ga. into 2 1/2"x10 ga.



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp
8-01-24	Electronic Stamp/Signature



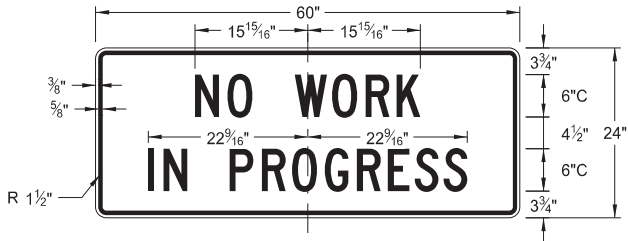
08/01/24

08/01/24

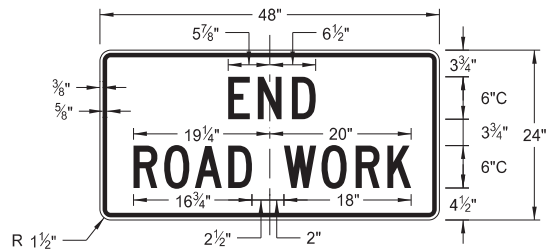
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



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



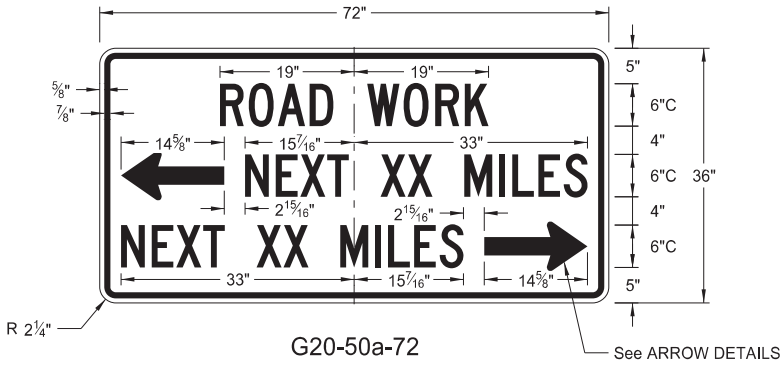
G20-1b-60
Legend: black (non-refl)
Background: orange



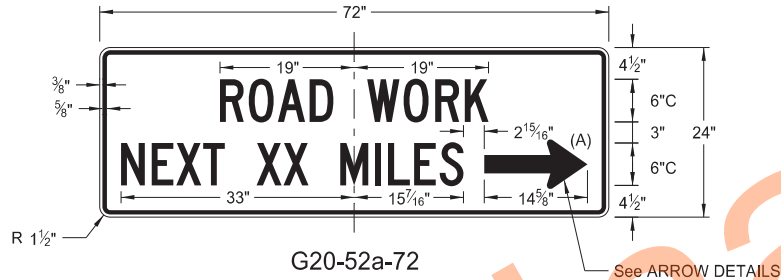
G20-2-48
Legend: black (non-refl)
Background: orange



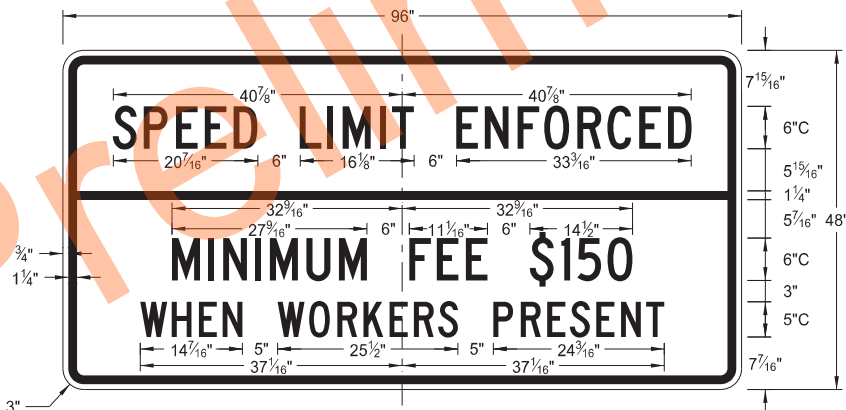
G20-4b-36
Legend: black (non-refl)
Background: orange



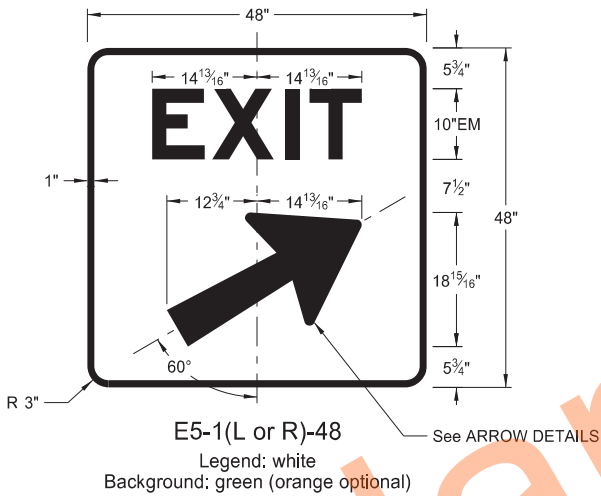
G20-50a-72
Legend: black (non-refl)
Background: orange



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

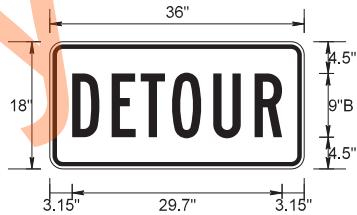


G20-55-96
Legend: black (non-refl)
Background: orange



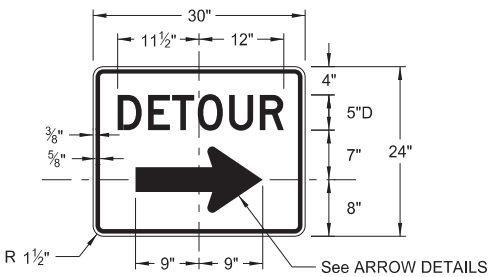
E5-1(L or R)-48

Legend: white
Background: green (orange optional)



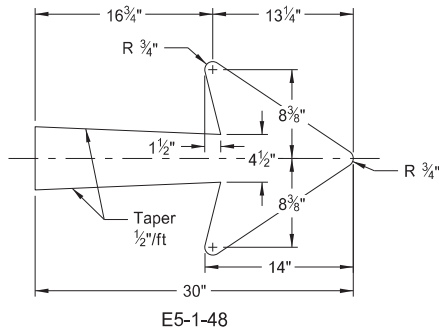
M4-8-36

Legend: black (non-refl)
Background: orange

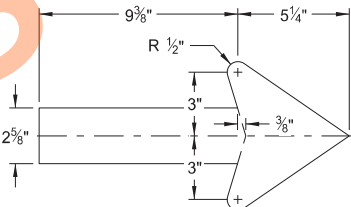


M4-9(L or R)-30 &
M4-9-30

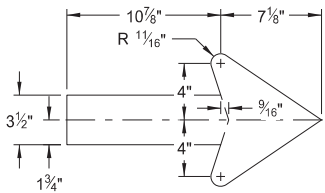
Legend: black (non-refl)
Background: orange



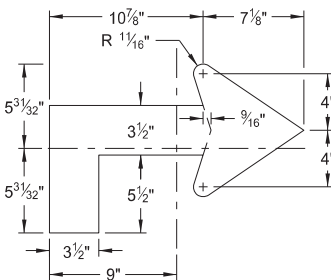
E5-1-48



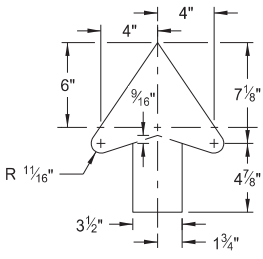
G20-50a-72
G20-52a-72



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



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



M4-9-30
Straight

ARROW DETAILS

NOTES:

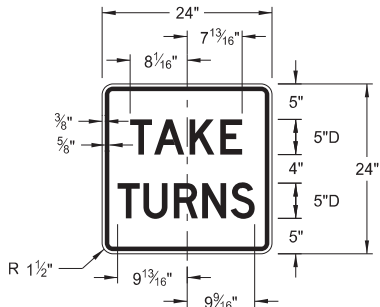
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
08-17-17	Added sign & background color
10-03-19	New Design Engineer PE Stamp
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes

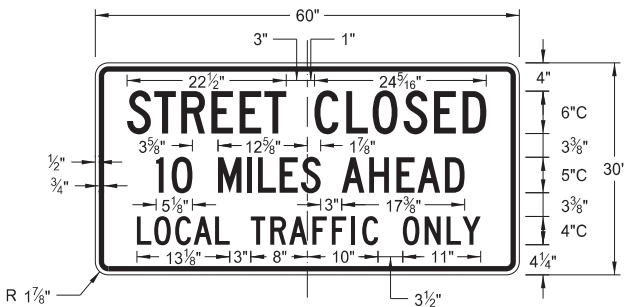


CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS

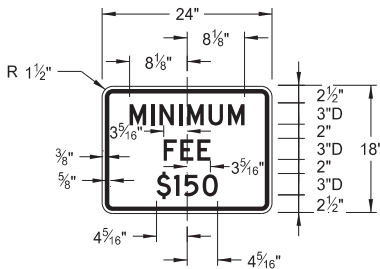
D-704-10



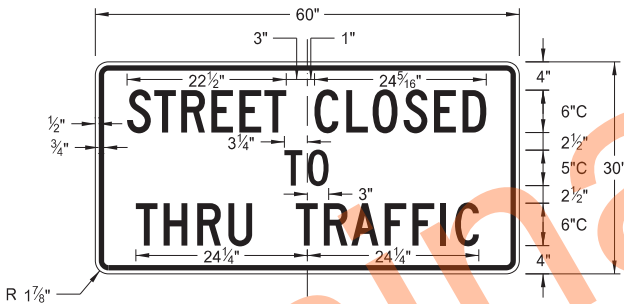
R1-50P-24
Legend: black (non-refl)
Background: white



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



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



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



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

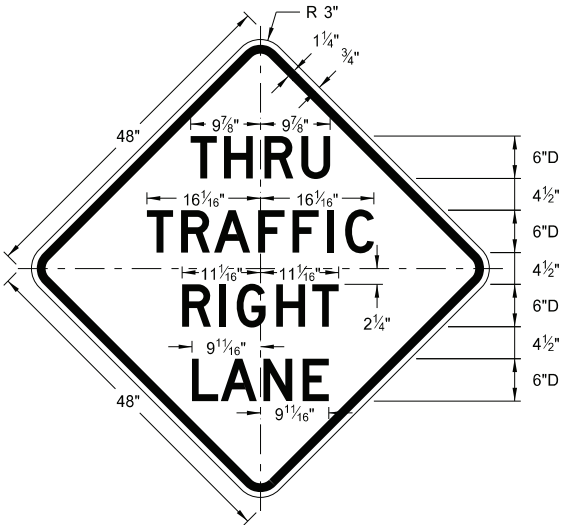
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
08-17-17	Revised sign number
10-03-19	New Design Engineer PE Stamp
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes



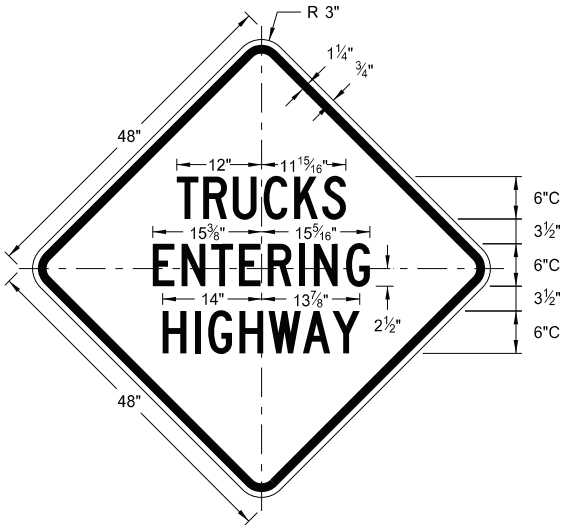
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

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

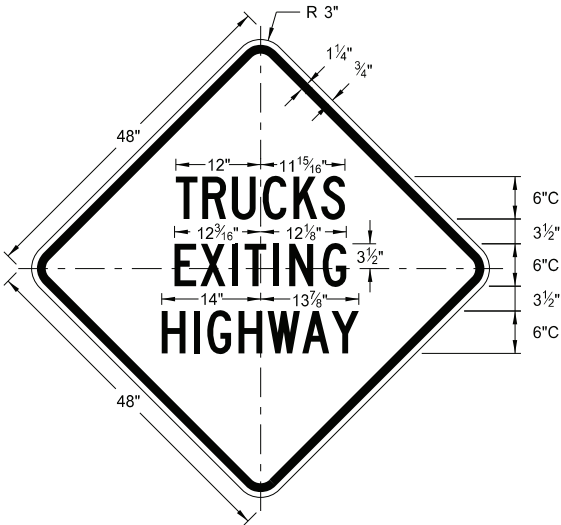
* DISTANCE MESSAGES



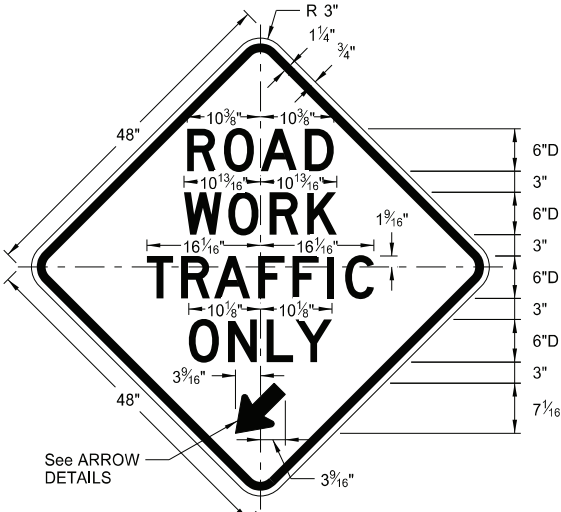
W5-8-48
Legend: black (non-refl)
Background: orange



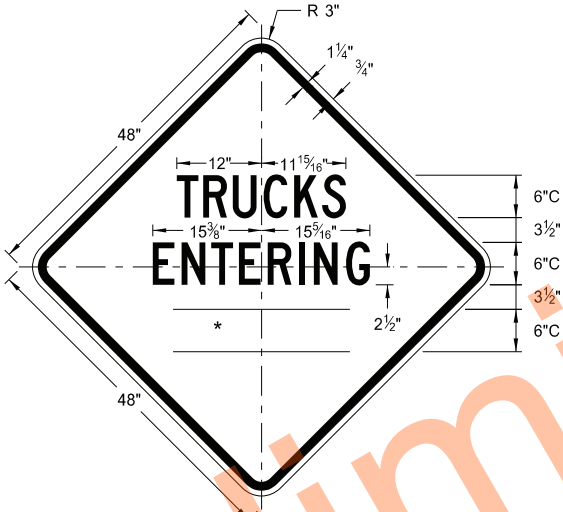
W8-53-48
Legend: black (non-refl)
Background: orange



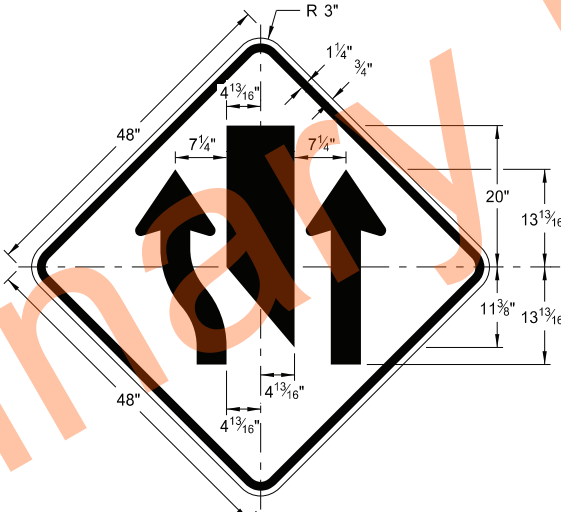
W8-56-48
Legend: black (non-refl)
Background: orange



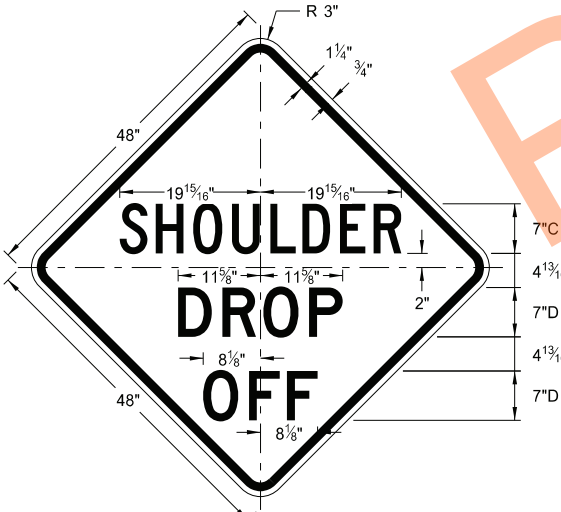
W5-9-48
Legend: black (non-refl)
Background: orange



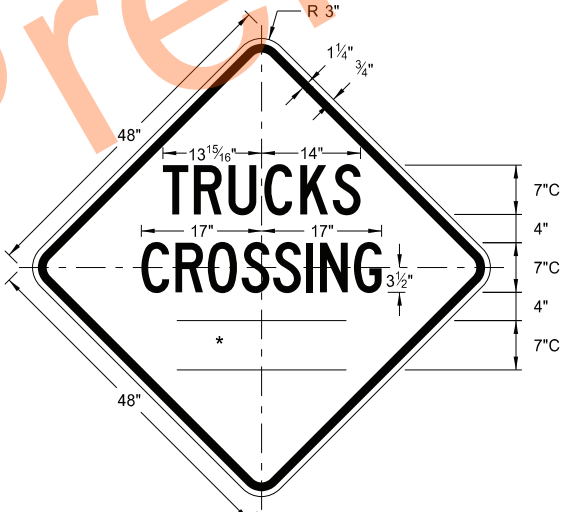
W8-54-48
Legend: black (non-refl)
Background: orange



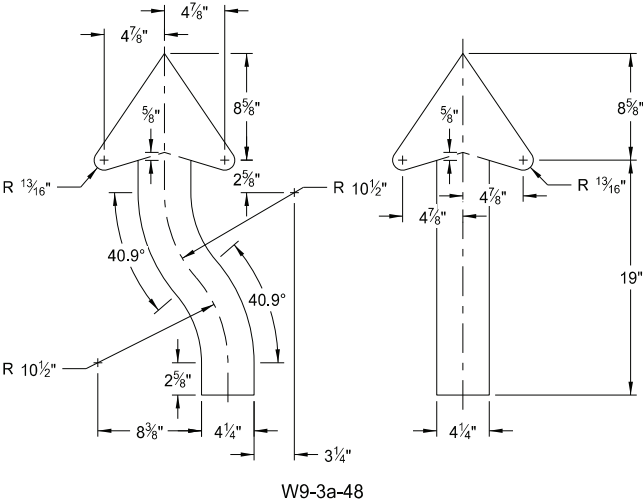
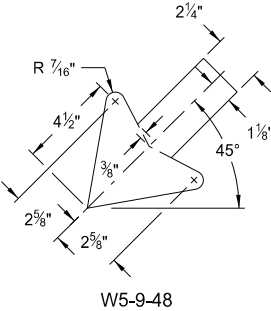
W9-3a-48
Legend: black (non-refl)
Background: orange



W8-9a-48
Legend: black (non-refl)
Background: orange



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



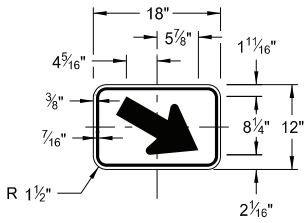
ARROW DETAILS

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated sign number
5-31-18	Revised sign and arrow details
10-03-19	New Design Engineer PE Stamp
8-01-24	Electronic Stamp/Signature

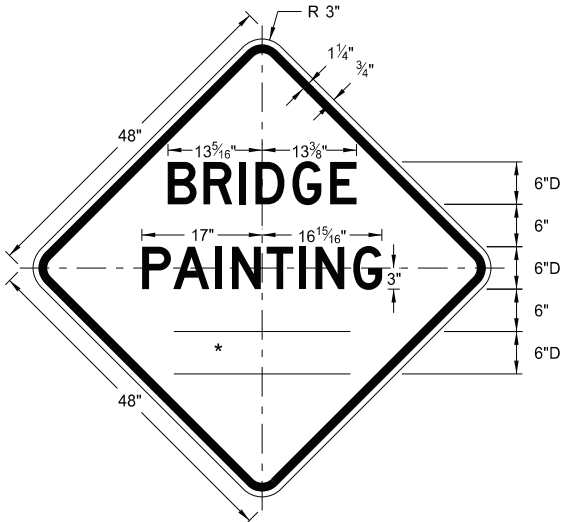


08/01/24

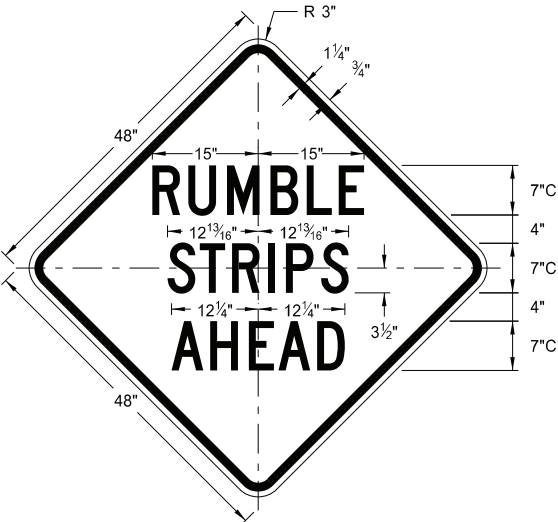
CONSTRUCTION SIGN DETAILS
WARNING SIGNS



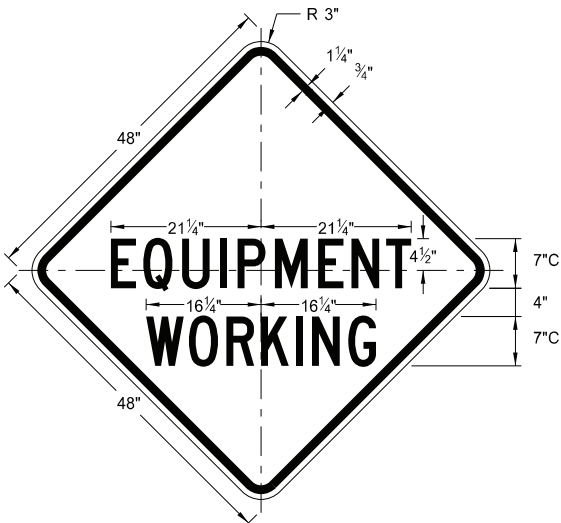
W16-7aP-18
Legend: black (non-refl)
Background: orange



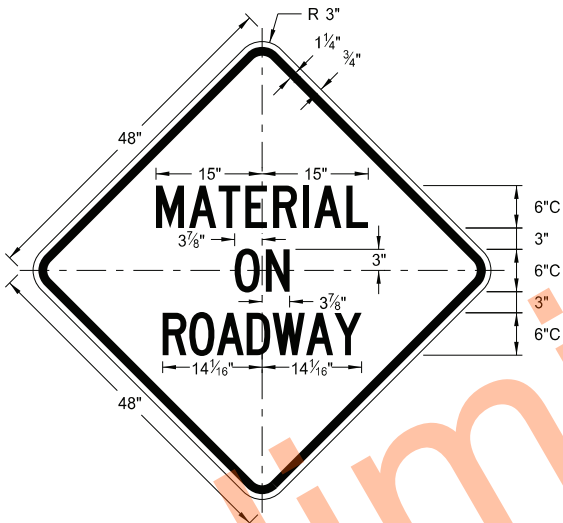
W21-50-48
Legend: black (non-refl)
Background: orange



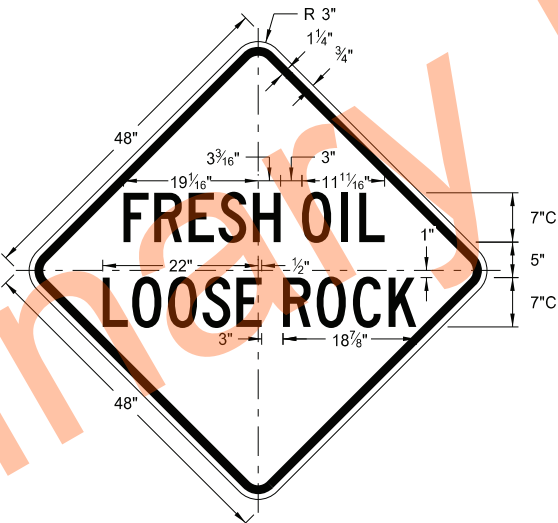
W21-53-48
Legend: black (non-refl)
Background: orange



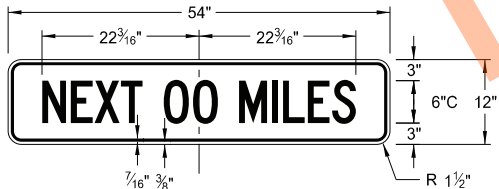
W20-51-48
Legend: black (non-refl)
Background: orange



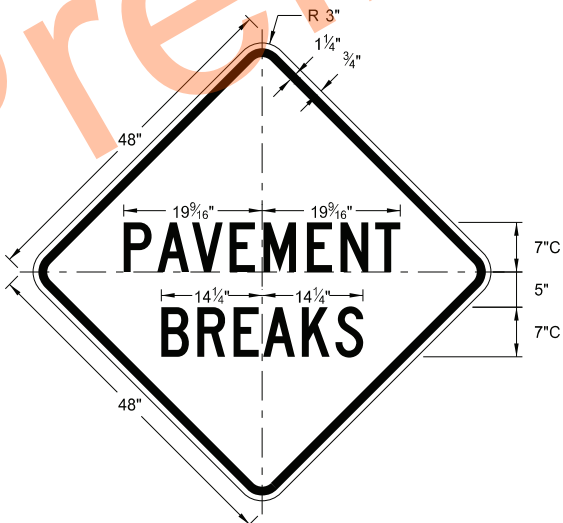
W21-51-48
Legend: black (non-refl)
Background: orange



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



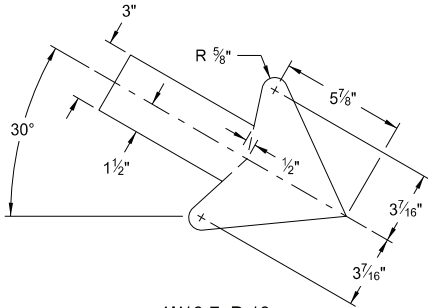
W20-52P-54
Legend: black (non-refl)
Background: orange



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

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

* DISTANCE MESSAGES



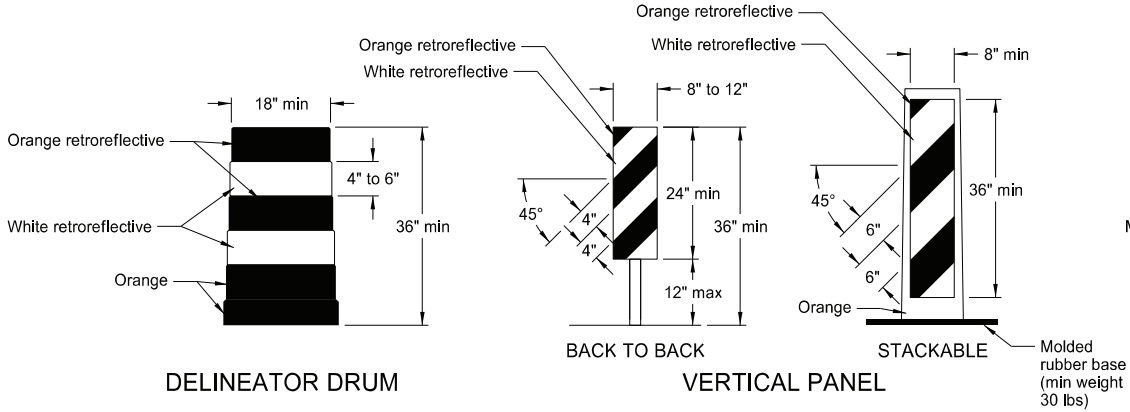
W16-7aP-18

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
5-31-18	
REVISIONS	
DATE	CHANGE
11-01-19	Added details for sign W16-7aP-18.
8-01-24	Electronic Stamp/Signature.



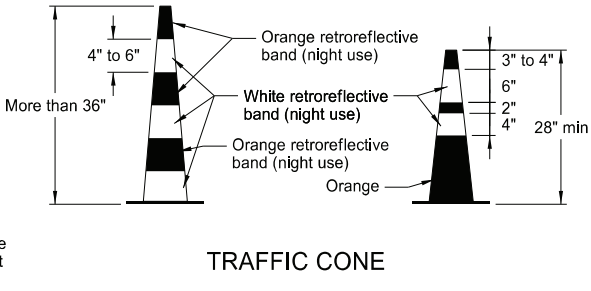
08/01/24

BARRICADE AND CHANNELIZING DEVICE DETAILS

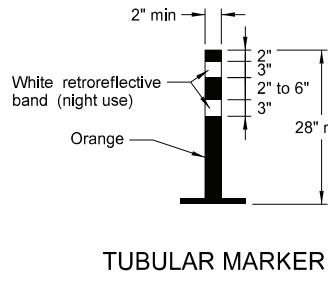


Provide horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide for drum markings. Use a minimum of two orange and two white stripes with the top stripe being orange for each drum. Do not exceed 3" nonretroreflectORIZED spaces between the horizontal orange and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

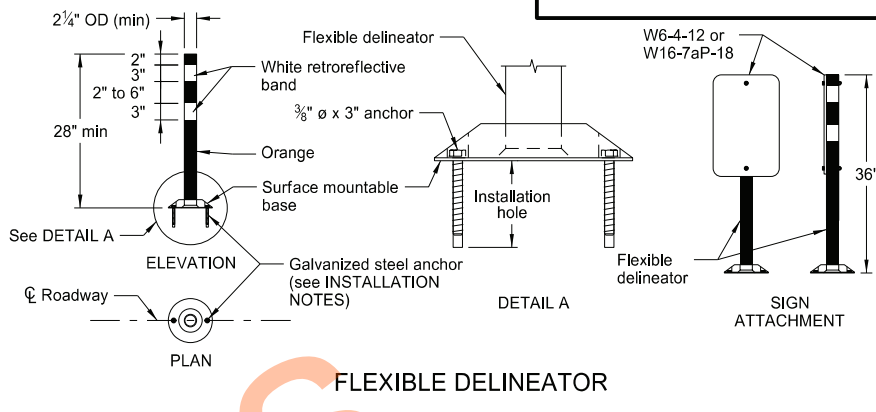
Provide alternating orange and white retroreflective stripes, sloping downward in direction vehicular traffic is to pass. Place retroreflective sheeting on both sides of panel with a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective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



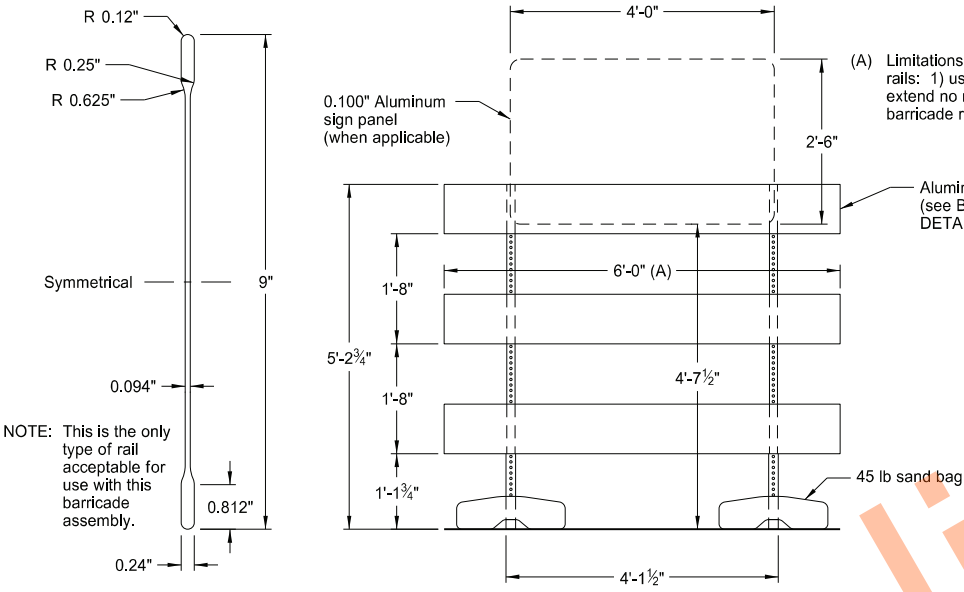
Provide retroreflectORIZATION of cones more than 36" in height by alternating orange and white retroreflective stripes. Use a minimum of two orange and two white stripes for each cone with the top stripe being orange. Use maximum 3" nonretroreflectORIZED space between the orange and white stripes.



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



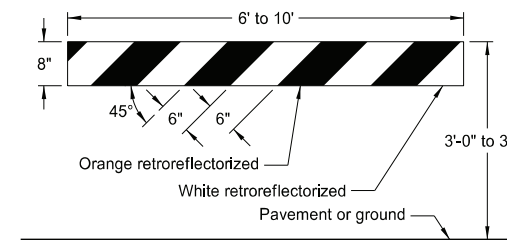
- INSTALLATION NOTES:
1. Drill installation holes to diameter and depth required by manufacturer's specifications.
 2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
 3. In lieu of bolted down base, use an 8" x 8" butyl pad or hot melt butyl.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



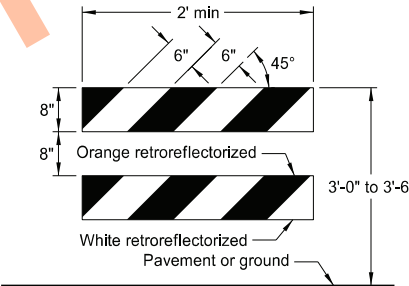
BARRICADE BLADE DETAIL

BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

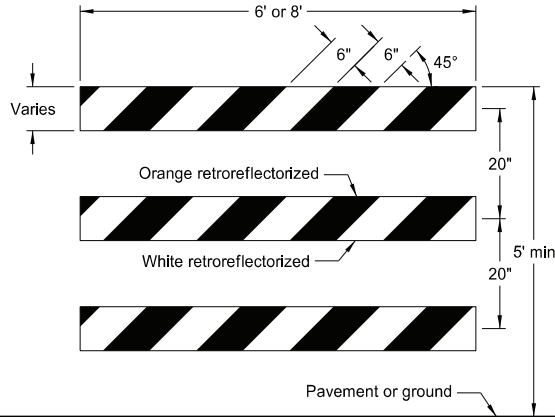
NOTE: For barricade markings use alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Place retroreflective sheeting on both sides of the rails with a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the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



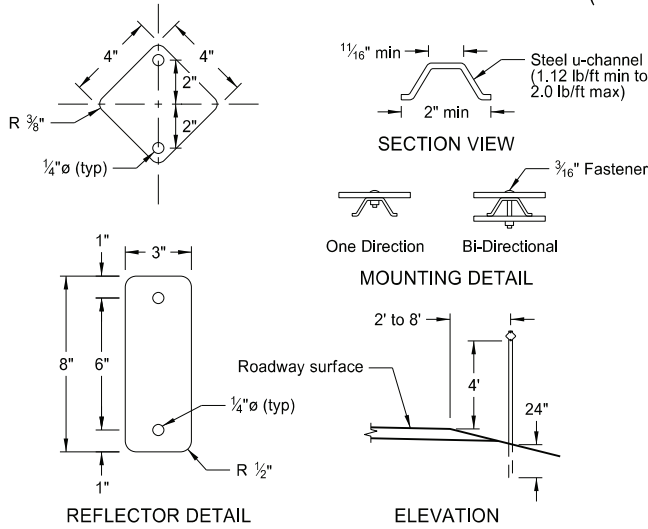
TYPE I BARRICADE



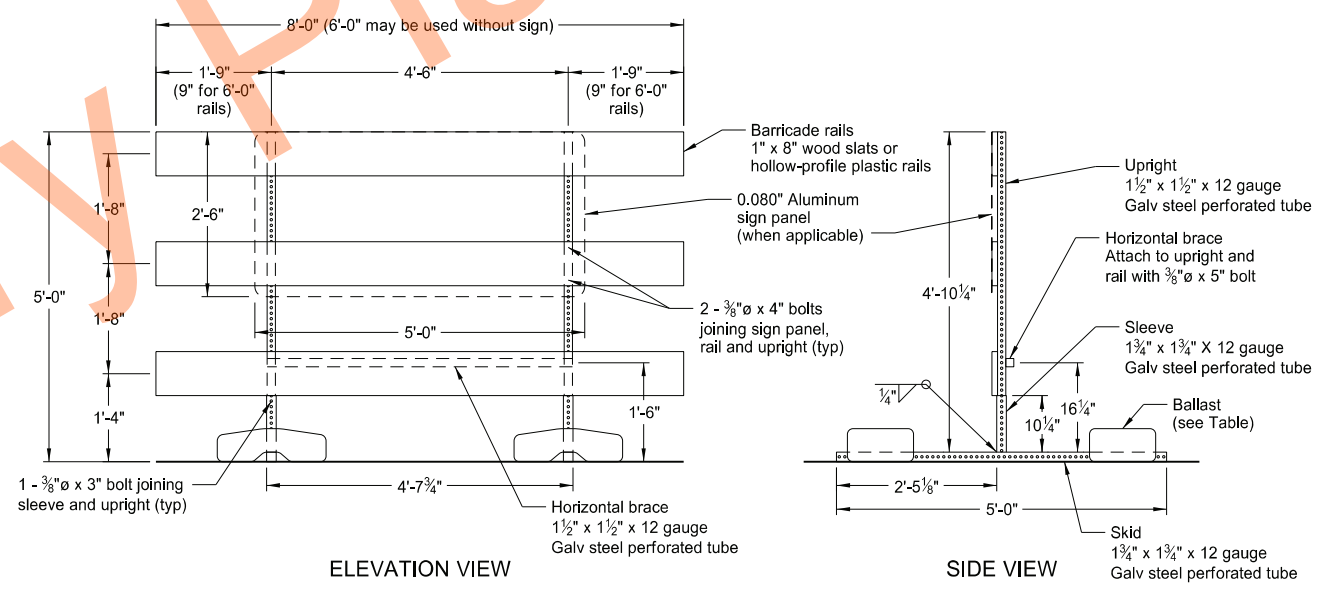
TYPE II BARRICADE



TYPE III BARRICADE



DELINEATORS



BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

MINIMUM BALLAST (For each side of barricade support)

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

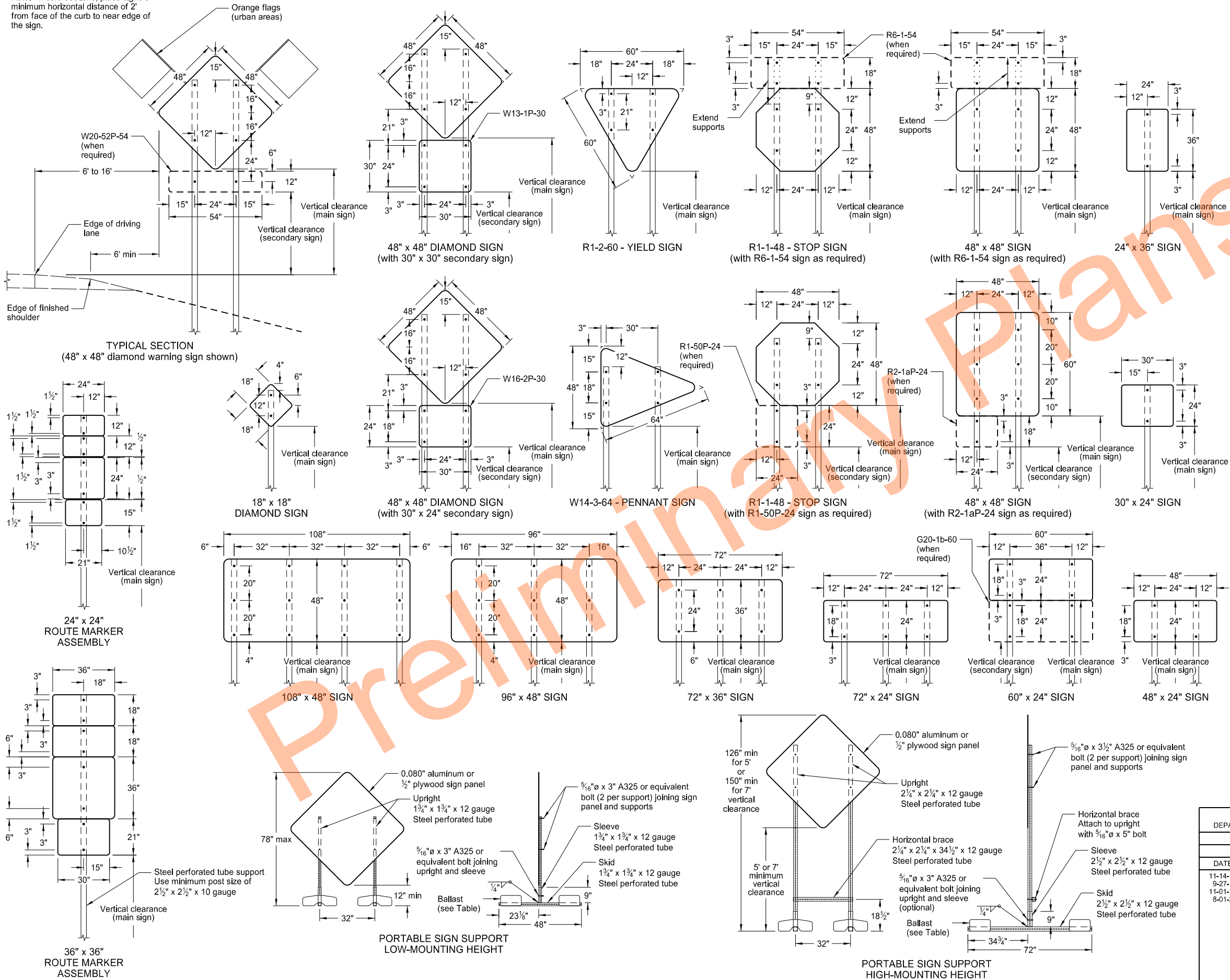
Note: Number of sandbags based on a wind speed of 55 MPH. Sandbags assumed to be placed at or near the ends of the skids.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
11-01-19	Revised details for Flexible Delineator
8-01-24	Electronic Stamp/Signature



CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

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



NOTES:

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

Place signs over 50 square feet on 2 1/2" x 2 1/2" perforated tube supports as a minimum.

Do not attach guy wires to sign supports. Attach wind beams behind sign panels when used with u-posts.
2. Sign Panels: Provide sign panels made of 0.100" aluminum, 1/2" plywood, or other approved material, except where noted. Punch all holes round for 3/8" bolts.
3. Alternate Messages: Install and remove alternate message signs on reflectorized plate (without borders) as required. (i.e. "Left" and "Right" message on lane closure sign)
4. Route Marker Auxiliary Signs: Provide route marker auxiliary signs, such as the cardinal direction and directional arrows, with a background and legend that match the route marker they are used with:

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

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

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

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

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

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

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

MINIMUM BALLAST
(For each side of sign support base)

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

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

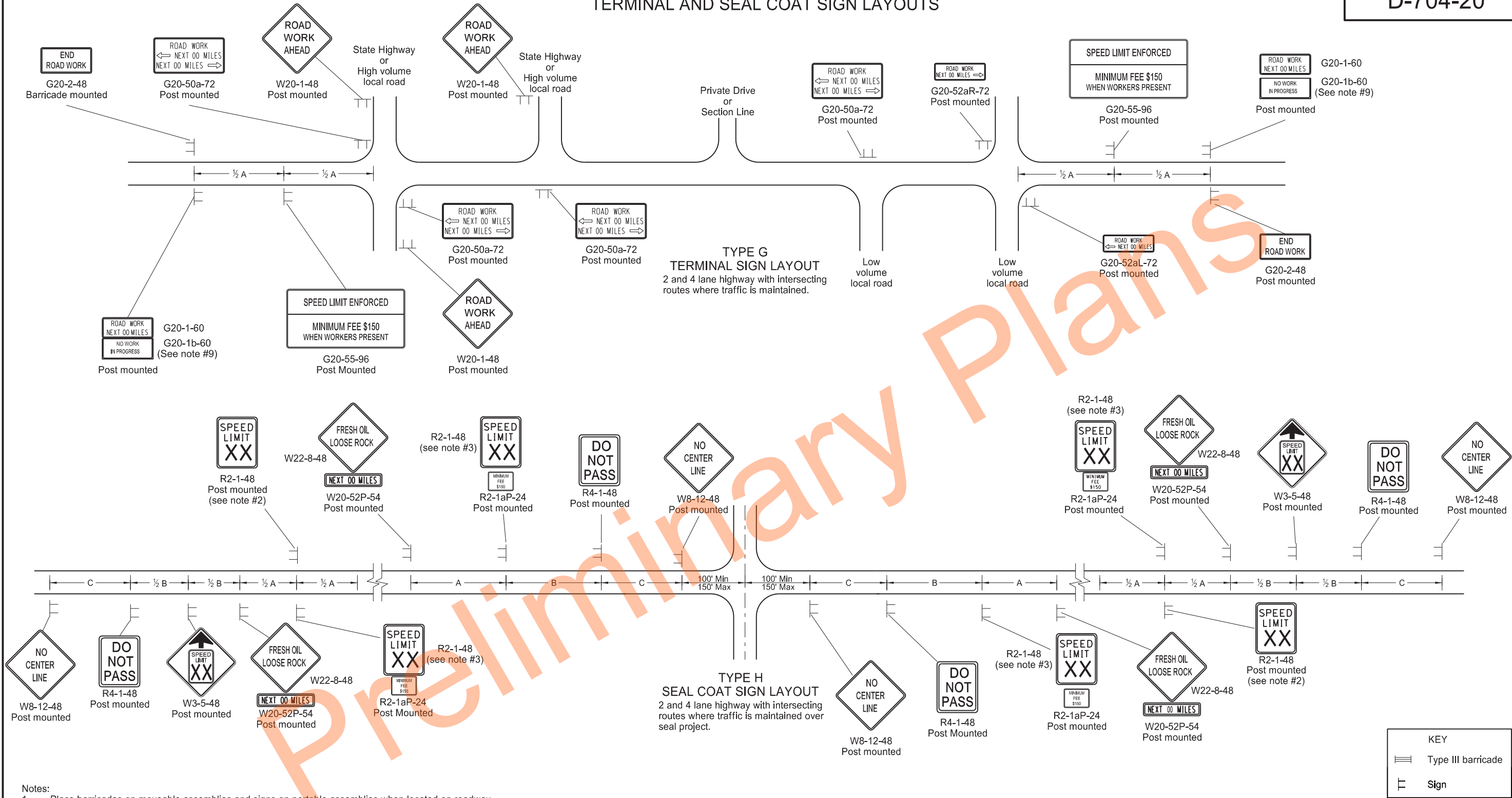
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE
11-14-13	Revised Note 6
9-27-17	Updated to active voice
11-01-19	Revised 60"x24" sign detail
8-01-24	Electronic Stamp/Signature



08/01/24

TERMINAL AND SEAL COAT SIGN LAYOUTS

D-704-20



Notes:

- Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
- Determine the exact speed limit in the field, based on location and conditions.
- Determine the reduced speed limit based on the in place speed limit before construction. Where speed limit reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 MPH.) Place the second speed limit sign at 1/2 B.
- Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
- Cover existing speed limit signs within a reduced speed zone.
- On seal coat projects, place signs R2-1-48, R2-1aP-24, R4-1-48, W22-8-48 and W20-52P-54 after all important intersections and at five mile intervals. Place sign W8-12-48 after all important intersections and at 2 mile intervals until short term center line pavement marking is placed.
- As an option, use portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Drawing D-704-14.
- Cover or remove speed limit signs from layout Type H when loose aggregate is removed.
- Install sign G20-1b-60 when work is suspended for winter.
- Use other traffic control layouts in immediate work areas. Place sign R2-1aP-24 below speed limit signs in reduced speed limit work areas.
- Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or the work is less than 15 days.
- Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

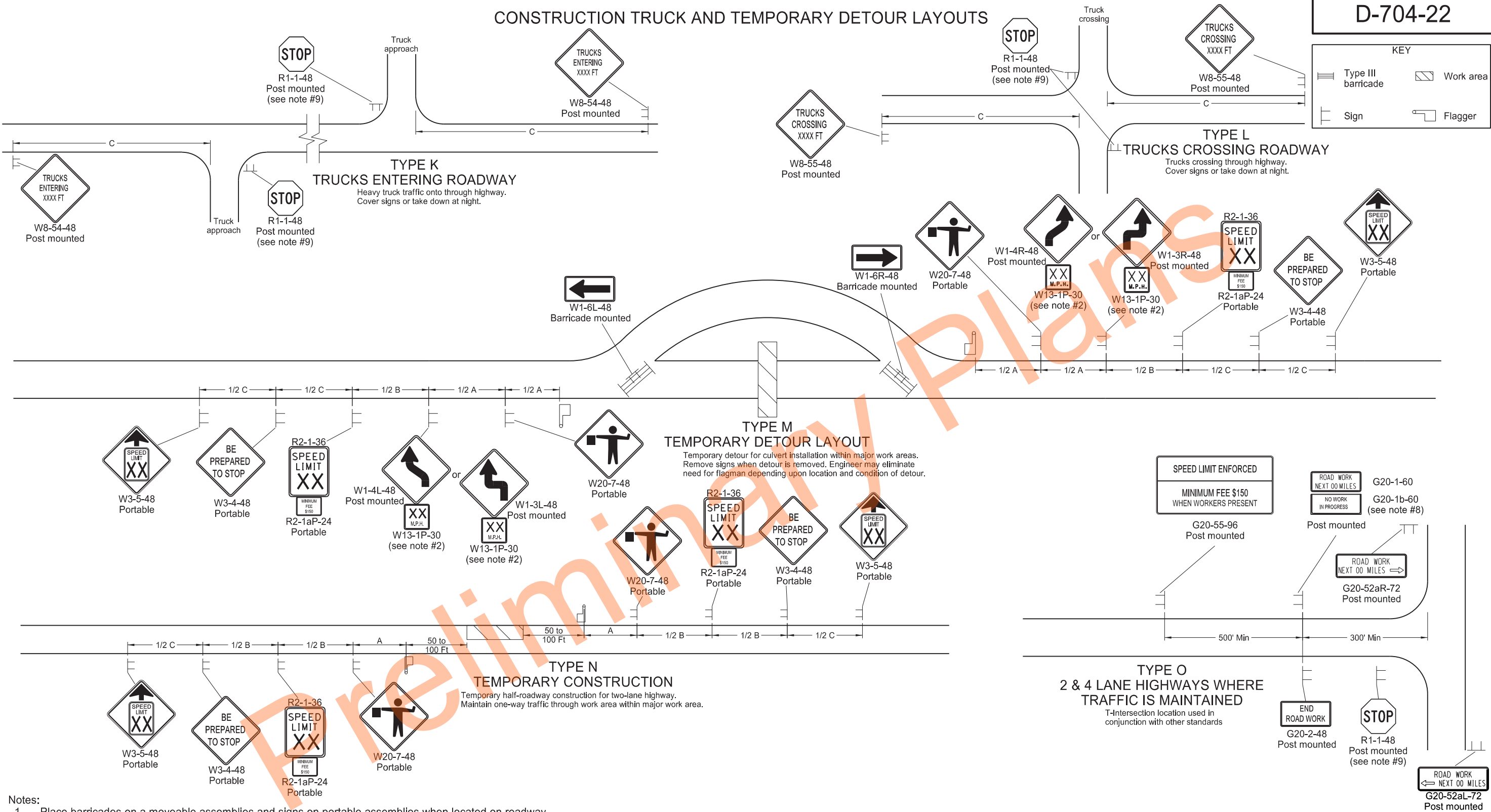
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs		
	Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 80 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Updated notes & sign numbers
11-01-19	Updated note & sign
12-08-21	Switched order of Road Work and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes



CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22



Notes:

- Place barricades on a moveable assemblies and signs on portable assemblies when located on roadway.
- Where necessary, safe speed to be determined by the Engineer.
- Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2 B.
- Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
- Cover existing speed limit signs within a reduced speed zone.
- Covered (when approved by engineer) or obliterated pavement marking measured as Obliteration of Pavement Marking.
- As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
- Install sign G20-1b-60 when work is suspended for winter.
- If existing stop sign is in place, a 48" stop sign is not required.
- Sign G20-55-96 is not required if layout is part of other traffic control that contains this sign, or if work is less than 15 days.
- Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

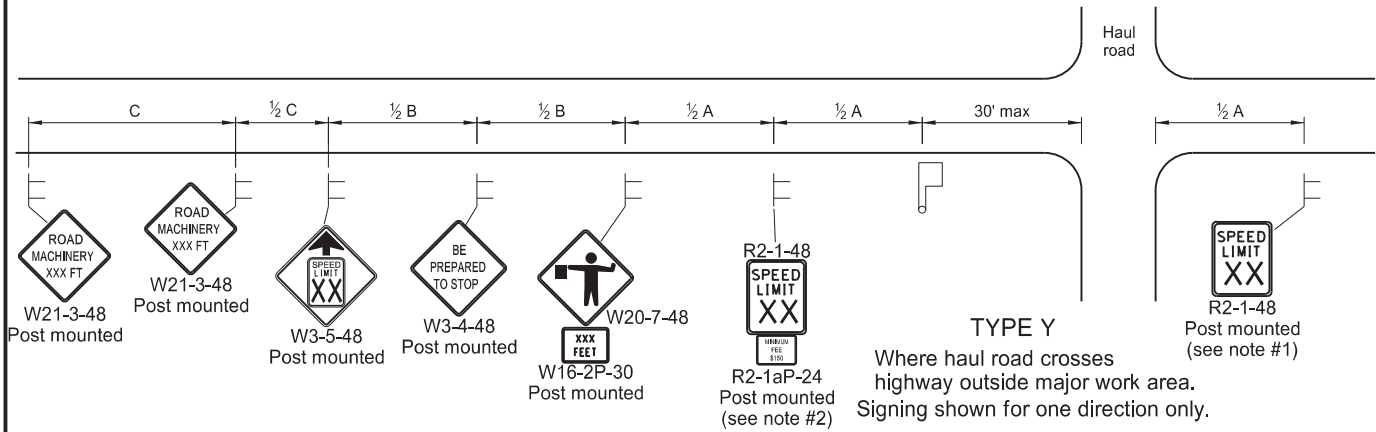
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 80 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Update notes & sign numbers
11-01-19	Revised sign numbers & note 7
12-09-21	Added Speed Limit Enforced and Dollars At Work signs
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes

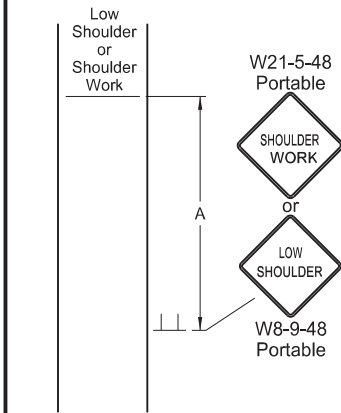
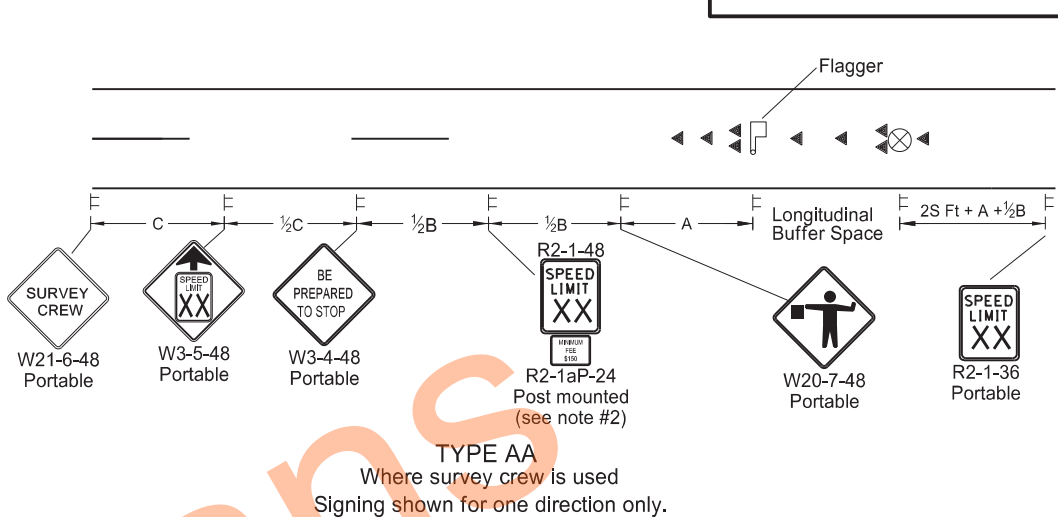


MISCELLANEOUS SIGN LAYOUTS

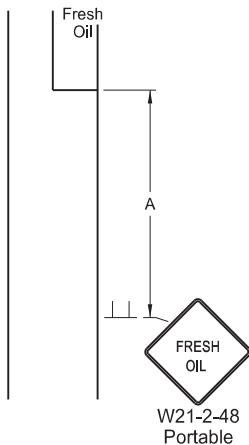
D-704-26



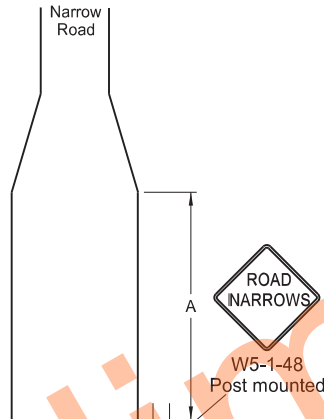
TYPE Z
Where speed zone is needed
Signing shown for one direction only.



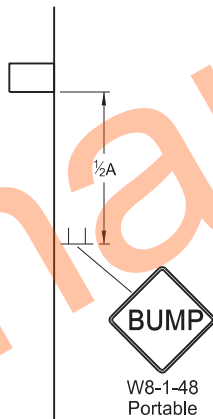
TYPE BB
Within major work area
where sign conditions exist



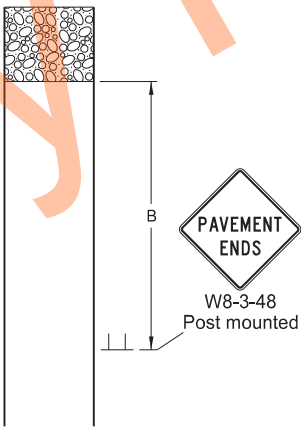
TYPE CC
Where sign conditions exist



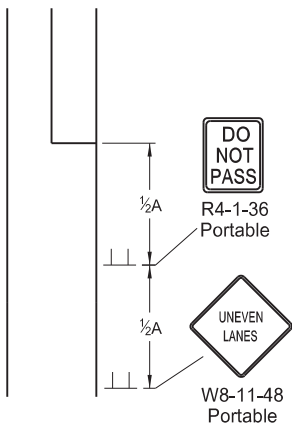
TYPE DD
Where sign conditions exist



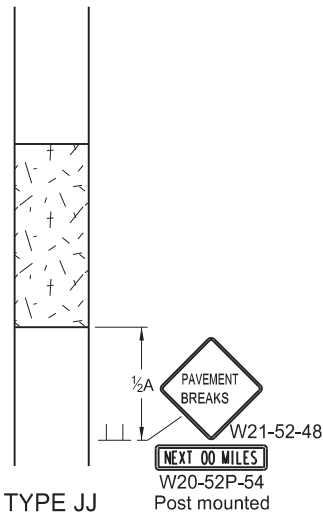
TYPE EE
Where sign conditions exist



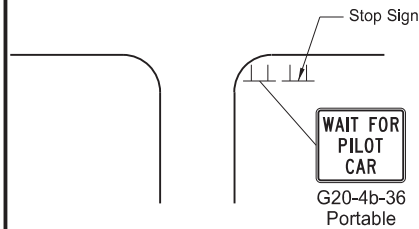
TYPE FF
Where sign conditions exist
Signing shown for one direction only.



TYPE GG
Where elevation difference
exists between lanes



TYPE JJ
For break in pavement.
Install signs when conditions exist
and remove when not applicable.
Signing shown for one direction only.



TYPE KK
At major intersections
within pilot car control area

- Notes
1. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
 2. Determine reduced speed limit based on in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2 B.
 3. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
 4. Cover existing speed limit signs within reduced speed zones.
 5. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
 6. Sign G20-55-96 is not required if this standard is part of other traffic control layouts, or work is less than 15 days.
 7. When pilot car operation is used, place sign G20-4b-36 "Wait For Pilot Car" at major intersections within pilot car control area.
 8. Recommend 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.
 9. Layouts shown for one direction only.

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 80 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

Longitudinal Buffer Space	
*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
80	910

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

KEY

Flagger

Sign

Cones

Survey Equipment

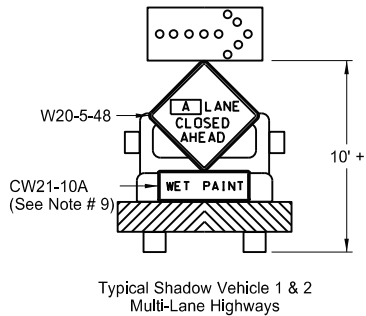
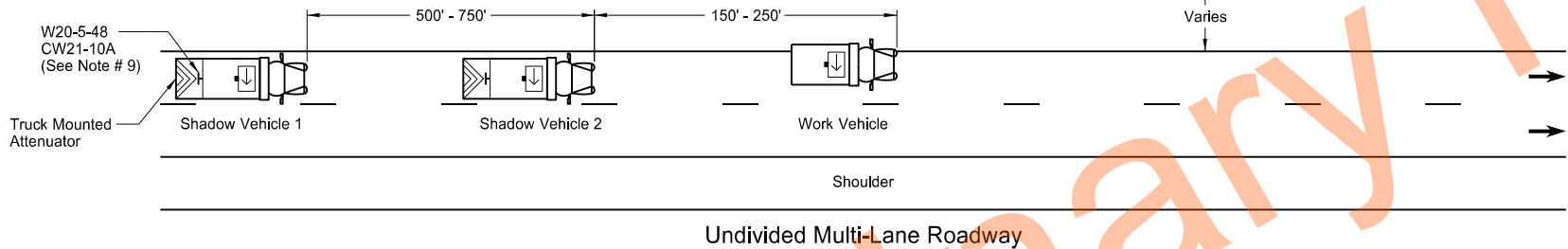
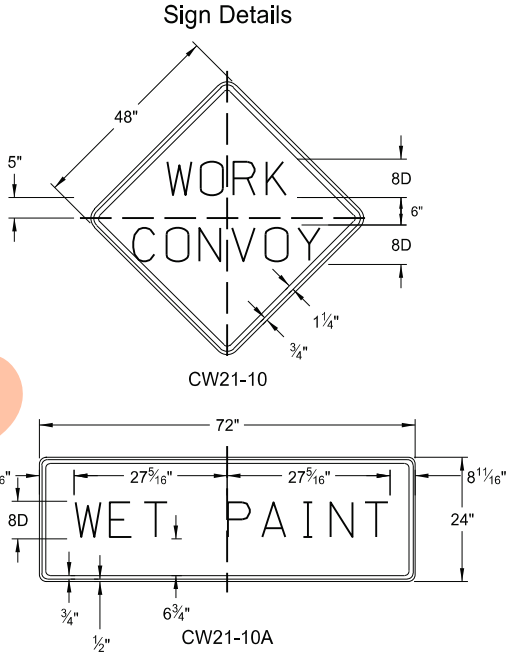
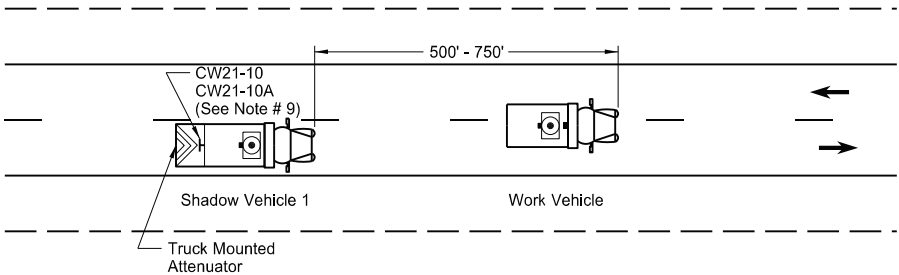
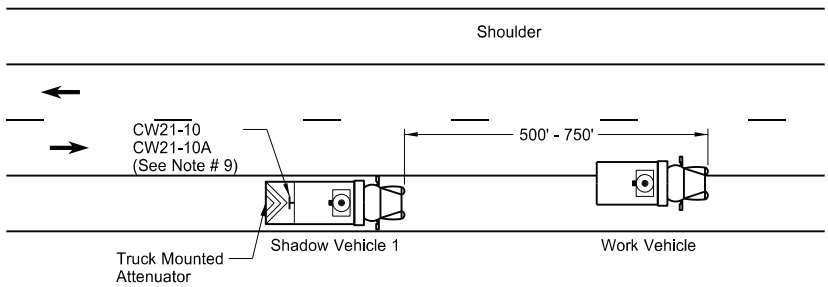
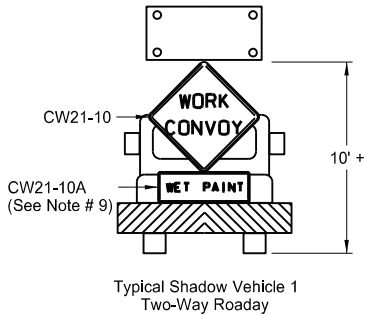
S = Numerical value of speed limit or 85th percentile.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Added speed limit signs. Updated notes & sign numbers
11-01-19	Revised note 5 & sign numbers
02-23-23	Revised distance & removed signs
06-30-25	Legislative Changes

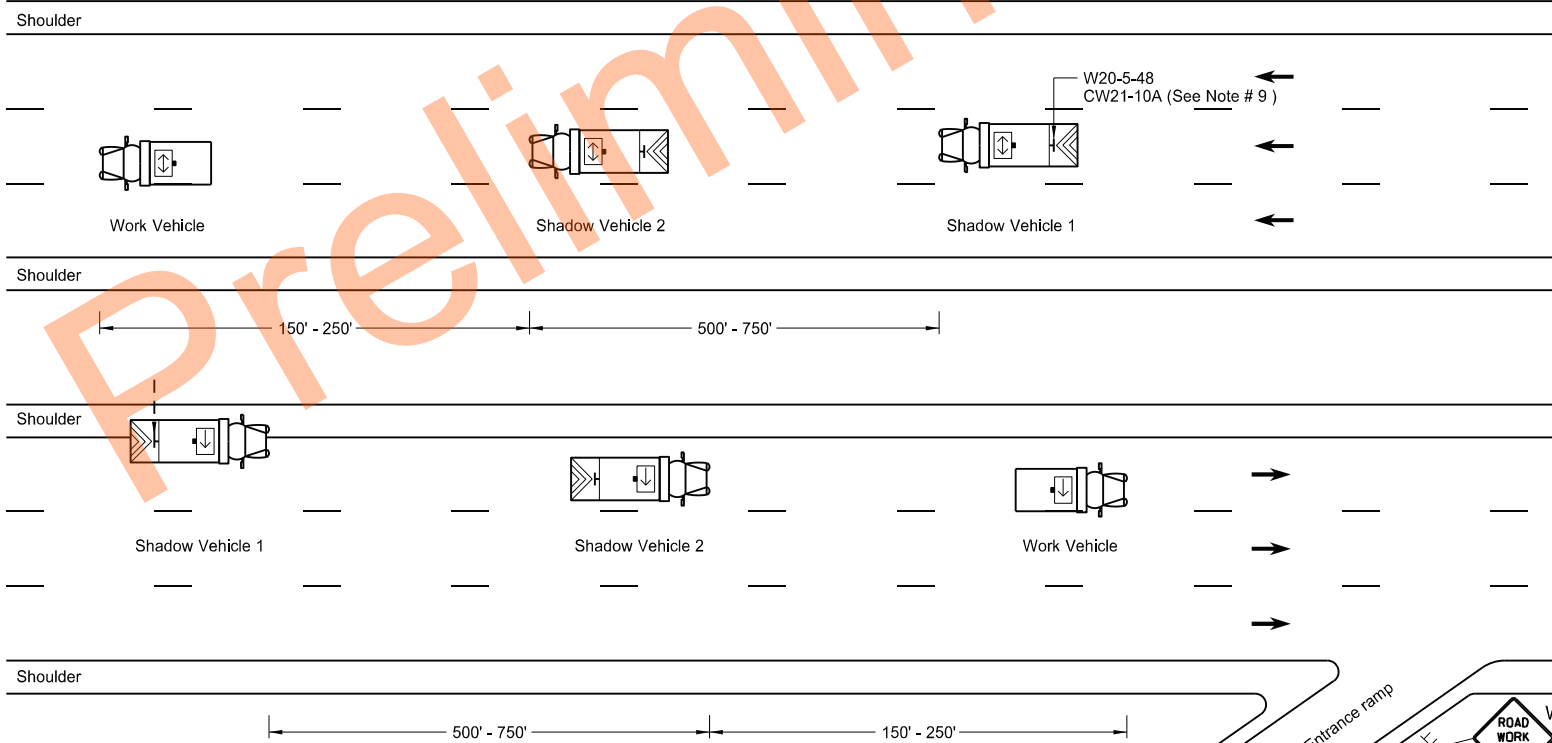


MOBILE OPERATION
(PAVEMENT MARKING)

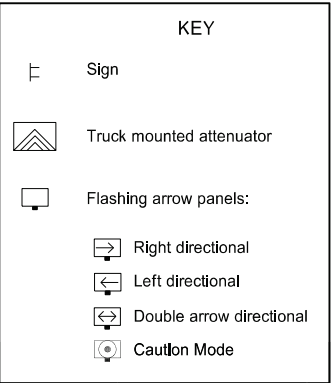
D-704-27



A = Left Right Center



- Notes
1. Use additional vehicles you choose to be in the convoy with truck mounted attenuators, at your own expense.
 2. Display yellow rotating beacons or strobe lights on shadow and work vehicles, unless otherwise stated in the plans.
 3. Use Type B or Type C flashing arrow panels controlled from inside the vehicle.
 4. Provide each vehicle with two-way electronic communication capability.
 5. Move shadow vehicle 1 first to shadow other convoy vehicles when convoy changes lane.
 6. Vary vehicle spacing between shadow vehicle 1 and shadow vehicle 2 based on sight distance restrictions. Motorists approaching the work convoy need to see trail vehicle in time to slow down and/or change lanes as they approach shadow vehicle.
 7. Sign Colors
Letters = Black
Border = Black
Background = Orange
 8. As an option, use shadow vehicle 2 the paint tender vehicle.
 9. Use sign CW21-10A only during painting operation.
 10. Pull over work and shadow vehicles periodically to allow motor vehicle traffic to pass on two lane - two way roadways.



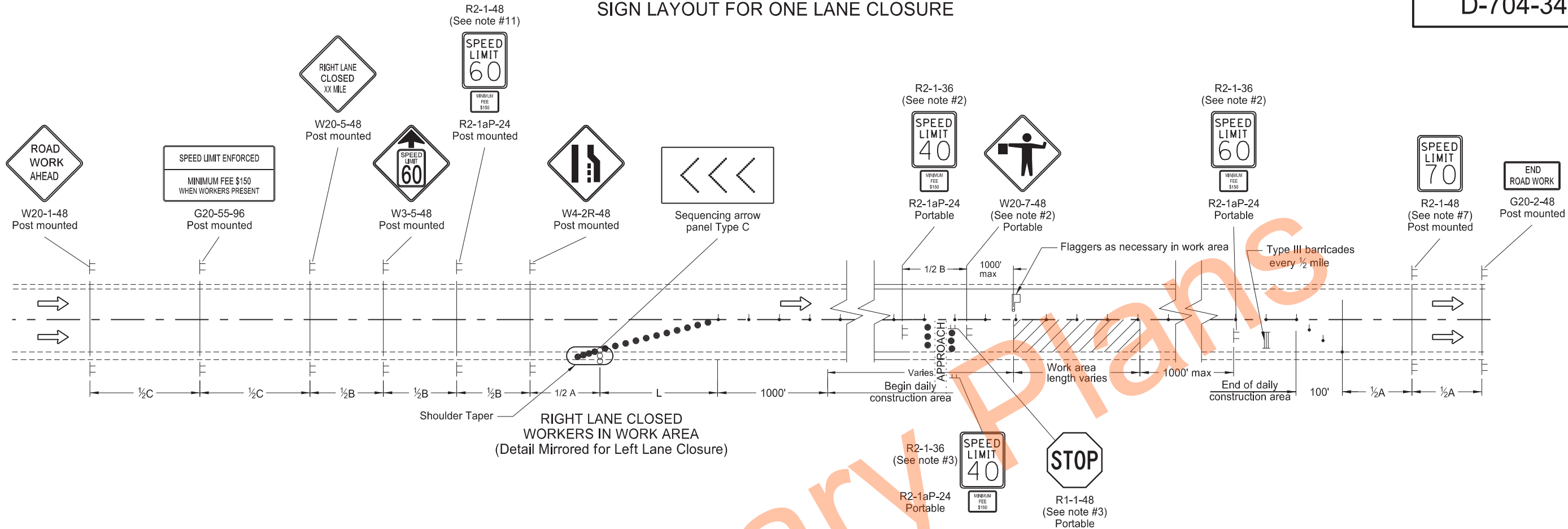
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
6-18-14	Removed shadow vehicle 2 on two lane roadways
9-27-17	Updated to active voice
11-08-19	Changed Standard Heading
6-02-24	Electronic Stamp/Signature.



08/02/24

SIGN LAYOUT FOR ONE LANE CLOSURE

D-704-34



Notes:

1. Install advance signs for flagging when flaggers are flagging.
2. Move the advanced flagger sign and speed limit signs as the work area moves through the construction zone. When the work area is not visible from the flagger, move the flagger station so the work area is visible. Place the 40 mph speed limit sign at 1/2A in advance of the flagger sign and move the 60 mph speed limit sign. Cover or remove the 40 mph speed limit and the Minimum Fee \$150 signs upon completion of the work day or when workers are not present. Determine the exact speed limit in the field, dependent on location and conditions.
3. Approaches: When the work area encompasses an approach, install a 40 mph speed limit sign to control the approach. Cover the existing stop sign and install a new portable stop sign when the approach is on the side of the lane closure. Remove the approach speed limit sign once the main line 40 mph speed zone is moved past the approach.
4. Variables:
 - S=Numerical value of speed limit or 85th percentile
 - W=The width of taper.
 - L=Minimum length of taper, or SxW for freeways, expressways, and all other roads with speeds of 45 mph or greater, or (WxSxS)/60 for urban, residential, and other streets with speeds of 40 mph or less.
5. Space delineator drums for tapering traffic at the dimension "S". Space tubular markers used for tangents at 2 times dimension "S".
6. Place sequencing arrow panels at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the work area and place on the roadway surface.
 - Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
 - Use Type B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
 - Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
7. Re-establish the speed limit. Determine the exact speed limit in the field, dependent on location and conditions.
8. Cover existing speed limit signs within a reduced speed zone.
9. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the diamond sign, and at such a distance above the edge that the flag does not touch the sign when limp.
10. Determine the reduced speed limit dependent on the in place speed limit before construction. Where speed limits are to be reduced more than 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2B.
11. As an option use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
12. Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or the work is less than 15 days.

KEY	
	Type I barricade
	Type II barricade
	Type III barricade
	Sign
	Delineator drum
	Work area
	Flagger
	Sequencing arrow panel
	Tubular markers

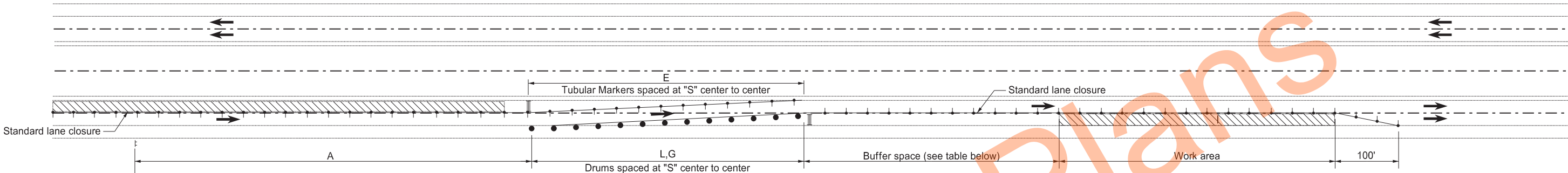
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 80 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-26-2012	
REVISIONS	
DATE	CHANGE
03-15-16	Removed Do Not Pass signs & updated notes
08-17-17	Updated notes & sign numbers & moved Speed Limit signs
11-01-19	Removed shldr taper details & revised tubular mkr symbol
12-08-21	Switched order of Road Work and Spd Limit Enforced, removed table, & added Dollars At Work
11-29-22 06-30-25	Removed Dollars At Work Legislative Changes

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

TRAFFIC CONTROL SYSTEM
LANE SHIFT BETWEEN A LANE CLOSURE AND AN OPPOSITE LANE CLOSURE

D-704-34A



QUANTITIES	
TYPE III BARRICADES	2 Each
DELINEATOR DRUMS	13 Each
TUBULAR MARKERS	13 Each
RAISED PAVEMENT MARKERS (White)	Varies
OBLITERATION OF PAVEMENT MARKING	Varies

KEY	
	Work area
	Type III barricade
	Traffic Direction
	Delineator drum
	Tubular markers
	Sign

LEGEND	
E	Obliteration of pavement marking (10' line, 30' skip centerline)
G	Raised pavement markers (white) 5' ctrs.

- Notes
- Variables
 - S = Numerical value of posted speed limit, off-peak 85th percentile speed prior to work starting, or the anticipated operating speed in mph.
 - W = Width of offset in feet.
 - L = Taper length in feet. Speeds 40 mph or less $L=WS^2/60$. Speeds 45 mph or greater $L= WS$.
 - Place signs and barricade on roadway on moveable assemblies.
 - Cover existing speed limit signs within reduced speed zones.
 - Upon approval, the Engineer will measure obliterated or covered pavement marking as Obliteration of Pavement Marking.
 - As an option, use portable sign supports in lieu of post mounted sign in accordance with NDDOT Standard Drawing D-704-14.
 - Place "Minimum Fee \$150" signs below speed limit signs when placing traffic control devices to reduce speed.
 - When duration of work is 14 days or less, obliteration of pavement marking (10' line, 30' skip, centerline) and raised pavement markers are not required.

Longitudinal Buffer Space	
*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
80	910

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

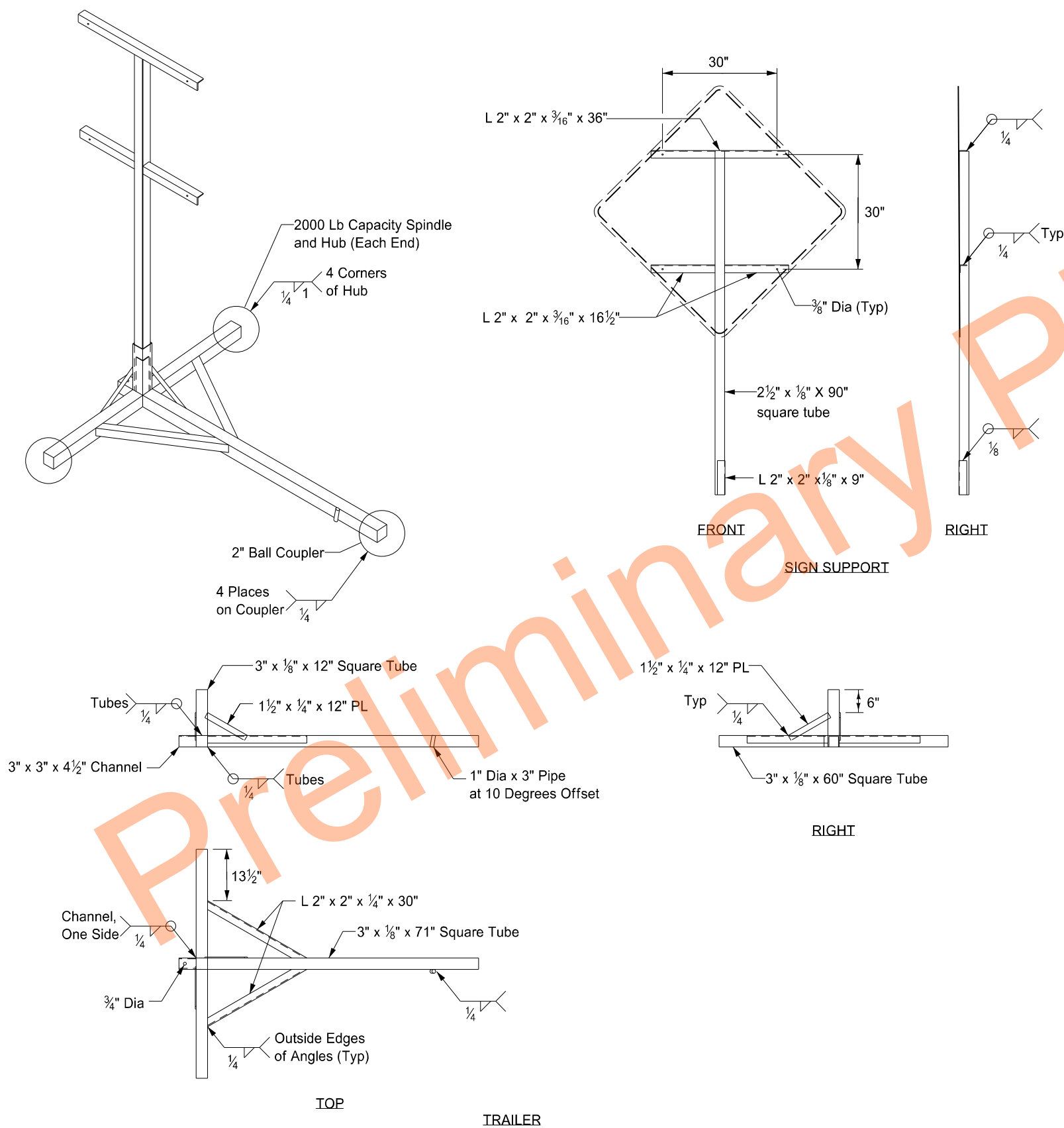
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 80 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-26-2012	
REVISIONS	
DATE	CHANGE
09-27-17	Updated to active voice
11-01-19	Clarified work zone
08-02-24	Electronic Stamp/Signature
06-30-25	Legislative Changes



PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



- Notes:
- 1. Maximum 250 pound weight of assembly.
 - 2. Use a 14" wheel and tire.
 - 3. Use no automotive and equipment axle assemblies for trailer-mounted sign supports.
 - 4. Other NCHRP 350 or MASH crash tested assemblies are acceptable.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-23-10	
REVISIONS	
DATE	CHANGE
12/02/2020	Updated Note to active voice.

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
12 02 2020

[illegible][illegible]

Technical drawing of a mechanical part with dimensions in inches. The part has a complex profile with multiple vertical and horizontal segments, and curved sections defined by radii. Dimensions include overall width 7'-6", overall height 12'-9", and various segment lengths and radii such as R=3'-4" and R=2'-4".

Technical drawing of a door handle assembly. The drawing shows a side view of the handle with the following dimensions:

- Total height: 6'-0"
- Top section height: 1'-0³/₄"
- Middle section height: 1'-9³/₄"
- Bottom section height: 1'-0³/₄"
- Bottom section height (alternative): 2'-0³/₄"
- Width: 1'-1"
- Detail: 3/4"

Technical drawing of a stylized 'STOP' sign. The sign is 8'-0" high and 6'-3" wide. The word 'STOP' is rendered in a bold, sans-serif font. Dimensions are provided for the overall size and the spacing between the letters. The overall width is 6'-3" and the overall height is 8'-0". The letters are spaced as follows: 16" between the first and second letters, 4" between the second and third letters, 2" between the third and fourth letters, 5" between the fourth and fifth letters, and 16" between the fifth letter and the right edge. The letters themselves have various internal dimensions: the 'S' is 4" wide at the top and 4" wide at the bottom; the 'T' is 4" wide at the top and 4" wide at the bottom; the 'O' is 4" wide at the top and 4" wide at the bottom; the 'P' is 4" wide at the top and 4" wide at the bottom. The sign is shown with a 1/4" scale bar.

Technical drawing of a 'SLOWLY' sign. The sign is 9'-8" wide and 8'-0" high. The letters are outlined with dimensions: 'S' is 16" wide and 4" high; 'L' is 16" wide and 4" high; 'O' is 16" wide and 4" high; 'W' is 16" wide and 4" high; 'L' is 16" wide and 4" high; 'Y' is 16" wide and 4" high. The sign is made of wood and has a white background.

[illegible]

Speed Limit	Chevron Width	Chevron Spacing 45° to Traffic
0-25 mph	8"	5'
30-40 mph	8"	15'
45 mph and above	12"	25'

Diagram illustrating a 10' wide edge line with 30' spacing. The diagram shows two parallel lines representing the edge line, with a dimension of 10' between them. A dimension of 30' is shown between the edge line and the center of the road.

Advance Placement Distance for Railroad Warning Signs	
Posted or 85th Percentile Speed	Advance Distance
20 mph	min. 100 ft
25 mph	min. 100 ft
30 mph	min. 100 ft
35 mph	min. 100 ft
40 mph	125 ft
45 mph	175 ft
50 mph	250 ft
55 mph	325 ft
60 mph	400 ft
65 mph	475 ft
70 mph	550 ft

[illegible]

W10-1 

Notes:
Mark a three lane roadway with a centerline for two-lane approach operation on the approach to a crossing. On multi-lane roads, extend the transverse bands across all approach lanes, and use individual R X R symbols in each approach lane.

R15-1

Railroad cross & 2 R's 60.5 S.F.
3 Bands (12' lane) 72 S.F.

*Stop Bar nearest crossing - 8' from gate or 26' to

Diagram illustrating the dimensions and markings for a 12-foot wide roadway. The diagram shows a cross-section of the road with various markings and dimensions:

- 12" min to 30" max**: Dimension for the top section of the road.
- Curb face**: Indicated by an arrow pointing to the left edge of the road.
- 24"**: Dimension for the first blacked-out section.
- 24"**: Dimension for the second blacked-out section.
- 2'x6', 2'x8", 2'x10' or 2'x12' white line**: Dimension for the white line section.
- 24"**: Dimension for the third blacked-out section.
- Wheel track**: Dimension for the wheel track section.
- 30"**: Dimension for the wheel track section.
- 24"**: Dimension for the fourth blacked-out section.
- 12" min to 30" max**: Dimension for the section below the fourth blacked-out section.
- 24"**: Dimension for the fifth blacked-out section.
- Wheel track**: Dimension for the wheel track section.
- 30" max**: Dimension for the wheel track section.
- 24"**: Dimension for the sixth blacked-out section.
- 6" min to 15" max**: Dimension for the bottom section of the road.
- ℄ of Roadway**: Indicated by an arrow pointing to the center line of the road.

NOTES:

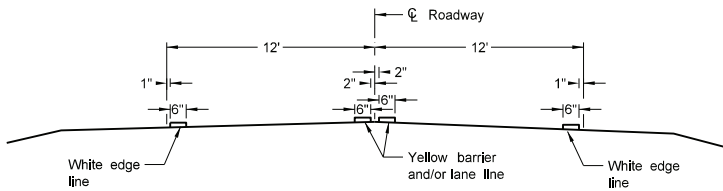
1. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph,
2. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-6-11	
REVISIONS	
DATE	CHANGE
10-17-17 08-27-19 01-28-2020 11-22-2023	Updated to active voice. New Design Engineer PE Stamp. Revised min Stop Bar distance to rail. Revised pavement marking widths.

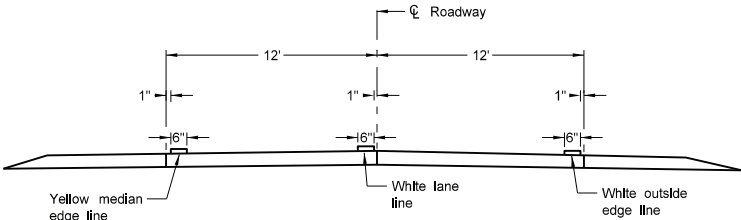


PAVEMENT MARKING

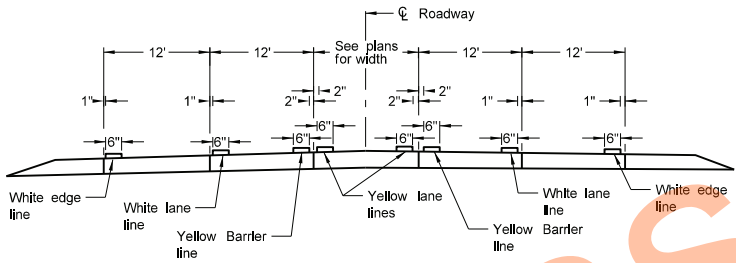
D-762-4



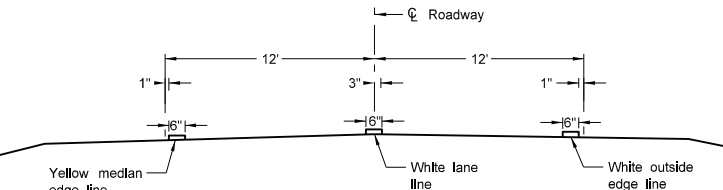
Two Lane Two Way
RURAL ROADWAY



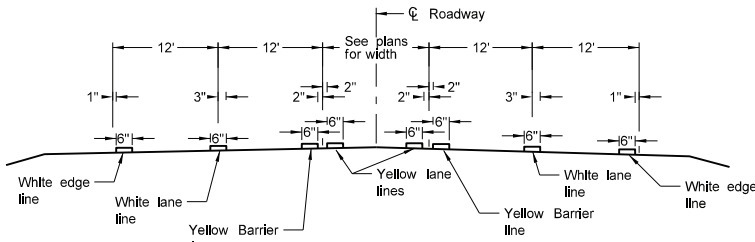
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



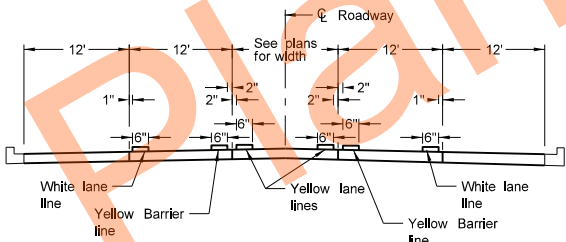
RURAL FIVE LANE ROADWAY
Concrete Section



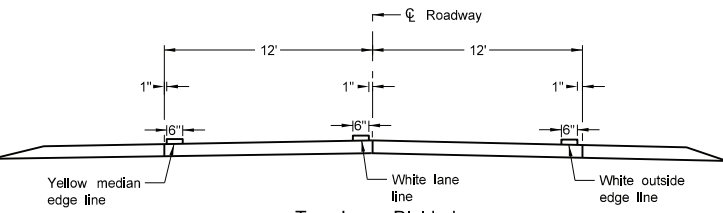
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



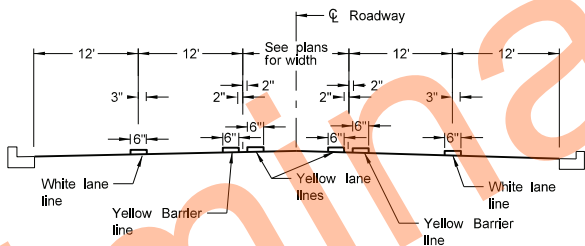
RURAL FIVE LANE ROADWAY
Asphalt Section



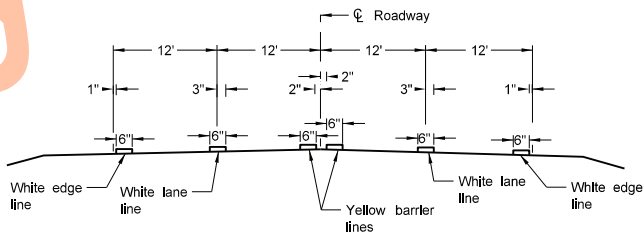
URBAN FIVE LANE SECTION
Concrete Section



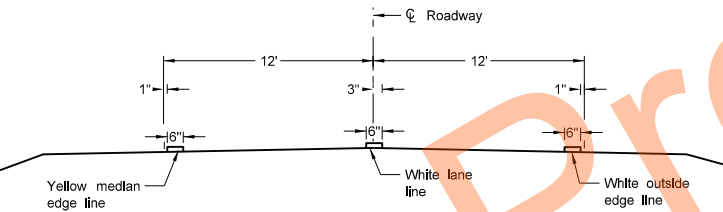
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



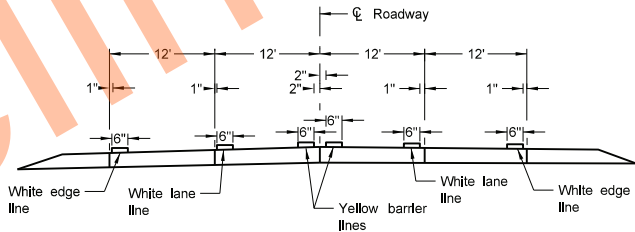
URBAN FIVE LANE SECTION
Asphalt Section



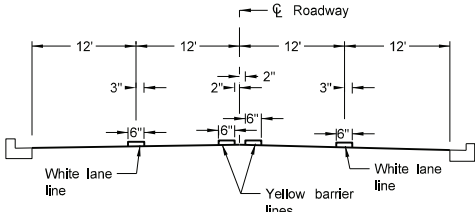
RURAL FOUR LANE ROADWAY
Asphalt Section



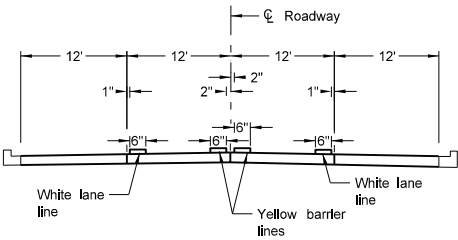
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



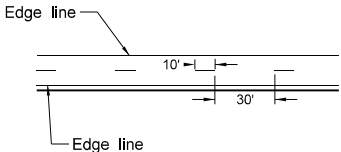
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

- NOTES:
1. Continue edge lines through private drives and field drives. Break edge lines for intersections.
 2. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
 3. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits < 40 mph.

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



PAVEMENT MARKING FOR STANDARD 90 DEGREE FLARED INTERSECTION
(No Center Left Turn Lane on Major Road)

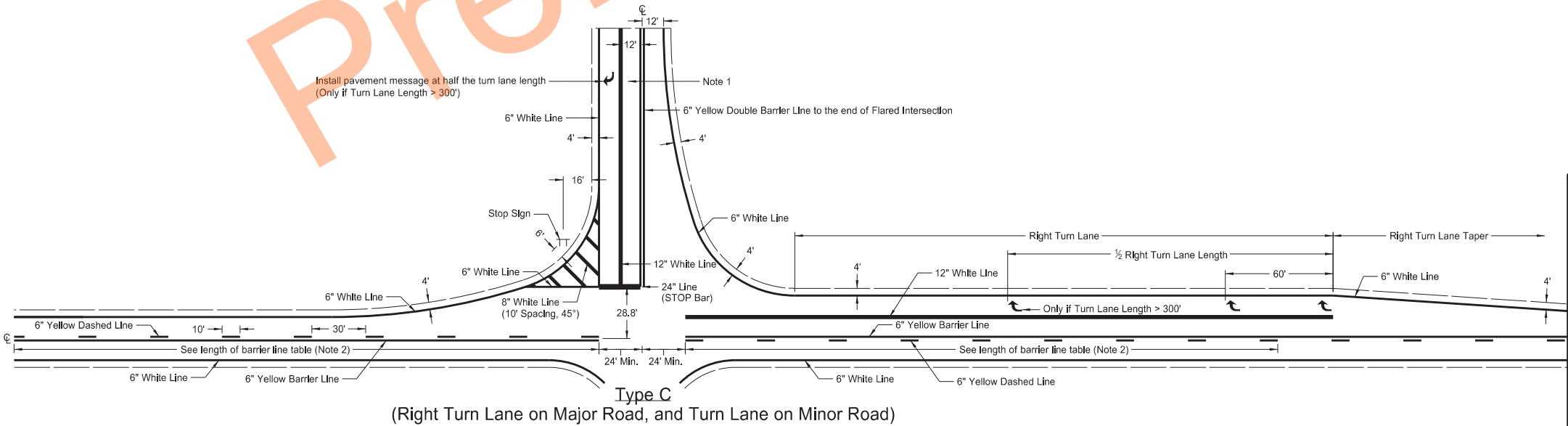
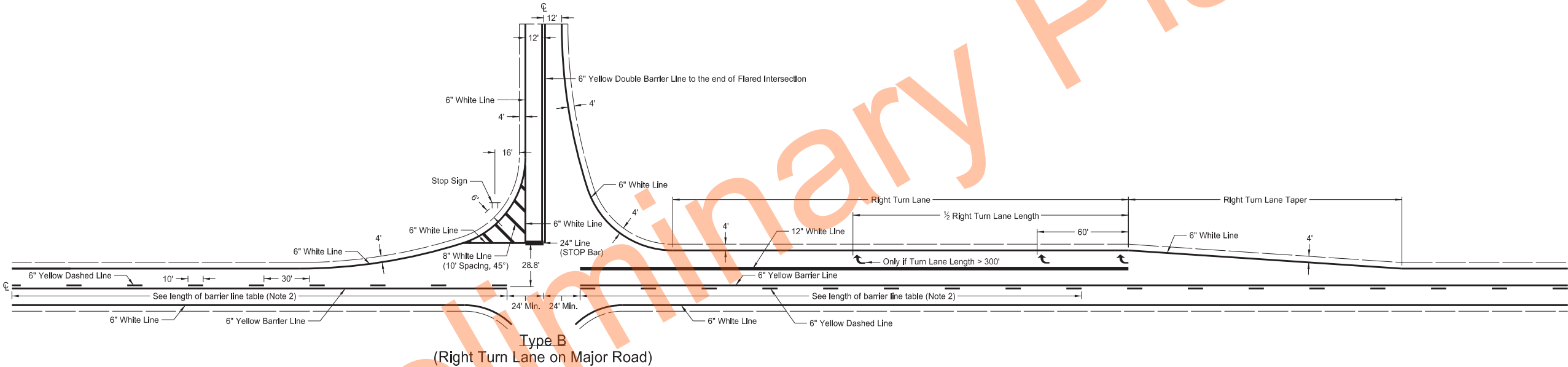
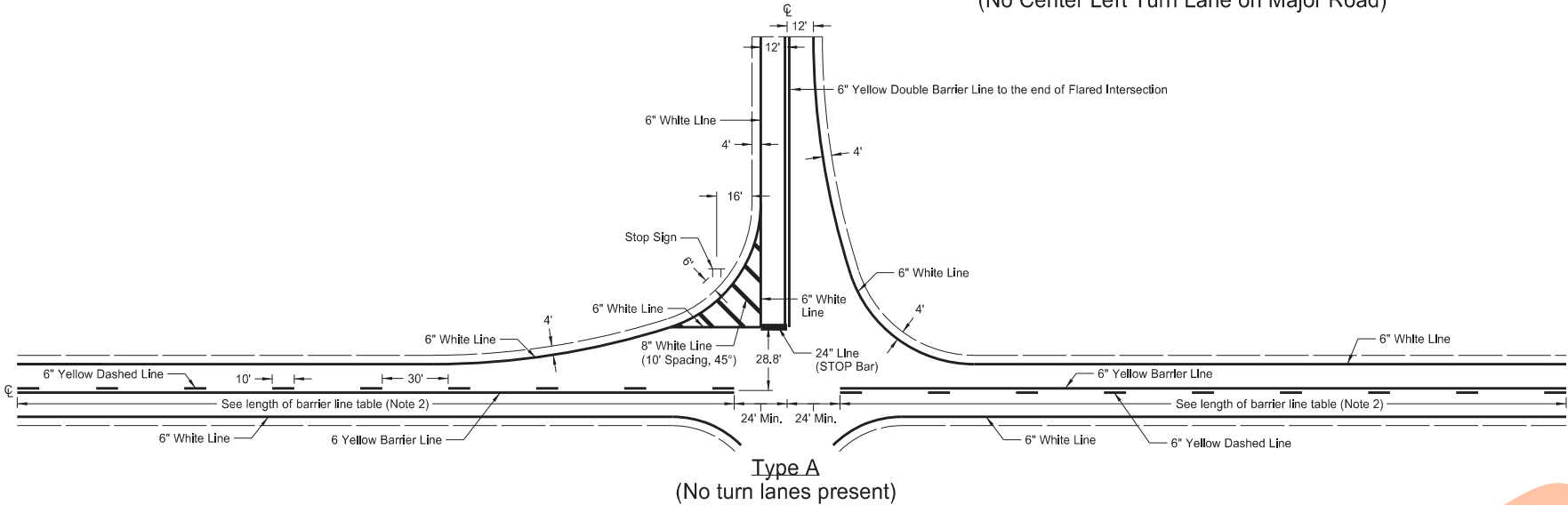
D-762-5

Notes

- 1. At "T" intersections (3-leg), additionally install left turn pavement marking message arrow.
- 2. The barrier lines have variable distances dependent on speed limit. Obtain barrier line length from table below (stopping sight distance.)
- 3. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
- 4. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40.
- 5. Wide line - 8 inches wide if 4 inch normal width lines are used and 12 inches wide if 6 inch normal width lines are used.

Table for Length of Barrier Line

Speed Limit (mph)	30	35	40	45	50	55	60	65	70
Minimum Length	200'	250'	305'	360'	425'	495'	570'	645'	730'



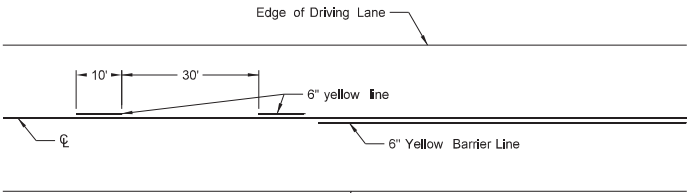
- 6" Marking
- 8" Marking
- 12" Marking
- 24" Marking

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
3-29-16	
REVISIONS	
DATE	CHANGE
8-17-17	Updated note & dimensioning.
8-30-18	Corrected pvmt mkg placement.
8-27-19	New Design Engineer PE Stamp.
11-22-23	Revised pavement marking widths.
1-17-24	Revised wide pvmt mkg width.

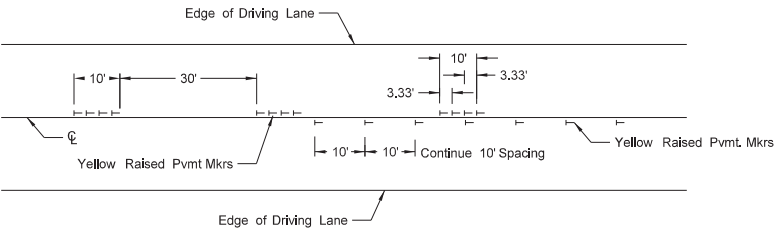


SHORT-TERM PAVEMENT MARKING

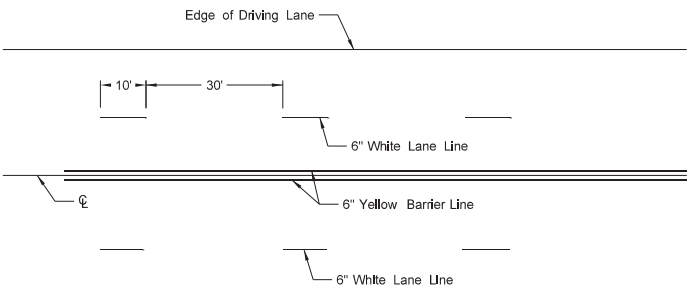
D-762-11



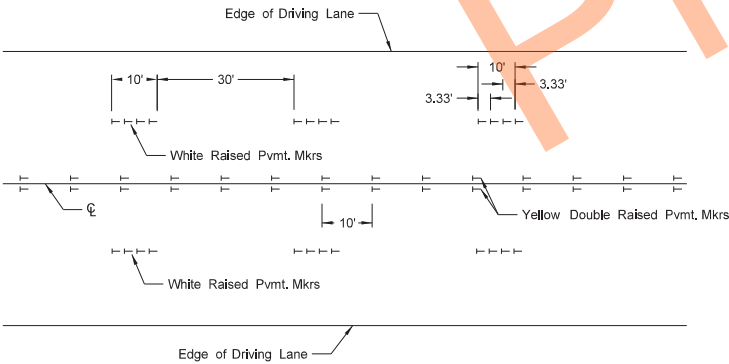
Painted or Tape Lines



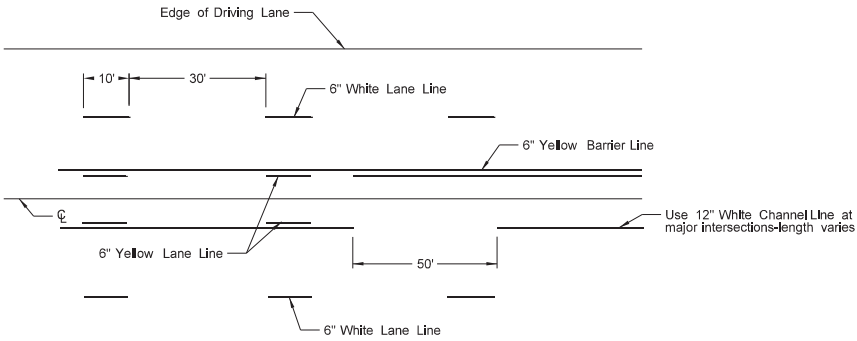
Raised Pavement Markers
TWO-LANE TWO-WAY ROADWAY



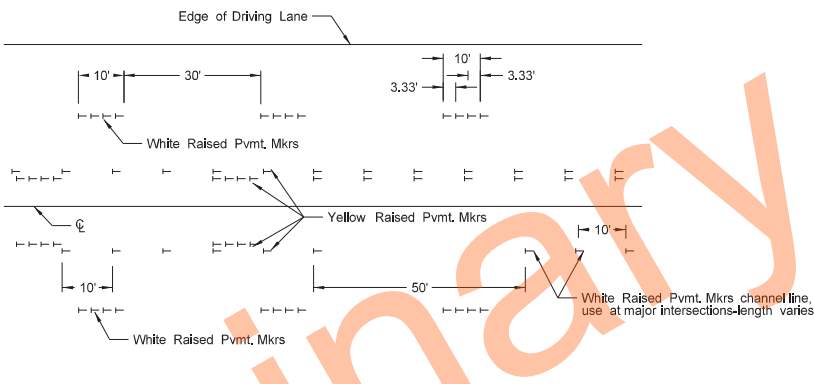
Painted or Tape Lines



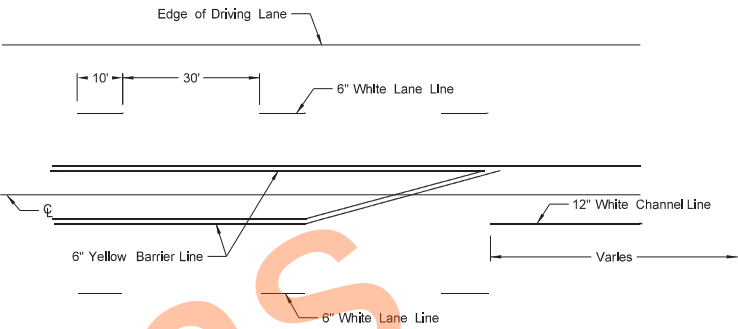
Raised Pavement Markers
FOUR LANE ROADWAY



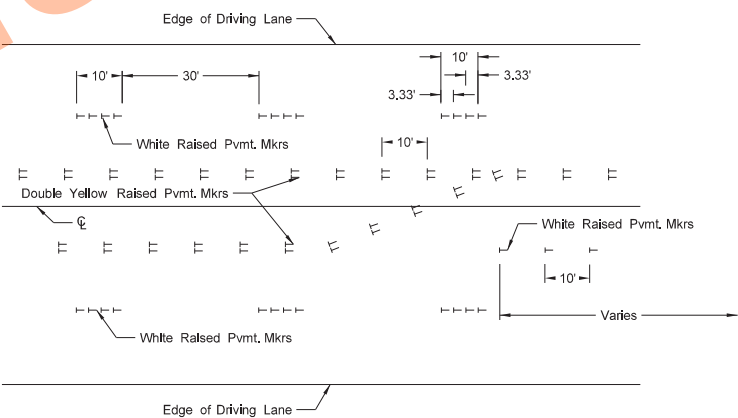
Painted or Tape Lines



Raised Pavement Markers
FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers
FIVE LANE ROADWAY WITH MARKED ISLANDS

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

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

