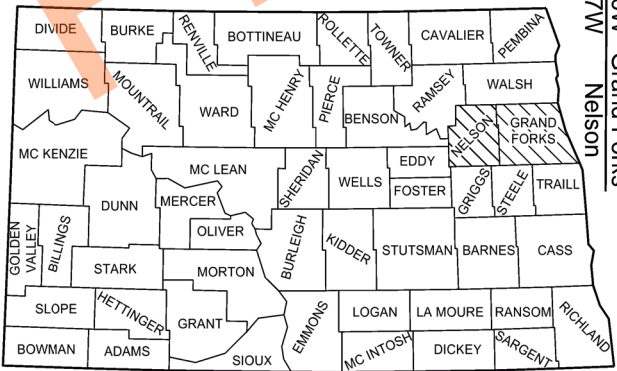


GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	7/1/2025
Supplemental Specifications	NONE

NH-6-002(155)318
Nelson and Grand Forks County
Petersburg E to 1.4 Miles W of JCT ND 18 - EB
Concrete Pavement Repair, Grinding,
Mill & Overlay Turn Lanes

Map of Grand Forks County, North Dakota, showing the proposed route for the Grand Forks Bypass. The map includes a grid of townships and ranges, with the proposed route highlighted in black. Key features include the city of Grand Forks, the Red River, and various landmarks. The map is labeled with "Begin Project RP 311.921" and "End Project RP 329.076". A large "Preliminary Plans" watermark is overlaid on the map.



DESIGNER Brian Ward
DESIGNER Adam Gorecki
DESIGNER Konrad Casler

ND DEPARTMENT OF TRANSPORTATION
GRAND FORKS DISTRICT

 3/05/26

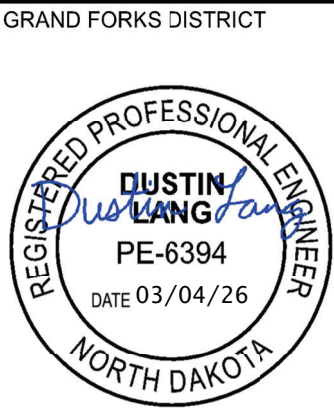
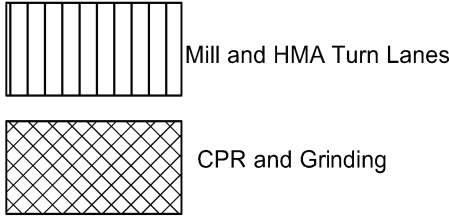
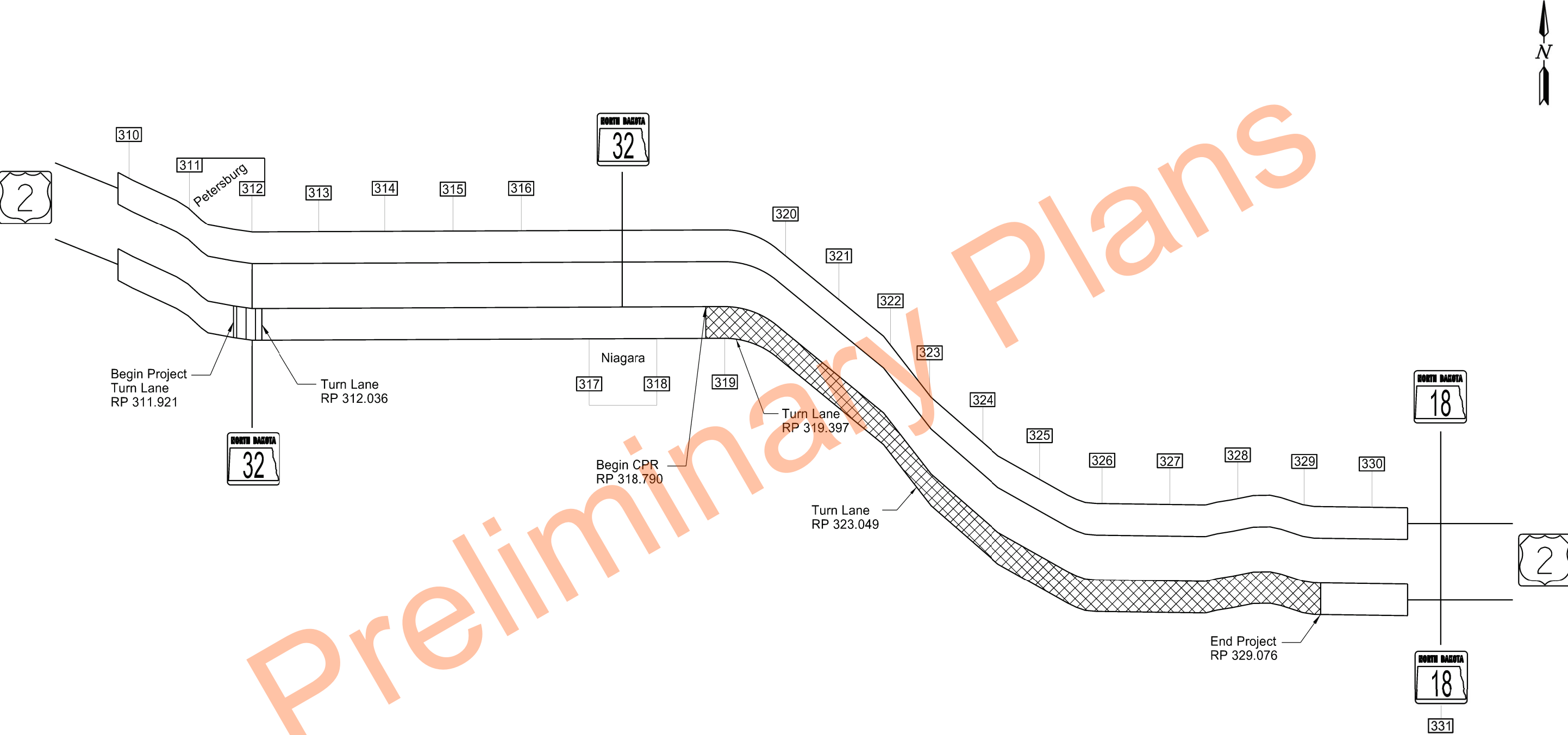


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6	1 - 1	Notes	D-101-30, 31,32,33	Symbols					
8	1 - 1	Quantities	D-550-2	Longitudinal Joint Details					
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			D-704-22	Construction Truck And Temporary Detour Layouts					
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			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					
SPECIAL PROVISIONS									
Number	Description								
SP 330(25)	Commercial Grade Asphalt								
SP339(25)	E-Ticketing (Mandatory)								

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-6-002(155)318	4	1



Scope of Work

CPR, Grinding, Mill & Overlay Turn Lanes
Petersburg E to 1.4 Miles W of JCT ND 18 - EB

REGISTERED PROFESSIONAL ENGINEER

DUSTIN LANG
PE-6394
DATE 02/27/26

NORTH DAKOTA

NOTES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-6-002(155)318	6	1

100-P01	COORDINATION OF PROJECTS: Another project in the vicinity of this project is under contract during the 2026 construction season. This project H-6-002(158)317 and is a CHIP SEAL on US 2, Niagara E to near Arvilla Westbound.	704-P01	TRAFFIC CONTROL FOR CONCRETE PAVEMENT REPAIR: Provide traffic control consisting of a temporary lane closure and flagging. The maximum work zone length is six miles. The length of the work zone includes the daily construction area plus the longitudinal buffer space and does not include tapers. Lane closures may be less than six miles in length, dependent upon the overall length of the project. Two work zones are allowed but must be separated by a three mile gap. The gap is considered the distance between the sign reestablishing the normal speed limit after the first work zone and the reduced speed ahead sign for second lane closure. 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 two lane closures whose combined total is 8 miles 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 {269} 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".
105-P01	PAVEMENT SWEEPING: Sweep paved areas that were used by construction traffic before opening these areas to public traffic.		
411-P01	TEMPORARY ASPHALT WEDGES: Place temporary asphalt wedges longitudinally along milled turn lanes to allow smooth passage of vehicles. Millings may be used instead of asphalt for all wedges. Include all costs associated with labor, materials, and equipment for the installation, maintenance and removal of the wedges in the contract price bid for "MILLING PAVEMENT SURFACE"		
570-P01	CONCRETE PAVEMENT REPAIR: An additional 25% has been added to the quantities for "CONCRETE PAVEMENT REPAIR-FULL DEPTH," to be used as directed by the Engineer.		
570-P02	SPALL REPAIR – PARTIAL DEPTH: 200 SF of "SPALL REPAIR – PARTIAL DEPTH" has been provided to be used as directed as the Engineer.		
570-PO3	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.	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(155)318	8	1

SPEC CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
103	0100 CONTRACT BOND	L SUM	0.8	0.8
109	1000 E-TICKETING	L SUM	1	1
411	0105 MILLING PAVEMENT SURFACE	SY	5,089	5,089
430	0500 COMMERCIAL GRADE HOT MIX ASPHALT	TON	576	576
430	1000 CORED SAMPLE	EA	4	4
570	0210 PCC PAVEMENT GRINDING	SY	84,484	84,484
570	0649 CONCRETE PAVEMENT REPAIR-FULL DEPTH	SY	5,300	5,300
570	1512 SPALL REPAIR-PARTIAL DEPTH	SF	200	200
702	0100 MOBILIZATION	L SUM	0.8	0.8
704	0100 FLAGGING	MHR	840	840
704	1000 TRAFFIC CONTROL SIGNS	UNIT	1,808	1,808
704	1050 TYPE I BARRICADE	EA	50	50
704	1052 TYPE III BARRICADE	EA	24	24
704	1060 DELINEATOR DRUMS	EA	50	50
704	1067 TUBULAR MARKERS	EA	321	321
704	1080 STACKABLE VERTICAL PANELS	EA	100	100
704	1087 SEQUENCING ARROW PANEL-TYPE C	EA	1	1
706	0500 AGGREGATE LABORATORY	EA	0.5	0.5
762	0103 PVMT MK PAINTED-MESSAGE	SF	192	192
762	0131 EPOXY PVMT MK 6IN LINE-GROOVED	LF	13,578	13,578
762	0432 SHORT TERM 6IN LINE-TYPE NR	LF	13,578	13,578
762	1106 PVMT MK PAINTED 6IN LINE	LF	109,699	109,699
762	1112 PVMT MK PAINTED 12IN LINE	LF	2,270	2,270
762	1124 PVMT MK PAINTED 24IN LINE	LF	12	12

BASIS OF ESTIMATE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-6-002(155)318	10	1

Estimated Quantities			
Description	Unit	Basis	Units
ND 32 Left and Right Turn Lanes RP 311.921 to RP 312.036			
Milling Pavement Surface	SY	See Sec. 90, Sheet 1	1,318
Commercial Grade Asphalt	Ton		147
Left Turn Lane and Median McCanna RP 319.213 to RP 319.397			
Milling Pavement Surface	SY	See Sec. 90, Sheet 2	1,664
Commercial Grade Asphalt	Ton		185
Right Turn Lane and Median Crossover Kolding Dam RP 322.860 to Rp 323.049			
Milling Pavement Surface	SY	See Sec. 90, Sheet 3	2,107
Commercial Grade Asphalt	Ton		235

HMA Cored Samples				
Specification	Basis of Estimate	Location	Quantity	Unit
SP 330(25) B, "Engineer's Acceptance Testing	1 Core per location	ND 32 Right and Left Turn Lanes	2	E/A
		McCanna Left Turn Lane	1	E/A
		Kolding Dam Right Turn Lane & Median	1	E/A
SSP 4 Longitudinal Joint Density			N/A	E/A
430.04.I.2.b(2) " Pavement Thickness Determination Cores"			N/A	E/A
			4	E/A

RP 318.790 to RP 329.076	Unit	Basis	Units
PCC Pavement Grinding: 12' driving lane with 1' feather pass on each side Total 14'	SY		84,483

Temporary Pavement Marking		
Location	Basis	Quantity
US 2 Mainline - RP 318.790 to RP 329.076		
Short Term 6IN Line - Type NR - 30' Skip 10' Line	1,320 LF/Mi	13,578 LF

Permanent Pavement Marking		
Location	Basis	Quantity
US 2 Mainline - RP 318.790 To 329.076		
Epoxy Pvmt Mk 6IN White Line-Grooved - 30' Skip 10' Line	1,320 LF/Mi	13,578 LF
Pvmt Mk Painted 6IN White Edge Line	5,280 LF/Mi	54,311 LF
Pvmt Mk Painted 6IN Yellow Median Edge Line	5,280 LF/Mi	54,311 LF
ND 32 Right and Left Turn Lanes RP 311.921		
Pvmt Mk Painted 6IN Yellow Edge Line	See Sec 120 Sheet 1	628 LF
Pvmt Mk Painted 6IN White Edge Line		449 LF
Pvmt Mk Painted 12IN White Channel Line		783 LF
Pvmt Mk Painted - Message White Turn Arrows		96 SF
McCanna Left Turn Lane RP 319.213		
Pvmt Mk Painted 12IN White Channel Line	See Sec 120 Sheet 2	845 LF
Pvmt Mk Painted - Message White Turn Arrows		48 SF
Kolding Dam Turn Lane and Median RP 322.860		
Pvmt Mk Painted 12IN White Channel Line	See Sec 120 Sheet 3	642 LF
Pvmt Mk Painted 24IN White - Stop Bar		12 LF
Pvmt Mk Painted - Message White Turn Arrows		48 SF
Total 6IN Pavement Marking		
	White	Yellow
Short Term 6IN – Type NR	13,578 LF	
Pvmt Mk Painted 6IN Line	54,760 LF	54,939 LF
Epoxy Pvmt Mk 6IN White Line-Grooved	13,578 LF	

Estimated Flagging Hours		
Operation	Basis	Flagging
Concrete Pavment Repair	30 Days x 12Hr/Day x 2 Flaggers	720 MHR
PCC Pavement Grinding	10 Days x 12Hr/Day x 1 Flagger	120 MHR



7IN CONCRETE PAVEMENT REPAIR- FULL DEPTH - EB RP 318.790 to RP 329.076										STATE	PROJECT NO.	SECTION NO.	SHEET NO.
STATION		Panel Location	DIMENSIONS			CONCRETE PAVEMENT REPAIR - FULL DEPTH	Saw Concrete*	Smooth Bar*	Comments				
			L	x	W								
			FT	x	FT	SY	LF	Bars					
95 +	15	A, B, C, D	7	x	27	21.0	68	24					
96 +	50	B	42	x	7	32.7	98	6					
96 +	78	A	14	x	7	10.9	42	6					
99 +	64	A, B	7	x	13	10.1	40	12					
99 +	71	C	7	x	7	5.4	28	6					
101 +	28	B	28	x	7	21.8	70	6					
101 +	42	C, D	14	x	14	21.8	56	12					
102 +	47	C	49	x	7	38.1	112	6					
107 +	10	D	7	x	7	5.4	28	6					
110 +	38	A, B, C, D	7	x	27	21.0	68	24					
111 +	29	A, B	7	x	13	10.1	40	12					
112 +	57	C	14	x	7	10.9	42	6					
113 +	75	B	21	x	7	16.3	56	6					
141 +	61	D	7	x	7	5.4	28	6					
144 +	97	C	7	x	7	5.4	28	6					
153 +	32	A, B	7	x	13	10.1	40	12					
154 +	20	A, B	7	x	13	10.1	40	12					
162 +	25	A, B, C, D	7	x	27	21.0	68	24					
162 +	60	A, B	7	x	13	10.1	40	12					
163 +	37	A, B, C, D	7	x	27	21.0	68	24					
163 +	51	D	28	x	7	21.8	70	6					
164 +	15	A, B, C, D	7	x	27	21.0	68	24					
164 +	79	A, B, C, D	7	x	27	21.0	68	24					
165 +	13	C, D	14	x	14	21.8	56	12					
165 +	34	A, B, C, D	7	x	27	21.0	68	24					
168 +	72	A, B	7	x	13	10.1	40	12					
170 +	72	C	7	x	7	5.4	28	6					
171 +	15	B	7	x	6.5	5.1	27	6					
174 +	44	B	7	x	6.5	5.1	27	6					
175 +	63	B	7	x	6.5	5.1	27	6					
176 +	33	C, D	14	x	14	21.8	56	12					
177 +	72	B	14	x	6.5	10.1	41	6					
178 +	56	A	14	x	6.5	10.1	41	6					
179 +	53	A, B	7	x	13	10.1	40	12					
181 +	50	B	14	x	6.5	10.1	41	6					
184 +	79	C, D	7	x	14	10.9	42	12					
196 +	7	D	7	x	7	5.4	28	6					
197 +	12	A, B, C, D	7	x	27	21.0	68	24					
199 +	65	C	14	x	7	10.9	42	6					
201 +	90	A, B	7	x	13	10.1	40	12					
203 +	42	A, B, C, D	7	x	27	21.0	68	24					
204 +	5	D	14	x	7	10.9	42	6					
204 +	40	D	7	x	7	5.4	28	6					
205 +	3	A, B	7	x	13	10.1	40	12					
206 +	1	A, B, C, D	7	x	27	21.0	68	24					
211 +	76	A	7	x	6.5	5.1	27	6					
211 +	90	D	7	x	7	5.4	28	6					
213 +	83	C	28	x	7	21.8	70	6					
224 +	69	B	35	x	6.5	25.3	83	6					
227 +	0	C	70	x	7	54.4	154	6					
227 +	70	A	7	x	6.5	5.1	27	6					
233 +	44	A	7	x	6.5	5.1	27	6					
233 +	51	C	7	x	7	5.4	28	6					
234 +	69	D	7	x	7	5.4	28	6					
237 +	90	A	7	x	7	5.4	28	6					

CPR Data Tables

CPR, Grinding, Mill & Overlay Turn Lanes
Petersburg E to 1.4 Miles W of JCT ND 18 - EB

REGISTERED PROFESSIONAL ENGINEER

DUSTIN LANG
PE-6394
DATE 03/02/26

NORTH DAKOTA

7IN CONCRETE PAVEMENT REPAIR- FULL DEPTH - EB RP 318.790 to RP 329.076										STATE	PROJECT NO.	SECTION NO.	SHEET NO.
STATION		Panel Location	DIMENSIONS			CONCRETE PAVEMENT REPAIR - FULL DEPTH -	Saw Concrete*	Smooth Bar *	Comments	ND	NH-6-002(155)318	11	2
			L	x	W								
			FT	x	FT								
239 +	25	A, B, C, D	14	x	27	42.0	82	24					
240 +	87	A	14	x	6.5	10.1	41	6					
242 +	70	A, B	7	x	13	10.1	40	12					
244 +	38	A, B, C, D	7	x	27	21.0	68	24					
244 +	95	B	7	x	6.5	5.1	27	6					
252 +	78	C	7	x	7	5.4	28	6					
262 +	90	D	7	x	7	5.4	28	6					
270 +	58	D	7	x	7	5.4	28	6					
275 +	45	C	21	x	7	16.3	56	6					
283 +	78	D	7	x	7	5.4	28	6					
285 +	20	D	7	x	7	5.4	28	6					
290 +	4	D	7	x	7	5.4	28	6					
291 +	21	A, B, C, D	35	x	27	105.0	124	24					
295 +	50	B	7	x	6.5	5.1	27	6					
298 +	86	B	21	x	6.5	15.2	55	6					
299 +	28	A, B, C, D	7	x	27	21.0	68	24					
300 +	60	A, B, C, D	7	x	27	21.0	68	24					
302 +	65	A, B, C, D	7	x	27	21.0	68	24					
303 +	27	A, B	7	x	13	10.1	40	12					
304 +	32	A	21	x	6.5	15.2	55	6					
305 +	64	A, B	7	x	13	10.1	40	12					
306 +	86	A, B, C, D	7	x	27	21.0	68	24					
311 +	51	A, B, C, D	7	x	27	21.0	68	24					
313 +	4	A, B, C, D	7	x	27	21.0	68	24					
315 +	35	D	7	x	7	5.4	28	6					
315 +	80	C	14	x	7	10.9	42	6					
318 +	61	D	7	x	7	5.4	28	6					
319 +	44	B	7	x	6.5	5.1	27	6					
320 +	42	D	7	x	7	5.4	28	6					
320 +	55	B	35	x	6.5	25.3	83	6					
322 +	50	D	14	x	7	10.9	42	6					
323 +	0	A, B, C, D	14	x	27	42.0	82	24					
328 +	83	A, B, C, D	7	x	27	21.0	68	24					
332 +	95	D	7	x	7	5.4	28	6					
333 +	37	D	7	x	7	5.4	28	6					
334 +	56	A, B, C, D	7	x	27	21.0	68	24					
334 +	63	C	14	x	7	10.9	42	6					
336 +	17	C	7	x	7	5.4	28	6					
339 +	44	C, D	7	x	14	10.9	42	12					
340 +	58	C	21	x	7	16.3	56	6					
343 +	54	B	14	x	6.5	10.1	41	6					
348 +	1	D	7	x	7	5.4	28	6					
349 +	27	C	7	x	7	5.4	28	6					
349 +	55	B, C	14	x	13.5	21.0	55	12					
351 +	53	C	14	x	7	10.9	42	6					
352 +	30	D	7	x	7	5.4	28	6					
367 +	73	D	7	x	7	5.4	28	6					
368 +	36	C	7	x	7	5.4	28	6					
374 +	58	D	7	x	7	5.4	28	6					
375 +	0	D	7	x	7	5.4	28	6					
375 +	28	D	7	x	7	5.4	28	6					
376 +	23	D	7	x	7	5.4	28	6					
376 +	95	C	7	x	7	5.4	28	6					
377 +	23	C	7	x	7	5.4	28	6					

CPR Data Tables

CPR, Grinding, Mill & Overlay Turn Lanes
Petersburg E to 1.4 Miles W of JCT ND 18 - EB

REGISTERED PROFESSIONAL ENGINEER

DUSTIN LANG

PE-6394

DATE 03/02/26

NORTH DAKOTA

7IN CONCRETE PAVEMENT REPAIR- FULL DEPTH - EB RP 318.790 to RP 329.076									
STATION		Panel Location	DIMENSIONS			CONCRETE PAVEMENT REPAIR - FULL DEPTH -	Saw Concrete*	Smooth Bar*	Comments
			L	x	W				
			FT	x	FT	SY	LF	EA	
379 +	60	C, D	7	x	14	10.9	42	12	
381 +	27	C, D	7	x	14	10.9	42	12	
381 +	68	C	7	x	7	5.4	28	6	
383 +	0	C	7	x	7	5.4	28	6	
387 +	75	A, B	7	x	13	10.1	40	12	
388 +	38	A, B	7	x	13	10.1	40	12	
389 +	8	D	7	x	7	5.4	28	6	
390 +	49	B	7	x	6.5	5.1	27	6	
391 +	62	B	7	x	6.5	5.1	27	6	
392 +	10	C	7	x	7	5.4	28	6	
399 +	72	C	14	x	7	10.9	42	6	
412 +	93	C, D	14	x	14	21.8	56	12	
413 +	42	C, D	14	x	14	21.8	56	12	
420 +	55	C	7	x	7	5.4	28	6	
420 +	85	C	7	x	7	5.4	28	6	
423 +	86	B	7	x	6.5	5.1	27	6	
433 +	75	C	28	x	7	21.8	70	6	
435 +	22	C	14	x	7	10.9	42	6	
435 +	64	B	63	x	6.5	45.5	139	6	
438 +	31	A, B, C, D	7	x	27	21.0	68	24	
438 +	81	A, B, C, D	7	x	27	21.0	68	24	
439 +	78	C	91	x	7	70.8	196	6	
442 +	79	C, D	7	x	14	10.9	42	12	
443 +	70	A, B, C, D	7	x	27	21.0	68	24	
445 +	30	C, D	7	x	14	10.9	42	12	
445 +	70	A, B, C, D	7	x	27	21.0	68	24	
446 +	20	D	7	x	7	5.4	28	6	
448 +	50	A, B, C, D	7	x	27	21.0	68	24	
449 +	7	C, D	7	x	14	10.9	42	12	
449 +	56	A, B, C, D	7	x	27	21.0	68	24	
450 +	96	C	14	x	7	10.9	42	6	
453 +	78	B	7	x	6.5	5.1	27	6	
456 +	2	A, B, C, D	7	x	27	21.0	68	24	
456 +	78	A, B, C, D	7	x	27	21.0	68	24	
456 +	85	C	49	x	7	38.1	112	6	
457 +	83	A, B, C, D	7	x	27	21.0	68	24	
458 +	45	A, B, C, D	7	x	27	21.0	68	24	
460 +	42	D	7	x	7	5.4	28	6	
461 +	66	D	7	x	7	5.4	28	6	
462 +	15	A, B, C, D	7	x	27	21.0	68	24	
462 +	57	C, D	7	x	14	10.9	42	12	
462 +	63	A, B, C, D	7	x	27	21.0	68	24	
462 +	70	C	14	x	7	10.9	42	6	
463 +	14	A, B, C, D	7	x	27	21.0	68	24	
464 +	46	D	7	x	7	5.4	28	6	
464 +	88	A, B, C, D	7	x	27	21.0	68	24	
467 +	89	A, B, C, D	7	x	27	21.0	68	24	
468 +	24	A, B, C, D	7	x	27	21.0	68	24	
469 +	36	A, B, C, D	7	x	27	21.0	68	24	
474 +	77	A, B, C, D	7	x	27	21.0	68	24	
485 +	31	A, B, C, D	7	x	27	21.0	68	24	
497 +	81	A, B, C, D	7	x	27	21.0	68	24	
499 +	20	C	14	x	7	10.9	42	6	
499 +	34	B	7	x	6.5	5.1	27	6	
499 +	41	A, B, C, D	7	x	6.5	5.1	27	6	

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-6-002(155)318	11	3

CPR Data Tables

CPR, Grinding, Mill & Overlay Turn Lanes
Petersburg E to 1.4 Miles W of JCT ND 18 - EB



7IN CONCRETE PAVEMENT REPAIR- FULL DEPTH - EB RP 318.790 to RP 329.076										STATE	PROJECT NO.	SECTION NO.	SHEET NO.	
STATION			Panel Location	DIMENSIONS			CONCRETE PAVEMENT REPAIR - FULL DEPTH -	Saw Concrete*	Smooth Bar*	Comments	ND	NH-6-002(155)318	11	4
											L	x	W	
				FT	x	FT					SY	LF	EA	
499	+	90	A, B, C, D	7	x	27	21.0	68	24					
510	+	26	A, B, C, D	7	x	27	21.0	68	24					
515	+	10	A, B, C, D	7	x	27	21.0	68	24					
520	+	22	A, B, C, D	7	x	27	21.0	68	24					
521	+	85	A, B, C, D	7	x	27	21.0	68	24					
524	+	8	A, B, C, D	7	x	27	21.0	68	24					
527	+	45	A, B, C, D	7	x	27	21.0	68	24					
528	+	6	A, B, C, D	7	x	27	21.0	68	24					
529	+	5	A, B, C, D	7	x	27	21.0	68	24					
529	+	53	A, B, C, D	7	x	27	21.0	68	24					
533	+	26	A, B, C, D	7	x	27	21.0	68	24					
533	+	67	C, D	7	x	14	10.9	42	12					
534	+	23	C	7	x	7	5.4	28	6					
534	+	37	A, B	7	x	13	10.1	40	12					
534	+	51	C	21	x	7	16.3	56	6					
535	+	36	A, B	7	x	13	10.1	40	12					
535	+	85	A, B, C, D	7	x	27	21.0	68	24					
535	+	99	D	7	x	7	5.4	28	6					
537	+	46	A, B, C, D	7	x	27	21.0	68	24					
540	+	18	C	28	x	7	21.8	70	6					
540	+	46	B	35	x	6.5	25.3	83	6					
540	+	60	D	7	x	7	5.4	28	6					
541	+	10	C, D	7	x	14	10.9	42	12					
543	+	64	A, B, C, D	7	x	27	21.0	68	24					
544	+	83	A, B, C, D	7	x	27	21.0	68	24					
545	+	30	A, B, C, D	7	x	27	21.0	68	24					
546	+	0	A, B, C, D	7	x	27	21.0	68	24					
546	+	95	A, B, C, D	7	x	27	21.0	68	24					
546	+	26	C, D	7	x	14	10.9	42	12					
548	+	61	A, B, C, D	14	x	27	42.0	82	24					
548	+	17	A, B, C, D	7	x	27	21.0	68	24					
549	+	59	C	21	x	7	16.3	56	6					
549	+	80	A, B, C, D	7	x	27	21.0	68	24					
549	+	87	C	14	x	7	10.9	42	6					
550	+	44	C	14	x	7	10.9	42	6					
551	+	13	A, B	7	x	13	10.1	40	12					
551	+	70	D	7	x	7	5.4	28	6					
552	+	60	A, B, C, D	7	x	27	21.0	68	24					
553	+	16	A, B, C, D	7	x	27	21.0	68	24					
554	+	30	D	7	x	7	5.4	28	6					
555	+	19	A, B, C, D	7	x	27	21.0	68	24					
557	+	30	A, B, C, D	7	x	27	21.0	68	24					
557	+	37	C	35	x	7	27.2	84	6					
559	+	32	A, B, C, D	7	x	27	21.0	68	24					
560	+	87	A, B, C, D	7	x	27	21.0	68	24					
561	+	29	A, B, C, D	7	x	27	21.0	68	24					
561	+	70	A, B, C, D	7	x	27	21.0	68	24					
562	+	67	A, B, C, D	7	x	27	21.0	68	24					
563	+	23	A, B, C, D	7	x	27	21.0	68	24					
563	+	58	A, B, C, D	7	x	27	21.0	68	24					
564	+	0	A, B, C, D	7	x	27	21.0	68	24					
565	+	0	A, B	7	x	13	10.1	40	12					
565	+	14	C, D	7	x	14	10.9	42	12					
566	+	3	A, B	7	x	13	10.1	40	12					
566	+	39	A, B, C, D	7	x	27	21.0	68	24					

CPR Data Tables

CPR, Grinding, Mill & Overlay Turn Lanes
Petersburg E to 1.4 Miles W of JCT ND 18 - EB

REGISTERED PROFESSIONAL ENGINEER

DUSTIN LANG

PE-6394

DATE 03/02/26

NORTH DAKOTA

7IN CONCRETE PAVEMENT REPAIR- FULL DEPTH - EB RP 318.790 to RP 329.076									
STATION		Panel Location	DIMENSIONS			CONCRETE PAVEMENT REPAIR - FULL DEPTH -	Saw Concrete*	Smooth Bar*	Comments
			L	x	W				
			FT	x	FT	SY	LF	EA	
568	+	69	A, B, C, D	7	x	27	21.0	68	24
568	+	98	A, B	7	x	13	10.1	40	12
569	+	53	A, B, C, D	7	x	27	21.0	68	24
570	+	10	A, B, C, D	7	x	27	21.0	68	24
570	+	38	A, B	7	x	13	10.1	40	12
572	+	40	A, B, C, D	7	x	27	21.0	68	24
574	+	3	A, B, C, D	7	x	27	21.0	68	24
576	+	92	D	7	x	7	5.4	28	6
577	+	18	A, B, C, D	7	x	27	21.0	68	24
577	+	38	D	7	x	7	5.4	28	6
577	+	92	A, B, C, D	7	x	27	21.0	68	24
578	+	57	A, B	7	x	13	10.1	40	12
579	+	7	C, D	7	x	14	10.9	42	12
579	+	57	A, B, C, D	7	x	27	21.0	68	24
587	+	73	C, D	7	x	14	10.9	42	12
588	+	68	A, B, C, D	7	x	27	21.0	68	24
590	+	55	A, B, C, D	7	x	27	21.0	68	24
591	+	11	D	7	x	7	5.4	28	6
592	+	50	A, B	7	x	13	10.1	40	12
593	+	90	A, B, C, D	7	x	27	21.0	68	24
594	+	90	D	7	x	7	5.4	28	6
595	+	37	A, B, C, D	7	x	27	21.0	68	24
596	+	0	A, B, C, D	7	x	27	21.0	68	24
597	+	0	C, D	7	x	14	10.9	42	12
598	+	34	A, B, C, D	7	x	27	21.0	68	24
598	+	80	C, D	7	x	14	10.9	42	12
600	+	49	A, B, C, D	7	x	27	21.0	68	24
601	+	4	A, B, C, D	7	x	27	21.0	68	24
603	+	20	D	7	x	7	5.4	28	6
604	+	19	C	21	x	7	16.3	56	6
604	+	88	C	7	x	7	5.4	28	6
605	+	37	C	70	x	7	54.4	154	6
606	+	42	A, B, C, D	7	x	27	21.0	68	24
606	+	49	C	14	x	7	10.9	42	6
607	+	34	C, D	7	x	14	10.9	42	12
608	+	4	A, B, C, D	7	x	27	21.0	68	24
609	+	2	A, B, C, D	7	x	27	21.0	68	24
609	+	51	A, B, C, D	7	x	27	21.0	68	24
614	+	27	A, B, C, D	7	x	27	21.0	68	24
615	+	50	A, B, C, D	7	x	27	21.0	68	24
622	+	65	A	7	x	6.5	5.1	27	6
624	+	71	C, D	7	x	14	10.9	42	12
625	+	46	A, B, C, D	7	x	27	21.0	68	24
627	+	8	D	70	x	7	54.4	154	6
627	+	78	A, B, C, D	7	x	27	21.0	68	24
628	+	42	C, D	28	x	14	43.6	84	12
628	+	70	A, B	7	x	13	10.1	40	12
629	+	54	C	7	x	7	5.4	28	6
631	+	52	D	7	x	7	5.4	28	6
632	+	70	C, D	7	x	14	10.9	42	12
634	+	92	A, B	14	x	13	20.2	54	12
634	+	99	C	7	x	7	5.4	28	6

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-6-002(155)318	11	5

Eastbound CPR Totals			
CONCRETE PAVEMENT REPAIR 8IN			
CONCRETE PAVEMENT REPAIR - FULL DEPTH - DOWELED	*SAW CONCRETE	*SMOOTH DOWEL BARS	
SY	LF	EA	
4241	14310	3732	
25%	5300	17888	4665

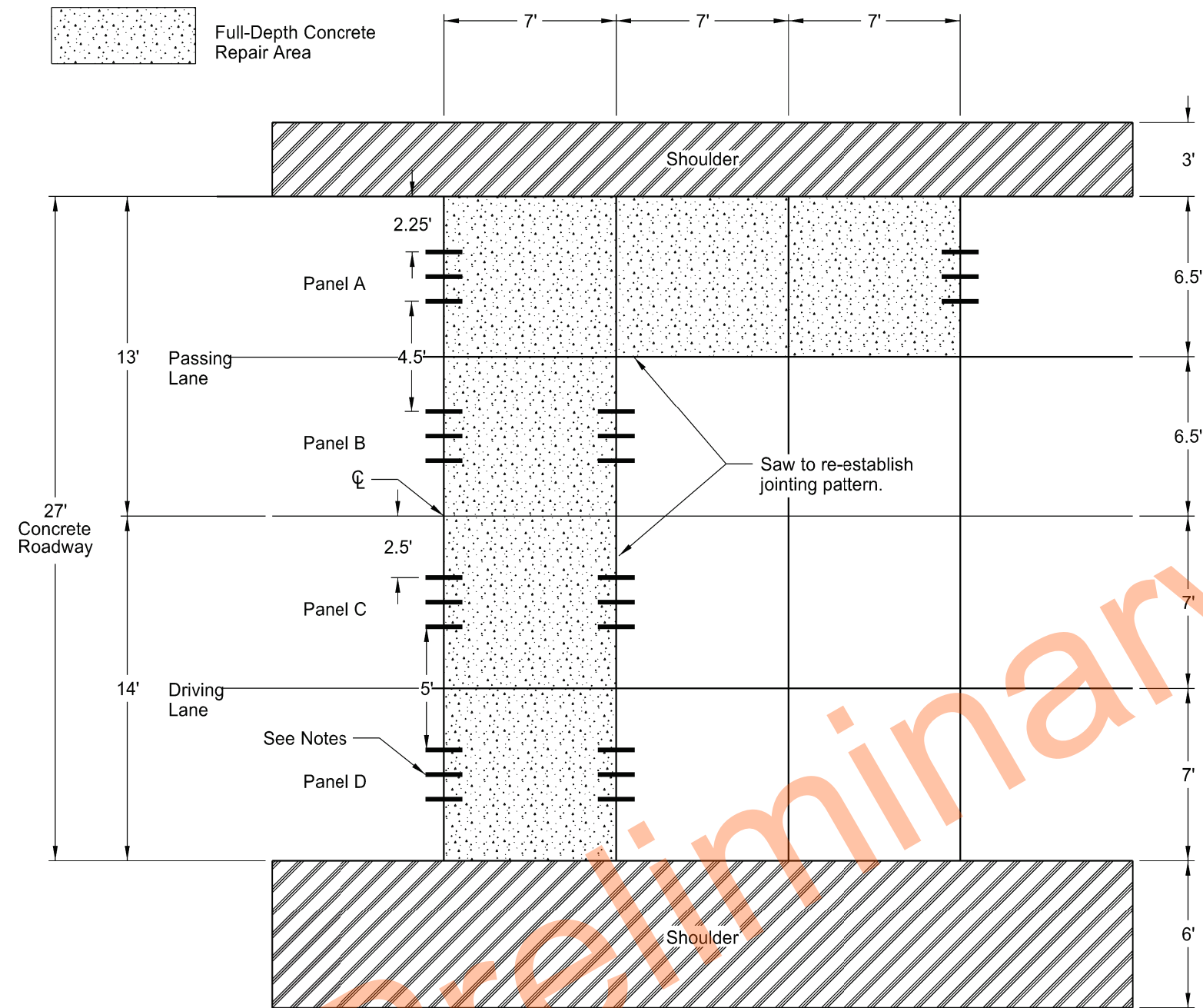
*Note: Saw Concrete and Smooth Dowel Bars will not be measured and paid for separately, but included in the Bid Item 570-0649

CPR Data Tables

CPR, Grinding, Mill & Overlay Turn Lanes
Petersburg E to 1.4 Miles W of JCT ND 18 - EB

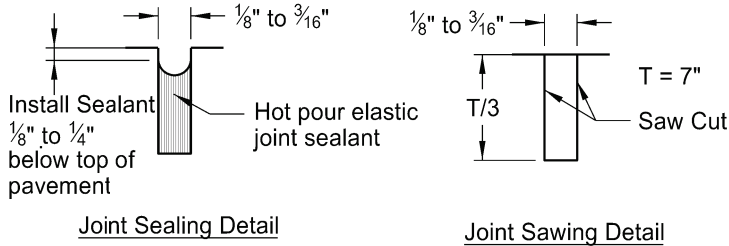
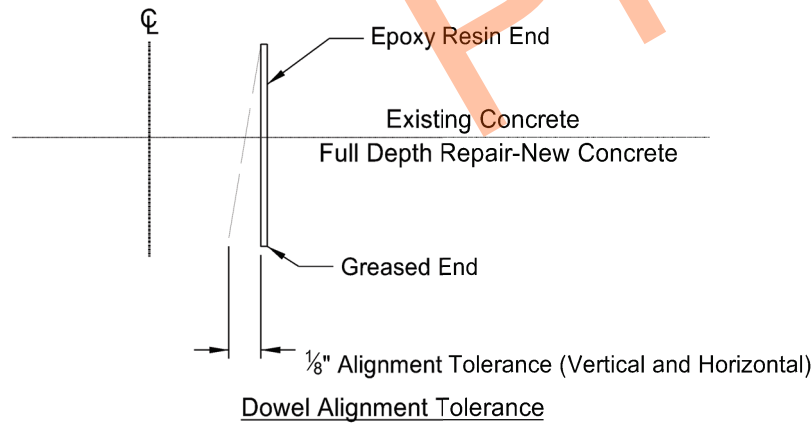
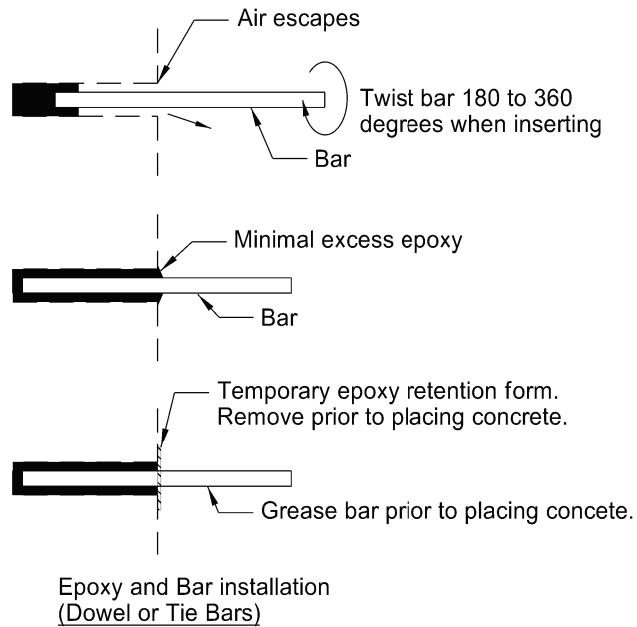


STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-6-002(155)318	20	1



Notes:

1. Install a group of three (3) Smooth Dowel Bars on the leading and trailing edges of each panel's full depth repair.
2. Space the center of the outer Dowel Bars from the edge of the panel according to panel width: 2.25' for 6.5' panels (A/B) and 2.5' for 7' panels (C/D).
3. Align Dowel Bars parallel to the roadway centerline and pavement surface at vertical midpoint of slab.
4. Within each grouping, space Dowel Bars @ 12" C-C.
5. Utilize 1" x 18" smooth Dowel Bars.
6. Re-establish joints after repairs are completed. Saw and seal joints.
7. Include all necessary materials and labor to complete full-depth repair in the price bid for "CONCRETE PAVEMENT REPAIR - FULL DEPTH."

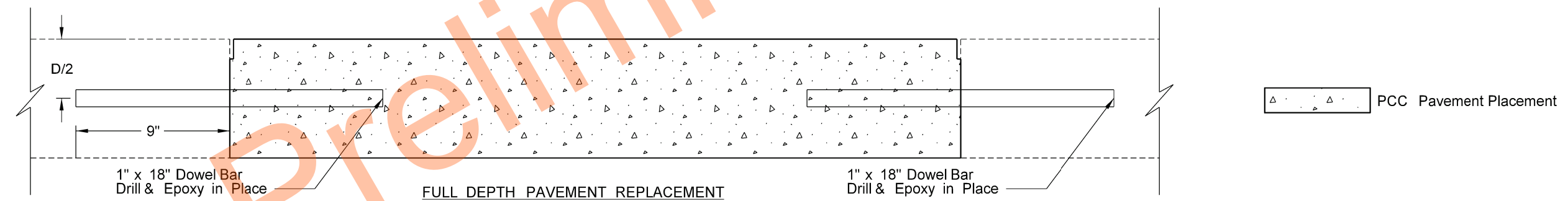
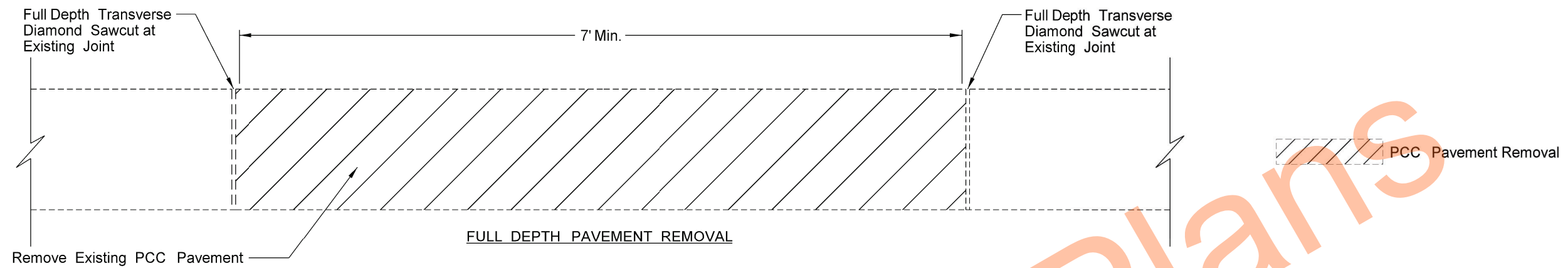


Full-Depth Repair and
Jointing Details

CPR, Grinding, Mill & Overlay Turn Lanes
Petersburg E to 1.4 Miles W of JCT ND 18 - EB



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-6-002(155)318	20	2

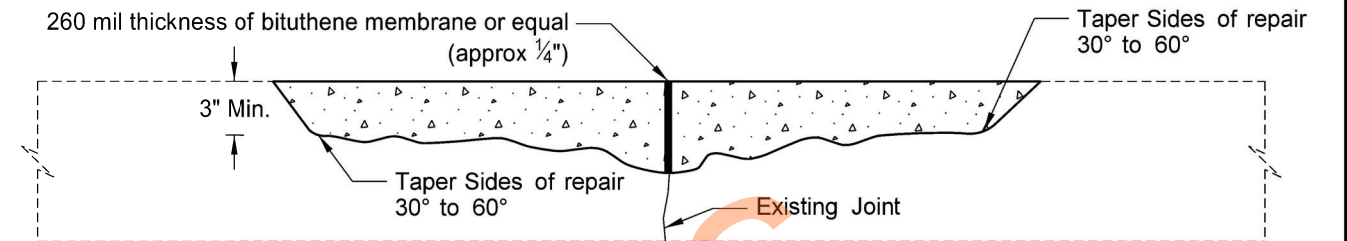
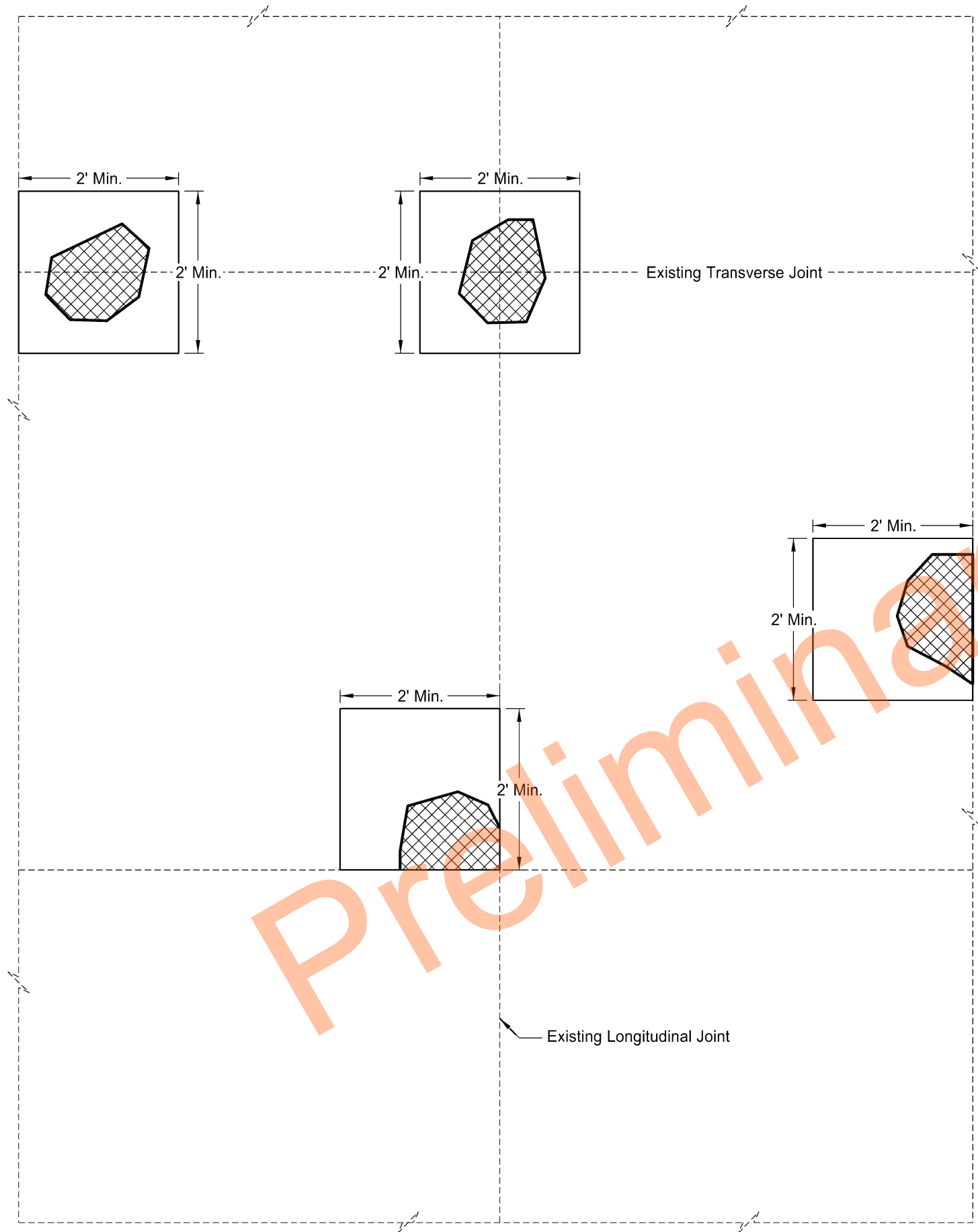


Full Depth Repair Detail

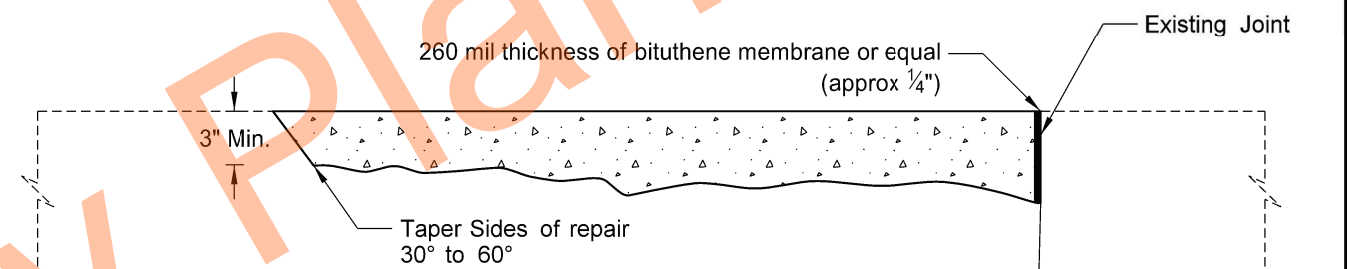
CPR, Grinding, Mill & Overlay Turn Lanes
Petersburg E to 1.4 Miles W of JCT ND 18 - EB



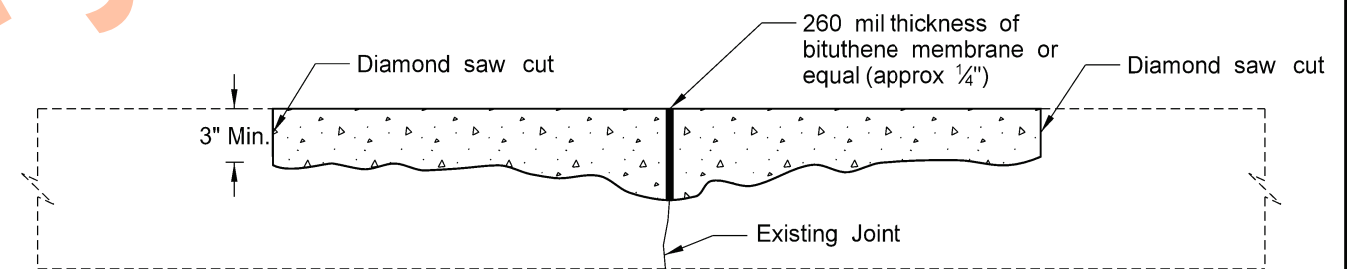
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-6-002(155)318	20	3



Cross Section - Repair Area (Milling)



Cross Section - Repair Area (Milling)



Cross Section - Repair Area (Sawing and Jackhammering)



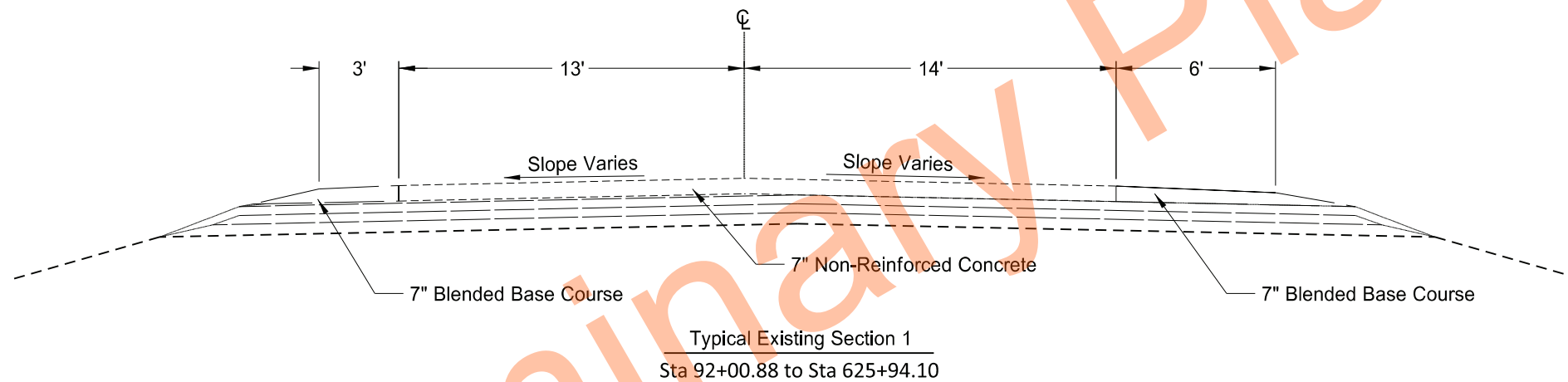
Concrete Removal Area

Jointed Non-Reinforced PCC Pavement
Spall Repair Detail

CPR, Grinding, Mill & Overlay Turn Lanes
Petersburg E to 1.4 Miles W of JCT ND 18 - EB



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-6-002(155)318	30	1

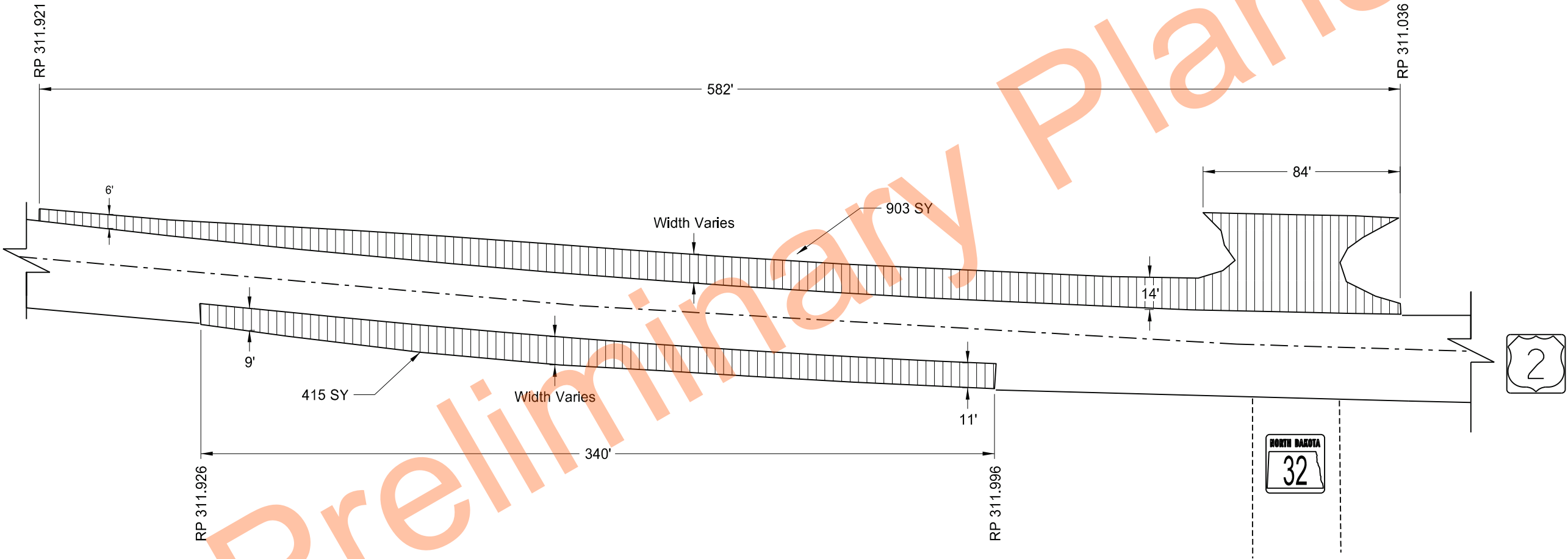


Typical Section

CPR, Grinding, Mill & Overlay Turn Lanes
Petersburg E to 1.4 Miles W of JCT ND 18 - EB



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-6-002(155)318	90	1



2" Milling and 2" HMA

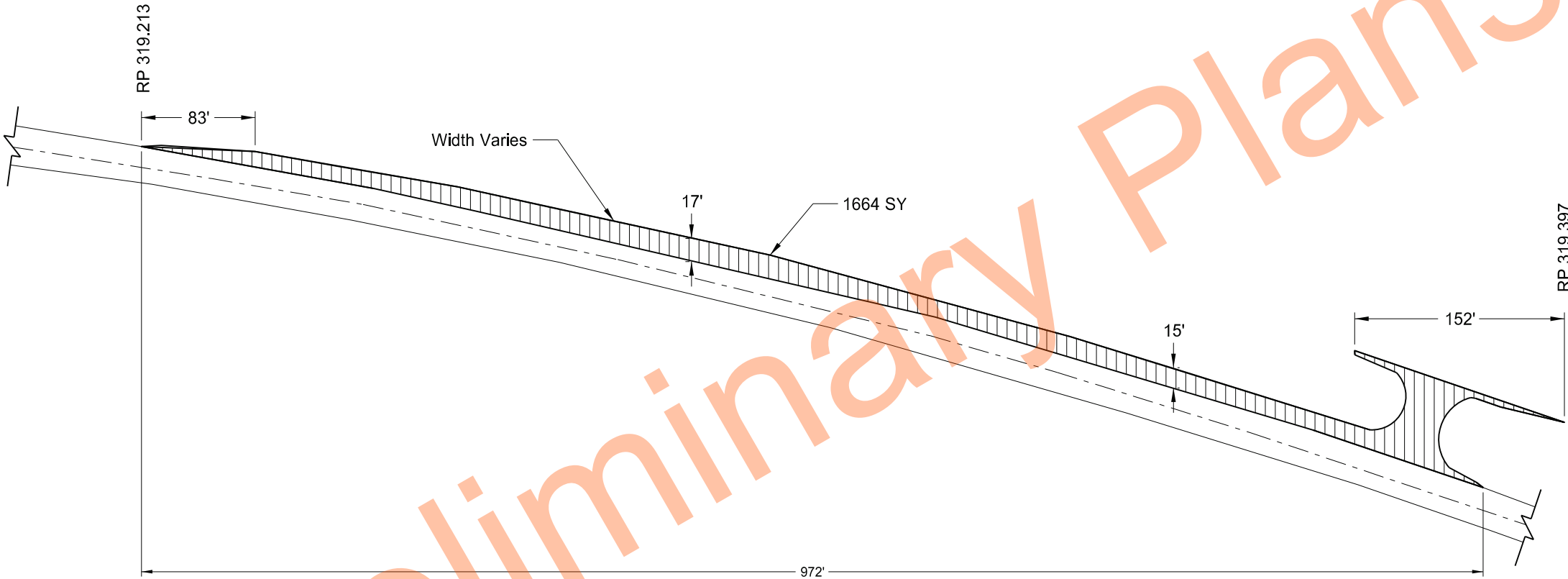
Basis of Estimate	
Milling Pavement Surface	1,318 SY
Commercial Grade Asphalt	148 Tons

ND 32 Turn Lanes and Median Cross-over

CPR, Grinding, Mill & Overlay Turn Lanes
Petersburg E to 1.4 Miles W of JCT 18 - EB



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-6-002(155)318	90	2



2" Mill and 2" HMA

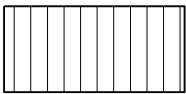
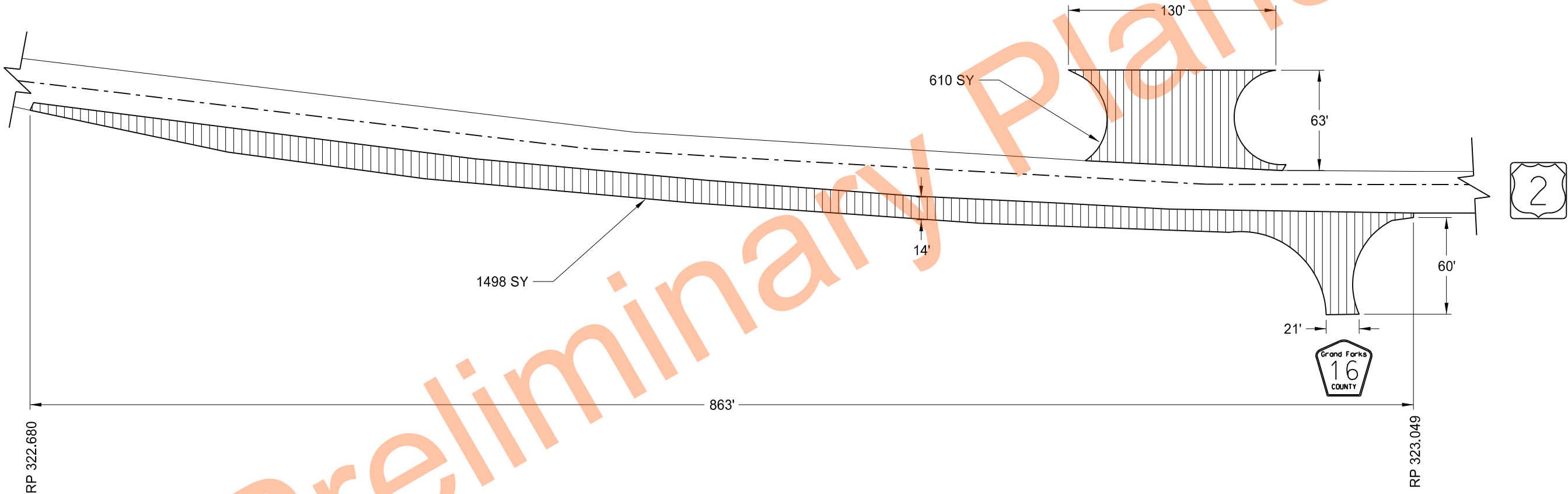
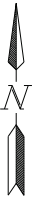
Basis of Estimate			
Milling Pavement Surface	1,664	SY	
Commercial Grade Asphalt	185	Tons	

LT Turn Lane McCanna

CPR, Grinding, Mill & Overlay Turn Lanes
Petersburg E to 1.4 miles W of JCT 18 - EB



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-6-002(155)318	90	3



2" Milling and 2" HMA

Basis of Estimate

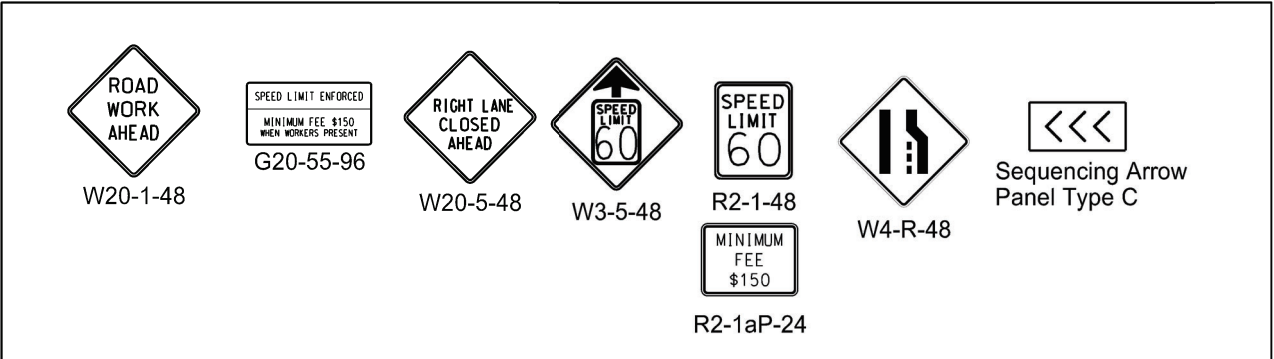
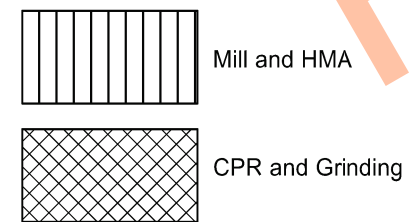
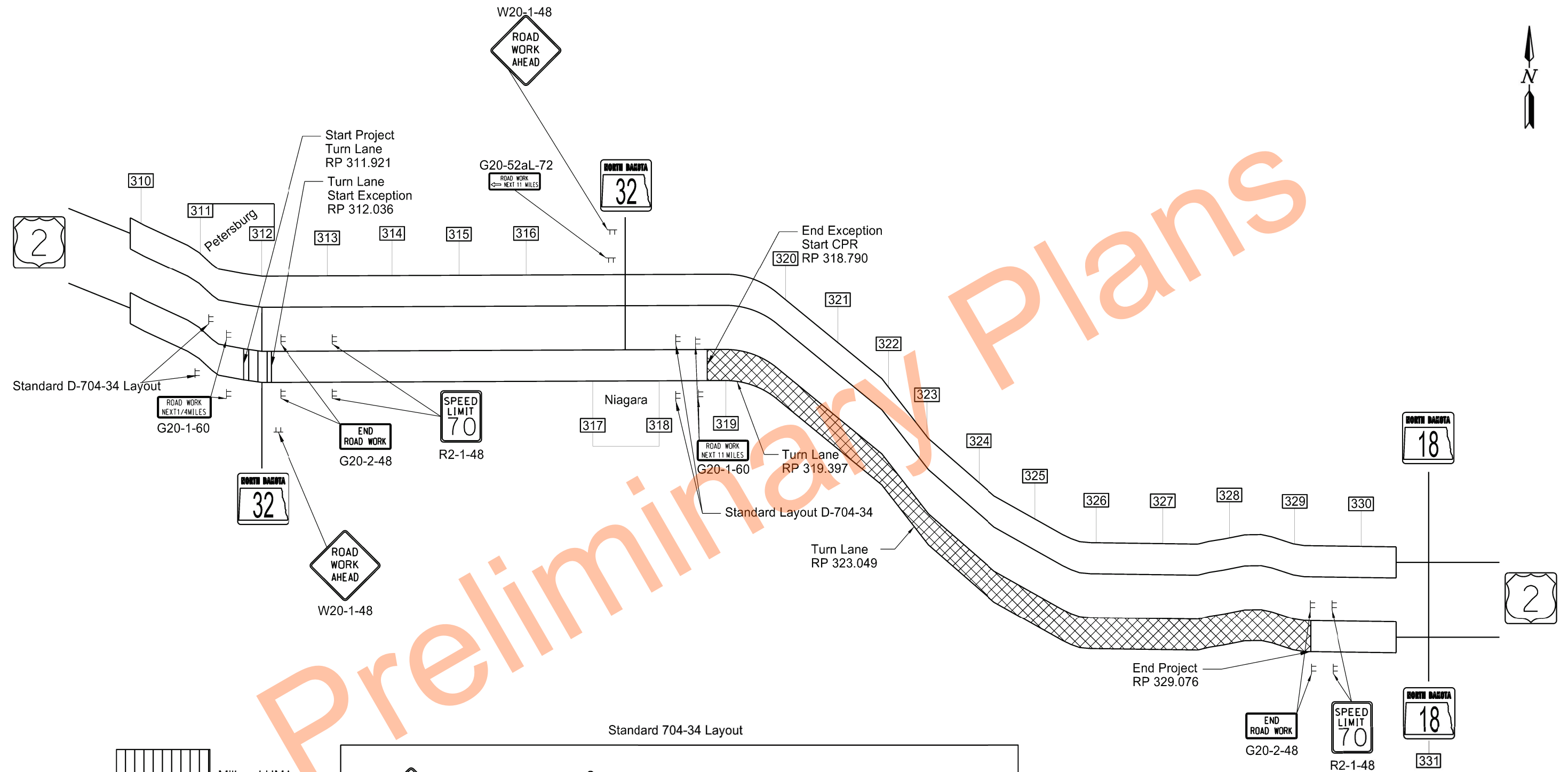
Milling Pavement Surface	2,108 SY
Commercial Grade Asphalt	235 Tons

Kolding Damn Turn Lane and Median

CPR, Grinding, Mill & Overlay Turn Lanes
Petersburg E to 1.4 Miles W of JCT 18 - EB



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-6-002(155)318	100	2

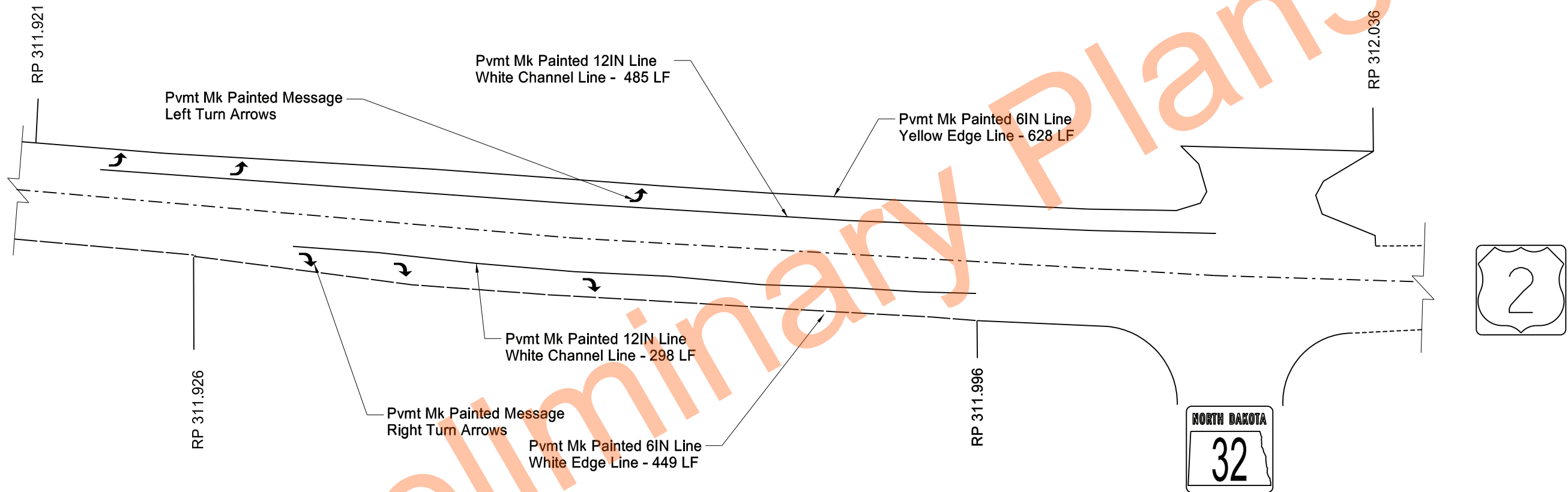


Work Zone Traffic Control

CPR, Grinding, Mill & Overlay Turn Lanes
Petersburg E to 1.4 Miles W of JCT ND 18 - EB



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-6-002(155)318	120	1



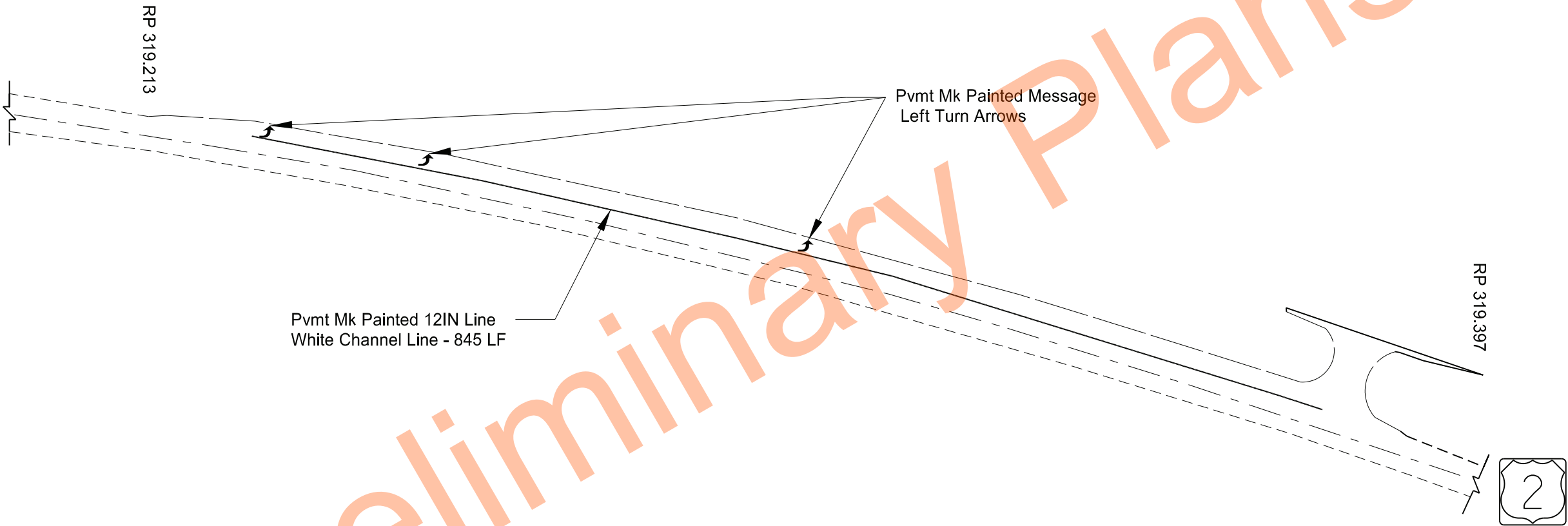
Spec	Code	Description	Quantity
762	1112	Pvmt Mk Painted 12IN Line White Channel Line	783 LF
762	1103	Pvmt Mk Painted Message Turn Arrows	96 SF
762	1106	Pvmt Mk Painted 6IN Line White Edge Line Yellow Edge Line	449 LF 628 LF

ND 32 Turn Lanes and Median Cross-over
Pavement Marking Details

CPR, Grinding, Mill & Overlay Turn Lanes
Petersburg E to 1.4 Miles W of JCT ND 18 - EB



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-6-002(155)318	120	2



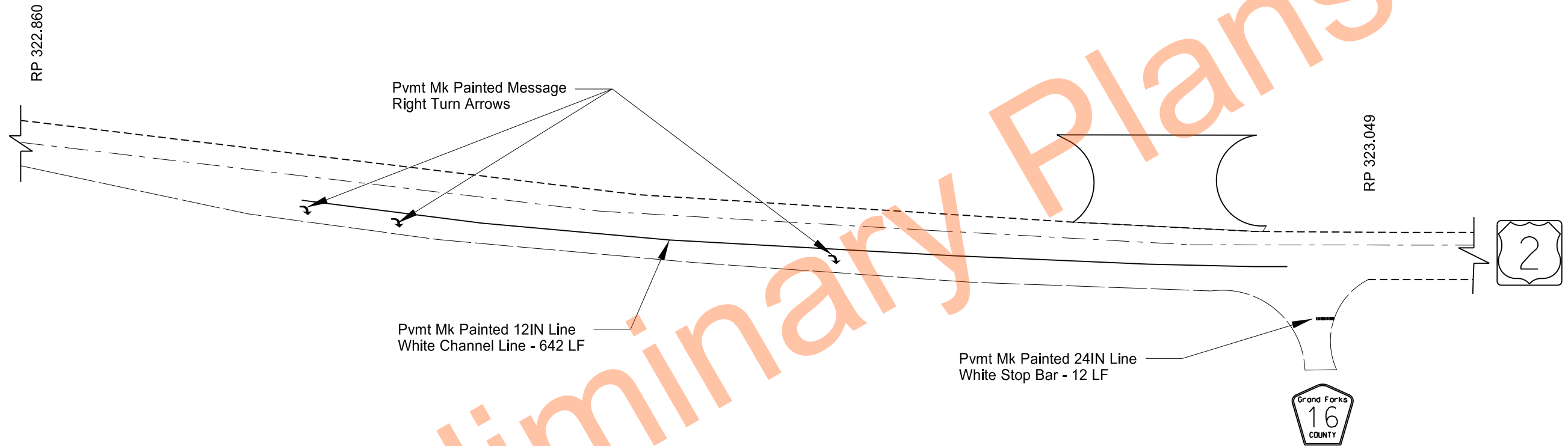
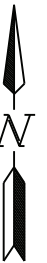
Spec	Code	Description	Quantity
762	1112	Pvmt Mk Painted 12IN Line White Channel Line	845 LF
762	1103	Pvmt Mk Painted Message Turn Arrows	48 SF

Left Turn Lane McCanna
Pavement Marking Details

CPR, Grinding, Mill & Overlay Turn Lanes
Petersburg E to 1.4 Miles W of JCT ND 18 - EB



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-6-002(155)318	120	3



Spec	Code	Description	Quantity
762	1112	Pvmt Mk Painted 12IN Line White Channel Line	642 LF
762	1103	Pvmt Mk Painted Message Turn Arrows	48 SF
		Pvmt Mk Painted 24IN Line White Stop Bar	12 LF

Kolding Dam Turn Lane and Median

Pavement Marking Details

CPR, Grinding, Mill & Overlay Turn Lanes
Petersburg E to 1.4 Miles W of JCT ND 18 - EB

REGISTERED PROFESSIONAL ENGINEER

DUSTIN LANG

PE-6394

DATE 02/27/26

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		

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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		

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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

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

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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

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LINE STYLES

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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

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LINE STYLES

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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

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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				

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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				

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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

Kirk J. Hoff

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

SYMBOLS

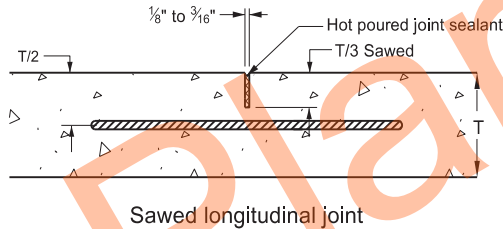
D-101-33

			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)		

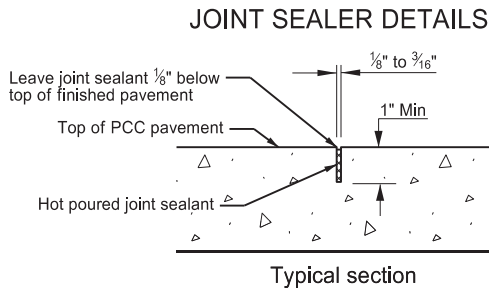
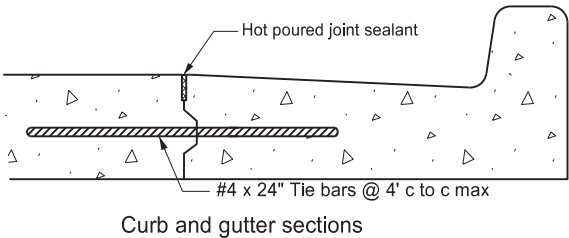
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
12-18-20	General Revisions Sheet added - Continued from D-101-32

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

- 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.

[illegible]

*Spacing where the calculated pullout strength of the tiebar equals the calculated yield strength of the tiebar - 48 inch spacing indicates a calculated spacing of 4 feet or greater.

[illegible]

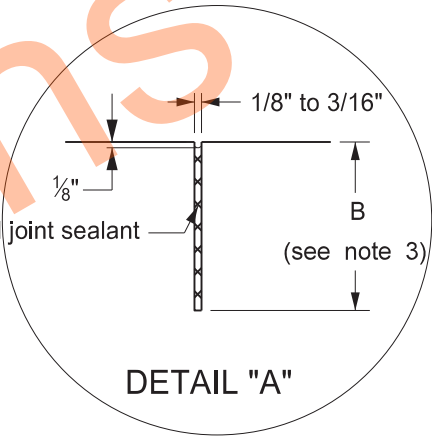
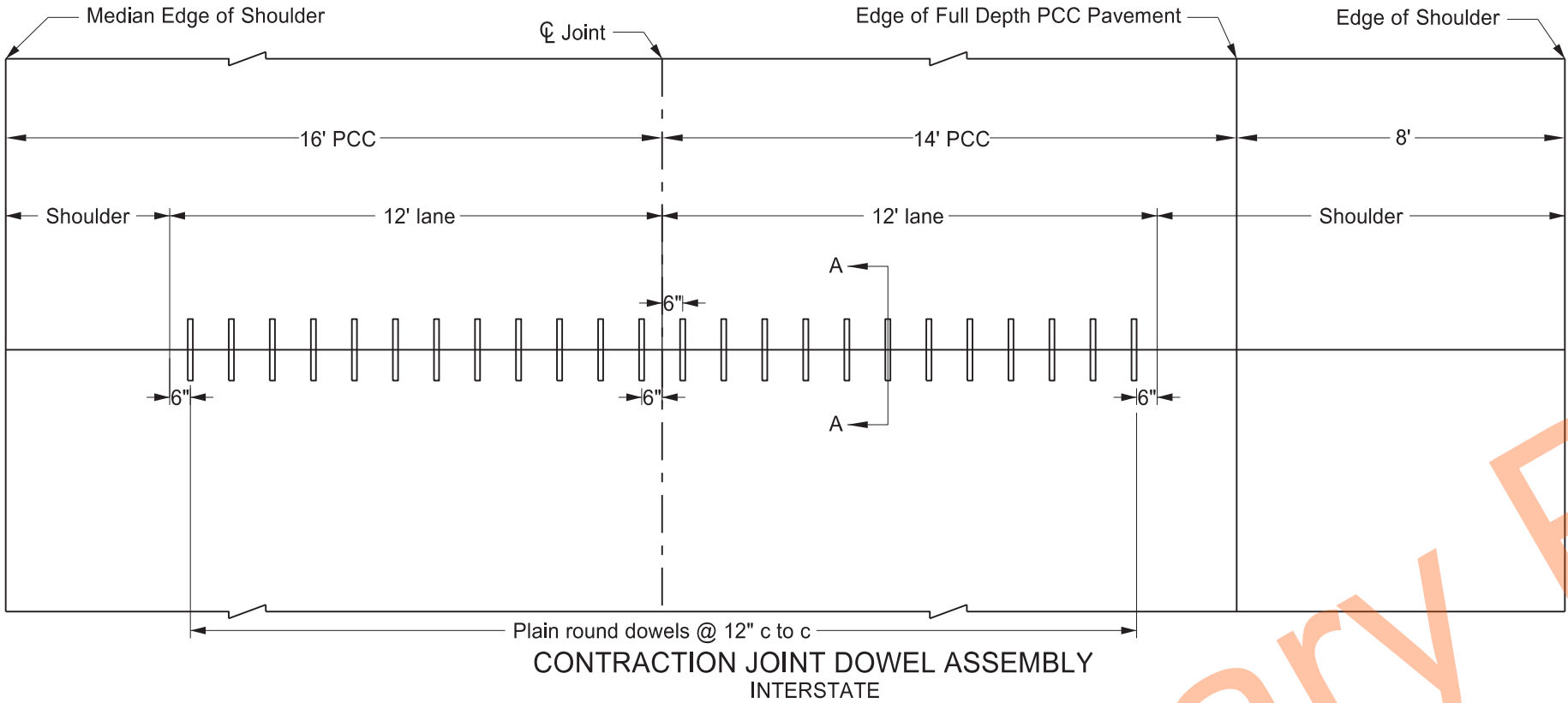
03/13/25

TRANSVERSE CONTRACTION JOINT DETAILS

D-550-3

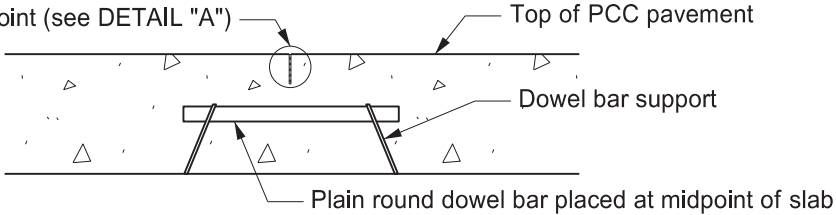
Notes

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

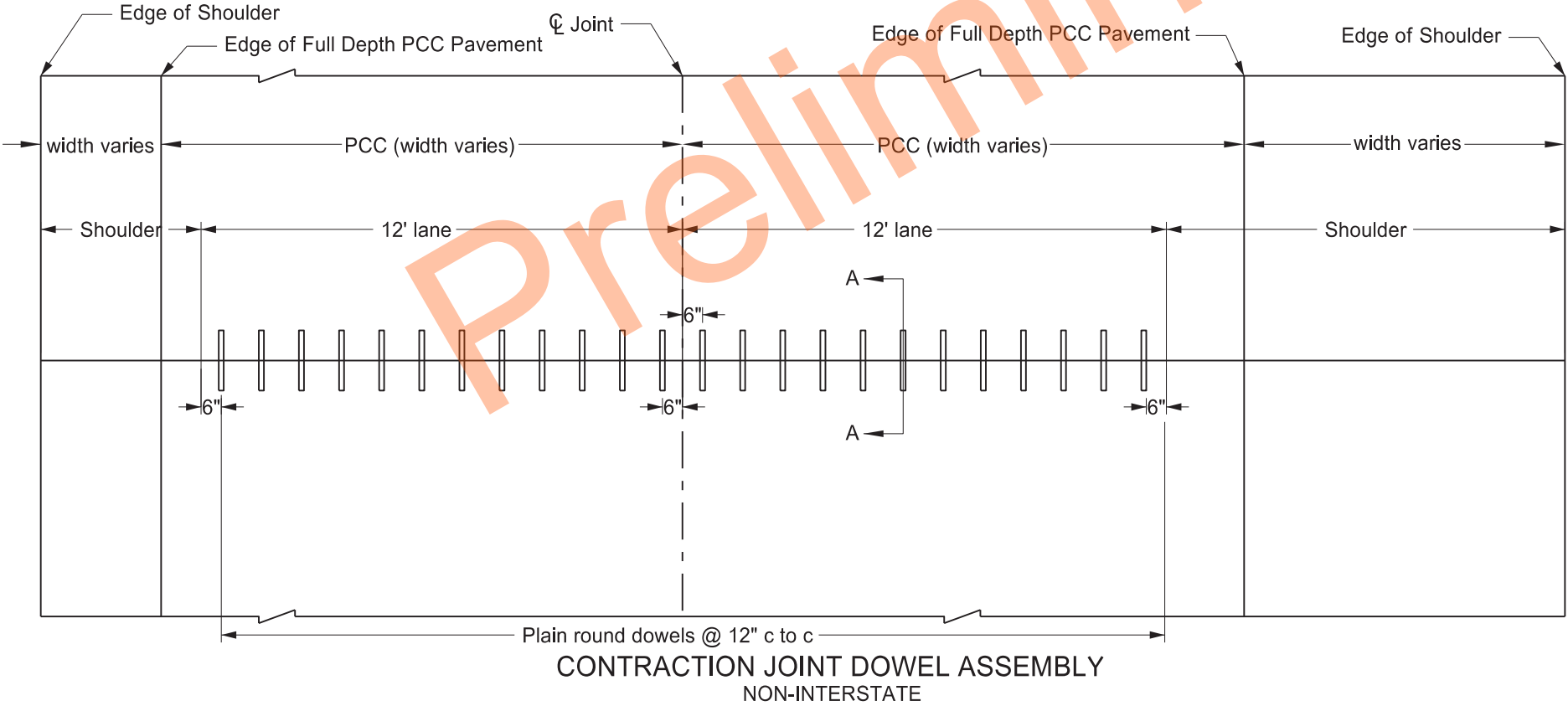


DETAIL "A"

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



SECTION A-A



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

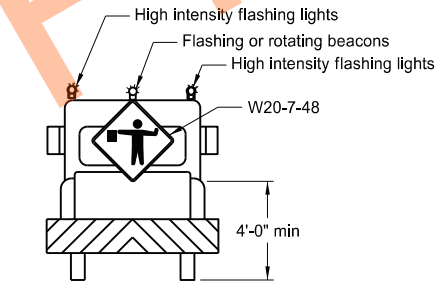
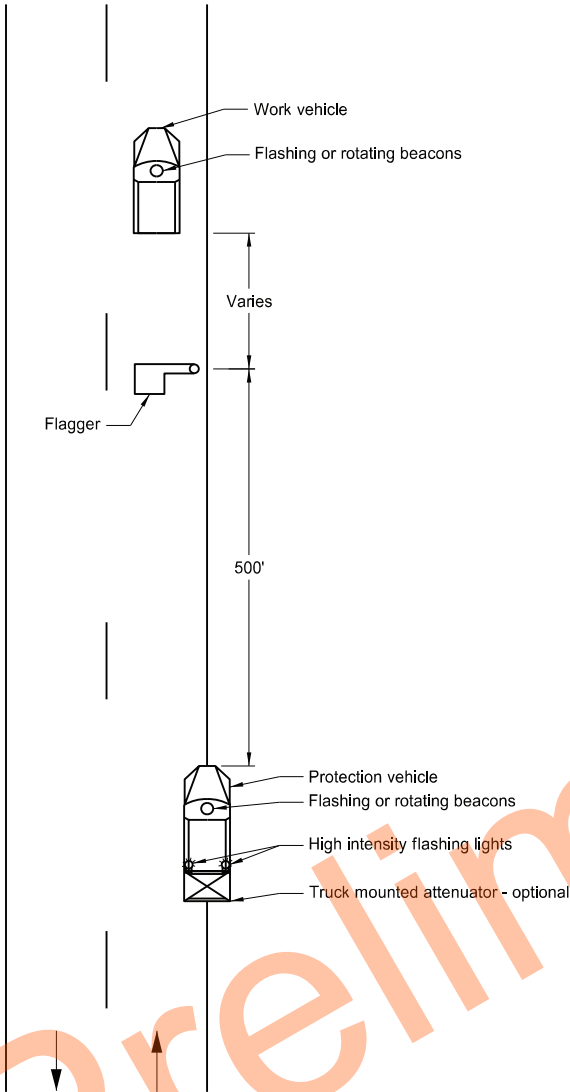


03/13/25

TRAFFIC CONTROL FOR CORING OF HOT BITUMINOUS PAVEMENT

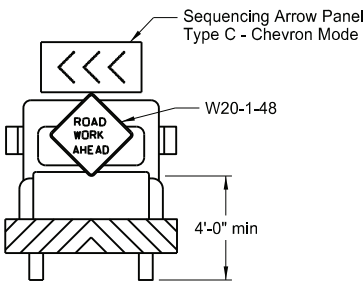
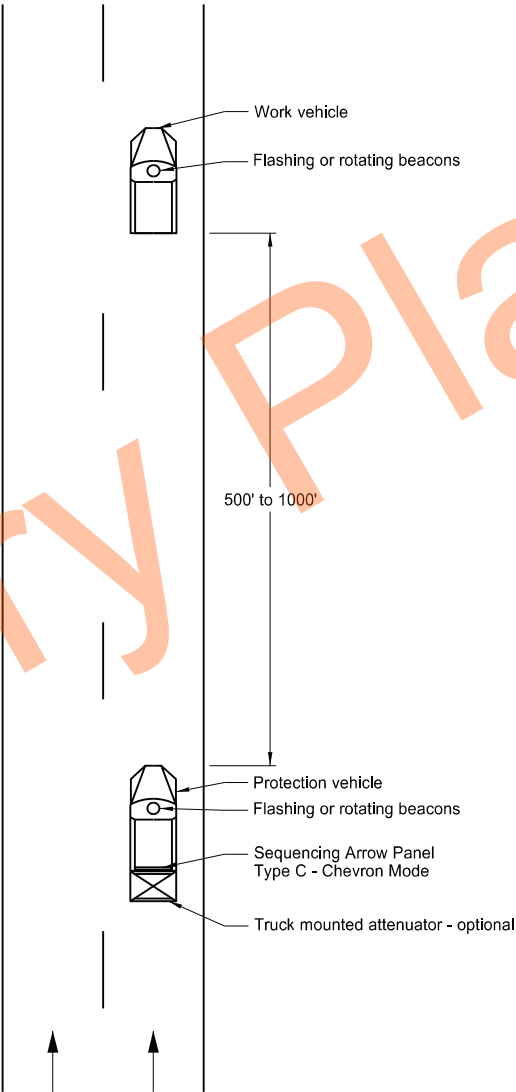
D-704-2

Two Lane, Two Way Roadways



Typical Protection Vehicle

Multilane Roadways



Typical Protection Vehicle

- Notes:
- 1. Display a 360 degree rotating, flashing, oscillating or strobe light on the working vehicle.
 - 2. Display a 360 degree rotating, flashing, oscillating or strobe light on the shadow vehicle. Operate a sequencing arrow panel Type C in chevron mode on the shadow vehicle for Multilane Roadway.
 - 3. Use these layouts during daylight hours and in areas of good visibility only.
 - 4. Use flagger to protect the work area and warn oncoming traffic for two lane, two way roadway.

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

08/01/24

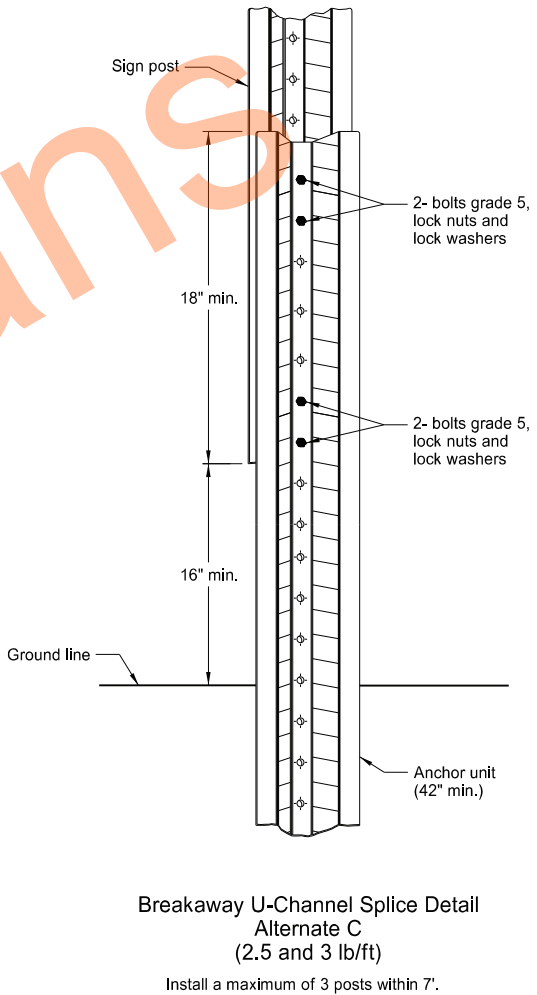
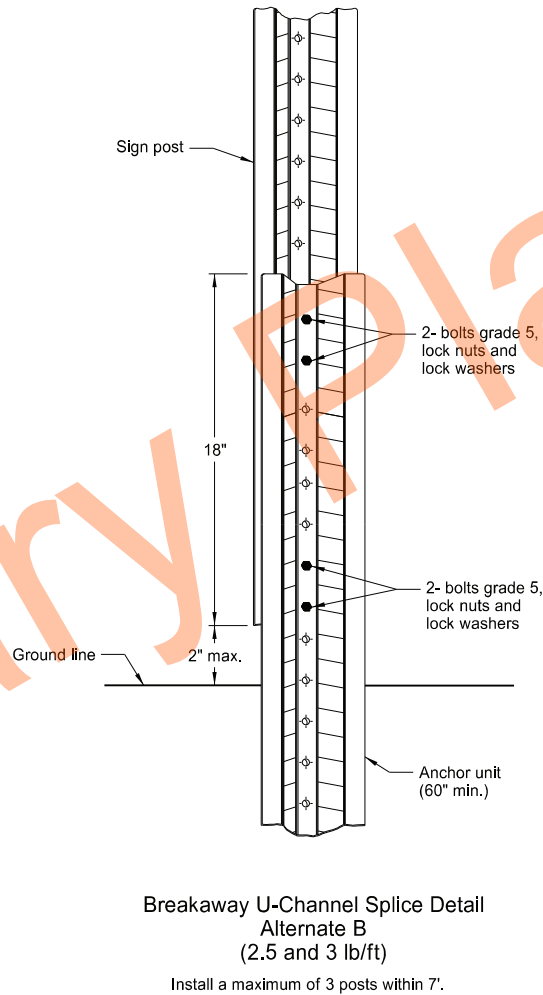
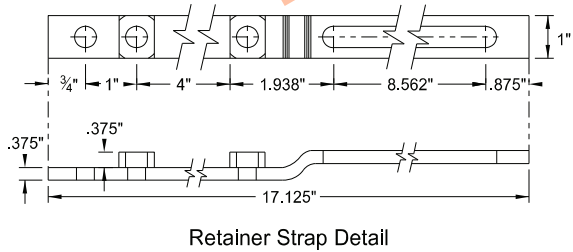
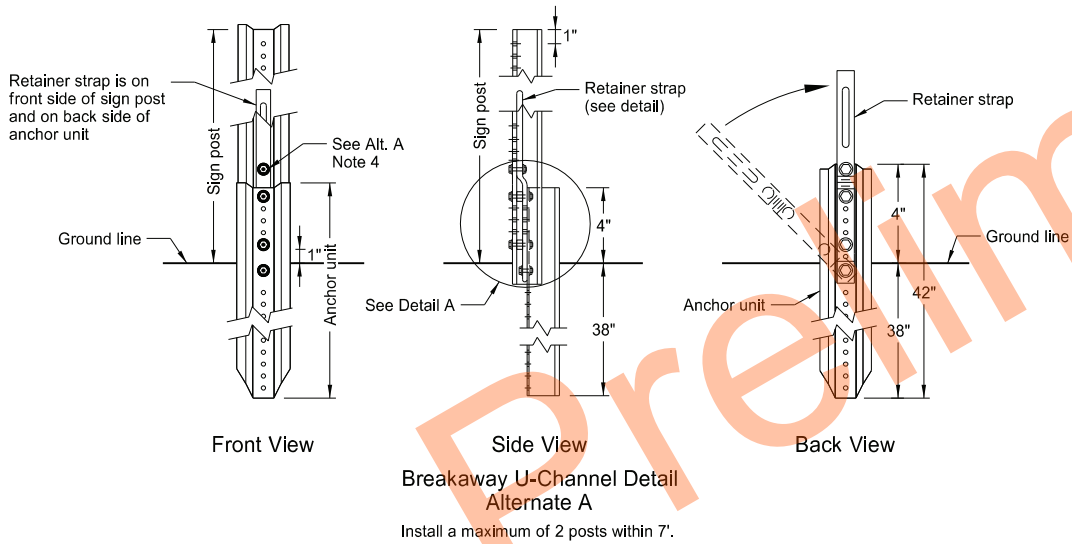
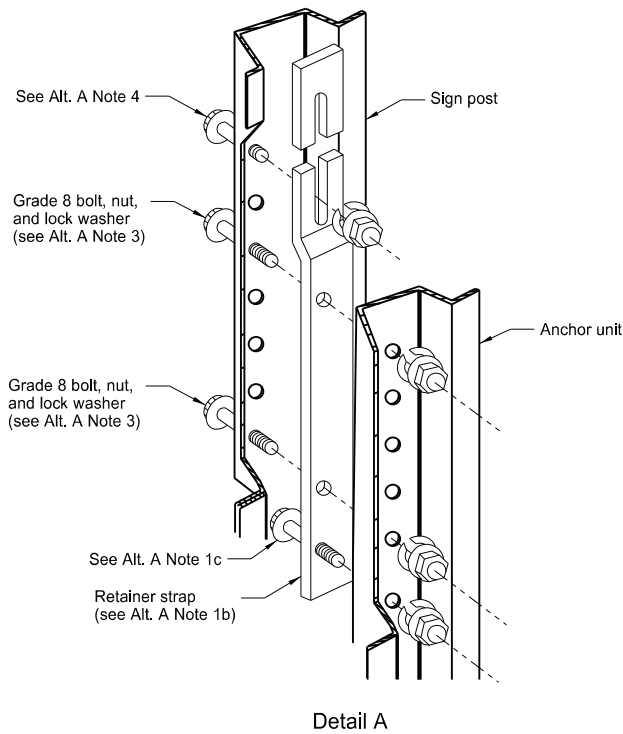


08/01/24

BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



Alternate A Steps of Installation:

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

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

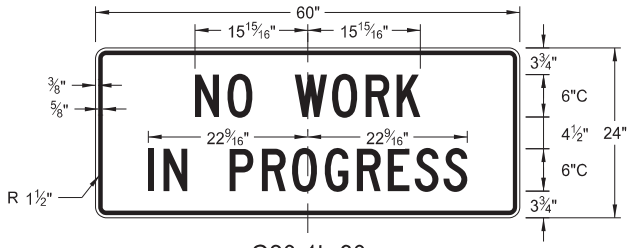


08/01/24

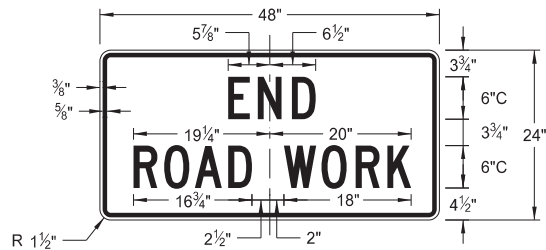
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



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



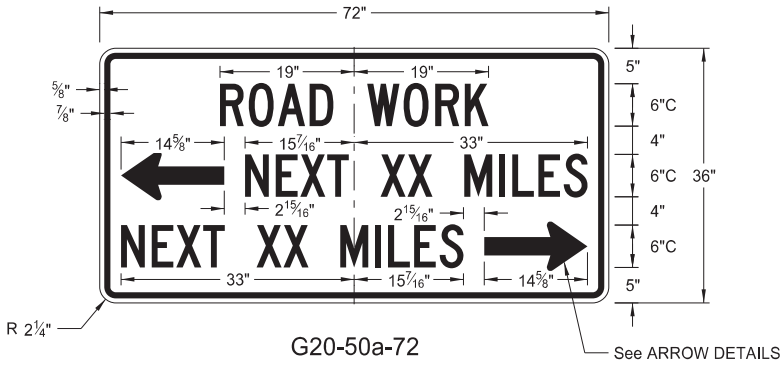
G20-1b-60
Legend: black (non-refl)
Background: orange



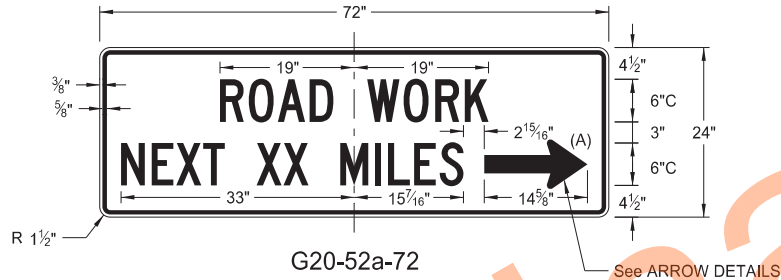
G20-2-48
Legend: black (non-refl)
Background: orange



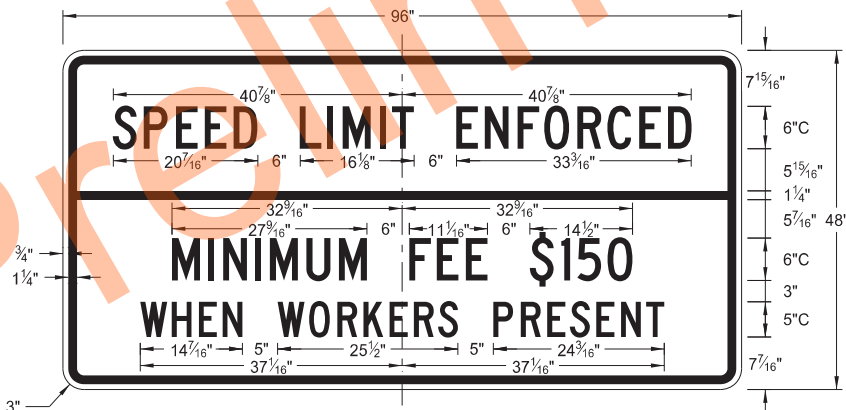
G20-4b-36
Legend: black (non-refl)
Background: orange



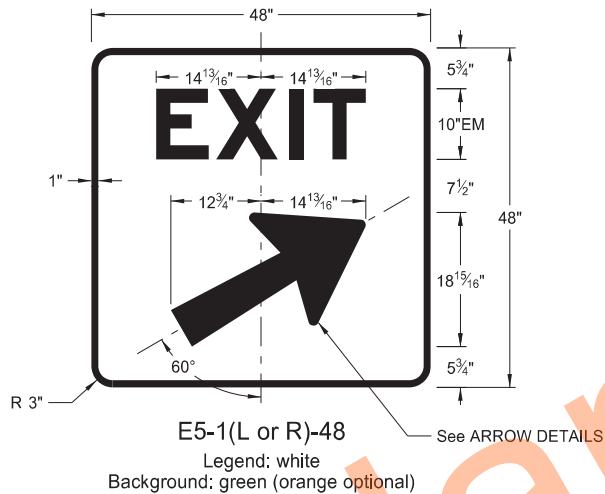
G20-50a-72
Legend: black (non-refl)
Background: orange



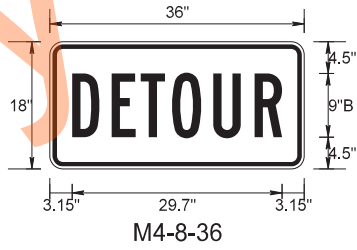
G20-52a-72
Legend: black (non-refl)
Background: orange



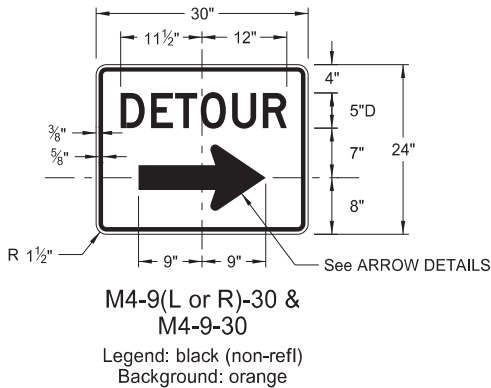
G20-55-96
Legend: black (non-refl)
Background: orange



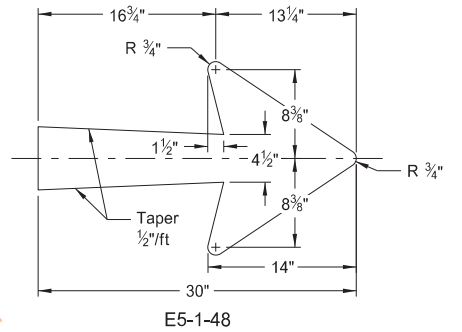
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



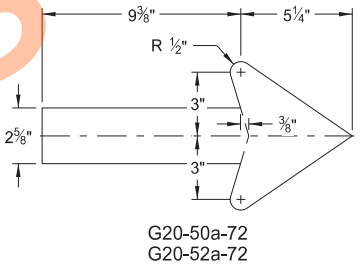
M4-8-36
Legend: black (non-refl)
Background: orange



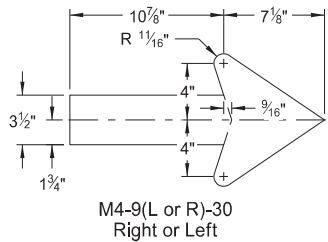
M4-9(L or R)-30 & M4-9-30
Legend: black (non-refl)
Background: orange



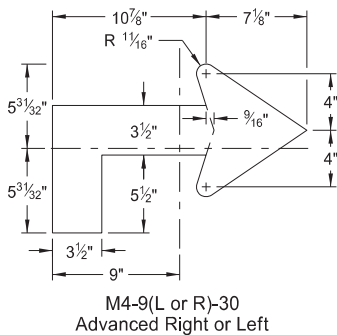
E5-1-48



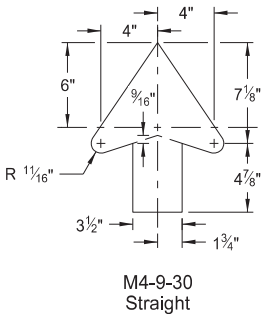
G20-50a-72
G20-52a-72



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:

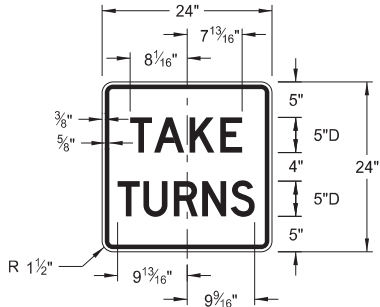
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

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

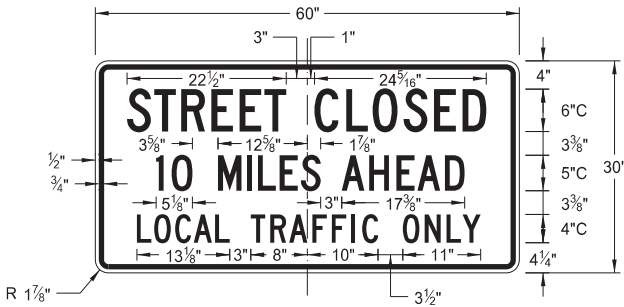


CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS

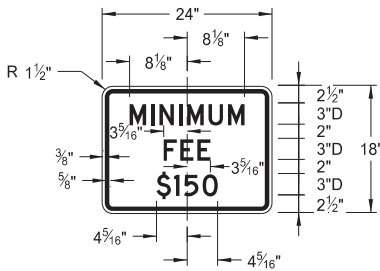
D-704-10



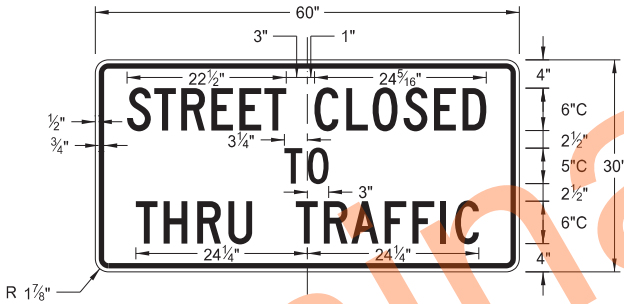
R1-50P-24
Legend: black (non-refl)
Background: white



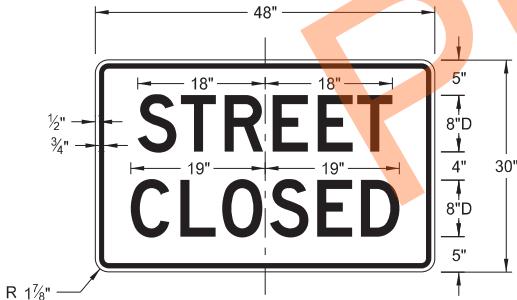
R11-3c-60
Legend: black (non-refl)
Background: white



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

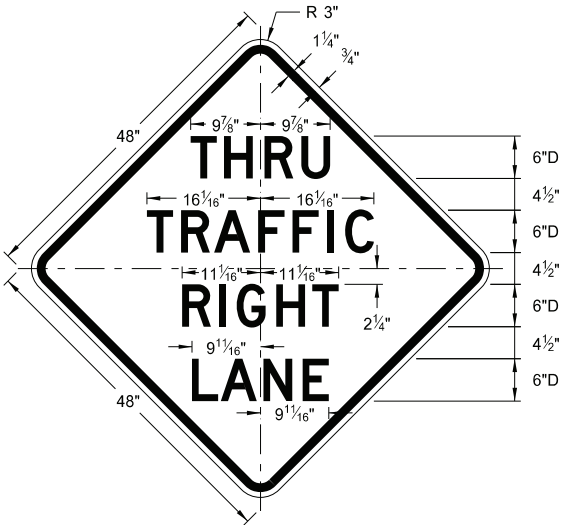
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
08-17-17	Revised sign number
10-03-19	New Design Engineer PE Stamp
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes



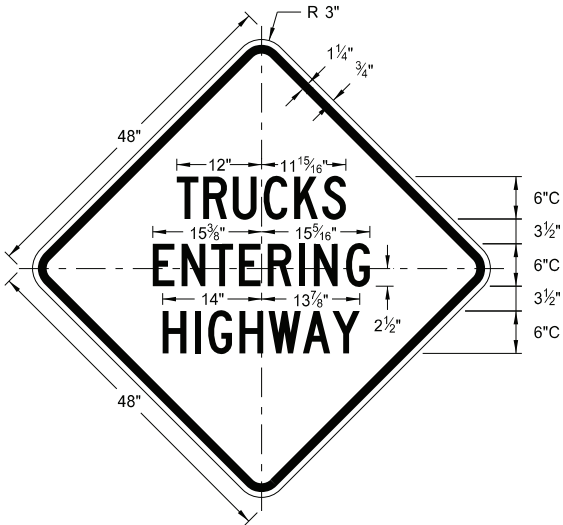
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

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

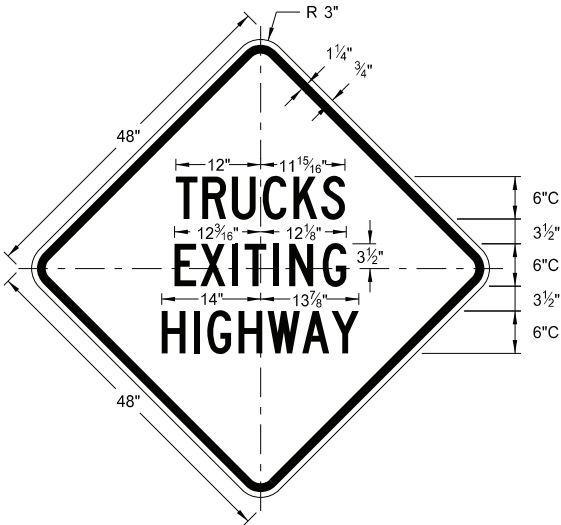
* DISTANCE MESSAGES



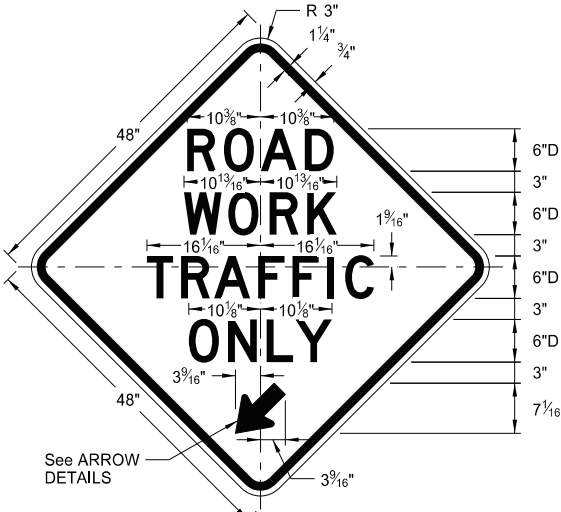
W5-8-48
Legend: black (non-refl)
Background: orange



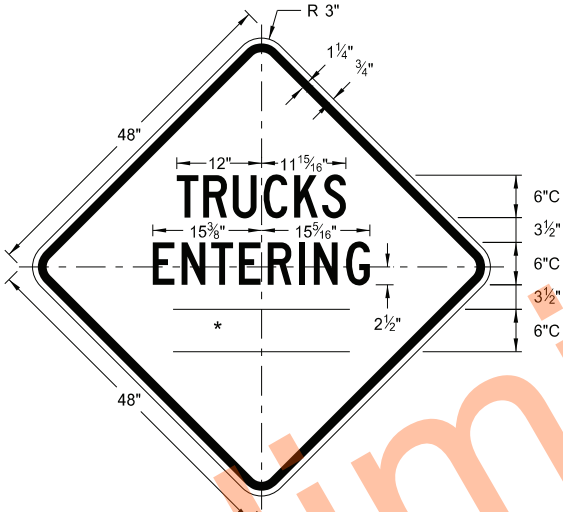
W8-53-48
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Background: orange



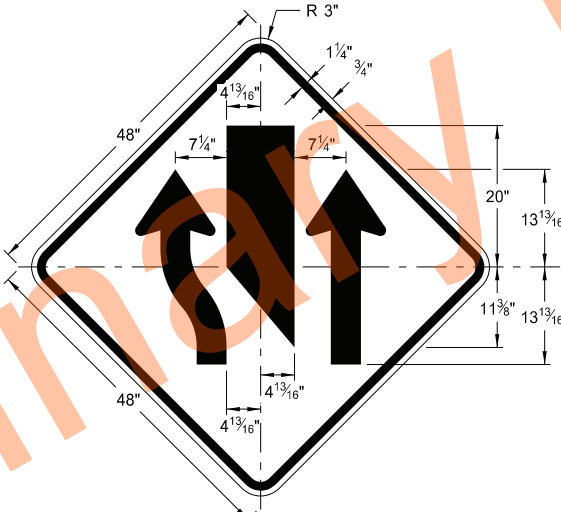
W8-56-48
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Background: orange



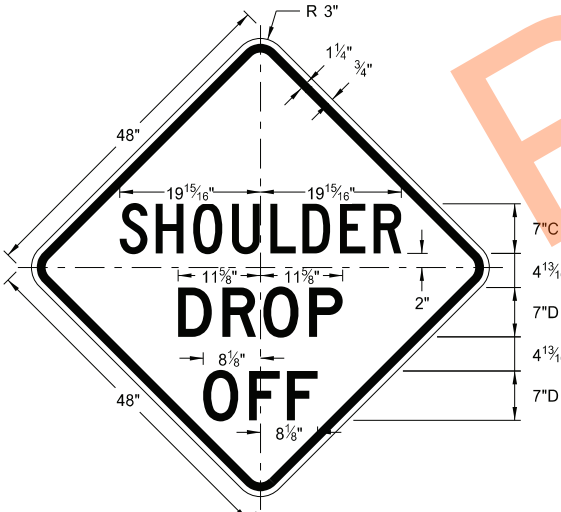
W5-9-48
Legend: black (non-refl)
Background: orange



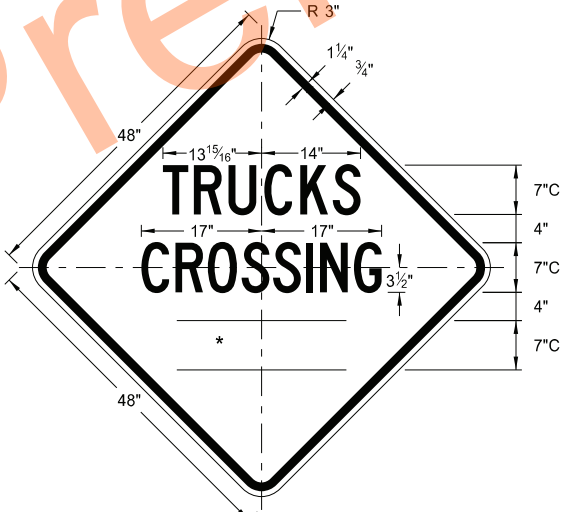
W8-54-48
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Background: orange



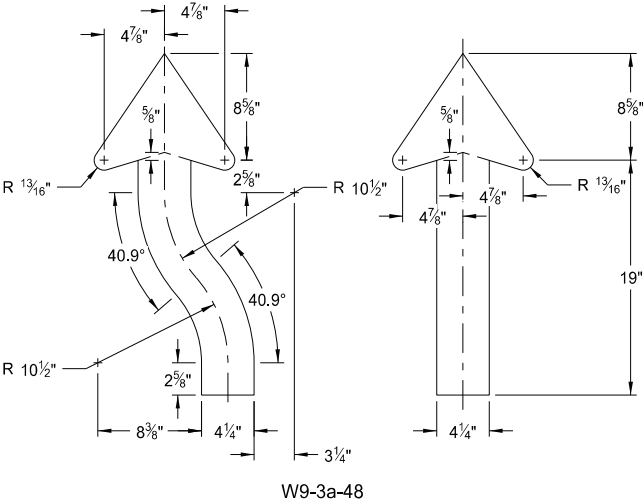
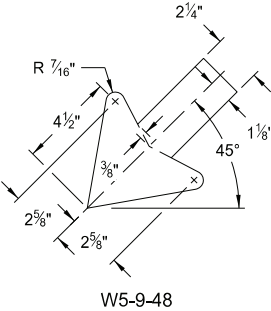
W9-3a-48
Legend: black (non-refl)
Background: orange



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

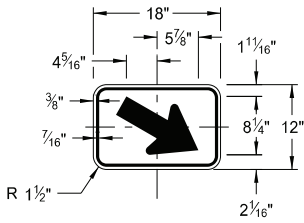


08/01/24

CONSTRUCTION SIGN DETAILS
WARNING SIGNS

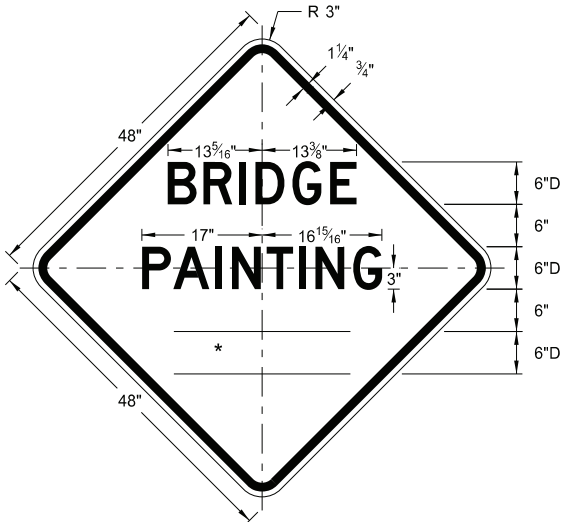
WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
½ MILE	Reduce 50%
1 MILE	Standard

* DISTANCE MESSAGES



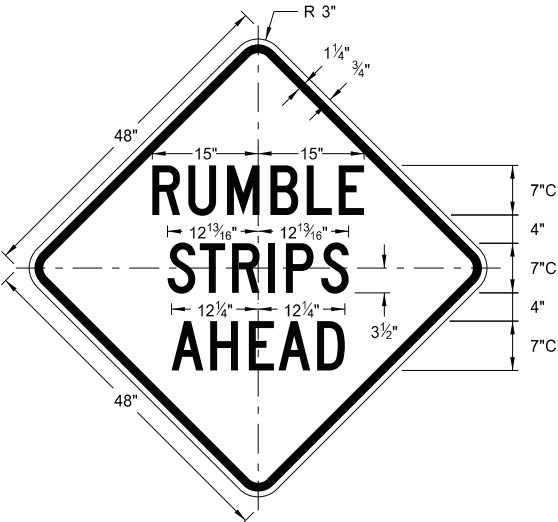
W16-7aP-18

Legend: black (non-refl)
Background: orange



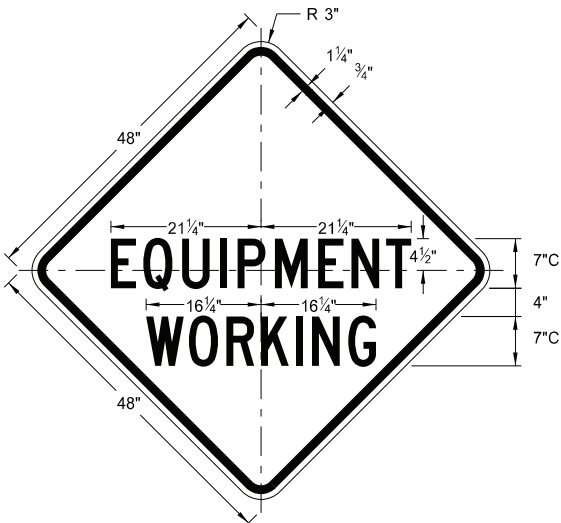
W21-50-48

Legend: black (non-refl)
Background: orange



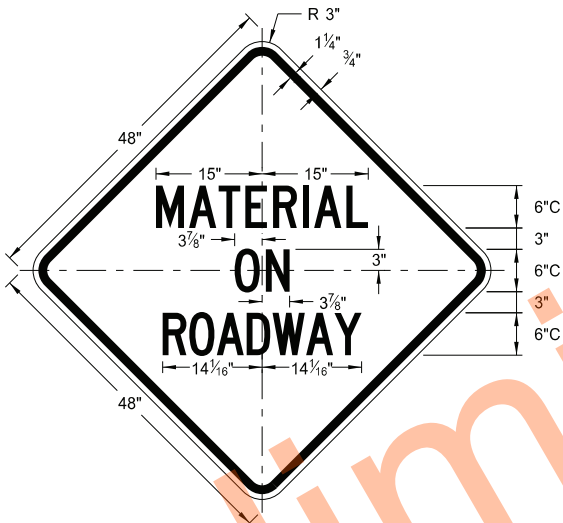
W21-53-48

Legend: black (non-refl)
Background: orange



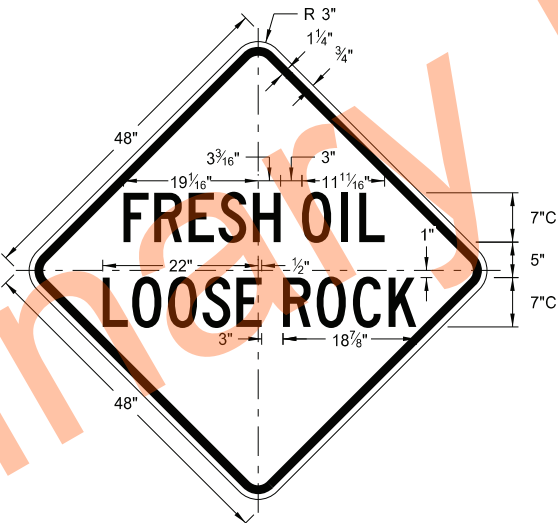
W20-51-48

Legend: black (non-refl)
Background: orange



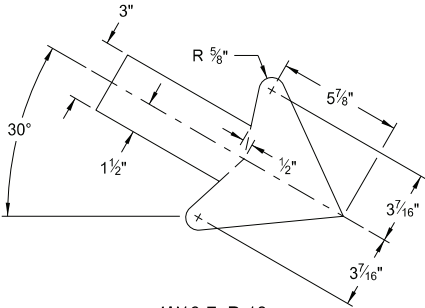
W21-51-48

Legend: black (non-refl)
Background: orange

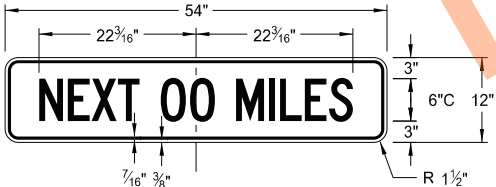


W22-8-48

Legend: black (non-refl)
Background: orange

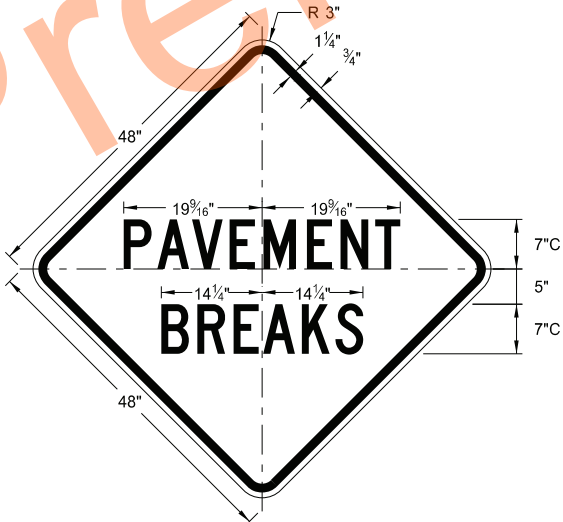


W16-7aP-18



W20-52P-54

Legend: black (non-refl)
Background: orange



W21-52-48

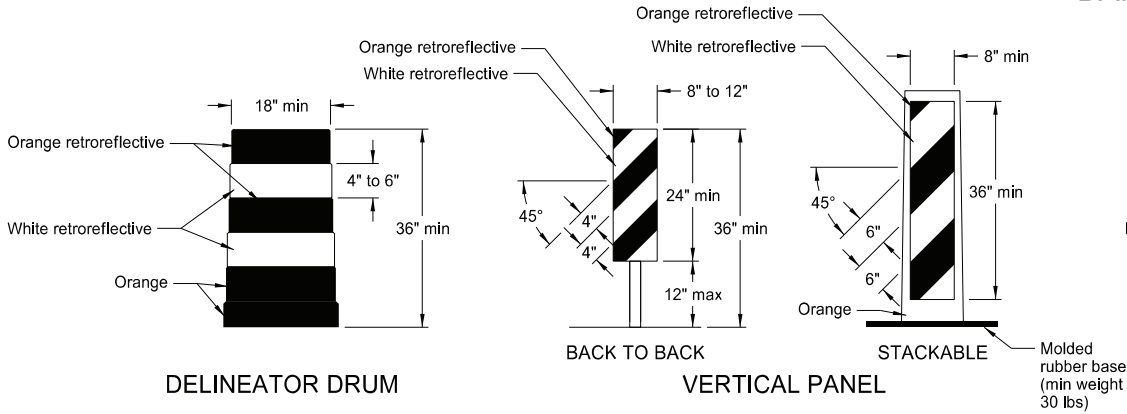
Legend: black (non-refl)
Background: orange

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



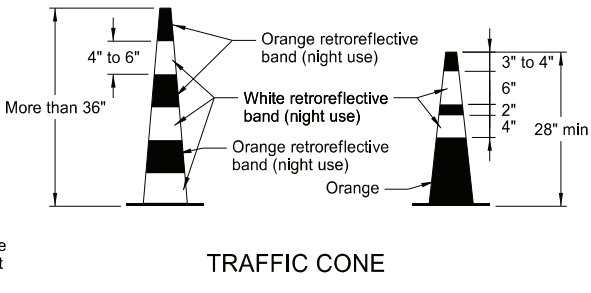
08/01/24

BARRICADE AND CHANNELIZING DEVICE DETAILS

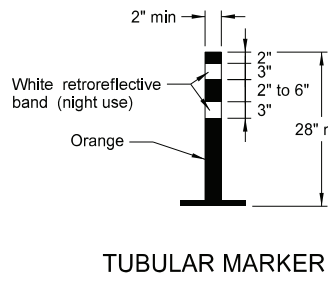


Provide horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide for drum markings. Use a minimum of two orange and two white stripes with the top stripe being orange for each drum. Do not exceed 3" nonretroreflectORIZED spaces between the horizontal orange and 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.

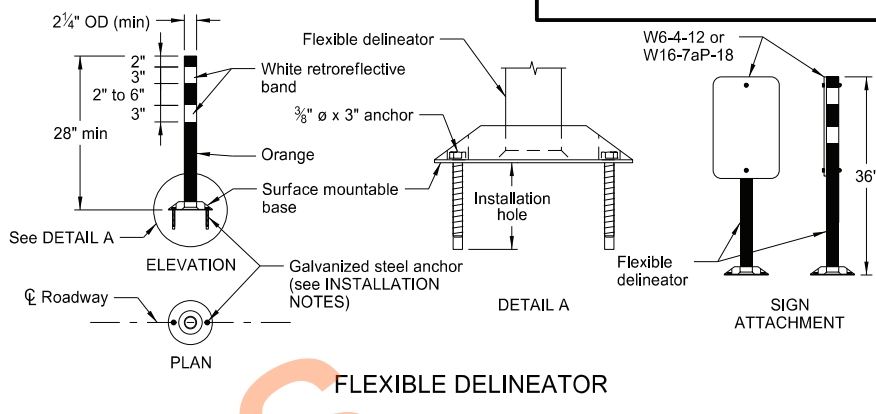
Provide alternating orange and white retroreflective stripes, sloping downward in direction vehicular traffic is to pass. Place retroreflective sheeting on both sides of panel with a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective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



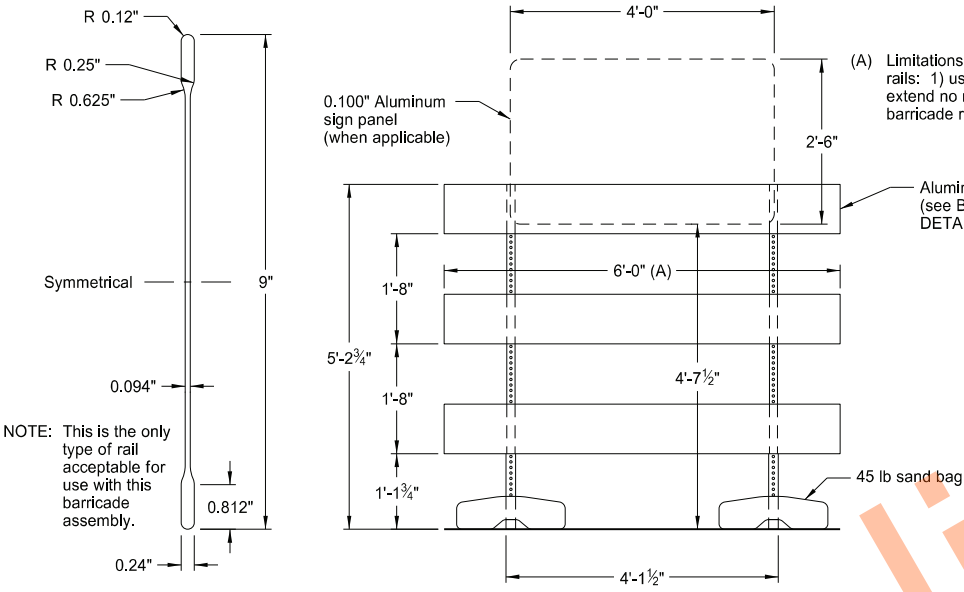
Provide retroreflectORIZATION of cones more than 36" in height by alternating orange and white retroreflective stripes. Use a minimum of two orange and two white stripes for each cone with the top stripe being orange. Use maximum 3" nonretroreflectORIZED space between the orange and white stripes.



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.

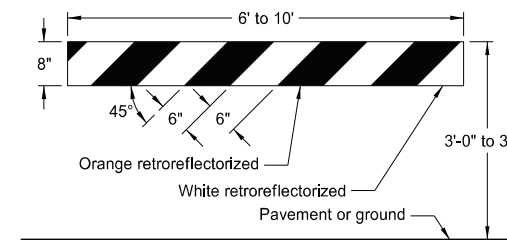


BARRICADE BLADE DETAIL

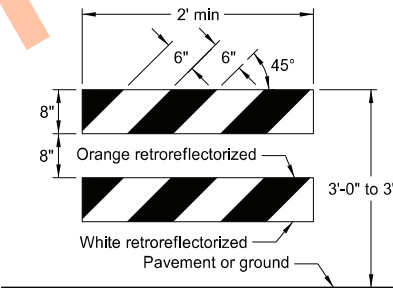
ELEVATION VIEW

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".

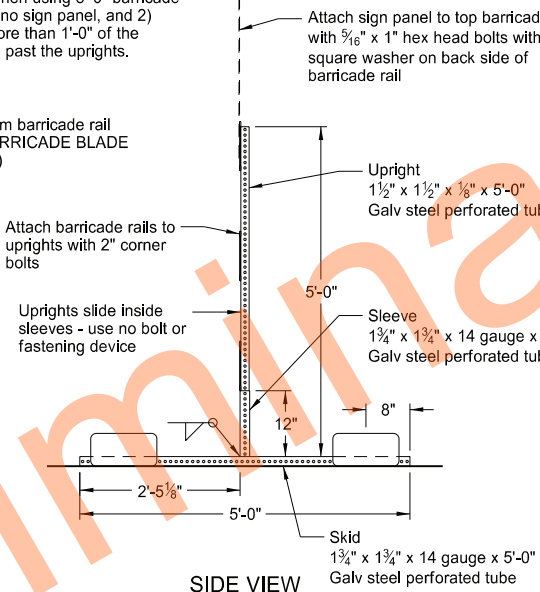


TYPE I BARRICADE

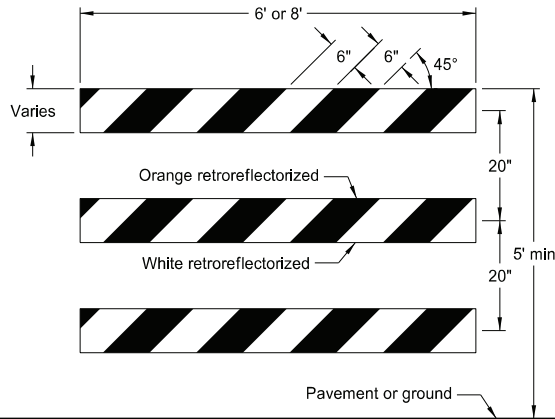


TYPE II BARRICADE

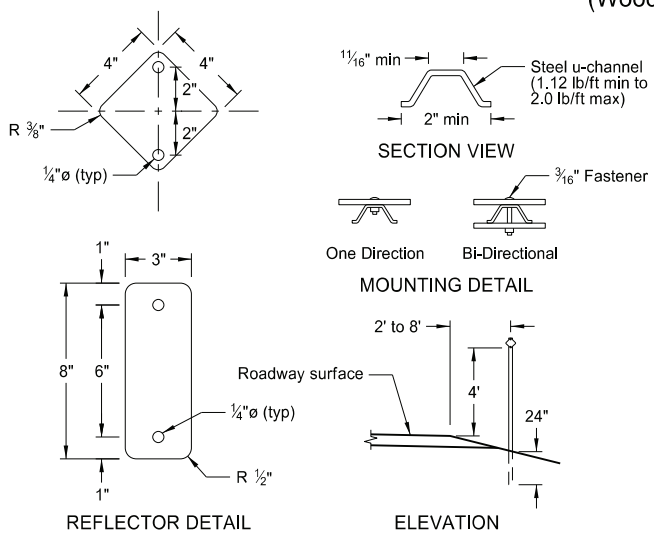
BARRICADE RAIL DETAILS



SIDE VIEW



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

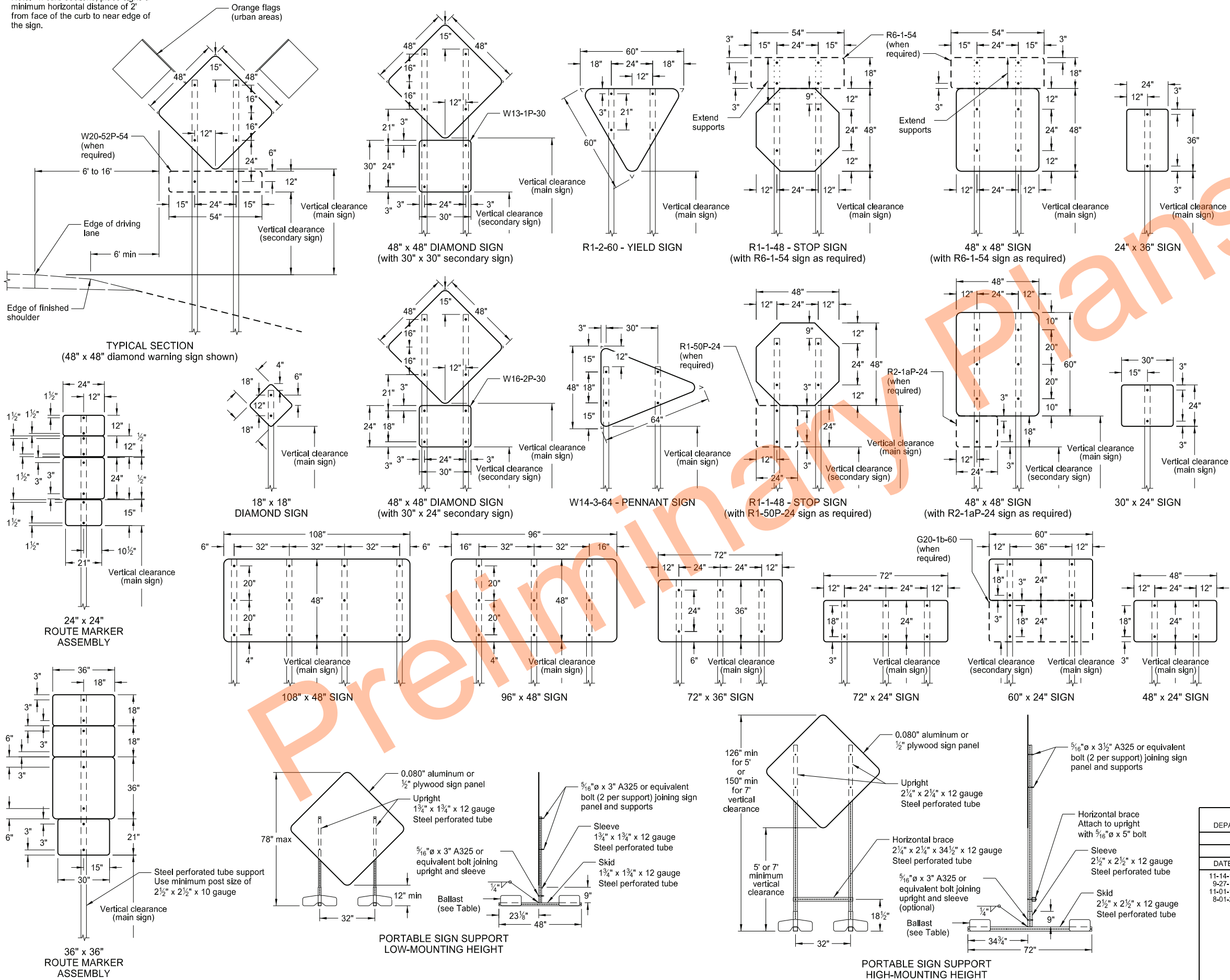
Note: Number of sandbags based on a wind speed of 55 MPH. Sandbags assumed to be placed at or near the ends of the skids.

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



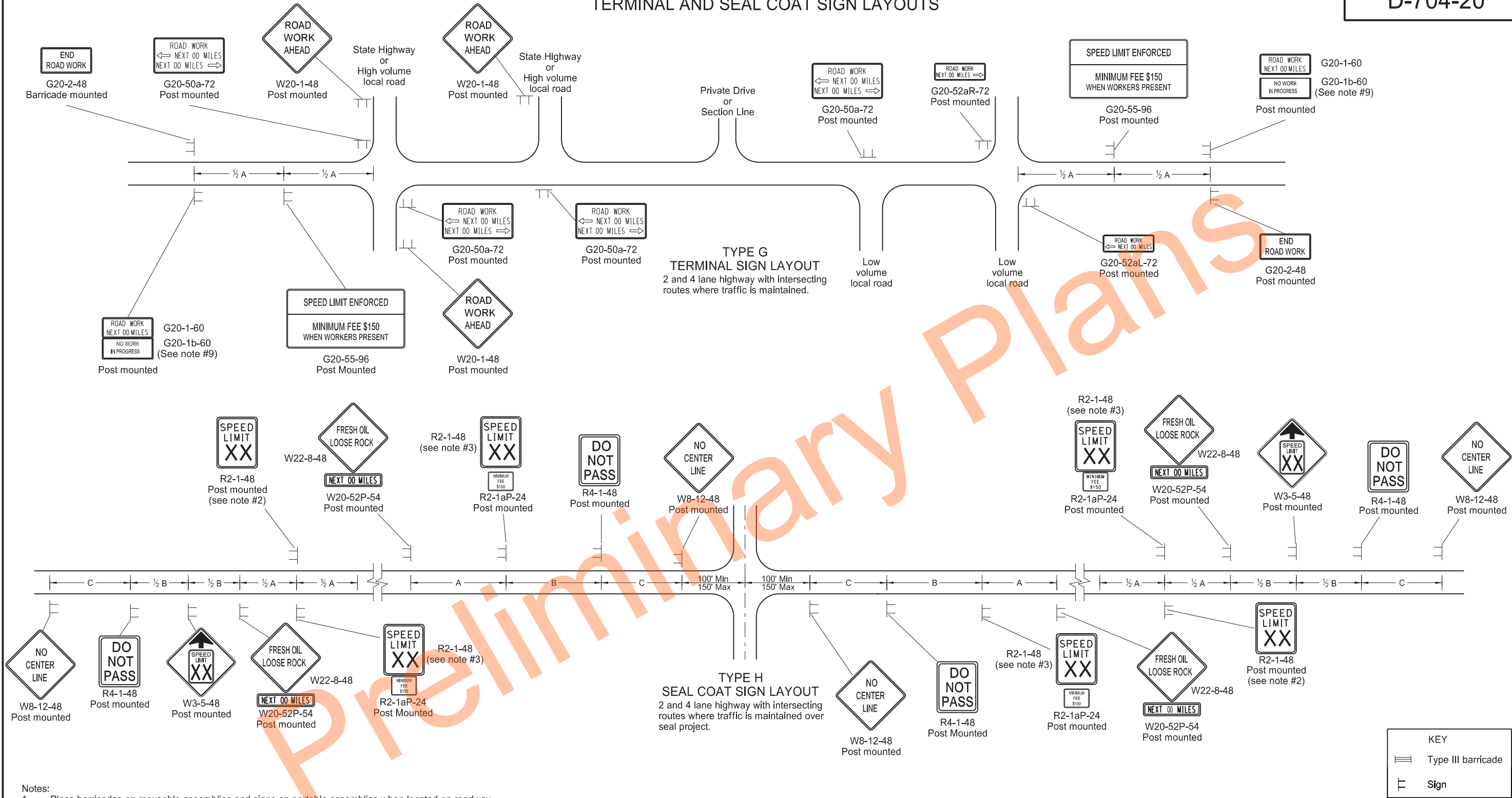
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

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



TERMINAL AND SEAL COAT SIGN LAYOUTS

D-704-20



Notes:

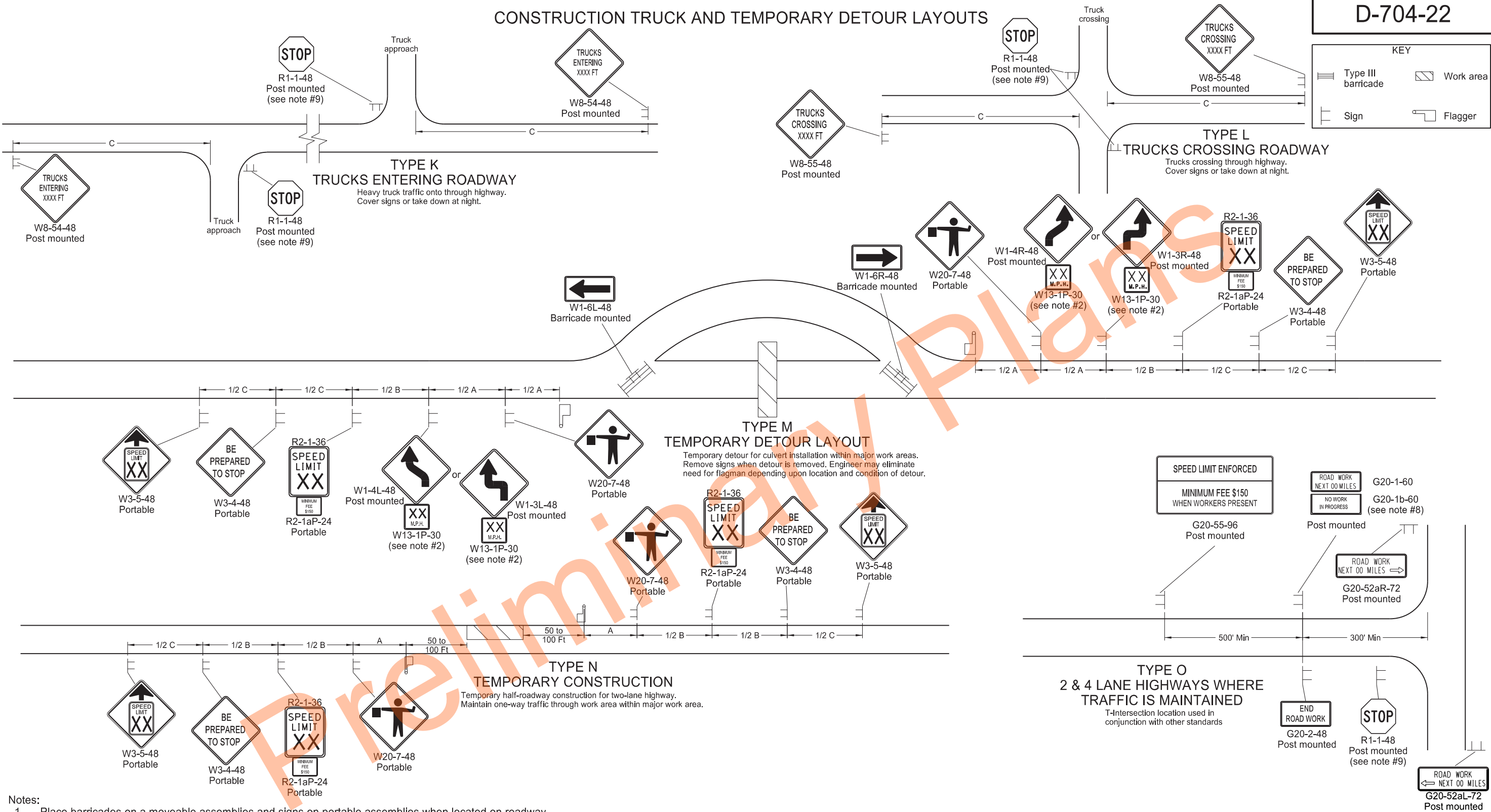
- Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
- Determine the exact speed limit in the field, based on location and conditions.
- Determine the reduced speed limit based on the in place speed limit before construction. Where speed limit reductions 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.

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.

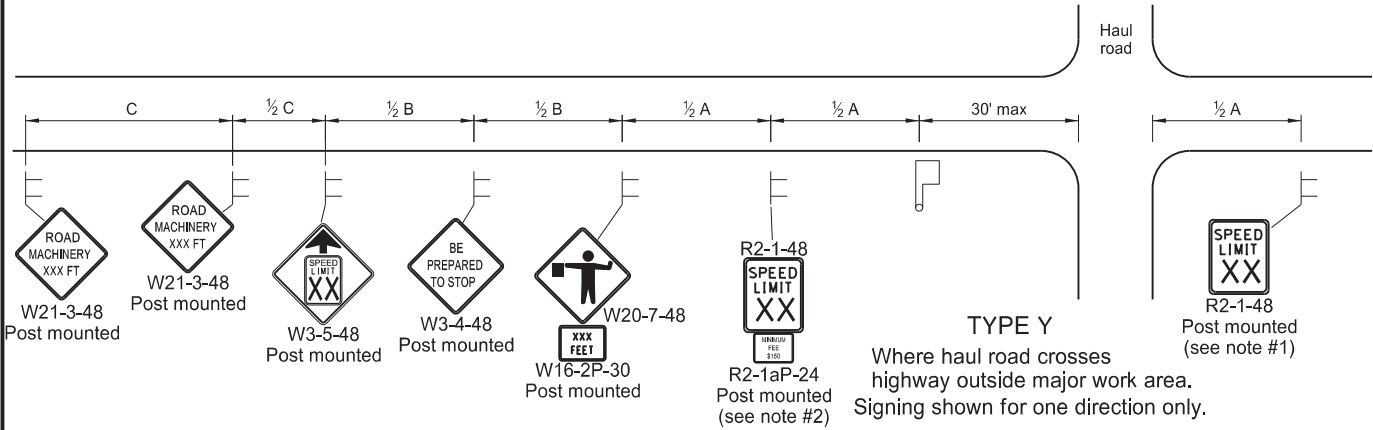
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway 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

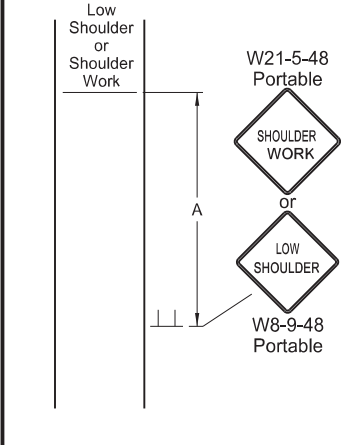
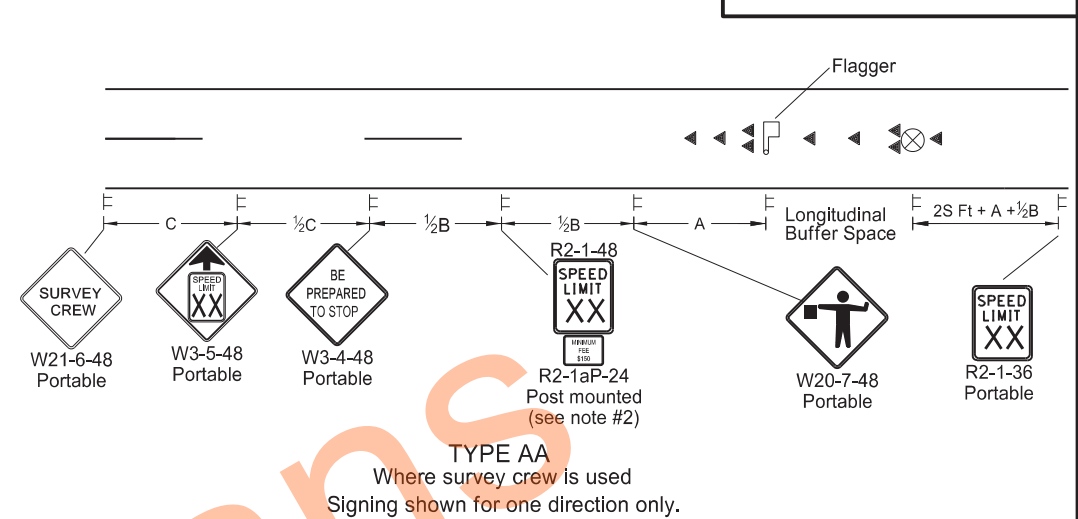


MISCELLANEOUS SIGN LAYOUTS

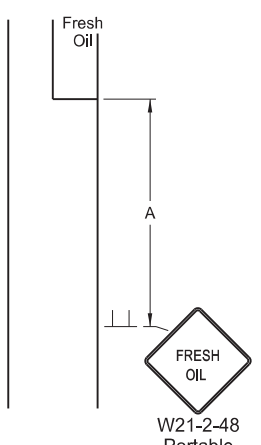
D-704-26



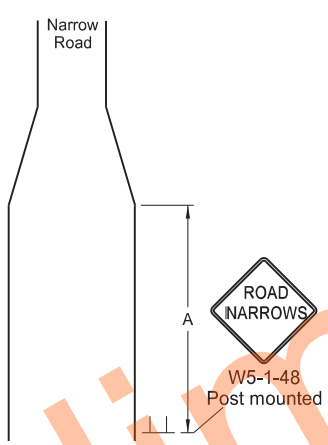
TYPE Z
Where speed zone is needed
Signing shown for one direction only.



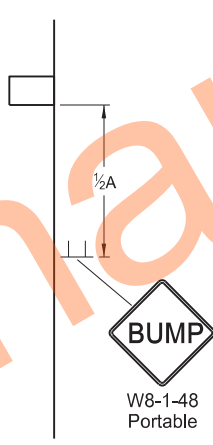
TYPE BB
Within major work area
where sign conditions exist



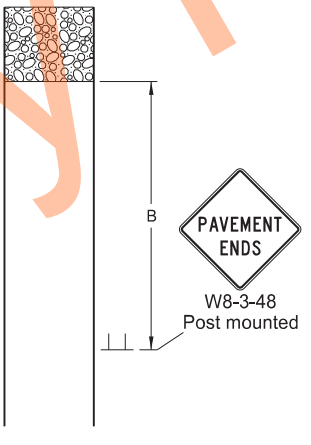
TYPE CC
Where sign conditions exist



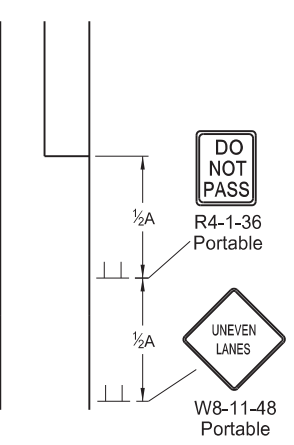
TYPE DD
Where sign conditions exist



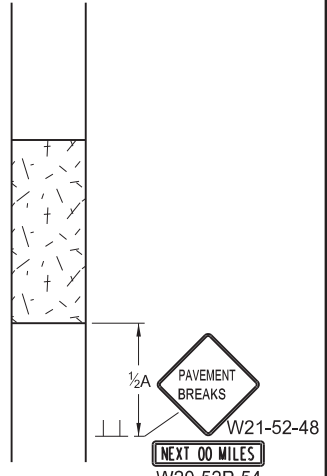
TYPE EE
Where sign conditions exist



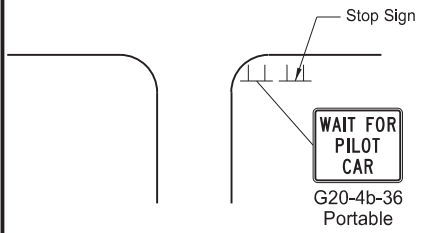
TYPE FF
Where sign conditions exist
Signing shown for one direction only.



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

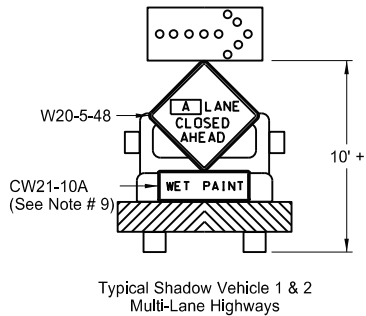
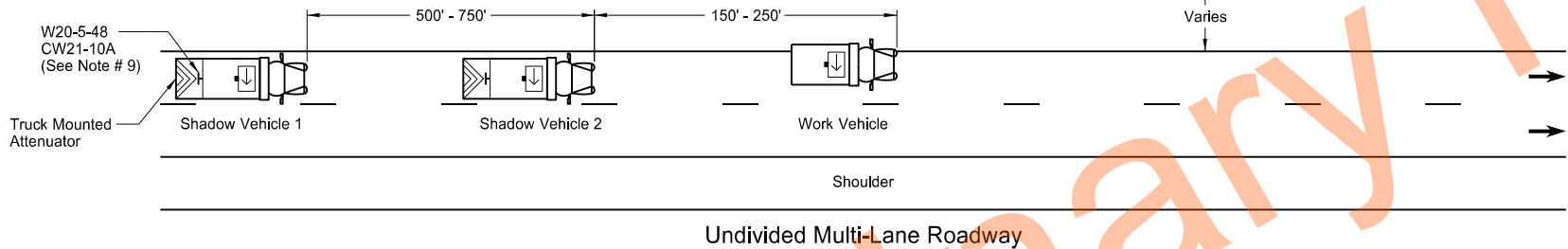
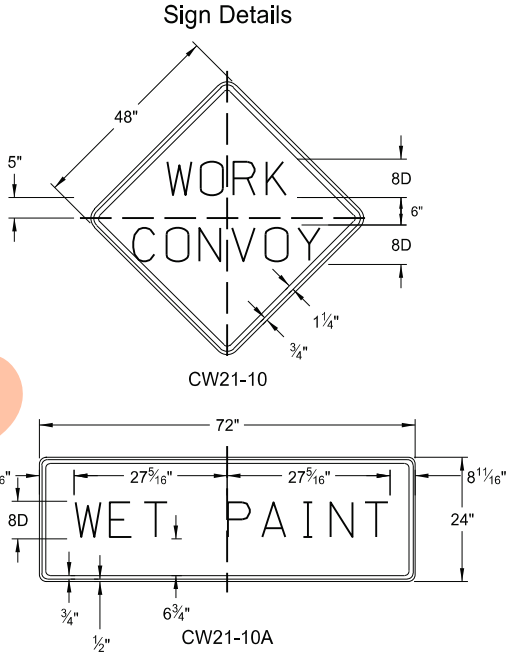
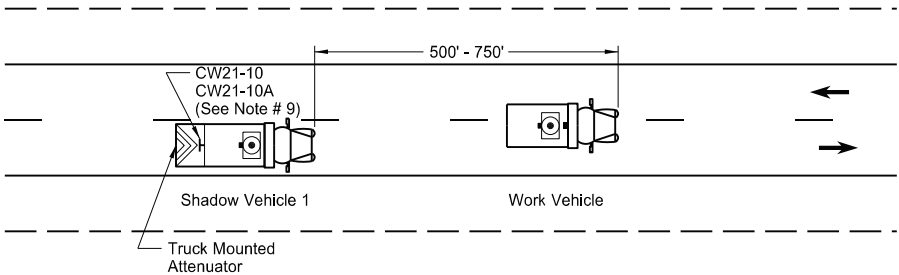
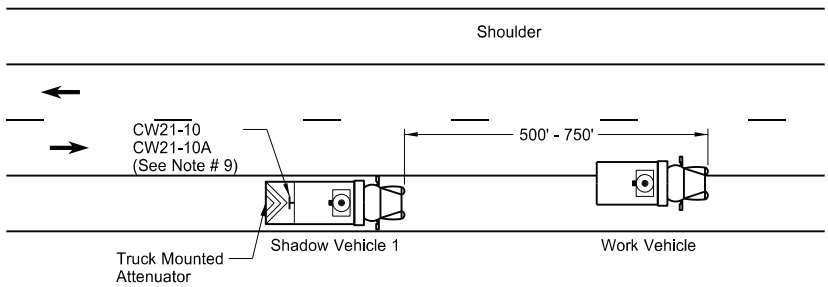
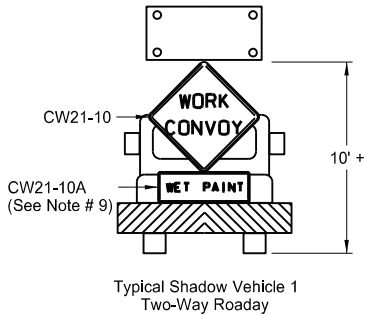
S = Numerical value of speed limit or 85th percentile.

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

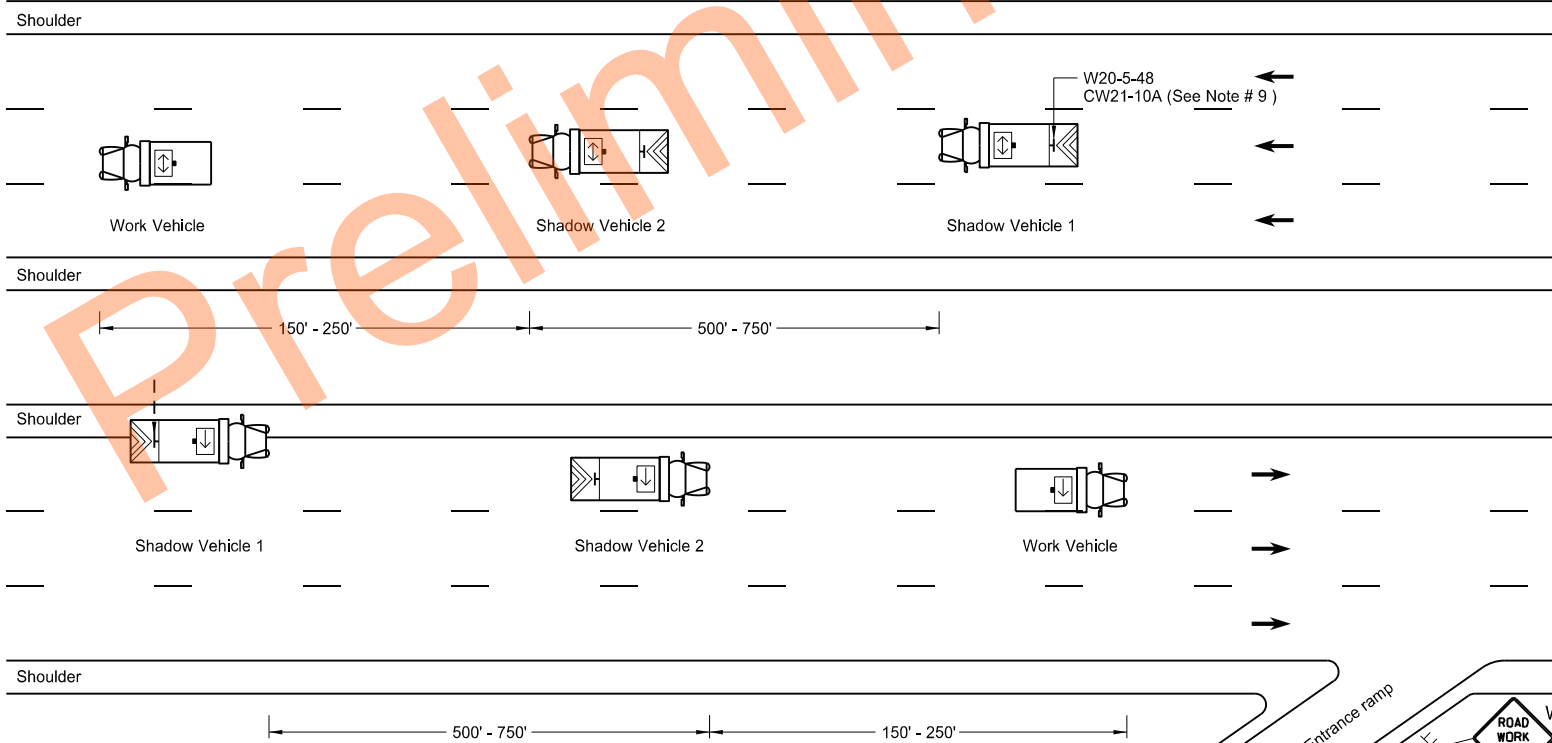


MOBILE OPERATION
(PAVEMENT MARKING)

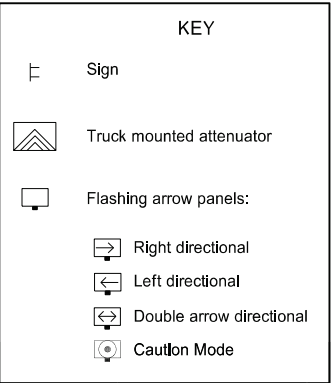
D-704-27



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.



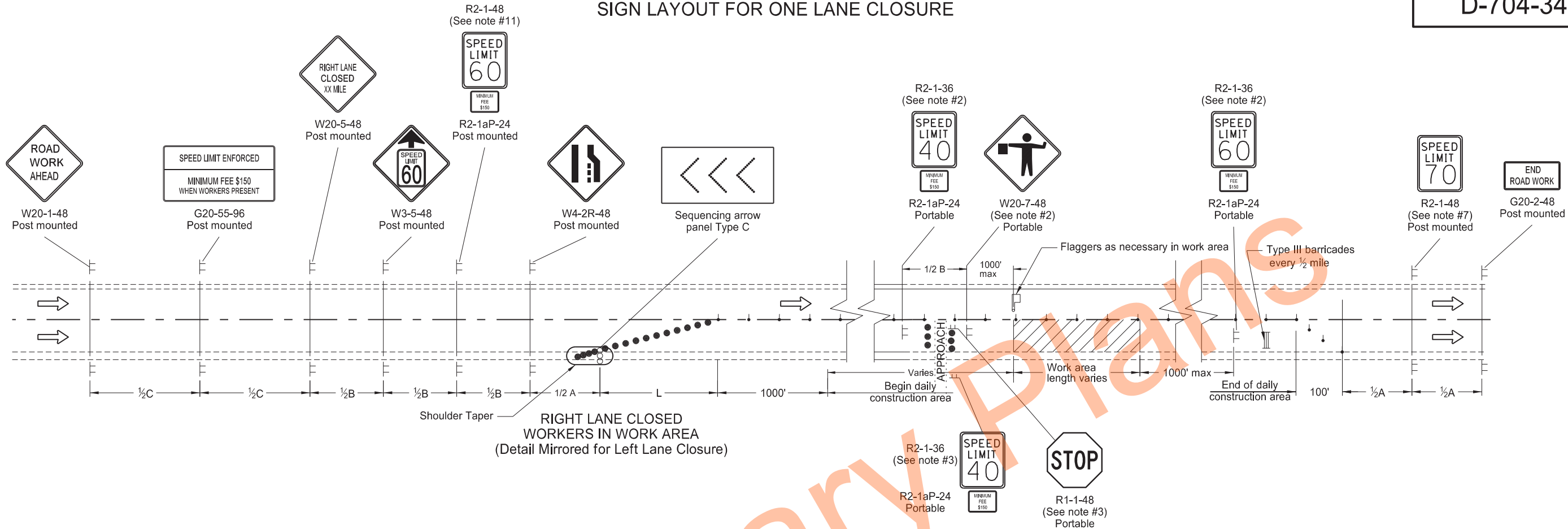
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
6-18-14	Removed shadow vehicle 2 on two lane roadways
9-27-17	Updated to active voice
11-08-19	Changed Standard Heading
6-02-24	Electronic Stamp/Signature.



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

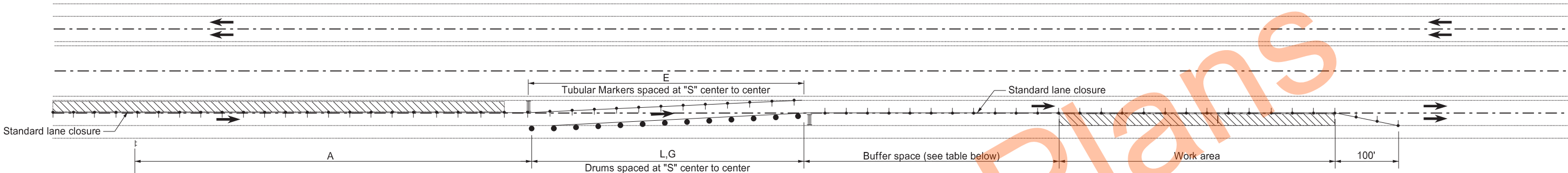
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway 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



W1-4L-48
Post Mounted

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.

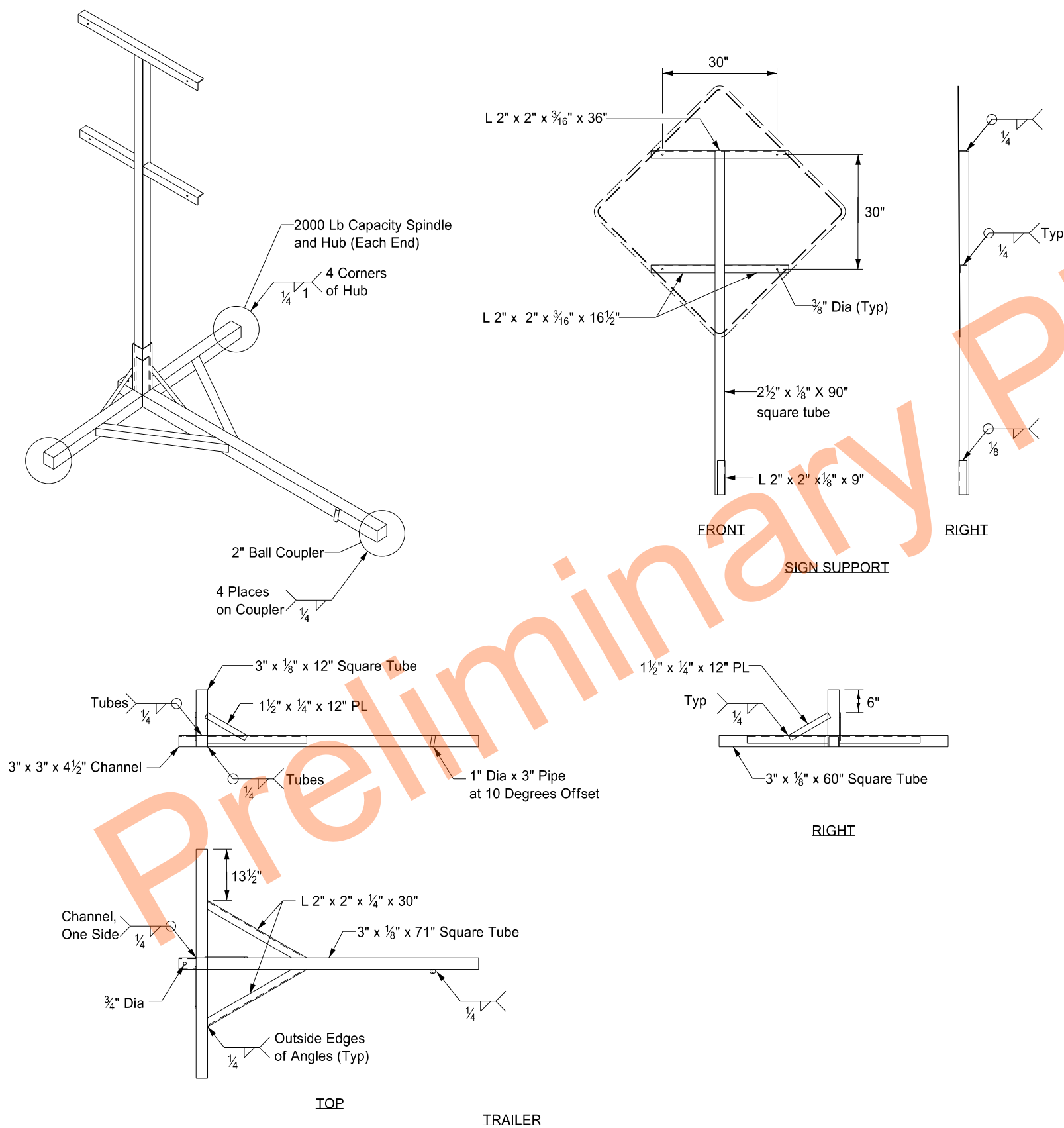
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
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Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban 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

Technical drawing of a large letter 'N' with dimensions. The overall height is 8'-0" and the overall width is 6'-6". The letter is composed of several vertical and diagonal strokes. The top horizontal stroke is 16" wide. The vertical strokes are 7" wide. The diagonal strokes are 15" wide. The letter has a 4" thick stroke. The bottom horizontal stroke is 16" wide. The letter is shown in a perspective view.

Technical drawing of a complex shape with dimensions and radii. The overall width is 11'-8". The overall height is 8'-4". The shape features several internal dimensions and radii:

- Top horizontal dimension: 11'-8"
- Left vertical dimension: 8'-4"
- Top-left horizontal dimension: 3'-0"
- Top-left horizontal dimension: 8"
- Top-left vertical dimension: 2'-8"
- Top-right vertical dimension: 2'-4"
- Right vertical dimension: 1'-8"
- Right vertical dimension: 2'-4"
- Bottom-right vertical dimension: 2'-0"
- Bottom horizontal dimension: 5'-4"
- Bottom horizontal dimension: 1'-0"
- Bottom horizontal dimension: 5'-4"
- Internal horizontal dimension: 2'-8"
- Internal horizontal dimension: 4"
- Internal horizontal dimension: 4"
- Internal vertical dimension: 1'-8"
- Internal vertical dimension: 8"
- Internal vertical dimension: 4"
- Radius: $R \approx 3'-4"$
- Radius: $R \approx 2'-4"$

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 of 7'-6", overall height of 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"
- Lower section height: 2'-0³/₄"
- Width at the base: 1'-1"
- Detail callout: 3/4"

Technical drawing of a stylized 'STOP' sign. The sign is rectangular with a total width of 6'-3" and a total height of 8'-0". The word 'STOP' is rendered in a bold, sans-serif font. The dimensions are as follows:

- Overall Dimensions:** 6'-3" wide by 8'-0" high.
- Letter Dimensions:**
 - S:** The vertical stem is 4" wide. The top loop has a width of 16" and a height of 4". The bottom loop has a width of 4" and a height of 4".
 - T:** The vertical stem is 4" wide. The top bar is 16" wide and 2" high. The middle bar is 16" wide and 4" high. The bottom bar is 16" wide and 4" high.
 - O:** The vertical stem is 4" wide. The top loop has a width of 16" and a height of 4". The bottom loop has a width of 4" and a height of 4".
 - P:** The vertical stem is 4" wide. The top loop has a width of 16" and a height of 4". The bottom loop has a width of 4" and a height of 4".
- Spacing:** The spacing between the letters is 16" between 'S' and 'T', 2" between 'T' and 'O', and 5" between 'O' and 'P'.

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 1/2" thick material. The drawing includes a top view and a side view.

Technical drawing of a stylized 'GOLF' sign. The sign is 12'-0" wide and 8'-0" high. The letters are outlined in black. Dimensions are provided for the overall size and the spacing between the letters. The overall width is 12'-0" and the overall height is 8'-0". The spacing between the letters is 4" for the 'G', 'O', 'L', and 'F', and 4" for the 'G' and 'O'.

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 horizontal lines representing the edge lines. The distance between the centerlines of these two lines is labeled as 10'. The distance between the centerlines of the two lines is also labeled as 30'.

[illegible]

W10-1 

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' 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.
- 24"**: Dimension for the first blacked-out section.
- 24"**: Dimension for the second blacked-out section.
- 24"**: Dimension for the third blacked-out section.
- 24"**: Dimension for the fourth blacked-out section.
- Wheel track**: Dimension for the wheel track.
- 30"**: Dimension for the wheel track.
- 12" min to 30" max**: Dimension for the bottom section of the road.
- 30" max**: Dimension for the wheel track.
- 6" min to 15" max**: Dimension for the bottom section of the road.

Labels and dimensions include:

- 2'x6', 2'x8', 2'x10' or 2'x12' white line**: Label for the white line markings.
- 24"**: Dimension for the white line markings.
- Wheel track**: Label for the wheel track.
- 30"**: Dimension for the wheel track.
- 12" min to 30" max**: Dimension for the bottom section of the road.
- 30" max**: Dimension for the wheel track.
- 6" min to 15" max**: Dimension for the bottom section of the road.

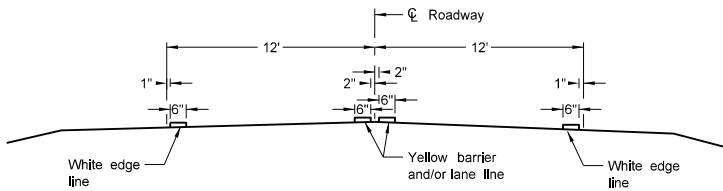
Advance Placement Distance for Railroad Warning Signs	
Posted or 85th Percentile Speed	Advance Distance
20 mph	min. 100 ft
25 mph	min. 100 ft
30 mph	min. 100 ft
35 mph	min. 100 ft
40 mph	125 ft
45 mph	175 ft
50 mph	250 ft
55 mph	325 ft
60 mph	400 ft
65 mph	475 ft
70 mph	550 ft

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.

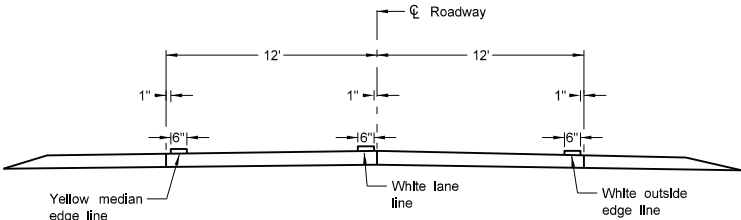


PAVEMENT MARKING

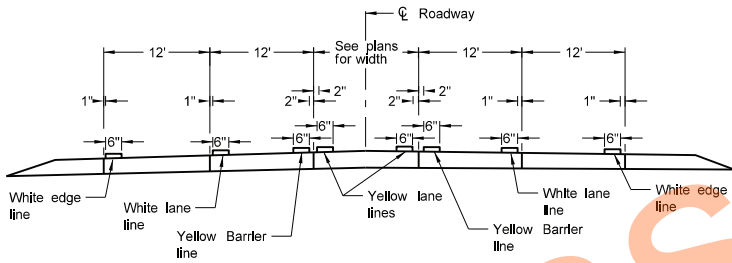
D-762-4



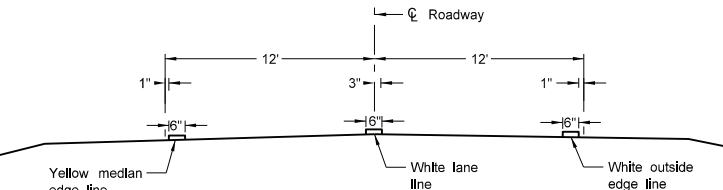
Two Lane Two Way
RURAL ROADWAY



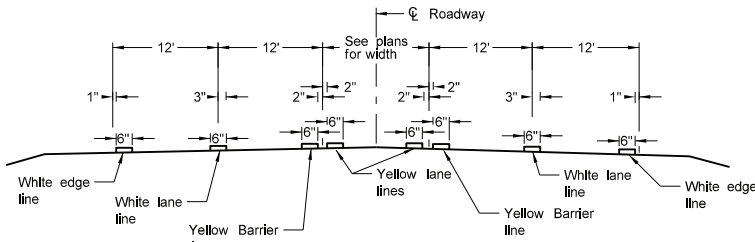
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



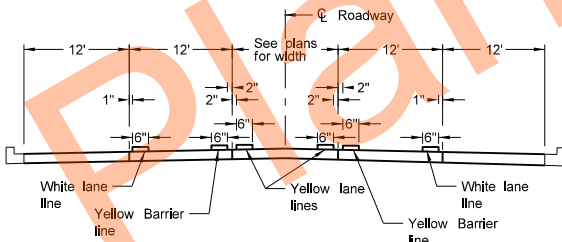
RURAL FIVE LANE ROADWAY
Concrete Section



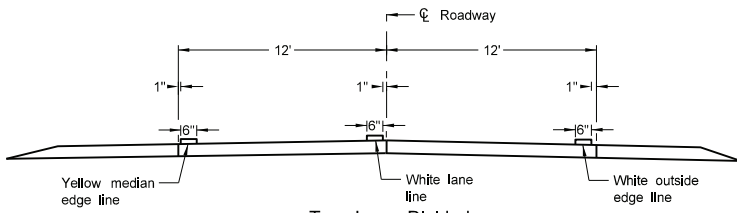
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



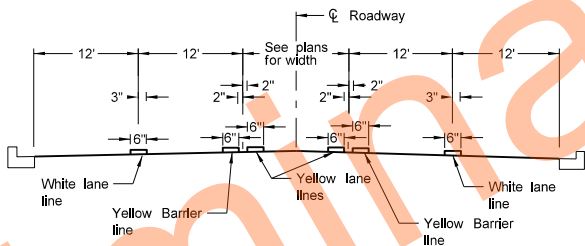
RURAL FIVE LANE ROADWAY
Asphalt Section



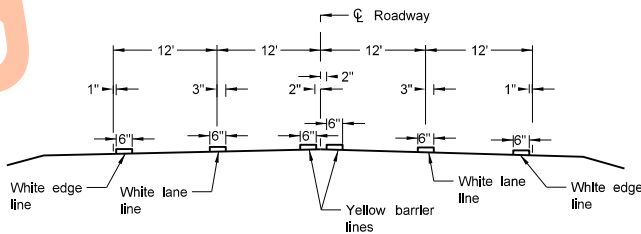
URBAN FIVE LANE SECTION
Concrete Section



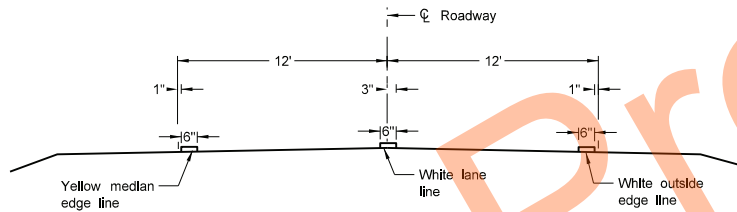
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



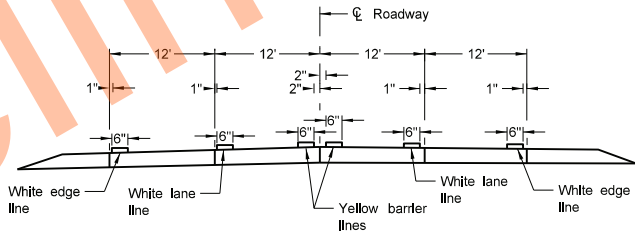
URBAN FIVE LANE SECTION
Asphalt Section



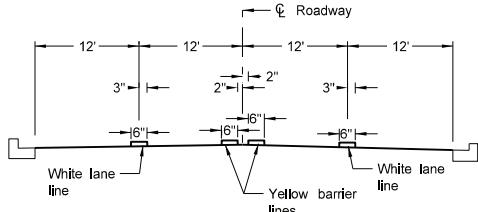
RURAL FOUR LANE ROADWAY
Asphalt Section



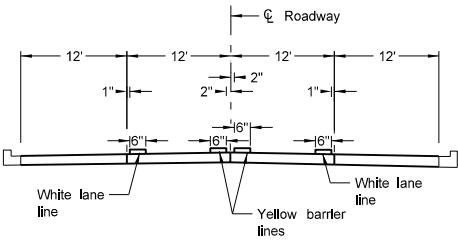
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



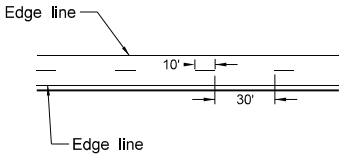
RURAL FOUR LANE ROADWAY
Concrete Section



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.
For section lines, county roads, and street approaches, stripe the radii and edge lines of the paved surface within the right of way except where curb and gutter is present.
 2. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
 3. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits < 40 mph.

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)

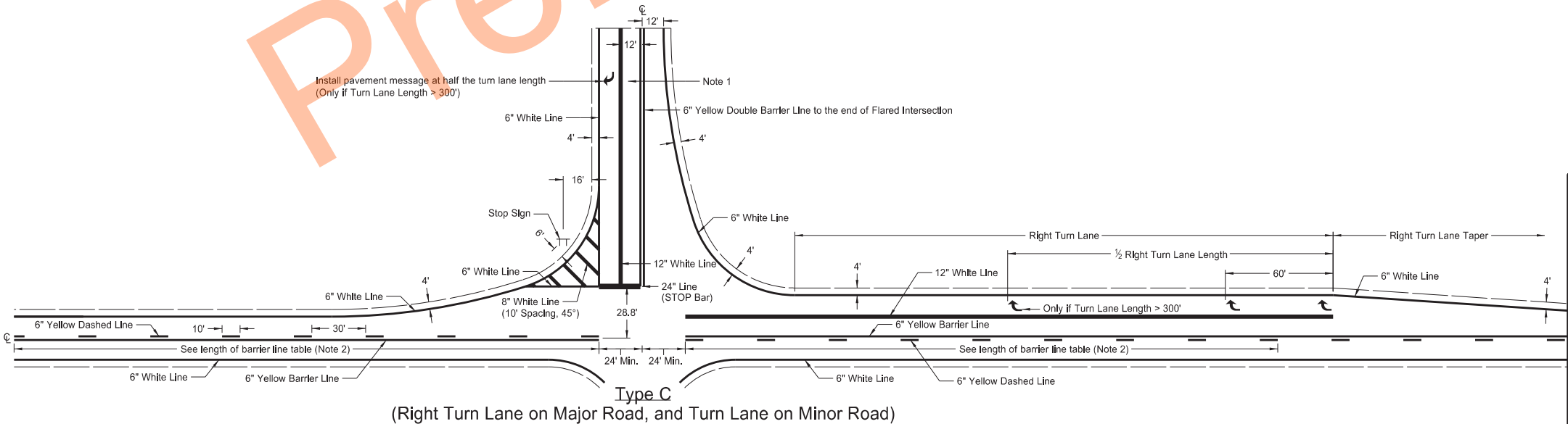
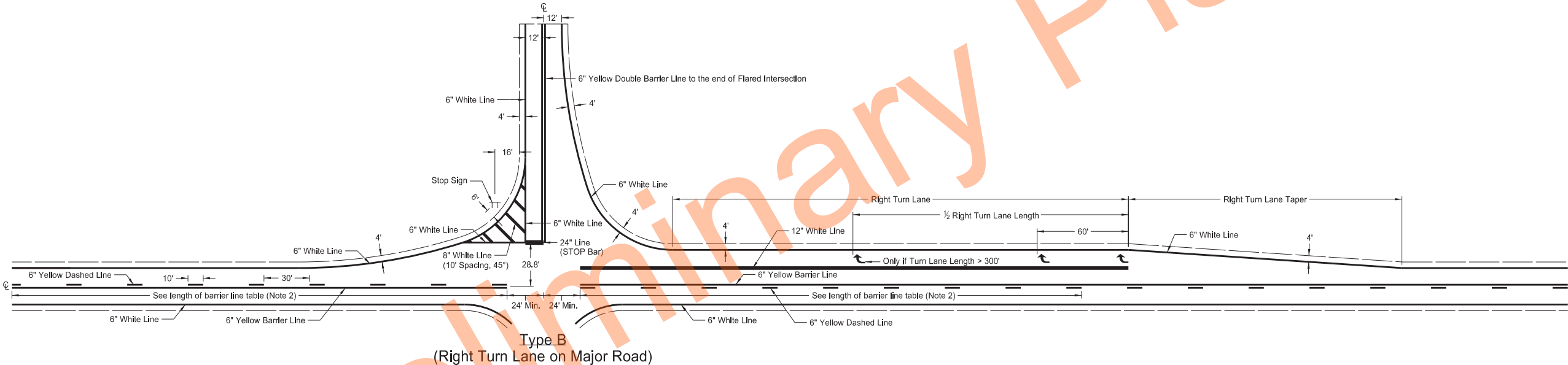
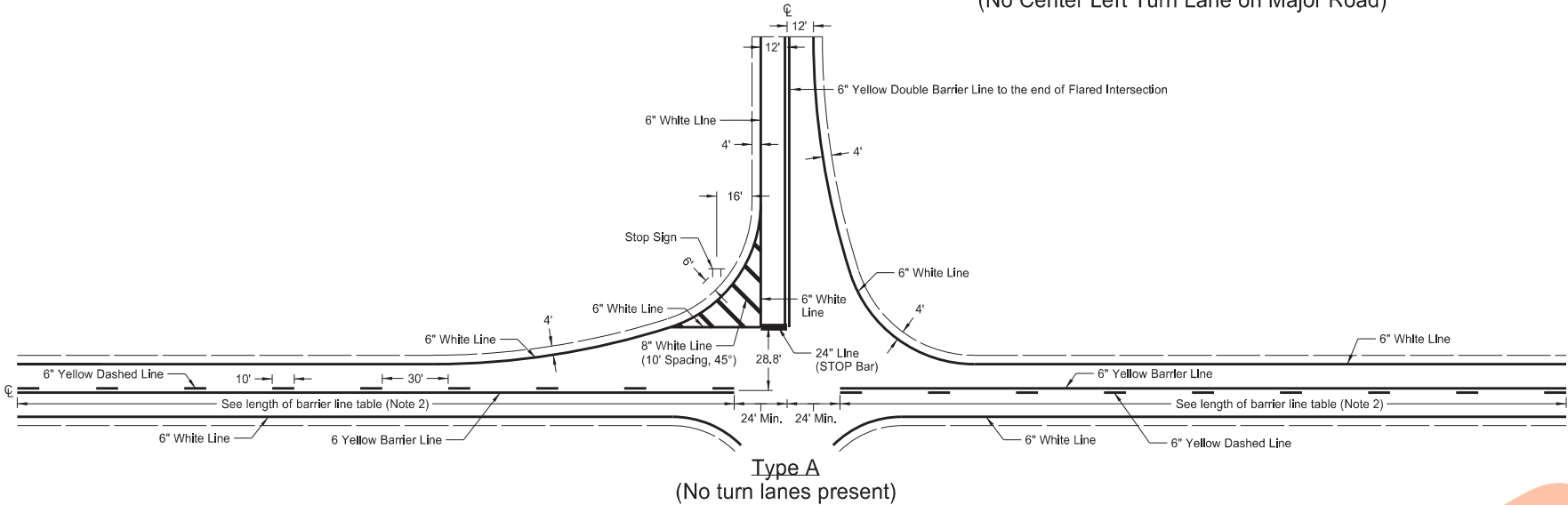
D-762-5

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'



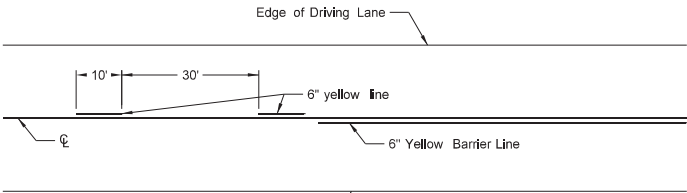
- 6" Marking
- 8" Marking
- 12" Marking
- 24" Marking

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.

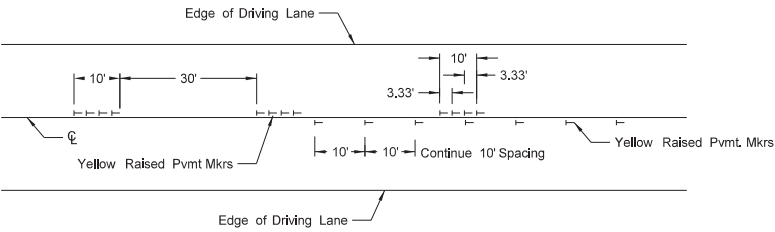


SHORT-TERM PAVEMENT MARKING

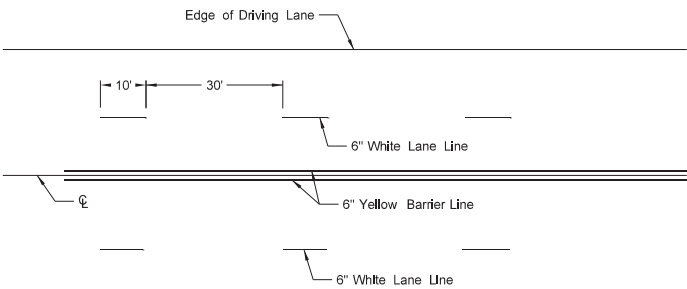
D-762-11



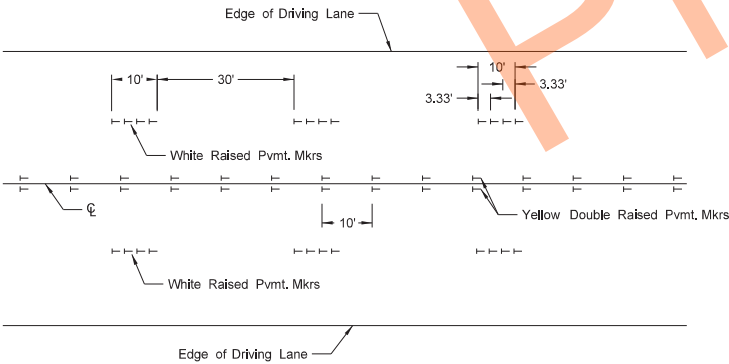
Painted or Tape Lines



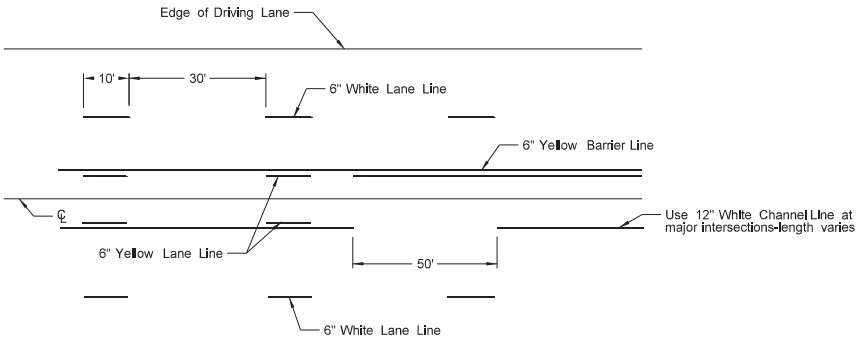
Raised Pavement Markers
TWO-LANE TWO-WAY ROADWAY



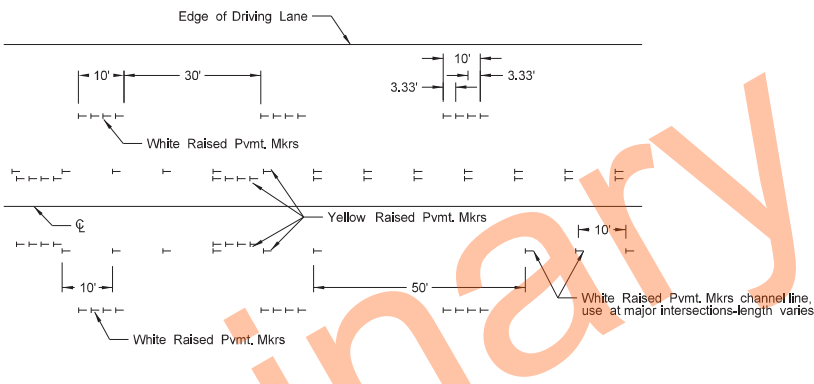
Painted or Tape Lines



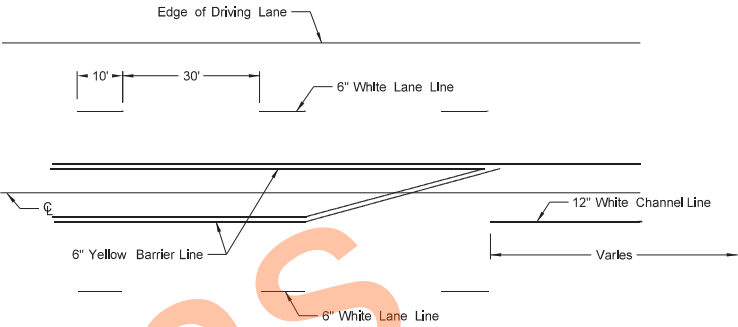
Raised Pavement Markers
FOUR LANE ROADWAY



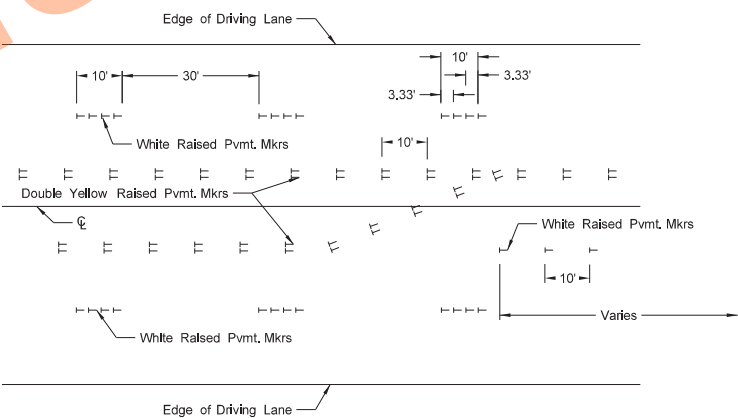
Painted or Tape Lines



Raised Pavement Markers
FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers
FIVE LANE ROADWAY WITH MARKED ISLANDS

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

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

