

DESIGN DATA				
Traffic	Average Daily			
Current 2021	Pass: 2,350	Trucks: 665	Total: 3,015	
Preventative Maintenance				

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

NH-3-052(054)185
Wells County

Fessenden S to W JCT 200
Mill/Overlay

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	NH-3-052(054)185	23377	1	1

GOVERNING SPECIFICATIONS

Date Published and Adopted
by the North Dakota
Department of Transportation

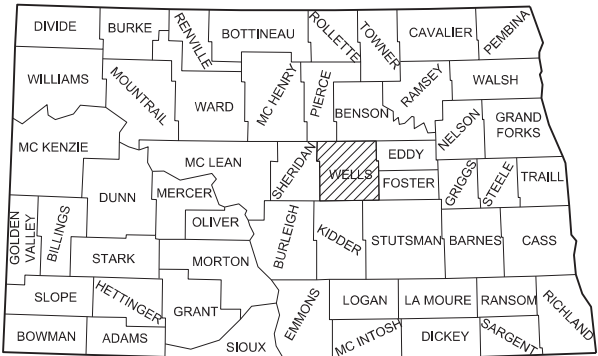
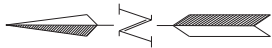
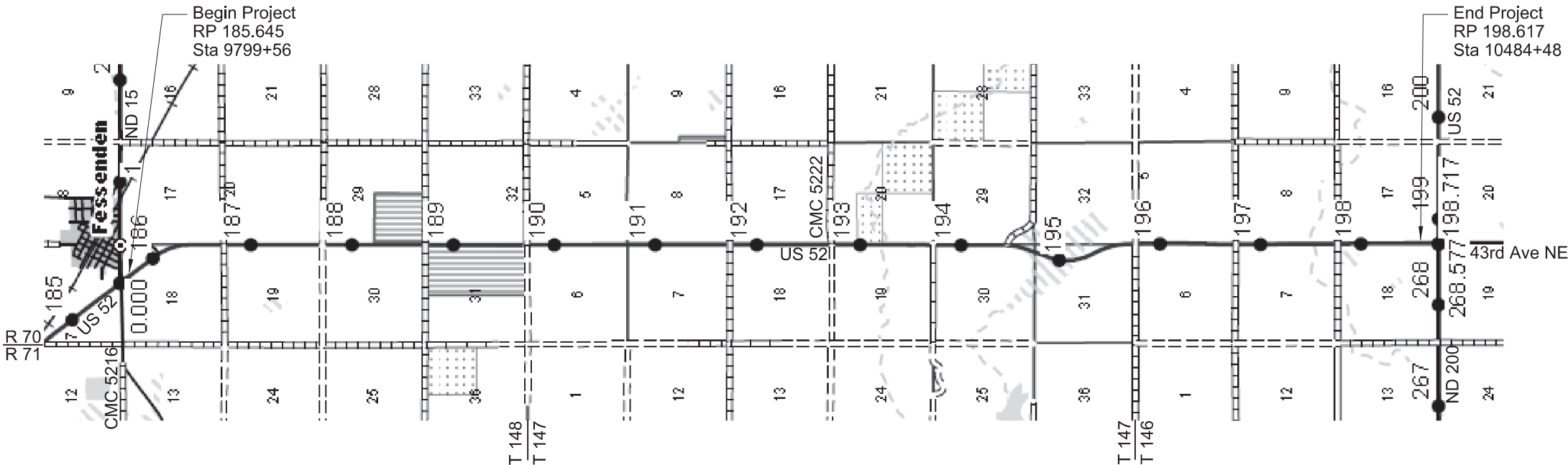
Standard Specifications

1/1/2022

Supplemental Specifications

NONE

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
NH-3-052(054)185 / Mill and Overlay	13.072	13.072



STATE COUNTY MAP

DESIGNER Dustin Legacie
DESIGNER
DESIGNER

ND DEPARTMENT OF TRANSPORTATION
Devils Lake District
Beggs, Chris K.
03/23/22

NDDOT Devils Lake District

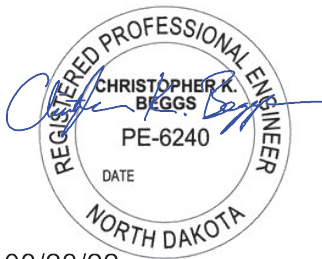
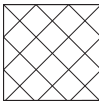
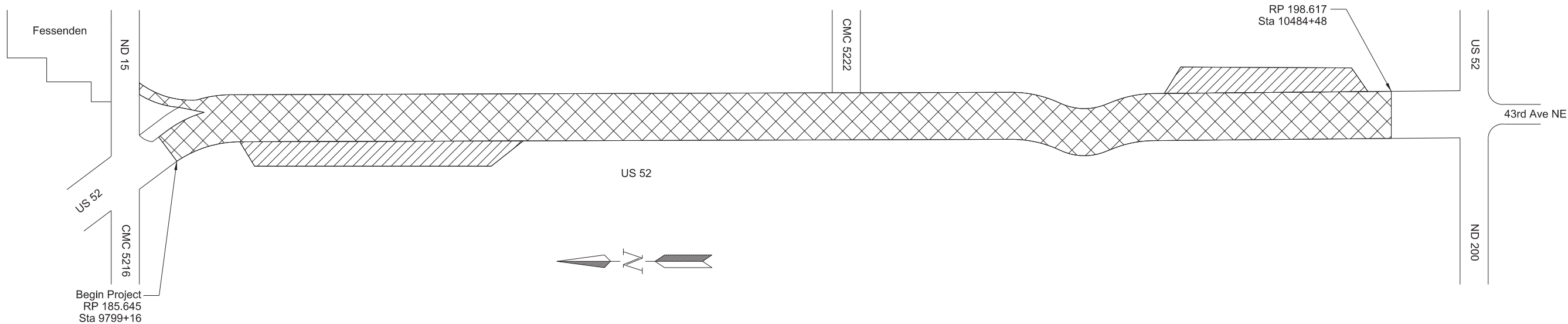
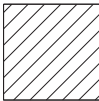


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1	1	Title Sheet	D-101-1, 2,3,4	NDDOT Abbreviations					
2	1	Table of Contents	D-101-10	NDDOT Utility Company and Organization Abbreviations					
4	1	Scope of Work	D-101-20, 21	Line Styles					
6	1	Notes	D-101-30, 31,32,33	Symbols					
8	1	Quantities	D-704-2	Traffic Control For Coring Of Hot Bituminous Pavement					
10	1	Basis of Estimate	D-704-5	Construction Sign Detail					
20	1-2	General Details	D-704-6	Construction Sign Details Project Funding Sign					
30	1-5	Typical Sections	D-704-7	Breakaway Systems For Construction Zone Signs - Perforated Tube					
100	1-3	Work Zone Traffic Control	D-704-8	Breakaway Systems For Construction Zone Signs - U-Channel Post					
180	1-7	Pit Plats and Borrow Areas	D-704-9	Construction Sign Details - Terminal And Guide Signs					
			D-704-10	Construction Sign Details - Regulatory Signs					
			D-704-11, 11A	Construction Sign Details - Warning Signs					
			D-704-13	Barricade And Channelizing Device Details					
			D-704-14	Construction Sign Punching And Mounting Details					
			D-704-15	Road Closure Layouts					
			D-704-20	Terminal And Seal Coat Sign Layouts					
			D-704-22	Construction Truck And Temporary Detour Layouts					
			D-704-23	Short Term Urban Detour And Lane Closure On A Divided Highway Layouts					
			D-704-26	Miscellaneous Sign Layouts					
			D-704-27	Mobile Operation (Pavement Marking)					
			D-704-50	Portable Sign Support Assembly					
			D-704-56	Mobile Operation - Grinding Shoulder Rumble Strips					
			D-706-1	Bituminous Laboratory					
			D-760-3	Rumble Strips Undivided Highways (Shoulders 4' Or Greater)					
			D-762-4	Pavement Marking					
			D-762-11	Short-Term Pavement Marking					
SPECIAL PROVISIONS									
Number	Description								
SP 24(22)	Flexible Pavement Surface Tolerance								
SSP 10	E Ticketing								
SSP 4	Longitudinal Joint Density								

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-052(054)185	4	1



Mill and Overlay



Passing Lane Tied Project
INF-X-3-052(053)185



Scope of Work

<div>NOTES</div>		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	NH-3-052(054)185	6	1
100-P01	COORDINATION OF PROJECTS: Another project in the vicinity of this project is under contract during the 2022 construction season. This project is NDDOT project SS-3-030(036)088, PCN 22602 and is a structure replacement project on ND 30 at RP 88.503 over the Pipestem Creek which US 52 is the designated detour route. Additional Tied project with this project is ND project INF-X-3-052(053)185. There is also a safety delineator project that will run through this project which is ND project HES-3-999(048). Second tied project of a mill and overlay is US 52 project NH-3-052(055)198.	<ul style="list-style-type: none">Two pieces hinged at the midpoint. <p>An installed array of PRS consists of a minimum of 3 individual strips. Move rumble strips with the flagging operation. Do not place rumble strips on horizontal curves.</p> <p>The Engineer will count and measure each array as one unit. Include the cost of providing, installing, maintaining, and relocating PRS in the unit price bid for “Portable Rumble Strips”.</p>			
107-P01	HAUL ROAD RESTORATION: Use Class 13 aggregate for haul road restoration.				
411-P01	MILLING PAVEMENT SURFACE: 882 tons of milled material will be used on approach transitions and the contractor will take ownership of the additional milled material from the project. This material will be paid for under “302-0308 Salvage Bituminous Pavement”.	704-P01 PORTABLE RUMBLE STRIPS: A quantity of 2 portable rumble strips are provided to be used during the duration of the project. Additional quantities are at the contractors expense.			
430-100	HMA LONGITUDINAL JOINTS: Construct the joints within the final lift of pavement as detailed within this note. Place a longitudinal joint at the centerline of the roadway. Construct each lane and the adjoining shoulder using a single pass or a hot seam. A hot seam is defined as follows: <ul style="list-style-type: none">Constructed using two pavers simultaneously;No more than 300 feet between pavers; andRoll the seam between paver passes in a manner such that the seam is not visible.	704-P02 TRAFFIC CONTROL FOR BITUMINOUS PAVEMENT: Provide traffic control consisting of a temporary road closure, flagging, and a pilot car. Traffic control device quantities are based on a 6 mile limitation and the list below. The Department will pay for all necessary deployed devices, regardless of the length of the lane closure. 1. Standard D-704-15; 4. Standard D-704-22, layouts and 5. Standard D-704-26, layouts CC, EE, and GG.			
430-P01	CONTRACTOR CORING: Before placing bituminous material into core holes, apply a tack coat on all sides of the core holes as specified in Section 401.	762-P01 SHORT TERM 4IN LINE-TYPE NR: Quantity for three applications of short term centerline pavement marking has been included in the plans. Additional applications required to accommodate the contractor’s operation are at the contractor’s expense. <ul style="list-style-type: none">One application for mill each dayOne application for HBP OverlayOne application for fog seal			
704-500	PORTABLE RUMBLE STRIPS (PRS): Use PRS made of rubber or engineered polymers. Install PRS as part of the temporary traffic control when the following signs are also part of the required traffic control set up: <ul style="list-style-type: none">“Be Prepared to Stop” (E3-4); and“Flagger” symbol (W20-7) Install PRS that meet the following criteria: <ul style="list-style-type: none">Have no adhesives or fasteners required for placement;Have a manufacture’s speed rating that meets or exceeds the posted speed limit; andEach strip in the array must weigh a minimum of 100 pounds. Use individual PRS construction in one of the following manners: <ul style="list-style-type: none">A single piece;Inter locking segments; or				

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-052(054)185	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
----	----	-----	----	-----	-----
103	0100	CONTRACT BOND	L SUM	0.16	0.16
302	0308	SALVAGED BITUMINOUS PAVEMENT	TON	882	882
401	0050	TACK COAT	GAL	13,628	13,628
411	0100	MILLING PAVEMENT SURFACE	TON	30,235	30,235
430	0045	SUPERPAVE FAA 45	TON	30,235	30,235
430	1000	CORED SAMPLE	EA	346	346
430	5818	PG 58H-34 ASPHALT CEMENT	TON	1,815	1,815
702	0100	MOBILIZATION	L SUM	0.16	0.16
704	0100	FLAGGING	MHR	400	400
704	1000	TRAFFIC CONTROL SIGNS	UNIT	1,620	1,620
704	1048	PORTABLE RUMBLE STRIPS	EA	2	2
704	1067	TUBULAR MARKERS	EA	250	250
704	1185	PILOT CAR	HR	150	150
706	0550	BITUMINOUS LABORATORY	EA	0.16	0.16
706	0600	CONTRACTOR'S LABORATORY	EA	0.16	0.16
760	0005	RUMBLE STRIPS - ASPHALT SHOULDER	MILE	21.68	21.68
760	0007	RUMBLE STRIPS - ASPHALT CENTERLINE	MILE	13.07	13.07
762	0430	SHORT TERM 4IN LINE-TYPE NR	LF	80,865	80,865
762	1104	PVMT MK PAINTED 4IN LINE	LF	143,290	143,290

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-052(054)185	10	1

NH-3-052(054)185				
Mainline			Sta 9799+16 to Sta 9832+05	
			Sta 9952+45 to Sta 10336+65	
			Sta 10451+65 to Sta 10487+73	
Materials	Basis	UNIT	Width (ft)	Total
SUPERPAVE FAA 45	2 Ton/CY	Ton	36.00	20,141
PG 58H-34 ASPHALT CEMENT	6.0 % of HBP	Ton	---	1208
TACK COAT	0.05 Gal/SY	Gal	36.00	9,063

Tack quantities have been figured for 1 lifts

NH-3-052(054)185				
Mainline			Sta 9832+05 to Sta 9952+45	
			Sta 10336+65 to Sta 10451+65	
Materials	Basis	UNIT	Width (ft)	Total
SUPERPAVE FAA 45	2 Ton/CY	Ton	30.00	8,719
PG 58H-34 ASPHALT CEMENT	6.0 % of HBP	Ton	0.00	523
TACK COAT	0.05 Gal/SY	Gal	33.00	3,923

Tack quantities have been figured for 1 lifts

RUMBLE STRIPS				
Item	Begin Station	End Station	Road Miles	Total Miles
RUMBLE STRIPS - ASPHALT SHOULDER	9799+16	10489+36	13.07 Miles	21.68
RUMBLE STRIPS - ASPHALT CENTERLINE	9799+16	10489+36	13.07 Miles	13.07

*4.58 Miles of Shoulder Rumble Strips were Excluded for Passing Lanes

MILLING PAVEMENT SURFACE(36' Width)					
Start Station	End Station	Length (ft)	Width (ft)	Qty	
9799+16	9832+05	3,289	36	1,462	TON
9952+45	10336+65	38,420	36	17,076	TON
10451+65	10487+73	3,608	36	1,604	TON
		Total=	20,142	TON	

MILLING PAVEMENT SURFACE(30' Width)					
Start Station	End Station	Length (ft)	Width (ft)	Qty	
9832+05	9952+45	12040	30	4,459	TON
10336+65	10451+65	11500	30	4,259	TON
		Total=	8,719	TON	

NH-3-052(054)185						
HWY 15 Exit						
			TACK COAT	Superpave FAA 45	PG 58H-34 Asphalt Cement	Milling Pavement Surface
Location	Lane	Area (sf)	Gal	Ton	Ton	Ton
HWY 52 Exit to ND 15	RT	13,099	73	162	10	162

SHORT TERM PAVEMENT MARKING		
		TOTAL
4" YELLOW, 10' LINE, 30' SKIP	51,021	LF*
SHORT TERM 4IN LINE-TYPE NR BARRIER- YELLOW-NPZ	29,844	LF*
*figured for 3 applications		

PERMANENT PAVEMENT MARKING		
		TOTAL
YELLOW, 10' LINE, 30' SKIP	17,007	LF
PVMT MK PAINTED 4IN LINE BARRIER-4" YELLOW-NPZ	9,948	LF
PVMT MK PAINTED 4IN LINE BARRIER-4" YELLOW-JCT 15 and 52	500	LF
PVMT MK PAINTED 4IN LINE 4" WHITE EDGE LINE	114,965	LF
PVMT MK PAINTED 4IN LINE 4" WHITE EDGE LINE JCT 15 and 52	870	LF
*23540' was subtracted off of the 4IN WHITE EDGE LINE for tied project		

HBP Cored Samples							
	A	B	C	D			
Specification Section	Lanes	Lifts	Distance (Feet)	Sublots (A × B × C)÷1000	Quantity (D × 2)	Quantity (1 per mile)	Unit
430.04 I.2.b(1), "General" Mainline Paving	2	1	69,020	138	276	N/A	EA
SSP 4 Longitudinal Joint Density	1	1	69,020	35	70	N/A	EA
Total					346	N/A	EA

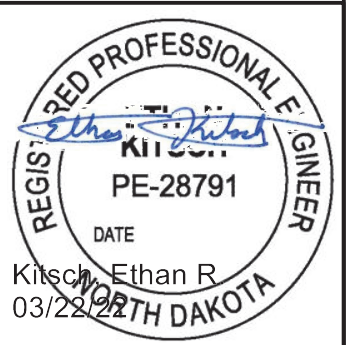
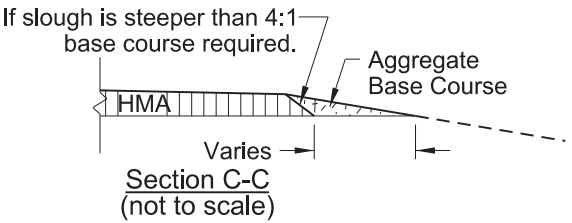
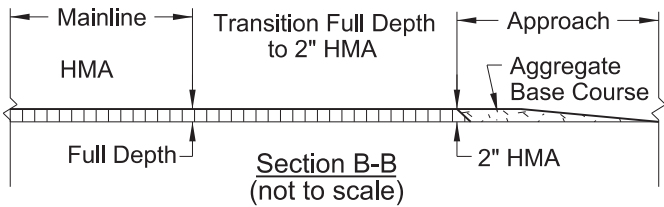
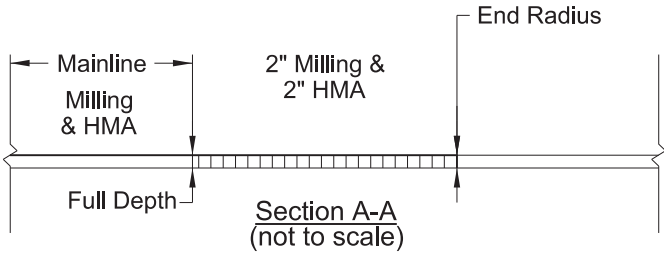


Basis of Estimate

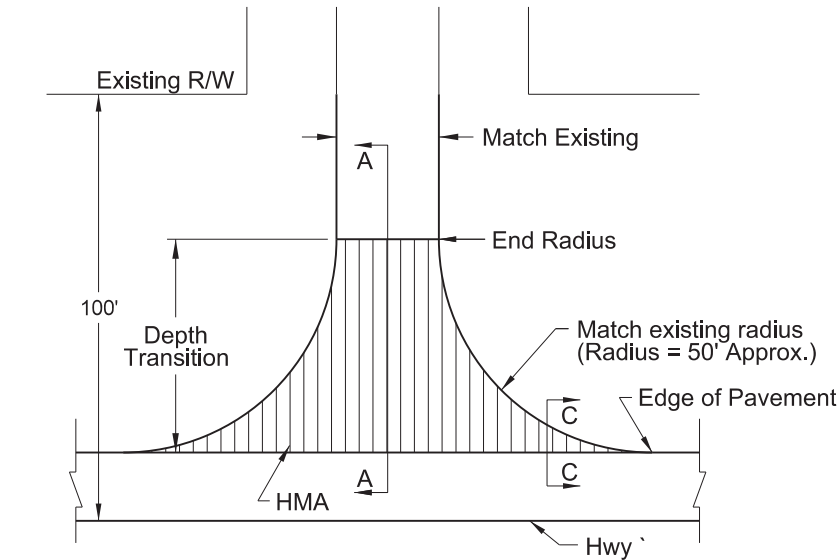
US 52
Fessenden S. to W. JCT 200

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-052(054)185	20	1

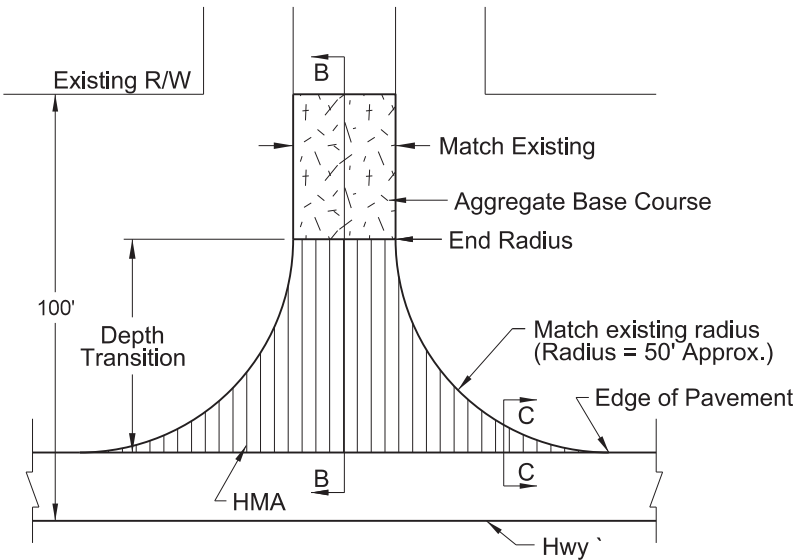
- Notes:
- Actual HMA paving and aggregate base course locations may vary in the field, as approved by the Engineer.
 - Quantity totals have been included in the bid items of the "Estimate of Quantities" of the plans.
 - Aggregate base course has been provided in the quantities to fill in around the radii. This material will be required when sloughs are steeper than 4:1 (see section C-C)



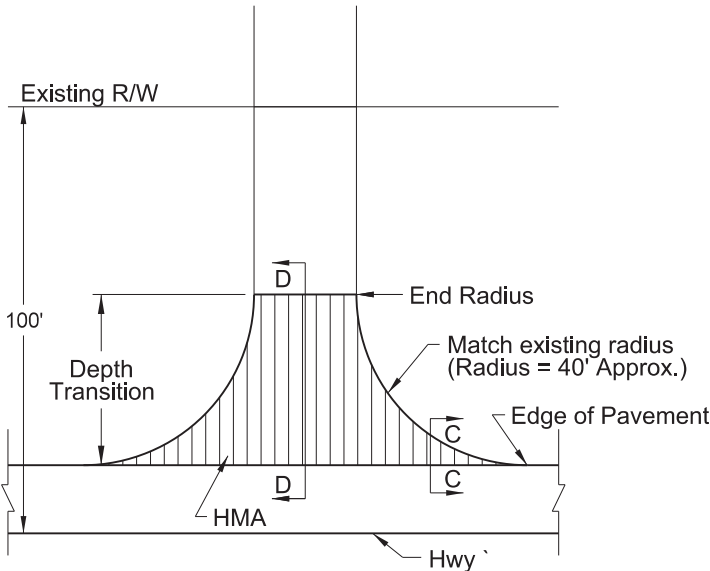
Approach Paving Details for Existing Approaches
(No Approach Grading)



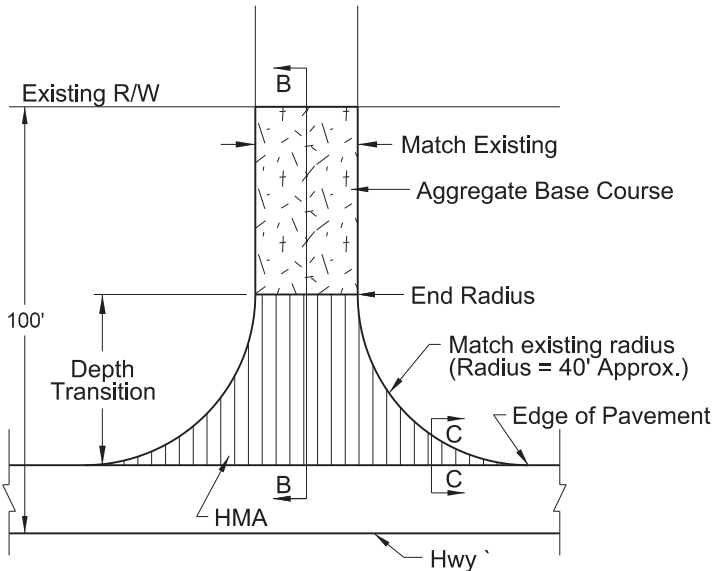
(1) Paved Section Line, County Road, or City Street Approach



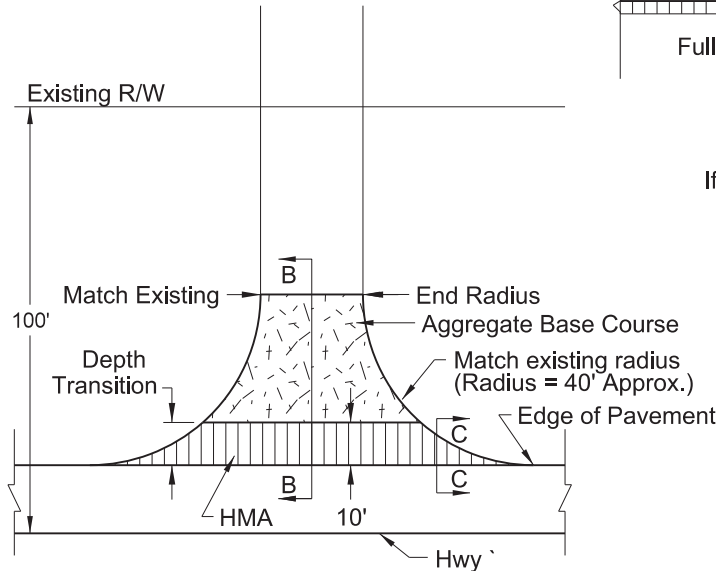
(2) Gravel Section Line, County Road, or Street Approach



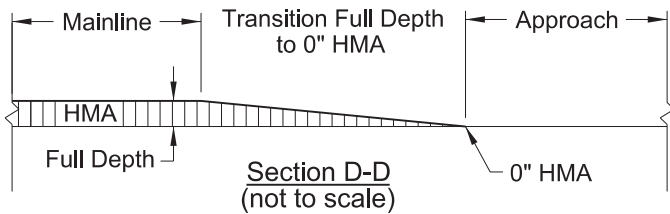
(3) Paved Private Drive Approach



(4) Gravel Private Drive Approach



(5) Field Drive Approach

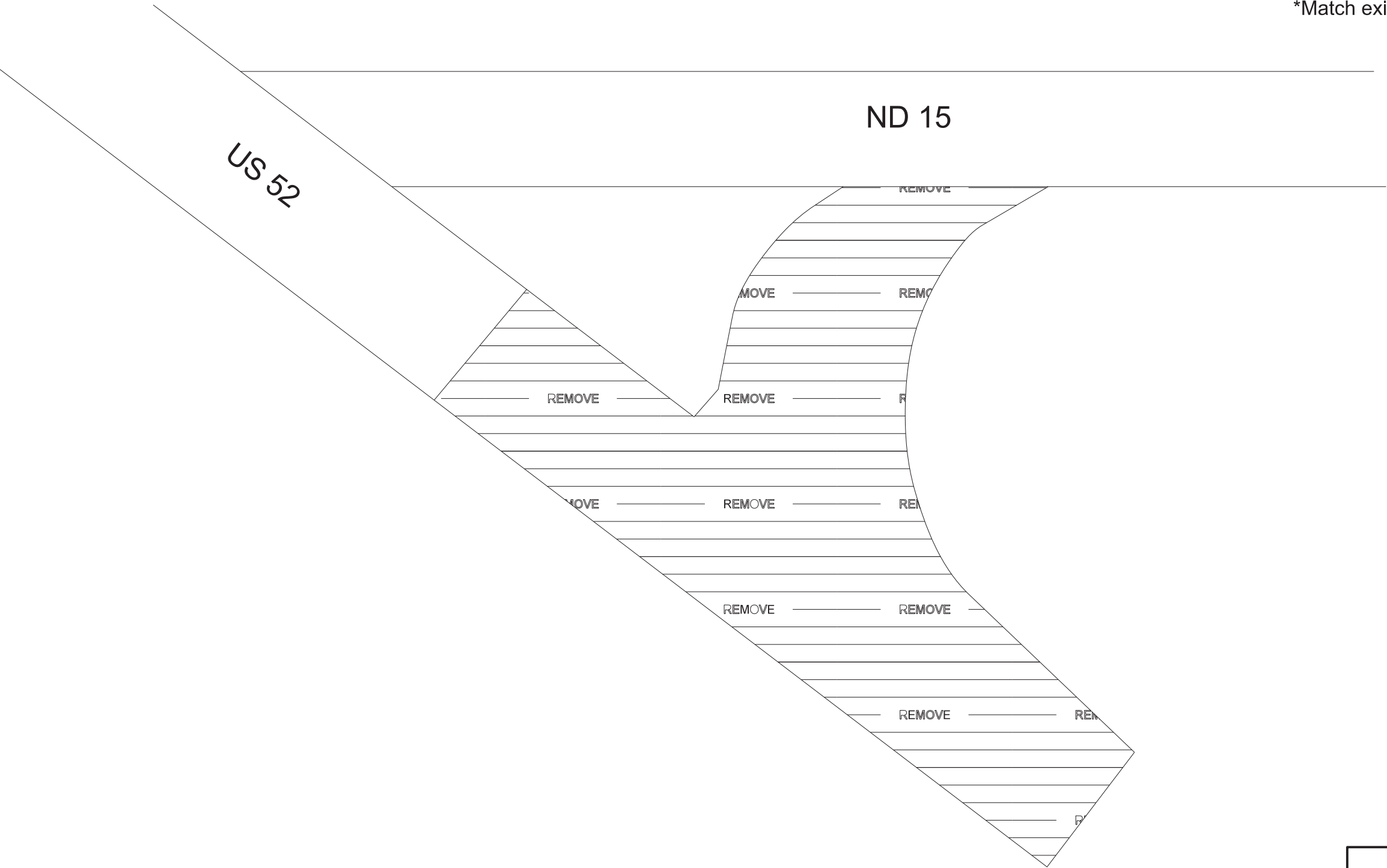


BASIS OF ESTIMATE		(1)	(2)	(3)	(4)	(5)	TOTALS
ITEM	UNIT	Paved Section Line	Gravel Section Line	Paved Private Drive	Gravel Private Drive	Field Drive	
Number of Locations	#	1	17	0	19	41	
Salvage Bituminous Pavement	TON	N/A	9	N/A	12	11	882
Milling Pavement Surface (2")	TON	28	28	N/A	20	8	1212
Tack Coat	GAL	13	13	9	9	4	569
Superpave FAA 45	TON	28	28	20	20	8	1212
PG 58H-34 Asphalt Cement	TON	1.68	1.68	1.2	1.20	0.50	74


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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*Mill and Overlay RT turn lane from US 52 onto ND 15
Perform the work to ND 15 shoulder

*Match exisitng slopes



REGISTERED PROFESSIONAL ENGINEER

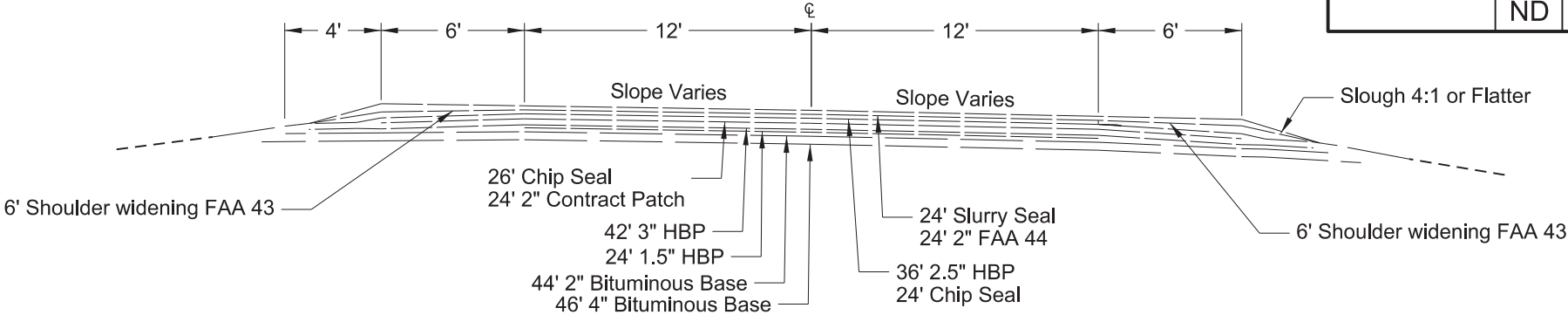

Kitsch
PE-28791

DATE
03/22/2022

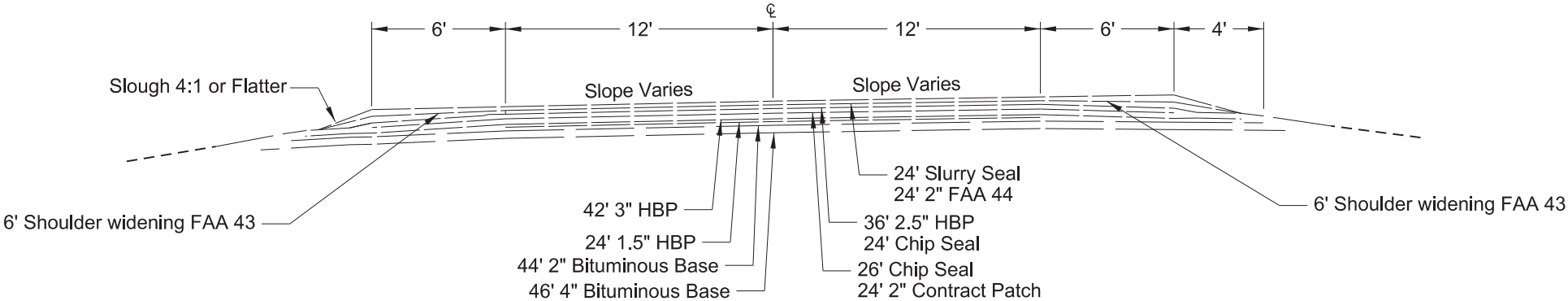
NORTH DAKOTA

JCT 52 and ND 15
Turn Lane

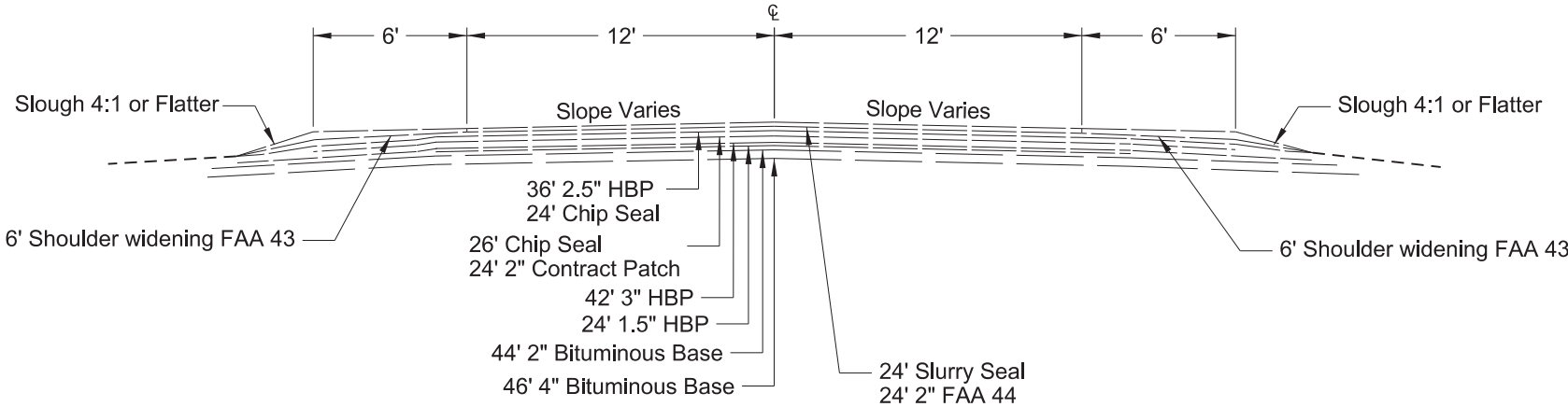
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	ND	NH-3-052(054)185	30	1



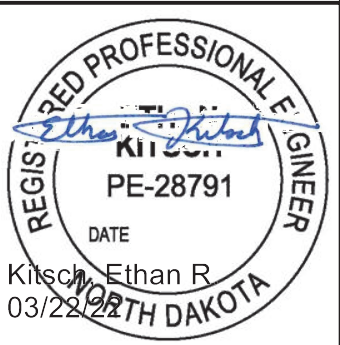
Existing Superelevation Typical Section: One
RP 185.892 to 186.187
Sta. 9812+20 to 9827+77
RP 194.357 to 194.601
Sta. 10259+15 to 10272+03
RP 195.351 to 195.666
Sta. 10311+64 to 10328+27



Existing Superelevation Typical Section: Two
RP 194.806 to 195.289
Sta. 10282+86 to 10308+36

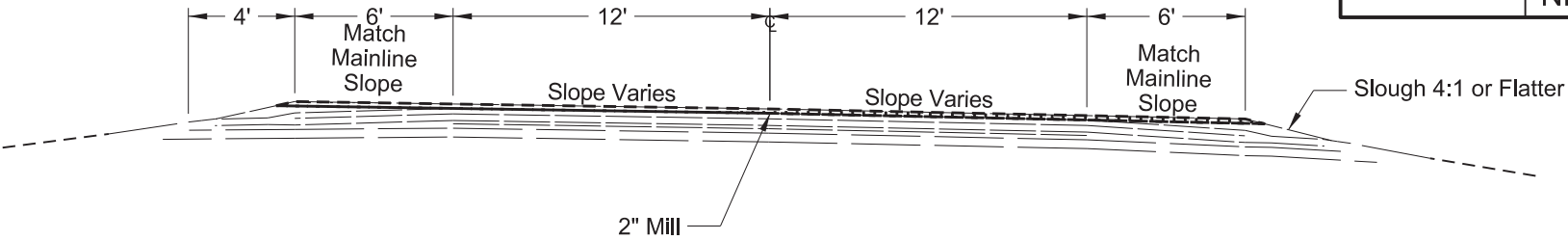


Existing Typical Section: Three
RP 185.645 to 185.892
Sta. 9799+16 to 9812+20
RP 186.187 to 194.357
Sta. 9827+77 to 10259+15
RP 194.601 to 194.806
Sta. 10272+03 to 10282+86
RP 195.289 to 195.351
Sta. 10308+36 to 10311+64
RP 195.666 to 198.686
Sta. 10328+27 to 10487+73

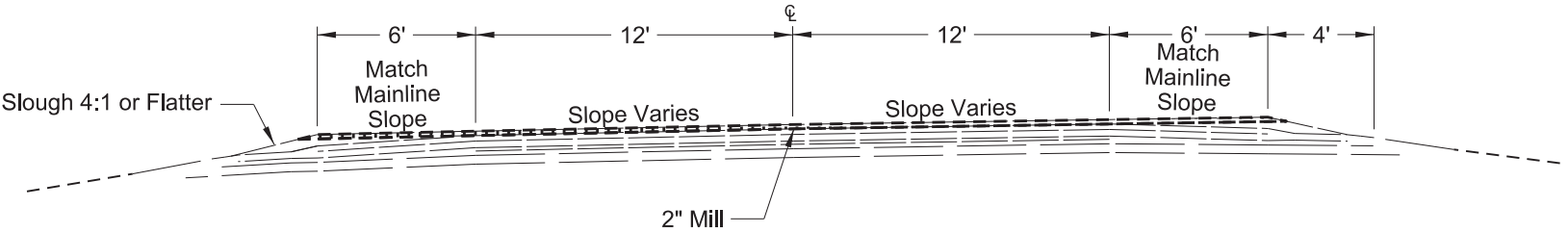


Existing Typicals

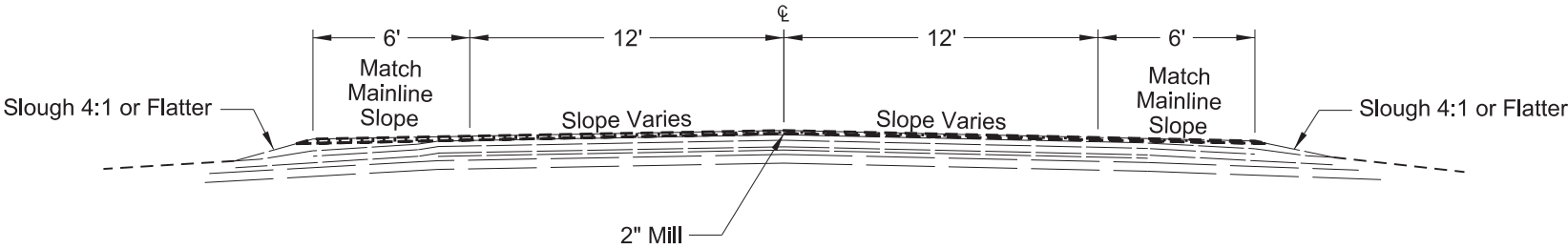
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	ND	NH-3-052(054)185	30	2



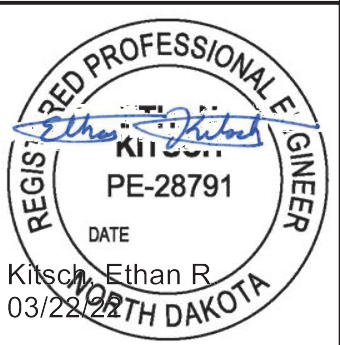
Milling Superelevation Typical Section: One
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Sta. 9812+20 to 9827+77
RP 194.357 to 194.601
Sta. 10259+15 to 10272+03
RP 195.351 to 195.666
Sta. 10311+64 to 10328+27



Milling Superelevation Typical Section: Two
RP 194.806 to 195.289
Sta. 10282+86 to 10308+36

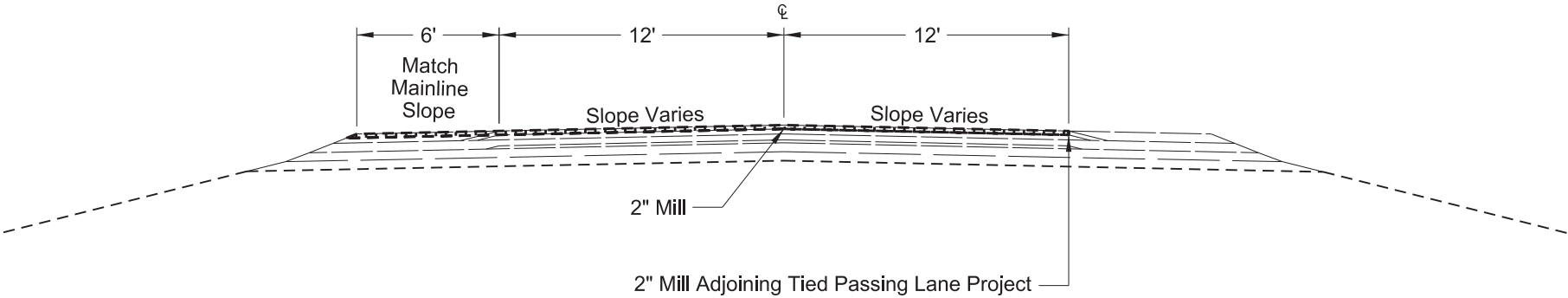


Milling Typical Section: Three
RP 185.645 to 185.892
Sta. 9799+16 to 9812+20
RP 186.187 to 186.268
Sta. 9827+77 to 9832+05
RP 188.548 to 194.357
Sta. 9952+45 to 10259+15
RP 194.601 to 194.806
Sta. 10272+03 to 10282+86
RP 195.289 to 195.351
Sta. 10308+36 to 10311+64
RP 195.666 to 195.825
Sta. 10328+27 to 10336+65
RP 195.825 to 198.686
Sta. 10451+65 to 10487+73



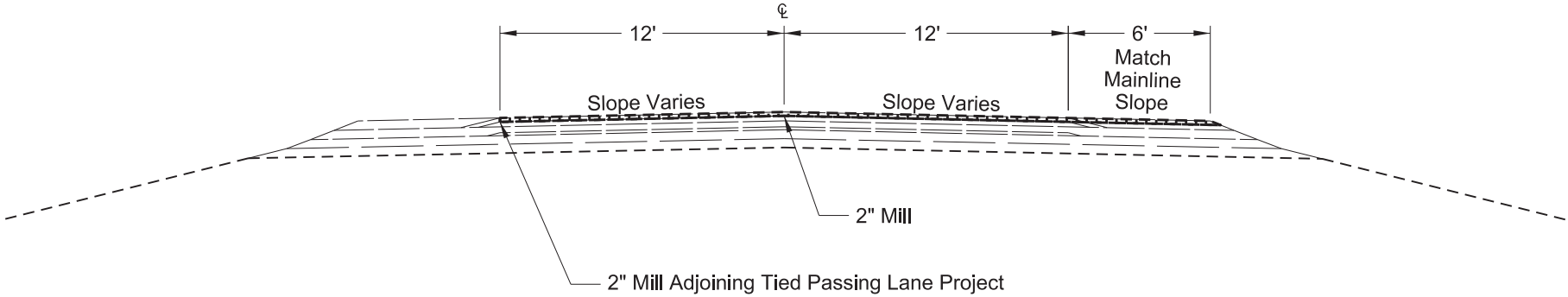
Milling Typicals

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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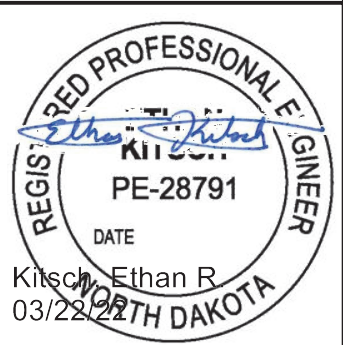


*Match Existing Slopes

RP 186.268 to 188.548
Sta. 9832+05 to 9952+45

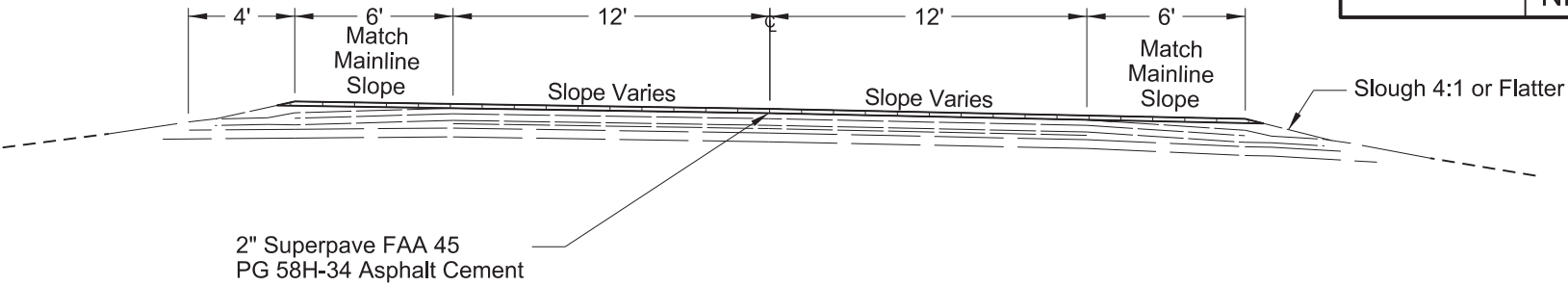


RP 195.825 to 198.003
Sta. 10336+65 to 10451+65



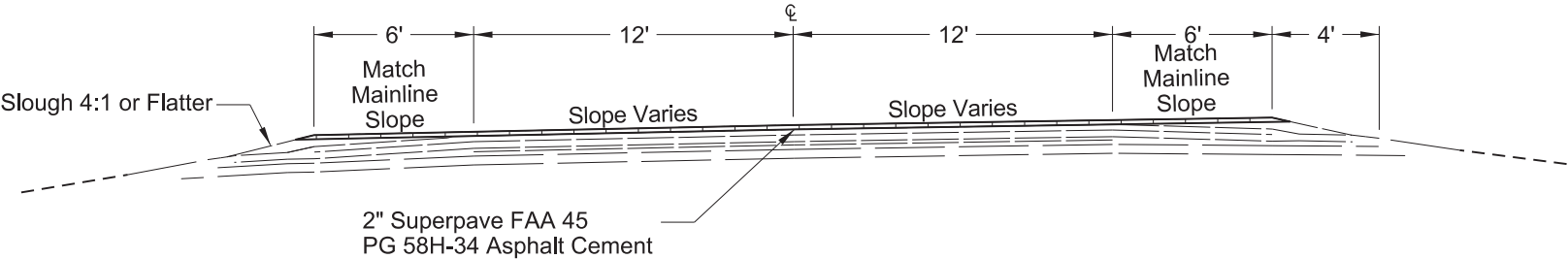
Milling Typicals

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-052(054)185	30	4

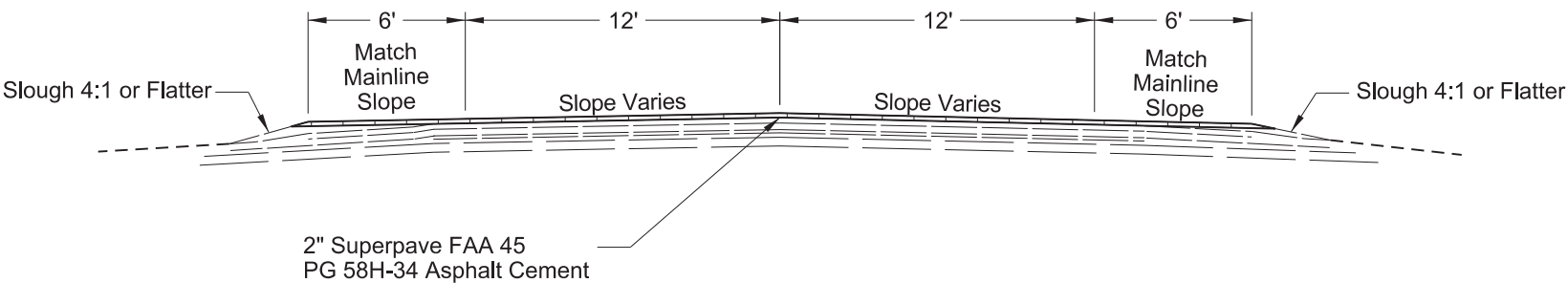


*Match Existing Slope

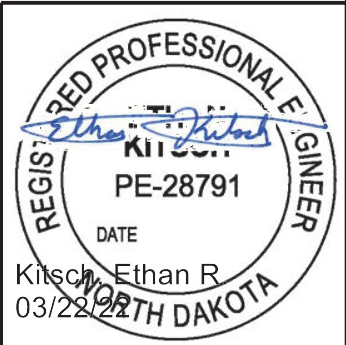
Proposed Superelevation Typical Section: One
 RP 185.892 to 186.187
 Sta. 9812+20 to 9827+77
 RP 194.357 to 194.601
 Sta. 10259+15 to 10272+03
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Proposed Superelevation Typical Section: Two
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 Sta. 10282+86 to 10308+36

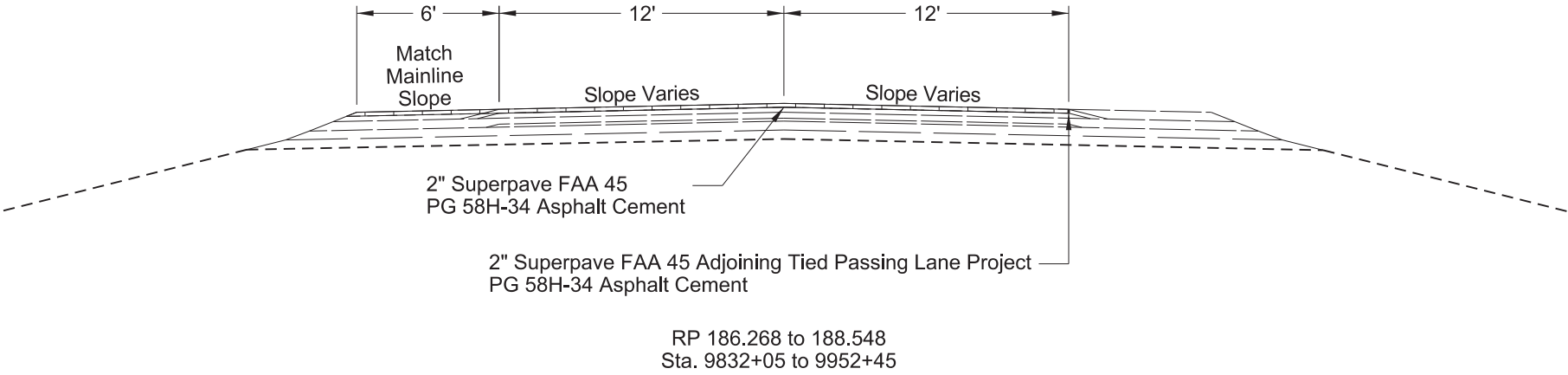


Proposed Typical Section: Three
 RP 185.645 to 185.892
 Sta. 9799+16 to 9812+20
 RP 186.187 to 194.357
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 RP 195.666 to 198.686
 Sta. 10328+27 to 10487+73

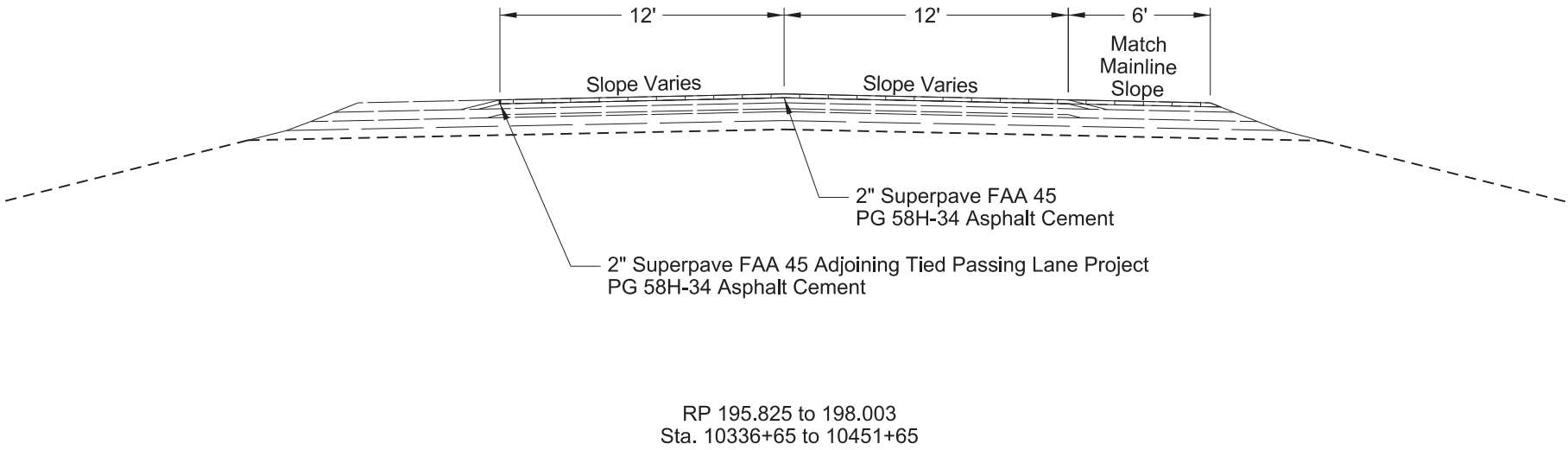


Proposed Typicals

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-052(054)185	30	5

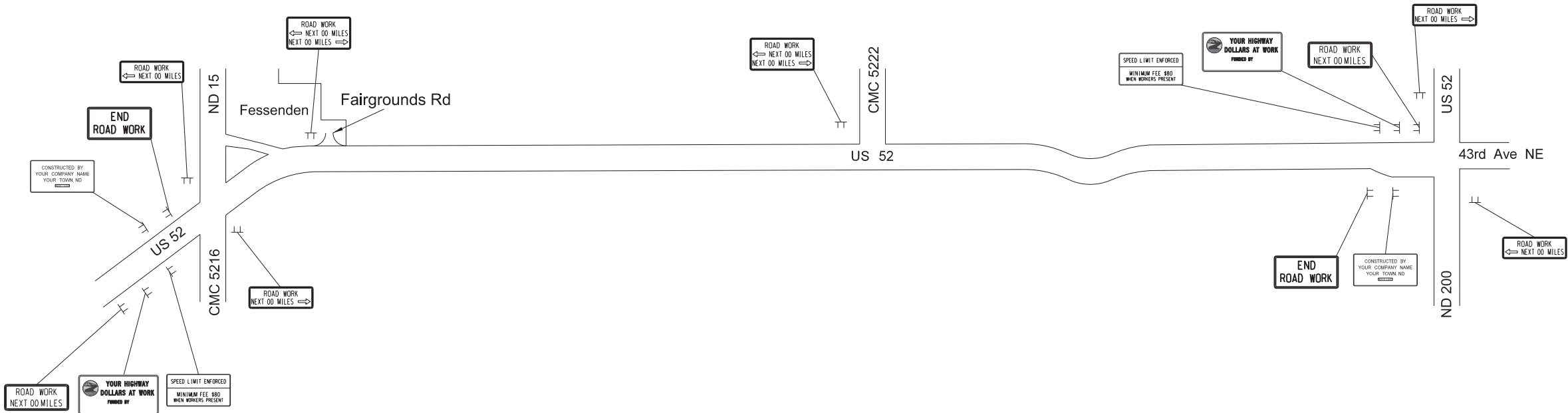
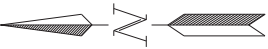


*Match Existing Slopes




Proposed Typicals

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-052(054)185	100	2



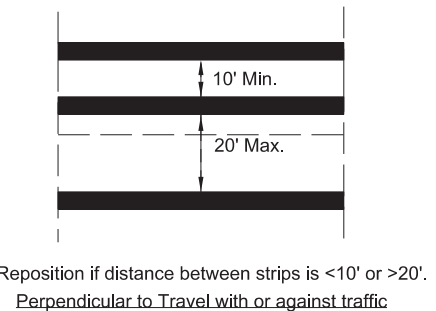
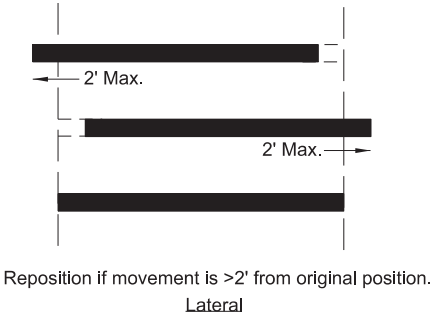
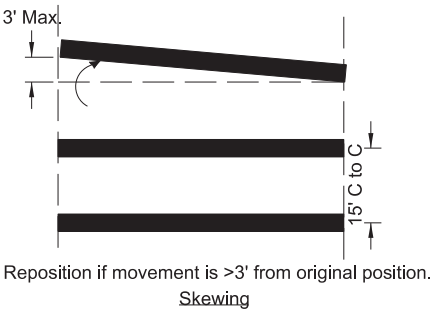
REGISTERED PROFESSIONAL ENGINEER


Kitsch
PE-28791

DATE
03/22/2022

ND
NORTH DAKOTA

US 52
Fessenden S. to W. JCT 200



PORTABLE RUMBLE STRIPS ARRAY
TYPES OF MOVEMENT AND MAXIMUM ALLOWANCES

- Notes:
1. Number of devices were calculated using 40 mph. Speed determined in the field based on location and conditions.
 2. Re-establish the speed limit. Determine the exact speed limit in the field, dependent on location and conditions.
 3. Sign R2-1aP-24 is not required when pilot car operation is used.
 4. Rumble strips are not used on a non paved surface or in a pre-construction speed zone of 25 mph or less.

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	

KEY

Work area

Flagger

Sign

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

REGISTERED PROFESSIONAL ENGINEER

PE-28791

DATE

03/22/2022

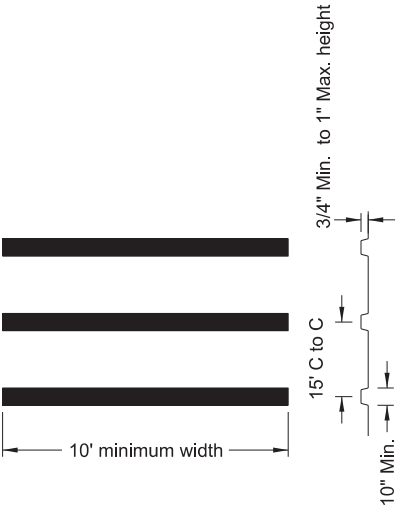
ETHAN R. KITSCH

SOUTH DAKOTA

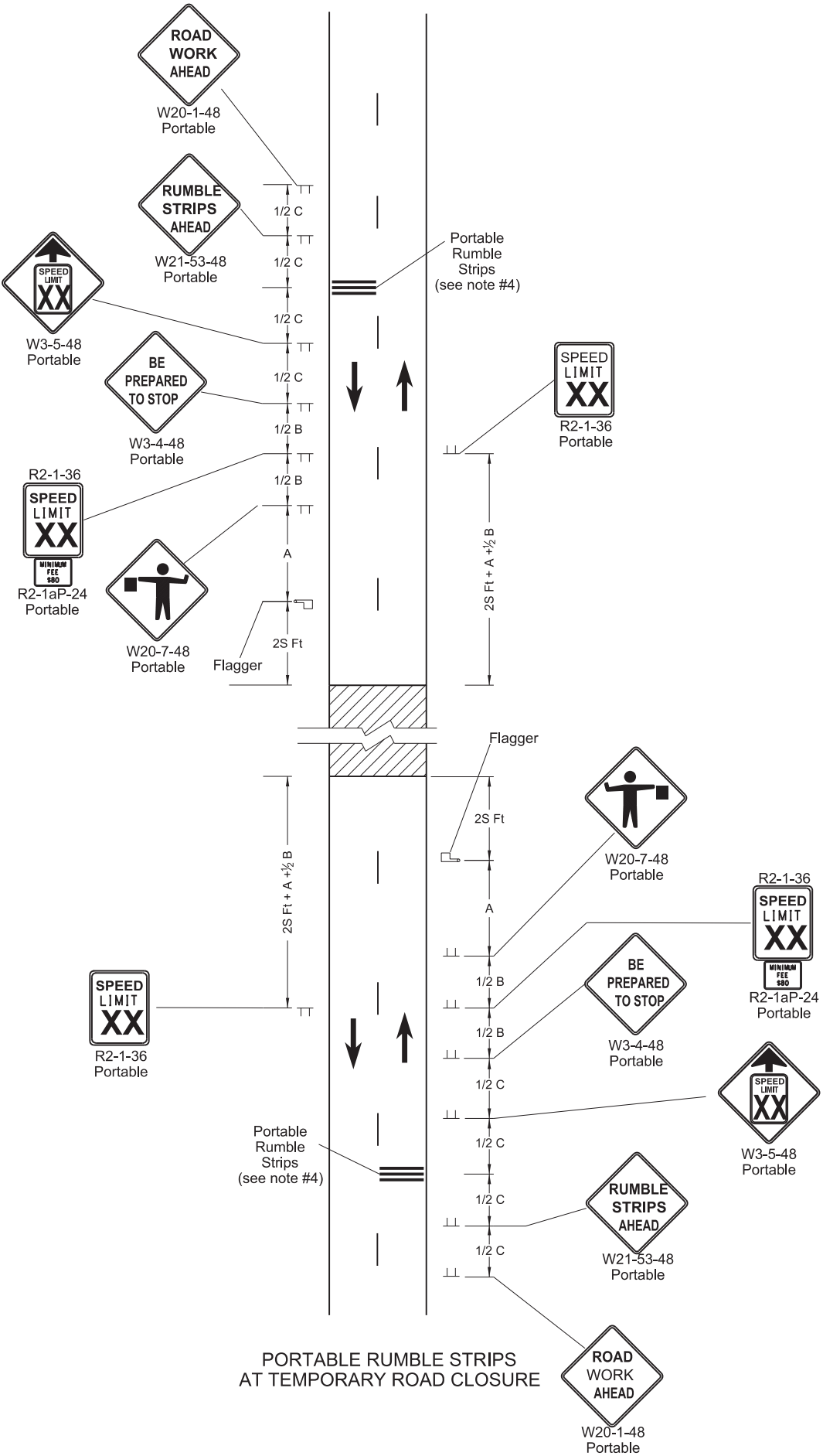
TWO-LANE PORTABLE RUMBLE STRIPS

2" Mill and Overlay

Fessenden S. to JCT 200



PORTABLE RUMBLE STRIPS ARRAY DETAIL

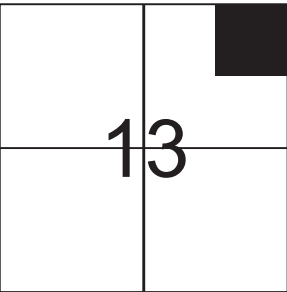


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

TEST HOLE PLAT

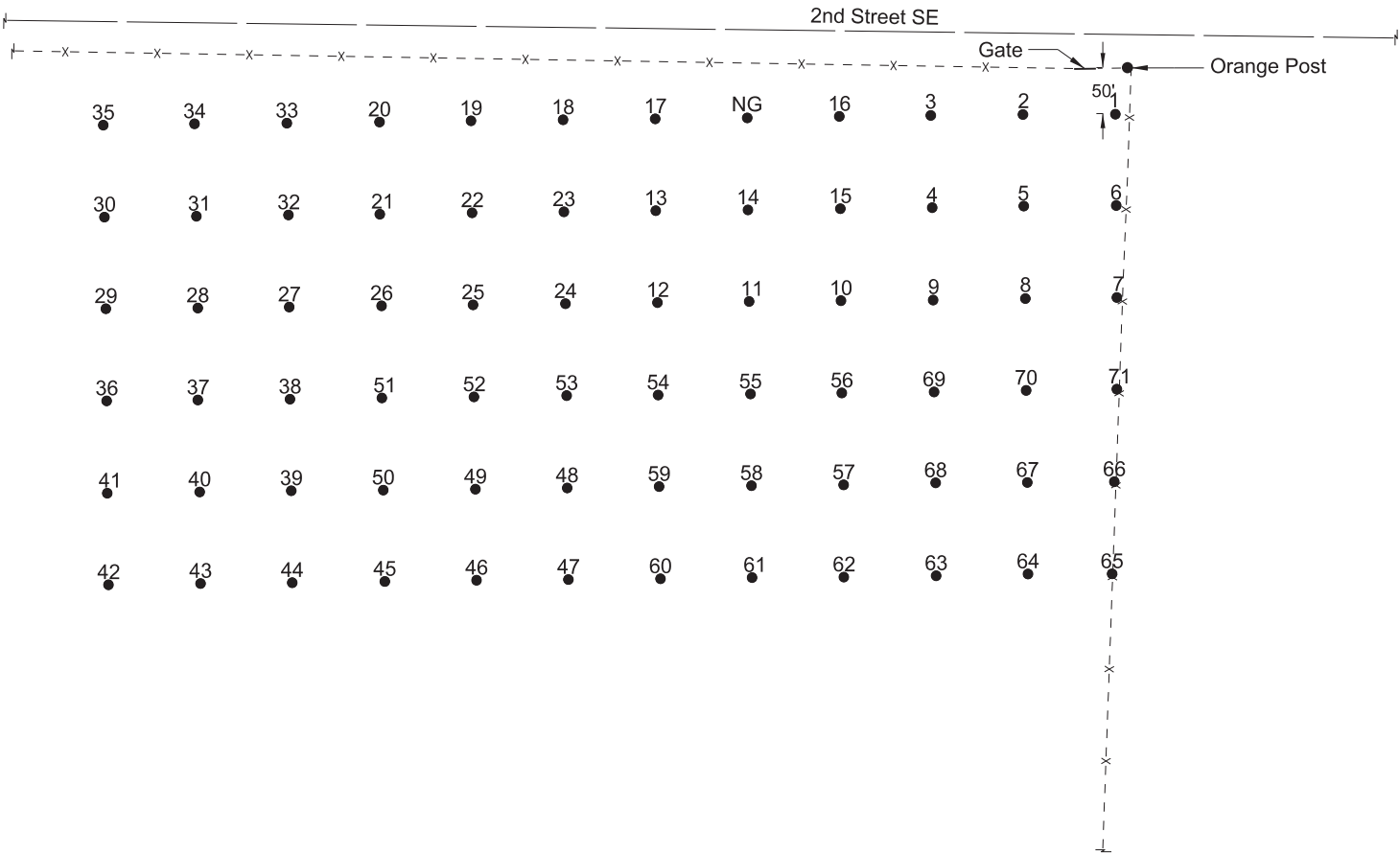
Location: NE1/4NE1/4 13-145-74 County: Sheridan
Ownership: Betty Mertz, John Mertz and Terry Mertz

LOCATION OF PIT IN SECTION



Area "A" consists of Test Holes 1 - 9
Area "B" consists of Test Holes 10 - 17
Area "C" consists of Test Holes 18 - 26
Area "D" consists of Test Holes 27 - 35
Area "E" consists of Test Holes 36 - 44
Area "F" consists of Test Holes 45 - 53
Area "G" consists of Test Holes 54 - 62
Area "H" consists of Test Holes 63 - 71

Legend:
gr = gravel
sd = sand
FS = fine sand
Fgr = fine gravel
CS = coarse sand
sh = shale
SiCl = silt clay
rk = rock
FeO = Iron oxide
CoS = Coal Slack
WL = water line
NG = no gravel
DM = disturbed material
CGr = coarse gravel



Scale 1"=200'

																									STATE	PROJECT NO.		SECTION NO.	SHEET NO.		
																									ND	NH-3-052(054)185		180	2		
PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES								PIT LOGGING BY TEST HOLES							
Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole	Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	
1	2.0	2.0 gr SiCl	0	8	19	30	SiCl	11	2.0	5.0 gr	0	10	20	30	+gr	25	0.5	5.5 Fgr	2	12	23	34	+gr	37	1.0	5.0 gr	1	15	25	36	rk
		1.0 sd SiCl								1.0 Fgr								2.0 gr								4.0 Fgr					
2	1.0	11.0 Fgr	2	9	20	31	+gr			4.0 gr								1.0 Fgr								1.0 gr					
		1.0 FgrSiCl								1.0 Fgr								2.0 gr								2.0 Fgr					
		1.0 Fgr								1.0 gr								3.0 Fgr								4.0 gr					
		2.0 FgrSiCl								1.0 Fgr								3.0 gr						38	1.0	7.0 gr	0	9	19	28	SiCl
		1.0 gr SiCl								2.0 FgrSiCl								3.0 Fgr								4.0 Fgr					
		2.0 gr								3.0 Fgr						26	0.5	7.5 gr	0	11	19	30	+gr			1.0 gr					
		1.0 gr SiCl						12	2.0	1.0 gr	0	3	15	28	+gr			2.0 Fgr								4.0 Fgr					
3	0.5	10.5 Fgr	0	3	8	14	+gr			10.0 Fgr								2.0 gr								1.5 sd sh					
		2.0 gr SiCl								1.0 gr								2.0 Fgr						39	0.5	9.5 gr	1	8	18	27	+gr
		7.0 gr								1.0 FgrSiCl								1.0 gr								3.0 Fgr					
4	1.0	5.0 FgrSiCl	0	0	6	11	+gr			5.0 Fgr								5.0 Fgr								2.0 gr					
		1.0 Fgr						13	0.5	5.5 Fgr	1	6	14	24	SiCl	27	0.5	6.5 gr	4	17	29	40	+gr			5.0 Fgr					
		1.0 FgrSiCl								9.0 gr								5.0 Fgr						40	1.5	3.5 Fgr	0	5	13	22	+gr
		10.0 Fgr								3.0 Fgr								1.0 gr								2.0 gr					
		2.0 FgrSiCl						14	2.0	3.0 Fgr	0	8	22	36	SiCl			2.0 Fgr								10.0 Fgr					
5	1.0	3.0 gr	0	2	8	18	SiCl			2.0 gr								1.5 Fgr sh								3.0 sd					
		2.0 Fgr						15	1.0	3.0 Fgr	0	1	4	7	SiCl			3.5 CGr						41	1.5	2.5 gr	0	4	13	21	+gr
		3.0 gr								3.0 sd sh						28	0.5	4.5 Fgr	4	14	25	34	rk			1.0 Fgr					
		2.0 Fgr								2.0 gr								1.0 gr								2.0 gr					
		2.0 gr SiCl						16	0.5	9.5 Fgr	0	4	11	19	SiCl			6.0 Fgr								6.0 Fgr					
		1.0 Fgr								2.0 gr								3.5 gr								2.0 Fgr sh					
6	1.0	1.0 FgrSiCl	0	3	10	20	SiCl	17	1.0	3.0 Fgr	2	23	36	48	rk	29	2.0	11.0 Fgr	1	11	18	27	rk			1.0 gr					
		6.0 Fgr								5.0 gr								2.0 Fgr sh						42	0.5	2.5 Fgr	0	3	10	16	+gr
		3.0 FgrSiCl						18	1.0	11.0 Fgr	0	3	8	17	SiCl			2.5 CGr								1.0 gr					
		2.5 Fgr								1.0 gr						30	2.0	9.0 Fgr	0	3	10	18	SiCl			6.0 Fgr					
		1.5 FgrSiCl						19	1.5	11.5 Fgr	0	5	9	17	SiCl			1.0 sd sh								2.0 Fgr sh					
7	0.5	1.5 gr	0	0	5	11	SiCl	20	0.5	19.5 Fgr	0	1	7	15	+gr	31	2.0	14.0 Fgr	0	2	9	17	SiCl			1.0 Fgr					
8	0.5	2.5 gr	0	5	13	22	+gr	21	2.0	2.0 gr	0	10	19	27	+gr	32	2.0	11.0 Fgr	0	4	12	21	SiCl			1.0 Fgr sh					
		1.0 Fgr								2.0 Fgr								1.0 sd								1.0 FS					
		1.0 gr								3.0 gr								4.5 Fgr								1.0 Fgr sh					
		2.0 FgrSiCl								1.0 Fgr						33	0.5	11.5 Fgr	0	0	3	10	SiCl			0.5 Fgr					
		2.0 Fgr								2.0 gr								1.0 Fgr sh								1.5 Fgr sh					
		2.0 FgrSiCl								5.0 Fgr								6.0 Fgr								2.0 sd					
		5.0 Fgr								1.0 sd sh						34	3.0	5.0 Fgr	0	2	6	12	+gr	43	1.0	4.0 Fgr	2	6	14	23	+gr
		1.0 gr CoS								1.0 Fgr								1.0 sd								3.0 gr					
		3.0 Fgr								1.0 sd								3.0 Fgr								12.0 Fgr					
9	0.5	2.5 gr	0	13	24	34	+cave	22	1.5	12.5 Fgr	0	3	9	18	SiCl			1.0 CS													
		2.0 FS						23	2.0	8.5 Fgr	0	2	8	15	SiCl			3.0 Fgr													
		2.0 Fgr								0.5 sd								1.0 sd													
		2.0 gr								2.5 Fgr								3.0 Fgr													
		1.0 gr CoS						24	1.0	6.0 gr	3	11	22	34	+gr	35	2.0	10.0 Fgr	0	1	4	9	SiCl								
		1.0 gr								1.0 Fgr						36	2.0	12.0 Fgr	1	11	19	27	+gr								
		4.0 CGr								6.0 gr								1.0 FgrSiCl													
10	0.5	2.5 gr	0	6	15	27	SiCl			2.0 CGr								2.0 sd sh													
		2.0 Fgr								4.0 gr								1.0 sd													
		1.0 gr																2.0 gr													
		5.0 Fgr																													

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-052(054)185	180	4

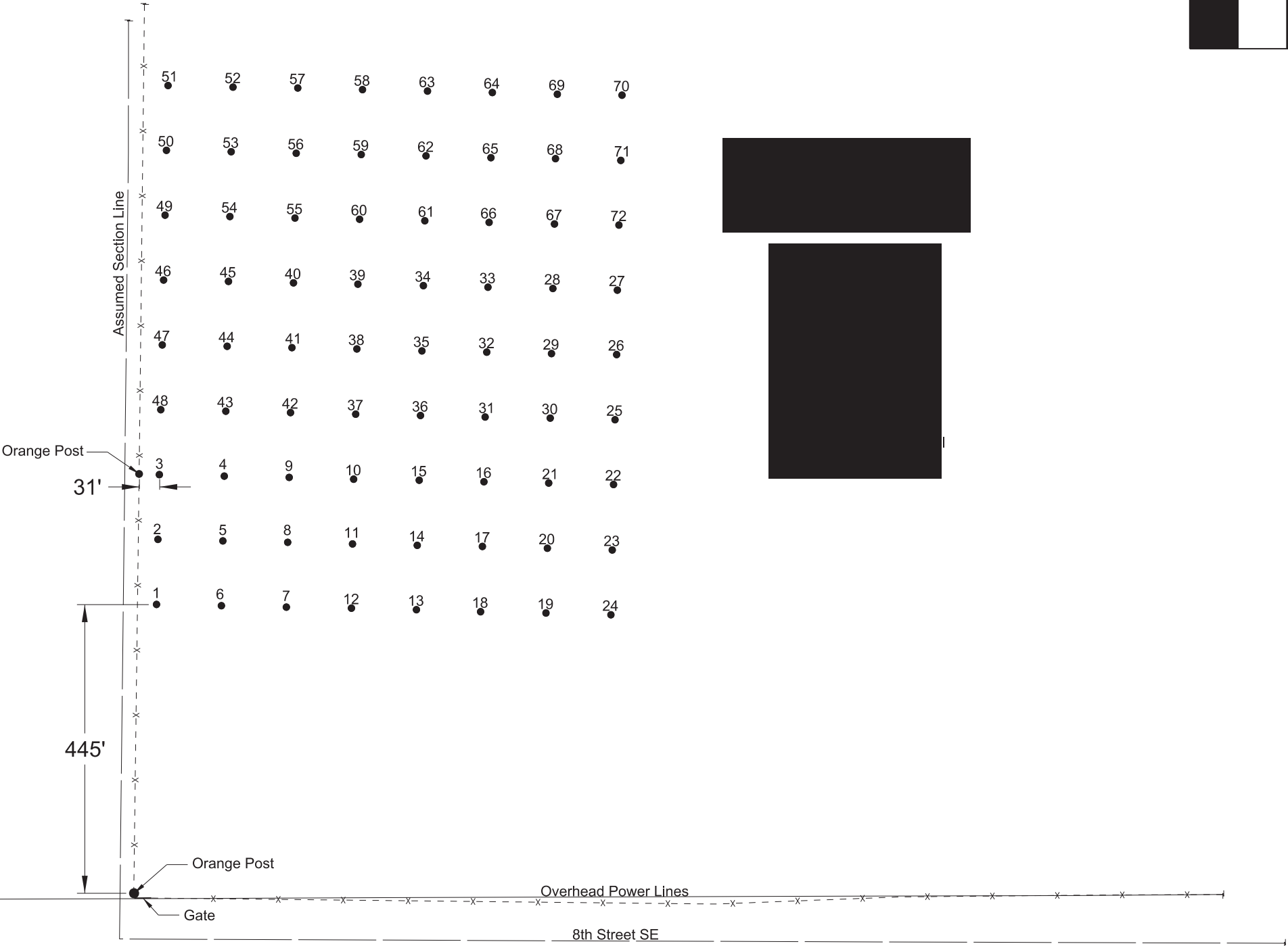
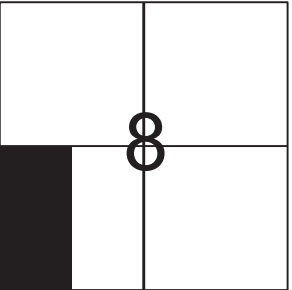
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

LOCATION OF PIT IN SECTION

TEST HOLE PLAT

Location: W1/2SW1/4 8-144-71 County: Kidder

Ownership: Karen Hirschert



Scale 1" = 200"

[illegible]

NDDOT ABBREVIATIONS

Ⓢ This is a special text character used in the labeling of existing features. It indicates a feature that has an unknown characteristic, potentially based on: lack of description, location accuracy or purpose.

Abn abandoned
Abut abutment
Adj adjusted
Aggr aggregate
Ahd ahead
ARV air release valve
Align alignment
Al alley
Alt alternate
Alum aluminum
ADA Americans with Disabilities Act
& and
Appr approach
Approx approximate
ACP asbestos cement pipe
Asph asphalt
AC asphalt cement
Assmd assumed
@ at
Atten attenuation
ATR automatic traffic recorder
Ave Avenue
Avg average
ADT average daily traffic

Bk back
BF back face
Balc balcony
B Wire barbed wire
Barr barricade
Btry battery
BI beehive inlet
Beg begin
BG below grade
BM bench mark
Bkwy bikeway
Bit bituminous
Blk block
BH bore hole
Bot bottom
Blvd Boulevard
Bndry boundary
Brkwy breakaway
Br bridge
Bldg building
Bus. business
BV butterfly valve
Byp bypass

C Gdrl cable guardrail
Calc calculate
CIP cast iron pipe
CB catch basin
CRS cationic rapid setting
C Gd cattle guard
C To C center to center
CL or Ⓢ centerline
Ch chain
Chnlk chain-link
Ch Blk channel block
Ch Ch channel change
Chk check
Chsld chiseled
Cir circle
Cl class
Clnt clean-out
Clr clear
Cl&gr clearing & grubbing
Comb. combination
Coml commercial
Compr compression
CADD computer aided drafting & design
Conc concrete
CECB concrete erosion control blanket
Cond conductor
Const construction
Cont continuous
CSB continuous split barrel sample
Contr contraction
Contr contractor
CP control point
Coord coordinate
Cor corner
Corr corrected
CAES corrugated aluminum end section
CAP corrugated aluminum pipe
CMES corrugated metal end section
CMP corrugated metal pipe
CPVCP corrugated poly-vinyl chloride pipe
CSes corrugated steel end section
CSFES corrugated steel flared end section
CSP corrugated steel pipe
CSTES corrugated steel traversable end section
Co County
Crse course
Ct Court
Xarm cross arm
Xbuck cross buck
Xsec cross sections
Xing crossing
Xrd crossroad
Crm crown

Culv culvert
C&G curb & gutter
CI curb inlet
CR curb ramp
C cut

Dd Ld dead load
Defl deflection
Defm deformed
DInt delineate
DIntr delineator
Depr depression
Desc description
Det detail
DWP detectable warning panel
Dtr detour
Dia or ⌀ diameter
Dir direction
Dist distance
DM disturbed material
DB ditch block
DG ditch grade
Dbl double
Dn down
Dwg drawing
Dr drive
Drwy driveway
DI drop inlet
D dry density
DSDS dynamic speed display sign

Ea each
Esmt easement
E East
EB Eastbound
Elast elastomeric
EL electric locker
E Mtr electric meter
Elec electric/al
EDM electronic distance meter
Elev or El elevation
Ellipt elliptical
Emb embankment
Emuls emulsion/emulsified
ES end section
Engr engineer
ESS environmental sensor station
Eq equal
Evgr evergreen
Exc excavation
Exst existing
Exp expansion
Expy Expressway
E external of curve
Extru extruded

FOS factor of safety
Fed Federal
FP feed point
Fn fence
Fn P fence post
FO fiber optic
FD field drive
F fill
FAA fine aggregate angularity
FH fire hydrant
Fl flange
Flrd flared
FES flared end section
F Bcn flashing beacon
FA flight auger sample
FL flow line
Ftg footing
FM force main
Fnd found
Fdn foundation
Frac fractional
Frwy freeway
Frt front
FF front face
F Disp fuel dispenser
FFP fuel filler pipes
FLS fuel leak sensor
Furn furnish/ed

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

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NDDOT ABBREVIATIONS

D-101-2

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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09-03-15 04-23-18 12-18-20	General Revisions General Revisions General Revisions

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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	South East	TERO	tribal employment rights ordinance
SW	South West	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		
SB	split barrel sample	VG	valley gutter
SH	sprinkler head	Vap	vapor
SV	sprinkler valve	Vert	vertical
Sq	square	VCP	vitrified clay pipe
Stk	stake	Vol	volume
Std	standard		
N	standard penetration test		
Std Specs	standard specifications	Wkwy	walkway
Stm L	steam line	W	water content
SEC	steel encased concrete	WGV	water gate valve
SMA	stone matrix asphalt	WL	water line
SSD	stopping sight distance	WM	water main
SD	storm drain	WMV	water main valve
St	street	W Mtr	water meter
SPP	structural plate pipe	WSV	water service valve
SPPA	structural plate pipe arch	WW	water well
Str	structure	Wrng	wearing
Subd	subdivision	WIM	weigh in motion
Sub	subgrade	W	west
Sub Prep	subgrade preparation	WB	westbound
Ss	subsoil	Wrng	wiring
SS	supplement specification	W/	with
Supp	supplemental	W/o	without
Surf	surfacing	WC	witness corner
Surv	survey		
Sym	symmetrical		

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MEASUREMENTS

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

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

SURVEY DESCRIPTIONS

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

SOIL TYPES

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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REVISIONS	
DATE	CHANGE
12-18-20	Sheet Added - Continued from D-101-3

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702COM 702 Communications
ACCENT Accent Communications
AGASSIZ WU Agassiz Water Users Incorporated
AGC Associated General Contractors of America
ALL PL Alliance Pipeline
ALL SEAS WU All Seasons Water Users Association
AMOCO PI Amoco Pipeline Company
AMRDA HESS Amerada Hess Corporation
AT&T AT&T Corporation
B PAW Bear Paw Energy Incorporated
BAKER ELEC Baker Electric
BASIN ELEC Basin Electric Cooperative Incorporated
BEK TEL Bek Communications Cooperative
BELLE PL Belle Fourche Pipeline Company
BLM Bureau of Land Management
BNSF Burlington Northern Santa Fe Railway
BOEING Boeing
BRNS RWD Barnes Rural Water District
BURK-DIV ELEC Burke-Divide Electric Cooperative
BURL WU Burleigh Water Users
CABLE ONE Cable One
CABLE SERV Cable Services
CAP ELEC Capital Electric Cooperative Incorporat
CASS CO ELEC Cass County Electric Cooperative
CASS RWU Cass Rural Water Users Incorporated
CAV ELEC Cavalier Rural Electric Cooperative
CBLCOM Cablecom Of Fargo
CENEX PL Cenex Pipeline
CENT PL WATER DIST Central Pipe Line Water District
CENT PWR ELEC Central Power Electric Cooperative
CENTURYLINK CenturyLink
COE Corps of Engineers
CONS TEL Consolidated Telephone
CONT RES Continental Resource Inc
CPR Canadian Pacific Railway
D O E Department Of Energy
DAK CARR Dakota Carrier Network
DAK CENT TEL Dakota Central Telephone
DAK RWD Dakota Rural Water District
DGC Dakota Gasification Company
DICKY R NET Dickey Rural Networks
DICKY RWU Dickey Rural Water Users Association
DICKY TEL Dickey Telephone
DNRR Dakota Northern Railroad
DOME PL Dome Pipeline Company
DVELEC Dakota Valley Electric Cooperative
DVMW Dakota, Missouri Valley & Western
ENBRDG Enbridge Pipelines Incorporated
ENVENTIS Enventis Telephone
FALK MNG Falkirk Mining Company
FHWA Federal Highway Administration
G FKS-TRL WD Grand Forks-trail Water District
GETTY TRD & TRAN Getty Trading & Transportation
GLDN W ELEC Golden West Electric Cooperative
GRGS CO TEL Griggs County Telephone
GTR RAMSEY WD Greater Ramsey Water District

GT PLNS NAT GAS Great Plains Natural Gas Company
HALS TEL Halstad Telephone Company
IDEA1 Idea1
INT-COMM TEL Inter-Community Telephone Company
KANEB PL Kaneb Pipeline Company
KEM ELEC Kem Electric Cooperative Incorporated
KOCH GATH SYS Koch Gathering Systems Incorporated
LKHD PL Lakehead Pipeline Company
LNGDN RWU Langdon Rural Water Users Incorporated
LWR YELL R ELEC Lower Yellowstone Rural Electric
MCKNZ CON McKenzie Consolidated Telcom
MCKNZ ELEC McKenzie Electric Cooperative
MCKNZ WRD McKenzie County Water Resource District
MCLEOD McLeod USA
MCLN ELEC McLean Electric Cooperative
MCLN-SHRDN R WAT McLean-Sheridan Rural Water
MDU Montana-dakota Utilities
MIDCO MidContinent Communications
MIDSTATE TEL Midstate Telephone Company
MINOT CABLE Minot Cable Television
MINOT TEL Minot Telephone Company
MISS VALL COMM Missouri Valley Communications
MISS W W S Missouri West Water System
MNKOTA PWR Minnkota Power
MOR-GRAN-SOU ELEC Mor-gran-sou Electric Cooperative
MOUNT-WILLI ELEC Mountrail-williams Electric Cooperative
MRE LBTY TEL Moore & Liberty Telephone
MUNICIPAL City Water And Sewer
MUNICIPAL City Of '.....'
N CENT ELEC North Central Electric Cooperative
N VALL W DIST North Valley Water District
ND PKS & REC North Dakota Parks And Recreation
ND TEL North Dakota Telephone Company
NDDOT North Dakota Department of Transportation
NDSU SOIL SCI DEPT NDSU Soil Science Department
NEMONT TEL Nemont Telephone
NODAK R ELEC Nodak Rural Electric Cooperative
NOON FRMS TEL Noonan Farmers Telephone Company
NPR Northern Plains Railroad
NSP Northern States Power
NTH PRAIR RW Northern Prairie Rural Water Association
NTHN BRDR PL Northern Border Pipeline
NTHN PLNS ELEC Northern Plains Electric Cooperative Incorporated
NTHWSTRN REF Northwestern Refinery Company
NW COMM Northwest Communication Cooperation
NWRWD Northwest Rural Water District
ONEOK Oneok gas
OSHA Occupational Safety and Health Administration
OTTR TL PWR Otter Tail Power Company
P L E M Prairielands Energy Marketing
POLAR COM Polar Communications
PVT ELEC Private Electric
QWEST Qwest Communications
R&T W SUPPLY R & T Water Supply Association

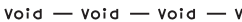


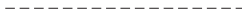
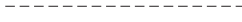


















RED RIV COMM Red River Rural Communications
RESVTN TEL Reservation Telephone
ROBRTS TEL Roberts Company Telephone
R-RIDER ELEC Roughrider Electric Cooperative
RRVW Red River Valley & Western Railroad
S CENT REG WD South Central Regional Water District
S E W U South East Water Users Incorporated
SCOTT CABLE Scott Cable Television Dickinson
SHERDN ELEC Sheridan Electric Cooperative
SHEYN VLY ELEC Sheyenne Valley Electric Cooperative
SKYTECH Skyland Technologies Incorporated
SLOPE ELEC Slope Electric Cooperative Incorporated
SOURIS RIV TELCOM Souris River Telecommunications
ST WAT COMM State Water Commission
STATE LN WATER State Line Water Cooperative
STER ENG Sterling Energy
STUT RWU Stutsman Rural Water Users
SW PL PRJ Southwest Pipeline Project
T M C Turtle Mountain Communications
TCI TCI of North Dakota
TESORO HGH PLNS PL Tesoro High Plains Pipeline
TRI-CNTY WU Tri-County Water Users Incorporated
TRL CO RWU Traill County Rural Water Users
UNTD TEL United Telephone
UPPR SOUR WUA Upper Souris Water Users Association
US SPRINT U.S. Sprint
USAF MSL CABLE U.S.A.F. Missile Cable
USFWS US Fish and Wildlife Service
USW COMM U.S. West Communications
VRNDRY ELEC Verendrye Electric Cooperative
W RIV TEL West River Telephone Incorporated
WAPA Western Area Power Administration
WEB W. E. B. Water Development Association
WILLI RWA Williams Rural Water Association
WILSTN BAS PL Williston Basin Interstate Pipeline Company
WLSH RWD Walsh Water Rural Water District
WOLVRTN TEL Wolverton Telephone
XLENER Xcel Energy
YSVR Yellowstone Valley Railroad


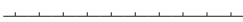




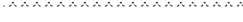







NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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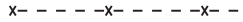





LINE STYLES

Existing Topography









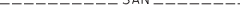













	Existing Ground Void
	Existing Cemetary Boundary
	Existing Box Culvert Bridge
	Existing Concrete Surface
	Existing Drainage Structure
	Existing Gravel Surface
	Existing Riprap
	Existing Dirt Surface
	Existing Asphalt Surface
	Existing Tie Point Line
	Existing Railroad Centerline
	Existing Guardrail Cable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

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




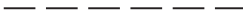
Proposed Topography

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










Existing Utilities

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




Proposed Utilities

	24 Inch Pipe
	Reinforced Concrete Pipe
	Under Drain
	Edge Drain

Traffic Utilities

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

Sign Structures

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

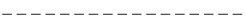
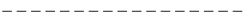











NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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LINE STYLES

D-101-21


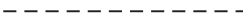
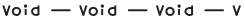
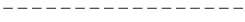




Right Of Way

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







Boundary Control



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

Cross Sections and Typicals


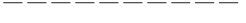
	Existing Ground
	Existing Topsoil (Cross Section View)
	Existing Ground Void (Not Surveyed)
	Existing Concrete
	Existing Aggregate (Cross Section View)
	Existing Curb and Gutter (Cross Section View)
	Existing Asphalt (Cross Section View)
	Existing Reinforcement Rebar

Geotechnical


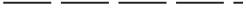
	Geotextile Fabric Type D
	Geogrid
	Geotextile Fabric Type R
	Geotextile Fabric Type R1
	Geotextile Fabric Type RR
	Geotextile Fabric Type S

	Subgrade Reinforcement
	Failure Line







Countours

	Depression Contours
	Supplemental Contour


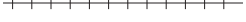


Profile

	Subgrade, Subcut or Ditch Grade
	Topsoil Profile










Striping

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


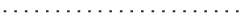





Pavement Joints

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





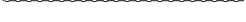
Bridge Details

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

Erosion Control

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

Environmental

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

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SYMBOLS



North Arrow (Half Scale)

Alignment Data Point

Alignment Monument

Spot Elevation

Existing Miscellaneous Spot

Existing Access Control Arrow

Existing Benchmark

Reset USGS Marker

Iron Monument Found

Iron Pin R/W Monument

Property Corner

Iron Pin Reference Monument

Right of Way Marker (Exst, Ppsd, Reset)

Existing Federal Reference Corner

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

Existing Witness Corner

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

Existing Traverse PI Aerial Panel

Existing Reference Marker Point NGS

Existing EFB Misc

Existing Bush or Shrub

Existing Large Evergreen Tree

Existing Small Evergreen Tree

Existing Large Tree

Existing Small Tree

Existing Tree Trunk

Cairn or Stone Circle

Existing Artifact

Existing Satellite Dish

Existing Weather Station

Existing Windmill or Tower

Reinforced Pavement

Continuous Split Barrel Sample

Flight Auger Sample

Split Barrel Sample

Thinwall Tube Sample

Standard Penetration Test

Inclinometer Tube











Excavation Unit

Existing Ground Water Well Bore Hole

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
































































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SYMBOLS

	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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SYMBOLS

	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					

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DATE	CHANGE	
12-18-20	General Revisions	

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		This document was originally issued and sealed by Kirk Hoff, Registration Number PE-4683, on 12/18/20 and the original document is stored at the North Dakota Department of Transportation
07-01-14		
REVISIONS		
DATE	CHANGE	
12-18-20	General Revisions	

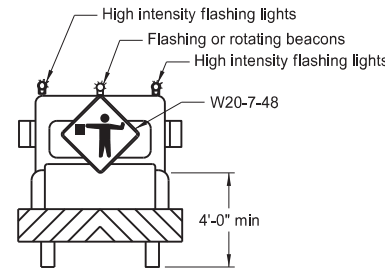
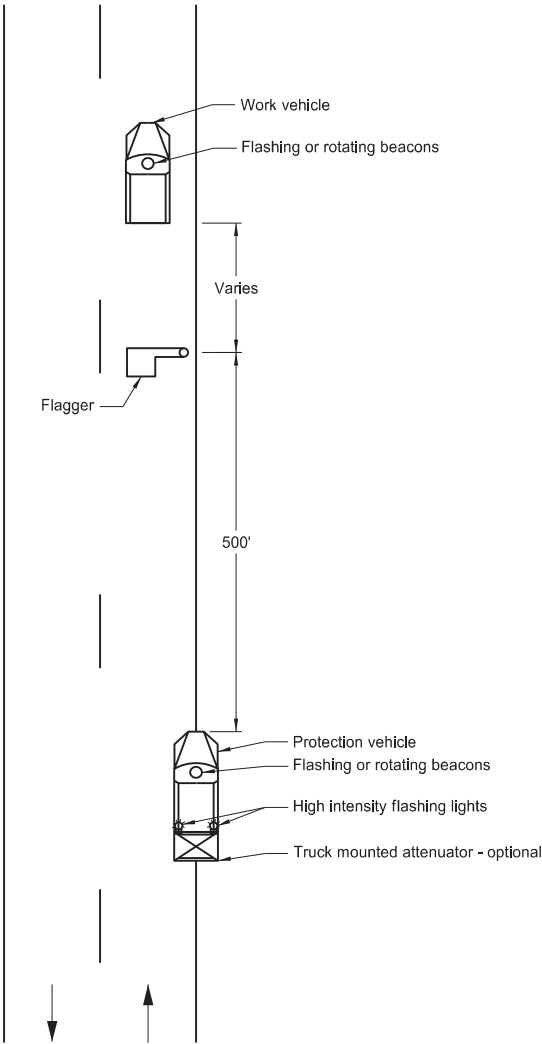
SYMBOLS

			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)		

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07-01-14		
REVISIONS		
DATE	CHANGE	
12-18-20	General Revisions Sheet added - Continued from D-101-32	

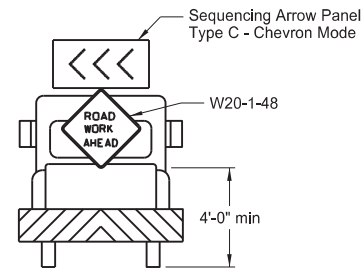
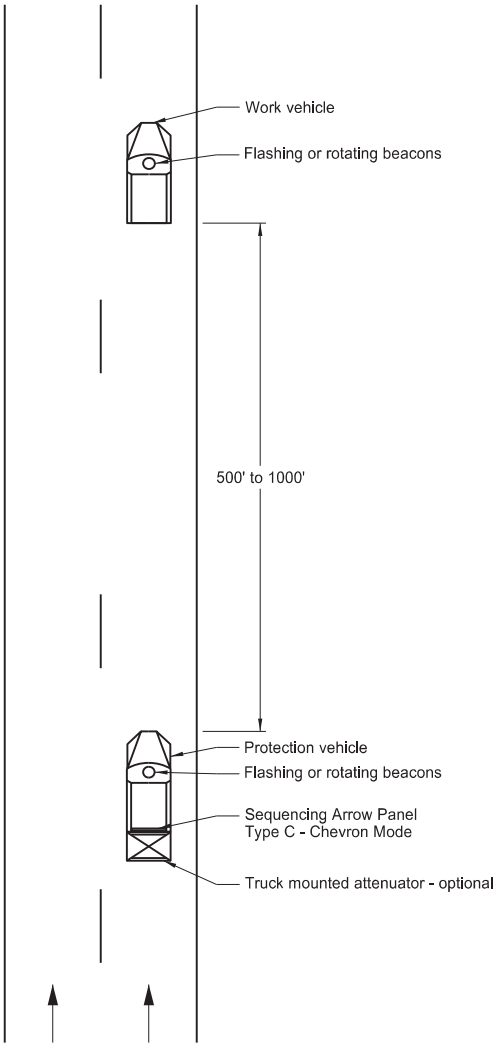
TRAFFIC CONTROL FOR CORING OF HOT BITUMINOUS PAVEMENT

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 10-03-19	Updated to active voice New Design Engr PE Stamp

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CONSTRUCTION SIGN DETAIL

D-704-5

SIGN NUMBER		G20-10-108				
WIDTH x HEIGHT		9'-0" x 4'-0"				
BORDER WIDTH		1.25" (Inset 0.75")				
CORNER RADIUS		3"				
MOUNTING		Ground				
BACKGROUND		TYPE: IV Reflective				
		COLOR: Fluorescent Orange				
LEGEND/BORDER		TYPE: Non-Refl				
		COLOR: Black				
SYMBOL		X	Y	WID	HT	ANGLE
		42.1	6.2	24	4	0

STATION(S):

AREA: 36.0 Sq.Ft.

9'-0"

4'-0"

6.2"

6"D

4.5"

6"D

4.5"

6"D

4.5"

4"

6.3"

CONSTRUCTED BY

YOUR COMPANY NAME

YOUR TOWN, ND

NDDOT LOGO

24"

8.25"

91.5"

8.25"

Dimensions are in inches,tenths

Letter locations are panel edge to lower left corner

LETTER POSITION (X)																		LENGTH		SIZE	SERIES
C	O	N	S	T	R	U	C	T	E	D		B	Y					69.7	6	D 2000	
19.2	24.5	30	35.1	39.7	44.3	49.4	54.8	59.7	64.3	69	73.1	79.1	83.7								
Y	O	U	R		C	O	M	P	A	N	Y		N	A	M	E		91.5	6	D 2000	
8.3	14.2	19.8	25.3	29.4	35.4	40.7	46.2	52.4	56.8	62.8	67.8	72.9	78.9	83.9	89.9	96					
Y	O	U	R		T	O	W	N	,		N	D						64.6	6	D 2000	
21.7	27.6	33.2	38.7	42.8	48.8	53.3	58.4	64.6	69.6	70.7	76.7	82.2									

Notes:

1. Post mount sign a distance of $\frac{1}{2}A$ following the End Road Work (G20-248) sign (maximum 2 signs per project.)
2. Use sign on rural projects with a 30 day or longer duration (not required on seal coats or other short duration projects.)
3. Do not place sign in urban areas or within city limits.


Advance Warning Sign Spacing (A)			
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 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

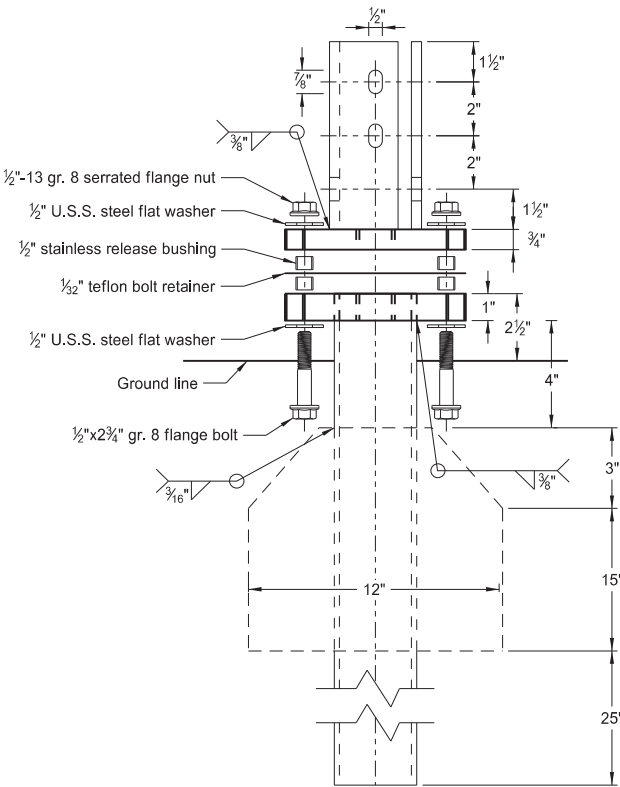
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		<p>This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 10/03/19 and the original document is stored at the North Dakota Department of Transportation</p>
8-22-12		
REVISIONS		
DATE	CHANGE	
7-18-14 9-27-17 8-30-18 10-03-19	Revise sheeting to type IV. Updated to active voice. Updated sign number in note 1. New Design Engineer PE Stamp.	

D-704-6

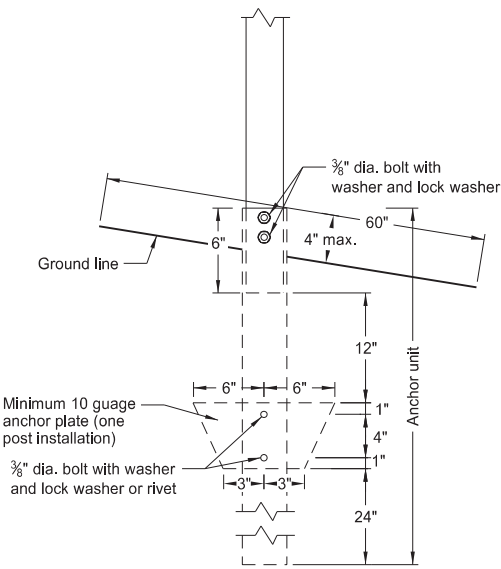
(A)	
FUNDING SOURCE MESSAGE VARIATIONS	
	FEDERAL
	STATE
	FEDERAL - STATE
	FEDERAL - LOCAL
	FEDERAL - STATE - LOCAL
	STATE - LOCAL

- Notes:
- 1) Contact the Communications Division of the NDDOT to obtain a copy of the image for the NDDOT Logo.
 - 2) Contact Project Engineer for funding source message.

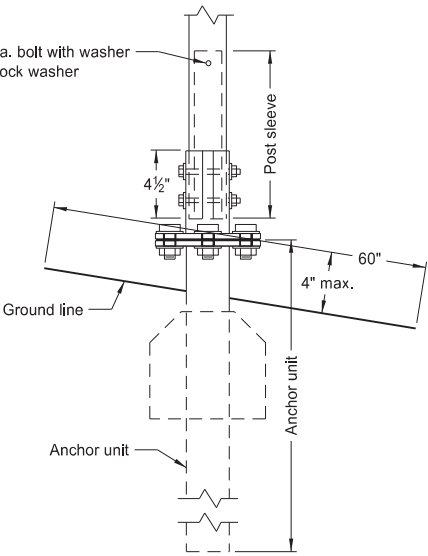
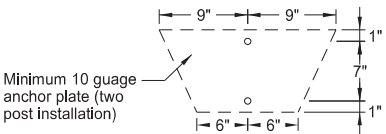
NORTH DAKOTA		
DEPARTMENT OF TRANSPORTATION		
12-08-21		
REVISIONS		
DATE	CHANGE	
		12/08/21



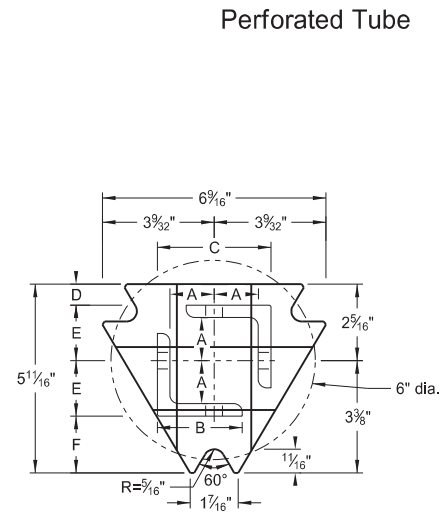
Multi-Directional Slip Base Assembly



Anchor Unit and Post Assembly

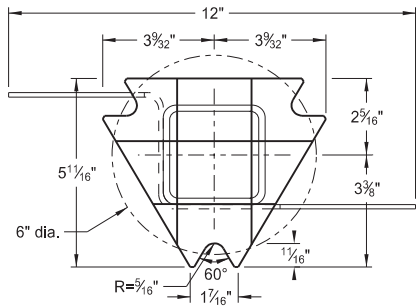


Multi-Directional Slip Base Anchor Unit and Post Sleeve Assembly



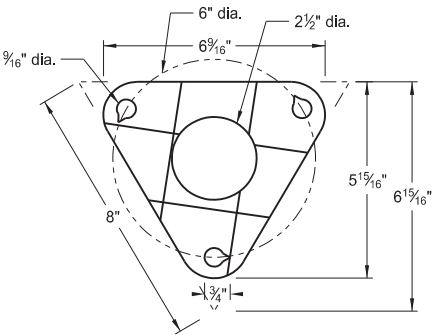
Top Post Receiver

Plate - ASTM A572 grade 50
Angle Receiver - 2 1/2"x2 1/2"x3/8" ASTM A36 structural angle



Bottom Soil Stub

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



Bolt Retainer for Base Connection
Bolt Retainer- 1/2" Reprocessed Teflon

Notes:

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

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

Properties of Telescoping Perforated Tube						
Tube Size in.	Wall Thickness in.	U.S. Standard Gauge	Weight per Foot lbs.	Moment of Inertia in. ⁴	Cross Sec. Area in. ²	Section Modulus in. ³
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2 1/2 x 2 1/2	0.105	12	3.141	0.804	0.803	0.643
2 1/2 x 2 1/2	0.135	10	4.006	0.979	1.010	0.785

Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2 3/16"x10 ga.	1 9/64"	2 1/2"	3 1/32"	2 5/32"	1 33/64"	1 7/8"
2 1/2"x10 ga.	1 9/32"	2 1/2"	3 5/16"	5/8"	1 21/32"	1 3/4"

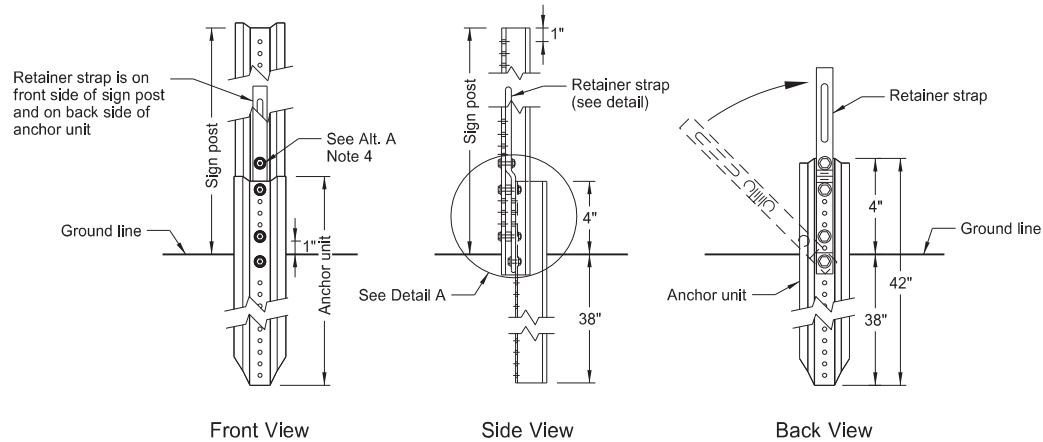
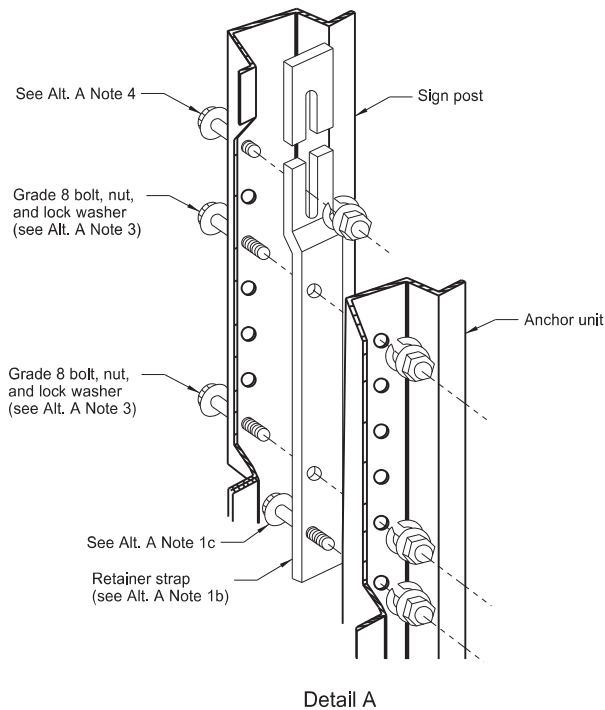
(A) Use breakaway base when support is placed in weak soils. Engineer determines if soils are weak.

(B) For additional wind load, insert the 2 3/16"x10 ga. into 2 1/2"x10 ga.

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

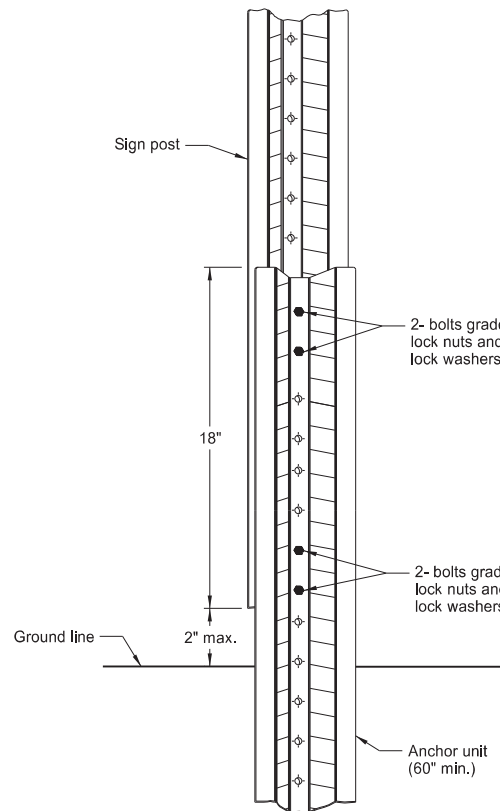
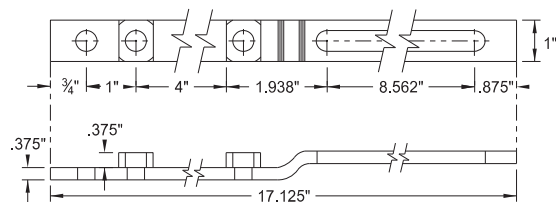
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U-Channel Post



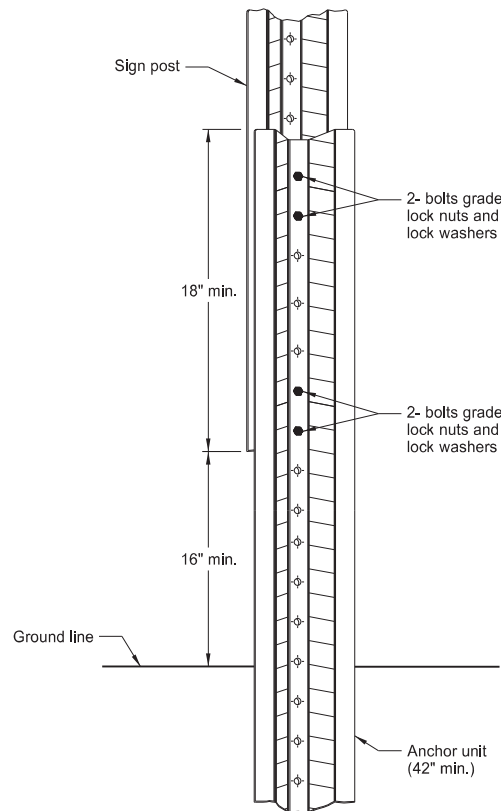
Breakaway U-Channel Detail Alternate A

Install a maximum of 2 posts within 7'.



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

Install a maximum of 3 posts within 7'.



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

Install a maximum of 3 posts within 7'.

Alternate A Steps of Installation:

- 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 $\frac{5}{16}$ "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 $\frac{5}{16}$ "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 $\frac{5}{16}$ "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 10-03-19	Updated to active voice New Design Engr PE Stamp

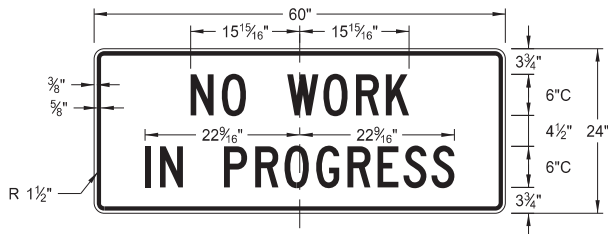
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CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS

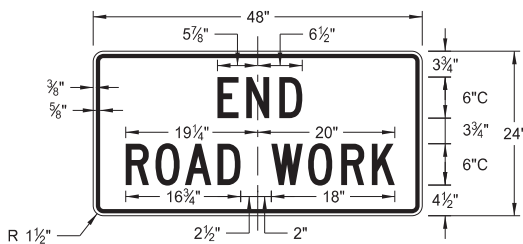
D-704-9



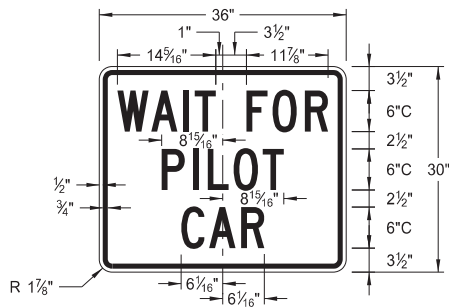
G20-1-60
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Background: orange



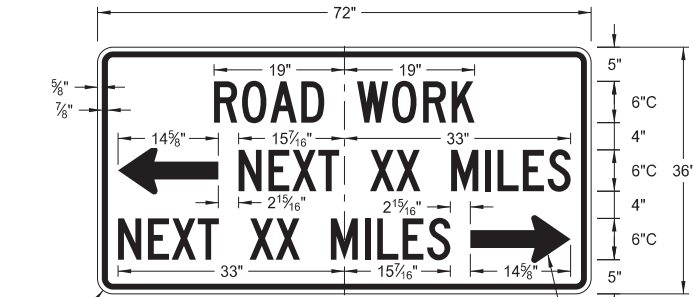
G20-1b-60
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Background: orange



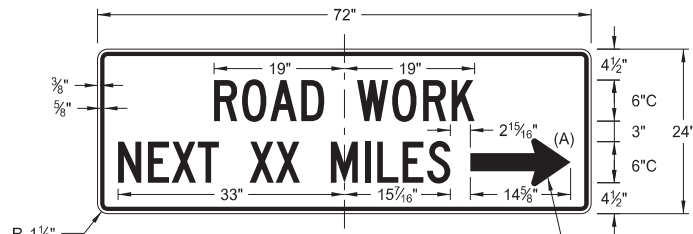
G20-2-48
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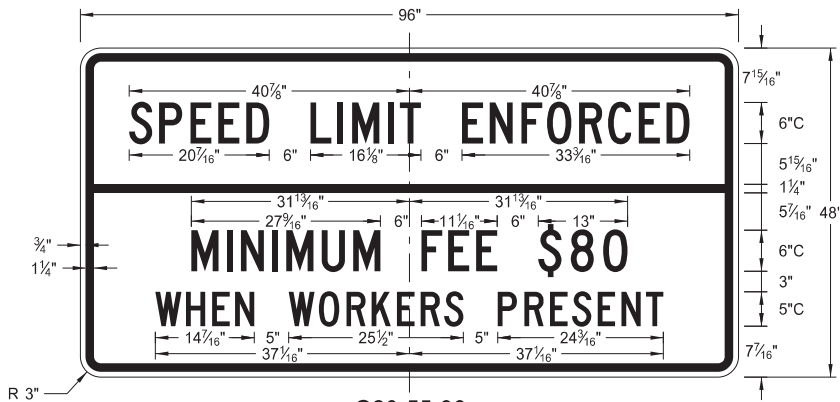
G20-4b-36
Legend: black (non-refl)
Background: orange



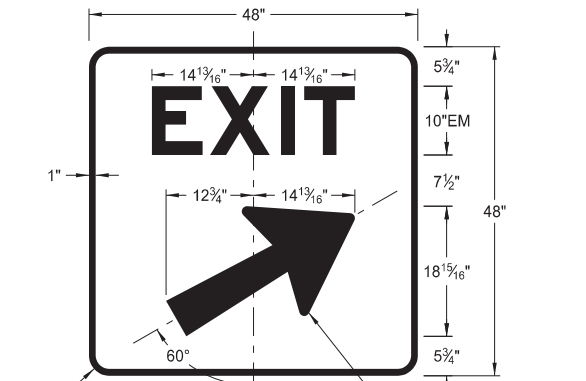
G20-50a-72
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Background: orange



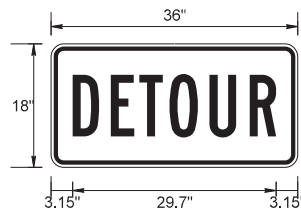
G20-52a-72
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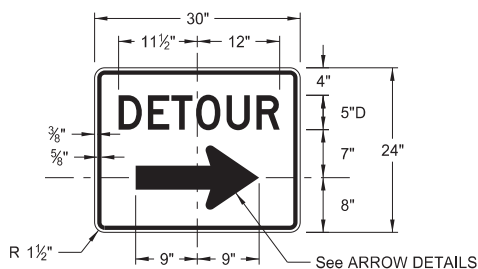
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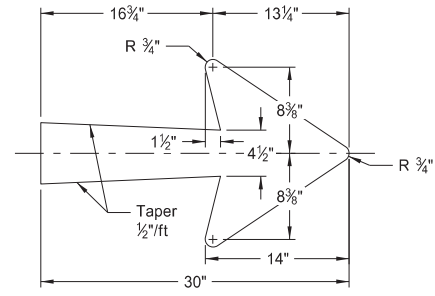
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



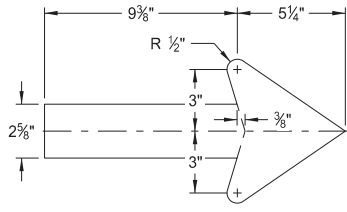
M4-8-36
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Background: orange



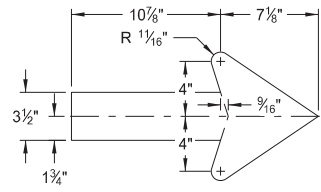
M4-9(L or R)-30 &
M4-9-30
Legend: black (non-refl)
Background: orange



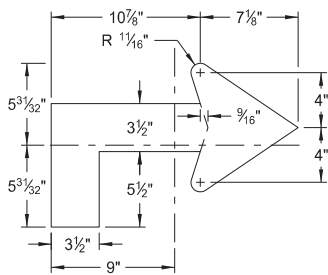
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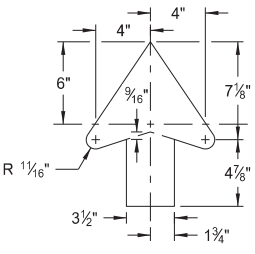
G20-50a-72
G20-52a-72



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:

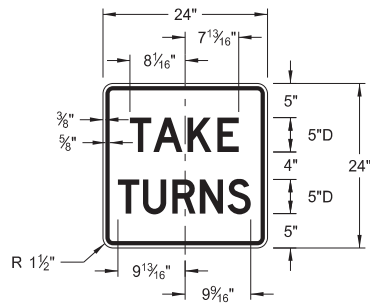
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

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

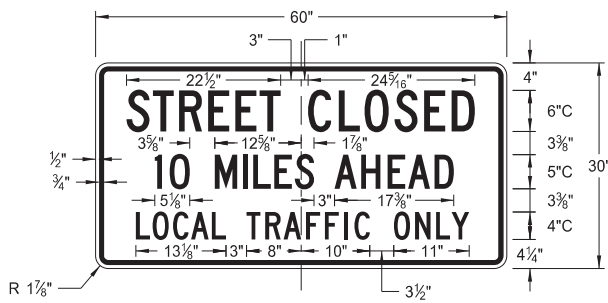
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CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS

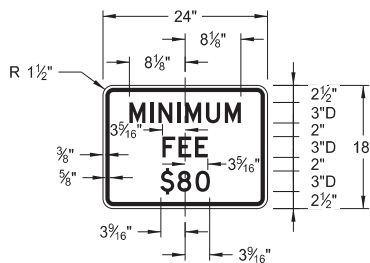
D-704-10



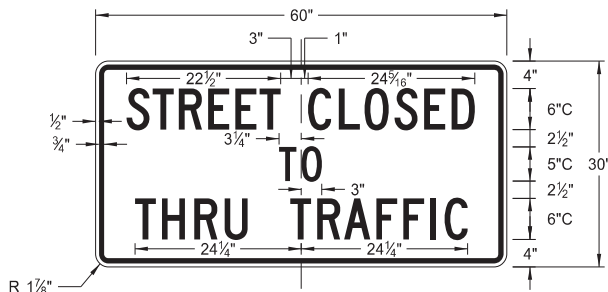
R1-50P-24
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Background: white



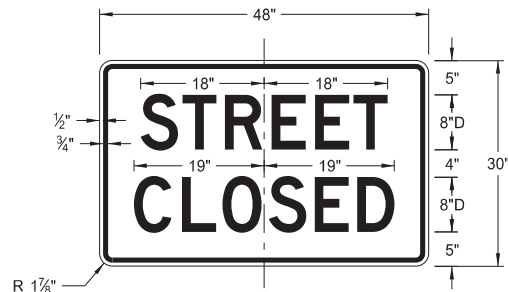
R11-3c-60
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Background: white



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



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



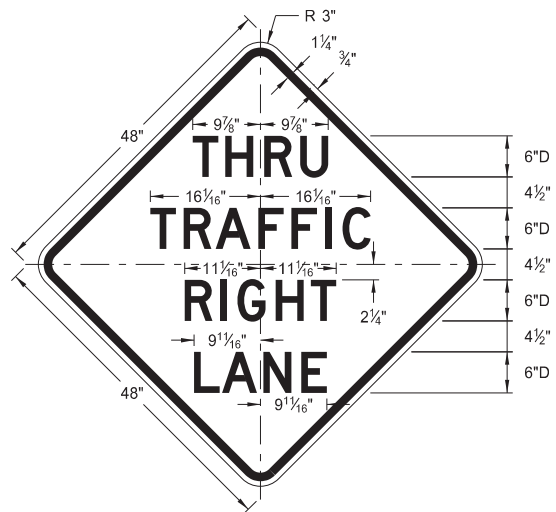
R11-2a-48
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NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Revised sign number
10-03-19	New Design Engineer PE Stamp

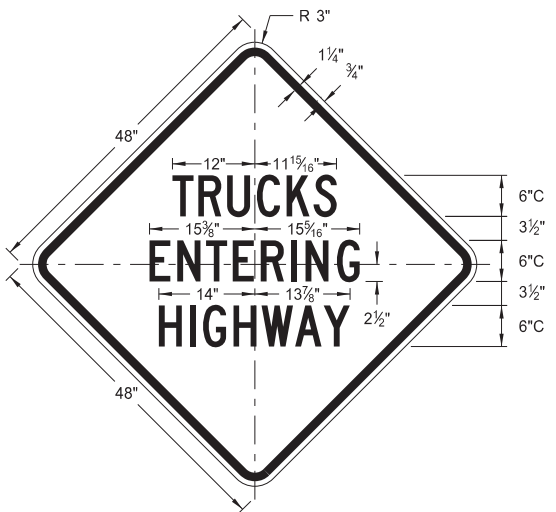
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CONSTRUCTION SIGN DETAILS
WARNING SIGNS

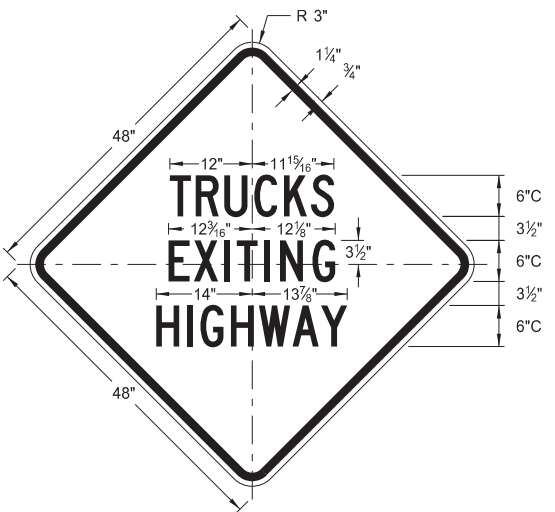
D-704-11



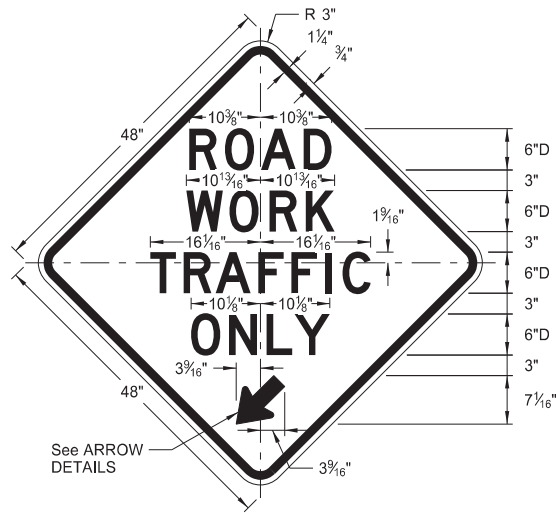
W5-8-48
Legend: black (non-refl)
Background: orange



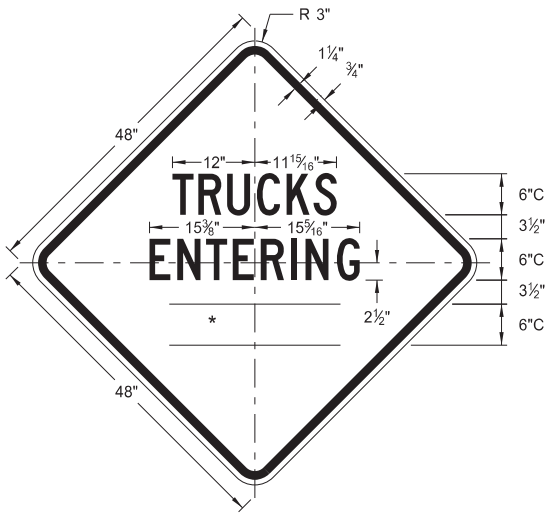
W8-53-48
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Background: orange



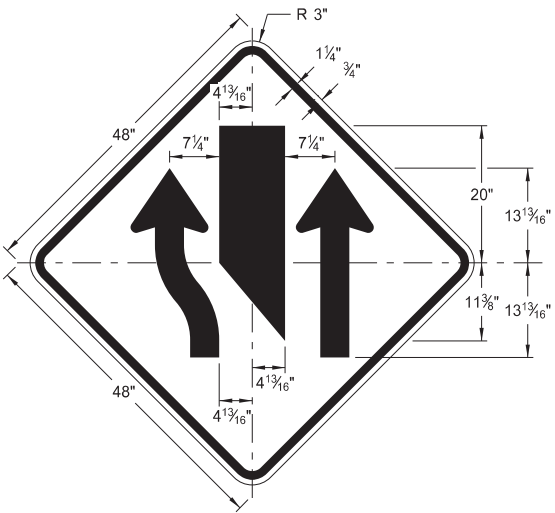
W8-56-48
Legend: black (non-refl)
Background: orange



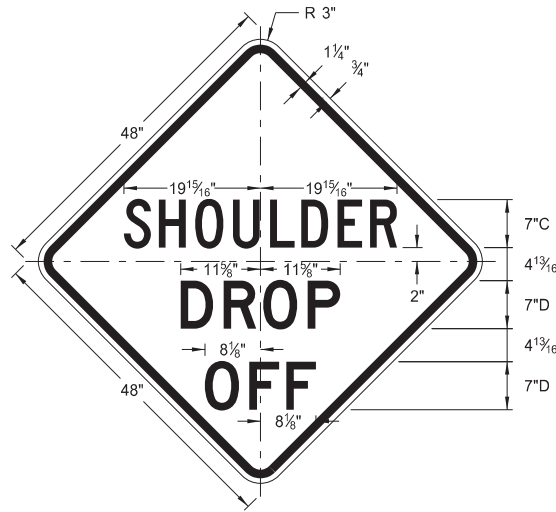
W5-9-48
Legend: black (non-refl)
Background: orange



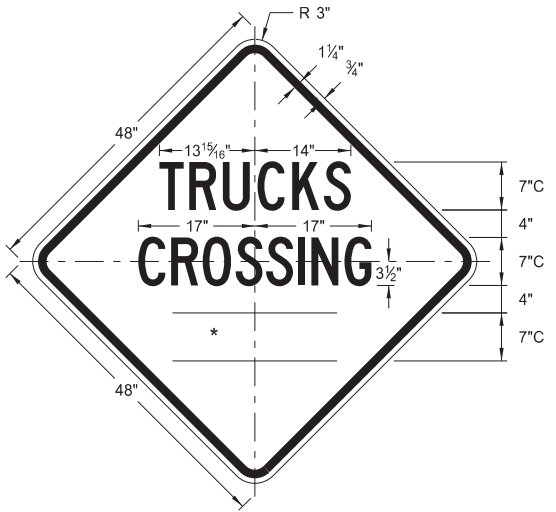
W8-54-48
Legend: black (non-refl)
Background: orange



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



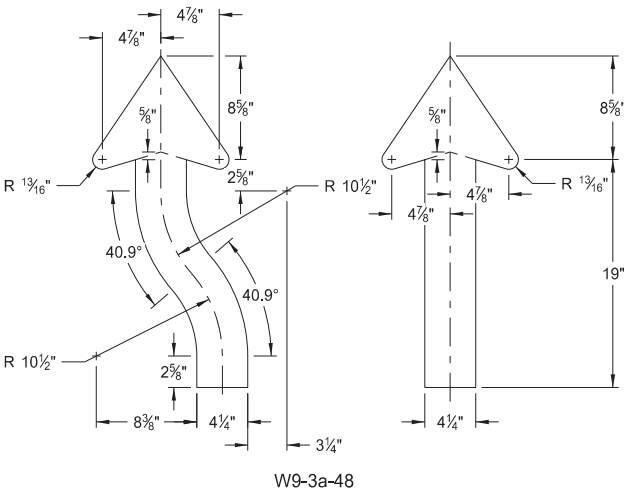
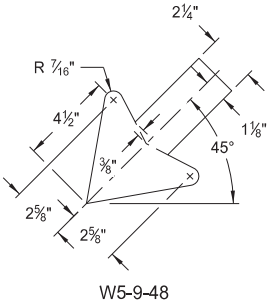
W8-9a-48
Legend: black (non-refl)
Background: orange



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

WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
1/2 MILE	Reduce 50%
1 MILE	Standard

* DISTANCE MESSAGES

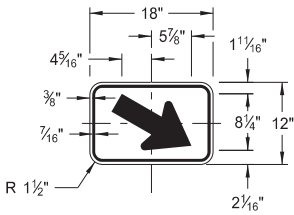


ARROW DETAILS

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

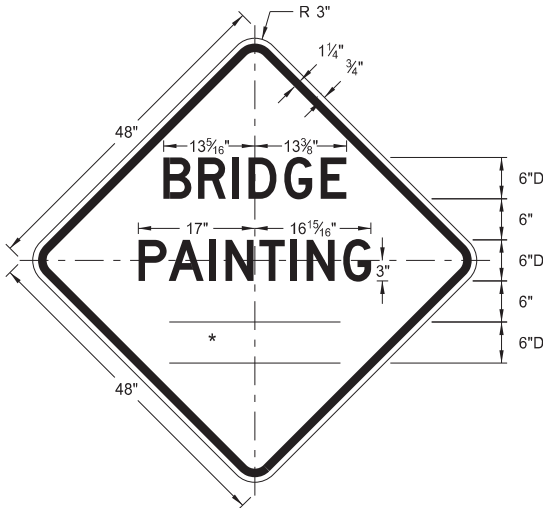
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CONSTRUCTION SIGN DETAILS
WARNING SIGNS



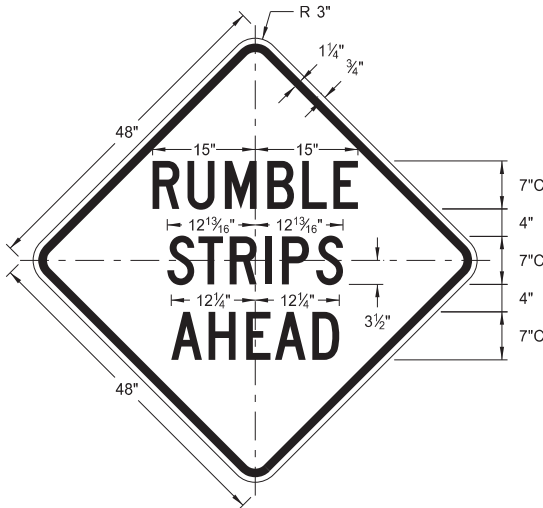
W16-7aP-18

Legend: black (non-refl)
Background: orange



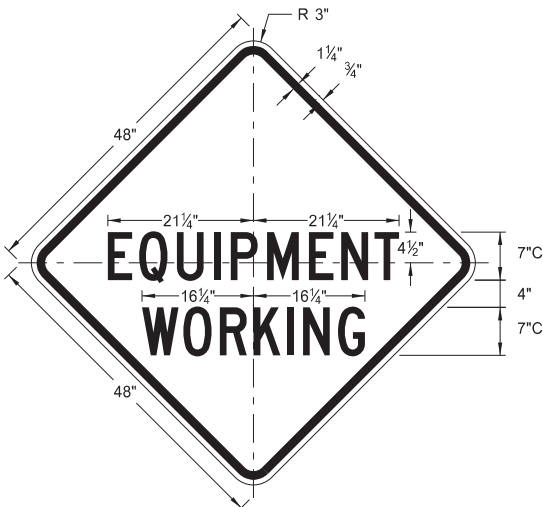
W21-50-48

Legend: black (non-refl)
Background: orange



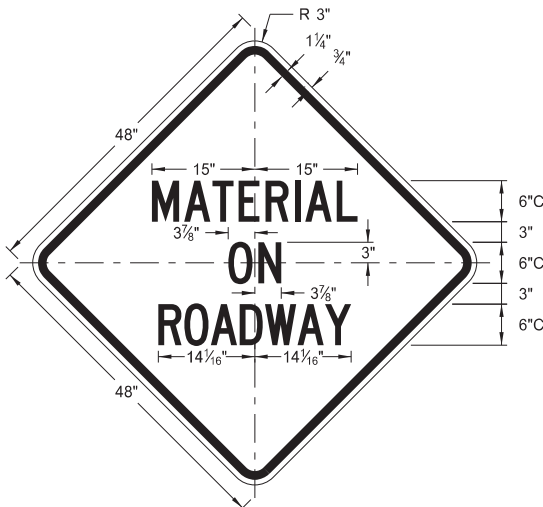
W21-53-48

Legend: black (non-refl)
Background: orange



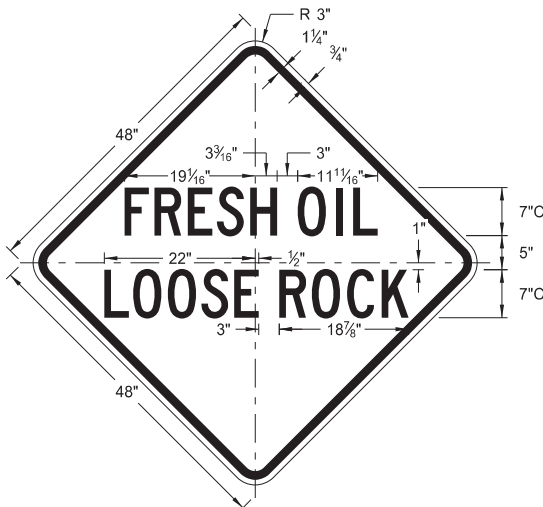
W20-51-48

Legend: black (non-refl)
Background: orange



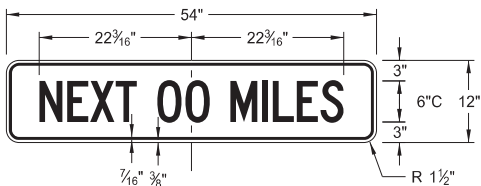
W21-51-48

Legend: black (non-refl)
Background: orange



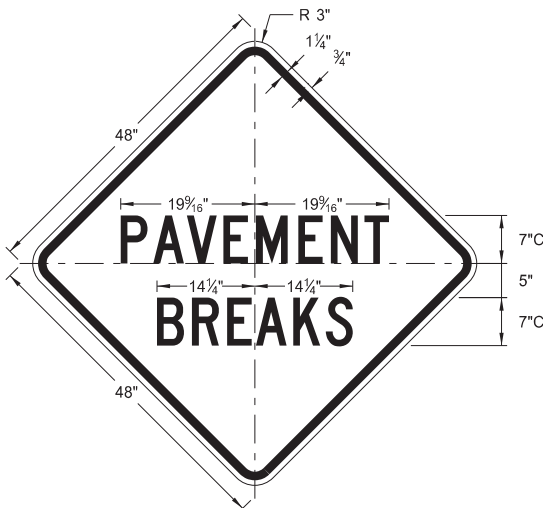
W22-8-48

Legend: black (non-refl)
Background: orange



W20-52P-54

Legend: black (non-refl)
Background: orange

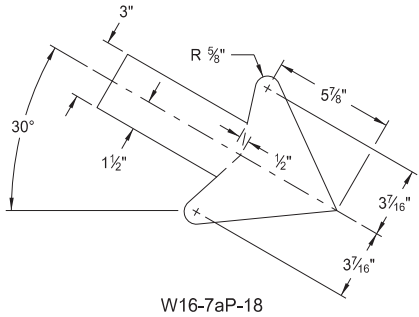


W21-52-48

Legend: black (non-refl)
Background: orange

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

* DISTANCE MESSAGES



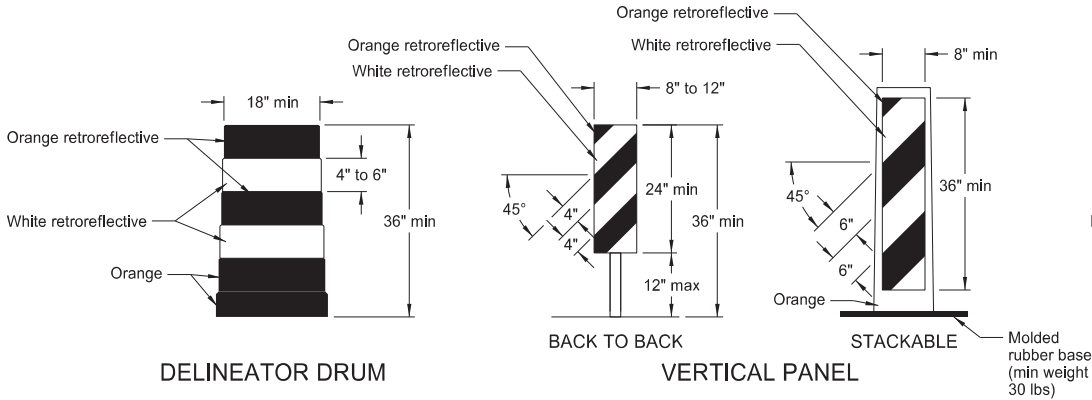
W16-7aP-18

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

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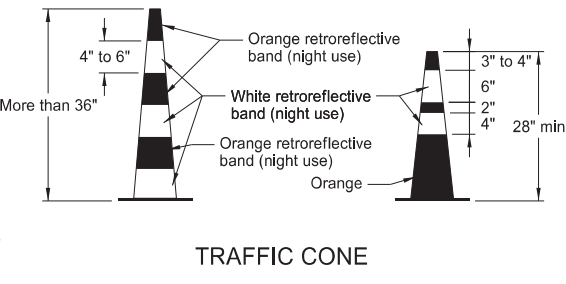
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13

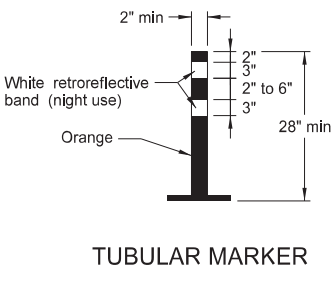


Provide horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide for drum markings. Use a minimum of two orange and two white stripes with the top stripe being orange for each drum. Do not exceed 3" nonretroreflectORIZED spaces between the horizontal orange and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

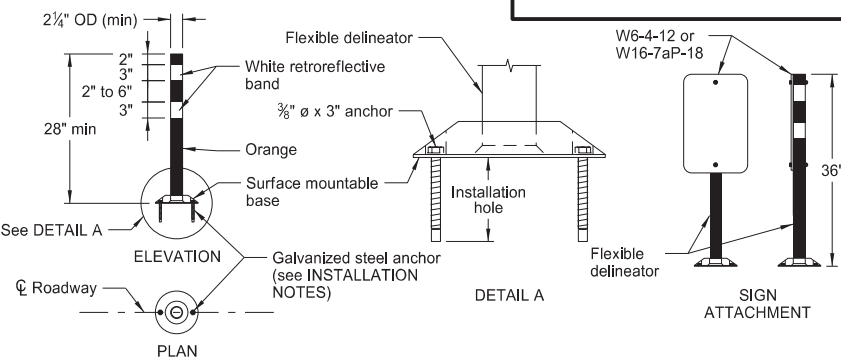
Provide alternating orange and white retroreflective stripes, sloping downward in direction vehicular traffic is to pass. Place retroreflective sheeting on both sides of panel with a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective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



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

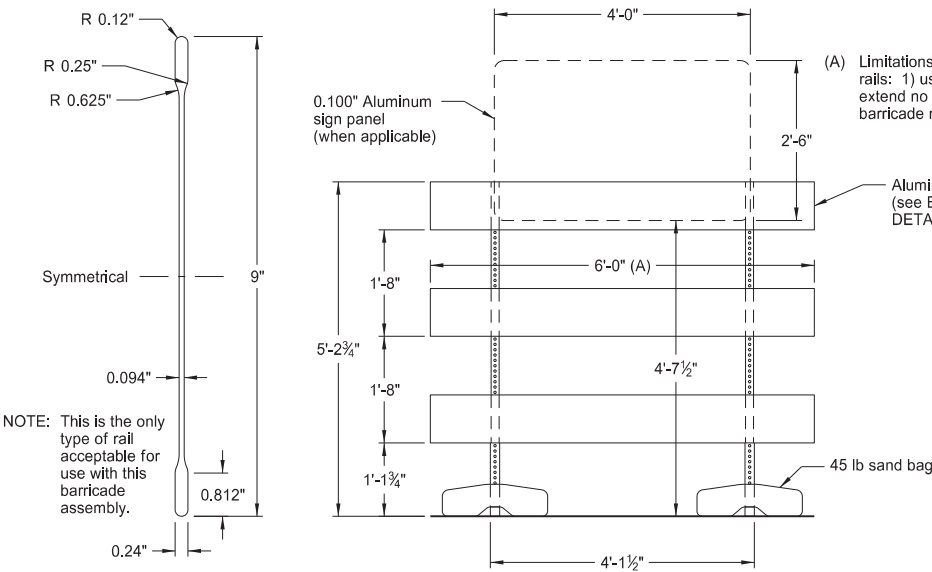


Provide retroreflectORIZATION of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



INSTALLATION NOTES:

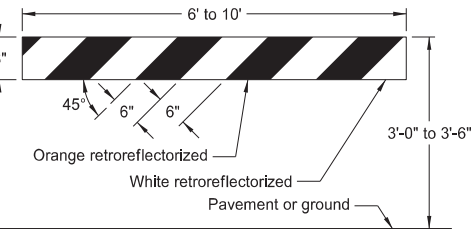
1. Drill installation holes to diameter and depth required by manufacturer's specifications.
2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
3. In lieu of bolted down base, use an 8" x 8" butyl pad or hot melt butyl. Remove butyl as close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



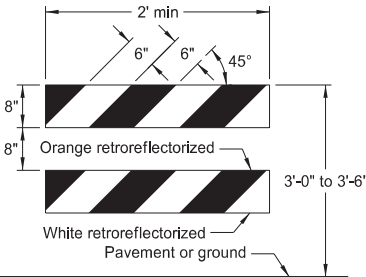
BARRICADE BLADE DETAIL

BARRICADE ASSEMBLY DETAIL
(Aluminum Barricade Rails)

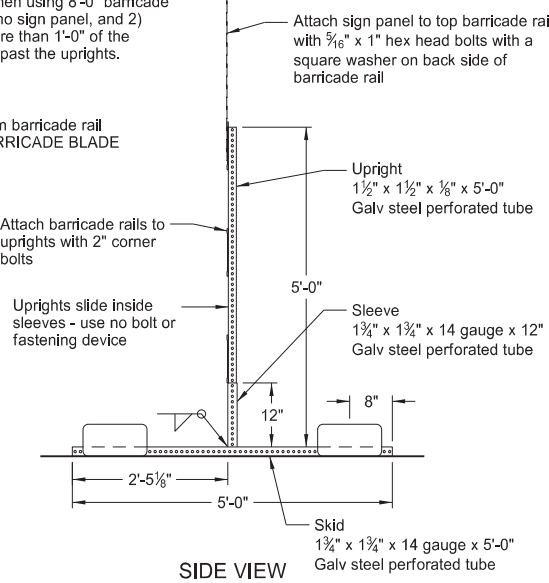
NOTE: For barricade markings use alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Place retroreflective sheeting on both sides of the rails with a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the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



TYPE I BARRICADE

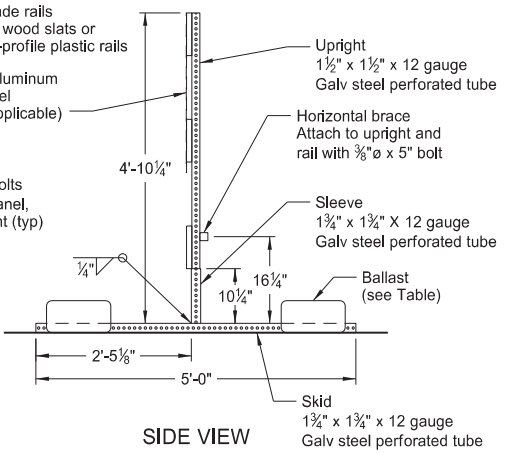


TYPE II BARRICADE
BARRICADE RAIL DETAILS

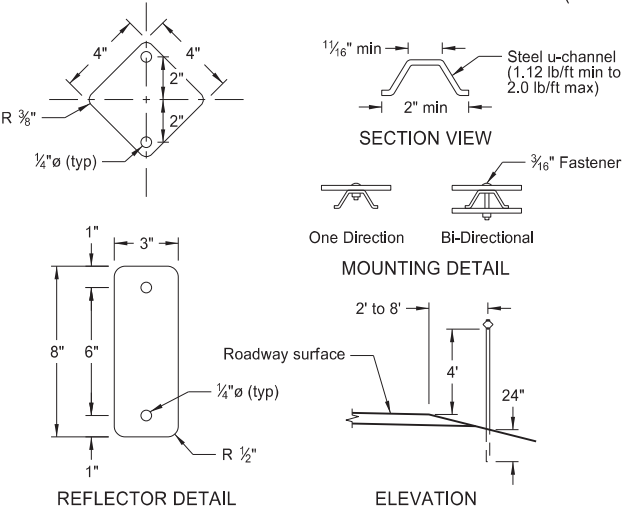


ELEVATION VIEW

BARRICADE ASSEMBLY DETAIL
(Wood or Plastic Rails)



SIDE VIEW



REFLECTOR DETAIL

ELEVATION

DELINEATORS

MINIMUM BALLAST
(For each side of barricade support)

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

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

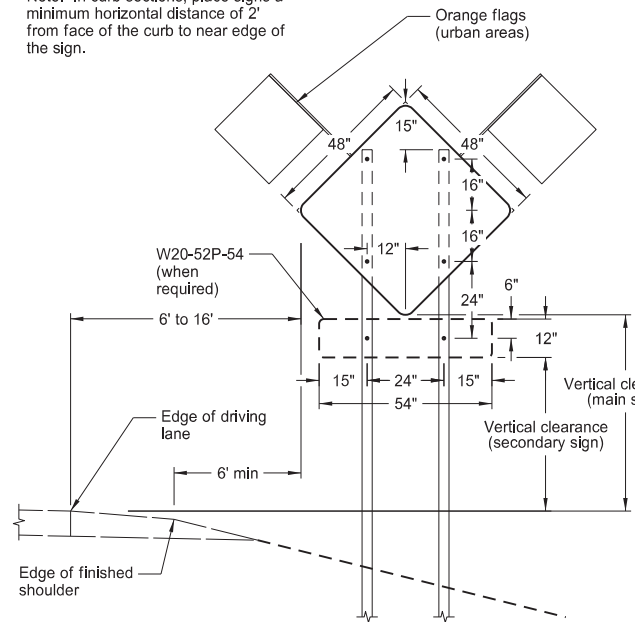
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17 11-01-19	Updated to active voice Revised details for Flexible Delineator

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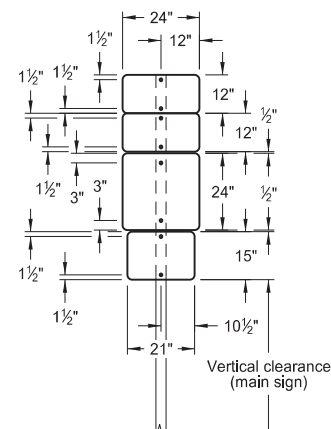
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

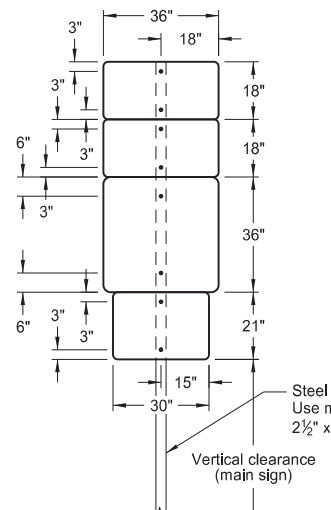
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



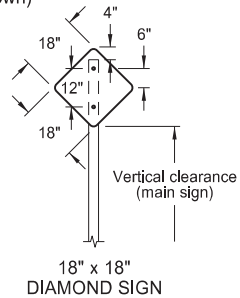
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



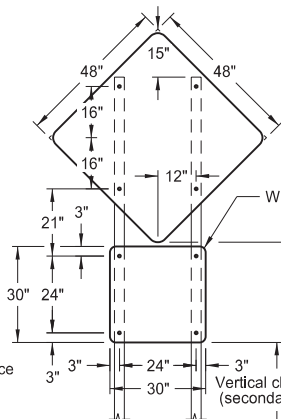
24" x 24" ROUTE MARKER ASSEMBLY



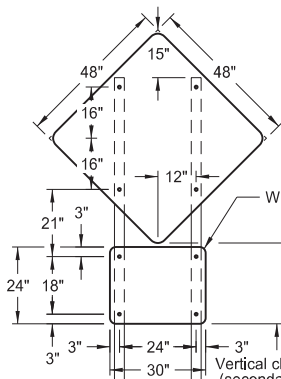
36" x 36" ROUTE MARKER ASSEMBLY



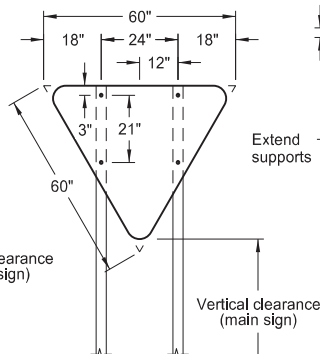
18" x 18" DIAMOND SIGN



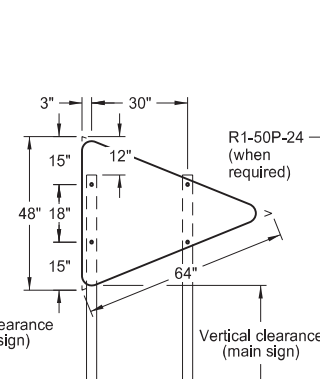
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



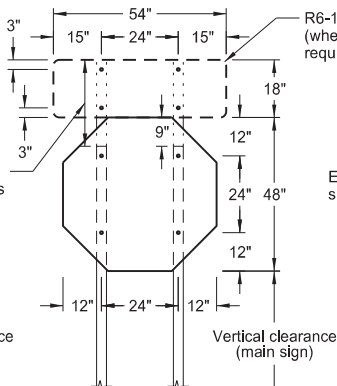
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



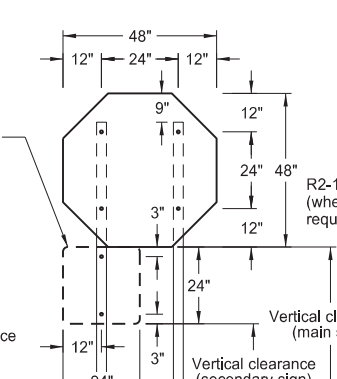
R1-2-60 - YIELD SIGN



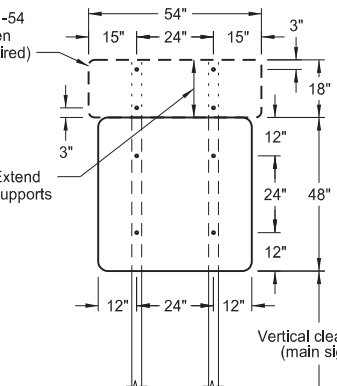
W14-3-64 - PENNANT SIGN



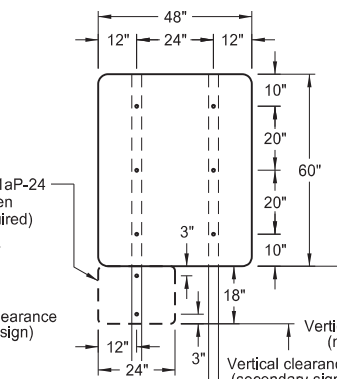
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



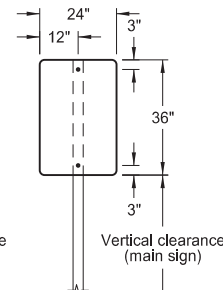
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



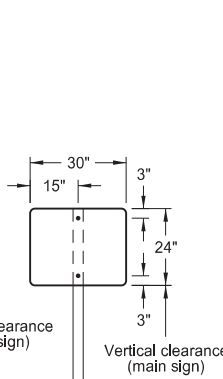
48" x 48" SIGN
(with R6-1-54 sign as required)



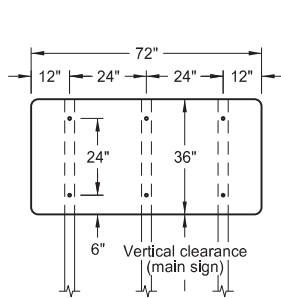
48" x 48" SIGN
(with R2-1aP-24 sign as required)



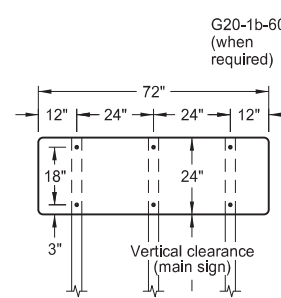
24" x 36" SIGN



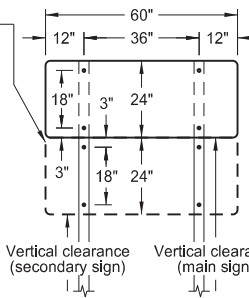
30" x 24" SIGN



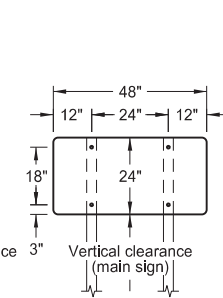
72" x 36" SIGN



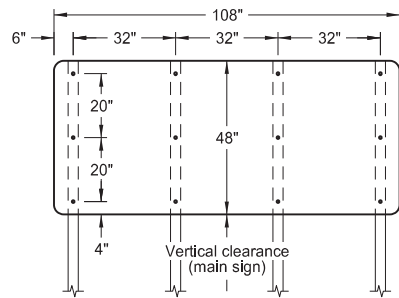
72" x 24" SIGN



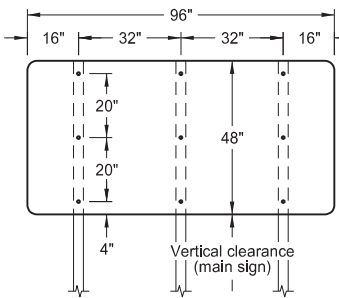
60" x 24" SIGN



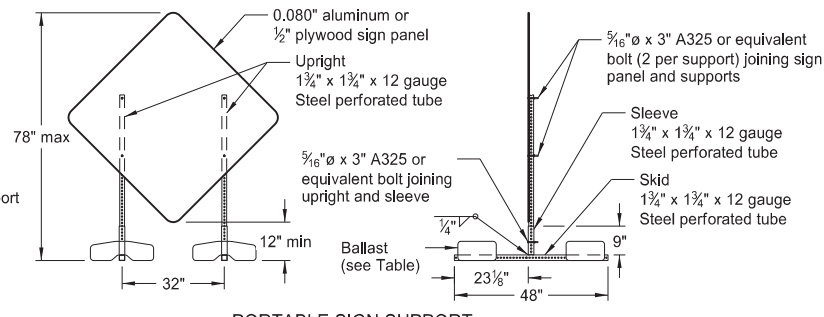
48" x 24" SIGN



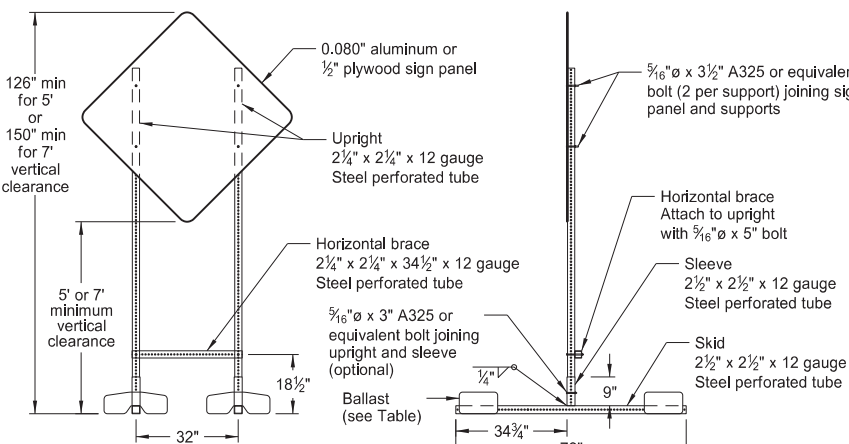
108" x 48" SIGN



96" x 48" SIGN



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

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

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

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

2. Sign Panels: Provide sign panels made of 0.100" aluminum, 1/2" plywood, or other approved material, except where noted. Punch all holes round for 3/8" bolts.

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

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

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

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

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

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

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

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

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

MINIMUM BALLAST
(For each side of sign support base)

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

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

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

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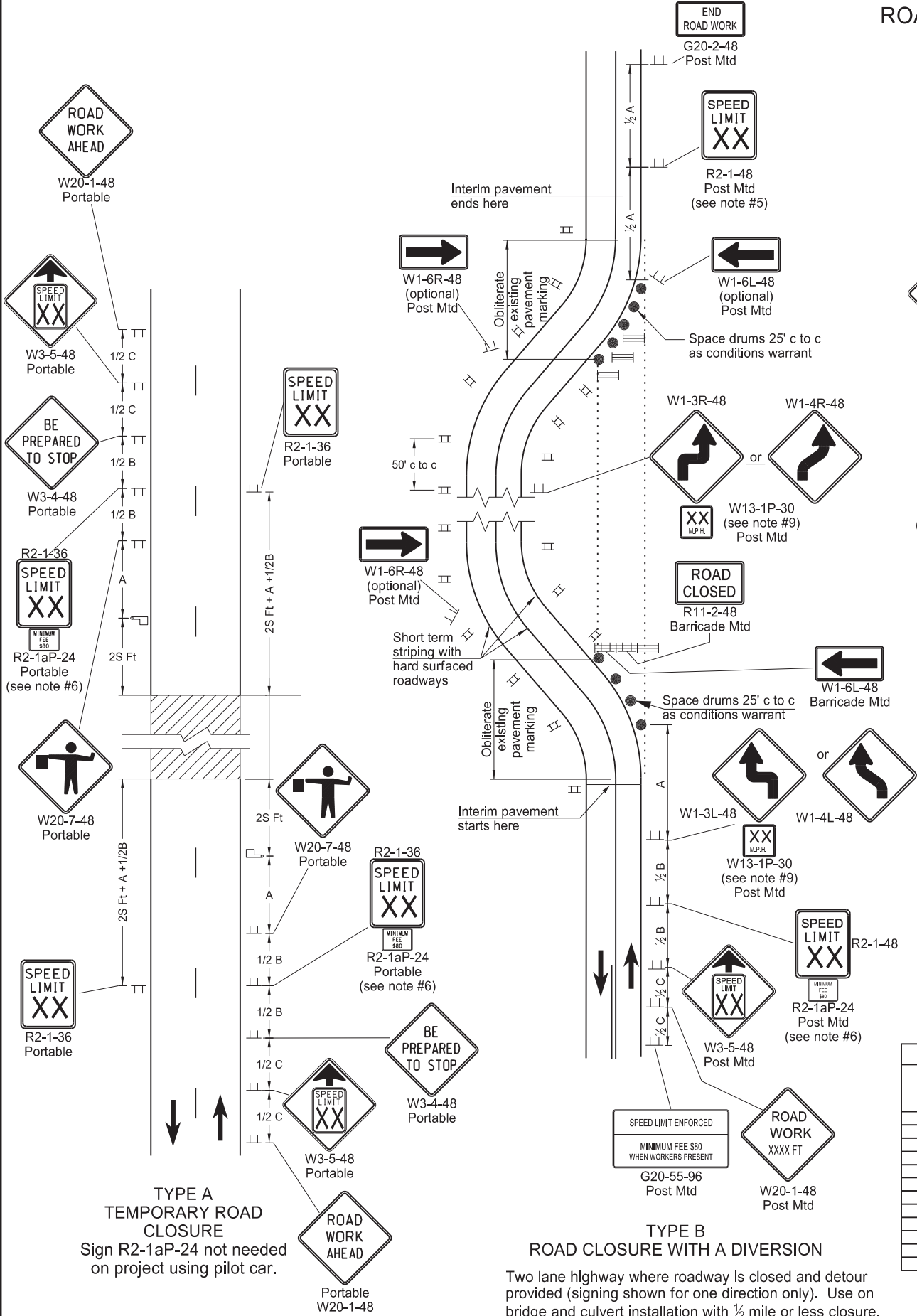
ROAD CLOSURE LAYOUTS

- Notes
1. Variables
- S = Numerical value of speed limit or 85th percentile.
W = The width of taper in feet.
L = Minimum length of taper, $S \times W$ for freeways, expressways, and other roads with speeds of 45 mph or greater, or $W \times S^2/60$ for urban, residential, and other streets with speeds of 40 mph or less.
2. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
3. Place delineator drums, barricades or cones for tapering traffic at dimension "S" and for tangents space at 2 times dimension "S".
4. 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 roadway surface. See Shoulder Closure Standard Drawing.
- 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).
5. Re-establish speed. Determine exact speed limit in the field, dependent on location and conditions.
6. 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 $\frac{1}{2} B$.
7. 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.
8. Cover existing speed limit signs within reduced speed zones.
9. Where necessary, engineer will determine safe speed.
10. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
11. Sign G20-55-96 is not required if this standard is part of other traffic control, or the work is less than 15 days.
12. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

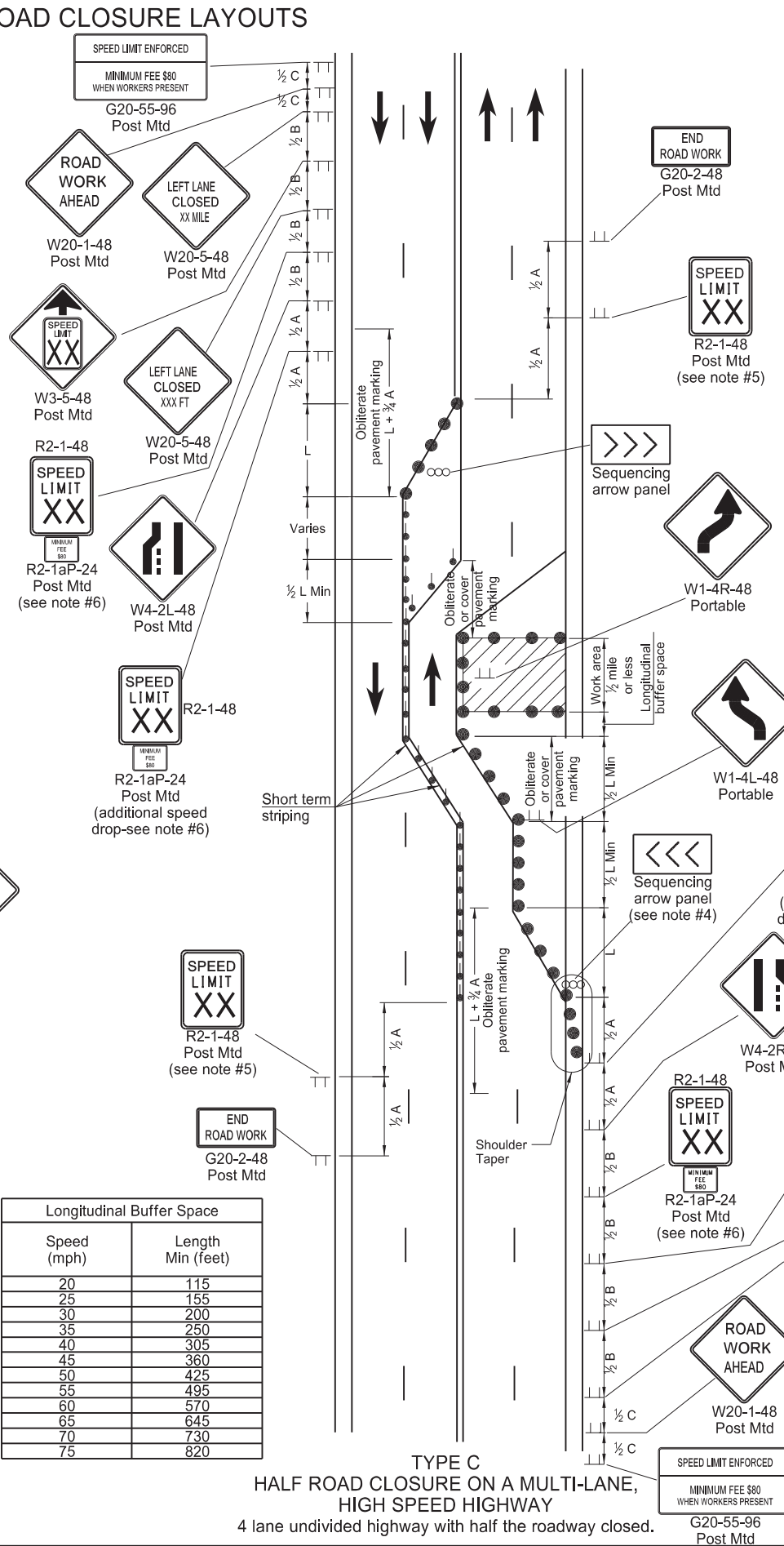
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

KEY			
	Type III barricade		Work area
	Sign		Flagger
	Delineator drum		Sequencing arrow panel
	Tubular markers		Vertical panels back to back

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



**TYPE B
ROAD CLOSURE WITH A DIVERSION**
Two lane highway where roadway is closed and detour provided (signing shown for one direction only). Use on bridge and culvert installation with $\frac{1}{2}$ mile or less closure.

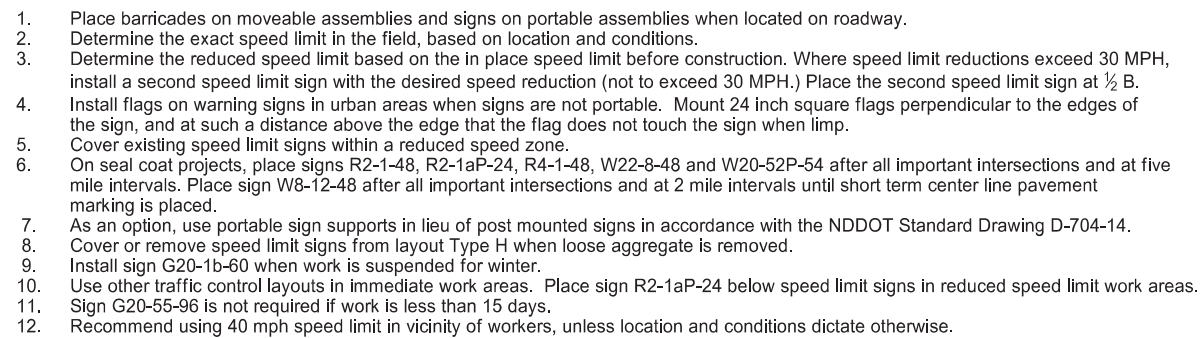


**TYPE C
HALF ROAD CLOSURE ON A MULTI-LANE,
HIGH SPEED HIGHWAY**
4 lane undivided highway with half the roadway closed.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated notes & Speed Limit signs
11-01-19	Sign, Notes, and Pymt Mkg updates

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D-704-20



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 75 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
8-17-17 11-01-19	Updated notes & sign numbers, Note & sign updates.

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CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22

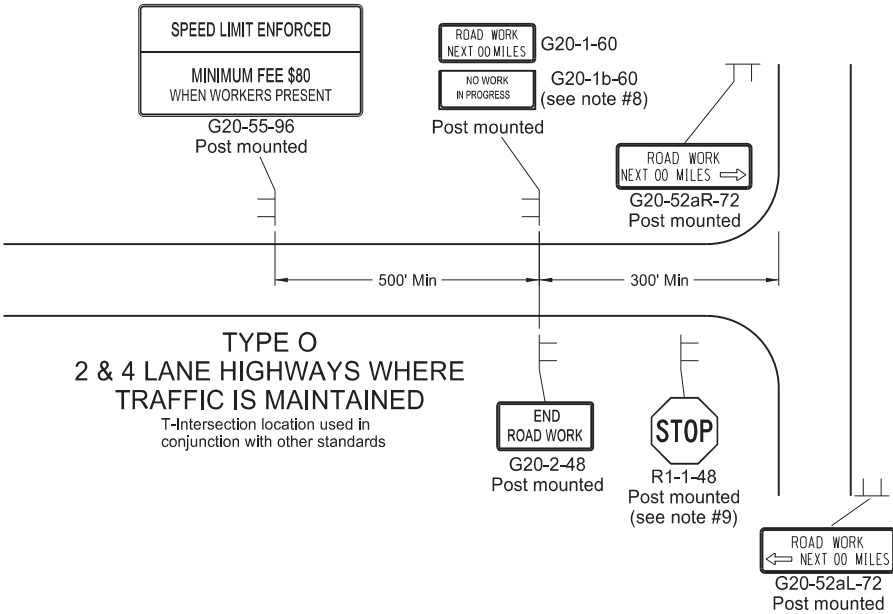
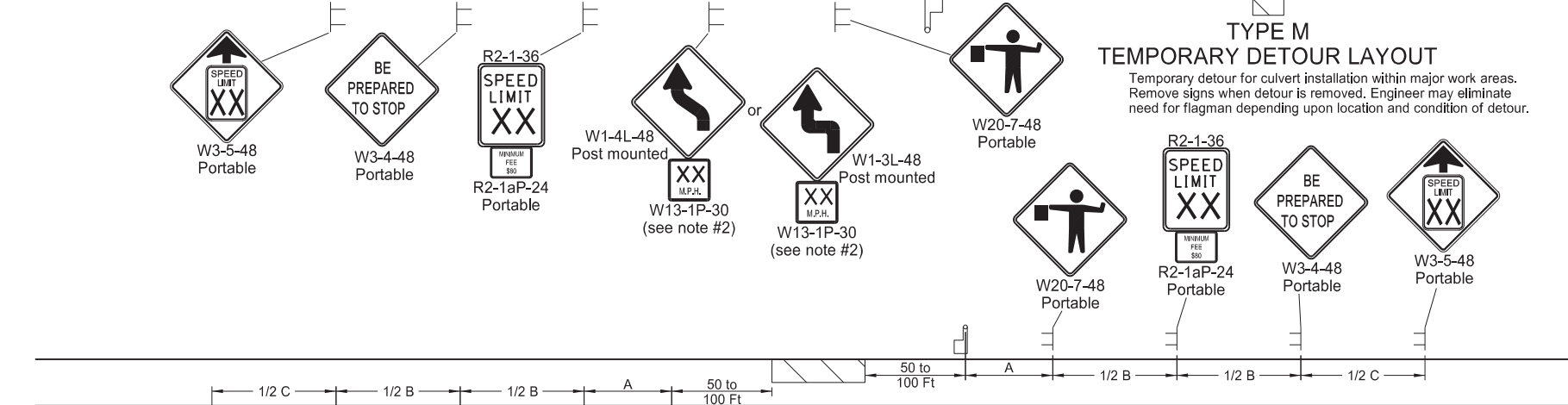
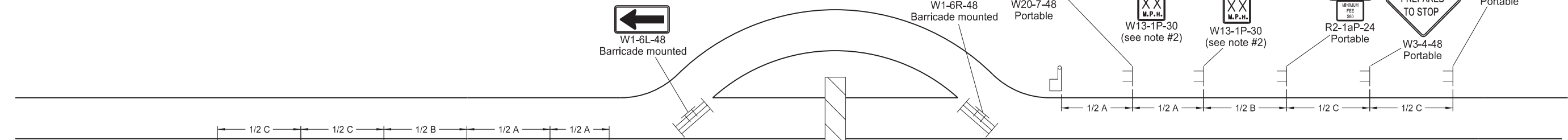
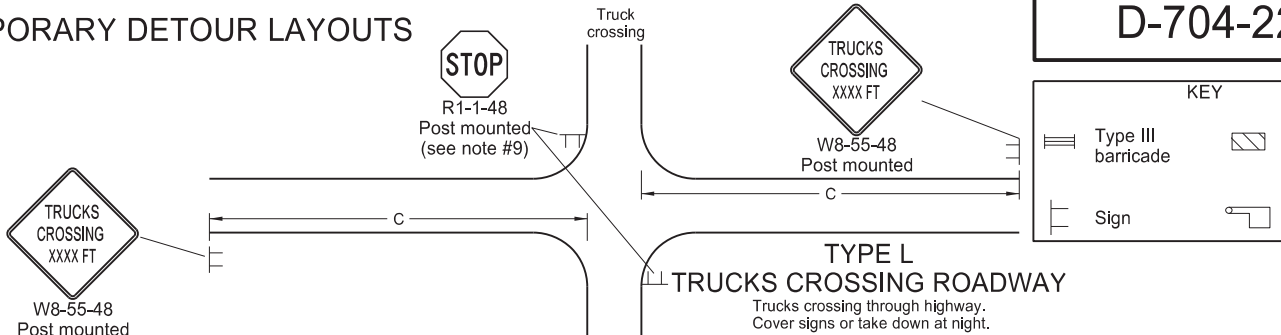
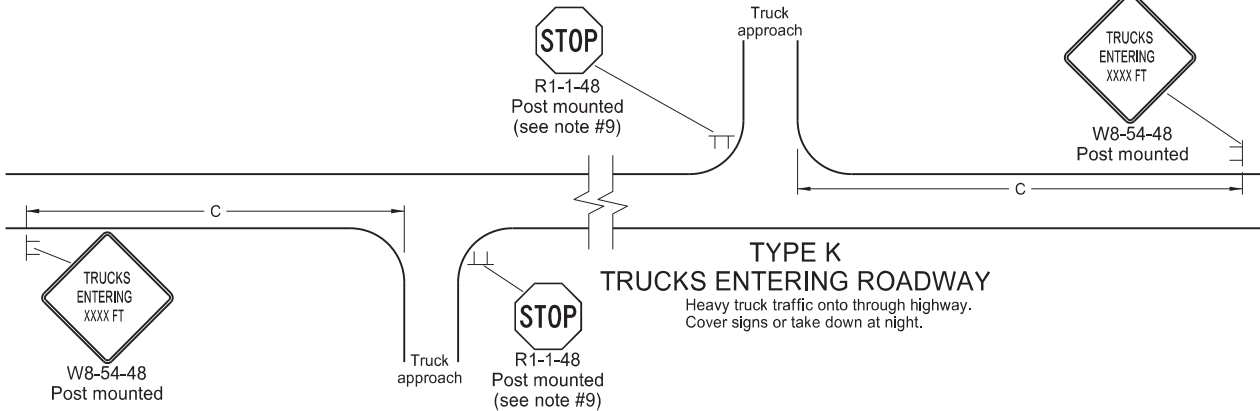
KEY

Type III
barricade

Sign

Work area

Flagger



- 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 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 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

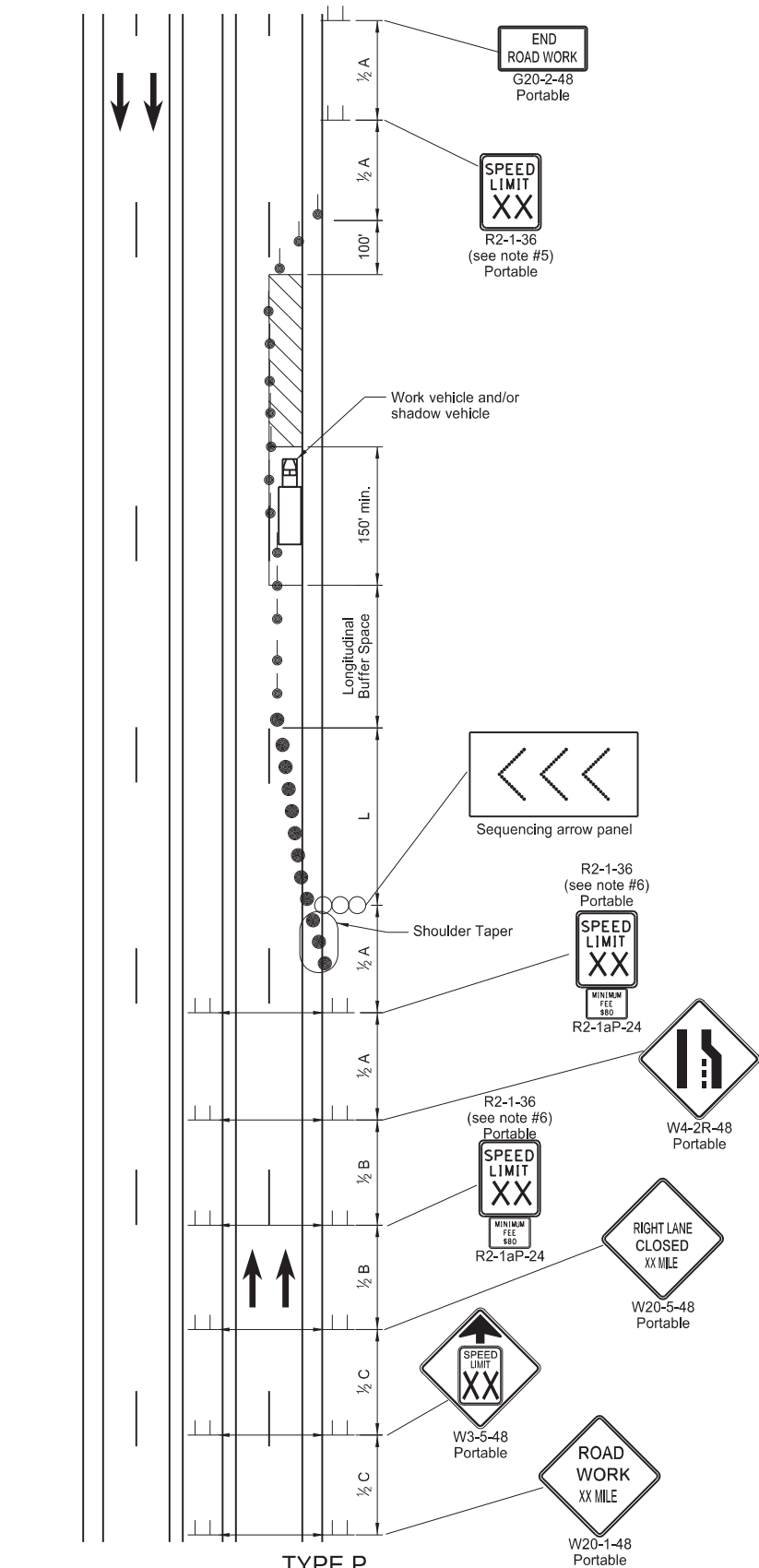
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
8-17-17 11-01-19	Update notes & sign numbers Revised sign numbers & note 7

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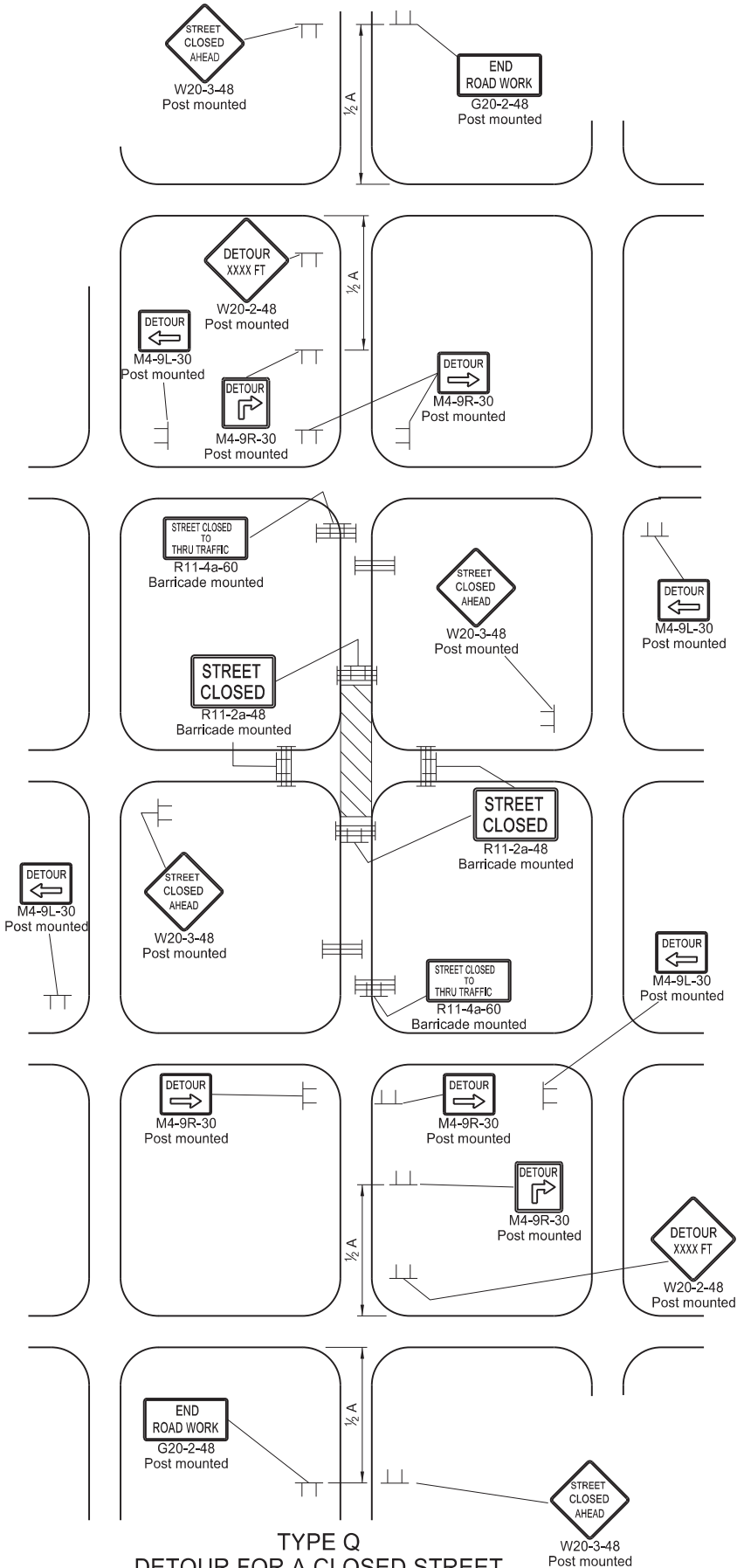
SHORT TERM URBAN DETOUR AND LANE CLOSURE ON A DIVIDED HIGHWAY LAYOUTS

D-704-23

- Notes
1. Variables
- S = Numerical value of speed limit or 85th percentile.
W = The width of taper in feet
L = Minimum length of taper, S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater, or W x S²/60 for urban, residential, and other streets with speeds of 40 mph or less.
2. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
3. Space delineator drums for tapering traffic at dimension "S". Space delineator drums or tubular markers for tangents at 2 times "S".
4. Place Sequencing Arrow Panels at the beginning of taper. Where shoulder width does not provide sufficient room, move panel closer to the work area and place on 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).
5. Re-established speed limit. Determine exact speed limit in the field, dependent on location and conditions.
6. 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.
7. 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.
8. Cover existing speed limit signs within a reduced speed zone.
9. Covered (when approved by engineer) or obliterated payment marking measured as as Obliteration of Pavement Marking.
10. Change intersection control on detour for Type Q when determined necessary by the engineer.
11. Engineer to determine safe speed where necessary. When parking is present, place signs so they are entirely visible above parked vehicles or at the edge of the parking area so they are visible to oncoming traffic.
12. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
13. Recommend using 40 mph speed limit in vicinity of workers for Layout Type P, unless location and conditions dictate otherwise.



TYPE P
STATIONARY LANE CLOSURE ON A DIVIDED HIGHWAY
4 lane divided roadway where 1/2 of roadway is closed.
Short-term (more than 1 hour within a single daylight period.)



TYPE Q
DETOUR FOR A CLOSED STREET
Where city streets are used for detouring traffic.
Urban projects do not require the G20-55-96 and R2-1aP-24 signs.

KEY			
	Type III barricade		Work area
	Sign		Sequencing arrow panel
	Delineator Drum		Tubular Markers

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs		
	Min.	(ft)	
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 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

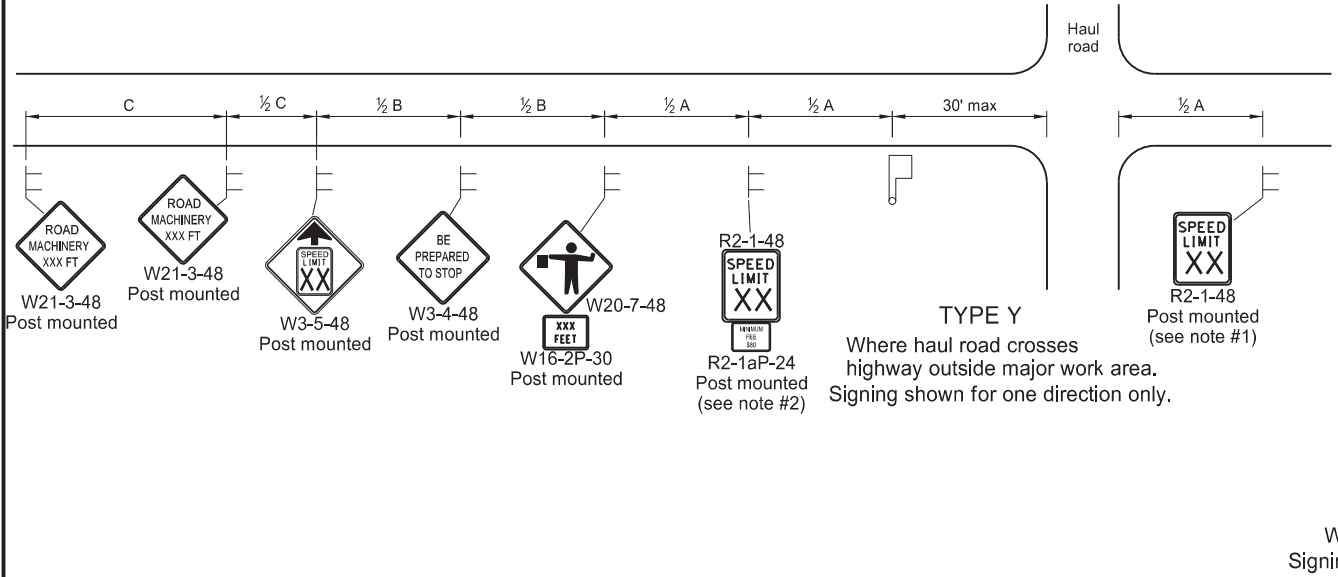
Longitudinal Buffer Space	
Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
8-17-17	Removed Speed limit signs, & updated notes & sign numbers.
11-01-19	Revised sign numbers & note.

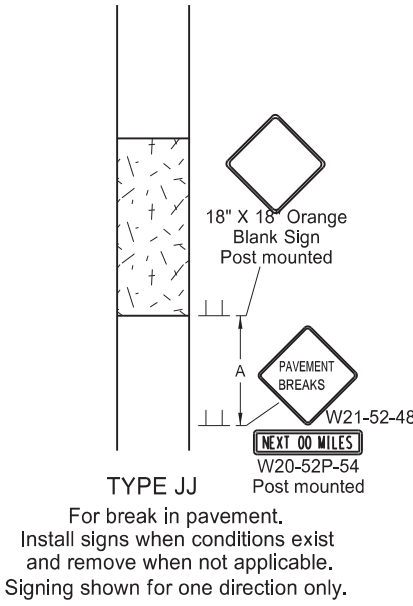
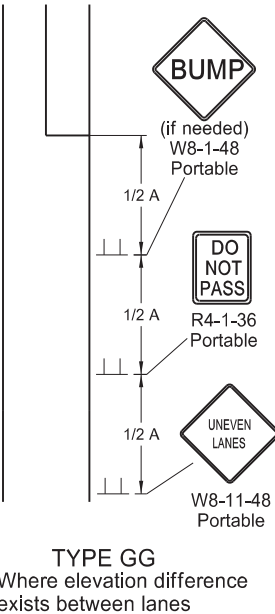
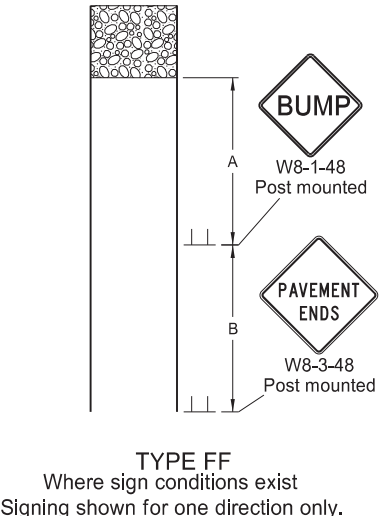
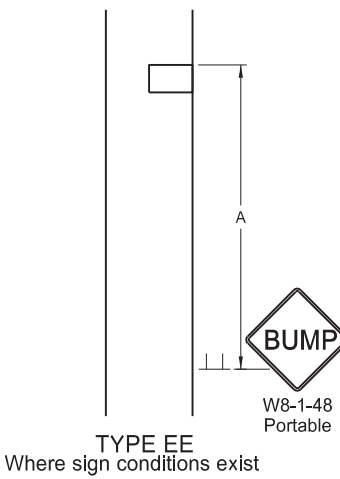
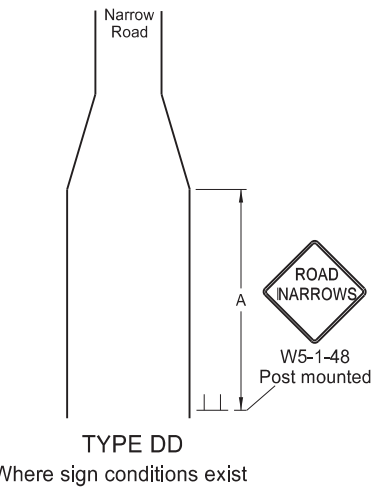
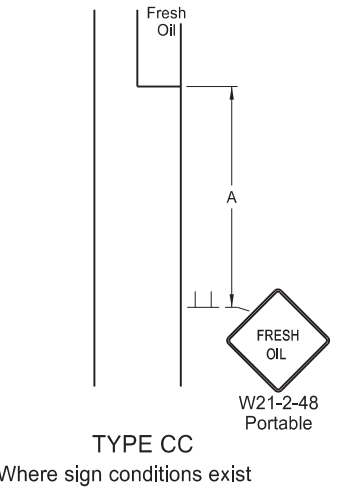
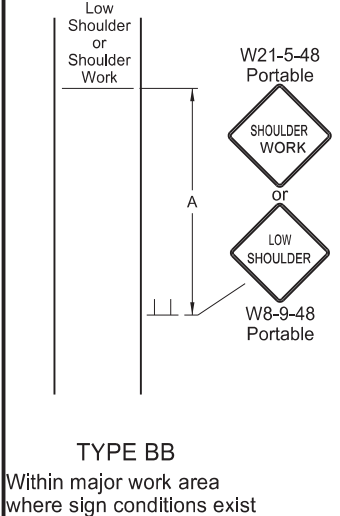
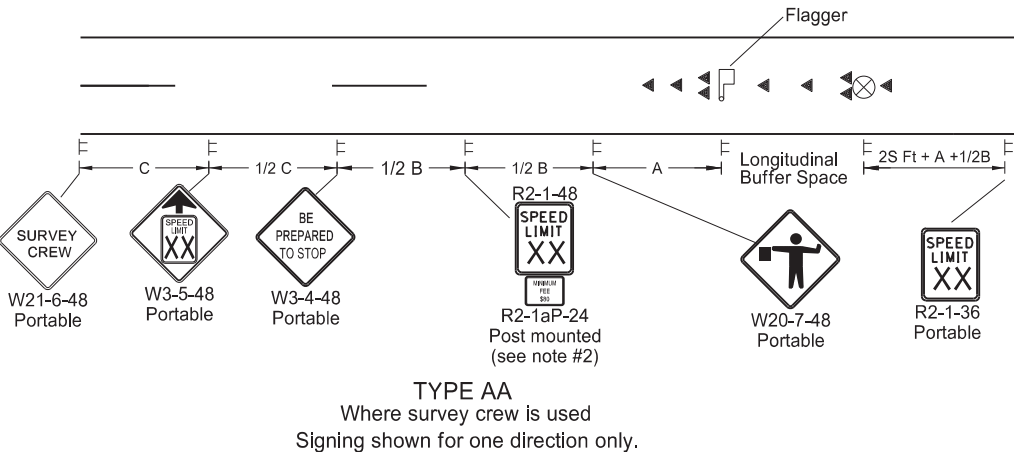
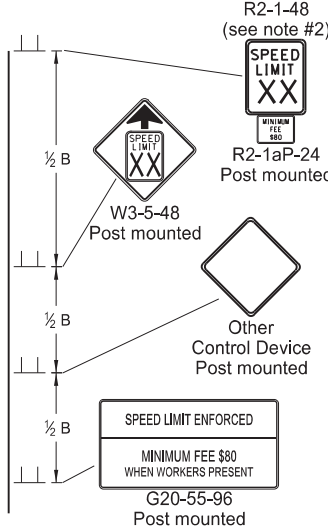
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MISCELLANEOUS SIGN LAYOUTS

D-704-26



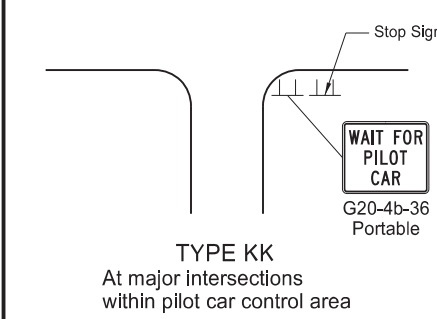
TYPE Z
Where speed zone is needed
Signing shown for one direction only.



KEY

- Flagger
- Sign
- Cones
- Survey Equipment

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



- 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 1/2B.
 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
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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

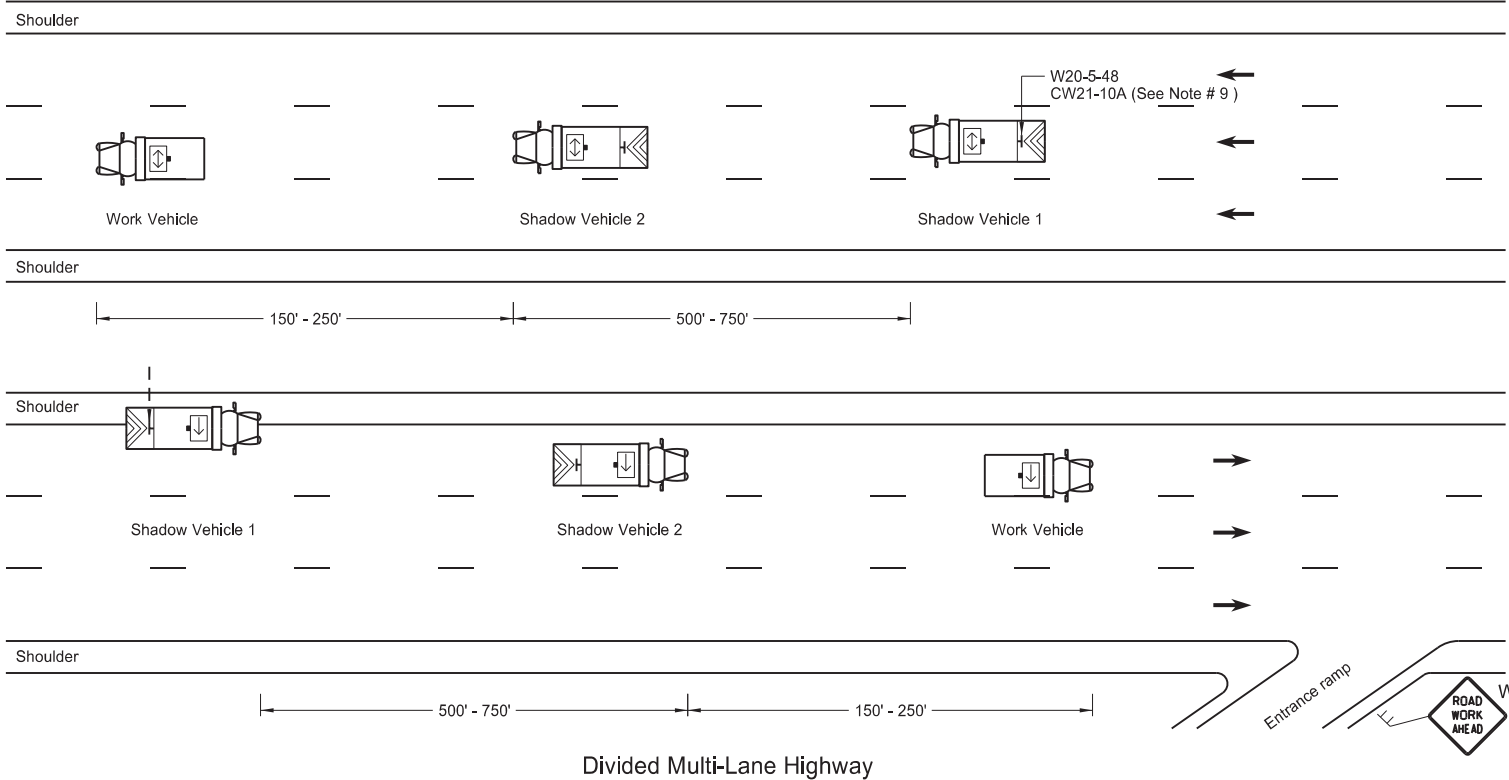
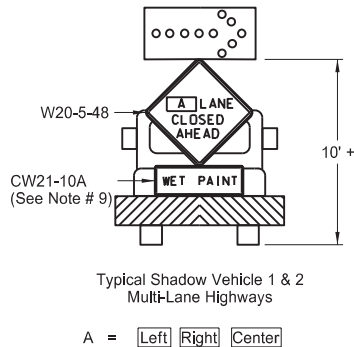
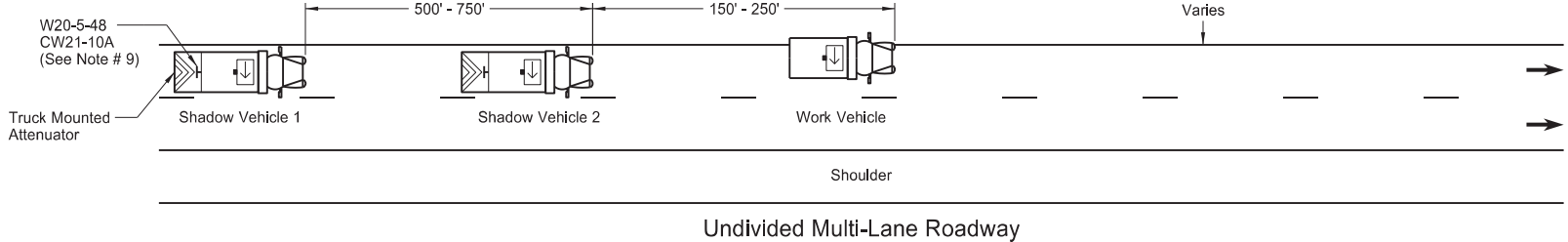
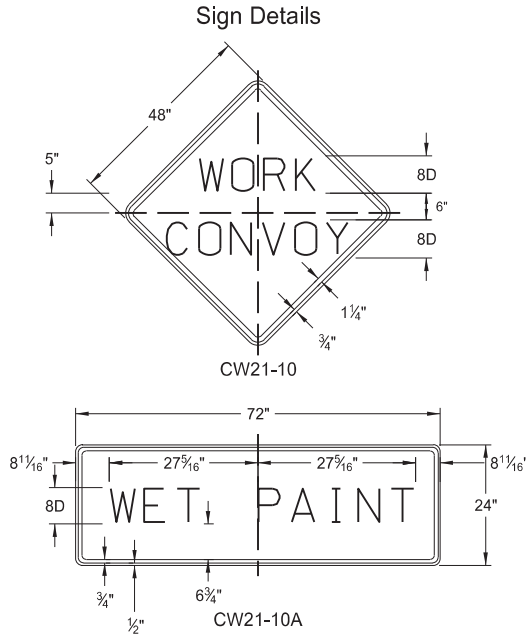
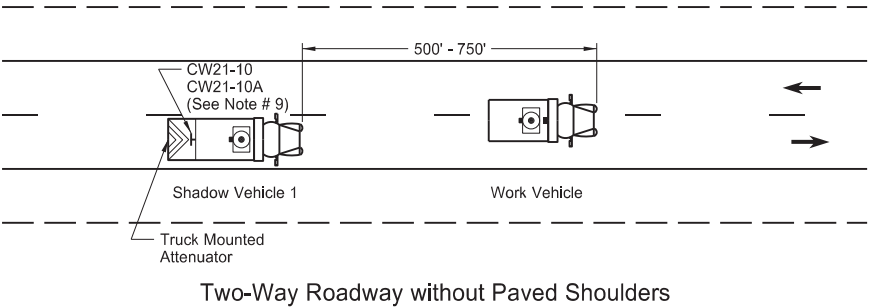
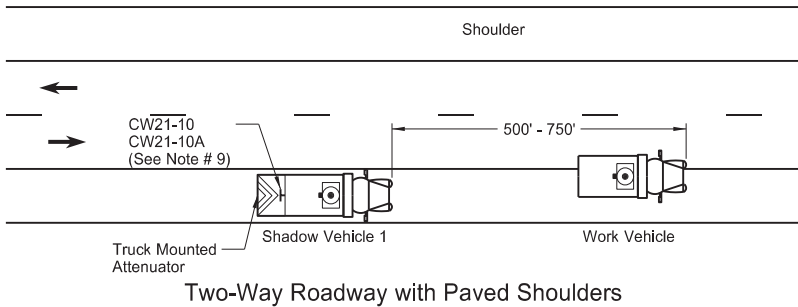
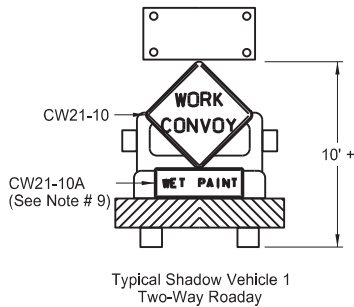
* Posted speed, off-peak 85th percentile speed prior to work starting, or the anticipated operating speed in mph.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
8-17-17	Added speed limit signs. Updated notes & sign numbers.
11-01-19	Revised note 5 & sign numbers.

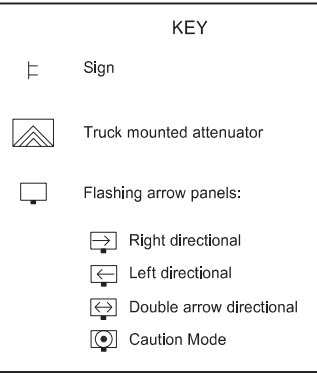
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MOBILE OPERATION
(PAVEMENT MARKING)

D-704-27



- 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.

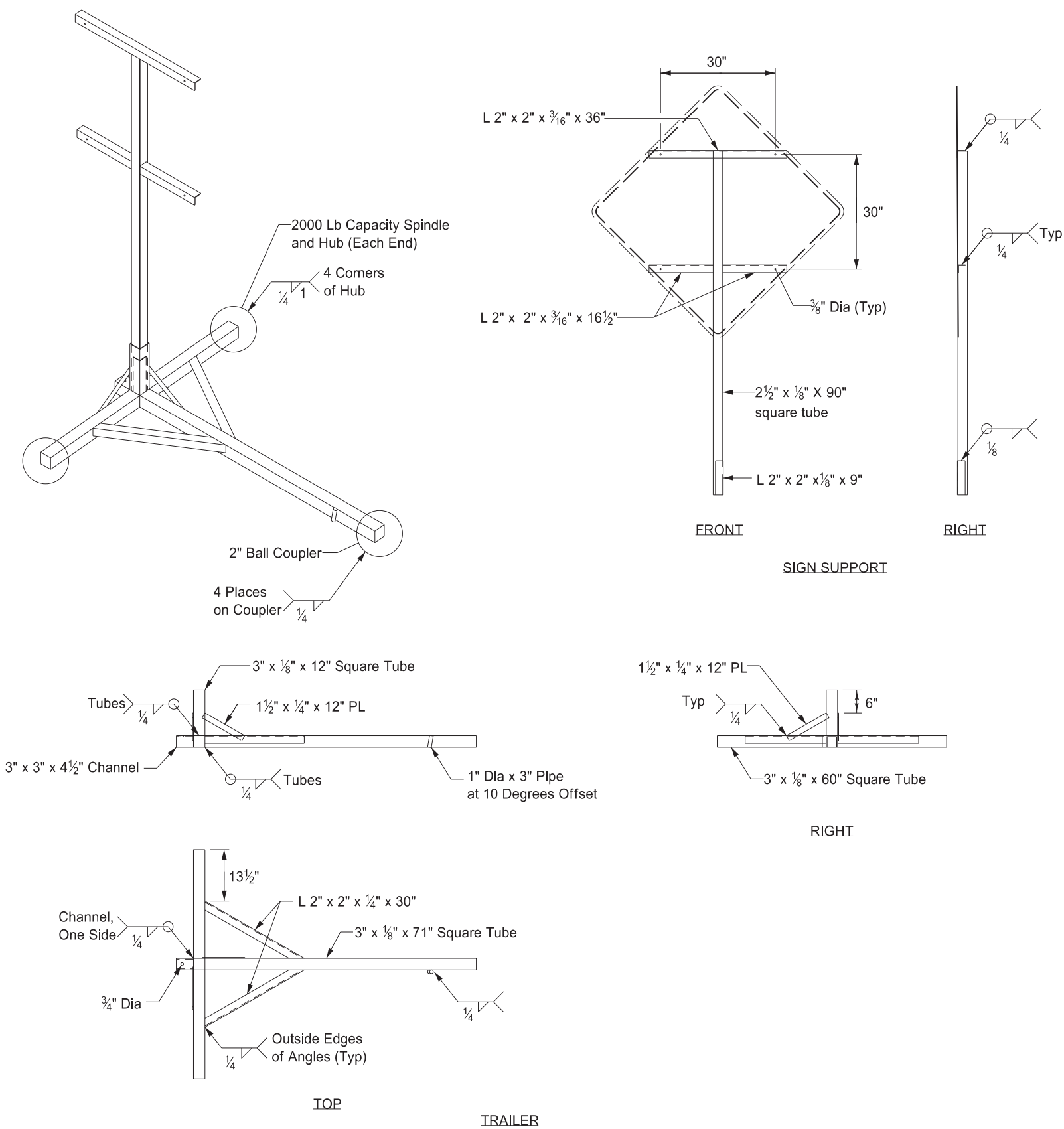


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
6-18-14	Removed shadow vehicle 2 on two lane roadways
9-27-17	Updated to active voice
11-08-19	Changed Standard Heading

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PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



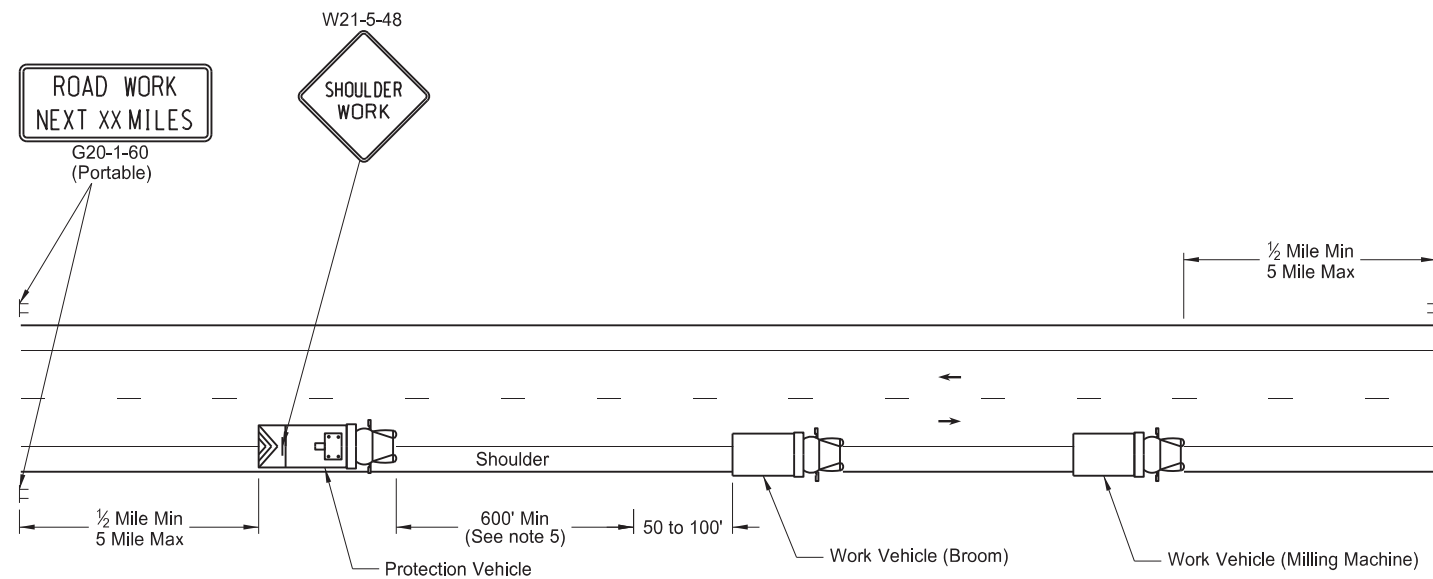
- Notes:
- ①. Maximum 250 pound weight of assembly.
 - ②. Use a 14" wheel and tire.
 - ③. Use no automotive and equipment axle assemblies for trailer-mounted sign supports.
 - ④. Other NCHRP 350 or MASH crash tested assemblies are acceptable.

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

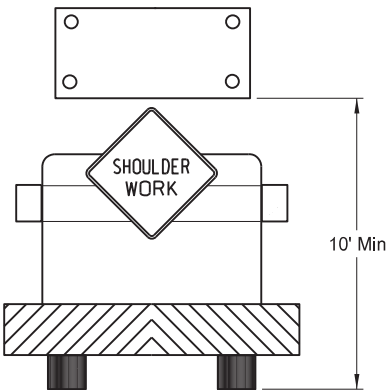
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MOBILE OPERATION
Grinding Shoulder Rumble Strips

D-704-56



TWO LANE - TWO WAY ROADWAY

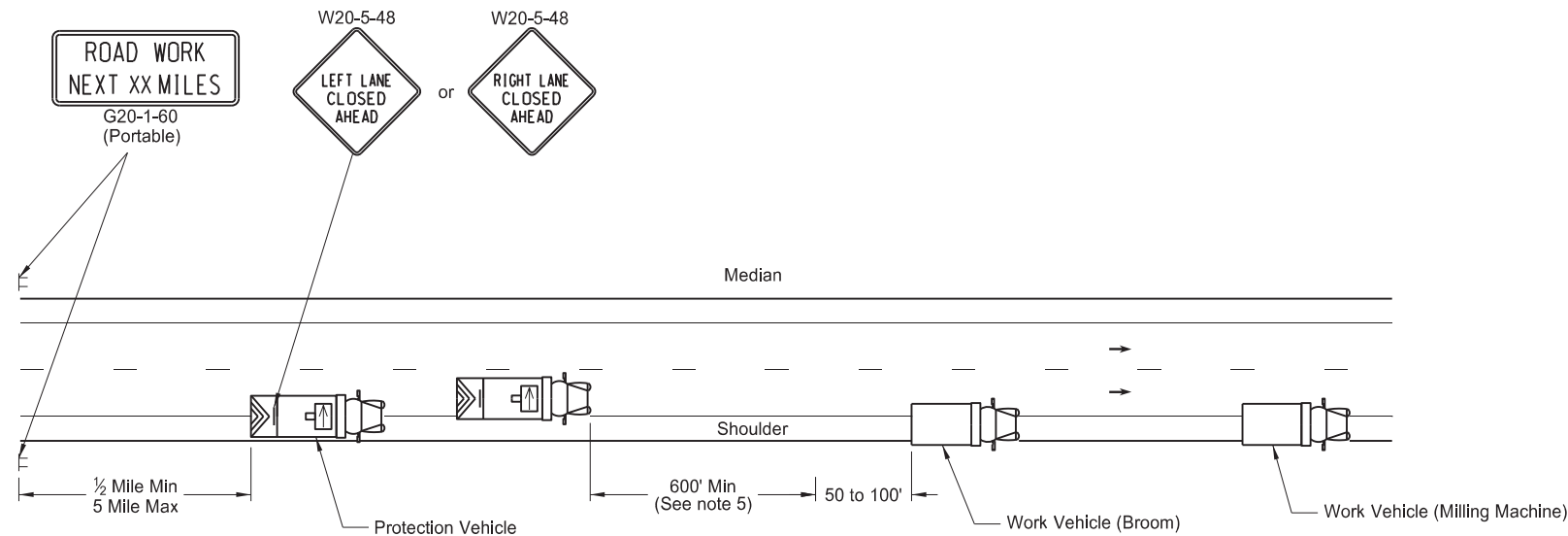


TWO LANE - TWO WAY ROADWAY

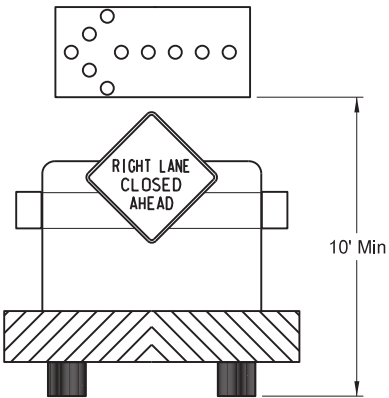
Typical Protection Vehicle with
Flashing Arrow Panel In Caution Mode

Notes:

1. Provide truck mounted attenuators on additional vehicles in the convoy, at no additional cost.
2. Provide rotating, flashing, oscillating, or strobe lights on vehicles.
3. Provide Type B or Type C flashing arrow panels that are controlled from inside the vehicle.
4. Provide two - way electronic communication capability in each vehicle.
5. Vary vehicle spacing between the protection vehicle and work vehicle depending on sight distance restrictions. Keep the spacing of the convoy vehicles such that motorists approaching the work convoy can see the protection vehicle in time to slow down and safely pass the work vehicles.
6. Move advance Road Work Ahead signs as the work area moves through the construction zone.

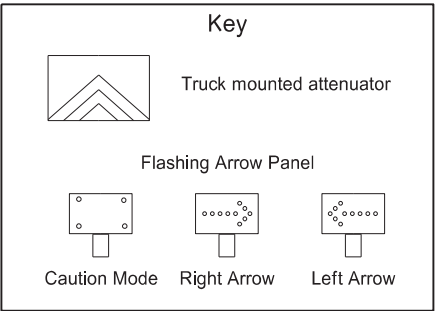


INTERSTATE & 4 LANE DIVIDED HIGHWAY



INTERSTATE & 4 LANE DIVIDED HIGHWAY

Typical Protection Vehicle with Flashing Arrow
Panel In Flashing Arrow Mode

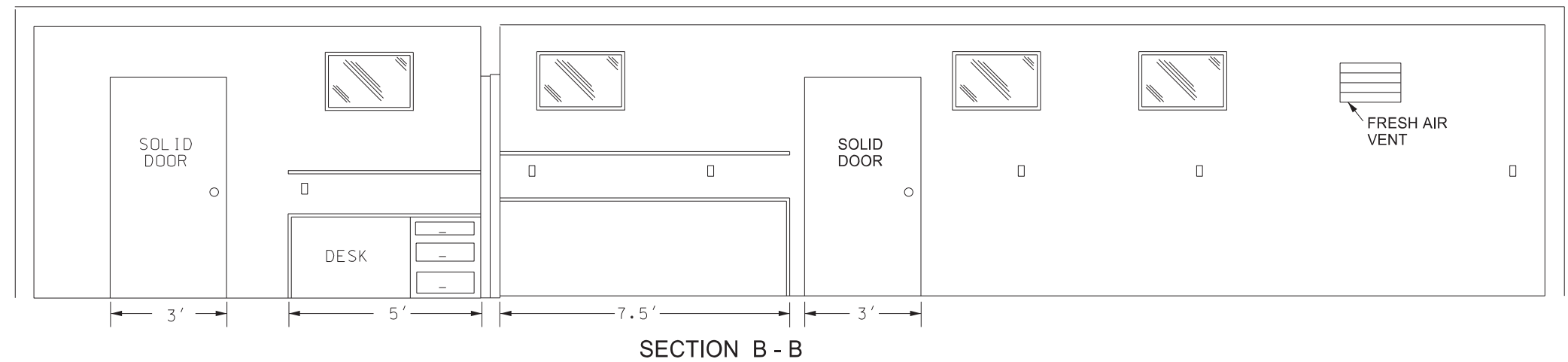
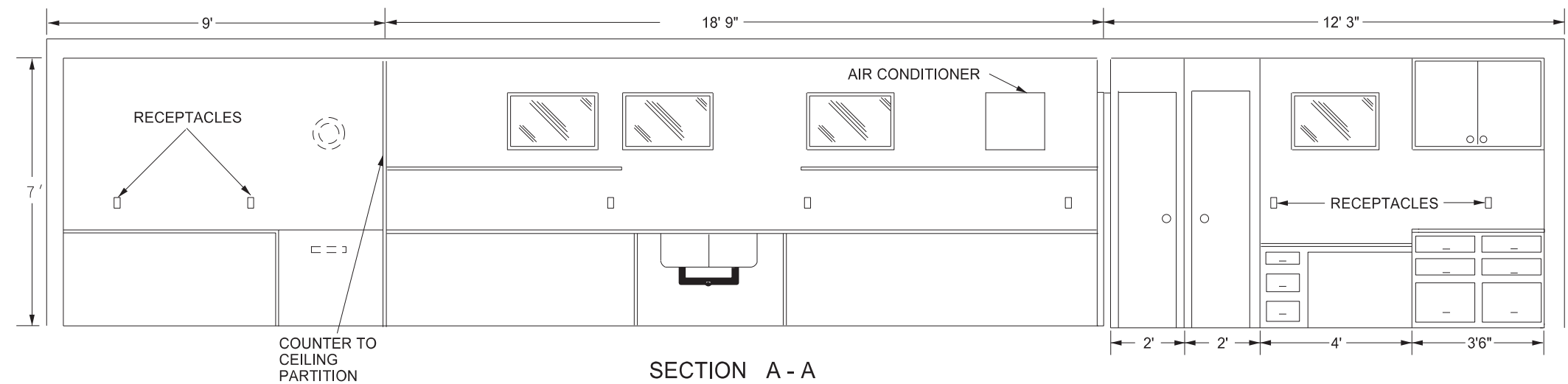
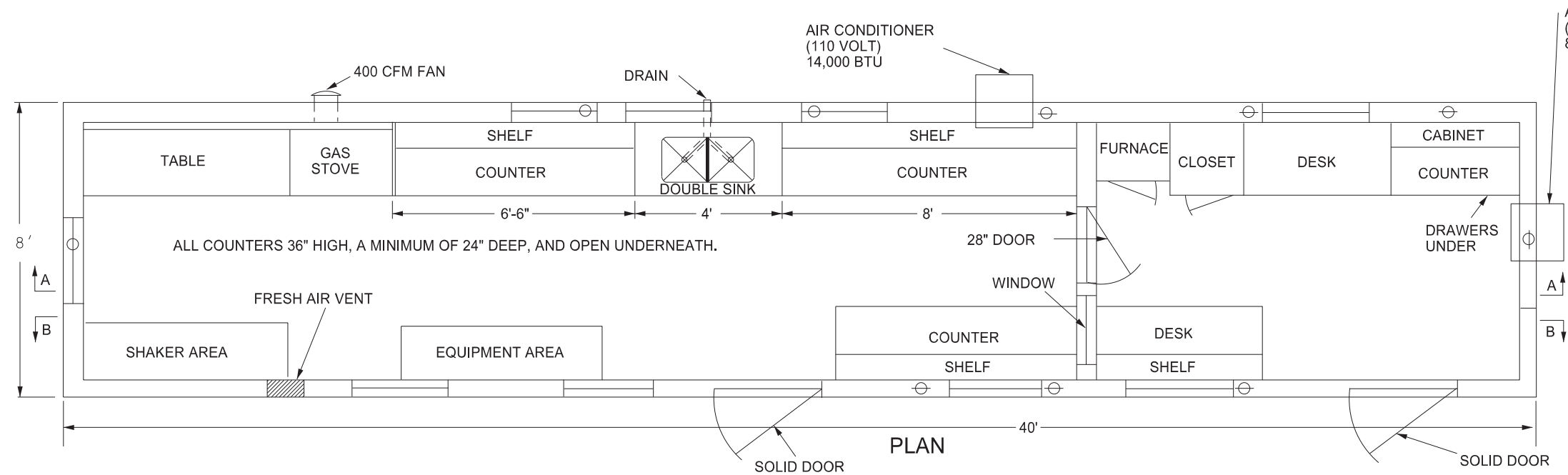


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-15-12	
REVISIONS	
DATE	CHANGE
8-17-17	Updated notes & signs
10-03-19	New Design Engineer PE Stamp

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BITUMINOUS LABORATORY

D-706-1

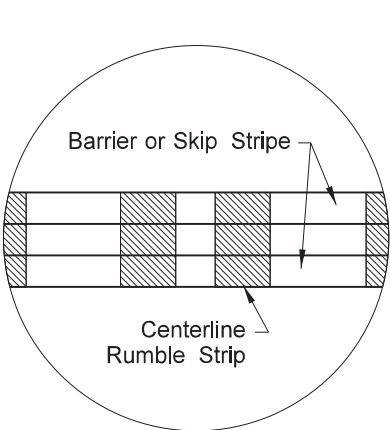
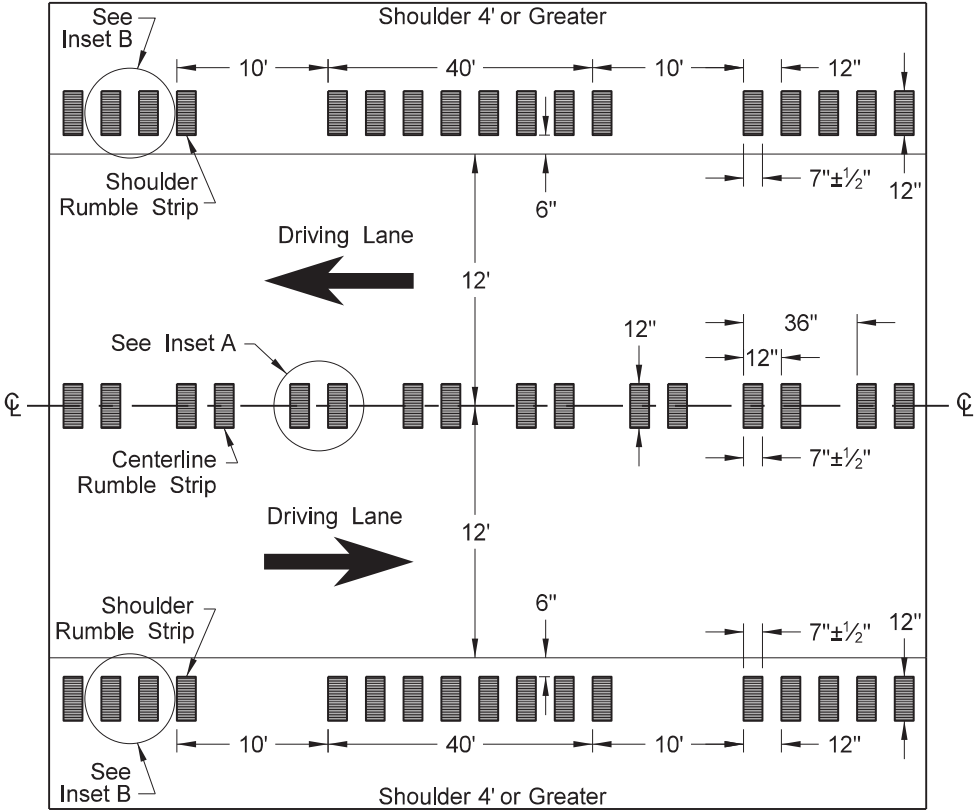


Provide a laboratory with the following:

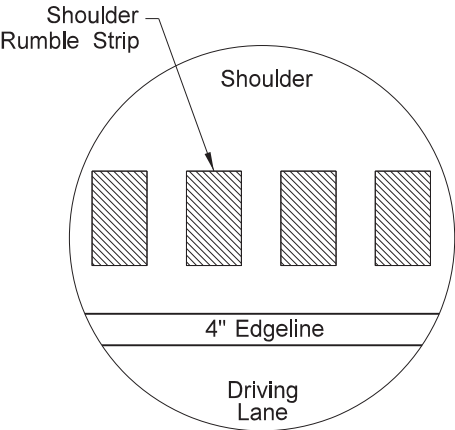
1. A 1'x1' shelf at 36" above the regular countertop.
2. Double compartment stainless steel sink, with each compartment a minimum of 16"x14"x10" deep. Provide water service lines made of copper or plastic and a diameter of ½ inch.
3. An exhaust fan capable of removing inside air at a rate of 400 CFM.
4. Fresh air vent hinged to open or close manually.
5. 24" x 48" table capable of holding a 200 lb masonry saw with a minimum clearance of 36" above the table.
6. A water supply tank with a capacity of 500 gallons and a 20 gallon capacity pressure tank on the pump.
7. Heavy duty type locks, latches, and hinges for doors made to withstand the intense use in service.
8. A wall between the office and the work area properly insulated to prevent the transmission of heat and noise.
9. The steel cable tie downs and ground anchors at each corner of the lab.
10. Electrical service entrance wired for 100 amps and separate circuits for air conditioners. Space convenience outlets in counter areas a minimum of four feet apart.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
07-30-14	Changed standard's title and revised notes.
01-11-16	Revised notes.
08-27-19	New Design Engineer PE Stamp

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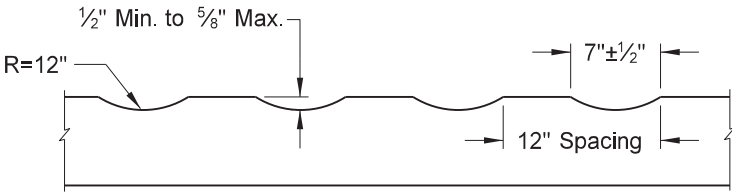
Inset A - Centerline Rumble Strip



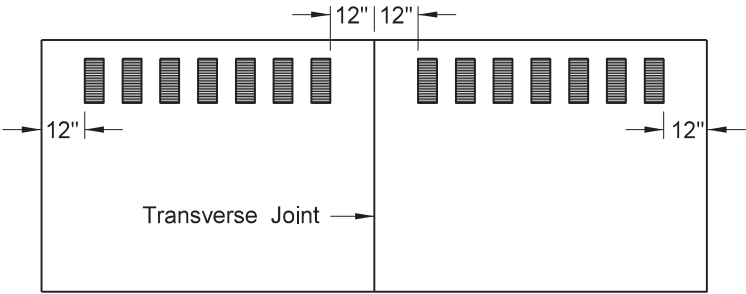
Inset B - Shoulder Rumble Strip

- NOTES:
- 1) Discontinue shoulder rumble strips through the entire length of right turn lanes, 100' before right turn lane tapers, and at the radius of a paved or gravel highway, section line, approach, or private drive.
 - 2) Discontinue centerline rumble strips through the entire length of left turn lanes, 100' before left turn lane tapers and median islands, and 100' before and after a paved or gravel highway, section line, approach, or private drive.

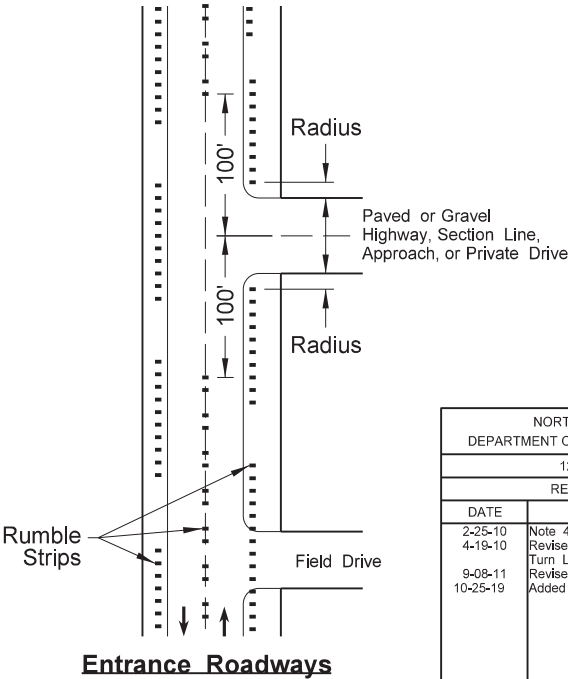
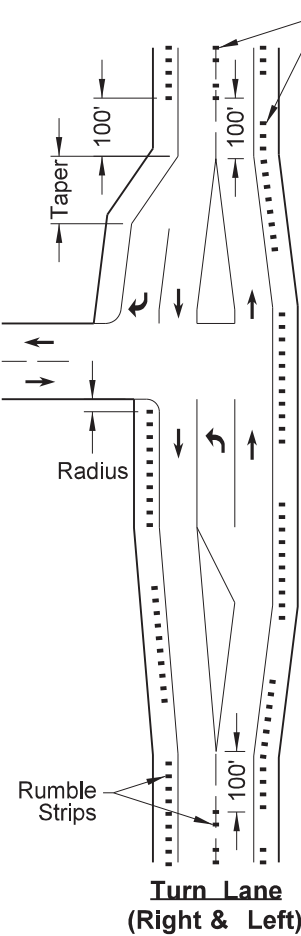
Undivided Highways (Shoulders 4' or Greater)



Profile of Rumble Strips - Bituminous and PCC Pavements



Discontinue rumble strip approx. 12" on both sides of PCC transverse joint



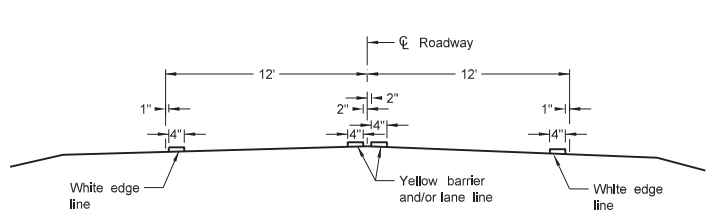
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-29-09	
REVISIONS	
DATE	CHANGE
2-25-10	Note 4 was added.
4-19-10	Revised Note 5, Note 6, and Turn Lane (Right & Left).
9-08-11	Revised Notes and D-760-3.
10-25-19	Added missing dimensions.

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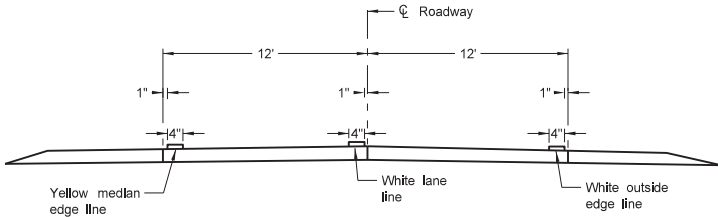
PAVEMENT MARKING

D-762-4

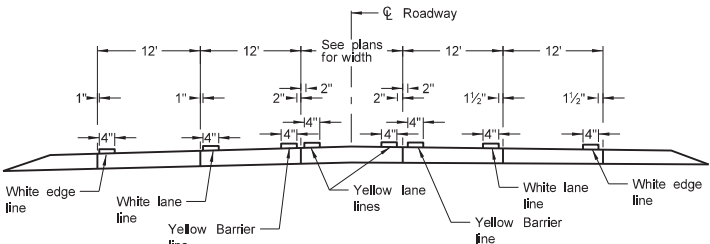
- NOTES:
- 1. Continue edge lines through private drives and field drives. Break edge lines for intersections.



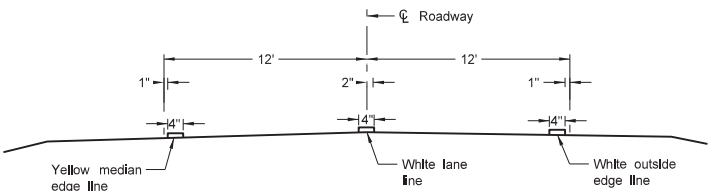
Two Lane Two Way
RURAL ROADWAY



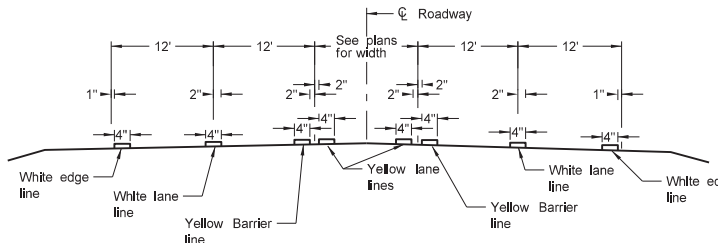
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



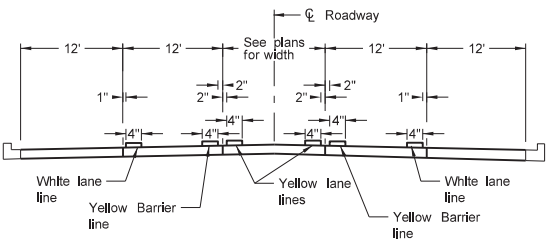
RURAL FIVE LANE ROADWAY
Concrete Section



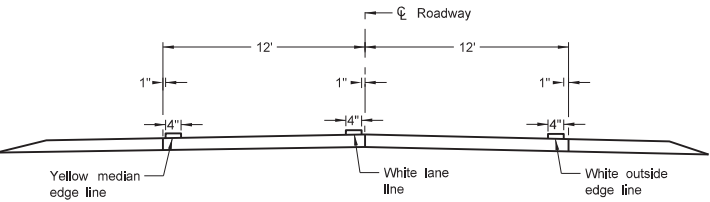
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



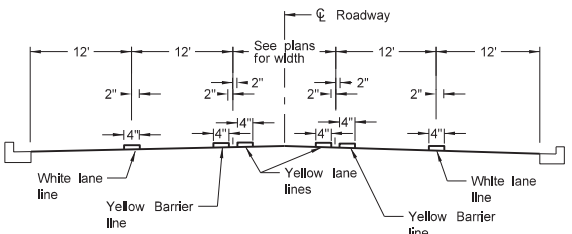
RURAL FIVE LANE ROADWAY
Asphalt Section



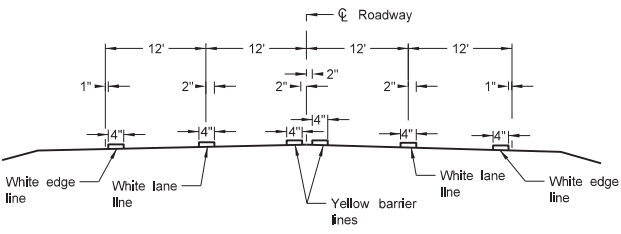
URBAN FIVE LANE SECTION
Concrete Section



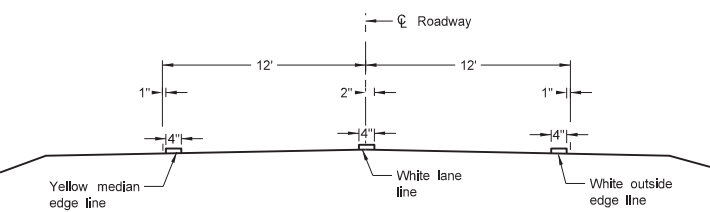
Two Lane Roadway
PRIMARY HIGHWAY
Concrete Section



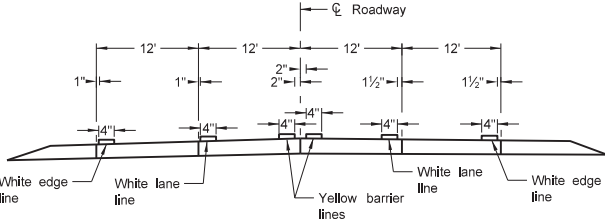
URBAN FIVE LANE SECTION
Asphalt Section



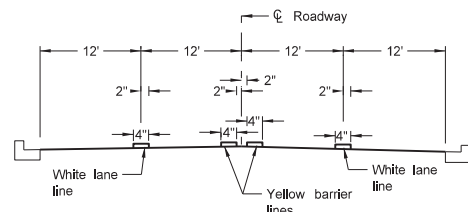
RURAL FOUR LANE ROADWAY
Asphalt Section



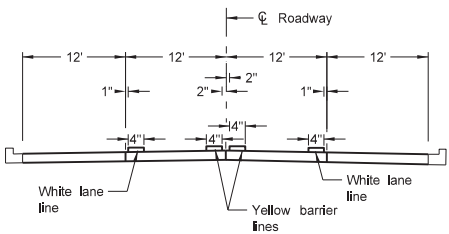
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



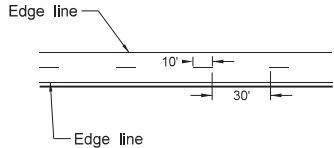
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



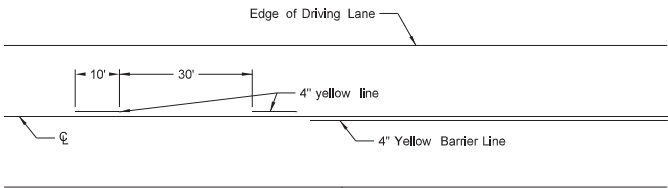
CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
10-17-17 08-27-19	Updated to active voice. New Design Engineer PE Stamp.

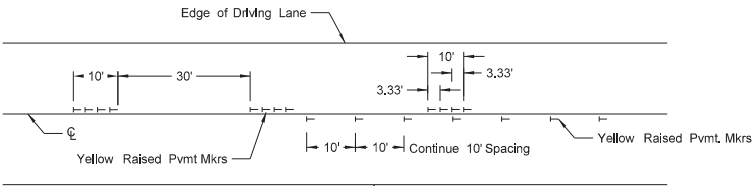
This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE-4683,
on 8/27/19 and the original document is stored at the
North Dakota Department
of Transportation

SHORT-TERM PAVEMENT MARKING

D-762-11

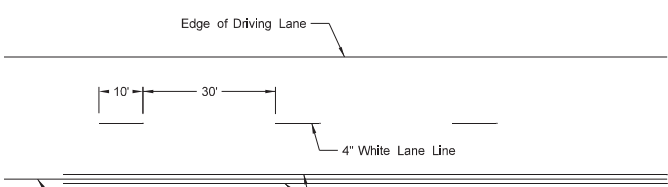


Painted or Tape Lines

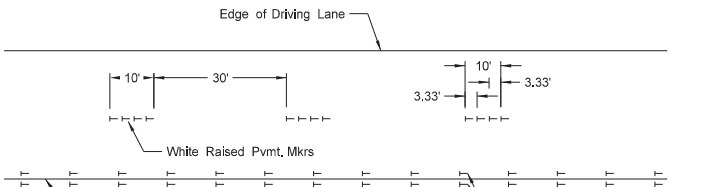


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

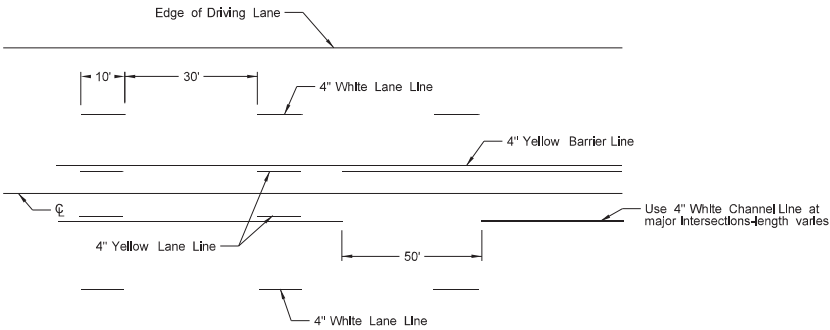


Painted or Tape Lines

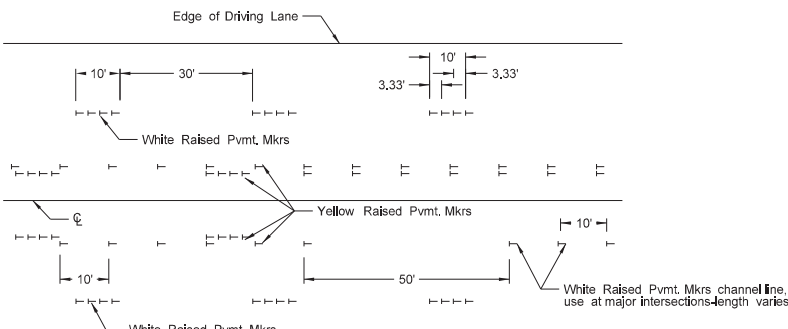


Raised Pavement Markers

FOUR LANE ROADWAY

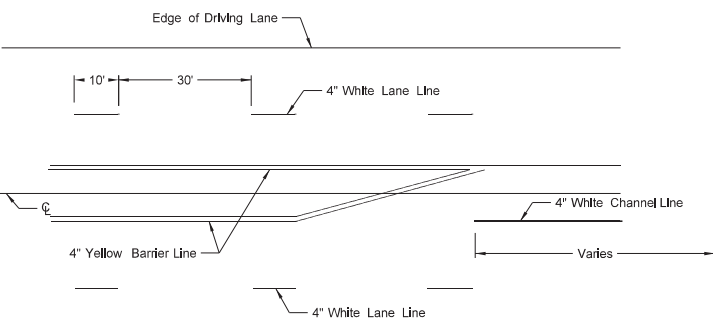


Painted or Tape Lines

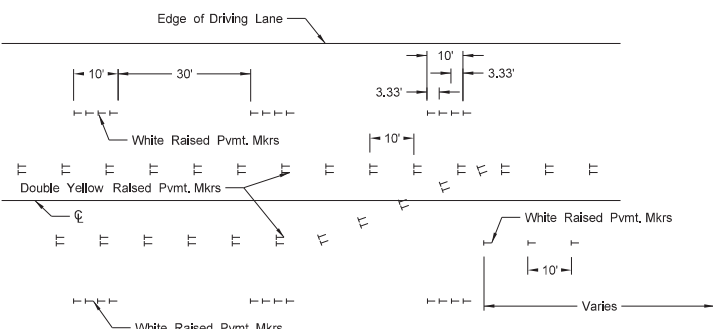


Raised Pavement Markers

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.

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.

This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683 ,
on 8/27/19 and the original document is stored at the
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of Transportation