

DESIGN DATA				
Traffic		Average Daily		
Current 2023	Pass: 1137	Trucks: 507	Total: 1645	
Preventive Maintenance				

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

NH-2-052(055)252
Stutsman County
US 52 - Buchanan Southeast to Jamestown
Southbound/Eastbound and Northbound/Westbound
Mill & Overlay 2" Max

	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	NH-NHU-2-052(055)252	24098	1	1

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

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
NH-2-052(055)252 (NB/SB) Frontage Road	12.304 1.427	12.304 1.427

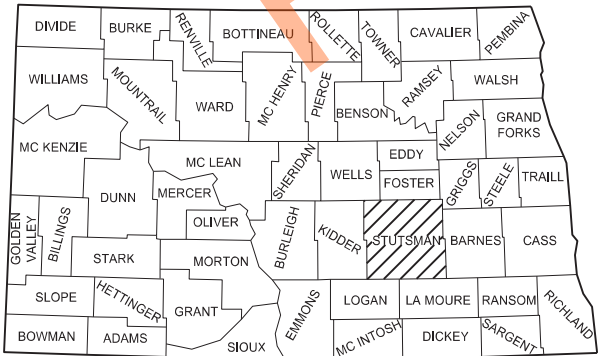
Begin Project H-2-052(042)252
RP 252.609 (NB/SB) (Sta 3337+78)

Sta Equation
Sta 3865+82.63 Bk
= Sta 13868+55.47 Ahd

Sta Equation
Sta 13907+15.00 Bk
= Sta 3904+42.16 Ahd

End 4 Lane Divided Highway
Begin 4 Lane with Turn Lanes
Sta 3967+00

End Project H-2-052(042)252
RP 264.913 (Sta 3987+42.68)
End at James River Bridge



STATE COUNTY MAP

DESIGNER Tyler Peterson
DESIGNER Harrison Philipp
DESIGNER

ND DEPARTMENT OF TRANSPORTATION
VALLEY CITY DISTRICT
Nathan Haaland
09/01/26

NDDOT VALLEY CITY DISTRICT



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6	1 - 2	Notes	D-101-30, 31, 32, 33	Symbols								
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100	1 - 2	Work Zone Traffic Control	D-704-13	Barricade And Channelizing Device Details								
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			D-704-34	Sign Layout For One Lane Closure								
			D-704-50	Portable Sign Support Assembly								
			D-704-56	Mobile Operation - Grinding Shoulder Rumble Strips								
			D-706-1	Bituminous Laboratory								
			D-760-2	Rumble Strips - Divided Highways (Non-Interstate)								
			D-760-5	Saw Slotted Rumble Strips At Intersections								
			D-762-1	Pavement Marking Message Details								
			D-762-4	Pavement Marking								
			D-762-11	Short-Term Pavement Marking								
SPECIAL PROVISIONS												
Number	Description											
604(25)	Flexible Pavement Surface Tolerance											
603(25)	E-Ticketing (Mandatory)											
SSP 4	Longitudinal Joint Density											

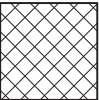
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-NHU-2-052(055)252	4	1

Begin Project SNH-2-052(055)252
Sta 3337+78 NB/SB
RP 252.609

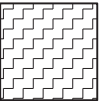
Buchanan



Legend



Sub Project 1 - Mainline - 0.5" Milling and 2" RHMA Overlay



Sub Project 2 - Urban - 0.5" Milling and 2" RHMA Overlay

Sta Equation
Sta 3865+82.63 Bk
Sta 13868+55.47 Ahd

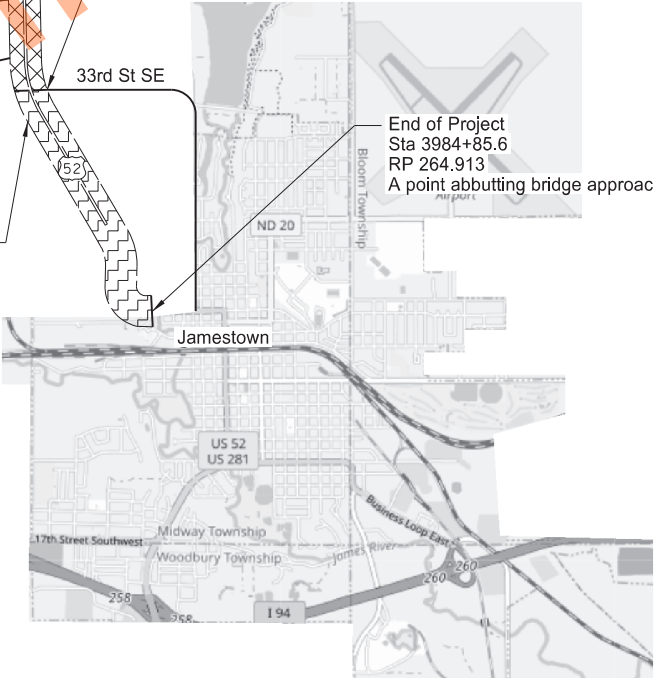
Begin Urban Portion
Sta 13895+50

33rd St SE

End of Project
Sta 3984+85.6
RP 264.913
A point abutting bridge approach slab.

BYP
281

Sta Equation
Sta 13907+15.00 Bk
Sta 3904+42.16 Ahd



Scope of Work

US Hwy 52





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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Sub Project 2 - Urban

-  0.5" Mill and 2" Overlay
-  2" Mill and 2" Overlay
-  75' Transition area

Scope of Work
Frontage Road



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	NH-NHU-2-052(055)252	6	1

NOTES

107-P01

HAUL ROADS RESTORATION: Use Class 13 aggregate for haul road restoration.

203-P01

SHOULDER PREPARATION: Remove all paragraphs in section 230.04 B. in the Standard Specifications and replace with the following: “Spray herbicide to kill all vegetation and roots on the pavement slough and within 2 feet of the outside edge of the slough. Spray herbicide to kill all vegetation and roots on existing aggregate shoulder. Mix and apply the herbicide according to the manufacturer’s recommendations. Spray herbicide in two applications that are three weeks apart. Complete spraying no more than 30 days before starting paving operations. Take precautionary measures to prevent any damage to adjacent vegetation caused by the spraying operation.”

302-P02

SALVAGE BITUMINOUS BASE COURSE: Use project millings as Salvage Bituminous Base Course. Ensure the material meets the 100% passing 1-1/2" sieve size requirement fromSection 817 B, "Salvaged Base Course Gradation." Disregard all other requirements from Section 302.03, "Materials," of the Standard Specifications. Bituminous Base Course material in the bid price or "SALVAGE BITUMINOUS BASE COURSE." No additional compensation will be provided.

411-P01

MILLING PAVEMENT SURFACE: The milled material will become property of NDDOT and stockpiled at the NDDOT storage yard located North of Buchanan, RP 251.1. Include all costs for removal, hauling, and stockpiling of milled material in the contract unit price for “Milling Pavement Surface.”

430-P01

MAINLINE MILLING/PATCHING: Raveling has occurred on existing longitudinal joints throughout the project corridor. Mill down approximately 2" in depth and 1' across each side of the existing raveled joint (2' total width). Remove all loose debris after milling. Tack the entire 2' wide area, including the vertical edges. Patch the 2' wide area prior to paving mainline using RAP – Superpave FAA 45. Ensure the HMA depth is no more than ¼" above the adjacent existing asphalt pavement.

The engineer will mark these areas prior to the start of work. Notify the engineer at least 48 hours before starting work.

Estimated quantities include 3.892 miles of longitudinal joint repair, equating to approximately 500 Tons of HMA. Perform compaction using the Ordinary Compacting Method as specified in Section 430.04 I.3.

Include the cost to mill the 2' wide area in the price bid for "MILLING PAVEMENT SURFACE". Include the cost to patch the 2' wide area in the price bid for "RAP – SUPERPAVE FAA 45". Quantities have been included in each respective bid item.

430-100

HMA LONGITUDINAL JOINTS: Construct the joints within the final lift of pavement as detailed within this note.

Place 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:

- Constructed using two pavers simultaneously
- No more than 300 feet between pavers; and
- Roll the seam between paver passes in a manner such that the seam is not visible.

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:

- "Be Prepared to Stop" (W3-4); and
- "Flagger" symbol (W20-7)

Install PRS that meet the following criteria:

- Have no adhesives or fasteners required for placement;
- Have a manufacture's speed rating that meets or exceeds the posted speed limit; and
- Each strip in the array must weigh a minimum of 100 pounds.

Use individual PRS constructed in one of the following manners:

- A single piece;
- Interlocking segments; or
- Two pieces hinged at the midpoint.

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.

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"

704-P02

TRAFFIC CONTROL FOR MILLING AND HMA OVERLAYS: Provide traffic control consisting of a temporary lane closure and flagging.

The maximum work zone length is limited to one day's production.

REGISTERED PROFESSIONAL ENGINEER
TYLER J. PETERSON
PE-27417
DATE 09/01/26
NORTH DAKOTA



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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NOTES

One day’s production is defined as the length of roadway that can be paved in a single day plus the length of roadway that can be milled in a single day.

For estimating purposes, the traffic control device list is based on a 6.5 mile work zone and the following list:

- 1. Standard D-704-15, Type A – For Frontage Road Milling and Operations, and Flagging at major intersections.
- 2. Standard D-704-22, Types K and L;
- 3. Standard D-704-26, Types CC, EE, and GG;
- 4. Standard D-704-33; Portable Rumble Strips for Flagging
- 5. Standard D-704-34; For Hwy 52 Milling and Paving Operations
- 6. Standard D-704-56; For Portable Rumble Strip installation

Place flaggers and traffic control devices as shown on Standard D-704-15, layout A at the following intersections when the lane closure spans across them:

- 1. 32nd St SE & 41st St NW
- 2. 31st St SE
- 3. 30th St SE
- 4. 28th St SE
- 5. 25th St SE
- 6. 5th Ave (Buchanan)
- 7. 24th St SE

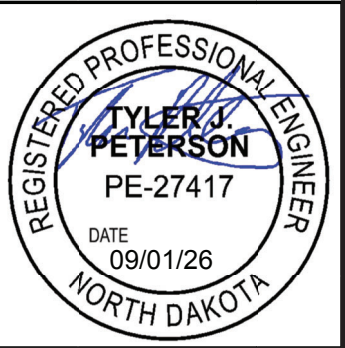
If all or portions of the lane closure are removed and uneven lanes exist, provide traffic control as specified in Section 704.04 O, "Traffic Control for Uneven Pavement".

Complete all paving, milling, and temporary pavement marking operations within the 6.5 mile lane closure. Complete all work in one lane before switching over to the adjacent lane.

Complete work in a manner such that lane closures can safely be removed if no work is to take place for more than 3 consecutive days. Remove lane closures if no work is to take place for more than 3 consecutive days.

The Department will pay for all necessary deployed devices, regardless of the number and length of the lane closures.

762-P01 PERMANENT PAVEMENT MARKING: Take note of existing pavement marking locations at right and left turn lane areas prior to beginning work, to ensure that all marking is returned to the proper location.



ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-NHU-2-052(055)252	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	URBAN	TOTAL
----	----	-----	----	-----	-----	-----
103	0100	CONTRACT BOND	L SUM	0.817	0.183	1
109	1000	E-TICKETING	L SUM	1		1
216	0100	WATER	M GAL	615		615
302	0305	SALVAGED BITUMINOUS BASE COURSE	TON	345		345
401	0050	TACK COAT	GAL	27,075	5,932	33,007
411	0100	MILLING PAVEMENT SURFACE	TON	18,618	3,784	22,402
430	0145	RAP - SUPERPAVE FAA 45	TON	56,164	12,902	69,066
430	1000	CORED SAMPLE	EA	378	95	473
430	5818	PG 58H-34 ASPHALT CEMENT	TON	2,696	619	3,315
702	0100	MOBILIZATION	L SUM	0.817	0.183	1
704	0100	FLAGGING	MHR	425	75	500
704	1000	TRAFFIC CONTROL SIGNS	UNIT	2,763		2,763
704	1048	PORTABLE RUMBLE STRIPS	EA	4		4
704	1052	TYPE III BARRICADE	EA	13		13
704	1060	DELINEATOR DRUMS	EA	60		60
704	1067	TUBULAR MARKERS	EA	270		270
704	1087	SEQUENCING ARROW PANEL-TYPE C	EA	1		1
704	1185	PILOT CAR	HR		50	50
706	0550	BITUMINOUS LABORATORY	EA	1		1
706	0600	CONTRACTOR'S LABORATORY	EA	1		1
760	0010	RUMBLE STRIPS - INTERSECTION	SET	1		1
760	0027	SINUSOIDAL RUMBLE STRIP - ASPHALT CENTERLINE	MILE	26.222		26.222
762	0103	PVMT MK PAINTED-MESSAGE	SF	1,376	944	2,320
762	0430	SHORT TERM 4IN LINE-TYPE NR	LF	709,260	89,366	798,626
762	1106	PVMT MK PAINTED 6IN LINE	LF	250,246	44,683	294,929
762	1112	PVMT MK PAINTED 12IN LINE	LF	16,811	9,389	26,200
762	1124	PVMT MK PAINTED 24IN LINE	LF	26		26

BASIS OF ESTIMATE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-NHU-2-052(055)252	10	1

		Typical Section A		Typical Section B		Frontage Road	
		Northbound/Westbound		3967+00 to 3984+86	0+00 to 75+35		
		3337+78 to 3865+82.63					
		13868+55.47 to 13907+15					
		3904+42.16 to 3967+00					
		Length = 62,922 ft					
Southbound/Eastbound		Length = 1,786 ft 0.338 Miles	Length = 7,535 ft 1.427 Miles				
3337+78 to 3865+82.63							
13868+55.47 to 13907+15							
3904+42.16 to 3967+00							
Length = 62,922 ft 23.834 Miles							
Material	Unit	Width (ft)	Quantity/Mile	Width (ft)	Quantity/Mile	Width (ft)	Quantity/Mile
Tack Coat - 1 Application @ 0.05 Gal/SY	Gal	38	1,115	80	2,347	24	704
Milling Pavmement Surface @ 2.0 Ton/CY	Ton	38	708	80	1,357	24	363
RAP - Superpave FAA 45 @ 2.0 Ton/CY	Ton	36	2,433	78	5,112	22	1,487
PG 58S-28 Asphalt Cement @ 4.8% by Weight of Mix	Ton	36	117	78	184,017	22	71

HMA Cored Samples								
		A	B		C			
Location	Specification Section	Distance (Ft)÷1000	Lanes	Joints	Lifts	Quantity (A x B x C)	Quantity (1 per miles)	Unit
US Hwy 52 Northbound	430.04 I.2.b(2), "Pavement Density Cores"	63	2	N/A	1	126	N/A	EA
	SSP 4 Longitudinal Joint Density in HMA Pavements (Centerline)	63	N/A	1	1	63	N/A	EA
	430.04 I.2.b(3), "Pavement Thickenss Determination Cores"					N/A	13	EA
US Hwy 52 Southbound	430.04 I.2.b(2), "Pavement Density Cores"	63	2	N/A	1	126	N/A	EA
	SSP 4 Longitudinal Joint Density in HMA Pavements (Centerline)	63	N/A	1	1	63	N/A	EA
	430.04 I.2.b(3), "Pavement Thickenss Determination Cores"					N/A	13	EA
US Hwy 52 5 Lane	430.04 I.2.b(2), "Pavement Density Cores"	2	5	N/A	1	10	N/A	EA
	SSP 4 Longitudinal Joint Density in HMA Pavements (Centerline)	2	N/A	2	1	4	N/A	EA
	430.04 I.2.b(3), "Pavement Thickenss Determination Cores"					N/A	1	EA
Frontage Road	430.04 I.2.b(2), "Pavement Density Cores"	8	2	N/A	1	15	N/A	EA
	SSP 4 Longitudinal Joint Density in HMA Pavements (Centerline)	2	N/A	2	1	5	N/A	EA
	430.04 I.2.b(3), "Pavement Thickenss Determination Cores"					N/A	2	EA
Total						411	13	EA

MILLINGS BREAKDOWN	
Millings Taken from Project	21,741 TON
Millings for RAP - Superpave FAA 45	16,342 TON
Millings for Salvage Bituminous Base (SBB)	515 TON
Millings left for Contractor Property	2,710 TON

*MILLINGS FROM PROJECT IS ESTIMATED AT 0.5" DEPTH THROUGHOUT PROJECT. ACTUAL TONNAGE MAY VARY

*RAP PERCENTAGE ESTIMATED AT 25% BY WEIGHT

*10% WASTE FACTOR WAS USED IN CALCULATIONS

RUMBLE STRIPS - ASPHALT SHOULDER			
Direction	RP	RP	Miles
Northbound	252.609	to 262.672	20.126
Southbound	252.609	to 262.672	20.126
Total =			40.252

25MGal/Mile for Dust Paliative
Total = 615 MGal

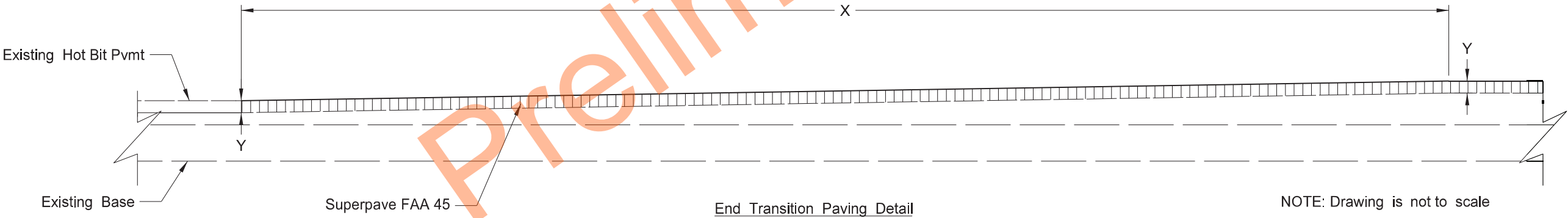
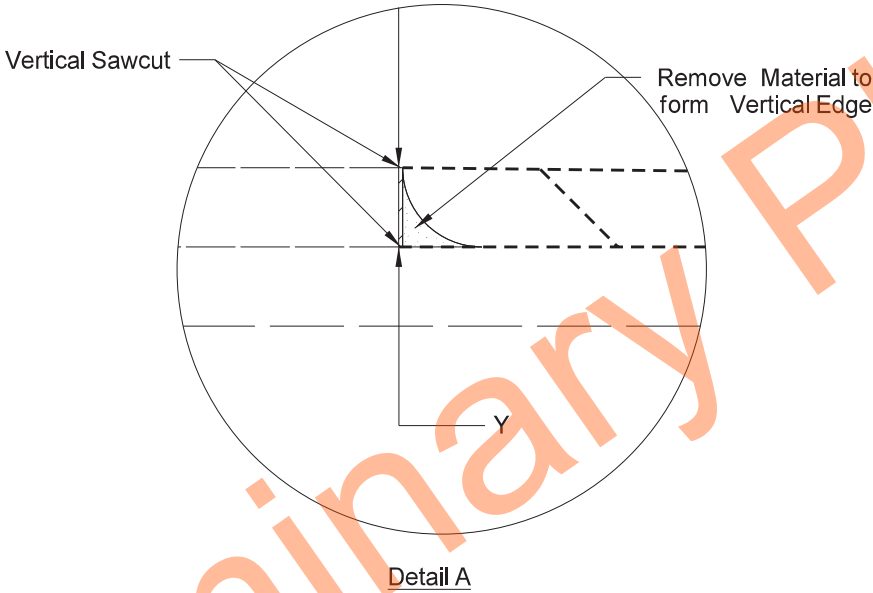
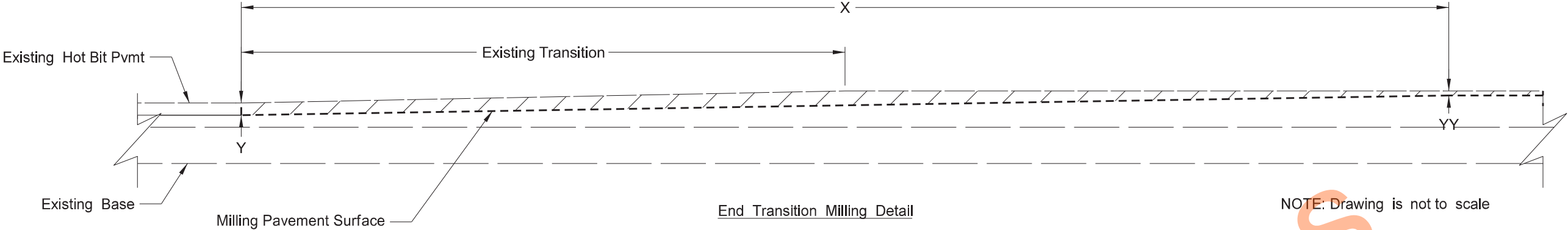
RUMBLE STRIPS - INTERSECTION	
Location	Quantity
Bypass Intersection Jct US52/281	1 Set

Pavement Marking		
Short Term 4IN Line - Type NR 2 Applications is Provided for Milling and Paving		
4" Yellow Edgeline	Northbound	62,200 LF
	Southbound	61,142 LF
	Bypass Int.	9,130
		132,472 LF
4" White Edgeline	Northbound	59,194 LF
	Southbound	59,382 LF
	Bypass Int.	10,900
		129,476 LF
4" White Centerline (10' Strip, 30' Skip)	Northbound	15,276 LF
	Southbound	15,133 LF
	Bypass Int.	692
		31,101 LF
Total = 293,049 x 2 Applications = 586,098 LF		
Short Term 4IN Line - Type NR 1 Application Is Provided for Rumble Strips		
4" Yellow Edgeline	Northbound	53,132 LF
	Southbound	53,132 LF
		106,264 LF
4" White Edgeline	Northbound	53,132 LF
	Southbound	53,132 LF
		106,264 LF
Total = 212,528 LF		

See section 120 sheets for permanent pavement marking details



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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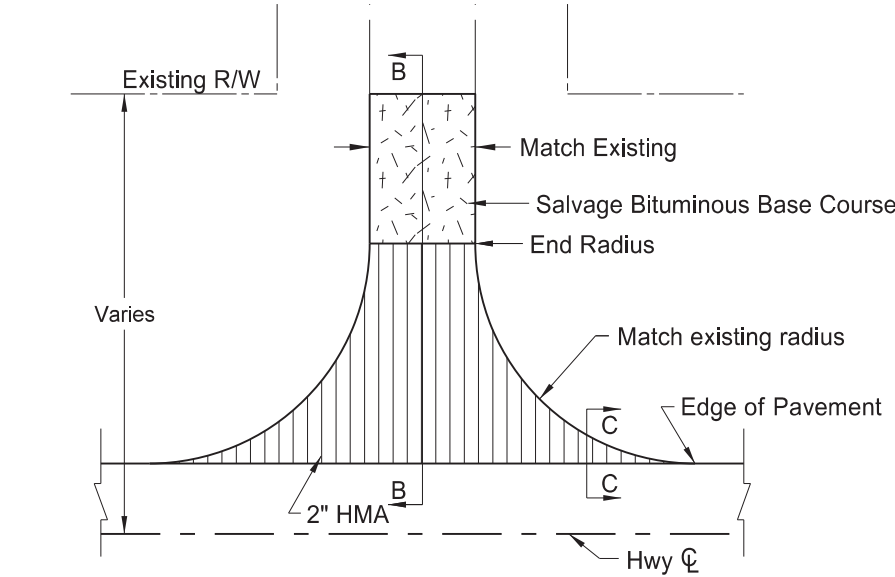
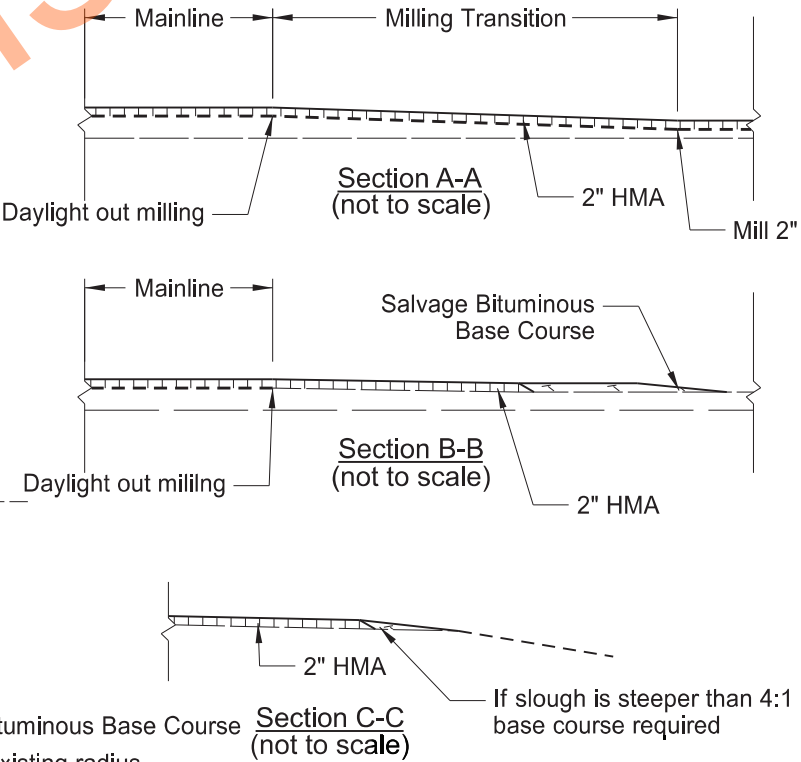
Milling & Paving Transitions (Mainline)						
Location	Sta	To	Sta	X	Y	YY
Begin Project (NB & SB)	3337+78		3339+53	175	2	0.5
North side of Bypass Intersection (NB)	13886+67		13887+42	75	2	0.5
South Side of Bypass Intersection (NB)	13889+32		13890+07	75	2	0.5
North side of Bypass Intersection (SB)	13886+67		13887+42	75	2	0.5
South Side of Bypass Intersection (SB)	13889+32		13890+07	75	2	0.5
End Project	3984+11		3985+86	175	2	0.5



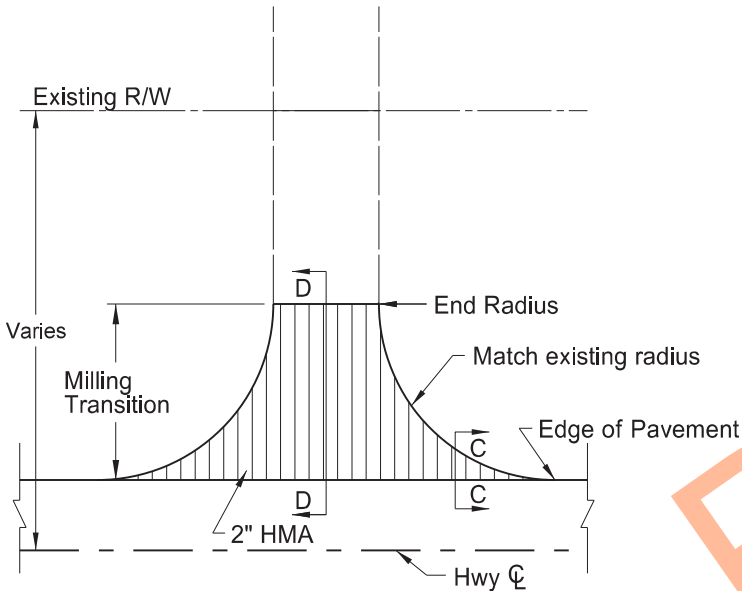
Milling and Paving Transitions
US Hwy 52

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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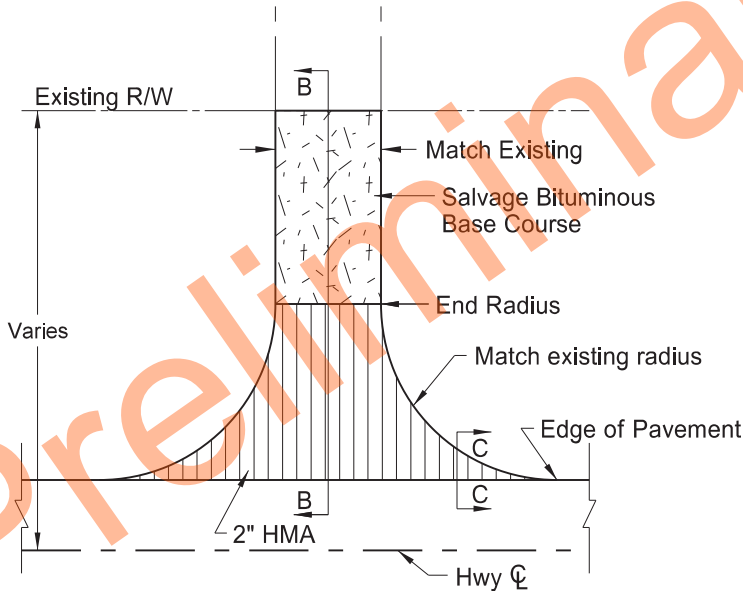
- Notes:
- Actual HMA paving and salvage bituminous base course locations may vary in the field, as approved by the Engineer.
 - Quantity totals have been included in the bid items of the "Estimate of Quantities" of the plans.
 - Salvage bituminous base course has been provided in the quantities to fill in around the radii. This material will be required when sloughs are steeper than 4:1 (see section C-C)



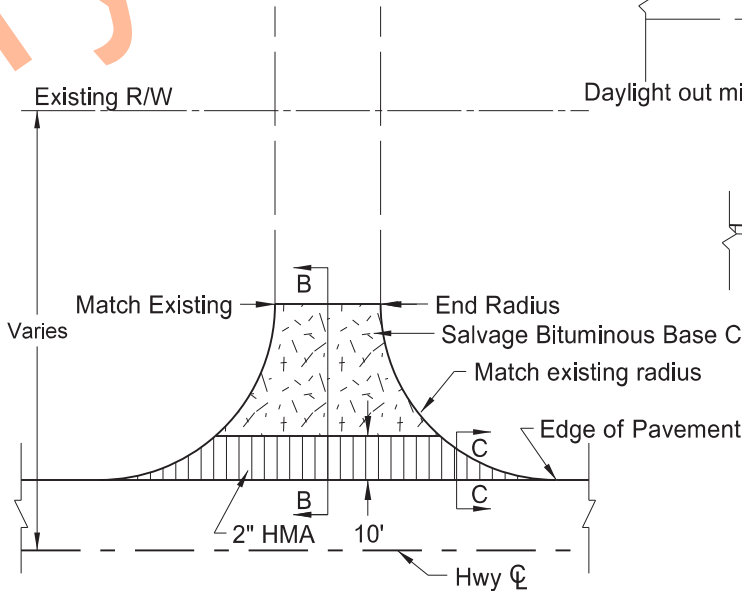
(2) Gravel Section Line, County Road, Turn Lane or Street Approach



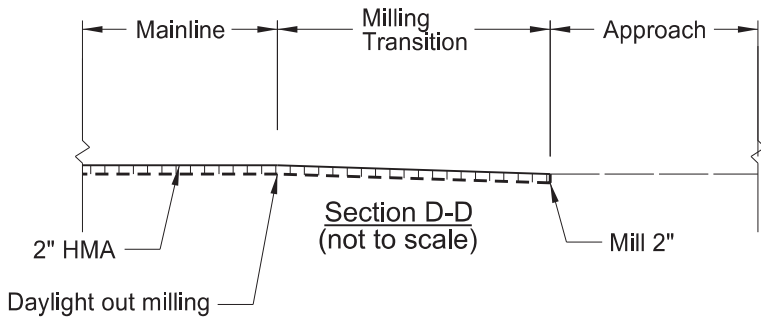
(3) Paved Private Drive Approach



(4) Gravel Private Drive Approach



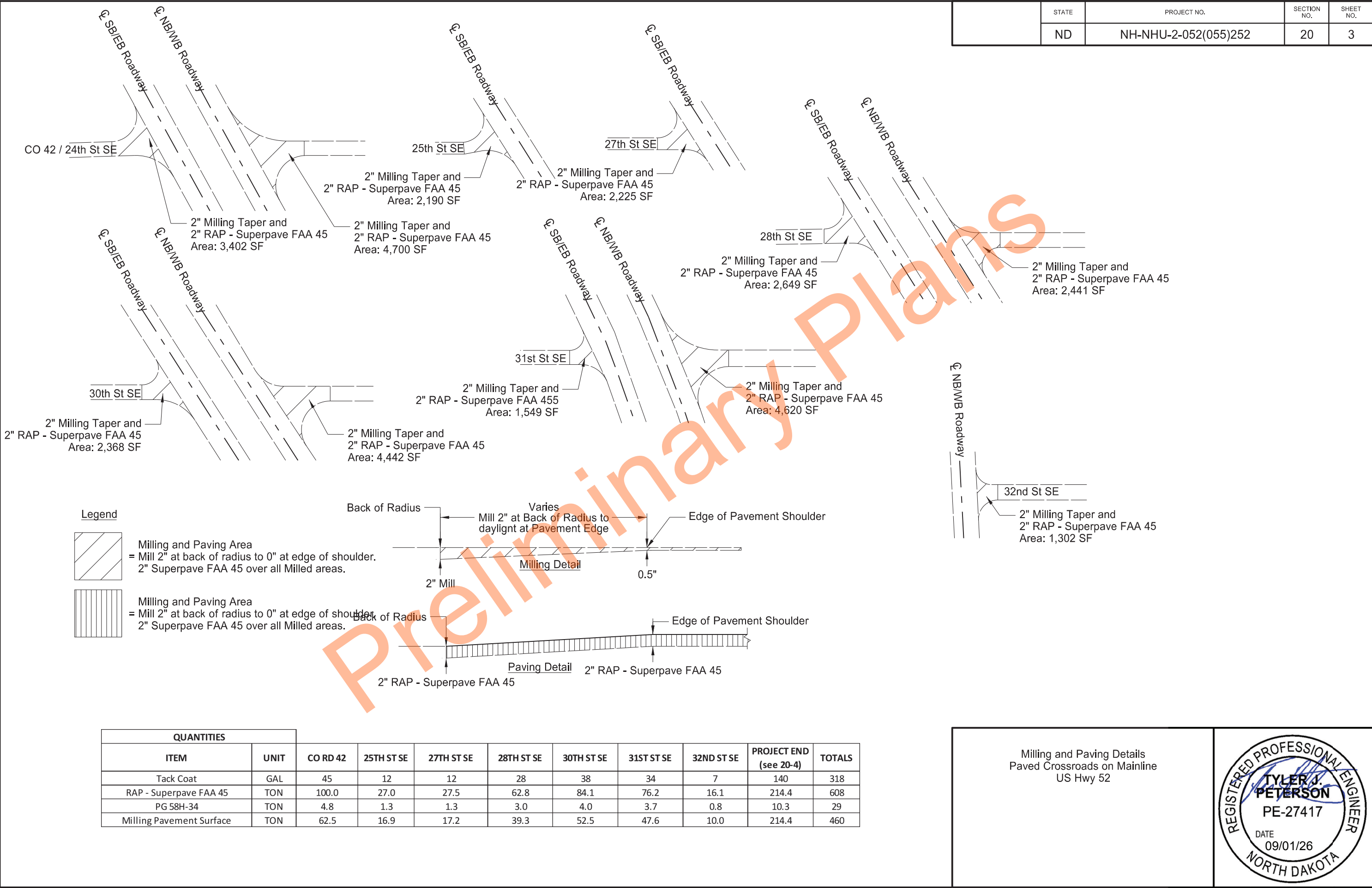
(5) Field Drive Approach



ITEM	UNIT	Gravel Section Line, Street, or Right Turn Lane	Paved Private Drive	Gravel Private Drive	Field Drive	TOTALS
Number of Locations	#	13	3	19	29	64
Salvage Bituminous Base Course	TON	4.8	0	6.2	5.7	345
Tack Coat	GAL	Quantities included in section 20	9	9	4	310
RAP - Superpave FAA 45	TON		20.3	20.3	8.4	690
PG 58H-34	TON		1.0	1.0	0.4	33
Milling Pavement Surface	TON		11.9	0	0	36

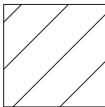


General Approach Paving Details
US Hwy 52 and Frontage Rd

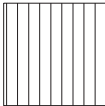


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-NHU-2-052(055)252	20	3

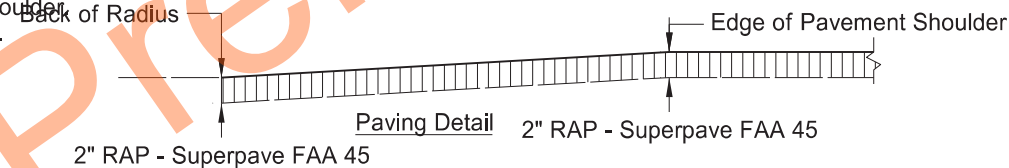
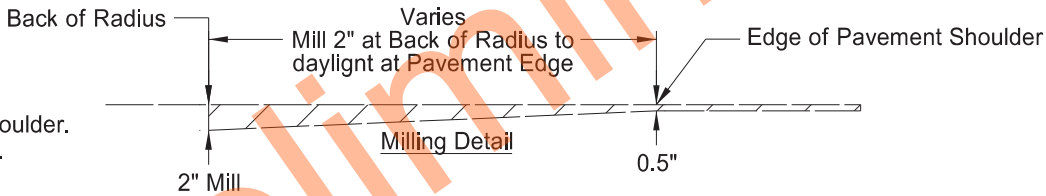
Legend



Milling and Paving Area
= Mill 2" at back of radius to 0" at edge of shoulder.
2" Superpave FAA 45 over all Milled areas.



Milling and Paving Area
= Mill 2" at back of radius to 0" at edge of shoulder.
2" Superpave FAA 45 over all Milled areas.

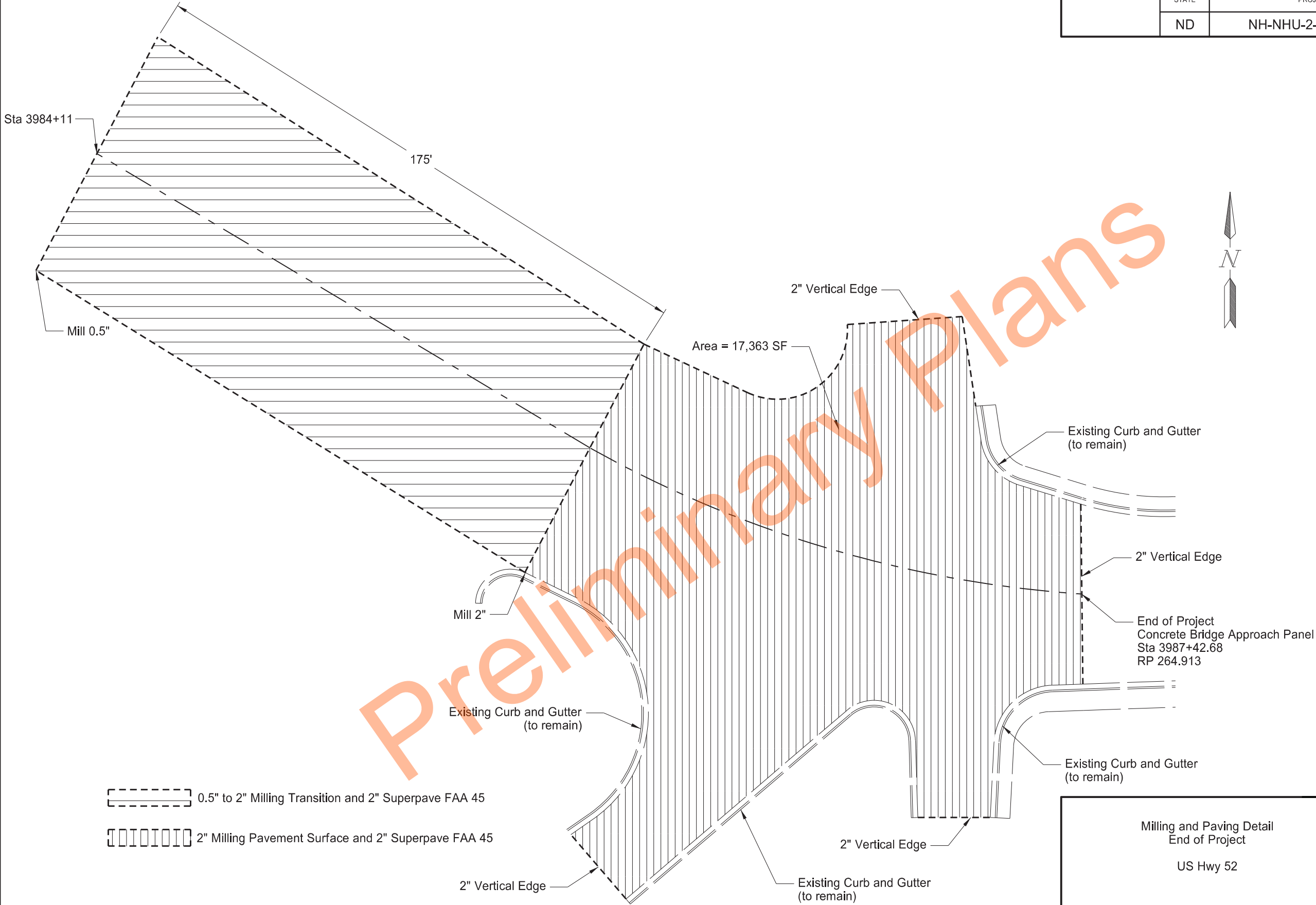


QUANTITIES											
ITEM	UNIT	CO RD 42	25TH ST SE	27TH ST SE	28TH ST SE	30TH ST SE	31ST ST SE	32ND ST SE	PROJECT END (see 20-4)	TOTALS	
Tack Coat	GAL	45	12	12	28	38	34	7	140	318	
RAP - Superpave FAA 45	TON	100.0	27.0	27.5	62.8	84.1	76.2	16.1	214.4	608	
PG 58H-34	TON	4.8	1.3	1.3	3.0	4.0	3.7	0.8	10.3	29	
Milling Pavement Surface	TON	62.5	16.9	17.2	39.3	52.5	47.6	10.0	214.4	460	

Milling and Paving Details
Paved Crossroads on Mainline
US Hwy 52



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-NHU-2-052(055)252	20	4

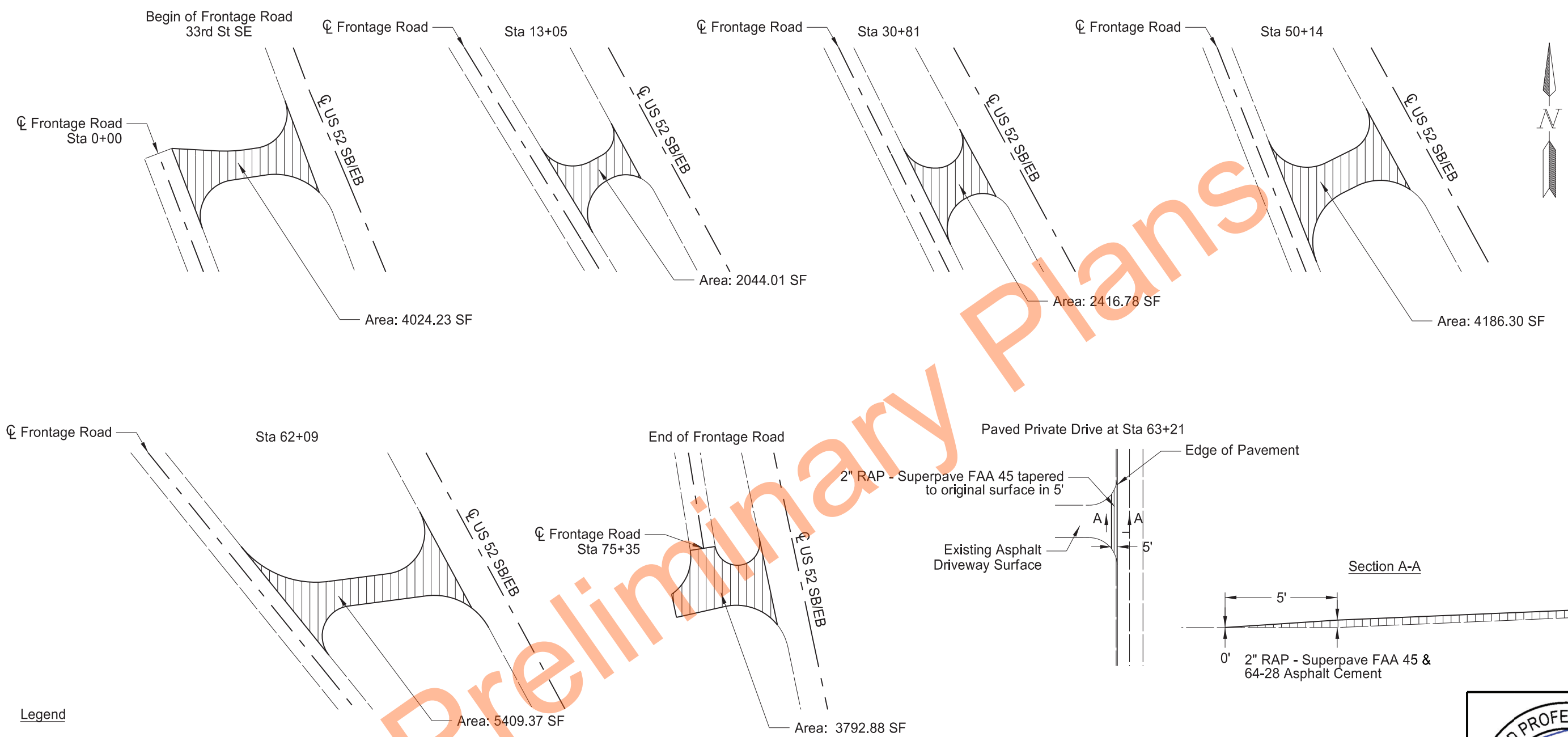


- 0.5" to 2" Milling Transition and 2" Superpave FAA 45
- 2" Milling Pavement Surface and 2" Superpave FAA 45

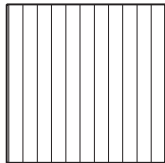
Milling and Paving Detail
End of Project
US Hwy 52



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-NHU-2-052(055)252	20	5



Legend



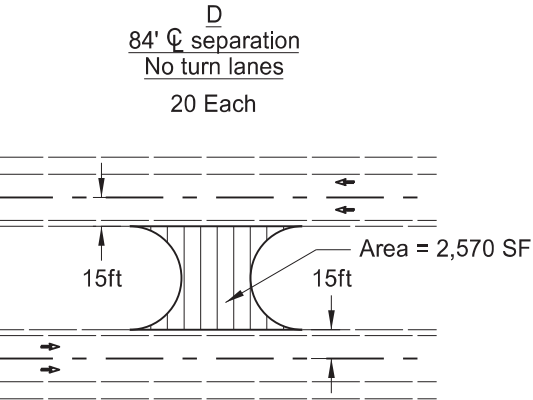
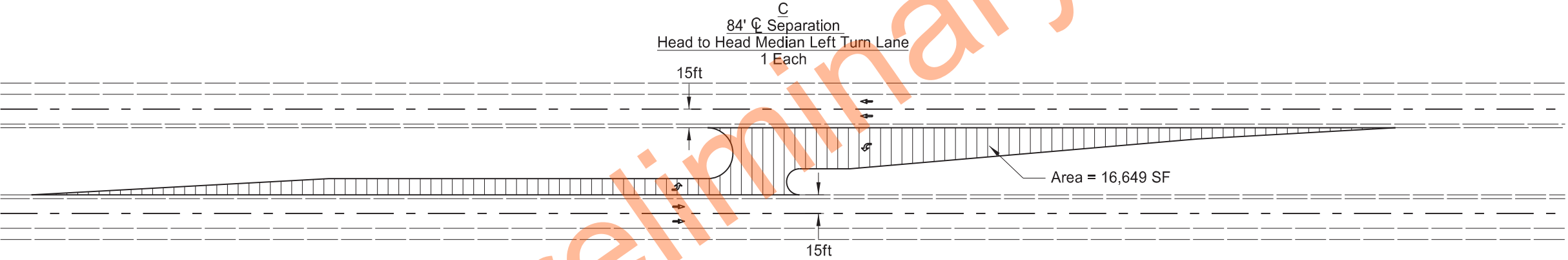
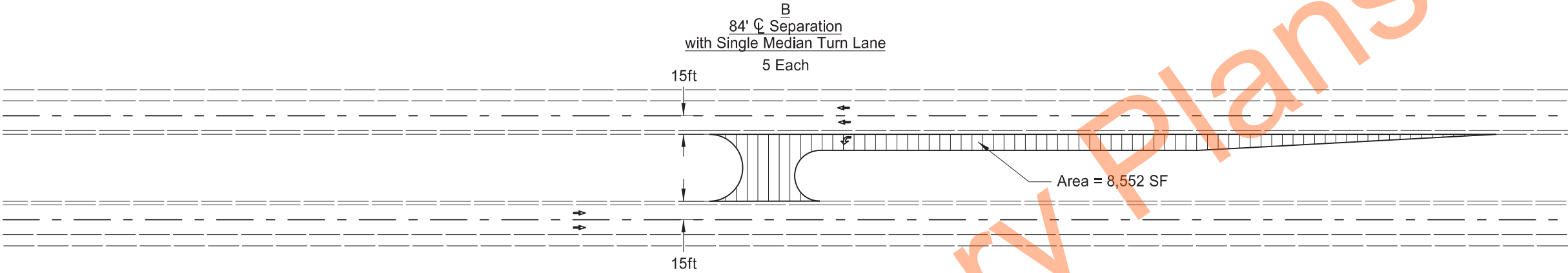
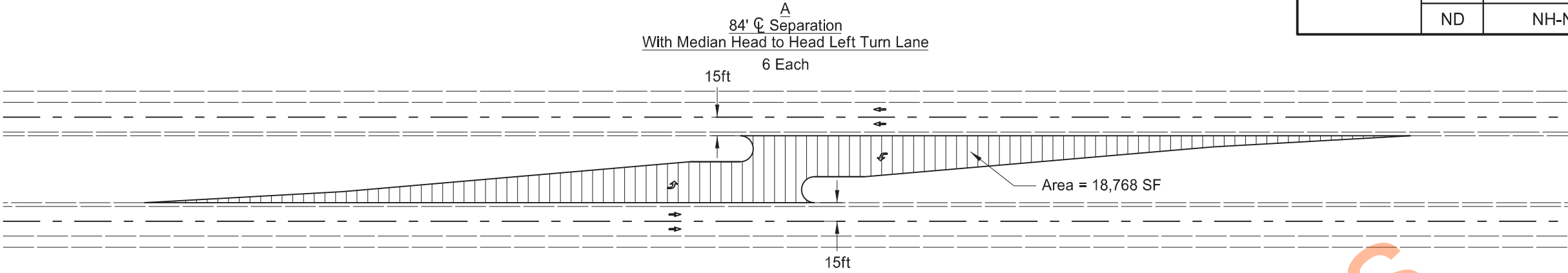
= 0.5" Mil and 2" RAP-Superpave FAA 45 Overlay

QUANTITIES									
ITEM	UNIT	33RD ST SE	STA 13+05	STA 30+81	STA 50+14	STA 62+09	END	63+21	TOTALS
Tack Coat	GAL	22	11	13	23	30	21	2	123
RAP - Superpave FAA 45	TON	49.7	25.2	29.8	51.7	66.8	46.8	1.8	272
PG 58H-34	TON	2.4	1.2	1.4	2.5	3.2	2.2	0.1	13
Milling Pavement Surface	TON	12.4	6.3	7.5	12.9	16.7	11.7	-	68



Approach Details
Frontage Road

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-NHU-2-052(055)252	20	6



QUANTITIES		A	B	C	D	TOTALS
ITEM	UNIT					
Number of Locations	Each	5	5	1	20	31
Tack Coat	GAL	104	48	92	14	1137
RAP - Superpave FAA 45	TON	231.7	105.6	205.5	31.7	2527
PG 58H-34	TON	11.1	5.1	9.9	1.5	121
Milling Pavement Surface	TON	57.9	26.4	51.4	7.9	632

 0.5" Milling & 2.0" RAP - Superpave FAA 45

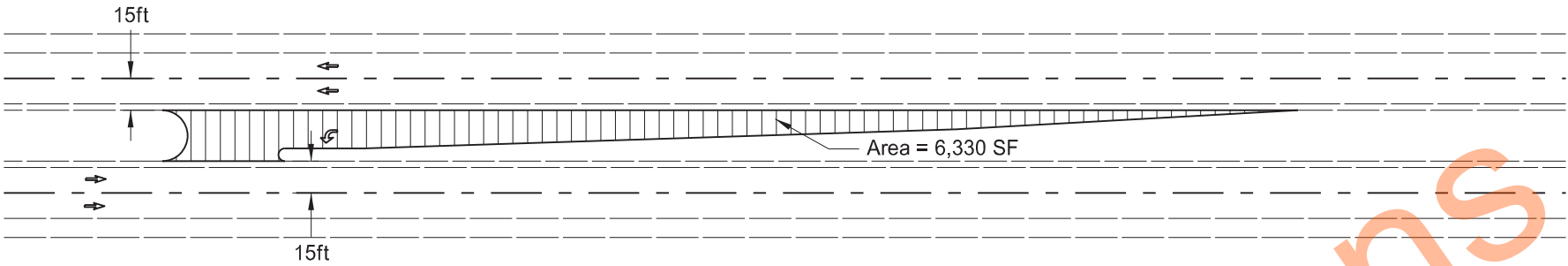
Milling and Paving Details
Turn Lanes

US Hwy 52

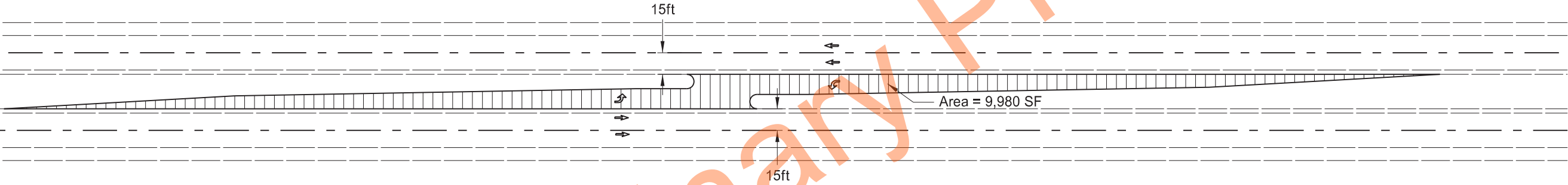


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-NHU-2-052(055)252	20	7

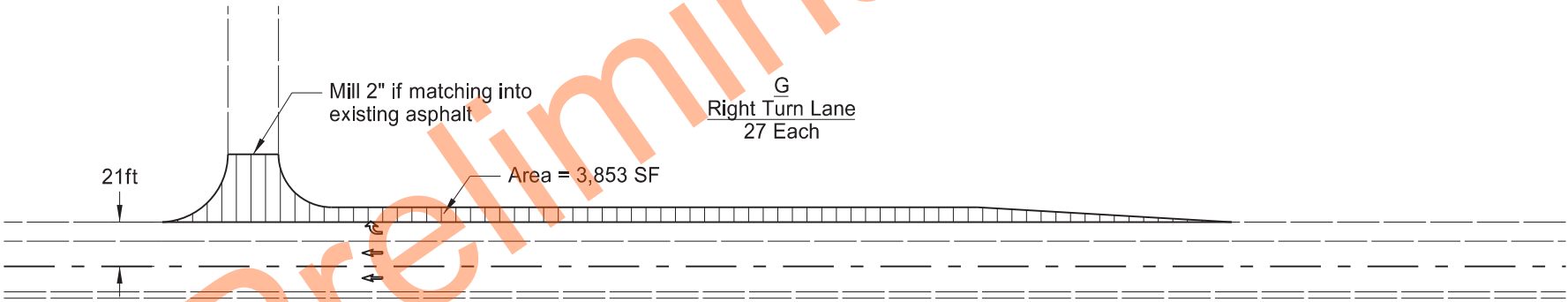
E
54' ϕ Separation
Head to Head
Single Median Left Turn Lane
3 Each



F
54' ϕ Separation
Head to Head
Median Left Turn Lane
2 Each



G
Right Turn Lane
27 Each



0.5" Milling & 2.0" RAP - Superpave FAA 45

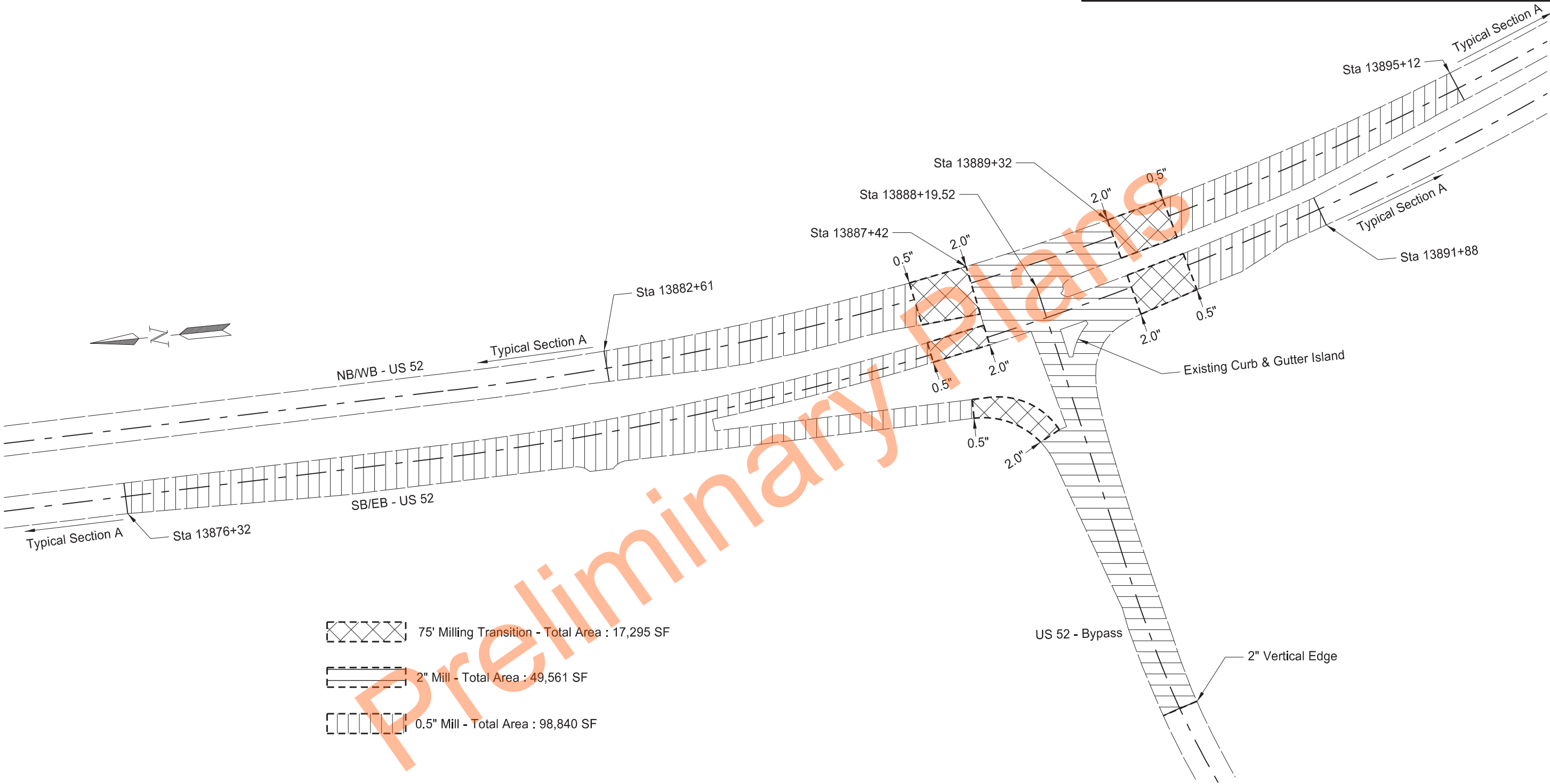
QUANTITIES					
ITEM	UNIT	E	F	G	TOTALS
Number of Locations	Each	3	2	27	32
Tack Coat	GAL	35	55	21	794
RAP - Superpave FAA 45	TON	78.1	123.2	47.6	1765
PG 58H-34	TON	3.8	5.9	2.3	85
Milling Pavement Surface	TON	19.5	30.8	11.9	441

Milling and Paving Details
Turn Lanes

US Hwy 52



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-NHU-2-052(055)252	20	8

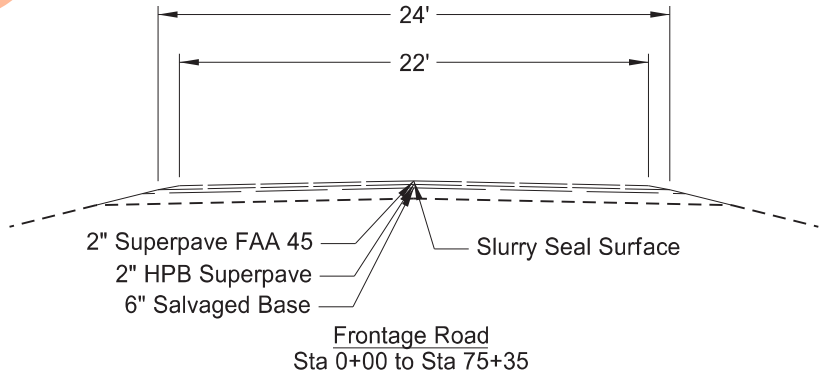
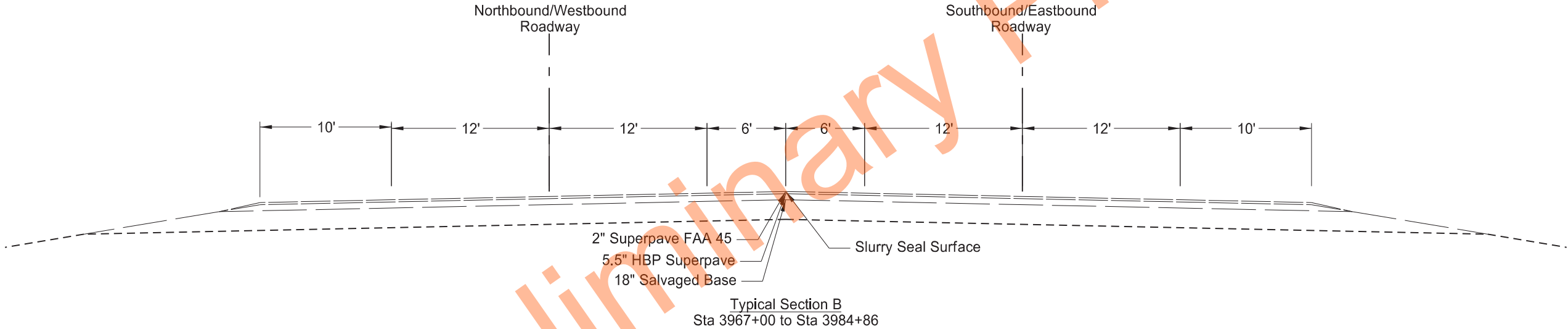
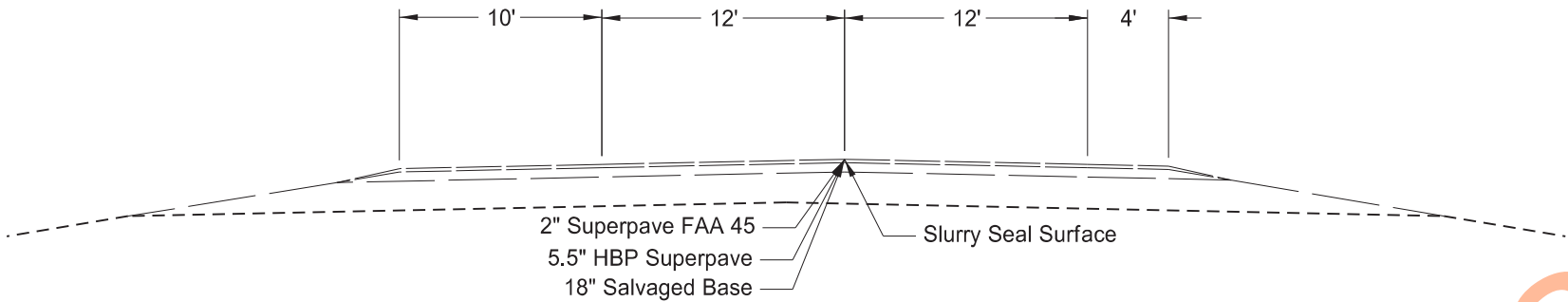


- 75' Milling Transition - Total Area : 17,295 SF
- 2" Mill - Total Area : 49,561 SF
- 0.5" Mill - Total Area : 98,840 SF

Milling Details
Hwy 52/281 Bypass Intersection
US Hwy 52



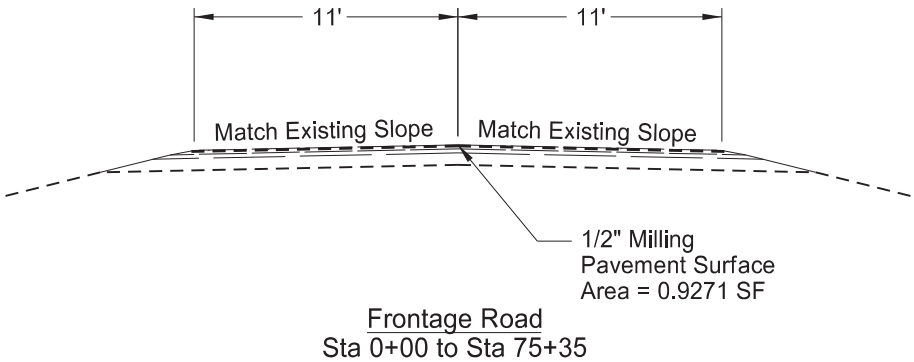
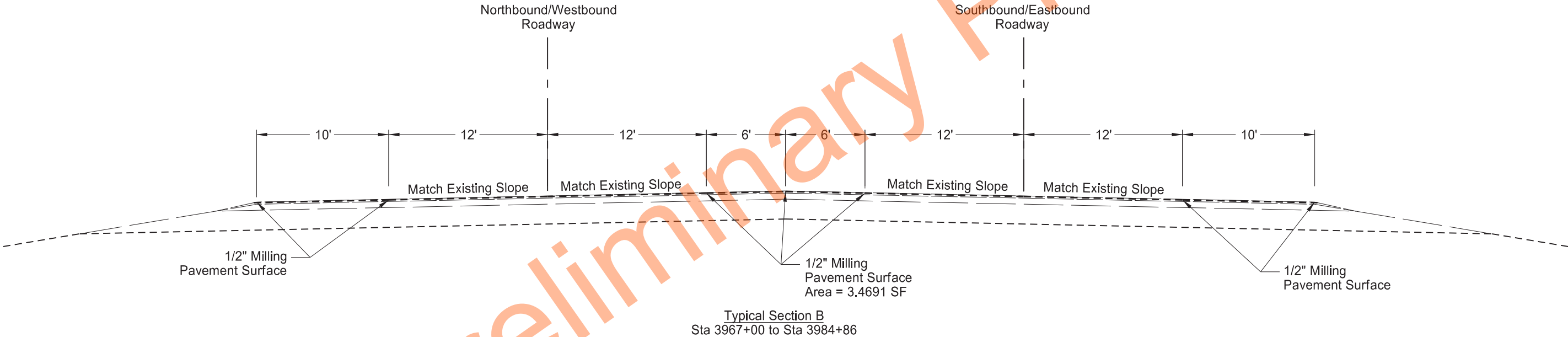
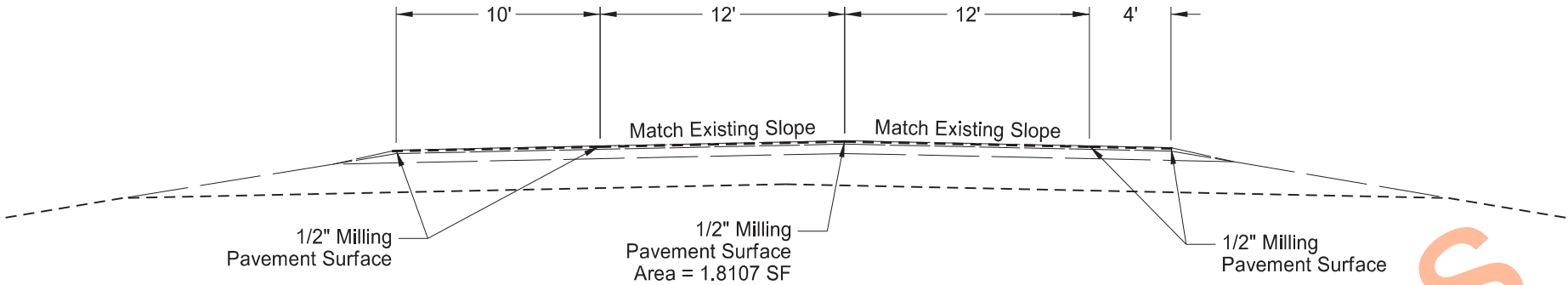
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-NHU-2-052(055)252	30	1



Existing Typical Sections
US Hwy 52



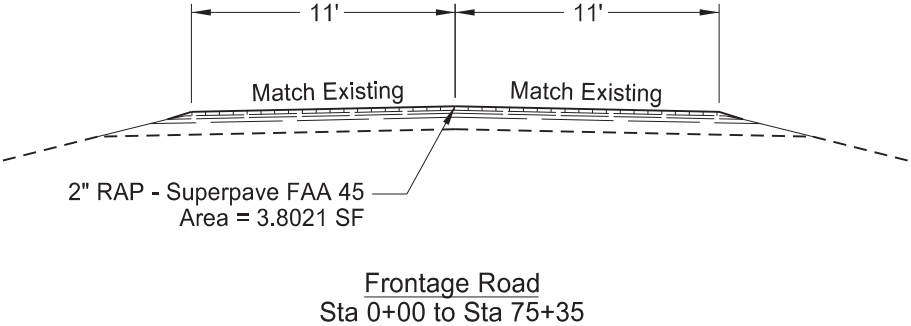
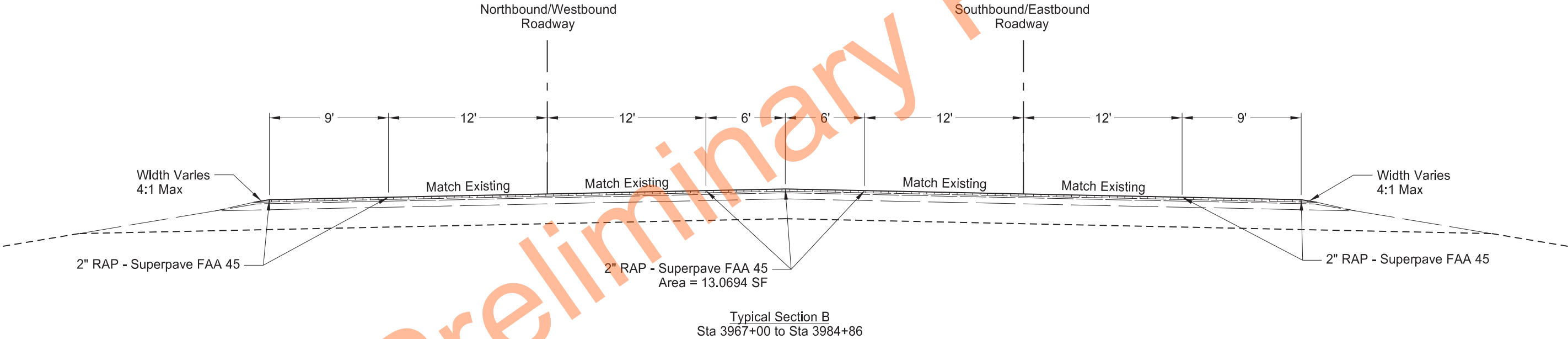
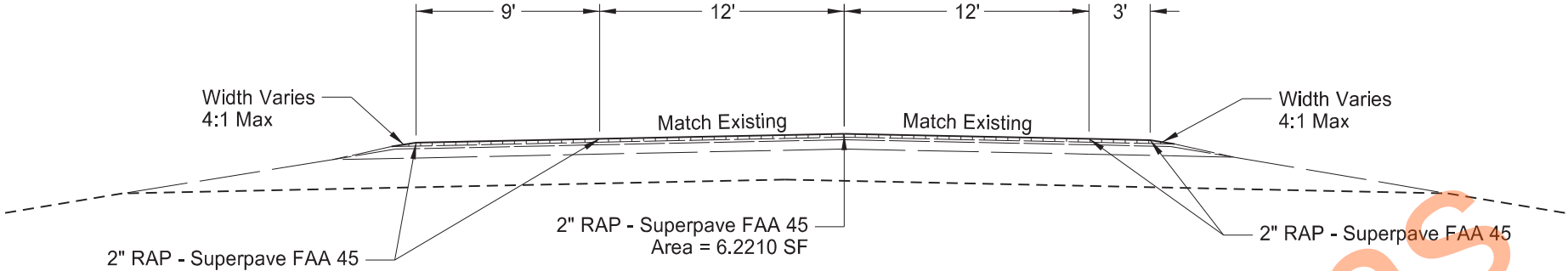
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-NHU-2-052(055)252	30	2



Milling Typical Section
US Hwy 52



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-NHU-2-052(055)252	30	3

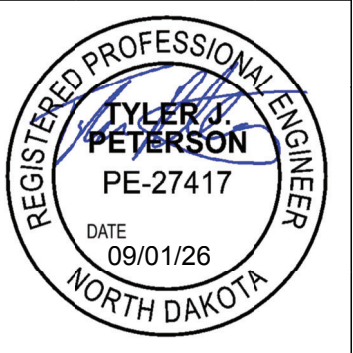


Proposed Typical Sections
US Hwy 52



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND		NH-NHU-2-052(055)252	82	1

SURVEY COORDINATE AND CURVE DATA - JAMESTOWN BYPASS											
HORIZONTAL ALIGNMENT				CURVE DATA		SURVEY CONTROL POINTS					
PNT	STATION	NORTHING	EASTING	ARC DEFINITION		PNT	NORTHING	EASTING	ELEV	STATION	OFFSET
US 52\US 281 (SCL 52)				C3005		CONTROL POINT DESCRIPTION					
BEG	13868+55.47	470399.97	2409834.18	PI STA = 13890+16.63		PRIMARY CONTROL					
PC	13880+54.32	469201.44	2409861.88	Delta = 28° 16' 51" LT		GPS 1	461478.42	2408091.22	1497.25	N\A	N\A
Station equation				D _a = 1° 30' 00"		#6 rebar w/ 1 1/2" Alum cap stamped ND DOT LS 3047					
US 52/281 & US 52/281 Truck By-pass Hwy Intscn				R = 3819.72'		GPS 2	478408.30	2412008.45	1520.21	N\A	N\A
US 52/281	13888+19.52	468443.32	2409955.81	T = 962.31'		#6 rebar w/ 1 1/2" Alum Cap on knob @ N approach					
Truck Bypass	48312+00.00	468443.32	2409955.81	L = 1885.39'		w side near N r\W near N 1/4 Cor Sec 11 T140 N R64W					
PI C3005	13890+16.63	468239.39	2409884.11			All coordinates on this sheet are Stutsman County ground coordinates. They are derived from the "North Dakota Coordinate system of 1983", NAD83(2011). South Zone Combination factor (cf) = 0.9998560					
PT	13899+39.71	467402.70	2410359.50			All coordinates and measurements on this document derived from the International Foot Definition.					
END	13906+61.16	466775.43	2410715.91			INITIALIZING BENCH MARK NDGPS					
US 52\US 281 Truck By-pass (SCL 52B)				SCS401		Stations (OPUS)		NAVD-88			
BEG\Hwy Intscn	48312+00.00	468443.32	2409955.81	PI STA = 48321+15.91				GEOID 12A			
Bk Tan Xing	48312+77.78	468426.94	2409879.78	Delta = 47° 57' 55" LT							
TS	48315+29.75	468373.87	2409633.45	D _a = 5° 15' 00"							
SC	48317+29.75	468325.81	2409439.39	R = 1091.35'							
PI SCS401	48321+15.91	468250.41	2409060.45	L _s = 200.00'							
CS	48324+43.38	467912.38	2408873.30	S _c = 5° 15' 00"							
ST	48326+43.38	467742.15	2408768.47	T _s = 586.16'							
TS	48385+32.52	462635.63	2405834.96	L = 713.63'							
SC	48387+32.52	462461.07	2405737.37								
PI SCS402	48394+29.18	461858.13	2405388.32								
CS	48400+86.28	461161.65	2405405.23								
ST	48402+86.28	460961.67	2405407.09								
END	48421+67.37	459080.99	2405446.46								
				SCS402							
				PI STA = 48394+29.18							
				Delta = 31° 04' 31" LT							
				D _a = 2° 00' 00"							
				R = 2864.79'							
				L _s = 200.00'							
				S _c = 2° 00' 00"							
				T _s = 896.66'							
				L = 1353.76'							



SURVEY DATA
US 52

Beginning chain EX 52 SBCL description
=====

Point 9200 N 469,722.3393 E 2,409,807.8310 Sta 100+00.00
Course from 9200 to PC EX 52 SBCL-1 S 1° 19' 25.60" E Dist 522.0087

Curve Data

Curve EX 52 SBCL-1
P.I. Station 113+96.52 N 468,326.3940 E 2,409,847.5911
Delta = 25° 34' 00.43" (LT)
Degree = 1° 29' 11.46"
Tangent = 874.5148
Length = 1,719.9110
Radius = 3,854.3617
External = 97.9642
Long Chord = 1,705.6773
Mid. Ord. = 95.5360
P.C. Station 105+22.01 N 469,200.4699 E 2,409,819.8906
P.T. Station 122+41.92 N 467,549.8596 E 2,410,249.7980
C.C. N 469,322.5580 E 2,413,672.3183
Back = S 1° 48' 54.59" E
Ahead = S 27° 22' 55.02" E
Chord Bear = S 14° 35' 54.81" E

Ending chain EX 52 SBCL description
=====

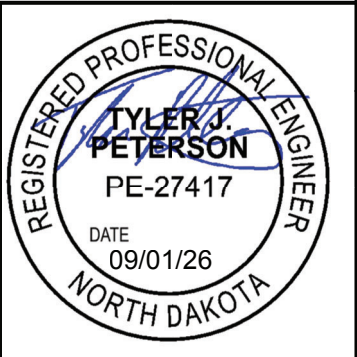
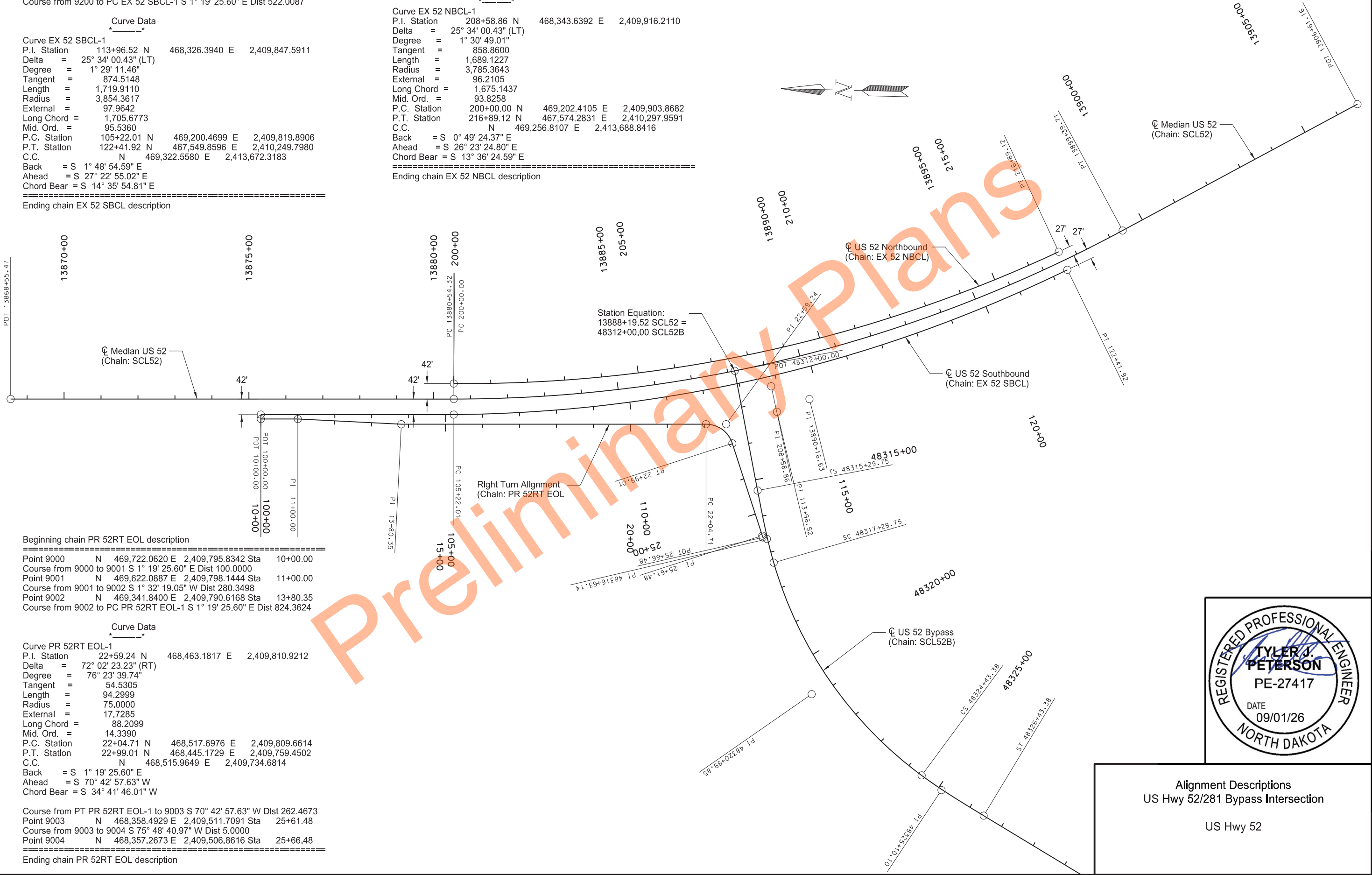
Beginning chain EX 52 NBCL description
=====

Curve Data

Curve EX 52 NBCL-1
P.I. Station 208+58.86 N 468,343.6392 E 2,409,916.2110
Delta = 25° 34' 00.43" (LT)
Degree = 1° 30' 49.01"
Tangent = 858.8600
Length = 1,689.1227
Radius = 3,785.3643
External = 96.2105
Long Chord = 1,675.1437
Mid. Ord. = 93.8258
P.C. Station 200+00.00 N 469,202.4105 E 2,409,903.8682
P.T. Station 216+89.12 N 467,574.2831 E 2,410,297.9591
C.C. N 469,256.8107 E 2,413,688.8416
Back = S 0° 49' 24.37" E
Ahead = S 26° 23' 24.80" E
Chord Bear = S 13° 36' 24.59" E

Ending chain EX 52 NBCL description
=====

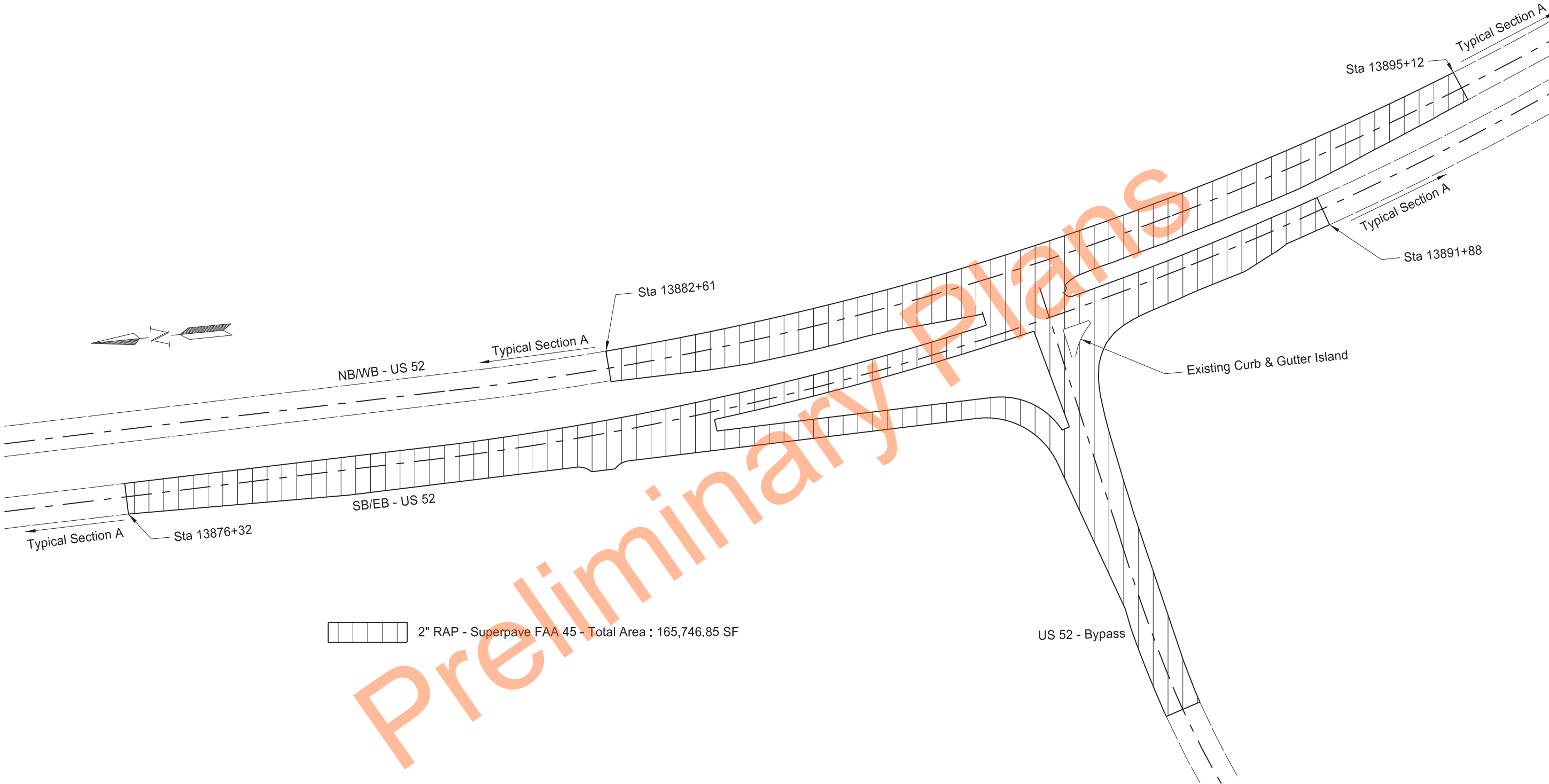
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-NHU-2-052(055)252	82	2



Alignment Descriptions
US Hwy 52/281 Bypass Intersection

US Hwy 52

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-NHU-2-052(055)252	90	1



Paving Layout
US Hwy 281/52 Bypass Intersection
US Hwy 52



[illegible][illegible]

SPEC & CODE			
704-1000	TRAFFIC CONTROL SIGNS	TOTAL UNITS	2763

[illegible]

REGISTERED PROFESSIONAL ENGINEER

TYLER J. PETERSON

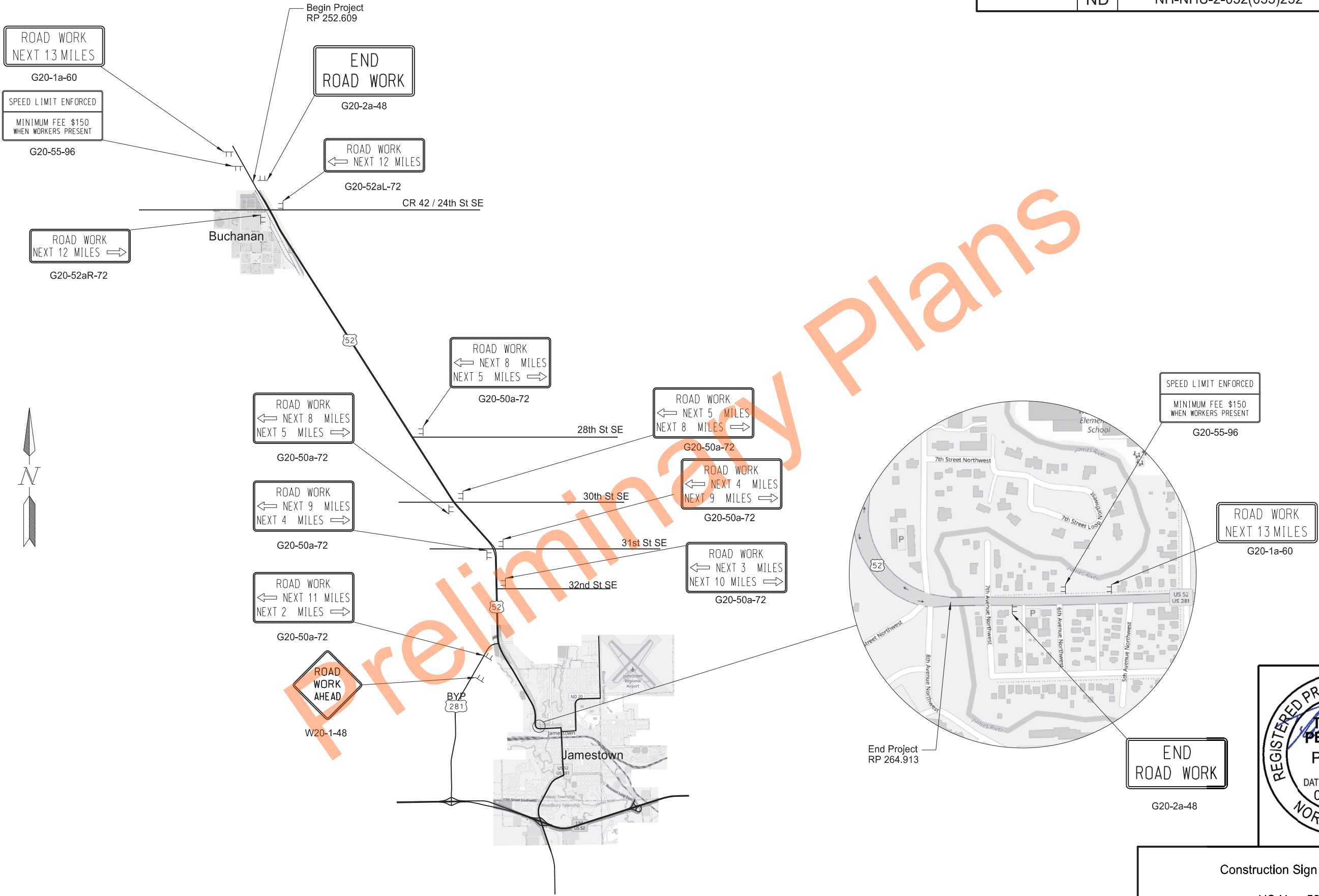
PE-27417

DATE
09/01/26

NORTH DAKOTA

VERSION: 6.26.2025

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-NHU-2-052(055)252	100	2



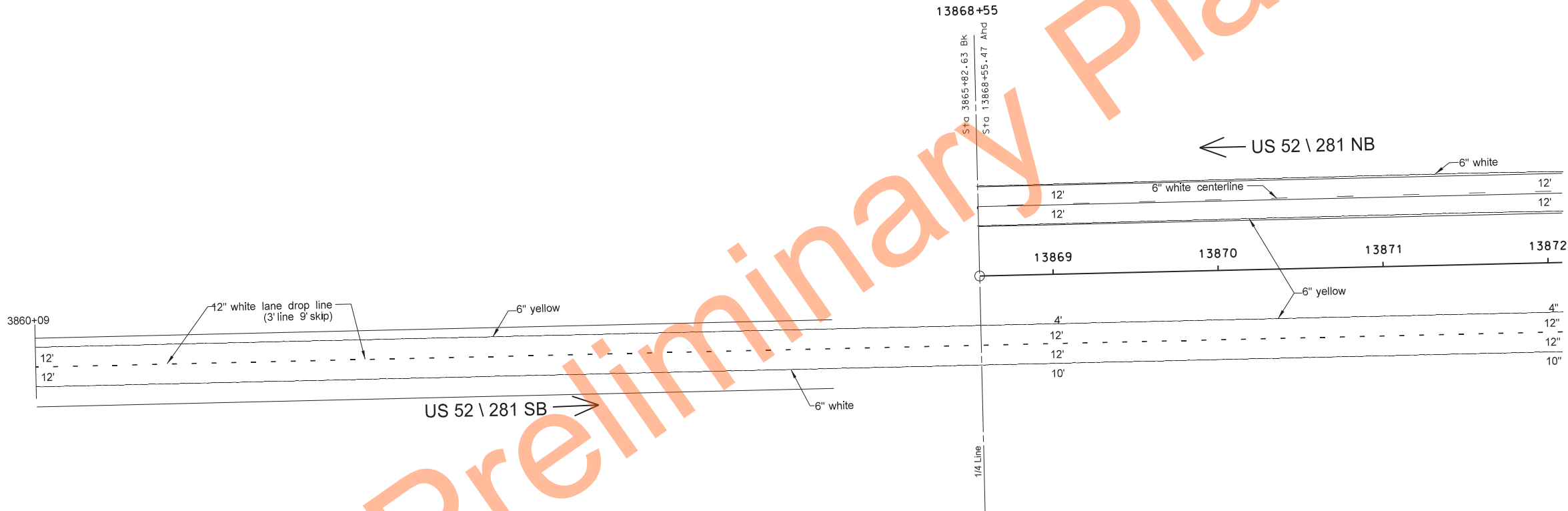
Construction Sign Layout
US Hwy 52

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-NHU-2-052(055)252	120	1



PVMT MK PAINTED 6IN LINE	
6" white edge line	1263 LF
6" yellow edge line	1263 LF
6" white centerline (10' line, 30' skip)	90 LF
TOTAL	2616 LF

PVMT MK PAINTED 12IN LINE	
12" white lane drop line (3' line, 9' skip)	230 LF



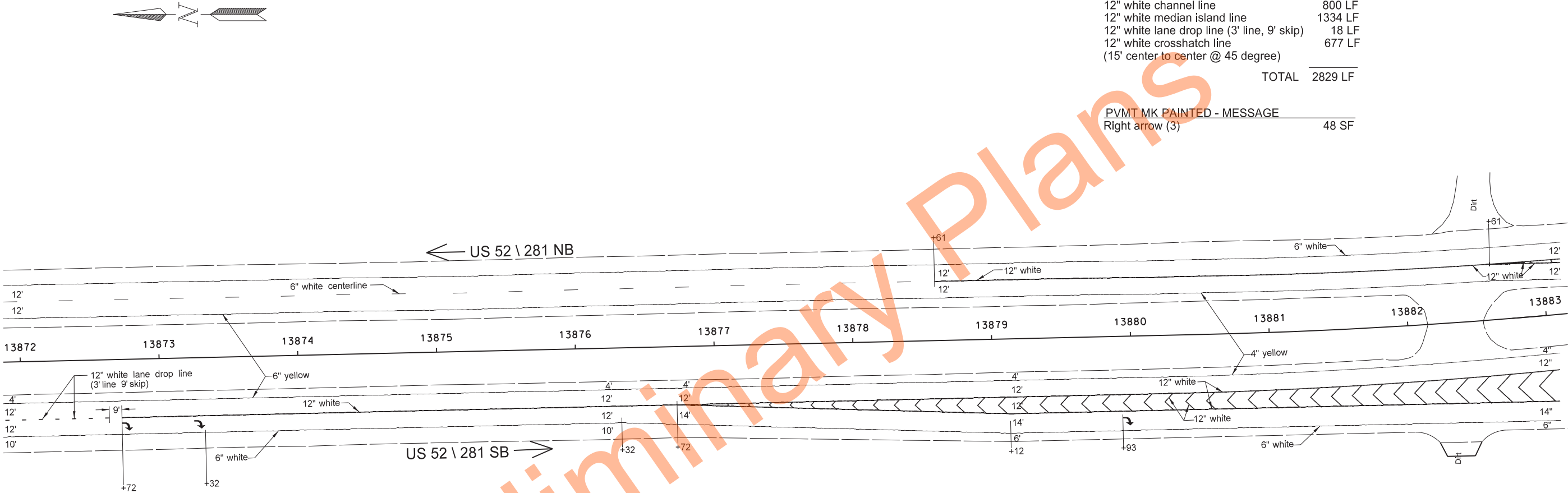
Pavement Marking
US 281/52 Bypass

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-NHU-2-052(055)252	120	2

PVMT MK PAINTED 6IN LINE	
6" white edge line	2200 LF
6" yellow edge line	2200 LF
6" white centerline (10' line, 30' skip)	170 LF
TOTAL	4570 LF

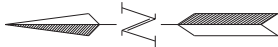
PVMT MK PAINTED 12IN LINE	
12" white channel line	800 LF
12" white median island line	1334 LF
12" white lane drop line (3' line, 9' skip)	18 LF
12" white crosshatch line	677 LF
(15' center to center @ 45 degree)	
TOTAL	2829 LF

PVMT MK PAINTED - MESSAGE	
Right arrow (3)	48 SF



Pavement Marking
US 52/281 Bypass

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-NHU-2-052(055)252	120	3

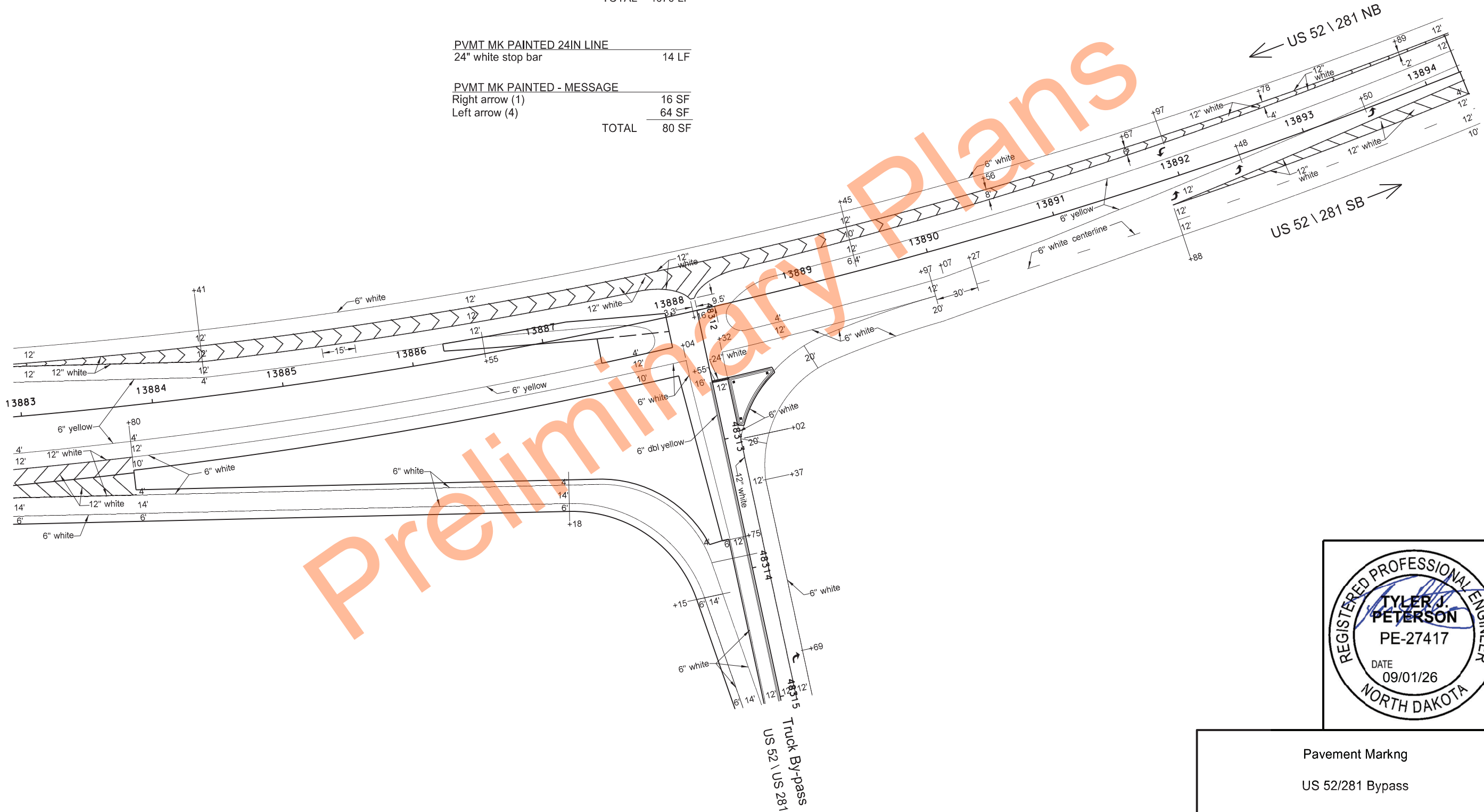


PVMT MK PAINTED 6IN LINE	
6" white edge line	4187 LF
6" yellow edge line	2121 LF
6" dbl yellow line (4" between)	490 LF
6" white centerline (10' line, 30' skip)	100 LF
TOTAL	6898 LF

PVMT MK PAINTED 12IN LINE	
12" white channel line	198 LF
12" white median island line	2791 LF
12" white crosshatch line	1081 LF
(15' center to center @ 45 degree)	
TOTAL	4070 LF

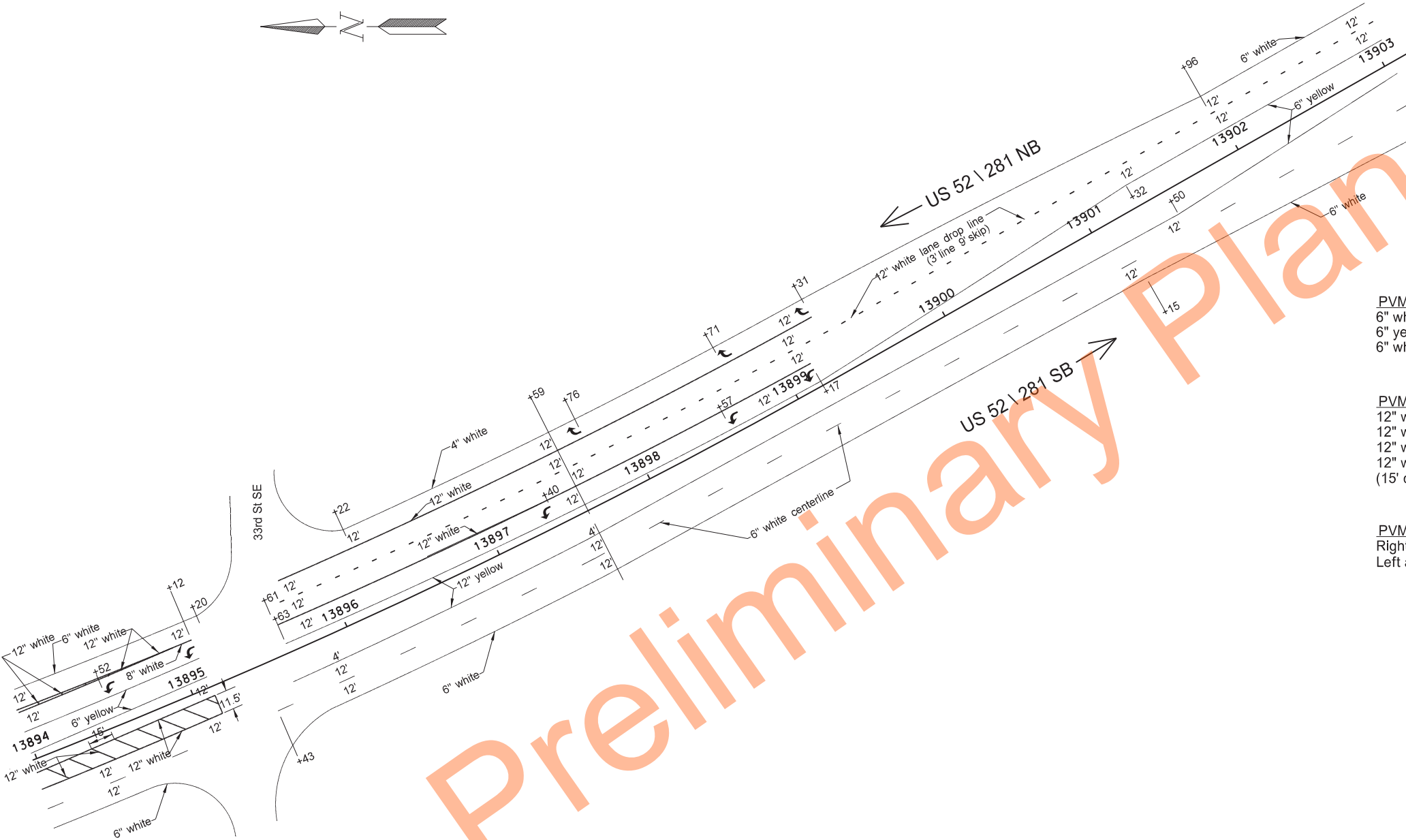
PVMT MK PAINTED 24IN LINE	
24" white stop bar	14 LF

PVMT MK PAINTED - MESSAGE	
Right arrow (1)	16 SF
Left arrow (4)	64 SF
TOTAL	80 SF



Pavement Markng
US 52/281 Bypass

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-NHU-2-052(055)252	120	4



PVMT MK PAINTED 6IN LINE	
6" white edge line	1868 LF
6" yellow edge line	1705 LF
6" white centerline (10' line, 30' skip)	222 LF
TOTAL	3795 LF

PVMT MK PAINTED 12IN LINE	
12" white channel line	917 LF
12" white median island line	236 LF
12" white lane drop line (3' line, 9' skip)	186 LF
12" white crosshatch line (15' center to center @ 45 degree)	108 LF
TOTAL	1447 LF

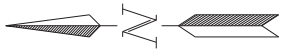
PVMT MK PAINTED - MESSAGE	
Right arrow (3)	48 SF
Left arrow (5)	80 SF
TOTAL	128 SF



Pavement Marking Details

US 52/281 Bypass

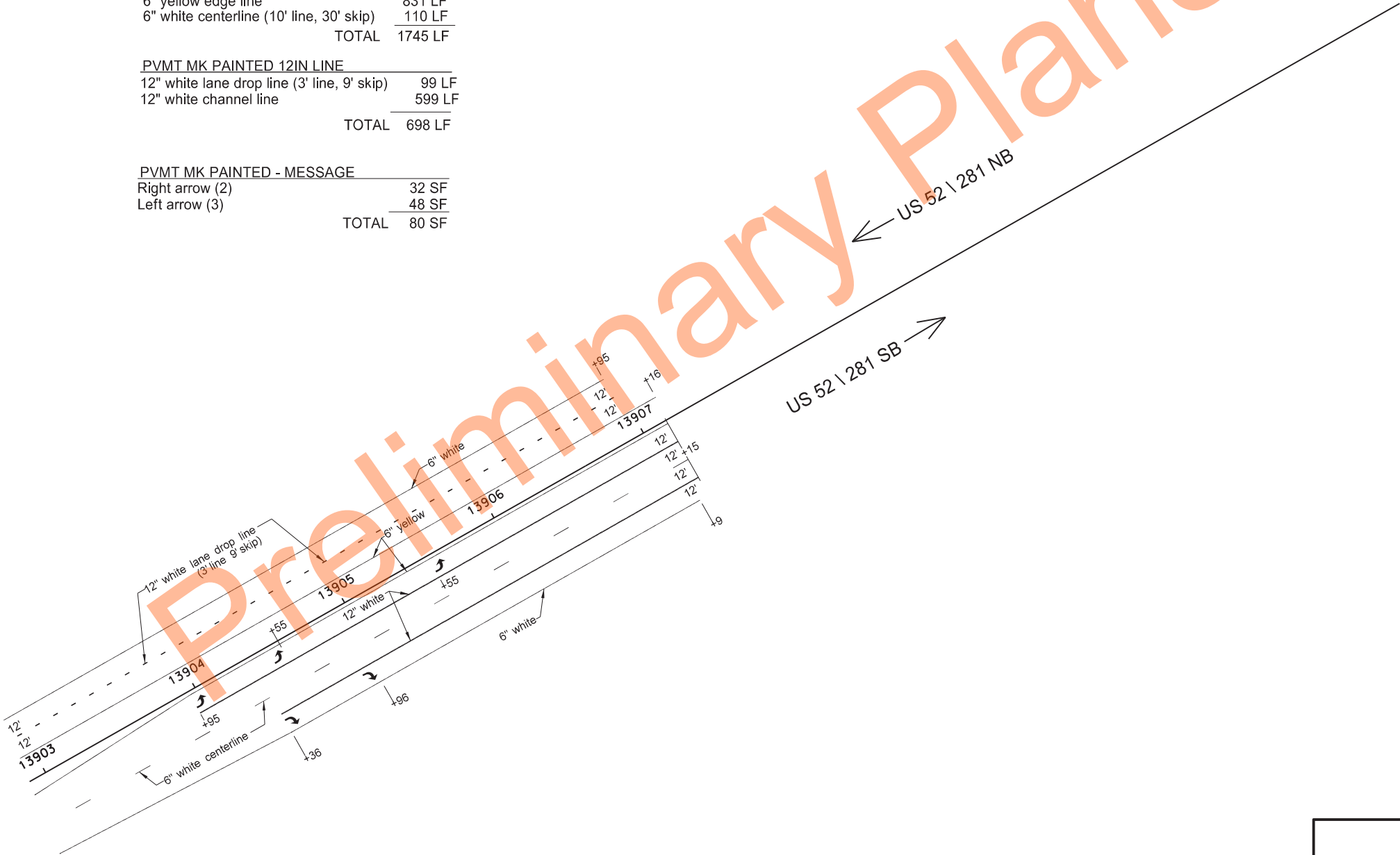
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-NHU-2-052(055)252	120	5



PVMT MK PAINTED 6IN LINE	
6" white edge line	804 LF
6" yellow edge line	831 LF
6" white centerline (10' line, 30' skip)	110 LF
TOTAL	1745 LF

PVMT MK PAINTED 12IN LINE	
12" white lane drop line (3' line, 9' skip)	99 LF
12" white channel line	599 LF
TOTAL	698 LF

PVMT MK PAINTED - MESSAGE	
Right arrow (2)	32 SF
Left arrow (3)	48 SF
TOTAL	80 SF



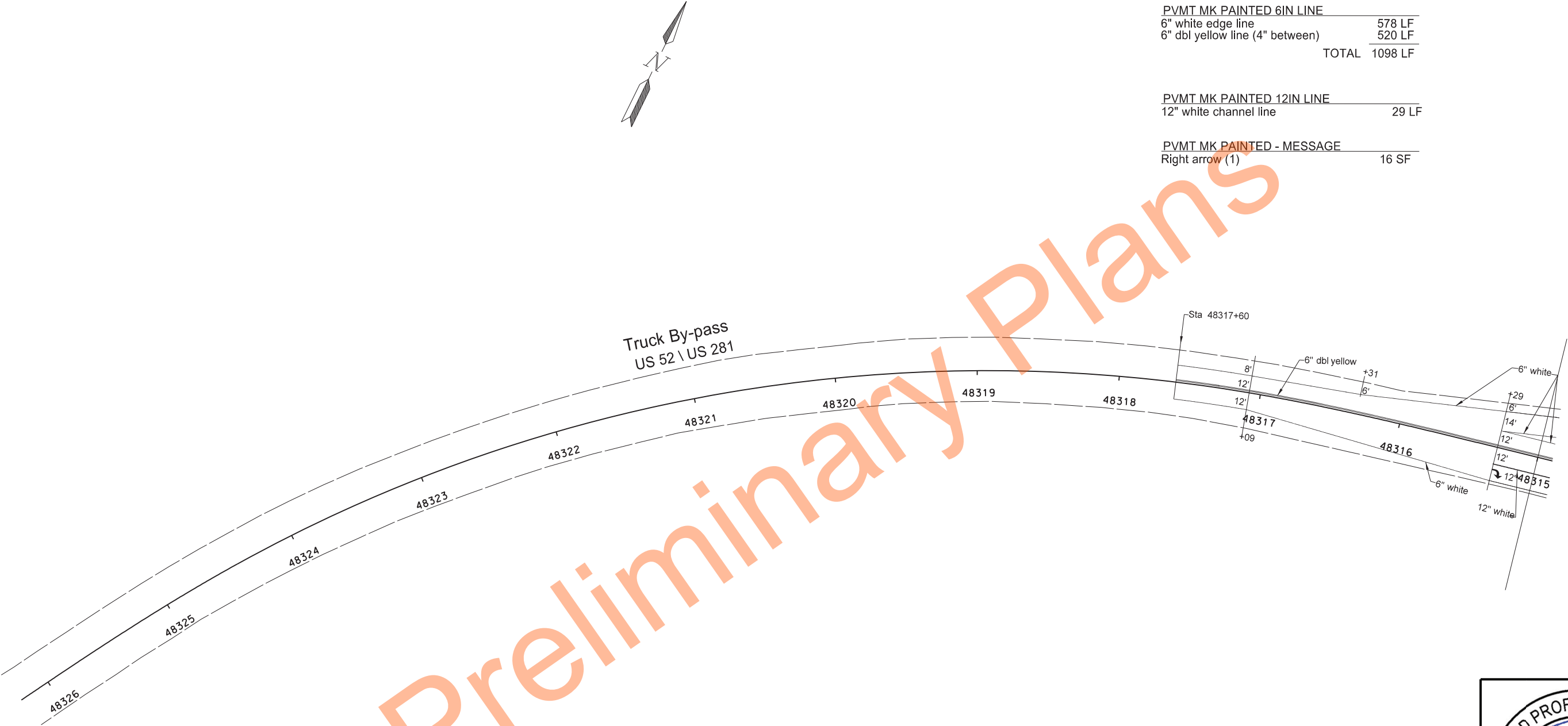
Pavement Marking
US 52/281 Bypass

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-NHU-2-052(055)252	120	6

PVTM MK PAINTED 6IN LINE	
6" white edge line	578 LF
6" dbl yellow line (4" between)	520 LF
TOTAL	1098 LF

PVTM MK PAINTED 12IN LINE	
12" white channel line	29 LF

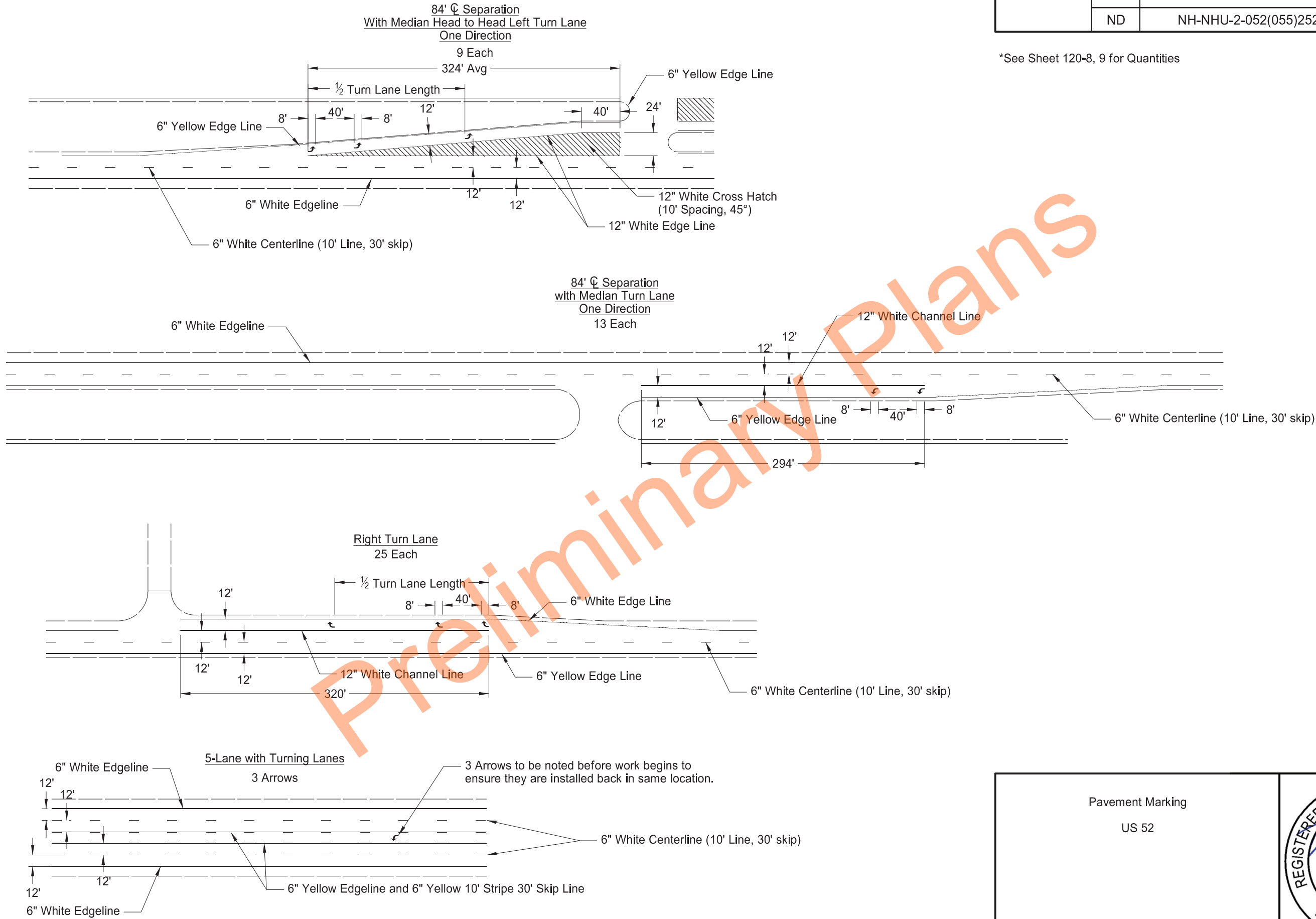
PVTM MK PAINTED - MESSAGE	
Right arrow (1)	16 SF



Pavement Marking
US 281/52 Bypass

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-NHU-2-052(055)252	120	7

*See Sheet 120-8, 9 for Quantities



Pavement Marking
US 52



Item		Location	Lt or Rt	Length (LF)	Item		Location	Lt or Rt	Length (LF)
Southbound Roadway					Northbound Roadway				
12" White Channel Line	24th St	Rt	317		12" White Channel Line	RP 264.31	Lt	214	
	RP 253.30	Rt	320			264.06	Lt	333	
	25th St	Rt	320				Rt	316	
	RP 254.21	Lt	295			263.89	Rt	324	
	RP 255.66	Lt	293			263.71	Lt	316	
	27th St	Rt	319				Rt	306	
	28th St	Rt	320			263.36	Rt	322	
	30th St	Rt	320				Rt	305	
	31st St	Rt	321			32nd St/41st St	Rt	198	
	RP 261.82	Rt	321			RP 261.82	Rt	294	
	32nd St	Rt	318			31st St	Rt	315	
		Rt	315				Rt	294	
	RP 263.71	Lt	292			30th St	Lt	320	
	RP 263.89	Lt	249			28th St	Lt	318	
		Rt	318			27th St	Rt	294	
	RP 264.06	Lt	293			RP 255.66	Lt	290	
	RP 264.31	Rt	320			RP 254.21	Rt	320	
	RP 264.54	Rt	287			25th St	Rt	216	
	RP 264.67	Rt	220			RP 253.30	Rt	291	
4th St NW (Jamestown)	Rt	216		24th St	Rt	337			
12" Cross Hatch Lines	24th St	Lt	184		12" Cross Hatch Lines	32nd St/41st St	Lt	363.5	
	28th St	Lt	208.5			30th St	Lt	234	
	30th St	Lt	215.5			28th St	Lt	244.5	
	31st St	Lt	215.5			24th St	Lt	207	
	32nd St/41st St	Lt	225.5						
Subtotal				7,023	Subtotal				6,972

Spec	Code	Description	Quantity	Unit
762	0103	Pvmt Mk Painted - Message	1,968	SF
762	1112	Pvmt Mk Painted 12 In Line	13,995	LF

STATE		PROJECT NO.	SECTION NO.	SHEET NO.
ND		NH-NHU-2-052(055)252	120	8

Item	Location	Lt or Rt	Each	Length (LF)	
Southbound Roadway					
Arrows	RP 252.737	Rt	3	48	
	RP 252.754	Lt	2	32	
	RP 253.239	Rt	3	48	
	RP 253.866	Lt	3	48	
	RP 254.151	Lt	2	32	
	RP 255.670	Lt	2	32	
	RP 256.211	Rt	3	48	
	RP 257.374	Rt	3	48	
	RP 257.730	Lt	2	32	
	RP 261.035	Rt	3	48	
	RP 261.042	Lt	2	32	
	RP 261.817	Rt	3	48	
	RP 262.046	Rt	3	48	
	RP 262.049	Lt	3	48	
	RP 263.638	Rt	3	48	
	RP 263.649	Lt	2	32	
	RP 263.833	Lt	2	32	
	RP 264.002	Rt	3	48	
	RP 264.238	Rt	3	48	
	RP 264.495	Rt	2	32	
	RP 264.629	Rt	2	32	
	RP 264.875	Rt	2	32	
	Subtotal			896	

Item	Location	Lt or Rt	Each	Length (LF)
Northbound Roadway				
Arrows	RP 264.780	Lt	1	16
	RP 264.695	Lt	1	16
	RP 264.575	Lt	1	16
	RP 264.375	Lt	2	32
	RP 264.135	Lt	3	48
	RP 264.130	Rt	3	48
	RP 263.954	Rt	3	48
	RP 263.781	Rt	3	48
	RP 263.777	Lt	3	48
	RP 263.428	Rt	3	48
	RP 263.424	Lt	3	48
	RP 262.193	Lt	3	48
	RP 262.150	Rt	2	32
	RP 261.938	Lt	2	32
	RP 261.163	Rt	3	48
	RP 261.153	Lt	2	32
	RP 259.872	Rt	3	48
	RP 259.864	Lt	3	48
	RP 257.514	Rt	3	48
	RP 257.509	Lt	3	48
	RP 256.348	Lt	2	32
	RP 255.776	Rt	2	32
	RP 254.266	Rt	3	48
	RP 254.010	Lt	2	32
	RP 253.357	Lt	2	32
	RP 252.836	Rt	3	48
RP 252.852	Lt	3	48	
Subtotal			1,072	

Pavement Marking	
US 281/52 Bypass	

REGISTERED PROFESSIONAL ENGINEER TYLER J. PETERSON PE-27417 DATE 09/01/26 NORTH DAKOTA
--

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-NHU-2-052(055)252	120	9

Southbound

6" Yellow Edgeline

Begin Sta	End Sta	Length (LF)
333827	386009	52182
390442	396700	6258
396700	398582	1882
398020	398582	562
Subtotal		60884

Total gap distance
-2118

Total Radius Distance
1997

10' line 30' skip
(Center turn lane stripe)
1320 LF x 0.25 330

Total 61093

6" Yellow Centerline (Frontage Rd.)

Begin Sta	End Sta	Length (LF)
0+15	75+35	7520
10' line, 30' skip		x 0.25
Total		1880

6" White Centerline

Begin Sta	End Sta	Length (LF)
3338+27	3860+09	52182
3904+42	3967+00	6258
3967+00	3987+42	2042
Subtotal		60482
10' line, 30' skip		x 0.25

Total = 15120.5

12" White Median Turn Lane Outline

24th St	264
	264
28th St	291
	289
30th St	287
	291
31st St	309
	311
	298
32nd St/41st St	298

Total 2902

6" White Edgeline

Begin Sta	End Sta	Length (LF)
333827	386009	52182
390442	396700	6258
396700	398582	1882
Subtotal		60322

Total gap distance
-989

Total 59333

Northbound

6" Yellow Edgeline

Begin Sta	End Sta	Length (LF)
333896	386583	52687
390442	396700	6258
396700	398582	1882
398020	398582	562
Subtotal		61389

Total gap distance
-2305

Total Radius Distance
2668

10' line 30' skip
(Center turn lane stripe)
1320 LF x 0.25 330

Total 62082

6" White Centerline

Begin Sta	End Sta	Length (LF)
333896	386583	52687
3904+42	3967+00	6258
3967+00	3987+42	2042
Subtotal		60987
10' line, 30' skip		x 0.25

Total = 15247

6" White Edgeline

Begin Sta	End Sta	Length (LF)
333896	386583	52687
390442	396700	6258
396700	398582	1882
Subtotal		60827

Total gap distance
-1751

Total 59076

Spec	Code	Description	Quantity	Unit
762	1106	Pvmt Mk Painted 6 In Line	273,831	LF
762	1112	Pvmt Mk Painted 12 In Line	2,902	LF
762	1124	Pvmt Mk Painted 24 In Line	12	LF

24" White Stop Bar

Location	Length (LF)
31st St West Crossroad	12
Total	12

Pavement Marking Details

US 52/281 Bypass



NDDOT ABBREVIATIONS

D-101-1

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

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

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

C Gdrl cable guardrail
Calc calculate
CIP cast iron pipe
CB catch basin
CRS cationic rapid setting
C Gd cattle guard
C To C center to center
CL or ☐ centerline
Ch chain
Chnlk chain-link
Ch Blk channel block
Ch Ch channel change
Chk check
Chsld chiseled
Cir circle
Cl class
Clnt clean-out
Clr clear
Cl&gr clearing & grubbing
Comb. combination
Coml commercial
Compr compression
CADD computer aided drafting & design
Conc concrete
CECB concrete erosion control blanket
Cond conductor
Const construction
Cont continuous
CSB continuous split barrel sample
Contr contraction
Contr contractor
CP control point
Coord coordinate
Cor corner
Corr corrected
CAES corrugated aluminum end section
CAP corrugated aluminum pipe
CMES corrugated metal end section
CMP corrugated metal pipe
CPVCP corrugated poly-vinyl chloride pipe
CSES corrugated steel end section
CSFES corrugated steel flared end section
CSP corrugated steel pipe
CSTES corrugated steel traversable end section
Co County
Crse course
Ct Court
Xarm cross arm
Xbuck cross buck
Xsec cross sections
Xing crossing
Xrd crossroad
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 ø diameter
Dir direction
Dist distance
DM disturbed material
DB ditch block
DG ditch grade
Dbl double
Dn down
Dwg drawing
Dr drive
Drwy driveway
DI drop inlet
D dry density

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

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

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NDDOT ABBREVIATIONS

D-101-3

Salv	salvage(d)	Tel	telephone
San	sanitary sewer line	Tel B	Telephone Booth
Sec	section	Tel P	telephone pole
SL	section line	Tv	television
Sep	separation	Temp	temperature
Seq	sequence	Temp	temporary
Serv	service	TBM	temporary bench mark
Sht	sheet	T	thinwall tube sample
Shtng	sheeting	Ts	topsoil
Shldr	shoulder	Traf	traffic
Sw or Sdwk	sidewalk	TSCB	traffic signal control box
SD	sight distance	Tr	trail
SN	sign number	Transf	transformer
Sig	signal	Trans	transition
Sgl	single	TT	transmission tower
SRCP	slotted reinforced concrete pipe	TES	traversable end section
SC	slow curing	Trans	transverse
SS	slow setting	Trtd	treated
Sm	small	Trmt	treatment
S	South	Qc	triaxial compression
SE	Southeast	TERO	tribal employment rights ordinance
SW	Southwest	Tpl	triple
SB	Southbound	Typ	typical
Sp	spaces		
Spcl	special	Qu	unconfined compressive strength
SA	special assembly	Ugrnd	underground
SP	special provisions	Util	utility
G	specific gravity		
Spk	spike		
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	VSFS	vehicle speed feedback sign
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 preperation	WB	westbound
Ss	subsoil	Wrng	wiring
SS	supplement specification	W/	with
Supp	supplemental	W/o	without
Surf	surfacing		
Surv	survey		
Sym	symmetrical		

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NDDOT ABBREVIATIONS

D-101-4

MEASUREMENTS

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

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

SURVEY DESCRIPTIONS

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

SOIL TYPES

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

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

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

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

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

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

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

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

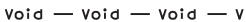
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12-18-20	General Revisions
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04-14-25	General Revisions

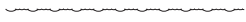
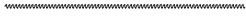
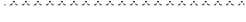


LINE STYLES

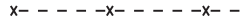
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Existing Topography

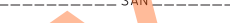
	Existing Ground Void
	Existing Cemetery Boundary
	Existing Box Culvert Bridge
	Existing Concrete Surface
	Existing Drainage Structure
	Existing Gravel Surface
	Existing Riprap
	Existing Dirt Surface
	Existing Asphalt Surface
	Existing Tie Point Line
	Existing Railroad Centerline
	Existing Guardrail Cable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

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

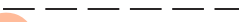
Proposed Topography

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

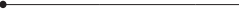
Existing Utilities

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

Proposed Utilities

	24 Inch Pipe
	Reinforced Concrete Pipe
	Under Drain
	Edge Drain

Traffic Utilities

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

Sign Structures

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

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

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PE-4683

ENGINEER

NORTH DAKOTA

12 18 2020

LINE STYLES

D-101-21

Right Of Way

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

Boundary Control

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

Cross Sections and Typicals

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

Geotechnical

	Geotextile Fabric Type D
	Geogrid
	Geotextile Fabric Type R
	Geotextile Fabric Type R1
	Geotextile Fabric Type RR
	Geotextile Fabric Type S
	Subgrade Reinforcement
	Failure Line

Countours

	Depression Contours
	Supplemental Contour

Profile

	Subgrade, Subcut or Ditch Grade
	Topsoil Profile

Striping

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

Pavement Joints

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

Bridge Details

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

Erosion Control

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

Environmental

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

NORTH DAKOTA
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07-01-14

REVISIONS

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SYMBOLS

D-101-30

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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12-18-20	General Revisions

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SYMBOLS

D-101-31

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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12-18-20	General Revisions



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SYMBOLS

D-101-32

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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12-18-20	General Revisions



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



12 18 2020

SYMBOLS

D-101-33

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

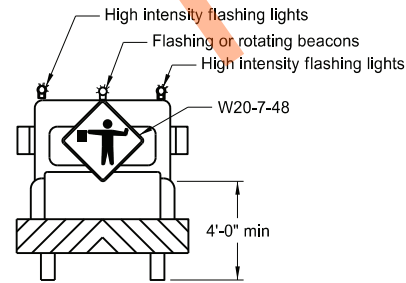
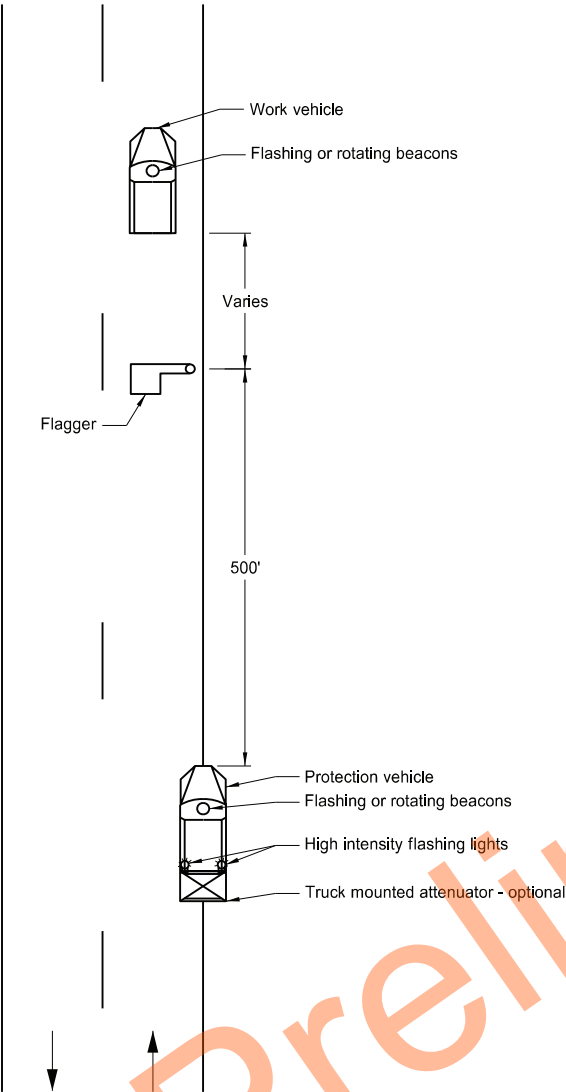
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
12-18-20	General Revisions Sheet added - Continued from D-101-32

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12 18 2020

TRAFFIC CONTROL FOR CORING OF HOT BITUMINOUS PAVEMENT

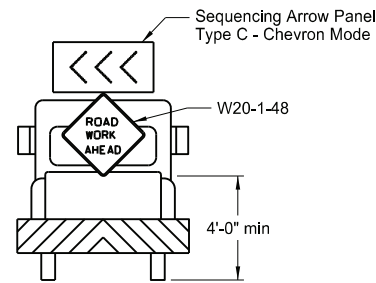
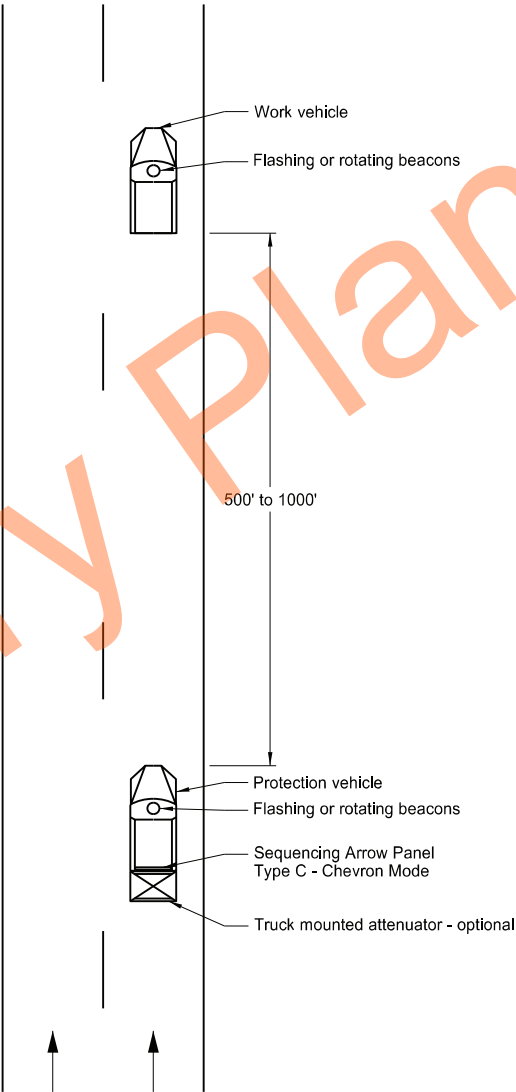
D-704-2

Two Lane, Two Way Roadways



Typical Protection Vehicle

Multilane Roadways



Typical Protection Vehicle

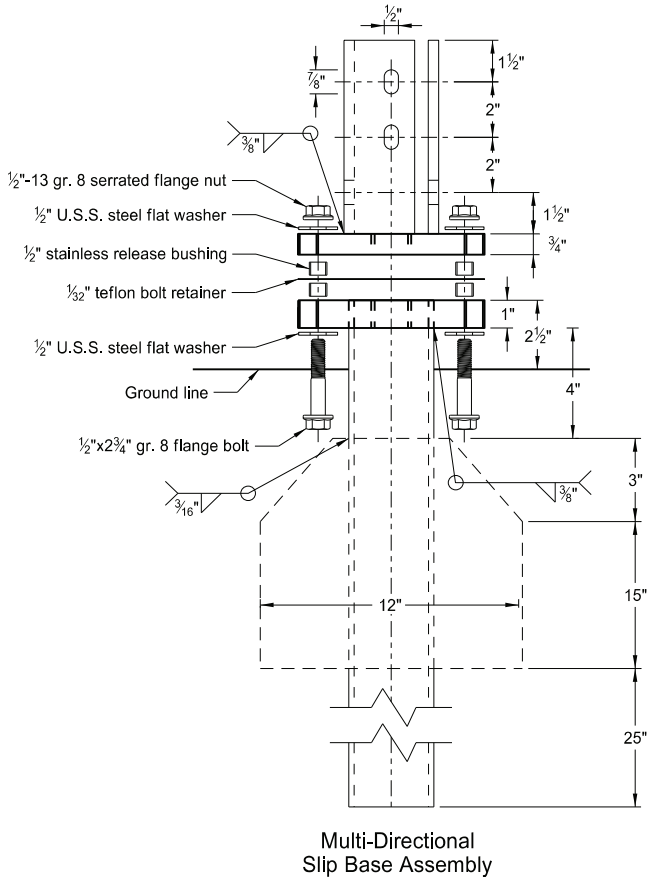
- Notes:
1. Display a 360 degree rotating, flashing, oscillating or strobe light on the working vehicle.
 2. Display a 360 degree rotating, flashing, oscillating or strobe light on the shadow vehicle. Operate a sequencing arrow panel Type C in chevron mode on the shadow vehicle for Multilane Roadway.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

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

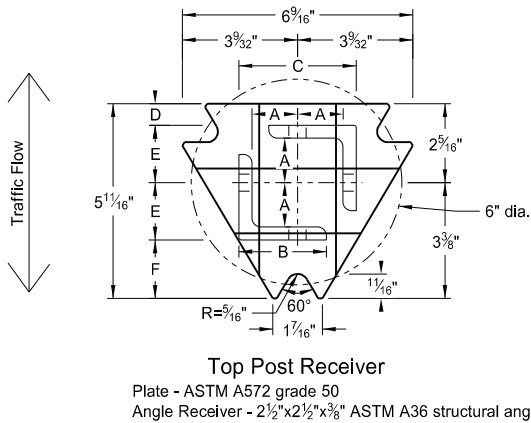
08/01/24

BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7



Perforated Tube



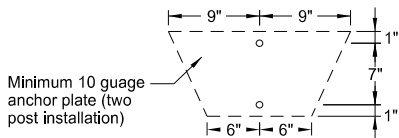
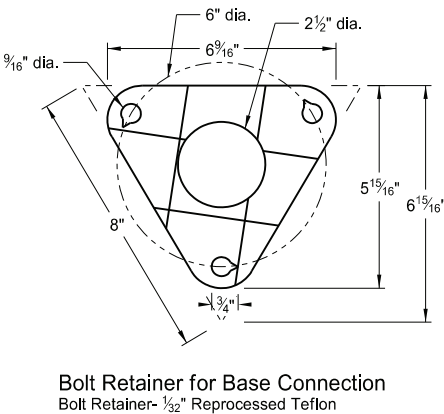
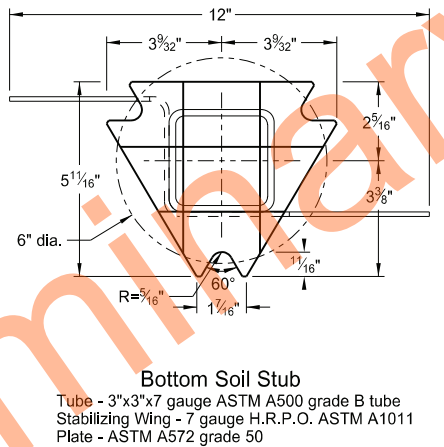
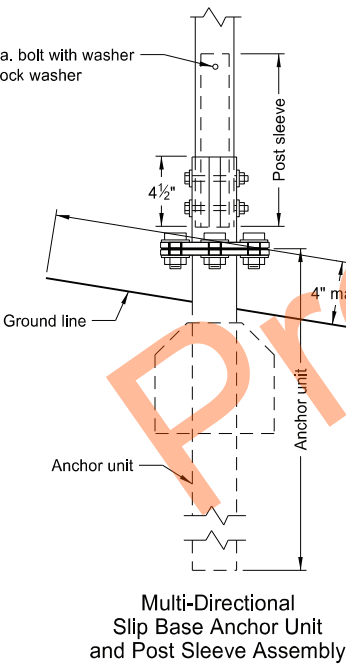
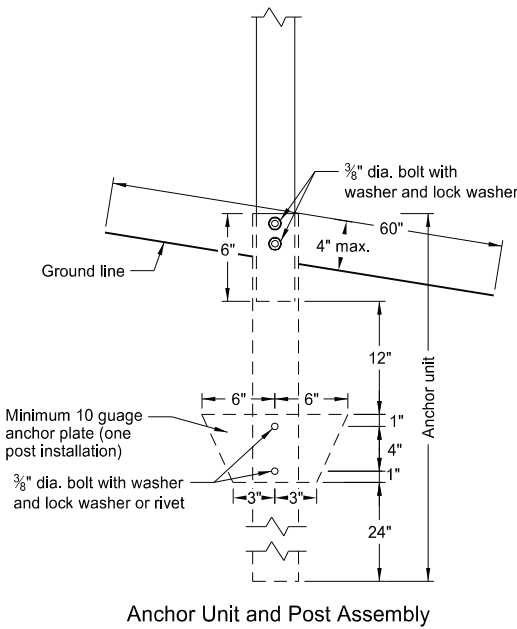
- Notes:
1. Torque slip base bolts as specified by manufacturer.
 2. Use anchor with 43.9 KSI yield strength and 59.3 KSI tensile strength.
 3. Provide 4" vertical clearance for anchor or breakaway base. Measure the 4"x60" measurement above and below post location and back and ahead of post.
 4. In concrete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

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

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

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

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



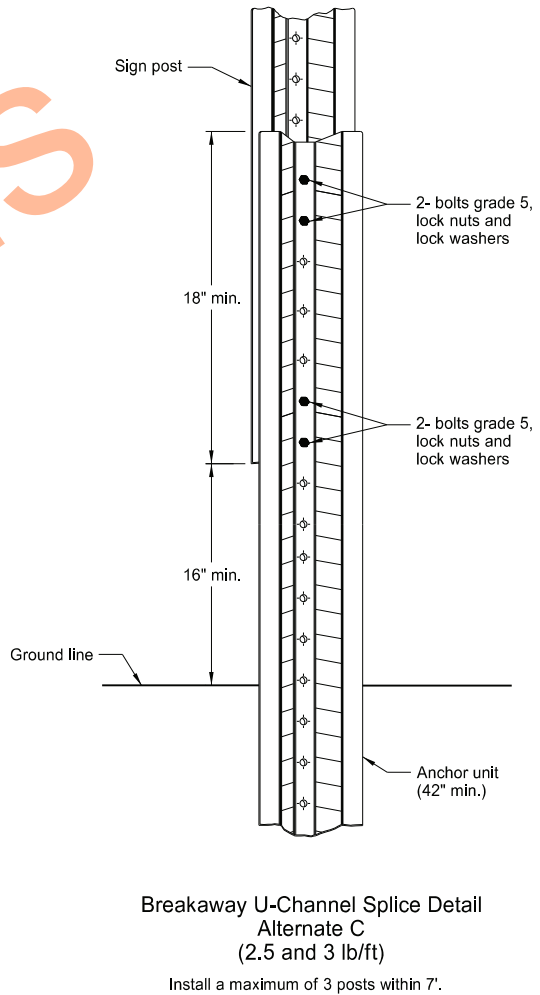
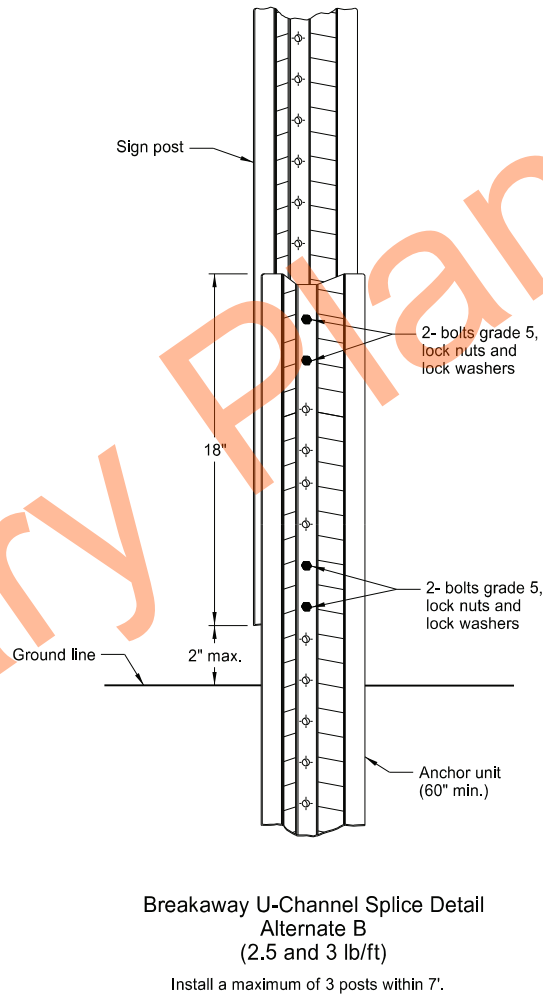
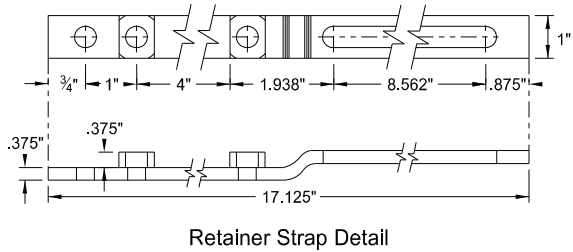
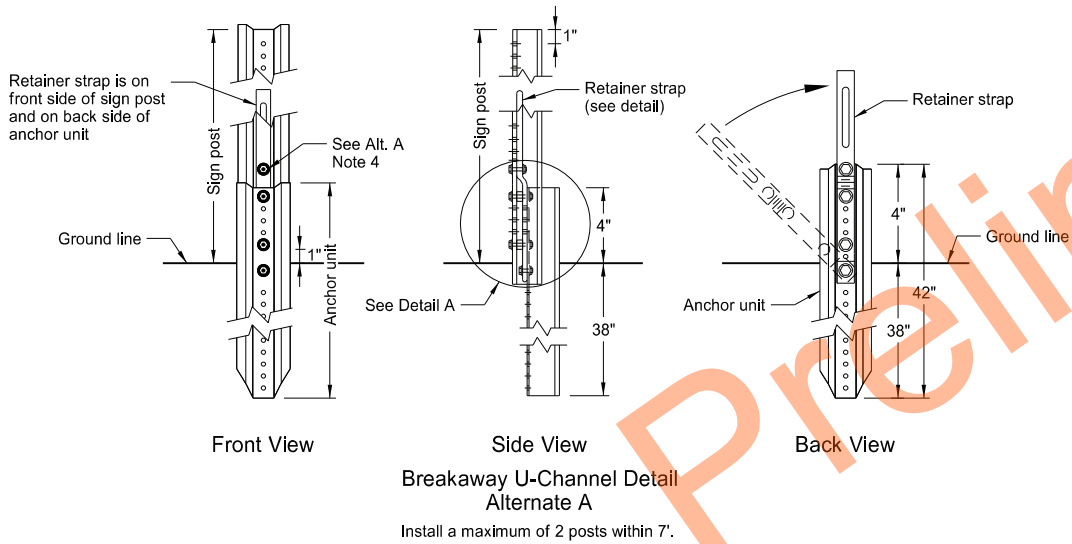
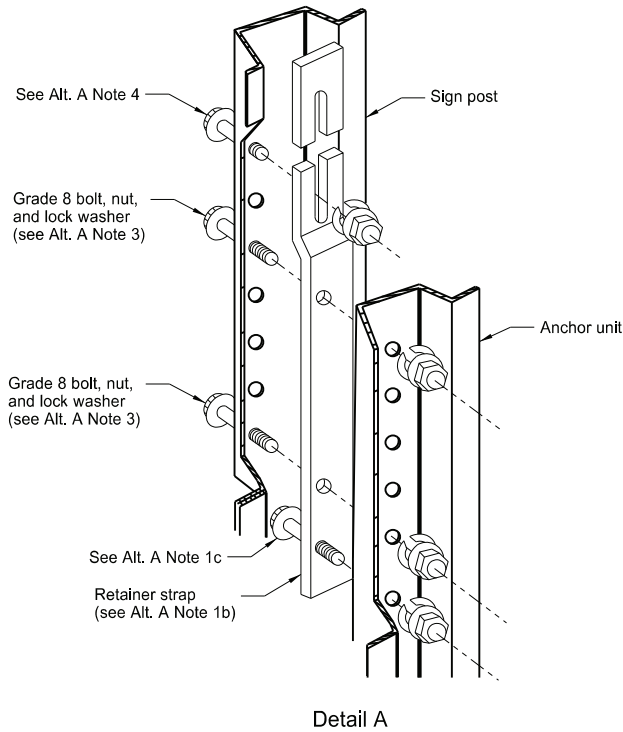
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp
8-01-24	Electronic Stamp/Signature



BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



Alternate A Steps of Installation:

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
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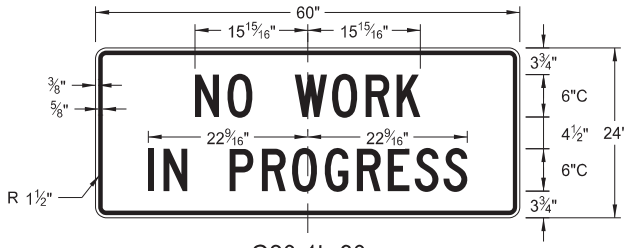


08/01/24

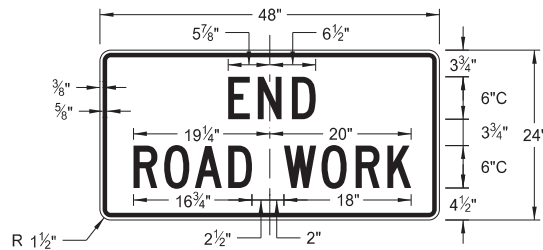
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



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



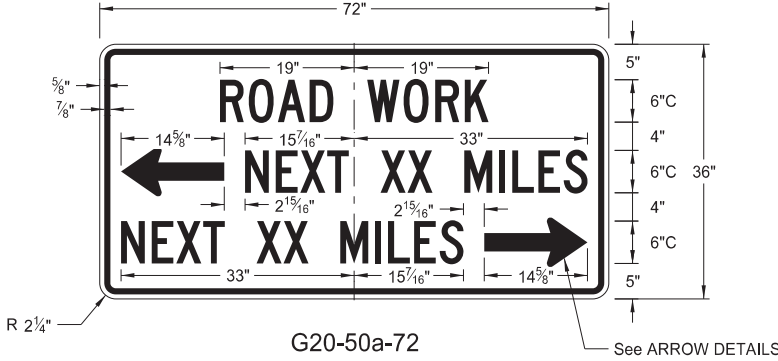
G20-1b-60
Legend: black (non-refl)
Background: orange



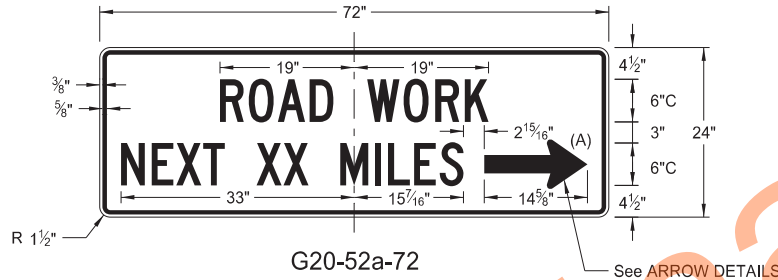
G20-2-48
Legend: black (non-refl)
Background: orange



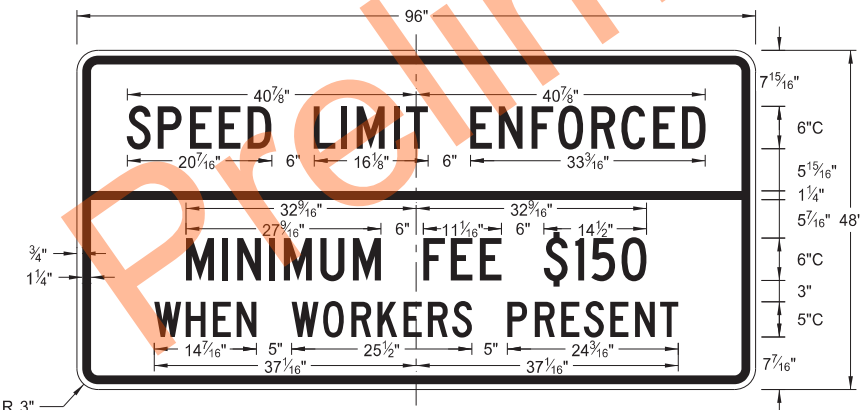
G20-4b-36
Legend: black (non-refl)
Background: orange



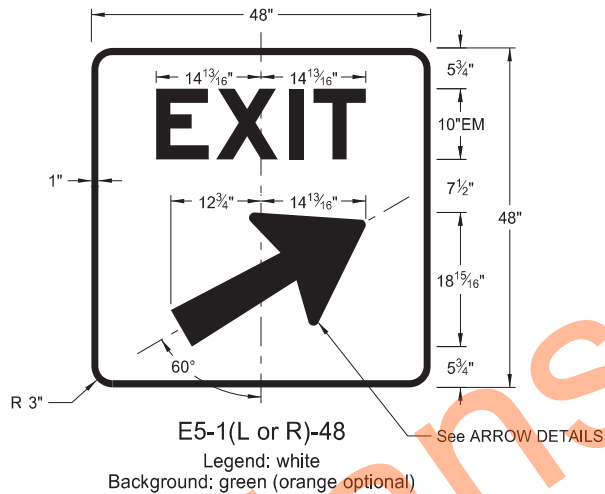
G20-50a-72
Legend: black (non-refl)
Background: orange



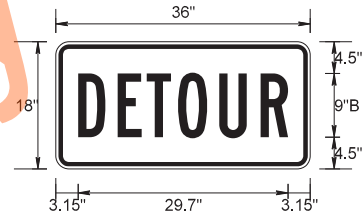
G20-52a-72
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Background: orange



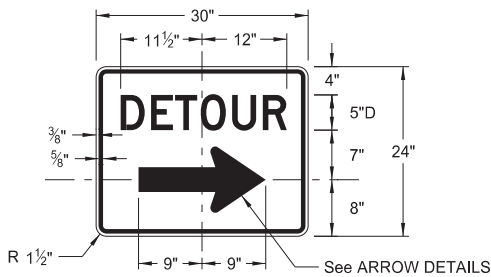
G20-55-96
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Background: orange



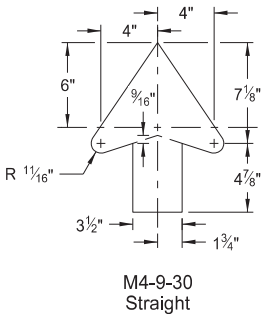
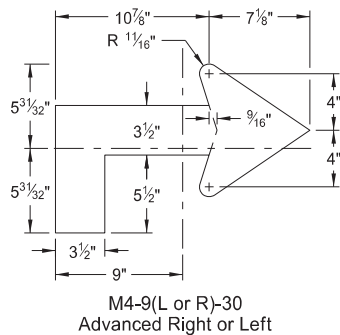
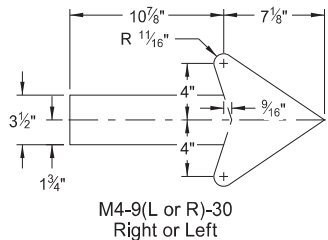
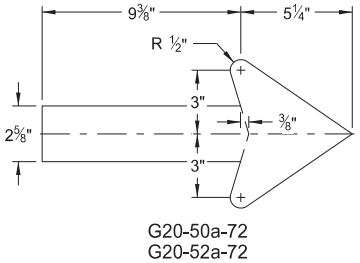
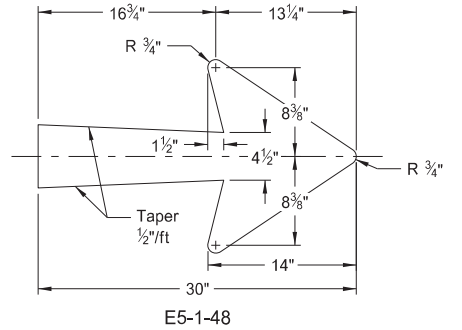
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



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



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



ARROW DETAILS

NOTES:

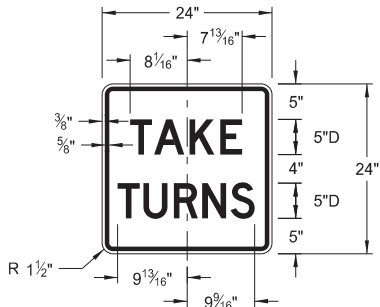
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

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

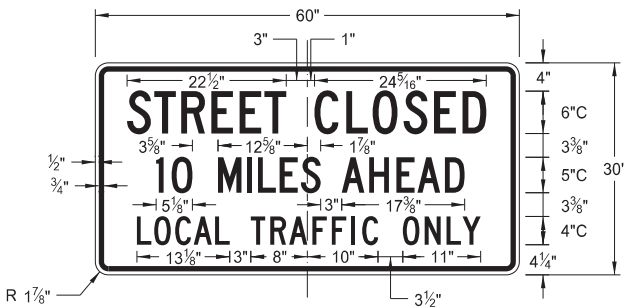


CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS

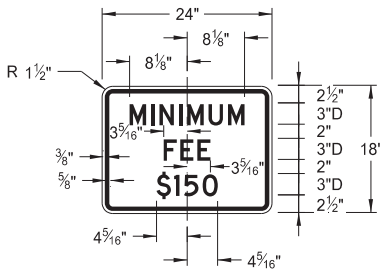
D-704-10



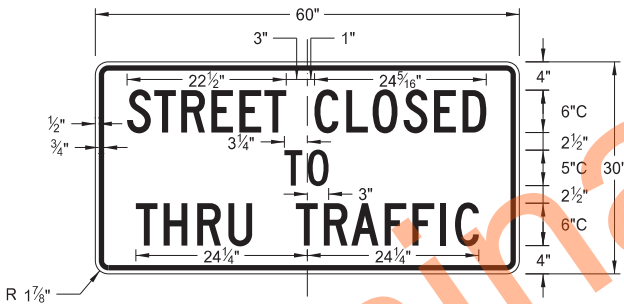
R1-50P-24
Legend: black (non-refl)
Background: white



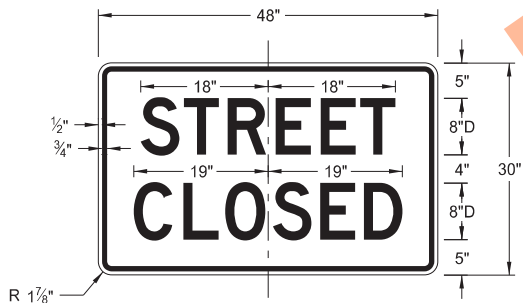
R11-3c-60
Legend: black (non-refl)
Background: white



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



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



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

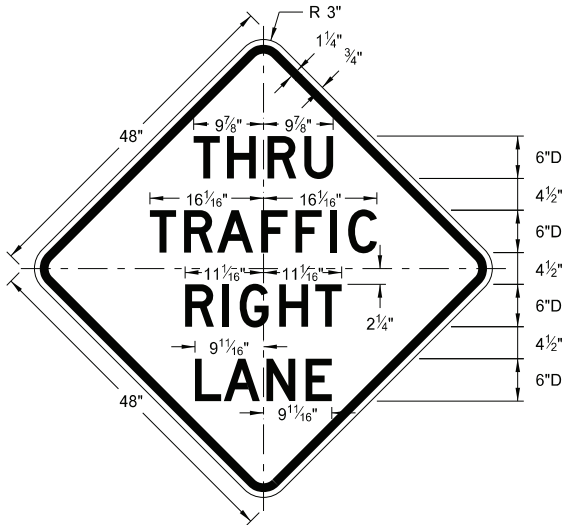
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
08-17-17	Revised sign number
10-03-19	New Design Engineer PE Stamp
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes



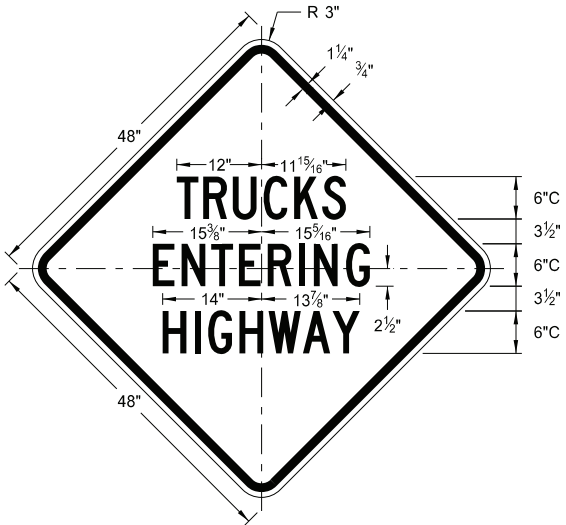
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

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

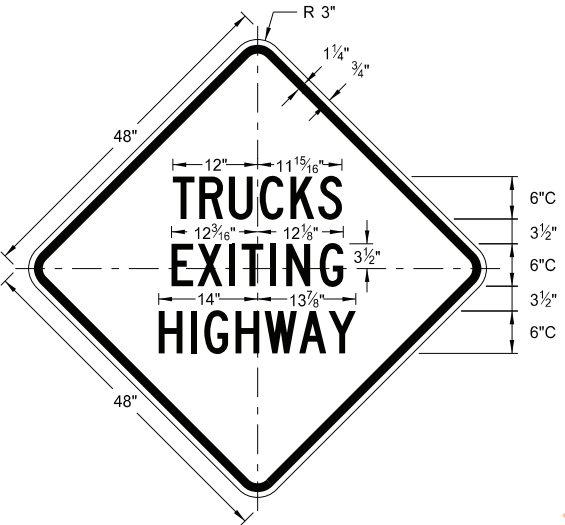
* DISTANCE MESSAGES



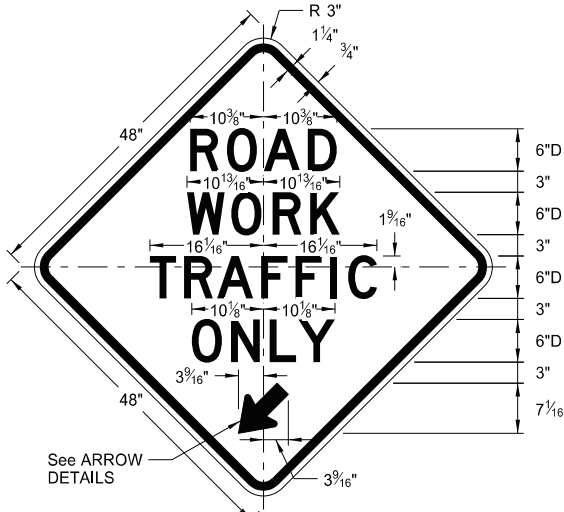
W5-8-48
Legend: black (non-refl)
Background: orange



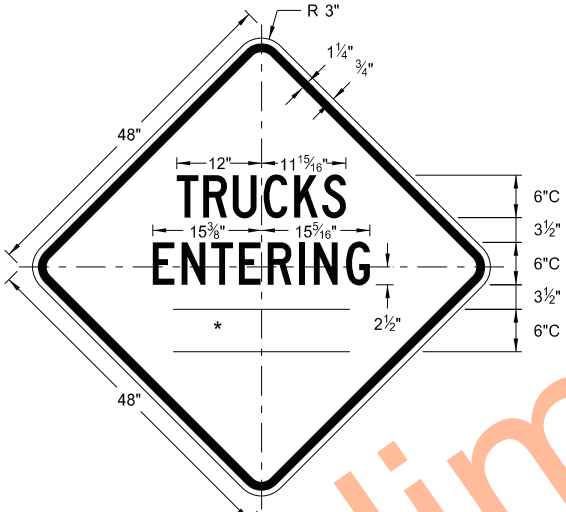
W8-53-48
Legend: black (non-refl)
Background: orange



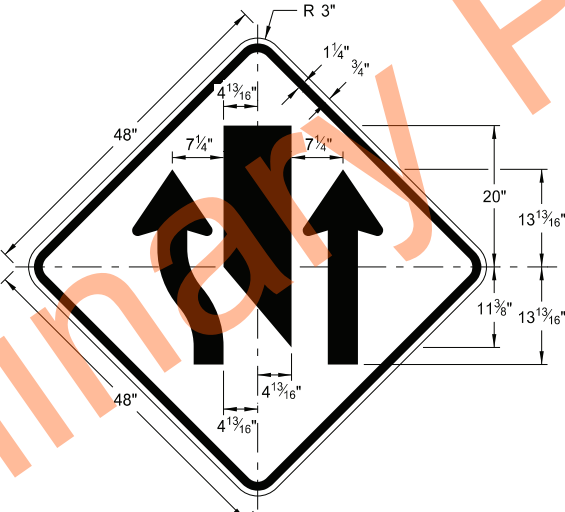
W8-56-48
Legend: black (non-refl)
Background: orange



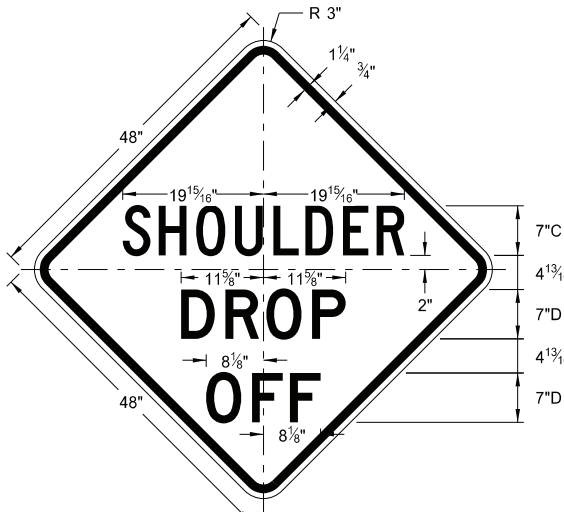
W5-9-48
Legend: black (non-refl)
Background: orange



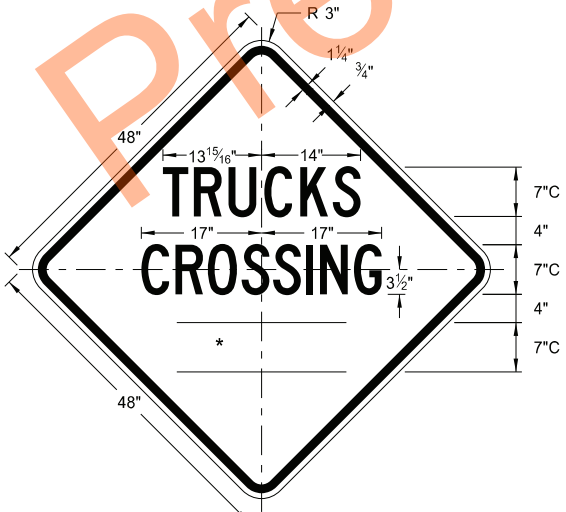
W8-54-48
Legend: black (non-refl)
Background: orange



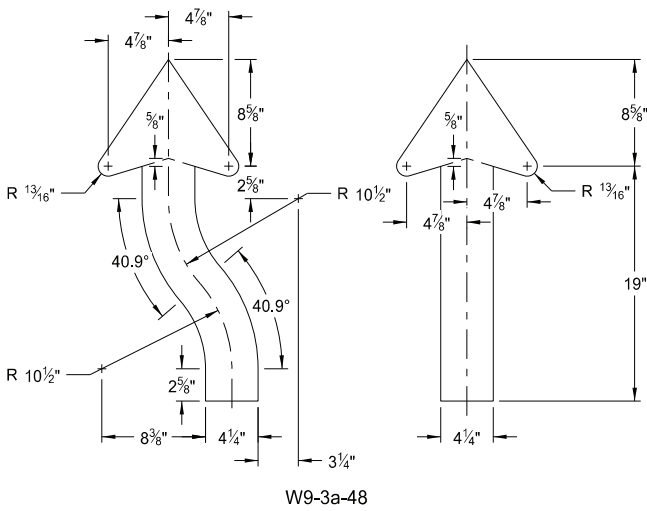
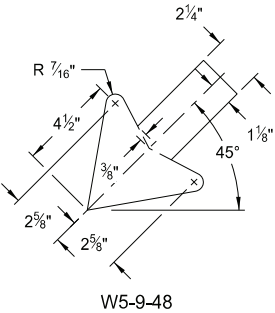
W9-3a-48
Legend: black (non-refl)
Background: orange



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



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



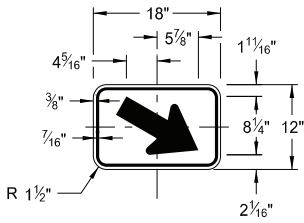
ARROW DETAILS

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

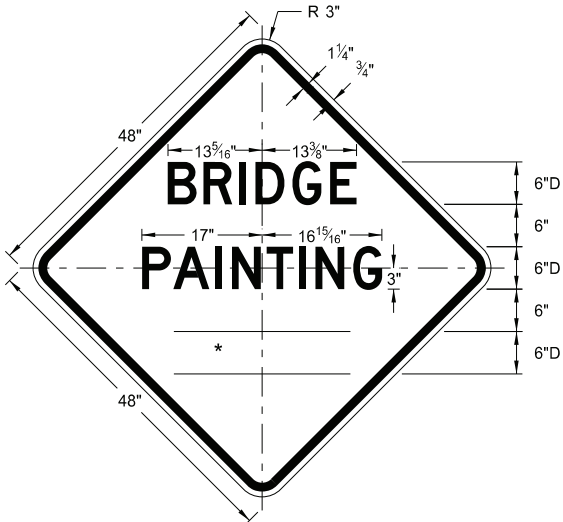


08/01/24

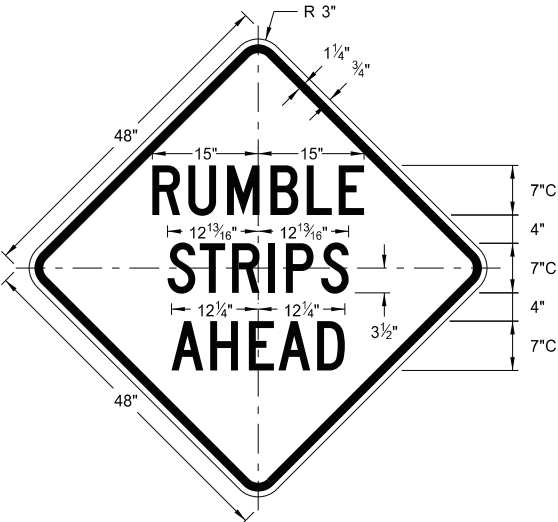
CONSTRUCTION SIGN DETAILS
WARNING SIGNS



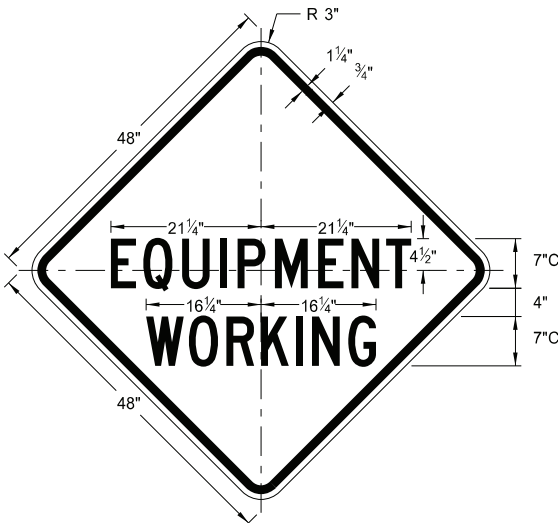
W16-7aP-18
Legend: black (non-refl)
Background: orange



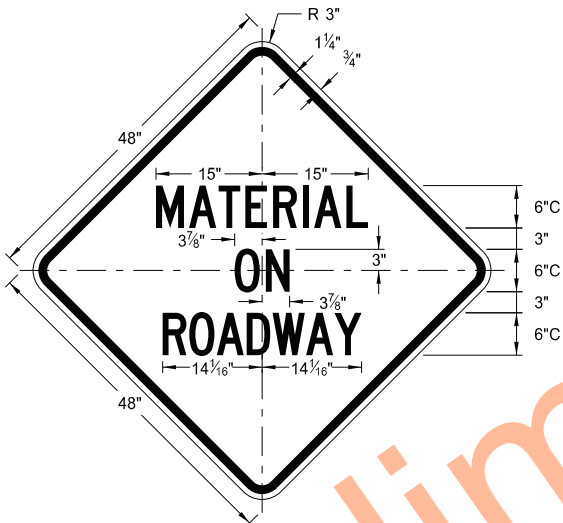
W21-50-48
Legend: black (non-refl)
Background: orange



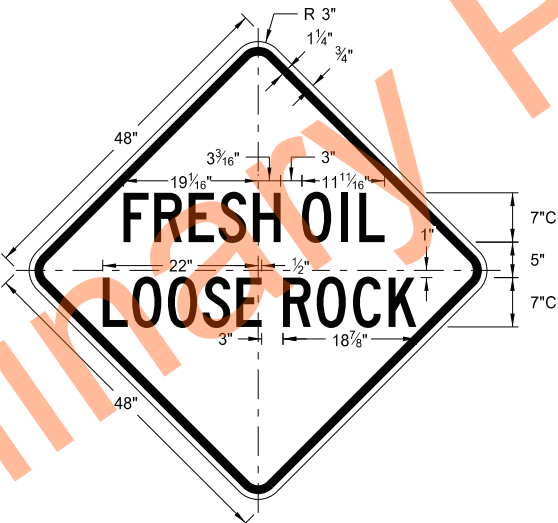
W21-53-48
Legend: black (non-refl)
Background: orange



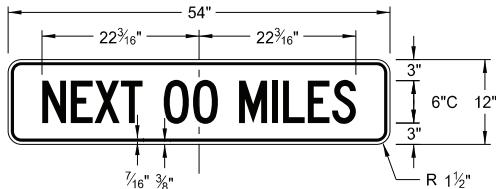
W20-51-48
Legend: black (non-refl)
Background: orange



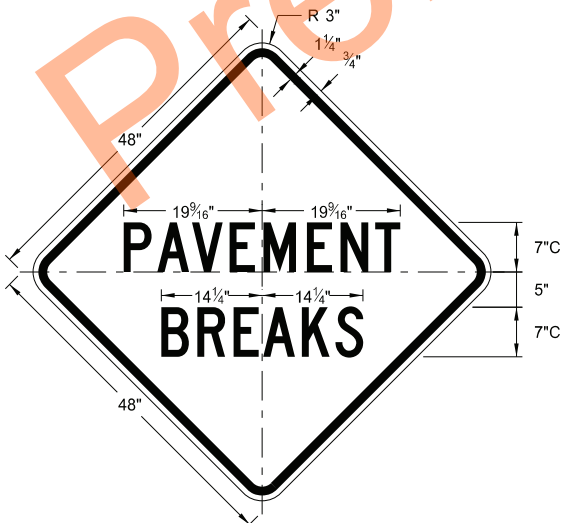
W21-51-48
Legend: black (non-refl)
Background: orange



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



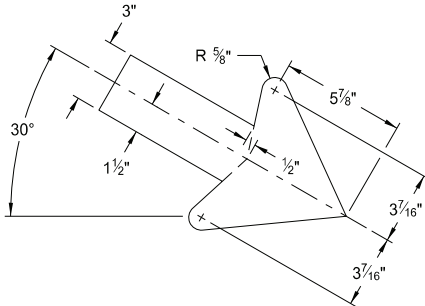
W20-52P-54
Legend: black (non-refl)
Background: orange



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

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

* DISTANCE MESSAGES



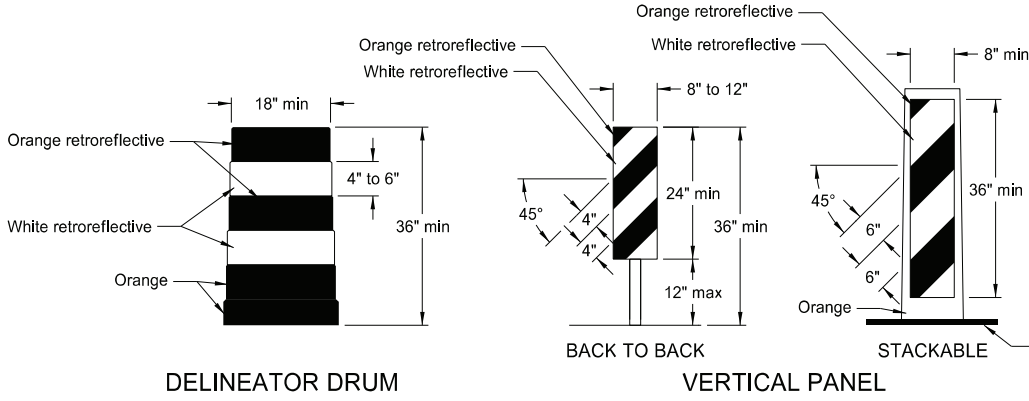
W16-7aP-18

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



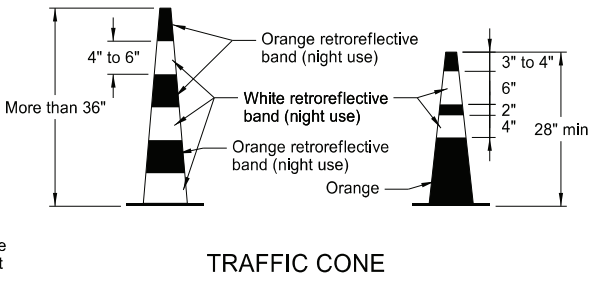
08/01/24

BARRICADE AND CHANNELIZING DEVICE DETAILS

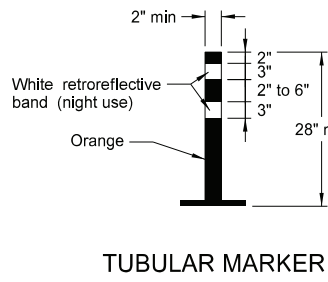


Provide horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide for drum markings. Use a minimum of two orange and two white stripes with the top stripe being orange for each drum. Do not exceed 3" nonretroreflective spaces between the horizontal orange and white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

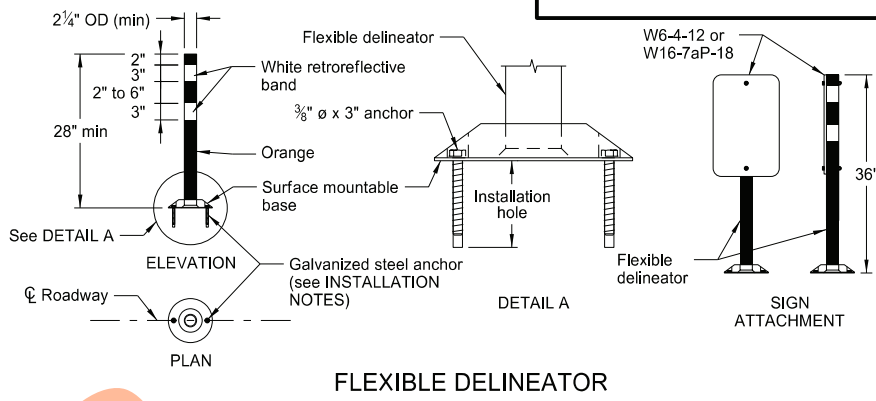
Provide alternating orange and white retroreflective stripes, sloping downward in direction vehicular traffic is to pass. Place retroreflective sheeting on both sides of panel with a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective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



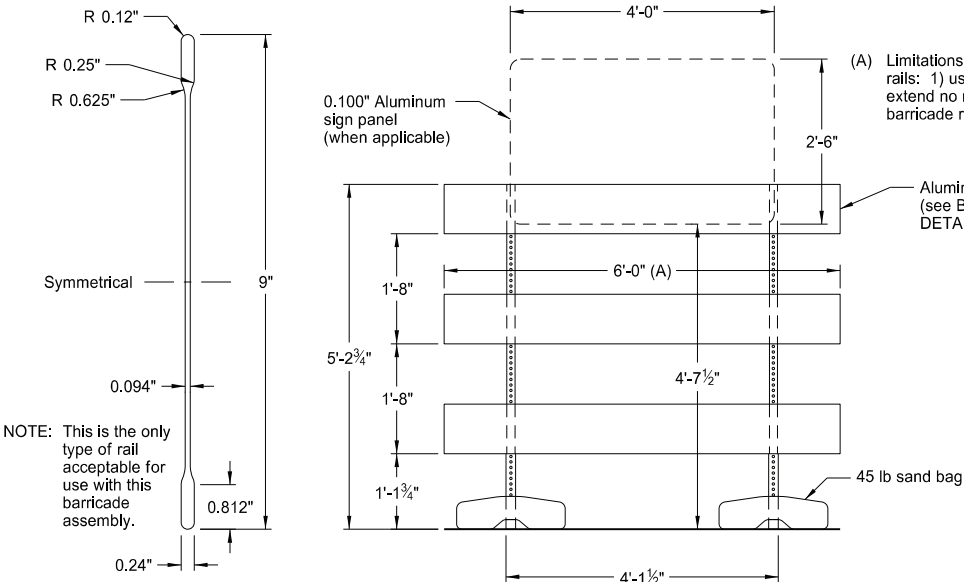
Provide retroreflectorization of cones more than 36" in height by alternating orange and white retroreflective stripes. Use a minimum of two orange and two white stripes for each cone with the top stripe being orange. Use maximum 3" nonretroreflective space between the orange and white stripes.



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



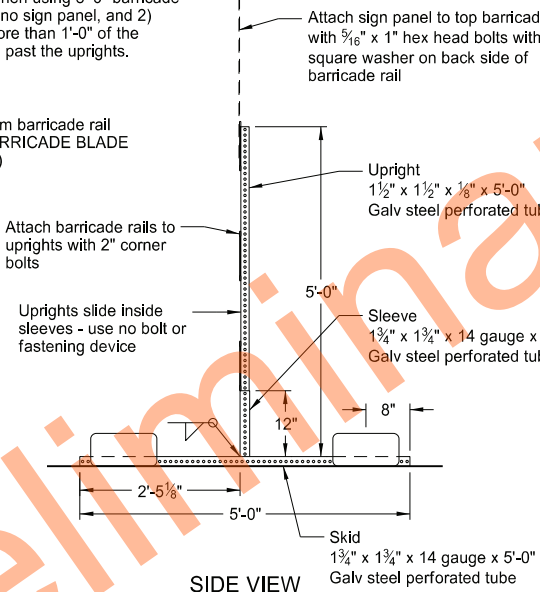
- INSTALLATION NOTES:
1. Drill installation holes to diameter and depth required by manufacturer's specifications.
 2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
 3. In lieu of bolted down base, use an 8" x 8" butyl pad or hot melt butyl.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



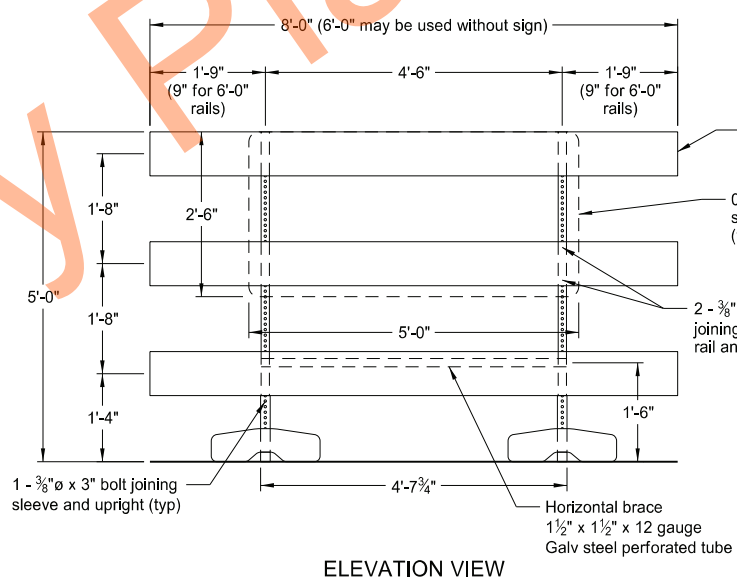
BARRICADE BLADE DETAIL

ELEVATION VIEW

BARRICADE ASSEMBLY DETAIL
(Aluminum Barricade Rails)

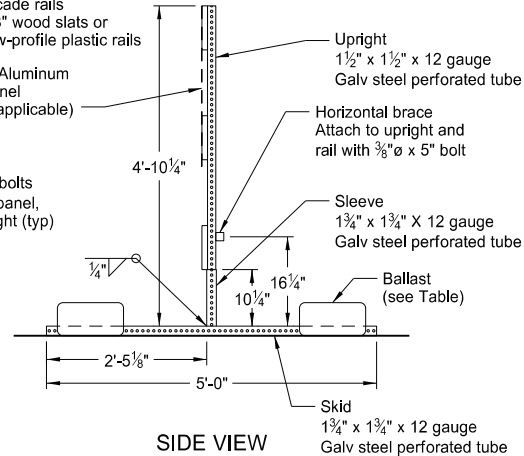


SIDE VIEW



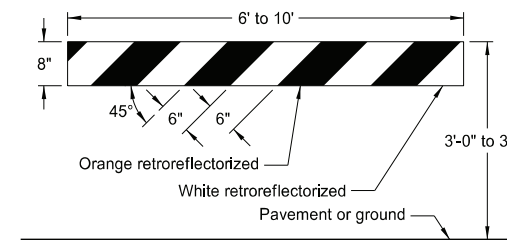
ELEVATION VIEW

BARRICADE ASSEMBLY DETAIL
(Wood or Plastic Rails)

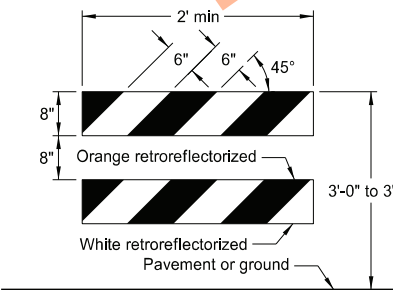


SIDE VIEW

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".

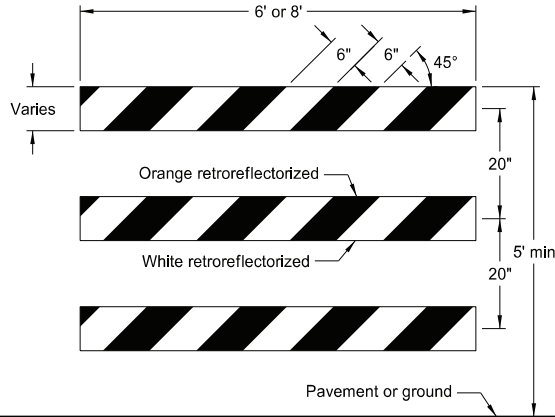


TYPE I BARRICADE

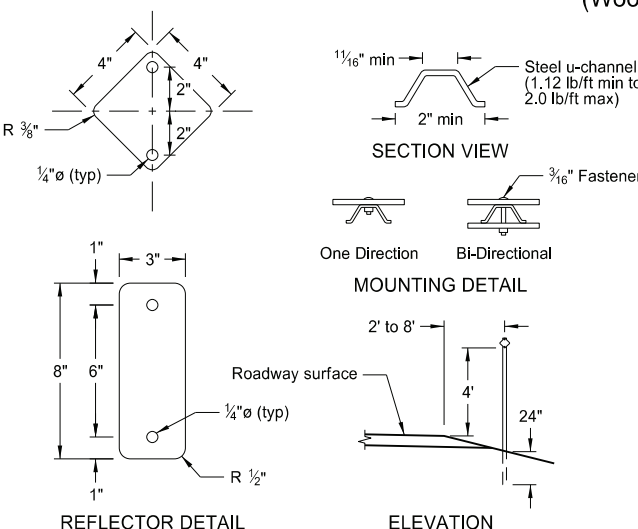


TYPE II BARRICADE

BARRICADE RAIL DETAILS



TYPE III BARRICADE



REFLECTOR DETAIL

ELEVATION

DELINEATORS

MINIMUM BALLAST
(For each side of barricade support)

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

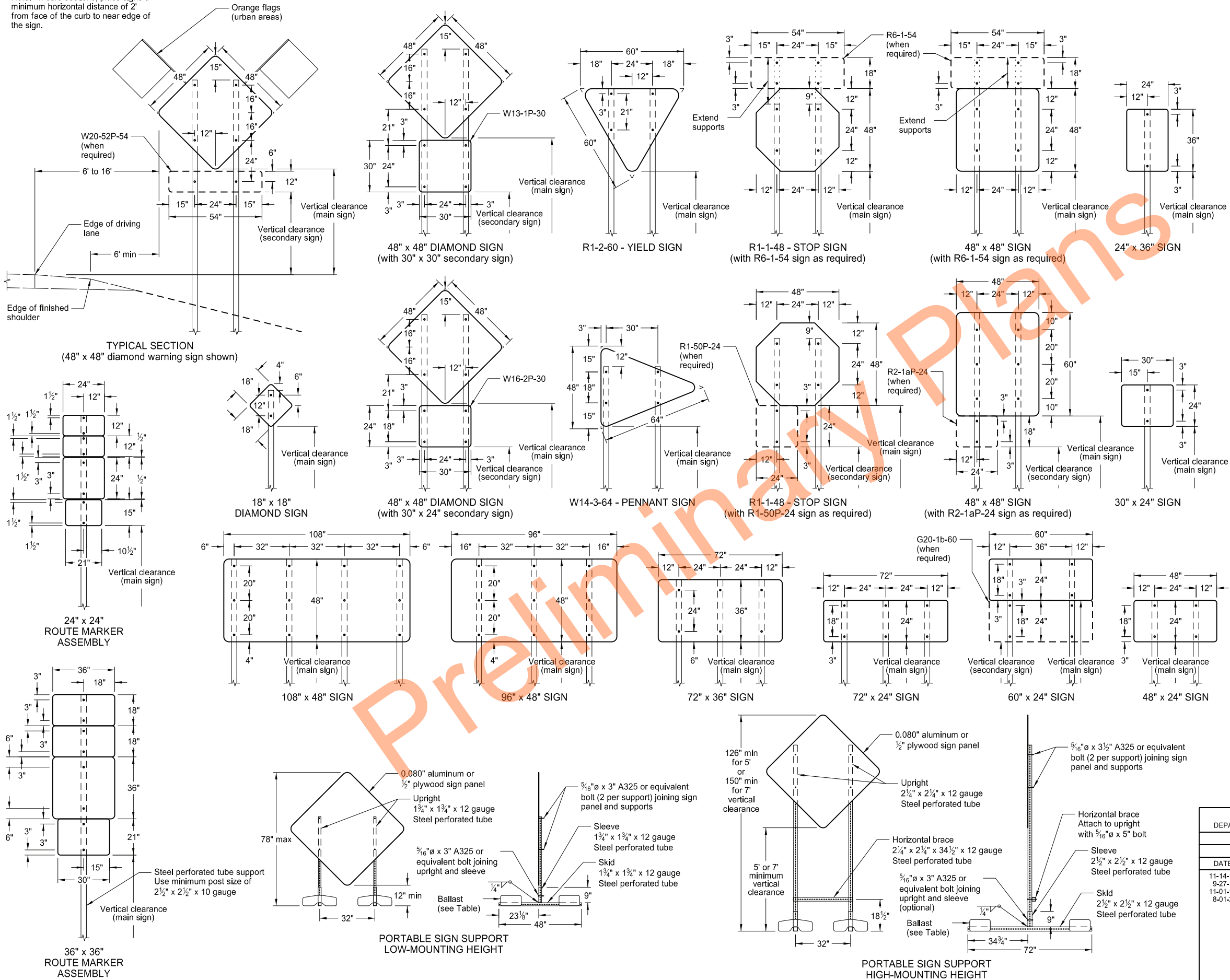
Note: Number of sandbags based on a wind speed of 55 MPH. Sandbags assumed to be placed at or near the ends of the skids.

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



CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

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



NOTES:

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

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

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

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

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

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

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

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

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

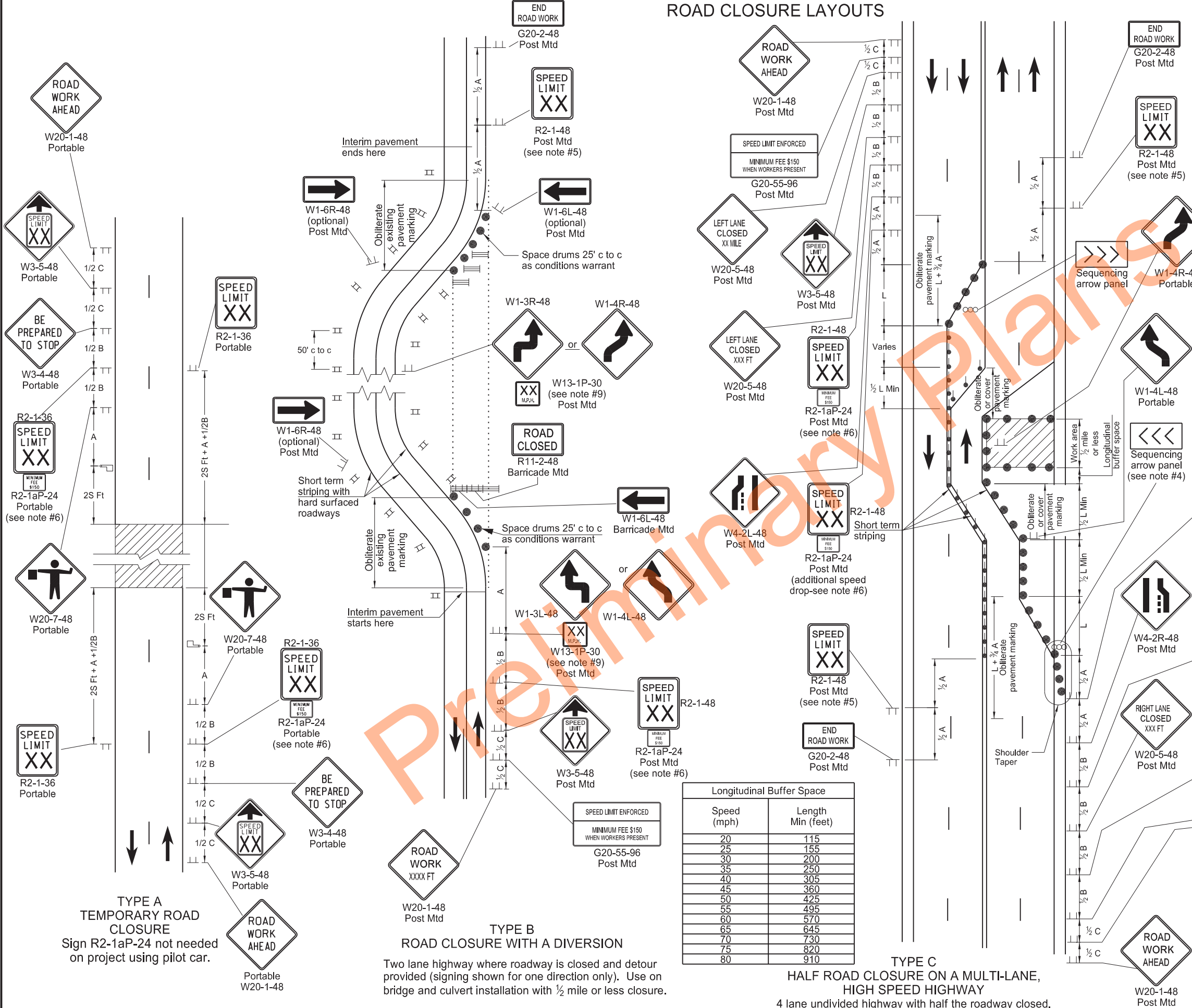
Provide a minimum clearance of 7'-0" from the ground at the post for signs with an area exceeding 50 square feet.

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

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

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

ROAD CLOSURE LAYOUTS



- Notes:
- 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 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.
 - Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
 - Place delineator drums, barricades or cones for tapering traffic at dimension "S" and for tangents space at 2 times dimension "S".
 - 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).
 - Re-establish speed. Determine exact speed limit in the field, dependent on location and conditions.
 - 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 reduced speed zones.
 - Where necessary, engineer will determine safe speed.
 - As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
 - Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or the work is less than 15 days.
 - Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

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

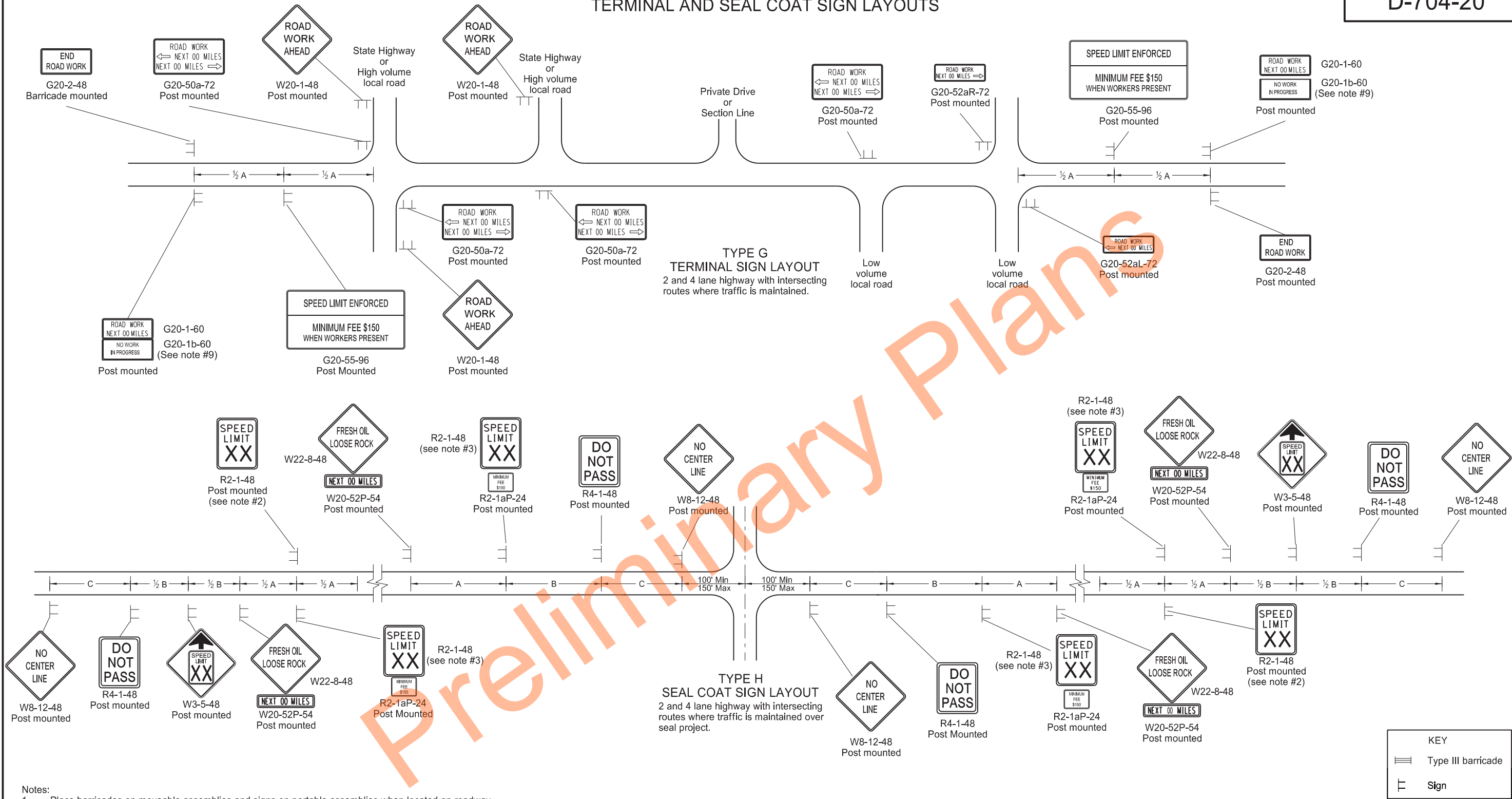
KEY	
	Type III barricade
	Sign
	Delineator drum
	Tubular markers
	Work area
	Flagger
	Sequencing arrow panel
	Vertical panels back to back

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Updated Notes & Spd Limit signs
11-01-19	Sign, Notes, & Pmnt Mk updates
12-08-21	Switched order of Road Work Ahead and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes



TERMINAL AND SEAL COAT SIGN LAYOUTS

D-704-20



Notes:

- Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
- Determine the exact speed limit in the field, based on location and conditions.
- Determine the reduced speed limit based on the in place speed limit before construction. Where speed limit reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 MPH.) Place the second speed limit sign at ½ B.
- Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
- Cover existing speed limit signs within a reduced speed zone.
- On seal coat projects, place signs R2-1-48, R2-1aP-24, R4-1-48, W22-8-48 and W20-52P-54 after all important intersections and at five mile intervals. Place sign W8-12-48 after all important intersections and at 2 mile intervals until short term center line pavement marking is placed.
- As an option, use portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Drawing D-704-14.
- Cover or remove speed limit signs from layout Type H when loose aggregate is removed.
- Install sign G20-1b-60 when work is suspended for winter.
- Use other traffic control layouts in immediate work areas. Place sign R2-1aP-24 below speed limit signs in reduced speed limit work areas.
- Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or the work is less than 15 days.
- Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

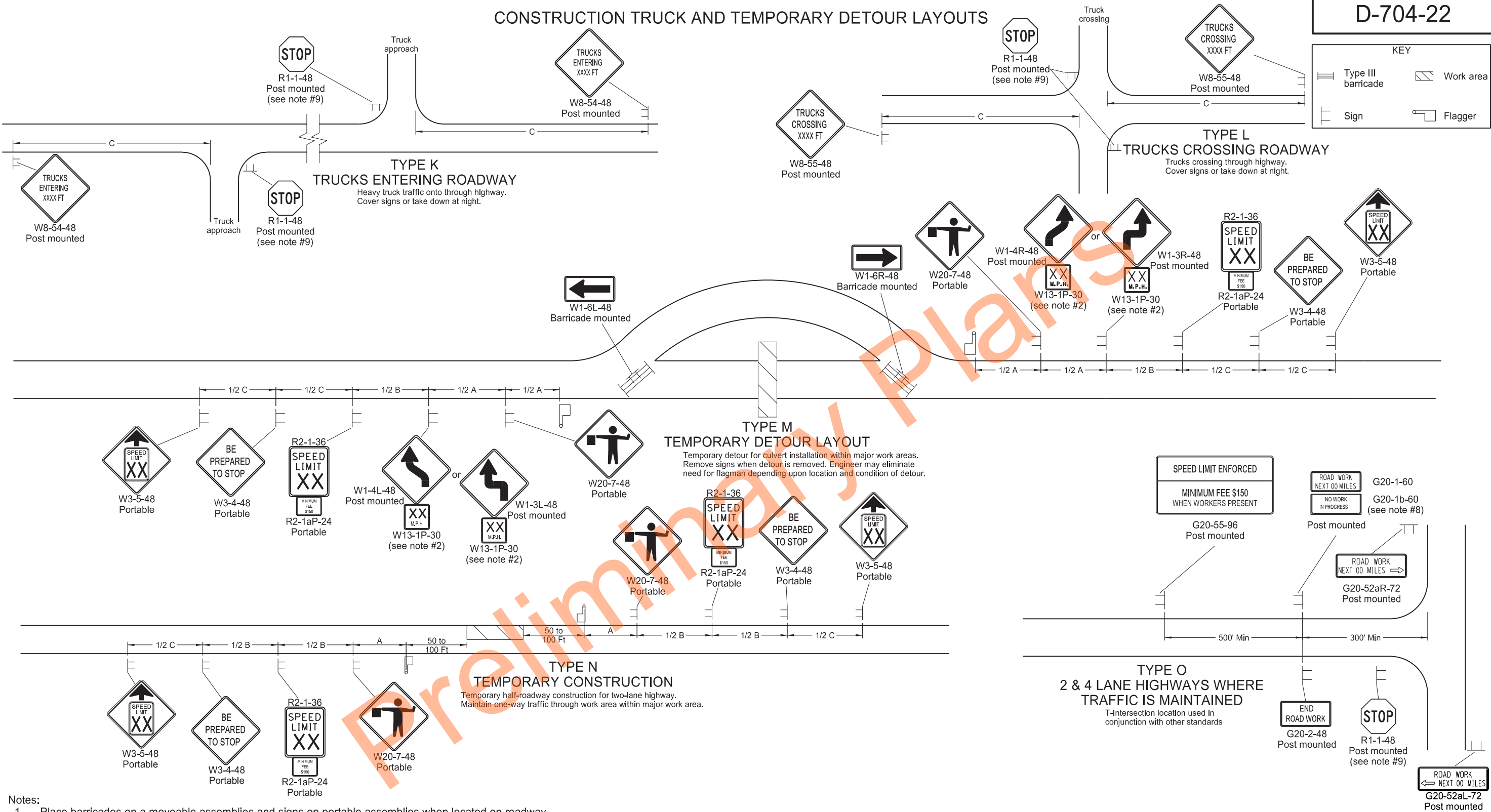
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and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

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



CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22



Notes:

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

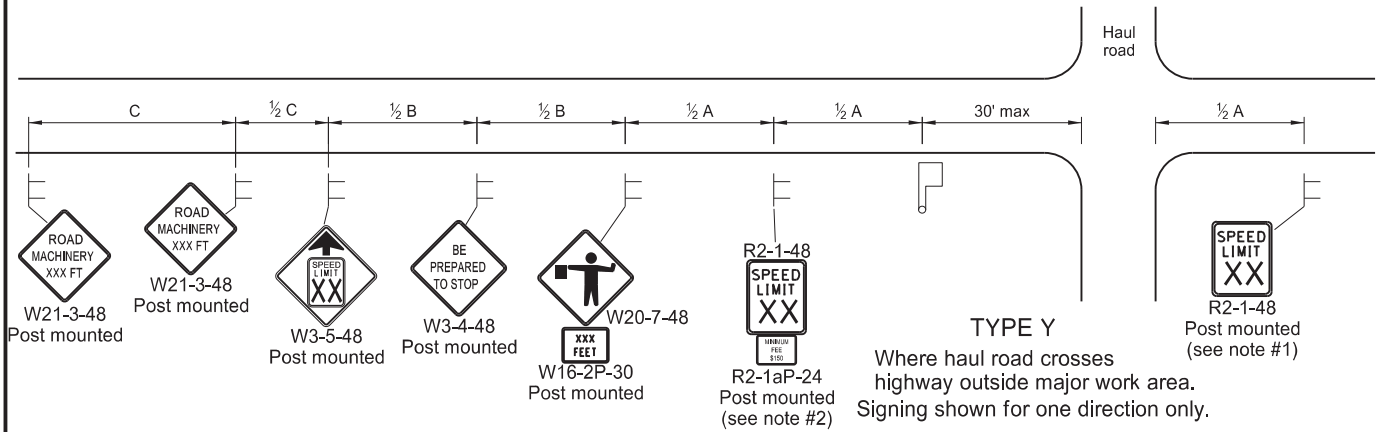
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway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

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

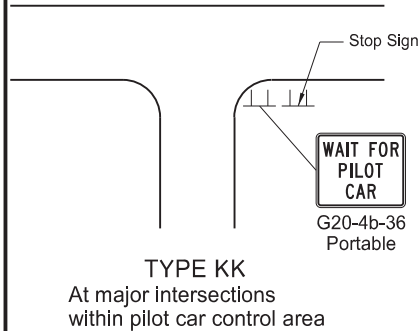
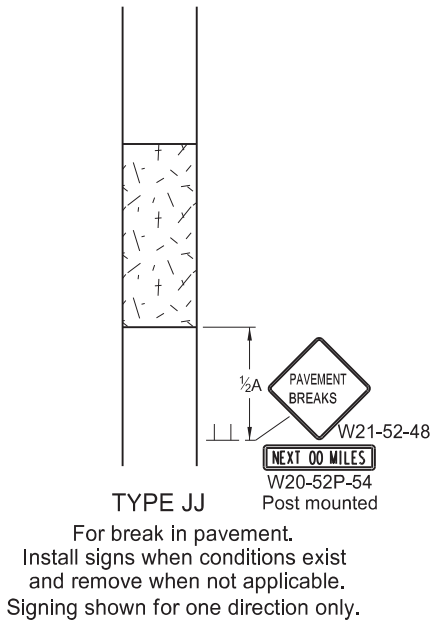
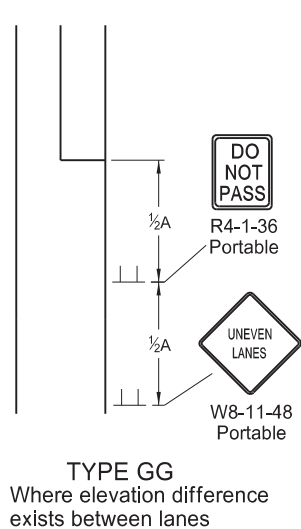
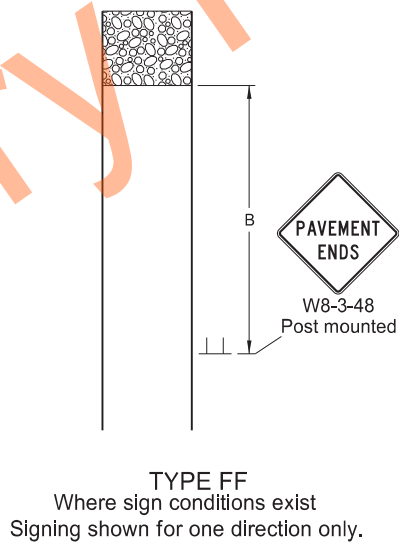
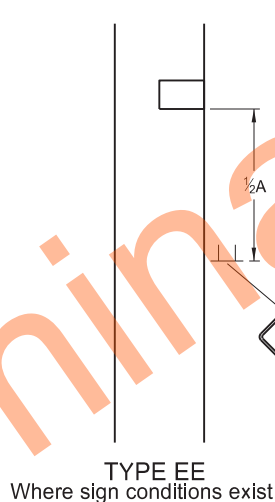
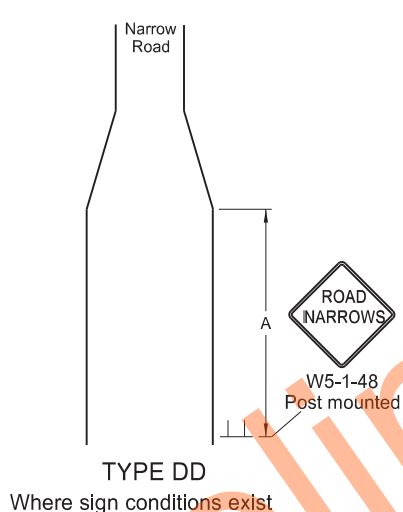
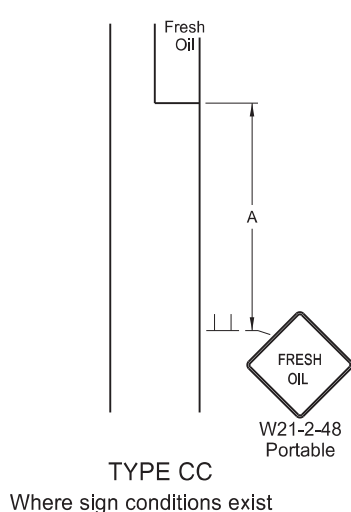
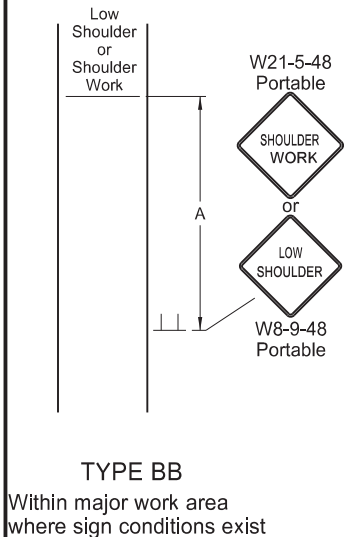
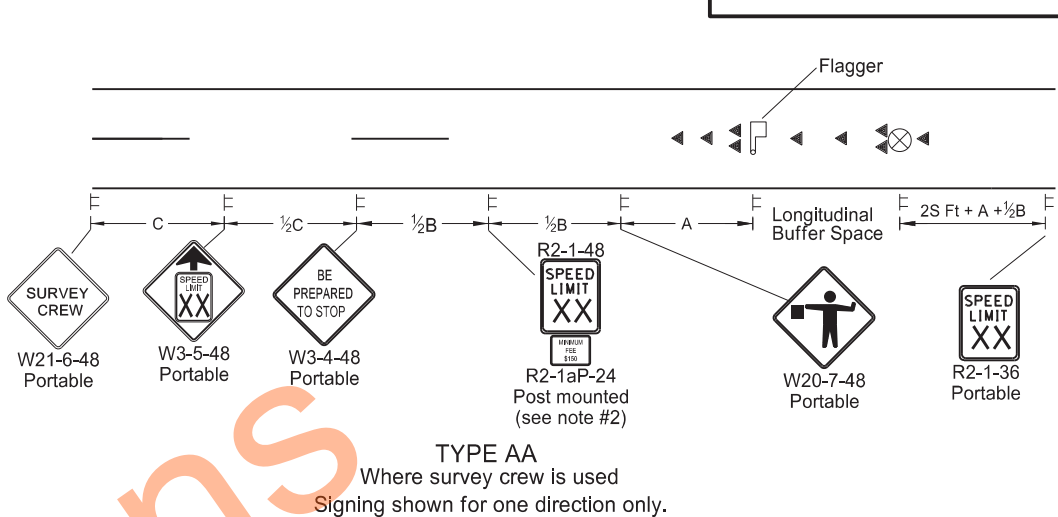


MISCELLANEOUS SIGN LAYOUTS

D-704-26



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



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

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

Longitudinal Buffer Space	
*Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820
80	910

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

KEY

Flagger

Sign

Cones

Survey Equipment

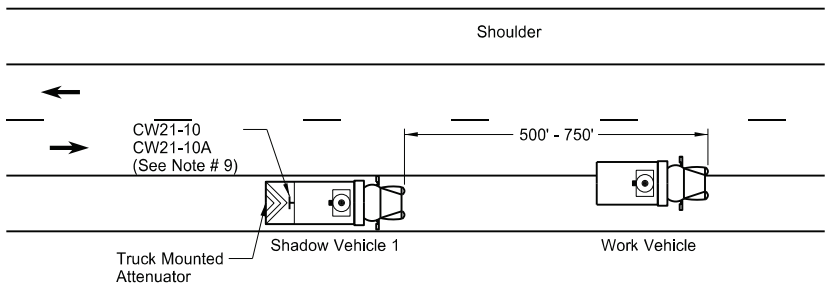
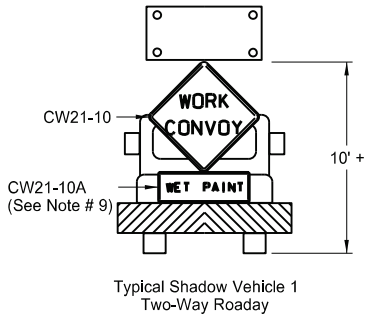
S = Numerical value of speed limit or 85th percentile.

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

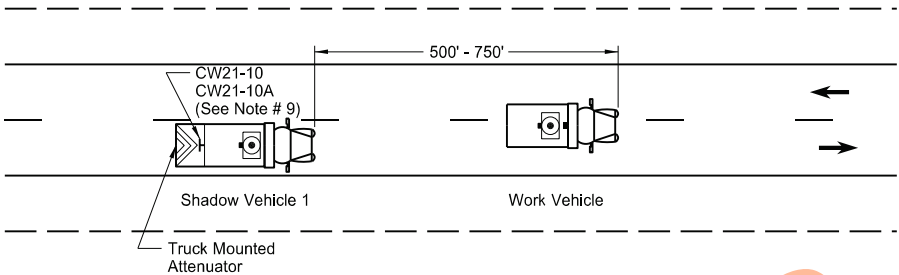


MOBILE OPERATION
(PAVEMENT MARKING)

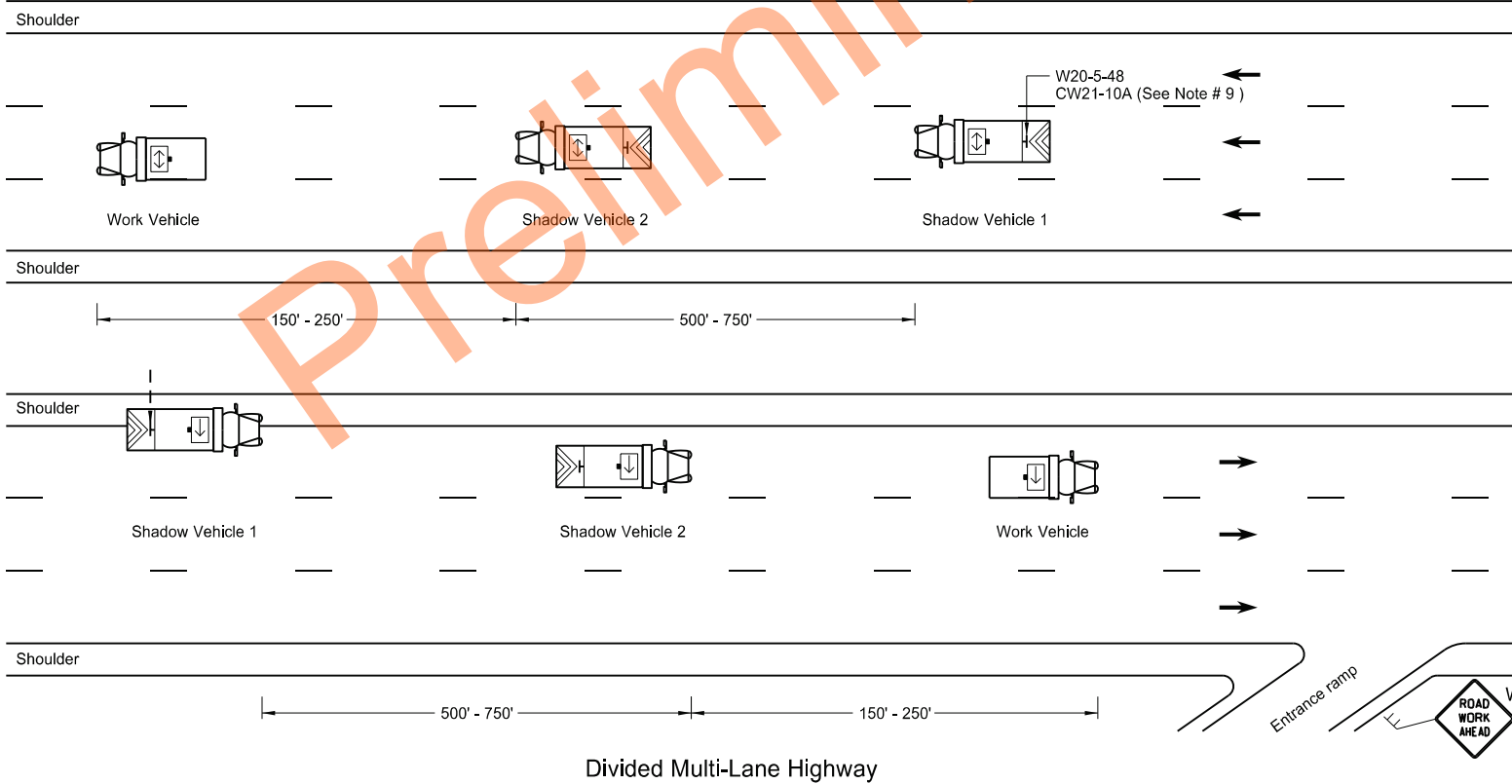
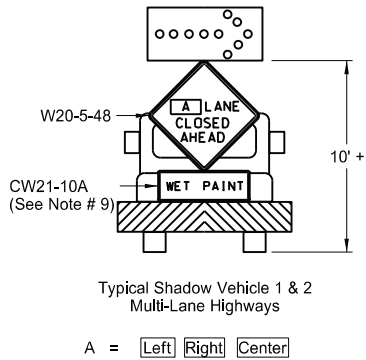
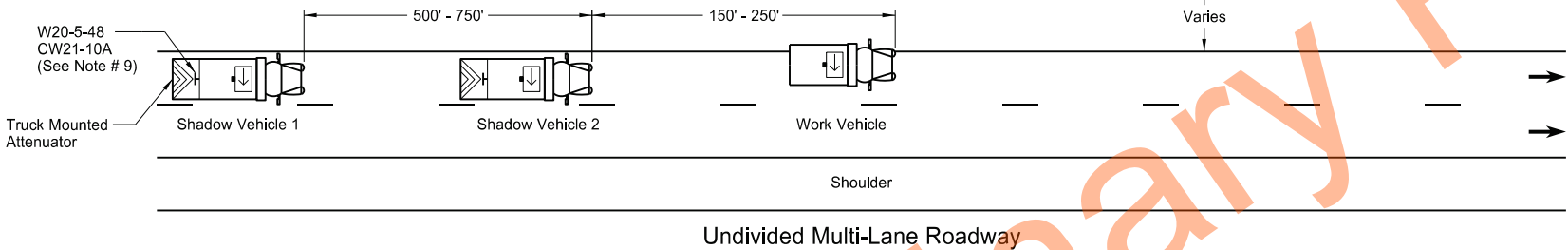
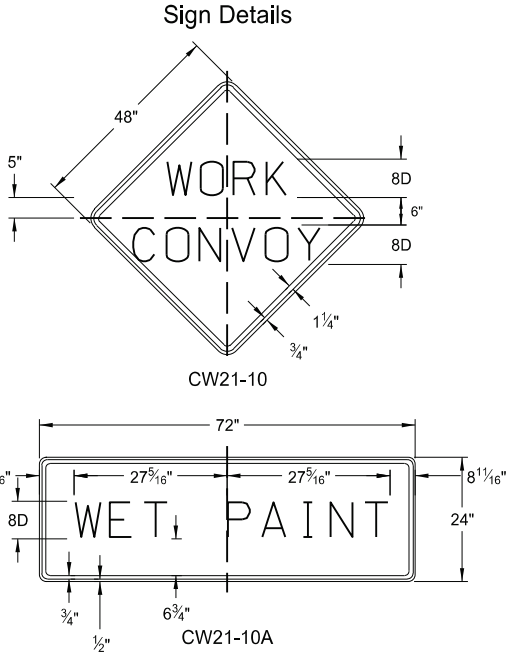
D-704-27



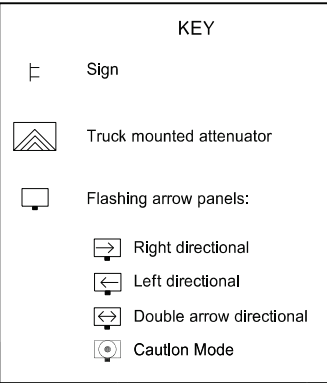
Two-Way Roadway with Paved Shoulders



Two-Way Roadway without Paved Shoulders



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



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



08/02/24

Two-Lane Roadway Portable Rumble Strips

D-704-33

Work area

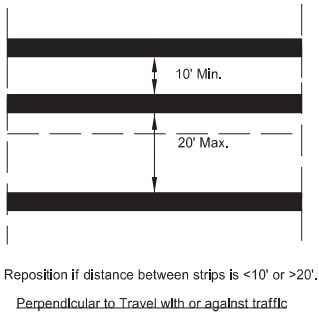
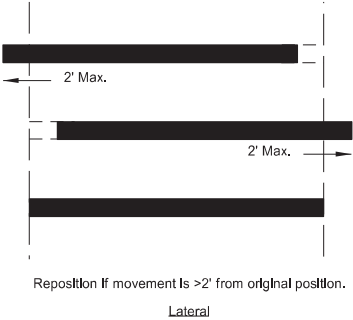
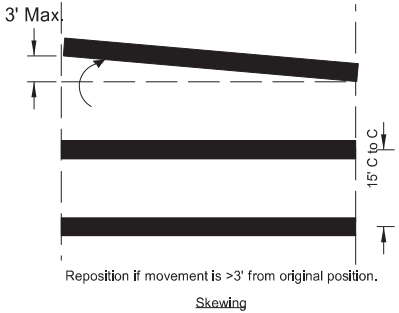
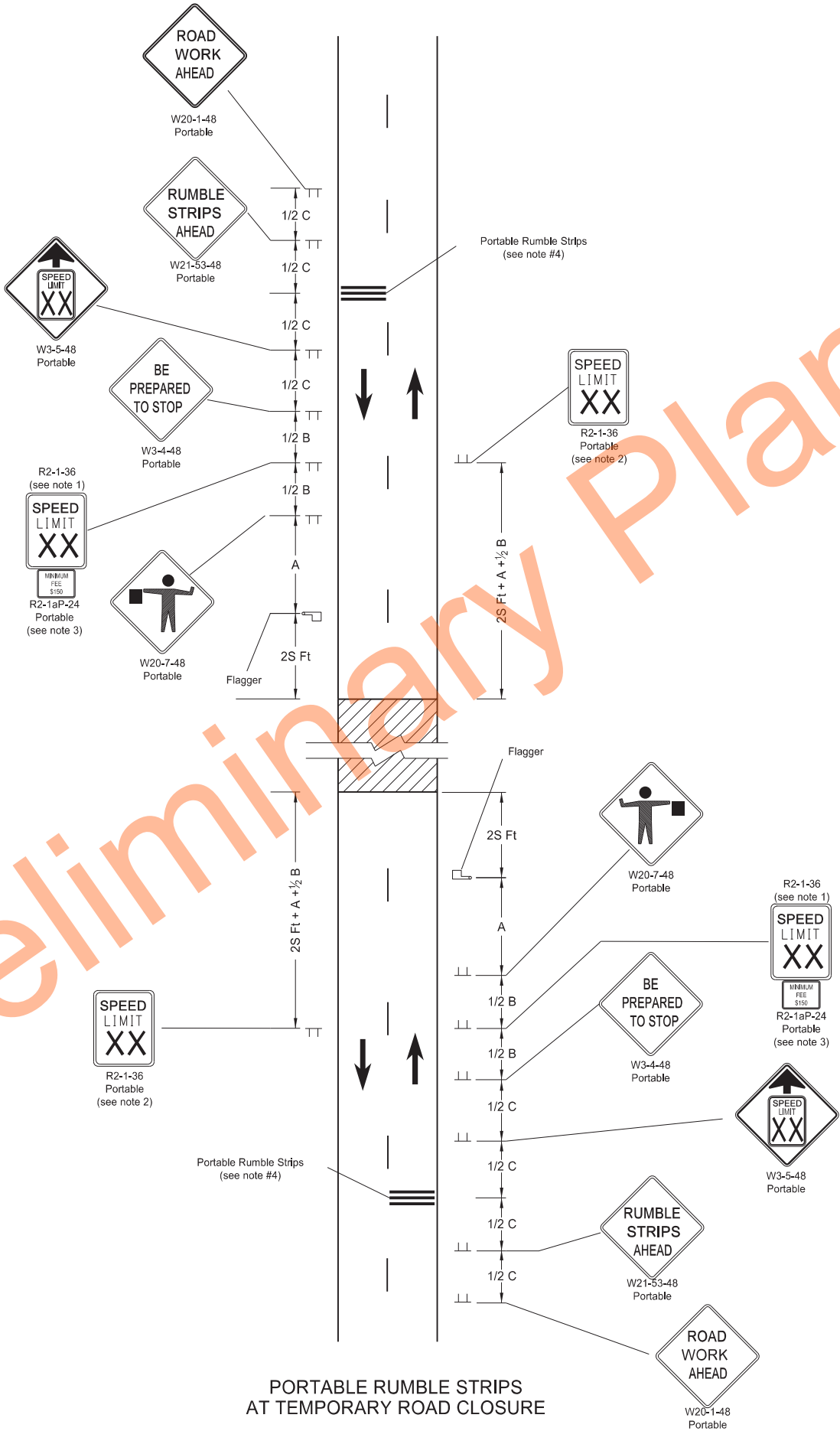
Flagger

Sign

KEY

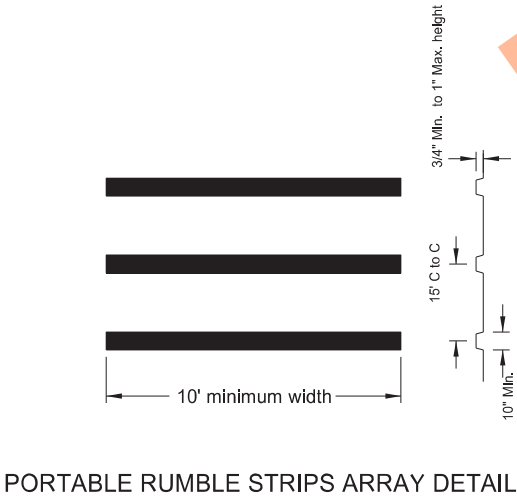
S = Numerical value of speed limit or 85th percentile.

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



PORTABLE RUMBLE STRIPS ARRAY
TYPES OF MOVEMENT AND MAXIMUM ALLOWANCES

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



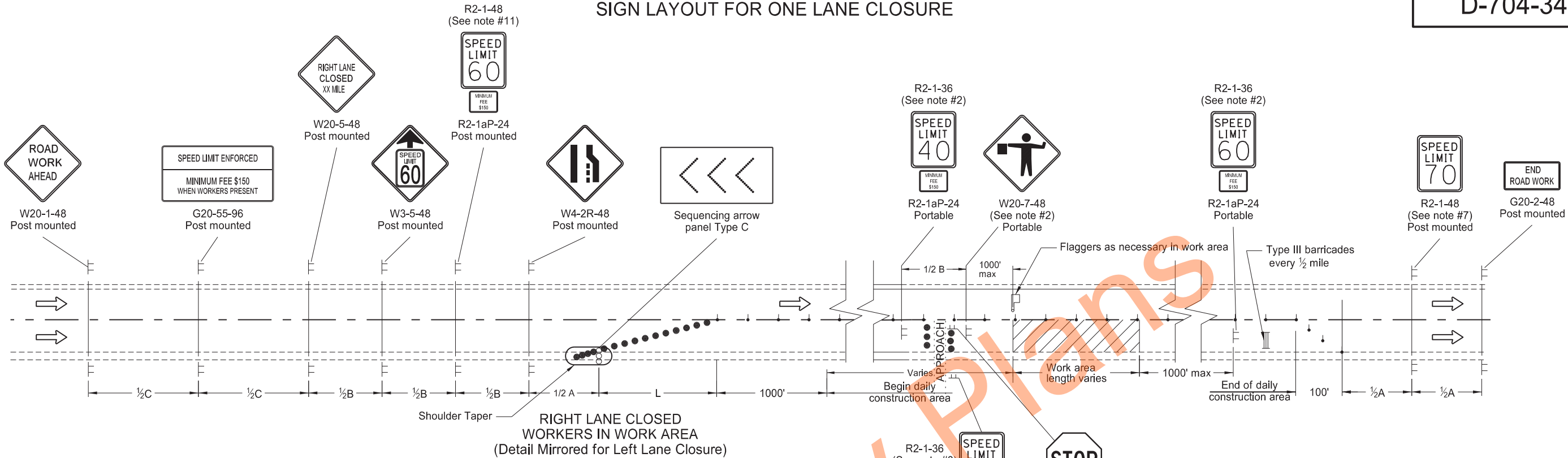
PORTABLE RUMBLE STRIPS
AT TEMPORARY ROAD CLOSURE

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



SIGN LAYOUT FOR ONE LANE CLOSURE

D-704-34



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

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

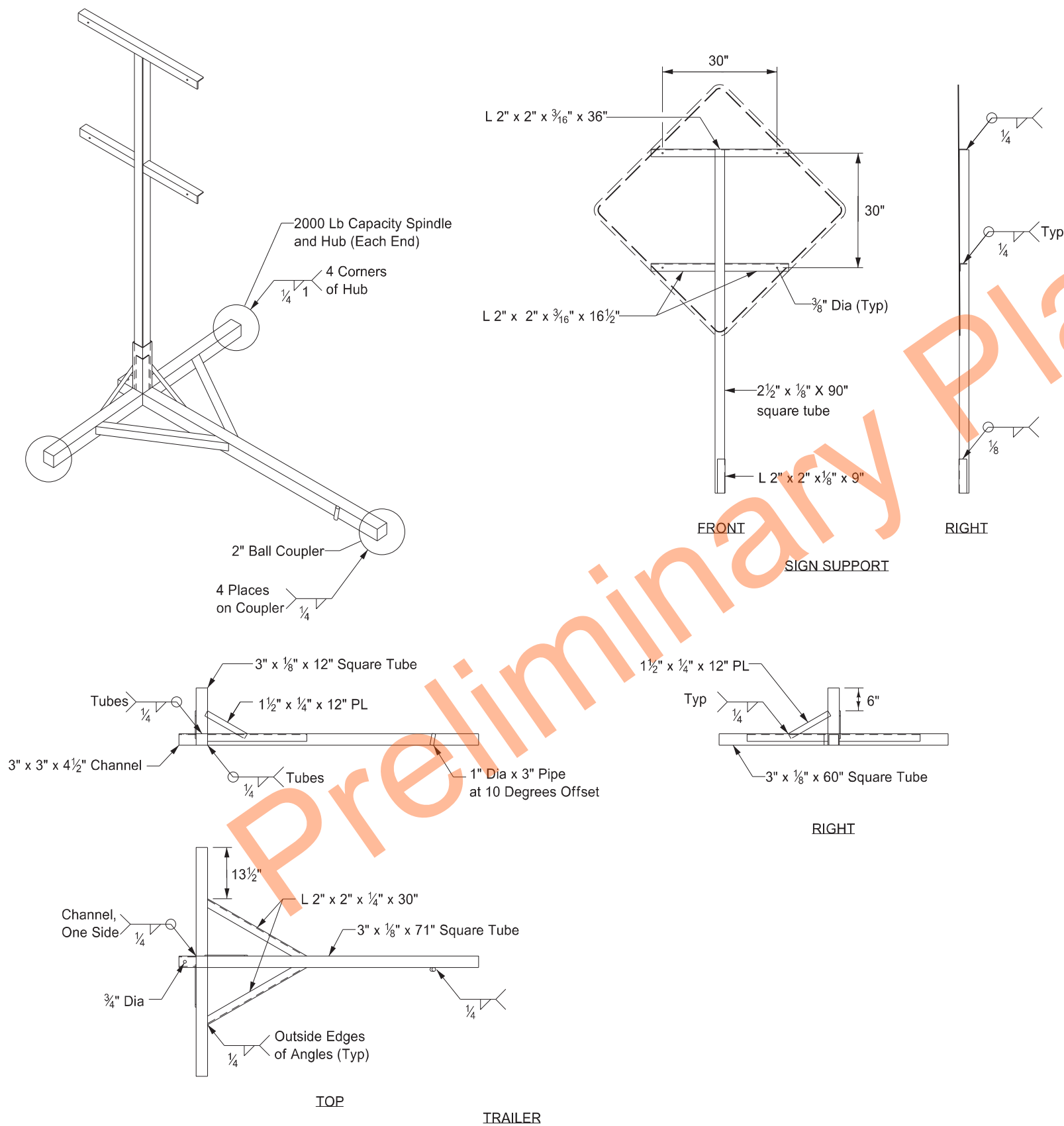
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway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

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

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

PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



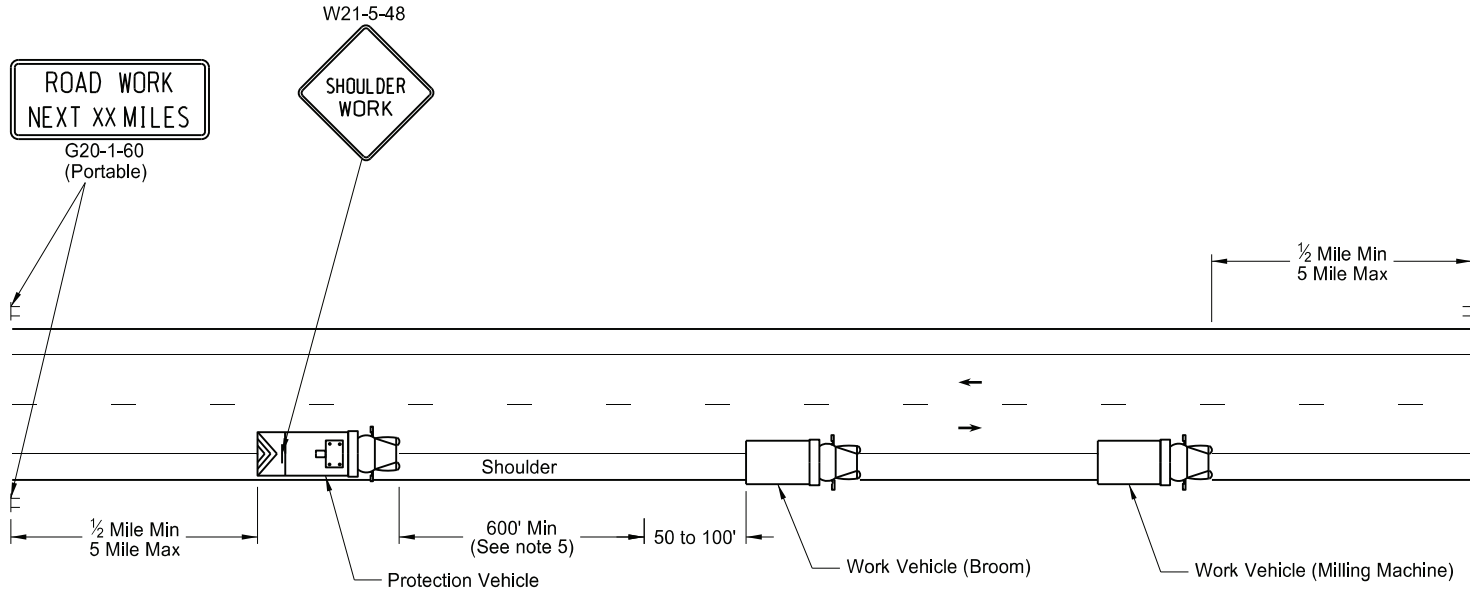
- Notes:
- 1. Maximum 250 pound weight of assembly.
 - 2. Use a 14" wheel and tire.
 - 3. Use no automotive and equipment axle assemblies for trailer-mounted sign supports.
 - 4. Other NCHRP 350 or MASH crash tested assemblies are acceptable.

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

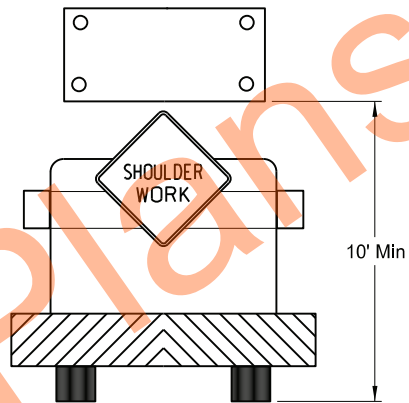
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
12 02 2020

MOBILE OPERATION
Grinding Shoulder Rumble Strips

D-704-56

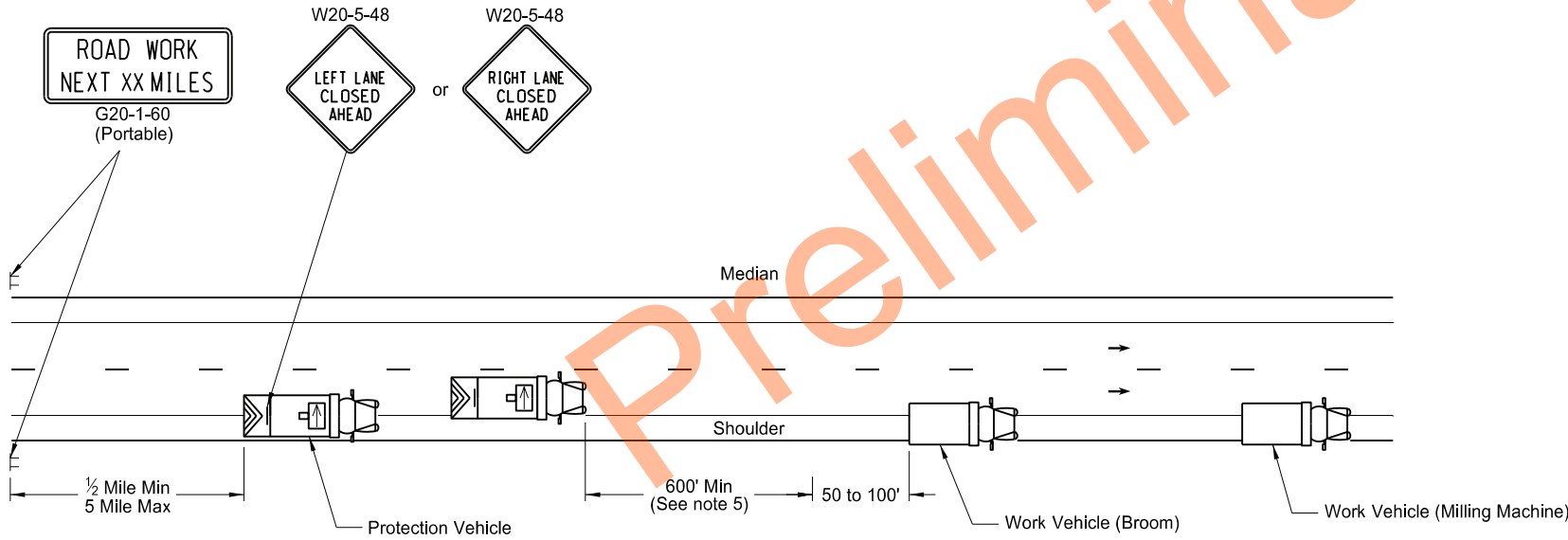


TWO LANE - TWO WAY ROADWAY

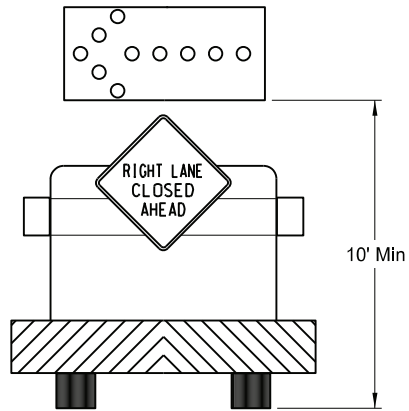


TWO LANE - TWO WAY ROADWAY

Typical Protection Vehicle with
Flashing Arrow Panel In Caution Mode



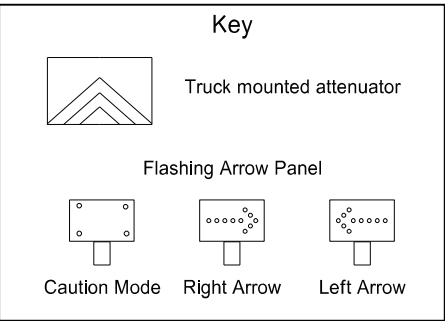
INTERSTATE & 4 LANE DIVIDED HIGHWAY



INTERSTATE & 4 LANE DIVIDED HIGHWAY

Typical Protection Vehicle with Flashing Arrow
Panel In Flashing Arrow Mode

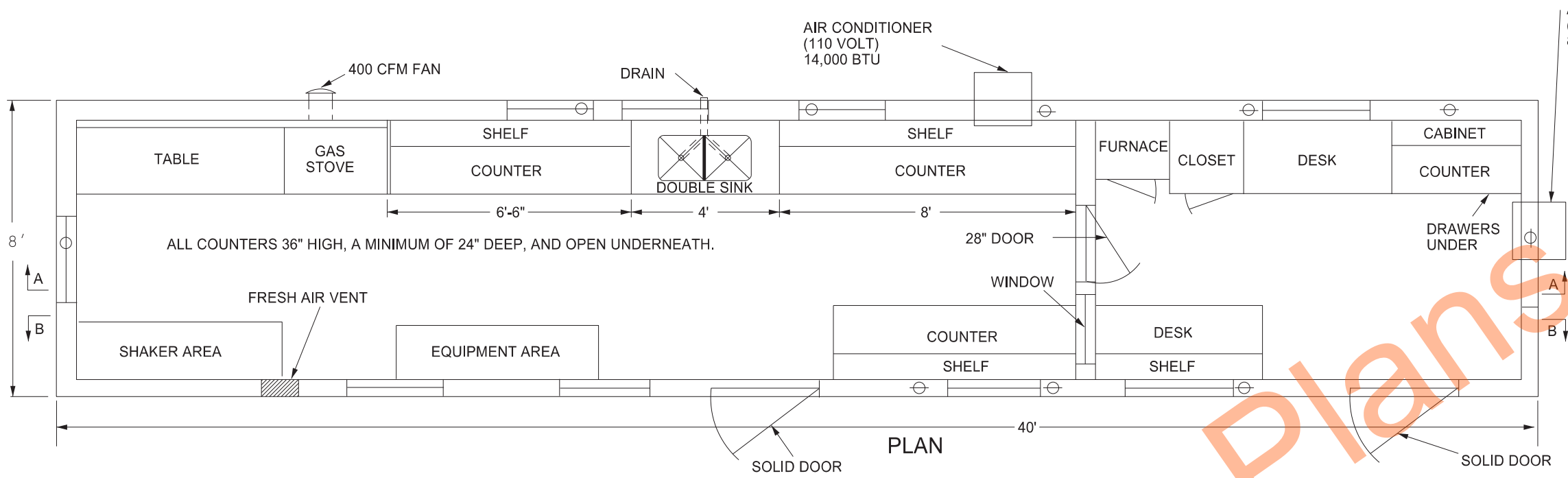
- Notes:
1. Provide truck mounted attenuators on additional vehicles in the convoy, at no additional cost.
 2. Provide rotating, flashing, oscillating, or strobe lights on vehicles.
 3. Provide Type B or Type C flashing arrow panels that are controlled from inside the vehicle.
 4. Provide two - way electronic 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.



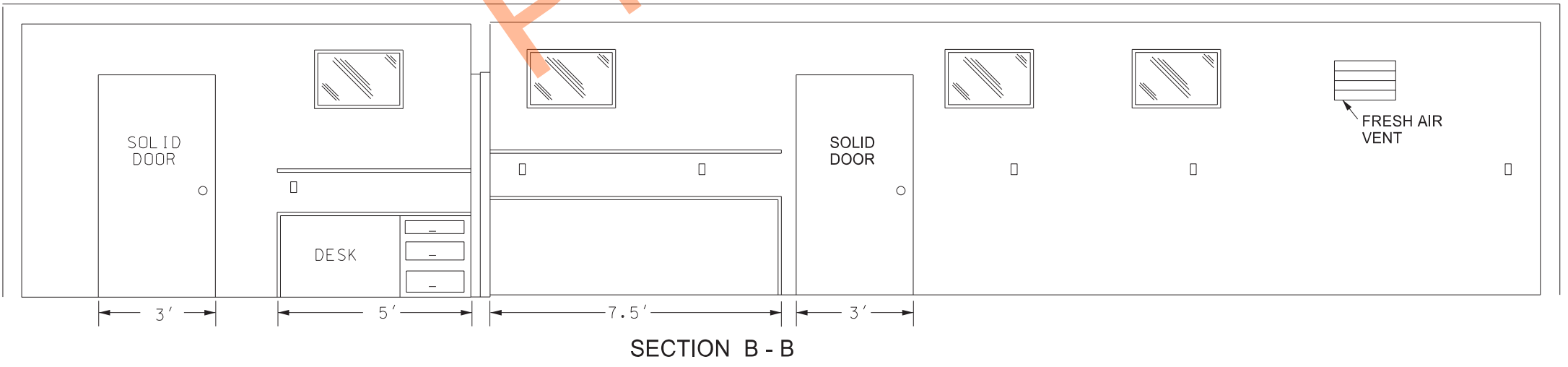
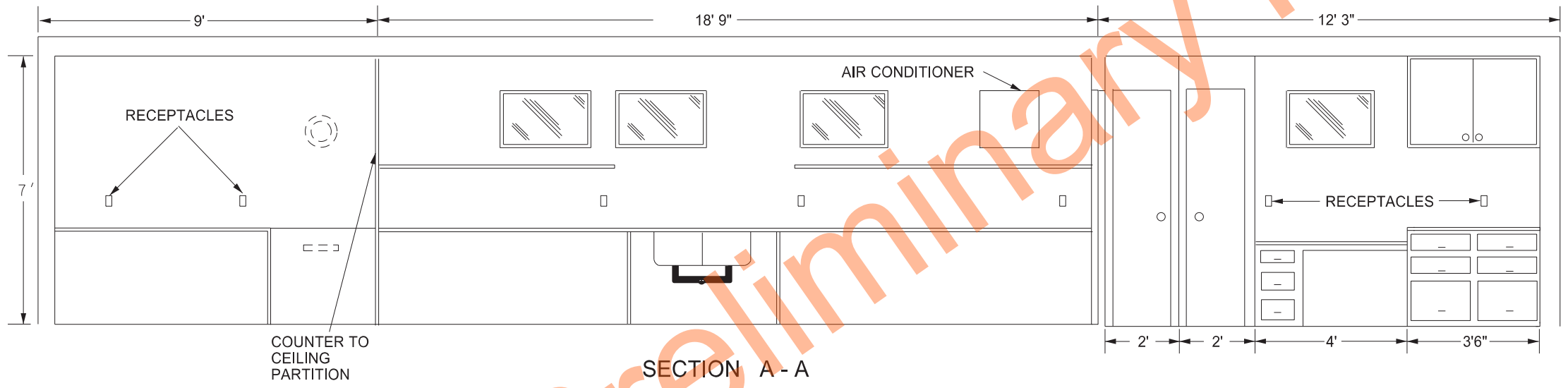
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-15-12	
REVISIONS	
DATE	CHANGE
8-17-17	Updated notes & signs
10-03-19	New Design Engineer PE Stamp
8-02-24	Electronic Stamp/Signature



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
08-09-24	Electronic Stamp/Signature.

KIRK J. HOFF

REGISTERED

PROFESSIONAL

PE-4683

ENGINEER

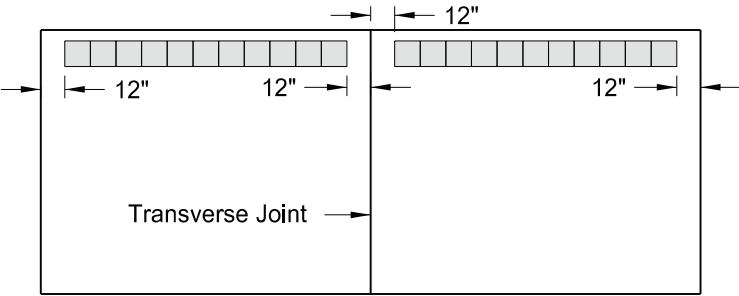
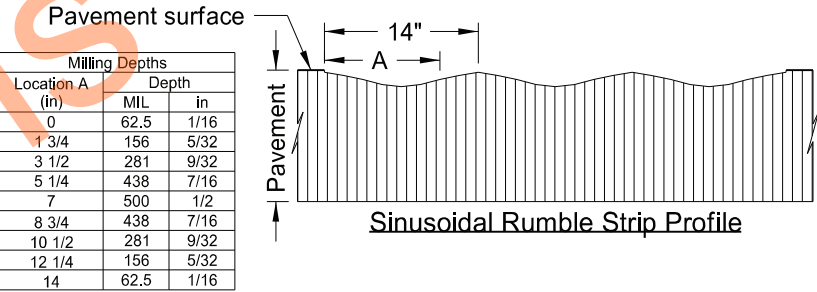
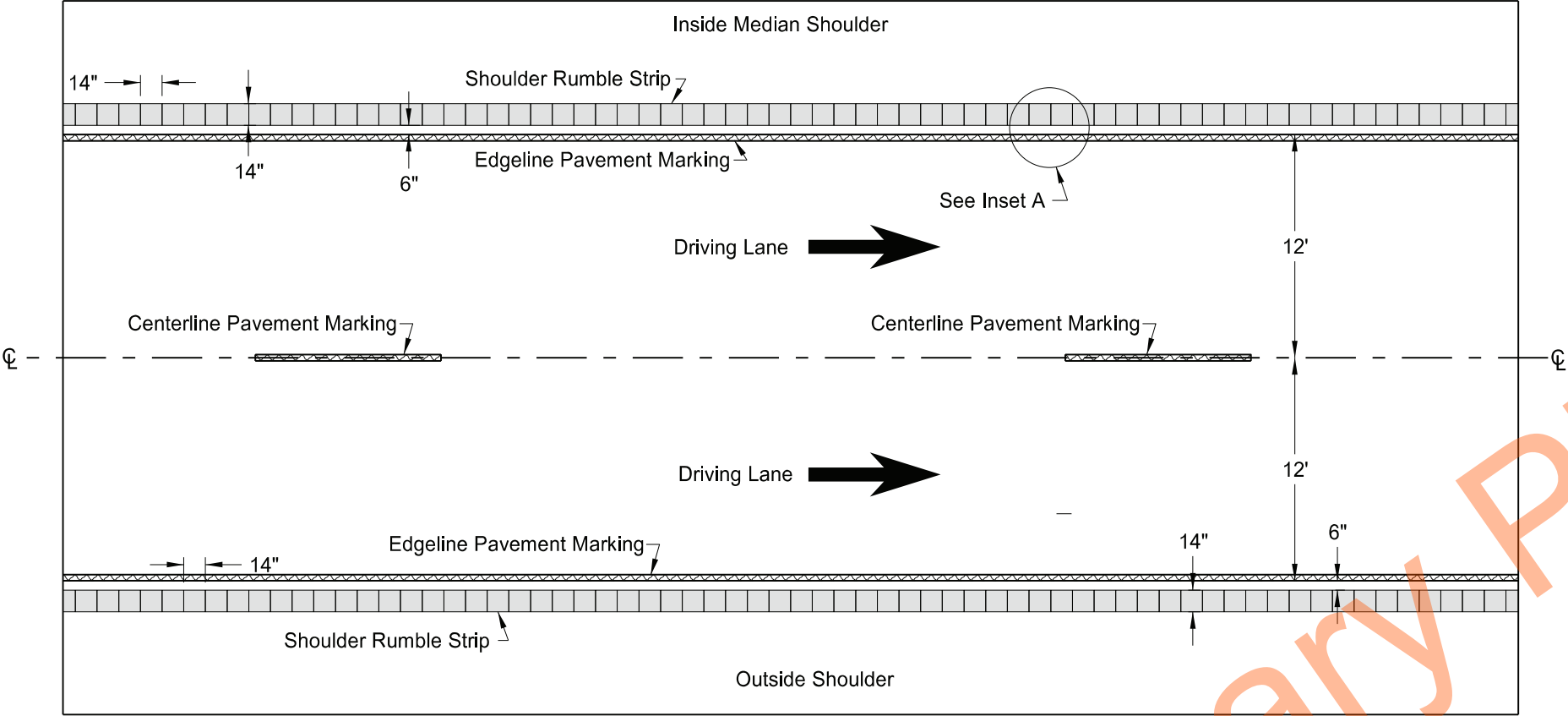
NORTH DAKOTA

08/09/24

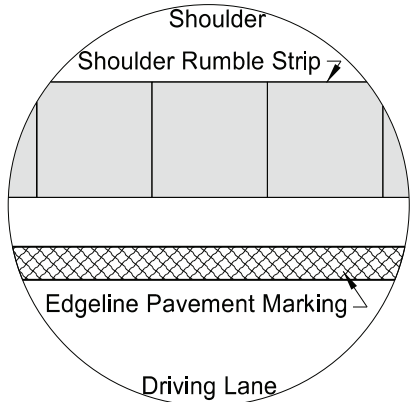
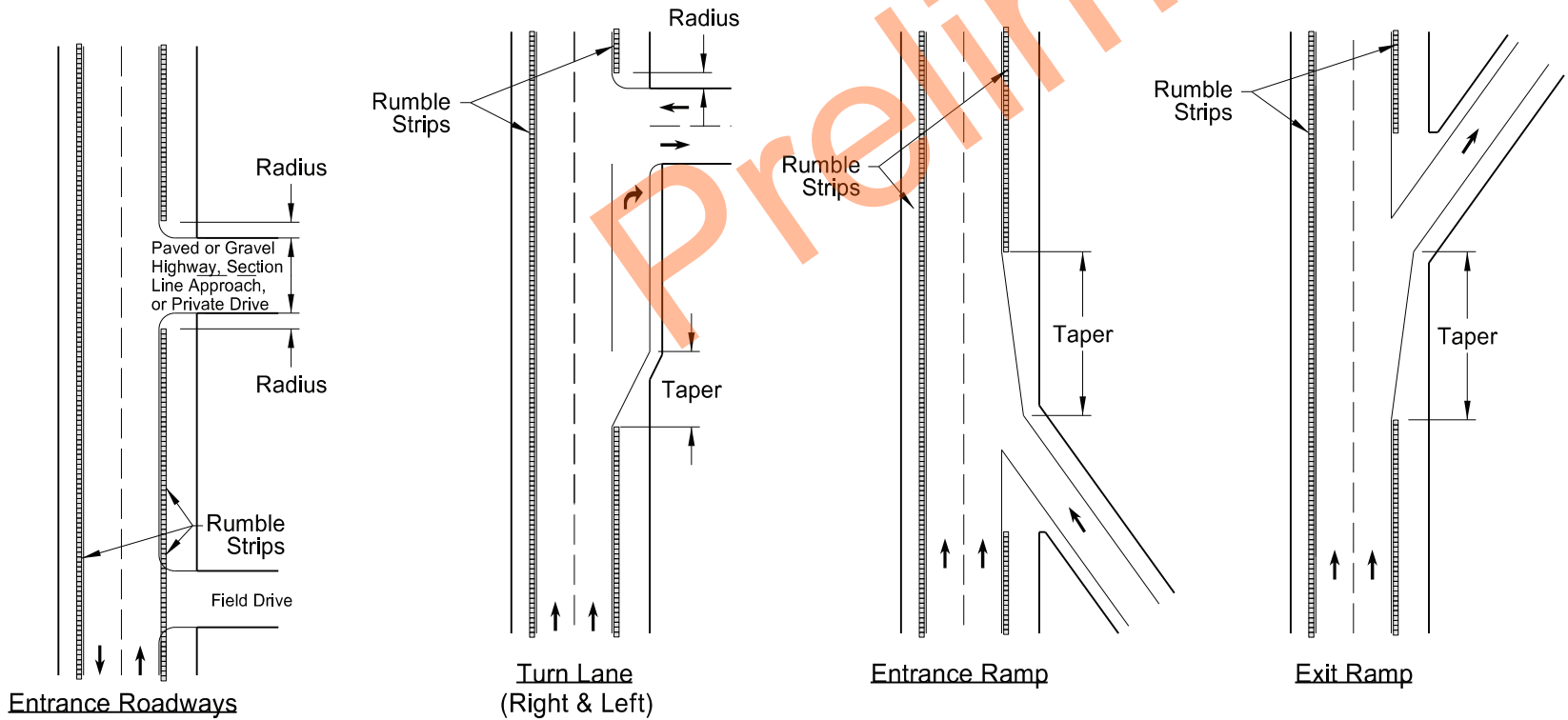
RUMBLE STRIPS
DIVIDED HIGHWAYS (NON-INTERSTATE)

NOTES:

1) Discontinue rumble strips through the entire length of turn lanes and tapers, at ramps and tapers, and at the radius of paved or gravel highways, section line approaches, and private drives.



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



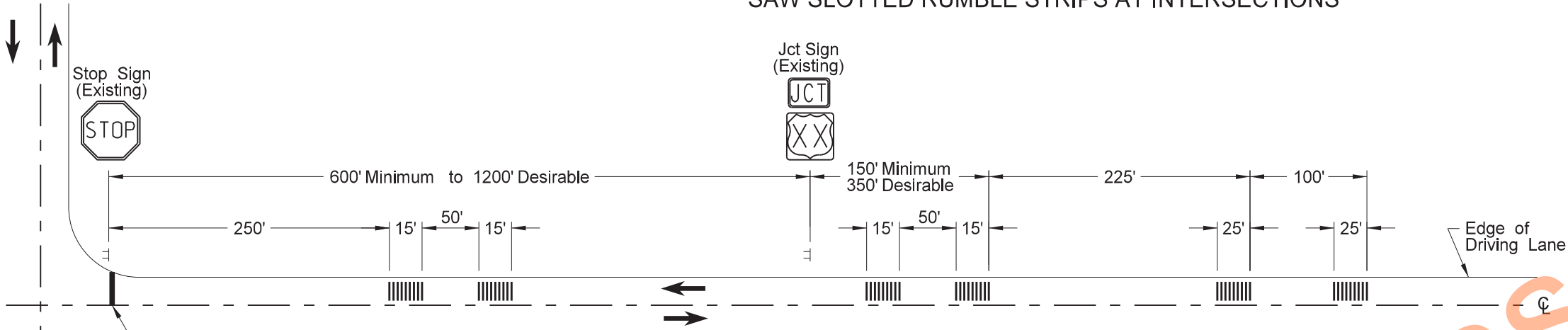
Inset A - Shoulder Rumble Strip
(Layout for opposite shoulder reversed)

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-29-09	
REVISIONS	
DATE	CHANGE
2-25-10	Note 4 was added.
9-08-11	Revised Notes and D-760-2.
8-27-19	New Design Engr PE Stamp.
11-16-21	Added rumbles to end of taper.
5-26-23	Rumble strips made sinusoidal.

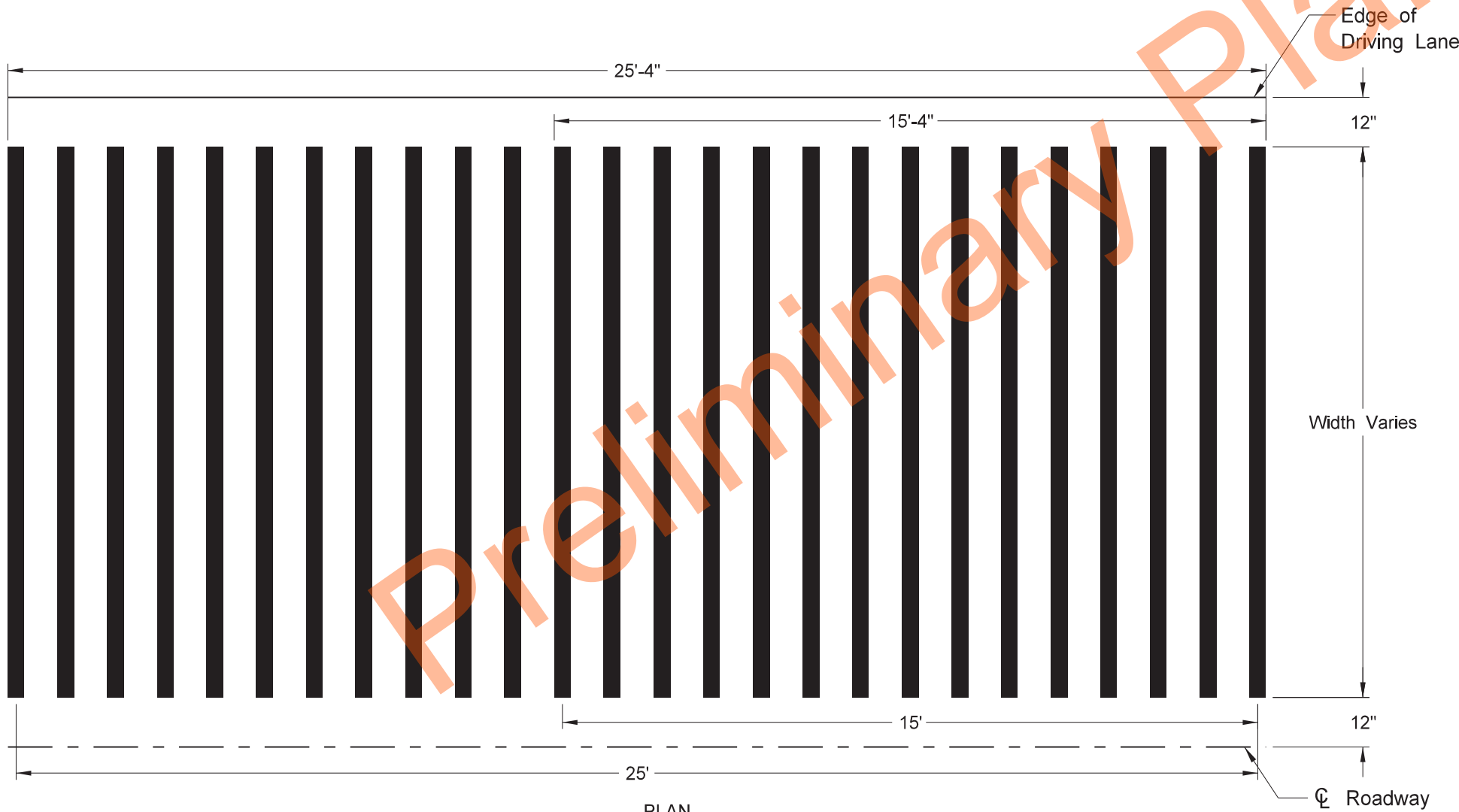


05/26/23

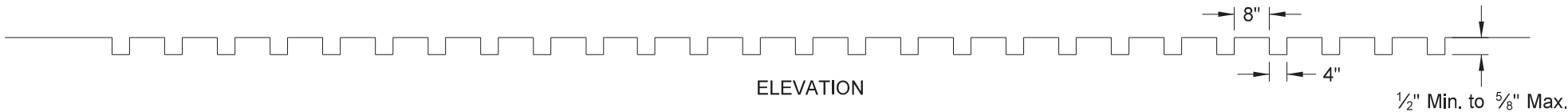
SAW SLOTTED RUMBLE STRIPS AT INTERSECTIONS



TYPICAL STOP INTERSECTION SAW SLOTTED RUMBLE STRIP LOCATION



PLAN



ELEVATION

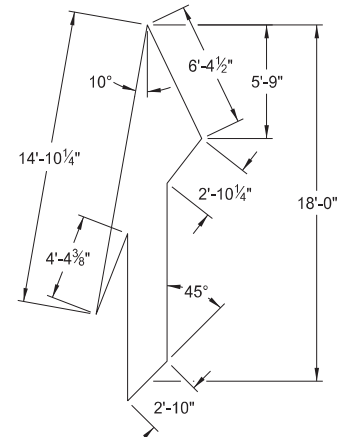
SAW SLOTTED RUMBLE STRIP DETAIL

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-29-09	
REVISIONS	
DATE	CHANGE
2-22-10	Saw Slotted width revised.
2-25-10	Note 7 was added.
9-08-11	Revised Notes and D-760-5.
7-07-14	Deleted Notes.
8-27-19	New Design Engr PE Stamp.
8-09-24	Electronic Stamp/Signature.



08/09/24

D-762-1



41 S. F.

[illegible]

46 S. F.

Centerline Pavement Marking Skip Spacing Detail

4 S. F. 22 S. F. 34.5 S. F.

Shldr, if present

6" yellow $\bar{C}$ (See Notes)

6" yellow barrier stripe (See Notes)

4" space between lines

Bands at right angles to pavement

2'

3.3'

6.6'

16"

6'

1.6'

$\bar{C}$ of driving lane

2'

*Stop line 8' from gate, if present

26' to nearest rail

Shldr, if present

10'

24'

20'

16'

60'

See Advanced Placement Distance table at right

W10-1

R15-1

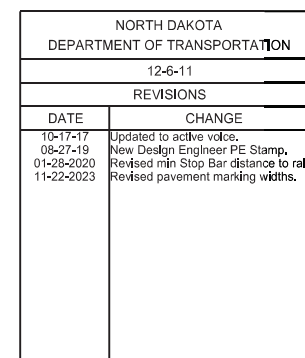
RAIL CROSSING ROAD

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

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

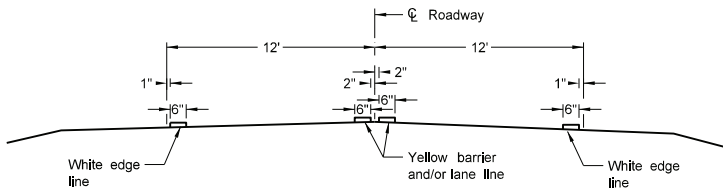
See plans for correct message. Use white pavement markings unless noted otherwise.

*Stop Bar nearest crossing - 8' from gate or 26' to nearest rail, whichever is further from tracks

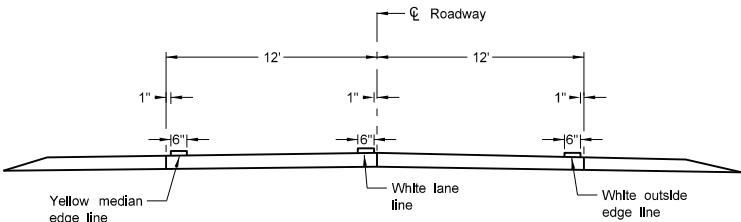


PAVEMENT MARKING

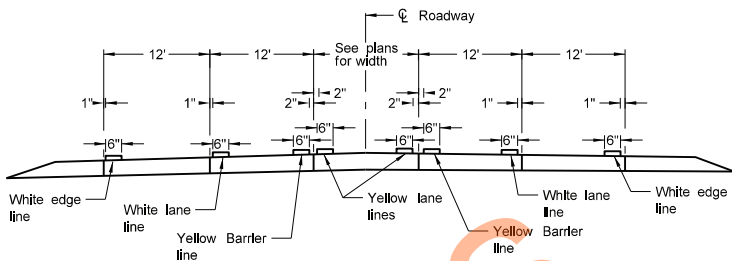
D-762-4



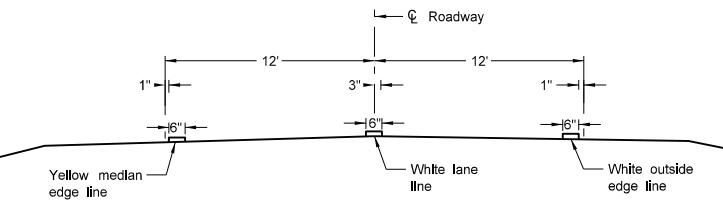
Two Lane Two Way
RURAL ROADWAY



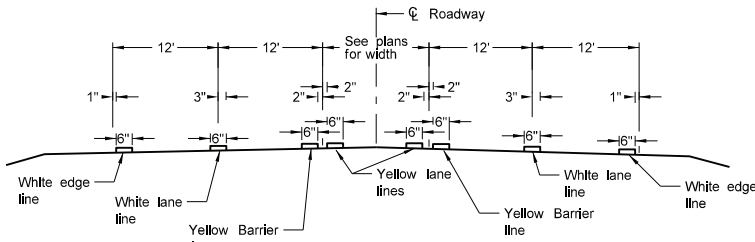
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



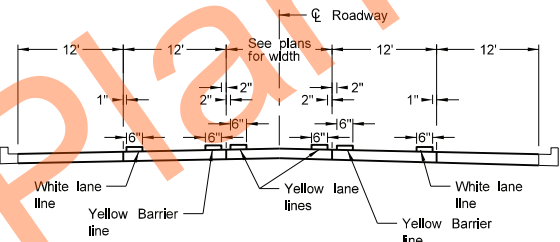
RURAL FIVE LANE ROADWAY
Concrete Section



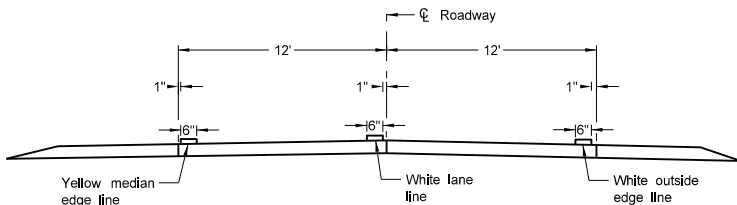
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



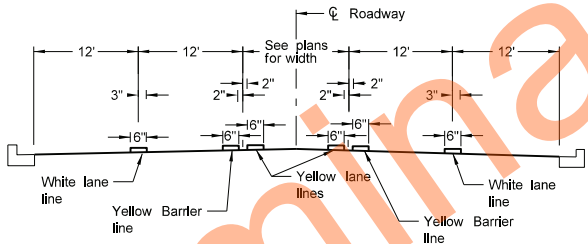
RURAL FIVE LANE ROADWAY
Asphalt Section



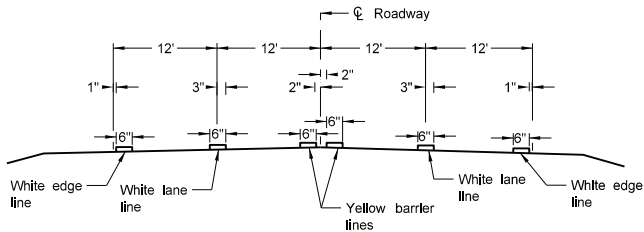
URBAN FIVE LANE SECTION
Concrete Section



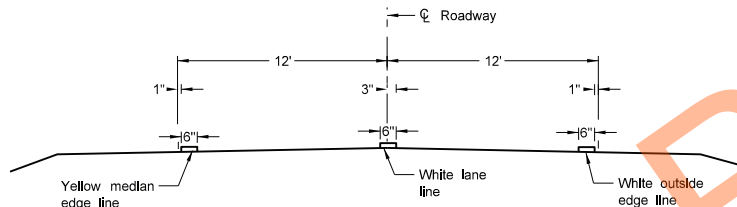
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



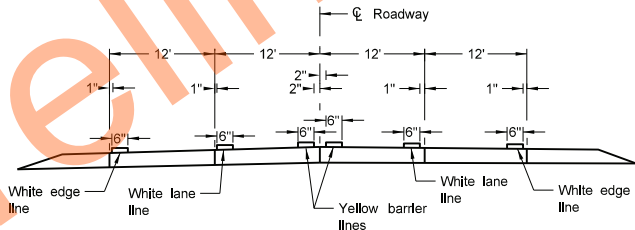
URBAN FIVE LANE SECTION
Asphalt Section



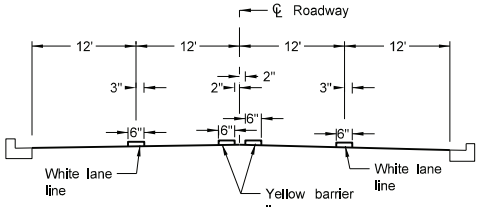
RURAL FOUR LANE ROADWAY
Asphalt Section



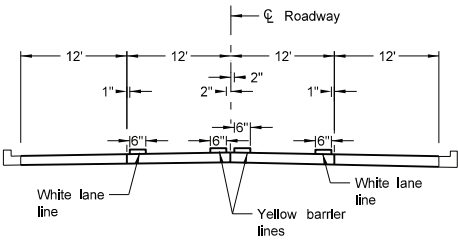
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



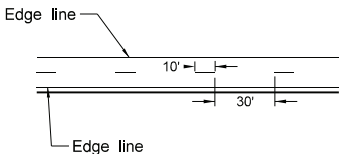
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

NOTES:

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

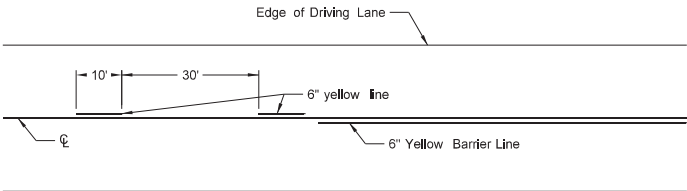
For section lines, county roads, and street approaches, stripe the radii and edge lines of the paved surface within the right of way except where curb and gutter is present.
2. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits >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

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

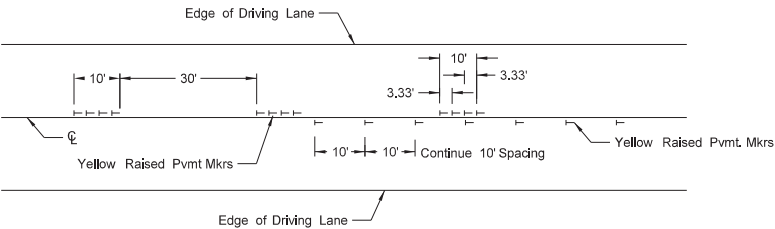


SHORT-TERM PAVEMENT MARKING

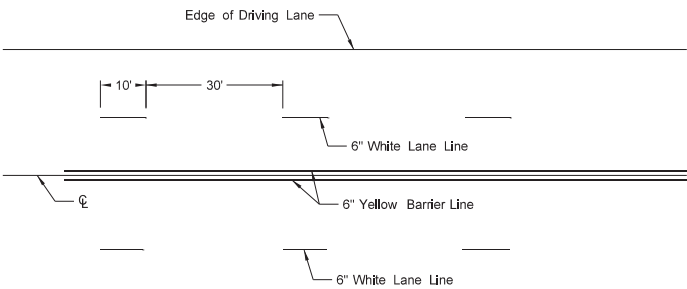
D-762-11



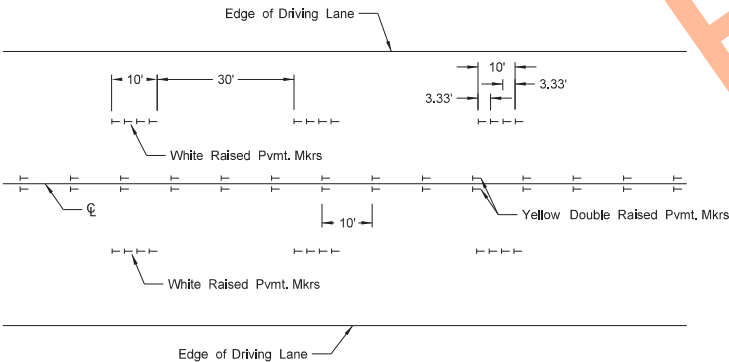
Painted or Tape Lines



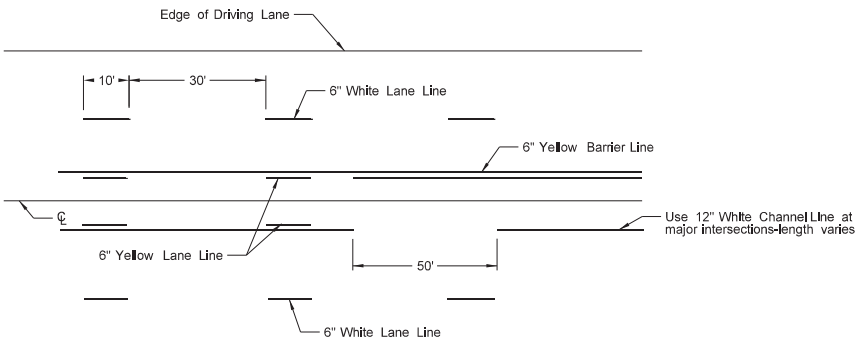
Raised Pavement Markers
TWO-LANE TWO-WAY ROADWAY



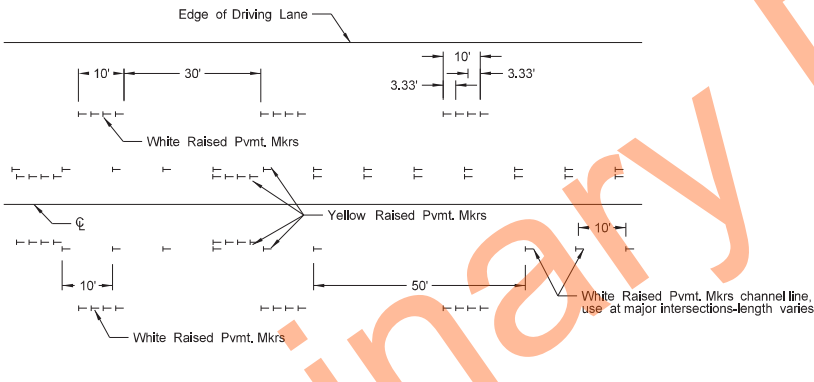
Painted or Tape Lines



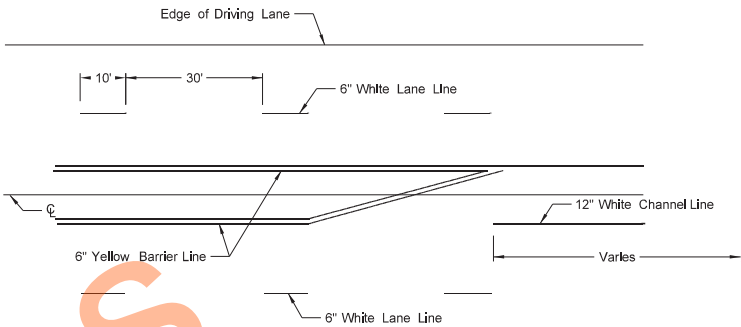
Raised Pavement Markers
FOUR LANE ROADWAY



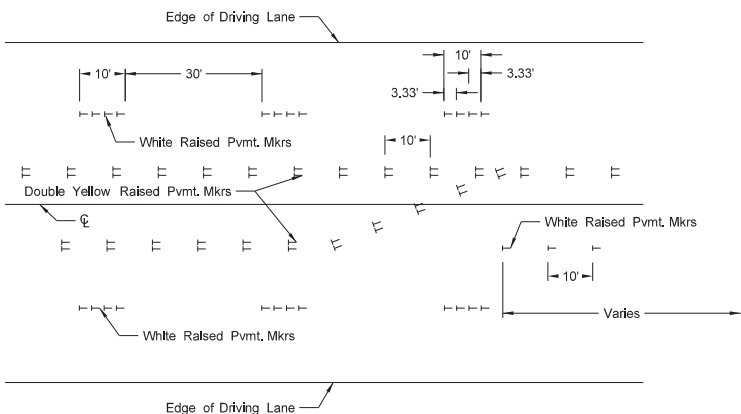
Painted or Tape Lines



Raised Pavement Markers
FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers
FIVE LANE ROADWAY WITH MARKED ISLANDS

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

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

