

DESIGN DATA				
Traffic		Average Daily		
Current	2021-ND 57	Pass: 3571	Trucks: 186	Total: 3757
Current	2021-ND 20	Pass: 5141	Trucks: 195	Total: 5336
Preventive Maintenance				

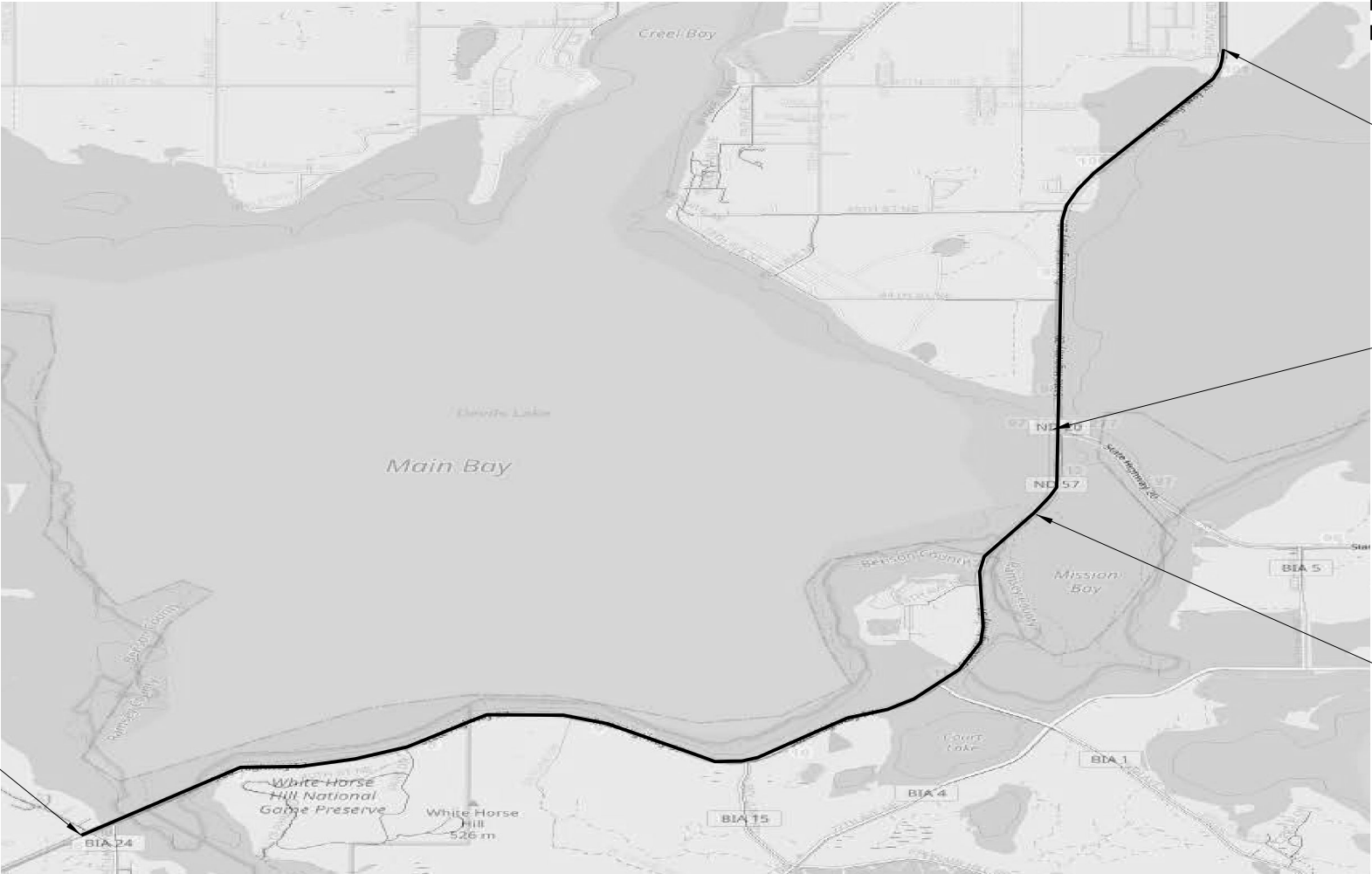
	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	H-3-057(058)006	23579	1	1
		H-3-020(139)097	23580		

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

H-3-057(058)006
H-3-020(139)097
Benson/Ramsey
ND 57-Fort Totten to Jct ND 20
ND 20-Jct ND 57 to RP 101.288
Contract Patching

GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	01/01/2022
Supplemental Specifications	NONE

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
H-3-057(058)006/Contract Patching	3.15	7.261
H-3-020(139)097/Contract Patching	1.27	3.596



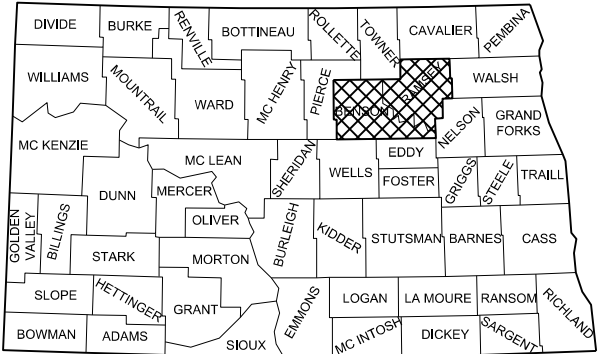
Begin Project
H-3-057(058)006
RP 6.0304
Station 318+39.82

End Project
H-3-020(139)097
RP 101.288
Station 5348+00.00

End Project
H-3-057(058)006
RP 13.291
Station 701+75.79

Begin Project
H-3-020(139)097
RP 97.692
Station 5158+15.51

Bridge Exception
Bridge ID 0057-012.469
RP 12.466 to RP 12.492
Sta 658+19.79 to Sta 659+54.63



STATE COUNTY MAP

DESIGNER Jason Hunter
DESIGNER
DESIGNER

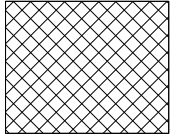
ND DEPARTMENT OF TRANSPORTATION DEVILS LAKE DISTRICT	Beggs, Chris K. 04/07/22
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NDDOT DEVILS LAKE DISTRICT

REGISTERED PROFESSIONAL ENGINEER
CHRISTOPHER K. BEGGS
PE-6240
DATE
04/07/22

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2	1	Table of Contents	D-101-10	NDDOT Utility Company and Organization Abbreviations					
4	1 - 2	Scope of Work	D-101-20, 21	Line Styles					
6	1 - 2	Notes	D-101-30, 31, 32, 33	Symbols					
8	1 - 2	Quantities	D-704-2	Traffic Control For Coring Of Hot Bituminous Pavement					
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			D-704-10	Construction Sign Details - Regulatory Signs					
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			D-704-26	Miscellaneous Sign Layouts					
			D-704-27	Mobile Operation (Pavement Marking)					
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			D-704-34	Sign Layout For One Lane Closure					
			D-704-50	Portable Sign Support Assembly					
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			D-706-1	Bituminous Laboratory					
			D-760-3	Rumble Strips Undivided Highways (Shoulders 4' Or Greater)					
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			D-762-1	Pavement Marking Message Details					
			D-762-4	Pavement Marking					
			D-762-5	Pavement Marking for Standard 90 Degree Flared Intersection-(No Center Left Turn Lane on Major Road)					
			D-762-11	Short-Term Pavement Marking					
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Number	Description								
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SP 26(22)	Tribal Employment Rights Ordinance (TERO)								
SP 27(22)	Tribal Employment Rights Ordinance (TERO)								
SSP 4	Longitudinal Joint Density								

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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Contract Patch

End Project BK
H-3-057(058)006
Jct ND 57 & ND20
RP 13.291
Sta 701+75.79
Begin Project AHD
H-3-020(139)097
RP 97.692
Sta 5158+15.51



210' offset East of ND 57 & ND 20 centerline

Patch 10
Area = 41,921 SF

Patch 9
Area = 142,354 SF

Patch 8
Area = 90,816 SF

Bridge Exception
Bridge ID 0057-012.469
RP 12.466 to RP 12.492
Sta 658+19.79 to Sta 659+54.63

SPIRIT LAKE
CASINO ENTERANCE
Patch 7
Area = 105,962 SF

Patch 6
Area = 94,871 SF

BIA 1

Patch 4
Area = 94,683 SF

Spirit Lake
Game & Fish Entrance

BIA 14
SKY LINE DR

Patch 5
Area = 96,016 SF

BIA 15
SKI JUMP RD

Patch 3
Area = 97,807 SF

WHITE HORSE HILL
NATIONAL GAME
PRESERVE

Patch 2
Area = 12,487 SF



Patch 1
Area = 122,318 SF

BIA 24

BIA 7

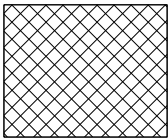
BIA 24

Begin Project
H-3-057(058)006
RP 6.03
Sta 318+39.82

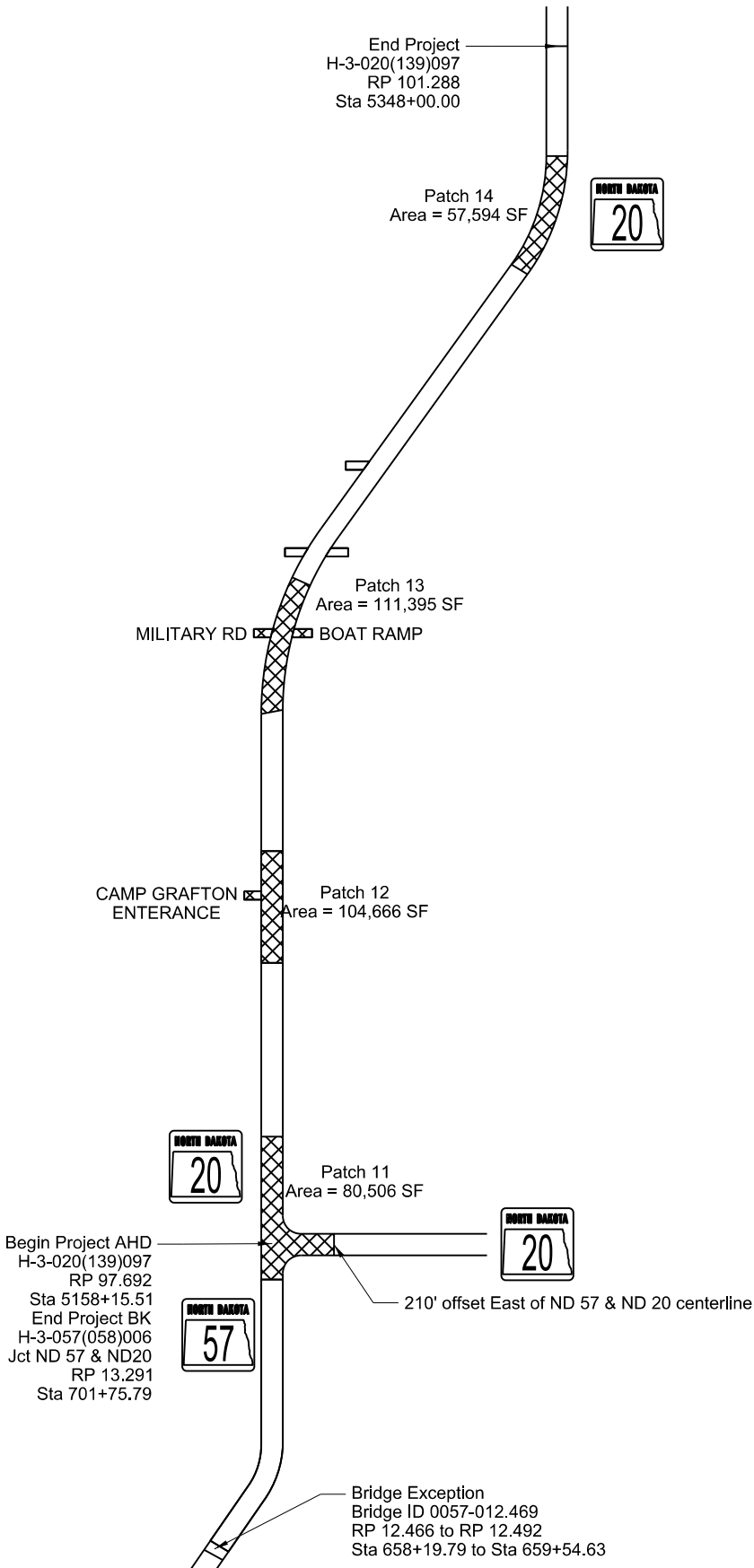


Scope of Work
ND 57

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	H-3-020(139)097	4	2



Contract Patch



REGISTERED PROFESSIONAL ENGINEER


KITSCH
PE-28791

DATE
04/07/2022

2022 NORTH DAKOTA

Scope of Work
ND 20

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	H-3-057(058)006	6	1
ND	H-3-020(139)097		

NOTES

- 100-P01 COORDINATION: At least one week before beginning work, contact the District Engineer or Assistant District Engineer to assure that contract patch locations are cleared for work. Segments of contract patch may be removed or added.
- 107-100 LAWS TO BE OBSERVED: All or a portion of this project lies within the exterior boundaries of an Indian Reservation. Review laws and ordinances pertaining to the work contained within the boundaries of the reservation.
- 108-500 TERO COORDINATION: Invite the Tribal TERO Office to the Preconstruction Conference.
- 411-P01 MILLING PAVEMENT SURFACE: All of milled material from the project shall become the property of the NDDOT and be hauled and stockpiled at the NDDOT Maintenance Yard(1905 Schwan Ave NW Devils Lake, ND 58301) on the west side of Devils Lake, ND, RP 266.940 on US 2. Use a pay-loader when pushing up the material on the stockpile. Process the millings so that the maximum particle size does not exceed 1-1/2". Notify the Engineer 72 hours prior to dropping off any millings. Include all costs associated with this work in the contract unit price for "MILLING PAVEMENT SURFACE".
- 430-P01 CALCULATED DENSITY: Compact the asphalt according to specification 430.04 I.2, "Calculated Density".
- 704-P01 TRAFFIC CONTROL FOR BITUMINOUS PAVEMENT: Provide traffic control consisting of a temporary road closure, flagging, and a pilot car.

Traffic control device quantities are based on a 6 mile limitation and the list below.The Department will pay for all necessary deployed devices, regardless of the length of the lane closure
 1. Standard D-704-12;
 2. Standard D-704-15, layout A, for the Lakota frontage road;
 3. Standard D-704-34 to be used for Mainline;
 4. Standard D-704-20, layout G – signing will be required at junctions: BIA24; BIA 7; White Horse Hill Entrance; BIA 14; BIA 15; BIA 1; Spirit Lake Casino Entrance; ND 20; Camp Grafton Entrance; Military Road.
 5. Standard D-704-22, layouts K and L; and
 6. Standard D-704-26, layouts CC, EE, and GG.
When installing layout G from Standard D-704-20, move sign W3-5-48 and the sign assembly containing signs R2-1-48 and R2-1a-24 with the work area as it progresses through the construction zone. Place the R2-1-48 assembly a minimum of 500 feet in advance of flagging signs.

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. BIA 24
2. BIA 7
3. White Horse Hill Enterance
4. BIA 14
5. BIA 15
6. BIA 1
7. Spirit Lake Casino Entrance
8. ND 20
9. Camp Grafton Entrance
10. Military Road

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” (E3-4); and
- “Flagger” symbol (W20-7)

Install PRS that meet the following criteria:

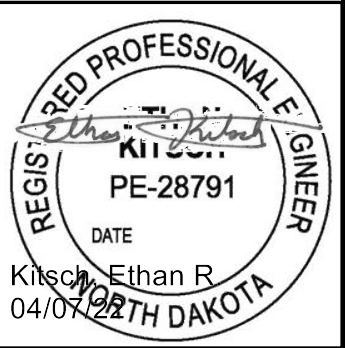
- Have no adhesives or fasteners required for placement;
- Have a manufacture’s speed rating that meets or exceeds the posted speed limit; and
- Each strip in the array must weigh a minimum of 100 pounds.

Use individual PRS construction in one of the following manners:

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

An installed array of PRS consists of a minimum of 2 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”.



NOTES

- 704-P01 PORTABLE RUMBLE STRIPS: A quantity of 4 portable rumble strips are provided (2 per project) to be used where ever needed on the projects. Additional quantities are at the contractors expense.
- 762-P01 SHORT TERM 4IN LINE-TYPE NR: Quantity for two applications of short term centerline pavement marking has been included in the plans. Additional applications required to accommodate the contractor's operation are at the contractor's expense.
- One application for HBP Overlay
 - One application for Rumble Strips.

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ND	H-3-020(139)097		



ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	H-3-057(058)006	8	1

SPEC CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
-----	-----	----	-----	-----
103	0100 CONTRACT BOND	L SUM	0.68	0.68
401	0050 TACK COAT	GAL	4,996	4,996
411	0105 MILLING PAVEMENT SURFACE	SY	2,667	2,667
430	0043 SUPERPAVE FAA 43	TON	12,996	12,996
430	5803 PG 58S-28 ASPHALT CEMENT	TON	792	792
702	0100 MOBILIZATION	L SUM	0.68	0.68
704	0100 FLAGGING	MHR	100	100
704	1000 TRAFFIC CONTROL SIGNS	UNIT	1,354	1,354
704	1048 PORTABLE RUMBLE STRIPS	EA	2	2
704	1185 PILOT CAR	HR	50	50
706	0550 BITUMINOUS LABORATORY	EA	0.68	0.68
706	0600 CONTRACTOR'S LABORATORY	EA	0.68	0.68
760	0005 RUMBLE STRIPS - ASPHALT SHOULDER	MILE	6.3	6.3
760	0007 RUMBLE STRIPS - ASPHALT CENTERLINE	MILE	3.15	3.15
762	0103 PVMT MK PAINTED-MESSAGE	SF	704	704
762	0430 SHORT TERM 4IN LINE-TYPE NR	LF	76,767	76,767
762	1104 PVMT MK PAINTED 4IN LINE	LF	119,853	119,853
762	1108 PVMT MK PAINTED 8IN LINE	LF	4,800	4,800
762	1124 PVMT MK PAINTED 24IN LINE	LF	212	212

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	H-3-020(139)097	8	2

SPEC CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
-----	-----	----	-----	-----
103	0100 CONTRACT BOND	L SUM	0.32	0.32
401	0050 TACK COAT	GAL	1,968	1,968
430	0043 SUPERPAVE FAA 43	TON	4,380	4,380
430	5803 PG 58S-28 ASPHALT CEMENT	TON	267	267
702	0100 MOBILIZATION	L SUM	0.32	0.32
704	0100 FLAGGING	MHR	100	100
704	1000 TRAFFIC CONTROL SIGNS	UNIT	1,298	1,298
704	1048 PORTABLE RUMBLE STRIPS	EA	2	2
704	1185 PILOT CAR	HR	50	50
706	0550 BITUMINOUS LABORATORY	EA	0.32	0.32
706	0600 CONTRACTOR'S LABORATORY	EA	0.32	0.32
760	0005 RUMBLE STRIPS - ASPHALT SHOULDER	MILE	2.54	2.54
760	0007 RUMBLE STRIPS - ASPHALT CENTERLINE	MILE	1.27	1.27
760	0010 RUMBLE STRIPS - INTERSECTION	SET	1	1
762	0103 PVMT MK PAINTED-MESSAGE	SF	336	336
762	0430 SHORT TERM 4IN LINE-TYPE NR	LF	44,500	44,500
762	1104 PVMT MK PAINTED 4IN LINE	LF	71,539	71,539
762	1108 PVMT MK PAINTED 8IN LINE	LF	5,700	5,700
762	1124 PVMT MK PAINTED 24IN LINE	LF	60	60

ND 57 PATCHING - Patch 1 - BIA 24 & BIA 7						
MATERIALS	BASIS	UNIT	Section 30 Sheet 2			TOTALS
			MP 6.0304 to MP 6.394			
			AREA (SF)	AREA		
SUPERPAVE FAA 43	2 Ton/CY	Ton	122,318	757	CY	1,514 Tons
PG 58S-28 ASPHALT CEMENT	6.1 % of HBP	Ton	122,318			92 Tons
TACK COAT	0.05 Gal/SY	Gal	122,318	13,591	SY	680 Gal

ND 57 PATCH - Patch 2						
MATERIALS	BASIS	UNIT	Section 30 Sheet 1			TOTALS
			MP 7.295 to MP 7.350			
			AREA (SF)	AREA		
SUPERPAVE FAA 45	2 Ton/CY	Ton	12,487	77	CY	154 Tons
PG 58H-34 ASPHALT CEMENT	6.1 % of HBP	Ton	12,487			9 Tons
TACK COAT	0.05 Gal/SY	Gal	12,487	1,387	SY	69 Gal

ND 57 PATCH - Patch 3 - White Horse Hill						
MATERIALS	BASIS	UNIT	Section 30 Sheet 2			TOTALS
			MP 7.7798 to MP 8.094			
			AREA (SF)	AREA		
SUPERPAVE FAA 45	2 Ton/CY	Ton	97,807	605	CY	1,210 Tons
PG 58H-34 ASPHALT CEMENT	6.1 % of HBP	Ton	97,807			74 Tons
TACK COAT	0.05 Gal/SY	Gal	97,807	10,867	SY	543 Gal

ND 57 PATCH - Patch 4 Spirit Lake Game & Fish						
MATERIALS	BASIS	UNIT	Section 30 Sheet 2			TOTALS
			MP 8.512 to MP 8.800			
			AREA (SF)	AREA		
SUPERPAVE FAA 45	2 Ton/CY	Ton	94,683	586	CY	1,172 Tons
PG 58H-34 ASPHALT CEMENT	6.1 % of HBP	Ton	94,683			71 Tons
TACK COAT	0.05 Gal/SY	Gal	94,683	10,520	SY	526 Gal

ND 57 PATCH - Patch 5 BIA 15 (Ski Jump RD)						
MATERIALS	BASIS	UNIT	Section 30 Sheet 2			TOTALS
			MP 9.674 to MP 10.000			
			AREA (SF)	AREA		
SUPERPAVE FAA 45	2 Ton/CY	Ton	96,016	594	CY	1,188 Tons
PG 58H-34 ASPHALT CEMENT	6.1 % of HBP	Ton	96,016			72 Tons
TACK COAT	0.05 Gal/SY	Gal	96,016	10,668	SY	533 Gal

ND 57 PATCH - Patch 6 BIA 1						
MATERIALS	BASIS	UNIT	Section 30 Sheet 2			TOTALS
			MP 10.861 to MP 11.166			
			AREA (SF)	AREA		
SUPERPAVE FAA 45	2 Ton/CY	Ton	94,871	587	CY	1,174 Tons
PG 58H-34 ASPHALT CEMENT	6.1 % of HBP	Ton	94,871			72 Tons
TACK COAT	0.05 Gal/SY	Gal	94,871	10,541	SY	527 Gal

ND 57 PATCH - Patch 7 Spirit Lake Casino						
MATERIALS	BASIS	UNIT	Section 30 Sheet 2			TOTALS
			MP 11.728 to MP 12.066			
			AREA (SF)	AREA		
SUPERPAVE FAA 45	2 Ton/CY	Ton	105,962	655	CY	1,310 Tons
PG 58H-34 ASPHALT CEMENT	6.1 % of HBP	Ton	105,962			80 Tons
TACK COAT	0.05 Gal/SY	Gal	105,962	11,774	SY	589 Gal

ND 57 PATCH - Patch 8						
MATERIALS	BASIS	UNIT	Section 30 Sheet 1			TOTALS
			MP 12.066 to MP 12.466			
			WIDTH (ft)	QUANTITY/ MILE		
SUPERPAVE FAA 45	2 Ton/CY	Ton	90,816	562	CY	1,124 Tons
PG 58H-34 ASPHALT CEMENT	6.1 % of HBP	Ton	90,816			69 Tons
TACK COAT	0.05 Gal/SY	Gal	90,816	10,091	SY	505 Gal
FOG COAT	0.05 Gal/SY	Gal	90,816	10,091	SY	505 Gal

ND 57 PATCH - Patch 9						
MATERIALS	BASIS	UNIT	Section 30 Sheet 1			TOTALS
			MP 12.492 to MP 13.119			
			AREA (SF)	AREA		
SUPERPAVE FAA 45	2 Ton/CY	Ton	142,354	880	CY	1,760 Tons
PG 58H-34 ASPHALT CEMENT	6.1 % of HBP	Ton	142,354			107 Tons
TACK COAT	0.05 Gal/SY	Gal	142,354	15,817	SY	791 Gal
FOG COAT	0.05 Gal/SY	Gal	142,354	15,817	SY	791 Gal

ND 57 PATCH - Patch 10 Jct ND 57 & ND 20						
MATERIALS	BASIS	UNIT	Section 30 Sheet 2			TOTALS
			MP 13.119 to MP 13.251			
			AREA (SF)	AREA		
SUPERPAVE FAA 45	2 Ton/CY	Ton	41,921	259	CY	518 Tons
PG 58H-34 ASPHALT CEMENT	6.1 % of HBP	Ton	41,921			32 Tons
TACK COAT	0.05 Gal/SY	Gal	41,921	4,658	SY	233 Gal

RUMBLE STRIPS ND 57			
ITEM	BEGIN (MILES)	END (MILES)	TOTAL (MILES)
RUMBLE STRIPS - ASPHALT SHOULDER	6.0304	6.394	0.727 Miles
RUMBLE STRIPS - ASPHALT CENTERLINE	6.0304	6.394	0.364 Miles
RUMBLE STRIPS - ASPHALT SHOULDER	7.295	7.350	0.110 Miles
RUMBLE STRIPS - ASPHALT CENTERLINE	7.295	7.350	0.055 Miles
RUMBLE STRIPS - ASPHALT SHOULDER	7.7798	8.094	0.628 Miles
RUMBLE STRIPS - ASPHALT CENTERLINE	7.7798	8.094	0.314 Miles
RUMBLE STRIPS - ASPHALT SHOULDER	8.512	8.800	0.576 Miles
RUMBLE STRIPS - ASPHALT CENTERLINE	8.512	8.800	0.288 Miles
RUMBLE STRIPS - ASPHALT SHOULDER	9.674	10.000	0.652 Miles
RUMBLE STRIPS - ASPHALT CENTERLINE	9.674	10.000	0.326 Miles
RUMBLE STRIPS - ASPHALT SHOULDER	10.861	11.166	0.610 Miles
RUMBLE STRIPS - ASPHALT CENTERLINE	10.861	11.166	0.305 Miles
RUMBLE STRIPS - ASPHALT SHOULDER	11.728	12.466	1.476 Miles
RUMBLE STRIPS - ASPHALT CENTERLINE	11.728	12.466	0.738 Miles
RUMBLE STRIPS - ASPHALT SHOULDER	12.492	13.251	1.518 Miles
RUMBLE STRIPS - ASPHALT CENTERLINE	12.492	13.251	0.759 Miles
Centerline	Total		3.149 Miles
Shoulder	Total		6.297 Miles

ND 20 PATCH - Patch 11 Jct ND 57 & ND 20						
MATERIALS	BASIS	UNIT	Section 30 Sheet 2			TOTALS
			MP 97.652 to MP 97.874			
			WIDTH (ft)	QUANTITY/ MILE		
SUPERPAVE FAA 45	2 Ton/CY	Ton	80,506	498	CY	996 Tons
PG 58H-34 ASPHALT CEMENT	6.1 % of HBP	Ton	80,506			61 Tons
TACK COAT	0.05 Gal/SY	Gal	80,506	8,945	SY	447 Gal

ND 20 PATCH - Patch 12 Camp Grafton						
MATERIALS	BASIS	UNIT	Section 30 Sheet 2			TOTALS
			MP 98.582 to MP 99.000			
			WIDTH (ft)	QUANTITY/ MILE		
SUPERPAVE FAA 45	2 Ton/CY	Ton	104,666	647	CY	1,294 Tons
PG 58H-34 ASPHALT CEMENT	6.1 % of HBP	Ton	104,666			79 Tons
TACK COAT	0.05 Gal/SY	Gal	104,666	11,630	SY	582 Gal

ND 20 PATCH - Patch 13 Military RD/Boat Ramp						
MATERIALS	BASIS	UNIT	Section 30 Sheet 2			TOTALS
			MP 99.367 to MP 99.744			
			WIDTH (ft)	QUANTITY/ MILE		
SUPERPAVE FAA 45	2 Ton/CY	Ton	111,395	689	CY	1,378 Tons
PG 58H-34 ASPHALT CEMENT	6.1 % of HBP	Ton	111,395			84 Tons
TACK COAT	0.05 Gal/SY	Gal	111,395	12,377	SY	619 Gal

ND 20 PATCH - Patch 14						
MATERIALS	BASIS	UNIT	Section 30 Sheet 1			TOTALS
			MP 100.754 to MP 101.005			
			WIDTH (ft)	QUANTITY/ MILE		
SUPERPAVE FAA 45	2 Ton/CY	Ton	57,594	356	CY	712 Tons
PG 58H-34 ASPHALT CEMENT	6.1 % of HBP	Ton	57,594			43 Tons
TACK COAT	0.05 Gal/SY	Gal	57,594	6,399	SY	320 Gal

RUMBLE STRIPS ND 20			
ITEM	BEGIN (MILES)	END (MILES)	TOTAL (MILES)
RUMBLE STRIPS - ASPHALT SHOULDER	97.652	97.874	0.444 Miles
RUMBLE STRIPS - ASPHALT CENTERLINE	97.652	97.874	0.222 Miles
RUMBLE STRIPS - ASPHALT SHOULDER	98.582	99.000	0.836 Miles
RUMBLE STRIPS - ASPHALT CENTERLINE	98.582	99.000	0.418 Miles
RUMBLE STRIPS - ASPHALT SHOULDER	99.367	99.744	0.754 Miles
RUMBLE STRIPS - ASPHALT CENTERLINE	99.367	99.744	0.377 Miles
RUMBLE STRIPS - ASPHALT SHOULDER	100.754	101.005	0.502 Miles
RUMBLE STRIPS - ASPHALT CENTERLINE	100.754	101.005	0.251 Miles
Centerline	Total		1.268 Miles
Shoulder	Total		2.536 Miles

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H-3-020(139)097				

H-3-057(058)006	
PERMANENT PAVEMENT MARKING	
MAINLINE	QUANTITY
4" Yellow, 10' Line, 30' Skip	8,428
Barrier- 4" Yellow - NPZ	34,753
4" White Edgeline	76,672
8" White Channel Line	4,800
24" White Continental Crosswalk/Stop Bars	212
SHORT TERM PAVEMENT MARKING	
MAINLINE	QUANTITY
*4" Yellow, 10' Line, 30' Skip	1,064
*Barrier- 4" Yellow - NPZ	75,703

*Quantity figured for two applications

H-3-020(139)097	
PERMANENT PAVEMENT MARKING	
MAINLINE	QUANTITY
4" Yellow, 10' Line, 30' Skip	5,977
Barrier- 4" Yellow - NPZ	24,000
4" White Edgeline	52,811
8" White Channel Line	5,700
24" White Stop Bar	60
SHORT TERM PAVEMENT MARKING	
MAINLINE	QUANTITY
*4" Yellow, 10' Line, 30' Skip	2,651
*Barrier- 4" Yellow - NPZ	41,849

*Quantity figured for two applications

H-3-020(139)097			
PERMANENT PAVEMENT MESSAGE			
MAINLINE	BASIS (SF/EA)	QUANTITY (EA)	QUANTITY
Arrow @ 3 per turn lane	16	21	336
TOTAL			336

H-3-057(058)006			
MAINLINE PERMANENT PAVEMENT MESSAGE			
MAINLINE	BASIS (SF/EA)	QUANTITY (EA)	QUANTITY
Arrow	16	44	704
TOTAL			704

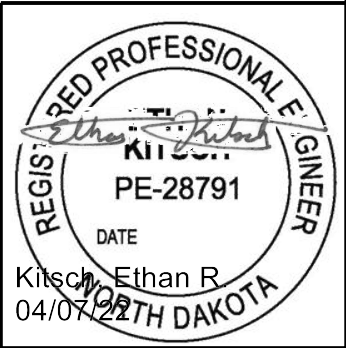
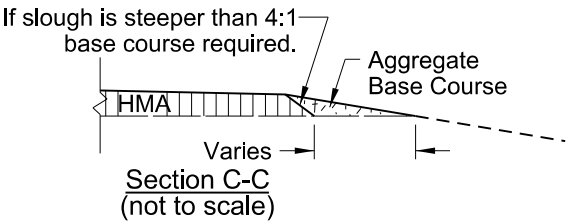
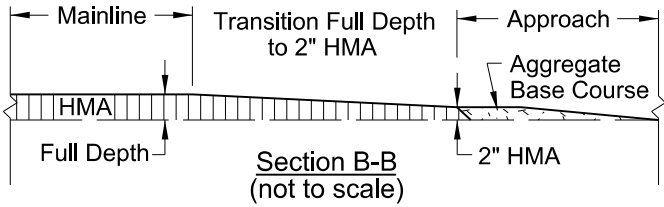
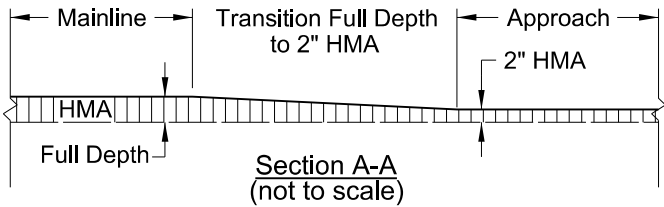


Basis of Estimate

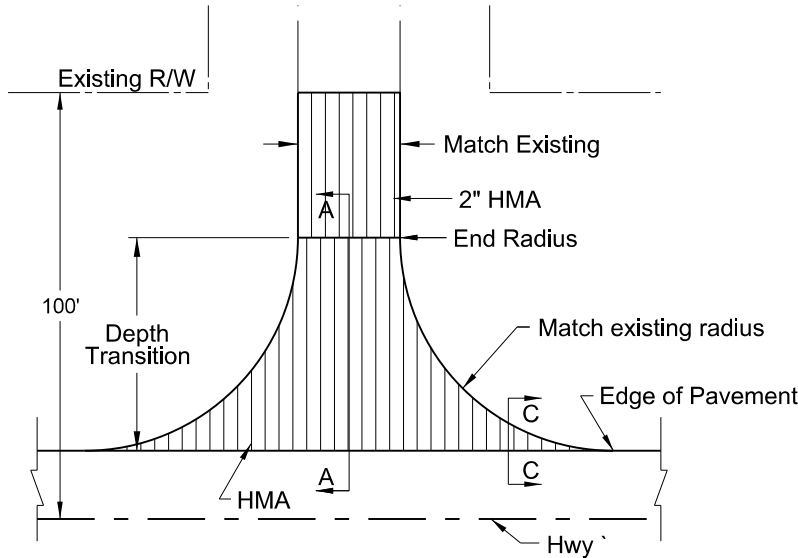
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	H-3-057(058)006	20	1
	H-3-020(139)097		

Notes:

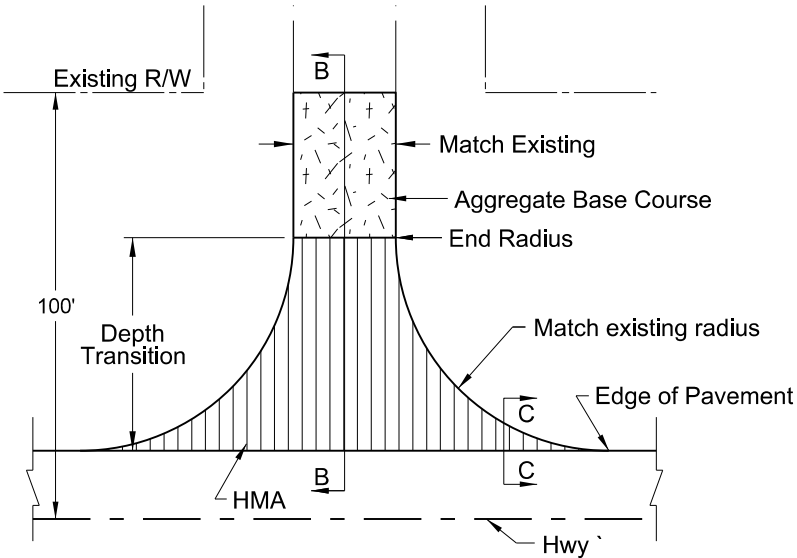
- 1. Actual HMA paving and aggregate base course locations may vary in the field, as approved by the Engineer.
- 2. Quantity totals have been included in the bid items of the "Estimate of Quantities" of the plans.
- 3. Aggregate base course has been provided in the quantities to fill in around the radii.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



Approach Paving Details
for Existing Rural Approaches
(No Approach Grading)
ND 57 & ND 20

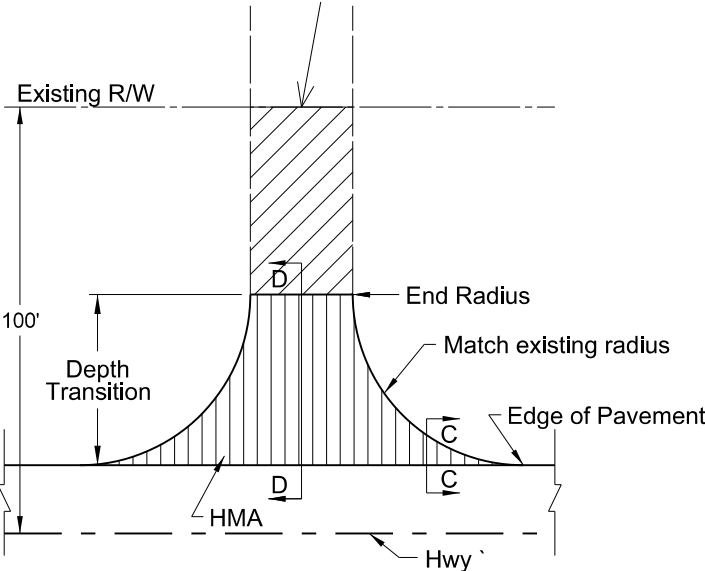


(1) Paved Section Line, County Road, or Street Approach

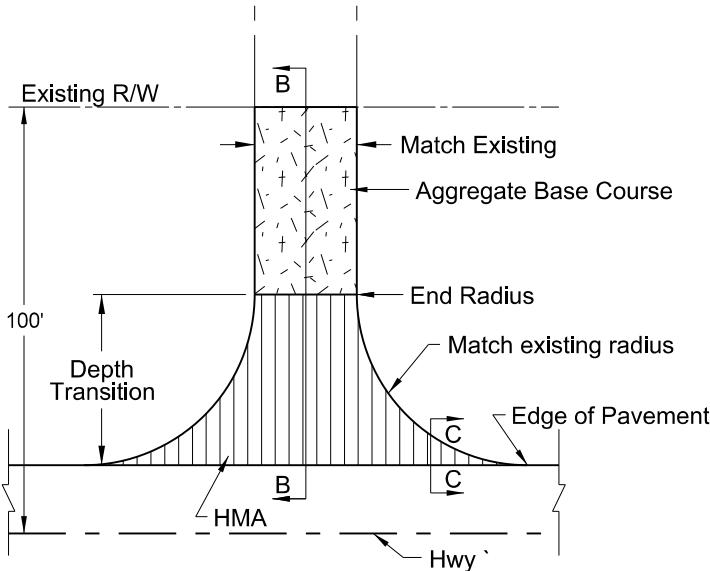


(2) Gravel Section Line, County Road, or Street Approach

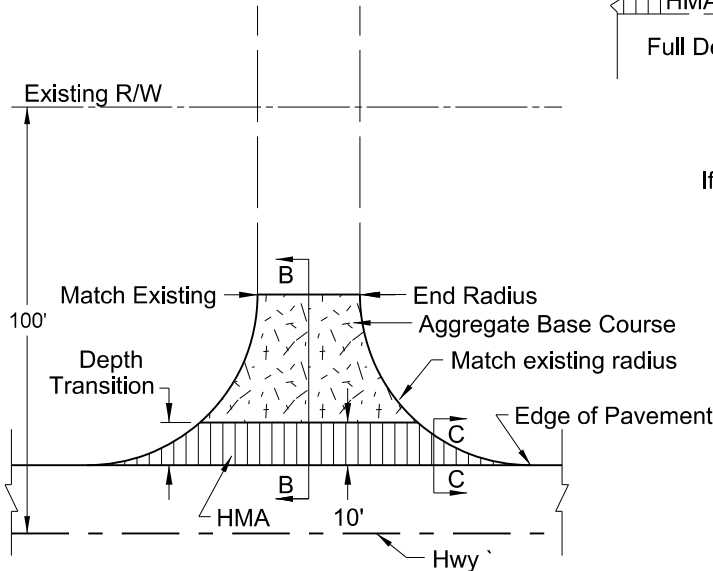
NOTE: (Modify detail below to pave HMA to ROW for Major Rehab and New/Recon projects. All other projects pave to radius as shown. Delete red text and red hatching.)



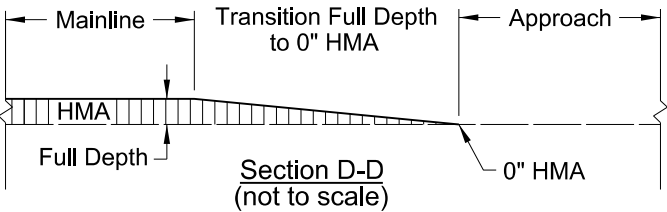
(3) Paved Private Drive Approach



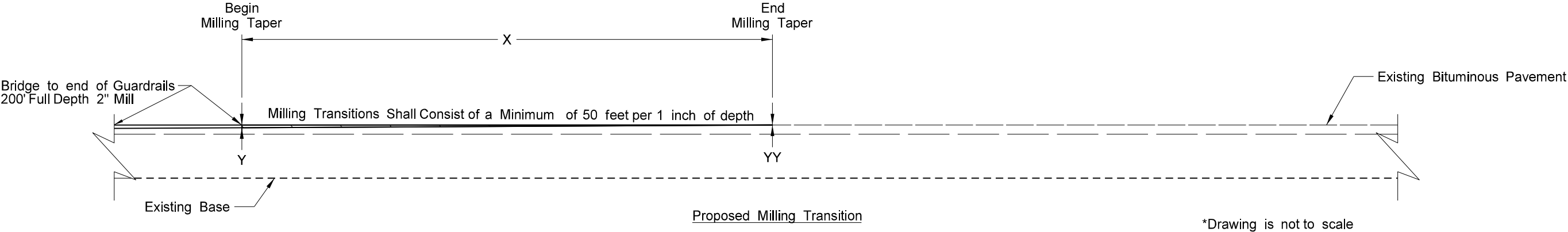
(4) Gravel Private Drive Approach



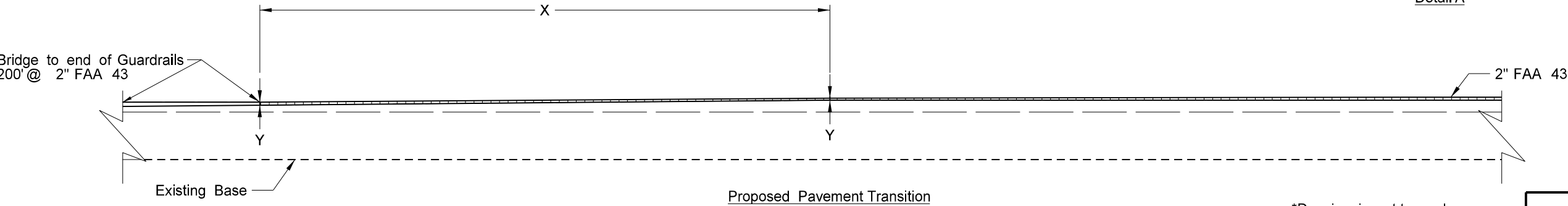
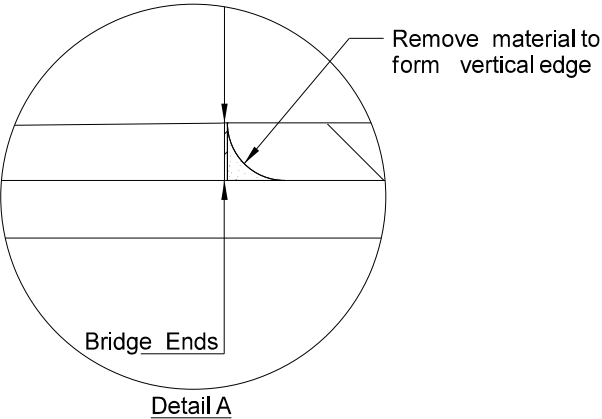
(5) Field Drive Approach



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	H-3-057(058)006	20	2



*Drawing is not to scale



*Drawing is not to scale

Milling and Paving Transitions

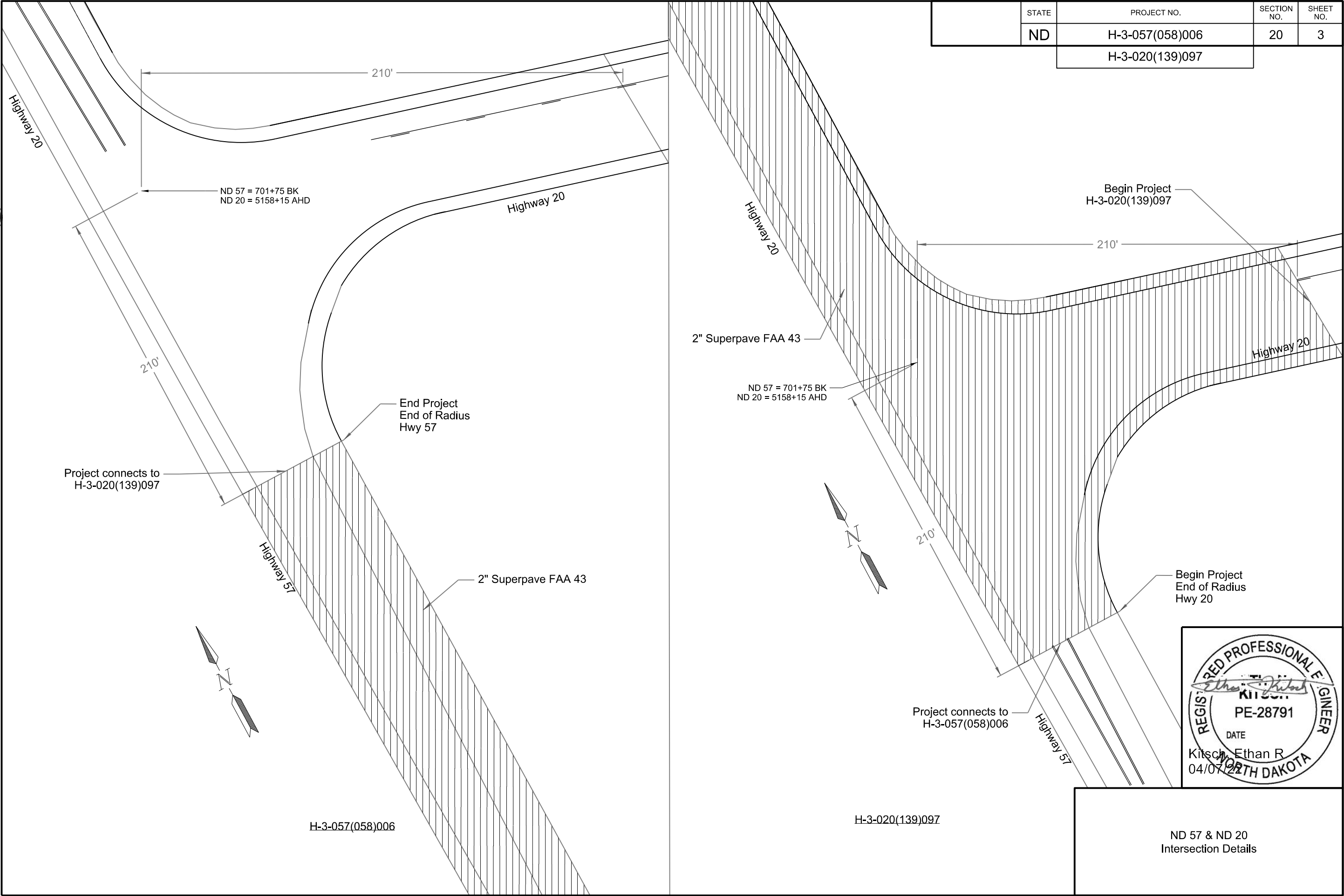
Location	X	Begin Milling/Paving Station	Y	YY	End Milling Station
Bridge 0057-012.469	100 ft	656+20	2.0 in	0 in	655+20
Bridge 0057-012.469	100 ft	661+55	2.0 in	0 in	662+55

Bridge to end of Guardrail Milling and Paving Full Depth

Location		Begin Milling/Paving Station		End Milling Station
Bridge 0057-012.469	200 ft	658+20	2.0 in	656+20
Bridge 0057-012.469	200 ft	659+55	2.0 in	661+55

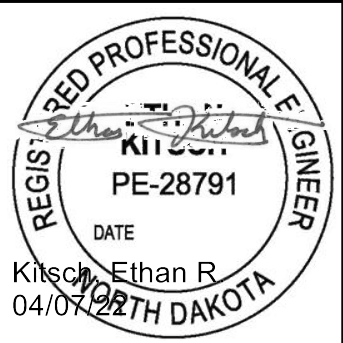
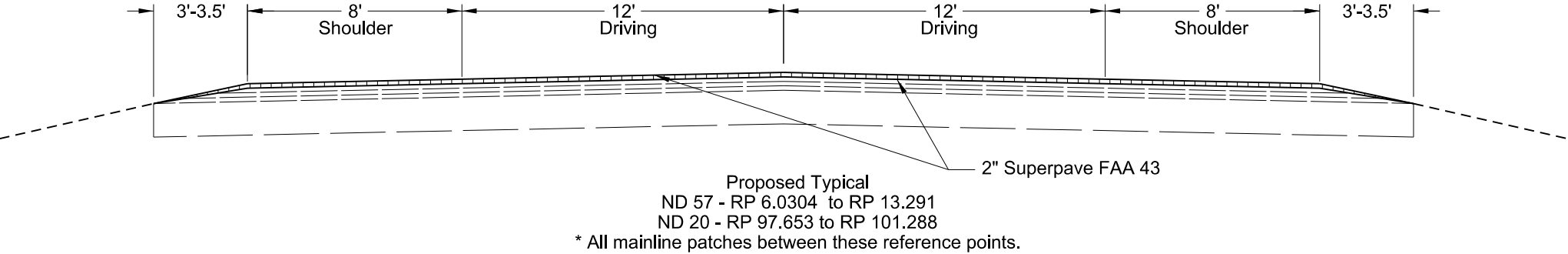
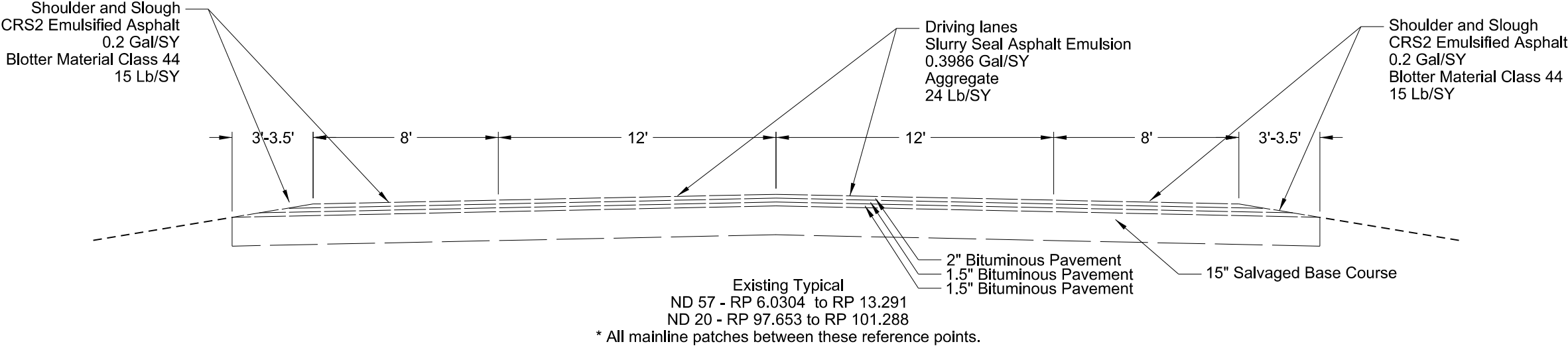


Milling and Paving End Transitions
Brigde 0057-012.469



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND H-3-057(058)006 H-3-020(139)097	20	3

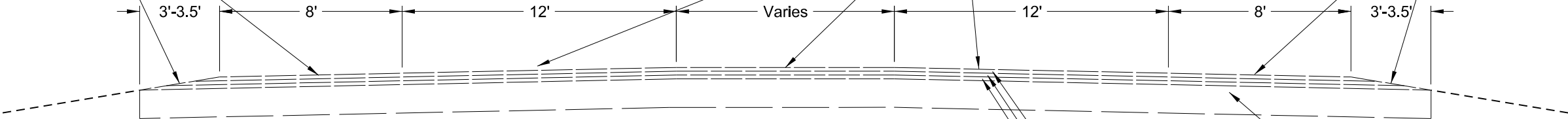
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	H-3-057(058)006	30	1
	H-3-020(139)097		



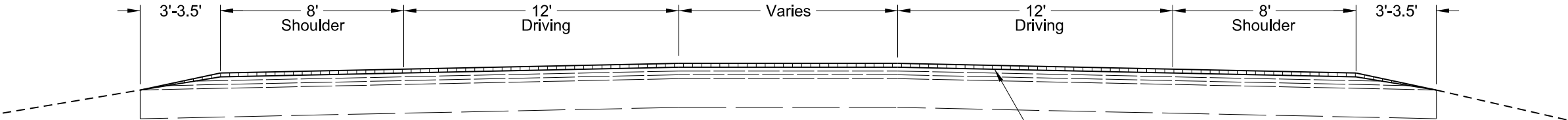
Existing and Proposed Typicals
ND 57
Ft Totten to Jct ND 20
ND 20
Jct ND 57 to RP 101.288

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	H-3-057(058)006	30
	H-3-020(139)097		

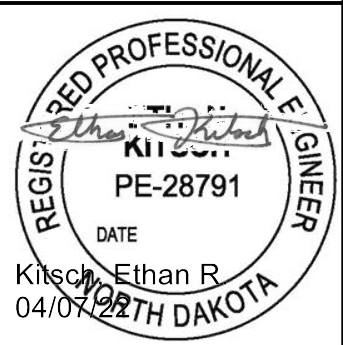
Shoulder and Slough
CRS2 Emulsified Asphalt
0.2 Gal/SY
Blotter Material Class 44
15 Lb/SY



Existing Typical
ND 57 - RP 6.0304 to RP 13.291
ND 20 - RP 97.653 to RP 101.288
* All mainline patches between these reference points.

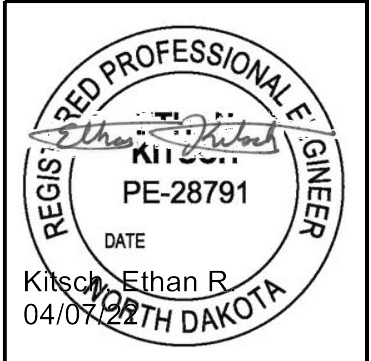
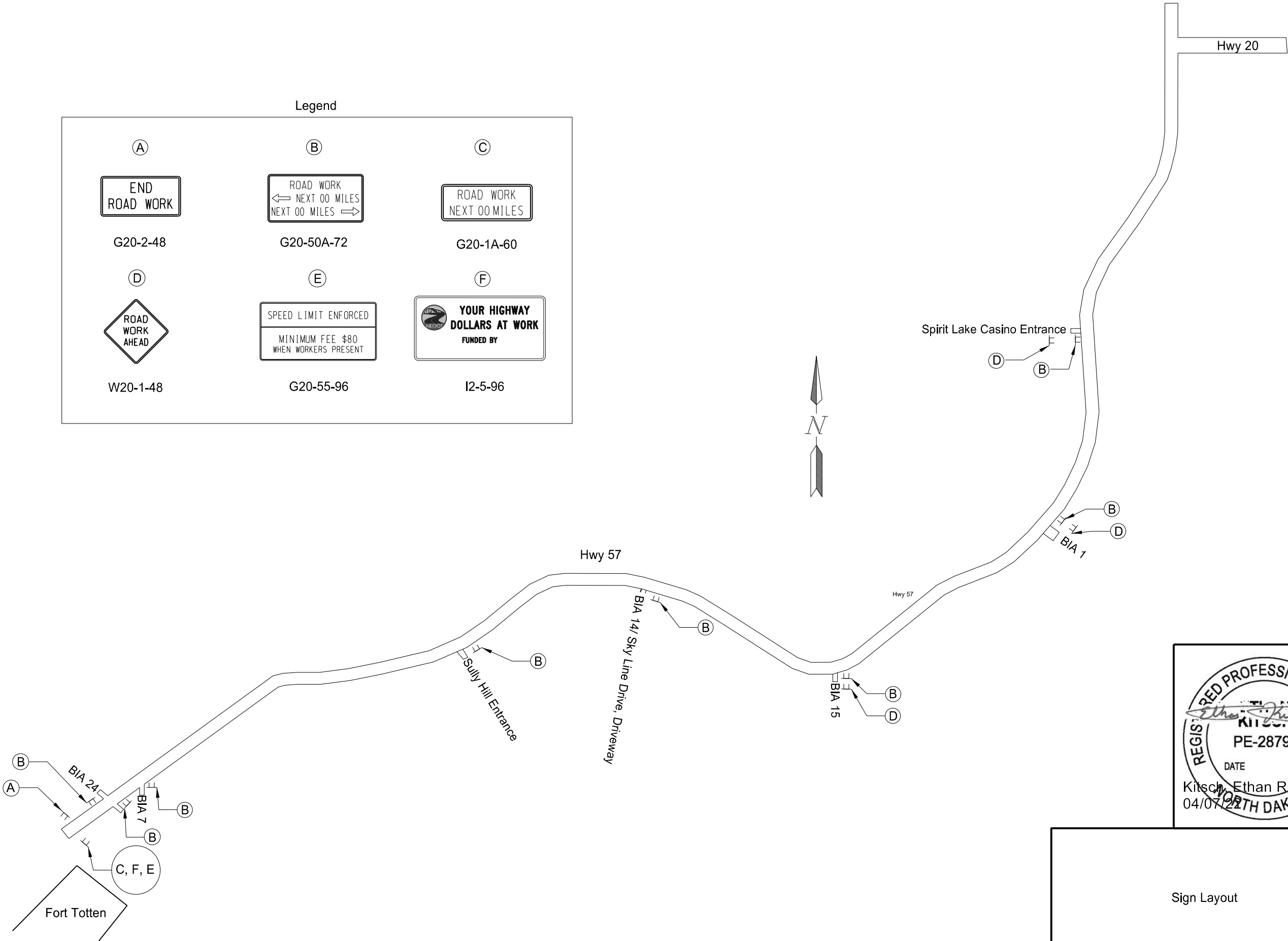


Proposed Typical
ND 57 - RP 6.0304 to RP 13.291
ND 20 - RP 97.653 to RP 101.288
* All mainline patches between these reference points.

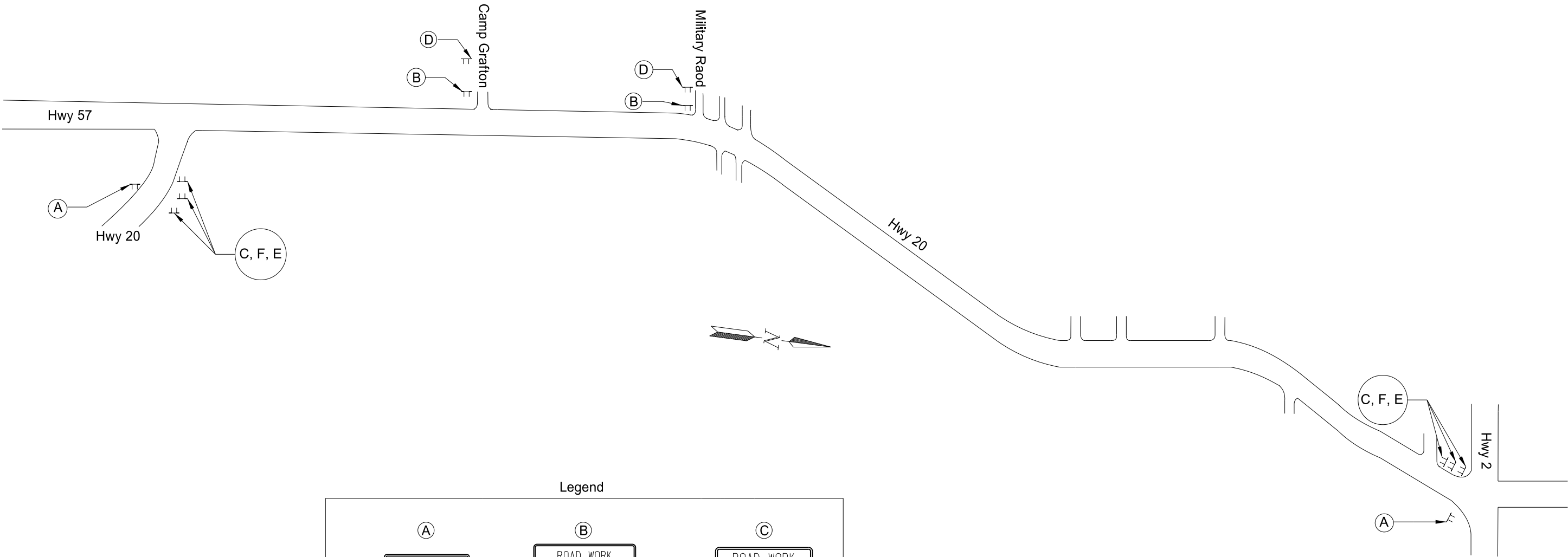


Existing and Proposed Typicals
Turn Lanes
ND 57
Ft Totten to Jct ND 20
ND 20
Jct ND 57 to RP 101.288


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	H-3-057(058)006	100	3



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	H-3-020(139)097	100	4



Legend

<p>(A)</p> <p>END ROAD WORK</p> <p>G20-2-48</p>	<p>(B)</p> <p>ROAD WORK ← NEXT 00 MILES NEXT 00 MILES →</p> <p>G20-50A-72</p>	<p>(C)</p> <p>ROAD WORK NEXT 00 MILES</p> <p>G20-1A-60</p>
<p>(D)</p> <p>ROAD WORK AHEAD</p> <p>W20-1-48</p>	<p>(E)</p> <p>SPEED LIMIT ENFORCED</p> <p>MINIMUM FEE \$80 WHEN WORKERS PRESENT</p> <p>G20-55-96</p>	<p>(F)</p> <p> YOUR HIGHWAY DOLLARS AT WORK FUNDED BY</p> <p>I2-5-96</p>

Devils Lake



Sign Layout

NDDOT ABBREVIATIONS

D-101-1

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

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



12 18 2020

NDDOT ABBREVIATIONS

D-101-2

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

07-01-14

REVISIONS

DATE	CHANGE
08-03-15	General Revisions
04-23-18	General Revisions
12-18-20	General Revisions

KIRK J. HOFF

REGISTERED

PROFESSIONAL

PE-4683

ENGINEER

NORTH DAKOTA

12 18 2020

NDDOT ABBREVIATIONS

D-101-3

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

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12 18 2020

MEASUREMENTS

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

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

SURVEY DESCRIPTIONS

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

SOIL TYPES

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

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



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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

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

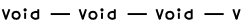
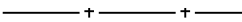




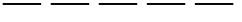






















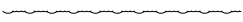
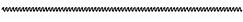
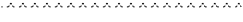

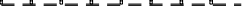





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LINE STYLES


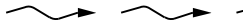
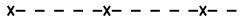


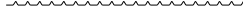


D-101-20

Existing Topography









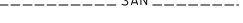













	Existing Ground Void
	Existing Cemetary Boundary
	Existing Box Culvert Bridge
	Existing Concrete Surface
	Existing Drainage Structure
	Existing Gravel Surface
	Existing Riprap
	Existing Dirt Surface
	Existing Asphalt Surface
	Existing Tie Point Line
	Existing Railroad Centerline
	Existing Guardrail Cable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

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

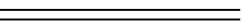


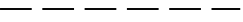
Proposed Topography

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

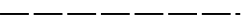
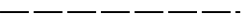
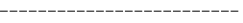




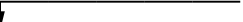

Existing Utilities

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




Proposed Utilities


	24 Inch Pipe
	Reinforced Concrete Pipe
	Under Drain
	Edge Drain

Traffic Utilities

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

Sign Structures






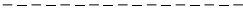







	Existing Overhead Sign Structure
	Existing Overhead Sign Structure Cantilever
	Overhead Sign Structure Cantilever

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION			
07-01-14 REVISIONS			
DATE	CHANGE		
09-23-16 12-18-20	Added and Revised Items, Organized by Functional Groups General Revisions		
			12 18 2020



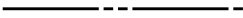
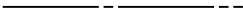
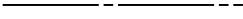




LINE STYLES

D-101-21

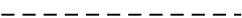
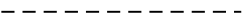
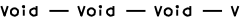





Right Of Way

	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


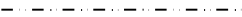
	Existing City Corporate Limits or Reservation Boundary
	Existing State or International Line
	Existing Township
	Existing County
	Existing Section Line
	Existing Quarter Section Line
	Existing Sixteenth Section Line
	Existing Centerline
	Tangent Line

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


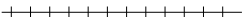

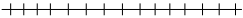
Profile

	Subgrade, Subcut or Ditch Grade
	Topsoil Profile




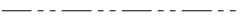





Striping

	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




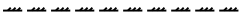
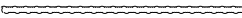
Bridge Details

	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
DEPARTMENT OF TRANSPORTATION

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PE-4683

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NORTH DAKOTA

12 18 2020


SYMBOLS


D-101-30


 North Arrow (Half Scale)


 Alignment Data Point


 Alignment Monument


 Spot Elevation


 Existing Miscellaneous Spot

 Existing Access Control Arrow

 Existing Benchmark

 Reset USGS Marker

 Iron Monument Found

 Iron Pin R/W Monument

 Property Corner




 Iron Pin Reference Monument


   Right of Way Marker (Exst, Ppsd, Reset)


 Existing Federal Reference Corner


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


 Existing Witness Corner


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


 Existing Traverse PI Aerial Panel


 Existing Reference Marker Point NGS


 Existing EFB Misc

 Existing Bush or Shrub


 Existing Large Evergreen Tree


 Existing Small Evergreen Tree


 Existing Large Tree

 Existing Small Tree

 Existing Tree Trunk

 Cairn or Stone Circle


 Existing Artifact

 Existing Satellite Dish

 Existing Weather Station


 Existing Windmill or Tower

 Reinforced Pavement


 Continuous Split Barrel Sample

 Flight Auger Sample

 Split Barrel Sample

 Thinwall Tube Sample

 Standard Penetration Test

 Inclinometer Tube

 Excavation Unit

 Existing Ground Water Well Bore Hole

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

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PROFESSIONAL

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






























ENGINEER

NORTH DAKOTA


12 18 2020

SYMBOLS

D-101-31

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

















































































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




12 18 2020

SYMBOLS


D-101-32

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

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



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



12 18 2020

SYMBOLS

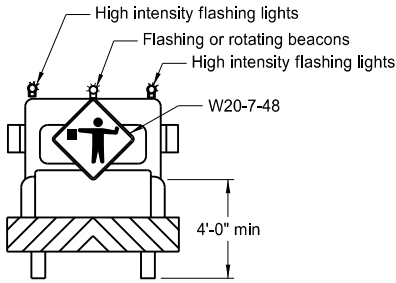
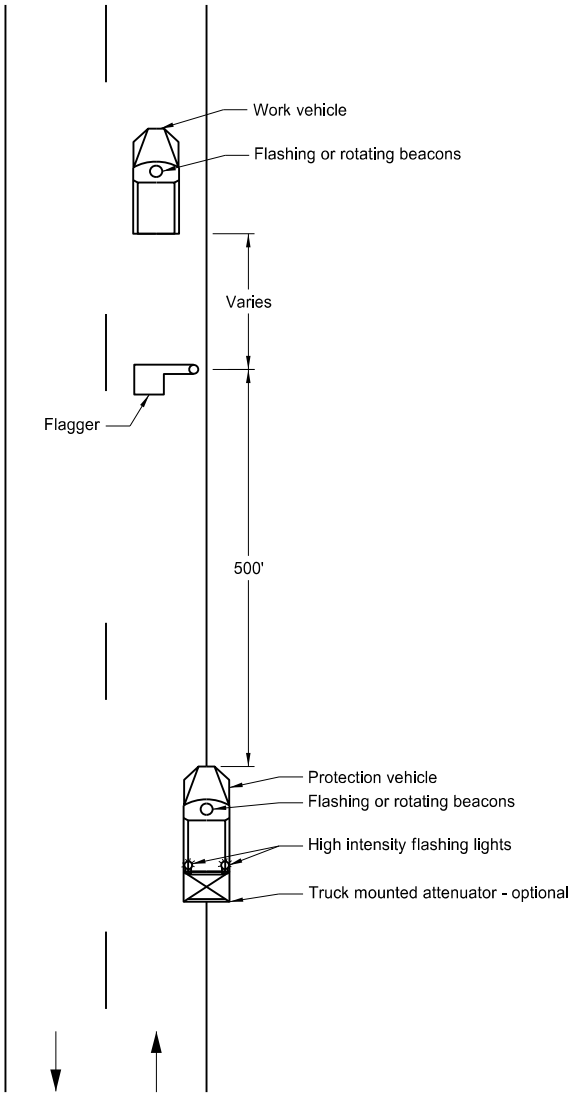
D-101-33

			Existing Manhole (Electrical, Gas, Telephone)		Cap or Stub Exst Gas, Exst Sanitary, Exst Storm Drain, Ppsd Storm Drain, Exst Water
			Water Manhole (Exst, Exst with Valve)		Existing Pedestal Electrical, Telephone, Fiber Optic Telephone, TV, Fiber Optic TV, Undefined
			Sanitary Sewer Manhole (Exst, Ppsd, Exst with Valve)		Existing Pipe Vent Gas, Fuel, Sanitary, Storm Drain, Water, Undefined
			Sanitary Force Main Manhole (Exst, Ppsd, Exst with Valve)		
			Storm Drain Manhole (Exst, Ppsd, Exst with Inlet, Ppsd with Inlet)		
			Force Main Storm Drain Manhole (Exst, Exst with Valve)		
			Manhole (Ppsd, Ppsd 48 Inch, Exst Undefined)		
			Existing Water Appurtenance		
			Sprinkler Head (Exst, Ppsd)		
			Fire Hydrant (Exst, Ppsd)		
			Cleanout (Exst Sanitary, Underdrain)		
			Existing Catch Basin Inlet (Round, Square)		
			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)		
					Existing Utility Marker
					Existing Meter
					Existing Fuel Dispensers
					Existing Fuel Filler Pipes
					Existing Fuel Leak Sensors

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

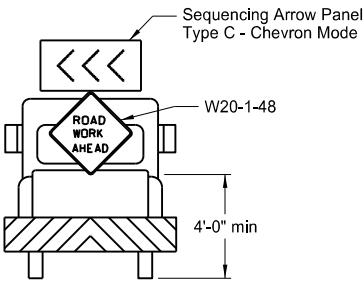
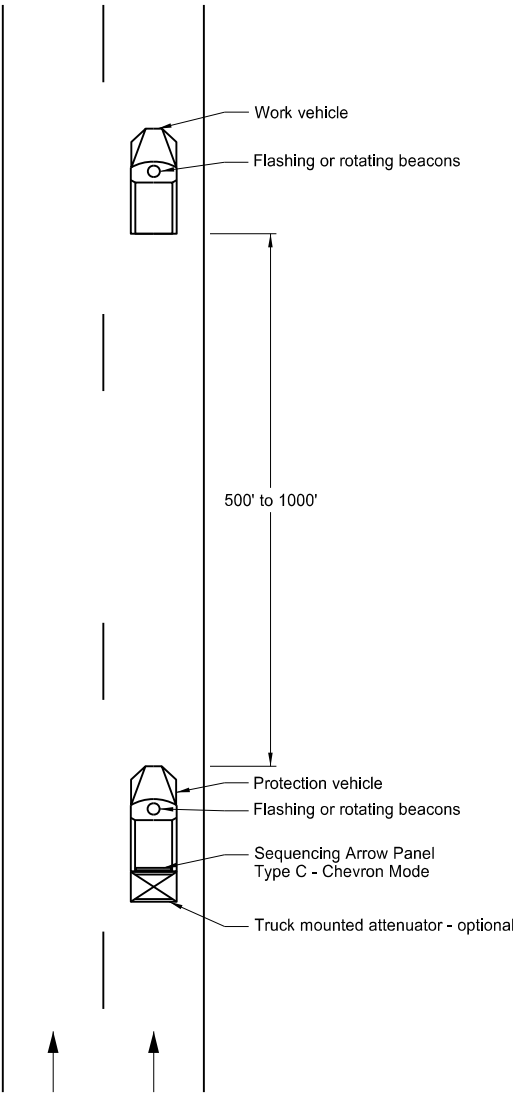
12 18 2020

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

This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on 10/03/19 and the original document is stored at the
North Dakota Department
of Transportation

SIGN NUMBER	G20-10-108
WIDTH x HEIGHT	9'-0" x 4'-0"
BORDER WIDTH	1.25" (inset 0.75")
CORNER RADIUS	3"
MOUNTING	Ground
BACKGROUND	TYPE: IV Reflective
	COLOR: Fluorescent Orange
LEGEND/BORDER	TYPE: Non-Refl
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE
	42.1	6.2	24	4	0

STATION(S):

AREA: 36.0 Sq.Ft.

Dimensions are in inches.tenthsLetter locations are panel edge to lower left corner

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

- Notes:
- 1. Post mount sign a distance of ½A following the End Road Work (G20-2-48) sign (maximum 2 signs per project.)
 - 2. Use sign on rural projects with a 30 day or longer duration (not required on seal coats or other short duration projects.)
 - 3. Do not place sign in urban areas or within city limits.

Advance Warning Sign Spacing (A)			
Road Type	Distance between signs min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 75 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE
7-18-14 9-27-17 8-30-18 10-03-19	Revise sheeting to type IV. Updated to active voice. Updated sign number in note 1. New Design Engineer PE Stamp.

This document was originally issued and sealed by

Kirk J Hoff,

Registration Number

PE- 4683,

on 10/03/19 and the original document is stored at the North Dakota Department of Transportation

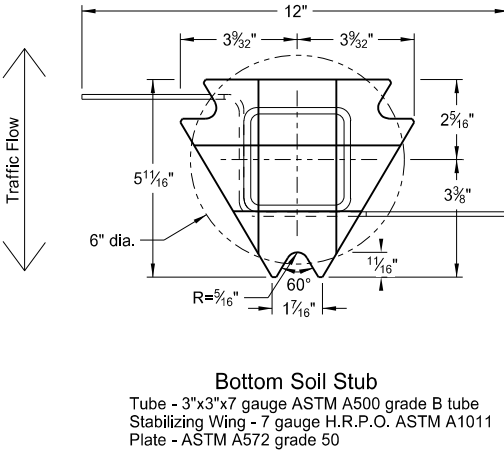
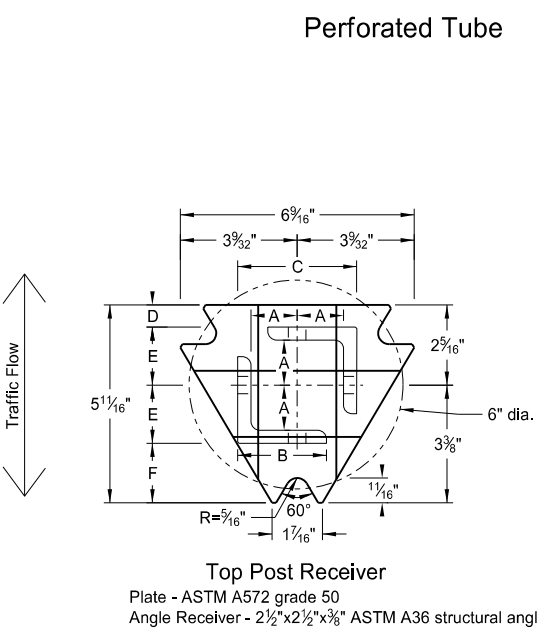
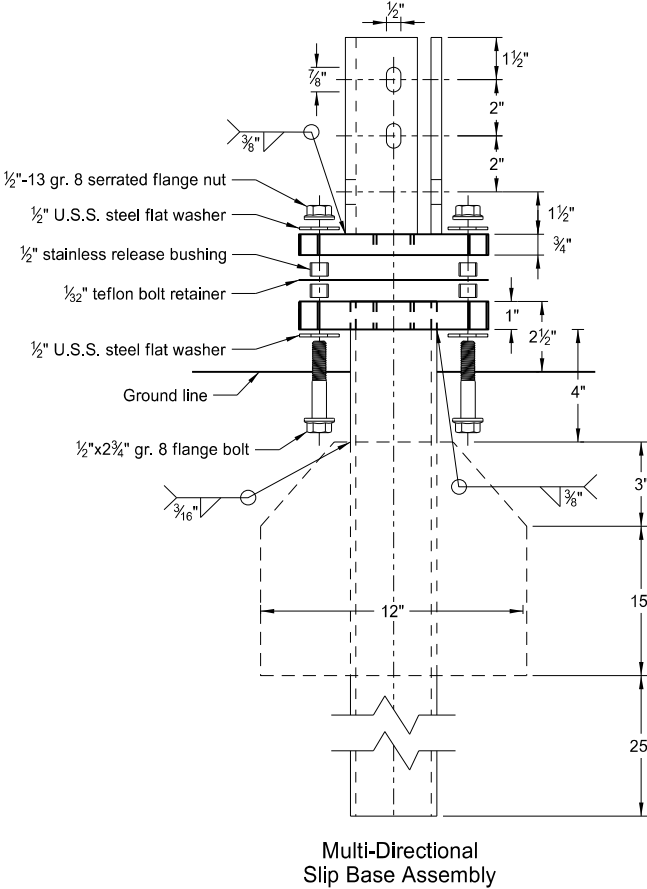
(A)	
FUNDING SOURCE MESSAGE VARIATIONS	
FEDERAL	
STATE	
FEDERAL - STATE	
FEDERAL - LOCAL	
FEDERAL - STATE - LOCAL	
STATE - LOCAL	

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

12/08/21

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.

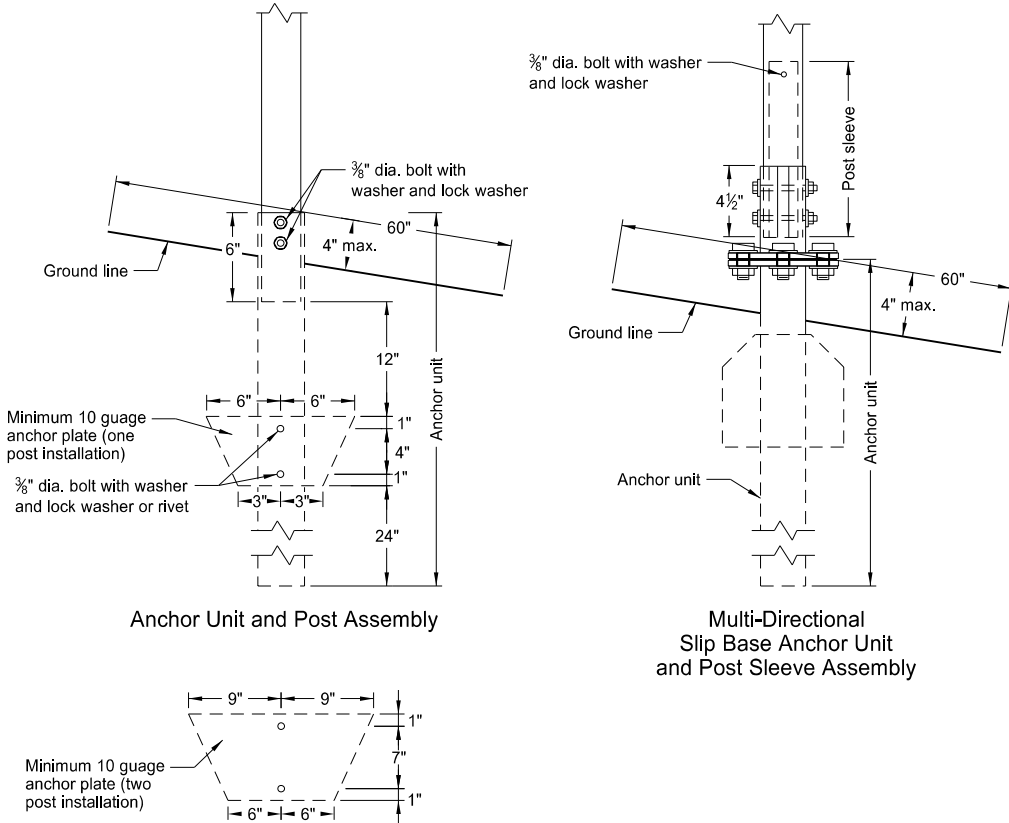


Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thick-ness Gauge	Sleeve Size in.	Wall Thick-ness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2 1/4
1	2 1/4	12			No	2 1/2
1	2 1/2	12			(A)	3
1	2 1/2	10			Yes	
1	2 1/4	12	2	12	Yes	
1	2 1/2	12	2 1/4	12	Yes	
2	2	12			No	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 3/8 x 2 3/8	0.135	10	3.432	0.605	0.841	0.590
2 1/2 x 2 1/2	0.105	12	3.141	0.804	0.803	0.643
2 1/2 x 2 1/2	0.135	10	4.006	0.979	1.010	0.785

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

- (A) Use breakaway base when support is placed in weak soils. Engineer determines if soils are weak.
- (B) For additional wind load, insert the 2 3/8"x10 ga. into 2 1/2"x10 ga.



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		This document was originally issued and sealed by Kirk J Hoff, Registration Number PE- 4683, on 10/03/19 and the original document is stored at the North Dakota Department of Transportation
2-28-14		
REVISIONS		
DATE	CHANGE	
9-27-17 10-03-19	Updated to active voice New Design Engr PE Stamp	

See Alt. A Note 4

Sign post

Grade 8 bolt, nut, and lock washer (see Alt. A Note 3)

Anchor unit

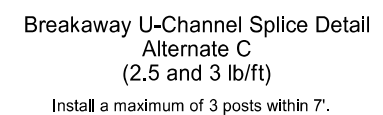
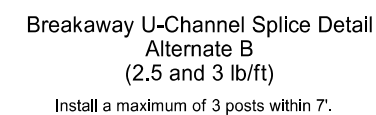
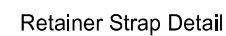
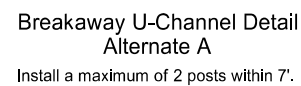
Grade 8 bolt, nut, and lock washer (see Alt. A Note 3)

See Alt. A Note 1c

Retainer strap (see Alt. A Note 1b)

Anchor unit

Detail A

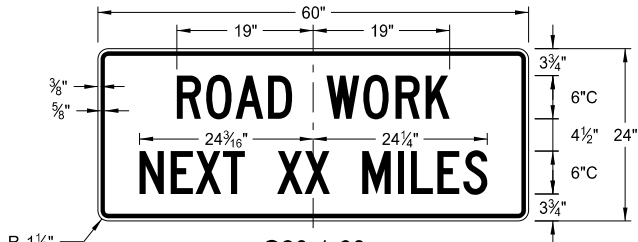


1.
 - a) Drive anchor unit to within 12" of ground level.
 - b) Establish proper assembly by lining up bottom hole of retainer strap with 6th hole from the top of the anchor unit.
 - c) Assemble strap to back of anchor unit using $\frac{5}{16}$ "x2" bolt, lock washer and nut.
 - d) Rotate strap 90° to left.
2.
 - a) Drive anchor unit to 4" above ground.
 - b) Rotate strap to vertical position.
3.
 - a) Place $\frac{5}{16}$ "x2" bolt, lock washer and nut in bottom of sign post to facilitate alignment of sign post with proper hole in anchor unit.
 - b) Alternately tighten two connector bolts.
4. Complete assembly by tightening $\frac{5}{16}$ "x2" bolt (this fastens sign post to retainer strap).
5. 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.

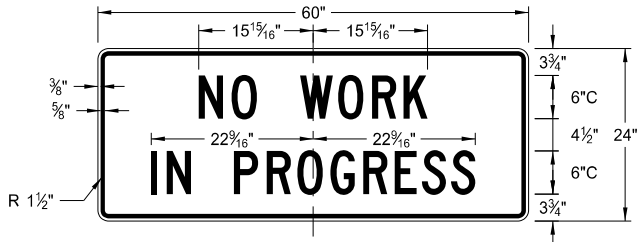
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CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS

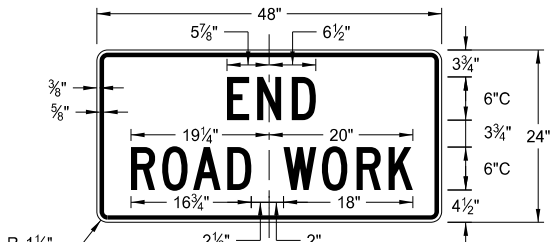
D-704-9



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



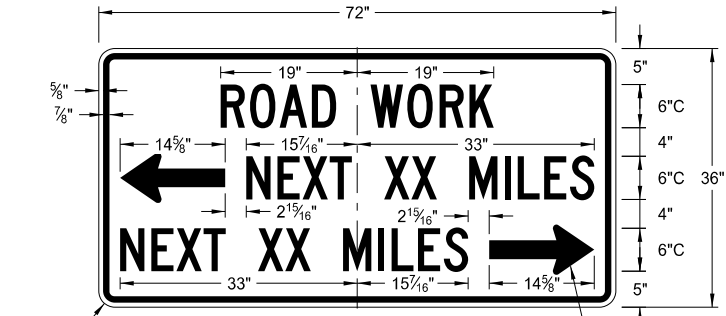
G20-1b-60
Legend: black (non-refl)
Background: orange



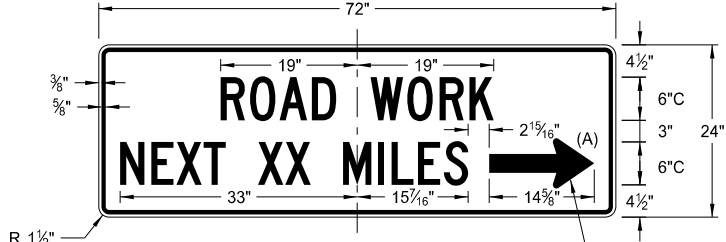
G20-2-48
Legend: black (non-refl)
Background: orange



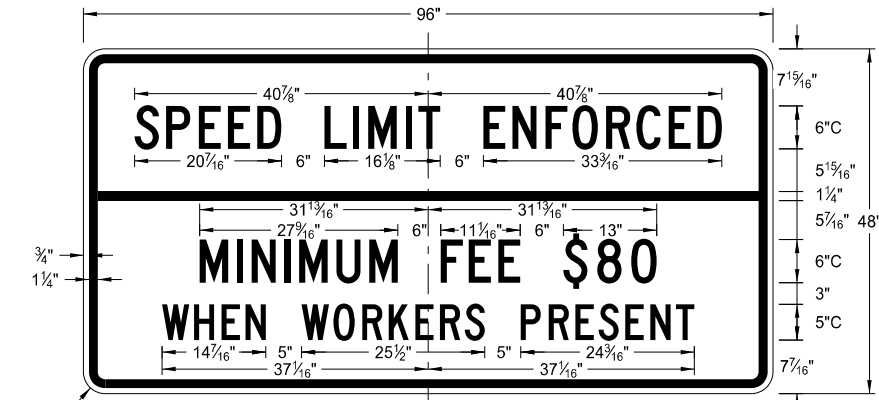
G20-4b-36
Legend: black (non-refl)
Background: orange



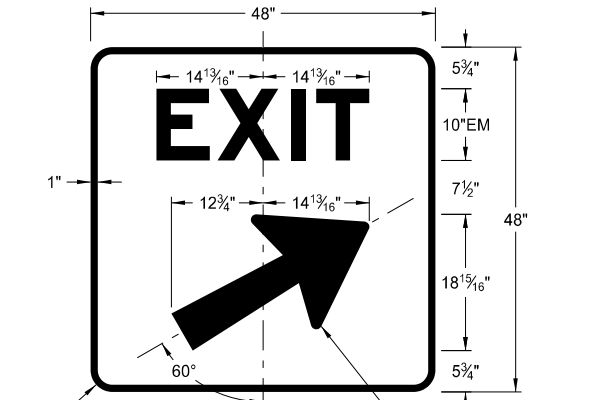
G20-50a-72
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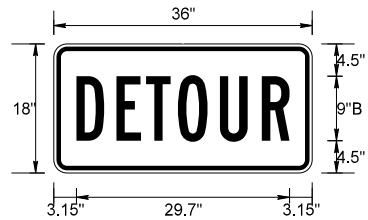
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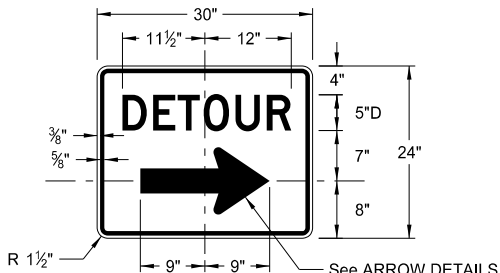
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Background: orange



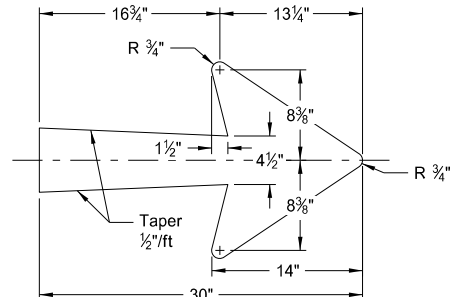
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



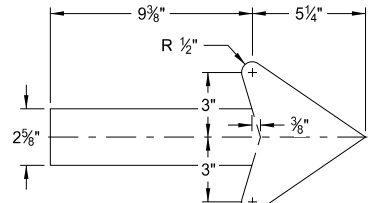
M4-8-36
Legend: black (non-refl)
Background: orange



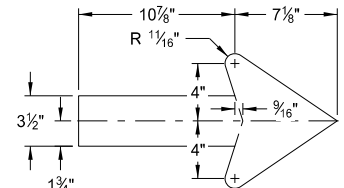
M4-9(L or R)-30 &
M4-9-30
Legend: black (non-refl)
Background: orange



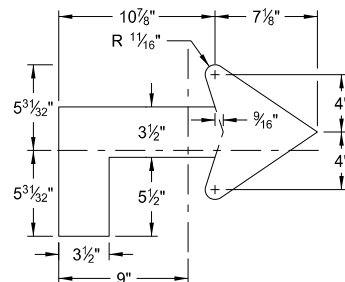
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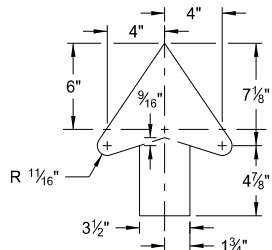
G20-50a-72
G20-52a-72



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



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



M4-9-30
Straight

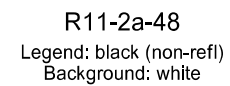
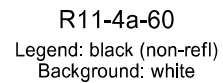
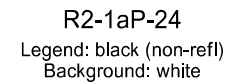
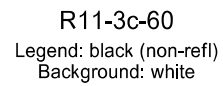
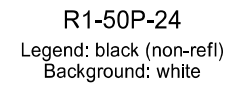
ARROW DETAILS

NOTES:

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

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

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Registration Number
PE- 4683,
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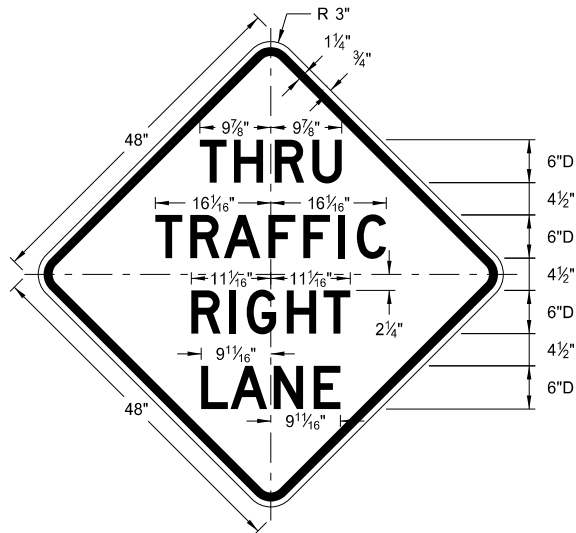


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17 10-03-19	Revised sign number New Design Engineer PE Stamp

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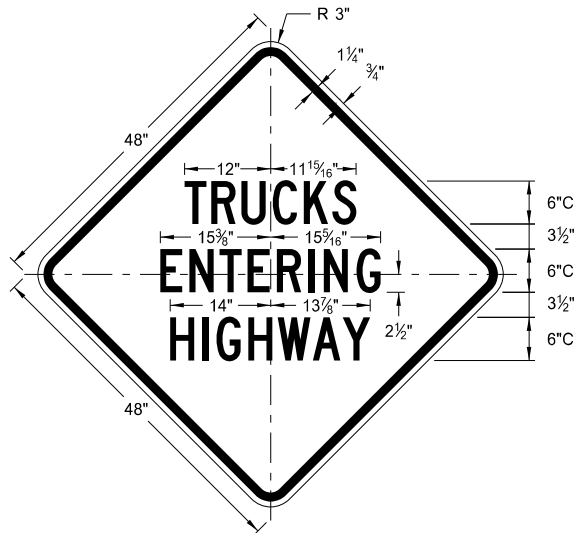
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

D-704-11



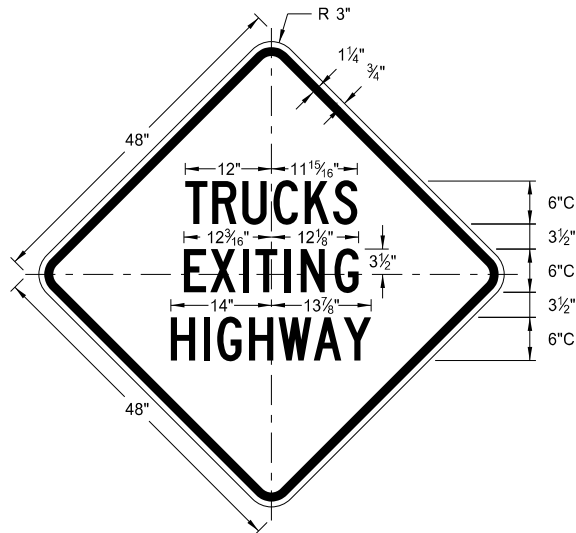
W5-8-48

Legend: black (non-refl)
Background: orange



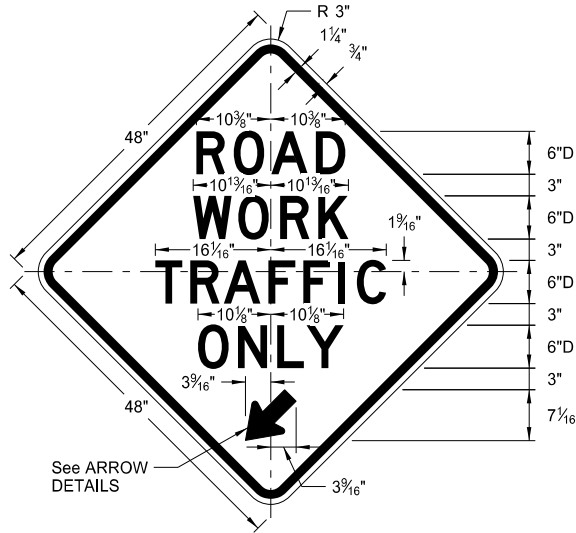
W8-53-48

Legend: black (non-refl)
Background: orange



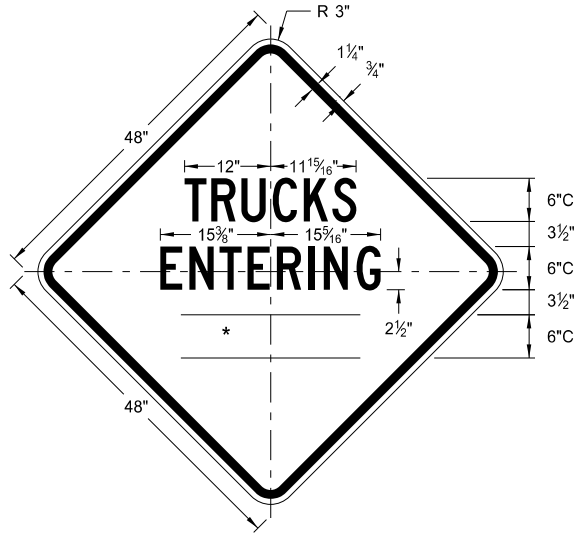
W8-56-48

Legend: black (non-refl)
Background: orange



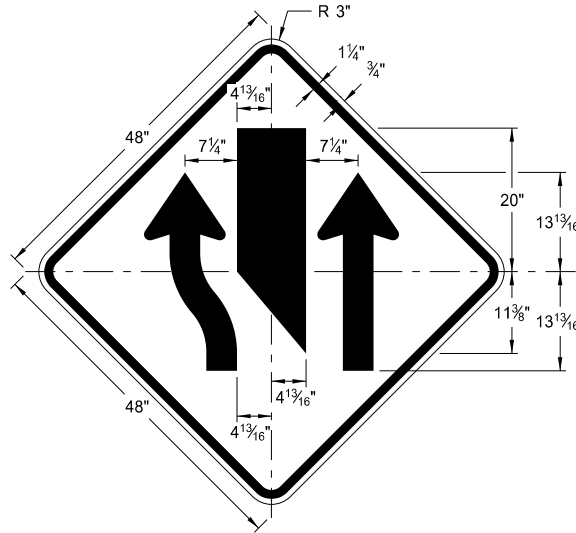
W5-9-48

Legend: black (non-refl)
Background: orange



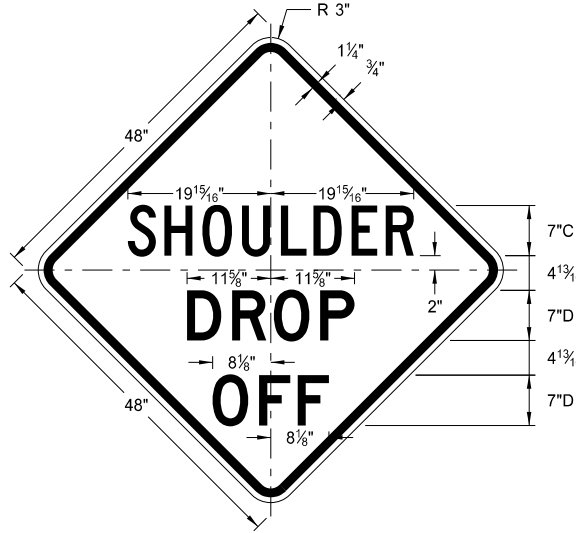
W8-54-48

Legend: black (non-refl)
Background: orange



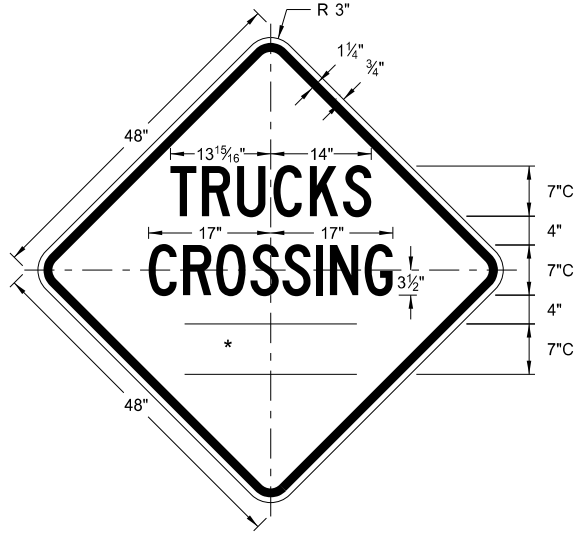
W9-3a-48

Legend: black (non-refl)
Background: orange



W8-9a-48

Legend: black (non-refl)
Background: orange

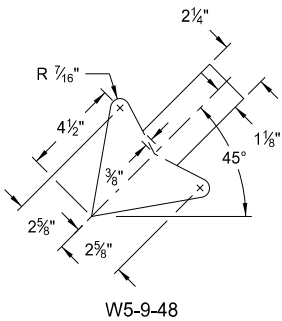


W8-55-48

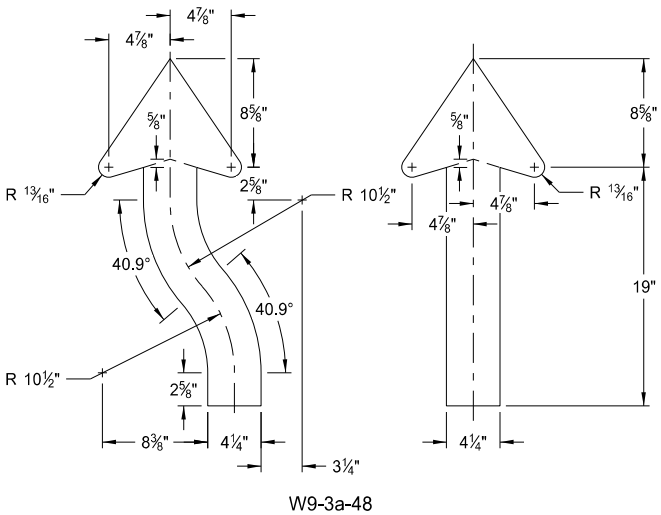
Legend: black (non-refl)
Background: orange

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

* DISTANCE MESSAGES



W5-9-48



W9-3a-48

ARROW DETAILS

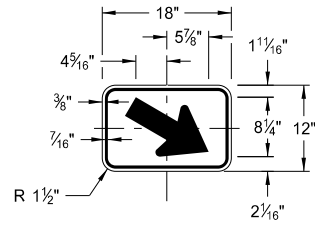
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated sign number
5-31-18	Revised sign and arrow details
10-03-19	New Design Engineer PE Stamp

This document was originally
issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on 10/03/19 and the original
document is stored at the
North Dakota Department
of Transportation

CONSTRUCTION SIGN DETAILS
WARNING SIGNS

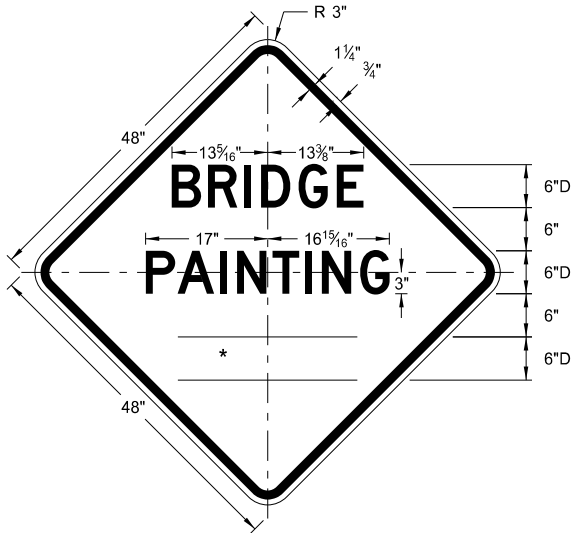
WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
½ MILE	Reduce 50%
1 MILE	Standard

* DISTANCE MESSAGES



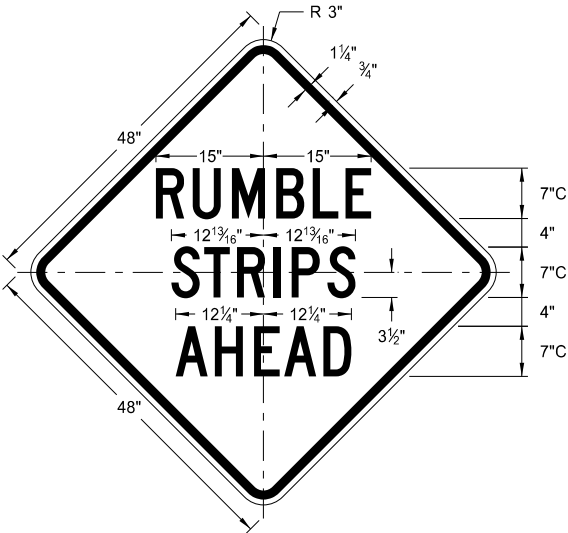
W16-7aP-18

Legend: black (non-refl)
Background: orange



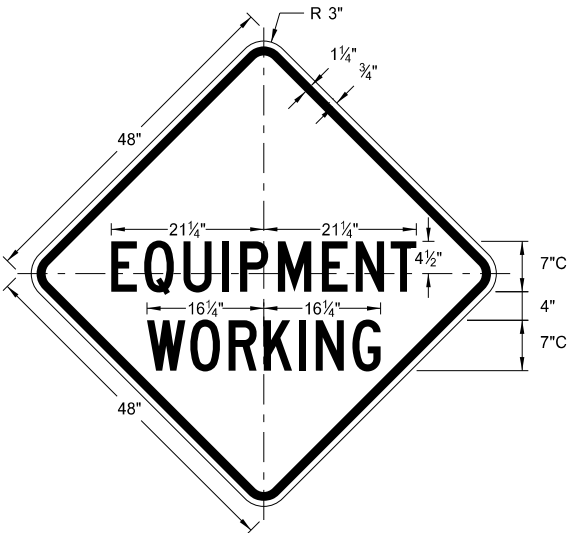
W21-50-48

Legend: black (non-refl)
Background: orange



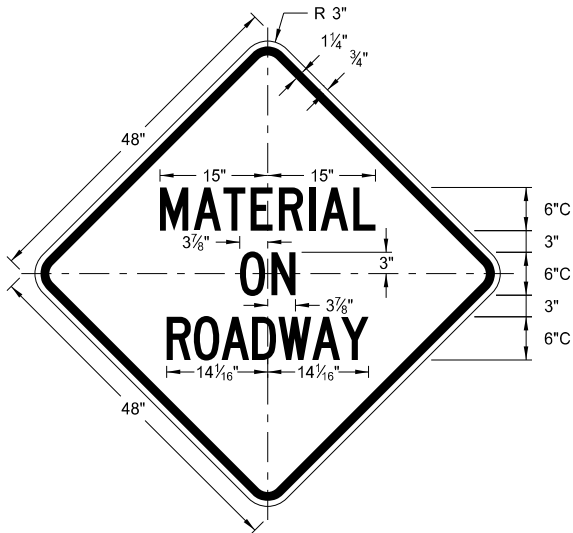
W21-53-48

Legend: black (non-refl)
Background: orange



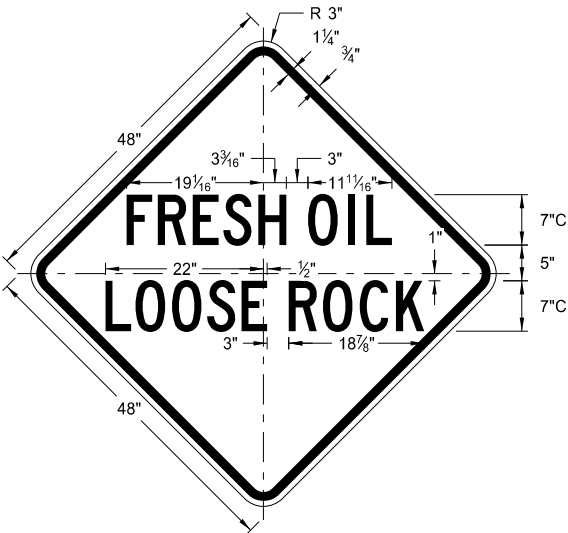
W20-51-48

Legend: black (non-refl)
Background: orange



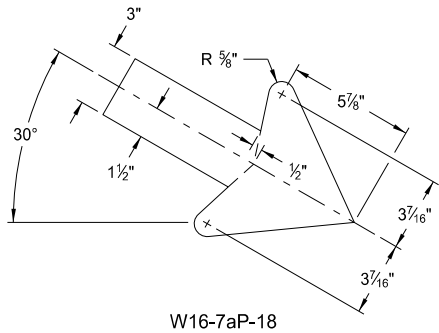
W21-51-48

Legend: black (non-refl)
Background: orange

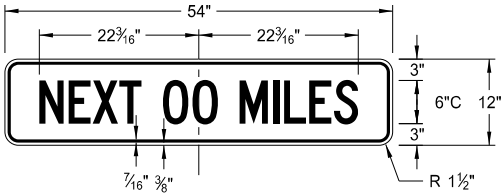


W22-8-48

Legend: black (non-refl)
Background: orange

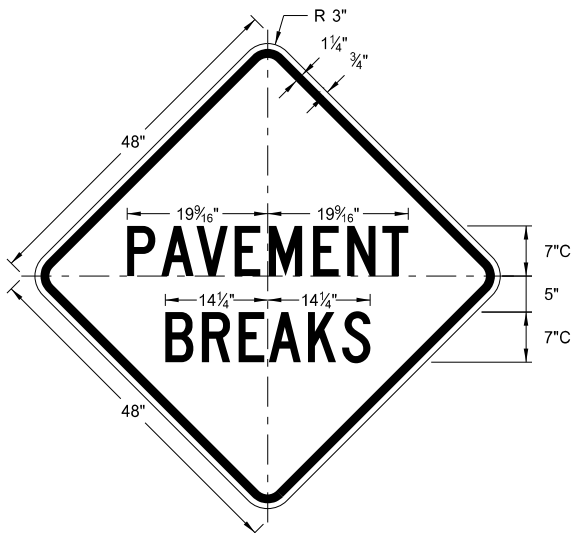


W16-7aP-18



W20-52P-54

Legend: black (non-refl)
Background: orange

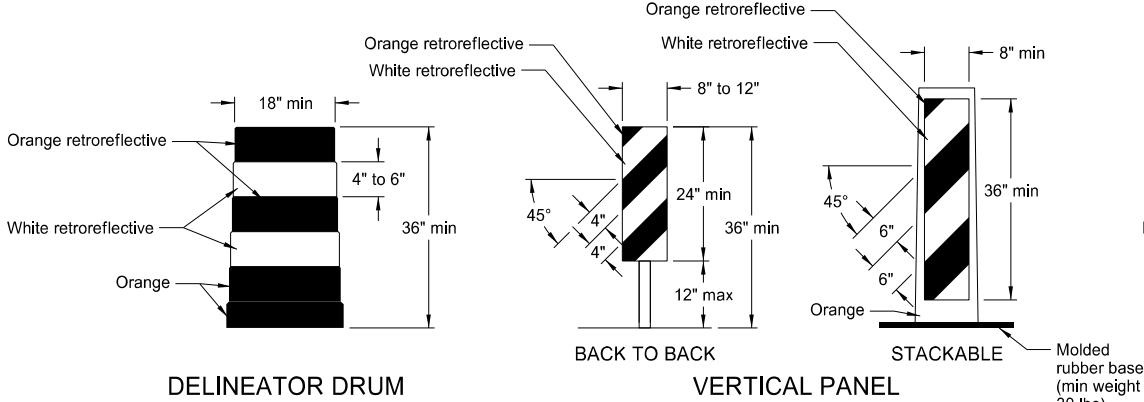


W21-52-48

Legend: black (non-refl)
Background: orange

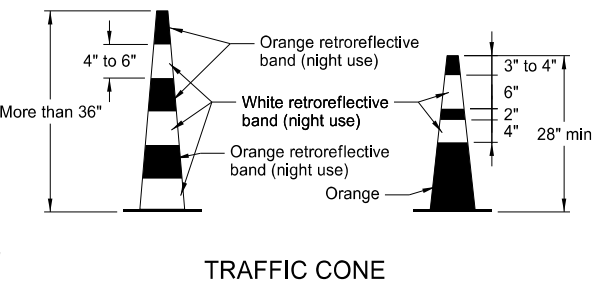
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		This document was originally issued and sealed by Kirk J Hoff, Registration Number PE- 4683, on 11/1/19 and the original document is stored at the North Dakota Department of Transportation
5-31-18		
REVISIONS		
DATE	CHANGE	
11-01-19	Added details for sign W16-7aP-18.	

BARRICADE AND CHANNELIZING DEVICE DETAILS

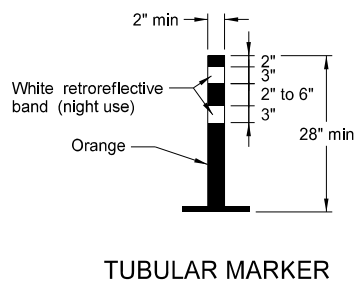


Provide horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide for drum markings. Use a minimum of two orange and two white stripes with the top stripe being orange for each drum. Do not exceed 3" nonretroreflectorized spaces between the horizontal orange and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

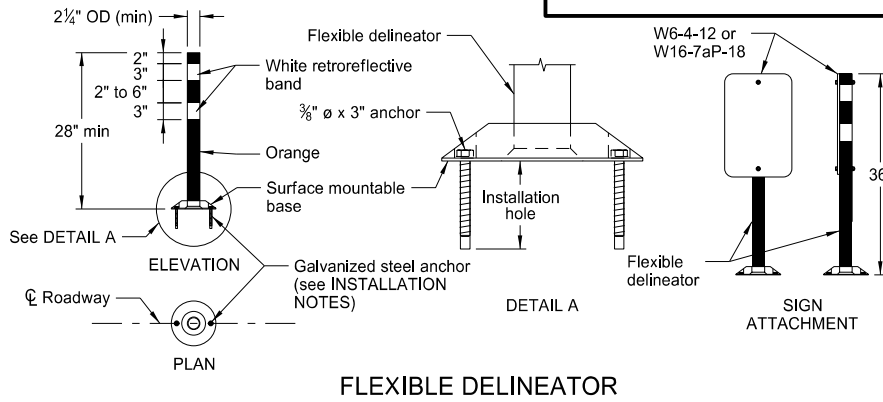
Provide alternating orange and white retroreflective stripes, sloping downward in direction vehicular traffic is to pass. Place retroreflective sheeting on both sides of panel with a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective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



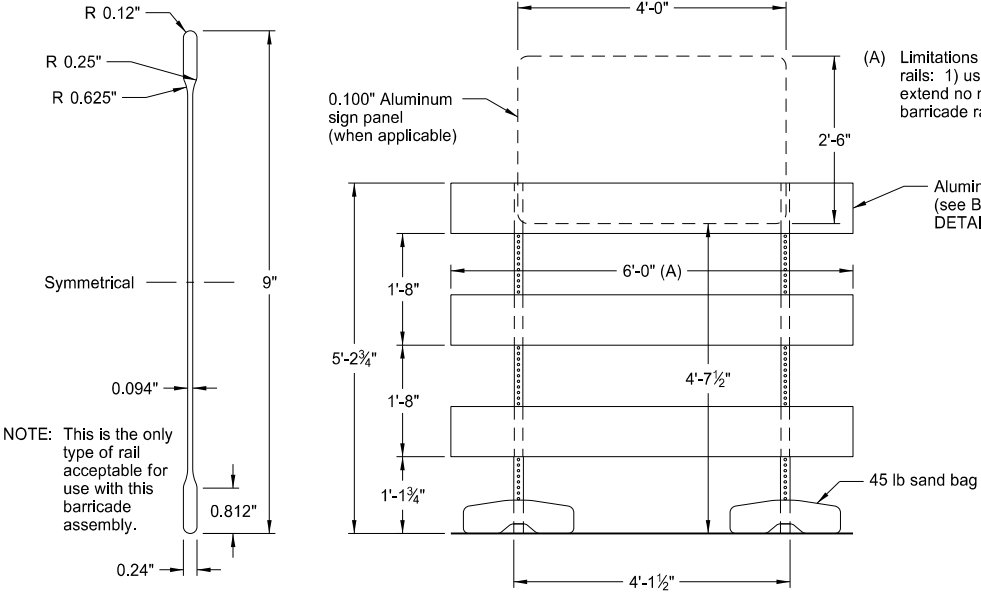
Provide retroreflectorization of cones more than 36" in height by alternating orange and white retroreflective stripes. Use a minimum of two orange and two white stripes for each cone with the top stripe being orange. Use maximum 3" nonretroreflectorized space between the orange and white stripes.



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



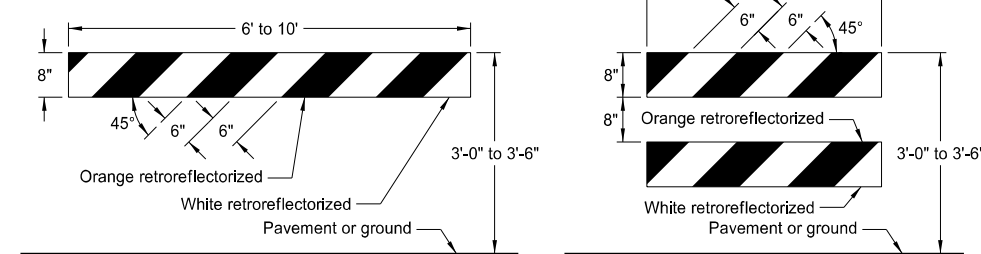
- INSTALLATION NOTES:
1. Drill installation holes to diameter and depth required by manufacturer's specifications.
 2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
 3. In lieu of bolted down base, use an 8" x 8" butyl pad or hot melt butyl.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



BARRICADE BLADE DETAIL

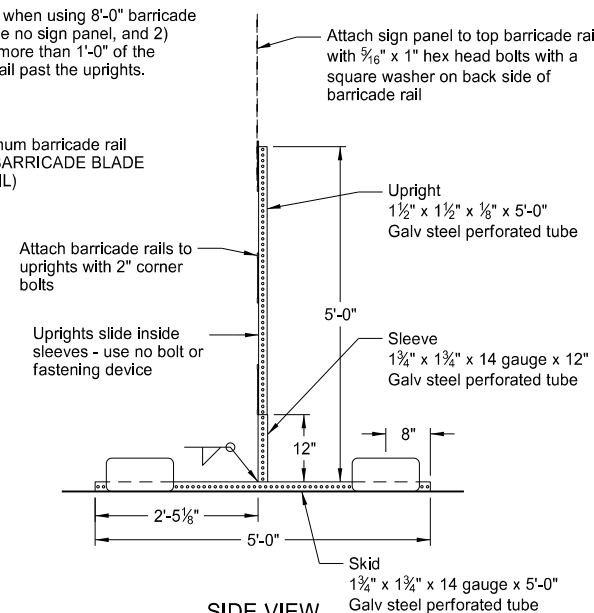
BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

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

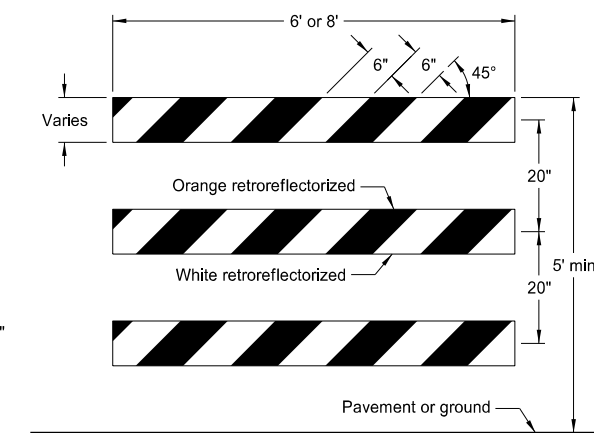


TYPE I BARRICADE

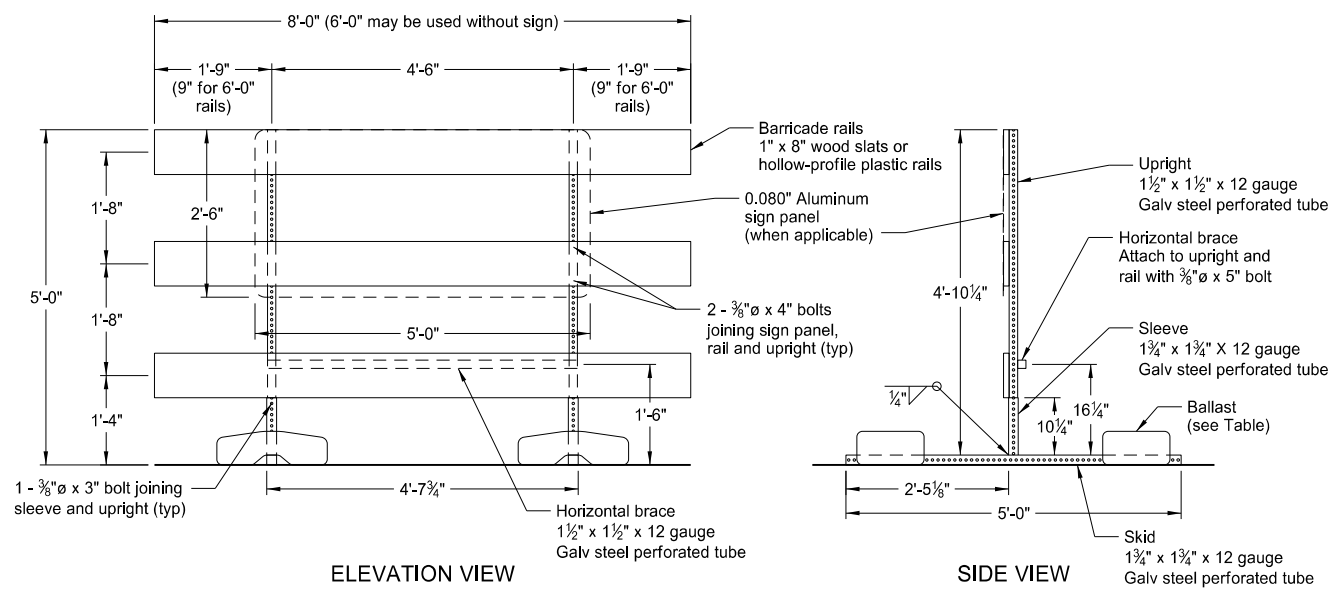
TYPE II BARRICADE
BARRICADE RAIL DETAILS



SIDE VIEW



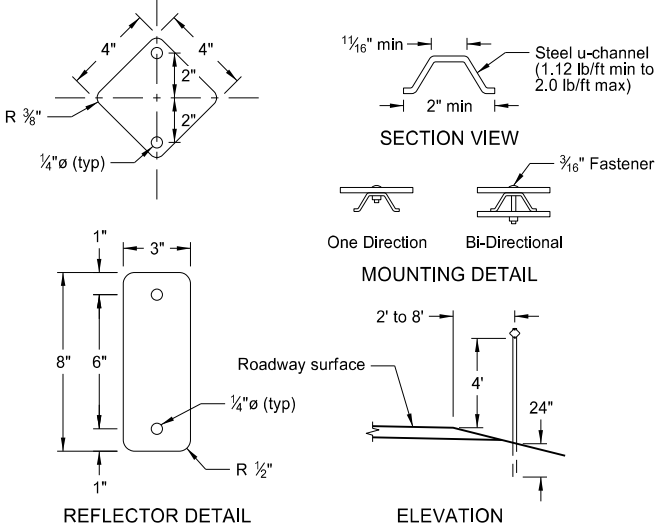
TYPE III BARRICADE



ELEVATION VIEW

BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

SIDE VIEW



REFLECTOR DETAIL

ELEVATION

DELINEATORS

MINIMUM BALLAST (For each side of barricade support)

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

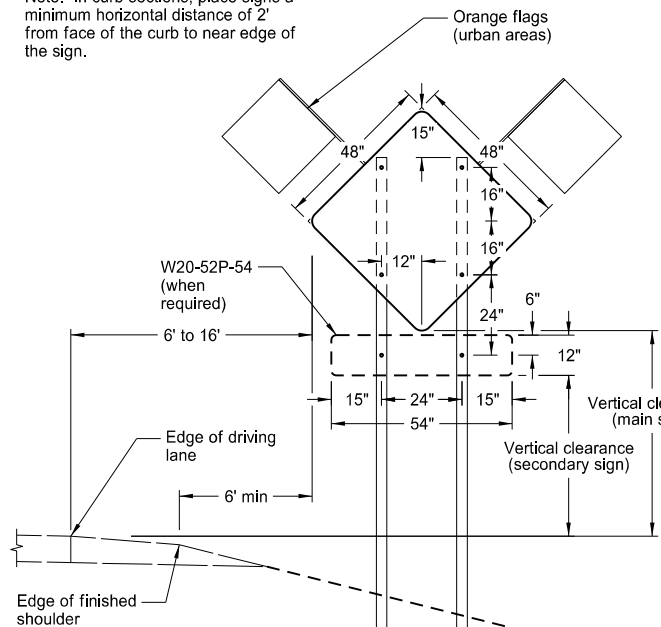
Note: Number of sandbags based on a wind speed of 55 MPH. Sandbags assumed to be placed at or near the ends of the skids.

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

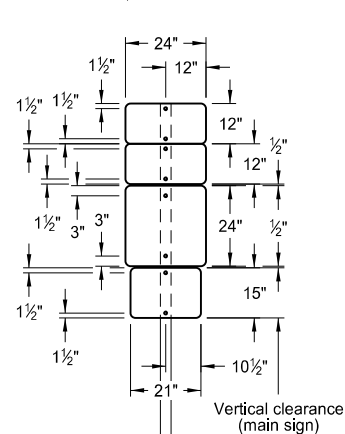
This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on 11/1/19 and the original document is stored at the North Dakota Department of Transportation

CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

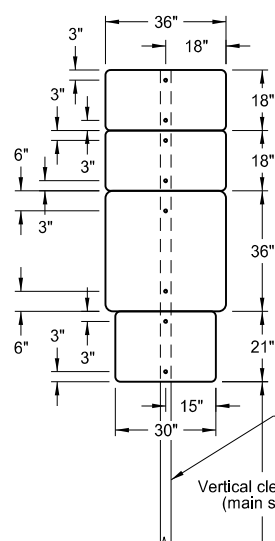
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



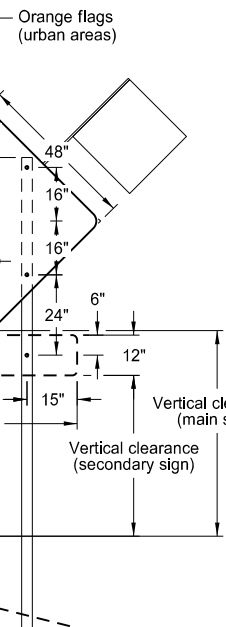
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



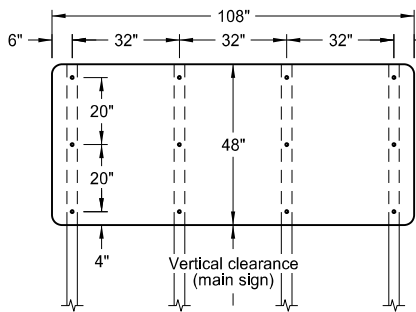
24" x 24"
ROUTE MARKER
ASSEMBLY



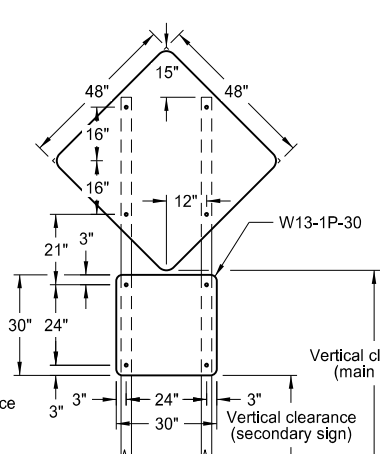
36" x 36"
ROUTE MARKER
ASSEMBLY



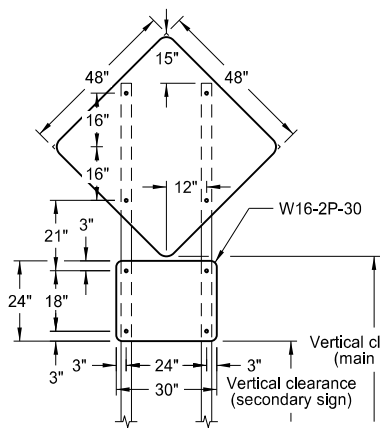
18" x 18"
DIAMOND SIGN



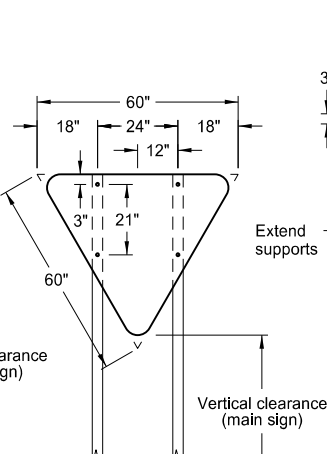
108" x 48" SIGN



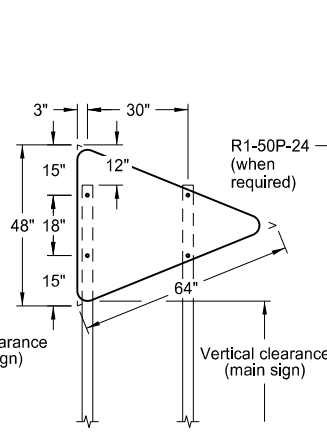
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



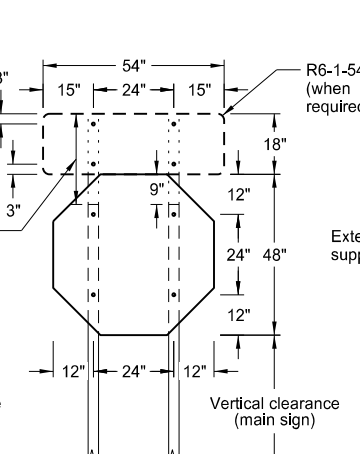
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



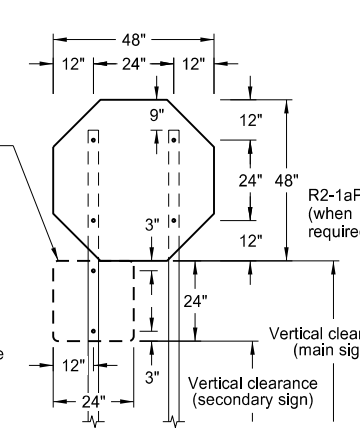
R1-2-60 - YIELD SIGN



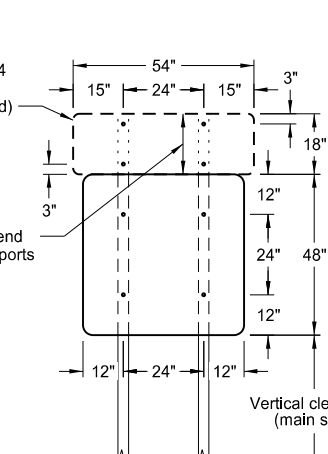
W14-3-64 - PENNANT SIGN



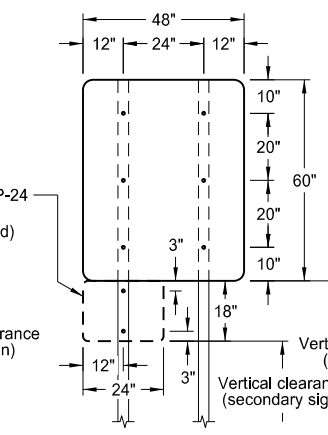
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



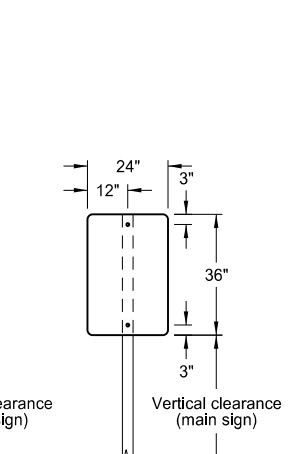
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



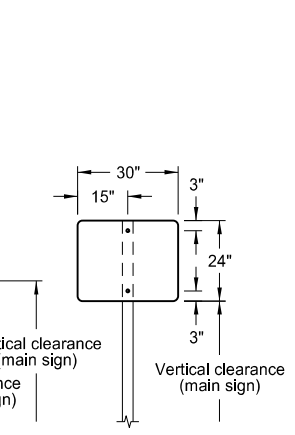
48" x 48" SIGN
(with R6-1-54 sign as required)



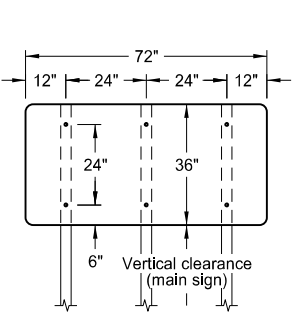
48" x 48" SIGN
(with R2-1aP-24 sign as required)



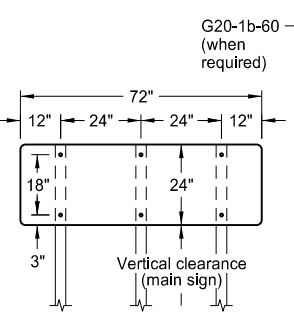
24" x 36" SIGN



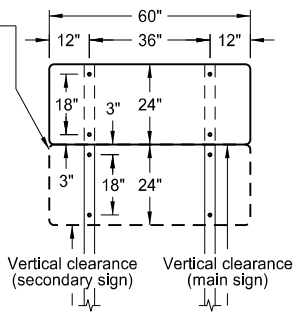
30" x 24" SIGN



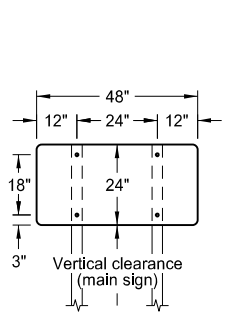
72" x 36" SIGN



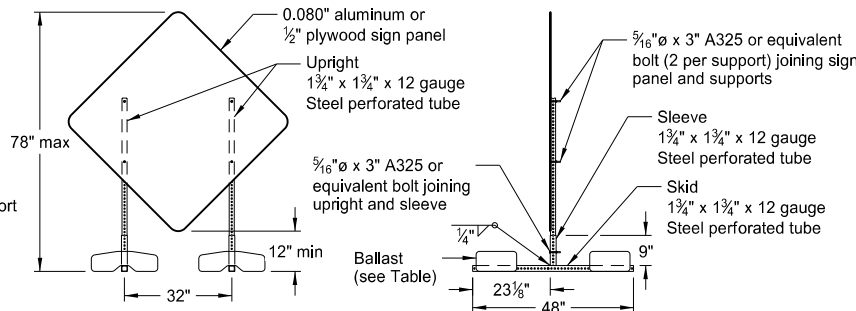
72" x 24" SIGN



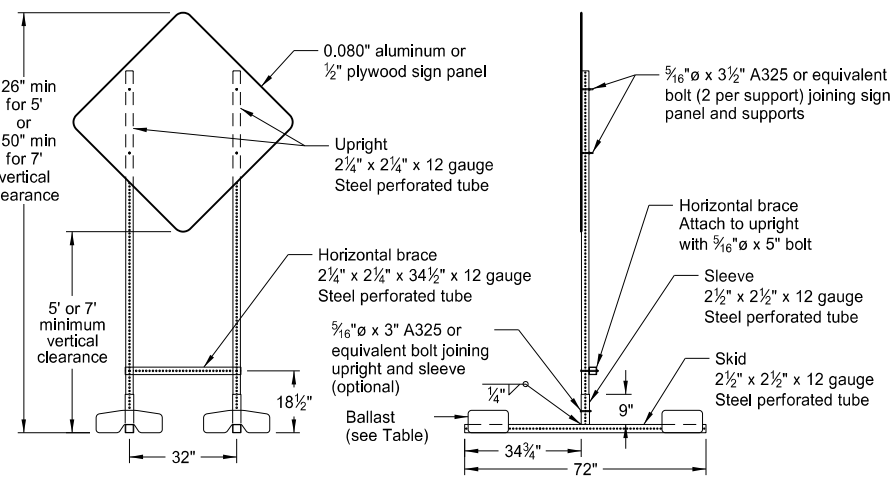
60" x 24" SIGN



48" x 24" SIGN



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

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

Place signs over 50 square feet on 2½" x 2½" 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, ½" plywood, or other approved material, except where noted. Punch all holes round for ⅝" bolts.
3. Alternate Messages: Install and remove alternate message signs on reflectorized plate (without borders) as required. (i.e. "Left" and "Right" message on lane closure sign)
4. Route Marker Auxiliary Signs: Provide route marker auxiliary signs, such as the cardinal direction and directional arrows, with a background and legend that match the route marker they are used with:

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

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

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

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

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

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

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

MINIMUM BALLAST
(For each side of sign support base)

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

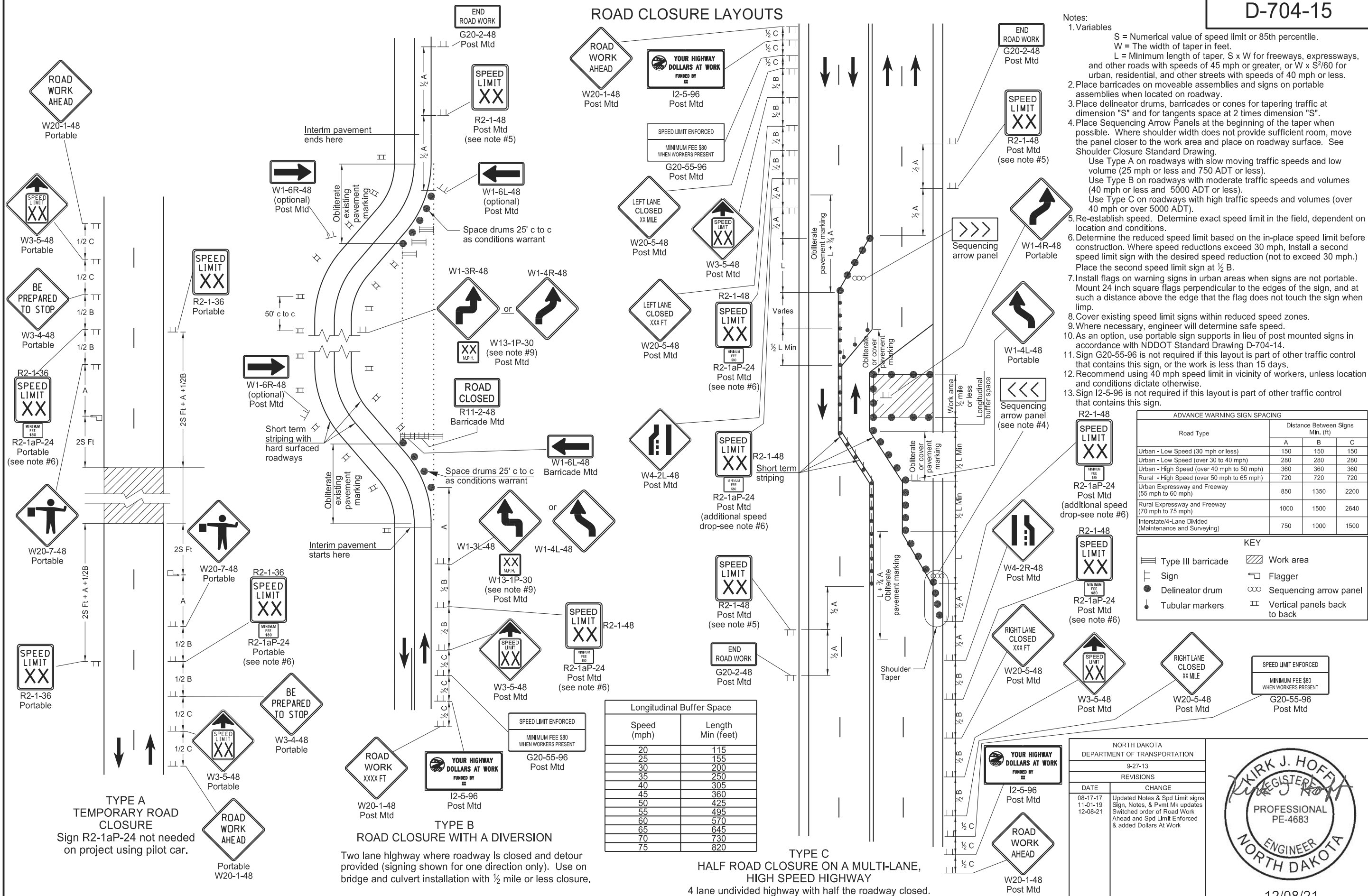
Note: The number of sandbags are based on a wind speed of 55 MPH. Place sandbags at or near the ends of skids.

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

This document was originally issued and sealed by

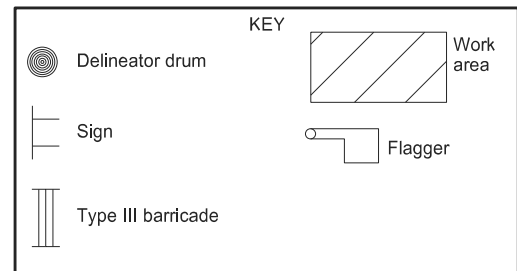
Kirk J Hoff,
Registration Number
PE-4683,
on 11/1/19 and the original document is stored at the North Dakota Department of Transportation

ROAD CLOSURE LAYOUTS



12/08/21

D-704-17



1. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
2. Remove existing striping as required. Use back to back delineators when inslope is 4:1 or flatter and roadway alignment is visible to approaching vehicles. Place back to back vertical panels when roadways have steep slopes and alignment is not visible to approaching traffic.
3. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
4. 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 ½B.
5. 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.
6. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
7. Cover existing speed limit signs within a reduced speed zone.
8. Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or if work is less than 15 days.
9. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.
10. Sign I2-5-96 is not required if this layout is part of other traffic control that contains this sign.

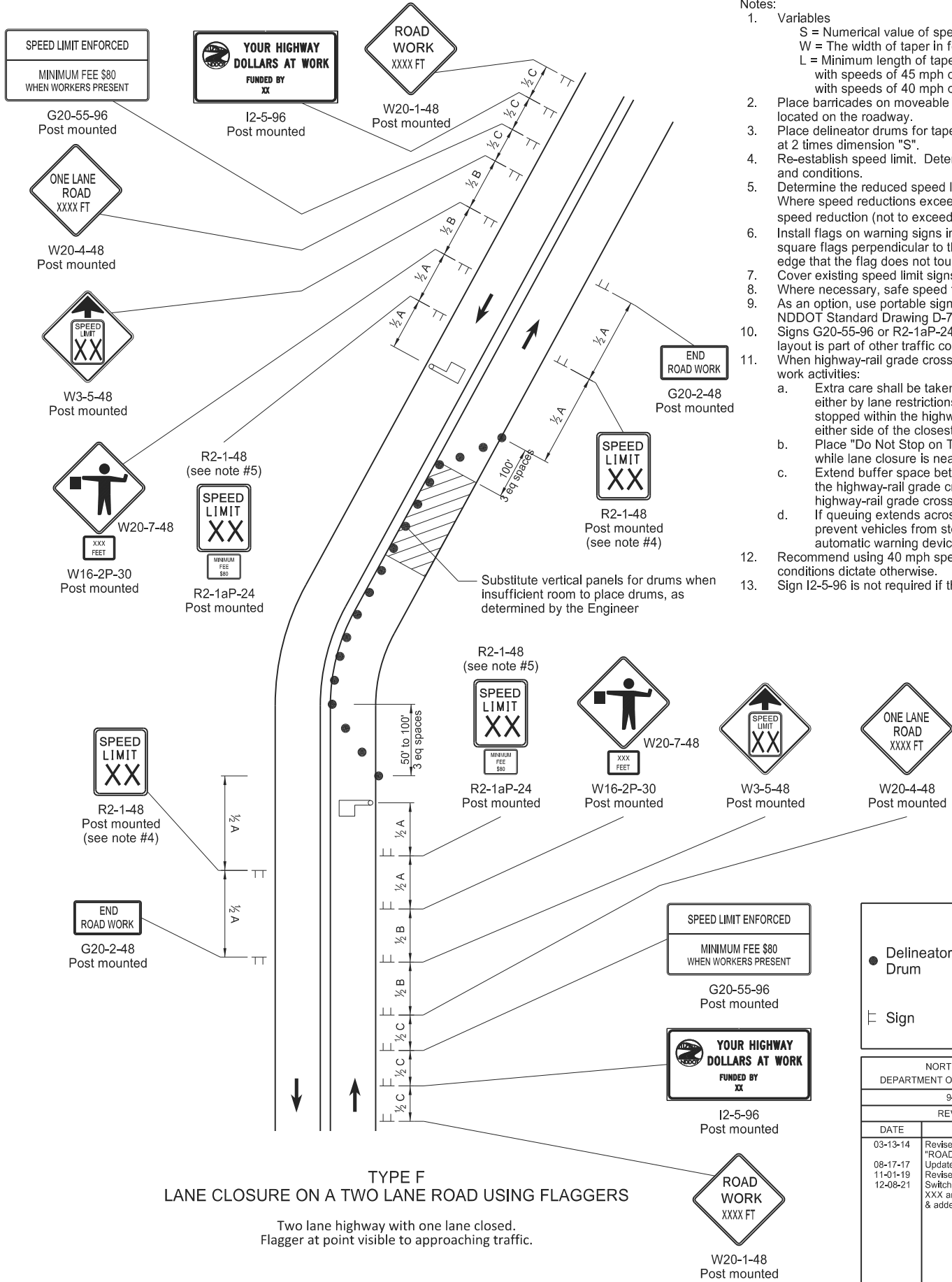
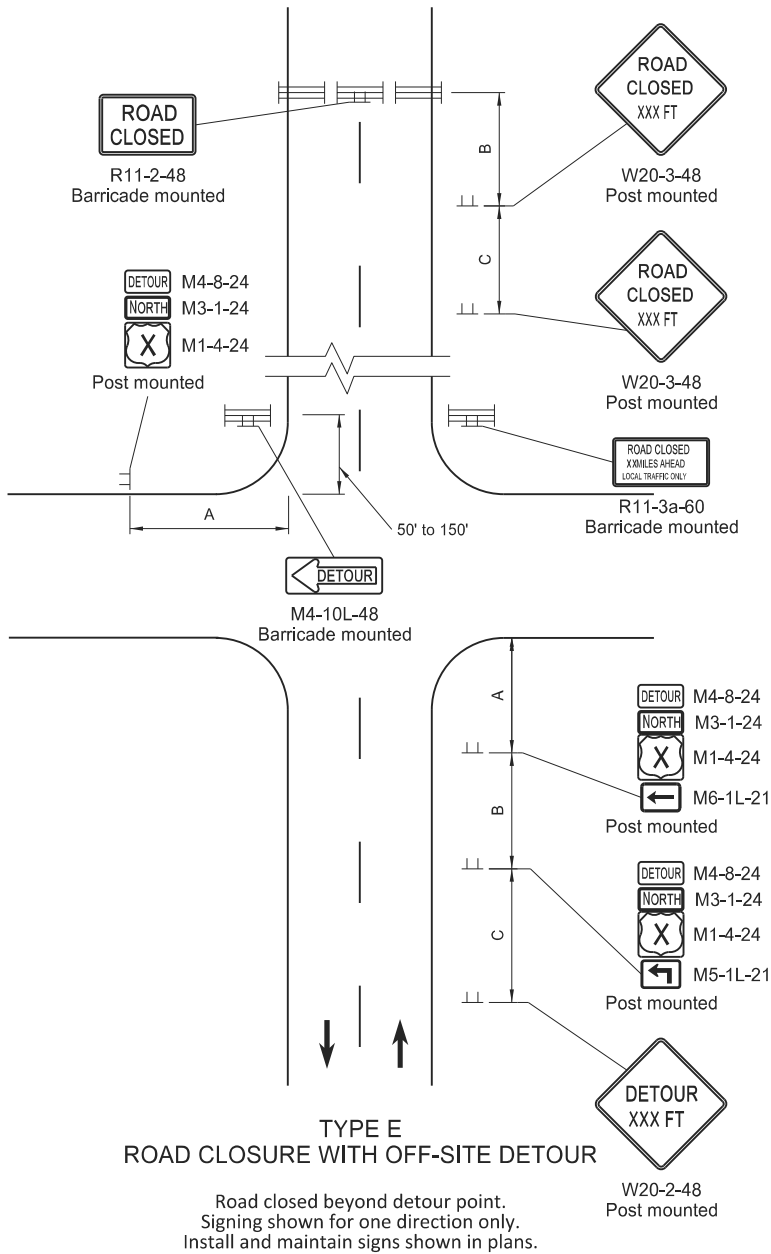
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Note update & sign numbers
11-01-19	Removed signs & revised note
12-08-21	Switched order of Road Work. XXXX and Spd Limit Enforced & added Dollars At Work

A circular professional engineer seal for the State of North Dakota. The outer ring contains the text "KIRK J. HOFF" at the top and "NORTH DAKOTA" at the bottom. Inside the ring, the word "REGISTERED" is at the top, "PROFESSIONAL" is in the middle, and "ENGINEER" is at the bottom. The license number "PE-4683" is centered below "PROFESSIONAL". A handwritten signature "Kirk J Hoff" is written across the seal.

12/08/21

D-704-19






ROAD CLOSURE AND LANE CLOSURE ON A TWO WAY ROAD LAYOUTS



- Notes:
1. Variables
 - S = Numerical value of speed limit or 85th percentile.
 - W = The width of taper in feet
 - L = Minimum length of taper in feet. $S \times W$ for freeways, expressways, and roads with speeds of 45 mph or greater, or $W \times S^2/60$ for urban, residential, and streets with speeds of 40 mph or less.
 2. Place barricades on moveable assemblies and signs on portable assemblies when located on the roadway.
 3. Place delineator drums for tapering traffic at 3 equal spaces and for tangents space them at 2 times dimension "S".
 4. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
 5. 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 second speed limit sign at $\frac{1}{2}B$.
 6. 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.
 7. Cover existing speed limit signs within a reduced speed zone.
 8. Where necessary, safe speed to be determined by the Engineer.
 9. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
 10. Signs G20-55-96 or R2-1aP-24 are not required when pilot car operation is used, if this layout is part of other traffic control that contains this sign, or if work is less than 15 days.
 11. When highway-rail grade crossings exist either within or in the vicinity of the roadway work activities:
 - a. Extra care shall be taken to minimize the probability of conditions being created, either by lane restrictions, flagging or other operations, where vehicles might be stopped within the highway-rail grade crossing (considered as being 15 feet on either side of the closest and farthest rail.)
 - b. Place "Do Not Stop on Tracks" sign (R8-8-24) near cross buck in each direction while lane closure is near tracks.
 - c. Extend buffer space between work zone and lane closure transition upstream of the highway-rail grade crossing to prevent flagging queue from extending across highway-rail grade crossing.
 - d. If queuing extends across highway-rail crossing, provide flagger at crossing to prevent vehicles from stopping within the crossing (even when automatic warning devices are in place.)
 12. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.
 13. Sign 12-5-96 is not required if this layout is part of other traffic control that contains this sign.

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

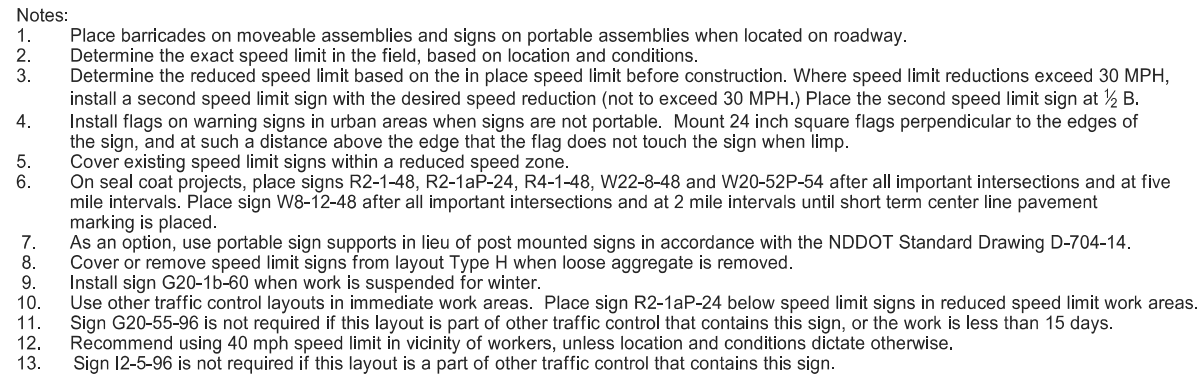
KEY

	Delineator Drum		Type III Barricade		Flagger
	Sign		Work/Hazard Area		

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
03-13-14	Revised Sign Cell "ROAD WORK XXX FT"
08-17-17	Update notes & sign numbers
11-01-19	Revised signs, sign #s, & notes
12-08-21	Switched order of Road Work XXX and Spd Limit Enforced & added Dollars At Work

12/08/21

D-704-20



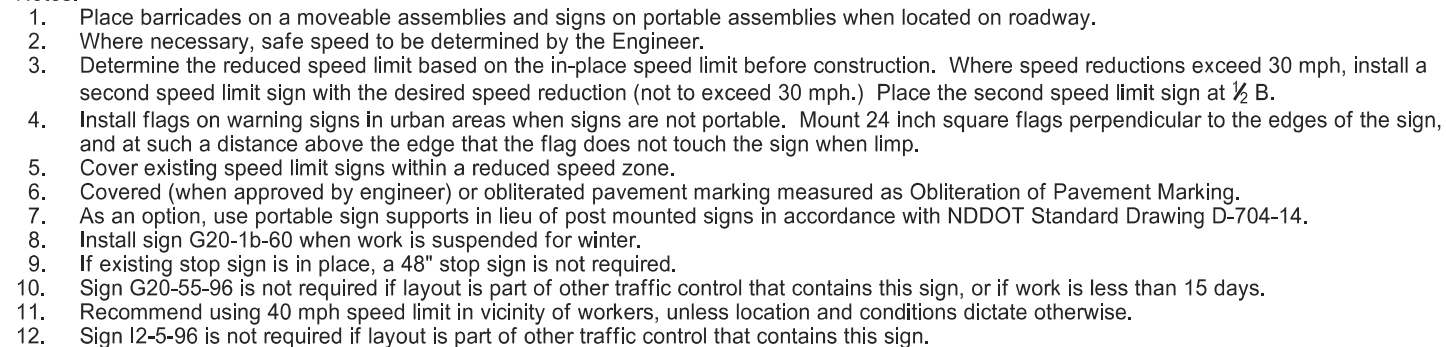
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
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



12/08/21

D-704-22



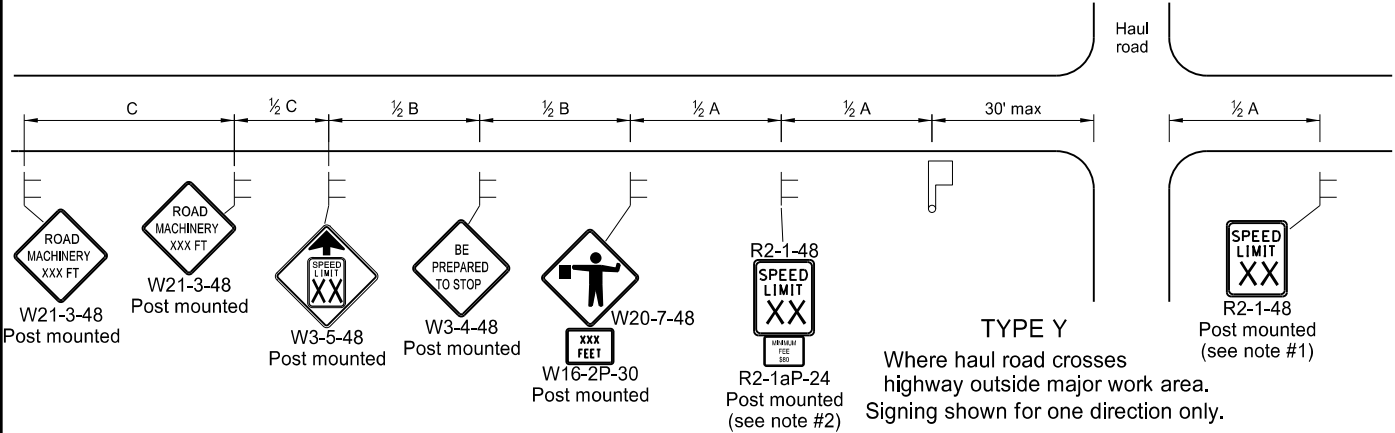
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway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

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

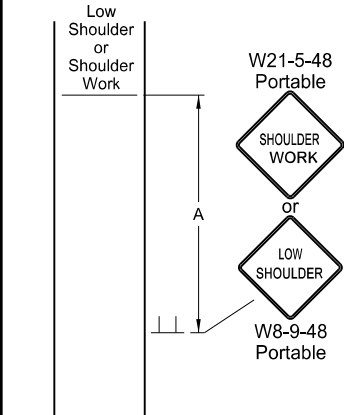
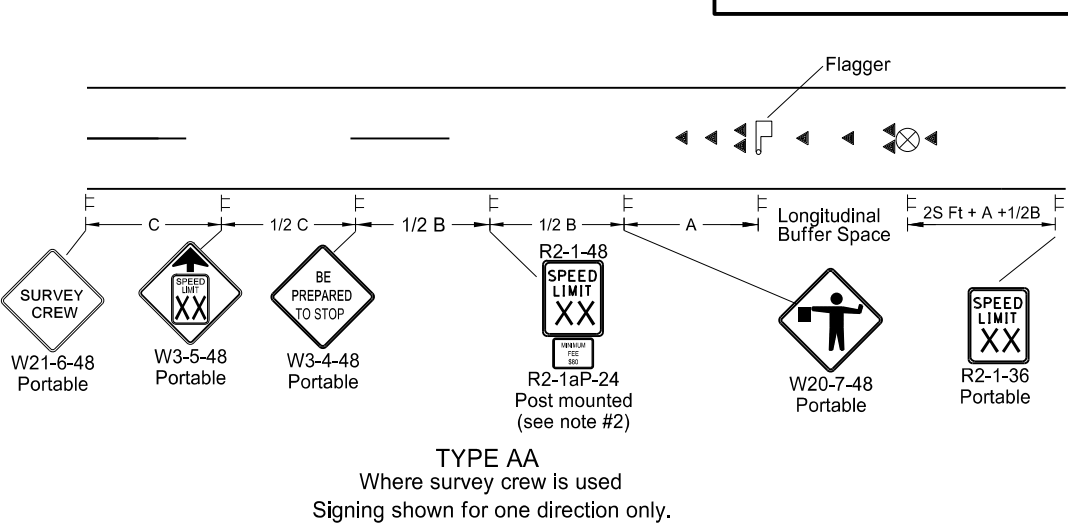
12/09/21

MISCELLANEOUS SIGN LAYOUTS

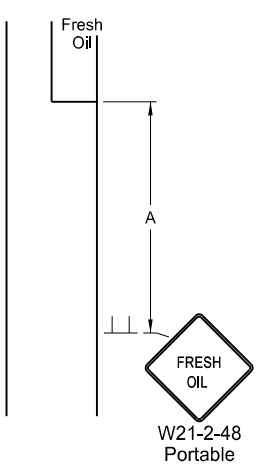
D-704-26



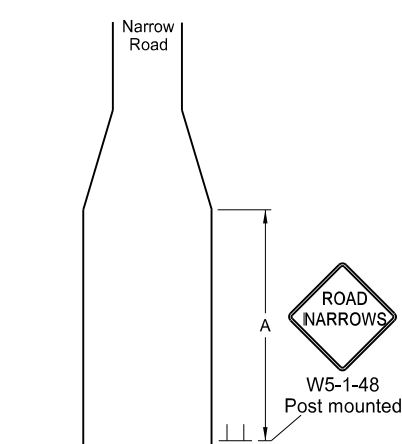
TYPE Z
Where speed zone is needed
Signing shown for one direction only.



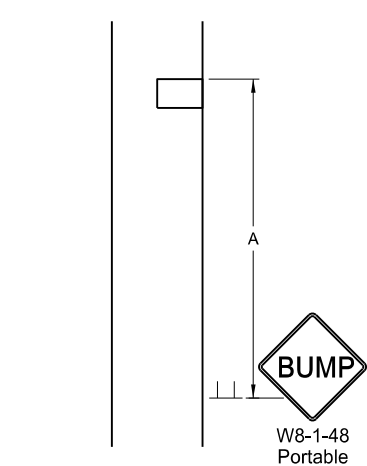
TYPE BB
Within major work area
where sign conditions exist



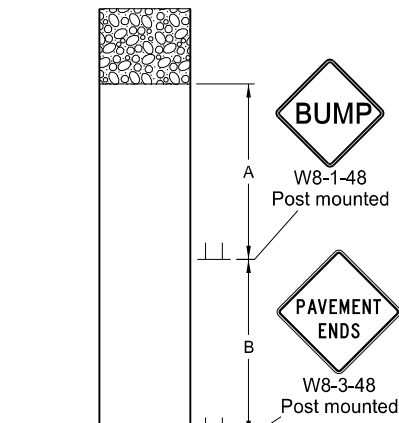
TYPE CC
Where sign conditions exist



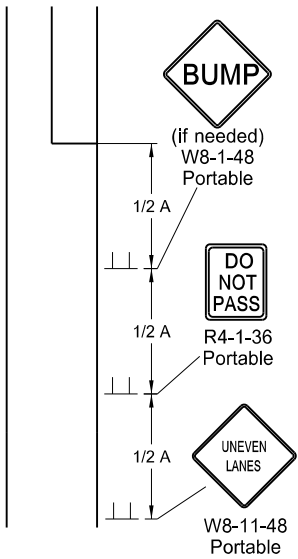
TYPE DD
Where sign conditions exist



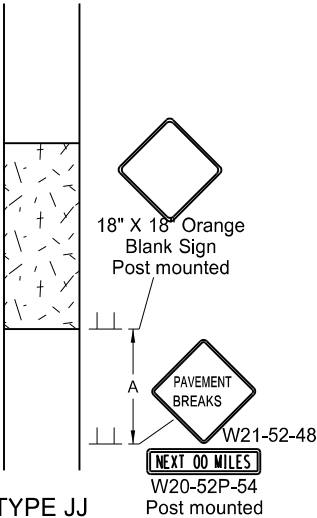
TYPE EE
Where sign conditions exist



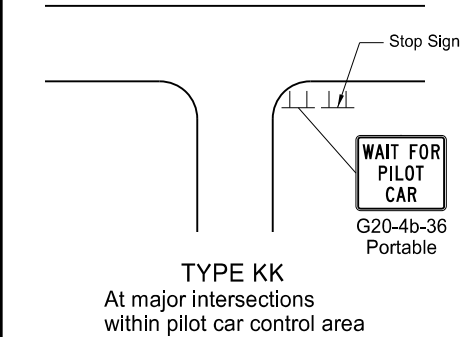
TYPE FF
Where sign conditions exist
Signing shown for one direction only.



TYPE GG
Where elevation difference
exists between lanes



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



TYPE KK
At major intersections
within pilot car control area

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

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

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

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

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

This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on 11/1/19 and the original document is stored at the North Dakota Department of Transportation

KEY

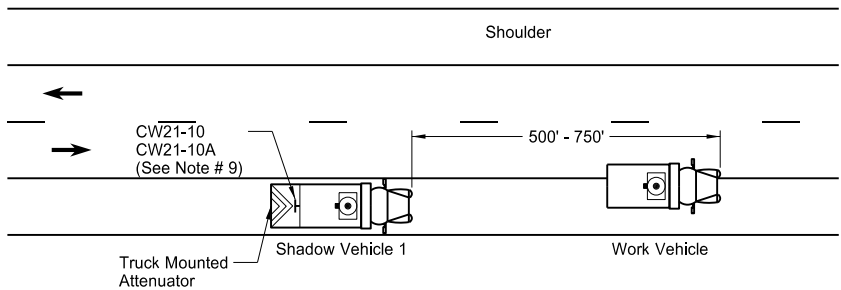
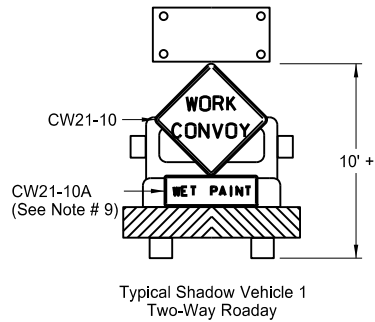
Flagger Sign

Cones Survey Equipment

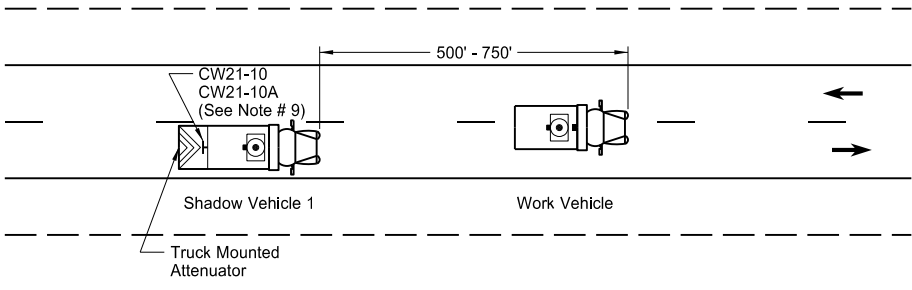
S = Numerical value of speed limit or 85th percentile.

MOBILE OPERATION
(PAVEMENT MARKING)

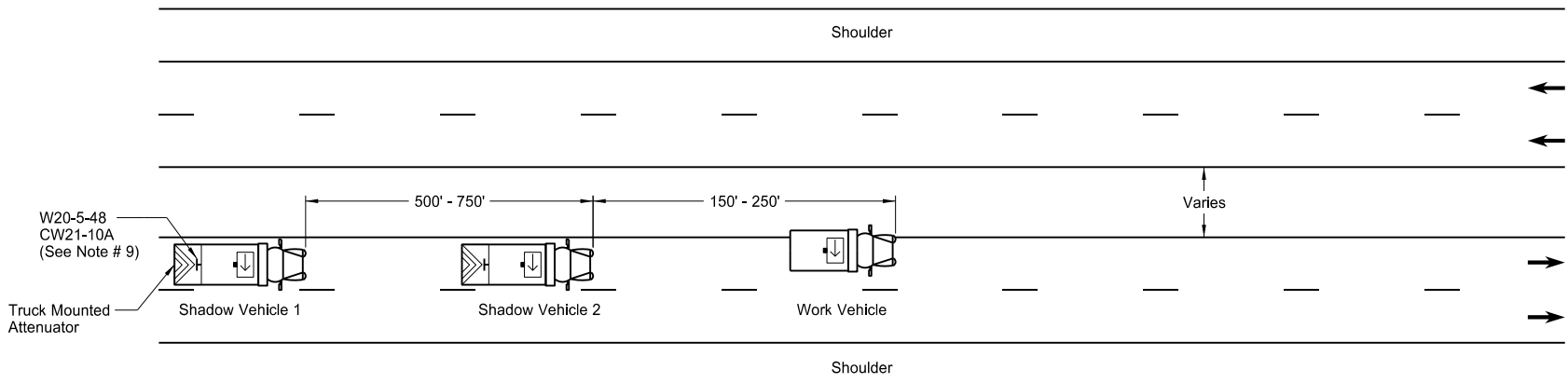
D-704-27



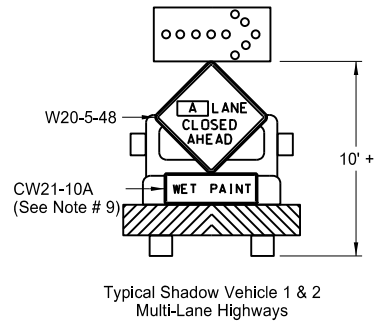
Two-Way Roadway with Paved Shoulders



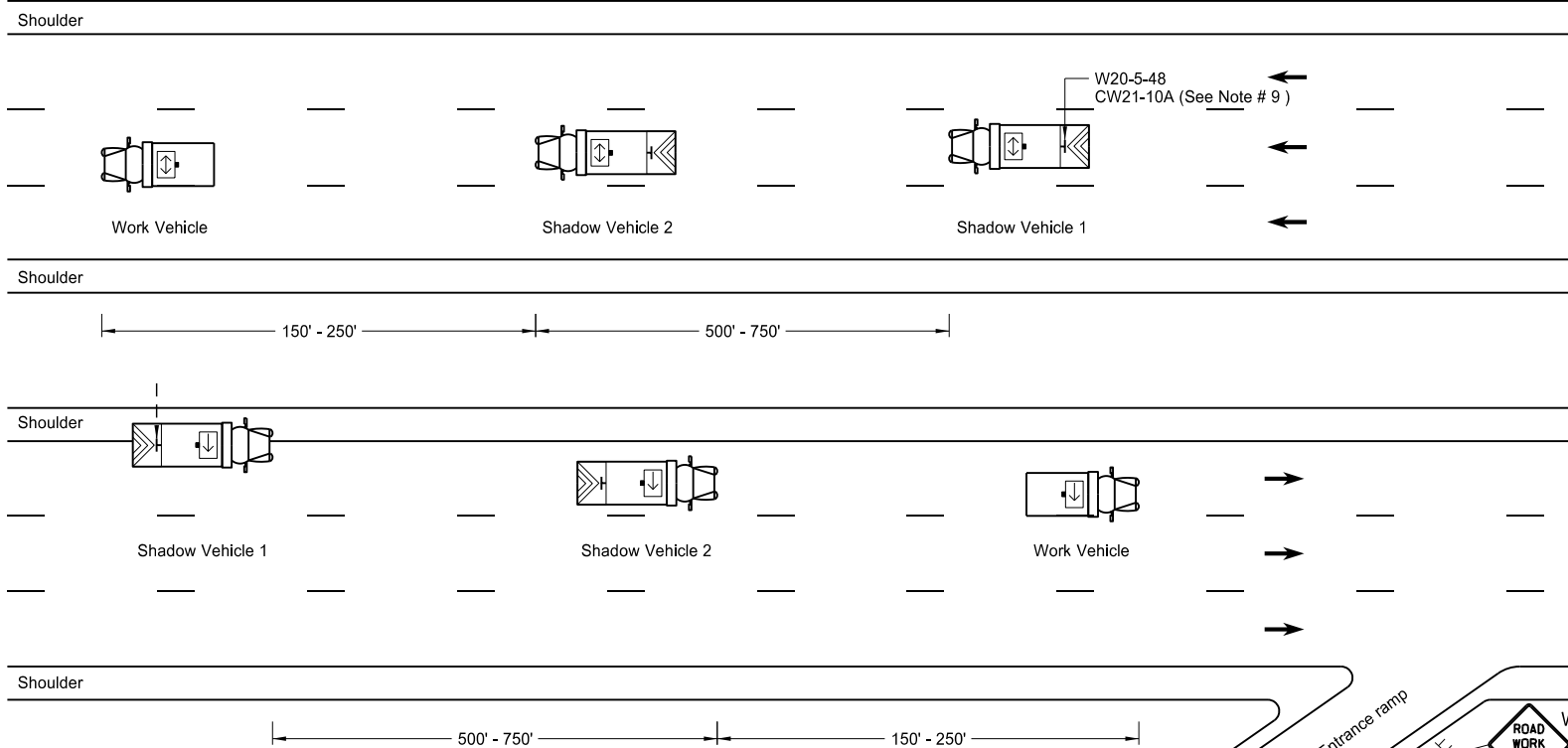
Two-Way Roadway without Paved Shoulders



Undivided Multi-Lane Roadway

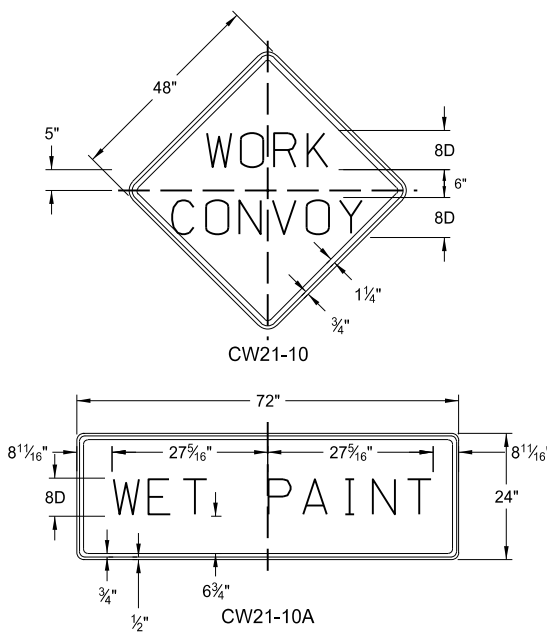


A = ☐ Left ☐ Right ☐ Center



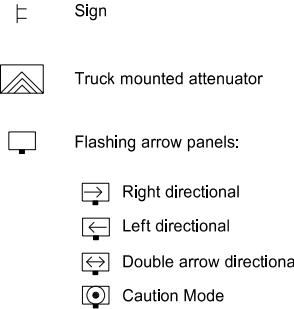
Divided Multi-Lane Highway

Sign Details



- Notes
- Use additional vehicles you choose to be in the convoy with truck mounted attenuators, at your own expense.
 - Display yellow rotating beacons or strobe lights on shadow and work vehicles, unless otherwise stated in the plans.
 - Use Type B or Type C flashing arrow panels controlled from inside the vehicle.
 - Provide each vehicle with two-way electronic communication capability.
 - Move shadow vehicle 1 first to shadow other convoy vehicles when convoy changes lane.
 - 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.
 - Sign Colors
Letters = Black
Border = Black
Background = Orange
 - As an option, use shadow vehicle 2 the paint tender vehicle.
 - Use sign CW21-10A only during painting operation.
 - Pull over work and shadow vehicles periodically to allow motor vehicle traffic to pass on two lane - two way roadways.

KEY



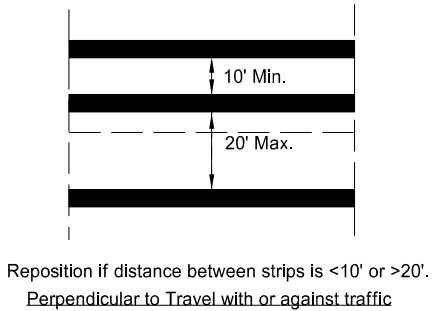
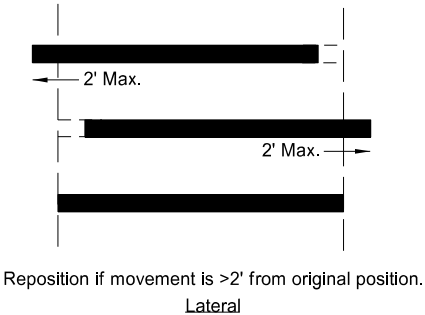
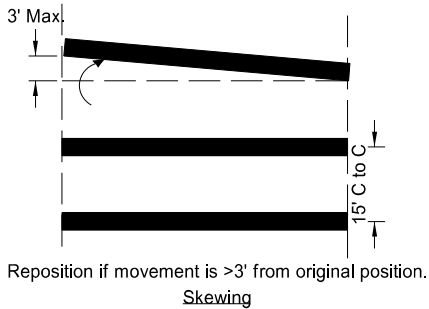
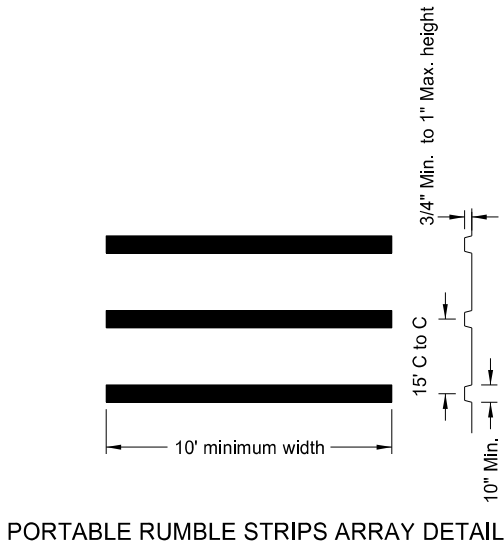
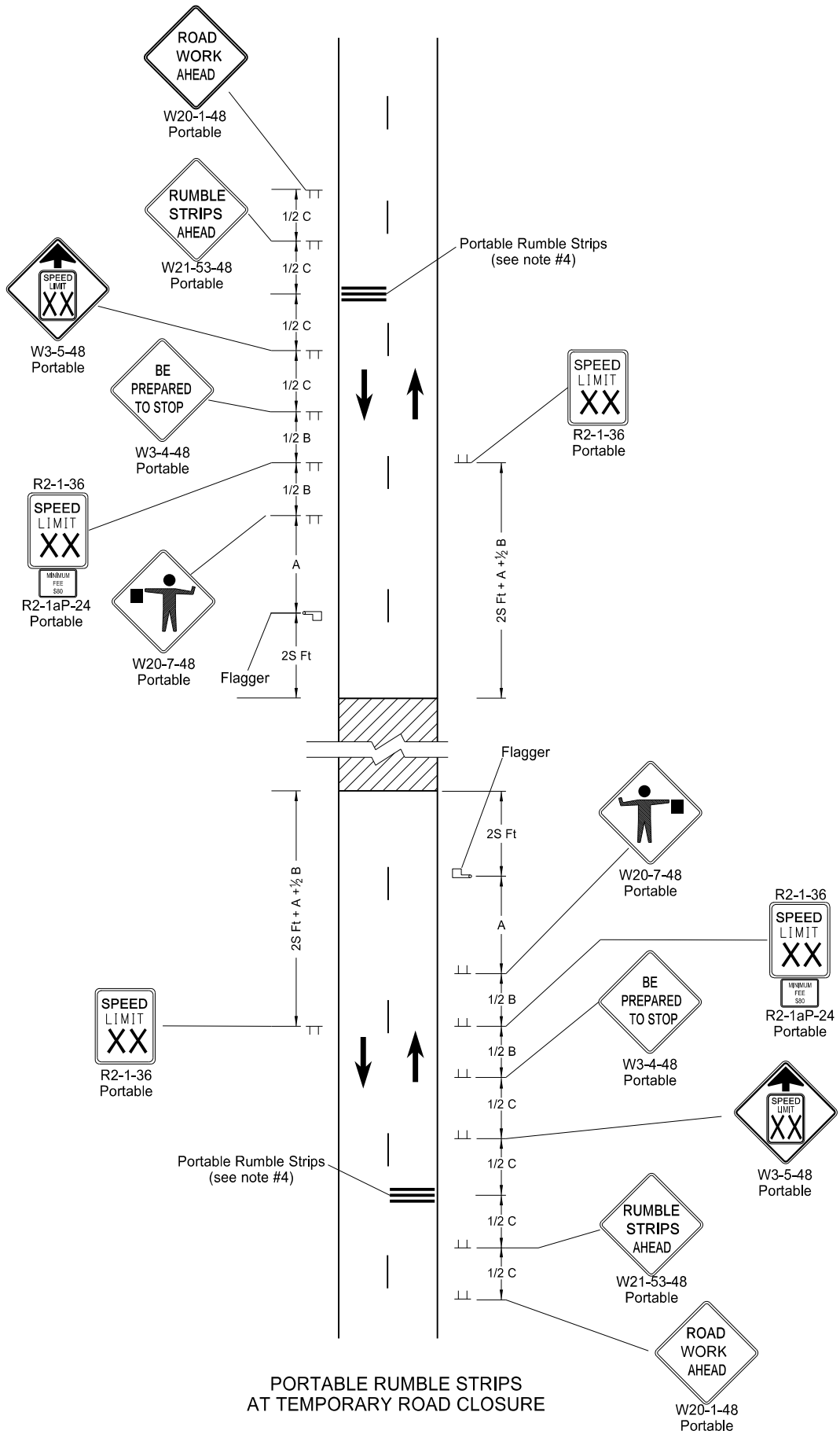
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
6-18-14	Removed shadow vehicle 2 on two lane roadways
9-27-17	Updated to active voice
11-08-19	Changed Standard Heading

This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on 11/08/19 and the original document is stored at the
North Dakota Department
of Transportation

Two-Lane Roadway Portable Rumble Strips

KEY	
	Work area
	Flagger
	Sign
S = Numerical value of speed limit or 85th percentile.	

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



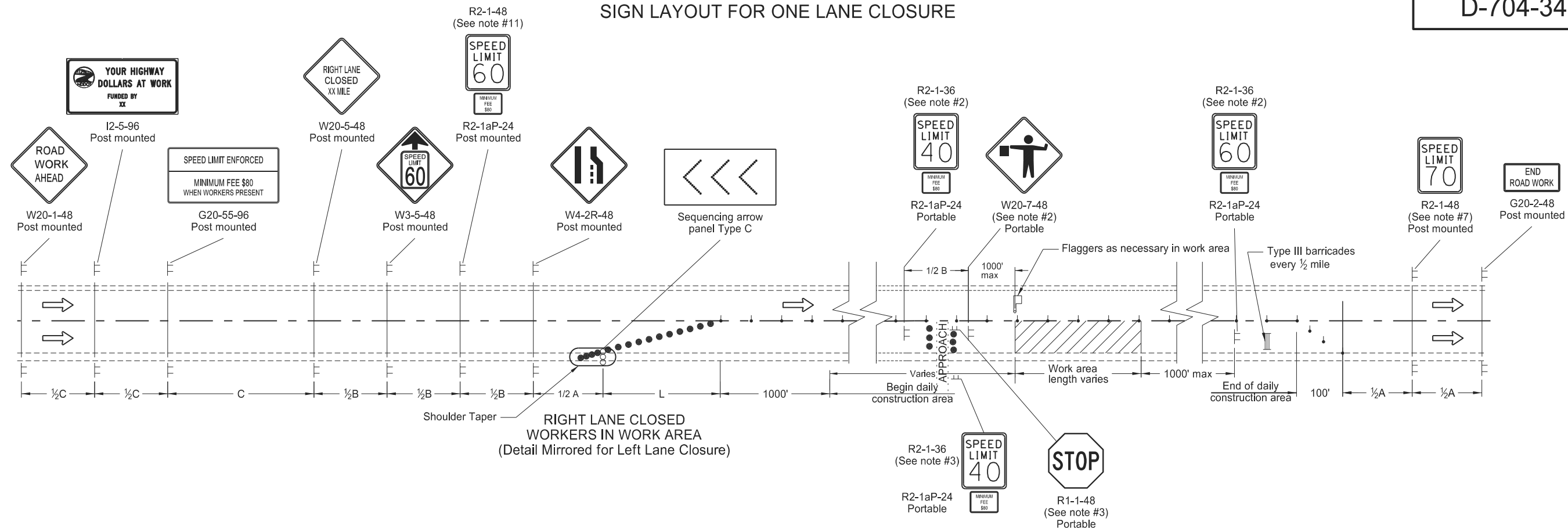
PORTABLE RUMBLE STRIPS ARRAY
TYPES OF MOVEMENT AND MAXIMUM ALLOWANCES

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		
02-22-22		
REVISIONS		
DATE	CHANGE	
		02/22/22

SIGN LAYOUT FOR ONE LANE CLOSURE

D-704-34



Notes:

1. Install advance signs for flagging when flaggers are flagging.
2. Move the advanced flagger sign and speed limit signs as the work area moves through the construction zone. When the work area is not visible from the flagger, move the flagger station so the work area is visible. Place the 40 mph speed limit sign at 1/2 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 \$80 signs upon completion of the work day or when workers are not present. Determine the exact speed limit in the field, dependent on location and conditions.
3. Approaches: When the work area encompasses an approach, install a 40 mph speed limit sign to control the approach. Cover the existing stop sign and install a new portable stop sign when the approach is on the side of the lane closure. Remove the approach speed limit sign once the main line 40 mph speed zone is moved past the approach.
4. Variables:
S=Numerical value of speed limit or 85th percentile
W=The width of taper.
L=Minimum length of taper, or SxW for freeways, expressways, and all other roads with speeds of 45 mph or greater, or (WxSxS)/60 for urban, residential, and other streets with speeds of 40 mph or less.
5. Space delineator drums for tapering traffic at the dimension "S". Space tubular markers used for tangents at 2 times dimension "S".
6. Place sequencing arrow panels at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the work area and place on the roadway surface.
Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
Use Type B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
7. Re-establish the speed limit. Determine the exact speed limit in the field, dependent on location and conditions.
8. Cover existing speed limit signs within a reduced speed zone.
9. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the diamond sign, and at such a distance above the edge that the flag does not touch the sign when limp.
10. Determine the reduced speed limit dependent on the in place speed limit before construction. Where speed limits are to be reduced more than 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2 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.
13. Sign I2-5-96 is not required if this layout is part of other traffic control that contains this sign.

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

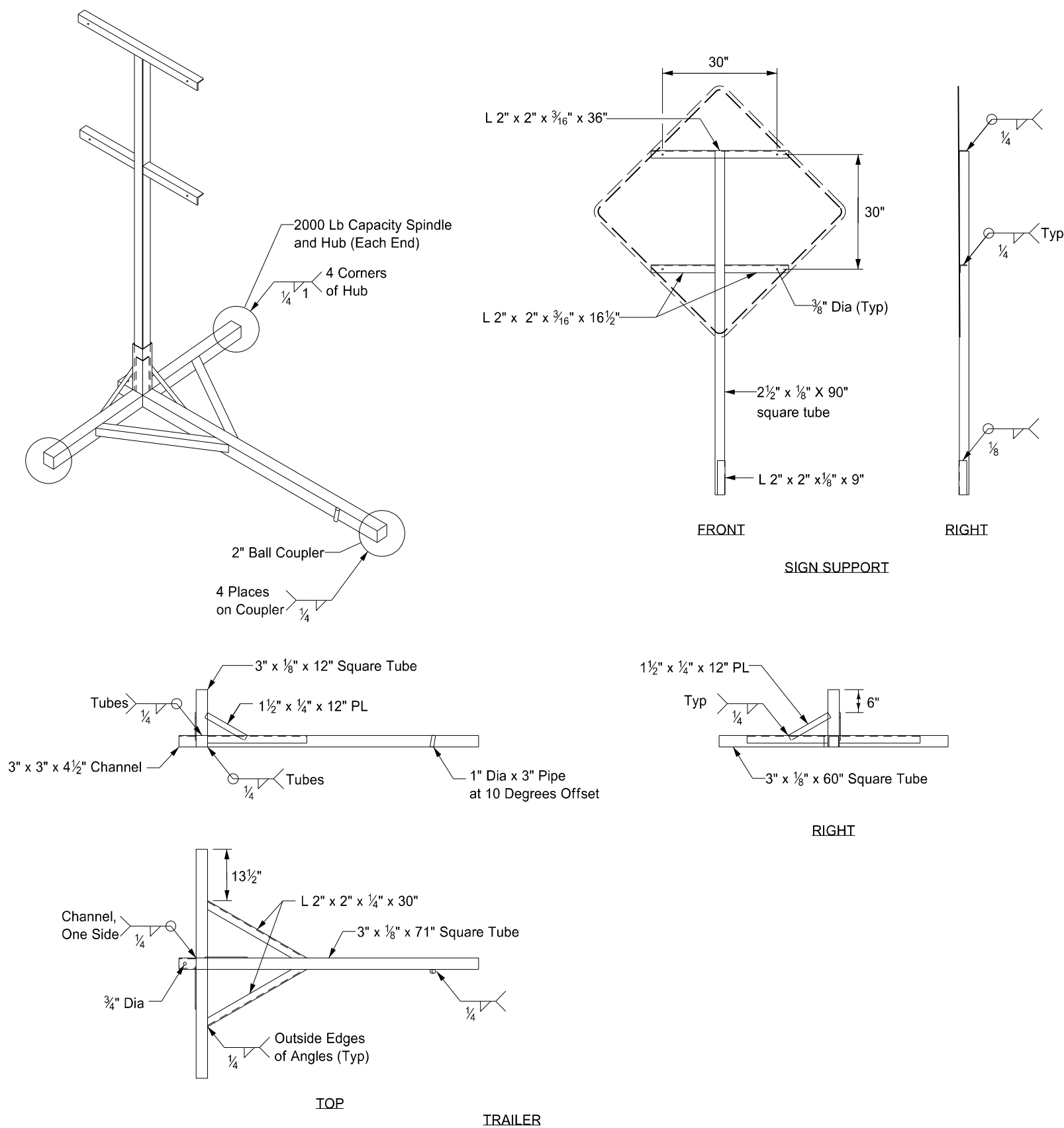
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-26-2012	
REVISIONS	
DATE	CHANGE
03-15-16	Removed Do Not Pass signs & updated notes
08-17-17	Updated notes & sign numbers & moved Speed Limit signs
11-01-19	Removed shldr taper details & revised tubular mkr symbol
12-08-21	Switched order of Road Work and Spd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



12/08/21

PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



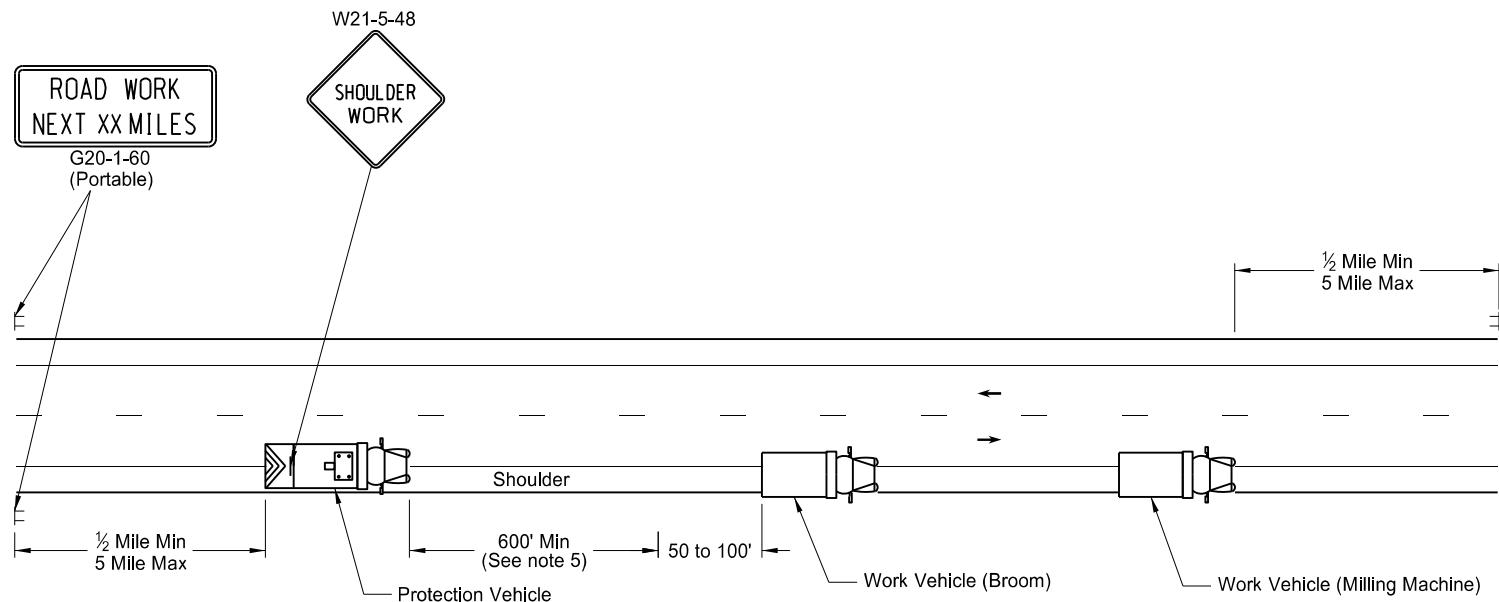
- Notes:
- Maximum 250 pound weight of assembly.
 - Use a 14" wheel and tire.
 - Use no automotive and equipment axle assemblies for trailer-mounted sign supports.
 - Other NCHRP 350 or MASH crash tested assemblies are acceptable.

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

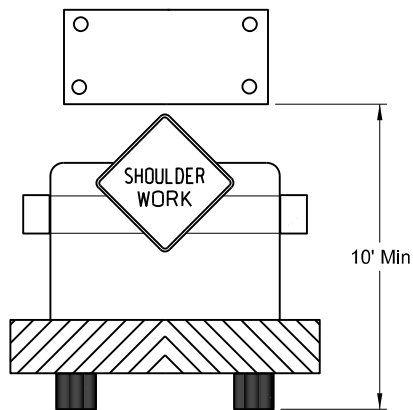


MOBILE OPERATION
Grinding Shoulder Rumble Strips

D-704-56



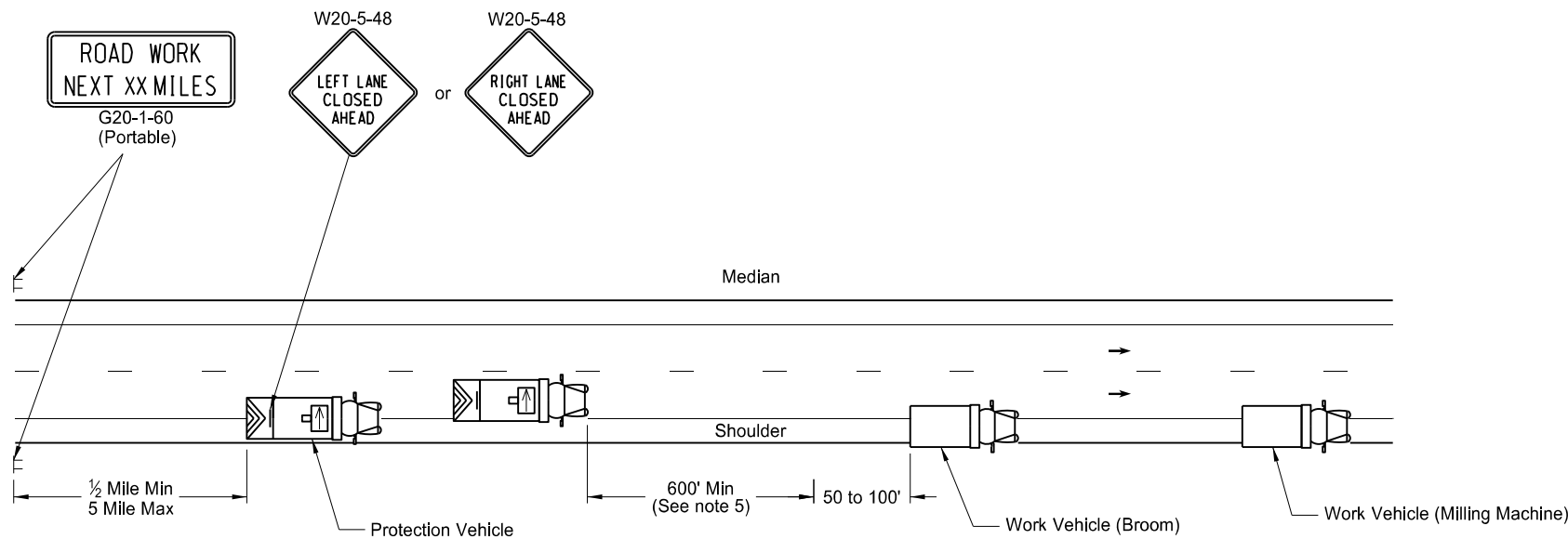
TWO LANE - TWO WAY ROADWAY



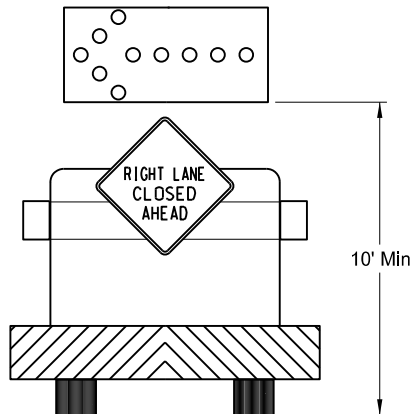
TWO LANE - TWO WAY ROADWAY

Typical Protection Vehicle with
Flashing Arrow Panel In Caution Mode

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

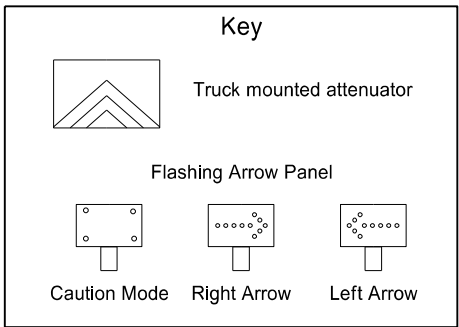


INTERSTATE & 4 LANE DIVIDED HIGHWAY



INTERSTATE & 4 LANE DIVIDED HIGHWAY

Typical Protection Vehicle with Flashing Arrow
Panel In Flashing Arrow Mode

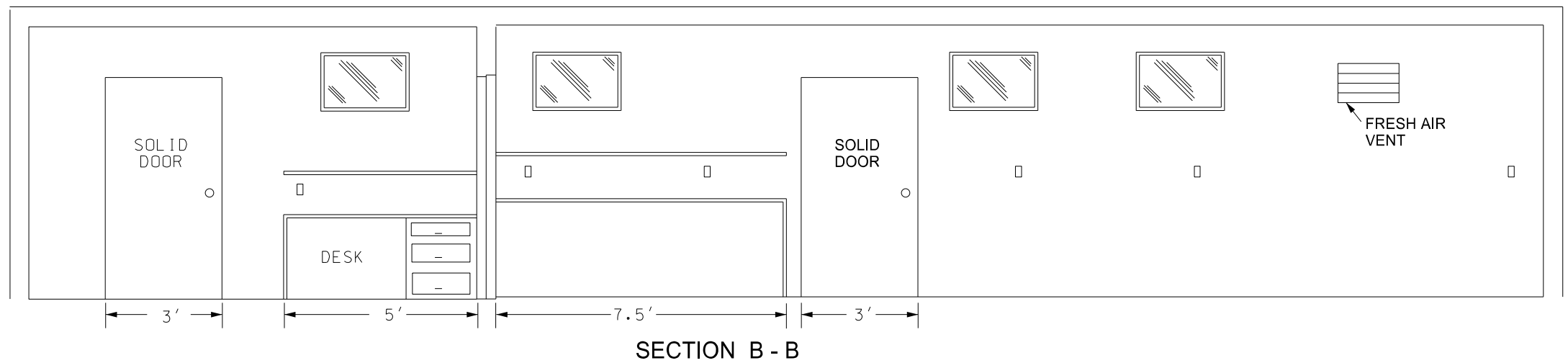
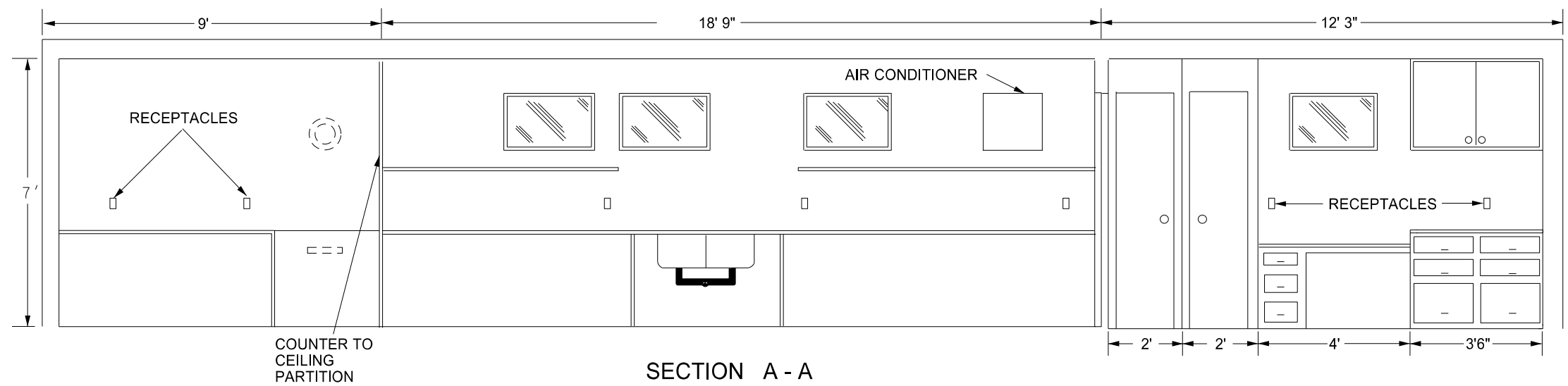
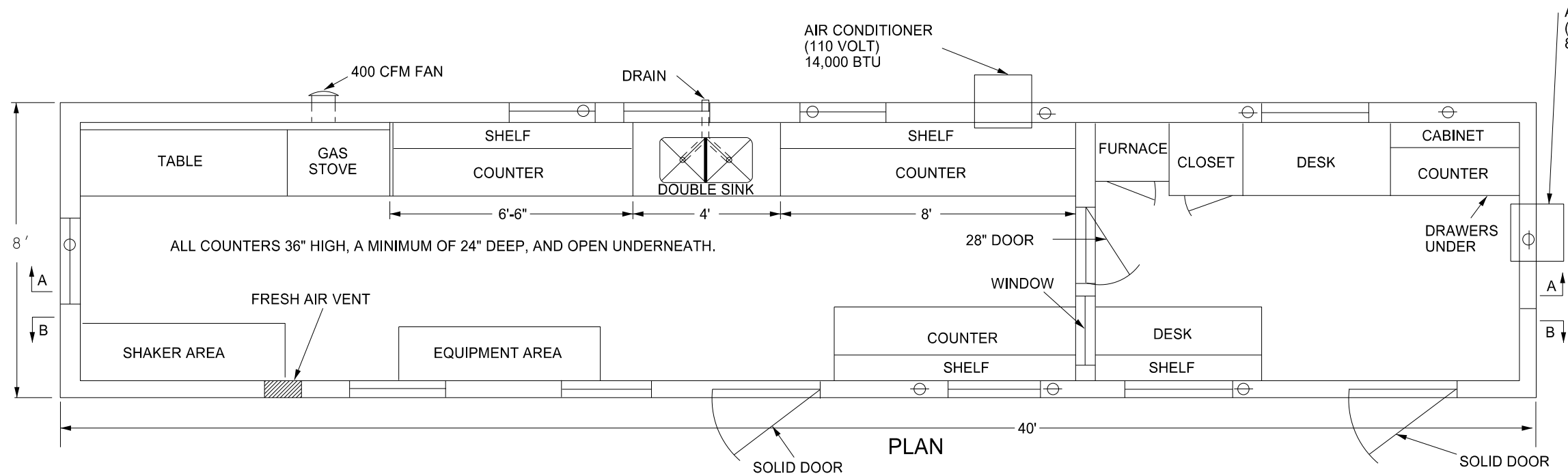


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-15-12	
REVISIONS	
DATE	CHANGE
8-17-17	Updated notes & signs
10-03-19	New Design Engineer PE Stamp

This document was originally
issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on 10/3/19 and the original
document is stored at the
North Dakota Department
of Transportation

BITUMINOUS LABORATORY

D-706-1



Provide a laboratory with the following:

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

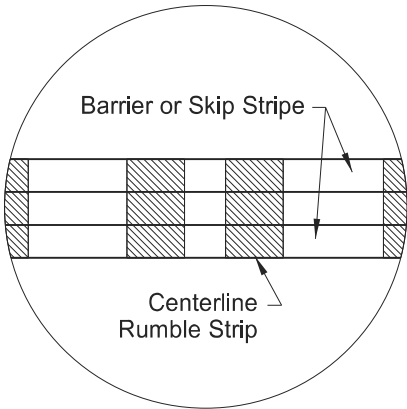
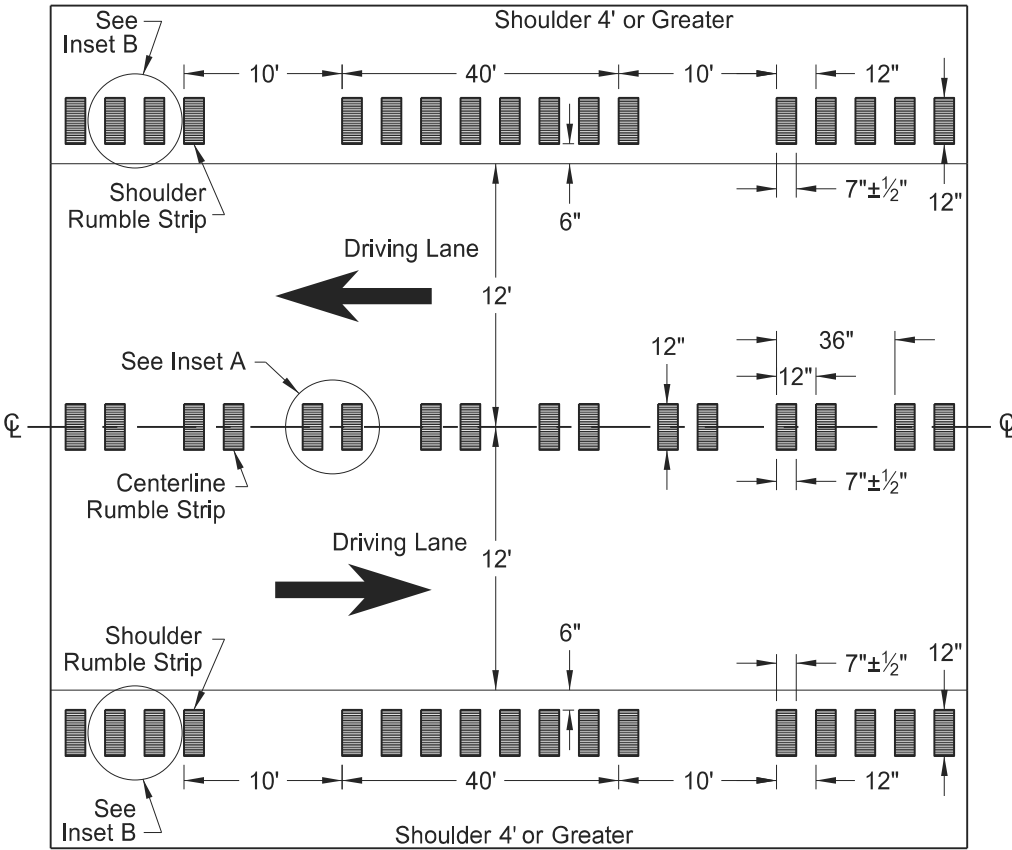
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
07-30-14	Changed standard's title and revised notes.
01-11-16	Revised notes.
08-27-19	New Design Engineer PE Stamp

This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on 08/27/19 and the original document is stored at the
North Dakota Department
of Transportation

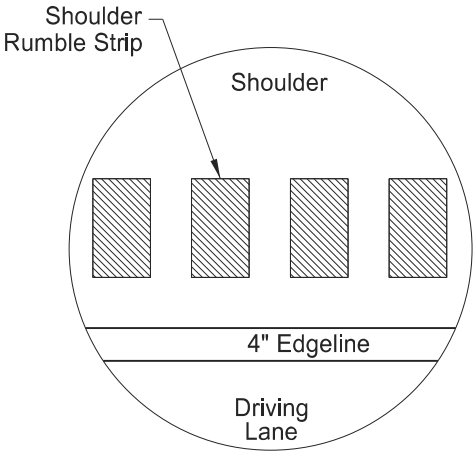
RUMBLE STRIPS UNDIVIDED HIGHWAYS (SHOULDERS 4' OR GREATER)

D-760-3

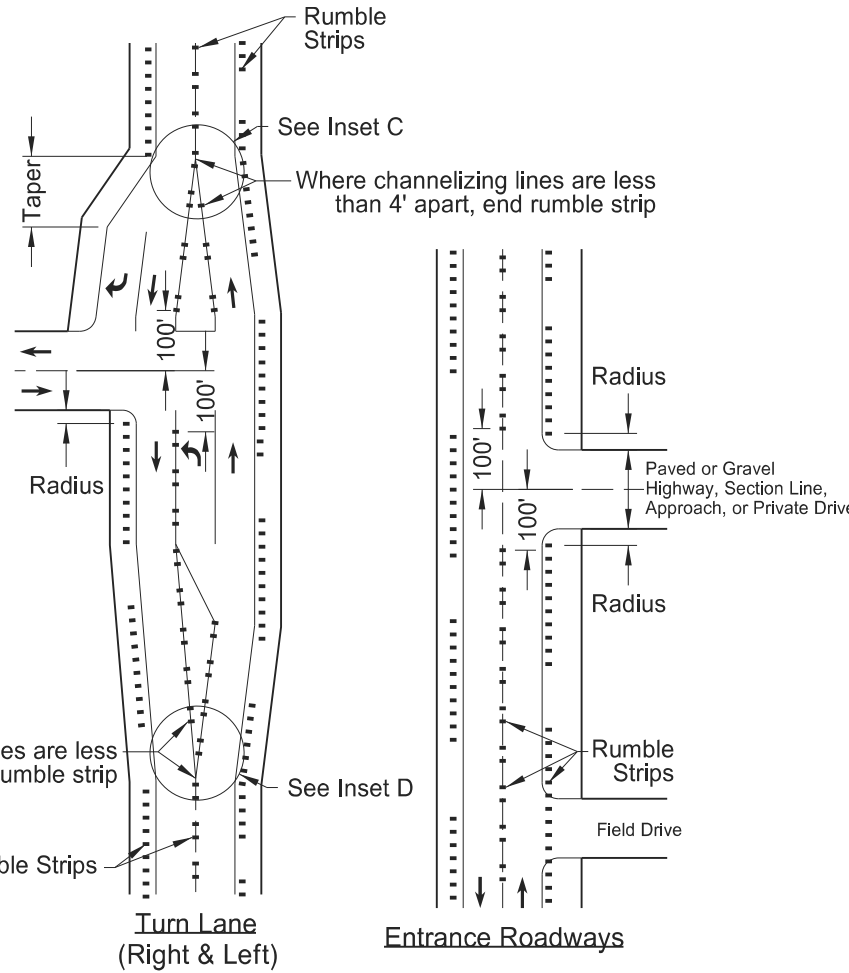
- NOTES:
- 1) Discontinue shoulder rumble strips through the entire length of right turn lanes and tapers, and at the radius of a paved or gravel highway, section line, approach, or private drive.
 - 2) Discontinue centerline rumble strips 100' before and after a paved or gravel highway, section line,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



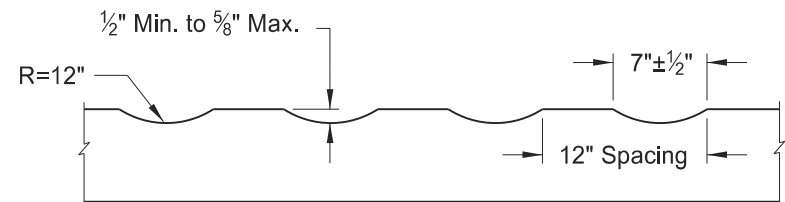
Inset A - Centerline Rumble Strip



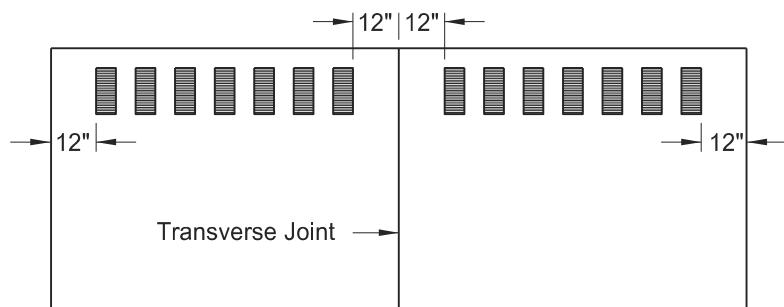
Inset B - Shoulder Rumble Strip



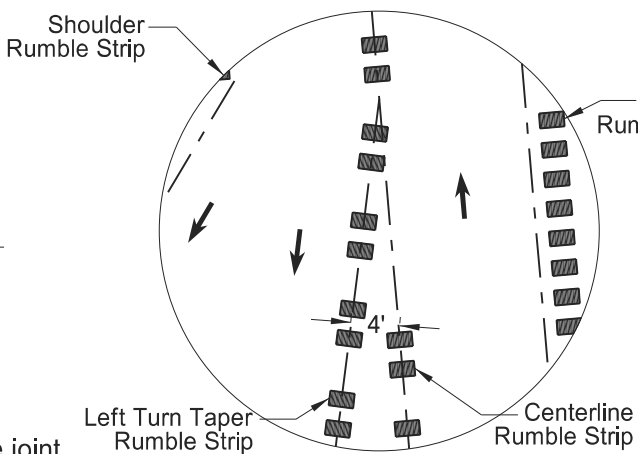
Undivided Highways (Shoulders 4' or Greater)



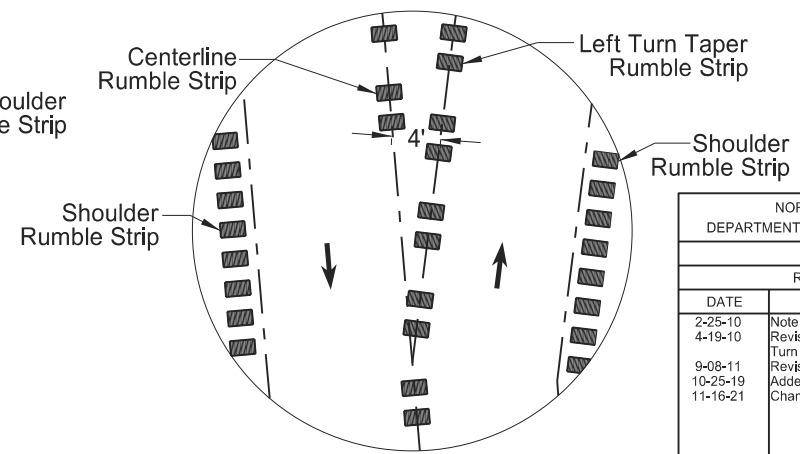
Profile of Rumble Strips - Bituminous and PCC Pavements



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



Inset C

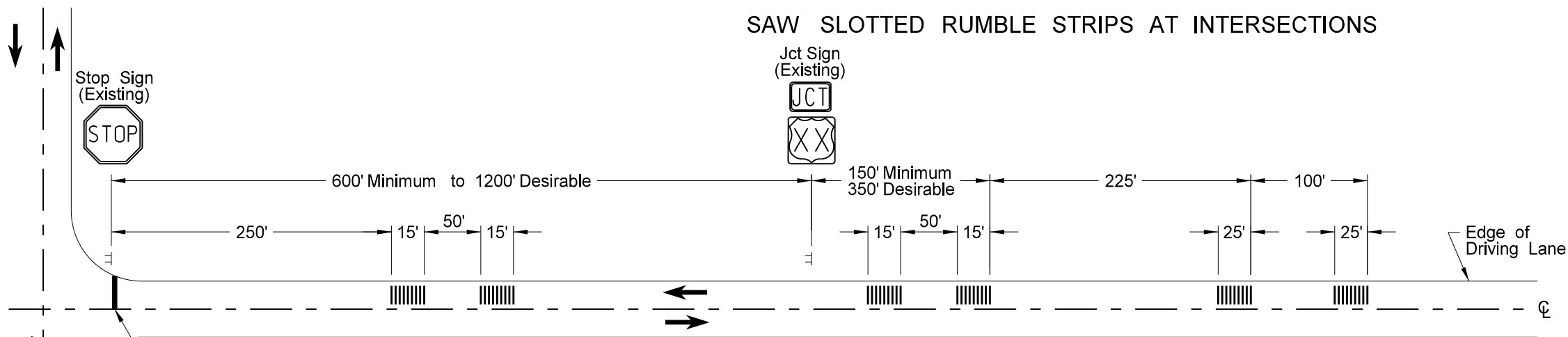


Inset D

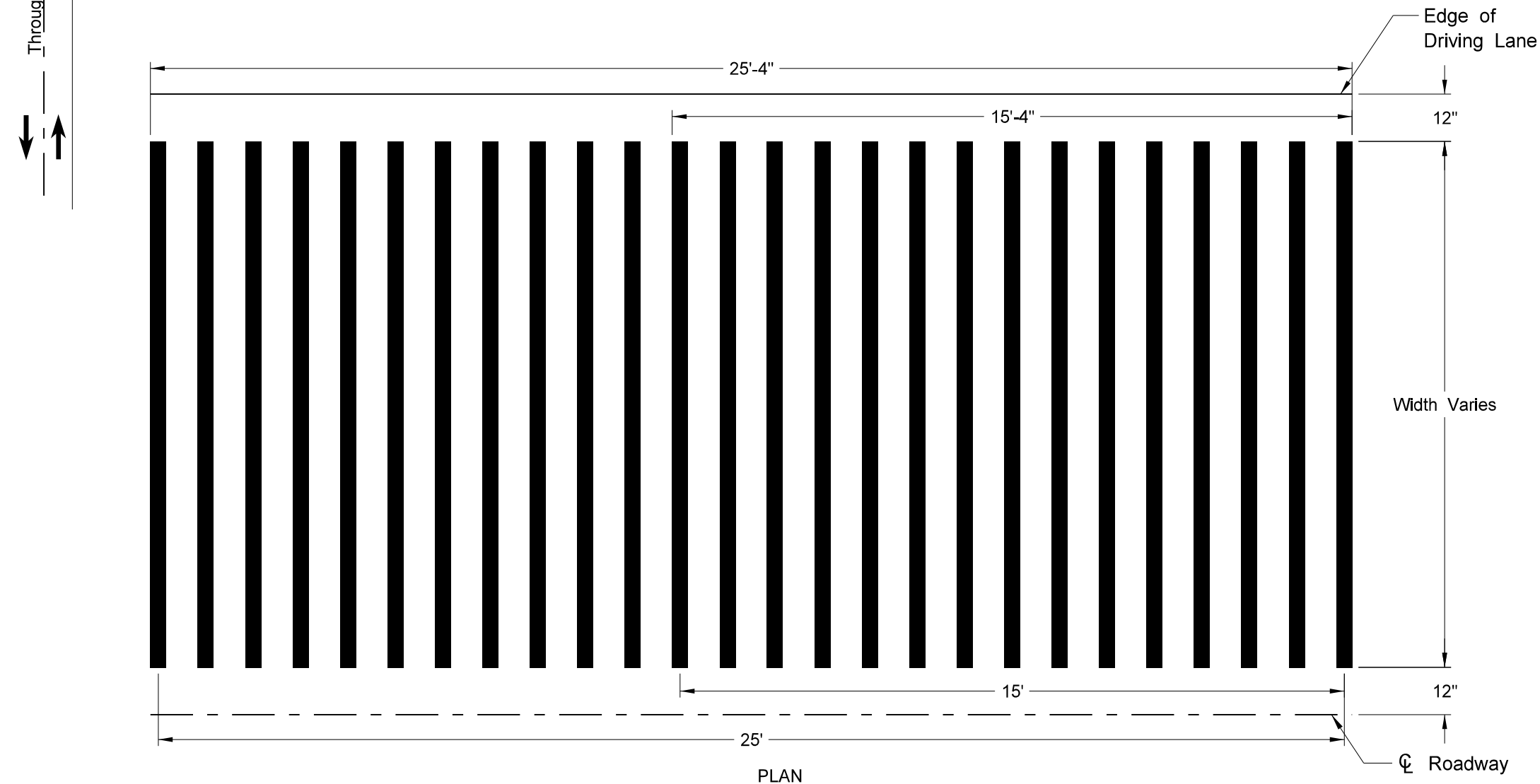
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-29-09	
REVISIONS	
DATE	CHANGE
2-25-10	Note 4 was added.
4-19-10	Revised Note 5, Note 6, and Turn Lane (Right & Left).
9-08-11	Revised Notes and D-760-3.
10-25-19	Added missing dimensions.
11-16-21	Changed turn lane rumble layouts.



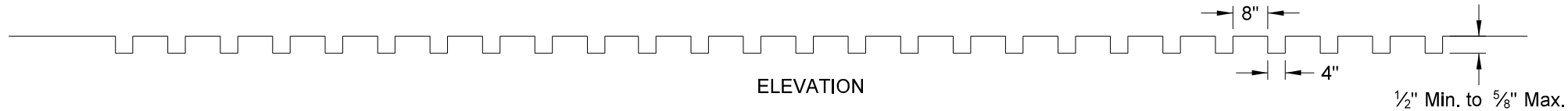
SAW SLOTTED RUMBLE STRIPS AT INTERSECTIONS



TYPICAL STOP INTERSECTION SAW SLOTTED RUMBLE STRIP LOCATION



PLAN



ELEVATION

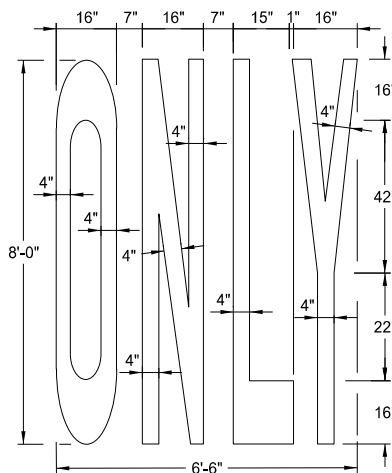
SAW SLOTTED RUMBLE STRIP DETAIL

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

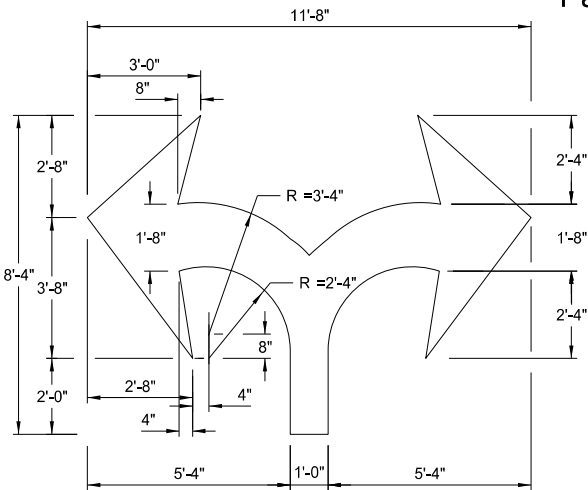
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Registration Number
PE- 4683 ,
on 8/27/19 and the original document is stored at the
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Pavement Marking Message Details

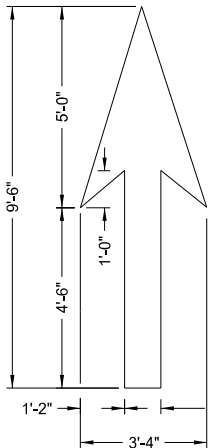
D-762-1



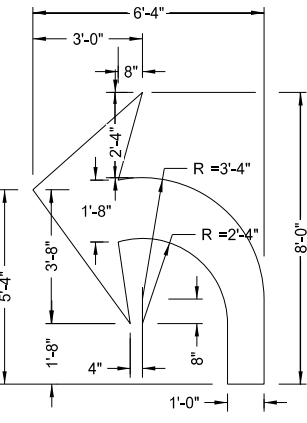
22 S. F.



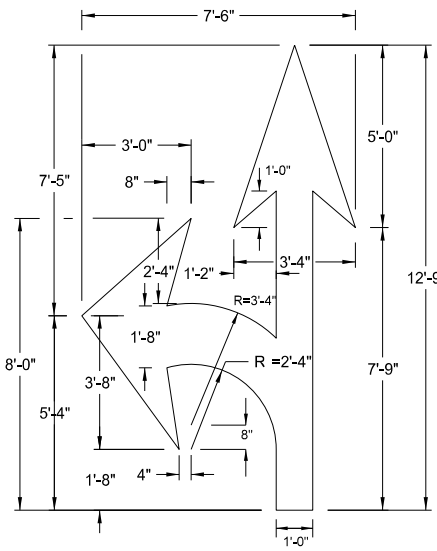
29 S. F.



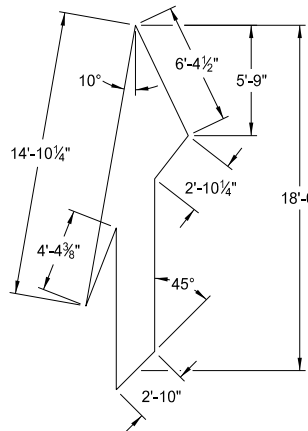
12 S. F.



16 S. F.

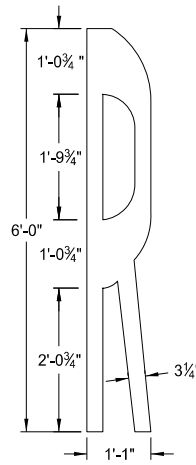


27 S. F.

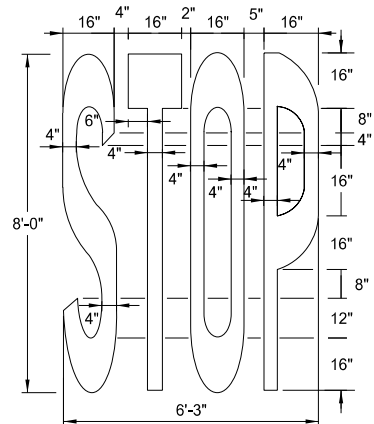


41 S. F.

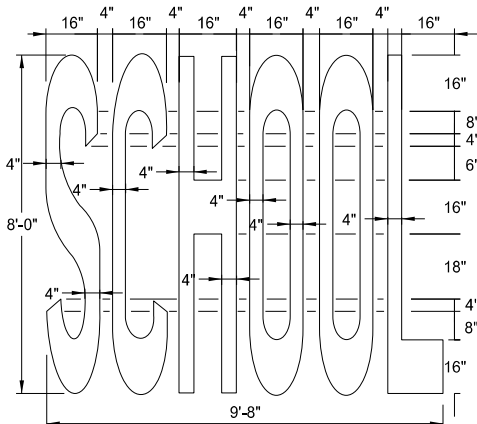
Note: Rotate merge arrow 20° from edge of roadway.



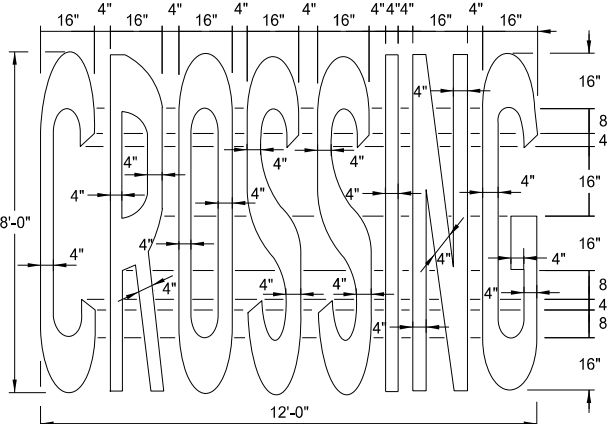
4 S. F.



22 S. F.



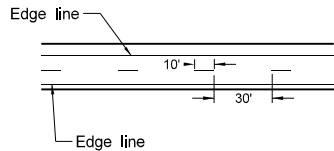
34.5 S. F.



46 S. F.

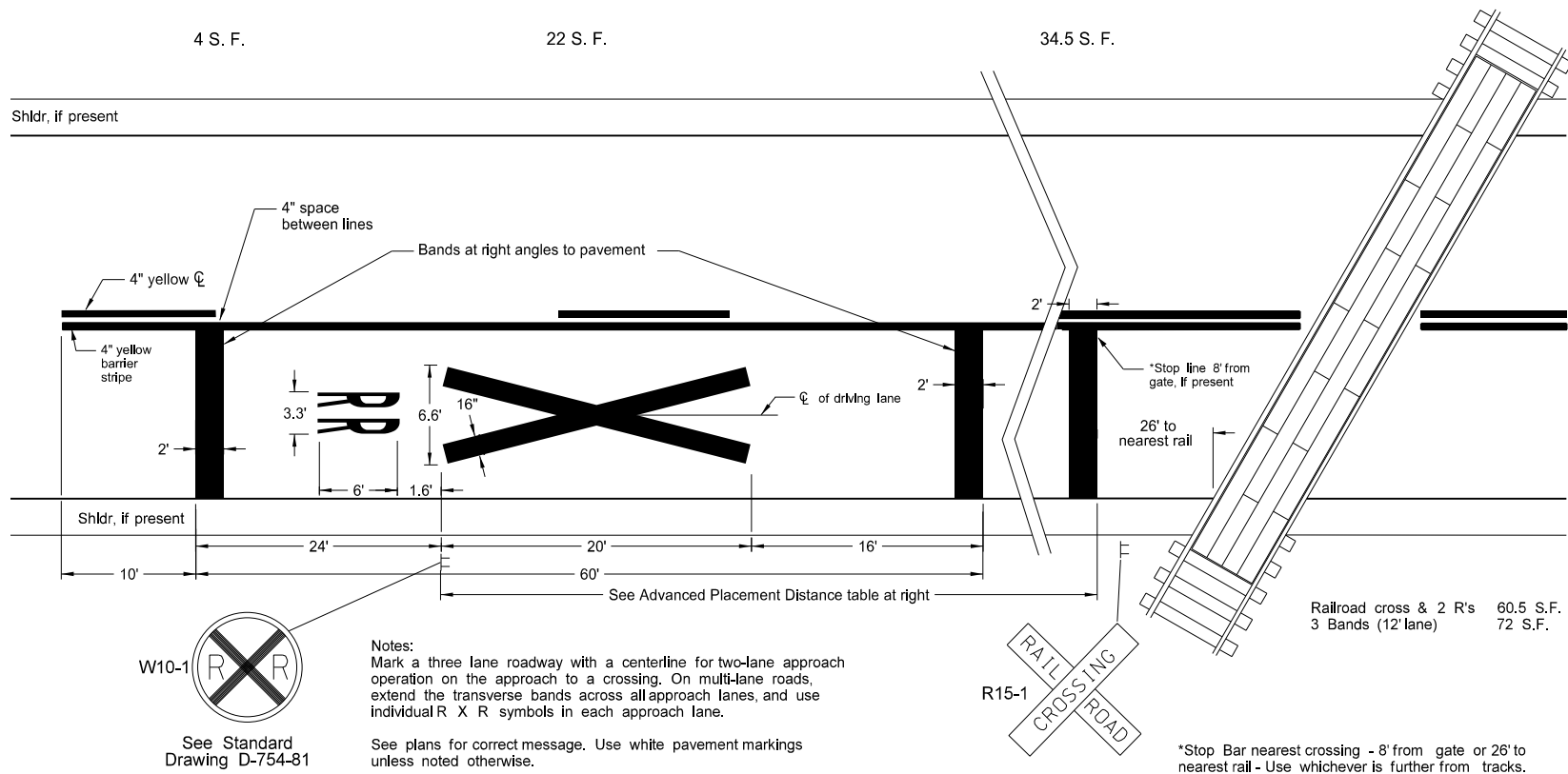
Speed Limit	Chevron Width	Chevron Spacing 45° to Traffic
0-25 mph	8"	5'
30-40 mph	8"	15'
45 mph and above	12"	25'

Chevron Crosshatching Table



Centerline Pavement Marking Skip Spacing Detail

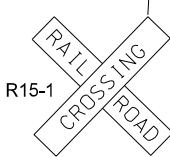
Advance Placement Distance for Railroad Warning Signs	
Posted or 85th Percentile Speed	Advance Distance
20 mph	min. 100 ft
25 mph	min. 100 ft
30 mph	min. 100 ft
35 mph	min. 100 ft
40 mph	125 ft
45 mph	175 ft
50 mph	250 ft
55 mph	325 ft
60 mph	400 ft
65 mph	475 ft
70 mph	550 ft



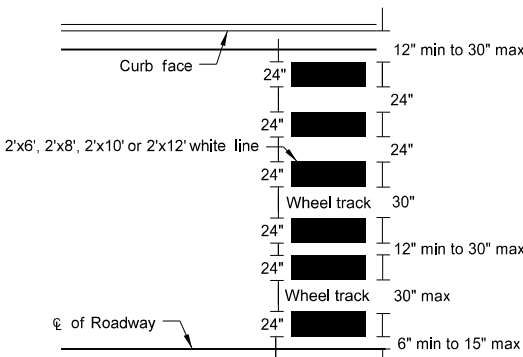
See Standard Drawing D-754-81

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 - Use whichever is further from tracks.



Continental Crosswalk Detail

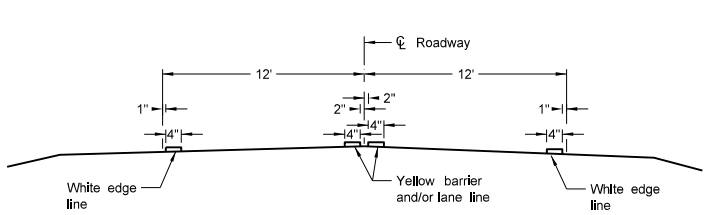
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-6-11	
REVISIONS	
DATE	CHANGE
10-17-17 08-27-19 01-28-2020	Updated to active voice. New Design Engineer PE Stamp. Revised min Stop Bar distance to rail.

This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE-4683,
on 1/28/2020 and the original document is stored at the
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of Transportation

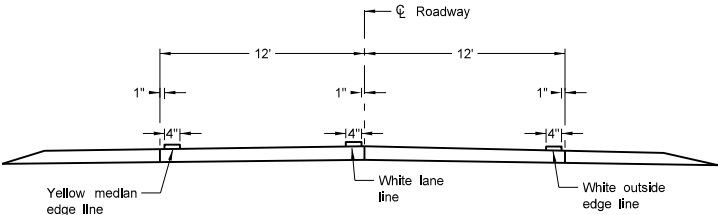
PAVEMENT MARKING

D-762-4

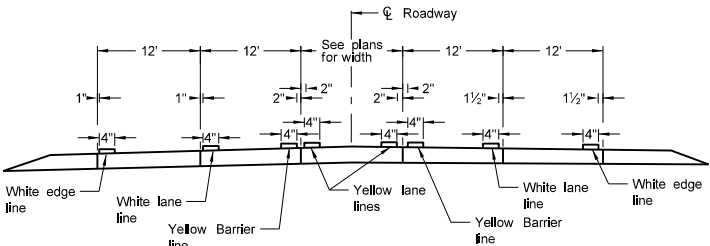
- NOTES:
1. Continue edge lines through private drives and field drives. Break edge lines for intersections.



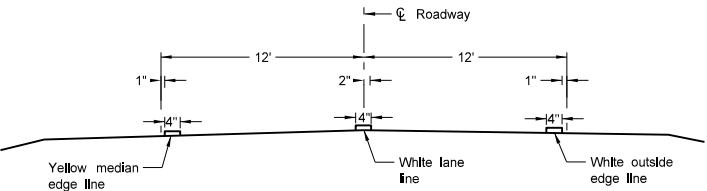
Two Lane Two Way
RURAL ROADWAY



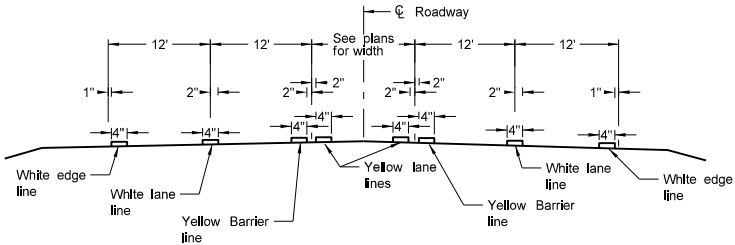
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



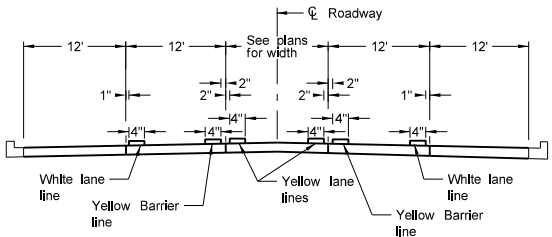
RURAL FIVE LANE ROADWAY
Concrete Section



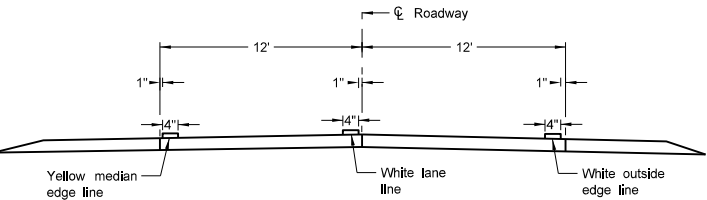
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



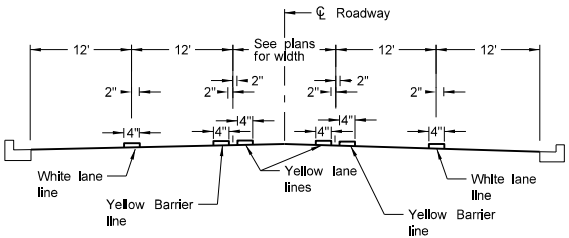
RURAL FIVE LANE ROADWAY
Asphalt Section



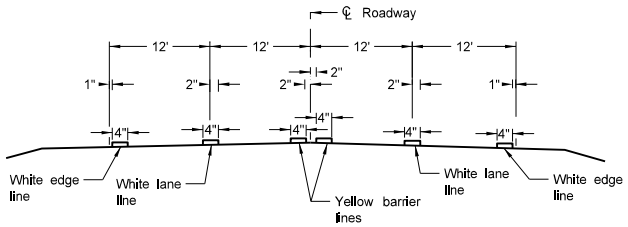
URBAN FIVE LANE SECTION
Concrete Section



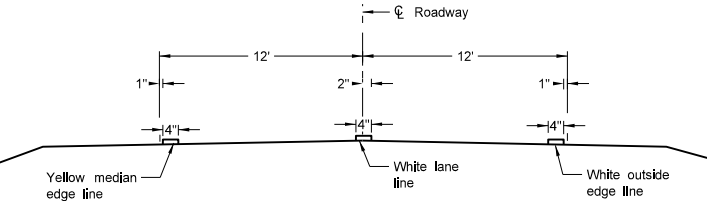
Two Lane Roadway
PRIMARY HIGHWAY
Concrete Section



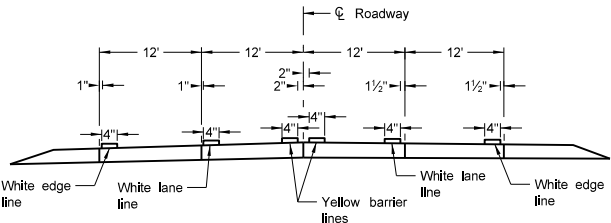
URBAN FIVE LANE SECTION
Asphalt Section



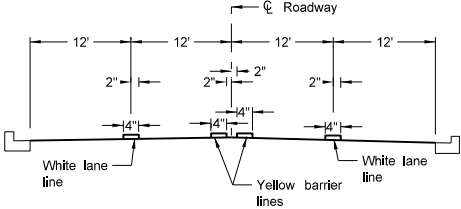
RURAL FOUR LANE ROADWAY
Asphalt Section



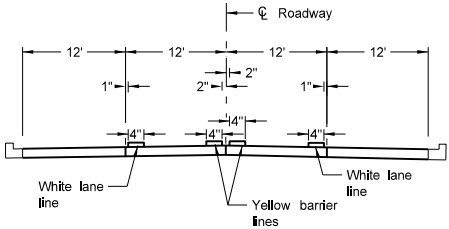
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



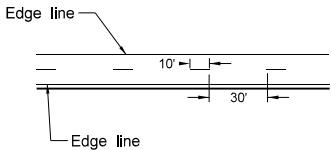
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



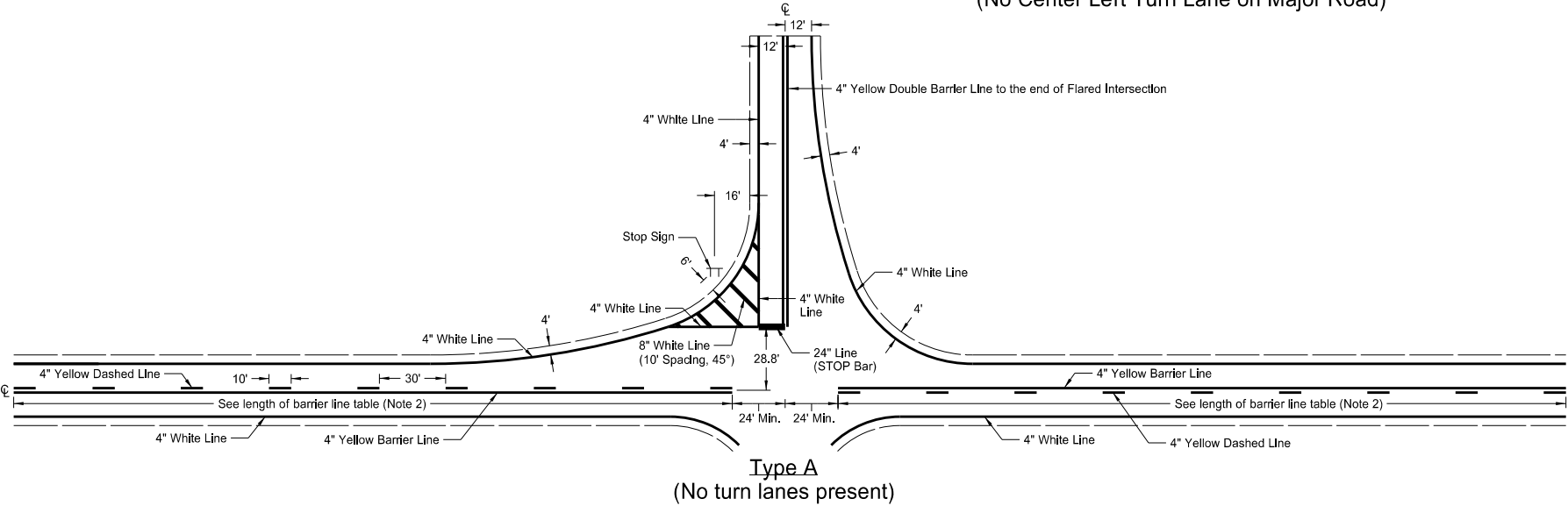
CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

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

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Registration Number
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on 8/27/19 and the original document is stored at the
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PAVEMENT MARKING FOR STANDARD 90 DEGREE FLARED INTERSECTION
(No Center Left Turn Lane on Major Road)

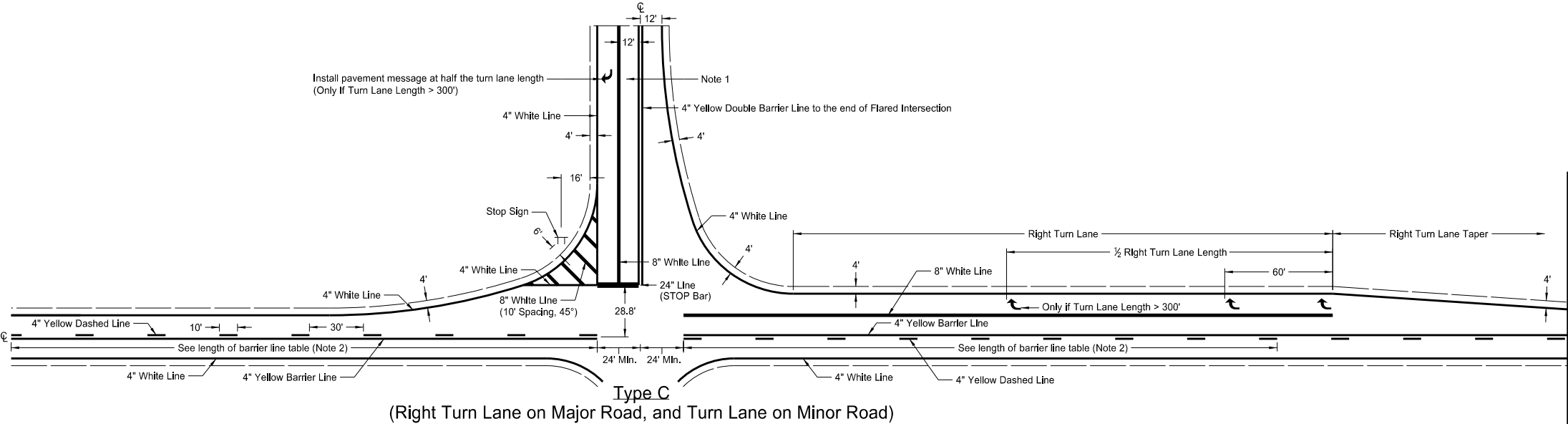
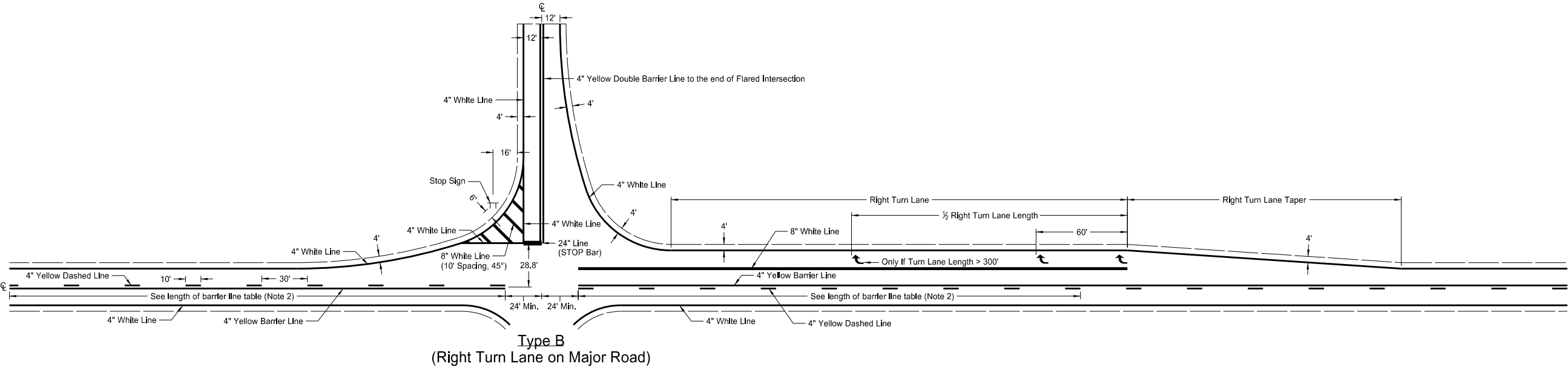
D-762-5



Notes

- At "T" intersections (3-leg), additionally install left turn pavement marking message arrow.
- The barrier lines have variable distances dependent on speed limit. Obtain barrier line length from table below (stopping sight distance.)

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



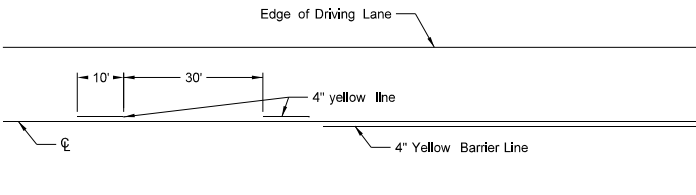
4" Marking
8" Marking
24" Marking

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
3-29-16	
REVISIONS	
DATE	CHANGE
8-17-17 8-30-18 8-27-19	Updated note & dimensioning. Corrected pvtmt mkg placement. New Design Engineer PE Stamp.

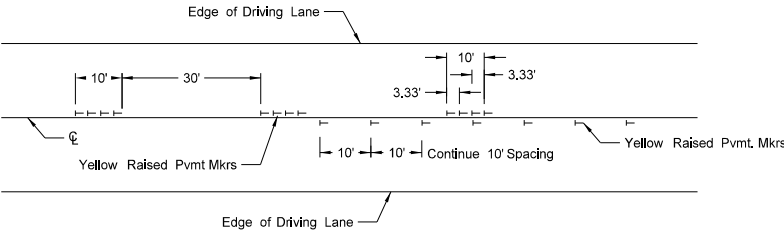
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Registration Number
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North Dakota Department
of Transportation

SHORT-TERM PAVEMENT MARKING

D-762-11

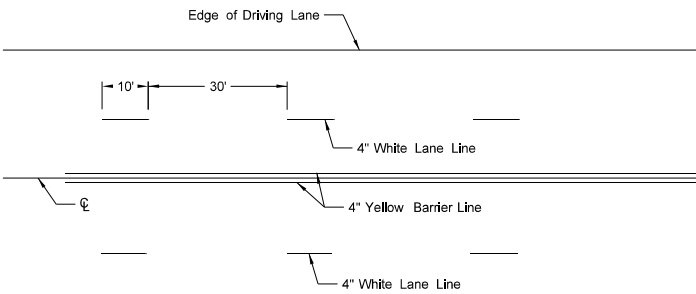


Painted or Tape Lines

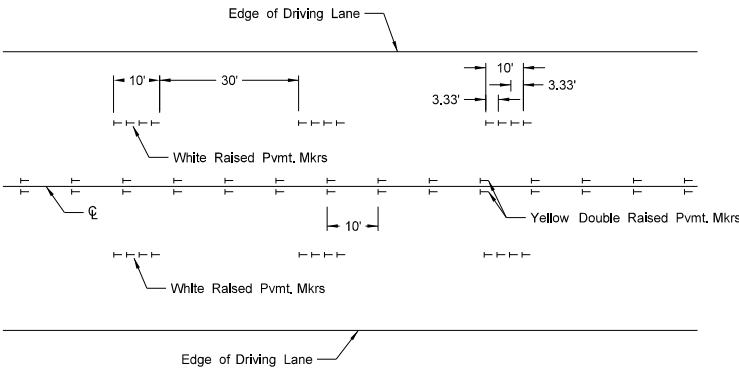


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

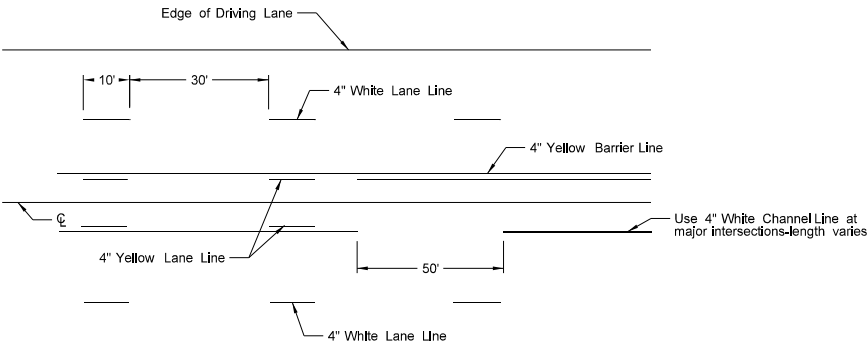


Painted or Tape Lines

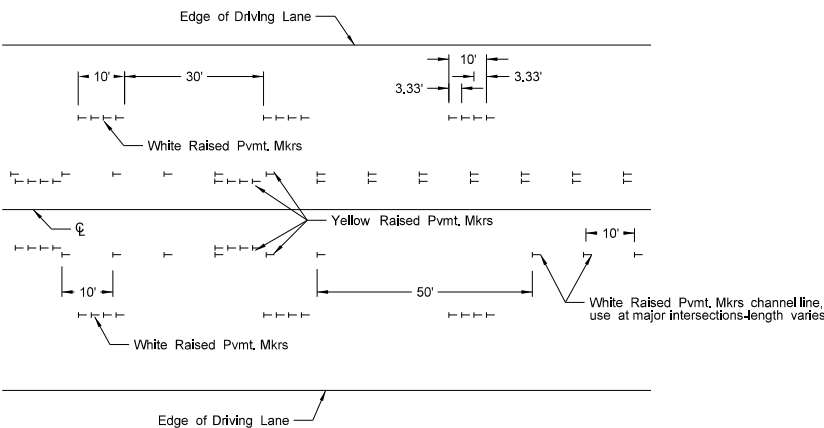


Raised Pavement Markers

FOUR LANE ROADWAY

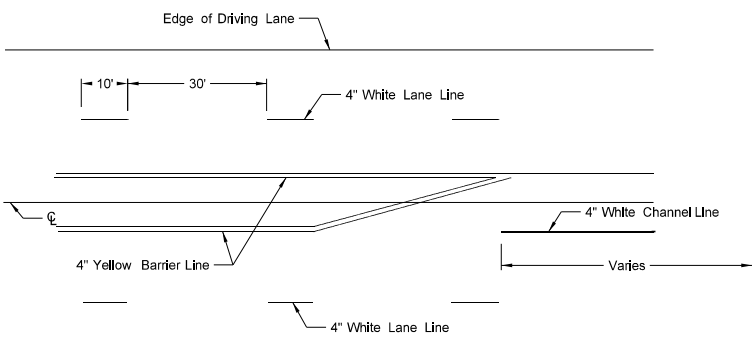


Painted or Tape Lines

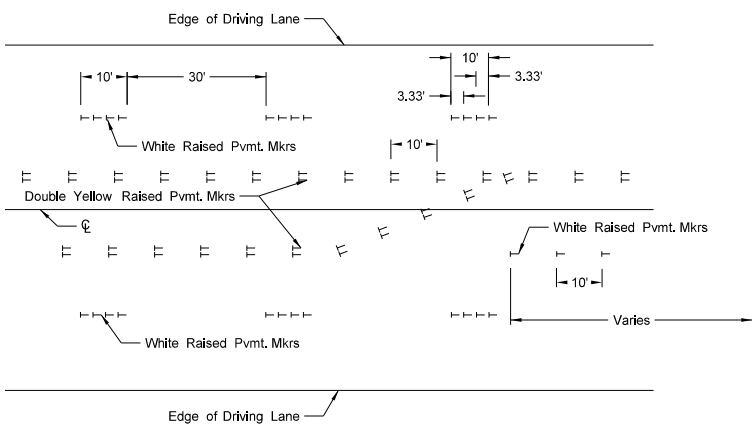


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

- NOTES:
1. Place no passing zones on two-lane two-way roadways as shown. In lieu of short term no passing zone pavement markings, place no passing zone signs. Replace no passing zone signs with short term no passing zone pavement marking within three days.
 2. Place short term center line stripe (paint) on top lift to match exact placement of permanent stripe.
 3. Remove raised markers and tape markings after permanent pavement marking is installed.

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

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