DESIGN DATA				
Traffic	Average Daily			
Current 2015	Pass: 1,190	Trucks: 615	Total: 1,805	
Forecast 2035	Pass: 1,775	Trucks: 920	Total: 2,695	
Clear Zone Distance: 20'		Design Speed: 65 MPH		
Minimum Sight Dist. for Stopping: 645'		Bridges: N/A		
Sight Dist. for No Passing Zone: 1100'				
Pavement Design Life: 20 years				
Design Accumulated One-way flexible ESALs: 2,749,247				

	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	SOIB-7-068(011)000	21180	1	1

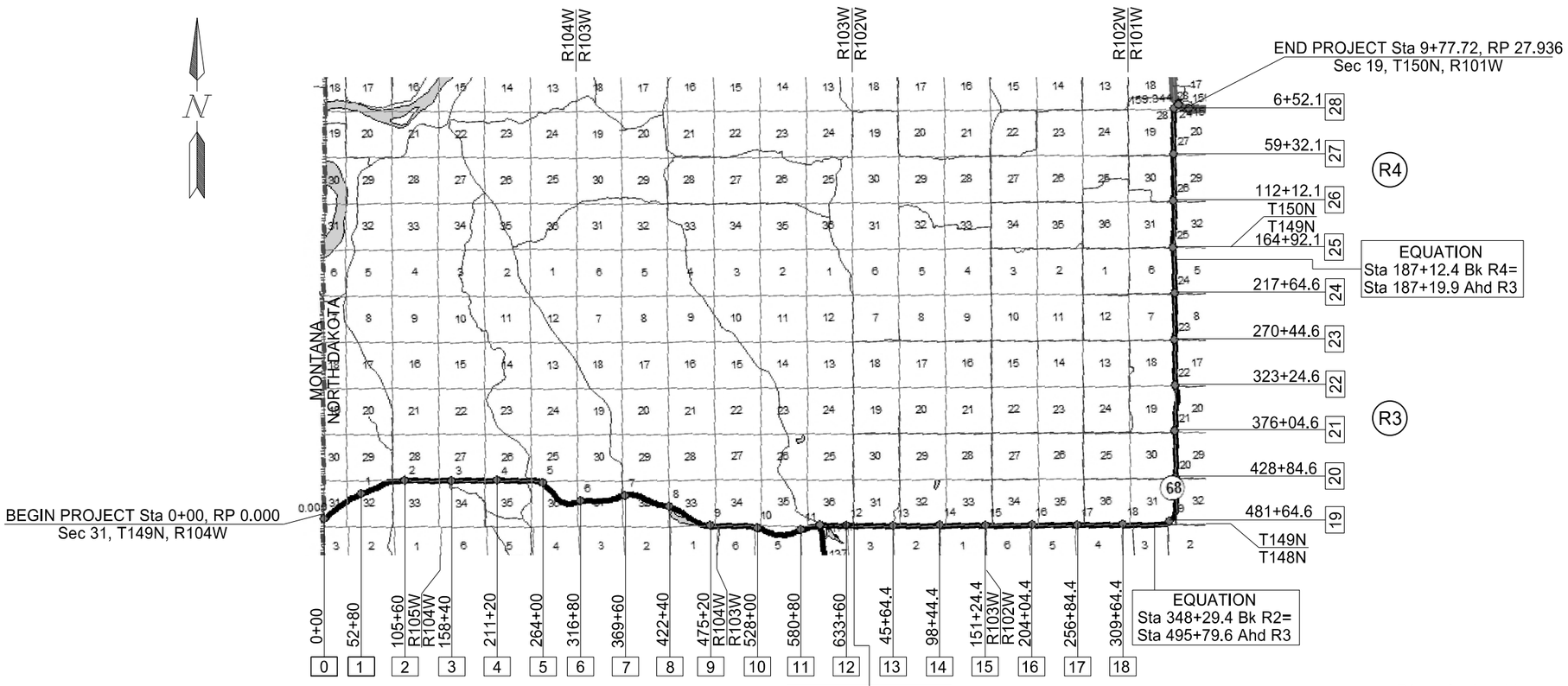
JOB # 32
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

SOIB-7-068(011)000

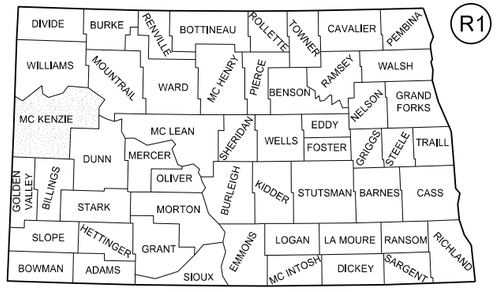
McKenzie County
State Line East to Junction US 85
Milling, Hot Mix Asphalt Overlay, and Incidentals

GOVERNING SPECIFICATIONS:
2014 Standard Specifications adopted by the North Dakota Department of Transportation and the Supplemental Specifications effective on the date the project is advertised.

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
SOIB-7-068(011)000	27.936 Miles	27.936 Miles



R1 - region (area) between Begin Project and first equation
R2 - region (area) between first and second equation
R3 - region (area) between second and third equation
R4 - region (area) between third equation and End Project



STATE COUNTY MAP

DESIGNERS

Scott Woodham /s/

APPROVED DATE 2-10-16

Roger Weigel /s/
OFFICE OF PROJECT DEVELOPMENT
ND DEPARTMENT OF TRANSPORTATION

I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of ND.

APPROVED DATE 2-10-16

James Douglas Rath /s/
NDDOT DESIGN

This document was originally issued and sealed by James Douglas Rath, Registration Number PE- 4288, on 2/10/16 and the original document is stored at the North Dakota Department of Transportation

2/10/2016 2:59:45 PM swoodham R:\project\70068000.011\design\001TS_001_titlesheet.dgn

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ND	SOIB-7-068(011)000	2	1

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PLAN SECTIONS

SPECIAL PROVISIONS

LIST OF STANDARD DRAWINGS

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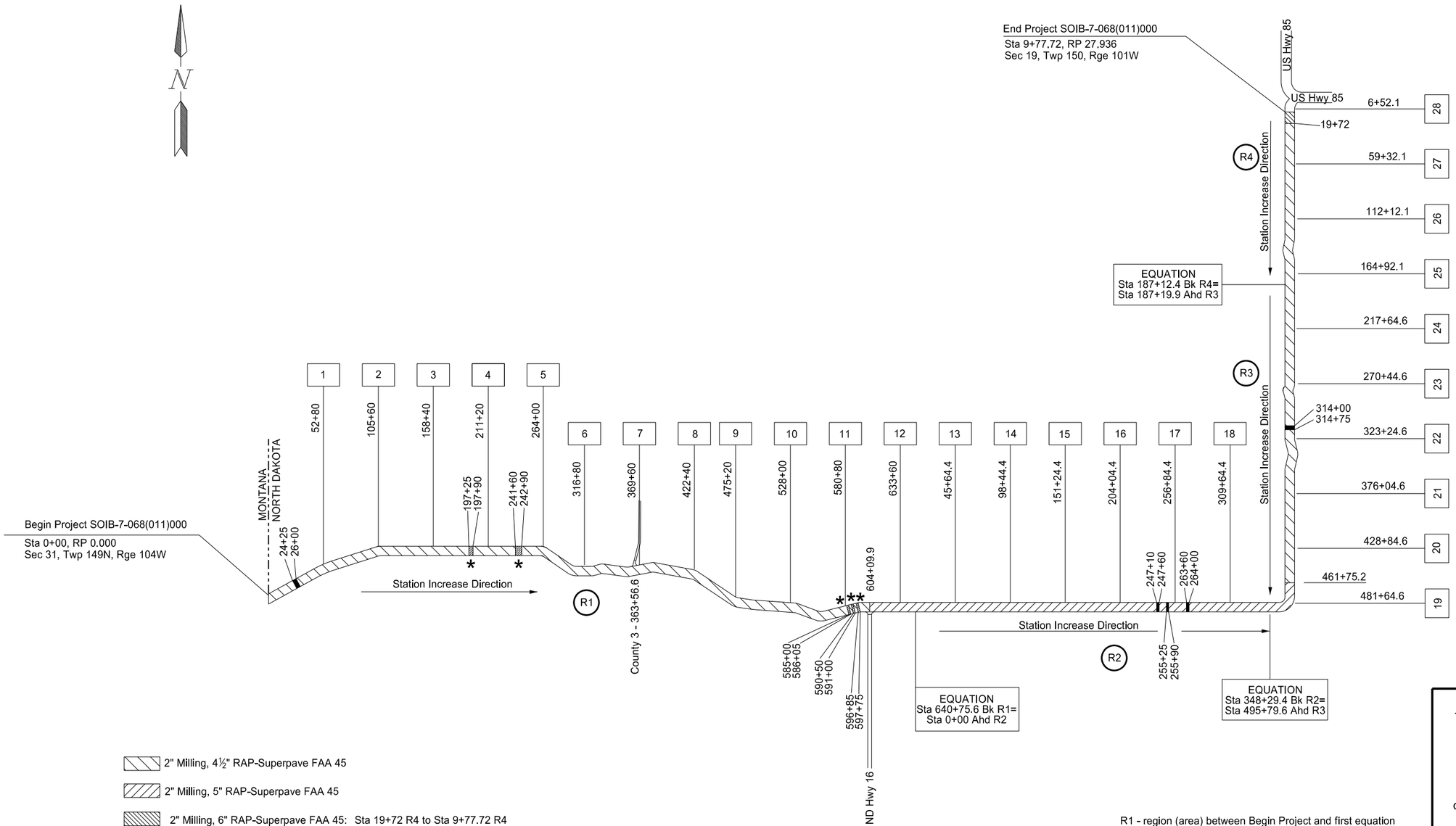

2" Milling, 4½" RAP-Superpave FAA 45

2" Milling, 5" RAP-Superpave FAA 45

2" Milling, 6" RAP-Superpave FAA 45: Sta 19+72 R4 to Sta 9+77.72 R4

* 5" Milling, 7½" RAP-Superpave FAA 45

Remove Bit Surfacing, 7" Aggr Base, 8" RAP-Superpave FAA 45: Sta 24+25 R1 to Sta 26+00 R1
Sta 247+10 R2 to Sta 247+60 R2
Sta 255+25 R2 to Sta 255+90 R2
Sta 263+60 R2 to Sta 264+00 R2
Sta 314+75 R3 to Sta 314+00 R3

R1 - region (area) between Begin Project and first equation
R2 - region (area) between first and second equation
R3 - region (area) between second and third equation
R4 - region (area) between third equation and End Project

SCOPE OF WORK

Hot Mix Asphalt Overlay

State Line East to Junction US 85

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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NOTES

100-P01 COORDINATION OF PROJECTS: Another project in the vicinity of this project is under contract during the 2016 construction season. This project is a chip seal and is located on highway 23 in Montana.

107-700 HAUL ROADS: The Engineer will not designate paved roads off the state system as haul roads.

107-710 HAUL ROADS: Before submitting a proposal, contact the appropriate State, County, Township, or City officials to determine if there are any roadways that will be designated as "no haul routes".

107-P01 MAINTAINING TRAFFIC – EDGE DROP-OFFS (PAVEMENT REPAIR AREAS): If public traffic is operating in an area with a drop-off greater than 2 inches, construct a temporary wedge composed of aggregate or embankment material with a foreslope of 4:1 or flatter.

Install stackable vertical panels along the edge of the driving lane that is adjacent to the drop off.

The Engineer will measure stackable vertical panels as specified in Section 704, “TemporaryTraffic Control”.

The Engineer will not measure material used to construct the wedge. Include cost for the additional aggregate or embankment required for this operation in the price bid for aggregate or earthwork pay items.

If unable to complete a traversable taper wedge provide 24 hour flagging and traffic control at no additional cost to the department.

107-P02 SIGNS IN MONTANA: It is the contractor’s responsibility to ensure that signs placed in Montana meet Montana standards. Contact the Glendive District before placing any signs in Montana.

230-P01 SHOULDER PREPARATION: In addition to the requirements of Section 230.04 B, till or disk the inslope a minimum of 2 FT wide from the bottom of the existing slough. Blade away the tilled material from the pavement slough before overlay placement.

After the bituminous pavement has been placed on the shoulders, provide a smooth transition between the top of the pavement slough and existing inslope. If additional material is needed to complete the transition, use bituminous millings leftover from this project. Remove all asphalt chunks, rock, and lumps of sod or dirt to allow a smooth transition.

704-P01 TRAFFIC CONTROL: Provide traffic control consisting of a lane closure, flagging, and a pilot car. Provide additional devices at no additional cost to the Department.

Traffic control devices are based on a 6 mile limitation and the list below.

D-704-15, Layout Type A for a temporary one lane closure with pilot car to perform placing of aggregate, milling, paving, and cutting in centerline rumble strips. Quantities are based on two lane closures happening simultaneously.

D-704-20, Layout Type G as the basis of the Construction Signing Sheet
D-704-22, Layouts Type K and L for trucks entering and exiting the roadway as needed.
D-704-24, Layout Type T for mobile operation on shoulder as needed.
D-704-26, Layouts Type BB, CC, EE, FF, and GG as needed.
D-704-27 for pavement marking
D-704-56 for grinding shoulder rumble strips

706-P01 FIELD OFFICE: Provide a field office which meets the following requirements:

1. Minimum total area of 440 square feet
2. Indoor bathroom facilities and supplies with weekly cleaning services
3. Hookups for heat, electricity, sewer, and potable water.
4. Minimum cabinet space of 32 cubic feet
5. Minimum counter space of 40 square feet
6. Air conditioner with a minimum of 20,000 BTUs
7. Lighting with a minimum of 110 foot-candles
8. Supply a photocopier with enough toner to last the length of the project and with the following capabilities:
    a. Printing;
    b. Scanning; and
    c. Producing 11 x 17 photocopies and prints.

Place the field office on the project, or as close to the project as possible. The Contractor is responsible for the pay for the following:
- Rental fees;
- Heating;
- Electrical;
- Sewer; and
- Potable water.

Make the field office available for occupancy one week before the start of the project. The Engineer will approve the location and the condition of the office. Do not remove the field office until the Engineer releases the field office.

The Engineer is responsible for the following items:
- Furnishing office equipment;
- Supplying paper; and
- Supplying and paying for internet service.

All requirements of the Field Office are subject to approval by the Engineer. Include the costs for the field office in the bid item "Field Office".

Schedule for payments:
- 25% when set up on site.
- 50% when 30% of the work is complete.
- 75% when 60% of the work is complete.
- 100% when project is complete.

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

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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ENVIRONMENTAL COMMITMENTS

ENVIRONMENTAL COMMITMENTS (EC): The North Dakota Department of Transportation has made environmental commitments to secure approval of this project. The environmental commitments are as follows:

EC-1: Unavoidable impacts to wetlands will be mitigated onsite, adjacent to the project, or at a NDDOT approved mitigation site or bank.

ACTION REQUIRED /TAKEN: 0.00 acres of permanent impacts to USACE jurisdictional waters and 0.00 acres of permanent impacts to EO 11990 wetlands will require mitigation.

Wetland Impact Table

Wetland Number	Location	Cowardin Class.	Wetland Type	Wetland Size (acres)	Wetland Feature	USACE Jurisdictional Wetlands[1]	Wetland Impacts (acres)		USFWS Easement Impacts (acres)		Wetland Mitigation								
											Mitigation Required			Bank		Onsite			
							Temp.	Perm.	Temp.	Perm.	EO 11990	USACE	USFWS	Location	acres	Mitigation Location; Ratio	acres	Constructed Site #	Constructed size (acres)
There are a number of adjacent wetlands, however, no impacts are anticipated within the limits of construction.																			
			Totals	0.00			0.00	0.00	0.00	0.0					0.00		0.00		0.00

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SOIB-7-068(011)000	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
103	0100	CONTRACT BOND	L SUM	1	1
202	0121	REMOVE & SALVAGE BITUMINOUS SURFACING	TON	726	726
203	0101	COMMON EXCAVATION-TYPE A	CY	162	162
216	0100	WATER	M GAL	11.6	11.6
230	0125	SHOULDER PREPARATION	MILE	55.874	55.874
251	0200	SEEDING CLASS II	ACRE	0.13	0.13
251	2000	TEMPORARY COVER CROP	ACRE	0.13	0.13
253	0101	STRAW MULCH	ACRE	0.26	0.26
302	0100	SALVAGED BASE COURSE	TON	887	887
401	0050	TACK COAT	GAL	58,636	58,636
411	0100	MILLING PAVEMENT SURFACE	TON	49,181	49,181
430	0145	RAP - SUPERPAVE FAA 45	TON	145,639	145,639
430	1000	CORED SAMPLE	EA	592	592
430	6428	PG 64-28 ASPHALT CEMENT	TON	6,116.8	6,116.8
702	0100	MOBILIZATION	L SUM	1	1
704	0100	FLAGGING	MHR	1,000	1,000
704	1000	TRAFFIC CONTROL SIGNS	UNIT	2,754	2,754
704	1052	TYPE III BARRICADE	EA	2	2
704	1067	TUBULAR MARKERS	EA	245	245
704	1080	STACKABLE VERTICAL PANELS	EA	23	23
704	1185	PILOT CAR	HR	500	500
706	0400	FIELD OFFICE	EA	1	1
706	0550	BITUMINOUS LABORATORY	EA	1	1
706	0600	CONTRACTOR'S LABORATORY	EA	1	1
709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	1,329	1,329
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	62	62
754	0112	FLAT SHEET FOR SIGNS-TYPE IV REFL SHEETING	SF	41	41
754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	289	289
754	0592	RESET SIGN PANEL	EA	3	3
760	0005	RUMBLE STRIPS - ASPHALT SHOULDER	MILE	55.9	55.9
760	0007	RUMBLE STRIPS - ASPHALT CENTERLINE	MILE	27.9	27.9
762	0103	PVMT MK PAINTED-MESSAGE	SF	32	32
762	0430	SHORT TERM 4IN LINE-TYPE NR	LF	343,966	343,966

ESTIMATE NUMBER: 16383 RUN DATE: 02/17/2016 TIME: 14:10:45

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SOIB-7-068(011)000	8	2

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
762	1104	PVMT MK PAINTED 4IN LINE	LF	382,730	382,730
762	1108	PVMT MK PAINTED 8IN LINE	LF	225	225
762	1124	PVMT MK PAINTED 24IN LINE	LF	48	48

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BASIS OF ESTIMATE

	Mainline											
	1		2		3		4		5		6	
	2" Milling, 4 ½" HMA		2" Milling, 4 ½" HMA		2" Milling, 5" HMA		2" Milling, 6" HMA		7" Aggr Base, 8" HMA		5" Milling, 7 ½" HMA	
	Sta 0+00 to 604+09.9 R1 Sta 461+75.2 R3 to 19+72 R4 *(*See column 2, 5, & 6 exceptions.)*		*Sta 4+75 to 24+25 R1 *Sta 26+00 to 27+33.1 R1 *Sta 261+50 to 238+75 R3 * Sta 217+65 to 192+85 R3 *Sta 114+75 to 101+56 R4		Sta 604+09.9 R1 to 461+75.2 R3 *(**See column 5 exceptions.)*		Sta 19+72 R4 to 9+77.72 R4		*Sta 24+25 R1 to 26+00 R1 **Sta 247+10 to 247+60 R2 **Sta 255+25 to 255+90 R2 **Sta 263+60 to 264+00 R2 *Sta 314+75 to 314+00 R3		*Sta 197+25 to 197+90 R1 *Sta 241+60 to 242+90 R1 *Sta 585+00 to 586+05 R1 *Sta 590+50 to 591+00 R1 *Sta 596+85 to 597+75 R1	
	Total Length=65,652 LF *Total Length=12.4341 Miles*		*Total Length=8,157.10 LF* *Total Length=1.5449 Miles*		*Total Length=38,038.2 LF* *Total Length=7.2042 Miles*		*Total Length=641.1 LF* *Total Length=0.1226 Miles*		*Total Length=392.8 LF* *Total Length=0.0744 Miles*		*Total Length=300'* *Total Length=0.0568 Miles*	
Material	**Unit**	*Width (ft)*	*Quantity per Mile*	*Width (ft)*	*Quantity per Mile*	Width (ft)	Quantity per Mile	Width (ft)	Quantity per Mile	Width (ft)	Quantity per Station	Width (ft)	Quantity per Station
Remove and Salvage Bituminous Surfacing	Ton	---	---	---	---	---	---	---	---	28	180	---	---
Common Excavation – Type A	CY	---	---	---	---	---	---	---	---	41.7	40	---	---
Salvaged Base Course @ 1.875 Ton/CY	Ton	---	---	---	---	---	---	---	---	33.8	147.3	---	---
Tack Coat @ 0.05 Gal/SY (1st Lift)	Gal	32	939	32	939	32	939	34	997.3	*33.8*	*18.8*	34.6	19.2
Tack Coat @ 0.05 Gal/SY (2nd Lift)	Gal	30	880	30	880	30.4	891.7	31	909.3	32.36	17.9	32.4	18.0
Tack Coat @ 0.05 Gal/SY (3rd Lift)	Gal	---	---	---	---	*29.5*	*865.3*	*29.5*	*865.3*	30.9	17.2	30.2	16.8
Tack Coat @ 0.05 Gal/SY (4th Lift)	Gal	---	---	---	---	---	---	---	---	29.5	16.4	---	---
Milling Pavement Surface	Ton	30.3	1,751	29	1,711	30.3	1,751	30.3	1,751	---	---	34.6	89.90
RAP - Superpave FAA 45 @ 2 Ton/CY	Ton	28	4,364	28	4,620.3	28	4,892	28	5,978.7	28	152.7	28	144.9
PG 64-28 Asphalt Cement @ 4.2%	Ton	---	183.3	---	194	---	205.5	---	251.1	---	6.41	---	6.09
Geosynthetic Material Type G	SY	---	---	---	---	---	---	---	---	29.5	327.8	---	---

NOTE: Stationing shown includes curves, but the curve lengths are excluded from total length shown for each segment.
See proposed typical sections for clarity.

Material Description	Rate
Removal of Bituminous Surfacing	1.875 Ton/CY
Pavement Surface Millings	1.875 Ton/CY
Salvaged Base Course	1.875 Ton/CY
Tack Coat	0.05 Gal/SY
RAP – Superpave FAA 45	2 Ton/CY
PG 64 – 28 Asphalt Cement	4.2% of RAP

MILLING SUMMARY		
Description	**Basis of Estimate**	**Quantity (Ton)**
Available Milled Material	1.875 Tons/CY of Milled Material	51,857 Ton
Milled Material Required for Production of RAP	25% of RAP-Superpave FAA 45 Quantity	36,410 Ton
Milled material available for production of Salvaged Base Course & transition between the top of the pavement slough and existing inslope	-	15,447 Ton

RUMBLE STRIPS		
Location	Rumble Strips – Asphalt Shoulder	Rumble Strips – Asphalt Centerline
RP 0.00 to RP 27.937	**55.871 Miles**	**27.936 Miles**

HBP Cored Samples							
	A	B	C	D			
Specification Section	**Distance (Ft)÷2000**	**Lanes**	**Lifts**	**Sublots (A × B × C)**	**Quantity (D × 2)**	**Quantity (1 per mile)**	**Unit**
430.04 I.2.b(1), "General"	74	2	2	296	592	N/A	EA
430.04 I.2.b(2), "Pavement Thickness Determination Cores"					N/A	0	EA
				Total	592	0	EA

Water
25 MGal/Mile for Dust Palliative
20 Gal/Ton for Salvaged Base Course

Seeding and Mulching
Seed and mulch all disturbed areas outside of the paved shoulder and approaches within the project limits.

PROJECT TOTAL
SEEDING CL. II: Estimated at 0.13 Acres.
TEMPORARY COVER CROP: Estimated at 0.13 Acres.
STRAW MULCH: Estimated at 0.26 Acres.

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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BASIS OF ESTIMATE

Begin Station (RP)	End Station (RP)	Existing Superelevation '/'	Proposed Superelevation '/'	Length (feet)	HMA Section End Area (SF)	HMA (Ton)	PG 64-28 AC (Ton)	Tack Coat (Gal)
PC 27+33.1 R1 (0.517)	PT 42+39.8 R1 (0.803)	0.031	0.030	1,506.7	12.8115	1,430	60.06	513
PC 83+04.4 R1 (1.573)	PT 98+96.6 R1 (1.874)	0.019	0.041	1,592.2	21.2513	2,506	105.25	694
TS 250+88.9 R1 (4.752)	ST 271+60.0 R1 (5.144)	0.090	0.058	2,071.1	28.7488	4,410	185.22	978
TS 284+24.6 R1 (5.383)	ST 309+61.8 R1 (5.864)	0.037	0.058	2,537.2	20.6275	3,877	162.83	895
PC 315+22.6 R1 (5.970)	PT 326+65.9 R1 (6.187)	0.026	0.041	1,143.3	18.0266	1,527	64.13	400
PC 336+77.1 R1(6.378)	PT 349+61.5 R1 (6.621)	0.040	0.041	1,284.4	11.06	1,052	44.18	432
TS 366+32.4 R1 (6.938)	ST 391+44.9 R1 (7.414)	0.036	0.050	2,512.5	17.333	3,226	135.49	875
PC 395+99.0 R1 (7.499)	PT 412+27.3 R1 (7.808)	0.014	0.030	1,628.3	18.2826	2,205	92.61	570
PC 419+79.4 R1 (7.951)	PT 433+23.8 R1 (8.205)	0.055	0.041	1,344.4	17.6718	1,760	73.92	472
PC 455+41.4 R1 (8.625)	PT 476+90.2 R1 (9.032)	0.032	0.041	2,148.8	15.1503	2,411	101.26	740
PC 512+79.2 R1 (9.712)	PT 536+64.2 R1 (10.164)	0.028	0.030	2,385.0	12.8115	2,263	95.05	806
PC 542+51.6 R1 (10.275)	PT 571+51.6 R1 (10.824)	0.022	0.041	2,900.0	18.7896	4,036	169.51	1,016
PC 586+98.5 R1 (11.117)	PT 607+11.8 R2 (11.498)	0.004	0.030	2,013.3	23.215	3,546	148.93	893
ST 495+79.6 Ahd R3 (18.732)	TS 461+75.2 R3 (19.377)	0.042	0.058	3,404.4	18.0586	4,554	191.27	1190
PT 359+34.1 R3 (21.316)	PC 348+79.1 R3 (21.517)	0.028	0.030	1,055.0	11.8677	927	38.93	356
PT 343+30.1 R3 (21.620)	PC 331+74.9 R3 (21.838)	0.047	0.046	1,155.2	10.9002	933	39.19	388
PT 324+36.1 R3 (21.978)	PC 314+62.8 R3 (22.163)	0.020	0.030	973.3	15.3449	1,106	46.45	335
PT 167+99.0 R4 (24.940)	PC 154+62.3 R4 (25.195)	0.012	0.030	1,336.7	18.7129	1,853	77.83	468
PT 149+86.1 R4 (25.285)	PC 140+12.7 R4 (25.469)	0.028	0.024	973.4	12.9371	933	39.19	332
PT 13+24.9 R4 (27.873)	PC 1+99.9 R4 (28.086) Project Ends at 9+77.7 R4 (27.937)	0.042	0.042	347.18	15.0247	386	16.21	117
					TOTAL	44,941	1,887.5	12,470

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SOIB-7-068(011)000	10	3

BASIS OF ESTIMATE

Barrier Stripe Locations

Eastbound Yellow Centerline Barrier			Westbound Yellow Centerline Barrier			Length of Double Barrier Stripe (feet)
Beginning RP	Ending RP	Length (feet)	Beginning RP	Ending RP	Length (feet)	
0.000	0.083	440	0.140	0.293	810	
0.355	0.665	1,640	0.563	0.868	1,610	540
1.534	1.679	765	1.735	1.887	805	
3.547	3.701	815	3.755	3.909	815	
4.045	4.150	555	4.253	4.358	555	
4.433	4.617	970	4.640	4.824	970	
5.134	5.209	395	5.342	5.417	395	
6.043	6.126	440	6.251	6.333	435	
6.295	6.441	770	6.503	6.649	770	
8.973	9.161	995	9.182	9.363	955	
10.191	10.429	1,255	10.399	10.636	1,250	160
10.886	11.088	1,065	11.095	11.296	1,060	
11.768	11.867	525	11.977	12.074	510	
12.444	12.558	600	12.653	12.766	595	
12.885	13.203	1,680	13.093	13.411	1,680	580
14.050	14.226	930	14.259	14.433	920	
16.124	16.396	1,435	16.332	16.604	1,435	340
17.019	17.185	875	17.228	17.393	870	
17.482	17.607	660	17.690	17.815	660	
19.482	19.518	190	19.692	19.724	170	
19.711	19.821	580	19.919	20.029	580	
20.194	20.515	1,695	20.401	20.723	1,700	600
22.066	22.355	1,525	22.275	22.563	1,520	425
23.693	23.995	1,595	23.901	24.203	1,595	495
26.215	26.412	1,040	26.424	26.619	1,030	
27.128	27.392	1,395	27.337	27.599	1,385	290
Total Eastbound Barrier Stripe (feet) =		**24,830**	Total Westbound Barrier Stripe (feet) =		**25,080**	
Total Eastbound Barrier Stripe (miles) =		4.703	Total Westbound Barrier Stripe (miles) =		4.750	
Total Double Barrier Stripe (feet) =						3,430
Total Double Barrier Stripe (miles) =						0.650

SHORT TERM PAVEMENT MARKING		
762-0430 Short Term 4 IN Line-Type NR		
Location	Basis	Quantity
Centerline – Top of Milled Surface	Centerline Skips 1,320 LF/mile Barrier Stripe	36,019 LF 49,910 LF
Centerline – Top of 1st Lift	Centerline Skips 1,320 LF/mile Barrier Stripe	36,019 LF 49,910 LF
Centerline – Top of 2nd Lift	Centerline Skips 1,320 LF/mile Barrier Stripe	36,019 LF 49,910 LF
Centerline – Top of 3rd Lift (Sta 19+72 to Sta 9+77.72)	Centerline Skips 1,320 LF/mile	250 LF
Centerline – Top of Fog Coat	Centerline Skips 1,320 LF/mile Barrier Stripe	36,019 LF 49,910 LF
	TOTAL	**343,966 LF**

PERMANENT PAVEMENT MARKING		
Location - Type	Basis	Quantity
Mainline Yellow Centerline Skips 4 IN Line (minus double barrier stripe locations)	1,320 LF/mile	36,019 LF
Mainline White Edge Lines 4 IN Line	10,560 LF/mile	295,013 LF
ND 16 Intersection		
Centerline – Pvmt MK Painted 4 IN Line	Centerline Skips 1,320 LF/mile Barrier Stripe 990 LF/mile	12 LF
Edge Lines – Pvmt MK Painted 4 IN Line	10,560 LF/mile	732 LF
Stop Bar - Pvmt MK Painted 24 IN Line		24 LF
Channel Line - Pvmt MK Painted 8 IN Line		225 LF
Pvmt MK Painted - Message		32 SF
McKenzie County 3 Intersection		
Centerline – Pvmt MK Painted 4 IN Line	Centerline Skips 1,320 LF/mile Barrier Stripe 990 LF/mile	29 LF
Edge Lines – Pvmt MK Painted 4 IN Line	10,560 LF/mile	420 LF
Stop Bar - Pvmt MK Painted 24 IN Line		24 LF

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SOIB-7-068(011)000	11	1

MILE POINT	*RT.OR LT.	CORE NO	DEPTH (inches)
2.755	LT	200	10.75
2.505	LT	201	10.50
2.255	LT	202	10.50
2.003	LT	203	10.00
1.755	LT	204	9.75
1.505	LT	205	10.00
1.255	LT	206	11.50
1.000	LT	207	11.00
0.755	LT	208	11.50
0.505	LT	209	13.50
0.255	LT	210	14.00
0.135	RT	211	8.00
0.385	RT	212	14.00
0.635	RT	213	10.75
0.885	RT	214	12.00
1.135	RT	215	12.00
1.385	RT	216	11.00
1.635	RT	217	11.50
1.885	RT	218	10.00
2.135	RT	219	9.50
2.385	RT	220	11.00
2.635	RT	221	11.00
2.885	RT	222	11.00
7.279	LT	164	8.00
7.029	LT	165	8.00
6.779	LT	166	12.50
6.529	LT	167	12.50
6.279	LT	168	11.50
6.033	LT	169	12.50
5.783	LT	170	12.00
5.533	LT	171	12.75
5.283	LT	172	12.75
5.028	LT	173	12.00
4.728	LT	174	11.50
4.528	LT	175	11.00
4.278	LT	176	10.75
4.020	LT	177	10.75
3.770	LT	178	11.00
3.520	LT	179	11.25
3.270	LT	180	11.00
3.010	LT	181	11.00
3.135	RT	182	11.75
3.385	RT	183	11.00
3.638	RT	184	11.00
3.885	RT	185	11.00
4.135	RT	186	11.00
4.385	RT	187	11.25
4.635	RT	188	12.25
4.885	RT	189	12.00
5.135	RT	190	12.00
5.385	RT	191	13.00
5.635	RT	192	13.00
5.885	RT	193	12.50
6.135	RT	194	13.50
6.385	RT	195	14.50
6.635	RT	196	12.75
6.885	RT	197	12.00
7.135	RT	198	9.00
7.385	RT	199	10.00
13.068	LT	118	9.50
12.818	LT	119	8.50
12.568	LT	120	9.50
12.318	LT	121	8.00
12.068	LT	122	8.00
11.819	LT	123	9.50
11.568	LT	124	9.25
11.318	LT	125	8.00
11.068	LT	126	8.00
10.814	LT	127	9.00
10.564	LT	128	9.00
10.314	LT	129	9.00
10.064	LT	130	9.00
9.805	LT	131	8.75
9.555	LT	132	9.75
9.305	LT	133	10.00
9.055	LT	134	10.00
8.800	LT	135	10.00
8.550	LT	136	10.00
8.675	RT	137	9.00
8.925	RT	138	8.50
9.175	RT	139	6.75

MILE POINT	*RT.OR LT.	CORE NO	DEPTH (inches)
9.425	RT	140	7.00
9.675	RT	141	7.75
9.925	RT	142	8.75
10.175	RT	143	9.50
10.425	RT	144	10.00
10.675	RT	145	10.00
10.925	RT	146	9.50
11.175	RT	147	10.00
11.425	RT	148	9.50
11.675	RT	149	8.25
11.925	RT	150	8.00
12.175	RT	151	8.25
12.425	RT	152	9.00
12.675	RT	153	8.25
12.925	RT	154	9.25
13.175	RT	155	8.00
8.274	LT	156	7.75
8.024	LT	157	8.00
7.774	LT	158	7.50
7.524	LT	159	7.50
7.649	RT	160	7.50
7.899	RT	161	7.00
8.149	RT	162	8.00
8.399	RT	163	8.00
17.859	LT	80	7.50
17.609	LT	81	8.75
17.359	LT	82	9.00
17.109	LT	83	6.25
16.850	LT	84	8.00
16.600	LT	85	7.75
16.350	LT	86	9.00
16.100	LT	87	8.00
15.844	LT	88	8.75
15.600	LT	89	6.50
15.350	LT	90	8.25
15.100	LT	91	7.50
14.834	LT	92	7.50
14.584	LT	93	8.25
14.334	LT	94	8.50
14.084	LT	95	8.50
13.817	LT	96	8.50
13.567	LT	97	8.25
13.317	LT	98	7.50
13.442	RT	99	7.75
13.692	RT	100	8.25
13.942	RT	101	8.50
14.192	RT	102	8.50
14.442	RT	103	8.50
14.692	RT	104	8.50
14.942	RT	105	7.50
15.205	RT	106	7.75
15.455	RT	107	9.50
15.705	RT	108	7.25
15.955	RT	109	7.50
16.205	RT	110	8.50
16.455	RT	111	8.50
16.705	RT	112	7.75
16.955	RT	113	6.00
17.205	RT	114	7.25
17.455	RT	115	8.50
17.705	RT	116	8.75
17.955	RT	117	9.00
22.899	LT	40	6.50
22.649	LT	41	6.00
22.399	LT	42	5.25
22.149	LT	43	5.50
21.890	LT	44	6.00
21.640	LT	45	7.00
21.390	LT	46	7.00
21.140	LT	47	6.00
20.882	LT	48	6.00
20.632	LT	49	7.00
20.382	LT	50	9.50
20.132	LT	51	8.50
19.880	LT	52	6.00
19.632	LT	53	7.50
19.382	LT	54	7.50
19.132	LT	55	8.00
18.882	LT	56	7.75
18.632	LT	57	8.50
18.382	LT	58	8.00
18.132	LT	59	8.00
18.257	RT	60	9.50
18.507	RT	61	7.75
18.757	RT	62	7.75
19.007	RT	63	7.50

MILE POINT	*RT.OR LT.	CORE NO	DEPTH (inches)
19.273	RT	64	9.00
19.523	RT	65	8.75
19.773	RT	66	8.50
20.023	RT	67	9.00
20.273	RT	68	9.00
20.523	RT	69	7.00
20.774	RT	70	7.50
21.023	RT	71	8.00
21.273	RT	72	7.50
21.523	RT	73	7.50
21.773	RT	74	7.00
22.023	RT	75	7.50
22.273	RT	76	6.00
22.523	RT	77	6.50
22.773	RT	78	6.50
23.023	RT	79	6.75
27.922	LT	1	9.50
27.672	LT	2	5.50
27.422	LT	3	8.00
27.171	LT	4	8.50
26.928	LT	5	8.00
26.678	LT	6	8.00
26.429	LT	7	11.00
26.181	LT	8	7.00
25.925	LT	9	7.50
25.671	LT	10	8.00
25.423	LT	11	6.50
25.176	LT	12	7.00
24.927	LT	13	7.00
24.679	LT	14	6.50
24.431	LT	15	5.50
24.177	LT	16	5.50
23.927	LT	17	6.00
23.677	LT	18	6.00
23.427	LT	19	6.00
23.177	LT	20	7.00
23.302	RT	21	7.50
23.552	RT	22	5.00
23.802	RT	23	7.50
24.052	RT	24	7.50
24.302	RT	25	8.00
24.553	RT	26	8.00
24.800	RT	27	7.75
25.049	RT	28	7.50
25.298	RT	29	7.00
25.545	RT	30	8.00
25.792	RT	31	6.50
26.050	RT	32	8.00
26.298	RT	33	7.00
26.547	RT	34	7.00
26.796	RT	35	8.00
27.045	RT	36	7.50
27.294	RT	37	7.50
27.542	RT	38	9.00
27.790	RT	39	6.50

Average Depth
8.855

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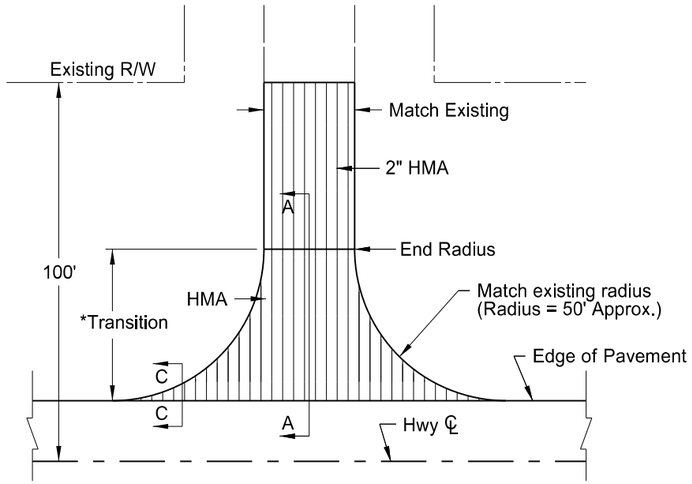
CORE DEPTHS

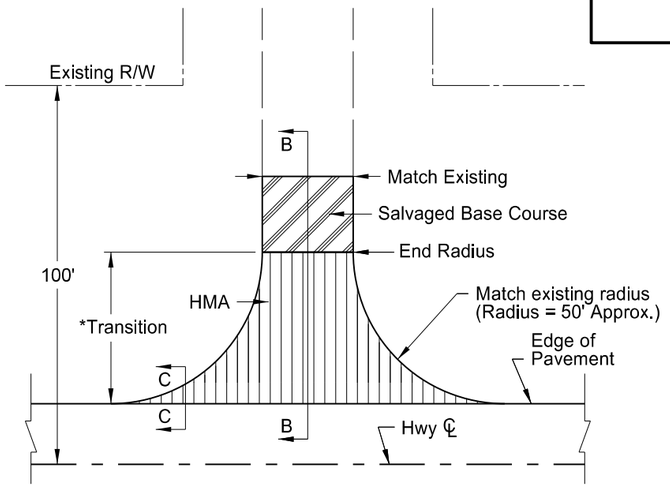
Hot Mix Asphalt Overlay

State Line East to Junction US 85

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SOIB-7-068(011)000	20	1



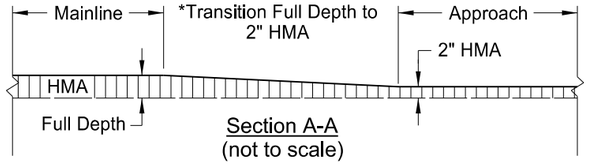
(1) Paved Section Line, County Road, or Street Approach



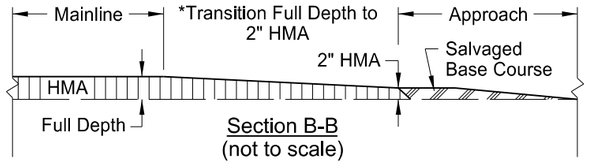
(2) Gravel Section Line, County Road, or Street Approach

Notes:

1. Actual HMA paving and salvaged 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. Salvaged 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).



Section A-A
(not to scale)



Section B-B
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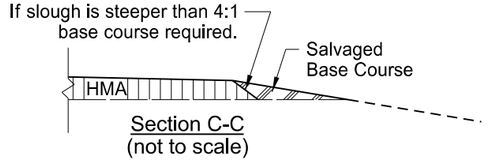
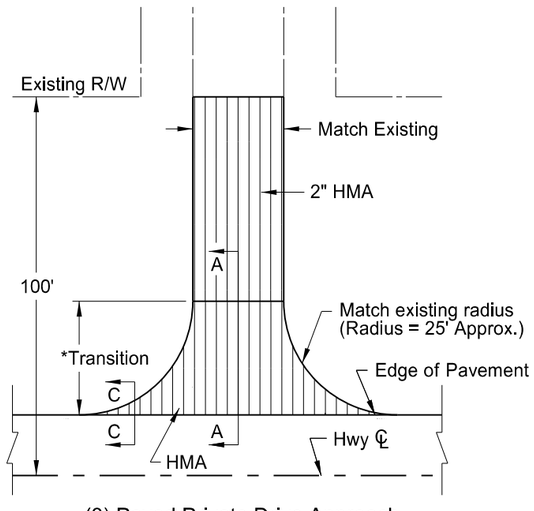
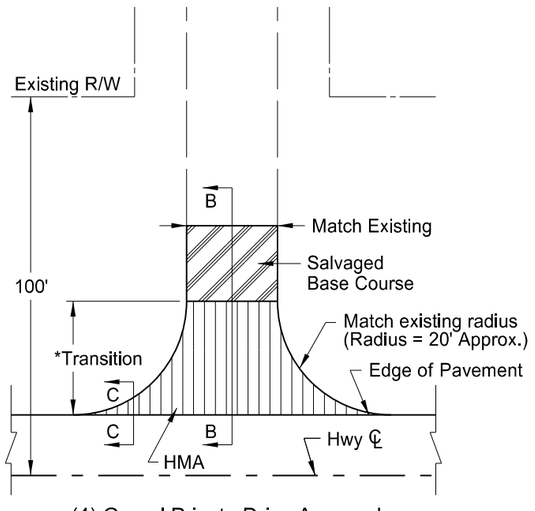


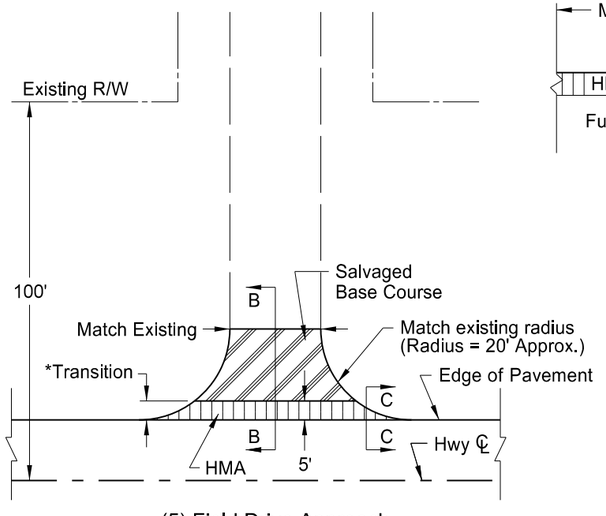
Section C-C
(not to scale)



(3) Paved Private Drive Approach



(4) Gravel Private Drive Approach



(5) Field Drive Approach

BASIS OF ESTIMATE		(1)	(2)	(3)	(4)	(5)	
ITEM	UNIT	Paved Section Line	Gravel Section Line	Paved Private Drive	Gravel Private Drive	Field Drive	TOTALS
Number of Locations	#	-	28	-	28	61	-
Salvaged Base Course	TON	N/A	4	N/A	2	2	290
Tack Coat	GAL	-	13	-	4	1	537
RAP-Superpave FAA 45	TON	-	51	-	13	2	1,914
PG 64-28 Asphalt Cement	TON	-	2	-	0.5	0.08	80.4

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Approach Paving Details for Structural Improvement Projects

Hot Mix Asphalt Overlay

State Line East to Junction US 85

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SOIB-7-068(011)000	20	2

LOCATION	TYPE
0+00 R1 Rt	Gravel Private Drive
62+50 R1 Lt	Gravel Private Drive
62+50 R1 Rt	Gravel Private Drive
76+61 R1 Rt	Gravel Private Drive
91+12 R1 Lt	Gravel Section Line
91+12 R1 Rt	Gravel Section Line
103+91 R1 Rt	Field Drive
113+75 R1 Lt	Gravel Private Drive
136+50 R1 Lt	Field Drive
136+50 R1 Rt	Field Drive
155+58 R1 Lt	Gravel Private Drive
156+88 R1 Rt	Gravel Private Drive
177+02 R1 Lt	Field Drive
188+05 R1 Lt	Field Drive
212+31 R1 Lt	Field Drive
218+79 R1 Rt	Field Drive
245+00 R1 Rt	Gravel Section Line
245+45 R1 Lt	Gravel Section Line
292+16 R1 Rt	Field Drive
321+50 R1 Lt	Field Drive
353+75 R1 Lt	Field Drive
353+75 R1 Rt	Field Drive
383+00 R1 Lt	Field Drive
383+00 R1 Rt	Field Drive
391+08 R1 Lt	Field Drive
391+08 R1 Rt	Gravel Private Drive
411+61 R1 Lt	Field Drive
413+50 R1 Rt	Gravel Private Drive
435+56 R1 Lt	Field Drive
435+56 R1 Rt	Field Drive
483+00 R1 Rt	Gravel Private Drive
491+50 R1 Rt	Field Drive
569+80 R1 Lt	Field Drive
569+80 R1 Rt	Field Drive
606+70 R2 Lt	Gravel Private Drive
620+07 R2 Rt	Gravel Private Drive
640+75 R2 Lt	Gravel Section Line
45+30 R2 Lt	Gravel Private Drive
45+30 R2 Rt	Gravel Section Line
52+73 R2 Lt	Gravel Section Line
98+20 R2 Rt	Paved Section Line
105+50 R2 Lt	Gravel Section Line
114+90 R2 Rt	Gravel Private Drive
121+45 R2 Lt	Field Drive
124+36 R2 Rt	Gravel Private Drive
128+75 R2 Lt	Field Drive
128+75 R2 Rt	Gravel Private Drive
135+00 R2 Rt	Field Drive
142+00 R2 Rt	Field Drive
144+93 R2 Lt	Field Drive
151+00 R2 Rt	Gravel Section Line
158+30 R2 Lt	Gravel Section Line
170+00 R2 Rt	Field Drive
183+92 R2 Rt	Gravel Private Drive
184+75 R2 Lt	Field Drive
186+55 R2 Rt	Gravel Private Drive
220+00 R2 Lt	Field Drive
220+80 R2 Rt	Field Drive
236+50 R2 Lt	Field Drive
254+22 R2 Rt	Gravel Section Line
263+90 R2 Lt	Gravel Section Line
281+50 R2 Rt	Field Drive
290+39 R2 Lt	Field Drive
301+59 R2 Rt	Field Drive
311+77 R2 Rt	Field Drive
320+25 R2 Rt	Gravel Section Line
340+15 R2 Rt	Gravel Private Drive
342+50 R2 Lt	Field Drive

LOCATION	TYPE
469+70 R3 Rt	Gravel Private Drive
456+42 R3 Rt	Field Drive
446+50 R3 Rt	Field Drive
430+08 R3 Lt	Gravel Section Line
430+08 R3 Rt	Gravel Section Line
416+32 R3 Lt	Gravel Private Drive
416+32 R3 Rt	Field Drive
404+00 R3 Lt	Field Drive
377+25 R3 Rt	Gravel Section Line
361+38 R3 Lt	Field Drive
361+38 R3 Rt	Field Drive
351+65 R3 Rt	Field Drive
345+43 R3 Lt	Field Drive
345+34 R3 Rt	Gravel Private Drive
340+00 R3 Lt	Field Drive
340+00 R3 Rt	Field Drive
337+48 R3 Lt	Field Drive
324+20 R3 Lt	Gravel Section Line
324+20 R3 Rt	Field Drive
311+00 R3 Lt	Field Drive
297+92 R3 Lt	Field Drive
297+92 R3 Rt	Field Drive
284+87 R3 Rt	Field Drive
282+59 R3 Lt	Gravel Private Drive
271+30 R3 Lt	Gravel Section Line
271+30 R3 Rt	Gravel Section Line
268+25 R3 Rt	Gravel Private Drive
243+75 R3 Lt	Gravel Private Drive
243+75 R3 Rt	Field Drive
218+52 R3 Lt	Gravel Section Line
218+52 R3 Rt	Gravel Section Line
202+00 R3 Lt	Field Drive
192+00 R3 Rt	Field Drive
165+88 R4 Lt	Gravel Section Line
165+88 R4 Rt	Gravel Section Line
153+09 R4 Rt	Field Drive
135+00 R4 Lt	Field Drive
120+53 R4 Rt	Gravel Private Drive
120+45 R4 Lt	Gravel Private Drive
112+86 R4 Lt	Gravel Section Line
112+86 R4 Rt	Gravel Section Line
89+24 R4 Rt	Field Drive
89+10 R4 Lt	Field Drive
60+15 R4 Lt	Gravel Section Line
60+15 R4 Rt	Gravel Section Line
44+55 R4 Lt	Field Drive
44+55 R4 Rt	Field Drive
37+55 R4 Lt	Gravel Private Drive
33+89 R4 Rt	Field Drive

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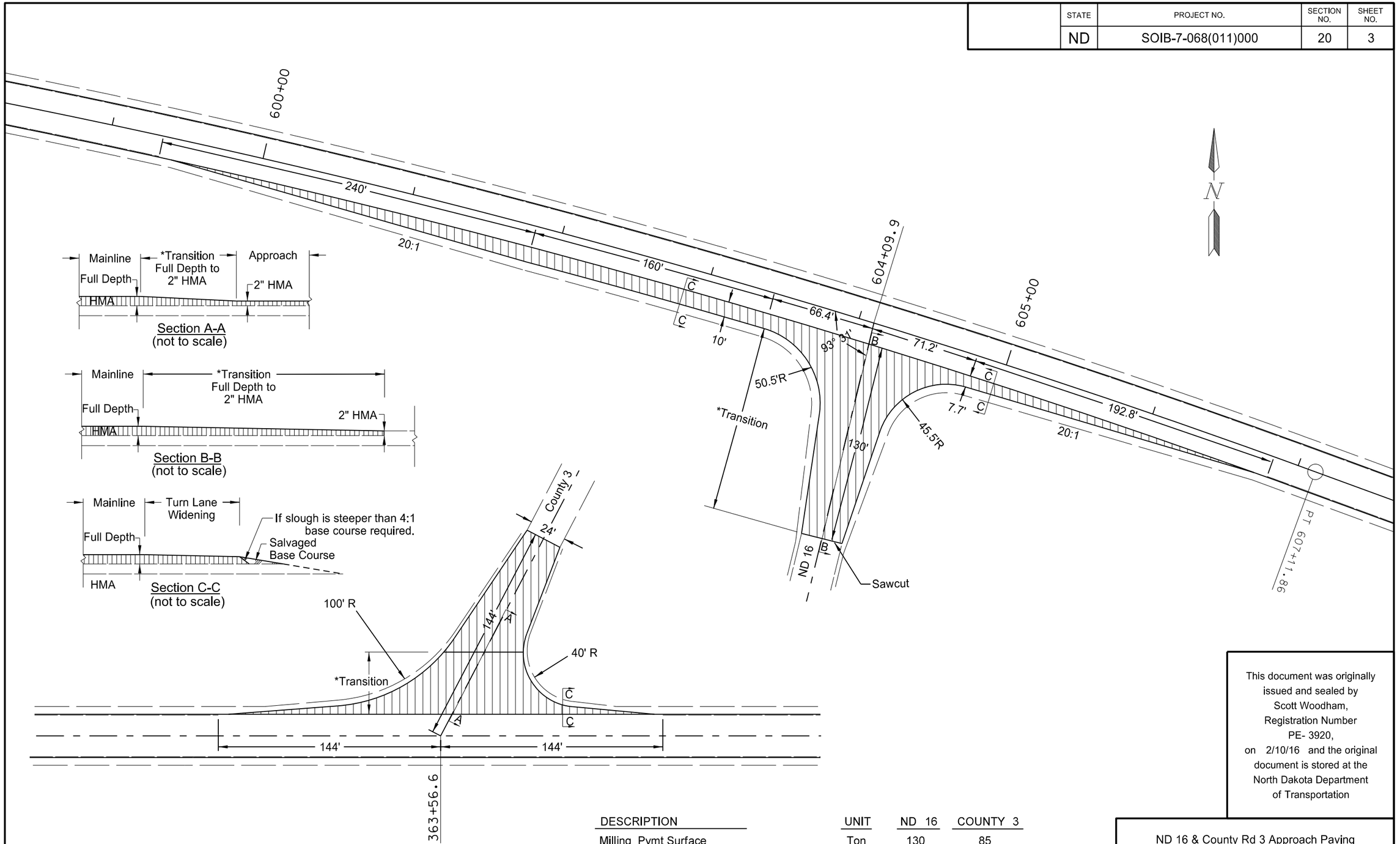
APPROACH LOCATIONS

Hot Mix Asphalt Overlay

State Line East to Junction US 85

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SOIB-7-068(011)000	20	3



DESCRIPTION	UNIT	ND 16	COUNTY 3
Milling Pvmt Surface	Ton	130	85
Tack Coat	Gal	117	38
RAP-Superpave FAA 45	Ton	258	115
PG 64-28 Asphalt Cement @ 4.2% HBP	Ton	10.8	4.8

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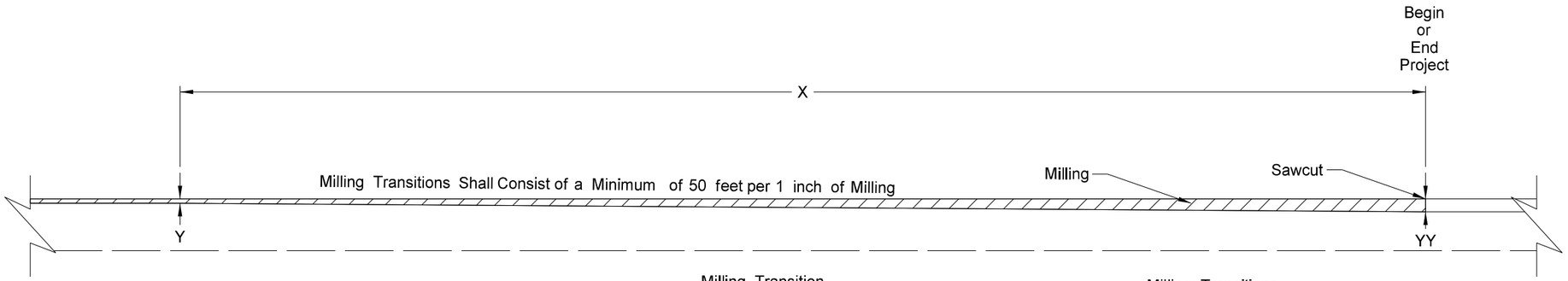
ND 16 & County Rd 3 Approach Paving

Hot Mix Asphalt Overlay

State Line to Junction US 85

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SOIB-7-068(011)000	20	4



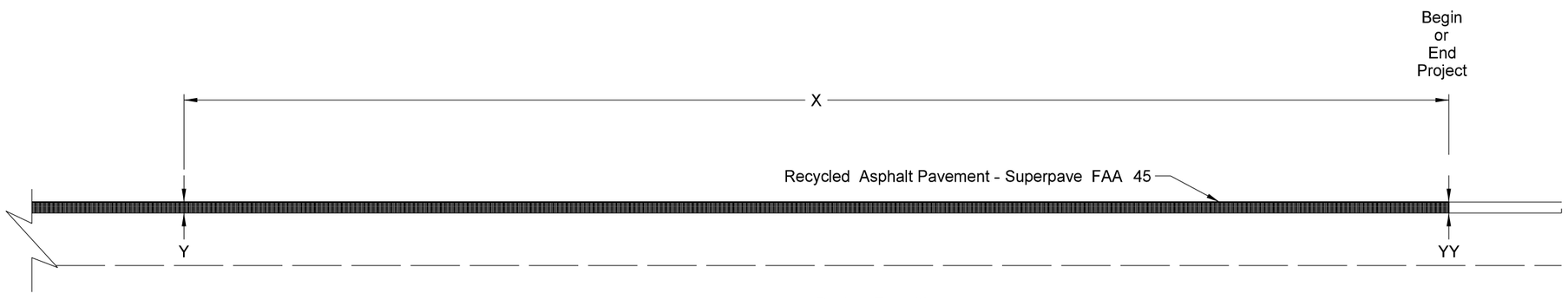
Milling Transition

Drawing is not to scale.

Milling Transitions

Begin Project	X	Y	YY
0+00	75 ft.	2 in.	3 in.

End Project	X	Y	YY
9+77.72	150 ft.	2 in.	3 in.



Paving Transition

Drawing is not to scale.

Paving Transitions

Begin Project	X	Y	YY
0+00	75 ft.	4½ in.	3 in.

End Project	X	Y	YY
9+77.72	150 ft.	6 in.	3 in.

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PAVING TRANSITIONS AT BEGINNG AND END OF PROJECT

Hot Mix Asphalt Overlay

State Line East to Junction US 85

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SOIB-7-068(011)000	20	5

P.C. Station 27+33.1 R1
P.I. Station 34+90.8 R1
Delta = 15° 04' 00.00" (RT)
Degree = 1° 00' 00.00"
Tangent = 757.7
Length = 1,506.67
Radius = 5,729.65
P.T. Station 42+39.8 R1

Station	Left Slope	Right Slope
PC - 138'	-2.1	-2.1
PC - 67'	0.0	-2.1
PC	2.1	-2.1
PC + 34'	3.0	-3.0
PT - 34'	3.0	-3.0
PT	2.1	-2.1
PT + 67'	0.0	-2.1
PT + 138'	-2.1	-2.1

P.C. Station 83+04.4 R1
P.I. Station 91+25.0 R1
Delta = 23° 53' 00.00" (RT)
Degree = 1° 30' 00.00"
Tangent = 807.87
Length = 1,592.22
Radius = 3,819.83
P.T. Station 98+96.6 R1

Station	Left Slope	Right Slope
PC - 161'	-2.1	-2.1
PC - 91'	0.0	-2.1
PC	2.7	-2.7
PC + 46'	4.1	-4.1
PT - 46'	4.1	-4.1
PT	2.7	-2.7
PT + 91'	0.0	-2.1
PT + 161'	-2.1	-2.1

T.S. Station 250+88.9 R1
S.C. Station 254+88.9 R1

P.C. Station 254+88.9 R1
P.I. Station 261+83.8 R1
Delta = 50° 08' 00.00" (RT)
Degree = 3° 00' 00.00"
Tangent = 1,094.93
Length = 1,271.11
Radius = 1,910.08
P.T. Station 267+60.0 R1

C.S. Station 267+60.0 R1
S.T. Station 271+60.0 R1

Station	Left Slope	Right Slope
TS - 145'	-2.1	-2.1
TS	0.0	-2.1
SC	5.8	-5.8
CS	5.8	-5.8
ST	0.0	-2.1
ST + 145'	-2.1	-2.1

T.S. Station 284+24.6 R1
S.C. Station 288+24.6 R1

P.C. Station 288+24.6 R1
P.I. Station 298+22.9 R1
Delta = 64° 07' 00.00" (RT)
Degree = 3° 00' 00.00"
Tangent = 1,398.35
Length = 1,737.22
Radius = 1,910.08
P.T. Station 305+61.8 R1

C.S. Station 305+61.8 R1
S.T. Station 309+61.8 R1

Station	Left Slope	Right Slope
TS - 145'	-2.1	-2.1
TS	0.0	-2.1
SC	5.8	-5.8
CS	5.8	-5.8
ST	0.0	-2.1
ST + 145'	-2.1	-2.1

P.C. Station 315+22.6 R1
P.I. Station 320+98.6 R1
Delta = 17° 09' 00.00" (RT)
Degree = 1° 30' 00.00"
Tangent = 576.0
Length = 1,143.33
Radius = 3,819.83
P.T. Station 326+65.9 R1

Station	Left Slope	Right Slope
PC - 161'	-2.1	-2.1
PC - 91'	0.0	-2.1
PC	2.7	-2.7
PC + 46'	4.1	-4.1
PT - 46'	4.1	-4.1
PT	2.7	-2.7
PT + 91'	0.0	-2.1
PT + 161'	-2.1	-2.1

P.C. Station 336+77.1 R1
P.I. Station 343+25.4 R1
Delta = 19° 16' 00.00" (LT)
Degree = 1° 30' 00.00"
Tangent = 648.34
Length = 1,284.45
Radius = 3,819.83
P.T. Station 349+61.5 R1

Station	Left Slope	Right Slope
PC - 161'	-2.1	-2.1
PC - 91'	-2.1	0.0
PC	-2.7	2.7
PC + 46'	-4.1	4.1
PT - 46'	-4.1	4.1
PT	-2.7	2.7
PT + 91'	-2.1	0.0
PT + 161'	-2.1	-2.1

T.S. Station 366+32.4 R1
S.C. Station 369+32.4 R1

P.C. Station 369+32.4 R1
P.I. Station 379+47.7 R1
Delta = 44° 15' 00.00" (RT)
Degree = 2° 00' 00.00"
Tangent = 1,315.30
Length = 1,912.50
Radius = 2,864.93
P.T. Station 388+44.9

C.S. Station 388+44.9 R1
S.T. Station 391+44.9 R1

Station	Left Slope	Right Slope
TS - 126'	-2.1	-2.1
TS	0.0	-2.1
SC	5.0	-5.0
CS	5.0	-5.0
ST	0.0	-2.1
ST + 126'	-2.1	-2.1

P.C. Station 395+99.0 R1
P.I. Station 404+18.7 R1
Delta = 16° 17' 00.00" (LT)
Degree = 1° 00' 00.00"
Tangent = 819.70
Length = 1,628.33
Radius = 5,729.65
P.T. Station 412+27.3 R1

Station	Left Slope	Right Slope
PC - 138'	-2.1	-2.1
PC - 67'	-2.1	0.0
PC	-2.1	2.1
PC + 34'	-3.0	3.0
PT - 34'	-3.0	3.0
PT	-2.1	2.1
PT + 67'	-2.1	0.0
PT + 138'	-2.1	-2.1

P.C. Station 419+79.4 R1
P.I. Station 426+58.6 R1
Delta = 20° 10' 00.00" (RT)
Degree = 1° 30' 00.00"
Tangent = 679.27
Length = 1,344.45
Radius = 3,819.83
P.T. Station 433+23.8 R1

Station	Left Slope	Right Slope
PC - 161'	-2.1	-2.1
PC - 91'	0.0	-2.1
PC	2.7	-2.7
PC + 46'	4.1	-4.1
PT - 46'	4.1	-4.1
PT	2.7	-2.7
PT + 91'	0.0	-2.1
PT + 161'	-2.1	-2.1

P.C. Station 455+41.4 R1
P.I. Station 466+45.1 R1
Delta = 32° 14' 00.00" (LT)
Degree = 1° 30' 00.00"
Tangent = 1,103.74
Length = 2,148.89
Radius = 3,819.83
P.T. Station 476+90.2 R1

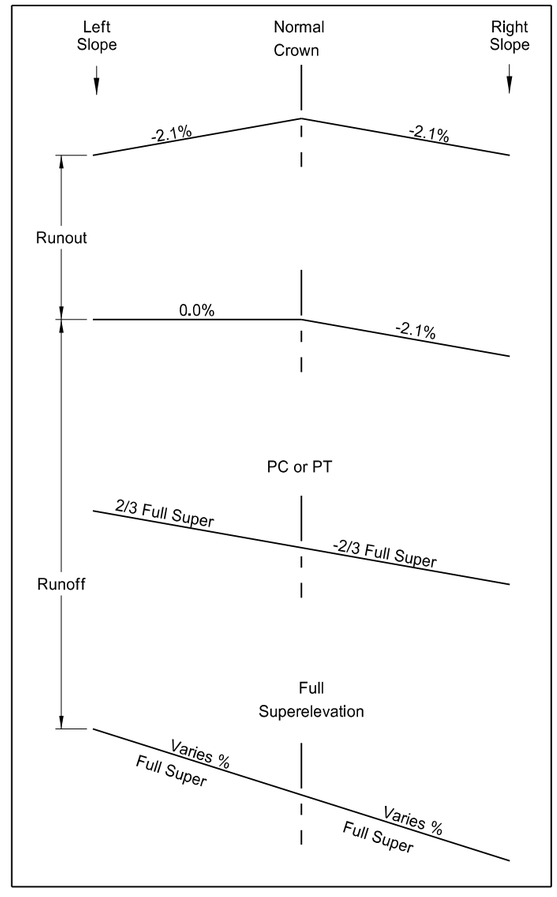
Station	Left Slope	Right Slope
PC - 161'	-2.1	-2.1
PC - 91'	-2.1	0.0
PC	-2.7	2.7
PC + 46'	-4.1	4.1
PT - 46'	-4.1	4.1
PT	-2.7	2.7
PT + 91'	-2.1	0.0
PT + 161'	-2.1	-2.1

P.C. Station 512+79.2 R1
P.I. Station 524+89.2 R1
Delta = 23° 51' 00.00" (RT)
Degree = 1° 00' 00.00"
Tangent = 1,210.00
Length = 2,385.00
Radius = 5,729.65
P.T. Station 536+64.2 R1

Station	Left Slope	Right Slope
PC - 161'	-2.1	-2.1
PC - 91'	-2.1	0.0
PC	-2.7	2.7
PC + 46'	-4.1	4.1
PT - 46'	-4.1	4.1
PT	-2.7	2.7
PT + 91'	-2.1	0.0
PT + 161'	-2.1	-2.1

P.C. Station 542+51.6 R1
P.I. Station 557+75.6 R1
Delta = 43° 30' 00.00" (RT)
Degree = 1° 30' 00.00"
Tangent = 1,523.95
Length = 2,900.00
Radius = 3,819.83
P.T. Station 571+51.6 R1

Station	Left Slope	Right Slope
PC - 161'	-2.1	-2.1
PC - 91'	-2.1	0.0
PC	-2.7	2.7
PC + 46'	-4.1	4.1
PT - 46'	-4.1	4.1
PT	-2.7	2.7
PT + 91'	-2.1	0.0
PT + 161'	-2.1	-2.1



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Superelevation Table

Hot Mix Asphalt Overlay

State Line East to Junction US 85

Note: Calculations based on AASHTO method five. A design speed of 65 mph and maximum superelevation of 6% were used.

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SOIB-7-068(011)000	20	6

P.C. Station 586+98.5 R1
P.I. Station 597+15.7 R1
Delta = 20° 08' 00.00" (RT)
Degree = 1° 00' 00.00"
Tangent = 1,017.20
Length = 2,013.33
Radius = 5,729.65
P.T. Station 607+11.8 R2

Station	Left Slope	Right Slope
PC - 138'	-2.1	-2.1
PC - 67'	0.0	-2.1
PC	2.1	-2.1
PC + 34'	3.0	-3.0
PT - 34'	3.0	-3.0
PT	2.1	-2.1
PT + 67'	0.0	-2.1
PT + 138'	-2.1	-2.1

T.S. Station 461+75.2 R3
S.C. Station 465+75.2 R3

P.C. Station 465+75.2 R3
P.I. Station 482+93.2 R3
Delta = 90° 08' 00.00" (RT)
Degree = 3° 00' 00.00"
Tangent = 2,117.93
Length = 2,604.40
Radius = 1,910.08
P.T. Station 491+79.6 R3

C.S. Station 491+79.6 R3
S.T. Station 495+79.6 R3

Station	Left Slope	Right Slope
TS - 145'	-2.1	-2.1
TS	0.0	-2.1
SC	5.8	-5.8
CS	5.8	-5.8
ST	0.0	-2.1
ST + 145'	-2.1	-2.1

P.C. Station 348+79.1 R3
P.I. Station 354+08.1 R3
Delta = 10° 33' 00.00" (LT)
Degree = 1° 00' 00.00"
Tangent = 529.00
Length = 1,055.00
Radius = 5,729.65
P.T. Station 359+34.1 R3

Station	Left Slope	Right Slope
PC - 138'	-2.1	-2.1
PC - 67'	-2.1	0.0
PC	-2.1	2.1
PC + 34'	-3.0	3.0
PT - 34'	-3.0	3.0
PT	-2.1	2.1
PT + 67'	-2.1	0.0
PT + 138'	-2.1	-2.1

P.C. Station 331+74.9 R3
P.I. Station 337+58.6 R3
Delta = 20° 13' 00.00" (RT)
Degree = 1° 45' 00.00"
Tangent = 583.72
Length = 1,155.20
Radius = 3,274.17
P.T. Station 343+30.1 R3

Station	Left Slope	Right Slope
PC - 138'	-2.1	-2.1
PC - 67'	0.0	-2.1
PC	3.1	-3.1
PC + 34'	4.6	-4.6
PT - 34'	4.6	-4.6
PT	3.1	-3.1
PT + 67'	0.0	-2.1
PT + 138'	-2.1	-2.1

P.C. Station 314+62.8 R3
P.I. Station 319+50.6 R3
Delta = 9° 44' 00.00" (LT)
Degree = 1° 00' 00.00"
Tangent = 487.80
Length = 973.30
Radius = 5,729.65
P.T. Station 324+36.1 R3

Station	Left Slope	Right Slope
PC - 138'	-2.1	-2.1
PC - 67'	0.0	-2.1
PC	2.1	-2.1
PC + 34'	3.0	-3.0
PT - 34'	3.0	-3.0
PT	2.1	-2.1
PT + 67'	0.0	-2.1
PT + 138'	-2.1	-2.1

P.C. Station 154+62.3 R4
P.I. Station 161+33.7 R4
Delta = 13° 22' 00.00" (LT)
Degree = 1° 00' 00.00"
Tangent = 671.40
Length = 1,336.67
Radius = 5,729.65
P.T. Station 167+99.0 R4

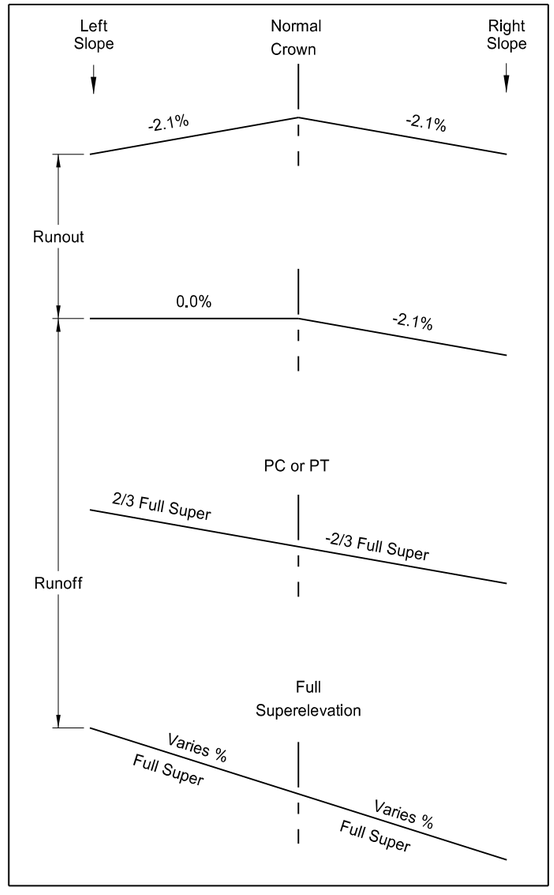
Station	Left Slope	Right Slope
PC - 138'	-2.1	-2.1
PC - 67'	0.0	-2.1
PC	2.1	-2.1
PC + 34'	3.0	-3.0
PT - 34'	3.0	-3.0
PT	2.1	-2.1
PT + 67'	0.0	-2.1
PT + 138'	-2.1	-2.1

P.C. Station 140+12.7 R4
P.I. Station 145+00.0 R4
Delta = 7° 18' 00.00" (RT)
Degree = 0° 45' 00.00"
Tangent = 487.33
Length = 973.47
Radius = 7,639.49
P.T. Station 149+86.1 R4

Station	Left Slope	Right Slope
PC - 138'	-2.1	-2.1
PC - 67'	0.0	-2.1
PC	2.1	-2.1
PC + 34'	2.4	-2.4
PT - 34'	2.4	-2.4
PT	2.1	-2.1
PT + 67'	0.0	-2.1
PT + 138'	-2.1	-2.1

P.C. Station 1+99.9 R4
P.I. Station 7+93.4 R4
Delta = 45° 00' 00.00" (LT)
Degree = 4° 00' 00.00"
Tangent = 593.48
Length = 1,125.00
Radius = 1,432.69
P.T. Station 13+24.9 R4

Station	Left Slope	Right Slope
PC - 138'	-2.1	-2.1
PC - 67'	-2.1	0.0
PC	-2.8	2.8
PC + 34'	-4.2	4.2
PT - 34'	-4.2	4.2
PT	-2.8	2.8
PT + 67'	-2.1	0.0
PT + 138'	-2.1	-2.1



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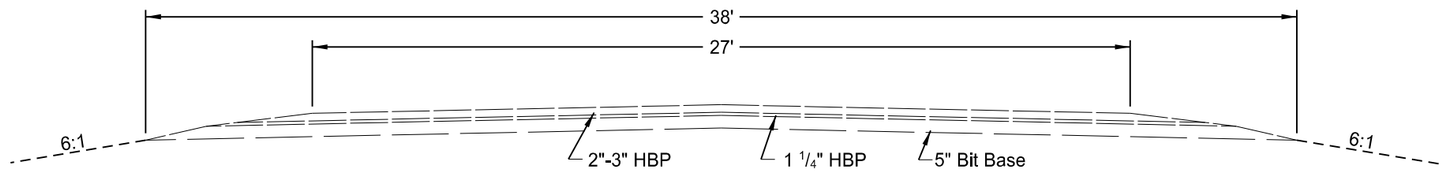
Note: Calculations based on AASHTO method five. A design speed of 65 mph and maximum superelevation of 6% were used.

Superelevation Table

Hot Mix Asphalt Overlay

State Line East to Junction US 85

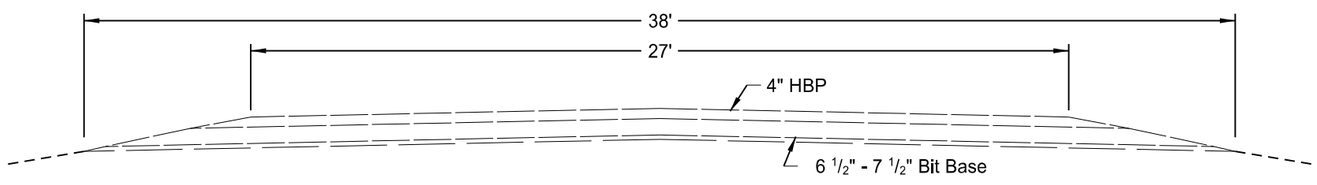
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SOIB-7-068(011)000	30	1



EXISTING TYPICAL SECTION
Sta 0+00 R1 to 4+75 R1
33+30 R1 to 640+75.6 Bk R1=0+00 R2 Ahd to 348+29.4 Bk R2=495+79.6 Ahd R3 to 261+50 R3
238+75 R3 to 217+65 R3
192+85 R3 to 187+19.9 Ahd R3=187+12.4 Bk R4 to 114+75 R4
101+56 R4 to 9+77.72 R4

Note: Curve section same as tangent except for superelevation.

Surfacing thickness was drawn from old plans. Actual thickness varies. See core depths shown in Section 11.



EXISTING TYPICAL SECTION
Sta 4+75 R1 to 33+30.1 R1
261+50 R3 to 238+75 R3
217+65 R3 to 192+85 R3
114+75 R4 to 101+56 R4

Note: Curve section same as tangent except for superelevation.

Surfacing thickness was drawn from old plans. Actual thickness varies. See core depths shown in Section 11.

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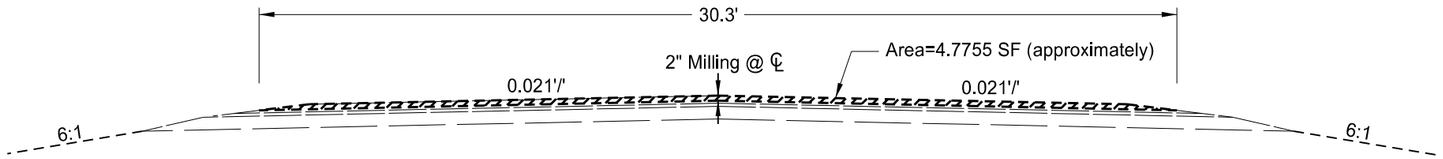
EXISTING TYPICAL SECTIONS

Hot Mix Asphalt Overlay

State Line East to Junction US 85

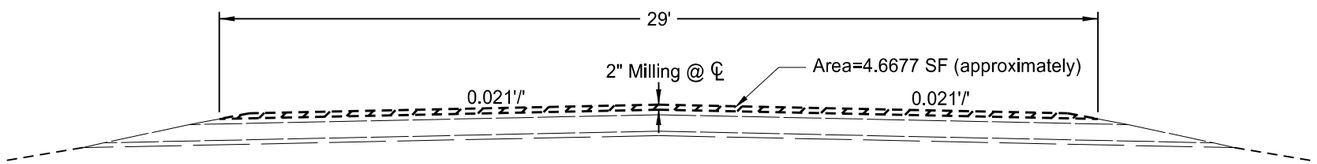
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SOIB-7-068(011)000	30	2



MILLING TYPICAL SECTION

0+00 R1 to 4+75 R1
33+30 R1 to 197+25 R1
197+90 R1 to 241+60 R1
242+90 R1 to 585+00 R1
586+05 R1 to 590+50 R1
591+00 R1 to 596+85 R1
597+75 R1 to 640+75.6 Bk=0+00 R2 Ahd to 247+10 R1
247+60 R1 to 255+25 R1
255+90 R1 to 263+60 R1
264+00 R1 to 348+29.4 Bk R2=495+79.6 Ahd R3 to 314+75 R3
314+00 R3 R3 to 261+50 R3
238+75 R3 to 217+65 R3
192+85 R3 to 187+19.9 Ahd R3=187+12.4 Bk R4 to 114+75 R4
101+56 R4 to 9+77.72 R4

Note: Curve section same as tangent except for superelevation.



MILLING TYPICAL SECTION

4+75 R1 to 24+25 R1
26+00 R1 to 33+30.1 R1
261+50 R3 to 238+75 R3
217+65 R3 to 192+85 R3
114+75 R4 to 101+56 R4

Note: Curve section same as tangent except for superelevation.

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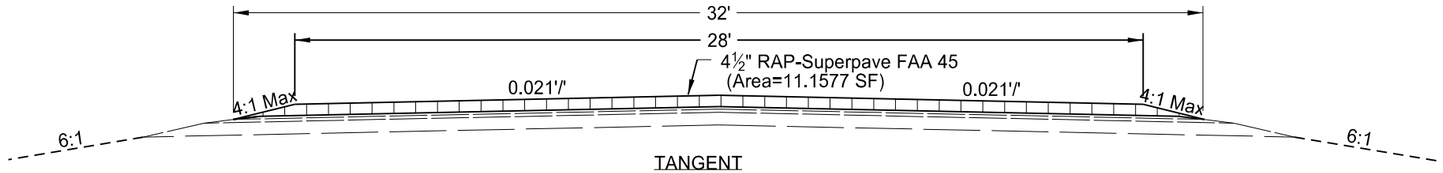
MILLING TYPICAL SECTIONS

Hot Mix Asphalt Overlay

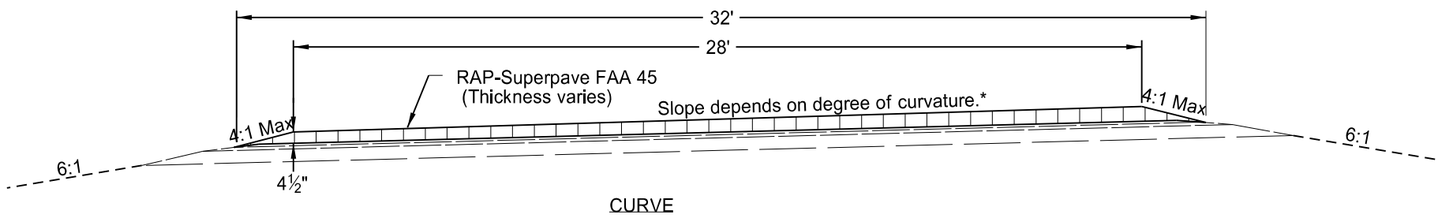
State Line East to Junction US 85

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SOIB-7-068(011)000	30	3



TANGENT

Sta 0+00 R1 to 4+75 R1
Sta 42+39.8 R1 to 83+04.4 R1
Sta 98+96.6 R1 to 197+25 R1
Sta 197+90 R1 to 241+60 R1
Sta 242+90 R1 to 250+88.9 R1
Sta 271+60 R1 to 284+24.6 R1
Sta 309+61.8 R1 to 315+22.6 R1
Sta 326+65.9 R1 to 336+77.1 R1
Sta 349+61.5 R1 to 366+32.4 R1
Sta 391+44.9 R1 to 395+99 R1
Sta 412+27.3 R1 to 419+79.4 R1
Sta 433+23.8 R1 to 455+41.4 R1
Sta 476+90.2 R1 to 512+79.2 R1
Sta 536+64.2 R1 to 542+51.6 R1
Sta 571+51.6 R1 to 585+00 R1
Sta 586+05 R1 to 586+98.5 R1
Sta 461+75.2 R3 to 359+34.1 R3
Sta 348+79.1 R3 to 343+30.1 R3
Sta 331+74.9 R3 to Sta 324+36.1 R3
Sta 314+00 R3 to 261+50 R3
Sta 238+75 R3 to 217+65 R3
Sta 192+85 R3 to 187+19.9 Ahd R3=187+12.4 Bk R4 to167+99 R4
Sta 154+62.3 R4 to Sta 149+86.1 R4
Sta 140+12.7 R4 to Sta 114+75 R4
Sta 101+56 R4 to 19+72 R4



CURVE

Sta 33+30 R1 to 42+39.8 R1
Sta 83+04.4 R1 to 98+96.6 R1
Sta 250+88.9 R1 to 271+60 R1
Sta 284+24.6 R1 to 309+61.8 R1
Sta 315+22.6 R1 to 326+65.9 R1
Sta 336+77.1 R1 to 349+61.5 R1
Sta 366+32.4 R1 to 391+44.9 R1
Sta 395+99 R1 to 412+27.3 R1
Sta 419+79.4 R1 to 433+23.8 R1
Sta 455+41.4 R1 to 476+90.2 R1
Sta 512+79.2 R1 to 536+64.2 R1
Sta 542+51.6 R1 to 571+51.6 R1
Sta 586+98.5 R1 to 590+50 R1
Sta 591+00 R1 to 596+85 R1
Sta 597+75 R1 to 604+09.9 R1
Sta 359+34.1 R3 to 348+79.1 R3
Sta 343+30.1 R3 to 331+74.9 R3
Sta 324+36.1 R3 to 314+75 R3
Sta 167+99 R4 to 154+62.3 R4
Sta 149+86.1 to 140+12.7 R4

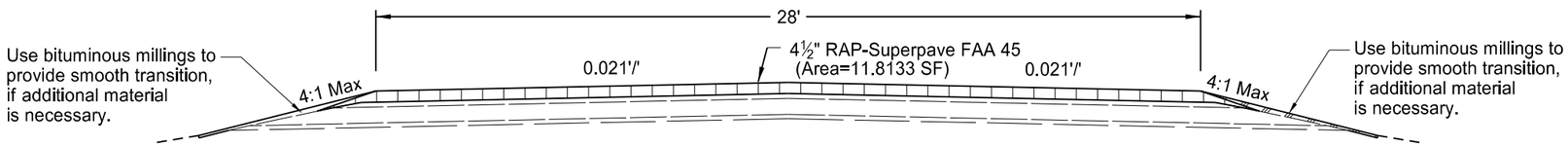
*See Curve Data Table.

SURFACING TYPICAL SECTIONS

Hot Mix Asphalt Overlay

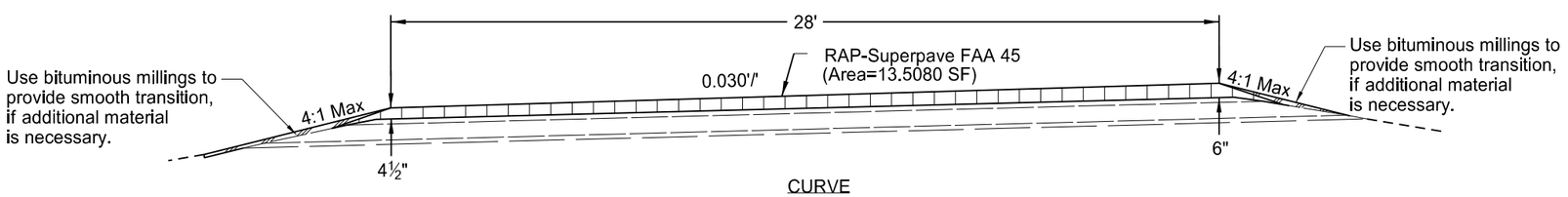
State Line East to Junction US 85

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SOIB-7-068(011)000	30	4



TANGENT

Sta 4+75 R1 to 24+25 R1
Sta 26+00 R1 to 27+33.1 R1
Sta 261+50 R3 to 238+75 R3
Sta 217+65 R3 to 192+85 R3
Sta 114+75 R4 to 101+56 R4



CURVE

Sta 27+33.1 R1 to 33+30 R1

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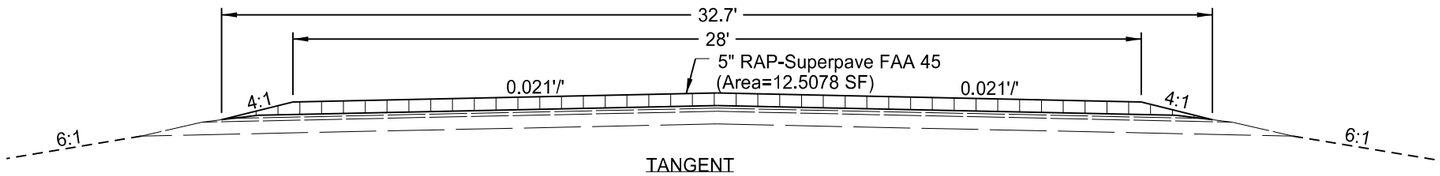
SURFACING TYPICAL SECTIONS

Hot Mix Asphalt Overlay

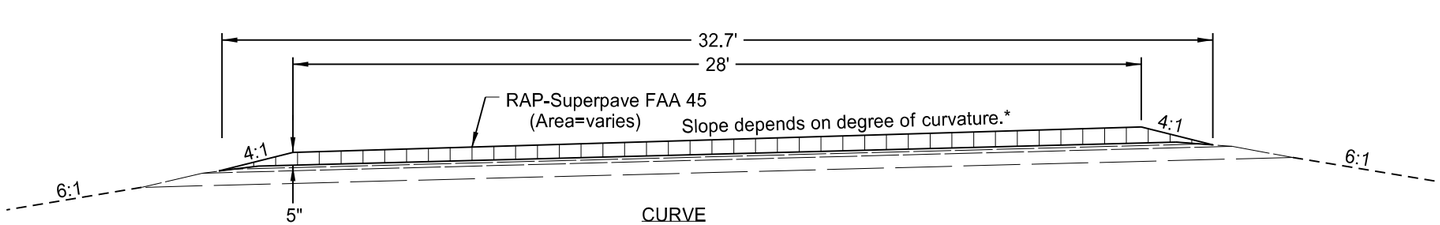
State Line East to Junction US 85

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SOIB-7-068(011)000	30	5



TANGENT

Sta 607+11.8 R1 to 640+75.6 Bk R1=0+00 Ahd R2 to 247+10 R2
Sta 247+60 R2 to 255+25 R2
Sta 255+90 R2 to 263+60 R2
Sta 264+00 R2 to 348+29.4 Bk R2=Sta 495+79.6 Ahd R3



CURVE

Sta 604+09.9 R1 to Sta 607+11.8 R1
Sta 495+79.6 R3 to Sta 461+75.2 R3

*See Curve Data sheets.

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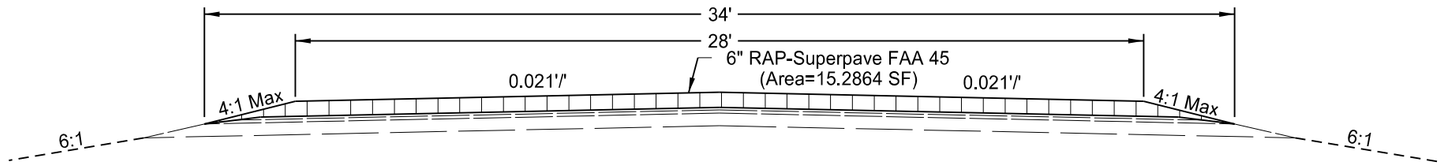
SURFACING TYPICAL SECTIONS

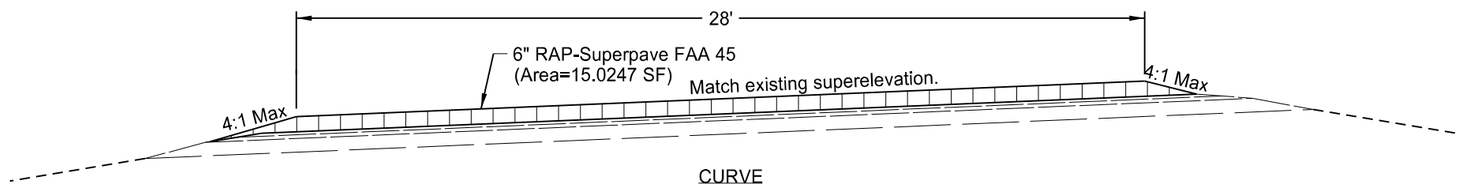
Hot Mix Asphalt Overlay

State Line East to Junction US 85

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SOIB-7-068(011)000	30	6



TANGENT
Sta 19+72 R4 to Sta 13+24.9 R4



CURVE
Sta 13+24.9 R4 to 9+77.72 R4

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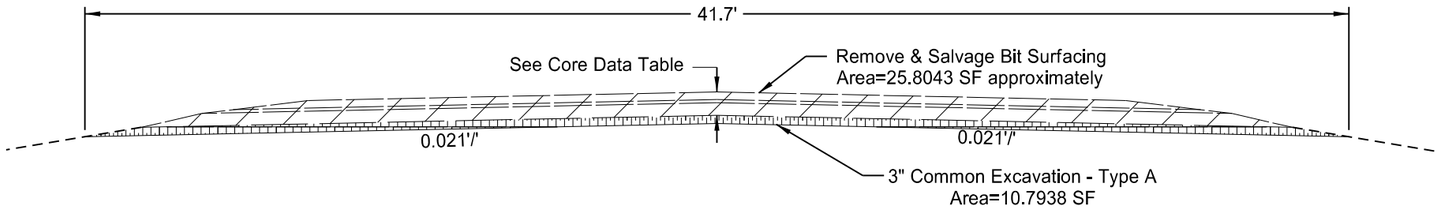
SURFACING TYPICAL SECTIONS

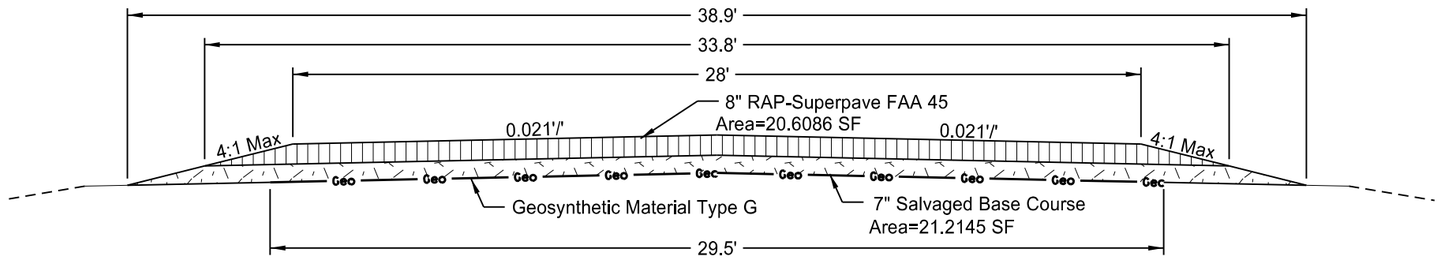
Hot Mix Asphalt Overlay

State Line East to Junction US 85

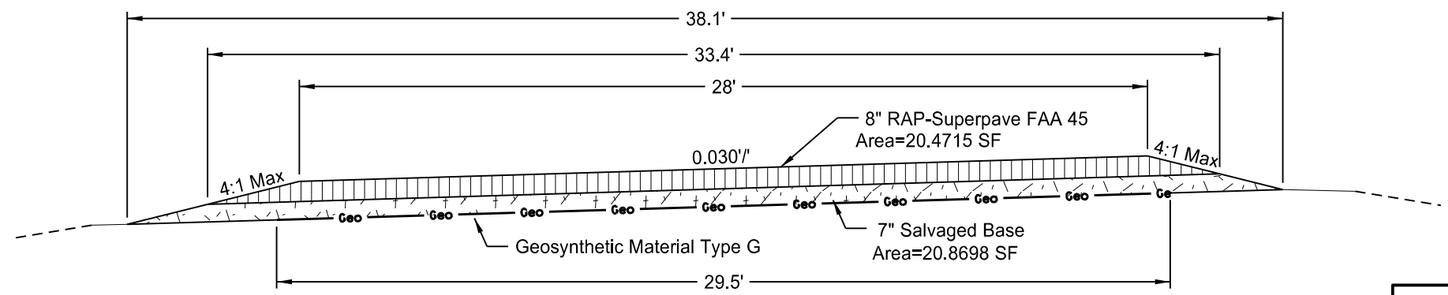
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SOIB-7-068(011)000	30	7



REMOVAL TYPICAL SECTION
Sta 24+25 R1 to 26+00 R1
Sta 247+10 R2 to 247+60 R2
Sta 255+25 R2 to 255+90 R2
Sta 263+60 R2 to 264+00 R2
Sta 314+75 R3 to 314+00 R3



PROPOSED TANGENT SECTION
Sta 24+25 R1 to 26+00 R1
Sta 247+10 R2 to 247+60 R2
Sta 255+25 R2 to 255+90 R2
Sta 263+60 R2 to 264+00 R2
Sta 314+62.8 R3 to 314+00 R3



PROPOSED CURVE SECTION
Sta 314+75 R3 to 314+62.8 R3

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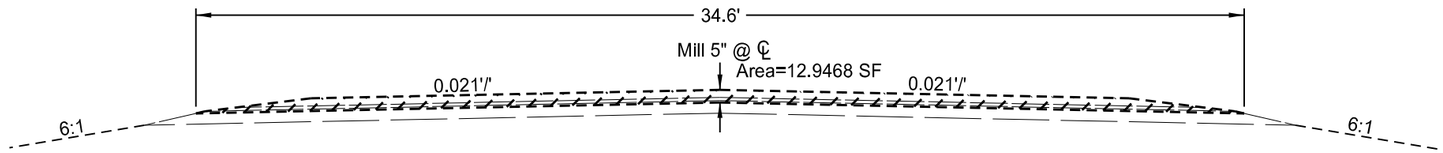
FULL DEPTH PAVEMENT REPAIR
TYPICAL SECTIONS

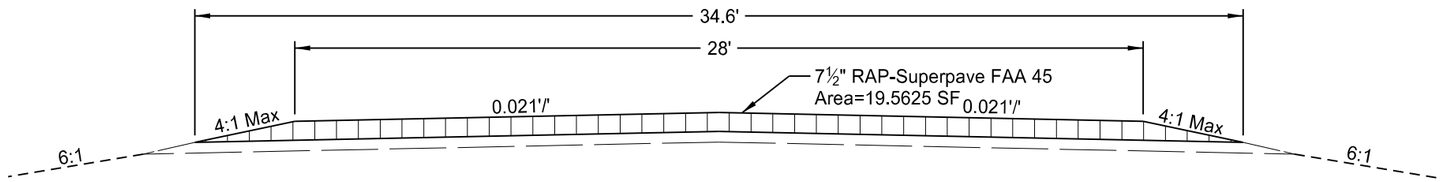
Hot Mix Asphalt Overlay

State Line East to Junction US 85

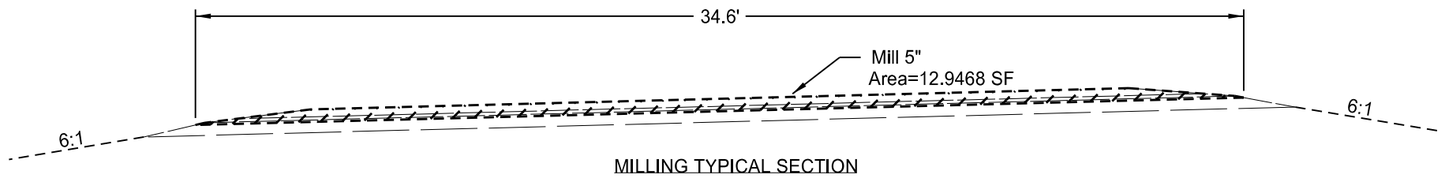
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SOIB-7-068(011)000	30	8



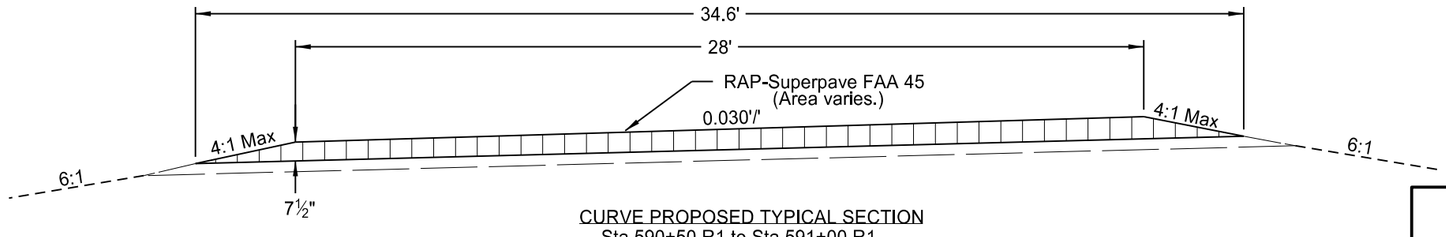
MILLING TYPICAL SECTION
Sta 197+25 R1 to 197+90 R1
Sta 241+60 R1 to 242+90 R1
Sta 585+00 R1 to 586+05 R1



TANGENT PROPOSED TYPICAL SECTION
Sta 197+25 R1 to 197+90 R1
Sta 241+60 R1 to 242+90 R1
Sta 585+00 R1 to 586+05 R1



MILLING TYPICAL SECTION
Sta 590+50 R1 to Sta 591+00 R1
Sta 596+85 R1 to Sta 597+75 R1



CURVE PROPOSED TYPICAL SECTION
Sta 590+50 R1 to Sta 591+00 R1
Sta 596+85 R1 to Sta 597+75 R1

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FULL DEPTH PAVEMENT REPAIR
TYPICAL SECTIONS

Hot Mix Asphalt Overlay

State Line East to Junction US 85

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SOIB-7-068(011)000	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
D3-36	36"x6"	STREET NAME SIGN (Sign and installation only)		6	
G20-1-60	**60"x24"**	**ROAD WORK NEXT __ MILES**	**4**	**34**	**136**
G20-1b-60	60"x24"	WORK IN PROGRESS/ NO WORK IN PROGRESS (Sign and installation only)		26	
G20-2-48	**48"x24"**	**END ROAD WORK**	**6**	**19**	**114**
G20-4-36	**36"x18"**	**PILOT CAR FOLLOW ME (Mounted to back of pilot car)**	**2**	**18**	**36**
G20-10-108	**108"x48"**	**CONTRACTOR SIGN**	**2**	**64**	**128**
G20-50a-72	**72"x36"**	**ROAD WORK NEXT __ MILES RT & LT ARROWS**	**24**	**37**	**888**
G20-52a-72	**72"x24"**	**ROAD WORK NEXT __ MILES RT or LT ARROW**	**2**	**30**	**60**
G20-55-96	**96"x48"**	**SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT**	**2**	**59**	**118**
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		10	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR ARROW RIGHT or LEFT		23	
M5-1-21	21"x15"	ARROW AHD AND RT or LT(Mounted on route marker post)		7	
M5-2-21	21"x15"	ARROW AHD UP & RT or LT (Mounted on route marker post)		7	
M6-1-21	21"x15"	ARROW RT or LT (Mounted on route marker post)		7	
M6-2-21	21"x15"	ARROW UP & RT or LT (Mounted on route marker post)		7	
M6-3-21	21"x15"	ARROW AHD (Mounted on route marker post)		7	
R1-1-48	**48"x48"**	**STOP**	**4**	**32**	**128**
R1-1a-18	**18"x18"**	**STOP and SLOW PADDLE Back to Back**	**4**	**5**	**20**
R1-2-60	60"x60"	YIELD		29	
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**4**	**39**	**156**
R2-1a-24	24"x18"	MINIMUM FEE $80 (Mounted on Speed Limit post)		10	
R3-7-48	48"x48"	LEFT or RIGHT LANE MUST TURN LEFT or RIGHT		35	
R4-1-48	48"x60"	DO NOT PASS		39	
R4-7-48	48"x60"	KEEP RIGHT SYMBOL		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-36	36"x12"	ONE WAY RIGHT or LEFT		13	
R7-1-12	12"x18"	NO PARKING		11	
R10-6-24	24"x36"	STOP HERE ON RED		16	
R11-2-48	48"x30"	ROAD CLOSED		28	
R11-2a-48	48"x30"	STREET CLOSED		28	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC		31	
W1-3-48	48"x48"	RIGHT or LEFT SHARP REVERSE CURVE ARROW		35	
W1-4-48	48"x48"	RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-4b-48	48"x48"	DOUBLE RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-6-48	48"x24"	LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD SYMBOL		35	
W3-3-48	48"x48"	SIGNAL AHEAD SYMBOL		35	
W3-4-48	**48"x48"**	**BE PREPARED TO STOP**	**4**	**35**	**140**
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**2**	**35**	**70**
W4-2-48	48"x48"	RIGHT or LEFT LANE TRANSITION SYMBOL		35	
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC SYMBOL		35	
W8-1-48	**48"x48"**	**BUMP**	**1**	**35**	**35**
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-9a-48	48"x48"	SHOULDER DROP-OFF		35	
W8-11-48	**48"x48"**	**UNEVEN LANES**	**1**	**35**	**35**
W8-12-48	48"x48"	NO CENTER STRIPE		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	**48"x48"**	**TRUCKS ENTERING AHEAD or __ FT.**	**2**	**35**	**70**
W8-55-48	**48"x48"**	**TRUCKS CROSSING AHEAD or __ FT.**	**2**	**35**	**70**
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W12-2-48	48"x48"	LOW CLEARANCE SYMBOL		35	
W13-1-24	24"x24"	__ MPH ADVISORY SPEED PLATE (Mounted on warning sign post)		11	
W13-4-48	48"x60"	RAMP ARROW		39	
W14-3-48	48"x36"	NO PASSING ZONE		23	
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**7**	**35**	**245**
W20-2-48	48"x48"	DETOUR AHEAD or __ FT		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT.		35	
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or __ FT.		35	
W20-5-48	48"x48"	RIGHT or LEFT LANE CLOSED AHEAD or __ FT.		35	
W20-7a-48	**48"x48"**	**FLAGGING SYMBOL**	**4**	**35**	**140**
W20-7k-24	24"x18"	__ FEET (Mounted on warning sign post)		10	
W20-8-48	48"x48"	STREET CLOSED		35	
W20-51-48	48"x48"	EQUIPMENT WORKING		35	
W20-52-54	**54"x12"**	**NEXT __ MILES (Mounted on warning sign post)**	**5**	**12**	**60**
W21-1a-48	48"x48"	WORKERS SYMBOL		35	
W21-2-48	**48"x48"**	**FRESH OIL**	**1**	**35**	**35**
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT		35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-5-48	**48"x48"**	**SHOULDER WORK**	**2**	**35**	**70**
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT.		35	
W21-6a-48	48"x48"	SURVEY CREW AHEAD		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT.		35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY		35	
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	
	24"x24"	TAKE TURNS (6" D letters) (Mounted on stop sign post)		11	

SPECIAL SIGNS

SPEC & CODE			
704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**2754**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	**FLAGGING**	**MHR**	**1000**
704-1041	ATTENUATION DEVICE-TYPE B-55	EACH	
704-1043	ATTENUATION DEVICE-TYPE B-65	EACH	
704-1044	ATTENUATION DEVICE-TYPE B-70	EACH	
704-1050	TYPE I BARRICADES	EACH	
704-1051	TYPE II BARRICADES	EACH	
704-1052	**TYPE III BARRICADES**	**EACH**	**2**
704-1060	DELINEATOR DRUMS	EACH	
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**245**
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1081	VERTICAL PANELS - BACK TO BACK	EACH	
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH	
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH	
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH	
704-1088	SEQUENCING ARROW PANEL - TYPE C - CROSSOVER	EACH	
704-1095	TYPE B FLASHERS	EACH	
704-1185	**PILOT CAR**	**HR**	**500**
704-1500	OBLITERATION OF PVMT MK	SF	
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF	
772-2110	FLASHING BEACON - POST MOUNTED	EACH	

NOTE:
If additional signs are required, units will be calculated using the formula from Section III-19.06 of the Design Manual.
http://www.dot.nd.gov/

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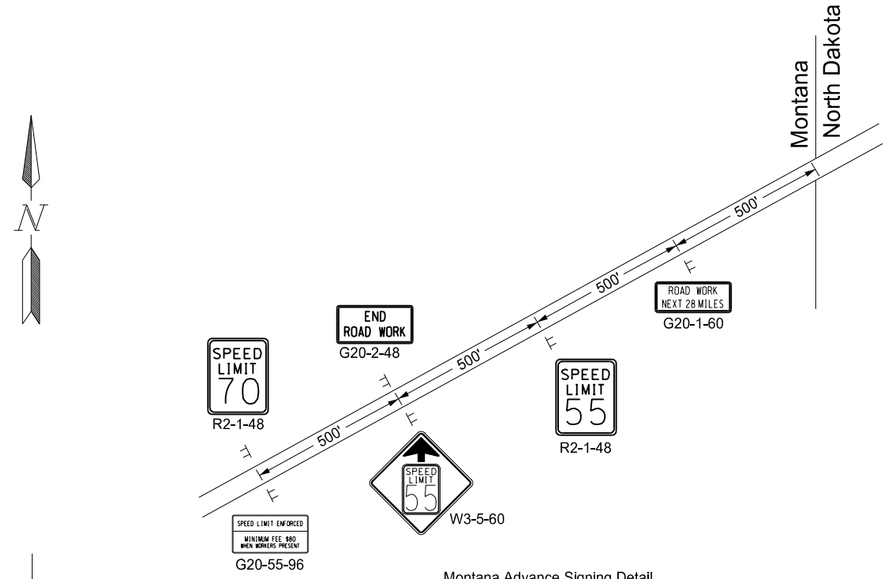
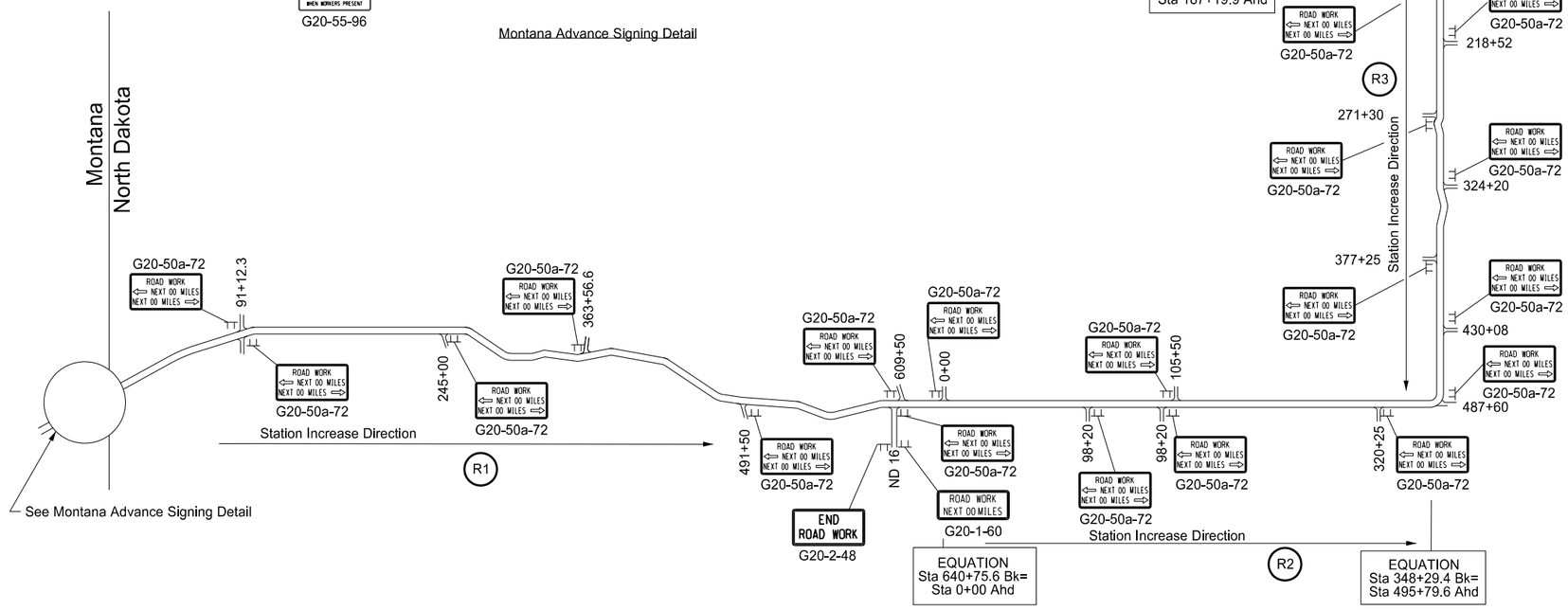
Traffic Control Devices List

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SOIB-7-068(011)000	100	2



Montana Advance Signing Detail



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WORK ZONE TRAFFIC CONTROL

Hot Mix Asphalt Overlay

State Line East to Junction US 85

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	SOIB-7-068(011)000	110	1

Sta/RP	Sign No.	Assembly No.	Flat Sheet For Signs IV SF	Flat Sheet For Signs XI SF	Sign Support Length 1st LF	2nd LF	3rd LF	4th LF	Support Size	Max Post Len LF	Sleeve Length 1st LF	2nd LF	3rd LF	4th LF	Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
R1																						
245+65 Rt		19		6.3	11.4				2.25 x 2.25 12 ga	11.6						1	4	2.5 x 2.5 12 ga				
277+79 Rt		19			11.4				2.25 x 2.25 12 ga	11.6						1	4	2.5 x 2.5 12 ga	1			
357+36 Rt		19			11.4				2.25 x 2.25 12 ga	11.6						1	4	2.5 x 2.5 12 ga	1			
603+77 Rt		2		7.5	11.6				2.5 x 2.5 10 ga	14.6						1	4	3 x 3 7 ga			1	
603+77. Rt		20		9.0	13.0				2.25 x 2.25 12 ga	14.1	4.2				2 x 2 12 ga	1	4	3 x 3 7 ga			1	
604+41 Rt		2		7.5	11.6				2.5 x 2.5 10 ga	14.6						1	4	3 x 3 7 ga			1	
608+57 Rt		9		5.0	10.7				2 x 2 12 ga	11.5						1	4	2.25 x 2.25 12 ga				
618+83 Rt		399	6.2		11.5				2.25 x 2.25 12 ga	12.7						1	4	2.5 x 2.5 12 ga				
621+14 Lt		399	6.2		11.5				2.25 x 2.25 12 ga	12.7						1	4	2.5 x 2.5 12 ga				
636+24 Rt		437	8.4		12.3				2.5 x 2.5 10 ga	15.2						1	4	3 x 3 7 ga			1	
Sub Total			20.8	35.3		**Total**	116.3									**Total**	40		2	0	4	
R2																						
152+09 Rt		437	8.4		12.3				2.5 x 2.5 10 ga	15.2						1	4	3 x 3 7 ga			1	
347+87 Lt		371	6.0		11.3				2.25 x 2.25 12 ga	12.9						1	4	2.5 x 2.5 12 ga				
Sub Total			14.4	0.0		**Total**	23.5									**Total**	8		0	0	1	
R3																						
454+86 Rt		19			11.4				2.25 x 2.25 12 ga	11.6						1	4	2.5 x 2.5 12 ga	1			
463+06 Lt		371	6.0		11.3				2.25 x 2.25 12 ga	12.9						1	4	2.5 x 2.5 12 ga				
Sub Total			6.0	0.0		**Total**	22.6									**Total**	8		1	0	0	
R4																						
3+29 Rt	chevr			6.0	10.2				2.25 x 2.25 12 ga	12.4						1	4	2.5 x 2.5 12 ga				
5+29 Rt	chevr			6.0	10.2				2.25 x 2.25 12 ga	12.4						1	4	2.5 x 2.5 12 ga				
7+29 Rt	chevr			6.0	10.2				2.25 x 2.25 12 ga	12.4						1	4	2.5 x 2.5 12 ga				
9+29 Rt	chevr			6.0	10.2				2.25 x 2.25 12 ga	12.4						1	4	2.5 x 2.5 12 ga				
11+29 Rt	chevr			3.0	10.2				2 x 2 12 ga	14.6						1	4	2.25 x 2.25 12 ga				
Sub Total			0.0	27.0		**Total**	50.8									**Total**	20		0	0	0	
Grand Total			41.2	62.3		**Total**	213.3									**Total**	76		3	0	5	

Basis of Estimate
Sign Support Lengths

The sign support lengths have been calculated using the following vertical clearances:

Rural Roadway - 60"

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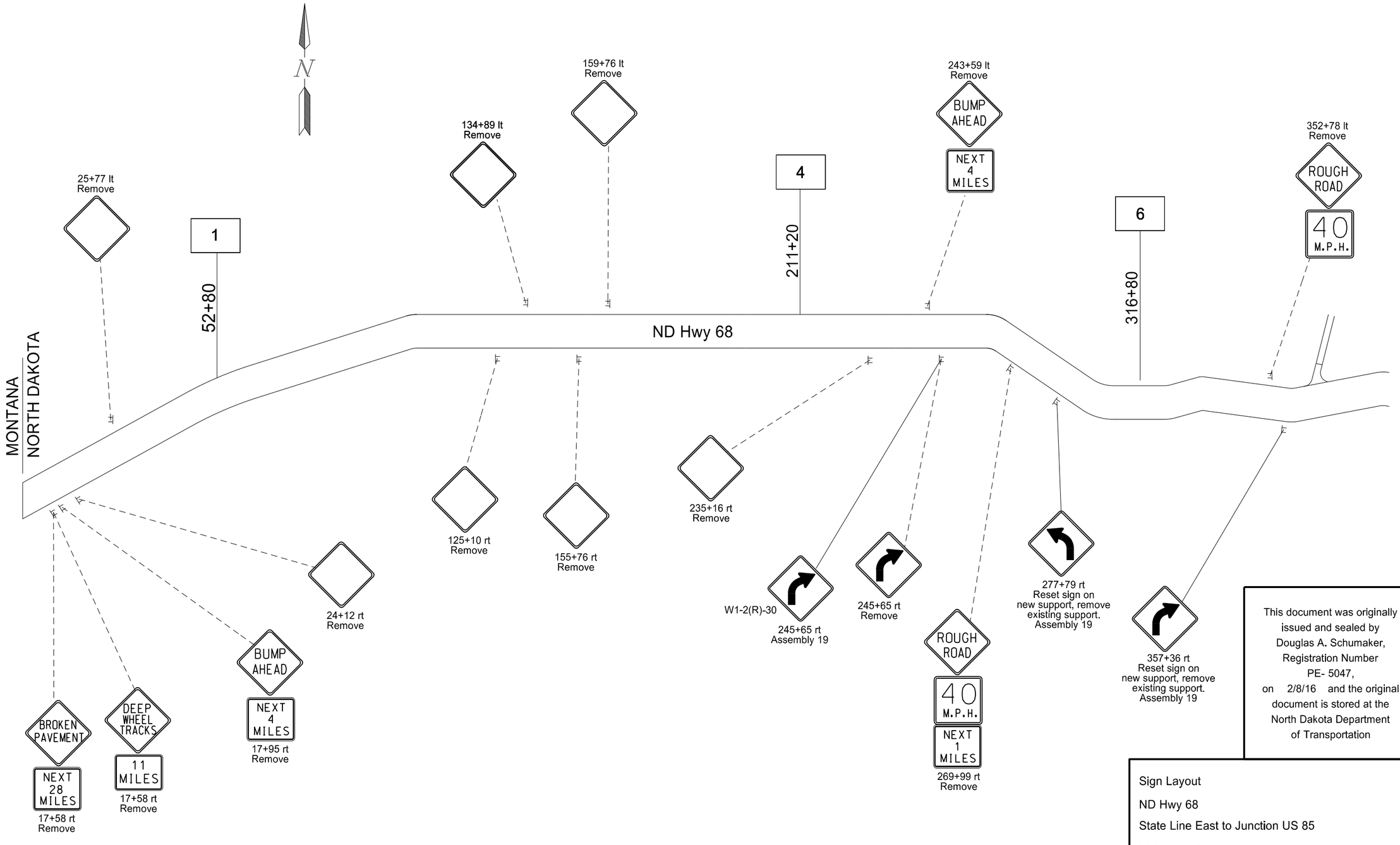
Sign Summary
Perforated Tube

ND Hwy 68
State Line East to Junction US

McKenzie County

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SOIB-7-068(011)000	110	2



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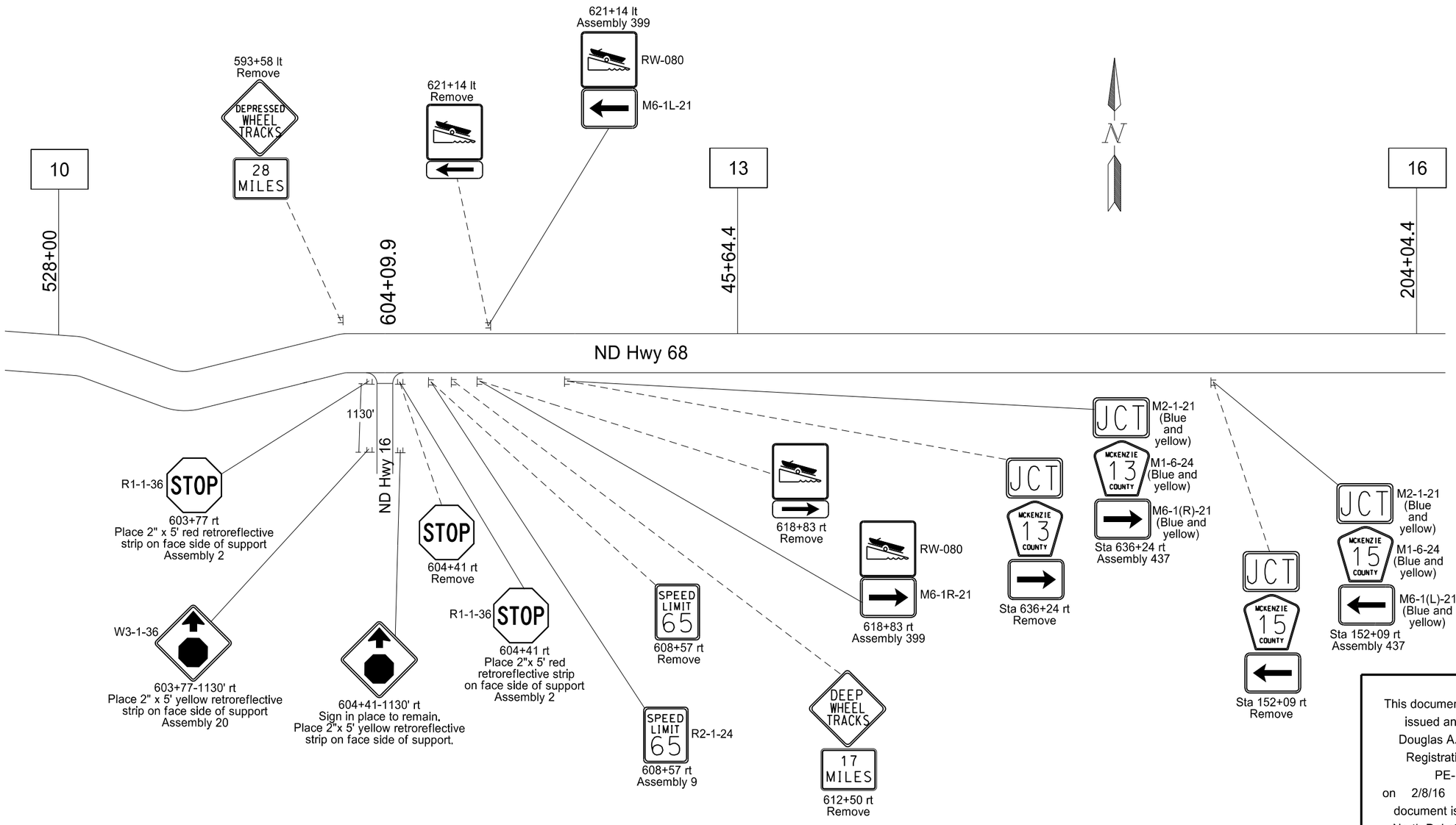
Sign Layout

ND Hwy 68

State Line East to Junction US 85

McKenzie County

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SOIB-7-068(011)000	110	3



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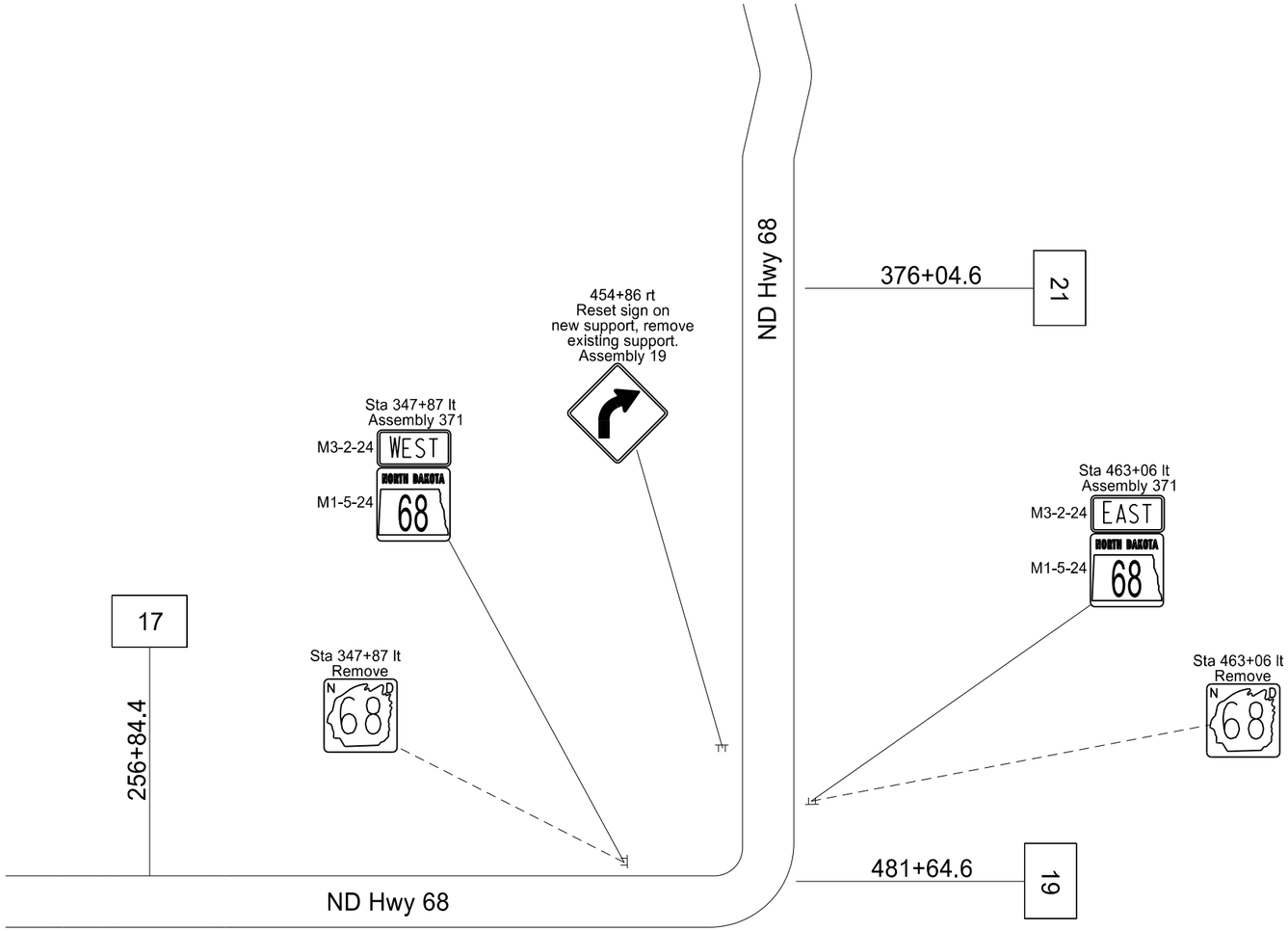
Sign Layout

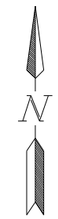
ND Hwy 68

State Line East to Junction US 85

McKenzie County

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SOIB-7-068(011)000	110	4





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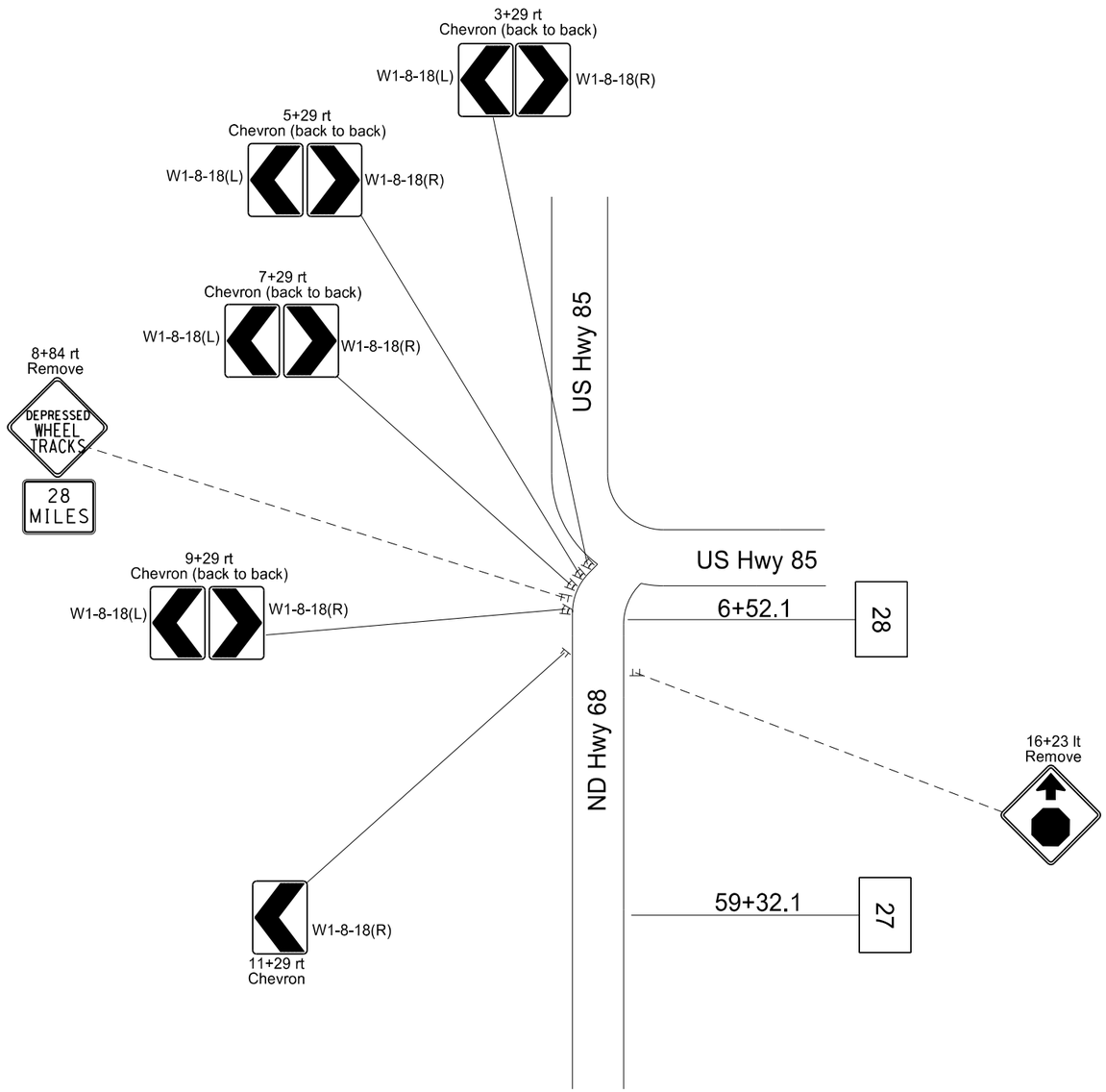
Sign Layout

ND Hwy 68

State Line East to Junction US 85

McKenzie County

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SOIB-7-068(011)000	110	5



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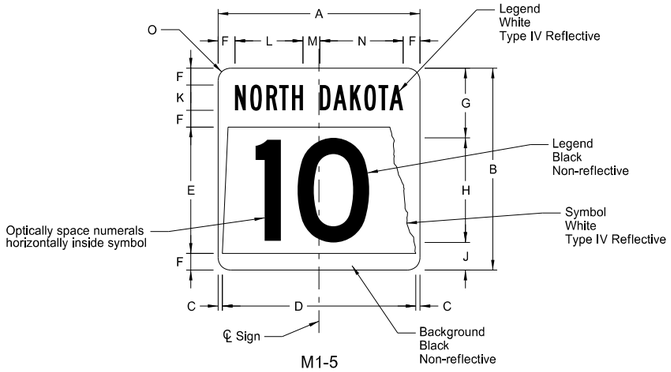
Sign Layout

ND Hwy 68

State Line East to Junction US 85

McKenzie County

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SOIB-7-068(011)000	110	6

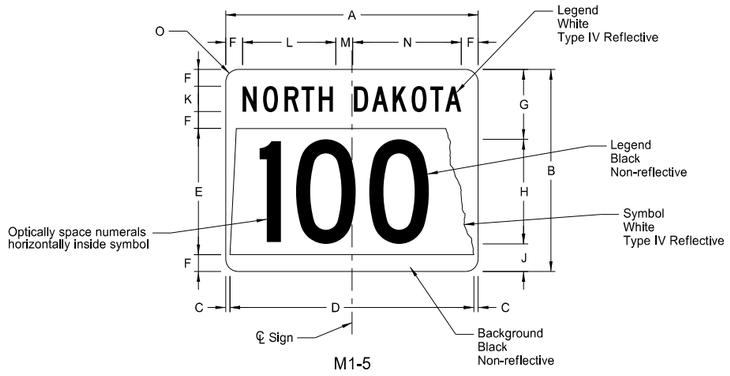


M1-5

STATE ROUTE MARKER

SIGN	DIMENSION (INCHES)													
	A	B	C	D	E	F	G	H	J	K	L	M	N	O
1, 2 digits	18*	18*	0.38	17.25	11.25	1.5	6.38	9 D**	2.63	2.25 B	6.1	1.5	7.4	1.5
1, 2 digits	24	24	0.5	23	15	2	8.5	12 D**	3.5	3 B	8.1	2	9.9	1.5
1, 2 digits	36	36	0.75	34.5	22.5	3	12.75	18 D**	5.25	4.5 B	12.1	3	14.9	2.25
1, 2 digits	48*	48*	1	46	30	4	17	24 D**	7	6 B	16.2	4	19.8	3

* Size not for independent use (only for use within a guide sign)
** Reduce numeral spacing by 25%

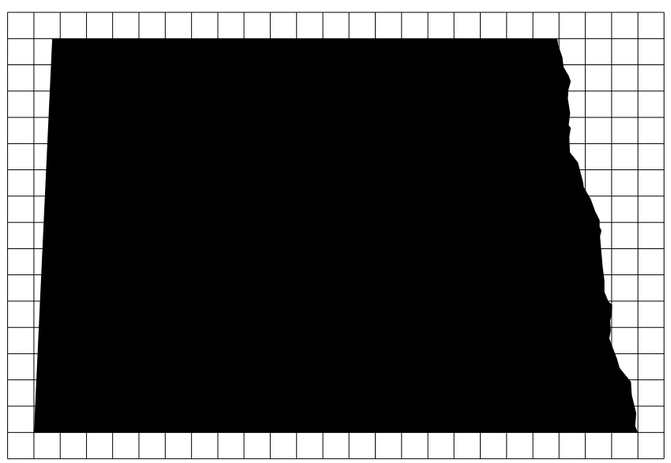


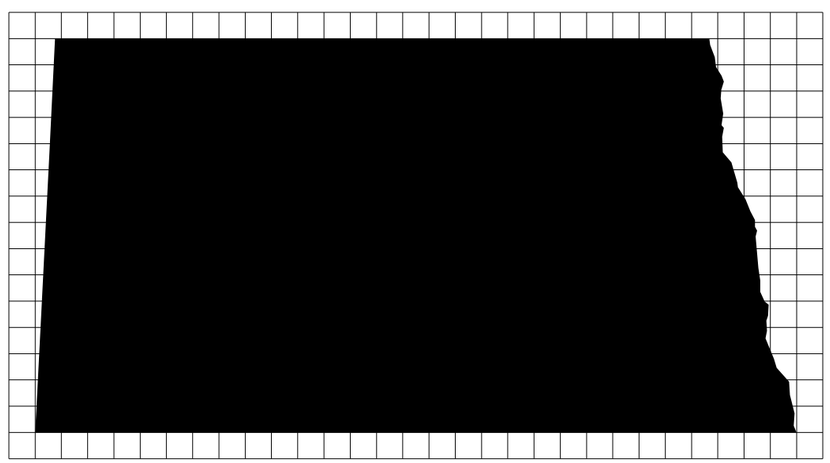
M1-5

STATE ROUTE MARKER

SIGN	DIMENSION (INCHES)													
	A	B	C	D	E	F	G	H	J	K	L	M	N	O
3 digits	24*	18*	1.13	21.75	11.25	1.5	6.38	9 C**	2.63	2.25 C	8.8	2	10.2	1.5
3 digits	30	24	0.5	29	15	2	8.5	12 C**	3.5	3 C	10.7	2.5	12.8	1.5
3 digits	45	36	0.75	43.5	22.5	3	12.75	18 C**	5.25	4.5 C	16.1	3.8	19.1	2.25
3 digits	60*	48*	1	58	30	4	17	24 C**	7	6 C	21.5	5	25.5	3
4 digits	24*	18*	1.13	21.75	11.25	1.5	6.38	9 B***	2.63	2.25 C	8.8	2	10.2	1.5
4 digits	30	24	0.5	29	15	2	8.5	12 B***	3.5	3 C	10.7	2.5	12.8	1.5
4 digits	45	36	0.75	43.5	22.5	3	12.75	18 B***	5.25	4.5 C	16.1	3.8	19.1	2.25
4 digits	60*	48*	1	58	30	4	17	24 B***	7	6 C	21.5	5	25.5	3

* Size not for independent use (only for use within a guide sign)
** Reduce numeral spacing by 25%
*** Reduce numeral spacing by 50%





Note: North Dakota symbol graphics file can be obtained from the Design Division of North Dakota Department of Transportation.

This document was originally issued and sealed by Douglas A. Schumaker, Registration Number PE- 5047, on 2/8/16 and the original document is stored at the North Dakota Department of Transportation

ND Highway Shield Details for Route Markers and Guide Signs

ND Hwy 68
State Line East to Jct US 85
McKenzie County

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SOIB-7-068(011)000	180	1

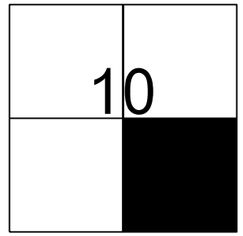
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

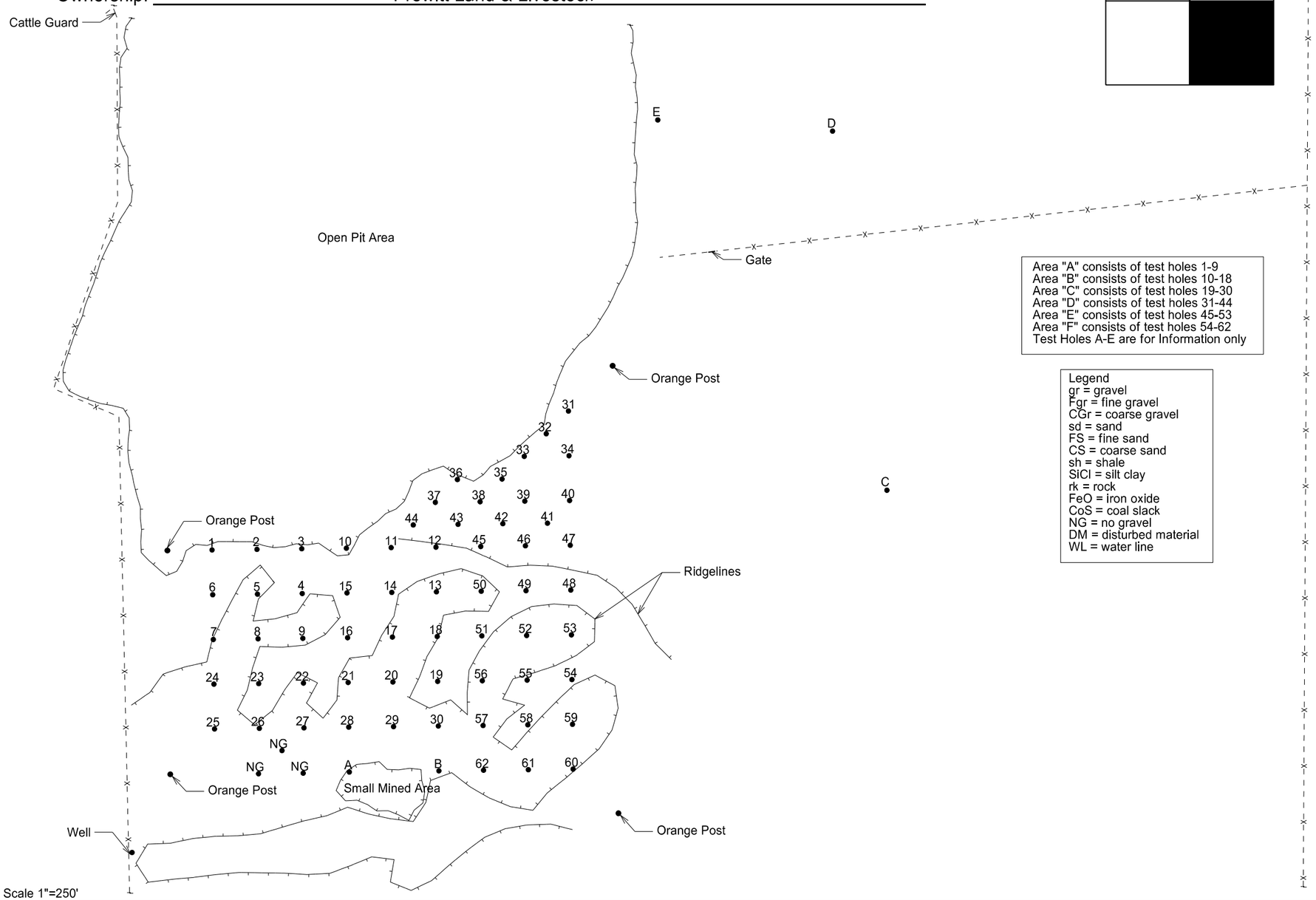
TEST HOLE PLAT

Location: SE1/4 10-24-59 County: Richland, MT

Ownership: Prewitt Land & Livestock

LOCATION OF PIT IN SECTION





Area "A" consists of test holes 1-9
Area "B" consists of test holes 10-18
Area "C" consists of test holes 19-30
Area "D" consists of test holes 31-44
Area "E" consists of test holes 45-53
Area "F" consists of test holes 54-62
Test Holes A-E are for Information only

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

Scale 1"=250'

2/9/2016 11:57:05 AM rsamardz R:\project\70068000.011\design\Pitplats\180PT_001_Prewitt.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SOIB-7-068(011)000	180	2

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
1	0.5	6.0 gr	0	15	38	55	+
		0.5 sd					
		4.0 gr					
		1.0 Fgr					
		6.0 gr					
		2.0 gr Si Cl					
2	2.0	3.0 gr	1	16	37	53	+
		1.0 FS					
		1.0 sd					
		13.0 gr					
3	1.0	4.0 gr	1	16	35	51	+
		2.0 sd					
		1.0 FS					
		12.0 gr					
4	2.0	1.0 Fgr Si Cl	0	13	37	53	+
		2.0 gr					
		1.0 Fgr Si Cl					
		11.0 gr					
		1.0 gr Co S					
		2.0 gr					
5	0.5	2.5 gr	1	17	40	55	Si Cl
		1.0 FS					
		8.0 gr					
		2.0 FS					
		5.0 gr					
6	0.5	0.5 Fgr Si Cl	0	11	33	48	Si Cl
		9.0 gr					
		1.0 sd Si Cl					
		0.5 sd					
		0.5 Fgr					
		3.0 gr					
		3.0 gr Si Cl					
7	0.5	4.0 gr	1	15	36	50	Si Cl
		0.5 FS					
		1.5 gr					
		2.5 FS					
		4.5 gr					
8	1.0	1.0 gr Si Cl	0	10	31	45	Si Cl
		2.0 gr					
		1.0 gr Co S					
		1.0 gr					
		1.0 sd					
		4.0 gr					
		1.0 gr Si Cl					
9	0.5	1.5 gr Si Cl	2	24	44	55	+
		13.0 gr					
		1.0 FS					
		4.0 gr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
10	0.5	1.0 FS	1	19	36	47	+
		3.5 gr					
		1.0 FS					
		4.0 gr					
		1.0 Si Cl					
		2.0 gr					
		3.0 FS					
		4.0 gr					
11	2.0	11.5 gr	0	13	31	46	+
		0.5 sd					
		3.0 gr					
		1.0 sd					
		2.0 gr					
12	1.0	2.0 sd	0	14	30	41	+
		1.5 Fgr					
		3.0 gr					
		1.0 FS					
		3.0 gr					
		1.0 FS					
		2.0 gr					
		4.5 gr					
		3.0 FS					
13	0.5	2.5 gr	0	10	29	42	+
		2.0 sd					
		1.0 gr					
		0.5 Fgr					
		1.0 gr					
		1.5 sd					
		1.0 Fgr					
		6.5 gr					
		0.5 sd					
		1.0 Fgr					
		2.0 gr					
14	2.0	2.0 sd	1	16	35	47	+
		14.0 gr					
		1.0 sd					
		1.0 Fgr					
15	2.0	0.5 sd Si Cl	0	16	39	55	+
		0.5 Fgr					
		17.0 gr					
16	0.5	2.5 gr Si Cl	1	15	30	39	+
		4.0 gr					
		6.0 FS					
		4.0 gr					
		1.5 gr Si Cl					
		1.5 gr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
17	0.5	0.5 gr Si Cl	0	12	34	48	+
		1.0 sd					
		1.0 sd Si Cl					
		1.0 gr					
		1.0 Fgr					
		1.0 gr					
		1.0 sd					
		6.0 gr					
		2.0 gr Si Cl					
		1.0 Fgr					
		2.0 gr					
		1.0 gr					
18	0.5	1.5 gr Si Cl	0	15	28	37	+
		4.0 gr					
		0.5 Si Cl					
		2.5 FS					
		1.0 gr					
		2.0 sd					
		1.0 FS Co S					
		2.0 gr					
		3.0 FS					
		2.0 gr					
		3.0 FS					
		13.0 gr					
19	4.0	3.0 sd	0	17	35	44	+
		13.0 gr					
20	2.0	1.0 sd Si Cl	0	16	36	48	Si Cl
		8.0 gr					
21	1.5	0.5 Fgr Si Cl	0	12	30	45	Si Cl
		2.5 gr					
		0.5 sd					
		1.0 gr					
		1.0 sd					
		2.0 gr					
		1.0 gr					
		1.0 sd					
		4.0 gr					
		2.0 gr Si Cl					
22	1.5	0.5 Fgr Si Cl	0	17	38	52	Si Cl
		9.0 gr					
		1.0 Fgr					
		3.0 gr					
		1.0 gr Si Cl					
23	0.5	1.5 gr Si Cl	1	19	41	53	Si Cl
		8.0 gr					
		0.5 FS					
		0.5 gr					
		2.0 sd					
		3.0 gr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	
24	1.0	1.0 Fgr Si Cl	0	4	19	30	Si Cl
		1.5 Fgr					
		0.5 sd					
		1.0 gr Si Cl					
25	0.5	2.5 gr	1	19	40	52	Si Cl
26	1.0	1.0 gr Si Cl	0	13	35	48	Si Cl
		2.0 gr					
		1.0 sd					
		3.0 gr					
		0.5 gr Si Cl					
27	5.0	1.0 sd	0	9	24	35	Si Cl
		2.0 gr					
		1.0 FS					
		2.0 sd					
28	3.0	1.0 Fgr Si Cl	0	8	24	42	Si Cl
		1.0 gr Si Cl					
29	2.5	1.5 gr Si Cl	1	24	43	54	Si Cl
		1.5 gr					
		3.5 gr Si Cl					
30	0.5	12.5 gr	1	13	39	56	Si Cl
31	2.0	8.0 gr	1	17	38	51	Si Cl
		1.0 FS					
		1.0 gr Si Cl					
		4.5 gr					
32	0.5	0.5 gr Si Cl	0	12	32	47	Si Cl
		8.0 gr					
		1.0 Fgr					
		2.0 FS					
		5.0 gr					
		1.0 gr Si Cl					
33	3.0	5.0 gr	0	12	26	36	+
		1.0 sd					
		1.0 gr					
		1.5 sd					
		2.5 gr					
		1.0 gr Si Cl					
		1.0 gr					
		4.0 sd					

RANGE 59 **TWP** 24 **SEC** SE1/4 10

COUNTY Richland MT Oct-15

PROSPECTED BY Volk/Nelson

INSPECTED & APPROVED Jeffrey Swank Oct-15

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SOIB-7-068(011)000	180	3

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
34	3.0	1.0 gr	0	12	28	38	+
		1.0 FS					
		3.0 gr					
		2.0 FS					
		2.0 gr					
		1.0 FS					
		1.0 gr Si Cl					
		2.0 gr					
		1.0 FS					
		1.5 gr					
		1.5 FS					
35	2.5	1.5 sd Si Cl	0	14	35	46	+
		1.0 Fgr					
		3.0 gr					
		1.0 Fgr					
		4.0 gr					
		2.0 gr Si Cl					
		4.0 gr					
		1.0 sd					
36	4.0	7.0 gr	0	13	31	47	+
		1.0 FS					
		4.0 gr					
		2.0 gr Si Cl					
		2.0 FS					
37	4.0	2.0 sd Si Cl	0	10	23	34	+
		1.0 gr					
		1.0 Fgr					
		3.0 gr					
		3.0 sd					
		1.0 sd Si Cl					
		1.0 gr					
		1.0 Fgr					
		1.5 gr					
		1.5 sd					
38	4.0	2.5 FS	0	8	23	34	+
		5.5 gr					
		3.0 FS					
		5.0 gr					
39	2.0	3.0 sd	0	9	25	38	+
		1.0 gr Si Cl					
		6.0 gr					
		2.0 sd					
		2.0 gr					
		1.0 Fgr					
		3.0 gr					
40	3.0	3.0 gr	1	14	32	47	+
		1.0 FS					
		13.0 gr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
41	1.0	2.0 sd	0	15	30	41	+
		1.0 Fgr					
		1.0 sd					
		2.0 gr					
		1.0 Fgr					
		4.0 gr					
		1.0 Fgr					
		3.5 gr					
		1.5 sd					
		1.0 gr					
		1.0 sd					
42	1.0	1.5 sd	1	8	32	47	+
		1.5 Fgr					
		6.0 gr					
		1.0 FS Co S					
		2.0 gr					
		1.0 sd					
		2.0 gr					
		1.0 FS					
		3.0 gr					
43	1.0	1.0 sd	1	13	36	52	+Cave
		6.0 gr					
		1.0 gr Si Cl					
		8.0 gr					
44	1.0	0.5 sd	1	12	32	44	+
		2.0 gr					
		1.5 sd					
		6.5 gr					
		1.5 FS					
		3.0 gr					
		1.0 FS					
		2.0 Si Cl					
		2.0 gr					
45	1.0	3.0 sd	0	13	31	42	+
		1.0 Fgr					
		2.0 gr					
		2.0 sd					
		3.0 gr					
46	4.0	2.0 sd	0	12	28	39	+
		2.0 Fgr					
		7.5 gr					
		0.5 FS					
		4.0 gr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
47	1.0	1.0 sd Si Cl	0	9	24	35	+
		3.0 sd					
		1.0 Fgr					
		2.0 sd					
		1.0 Fgr					
		1.0 sd					
		1.0 Fgr					
		1.5 gr					
		0.5 sd					
		5.5 gr					
		0.5 sd					
		1.0 gr					
		0.5 sd					
		1.0 gr					
48	4.0	2.0 FS	0	5	11	16	+
		10.0 sd					
		2.0 gr					
		1.0 gr Si Cl					
		1.0 gr					
49	3.0	8.0 sd	0	8	20	31	+
		1.0 Fgr					
		1.0 Fgr Si Cl					
50	2.0	1.0 sd	1	14	28	39	+
		2.0 gr					
		2.0 FS					
		5.0 gr					
		0.5 Si Cl					
		2.5 gr					
		3.0 FS					
		2.0 gr					
51	3.0	2.0 gr	0	12	32	44	+
		1.0 sd					
		5.0 gr					
		1.0 Fgr					
		1.0 gr					
		3.0 sd					
		1.0 Fgr					
		3.0 gr					
52	1.0	1.0 Fgr	1	12	28	38	+
		1.0 FS					
		7.5 gr					
		5.5 FS					
		4.0 gr					
53	2.0	1.0 sd	0	13	31	41	+
		2.0 FS					
		1.0 sd					
		9.0 gr					
		1.0 FS					
		1.0 Fgr Si Cl					
		2.0 gr Si Cl					
		1.0 sd					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
54	4.0	7.5 FS	0	8	19	26	+
		2.5 gr					
		2.0 FS					
		4.0 gr					
55	2.0	9.0 gr	0	15	36	51	+
		1.0 sd					
		1.0 FS					
		5.5 gr					
		0.5 sd					
		1.0 gr					
56	3.5	2.5 FS	1	16	35	47	+
		10.0 gr					
		1.0 FS					
		3.0 gr					
57	1.0	2.0 gr Si Cl	0	13	40	53	Si Cl
		6.0 gr					
		1.0 gr Si Cl					
		3.0 gr					
58	0.5	0.5 gr	1	14	33	44	+
		5.0 FS					
		1.0 gr					
		1.5 FS					
		11.5 gr					
59	0.5	0.5 gr	0	15	35	47	+
		1.0 Fgr					
		2.5 gr					
		1.5 sd					
		2.0 FS					
		0.5 sd					
		10.5 gr					
		1.0 sd					
60	5.0	1.0 sd	0	16	32	42	+
		2.0 gr					
		1.0 gr Si Cl					
		4.0 FS					
		7.0 gr					

RANGE 59 **TWP** 24 **SEC** SE1/4 10

COUNTY Richland MT Oct-15

PROSPECTED BY Volk/Nelson

INSPECTED & APPROVED Jeffrey Swank Oct-15

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SOIB-7-068(011)000	180	4

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
61	0.5	0.5 Fgr	2	18	38	51	+
		12.0 gr					
		1.0 Fgr					
		3.0 gr					
		2.0 sd Si Cl					
		1.0 gr					
62	1.5	1.5 gr Si Cl	1	17	39	54	Si Cl
		9.0 gr					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole
A	0.5	1.5 gr Si Cl	1	24	46	57	Si Cl
		4.0 gr					
B	0.5	1.5 gr	0	14	36	50	+
		1.0 sd					
		1.0 FS					
		3.0 gr					
		3.0 Fgr					
		7.0 gr					
		3.0 gr Si Cl					
C	2.5	0.5 gr Si Cl	0	12	30	41	+
		2.0 sd					
		2.0 gr					
		2.5 Fgr					
		4.5 gr					
		2.0 sd					
		4.0 gr					
D	1.5	5.5 sd	0	11	24	34	+
		9.0 gr					
		2.0 Fgr					
		2.0 FS					
E	5.0	3.5 gr	2	23	40	52	+
		1.5 sd					
		1.0 gr					
		1.0 Si Cl					
		5.0 gr					
		3.0 gr Si Cl					

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole

PIT LOGGING BY TEST HOLES

Test Hole No.	Depth of Stripping (Ft)	Depth of Material (Ft)	% Retained on 1½" Screen	% Retained on ¾" Screen	% Retained on 3/8" Screen	% Retained on #4 Screen	Bottom of Test Hole

RANGE 59 **TWP** 24 **SEC** SE1/4 10

COUNTY Richland MT Oct-15

PROSPECTED BY Volk/Nelson

INSPECTED & APPROVED Jeffrey Swank Oct-15

NDDOT ABBREVIATIONS

D-101-1

?	This is a special text character used in the labeling of existing features. It indicates a feature that has an unknown characteristic, potentially based on: lack of description, location accuracy or purpose.
Abn	abandoned
Abut	abutment
Ac	acres
Adj	adjusted
Aggr	aggregate
Ahd	ahead
ARV	air release valve
Align	alignment
Al	alley
Alt	alternate
Alum	aluminum
ADA	Americans with Disabilities Act
A	ampere
&	and
Appr	approach
Approx	approximate
ACP	asbestos cement pipe
Asph	asphalt
AC	asphalt cement
Assmd	assumed
@	at
Atten	attenuation
ATR	automatic traffic recorder
Ave	Avenue
Avg	average
ADT	average daily traffic
Az	azimuth
Bk	back
BF	back face
Bs	backsight
Balc	balcony
B Wire	barbed wire
Barr	barricade
Btry	battery
Brg	bearing
BI	beehive inlet
Beg	begin
BM	bench mark
Bkwy	bikeway
Bit	bituminous
Blk	block
Bd Ft	board feet
BH	bore hole
BS	both sides
Bot	bottom
Blvd	Boulevard
Bndry	boundary
BC	brass cap
Brkwy	breakaway
Br	bridge
Bldg	building
BV	butterfly valve
Byp	bypass
C Gdrl	cable guardrail
Calc	calculate
Cd	candela
CIP	cast iron pipe
CB	catch basin
CRS	cationic rapid setting
C Gd	cattle guard
C To C	center to center
Cl or ℄	centerline
Cm	centimeter
Ch	chain
Chnlk	chain-link
Ch Blk	channel block
Ch Ch	channel change
Chk	check
Chsld	chiseled
Cir	circle
Cl	class
Cl	clay
Cl F	clay fill
Cl Hvy	clay heavy
Cl Lm	clay loam
Clnt	clean-out
Clr	clear
Cl&gr	clearing & grubbing
Co S	coal slack
Comb.	combination
Coml	commercial
Compr	compression
CADD	computer aided drafting & design
Conc	concrete
Cond	conductor
Const	construction
Cont	continuous
CSB	continuous split barrel sample
Contr	contraction
Contr	contractor
CP	control point
Coord	coordinate
Cor	corner
Corr	corrected
CAES	corrugated aluminum end section
CAP	corrugated aluminum pipe
CMES	corrugated metal end section
CMP	corrugated metal pipe
CPVCP	corrugated poly-vinyl chloride pipe
CSES	corrugated steel end section
CSP	corrugated steel pipe
C	coulomb
Co	County
Crse	course
C Gr	course gravel
CS	course sand
Ct	Court
Xarm	cross arm
Xbuck	cross buck
Xsec	cross sections
Xing	crossing
Xrd	Crossroad
Crn	crown
CF	cubic feet
M3	cubic meter
M3/s	cubic meters per second
CY	cubic yard
Cy/mi	cubic yards per mile
Culv	culvert
C&G	curb & gutter
CI	curb inlet
CR	curb ramp
CS	curve to spiral
C	cut
Dd Ld	dead load
Defl	deflection
Defm	deformed
Deg or D	degree
Dlnt	delineate
Dlntr	delineator
Depr	depression
Desc	description
Det	detail
DWP	detectable warning panel
Dtr	detour
Dia	diameter
Dir	direction
Dist	distance
DM	disturbed material
DB	ditch block
DG	ditch grade
Dbl	double
Dn	down
Dwg	drawing
Dr	drive
Drwy	driveway
DI	drop inlet
D	dry density
Ea	each
Esmt	easement
E	East
EB	Eastbound
Elast	elastomeric
EL	electric locker
E Mtr	electric meter
Elec	electric/al
EDM	electronic distance meter
Elev or El	elevation
Ellipt	elliptical
Emb	embankment
Emuls	emulsion/emulsified
ES	end section
Engr	engineer
ESS	environmental sensor station
Eq	equal
Eq	equation
Evgr	evergreen
Exc	excavation
Exst	existing
Exp	expansion
Expy	Expressway
E	external of curve
Extru	extruded
FOS	factor of safety
F	Fahrenheit
FS	far side
F	farad
Fed	Federal
FP	feed point
Ft	feet/foot
Fn	fence
Fn P	fence post
FO	fiber optic
FB	field book
FD	field drive
F	fill
FAA	fine aggregate angularity
FS	fine sand
FH	fire hydrant
Fl	flange
Flrd	flared
FES	flared end section
F Bcn	flashing beacon
FA	flight auger sample
FL	flow line
Ftg	footing
FM	force main
Fs	foresight
Fnd	found
Fdn	foundation
Frac	fractional
Frwy	freeway
Frt	front
FF	front face
F Disp	fuel dispenser

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NDDOT ABBREVIATIONS

D-101-2

FFP	fuel filler pipes
FLS	fuel leak sensor
Furn	furnish/ed
Gal	gallon
Galv	galvanized
Gar	garage
Gs L	gas line
G Reg	gas line regulator
GMV	gas main valve
G Mtr	gas meter
GSV	gas service valve
GVP	gas vent pipe
GV	gate valve
Ga	gauge
Geod	geodetic
GIS	Geographical Information System
G	giga
GPS	Global Positioning System
Gov	government
Grd	graded/grade
Gr	gravel
Grnd	ground
GWM	ground water monitor
Gdrl	guardrail
Gtr	gutter
H Plg	H piling
Hdwl	headwall
Ha	hectare
Ht	height
HI	height of instrument
Hel	helical
H	henry
Hz	hertz
HDPE	high density polyethylene
HM	high mast
HP	high pressure
HPS	high pressure sodium
Hwy	highway
Hor	horizontal
HBP	hot bituminous pavement
HMA	hot mix asphalt
Hr	hour(s)
Hyd	hydrant
Ph	hydrogen ion content
Id	identification
In or "	inch
Incl	inclinometer tube
IMH	inlet manhole
ID	inside diameter
Inst	instrument
Intchg	interchange
Intmdt	intermediate
Intscn	intersection
Inv	invert
IM	iron monument
I Pn	Iron Pin
IP	iron Pipe
Jt	joint
J	joule
Jct	junction
K	kelvin
Kn	kilo newton
Kpa	kilo pascal
Kg	kilogram
Kg/m3	kilogram per cubic meter
Km	kilometer
K	Kip(s)
LS	Land Surveyor (licensed)
LSIT	Land Surveyor In Training
Ln	lane
Lg	large
Lat	latitude
Lt	left
L	length of curve
Lens	lenses
Lvl	level
LB	level book
Lvlng	leveling
Lht	light
LP	light pole
Ltg	lighting
Lig Co	lignite coal
Lig Sl	lignite slack
LF	linear foot
Liq	liquid
LL	liquid limit
L	litre
Lm	loam
Loc	location
LC	long chord
Long.	longitude
Lp	loop
LD	loop detector
Lm	lumen
Lum	luminaire
L Sum	lump sum
Lx	lux
ML	main line
M Hr	man hour
MH	manhole
Mkd	marked
Mkr	marker
Mkg	marking
MA	mast arm
Matl	material
Max	maximum
MC	meander corner
Meas	measure
Mdn	median
MD	median drain
MC	medium curing
M	mega
Mer	meridian
M	meter
M/s	meters per second
M	mid ordinate of curve
Mi	mile
MM	mile marker
MP	mile post
Ml	milliliter
Mm	millimeter
Mm/hr	millimeters per hour
Min	minimum
Misc	miscellaneous
Mon	monument
Mnd	mound
Mtbl	mountable
Mtd	mounted
Mtg	mounting
Mk	muck
Mun	municipal
N	nano
NGS	National Geodetic Survey
NS	near side
Neop	neoprene
Ntwk	network
N	newton
N	North
NE	North East
NW	North West
NB	Northbound
No. or #	number
Obsc	obscure(d)
Obsn	observation
Ocpd	occupied
Ocpy	occupy
Off Loc	office location
O/s	offset
OC	on center
C	one dimensional consolidation
OC	organic content
Orig	original
O To O	out to out
OD	outside diameter
OH	overhead
PMT	pad mounted transformer
Pg	pages
Pntd	painted
Pr	pair
Pnl	panel
Pk	park
PK	Parker-Kalon nail
Pa	pascal
PSD	passing sight distance
Pvmt	pavement
Ped	pedestal
Ped	pedestrian
PPP	pedestrian pushbutton post
Pen.	penetration
Perf	perforated
Per.	perimeter
PL	pipeline
Pl	place
P&P	plan & profile
PL	plastic limit
Pl	plate
Pt	point
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
PE	polyethylene
PVC	polyvinyl chloride
PCC	Portland Cement concrete
Lb or #	pounds
PP	power pole
Preempt	preemption
Prefab	prefabricated
Prfmd	preformed
Prep	preperation
Press.	pressure
PRV	pressure relief valve
Prestr	prestressed
Pvt	private
PD	private drive
Prod.	production/produce
Prog	programmed
Prop.	property
Prop Ln	property line
Ppsd	proposed
PB	pull box

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NDDOT ABBREVIATIONS

Qty	quantity
Qtr	quarter
Rad or R	radius
RR	railroad
Rlwy	railway
Rsd	raised
RTP	random traverse point
Rge or R	range
RC	rapid curing
Rec	record
Rcy	recycle
RAP	recycled asphalt pavement
RPCC	recycled portland cement concrete
Ref	reference
R Mkr	reference marker
RM	reference monument
Refl	reflectorized
RCB	reinforced concrete box
RCES	reinforced concrete end section
RCP	reinforced concrete pipe
RCPS	reinforced concrete pipe sewer
Reinf	reinforcement
Res	reservation
Ret	retaining
Rev	reverse
Rt	right
R/W	right of way
Riv	river
Rd	road
Rdbd	road bed
Rdwy	roadway
RWIS	roadway weather information system
Rk	rock
Rt	route
Salv	salvage(d)
Sd	sand
Sdy Cl	sandy clay
Sdy Cl Lm	sandy clay loam
Sdy Fl	sandy fill
Sdy Lm	sandy loam
San	sanitary sewer line
Sc	scoria
Sec	seconds
Sec	section
SL	section line
Sep	separation
Seq	sequence
Serv	service
Sh	shale
Sht	sheet
Shtng	sheeting
Shldr	shoulder
Sw	sidewalk
S	siemens
SD	sight distance
SN	sign number
Sig	signal
Si Cl	silt clay
Si Cl Lm	silty clay loam
Si Lm	silty loam
Sgl	single
SC	slow curing
SS	slow setting
Sm	small
S	South
SE	South East
SW	South West
SB	Southbound
Sp	spaces
Spcl	special
SA	special assembly
SP	special provisions
G	specific gravity
Spk	spike
SC	spiral to curve
ST	spiral to tangent
SB	split barrel sample
SH	sprinkler head
SV	sprinkler valve
Sq	square
SF	square feet
Km2	square kilometer
M2	square meter
SY	square yard
Stk	stake
Std	standard
N	standard penetration test
Std Specs	standard specifications
Sta	station
Sta Yd	station yards
Stm L	steam line
SEC	steel encased concrete
SMA	stone matrix asphalt
SSD	stopping sight distance
SD	storm drain
St	street
SPP	structural plate pipe
SPPA	structural plate pipe arch
Str	structure
Subd	subdivision
Sub	subgrade
Sub Prep	subgrade preperation
Ss	subsoil
SE	superelevation
SS	supplement specification
Supp	supplemental
Surf	surfacing
Surv	survey
Sym	symmetrical
SI	systems international
Tan	tangent
T	tangent (semi)
TS	tangent to spiral
Tel	telephone
Tel B	Telephone Booth
Tel P	telephone pole
Tv	television
Temp	temperature
Temp	temporary
TBM	temporary bench mark
T	tesla
T	thinwall tube sample
T/mi	tons per mile
Ts	topsoil
Twp or T	township
Traf	traffic
TSCB	traffic signal control box
Tr	trail
Transf	transformer
TB	transit book
Trans	transition
TT	transmission tower
Trans	transverse
Trav	traverse
TP	traverse point
Trtd	treated
Trmt	treatment
Qc	triaxial compression
TERO	tribal employment rights ordinance
Tpl	triple
TP	turning point
Typ	typical
Qu	unconfined compressive strength
Ugrnd	underground
USC&G	US Coast & Geodetic Survey
USGS	US Geologic Survey
Util	utility
VG	valley gutter
Vap	vapor
Vert	vertical
VC	vertical curve
VCP	vitrified clay pipe
V	volt
Vol	volume
Wkwy	walkway
W	water content
WGV	water gate valve
WL	water line
WM	water main
WMV	water main valve
W Mtr	water meter
WSV	water service valve
WW	water well
W	watt
Wrng	wearing
Wb	weber
WIM	weigh in motion
W	west
WB	westbound
Wrng	wiring
W/	with
W/o	without
WC	witness corner
WGS	world geodetic system
Z	zenith

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

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Line Styles

- Limits of Const Transition Line
- Bale Check
- Rock Check
- Sight Distance Triangle Line
- Small Hidden Object
- Dimension Leader
- Existing Ground
- Existing Topsoil (Cross Section View)
- Large Hidden Object
- Edge Drain
- Geotextile Fabric Type D
- Existing Electrical
- Existing Fiber Optic Line
- Existing TV Fiber Optic
- Existing Gas Pipe
- Geogrid
- Existing Overhead Utility Line
- Existing Power
- Existing Fuel Pipeline
- Existing Undefined Above Ground Pipe Line
- Geotextile Fabric Type R
- Geotextile Fabric Type R1
- Remove Line
- Geotextile Fabric Type RR
- Geotextile Fabric Type S
- Floating Silt Curtain
- Existing Telephone Line
- Existing TV Line
- Existing Assumed Ground (Not Surveyed)
- Tentative Ground Line
- Existing Water or Steam Line
- Existing Under Drain
- Under Drain
- Wall
- Existing Slotted Drain
- Existing Cemetary Boundary
- 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
- Wetland Mitigation
- Existing Box Culvert Bridge
- Existing Concrete Surface
- Existing Drainage Structure
- Easement
- Existing Concrete
- Existing Easement
- Existing Gravel Surface
- Existing Aggregate (Cross Section View)
- Existing Curb and Gutter (Cross Section View)
- Existing Riprap
- Existing Underground Vault or Lift Station
- Tangent Line
- Hidden Object
- Existing Dirt Surface
- Existing Conduit
- Topsoil Profile
- Existing Conductor
- Conductor
- Fiber Optic
- Existing Loop Detector
- Subgrade, Subcut or Ditch Grade
- Existing Asphalt Surface
- Existing Asphalt (Cross Section View)
- Existing Reinforcement Rebar
- Existing Tie Point Line
- Existing State or International Line
- Existing Quarter Section Line
- Existing County
- Existing Section Line
- Existing Township
- Existing Railroad Centerline
- Centerline
- Existing Centerline
- Supplemental Contour
- Right of Way
- Existing Right of Way
- Existing Right of Way Railroad
- Failure Line
- Existing Conditions
- Existing Ground (Details)
- Existing Sixteenth Section Line
- Existing Right of Way Not State Owned
- Phantom Object
- Centerline Main
- Existing Guardrail Cable
- Existing Guardrail Metal
- Existing Edge of Water
- Excavation Limits
- Existing Government Lot Line
- Existing Adjacent Block Lines
- Existing Adjacent Lot Lines
- Existing Adjacent Property Line
- Existing Adjacent Subdivision Lines

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Line Styles

- Subgrade Reinforcement
- Existing Down Guy Wire Down Guy
- Existing Fence
- Existing Railroad
- Existing Sanitary Sewer
- Existing Sanitary Force Main
- Existing Storm Drain
- Existing Storm Drain Force Main
- Fence
- Silt Fence
- Existing Field Line
- Exst Flow
- Flow
- Existing Culvert
- Existing Curb
- Existing Valley Gutter
- Existing Driveway Gutter
- Existing Curb and Gutter
- Existing Mountable Curb and Gutter
- Existing Double Micro Loop Detector
- Micro Loop Detector Double
- Existing Overhead Sign Structure
- Existing Micro Loop Detector
- Micro Loop Detector
- Existing Overhead Sign Structure Cantilever
- Existing Railroad Switch
- Overhead Sign Structure Cantilever
- 24 Inch Pipe
- Reinforced Concrete Pipe
- Signal Head with Mast Arm
- Existing Signal Head with Mast Arm
- Tie Bar at Random Spacing
- 3-Cable w Posts
- Existing 3-Cable w Posts
- Site Boundary
- Fiber Rolls
- Doweled Joint
- Tie Bar 30 Inch 4 Foot Center to Center
- Tie Bar 18 Inch 3 Foot Center to Center
- Existing Berm, Dike, Pit, or Earth Dam
- Existing Ditch Block
- Depression Contours
- Existing City Corporate Limits or Reservation Boundary
- Gravel Pit - Borrow Area
- Existing Tree Boundary
- Tree Row
- Existing Brush or Shrub Boundary
- Existing Retaining Wall
- Existing Planter or Wall
- Retaining Wall (Plan View)
- Sheet Piling
- W-Beam w Posts
- Existing W-Beam Guardrail with Posts
- Exst Wet Area-Vegetation Break
- Existing Wetland Delineated

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Symbols

D-101-30

North Arrow (Half Scale)

Truck Mounted Attenuator

Type I Barricade

Type II Barricade

Type III Barricade

Catch Basin

Cairn or Stone Circle

Video Detection Camera

Storm Drain Cap or Stub

Corrugated Metal End Section 18 Inch

Corrugated Metal End Section 24 Inch

Corrugated Metal End Section 30 Inch

Corrugated Metal End Section 36 Inch

Corrugated Metal End Section 42 Inch

Corrugated Metal End Section 48 Inch

Concrete Foundation

Ground Connection Conductor

Neutral Connection Conductor

Phase 1 Connection Conductor

Phase 2 Connection Conductor

Traffic Cone

Signal Controller

Pad Mounted Signal Controller

Alignment Data Point

Emergency Vehicle Detector

Attenuation Device

Diamond Grade Delineator Type A

Diamond Grade Delineator Type B

Diamond Grade Delineator Type C

Diamond Grade Delineator Type D

Diamond Grade Delineator Type E

Flexible Delineator

Flexible Delineator Type A

Flexible Delineator Type B

Flexible Delineator Type C

Flexible Delineator Type D

Flexible Delineator Type E

Delineator Type A

Delineator Type A Reset

Delineator Type B

Delineator Type B Reset

Delineator Type C

Delineator Type D

Delineator Type E

Delineator Drums

Spot Elevation

Existing Access Control Arrow

Existing Artifact

Existing Flashing Beacon

Existing Benchmark

Existing Railroad Battery Box

Existing Bush or Shrub

Existing Gas Cap or Stub

Existing Sanitary Cap or Stub

Existing Storm Drain Cap or Stub

Existing Water Cap or Stub

Existing Sanitary Cleanout

Existing Concrete Foundation

Existing Traffic Signal Controller

Existing Pad Mounted Signal Controller

Existing Sixteenth Section Corner

Existing Quarter Section Corner

Existing Section Corner

Existing Railroad Crossbuck

Existing Satellite Dish

Existing Fuel Dispensers

Existing Flexible Delineator Type A

Existing Flexible Delineator Type B

Existing Flexible Delineator Type C

Existing Flexible Delineator Type D

Existing Flexible Delineator Type E

Existing Delineator Type A

Existing Delineator Type B

Existing Delineator Type C

Existing Delineator Type D

Existing Delineator Type E

Existing EFB Misc

Existing Flashing Beacon

Existing Pipe Mounted Flasher

Existing Pad Mounted Feed Point

Existing Pipe Mounted Feed Point with Pad

Existing Pole Mounted Feed Point

Existing Railroad Frog

Existing Snow Gate 18

Existing Snow Gate 28

Existing Snow Gate 40

Existing Headwall

Existing Pedestrian Head with Number

Existing Signal Head

Existing Sprinkler Head

Existing Fire Hydrant

Existing Catch Basin Drop Inlet

Existing Curb Inlet

Existing Manhole Inlet

Existing Junction Box

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE

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Symbols

D-101-31

- Existing Light Standard
- Existing High Mast Light Standard 10 Luminaire
- Existing High Mast Light Standard 3 Luminaire
- Existing High Mast Light Standard 4 Luminaire
- Existing High Mast Light Standard 5 Luminaire
- Existing High Mast Light Standard 6 Luminaire
- Existing High Mast Light Standard 7 Luminaire
- Existing High Mast Light Standard 8 Luminaire
- Existing High Mast Light Standard 9 Luminaire
- Existing Overhead Sign Structure Load Center
- Existing Luminaire
- Existing Light Standard Luminaire
- Existing Federal Mailbox
- Existing Private Mailbox
- Existing Meander Section Corner
- Existing Meter
- Existing Electrical Manhole
- Existing Gas Manhole
- Existing Sanitary Manhole
- Existing Sanitary Force Main Manhole
- Existing Sanitary Manhole with Valve
- Existing Storm Drain Manhole
- Existing Force Main Storm Drain Manhole
- Existing Force Main Storm Drain Manhole with Valve
- Existing Telephone Manhole
- Existing Manhole with Valve Water
- Existing Water Manhole
- Existing Mile Post Type A
- Existing Mile Post Type B
- Existing Mile Post Type C
- Existing Reference Marker
- Existing RW Marker
- Existing Utility Marker
- Iron Monument Found
- Iron Pin R/W Monument
- Existing Object Marker Type I
- Existing Object Marker Type II
- Existing Object Marker Type III
- Existing Electrical Pedestal
- Existing Telephone Pedestal
- Existing Fiber Optic Telephone Pedestal
- Existing TV Pedestal
- Existing Fiber Optic TV Pedestal
- Existing Fuel Filler Pipes
- Existing Traverse PI Aerial Panel
- Existing Pole
- Existing Power Pole
- Existing Power Pole with Transformer
- Existing Telephone Pole
- Existing Wood Pole
- Existing Post
- Existing Pedestrian Push Button Post
- Existing Control Point CP
- Existing Control Point GPS-RTK
- Existing Control Point TRI
- Existing Reference Marker Point NGS
- Existing Pull Box
- Existing Intelligent Transportation Pull Box
- Existing Water Pump
- Existing Slotted Reinforced Concrete Pipe
- Existing RR Profile Spot
- Existing Fuel Leak Sensors
- Existing Highway Sign
- Existing Miscellaneous Spot
- Existing Lighting Standard Pole
- Existing Traffic Signal Standard
- Existing Transformer
- Existing Large Evergreen Tree
- Existing Small Evergreen Tree
- Existing Large Tree
- Existing Small Tree
- Existing Tree Trunk
- Existing Pad Mounted Traffic Signal Control Box
- Existing Undefined Manhole
- Existing Undefined Pull Box
- Existing Undefined Pedestal
- Existing Undefined Valve
- Existing Undefined Pipe Vent
- Existing Gas Valve
- Existing Water Valve
- Existing Fuel Pipe Vent
- Existing Gas Pipe Vent
- Existing Sanitary Pipe Vent
- Existing Storm Drain Pipe Vent
- Existing Water Pipe Vent
- Existing Weather Station
- Existing Ground Water Well Bore Hole
- Existing Windmill or Tower
- Existing Witness Corner
- Flashing Beacon
- Flagger
- Pipe Mounted Flasher
- Sanitary Force Main with Valve

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
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DATE	CHANGE

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Symbols

D-101-32

- Pad Mounted Feed Point
- Pipe Mounted Feed Point with Pad
- Pole Mounted Feed Point
- Headwall
- Double Headwall with Vegitation Barrier
- Single Headwall with Vegitation Barrier
- Pole Mounted Head
- Sprinkler Head
- Fire Hydrant
- Inlet Type 1
- Inlet Type 2
- Double Inlet Type 2
- Inlet Grate Type 2
- Junction Box
- High Mast Light Standard 10 Luminaire
- High Mast Light Standard 3 Luminaire
- High Mast Light Standard 4 Luminaire
- High Mast Light Standard 5 Luminaire
- High Mast Light Standard 6 Luminaire
- High Mast Light Standard 7 Luminaire
- High Mast Light Standard 8 Luminaire
- High Mast Light Standard 9 Luminaire
- Relocate Light Standard
- Overhead Sign Structure Load Center
- Light Standard 100 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 150 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 175 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 200 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 250 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 310 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 35 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 400 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 50 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 70 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 700 Watt High Pressure Sodium Vapor Luminaire
- Manhole
- Manhole 48 Inch
- Sanitary Force Main Manhole
- Sanitary Sewer Manhole
- Storm Drain Manhole
- Storm Drain Manhole with Inlet
- Reset Mile Post
- Mile Post Type A
- Mile Post Type B
- Mile Post Type C
- Right of Way Marker
- Tubular Marker
- Alignment Monument
- Iron Pin Reference Monument
- Object Marker Type I
- Object Marker Type II
- Object Marker Type III
- Caution Mode Arrow Panel
- Back to Back Vertical Panel Sign
- Double Direction Arrow Panel
- Left Directional Arrow Panel
- Right Directional Arrow Panel
- Sequencing Arrow Panel
- Truck Mounted Arrow Panel
- Power Pole
- Wood Pole
- Pedestrian Push Button Post
- Property Corner
- Pull Box
- Intelligent Transportation Pull Box
- Sanitary Pump
- Storm Drain Pump
- Reinforced Pavement
- Reinforced Concrete End Section 15 Inch
- Reinforced Concrete End Section 18 Inch
- Reinforced Concrete End Section 24 Inch
- Reinforced Concrete End Section 30 Inch
- Reinforced Concrete End Section 36 Inch
- Reinforced Concrete End Section 42 Inch
- Reinforced Concrete End Section 48 Inch
- Reinforced Concrete End Section 54 Inch
- Reset Right of Way Marker
- Reset USGS Marker
- Right of Way Markers
- Riser 30 Inch
- Continuous Split Barrel Sample (CSB)
- Flight Auger Sample (FA)
- Split Barrel Sample (SB)
- Thinwall Tube Sample (T)
- Highway Sign
- SNOW GATE 18 FT
- SNOW GATE 28 FT
- SNOW GATE 40 FT
- Standard Penetration Test (N)
- Transformer
- Inclinometer Tube (Incl)
- Underdrain Cleanout
- Excavation Unit
- Water Valve

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
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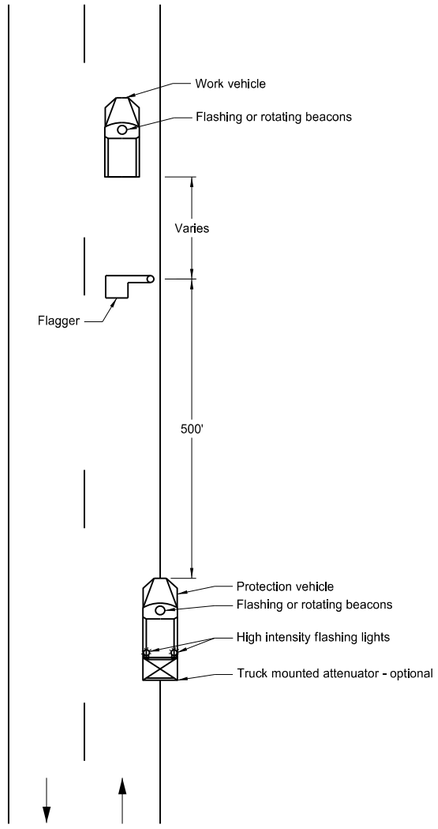
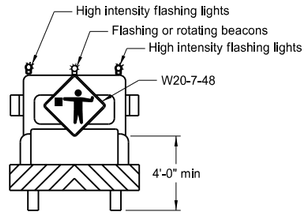
TRAFFIC CONTROL FOR CORING OF HOT BITUMINOUS PAVEMENT

D-704-2

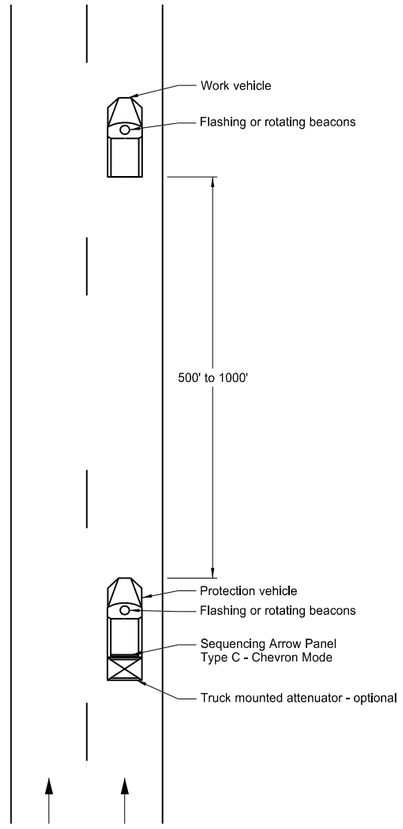
Two Lane, Two Way Roadways

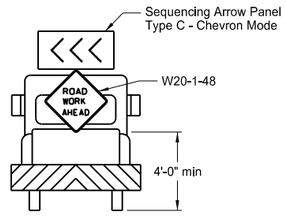




Typical Protection Vehicle

Multilane Roadways





Typical Protection Vehicle

Notes:

1. The working vehicle shall display a 360 degree rotating, flashing, oscillating or strobe light.
2. The shadow vehicle shall display a 360 degree rotating, flashing, oscillating or strobe light. The shadow vehicle for Multilane Roadway shall also have a sequencing arrow panel Type C operated in the chevron mode.
3. This application is for use during daylight hours and in areas of good visibility only.
4. Two lane, two way roadway, a flagger shall be used to protect the work area and warn oncoming traffic.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE

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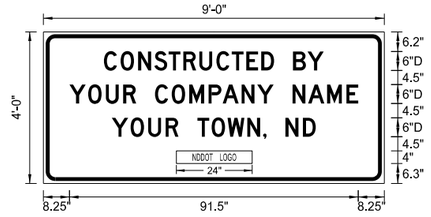
CONSTRUCTION SIGN DETAIL

D-704-5

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

SYMBOL	X	Y	WID	HT	ANGLE
	42.1	6.2	24	4	0

STATION(S): AREA: 36.0 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

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

Notes:

1. Sign shall be placed a distance of ½A following the End Road Work (G20-2a-48) sign. There shall be a maximum of 2 signs per project.
2. Sign shall be post mounted.
3. Sign required on rural projects with a 30 day or longer duration and it is not required on seal coat projects or other short duration projects.
4. Sign shall not be placed 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	Revise sheeting to type IV

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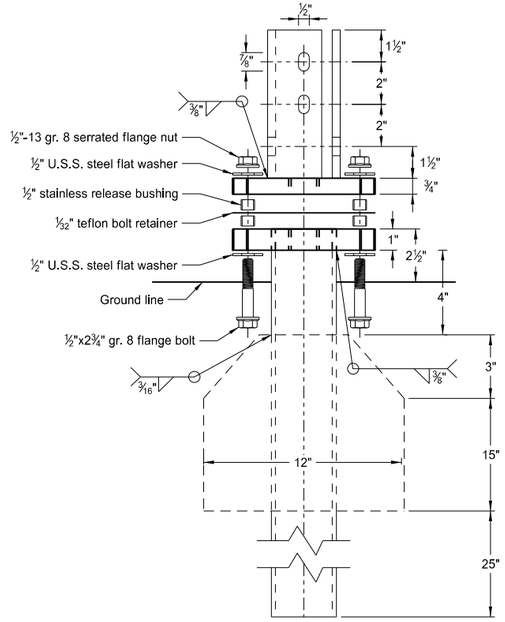
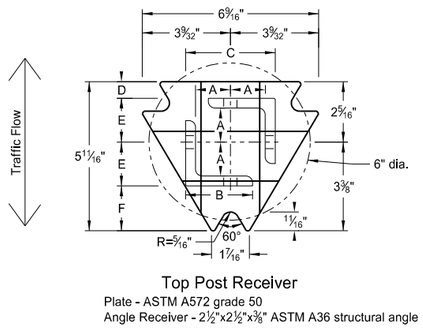
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

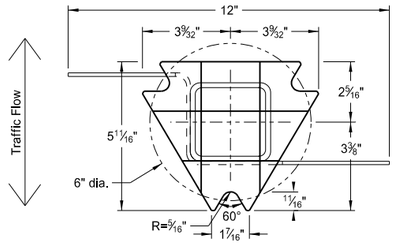


Multi-Directional
Slip Base Assembly

Perforated Tube



Top Post Receiver
Plate - ASTM A572 grade 50
Angle Receiver - 2½"x2½"x⅜" ASTM A36 structural angle



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

Notes:

1. Slip base bolts shall be torqued as specified by the manufacturer.
2. Anchor shall have a yield strength of 43.9 KSI and tensile strength of 59.3 KSI.
3. The 4" vertical clearance is required for the anchor or breakaway base. The 4"x60" measurement shall be made above and below post location and also back and ahead of the post.
4. When used in concrete sidewalk, anchor shall be same except without the wings.
5. Four post signs shall have over 7' between the first and the fourth posts.

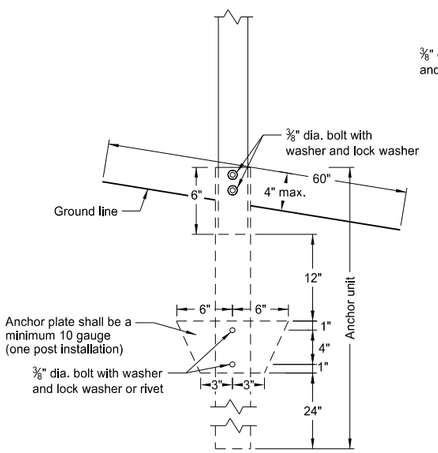
Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thick-ness Gauge	Sleeve Size in.	Wall Thick-ness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2¼
1	2¼	12			No	2½
1	2½	12			(A)	3
1	2½	10			Yes	
1	2¼	12	2	12	Yes	
1	2½	12	2¼	12	Yes	
2	2	12			No	2¼
2	2¼	12			No	2½
2	2½	12			Yes	
2	2½	12			Yes	
2	2¼	10	2	12	Yes	
2	2½	12	2¼	12	Yes	
3 & 4	2½	12			Yes	
3 & 4	2½	10			Yes	
3 & 4	2½	12	2¼	12	Yes	
3 & 4	2¼	12	2	12	Yes	
3 & 4	2½	10	2³⁄₁₆	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 $in.^3$
1½ x 1½	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
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2³⁄₁₆ x 2³⁄₁₆	0.135	10	3.432	0.605	0.841	0.590
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643
2½ x 2½	0.135	10	4.006	0.979	1.010	0.785

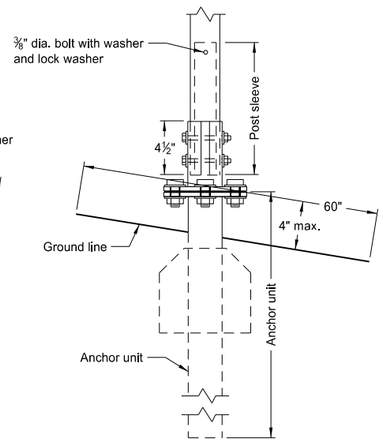
Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2³⁄₁₆"x10 ga.	1⁹⁄₆₄"	2½"	3¹⁄₃₂"	25⁄₃₂"	1³³⁄₆₄"	1⅞"
2½"x10 ga.	1⁹⁄₃₂"	2½"	3⁵⁄₁₆"	⅝"	1²¹⁄₃₂"	1¾"

(A) The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak.

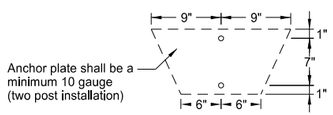
(B) The 2³⁄₁₆"x10 ga. may be inserted into 2½"x10 ga. for additional wind load.

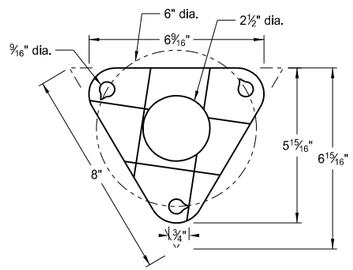


Anchor Unit and Post Assembly



Multi-Directional
Slip Base Anchor Unit
and Post Sleeve Assembly





Bolt Retainer for Base Connection
Bolt Retainer- ¹⁄₃₂" Reprocessed Teflon

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE

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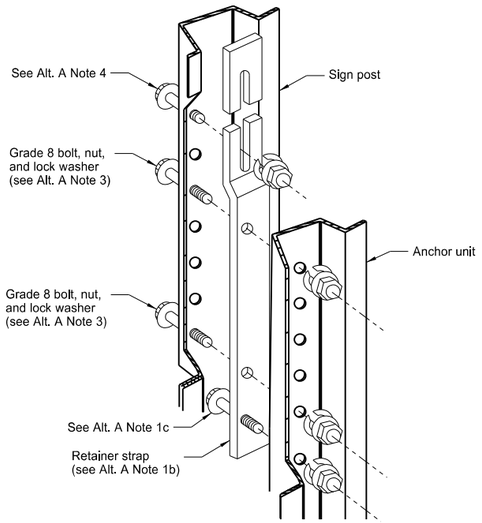
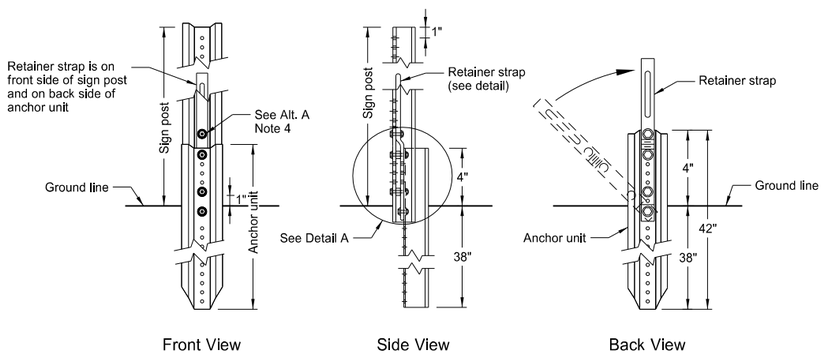
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



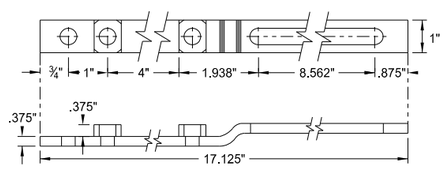
Detail A



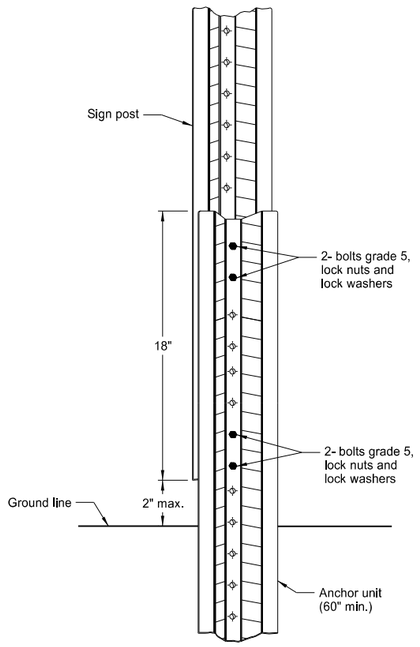
Front View Side View Back View

Breakaway U-Channel Detail
Alternate A

A maximum of 2 posts shall be installed within 7'.

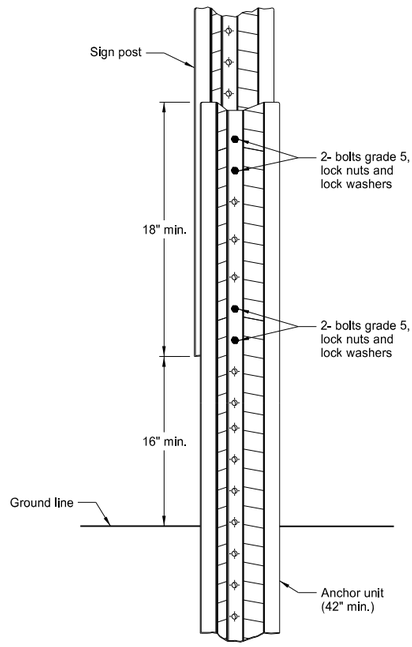


Retainer Strap Detail



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

A maximum of 3 posts shall be installed within 7'.



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

A maximum of 3 posts shall be installed within 7'.

Alternate A Steps of Installation:

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
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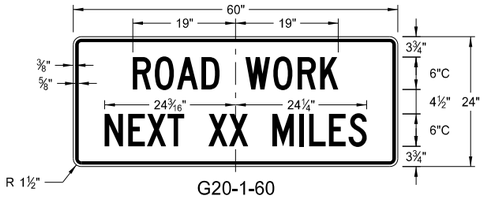
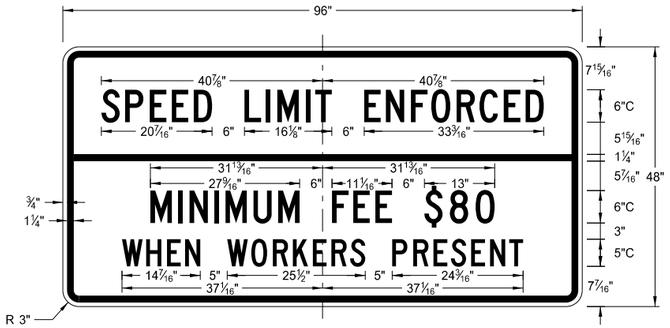
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS

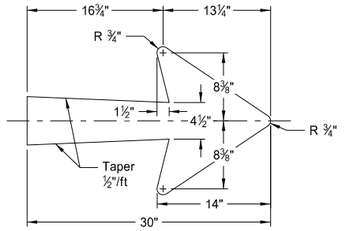


G20-1-60
Legend: black (non-refl)
Background: orange

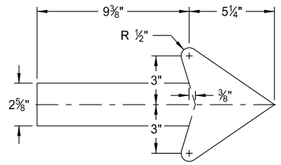
G20-4b-36
Legend: black (non-refl)
Background; orange



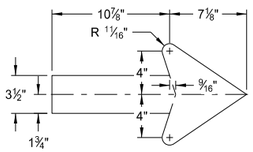
G20-55-96
Legend: black (non-refl)
Background: orange



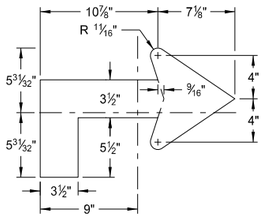
E5-1-48



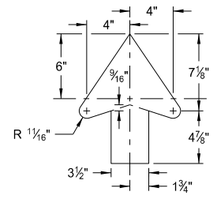
G20-50a-72
G20-52a-72



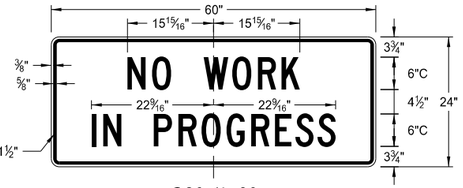
M4-9(L or R)-30
Right or Left



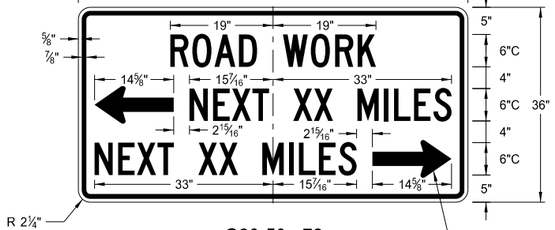
M4-9(L or R)-30
Advanced Right or Left



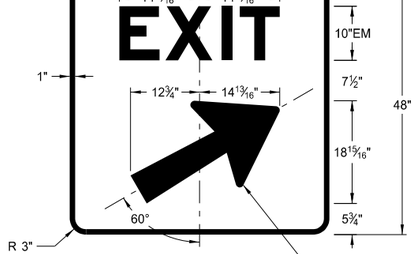
M4-9-30
Straight



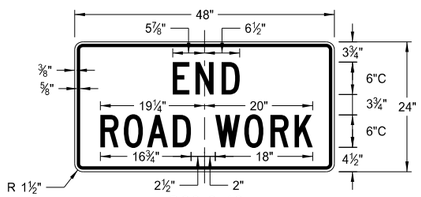
G20-1b-60
Legend: black (non-refl)
Background: orange



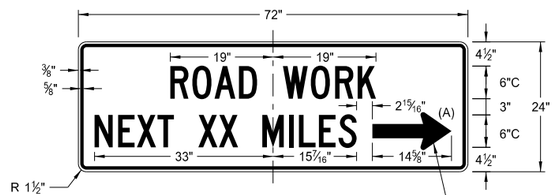
G20-50a-72
Legend: black (non-refl)
Background: orange



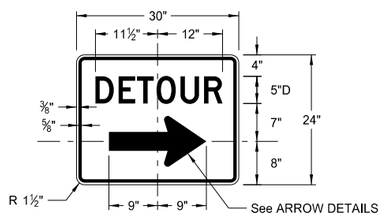
E5-1(L or R)-48
Legend: white
Background: green



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



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



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

ARROW DETAILS

NOTES:

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE

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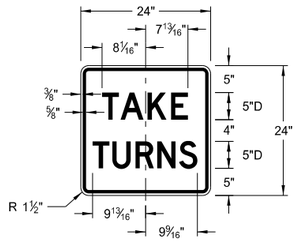
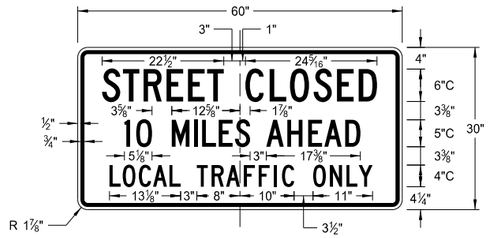
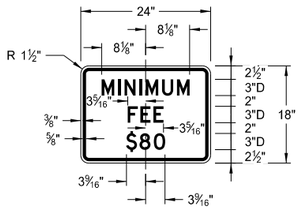
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



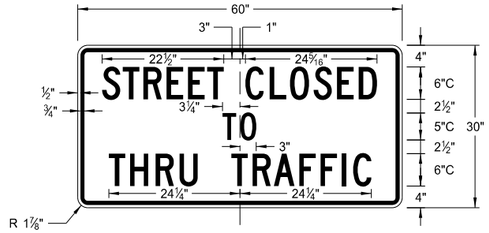
R1-50-24
Legend: black (non-refl)
Background: white



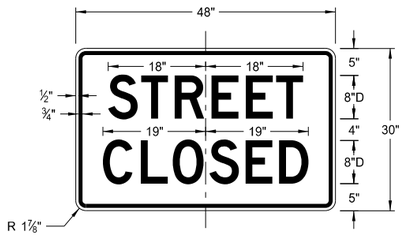
R11-3c-60
Legend: black (non-refl)
Background: white



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



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



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

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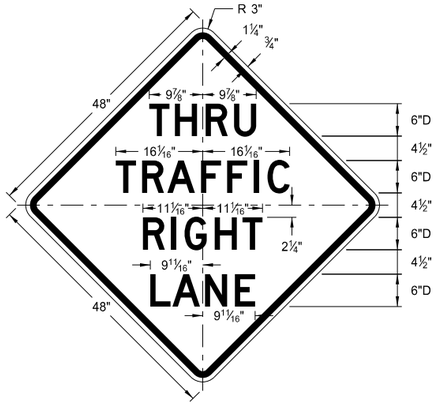
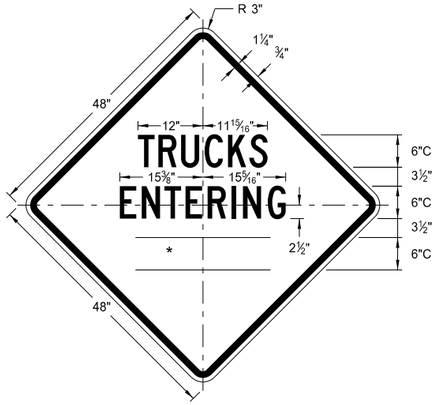
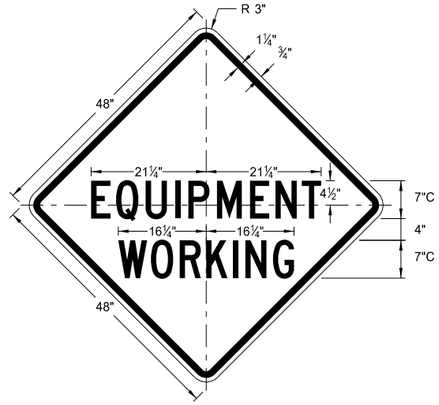
CONSTRUCTION SIGN DETAILS
WARNING SIGNS



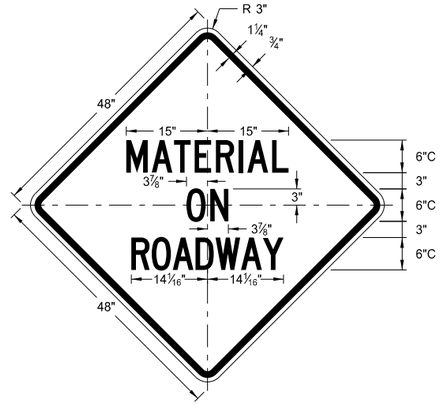
W5-8-48
Legend: black (non-refl)
Background: orange



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



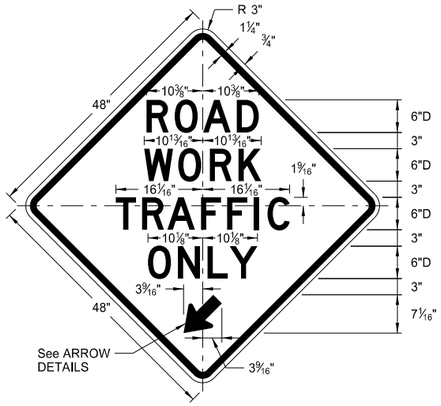
W20-51-48
Legend: black (non-refl)
Background: orange



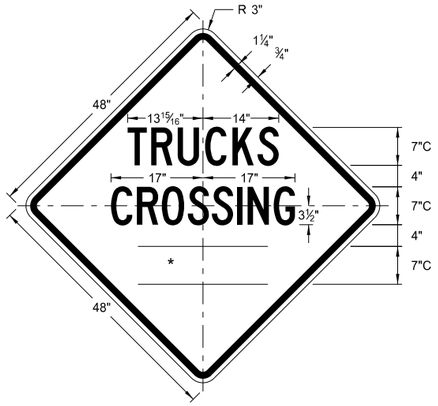
W21-51-48
Legend: black (non-refl)
Background: orange

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

* DISTANCE MESSAGES

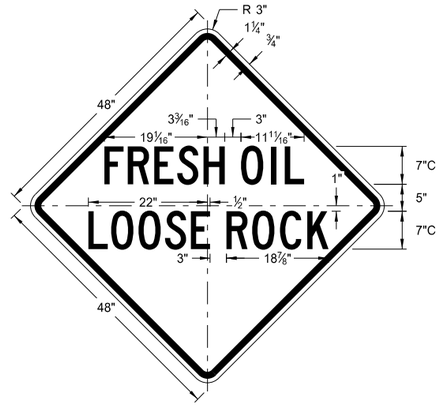


W5-9-48
Legend: black (non-refl)
Background: orange

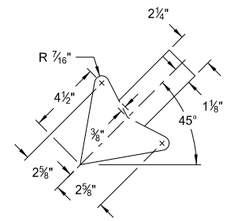


W8-55-48
Legend: black (non-refl)
Background: orange

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

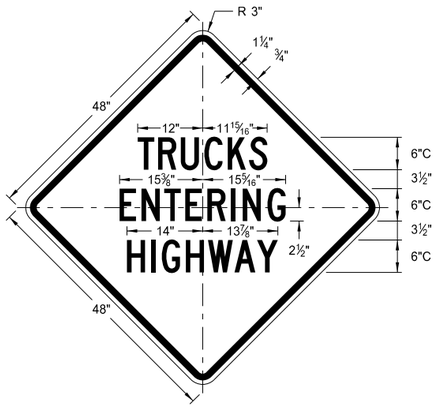


W22-8-48
Legend: black (non-refl)
Background: orange

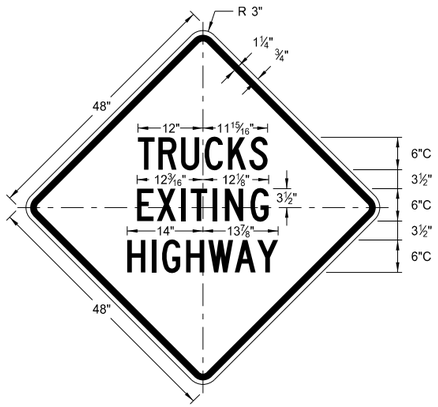


W5-9-48

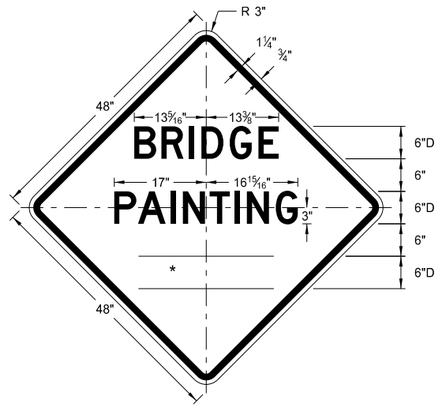
ARROW DETAILS



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



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



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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
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DATE	CHANGE

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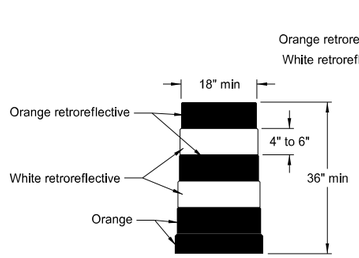
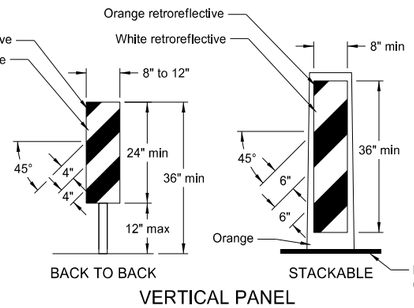
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



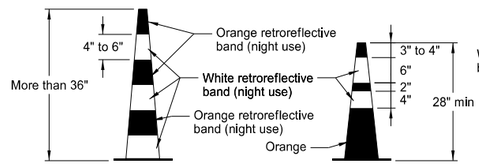
DELINEATOR DRUM

The markings on drums shall be horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide. Each drum shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectorized spaces between the horizontal orange and white stripes shall not exceed 3" wide. Stripes shall not be placed on ribs or indentations in the drum. Drums shall have closed tops that will not allow collection of construction debris or other debris. Ballast shall not be placed on the top of a drum.



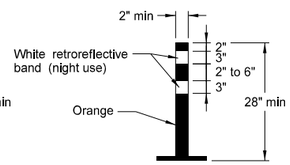
VERTICAL PANEL

Markings for vertical panels shall be alternating orange and white retroreflective stripes, sloping downward in the direction vehicular traffic is to pass. Retroreflective sheeting shall be placed on both sides of panel and shall have 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, a stripe width of 6 inches shall be used.



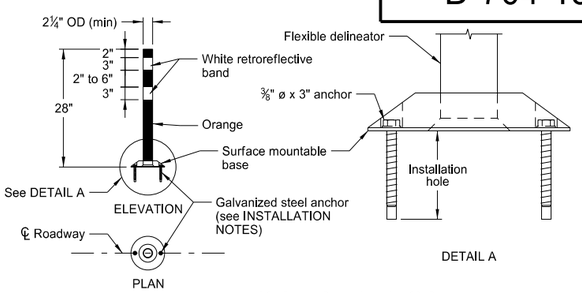
TRAFFIC CONE

Retroreflectorization of cones more than 36" in height shall be provided by alternating orange and white retroreflective stripes. Each cone shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectorized space between the orange and white stripes shall not exceed 3" wide.



TUBULAR MARKER

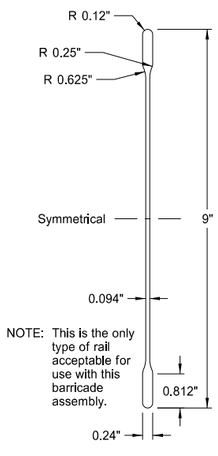
Retroreflectorization of tubular markers more than 42" in height shall be provided by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



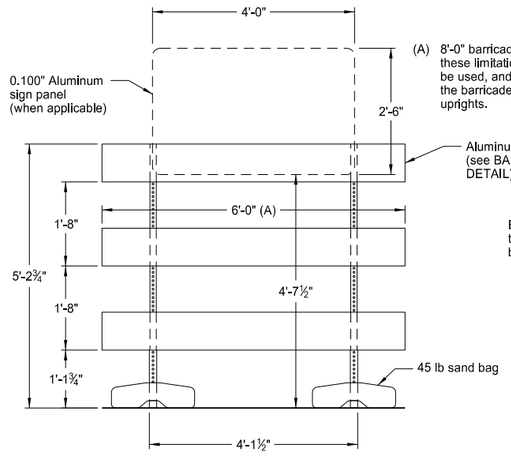
FLEXIBLE DELINEATOR

INSTALLATION NOTES:

1. Drill installation holes to diameter and depth as 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, the contractor may use an 8" x 8" butyl pad or hot melt butyl. Butyl shall be removed as close as possible to pavement surface.

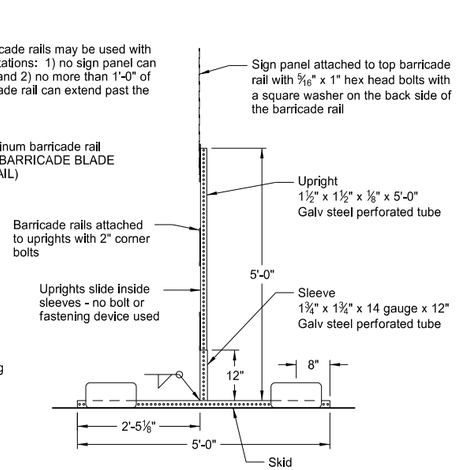


BARRICADE BLADE DETAIL



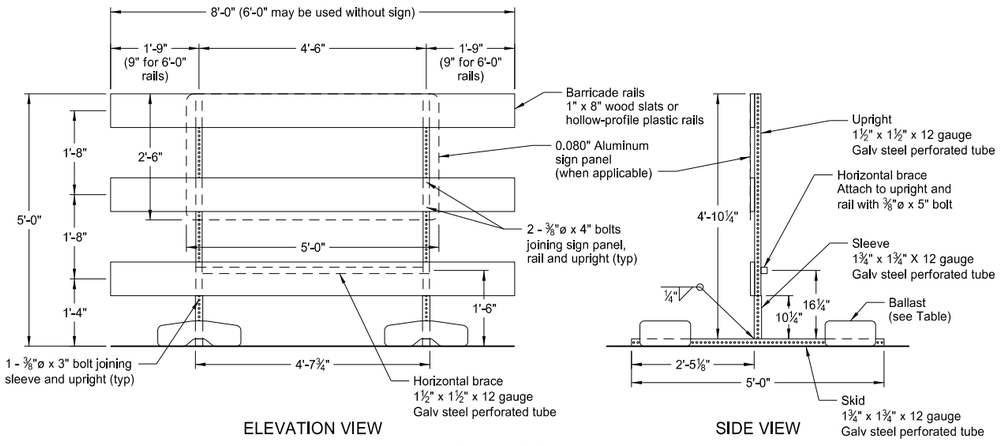
ELEVATION VIEW

(A) 8'-0" barricade rails may be used with these limitations: 1) no sign panel can be used, and 2) no more than 1'-0" of the barricade rail can extend past the uprights.



SIDE VIEW

BARRICADE ASSEMBLY DETAIL
(Aluminum Barricade Rails)

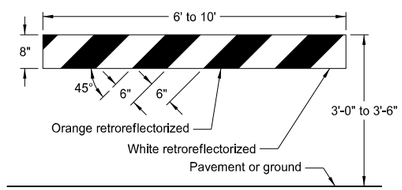


ELEVATION VIEW

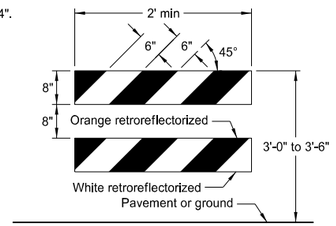
SIDE VIEW

BARRICADE ASSEMBLY DETAIL
(Wood or Plastic Rails)

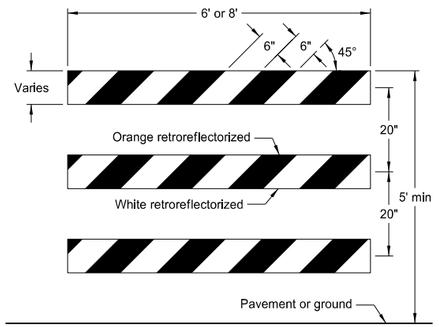
NOTE: Markings for barricades shall be alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Retroreflective sheeting shall be placed on both sides of the rails and shall have a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the barricade length is less than 36", the rail stripe width shall be 4".



TYPE I BARRICADE

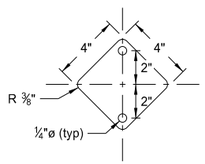


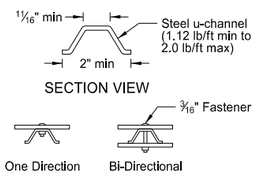
TYPE II BARRICADE

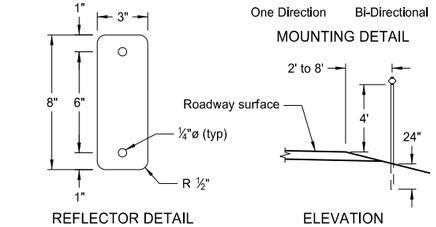


TYPE III BARRICADE

BARRICADE RAIL DETAILS







DELINEATORS

MINIMUM BALLAST
(For each side of barricade support)

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
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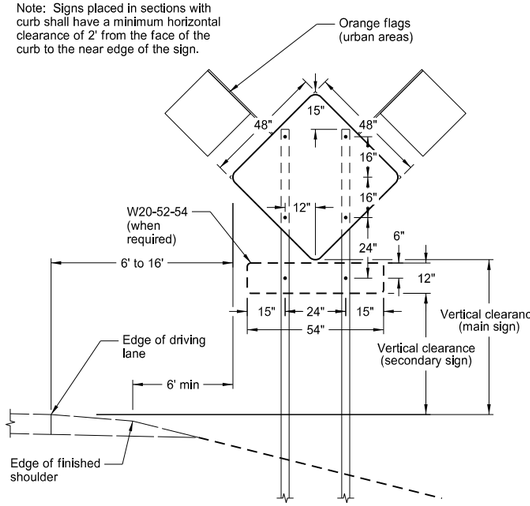
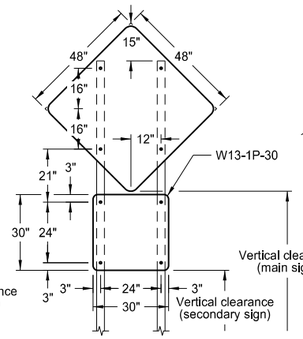
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

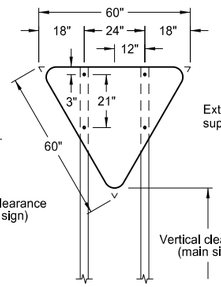
Note: Signs placed in sections with curb shall have a minimum horizontal clearance of 2' from the face of the curb to the near edge of the sign.



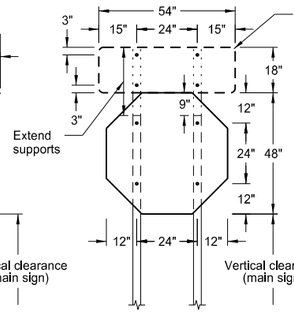
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



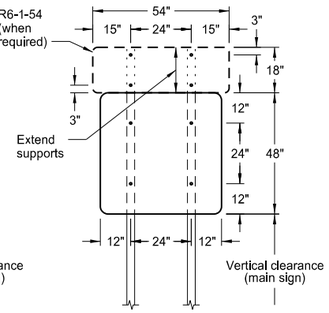
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



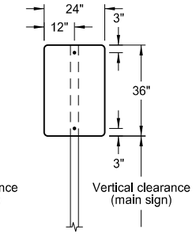
R1-2-60 - YIELD SIGN



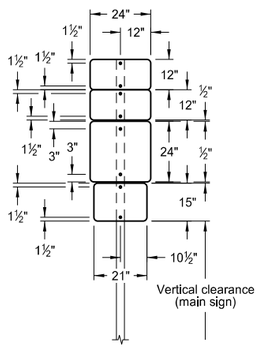
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



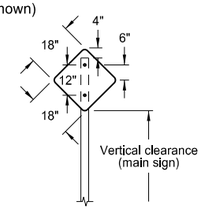
48" x 48" SIGN
(with R6-1-54 sign as required)



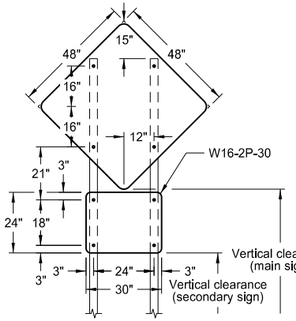
24" x 36" SIGN



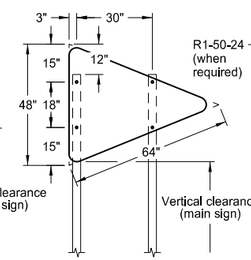
24" x 24"
ROUTE MARKER
ASSEMBLY



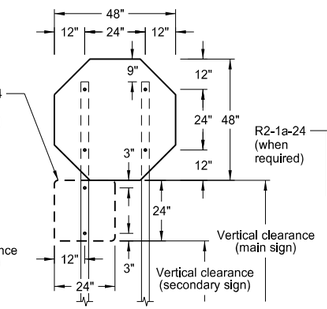
18" x 18"
DIAMOND SIGN



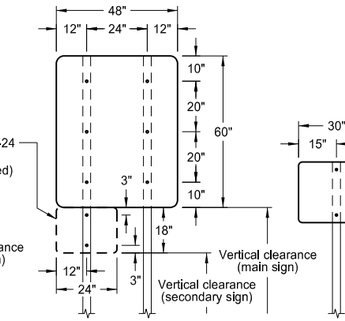
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



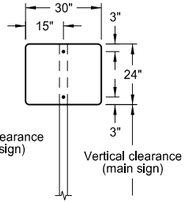
W14-3-64 - PENNANT SIGN



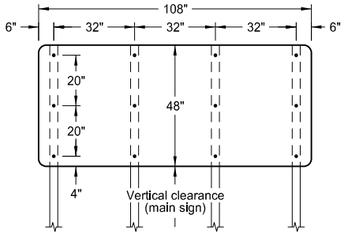
R1-1-48 - STOP SIGN
(with R1-50-24 sign as required)



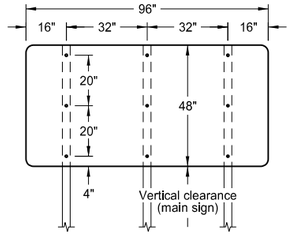
48" x 48" SIGN
(with R2-1a-24 sign as required)



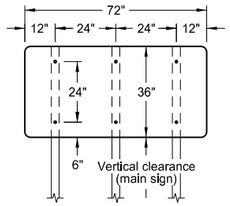
30" x 24" SIGN



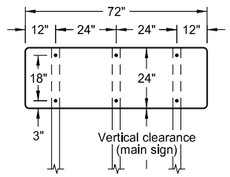
108" x 48" SIGN



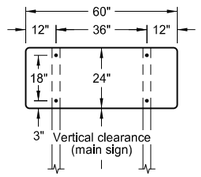
96" x 48" SIGN



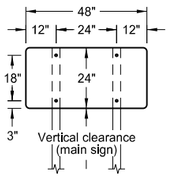
72" x 36" SIGN



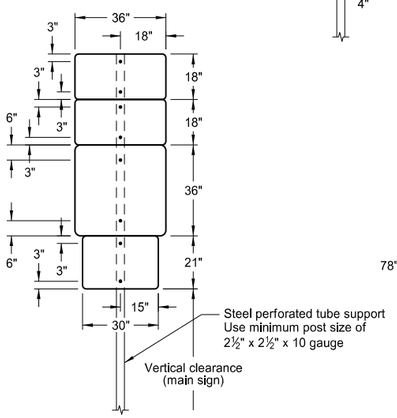
72" x 24" SIGN



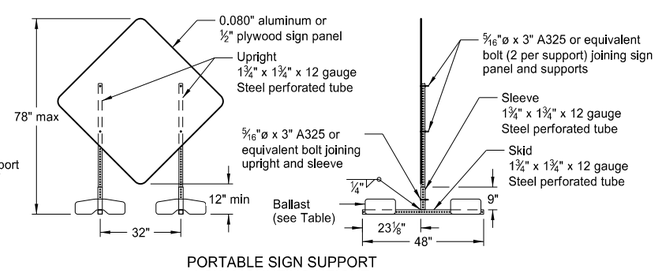
60" x 24" SIGN



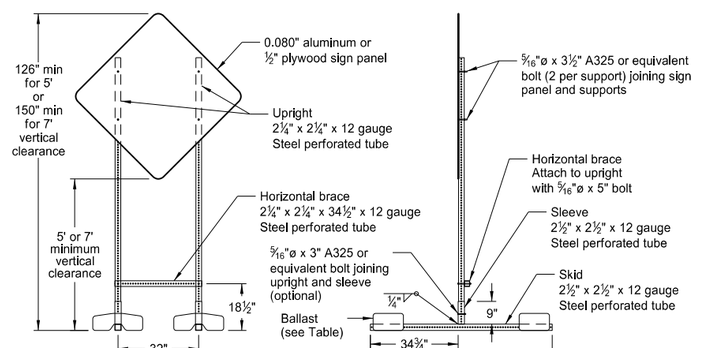
48" x 24" SIGN



36" x 36"
ROUTE MARKER
ASSEMBLY



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

1. Sign Supports: Supports shall be galvanized or painted. 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, the minimum post size for assemblies containing a secondary sign is 3.0 lb/ft. Post sizes are based on a wind speed of 55 MPH.

   Signs over 50 square feet should be installed on 2½" x 2½" perforated tube supports as a minimum.

   Guy wires shall not be attached to sign supports. Wind beams may be attached to u-posts behind the sign panels.

2. Sign Panels: Provide sign panels made of 0.100" aluminum, ½" plywood, or other approved material, except where noted. All holes to be punched round for ⅜" bolts.

3. Alternate Messages: The signs that have alternate messages may have these alternate messages placed on a reflectorized plate (without a border) and installed and removed as required. (i.e. "Left" and "Right" message on a 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 as stated above.

   Large signs having an area exceeding 50 square feet shall have a minimum clearance of 7'-0" from the ground at the post.

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

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

   Signs mounted to the portable sign supports shown in the LOW-MOUNTING HEIGHT and HIGH-MOUNTING HEIGHT Details shall have 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. The sandbags are assumed to be placed at or near the ends of the skids.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE
11-14-13	Revised Note 6.

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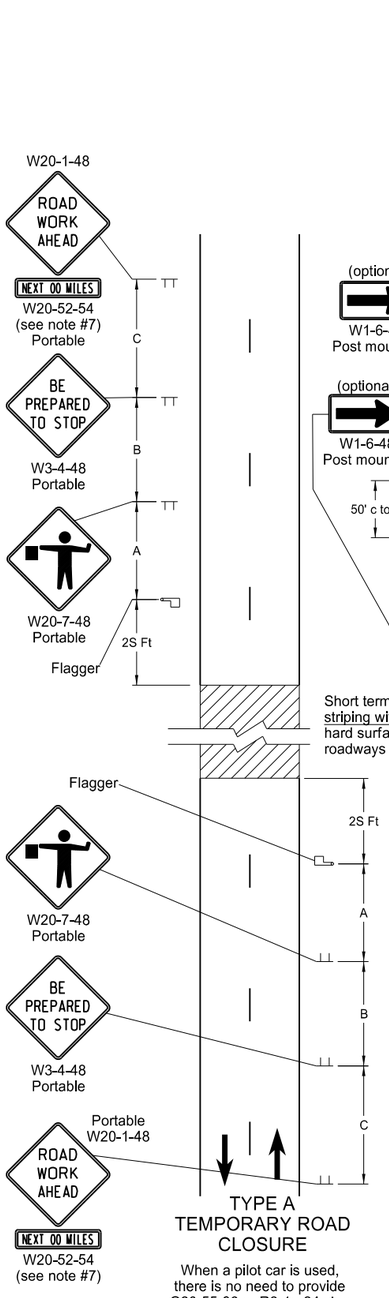
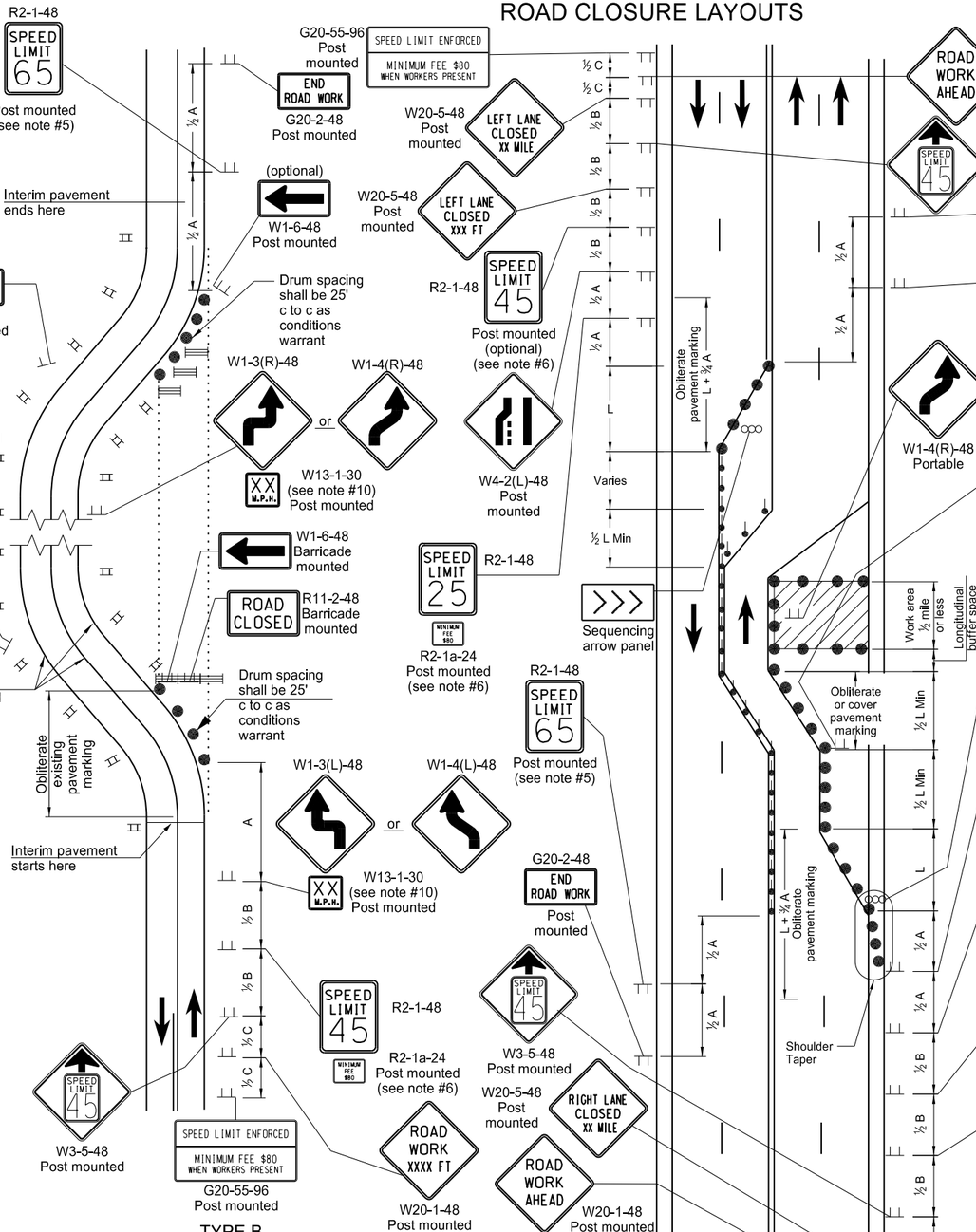
ROAD CLOSURE LAYOUTS

D-704-15



TYPE A
TEMPORARY ROAD CLOSURE

When a pilot car is used, there is no need to provide G20-55-96 or R2-1a-24 sign on the project as the pilot car will control the speed.



TYPE B
ROAD CLOSURE WITH A DIVERSION

Two lane highway where roadway is closed and detour is provided (signing shown for one direction of travel only). Use on bridge and culvert installation where closure is ½ mile or less.

TYPE C
HALF ROAD CLOSURE ON A MULTI-LANE, HIGH SPEED HIGHWAY

4 lane undivided highway with half the roadway closed.

Notes

1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of taper.
   L = Minimum length of taper, or S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater, or W x $S^2/60$ for urban, residential, and other streets with speeds of 40 mph or less.
2. Barricades placed on roadway shall be on a moveable assembly. Signs placed on roadway shall be placed on skid mounted assemblies.
3. Delineator drums, barricades or cones used for tapering traffic shall be spaced at the dimension "S". Delineator drums or cones used for tangents shall be spaced at 2 times dimension "S".
4. Sequencing Arrow Panels
   Panels should normally be placed at the beginning of the taper. Where shoulder width does not provide sufficient room, the panel should be moved closer to the work area so that it can be placed on the roadway surface. See Shoulder Closure Standard Drawing.
   Type A shall be used on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
   Type B shall be used on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
   Type C shall be used on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
5. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
6. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½ B.
7. Use when work area is 1 mile or longer.
8. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
9. Existing speed limit signs within a reduced speed zone shall be covered.
10. Where necessary, safe speed to be determined by the Engineer.
11. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
12. G20-55-96 sign is not required if this standard is part of other traffic control layouts, or the work is less than 15 days.

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

KEY

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE

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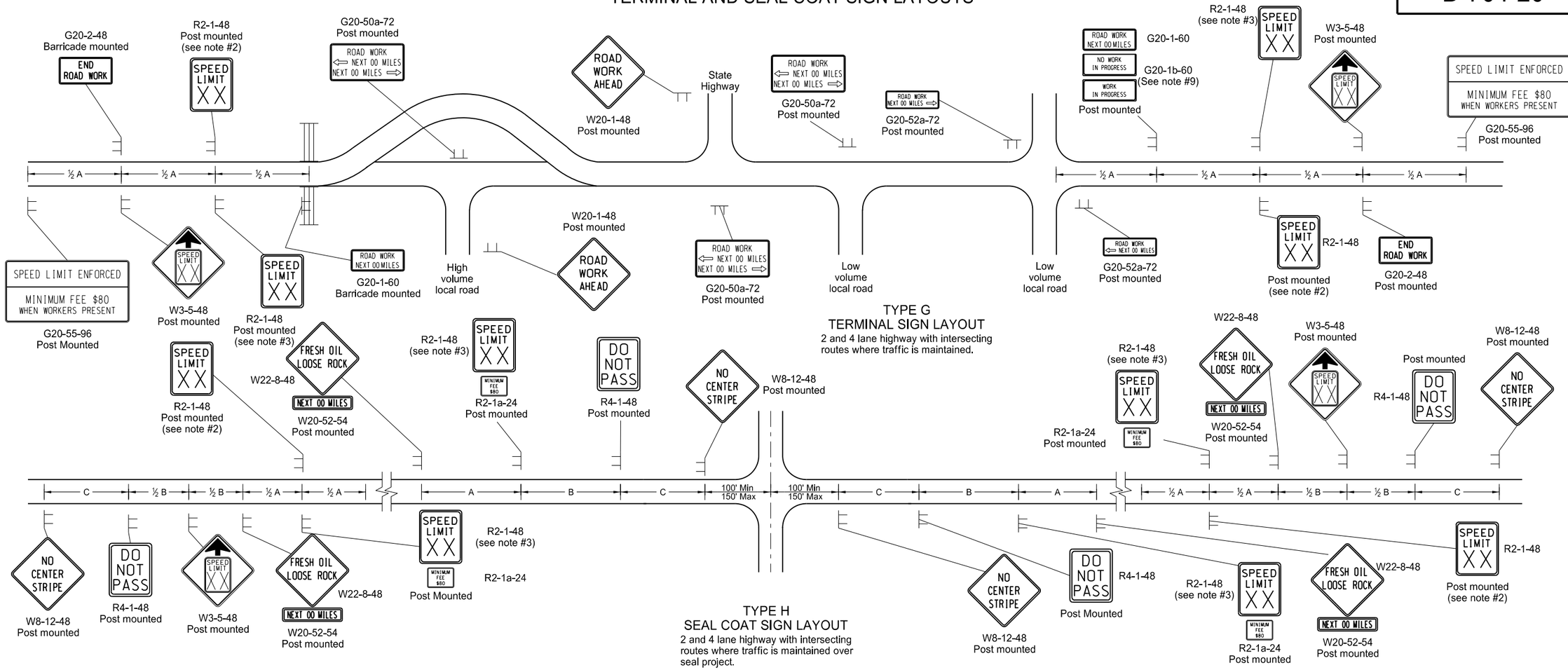
TERMINAL AND SEAL COAT SIGN LAYOUTS

D-704-20



1. Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies.
2. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
3. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 MPH below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 MPH. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½ B.
4. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
5. Existing speed limit signs within a reduced speed zone shall be covered.
6. On seal projects, signs R2-1-48, R2-1a-24, R4-1-48, W22-8-48 and W20-52-54 shall be placed just after all important intersections and at five mile intervals thereafter. Sign W8-12-48 shall be placed just after all important intersections and at 2 mile intervals thereafter until the short term center line pavement marking is in place. No short term pavement markings are placed when traffic volumes are 750 ADT or less.
7. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
8. Type H construction sign traffic control shall have the speed limit signs covered or removed once the loose aggregate has been removed.
9. The contractor shall install the G20-1b-60 sign when work is suspended for winter.
10. Other traffic control layouts will be required in the immediate work areas. If the speed limit is reduced in the work area, speed limit signs shall have the R2-1a-24 sign placed below.
11. G20-55-96 sign is not required if work is less than 15 days.

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

KEY

Type III barricade

Sign

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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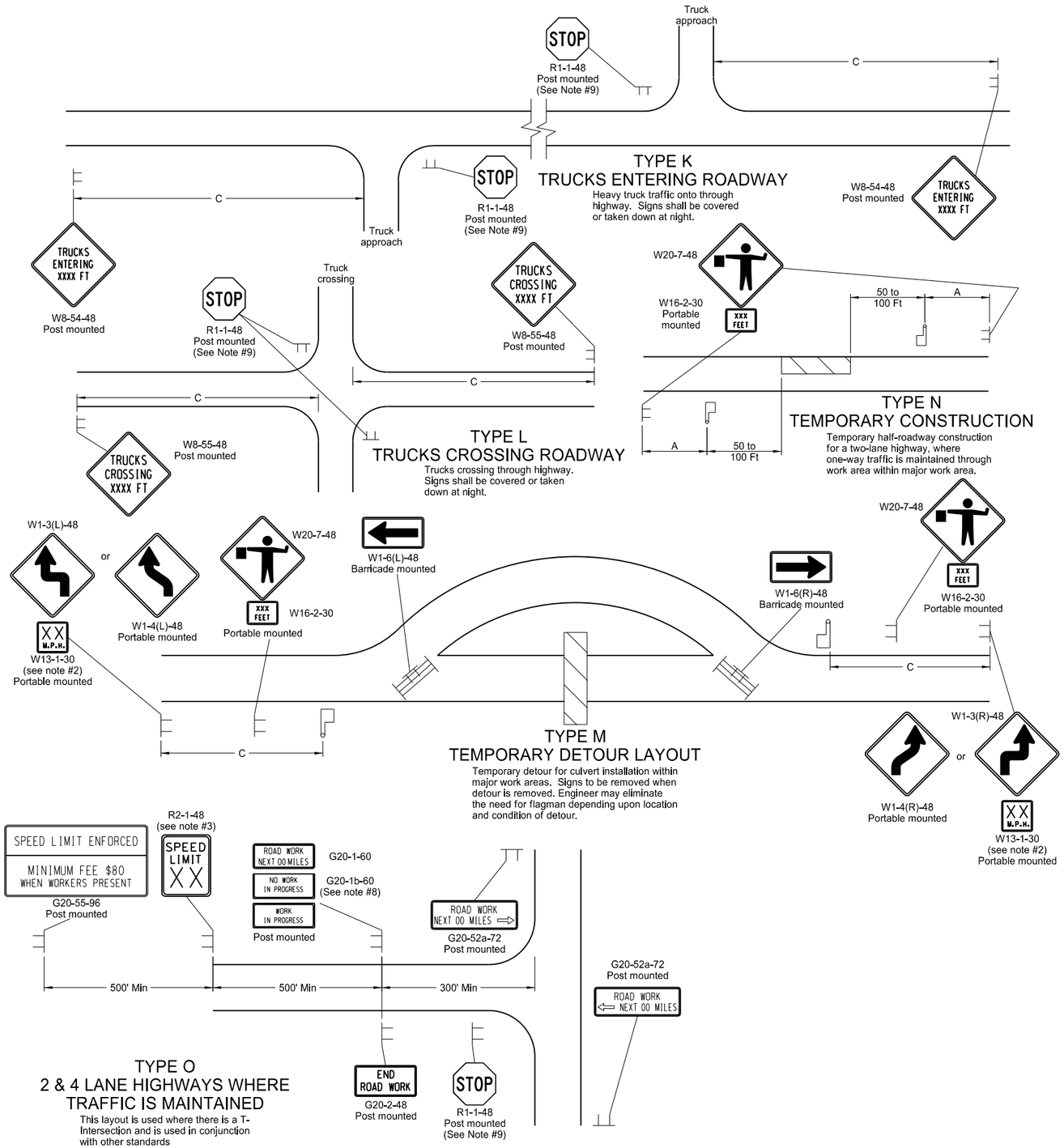
CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22



Notes

1. Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies.
2. Where necessary, safe speed to be determined by the Engineer.
3. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½ B.
4. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
5. Existing speed limit signs within a reduced speed zone shall be covered.
6. Obliterated or covered pavement marking shall be paid for as Obliteration of Pavement Marking. The covering shall be approved by the engineer.
7. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
8. The contractor shall install the G20-1b-60 sign when work is suspended for winter.
9. If existing stop sign is in place, a 48" stop sign is not required.
10. G20-55-96 sign is not required if this standard is part of other traffic control layouts with this sign or the work is less than 15 days.

KEY

Type III barricade — Work area

Sign — Flagger

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	
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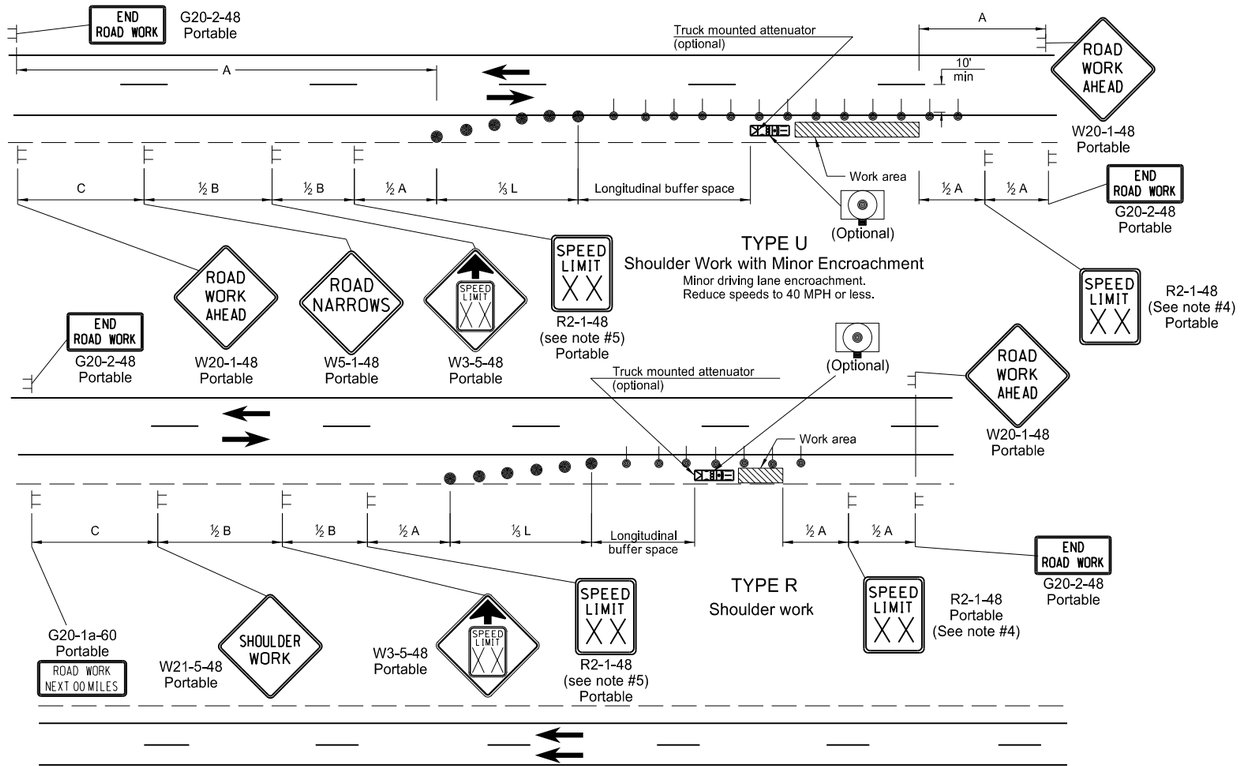
SHOULDER CLOSURES AND BRIDGE PAINTING LAYOUTS

D-704-24



Notes

1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of the taper.
   L = Minimum length of taper, or S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater, or W x S^2 /60 for urban, residential, and other streets with speeds of 40 mph or less.
2. Delineator drums used for tapering traffic shall be spaced at dimension "S".
   Delineator drums or tubular markers used for tangents shall be spaced at 2 times "S".
3. Sequencing Arrow Panels
   Type A shall be used on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
   Type B shall be used on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
   Type C shall be used on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
4. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
5. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½B.
6. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
7. Existing speed limit signs within a reduced speed zone shall be covered.
8. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.

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

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

KEY

Sign — Work area
Delineator Drum — Tubular Marker
Sequencing Arrow Panel (Caution Mode)

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
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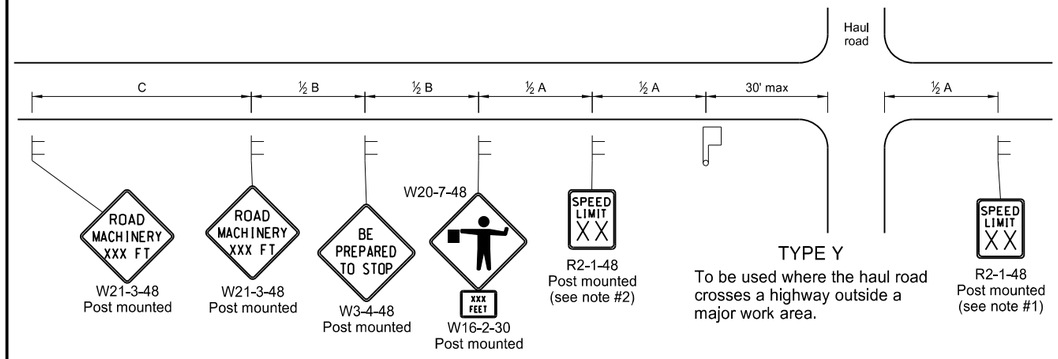
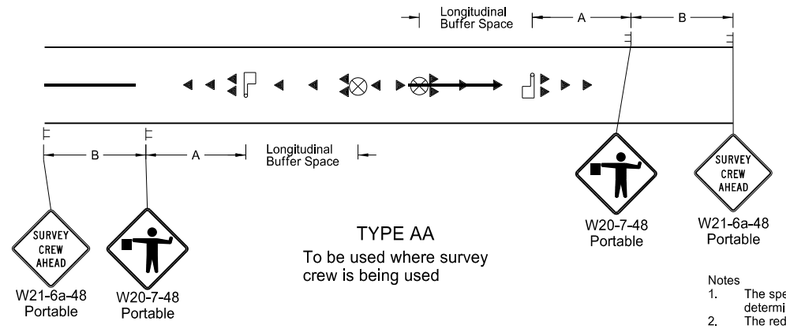
MISCELLANEOUS SIGN LAYOUTS

D-704-26



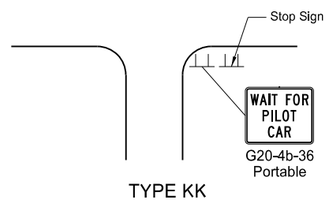
TYPE Y

To be used where the haul road crosses a highway outside a major work area.



TYPE AA

To be used where survey crew is being used

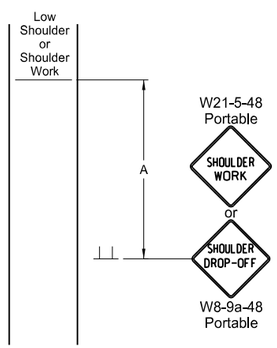


TYPE KK

To be used at major intersections within pilot car control area

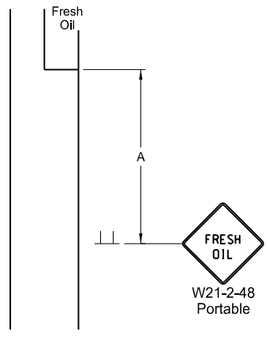
Notes

1. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
2. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at ½ B.
3. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
4. Existing speed limit signs within a reduced speed zone shall be covered.
5. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
6. G20-55-96 signs are not required if this standard is part of other traffic control layouts, or the work is less than 15 days.
7. When a pilot car operation is used, place a G20-4b-36 "Wait For Pilot Car" sign at major intersections within pilot car control area.



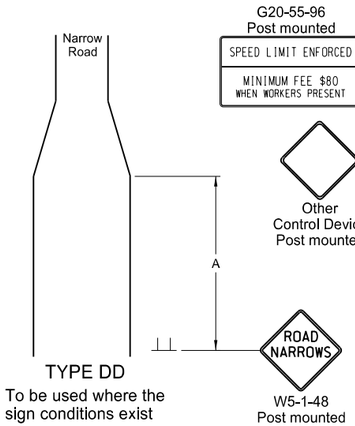
TYPE BB

To be used within a major work area where the sign conditions exist



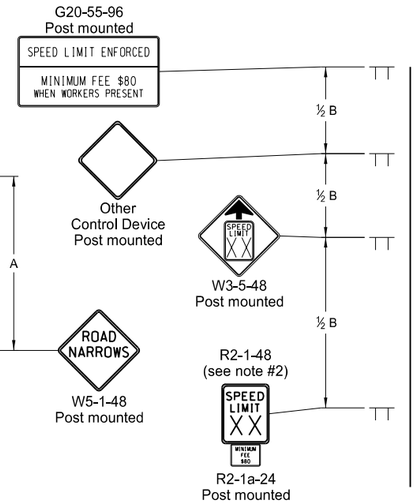
TYPE CC

To be used where the sign conditions exist



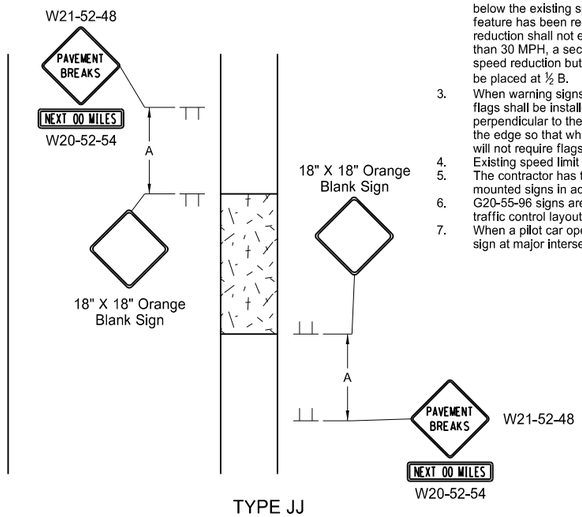
TYPE DD

To be used where the sign conditions exist



TYPE Z

To be used where speed zone is needed

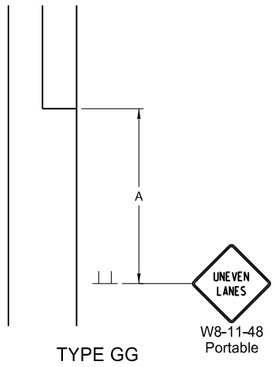


TYPE JJ

To be used where there is a break in the pavement. These signs may be skid mounted or post mounted and shall be installed when conditions exist and removed when not applicable.

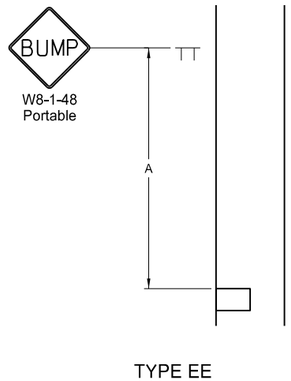
Longitudinal Buffer Space	
*Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

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



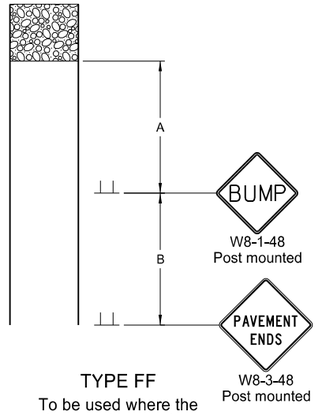
TYPE GG

To be used where a difference of elevation between lanes exist



TYPE EE

To be used where the sign conditions exist



TYPE FF

To be used where the sign conditions exist

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

KEY

Sign — Flagger

Cones

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

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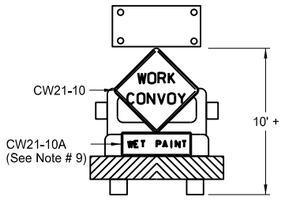
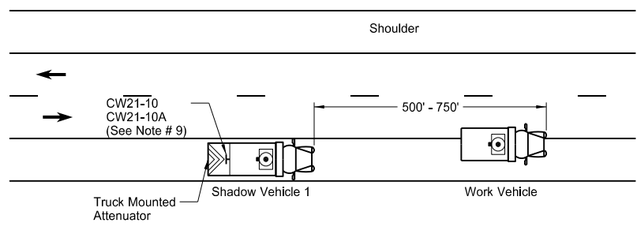
TRAFFIC CONTROL PLAN FOR MOVING OPERATIONS

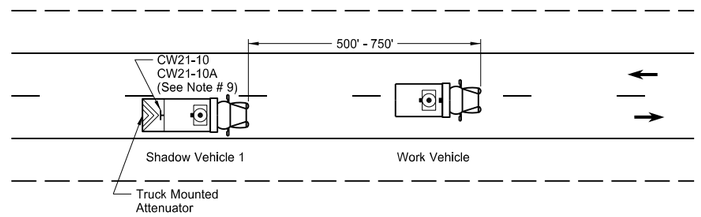
D-704-27



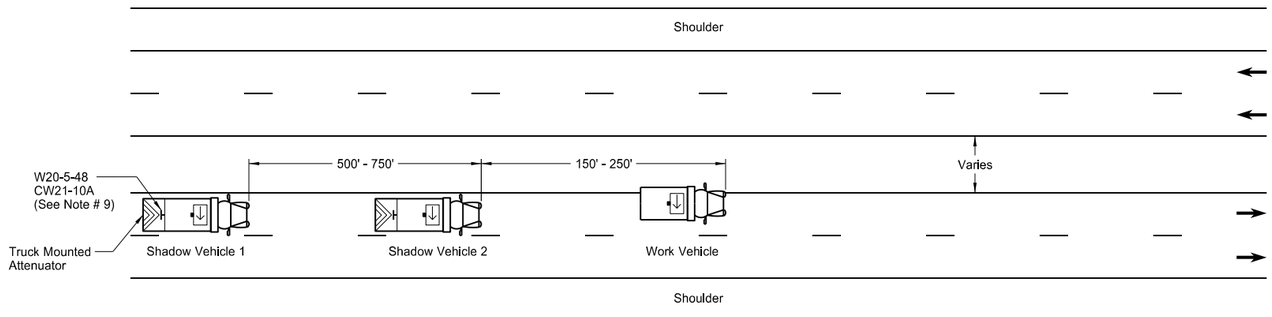
Typical Shadow Vehicle 1
Two-Way Roaday



Two-Way Roadway with Paved Shoulders

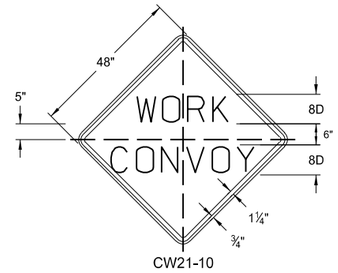


Two-Way Roadway without Paved Shoulders

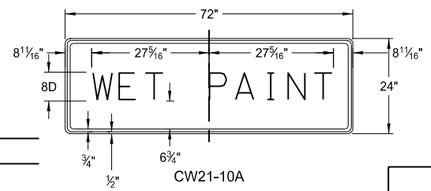


Undivided Multi-Lane Roadway

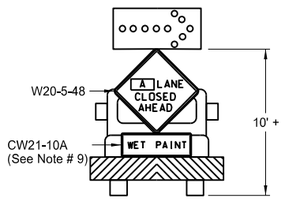
Sign Details



CW21-10

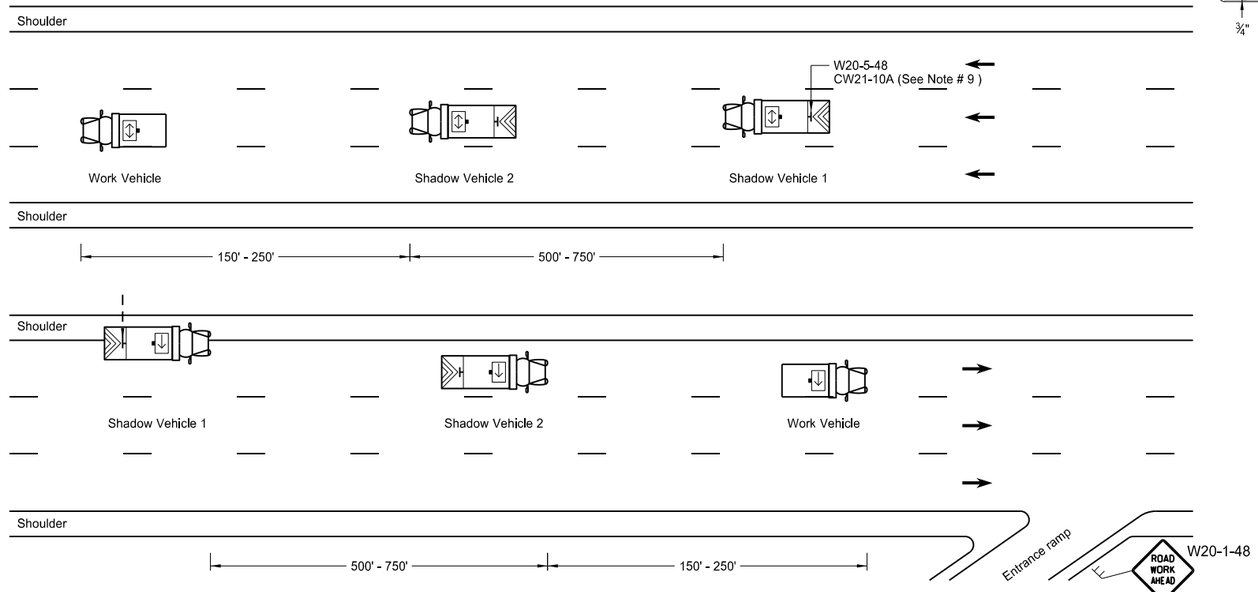


CW21-10A



Typical Shadow Vehicle 1 & 2
Multi-Lane Highways

A = Left Right Center



Divided Multi-Lane Highway

KEY

- Sign
- Truck mounted attenuator
- Flashing arrow panels:
  - Right directional
  - Left directional
  - Double arrow directional
  - Caution Mode

Notes

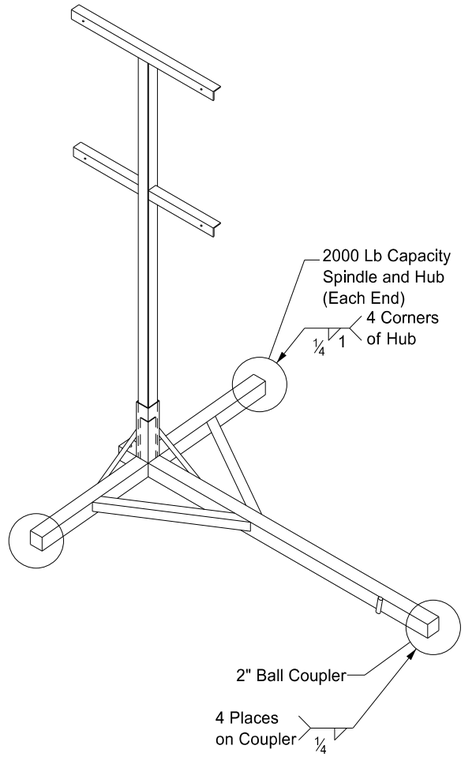
1. If the contractor chooses to place more vehicles in the convoy than are shown, these vehicles shall have the truck mounted attenuator and shall be at the contractor's expense.
2. Shadow and work vehicles shall display yellow rotating beacons or strobe lights unless otherwise stated elsewhere in the plans.
3. Flashing arrow panels shall be Type B or Type C. The panel operation shall be controlled from inside the vehicle.
4. Each vehicle shall have two-way electronic communication capability.
5. When work convoys must change lanes, shadow vehicle 1 should change lanes first to shadow other convoy vehicles.
6. Vehicle spacing between the shadow vehicle 1 and shadow vehicle 2 will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the trail vehicle in time to slow down and/or change lanes as they approach the shadow vehicle.
7. Sign Colors
   Letters = Black
   Border = Black
   Background = Orange
8. Shadow vehicle 2 may be used as the paint tender vehicle.
9. Sign CW21-10A shall only be used during a painting operation.
10. On two lane - two way roadways, the work and shadow vehicles should pull over periodically to allow motor vehicle traffic to pass.

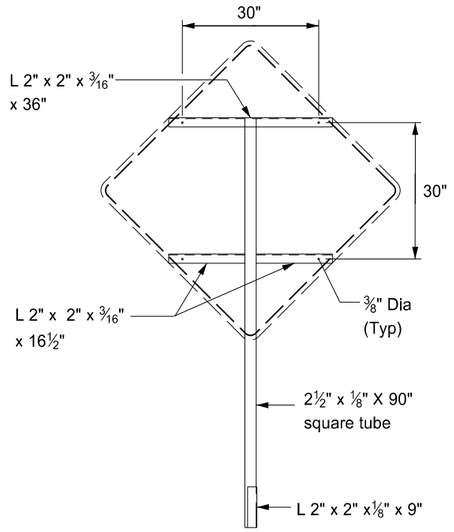
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
6-18-14	Removed shadow vehicle 2 on two lane roadways

This document was originally issued and sealed by Roger Weigel Registration Number PE- 2930, on 06/18/14 and the original document is stored at the North Dakota Department of Transportation

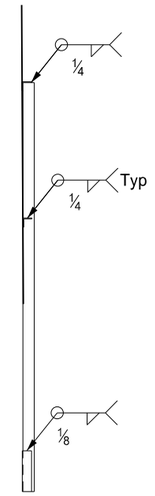
PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



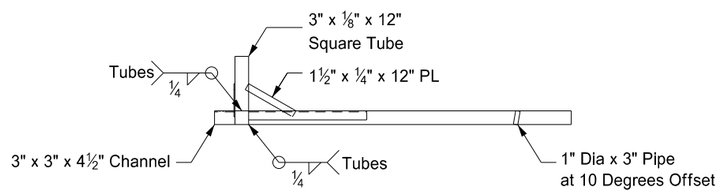


FRONT

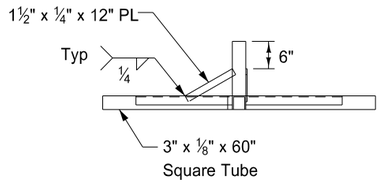


RIGHT

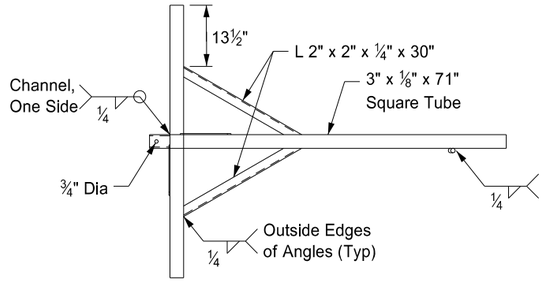
SIGN SUPPORT



FRONT



RIGHT



TOP

TRAILER

Notes:

1. The maximum weight of the assembly is 250 pounds.
2. Use a 14" wheel and tire.
3. Automotive and equipment axle assemblies may not be used for trailer-mounted sign supports.
4. Other NCHRP 350 crash tested assemblies are acceptable.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-23-10	
REVISIONS	
DATE	CHANGE

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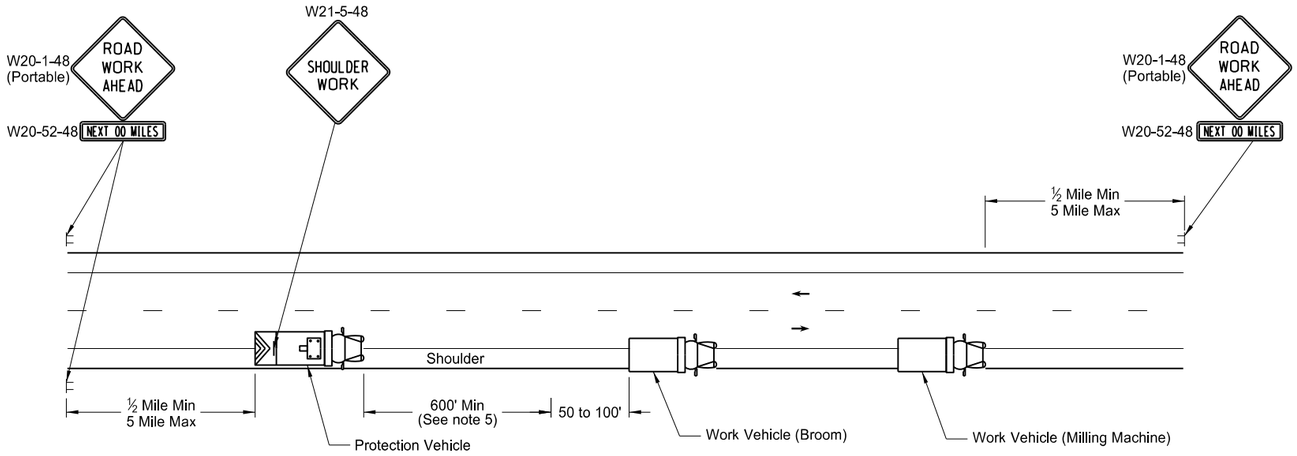
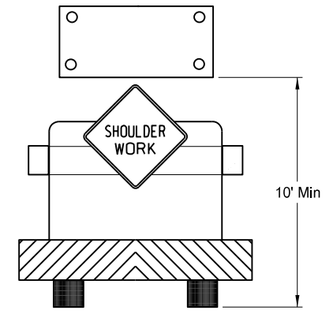
MOBILE OPERATION
Grinding Shoulder Rumble Strips

D-704-56



TWO LANE - TWO WAY ROADWAY

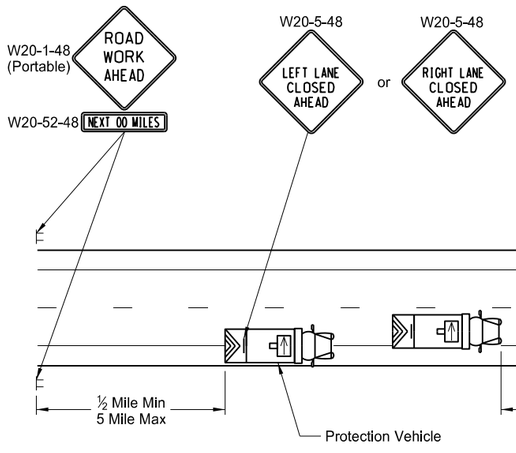


TWO LANE - TWO WAY ROADWAY

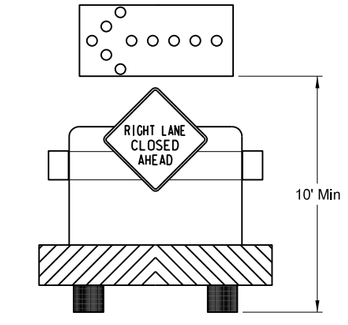
Typical Protection Vehicle with
Flashing Arrow Panel In Caution Mode

Notes:

1. If the contractor chooses to place more vehicles in the convoy than are shown, these vehicles shall have the truck mounted attenuator and shall be at the contractors expense.
2. Vehicles shall have a rotating, flashing, oscillating or strobe lights.
3. Flashing arrow panels shall be Type B or Type C. The panel operation shall be controlled from inside the vehicle.
4. Each vehicle shall have two - way electronic communication capability.
5. Vehicle spacing between the protection vehicle and work vehicle will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the protection vehicle in time to slow down and safely pass the work vehicles.
6. ROAD WORK AHEAD SIGN: Advance Road Work Ahead signs shall be moved as the work area moves through the construction zone.
7. Next XX Miles sign required when the distance from Road Work Ahead sign to the work location is two miles or greater.

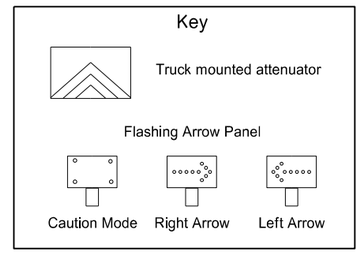


INTERSTATE & 4 LANE DIVIDED HIGHWAY



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

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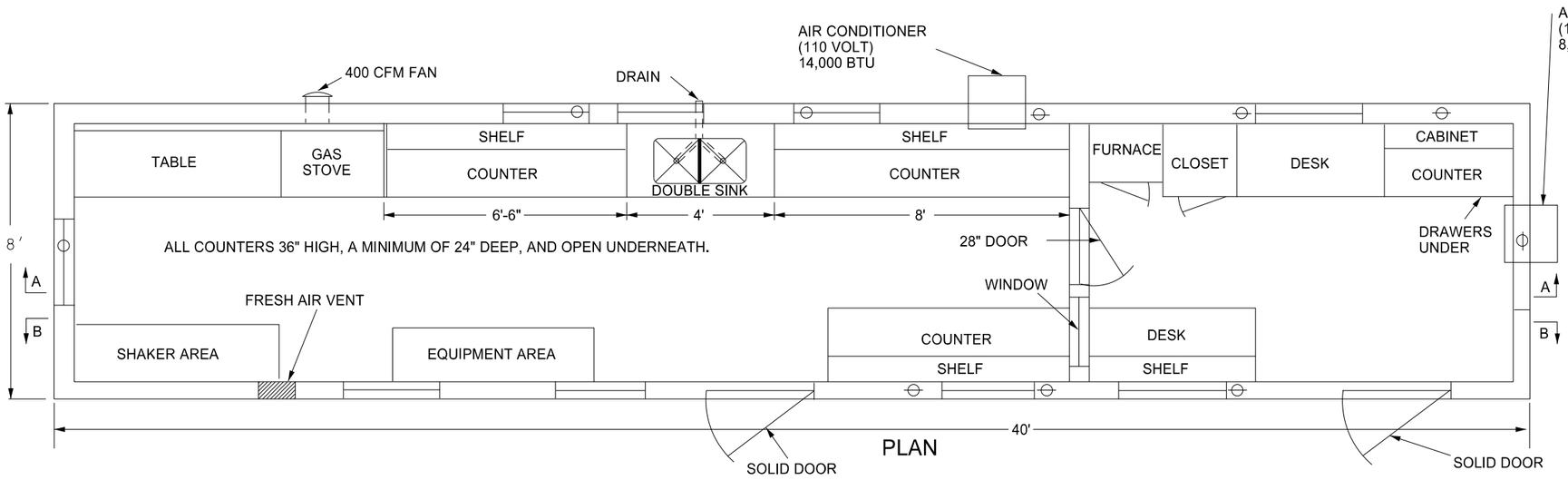
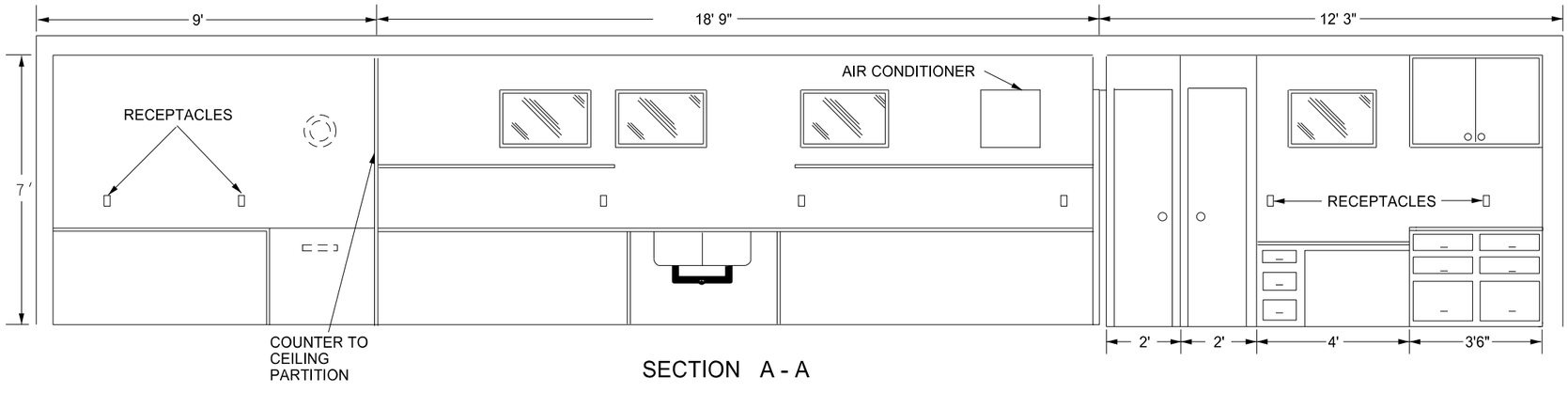
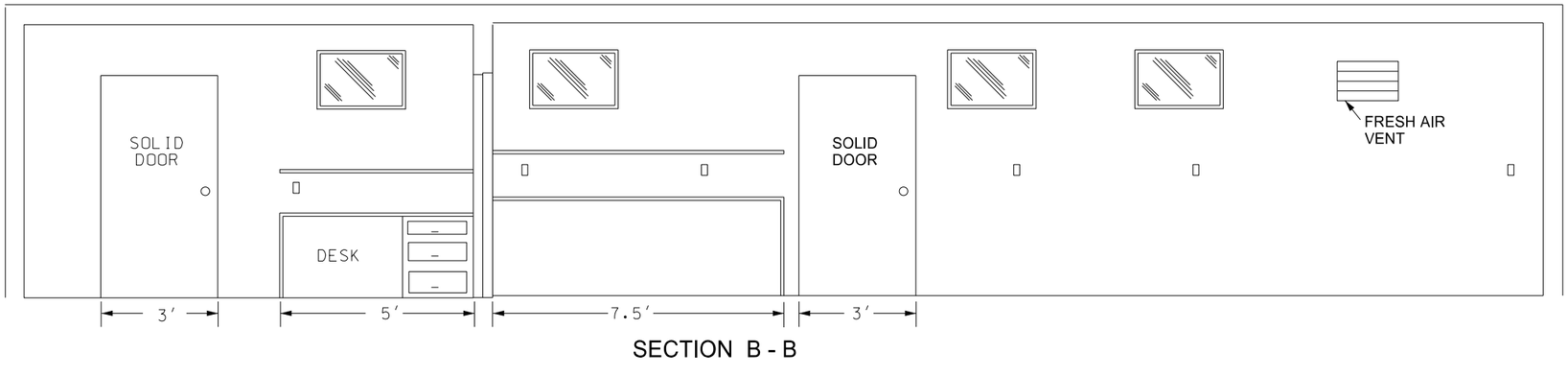
BITUMINOUS LABORATORY

D-706-1







Provide a laboratory with the following:

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
07-30-14	Changed standard's title and revised notes.
01-11-16	Revised notes.

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PERFORATED TUBE ASSEMBLY DETAILS

D-754-23

Notes:

1. Curbed Roadways: The clearance from the face of the curb should be 3' except where right of way or sidewalk width is limited, a minimum clearance of 2' shall be provided. The horizontal clearance may need to be increased to maintain a minimum sidewalk clear width of 4' from the sign support, not including any attached curb.

2. Minimum vertical clearance: Signs installed at the side of the road in rural districts shall be at least 5' measured from the bottom of the sign to the edge of the driving lane or auxiliary lane. Where parking or pedestrian movements occur, the clearance to the bottom of the sign shall be at least 7'.

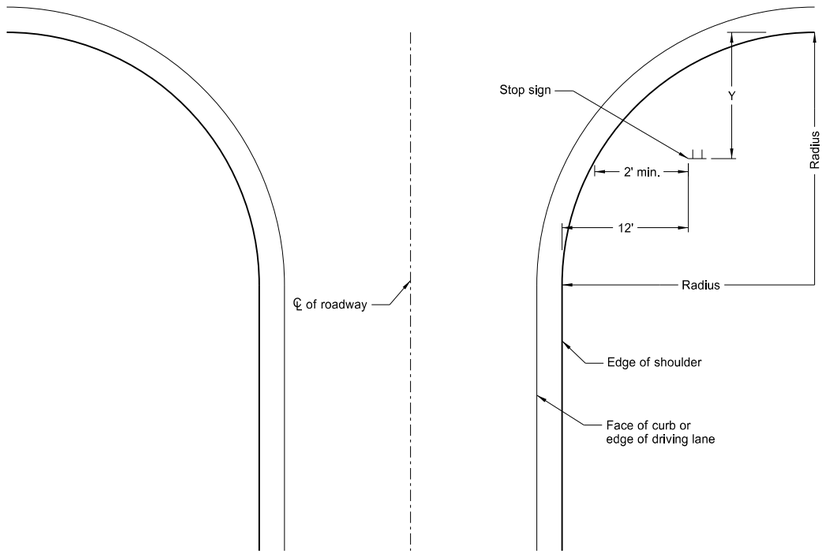
   Signs on expressways shall be installed with a minimum height of 7'.

   Adopt-a-highway signs installed on Freeways shall be at least 7' above the edge of the driving lane.

   The vertical clearance shall have a maximum height of 6" above the vertical clearance specified above.

3. Offset signs: Where signs are placed at least 30 feet or more from the edge of the traveled way, the height to the bottom of such sign shall be 5' above the edge of the driving lane.

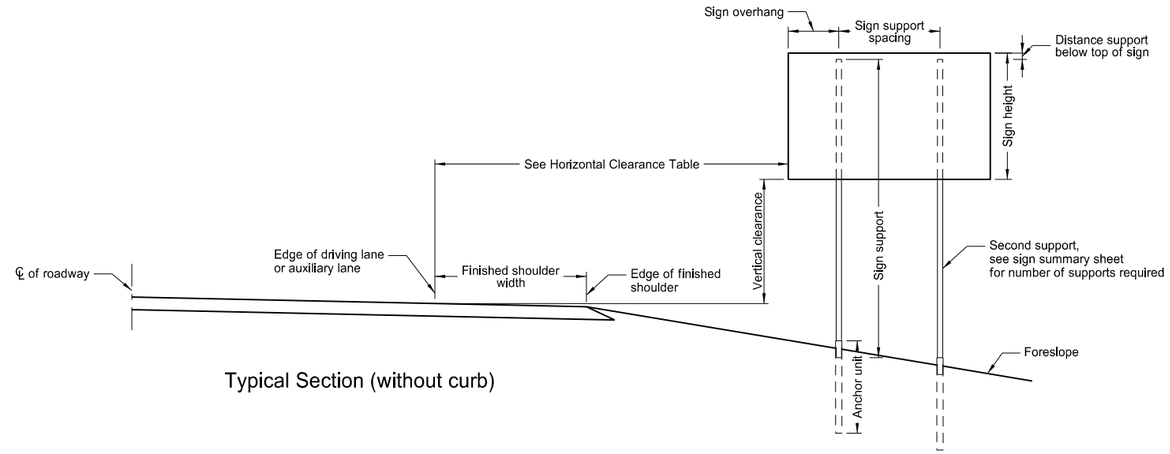
4. The clearance from edge of shared use path to edge of sign should be 3' except where width is limited, a minimum clearance of 2' shall be provided.



Stop Sign Location
Wide Throat Intersection

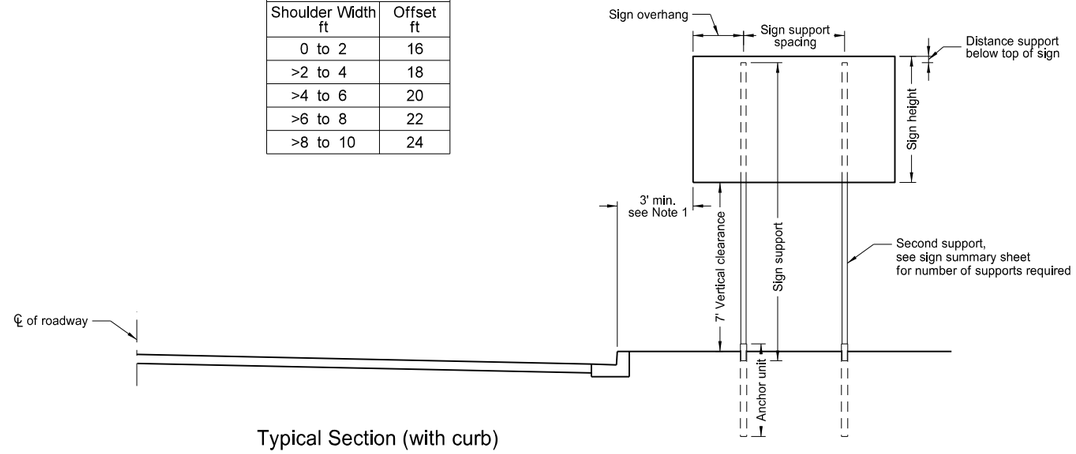
This layout is to be used for the placement of "Stop" signs.

Radius ft.	Y-max. ft.	Y-min. ft.
40	50	15
45	50	18
50	50	21
55	50	25
60	50	28
65	50	32
70	50	35
75	50	39
80	50	43



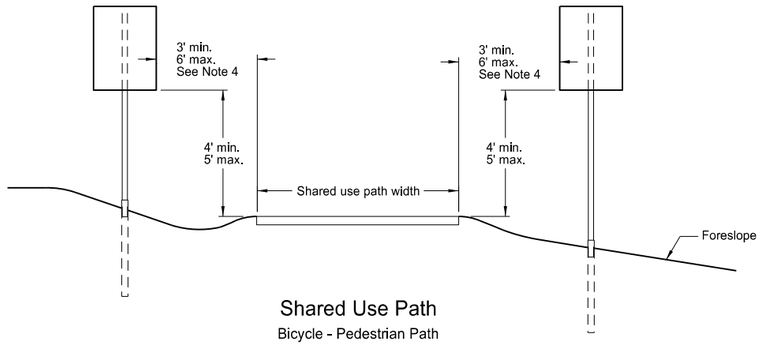
Typical Section (without curb)

Horizontal Clearance Table	
Shoulder Width ft	Offset ft
0 to 2	16
>2 to 4	18
>4 to 6	20
>6 to 8	22
>8 to 10	24



Typical Section (with curb)

Residential or Business District



Shared Use Path

Bicycle - Pedestrian Path

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
7-8-14	Revised note 2, added note 4.

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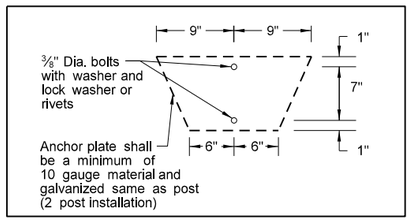
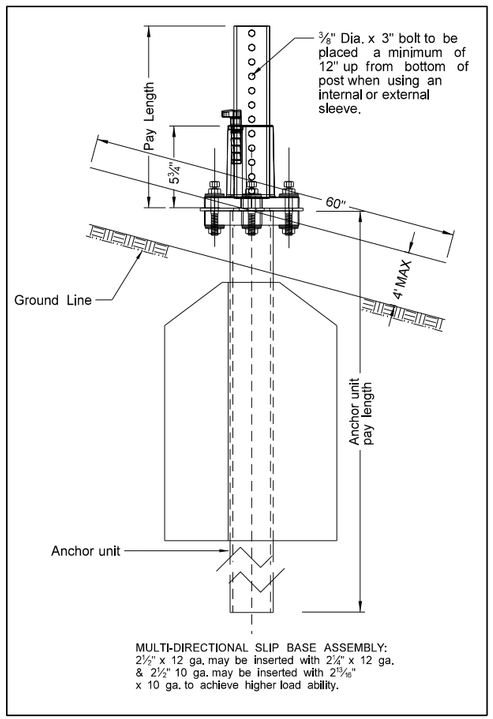
Mounting Details Perforated Tube

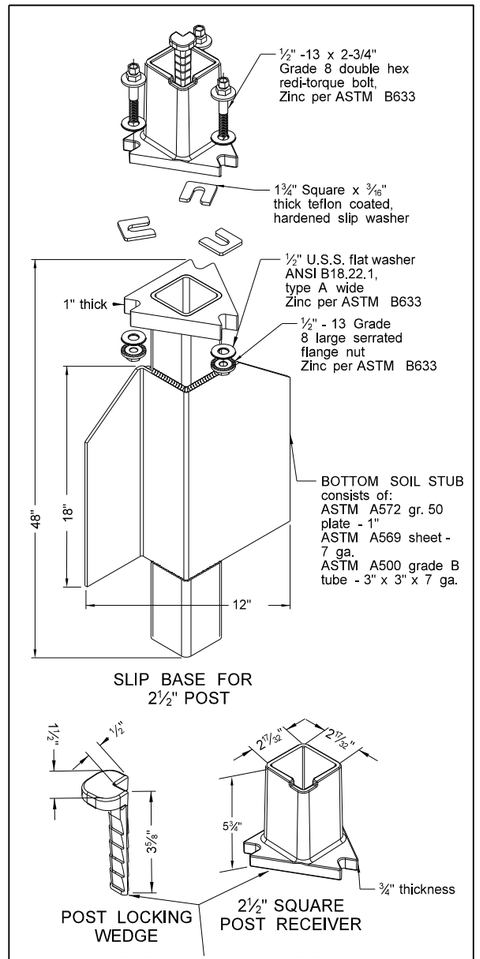
D-754-24

Number of Posts	Telescoping Perforated Tube: Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thick-ness Gauge
1	2	12			No	2¼	12
1	2¼	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2¼	12	2½(D)	12	Yes		7
1	2½	12	2¼	12	Yes		7
2	2½	10			Yes		7
2	2¼	12	2½(D)	12	Yes		7
2	2½	12	2¼	12	Yes		7
3 & 4	2½	12			Yes		7
3 & 4	2½	10			Yes		7
3 & 4	2½	12	2¼	12	Yes		7
3 & 4	2¼	12	2½(D)	12	Yes		7
3 & 4	2½	10	2⁹⁄₁₆	10	Yes		7

(B) - The 2½", 12 gauge posts do not need breakaway bases when placed in standard soils, but require a shim as specified by the manufacturer. The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.
(C) - 3" anchor unit
(D) - 2½" x 12 ga. x 18" minimum length external sleeve required.





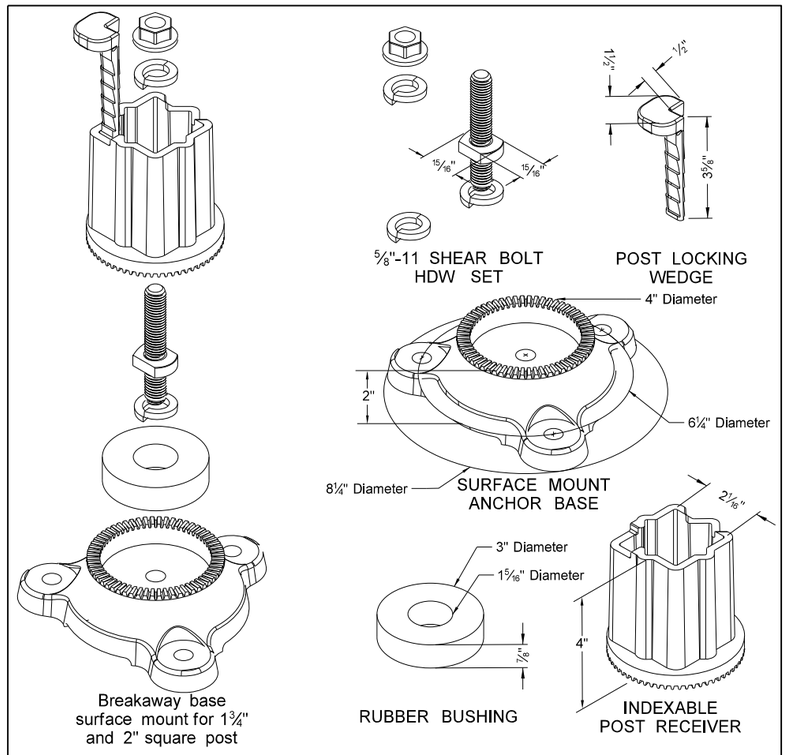


Properties of Telescoping Perforated Tubes: Tube Size In.	Wall Thickness in.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In.⁴	Cross Sect. Area In.²	Section Modulus In.³
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2⅜ x 2⅜	0.135	10	3.432	0.605	0.841	0.590
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643
2½ x 2½	0.135	10	4.006	0.979	1.010	0.783

The 2 ¾" size 10 gauge is shown as 2.19" size on the plans; The 2½" size is shown as 2.51" size on the plans.

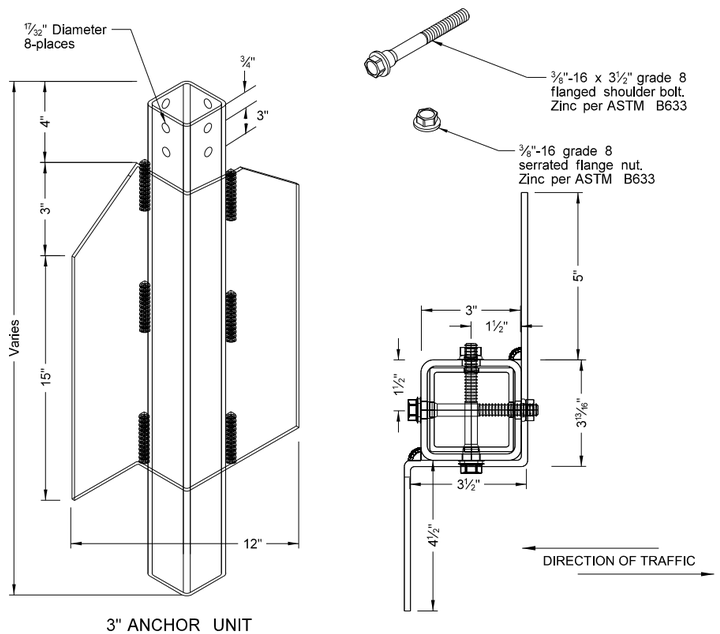
NOTE:

1. 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement shall be made above and below post location and also back and ahead of post.
2. Anchor material shall be 7 guage H.R.P.O. Commmercial quality ASTM A569 and 3" x 3" x 7" guage ASTM A500 grade B. Anchor shall have a yield strength 43.9 KSI and tensile strength of 59.3 KSI. Anchor shall be hot dipped galvanized per ASTM A123/153. All tolerances on anchor unit and slip base bottom assembly are +/- 0.005" unless otherwise noted.
3. When used in concrete sidewalk, anchor shall be the same concept without the wings
4. Four post signs shall have over 8' between the first and fourth posts.
5. Installation procedures as per manufacturers recommendation.
6. Concrete fasteners for surface mount breakaway base shall be a minimum ½" diameter x 4" grade 8.



SHOULDER BOLT

Shimming agent to reduce tolerance between 3" anchor unit and 2½" post.
(standard ⅞" diameter grade 8 bolt may be used with proper shim)



3" ANCHOR UNIT

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE

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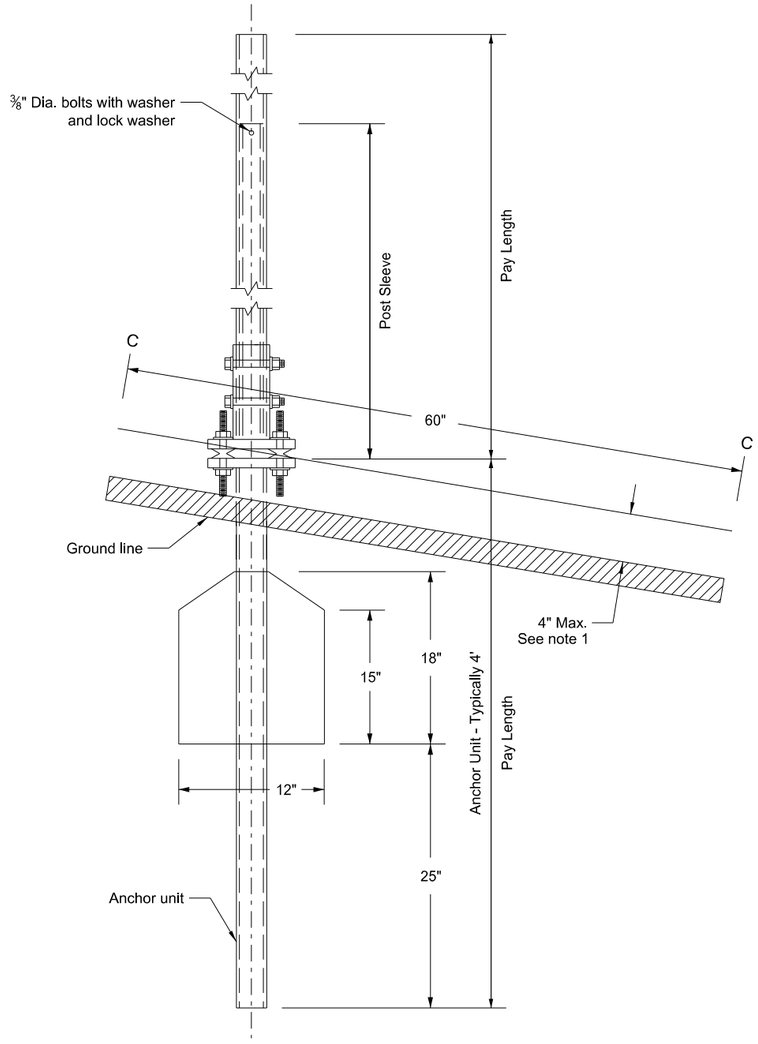
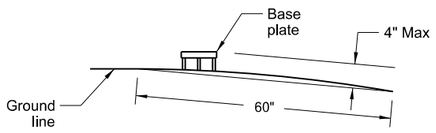
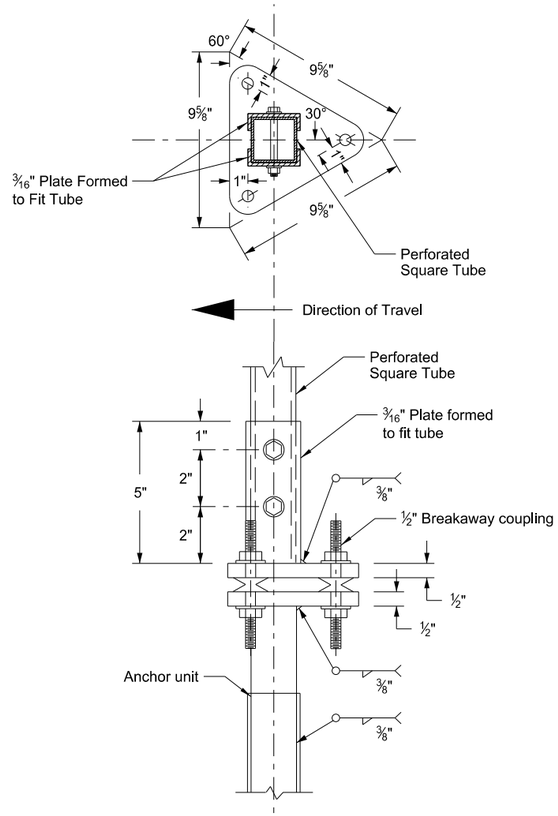




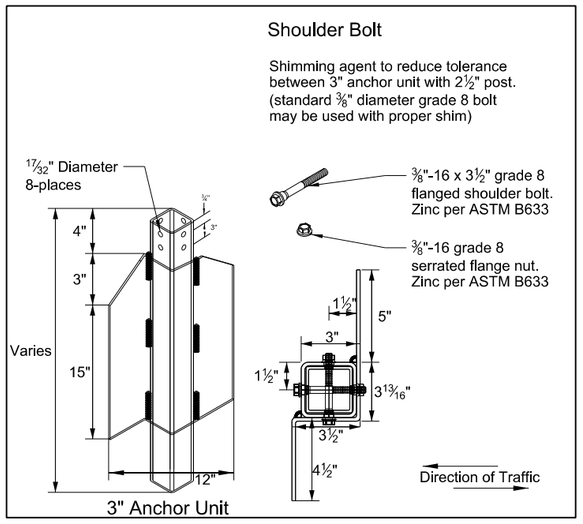
Section C-C

Max. protection of the stub post is 4" above a 60" chord aligned radially to the center line of the highway and connecting any point, within the length of the chord, on the ground surface on one side of the support to a point in the ground surface on the other side.

Breakaway Coupler System for Perforated Tubes



Base Plate with Breakaway Coupler



3" Anchor Unit

Notes:

1. 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement shall be made above and below post location and also back and ahead of post.
2. Anchor unit shall be the same size as the post and shall have the same specification as the post.
3. Four post signs shall have over 8' between the first and fourth post.
4. In lieu of the breakaway base system on standard D-754-24 the breakaway coupling system may be used. The breakaway coupler system shall be manufactured from material meeting the requirements of ASTM A325 fasteners with the special requirements as specified by DENT BREAKAWAY IND., INC. which meets the test requirements of NCHRP Report 350.

Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thickness Guage
1	2	12			No	2¼	12
1	2¼	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2¼	12	2	12	Yes		7
1	2½	12	2¼	12	Yes		7
2	2½	10			Yes		7
2	2¼	12	2	12	Yes		7
2	2½	12	2¼	12	Yes		7
3 & 4	2½	12			Yes		7
3 & 4	2½	10			Yes		7
3 & 4	2½	12	2¼	12	Yes		7
3 & 4	2¼	12	2	12	Yes		7
3 & 4	2½	10	2 3/16	10	Yes		7

(B) - The 2½" 12 gauge posts do not need breakaway bases when placed in standard soils. The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.

(C) - 3" anchor unit

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-2013	
REVISIONS	
DATE	CHANGE

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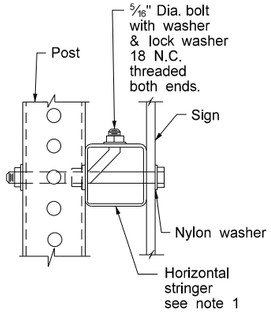
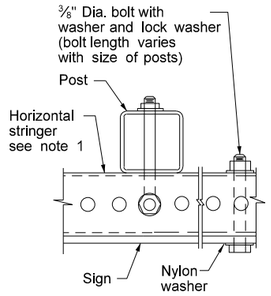
Mounting Details Perforated Tube

D-754-25

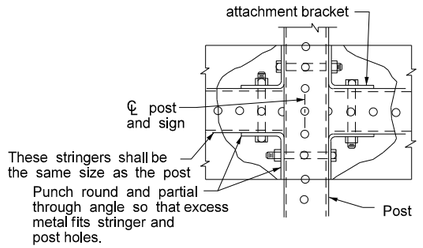


Side View



Top View

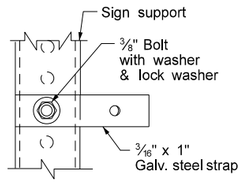
STRINGER MOUNTING
(WITH STRINGER IN FRONT OF POST)



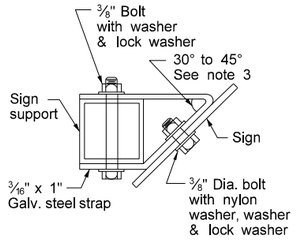
STREET NAME SIGNS
AND ONE WAY SIGNS
SINGLE POST ASSEMBLY
ONE STRINGER OR
BACK TO BACK MOUNTING

Note:

1. Horizontal stringers - In lieu of perforated tubes, the contractor may substitute z bar stringers. The z bar stringers shall be 1¾" x 3/16" thick, 1.08 lbs./ft aluminum or 3.16 lbs./ft steel.
2. Metal washers used on sign face shall have a minimum outside diameter of 15/16" ± 1/16" and 10 gauge thickness.
3. No Parking Signs: All no parking signs with directional arrows shall be placed at a 30 to 45 degree angle with the line of traffic flow. No parking signs required at the above angles may have the support turned to the correct angle. If the no parking sign is placed with another sign that has to be placed at a 90 degree angle with the line of traffic flow, the detailed angle strap should be used to mount the no parking sign. Flat washers and lock washers shall be used with all nylon washers.
4. In lieu of using the bent bolt to attach the post to the stringer, the contractor may choose to punch the sign backing and place the bolt through the sign, the stringer and the post.
5. 4" vertical clearance of anchor or breakaway base. The 4" x 60" measurement shall be made above and below post location and also back and ahead of post.

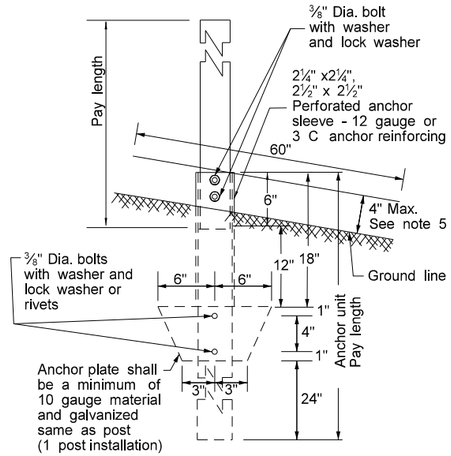


Side View



Top View

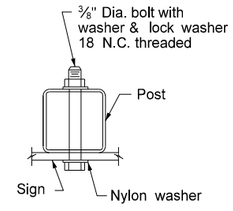
STRAP DETAIL



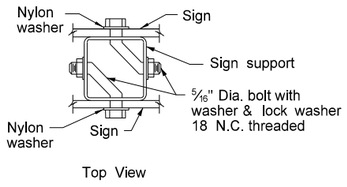
ANCHOR UNIT AND
POST ASSEMBLY

Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thick-ness Gauge
1	2	12			No	2¼	12
1	2¼	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2¼	12	2½(D)	12	Yes		7
1	2½	12	2¼	12	Yes		7
2	2½	10			Yes		7
2	2¼	12	2½(D)	12	Yes		7
2	2½	12	2¼	12	Yes		7
3 & 4	2½	12			Yes		7
3 & 4	2½	10			Yes		7
3 & 4	2½	12	2¼	12	Yes		7
3 & 4	2¼	12	2½(D)	12	Yes		7
3 & 4	2½	10	2 3/16	10	Yes		7

(B) - The 2½", 12 gauge posts do not need breakaway bases when placed in standard soils, but require a shim as specified by the manufacturer. The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.
(C) - 3" anchor unit
(D) - 2½" x 12 ga. x 18" minimum length external sleeve required.

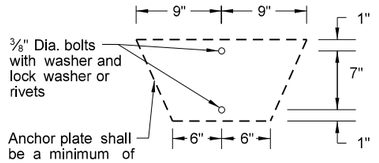


BOLT MOUNTING



Top View

BACK TO BACK
MOUNTING



Properties of Telescoping Perforated Tubes						
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia $In.^4$	Cross Sect. area $In.^2$	Section Modulus $In.^3$
1½ x 1½	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
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643
2½ x 2½	0.135	10	4.006	0.979	1.010	0.783

The 2 3/16" size 10 gauge is shown as 2.19" size on the plans.
The 2½" size is shown as 2.51" size on the plans.

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

8-6-09

REVISIONS

DATE	CHANGE
7-8-14	Revised Note 3

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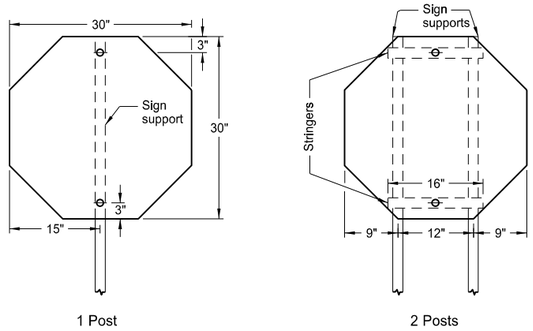
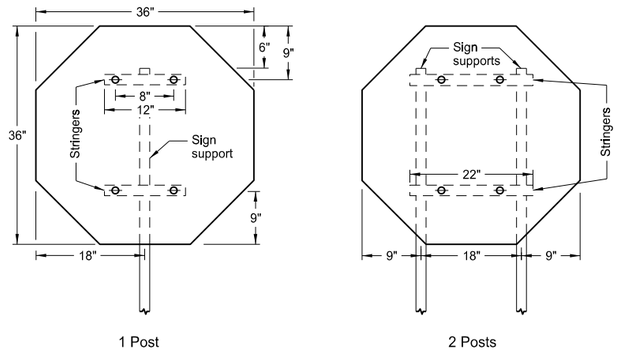
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS

D-754-26



1 Post 2 Posts

Assembly No. 1



1 Post 2 Posts 3 Posts

Assembly No. 2

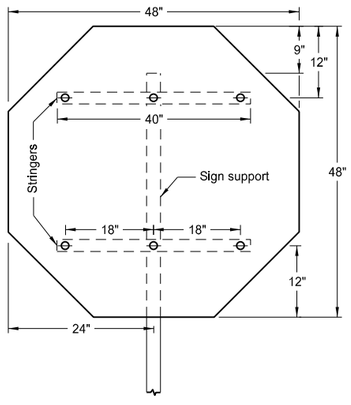
Notes:

1. See Standard D-754-25 for mounting details.

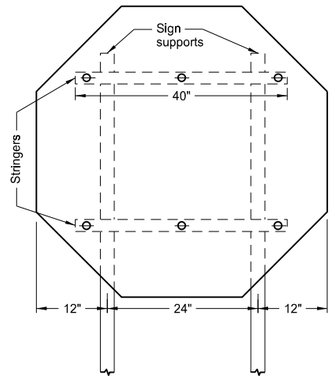
2. The minimum sign backing material thickness shall be 0.100 inch.

3. Perforated square tube stringer shall be 1½" x 1½".

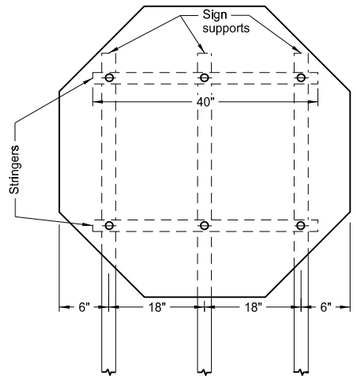
4. All holes shall be punched round for ⅜" bolt.



1 Post

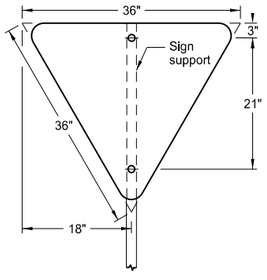


2 Posts



3 Posts

Assembly No. 3



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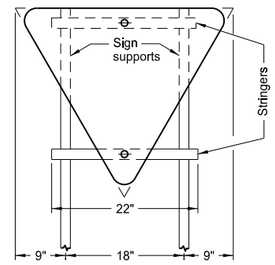

2 Posts

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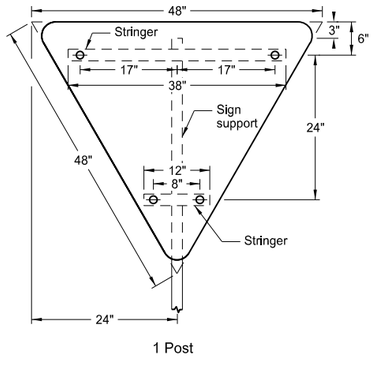

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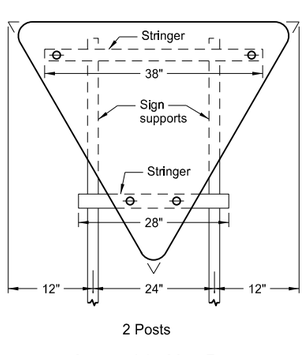
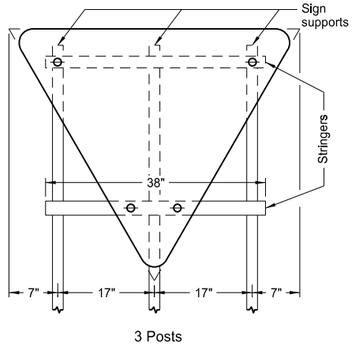


2 Posts



3 Posts

Assembly No. 5

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

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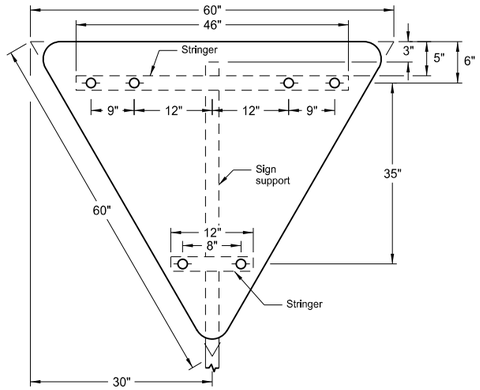
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION
DETAILS REGULATORY, WARNING AND GUIDE SIGNS

D-754-27



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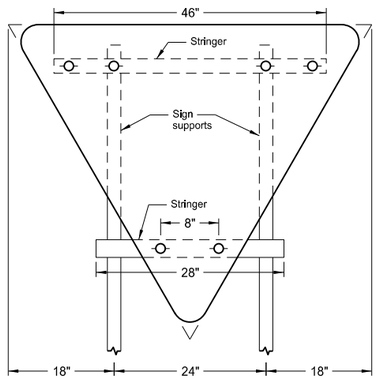
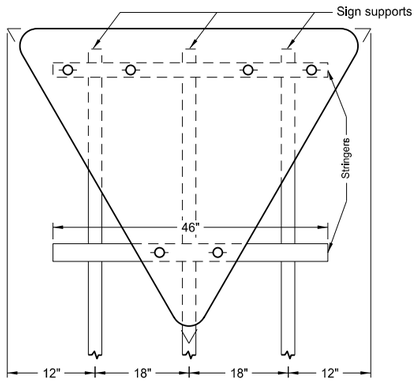


2 Posts



3 Posts

Assembly No. 6

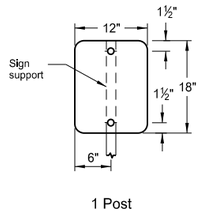
Notes:

1. See Standard D-754-25 for mounting details.

2. The minimum sign backing material thickness shall be 0.100 inch.

3. Perforated square tube stringer shall be 1½" x 1½".

4. All holes shall be punched round for ⅜" bolt.



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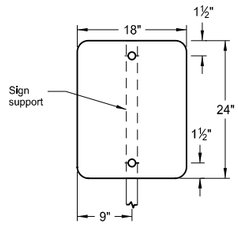
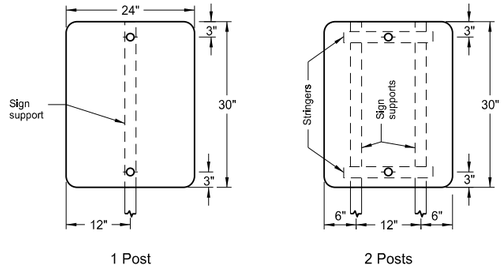


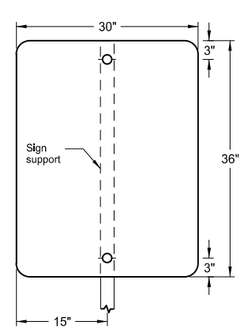
1 Post

Assembly No. 8

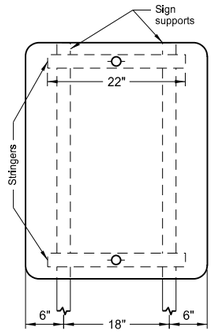


1 Post 2 Posts

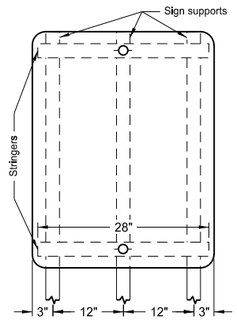
Assembly No. 9



1 Post

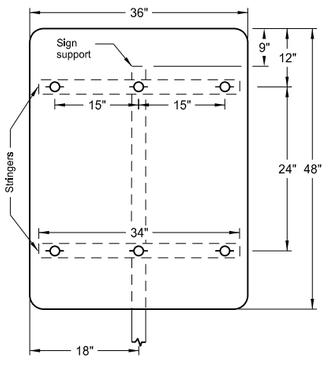


2 Posts



3 Posts

Assembly No. 10



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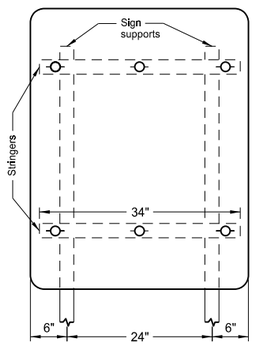
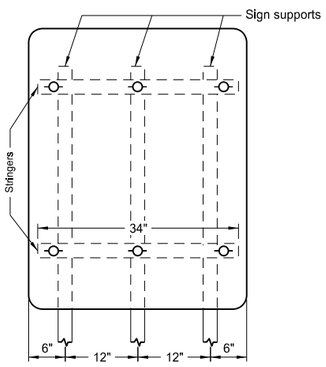


2 Posts



3 Posts

Assembly No. 11

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

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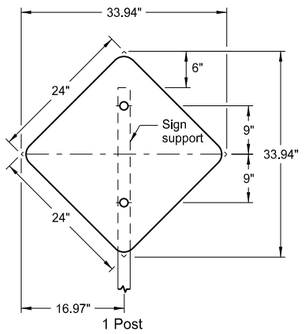
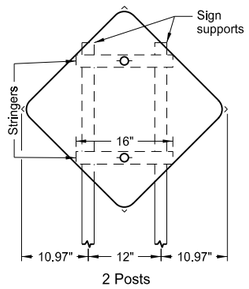
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS

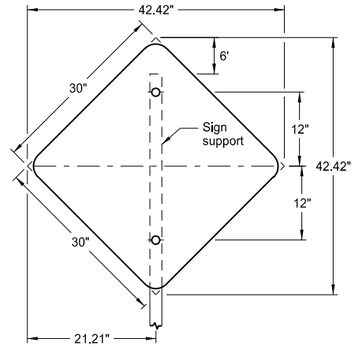


1 Post



2 Posts

Assembly No. 18



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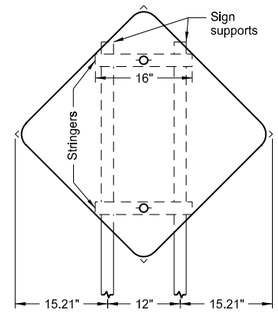

2 Posts

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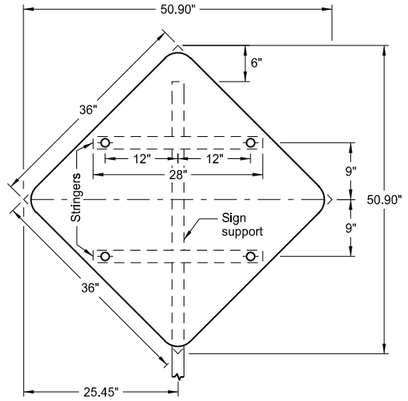
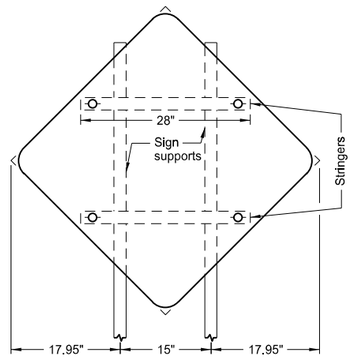
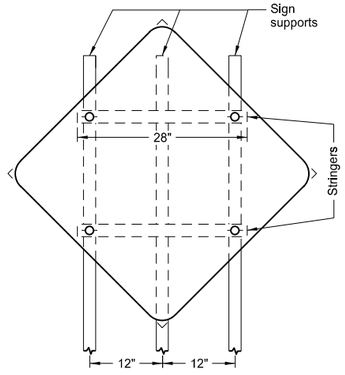


1 Post

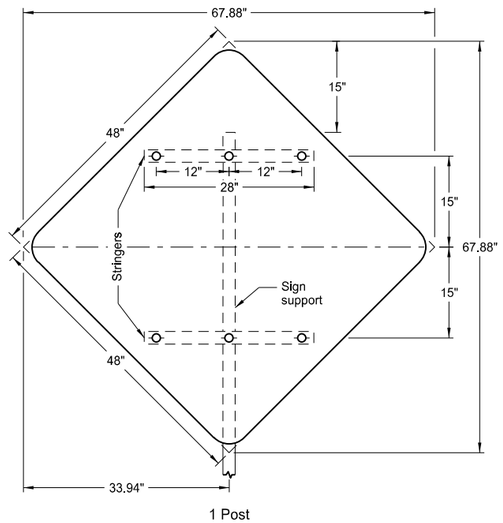


2 Posts



3 Posts

Assembly No. 20



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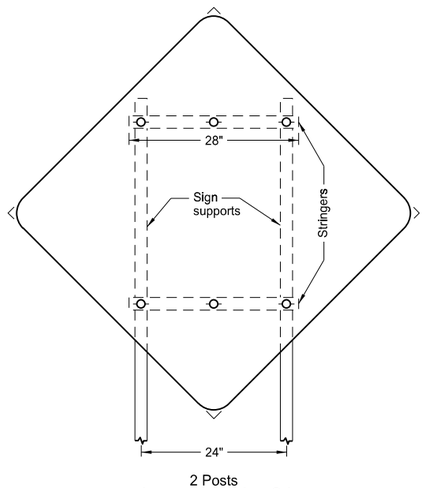
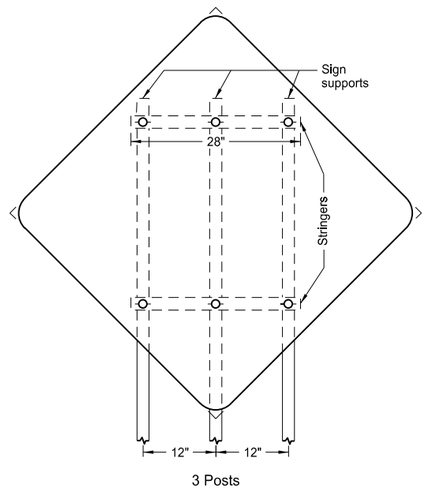


2 Posts



3 Posts

Assembly No. 21

Notes:

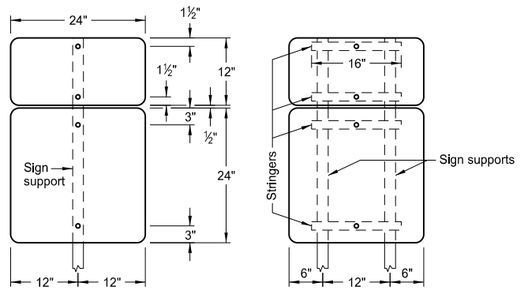
1. See Standard D-754-25 for mounting details.
2. The minimum sign backing material thickness shall be 0.100 inch.
3. Perforated square tube stringer shall be 1½" x 1½".
4. All holes shall be punched round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

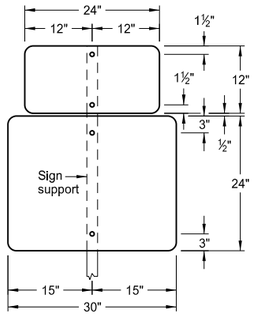
This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 12-1-10 and the original document is stored at the North Dakota Department of Transportation

SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS - ROUTE MARKER SIGNS

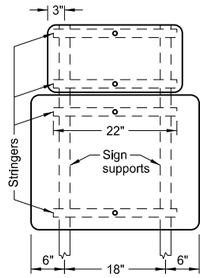
D-754-51



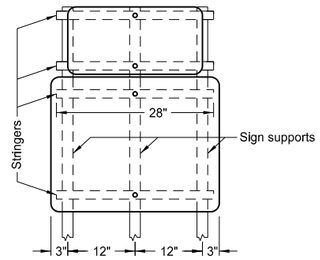
1 Post 2 Posts



1 Post



2 Posts



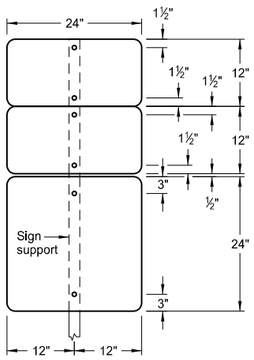
3 Posts

ASSEMBLY NO. 371

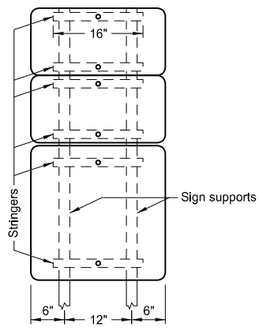
ASSEMBLY NO. 372

Notes:

1. The minimum sign backing material thickness shall be 0.100 inch.
2. Perforated square tube stringer shall be 1½"x1½".
3. All holes shall be punched round for ⅜" bolt.



1 Post



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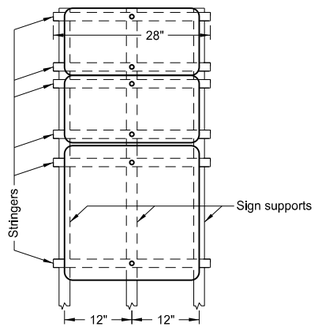
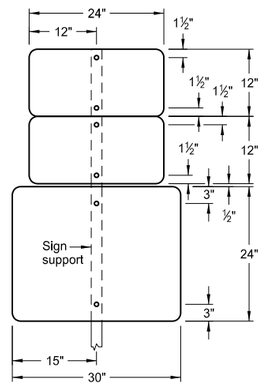
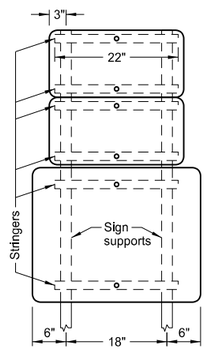


3 Posts

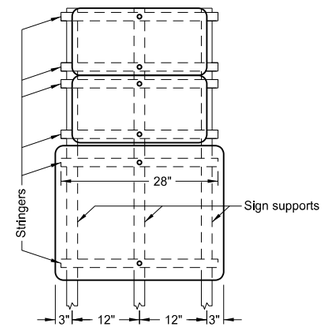
ASSEMBLY NO. 373



1 Post



2 Posts



3 Posts

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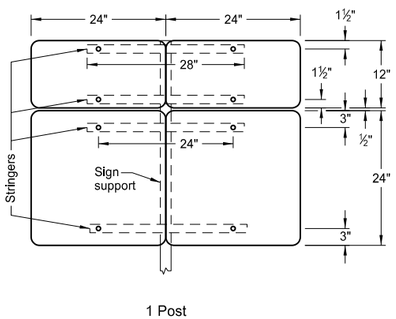

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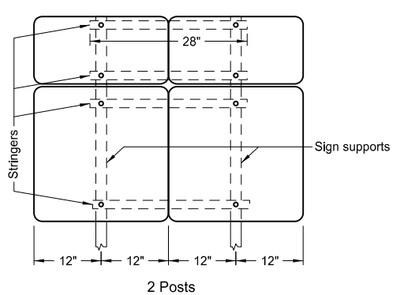
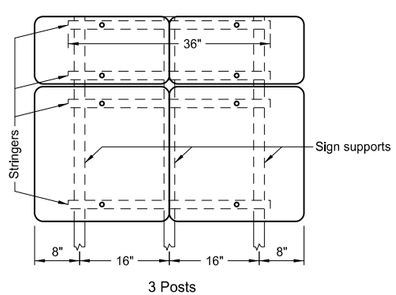


2 Posts



3 Posts

ASSEMBLY NO. 375

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE

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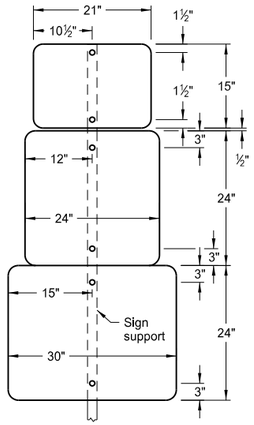
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS - ROUTE MARKER SIGNS

D-754-58



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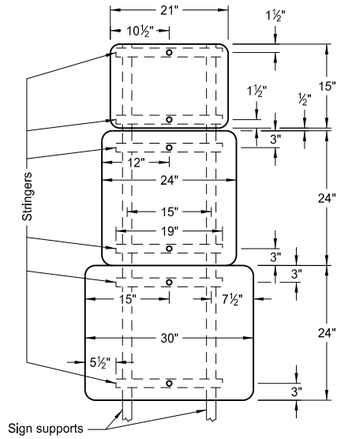
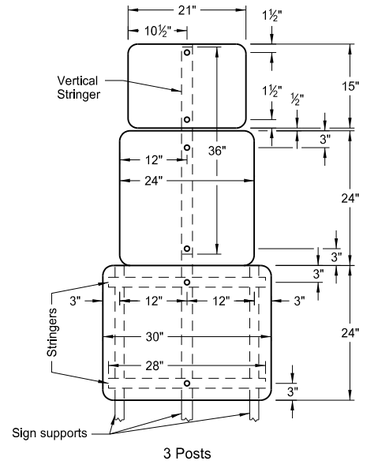
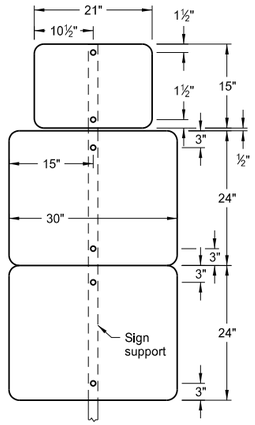


2 Posts



3 Posts

ASSEMBLY 396



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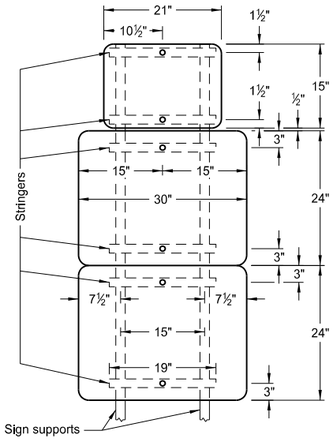
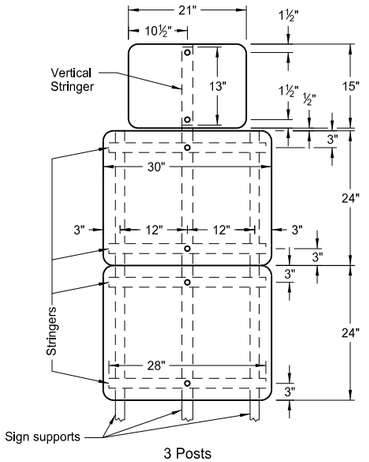
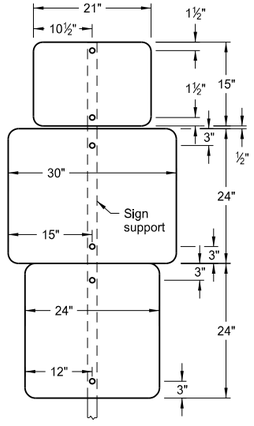


2 Posts

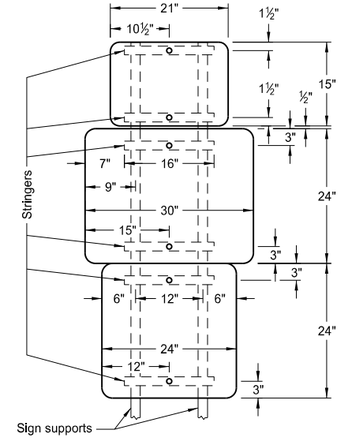


3 Posts

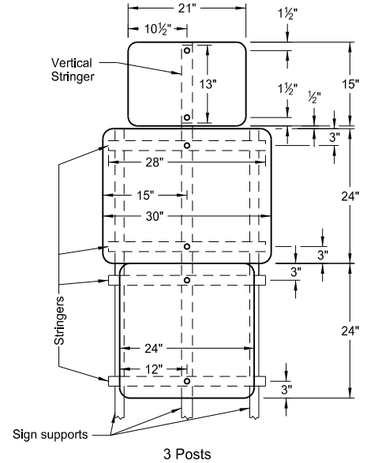
ASSEMBLY 397



1 Post

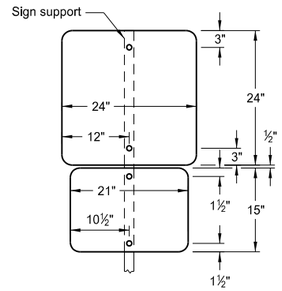


2 Posts



3 Posts

ASSEMBLY 398



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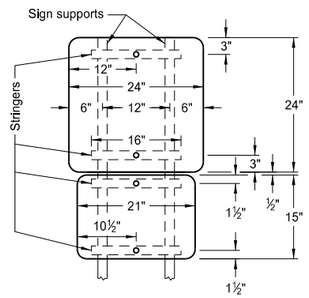

2 Posts

ASSEMBLY 399

Notes:

1. The minimum sign backing material thickness shall be 0.100 inch.
2. Perforated square tube stringer shall be 1½"x1½".
3. All holes shall be punched round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE

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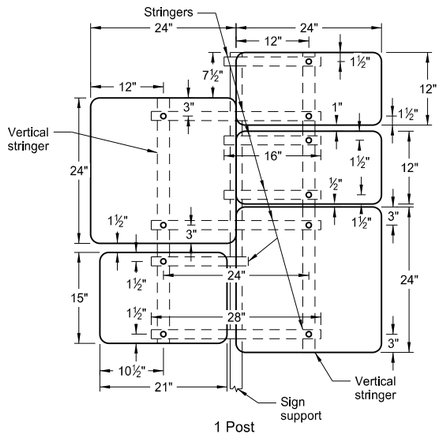
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS - ROUTE MARKER SIGNS

D-754-74



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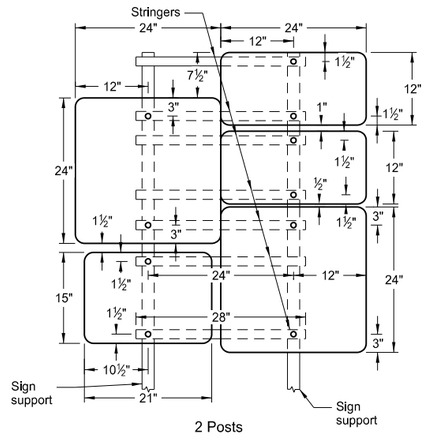
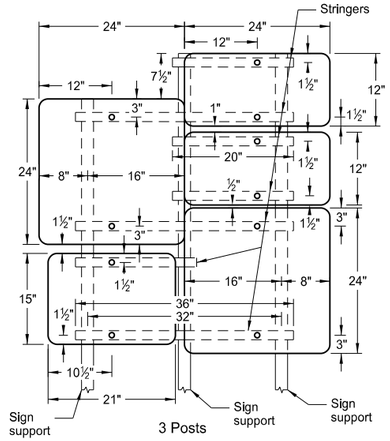
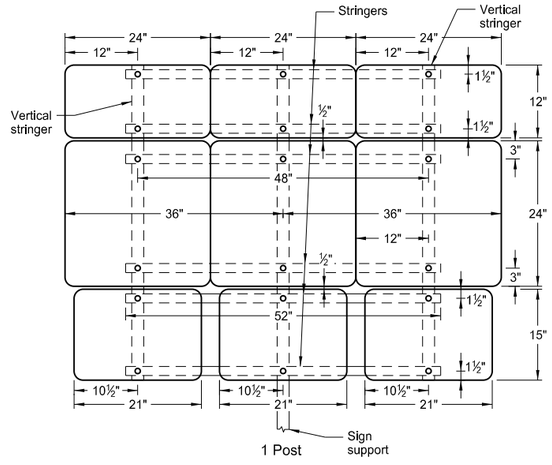


2 Posts

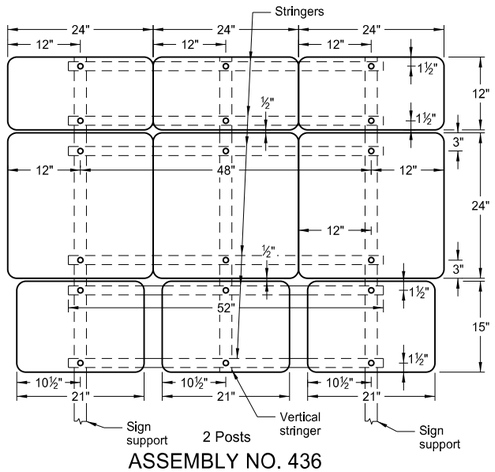


3 Posts

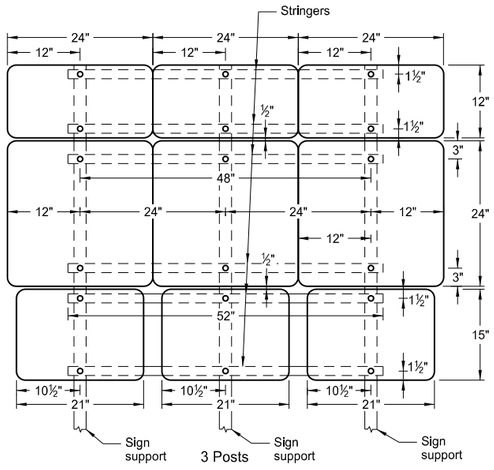
ASSEMBLY NO. 435



1 Post

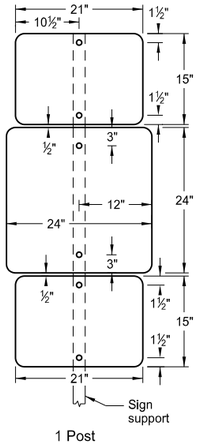


2 Posts

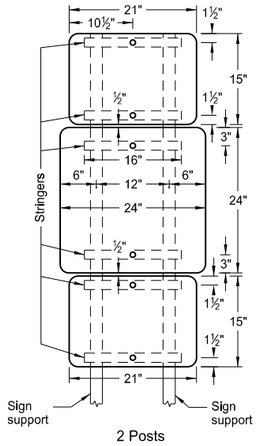


3 Posts

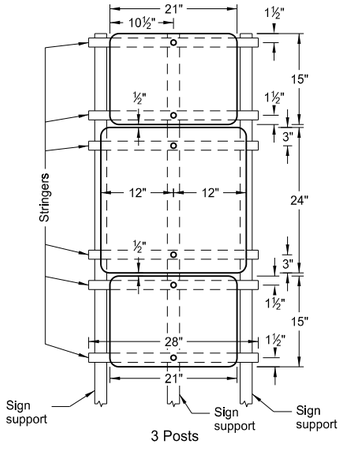
ASSEMBLY NO. 436



1 Post



2 Posts



3 Posts

ASSEMBLY NO. 437

Notes:

1. The minimum sign backing material thickness shall be 0.100 inch.
2. Perforated square tube stringer shall be 1½"x1½".
3. All holes shall be punched round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE

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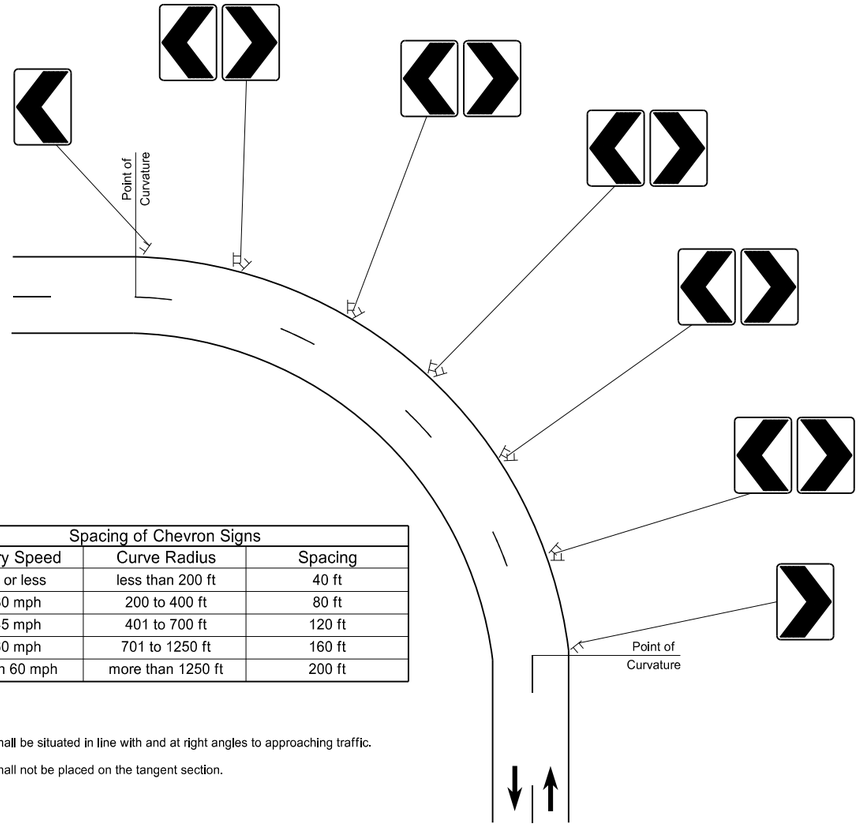
CHEVRON INSTALLATION DETAILS

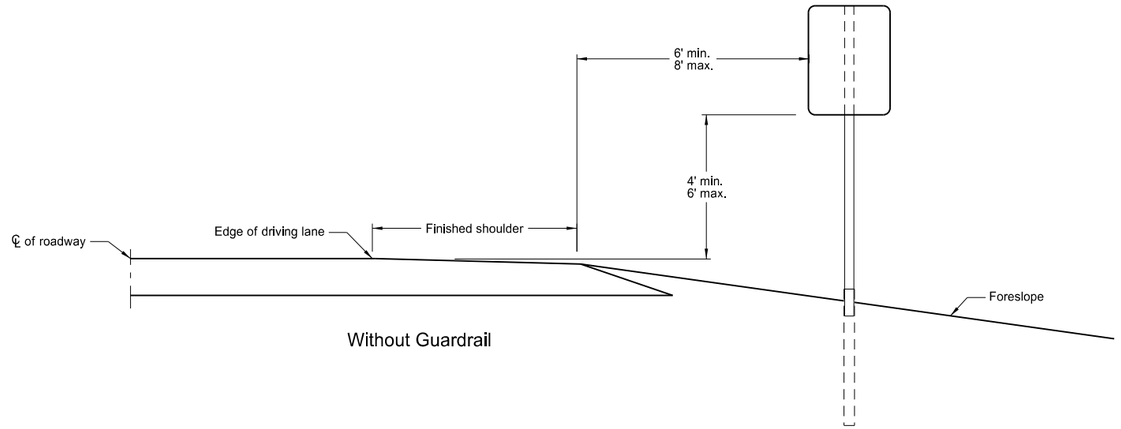
D-754-79



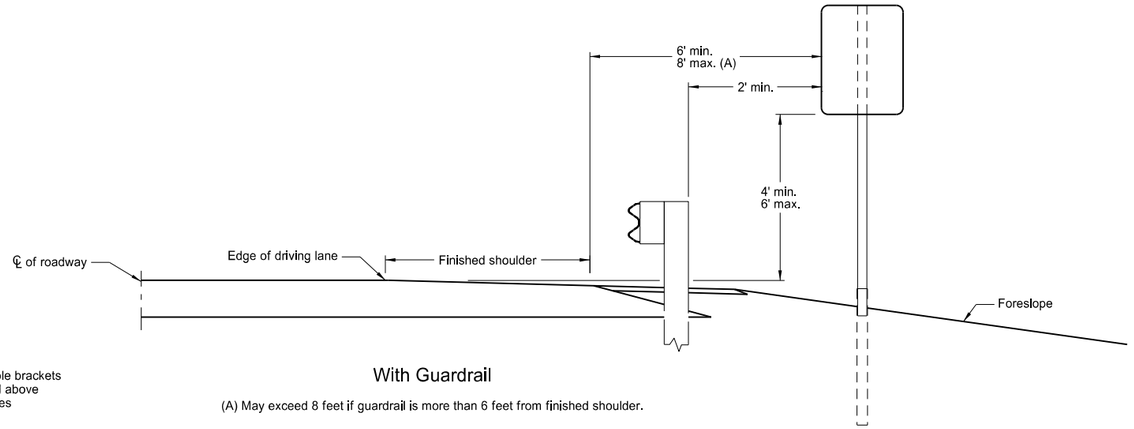
Spacing of Chevron Signs		
Advisory Speed	Curve Radius	Spacing
15 mph or less	less than 200 ft	40 ft
20 to 30 mph	200 to 400 ft	80 ft
35 to 45 mph	401 to 700 ft	120 ft
50 to 60 mph	701 to 1250 ft	160 ft
more than 60 mph	more than 1250 ft	200 ft

Notes:

1. Chevrons shall be situated in line with and at right angles to approaching traffic.
2. Chevrons shall not be placed on the tangent section.

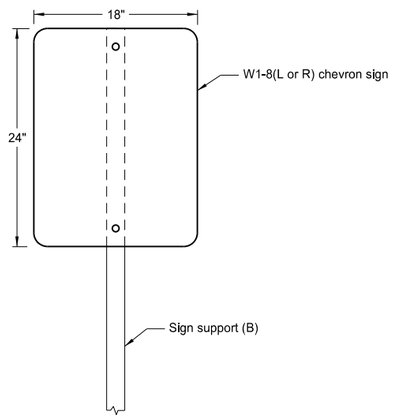


Without Guardrail



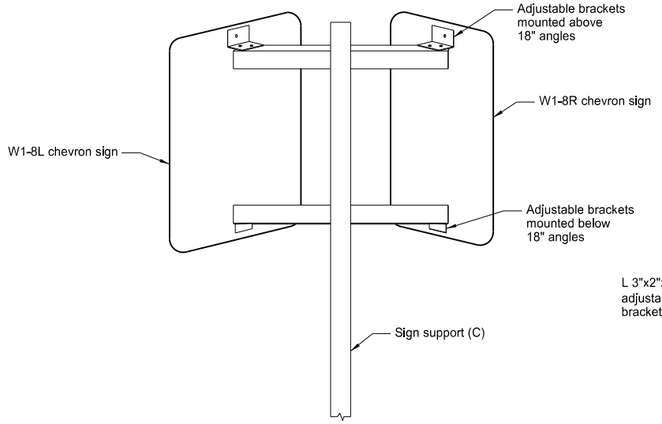
With Guardrail

(A) May exceed 8 feet if guardrail is more than 6 feet from finished shoulder.



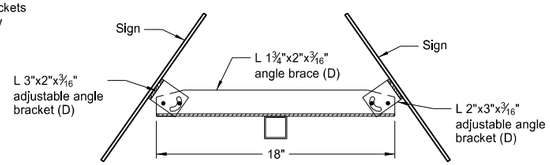
Chevron Single Sign Assembly

(B) Single sign support shall be 2x2x12ga. perforated tube
Anchor unit shall be 2.25x2.25x12ga. perforated tube



Chevron Double Sign Assembly

(C) Double sign support shall be 2.25x2.25x12ga. perforated tube
Anchor unit shall be 2.5x2.5x12ga. perforated tube



Top View

(D) All angles shown shall be aluminum or steel. The sizes are the minimum allowed, larger sizes may be used if approved by the Engineer.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-10-13	
REVISIONS	
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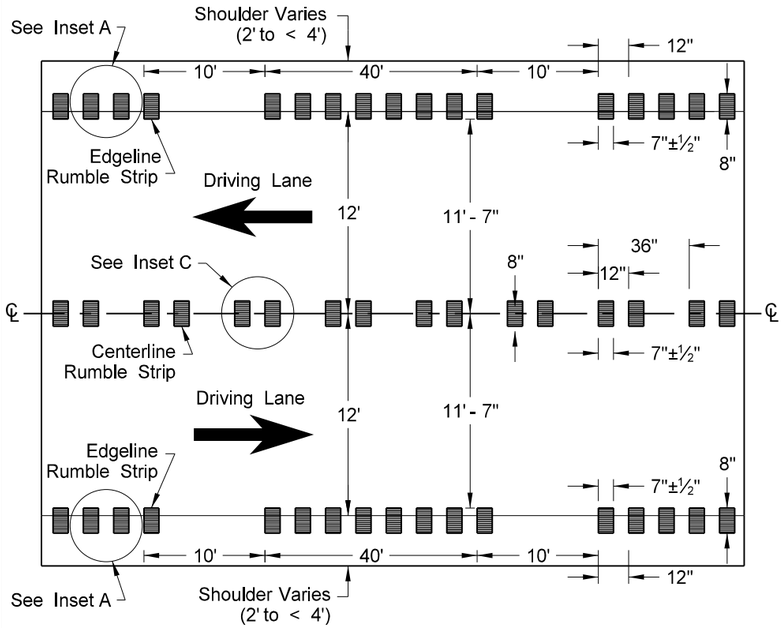
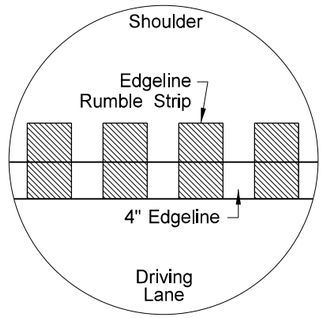
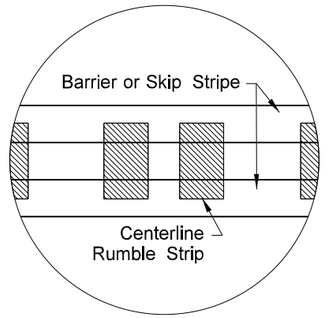
RUMBLE STRIPS
UNDIVIDED HIGHWAYS (SHOULDERS LESS THAN 4')



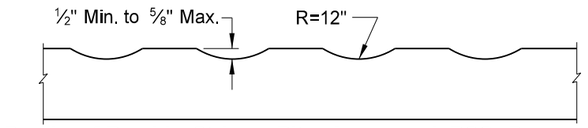
Undivided Highways (12' Driving Lanes & Shoulders 2' to < 4')



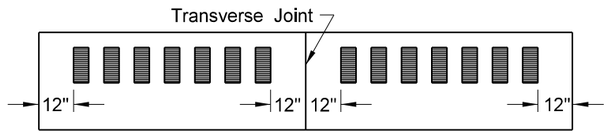
Inset A - Edgeline Rumble Strip



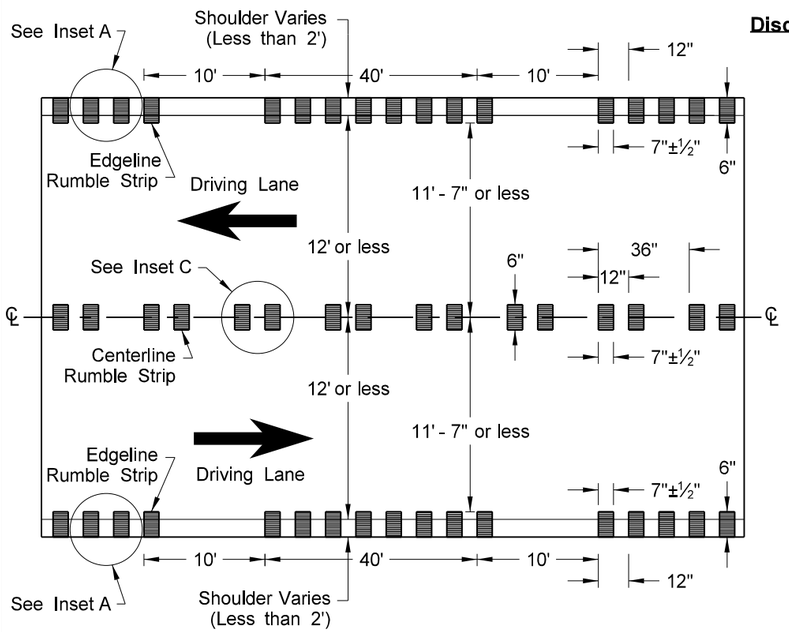
Inset C - Centerline Rumble Strip



Profile of Rumble Strips - Bituminous and PCC Pavements



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

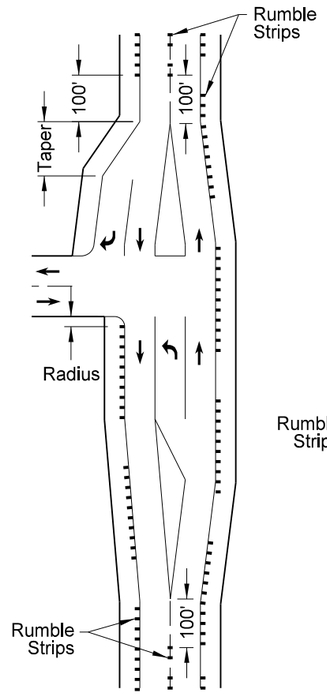


Undivided Highways (12' Driving Lanes or less & Shoulders Less than 2')

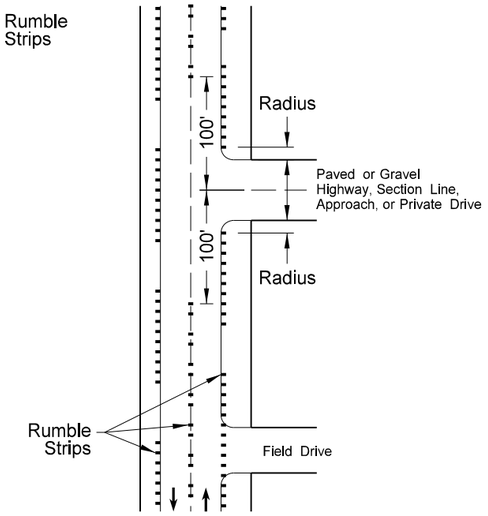
NOTES:

1) Discontinue edgeline rumble strips through the entire length of right turn lanes, 100' before right turn lane tapers, and at the radius of a paved or gravel highway, section line, approach, or private drive.

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



Turn Lane
(Right & Left)



Entrance Roadways

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).
9-8-11	Revised Notes and D-760-4.
1-26-12	Revised details for rumble strip widths and dimensions.

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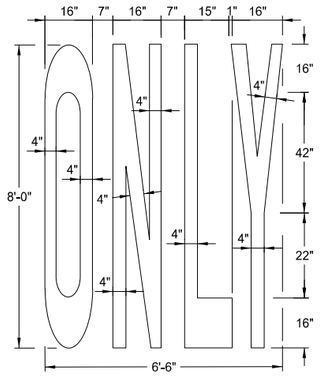
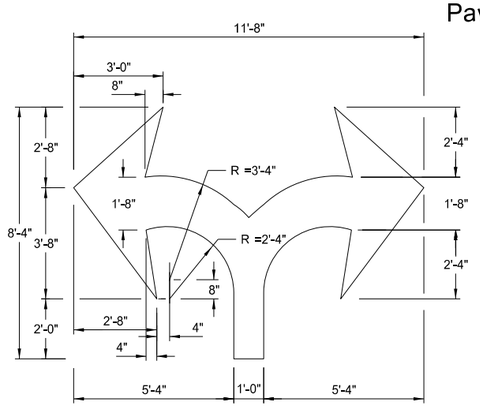
Pavement Marking Message Details

D-762-1



22 S. F.



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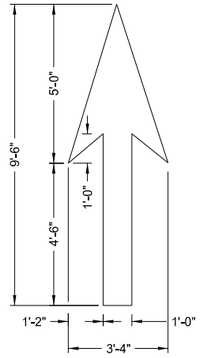
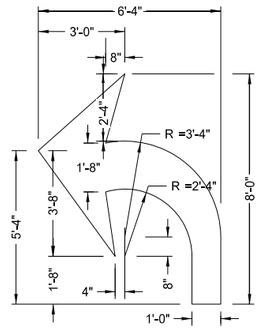


12 S. F.



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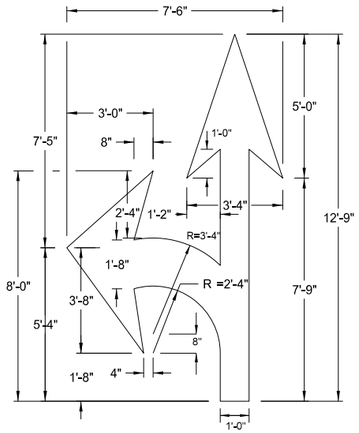

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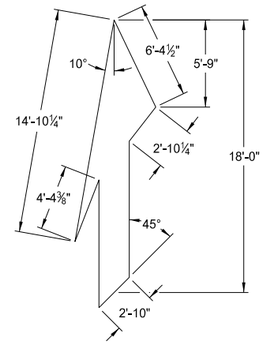
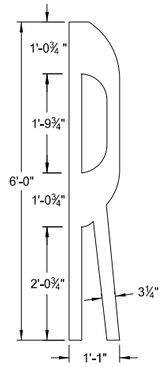
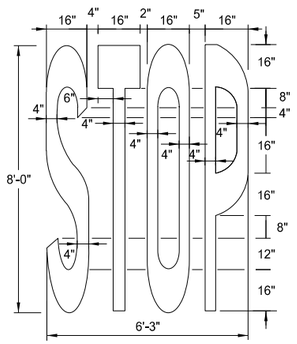


41 S. F.

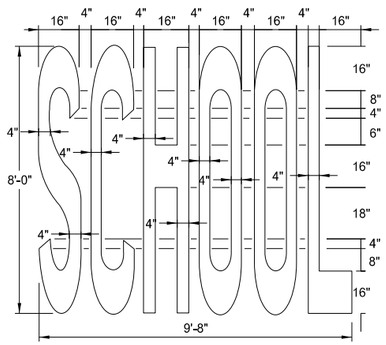
Note:
The merge arrow shall be rotated 20° from the edge of the roadway.



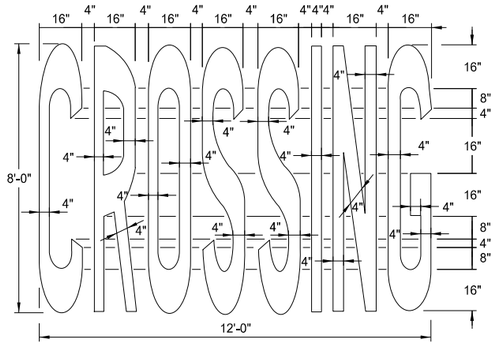
4 S. F.



22 S. F.



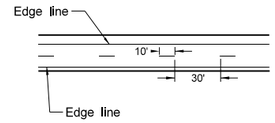
34.5 S. F.



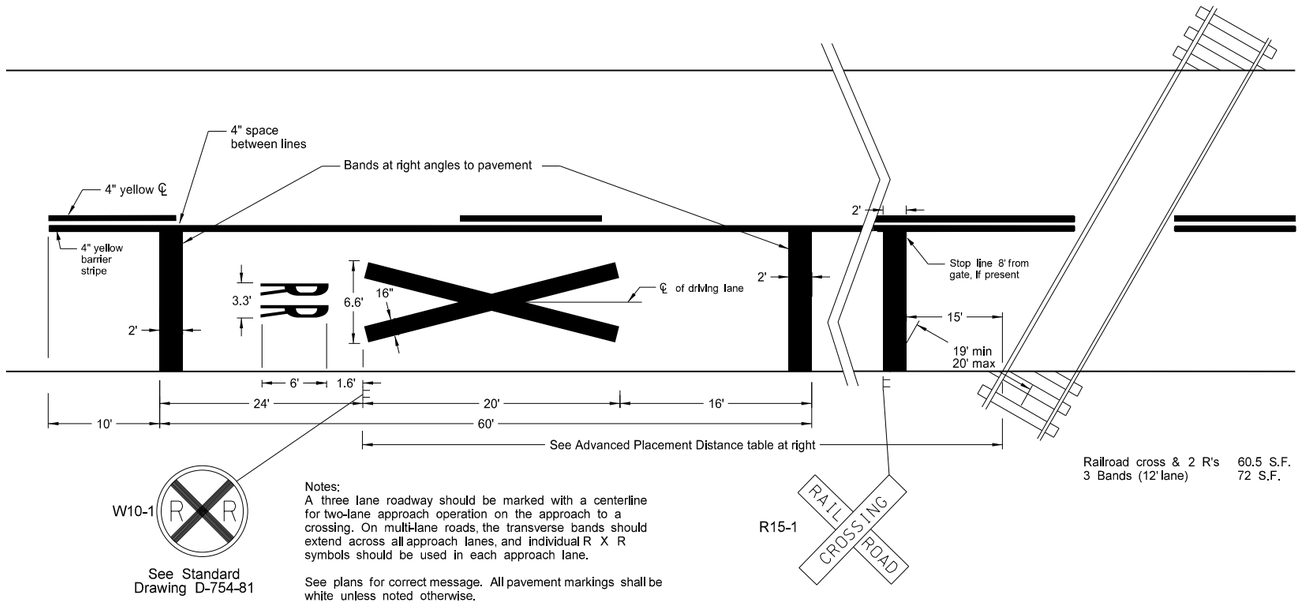
46 S. F.

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



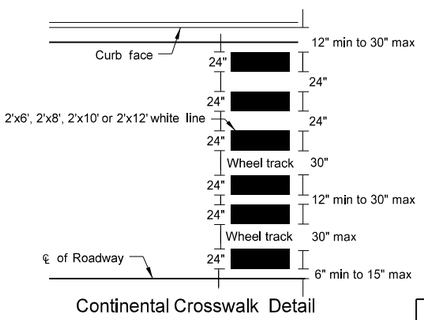
Centerline Pavement Marking Skip Spacing Detail



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

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

See plans for correct message. All pavement markings shall be white unless noted otherwise.



Continental Crosswalk 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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-6-11	
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DATE	CHANGE

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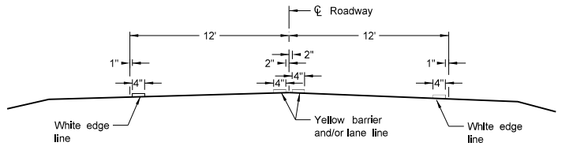
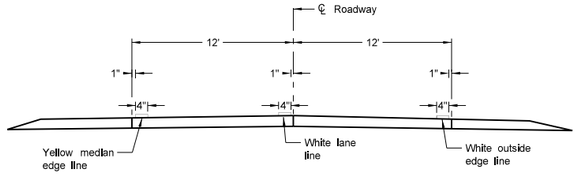
PAVEMENT MARKING

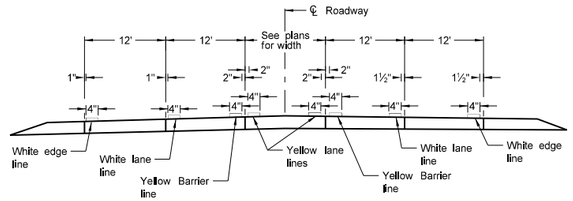
D-762-4



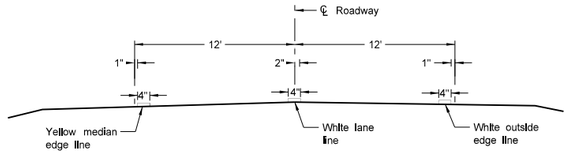
Two Lane Two Way
RURAL ROADWAY



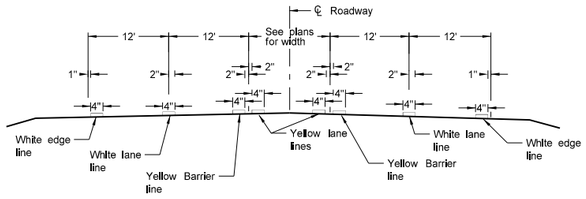
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



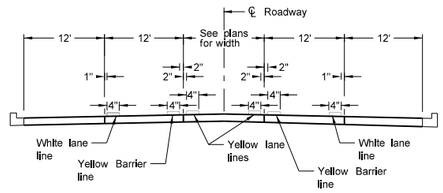
RURAL FIVE LANE ROADWAY
Concrete Section



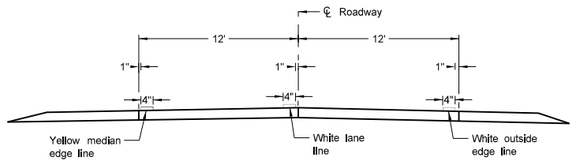
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



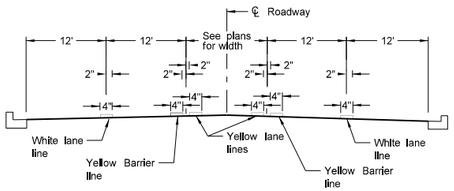
RURAL FIVE LANE ROADWAY
Asphalt Section



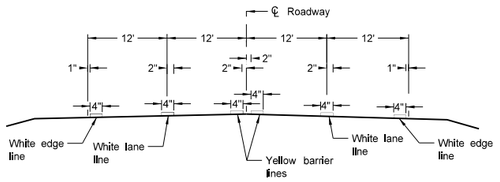
URBAN FIVE LANE SECTION
Concrete Section



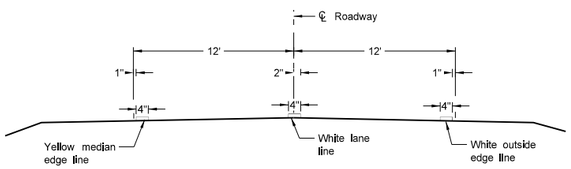
Two Lane Roadway
PRIMARY HIGHWAY
Concrete Section



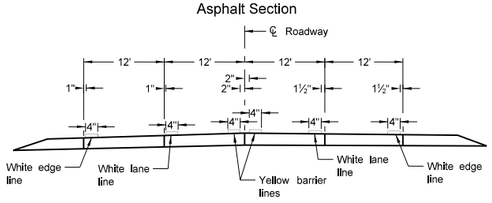
URBAN FIVE LANE SECTION
Asphalt Section



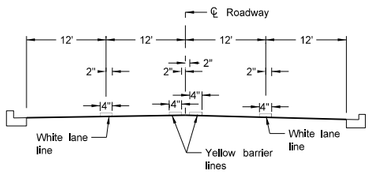
RURAL FOUR LANE ROADWAY
Asphalt Section



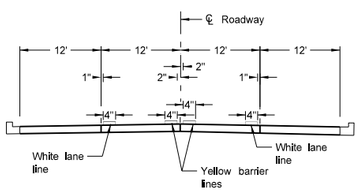
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



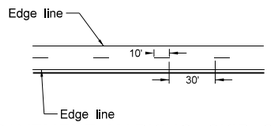
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

NOTES:

1. Edge lines shall be continued through private drives and field drives and broken for intersections.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

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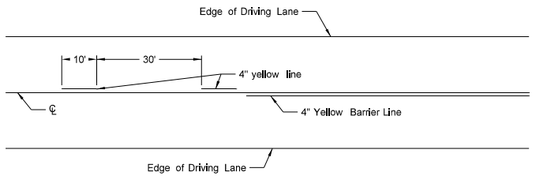
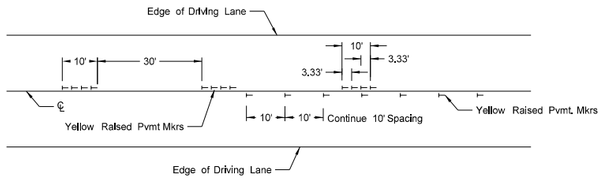
SHORT-TERM PAVEMENT MARKING

D-762-6

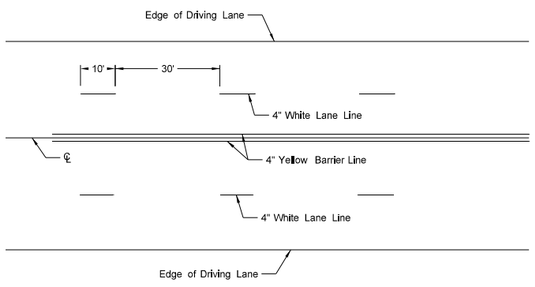


Painted or Tape Lines

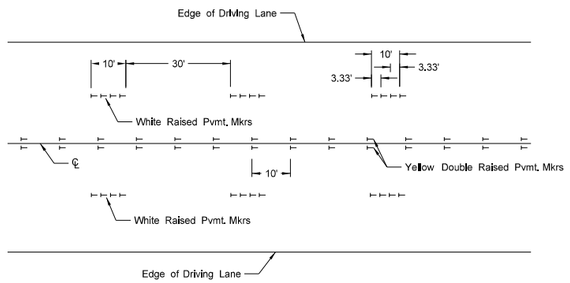


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

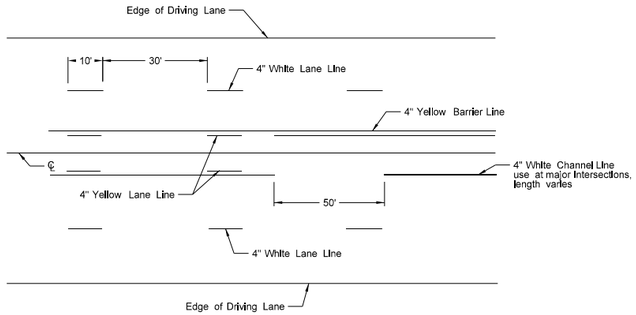


Painted or Tape Lines



Raised Pavement Markers

FOUR LANE ROADWAY



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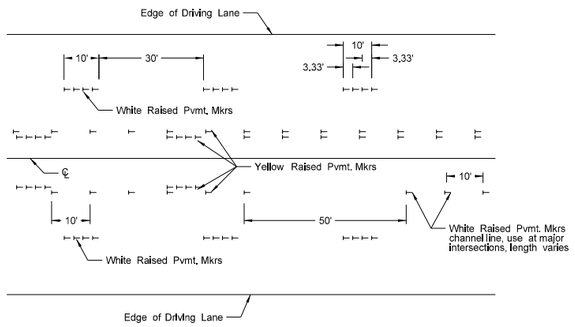
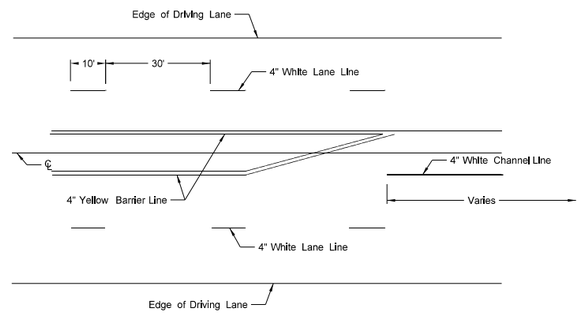


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



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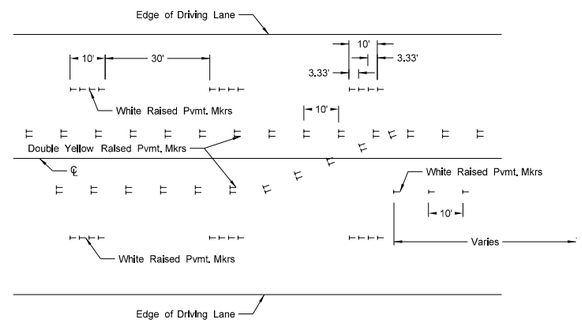

Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

NOTES:

1. Two-lane two-way roadways shall have no passing zones placed as shown. No passing zone signs may be placed in lieu of short term no passing zone pavement markings. These signs will be allowed to remain in place for three days, at which time the short term no passing zone pavement marking shall be placed.

2. Short term center line stripe (paint) on top lift shall be carefully placed with exact spacing so that the permanent stripe will match when applied.

3. Raised markers and tape markings shall be removed after permanent pavement marking has been installed. Removed markings shall become the property of the contractor.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

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