DESIGN DATA				
Traffic	Average Daily			
Current 2022	Pass: 1335	Trucks: 640	Total: 1975	
Forecast	Pass:	Trucks:	Total:	
Clear Zone Distance:		Design Speed:		
Minimum Sight Dist. for Stopping:		Bridges:		
Sight Dist. for No Passing Zone:				
Pavement Design Life (years)				
Design Accumulated One-way ESALs:				

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	NH-4-052(104)141	23641	1	1

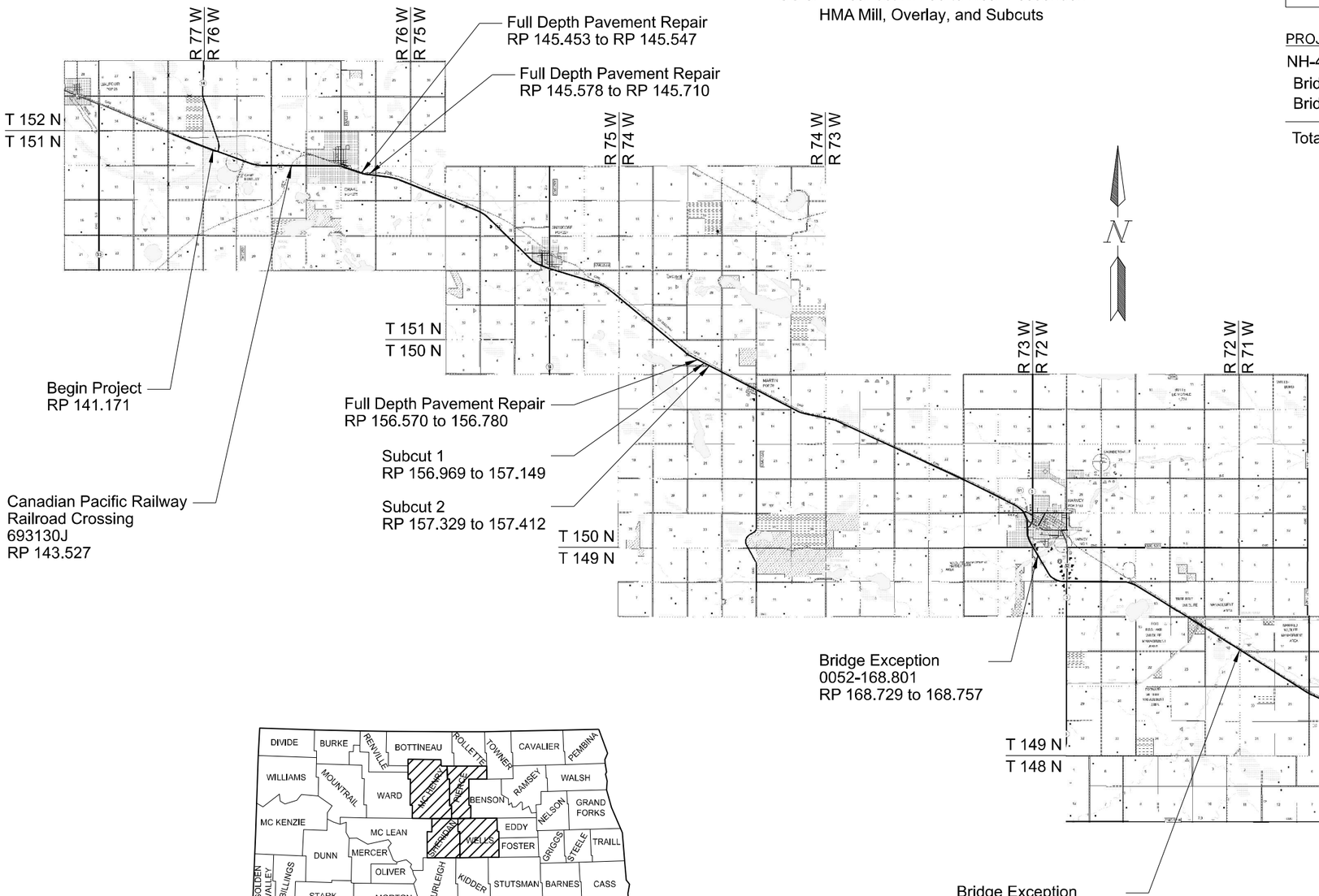
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

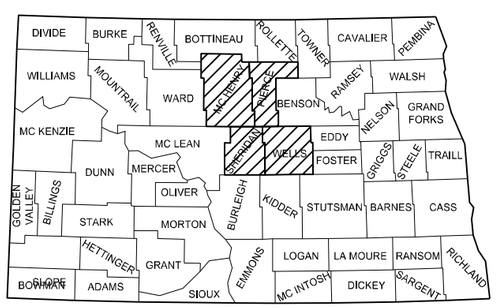
NH-4-052(104)141

McHenry, Pierce, Sheridan & Wells Counties
US 52 - Near Jct ND 53 to Near Fessenden
HMA Mill, Overlay, and Subcuts

GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	4/1/2023
Supplemental Specifications	NONE

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
NH-4-052(104)137	44.468	44.468
Bridge Exception	0.028	
Bridge Exception	0.028	
Total	44.412	44.468





STATE COUNTY MAP

DESIGNER
Hunter Waslaski
DESIGNER
DESIGNER

ND DEPARTMENT OF TRANSPORTATION
MINOT DISTRICT ENGINEER
Korby Seward

MINOT DISTRICT
CHAD E. BEGGS
REGISTERED
PROFESSIONAL
PE-5436
12/18/23
ENGINEER
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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PLAN SECTIONS

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SPECIAL PROVISIONS

Number	Description
SSP 4	Longitudinal Joint Density
PSP 56(23)	Permits and Environmental Considerations
SP 282(23)	Railroad Requirements
SP 280(23)	E-Ticketing (Mandatory)
SP 314(23)	Flexible Pavement Surface Tolerance

LIST OF STANDARD DRAWINGS

Number	Description
D-101-1, 2,3,4	NDDOT Abbreviations
D-101-10	NDDOT Utility Company and Organization Abbreviations
D-101-20, 21	Line Styles
D-101-30, 31,32,33	Symbols
D-704-7	Breakaway Systems For Construction Zone Signs - Perforated Tube
D-704-8	Breakaway Systems For Construction Zone Signs - U-Channel Post
D-704-9	Construction Sign Details - Terminal And Guide Signs
D-704-10	Construction Sign Details - Regulatory Signs
D-704-11, 11A	Construction Sign Details - Warning Signs
D-704-13	Barricade And Channelizing Device Details
D-704-14	Construction Sign Punching And Mounting Details
D-704-15	Road Closure Layouts
D-704-20	Terminal And Seal Coat Sign Layouts
D-704-22	Construction Truck And Temporary Detour Layouts
D-704-26	Miscellaneous Sign Layouts
D-704-27	Mobile Operation (Pavement Marking)
D-704-33	Two-Lane Roadway Portable Rumble Strips
D-704-50	Portable Sign Support Assembly
D-704-56	Mobile Operation - Grinding Shoulder Rumble Strips
D-706-1	Bituminous Laboratory
D-754-10	Arrow Details for Lane Control and Arrow-Per-Lane Signs
D-754-23	Perforated Tube Assembly Details
D-754-24, 25	Mounting Details Perforated Tube
D-754-24A	Breakaway Coupler System For Perforated Tubes
D-754-27	Sign Punching, Stringer and Support Location Details Regulatory, Warning and Guide Signs
D-754-74	Sign Punching, Stringer and Support Location Details - Route Marker Signs
D-754-87	Sign Punching, Stringer And Support Location Details For Street Name Signs And 911 Signs
D-760-3	Rumble Strips Undivided Highways (Shoulders 4' Or Greater)
D-760-4	Rumble Strips Undivided Highways (Shoulders Less Than 4')
D-762-4	Pavement Marking
D-762-5	Pavement Marking for Standard 90 Degree Flared Intersection-(No Center Left Turn Lane on Major Road)
D-762-6	Pavement Marking for Standard 90 Degree Flared Intersection - (Center Left Turn Lane on Major Road)
D-762-11	Short-Term Pavement Marking
D-764-1	W-Beam Guardrail General Details
D-764-5	Sequential Kinking Terminal
D-764-6	Flared Energy Absorbing Terminal
D-764-10	Thrie Beam Transition To Double Box Beam Retrofit

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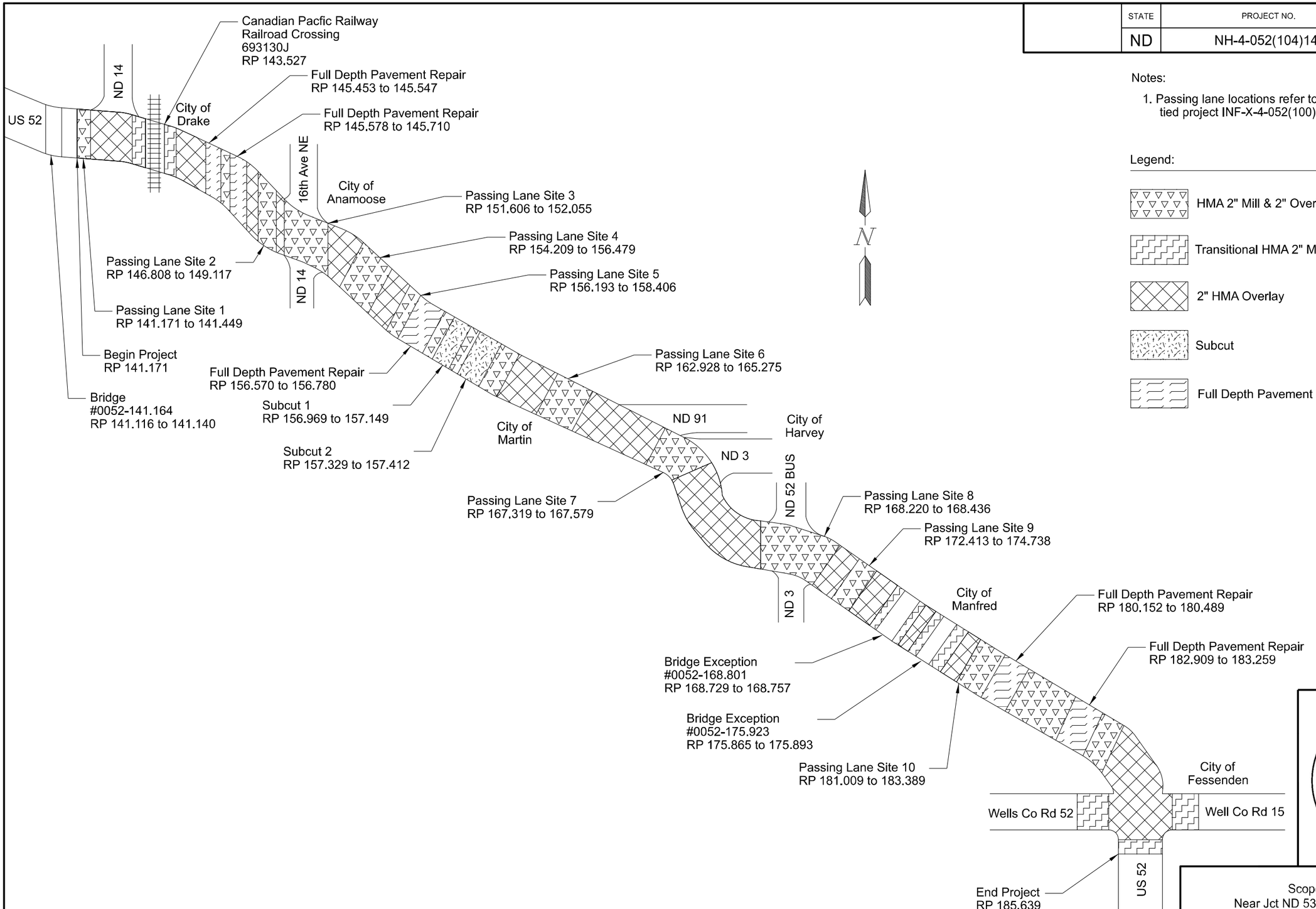
Notes:

1. Passing lane locations refer to tied project INF-X-4-052(100)140

Legend:

- HMA 2" Mill & 2" Overlay
- Transitional HMA 2" Mill & 2" Overlay
- 2" HMA Overlay
- Subcut
- Full Depth Pavement Repair



REGISTERED PROFESSIONAL ENGINEER
ERIC M. MERCK
PE-28798
DATE 12/15/23
NORTH DAKOTA

Scope of Work
Near Jct ND 53 to Near Fessenden
US 52

McHenry, Pierce, Sheridan & Wells County, ND

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 2024 construction season. This project is constructing passing lanes and turn lanes, INF-X-4-052(100)140; PCN 23150, along US 52.

107-P01 RAILROAD PROTECTIVE LIABILITY INSURANCE: This project crosses the Canadian Pacific Kansas City Railway at RP #693130J. The type of work that will be performed within the railroad right of way is HMA mill and overlay. Direct inquiries regarding protective liability insurance to:

BRIAN OSBORNE
Manager Public Works
Canadian Pacific Kansas City Railroad
120 South 6th Street, Suite 700,
Minneapolis, MN 55402
612-330-4555 off.
brian_osborne@cpkcr.ca

Obtain information regarding crossing number #693130J from the Federal Railroad Administration website: http://safetydata.fra.dot.gov/Officeofsafety/

107-P02 HAUL ROAD RESTORATION: Use Class 13 aggregate for haul road restoration. This material will be paid according to the PS-1 schedule.

108-100 WEEKLY PLANNING & REPORTING MEETING: A weekly planning and reporting meeting is required.

108-P01 MINOT AIR FORCE BASE NOTIFICATION: US 52 is a mission essential route that is used by the 91st Missile Wing for convoy operations and may affect construction activities including work stoppages while convoys pass through the project area. Coordinate with Minot Air Force Base (MAFB) representatives to attend the pre-construction conference and provide a project schedule a minimum of 1 month prior to construction. Keep MAFB representatives informed of scheduling changes and lane or road closures/width restrictions occurring during construction. Contact information for the MAFB is below:

Mrs. Michelle Beavers, GS-11, DAFC
Engineering Technician, Missile Engineering
5 CES/CFM
Minot AFB, ND
Comm: (701) 723-3998, dsn: 453-3998

Mission Essential route ends at RP 145.000 in the City of Drake.

202-P01 REMOVAL OF BITUMINOUS SURFACING: Removal of Bituminous Surfacing includes the removal of the existing bituminous pavement and the underlying aggregate base material.

230-P01 SHOULDER PREPARATION: Remove paragraphs 2 & 3 from the Standard Specification, 230.04 B "Shoulder Preparation."

401-P01 FOG SEAL: Apply fog seal after final rolling with a minimum mat temperature of 125 degrees. Apply fog seal at a rate of 0.05 Gal/SY. Dilute the fog seal at the supplier at a 50/50 ratio and allow fog seal to penetrate and dry before opening the roadway to traffic.

401-P02 PRIME COAT & BLOTTER MATERIAL: Apply prime coat or pave each subgrade repair and full depth pavement repair location within 48 hours of completing the repair. If the contractor elects to prime these areas, apply a double application of prime and blotter to each repair location. First application to include prime coat at 0.25 gallons per square yard and blotter material class 44 at 15 pounds per square yard. Second application to include prime coat at 0.15 gallons per square yard and blotter material class 44 at 12 pounds per square yard.

411-P01 MILLING PAVEMENT SURFACE: All millings are to become property of the Contractor. All costs for labor and equipment to mill, haul, and stockpile the material shall be included in the unit price bid for "Milling Pavement Surface."

411-P02 MILLING PAVEMENT SURFACE: Delamination areas appearing in the existing surface after completion of the proposed asphalt milling operations is required to be removed as directed by the Project Engineer. Payment for the additional removal will be paid for at the unit price bid for "Milling Pavement Surface".

430-100 HMA LONGITUDINAL JOINTS: Construct the joints within the final lift of pavement as detailed within this note.

Place a longitudinal joint at the centerline of the roadway.

Construct each lane and the adjoining shoulder using a single pass or a hot seam.

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

704-100 TRAFFIC CONTROL SUPERVISOR: Provide a Traffic Control Supervisor.

704-500 PORTABLE RUMBLE STRIPS (PRS): Use PRS made of rubber or engineered polymers.

Install PRS as part of the temporary traffic control when the following signs are also part of the required traffic control set up:

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

REGISTERED PROFESSIONAL ENGINEER
ERIC M MERCK
PE-28798
DATE 12/15/23
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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NOTES

Install PRS that meet the following criteria:

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

Use individual PRS constructed in one of the following manners:

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

An installed array of PRS consists of a minimum of 3 individual strips.

Move rumble strips with the flagging operation. Do not place rumble strips on horizontal curves.

The Engineer will count and measure each array as one unit. Include the cost of providing, installing, maintaining, and relocating PRS in the unit price bid for "Portable Rumble Strips".

704-P01 TRAFFIC CONTROL FOR BITUMINOUS PAVEMENT: Provide traffic control consisting of a temporary road closure, flagging, and a pilot car.

The maximum work zone length is limited to one days' production. One day's production is defined as the length of roadway that can be paved in a single day.

Traffic control device quantities are based on a 6-mile limitation and the list below.

1. Standard D-704-12;
2. Standard D-704-15, layout A;
3. Standard D-704-20, layout G – signing will be required at junctions:
   - US 52 & ND 14
   - US 52 & ND 3
   - US 52 & ND 91
   - US 52 & US 52 BUS
4. Standard D-704-22, layouts K and L; and
5. Standard D-704-26, layouts CC, EE, and GG.

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

- US 52 & ND 14 / 16th Ave NE
- US 52 & US 52 BUS / ND 3

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

The Department will pay for all necessary deployed devices.

704-P02 STACKABLE VERTICAL PANELS: Provide two molded rubber bases for each stackable vertical panel. Include the cost for the additional base in the unit price bid for "Stackable Vertical Panels".

704-P03 TRAFFIC CONTROL FOR SUBCUTS: Perform subgrade repairs on one half of the roadway while maintaining traffic on a single 14' minimum width lane with pilot car and flagging operations on the adjacent half. Resume two-way traffic by the end of the working day or continue to maintain one lane traffic with pilot car operations. Use a maximum longitudinal slope of 7% if carrying traffic. Public traffic is not allowed on the repair area until the base section is at finished grade. Use only low ground pressure construction equipment in the repair area until the first lift of material is placed.

Payment will only be made for flagging and pilot car while the contractor is actively working in the repair area. Do not exceed 15-minute wait time in flagging zones.

Remove bituminous surfacing, excavate material, install aggregate base to finished grade, and construct a 4:1 traversable wedge between the edge of the existing pavement and top of aggregate base prior to resuming two-way traffic.

704-P04 TRAFFIC CONTROL FOR GUARDRAIL REPLACEMENT: An additional 40 delineator drums have been included in the traffic control devices list to account for the guardrail removals and replacements at the Sheyenne River Bridge (RP 168.801) and James River Bridge (RP 175.923). Install temporary devices as specified in Section 764.04 A.2.

706-P01 BITUMINOUS LABORATORY: Supply a copy machine, with reduction capabilities, and toner. The payment for these items shall be included in the unit price bid for "Bituminous Laboratory".

706-P02 FIELD OFFICE: Provide a field office which meets the following requirements, subject to approval by the Engineer:

1. Be completely insulated and weather tight.
2. Minimum total area of 450 square feet.
3. Indoor bathroom facilities, sewer, and potable water.
4. Have a dependable source of electricity for power and lights with a minimum of 6 electrical outlets spaced

REGISTERED PROFESSIONAL ENGINEER
ERIC M MERCK
PE-28798
DATE 12/15/23
NORTH DAKOTA

NOTES

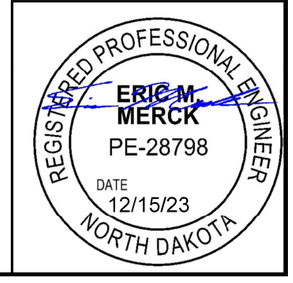
throughout the building and light fixtures spaced to uniformly light the interior (lumens required 110 foot-candles).

5. Be wired for DSL Broadband internet with wireless Wi-Fi and have the capability to allow for hard wiring the computer. Include the cost of installation and monthly fees.
6. A heating and cooling system that is capable of maintain the temperature between 65°F and 78°F year-round
7. A countertop microwave with a minimum interior space of 1.1 cu. ft.
8. A refrigerator with a minimum interior space of 18 cu. ft.
9. A minimum of 3 desks and 3 desk chairs, 3 extra chairs, a drawer file cabinet with at least two drawers, one table minimum of 2.5 ft x 5 ft.
10. Photocopy machine/Printer capable of 11x17 photocopies/prints and tone to last the duration of the project. Engineer will provide paper. Other features to include digital copying and scanning. (Fax capabilities can be included but not necessary).
11. The location of the field office will be on, or as close to the project as possible and approved by the Engineer. Any rental fees will be paid for by the Contractor.
12. Make the field office available for occupancy one week before the start of the project and remain through the project completion.
13. Heat, electric, internet service, sewer, and water hookups to be furnished by the Contractor, Contractor to pay utility bills.

Include the costs for the field office in the bid item "FIELD OFFICE" and the Schedule for Payment is as follows:

- 25% when set up on site.
- 50% when 30% of the work is complete.
- 75% when 60% of the work is complete.
- 100% when the 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.



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NOTES

SECTION 110

754-P01 REMOVE AND SALVAGE SIGNS: Remove the signs shown in Section 110 and deliver these signs to location shown.

City of Martin
Milton Hase
(701) 693-2230

City of Harvey
513 Irving Ave
Harvey, ND
(701) 324-2000
publicworks@harveynd.com

Include the costs to remove and deliver these signs in the price bid for “Steel Galv Posts-Telescoping Perforated Tube”.

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 12/05/23
NORTH DAKOTA

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-052(104)141	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
103	0100	CONTRACT BOND	L SUM	0.4	0.4
107	0100	RAILWAY PROTECTION INSURANCE	L SUM	0.4	0.4
107	0140	RAILROAD COORDINATION	L SUM	0.4	0.4
109	1000	E-TICKETING	L SUM	0.4	0.4
202	0135	REMOVAL OF BITUMINOUS SURFACING	TON	36,275	36,275
203	0138	COMMON EXCAVATION-SUBCUT	CY	3,604	3,604
203	0238	SUBCUT AGGREGATE	CY	6,758	6,758
230	0125	SHOULDER PREPARATION	MILE	73.777	73.777
302	0120	AGGREGATE BASE COURSE CL 5	TON	21,577	21,577
302	0356	AGGREGATE SURFACE COURSE CL 13	TON	692	692
401	0050	TACK COAT	GAL	103,096	103,096
401	0060	PRIME COAT	GAL	12,467	12,467
401	0070	FOG SEAL	GAL	44,796	44,796
401	0160	BLOTTER MATERIAL CL 44	TON	425	425
411	0100	MILLING PAVEMENT SURFACE	TON	24,931	24,931
430	0045	SUPERPAVE FAA 45	TON	123,878	123,878
430	1000	CORED SAMPLE	EA	705	705
430	5818	PG 58H-34 ASPHALT CEMENT	TON	7,444	7,444
624	3005	CONNECTION PLATE MODIFICATION	EA	8	8
702	0100	MOBILIZATION	L SUM	0.4	0.4
704	0100	FLAGGING	MHR	2,400	2,400
704	1000	TRAFFIC CONTROL SIGNS	UNIT	3,276	3,276
704	1048	PORTABLE RUMBLE STRIPS	EA	4	4
704	1060	DELINEATOR DRUMS	EA	40	40
704	1080	STACKABLE VERTICAL PANELS	EA	30	30
704	1185	PILOT CAR	HR	800	800
706	0400	FIELD OFFICE	EA	0.4	0.4
706	0500	AGGREGATE LABORATORY	EA	0.4	0.4
706	0550	BITUMINOUS LABORATORY	EA	0.4	0.4
706	0600	CONTRACTOR'S LABORATORY	EA	0.4	0.4
709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	31,164	31,164
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	5.2	5.2
754	0112	FLAT SHEET FOR SIGNS-TYPE IV REFL SHEETING	SF	16.8	16.8

ESTIMATE NUMBER: 23731 ESTIMATE TYPE: FINAL FINALIZED: Y RUN DATE: 12/19/2023 TIME: 14:55:05

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	103.9	103.9
754	0592	RESET SIGN PANEL	EA	3	3
760	0025	SINUSOIDAL RUMBLE STRIP - ASPHALT SHOULDER	MILE	67.8	67.8
760	0027	SINUSOIDAL RUMBLE STRIP - ASPHALT CENTERLINE	MILE	44.412	44.412
762	0112	EPOXY PVMT MK MESSAGE	SF	265	265
762	0114	EPOXY PVMT MK 6IN LINE	LF	416,458	416,458
762	0432	SHORT TERM 6IN LINE-TYPE NR	LF	214,840	214,840
764	0131	W-BEAM GUARDRAIL	LF	515.6	515.6
764	0145	W-BEAM GUARDRAIL END TERMINAL	EA	8	8
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS	LF	965.2	965.2
764	1050	RESET W-BEAM GUARDRAIL	LF	400	400
764	2081	REMOVE END TREATMENT & TRANSITION	EA	8	8

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

		Typical Section 1 (7.987 Miles) RP 141.171 to 141.346 RP 141.396 to 141.449 RP 146.808 to 148.951 RP 148.951 to 149.117 RP 151.616 to 151.765 RP 151.924 to 152.055 RP 156.193 to 156.479 RP 162.928 to 165.275 RP 168.220 to 168.394 RP 168.408 to 168.446 RP 172.413 to 174.738		Typical Section 2 (0.050 Miles) RP 141.346 to 141.396		Typical Section 3 (3.386 Miles) RP 141.449 to 144.703 RP 144.975 to 145.107		Typical Section 5 (12.333 Miles) RP 145.107 to 145.453 RP 145.547 to 145.578 RP 145.710 to 146.808 RP 149.117 to 151.606 RP 152.055 to 154.209 RP 158.406 to 158.624 RP 158.845 to 162.928 RP 165.275 to 167.189		Typical Section 6 (10.979 Miles) RP 167.934 to 168.220 RP 168.504 to 168.729 RP 168.757 to 169.691 RP 170.480 to 171.988 RP 172.335 to 172.413 RP 174.738 to 175.865 RP 175.893 to 180.152 RP 180.489 to 181.009 RP 183.389 to 185.431		Typical Section 7 (0.035 Miles) RP 151.606 to 151.616 RP 151.765 to 151.790		Typical Section 11,12 (3.448 Miles) RP 154.209 to 156.193 RP 156.479 to 156.580 RP 156.780 to 156.969 RP 157.149 to 157.329 RP 157.412 to 158.406	
		Area: 4.00 SF		Area: 4.83 SF		Area: 5.67 SF		Area: 7.09 SF		Area: 7.59 SF		Area: 5.22 SF		Area: 5.13 SF	
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 Mile**	**Width (ft)**	**Quantity per Mile**	**Width (ft)**	**Quantity per Mile**
Superpave FAA 45	Ton	24	1,564	30	1,889	36	2,218	45	2,773	40	2,969	32.7	2,042	31.6	2,006
Tack Coat @ 0.10 Gal/SY	Gal.	24	1,408	30	1,760	36	2,112	45	2,640	40	2,347	32.7	1,918	31.6	1,854
Fog Coat @ 0.05 Gal/SY	Gal.	24	704	28	822	32	939	40	1,174	36	1,056	30	880	30	880
PG 58H-34 Asphalt Cement @ 6.0%	Ton	-	94	-	114	-	133	-	167	-	178	-	123	-	120
Aggregate Surface Course CL 13	Ton	-	-	-	-	-	-	-	-	-	-	-	-	-	-

		Typical Section 13 (0.221 Miles) RP 158.624 to 158.845		Typical Section 14 (0.745 Miles) RP 167.189 to 167.934		Typical Section 15, 16 (2.102 Miles) RP 168.394 to 168.408 RP 168.446 to 168.504 RP 181.009 to 182.909 RP 183.259 to 183.389	
		Area: 7.25 SF		Area: 8.47 SF		Area: 4.18 SF	
Material	**Unit**	**Width (ft)**	**Quantity per Mile**	**Width (ft)**	**Quantity per Mile**	**Width (ft)**	**Quantity per Mile**
Superpave FAA 45	Ton	46	2,836	53.6	3,313	26	1,635
Tack Coat @ 0.10 Gal/SY	Gal.	46	2,699	53.6	3,145	26	1,525
Fog Coat @ 0.05 Gal/SY	Gal.	41	1,203	52	1,525	24	704
PG 58H-34 Asphalt Cement @ 6.0%	Ton	-	170	-	199	-	98
Aggregate Surface Course CL 13	Ton	-	-	-	-	-	-

REGISTERED PROFESSIONAL ENGINEER
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PE-28798
DATE 12/18/23
NORTH DAKOTA

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

Material	Unit	Full Depth Pavement Repair 1 (0.094 Miles) RP 145.453 to 145.547		Full Depth Pavement Repair 2 (0.132 Miles) RP 145.578 to 145.710		Full Depth Pavement Repair 3 (0.200 Miles) RP 156.580 to 156.780		Full Depth Pavement Repair 4 (0.337 Miles) RP 180.152 to 180.489		Full Depth Pavement Repair 5 (0.350 Miles) RP 182.909 to 183.259	
		Width (ft)	Quantity	Width (ft)	Quantity	Width (ft)	Quantity	Width (ft)	Quantity	Width (ft)	Quantity
Superpave FAA 45	Ton	45	1,172	45	1,646	39.6	1,742	40	5,427	31.8	2,755
Prime Coat @ 0.40 Gal/SY	Gal.	45	993	45	1,394	39.6	1,859	40	3,164	31.8	2,612
Blotter Material Class 44 @ 27 Lbs/SY	Ton	45	34	45	48	39.6	63	40	107	31.8	89
Tack Coat @ 0.10 Gal/SY	Gal.	45	497	45	697	39.6	465	40	2,373	31.8	1,306
Fog Coat @ 0.05 Gal/SY	Gal.	40	111	40	155	36	212	36	356	28	288
PG 58H-34 Asphalt Cement @ 6.0%	Ton	-	71	-	99	-	105	-	326	-	166
Aggregate Surface Course CL 13	Ton	-	-	-	-	-	-	-	-	-	-
Aggregate Base Course CL 5	Ton	-	2,128	-	2,988	-	3,378	-	3,708	-	4,921
Subgrade Aggregate	Ton	-	-	-	-	-	-	-	-	-	-
Removal of Bituminous Surfacing	Ton	-	3,040	-	4,268	-	5,120	-	8,134	-	7,676
Geosynthetic Material Type G	SY	45	2,482	45	3,098	39.6	4,647	40	7,909	31.8	6,530

Material	Unit	Subcut 1 (0.180 Miles) RP 156.969 to 157.149		Subcut 2 (0.083 Miles) RP 157.329 to 157.412		Turn Lane Typical Sections 4,8,9 10,17,18	Approaches See Sec. 20 - Sheet 1	Sheyenne River Bridge RP 168.801	James River Bridge RP 175.923	Totals (Units)
		Width (ft)	Quantity	Width (ft)	Quantity					
Superpave FAA 45	Ton	39.6	1,568	39.6	723	5,915	2,416	51	51	123,878
Prime Coat @ 0.40 Gal/SY	Gal.	39.6	1,673	39.6	772	-	-	-	-	12,467
Blotter Material Class 44 @ 27 Lbs/SY	Ton	39.6	57	39.6	27	-	-	-	-	425
Tack Coat @ 0.10 Gal/SY	Gal.	39.6	419	39.6	193	5,458	2,174	49	49	103,096
Fog Coat @ 0.05 Gal/SY	Gal.	36	191	36	88	2,532	-	-	-	44,796
PG 58H-34 Asphalt Cement @ 6.0%	Ton	-	95	-	44	355	146	3	3	7,444
Aggregate Surface Course CL 13	Ton	-	-	-	-	-	332	180	180	692
Aggregate Base Course CL 5	Ton	-	3,048	-	1,406	-	-	-	-	21,577
Subgrade Aggregate	Ton	-	4,787	-	1,971	-	-	-	-	6,758
Common Excavation - Subcut	CY	-	2,553	-	1,051	-	-	-	-	3,604
Removal of Bituminous Surfacing	Ton	-	4,616	-	2,129	-	-	646	646	36,275
Geosynthetic Material Type G	SY	39.6	4,182	39.6	1,929	-	-	-	-	31,164

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ND	NH-4-052(104)141	10	3

BASIS OF ESTIMATE

Milling Pavement Surface					
Location		(A)	(B)	(C) = (A x B)/9	(D) = C x Depth
Begin RP	End RP	Milling Length (ft)	Milling Width (ft)	Total (SY)	Total (Tons)
141.171	141.346	924	24	2,464	274
141.346	141.396	264	30	880	98
141.396	141.449	280	24	747	83
141.449	141.468	100*	36	400	23
143.508	143.527	100*	36	400	23
143.527	143.546	100*	36	400	23
145.434	145.453	100	40	445	50
145.547	145.578	164	40	729	81
145.710	145.729	100	40	445	50
146.789	146.808	100*	40	445	25
146.808	149.117	12,192	24	32,512	3,613
149.117	149.136	100*	40	445	25
151.587	151.606	100*	40	445	25
151.606	151.616	53	32.7	193	22
151.616	151.765	787	24	2,099	234
151.765	151.790	132	32.7	480	54
151.790	151.814	259	Varies	292	33
151.814	151.896	433	Varies	3,464	385
151.896	151.924	148	Varies	670	75
151.924	152.055	692	24	1,846	206
152.055	152.074	100*	40	445	25
154.190	154.209	100*	40	445	25
154.209	156.193	12,466	31.6	43,770	4864

***Transitional Taper**

Milling Pavement Surface					
Location		(A)	(B)	(C) = (A x B)/9	(D) = C x Depth
Begin RP	End RP	Milling Length (ft)	Milling Width (ft)	Total (SY)	Total (Tons)
156.193	156.479	1,510	24	4,027	448
156.479	156.580	533	31.6	1,872	208
156.780	156.969	998	31.6	3,504	390
157.149	157.329	951	31.6	3,339	371
157.412	158.406	5,249	31.6	18,430	2,048
158.406	158.425	100*	40	445	25
162.909	162.928	100*	40	445	25
162.928	165.275	12,393	24	33,048	3,672
165.275	165.294	100*	40	445	25
167.300	167.319	100*	40	445	25
167.468	167.543	396	51.6	2,271	253
167.579	167.598	100*	40	445	25
168.201	168.220	100*	28	312	18
168.220	168.394	919	24	2,451	273
168.394	168.408	78	26	226	26
168.408	168.446	201	24	536	60
168.446	168.504	307	26	887	99
168.504	168.523	100*	28	312	18
168.710	168.729	100*	28	312	18
168.757	168.776	100*	28	312	18

***Transitional Taper**

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-052(104)141	10	4

BASIS OF ESTIMATE

Milling Pavement Surface					
Location		(A)	(B)	(C) = (A x B)/9	(D) = C x Depth
Begin RP	End RP	Milling Length (ft)	Milling Width (ft)	Total (SY)	Total (Tons)
172.394	172.413	100*	28	312	18
172.413	174.738	12,377	24	33,006	3,668
174.738	174.757	100*	28	312	18
175.846	175.865	100*	28	312	18
175.893	175.912	100*	28	312	18
180.133	180.152	100	28	312	35
180.489	180.508	100	28	312	35
180.990	181.009	100*	28	312	18
181.009	182.909	10,032	26	28,982	3,221
183.259	183.389	687	26	1,985	221
183.389	183.408	100*	28	312	18
185.620	185.639	100*	48	534	30
Wells Co Rd 15	US 52	100*	28	312	18
Wells Co Rd 52	US 52	100*	24	267	15
*Transitional Taper			Total	236,107	27,701

HMA Cored Samples							
	A	B		C			
Specification Section	Distance (Ft)÷1000	Lanes	Joints	Lifts	Quantity (A x B x C)	Quantity (1 per mile)	Unit
430.04 I.2.b(1), "General"	235	2	N/A	1	470	N/A	EA
SSP 4 Longitudinal Joint Density in HMA Pavements (Centerline)	235	N/A	1	1	235	N/A	EA
				Total	705	0	EA

Rumble Strips - Sinusoidal		
Pay Quantity	Centerline	Edge Line
Miles	44.412	67.800

Estimated Milled Material Quantity		
Area(SY)	Depth(Inches)	Total(Tons)*
226,224	2	25,150
9,883	1**	562
Less 10% for losses		2,770
TOTAL		24,931

*2.00 Ton/CY
**Transitional Taper

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-052(104)141	10	5

BASIS OF ESTIMATE

Pavement Markings: NH-4-052(104)141					
Spec	Code	Bid Item	Basis	Permanent	Temporary
762	0112	EPOXY PVMT MK MESSAGE	Railroad Crossing (SF) RP 143.527	265	---
762	0432	SHORT TERM 6IN LINE – TYPE NR	Centerline Skips 1,320 LF/mile (LF) Centerline Barrier Stripe (LF)	---	214,840*
762	1104	EPOXY PVMT MK 6IN LINE	Centerline Skips 1,320 LF/mile (LF)	32,692	---
762	1104	EPOXY PVMT MK 6IN LINE	Centerline Barrier Stripe (LF)	74,734	---
762	1104	EPOXY PVMT MK 6IN LINE	Lt & Rt Edgeline 10,560 LF/mile (LF)	309,032	---

*Allows for application after seal and after fog

Pavement Markings: NH-4-052(104)141			
Begin RP	End RP	6IN Yellow Centerline	
		Westbound Lane	Eastbound Lane
141.449	141.587	Barrier Stripe	Skips
141.587	142.077	Skips	
142.077	142.159	Skips	Barrier Stripe
142.159	142.255	Barrier Stripe	Skips
142.255	142.506	Skips	
142.506	142.639	Skips	Barrier Stripe
142.639	142.707	Skips	
142.707	142.862	Barrier Stripe	Skips
142.862	142.954	Skips	
142.954	143.022	Skips	Barrier Stripe
143.022	143.192	Skips	
143.192	143.267	Barrier Stripe	Skips
143.267	143.340	Skips	
143.340	143.521	Skips	Barrier Stripe
143.533	143.703	Barrier Stripe	Skips
143.703	144.588	Skips	
144.588	144.633	Barrier Stripe	Barrier Stripe
144.655	144.672	Barrier Stripe	Barrier Stripe
144.680	144.703	Barrier Stripe	Barrier Stripe
144.703	144.790	Double Barrier Stripe	Double Barrier Stripe
144.790	144.887	Double Barrier Stripe	
144.905	144.975	Double Barrier Stripe	Double Barrier Stripe
144.975	144.997	Barrier Stripe	Barrier Stripe
144.997	145.047	Barrier Stripe	Skips

Pavement Markings: NH-4-052(104)141			
Begin RP	End RP	6IN Yellow Centerline	
		Westbound Lane	Eastbound Lane
145.047	146.796	Skips	
146.796	146.808	Barrier Stripe	Barrier Stripe
149.117	149.224	Barrier Stripe	Barrier Stripe
149.224	151.606	Skips	
152.055	153.265	Skips	
153.265	153.492	Skips	Barrier Stripe
153.492	153.618	Skips	
153.618	153.775	Barrier Stripe	Skips
153.775	153.955	Skips	Barrier Stripe
153.955	154.064	Skips	
154.102	154.209	Barrier Stripe	Barrier Stripe
158.406	158.418	Barrier Stripe	Barrier Stripe
158.418	158.603	Barrier Stripe	Barrier Stripe
158.614	158.677	Barrier Stripe	Barrier Stripe
158.692	158.709	Barrier Stripe	Barrier Stripe
158.719	158.756	Barrier Stripe	Barrier Stripe
158.761	158.813	Barrier Stripe	Barrier Stripe
158.850	158.960	Barrier Stripe	Barrier Stripe
158.960	162.821	Skips	
162.821	162.928	Barrier Stripe	Barrier Stripe
165.275	165.382	Barrier Stripe	Barrier Stripe
165.382	167.178	Skips	
167.178	167.254	Double Barrier Stripe	Double Barrier Stripe
167.693	167.793	Double Barrier Stripe	Double Barrier Stripe
167.793	167.849	Double Barrier Stripe	
167.864	167.934	Double Barrier Stripe	Double Barrier Stripe
167.934	168.115	Barrier Stripe	Skips
168.115	168.220	Skips	
168.436	168.503	Skips	Barrier Stripe
168.503	168.517	Barrier Stripe	Barrier Stripe
168.517	168.671	Barrier Stripe	Skips

REGISTERED PROFESSIONAL ENGINEER
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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-052(104)141	10	6

BASIS OF ESTIMATE

Pavement Markings: NH-4-052(104)141			
Begin RP	End RP	6IN Yellow Centerline	
		Westbound Lane	Eastbound Lane
168.671	168.848	Barrier Stripe	Barrier Stripe
168.848	168.958	Skips	Barrier Stripe
168.958	169.231	Barrier Stripe	Skips
169.231	169.654	Skips	
169.654	169.686	Barrier Stripe	Barrier Stripe
169.686	169.852	Double Barrier Stripe	Double Barrier Stripe
169.852	169.972	Double Barrier Stripe	
169.998	170.135		Double Barrier Stripe
170.135	170.488	Double Barrier Stripe	Double Barrier Stripe
170.488	171.982	Skips	
171.982	172.113	Double Barrier Stripe	Double Barrier Stripe
172.113	172.174	Double Barrier Stripe	
172.199	172.340	Double Barrier Stripe	Double Barrier Stripe
172.340	172.355	Skips	
172.355	172.413	Barrier Stripe	Barrier Stripe
174.738	174.796	Barrier Stripe	Barrier Stripe
174.796	175.795	Barrier Stripe	Barrier Stripe
175.795	175.951	Barrier Stripe	Barrier Stripe
175.951	180.951	Skips	
180.951	181.009	Barrier Stripe	Barrier Stripe
183.389	183.449	Barrier Stripe	Barrier Stripe
183.449	185.406	Skips	
185.406	185.431	Barrier Stripe	Barrier Stripe
185.431	185.525	Double Barrier Stripe	Double Barrier Stripe
185.525	185.584	Double Barrier Stripe	
185.609	185.639	Double Barrier Stripe	Double Barrier Stripe

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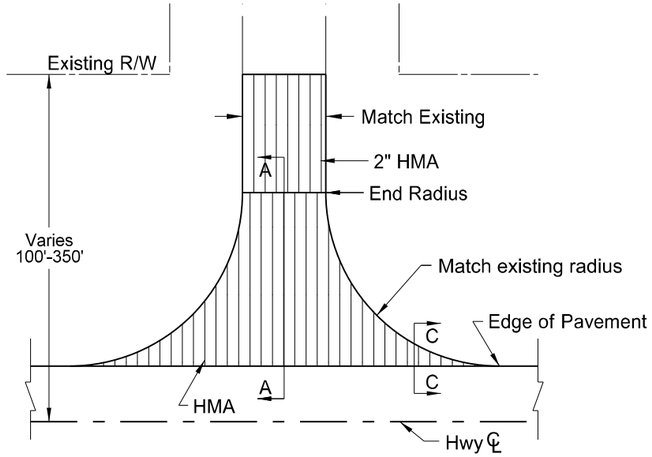
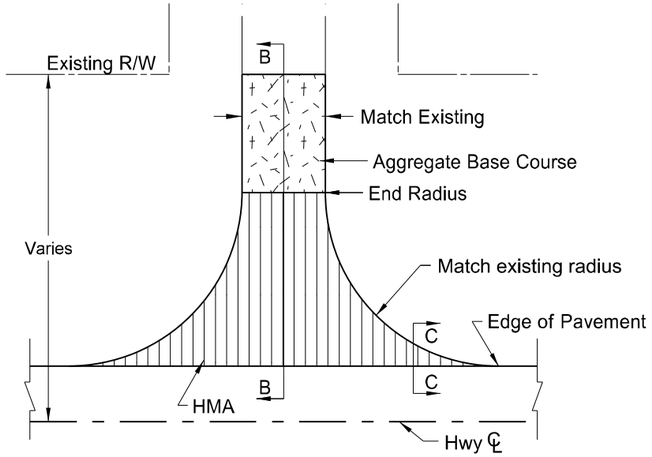
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	20	1



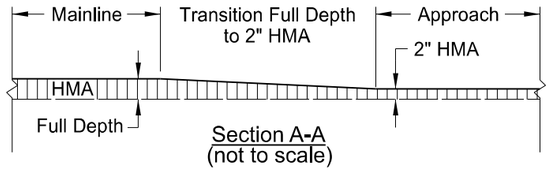
(1) Paved Section Line, County Road, or Street Approach



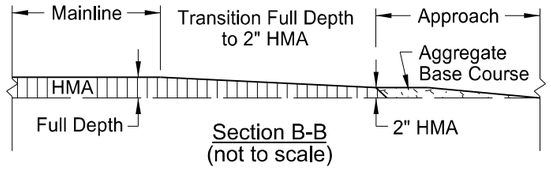
(2) Gravel Section Line, County Road, or Street Approach

Notes:

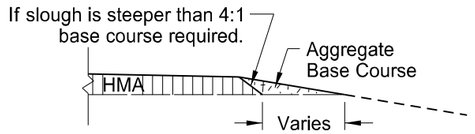
1. Actual HMA paving and aggregate base course locations may vary in the field, as approved by the Engineer.
2. Quantity totals have been included in the bid items of the "Estimate of Quantities" of the plans.
3. Aggregate base course has been provided in the quantities to fill in around the radii. This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



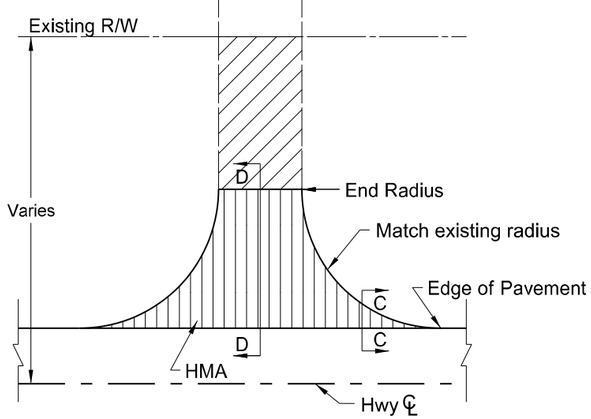
Section A-A
(not to scale)



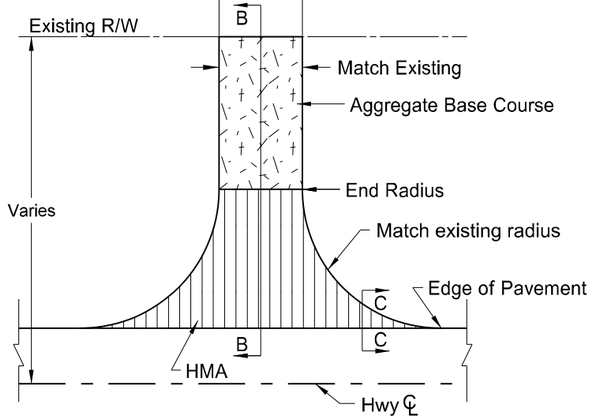
Section B-B
(not to scale)



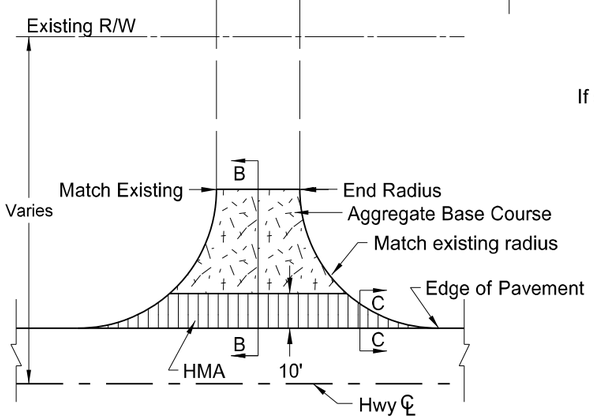
Section C-C
(not to scale)



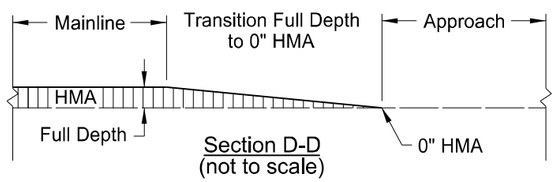
(3) Paved Private Drive Approach



(4) Gravel Private Drive Approach



(5) Field Drive Approach



Section D-D
(not to scale)

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	#	19	47	8	41	78	193
Aggregate Base Course CL 13	TON	N/A	94	N/A	82	156	332
Tack Coat @ 0.10 Gal/SY	GAL	790	611	88	451	234	2,174
Superpave FAA 45	TON	878	679	98	501	260	2,416
PG 58H-34 Asphalt Cement	TON	53	41	6	30	16	146

REGISTERED PROFESSIONAL ENGINEER
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DATE 12/18/23
NORTH DAKOTA

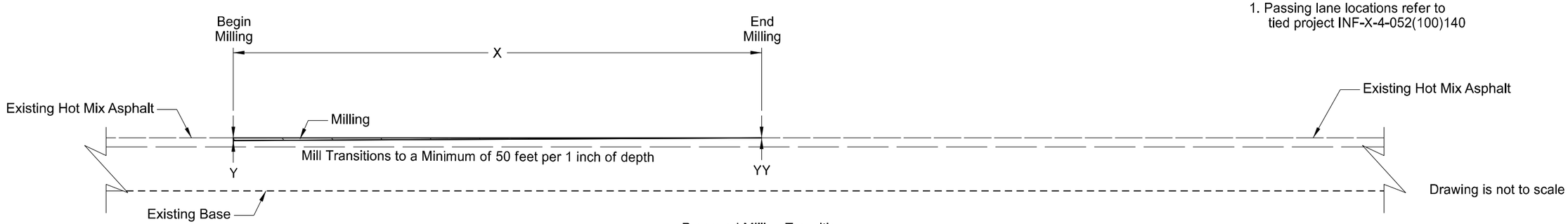
Approach Paving Details for
Existing Rural Approaches
Near Jct ND 53 to Near Fessenden
US 52

McHenry, Pierce, Sheridan & Wells County, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	20	2

Notes:

1. Passing lane locations refer to tied project INF-X-4-052(100)140



Proposed Milling Transition

Milling Transitions

Location	X	Begin Milling Station	Y	YY	End Milling Station	Mill (SY)
End Passing Lane Site 1	100 ft	RP 141.449	2 in	0 in	RP 141.468	400
RR	100 ft	RP 143.508	0 in	2 in	RP 143.527	400
RR	100 ft	RP 143.527	2 in	0 in	RP 143.546	400
Begin Passing Lane Site 2	100 ft	RP 146.789	0 in	2 in	RP 146.808	445
End Passing Lane Site 2	100 ft	RP 149.117	2 in	0 in	RP 149.136	445
Begin Passing Lane Site 3	100 ft	RP 151.587	0 in	2 in	RP 151.606	445
End Passing Lane Site 3	100 ft	RP 152.055	2 in	0 in	RP 152.074	445
Begin Passing Lane Site 4	100 ft	RP 154.190	0 in	2 in	RP 154.209	445
End Passing Lane Site 5	100 ft	RP 158.406	2 in	0 in	RP 158.425	445
Begin Passing Lane Site 6	100 ft	RP 162.909	0 in	2 in	RP 162.928	445
End Passing Lane Site 6	100 ft	RP 165.275	2 in	0 in	RP 165.294	445
Begin Passing Lane Site 7	100 ft	RP 167.300	0 in	2 in	RP 167.319	445
End Passing Lane Site 7	100 ft	RP 167.579	2 in	0 in	RP 167.598	445
Begin Passing Lane Site 8	100 ft	RP 168.201	0 in	2 in	RP 168.220	312
End Passing Lane Site 8	100 ft	RP 168.504	2 in	0 in	RP 168.523	312
Bridge	100 ft	RP 168.710	0 in	2 in	RP 168.729	312
Bridge	100 ft	RP 168.757	2 in	0 in	RP 168.776	312
Begin Passing Lane Site 9	100 ft	RP 172.394	0 in	2 in	RP 172.413	312
End Passing Lane Site 9	100 ft	RP 174.738	2 in	0 in	RP 174.757	312
Bridge	100 ft	RP 175.846	0 in	2 in	RP 175.865	312
Bridge	100 ft	RP 175.893	2 in	0 in	RP 175.912	312
Begin Passing Lane Site 10	100 ft	RP 180.990	0 in	2 in	RP 181.009	312
End Passing Lane Site 10	100 ft	RP 183.389	2 in	0 in	RP 183.408	312
End of Project	100 ft	RP 185.620	0 in	2 in	RP 185.639	312

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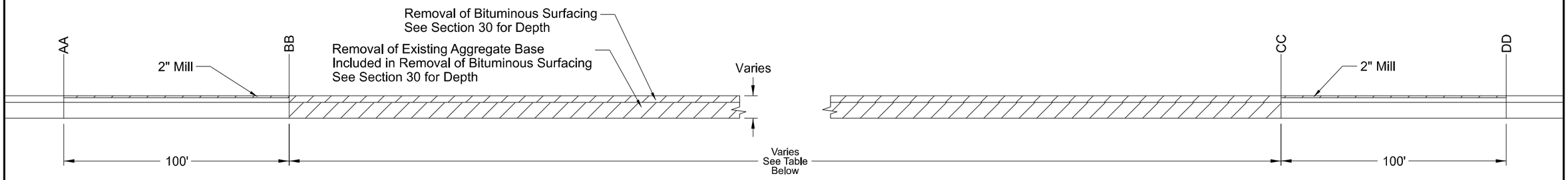
Milling Transitions
Near Jct ND 53 to Near Fessenden
US 52

McHenry, Pierce, Sheridan & Wells County, ND

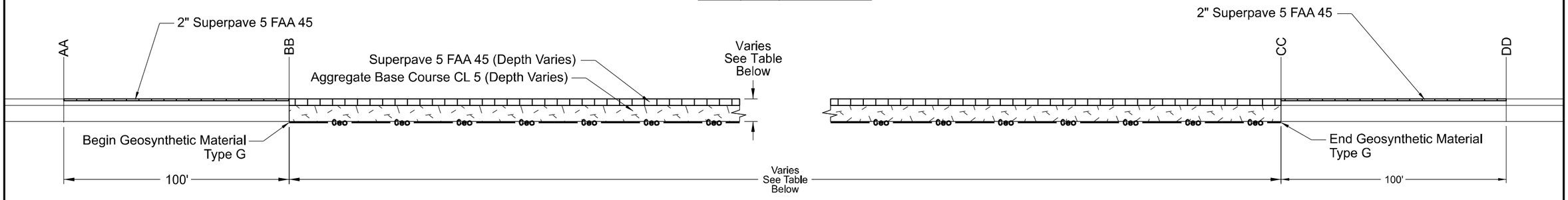
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	20	3

Notes:

1. At Location 4, place 7 inches of Aggregate Base Course CL 5 over top of Geosynthetic Material Type G prior to compacting.
2. Minimum thickness of top lift Superpave FAA 45 = 2 inches
3. Do not scarify the bottom of the full depth pavement repair.



Full Depth Repair Profile View



Proposed Full Depth Repair Profile View

Full Depth Pavement Repair Locations

Location	AA	BB	CC	DD	Depth: CL 5	Depth: FAA 45	Length (LF)
Location 1	RP 145.434	RP 145.453	RP 145.547	RP 145.559	17"	9"	500
Location 2	RP 145.559	RP 145.578	RP 145.710	RP 145.729	17"	9"	700
Location 3	RP 156.551	RP 156.580	RP 156.780	RP 156.799	7"	5"	1,110
Location 4	RP 180.133	RP 180.152	RP 180.489	RP 180.508	9"	12"	1,780
Location 5	RP 182.890	RP 182.909	RP 183.259	RP 183.278	15"	8"	1,850

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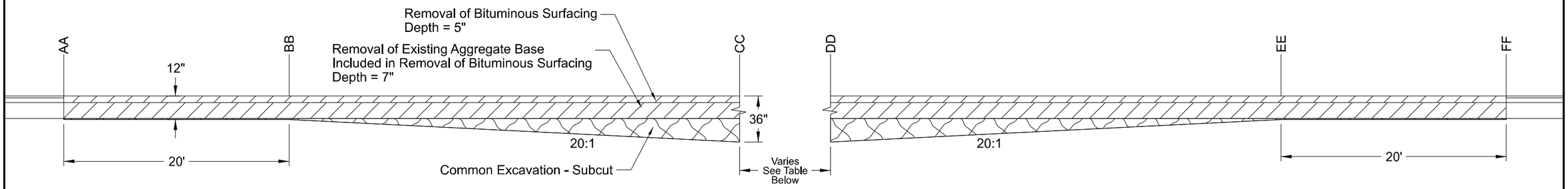
Full Depth Pavement Repair Details
Near Jct ND 53 to Near Fessenden
US 52

McHenry, Pierce, Sheridan & Wells County, ND

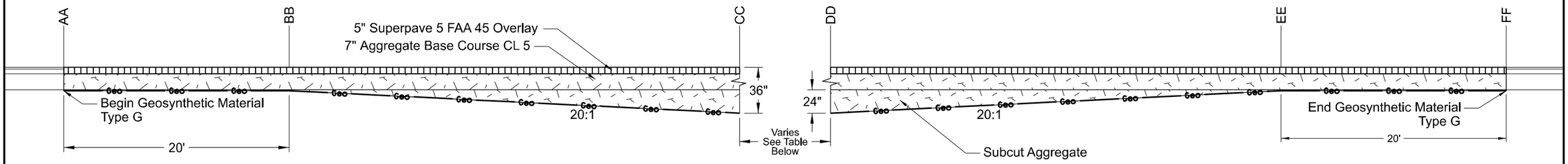
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	20	4

Notes:

1. Minimum thickness of top lift Superpave FAA 45 = 2 inches



Subcut Removal Profile View



Proposed Subcut Profile View

Subcut Locations

Location	AA	BB	CC	DD	EE	FF	Length (LF)
Subcut 1	RP 156.969	RP 156.973	RP 156.981	RP 157.133	RP 157.145	RP 157.149	800
Subcut 2	RP 157.329	RP 157.333	RP 157.341	RP 157.400	RP 157.408	RP 157.412	310

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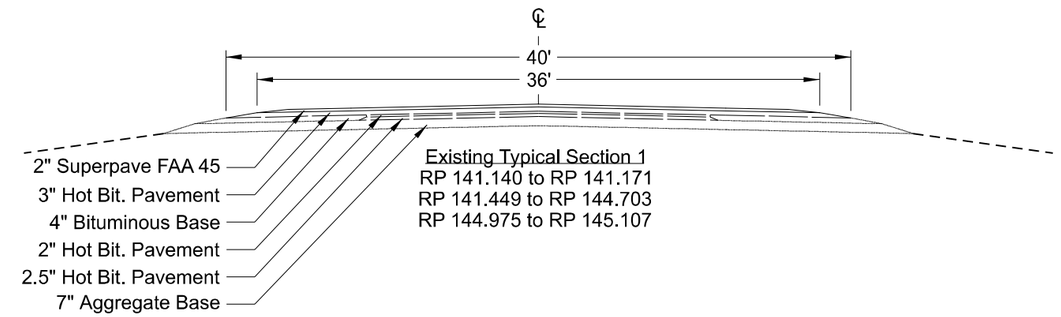
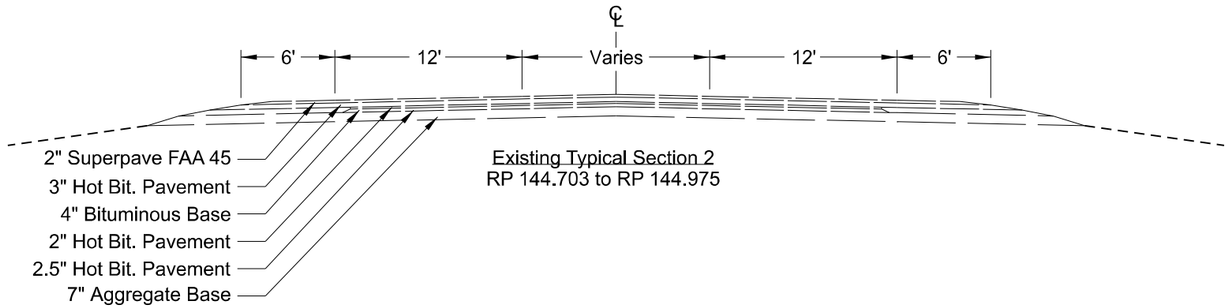
Subcut Details
Near Jct ND 53 to Near Fessenden
US 52

McHenry, Pierce, Sheridan & Wells County, ND

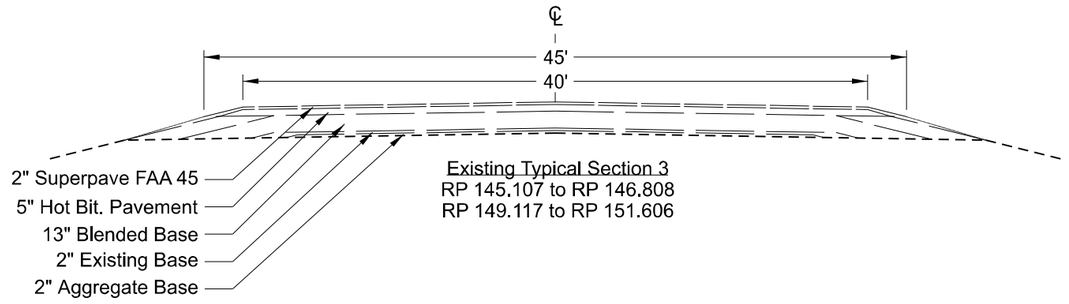
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	30	1



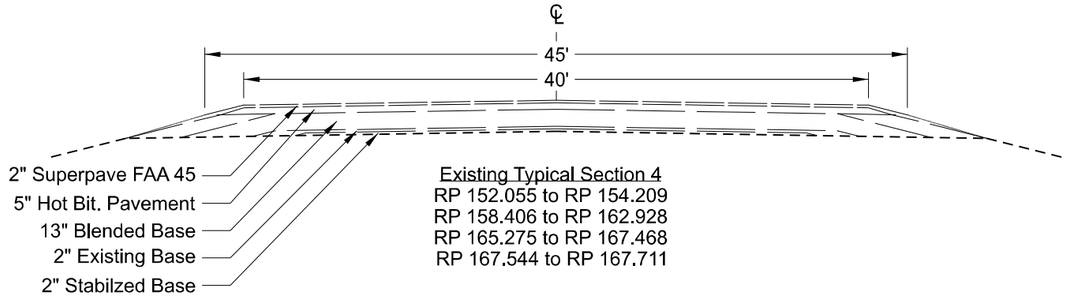
Existing Typical Section 1
RP 141.140 to RP 141.171
RP 141.449 to RP 144.703
RP 144.975 to RP 145.107



Existing Typical Section 2
RP 144.703 to RP 144.975



Existing Typical Section 3
RP 145.107 to RP 146.808
RP 149.117 to RP 151.606



Existing Typical Section 4
RP 152.055 to RP 154.209
RP 158.406 to RP 162.928
RP 165.275 to RP 167.468
RP 167.544 to RP 167.711

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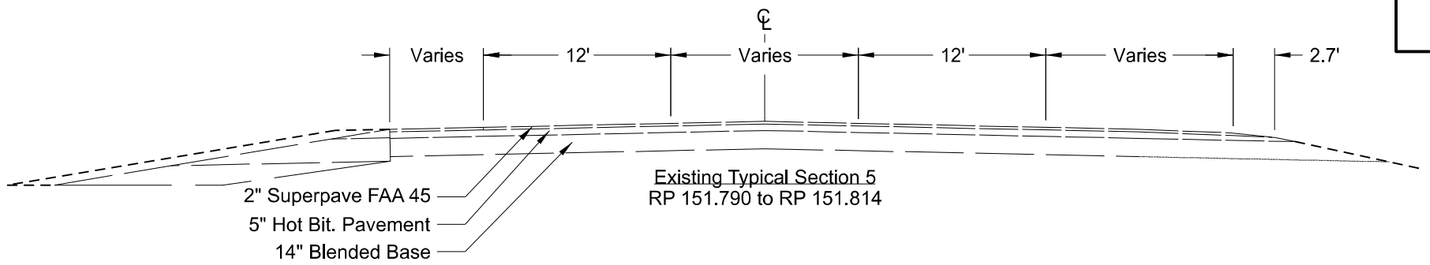
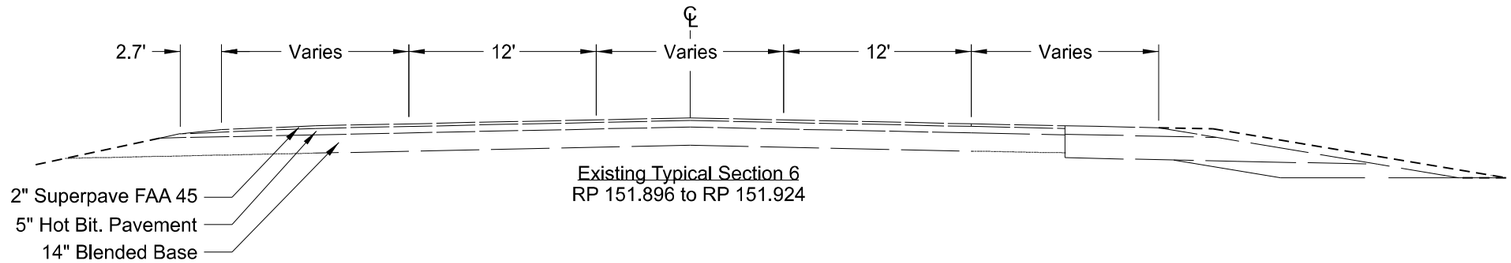
McHenry, Pierce, Sheriden & Wells County, ND

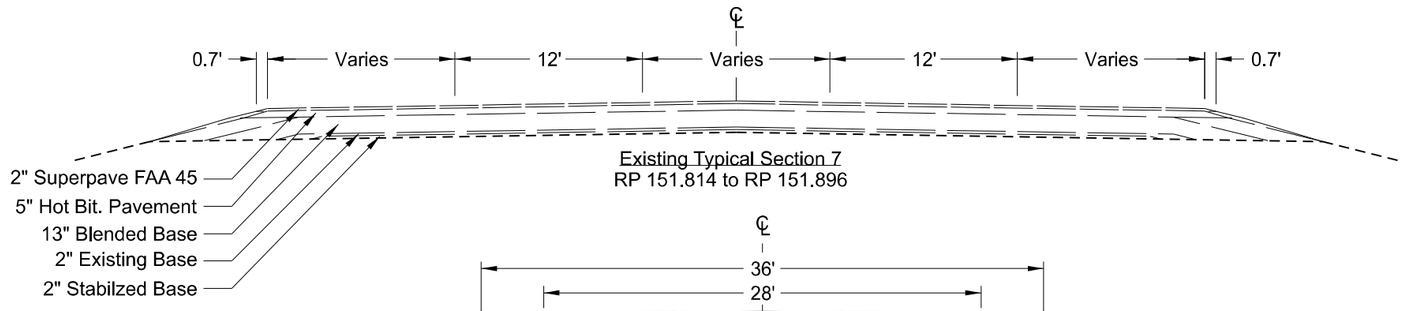
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	30	2



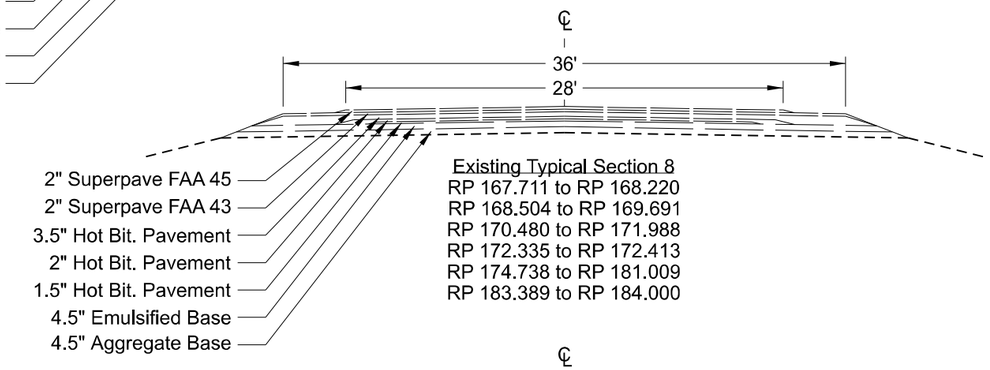
Existing Typical Section 5
RP 151.790 to RP 151.814



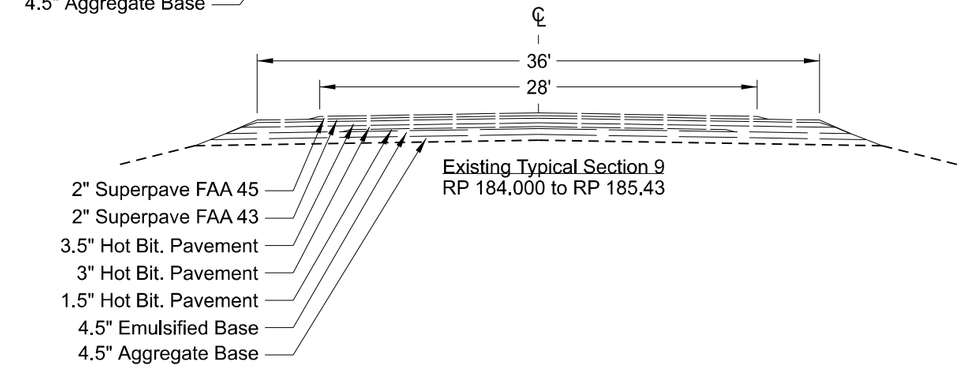
Existing Typical Section 6
RP 151.896 to RP 151.924



Existing Typical Section 7
RP 151.814 to RP 151.896



Existing Typical Section 8
RP 167.711 to RP 168.220
RP 168.504 to RP 169.691
RP 170.480 to RP 171.988
RP 172.335 to RP 172.413
RP 174.738 to RP 181.009
RP 183.389 to RP 184.000



Existing Typical Section 9
RP 184.000 to RP 185.43

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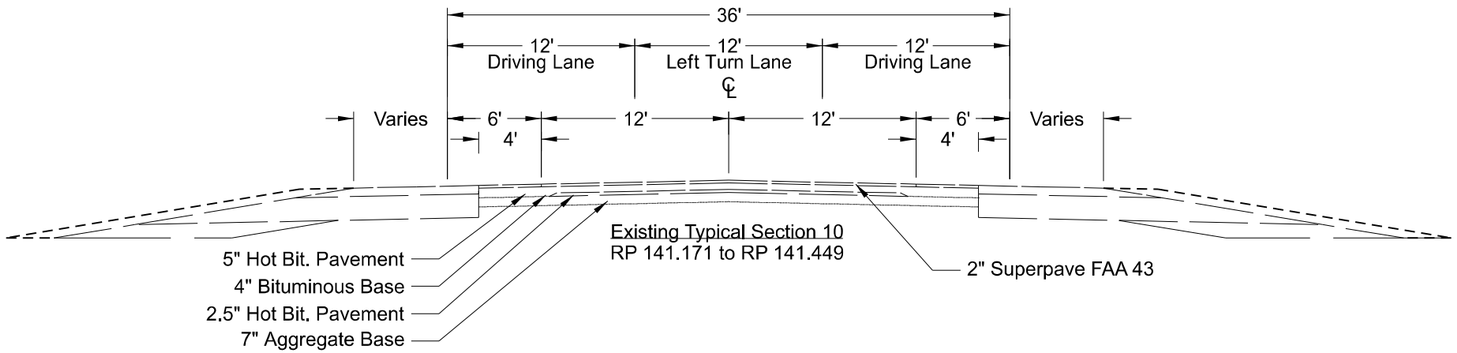
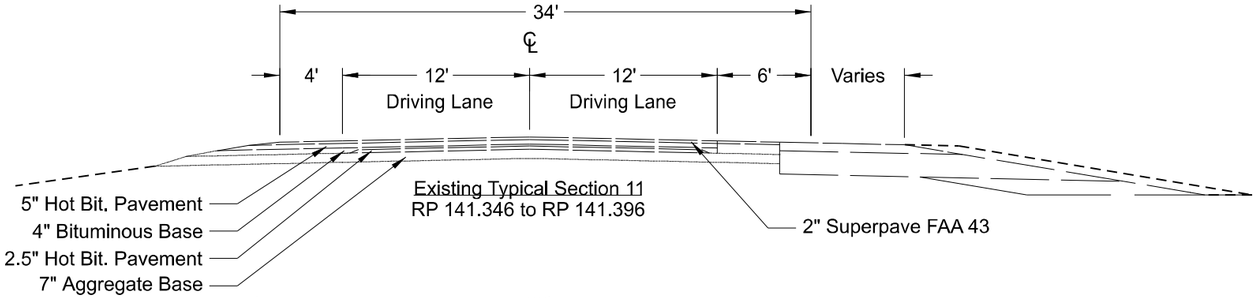
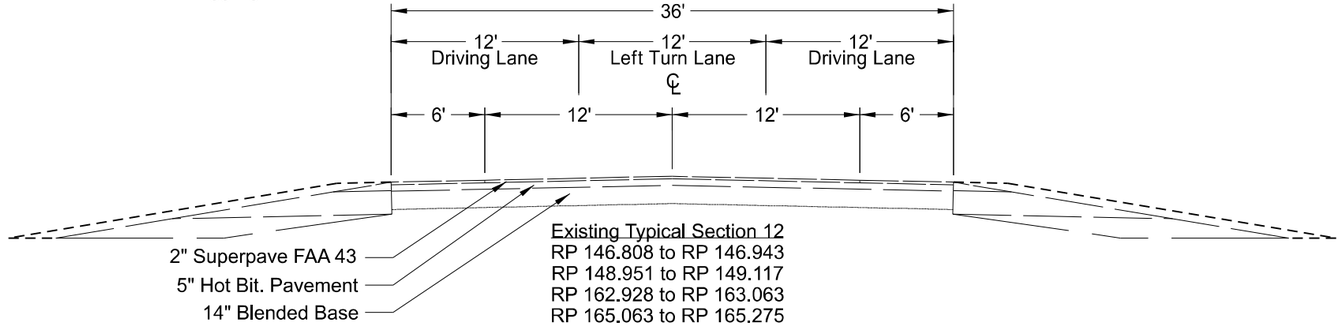
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	30	3



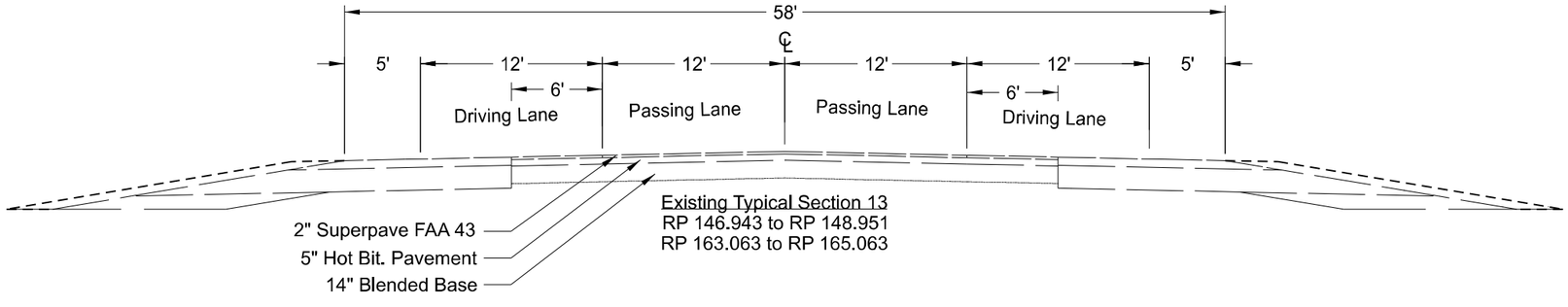
Existing Typical Section 10
RP 141.171 to RP 141.449



Existing Typical Section 11
RP 141.346 to RP 141.396



Existing Typical Section 12
RP 146.808 to RP 146.943
RP 148.951 to RP 149.117
RP 162.928 to RP 163.063
RP 165.063 to RP 165.275



Existing Typical Section 13
RP 146.943 to RP 148.951
RP 163.063 to RP 165.063

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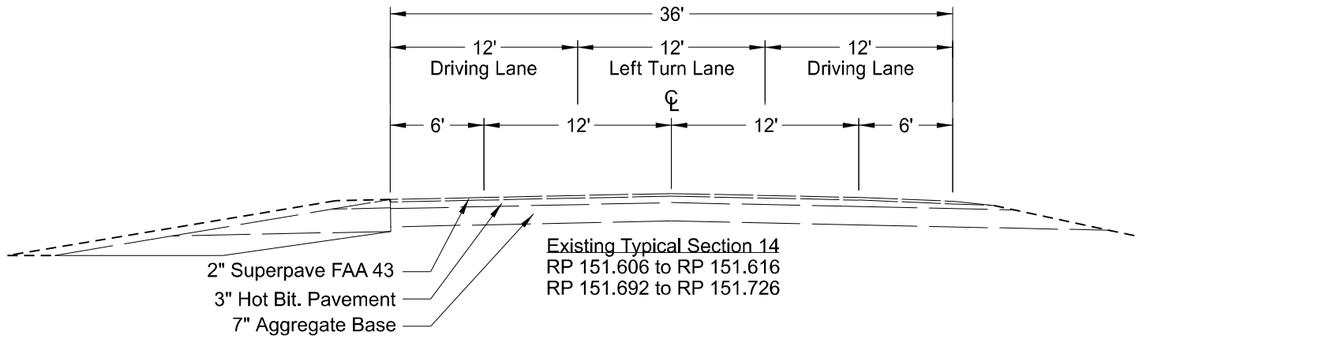
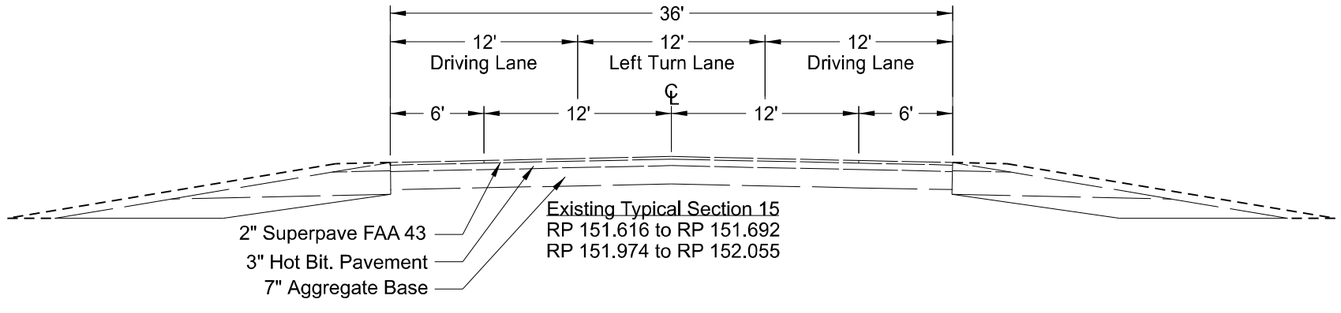
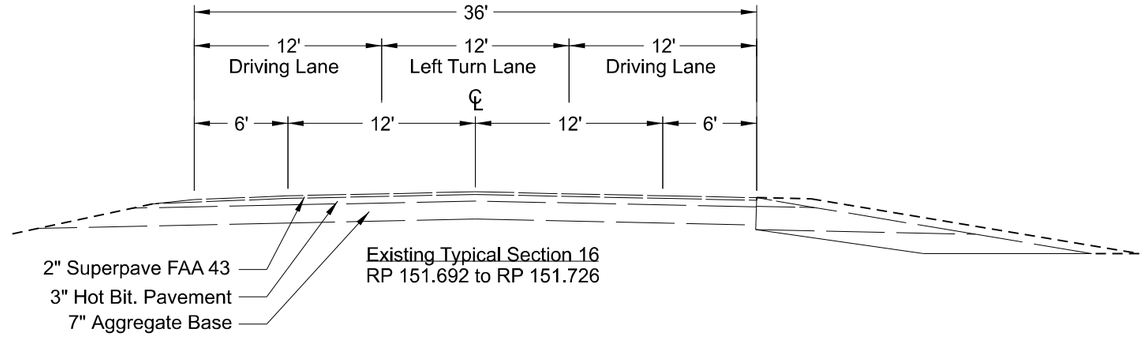
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	30	4



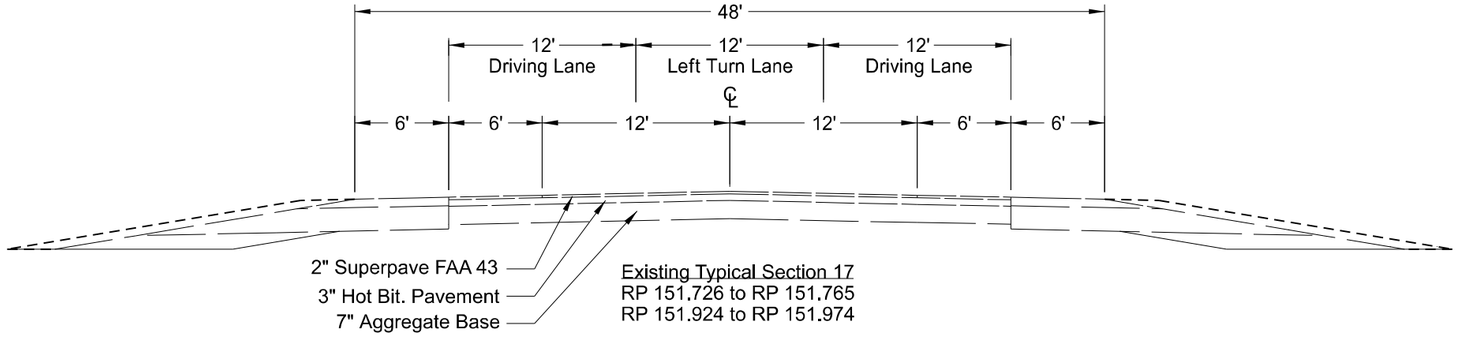
Existing Typical Section 14
RP 151.606 to RP 151.616
RP 151.692 to RP 151.726



Existing Typical Section 15
RP 151.616 to RP 151.692
RP 151.974 to RP 152.055



Existing Typical Section 16
RP 151.692 to RP 151.726



Existing Typical Section 17
RP 151.726 to RP 151.765
RP 151.924 to RP 151.974

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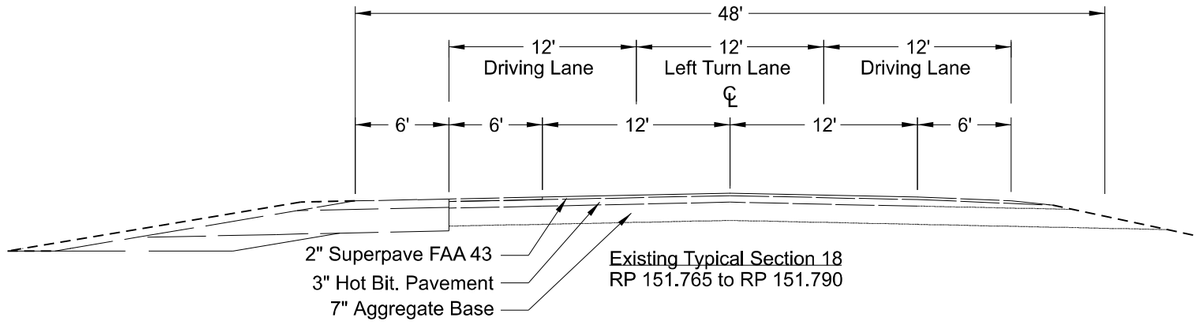
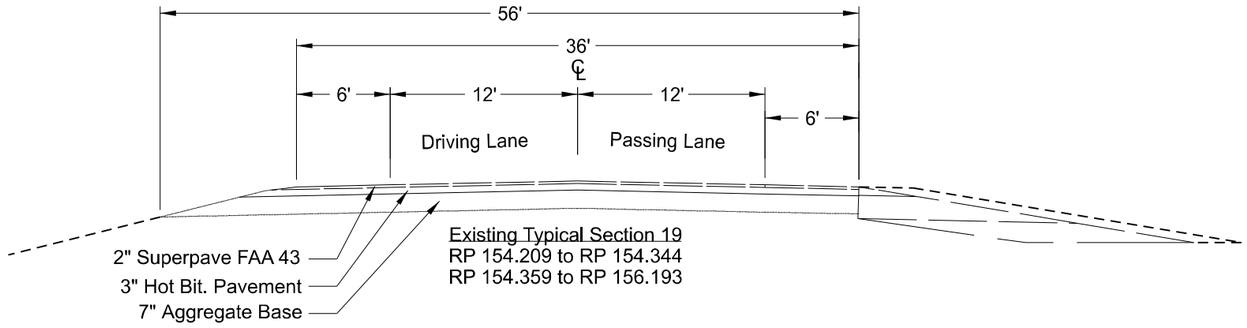
US 52

McHenry, Pierce, Sheriden & Wells County, ND

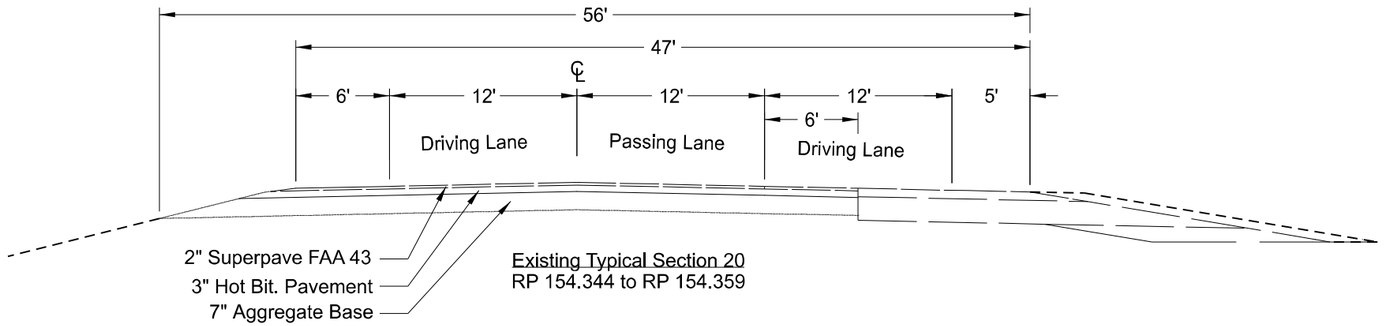
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	30	5



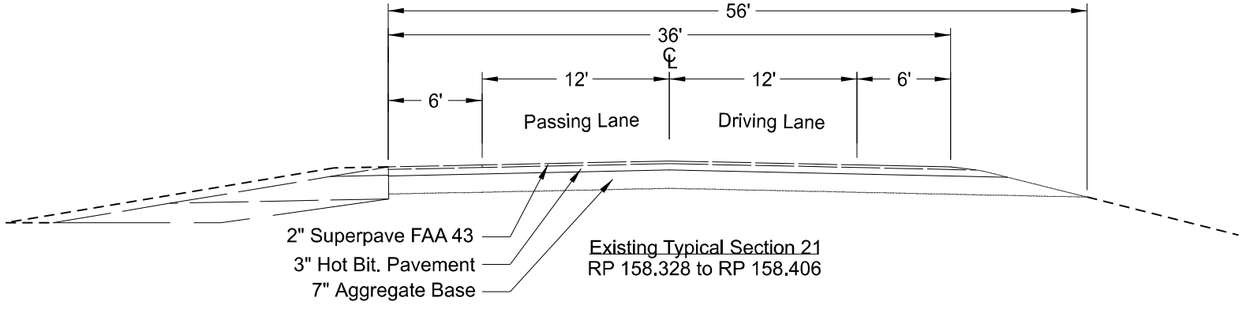
Existing Typical Section 18
RP 151.765 to RP 151.790



Existing Typical Section 19
RP 154.209 to RP 154.344
RP 154.359 to RP 156.193



Existing Typical Section 20
RP 154.344 to RP 154.359



Existing Typical Section 21
RP 158.328 to RP 158.406

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US 52

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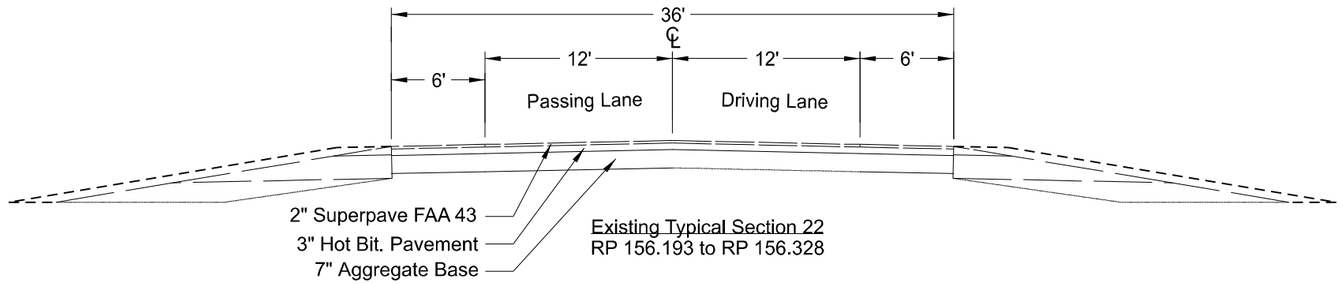
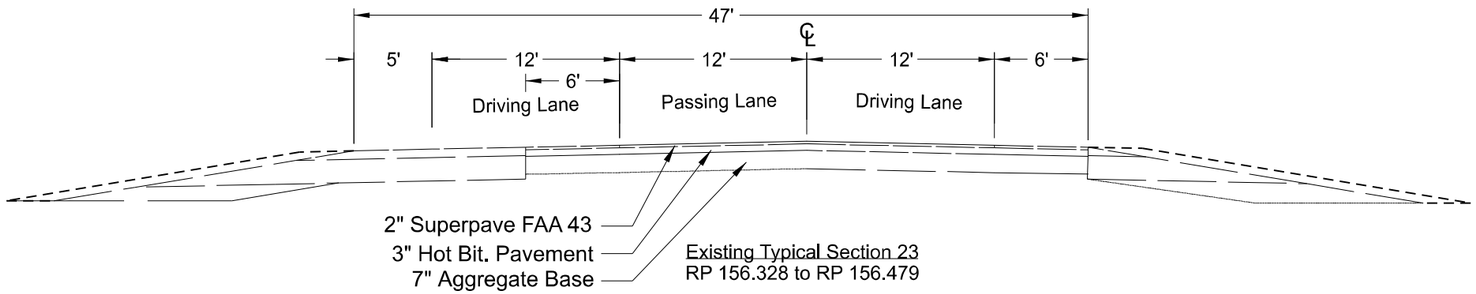
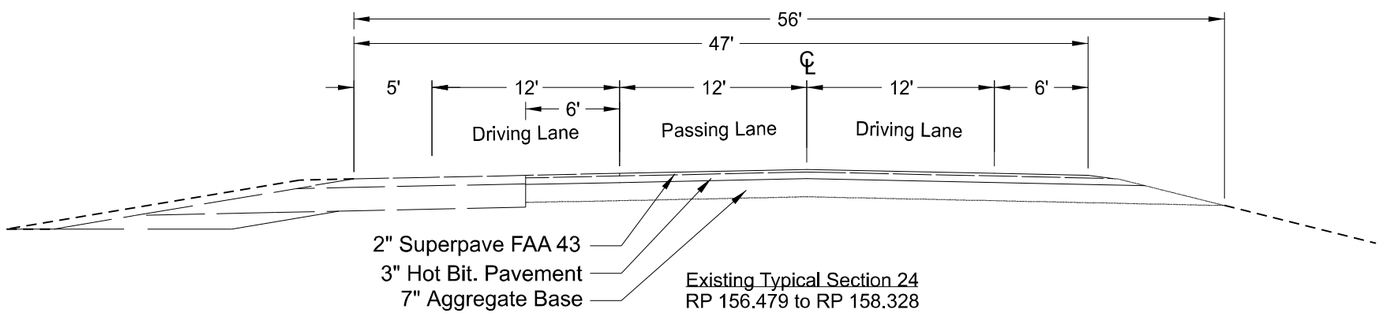
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	30	6



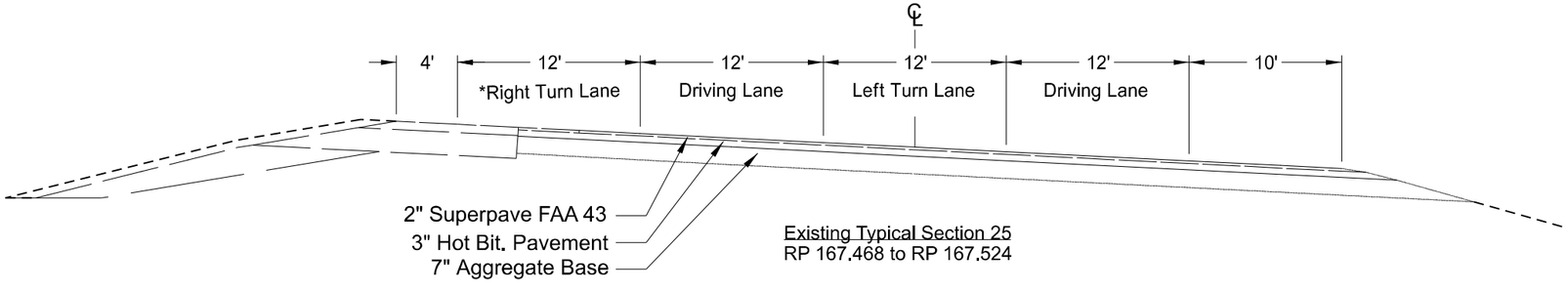
Existing Typical Section 22
RP 156.193 to RP 156.328



Existing Typical Section 23
RP 156.328 to RP 156.479



Existing Typical Section 24
RP 156.479 to RP 158.328



Existing Typical Section 25
RP 167.468 to RP 167.524

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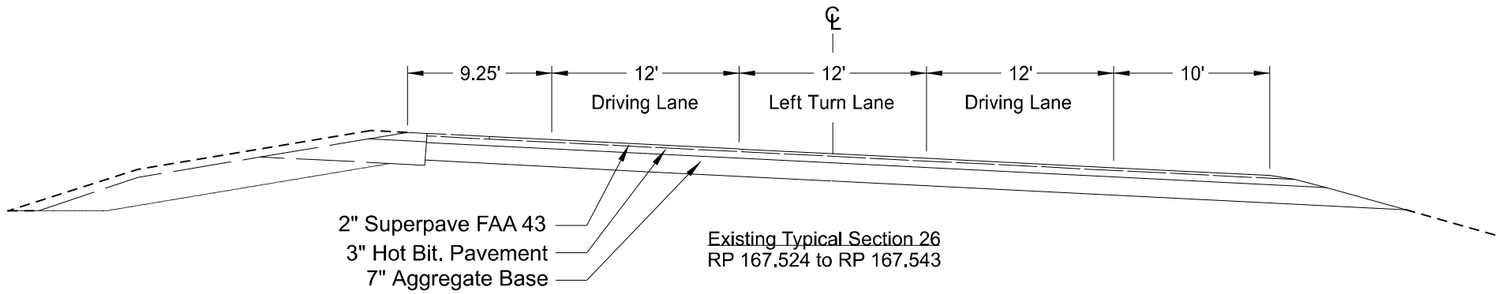
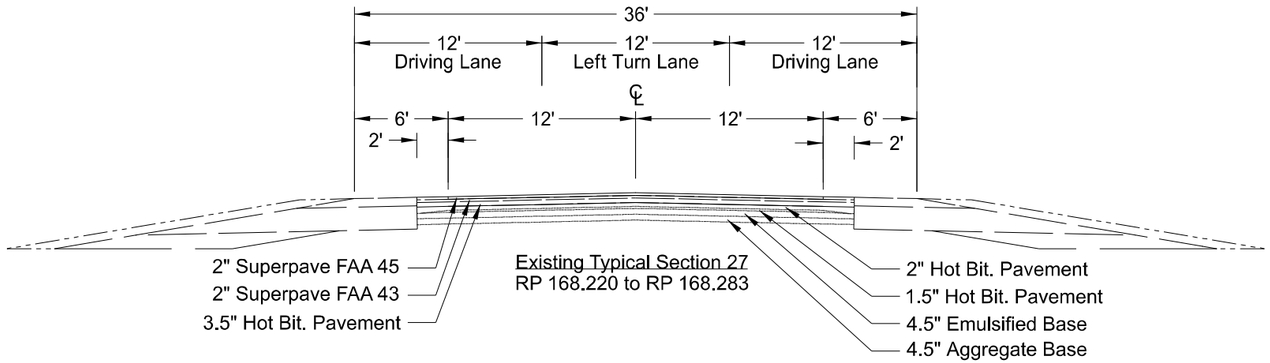
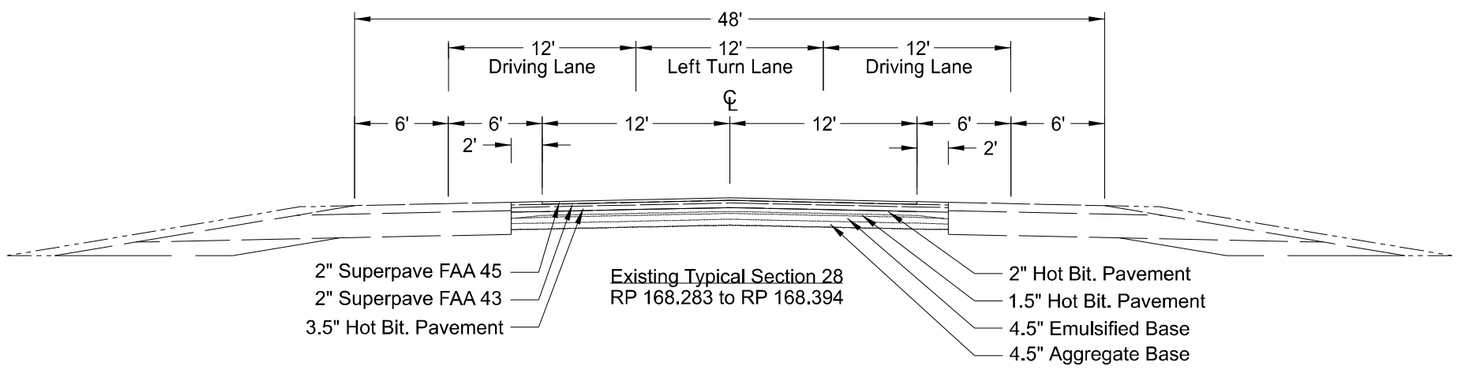
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	30	7



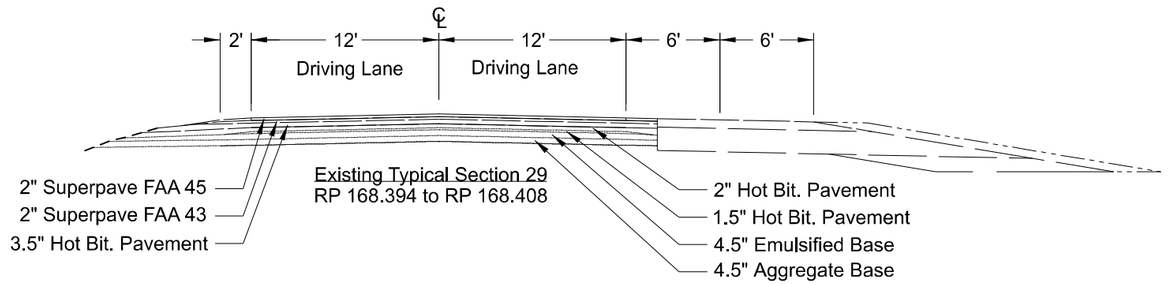
Existing Typical Section 26
RP 167.524 to RP 167.543



Existing Typical Section 27
RP 168.220 to RP 168.283



Existing Typical Section 28
RP 168.283 to RP 168.394



Existing Typical Section 29
RP 168.394 to RP 168.408

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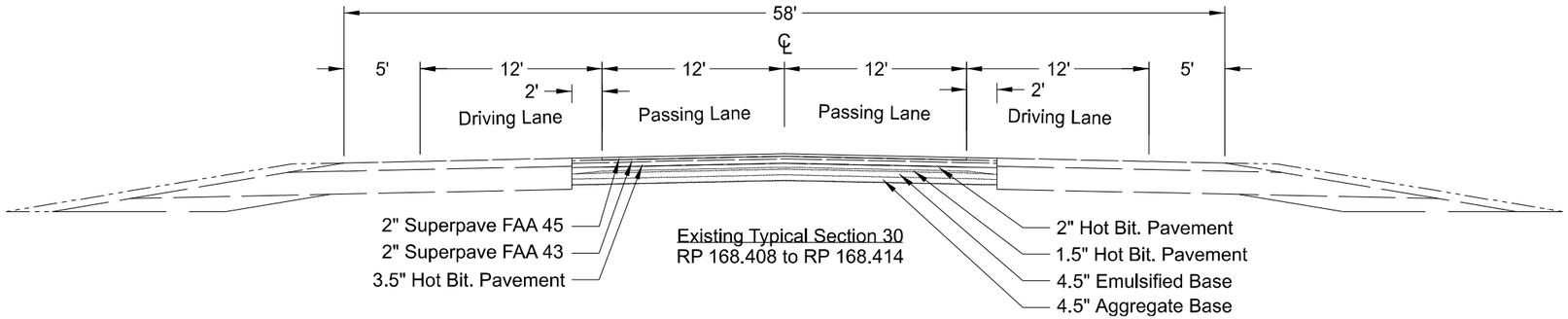
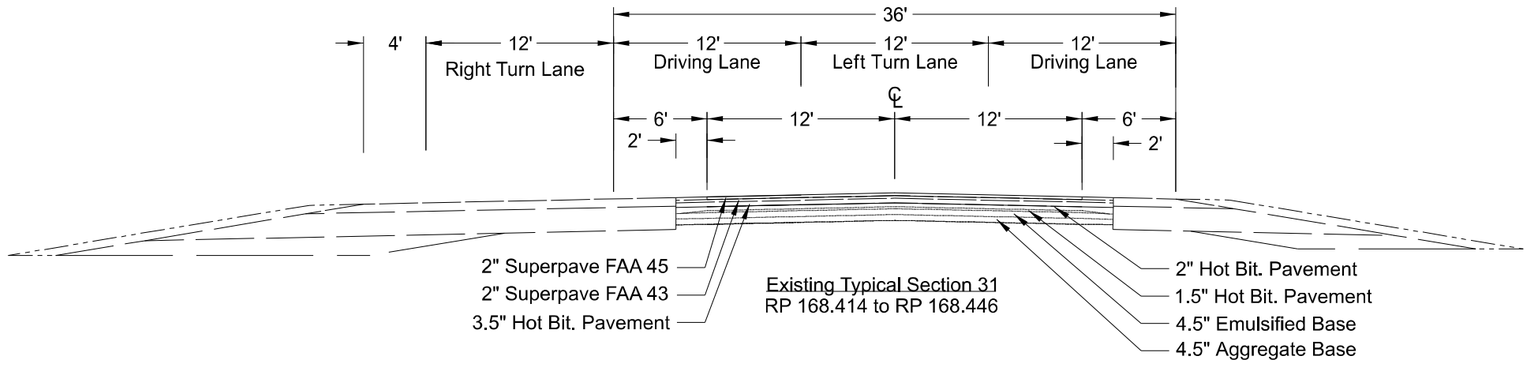
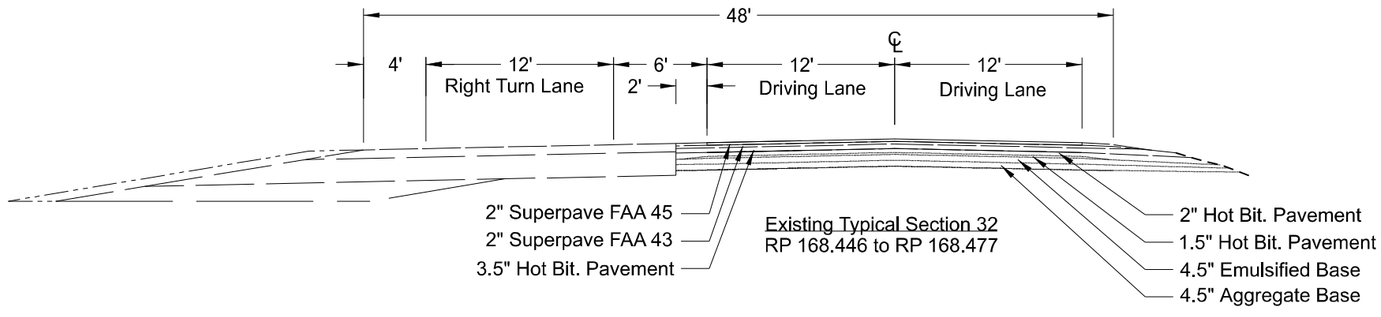
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	30	8



Existing Typical Section 30
RP 168.408 to RP 168.414



Existing Typical Section 31
RP 168.414 to RP 168.446



Existing Typical Section 32
RP 168.446 to RP 168.477

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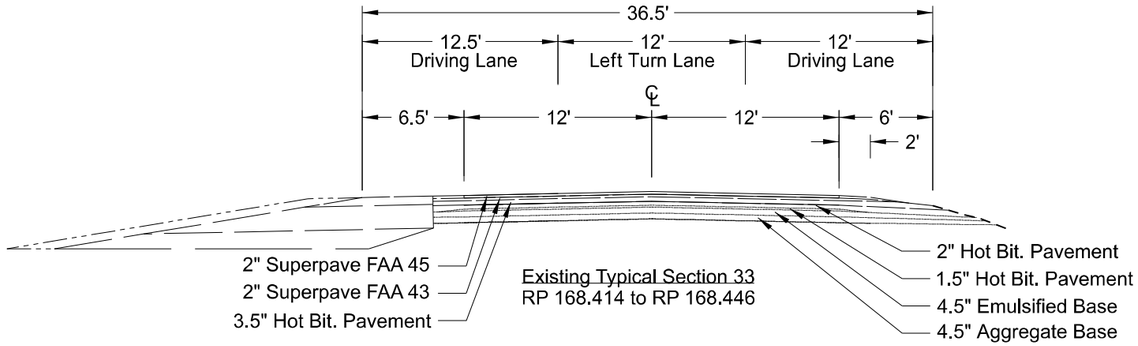
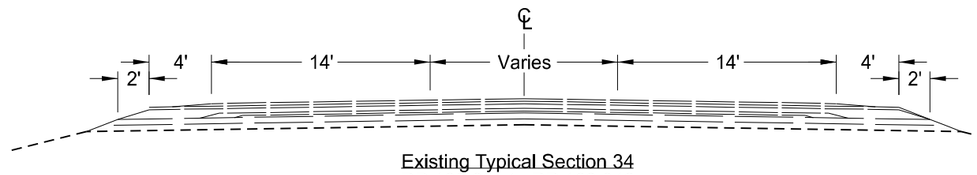
McHenry, Pierce, Sheridan & Wells County, ND

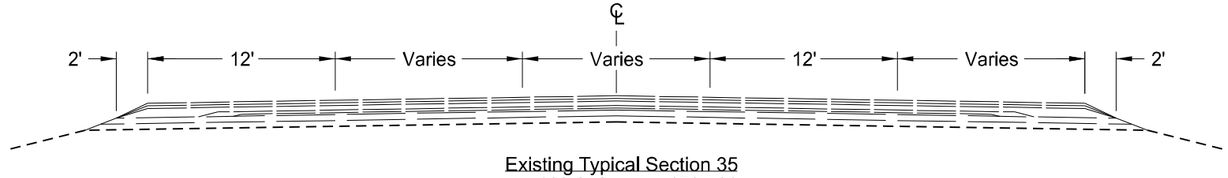
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	30	9



Existing Typical Section 33
RP 168.414 to RP 168.446



Existing Typical Section 34
RP 169.691 to RP 169.842
RP 171.988 to RP 172.335
RP 185.431 to RP 185.639



Existing Typical Section 35
RP 169.842 to RP 170.480

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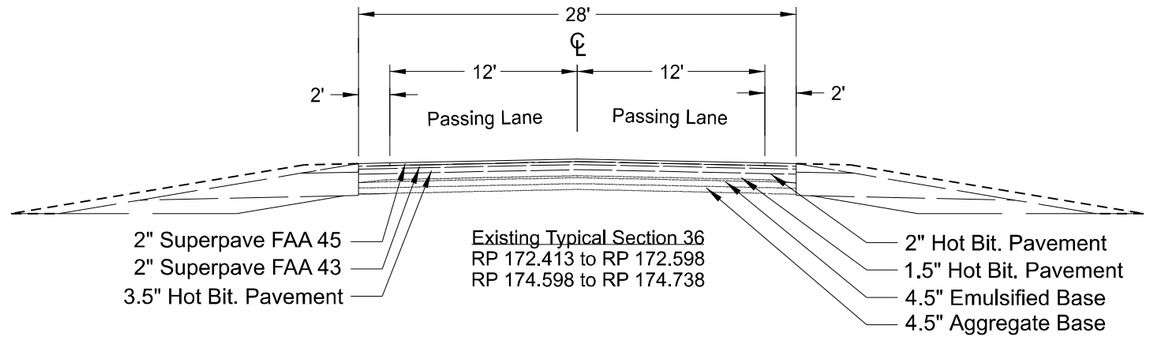
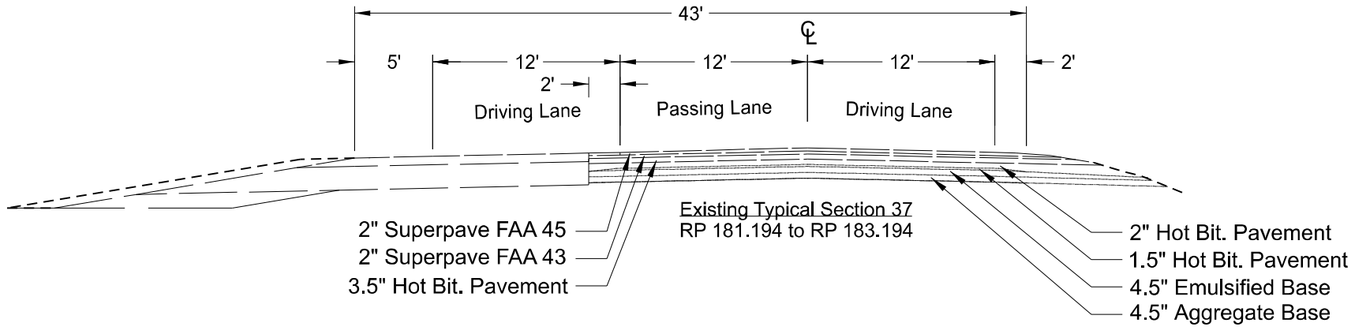
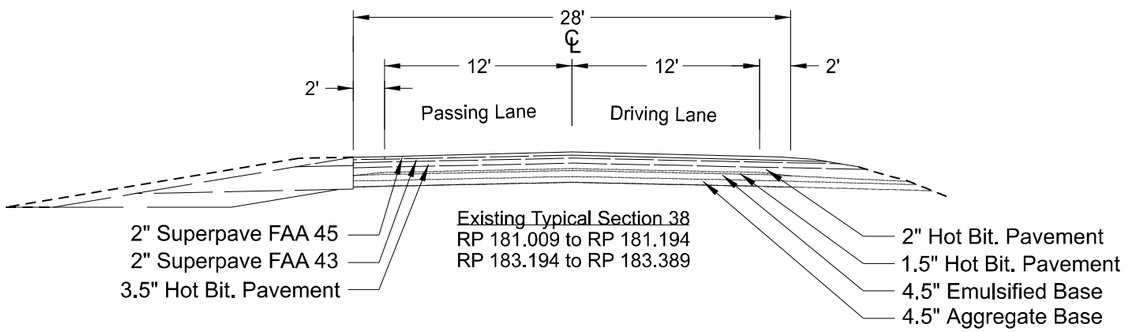
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	30	10



Existing Typical Section 36
RP 172.413 to RP 172.598
RP 174.598 to RP 174.738



Existing Typical Section 37
RP 181.194 to RP 183.194



Existing Typical Section 38
RP 181.009 to RP 181.194
RP 183.194 to RP 183.389

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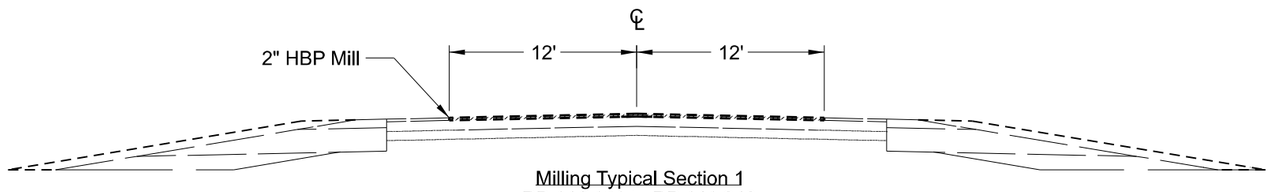
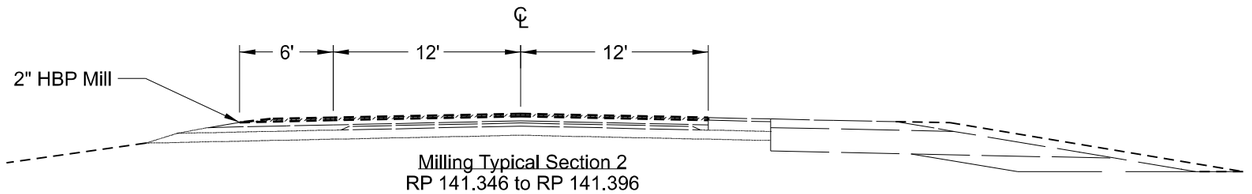
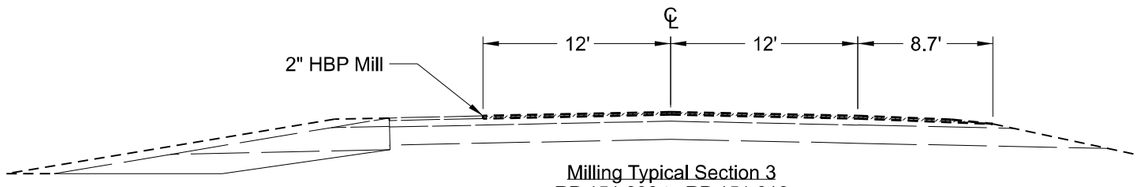
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	30	11



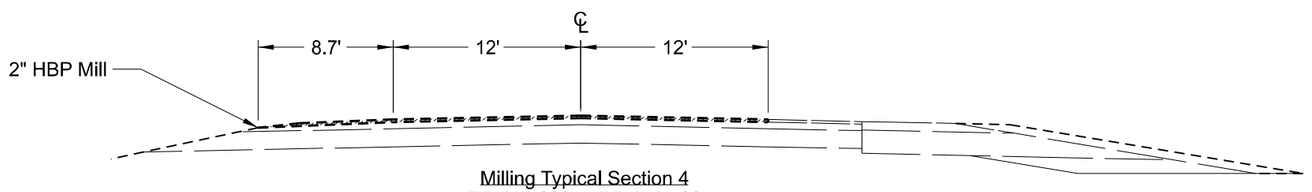
Milling Typical Section 1
RP 141.171 to RP 141.346
RP 141.396 to RP 141.449
RP 146.808 to RP 149.117
RP 151.616 to RP 151.692
RP 151.726 to RP 151.765
RP 151.924 to RP 152.055
RP 156.193 to RP 156.479
RP 162.928 to RP 165.275
RP 168.220 to RP 168.394
RP 168.408 to RP 168.446
RP 172.413 to RP 174.738
(See Note 1)



Milling Typical Section 2
RP 141.346 to RP 141.396
(See Note 1)



Milling Typical Section 3
RP 151.606 to RP 151.616
(See Note 1)



Milling Typical Section 4
RP 151.692 to RP 151.726
(See Note 1)

Notes:

1. Mill to limits of tied project INF-X-4-052(100)140

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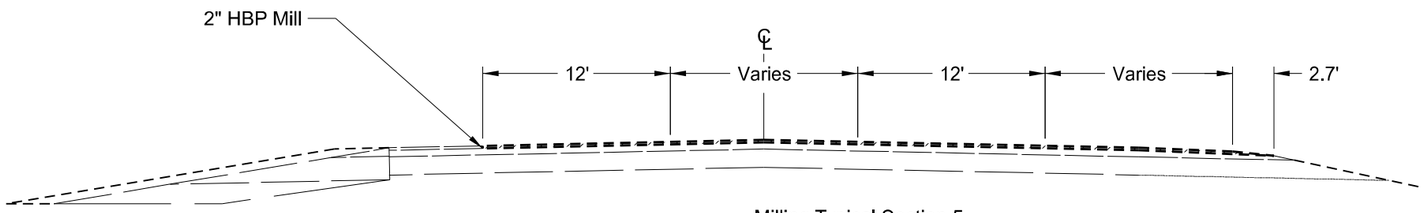
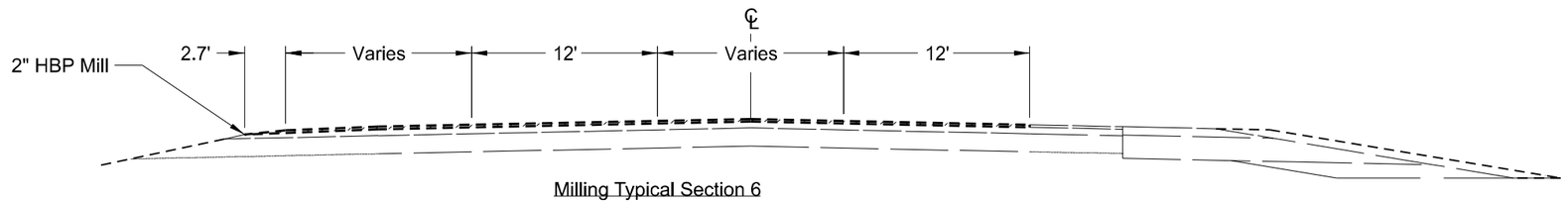
	ND	NH-4-052(104)141	30	12

Notes:

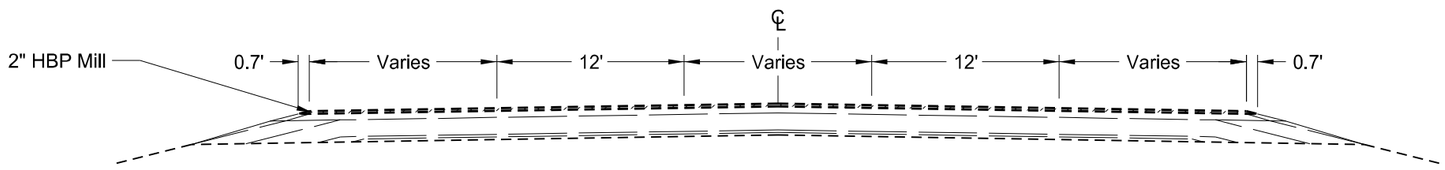
1. Mill to limits of tied project INF-X-4-052(100)140



Milling Typical Section 5
RP 151.765 to RP 151.814
(See Note 1)



Milling Typical Section 6
RP 151.896 to RP 151.924
(See Note 1)



Milling Typical Section 7
RP 151.814 to RP 151.896
(See Note 1)

REGISTERED PROFESSIONAL ENGINEER
ERIC M. MERCK
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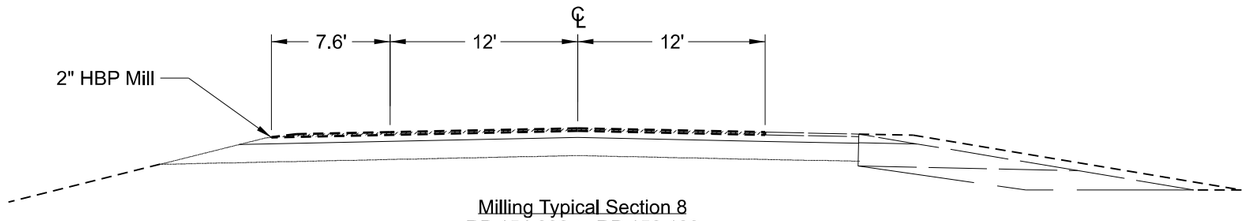
Milling Typical Sections
Near Jct ND 53 to Near Fessenden
US 52

McHenry, Pierce, Sheriden & Wells County, ND

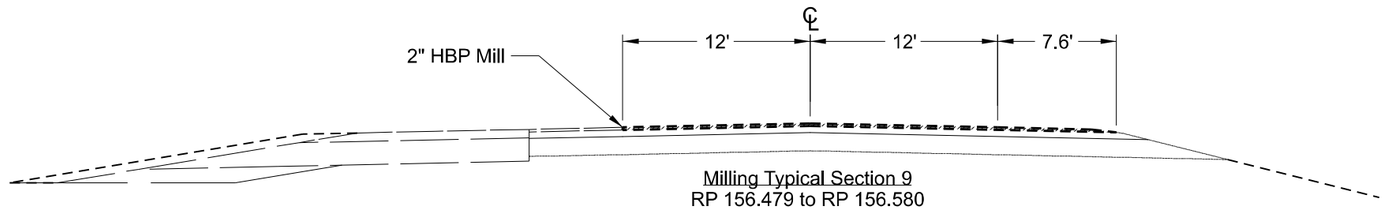
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	30	13

Notes:

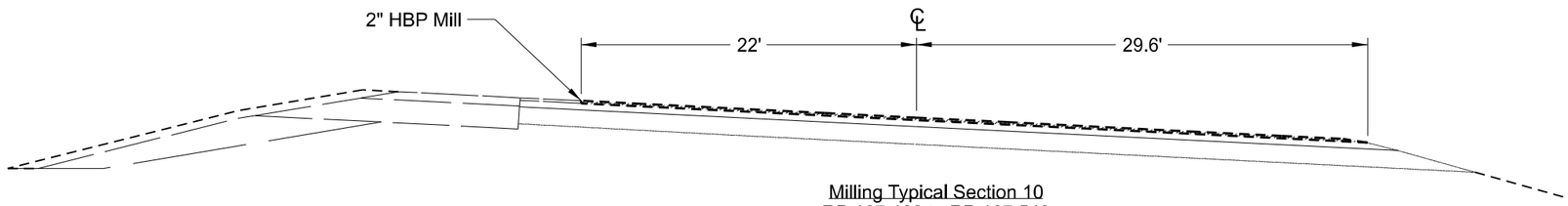
1. Mill to limits of tied project INF-X-4-052(100)140



Milling Typical Section 8
RP 154.209 to RP 156.193
(See Note 1)



Milling Typical Section 9
RP 156.479 to RP 156.580
RP 156.780 to RP 156.969
RP 157.149 to RP 157.329
RP 157.412 to RP 158.328
(See Note 1)



Milling Typical Section 10
RP 167.468 to RP 167.543
(See Note 1)

REGISTERED PROFESSIONAL ENGINEER
ERIC M. MERCK
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NORTH DAKOTA

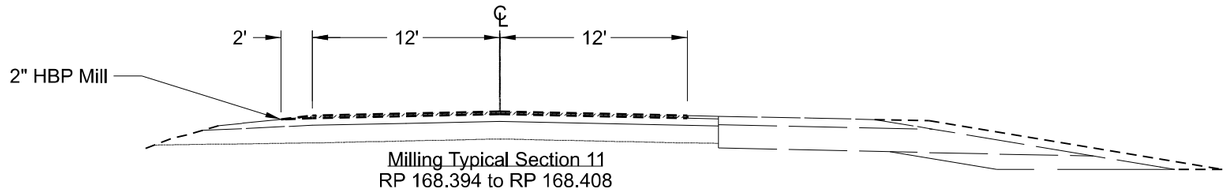
Milling Typical Sections
Near Jct ND 53 to Near Fessenden
US 52

McHenry, Pierce, Sheriden & Wells County, ND

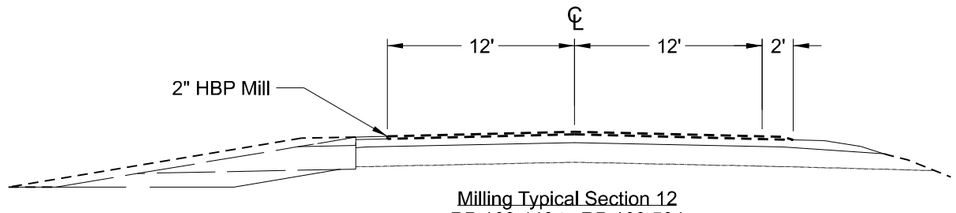
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	30	14

Notes:

1. Mill to limits of tied project INF-X-4-052(100)140



Milling Typical Section 11
RP 168.394 to RP 168.408
(See Note 1)



Milling Typical Section 12
RP 168.446 to RP 168.504
RP 181.009 to RP 182.909
RP 183.259 to RP 183.389
(See Note 1)

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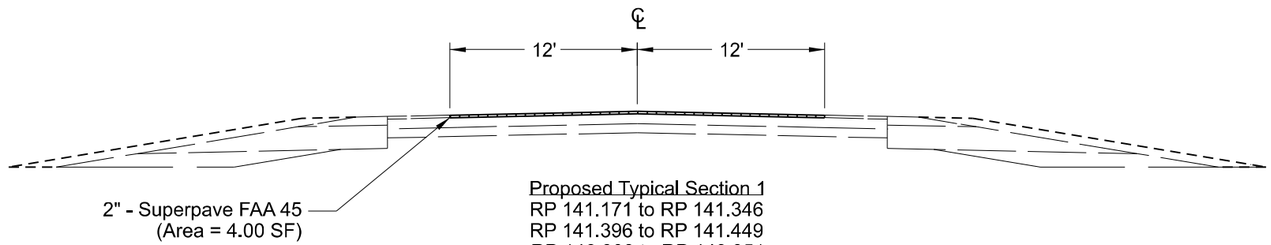
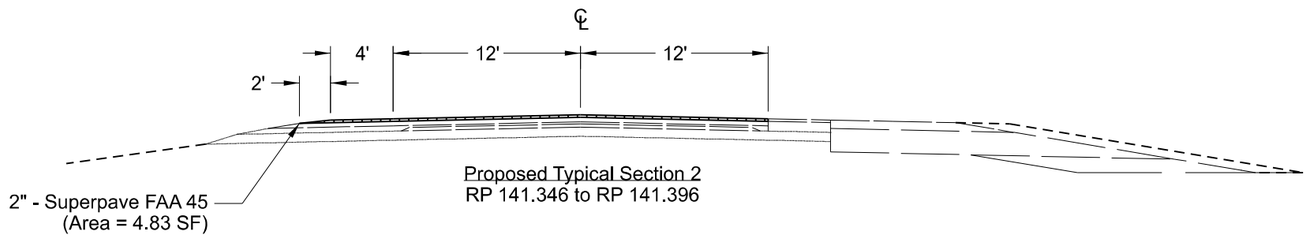
Milling Typical Sections
Near Jct ND 53 to Near Fessenden
US 52

McHenry, Pierce, Sheridan & Wells County, ND

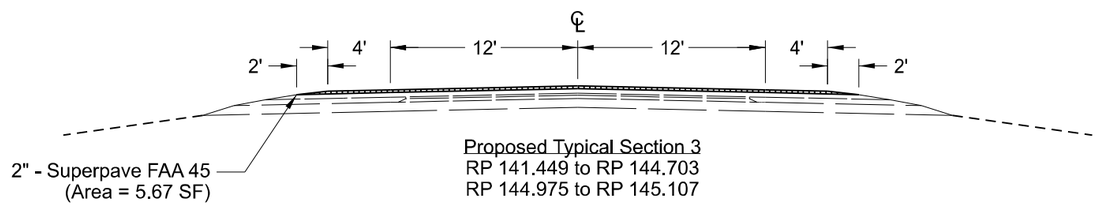
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	30	15



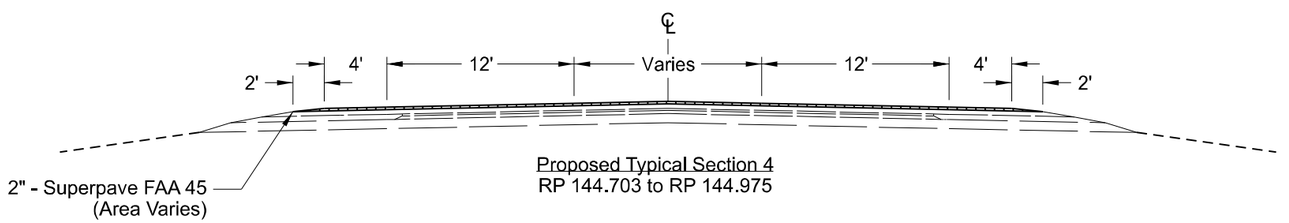
Proposed Typical Section 1
RP 141.171 to RP 141.346
RP 141.396 to RP 141.449
RP 146.808 to RP 148.951
RP 148.951 to RP 149.117
RP 151.616 to RP 151.765
RP 151.924 to RP 152.055
RP 156.193 to RP 156.479
RP 162.928 to RP 165.275
RP 168.220 to RP 168.394
RP 168.408 to RP 168.446
RP 172.413 to RP 174.738



Proposed Typical Section 2
RP 141.346 to RP 141.396



Proposed Typical Section 3
RP 141.449 to RP 144.703
RP 144.975 to RP 145.107



Proposed Typical Section 4
RP 144.703 to RP 144.975

REGISTERED PROFESSIONAL ENGINEER
ERIC M. MERCK
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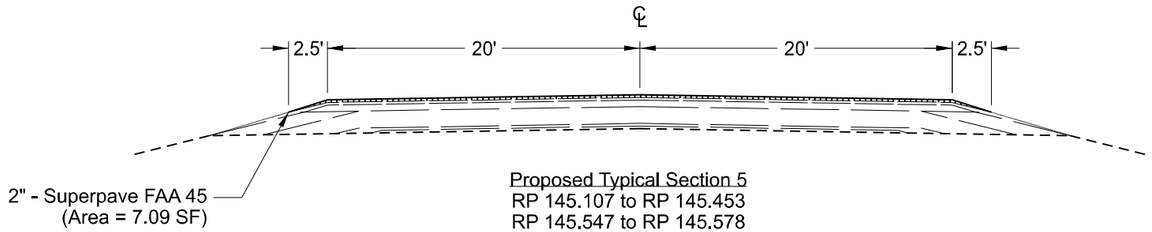
NORTH DAKOTA

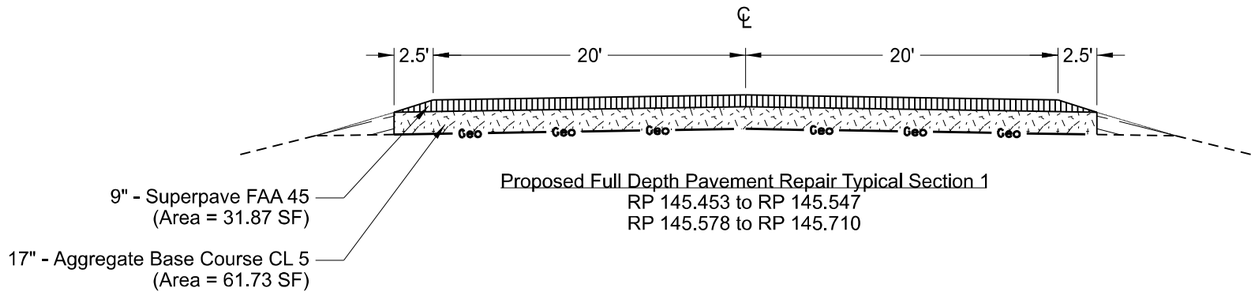
Proposed Typical Sections
Near Jct ND 53 to Near Fessenden
US 52

McHenry, Pierce, Sheridan & Wells County, ND

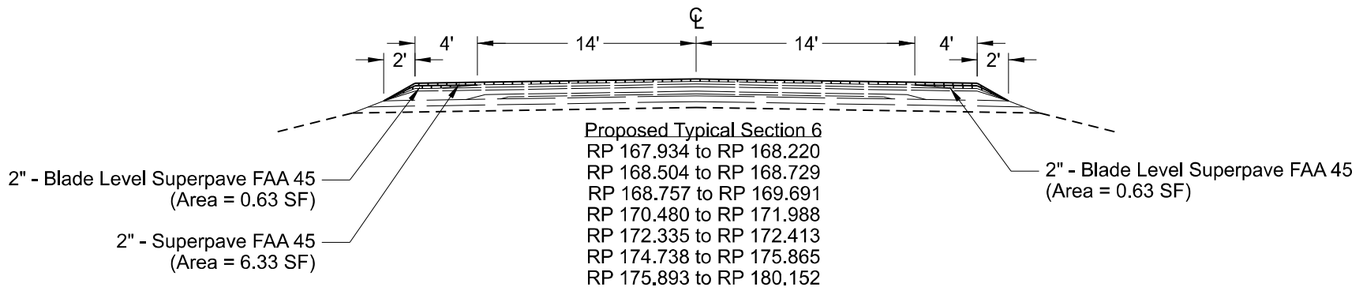
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	30	16



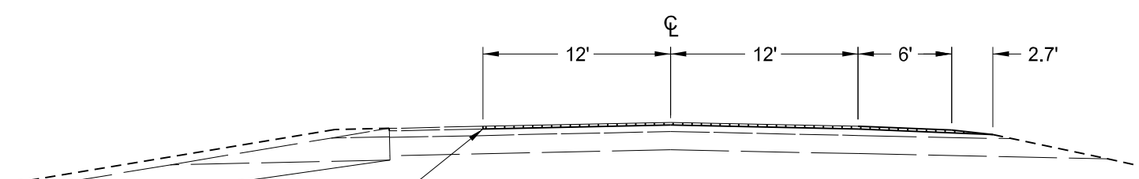
Proposed Typical Section 5
RP 145.107 to RP 145.453
RP 145.547 to RP 145.578
RP 145.710 to RP 146.808
RP 149.117 to RP 151.606
RP 152.055 to RP 154.209
RP 158.406 to RP 158.624
RP 158.845 to RP 162.928
RP 165.275 to RP 167.189



Proposed Full Depth Pavement Repair Typical Section 1
RP 145.453 to RP 145.547
RP 145.578 to RP 145.710



Proposed Typical Section 6
RP 167.934 to RP 168.220
RP 168.504 to RP 168.729
RP 168.757 to RP 169.691
RP 170.480 to RP 171.988
RP 172.335 to RP 172.413
RP 174.738 to RP 175.865
RP 175.893 to RP 180.152
RP 180.489 to RP 181.009
RP 183.389 to RP 185.431



Proposed Typical Section 7
RP 151.606 to RP 151.616
RP 151.765 to RP 151.790

REGISTERED PROFESSIONAL ENGINEER
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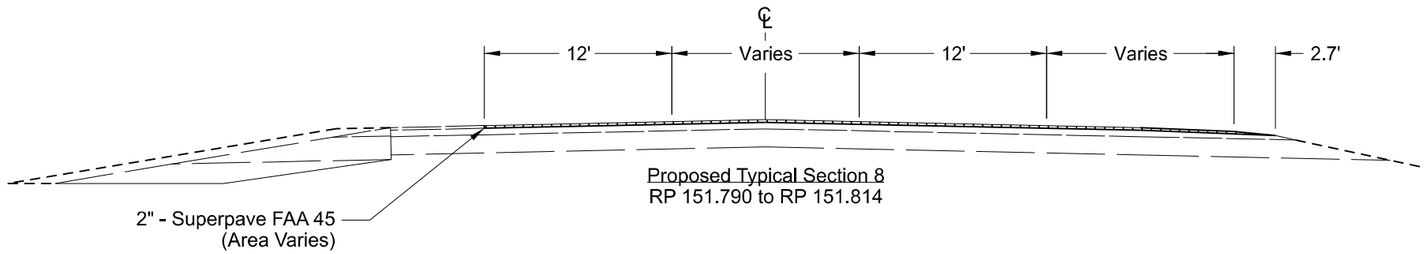
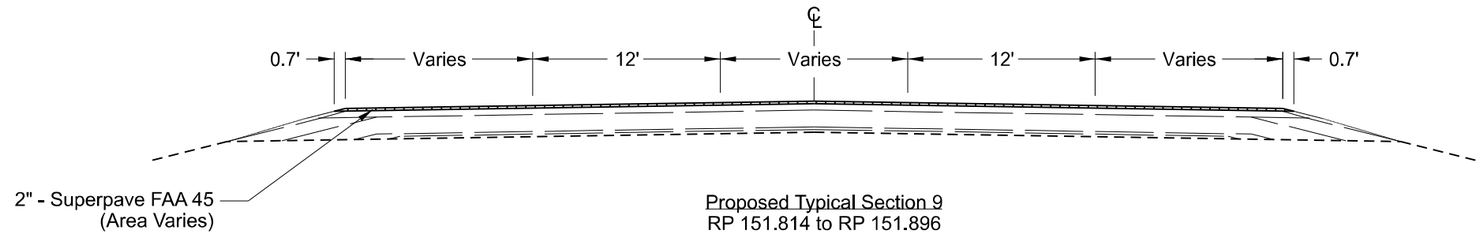
Proposed Typical Sections
Near Jct ND 53 to Near Fessenden
US 52

McHenry, Pierce, Sheridan & Wells County, ND

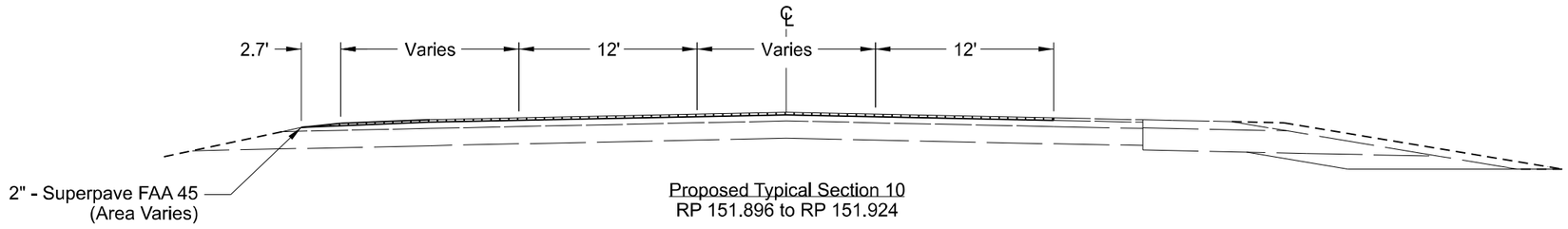
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	30	17



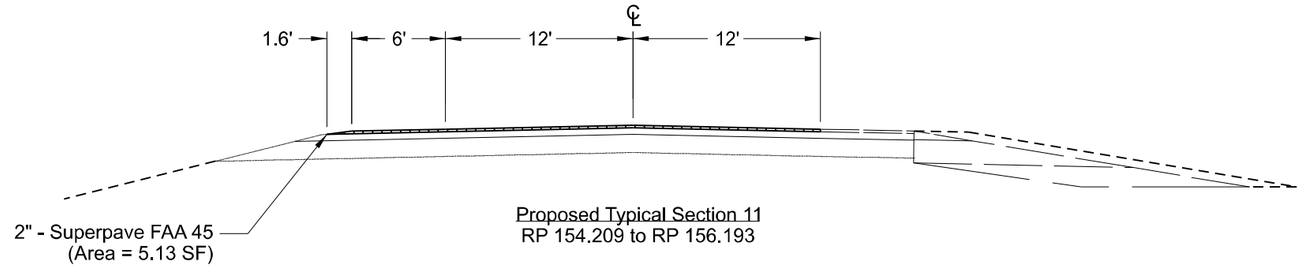
Proposed Typical Section 8
RP 151.790 to RP 151.814



Proposed Typical Section 9
RP 151.814 to RP 151.896



Proposed Typical Section 10
RP 151.896 to RP 151.924



Proposed Typical Section 11
RP 154.209 to RP 156.193

REGISTERED PROFESSIONAL ENGINEER
ERIC M. MERCK
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Proposed Typical Sections
Near Jct ND 53 to Near Fessenden
US 52

McHenry, Pierce, Sheriden & Wells County, ND

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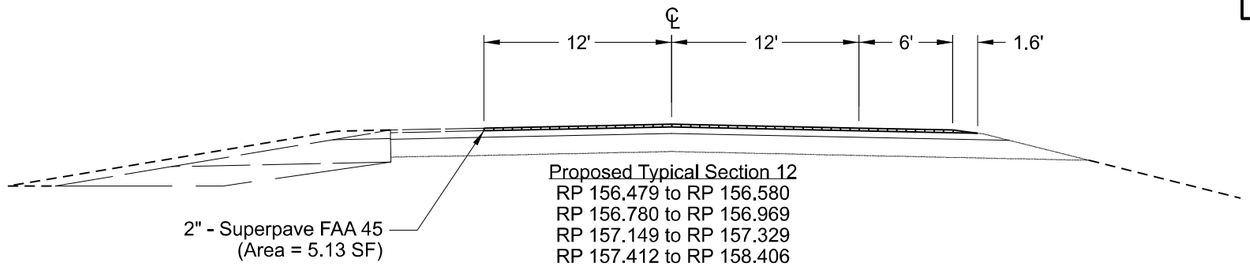
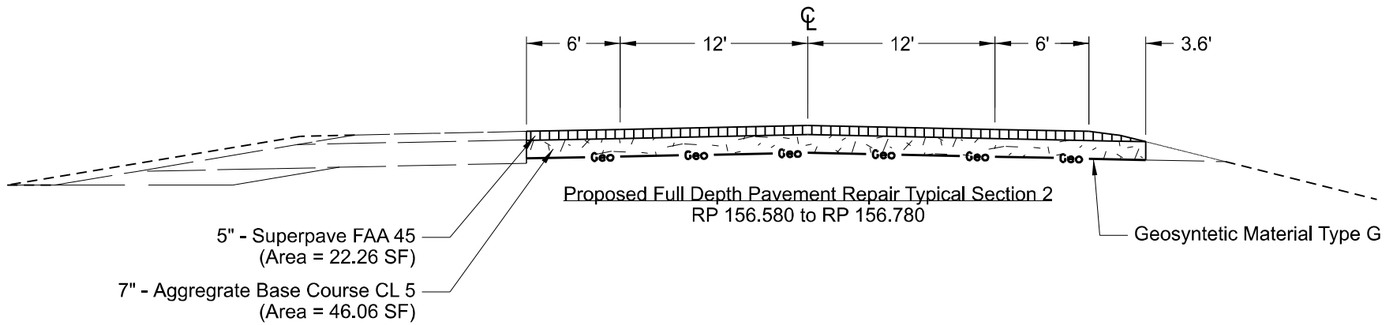
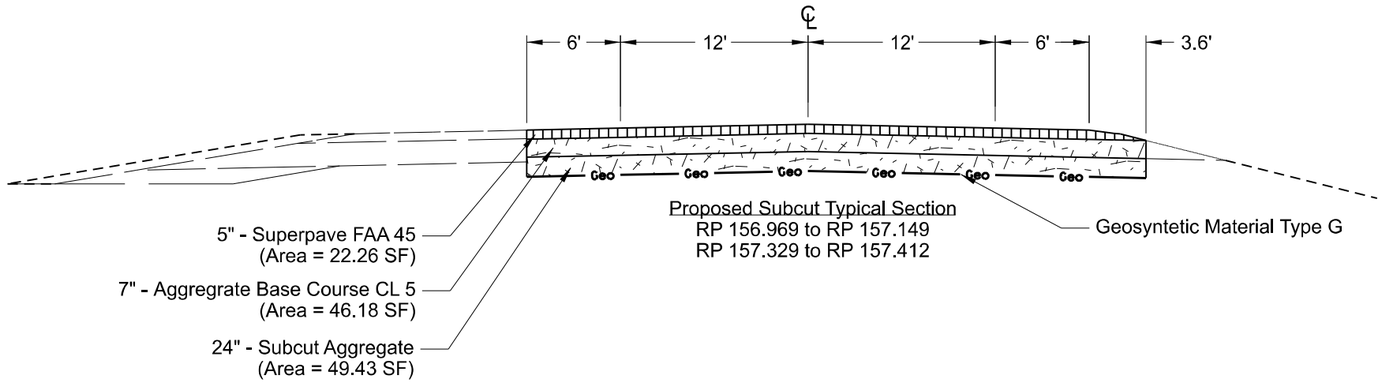
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	30	18



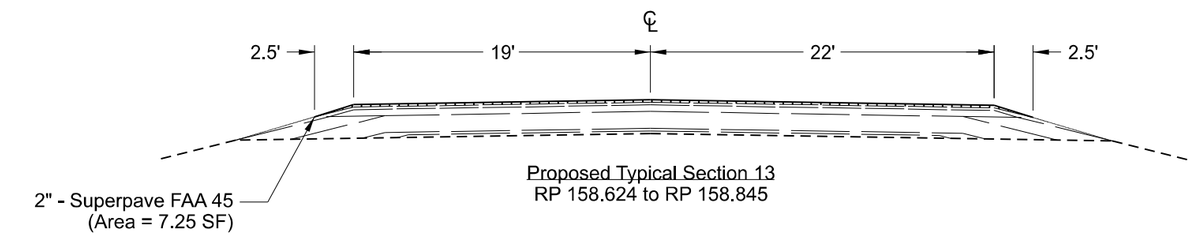
Proposed Typical Section 12
RP 156.479 to RP 156.580
RP 156.780 to RP 156.969
RP 157.149 to RP 157.329
RP 157.412 to RP 158.406



Proposed Full Depth Pavement Repair Typical Section 2
RP 156.580 to RP 156.780



Proposed Subcut Typical Section
RP 156.969 to RP 157.149
RP 157.329 to RP 157.412



Proposed Typical Section 13
RP 158.624 to RP 158.845

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NORTH DAKOTA

Proposed Typical Sections
Near Jct ND 53 to Near Fessenden
US 52

McHenry, Pierce, Sheriden & Wells County, ND

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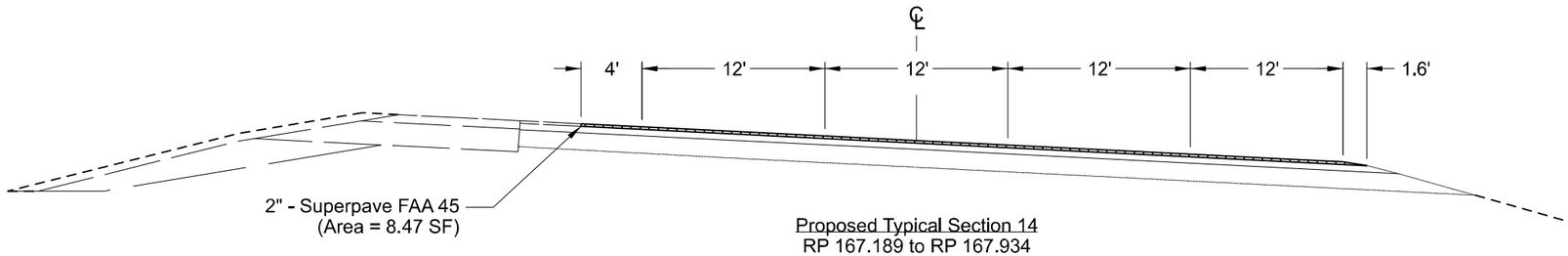
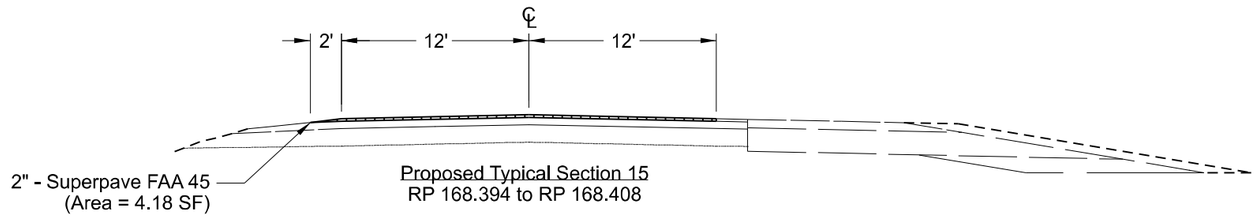
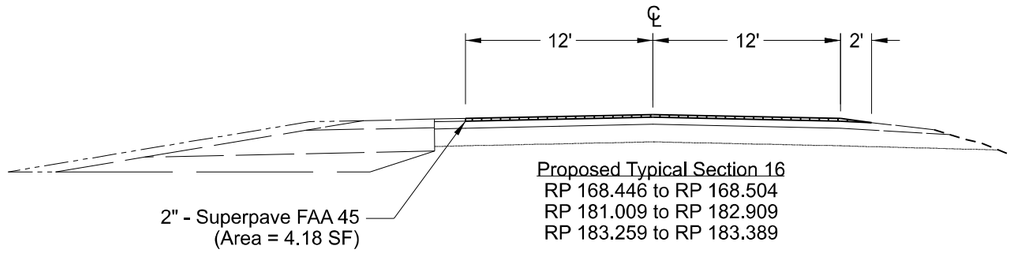
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	30	19



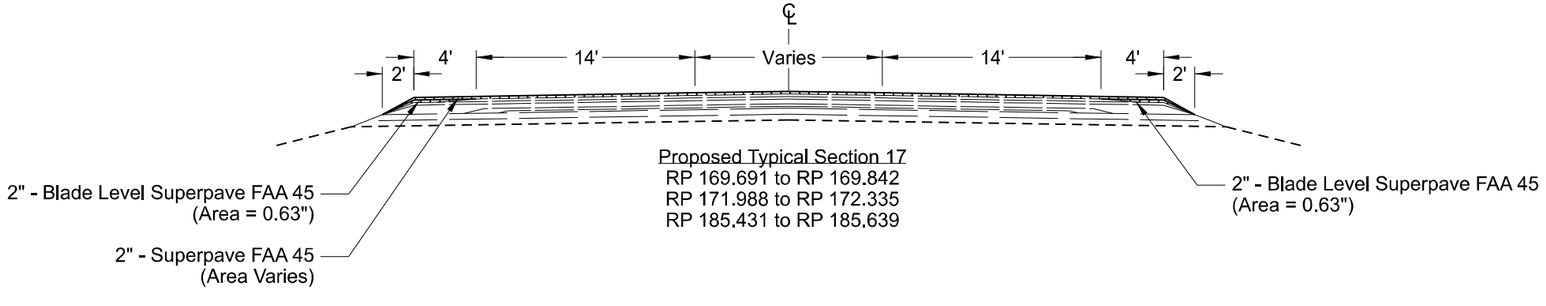
Proposed Typical Section 14
RP 167.189 to RP 167.934



Proposed Typical Section 15
RP 168.394 to RP 168.408



Proposed Typical Section 16
RP 168.446 to RP 168.504
RP 181.009 to RP 182.909
RP 183.259 to RP 183.389



Proposed Typical Section 17
RP 169.691 to RP 169.842
RP 171.988 to RP 172.335
RP 185.431 to RP 185.639

REGISTERED PROFESSIONAL ENGINEER
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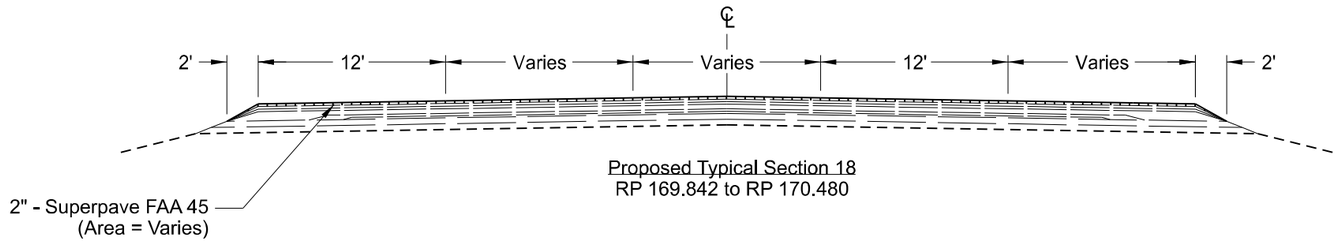
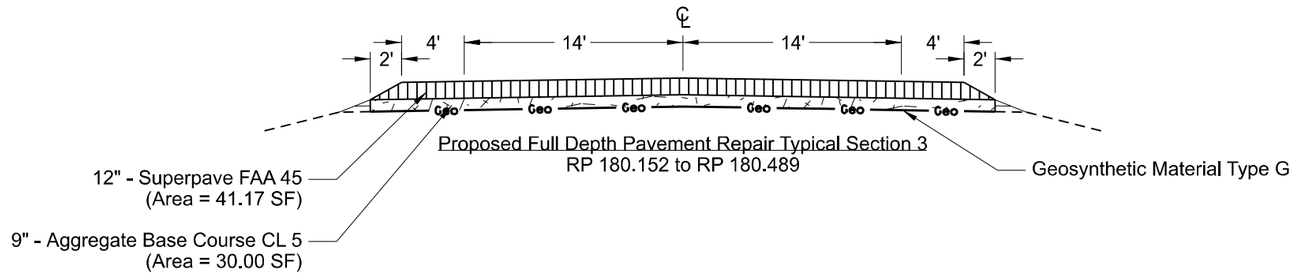
Proposed Typical Sections
Near Jct ND 53 to Near Fessenden
US 52

McHenry, Pierce, Sheriden & Wells County, ND

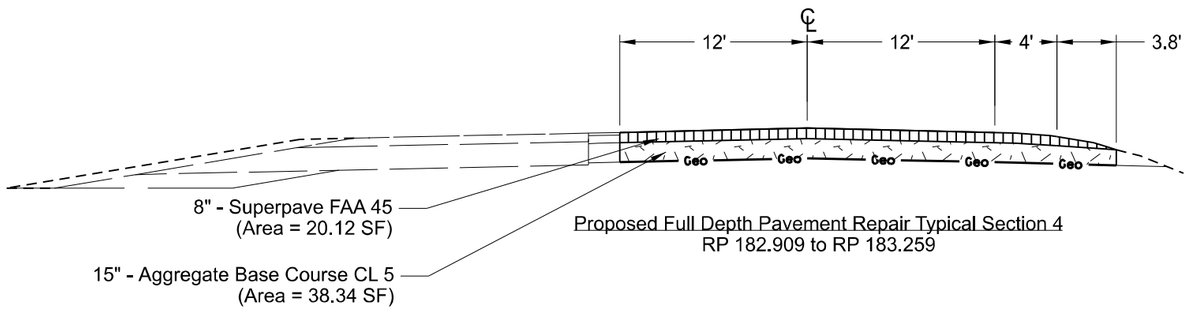
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	30	20



Proposed Typical Section 18
RP 169.842 to RP 170.480



Proposed Full Depth Pavement Repair Typical Section 3
RP 180.152 to RP 180.489



Proposed Full Depth Pavement Repair Typical Section 4
RP 182.909 to RP 183.259

REGISTERED PROFESSIONAL ENGINEER
ERIC M. MERCK
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DATE 12/19/23
NORTH DAKOTA

Proposed Typical Sections
Near Jct ND 53 to Near Fessenden
US 52

McHenry, Pierce, Sheriden & Wells County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-052(104)141	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE		35	
G20-1-60	**60"x24"**	**ROAD WORK NEXT __ MILES**	**2**	**28**	**56**
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)		18	
G20-2-48	**48"x24"**	**END ROAD WORK**	**2**	**26**	**52**
G20-4-36	**36"x18"**	**PILOT CAR FOLLOW ME (Mounted to back of pilot car)**	**2**	**18**	**36**
G20-4b-36	36"x30"	WAIT FOR PILOT CAR		18	
G20-50a-72	**72"x36"**	**ROAD WORK NEXT __ MILES RT & LT ARROWS**	**10**	**43**	**430**
G20-52a-72	**72"x24"**	**ROAD WORK NEXT __ MILES RT or LT ARROW**	**2**	**36**	**72**
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT		59	
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		11	
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 (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)		7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)		7	
R1-1-48	**48"x48"**	**STOP**	**2**	**32**	**64**
R1-2-60	60"x60"	YIELD		29	
R2-1-36	**36"x48"**	**SPEED LIMIT __ (Portable only)**	**8**	**30**	**240**
R2-1-48	48"x60"	SPEED LIMIT __		39	
R2-1aP-24	**24"x18"**	**MINIMUM FEE $80 (Mounted on Speed Limit post)**	**4**	**10**	**40**
R3-2-48	48"x48"	NO LEFT TURN		35	
R4-1-48	**48"x60"**	**DO NOT PASS**	**4**	**39**	**156**
R4-7-48	48"x60"	KEEP RIGHT		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-54	54"x18"	ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)		14	
R7-1-12	12"x18"	NO PARKING ANY TIME		11	
R10-6-24	24"x36"	STOP HERE ON RED		16	
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)		12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)		12	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)		15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT		35	
W1-4-48	48"x48"	REVERSE CURVE RIGHT or LEFT		35	
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT		35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD		35	
W3-3-48	48"x48"	SIGNAL AHEAD		35	
W3-4-48	**48"x48"**	**BE PREPARED TO STOP**	**4**	**35**	**140**
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**4**	**35**	**140**
W4-2-48	48"x48"	LANE ENDS RIGHT or LEFT		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		35	
W8-1-48	**48"x48"**	**BUMP**	**16**	**35**	**560**
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-11-48	**48"x48"**	**UNEVEN LANES**	**4**	**35**	**140**
W8-12-48	48"x48"	NO CENTER LINE		35	
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	**48"x48"**	**TRUCKS ENTERING AHEAD or __ FT or _ MILE**	**2**	**35**	**70**
W8-55-48	**48"x48"**	**TRUCKS CROSSING AHEAD or __ FT or _ MILE**	**2**	**35**	**70**
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W13-1P-30	30"x30"	__ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)		14	
W14-3-64	64"x48"	NO PASSING ZONE		28	
W16-2P-30	30"x24"	__ FEET PLAQUE (Mounted on warning sign post)		10	
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**16**	**35**	**560**
W20-2-48	48"x48"	DETOUR AHEAD or __ FT or _ MILE		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT or _ MILE		35	
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or __ FT or _ MILE		35	
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or __ FT or _ MILE		35	
W20-7-48	**48"x48"**	**FLAGGER**	**4**	**35**	**140**
W20-8-18	**18"x18"**	**STOP - SLOW PADDLE Back to Back**	**6**	**5**	**30**
W20-52P-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)		12	
W21-1-48	48"x48"	WORKERS		35	
W21-2-48	**48"x48"**	**FRESH OIL**	**2**	**35**	**70**
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT or _ MILE		35	
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 or _ MILE		35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-6-48	48"x48"	SURVEY CREW		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT		35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY		35	
W21-52-48	48"x48"	PAVEMENT BREAKS		35	
W21-53-48	**48"x48"**	**RUMBLE STRIPS AHEAD**	**4**	**35**	**140**
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	
W24-1-48	48"x48"	DOUBLE REVERSE CURVE		35	

SPECIAL SIGNS

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**3276**

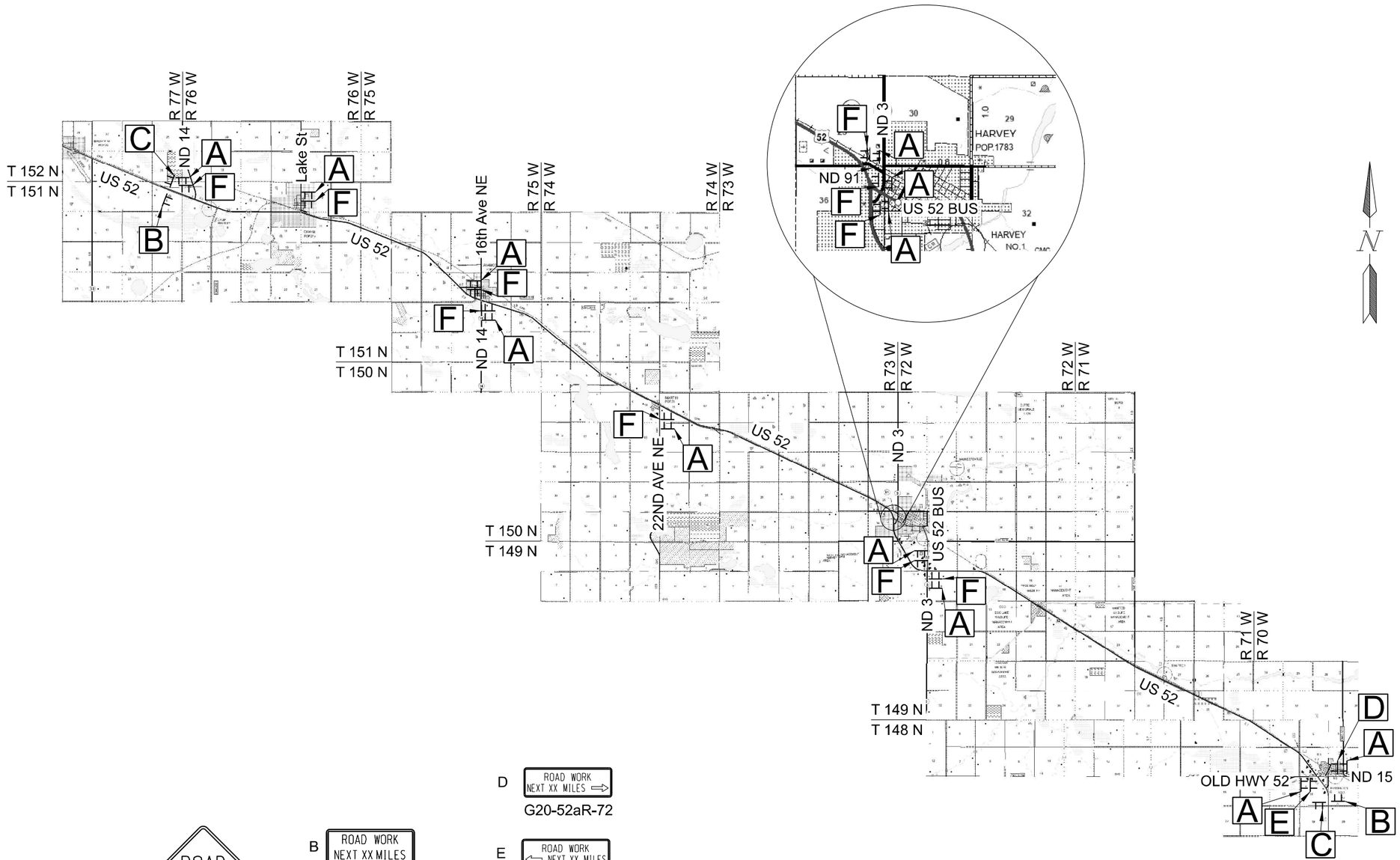
SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	**FLAGGING**	**MHR**	**2400**
704-1048	**PORTABLE RUMBLE STRIPS**	**EACH**	**4**
704-1050	TYPE I BARRICADES	EACH	
704-1052	TYPE III BARRICADES	EACH	
704-1060	**DELINEATOR DRUMS**	**EACH**	**40**
704-1065	TRAFFIC CONES	EACH	
704-1067	TUBULAR MARKERS	EACH	
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1080	**STACKABLE VERTICAL PANELS**	**EACH**	**30**
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	
704-1185	**PILOT CAR**	**HR**	**800**
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	
762-0432	**SHORT TERM 6IN LINE - TYPE NR**	**LF**	**214840**

NOTE:
If additional signs are required, units will be calculated using the formula from Section III-18.06 of the Design Manual.
http://www.dot.nd.gov/

REGISTERED PROFESSIONAL ENGINEER
ERIC M MERCK
PE-28798
DATE 12/15/23
NORTH DAKOTA

Traffic Control Devices List

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	100	2



W20-1-48

G20-1-60

G20-2-48

G20-52aR-72

G20-52aL72

G20-50a-72

REGISTERED PROFESSIONAL ENGINEER
ERIC M. MERCK
PE-28798
DATE 12/15/23
NORTH DAKOTA

Construction Signing
Near Jct ND 53 to Near Fessenden
US 52

McHenry, Pierce, Sheridan & Wells County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	NH-4-052(104)141	110	1

Station / 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	Vert Clear-ance FT	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
142.05 Rt		437	8.4		13.6				5.0	2.5 x 2.5 10 ga	15.2						1	4	3 x 3 7 ga			1	
142.26 Lt		437	8.4		13.6				5.0	2.5 x 2.5 10 ga	15.2						1	4	3 x 3 7 ga			1	
158.85 Rt	SA 2E			5.2	14.1	14.6			5.0	2.25 x 2.25 12 ga	16.7	3.4	3.9			2.5 x 2.5 12 ga	2	4	3 x 3 7 ga	1		2	
168.67 Rt		9			12.0				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga	1			
168.78 Lt		9			12.0				5.0	2.25 x 2.25 12 ga	15.0						1	4	2.5 x 2.5 12 ga	1			
Sub Total			16.8	5.2		**Total**	79.9										**Total**	24.0		3	0	4	
Grand Total			**16.8**	**5.2**		**Total**	**79.9**										**Total**	**24**	**0**	**3**	**0**	**4**	

11/29/23 9:16:43AM
Page 1 of 1

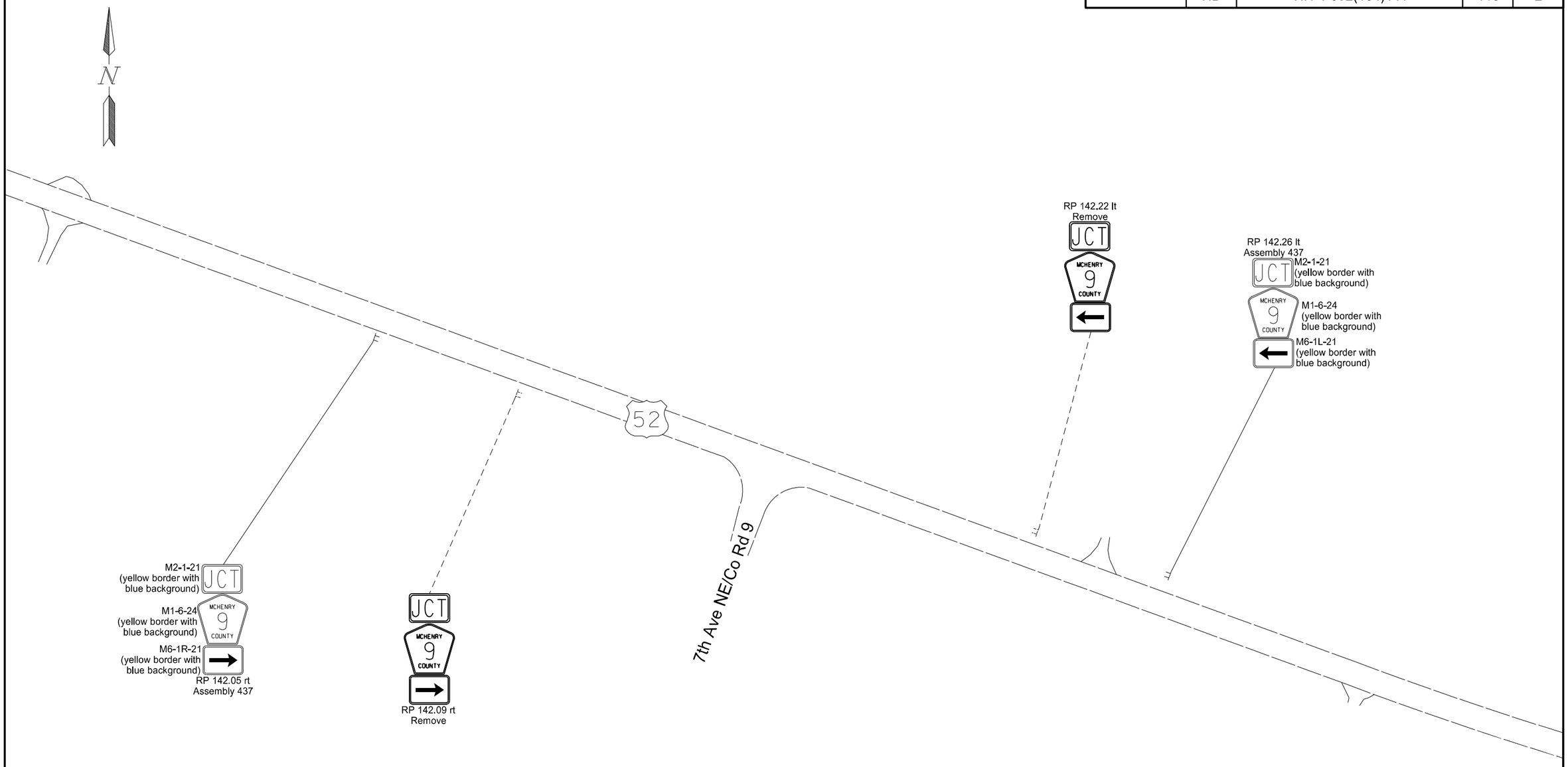
REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE
12/05/23
NORTH DAKOTA

Sign Summary
Perforated Tube

Near Jct ND 53 to Near Fessenden
US 52

McHenry, Pierce, Sheridan & Wells County, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	110	2

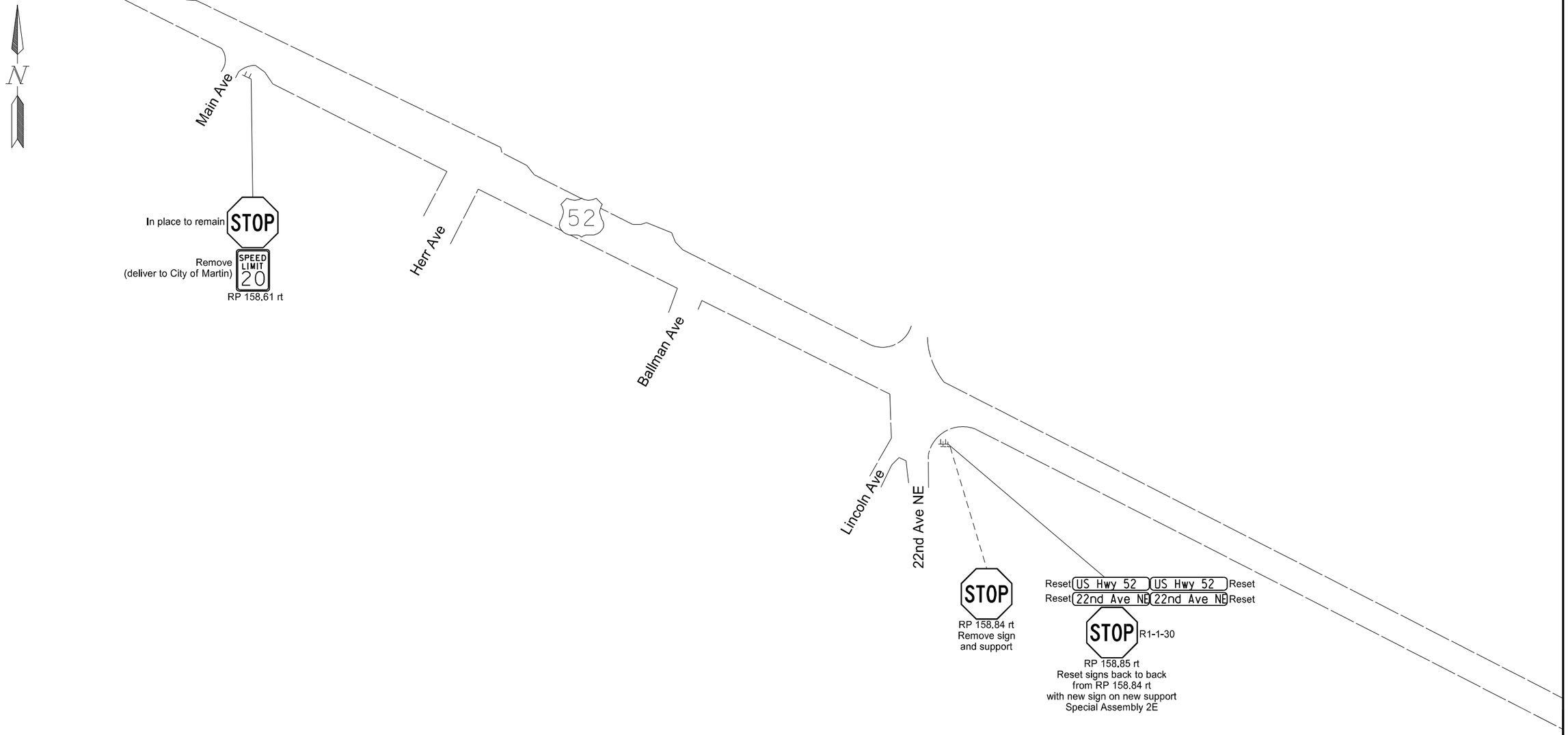


Sign Layout
Near Jct ND 53 to Near Fessenden
US 52

McHenry, Pierce, Sheridan & Wells County, ND

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 12/05/23
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	110	3

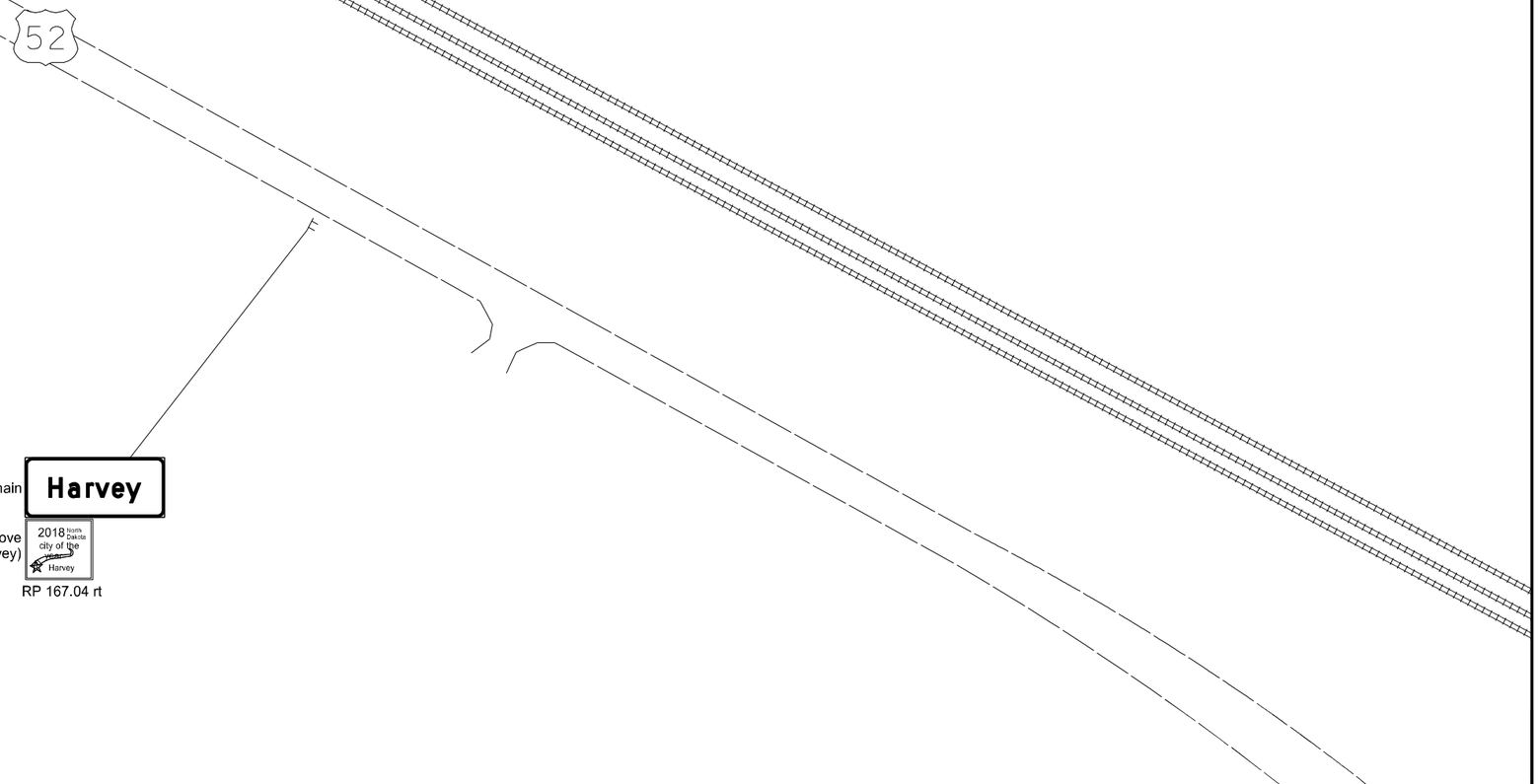


Sign Layout
Near Jct ND 53 to Near Fessenden
US 52

McHenry, Pierce, Sheridan & Wells County, ND

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 12/05/23
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	110	4



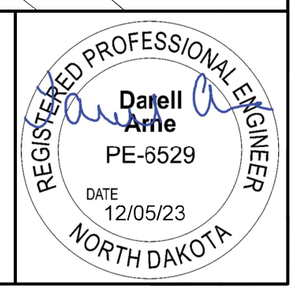
In place to remain **Harvey**

Remove (deliver to City of Harvey)

RP 167.04 rt

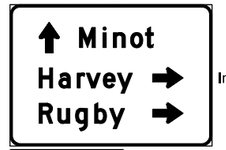
Sign Layout
Near Jct ND 53 to Near Fessenden
US 52

McHenry, Pierce, Sheridan & Wells County, ND

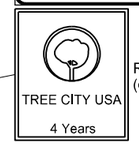


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	110	5

RP 167,96 lt



In place to remain



Remove
(deliver to City of Harvey)

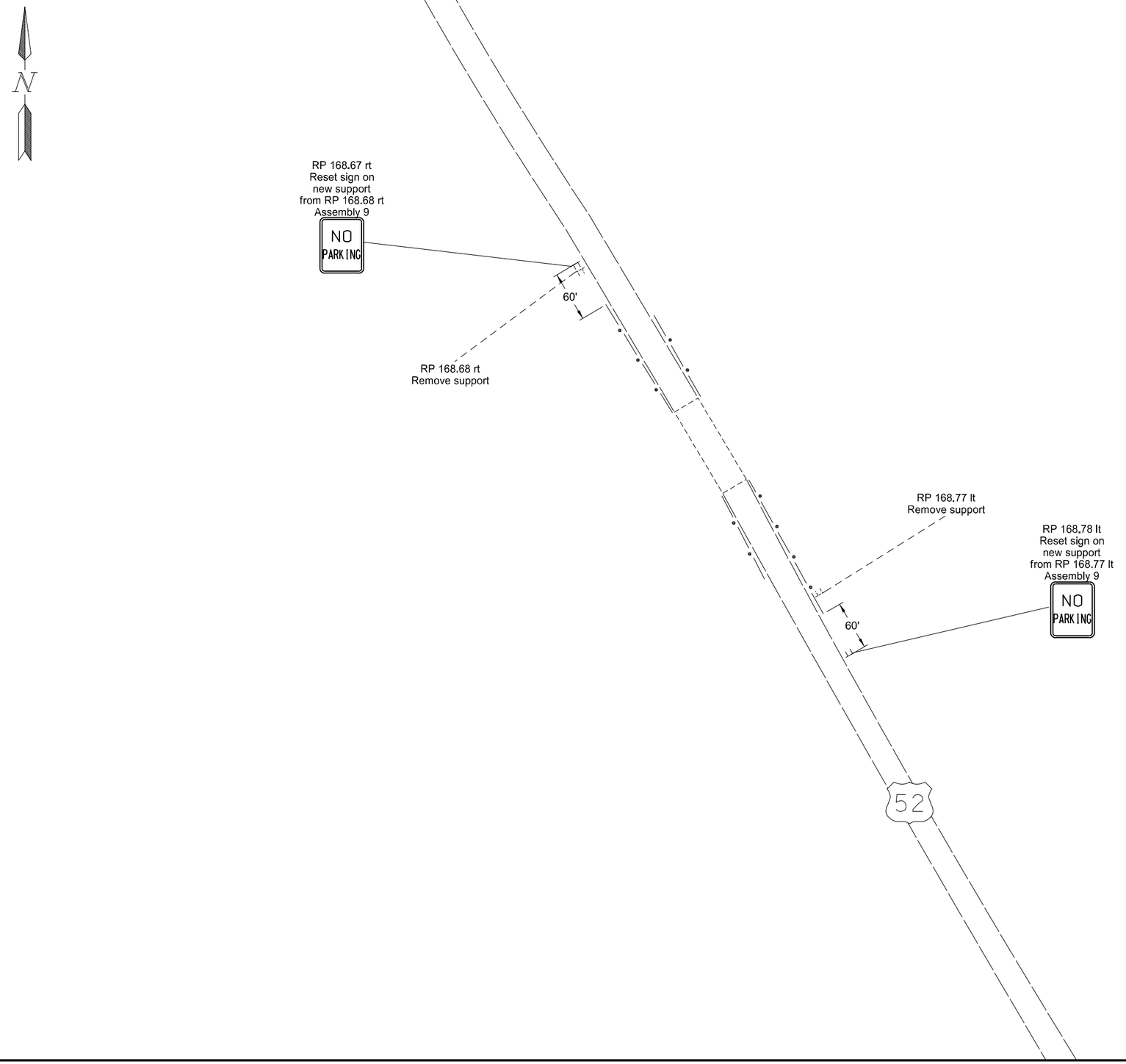
Sign Layout
Near Jct ND 53 to Near Fessenden
US 52

McHenry, Pierce, Sheridan & Wells County, ND

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 12/05/23
NORTH DAKOTA

DocuSign Envelope ID: E6CED128-0AEC-4DFC-AB74-F5E277F07B03

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	110	6



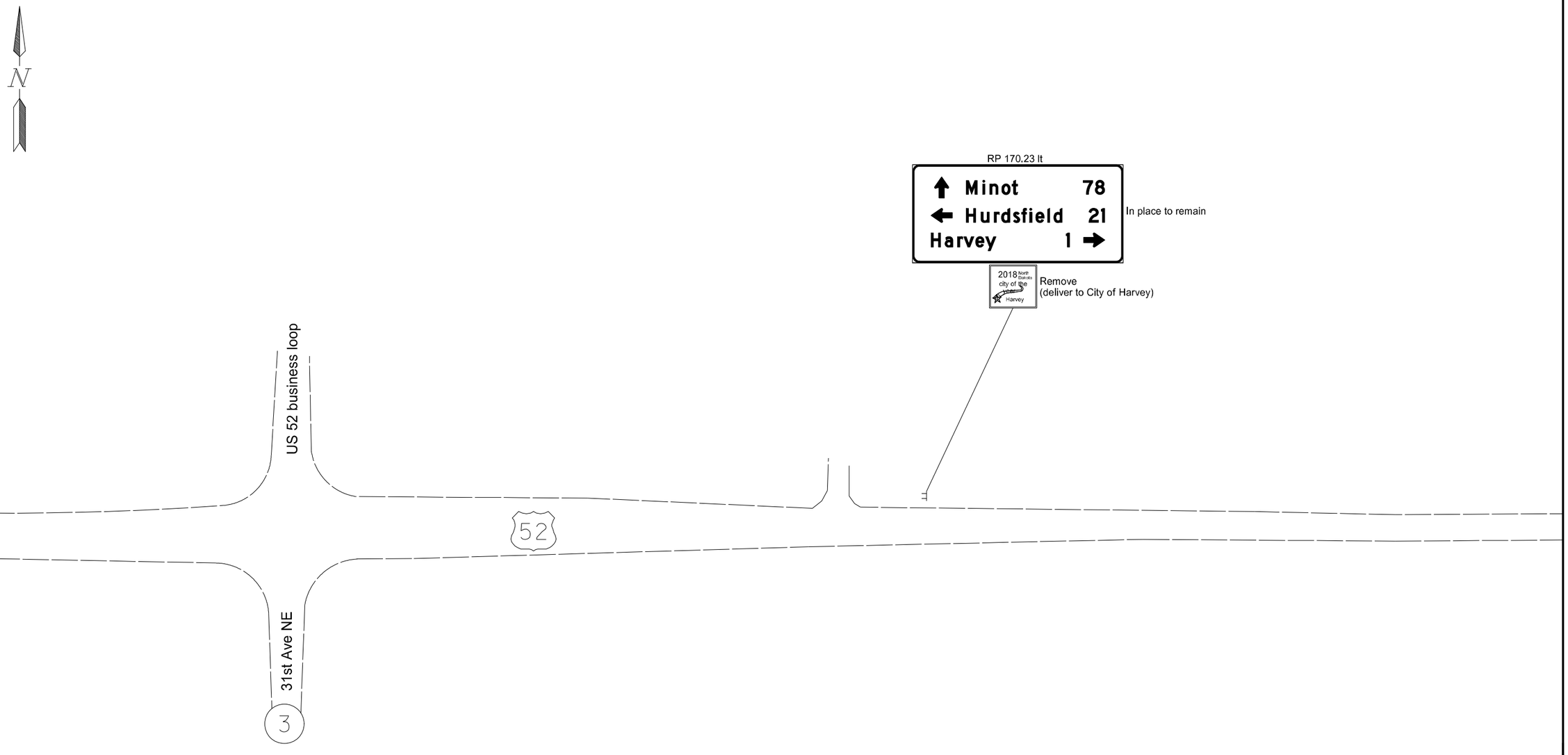
Sign Layout
Near Jct ND 53 to Near Fessenden
US 52

McHenry, Pierce, Sheridan & Wells County, ND

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE
12/05/23
NORTH DAKOTA

11/29/2023 9:34:57 AM sulvestad R:\project\40052141.104\Traffic\110SN_006_lsign.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	110	7

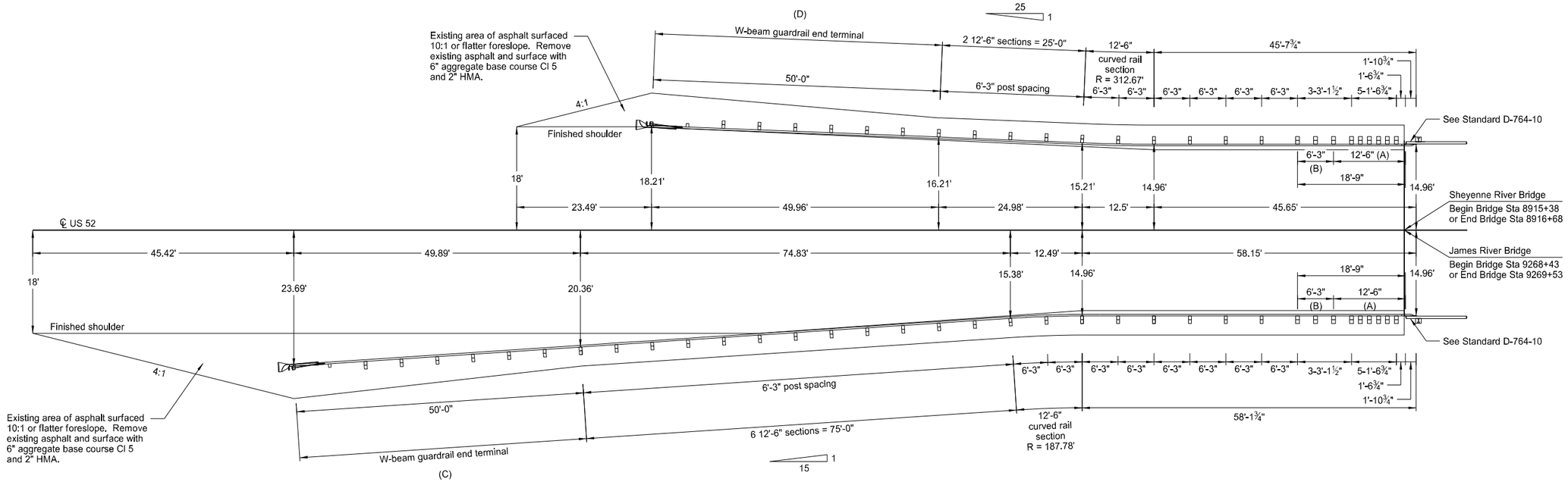


Sign Layout
Near Jct ND 53 to Near Fessenden
US 52

McHenry, Pierce, Sheridan & Wells County, ND

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 12/05/23
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-052(104)141	130	1



(A) Thrie beam rail section (double thickness)

(B) W-Thrie beam transition section (double thickness)

(C) Install a FLEAT end terminal at this location.

(D) Install an SKT end terminal at this location.

Thrie/W-Beam Guardrail Layout
At Both Ends of Bridge

Sheyenne River Bridge
RP 168.801

James River Bridge
RP 175.923

US 52

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 12/18/23
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-052(104)141	130	2

W-BEAM GUARDRAIL SUMMARY OF QUANTITIES

THRIE/W-BEAM GUARDRAIL AT BRIDGE ENDS

LOCATION	(A) 5/8" Ø x 18" LONG GUARD-RAIL BOLT	(A) 6" x 8" x 6'-0" TIMBER POST	(A) 6" x 8" x 14" TIMBER BLOCK	(A) 5/8" Ø x 1 1/4" LONG GUARD-RAIL BOLT	(A) 12'- 6" STRAIGHT W-BEAM RAIL SECTION	(A) 12'- 6" CURVED W-BEAM RAIL SECTION	(A) REFL-ECTOR-IZED PLATES	(A) 8"x 8" x 6' WOOD POST	(A) 8"x 8" x 22" WOOD OFF-SET BLOCK	(A) 8"x 8" x 18" WOOD OFF-SET BLOCK	(A) 8"x 8" x 14" WOOD OFF-SET BLOCK	(A) 6'-3" DOUBLE W-THRIE BEAM TRANS-ITION SECTION	(A) 12'-6" DOUBLE THRIE BEAM SECTION	(A) 2'-6" THRIE BEAM TERM-INAL CON-NECTOR	(A) 7/8" Ø x VAR-IABLE LONG. BOLT	(A) 3/4" Ø x 2-1/2" LONG POST BOLT
	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH
Sta 8914+69.53 to 8915+40.17 Rt	25	8	8	64	3	1	9	9	7	1	1	1	1	1	5	2
Sta 8914+82.02 to 8915+40.17 Lt	23	6	6	56	2	1	7	9	7	1	1	1	1	1	5	2
Sta 8916+65.83 to 8917+23.98 Rt	23	6	6	56	2	1	7	9	7	1	1	1	1	1	5	2
Sta 8916+65.83 to 8917+36.47 Lt	25	8	8	64	3	1	9	9	7	1	1	1	1	1	5	2
TOTAL	96	28	28	240	10	4	32	36	28	4	4	4	4	4	20	8

SPEC	CODE	BID ITEM	QTY	UNIT
764	0131	W-BEAM GUARDRAIL		
		Sta 8914+69.53 to 8915+40.17 Rt	70.7	LF
		Sta 8914+82.02 to 8915+40.17 Lt	58.2	LF
		Sta 8916+65.83 to 8917+23.98 Rt	58.2	LF
		Sta 8916+65.83 to 8917+36.47 Lt	70.7	LF
		Total	257.8	LF
764	0145	W-BEAM GUARDRAIL END TERMINAL		
		Sta 8913+44.81 to 8913+94.70 Rt	1	Ea
		Sta 8914+07.08 to 8914+57.04 Lt	1	Ea
		Sta 8917+48.96 to 8917+98.92 Rt	1	Ea
		Sta 8918+11.30 to 8918+61.19 Lt	1	Ea
		Total	4	Ea
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS		
		Sta 8913+76.06 to 8915+40.17 Rt	164.4	LF
		Sta 8914+63.34 to 8915+40.17 Lt	76.9	LF
		Sta 8916+65.83 to 8917+42.66 Rt	76.9	LF
		Sta 8916+65.83 to 8918+29.94 Lt	164.4	LF
		Total	482.6	LF

SPEC	CODE	BID ITEM	QTY	UNIT
764	1050	RESET W-BEAM GUARDRAIL		
		Sta 8913+94.70 to 8914+69.53 Rt	75	LF
		Sta 8914+57.04 to 8914+82.02 Lt	25	LF
		Sta 8917+23.98 to 8917+48.96 Rt	25	LF
		Sta 8917+36.47 to 8918+11.30 Lt	75	LF
		Total	200	LF
764	2081	REMOVE END TREATMENT & TRANSITION		
		Sta 8913+26.19 to 8913+76.06 Rt	1	Ea
		Sta 8914+13.47 to 8914+63.34 Lt	1	Ea
		Sta 8917+42.66 to 8917+92.53 Rt	1	Ea
		Sta 8918+29.94 to 8918+79.81 Lt	1	Ea
		Total	4	Ea

(A) Include these items in the contract unit price bid for "W-Beam Guardrail".

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 12/18/23
NORTH DAKOTA

Thrie/W-Beam Guardrail Quantities

Sheyenne River Bridge
RP 168.801

US 52

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-052(104)141	130	3

W-BEAM GUARDRAIL SUMMARY OF QUANTITIES

THRIE/W-BEAM GUARDRAIL AT BRIDGE ENDS

LOCATION	(A) 5/8" Ø x 18" LONG GUARD-RAIL BOLT	(A) 6" x 8" x 6'-0" TIMBER POST	(A) 6" x 8" x 14" TIMBER BLOCK	(A) 5/8" Ø x 1 1/4" LONG GUARD-RAIL BOLT	(A) 12'- 6" STRAIGHT W-BEAM RAIL SECTION	(A) 12'- 6" CURVED W-BEAM RAIL SECTION	(A) REFL-ECTOR-IZED PLATES	(A) 8"x 8" x 6' WOOD POST	(A) 8"x 8" x 22" WOOD OFF-SET BLOCK	(A) 8"x 8" x 18" WOOD OFF-SET BLOCK	(A) 8"x 8" x 14" WOOD OFF-SET BLOCK	(A) 6'-3" DOUBLE W-THRIE BEAM TRANS-ITION SECTION	(A) 12'-6" DOUBLE THRIE BEAM SECTION	(A) 2'-6" THRIE BEAM TERM-INAL CON-NECTOR	(A) 7/8" Ø x VAR-IABLE LONG. BOLT	(A) 3/4" Ø x 2-1/2" LONG POST BOLT
	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH
Sta 9267+74.53 to 9268+45.17 Rt	25	8	8	64	3	1	9	9	7	1	1	1	1	1	5	2
Sta 9267+87.02 to 9268+45.17 Lt	23	6	6	56	2	1	7	9	7	1	1	1	1	1	5	2
Sta 9269+50.83 to 9270+08.98 Rt	23	6	6	56	2	1	7	9	7	1	1	1	1	1	5	2
Sta 9269+50.83 to 9270+21.47 Lt	25	8	8	64	3	1	9	9	7	1	1	1	1	1	5	2
TOTAL	96	28	28	240	10	4	32	36	28	4	4	4	4	4	20	8

SPEC	CODE	BID ITEM	QTY	UNIT
764	0131	W-BEAM GUARDRAIL		
		Sta 9267+74.53 to 9268+45.17 Rt	70.7	LF
		Sta 9267+87.02 to 9268+45.17 Lt	58.2	LF
		Sta 9269+50.83 to 9270+08.98 Rt	58.2	LF
		Sta 9269+50.83 to 9270+21.47 Lt	70.7	LF
		Total	257.8	LF
764	0145	W-BEAM GUARDRAIL END TERMINAL		
		Sta 9266+49.81 to 9266+99.70 Rt	1	Ea
		Sta 9267+12.08 to 9267+62.04 Lt	1	Ea
		Sta 9270+33.96 to 9270+83.92 Rt	1	Ea
		Sta 9270+96.30 to 9271+46.19 Lt	1	Ea
		Total	4	Ea
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS		
		Sta 9266+81.06 to 9268+45.17 Rt	164.4	LF
		Sta 9267+68.34 to 9268+45.17 Lt	76.9	LF
		Sta 9269+50.83 to 9270+27.66 Rt	76.9	LF
		Sta 9269+50.83 to 9271+14.94 Lt	164.4	LF
		Total	482.6	LF

SPEC	CODE	BID ITEM	QTY	UNIT
764	1050	RESET W-BEAM GUARDRAIL		
		Sta 9266+99.70 to 9267+74.53 Rt	75	LF
		Sta 9267+62.04 to 9267+87.02 Lt	25	LF
		Sta 9270+08.98 to 9270+33.96 Rt	25	LF
		Sta 9270+21.47 to 9270+96.30 Lt	75	LF
		Total	200	LF
764	2081	REMOVE END TREATMENT & TRANSITION		
		Sta 9266+31.16 to 9266+81.06 Rt	1	Ea
		Sta 9267+18.47 to 9267+68.34 Lt	1	Ea
		Sta 9270+27.66 to 9270+77.53 Rt	1	Ea
		Sta 9271+14.94 to 9271+64.81 Lt	1	Ea
		Total	4	Ea

(A) Include these items in the contract unit price bid for "W-Beam Guardrail".

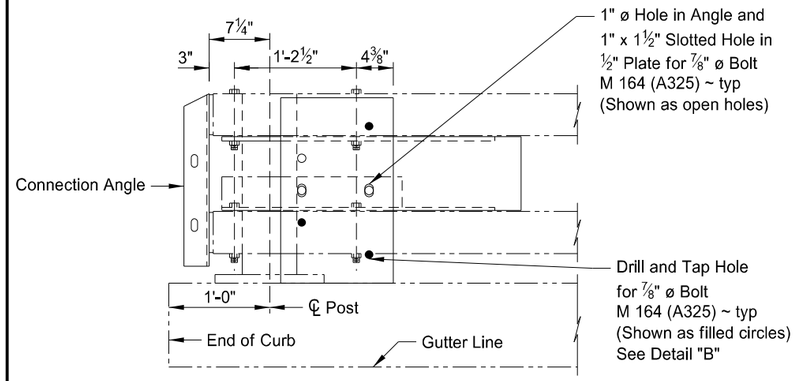
REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 12/18/23
NORTH DAKOTA

Thrie/W-Beam Guardrail Quantities

James River Bridge
RP 175.923

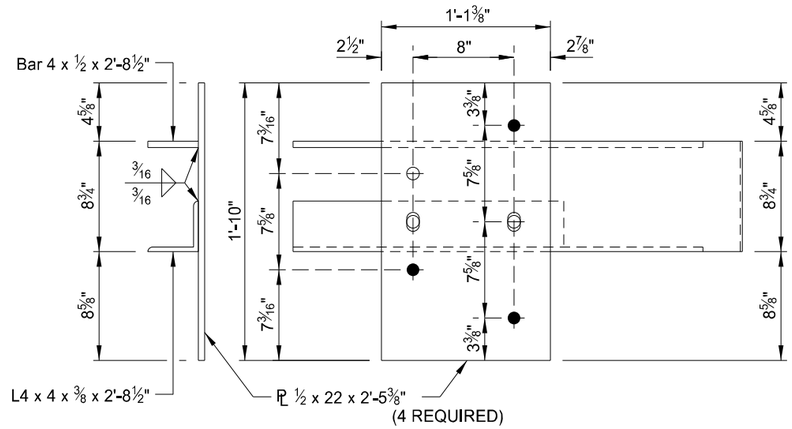
US 52

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-052(104)141	170	1

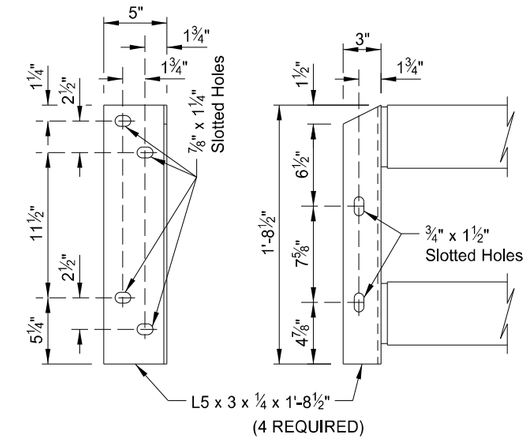


ELEVATION

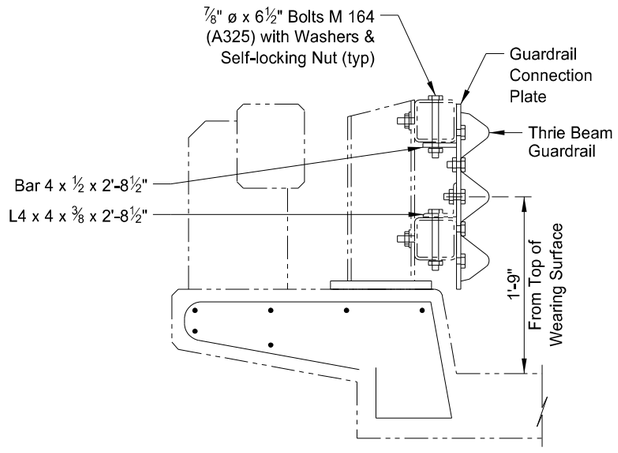
END POST CONNECTION DETAIL



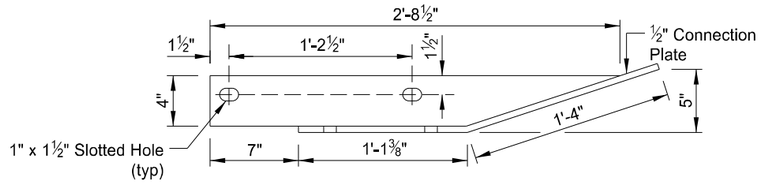
GUARDRAIL CONNECTION PLATE DETAILS



CONNECTION ANGLE DETAILS

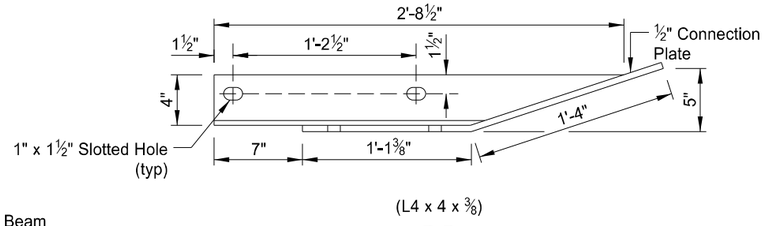


THRIE BEAM CONNECTION DETAIL



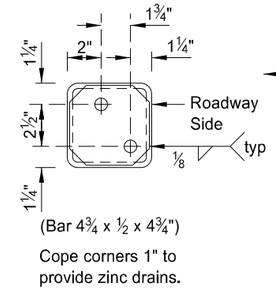
(Bar 4 x ½)

A-A



(L4 x 4 x ⅜)

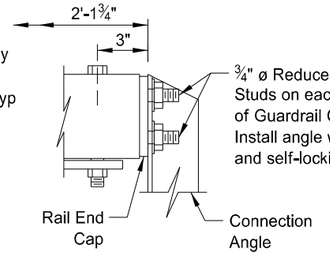
B-B



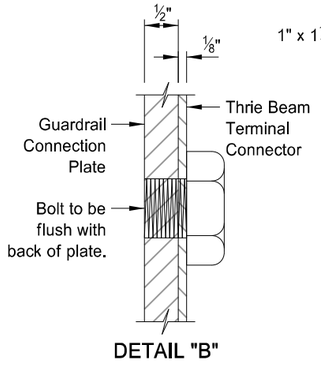
(Bar 4¾ x ½ x 4¾")

Cope corners 1" to
provide zinc drains.

RAIL CAP END VIEW



RAIL CAP DETAIL



DETAIL "B"

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
624	3005	CONNECTION PLATE MODIFICATION	EA	4

NOTES:

SCOPE OF WORK: Work at this site consists of modifiying the guardrail connection plates.

Maintain one lane of traffic across the bridge at all times.

REGISTERED PROFESSIONAL ENGINEER
Kyle Evert
PE-7868
DATE 12/07/23
NORTH DAKOTA

SHEYENNE RIVER
NEAR HARVEY

CONNECTION PLATE
MODIFICATION DETAILS

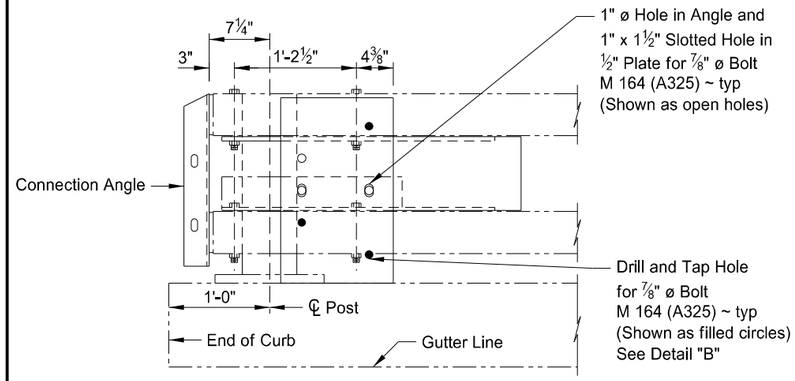
ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

Thorenson, Jason R.
12/07/23

DRAWING NO. 52-168.801-1

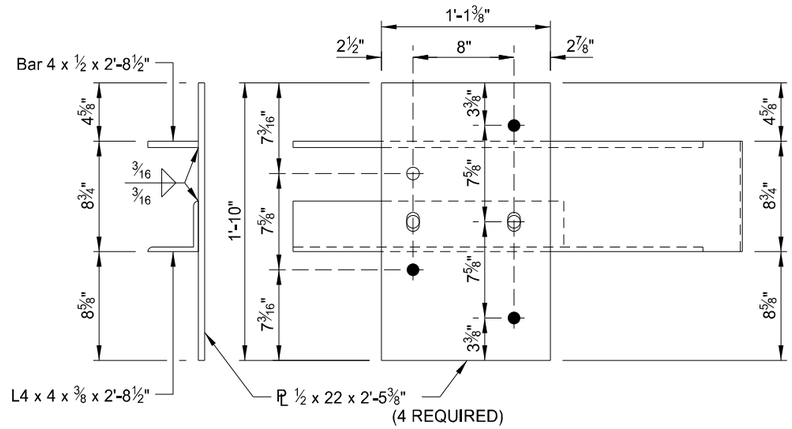
12/7/2023 9:53:10 AM acahlin R:\project\40052141.104\Bridge\dgn\52-168.801\170BR_001_CONNECTPL.dgn ATC KFE

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-052(104)141	170	2

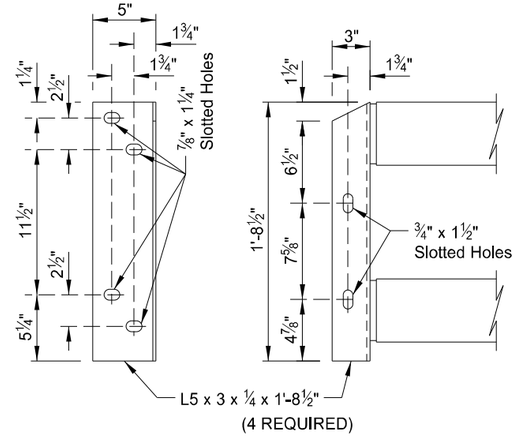


ELEVATION

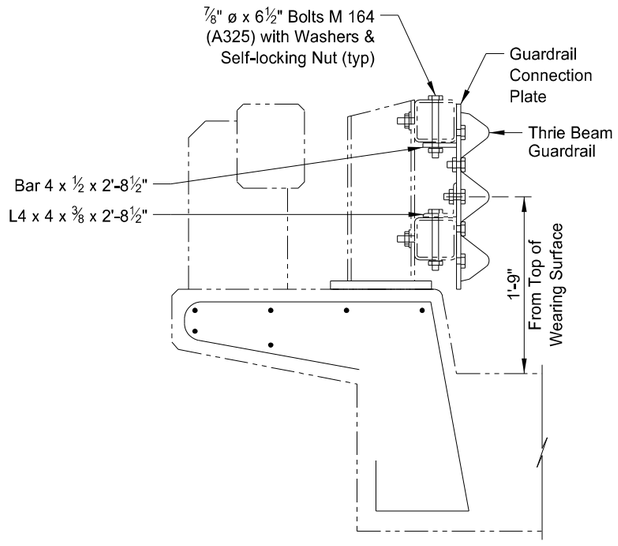
END POST CONNECTION DETAIL



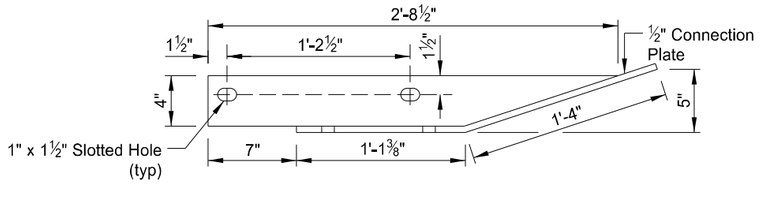
GUARDRAIL CONNECTION PLATE DETAILS



CONNECTION ANGLE DETAILS

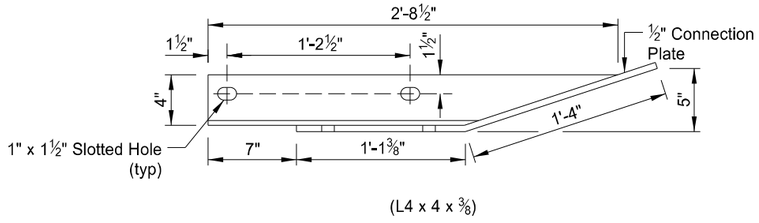


THRIE BEAM CONNECTION DETAIL



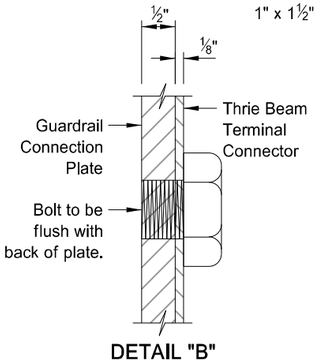
(Bar 4 x ½)

A-A

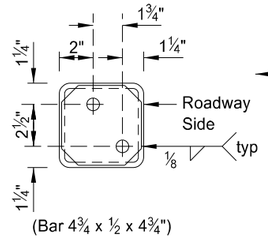


(L4 x 4 x ⅜)

B-B



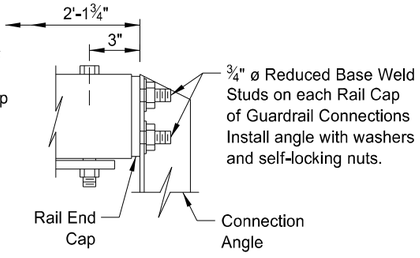
DETAIL "B"



(Bar 4¾ x ½ x 4¾")

Cope corners 1" to
provide zinc drains.

RAIL CAP END VIEW



RAIL CAP DETAIL

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
624	3005	CONNECTION PLATE MODIFICATION	EA	4

NOTES:

SCOPE OF WORK: Work at this site consists of modifiying the guardrail connection plates.

Maintain one lane of traffic across the bridge at all times.

REGISTERED PROFESSIONAL ENGINEER
Kyle Evert
PE-7868
DATE 12/07/23
NORTH DAKOTA

JAMES RIVER
NEAR MANFRED

CONNECTION PLATE
MODIFICATION DETAILS

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

Thorenson, Jason R.
12/07/23

DRAWING NO. 52-175.923-1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	180	1

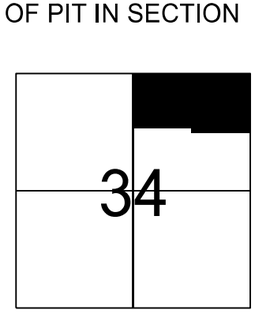
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

TEST HOLE PLAT

Location: NE1/4 34-155-77 County: McHenry

Ownership: Henry Ramon & Helen E. Anderson Towner, ND

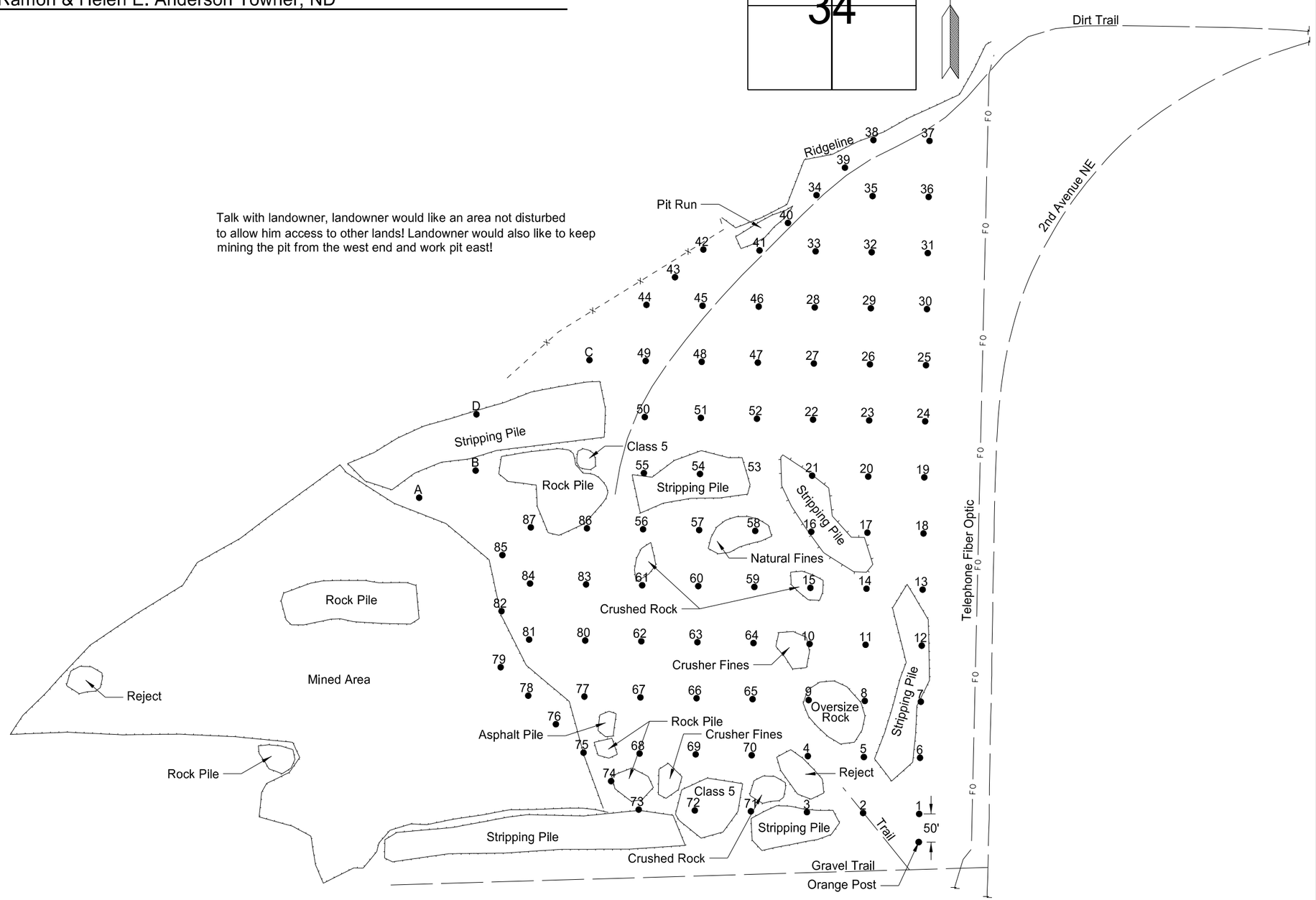
LOCATION OF PIT IN SECTION



Area "A" consists of Test Holes 1 - 9
Area "B" consists of Test Holes 10 - 18
Area "C" consists of Test Holes 19 - 27
Area "D" consists of Test Holes 28 - 39
Area "E" consists of Test Holes 40 - 46
Area "F" consists of Test Holes 47 - 55
Area "G" consists of Test Holes 56 - 64
Area "H" consists of Test Holes 65 - 74
Area "I" consists of Test Holes 75 - 87
Testholes A - D for information only

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

Talk with landowner, landowner would like an area not disturbed to allow him access to other lands! Landowner would also like to keep mining the pit from the west end and work pit east!



Scale 1"=200'

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-052(104)141	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	2.5	0.5 gr SiCl	6	27	44	58	+WL 13.0
		10.0 gr					
2	2.0	8.5 gr	2	14	29	40	+WL 12.0
		1.5 sd					
3	3.0	1.0 gr SiCl	1	18	34	46	FS SiCl
		6.0 gr					
		1.0 FS CoS					
4	3.5	10.5 gr	3	19	36	48	+WL 14.0
5	2.0	6.5 gr	5	23	38	48	+WL 13.0
		0.5 sd					
		1.0 sd CoS					
		1.0 FS CoS					
		0.5 SiCl					
		1.5 gr					
6	4.0	9.5 gr	2	17	36	47	+WL 14.5
		1.0 sd					
7	4.0	5.5 gr	4	22	39	47	+WL 15.0
		0.5 sd					
		1.5 Fgr					
		0.5 FS CoS					
		1.0 FS SiCl					
		2.0 gr					
8	3.0	10.5 gr	3	20	39	50	+WL 13.5
9	3.5	0.5 gr SiCl	4	22	37	48	+WL 14.0
		6.5 gr					
		0.5 sd					
		3.0 gr					
10	3.5	10.5 gr	1	16	33	43	+WL 14.0
11	3.5	8.5 gr	2	26	42	51	+WL 13.0
		0.5 sd					
		1.0 gr					
12	1.0	10.0 gr	1	20	39	53	+WL 11.0
13	6.0	10.0 gr	2	23	39	49	+WL 16.0
14	4.0	6.0 gr	1	16	29	38	+WL 14.0
		2.0 sd					
		2.0 gr					
15	4.0	7.5 gr	4	25	40	52	+WL 14.0
		0.5 gr SCoS					
		2.0 gr					
16	3.0	8.5 gr	2	17	34	44	+WL 14.0
		0.5 sd					
		2.0 gr					
17	4.5	10.0 gr	3	20	35	45	+WL 16.0
		0.5 sd					
		1.0 gr					
18	5.5	10.5 gr	2	9.5	32	43	+Cave
19	3.0	12.0 gr	5	26	40	49	+WL 15.0
20	2.5	9.5 gr	2	16	32	44	+WL 14.0
		1.0 sd					
		1.0 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
21	2.5	9.5 gr	2	22	39	50	+WL 13.0
		0.5 SiCl					
		0.5 gr					
22	2.0	11.0 gr	2	19	37	47	+WL 13.0
23	1.5	0.5 gr SiCl	1	22	36	46	+WL 13.0
		6.5 gr					
		1.0 sd					
		0.5 Fgr					
		3.0 gr					
24	2.0	1.0 gr SiCl	2	17	35	45	+WL 13.0
		10.0 gr					
25	3.0	0.5 gr SiCl	1	19	34	46	+WL 14.5
		8.0 gr					
		0.5 sd					
		2.5 gr					
26	2.5	10.5 gr	2	20	36	45	+WL 14.0
		1.0 gr CoS					
27	2.0	0.5 gr SiCl	3	23	39	49	+WL 14.0
		11.5 gr					
28	3.0	8.0 gr	1	18	32	40	+WL 14.0
		1.5 sd					
		1.5 FS					
29	2.5	0.5 gr SiCl	6	23	39	49	+WL 15.0
		10.0 gr					
		1.0 FS					
		1.0 gr					
		1.0 Fgr CoS					
		1.0 gr					
30	2.5	8.0 gr	2	17	31	41	+WL 15.0
		0.5 SiCl					
		2.0 gr					
		2.0 sd CoS					
31	3.0	12.0 gr	5	26	40	50	+WL 15.0
32	3.0	12.0 gr	3	18	36	47	+WL 15.0
33	2.0	10.0 gr	4	23	40	53	+WL 15.0
		1.0 sd					
		2.0 gr					
34	1.0	13.0 gr	2	20	37	47	+WL 14.0
35	2.0	11.5 gr	6	24	41	51	+WL 15.0
		1.5 gr CoS					
36	2.5	11.5 gr	3	22	37	45	+WL 15.0
		0.5 SiCl					
		0.5 gr					
37	1.0	13.0 gr	2	28	42	50	+WL 14.0
38	1.0	13.0 gr	2	22	38	47	+WL 14.0
39	1.0	0.5 gr SiCl	0	19	35	46	+WL 14.0
		10.5 gr					
		1.0 Fgr CoS					
		1.0 gr					
40	1.5	12.5 gr	3	23	39	50	+WL 14.0
41	1.5	12.5 gr	6	27	43	53	+WL 14.0

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
42	1.5	9.5 gr	1	18	35	45	+WL 13.5
		1.0 sd					
		1.5 gr					
43	1.5	0.5 gr SiCl	6	27	42	52	+WL 14.0
		12.0 gr					
44	3.0	10.5 gr	3	21	35	46	+WL 16.0
		0.5 sd					
		2.0 gr					
45	2.0	12.5 gr	4	23	41	51	+WL 14.5
46	2.0	1.0 gr SiCl	2	20	39	50	+WL 14.0
		11.0 gr					
47	2.0	9.0 gr	4	29	48	57	+WL 14.0
		1.0 gr SiCl					
		2.0 gr					
48	3.5	8.5 gr	4	15	31	40	+WL 15.0
		1.0 sd					
		2.0 gr					
49	5.5	0.5 gr SiCl	4	20	36	47	+WL 18.0
		12.0 gr					
50	6.0	12.0 gr	2	16	34	44	+WL 18.0
51	4.5	0.5 gr SiCl	3	22	37	46	+WL 16.0
		8.0 gr					
		1.0 Fgr					
		2.0 gr					
52	3.5	6.5 gr	1	17	32	41	+WL 15.0
		2.0 sd					
		0.5 gr					
		0.5 SiCl					
		2.0 gr CoS					
53	4.0	10.0 gr	2	24	39	50	+WL 15.0
		1.0 sd					
54	5.5	9.5 gr	1	16	31	42	+WL 17.0
		1.0 gr CoS					
		1.0 gr					
55	7.0	11.0 gr	5	30	45	54	+WL 18.0
56	4.5	10.5	1	20	35	45	+WL 15.0
57	4.5	10.5 gr	0	23	39	49	+WL 15.0
58	4.0	11.0 gr	1	20	39	50	+WL 15.0
59	4.0	10.0 gr	1	24	42	53	+WL 14.0
60	6.0	10.0 gr	1	18	36	47	+WL 16.0
61	5.0	9.0 gr	1	23	40	51	+WL 15.0
		1.0 gr CoS					
62	5.0	9.5 gr	3	18	38	50	+WL 14.5
63	5.5	8.5 gr	3	22	38	50	+WL 14.0
64	5.0	9.5 gr	2	15	35	46	+WL 14.5
65	5.0	5.0 gr	1	18	36	49	+WL 14.5
		1.0 sd					
		3.0 3.5					
66	5.0	8.0 gr	1	15	31	42	+WL 15.0
		2.0 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	
67	3.5	0.5 gr SiCl	1	18	39	50	+WL 13.5
		9.5 gr					
68	2.0	10.0 gr	2	18	37	48	+WL 12.0
69	3.0	10.0 gr	0	19	37	46	+WL 13.5
		0.5 sd					
70	4.0	8.0 gr	1	17	31	40	+WL 14.0
		2.0 sd					
71	2.0	10.0 gr	1	26	45	55	+WL 12.0
72	1.0	6.5 gr	2	19	37	47	+WL 11.0
		1.0 sd					
		2.5 gr					
73	1.0	1.5 gr SiCl	1	23	40	51	+WL 10.5
		8.0 gr					
74	0.5	9.0 gr	1	17	35	45	+WL 9.5
75	0.5	2.5 gr	1	20	39	49	+WL 8.0
		1.0 sd					
		4.0 gr					
76	0.0	3.5 gr	1	17	35	45	+WL 3.5
77	0.0	10.5 gr	3	22	40	51	+WL 10.5
78	0.0	7.0 gr	2	20	37	49	+WL 7.5
		0.5 gr CoS					
79	0.0	2.0 gr	0	20	42	51	+WL 2.5
		0.5 gr CoS					
80	3.0	9.0 gr	1	20	36	48	+WL 12.0
81	2.0	9.5 gr	6	28	43	52	+WL 11.5
82	0.0	4.0 gr	2	15	30	41	+WL 11.0
		0.5 SiCl					
		3.5 gr					
		1.0 sd CoS					
		1.0 sd					
		1.0 gr					
83	4.0	10.0 gr	6	26	42	53	+WL 14.0
84	3.0	10.5 gr	2	17	33	45	+WL 13.5
85	3.0	11.0 gr	3	26	40	51	+WL 14.0
86	4.5	9.0 gr	2	24	39	50	+WL 13.5
87	4.0	9.0 gr	3	20	32	42	+WL 14.5
		1.5 sd					

RANGE 77 **TWP** 155 **SEC** NE1/4 34

COUNTY McHenry Jun-20

PROSPECTED BY Volk/Nelson

INSPECTED & APPROVED Jeffrey Swank Jul-20

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-052(104)141	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
A1	0.0	5.0 gr	3	22	39	50	+Cave
B1	4.5	0.5 gr SiCl	3	22	39	51	+WL 16.0
		8.5 gr					
		0.5 sd					
		2.0 gr					
C1	1.5	9.0 gr	3	19	35	45	+WL 13.0
		0.5 gr SiCl					
		2.0 gr					
D1	6.0	13.0 gr	3	23	39	48	+WL 19.0

RANGE 77 **TWP** 155 **SEC** NE1/4 34

COUNTY McHenry Jun-20

PROSPECTED BY Volk/Nelson

INSPECTED & APPROVED Jeffrey Swank Jul-20

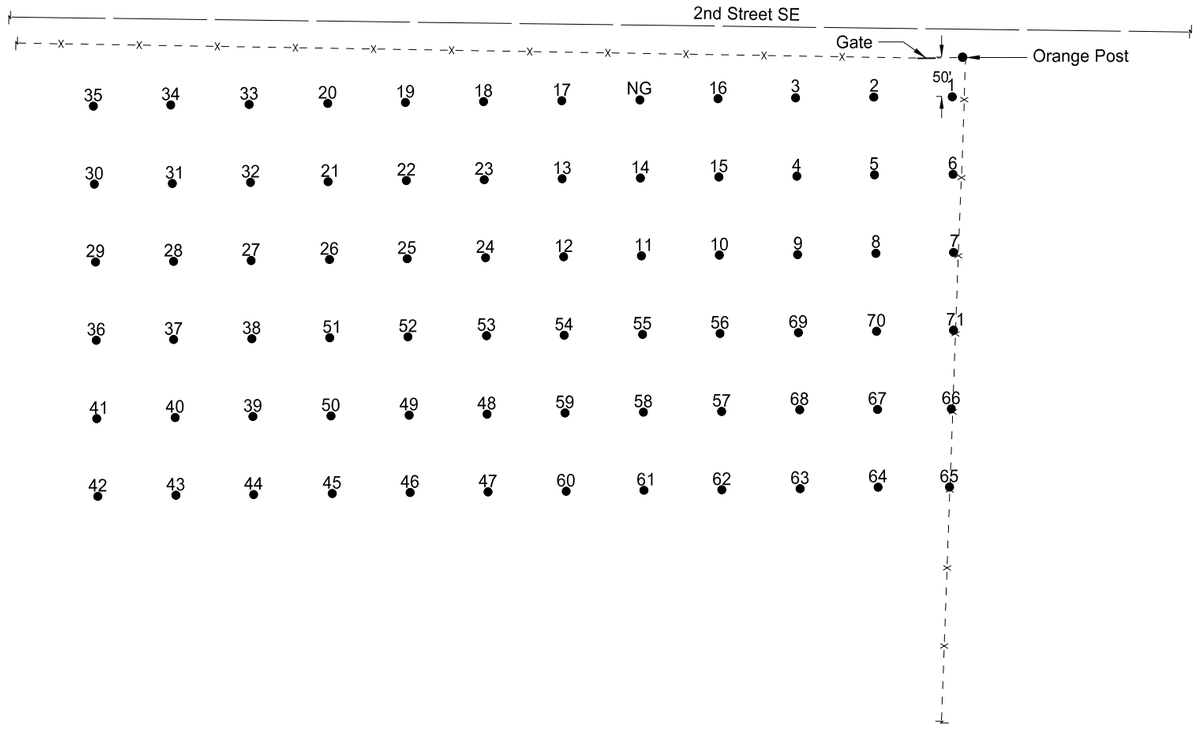
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-4-052(104)141	180	4

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

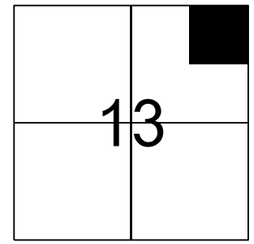
TEST HOLE PLAT

Location: NE1/4NE1/4 13-145-74 County: Sheridan

Ownership: Betty Mertz, John Mertz and Terry Mertz



LOCATION OF PIT IN SECTION



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

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

Scale 1"=200'

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-052(104)141	180	5

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	2.0	2.0 gr SiCl	0	8	19	30	SiCl
		1.0 sd SiCl					
2	1.0	11.0 Fgr	2	9	20	31	+gr
		1.0 FgrSiCl					
		1.0 Fgr					
		2.0 FgrSiCl					
		1.0 gr SiCl					
		2.0 gr					
		1.0 gr SiCl					
3	0.5	10.5 Fgr	0	3	8	14	+gr
		2.0 gr SiCl					
		7.0 gr					
4	1.0	5.0 FgrSiCl	0	0	6	11	+gr
		1.0 Fgr					
		1.0 FgrSiCl					
		10.0 Fgr					
		2.0 FgrSiCl					
5	1.0	3.0 gr	0	2	8	18	SiCl
		2.0 Fgr					
		3.0 gr					
		2.0 Fgr					
		2.0 gr SiCl					
		1.0 Fgr					
6	1.0	1.0 FgrSiCl	0	3	10	20	SiCl
		6.0 Fgr					
		3.0 FgrSiCl					
		2.5 Fgr					
		1.5 FgrSiCl					
7	0.5	1.5 gr	0	0	5	11	SiCl
8	0.5	2.5 gr	0	5	13	22	+gr
		1.0 Fgr					
		1.0 gr					
		2.0 FgrSiCl					
		2.0 Fgr					
		2.0 FgrSiCl					
		5.0 Fgr					
		1.0 gr CoS					
		3.0 Fgr					
9	0.5	2.5 gr	0	13	24	34	+cave
		2.0 FS					
		2.0 Fgr					
		2.0 gr					
		1.0 gr CoS					
		1.0 gr					
		4.0 CGr					
10	0.5	2.5 gr	0	6	15	27	SiCl
		2.0 Fgr					
		1.0 gr					
		5.0 Fgr					

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
11	2.0	5.0 gr	0	10	20	30	+gr
		1.0 Fgr					
		4.0 gr					
		1.0 Fgr					
		1.0 gr					
		1.0 Fgr					
		2.0 FgrSiCl					
		3.0 Fgr					
12	2.0	1.0 gr	0	3	15	28	+gr
		10.0 Fgr					
		1.0 gr					
		1.0 FgrSiCl					
		5.0 Fgr					
13	0.5	5.5 Fgr	1	6	14	24	SiCl
		9.0 gr					
		3.0 Fgr					
14	2.0	3.0 Fgr	0	8	22	36	SiCl
		2.0 gr					
15	1.0	3.0 Fgr	0	1	4	7	SiCl
		3.0 sd sh					
		2.0 gr					
16	0.5	9.5 Fgr	0	4	11	19	SiCl
		2.0 gr					
17	1.0	3.0 Fgr	2	23	36	48	rk
		5.0 gr					
18	1.0	11.0 Fgr	0	3	8	17	SiCl
		1.0 gr					
19	1.5	11.5 Fgr	0	5	9	17	SiCl
20	0.5	19.5 Fgr	0	1	7	15	+gr
21	2.0	2.0 gr	0	10	19	27	+gr
		2.0 Fgr					
		3.0 gr					
		1.0 Fgr					
		2.0 gr					
		5.0 Fgr					
		1.0 sd sh					
		1.0 Fgr					
		1.0 sd					
22	1.5	12.5 Fgr	0	3	9	18	SiCl
23	2.0	8.5 Fgr	0	2	8	15	SiCl
		0.5 sd					
		2.5 Fgr					
24	1.0	6.0 gr	3	11	22	34	+gr
		1.0 Fgr					
		6.0 gr					
		2.0 CGr					
		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
25	0.5	5.5 Fgr	2	12	23	34	+gr
		2.0 gr					
		1.0 Fgr					
		2.0 gr					
		3.0 Fgr					
		3.0 gr					
		3.0 Fgr					
26	0.5	7.5 gr	0	11	19	30	+gr
		2.0 Fgr					
		2.0 gr					
		2.0 Fgr					
		1.0 gr					
		5.0 Fgr					
27	0.5	6.5 gr	4	17	29	40	+gr
		5.0 Fgr					
		1.0 gr					
		2.0 Fgr					
		1.5 Fgr sh					
		3.5 CGr					
28	0.5	4.5 Fgr	4	14	25	34	rk
		1.0 gr					
		6.0 Fgr					
		3.5 gr					
29	2.0	11.0 Fgr	1	11	18	27	rk
		2.0 Fgr sh					
		2.5 CGr					
30	2.0	9.0 Fgr	0	3	10	18	SiCl
		1.0 sd sh					
31	2.0	14.0 Fgr	0	2	9	17	SiCl
32	2.0	11.0 Fgr	0	4	12	21	SiCl
		1.0 sd					
		4.5 Fgr					
33	0.5	11.5 Fgr	0	0	3	10	SiCl
		1.0 Fgr sh					
		6.0 Fgr					
34	3.0	5.0 Fgr	0	2	6	12	+gr
		1.0 sd					
		3.0 Fgr					
		1.0 CS					
		3.0 Fgr					
		1.0 sd					
		3.0 Fgr					
35	2.0	10.0 Fgr	0	1	4	9	SiCl
36	2.0	12.0 Fgr	1	11	19	27	+gr
		1.0 FgrSiCl					
		2.0 sd sh					
		1.0 sd					
		2.0 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	
37	1.0	5.0 gr	1	15	25	36	rk
		4.0 Fgr					
		1.0 gr					
		2.0 Fgr					
		4.0 gr					
38	1.0	7.0 gr	0	9	19	28	SiCl
		4.0 Fgr					
		1.0 gr					
		4.0 Fgr					
		1.5 sd sh					
39	0.5	9.5 gr	1	8	18	27	+gr
		3.0 Fgr					
		2.0 gr					
		5.0 Fgr					
40	1.5	3.5 Fgr	0	5	13	22	+gr
		2.0 gr					
		10.0 Fgr					
		3.0 sd					
41	1.5	2.5 gr	0	4	13	21	+gr
		1.0 Fgr					
		2.0 gr					
		6.0 Fgr					
		2.0 Fgr sh					
42	0.5	2.5 Fgr	0	3	10	16	+gr
		1.0 gr					
		6.0 Fgr					
		2.0 Fgr sh					
		1.0 Fgr					
		1.0 Fgr sh					
		1.0 FS					
		1.0 Fgr sh					
		0.5 Fgr					
		1.5 Fgr sh					
		2.0 sd					
43	1.0	4.0 Fgr	2	6	14	23	+gr
		3.0 gr					
		12.0 Fgr					

RANGE 74 **TWP** 145 **SEC** NE 1/4 13

COUNTY Sheridan May-17

PROSPECTED BY Rogstad/Usher

INSPECTED & APPROVED Jeffrey Swank Jun-17

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-4-052(104)141	180	6

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
44	1.0	6.0 gr	0	8	19	29	+gr
		2.0 Fgr					
		2.0 gr					
		2.0 Fgr					
		2.0 gr					
		5.0 Fgr					
45	0.5	4.5 Fgr	0	10	20	31	+gr
		1.0 gr					
		8.0 Fgr					
		1.0 gr					
		5.0 Fgr					
46	1.0	8.0 gr	1	11	22	33	+gr
		1.0 Fgr					
		5.0 gr					
		5.0 Fgr					
47	0.5	2.5 Fgr	1	16	25	36	+gr
		5.0 gr					
		1.0 Fgr					
		1.0 gr					
		7.0 Fgr					
		1.0 gr					
		1.0 Fgr					
		1.0 gr					
48	0.5	13.5 gr	1	12	23	35	+gr
		2.0 Fgr					
		1.0 gr					
		2.0 Fgr					
		1.0 gr					
49	0.5	2.5 gr	1	13	23	34	+gr
		1.0 Fgr					
		2.0 gr					
		5.0 Fgr					
		1.0 gr					
		4.0 Fgr					
		2.0 gr					
		2.0 Fgr					
50	0.5	7.5 gr	1	8	20	31	+gr
		1.0 Fgr					
		4.0 gr					
		7.0 Fgr					
51	0.5	5.5 gr	3	16	26	36	+gr
		2.0 Fgr					
		3.0 gr					
		2.0 Fgr					
		2.0 gr					
		5.0 Fgr					

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
52	0.5	10.5 gr	1	9	22	34	+gr
		2.0 Fgr					
		1.0 gr					
		1.0 Fgr					
		2.5 gr					
		2.5 Fgr					
53	1.0	6.0 gr	2	11	25	37	+gr
		1.0 Fgr					
		5.0 gr					
		3.0 Fgr					
		4.0 gr					
54	1.0	2.0 Fgr	3	15	26	37	+gr
		4.0 gr					
		1.0 Fgr					
		9.0 gr					
		1.0 Fgr					
		2.0 gr					
		1.5 Fgr					
		0.5 gr					
		2.0 Fgr					
		3.0 gr					
		2.0 Fgr					
		3.0 gr					
55	0.5	19.5 gr	2	14	27	39	+gr
56	0.5	8.5 gr	3	14	27	39	+gr
		1.0 Fgr					
		3.0 gr					
		1.5 Fgr					
		0.5 gr					
		2.0 Fgr					
		3.0 gr					
57	0.5	19.5 gr	2	13	25	37	+gr
58	0.5	2.5 gr	2	12	25	36	+gr
		1.0 Fgr					
		3.0 gr					
		2.0 Fgr					
		5.0 gr					
		2.5 Fgr					
		3.5 gr					
59	0.5	13.5 gr	0	14	27	39	+cave
60	0.5	5.5 gr	2	10	25	39	rk
		2.0 Fgr					
		3.0 gr					
61	2.0	18.0 gr	1	12	26	38	+gr
62	0.5	5.5 gr	2	14	26	37	+gr
		2.0 Fgr					
		3.5 gr					
		0.5 Fgr					
		3.0 gr					
		1.0 Fgr					
		4.0 gr					
63	3.0	17.0 gr	2	10	22	35	+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
64	0.5	4.5 gr	2	16	26	38	+gr
		1.0 Fgr					
		8.0 gr					
		2.0 Fgr					
		1.0 gr					
		2.0 Fgr					
		1.0 gr					
65	0.5	9.5 gr	0	10	21	34	+gr
		1.0 Fgr					
		2.0 gr					
		2.0 Fgr					
		2.0 gr					
		1.0 FgrSiCl					
		2.0 Fgr					
66	0.5	3.5 gr	0	3	12	23	+gr
		2.0 Fgr					
		2.0 gr					
		1.0 Fgr					
		9.5 FgrSiCl					
		1.5 sd sh					
67	0.5	5.5 gr	0	13	23	35	+gr
		1.0 Fgr					
		13.0 gr					
68	1.0	13.0 gr	3	13	30	39	+gr
		1.0 Fgr					
		5.0 gr					
69	1.0	7.0 gr	3	14	28	42	+gr
		1.0 Fgr					
		11.0 gr					
70	0.5	2.5 CGr	2	11	22	33	SiCl
		5.0 gr					
		2.0 Fgr					
		2.0 FgrSiCl					
		1.0 Fgr					
		2.0 FgrSiCl					
		1.0 Fgr					
71	0.5	3.5 gr	0	5	13	23	SiCl
		1.0 Fgr					
		1.0 FgrSiCl					
		1.0 Fgr					

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 74 **TWP** 145 **SEC** NE 1/4 13

COUNTY Sheridan May-17

PROSPECTED BY Rogstad/Usher

INSPECTED & APPROVED Jeffrey Swank Jun-17

NDDOT ABBREVIATIONS

D-101-1

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
04-23-18	General Revisions
09-20-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
08/16/22

NDDOT ABBREVIATIONS

D-101-2

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
Gov	government
Grd	graded/grade
Grnd	ground
GWM	ground water monitor
Gdrl	guardrail
Gtr	gutter
H Plg	H piling
Hdwl	headwall
Ht	height
Hel	helical
HDPE	high density polyethylene
HM	high mast
HP	high pressure
HPS	high pressure sodium
HTCG	high tension cable guardrail
Hwy	highway
Hor	horizontal
HBP	hot bituminous pavement
HMA	hot mix asphalt
Hyd	hydrant
Ph	hydrogen ion content
Id	identification
Incl	inclinometer tube
IMH	inlet manhole
ID	inside diameter
Inst	instrument
Intchg	interchange
Intmdt	intermediate
Intscn	intersection
Inv	invert
IP	iron pipe
Jt	joint
Jct	junction

Ln	lane
Lg	large
Lat	latitude
Lt	left
Lens	lenses
Lvl	level
Lvlng	leveling
Lht	light
LP	light pole
Ltg	lighting
Liq	liquid
LL	liquid limit
Loc	location
Long.	longitude
Lp	loop
LD	loop detector
Lum	luminaire
Mb	mailbox
ML	main line
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
MGS	Midwest Guardrail System
MM	mile marker
MP	mile post
Min	minimum
Misc	miscellaneous
Mon	monument
Mnd	mound
Mtbl	mountable
Mtd	mounted
Mtg	mounting
Mk	muck
Neop	neoprene
Ntwk	network
N	North
NE	North East
NW	North West
NB	Northbound
No. or #	number

Obsc	obscure(d)
Ocpd	occupied
Ocpy	occupy
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
PSD	passing sight distance
Pvmt	pavement
Ped	pedestal
Ped	pedestrian
PPP	pedestrian pushbutton post
Pen.	penetration
Perf	perforated
Per.	perimeter
Perm	permanent
PL	pipeline
Pl	place
P&P	plan & profile
PL	plastic limit
Pl or ℄	plate
Pt	point
PE	polyethylene
PVC	polyvinyl chloride
PCC	Portland Cement concrete
PP	power pole
Preempt	preemption
Prefab	prefabricated
Prfmd or Pref	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

Qty	quantity
Qtr	quarter
Rad or R	radius
RR	railroad
Rlwy	railway
Rsd	raised
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
RP	reference point
Refl	reflectorized
RCB	reinforced concrete box
RCES	reinforced concrete end section
RCFES	reinforced concrete flared end section
RCP	reinforced concrete pipe
RCPS	reinforced concrete pipe sewer
RCTES	reinforced concrete traversable end section
Reinf	reinforcement
Res	reservation
Res	residence
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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
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08-03-15	General Revisions
04-23-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions

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08/16/22

Salv	salvage(d)
San	sanitary sewer line
Sec	section
SL	section line
Sep	separation
Seq	sequence
Serv	service
Sht	sheet
Shtng	sheeting
Shldr	shoulder
Sw or Sdwk	sidewalk
SD	sight distance
SN	sign number
Sig	signal
Sgl	single
SRCP	slotted reinforced concrete pipe
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
SB	split barrel sample
SH	sprinkler head
SV	sprinkler valve
Sq	square
Stk	stake
Std	standard
N	standard penetration test
Std Specs	standard specifications
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
SS	supplement specification
Supp	supplemental
Surf	surfacing
Surv	survey
Sym	symmetrical

Tel	telephone
Tel B	Telephone Booth
Tel P	telephone pole
Tv	television
Temp	temperature
Temp	temporary
TBM	temporary bench mark
T	thinwall tube sample
Ts	topsoil
Traf	traffic
TSCB	traffic signal control box
Tr	trail
Transf	transformer
Trans	transition
TT	transmission tower
TES	traversable end section
Trans	transverse
Trtd	treated
Trmt	treatment
Qc	triaxial compression
TERO	tribal employment rights ordinance
Tpl	triple
Typ	typical
Qu	unconfined compressive strength
Ugrnd	underground
Util	utility
VG	valley gutter
Vap	vapor
Vert	vertical
VCP	vitrified clay pipe
Vol	volume
VSFS	vehicle speed feedback sign
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
Wrng	wearing
WIM	weigh in motion
W	west
WB	westbound
Wrng	wiring
W/	with
W/o	without
WC	witness corner

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07-01-14	
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08-16-22	General Revisions

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08/16/22

NDDOT ABBREVIATIONS

MEASUREMENTS

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

SURVEY DESCRIPTIONS

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

SOIL TYPES

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
07-01-14

REVISIONS

DATE	CHANGE
12-18-20	Sheet Added - Continued from D-101-3

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

702COM	702 Communications
ACCENT	Accent Communications
AGASSIZ WU	Agassiz Water Users Incorporated
AGC	Assiociated General Contractors of America
ALL PL	Alliance Pipeline
ALL SEAS WU	All Seasons Water Users Association
AMOCO PI	Amoco Pipeline Company
AMRDA HESS	Amerada Hess Corporation
AT&T	AT&T Corporation
B PAW	Bear Paw Energy Incorporated
BAKER ELEC	Baker Electric
BASIN ELEC	Basin Electric Cooperative Incorporated
BEK TEL	Bek Communications Cooperative
BELLE PL	Belle Fourche Pipeline Company
BLM	Bureau of Land Management
BNSF	Burlington Northern Santa Fe Railway
BOEING	Boeing
BRNS RWD	Barnes Rural Water District
BURK-DIV ELEC	Burke-Divide Electric Cooperative
BURL WU	Burleigh Water Users
CABLE ONE	Cable One
CABLE SERV	Cable Services
CAP ELEC	Capital Electric Cooperative Incorporat
CASS CO ELEC	Cass County Electric Cooperative
CASS RWU	Cass Rural Water Users Incorporated
CAV ELEC	Cavalier Rural Electric Cooperative
CBLCOM	Cablecom Of Fargo
CENEX PL	Cenex Pipeline
CENT PL WATER DIST	Central Pipe Line Water District
CENT PWR ELEC	Central Power Electric Cooperative
CENTURYLINK	CenturyLink
COE	Corps of Engineers
CONS TEL	Consolidated Telephone
CONT RES	Continental Resource Inc
CPR	Canadian Pacific Railway
D O E	Department Of Energy
DAK CARR	Dakota Carrier Network
DAK CENT TEL	Dakota Central Telephone
DAK RWD	Dakota Rural Water District
DGC	Dakota Gasification Company
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
EQUINOR	Equinor Pipeline
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
GTR RAMSEY WD	Greater Ramsey Water District
GT PLNS NAT GAS	Great Plains Natural Gas Company
HALS TEL	Halstad Telephone Company
IDEA1	Idea1
INT-COMM TEL	Inter-Community Telephone Company
KANEB PL	Kaneb Pipeline Company
KEM ELEC	Kem Electric Cooperative Incorporated
KOCH GATH SYS	Koch Gathering Systems Incorporated
LKHD PL	Lakehead Pipeline Company
LNGDN RWU	Langdon Rural Water Users Incorporated
LWR YELL R ELEC	Lower Yellowstone Rural Electric
MCKNZ CON	McKenzie Consolidated Telcom
MCKNZ ELEC	McKenzie Electric Cooperative
MCKNZ WRD	McKenzie County Water Resource District
MCLEOD	McLeod USA
MCLN ELEC	McLean Electric Cooperative
MCLN-SHRDN R WAT	McLean-Sheridan Rural Water
MDU	Montana-dakota Utilities
MIDCO	MidContinent Communications
MIDSTATE TEL	Midstate Telephone Company
MINOT CABLE	Minot Cable Television
MINOT TEL	Minot Telephone Company
MISS VALL COMM	Missouri Valley Communications
MISS W W S	Missouri West Water System
MNKOTA PWR	Minnkota Power
MOR-GRAN-SOU ELEC	Mor-gran-sou Electric Cooperative
MOUNT-WILLI ELEC	Mountrail-williams Electric Cooperative
MRE LBTY TEL	Moore & Liberty Telephone
MUNICIPAL	City Water And Sewer
MUNICIPAL	City Of '.....'
N CENT ELEC	North Central Electric Cooperative
N VALL W DIST	North Valley Water District
ND PKS & REC	North Dakota Parks And Recreation
ND TEL	North Dakota Telephone Company
NDDOT	North Dakota Department of Transportation
NDSU SOIL SCI DEPT	NDSU Soil Science Department
NEMONT TEL	Nemont Telephone
NODAK R ELEC	Nodak Rural Electric Cooperative
NOON FRMS TEL	Noonan Farmers Telephone Company
NPR	Northern Plains Railroad
NSP	Northern States Power
NTH PRAIR RW	Northern Prairie Rural Water Association
NTHN BRDR PL	Northern Border Pipeline
NTHN PLNS ELEC	Northern Plains Electric Cooperative Incorporated
NTHWSTRN REF	Northwestern Refinery Company
NW COMM	Northwest Communication Cooperation
NWRWD	Northwest Rural Water District
ONEOK	Oneok gas
OSHA	Occupational Safety and Health Administration
OTTR TL PWR	Otter Tail Power Company
PAAP	Plains All American Pipeline
P L E M	Prairielands Energy Marketing
POLAR COM	Polar Communications
PVT ELEC	Private Electric
QWEST	Qwest Communications
R&T W SUPPLY	R & T Water Supply Association
RED RIV COMM	Red River Rural Communications
RESVTN TEL	Reservation Telephone
ROBRTS TEL	Roberts Company Telephone
R-RIDER ELEC	Roughrider Electric Cooperative
RRVW	Red River Valley & Western Railroad
S CENT REG WD	South Central Regional Water District
S E W U	South East Water Users Incorporated
SCOTT CABLE	Scott Cable Television Dickinson
SHERDN ELEC	Sheridan Electric Cooperative
SHEYN VLY ELEC	Sheyenne Valley Electric Cooperative
SKYTECH	Skyland Technologies Incorporated
SLOPE ELEC	Slope Electric Cooperative Incorporated
SOURIS RIV TELCOM	Souris River Telecommunications
ST WAT COMM	State Water Commission
STATE LN WATER	State Line Water Cooperative
STER ENG	Sterling Energy
STUT RWU	Stutsman Rural Water Users
SW PL PRJ	Southwest Pipeline Project
T M C	Turtle Mountain Communications
TCI	TCI of North Dakota
TESORO HGH PLNS PL	Tesoro High Plains Pipeline
TRI-CNTY WU	Tri-County Water Users Incorporated
TRL CO RWU	Traill County Rural Water Users
UNTD TEL	United Telephone
UPPR SOUR WUA	Upper Souris Water Users Association
US SPRINT	U.S. Sprint
USAF MSL CABLE	U.S.A.F. Missile Cable
USFWS	US Fish and Wildlife Service
USW COMM	U.S. West Communications
VRNDRY ELEC	Verendrye Electric Cooperative
W RIV TEL	West River Telephone Incorporated
WAPA	Western Area Power Administration
WAWSA	Western Area Water Supply Authority
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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04-23-18	General Revisions
09-20-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions

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LINE STYLES

D-101-20

Existing Topography

- Existing Ground Void
- Existing Cemetary Boundary
- Existing Box Culvert Bridge
- Existing Concrete Surface
- Existing Drainage Structure
- Existing Gravel Surface
- Existing Riprap
- Existing Dirt Surface
- Existing Asphalt Surface
- Existing Tie Point Line
- Existing Railroad Centerline
- Existing Guardrail Cable
- Existing Guardrail Metal
- Existing Edge of Water
- Existing Fence
- Existing Railroad
- Existing Field Line
- Exst Flow
- Existing Curb
- Existing Valley Gutter
- Existing Driveway Gutter
- Existing Curb and Gutter
- Existing Mountable Curb and Gutter
- Existing 3-Cable w Posts
- Site Boundary
- Existing Berm, Dike, Pit, or Earth Dam
- Existing Ditch Block
- Existing Tree Boundary
- Existing Brush or Shrub Boundary
- Existing Retaining Wall
- Existing Planter or Wall
- Existing W-Beam Guardrail with Posts
- Existing Railroad Switch
- Gravel Pit - Borrow Area
- Existing Wet Area-Vegetation Break
- Existing High Tension Cable Guardrail
- Existing High Tension Cable Guardrail with Posts

Proposed Topography

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

Existing Utilities

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

Proposed Utilities

- 24 Inch Pipe
- Reinforced Concrete Pipe
- Under Drain
- Edge Drain

Traffic Utilities

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

Sign Structures

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

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REVISIONS

DATE	CHANGE
09-23-16 12-18-20	Added and Revised Items, Organized by Functional Groups General Revisions

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LINE STYLES

D-101-21

Right Of Way

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

Boundary Control

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

Cross Sections and Typicals

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

Geotechnical

- Geotextile Fabric Type D (D — D)
- Geogrid (Geo — Geo)
- Geotextile Fabric Type R (R — R)
- Geotextile Fabric Type R1 (R — R)
- Geotextile Fabric Type RR (RR — RR)
- Geotextile Fabric Type S (S — S)
- Subgrade Reinforcement
- Failure Line

Countours

- Depression Contours
- Supplemental Contour

Profile

- Subgrade, Subcut or Ditch Grade
- Topsoil Profile

Striping

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

Pavement Joints

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

Bridge Details

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

Erosion Control

- Limits of Const Transition Line
- Bale Check
- Rock Check
- Floating Silt Curtain (S — S)
- Silt Fence (SF — SF)
- Excavation Limits
- Fiber Rolls

Environmental

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

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SYMBOLS

D-101-30

North Arrow (Half Scale)

Alignment Data Point

Alignment Monument

Spot Elevation

Existing Miscellaneous Spot

Existing Access Control Arrow

Existing Benchmark

Reset USGS Marker

Iron Monument Found

Iron Pin R/W Monument

Property Corner

Iron Pin Reference Monument

Right of Way Marker (Exst, Ppsd, Reset)

Existing Federal Reference Corner

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

Existing Witness Corner

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

Existing Traverse PI Aerial Panel

Existing Reference Marker Point NGS

Existing EFB Misc

Existing Bush or Shrub

Existing Large Evergreen Tree

Existing Small Evergreen Tree

Existing Large Tree

Existing Small Tree

Existing Tree Trunk

Cairn or Stone Circle

Existing Artifact

Existing Satellite Dish

Existing Weather Station

Existing Windmill or Tower

Reinforced Pavement

CSB Continuous Split Barrel Sample

FA Flight Auger Sample

SB Split Barrel Sample

T Thinwall Tube Sample

N Standard Penetration Test

Incl Inclinometer Tube

Excavation Unit

Existing Ground Water Well Bore Hole

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SYMBOLS

D-101-31

- Flexible Delineator
- Flexible Delineator Type A (Exst, Ppsd)
- Flexible Delineator Type B (Exst, Ppsd)
- Flexible Delineator Type C (Exst, Ppsd)
- Flexible Delineator Type D (Exst, Ppsd)
- Flexible Delineator Type E (Exst, Ppsd)
- Delineator Type A (Exst, Ppsd, Diamond Grade-Reset)
- Delineator Type B (Exst, Ppsd, Diamond Grade-Reset)
- Delineator Type C (Exst, Ppsd, Diamond Grade)
- Delineator Type D (Exst, Ppsd, Diamond Grade)
- Delineator Type E (Exst, Ppsd, Diamond Grade)
- Barricade (Type I, Type II, Type III}
- Arrow Panel (Caution Mode, Double Direction, Left Directional, Right Directional, Sequencing, Truck Mounted)
- Attenuation Device
- Truck Mounted Attenuator
- Delineator Drums
- Flagger
- Tubular Marker
- Traffic Cone
- Back to Back Vertical Panel Sign

- Highway Sign (Exst, Ppsd)
- Mile Post Type A (Exst-Ppsd-Reset)
- Mile Post Type B (Exst, Ppsd)
- Mile Post Type C (Exst, Ppsd)
- Object Marker Type I (Exst, Ppsd)
- Object Marker Type II (Exst, Ppsd)
- Object Marker Type III (Exst, Ppsd)
- Existing Reference Marker
- Road Closure Gate 18 Ft (Exst, Ppsd)
- Road Closure Gate 28 Ft (Exst, Ppsd)
- Road Closure Gate 40 Ft (Exst, Ppsd)
- Existing Railroad Battery Box
- Existing RR Profile Spot
- Existing Railroad Crossbuck
- Existing Railroad Frog
- Existing Mailbox (Private, Federal)

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SYMBOLS

D-101-32

- Existing Luminaire
- Luminaire LED
- Existing Light Standard Luminaire
- Relocate Light Standard
- Light Standard Light LED Luminaire
- Light Standard 35 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 100 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 150 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 400 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 700 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire
- Emergency Vehicle Detector
- Video Detection Camera

- High Mast Light Standard 3 Luminaire (Exst, Ppsd)
- High Mast Light Standard 4 Luminaire (Exst, Ppsd)
- High Mast Light Standard 5 Luminaire (Exst, Ppsd)
- High Mast Light Standard 6 Luminaire (Exst, Ppsd)
- High Mast Light Standard 7 Luminaire (Exst, Ppsd)
- High Mast Light Standard 8 Luminaire (Exst, Ppsd)
- High Mast Light Standard 9 Luminaire (Exst, Ppsd)
- High Mast Light Standard 10 Luminaire (Exst, Ppsd)
- Overhead Sign Structure Load Center (Exst, Ppsd)
- Traffic Signal Controller (Exst, Ppsd)
- Pad Mounted Traffic Signal Controller (Exst, Ppsd)
- Flashing Beacon (Exst, Ppsd)
- Concrete Foundation (Exst, Ppsd)
- Pipe Mounted Flasher (Exst, Ppsd)
- Pad Mounted Feed Point (Exst, Ppsd)
- Pipe Mounted Feed Point with Pad (Exst, Ppsd)
- Pole Mounted Feed Point (Exst, Ppsd)
- Junction Box (Exst, Ppsd)
- Existing Pedestrian Head with Number
- Existing Signal Head
- Pole Mounted Head
- Existing Lighting Standard Pole

- Existing Traffic Signal Standard
- Pull Box (Exst-Ppsd-Undefined)
- Intelligent Transportation Pull Box (Exst, Ppsd)
- Transformer (Exst, Ppsd)
- Power Pole (Exst-Ppsd-with Transformer)
- Wood Pole (Exst, Ppsd)
- Pedestrian Push Button Post (Exst, Ppsd)
- Existing Pole
- Existing Telephone Pole
- Existing Post
- Connection Conductor (Ground, Neutral, Phase 1, Phase 2)

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SYMBOLS

D-101-33

Existing Manhole (Electrical, Gas, Telephone)

Water Manhole (Exst, Exst with Valve)

Sanitary Sewer Manhole (Exst, Ppsd, Exst with Valve)

Sanitary Force Main Manhole (Exst, Ppsd, Exst with Valve)

Storm Drain Manhole (Exst, Ppsd, Exst with Inlet, Ppsd with Inlet)

Force Main Storm Drain Manhole (Exst, Exst with Valve)

Manhole (Ppsd, Ppsd 48 Inch, Exst Undefined)

Existing Water Appurtenance

Sprinkler Head (Exst, Ppsd)

Fire Hydrant (Exst, Ppsd)

Cleanout (Exst Sanitary, Underdrain)

Existing Catch Basin Inlet (Round, Square)

Existing Curb Inlet (Round, Square)

Existing Slotted Reinforced Concrete Pipe

Catch Basin (Riser 30 Inch, Beehive, Type A)

Inlet Mountable Curb (Type A, Type B)

Inlet Saddle Base (Type 1, Type 2)

Inlet Special (Catch Basin, Type 1, Type A)

Inlet (Tee, Type 1, Type 2, Type 2 Double)

Median Drain

Headwall (Exst, Ppsd, Ppsd Single with Vegitation Barrier, Ppsd Double with Vegitation Barrier)

Cap or Stub
Exst Gas, Exst Sanitary, Exst Storm Drain, Ppsd Storm Drain, Exst Water

Existing Pedestal
Electrical, Telephone, Fiber Optic Telephone, TV, Fiber Optic TV, Undefined

Existing Pipe Vent
Gas, Fuel, Sanitary, Storm Drain, Water, Undefined

Valve
Exst Gas, Exst Water, Ppsd Water, Exst Undefined

Pump
Sanitary, Storm Drain, Exst Water

Corrugated Metal End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)

Reinforced Concrete End Section (18, 24, 30, 36, 42, 48, 54, 60 Inch)

Existing Utility Marker

Existing Meter

Existing Fuel Dispensers

Existing Fuel Filler Pipes

Existing Fuel Leak Sensors

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12-18-20	General Revisions Sheet added - Continued from D-101-32

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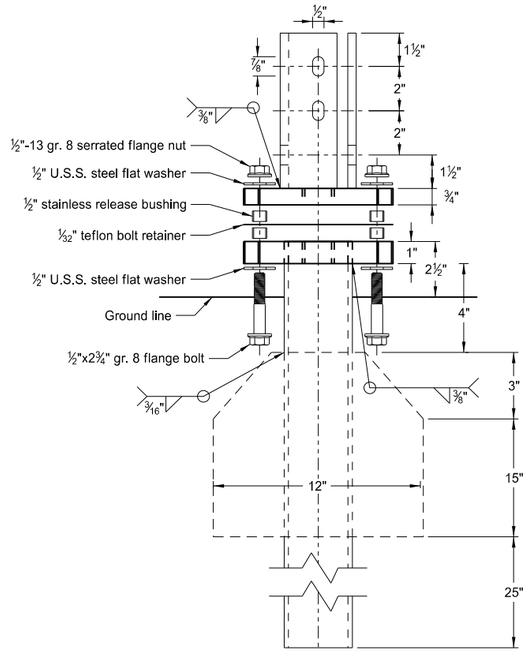
12 18 2020

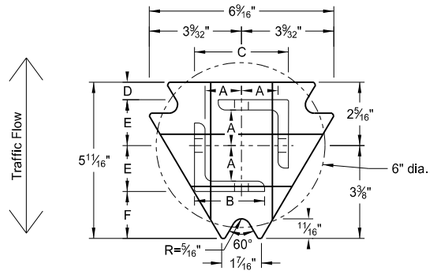
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

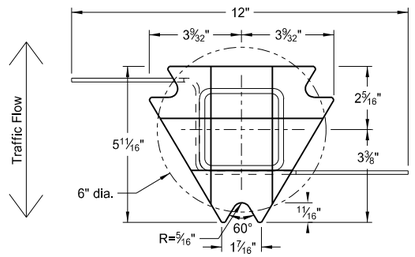


Multi-Directional
Slip Base Assembly

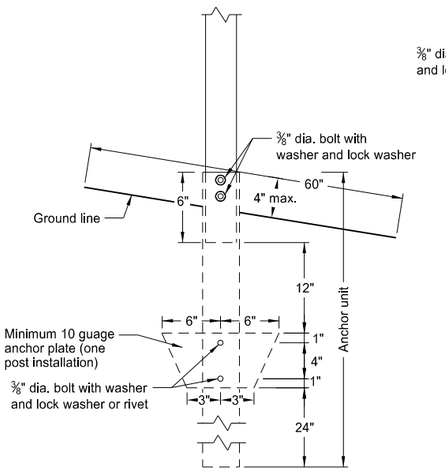
Perforated Tube



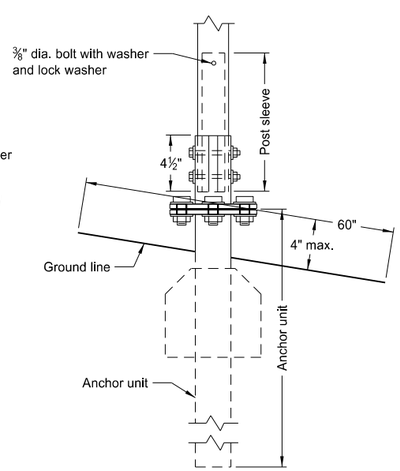
Top Post Receiver
Plate - ASTM A572 grade 50
Angle Receiver - 2½"x2½"x⅜" ASTM A36 structural angle



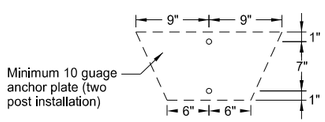
Bottom Soil Stub
Tube - 3"x3"x7 gauge ASTM A500 grade B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A1011
Plate - ASTM A572 grade 50

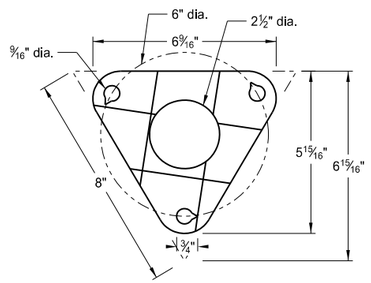


Anchor Unit and Post Assembly



Multi-Directional
Slip Base Anchor Unit
and Post Sleeve Assembly





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

Notes:

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

Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thick-ness Gauge	Sleeve Size in.	Wall Thick-ness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	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) Use breakaway base when support is placed in weak soils. Engineer determines if soils are weak.

(B) For additional wind load, insert the 2³/16"x10 ga. into 2½"x10 ga.

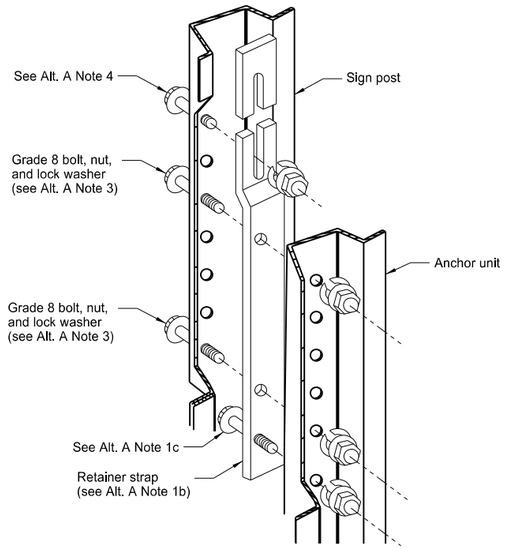
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp

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

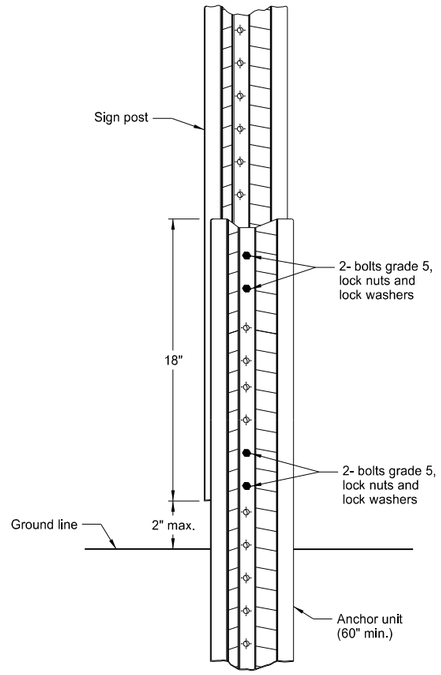
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post

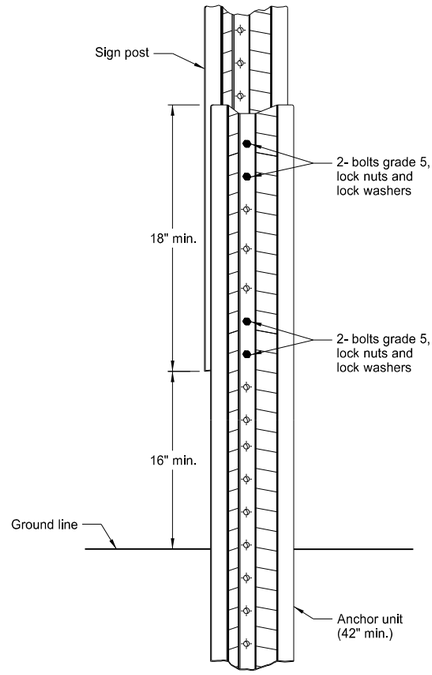


Detail A



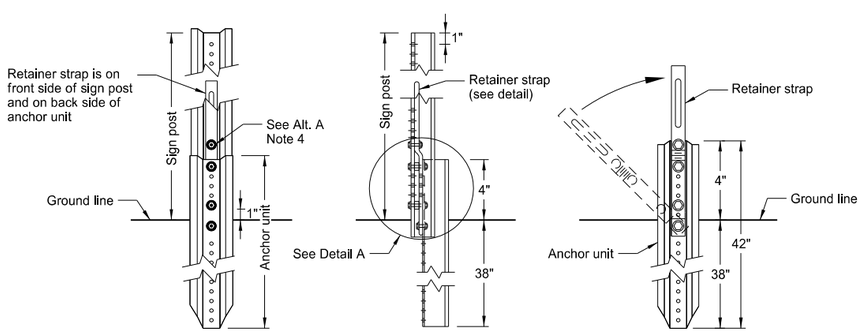
Breakaway U-Channel Splice Detail
Alternate B
(2.5 and 3 lb/ft)

Install a maximum of 3 posts within 7'.



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

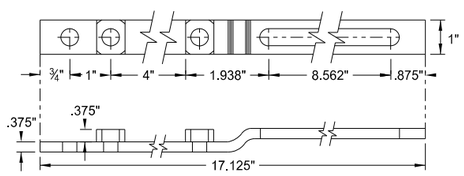
Install a maximum of 3 posts within 7'.



Front View Side View Back View

Breakaway U-Channel Detail
Alternate A

Install a maximum of 2 posts within 7'.



Retainer Strap Detail

Alternate A Steps of Installation:

1. a) Drive anchor unit to within 12" of ground level.
   b) Establish proper assembly by lining up bottom hole of retainer strap with 6th hole from the top of the anchor unit.
   c) Assemble strap to back of anchor unit using 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. Properly nest base post, strap, and sign post. Proper nesting occurs when all flat surfaces of the base post, strap, and sign post at the bolts have full contact across the entire width.

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

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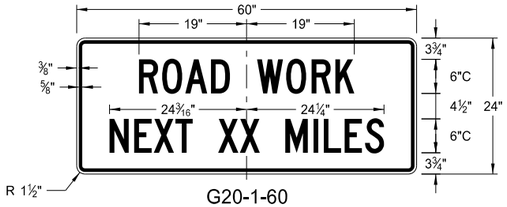
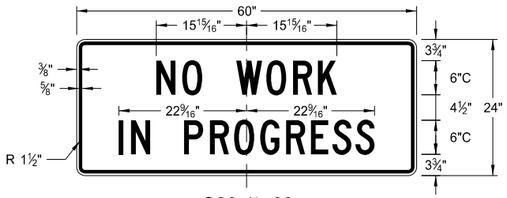
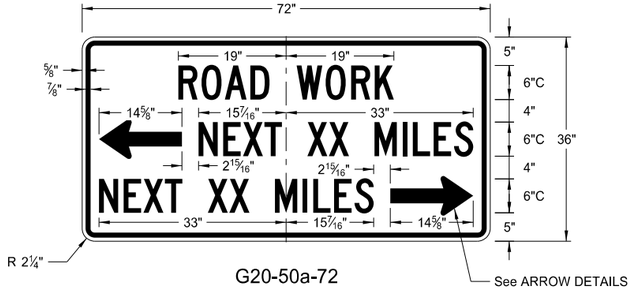
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



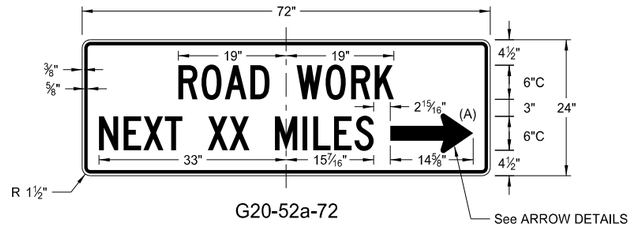
G20-1-60
Legend: black (non-refl)
Background: orange



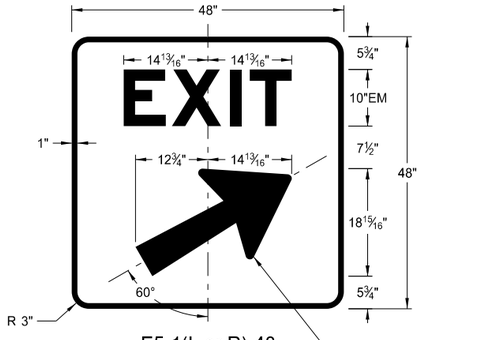
G20-1b-60
Legend: black (non-refl)
Background: orange



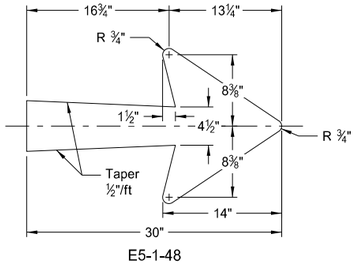
G20-50a-72
Legend: black (non-refl)
Background: orange



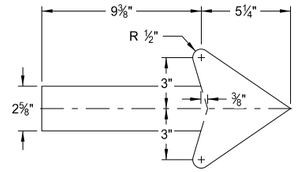
G20-52a-72
Legend: black (non-refl)
Background: orange



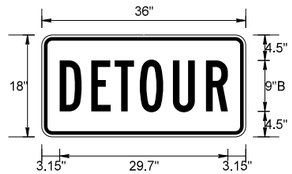
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



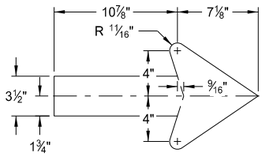
E5-1-48



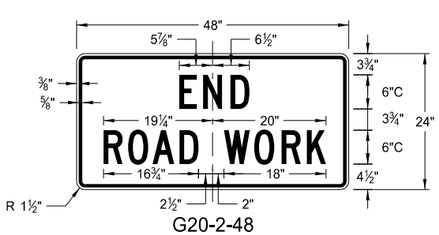
G20-50a-72
G20-52a-72



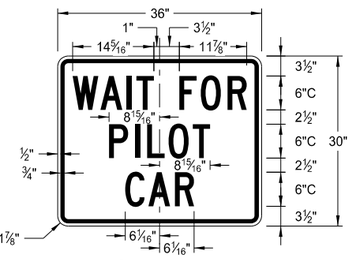
M4-8-36
Legend: black (non-refl)
Background: orange



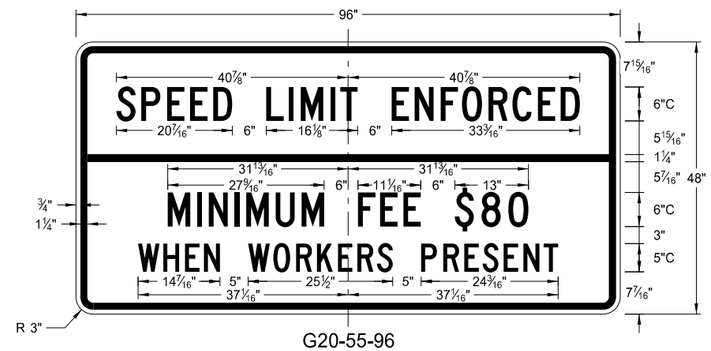
M4-9(L or R)-30
Right or Left



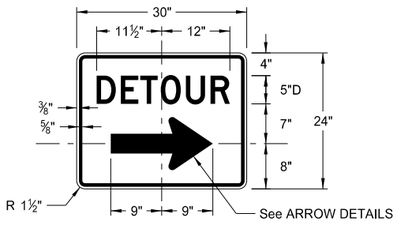
G20-2-48
Legend: black (non-refl)
Background: orange



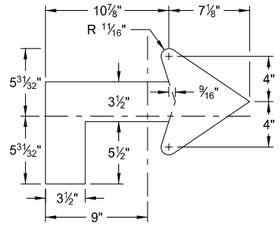
G20-4b-36
Legend: black (non-refl)
Background: orange



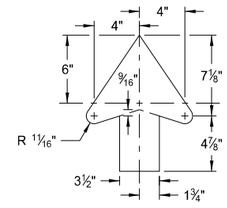
G20-55-96
Legend: black (non-refl)
Background: orange



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



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



M4-9-30
Straight

ARROW DETAILS

NOTES:

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

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

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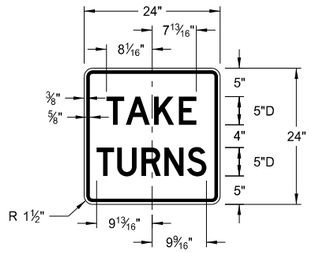
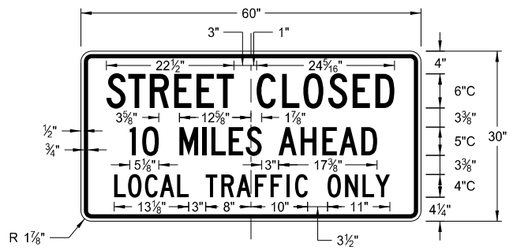
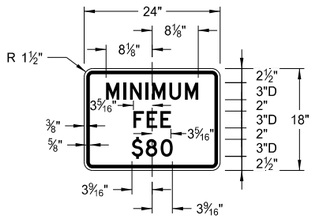
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



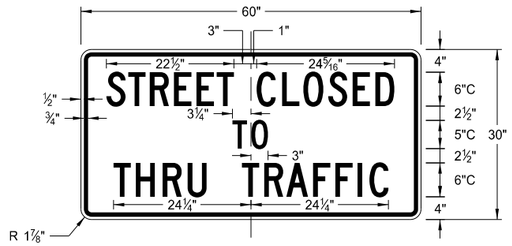
R1-50P-24
Legend: black (non-refl)
Background: white



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



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



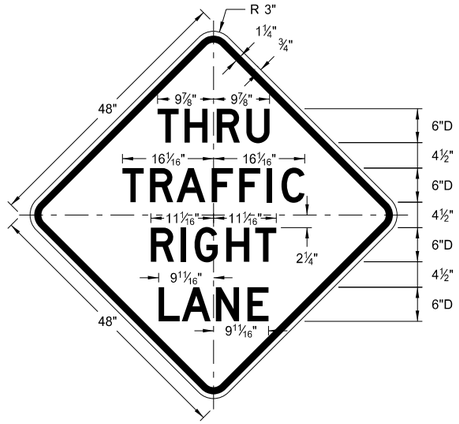
R11-4a-60
Legend: black (non-refl)
Background: white

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

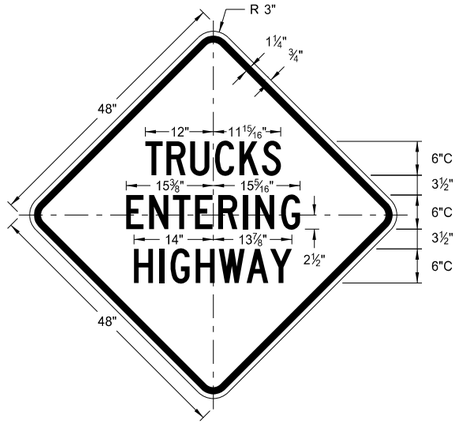
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Revised sign number
10-03-19	New Design Engineer PE Stamp

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

CONSTRUCTION SIGN DETAILS
WARNING SIGNS



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



W8-53-48
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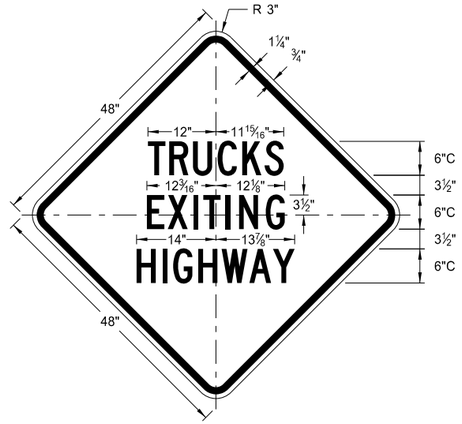
Background: orange



W8-56-48
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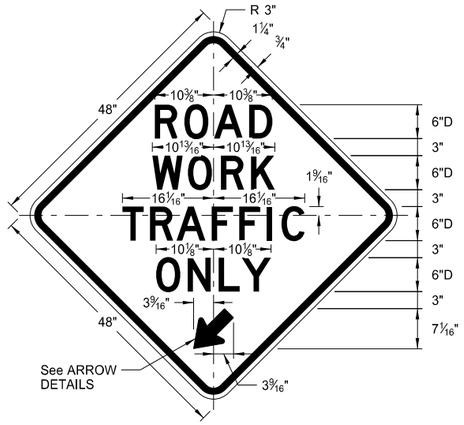

W5-9-48
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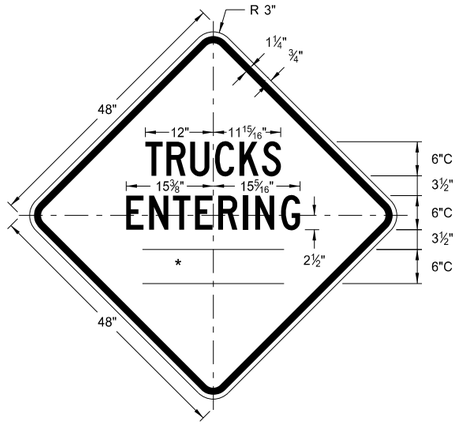
Background: orange



W8-54-48
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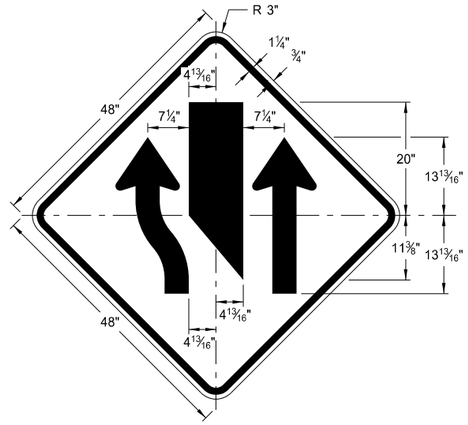
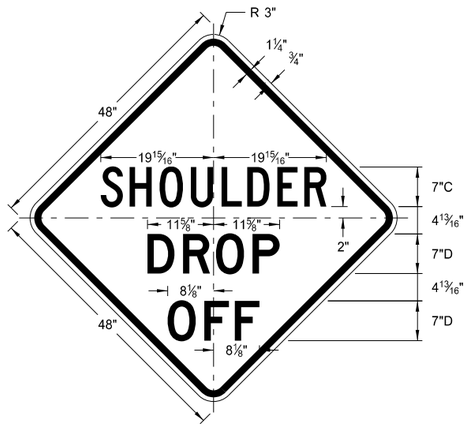
Background: orange



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



W8-9a-48
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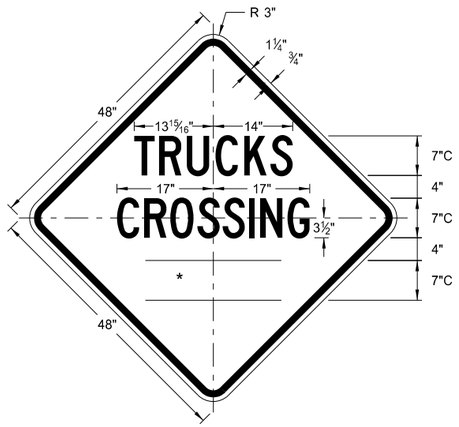
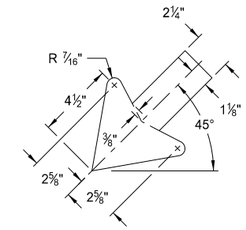
Background: orange



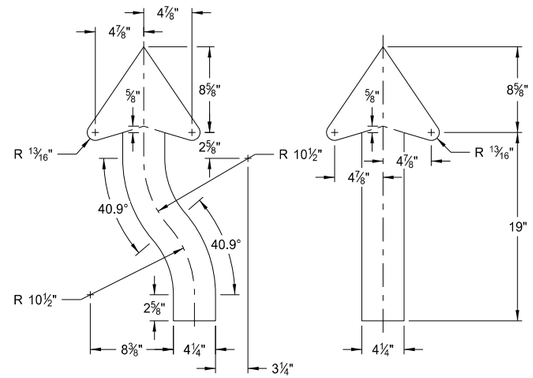
W8-55-48
Legend: black (non-refl)
Background: orange

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

* DISTANCE MESSAGES



W5-9-48



W9-3a-48

ARROW DETAILS

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

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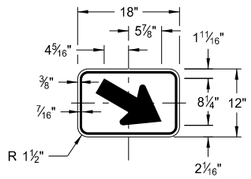
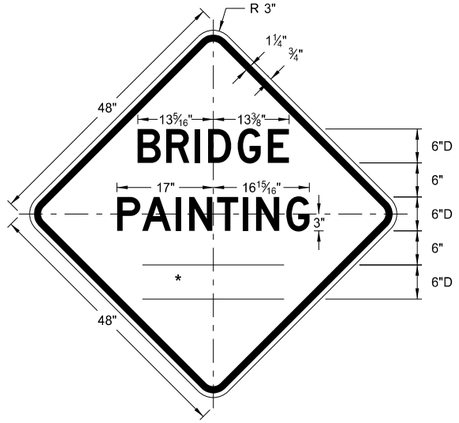
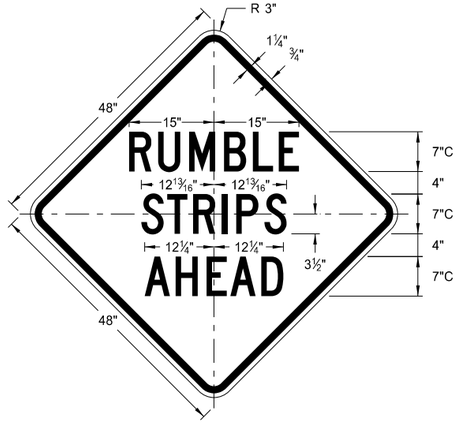
CONSTRUCTION SIGN DETAILS
WARNING SIGNS



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



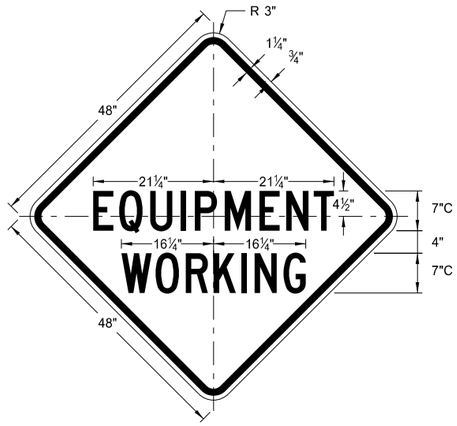
W21-50-48
Legend: black (non-refl)
Background: orange



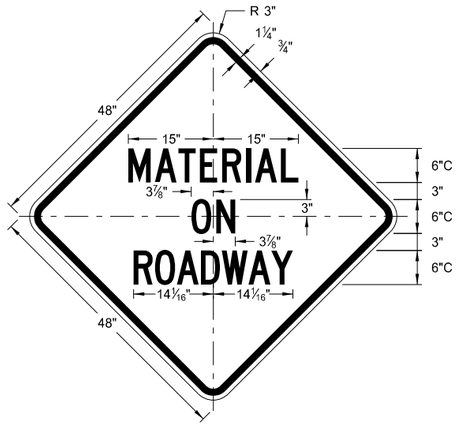
W21-53-48
Legend: black (non-refl)
Background: orange

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



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



W21-51-48
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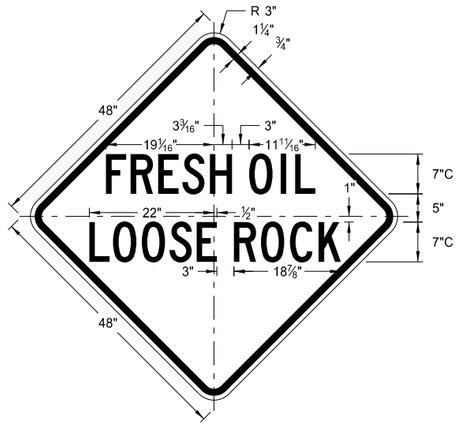
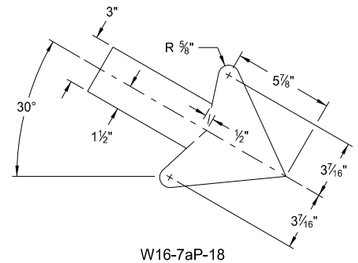
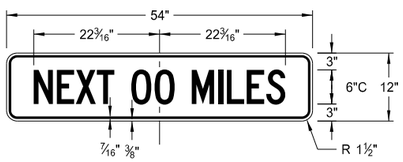
Background: orange



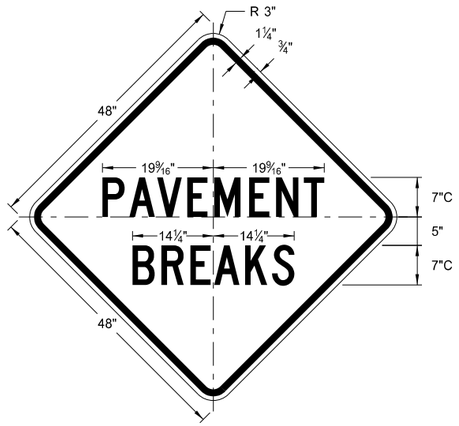
W22-8-48
Legend: black (non-refl)
Background: orange



W16-7aP-18



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



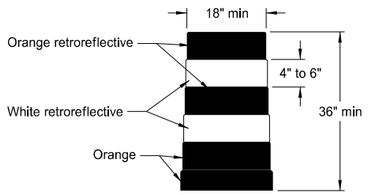
W21-52-48
Legend: black (non-refl)
Background: orange

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

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

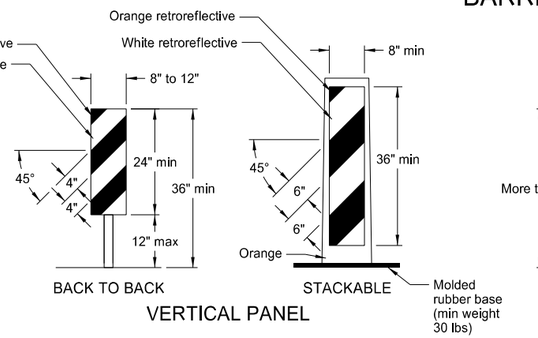
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



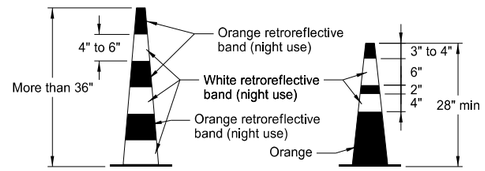
DELINEATOR DRUM

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



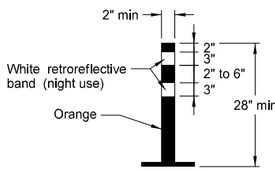
VERTICAL PANEL

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



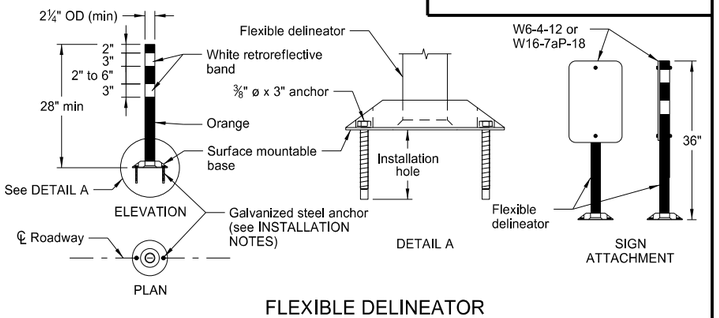
TRAFFIC CONE

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



TUBULAR MARKER

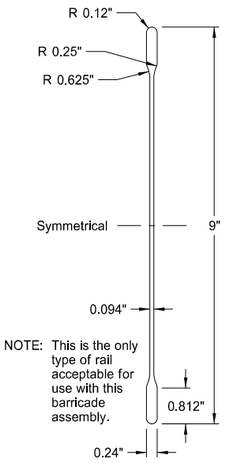
Provide retroreflectorization of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



FLEXIBLE DELINEATOR

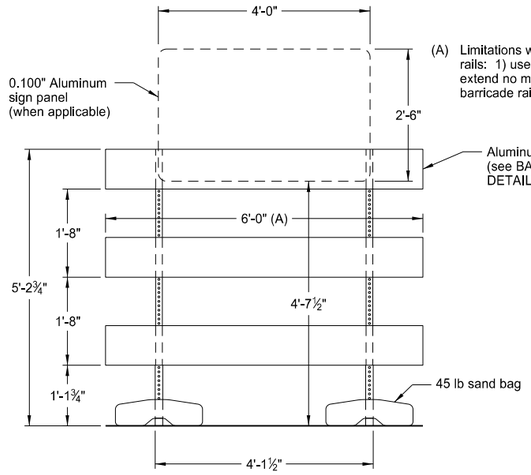
INSTALLATION NOTES:

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



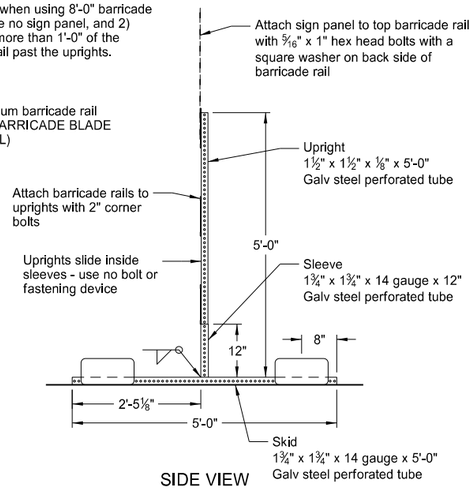
NOTE: This is the only type of rail acceptable for use with this barricade assembly.

BARRICADE BLADE DETAIL



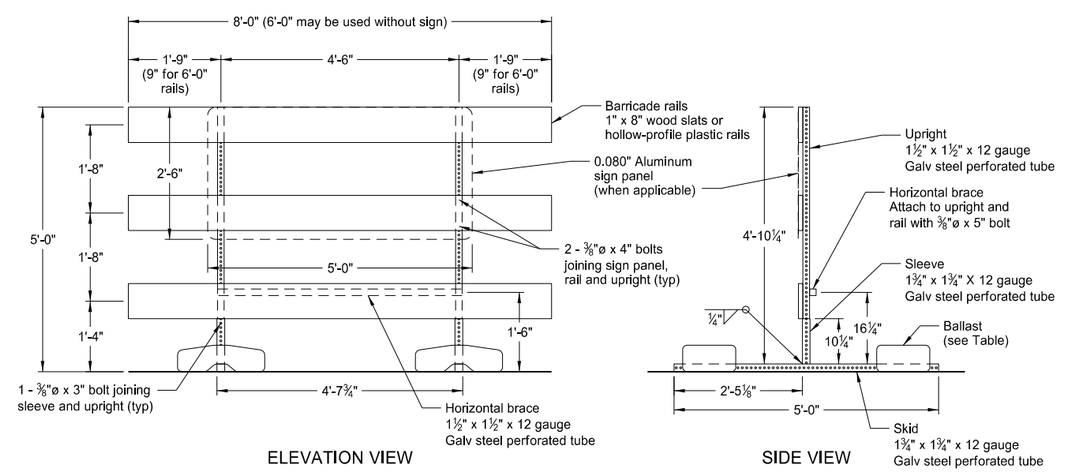
(A) Limitations when using 8'-0" barricade rails: 1) use no sign panel, and 2) extend no more than 1'-0" of the barricade rail past the uprights.

ELEVATION VIEW



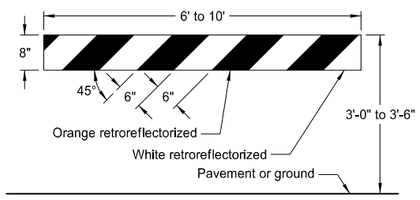
SIDE VIEW

BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

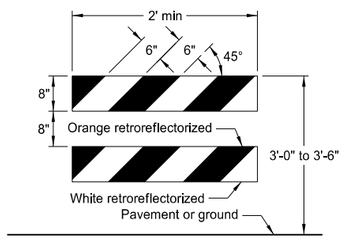


BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

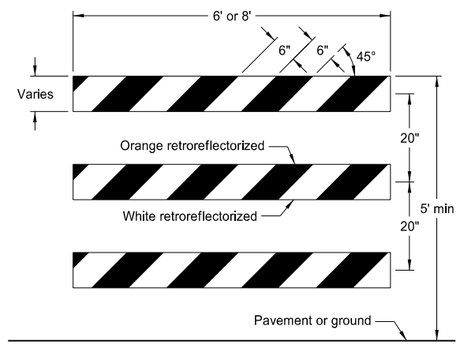
NOTE: For barricade markings use alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Place retroreflective sheeting on both sides of the rails with a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the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



TYPE I BARRICADE

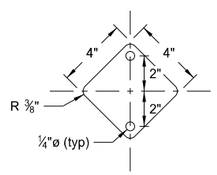


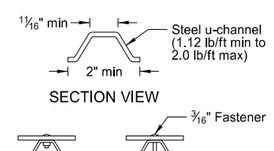
TYPE II BARRICADE

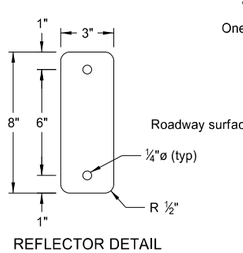


TYPE III BARRICADE

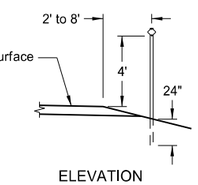
BARRICADE RAIL DETAILS







REFLECTOR DETAIL



ELEVATION

DELINEATORS

MINIMUM BALLAST
(For each side of barricade support)

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

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

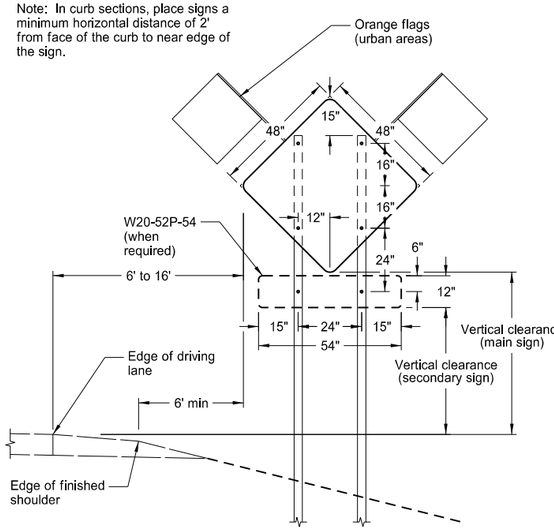
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17 11-01-19	Updated to active voice Revised details for Flexible Delineator

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

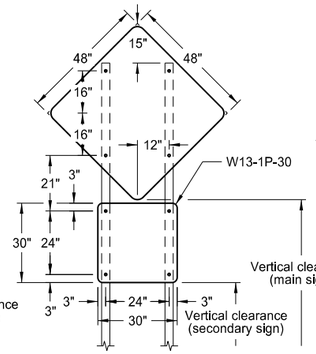
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

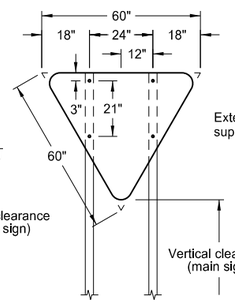
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



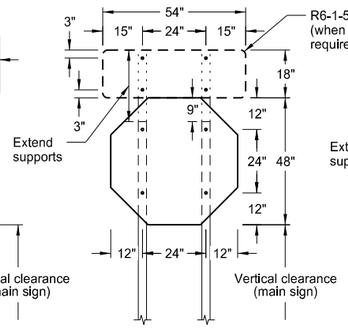
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



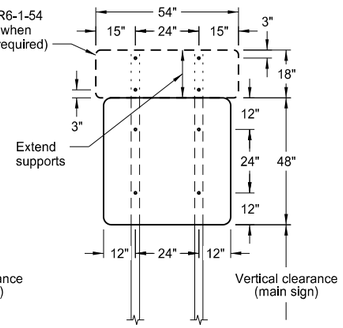
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



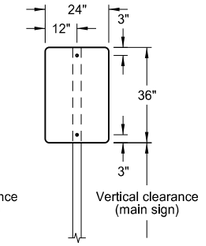
R1-2-60 - YIELD SIGN



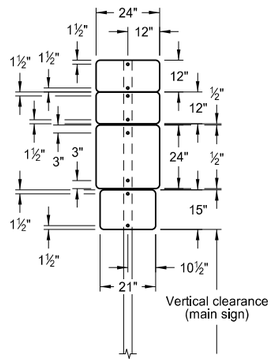
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



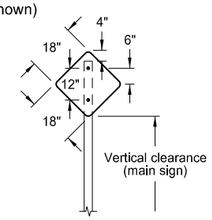
48" x 48" SIGN
(with R6-1-54 sign as required)



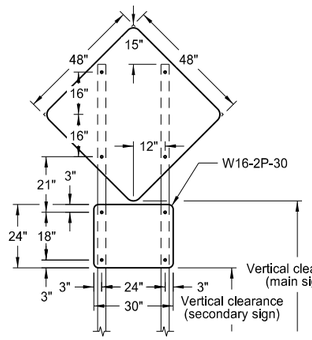
24" x 36" SIGN



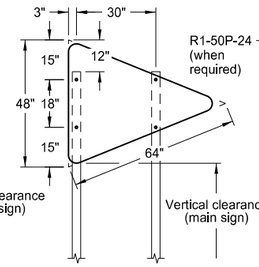
24" x 24"
ROUTE MARKER
ASSEMBLY



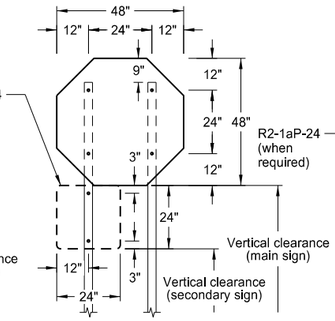
18" x 18"
DIAMOND SIGN



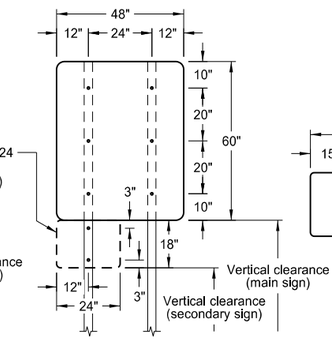
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



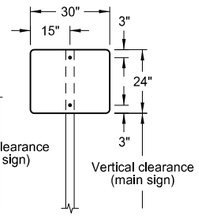
W14-3-64 - PENNANT SIGN



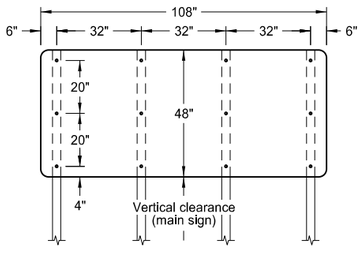
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



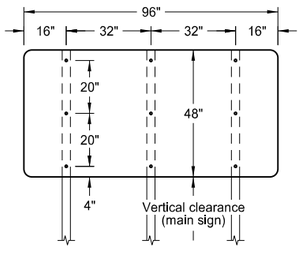
48" x 48" SIGN
(with R2-1aP-24 sign as required)



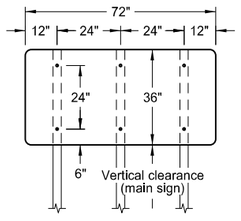
30" x 24" SIGN



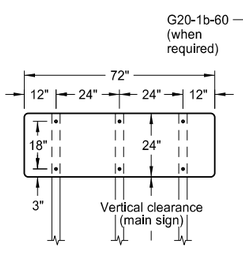
108" x 48" SIGN



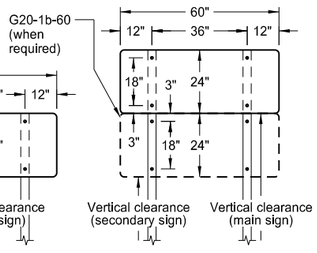
96" x 48" SIGN



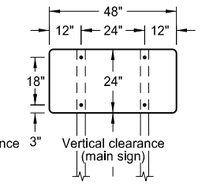
72" x 36" SIGN



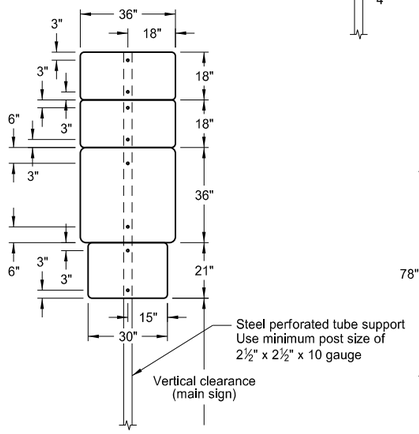
72" x 24" SIGN



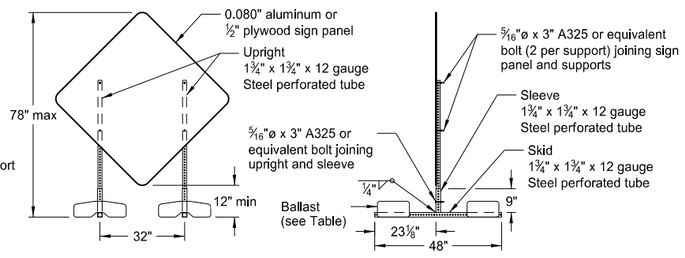
60" x 24" SIGN



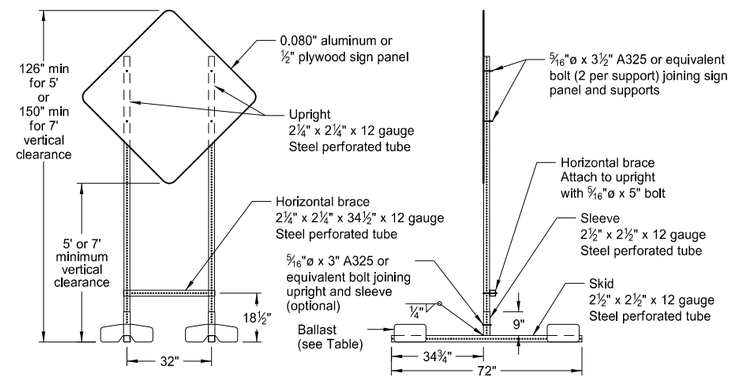
48" x 24" SIGN



36" x 36"
ROUTE MARKER
ASSEMBLY



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

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

   Place signs over 50 square feet on 2½" x 2½" perforated tube supports as a minimum.

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

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

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

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

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

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

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

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

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

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

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

MINIMUM BALLAST
(For each side of sign support base)

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

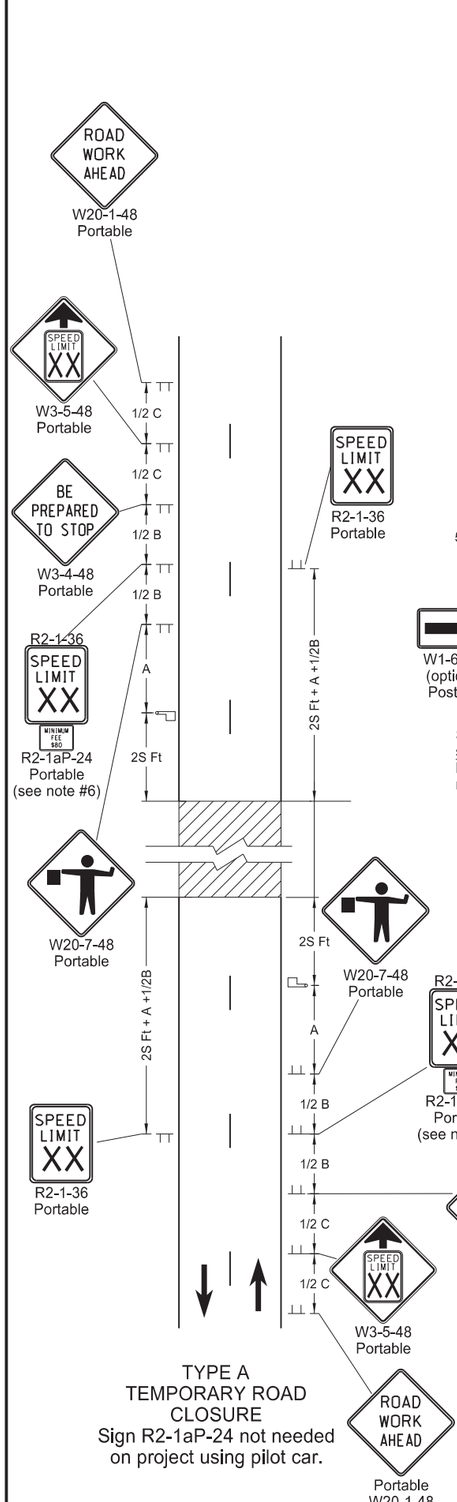
Note: The number of sandbags are based on a wind speed of 55 MPH. Place sandbags at or near the ends of skids.

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

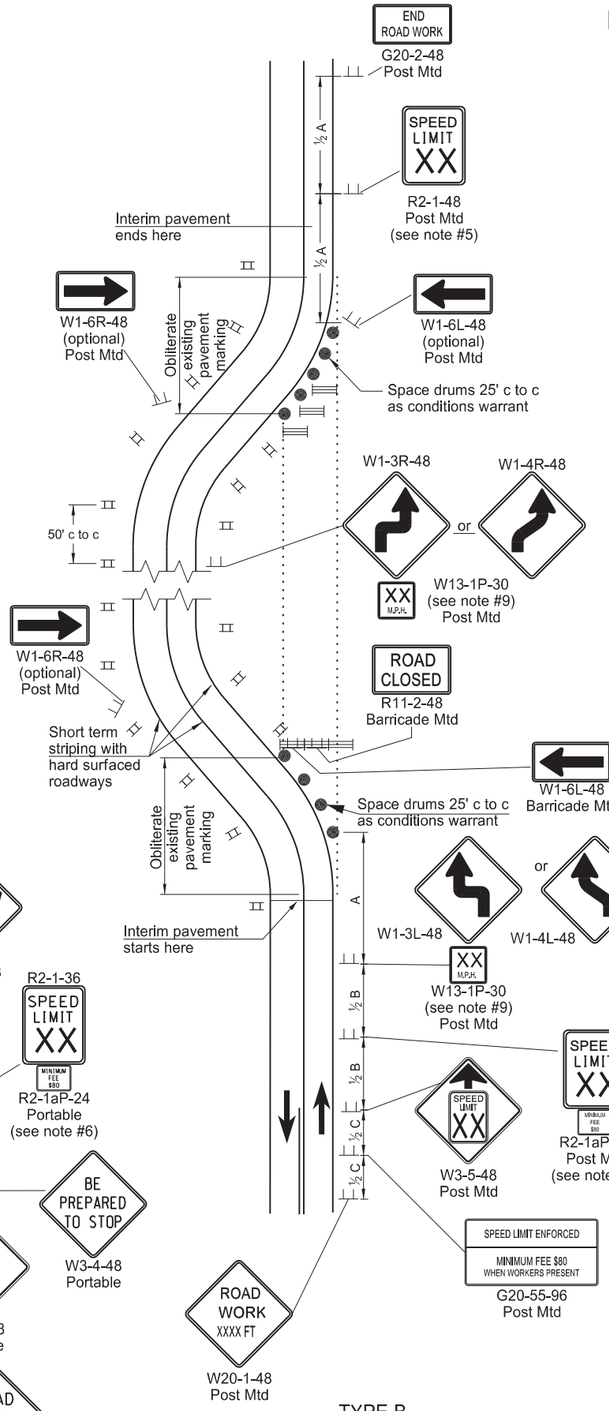
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 11/1/19 and the original document is stored at the North Dakota Department of Transportation

ROAD CLOSURE LAYOUTS

D-704-15

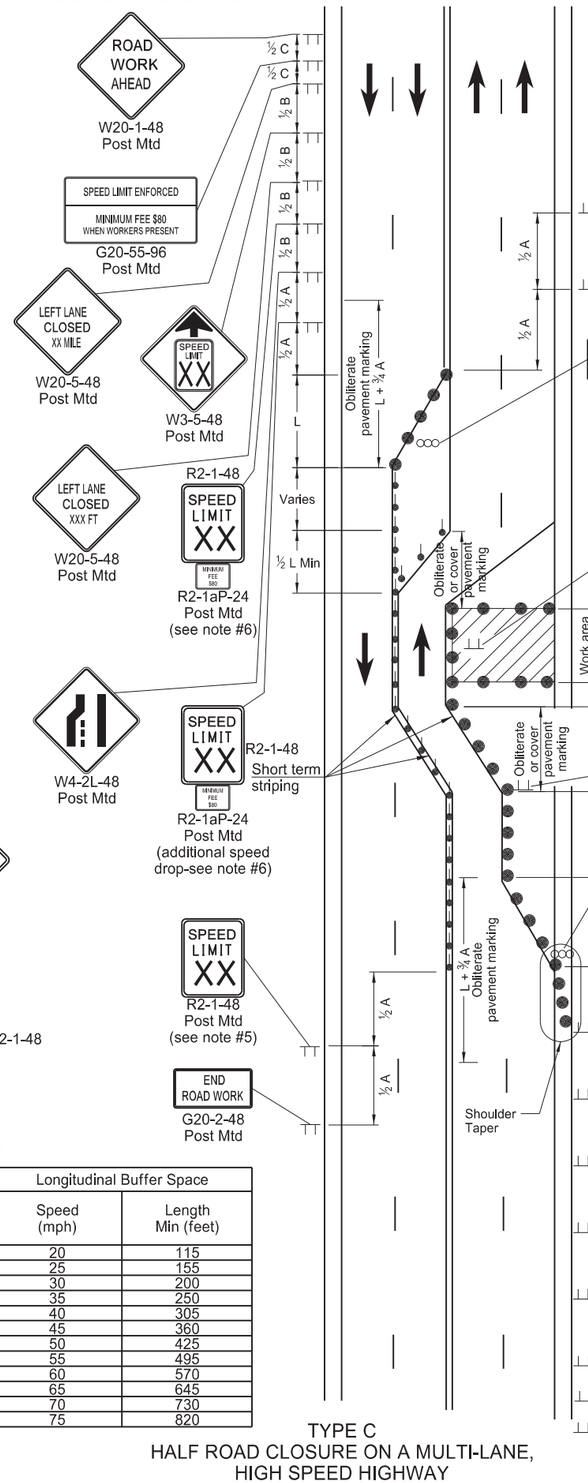


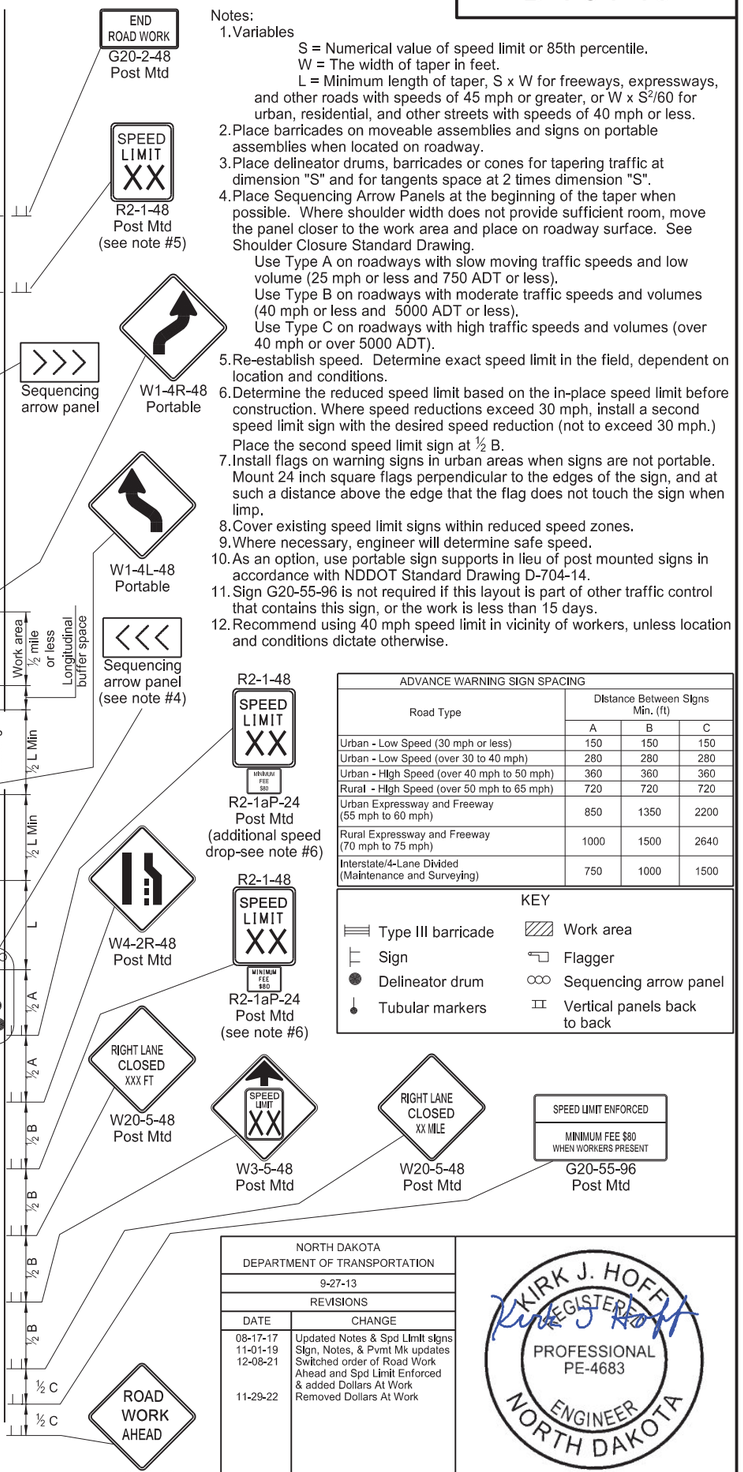
TYPE A
TEMPORARY ROAD CLOSURE
Sign R2-1aP-24 not needed on project using pilot car.



TYPE B
ROAD CLOSURE WITH A DIVERSION
Two lane highway where roadway is closed and detour provided (signing shown for one direction only). Use on bridge and culvert installation with ½ mile or less closure.

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





TYPE 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 in feet.
   L = Minimum length of taper, S x W for freeways, expressways, and other roads with speeds of 45 mph or greater, or W x S^2/60 for urban, residential, and other streets with speeds of 40 mph or less.
2. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
3. Place delineator drums, barricades or cones for tapering traffic at dimension "S" and for tangents space at 2 times dimension "S".
4. Place Sequencing Arrow Panels at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the work area and place on roadway surface. See Shoulder Closure Standard Drawing.
   Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
   Use Type B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
   Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
5. Re-establish speed. Determine exact speed limit in the field, dependent on location and conditions.
6. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½ B.
7. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
8. Cover existing speed limit signs within reduced speed zones.
9. Where necessary, engineer will determine safe speed.
10. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
11. Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or the work is less than 15 days.
12. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

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

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

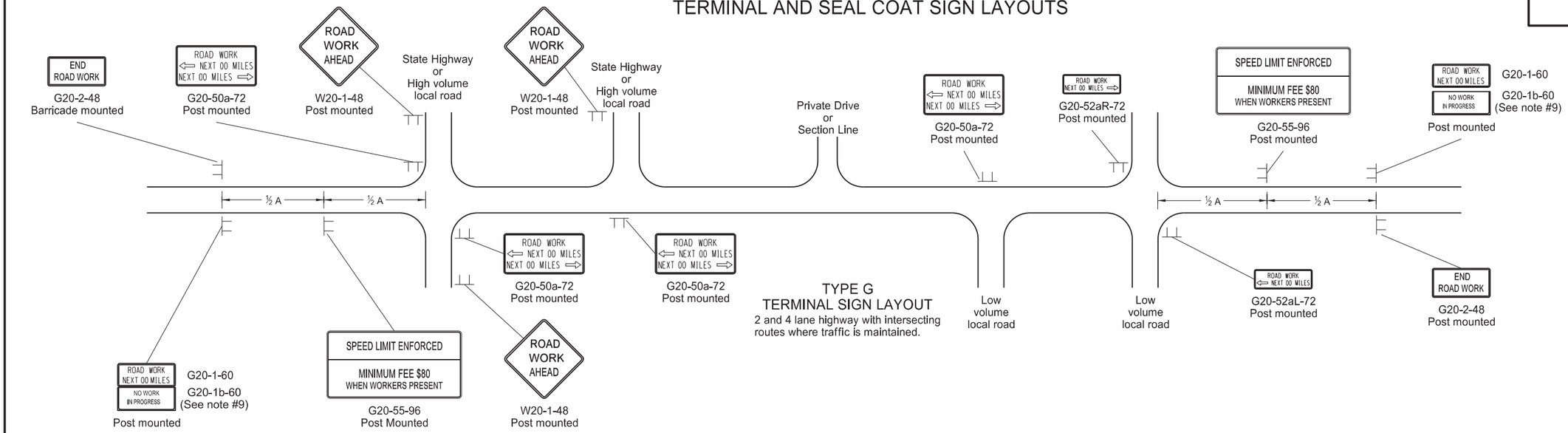
DATE	CHANGE
08-17-17	Updated Notes & Spd Limit signs
11-01-19	Sign, Notes, & Pvmt Mk updates
12-08-21	Switched order of Road Work Ahead and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work

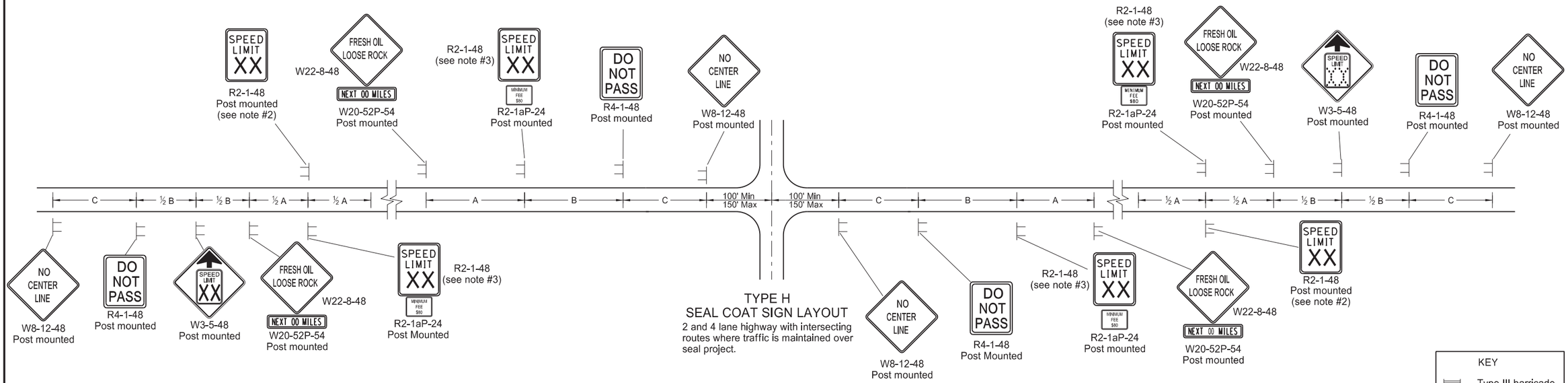
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

11/29/22

TERMINAL AND SEAL COAT SIGN LAYOUTS

D-704-20





Notes:

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE
08-17-17	Updated notes & sign numbers
11-01-19	Updated note & sign
12-08-21	Switched order of Road Work and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work

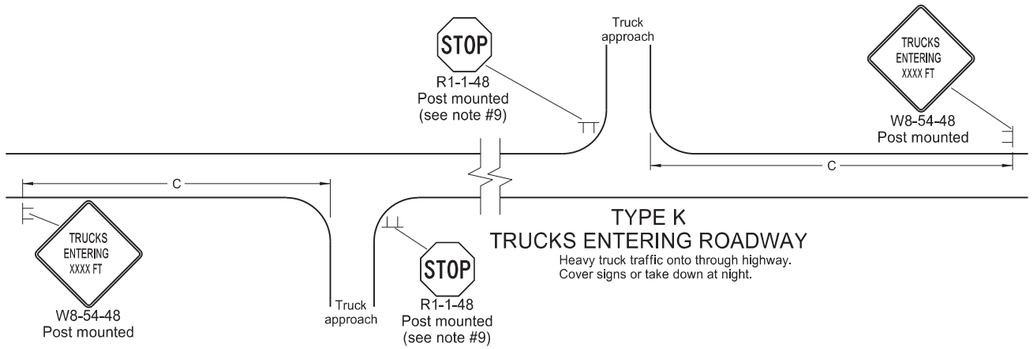
KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 ENGINEER NORTH DAKOTA

11/29/22

CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

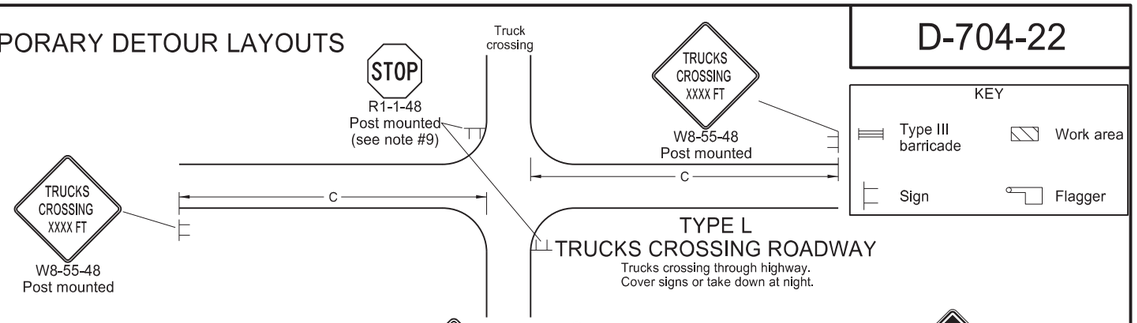
D-704-22

KEY
- Type III barricade
- Work area
- Sign
- Flagger



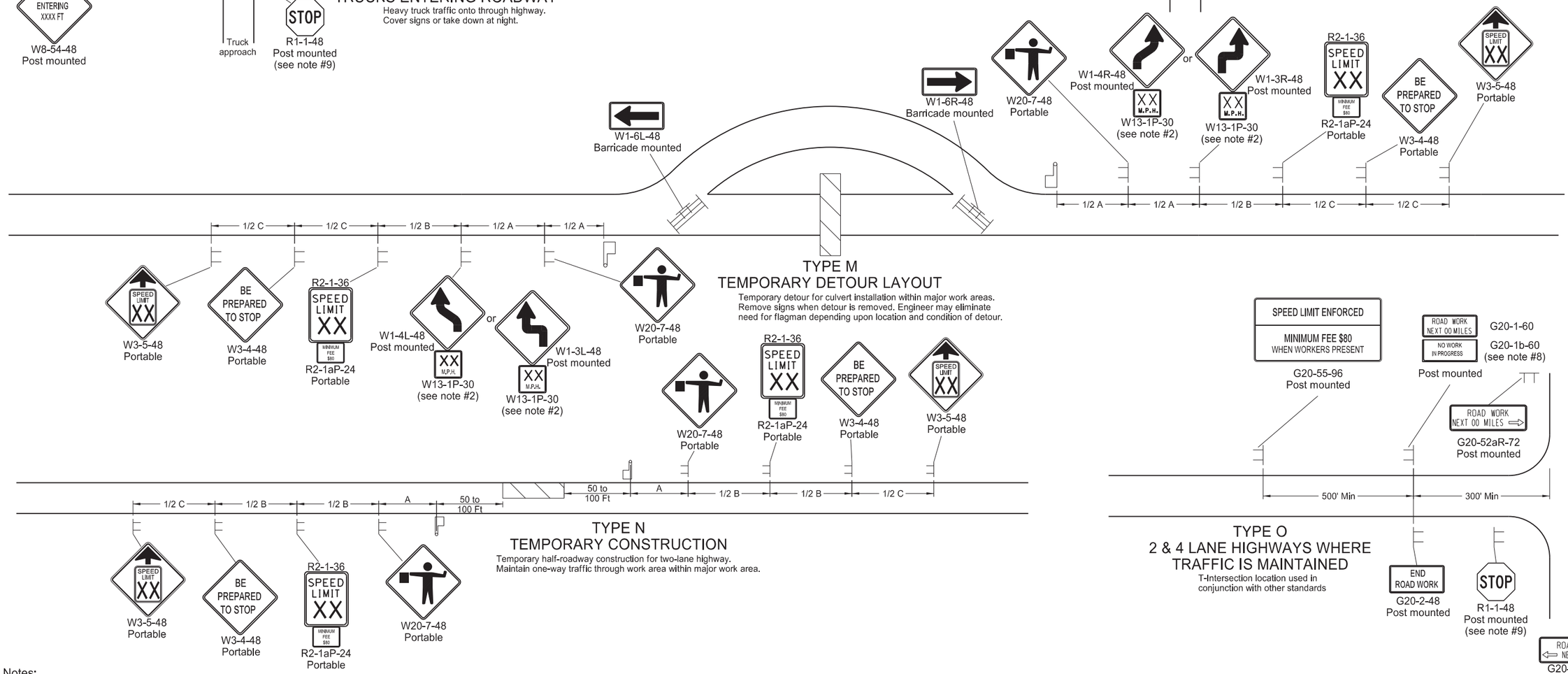
TYPE K
TRUCKS ENTERING ROADWAY

Heavy truck traffic onto through highway.
Cover signs or take down at night.



TYPE L
TRUCKS CROSSING ROADWAY

Trucks crossing through highway.
Cover signs or take down at night.



TYPE M
TEMPORARY DETOUR LAYOUT

Temporary detour for culvert installation within major work areas.
Remove signs when detour is removed. Engineer may eliminate need for flagman depending upon location and condition of detour.

TYPE N
TEMPORARY CONSTRUCTION

Temporary half-roadway construction for two-lane highway.
Maintain one-way traffic through work area within major work area.

TYPE O
2 & 4 LANE HIGHWAYS WHERE TRAFFIC IS MAINTAINED

T-Intersection location used in conjunction with other standards

Notes:

1. Place barricades on a moveable assemblies and signs on portable assemblies when located on roadway.
2. Where necessary, safe speed to be determined by the Engineer.
3. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½ B.
4. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
5. Cover existing speed limit signs within a reduced speed zone.
6. Covered (when approved by engineer) or obliterated pavement marking measured as Obliteration of Pavement Marking.
7. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
8. Install sign G20-1b-60 when work is suspended for winter.
9. If existing stop sign is in place, a 48" stop sign is not required.
10. Sign G20-55-96 is not required if layout is part of other traffic control that contains this sign, or if work is less than 15 days.
11. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

ADVANCE WARNING SIGN SPACING

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE
08-17-17	Update notes & sign numbers
11-01-19	Revised sign numbers & note 7
12-09-21	Added Speed Limit Enforced and Dollars At Work signs
11-29-22	Removed Dollars At Work

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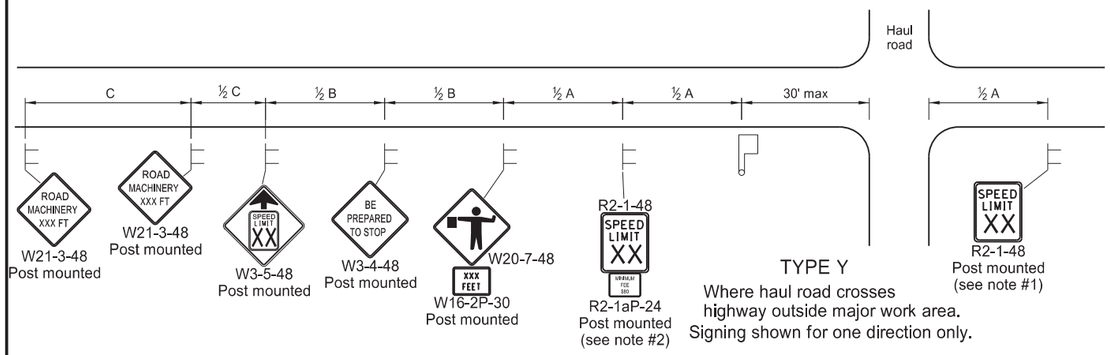
NORTH DAKOTA

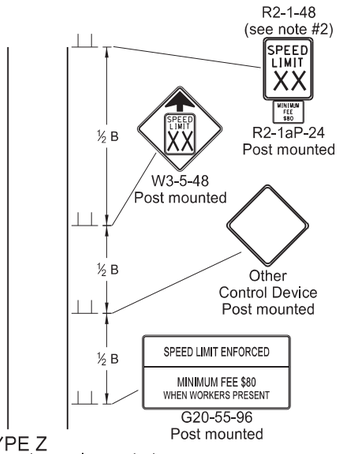
11/29/22

MISCELLANEOUS SIGN LAYOUTS

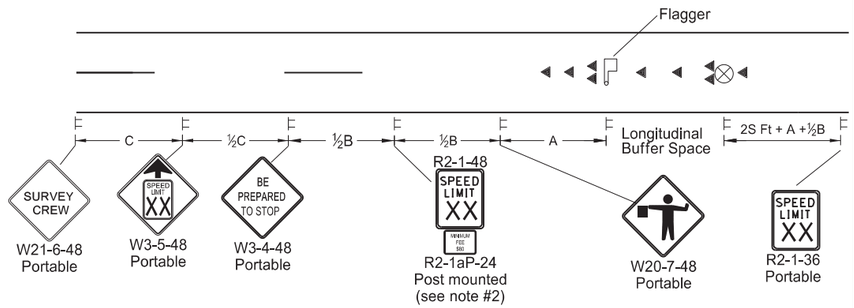
D-704-26



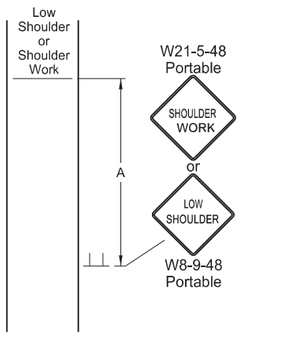
TYPE Y
Where haul road crosses highway outside major work area.
Signing shown for one direction only.



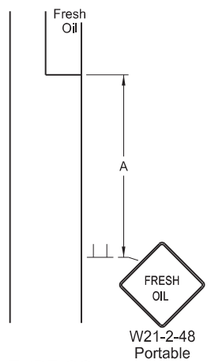
TYPE Z
Where speed zone is needed
Signing shown for one direction only.



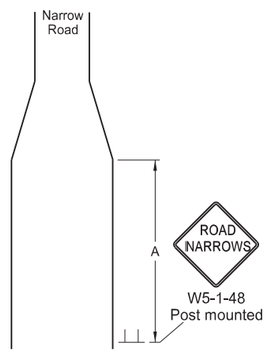
TYPE AA
Where survey crew is used
Signing shown for one direction only.



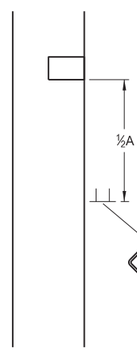
TYPE BB
Within major work area where sign conditions exist



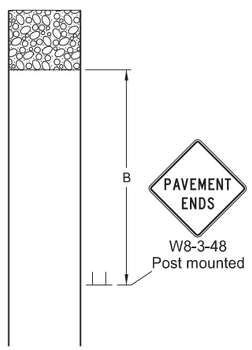
TYPE CC
Where sign conditions exist



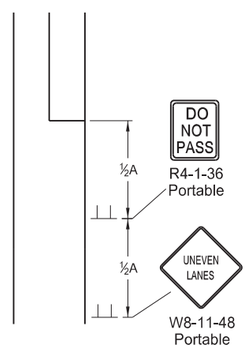
TYPE DD
Where sign conditions exist



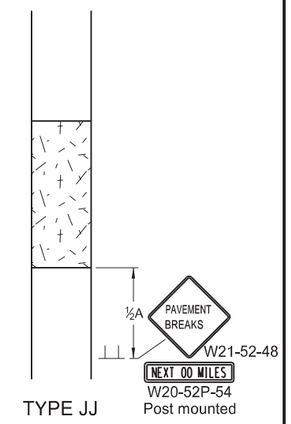
TYPE EE
Where sign conditions exist



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



TYPE GG
Where elevation difference exists between lanes

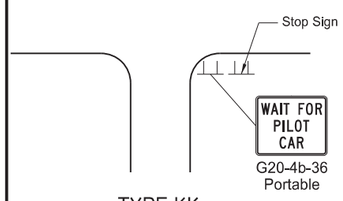


TYPE JJ
For break in pavement.
Install signs when conditions exist and remove when not applicable.
Signing shown for one direction only.

KEY

Flagger	Sign
Cones	Survey Equipment

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



TYPE KK
At major intersections within pilot car control area

Notes
1. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
2. Determine reduced speed limit based on in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½B.
3. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
4. Cover existing speed limit signs within reduced speed zones.
5. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
6. Sign G20-55-96 is not required if this standard is part of other traffic control layouts, or work is less than 15 days.
7. When pilot car operation is used, place sign G20-4b-36 "Wait For Pilot Car" at major intersections within pilot car control area.
8. Recommend 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.
9. Layouts shown for one direction only.

ADVANCE WARNING SIGN SPACING

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

Longitudinal Buffer Space

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

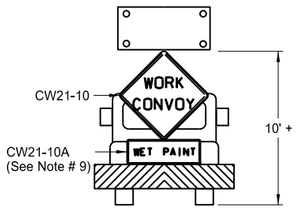
REVISIONS

DATE	CHANGE
8-17-17	Added speed limit signs. Updated notes & sign numbers.
11-01-19	Revised note 5 & sign numbers.
2-23-23	Revised distance & removed signs.

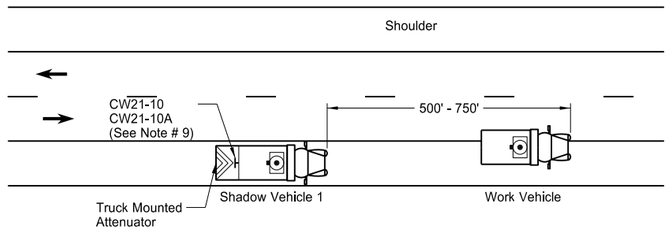
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

02/23/23

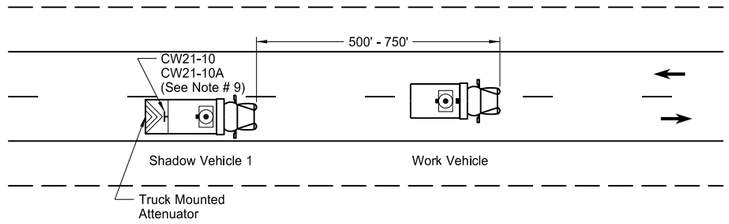
MOBILE OPERATION
(PAVEMENT MARKING)



Typical Shadow Vehicle 1
Two-Way Roaday

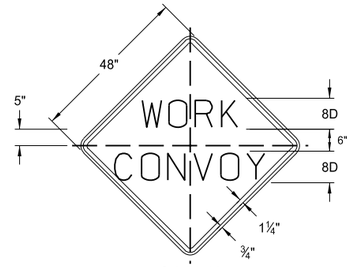


Two-Way Roadway with Paved Shoulders

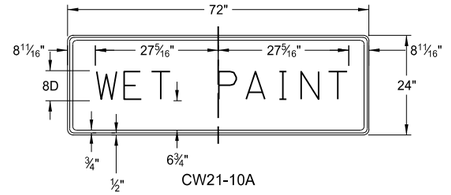


Two-Way Roadway without Paved Shoulders

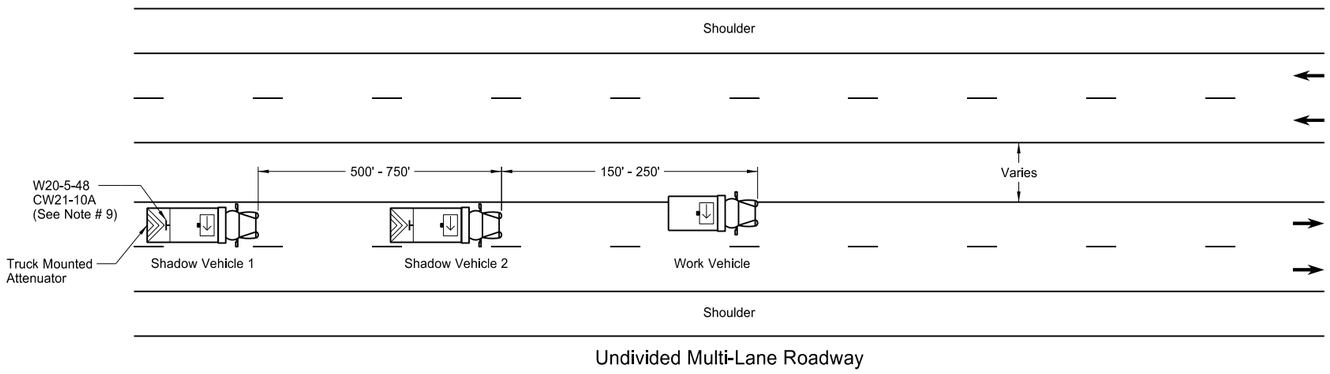
Sign Details



CW21-10

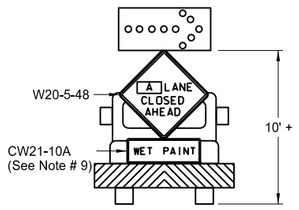


CW21-10A



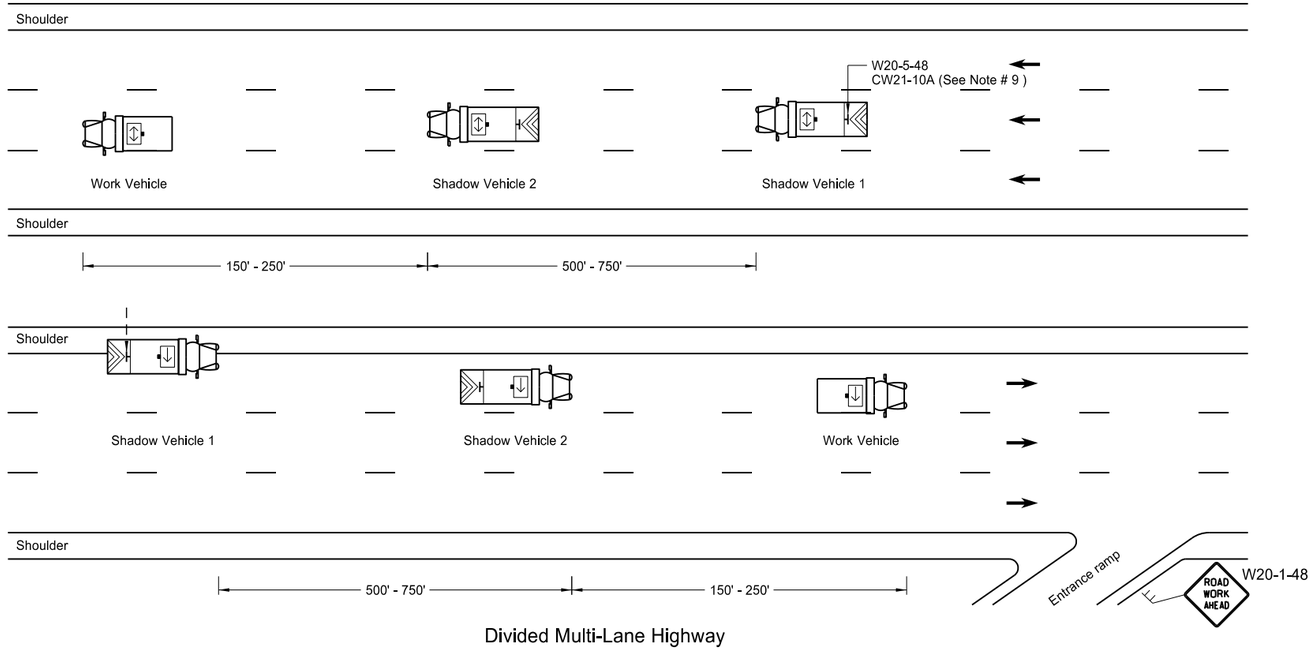
Undivided Multi-Lane Roadway

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



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

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

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

Two-Lane Roadway Portable Rumble Strips

D-704-33

KEY

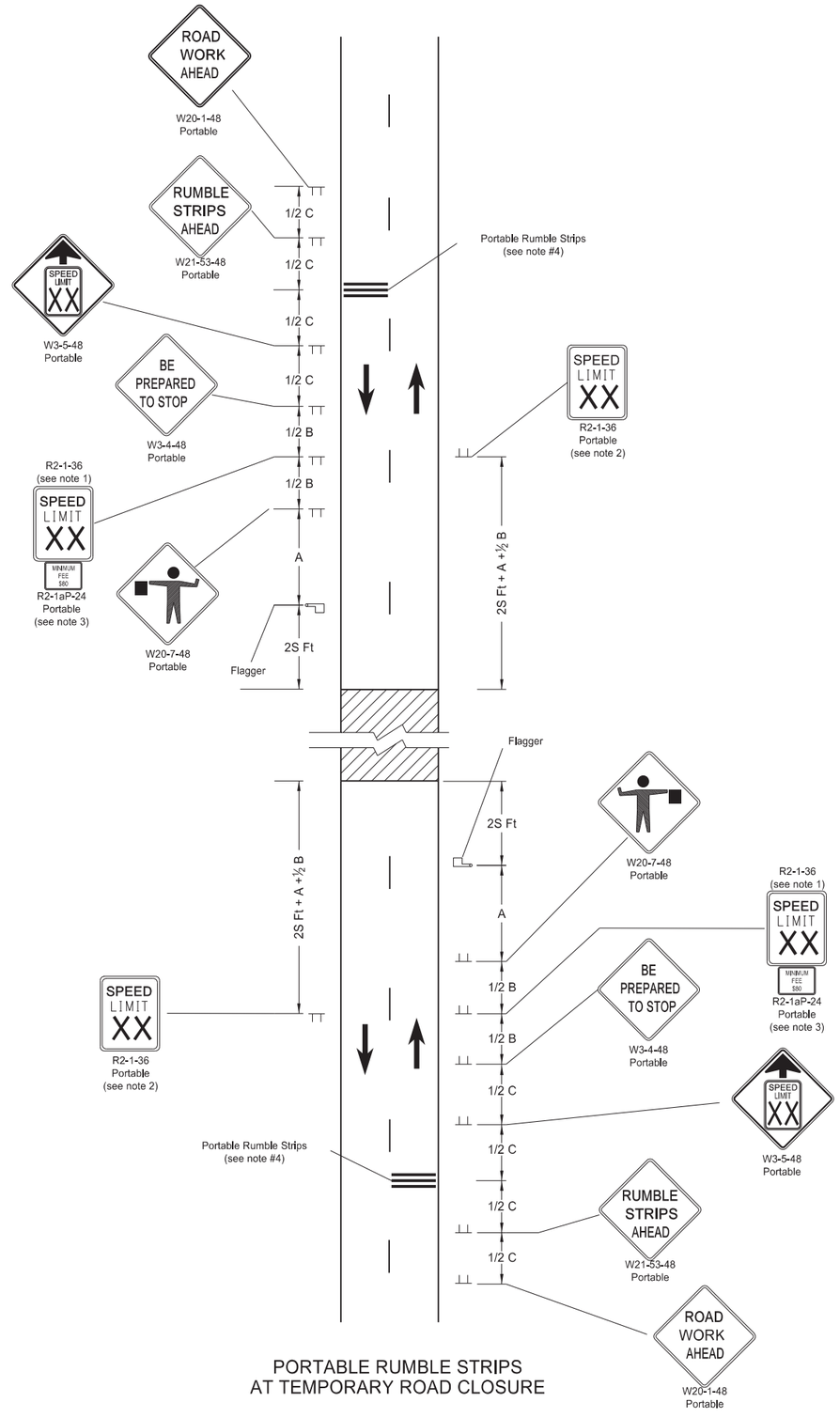
Work area

Flagger

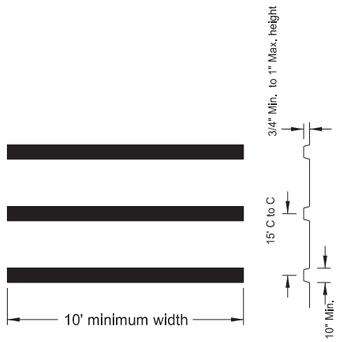
Sign

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

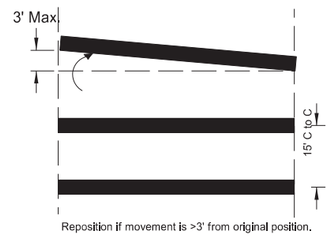
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - High Speed (over 45 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720



PORTABLE RUMBLE STRIPS AT TEMPORARY ROAD CLOSURE



PORTABLE RUMBLE STRIPS ARRAY DETAIL

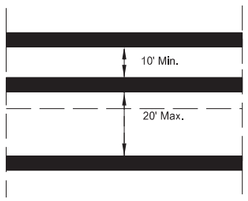


Reposition if movement is >3' from original position.

Skewing

Reposition if movement is >2' from original position.

Lateral



Reposition if distance between strips is <10' or >20'.

Perpendicular to Travel with or against traffic

PORTABLE RUMBLE STRIPS ARRAY TYPES OF MOVEMENT AND MAXIMUM ALLOWANCES

Notes:

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
02-22-22	
REVISIONS	
DATE	CHANGE
03/07/23	Use changed to min 45 mph.

KIRK J. HOFFMANN
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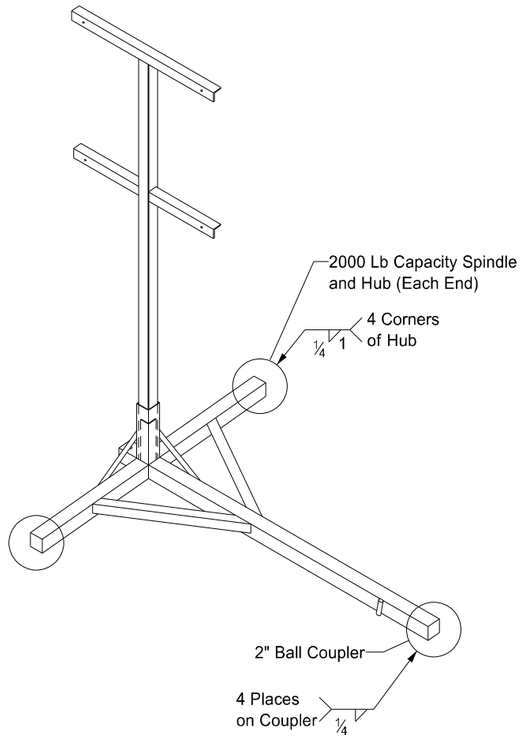
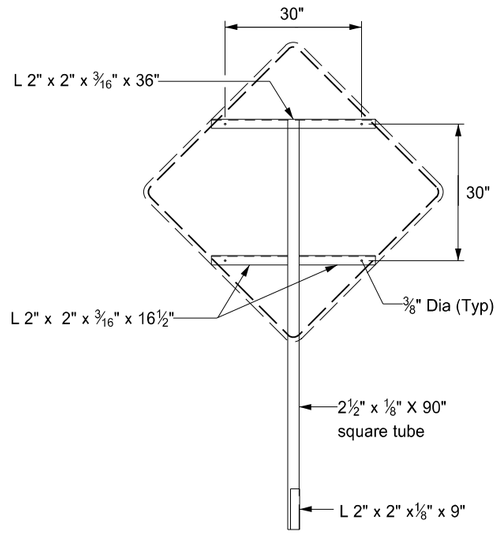
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

03/07/23

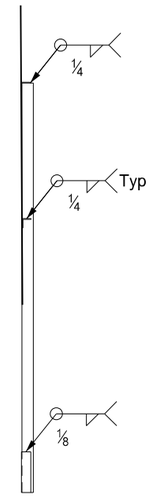
PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50





FRONT

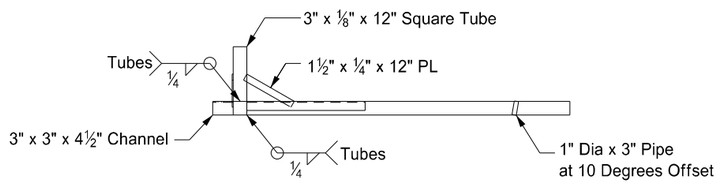


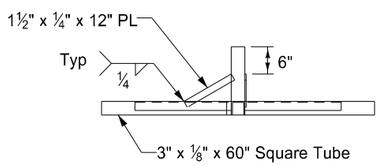
RIGHT

SIGN SUPPORT

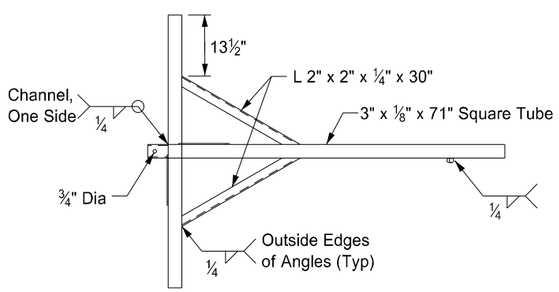
Notes:

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





RIGHT



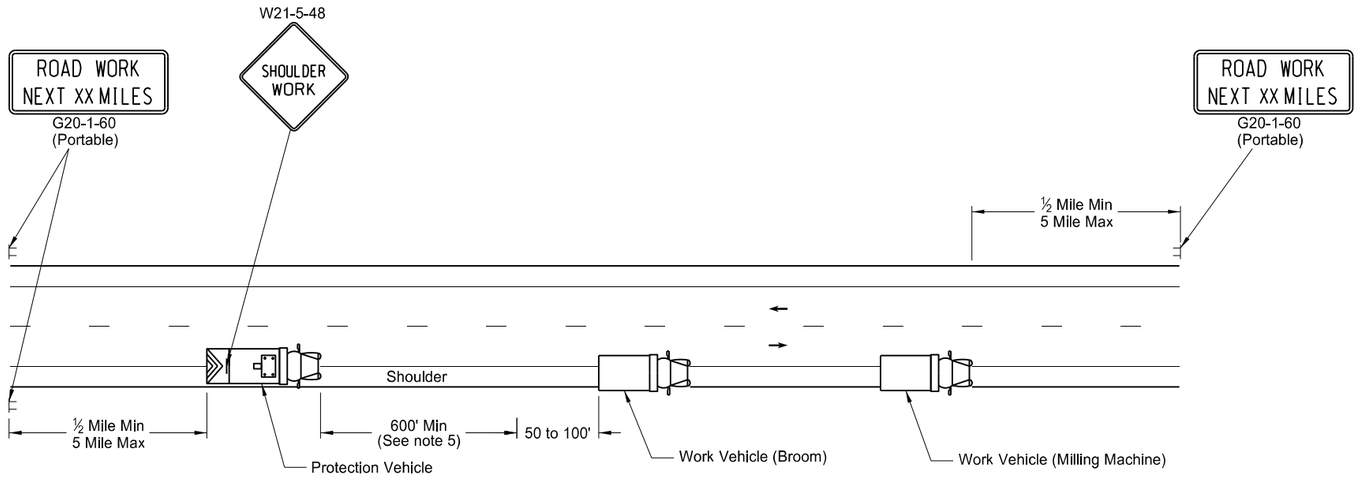
TOP

TRAILER

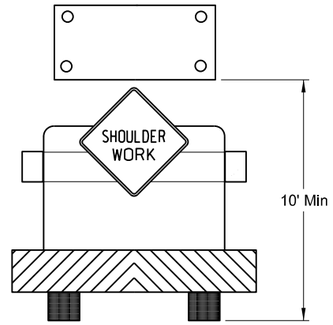
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-23-10	
REVISIONS	
DATE	CHANGE
12/02/2020	Updated Note to active voice.

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

MOBILE OPERATION
Grinding Shoulder Rumble Strips



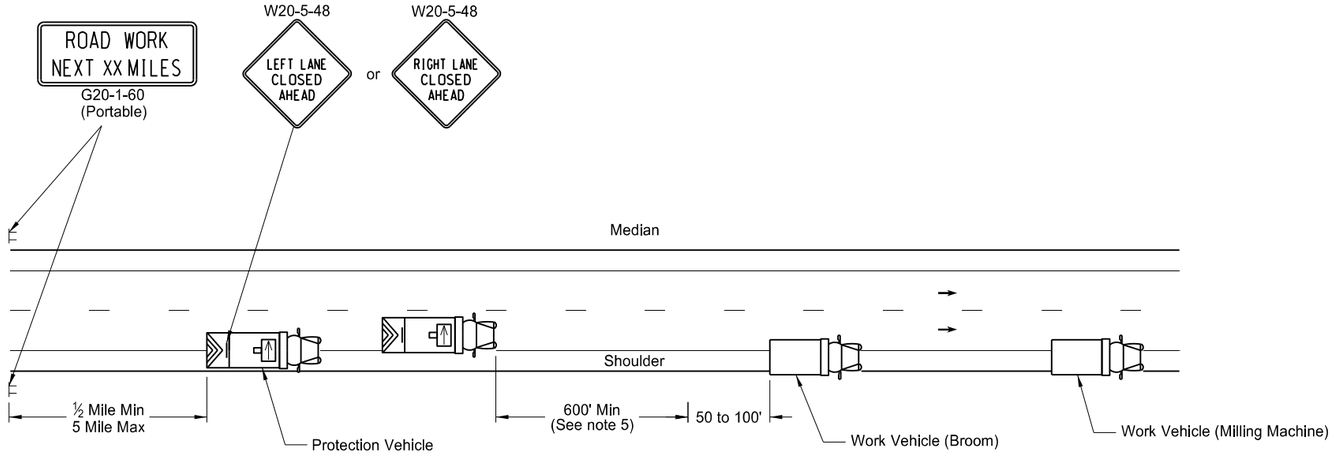
TWO LANE - TWO WAY ROADWAY



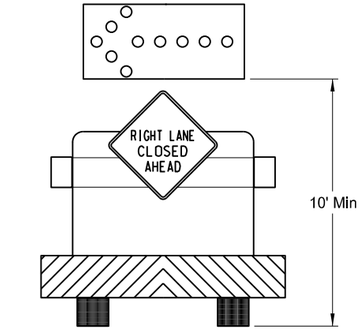
TWO LANE - TWO WAY ROADWAY

Typical Protection Vehicle with
Flashing Arrow Panel In Caution Mode

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

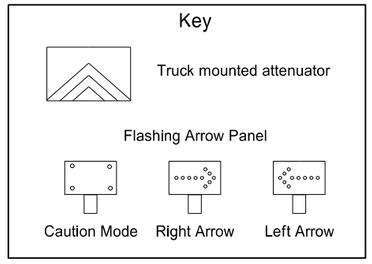


INTERSTATE & 4 LANE DIVIDED HIGHWAY



INTERSTATE & 4 LANE DIVIDED HIGHWAY

Typical Protection Vehicle with Flashing Arrow
Panel In Flashing Arrow Mode

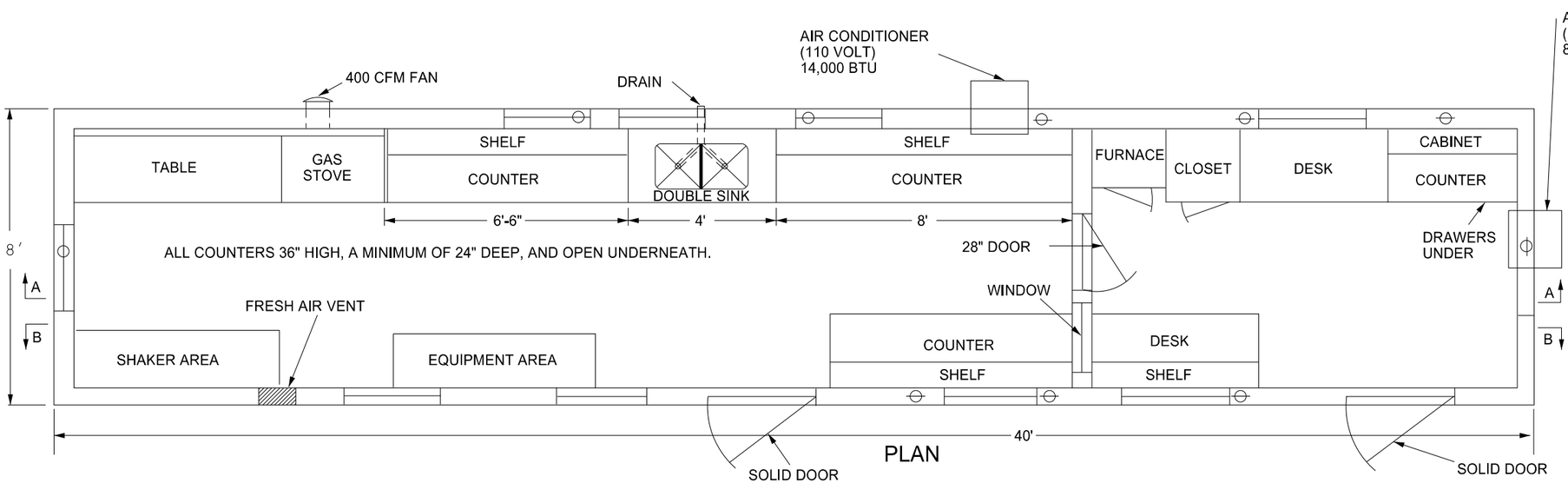


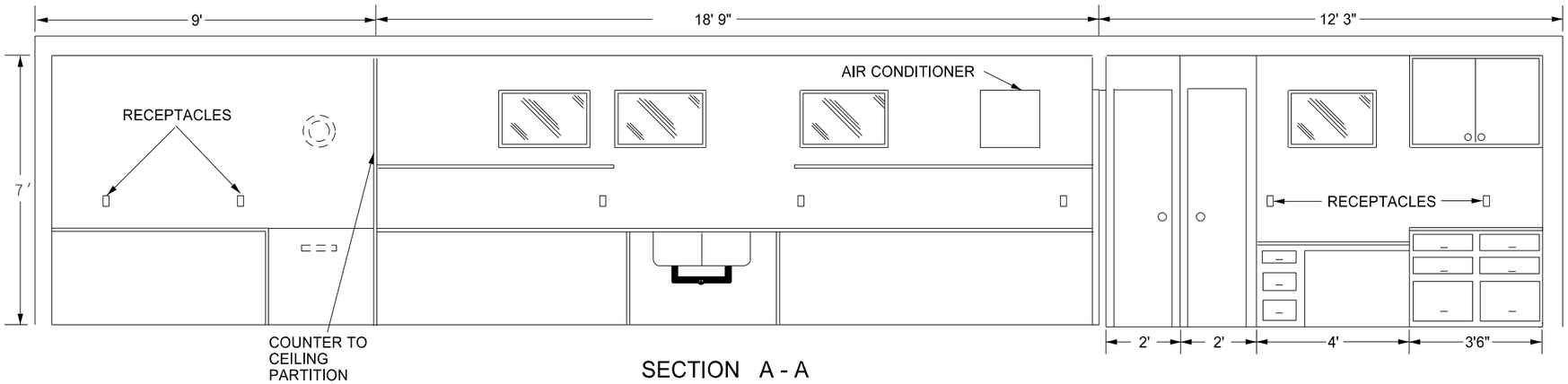
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-15-12	
REVISIONS	
DATE	CHANGE
8-17-17	Updated notes & signs
10-03-19	New Design Engineer PE Stamp

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

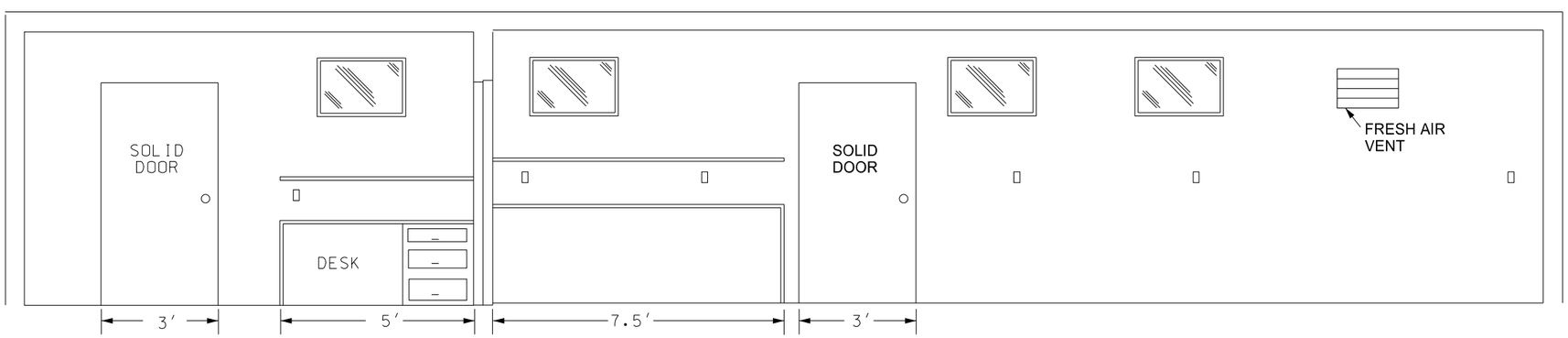
BITUMINOUS LABORATORY

D-706-1





SECTION A - A



SECTION B - B

Provide a laboratory with the following:

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

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

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

PERFORATED TUBE ASSEMBLY DETAILS

D-754-23

Notes:

1. Curbed Roadways: Use a 3' clearance from face of the curb except where right of way or sidewalk width is limited; Use a minimum 2' clearance. Increase the horizontal clearance if required to maintain a minimum sidewalk clear width of 4' from the sign support, not including any attached curb.

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

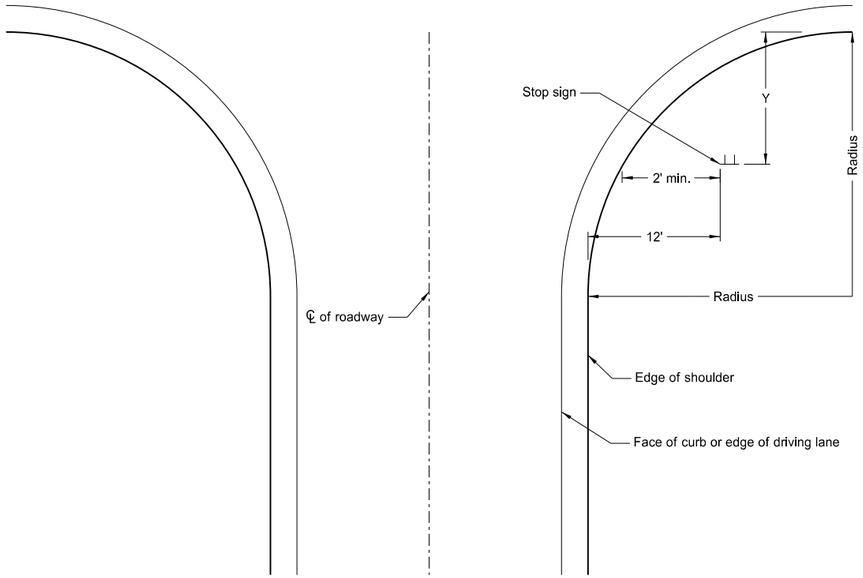
   Install signs on expressways a minimum height of 7'.

   Install adopt-a-highway signs on Freeways at least 7' above the edge of the driving lane.

   Maximum vertical clearance is 6" greater than the minimum vertical clearance.

3. Offset signs: Use a vertical clearance of 5' above the edge of the driving lane for signs placed 30 feet or more from the edge of the traveled way.

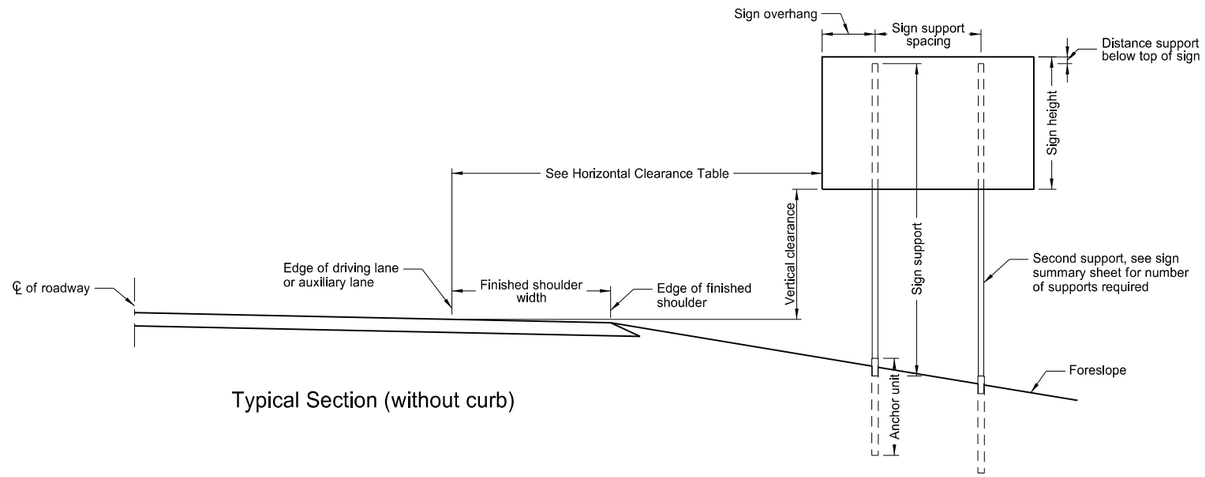
4. Provide a horizontal clearance from edge of shared use path to edge of sign of 3', except where width is limited. Provide a minimum clearance of 2'.



Stop Sign Location
Wide Throat Intersection

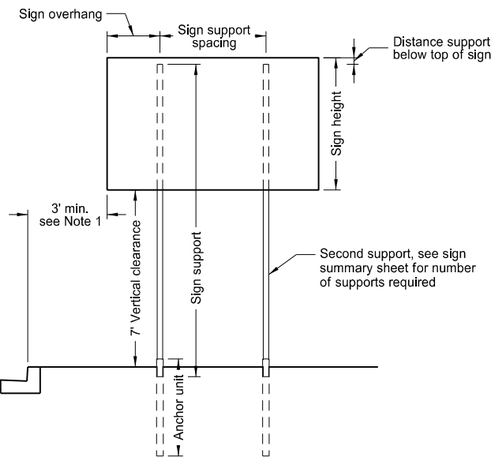
Use layout for the placement of "Stop" signs.

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



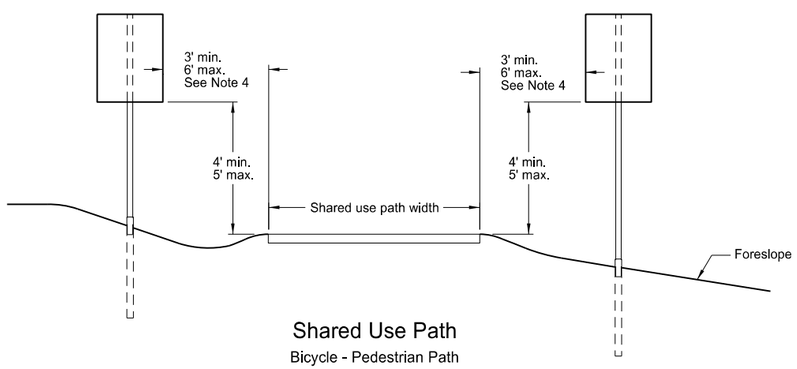
Typical Section (without curb)

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.
8-30-18	Updated notes to active voice.
8-29-19	New Design Engineer PE Stamp.

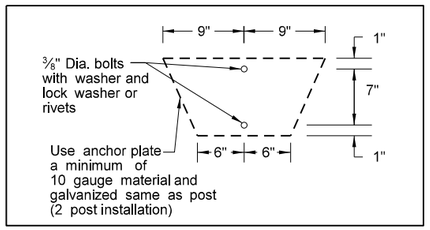
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8/29/19 and the original document is stored at the North Dakota Department of Transportation

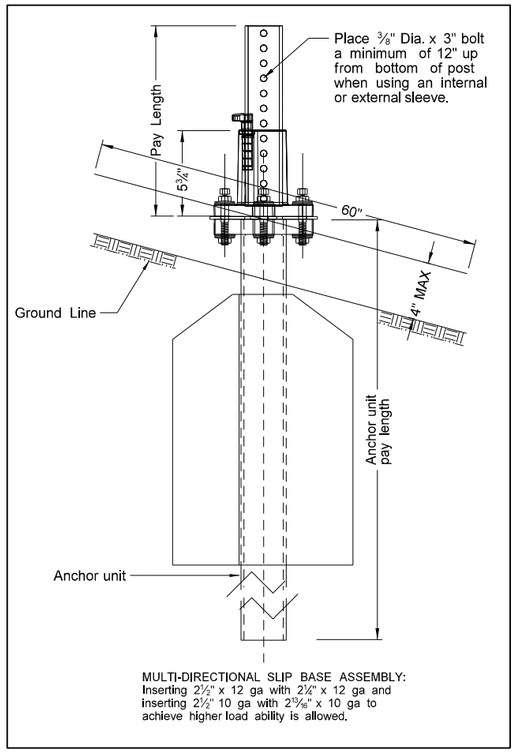
Mounting Details Perforated Tube

D-754-24

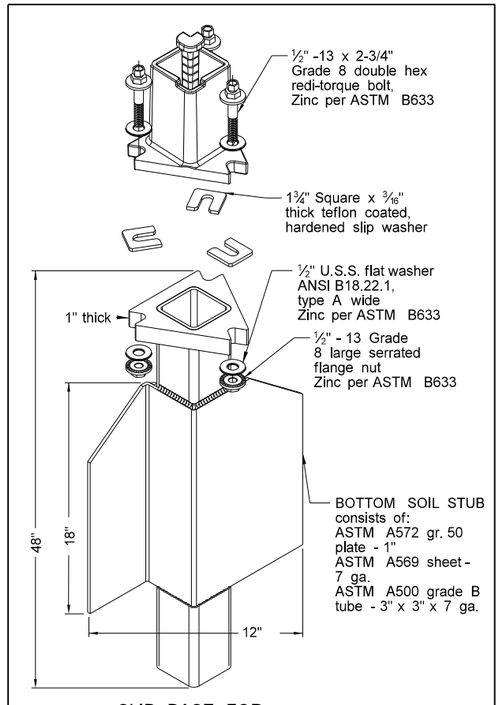
Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thick-ness Gauge
1	2	12			No	2¼	12
1	2¼	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2¼	12	2½(D)	12	Yes		7
1	2½	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	2⅜16	10	Yes		7

(B) - Provide a shim as specified by the manufacturer when placing 2½", 12 gauge posts in standard soils without breakaway bases. Provide breakaway base when placing the support in weak soils. The Engineer will 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.

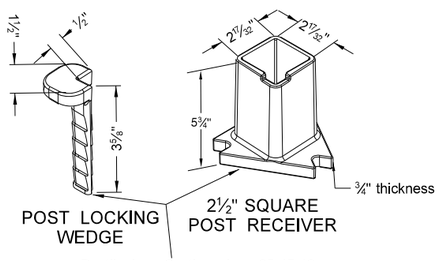




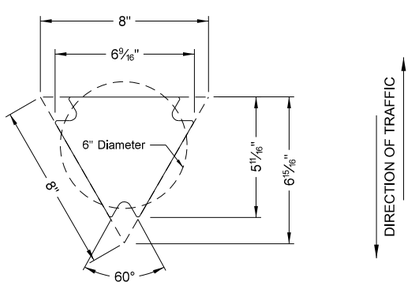
MULTI-DIRECTIONAL SLIP BASE ASSEMBLY:
Inserting 2½" x 12 ga with 2¼" x 12 ga and inserting 2½" 10 ga with 2⅜16" x 10 ga to achieve higher load ability is allowed.



SLIP BASE FOR 2½" POST



Ductile Iron Casting class 65-45-12.
Hot Dip Galvanize ASTM A153



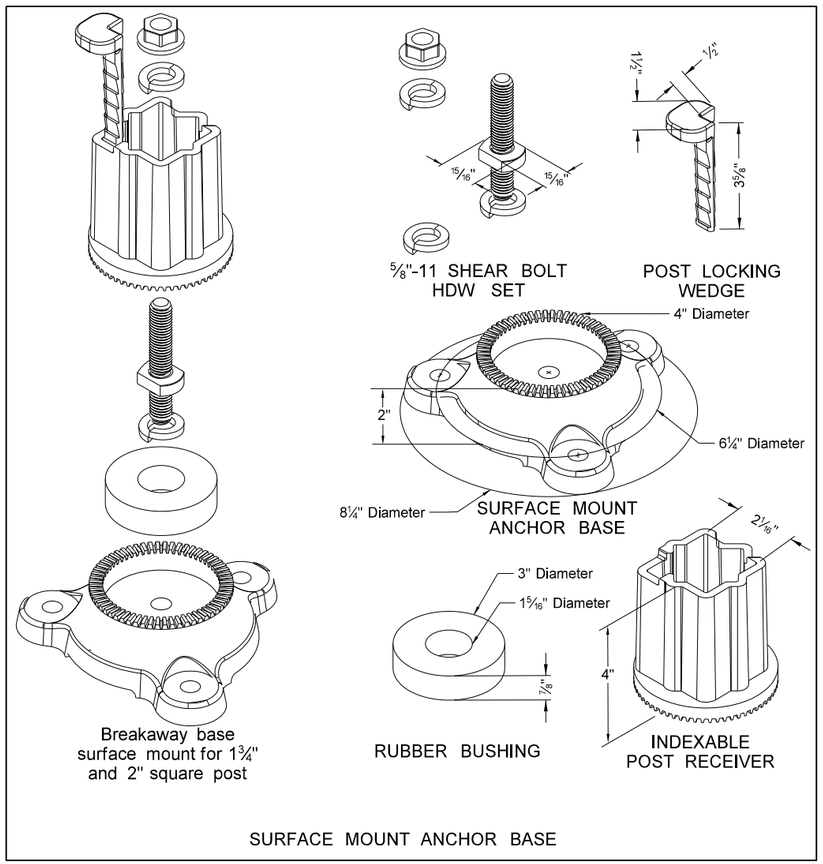
SLIP BASE DETAIL

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 Modulud 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
2⅜16 x 2⅜16	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 ⅜16" 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:

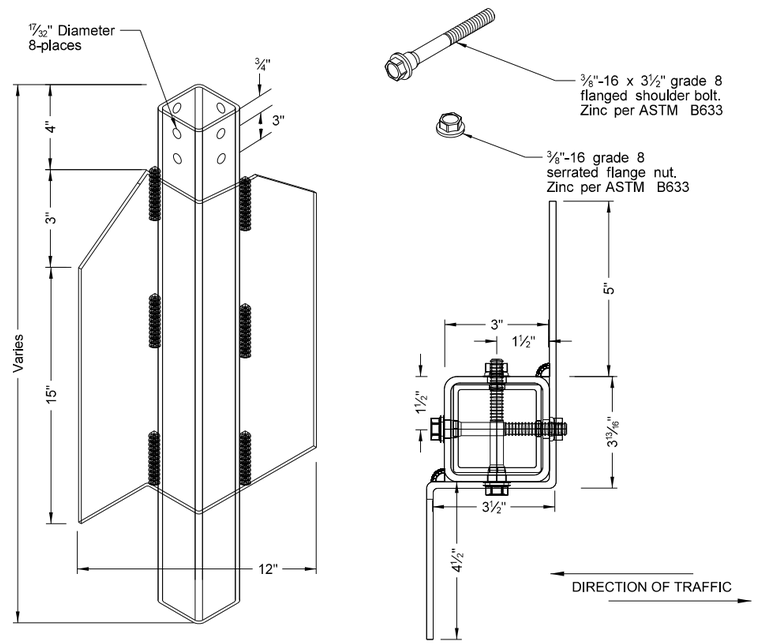
1. 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.
2. Provide 7 guage HRPO commmercial quality ASTM A569 and 3" x 3" x 7" guage ASTM A500 grade B anchor material with 43.9 KSI yield strength and 59.3 KSI tensile strength. Hot dip galvanize anchor per ASTM A123/153. Tolerances on anchor unit and slip base bottom assembly are +/- 0.005" unless ortherwise noted.
3. Eliminate wings when anchor is used in concrete sidewalk.
4. Provide a minimum 8' distance between the first and fourth post on four post signs.
5. Install in accordance with manufacturers recommendation.
6. Use a minimum ½" diameter x 4" grade 8 concrete fastener for surface mount breakaway base.



SURFACE MOUNT ANCHOR BASE

SHOULDER BOLT

Shimming agent to reduce tolerance between 3" anchor unit and 2½" post.
(use standard ⅜" diameter grade 8 bolt with proper shim)



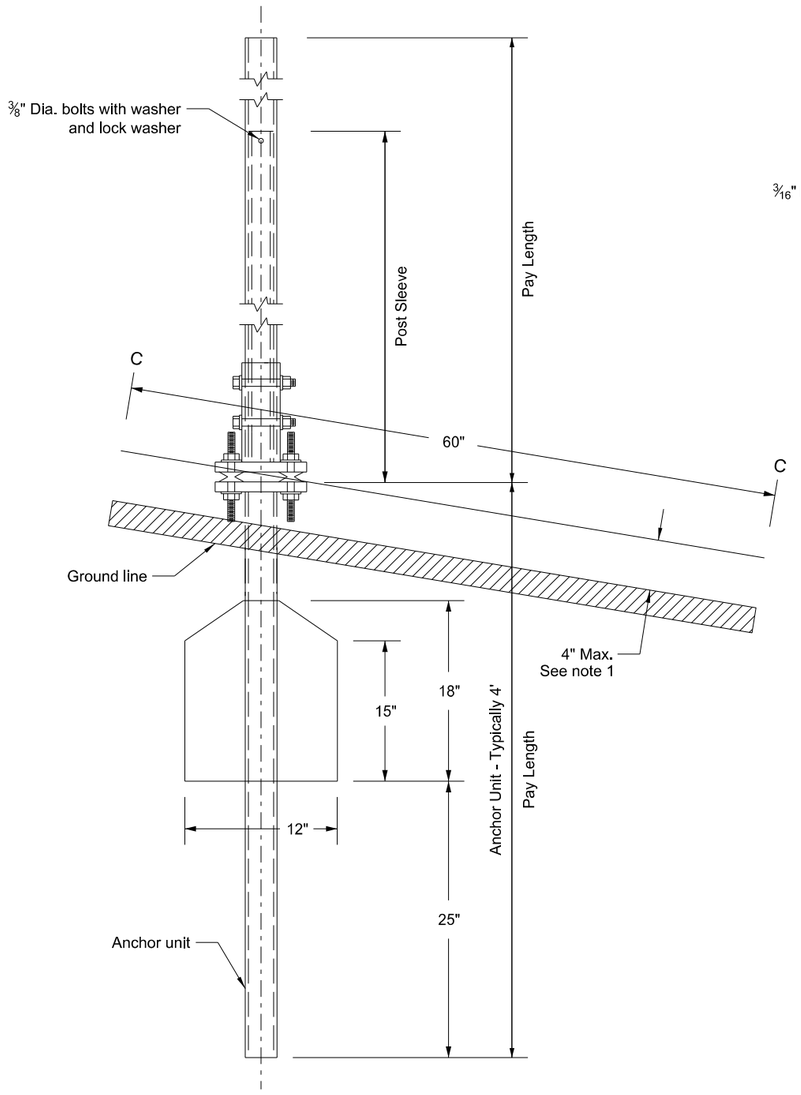
3" ANCHOR UNIT

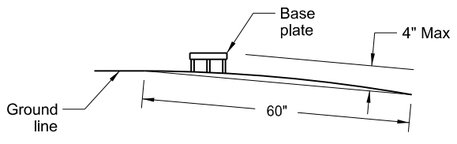
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice & corrected max height of base.
8-29-19	New Design Engineer PE Stamp.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE- 4683 on 8/29/19 and the original document is stored at the North Dakota Department of Transportation

Breakaway Coupler System for Perforated Tubes

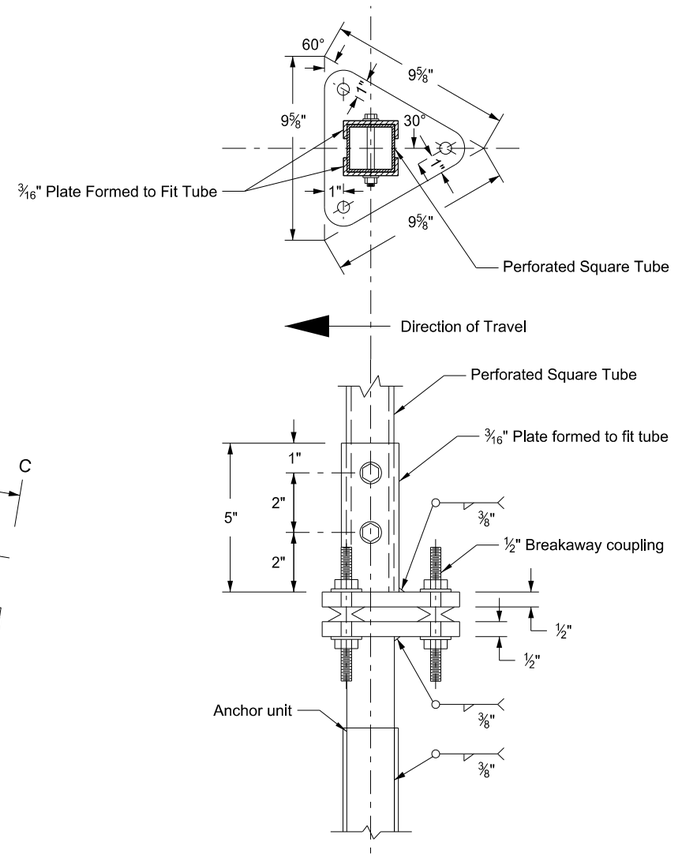
D-754-24A





Section C-C

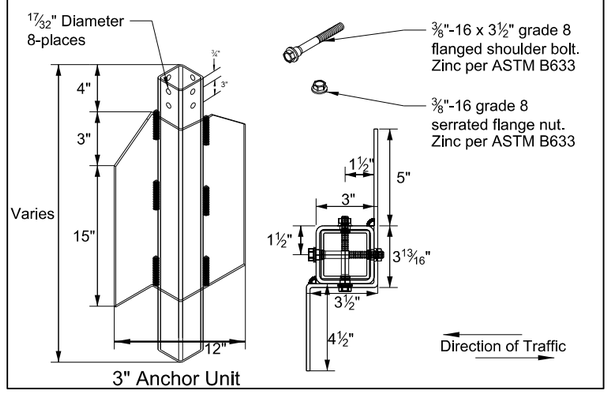
Max protection of the stub post is 4" above a 60" chord aligned radially to the center line of the highway and connecting any point, within the length of the chord, on the ground surface on one side of the support to a point in the ground surface on the other side.



Base Plate with Breakaway Coupler

Shoulder Bolt

Shimming agent to reduce tolerance between 3" anchor unit with 2½" post. (use of standard ⅜" diameter grade 8 bolt allowed with proper shim)



3" Anchor Unit

Notes:

1. 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.
2. Use anchor unit of the same size and specification as the post.
3. Provide a minimum 8' distance between the first and fourth post on four post signs.
4. Use the breakaway base system on standard D-754-24 or the breakaway coupling system manufactured from material meeting the requirements of ASTM A325 fasteners with the special requirements 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) - 2½" 12 gauge posts do not need breakaway bases unless support is placed in boggy, wet, or loose soil areas.

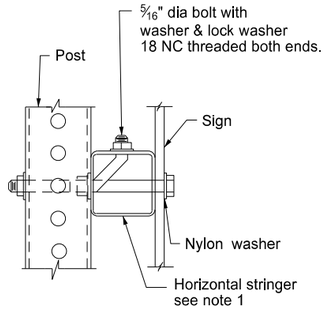
(C) - 3" anchor unit

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-2013	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
8-30-19	New Design Engr PE Stamp.

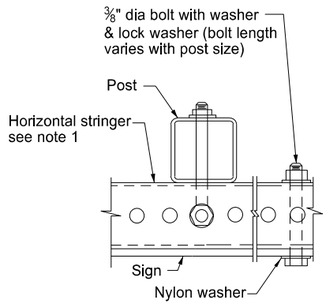
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8/30/19 and the original document is stored at the North Dakota Department of Transportation

Mounting Details Perforated Tube

D-754-25

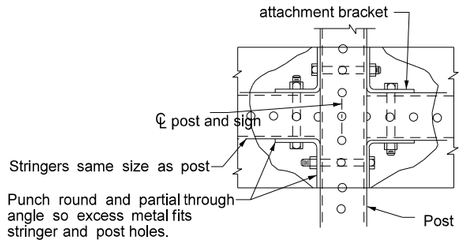


Side View



Top View

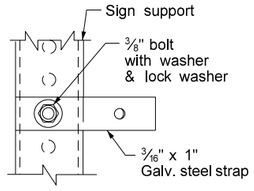
STRINGER MOUNTING
(WITH STRINGER IN FRONT OF POST)



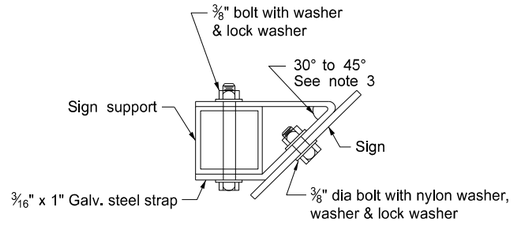
STREET NAME SIGNS AND ONE WAY SIGNS
SINGLE POST ASSEMBLY
ONE STRINGER OR BACK TO BACK MOUNTING

Note:

1. Horizontal stringers - Use perforated tubes or 1¾" x 3/16" thick, 1.08 lbs./ft aluminum or 3.16 lbs./ft steel z bar stringers.
2. Use minimum outside diameter 15/16" ±1/16" and 10 gauge thick metal washers on sign face.
3. Place No Parking signs with directional arrows at a 30 to 45 degree angle with the line of traffic flow. Turning the support to the correct angle for No Parking signs requiring the above angles is allowed. If the No Parking sign is placed with another sign that requires placement at a 90 degree angle with the line of traffic flow, use the detailed angle strap to mount the No Parking sign. Use flat washers and lock washers with all nylon washers.
4. Punching the sign backing and placing the bolt through the sign, the stringer and the post is allowed in lieu of using the bent bolt to attach the post to the stringer.
5. 4" vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.

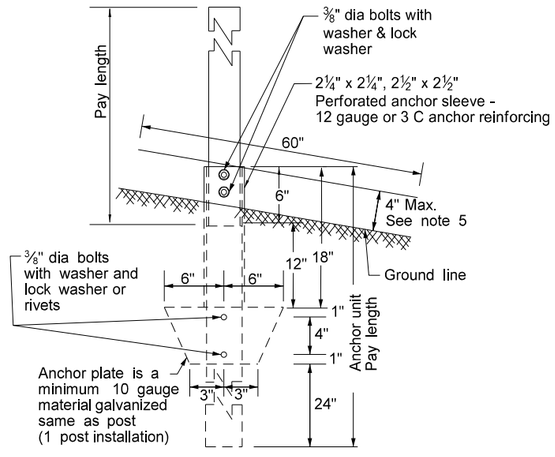


Side View



Top View

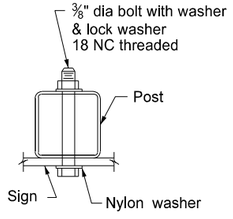
STRAP DETAIL



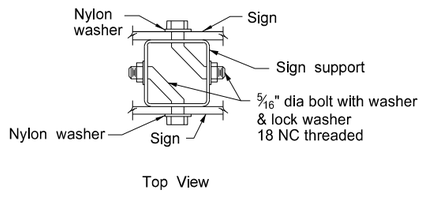
ANCHOR UNIT AND POST ASSEMBLY

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) - When placing 2½", 12 gauge posts in standard soils without breakaway bases, provide a shim as specified by the manufacturer. Provide breakaway base when placing the support in weak soils. Engineer will determine if 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.

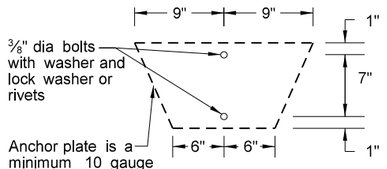


BOLT MOUNTING



Top View

BACK TO BACK MOUNTING



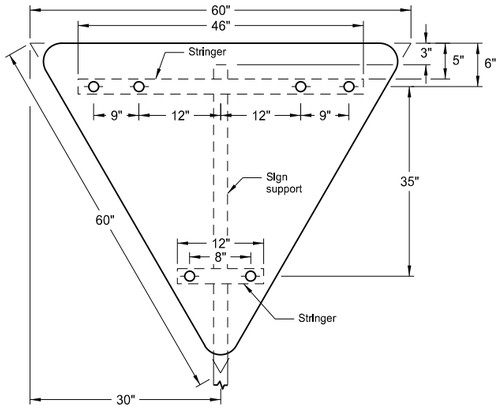
Properties of Telescoping Perforated Tubes						
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In.⁴	Cross Sect. area In.²	Section Modulus In.³
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	0.561	0.695	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.

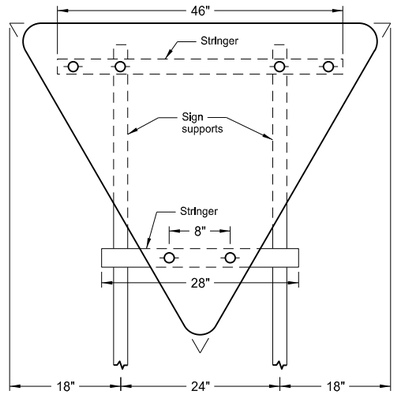
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE
7-8-14	Revised Note 3.
8-30-18	Updated notes to active voice.
8-30-19	New Design Engr PE Stamp.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE- 4683 , on 8/30/19 and the original document is stored at the North Dakota Department of Transportation

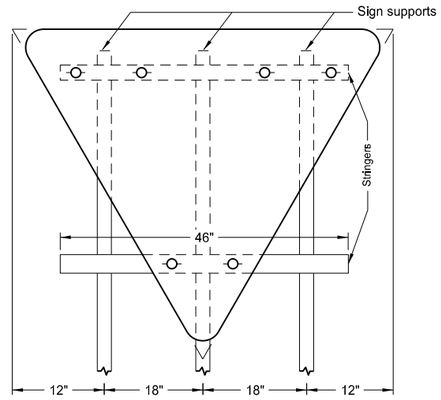
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS



1 Post



2 Posts

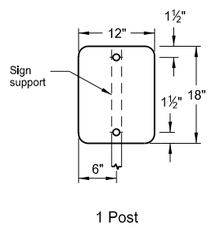


3 Posts

Assembly No. 6

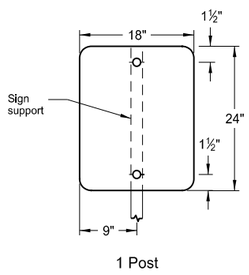
Notes:

1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1½" x 1½" perforated square tube stringers.
3. Punch holes round for ⅜" bolt.



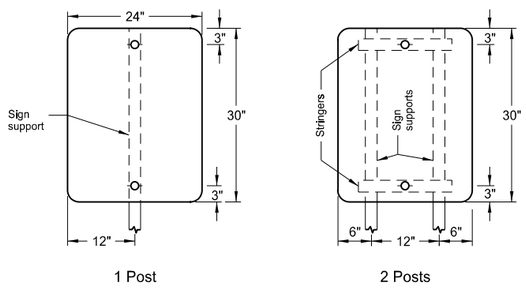
1 Post

Assembly No. 7



1 Post

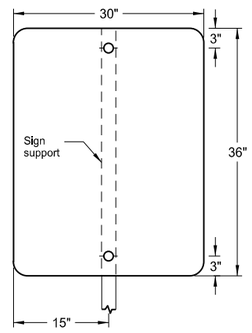
Assembly No. 8



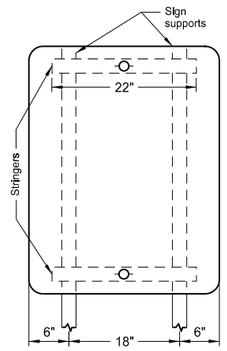
1 Post

2 Posts

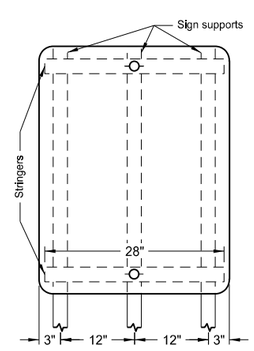
Assembly No. 9



1 Post

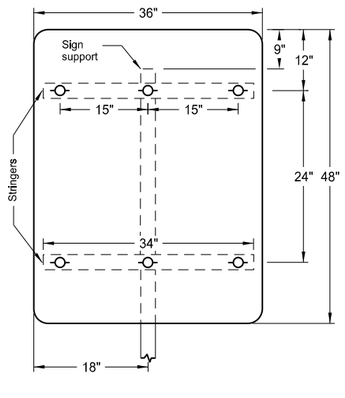


2 Posts

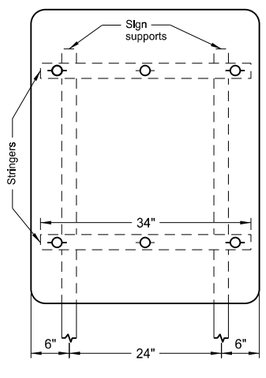


3 Posts

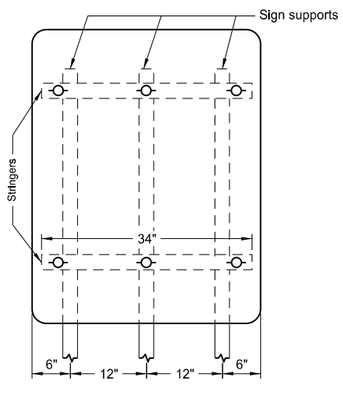
Assembly No. 10



1 Post



2 Posts



3 Posts

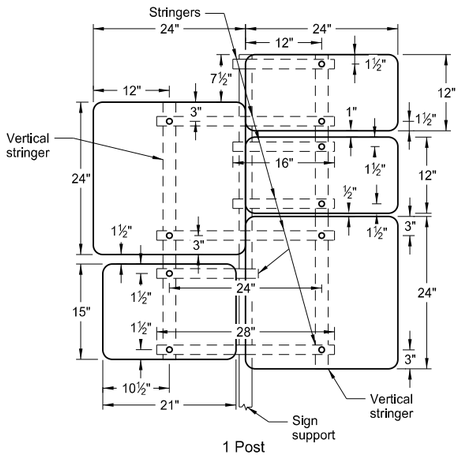
Assembly No. 11

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18 8-30-19	Updated notes to active voice. New Design Engineer PE Stamp.

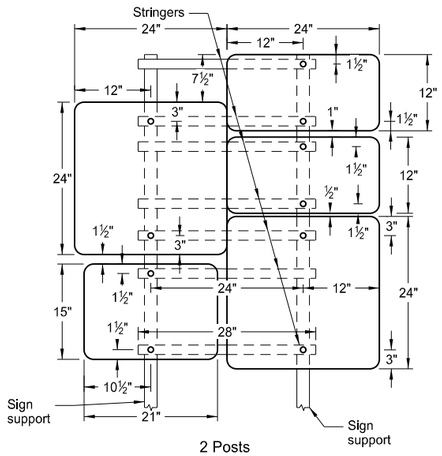
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8/30/19 and the original document is stored at the North Dakota Department of Transportation

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

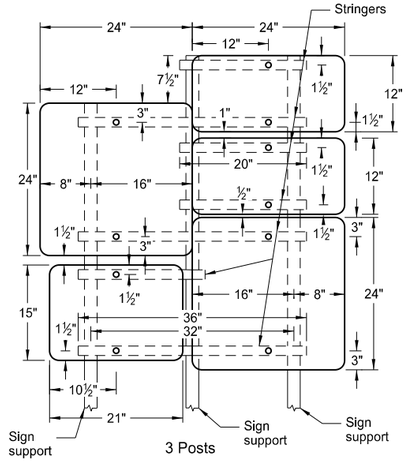
D-754-74



1 Post

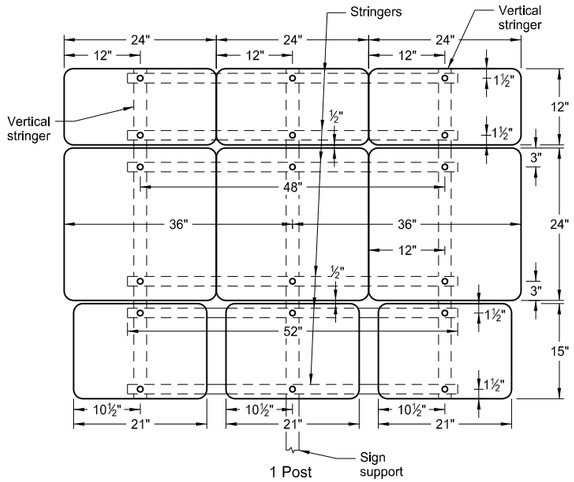


2 Posts

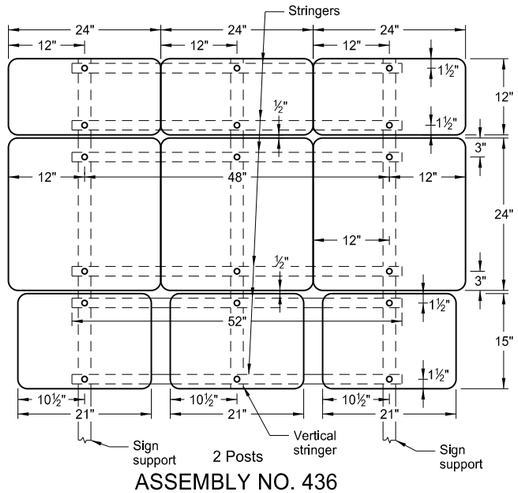


3 Posts

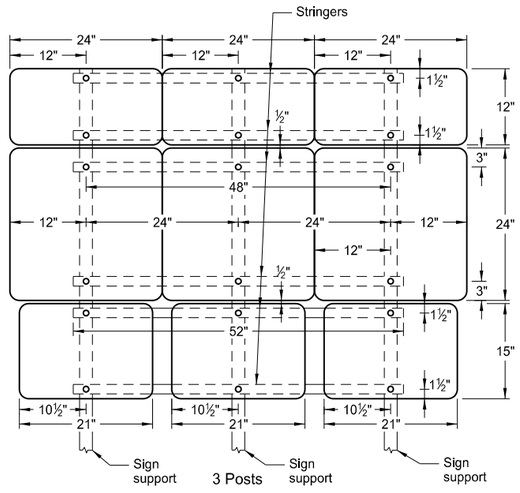
ASSEMBLY NO. 435



1 Post

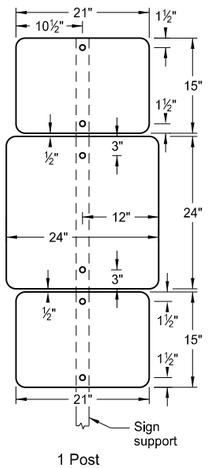


2 Posts

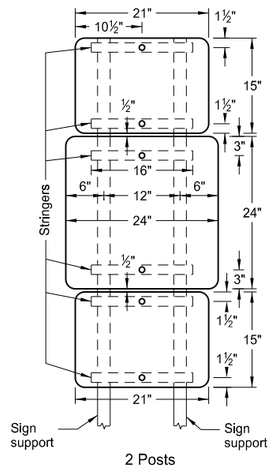


3 Posts

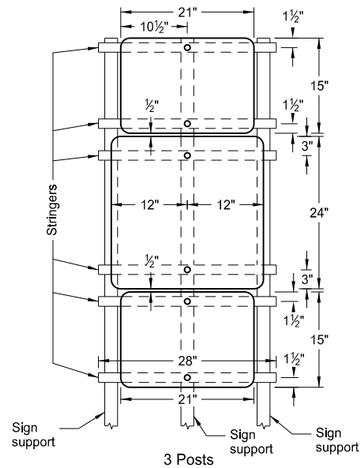
ASSEMBLY NO. 436



1 Post



2 Posts



3 Posts

ASSEMBLY NO. 437

Notes:

1. Use 0.100 inch minimum thickness sign backing material.
2. Use 1½"x1½" perforated square tube stringers.
3. Punch holes round for ⅜" bolt.

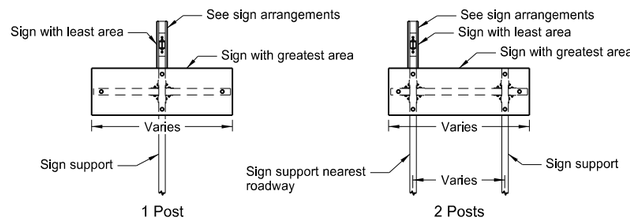
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE
8-30-18 9-05-19	Updated notes to active voice. New Design Engineer PE Stamp.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 9/05/19 and the original document is stored at the North Dakota Department of Transportation

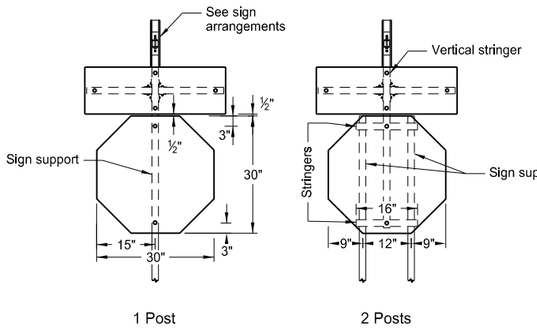
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS FOR STREET NAME SIGNS AND 911 SIGNS

D-754-87

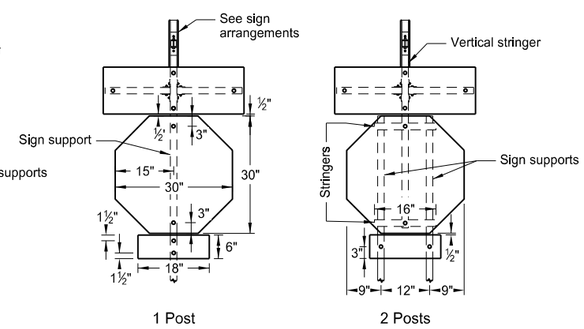
A - Single sign
B - Single sign back to back
C - Single sign each direction
D - Single sign one direction, back to back other direction
E - Back to back both directions



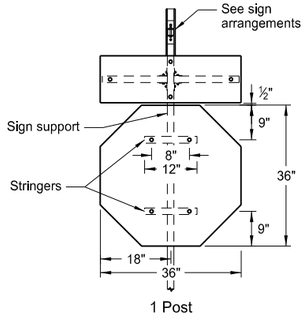
Special Assembly 1 (A, B, C, D or E)



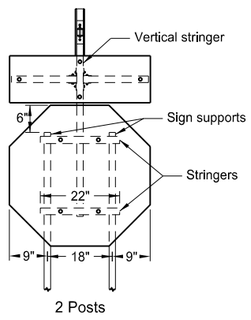
Special Assembly 2 (A, B, C, D or E)



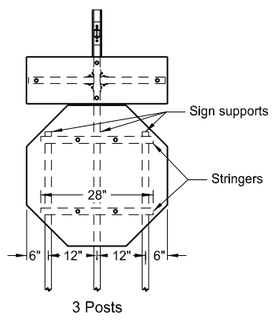
Special Assembly 3 (A, B, C, D or E)



1 Post

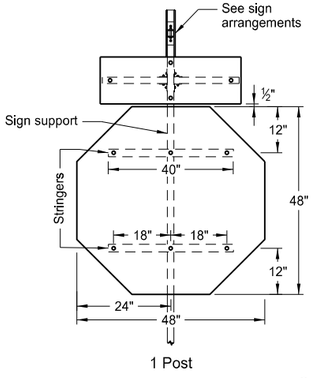


2 Posts

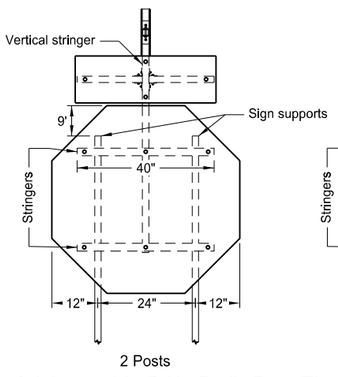


3 Posts

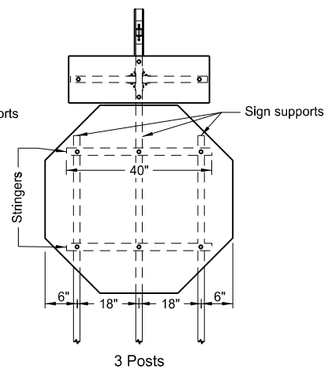
Special Assembly 4 (A, B, C, D or E)



1 Post

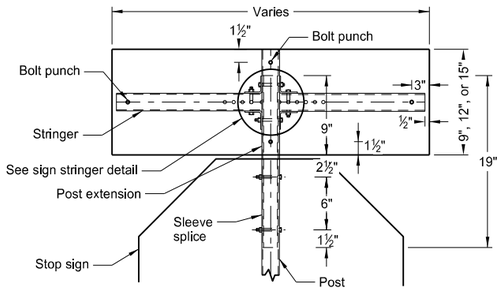


2 Posts



3 Posts

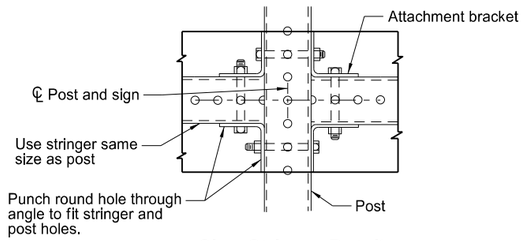
Special Assembly 5 (A, B, C, D or E)



Front View

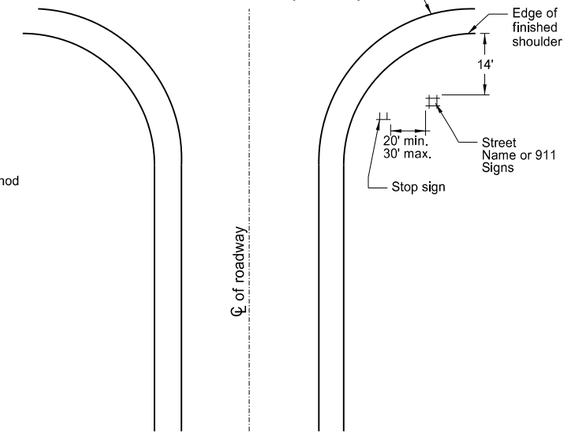
Sleeve Splice Detail

Note: Only use splice method with approval of engineer.



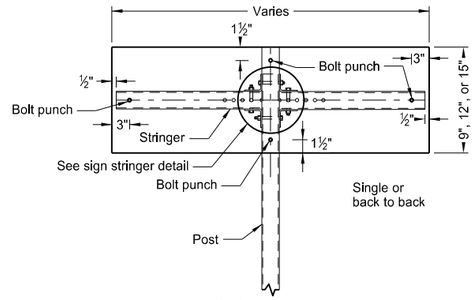
Sign Stringer Detail

Note: See Standard Drawing D-754-86 for 911 support information and sign layout details.

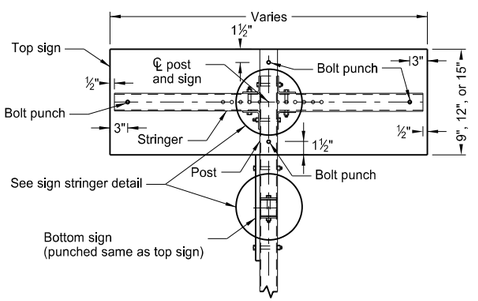


Intersection Layout

Note: Use layout for street name signs or 911 signs with Special Assembly 1 .

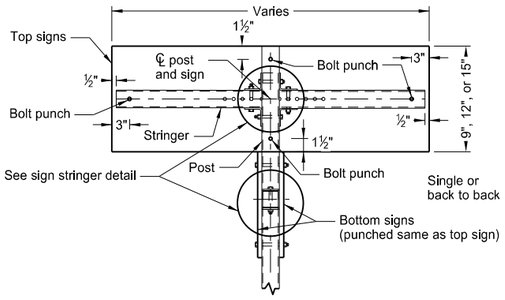


Detail A or B



Detail C

Sign Arrangements



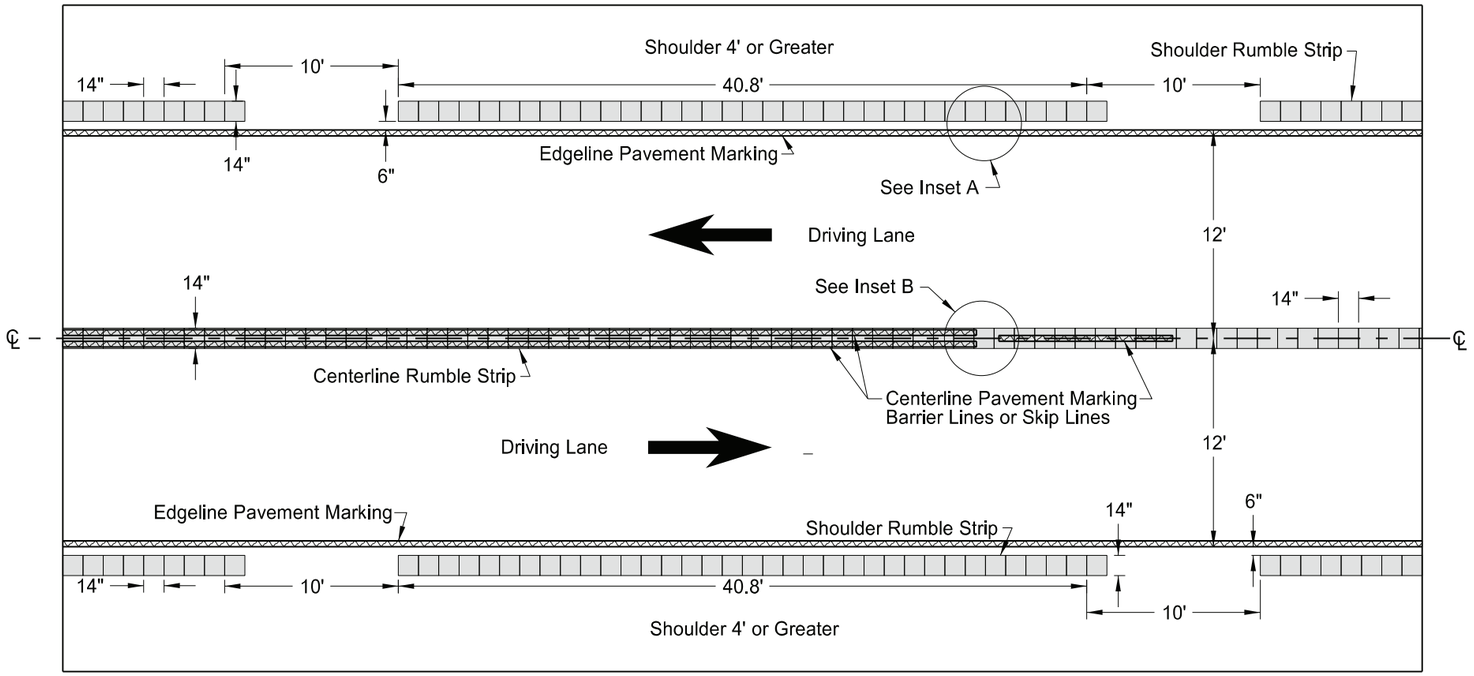
Detail D or E

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
8-30-18	Added 2 post layout for SA1 and Updated notes to active voice.
9-05-19	New Design Engineer PE Stamp.

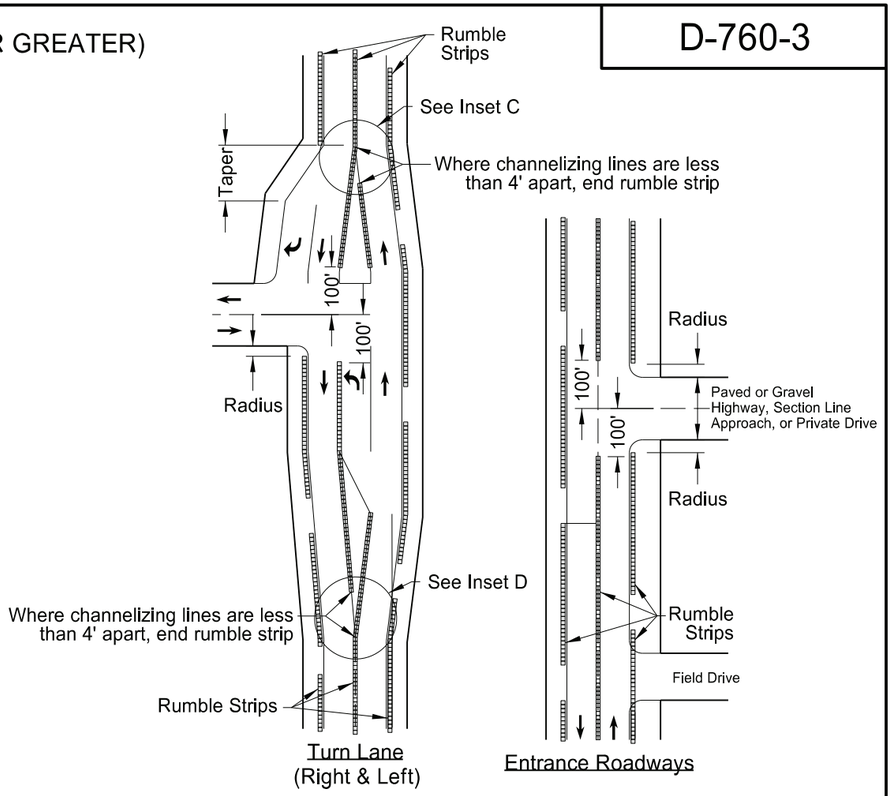
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 9/05/19 and the original document is stored at the North Dakota Department of Transportation

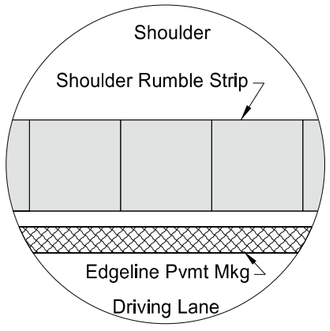
RUMBLE STRIPS UNDIVIDED HIGHWAYS (SHOULDERS 4' OR GREATER)

D-760-3

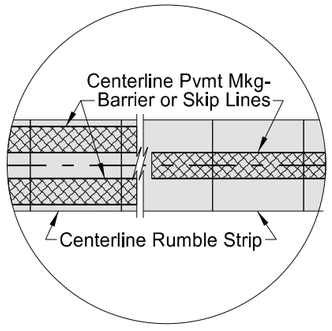


Undivided Highways (Shoulders 4' or Greater)

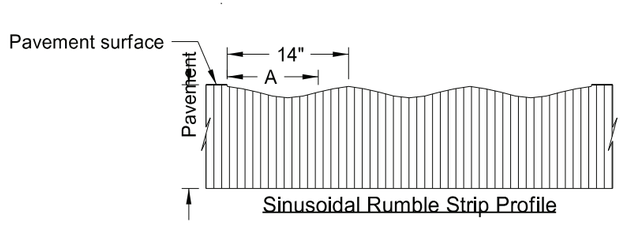




Inset A - Shoulder Rumble Strip
(Layout for opposite shoulder reversed)

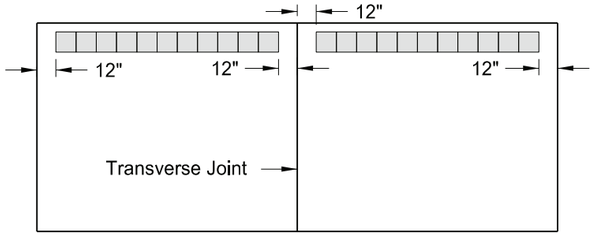


Inset B - Centerline Rumble Strip

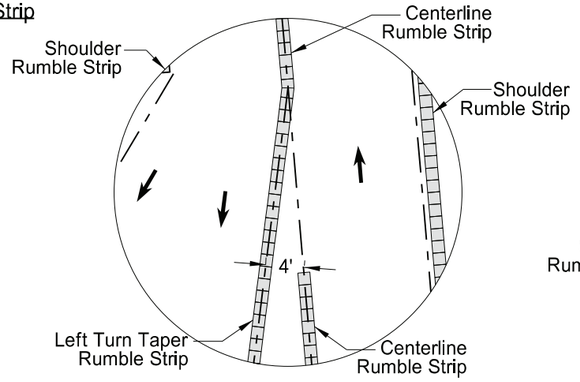


Sinusoidal Rumble Strip Profile

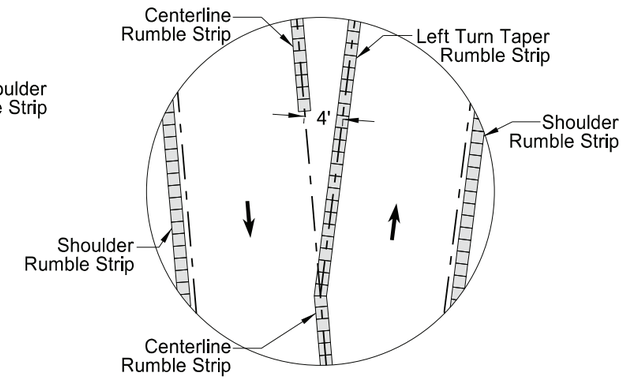
Milling Depths		
Location A (in)	Depth MIL	Depth in
0	62.5	1/16
1 3/4	156	5/32
3 1/2	281	9/32
5 1/4	438	7/16
7	500	1/2
8 3/4	438	7/16
10 1/2	281	9/32
12 1/4	156	5/32
14	62.5	1/16



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



Inset C



Inset D

NOTES:

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

2) Discontinue centerline rumble strips 100' before and after paved or gravel highways, section line approaches, or private drives. Place rumble strips at left turn lanes as shown below.

3) No additional quantity provided for centerline rumble strips on left turn tapers. Include all costs for centerline rumble strips on left turn tapers in the price bid for "Sinusoidal Rumble Strip - Asphalt Centerline" or "Sinusoidal Rumble Strip - Concrete Centerline".

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

12-29-09

REVISIONS

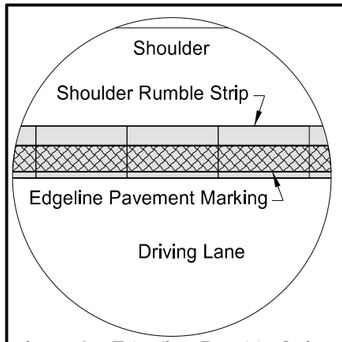
DATE	CHANGE
2-25-10	Note 4 was added.
4-19-10	Revised Note 5, Note 6, and Turn Lane (Right & Left).
9-08-11	Revised Notes and D-760-3.
10-25-19	Added missing dimensions.
11-16-21	Changed turn lane rumble layouts.
3-07-23	Added Note 3.
5-26-23	Made rumble strips sinusoidal.

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

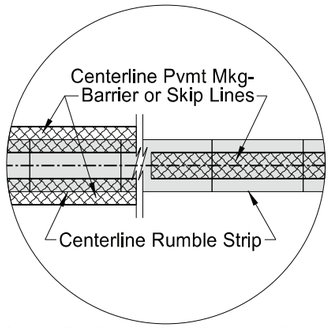
05/26/23

RUMBLE STRIPS
UNDIVIDED HIGHWAYS (SHOULDERS LESS THAN 4')

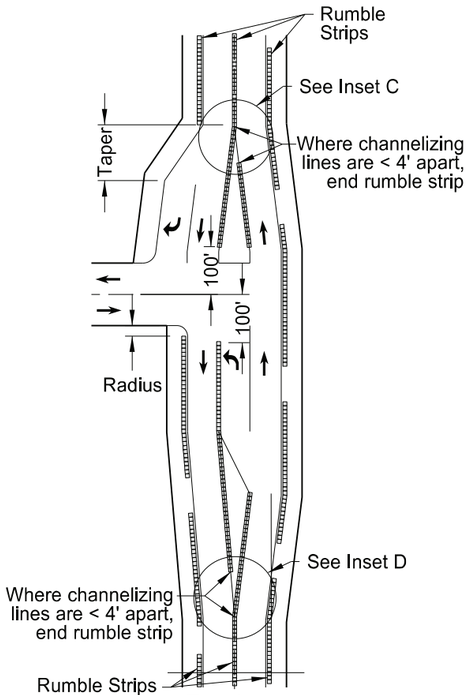
D-760-4



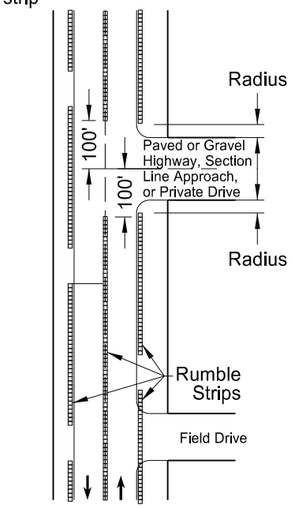
Inset A - Edgeline Rumble Strip
(Layout for opposite shoulder reversed)



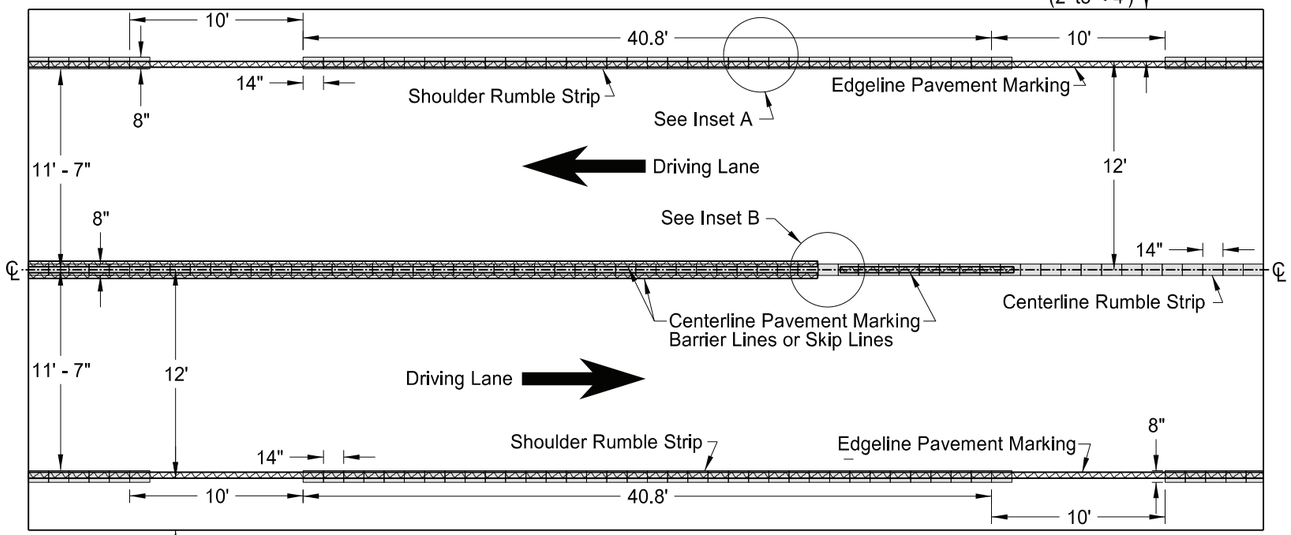
Inset B - Centerline Rumble Strip



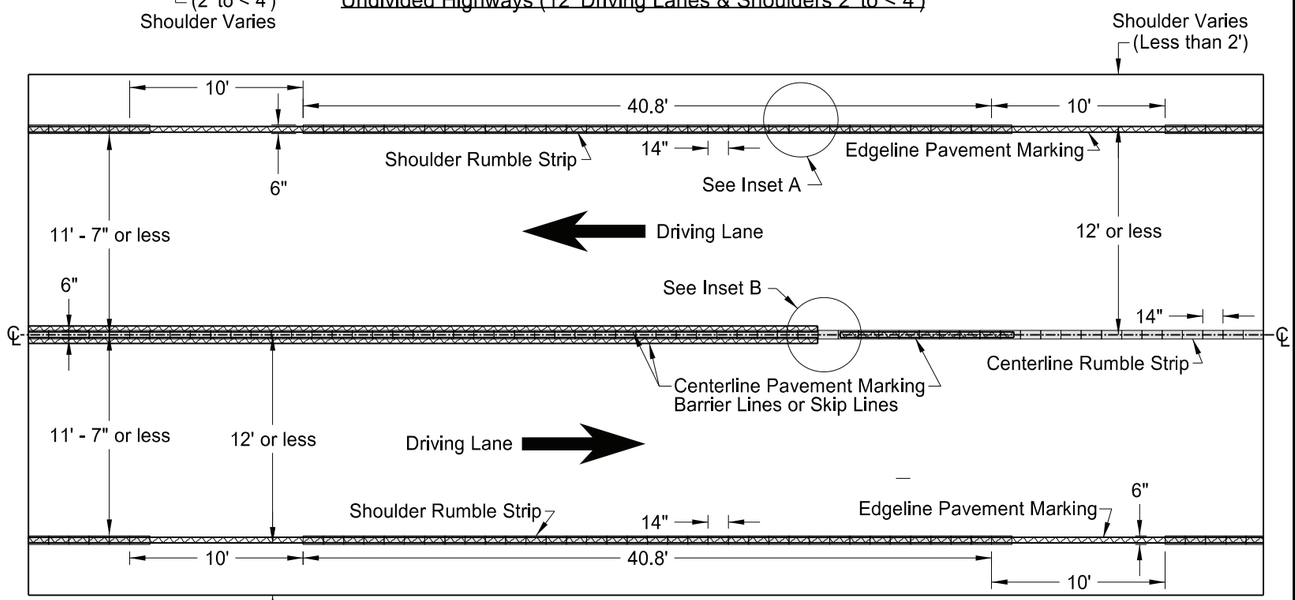
Turn Lane
(Right & Left)



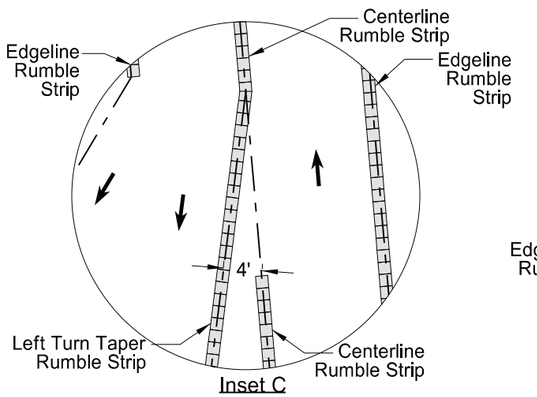
Entrance Roadways



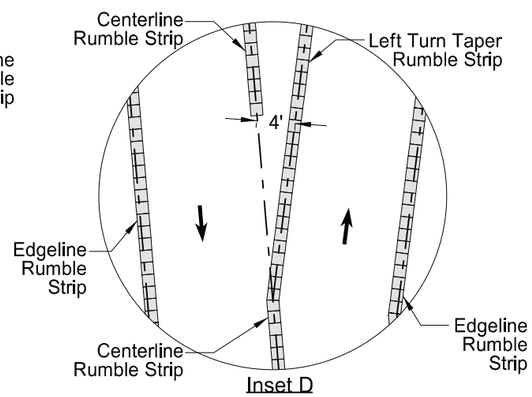
Undivided Highways (12' Driving Lanes & Shoulders 2' to < 4')



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



Inset C



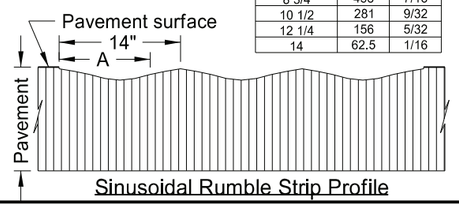
Inset D

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

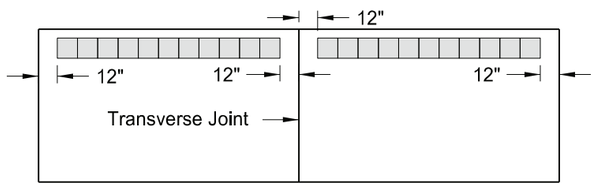
2) Discontinue centerline rumble strips 100' before and after paved or gravel highways, section line approaches, or private drives. Place rumble strips at left turn lanes as shown below.

3) No additional quantity provided for centerline rumble strips on left turn tapers. Include all costs for centerline rumble strips on left turn tapers in the price bid for "Sinusoidal Rumble Strip - Asphalt Centerline" or "Sinusoidal Rumble Strip - Concrete Centerline".

Milling Depths		
Location A (in)	Depth	
	MIL	in
0	62.5	1/16
1 3/4	156	5/32
3 1/2	281	9/32
5 1/4	438	7/16
7	500	1/2
8 3/4	438	7/16
10 1/2	281	9/32
12 1/4	156	5/32
14	62.5	1/16



Sinusoidal Rumble Strip Profile



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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-29-09	
REVISIONS	
DATE	CHANGE
2-25-10	Note 4 was added.
4-19-10	Revised Note 5, Note 6, and Turn Lane (Right & Left).
9-08-11	Revised Notes and D-760-4.
1-26-12	Revised details for rumble strip widths and dimensions.
10-25-19	Added missing dimensions.
11-16-21	Revised turn lane rumble layout.
3-07-23	Added Note 3.
5-26-23	Rumble Strips made Sinusoidal.

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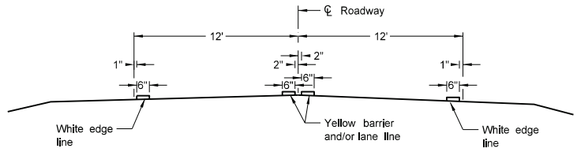
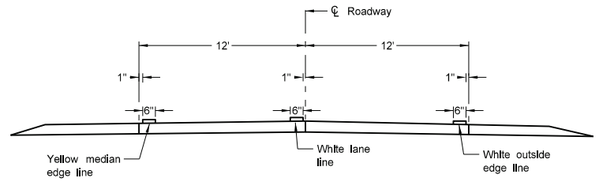
05/26/23

PAVEMENT MARKING

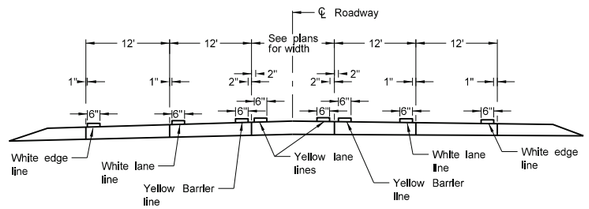
D-762-4



Two Lane Two Way
RURAL ROADWAY



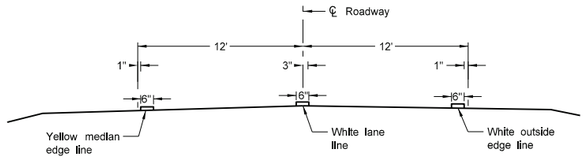
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



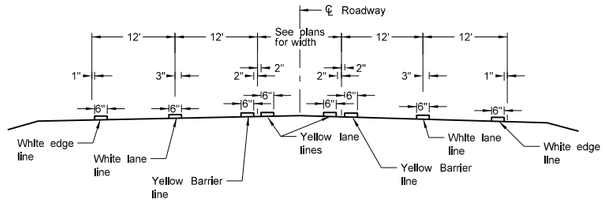
RURAL FIVE LANE ROADWAY
Concrete Section

NOTES:

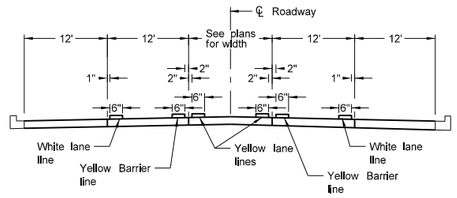
1. Continue edge lines through private drives and field drives. Break edge lines for intersections.
2. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph,
3. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.



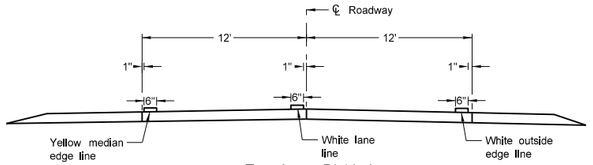
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



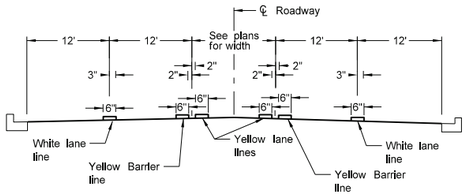
RURAL FIVE LANE ROADWAY
Asphalt Section



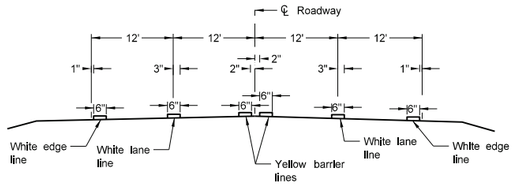
URBAN FIVE LANE SECTION
Concrete Section



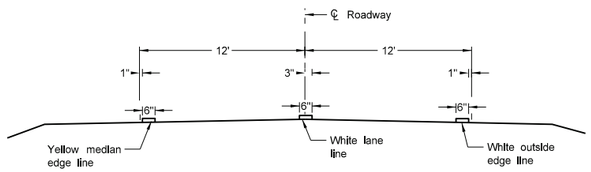
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



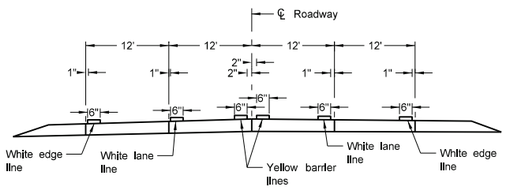
URBAN FIVE LANE SECTION
Asphalt Section



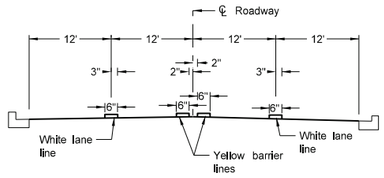
RURAL FOUR LANE ROADWAY
Asphalt Section



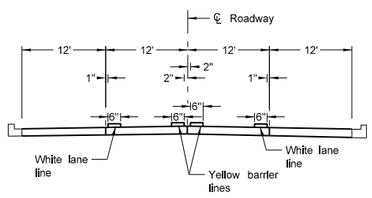
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



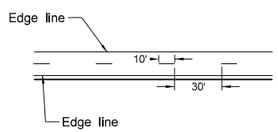
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

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

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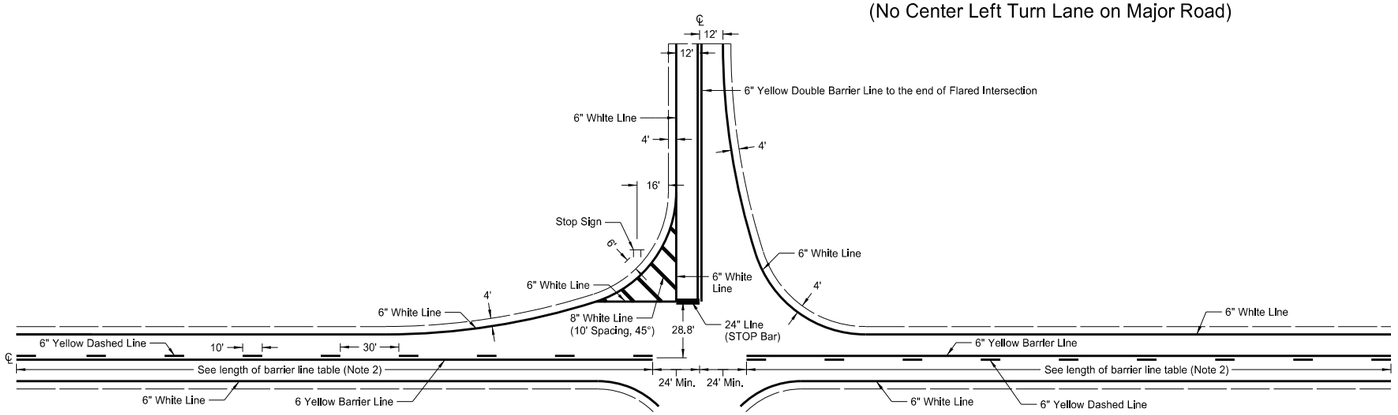
PAVEMENT MARKING FOR STANDARD 90 DEGREE FLARED INTERSECTION

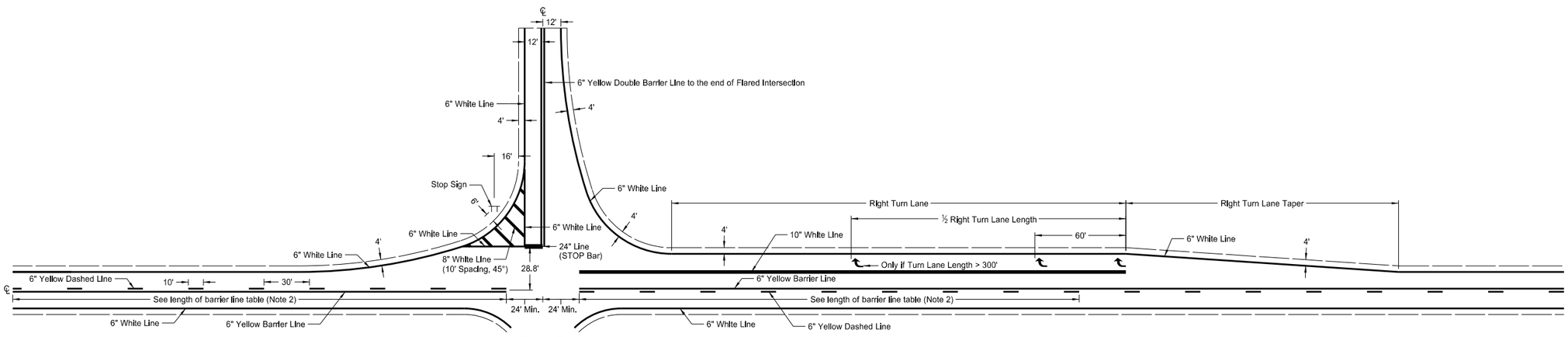
D-762-5

(No Center Left Turn Lane on Major Road)



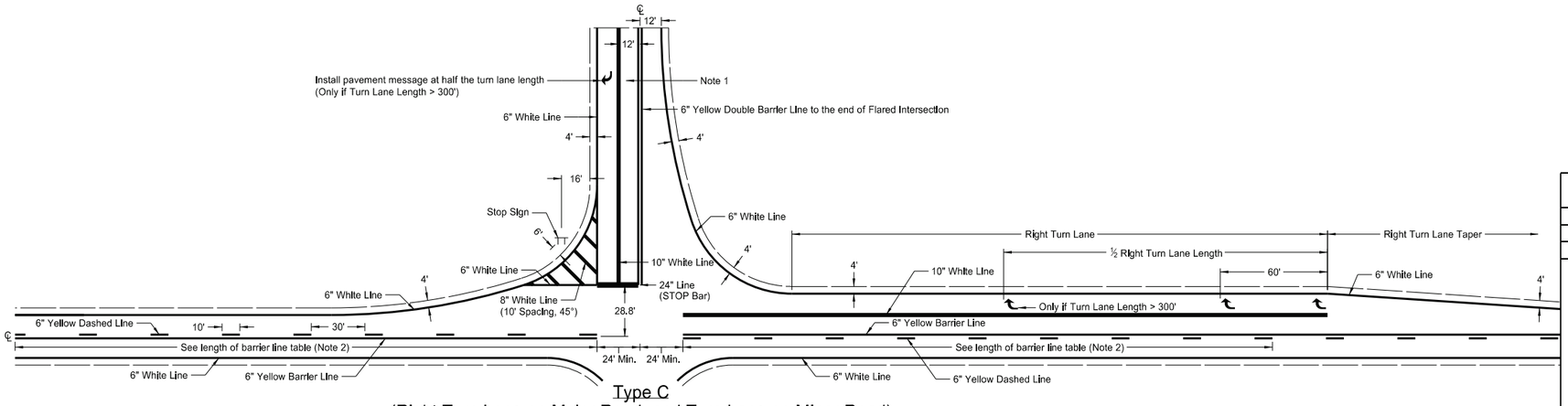
Type A

(No turn lanes present)



Type B

(Right Turn Lane on Major Road)



Type C

(Right Turn Lane on Major Road, and Turn Lane on Minor Road)

Notes

1. At "T" intersections (3-leg), additionally install left turn pavement marking message arrow.
2. The barrier lines have variable distances dependent on speed limit. Obtain barrier line length from table below (stopping sight distance.)
3. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
4. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40.
5. Wide line - 8 inches wide if 4 inch normal width lines are used and 10 inches wide if 6 inch normal width lines are used.

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

6" Marking

8" Marking

10" Marking

24" Marking

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

3-29-16

REVISIONS

DATE	CHANGE
8-17-17	Updated note & dimensioning.
8-30-18	Corrected pvmt mkg placement.
8-27-19	New Design Engineer PE Stamp.
11-22-23	Revised pavement marking widths.

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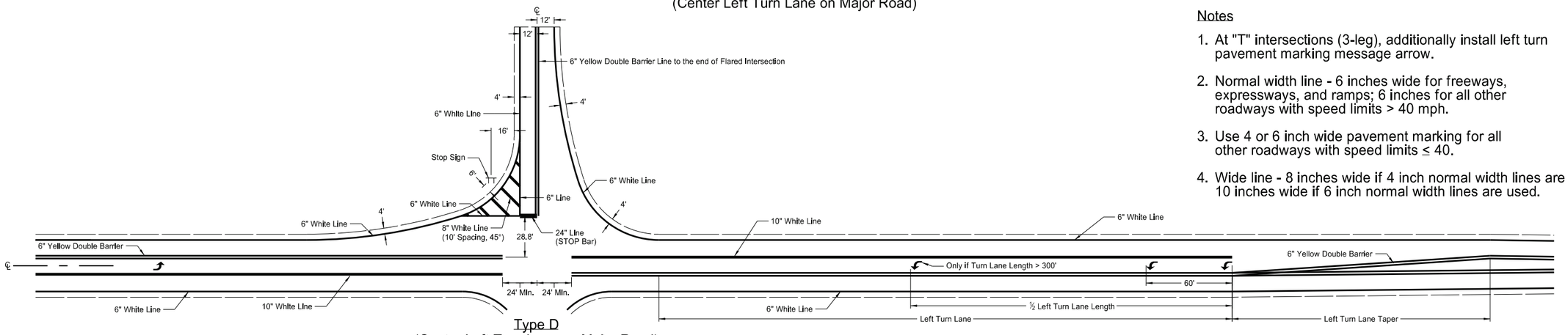
PAVEMENT MARKING FOR STANDARD 90 DEGREE FLARED INTERSECTION

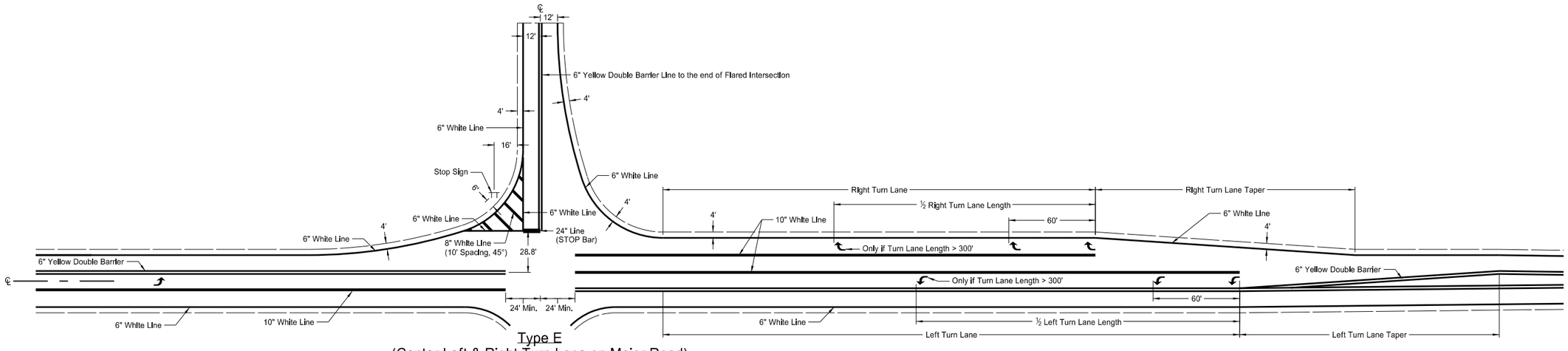
D-762-6

(Center Left Turn Lane on Major Road)



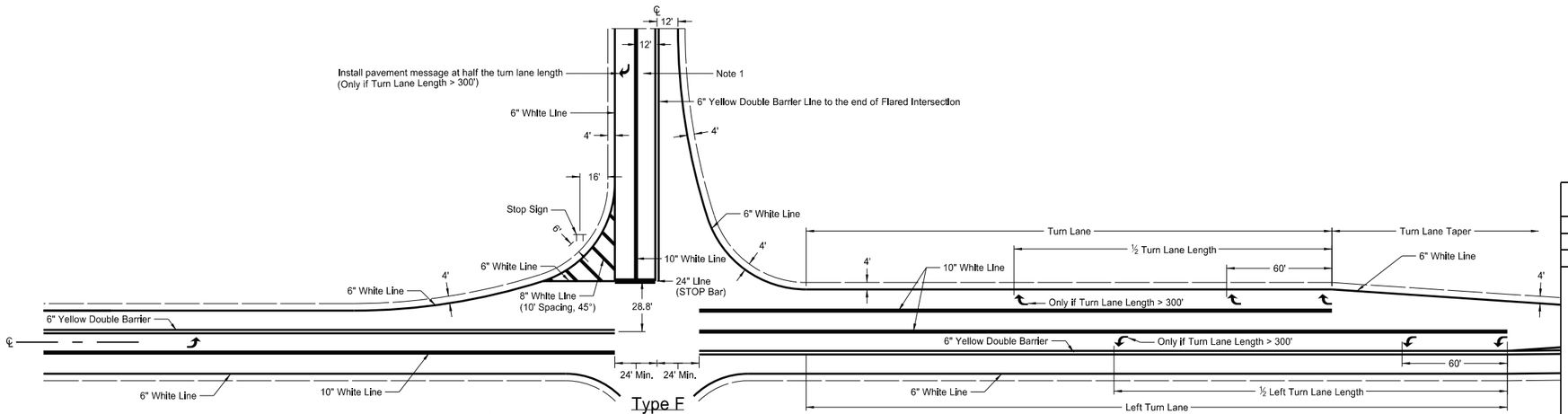
Type D

(Center Left Turn Lane on Major Road)



Type E

(Center Left & Right Turn Lane on Major Road)



Type F

(Center Left & Right Turn Lane on Major road, and Turn Lane on Minor Road)

Notes

1. At "T" intersections (3-leg), additionally install left turn pavement marking message arrow.
2. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
3. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40.
4. Wide line - 8 inches wide if 4 inch normal width lines are used and 10 inches wide if 6 inch normal width lines are used.

6" Marking
8" Marking
10" Marking
24" Marking

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

3-29-16

REVISIONS

DATE	CHANGE
8-17-17	Updated dimensioning.
8-27-19	New Design Engineer PE Stamp.
11-22-23	Revised pavement marking widths.

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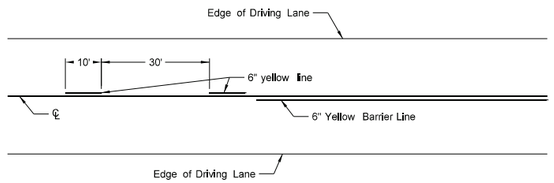
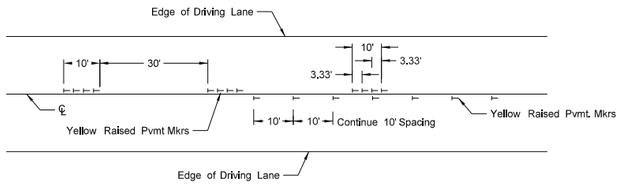
SHORT-TERM PAVEMENT MARKING

D-762-11

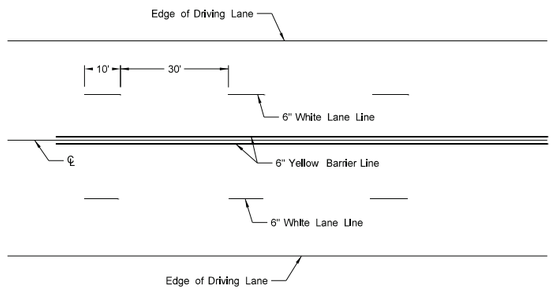


Painted or Tape Lines

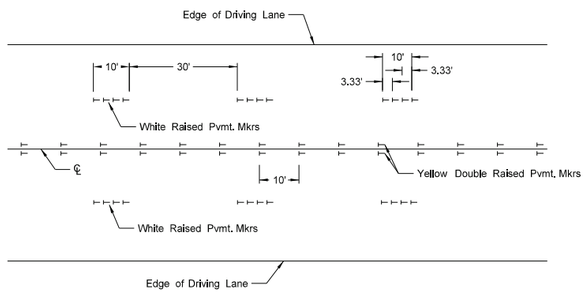


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

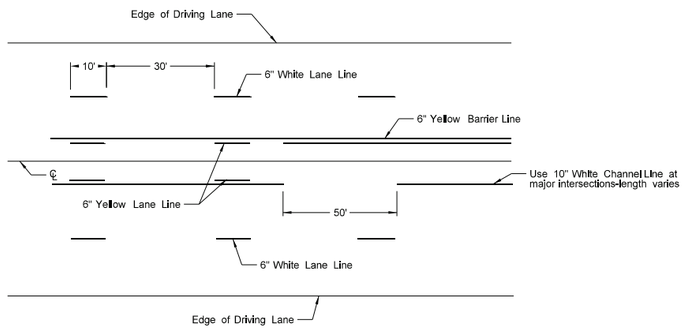


Painted or Tape Lines

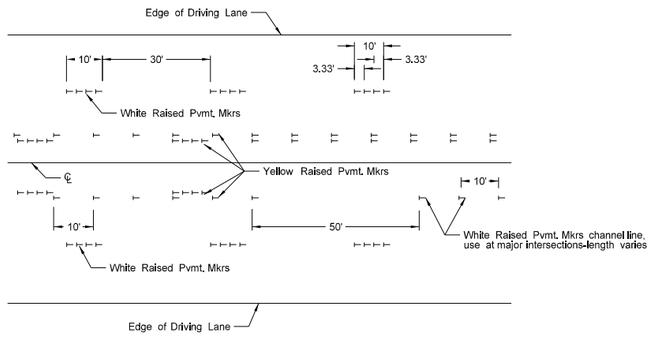


Raised Pavement Markers

FOUR LANE ROADWAY

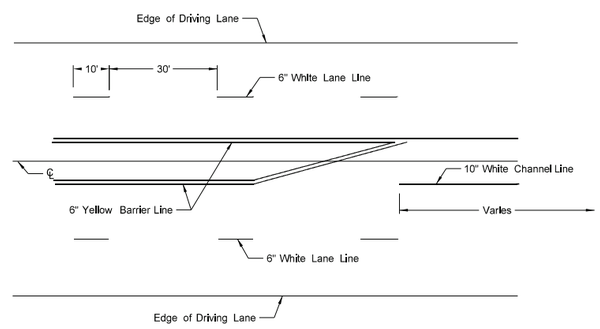


Painted or Tape Lines

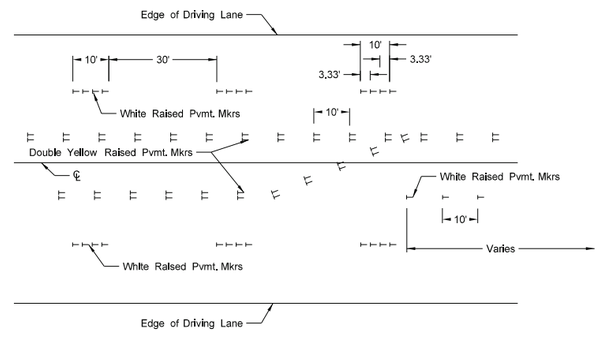


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

NOTES:

1. Place no passing zones on two-lane two-way roadways as shown. In lieu of short term no passing zone pavement markings, place no passing zone signs. Replace no passing zone signs with short term no passing zone pavement marking within three days.
2. Place short term center line stripe (paint) on top lift to match exact placement of permanent stripe.
3. Remove raised markers and tape markings after permanent pavement marking is installed.
4. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
5. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.
6. Wide lines - 8 inches wide if 4 inch normal width lines are used and 10 inches wide if 6 inch normal width lines are used.

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

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ENGINEER
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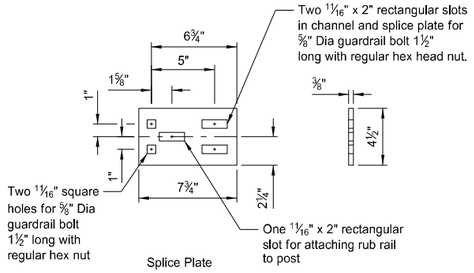
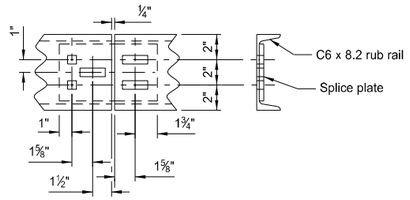
W-BEAM GUARDRAIL GENERAL DETAILS

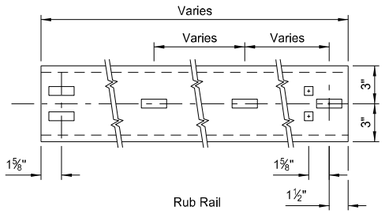
D-764-1



Splice Plate

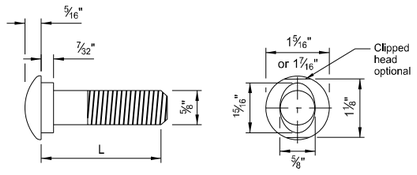


Splice Detail

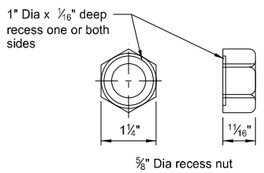


Rub Rail

C6x8 RUB RAIL AND SPLICE PLATE

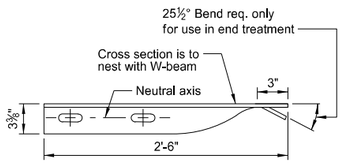


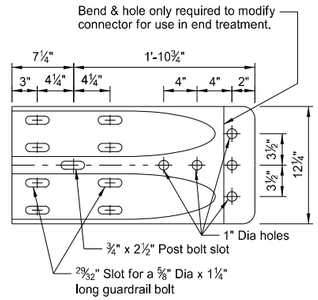
5/8" Diameter Guardrail Bolt	
L	Thread Length
1 1/4"	Full length thread
2"	1 3/4" Min thread length
9 1/2"	4" Min thread length
18"	4" Min thread length
20"	4" Min thread length
22"	4" Min thread length
25"	4" Min thread length



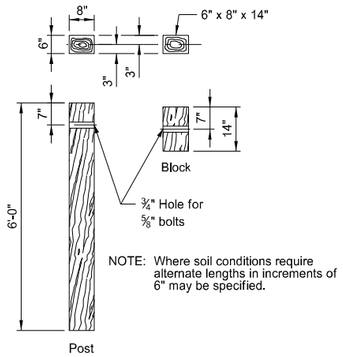
5/8" Dia recess nut

5/8" GUARDRAIL BOLT & RECESS NUT



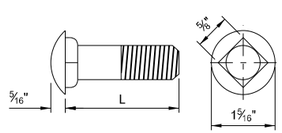


W BEAM TERMINAL CONNECTOR



Post

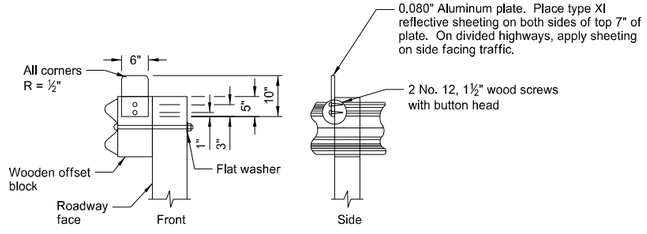
6"x8" TIMBER POST & BLOCK



5/8" Diameter Carriage Bolt	
L	Thread Length
1 1/2"	Full length thread
3"	1 1/2" Min thread length
11"	1 3/4" Min thread length
13"	1 3/4" Min thread length

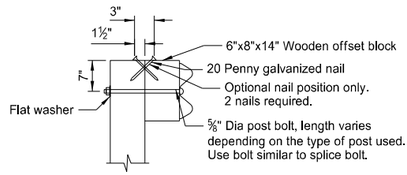
5/8" Hex nut

5/8" CARRIAGE BOLT & NUT

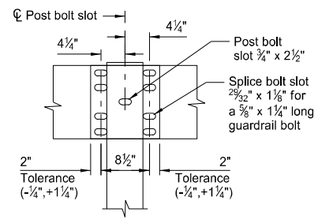


REFLECTORIZED PLATE DETAIL

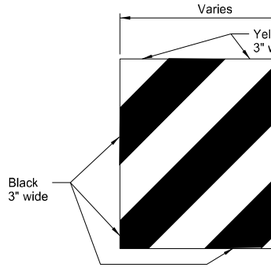
Additional reflectors are added to the W-beam guardrail quantities for placement on end treatment.



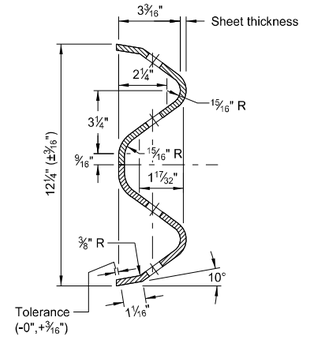
TYPICAL POST ATTACHMENT DETAIL



SPLICE DETAIL



IMPACT HEAD OBJECT MARKER



W-BEAM CROSS SECTION

NOTES:

1. Place reflector plates at the first post and spaced at 25' centers on guardrail less than 250' in length and at 50' centers for guardrail over 250' in length. Use reflector the same color as the pavement marking adjacent to that reflector unless noted otherwise on the plans.
2. Dispose of excess earth from excavations for guard posts as directed by the engineer. Replace bituminous material where guardrail is installed after mat is placed. Include cost of excavation and replacing of bituminous material in the price bid for other items.
3. Place Object Marker within the vertical edges of the Impact Plate. Use type XI retroreflective sheeting meeting the requirements of Section 894.02.E of the standard specifications. Apply sheeting to 0.100 Aluminum sheeting meeting the requirements Section 894.01.A. Attach the Object Marker to the Impact Head Plate with non-rust rivets or some other non-rust attachment device. Slope stripes downward toward the roadway side.
4. Guardrail installation height tolerance = - 1/4" , + 1".
5. Standard W-Beam rail post bolt slot spacing is 6'-3". Post bolt slot spacing of 3'-1 1/2" is acceptable.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

10-11-13

REVISIONS

DATE	CHANGE
10-25-19	Updated notes to active voice and added Note 5.
12-02-20	Updated clipped head to optional

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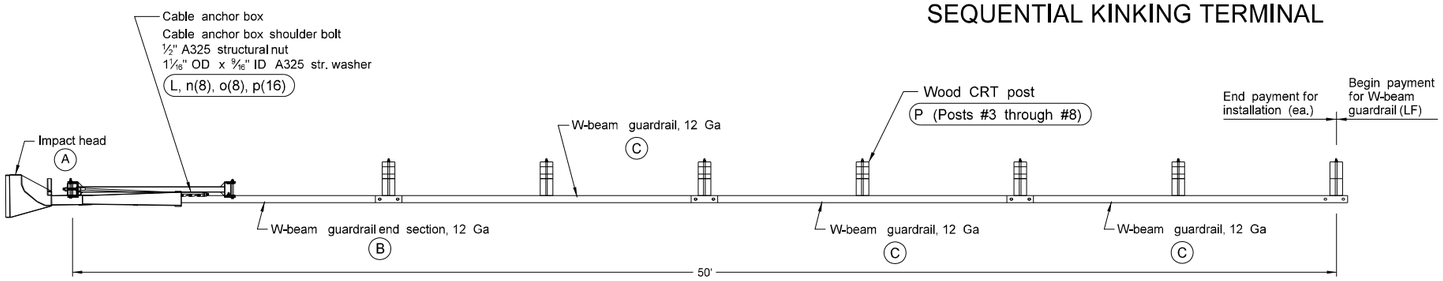
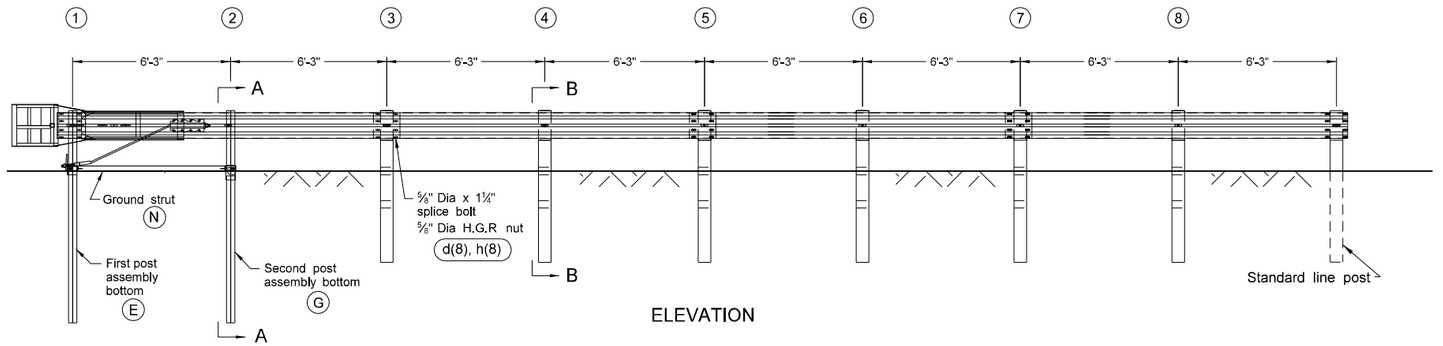
12 02 2020

SEQUENTIAL KINKING TERMINAL

D-764-5



PLAN

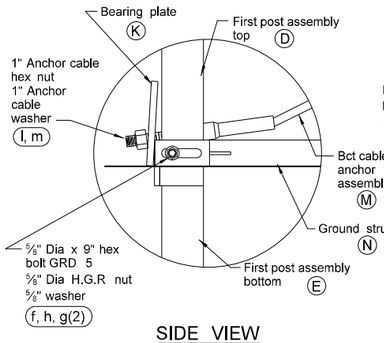


ELEVATION

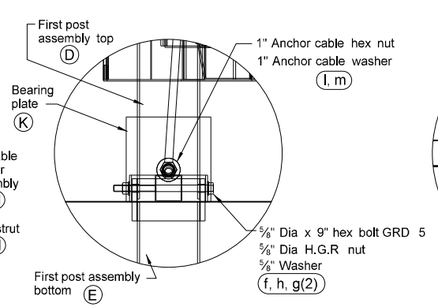
ITEM	QTY	BILL OF MATERIALS
A	1	IMPACT HEAD
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga
C	3	W-BEAM GUARDRAIL, 12 Ga
D	1	FIRST POST ASSEMBLY TOP
E	1	FIRST POST ASSEMBLY BOTTOM
F	1	SECOND POST ASSEMBLY TOP
G	1	SECOND POST ASSEMBLY BOTTOM
K	1	BEARING PLATE
L	1	CABLE ANCHOR BOX
M	1	BCT CABLE ANCHOR ASSEMBLY
N	1	GROUND STRUT HINGED POST
P	6	WOOD CRT POST
R	6	TIMBER BLOCKOUT/RCY EQUIVALENT
		HARDWARE
a	2	1/4 " x 4" HEX BOLT Grade 5
b	4	¼" WASHER
c	2	¼" HEX NUT
d	25	⅝" Dia X 1¼" SPLICE BOLT, POST #2
e	6	⅝" Dia X 18" H.G.R. BOLT (POSTS 3 THRU 8)
f	1	⅝" Dia X 9" HEX BOLT GRD 5
g	8	⅝" WASHER
h	32	⅝" Dia H.G.R. NUT
j	1	¾" Dia X 8½" HEX BOLT GRD A449
k	1	¾" Dia HEX NUT
l	2	1" ANCHOR CABLE HEX NUT
m	2	1" ANCHOR CABLE WASHER
n	8	GROUND STRUT HINGED POST
o	8	½" A325 STRUCTURAL NUT
p	16	1⅛" OD X ⅝" ID A325 STR. WASHER

GENERAL NOTES:

1. Use breakaway posts with the SKT.
2. Use galvanized bolts, nuts, cable assemblies, cable anchors, and bearing plates.
3. Flare the SKT at a rate of up to 25:1 to prevent shoulder encroachment by the impact head.
4. Grade site as needed to prevent lower sections of the posts from protruding more than 4" above ground (measured along a 5' cord).
5. Drive the lower section of the hinged posts without the upper post attached. If the post is placed in a drilled hole, compact the backfill material satisfactorily to prevent settlement.
6. When rock is encountered during excavation, use a 10" diameter post hole, 20" into the rock surface, if approved by the engineer. Place granular material in the bottom of the hole, approximately 2½" deep to provide drainage. Field cut posts 1 & 2 to length, place in the hole, and backfill with adequately compacted material excavated from the hole.
7. Place the breakaway cable assembly taut. Use a locking device (vice grips or channel lock pliers) to prevent the cable from twisting when tightening nuts.
8. "Toe nail" the wood blockouts on post #3 through post #8 with two 20 penny galvanized nails in each rectangular post, to prevent them from turning when the wood shrinks.

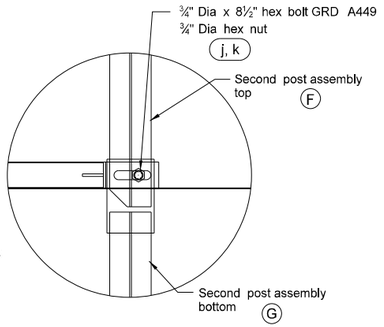


SIDE VIEW

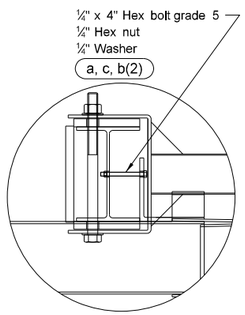


FRONT VIEW

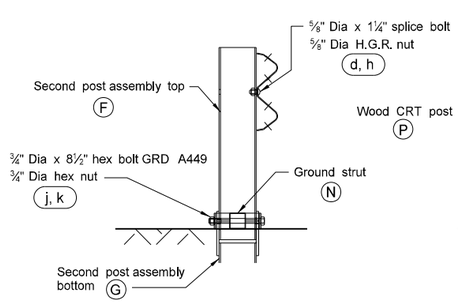
POST #1 CONNECTION DETAILS



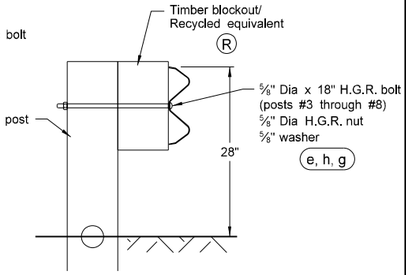
SIDE VIEW DETAIL OF POST #2



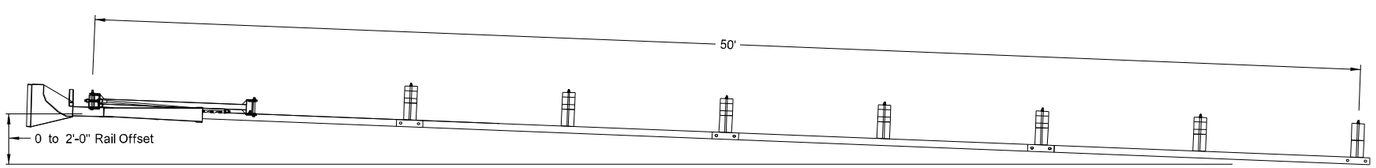
IMPACT HEAD CONNECTION DETAIL



SECTION A-A
Post #2



SECTION B-B
Posts #3 through #8



FLARED INSTALLATION
25:1 maximum flare rate

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-11-13	
REVISIONS	
DATE	CHANGE
12-02-20	Updated notes to active voice.

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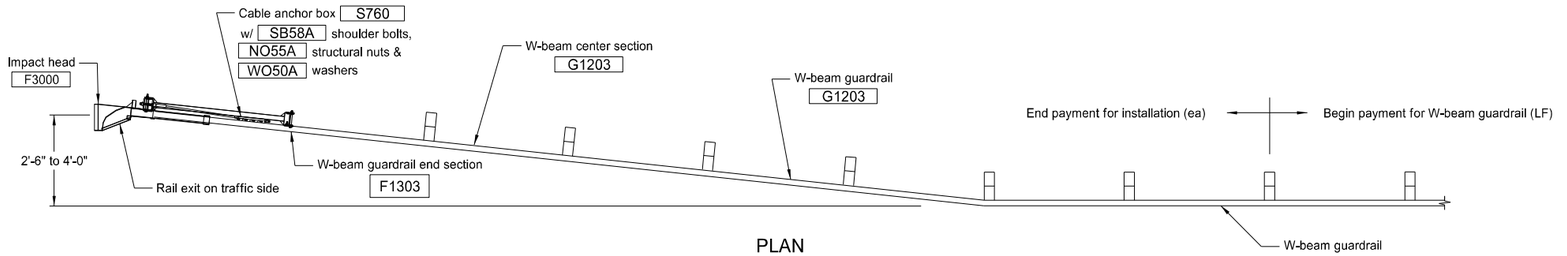
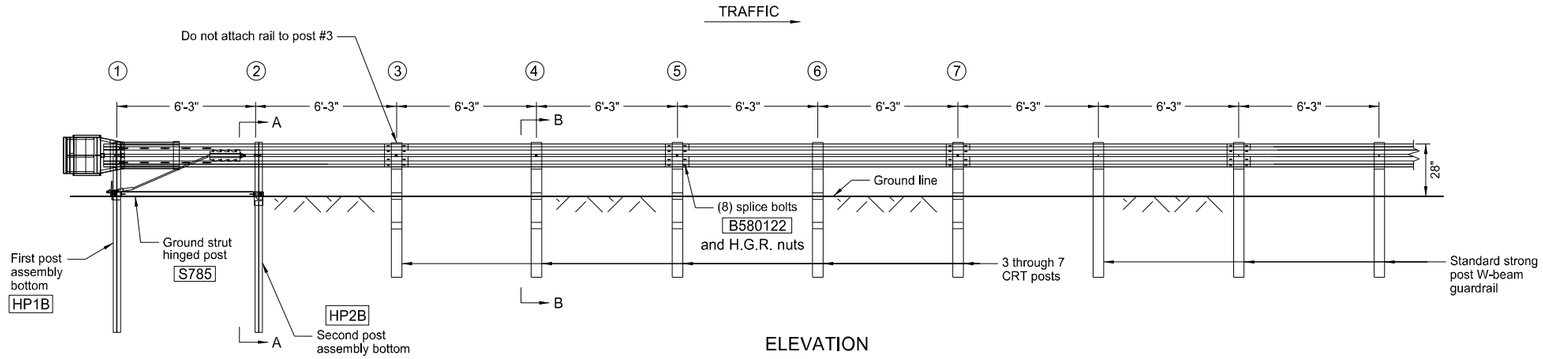
12 02 2020

FLARED ENERGY ABSORBING TERMINAL

D-764-6



PLAN

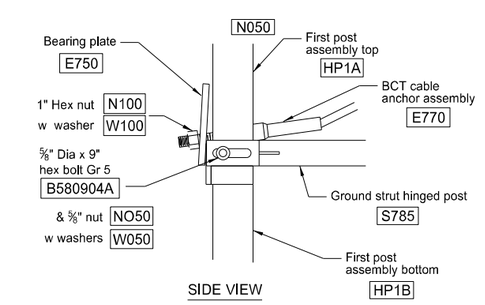


ELEVATION

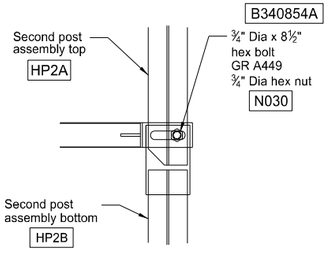
ITEM #	QTY	BILL OF MATERIALS
F3000	1	IMPACT HEAD
F1303	1	W-BEAM GUARDRAIL END SECTION, 12 GA
G1203	2	W-BEAM GUARDRAIL, 12 GA
HP1A	1	FIRST POST ASSEMBLY TOP
HP1B	1	FIRST POST ASSEMBLY BOTTOM
HP2A	1	SECOND POST ASSEMBLY TOP
HP2B	1	SECOND POST ASSEMBLY BOTTOM
P671	5	WOOD CRT POST
P675	5	TIMBER BLOCKOUT OR RECYCLED EQUIVALENT
E750	1	BEARING PLATE
S760	1	CABLE ANCHOR BOX
E770	1	BCT CABLE ANCHOR ASSEMBLY
S785	1	GROUND STRUT HINGED POST
		HARDWARE
B140404	2	¼" Dia x 4" HEX BOLT
WO14	4	¼" WASHER
N014	2	¼" HEX NUT
B580122	17	⅝" Dia x 1¼" SPLICE BOLT
B581802	4	⅝ Dia x 10" H.G.R. BOLT (POSTS 3 THRU 6)
B580904A	1	⅝" Dia x 9" HEX BOLT GR 5
W050	5	⅝" WASHER
N050	22	⅝" Dia H.G.R. NUT
B340854A	1	¾" Dia x 8½" HEX BOLT GR A449
NO30	1	¾" Dia HEX NUT
N100	2	1" ANCHOR CABLE HEX NUT
W100	2	1" ANCHOR CABLE WASHER
SB58A	8	CABLE ANCHOR BOX SHOULDER BOLT
N055A	8	½" A325 STRUCTURAL NUT
W050A	16	1 1/16" OD x 3/16" ID A325 STR. WASHER

GENERAL NOTES

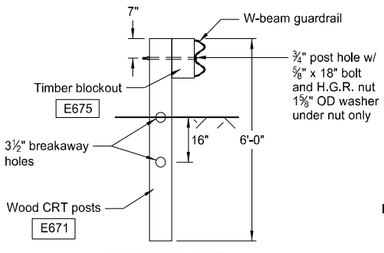
1. Use wood posts with the Flared Energy Absorbing Terminal except posts #1 and #2.
2. Use galvanized bolts, nuts, cable assemblies, cable anchors, and bearing plates.
3. Grade site as needed to prevent lower sections of the posts from protruding more than 4 inches above the ground (measured along a 60 inch cord).
4. Drive the lower section without the upper post attached. If the post is placed in a drilled hole, compact the backfill material satisfactorily to prevent settlement.
5. When rock is encountered during excavation, use a 12" diameter post hole 20" into the rock surface, if approved by the Engineer. Place granular material in the bottom of hole approximately 2½" deep to provide drainage. Field cut soil tubes to length, place in hole, and back fill with adequately compacted material excavated from hole.
6. Place the breakaway cable assembly taut. Use a locking device (vice grips or channel lock pliers) to prevent the cable from twisting when tightening nuts.
7. "Toe nail" the wood blockouts to the rectangular wood posts with two 20 penny galvanized nails in each post to prevent them from turning when the wood shrinks.
8. Flare the Flared Energy Absorbing Terminal when the approach guardrail is parallel with the roadway. When the approach guardrail is flared at 16:1 to 10:1, flare the Flared Energy Absorbing Terminal at the flare rate of the guardrail. When the guardrail flare is between 10:1 and 7:1, turn the Flared Energy Absorbing Terminal parallel to the roadway.



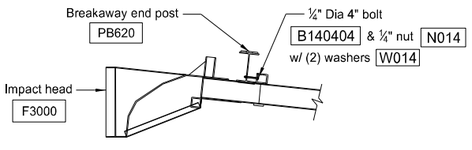
SIDE VIEW



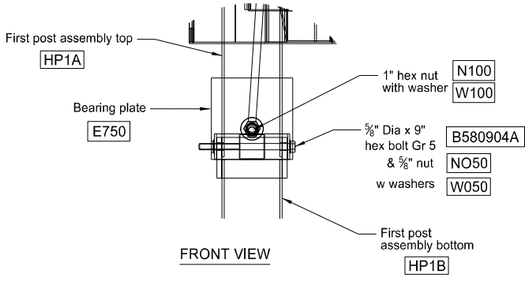
SIDE VIEW DETAIL OF POST #2



SECTION B-B
POST 3 THRU 7

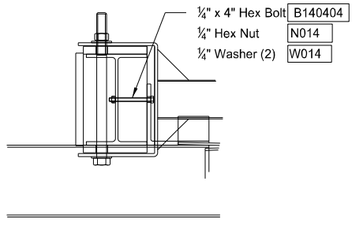


IMPACT HEAD CONNECTING DETAIL

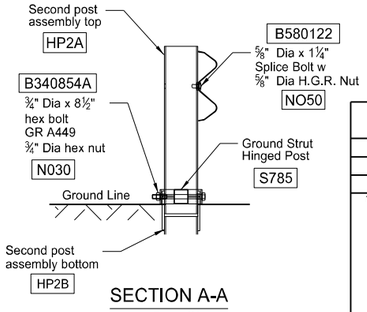


FRONT VIEW

POST #1 CONNECTION DETAILS



IMPACT HEAD CONNECTION DETAIL



SECTION A-A
at Post #2

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-11-13	
REVISIONS	
DATE	CHANGE
12-02-20	Update notes to active voice.

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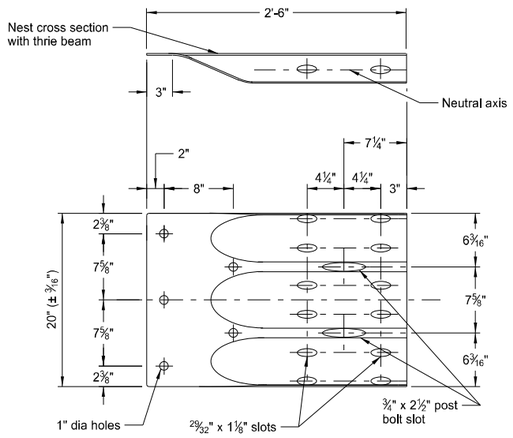
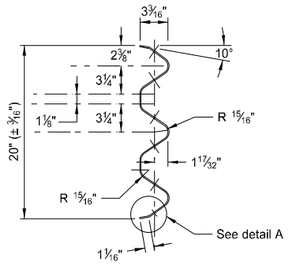
THRIE BEAM TRANSITION TO DOUBLE BOX BEAM RETROFIT

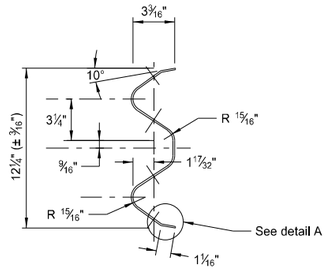
D-764-10



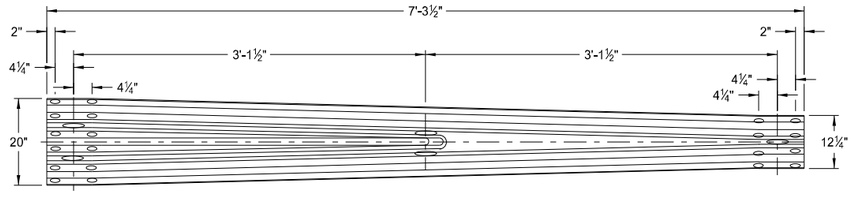
THRIE BEAM TERMINAL CONNECTOR



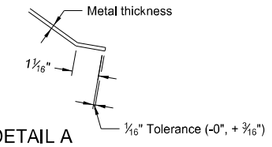
THRIE BEAM END VIEW



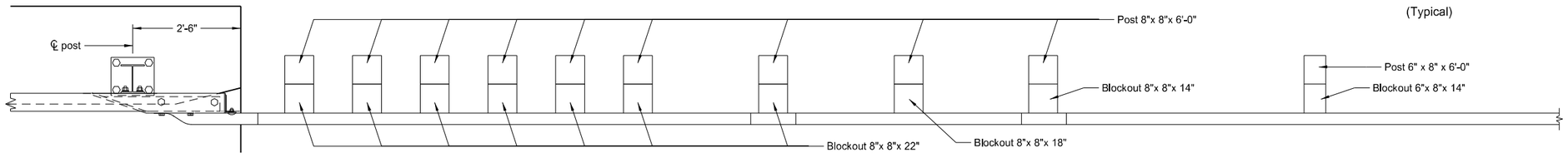
W-BEAM END VIEW



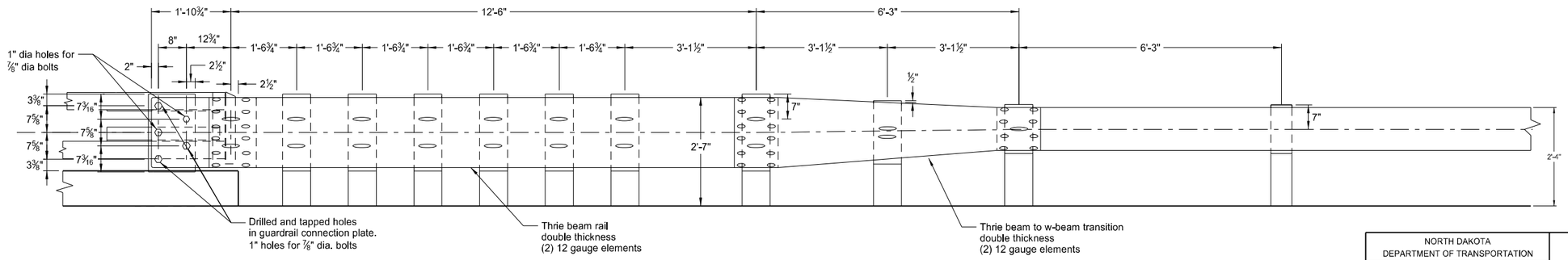
THRIE BEAM TO W-BEAM TRANSITION SECTION



DETAIL A
(Typical)



PLAN



ELEVATION

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-11-13	
REVISIONS	
DATE	CHANGE
12/02/20	Updated text to active voice.

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12 02 2020