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STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
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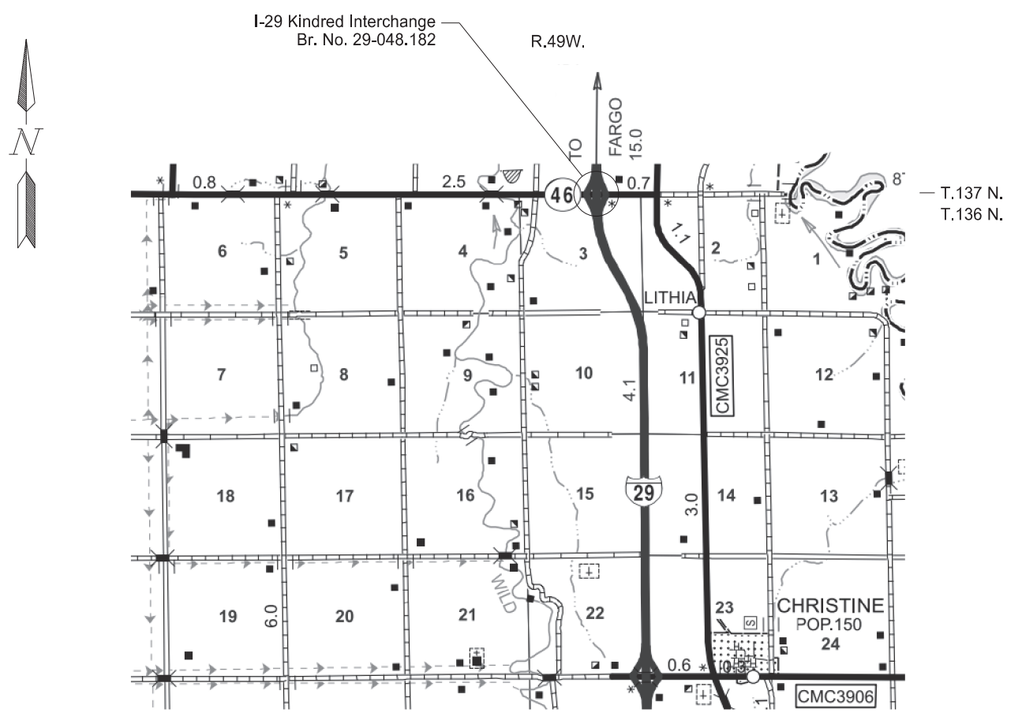
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

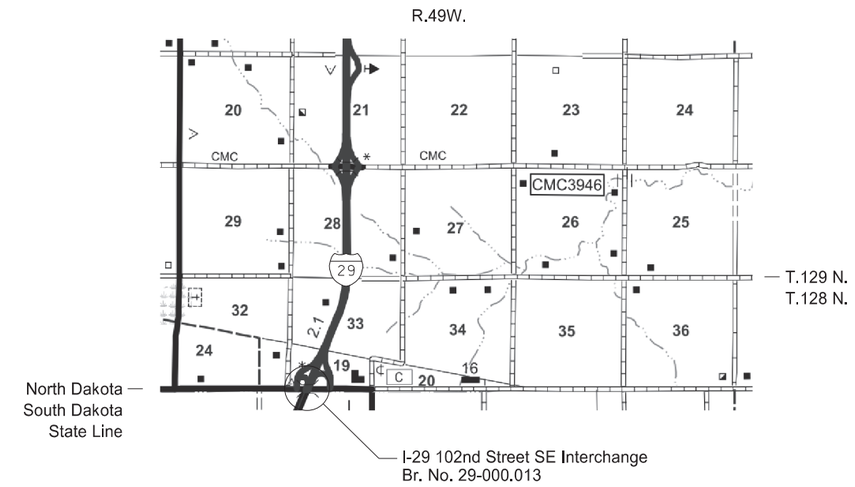
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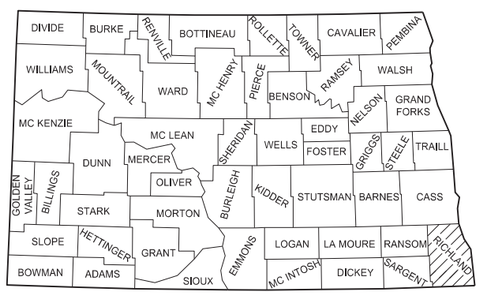
Richland County
I-29 102nd St. SE Interchange
I-29 Kindred Interchange
Bridge Deck Overlay, Spall Repair, Curb Overlay,
Slope Protection Repairs, & Pier Embankment Repair

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

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
IM-BRI-8-029(216)000	0.00	0.00







STATE COUNTY MAP

ND DEPARTMENT OF TRANSPORTATION
OFFICE OF PROJECT DEVELOPMENT

Jason Thorenson
08/04/26

NDDOT BRIDGE DIVISION

REGISTERED PROFESSIONAL ENGINEER
JASON R. THORENSON
PE - 5048
DATE
08/04/26
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-BRI-8-029(216)000	2	1

TABLE OF CONTENTS

PLAN SECTIONS

Section	Page(s)	Description
1	1	Title Sheet
2	1	Table of Contents
4	1	Scope of Work
6	1 - 2	Notes
8	1 - 2	Quantities
10	1	Basis of Estimate
30	1	Typical Sections
40	1	Removals
90	1	Paving Layouts
100	1 - 15	Work Zone Traffic Control
130	1	Guardrail
170	1 - 10	Bridges and Box Culverts

SPECIAL PROVISIONS

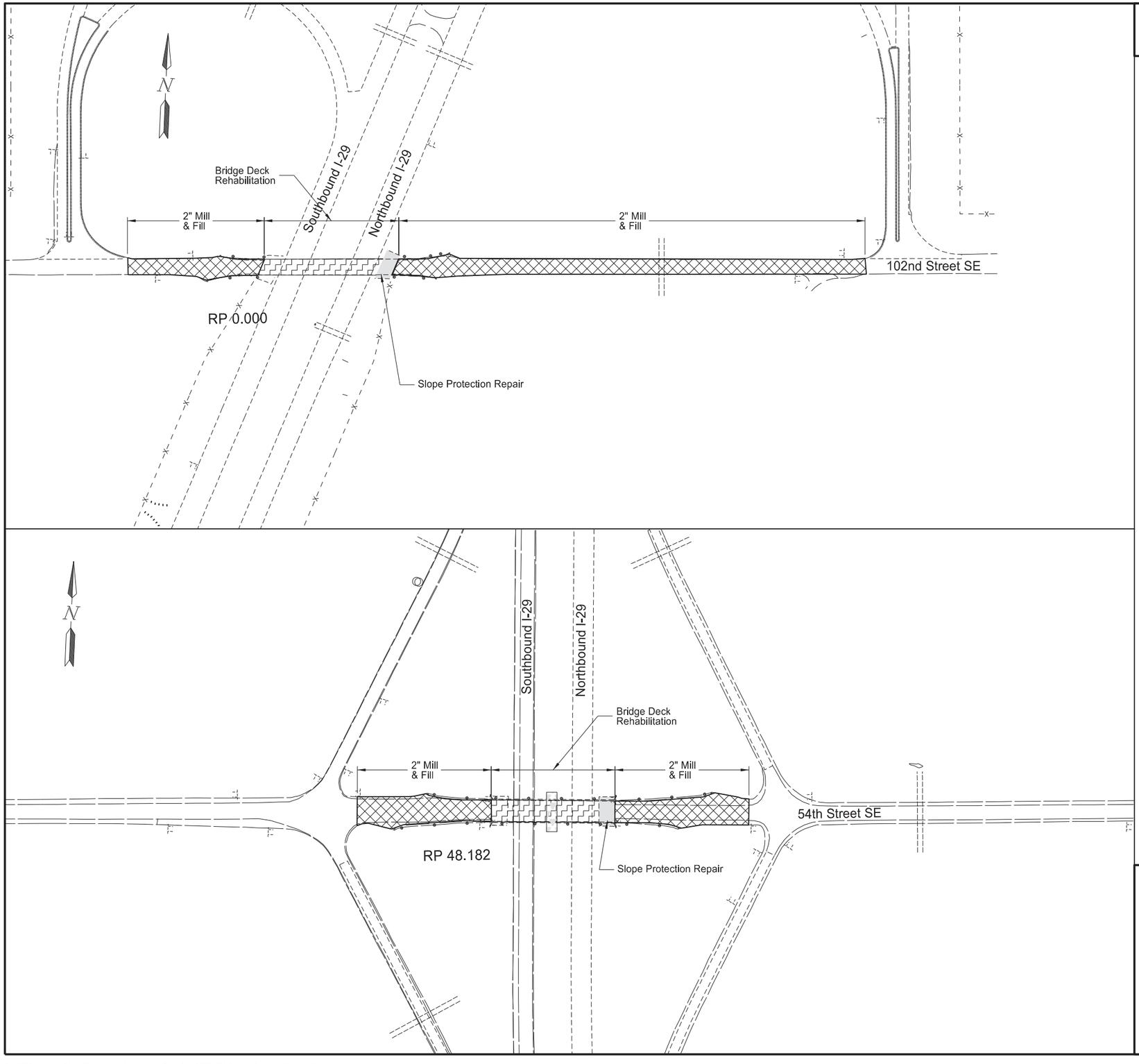
Number	Description
PSP 1	Permits and Environmental Considerations
SSP 2	Federal Migratory Bird Treaty Act
SSP 10	E-Ticketing
SP 464(25)	Concrete Spall Repair
SP 465(25)	Hydrodemolition and Overlay of Concrete Bridge Decks
SP 466(25)	Commercial Grade Asphalt With Density
SP 547(25)	Tribal Employment Rights Ordinance (TERO)

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-258-1	Standard Slope Protection Under Bridges
D-704-1	Attenuation Device
D-704-2	Traffic Control For Coring Of Hot Bituminous Pavement
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-704-12	Shoulder Closure Tapers
D-704-13	Barricade And Channelizing Device Details
D-704-14	Construction Sign Punching And Mounting Details
D-704-16	Lane Closure On A Two Lane Road Using Traffic Control Signals
D-704-17	Sign Layout For One Lane Closure Two Lane Roadway
D-704-18	Sign Layout For Interstate System One Lane Closure
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-704-35	Sign Layout For One Lane Closure - Interstate System
D-704-50	Portable Sign Support Assembly
D-704-51	Portable Precast Concrete Median Barrier (Temporary Usage)
D-748-1	Curb & Gutter And Valley Gutter
D-762-2	Interstate Pavement Marking 4 Lane Divided Highway
D-762-4	Pavement Marking
D-762-11	Short-Term Pavement Marking
D-764-1	W-Beam Guardrail General Details
D-764-10	Thrie Beam Transition To Double Box Beam Retrofit
D-764-22	Typical Grading At Bridge Ends With W-Beam Guardrail
D-772-6	Span Wire Mounted Traffic Signals

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Bridge Deck Rehabilitation

2" Mill & Overlay

Slope Protection Repair

Embankment Repair

Scope of Work

RP 000 & RP 048

Bridge Rehabilitation

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PE 2928
ENGINEER
NORTH DAKOTA

08/03/26

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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NOTES

105-110 PAVEMENT SWEEPING: Sweep paved areas that were used by construction traffic before opening these areas to public traffic.

Sweep all newly constructed pavement no more than 24 hours before a scheduled final inspection.

Use a vacuum or pick-up type sweeper to perform this work.

107-100 LAWS TO BE OBSERVED: All or a portion of this project lies within the exterior boundaries of an Indian Reservation. Review law and ordinances pertaining to the work contained within the boundaries of the reservation.

108-500 TERO COORDINATION: Invite the Tribal TERO Office to the Preconstruction Conference.

704-200 STATE FURNISHED MEDIAN BARRIER: Obtain (73) 2' x 10' concrete barriers and (32) 18" x 19' steel barriers. They can be picked up and returned to the Casselton yard at 15482 37th St SE in Casselton ND 58012. The hardware can be picked up and returned to the Fargo District yard at 503 38th St S in Fargo ND 58103. Contact the Fargo District office at 701-239-8900 to facilitate the exchanges.

If returning barriers with connection components, coordinate the delivery location for the connecting components with the Engineer. Some 4 inch x 4 inch boards are available at the return location. Provide any additional 4 inch x 4 inch boards necessary to stack barriers. The boards will become property of the Department.

Include all costs associated with median barriers in the contract unit price for "State Furnished Median Barrier".

704-450 LANE CLOSURE - SIGNAL CONTROL/FLAGGING CONTROL: Install either the signal-controlled lane closure on Standard D-704-16 or the flagging controlled lane closure on Standard D-704-17.

Obtain an electrical source for traffic signals. Solar powered signals may be used. Place generators a minimum of 60 feet from the roadway centerline, unless the generator and signal are part of a trailer mounted unit.

Place utility poles and equipment a minimum of 60 feet from the roadway centerline and place power conductors a minimum of 6 inches below the ground surface. Remove poles after they are no longer necessary.

The Engineer will measure individual traffic control devices, other than the signal system and flaggers, shown on the standards. Payment will be made at the respective contract unit price.

Include the cost of either a traffic signal system or flaggers in the contract unit price for "Lane Closure – Signal Control/Flagging Control".

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

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

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

Install PRS that meet the following criteria:

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

Use individual PRS constructed in one of the following manners:

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

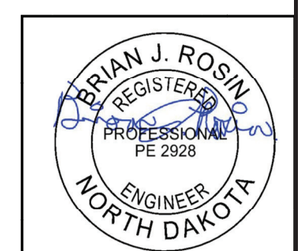
An installed array of PRS consists of a minimum of 3 individual strips.

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

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

704-P01 TRAFFIC CONTROL: Traffic control device quantities are based on the following list:

1. D-704-16 or D-704-17, Temporary Lane Closure.
2. D-704-18, One-Lane Closure – For slope protection replacement at RP 000, median pier embankment grading at RP 048, and for single lane closures beneath the structures at RP 000 and 048 during roadway canopy installation and removal.
3. D-704-22, Construction Truck and Temporary Detour Layouts – Type K & L for hauling material.
4. D-704-33, Two-Lane Roadway Portable Rumble Strips – For mill and fill operations
5. D-704-35 One Lane Closure – For east slope protection replacement at RP 048.



08/03/26

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NOTES

704-P02 WORK ZONE TRAFFIC CONTROL PHASES: Work can be performed at both structures concurrently. The device list and plan sheets have been developed based on the following phases:

RP 000

Phase 1

Perform single lane closures on I-29 (one bound at a time) beneath the structure as canopy is installed overhead in accordance with D-704-18. Close the WB lane while performing the north half of the bridge deck overlay. Place signing for the single lane closure in accordance with Sheets 100-4-8.

Phase 2

Flip the traffic control on Sheets 100-4-8 to close the EB lanes while performing the south half of the bridge deck overlay. Perform single lane closures on I-29 (one bound at a time) beneath the structure as canopy is removed overhead in accordance with D-704-18.

Phase 3

Perform Mill and Overlay operations with signing in accordance with D-704-33 beyond the bridge ends. Construct one bound at a time. Both lanes of traffic must be open after work is completed for the day.

Phase A (Can be performed concurrently with any numbered phase)

Perform right lane closure of NB and SB I-29 (including turn lane) to repair the slope protection underneath the bridge in accordance with D-704-35 and Section 100, Sheet 100-9 for additional signing to accommodate turn lane.

RP 048

Phase 1

Perform single lane closures on I-29 (one bound at a time) beneath the structure as canopy is installed overhead in accordance with D-704-18. Close the WB lane while performing the north half of the bridge deck overlay. Place signing for the single lane closure in accordance with Sheets 100-4,10-14.

Phase 2

Flip the traffic control on Sheets 100-4, 10-14 to close the EB lanes while performing the south half of the bridge deck overlay. Perform single lane closures on I-29 (one bound at a time) beneath the structure as canopy is removed overhead in accordance with D-704-18.

Phase 3

Perform Mill and Overlay operations with signing in accordance with D-704-33 beyond the bridge ends. Construct one bound at a time. Both lanes of traffic must be open after work is completed for the day.

Phase B (Can be performed concurrently with any numbered phase)

Perform right lane closure of NB I-29 to repair the slope protection underneath the bridge in accordance with D-704-18.

Phase C (Can be performed concurrently with any numbered phase)

Perform left lane closure of NB and SB I-29 to perform earthwork grading repair the pier in accordance with D-704-35.

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08/03/26

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-BRI-8-029(216)000	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
103	0100	CONTRACT BOND	L SUM	1	1
203	0195	EMBANKMENT SPECIAL	L SUM	1	1
255	0201	TRM TYPE 1	SY	115	115
258	0200	REMOVE & REPLACE CONCRETE SLOPE PROTECTION	SY	423	423
411	0114	MILLING PAVEMENT SURFACE - 2 INCH	SY	6,744	6,744
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT	TON	755	755
430	1000	CORED SAMPLE	EA	7	7
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	2,668	2,668
602	1300	BRIDGE DECK GROOVING	SF	17,050	17,050
624	3012	REMOVE & RESET DBL BOX BEAM RETROFIT - E-RAIL	LF	980	980
650	0704	OVERLAY CONCRETE	CY	132	132
650	0707	DECK CONCRETE	CY	79	79
650	0710	CLASS 1-H REMOVAL	SY	1,894	1,894
650	0720	CLASS 1 REMOVAL	SY	1,894	1,894
650	0723	CLASS 3 REMOVAL	SY	294	294
650	0724	CLASS 4 REMOVAL	SY	147	147
702	0100	MOBILIZATION	L SUM	1	1
704	0100	FLAGGING	MHR	140	140
704	1000	TRAFFIC CONTROL SIGNS	UNIT	4,698	4,698
704	1018	LANE CLOSURE-SIGNAL CONTROL/FLAGGING CONTROL	EA	2	2
704	1038	ATTENUATION DEVICE-TYPE B-40	EA	1	1
704	1039	ATTENUATION DEVICE-TYPE B-45	EA	1	1
704	1041	ATTENUATION DEVICE-TYPE B-55	EA	1	1
704	1043	ATTENUATION DEVICE-TYPE B-65	EA	1	1
704	1046	ATTENUATION DEVICE-TYPE B-80	EA	1	1
704	1048	PORTABLE RUMBLE STRIPS	EA	4	4
704	1052	TYPE III BARRICADE	EA	8	8
704	1060	DELINEATOR DRUMS	EA	102	102
704	1067	TUBULAR MARKERS	EA	49	49
704	1087	SEQUENCING ARROW PANEL-TYPE C	EA	2	2
704	1500	OBLITERATION OF PAVEMENT MARKING	SF	1,329	1,329
704	3511	STATE FURNISHED MEDIAN BARRIER	LF	1,338	1,338
748	0141	CURB & GUTTER-TYPE 1 SPECIAL	LF	60	60

ESTIMATE NUMBER: 25674 ESTIMATE TYPE: FINAL FINALIZED: Y RUN DATE: 08/04/2026 TIME: 10:37:43

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-BRI-8-029(216)000	8	2

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
762	0422	SHORT TERM 6IN LINE-TYPE R	LF	18,880	18,880
762	0426	SHORT TERM 24IN LINE-TYPE R	LF	48	48
762	1106	PVMT MK PAINTED 6IN LINE	LF	8,900	8,900
764	0150	REMOVE & RESET GUARDRAIL	LF	83	83
930	7012	ROADWAY CANOPY	L SUM	1	1
930	9612	SPALL REPAIR	SF	69	69
930	9690	CURB OVERLAY	LF	980	980

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-BRI-8-029(216)000	10	1

SPEC	CODE	BID ITEM	QUANTITY	UNIT
762	1106	PVMT MK PAINTED 6IN LINE		
		RP 000 Yellow Centerline Lines	2900	LF
		RP 000 White Edge Lines	2900	LF
		RP 048 Yellow Centerline Lines	1550	LF
		RP 048 White Edge Lines	1550	LF

HMA (CY) * 2 Ton/CY = Tons of HMA

HMA Cored Samples (RP 000)							
	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(2), "Pavement Density Cores"	1	2	N/A	1	2	N/A	EA
SSP 4 Longitudinal Joint Density in HMA Pavements (Centerline)	1	N/A	1	1	1	N/A	EA
430.04 I.2.b(3),"Pavement Thickness Determination Cores"					N/A	0	EA
				Total	3	0	EA

HMA Cored Samples (RP 048 - KIndred)							
	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(2), "Pavement Density Cores"	1	2	N/A	1	2	N/A	EA
SSP 4 Longitudinal Joint Density in HMA Pavements (Centerline)	1	N/A	1	1	1	N/A	EA
430.04 I.2.b(3),"Pavement Thickness Determination Cores"					N/A	1	EA
				Total	3	1	EA

Basis of Estimate

I-29 Bridge Rehabilitation

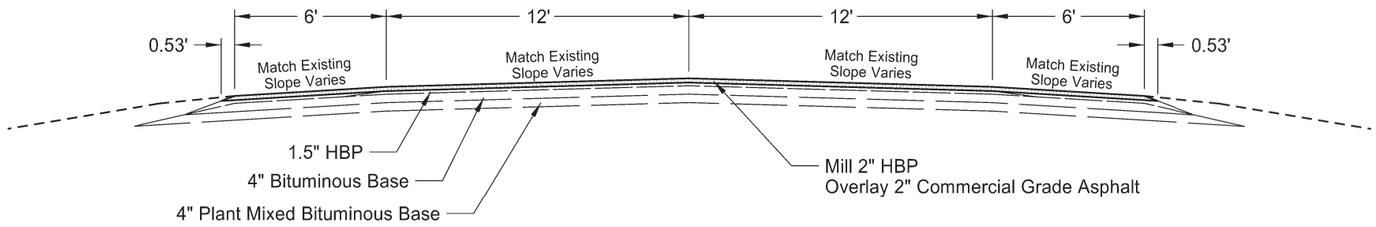
BRIAN J. ROSIN REGISTERED PROFESSIONAL PE 2928 ENGINEER NORTH DAKOTA

08/03/26

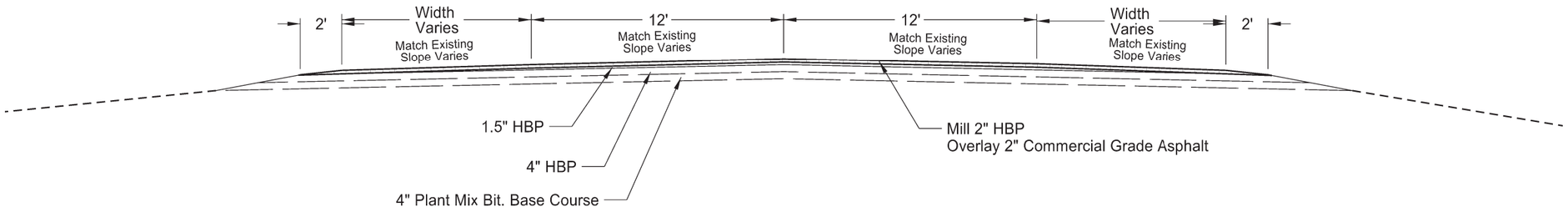
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-BRI-8-029(216)000	30	1

RP 000 - State Line Crossroad



RP 048 - Kindred Interchange Crossroad



Typical Sections

RP 000 & RP 048

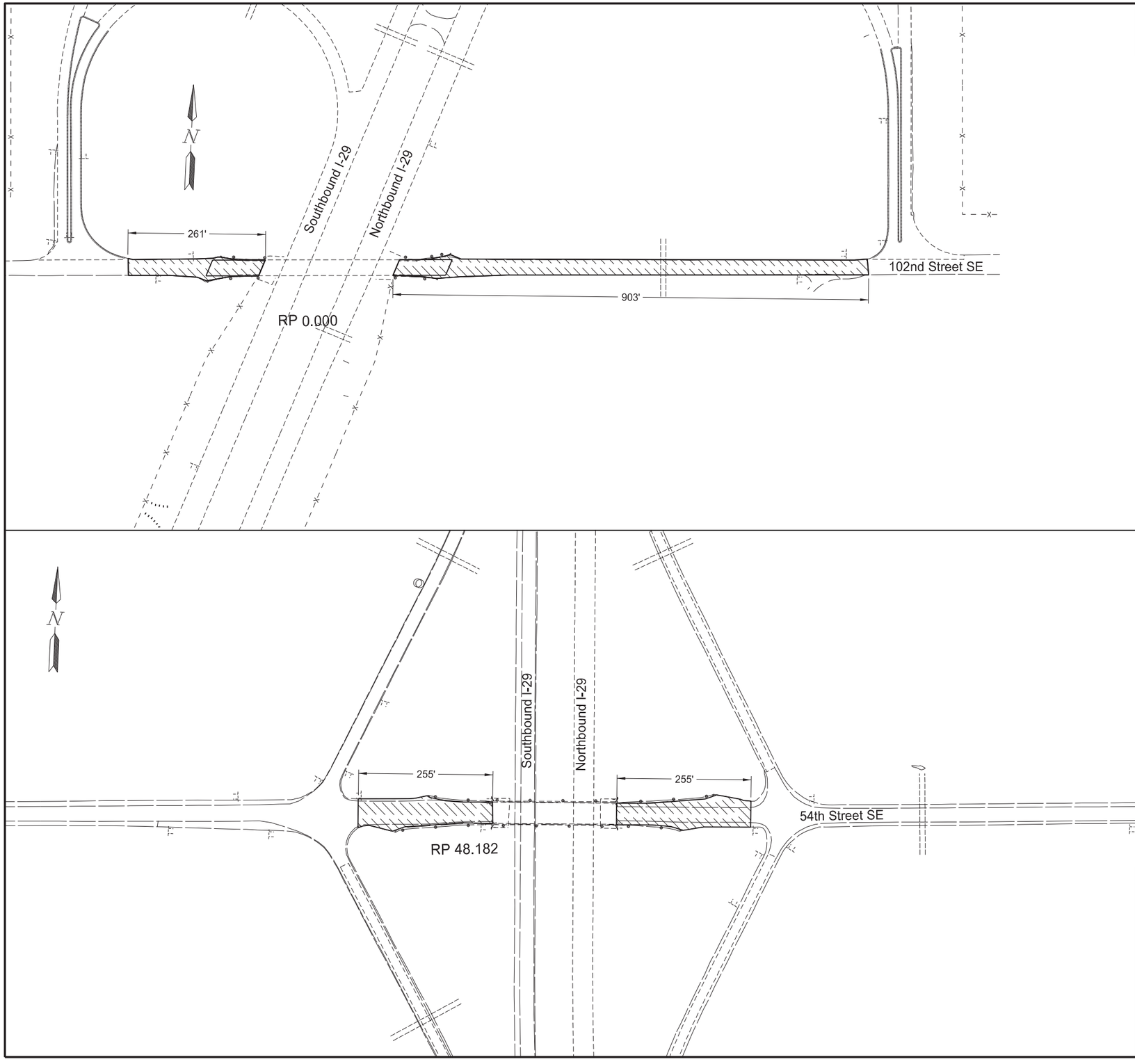
Bridge Rehabilitation

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08/03/26

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-BRI-8-029(216)000	40	1

SPEC	CODE	BID ITEM	QUANTITY	UNIT
411	0114	MILLING PAVEMENT SURFACE - 2 INCH		
		RP 000 - West Approach	935	SY
		RP 000 - East Approach	3011	SY
		RP 048 - West Approach	1395	SY
		RP 048 - East Approach	1403	SY

Milling 2"

Removal
Milling Dimension

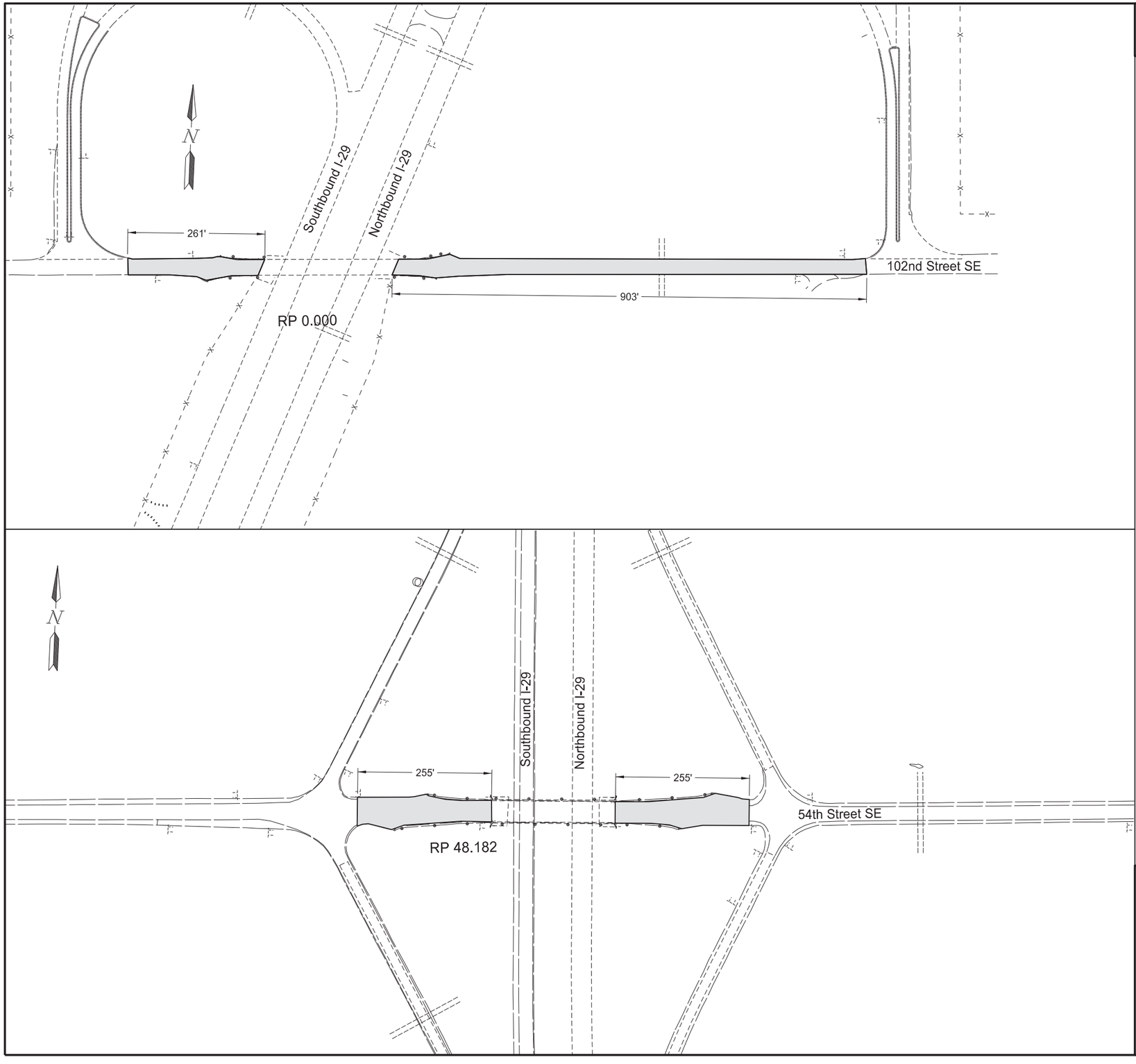
RP 000 and RP 048

I-29 Bridge Rehabilitations

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08/03/26

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-BRI-8-029(216)000	90	1

SPEC	CODE	BID ITEM	QUANTITY	UNIT
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT		
		RP 000 - West Approach	104	TON
		RP 000 - East Approach	335	TON
		RP 048 - West Approach	155	TON
		RP 048 - East Approach	156	TON

Overlay 2" HMA

Paving Layout

RP 000 and RP 048

I-29 Bridge Rehabilitations

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-BRI-8-029(216)000	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED BY PHASE NO. 1&2	3		TOTAL 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					28	
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)					18	
G20-2-48	**48"x24"**	**END ROAD WORK**	**5**	**2**		**5**	**26**	**130**
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)					18	
G20-4b-36	36"x30"	WAIT FOR PILOT CAR					18	
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS					43	
G20-52a-72	72"x24"	ROAD WORK NEXT __ MILES RT or LT ARROW					36	
G20-55-96	**96"x48"**	**SPEED LIMIT ENFORCED - MINIMUM FEE $150 WHEN WORKERS PRESENT**	**3**			**3**	**59**	**177**
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**	**4**			**4**	**32**	**128**
R1-2-60	60"x60"	YIELD					29	
R2-1-36	36"x48"	SPEED LIMIT __ (Portable only)					30	
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**4**	**4**		**4**	**39**	**156**
R2-1aP-24	**24"x18"**	**MINIMUM FEE $150 (Mounted on Speed Limit post)**	**3**	**2**		**3**	**10**	**30**
R3-2-48	48"x48"	NO LEFT TURN					35	
R4-1-48	48"x60"	DO NOT PASS					39	
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**	**3**			**3**	**16**	**48**
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**	**1**			**1**	**35**	**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**	**3**			**3**	**35**	**105**
W3-4-48	**48"x48"**	**BE PREPARED TO STOP**		**2**		**2**	**35**	**70**
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**3**	**2**		**3**	**35**	**105**
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					35	
W8-3-48	48"x48"	PAVEMENT ENDS					35	
W8-7-48	48"x48"	LOOSE GRAVEL					35	
W8-11-48	48"x48"	UNEVEN LANES					35	
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**			**2**	**35**	**70**
W8-55-48	**48"x48"**	**TRUCKS CROSSING AHEAD or __ FT or _ MILE**	**2**			**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**	**2**	**2**		**2**	**35**	**70**
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**	**2**			**2**	**35**	**70**
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or __ FT or _ MILE					35	
W20-7-48	**48"x48"**	**FLAGGER**		**2**		**2**	**35**	**70**
W20-8-18	**18"x18"**	**STOP - SLOW PADDLE Back to Back**		**2**		**2**	**5**	**10**
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					35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT or _ MILE					35	
W21-5-48	48"x48"	SHOULDER WORK					35	
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 BY PHASE NO. 1&2	3		TOTAL 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**		**2**		**2**	**35**	**70**
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK					35	
W24-1-48	48"x48"	DOUBLE REVERSE CURVE					35	

SPECIAL SIGNS

CONSIGN1	150"x60"	12 FT LANE AHEAD WIDE VEHICLES USE ALTERNATE ROUTE	2			2	88	176

SPEC & CODE

704-1000	TRAFFIC CONTROL SIGNS	TOTAL UNITS	1590

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY BY PHASE NO. 1&2	3		TOTAL QUANTITY
704-0100	**FLAGGING**	MHR		**40**		**40**
704-1018	**LANE CLOSURE-SIGNAL CONTROL/FLAGGING CONTROL**	EACH	**1**			**1**
704-1038	**ATTENUATION DEVICE-TYPE B-40**	EA	**1**			**1**
704-1041	**ATTENUATION DEVICE-TYPE B-55**	EACH	**1**			**1**
704-1048	**PORTABLE RUMBLE STRIPS**	EACH		**2**		**2**
704-1050	TYPE I BARRICADES	EACH				
704-1052	**TYPE III BARRICADES**	EACH	**2**			**2**
704-1060	**DELINEATOR DRUMS**	EACH	**12**			**12**
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				
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				
704-1500	**OBLITERATION OF PVMT MK**	SF	**355**			**355**
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF				
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH				
704-3511	**STATE FURNISHED MEDIAN BARRIER**	LF	**608**			**608**
762-0200	RAISED PAVEMENT MARKERS	EACH				
762-0420	SHORT TERM 4IN LINE - TYPE R	LF				
762-0422	**SHORT TERM 6IN LINE-TYPE R**	LF	**2440**			**2440**
762-0426	**SHORT TERM 24IN LINE-TYPE R**	LF	**24**			**24**
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF				

NOTE:
If additional signs are required, units will be calculated using the formula from Section III-18.06 of the Design Manual.
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Traffic Control Devices List

RP 000

Docusign Envelope ID: 2A61A712-0C06-88AF-830B-ADB427ABC22C

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-BRI-8-029(216)000	100	2

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED BY PHASE NO. 1&2	3		TOTAL 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					28	
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)					18	
G20-2-48	**48"x24"**	**END ROAD WORK**	**4**	**2**		**4**	**26**	**104**
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)					18	
G20-4b-36	36"x30"	WAIT FOR PILOT CAR					18	
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS					43	
G20-52a-72	72"x24"	ROAD WORK NEXT __ MILES RT or LT ARROW					36	
G20-55-96	**96"x48"**	**SPEED LIMIT ENFORCED - MINIMUM FEE $150 WHEN WORKERS PRESENT**	**2**			**2**	**59**	**118**
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					32	
R1-2-60	60"x60"	YIELD					29	
R2-1-36	**36"x48"**	**SPEED LIMIT __ (Portable only)**		**4**		**4**	**30**	**120**
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**7**			**7**	**39**	**273**
R2-1aP-24	**24"x18"**	**MINIMUM FEE $150 (Mounted on Speed Limit post)**	**5**	**2**		**5**	**10**	**50**
R3-2-48	48"x48"	NO LEFT TURN					35	
R4-1-48	48"x60"	DO NOT PASS					39	
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**	**2**			**2**	**16**	**32**
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**	**1**			**1**	**35**	**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**	**4**			**4**	**35**	**140**
W3-4-48	**48"x48"**	**BE PREPARED TO STOP**		**2**		**2**	**35**	**70**
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**3**	**2**		**3**	**35**	**105**
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					35	
W8-3-48	48"x48"	PAVEMENT ENDS					35	
W8-7-48	48"x48"	LOOSE GRAVEL					35	
W8-11-48	48"x48"	UNEVEN LANES					35	
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					35	
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __ FT or _ MILE					35	
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**	**4**	**2**		**4**	**35**	**140**
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**	**5**			**5**	**35**	**175**
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or __ FT or _ MILE					35	
W20-7-48	**48"x48"**	**FLAGGER**		**2**		**2**	**35**	**70**
W20-8-18	**18"x18"**	**STOP - SLOW PADDLE Back to Back**		**2**		**2**	**5**	**10**
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					35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT or _ MILE					35	
W21-5-48	48"x48"	SHOULDER WORK					35	
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 BY PHASE NO. 1&2	3		TOTAL 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**		**2**		**2**	**35**	**70**
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**	**1512**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY BY PHASE NO. 1&2	3		TOTAL QUANTITY
704-0100	**FLAGGING**	MHR		**40**		**40**
704-1018	**LANE CLOSURE-SIGNAL CONTROL/FLAGGING CONTROL**	EACH	**1**			**1**
704-1039	**ATTENUATION DEVICE-TYPE B-45**	EA	**1**			**1**
704-1043	**ATTENUATION DEVICE-TYPE B-65**	EA	**1**			**1**
704-1048	**PORTABLE RUMBLE STRIPS**	EACH		**2**		**2**
704-1050	TYPE I BARRICADES	EACH				
704-1052	**TYPE III BARRICADES**	EACH	**4**			**4**
704-1060	**DELINEATOR DRUMS**	EACH	**24**			**24**
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				
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				
704-1500	**OBLITERATION OF PVMT MK**	SF	**254**			**254**
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF				
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH				
704-3511	**STATE FURNISHED MEDIAN BARRIER**	LF	**530**			**530**
762-0200	RAISED PAVEMENT MARKERS	EACH				
762-0420	**SHORT TERM 4IN LINE - TYPE R**	LF	**2040**			**2040**
762-0426	**SHORT TERM 24IN LINE-TYPE R**	LF	**24**			**24**
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF				

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/

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Traffic Control Devices List

RP 048

Docusign Envelope ID: 2A61A712-0C06-88AF-830B-ADB427ABC22C

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-BRI-8-029(216)000	100	3

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED BY PHASE NO. A	B	C		TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	**48"x48"**	**EXIT GORE**		**1**			**1**	**35**	**35**
G20-1-60	60"x24"	ROAD WORK NEXT __ MILES						28	
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)						18	
G20-2-48	**48"x24"**	**END ROAD WORK**	**4**	**2**	**4**		**4**	**26**	**104**
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)						18	
G20-4b-36	36"x30"	WAIT FOR PILOT CAR						18	
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS						43	
G20-52a-72	72"x24"	ROAD WORK NEXT __ MILES RT or LT ARROW						36	
G20-55-96	**96"x48"**	**SPEED LIMIT ENFORCED - MINIMUM FEE $150 WHEN WORKERS PRESENT**	**4**	**2**	**4**		**4**	**59**	**236**
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						32	
R1-2-60	**60"x60"**	**YIELD**	**1**				**1**	**29**	**29**
R2-1-36	**36"x48"**	**SPEED LIMIT __ (Portable only)**	**5**				**5**	**30**	**150**
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**8**	**4**	**8**		**8**	**39**	**312**
R2-1aP-24	**24"x18"**	**MINIMUM FEE $150 (Mounted on Speed Limit post)**	**9**	**2**	**8**		**9**	**10**	**90**
R3-2-48	48"x48"	NO LEFT TURN						35	
R4-1-48	48"x60"	DO NOT PASS						39	
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						35	
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**4**	**2**	**4**		**4**	**35**	**140**
W4-2-48	**48"x48"**	**LANE ENDS RIGHT or LEFT**	**4**	**2**	**4**		**4**	**35**	**140**
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						35	
W8-3-48	48"x48"	PAVEMENT ENDS						35	
W8-7-48	48"x48"	LOOSE GRAVEL						35	
W8-11-48	48"x48"	UNEVEN LANES						35	
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						35	
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __ FT or _ MILE						35	
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**	**4**	**2**	**4**		**4**	**35**	**140**
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**	**4**	**2**	**4**		**4**	**35**	**140**
W20-7-48	**48"x48"**	**FLAGGER**	**2**		**2**		**2**	**35**	**70**
W20-8-18	**18"x18"**	**STOP - SLOW PADDLE Back to Back**	**2**		**2**		**2**	**5**	**10**
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						35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT or _ MILE						35	
W21-5-48	48"x48"	SHOULDER WORK						35	
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 BY PHASE NO. A	B	C		TOTAL 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						35	
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK						35	
W24-1-48	48"x48"	DOUBLE REVERSE CURVE						35	

SPECIAL SIGNS

SPEC & CODE		TOTAL UNITS	
704-1000	TRAFFIC CONTROL SIGNS		1596

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY BY PHASE NO. A	B	C		TOTAL QUANTITY
704-0100	**FLAGGING**	MHR	**20**		**40**		**60**
704-1045	ATTENUATION DEVICE-TYPE B-75	EACH					
704-1046	**ATTENUATION DEVICE-TYPE B-80**	EACH		**1**			**1**
704-1048	PORTABLE RUMBLE STRIPS	EACH					
704-1050	TYPE I BARRICADES	EACH					
704-1052	**TYPE III BARRICADES**	EACH	**2**		**2**		**2**
704-1060	**DELINEATOR DRUMS**	EACH	**55**	**31**	**66**		**66**
704-1065	TRAFFIC CONES	EACH					
704-1067	**TUBULAR MARKERS**	EACH	**49**		**24**		**49**
704-1070	DELINEATOR	EACH					
704-1072	FLEXIBLE DELINEATORS	EACH					
704-1080	STACKABLE VERTICAL PANELS	EACH					
704-1081	VERTICAL PANELS - BACK TO BACK	EACH					
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH					
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH					
704-1087	**SEQUENCING ARROW PANEL - TYPE C**	EACH	**2**	**1**	**2**		**2**
704-1500	**OBLITERATION OF PVMT MK**	SF	**240**	**120**	**240**		**600**
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF					
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH					
704-3511	**STATE FURNISHED MEDIAN BARRIER**	LF		**200**			**200**
762-0200	RAISED PAVEMENT MARKERS	EACH					
762-0420	SHORT TERM 4IN LINE - TYPE R	LF					
762-0422	**SHORT TERM 6IN LINE-TYPE R**	LF	**4800**	**2400**	**4800**		**12000**
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF					

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/

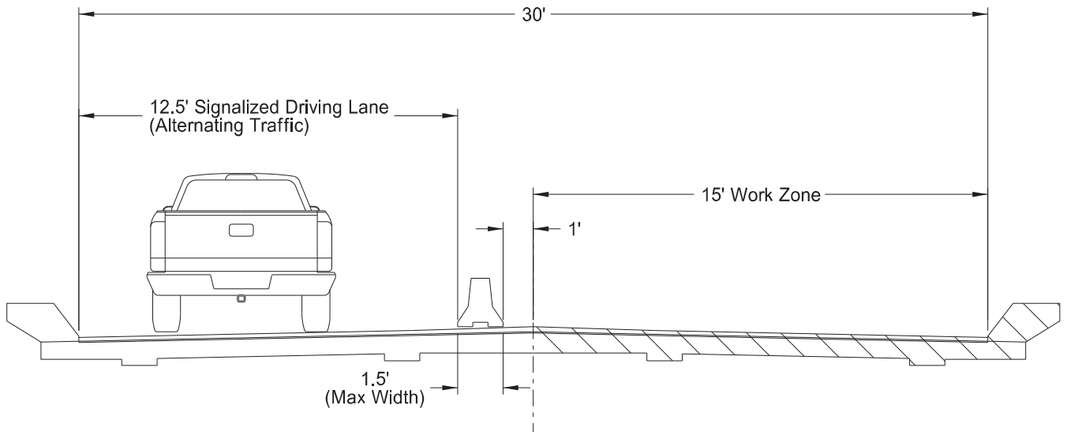
BRIAN J. ROSIN
REGISTERED
PROFESSIONAL
PE 2928
ENGINEER
NORTH DAKOTA
08/03/26

Traffic Control Devices List

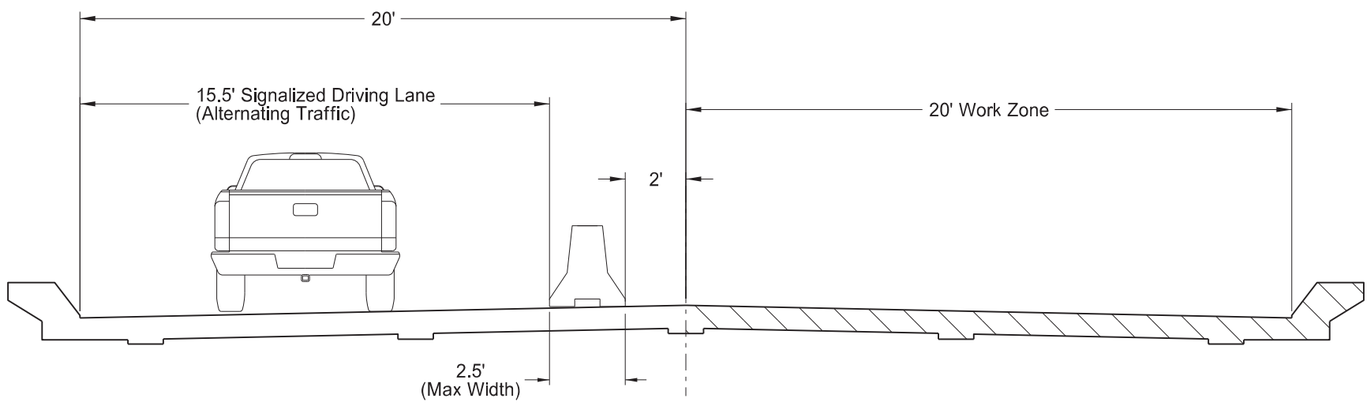
I-29 Slope Protection

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	ND	IM-BRI-8-029(216)000	100	4



Structure Number 0029-000.013



Structure Number 0029-048.182

Work Zone Traffic Control

RP 000 & 048
Phase 1 (Flip for Phase 2)

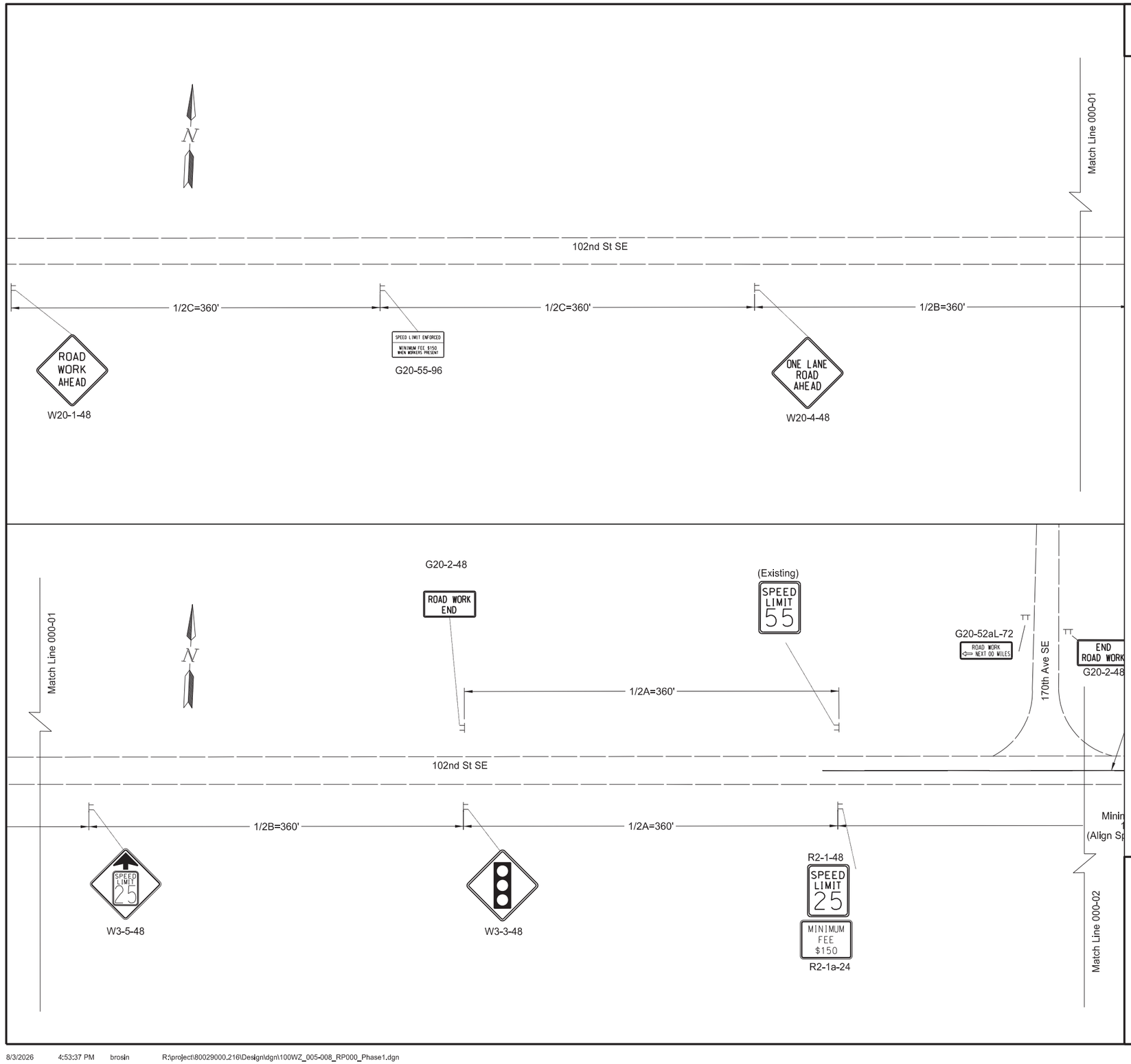
I-29 Bridge Rehabilitation

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NORTH DAKOTA

08/03/26

Docusign Envelope ID: 2A61A712-0C06-88AF-830B-ADB427ABC22C

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ND	IM-BRI-8-029(216)000	100	5



Work Zone Traffic Control

RP 000
Phase 1

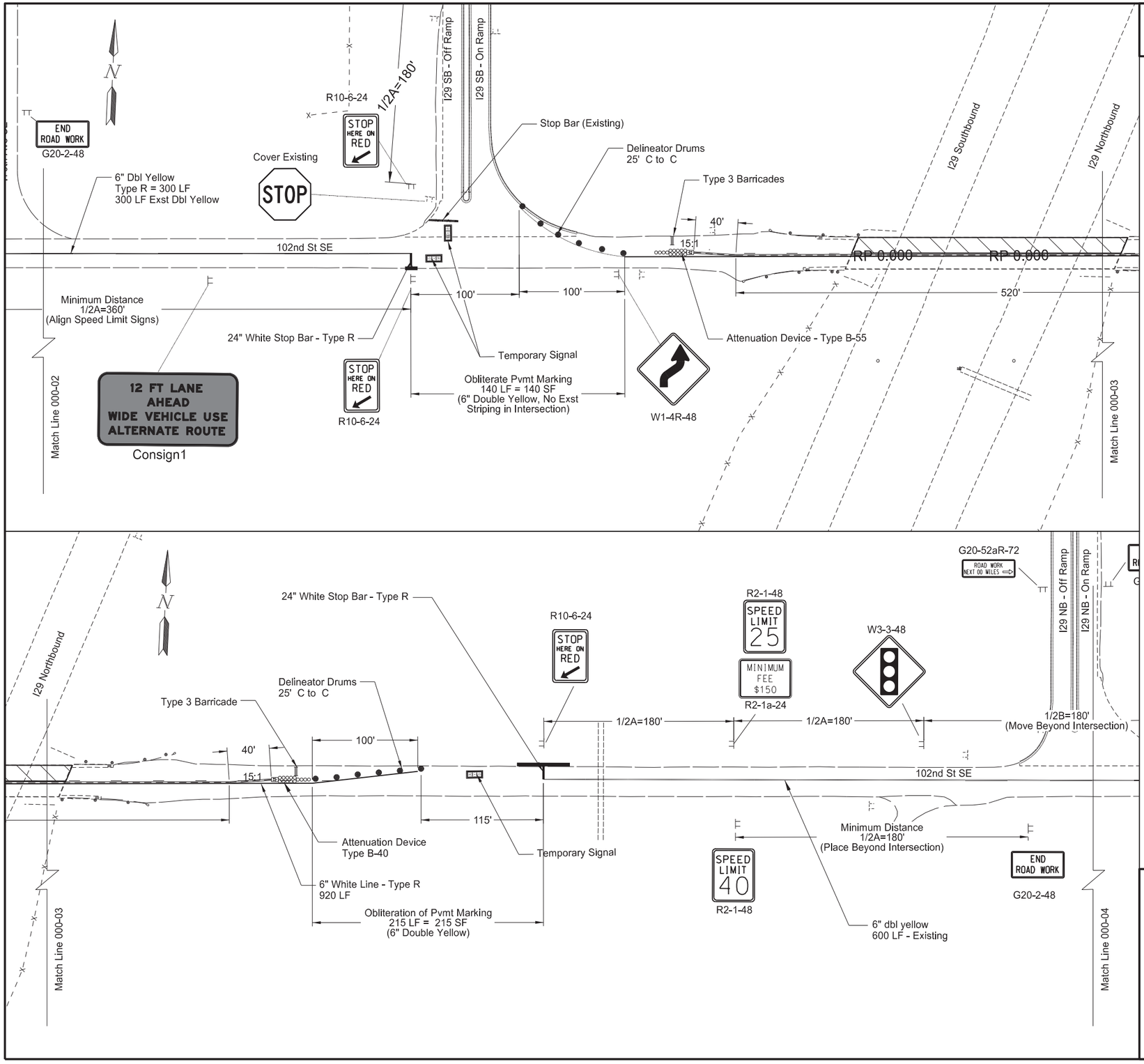
I-29 Bridge Rehabilitation

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08/03/26

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Work Zone Traffic Control

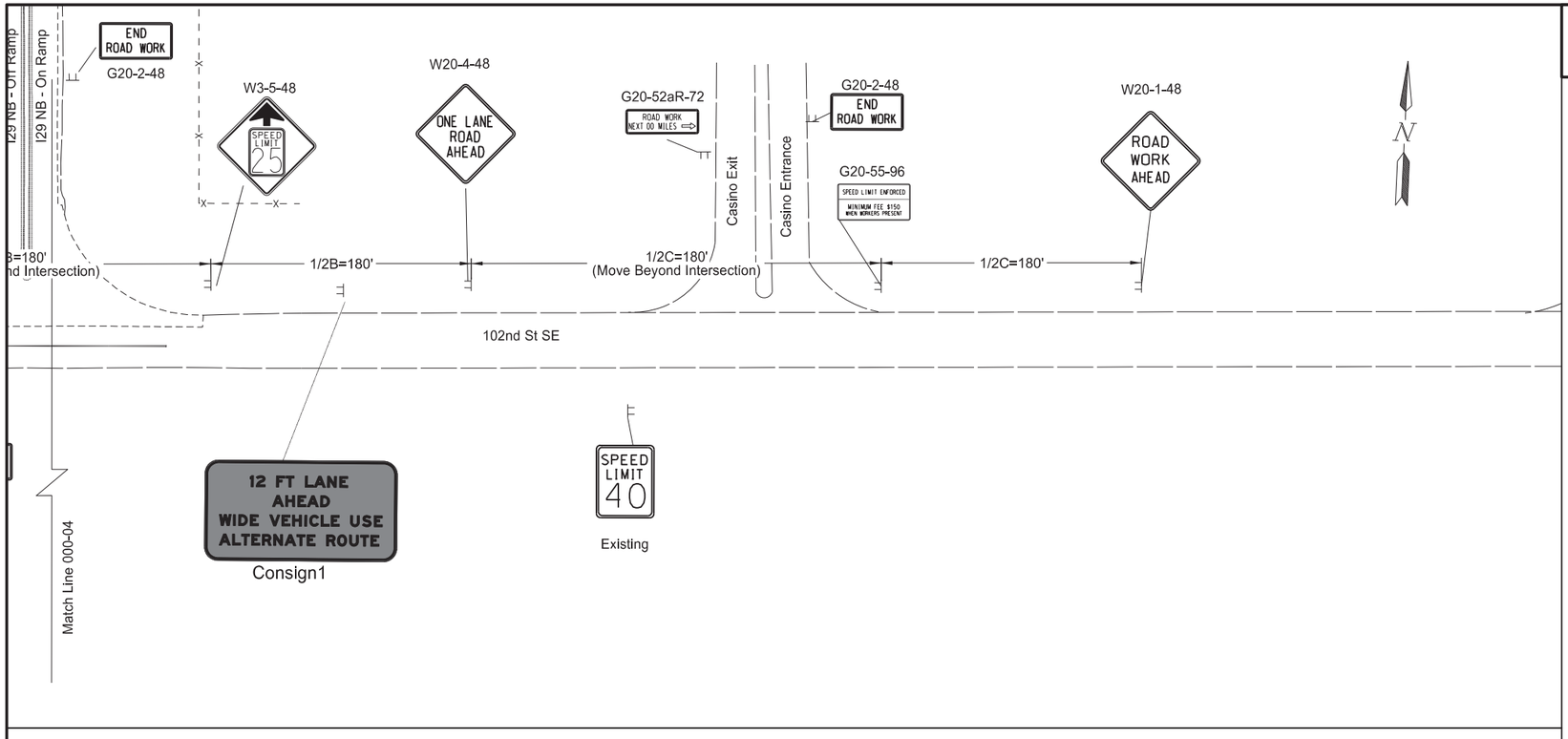
RP 000
Phase 1

I-29 Bridge Rehabilitation

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Work Zone Traffic Control

RP 000
Phase 1

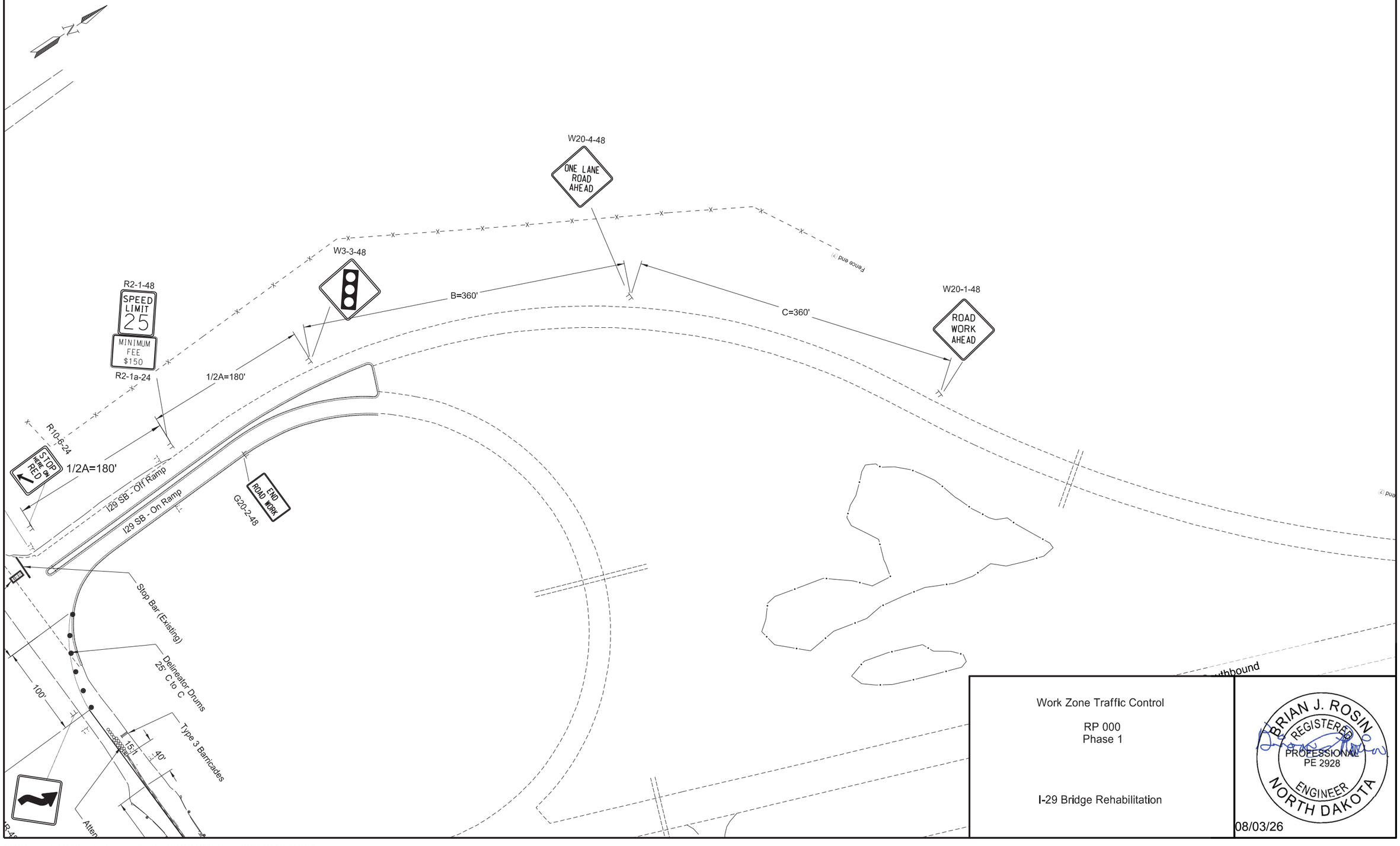
I-29 Bridge Rehabilitation

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NORTH DAKOTA

08/03/26

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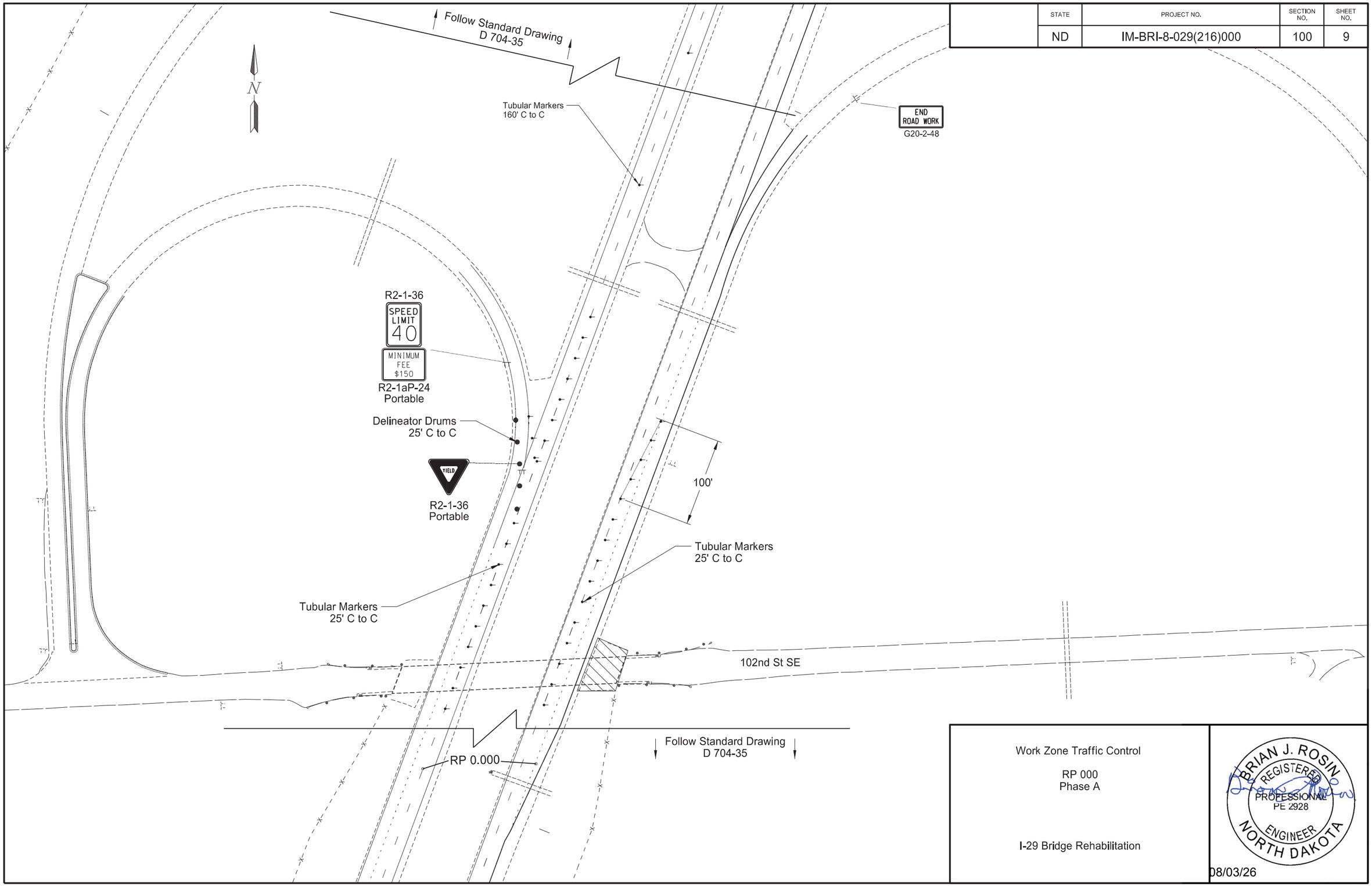
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Work Zone Traffic Control

RP 000
Phase A

I-29 Bridge Rehabilitation

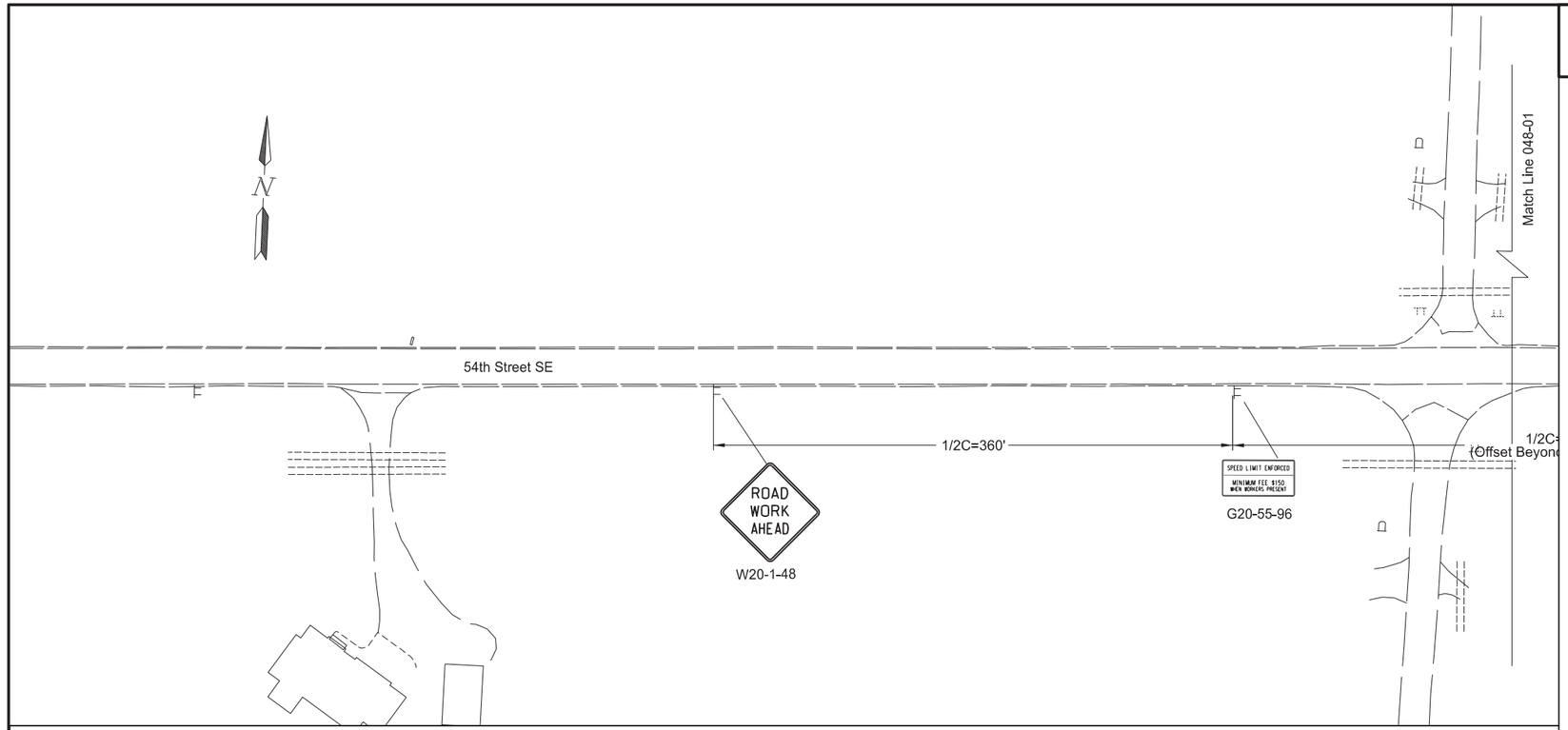
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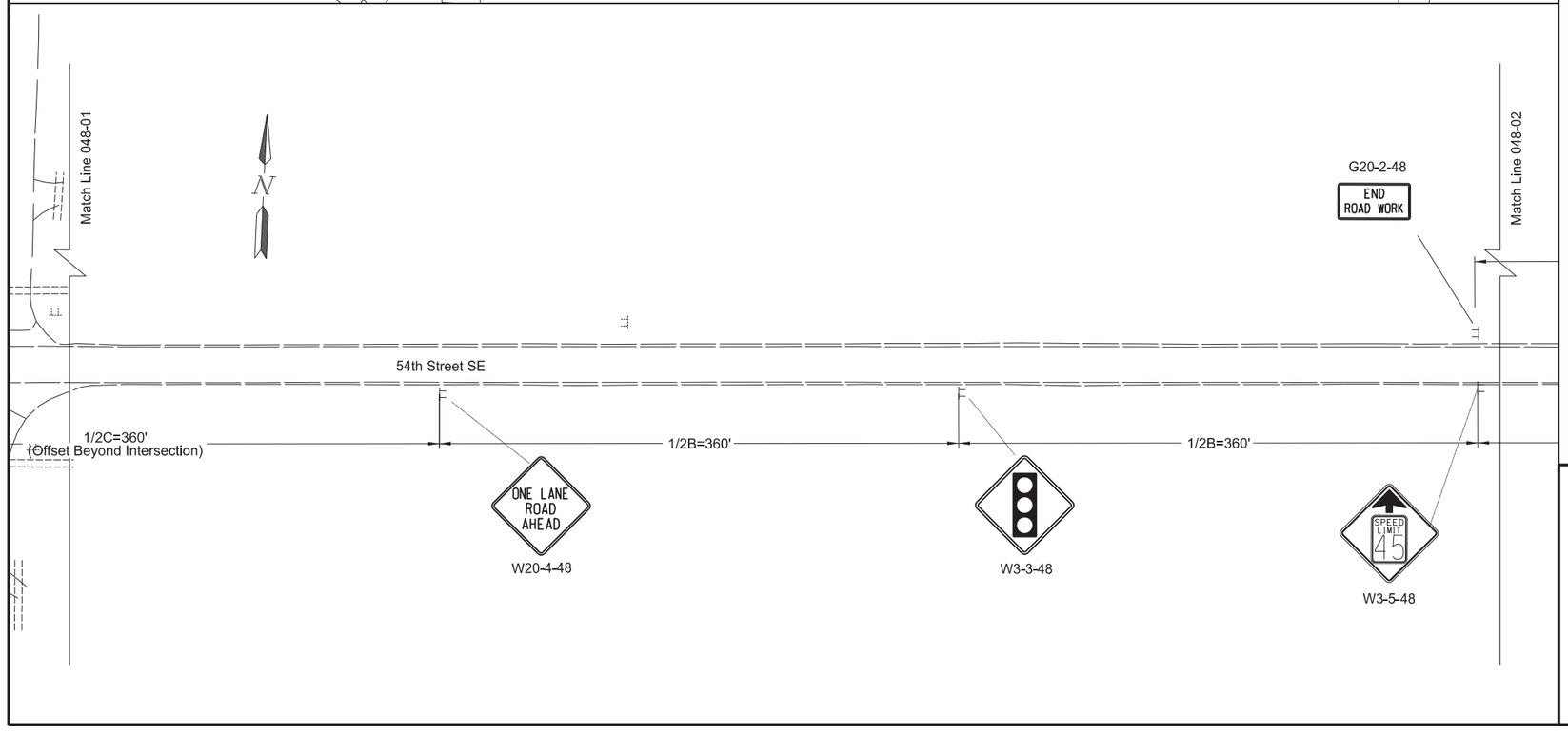
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Work Zone Traffic Control

RP 048
Phase 1

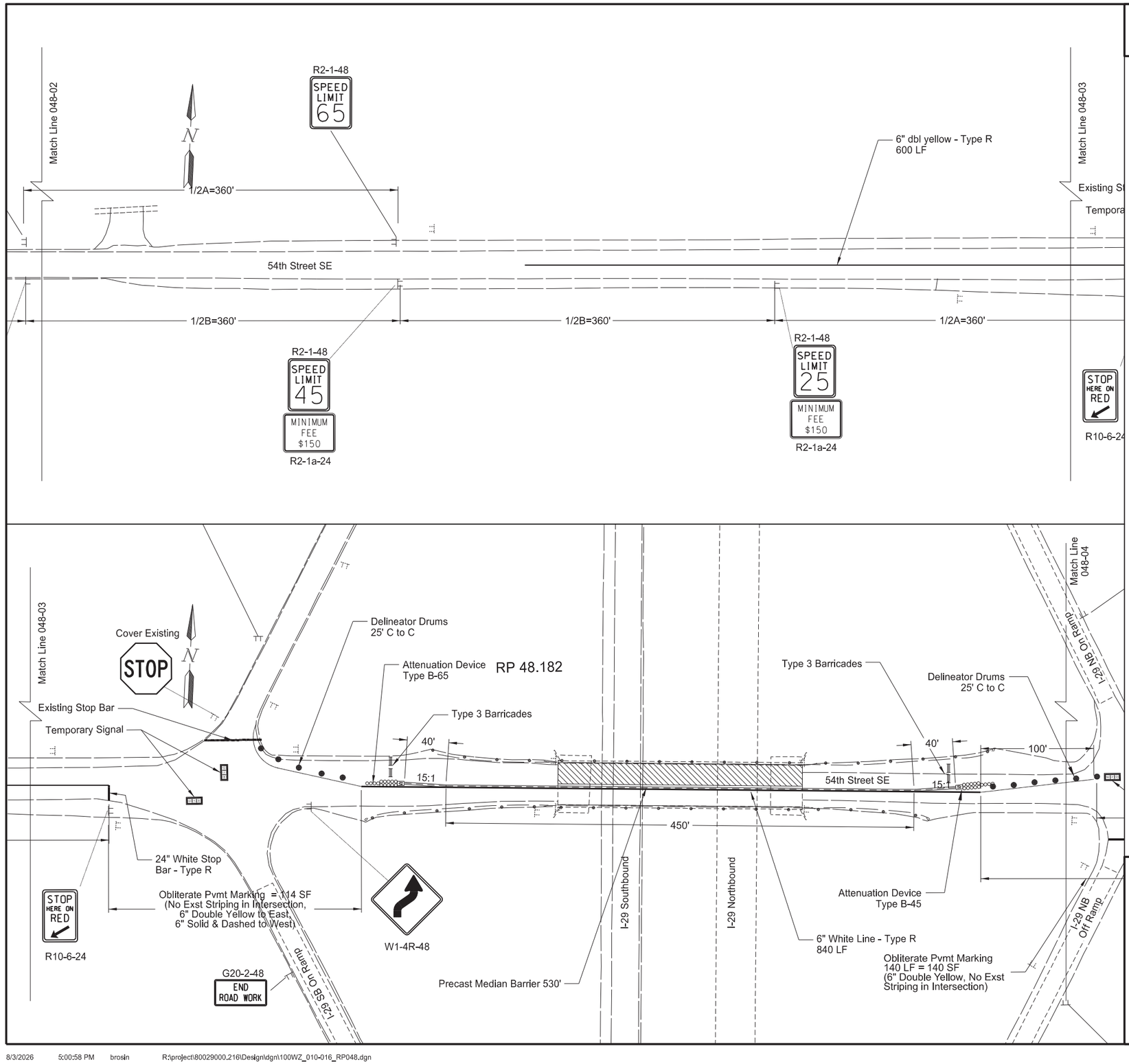
I-29 Bridge Rehabilitation

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Work Zone Traffic Control

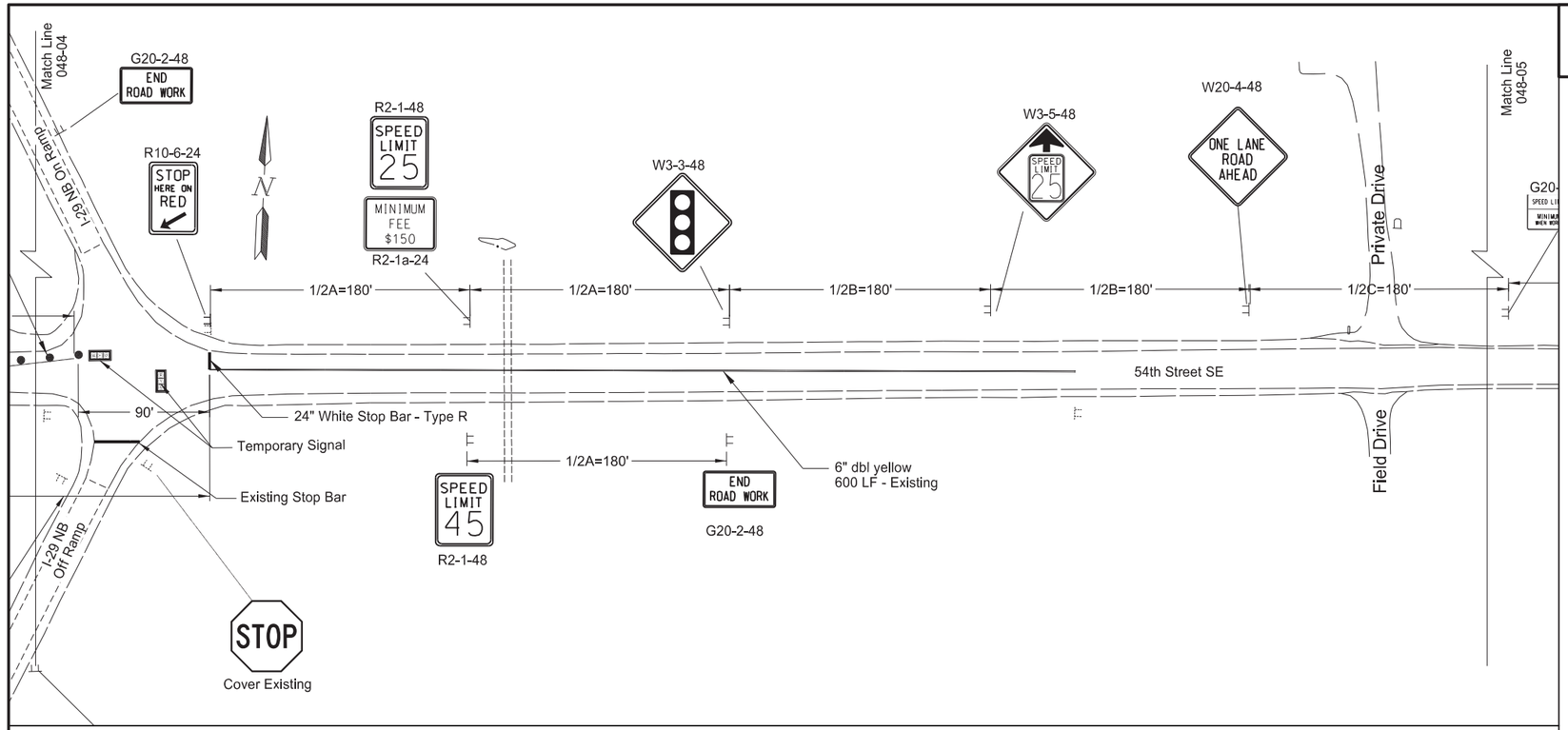
RP 048
Phase 1

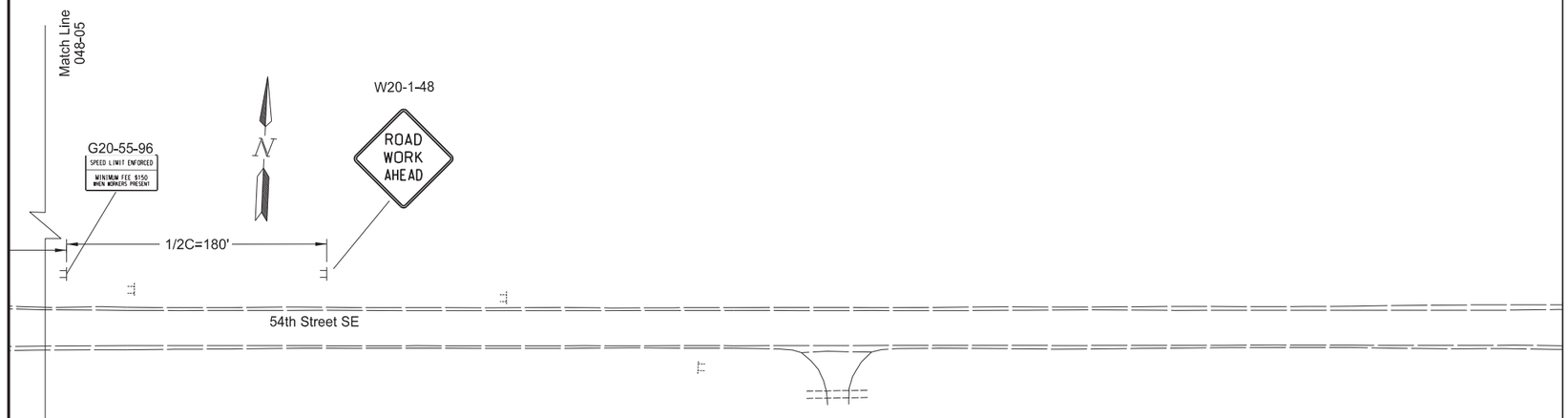
I-29 Bridge Rehabilitation

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Work Zone Traffic Control

RP 048
Phase 1

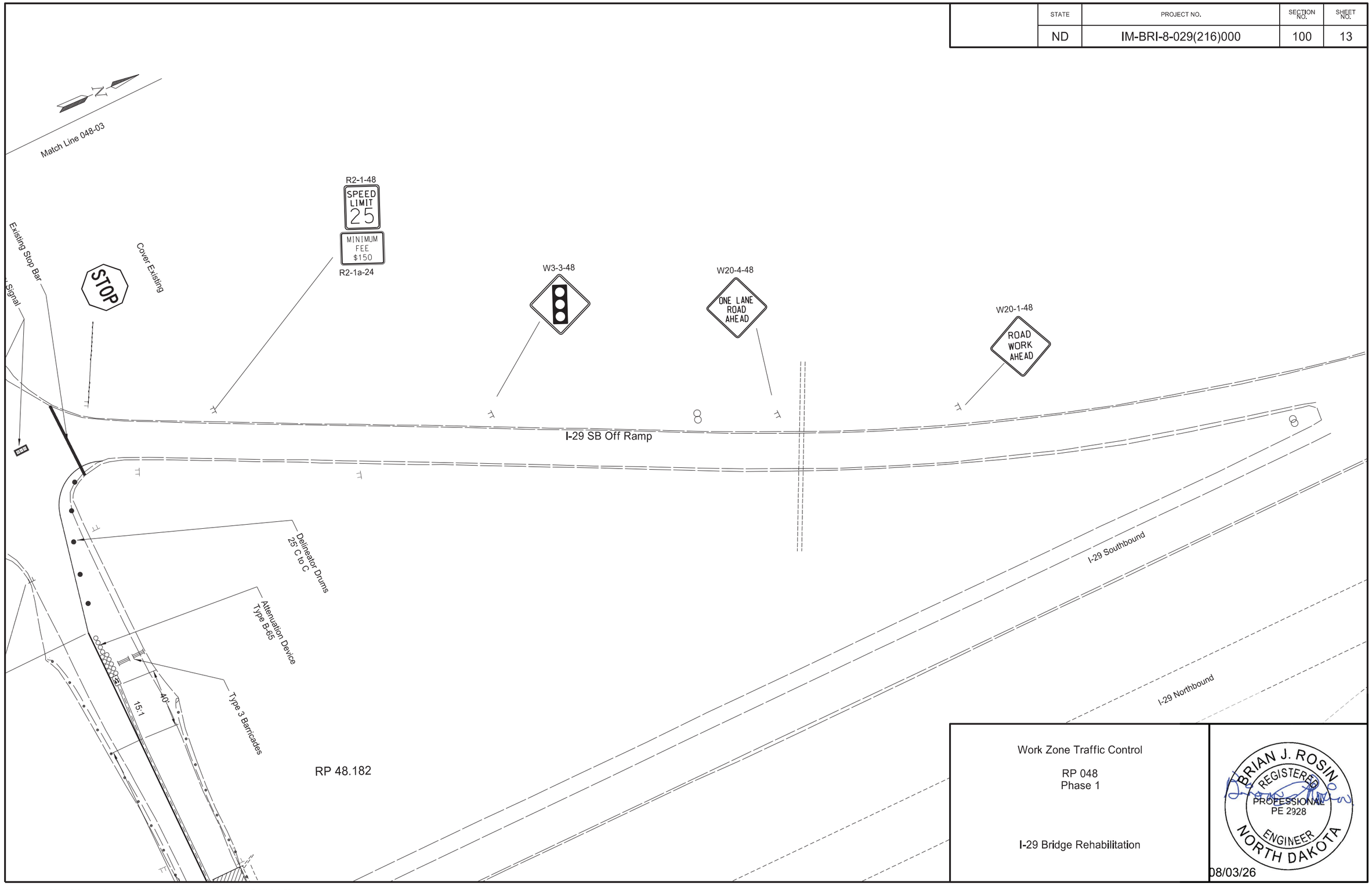
I-29 Bridge Rehabilitation

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Work Zone Traffic Control

RP 048
Phase 1

I-29 Bridge Rehabilitation

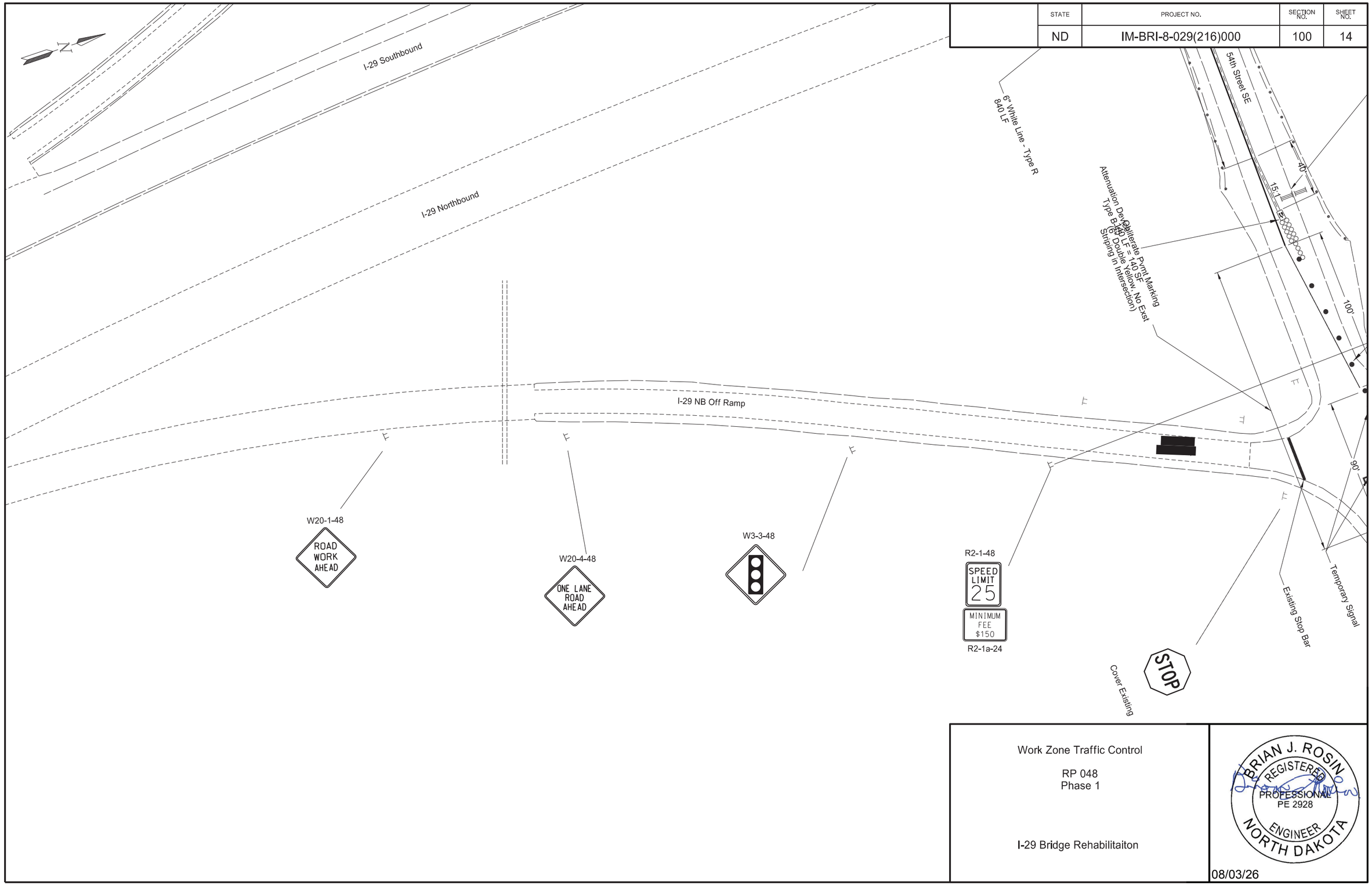
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ENGINEER
NORTH DAKOTA

08/03/26

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Work Zone Traffic Control

RP 048
Phase 1

I-29 Bridge Rehabilitaiton

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ENGINEER
NORTH DAKOTA

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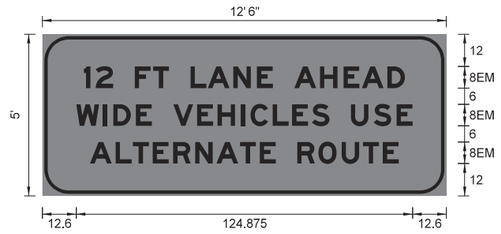
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SIGN NUMBER	Consign 1
WIDTH X HEIGHT	12'-6" x 5'-0"
BORDER WIDTH	1.25" (inset 0.75")
CORNER RADIUS	9"
MOUNTING	Ground
BACKGROUND	**TYPE:** IV Reflective
	COLOR: Orange
LEGEND/BORDER	**TYPE:** IV Reflective
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S):

AREA: 62.5 Sq.Ft.



Dimensions are in inches tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Const_Detour.sst

LETTER POSITION (X)																			LENGTH	SIZE	SERIES
1	2		F	T		L	A	N	E		A	H	E	A	D				119.2	8.0	EM 2000
15.4	19.8	26.3	34.3	41.1	47.0	55.0	61.4	70.9	79.6	85.6	93.6	103.1	111.8	118.6	128.1						
W	I	D	E		V	E	H	I	C	L	E	S		U	S	E			124.9	8.0	EM 2000
12.6	22.5	26.3	34.7	40.6	48.6	57.4	65.0	73.8	77.3	85.5	92.7	100.1	106.6	114.6	123.0	131.5					
A	L	T	E	R	N	A	T	E		R	O	U	T	E					114.6	8.0	EM 2000
17.7	27.2	33.6	41.0	48.6	56.7	64.6	73.4	80.7	86.6	94.6	102.5	111.1	119.0	126.4							

Construction Sign Details

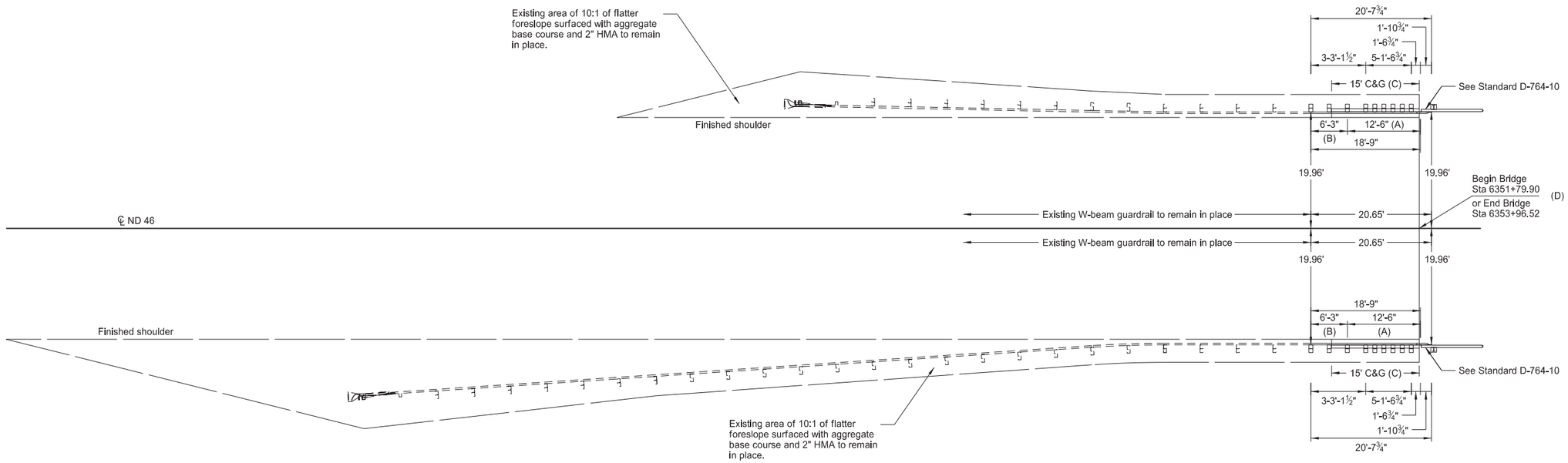
I-29

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE
08/04/26
NORTH DAKOTA

Docusign Envelope ID: 0D838D32-F380-89F6-8398-C4A0AADFCC26

23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-BRI-8-029(216)000	130	1



SPEC	CODE	BID ITEM	QTY	UNIT
764	0150	REMOVE & RESET GUARDRAIL		
		Sta 6351+60.02 to 6351+80.67 Rt	20.7	LF
		Sta 6351+60.02 to 6351+80.67 Lt	20.7	LF
		Sta 6353+95.75 to 6354+16.40 Rt	20.7	LF
		Sta 6353+95.75 to 6354+16.40 Lt	20.7	LF
		Total	82.8	LF

(A) Thrie beam rail section (double thickness)

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

(C) See Section 170

(D) Equation
6352+97.42 Bk=
6352+79.04 Ahd

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

Kindred Interchange Crossroad
RP 48.182

I-29

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE
08/04/26
NORTH DAKOTA

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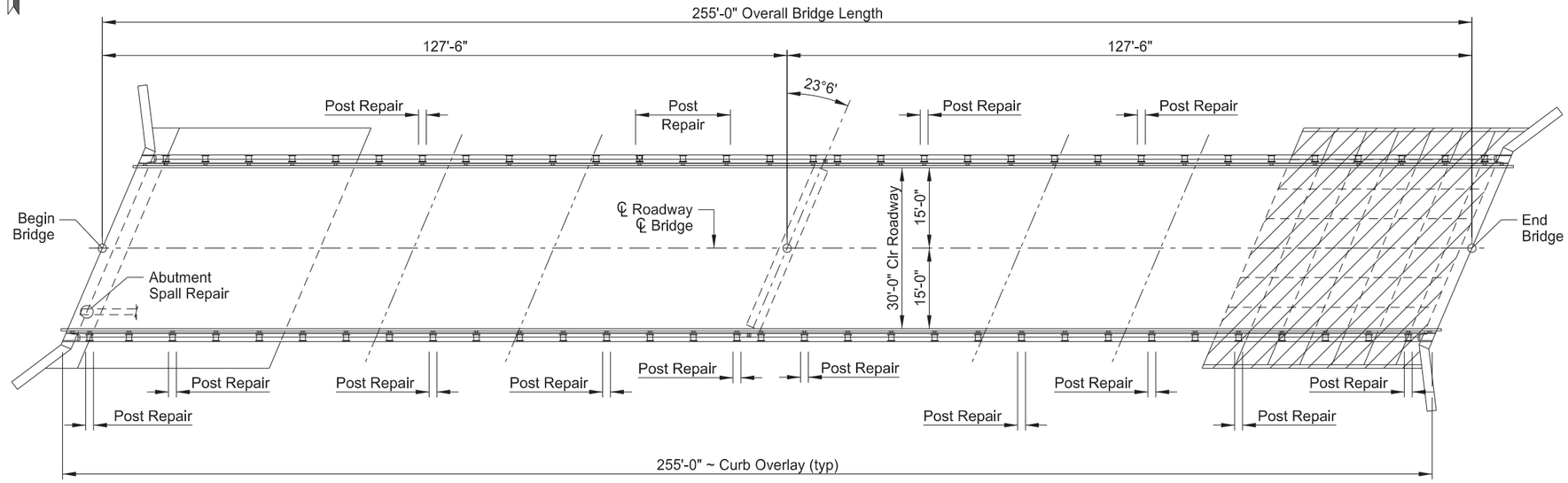
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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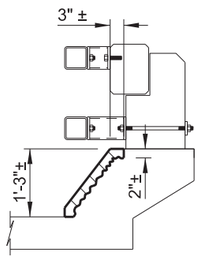
The hatched area indicates existing slope protection concrete to be removed and replaced.

The hatched area indicates curb overlay.

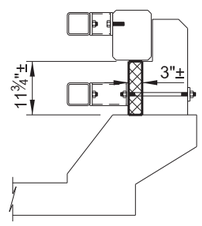
The hatched area indicates spall repair area.



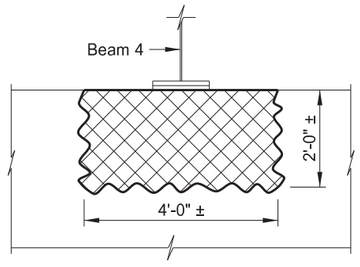
PLAN



CURB OVERLAY



(PAID FOR AS SPALL REPAIR)
POST REPAIR



(PAID FOR AS SPALL REPAIR)
ABUTMENT REPAIR

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
258	0200	REMOVE & REPLACE CONCRETE SLOPE PROTECTION	SY	198
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	1,252
602	1300	BRIDGE DECK GROOVING	SF	7,650
624	3012	REMOVE & RESET DBL BOX BEAM RETROFIT - E-RAIL	LF	510
650	0704	OVERLAY CONCRETE	CY	59
650	0707	DECK CONCRETE	CY	19
650	0710	CLASS 1-H REMOVAL	SY	850
650	0720	CLASS 1 REMOVAL	SY	850
650	0723	CLASS 3 REMOVAL	SY	85
650	0724	CLASS 4 REMOVAL	SY	43
930	7012	ROADWAY CANOPY	L SUM	0.5
930	9612	SPALL REPAIR	SF	36
930	9690	CURB OVERLAY	LF	510

REGISTERED PROFESSIONAL ENGINEER
SAMUEL WELCH
PE-10948
DATE 08/04/26
NORTH DAKOTA

SPECIAL PROVISIONS	
SP 465(25)	HYDRODEMOLITION AND OVERLAY
SP 464(25)	CONCRETE SPALL REPAIR

STANDARD DRAWINGS

D-258-1

I-29/102ND ST SE INTERCHANGE

BRIDGE LAYOUT

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

Jason Thorenson
08/04/26

DRAWING NO. 29-000.013-1

8/3/2026 7:06:44 AM eajohnson R:\project\80029000.216\Bridge\dgn\29-000.013\170BR_001_BRLO.dgn

EAJ SRW

Docusign Envelope ID: FB1E3A66-732D-8692-81B6-9A9DEF30E401

NOTES

100 SCOPE OF WORK: Work at this site consists of the following:

- Bridge deck overlay
- Remove & reset double box beam rail
- Concrete spall repairs
- Curb overlay
- Penetrating water repellent treatment
- Concrete slope protection repairs

258 REMOVE & REPLACE CONCRETE SLOPE PROTECTION: Remove and replace the concrete slope protection at the east abutment according to Std. Dwg. D-258-1. Remove foam and other repair material previously placed between and beneath the concrete panels. Place and compact ordinary backfill to fill any voids in the subgrade.

602 WATER-WASHING EQUIPMENT: In addition to the water-washing equipment listed in Section 602.02 D., a cold water pressure washer that provides a minimum nozzle pressure of 3,000 psi may be used.

602 PENETRATING WATER REPELLENT TREATMENT: Apply the penetrating water repellent solution to the top of the deck, front face and top of curbs, concrete rails, and rails posts after repairs have been made. Apply penetrating water repellent solution prior to sealing any bridge deck cracks. Do not apply pavement markings or allow traffic on the driving surfaces until the solution has completely penetrated and the entire driving surface is dry.

602 BRIDGE DECK GROOVING: Perform bridge deck grooving in accordance with Section 602.04 D.3. Bridge deck grooving will be paid separately.

624 REMOVE & RESET RETROFIT: Prior to performing repairs to the concrete curb, posts, and rail, remove the existing double box beam retrofit. After the repairs have been completed, reset the double box beam retrofit in accordance with Section 624.

Include all labor, equipment, and materials required to perform the work as specified in the price bid for “Remove & Reset Double Box Beam Retrofit – E-Rail.”

650 OVERLAY CONCRETE: An additional 1/2" depth of overlay concrete was included in the overlay concrete quantities to account for the irregular surface profile from milling and hydrodemolition.

650 CRACK SEALING: After the penetrating water repellent has been applied and is dry, the Engineer will perform a visual inspection of the bridge deck and curb to determine the need for crack sealing. Mark and repair all visible cracks on the top surface measuring 0.012" or greater in width at the widest segment or as directed by the Engineer.

Immediately before applying the sealer, clean the cracks by removing all dust and debris with compressed air. Seal the cracks with a two-part epoxy in accordance with the manufacturer’s recommendations. Chase crack with the sealant application to the limits of the crack, including those portions that are narrower than 0.012" wide. Use Paulco TE-2501 (Viking Paints, Inc.), Dural 50 LM (Euclid Chemical Co.), TK-9000 or TK-2110 (TK Products), or an approved equal epoxy sealer.

Include all material, labor, and equipment required to crack seal the bridge deck and curb in the price bid for “Overlay Concrete.”

930 SPALL REPAIR: The structure has areas of spalling and concrete deterioration as indicated in the table below. See supplemental bid information for photos of concrete spalling. The extents of repairs as shown in the “Spall Repair” table are approximations. The actual limits and number of repair locations are to be determined by the Engineer in the field.

LOCATION	PHOTO	QUANTITY (SF)
Abutment Backwall	#69	8
Posts	#18 to 25	1.5 each

930 CURB OVERLAY: The concrete curb surface is cracked and delaminated. Remove the existing curb concrete as shown. Use a 15-pound maximum size chipping hammer on any unsound concrete.

Provide sharp, neat lines at least 1 inch deep at the edges of the repair areas. Produce these sharp, neat lines by saw cutting or other means approved by the Engineer.

Sand blast clean any rust scale found on the exposed reinforcing steel. Clean the existing concrete surface by light sand blasting or high-pressure water blasting. After the surface has dried and just before the patching material is placed, coat the surface with an epoxy bonding agent.

Replace removed concrete with Class AE-5 Concrete or a two component, polymer-modified, cementitious repair mortar material that is specifically intended for patching concrete and contains a corrosion inhibitor. This patching material may be SikaTop 123 Plus (Sika Corporation), Duraltop Gel (Euclid Chemical Company), MasterEmaco N 400 (BASF Corporation), Duo Patch (SpecChem) or an approved equal repair mortar. Place and cure the material as recommended by the manufacturer.

Include all labor, equipment, and materials needed for the repair as specified in the bid item "Curb Overlay."

REGISTERED PROFESSIONAL ENGINEER
SAMUEL WELCH
PE-10948
DATE 08/04/26
NORTH DAKOTA

Docusign Envelope ID: FB1E3A66-732D-8692-81B6-9A9DEF30E401

23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-BRI-8-029(216)000	170	3

NOTES

930 ROADWAY CANOPY: Construct a canopy above the traveled roadway under the existing structure to protect traffic from falling material. The canopy is an added safeguard and does not relieve the Contractor from any responsibility for the safety of the public.

Submit the canopy details, including materials that will be used, to the Engineer for review at least 14 calendar days prior to installation of the canopy. Provide a canopy under the existing structure with a minimum vertical clearance of 15'-6" above the traveled roadway. Extend the canopy a minimum distance of 5'-0" beyond the outside edge of the bridge deck and a minimum distance of 5'-0" beyond the edge of the driving lanes beneath the structure. Notify the Engineer two calendar days prior to installation of the canopy. The Engineer will update the NDDOT travel map for the reduced vertical clearance with the canopy in place.

The canopy must be in place before conducting work above traffic lanes under the bridge and remain in place until after work is complete. The canopy may be supported from the ground or suspended from the girders. Complete the installation of the canopy in a minimum amount of time and with the least inconvenience to the public. Remove the canopy after all work taking place above traffic lanes is completed.

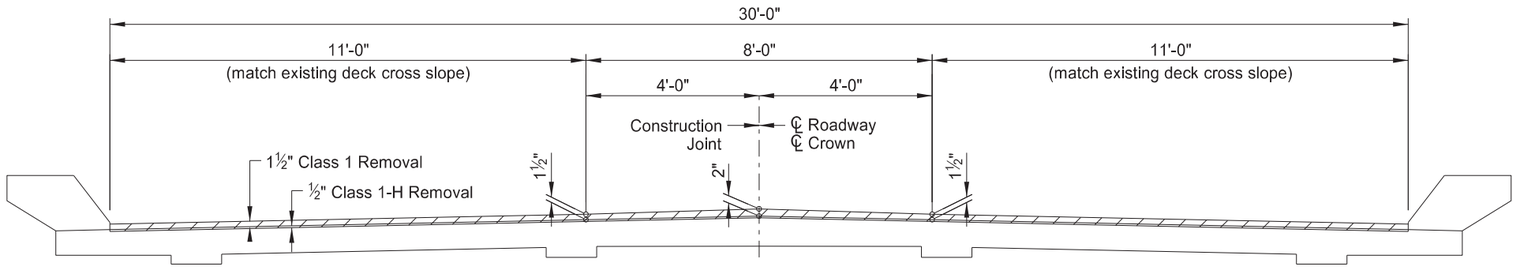
Include all costs for construction, maintenance, and removal of the canopy system in the contract unit price for “Roadway Canopy.”



Docusign Envelope ID: FB1E3A66-732D-8692-81B6-9A9DEF30E401

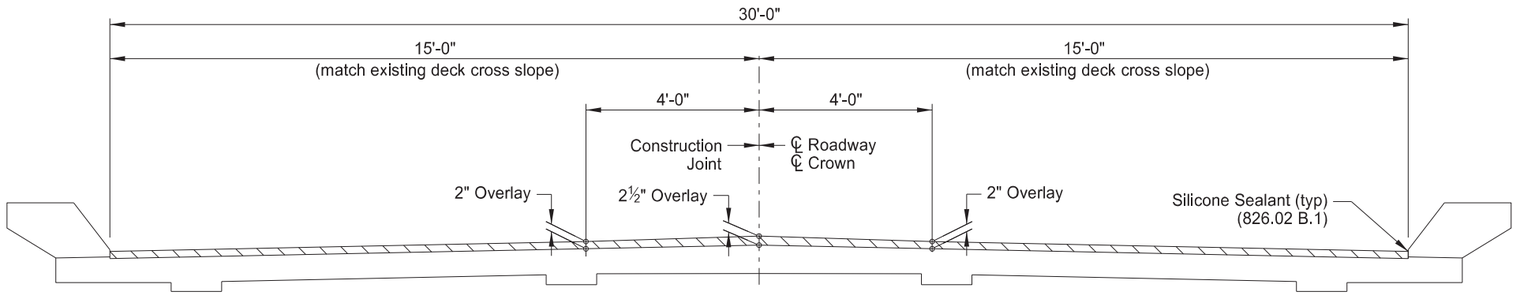
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-BRI-8-029(216)000	170	4



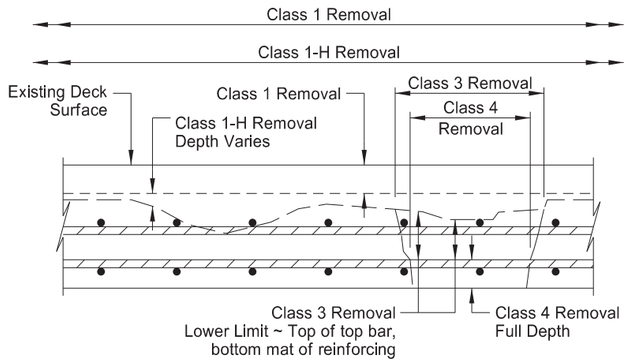
(SHOWING REMOVAL)

TYPICAL DECK SECTION



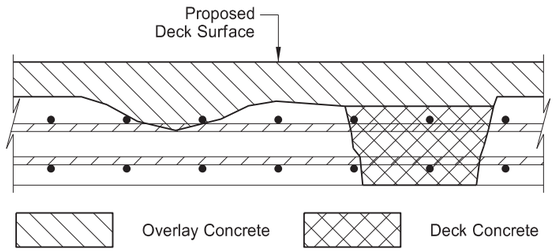
(SHOWING OVERLAY)

TYPICAL DECK SECTION



(SHOWING REMOVALS)

EXISTING BRIDGE DECK SECTION



(SHOWING DECK & OVERLAY CONCRETE)

PROPOSED BRIDGE DECK SECTION

REGISTERED PROFESSIONAL ENGINEER
SAMUEL WELCH
PE-10948
DATE
08/04/26
NORTH DAKOTA

QUANTITIES	
OVERLAY CONCRETE	59 CY
DECK CONCRETE	19 CY
CLASS 1-H REMOVAL	850 SY
CLASS 1 REMOVAL	850 SY
CLASS 3 REMOVAL	85 SY
CLASS 4 REMOVAL	43 SY

I-29/102ND ST SE INTERCHANGE

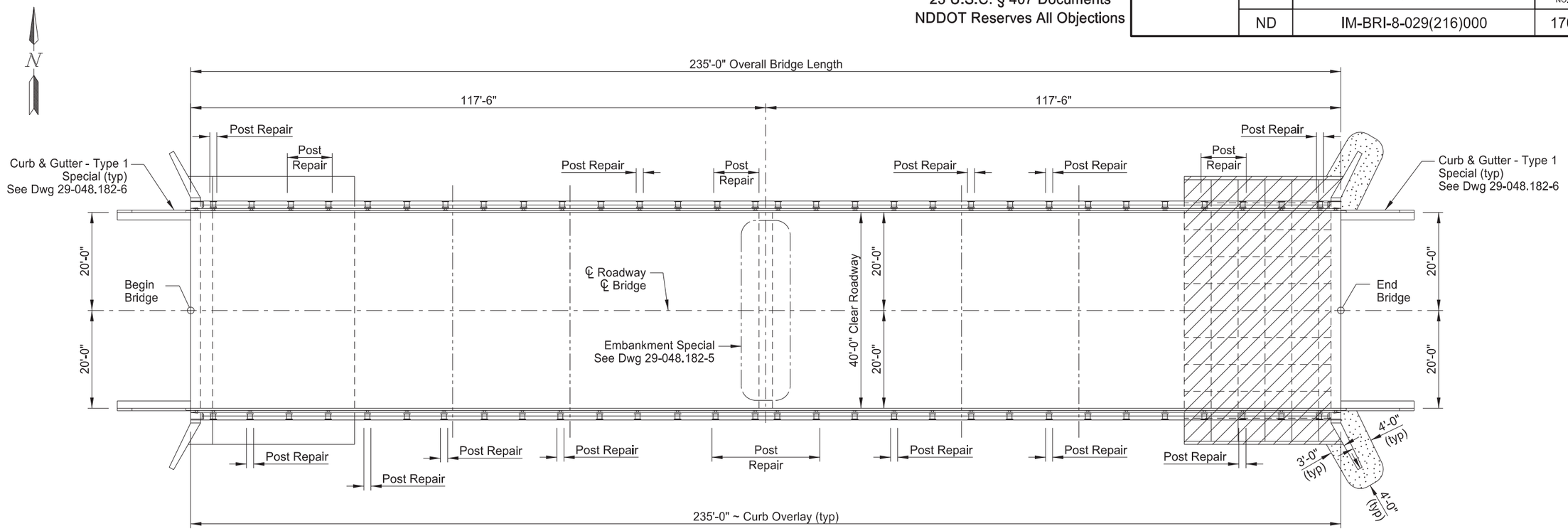
DECK OVERLAY DETAILS

DRAWING NO.	29-000.013-4

Docusign Envelope ID: FB1E3A66-732D-8692-81B6-9A9DEF30E401

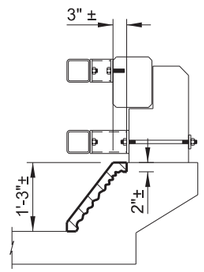
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-BRI-8-029(216)000	170	5



PLAN

The hatched area indicates embankment special and TRM. Actual limits to by determined by the Engineer.

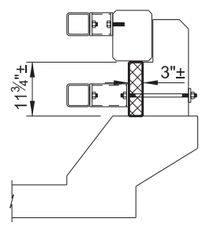


CURB OVERLAY

The hatched area indicates existing slope protection concrete to be removed and replaced.

The hatched area indicates curb overlay.

The hatched area indicates spall repair area.



(PAID FOR AS SPALL REPAIR)
POST REPAIR

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
203	0195	EMBANKMENT SPECIAL	L SUM	1
255	0201	TRM TYPE I	SY	115
258	0200	REMOVE & REPLACE CONCRETE SLOPE PROTECTION	SY	225
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	1,416
602	1300	BRIDGE DECK GROOVING	SF	9,400
624	3012	REMOVE & RESET DBL BOX BEAM RETROFIT - E-RAIL	LF	470
650	0704	OVERLAY CONCRETE	CY	73
650	0707	DECK CONCRETE	CY	60
650	0710	CLASS 1-H REMOVAL	SY	1,044
650	0720	CLASS 1 REMOVAL	SY	1,044
650	0723	CLASS 3 REMOVAL	SY	209
650	0724	CLASS 4 REMOVAL	SY	104
748	0141	CURB & GUTTER-TYPE 1 SPECIAL	LF	60
930	7012	ROADWAY CANOPY	L SUM	0.5
930	9612	SPALL REPAIR	SF	33
930	9690	CURB OVERLAY	LF	470

REGISTERED PROFESSIONAL ENGINEER
SAMUEL WELCH
PE-10948
DATE 08/04/26
NORTH DAKOTA

SPECIAL PROVISIONS	
SP 465(25)	HYDRODEMOLITION AND OVERLAY
SP 464(25)	CONCRETE SPALL REPAIR

STANDARD DRAWINGS

D-258-1, D-748-1, D-764-22

I-29/KINDRED INTERCHANGE

BRIDGE LAYOUT

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

Jason Thorenson
08/04/26

DRAWING NO. 29-048.182-1

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23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-BRI-8-029(216)000	170	6

NOTES

100 SCOPE OF WORK: Work at this site consists of the following:

- Bridge deck overlay
- Remove & reset double box beam rail
- Concrete spall repairs
- Curb overlay
- Penetrating water repellent treatment
- Concrete slope protection repairs
- Install curb at bridge ends
- Erosion repairs

203 EMBANKMENT SPECIAL: Furnish, place, and compact earthen embankment to restore areas of erosion and settlement around the bridge pier and east wing walls. Remove the bituminous and other repair materials previously placed to fill the erosion voids wrapping around the wing walls. Place and compact borrow in layers not to exceed 6 inches. Compact the borrow in place with jumping jack or plate compactor. Shape embankment to allow for topsoil to be placed as per Section 203.04.D.3. It is anticipated that this work will require approximately 30 CY of embankment and topsoil at the pier and approximately 10 CY of embankment and topsoil around the east wing walls. Include all labor, equipment, and material to complete this work in the bid item “Embankment Special.”

255 TRM TYPE 1: After placing imported topsoil at the pier and east wing walls, seed the topsoil with Class II seed mixture meeting Section 251.03 D. Prior to seeding, loosen the soil by means of a hand rake or drag. Place seed by broadcasting the area at a rate of 0.06 pounds per SY. After seeding, rake the area loosely to cover the seed. Install TRM Type 1 over the repaired embankment. The extents shown in the plans are approximations, the actual extents will be determined by the Engineer in the field. Include all labor, equipment, and material to seed and install the TRM in the bid item “TRM TYPE 1.”

258 REMOVE & REPLACE CONCRETE SLOPE PROTECTION: Remove and replace the concrete slope protection at the east abutment according to Std. Dwg. D-258-1. Remove foam and other repair material previously placed between and beneath the concrete panels. Place and compact ordinary backfill to fill any voids in the subgrade.

602 WATER-WASHING EQUIPMENT: In addition to the water-washing equipment listed in Section 602.02 D., a cold water pressure washer that provides a minimum nozzle pressure of 3,000 psi may be used.

602 PENETRATING WATER REPELLENT TREATMENT: Apply the penetrating water repellent solution to the top of the deck, front face and top of curbs, concrete rails, and rails posts after repairs have been made. Apply penetrating water repellent solution prior to sealing any bridge deck cracks. Do not apply pavement markings or allow traffic on the driving surfaces until the solution has completely penetrated and the entire driving surface is dry.

602 BRIDGE DECK GROOVING: Perform bridge deck grooving in accordance with Section 602.04 D.3. Bridge deck grooving will be paid separately.

624 REMOVE & RESET RETROFIT: Prior to performing repairs to the concrete curb, posts, and rail, remove the existing double box beam retrofit. After the repairs have been completed, reset the double box beam retrofit in accordance with Section 624.

Include all labor, equipment, and materials required to perform the work as specified in the price bid for “Remove & Reset Double Box Beam Retrofit – E-Rail.”

650 OVERLAY CONCRETE: An additional 1/2" depth of overlay concrete was included in the overlay concrete quantities to account for the irregular surface profile from milling and hydrodemolition.

650 CRACK SEALING: After the penetrating water repellent has been applied and is dry, the Engineer will perform a visual inspection of the bridge deck and curb to determine the need for crack sealing. Mark and repair all visible cracks on the top surface measuring 0.012" or greater in width at the widest segment or as directed by the Engineer.

Immediately before applying the sealer, clean the cracks by removing all dust and debris with compressed air. Seal the cracks with a two-part epoxy in accordance with the manufacturer’s recommendations. Chase crack with the sealant application to the limits of the crack, including those portions that are narrower than 0.012" wide. Use Paulco TE-2501 (Viking Paints, Inc.), Dural 50 LM (Euclid Chemical Co.), TK-9000 or TK-2110 (TK Products), or an approved equal epoxy sealer.

Include all material, labor, and equipment required to crack seal the bridge deck and curb in the price bid for “Overlay Concrete.”

748 CURB & GUTTER – TYPE 1 SPECIAL: Construct curb & gutter within the existing HMA pavement as shown in the plans to direct runoff away from the bridge ends. Remove the existing HMA and base to a depth of 12” to allow for construction of the new curb and gutter.

Place and compact foundation fill to the bottom limits of the curb and gutter. After constructing the new curb and gutter, place and compact commercial grade HMA to patch the roadway surfacing and provide a smooth transition to the new curb and gutter.

Include all costs for curb installation as specified, including HMA and base removals, and foundation fill in the unit price bid for “Curb & Gutter – Type 1 Special.” Payment for the commercial grade HMA used for patching will be made separately.



Docusign Envelope ID: FB1E3A66-732D-8692-81B6-9A9DEF30E401

23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-BRI-8-029(216)000	170	7

NOTES

930 SPALL REPAIR: The structure has areas of spalling and concrete deterioration as indicated in the table below. See supplemental bid information for photos of concrete spalling. The extents of repairs as shown in the “Spall Repair” table are approximations. The actual limits and number of repair locations are to be determined by the Engineer in the field.

LOCATION	PHOTO	QUANTITY (SF)
Posts	#14, 16, & 68 to 73	1.5 each
Rail	#118	1.5 each

930 CURB OVERLAY: The concrete curb surface is cracked and delaminated. Remove the existing curb concrete as shown. Use a 15-pound maximum size chipping hammer on any unsound concrete.

Provide sharp, neat lines at least 1 inch deep at the edges of the repair areas. Produce these sharp, neat lines by saw cutting or other means approved by the Engineer.

Sand blast clean any rust scale found on the exposed reinforcing steel. Clean the existing concrete surface by light sand blasting or high-pressure water blasting. After the surface has dried and just before the patching material is placed, coat the surface with an epoxy bonding agent.

Replace removed concrete with Class AE-5 Concrete or a two component, polymer-modified, cementitious repair mortar material that is specifically intended for patching concrete and contains a corrosion inhibitor. This patching material may be SikaTop 123 Plus (Sika Corporation), Duraltop Gel (Euclid Chemical Company), MasterEmaco N 400 (BASF Corporation), Duo Patch (SpecChem) or an approved equal repair mortar. Place and cure the material as recommended by the manufacturer.

Include all labor, equipment, and materials needed for the repair as specified in the bid item "Curb Overlay."

930 ROADWAY CANOPY: Construct a canopy above the traveled roadway under the existing structure to protect traffic from falling material. The canopy is an added safeguard and does not relieve the Contractor from any responsibility for the safety of the public.

Submit the canopy details, including materials that will be used, to the Engineer for review at least 14 calendar days prior to installation of the canopy. Provide a canopy under the existing structure with a minimum vertical clearance of 15'-6" above the traveled roadway. Extend the canopy a minimum distance of 5'-0" beyond the outside edge of the bridge deck and a minimum distance of 5'-0" beyond the edge of the driving lanes beneath the structure. Notify the Engineer two calendar days prior to installation of the canopy. The Engineer will update the NDDOT travel map for the reduced vertical clearance with the canopy in place.

The canopy must be in place before conducting work above traffic lanes under the bridge and remain in place until after work is complete. The canopy may be supported from the ground or suspended from the girders. Complete the installation of the canopy in a minimum amount of time and with the least inconvenience to the public. Remove the canopy after all work taking place above traffic lanes is completed.

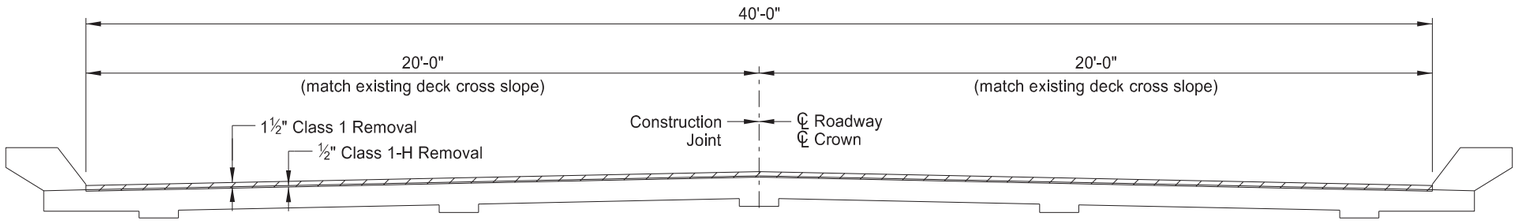
Include all costs for construction, maintenance, and removal of the canopy system in the contract unit price for “Roadway Canopy.”



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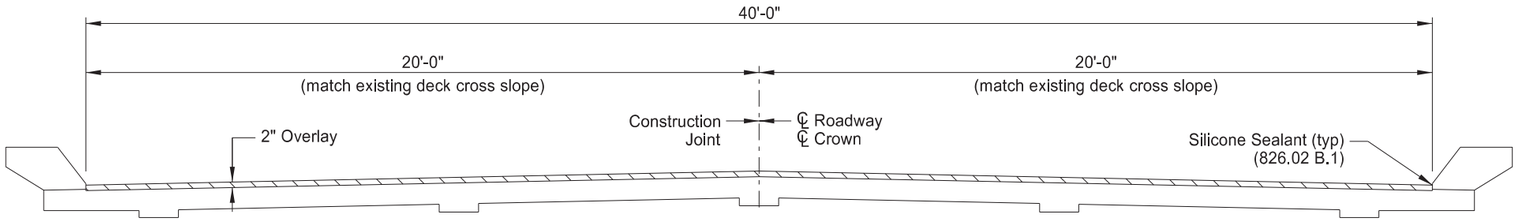
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-BRI-8-029(216)000	170	8



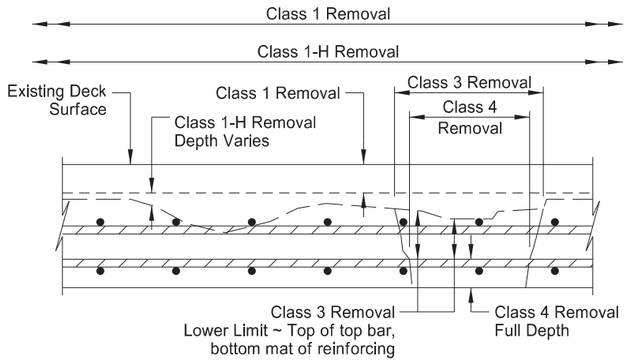
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TYPICAL DECK SECTION



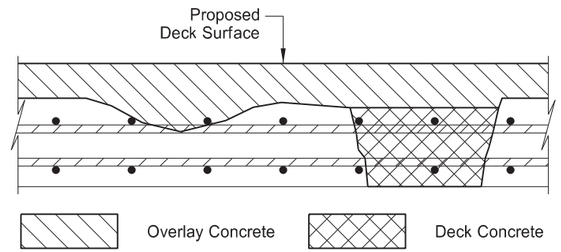
(SHOWING OVERLAY)

TYPICAL DECK SECTION



(SHOWING REMOVALS)

EXISTING BRIDGE DECK SECTION



(SHOWING DECK & OVERLAY CONCRETE)

PROPOSED BRIDGE DECK SECTION

REGISTERED PROFESSIONAL ENGINEER
SAMUEL WELCH
PE-10948
DATE
08/04/26
NORTH DAKOTA

QUANTITIES	
OVERLAY CONCRETE	73 CY
DECK CONCRETE	60 CY
CLASS 1-H REMOVAL	1,044 SY
CLASS 1 REMOVAL	1,044 SY
CLASS 3 REMOVAL	209 SY
CLASS 4 REMOVAL	104 SY

I-29/KINDRED INTERCHANGE

DECK OVERLAY DETAILS

DRAWING NO.	29-048.182-4

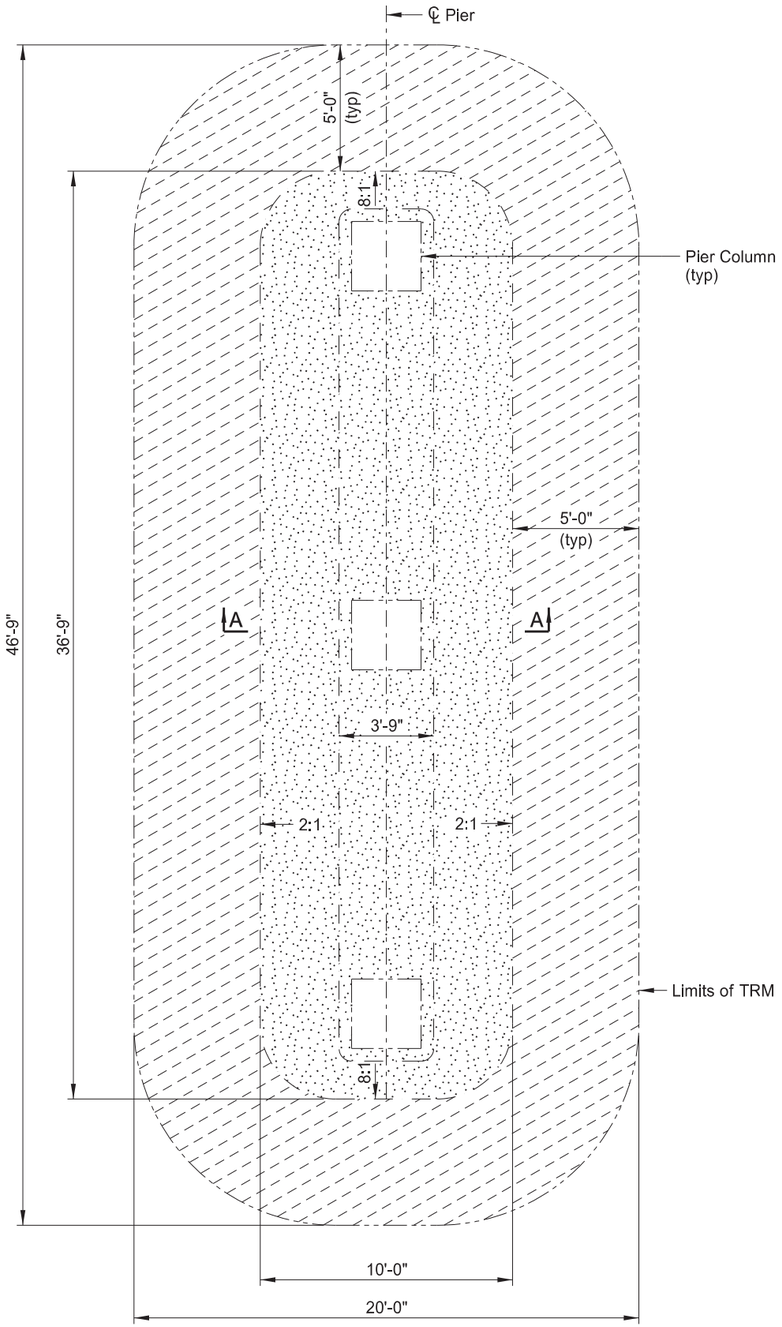
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EAJ SRW

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23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

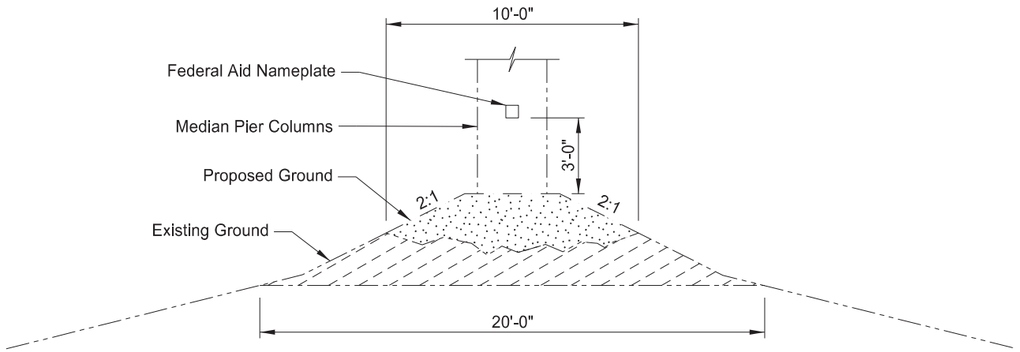
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	IM-BRI-8-029(216)000	170	9



PLAN

The hatched area indicates TRM limits.

The hatched area indicates embankment special and TRM.



A-A

REGISTERED PROFESSIONAL ENGINEER
SAMUEL WEICH
PE-10948
DATE 08/04/26
NORTH DAKOTA

QUANTITIES	
EMBANKMENT SPECIAL	1 L SUM
TRM TYPE 1	95 SY

I-29/KINDRED INTERCHANGE

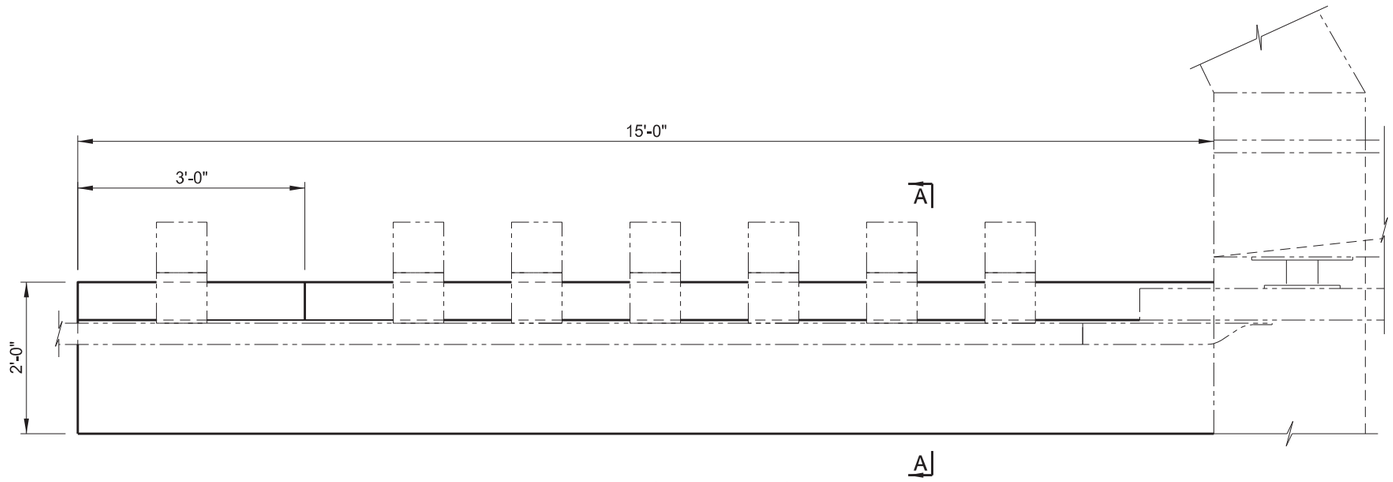
EMBANKMENT SPECIAL DETAIL

DRAWING NO.	29-048.182-5

Docusign Envelope ID: FB1E3A66-732D-8692-81B6-9A9DEF30E401

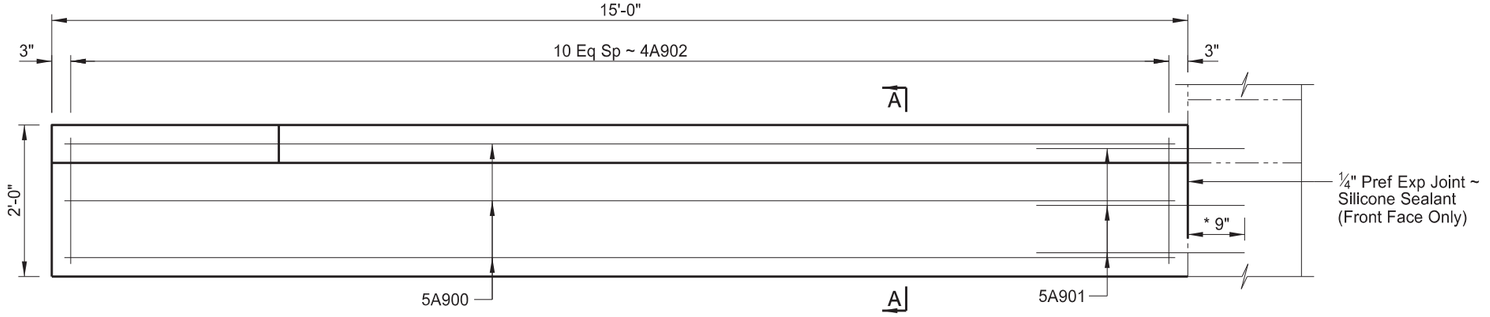
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	IM-BRI-8-029(216)000	170	10



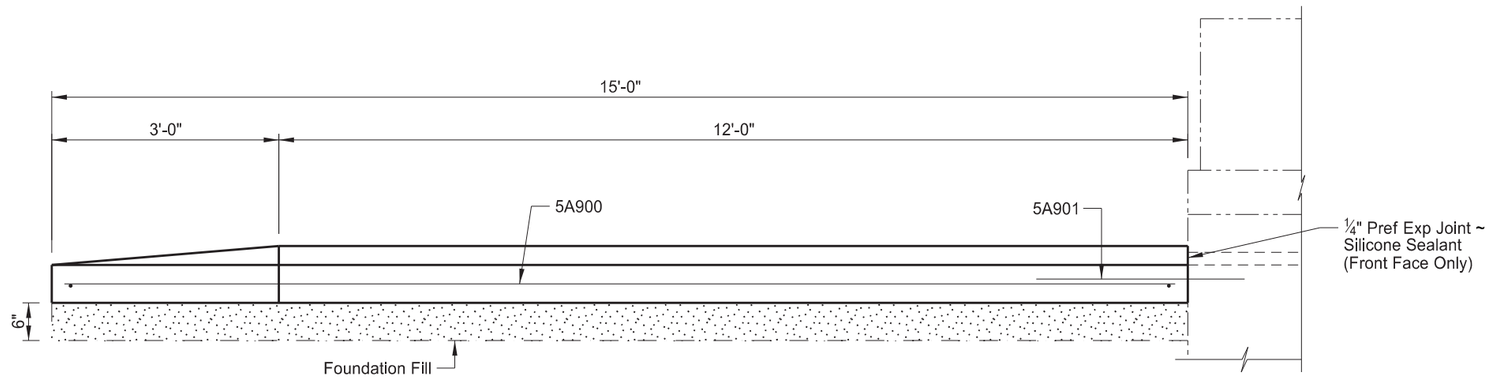
(SHOWING DIMENSIONS)

PLAN



(SHOWING REINFORCING)

PLAN



ELEVATION

NOTES

The estimated material quantities shown are for information purposes only. Include the concrete, reinforcing bars, silicone sealant, and labor required to build the curbs in the pay item "Curb & Gutter - Type 1 Special." Use Class AE concrete and Grade 60 reinforcing steel. Provide reinforcing steel that meets the requirements of Section 612.

Install 5A901 bars according to manufacturer's recommendations, with a high strength adhesive specifically intended for concrete anchorage (16k min. ultimate pullout) and that meets the requirements of Section 806.02. Provide a minimum anchorage length of 9 inches.

* Length may vary depending on manufacturer's recommendations for anchorage. Length based on 9 inches minimum anchorage length.

** Shape to the grading requirements of standard drawing D-764-22.

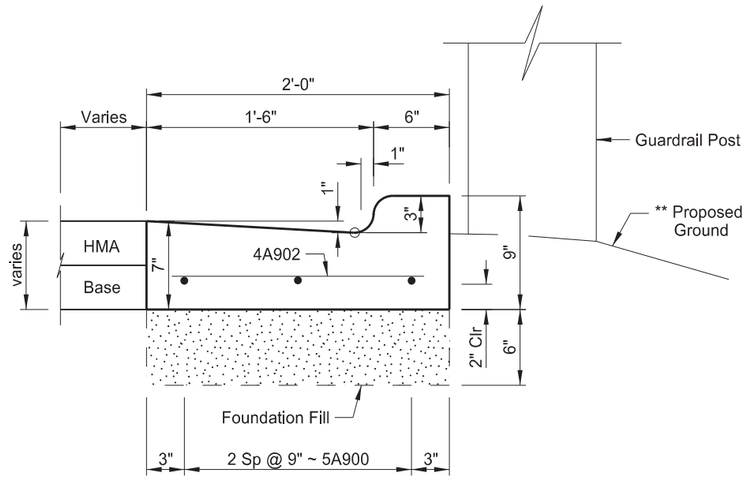
SKEW ANGLE = 0°

BAR LIST - ONE CURB

SIZE	MARK	NO.	LENGTH
5	A900	3	14'-8"
5	A901	3	* 2'-9"
4	A902	11	1'-8"

ESTIMATED MATERIAL QUANTITIES

REINFORCING STEEL (LBS)	CONCRETE (CY)
60	.5



(NEW CONCRETE CURB)

A-A

REGISTERED PROFESSIONAL ENGINEER
SAMUEL WEICH
PE-10948
DATE 08/04/26
NORTH DAKOTA

QUANTITIES (ONE CURB)

CURB & GUTTER - TYPE 1 SPECIAL 15 LF

I-29/KINDRED INTERCHANGE

NEW CONCRETE CURB & GUTTER

DRAWING NO. 29-048.182-6

Docusign Envelope ID: 60E6D5C0-46BC-49CB-8E0F-CBA6AC9DB3C4

NDDOT ABBREVIATIONS

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

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KIRK J. HOFFA
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NDDOT ABBREVIATIONS

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
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	Northeast
NW	Northwest
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
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

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NDDOT ABBREVIATIONS

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	Southeast
SW	Southwest
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

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

SOIL TYPES

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

702COM	702 Communications
ACCENT	Accent Communications
AGASSIZ WU	Agassiz Water Users District
AGC	Associated General Contractors of America
ALL PL	Alliance Pipeline
ALL SEAS WU	All Seasons Water Users District
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 WRD	Burleigh County Water Resource District
CABLE ONE	Cable One
CABLE SERV	Cable Services
CAP ELEC	Capital Electric Cooperative Incorporated
CASS CO ELEC	Cass County Electric Cooperative
CASS RWU	Cass Rural Water Users District
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 COMM	Consolidated Communications
CONS TELCOM	Consolidated Telcom
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 WRD	Dickey County Water Resource District
DICKEY TEL	Dickey Telephone
DNRR	Dakota Northern Railroad
DOME PL	Dome Pipeline Company
DVELEC	Dakota Valley Electric Cooperative
DVMW	Dakota, Missouri Valley & Western
E CENT REG WD	East Central Water District
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
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
LWR YELL R ELEC	Lower Yellowstone Rural Electric
LUMEN	Lumen Technologies Incorporated
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 District
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 Incorporated
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
MLGC	Moore & Liberty - Griggs County
MUNICIPAL	City Water And Sewer
MUNICIPAL	City Of '.....'
N CENT ELEC	North Central Electric Cooperative
N PRAIR REG WD	North Prairie Regional Water District
ND PKS & REC	North Dakota Parks And Recreation
ND TEL	North Dakota Telephone Company
NDDOT	North Dakota Department of Transportation
NE REG WD	Northeast Regional Water District
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
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 REG WD	R & T Water District
RED RIV COMM	Red River 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
SE W U	Southeast 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 RWD	Stutsman Rural Water District
SW PL PRJ	Southwest Pipeline Project
SWWA	Southwest Water Authority
SUNOCO	Sunoco LP
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 WRD	Traill County Water Resource District
UNTD TEL	United Telephone
UPPR SOUR WD	Upper Souris Water District
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 WRD	Williams County Water Resource District
WILSTN BAS PL	Williston Basin Interstate Pipeline Company
WLSH RWD	Walsh Water Rural Water District
WOLVRTN TEL	Wolverton Telephone
XLENER	Xcel Energy
YSVR	Yellowstone Valley Railroad

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LINE STYLES

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 (REMOVE — REMOVE)
- Wall
- Retaining Wall (Plan View)
- W-Beam w Posts
- High Tension Cable Guardrail with Posts

Existing Utilities

- Existing Electrical (E)
- Existing Fiber Optic Line (FO)
- Existing TV Fiber Optic (FO)
- Existing Gas Pipe (G)
- Existing Overhead Utility Line (OH)
- Existing Power (P)
- Existing Fuel Pipeline (PL)
- Existing Undefined Above Ground Pipe Line (PL)
- Existing Sanitary Sewer (SAN)
- Existing Sanitary Force Main (SAN FM)
- Existing Storm Drain (SD)
- Existing Storm Drain Force Main (SD FM)
- Existing Culvert
- Existing Telephone Line (T)
- Existing TV Line (TV)
- Existing Water or Steam Line (W)
- 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

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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

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

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12 18 2020

SYMBOLS

D-101-30

North Arrow (Half Scale)

Alignment Data Point

Alignment Monument

Spot Elevation

Existing Miscellaneous Spot

Existing Access Control Arrow

Existing Benchmark

Reset USGS Marker

Iron Monument Found

Iron Pin R/W Monument

Property Corner

Iron Pin Reference Monument

Right of Way Marker (Exst, Ppsd, Reset)

Existing Federal Reference Corner

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

Existing Witness Corner

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

Existing Traverse PI Aerial Panel

Existing Reference Marker Point NGS

Existing EFB Misc

Existing Bush or Shrub

Existing Large Evergreen Tree

Existing Small Evergreen Tree

Existing Large Tree

Existing Small Tree

Existing Tree Trunk

Cairn or Stone Circle

Existing Artifact

Existing Satellite Dish

Existing Weather Station

Existing Windmill or Tower

Reinforced Pavement

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

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

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12 18 2020

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)

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

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12 18 2020

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)

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

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12 18 2020

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
07-01-14

REVISIONS

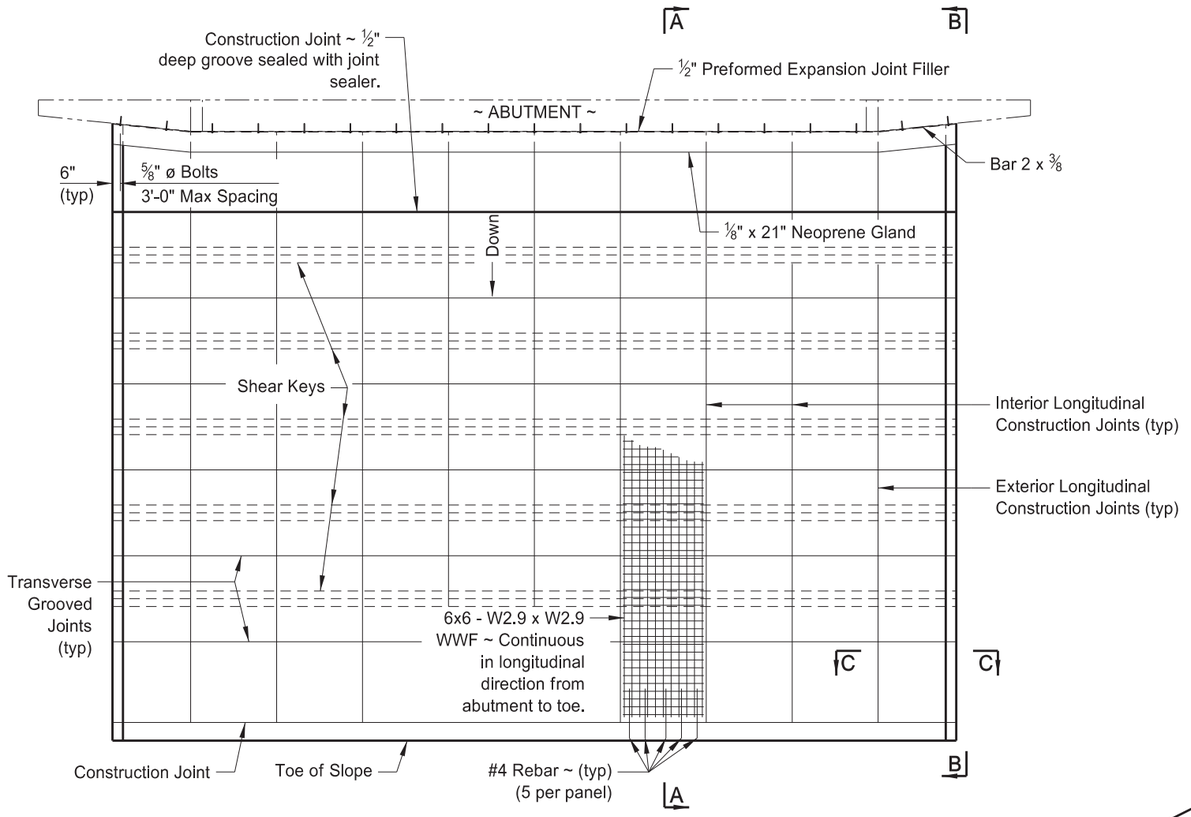
DATE	CHANGE
12-18-20	General Revisions Sheet added - Continued from D-101-32

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NORTH DAKOTA
12 18 2020

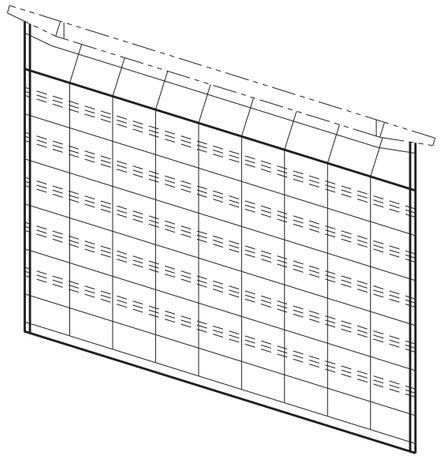
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STANDARD SLOPE PROTECTION UNDER BRIDGES

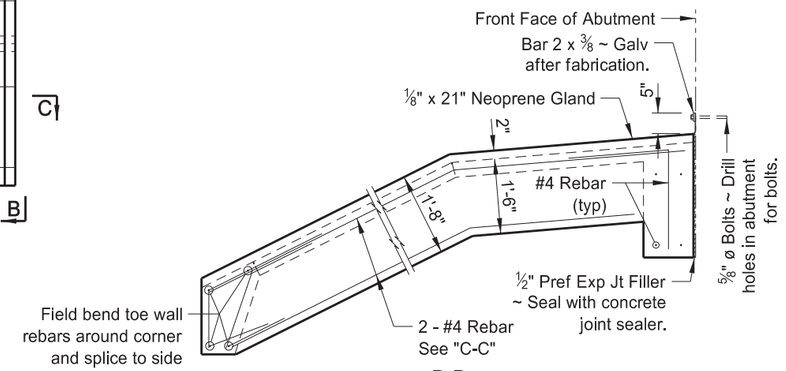
D-258-1



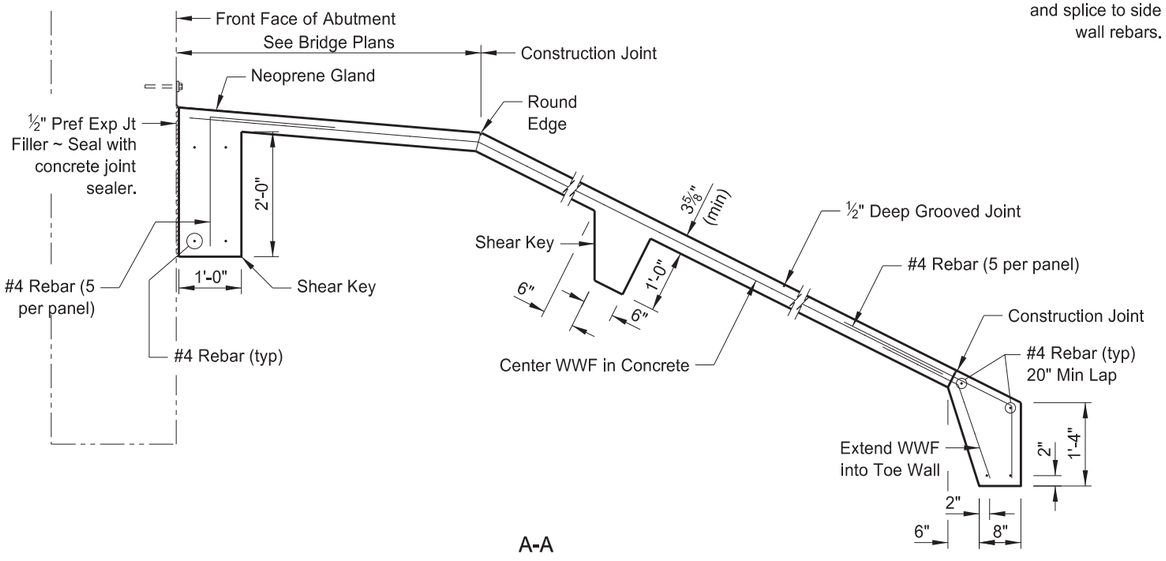
SLOPE PROTECTION LAYOUT



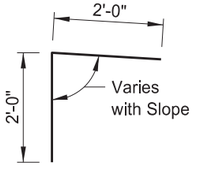
SKEWED SLOPE PROTECTION LAYOUT



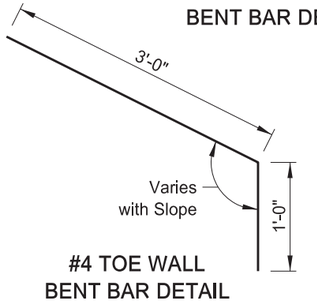
B-B



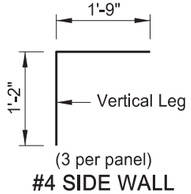
A-A



#4 SHEAR KEY BENT BAR DETAIL

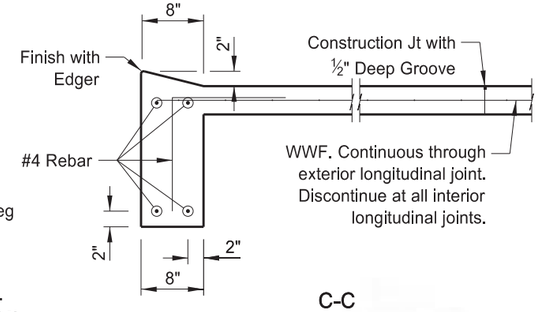


#4 TOE WALL BENT BAR DETAIL



(3 per panel)

#4 SIDE WALL BENT BAR DETAIL



C-C

NOTES:

Construct the toe wall before concrete is placed on the slope.

Construct 5'-6" square interior panels. Vary the width of the outside panels from 5'-0" min to 8"-0" max to achieve the width shown in the plans. Vary the length of the bottom panel from 3'-0" min to 8'-0" max to achieve the length shown in the plans.

Construct ½" deep grooves in transverse and longitudinal joints. Seal the joints with a concrete joint sealant meeting 826.02 or ASTM C-920, Class 25.

Install ½" thick preformed expansion joint filler around pier columns or other obstructions projecting through the concrete slope protection.

Place shear keys in every panel on the slope, as shown.

Supply the welded wire fabric (WWF) in sheets. Use a lap splice at least 8" long when it is necessary to make the WWF continuous.

Fasten the neoprene gland to the front face of abutment using ⅝" diameter bolts passing through a 2" wide x ⅜" thick steel bar. Provide a continuous steel bar, or a series of shorter bars, each with a length sufficient to hold a minimum of 3 bolts and extend a minimum distance of 6" past the centerline of outer bolts. Install the bolts into the front face of abutment using chemical or mechanical anchors. Galvanize the bolts and steel bars per Section 854.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

07/10/14

REVISIONS

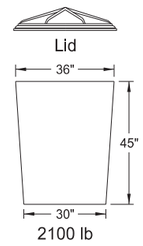
DATE	CHANGE
07/10/14	CHANGED FROM D-708-1
09/03/19	UPDATED SIGNATURE
02/23/24	Updated Signature Revised notes & updated to active voice

REGISTERED PROFESSIONAL ENGINEER
JASON R. THORENSON
PE - 5048
DATE
02/23/24
NORTH DAKOTA

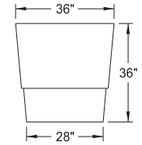
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ATTENUATION DEVICE

D-704-1



2100 lb

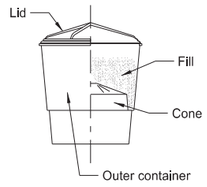


200, 400, 700 and 1400 lb

Outer Containers

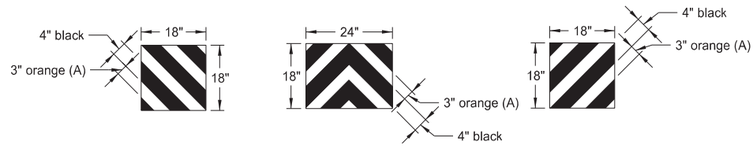


Cones



Typical Assembly

Typical Module Construction Detail

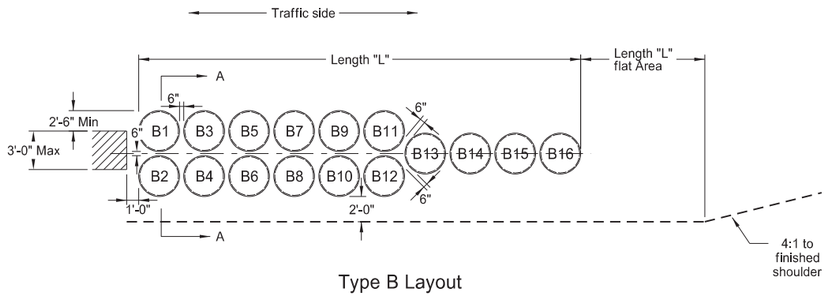


Left Side Traffic | Both Sides Traffic | Right Side Traffic

Reflective Sheet Detail

Note:
Apply Type IV reflective sheeting (as specified in the NDDOT Standard Specifications) directly to the outer container of the last attenuation device facing traffic, following the details above. Or apply the sheet to a metallic sheet and attach it to the container with approved fasteners.

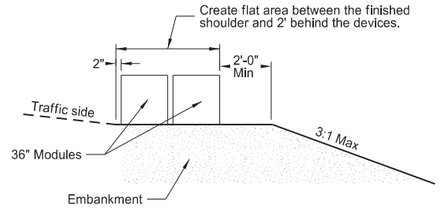
(A) Use 3" orange sheeting for temporary installations, and 3" yellow sheeting for permanent installations.



Type B Layout

Note:
Angle attenuation devices 10 degrees towards traffic when placed at piers offset from roadway.

Fill Chart					
	Module Weights (LBS)				
	200	400	700	1400	2100
Distance from top edge	8½"	5"	4"	3"	0"



Section A-A
(Type B Layout)

Type B Attenuation Device												
Module Number	Dash Number											
	80	75	70	65	60	55	50	45	40	35	30	25
	Module Weights (LBS)											
B1	2100	2100										
B2	2100	2100										
B3	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100		
B4	2100	2100	2100	2100	2100	2100	2100	2100	2100	2100		
B5	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B6	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B7	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B8	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400	1400
B9	700	700	700	700	700	700	700	700	700	700	700	700
B10	700	700	700	700	700	700	700	700	700	700	700	700
B11	700	700	700	700	700	700	700	700	700	700	700	700
B12	700	700	700	700	700	700	700	700	700	700	700	700
B13	700	700	700	700	700	700	700	700	700	700	700	700
B14	400	400	400	400	400	400	400	400	400	400	400	400
B15	400	400	400	400	400	400	400	400	400	400	400	400
B16	200	200	200	200	200	200	200	200	200	200	200	200
Length (L)	34.2'	34.2'	30.7'	30.7'	30.7'	30.7'	30.7'	30.7'	30.7'	30.7'	27.2'	27.2'
Module Weights (LBS)	Replacement Module											
2100	1	1	1	1	1	1	1	1	1	1		
1400	1	1	1	1	1	1	1	1	1	1	1	1
700	2	2	2	2	2	2	2	2	2	2	2	2
400	1	1	1	1	1	1	1	1	1	1	1	1
200	2	2	2	2	1	1	1	1	1	1	1	1

Notes:

1. Materials
   A) Use modules manufactured from frangible polyethylene material which shatters upon impact.
   B) Fill modules with class 43 aggregate meeting NDDOT Standard Specifications aggregate requirements. Use fill with a unit weight of at least 100 pounds per cubic foot. Use fill with a moisture content of 2% or less when left over winter.

2. Modules
   Provide modules in two sizes containing volumes of either 2, 4, 7, 14, or 21 cubic feet minimum.
   A) Provide three components for 2, 4, or 7 cubic foot module containers:
      1) A 14 C.F., yellow outer container.
      2) A black lid securely locking over the top lip of the container.
      3) A variable cone-shaped supporting insert capable of supporting 200, 400, or 700 pounds of sand mass to allow for three sizes of modules. Place cone inserts inside the 14 cubic foot container.
   B) Provide two components for the 14 cubic foot module container:
      1) A 14 C.F., yellow outer container.
      2) A black lid securely locking over the top lip of the container.
   C) Provide two components for the 21 cubic foot module container:
      1) A 36" height X 36" width yellow outer container.
      2) A black lid which locks securely over the top of the container.

3. For temporary installations use Energite or Fitch attenuation barrels manufactured by Energy Absorption Systems of Chicago, IL, TrafFix barrels manufactured by TrafFix Devices, Inc. of San Clemente, CA, or approved equal modules. As an option, place attenuation devices on 3½" maximum thickness pallets to facilitate maintenance.

4. For permanent installations use Barrel Attenuation Device consisting of one-piece outer sand container modules with separate detachable lid. Energite attenuation barrels manufactured by Energy Absorption Systems of Chicago, IL, TrafFix barrels manufactured by TrafFix Devices, Inc. of San Clemente, CA, or approved equal meet these requirements.

5. The Typical Module Construction Detail and Type B Layout are based on the Energite Crash Cushion manufactured by Energy Absorption. Provide any required layouts and details from other sand filled attenuation module manufacturers which differ from those shown here.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-25-12

REVISIONS

DATE	CHANGE
07-18-14	Revised sheeting in reflective sheet detail
09-27-17	Update to active voice
10-03-19	New Design Engr PE Stamp
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes

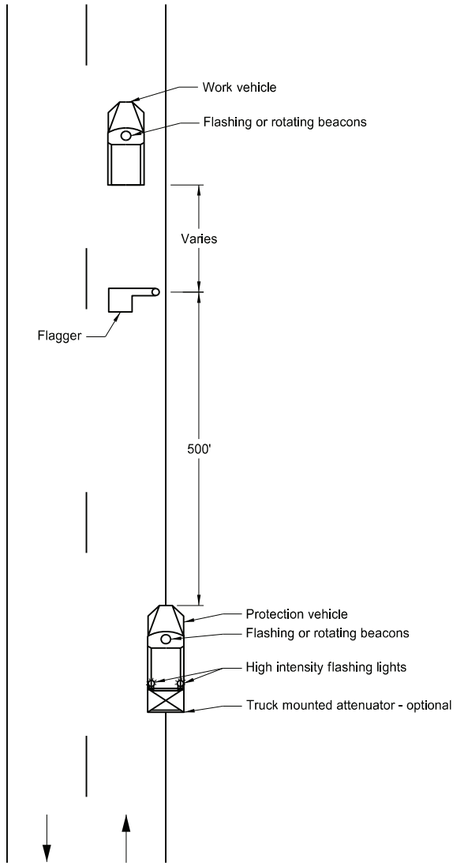
KIRK J. HOFF
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PROFESSIONAL
PE-4683
06/30/25
ENGINEER
NORTH DAKOTA

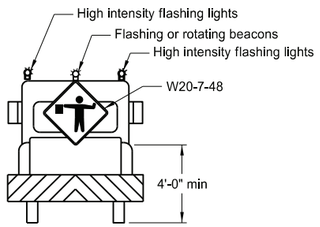
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TRAFFIC CONTROL FOR CORING OF HOT BITUMINOUS PAVEMENT

D-704-2

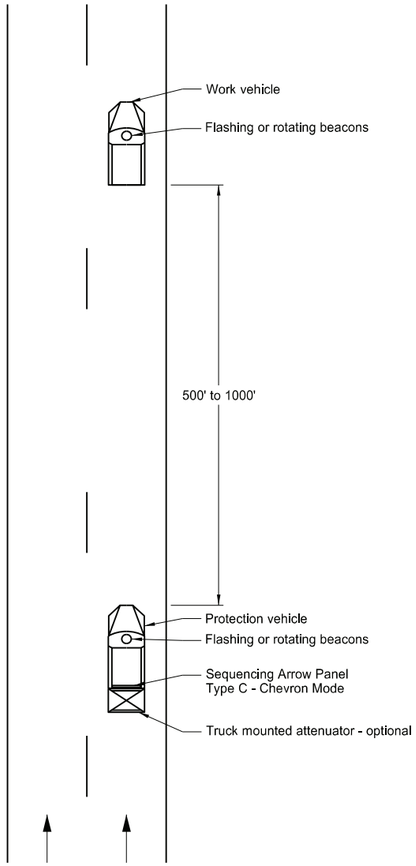
Two Lane, Two Way Roadways

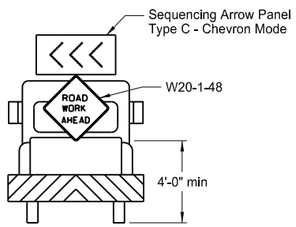




Typical Protection Vehicle

Multilane Roadways





Typical Protection Vehicle

Notes:

1. Display a 360 degree rotating, flashing, oscillating or strobe light on the working vehicle.

2. Display a 360 degree rotating, flashing, oscillating or strobe light on the shadow vehicle. Operate a sequencing arrow panel Type C in chevron mode on the shadow vehicle for Multilane Roadway.

3. Use these layouts during daylight hours and in areas of good visibility only.

4. Use flagger to protect the work area and warn oncoming traffic for two lane, two way roadway.

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

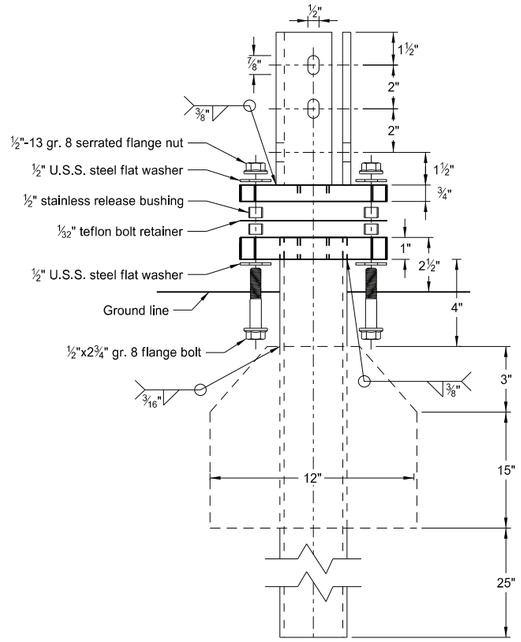
KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 ENGINEER NORTH DAKOTA

08/01/24

DocuSign Envelope ID: B6D1C72A-6E5E-4E5C-A02F-4D3D1C582775

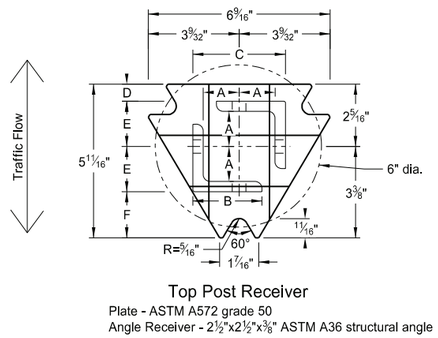
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

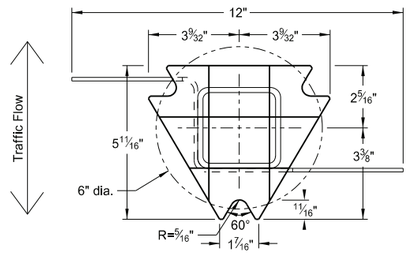


Multi-Directional
Slip Base Assembly

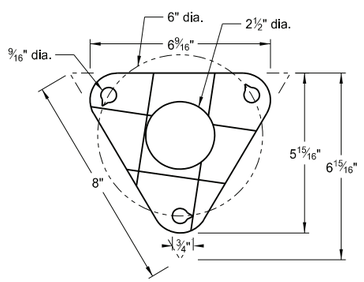
Perforated Tube



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



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.

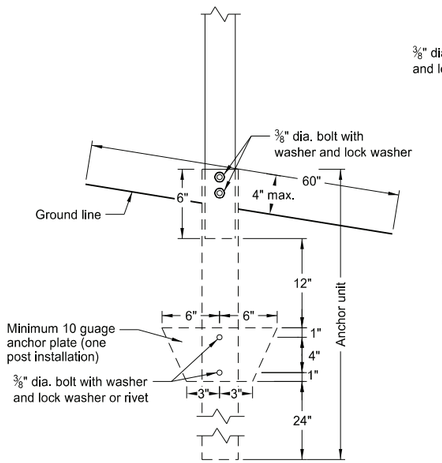
Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thick-ness Gauge	Sleeve Size in.	Wall Thick-ness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2¼
1	2¼	12			No	2½
1	2½	12			(A)	3
1	2½	10			Yes	
1	2¼	12	2	12	Yes	
1	2½	12	2¼	12	Yes	
2	2	12			No	2¼
2	2¼	12			No	2½
2	2½	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	2 3/16	10	Yes	

Properties of Telescoping Perforated Tube						
Tube Size in.	Wall Thickness in.	U.S. Standard Gauge	Weight per Foot lbs.	Moment of Inertia in.⁴	Cross Sec. Area in.²	Section Modulus in.³
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	0.785

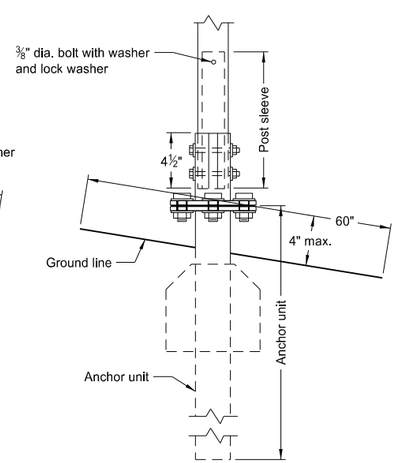
Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2 3/16"x10 ga.	1 9/64"	2½"	3 1/32"	25/32"	1 33/64"	1 7/8"
2½"x10 ga.	1 9/32"	2½"	3 5/16"	⅝"	1 21/32"	1¾"

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

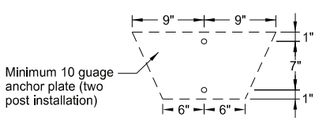
(B) For additional wind load, insert the 2 3/16"x10 ga. into 2½"x10 ga.



Anchor Unit and Post Assembly



Multi-Directional
Slip Base Anchor Unit
and Post Sleeve Assembly



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

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

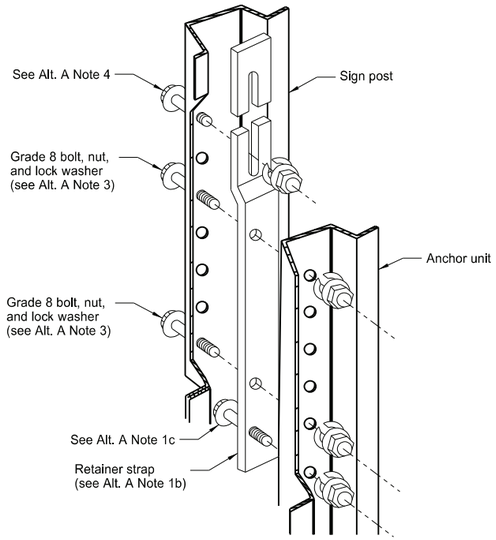
08/01/24

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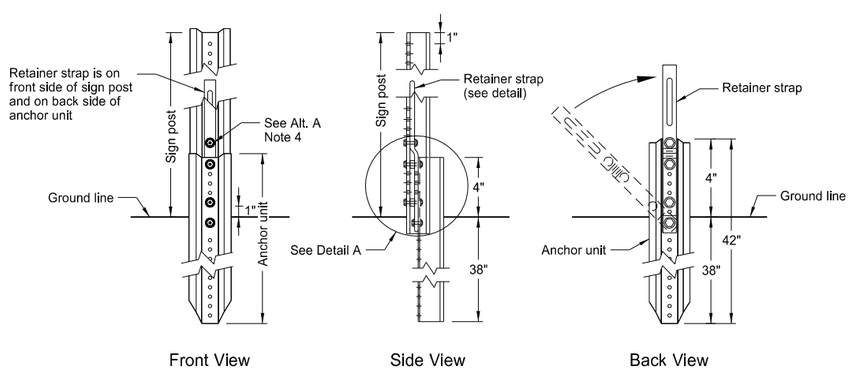
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



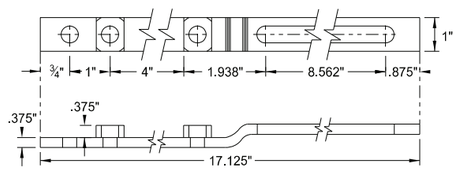
Detail A



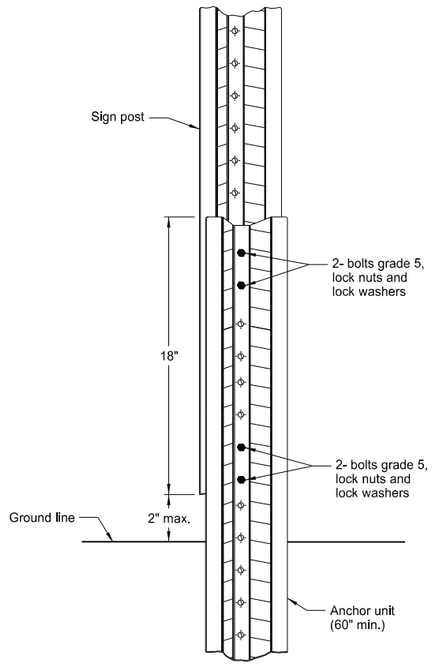
Front View | Side View | Back View

Breakaway U-Channel Detail Alternate A

Install a maximum of 2 posts within 7'.

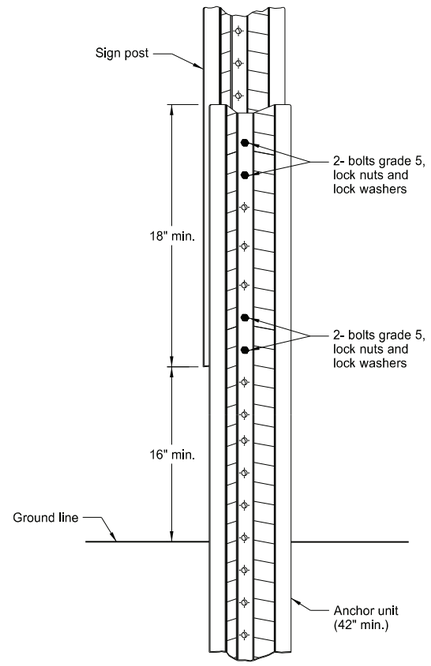


Retainer Strap Detail



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

Install a maximum of 3 posts within 7'.



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

Install a maximum of 3 posts within 7'.

Alternate A Steps of Installation:

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
8-01-24	Electronic Stamp/Signature

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

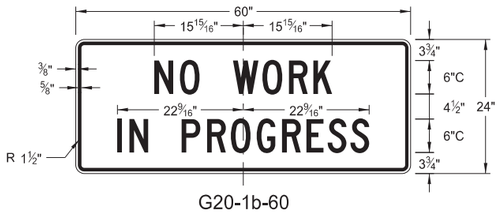
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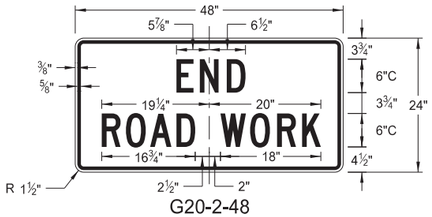
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



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Background: orange



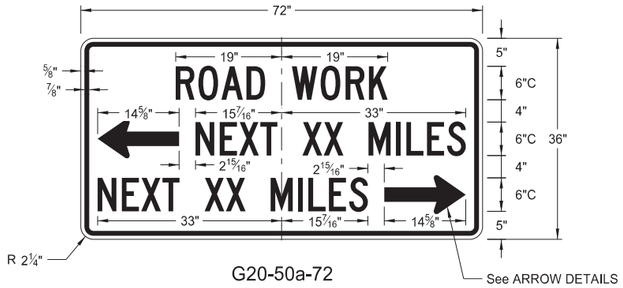
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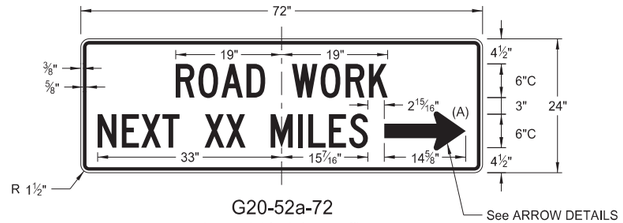
G20-2-48
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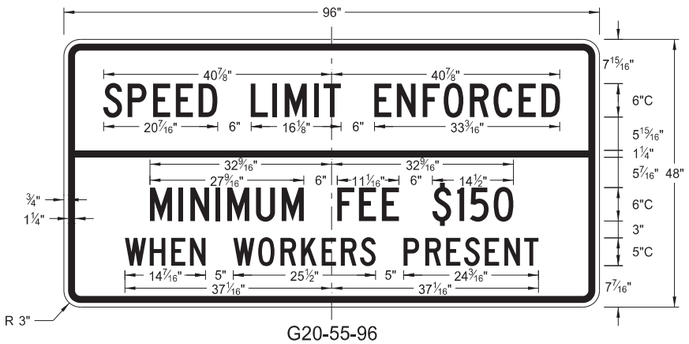
G20-4b-36
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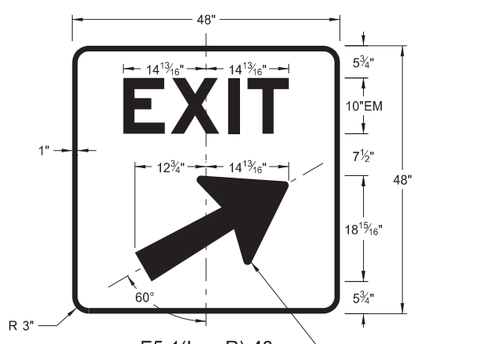
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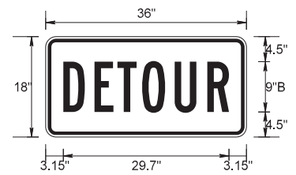
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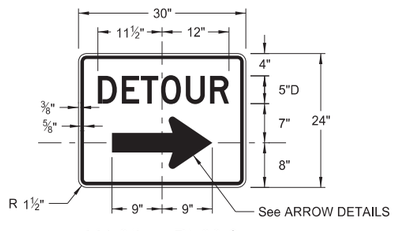
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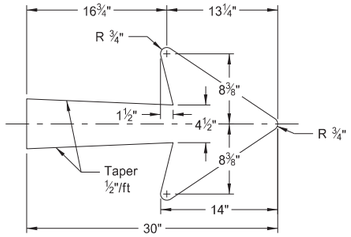
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



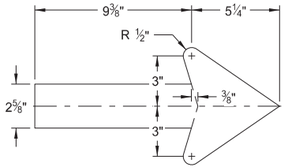
M4-8-36
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Background: orange



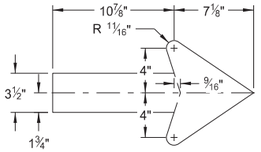
M4-9(L or R)-30 &
M4-9-30
Legend: black (non-refl)
Background: orange



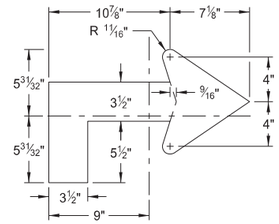
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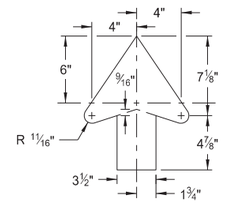
G20-50a-72
G20-52a-72



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



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



M4-9-30
Straight

ARROW DETAILS

NOTES:

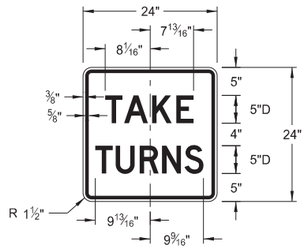
(A) Arrow may be right or left of the legend to Indicate construction to the right or left.

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

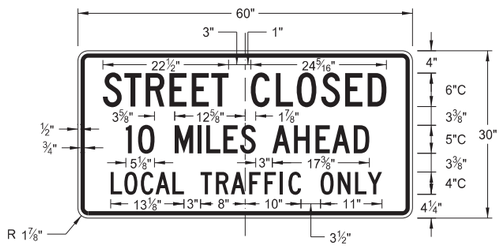
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4883
06/30/25
ENGINEER
NORTH DAKOTA

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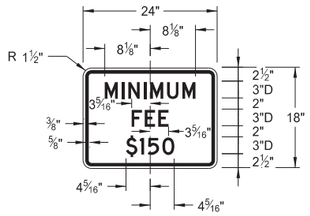
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



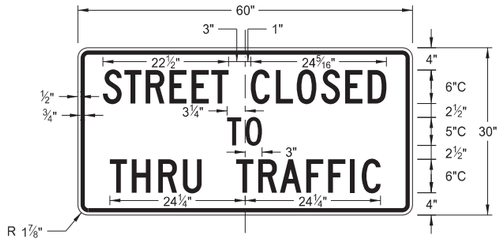
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Background: white



R11-3c-60
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Background: white



R2-1aP-24
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R11-4a-60
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Background: white



R11-2a-48
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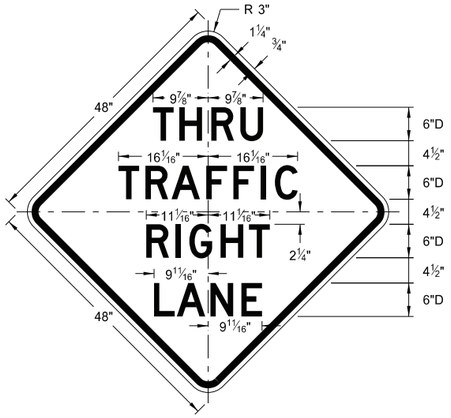
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
08-17-17	Revised sign number
10-03-19	New Design Engineer PE Stamp
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes

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

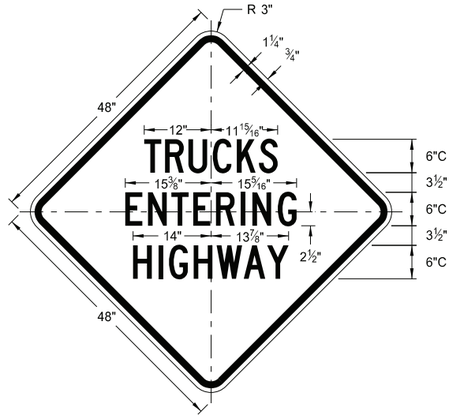
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CONSTRUCTION SIGN DETAILS
WARNING SIGNS

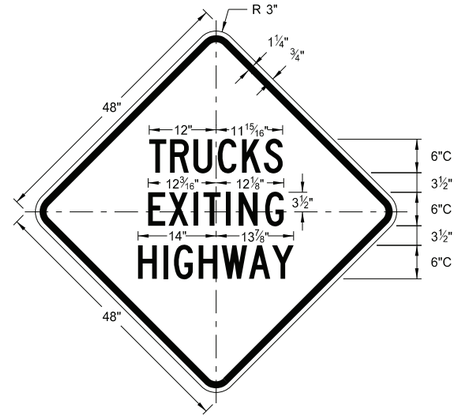
D-704-11



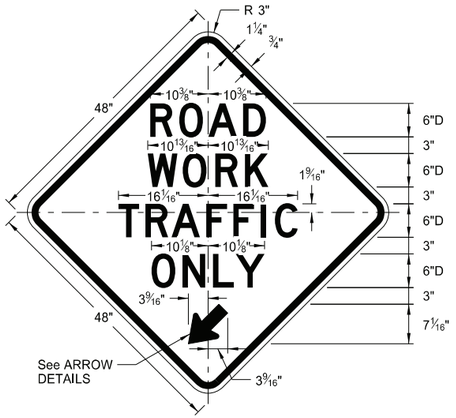
W5-8-48
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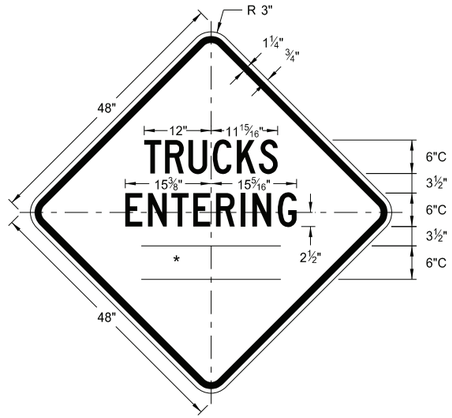
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Background: orange



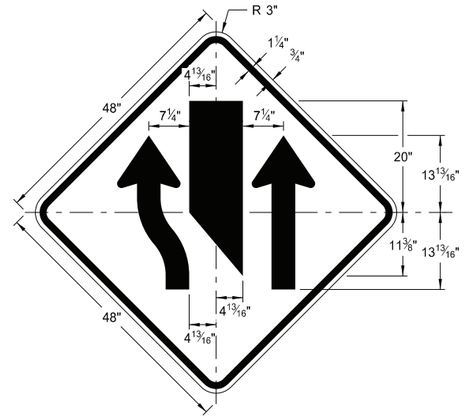
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Background: orange



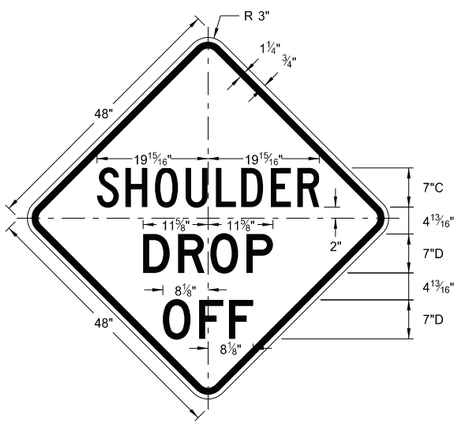
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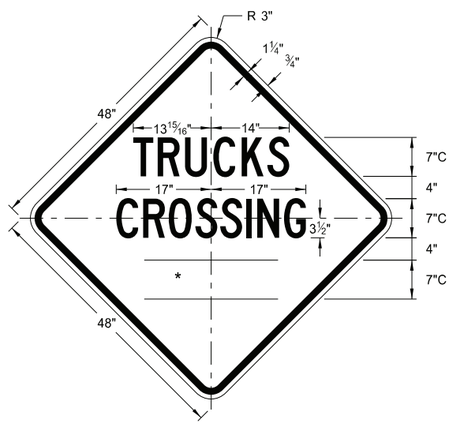
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W9-3a-48
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Background: orange



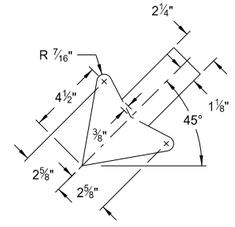
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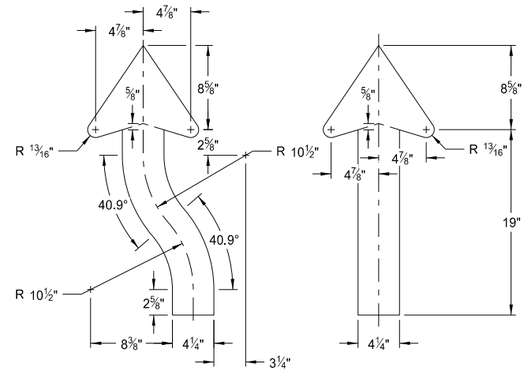
W8-55-48
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WORD	LETTER SPACING
AHEAD	Standard
200 FT	Standard
350 FT	Standard
500 FT	Standard
1000 FT	Reduce 40%
1500 FT	Reduce 40%
½ MILE	Reduce 50%
1 MILE	Standard

* 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
8-01-24	Electronic Stamp/Signature

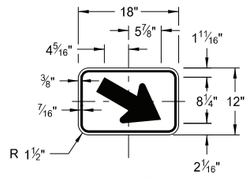
KIRK J. HOFFA
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/01/24

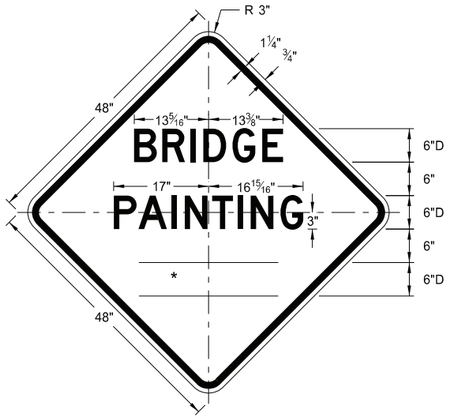
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CONSTRUCTION SIGN DETAILS
WARNING SIGNS

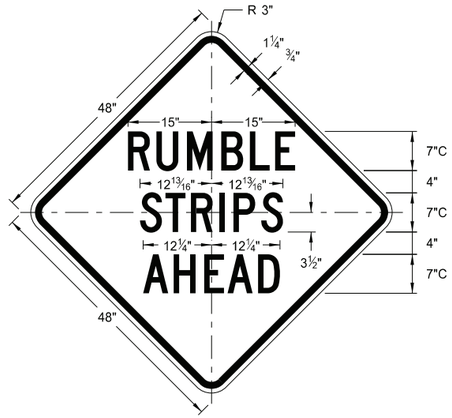
D-704-11A



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



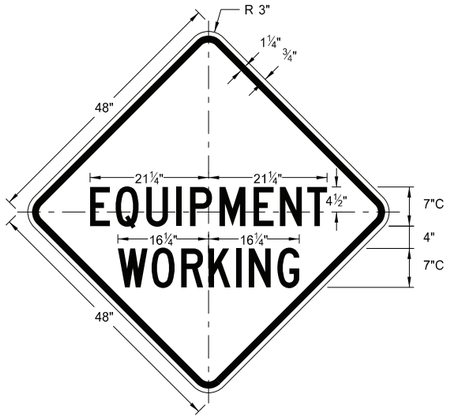
W21-50-48
Legend: black (non-refl)
Background: orange



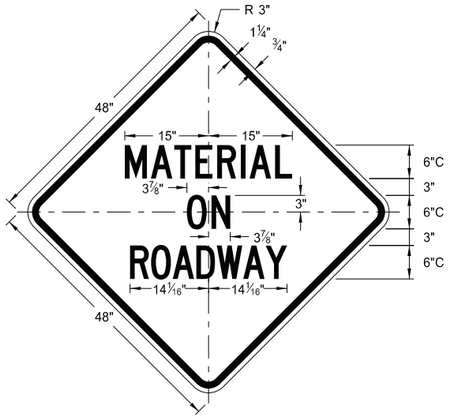
W21-53-48
Legend: black (non-refl)
Background: orange

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

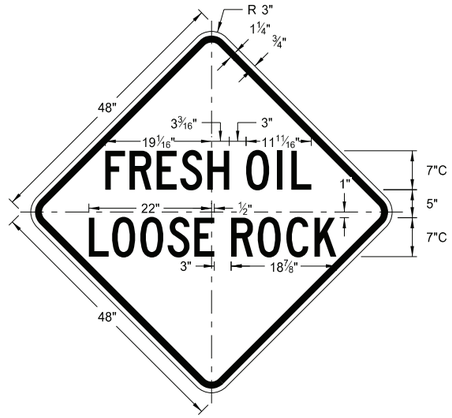
* DISTANCE MESSAGES



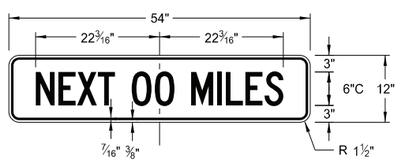
W20-51-48
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Background: orange



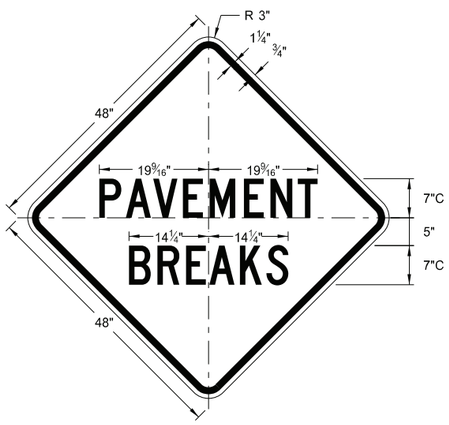
W21-51-48
Legend: black (non-refl)
Background: orange



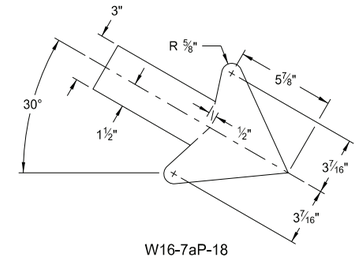
W22-8-48
Legend: black (non-refl)
Background: orange



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



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



W16-7aP-18

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

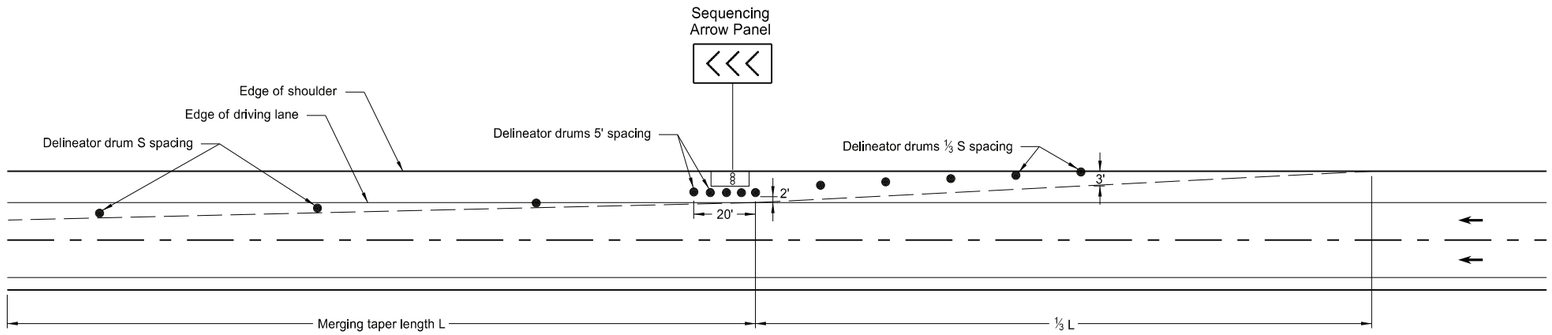
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/01/24

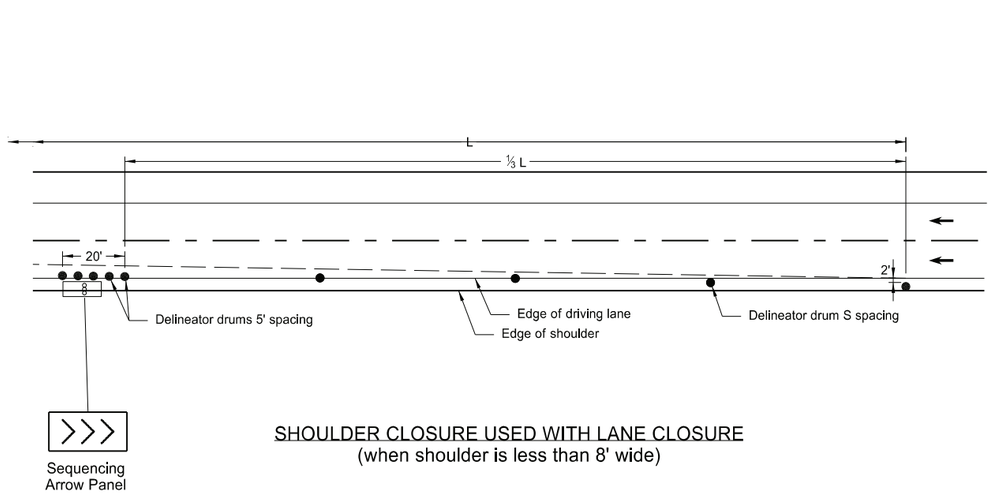
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SHOULDER CLOSURE TAPERS

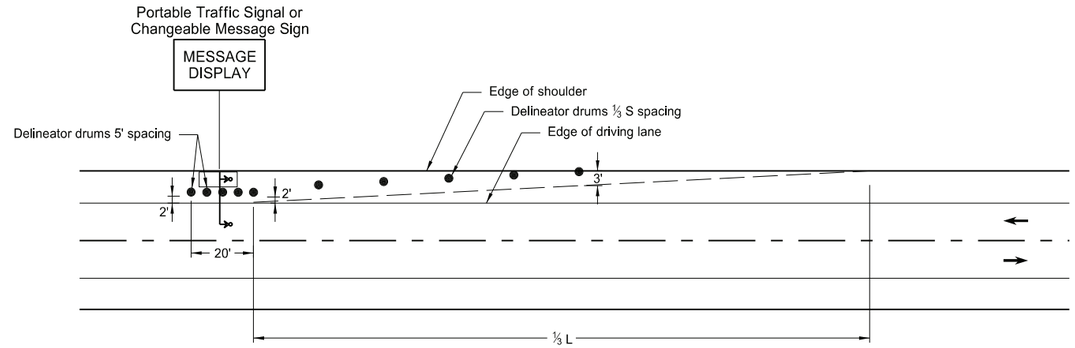
D-704-12



SHOULDER CLOSURE WITH LANE CLOSURE
(when shoulder is 8' or wider)



SHOULDER CLOSURE USED WITH LANE CLOSURE
(when shoulder is less than 8' wide)



PORTABLE TRAFFIC SIGNAL OR CHANGEABLE MESSAGE SIGN ON SHOULDER

KEY

● Delineator Drum	∞ Sequencing Arrow Panel
° Message Display	Portable Traffic Signal

Notes:

1. S = Posted Speed Limit in mph
   W = Width of offset in feet
   L = Taper length in feet
   $L = WS^2/60$ (40mph or less)
   L = WS (45mph or more)
2. If a shoulder taper is used, use a length of approximately ⅓L. If a shoulder is used as a travel lane, use a normal merging or shifting taper.
3. When paved shoulders of 8 foot width or more are closed, use channelizing devices to close shoulder in advance, to delineate beginning of work space, and to direct vehicular traffic to remain within the traveled way.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active volce
10-25-19	Added L dimension to detail
8-01-24	Electronic Stamp/Signature

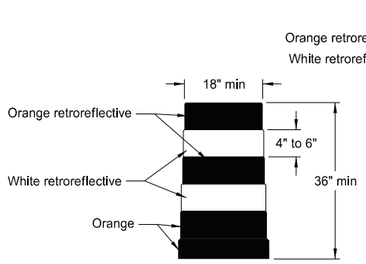
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/01/24

DocuSign Envelope ID: B6D1C72A-6E5E-4E5C-A02F-4D3D1C582775

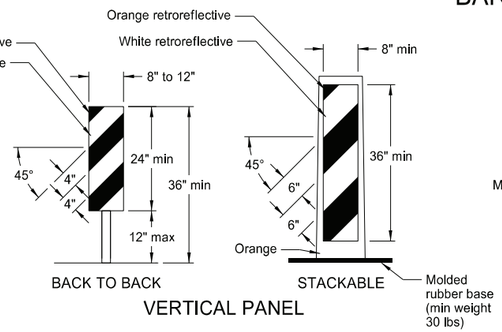
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



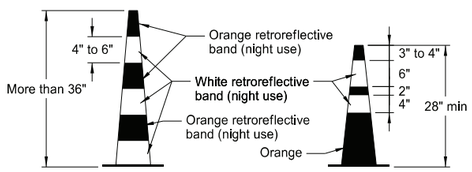
DELINEATOR DRUM

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.



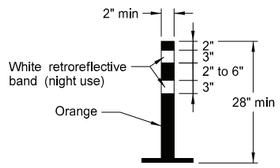
VERTICAL PANEL

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.



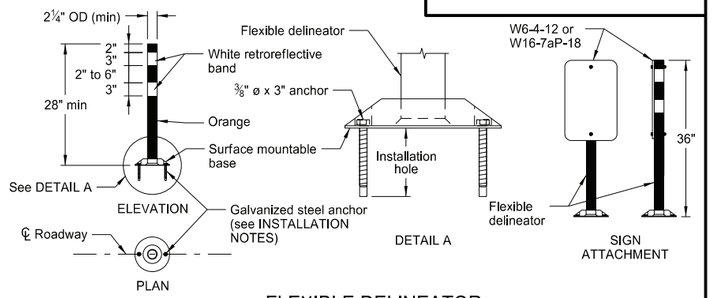
TRAFFIC CONE

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

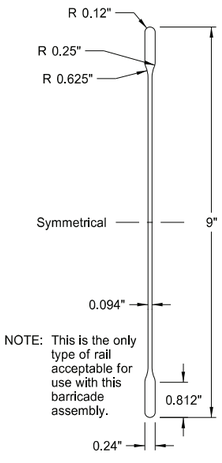
Provide retroreflectorization of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



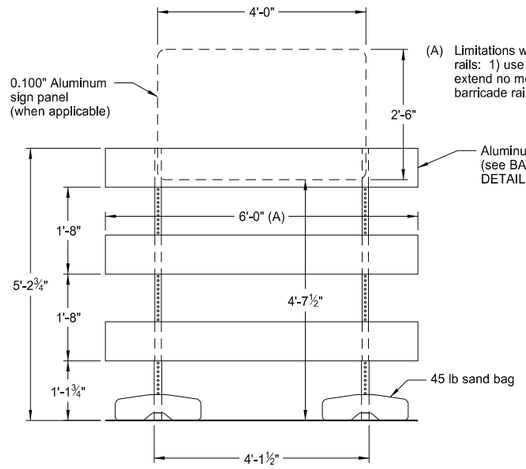
FLEXIBLE DELINEATOR

INSTALLATION NOTES:

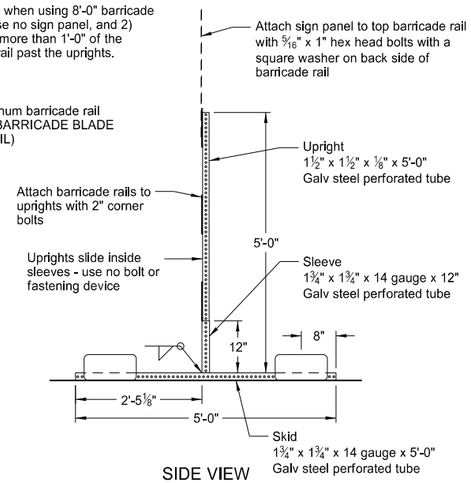
1. Drill installation holes to diameter and depth required by manufacturer's specifications.
2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
3. In lieu of bolted down base, use an 8" x 8" butyl pad or hot melt butyl. Remove butyl as close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



BARRICADE BLADE DETAIL

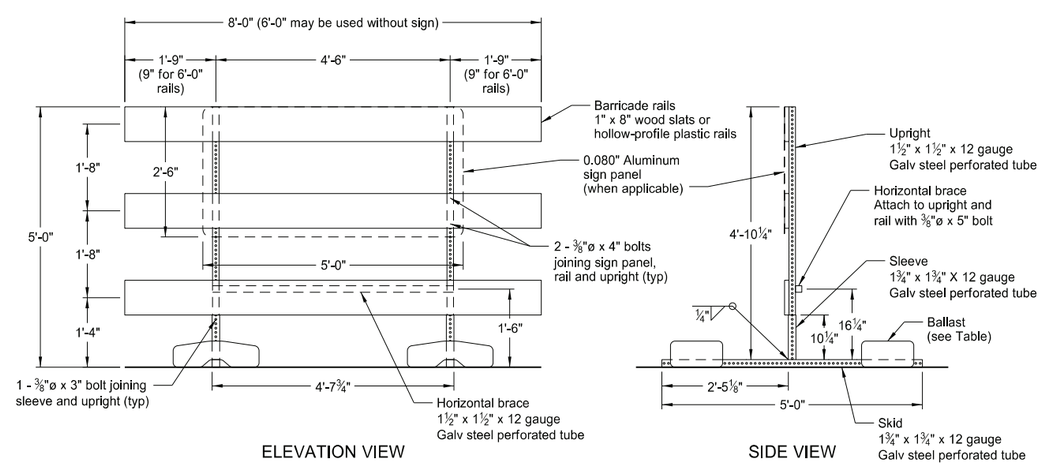


ELEVATION VIEW



SIDE VIEW

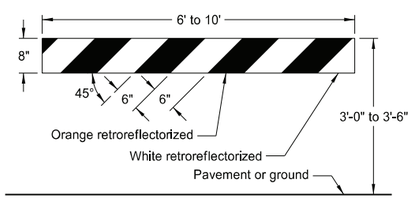
BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)



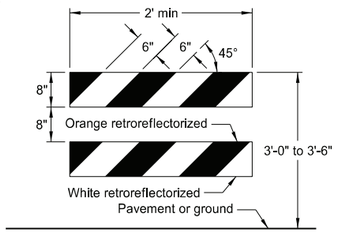
ELEVATION VIEW — SIDE VIEW

BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

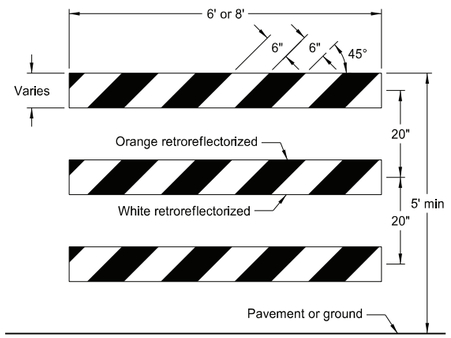
NOTE: For barricade markings use alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Place retroreflective sheeting on both sides of the rails with a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the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



TYPE I BARRICADE

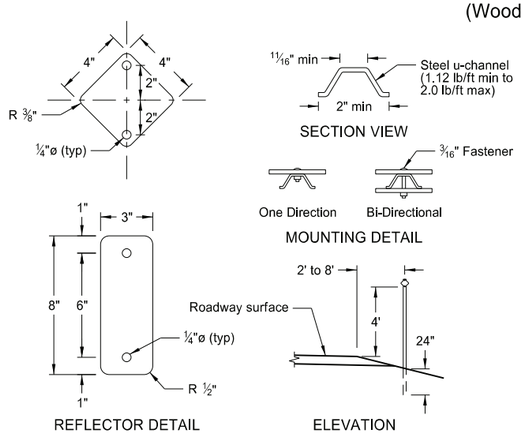


TYPE II BARRICADE



TYPE III BARRICADE

BARRICADE RAIL DETAILS



DELINEATORS

MINIMUM BALLAST
(For each side of barricade support)

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

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

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

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

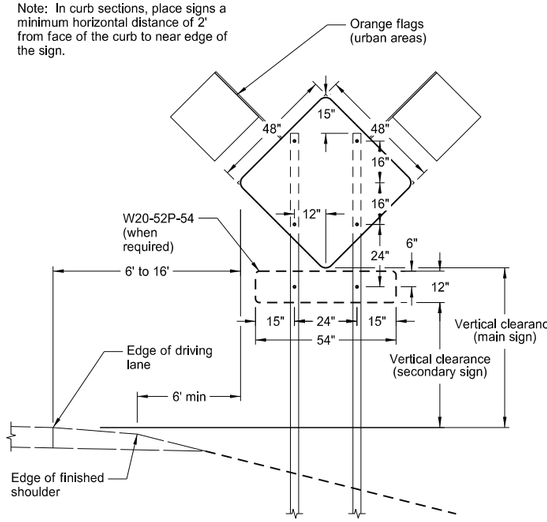
08/01/24

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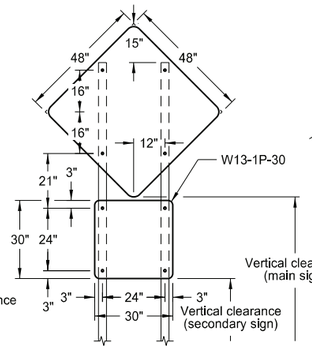
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

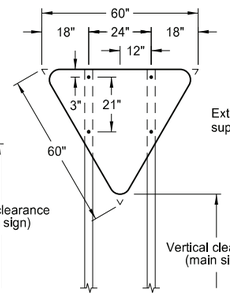
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



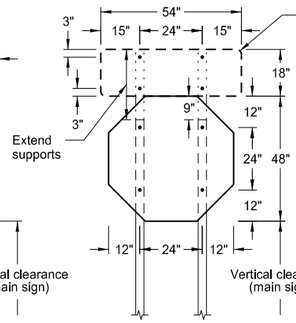
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



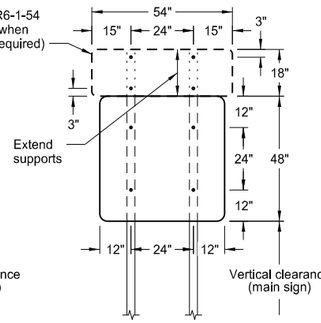
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



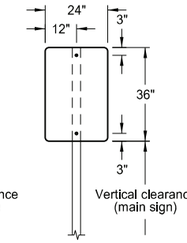
R1-2-60 - YIELD SIGN



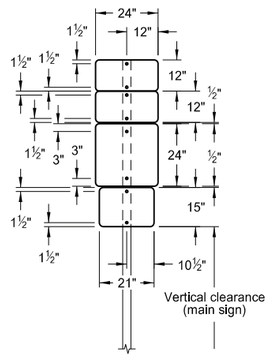
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



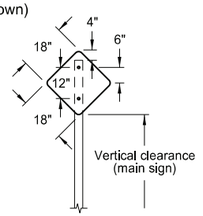
48" x 48" SIGN
(with R6-1-54 sign as required)



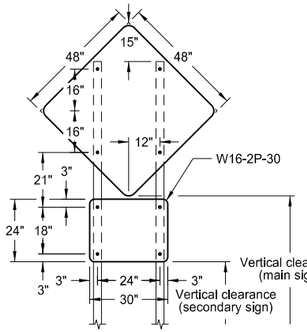
24" x 36" SIGN



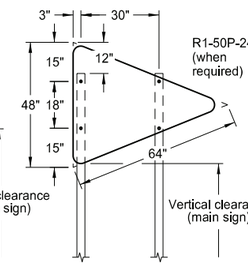
24" x 24"
ROUTE MARKER
ASSEMBLY



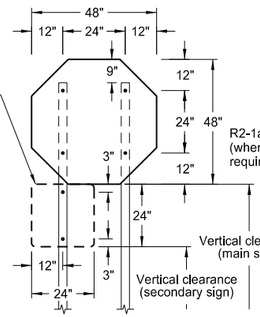
18" x 18"
DIAMOND SIGN



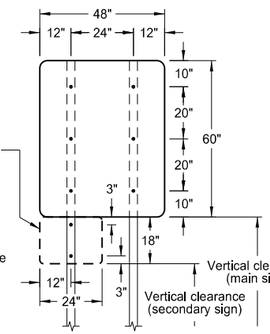
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



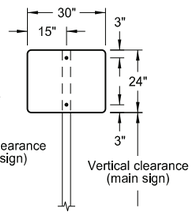
W14-3-64 - PENNANT SIGN



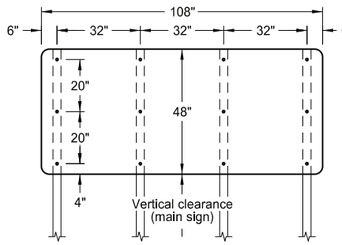
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



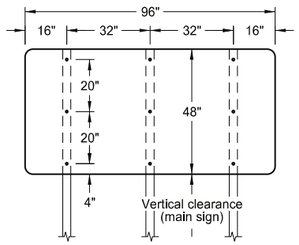
48" x 48" SIGN
(with R2-1aP-24 sign as required)



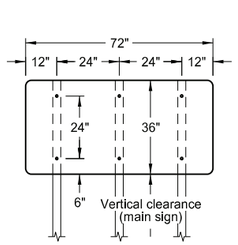
30" x 24" SIGN



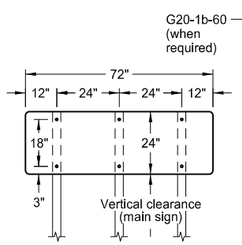
108" x 48" SIGN



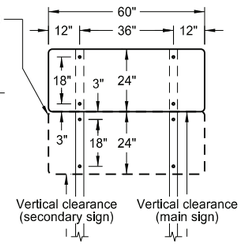
96" x 48" SIGN



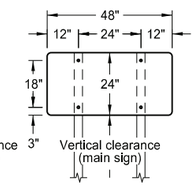
72" x 36" SIGN



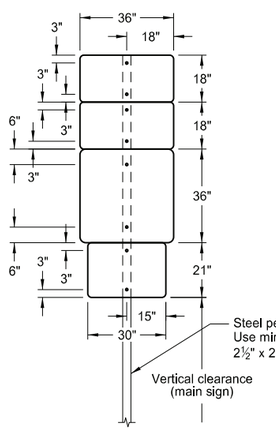
72" x 24" SIGN



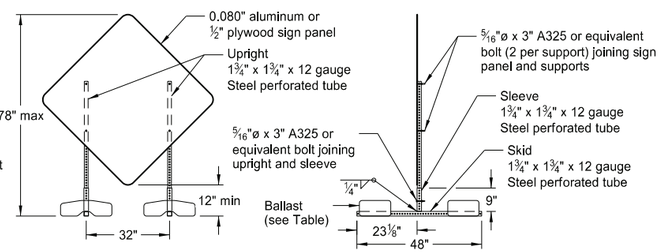
60" x 24" SIGN



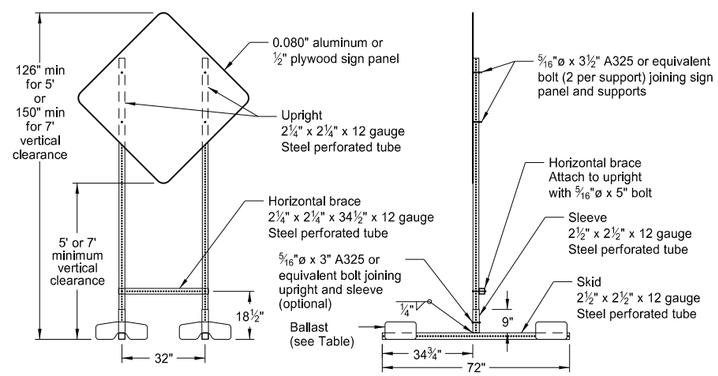
48" x 24" SIGN



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
8-01-24	Electronic Stamp/Signature

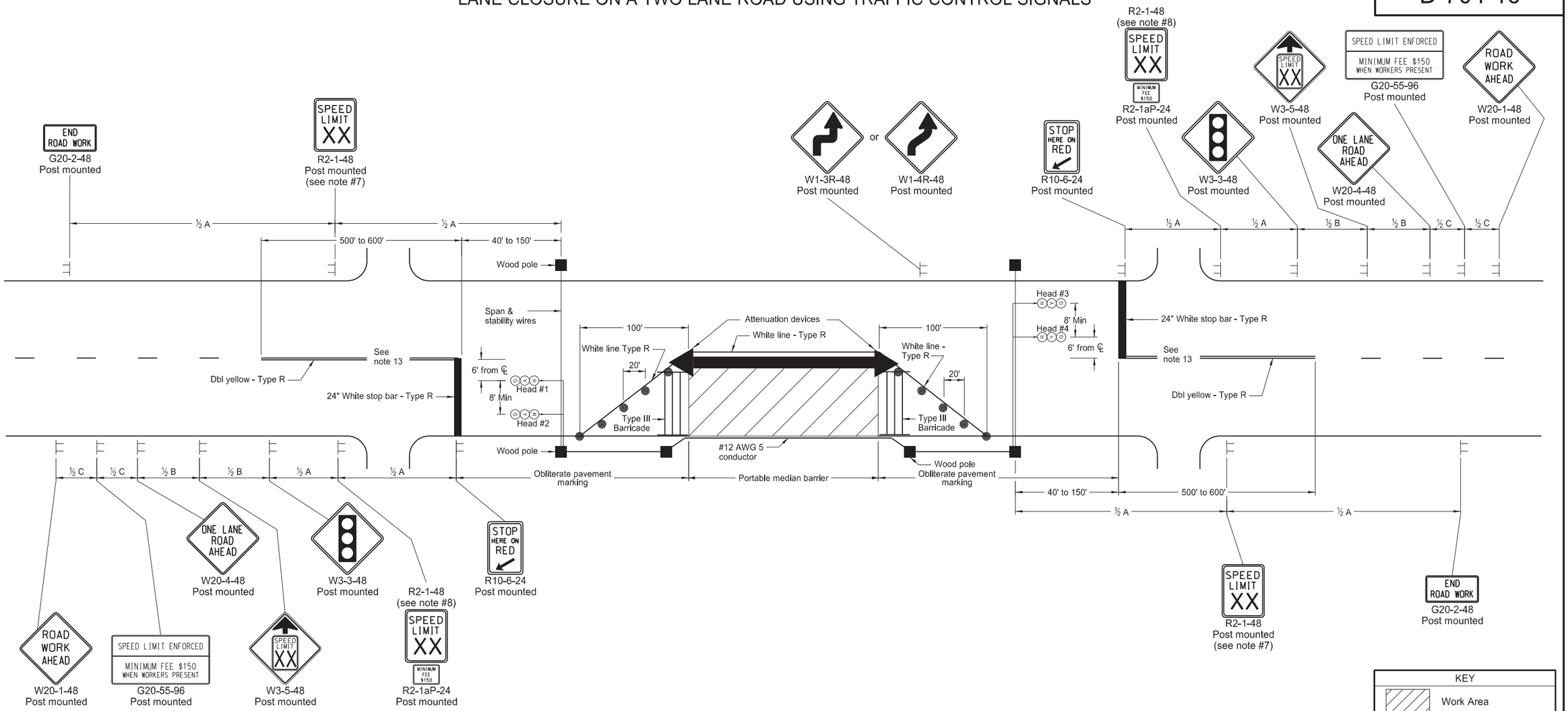
KIRK J. HOFFA
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/01/24

Docusign Envelope ID: F5C9 4-A0E -4 BB-B36B-4 04844BFCB

LANE CLOSURE ON A TWO LANE ROAD USING TRAFFIC CONTROL SIGNALS

D-704-16



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

SUGGESTED TIMING AND SIGNAL SEQUENCE						
Heads 1 & 2	Green	Yellow	Red			
Heads 3 & 4			Red	Green	Yellow	Red
Time Cycle = 90 seconds	18.0	4.5	22.5	18.0	4.5	22.5
Percent of Cycle	20	5	25	20	5	25

KEY

- Work Area
- Type III Barricade
- Sign
- Delineator Drum
- Wood Pole

Notes:

1. Span conductor overhead between poles except on bridges, where it may alternately be attached and supported by the bridge structure. When conductor is supported by the bridge structure, attach conductor to avoid interference with bridge construction. Attach conductor on either side of bridge as determined by field personnel.
2. Locate controller on a wood pole in the cable run between signal heads for through traffic movements.
3. The timing schedule is suggested trial setting. Check signals in operation frequently to obtain the most efficient timing schedule.
4. Place wood poles a minimum of 16 feet from edge of driving lane. Provide a minimum 16 to 19 feet clearance from the center line of the roadway to the bottom of traffic signal heads suspended over the roadway.
5. Place traffic signal heads with 12 inch red, yellow and green lenses and 5 inch louvered backplates.
6. See standard drawing "Span Wire Mounted Traffic Signals" for interim traffic construction details.
7. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
8. 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.
9. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
10. Cover existing speed limit signs within a reduced speed zone.
11. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
12. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
13. Continue double yellow centerline thru private drives.
14. Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or if work is less than 15 days.
15. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.
16. As an option, use solar powered signals instead of wood pole signal system.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

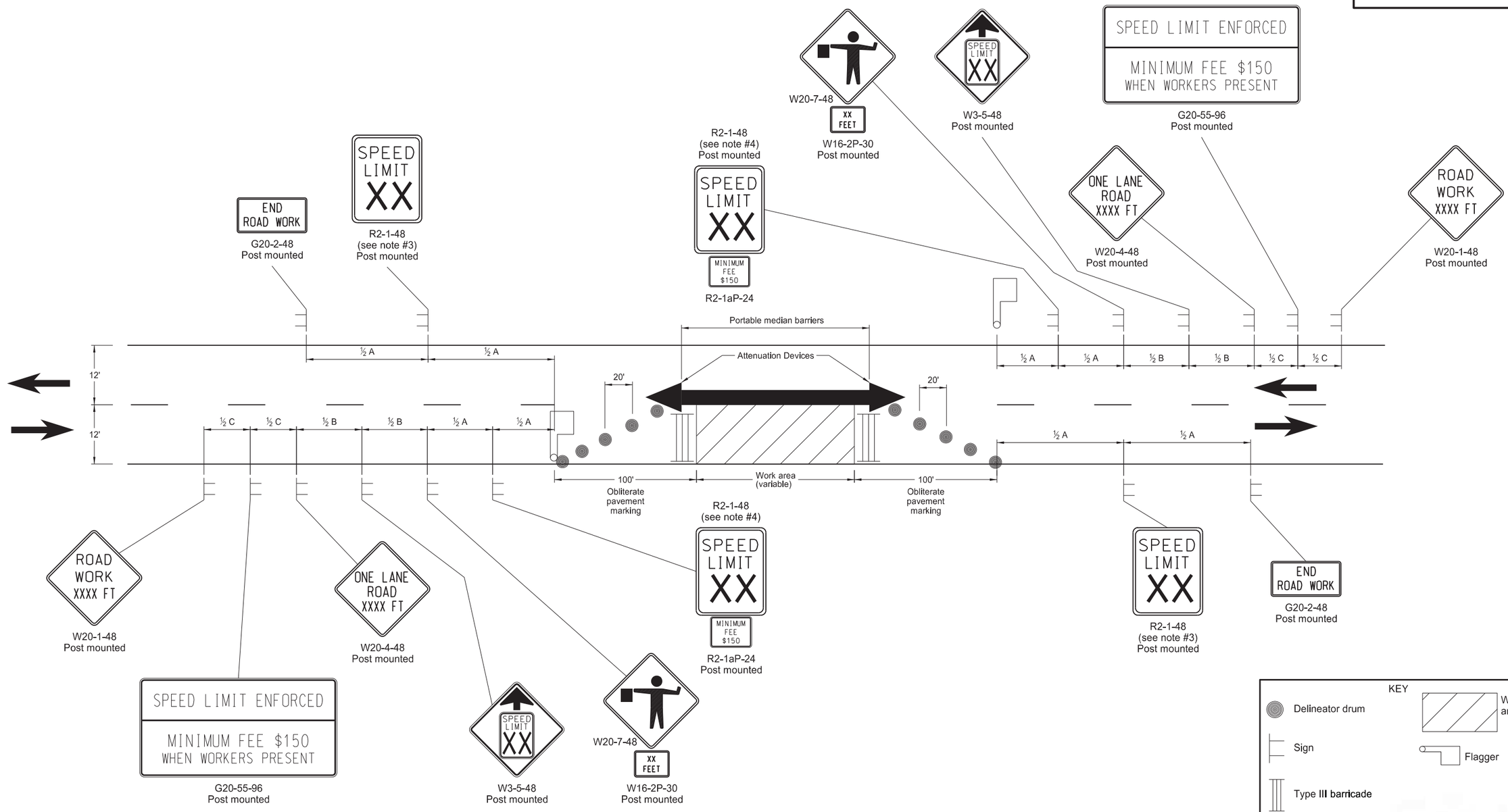
DATE	CHANGE
11-20-15	Revised Note 6 & Renumbered
	Minimum Fee plaque
08-17-17	Revised notes & added note
11-01-19	Revise sign #s & pvmt mk type
12-08-21	Switched order of Road Work Ahead and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work
08-31-23	Corrected Note 14 grammar
08-21-24	Pvmt Mkg Width & Med Barrier
06-30-25	Legislative Changes

KIRK J. HOFF REGISTERED PROFESSIONAL PE-4883 06/30/25 ENGINEER NORTH DAKOTA

Docusign Envelope ID: F5C9 4-A0E -4 BB-B36B-4 04844BFCB

SIGN LAYOUT FOR ONE LANE CLOSURE TWO LANE ROADWAY

D-704-17



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

Notes:
1. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
2. Remove existing striping as required. Use back to back delineators when inslope is 4:1 or flatter and roadway alignment is visible to approaching vehicles. Place back to back vertical panels when roadways have steep slopes and alignment is not visible to approaching traffic.
3. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
4. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 MPH.) Place the second speed limit sign at ½B.
5. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
6. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
7. Cover existing speed limit signs within a reduced speed zone.
8. Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or if work is less than 15 days.
9. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

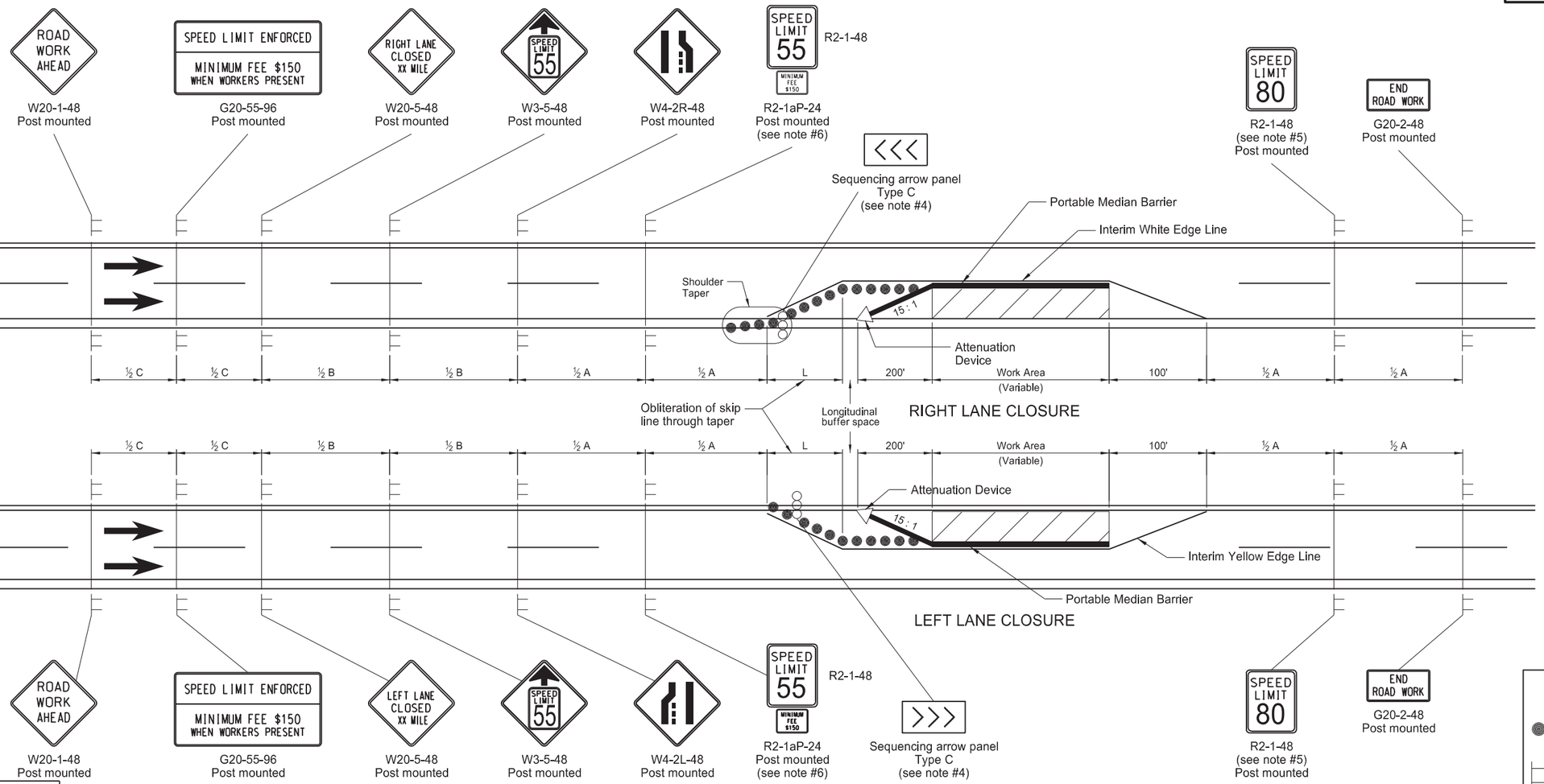
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Note update & sign numbers
11-01-19	Removed signs & revised note
12-08-21	Switched order of Road Work XXXX and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work
08-21-24	Pvmt Mkg Width & Med Barrier
06-30-25	Legislative Changes

KIRK J. HOFF REGISTERED PROFESSIONAL PE-4883 06/30/25 ENGINEER NORTH DAKOTA

Docusign Envelope ID: F5C9 4-A0E -4 BB-B36B-4 04844BFCB

SIGN LAYOUT FOR INTERSTATE SYSTEM ONE LANE CLOSURE

D-704-18



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

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

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

Notes:

1. Variables
   S = Numerical value of posted speed limit, off-peak 85th percentile speed prior to work starting, or anticipated operating speed in MPH.
   W = The width of offset in feet.
   L = Minimum taper length in feet. S x W for freeways, expressways, and roads with speeds of 45 mph or greater, or
   W x S^2 /60 for urban, residential, and streets with speeds of 40 mph or less.
2. Place barricades on moveable assemblies and signs on portable assemblies when located on the roadway.
3. Space delineator drums used for tapering traffic and on tangent at 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 the roadway surface. See Shoulder Closure Standard Drawing. Use Type C on roadways with high traffic speeds and volumes (over 40 mph or 5000 ADT or greater).
5. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
6. Determine the reduced speed limit based on the in place speed limit before construction. Where speed reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 MPH.) Place the second speed limit sign at 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 a reduced speed zone.
9. As an option, use portable sign supports in lieu of post mounted signs in accordance with the Standard D-704-14.
10. Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or if work is less than 15 days.
11. Reduce speed limit further, if location and conditions dictate.

KEY

- Delineator Drum
- Sign
- Attenuation Device
- Sequencing Arrow Panel
- Work Area

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE
01-13-16	Changed to Interim yellow edge line
03-15-16	Removed Do Not Pass signs & updated notes
08-17-17	Updated notes & sign numbers
11-01-19	Note, sign #, & pvmt obllt change
12-08-21	Switched order of Road Work Ahead and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work
08-21-24	Portable Median Barriers
06-30-25	Legislative Changes

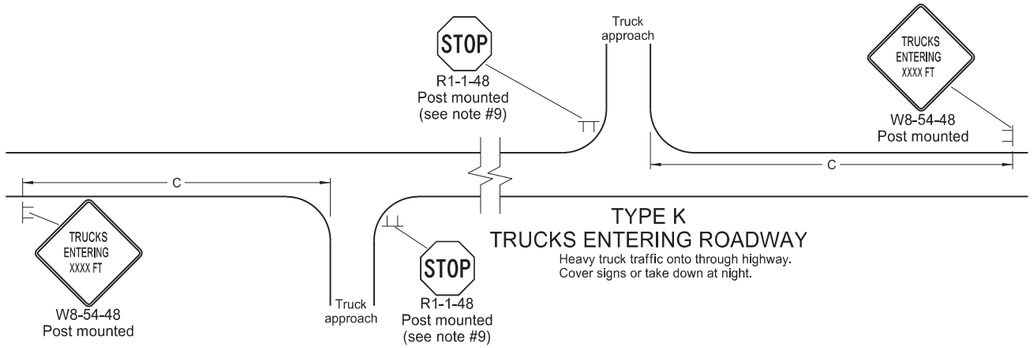
KIRK J. HOFFA REGISTERED PROFESSIONAL PE-4683 06/30/25 ENGINEER NORTH DAKOTA

Docusign Envelope ID: F5C9 4-A0E -4 BB-B36B-4 04844BFCB

CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

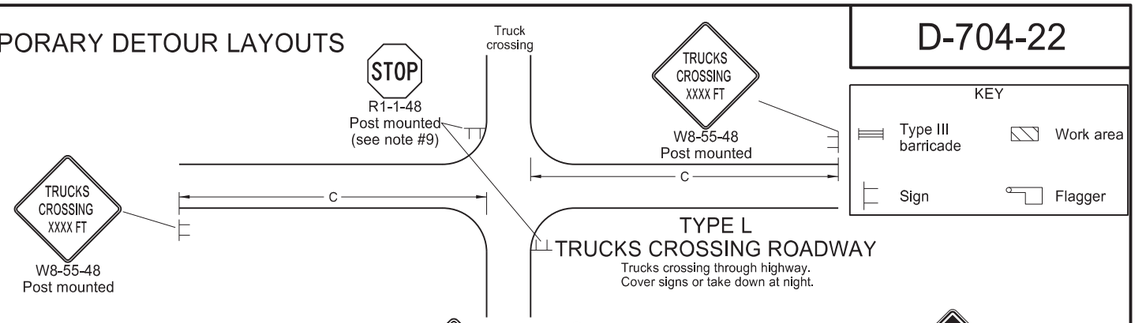
D-704-22

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



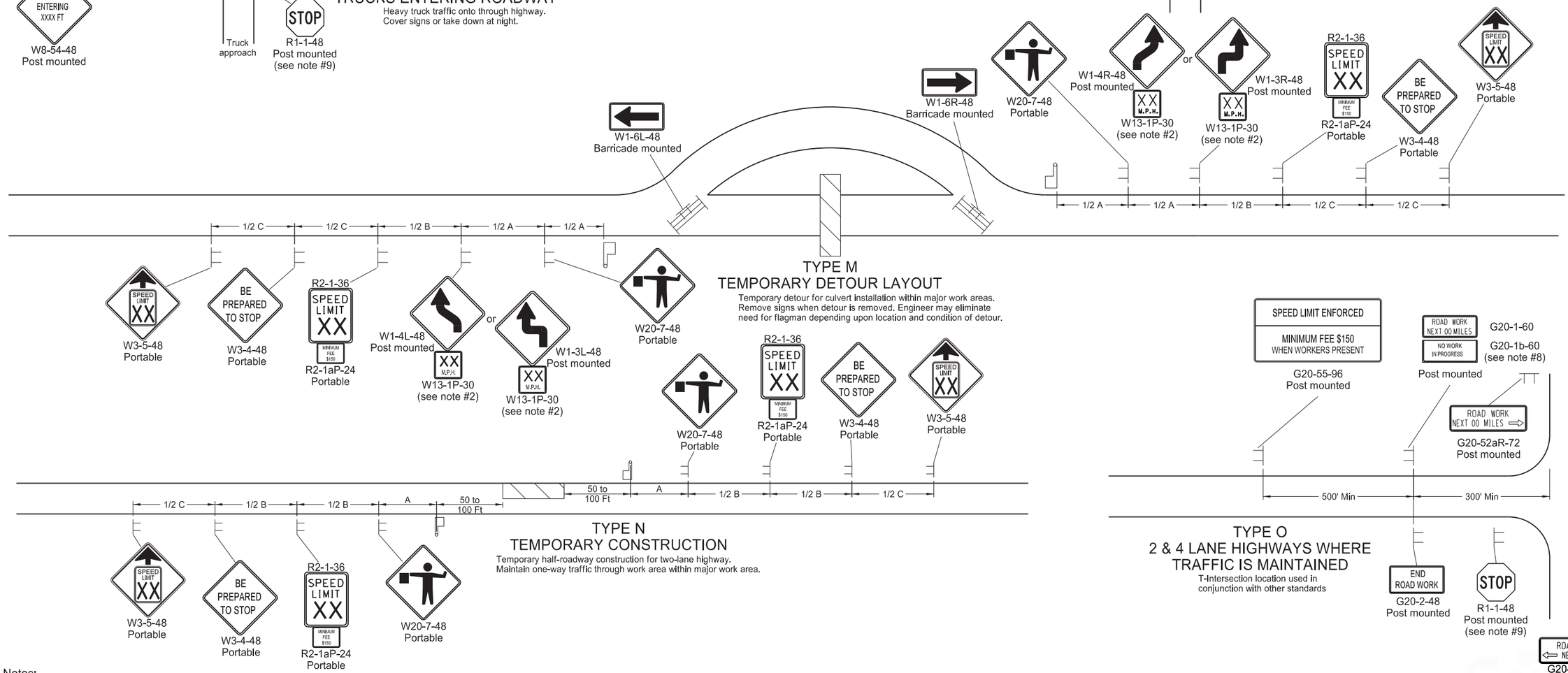
TYPE K
TRUCKS ENTERING ROADWAY

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

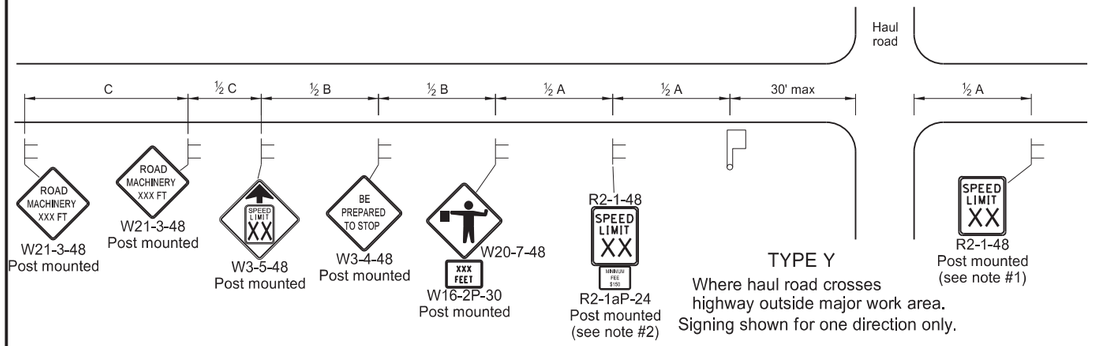
DATE	CHANGE
08-17-17	Update notes & sign numbers
11-01-19	Revised sign numbers & note 7
12-09-21	Added Speed Limit Enforced and Dollars At Work signs
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes

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PE-4683
06/30/25
ENGINEER
NORTH DAKOTA

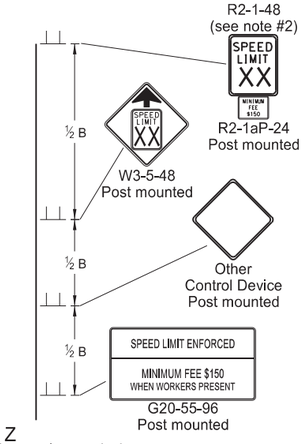
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MISCELLANEOUS SIGN LAYOUTS

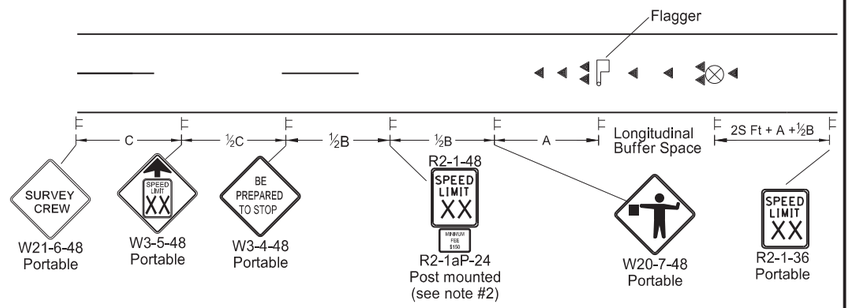
D-704-26



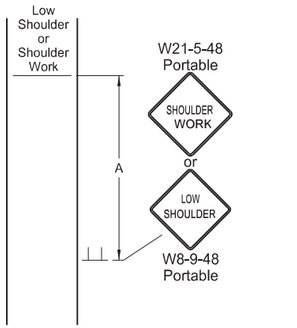
TYPE Y
Where haul road crosses highway outside major work area.
Signing shown for one direction only.



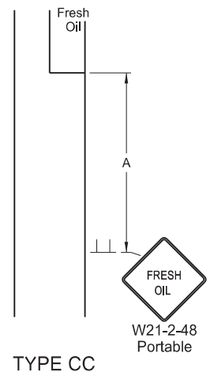
TYPE Z
Where speed zone is needed
Signing shown for one direction only.



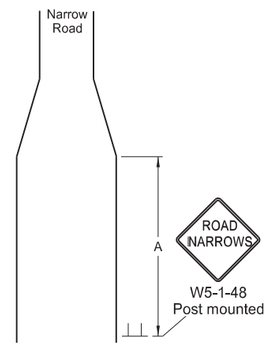
TYPE AA
Where survey crew is used
Signing shown for one direction only.



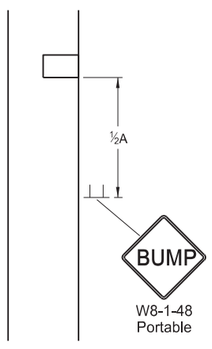
TYPE BB
Within major work area where sign conditions exist



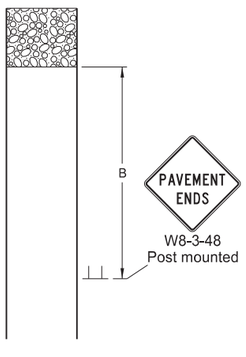
TYPE CC
Where sign conditions exist



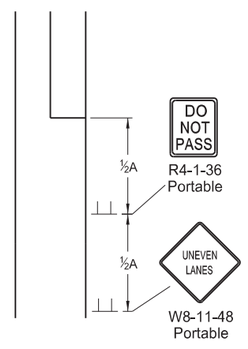
TYPE DD
Where sign conditions exist



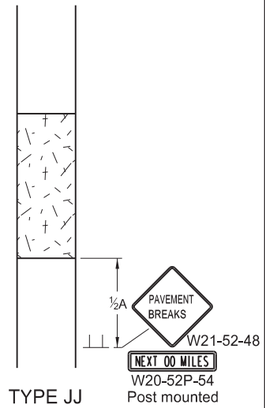
TYPE EE
Where sign conditions exist



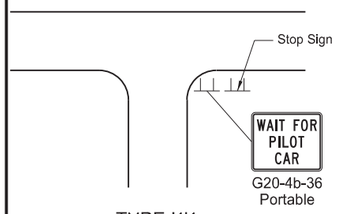
TYPE FF
Where sign conditions exist
Signing shown for one direction only.



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.



TYPE KK
At major intersections within pilot car control area

KEY
Flagger
Sign
Cones
Survey Equipment
S = Numerical value of speed limit or 85th percentile.

Notes
1. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
2. Determine reduced speed limit based on in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 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 80 mph)	1000	1500	2640
Interstate/4-Lane Divided (Maintenance and Surveying)	750	1000	1500

Longitudinal Buffer Space

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

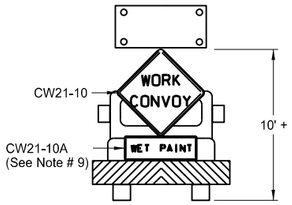
DATE	CHANGE
08-17-17	Added speed limit signs. Updated notes & sign numbers
11-01-19	Revised note 5 & sign numbers
02-23-23	Revised distance & removed signs
06-30-25	Legislative Changes

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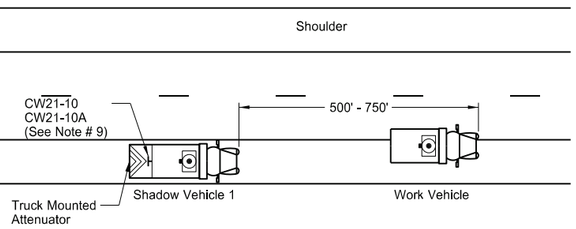
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MOBILE OPERATION
(PAVEMENT MARKING)

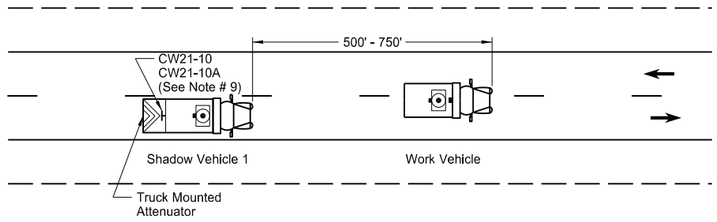
D-704-27



Typical Shadow Vehicle 1
Two-Way Roaday

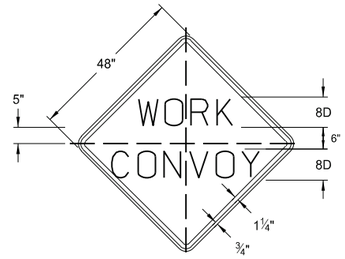


Two-Way Roadway with Paved Shoulders

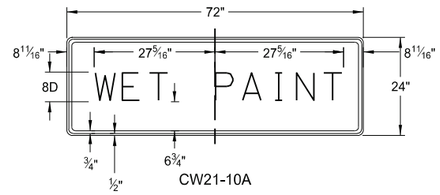


Two-Way Roadway without Paved Shoulders

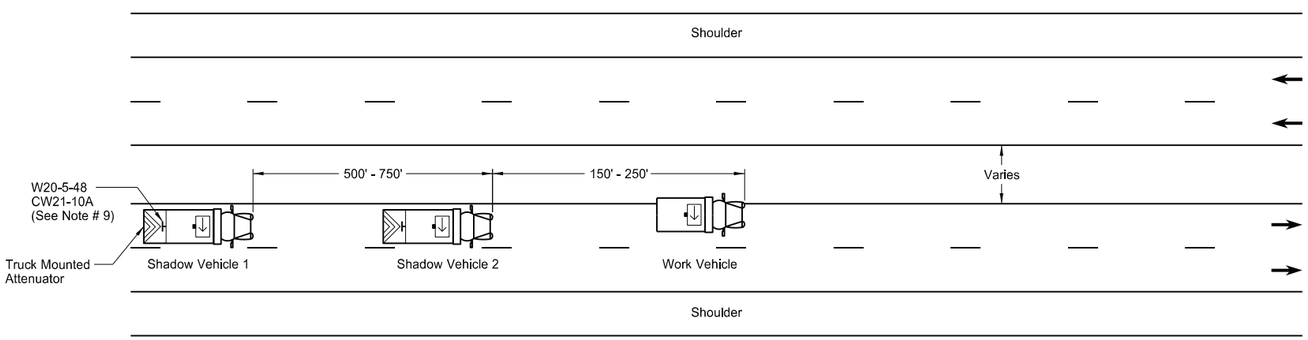
Sign Details



CW21-10

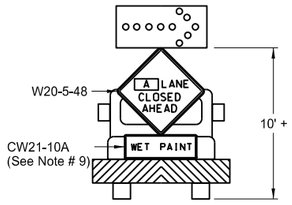


CW21-10A



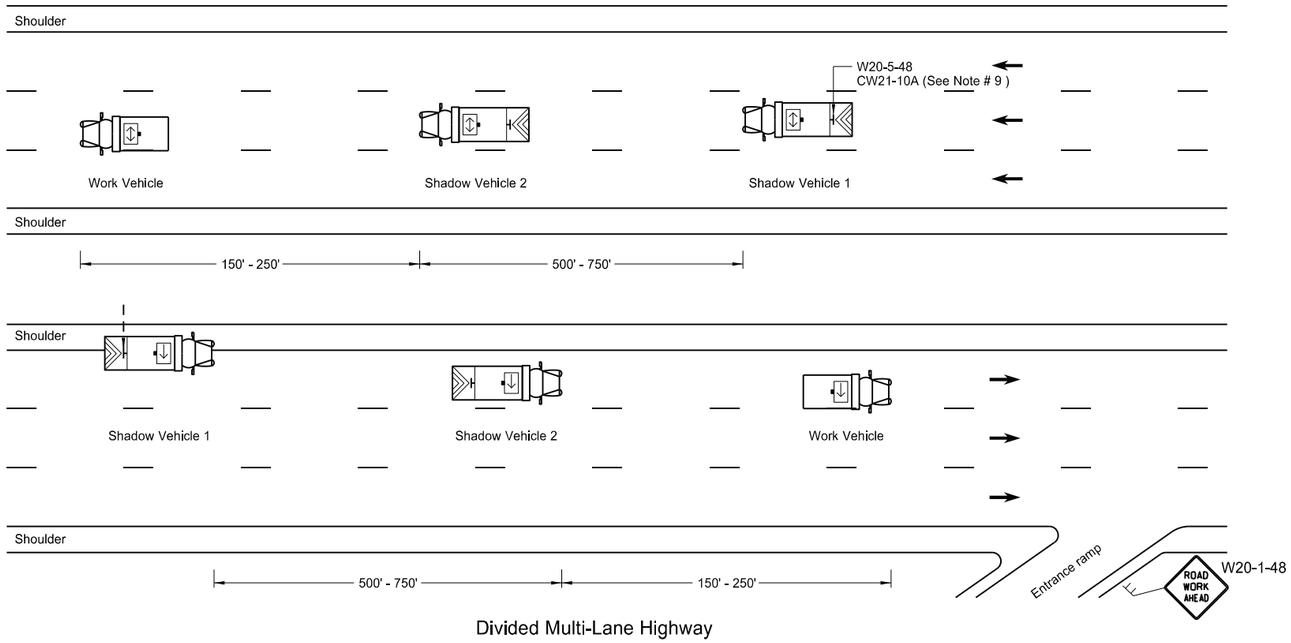
Undivided Multi-Lane Roadway

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
8-02-24	Electronic Stamp/Signature.

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08/02/24

Docusign Envelope ID: E 899F0-B9 -448 -BF85- 48 63D5F5D

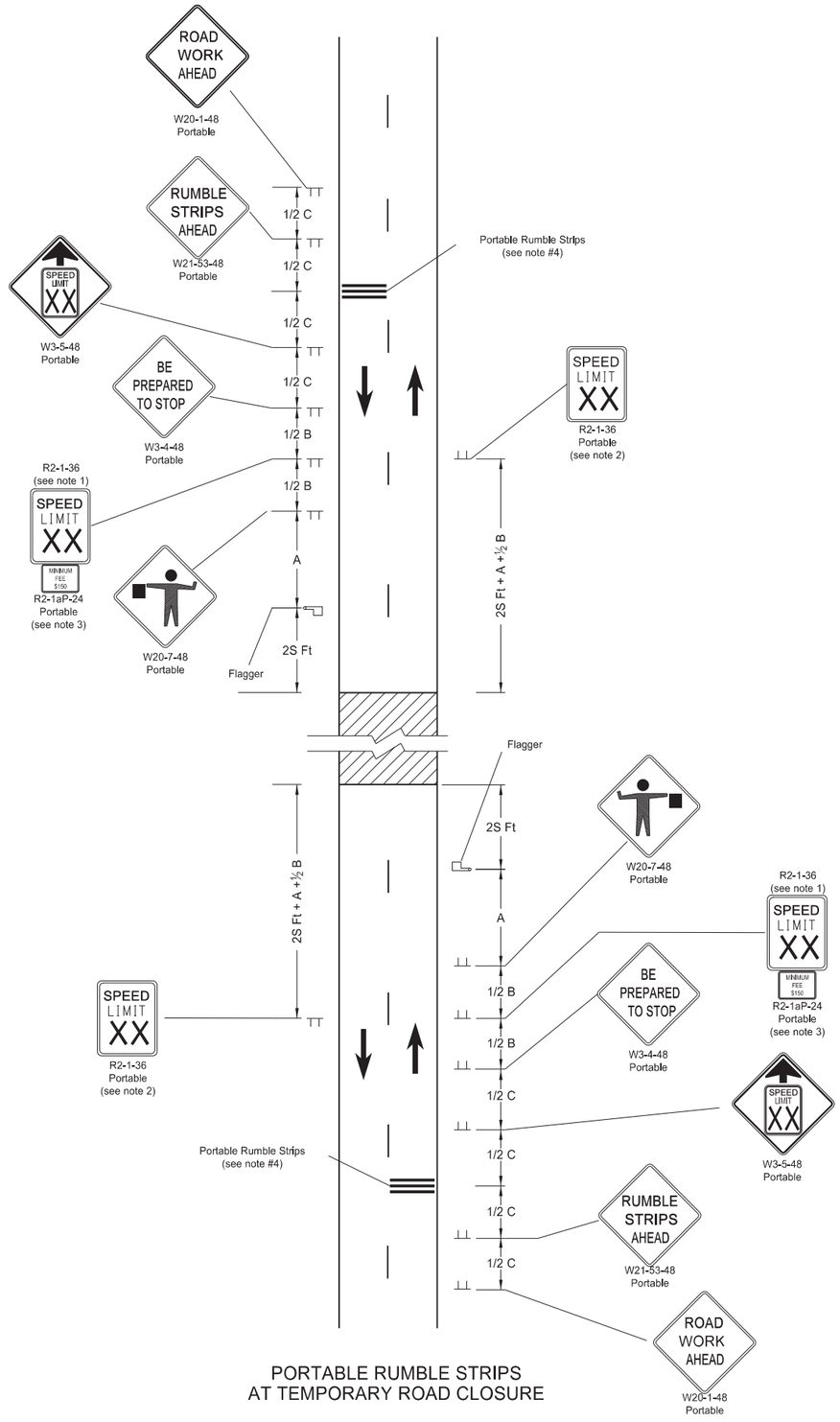
Two-Lane Roadway Portable Rumble Strips

KEY

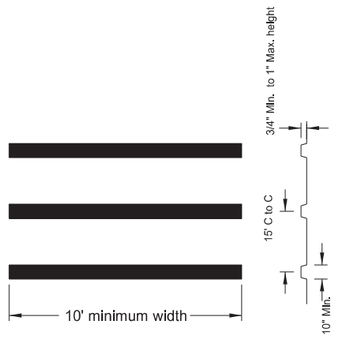
- Work area
- Flagger
- Sign

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

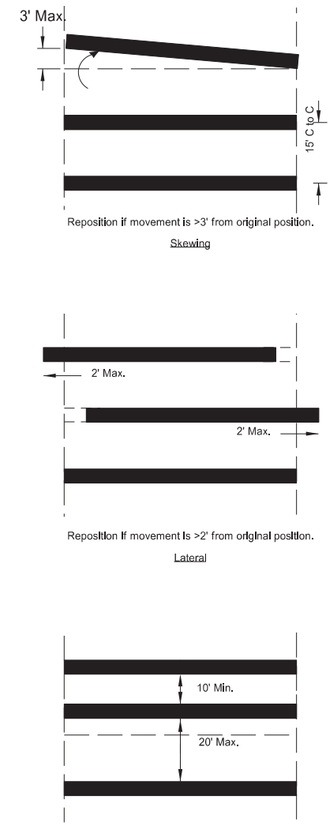
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - High Speed (over 45 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720



PORTABLE RUMBLE STRIPS AT TEMPORARY ROAD CLOSURE



PORTABLE RUMBLE STRIPS ARRAY DETAIL



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.

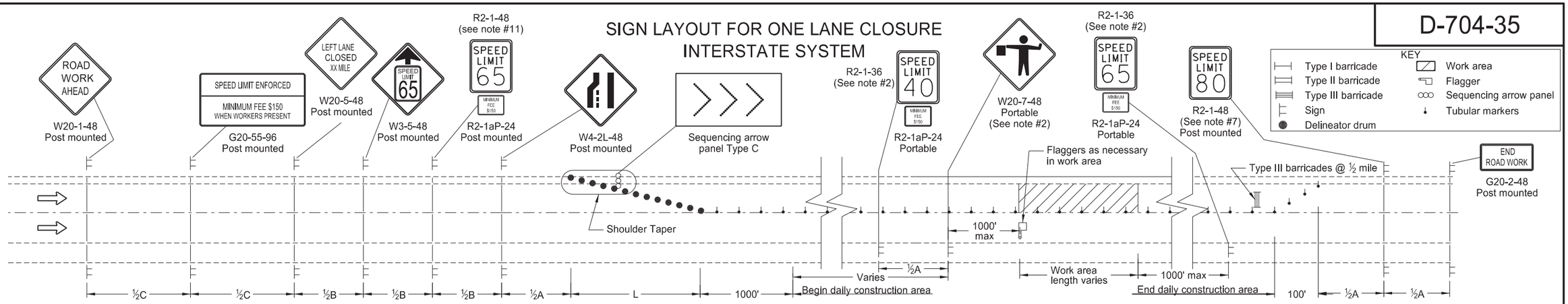
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
02-22-22	
REVISIONS	
DATE	CHANGE
03-07-23	Use changed to min 45 mph
06-30-25	Legislative Changes

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

Docusign Envelope ID: E 899F0-B9 -448 -BF85- 48 63D5F5D

D-704-35

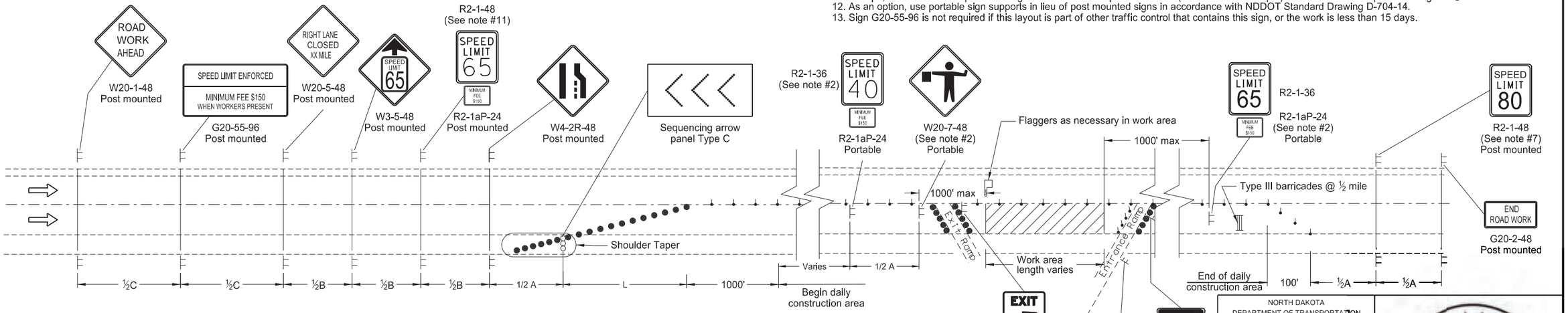
SIGN LAYOUT FOR ONE LANE CLOSURE INTERSTATE SYSTEM



LEFT LANE CLOSED
WORKERS IN WORK AREA

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

Notes:
1. Install advance signs for flagging when flaggers are flagging.
2. Move the advanced flagger sign and the speed limit signs as the work area moves through the construction zone. When the work area is not visible from the flagger, move the flagger station so the work area is visible. Space the 40 mph speed limit sign at ½A in advance of the flagger sign and move the 65 mph speed limit sign. Cover or remove the 40 mph speed limit and Minimum Fee $150 signs and the 65 mph speed limit sign upon completion of the work day or when workers are not present.
3. RAMPS: When the work area encompasses an entrance ramp, install a 40 mph speed limit sign on the ramp and cover any existing yield sign. Install new yield sign as necessary. Remove the ramp speed limit sign when the main line 40 mph speed zone is moved past the ramp.
4. Variables:
   S=Numerical value of speed limit or 85th percentile
   W=The width of taper.
   L=Minimum length of taper, or SxW for freeways, expressways, and all other roads with speeds of 45 mph or greater, or
   WxSxS/60 for urban, residential, and other streets with speeds of 40 mph or less.
5. Space delineator drums for tapering traffic at the dimension "S". Space tubular markers used for tangents at 2 times dimension "S".
6. Place sequencing arrow panels at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the work area and place on the roadway surface.
   Use Type C on roadways with high traffic speeds and volumes (over 40 mph or 5000 ADT or greater).
7. Re-establish the speed limit. Determine the exact speed limit in the field, dependent on location and conditions.
8. Cover existing speed limit signs within a reduced speed zone.
9. Upon approval, the Engineer will measure obliterated or covered pavement marking as Obliteration of Pavement Marking.
10. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the diamond sign, and at such a distance above the edge that the flag does not touch the sign when limp.
11. Determine the reduced speed limit dependent on the in place speed limit before construction. When speed limits are to be reduced more than 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½B.
12. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
13. 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.



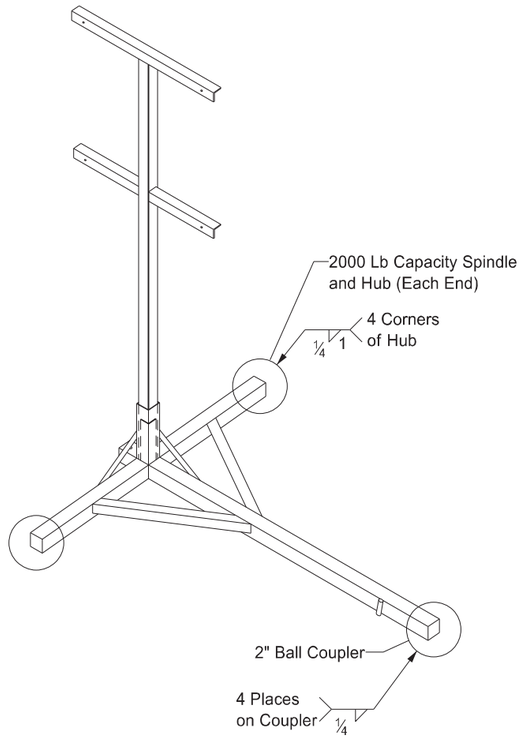
RIGHT LANE CLOSED
WORKERS IN WORK AREA

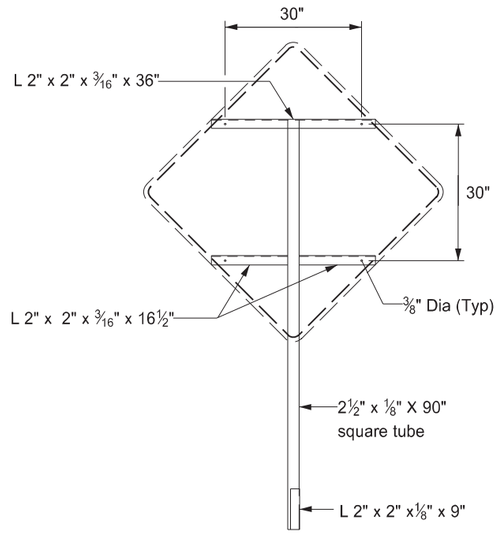
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-7-2012	
REVISIONS	
DATE	CHANGE
06-23-14	Revised Note 12
03-15-16	Removed Do Not Pass signs & updated notes
08-17-17	Moved speed signs & added note
10-17-17	Corrected spelling of "shoulder"
11-01-19	Revised tubular Mrkrs symbols
12-08-21	Switched order of Road Work Ahead and Spd Limit Enforced, added Dollars At Work, & removed table
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes

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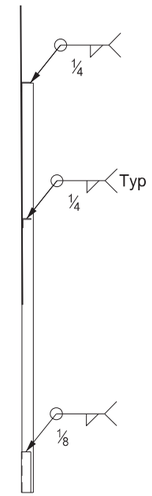
PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50





FRONT

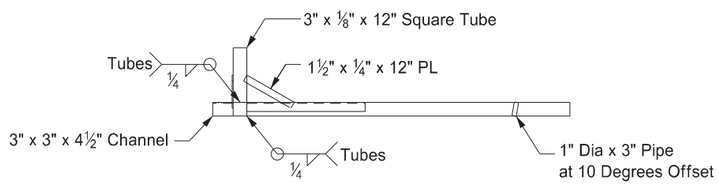


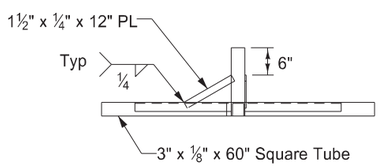
RIGHT

SIGN SUPPORT

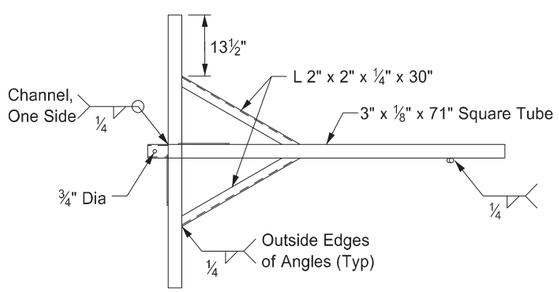
Notes:

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.

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12 02 2020

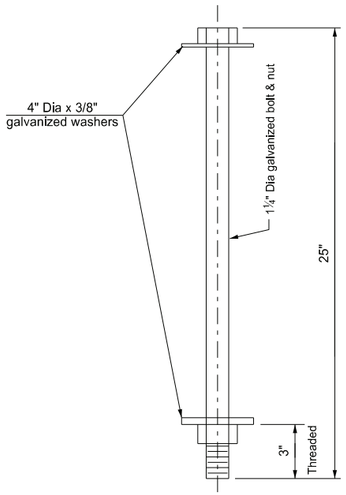
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CONCRETE MEDIAN BARRIER
(TEMPORARY USAGE)

D-704-51

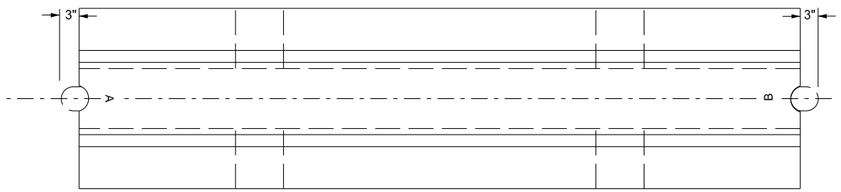
Notes:

1. Barrier ends imprinted with 4 inch letters A and B. Field match A end with B end.
2. Place barrier markers at the center of the barrier at 20' centers.
3. Connect barrier sections with 1 ¼" Dia A-307 double hex connecting bolt. Maintain bottom nut and washer connection for duration of barrier installation.
4. Place barrier to minimize openings between individual sections.

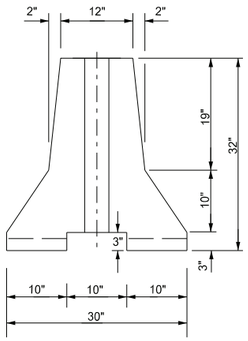


Connecting Bolt Detail

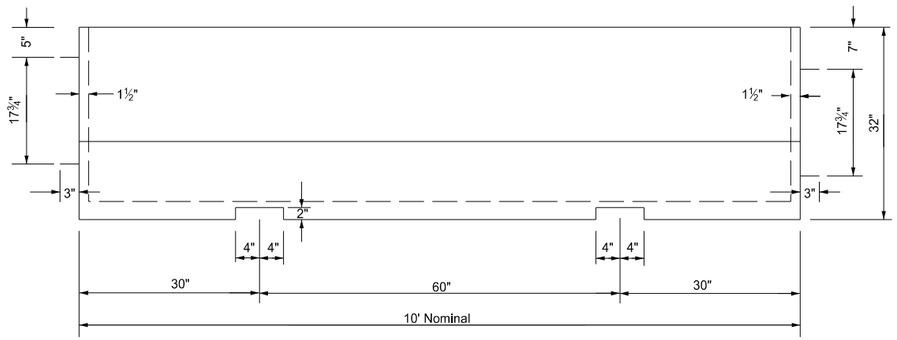
(One per 10 Ft section)



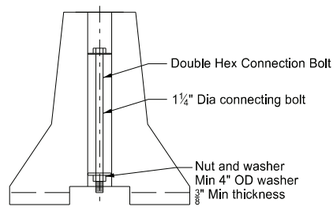
Plan View



End View



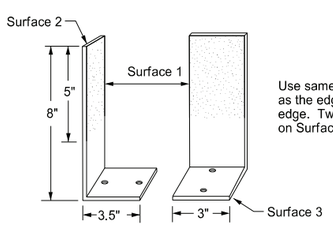
Side View



Bolt Connection Detail

Marker Body
Use high impact,weatherable engineering thermo-plastic material conforming to the following:

Property	Result	ASTM Test Method
Thickness (min)	.090"	——
Tensile strength (min psi) @ yield	5,500	D638
Impact strength @ -20°F (ft-lbs/in of notch)	3.2	D256 Method A
Impact strength @ 73°F (ft-lbs/in of notch)	14.0	D256 Method A
Flexural strength, PSI ¼" @ 73°F	8,000	D790
Flexural modulus, PSI ¼" @ 73°F	300,000	D790
Elongation @ yield	30%	D638



Use same color reflective faces as the edge line along barrier edge. Two way reflective on Surface 1 & 2.

Barrier Marker Detail

Reflective Tape
Use retroreflective, acrylic microprism material with acrylic backing, 3" wide, providing the following minimum optical performance with an observation angle of 0.1° measured in candlepower for the reflector:

Entrance Angle	Specific Intensity
Yellow - 4"	136
White - 4"	200

Adhesive
Use factory applied solid butyl rubber ⅛" thick, 2" wide on 2¼" wide release paper on surface 3 to temporarily mount markers to portable concrete barrier.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-20-12	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
11-01-19	New Design Engr PE Stamp
8-21-24	Removed Fabrication Info

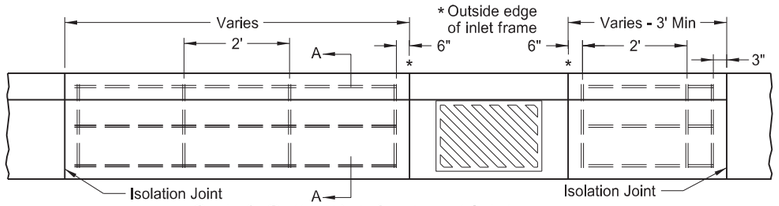
KIRK J. HOFF
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08/21/24

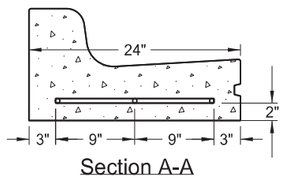
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Curb & Gutter and Valley Gutter

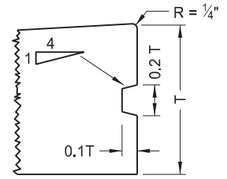
D-748-1



Curb & Gutter Reinforcing at Inlets



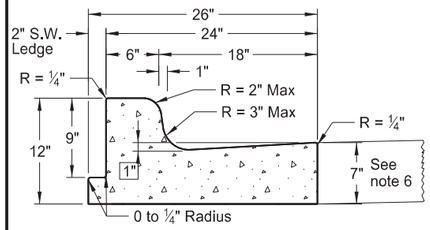
Section A-A



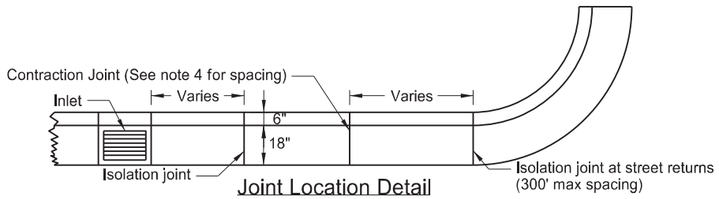
Keyway Detail for Curb & Gutter

(To be used with PCC Pavement and Drives)

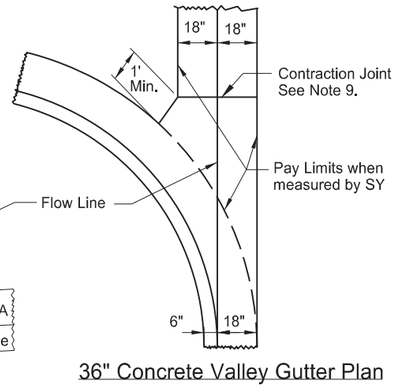
T= Thickness of pavement unless otherwise noted on plans.



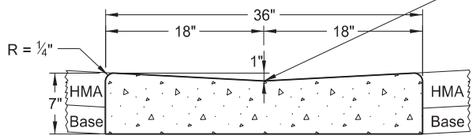
Curb & Gutter Type 1 (Sec. A & B)
Adjacent to Concrete Sidewalk, Median, or Parking Lot. (Sec. A shown. See Sec B for additional details.)



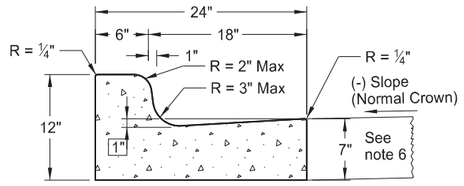
Joint Location Detail



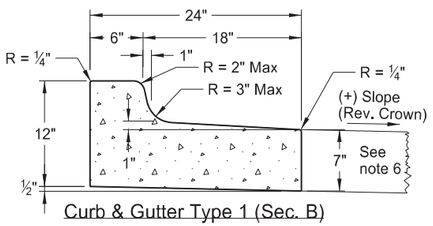
36" Concrete Valley Gutter Plan



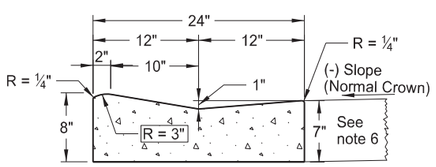
36" Concrete Valley Gutter Detail



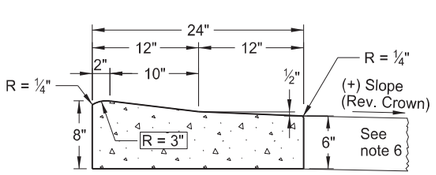
Curb & Gutter Type 1 (Sec. A)



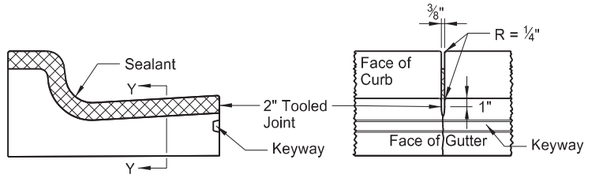
Curb & Gutter Type 1 (Sec. B)



Mountable Curb & Gutter Type 1 (Sec. A)



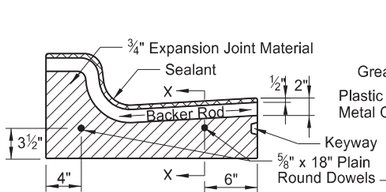
Mountable Curb & Gutter Type 1 (Sec. B)



Detail
(10' Max Spacing)

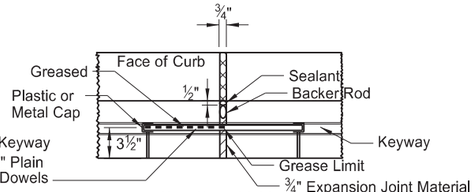
Contraction Joint

Section Y-Y

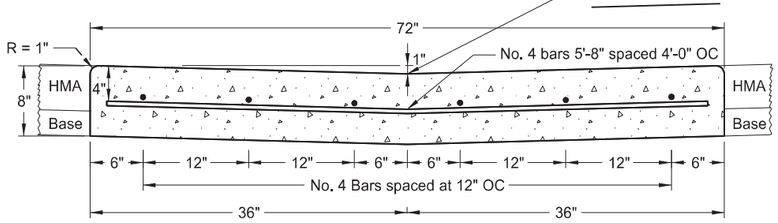


Detail

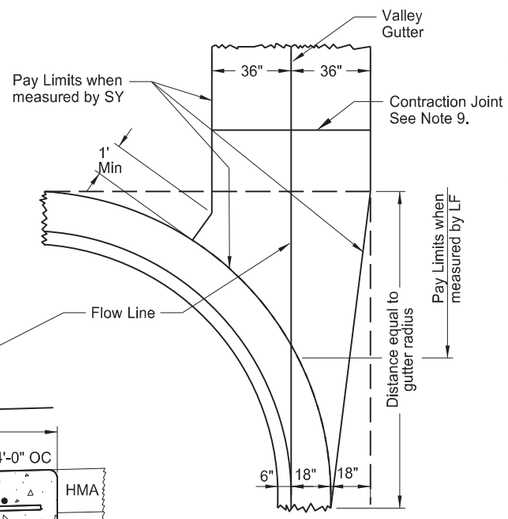
Isolation Joint



Section X-X



72" Concrete Valley Gutter Detail



72" Concrete Valley Gutter Plan

NOTES:

1. Use Curb and Gutter Type 1 (Sec. A & B). Use section "A" with (-) pavement slopes and section "B" with (+) pavement slopes.
2. Contraction Joints: Tool the Curb & Gutter 2" as shown on the contraction joint details.
3. Isolation Joints: Use ¾" expansion joint material for isolation joints. Form the backer rod and joint sealant opening with a pre-cut piece of wood or other material approved by the engineer. Dowel supports are not required on the second pour at a cold joint. Install plastic or metal caps and greased dowels in the cold joint for the second pour.
4. Joint Spacing: For hot mix asphalt pavements use a 10' max joint spacing for the curb and gutter with panels on each side of the inlets. For concrete pavements match the joint spacing for the curb and gutter to the pavement joint on PCC Pavements (approximately 15' spacing.)
5. Joint sealing: For contraction joint, use joint sealant that conforms to section 826.02B. Use sealant for expansion joints specified in note 3 above. Tool and install sealant in accordance with the manufacturer's recommendations.
6. Curb & Gutter-Pavement Interface: For hot mix asphalt pavement use gutter depth shown. For PCC pavements, either match gutter depth to adjacent pavement depth or construct gutter depth shown.
7. Tie curb and gutter to abutting PCC pavement with No. 4 bars, 2'-0" in length, spaced at 3'-9" centers for 15' joint spacing (maximum spacing of 4' centers).
8. On street returns and other locations where new curb and gutter ends and does not abut existing curb and gutter, taper the last two (2) feet of the curb from 6" in height to 0". Install a 1/2" premolded full depth isolation joint (the same shape as the curb and gutter just ahead of the taper) with an 18" plain round bar across the joint.
9. Valley Gutter Joints: Form, saw, or score ⅛" min. to ⅜" max. width contraction joints (a minimum 2" depth) at approx 10' intervals. Seal the joints with hot poured elastic type joint sealer (Section 826.02A.2 of the Standard Specifications.) Include all costs for the joint and sealant in the price bid for Valley Gutter.
10. Reinforcing at Inlets: Use #4 deformed reinforcing bars without splices. Include all costs for reinforcing bars at inlets (even inlets located on radii) in the price bid for "Curb & Gutter - Type 1" or "Curb & Gutter Mountable - Type 1." Extend reinforcement to the second joint (with rebar placed through the first joint) in cases where the 3' minimum panel length can't be obtained.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

8-7-2013

REVISIONS

DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engr PE Stamp.
10-30-24	Revised bar size & notes.

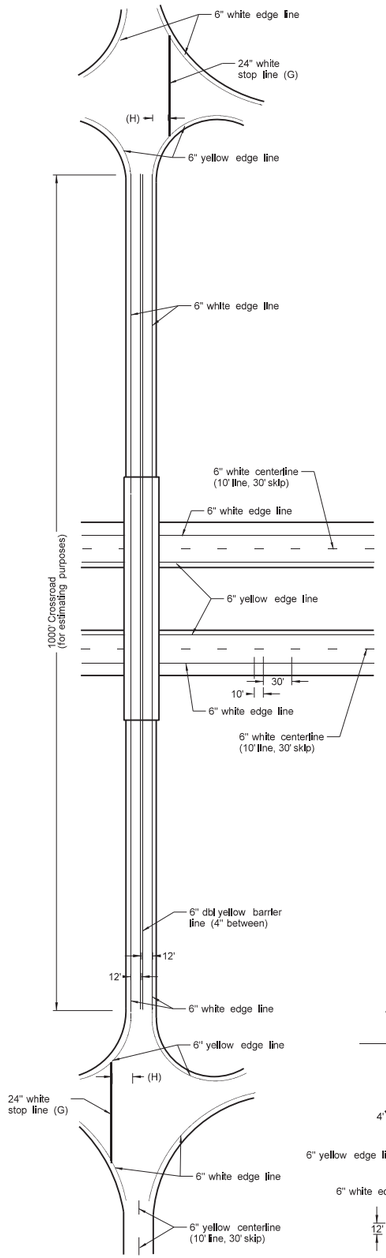
KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 ENGINEER NORTH DAKOTA

10/30/24

DocuSign Envelope ID: 09EA856C-BD61-42B6-B726-BC2420A5CEC1

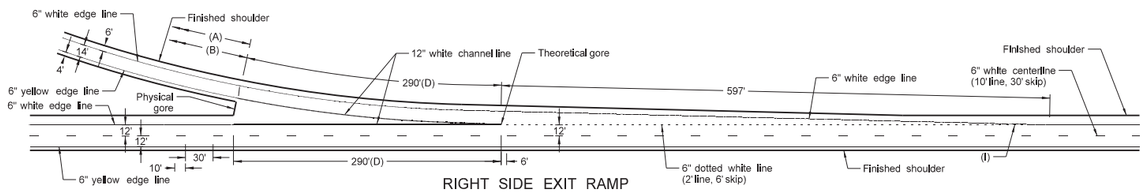
INTERSTATE PAVEMENT MARKING
4 LANE DIVIDED HIGHWAY

D-762-2

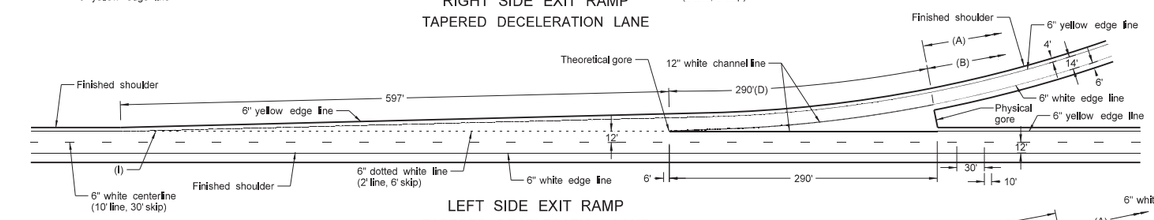


CROSS-ROAD & STRUCTURE

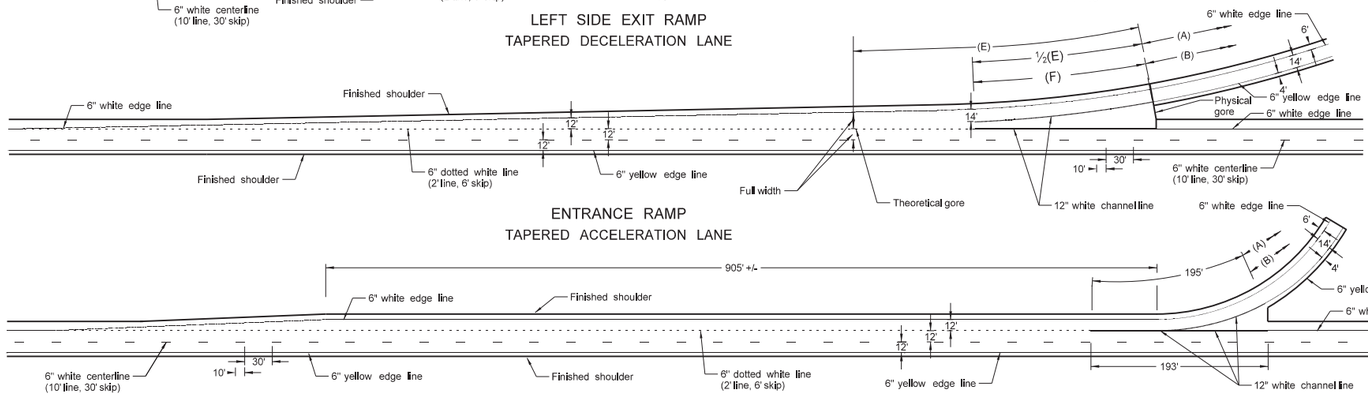
Engineer will determine length striped.



RIGHT SIDE EXIT RAMP
TAPERED DECELERATION LANE

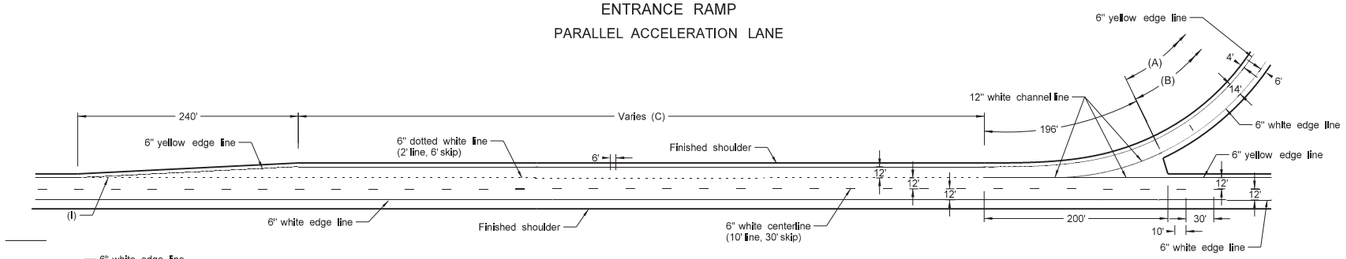


LEFT SIDE EXIT RAMP
TAPERED DECELERATION LANE

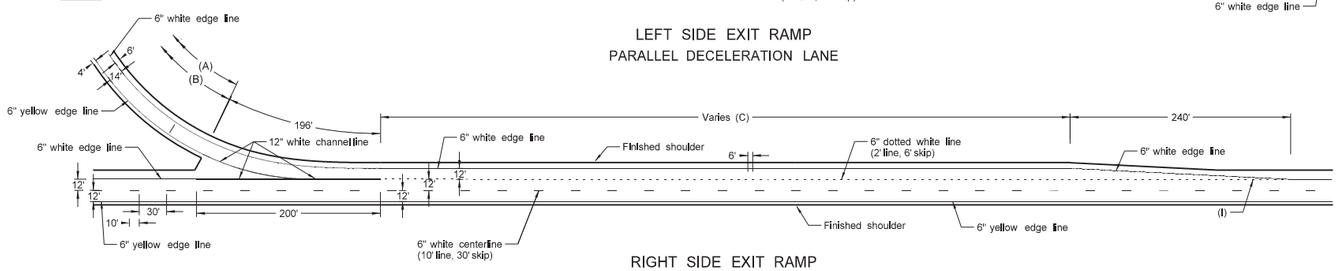


ENTRANCE RAMP
TAPERED ACCELERATION LANE

ENTRANCE RAMP
PARALLEL ACCELERATION LANE



LEFT SIDE EXIT RAMP
PARALLEL DECELERATION LANE



RIGHT SIDE EXIT RAMP
PARALLEL DECELERATION LANE

NOTE:

(A) Normal width white edge line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.

Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.

(B) Normal width yellow edge line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.

Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.

(C) Assume "varies" equals 790' for purpose of estimate. Place pavement marking from beginning of taper to the 12" line.
(D) Beginning of physical gore to theoretical gore.
(E) If the distace is less than 350' extend the 12" channel line to the theoretical gore, otherwise use 195'.
(F) Use 195' for estimating purposes.
(G) Not required for gravel surface crossroad approaches.
(H) 4' minimum, 15' maximum from nearest edge of intersection traveled way.
(I) Extend dotted line until it touches the edgeline.

BASIS OF ESTIMATE		
LOCATION	ITEM	
Right or Left Side Exit Ramp TAPERED	12" White channel line	580 LF
	24" White stop line	60 LF
	6" White dotted line	148 LF
	6" White edge line	1115 LF
	6" Yellow edge line	1075 LF
Entrance Ramp TAPERED	12" White channel line	390 LF
	6" White dotted line	258 LF
	6" White edge line	1270 LF
	6" Yellow edge line	1075 LF
Right or Left Side Exit Ramp PARALLEL	12" White channel line	396 LF
	24" White stop line	60 LF
	6" White dotted line (C)	258 LF
	6" White edge line	1115 LF
	6" Yellow edge line	1075 LF
Entrance Ramp PARALLEL	12" White channel line	388 LF
	6" White dotted line	283 LF
	6" White edge line	1275 LF
	6" Yellow edge line	1075 LF
Main Line (Both Roadways)	6" White lane line, 10' line, 30' skip	2640 LF/MI
	6" White edge line	10,560 LF/MI
	6" Yellow edge line	10,560 LF/MI
Cross Road	6" White edge line	2000 LF
	6" Dbl yellow barrier line (4" between)	2000 LF

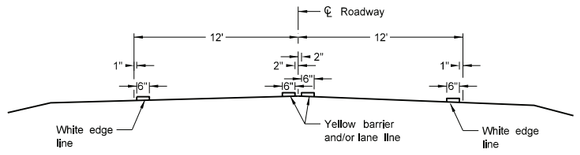
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-3-11	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice
10-25-19	Replaced 2' Max dim with Note (I)
11-05-21	Revised labels
11-22-23	Revised pvmt marking widths
1-17-24	Revised wide pvmt marking width

KIRK J. HOFFERT
REGISTERED
PROFESSIONAL
PE-4153
01/17/24
ENGINEER
NORTH DAKOTA

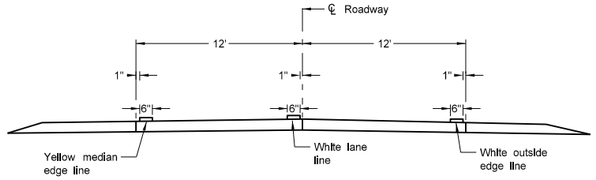
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PAVEMENT MARKING

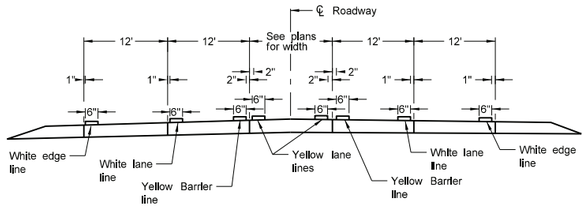
D-762-4



Two Lane Two Way
RURAL ROADWAY



Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



RURAL FIVE LANE ROADWAY
Concrete Section

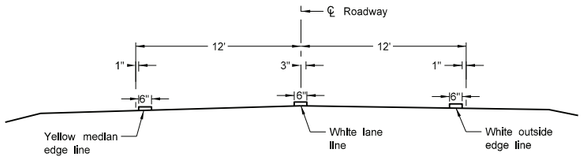
NOTES:

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

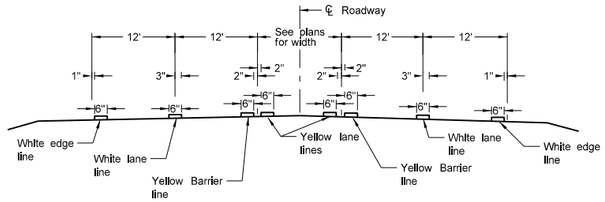
   For section lines, county roads, and street approaches, stripe the radii and edge lines of the paved surface within the right of way except where curb and gutter is present.

2. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph,

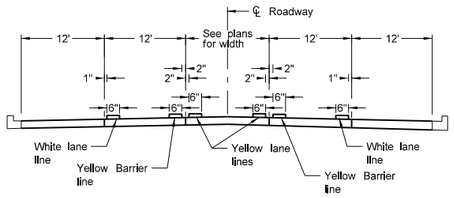
3. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits < 40 mph.



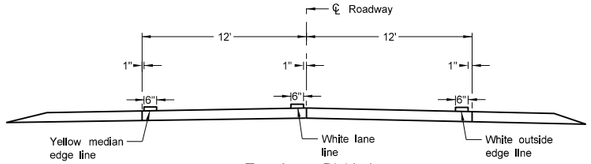
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



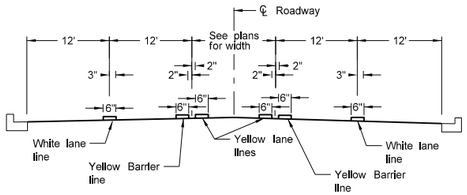
RURAL FIVE LANE ROADWAY
Asphalt Section



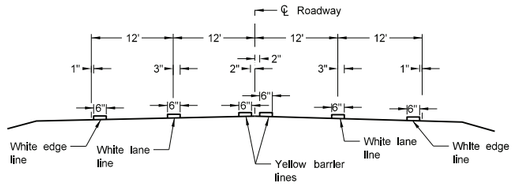
URBAN FIVE LANE SECTION
Concrete Section



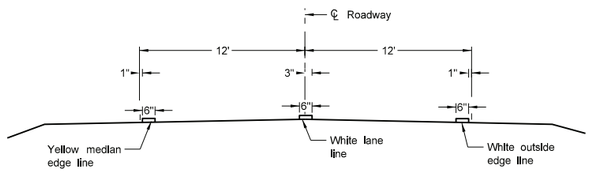
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



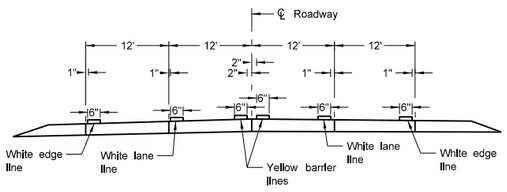
URBAN FIVE LANE SECTION
Asphalt Section



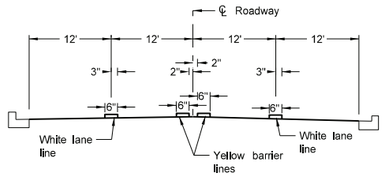
RURAL FOUR LANE ROADWAY
Asphalt Section



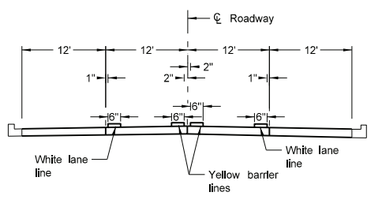
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



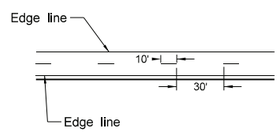
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

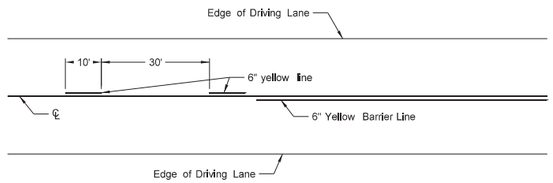
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.
11-22-23	Revised pavement marking widths.
07-09-24	Modified Note 1.

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
07/09/24
ENGINEER
NORTH DAKOTA

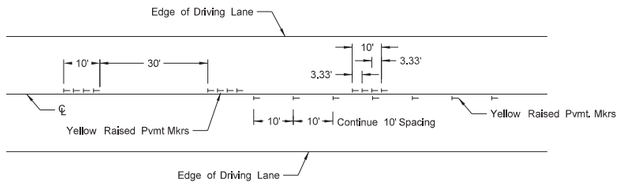
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SHORT-TERM PAVEMENT MARKING

D-762-11

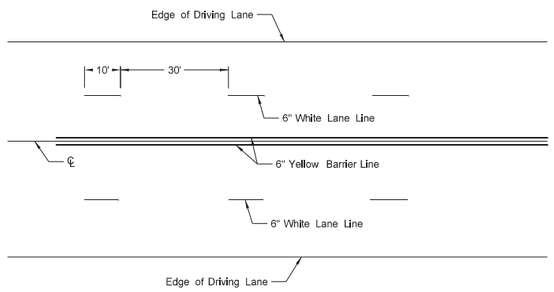


Painted or Tape Lines

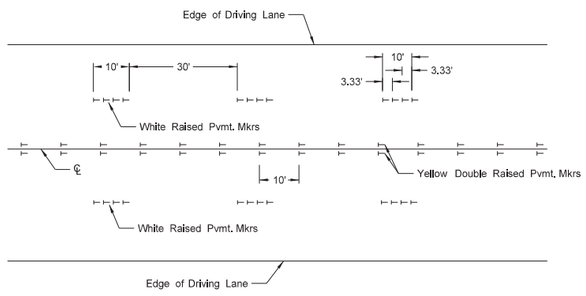


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

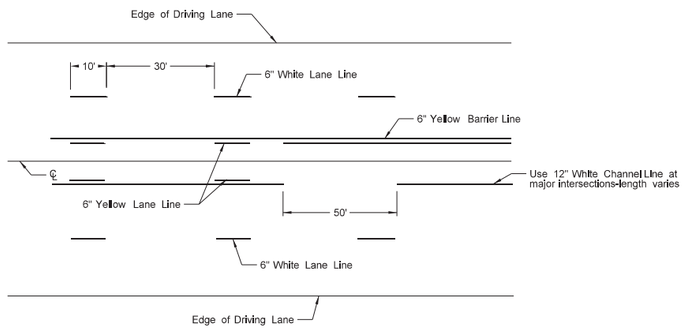


Painted or Tape Lines

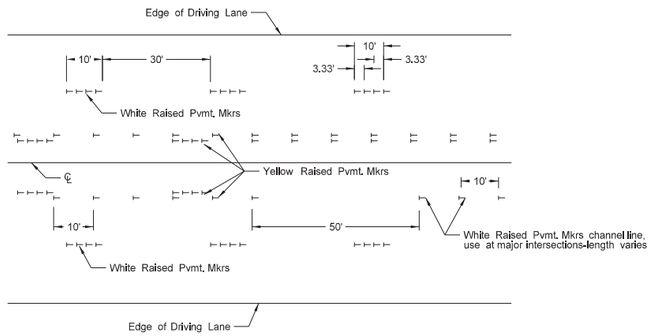


Raised Pavement Markers

FOUR LANE ROADWAY

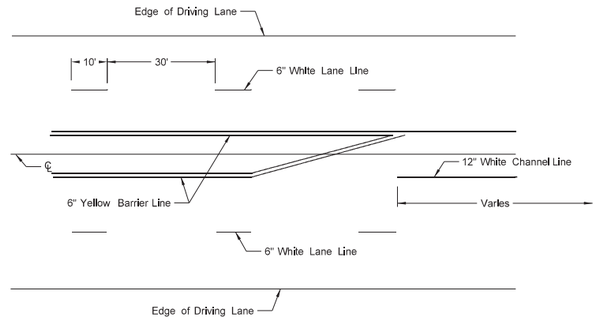


Painted or Tape Lines

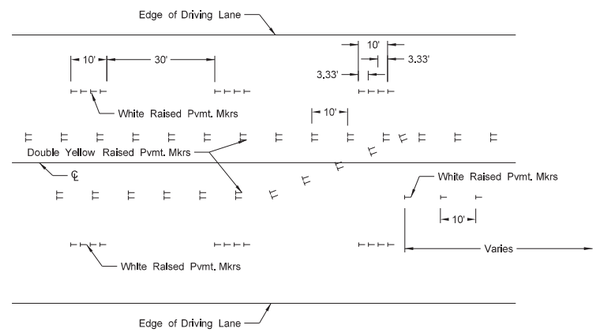


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

NOTES:

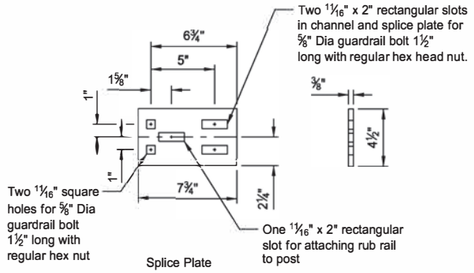
1. Place no passing zones on two-lane two-way roadways as shown. In lieu of short term no passing zone pavement markings, place no passing zone signs. Replace no passing zone signs with short term no passing zone pavement marking within three days.
2. Place short term center line stripe (paint) on top 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 12 inches wide if 6 inch normal width lines are used.

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

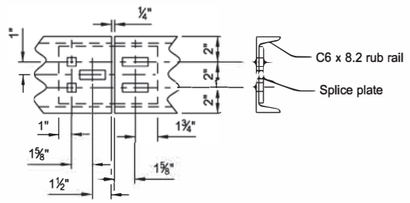
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
01/17/24
ENGINEER
NORTH DAKOTA

W-BEAM GUARDRAIL GENERAL DETAILS

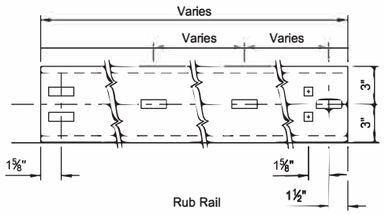
D-764-1



Splice Plate

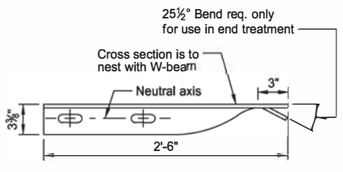


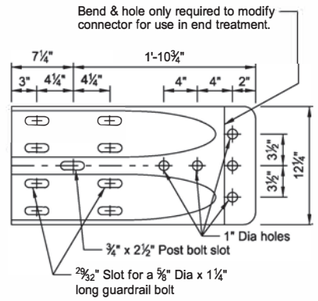
Splice Detail



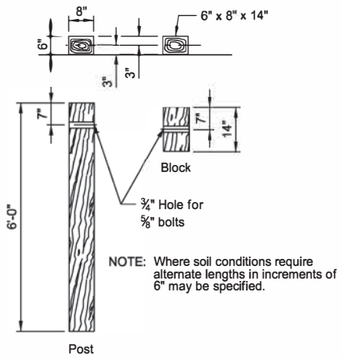
Rub Rail

C6x8 RUB RAIL AND SPLICE PLATE



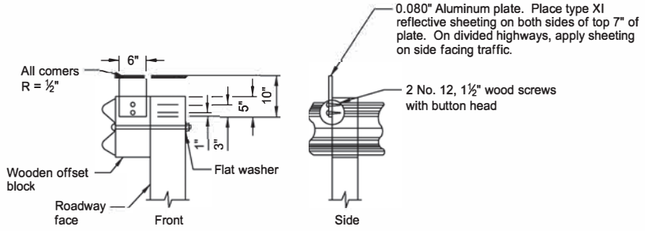


W BEAM TERMINAL CONNECTOR



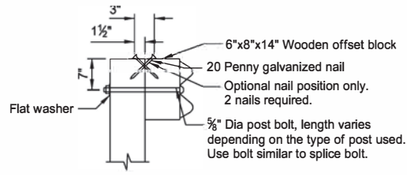
Post

6"x8" TIMBER POST & BLOCK

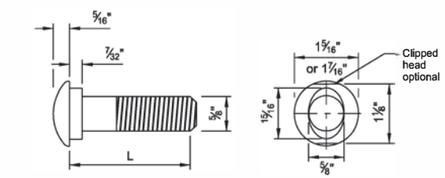


REFLECTORIZED PLATE DETAIL

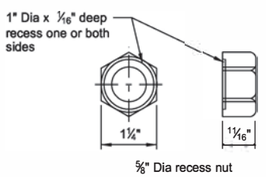
Additional reflectors are added to the W-beam guardrail quantities for placement on end treatment.



TYPICAL POST ATTACHMENT DETAIL

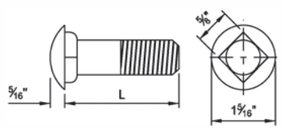


5/8" Diameter Guardrail Bolt	
L	Thread Length
1 1/4"	Full length thread
2"	1 3/4" Min thread length
9 1/2"	4" Min thread length
18"	4" Min thread length
20"	4" Min thread length
22"	4" Min thread length
25"	4" Min thread length



5/8" Dia recess nut

5/8" GUARDRAIL BOLT & RECESS NUT

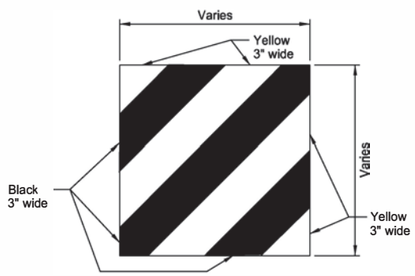


5/8" Diameter Carriage Bolt	
L	Thread Length
1 1/2"	Full length thread
3"	1 1/2" Min thread length
11"	1 3/4" Min thread length
13"	1 3/4" Min thread length

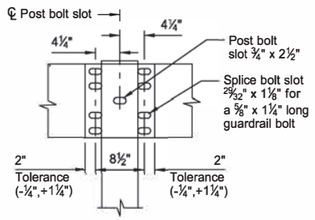


5/8" Hex nut

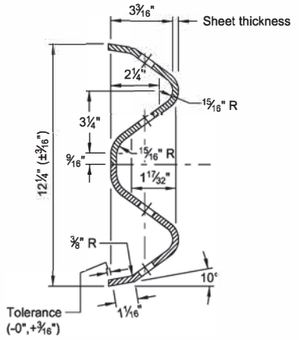
5/8" CARRIAGE BOLT & NUT



IMPACT HEAD OBJECT MARKER



SPLICE DETAIL



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

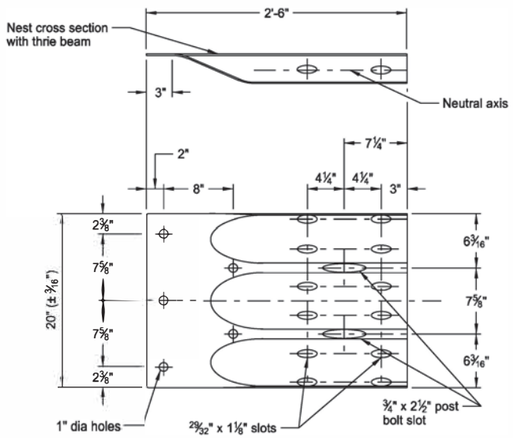
DATE	CHANGE
10-25-19	Updated notes to active voice and added Note 5.
12-02-20	Updated clipped head to optional

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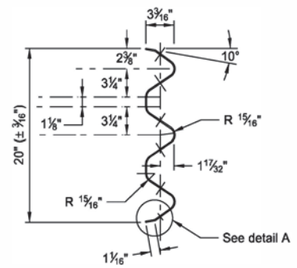
12 02 2020

THRIE BEAM TRANSITION TO DOUBLE BOX BEAM RETROFIT

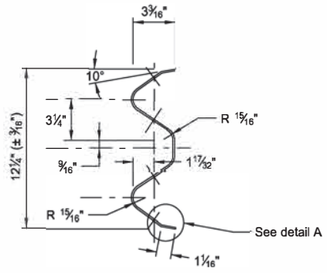
D-764-10



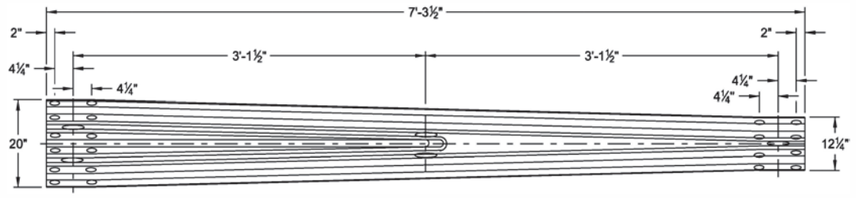
THRIE BEAM TERMINAL CONNECTOR



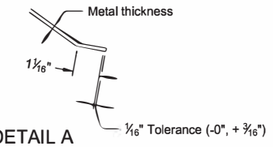
THRIE BEAM END VIEW



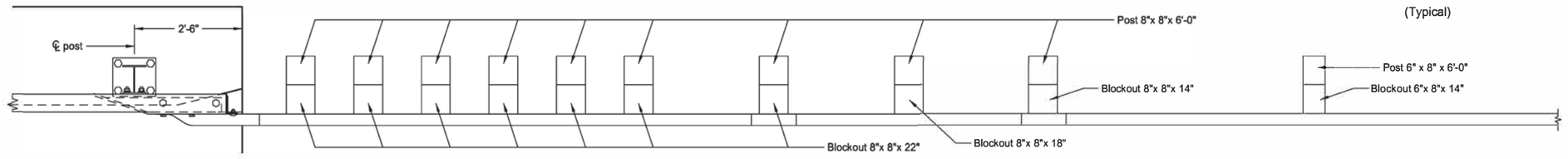
W-BEAM END VIEW



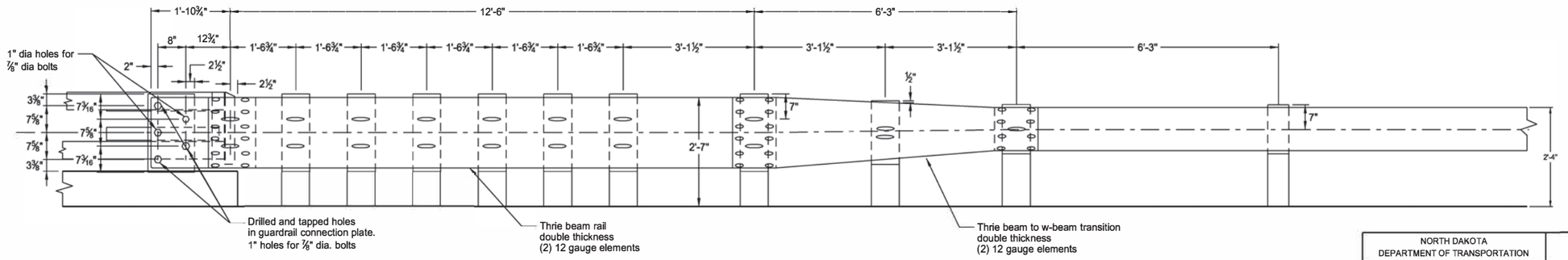
THRIE BEAM TO W-BEAM TRANSITION SECTION



DETAIL A
(Typical)



PLAN



ELEVATION

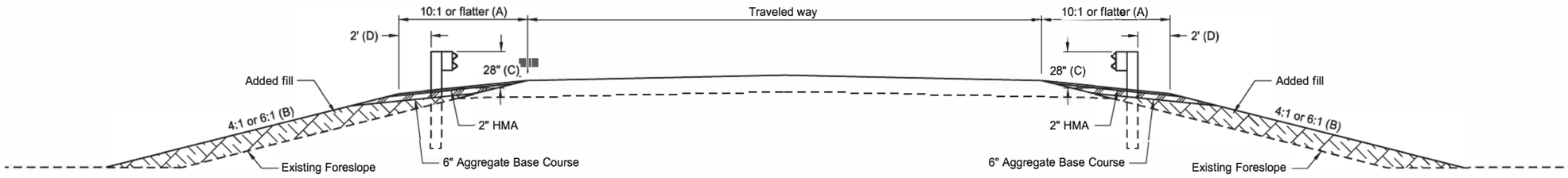
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-11-13	
REVISIONS	
DATE	CHANGE
12/02/20	Updated text to active voice.

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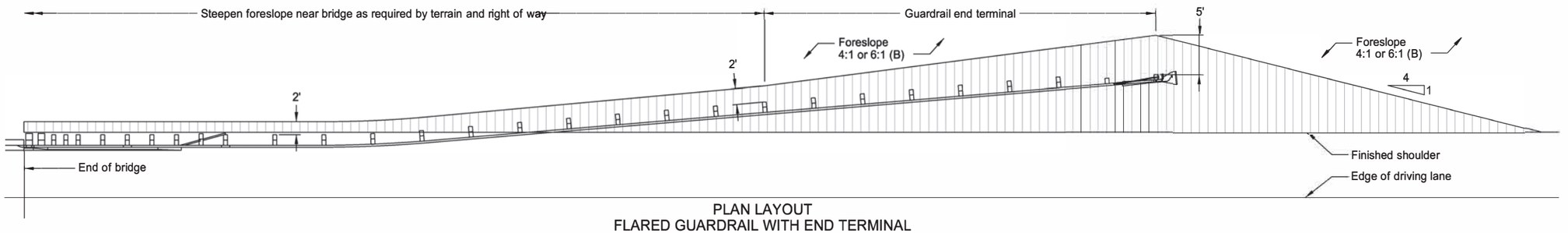
12 02 2020

D-764-22

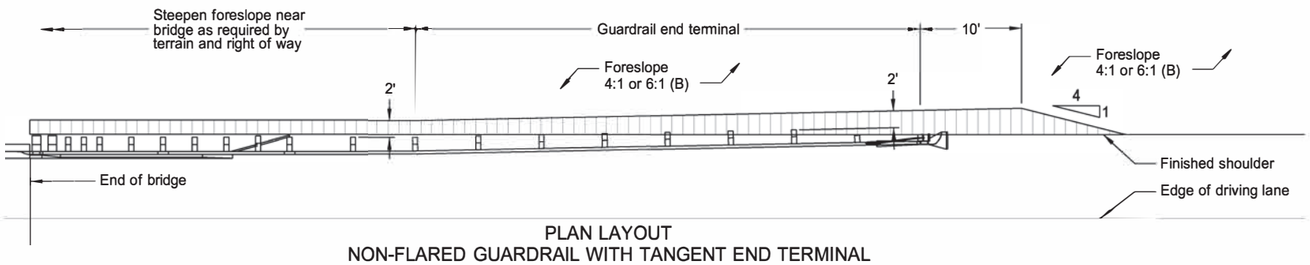
TYPICAL GRADING AT BRIDGE ENDS WITH W-BEAM GUARDRAIL



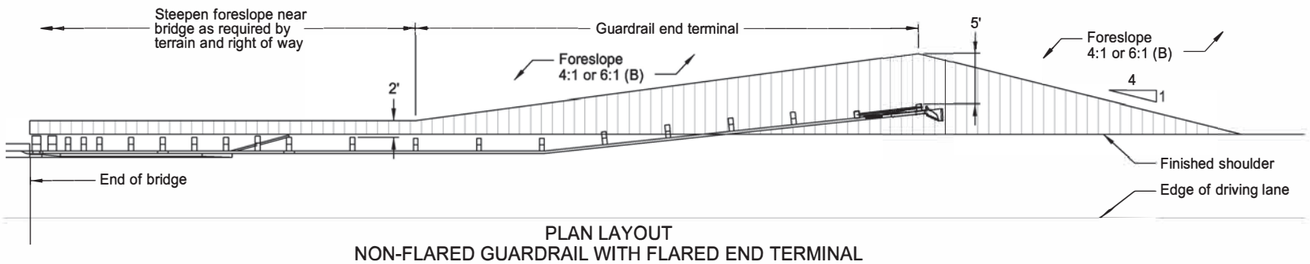
TYPICAL SECTION



PLAN LAYOUT
FLARED GUARDRAIL WITH END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH TANGENT END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH FLARED END TERMINAL

NOTES:

(A) Use slope flatter than 10:1 when necessary to provide proper guardrail height.

(B) When normal foreslope is 4:1, use added fill slope of 4:1. When normal foreslope is 6:1, use added fill slope of 6:1.

(C) Measure from top of guardrail to top of surfacing at front face of guardrail.

(D) Dimension at end terminals vary per Plan Layouts shown on this sheet.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
12-02-20	Updated notes to active voice.

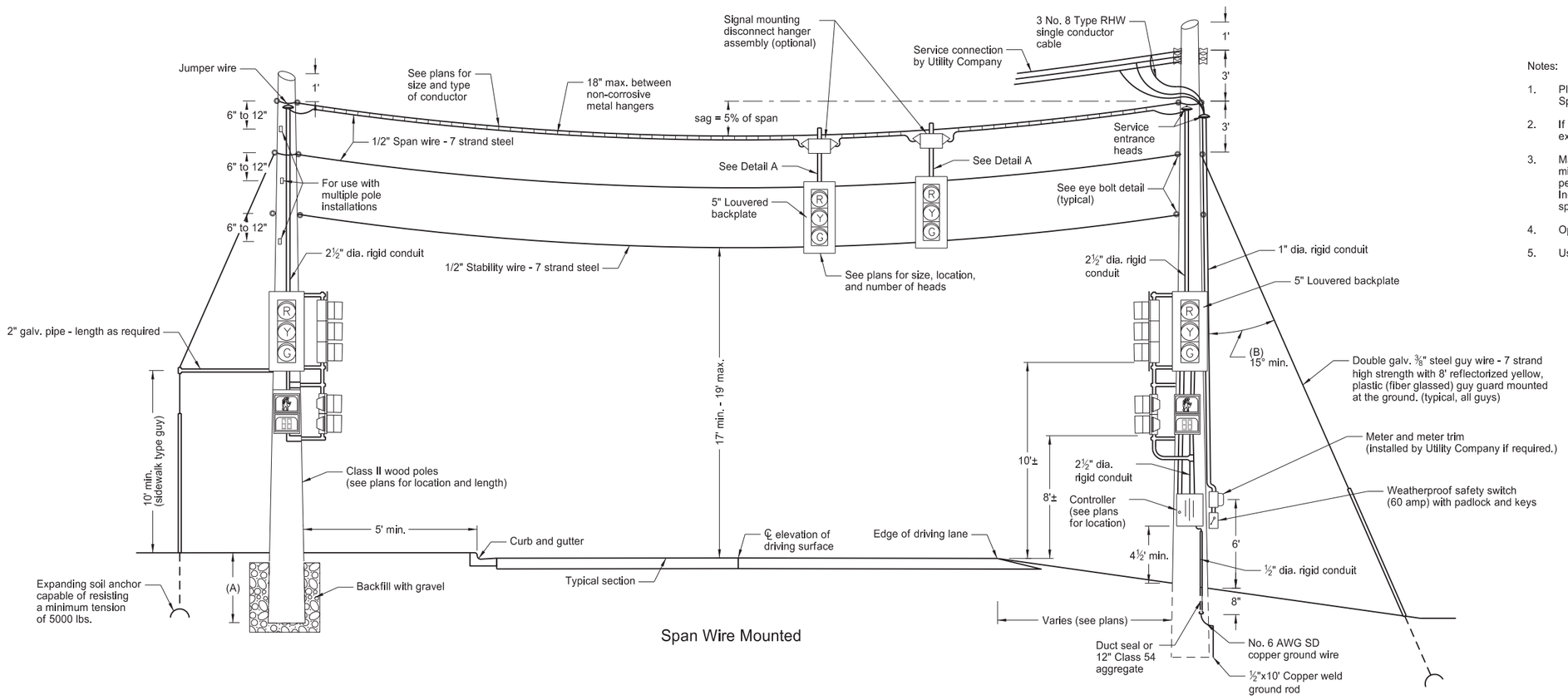
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12 02 2020

Docusign Envelope ID: CBA567C7-C11B-4F0B-89AF-E47B33997859

SPAN WIRE MOUNTED TRAFFIC SIGNALS

D-772-6



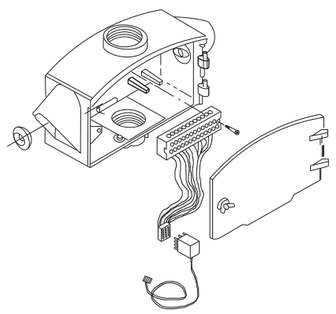
Span Wire Mounted

Notes:

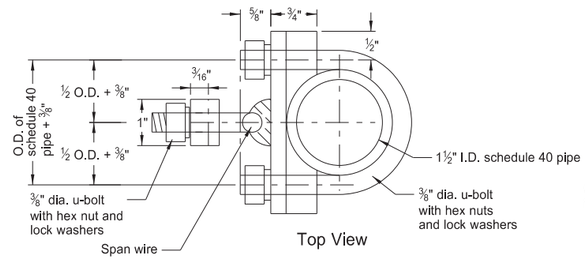
1. Place span wired mounted traffic signals in accordance with Standard Specifications Section 772 and 896.
2. If a guy wire angle of less than 45° is used, increase the capability of the expanding soil anchor to resist tensions on site.
3. Maintain the required 17 to 19 ft. signal height over the roadway for a minimum period of 90 calendar days after installation, unless written permission is granted by the Engineer to waive the 90 day requirement. Include all costs to maintain the signal head elevation in the price bid for span wire mounted signals.
4. Operate traffic signal controller on 120 volts.
5. Use thimble type connections for span wire and stability wire.

(A) Pole Depth of Setting	
Length of pole (ft)	Depth of pole mln. (ft)
35	6
40	6
45	6.5
50	7
55	7.5

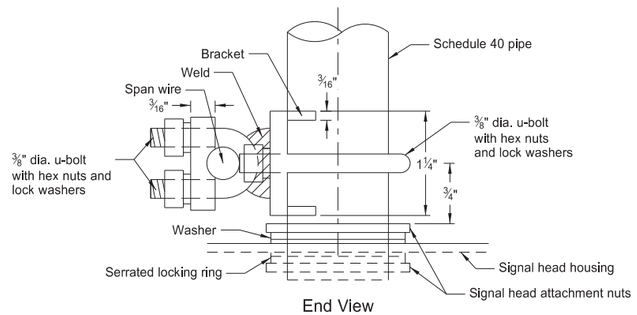
(B) Guy Wire	
Angle	Anchor Resistance min.
30°	12,000 lbs.
15°	24,500 lbs.



Signal Mounting Disconnect Hanger Assembly

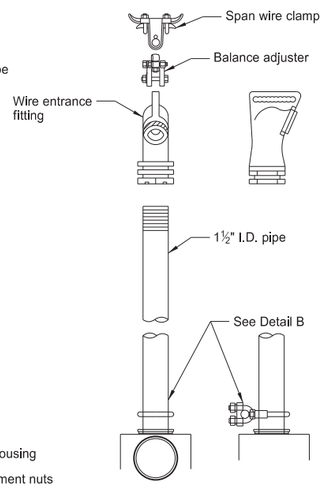


Top View

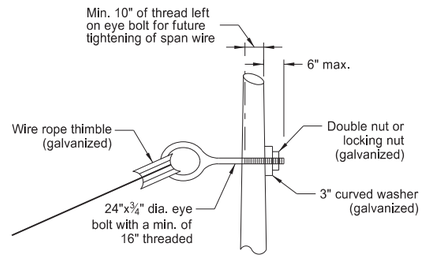


End View

Detail B



Detail A



Eye Bolt Detail

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
07-08-14	Title change, span wire size 7 sag
10-17-17	Updated to active voice
08-28-19	New Design Engineer PE Stamp
08-20-25	Added physical stamp & signature

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08/20/25