

	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	SS-1-999(053)	23897	1	1

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

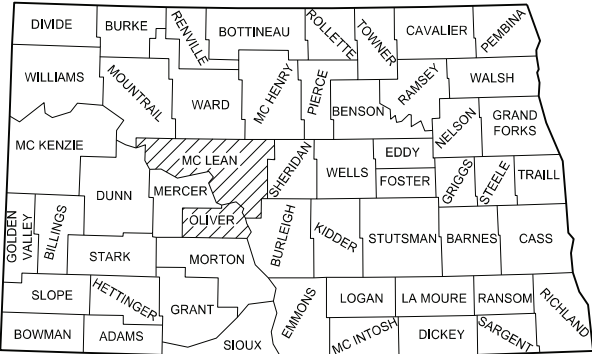
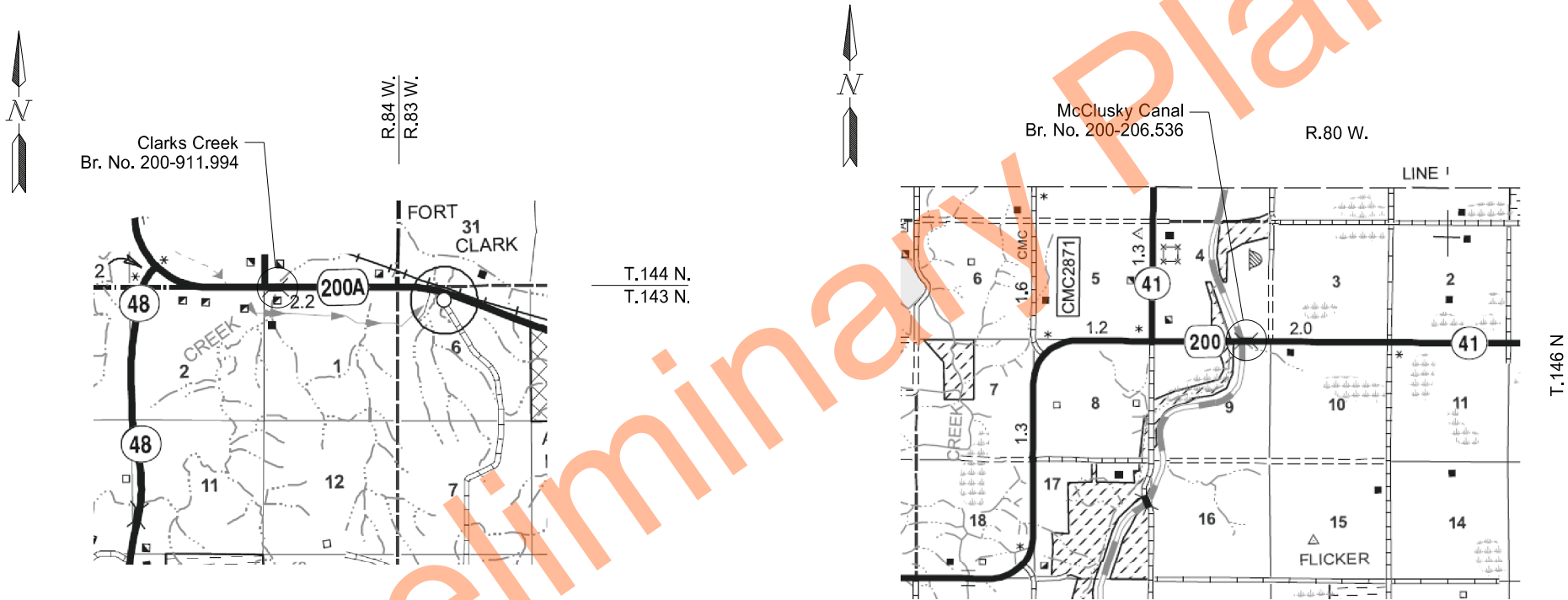
SS-1-999(053)

McLean & Oliver Counties
McClusky Canal, Clarks Creek ~ Bismarck District

Deck Overlay, Rail Retrofit, Concrete Spall Repair, Approach Paving, Guardrail

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
SS-1-999(053)	N/A	N/A



STATE COUNTY MAP

ND DEPARTMENT OF TRANSPORTATION
OFFICE OF PROJECT DEVELOPMENT

Jason Thorenson
Jason Thorenson
07/24/26

BRIDGE DIVISION



TABLE OF CONTENTS						STATE	PROJECT NO.	SECTION NO.	SHEET NO.
						ND	SS-1-999(053)	2	1
PLAN SECTIONS					LIST OF STANDARD DRAWINGS				
Section	Page(s)	Description	Number	Description					
1	1	Title Sheet	D-101-1, 2, 3, 4	NDDOT Abbreviations					
2	1	Table of Contents	D-101-10	NDDOT Utility Company and Organization Abbreviations					
6	1 - 3	Notes	D-101-20, 21	Line Styles					
6	4	Environmental Notes	D-101-30, 31, 32, 33	Symbols					
8	1 - 2	Quantities	D-704-7	Breakaway Systems For Construction Zone Signs - Perforated Tube					
10	1	Basis of Estimate	D-704-8	Breakaway Systems For Construction Zone Signs - U-Channel Post					
20	1 - 2	General Details	D-704-9	Construction Sign Details - Terminal And Guide Signs					
100	1 - 7	Work Zone Traffic Control	D-704-10	Construction Sign Details - Regulatory Signs					
120	1 - 2	Pavement Marking	D-704-11, 11A	Construction Sign Details - Warning Signs					
130	1 - 3	Guardrail	D-704-13	Barricade And Channelizing Device Details					
170	1 - 6	Bridge ~ 200-206.536	D-704-14	Construction Sign Punching And Mounting Details					
170	7 - 9	Bridge ~ 200-911.994	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-704-33	Two-Lane Roadway Portable Rumble Strips					
			D-704-34	Sign Layout For One Lane Closure					
			D-704-50	Portable Sign Support Assembly					
			D-748-1	Curb & Gutter And Valley Gutter					
			D-762-4	Pavement Marking					
			D-762-11	Short-Term Pavement Marking					
			D-764-1	W-Beam Guardrail General Details					
			D-764-5	Sequential Kinking Terminal					
			D-764-10	Thrie Beam Transition To Double Box Beam Retrofit					
			D-764-13	W-Beam Guardrail With Approaches Near Bridge For Low Volume Low Speed Roadways					
			D-764-14	Special W-Beam Guardrail Anchor					
			D-764-22	Typical Grading At Bridge Ends With W-Beam Guardrail					
SPECIAL PROVISIONS									
Number	Description								
SSP 2	Federal Migratory Bird Treaty Act								
SP 442(25)	Concrete Spall Repair								
SP 485(25)	Commercial Grade Asphalt Without Density								

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-999(053)	6	1

NOTES

202-P01 REMOVAL OF BITUMINOUS SURFACING: Remove surfacing and aggregate base at the new guardrail installation location.

Include the cost of labor, equipment, and materials to remove surfacing and aggregate base in the unit price bid for "Removal of Bituminous Surfacing".

704-200 STATE FURNISHED MEDIAN BARRIER: Obtain (46) 22.5" x 12.5' concrete barriers. They can be picked up from the Casselton yard at 15482 37th St SE in Casselton ND 58012. The hardware can be picked up from 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. They can be returned to the New Salem yard.
Contact the Bismarck District office at 701-328-6950 to facilitate the exchange.

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 standard. 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

704-900 ATTENUATION DEVICE TYPE B: Install either of the following attenuation devices:

- The barrel type shown on standard D-704-01; or
 - The liquid filled attenuation device described in this note.
- Install liquid filled attenuation devices that are 2.5 feet wide.

Before installing devices, provide the Engineer a Certificate of Compliance stating that the devices meet NCHRP Report 350, MASH 2009, or MASH 2016, and a copy of an eligibility letter from FHWA.

Use devices rated for the MPH designation used in the item description.

Install devices according to the manufacturer's specifications.

Liquid filled attenuators may not be deployed in any portion of the months of January, February, and December, nor before the 15th of March.

If liquid filled attenuation devices are deployed after the 15th of March or in any portion of the months of April, October or November, include calcium magnesium acetate or potassium acetate in the liquid filled barrier solution. Mix the anti-icing chemicals with water as recommended by the anti-icing chemical manufacturer to protect the barrier from freezing to a temperature of 0°F. Contact the Engineer and the NDDOT Environmental and Transportation Services Division in the case of a spill leaving the roadway. Dispose of the mixture inside the device as specified in Section 107.17, "Removed Material".

Provide a full replacement set of attenuators available to the project. If the replacement devices are installed, have a set of replacement devices available to the project within 3 calendar days.

Immediately replace any damaged pieces. The Department will reimburse the Contractor for damaged pieces based on the invoice price plus 10 percent. All other costs associated with installing and maintaining replacement pieces will be at no additional cost to the Department.

704-P01 TRAFFIC CONTROL DEVICES: The traffic control devices list has been developed using the following layouts in the Standard Drawings for traffic control.

1. Standard D-704-16; Lane Closure on a Two Lane Road Using Traffic Control Signals
2. Standard D-704-17; Sign Layout for One Lane Closure Two Lane Roadway



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-999(053)	6	2

NOTES

704-P02 TRAFFIC CONTROL PHASING: Quantities provided in the traffic control devices list were calculated using the following phases:

Phase 1 refers to the westbound lane closures for two ND 200 bridge locations (0200-206.536, 0200-911.994)

Phase 2 refers to the eastbound lane closures for two ND 200 bridge locations (0200-206.536, 0200-911.994)

For the outside lane closure, place precast median barriers so that they are centered over the centerline marking. Install interim white edgeline adjacent to the barriers as shown in Standard Drawing D-704-16. Maintain a minimum of 14 feet of open travel lane width at all times.

704-P03 STATE FURNISHED MEDIAN BARRIER: Place 10 barriers on the roadway centerline on the structure (work area) and 9 barriers at 15:1 taper (6' offset) in accordance with D-704-16. A quantity of 26 barriers are needed for the work on structure #200-911.994 and 20 barriers are needed for the work on structure #200-206.536. The quantity of barriers provided is enough for 2 locations to be worked on simultaneously.

Preliminary Plans



NOTES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-999(053)	6	3

SECTION 130

203-P01 GUARDRAIL EMBANKMENT: The embankment material required for guardrail installation is not available within the highway right of way. It will be the contractor's responsibility to obtain embankment material.

Include all costs to locate the embankment material in the contract unit price bid for "Guardrail Embankment."

748-P01 CURB & GUTTER – TYPE 1 SPECIAL: Install curb and gutter at the McClusky Canal Crossing, Str No. 0200-206.536 in accordance with Standard Drawing D-748-1. Utilize a 3" curb height in place of the 6" curb height shown in the standard drawing.

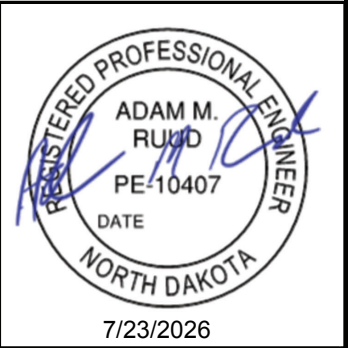
Install #4 rebar with a length that will provide 3" clear distance on each end. Use grade 60 reinforcing steel meeting Section 612.

Include all costs for constructing the curb and gutter as described above in the contract unit price bid for the item "Curb & Gutter – Type 1 Special."

764-P01 REMOVE CONCRETE SAFETY SHAPE TRANSITION: This item consists of removing the concrete safety shape transitions at the corners of the McClusky Canal Crossing, Str No. 200-206.536.

Each safety shape transition is 13'-7" in length and is constructed of approximately 2.1 cubic yards of reinforced concrete. The bottom of the safety shape transition is approximately 2 feet below the finished surface. Saw cutting may be required to separate the safety shape transition from the adjacent bridge E-rail barrier that is to remain in place.

Include all costs for the removal as described above in the contract unit price bid for "Remove Concrete Safety Shape Transition."



ENVIRONMENTAL NOTES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-999(053)	6	4

ENVIRONMENTAL NOTES (EN): The North Dakota Department of Transportation and the Federal Highway Administration have made environmental commitments to secure approval of this project. The following environmental notes are requirements to comply with these commitments:

EN-1 THREATENED AND ENDANGERED SPECIES: The project is located near/within suitable habitat for the species listed in the following table.

SPECIES	HABITAT	PRESENCE
Northern Long-Eared Bat	Forested/Wooded Areas/Bridges/Box Culverts/Caves/Mines	Active Season: April 15 - October 31* Inactive Season: Nov 1 – April 14*

*Time frames can differ slightly, depending on the year

If any of the above threatened and endangered species are identified within 1 mile of the project, the Contractor will notify the Engineer immediately and cease construction activities in the vicinity until an avoidance area is established. The Engineer will establish an avoidance area that is at least a 0.5 mile and immediately coordinate with the USFWS (701-355-8513), FHWA (701-221-9464), and NDDOT Environmental and Transportation Services (701-328-2592). The Contractor will not resume work within the avoidance area until the Engineer has confirmed with the agencies that work may proceed (either the species have left the area, or approved avoidance/minimization measures have been implemented).

Preliminary Plans



ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-999(053)	8	1

SPEC CODE	ITEM DESCRIPTION	UNIT	QUANTITY	TOTAL
103	0100 CONTRACT BOND	L SUM	1	1
202	0132 REMOVAL OF BITUMINOUS SURFACING	SY	644.23	644.23
203	0218 GUARDRAIL EMBANKMENT	EA	4	4
302	0120 AGGREGATE BASE COURSE CL 5	TON	754.97	754.97
411	0100 MILLING PAVEMENT SURFACE	TON	40	40
430	0500 COMMERCIAL GRADE HOT MIX ASPHALT	TON	644.232	644.232
602	1250 PENETRATING WATER REPELLENT TREATMENT	SY	1,170	1,170
602	1300 BRIDGE DECK GROOVING	SF	8,469	8,469
624	3002 DOUBLE BOX BEAM RAIL RETROFIT - E-RAIL	LF	212	212
650	0704 OVERLAY CONCRETE	CY	35	35
650	0707 DECK CONCRETE	CY	12	12
650	0720 CLASS 1 REMOVAL	SY	660	660
650	0721 CLASS 2 REMOVAL	SY	229	229
650	0722 CLASS 2-A REMOVAL	LF	412	412
650	0723 CLASS 3 REMOVAL	SY	58	58
650	0724 CLASS 4 REMOVAL	SY	16	16
650	0805 DECK SPALL REPAIR	SF	37	37
702	0100 MOBILIZATION	L SUM	1	1
704	1000 TRAFFIC CONTROL SIGNS	UNIT	1,508	1,508
704	1018 LANE CLOSURE-SIGNAL CONTROL/FLAGGING CONTROL	EA	2	2
704	1043 ATTENUATION DEVICE-TYPE B-65	EA	4	4
704	1052 TYPE III BARRICADE	EA	4	4
704	1060 DELINEATOR DRUMS	EA	45	45
704	1500 OBLITERATION OF PAVEMENT MARKING	SF	1,400	1,400
704	3511 STATE FURNISHED MEDIAN BARRIER	LF	575	575
748	0141 CURB & GUTTER-TYPE 1 SPECIAL	LF	60	60
762	0114 EPOXY PVMT MK 6IN LINE	LF	1,945	1,945
762	0422 SHORT TERM 6IN LINE-TYPE R	LF	400	400
762	0426 SHORT TERM 24IN LINE-TYPE R	LF	48	48
764	0131 W-BEAM GUARDRAIL	LF	311	311
764	0145 W-BEAM GUARDRAIL END TERMINAL	EA	6	6
764	0151 REMOVE W-BEAM GUARDRAIL & POSTS	LF	158	158
764	1990 REMOVE CONCRETE SAFETY SHAPE TRANSITION	EA	4	4

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-999(053)	8	2

SPEC CODE	ITEM DESCRIPTION	UNIT	QUANTITY	TOTAL
764	2081 REMOVE END TREATMENT & TRANSITION	EA	12	12
930	8644 SILICONE SEALANT	LF	146	146
930	9612 SPALL REPAIR	SF	15	15

Preliminary Plans

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-1-999(053)	10	1

Estimated Quantities for Guardrail Embankment Surfacing							
				West of Bridge		East of Bridge	
Spec	Code	Bid Item	UNIT	RT	LT	RT	LT
202	132	Remove Bituminous Surfacing	SY	214.50	115.87	98.95	214.91
		2" Bituminous with 6" Aggregate Base					
302	120	Aggregate Base Course Cl 5 @ 1.875 Ton/CY+25%	TON	251.37	135.79	115.96	251.85
*	*	Tack Coat @0.05 Gal/SY	GAL	10.725	5.7935	4.9475	10.7456
*	*	Prime Coat @0.25 Gal/SY	GAL	53.625	28.97	24.74	53.73
430	500	Commercial Grade Hot Mix Asphalt @ 2 Ton/CY	TON	214.50	115.87	98.95	214.912
*	*	PG 58H-34 Asphalt Cement @6%	TON	12.87	6.95	5.94	12.9

* Not a pay item. Included in the contract unit price bid for 430 0500 Commercial Grade Hot Mix Asphalt. See Section 130 and Standard Drawing D-764-22

Materials

Agg Base CL 5 1.875 Ton/CY
Commercial Grade Hot Mix Asphalt 2.0 Ton/CY
PG 58H-34 Aspalt Cement 6.0% Commercial Grade HMA (include in the bid price for "Commercial Grade Hot Mix Asphalt")

762-0114 Epoxy PVMT 6in Line		
Type	Quantity	Unit
White CL	1945	LF

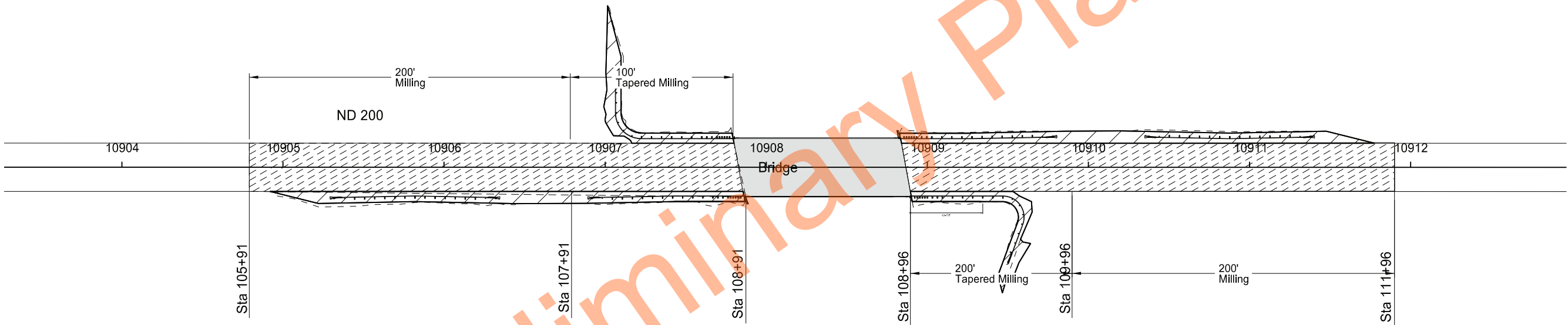
Preliminary Plans

Basis of Estimate



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-1-999(053)	20	1

MCLEAN COUNTY



Milling and Paving Plan

Legend

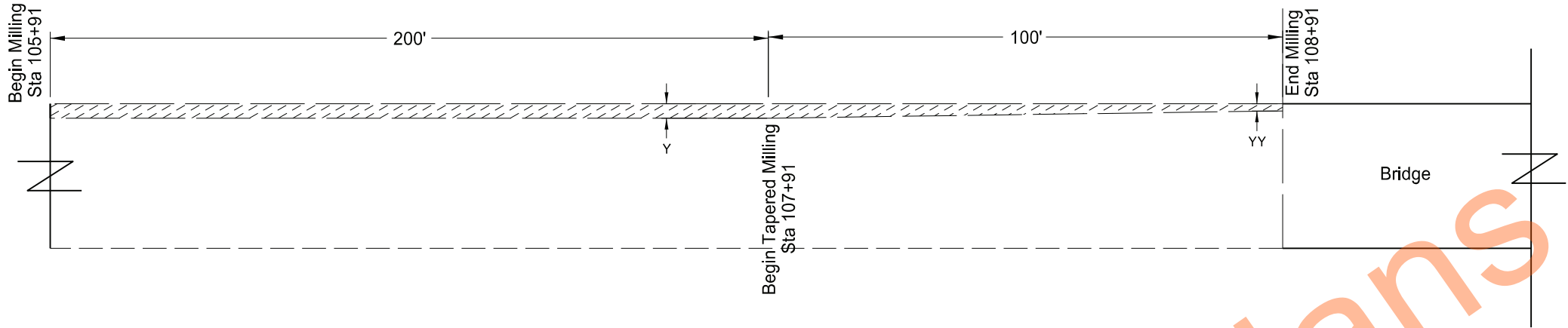
-  Milling Transition
-  Deck Overlay
-  2 " HMA Guardrail Surfacing

Milling/Paving Transition Detail

ND Hwy 200
Structure # 200-206.536



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-1-999(053)	20	2



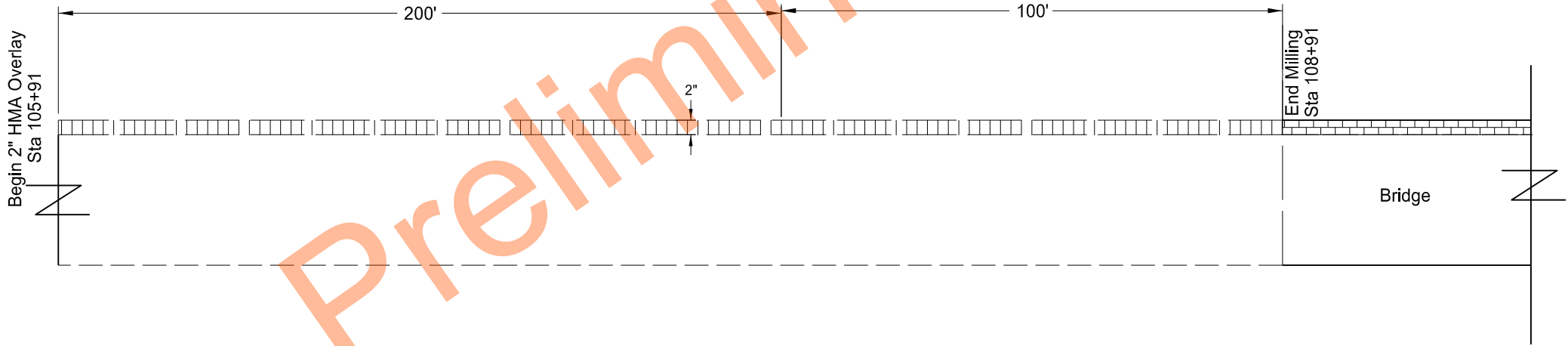
Drawing is not to scale

Milling Transition

Milling Transitions						
X (FT)	Station	Y (IN)	Station	YY (IN)	Width	Milling (SY)
200	105+91	2	107+91	-	28	88.89
100	107+91	2	108+91	1	28	16.67

Legend

-  Milling
-  HMA
-  Deck Overlay



Drawing is not to scale

Paving Layout

Milling/Paving Transition Detail

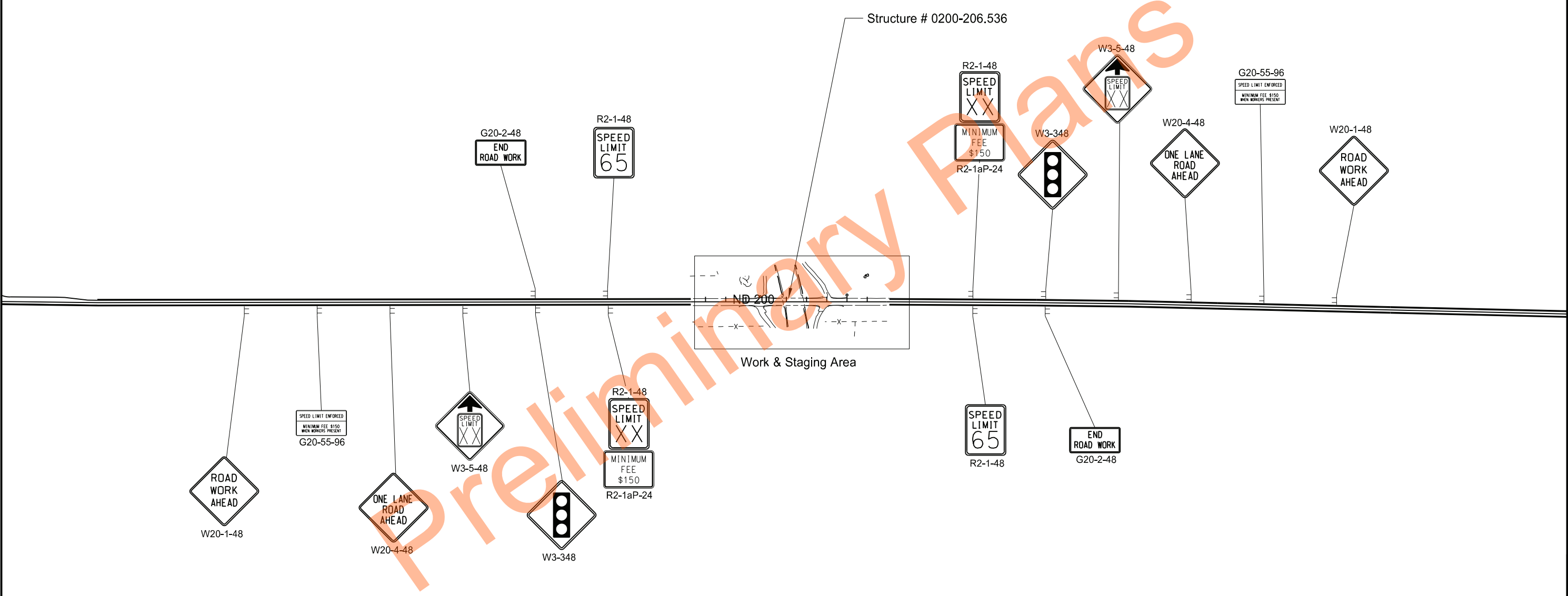
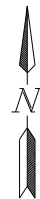
ND Hwy 200
Structure # 200-206.536



[illegible]

VERSION: 6.26.2025

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-1-999(053)	100	2

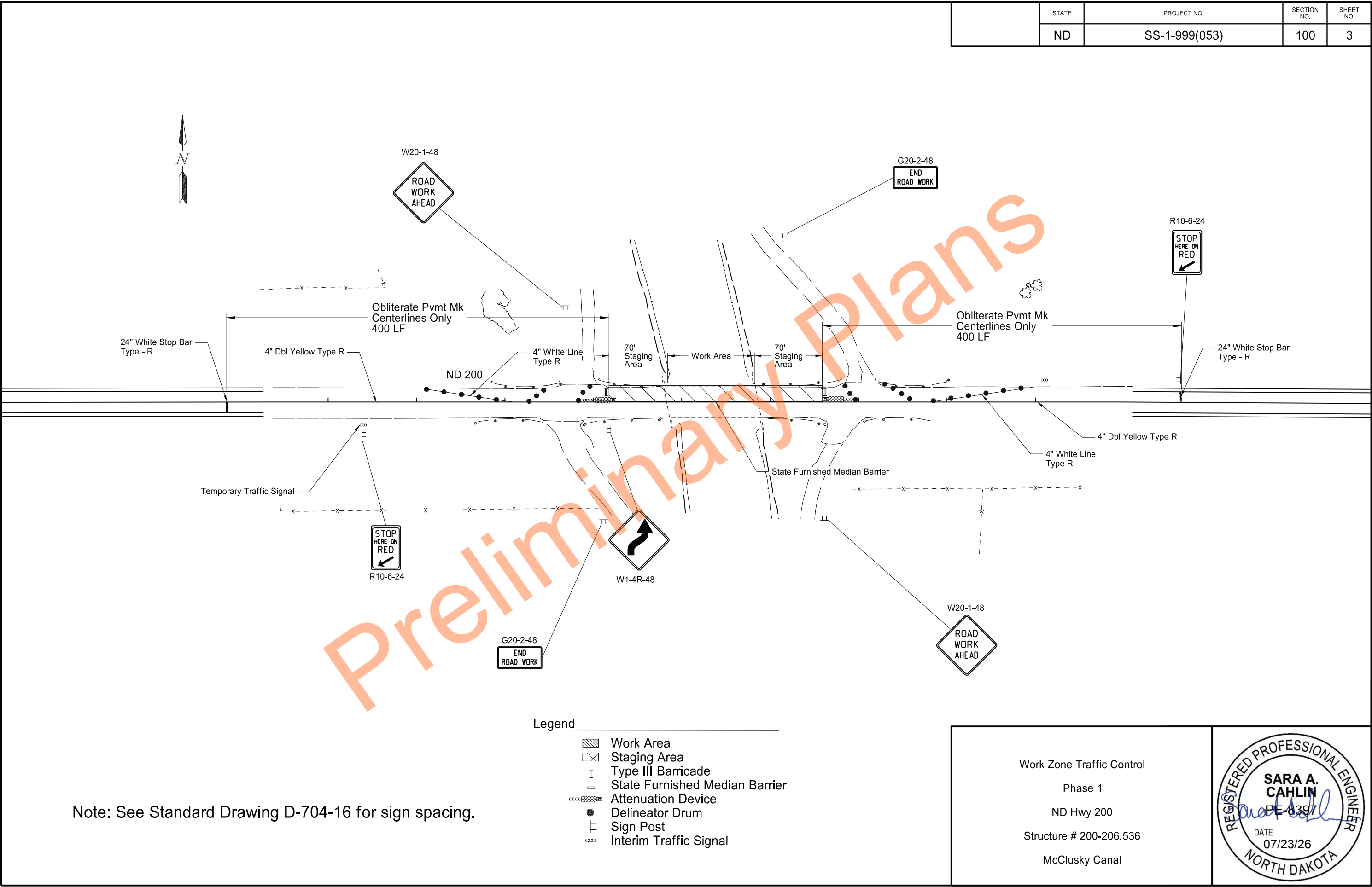


Note: See Standard Drawing D-704-16 for Sign Spacing

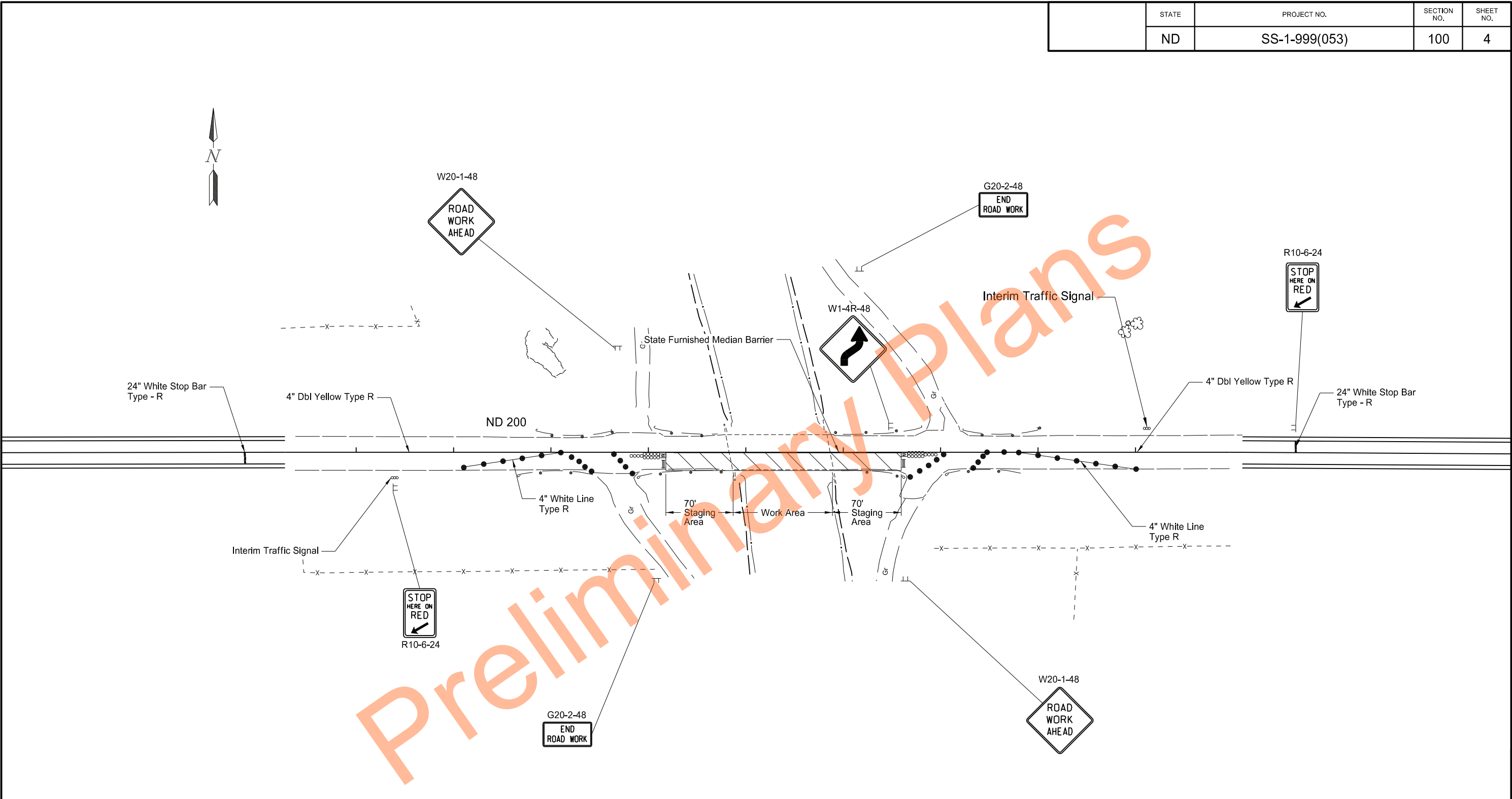
Work Zone Traffic Control
Sign Layout
ND Hwy 200
Structure # 0200-206.536
McClusky Canal



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-1-999(053)	100	3



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-1-999(053)	100	4



Preliminary Plans

Note: See Standard Drawing D-704-16 for sign spacing.

Legend

Work Area

Staging Area

Type III Barricade

State Furnished Median Barrier

Attenuation Device

Delineator Drum

Sign Post

Interim Traffic Signal

Work Zone Traffic Control

Phase 2

ND Hwy 200

Structure # 0200-206.536

REGISTERED PROFESSIONAL ENGINEER

SARA A. CAHLIN

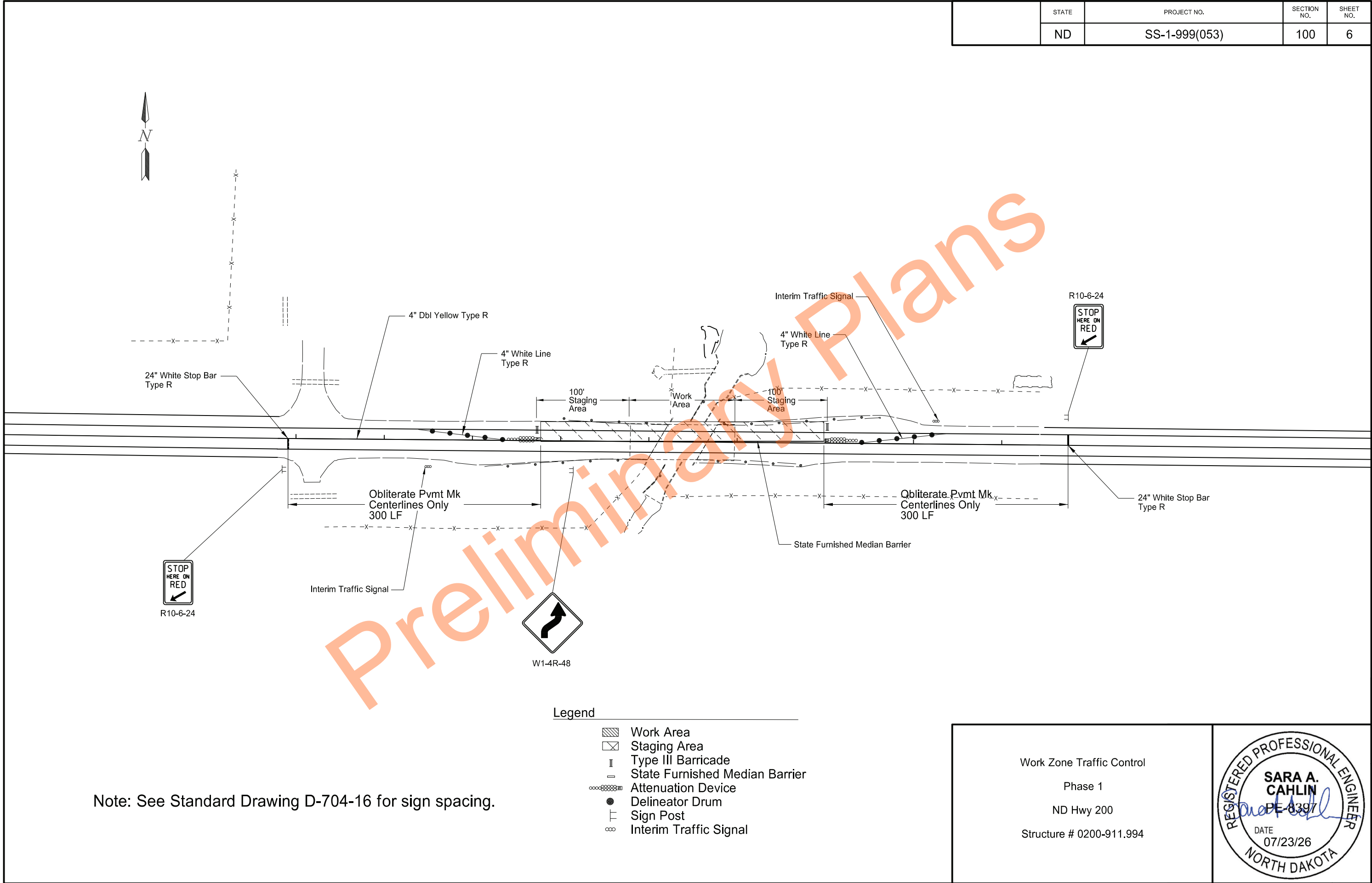
PE-8397

DATE 07/23/26

NORTH DAKOTA



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-999(053)	100	6



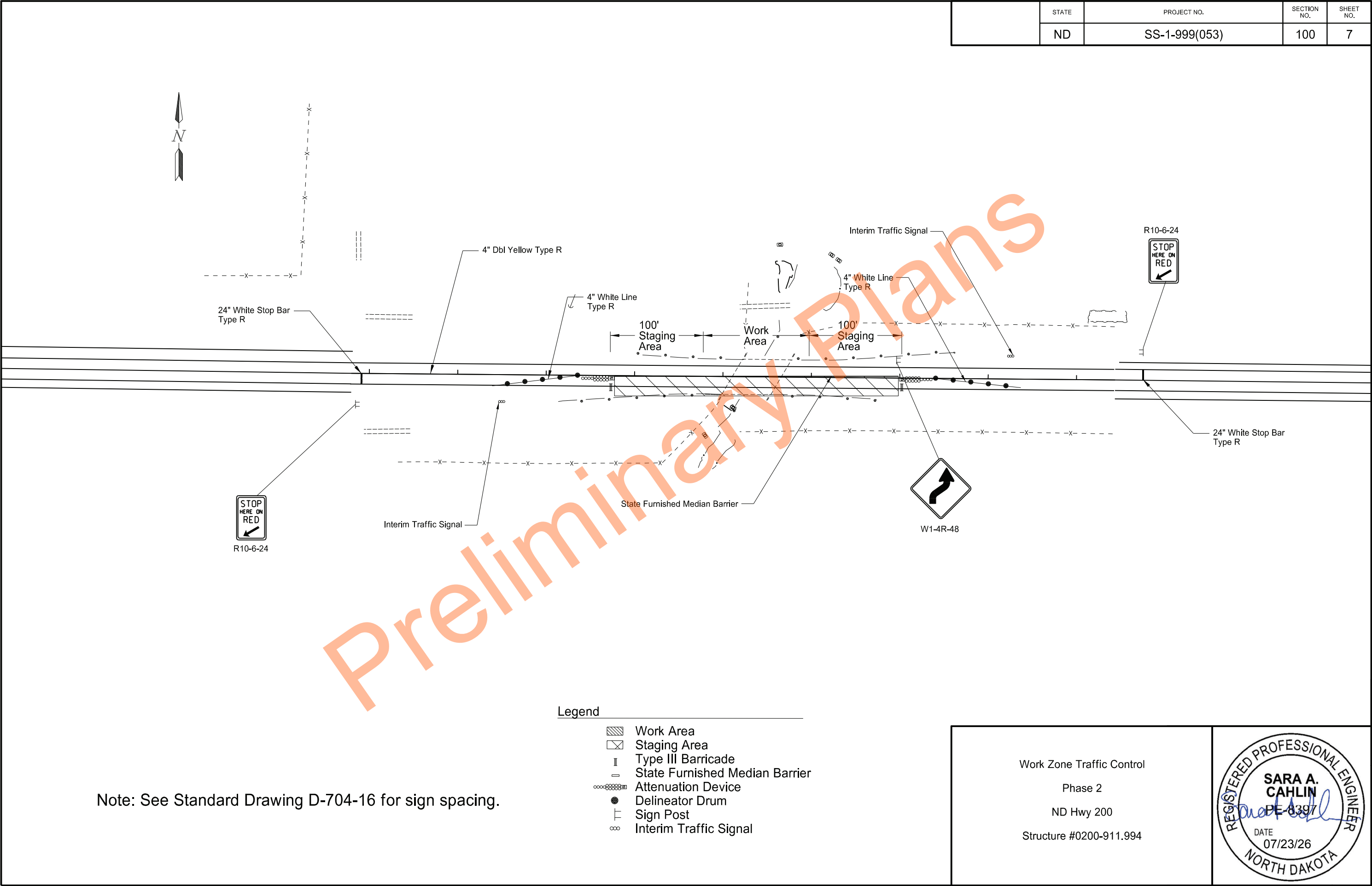
Note: See Standard Drawing D-704-16 for sign spacing.

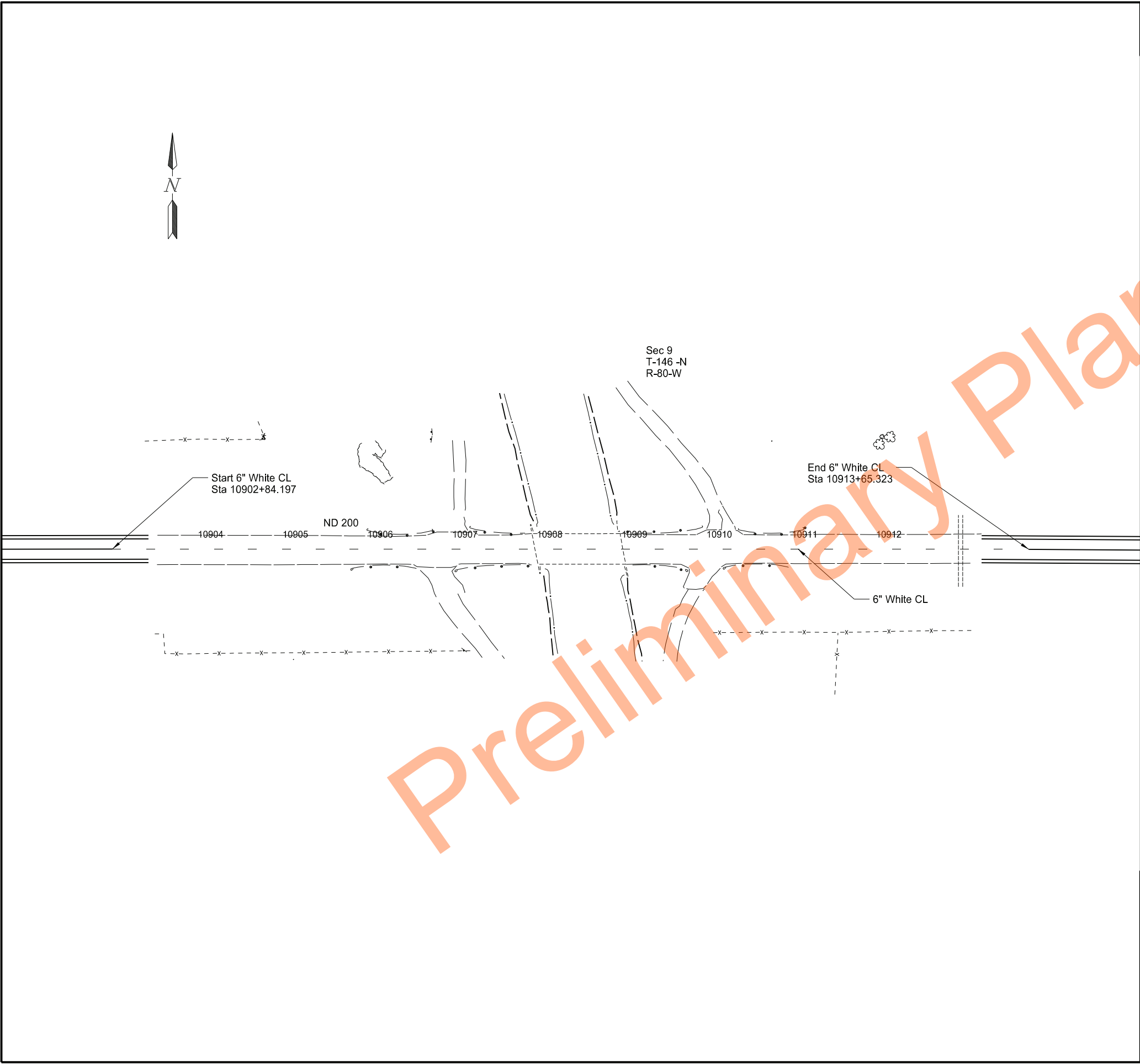
- Legend
- Work Area
 - Staging Area
 - Type III Barricade
 - State Furnished Median Barrier
 - Attenuation Device
 - Delineator Drum
 - Sign Post
 - Interim Traffic Signal

Work Zone Traffic Control
Phase 1
ND Hwy 200
Structure # 0200-911.994

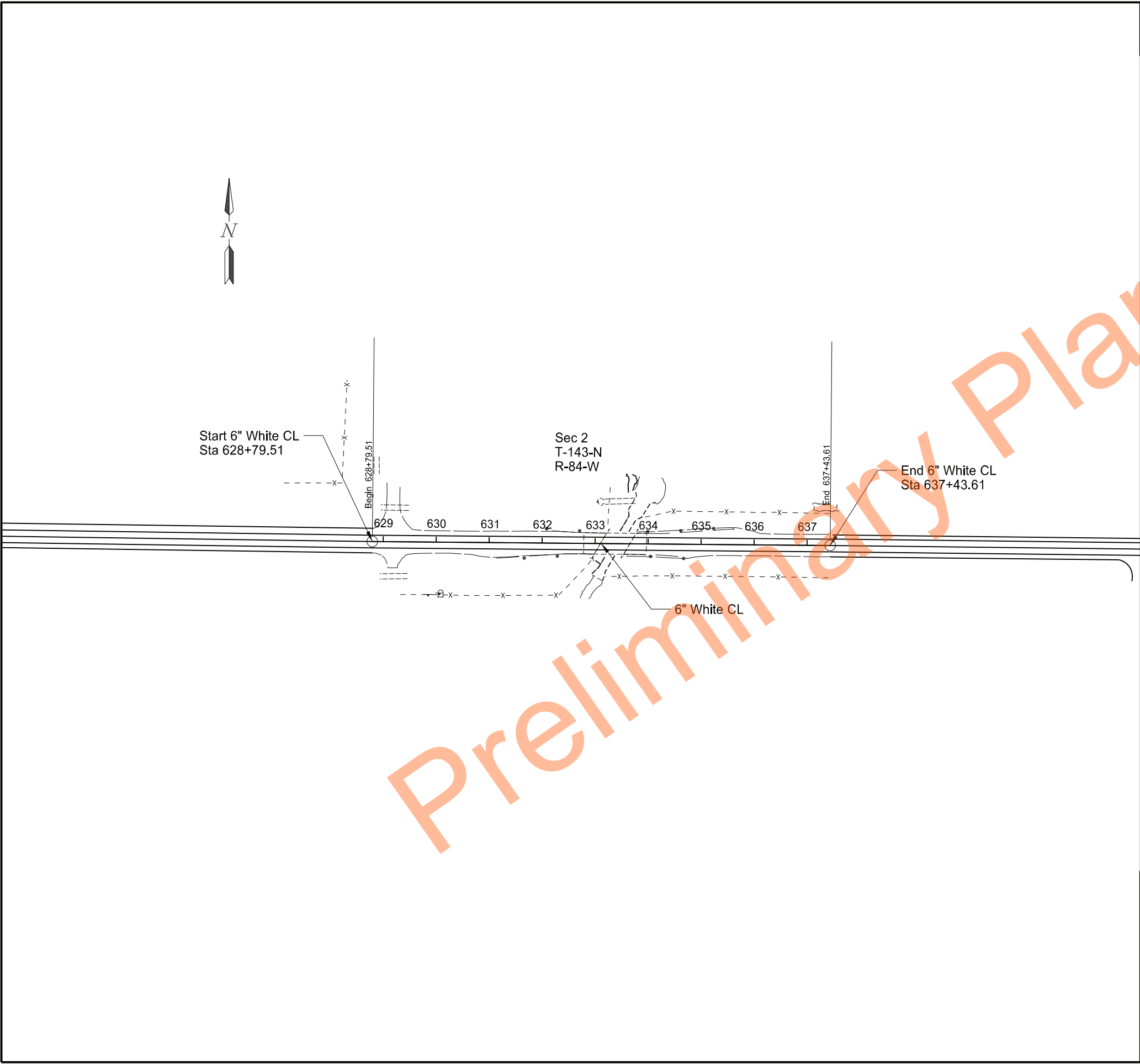


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-1-999(053)	100	7





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-1-999(053)	120	1
SPEC	CODE	BID ITEM	QTY	UNIT
762	0114	Epoxy PVMt 6in Line		
		6" White Centerline	1,080	LF
</				



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-1-999(053)	120	2

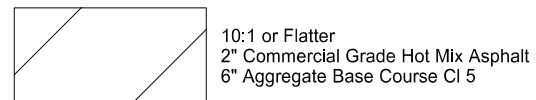
SPEC	CODE	BID ITEM	QTY	UNIT
762	0114	Epoxy PVMT 6in Line		
		6" White Centerline	865	LF

Pavement Marking

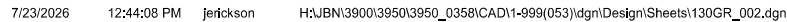
ND Hwy 200

Structure # 200-206.536





REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA
7/23/2026



W-BEAM GUARDRAIL SUMMARY OF QUANTITIES
THRIE/W-BEAM GUARDRAIL AT BRIDGE ENDS

LOCATION	(A) 2'-6" THRIE- BEAM TERMINAL CONNECTOR	(A) 7/8" DIA X VARIABLE LENGTH HEAVY HEX HEAD BOLT	(A) 8" X 8" X 6'-0" TIMBER POST	(A) 8" X 8" X 22" WOOD OFFSET BLOCK	(A) 8" X 8" X 18" WOOD OFFSET BLOCK	(A) 8" X 8" X 14" WOOD OFFSET BLOCK	(A) 12'-6" THRIE BEAM RAIL DOUBLE THICKNESS	(A) 3/4" DIA X 2-1/2" LONG POST BOLT	(A) 6'-3" THRIE BEAM TO W- BEAM TRANSITION SECTION DOUBLE THICKNESS	(A) 6" X 8" X 6'-0' TIMBER POST	(A) 6" X 8" X 6'-0' CRT TIMBER POST	(A) 6" X 8" X 14" WOOD OFFSET BLOCK	(A) 5/8" DIA X 18" GUARDRAIL BOLT	(A) 5/8" DIA X 10" GUARDRAIL BOLT	(A) 12'-6" STRAIGHT RAIL SECTION	(A) 12'-6" CURVED RAIL SECTION	(A) 5/8" DIA X 1-1/4" LONG W-BEAM GUARDRAIL SPLICE BOLT	(A) REFLECTOR- IZED PLATES	(A) W BEAM END SECTION (FLARED)	(A) BCT CABLE ASSEMBLY, POST SLEEVE AND BEARING PLATE	(A) BCT ANCHOR PLATE AND CABLE END PLATE	(A) BCT TERMINAL POST	(A) 5/8" DIA X 1-1/2" LONG HEX HEAD BOLT	(B) GUARDRAIL EMBANK- MENT
	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	CY
Sta 50+91.64 to Sta 51+37.29 Rt	1	5	9	7	1	1	1	2	1	4	0	4	21	0	2	0	48	8	0	0	0	0	0	2
Sta 50+56.22 to Sta 51+30.37 Lt	1	5	9	7	1	1	1	2	1	7	6	7	24	6	5	2	84	7	1	1	1	1	8	1
Sta 52+39.81 to Sta 53+01.53 Rt	1	5	9	7	1	1	1	2	1	7	6	7	24	6	5	2	84	7	1	1	1	1	8	1
Sta 52+32.89 to Sta 52+78.54 Lt	1	5	9	7	1	1	1	2	1	4	0	4	21	0	2	0	48	8	0	0	0	0	0	6
Total	4	20	36	28	4	4	4	8	4	22	12	22	90	12	14	4	264	30	2	2	2	2	16	10

Note:
(A) Include these items in the price bid for "W-Beam Guardrail".
(B) Include in the price bid for "Guardrail Embankment".

SPEC	CODE	BID ITEM	QTY	UNIT
203	0218	GUARDRAIL EMBANKMENT		
		Sta 48+37.54 to Sta 51+36.51 Rt	1	EA
		Sta 50+46.95 to Sta 51+29.61 Lt	1	EA
		Sta 52+40.45 to Sta 53+01.53 Rt	1	EA
		Sta 52+33.79 to Sta 55+32.64 Lt	1	EA
		Total	4	EA
748	0141	CURB & GUTTER-TYPE 1 SPECIAL		
		Sta 51+21.51 to Sta 51+36.51 Rt	15	LF
		Sta 51+14.61 to Sta 51+29.61 Lt	15	LF
		Sta 52+40.45 to Sta 52+55.45 Rt	15	LF
		Sta 52+33.79 to Sta 52+48.79 Lt	15	LF
		Total	60	LF
764	0131	W-BEAM GUARDRAIL		
		Sta 50+91.64 to Sta 51+37.29 Rt	45.6	LF
		Sta 50+56.22 to Sta 51+30.37 Lt	109.9	LF
		Sta 52+39.81 to Sta 53+01.53 Rt	109.9	LF
		Sta 52+32.89 to Sta 52+78.54 Lt	45.6	LF
		Total	311	LF
764	0145	W-BEAM GUARDRAIL END TERMINAL		
		Sta 48+81.67 to Sta 49+31.66 Rt	1	EA
		Sta 49+31.66 to Sta 49+81.65 Rt	1	EA
		Sta 50+41.65 to Sta 50+91.64 Rt	1	EA
		Sta 52+78.54 to Sta 53+28.53 Lt	1	EA
		Sta 53+88.53 to Sta 54+38.52 Lt	1	EA
		Sta 54+38.52 to Sta 54+88.51 Lt	1	EA
		Total	6	EA
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS		
		Sta 50+77.13 to Sta 51+29.02 Rt	52	LF
		Sta 50+95.21 to Sta 51+22.10 Lt	27	LF
		Sta 52+48.08 to Sta 52+74.97 Rt	27	LF
		Sta 52+41.16 to Sta 52+93.05 Lt	52	LF
		Total	158	LF

SPEC	CODE	BID ITEM	QTY	UNIT
764	1990	REMOVE CONCRETE SAFETY SHAPE TRANSITION		
		Sta 51+29.02 to Sta 51+36.52 Rt	1	EA
		Sta 51+22.10 to Sta 51+29.60 Lt	1	EA
		Sta 52+40.58 to Sta 52+48.08 Rt	1	EA
		Sta 52+33.66 to Sta 52+41.16 Lt	1	EA
		Total	4	EA
764	2081	REMOVE END TREATMENT & TRANSITION		
		Sta 49+17.39 to Sta 49+54.61 Rt	1	EA
		Sta 49+54.61 to Sta 49+91.83 Rt	1	EA
		Sta 49+38.97 to Sta 49+76.19 Lt	1	EA
		Sta 49+76.19 to Sta 50+13.41 Lt	1	EA
		Sta 50+40.33 to Sta 50+77.13 Rt	1	EA
		Sta 50+58.41 to Sta 50+95.21 Lt	1	EA
		Sta 52+74.97 to Sta 53+11.77 Rt	1	EA
		Sta 52+93.05 to Sta 53+29.85 Lt	1	EA
		Sta 53+56.77 to Sta 53+93.99 Rt	1	EA
		Sta 53+93.99 to Sta 54+31.21 Rt	1	EA
		Sta 53+74.85 to Sta 54+12.07 Lt	1	EA
		Sta 54+12.07 to Sta 54+49.29 Lt	1	EA
		Total	12	EA

Thrie/W-Beam Guardrail Quantities
At Both Ends of Bridge
Site 1 - Str No. 0200-206.536
McClusky Canal Crossing

Structure Repairs
ND 200
2 Miles South of Turtle Lake



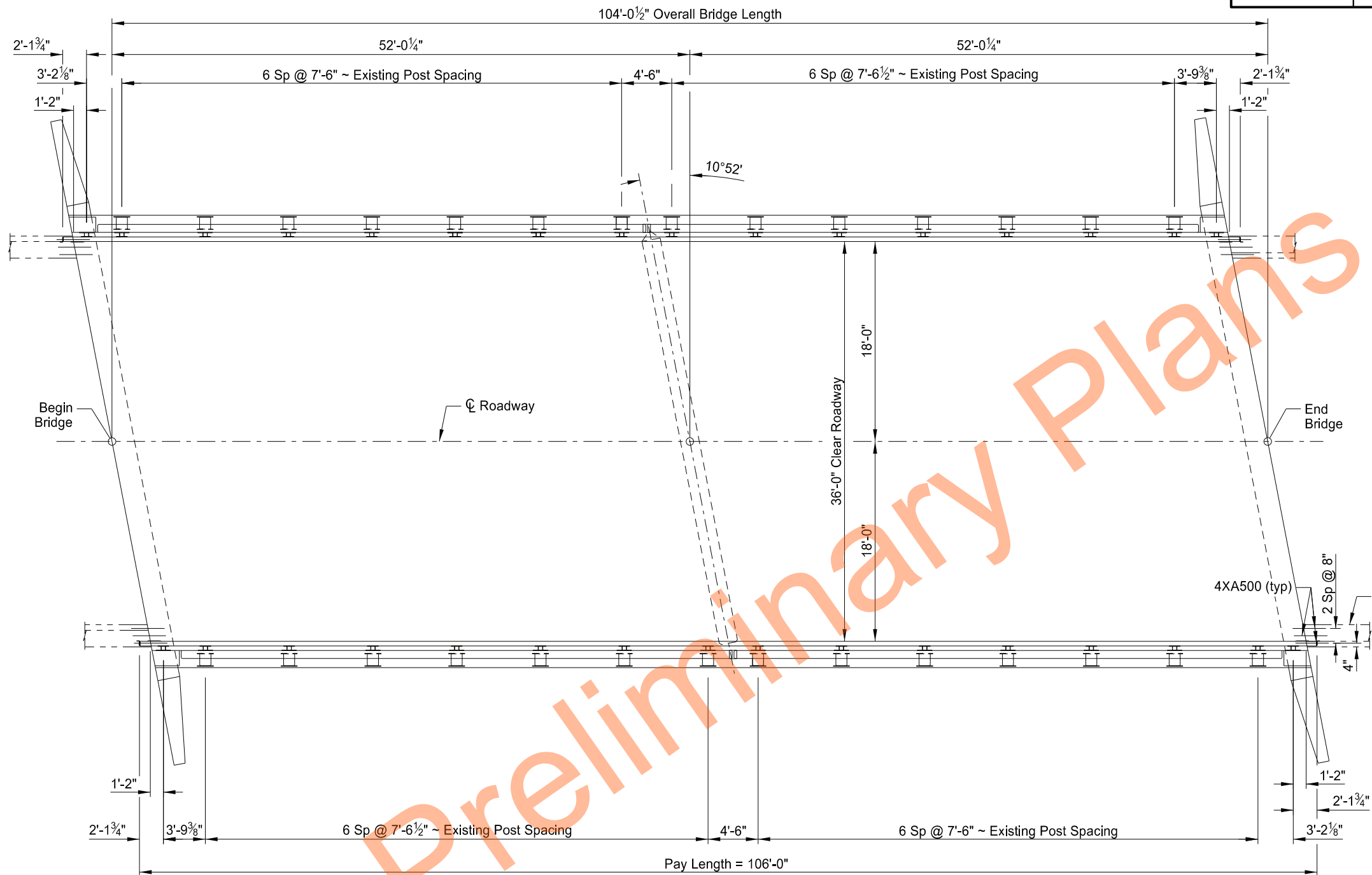
7/23/2026

BAR LIST			
SIZE	MARK	NO.	LENGTH
4	XA500	12	3'-0"

ESTIMATED MATERIAL QUANTITIES			
REINFORCING STEEL (LBS)			
24			

Drill and epoxy 4XA500 bars into the bridge deck to tie the curb and gutter sections. Install 4XA500 bars (epoxy coated) 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 1 foot. Length may vary depending on manufacturer's recommendations for anchorage. Length shown based on 1 foot minimum anchorage length. Include all work and materials to provide and install the 4XA500 bars in the bid item "Curb and Gutter - Type 1 Special." Refer to Section 130.

SPECIAL PROVISIONS	
SP 442(25)	CONCRETE SPALL REPAIR
McCLUSKY CANAL	
BRIDGE LAYOUT	
ND DEPARTMENT OF TRANSPORTATION BRIDGE DIVISION	
	Jason Thorenson 07/24/26
DRAWING NO.	200-206.536-1



PLAN

BRIDGE BID ITEMS				
SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	566
602	1300	BRIDGE DECK GROOVING	SF	3,746
624	3002	DOUBLE BOX BEAM RAIL RETROFIT - E-RAIL	LF	212.0
650	0704	OVERLAY CONCRETE	CY	23
650	0707	DECK CONCRETE	CY	5
650	0720	CLASS 1 REMOVAL	SY	416
650	0721	CLASS 2 REMOVAL	SY	83
650	0722	CLASS 2-A REMOVAL	LF	150
650	0723	CLASS 3 REMOVAL	SY	21
650	0724	CLASS 4 REMOVAL	SY	4
930	9612	SPALL REPAIR	SF	5



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-999(053)	170	2

NOTES

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

- Deck overlay
- Double box beam rail retrofit
- Penetrating water repellent treatment
- Spall repair

105 CONTROL OF WORK: Protect all utility conduits mounted on the bridge during work activities.

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

602 PENETRATING WATER REPELLENT TREATMENT: In addition to the top of the deck surface, apply the penetrating water repellent solution to the curb, posts, and rail. Apply penetrating water repellent solution prior to sealing any bridge deck cracks. Do not apply pavement marking or allow traffic until the solution has completely penetrated and the entire driving surface is dry.

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.

The Engineer will measure overlay concrete based on Section 650.05 B.2. "Yield Box Method."

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 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 work and materials associated with the bridge deck crack sealing in the bid item "Overlay Concrete."

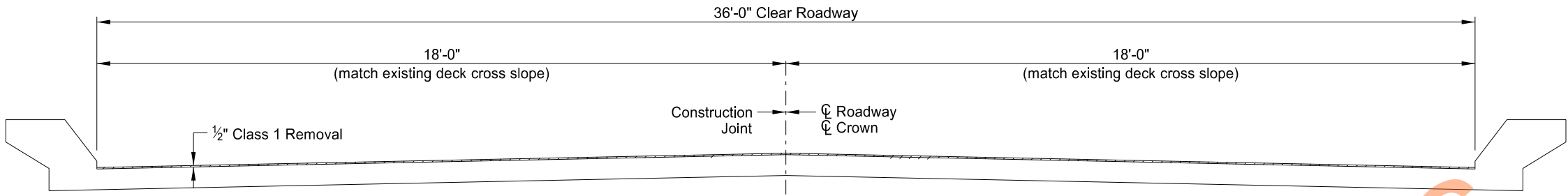
930 SPALL REPAIR: The structure has areas of spalling and concrete deterioration as indicated in the table below. See supplemental bid information for photos of concrete spalling. The extents of repairs as shown in the "Spall Repair" table are approximations. The actual limits and number of repair locations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

LOCATION	PHOTO	QUANTITY (SF)
RAILING POST	#1, #2	3
ABUTMENT WINGWALL	#3	2

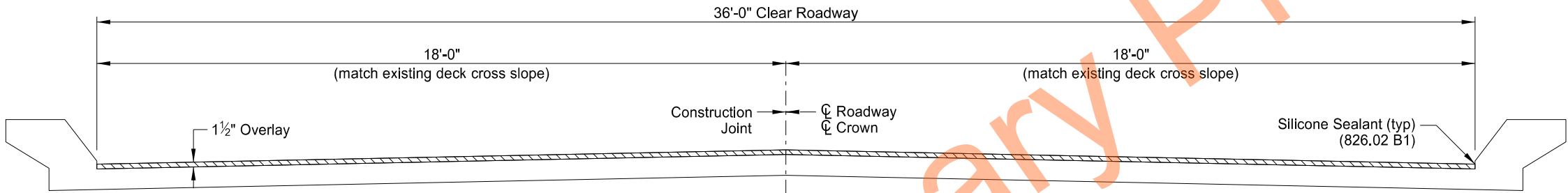


23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

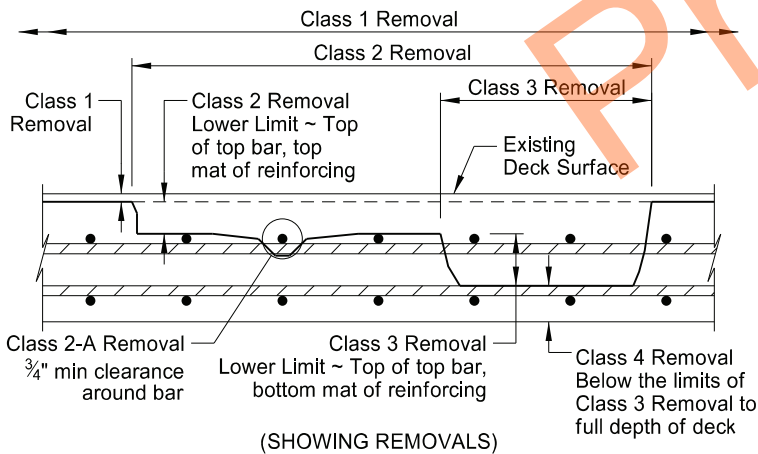
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-999(053)	170	3



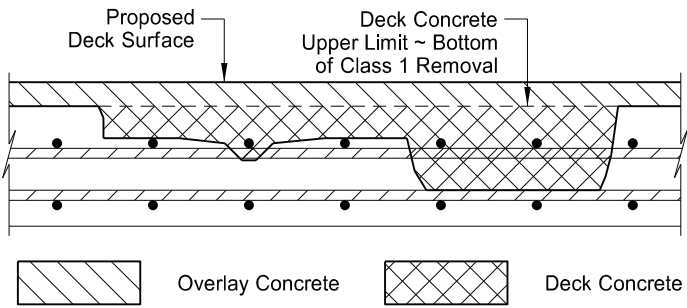
(SHOWING REMOVAL)
TYPICAL DECK SECTION



(SHOWING OVERLAY)
TYPICAL DECK SECTION



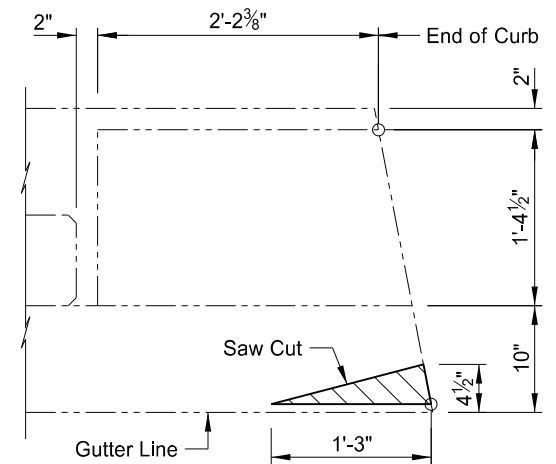
(SHOWING REMOVALS)
EXISTING BRIDGE DECK SECTION



(SHOWING DECK & OVERLAY CONCRETE)
PROPOSED BRIDGE DECK SECTION



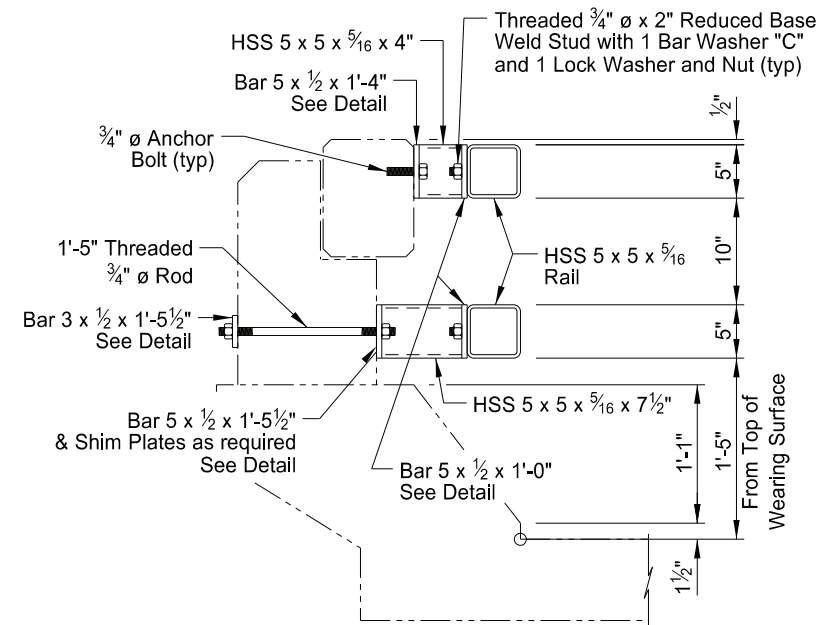
QUANTITIES	
OVERLAY CONCRETE	23 CY
DECK CONCRETE	5 CY
CLASS 1 REMOVAL	416 SY
CLASS 2 REMOVAL	83 SY
CLASS 2-A REMOVAL	150 LF
CLASS 3 REMOVAL	21 SY
CLASS 4 REMOVAL	4 SY
McCLUSKY CANAL	
DECK OVERLAY DETAILS	
DRAWING NO.	200-206.536-3



PLAN
CONCRETE REMOVAL DETAIL



See Dwg 200-206.536-6 for notes and details not shown on this drawing.



C-C



SEE DWG 200-206.536-6

DOUBLE BOX BEAM E-RAIL RETROFIT DETAILS

200-206.536-5

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-999(053)	170	6

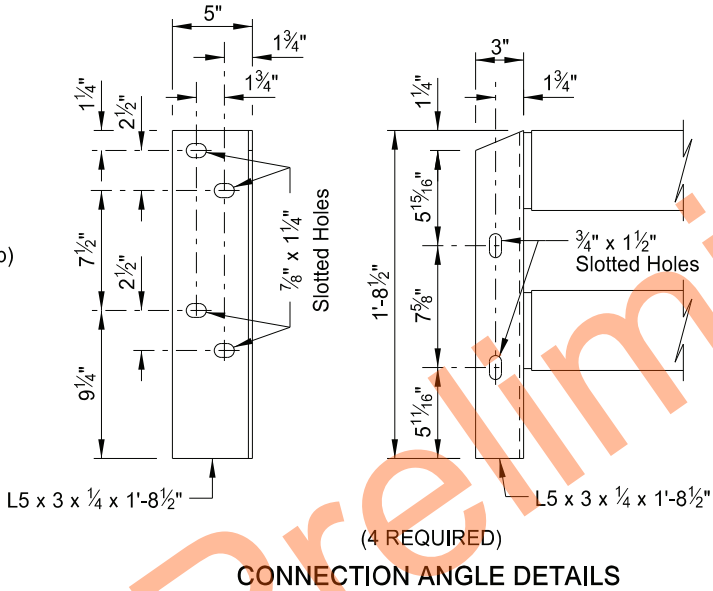
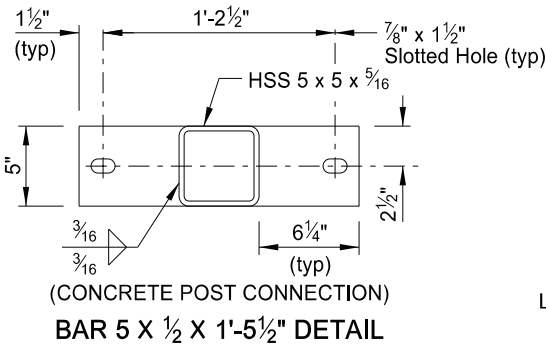
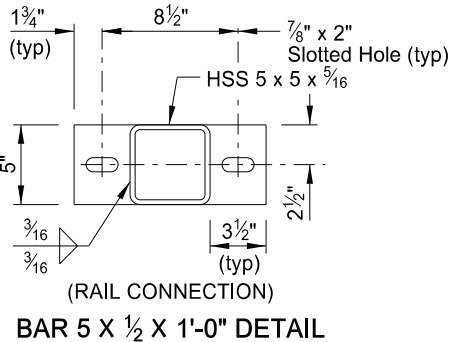
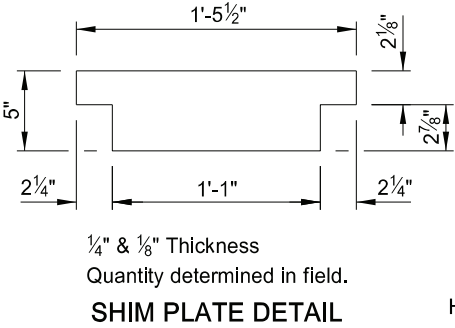
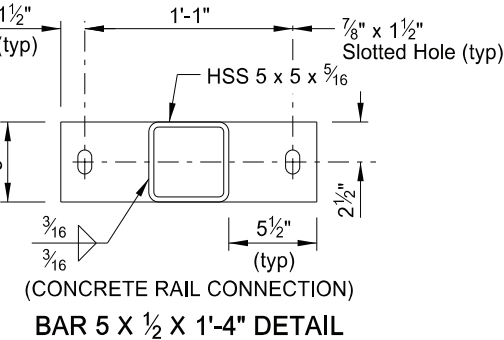
NOTES:

Galvanize all steel components after fabrication according to Section 854.

Provide reduced base studs in accordance with ASTM A108.

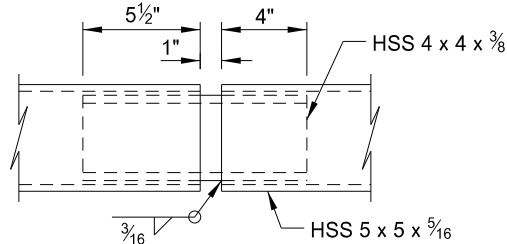
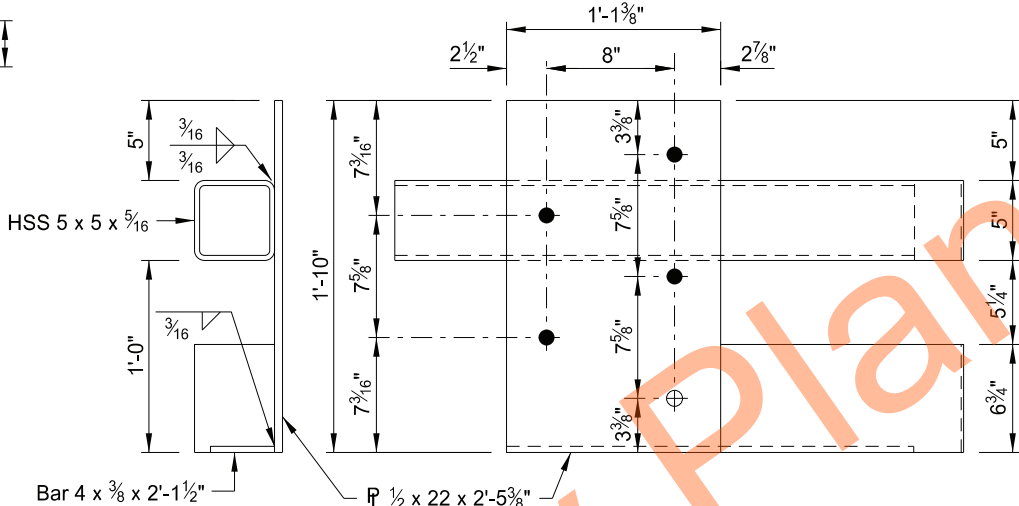
Tighten the threaded rods to provide a minimum tensile force of 2,500 lbs and a maximum tensile force of 2,700 lbs.

Embed anchor bolts into the concrete using a chemical adhesive system that can develop a tensile strength of at least 17,500 lbs.

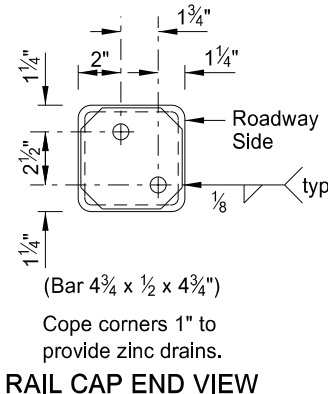
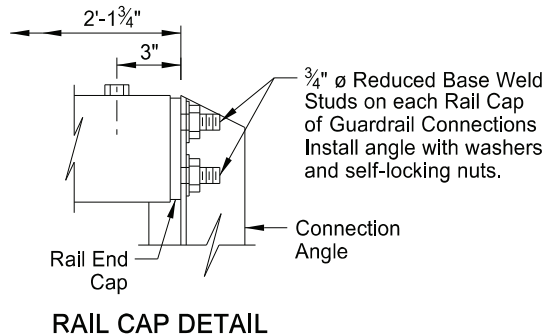
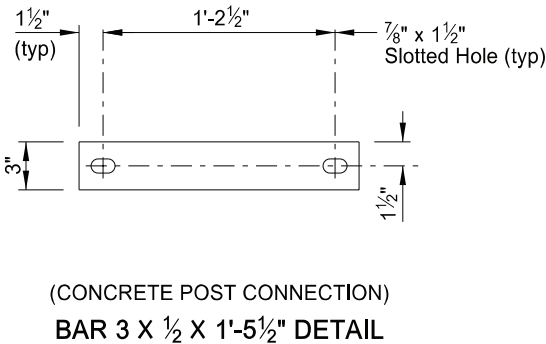
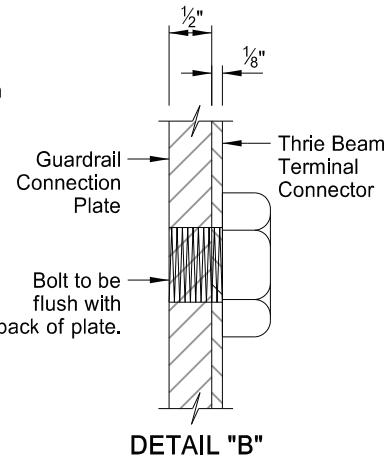
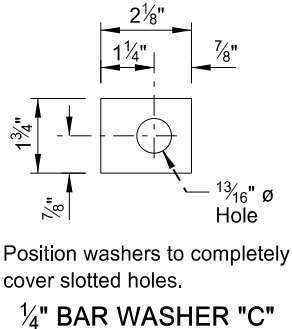


The filled circles indicate drilled and tapped holes for 7/8" ø bolts M 164 (A325). See Detail "B."

The open circle indicates a drilled hole through the 1/2" plate for a 7/8" ø bolt M 164 (A325).



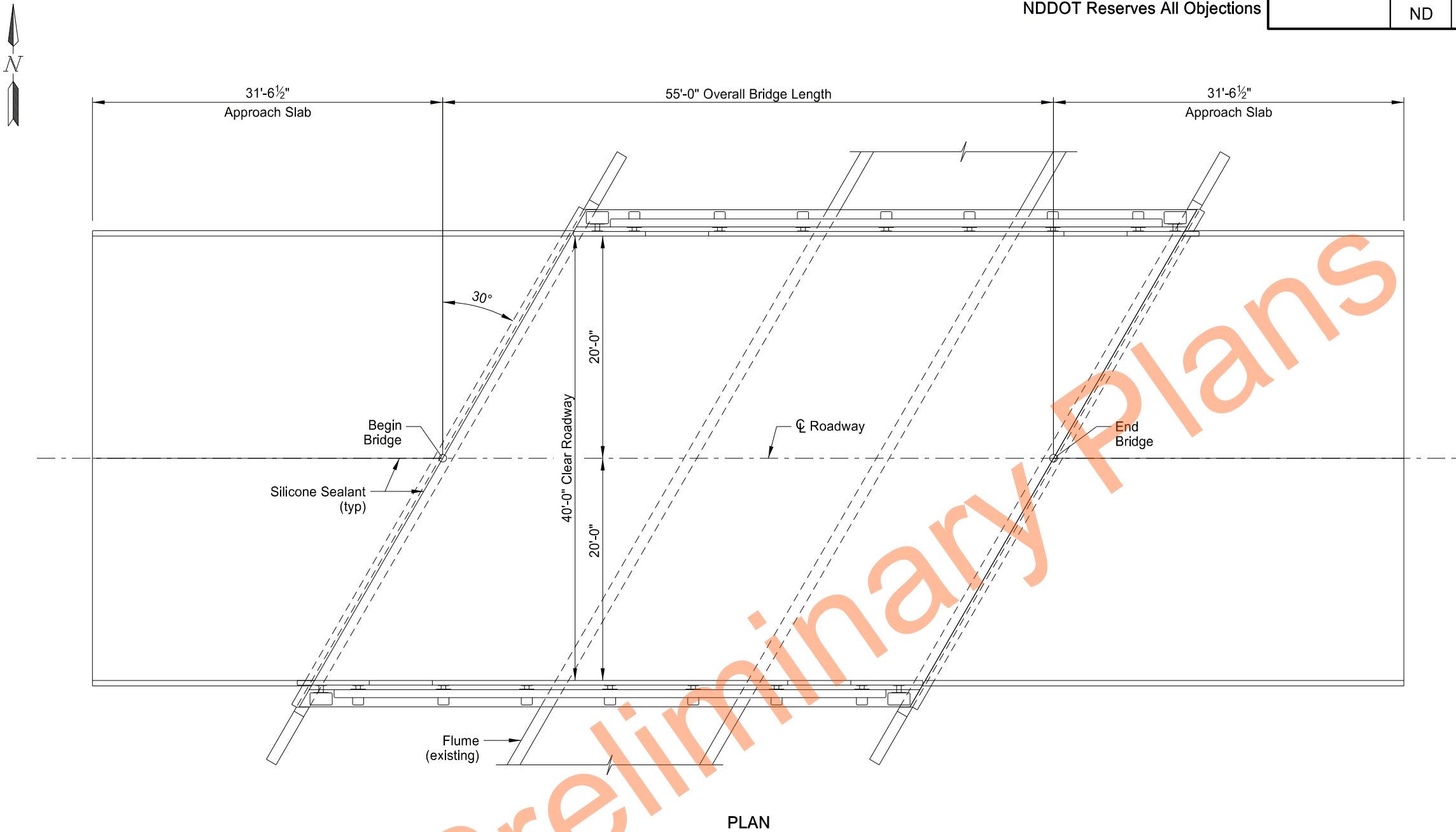
RAIL SPLICE DETAIL



QUANTITIES	
E-RAIL RETROFIT	212.0 LF
McCLUSKY CANAL	
DOUBLE BOX BEAM E-RAIL RETROFIT DETAILS	
DRAWING NO.	200-206.536-6

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-999(053)	170	7



BRIDGE BID ITEMS				
SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	604
602	1300	BRIDGE DECK GROOVING	SF	4,723
650	0704	OVERLAY CONCRETE	CY	12
650	0707	DECK CONCRETE	CY	7
650	0720	CLASS 1 REMOVAL	SY	244
650	0721	CLASS 2 REMOVAL	SY	146
650	0722	CLASS 2-A REMOVAL	LF	262
650	0723	CLASS 3 REMOVAL	SY	37
650	0724	CLASS 4 REMOVAL	SY	12
650	0805	DECK SPALL REPAIR	SF	37
930	8644	SILICONE SEALANT	LF	146
930	9612	SPALL REPAIR	SF	10



SPECIAL PROVISIONS	
SP 442(25)	CONCRETE SPALL REPAIR
CLARKS CREEK	
BRIDGE LAYOUT	
ND DEPARTMENT OF TRANSPORTATION BRIDGE DIVISION	
Jason Thorenson 07/24/26	
DRAWING NO.	200-911.994-1

NOTES

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-999(053)	170	8

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

• Penetrating water repellent treatment

• Deck spall repair (approach slab)

• Spall repair

• Joint sealing
- 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 BRIDGE DECK GROOVING: Perform grooving of the bridge deck and existing approach slabs in accordance with Section 602.04 D.3. Bridge deck and approach slab grooving will be paid for separately.
- 602 PENETRATING WATER REPELLENT TREATMENT: In addition to the top of the deck surface, apply the penetrating water repellent solution to the top of the approach slab, curb, posts, and rail. Apply penetrating water repellent solution prior to sealing any bridge deck cracks. Do not apply pavement marking or allow traffic until the solution has completely penetrated and the entire driving surface is dry.
- 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.
- The Engineer will measure overlay concrete based on Section 650.05 B.2. "Yield Box Method."
- 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 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 work and materials associated with the bridge deck crack sealing in the bid item "Overlay Concrete."
- 650 DECK SPALL REPAIR: Complete the approach slab concrete repair as a deck spall repair in accordance with the construction requirements of Section 650.04 with the following exceptions.

- Saw cut the perimeter of the repair area to a depth of 1". Remove all concrete to a depth of 2" or to sound concrete, whichever is greater.
- Complete removals using mechanical equipment, with the exception that a milling machine specified for Class 1 removals will not be required.
- Use Class AE concrete meeting 602.03 B to restore the full depth of the repair area. Provide a mix that will attain a compressive strength of 4,000 psi at 28 days.
- Concrete placement using a buggy or pump is not required.
- Section 650.04 E "Mixing of Materials" is waived. Use of a mobile mixer is not required.

See supplemental bid information for photos of deck concrete spalling. Include all labor, equipment, and materials required to remove and replace the approach slab concrete in the bid item "Deck Spall Repair."

- 930 SILICONE SEALANT: Remove and replace the silicone sealant in the joints noted in the plans. Clean the joint of all foreign material and sand blast before the new silicone sealant is installed. Include all materials, labor, and equipment required to remove and replace the silicone sealant in the bid item "Silicone Sealant."

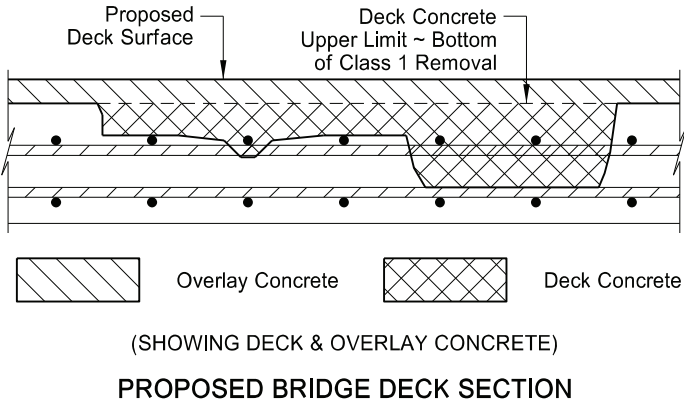
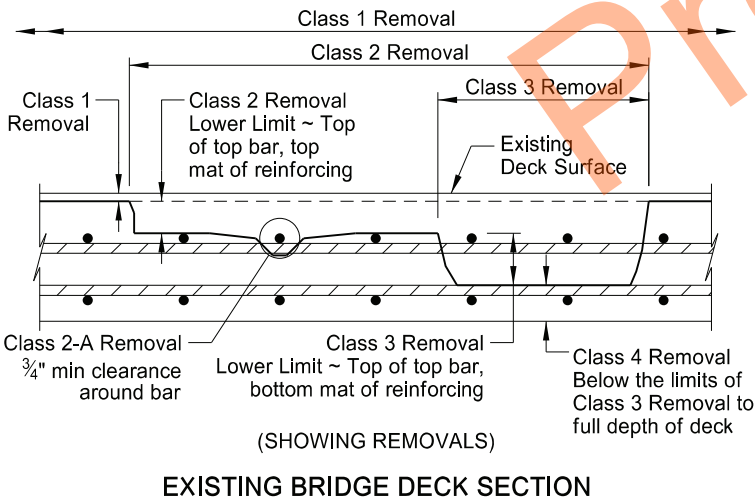
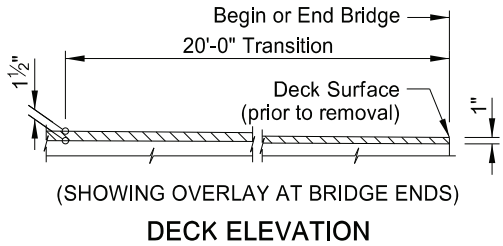
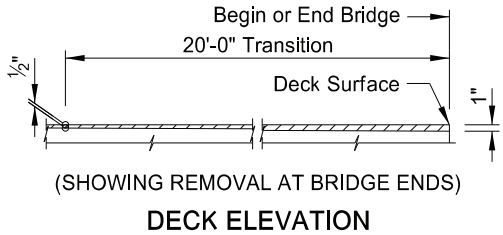
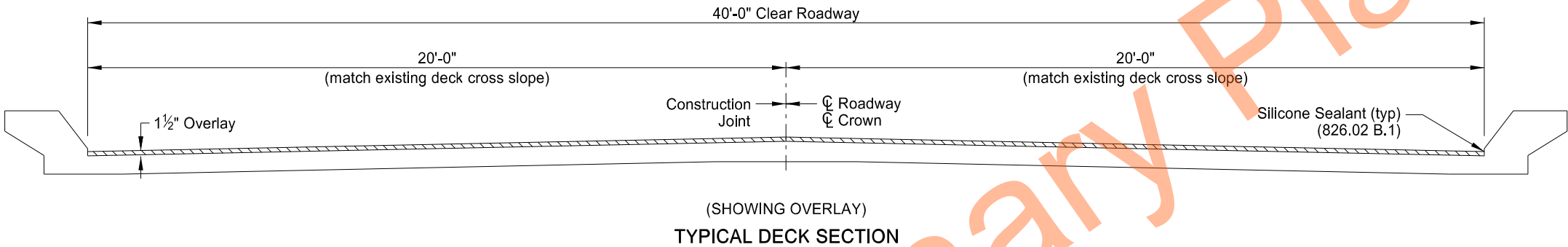
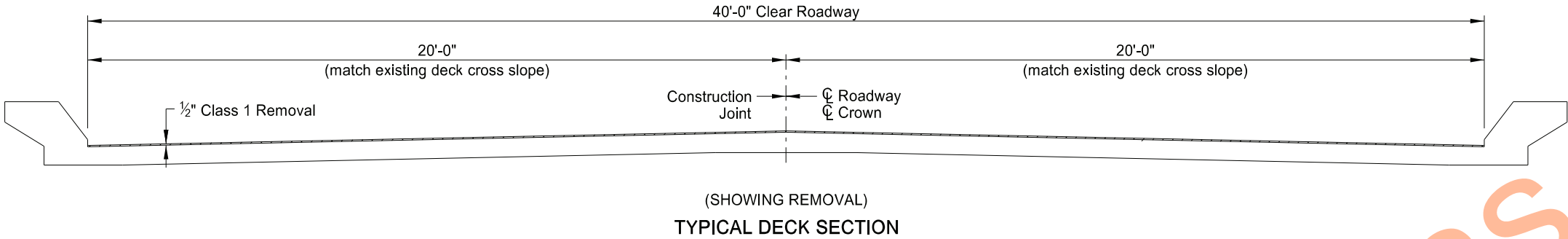
- 930 SPALL REPAIR: The structure has areas of spalling and concrete deterioration as indicated in the table below. See supplemental bid information for photos of concrete spalling. The extents of repairs as shown in the "Spall Repair" table are approximations. The actual limits and number of repair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

LOCATION	PHOTO	QUANTITY (SF)
DECK SIDE	#1	2
ABUTMENT	#2, #3, #4	8



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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-1-999(053)	170	9



QUANTITIES	
OVERLAY CONCRETE	12 CY
DECK CONCRETE	7 CY
CLASS 1 REMOVAL	244 SY
CLASS 2 REMOVAL	146 SY
CLASS 2-A REMOVAL	262 LF
CLASS 3 REMOVAL	37 SY
CLASS 4 REMOVAL	12 SY
CLARKS CREEK	
DECK OVERLAY DETAILS	
DRAWING NO.	200-911.994-3

NDDOT ABBREVIATIONS

D-101-1

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
04-23-18	General Revisions
09-20-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions
04-14-25	General Revisions



NORTH DAKOTA	
DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
08-03-15	General Revisions
04-23-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions
04-14-25	General Revisions

NDDOT ABBREVIATIONS

D-101-3

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
09-03-15	General Revisions
04-23-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions
04-14-25	General Revisions



NDDOT ABBREVIATIONS

D-101-4

MEASUREMENTS

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

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

SURVEY DESCRIPTIONS

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

SOIL TYPES

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
12-18-20	Sheet Added
4-14-25	- Continued from D-101-3 General Revisions



NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

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

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

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

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE
04-23-18	General Revisions
09-20-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions
04-14-25	General Revisions



LINE STYLES

D-101-20

Existing Topography

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

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

Proposed Topography

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

Existing Utilities

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

Proposed Utilities

	24 Inch Pipe
	Reinforced Concrete Pipe
	Under Drain
	Edge Drain

Traffic Utilities

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

Sign Structures

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

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

KIRK J. HOFF

REGISTERED

PROFESSIONAL

PE-4683

ENGINEER

NORTH DAKOTA

12 18 2020

LINE STYLES

D-101-21

Right Of Way

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

Boundary Control

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

Cross Sections and Typicals

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

Geotechnical

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

Countours

	Depression Contours
	Supplemental Contour

Profile

	Subgrade, Subcut or Ditch Grade
	Topsoil Profile

Striping

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

Pavement Joints

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

Bridge Details

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

Erosion Control

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

Environmental

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

07-01-14

REVISIONS

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

KIRK J. HOFF

REGISTERED

PROFESSIONAL

PE-4683

ENGINEER

NORTH DAKOTA

12 18 2020

SYMBOLS

D-101-30

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

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

12 18 2020

SYMBOLS

D-101-31

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

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

12 18 2020

SYMBOLS

D-101-32

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

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

KIRK J. HOFF
REGISTERED
PROFESSIONAL



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



12 18 2020

SYMBOLS

D-101-33

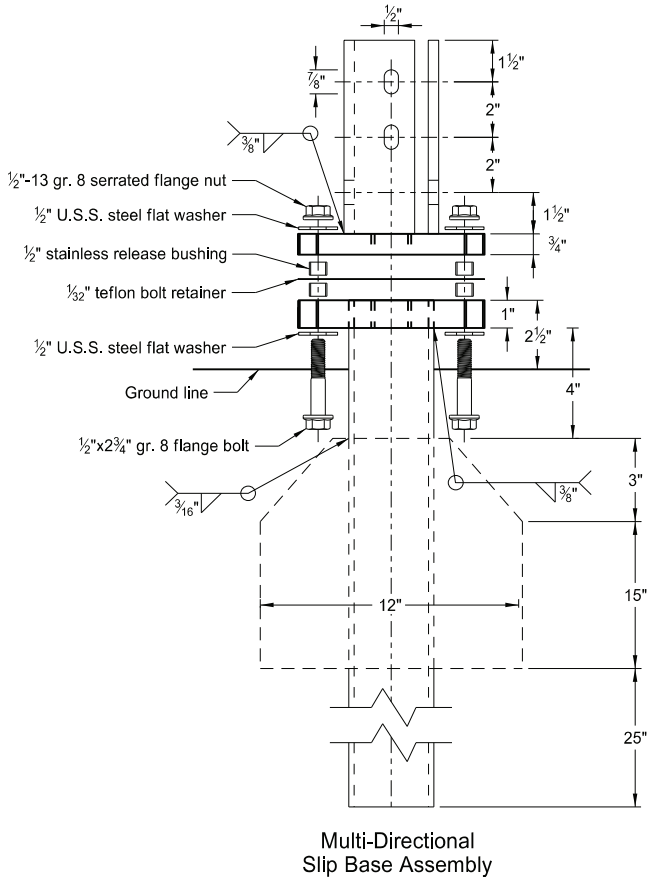
			Existing Manhole (Electrical, Gas, Telephone)		Cap or Stub Exst Gas, Exst Sanitary, Exst Storm Drain, Ppsd Storm Drain, Exst Water
			Water Manhole (Exst, Exst with Valve)		Existing Pedestal Electrical, Telephone, Fiber Optic Telephone, TV, Fiber Optic TV, Undefined
			Sanitary Sewer Manhole (Exst, Ppsd,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

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

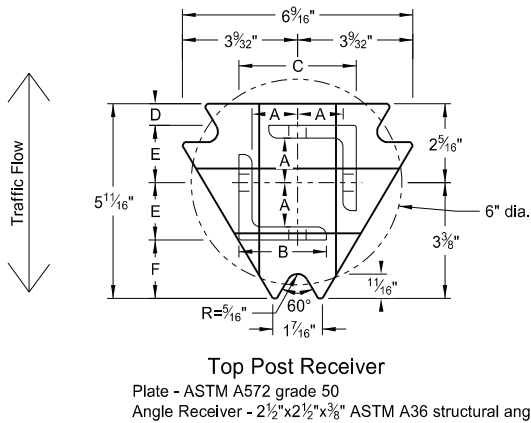
12 18 2020

BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7



Perforated Tube



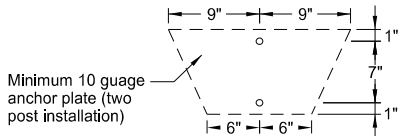
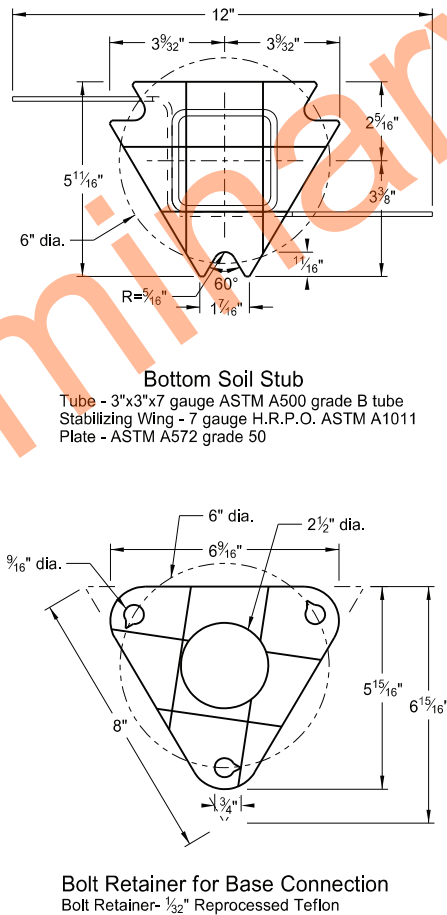
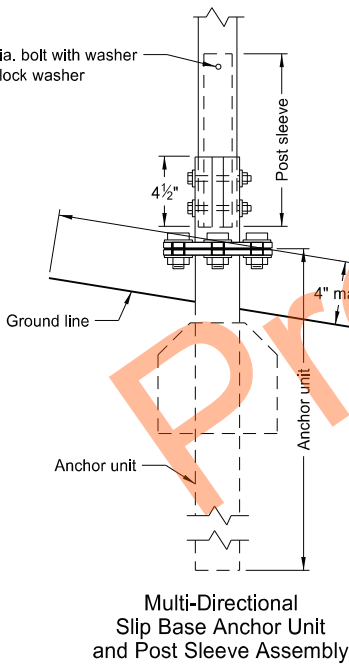
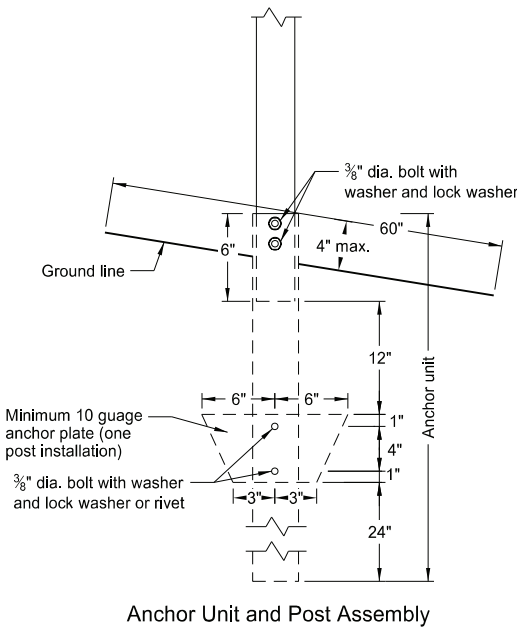
- Notes:
1. Torque slip base bolts as specified by manufacturer.
 2. Use anchor with 43.9 KSI yield strength and 59.3 KSI tensile strength.
 3. Provide 4" vertical clearance for anchor or breakaway base. Measure the 4"x60" measurement above and below post location and back and ahead of post.
 4. In concrete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

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

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

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

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



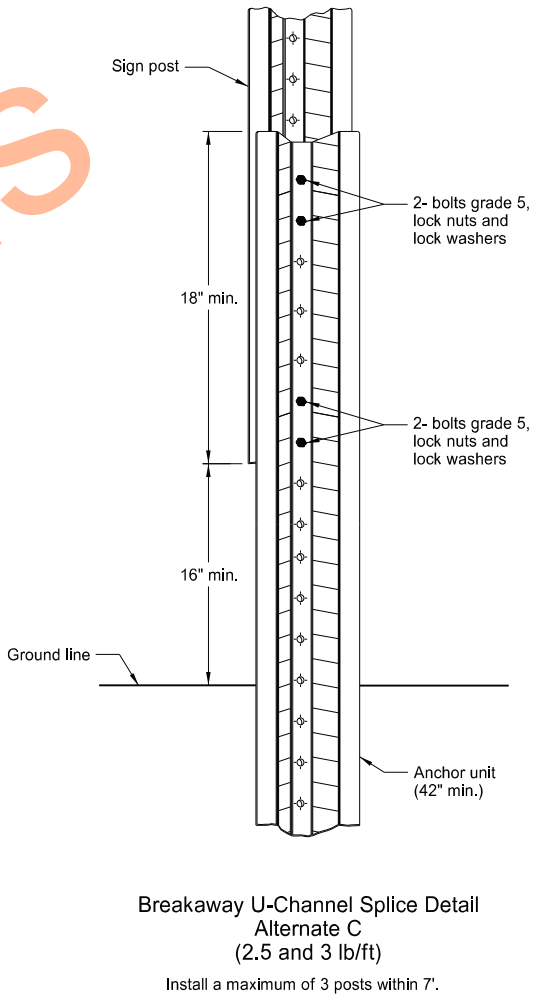
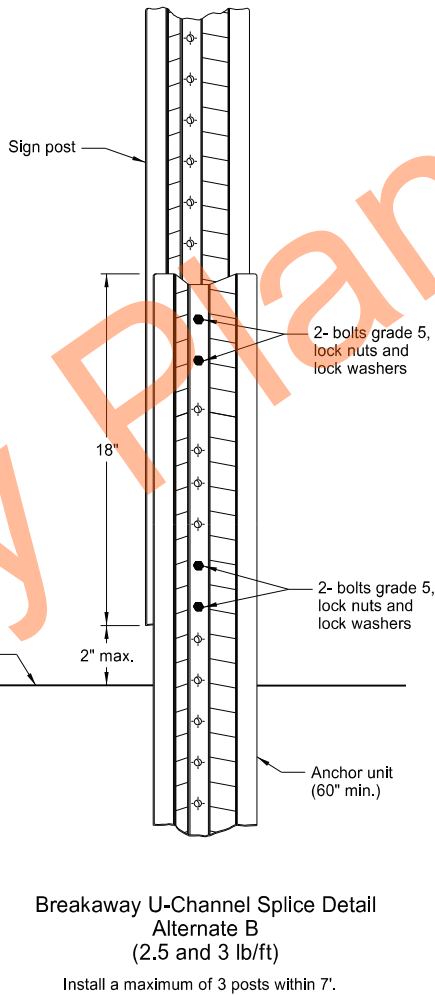
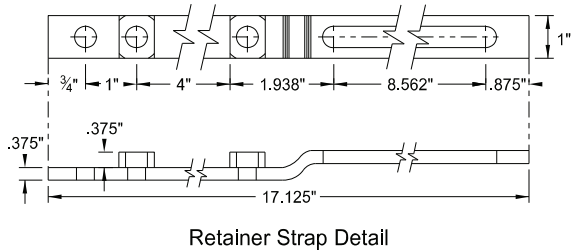
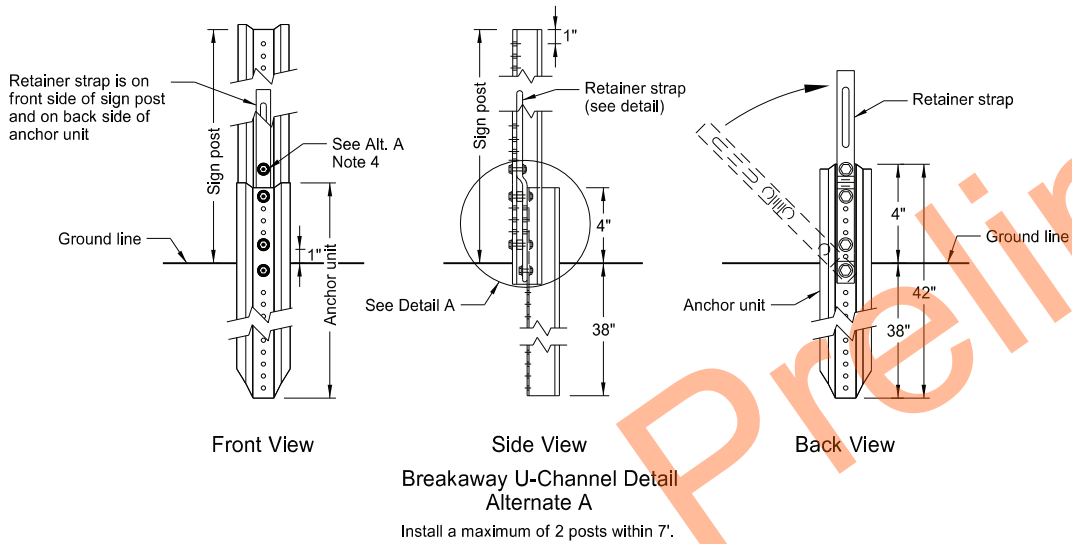
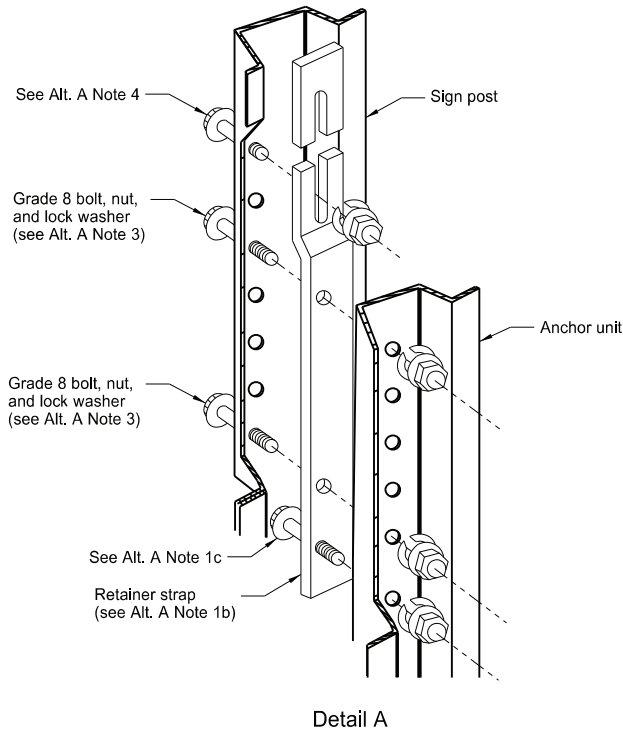
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp
8-01-24	Electronic Stamp/Signature



BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



Alternate A Steps of Installation:

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

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

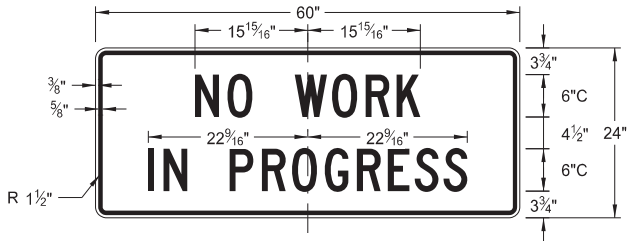


08/01/24

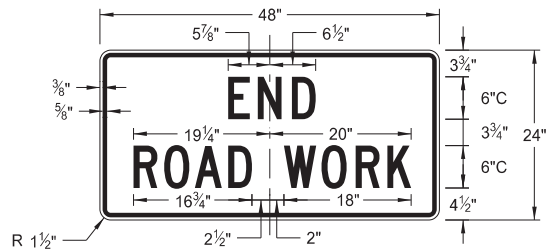
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



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



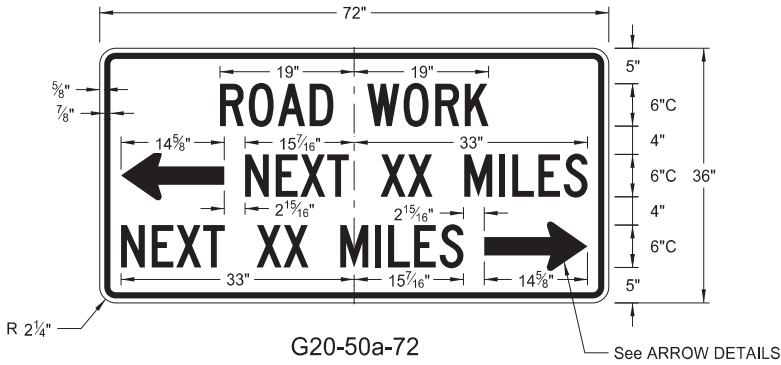
G20-1b-60
Legend: black (non-refl)
Background: orange



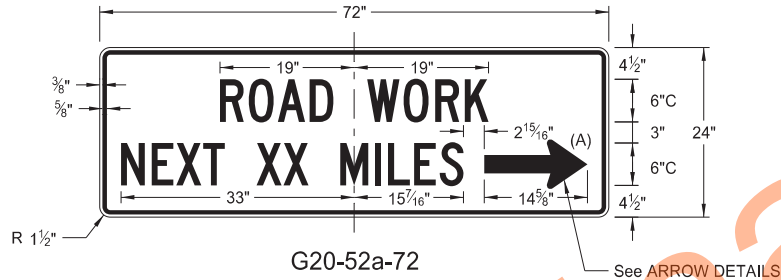
G20-2-48
Legend: black (non-refl)
Background: orange



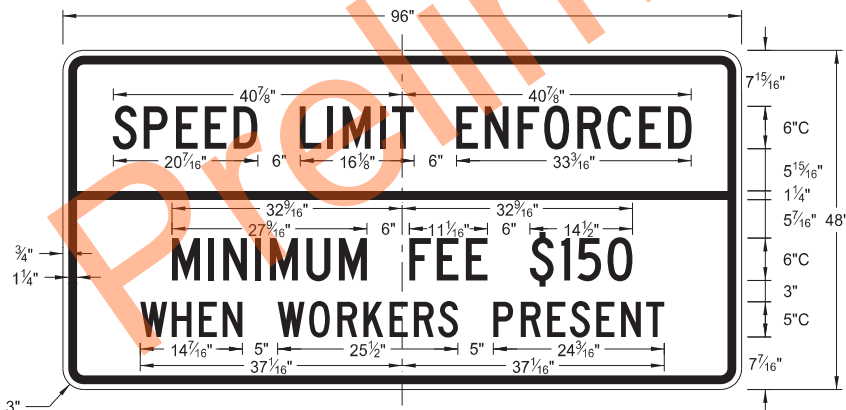
G20-4b-36
Legend: black (non-refl)
Background: orange



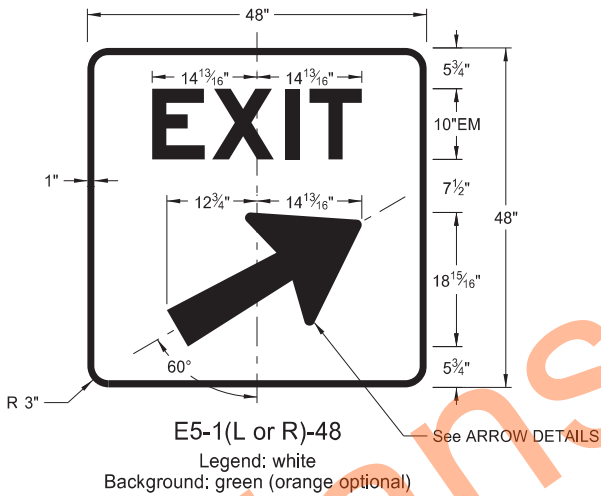
G20-50a-72
Legend: black (non-refl)
Background: orange



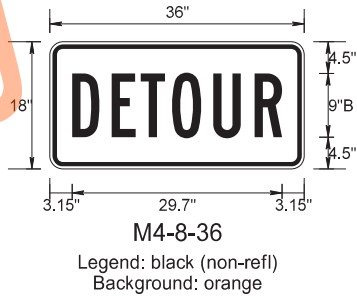
G20-52a-72
Legend: black (non-refl)
Background: orange



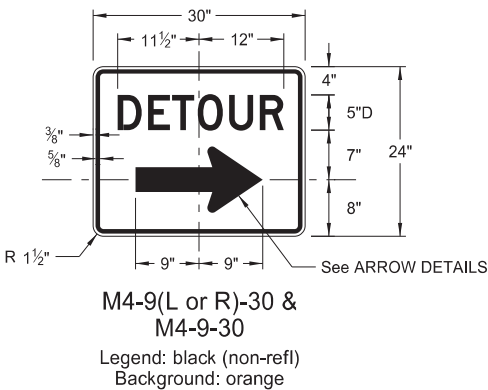
G20-55-96
Legend: black (non-refl)
Background: orange



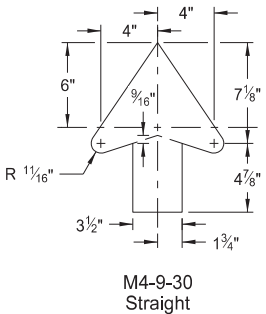
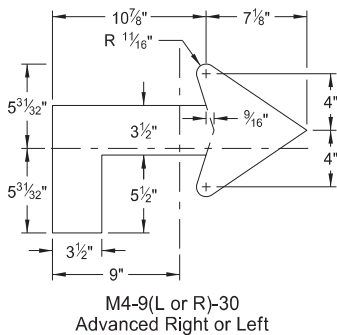
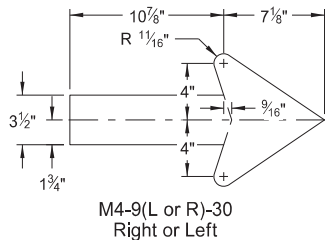
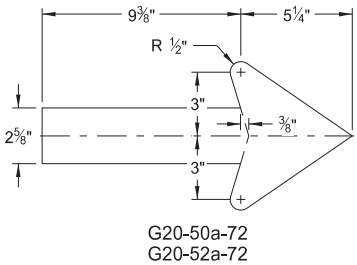
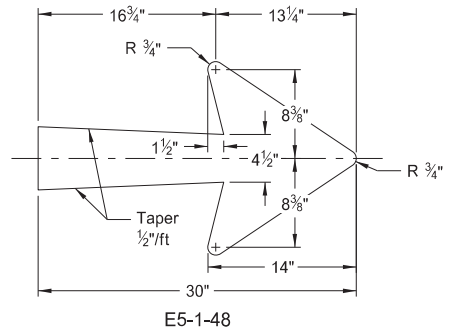
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



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



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



ARROW DETAILS

NOTES:

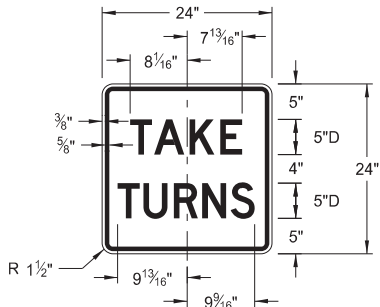
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

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

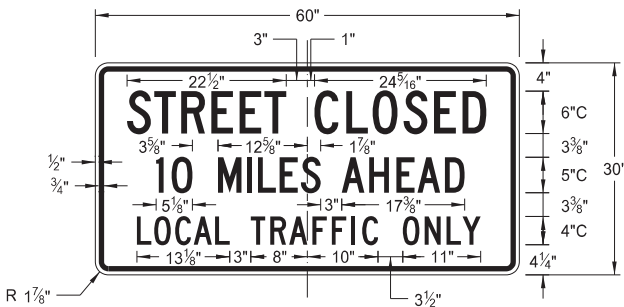


CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS

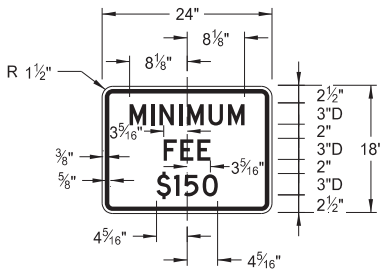
D-704-10



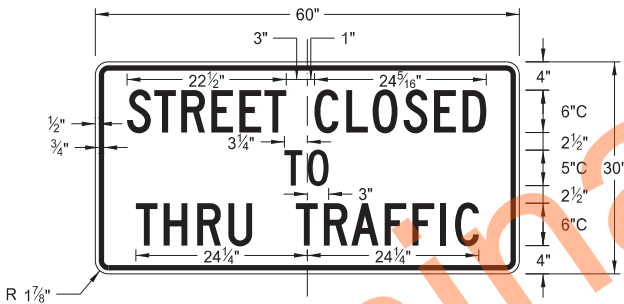
R1-50P-24
Legend: black (non-refl)
Background: white



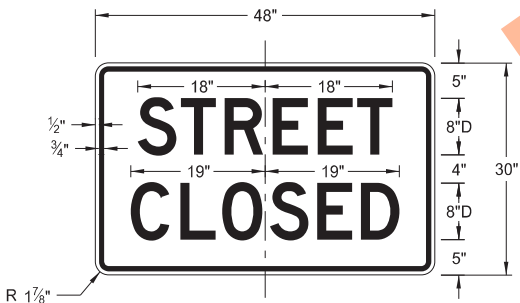
R11-3c-60
Legend: black (non-refl)
Background: white



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



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



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

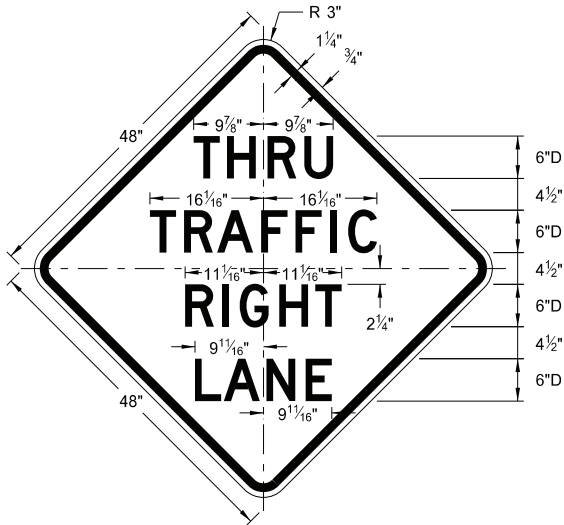
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
08-17-17	Revised sign number
10-03-19	New Design Engineer PE Stamp
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes



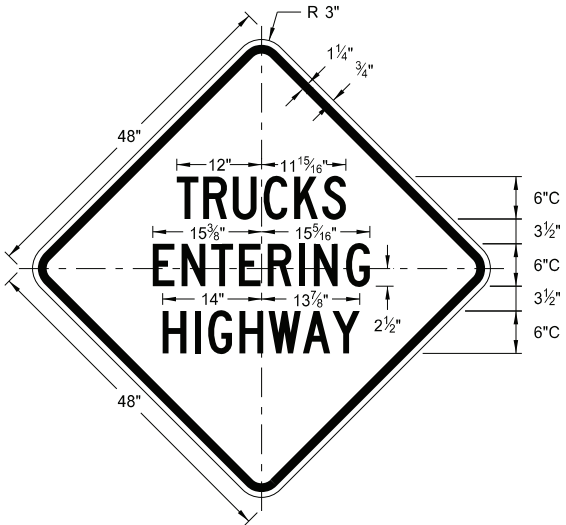
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

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

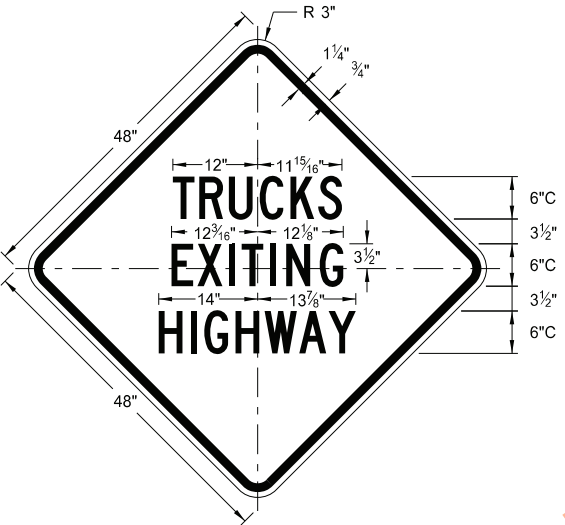
* DISTANCE MESSAGES



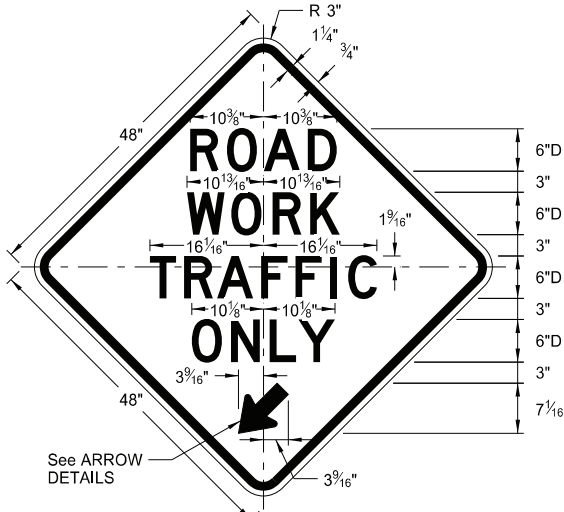
W5-8-48
Legend: black (non-refl)
Background: orange



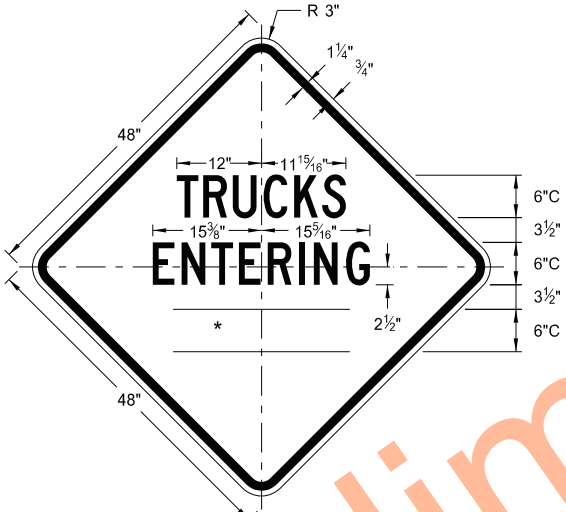
W8-53-48
Legend: black (non-refl)
Background: orange



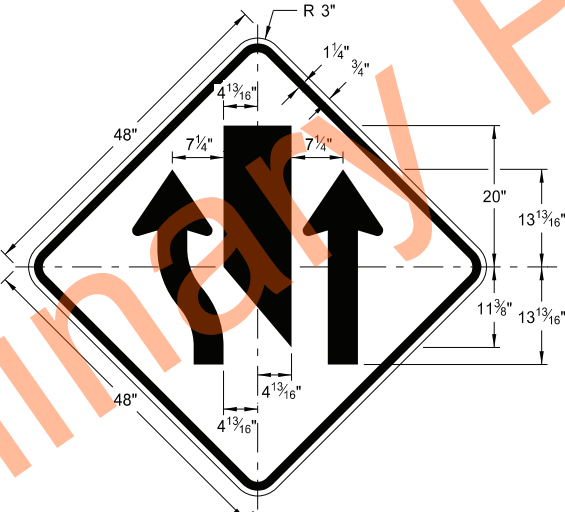
W8-56-48
Legend: black (non-refl)
Background: orange



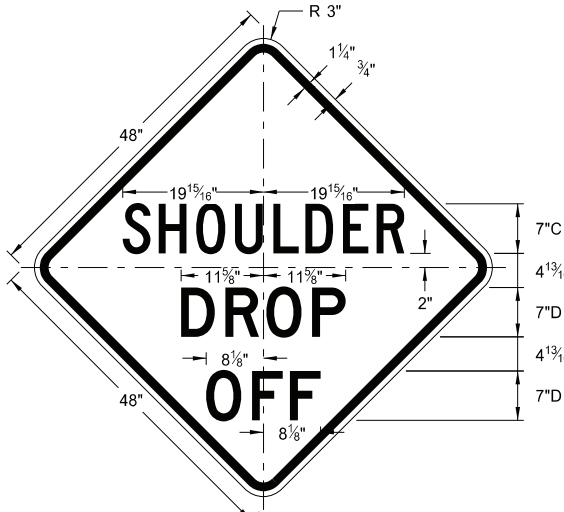
W5-9-48
Legend: black (non-refl)
Background: orange



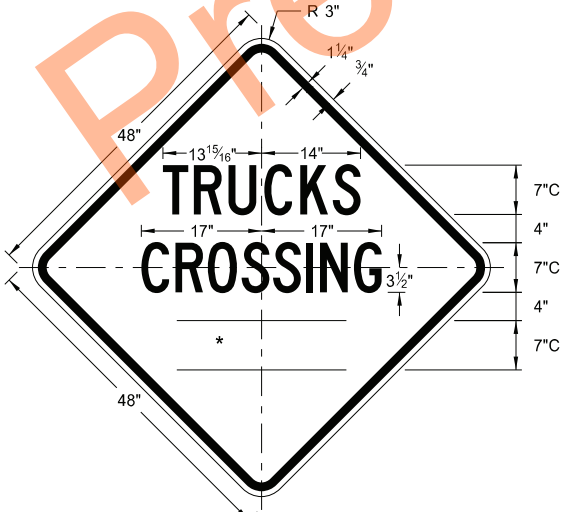
W8-54-48
Legend: black (non-refl)
Background: orange



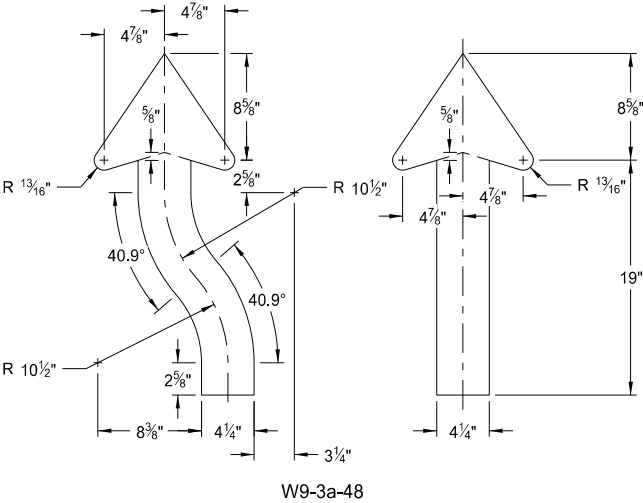
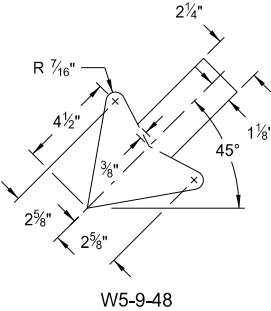
W9-3a-48
Legend: black (non-refl)
Background: orange



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



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



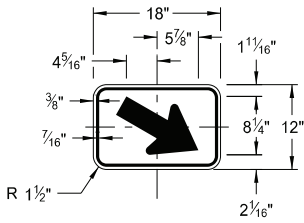
ARROW DETAILS

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

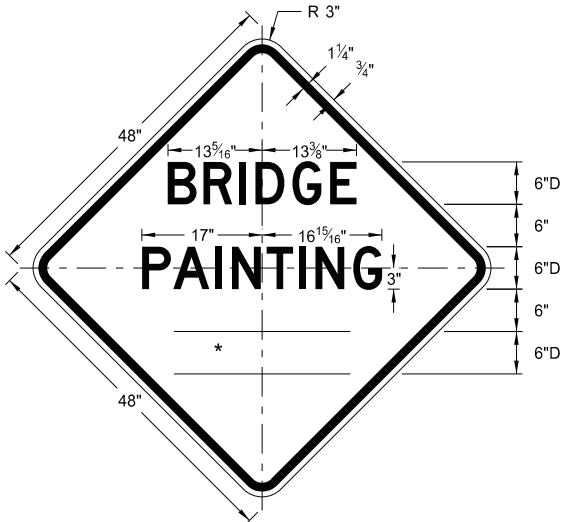


08/01/24

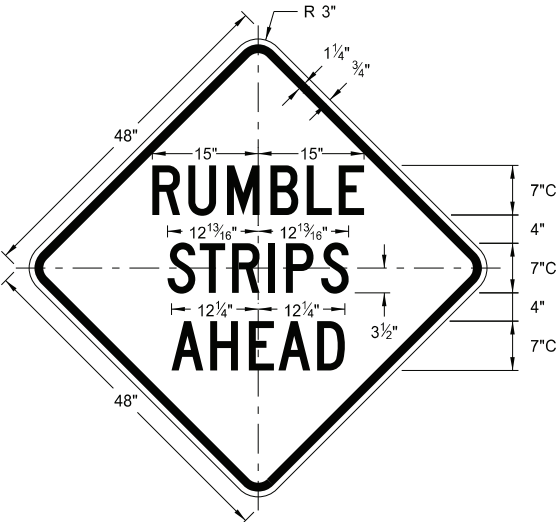
CONSTRUCTION SIGN DETAILS
WARNING SIGNS



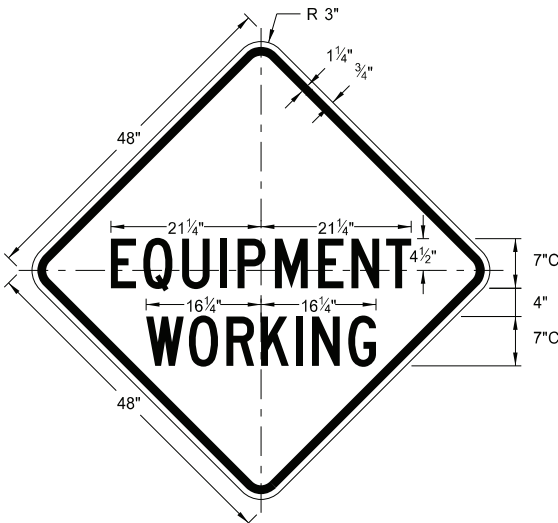
W16-7aP-18
Legend: black (non-refl)
Background: orange



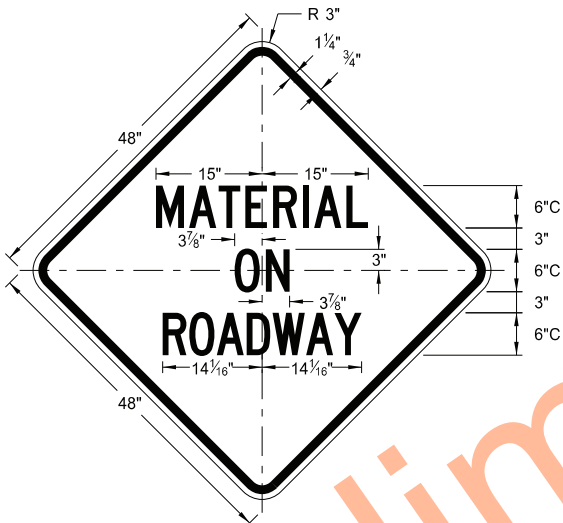
W21-50-48
Legend: black (non-refl)
Background: orange



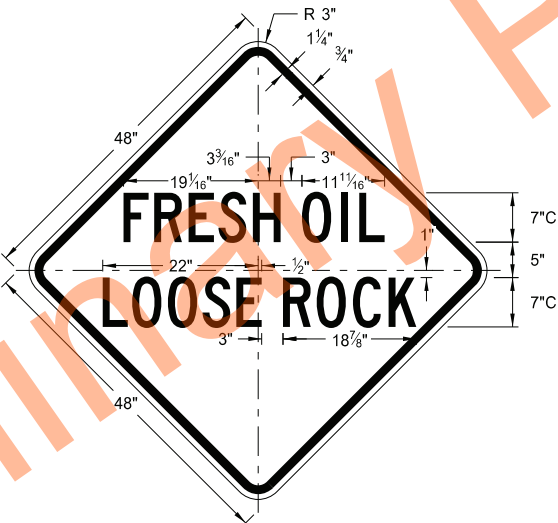
W21-53-48
Legend: black (non-refl)
Background: orange



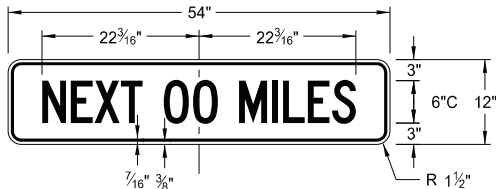
W20-51-48
Legend: black (non-refl)
Background: orange



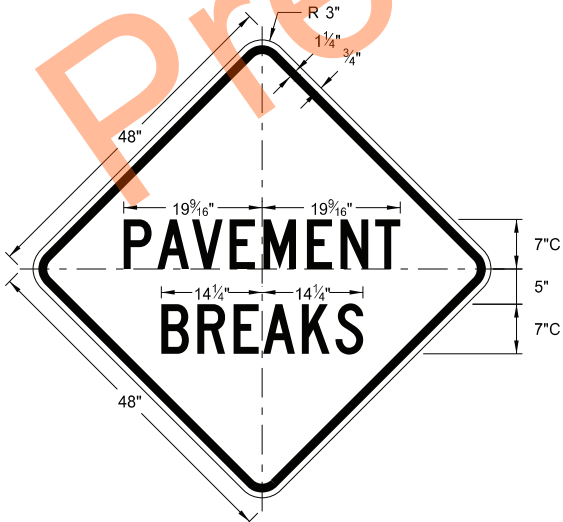
W21-51-48
Legend: black (non-refl)
Background: orange



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



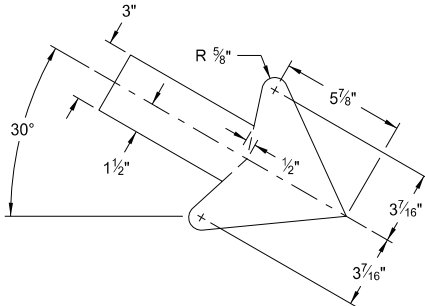
W20-52P-54
Legend: black (non-refl)
Background: orange



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

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

* DISTANCE MESSAGES



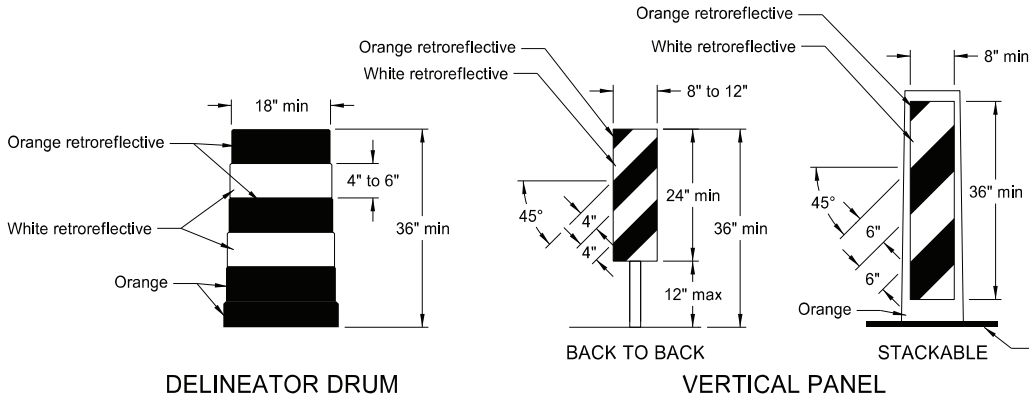
W16-7aP-18

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



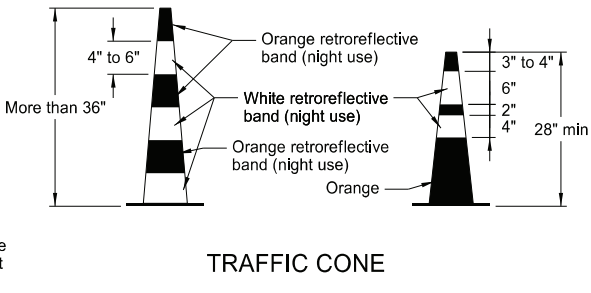
08/01/24

BARRICADE AND CHANNELIZING DEVICE DETAILS

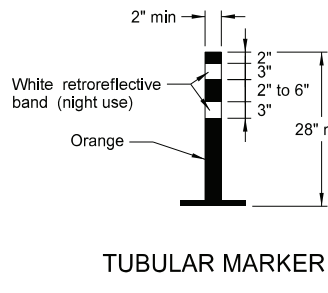


Provide horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide for drum markings. Use a minimum of two orange and two white stripes with the top stripe being orange for each drum. Do not exceed 3" nonretroreflective spaces between the horizontal orange and white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

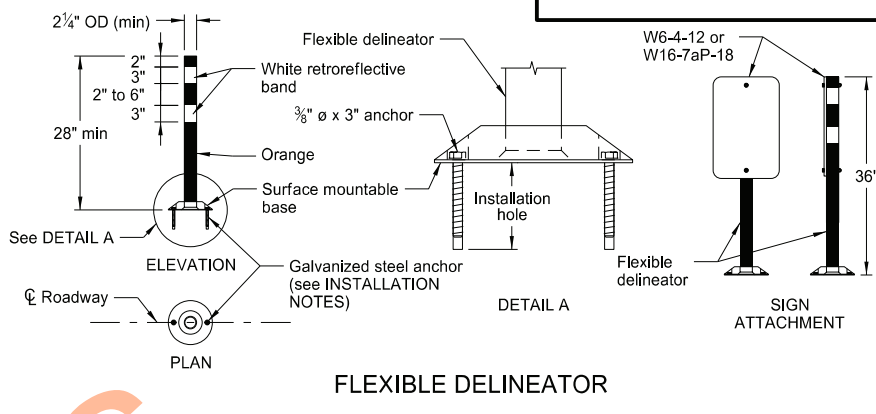
Provide alternating orange and white retroreflective stripes, sloping downward in direction vehicular traffic is to pass. Place retroreflective sheeting on both sides of panel with a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective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



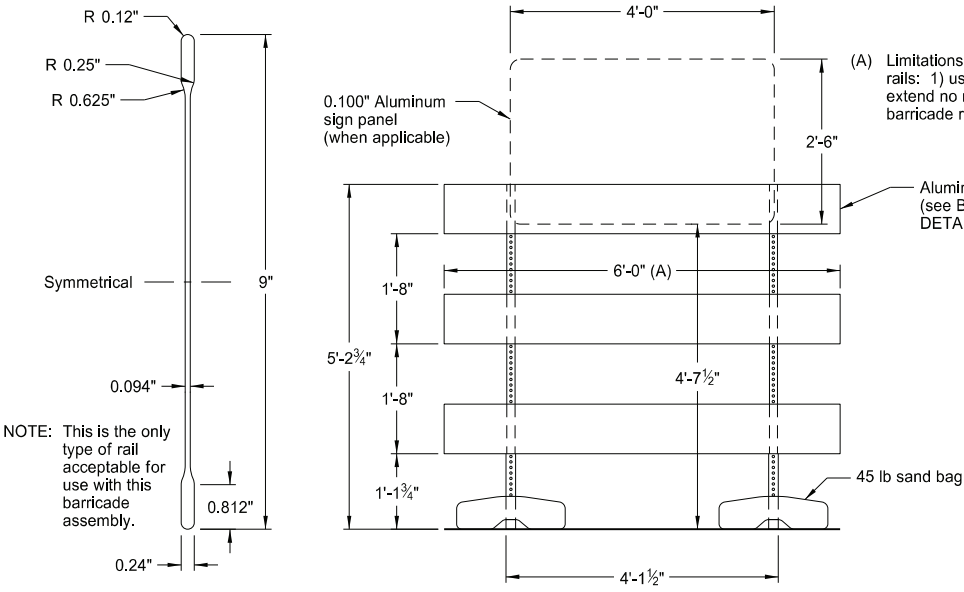
Provide retroreflectorization of cones more than 36" in height by alternating orange and white retroreflective stripes. Use a minimum of two orange and two white stripes for each cone with the top stripe being orange. Use maximum 3" nonretroreflective space between the orange and white stripes.



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



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

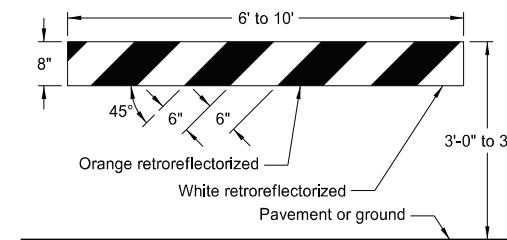


BARRICADE BLADE DETAIL

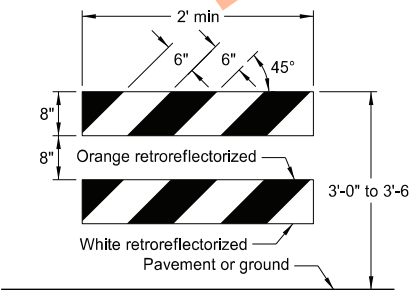
ELEVATION VIEW

BARRICADE ASSEMBLY DETAIL
(Aluminum Barricade Rails)

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

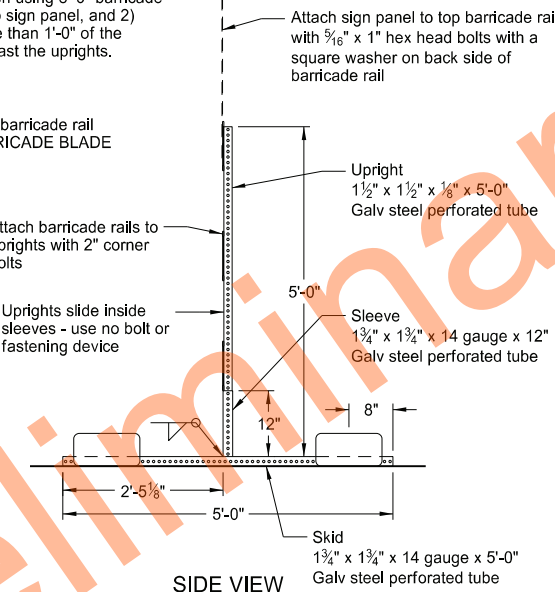


TYPE I BARRICADE

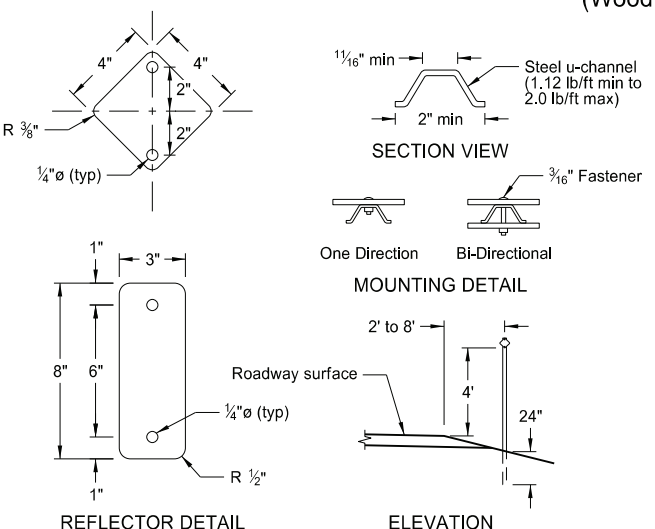


TYPE II BARRICADE

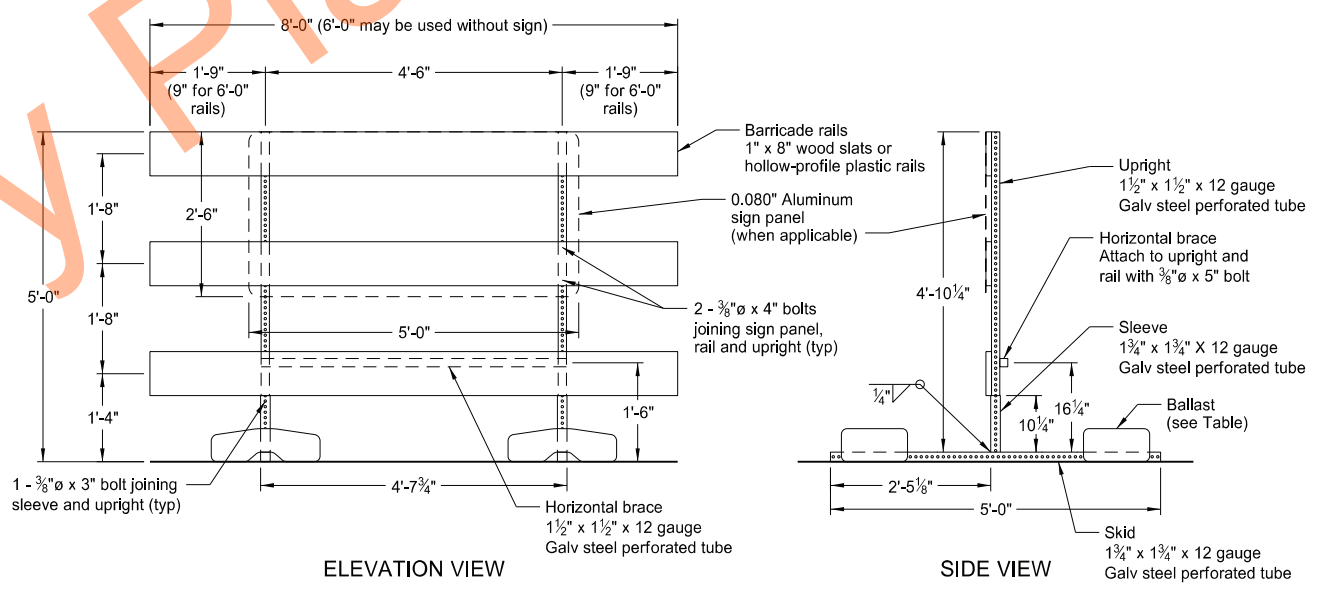
BARRICADE RAIL DETAILS



TYPE III BARRICADE



DELINEATORS



ELEVATION VIEW

BARRICADE ASSEMBLY DETAIL
(Wood or Plastic Rails)

SIDE VIEW

MINIMUM BALLAST
(For each side of barricade support)

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

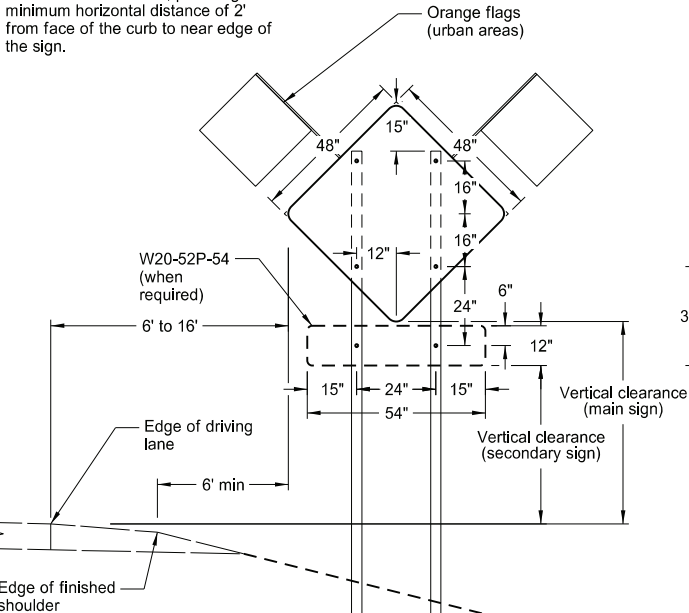
Note: Number of sandbags based on a wind speed of 55 MPH. Sandbags assumed to be placed at or near the ends of the skids.

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

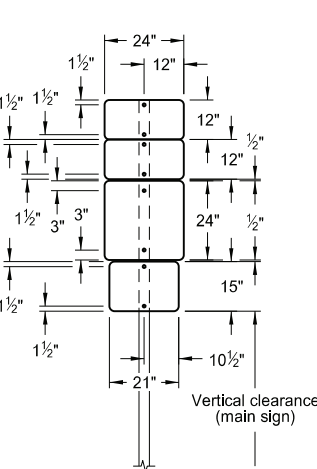


CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

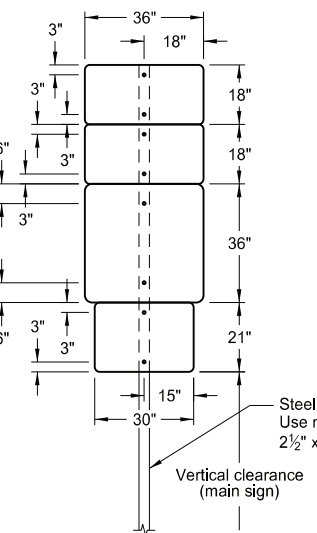
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



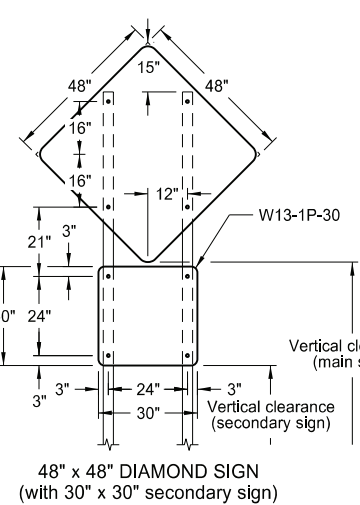
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



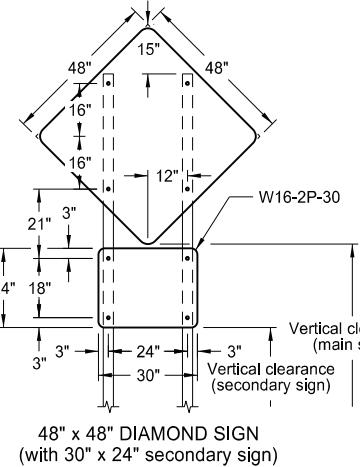
24" x 24" ROUTE MARKER ASSEMBLY



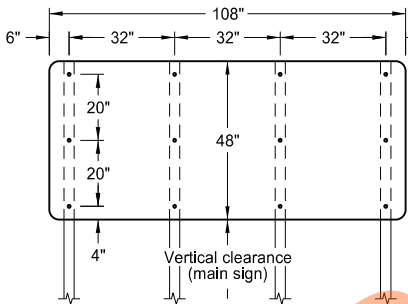
36" x 36" ROUTE MARKER ASSEMBLY



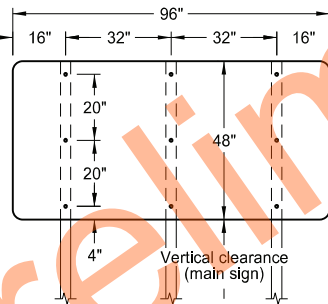
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



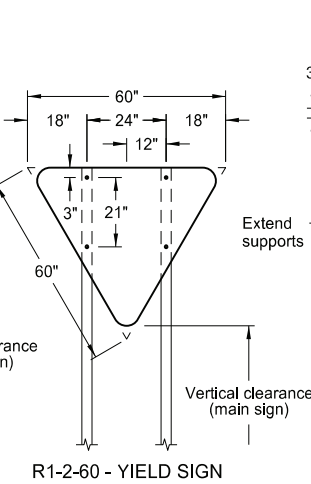
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



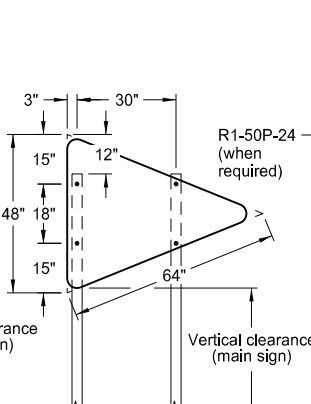
108" x 48" SIGN



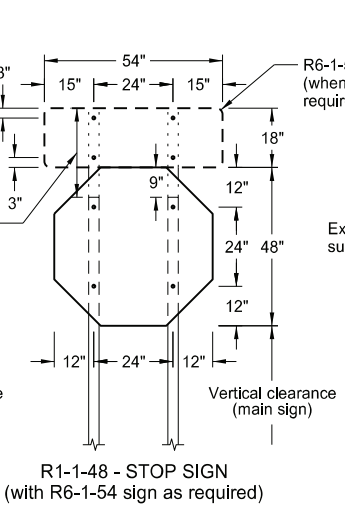
96" x 48" SIGN



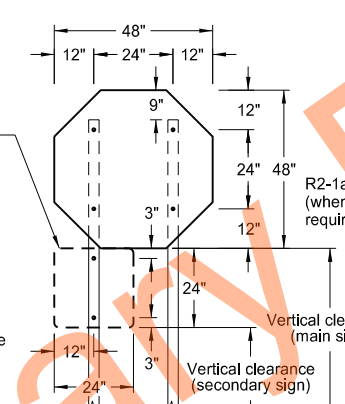
R1-2-60 - YIELD SIGN



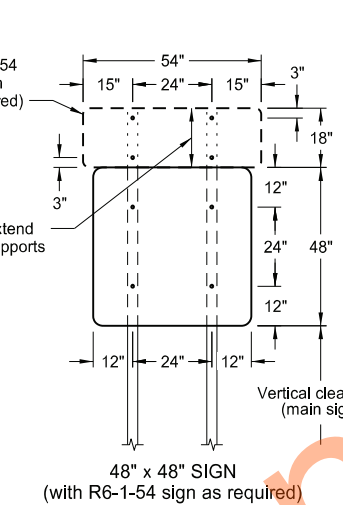
W14-3-64 - PENNANT SIGN



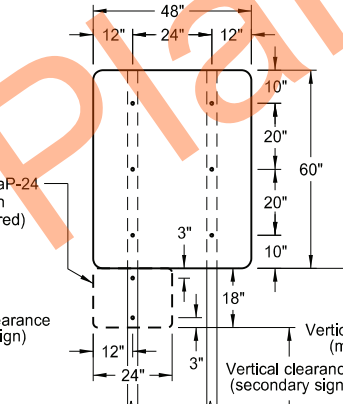
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



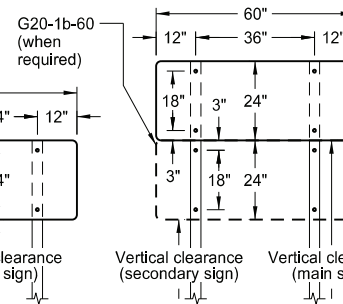
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



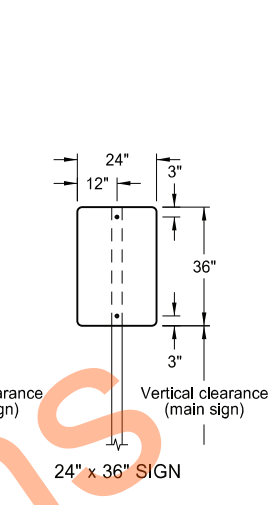
48" x 48" SIGN
(with R6-1-54 sign as required)



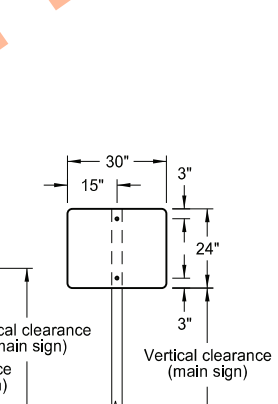
48" x 48" SIGN
(with R2-1aP-24 sign as required)



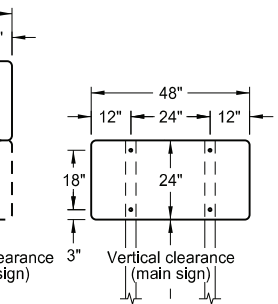
60" x 24" SIGN



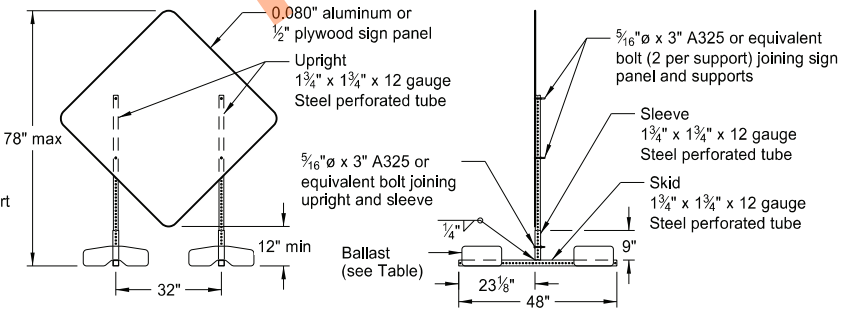
24" x 36" SIGN



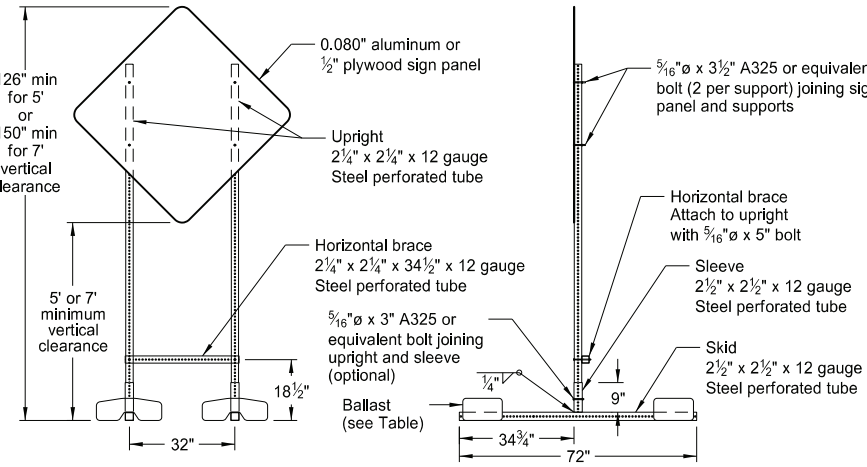
30" x 24" SIGN



48" x 24" SIGN



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

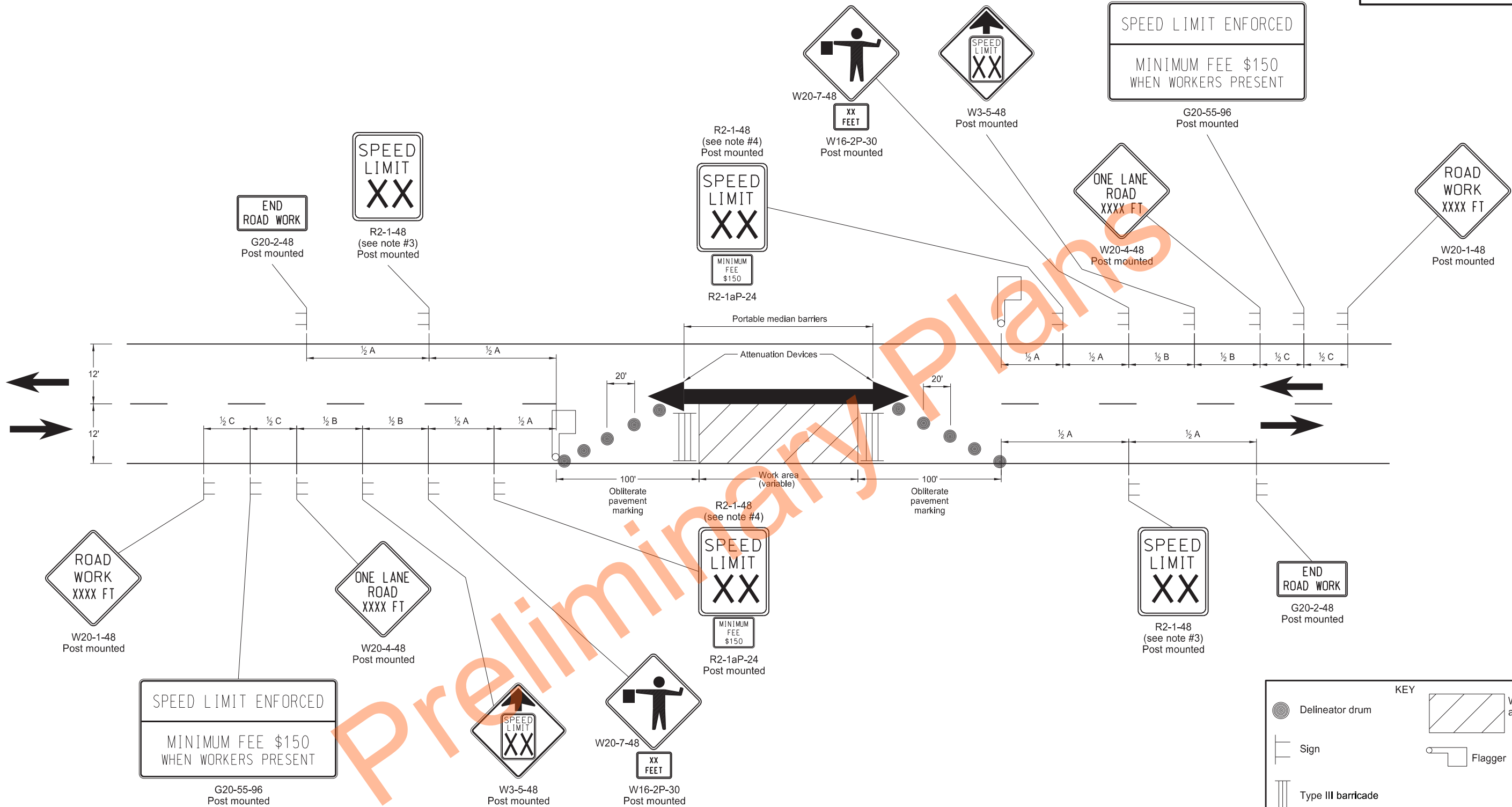


08/01/24



SIGN LAYOUT FOR ONE LANE CLOSURE TWO LANE ROADWAY

D-704-17



KEY

Delineator drum

Sign

Type III barricade

Work area

Flagger

Notes:

- Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
- 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.
- Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
- Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 MPH.) Place the second speed limit sign at 1/2B.
- 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.
- As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
- Cover existing speed limit signs within a reduced speed zone.
- 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.
- Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and Freeway (55 mph to 60 mph)	850	1350	2200
Rural Expressway and Freeway (70 mph to 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	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



Two-Lane Roadway Portable Rumble Strips

D-704-33

Work area

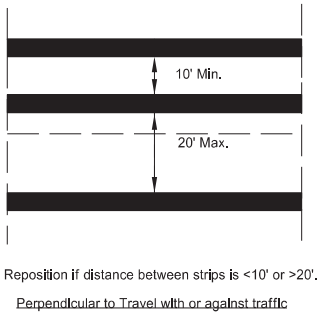
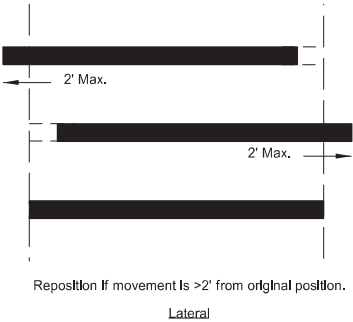
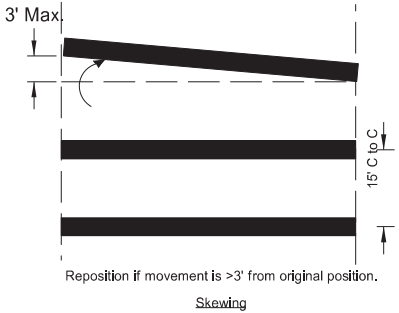
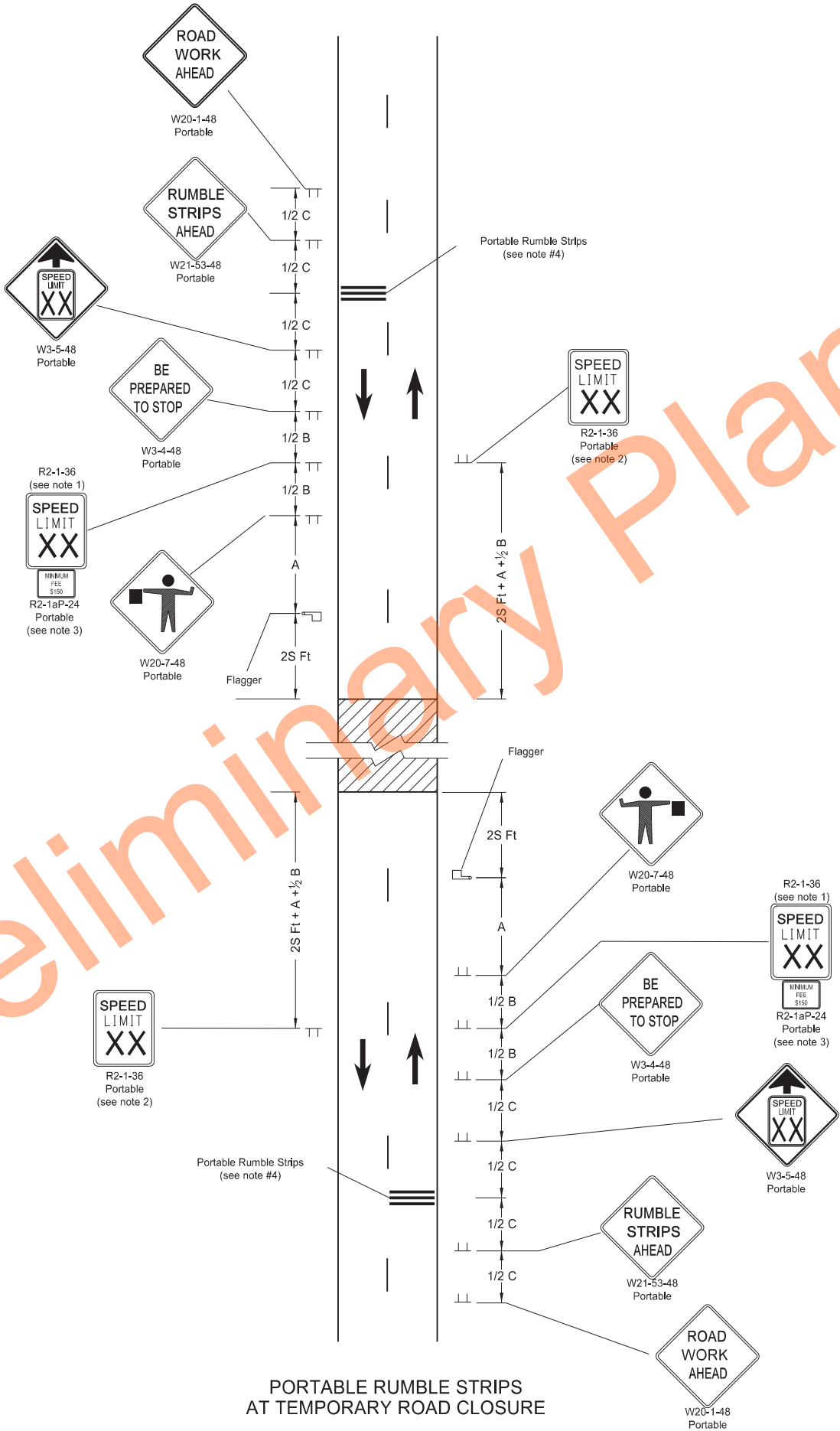
Flagger

Sign

KEY

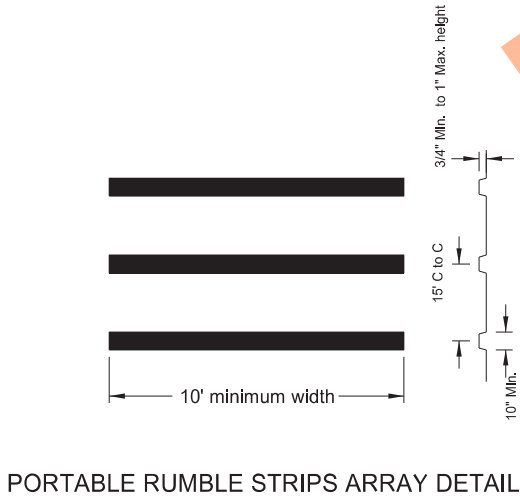
S = Numerical value of speed limit or 85th percentile.

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



PORTABLE RUMBLE STRIPS ARRAY
TYPES OF MOVEMENT AND MAXIMUM ALLOWANCES

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



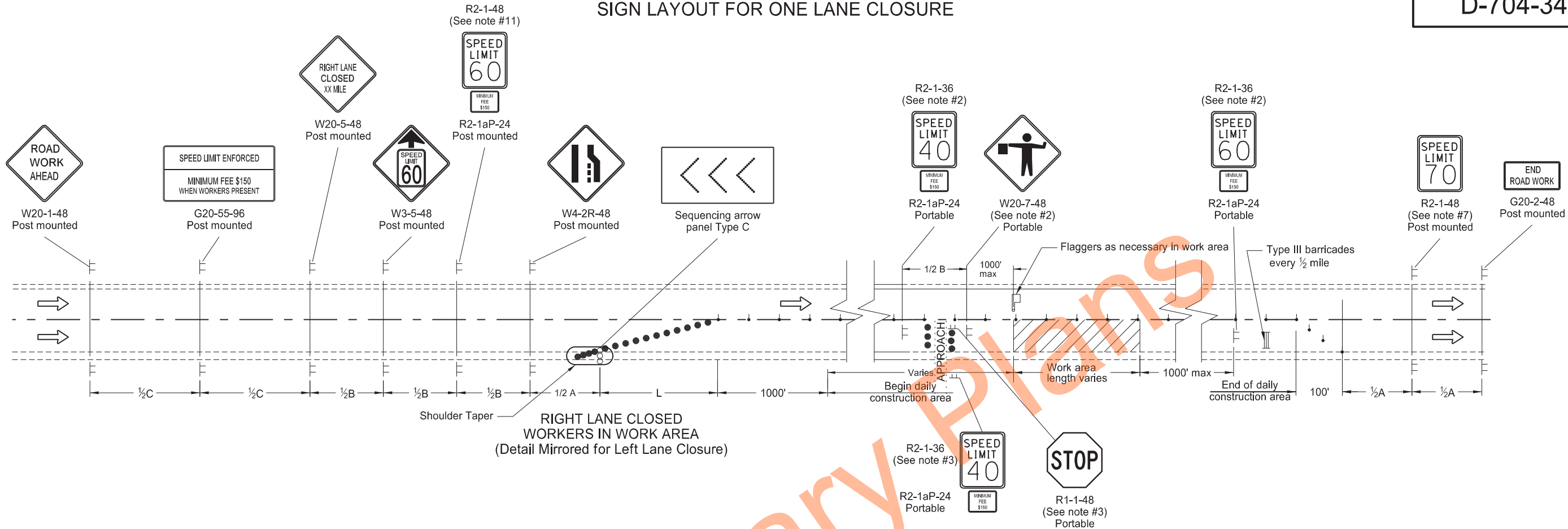
PORTABLE RUMBLE STRIPS
AT TEMPORARY ROAD CLOSURE

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



SIGN LAYOUT FOR ONE LANE CLOSURE

D-704-34



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

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

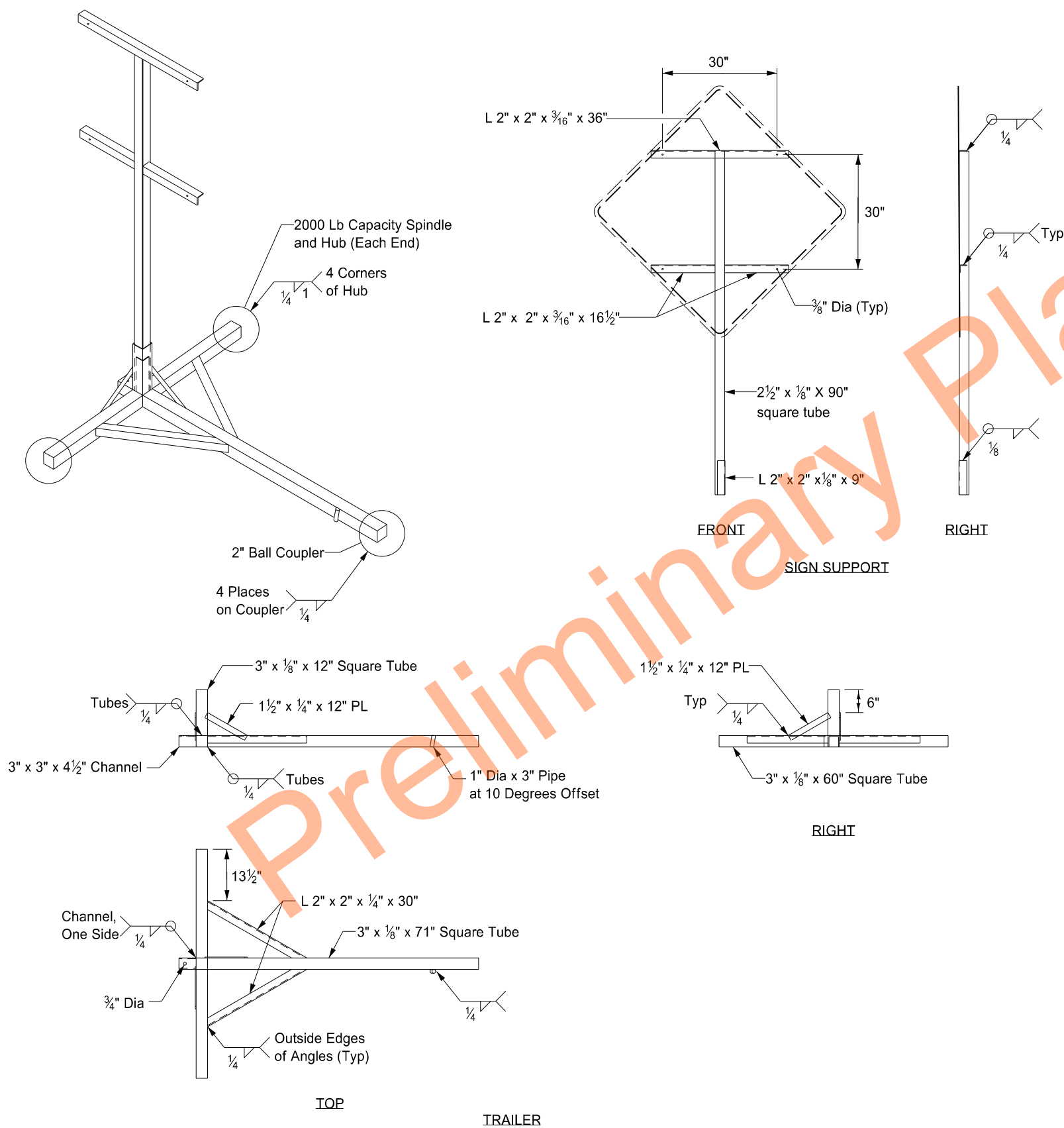
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway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

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

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

PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50

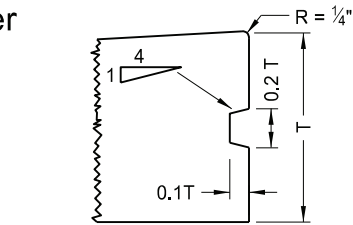
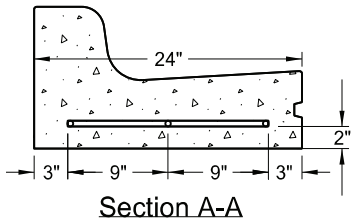
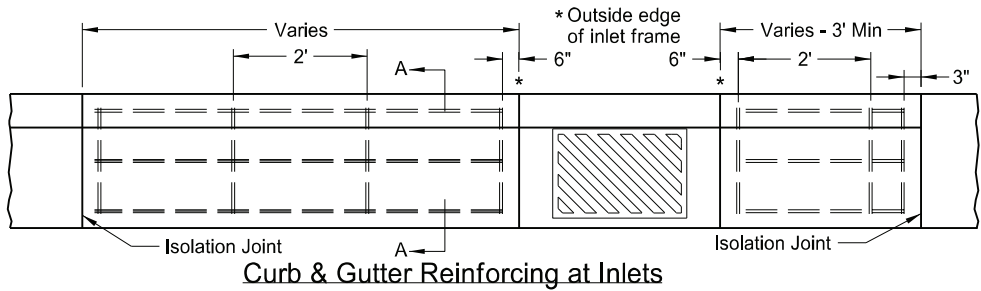


- Notes:
- ①. Maximum 250 pound weight of assembly.
 - ②. Use a 14" wheel and tire.
 - ③. Use no automotive and equipment axle assemblies for trailer-mounted sign supports.
 - ④. Other NCHRP 350 or MASH crash tested assemblies are acceptable.

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

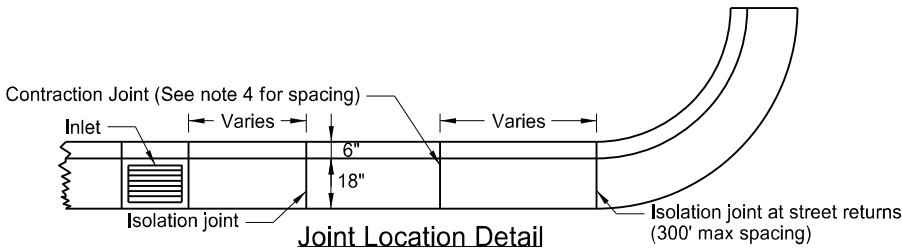
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
12 02 2020

Curb & Gutter and Valley Gutter

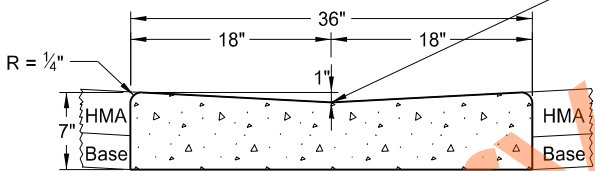


Keyway Detail for Curb & Gutter
(To be used with PCC Pavement and Drives)

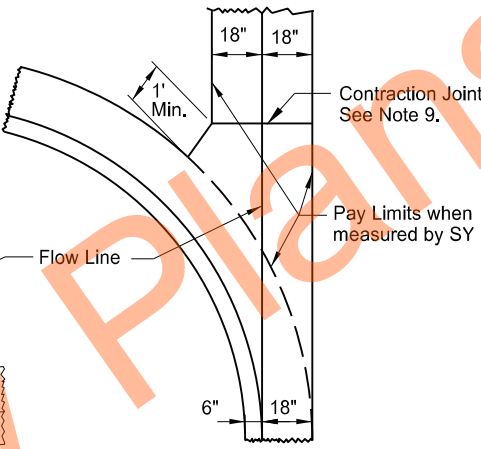
T= Thickness of pavement unless otherwise noted on plans.



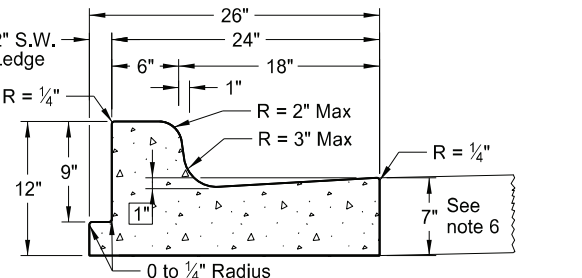
Joint Location Detail



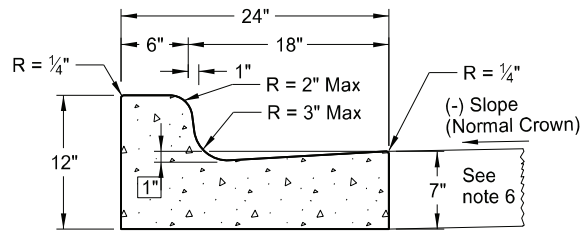
36" Concrete Valley Gutter Detail



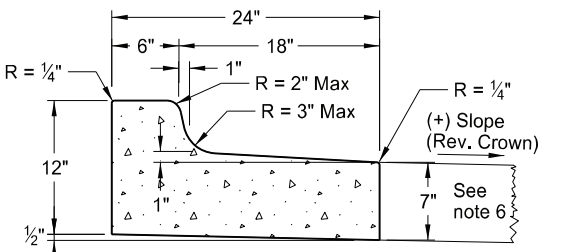
36" Concrete Valley Gutter Plan



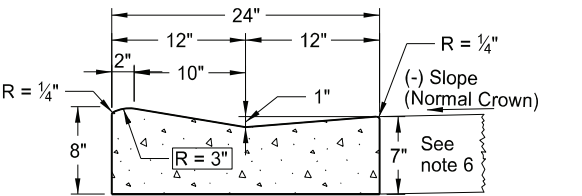
Curb & Gutter Type 1 (Sec. A & B)
Adjacent to Concrete Sidewalk, Median, or Parking Lot. (Sec. A shown. See Sec B for additional details.)



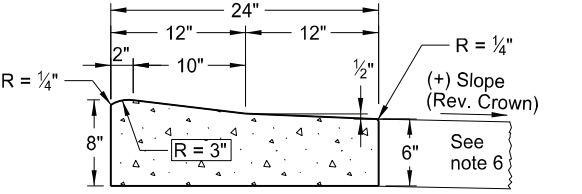
Curb & Gutter Type 1 (Sec. A)



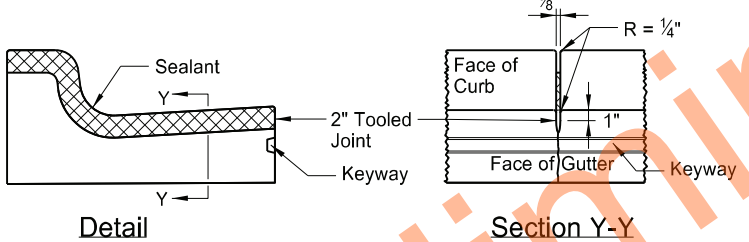
Curb & Gutter Type 1 (Sec. B)



Mountable Curb & Gutter Type 1 (Sec. A)

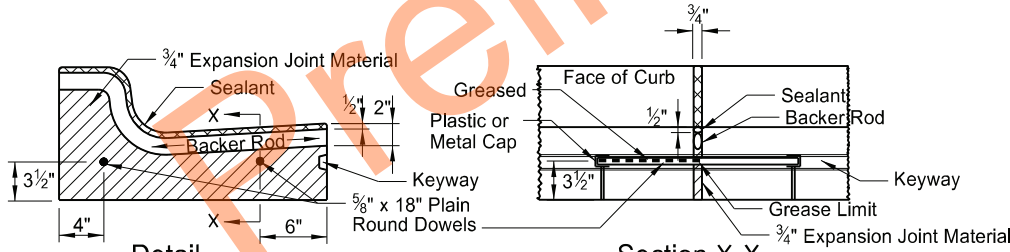


Mountable Curb & Gutter Type 1 (Sec. B)



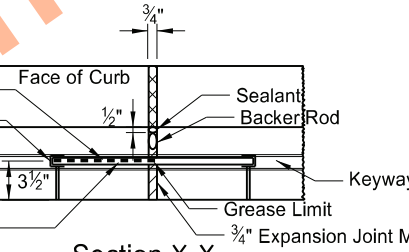
Detail

Contraction Joint

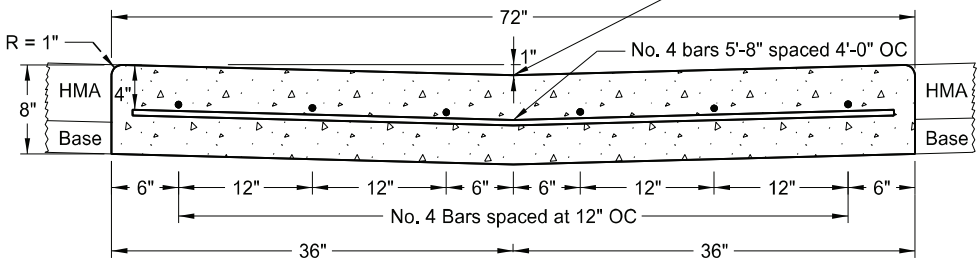


Detail

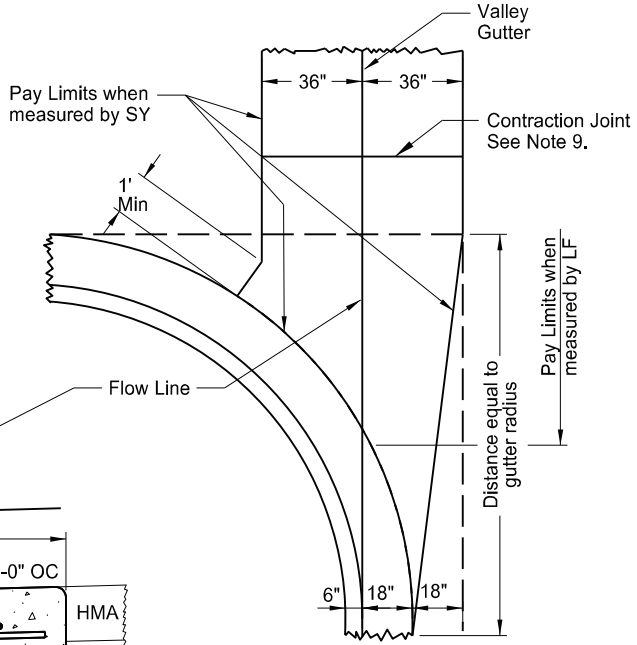
Isolation Joint



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 $\frac{3}{4}$ " 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 $\frac{1}{8}$ " min. to $\frac{3}{8}$ " 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.

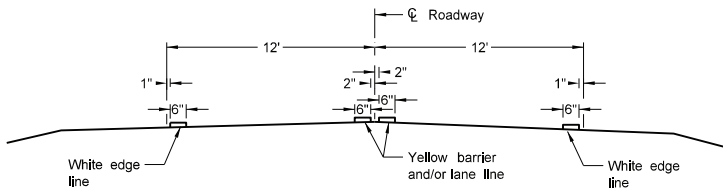
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-7-2013	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engr PE Stamp.
10-30-24	Revised bar size & notes.



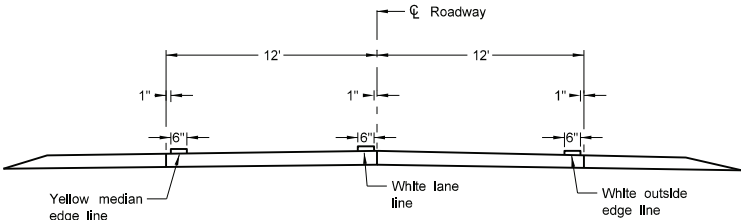
10/30/24

PAVEMENT MARKING

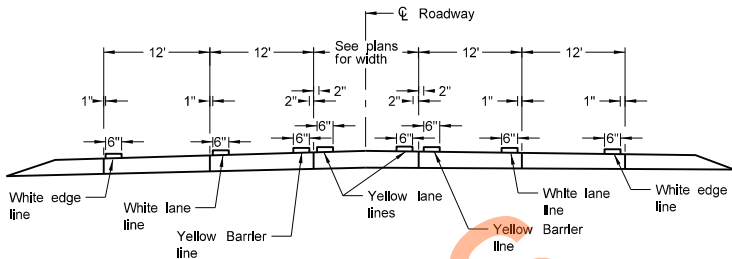
D-762-4



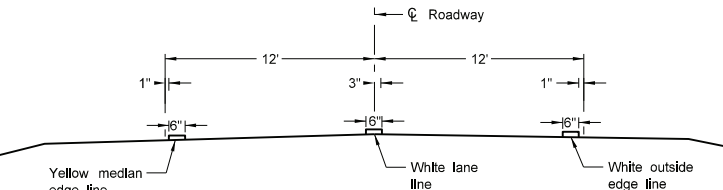
Two Lane Two Way
RURAL ROADWAY



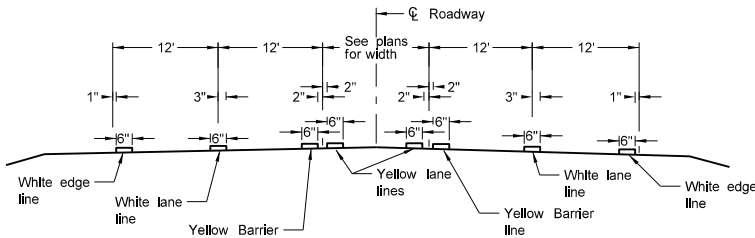
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



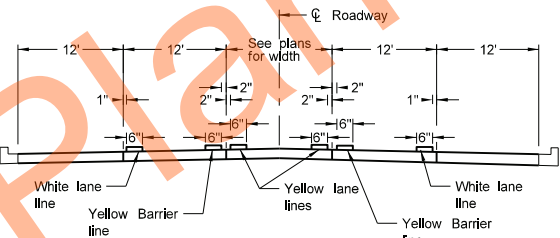
RURAL FIVE LANE ROADWAY
Concrete Section



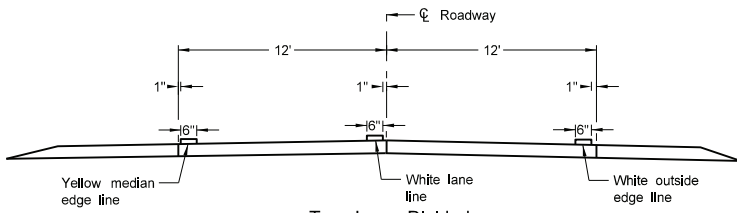
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



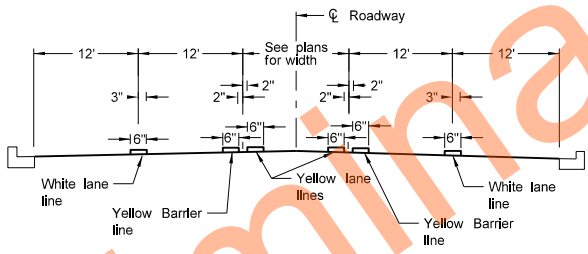
RURAL FIVE LANE ROADWAY
Asphalt Section



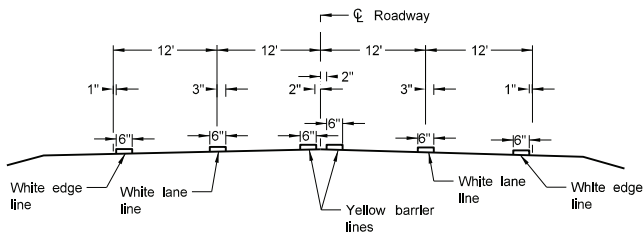
URBAN FIVE LANE SECTION
Concrete Section



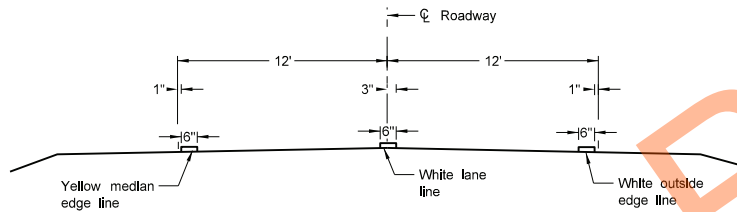
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



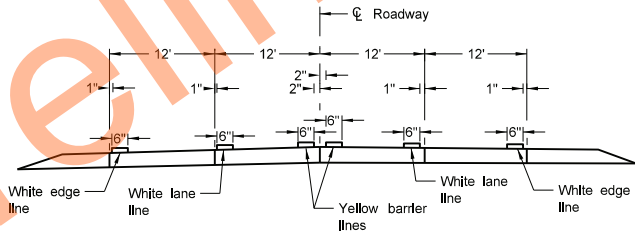
URBAN FIVE LANE SECTION
Asphalt Section



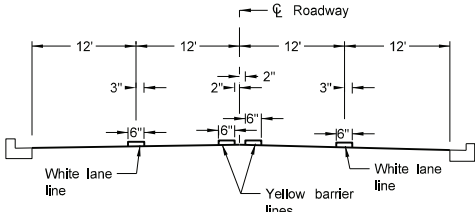
RURAL FOUR LANE ROADWAY
Asphalt Section



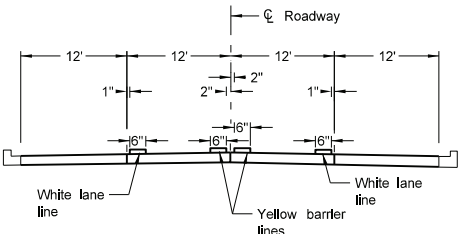
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



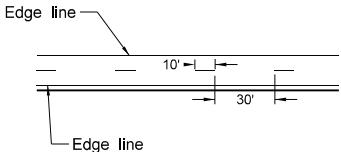
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

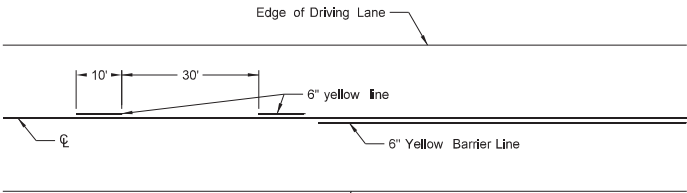
- NOTES:
1. Continue edge lines through private drives and field drives. Break edge lines for intersections.
 2. For section lines, county roads, and street approaches, stripe the radii and edge lines of the paved surface within the right of way except where curb and gutter is present.
 3. Normal width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

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

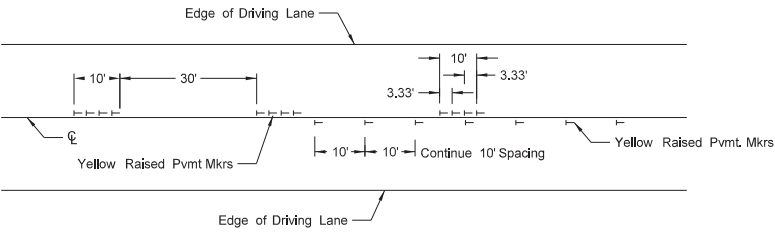


SHORT-TERM PAVEMENT MARKING

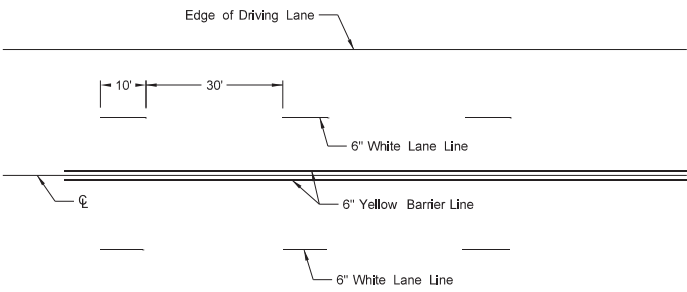
D-762-11



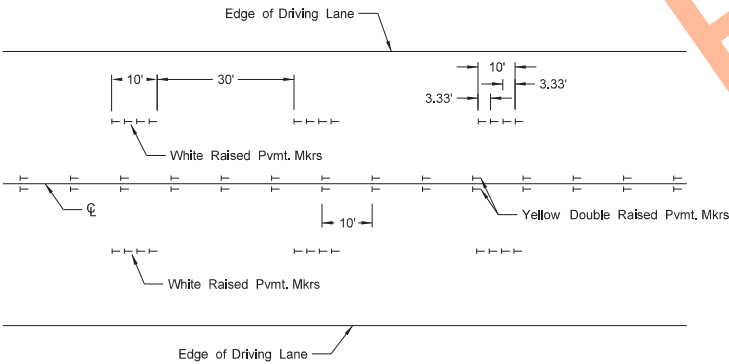
Painted or Tape Lines



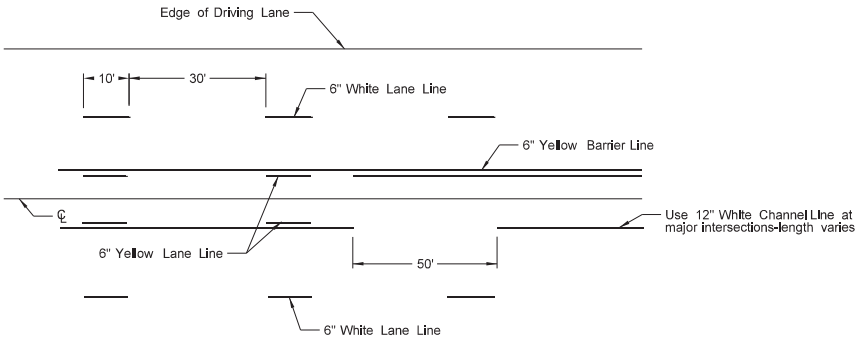
Raised Pavement Markers
TWO-LANE TWO-WAY ROADWAY



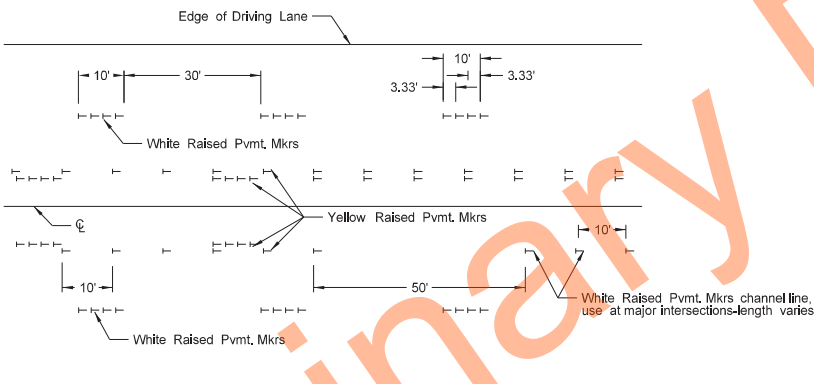
Painted or Tape Lines



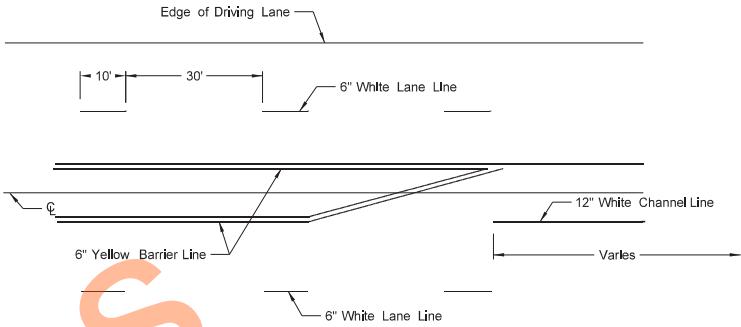
Raised Pavement Markers
FOUR LANE ROADWAY



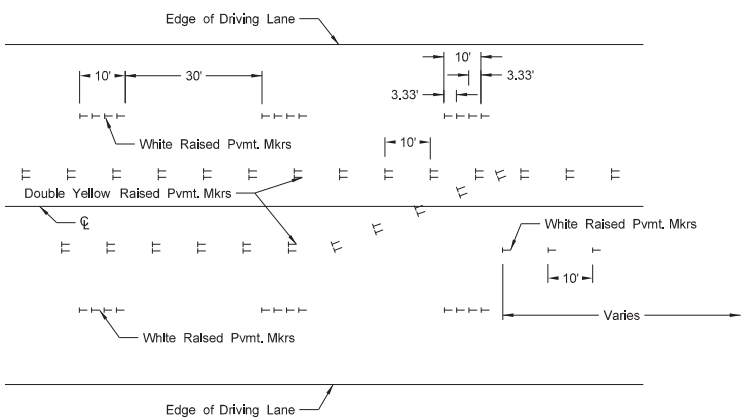
Painted or Tape Lines



Raised Pavement Markers
FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers
FIVE LANE ROADWAY WITH MARKED ISLANDS

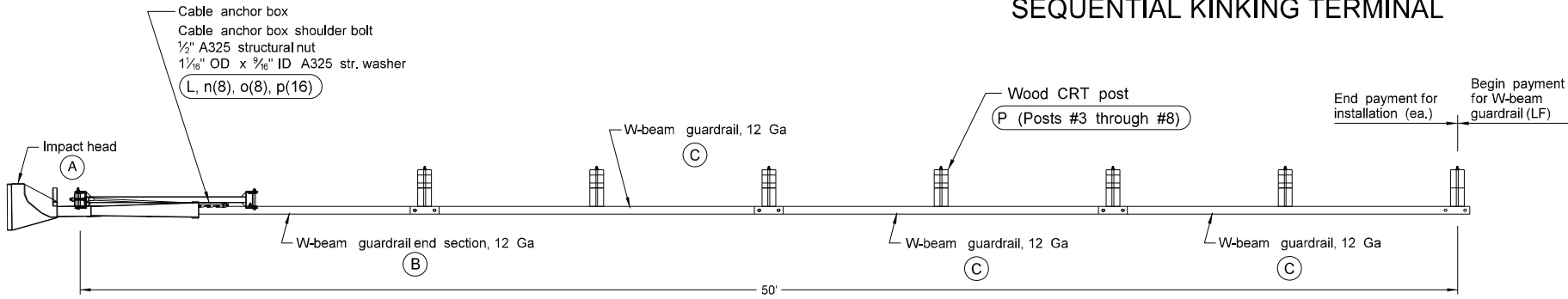
- NOTES:
1. Place no passing zones on two-lane two-way roadways as shown. In lieu of short term no passing zone pavement markings, place no passing zone signs. Replace no passing zone signs with short term no passing zone pavement marking within three days.
 2. Place short term center line stripe (paint) 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.

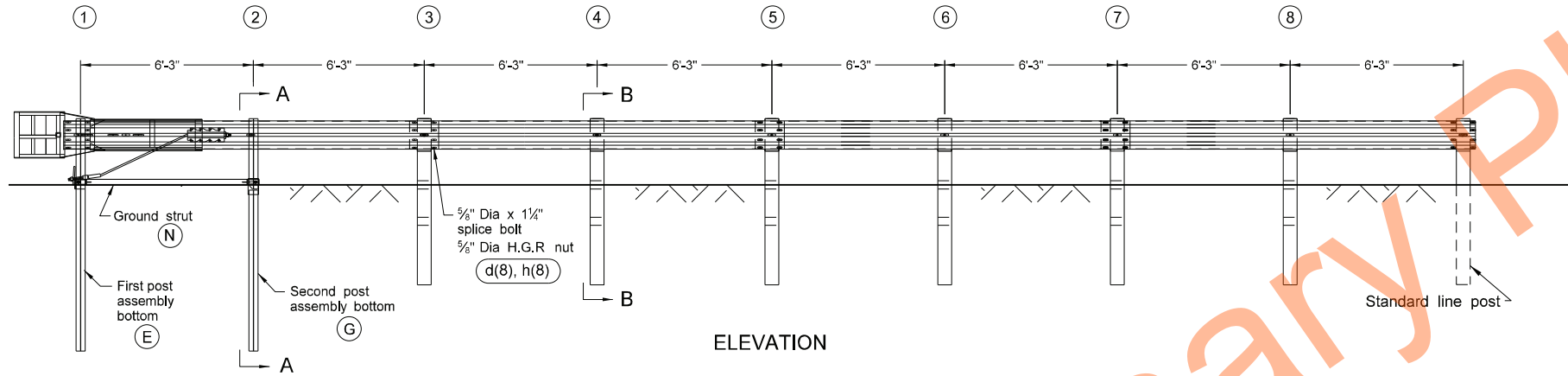


SEQUENTIAL KINKING TERMINAL

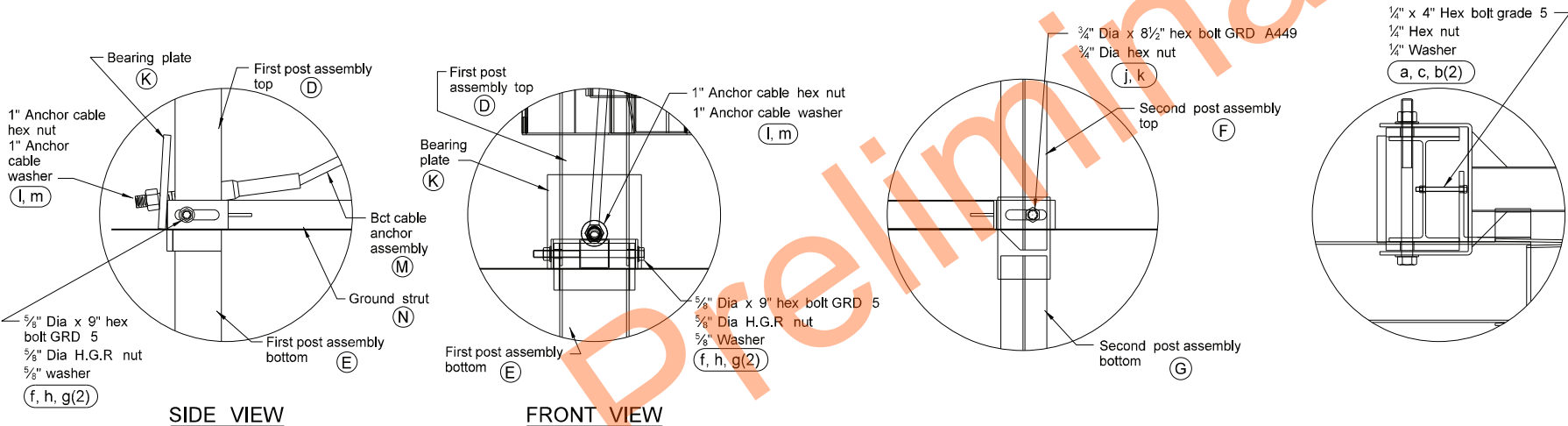
D-764-5



PLAN



ELEVATION

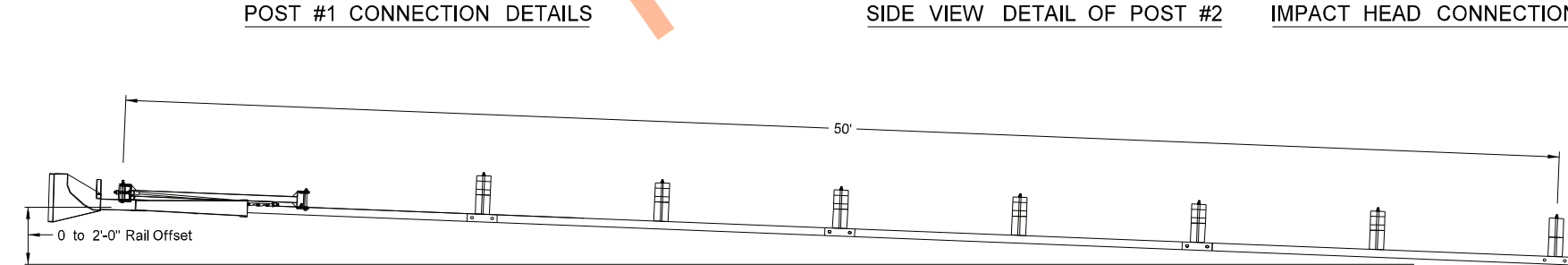


SIDE VIEW

FRONT VIEW

SIDE VIEW DETAIL OF POST #2

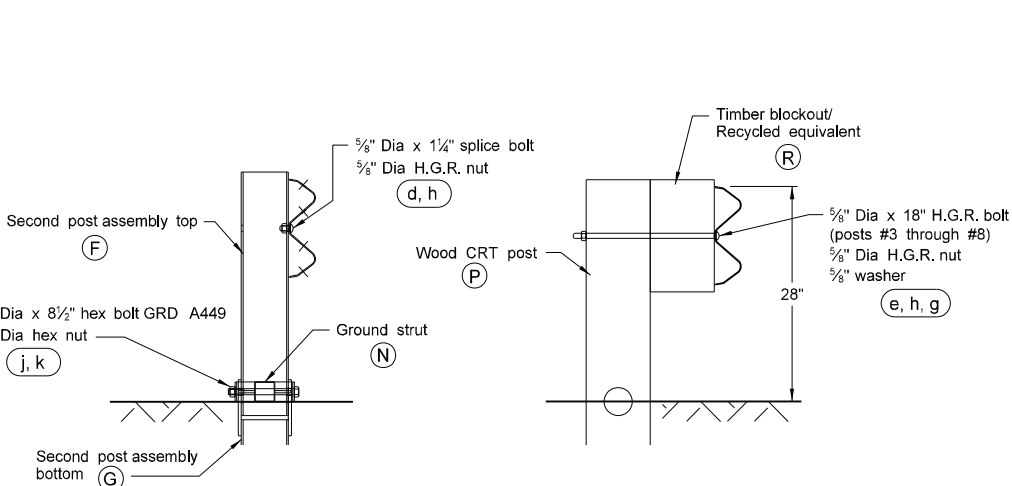
IMPACT HEAD CONNECTION DETAIL



FLARED INSTALLATION
25:1 maximum flare rate

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

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



SECTION A-A
Post #2

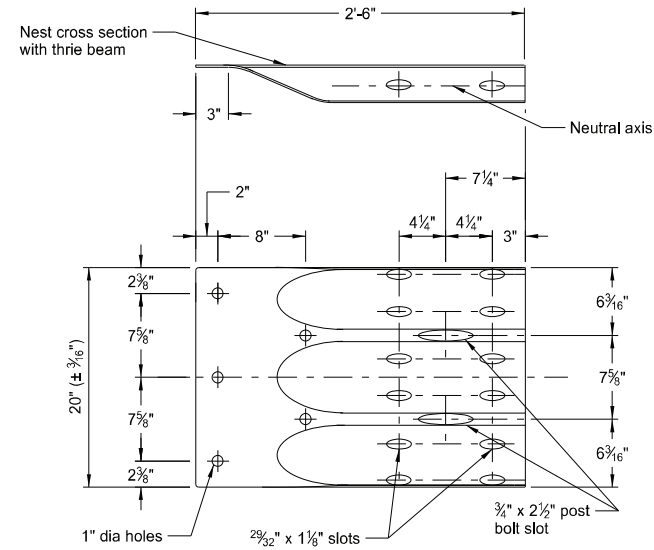
SECTION B-B
Posts #3 through #8

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

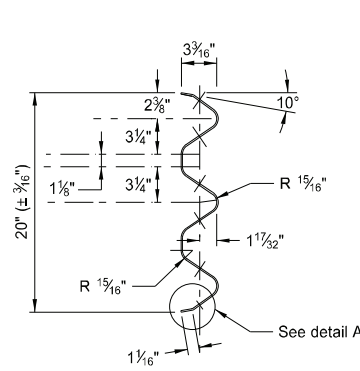
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
12 02 2020

THRIE BEAM TRANSITION TO DOUBLE BOX BEAM RETROFIT

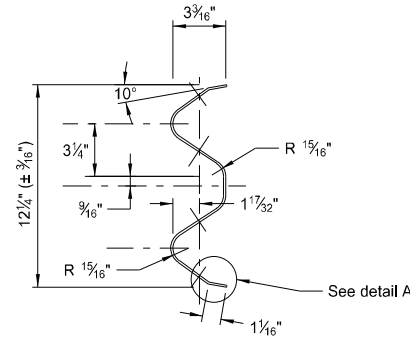
D-764-10



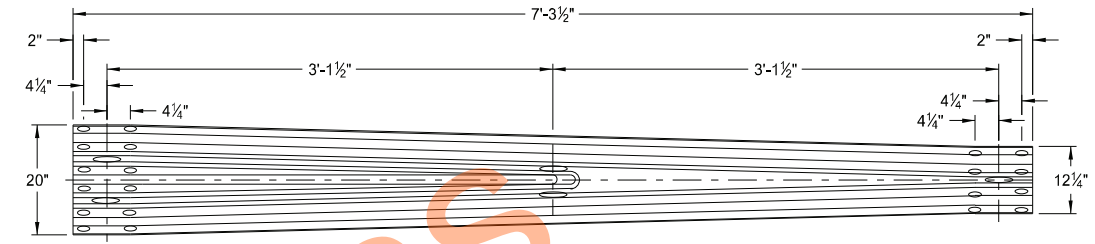
THRIE BEAM TERMINAL CONNECTOR



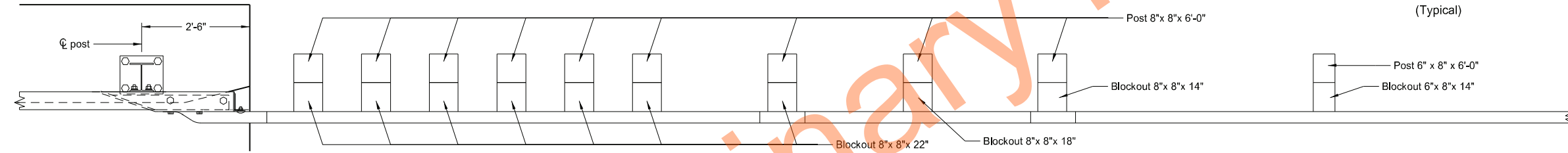
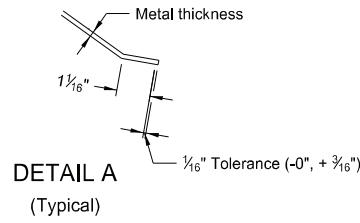
THRIE BEAM END VIEW



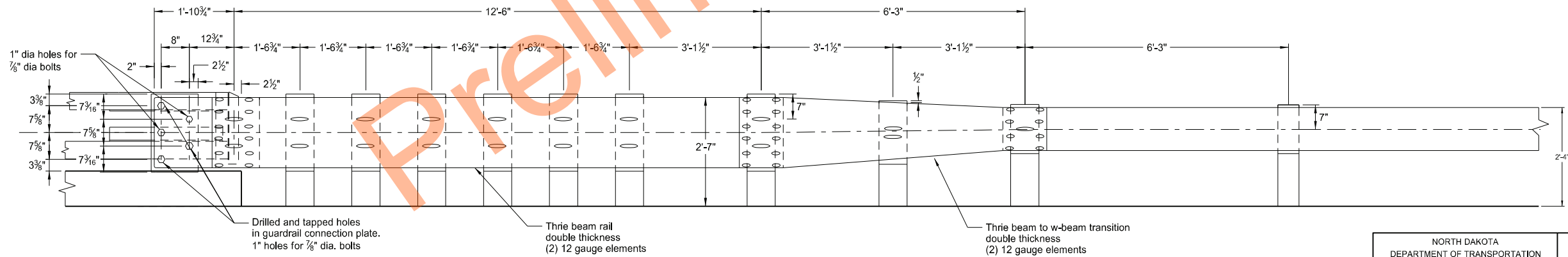
W-BEAM END VIEW



THRIE BEAM TO W-BEAM TRANSITION SECTION



PLAN



ELEVATION

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

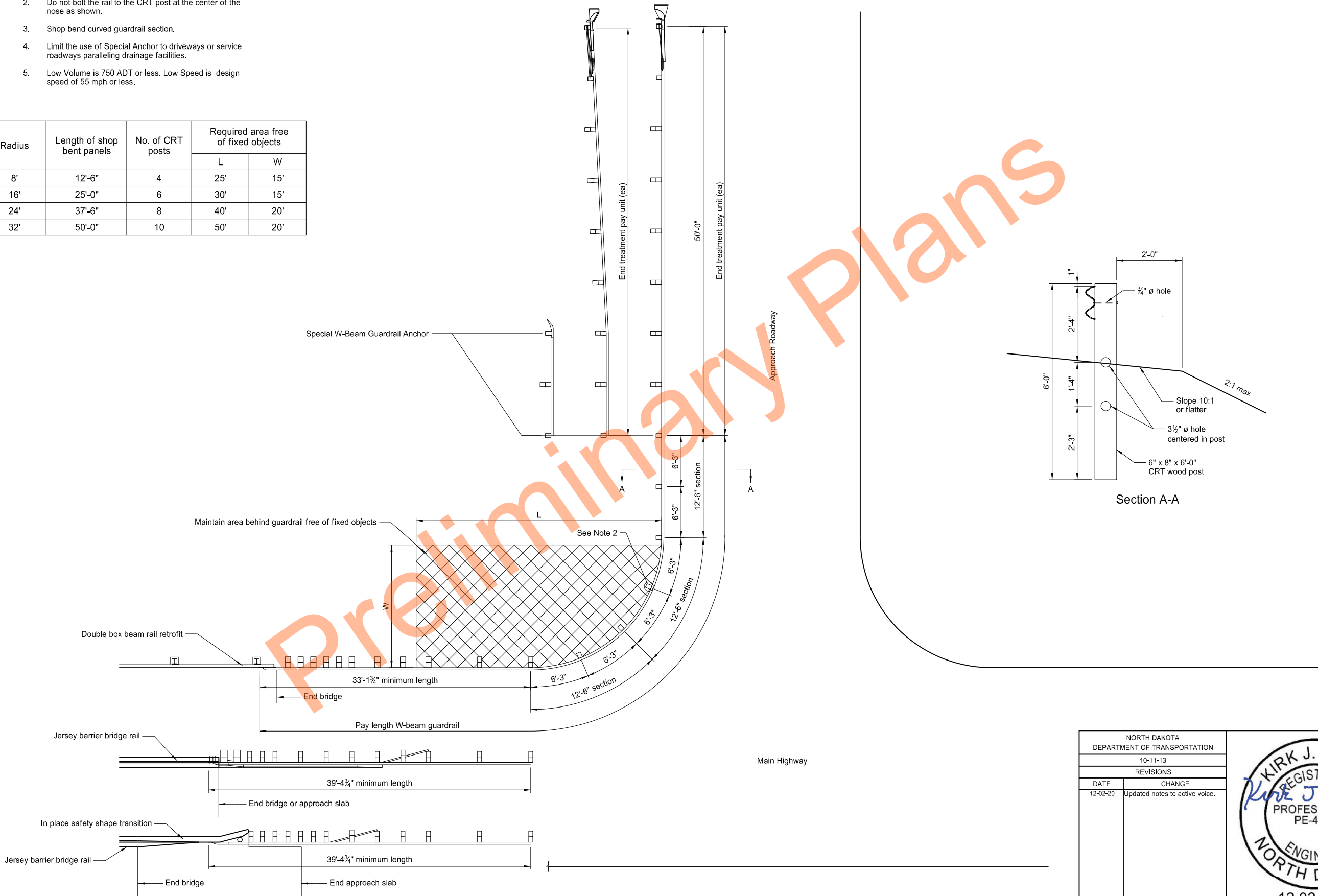


NOTES:

- 1. Use no washers on the 5/8" guardrail bolts connecting the rail to the Controlled Release Terminal (CRT) posts.
- 2. Do not bolt the rail to the CRT post at the center of the nose as shown.
- 3. Shop bend curved guardrail section.
- 4. Limit the use of Special Anchor to driveways or service roadways paralleling drainage facilities.
- 5. Low Volume is 750 ADT or less. Low Speed is design speed of 55 mph or less.

Radius	Length of shop bent panels	No. of CRT posts	Required area free of fixed objects	
			L	W
8'	12'-6"	4	25'	15'
16'	25'-0"	6	30'	15'
24'	37'-6"	8	40'	20'
32'	50'-0"	10	50'	20'

W-BEAM GUARDRAIL WITH APPROACHES NEAR BRIDGE
FOR LOW VOLUME LOW SPEED ROADWAYS

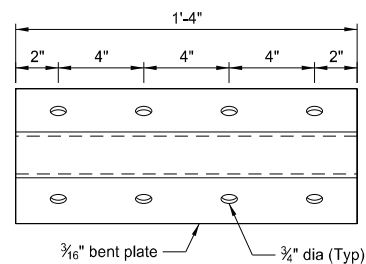


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-11-13	
REVISIONS	
DATE	CHANGE
12-02-20	Updated notes to active voice.

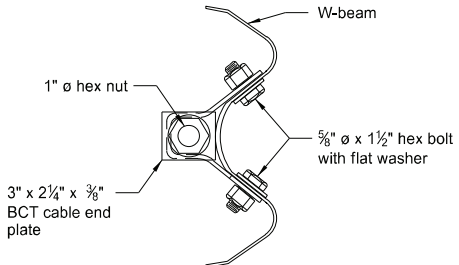
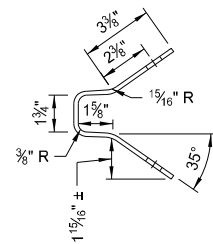
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
12 02 2020

SPECIAL W-BEAM GUARDRAIL ANCHOR

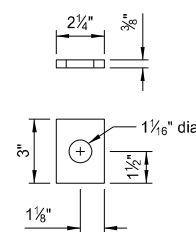
D-764-14



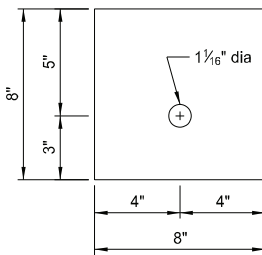
BCT ANCHOR PLATE



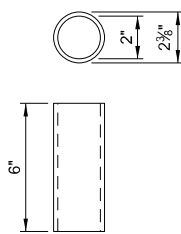
SECTION B-B



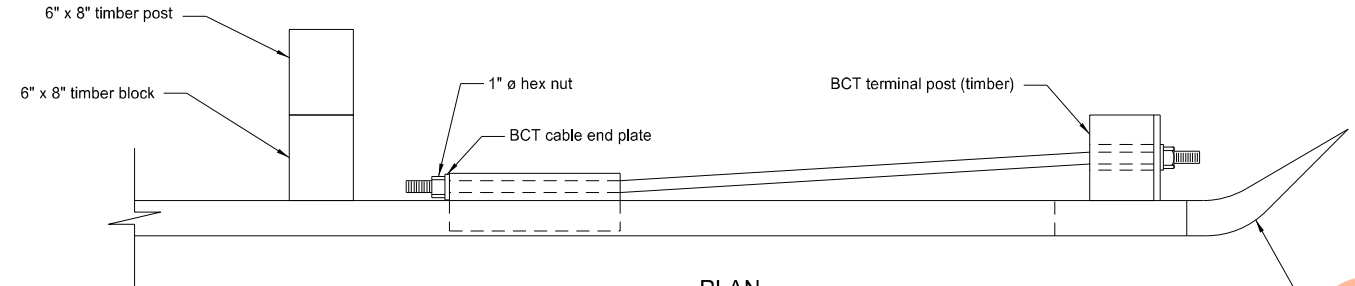
BCT CABLE END PLATE



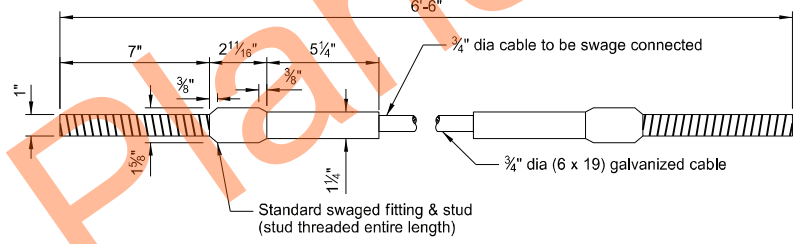
BEARING PLATE



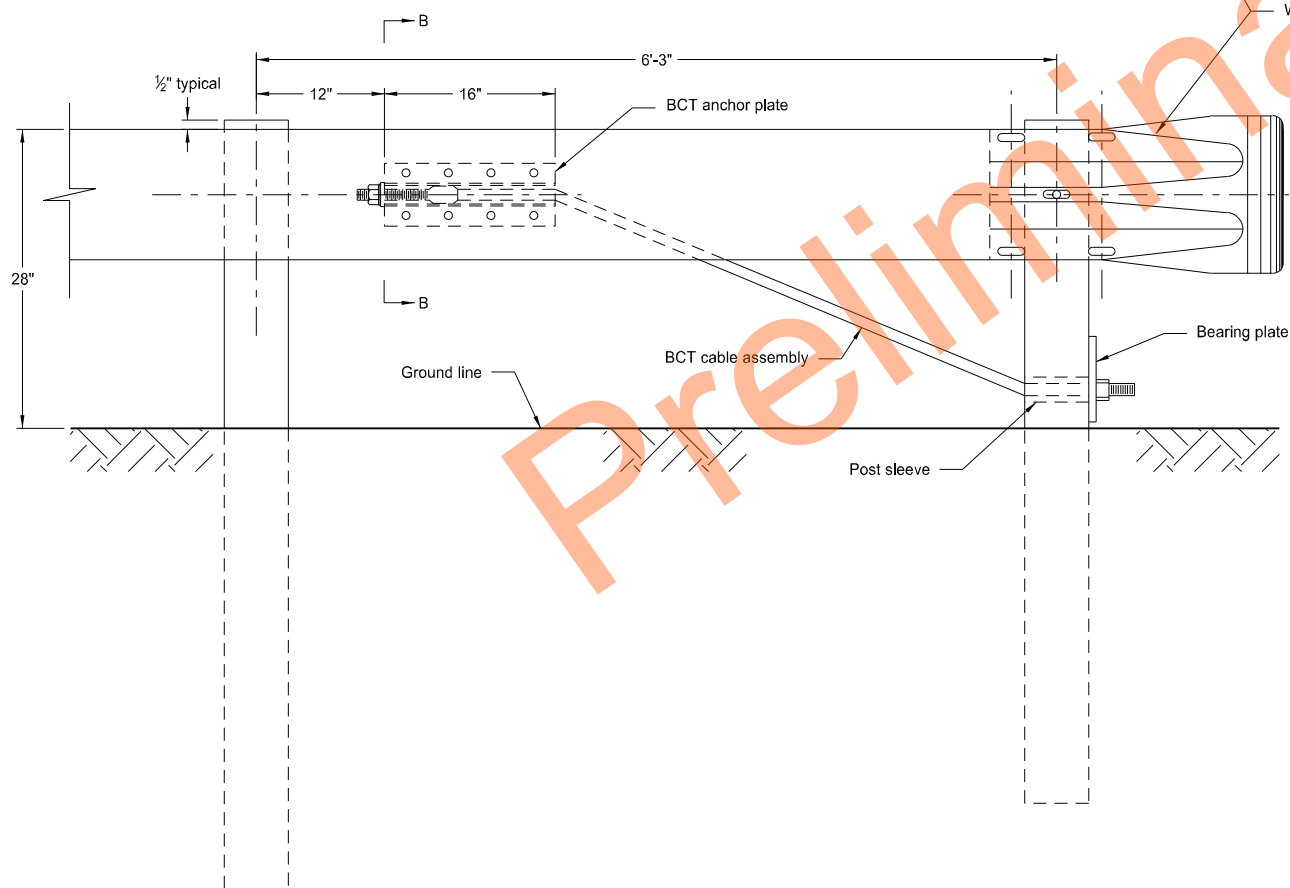
POST SLEEVE



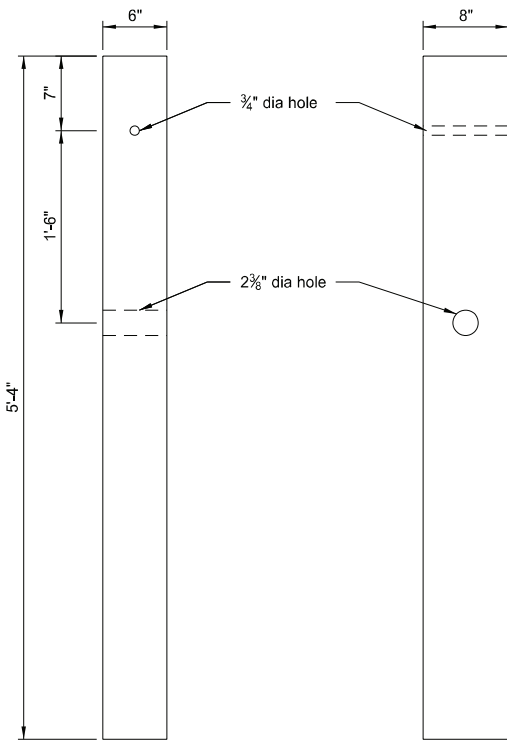
PLAN



BCT CABLE ASSEMBLY

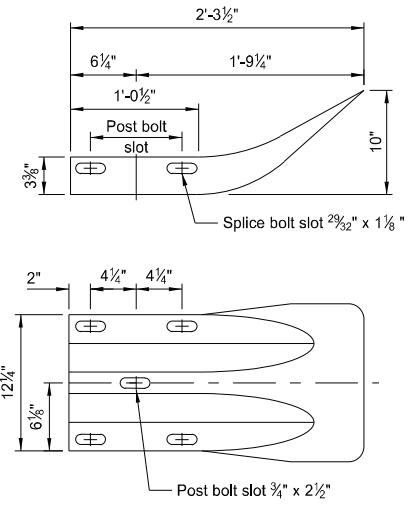


ELEVATION



FRONT VIEW SIDE VIEW

BCT TERMINAL POST DETAILS



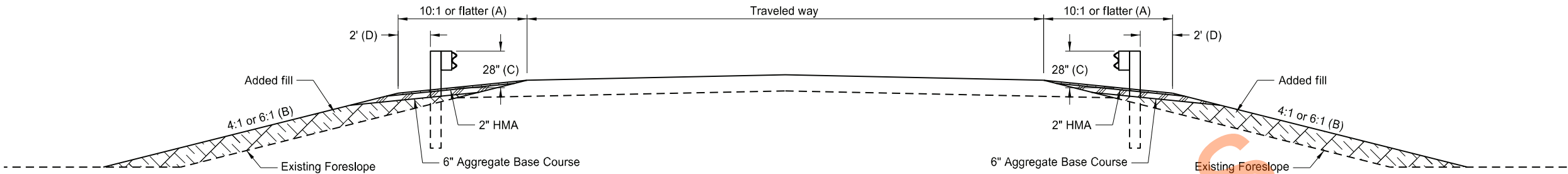
W BEAM END SECTION (FLARED)

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-11-13	
REVISIONS	
DATE	CHANGE
12/02/20	Dsn Engr Signature Update

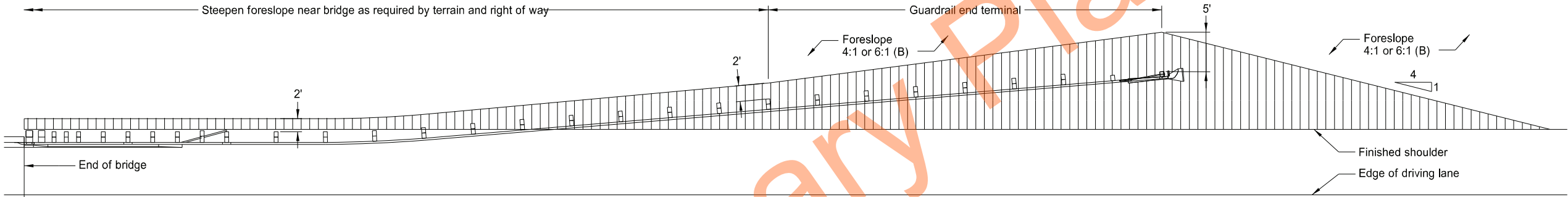
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
12 02 2020

TYPICAL GRADING AT BRIDGE ENDS
WITH W-BEAM GUARDRAIL

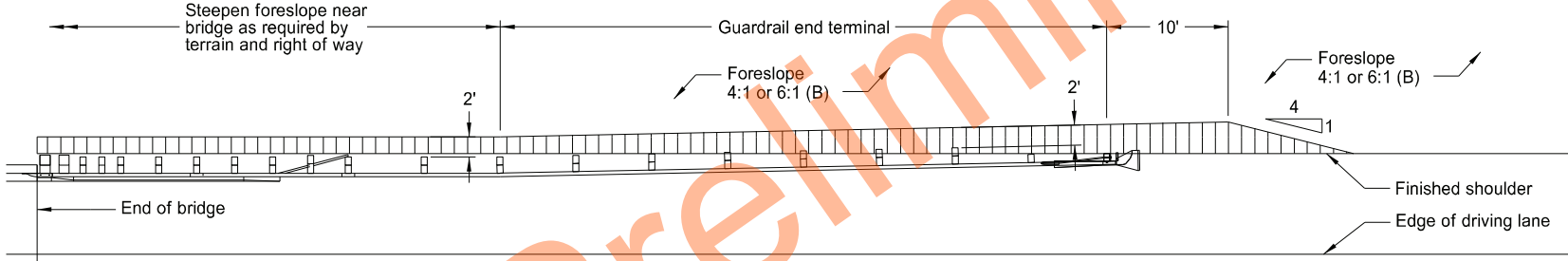
D-764-22



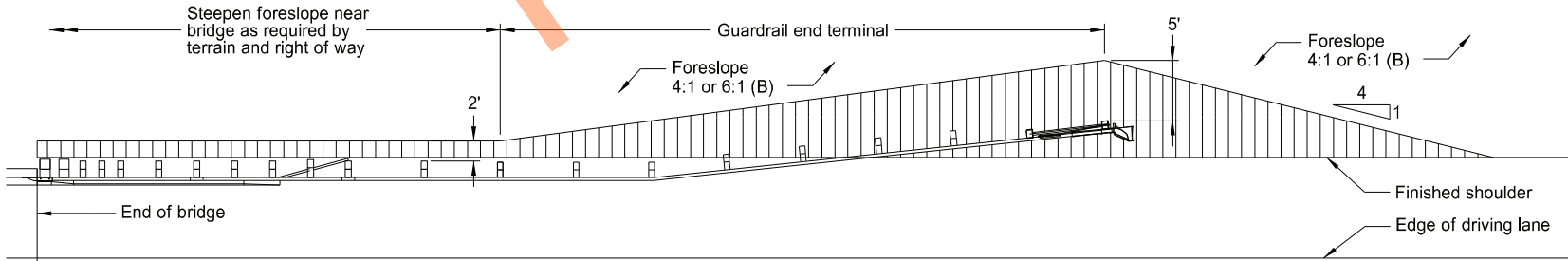
TYPICAL SECTION



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.

KIRK J. HOFF

REGISTERED

PROFESSIONAL

PE-4683

ENGINEER

NORTH DAKOTA

12 02 2020