DESIGN DATA - ND 1 Str No. 01-143.430				
Traffic	Average Daily			
Current 2022	Pass: 290	Trucks: 80	Total: 370	
Preventive Maintenance				

DESIGN DATA - ND 17 Str No. 17-042.967				
Traffic	Average Daily			
Current 2022	Pass: 340	Trucks: 90	Total: 430	
Preventive Maintenance				

DESIGN DATA - ND 19 Str No. 19-118.258				
Traffic	Average Daily			
Current 2022	Pass: 225	Trucks: 50	Total: 275	
Preventive Maintenance				

DESIGN DATA - ND 52 Str No. 52-222.340				
Traffic	Average Daily			
Current 2022	Pass: 2,185	Trucks: 715	Total: 2,900	
Preventive Maintenance				

DESIGNER
Adam Kaye
DESIGNER
Samuel Ihrke
DESIGNER

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

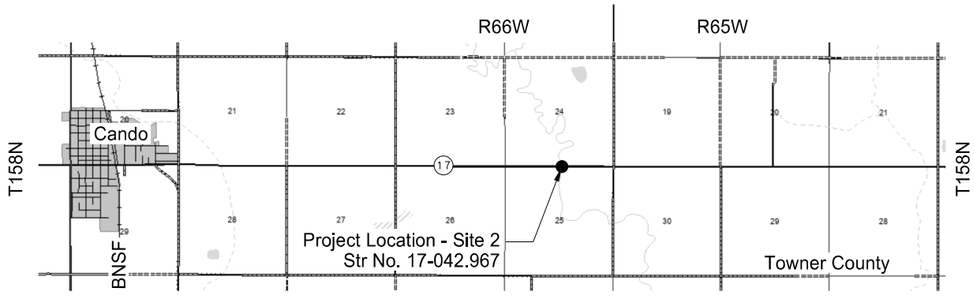
SS-3-999(051)

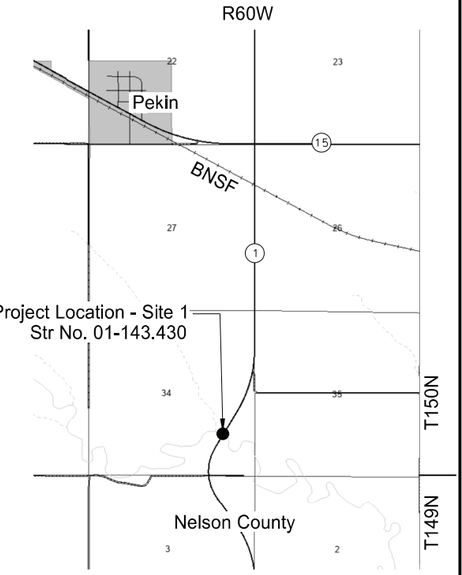
Nelson, Towner, Benson, & Foster County
2.5 Miles Sorth of Pekin, 4.5 Miles East of Cando,
15 Miles West of Minnewaukan, and North side of Carrington over CP Rail

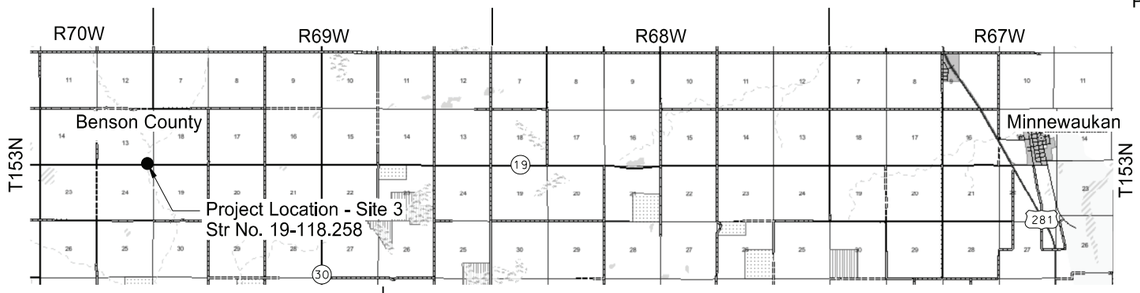
Structure Repairs, Mill and HMA Overlay, and Guardrail

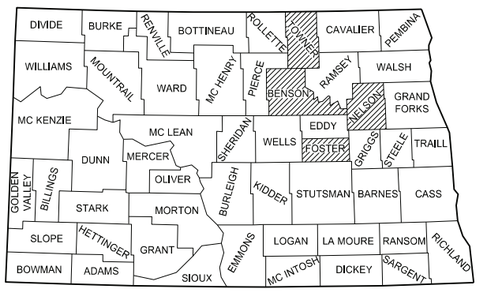
GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	4/1/2023
Supplemental Specifications	NONE

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
SS-3-999(051)	0.360	
Site 1	0.126	
Site 2	0.071	
Site 3	0.107	
Site 4	0.056	

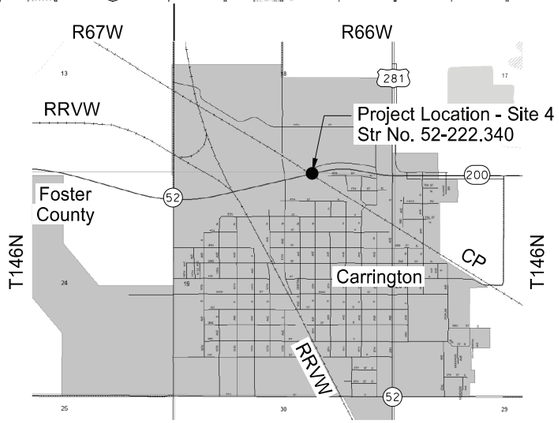








STATE COUNTY MAP



HOUSTON ENGINEERING, INC.

REGISTERED PROFESSIONAL ENGINEER
DEON D. WAWRZYNIAK
PE-4622
DATE 06/11/25
NORTH DAKOTA

ND DEPARTMENT OF TRANSPORTATION
OFFICE OF PROJECT DEVELOPMENT

Jason Thorenson
06/11/25

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PLAN SECTIONS

SPECIAL PROVISIONS

LIST OF STANDARD DRAWINGS

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Nelson County

Structure Improvements:
- Deck Overlay
- Rail Retrofit
- Deck Drain Modifications
- Spall Repair
- Tree & Brush Removal

Variable Depth Mill & 2" Overlay

Guardrail Embankment

Gate
CP5000
RP5015
BM5004
CP5001
CP5002
CP5003
Remove and Replace Guardrail
ND 1
Sign
Remove and Replace Guardrail
ND 1
Remove and Replace Guardrail
Str No. 01-143.430
Sheyenne River Crossing
See Note for Improvements
Remove and Replace Guardrail
Gate
Sheyenne River

Scope of Work
Site 1 - Str No. 01-143.430
Sheyenne River Crossing

Structure Repairs
ND 1
2.5 Miles South of Pekin

REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
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6/9/2025

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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Structure Improvements:
- Deck Overlay
- Spall Repair
- Scour/Erosion Repair
- Riprap

Variable Depth Mill & 2" Overlay

Towner County

CP15000

OH OH OH

FO FO FO FO FO

Remove and Reset Guardrail

BM15002

Remove and Reset Guardrail

ND 17

ND 17

Remove and Reset Guardrail

Str No. 17-042.967
Mauvais Coulee Crossing
See Note for Improvements

Remove and Reset Guardrail

RM15382

CP15001

FO FO FO FO FO FO

Mauvais Coulee

Scope of Work
Site 2 - Str No. 17-042.967
Mauvais Coulee Crossing

Structure Repairs
ND 17
4.5 Miles East of Cando

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N

Big Coulee

Benson County

Structure Improvements:
- Deck Overlay
- Rail Retrofit
- Spall Repair
- Scour/Erosion Repair
- Riprap

Variable Depth Mill & 2" Overlay

Guardrail Embankment

Remove and Replace Guardrail

Remove and Replace Guardrail

ND 19

BM 10005

ND 19

Sec Cor

RP 10008

Remove and Replace Guardrail

Str No. 19-118.258
Big Coulee Crossing
See Note for Improvements

Remove and Replace Guardrail

FO FO FO FO FO FO FO FO FO FO FO FO FO FO FO FO FO

Scope of Work
Site 3 - Str No. 19-118.258
Big Coulee Crossing

Structure Repairs
ND 19
15 Miles East of Minnewaukan

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ADAM M. RUUD
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NORTH DAKOTA

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Structure Improvements:
- Deck Spall Repair
- Silicone Sealant
- Spall Repair
- Crack Sealing
- Concrete Slope Protection Remove & Replace

Foster County

Private Rail Line

Ex RR RW

CPR

Str No. 52-222.340
Canadian Pacific Overhead
See Note for Improvements

US 52

RP997

RP1170

RP1459

RP1169

RP998

CP1286

CP999

Scope of Work
Site 4 - Str No. 52-222.340
Canadian Pacific Overhead

Structure Repairs
US 52
North Side of Carrington ND

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NOTES

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

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

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

107-112 RAILROAD PROTECTIVE LIABILITY INSURANCE: SITE 4 crosses the Canadian Pacific Railway at RP 352.67. The type of work that will be performed within the railroad right of way is structure rehabilitation and concrete slope protection repair. Direct inquiries regarding protective liability insurance to:

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

Obtain information regarding crossing number 694955U from the Federal Railroad Administration website: http://safetydata.fra.dot.gove/Officeofsafety/

202-P01 REMOVAL OF BITUMINOUS SURFACING: Remove surfacing and aggregate base at the guardrail remove and reset and new guardrail installation locations (Site 1 and Site 3).

Remove topsoil. Excavate and dispose of existing embankment material to allow for placement of 6 inch Aggregate Base Course CL 5 and 2 inch Commercial Grade Hot Mix Asphalt. Include the cost of labor, equipment and materials to remove surfacing, aggregate base, topsoil stripping, topsoil placement and excavated embankment material in the unit price bid for “Removal of Bituminous Surfacing”.

203-P01 GUARDRAIL EMBANKMENT: The material required for guardrail embankment construction is not available within the highway right of way. Obtain material from a contractor furnished borrow source.

Include all costs of labor, equipment and materials needed to haul material and construct the guardrail embankment in the unit price bid for “Guardrail Embankment”.

251-P01 SEEDING CLASS II: Seeding Class II, Temporary Cover Crop and Hydraulic Mulch to be paid for by plan quantity.

253-P01 HYDRAULIC MULCH: Section 253.04.B.2 Temporary Care Maintenance does not apply.

704-200 STATE FURNISHED MEDIAN BARRIER: Obtain (50) 2.5’ x 10’ concrete barriers. They can be picked up and returned to the Devils Lake District yard at 1905 Schwan Ave NW in Devils Lake ND 58301. Contact the Devils Lake District office at 701-665-5100 to facilitate the exchanges.

Obtain (26) 2.0’ x 10’ concrete barriers. They can be picked up from the Minot District yard at 1305 Hwy 2 Bypass E in Minot ND 58701. Contact the Minot District office at 701-857-6925 to facilitate the exchanges. They can be returned to the Grand Forks District yard at 1951 N Washington in Grand Forks ND 58201. Contact the Grand Forks District office at 701-787-6500 to facilitate the exchanges.

Obtain (45) 2.0’ x 10’ concrete barriers. They can be picked up and returned to the Grand Forks District yard at 1951 N Washington in Grand Forks ND 58201. Contact the Grand Forks District office at 701-787-6500 to facilitate the exchanges.

Obtain (18) 2.0’ x 10’ concrete barriers. They can be picked up and returned to the Casselton yard at 15482 37th St SE in Casselton ND 58012. The hardware can be picked up and returned to the Fargo District yard at 503 38th St S in Fargo ND 58103. Contact the Fargo District office at 701-239-8900 to facilitate the exchanges.

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

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

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

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

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

Install PRS that meet the following criteria:

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

Use individual PRS constructed in one of the following manners:

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DATE
NORTH DAKOTA
6/9/2025

NOTES

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

An installed array of PRS consists of a minimum of 3 individual strips. Move rumble strips with the flagging operation. Do not place rumble strips on horizontal curves.

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

704-510 OBLITERATION OF PAVEMENT MARKINGS: Masking of pavement markings designated for obliteration is allowed. Choose to remove or mask marking as specified in Section 704.04 N, "Obliteration of Pavement Markings".

704-P01 TEMPORARY TRAFFIC CONTROL DEVICES: The Traffic Control Devices List has been developed using traffic control sign layouts (shown in Section 100 of the plans) and Standard Drawings listed below:

D-704-12 for shoulder closure tapers.

D-704-15, Layout Type A for temporary road closures.

D-704-16 for lane closures on a two-lane road using traffic control signals.

D-704-17 for one lane closure on a two-lane road using flaggers and temporary median barrier.

D-704-22, Layouts Type K and L for trucks entering and crossing roadways.

D-704-26, Layout Type CC, EE, and GG for milling and paving operations.

D-704-27 for mobile operations (pavement markings).

D-704-33 for two-lane roadway portable rumble strips.

704-P02 TEMPORARY TRAFFIC CONTROL PHASING: The traffic control details, as indicated in the plans, have been developed based on the premise that this project will be constructed as follows. Adequate traffic control signs and devices have been provided in the Traffic Control Devices List to allow concurrent work at all sites.

If electing to utilize a different phasing plan, submit a detailed traffic control plan to the Engineer for approval a minimum of 14 days prior to installing traffic control device.

The construction phasing plan is listed below.

Site 1 – Structure No. 01-143.430 – Sheyenne River Crossing:

Use interim traffic signals and temporary median barrier to maintain one lane of traffic during bridge related construction. Install signs and devices in accordance with Standard Drawing D-704-16 and the modifications shown on the traffic control layout sheet.

Use Standard Drawings D-704-17 and D-704-33 when flagging is necessary to install, reset, or remove interim traffic signals, attenuation devices, temporary barrier, W-beam guardrail, temporary pavement markings, and for milling and paving operations on the bridge ends.

Site 2 – Structure No. 17-042.967 – Mauvais Coulee Crossing:

Use interim traffic signals and temporary median barrier to maintain one lane of traffic during bridge related construction. Install signs and devices in accordance with Standard Drawing D-704-16 and the modifications shown on the traffic control layout sheet.

Use Standard Drawings D-704-17 and D-704-33 when flagging is necessary to install, reset, or remove interim traffic signals, attenuation devices, temporary barrier, W-beam guardrail, temporary pavement markings, and for milling and paving operations on the bridge ends.

Site 3 – Structure No. 19-118.258 – Big Coulee Crossing:

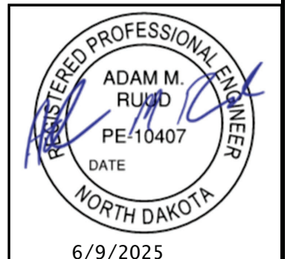
Use interim traffic signals and temporary median barrier to maintain one lane of traffic during bridge related construction. Install signs and devices in accordance with Standard Drawing D-704-16 and the modifications shown on the traffic control layout sheet.

Use Standard Drawings D-704-17 and D-704-33 when flagging is necessary to install, reset, or remove interim traffic signals, attenuation devices, temporary barrier, W-beam guardrail, temporary pavement markings, and for milling and paving operations on the bridge ends.

Site 4 – Structure No. 52-222.340 – CP Railway Crossing:

Use interim traffic signals and temporary median barrier to maintain one lane of traffic during bridge related construction. Install signs and devices in accordance with Standard Drawing D-704-16 and the modifications shown on the traffic control layout sheet.

Use Standard Drawings D-704-15 Layout Type A and D-704-17 when flagging is necessary to install, reset, or remove interim traffic signals, attenuation devices, temporary barrier, and temporary pavement markings.



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704-P03 PORTABLE CHANGEABLE MESSAGE SIGN: Install Portable Changeable Message Signs (PCMS) 2 weeks before work begins on Site 4. The Engineer will determine the locations for PCMS installation. Relocated PCMS as directed by the Engineer.

Provide an operator trained in the use of the PCMS.

The Engineer will determine the message to be displayed. Program the message within one hour of the Engineer's request to change the message.

704-P04 LANE CLOSURE - SIGNAL CONTROL: Install the signal-controlled lane closure on Standard D-704-16.

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, as shown on the standards. Payment will be made at the respective contract unit price.

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

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

764-P01 REMOVED W-BEAM GUARDRAIL: Deliver the removed Box Beam guardrail and end treatment materials from site 3 (ND 19) to the NDDOT Devils Lake Yard at 1905 Schwan Ave NW, Devils Lake and neatly stack at the location in the storage yard.

Include all costs for delivery of the removed guardrail materials in the contract unit prices bid for "Remove W-Beam Guardrail & Posts" and "Remove End Treatment & Transition".

764-P02 MGS THRIE BEAM TRANSITION TO DOUBLE BOX BEAM RETROFIT: Use of composite blocks in lieu of wood blocks at posts 10+ is acceptable. Provide composite blocks that have been MASH tested and approved. Submit materials and documentation for approval prior to installation.

REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
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DATE
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6/9/2025

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ENVIRONMENTAL NOTES

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 SPAWNING RESTRICTION: Do not work within the Sheyenne River from April 15 to June 1.

EN-2 AQUATIC NUISANCE SPECIES (ANS): Equipment that was last used outside of North Dakota or within a Class I infested waterbody (identified on the North Dakota Game and Fish Department (NDGFD) website) requires an inspection by NDGFD. Notify the NDGFD at least 10 business days prior to pumps, watercraft, or any equipment entering a public water to allow the NDGFD sufficient time to inspect any and all such equipment for ANS. Contact the NDGFD ANS Coordinator, Ben Holen by e-mail - bholen@nd.gov for equipment inspections. Supply one of the following to the engineer as proof of compliance prior to work taking place in the water: (1) the NDGFD inspection report, (2) documented NDGFD correspondence (email or signed letter).

EN-3 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 1 - October 31* Inactive Season: November 1 - March 31*

*Time frames can differ slightly, depending on the year

Remove trees with a 3” or greater diameter at breast height (DBH) during the Inactive Season for the Northern Long-Eared Bat.

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).

REGISTERED PROFESSIONAL ENGINEER
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DATE
NORTH DAKOTA
6/9/2025

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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Estimated Quantities

SPEC	CODE	ITEM DESCRIPTION	UNIT	Site 1	Site 2	Site 3	Site 4	TOTAL
103	0100	CONTRACT BOND	L SUM	0.38	0.2	0.25	0.17	1
107	0100	RAILWAY PROTECTION INSURANCE	L SUM				1	1
107	0140	RAILROAD COORDINATION	L SUM				1	1
107	0151	RAILROAD FLAGGING	L SUM				1	1
201	0352	REMOVAL OF TREES & BRUSH	L SUM	1				1
202	0132	REMOVAL OF BITUMINOUS SURFACING	SY			590		590
203	0140	BORROW-EXCAVATION	CY	348	217	170		735
216	0100	WATER	M GAL	5		5		10
251	0200	SEEDING CLASS II	ACRE	0.82	0.3	0.63		1.75
251	2000	TEMPORARY COVER CROP	ACRE	0.82	0.3	0.63		1.75
253	0201	HYDRAULIC MULCH	ACRE	1.64	0.6	1.26		3.5
256	0201	RIPRAP GRADE II	TON		426	290		716
258	0200	REMOVE & REPLACE CONCRETE SLOPE PROTECTION	SY				180	180
260	0100	SILT FENCE UNSUPPORTED	LF	177	42	90		309
260	0101	REMOVE SILT FENCE UNSUPPORTED	LF	177	42	90		309
261	0112	FIBER ROLLS 12IN	LF	360	238	928		1526
261	0113	REMOVE FIBER ROLLS 12IN	LF	180	119	464		763
262	0100	FLOTATION SILT CURTAIN	LF		172	155		327
262	0101	REMOVE FLOTATION SILT CURTAIN	LF		172	155		327
302	0120	AGGREGATE BASE COURSE CL 5	TON	155		111		266
411	0105	MILLING PAVEMENT SURFACE	SY	1579	378	1407		3364
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT	TON	237	45	226		508
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	534	317	267	22	1140
602	7000	SPECIAL SURFACE FINISH	SF	1240	681	574	3832	6327
624	3001	DOUBLE BOX BEAM RAIL RETROFIT-FREE STANDING	LF	320		160		480
624	3011	REMOVE & RESET DBL BOX BEAM RETROFIT - FREE STAND	LF		188.6			188.6
650	0704	OVERLAY CONCRETE	CY	30	18	15		63
650	0707	DECK CONCRETE	CY	8	2	2		12
650	0710	CLASS 1-H REMOVAL	SY	534	317	267		1118
650	0720	CLASS 1 REMOVAL	SY	534	317	267		1118
650	0723	CLASS 3 REMOVAL	SY	43	10	8		61
650	0724	CLASS 4 REMOVAL	SY	11	3	3		17
650	0805	DECK SPALL REPAIR	SF				198	198
702	0100	MOBILIZATION	L SUM	0.38	0.2	0.25	0.17	1
704	0100	FLAGGING	MHR	75	75	75	100	325
704	1000	TRAFFIC CONTROL SIGNS	UNIT	2270	2235	2322	1236	8063
704	1018	LANE CLOSURE-SIGNAL CONTROL/FLAGGING CONTROL	EA	1	1	1	1	4
704	1039	ATTENUATION DEVICE-TYPE B-45	EA				2	2
704	1043	ATTENUATION DEVICE-TYPE B-65	EA	2	2	2		6
704	1048	PORTABLE RUMBLE STRIPS	EA	2	2	2		6
704	1052	TYPE III BARRICADE	EA	2	2	2	4	10
704	1060	DELINEATOR DRUMS	EA	10	10	10	10	40
704	1067	TUBULAR MARKERS	EA	15	15	15		45
704	1500	OBLITERATION OF PAVEMENT MARKING	SF	1190	860	735	1740	4525
704	3511	STATE FURNISHED MEDIAN BARRIER	LF	300	310	280	500	1390
704	4011	PORTABLE CHANGEABLE MESSAGE SIGN	EA				4	4
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY		376	256		632

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Estimated Quantities

SPEC	CODE	ITEM DESCRIPTION	UNIT	Site 1	Site 2	Site 3	Site 4	TOTAL
762	0422	SHORT TERM 6IN LINE-TYPE R	LF	3026	3146	3088	3288	12548
762	0426	SHORT TERM 24IN LINE-TYPE R	LF	24	24	24	24	96
762	0432	SHORT TERM 6IN LINE-TYPE NR	LF	2180	495	565		3240
762	1106	PVMT MK PAINTED 6IN LINE	LF	4367	2860	2355	5176	14758
764	0131	W-BEAM GUARDRAIL	LF	358		358		716
764	0145	W-BEAM GUARDRAIL END TERMINAL	EA	4		4		8
764	0150	REMOVE & RESET GUARDRAIL	LF		313			313
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS	LF	413				413
764	2080	REMOVE BOX BEAM GUARDRAIL	LF			615		615
764	2081	REMOVE END TREATMENT & TRANSITION	EA	4		2		6
910	0565	CONTROLLED DENSITY BACKFILL	CY		1			1
930	8644	SILICONE SEALANT	LF				685	685
930	9223	CRACK SEALING	LF	67	66	128	100	361
930	9534	MODIFY DECK DRAIN	EA	8				8
930	9612	SPALL REPAIR	SF	106	102	90	43	341
950	9712	JOINT TREATMENT	LF				60	60

BASIS OF ESTIMATE

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	ND	SS-3-999(051)	10	1

Site 1 - Guardrail Area Reconstruction

Material	Unit	Lt Guardrail Paving: Sta 101+95.04 to Begin Bridge Sta 103+25.38 (Str No. 01-143.430) Rt Guardrail Paving: Sta 100+84.10 to Begin Bridge Sta 103+25.38 (Str No. 01-143.430)											Lt Guardrail Paving: End Bridge Sta 104+85.21 to Sta 107+49.08 (Str No. 01-143.430) Rt Guardrail Paving: End Bridge Sta 104+85.21 to Sta 106+15.50 (Str No. 01-143.430)											Site 1 Subtotal
		Area (SF)		Depth (In)	Slough Length (LF)		Slough Cross-Sectional Area (SF)	Interior Slough Length (LF)		Interior Slough Tie-In Cross Sectional Area (SF)	Subtotal			Area (SF)		Depth (In)	Slough Length (LF)		Slough Cross-Sectional Area (SF)	Interior Slough Length (LF)		Interior Slough Tie-In Cross Sectional Area (SF)	Subtotal		
		Lt	Rt		Lt	Rt		Lt	Rt		Lt	Rt		Lt	Rt		Lt	Rt		Lt	Rt		Lt	Rt	
Aggregate Base Course Cl 5 (1.875 TON/CY)	TON	187	1124	6	131	244	0.56	130	241	0.25	14	53	TON	1689	187	6	270	131	0.56	264	130	0.25	74	14	155
Commercial Grade Hot Mix Asphalt (2 TON/CY)	TON	788	2283	2	131	244	0.04	-	-	-	10	29	TON	2989	788	2	270	131	0.04	-	-	-	38	10	87

Site 3 - Guardrail Area Reconstruction

Material	Unit	Lt Guardrail Paving: Sta 302+89.15 to Begin Bridge Sta 304+16.83 (Str No. 19-118.258) Rt Guardrail Paving: Sta 301+75.98 to Begin Bridge Sta 304+16.83 (Str No. 19-118.258)											Lt Guardrail Paving: End Bridge Sta 304+96.69 to Sta 307+39.10 (Str No. 19-118.258) Rt Guardrail Paving: End Bridge Sta 304+96.69 to Sta 306+21.26 (Str No. 19-118.258)											Site 3 Subtotal
		Area (SF)		Depth (In)	Slough Length (LF)		Slough Cross-Sectional Area (SF)	Interior Slough Length (LF)		Interior Slough Tie-In Cross Sectional Area (SF)	Subtotal			Area (SF)		Depth (In)	Slough Length (LF)		Slough Cross-Sectional Area (SF)	Interior Slough Length (LF)		Interior Slough Tie-In Cross Sectional Area (SF)	Subtotal		
		Lt	Rt		Lt	Rt		Lt	Rt		Lt	Rt		Lt	Rt		Lt	Rt		Lt	Rt		Lt	Rt	
Aggregate Base Course Cl 5 (1.875 TON/CY)	TON	265	617	6	128	244	0.56	127	241	0.4	18	38	TON	675	196	6	245	125	0.56	242	125	0.4	40	15	111
Commercial Grade Hot Mix Asphalt (2 TON/CY)	TON	698	2021	2	128	244	0.04	-	-	-	9	26	TON	2113	607	2	245	125	0.04	-	-	-	27	8	70

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BASIS OF ESTIMATE

	Site 1 - Mill and Overlay														
	Sta 100+84.10 to Begin Bridge Sta 103+25.38 (Str No. 01-143.430)							End Bridge Sta 104+85.21 to Sta 107+49.08 (Str No. 01-143.430)							
Material	Unit	Area (SF)	Depth (In)	Slough Length (LF)		Slough Cross-Sectional Area (SF)	Subtotal	Unit	Area (SF)	Depth (In)	Slough Length (LF)		Slough Cross-Sectional Area (SF)	Subtotal	Site 1 Subtotal
				Lt	Rt						Lt	Rt			
Commercial Grade Hot Mix Asphalt (2 TON/CY)	TON	5789	2	111	-	0.03	72	TON	6333	2	-	134	0.03	78	150

	Site 2 - Mill and Overlay														
	Sta 203+61.20 to Begin Bridge Sta 204+11.20 (Str No. 17-042.967)							End Bridge Sta 205+05.95 to Sta 205+55.95 (Str No. 17-042.967)							
Material	Unit	Area (SF)	Depth (In)	Slough Length (LF)		Slough Cross-Sectional Area (SF)	Subtotal	Unit	Area (SF)	Depth (In)	Slough Length (LF)		Slough Cross-Sectional Area (SF)	Subtotal	Site 2 Subtotal
				Lt	Rt						Lt	Rt			
Commercial Grade Hot Mix Asphalt (2 TON/CY)	TON	1766	2	50	50	0.03	22	TON	1813	2	50	50	0.03	23	45

	Site 3 - Mill and Overlay														
	Sta 301+75.98 to Begin Bridge Sta 304+16.83 (Str No. 19-118.258)							End Bridge Sta 304+96.69 to Sta 307+39.10 (Str No. 19-118.258)							
Material	Unit	Area (SF)	Depth (In)	Slough Length (LF)		Slough Cross-Sectional Area (SF)	Subtotal	Unit	Area (SF)	Depth (In)	Slough Length (LF)		Slough Cross-Sectional Area (SF)	Subtotal	Site 3 Subtotal
				Lt	Rt						Lt	Rt			
Commercial Grade Hot Mix Asphalt (2 TON/CY)	TON	6262	2	114	-	0.03	78	TON	6302	2	-	118	0.03	78	156

Water
20 Gal/Ton for Aggregates

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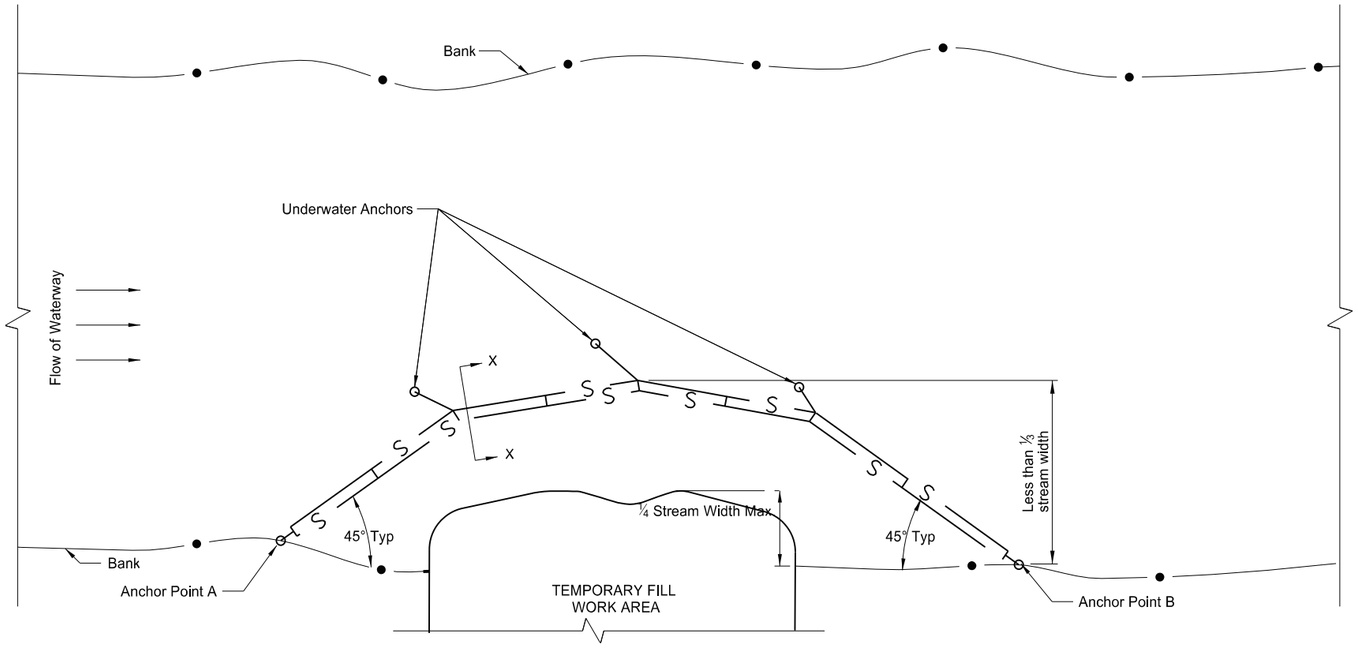
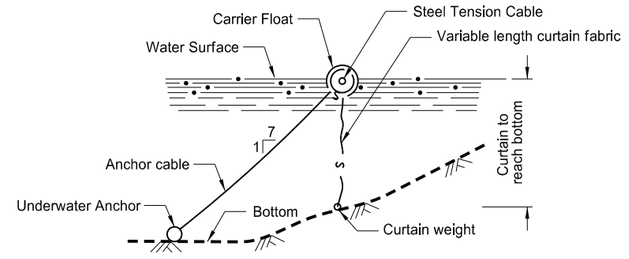
	ND	SS-3-999(051)	20	1



PLAN VIEW
FLOTATION SILT CURTAIN - TYPE WORK AREA



SECTION X-X
FLOTATION SILT CURTAINS

General Details
Flotation Silt Curtain
Sites 2 and 3

Structure Repairs

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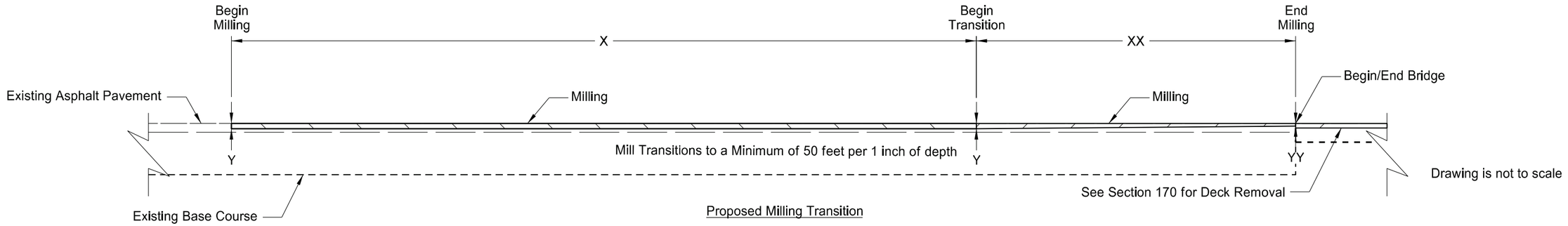
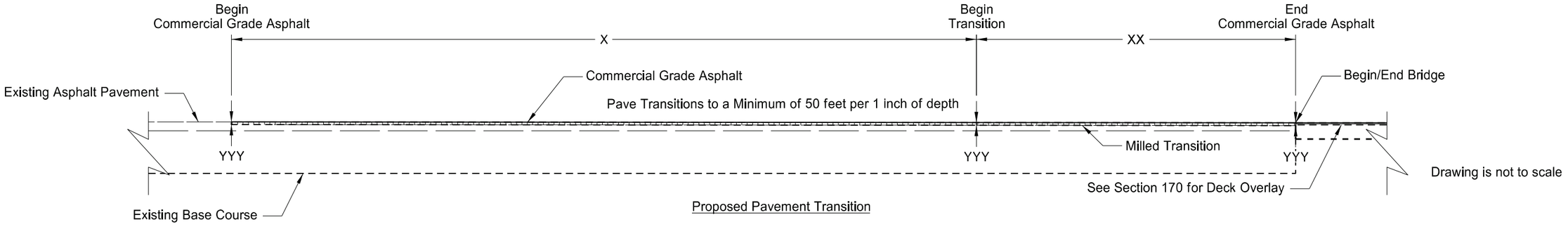
	ND	SS-3-999(051)	20	2



Proposed Milling Transition



Proposed Pavement Transition

Milling and Paving Transitions

Location	X	XX	Y	YY	YYY	Mill (SY)	Commercial Grade Asphalt (Ton)
Sta 100+84.10 to Begin Bridge (Str No. 01-143.430)	191 ft	50 ft	2.0 in	1.5 in	2.0 in	726	72
End Bridge (Str No. 01-143.430) to Sta 107+49.08	214 ft	50 ft	2.0 in	1.5 in	2.0 in	853	78
Sta 203+61.20 to Begin Bridge (Str No. 17-042.967)	0 ft	50 ft	2.0 in	1.5 in	2.0 in	187	22
End Bridge (Str No. 17-042.967) to Sta 205+55.95	0 ft	50 ft	2.0 in	1.5 in	2.0 in	191	23
Sta 301+75.98 to Begin Bridge (Str No. 19-118.258)	191 ft	50 ft	2.0 in	1.5 in	2.0 in	707	78
End Bridge (Str No. 19-118.258) to Sta 307+39.10	192 ft	50 ft	2.0 in	1.5 in	2.0 in	700	78

General Details
Milling and Paving End Transitions
Sites 1, 2 and 3

Structure Repairs

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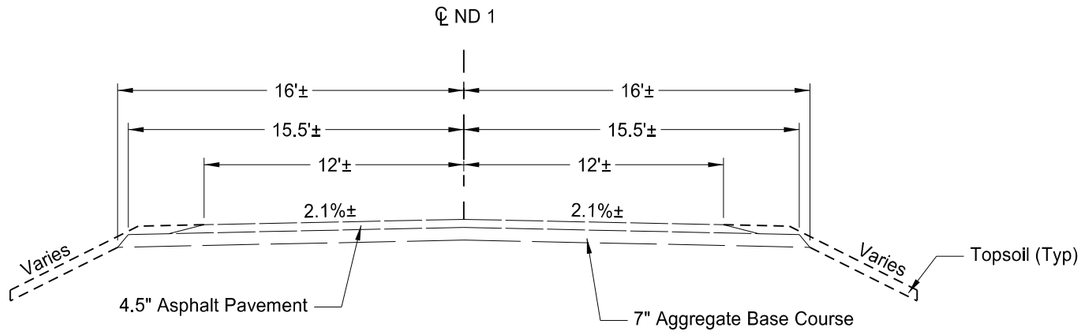
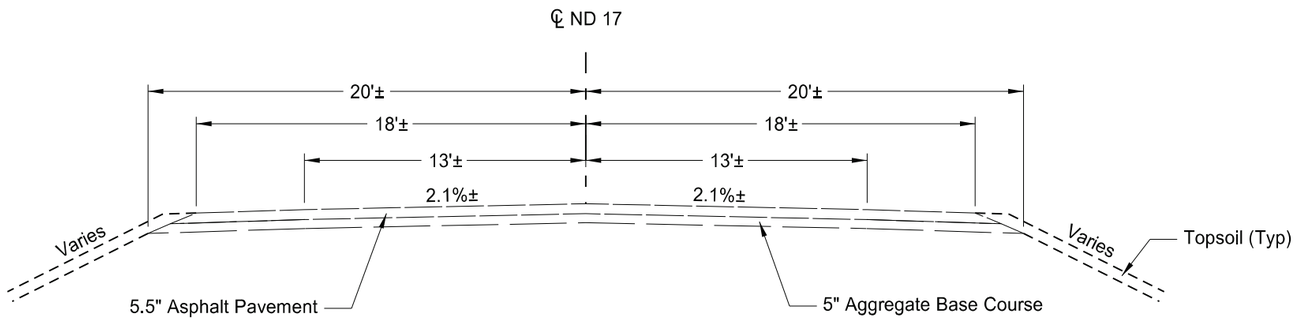
	ND	SS-3-999(051)	30	1



Existing Typical Section - Site 1

Sta 100+78.36 to Begin Bridge (Str No. 01-143.430)
End Bridge (Str No. 01-143.430) to Sta 107+48.49



Existing Typical Section - Site 2

Sta 203+61.20 to Begin Bridge (Str No. 01-143.430)
End Bridge (Str No. 01-143.430) to Sta 205+55.95

Existing Typical Sections

Site 1 - Str No 01-143.430
Sheyenne River Crossing

Site 2 - Str No 17-042.967
Mavais Coulee Crossing

Structure Repairs

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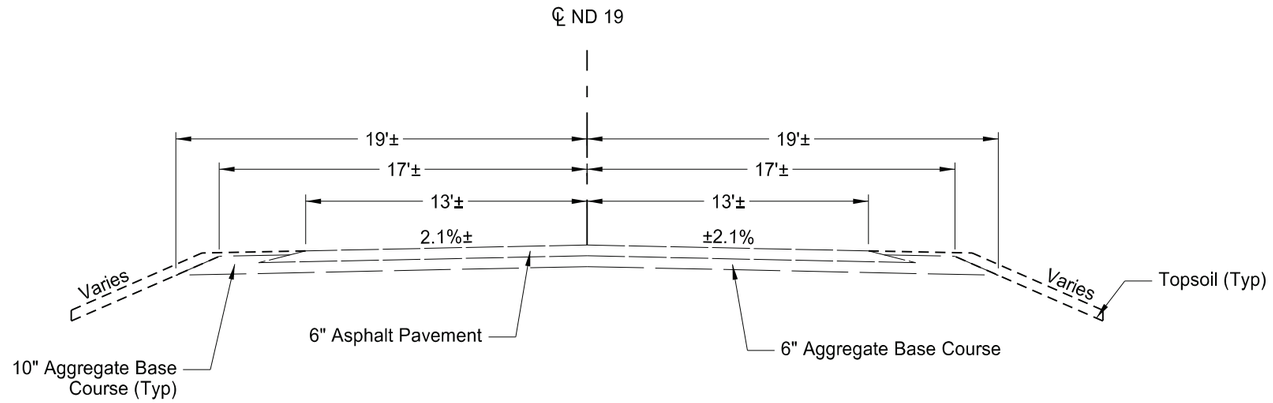
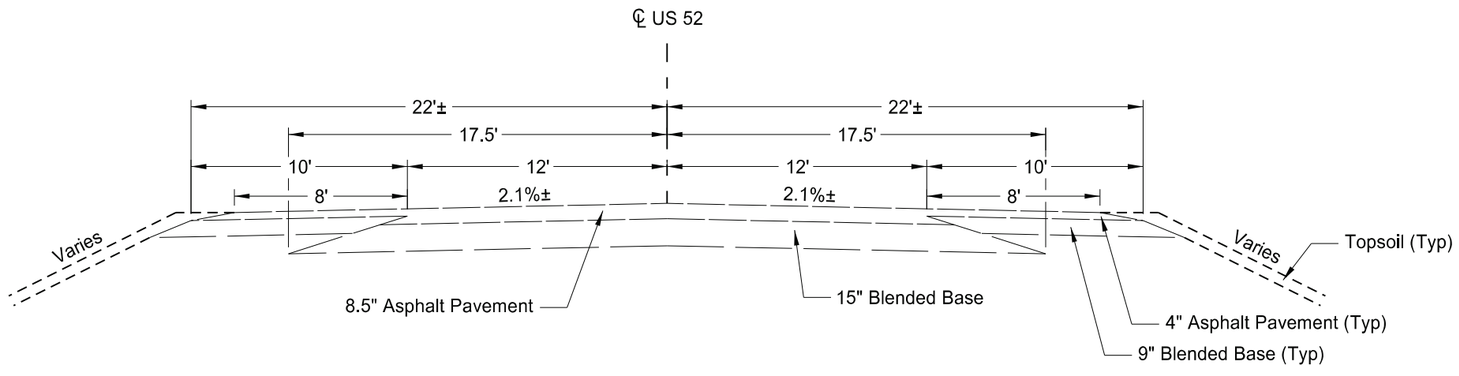
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	30	2



Existing Typical Section - Site 3

Sta 301+75.98 to Begin Bridge (Str No. 119-118.258)
End Bridge (Str No. 119-118.258) to Sta 307+39.10



Existing Typical Section - Site 4

Sta 403+53.74 to Begin Approach Slab (Str No. 52-222.340)
End Approach Slab (Str No. 52-222.340) to Sta 406+09.63

Existing Typical Sections

Site 3 - Str No 119-118.258
Big Coulee Crossing

Site 4 - Str No 52-222.340
Canadian Pacific Overhead

Structure Repairs

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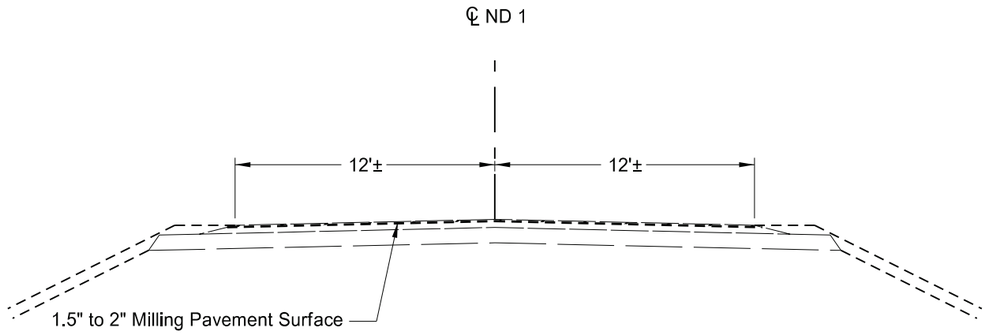
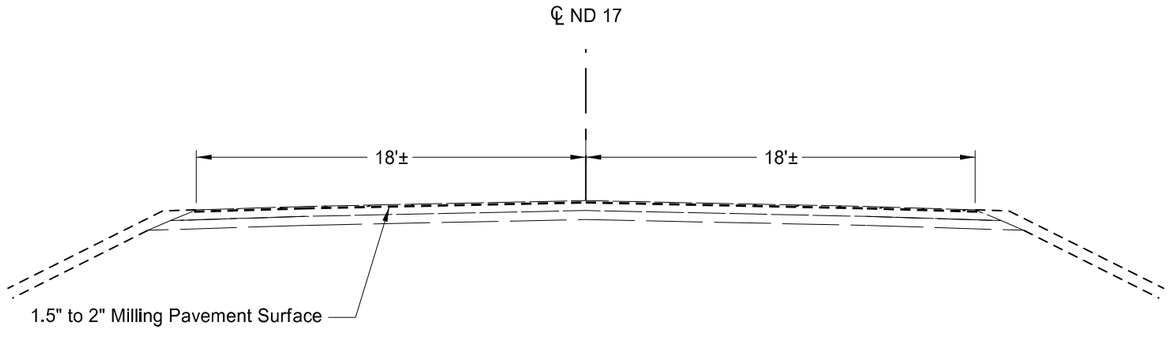
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	30	3



Removal Typical Section - Site 1

Sta 100+78.36 to Begin Bridge (Str No. 01-143.430)
End Bridge (Str No. 01-143.430) to Sta 107+48.49



Removal Typical Section - Site 2

Sta 203+61.20 to Begin Bridge (Str No. 01-143.430)
End Bridge (Str No. 01-143.430) to Sta 205+55.95

Milling and Removal Typical Sections

Site 1 - Str No 01-143.430
Sheyenne River Crossing

Site 2 - Str No 17-042.967
Mavais Coulee Crossing

Structure Repairs

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DATE
NORTH DAKOTA
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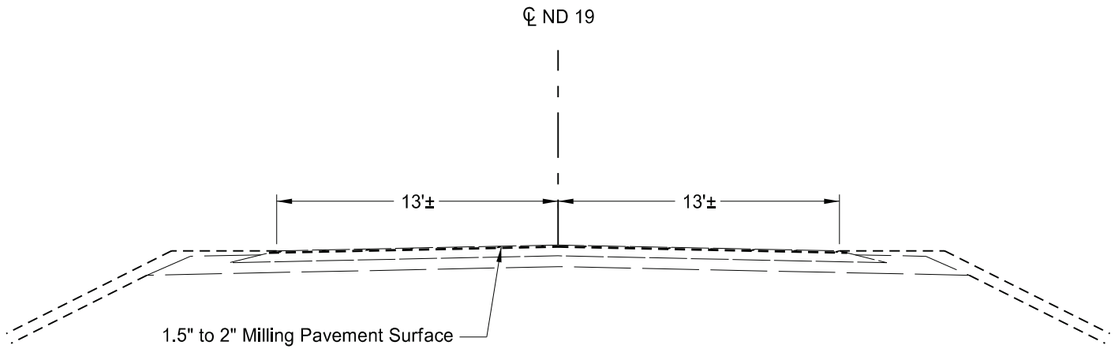
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	30	4



Removal Typical Section - Site 3

Sta 301+75.98 to Begin Bridge (Str No. 119-118.258)
End Bridge (Str No. 119-118.258) to Sta 307+39.10

Milling and Removal Typical Sections

Site 3 - Str No 119-118.258
Big Coulee Crossing

Structure Repairs

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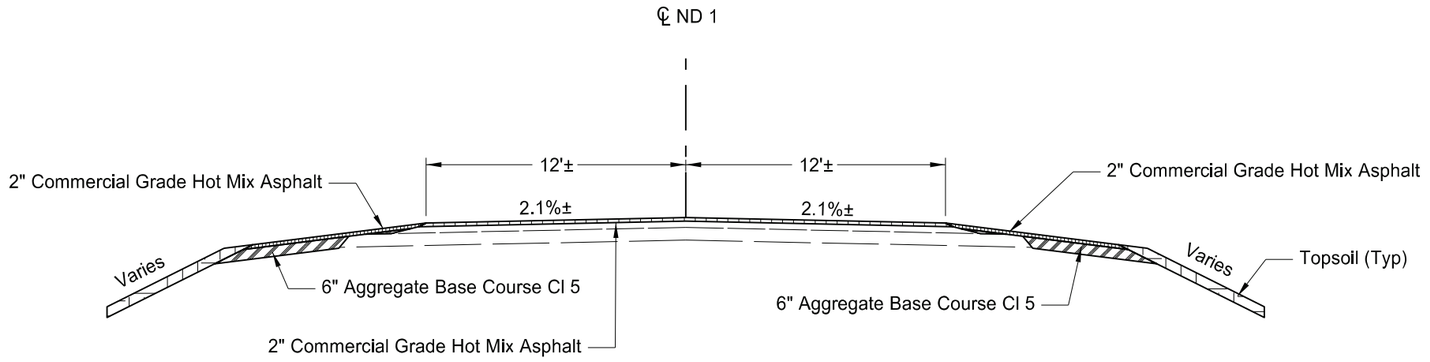
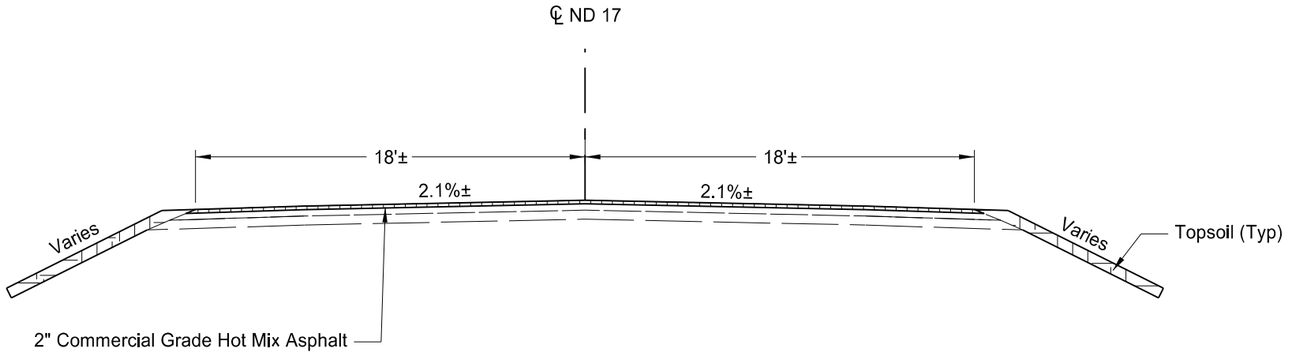
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	30	5



Proposed Typical Section - Site 1

Sta 100+78.36 to Begin Bridge (Str No. 01-143.430)
End Bridge (Str No. 01-143.430) to Sta 107+48.49



Proposed Typical Section - Site 2

Sta 203+61.20 to Begin Bridge (Str No. 01-143.430)
End Bridge (Str No. 01-143.430) to Sta 205+55.95

Proposed Typical Sections

Site 1 - Str No 01-143.430
Sheyenne River Crossing

Site 2 - Str No 17-042.967
Mavais Coulee Crossing

Structure Repairs

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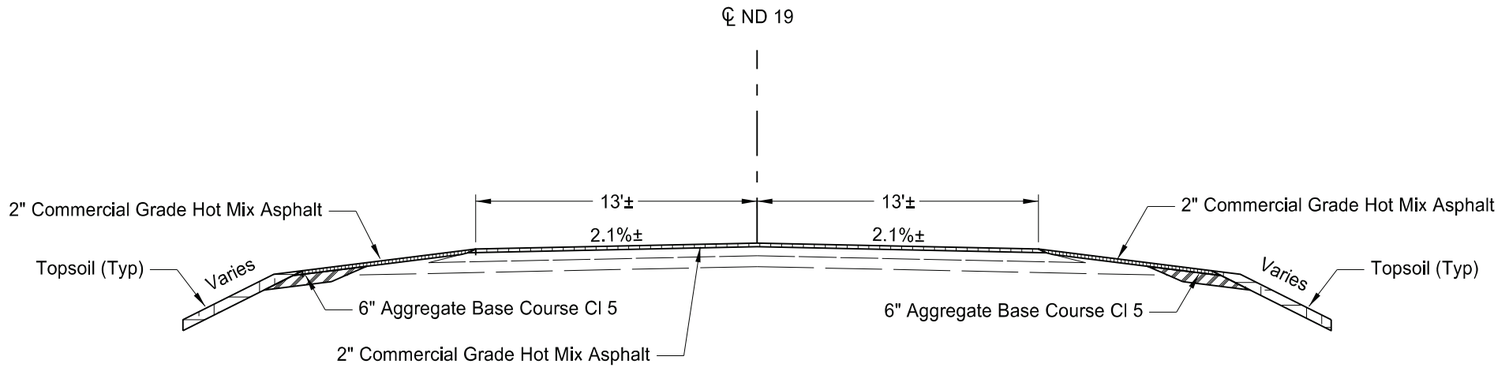
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	30	6



Proposed Typical Section - Site 3

Sta 301+75.98 to Begin Bridge (Str No. 119-118.258)
End Bridge (Str No. 119-118.258) to Sta 307+39.10

Proposed Typical Sections

Site 3 - Str No 119-118.258
Big Coulee Crossing

Structure Repairs

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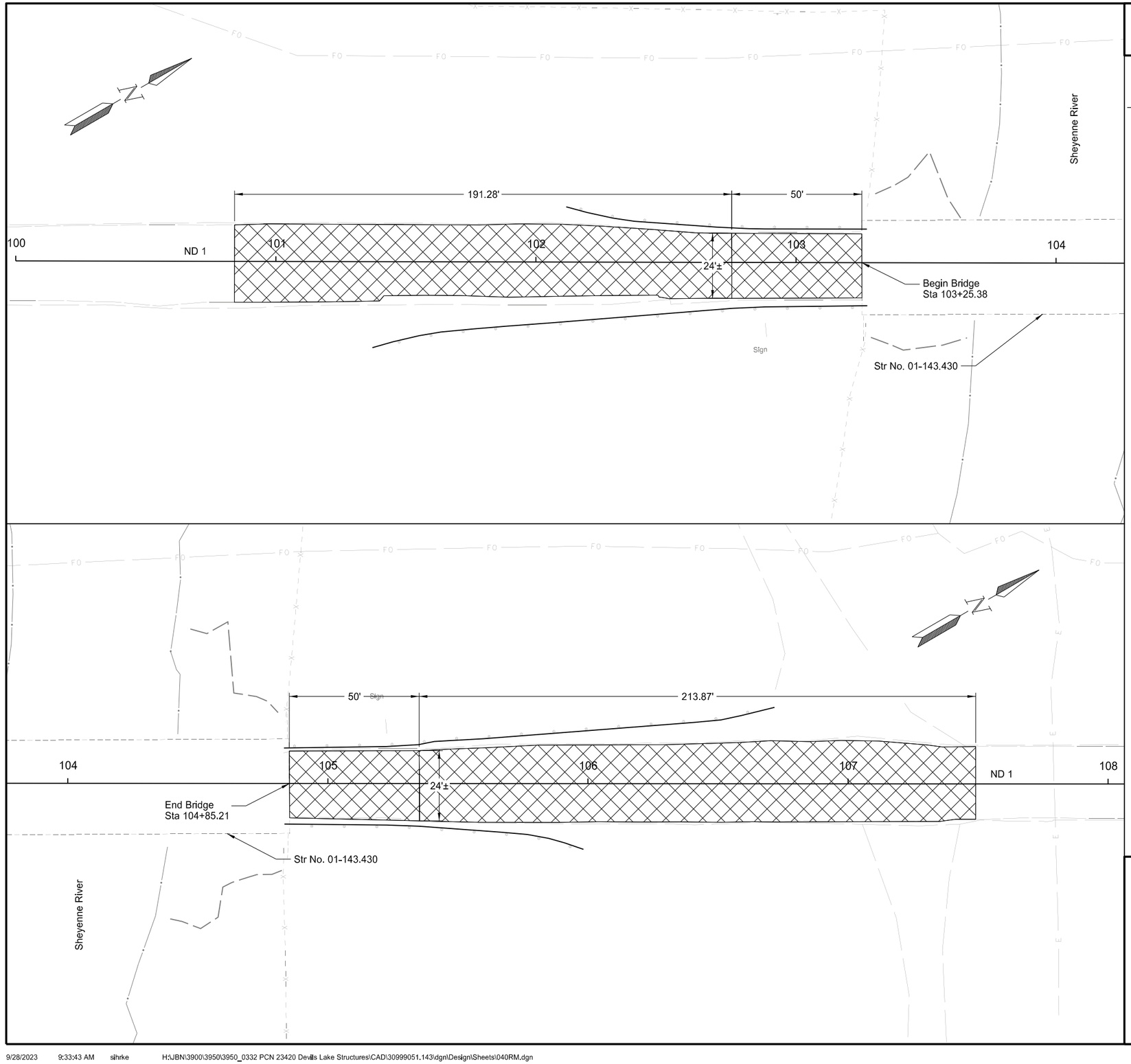
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	40	1

SPEC	CODE	BID ITEM	QTY	UNIT
411	0105	MILLING PAVEMENT SURFACE		
		Sta 100+84.10 to Sta 103+25.38	726	SY
		Sta 104+85.21 to Sta 107+49.08	853	SY

Note: See Section 130 for removal of guardrail and end terminals



Variable Depth Milling Pavement Surface

Remove Guardrail & End Terminal

Removals
Site 1 - Str No. 01-143.430
Sheyenne River Crossing

Structure Repairs
ND 1
2.5 Miles South of Pekin

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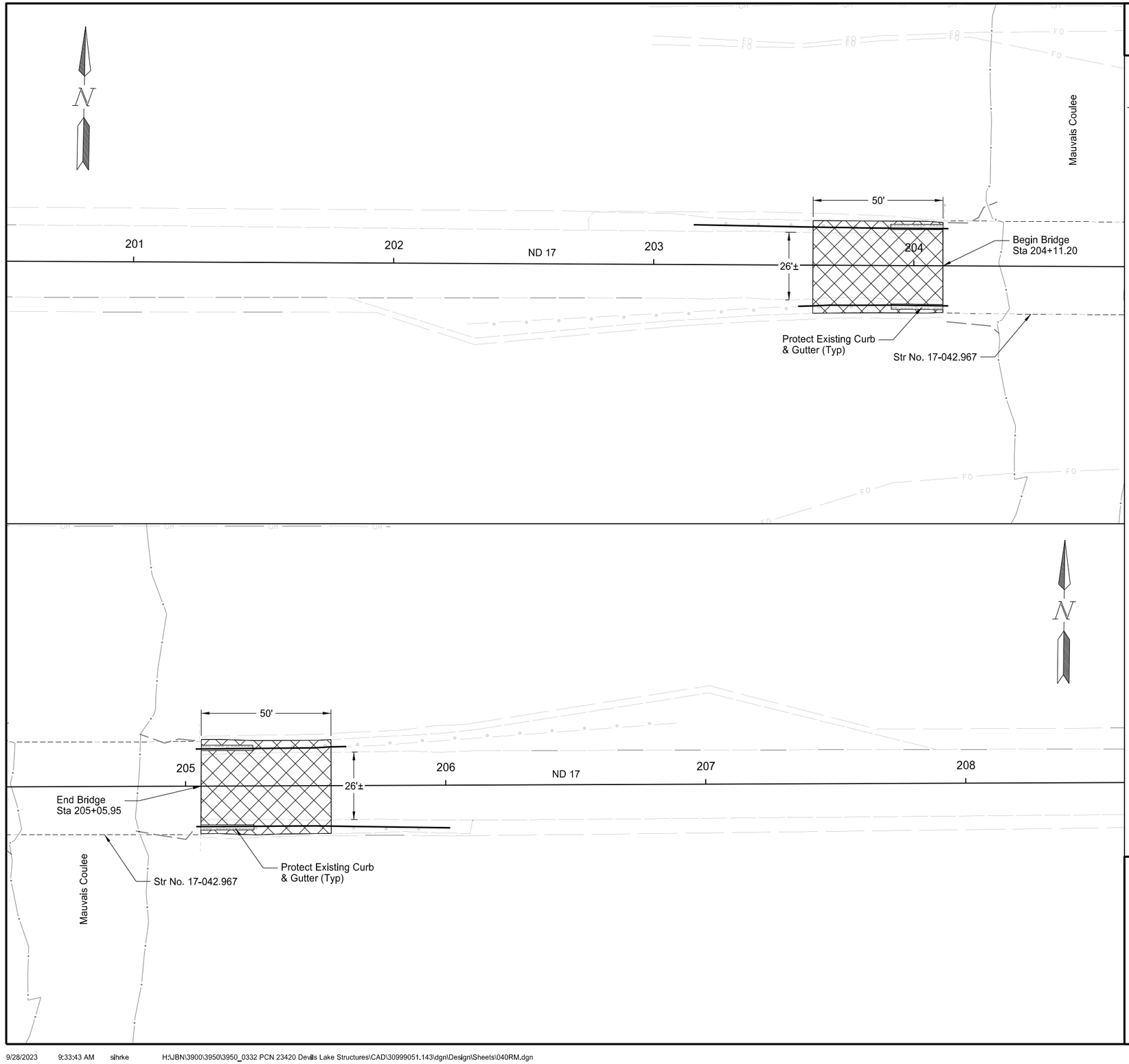

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	40	2

SPEC	CODE	BID ITEM	QTY	UNIT
411	0105	MILLING PAVEMENT SURFACE		
		Sta 203+61.20 to Sta 204+11.20	187	SY
		Sta 205+05.95 to Sta 205+55.95	191	SY

Note: See Section 130 for removal of guardrail

Variable Depth Milling Pavement Surface

Remove & Reset Guardrail

Removals
Site 2 - Str No. 17-042.967
Mauvais Coulee Crossing

Structure Repairs
ND 17
4.5 Miles East of Cando

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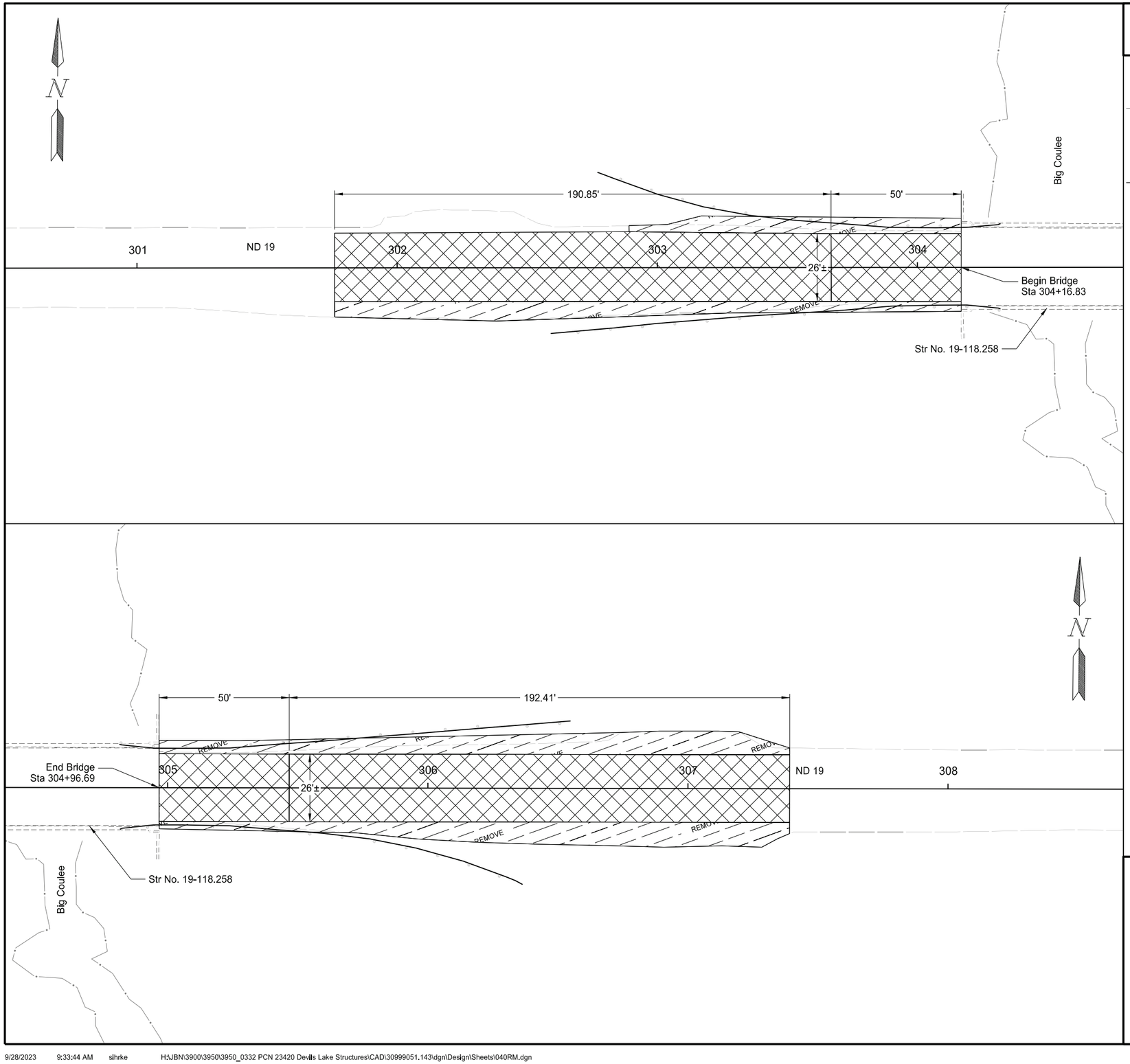
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	40	3

SPEC	CODE	BID ITEM	QTY	UNIT
202	0132	REMOVAL OF BITUMINOUS SURFACING		
		Sta 302+89.15 Lt to Sta 304+16.83 Lt	80	SY
		Sta 301+75.98 Rt to Sta 304+16.83 Rt	146	SY
		Sta 304+96.69 Lt to Sta 307+39.10 Lt	185	SY
		Sta 304+96.76 Rt to Sta 307+39.10 Rt	179	SY
411	0105	MILLING PAVEMENT SURFACE		
		Sta 301+75.98 to Sta 304+16.83	707	SY
		Sta 304+96.69 to Sta 307+39.10	700	SY

Note: See Section 130 for removal of guardrail and end terminals



Variable Depth Milling Pavement Surface

Removal of Bituminous Surfacing

Remove Guardrail & End Terminal

Removals
Site 3 - Str No. 19-118.258
Big Coulee Crossing

Structure Repairs
ND 19
15 Miles West of Minnewauken

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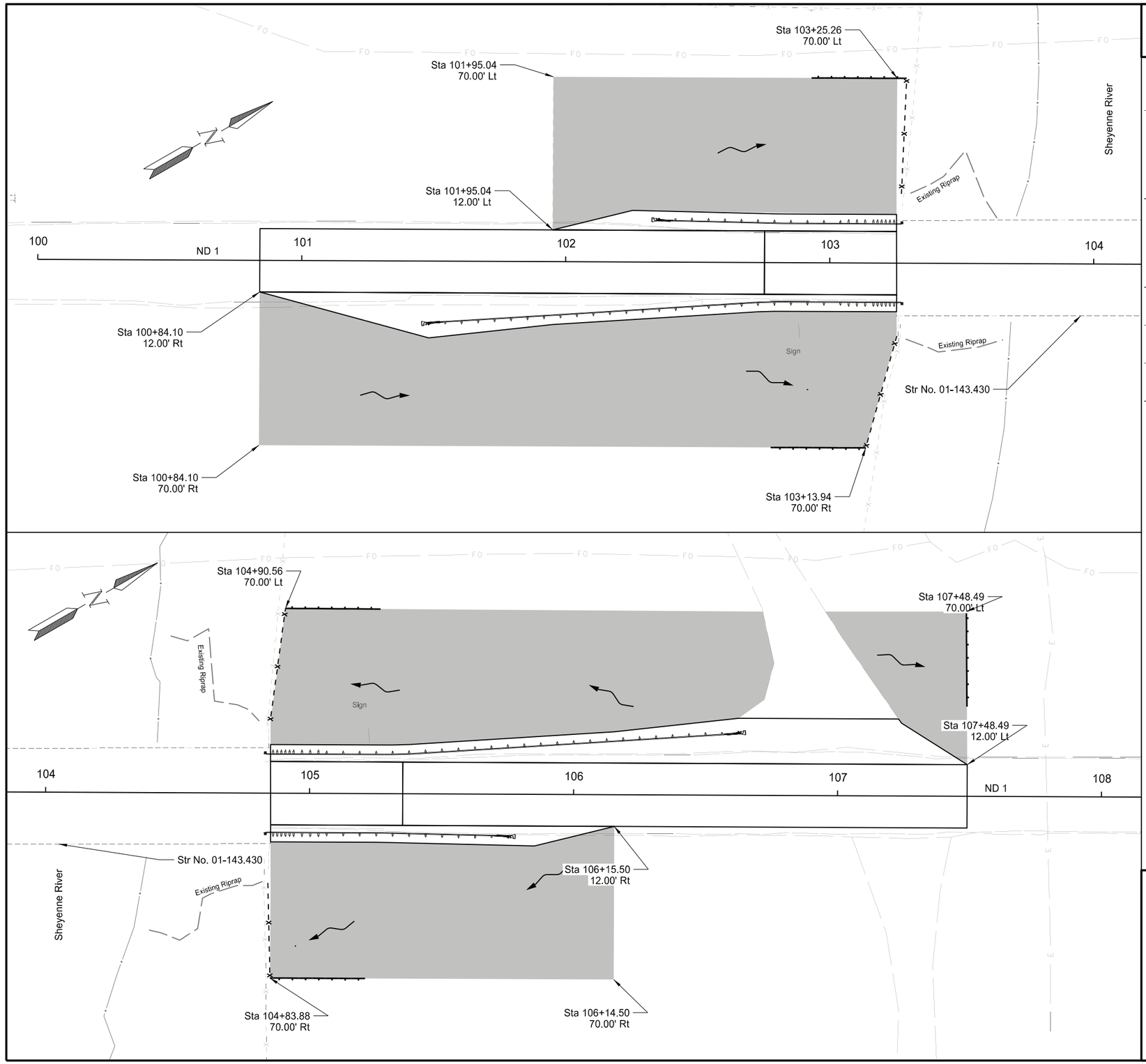

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	76	1

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sta 100+84.10 Rt to Sta 103+25.38 Rt	0.263	ACRE
		Sta 101+95.04 Lt to Sta 103+25.26 Lt	0.155	ACRE
		Sta 104+84.65 Lt to Sta 106+75.74 Lt	0.202	ACRE
		Sta 104+84.65 Rt to Sta 106+15.50 Rt	0.155	ACRE
		Sta 106+95.17 Lt to Sta 107+49.08 Lt	0.043	ACRE
253	0201	HYDRAULIC MULCH		
		Sta 100+84.10 Rt to Sta 103+25.38 Rt	0.263	ACRE
		Sta 101+95.04 Lt to Sta 103+25.26 Lt	0.155	ACRE
		Sta 104+84.65 Lt to Sta 106+75.74 Lt	0.202	ACRE
		Sta 104+84.65 Rt to Sta 106+15.50 Rt	0.155	ACRE
		Sta 106+95.17 Lt to Sta 107+49.08 Lt	0.043	ACRE
260	0100	SILT FENCE UNSUPPORTED		
		Sta 103+13.94 to Sta 104+90.56	177	LF
260	0101	REMOVE SILT FENCE UNSUPPORTED		
		Sta 103+13.94 to Sta 104+90.56	177	LF
261	0112	FIBER ROLLS 12IN		
		Sta 102+77.94 to Sta 107+48.86	180	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Sta 102+77.94 to Sta 107+48.86	180	LF

Temporary 12IN Fiber Rolls
Sheet 1: Site 1 - Str No. 01-143.430

Start Sta	Offset	End Sta	Offset	Length (LF)
102+93	70' Lt	103+29	70' Lt	36
102+78	70' Rt	103+14	70' Rt	36
104+85	70' Rt	105+21	70' Rt	36
104+91	70' Lt	105+27	70' Lt	36
107+48	70' Lt	107+49	34' Lt	36
			Total	180

Silt Fence
Sheet 1: Site 1 - Str No. 01-143.430

Start Sta	Offset	End Sta	Offset	Length (LF)
103+29	70' Lt	103+27	26' Lt	53
103+26	27' Rt	103+14	70' Rt	44
104+91	70' Lt	104+85	27' Lt	43
104+84	33' Rt	104+85	70' Rt	37
			Total	177

Flow Line

Temporary Cover Crop
Hydraulic Mulch

Fiber Rolls 12IN

Silt Fence

Flotation Silt Curtain

Temporary Erosion Control
Site 1 - Str No. 01-143.430
Sheyenne River Crossing

Structure Repairs
ND 1
2.5 Miles South of Pekin

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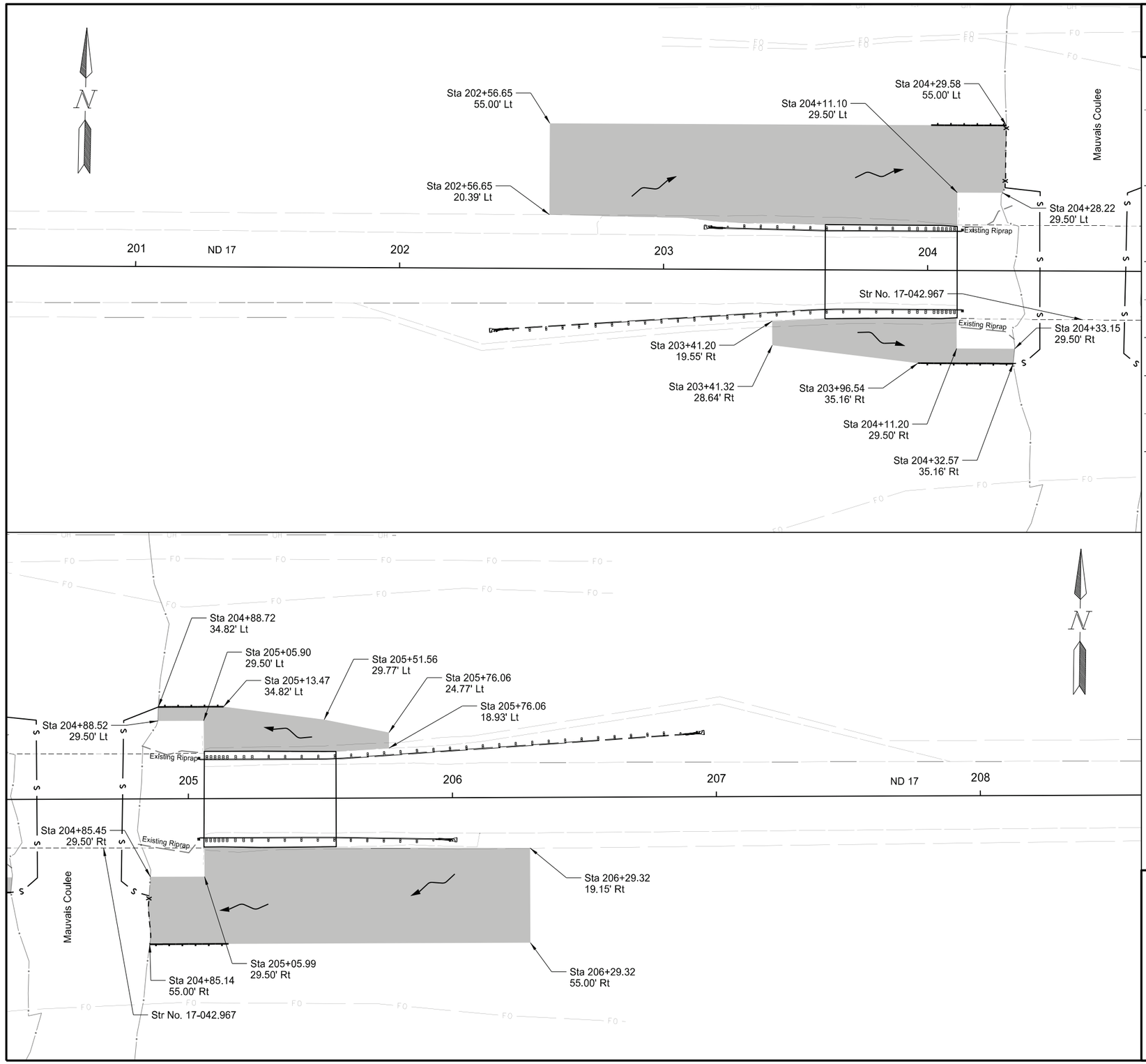
9/28/2023



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	76	2

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sta 202+56.65 Lt to Sta 204+29.37 Lt	0.141	ACRE
		Sta 203+41.20 Rt to Sta 204+32.57 Rt	0.025	ACRE
		Sta 204+84.64 Rt to Sta 206+29.32 Rt	0.115	ACRE
		Sta 204+88.52 Lt to Sta 205+76.06 Lt	0.023	ACRE
253	0201	HYDRAULIC MULCH		
		Sta 202+56.65 Lt to Sta 204+29.37 Lt	0.141	ACRE
		Sta 203+41.20 Rt to Sta 204+32.57 Rt	0.025	ACRE
		Sta 204+84.64 Rt to Sta 206+29.32 Rt	0.115	ACRE
		Sta 204+88.52 Lt to Sta 205+76.06 Lt	0.023	ACRE
260	0100	SILT FENCE UNSUPPORTED		
		Sta 204+29.58 to Sta 204+85.14	42	LF
260	0101	REMOVE SILT FENCE UNSUPPORTED		
		Sta 204+29.58 to Sta 204+85.14	42	LF
261	0112	FIBER ROLLS 12IN		
		Sta 204+01.10 to Sta 204+15.85	119	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Sta 204+01.10 to Sta 204+15.85	119	LF
262	0100	FLOTATION SILT CURTAIN		
		Sta 204+29.23 to Sta 204+88.72	172	LF
262	0101	REMOVE FLOTATION SILT CURTAIN		
		Sta 204+29.23 to Sta 204+88.72	172	LF

Temporary 12IN Fiber Rolls
Sheet 2: Site 2 - Str No. 17-042.967

Start Sta	Offset	End Sta	Offset	Length (LF)
204+01	55' Lt	204+30	55' Lt	29
203+97	35' Rt	204+33	35' Rt	36
204+85	55' Rt	205+15	55' Rt	30
204+89	35' Lt	205+13	35' Lt	24
			Total	119

Silt Fence
Sheet 2: Site 2 - Str No. 17-042.967

Start Sta	Offset	End Sta	Offset	Length (LF)
204+30	55' Lt	204+29	31' Lt	24
204+85	37' Rt	204+85	55' Rt	18
			Total	42

Flotation Silt Curtain
Sheet 2: Site 2 - Str No. 17-042.967

Start Sta	Offset	End Sta	Offset	Length (LF)
204+29	31' Lt	204+33	35' Rt	85
204+89	35' Lt	204+85	37' Rt	87
			Total	172

Flow Line

Temporary Cover Crop
Hydraulic Mulch

Fiber Rolls 12IN

Silt Fence

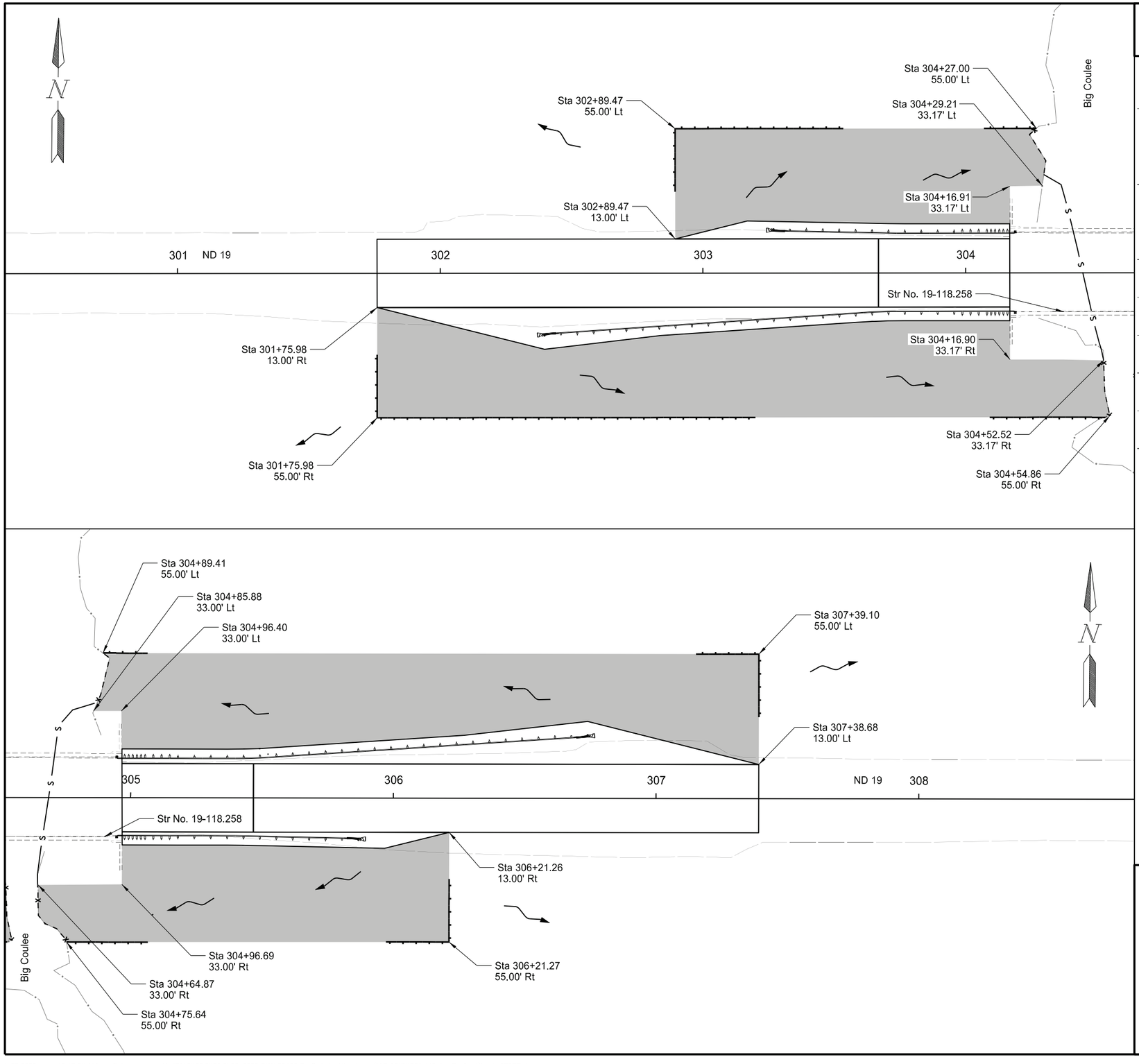
Flotation Silt Curtain

Temporary Erosion Control
Site 2 - Str No. 17-042.967
Mauvais Coulee Crossing

Structure Repairs
ND 17
4.5 Miles East of Cando

REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA

9/28/2023



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	76	3

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sta 301+75.98 Rt to Sta 304+54.86 Rt	0.204	ACRE
		Sta 302+89.47 Lt to Sta 304+50.56 Lt	0.113	ACRE
		Sta 304+64.95 Rt to Sta 306+21.26 Rt	0.120	ACRE
		Sta 304+85.88 Lt to Sta 307+39.10 Lt	0.189	ACRE
253	0201	HYDRAULIC MULCH		
		Sta 301+75.98 Rt to Sta 304+54.86 Rt	0.204	ACRE
		Sta 302+89.47 Lt to Sta 304+50.56 Lt	0.113	ACRE
		Sta 304+64.95 Rt to Sta 306+21.26 Rt	0.120	ACRE
		Sta 304+85.881 Lt to Sta 307+39.10 Lt	0.189	ACRE
260	0100	SILT FENCE UNSUPPORTED		
		Sta 304+27.00 to Sta 304+89.41	90	LF
260	0101	REMOVE SILT FENCE UNSUPPORTED		
		Sta 304+27.00 to Sta 304+89.41	90	LF
261	0112	FIBER ROLLS 12IN		
		Sta 301+75.98 to Sta 307+39.10	464	LF
261	0113	REMOVE FIBER ROLLS 12IN		
		Sta 301+75.98 to Sta 307+39.10	464	LF
262	0100	FLOTATION SILT CURTAIN		
		Sta 304+29.81 to Sta 304+87.27	155	LF
262	0101	REMOVE FLOTATION SILT CURTAIN		
		Sta 304+29.81 to Sta 304+87.27	155	LF

Flow Line

Temporary Cover Crop
Hydraulic Mulch

Fiber Rolls 12IN

Silt Fence

Flotation Silt Curtain

Temporary 12IN Fiber Rolls
Sheet 3: Site 3 - Str No. 19-118.258

Start Sta	Offset	End Sta	Offset	Length (LF)
301+76	31' Rt	301+76	55' Rt	24
301+76	55' Rt	303+20	55' Rt	144
302+89	31' Lt	302+89	55' Lt	24
302+89	55' Lt	303+53	55' Lt	64
304+07	55' Lt	304+27	55' Lt	20
304+09	55' Rt	304+53	55' Rt	44
304+76	55' Rt	305+07	55' Rt	31
304+89	55' Rt	305+06	55' Rt	17
305+97	55' Rt	306+21	55' Rt	24
306+21	55' Rt	306+21	31' Rt	24
307+15	55' Lt	307+39	55' Lt	24
307+39	55' Lt	307+39	31' Lt	24
			Total	464

Silt Fence
Sheet 3: Site 3 - Str No. 19-118.258

Start Sta	Offset	End Sta	Offset	Length (LF)
304+27	55' Lt	304+30	37' Lt	21
304+53	33' Rt	304+55	55' Rt	21
304+89	55' Lt	304+87	36' Lt	21
304+65	33' Rt	304+76	55' Rt	27
			Total	90

Flotation Silt Curtain
Sheet 3: Site 3 - Str No. 19-118.258

Start Sta	Offset	End Sta	Offset	Length (LF)
304+30	37' Lt	304+53	33' Rt	76
304+87	36' Lt	304+65	33' Rt	79
			Total	155

Temporary Erosion Control
Site 3 - Str No. 19-118.258
Big Coulee Crossing

Structure Repairs
ND 19
15 Miles West of Minnewauken

REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
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NORTH DAKOTA

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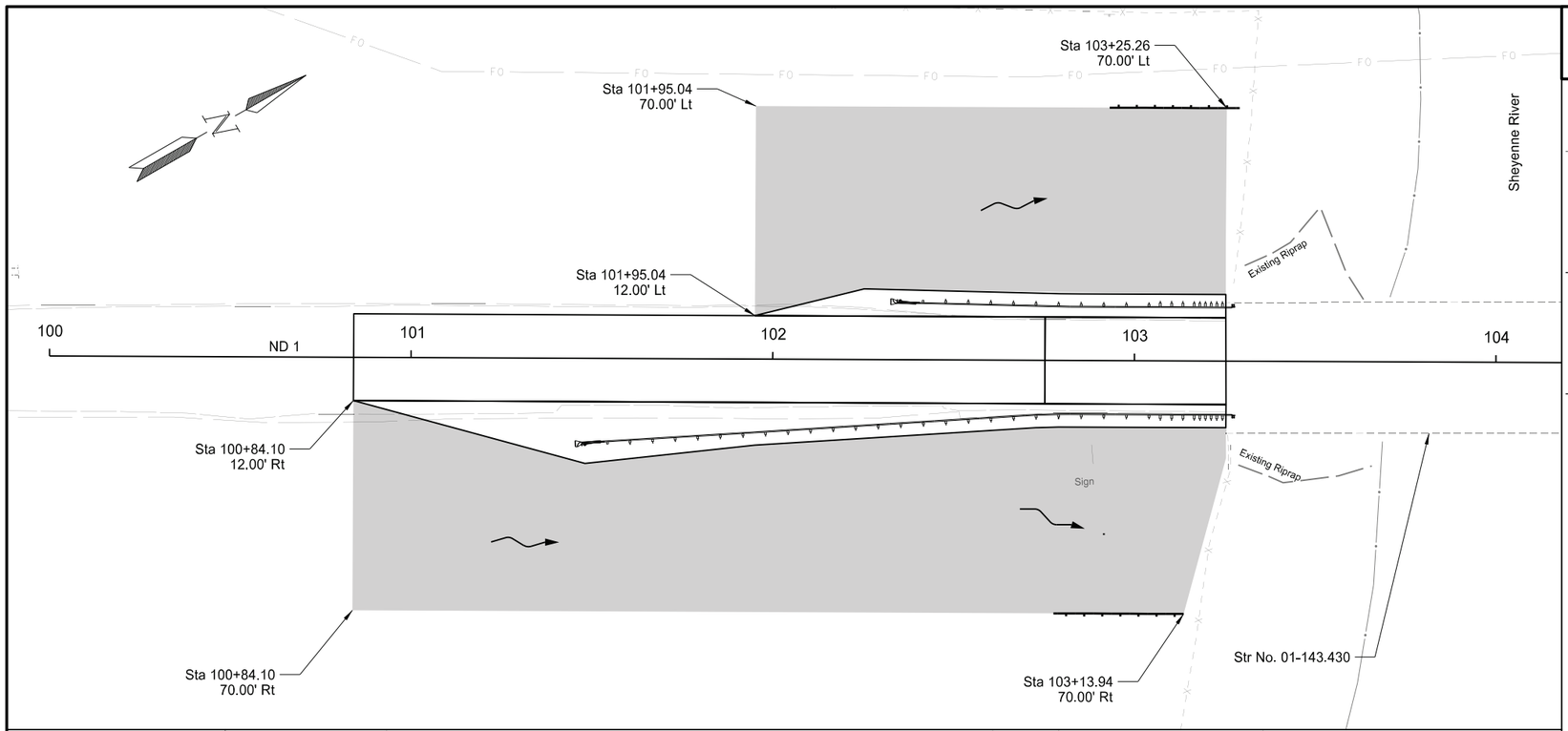
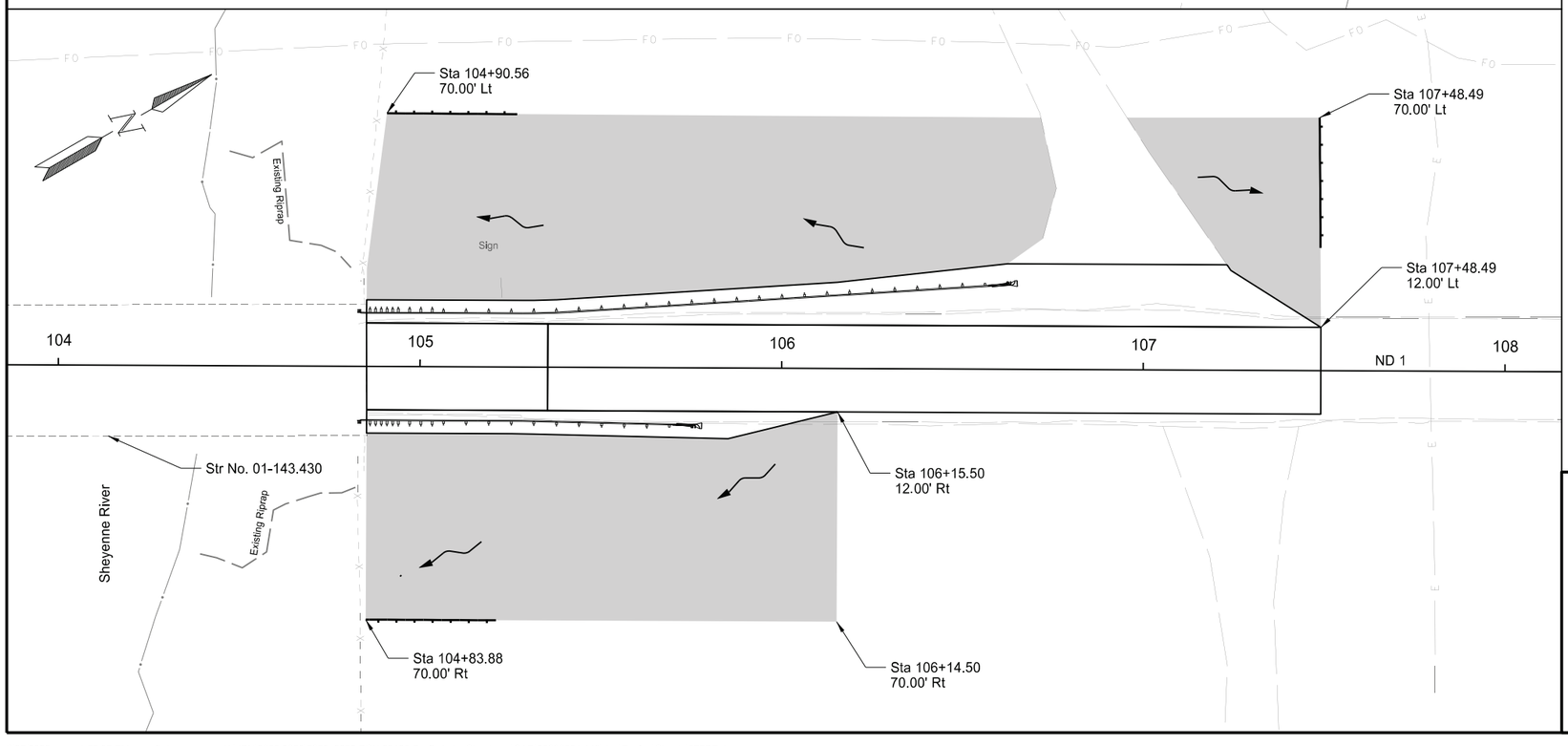




	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	77	1

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sta 100+84.10 Rt to Sta 103+25.38 Rt	0.263	ACRE
		Sta 101+95.40 Lt to Sta 103+25.26 Lt	0.155	ACRE
		Sta 104+84.65 Lt to Sta 106+75.74 Lt	0.202	ACRE
		Sta 104+84.65 Rt to Sta 106+15.50 Rt	0.155	ACRE
		Sta 106+95.17 Lt to Sta 107+49.08 Lt	0.043	ACRE
253	0201	HYDRAULIC MULCH		
		Sta 100+84.10 Rt to Sta 103+25.38 Rt	0.263	ACRE
		Sta 101+95.40 Lt to Sta 103+25.26 Lt	0.155	ACRE
		Sta 104+84.65 Lt to Sta 106+75.74 Lt	0.202	ACRE
		Sta 104+84.65 Rt to Sta 106+15.50 Rt	0.155	ACRE
		Sta 106+95.17 Lt to Sta 107+49.08 Lt	0.043	ACRE
261	0112	FIBER ROLLS 12IN		
		Sta 102+77.94 to Sta 107+48.86	180	LF

Permanent 12IN Fiber Rolls				
Sheet 1: Site 1 - Str No. 01-143.430				
Start Sta	Offset	End Sta	Offset	Length (LF)
102+93	70' Lt	103+29	70' Lt	36
102+78	70' Rt	103+14	70' Rt	36
104+85	70' Rt	105+21	70' Rt	36
104+91	70' Lt	105+27	70' Lt	36
107+48	70' Lt	107+49	34' Lt	36
			Total	180

Flow Line

Seeding Class II
Hydraulic Mulch

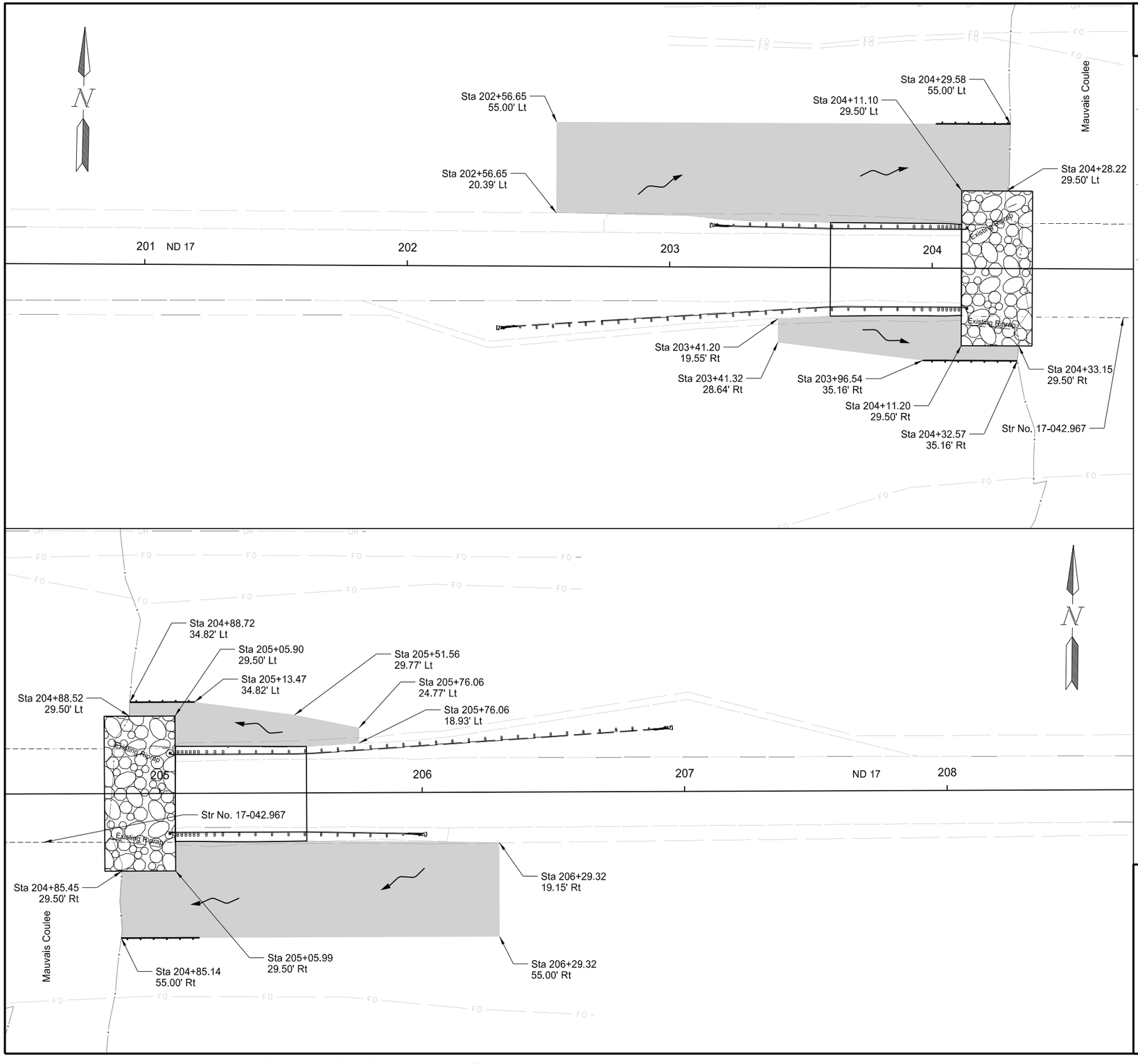
Fiber Rolls 12IN

Permanent Erosion Control
Site 1 - Str No. 01-143.430
Sheyenne River Crossing

Structure Repairs
ND 1
2.5 Miles South of Pekin

REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA
9/28/2023

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	77	2



SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sta 202+56.65 Lt to Sta 204+29.37 Lt	0.141	ACRE
		Sta 203+41.20 Rt to Sta 204+32.57 Rt	0.025	ACRE
		Sta 204+84.64 Rt to Sta 206+29.32 Rt	0.115	ACRE
		Sta 204+88.52 Lt to Sta 205+76.06 Lt	0.023	ACRE
253	0201	HYDRAULIC MULCH		
		Sta 202+56.65 Lt to Sta 204+29.37 Lt	0.141	ACRE
		Sta 203+41.20 Rt to Sta 204+32.57 Rt	0.025	ACRE
		Sta 204+84.64 Rt to Sta 206+29.32 Rt	0.115	ACRE
		Sta 204+88.52 Lt to Sta 205+76.06 Lt	0.023	ACRE
261	0112	FIBER ROLLS 12IN		
		Sta 204+01.10 to Sta 204+15.85	119	LF

Permanent 12IN Fiber Rolls
Sheet 2: Site 2 - Str No. 17-042.967

Start Sta	Offset	End Sta	Offset	Length (LF)
204+01	55' Lt	204+30	55' Lt	29
203+97	35' Rt	204+33	35' Rt	36
204+85	55' Rt	205+15	55' Rt	30
204+89	35' Lt	205+13	35' Lt	24
			Total	119

Flow Line

Seeding Class II
Hydraulic Mulch

Riprap
See Section 170 for Details

Fiber Rolls 12IN

Permanent Erosion Control
Site 2 - Str No. 17-042.967
Mauvais Coulee Crossing

Structure Repairs
ND 17
4.5 Miles East of Cando

REGISTERED PROFESSIONAL ENGINEER
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PE-10407
DATE
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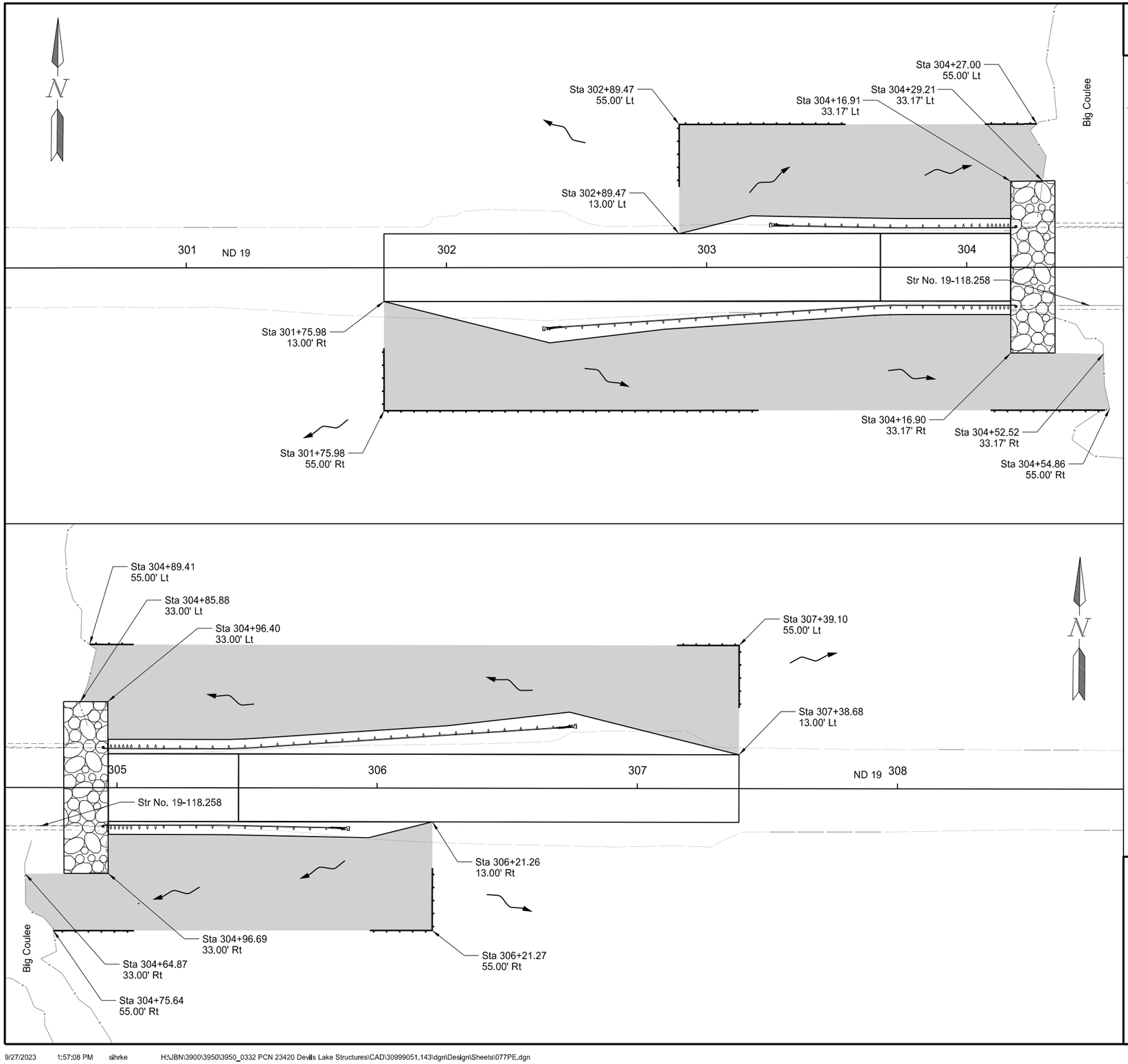


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	77	3

SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sta 301+75.98 Rt to Sta 304+54.86 Rt	0.204	ACRE
		Sta 302+89.47 Lt to Sta 304+50.56 Lt	0.113	ACRE
		Sta 304+64.95 Rt to Sta 306+21.26 Rt	0.120	ACRE
		Sta 304+85.88 Lt to Sta 307+39.10 Lt	0.189	ACRE
253	0201	HYDRAULIC MULCH		
		Sta 301+75.98 Rt to Sta 304+54.86 Rt	0.204	ACRE
		Sta 302+89.47 Lt to Sta 304+50.56 Lt	0.113	ACRE
		Sta 304+64.95 Rt to Sta 306+21.26 Rt	0.120	ACRE
		Sta 304+85.88 Lt to Sta 307+39.10 Lt	0.189	ACRE
261	0112	FIBER ROLLS 12IN		
		Sta 301+75.98 to Sta 307+39.10	464	LF

Permanent 12IN Fiber Rolls				
Sheet 3: Site 3 - Str No. 19-118.258				
Start Sta	Offset	End Sta	Offset	Length (LF)
301+76	31' Rt	301+76	55' Rt	24
301+76	55' Rt	303+20	55' Rt	144
302+89	31' Lt	302+89	55' Lt	24
302+89	55' Lt	303+53	55' Lt	64
304+07	55' Lt	304+27	55' Lt	20
304+09	55' Rt	304+53	55' Rt	44
304+76	55' Rt	305+07	55' Rt	31
304+89	55' Rt	305+06	55' Rt	17
305+97	55' Rt	306+21	55' Rt	24
306+21	55' Rt	306+21	31' Rt	24
307+15	55' Lt	307+39	55' Lt	24
307+39	55' Lt	307+39	31' Lt	24
			Total	464

Flow Line

Seeding Class II
Hydraulic Mulch

Riprap
See Section 170 for Details

Fiber Rolls 12IN

Permanent Erosion Control
Site 3 - Str No. 19-118.258
Big Coulee Crossing

Structure Repairs
ND 19
15 Miles West of Minnewauken

REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA
9/28/2023

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	82	1

Beginning chain OCL_ND 1 description

Point 1 N 285,616.9068 E 2,505,655.9326 Sta 100+00.00

Course from 7 to 8 N 30° 07' 34.07" E Dist 1,039.8958

Point 2 N 286,516.3362 E 2,506,177.8617 Sta 110+39.90

Ending chain OCL_SITE1 description

Beginning chain OCL_ND 17 description

Point 3 N 545,286.1149 E 2,304,841.1228 Sta 200+00.00

Course from 3 to 4 N 89° 06' 20.50" E Dist 1,027.6047

Point 4 N 545,302.1537 E 2,305,868.6023 Sta 210+27.60

Ending chain OCL_ND 17 description

Beginning chain OCL_ND 19 description

Point 5 N 389,687.2450 E 2,190,479.4620 Sta 300+00.00

Course from 5 to 6 N 89° 31' 50.07" E Dist 914.5707

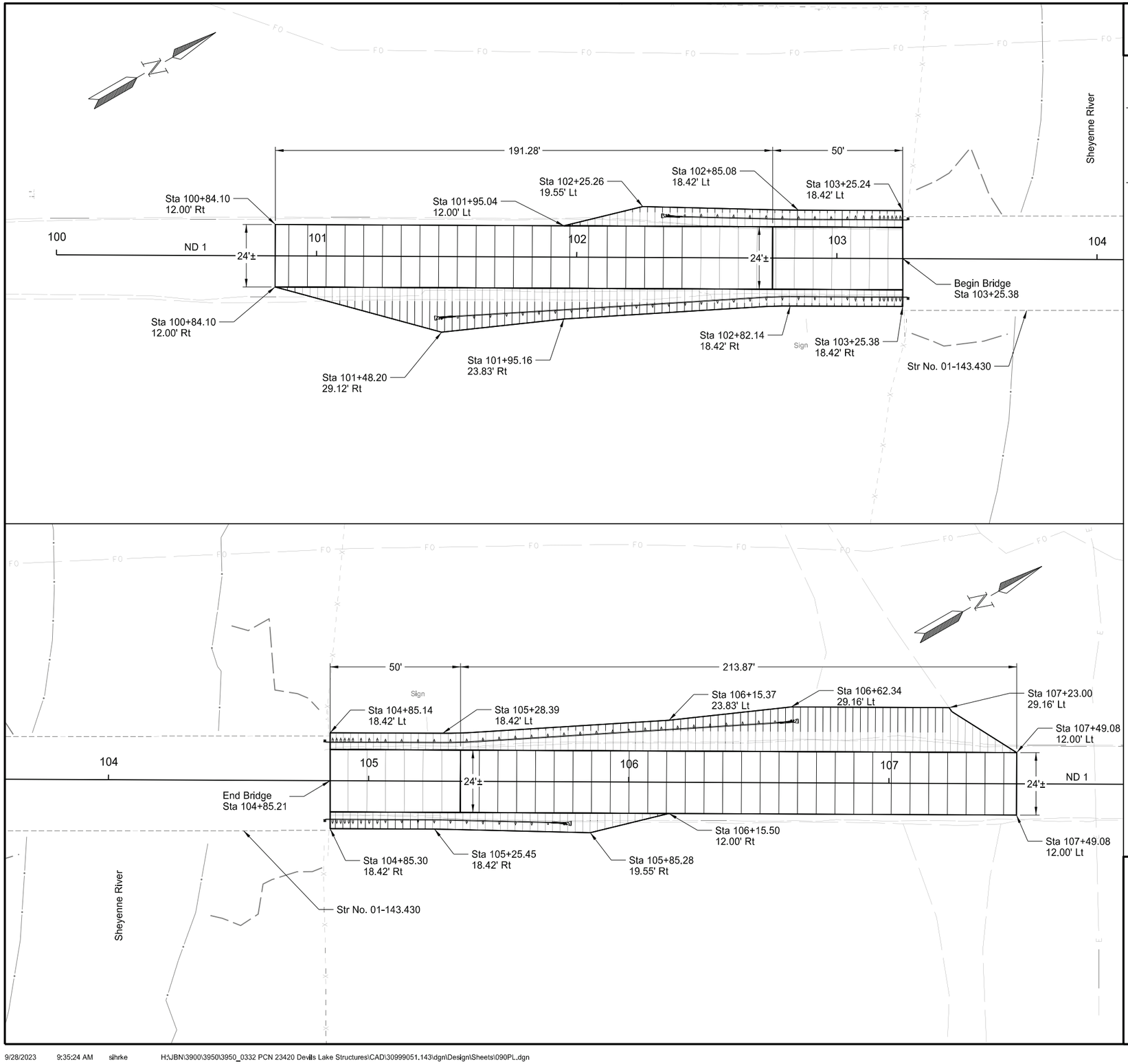
Point 6 N 389,694.7380 E 2,191,394.0020 Sta 309+14.57

Ending chain OCL_ND 19 description

Survey Data

Structure Repairs
ND1, ND 17, ND 19
Pekin, Cando, Minnewauken

REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA
9/28/2023



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	90	1

SPEC	CODE	BID ITEM	QTY	UNIT
302	0120	AGGREGATE BASE COURSE CL 5		
		Sta 101+95.04 Lt to Sta 103+25.24 Lt	14	TON
		Sta 100+84.10 Rt to Sta 103+25.38 Rt	53	TON
		Sta 104+85.14 Lt to Sta 107+49.08 Lt	74	TON
		Sta 104+85.30 Rt to Sta 106+15.50 Rt	14	TON
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT		
		Sta 101+95.04 Lt to Sta 103+25.24 Lt	10	TON
		Sta 100+84.10 to Sta 103+25.38	72	TON
		Sta 100+84.10 Rt to Sta 103+25.38 Rt	29	TON
		Sta 104+85.14 Lt to Sta 107+49.08 Lt	38	TON
		Sta 104+85.21 to Sta 107+49.08	78	TON
		Sta 104+85.30 Rt to Sta 106+15.50 Rt	10	TON

2" Commercial Grade Hot Mix Asphalt

2" Commercial Grade Hot Mix Asphalt
6" Aggregate Base Course Cl 5

Paving Layouts
Site 1 - Str No. 01-143.430
Sheyenne River Crossing

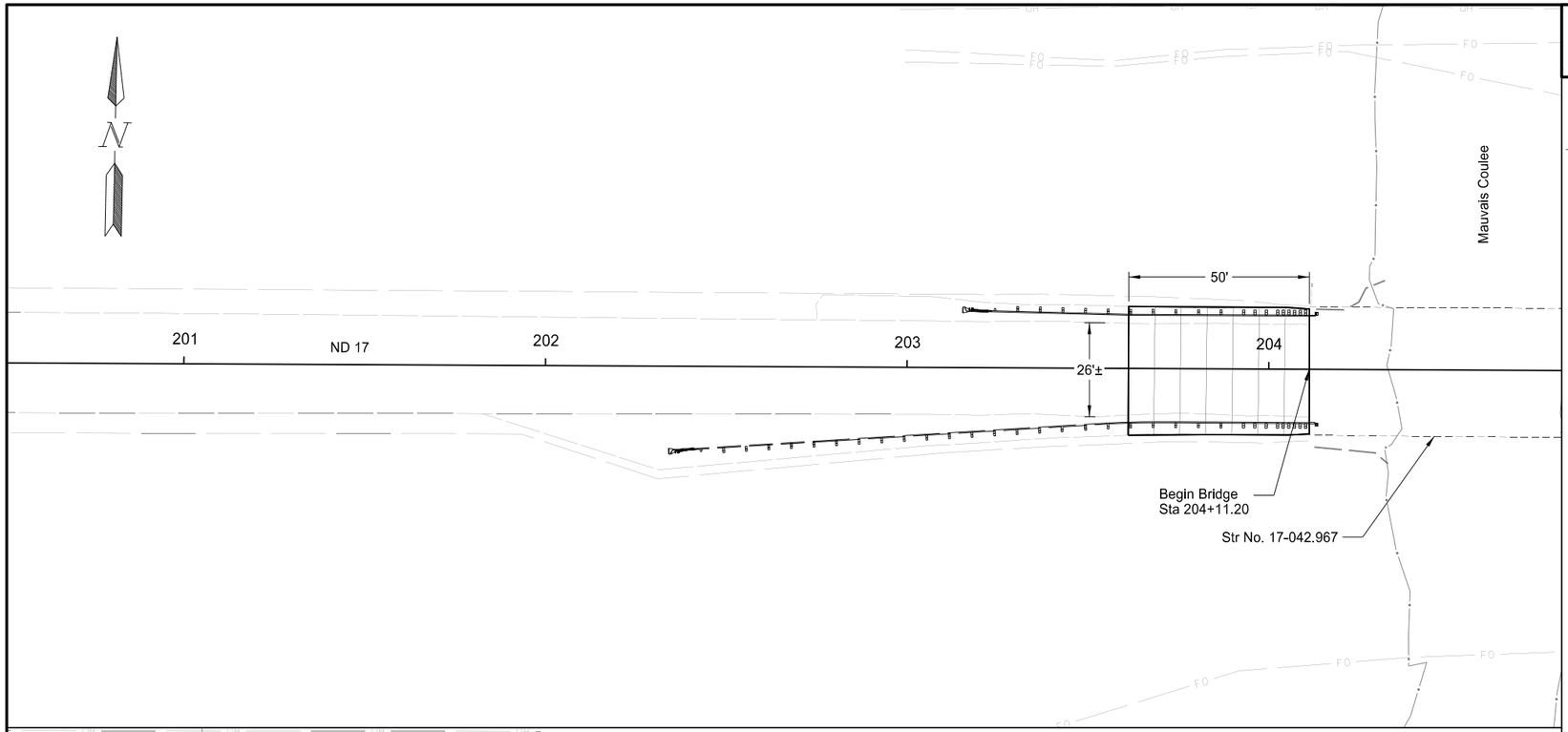
Structure Repairs
ND 1
2.5 Miles South of Pekin

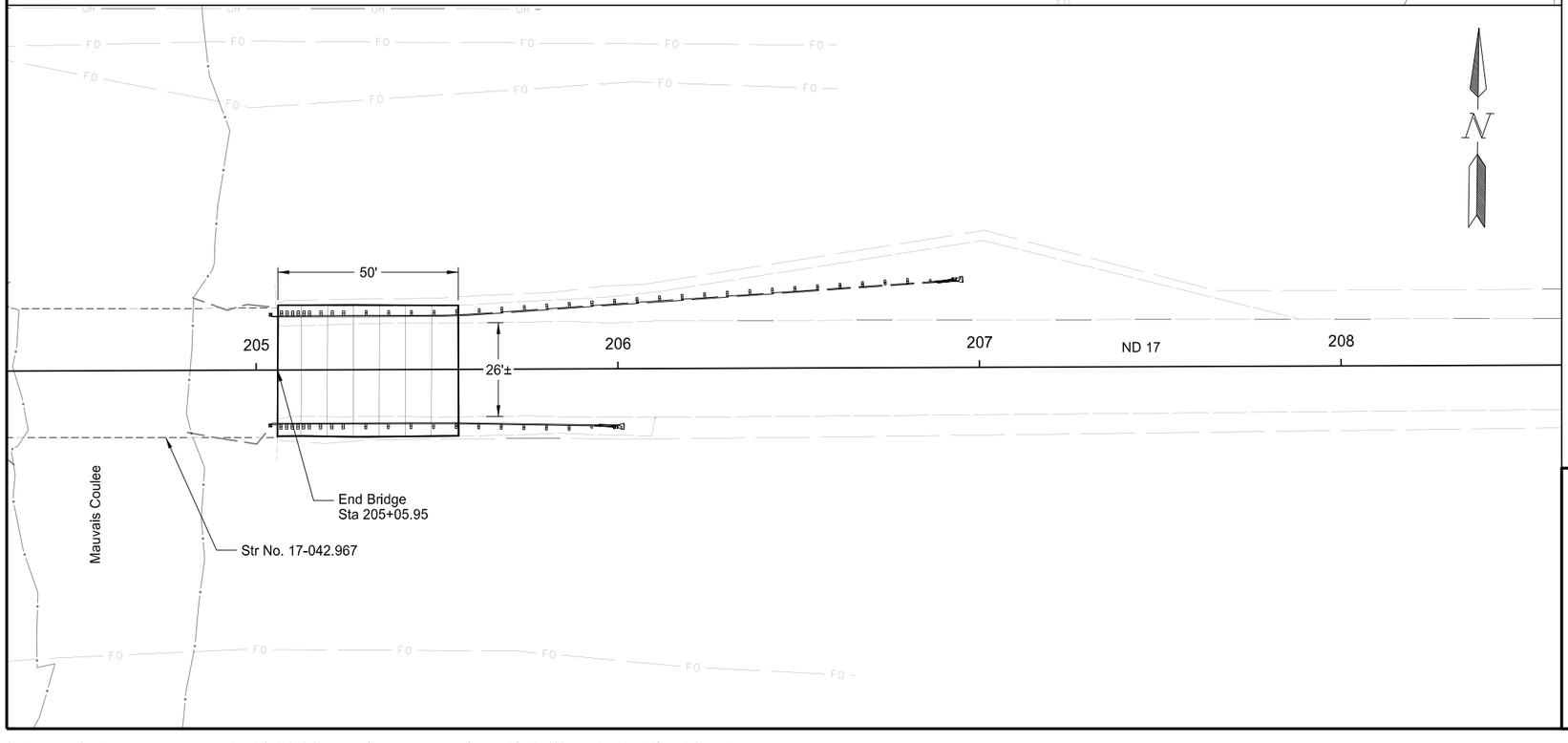
REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA

9/28/2023

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	90	2

SPEC	CODE	BID ITEM	QTY	UNIT
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT		
		Sta 203+61.20 to Sta 204+11.20	22	TON
		Sta 205+05.95 to Sta 205+55.95	23	TON





2" Commercial Grade Hot Mix Asphalt

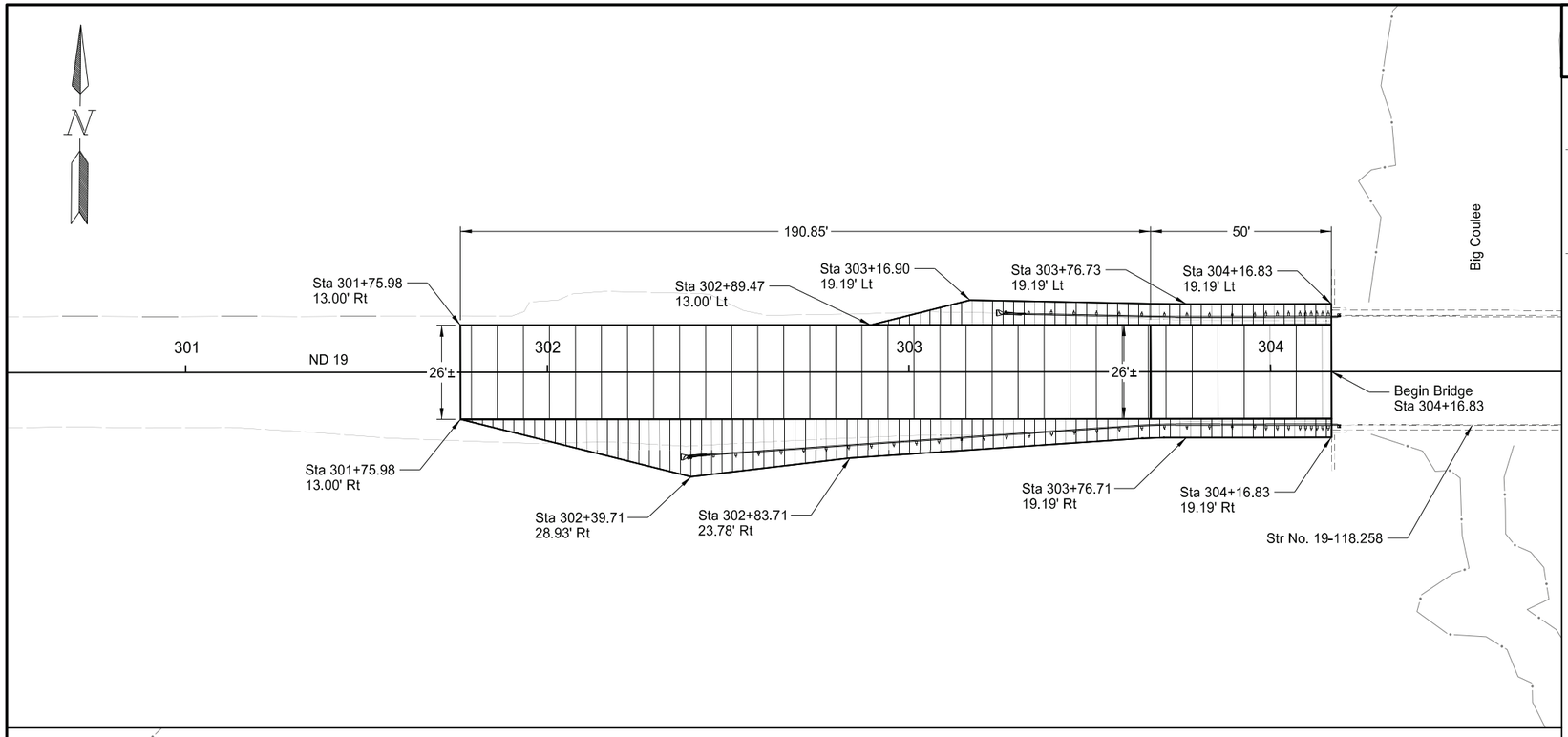
2" Commercial Grade Hot Mix Asphalt
6" Aggregate Base Course Cl 5

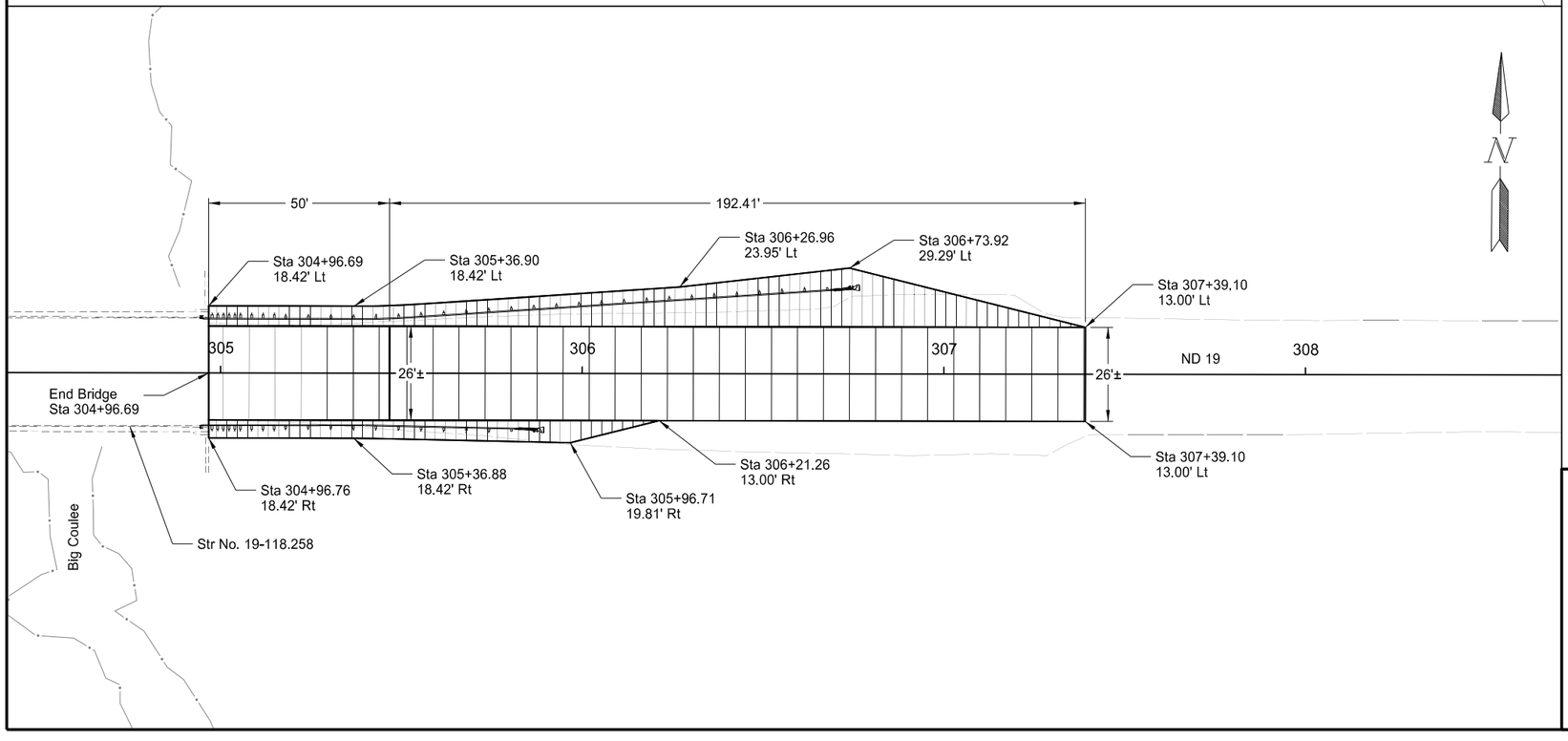
Paving Layouts
Site 2 - Str No. 17-042.967
Mauvais Coulee Crossing

Structure Repairs
ND 17
4.5 Miles East of Cando

REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA

9/28/2023





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	90	3

SPEC	CODE	BID ITEM	QTY	UNIT
302	0120	AGGREGATE BASE COURSE CL 5		
		Sta 302+89.47 Lt to Sta 304+16.83 Lt	18	TON
		Sta 301+75.98 Rt to Sta 304+16.83 Rt	38	TON
		Sta 304+96.69 Lt to Sta 307+39.10 Lt	40	TON
		Sta 304+96.76 Rt to Sta 306+21.26 Rt	15	TON
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT		
		Sta 302+89.47 Lt to Sta 304+16.83 Lt	9	TON
		Sta 301+75.98 to Sta 304+16.83	78	TON
		Sta 301+75.98 Rt to Sta 304+16.83 Rt	26	TON
		Sta 304+96.69 Lt to Sta 307+39.10 Lt	27	TON
		Sta 304+96.69 to Sta 307+39.10	78	TON
		Sta 304+96.76 Rt to Sta 306+21.26 Rt	8	TON

2" Commercial Grade Hot Mix Asphalt

2" Commercial Grade Hot Mix Asphalt
6" Aggregate Base Course Cl 5

Paving Layouts
Site 3 - Str No. 19-118.258
Big Coulee Crossing

Structure Repairs
ND 19
15 Miles West of Minnewauken

REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA

9/28/2023

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE		35	
G20-1-60	60"x24"	ROAD WORK NEXT __ MILES		28	
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)		18	
G20-2-48	**48"x24"**	**END ROAD WORK**	**2**	**26**	**52**
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)		18	
G20-4b-36	36"x30"	WAIT FOR PILOT CAR		18	
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS		43	
G20-52a-72	72"x24"	ROAD WORK NEXT __ MILES RT or LT ARROW		36	
G20-55-96	**96"x48"**	**SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT**	**2**	**59**	**118**
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		11	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)		7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)		7	
R1-1-48	**48"x48"**	**STOP**	**2**	**32**	**64**
R1-2-60	60"x60"	YIELD		29	
R2-1-36	**36"x48"**	**SPEED LIMIT __ (Portable only)**	**4**	**30**	**120**
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**6**	**39**	**234**
R2-1aP-24	**24"x18"**	**MINIMUM FEE $80 (Mounted on Speed Limit post)**	**4**	**10**	**40**
R3-2-48	48"x48"	NO LEFT TURN		35	
R4-1-36	**36"x48"**	**DO NOT PASS**	**2**	**30**	**60**
R4-1-48	48"x60"	DO NOT PASS		39	
R4-7-48	48"x60"	KEEP RIGHT		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-54	54"x18"	ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)		14	
R7-1-12	12"x18"	NO PARKING ANY TIME		11	
R10-6-24	**24"x36"**	**STOP HERE ON RED**	**2**	**16**	**32**
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)		12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)		12	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)		15	
W1-3-48	**48"x48"**	**REVERSE TURN RIGHT or LEFT**	**1**	**35**	**35**
W1-4-48	**48"x48"**	**REVERSE CURVE RIGHT or LEFT**	**1**	**35**	**35**
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT		35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD		35	
W3-3-48	**48"x48"**	**SIGNAL AHEAD**	**2**	**35**	**70**
W3-4-48	**48"x48"**	**BE PREPARED TO STOP**	**2**	**35**	**70**
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**2**	**35**	**70**
W4-2-48	48"x48"	LANE ENDS RIGHT or LEFT		35	
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC		35	
W8-1-48	**48"x48"**	**BUMP**	**4**	**35**	**140**
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-11-48	**48"x48"**	**UNEVEN LANES**	**2**	**35**	**70**
W8-12-48	48"x48"	NO CENTER LINE		35	
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	**48"x48"**	**TRUCKS ENTERING AHEAD or __ FT or _ MILE**	**2**	**35**	**70**
W8-55-48	**48"x48"**	**TRUCKS CROSSING AHEAD or __ FT or _ MILE**	**2**	**35**	**70**
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W13-1P-30	30"x30"	__ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)		14	
W14-3-64	64"x48"	NO PASSING ZONE		28	
W16-2P-30	**30"x24"**	**__ FEET PLAQUE (Mounted on warning sign post)**	**2**	**10**	**20**
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**2**	**35**	**70**
W20-2-48	48"x48"	DETOUR AHEAD or __ FT or _ MILE		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT or _ MILE		35	
W20-4-48	**48"x48"**	**ONE LANE ROAD AHEAD or __ FT or _ MILE**	**2**	**35**	**70**
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or __ FT or _ MILE		35	
W20-7-48	**48"x48"**	**FLAGGER**	**2**	**35**	**70**
W20-8-18	**18"x18"**	**STOP - SLOW PADDLE Back to Back**	**2**	**5**	**10**
W20-52P-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)		12	
W21-1-48	48"x48"	WORKERS		35	
W21-2-48	**48"x48"**	**FRESH OIL**	**1**	**35**	**35**
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT or _ MILE		35	
W21-5-48	48"x48"	SHOULDER WORK		35	
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT or _ MILE		35	
W21-6-48	48"x48"	SURVEY CREW		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT		35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY		35	
W21-52-48	48"x48"	PAVEMENT BREAKS		35	
W21-53-48	**48"x48"**	**RUMBLE STRIPS AHEAD**	**2**	**35**	**70**
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	
W24-1-48	48"x48"	DOUBLE REVERSE CURVE		35	

SPECIAL SIGNS

Consign 1	**48"x48"**	**XX FT WIDTH AHEAD**	**4**	**35**	**140**
Consign 2	**96"x84"**	**WIDTH RESTRICTION - ND 1 NORTH**	**2**	**87**	**174**
Consign 3	**96"x84"**	**WIDTH RESTRICTION - ND 1 SOUTH**	**3**	**87**	**261**

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**2270**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	**FLAGGING**	**MHR**	**75**
704-1018	**LANE CLOSURE-SIGNAL CONTROL/FLAGGING CONTROL**	**EACH**	**1**
704-1043	**ATTENUATION DEVICE-TYPE B-65**	**EACH**	**2**
704-1048	**PORTABLE RUMBLE STRIPS**	**EACH**	**2**
704-1050	TYPE I BARRICADES	EACH	
704-1052	**TYPE III BARRICADES**	**EACH**	**2**
704-1060	**DELINEATOR DRUMS**	**EACH**	**10**
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**15**
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1080	STACKABLE VERTICAL PANELS	EACH	
704-1081	VERTICAL PANELS - BACK TO BACK	EACH	
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH	
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH	
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH	
704-1500	**OBLITERATION OF PVMT MK**	**SF**	**1190**
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
704-3511	**STATE FURNISHED MEDIAN BARRIER**	**LF**	**300**
704-4011	PORTABLE CHANGEABLE MESSAGE SIGN	EACH	
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0422	**SHORT TERM 6IN LINE-TYPE R**	**LF**	**3026**
762-0426	**SHORT TERM 24IN LINE-TYPE R**	**LF**	**24**
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF	
762-0432	**SHORT TERM 6IN LINE-TYPE NR**	**LF**	**2180**

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

REGISTERED PROFESSIONAL ENGINEER
STEVEN L. STRACK
PE-10621
DATE
NORTH DAKOTA

6/10/2025

Traffic Control Devices List
Site 1 - Structure No. 01-143.430
Structure Repairs
ND State Highway 1
2.5 Miles South of Pekin

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	100	2

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE		35	
G20-1-60	60"x24"	ROAD WORK NEXT __ MILES		28	
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)		18	
G20-2-48	**48"x24"**	**END ROAD WORK**	**2**	**26**	**52**
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)		18	
G20-4b-36	36"x30"	WAIT FOR PILOT CAR		18	
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS		43	
G20-52a-72	72"x24"	ROAD WORK NEXT __ MILES RT or LT ARROW		36	
G20-55-96	**96"x48"**	**SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT**	**2**	**59**	**118**
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		11	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)		7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)		7	
R1-1-48	**48"x48"**	**STOP**	**2**	**32**	**64**
R1-2-60	60"x60"	YIELD		29	
R2-1-36	**36"x48"**	**SPEED LIMIT __ (Portable only)**	**4**	**30**	**120**
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**6**	**39**	**234**
R2-1aP-24	**24"x18"**	**MINIMUM FEE $80 (Mounted on Speed Limit post)**	**4**	**10**	**40**
R3-2-48	48"x48"	NO LEFT TURN		35	
R4-1-36	**36"x48"**	**DO NOT PASS**	**2**	**30**	**60**
R4-1-48	48"x60"	DO NOT PASS		39	
R4-7-48	48"x60"	KEEP RIGHT		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-54	54"x18"	ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)		14	
R7-1-12	12"x18"	NO PARKING ANY TIME		11	
R10-6-24	**24"x36"**	**STOP HERE ON RED**	**2**	**16**	**32**
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)		12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)		12	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)		15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT		35	
W1-4-48	**48"x48"**	**REVERSE CURVE RIGHT or LEFT**	**1**	**35**	**35**
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT		35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD		35	
W3-3-48	**48"x48"**	**SIGNAL AHEAD**	**2**	**35**	**70**
W3-4-48	**48"x48"**	**BE PREPARED TO STOP**	**2**	**35**	**70**
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**2**	**35**	**70**
W4-2-48	48"x48"	LANE ENDS RIGHT or LEFT		35	
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC		35	
W8-1-48	**48"x48"**	**BUMP**	**4**	**35**	**140**
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-11-48	**48"x48"**	**UNEVEN LANES**	**2**	**35**	**70**
W8-12-48	48"x48"	NO CENTER LINE		35	
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	**48"x48"**	**TRUCKS ENTERING AHEAD or __ FT or _ MILE**	**2**	**35**	**70**
W8-55-48	**48"x48"**	**TRUCKS CROSSING AHEAD or __ FT or _ MILE**	**2**	**35**	**70**
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W13-1P-30	30"x30"	__ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)		14	
W14-3-64	64"x48"	NO PASSING ZONE		28	
W16-2P-30	**30"x24"**	**__ FEET PLAQUE (Mounted on warning sign post)**	**2**	**10**	**20**
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**2**	**35**	**70**
W20-2-48	48"x48"	DETOUR AHEAD or __ FT or _ MILE		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT or _ MILE		35	
W20-4-48	**48"x48"**	**ONE LANE ROAD AHEAD or __ FT or _ MILE**	**2**	**35**	**70**
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or __ FT or _ MILE		35	
W20-7-48	**48"x48"**	**FLAGGER**	**2**	**35**	**70**
W20-8-18	**18"x18"**	**STOP - SLOW PADDLE Back to Back**	**2**	**5**	**10**
W20-52P-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)		12	
W21-1-48	48"x48"	WORKERS		35	
W21-2-48	**48"x48"**	**FRESH OIL**	**1**	**35**	**35**
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT or _ MILE		35	
W21-5-48	48"x48"	SHOULDER WORK		35	
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT or _ MILE		35	
W21-6-48	48"x48"	SURVEY CREW		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT		35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY		35	
W21-52-48	48"x48"	PAVEMENT BREAKS		35	
W21-53-48	**48"x48"**	**RUMBLE STRIPS AHEAD**	**2**	**35**	**70**
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	
W24-1-48	48"x48"	DOUBLE REVERSE CURVE		35	

SPECIAL SIGNS

Consign 1	**48"x48"**	**XX FT WIDTH AHEAD**	**4**	**35**	**140**
Consign 4	**96"x84"**	**WIDTH RESTRICTION - ND 17 EAST**	**3**	**87**	**261**
Consign 5	**96"x84"**	**WIDTH RESTRICTION - ND 17 WEST**	**2**	**87**	**174**

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**2235**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	**FLAGGING**	**MHR**	**75**
704-1018	**LANE CLOSURE-SIGNAL CONTROL/FLAGGING CONTROL**	**EACH**	**1**
704-1043	**ATTENUATION DEVICE-TYPE B-65**	**EACH**	**2**
704-1048	**PORTABLE RUMBLE STRIPS**	**EACH**	**2**
704-1050	TYPE I BARRICADES	EACH	
704-1052	**TYPE III BARRICADES**	**EACH**	**2**
704-1060	**DELINEATOR DRUMS**	**EACH**	**10**
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**15**
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1080	STACKABLE VERTICAL PANELS	EACH	
704-1081	VERTICAL PANELS - BACK TO BACK	EACH	
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH	
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH	
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH	
704-1500	**OBLITERATION OF PVMT MK**	**SF**	**860**
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
704-3511	**STATE FURNISHED MEDIAN BARRIER**	**LF**	**310**
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0422	**SHORT TERM 6IN LINE-TYPE R**	**LF**	**3146**
762-0426	**SHORT TERM 24IN LINE-TYPE R**	**LF**	**24**
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF	
762-0432	**SHORT TERM 6IN LINE-TYPE NR**	**LF**	**495**

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

REGISTERED PROFESSIONAL ENGINEER
STEVEN L. STRACK
PE-10621
DATE
NORTH DAKOTA

6/10/2025

Traffic Control Devices List
Site 2 - Structure No. 17-042.967
Structure Repairs
ND State Highway 17
4.5 Miles East of Cando

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	100	3

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE		35	
G20-1-60	60"x24"	ROAD WORK NEXT __ MILES		28	
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)		18	
G20-2-48	**48"x24"**	**END ROAD WORK**	**2**	**26**	**52**
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)		18	
G20-4b-36	36"x30"	WAIT FOR PILOT CAR		18	
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS		43	
G20-52a-72	72"x24"	ROAD WORK NEXT __ MILES RT or LT ARROW		36	
G20-55-96	**96"x48"**	**SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT**	**2**	**59**	**118**
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		11	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)		7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)		7	
R1-1-48	**48"x48"**	**STOP**	**2**	**32**	**64**
R1-2-60	60"x60"	YIELD		29	
R2-1-36	**36"x48"**	**SPEED LIMIT __ (Portable only)**	**4**	**30**	**120**
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**6**	**39**	**234**
R2-1aP-24	**24"x18"**	**MINIMUM FEE $80 (Mounted on Speed Limit post)**	**4**	**10**	**40**
R3-2-48	48"x48"	NO LEFT TURN		35	
R4-1-36	**36"x48"**	**DO NOT PASS**	**2**	**30**	**60**
R4-1-48	48"x60"	DO NOT PASS		39	
R4-7-48	48"x60"	KEEP RIGHT		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-54	54"x18"	ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)		14	
R7-1-12	12"x18"	NO PARKING ANY TIME		11	
R10-6-24	**24"x36"**	**STOP HERE ON RED**	**2**	**16**	**32**
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)		12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)		12	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)		15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT		35	
W1-4-48	**48"x48"**	**REVERSE CURVE RIGHT or LEFT**	**1**	**35**	**35**
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT		35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD		35	
W3-3-48	**48"x48"**	**SIGNAL AHEAD**	**2**	**35**	**70**
W3-4-48	**48"x48"**	**BE PREPARED TO STOP**	**2**	**35**	**70**
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**2**	**35**	**70**
W4-2-48	48"x48"	LANE ENDS RIGHT or LEFT		35	
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC		35	
W8-1-48	**48"x48"**	**BUMP**	**4**	**35**	**140**
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-11-48	**48"x48"**	**UNEVEN LANES**	**2**	**35**	**70**
W8-12-48	48"x48"	NO CENTER LINE		35	
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	**48"x48"**	**TRUCKS ENTERING AHEAD or __ FT or _ MILE**	**2**	**35**	**70**
W8-55-48	**48"x48"**	**TRUCKS CROSSING AHEAD or __ FT or _ MILE**	**2**	**35**	**70**
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W13-1P-30	30"x30"	__ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)		14	
W14-3-64	64"x48"	NO PASSING ZONE		28	
W16-2P-30	**30"x24"**	**__ FEET PLAQUE (Mounted on warning sign post)**	**2**	**10**	**20**
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**2**	**35**	**70**
W20-2-48	48"x48"	DETOUR AHEAD or __ FT or _ MILE		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT or _ MILE		35	
W20-4-48	**48"x48"**	**ONE LANE ROAD AHEAD or __ FT or _ MILE**	**2**	**35**	**70**
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or __ FT or _ MILE		35	
W20-7-48	**48"x48"**	**FLAGGER**	**2**	**35**	**70**
W20-8-18	**18"x18"**	**STOP - SLOW PADDLE Back to Back**	**2**	**5**	**10**
W20-52P-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)		12	
W21-1-48	48"x48"	WORKERS		35	
W21-2-48	**48"x48"**	**FRESH OIL**	**1**	**35**	**35**
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT or _ MILE		35	
W21-5-48	48"x48"	SHOULDER WORK		35	
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT or _ MILE		35	
W21-6-48	48"x48"	SURVEY CREW		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT		35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY		35	
W21-52-48	48"x48"	PAVEMENT BREAKS		35	
W21-53-48	**48"x48"**	**RUMBLE STRIPS AHEAD**	**2**	**35**	**70**
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	
W24-1-48	48"x48"	DOUBLE REVERSE CURVE		35	

SPECIAL SIGNS

Consign 1	**48"x48"**	**XX FT WIDTH AHEAD**	**4**	**35**	**140**
Consign 6	**96"x84"**	**WIDTH RESTRICTION - ND 19 EAST**	**3**	**87**	**261**
Consign 7	**96"x84"**	**WIDTH RESTRICTION - ND 19 WEST**	**3**	**87**	**261**

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**2322**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	**FLAGGING**	**MHR**	**75**
704-1018	**LANE CLOSURE-SIGNAL CONTROL/FLAGGING CONTROL**	**EACH**	**1**
704-1043	**ATTENUATION DEVICE-TYPE B-65**	**EACH**	**2**
704-1048	**PORTABLE RUMBLE STRIPS**	**EACH**	**2**
704-1050	TYPE I BARRICADES	EACH	
704-1052	**TYPE III BARRICADES**	**EACH**	**2**
704-1060	**DELINEATOR DRUMS**	**EACH**	**10**
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**15**
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1080	STACKABLE VERTICAL PANELS	EACH	
704-1081	VERTICAL PANELS - BACK TO BACK	EACH	
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH	
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH	
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH	
704-1500	**OBLITERATION OF PVMT MK**	**SF**	**735**
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
704-3511	**STATE FURNISHED MEDIAN BARRIER**	**LF**	**280**
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0422	**SHORT TERM 6IN LINE-TYPE R**	**LF**	**3088**
762-0426	**SHORT TERM 24IN LINE-TYPE R**	**LF**	**24**
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF	
762-0432	**SHORT TERM 6IN LINE-TYPE NR**	**LF**	**565**

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

REGISTERED PROFESSIONAL ENGINEER
STEVEN L. STRACK
PE-10621
DATE
NORTH DAKOTA
6/10/2025

Traffic Control Devices List
Site 3 - Structure No. 19-118.258
Structure Repairs
ND State Highway 19
15 Miles West of Minnewaukan

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	100	4

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE		35	
G20-1-60	60"x24"	ROAD WORK NEXT __ MILES		28	
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)		18	
G20-2-48	**48"x24"**	**END ROAD WORK**	**2**	**26**	**52**
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)		18	
G20-4b-36	36"x30"	WAIT FOR PILOT CAR		18	
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS		43	
G20-52a-72	72"x24"	ROAD WORK NEXT __ MILES RT or LT ARROW		36	
G20-55-96	**96"x48"**	**SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT**	**2**	**59**	**118**
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		11	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)		7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)		7	
R1-1-48	**48"x48"**	**STOP**	**2**	**32**	**64**
R1-2-60	60"x60"	YIELD		29	
R2-1-36	**36"x48"**	**SPEED LIMIT __ (Portable only)**	**4**	**30**	**120**
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**5**	**39**	**195**
R2-1aP-24	**24"x18"**	**MINIMUM FEE $80 (Mounted on Speed Limit post)**	**3**	**10**	**30**
R3-2-48	48"x48"	NO LEFT TURN		35	
R4-1-48	48"x60"	DO NOT PASS		39	
R4-7-48	48"x60"	KEEP RIGHT		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-54	54"x18"	ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)		14	
R7-1-12	12"x18"	NO PARKING ANY TIME		11	
R10-6-24	**24"x36"**	**STOP HERE ON RED**	**2**	**16**	**32**
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)		12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)		12	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)		15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT		35	
W1-4-48	**48"x48"**	**REVERSE CURVE RIGHT or LEFT**	**1**	**35**	**35**
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT		35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD		35	
W3-3-48	**48"x48"**	**SIGNAL AHEAD**	**2**	**35**	**70**
W3-4-48	**48"x48"**	**BE PREPARED TO STOP**	**2**	**35**	**70**
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**2**	**35**	**70**
W4-2-48	48"x48"	LANE ENDS RIGHT or LEFT		35	
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC		35	
W8-1-48	48"x48"	BUMP		35	
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-11-48	48"x48"	UNEVEN LANES		35	
W8-12-48	48"x48"	NO CENTER LINE		35	
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	**48"x48"**	**TRUCKS ENTERING AHEAD or __ FT or _ MILE**	**2**	**35**	**70**
W8-55-48	**48"x48"**	**TRUCKS CROSSING AHEAD or __ FT or _ MILE**	**2**	**35**	**70**
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W13-1P-30	30"x30"	__ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)		14	
W14-3-64	64"x48"	NO PASSING ZONE		28	
W16-2P-30	**30"x24"**	**__ FEET PLAQUE (Mounted on warning sign post)**	**2**	**10**	**20**
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**2**	**35**	**70**
W20-2-48	48"x48"	DETOUR AHEAD or __FT or _MILE		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT or _ MILE		35	
W20-4-48	**48"x48"**	**ONE LANE ROAD AHEAD or __ FT or _ MILE**	**2**	**35**	**70**
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or __ FT or _ MILE		35	
W20-7-48	**48"x48"**	**FLAGGER**	**2**	**35**	**70**
W20-8-18	**18"x18"**	**STOP - SLOW PADDLE Back to Back**	**2**	**5**	**10**
W20-52P-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)		12	
W21-1-48	48"x48"	WORKERS		35	
W21-2-48	48"x48"	FRESH OIL		35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT or _ MILE		35	
W21-5-48	48"x48"	SHOULDER WORK		35	
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT or _ MILE		35	

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

SPECIAL SIGNS

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**1236**

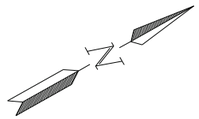
SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	**FLAGGING**	**MHR**	**100**
704-1018	**LANE CLOSURE-SIGNAL CONTROL/FLAGGING CONTROL**	**EACH**	**1**
704-1039	**ATTENUATION DEVICE-TYPE B-45**	**EACH**	**2**
704-1048	PORTABLE RUMBLE STRIPS	EACH	
704-1050	TYPE I BARRICADES	EACH	
704-1052	**TYPE III BARRICADES**	**EACH**	**4**
704-1060	**DELINEATOR DRUMS**	**EACH**	**10**
704-1065	TRAFFIC CONES	EACH	
704-1067	TUBULAR MARKERS	EACH	
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1080	STACKABLE VERTICAL PANELS	EACH	
704-1081	VERTICAL PANELS - BACK TO BACK	EACH	
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH	
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH	
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH	
704-1500	**OBLITERATION OF PVMT MK**	**SF**	**1740**
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
704-3511	**STATE FURNISHED MEDIAN BARRIER**	**LF**	**500**
704-4011	**PORTABLE CHANGEABLE MESSAGE SIGN**	**EACH**	**4**
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0422	**SHORT TERM 6IN LINE-TYPE R**	**LF**	**3288**
762-0426	**SHORT TERM 24IN LINE-TYPE R**	**LF**	**24**
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF	
762-0432	SHORT TERM 6IN LINE-TYPE NR	LF	

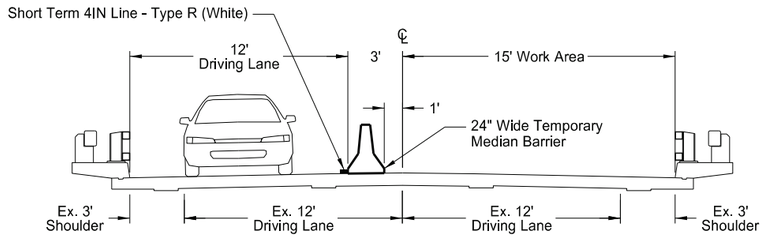
NOTE:
If additional signs are required, units will be calculated using the formula from Section III-18.06 of the Design Manual.
http://www.dot.nd.gov/

REGISTERED PROFESSIONAL ENGINEER
STEVEN L. STRACK
PE-10621
DATE
NORTH DAKOTA
6/10/2025

Traffic Control Devices List
Site 4 - Structure No. 52-222.340
Structure Repairs
US Highway 52
Carrington

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	100	5

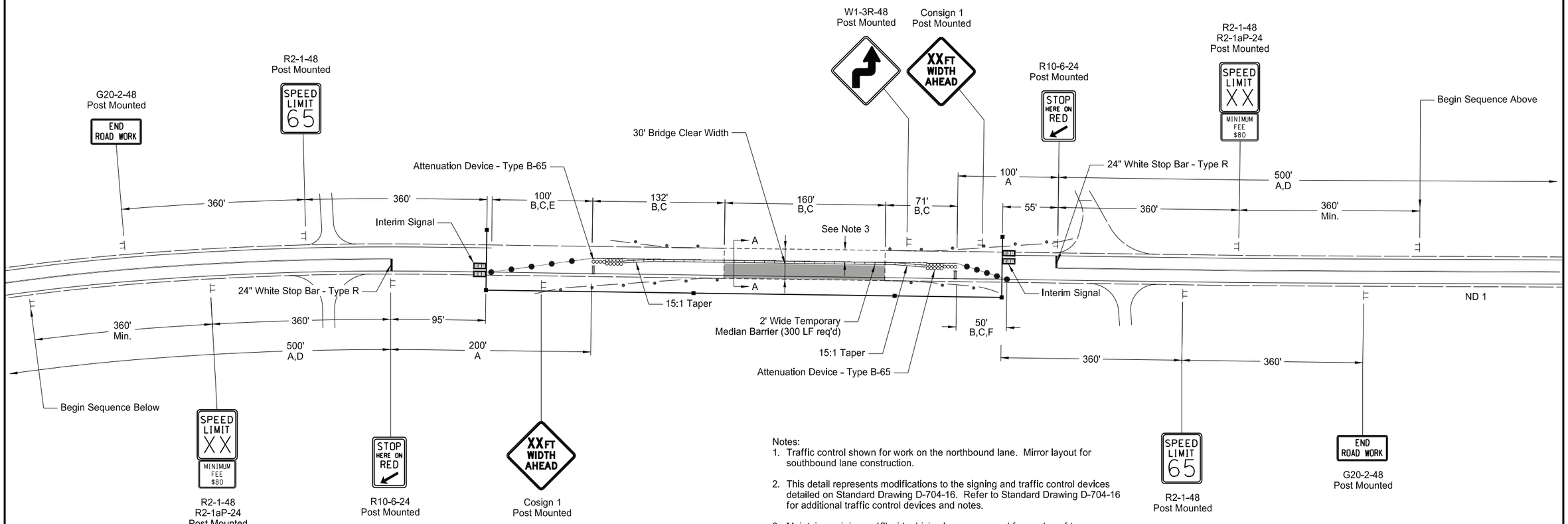


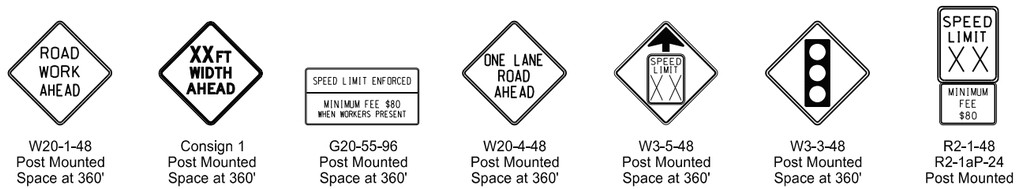


Section A-A

Northbound lane closure shown. Mirror for southbound lane closure.

Sign Sequence





Sign Sequence

Notes:
1. Traffic control shown for work on the northbound lane. Mirror layout for southbound lane construction.
2. This detail represents modifications to the signing and traffic control devices detailed on Standard Drawing D-704-16. Refer to Standard Drawing D-704-16 for additional traffic control devices and notes.
3. Maintain a minimum 12' wide driving lane, measured from edge of temporary barrier to edge of bridge barrier.
4. Use Standard Drawings D-704-17 and D-704-33 when flagging is necessary to install, reset, or remove interim traffic signals, attenuation devices, temporary barrier, W-beam guardrail, temporary pavement markings, and for milling and paving operations at the bridge ends.
5. When flaggers are present, use portable rumble strips (PRS).

LEGEND

	Type III Barricade	●	Delineator Drum
⊢	Sign	■	Wood Post
	Work Area		

A	Obliteration of Pavement Marking (℄)
B	Obliteration of Pavement Marking (Edge Line)
C	Short Term 6IN Line - Type R (White)
D	Short Term 6IN Line - Type R (Double Yellow)
E	Drums Spaced @ 20' Centers
F	Drums Spaced @ 10' Centers

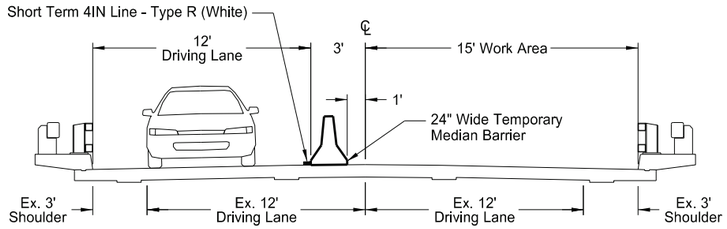
Temporary Traffic Control
Site 1 - Structure No. 01-143.430
Sheyenne River Crossing

Structure Repairs
ND 1
2.5 Miles South of Pekin

REGISTERED PROFESSIONAL ENGINEER
STEVEN L. STRACK
PE-10621
DATE
NORTH DAKOTA
6/10/2025

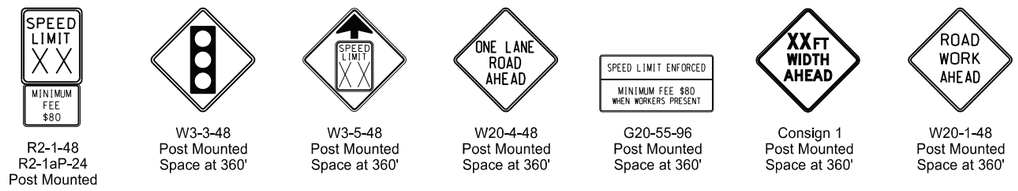
6/3/2025 1:56:30 PM kstrecker H:\JBN\3900\3950\3950_0332 PCN 23420 Devils Lake Structures\CAD\30999051.143\dgn\Design\Sheets\100WZ_ConSign_Site 1.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	100	6

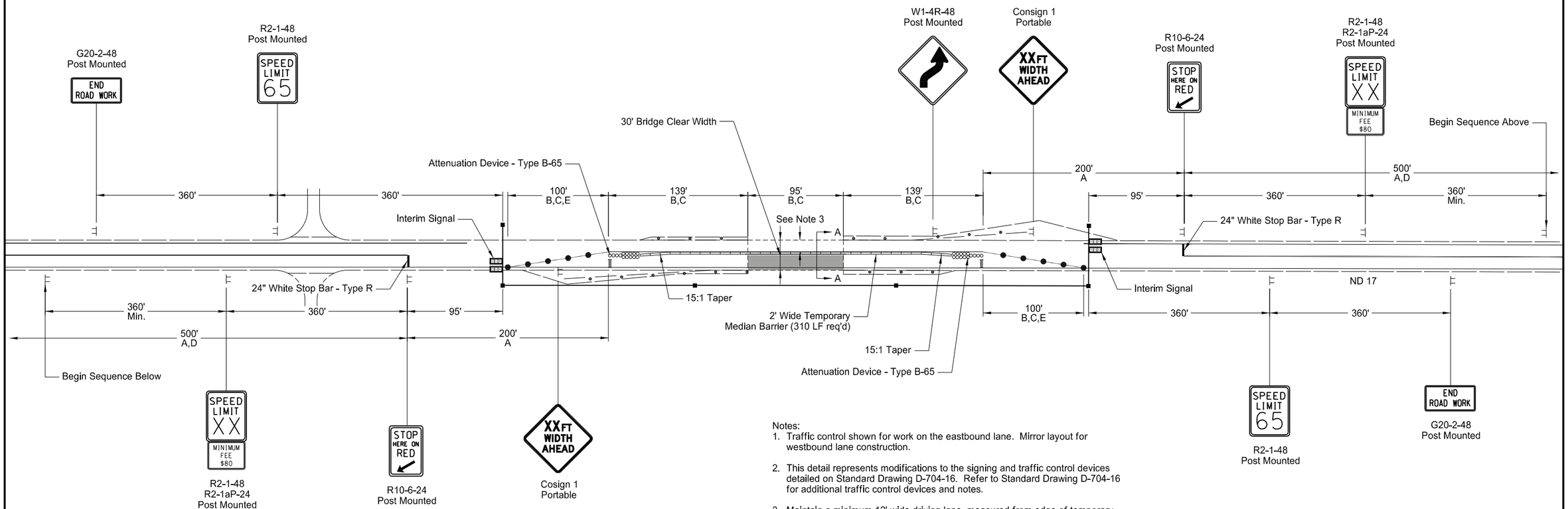


Section A-A

Eastbound lane closure shown. Mirror for westbound lane closure.



Sign Sequence



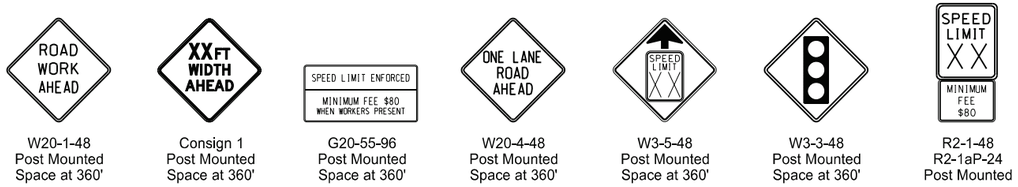
Notes:

1. Traffic control shown for work on the eastbound lane. Mirror layout for westbound lane construction.
2. This detail represents modifications to the signing and traffic control devices detailed on Standard Drawing D-704-16. Refer to Standard Drawing D-704-16 for additional traffic control devices and notes.
3. Maintain a minimum 12' wide driving lane, measured from edge of temporary barrier to edge of bridge barrier.
4. Use Standard Drawings D-704-17 and D-704-33 when flagging is necessary to install, reset, or remove interim traffic signals, attenuation devices, temporary barrier, W-beam guardrail, temporary pavement markings, and for milling and paving operations at the bridge ends.
5. When flaggers are present, use portable rumble strips (PRS).

LEGEND

	Type III Barricade	●	Delineator Drum
⊢	Sign	■	Wood Post
	Work Area		

A	Obliteration of Pavement Marking (℄)
B	Obliteration of Pavement Marking (Edge Line)
C	Short Term 6IN Line - Type R (White)
D	Short Term 6IN Line - Type R (Double Yellow)
E	Drums Spaced @ 20' Centers



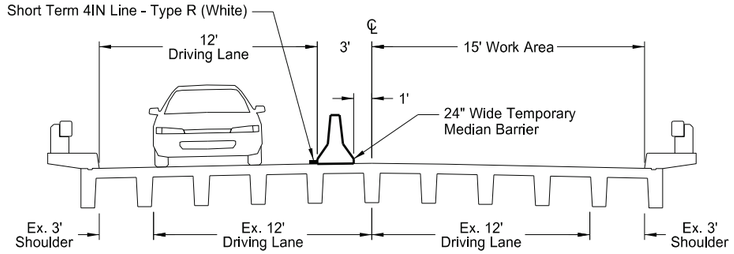
Sign Sequence

Temporary Traffic Control
Site 2 - Structure No. 17-042.967
Mauvais Coulee Crossing

Structure Repairs
ND 17
4.5 Miles East of Cando

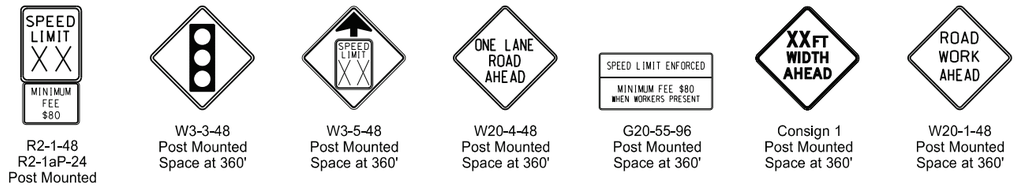
REGISTERED PROFESSIONAL ENGINEER
STEVEN L. STRACK
PE-10621
DATE
NORTH DAKOTA
6/10/2025

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	100	7

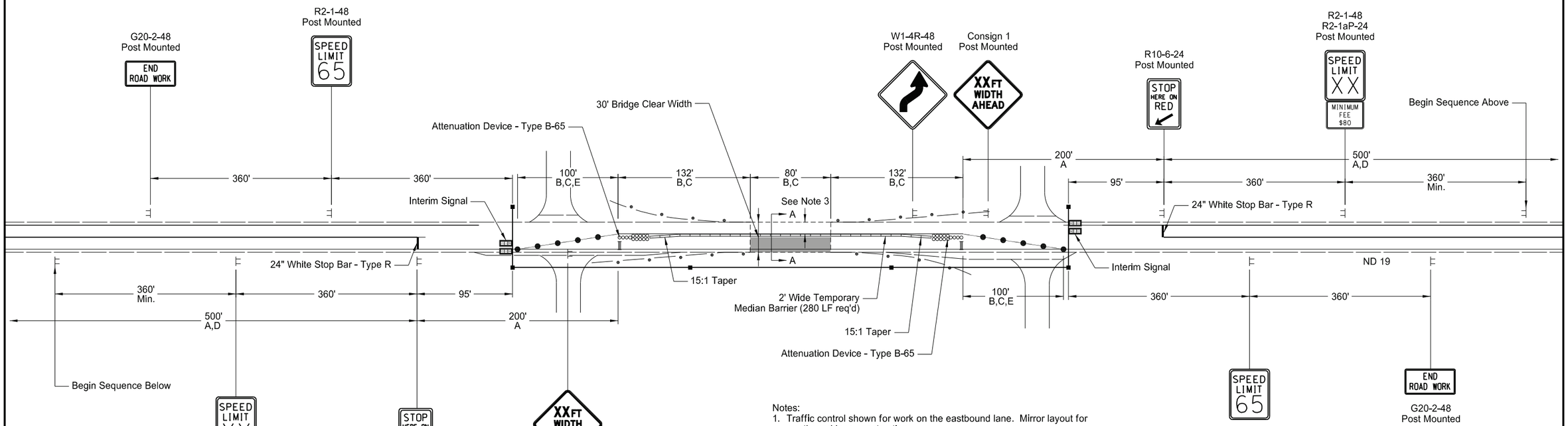


Section A-A

Eastbound lane closure shown. Mirror for westbound lane closure.

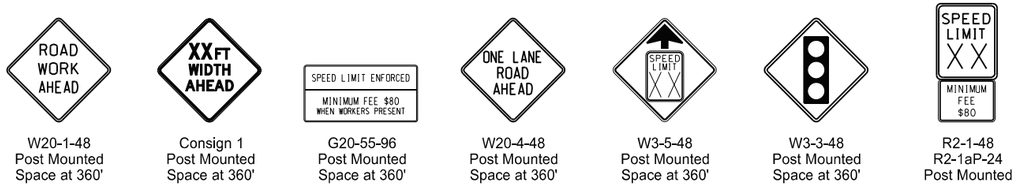


Sign Sequence



Notes:

1. Traffic control shown for work on the eastbound lane. Mirror layout for westbound lane construction.
2. This detail represents modifications to the signing and traffic control devices detailed on Standard Drawing D-704-16. Refer to Standard Drawing D-704-16 for additional traffic control devices and notes.
3. Maintain a minimum 12' wide driving lane, measured from edge of temporary barrier to edge of bridge barrier.
4. Use Standard Drawings D-704-17 and D-704-33 when flagging is necessary to install, reset, or remove interim traffic signals, attenuation devices, temporary barrier, W-beam guardrail, temporary pavement markings, and for milling and paving operations at the bridge ends.
5. When flaggers are present, use portable rumble strips (PRS).



Sign Sequence

LEGEND

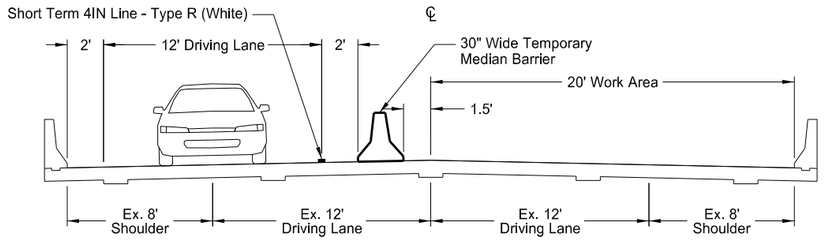
	Type III Barricade	●	Delineator Drum
⊢	Sign	■	Wood Post
	Work Area		

A	Obliteration of Pavement Marking (℄)
B	Obliteration of Pavement Marking (Edge Line)
C	Short Term 6IN Line - Type R (White)
D	Short Term 6IN Line - Type R (Double Yellow)
E	Drums Spaced @ 20' Centers

Temporary Traffic Control
Site 3 - Structure No. 19-118.258
Big Coulee Crossing

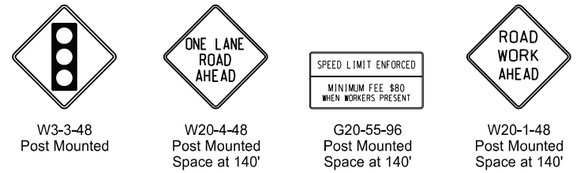
Structure Repairs
ND 19
15 Miles West of Minnewaukan

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	100	8



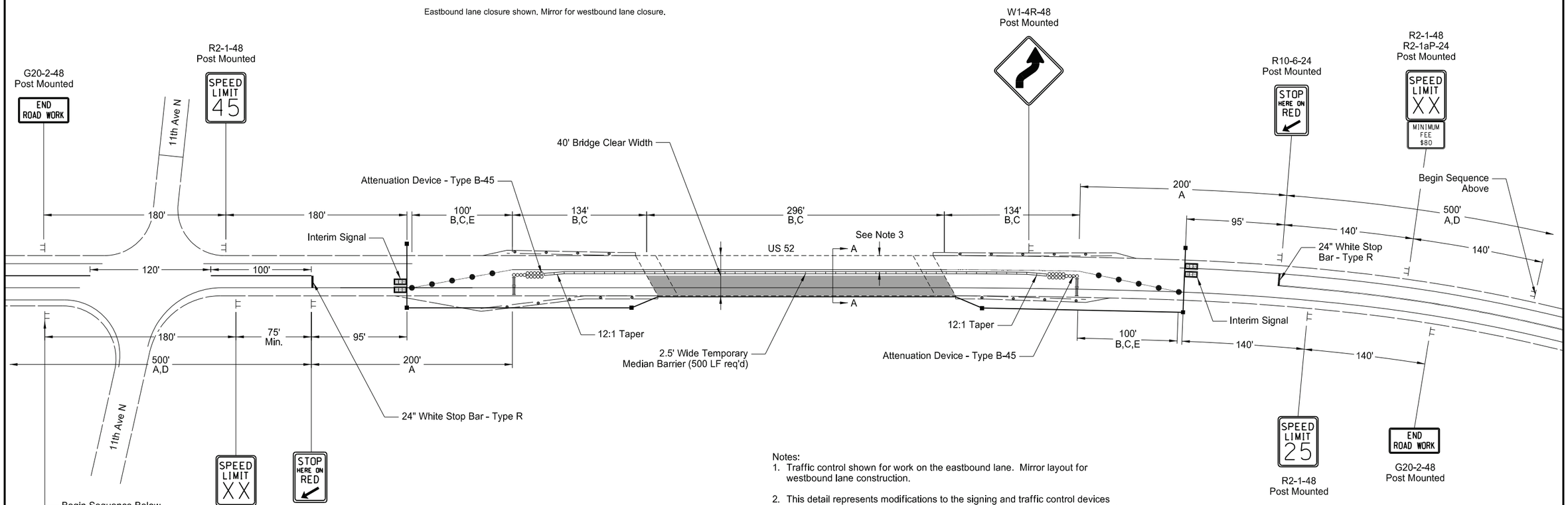
Section A-A

Eastbound lane closure shown. Mirror for westbound lane closure.



W3-3-48 Post Mounted
W20-4-48 Post Mounted Space at 140'
G20-55-96 Post Mounted Space at 140'
W20-1-48 Post Mounted Space at 140'

Sign Sequence



Notes:
1. Traffic control shown for work on the eastbound lane. Mirror layout for westbound lane construction.
2. This detail represents modifications to the signing and traffic control devices detailed on Standard Drawing D-704-16. Refer to Standard Drawing D-704-16 for additional traffic control devices and notes.
3. Maintain a minimum separation of 16' from edge of temporary barrier to edge of bridge barrier. Maintain a minimum 12' wide driving lane with 2' of separation between white edge line and edge of bridge/temporary barrier.
4. Use Standard Drawings D-704-15 Layout Type A and D-704-17 when flagging is necessary to install, reset, or remove interim traffic signals, attenuation devices, temporary barrier, and temporary pavement markings.

W20-1-48 Post Mounted Space at 180'
G20-55-96 Post Mounted Space at 180'
W20-4-48 Post Mounted Space at 180'
W3-5-48 Post Mounted Space at 180'
W3-3-48 Post Mounted Space at 180'
R2-1-48 R2-1aP-24 Post Mounted

Sign Sequence

LEGEND

	Type III Barricade	●	Delineator Drum
⊢	Sign	■	Wood Post
	Work Area		
A	Obliteration of Pavement Marking (℄)		
B	Obliteration of Pavement Marking (Edge Line)		
C	Short Term 6IN Line - Type R (White)		
D	Short Term 6IN Line - Type R (Double Yellow)		
E	Drums Spaced @ 20' Centers		

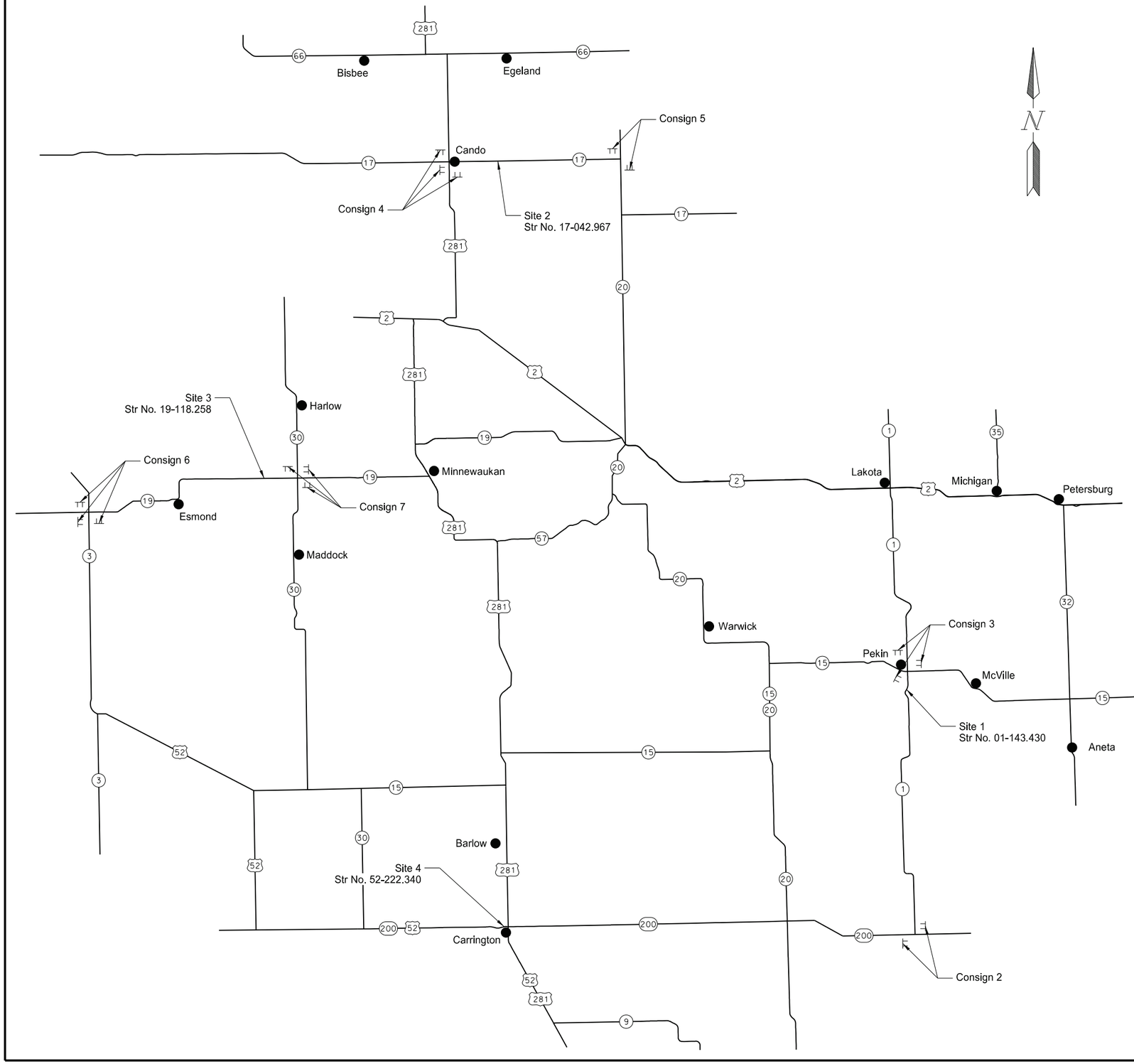
Temporary Traffic Control
Site 4 - Structure No. 52-222.340
CP Railway Crossing

Structure Repairs
US 52
North Side of Carrington ND

REGISTERED PROFESSIONAL ENGINEER
STEVEN L. STRACK
PE-10621
DATE
NORTH DAKOTA
6/10/2025

6/3/2025 1:56:31 PM kstrecker H:\JBN\3900\3950\3950_0332 PCN 23420 Devils Lake Structures\CAD\30999051.143\dgn\Design\Sheets\100WZ_ConSign_Site 4.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	100	9



Notes:

1. Sign locations to be verified in the field by the Engineer prior to installation.
2. Signs to be in place prior to, but no more than seven days in advance of restricted width conditions. Immediately remove or cover when width restrictions are no longer present.
3. Refer to "Width Restriction Construction Sign Details" sheets for sign information.

Temporary Traffic Control
Width Restriction Signing

Structure Repairs
ND State Highways 1, 17, & 19
Multiple Locations

REGISTERED PROFESSIONAL ENGINEER
STEVEN L. STRACK
PE-10621
DATE
NORTH DAKOTA

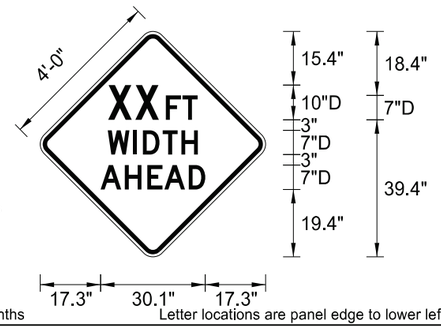
6/10/2025

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(501)	100	10

SIGN NUMBER	Consign 1
WIDTH X HEIGHT	4'-0" x 4'-0"
BORDER WIDTH	1.25" (inset 0.75")
CORNER RADIUS	3"
MOUNTING	Ground
BACKGROUND	TYPE: XI Reflective
	COLOR: Fluorescent Orange
LEGEND/BORDER	TYPE: Non-Reflective
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE

STATION(S): AREA: 16.0 Sq.Ft.



Note:
Install 24-inch square flags on all sign assemblies that contain Consign 1.

Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

PANEL STYLE: ND_Const_48_Large_Diam.ssl

LETTER POSITION (X)																			LENGTH	SIZE	SERIES
X	X	F	T																25.7	10,7	D 2000
19.5	27.3	36.1	40.9																		
W	I	D	T	H															25,9	7	D 2000
19.4	26.7	29,5	35.2	40.6																	
A	H	E	A	D															30.1	7	D 2000
17.3	24.3	30.8	35.7	42.7																	

Temporary Traffic Control
Width Restriction Construction Sign Details

Structure Repairs
ND State Highways 1, 17, & 19
Multiple Locations

REGISTERED PROFESSIONAL ENGINEER
STEVEN L. STRACK
PE-10621
DATE
NORTH DAKOTA

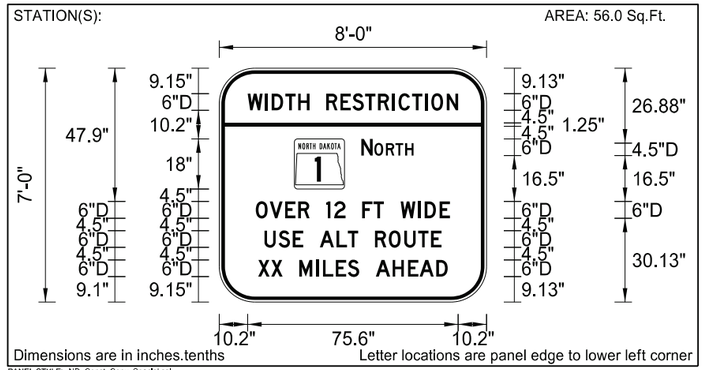
6/10/2025

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(501)	100	11

SIGN NUMBER	Consign 2
WIDTH X HEIGHT	8'-0" x 7'-0"
BORDER WIDTH	1.25" (inset 0.75")
CORNER RADIUS	12"
MOUNTING	Ground
BACKGROUND	TYPE: XI Reflective
	COLOR: Fluorescent Orange
LEGEND/BORDER	TYPE: Non-Reflective
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE
ND_M1-5_2	27	40.6	18	18	0

STATION(S): AREA: 56.0 Sq.Ft.



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

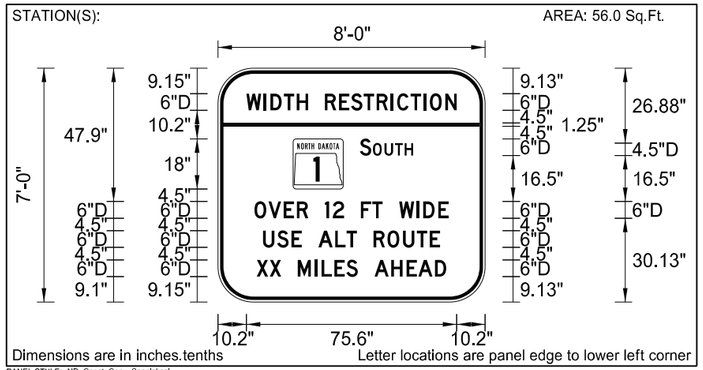
PANEL STYLE: ND_Const_Conv_Special.ssl

LETTER POSITION (X)																			LENGTH	SIZE	SERIES
W	I	D	T	H	R	E	S	T	R	I	C	T	I	O	N				75.6	6	D 2000
10.2	16.4	18.8	23.7	28.3	38.4	43.5	47.8	52.4	57	62.1	64.4	69.2	73.9	76.1	81.7						
N	O	R	T	H															18.8	6,4.5	D 2000
51	55.7	59.9	63.3	66.8																	
O	V	E	R	1	2	F	T	W	I	D	E								69.8	6	D 2000
13.1	18.2	23.6	28.4	38.4	41.3	51.3	55.4	65.1	71.4	73.8	79.2										
U	S	E	A	L	T	R	O	U	T	E									63.6	6	D 2000
16.2	21.3	26.4	36.1	42.1	46.2	55.9	60.9	66.5	71.5	76.1											
X	X	M	I	L	E	S	A	H	E	A	D								68.1	6	D 2000
14	18.6	28.7	34.8	37.2	41.9	46.2	56.3	62.3	67.8	72	78										

SIGN NUMBER	Consign 3
WIDTH X HEIGHT	8'-0" x 7'-0"
BORDER WIDTH	1.25" (inset 0.75")
CORNER RADIUS	12"
MOUNTING	Ground
BACKGROUND	TYPE: XI Reflective
	COLOR: Fluorescent Orange
LEGEND/BORDER	TYPE: Non-Reflective
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE
ND_M1-5_2	27	40.6	18	18	0

STATION(S): AREA: 56.0 Sq.Ft.



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

PANEL STYLE: ND_Const_Conv_Special.ssl

LETTER POSITION (X)																			LENGTH	SIZE	SERIES
W	I	D	T	H	R	E	S	T	R	I	C	T	I	O	N				75.6	6	D 2000
10.2	16.4	18.8	23.7	28.3	38.4	43.5	47.8	52.4	57	62.1	64.4	69.2	73.9	76.1	81.7						
S	O	U	T	H															19.1	6,4.5	D 2000
51	55.7	59.9	63.6	67.1																	
O	V	E	R	1	2	F	T	W	I	D	E								69.8	6	D 2000
13.1	18.2	23.6	28.4	38.4	41.3	51.3	55.4	65.1	71.4	73.8	79.2										
U	S	E	A	L	T	R	O	U	T	E									63.6	6	D 2000
16.2	21.3	26.4	36.1	42.1	46.2	55.9	60.9	66.5	71.5	76.1											
X	X	M	I	L	E	S	A	H	E	A	D								68.1	6	D 2000
14	18.6	28.7	34.8	37.2	41.9	46.2	56.3	62.3	67.8	72	78										

Temporary Traffic Control
Width Restriction Construction Sign Details
Site 1 - Structure No. 01-143.430
Sheyenne River Crossing

Structure Repairs
ND State Highway 1
2.5 Miles South of Pekin

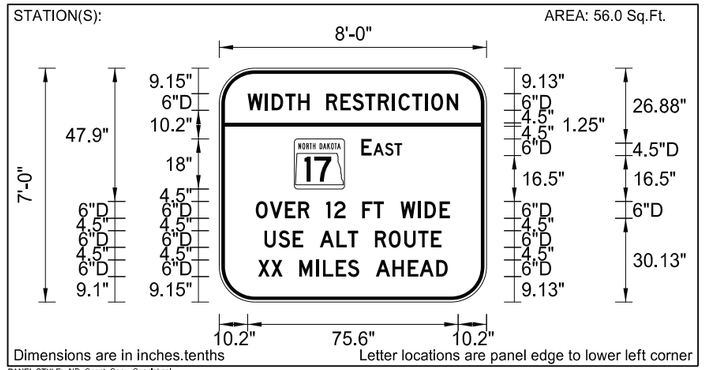
REGISTERED PROFESSIONAL ENGINEER
STEVEN L. STRACK
PE-10621
DATE
NORTH DAKOTA
6/10/2025

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(501)	100	12

SIGN NUMBER	Consign 4
WIDTH X HEIGHT	8'-0" x 7'-0"
BORDER WIDTH	1.25" (inset 0.75")
CORNER RADIUS	12"
MOUNTING	Ground
BACKGROUND	TYPE: XI Reflective
	COLOR: Fluorescent Orange
LEGEND/BORDER	TYPE: Non-Reflective
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE
ND_M1-5_2	27	40.6	18	18	0

STATION(S): AREA: 56.0 Sq.Ft.



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

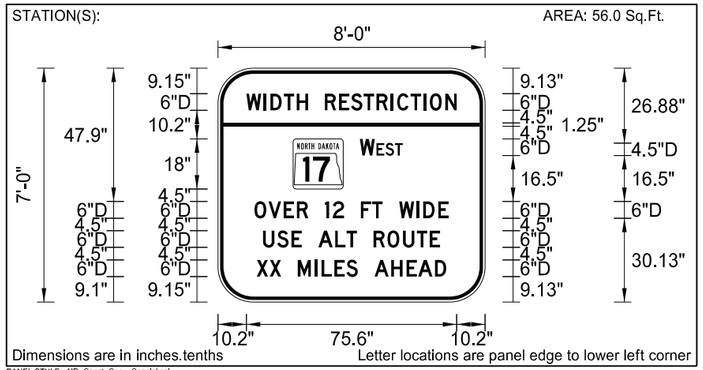
PANEL STYLE: ND_Const_Conv_Special.ssl

LETTER POSITION (X)																			LENGTH	SIZE	SERIES
W	I	D	T	H	R	E	S	T	R	I	C	T	I	O	N				75.6	6	D 2000
10.2	16.4	18.8	23.7	28.3	38.4	43.5	47.8	52.4	57	62.1	64.4	69.2	73.9	76.1	81.7						
E	A	S	T																14.7	6,4.5	D 2000
51	55.3	59.5	62.9																		
O	V	E	R	1	2	F	T	W	I	D	E								69.8	6	D 2000
13.1	18.2	23.6	28.4	38.4	41.3	51.3	55.4	65.1	71.4	73.8	79.2										
U	S	E	A	L	T	R	O	U	T	E									63.6	6	D 2000
16.2	21.3	26.4	36.1	42.1	46.2	55.9	60.9	66.5	71.5	76.1											
X	X	M	I	L	E	S	A	H	E	A	D								68.1	6	D 2000
14	18.6	28.7	34.8	37.2	41.9	46.2	56.3	62.3	67.8	72	78										

SIGN NUMBER	Consign 5
WIDTH X HEIGHT	8'-0" x 7'-0"
BORDER WIDTH	1.25" (inset 0.75")
CORNER RADIUS	12"
MOUNTING	Ground
BACKGROUND	TYPE: XI Reflective
	COLOR: Fluorescent Orange
LEGEND/BORDER	TYPE: Non-Reflective
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE
ND_M1-5_2	27	40.6	18	18	0

STATION(S): AREA: 56.0 Sq.Ft.



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

PANEL STYLE: ND_Const_Conv_Special.ssl

LETTER POSITION (X)																			LENGTH	SIZE	SERIES
W	I	D	T	H	R	E	S	T	R	I	C	T	I	O	N				75.6	6	D 2000
10.2	16.4	18.8	23.7	28.3	38.4	43.5	47.8	52.4	57	62.1	64.4	69.2	73.9	76.1	81.7						
W	E	S	T																15.4	6,4.5	D 2000
51	56.9	60.2	63.6																		
O	V	E	R	1	2	F	T	W	I	D	E								69.8	6	D 2000
13.1	18.2	23.6	28.4	38.4	41.3	51.3	55.4	65.1	71.4	73.8	79.2										
U	S	E	A	L	T	R	O	U	T	E									63.6	6	D 2000
16.2	21.3	26.4	36.1	42.1	46.2	55.9	60.9	66.5	71.5	76.1											
X	X	M	I	L	E	S	A	H	E	A	D								68.1	6	D 2000
14	18.6	28.7	34.8	37.2	41.9	46.2	56.3	62.3	67.8	72	78										

Temporary Traffic Control
Width Restriction Construction Sign Details
Site 2 - Structure No. 17-042.967
Mauvais Coulee Crossing

Structure Repairs
ND State Highway 17
4.5 Miles East of Cando

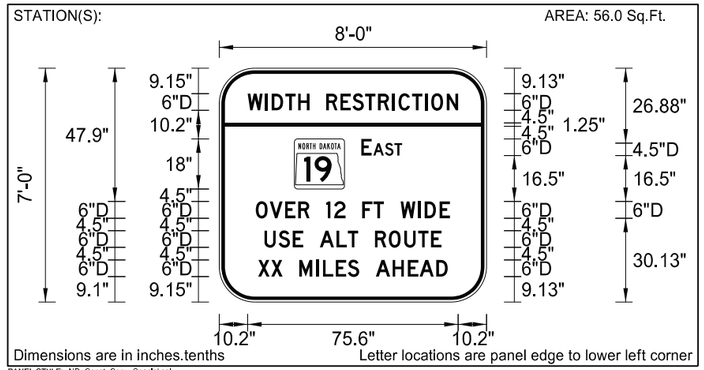
REGISTERED PROFESSIONAL ENGINEER
STEVEN L. STRACK
PE-10621
DATE
NORTH DAKOTA
6/10/2025

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(501)	100	13

SIGN NUMBER	Consign 6
WIDTH X HEIGHT	8'-0" x 7'-0"
BORDER WIDTH	1.25" (inset 0.75")
CORNER RADIUS	12"
MOUNTING	Ground
BACKGROUND	TYPE: XI Reflective
	COLOR: Fluorescent Orange
LEGEND/BORDER	TYPE: Non-Reflective
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE
ND_M1-5_2	27	40.6	18	18	0

STATION(S): AREA: 56.0 Sq.Ft.



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

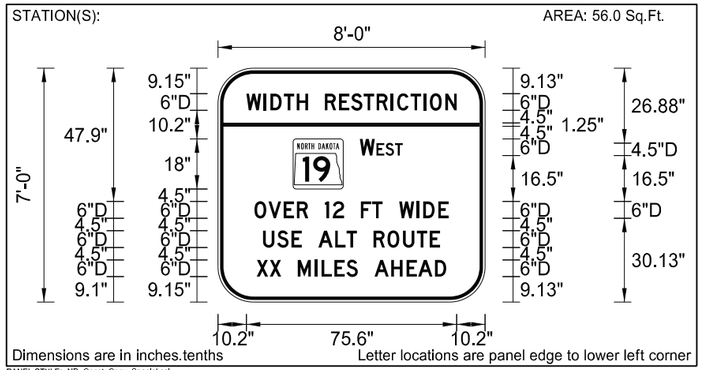
PANEL STYLE: ND_Const_Conv_Special.ssl

LETTER POSITION (X)																			LENGTH	SIZE	SERIES
W	I	D	T	H	R	E	S	T	R	I	C	T	I	O	N				75.6	6	D 2000
10.2	16.4	18.8	23.7	28.3	38.4	43.5	47.8	52.4	57	62.1	64.4	69.2	73.9	76.1	81.7						
E	A	S	T																14.7	6,4.5	D 2000
51	55.3	59.5	62.9																		
O	V	E	R	1	2	F	T	W	I	D	E								69.8	6	D 2000
13.1	18.2	23.6	28.4	38.4	41.3	51.3	55.4	65.1	71.4	73.8	79.2										
U	S	E	A	L	T	R	O	U	T	E									63.6	6	D 2000
16.2	21.3	26.4	36.1	42.1	46.2	55.9	60.9	66.5	71.5	76.1											
X	X	M	I	L	E	S	A	H	E	A	D								68.1	6	D 2000
14	18.6	28.7	34.8	37.2	41.9	46.2	56.3	62.3	67.8	72	78										

SIGN NUMBER	Consign 7
WIDTH X HEIGHT	8'-0" x 7'-0"
BORDER WIDTH	1.25" (inset 0.75")
CORNER RADIUS	12"
MOUNTING	Ground
BACKGROUND	TYPE: XI Reflective
	COLOR: Fluorescent Orange
LEGEND/BORDER	TYPE: Non-Reflective
	COLOR: Black

SYMBOL	X	Y	WID	HT	ANGLE
ND_M1-5_2	27	40.6	18	18	0

STATION(S): AREA: 56.0 Sq.Ft.



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

PANEL STYLE: ND_Const_Conv_Special.ssl

LETTER POSITION (X)																			LENGTH	SIZE	SERIES
W	I	D	T	H	R	E	S	T	R	I	C	T	I	O	N				75.6	6	D 2000
10.2	16.4	18.8	23.7	28.3	38.4	43.5	47.8	52.4	57	62.1	64.4	69.2	73.9	76.1	81.7						
W	E	S	T																15.4	6,4.5	D 2000
51	56.9	60.2	63.6																		
O	V	E	R	1	2	F	T	W	I	D	E								69.8	6	D 2000
13.1	18.2	23.6	28.4	38.4	41.3	51.3	55.4	65.1	71.4	73.8	79.2										
U	S	E	A	L	T	R	O	U	T	E									63.6	6	D 2000
16.2	21.3	26.4	36.1	42.1	46.2	55.9	60.9	66.5	71.5	76.1											
X	X	M	I	L	E	S	A	H	E	A	D								68.1	6	D 2000
14	18.6	28.7	34.8	37.2	41.9	46.2	56.3	62.3	67.8	72	78										

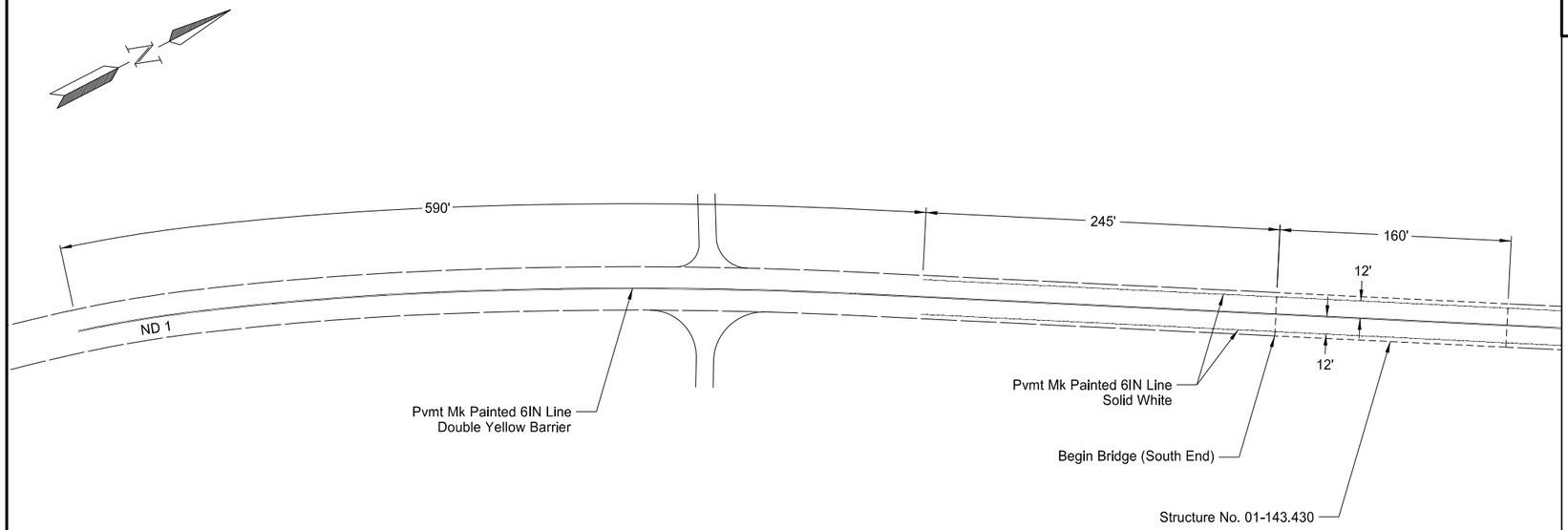
Temporary Traffic Control
Width Restriction Construction Sign Details
Site 3 - Structure No. 19-118.258
Big Coulee Crossing

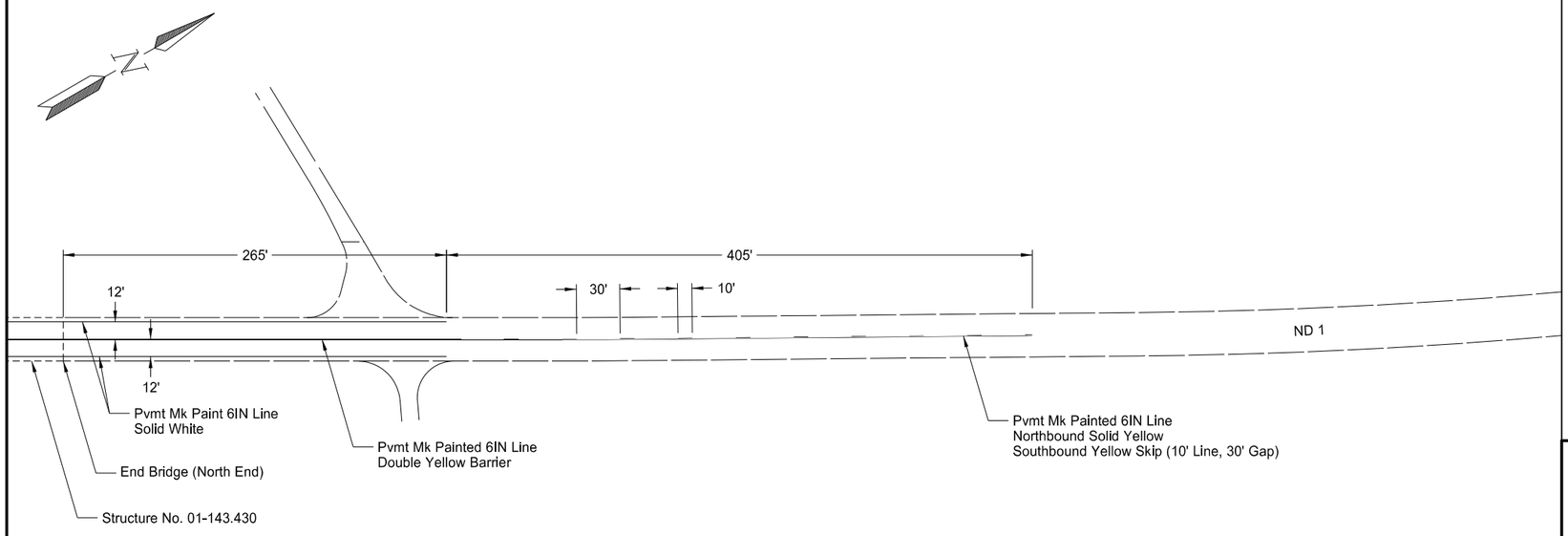
Structure Repairs
ND State Highway 19
15 Miles West of Minnewaukan

REGISTERED PROFESSIONAL ENGINEER
STEVEN L. STRACK
PE-10621
DATE
NORTH DAKOTA
6/10/2025

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	120	1

SPEC	CODE	BID ITEM	QTY	UNIT
762	1106	PVMT MK PAINTED 6IN LINE		
		Centerline Skip	102	LF
		Centerline NB Barrier	405	LF
		Centerline Dbl Barrier	2,520	LF
		Edge Line	1,340	LF



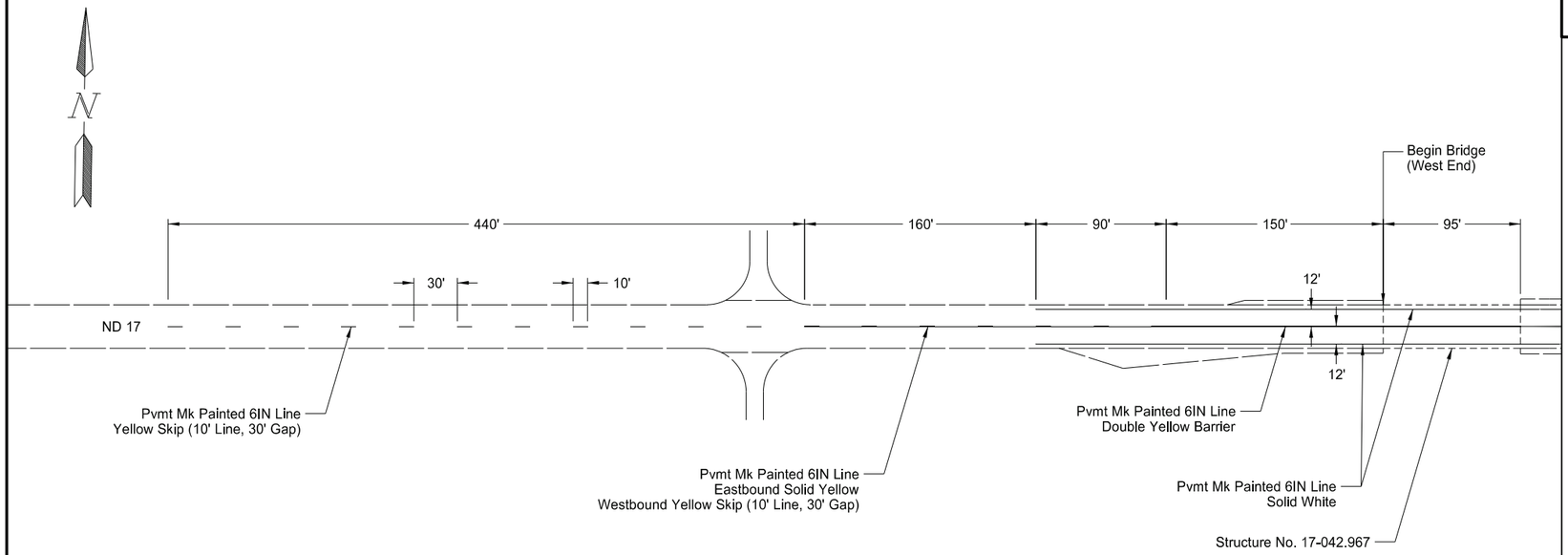


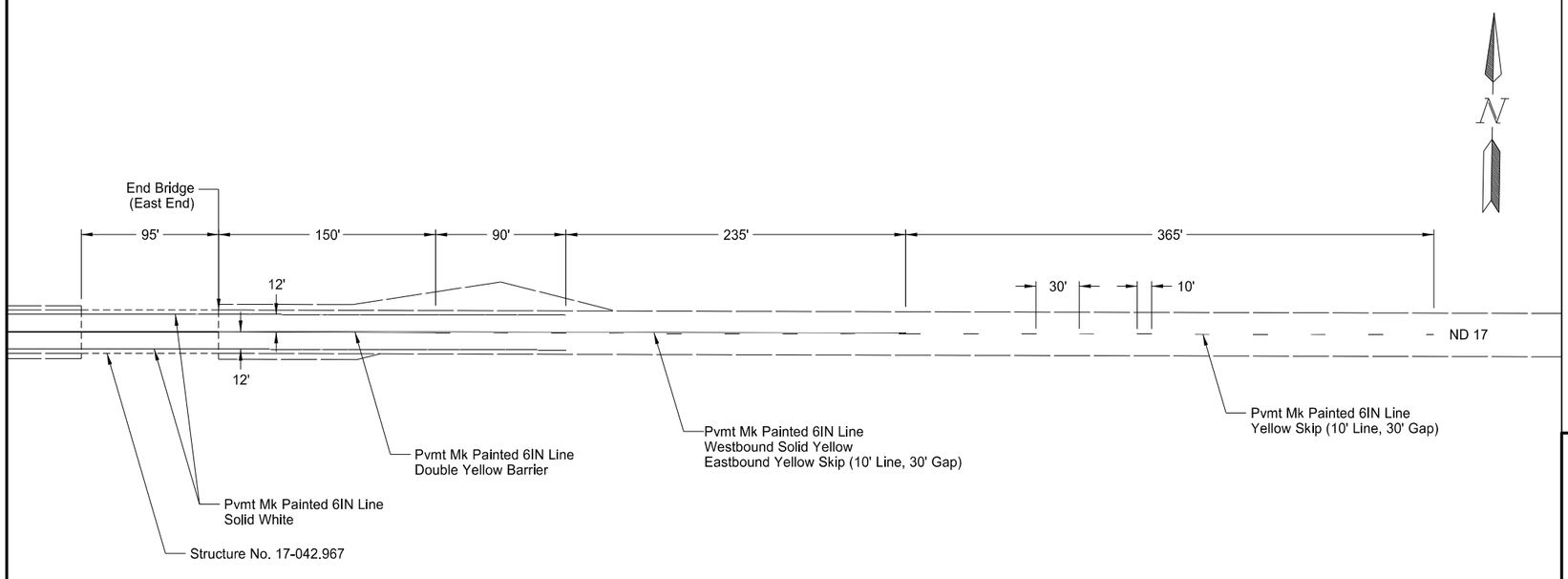
Pavement Markings
Site 1- Structure No. 01-143.430
Sheyenne River Crossing

Structure Repairs
ND 1
2.5 Miles South of Pekin

REGISTERED PROFESSIONAL ENGINEER
STEVEN L. STRACK
PE-10621
DATE
NORTH DAKOTA
6/9/2025

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	120	2





SPEC	CODE	BID ITEM	QTY	UNIT
762	1106	PVMT MK PAINTED 6IN LINE		
		Centerline Skip	345	LF
		Centerline EB Barrier	250	LF
		Centerline WB Barrier	325	LF
		Centerline Dbl Barrier	790	LF
		Edge Line	1,150	LF

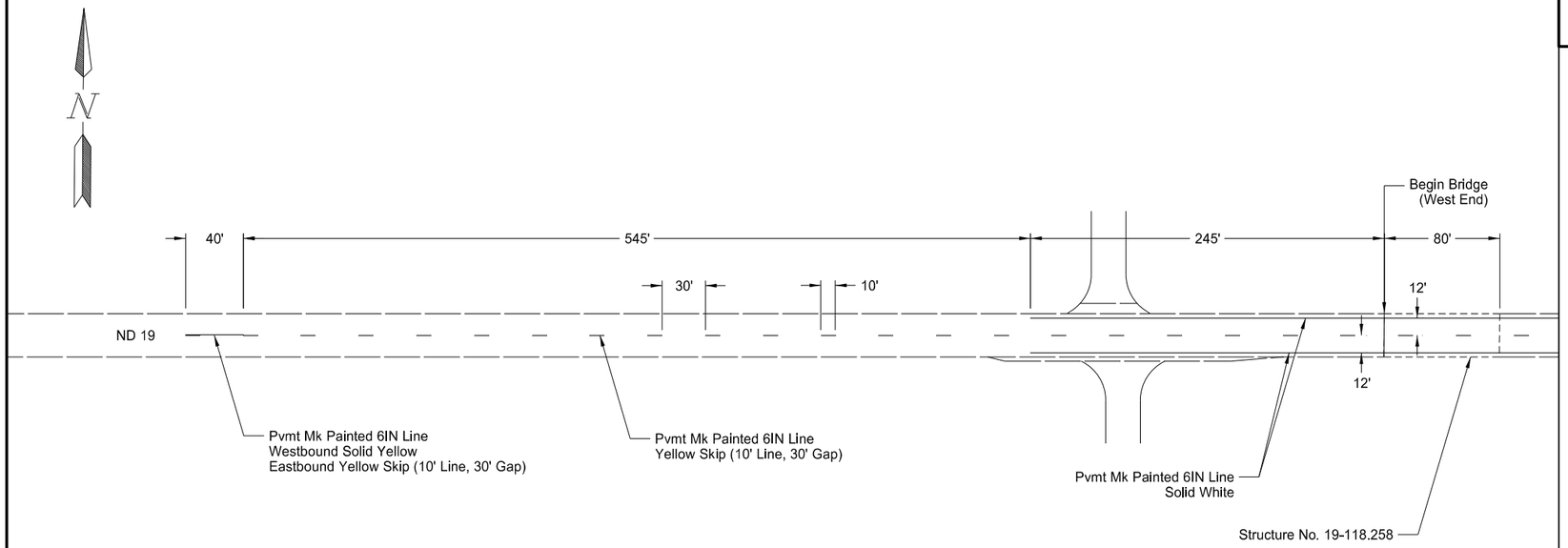
Pavement Markings
Site 2 - Structure No. 17-042.967
Mauvais Coulee Crossing

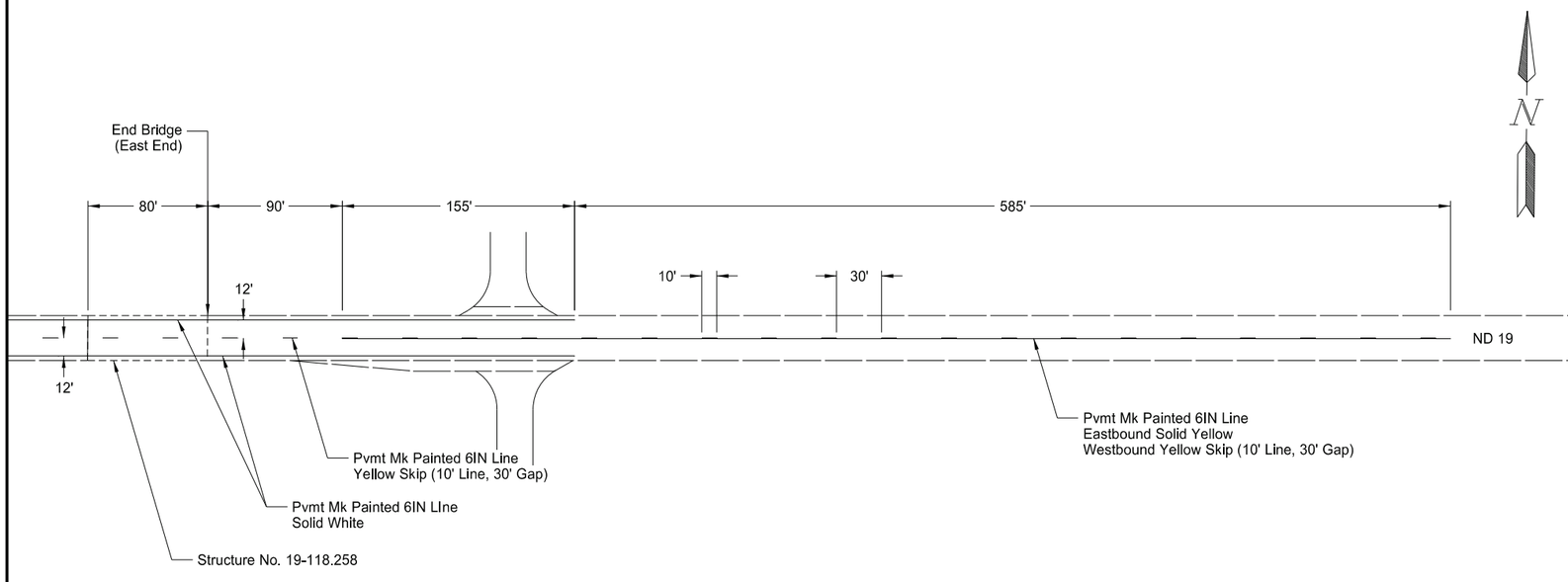
Structure Repairs
ND 17
4.5 Miles East of Cando

REGISTERED PROFESSIONAL ENGINEER
STEVEN L. STRACK
PE-10621
DATE
NORTH DAKOTA
6/9/2025

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	120	3

SPEC	CODE	BID ITEM	QTY	UNIT
762	1106	PVMT MK PAINTED 6IN LINE		
		Centerline Skip	435	LF
		Centerline EB Barrier	740	LF
		Centerline WB Barrier	40	LF
		Edge Line	1,140	LF



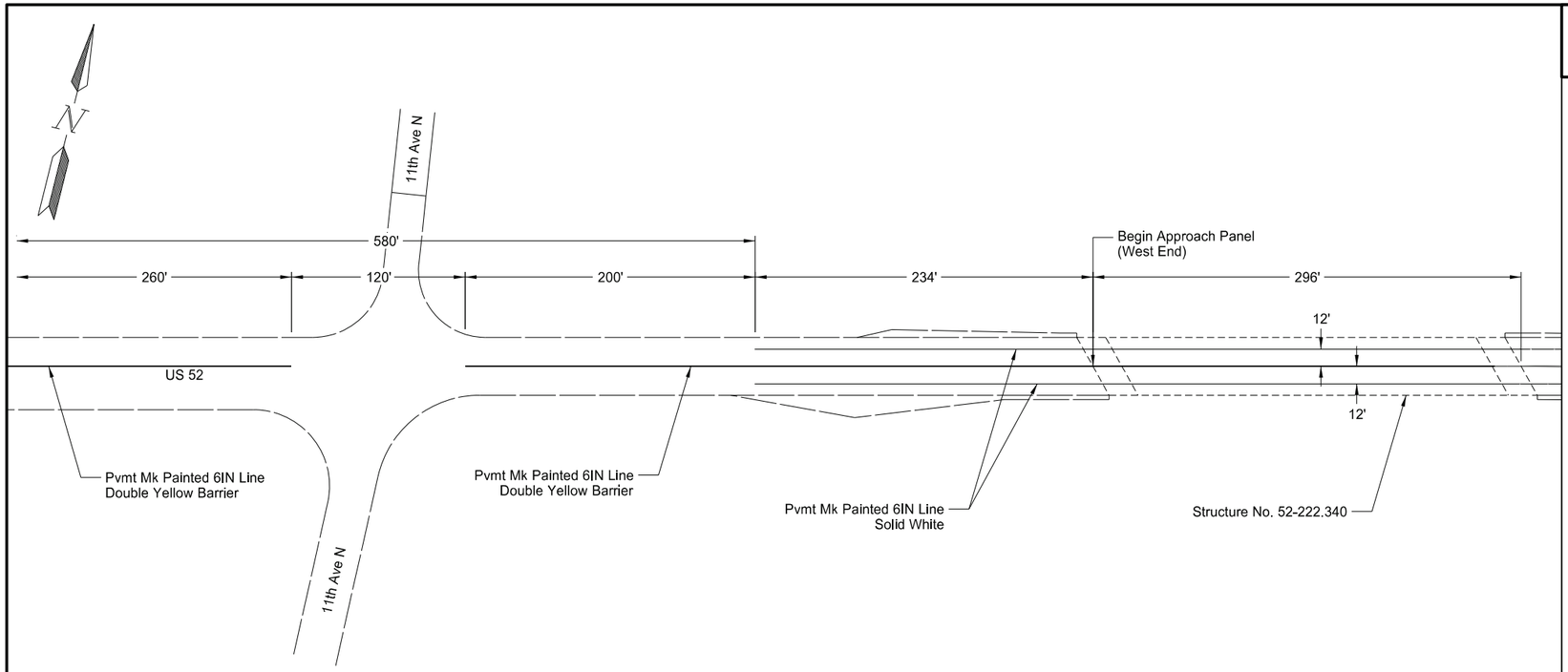


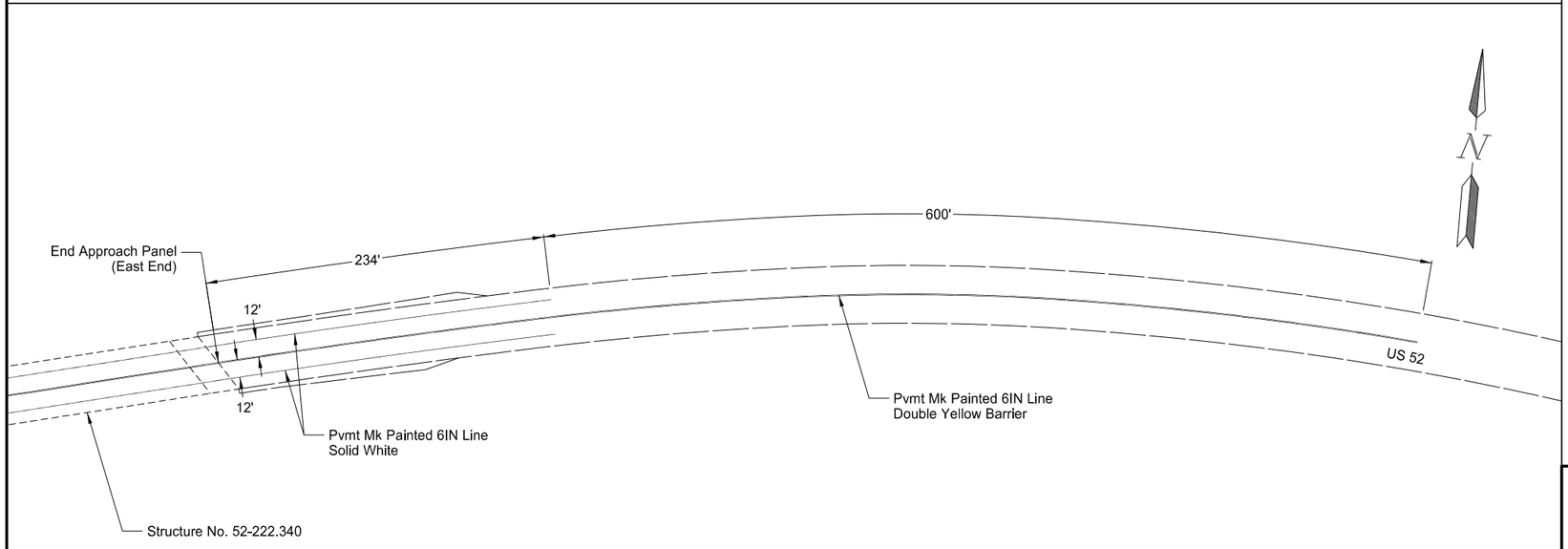
Pavement Markings
Site 3 - Structure No. 19-118.258
Big Coulee Crossing

Structure Repairs
ND 19
15 Miles West of Minnewaukan

REGISTERED PROFESSIONAL ENGINEER
STEVEN L. STRACK
PE-10621
DATE
NORTH DAKOTA
6/9/2025

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	120	4





SPEC	CODE	BID ITEM	QTY	UNIT
762	1106	PVMT MK PAINTED 6IN LINE		
		Centerline Dbl Barrier	3,648	LF
		Edge Line	1,528	LF

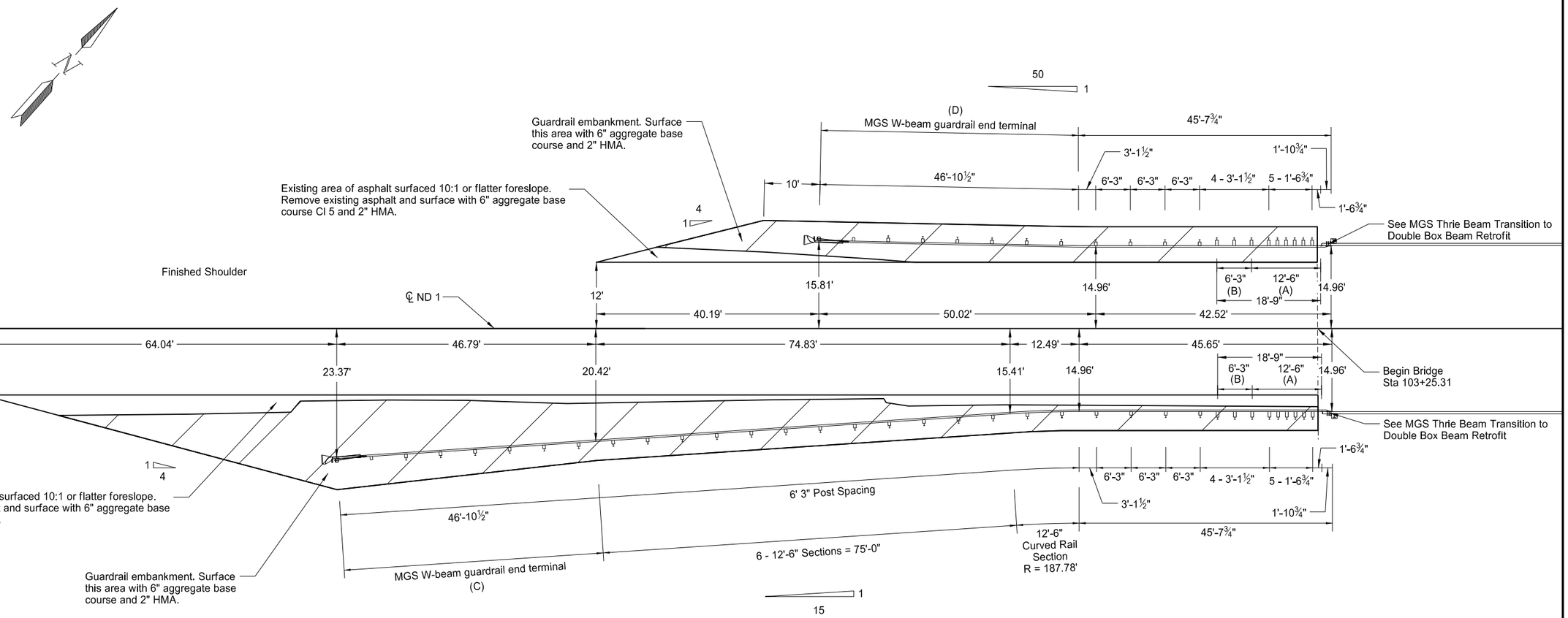
Pavement Markings
Site 4 - Structure No. 52-222.340
CP Railway Crossing

Structure Repairs
US 52
North Side of Carrington ND

REGISTERED PROFESSIONAL ENGINEER
STEVEN L. STRACK
PE-10621
DATE
NORTH DAKOTA
6/9/2025

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	130	1

23 USC § 407 Documents
NDDOT Reserves All Objections



(A) Thrie beam rail section (double thickness)

(B) Symmetrical W-beam to thrie beam transistion

(C) Install an MGS FLEAT end terminal at this location. See Standard D-764-38. Instead of the CRT wood posts at posts 3 through 8 shown on D-764-38 install:

Posts 3 through 6:
Steel posts, per the manufacturer's recommendation, with 8" routed timber blocks.

Posts 7 and 8:
Standard steel line posts with 8" routed wood blocks. See plan details.

(D) Install MASH Sequential Kinking Terminal at this location. See Standard D-764-51. Instead of the CRT wood posts at posts 3 through 8 shown on D-764-51 install:

Posts 3 through 8:
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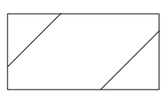


10:1 or Flatter
2" Commercial Grade Hot Mix Asphalt
6" Aggregate Base Course Cl 5

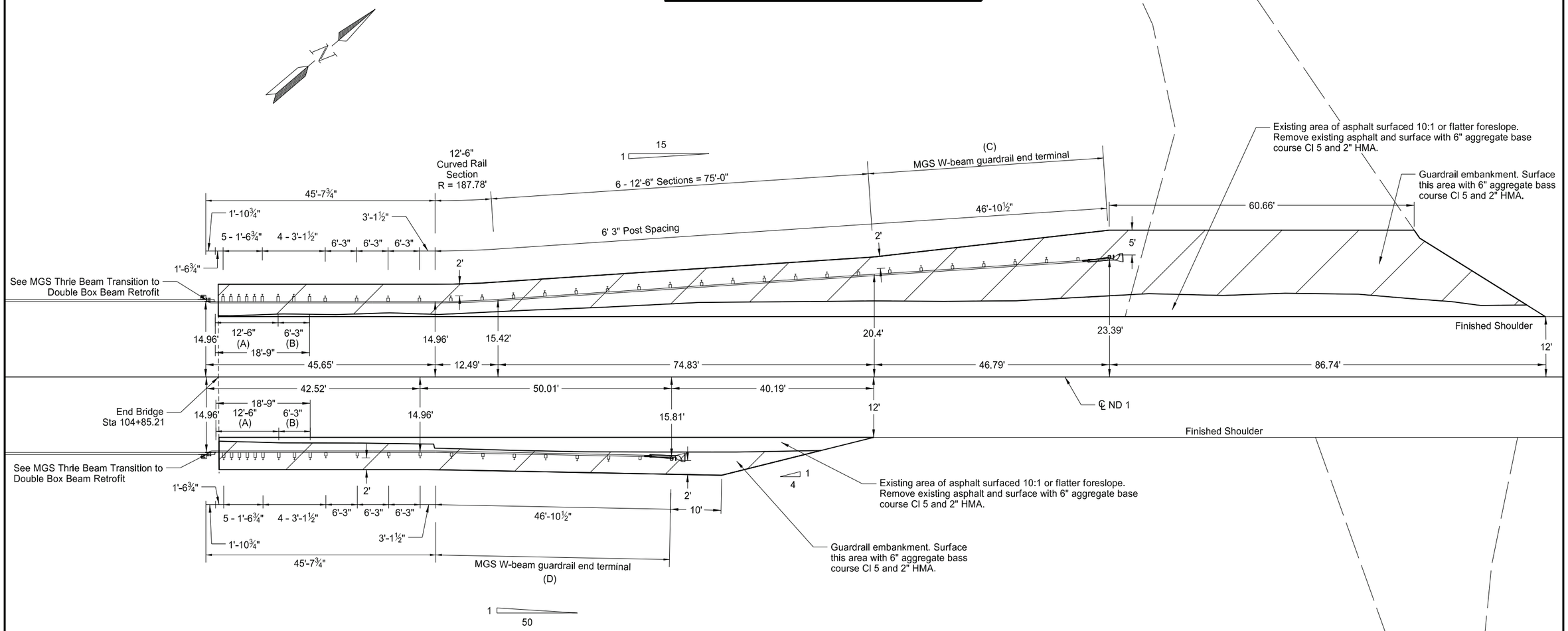
Thrie/MGS W-Beam Guardrail Layout
At Beginning of Bridge
Site 1 - Str No. 01-143.430
Sheyenne River Crossing

Structure Repairs
ND 1
2.5 Miles South of Pekin

REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA
6/9/2025

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	130	2

23 USC § 407 Documents
NDDOT Reserves All Objections



(A) Thrie beam rail section (double thickness)

(B) Symmetrical W-beam to thrie beam transistion

(C) Install an MGS FLEAT end terminal at this location. See Standard D-764-38. Instead of the CRT wood posts at posts 3 through 8 shown on D-764-38 install:

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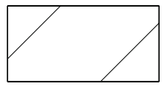
Standard Steel line posts with 8" routedwood blocks. See plan details.



10:1 or Flatter
2" Commercial Grade Hot Mix Asphalt
6" Aggregate Base Course Cl 5

Thrie/MGS W-Beam Guardrail Layouts
At End of Bridge
Site 1 - Str No. 01-143.430
Sheyenne River Crossing

Structure Repairs
ND 1
2.5 Miles South of Pekin

REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA
6/9/2025

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	130	3

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

LOCATION	(A) 2'-6" THRIE-BEAM TERMINAL CONNECTOR	(A) 7/8" DIA X 3/4" LONG BOLT	(A) 5/8" DIA X 2" LONG BOLT	(A) HSS12 X 6 X 1/4 X 1'-9 1/8" STEEL BLOCK	(A) HSS12 X 6 X 1/4 X 1'-2" STEEL BLOCK	(A) 6" X 8" X 14" ROUTED WOOD BLOCK	(A) 12'-6" THRIE BEAM RAIL DOUBLE THICKNESS	(A) 6'-3" W-THRIE BEAM TRANSITION SECTION	(A) W6 X 9 X 6'-6" POST	(A) W6 X 9 X 6'-0" POST	(A) 5/8" DIA X 10" LONG GUARDRAIL BOLT	(A) 5/8" DIA X 14" LONG 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 BOLT	(A) REFLECTOR-IZED PLATES	(B) EMBANK MENT
	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	CY
Sta 103+77.00 Lt to Sta 104+22.64 Lt	1	5	2	7	2	4	1	1	7	6	4	16	2	0	48	4	114
Sta 102+89.68 Rt to Sta 104+22.64 Rt	1	5	2	7	2	18	1	1	7	20	18	16	8	1	104	8	45
Sta 105+77.54 Lt to Sta 107+10.50 Lt	1	5	2	7	2	18	1	1	7	20	18	16	8	1	104	8	177
Sta 105+77.54 Rt to Sta 106+23.18 Rt	1	5	2	7	2	4	1	1	7	6	4	16	2	0	48	4	12
Total	**4**	**20**	**8**	**28**	**8**	**44**	**4**	**4**	**28**	**52**	**44**	**64**	**20**	**2**	**304**	**24**	**348**

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

(B) Include in price bid for "Borrow-Excavation".

SPEC	CODE	BID ITEM	QTY	UNIT
203	0140	BORROW-EXCAVATION		
		Sta 101+95.04 Lt to Sta 103+25.24 Lt	114	CY
		Sta 100+84.10 Rt to Sta 103+25.38 Rt	45	CY
		Sta 104+85.14 Lt to Sta 107+49.08 Lt	177	CY
		Sta 104+85.30 Rt to Sta 106+15.50 Rt	12	CY
764	0131	W-BEAM GUARDRAIL		
		Sta 102+82.11 Lt to Sta 103+27.75 Lt	45.6	LF
		Sta 101+94.93 Rt to Sta 103+27.89 Rt	133.1	LF
		Sta 104+82.65 Lt to Sta 106+15.61 Lt	133.1	LF
		Sta 104+82.78 Rt to Sta 105+28.42 Rt	45.6	LF
764	0145	W-BEAM GUARDRAIL END TERMINAL		
		Sta 102+32.51 Lt to Sta 102+82.11 Lt	1	EA
		Sta 101+45.39 Rt to Sta 101+94.93 Rt	1	EA
		Sta 106+15.61 Lt to Sta 106+65.15 Lt	1	EA
		Sta 105+28.42 Rt to Sta 105+78.02 Rt	1	EA
764	0151	REMOVE W-BEAM GUARDRAIL & POSTS		
		Sta 102+60.98 Lt to Sta 103+27.24 Lt	66.3	LF
		Sta 101+86.36 Rt to Sta 103+27.43 Rt	141.4	LF
		Sta 104+83.10 Lt to Sta 106+22.38 Lt	139.7	LF
		Sta 104+83.32 Rt to Sta 105+41.52 Rt	65.8	LF
764	2081	REMOVE END TREATMENT & TRANSITION		
		Sta 102+11.64 Lt to Sta 102+60.98 Lt	1	EA
		Sta 101+37.19 Rt to Sta 101+86.36 Rt	1	EA
		Sta 106+22.38 Lt to Sta 106+71.74 Lt	1	EA
		Sta 105+41.52 Rt to Sta 105+91.02 Rt	1	EA

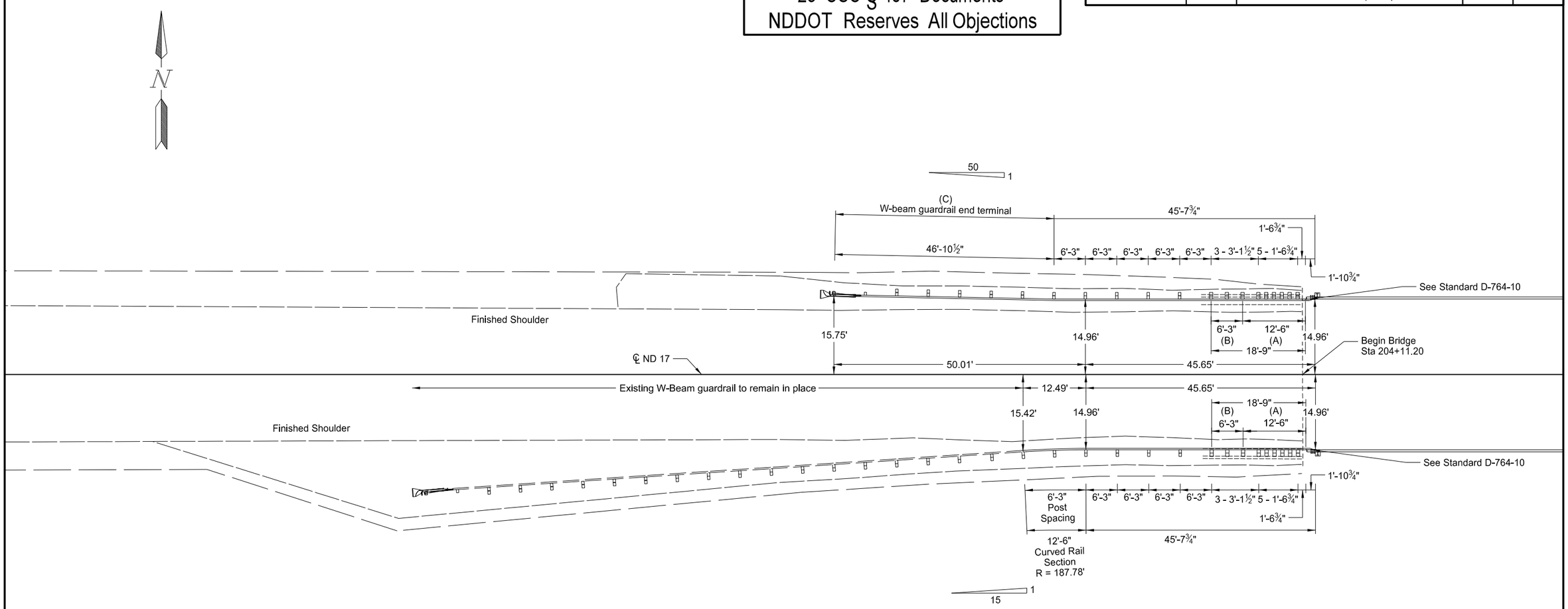
Thrie/MGS W- Beam Guardrail Quantities
At Both Ends of Bridge
Site 1 - Str No. 01-143.430
Sheyenne River Crossing

Structure Repairs
ND 1
2.5 Miles South of Pekin

REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA
6/9/2025

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	130	4

23 USC § 407 Documents
NDDOT Reserves All Objections



SPEC	CODE	BID ITEM	QTY	UNIT
764	0150	REMOVE & RESET GUARDRAIL		
		Sta 203+15.26 Lt to Sta 204+13.65 Lt	98.3	LF
		Sta 203+55.59 Rt to Sta 204+13.75 Rt	58.1	LF

(A) Thrie beam rail section (double thickness)

(B) Symmetrical W-beam to thrie beam transistion

(C) Reset existing FLEAT end terminal at this location

Thrie/W-Beam Guardrail Layout
At Beginning of Bridge
Site 2 - Str No. 17-042.967
Mauvais Coulee Crossing

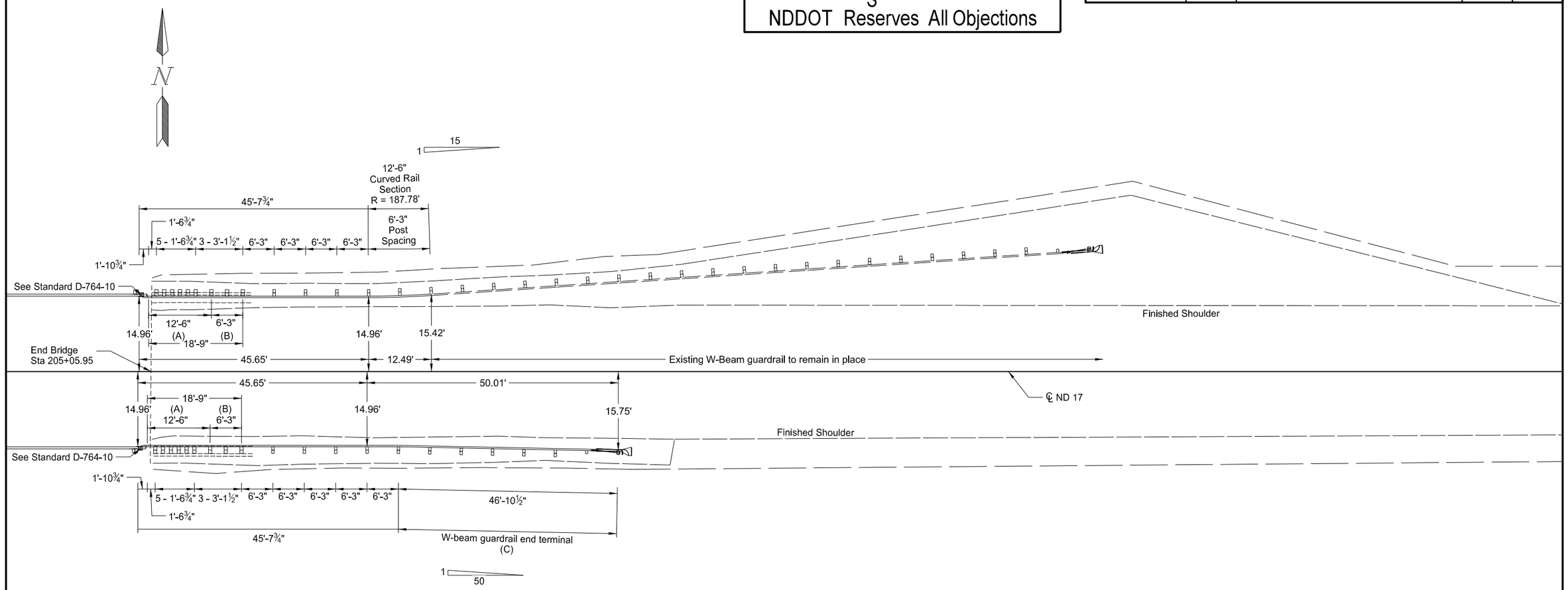
Structure Repairs
ND 17
4.5 Miles East of Cando

REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA
6/9/2025

5/13/2025 1:10:17 PM aruud H:\JBN\3900\3950\3950_0332 PCN 23420 Devils Lake Structures\CAD\30999051.143\dgn\Design\Sheets\130GR_004.dgn

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	130	5

23 USC § 407 Documents
NDDOT Reserves All Objections



SPEC	CODE	BID ITEM	QTY	UNIT
764	0150	REMOVE & RESET GUARDRAIL		
		Sta 205+03.57 Lt to Sta 205+61.79 Lt	58.1	LF
		Sta 205+03.32 Rt to Sta 206+01.71 Rt	98.3	LF

(A) Thrie beam rail section (double thickness)

(B) Symmetrical W-beam to thrie beam transistion

(C) Reset existing FLEAT end terminal at this location

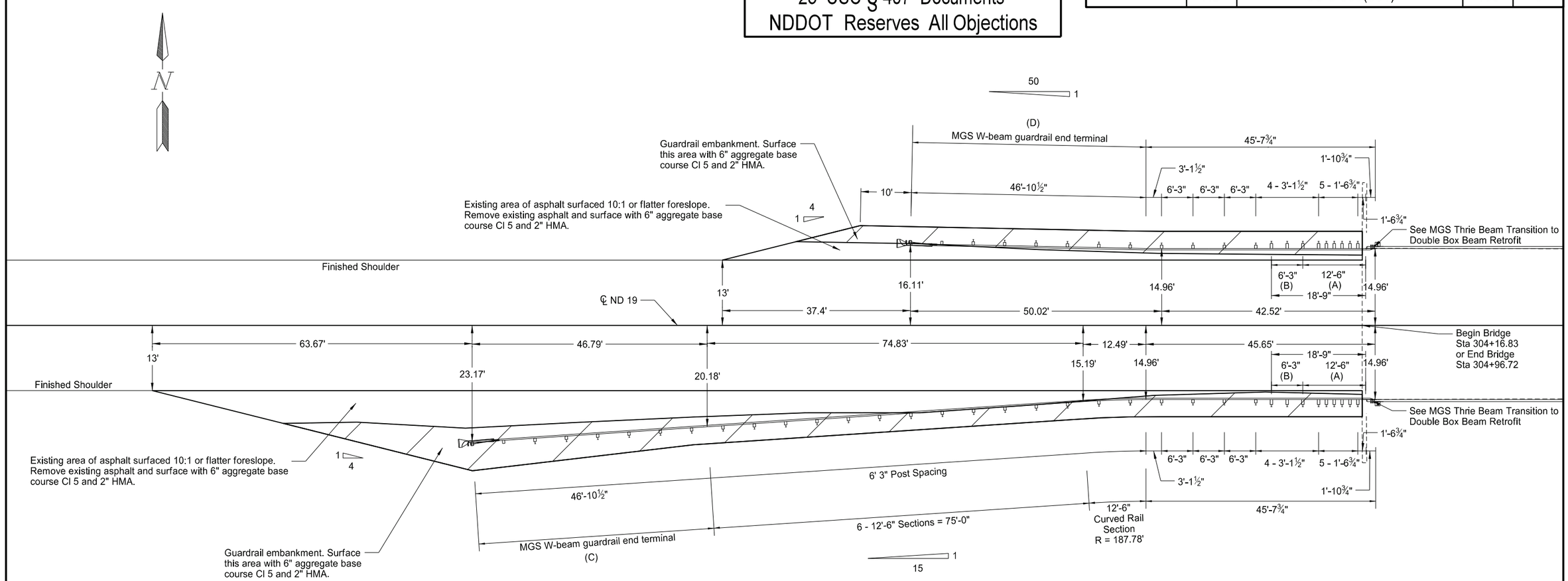
Thrie/W-Beam Guardrail Layout
At End of Bridge
Site 2 - Str No. 17-042.967
Mauvais Coulee Crossing

Structure Repairs
ND 17
4.5 Miles East of Cando

REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA
6/9/2025

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-3-999(051)	130	6

23 USC § 407 Documents
NDDOT Reserves All Objections



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10:1 or Flatter
2" Commercial Grade Hot Mix Asphalt
6" Aggregate Base Course CI 5

Thrie/MGS W-Beam Guardrail Layouts
At Both Ends of Bridge
Site 3 - Str No. 19-118.258
Big Coulee Crossing

Structure Repairs
ND 19
15 Miles West of Minnewauken

REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA
6/9/2025

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	130	7

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

LOCATION	(A) 2'-6"THRIE-BEAM TERMINAL CONNECTOR	(A) 7/8" DIA X 3/4" LONG BOLT	(A) 5/8" DIA X 2" LONG BOLT	(A) HSS12 X 6 X 1/4 X 1'-9 1/8" STEEL BLOCK	(A) HSS12 X 6 X 1/4 X 1'-2" STEEL BLOCK	(A) 6" X 8" X 14" ROUTED WOOD BLOCK	(A) 12'-6" THRIE BEAM RAIL DOUBLE THICKNESS	(A) 6'-3" W-THRIE BEAM TRANSITION SECTION	(A) W6 X 9 X 6'-6" POST	(A) W6 X 9 X 6'-0" POST	(A) 5/8" DIA X 10" LONG GUARDRAIL BOLT	(A) 5/8" DIA X 14" LONG 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 BOLT	(A) REFLECTOR-IZED PLATES	(B) EMBANK MENT
	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	CY
Sta 303+73.76 Lt to Sta 304+19.40 Lt	1	5	2	7	2	4	1	1	7	6	4	16	2	0	48	4	26
Sta 302+86.44 Rt to Sta 304+19.40 Rt	1	5	2	7	2	18	1	1	7	20	18	16	8	1	104	8	21
Sta 304+94.22 Lt to Sta 306+27.19 Lt	1	5	2	7	2	18	1	1	7	20	18	16	8	1	104	8	33
Sta 304+94.22 Rt to Sta 305+39.86 Rt	1	5	2	7	2	4	1	1	7	6	4	16	2	0	48	4	35
Total	**4**	**20**	**8**	**28**	**8**	**44**	**4**	**4**	**28**	**52**	**44**	**64**	**20**	**2**	**304**	**24**	**115**

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

(B) Include in price bid for "Borrow-Excavation".

SPEC	CODE	BID ITEM	QTY	UNIT
203	0140	BORROW-EXCAVATION		
		Sta 302+89.47 Lt to Sta 304+16.83 Lt	26	CY
		Sta 301+75.98 Rt to Sta 304+16.83 Rt	21	CY
		Sta 304+96.69 Lt to Sta 307+39.10 Lt	33	CY
		Sta 304+96.76 Rt to Sta 306+21.26 Rt	35	CY
764	0131	W-BEAM GUARDRAIL		
		Sta 303+73.76 Lt to Sta 304+19.40 Lt	45.6	LF
		Sta 302+86.44 Rt to Sta 304+19.40 Rt	133.1	LF
		Sta 304+94.22 Lt to Sta 306+27.19 Lt	133.1	LF
		Sta 304+94.22 Rt to Sta 305+39.86 Rt	45.6	LF
764	0145	W-BEAM GUARDRAIL END TERMINAL		
		Sta 303+24.19 Lt to Sta 303+73.76 Lt	1	EA
		Sta 302+37.01 Rt to Sta 302+86.44 Rt	1	EA
		Sta 306+27.19 Lt to Sta 306+76.62 Lt	1	EA
		Sta 305+39.86 Rt to Sta 305+89.43	1	EA
764	2080	REMOVE BOX BEAM GUARDRAIL		
		Sta 302+77.04 Lt to Sta 304+31.97 Lt	158.4	LF
		Sta 302+83.91 Rt to Sta 304+31.92 Rt	148.6	LF
		Sta 304+81.39 Lt to Sta 306+29.87 Lt	149	LF
		Sta 304+81.65 Rt to Sta 306+36.47 Rt	158.6	LF
764	2081	REMOVE END TREATMENT & TRANSITION		
		Sta 302+59.03 Rt to Sta 302+83.91 Rt	1	EA
		Sta 306+29.87 Lt to Sta 306+54.81 Lt	1	EA

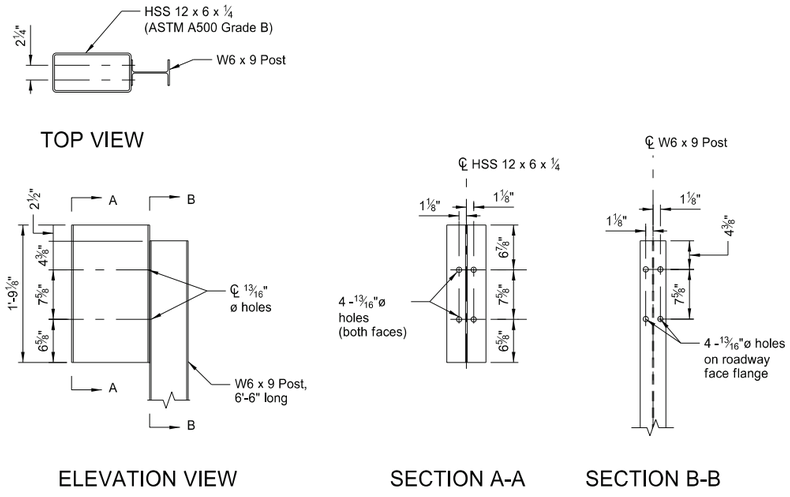
Thrie/MGS W-Beam Guardrail Quantities
At Both Ends of Bridge
Site 3 - Str No. 19-118.258
Big Coulee Crossing

Structure Repairs
ND 19
15 Miles West of Minnewauken

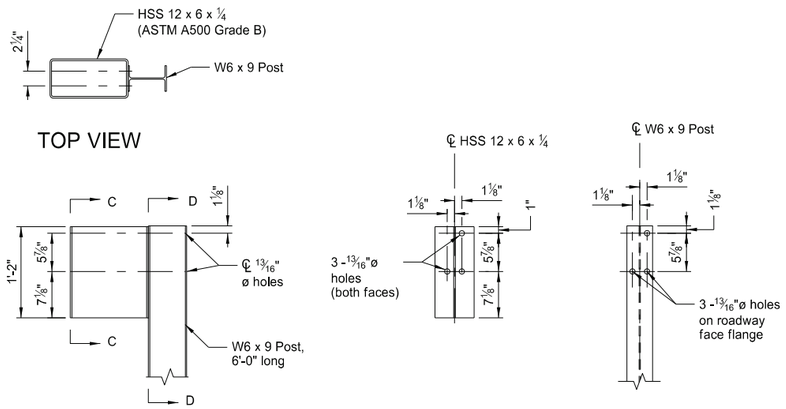
REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA
6/9/2025

23 USC § 407 Documents
NDDOT Reserves All Objections

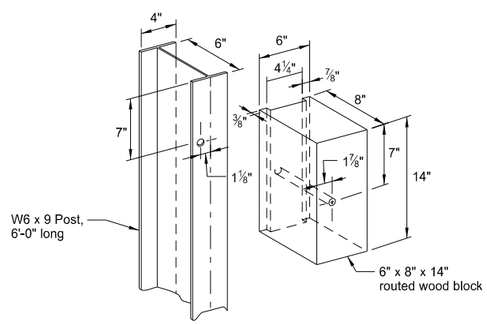
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	130	8



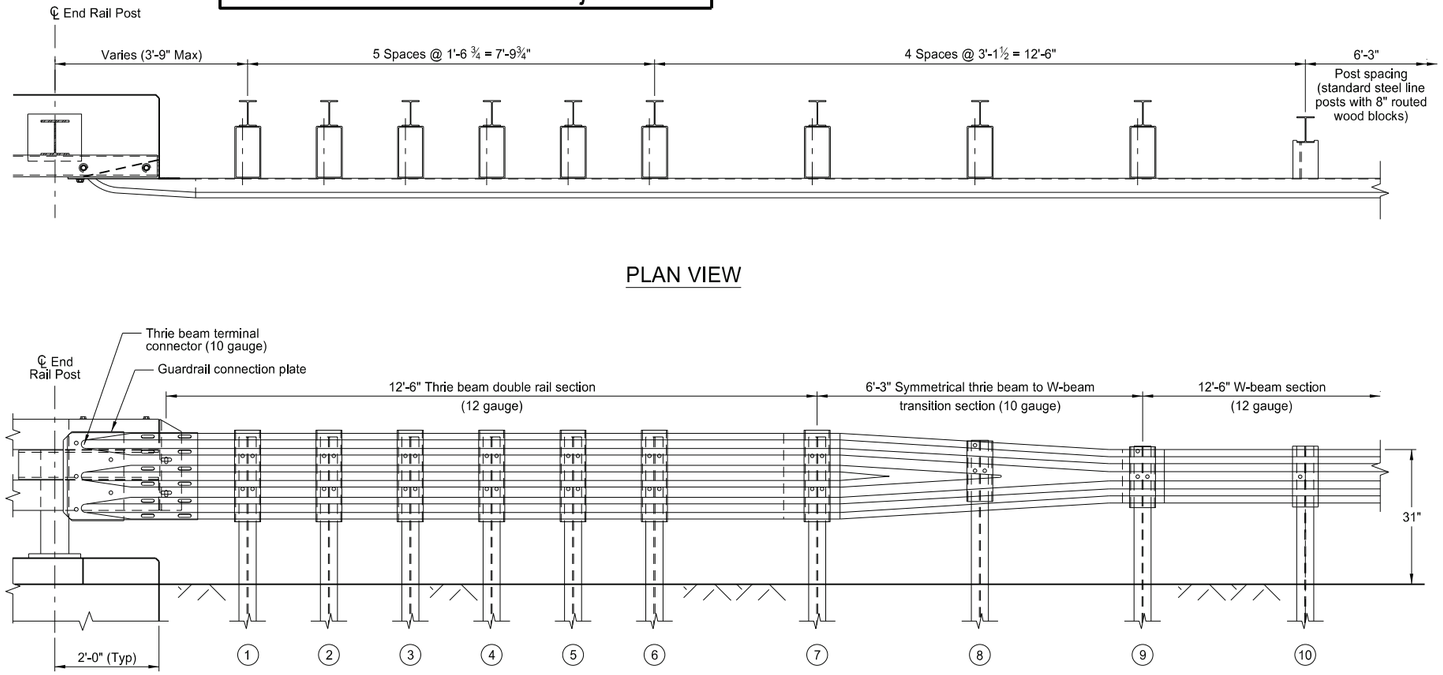
THRIE BEAM STEEL BLOCKOUT (POSTS 1-7)

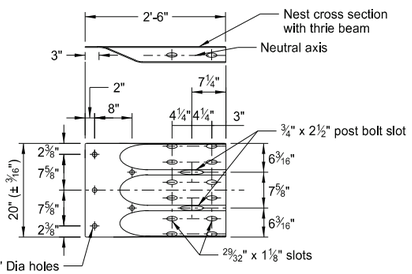


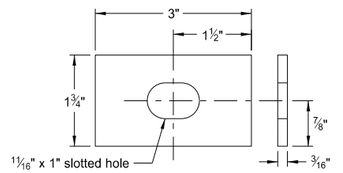
THRIE BEAM STEEL BLOCKOUT (POSTS 8-9)



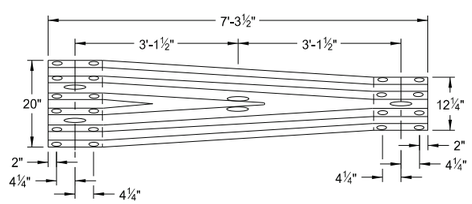
STANDARD STEEL LINE POST WITH 8" ROUTED WOOD BLOCKS (POST 10)

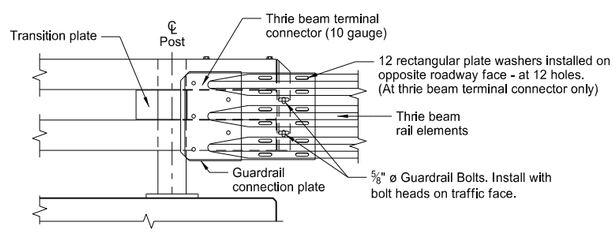






TRANSITION POST AND BLOCKOUT SIZING		
POST NO.	POST SIZE	BLOCKOUT SIZE
1-7	W6 x 9 x 6'-6" long	HSS 12 x 6 x ¼ x 1'-9⅛" long
8-9	W6 x 9 x 6'-0" long	HSS 12 x 6 x ¼ x 1'-2" long
10	W6 x 9 x 6'-0" long	6" x 8" x 14" routed wood





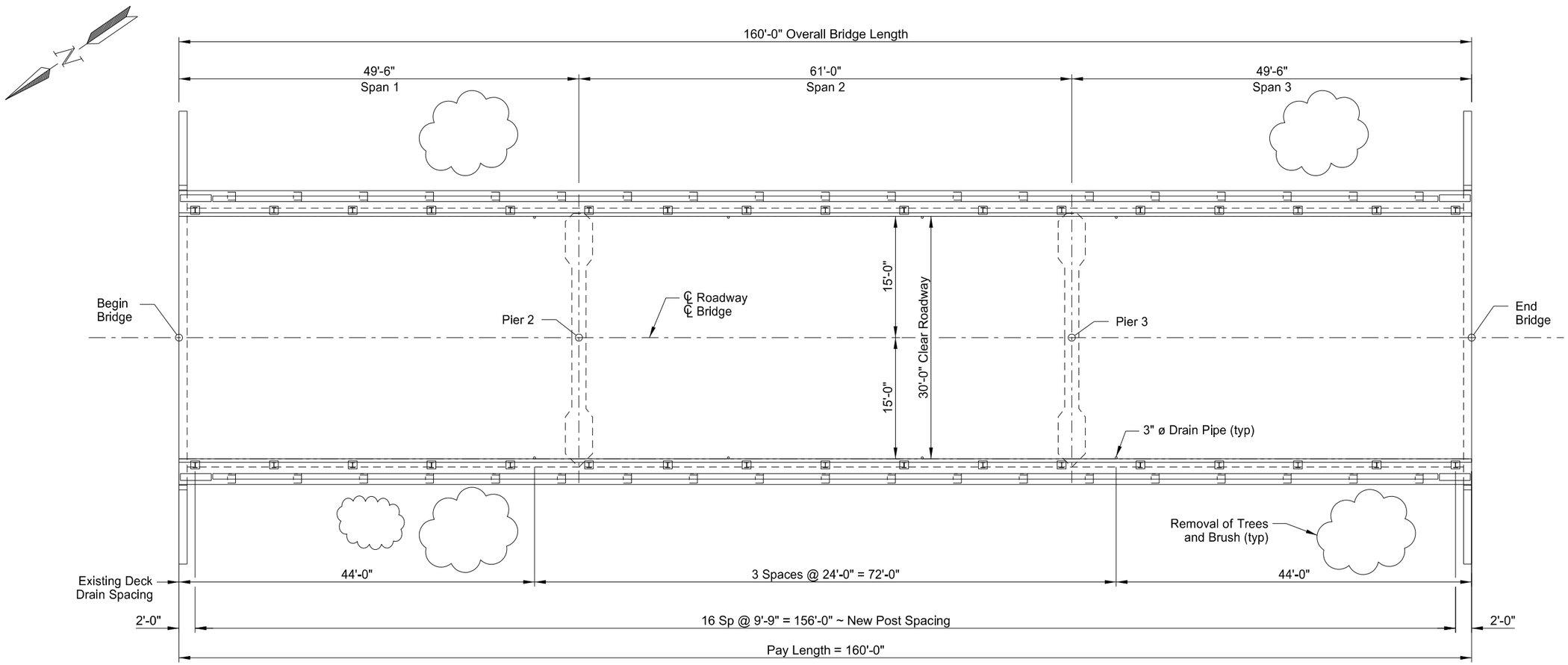
REGISTERED PROFESSIONAL ENGINEER
ADAM M. RUUD
PE-10407
DATE
NORTH DAKOTA
6/9/2025

MGS Thrie Beam Transition to Double Box Beam Retrofit Detail

Site 1 - ND 1 - Str No. 01-143.430
Site 3 - ND 19 - Str No. 19-118.258

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	170	1



BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
201	0352	REMOVAL OF TREES & BRUSH	L SUM	1
602	1250	PENETRATING WATER REPELLANT TREATMENT	SY	534
602	7000	SPECIAL SURFACE FINISH	SF	1,240
624	3001	DOUBLE BOX BEAM RAIL RETROFIT-FREE STANDING	LF	320
650	0704	OVERLAY CONCRETE	CY	30
650	0707	DECK CONCRETE	CY	8
650	0710	CLASS 1-H REMOVAL	SY	534
650	0720	CLASS 1 REMOVAL	SY	534
650	0723	CLASS 3 REMOVAL	SY	43
650	0724	CLASS 4 REMOVAL	SY	11
930	9223	CRACK SEALING	LF	67
930	9534	MODIFY DECK DRAIN	EA	8
930	9612	SPALL REPAIR	SF	106

REGISTERED PROFESSIONAL ENGINEER
ADAM M. KAY
PE-40591
DATE
NORTH DAKOTA

SPECIAL PROVISIONS	
SP 150(23)	CONCRETE SPALL REPAIR
SP 648(23)	HYDRODEMOLITION AND OVERLAY OF CONCRETE BRIDGE DECKS

SHEYENNE RIVER
NELSON COUNTY, NORTH DAKOTA

SITE 1

BRIDGE LAYOUT

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

Jason Thorenson
06/13/25

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	170	2

NOTES - SITE 1

100 SCOPE OF WORK: This project consists of placing a deck overlay, deck drain modifications, installing a double box beam rail retrofit, spall repair, crack sealing, and removal of trees and brush. Complete superstructure work at this site half the bridge at a time to maintain traffic.

201 REMOVAL OF TREES & BRUSH: Remove trees and brush within the work limits at the locations shown in the plans, as well as any additional locations ordered by the Engineer. Remove trees and brush according to Section 201 Clearing and Grubbing. Payment for “Removal of Trees & Brush” will be lump sum.

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 SPECIAL SURFACE FINISH: Clean the front face and top of the bridge curb using sandblasting, shot blasting, or water-washing equipment to remove all dirt, grease, oil, efflorescence, laitance, and loose or flaking coatings. Fill cracks larger than 0.012” with Tex-Cote Skim Cote or an approved crack sealer compatible with Tex-Cote XL 70 Bridge Cote. Apply Tex-cote XL 70 Bridge Cote with Silane to the front face and top of the bridge curb. Use gray surface finish color 36424 meeting AMS-STD 595 with a medium texture finish.

602 PENETRATING WATER REPELLENT TREATMENT: Apply penetrating water repellent to the driving surface of the bridge deck. Apply penetrating water repellent solution prior to sealing any bridge deck cracks. Do not 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 hydrodemolition.

650 OVERLAY CONCRETE 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 its 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 limits of crack, including those portions that are narrower than 0.012” wide. The epoxy sealer may be Paulco TE-2501 (Viking Paints, Inc.), Dural 50 LM (Euclid Chemical Co.), TK-9000 or TK-2110 (TK Products), or an approved equal.

Include all work and materials associated in the deck overlay crack sealing in the bid item “Overlay Concrete.”

930 CRACK SEALING: The Engineer will perform a visual inspection of the abutments to determine the need for crack sealing in addition to those shown in the plans. Repair all cracks designated by the Engineer at this time.

Perform a visual inspection of the abutments and mark all visible cracks appearing on the surface 0.012" or greater in width at its 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 limits of crack, including those portions that are narrower than 0.012" wide. The epoxy sealer may be Sikadur Crack Weld (Sika Corporation), Simpson Strong-Tie Crack-Pac (Euclid Chemical Co.), MasterFlow 647 (BASF Chemical Co.), or an approved equal.

Include all work and materials associated with the abutment crack sealing in the bid item “Crack Sealing.”

930 MODIFY DECK DRAIN: Provide structural bars for the deck drain extensions meeting Section 834.01 A, except the Charpy V-notch test is waived. The HSS deck drainpipe shall be ASTM A500 Grade B. Galvanize all structural bars and tubes according to Section 854. Provide the anchor bolts according to the manufacturer's recommendations with an expansive anchor bolt system capable of developing an allowable tensile load of 3,020 lb in 3,000 psi normal weight concrete.

Include all labor, equipment, and materials to install the anchor bolts into the underside of the deck and extend the deck drains in the bid item “Modify Deck Drain.”

930 SPALL REPAIR: The structure has areas of spalling and concrete deterioration as indicated in the “Spall Repair” table below. Follow the repair procedures in accordance with SP 150(23) Concrete Spall Repair.

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. See Supplemental Data for photos.

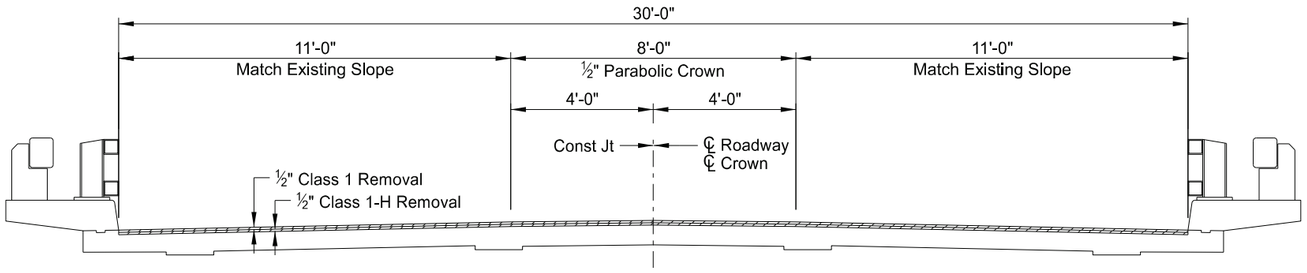
A minimum area of 1 SF will be paid at each repair location. Include all labor, equipment and materials needed to repair the spall areas in the bid item “Spall Repair.”

SPALL REPAIR		
PICTURE	LOCATION	QUANTITY (SF)
1 - 3	Abutment 1	42
4 - 6	Abutment 4	64

REGISTERED PROFESSIONAL ENGINEER
ADAM M. KAYE
PE-40591
DATE
NORTH DAKOTA

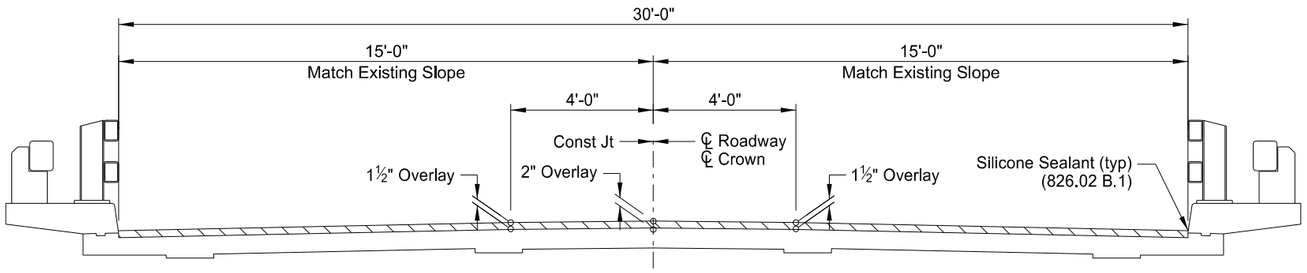
23 U.S.C. 407
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	170	3



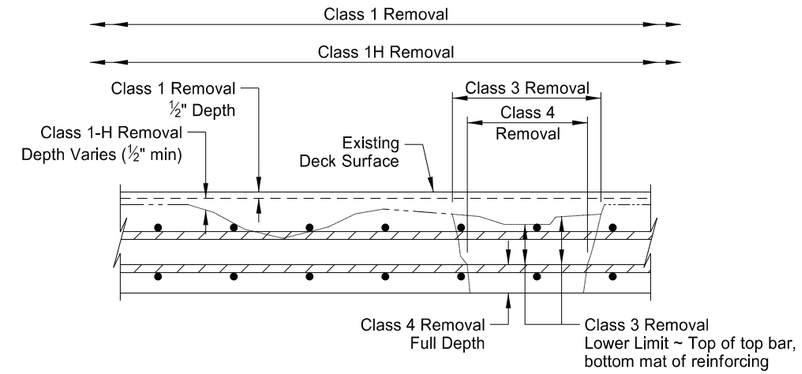
(SHOWING REMOVAL)

TYPICAL DECK SECTION



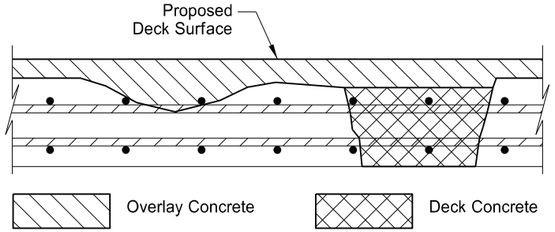
(SHOWING OVERLAY)

TYPICAL DECK SECTION



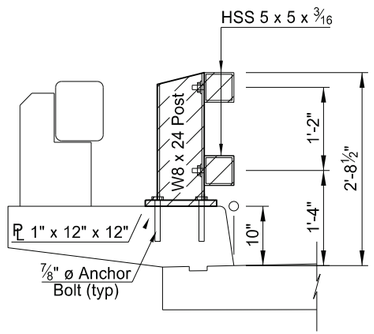
(SHOWING REMOVALS)

EXISTING BRIDGE DECK SECTION



(SHOWING DECK & OVERLAY CONCRETE)

PROPOSED BRIDGE DECK SECTION

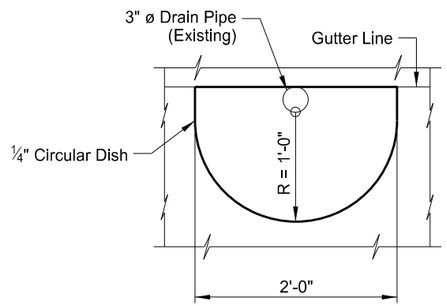


Hatched area indicates double box beam rail retrofit to be removed.

NOTE:

See Dwg 01-143.430-7 for details.

EXISTING RAIL RETROFIT
(SHOWING REMOVAL)



(8 Required)

DRAIN DISH DETAIL

QUANTITIES	
OVERLAY CONCRETE	30 CY
DECK CONCRETE	8 CY
CLASS 1 REMOVAL	534 SY
CLASS 1H REMOVAL	534 SY
CLASS 3 REMOVAL	43 SY
CLASS 4 REMOVAL	11 SY

REGISTERED PROFESSIONAL ENGINEER
ADAM M. KAYE
PE-40591
DATE
NORTH DAKOTA

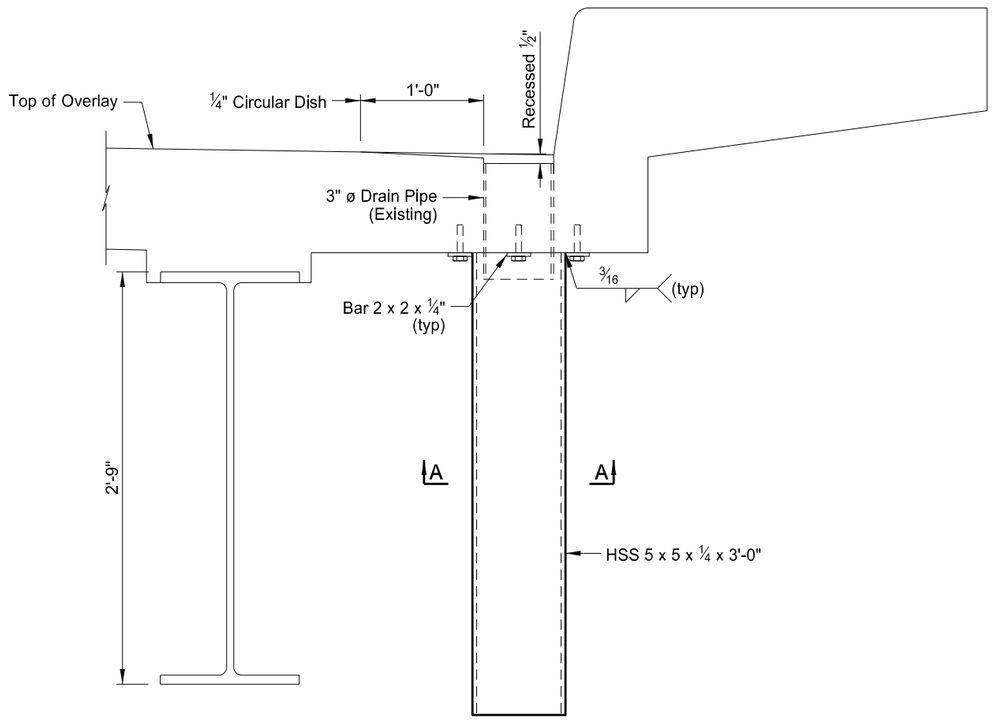
SHEYENNE RIVER
NELSON COUNTY, NORTH DAKOTA

SITE 1

DECK OVERLAY DETAILS

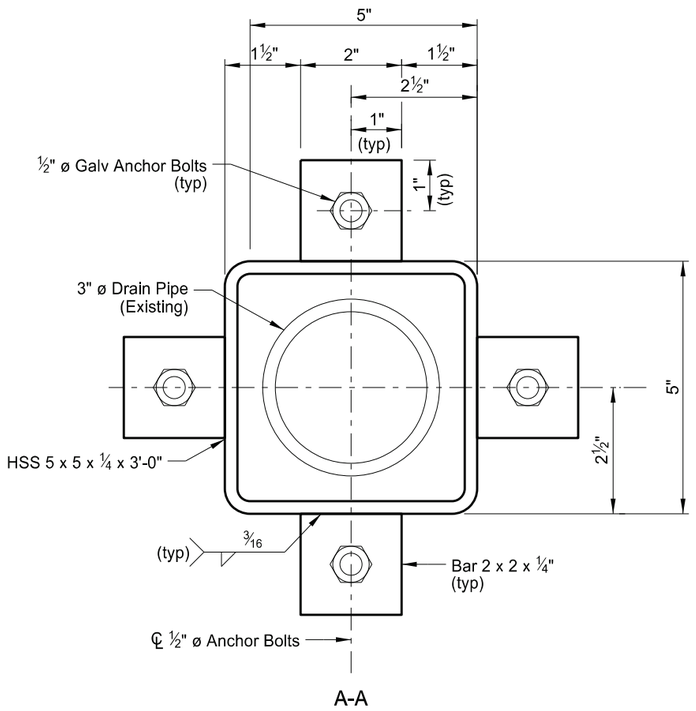
23 U.S.C. 407
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	170	4



(8 Deck Drains)

DECK DRAIN DETAILS



A-A

REGISTERED PROFESSIONAL ENGINEER
ADAM M. KAYE
PE-40591
DATE
NORTH DAKOTA

QUANTITIES	
MODIFY DECK DRAIN	8 EA

SHEYENNE RIVER
NELSON COUNTY, NORTH DAKOTA

SITE 1

DECK DRAIN DETAILS

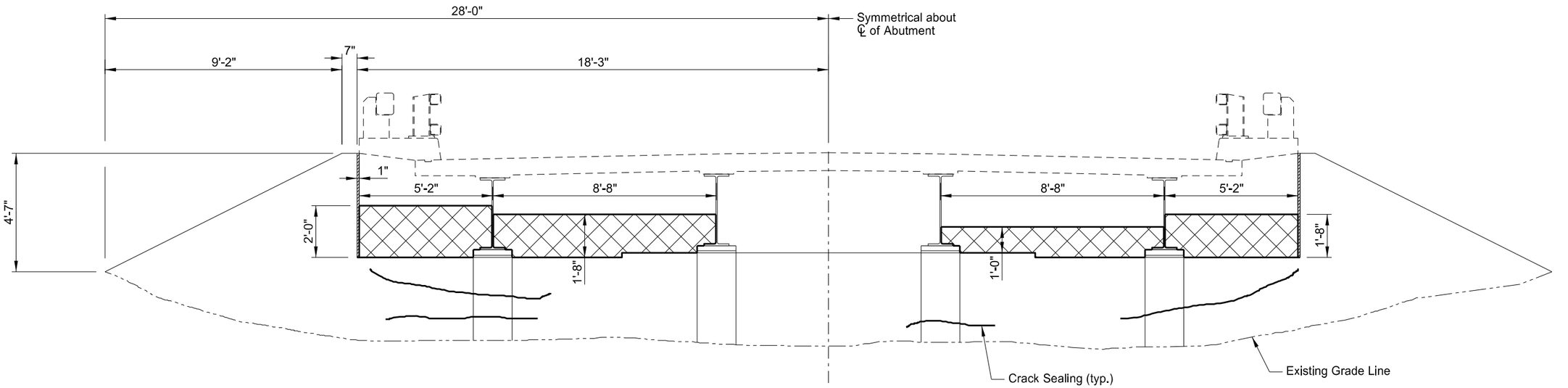
23 U.S.C. 407
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	170	5

Indicates spall repair area.

NOTES:

All areas to be verified by the Engineer in the field prior to removal.



(LOOKING NORTH)

ABUTMENT 1

QUANTITIES	(ONE ABUTMENT)
SPALL REPAIR	42 SF
CRACK SEALING	22 LF

REGISTERED PROFESSIONAL ENGINEER
ADAM M. KAYE
PE-40591
DATE
NORTH DAKOTA

SHEYENNE RIVER
NELSON COUNTY, NORTH DAKOTA

SITE 1

ABUTMENT REPAIR DETAILS

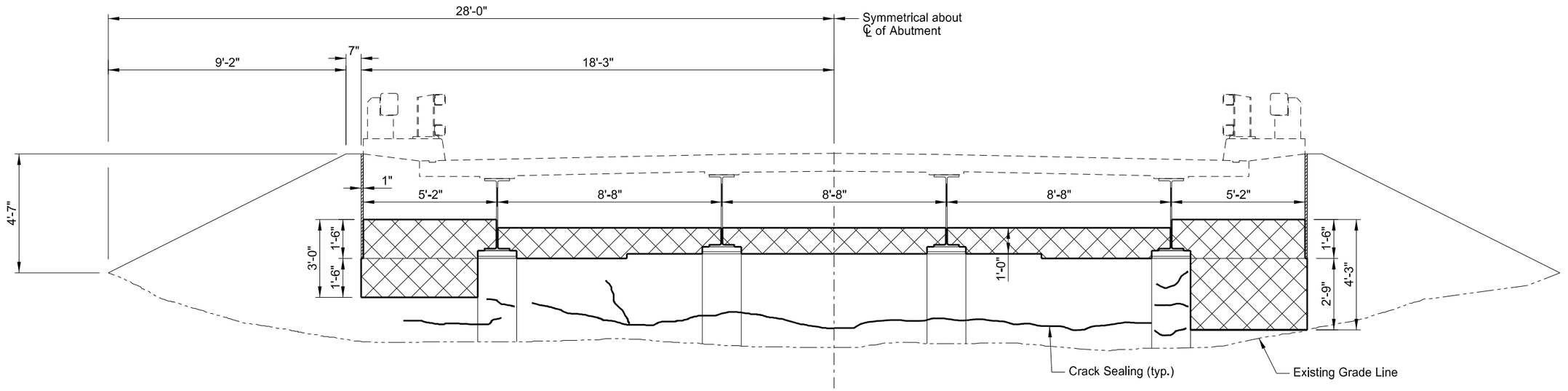
23 U.S.C. 407
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	170	6

Indicates spall repair area.

NOTES:

All areas to be verified by the Engineer in the field prior to removal.



(LOOKING SOUTH)

ABUTMENT 4

QUANTITIES	(ONE ABUTMENT)
SPALL REPAIR	64 SF
CRACK SEALING	45 LF

REGISTERED PROFESSIONAL ENGINEER
ADAM M. KAYE
PE-40591
DATE
NORTH DAKOTA

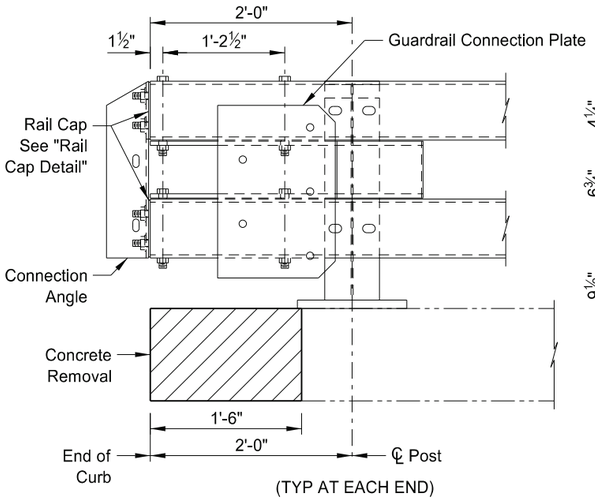
SHEYENNE RIVER
NELSON COUNTY, NORTH DAKOTA

SITE 1

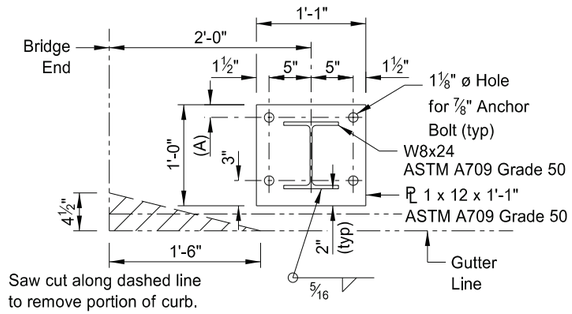
ABUTMENT REPAIR DETAILS

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	170	7

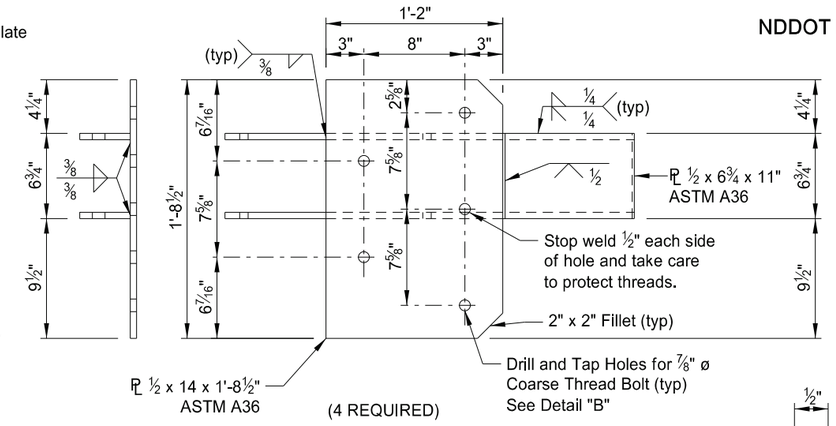


(TYP AT EACH END)

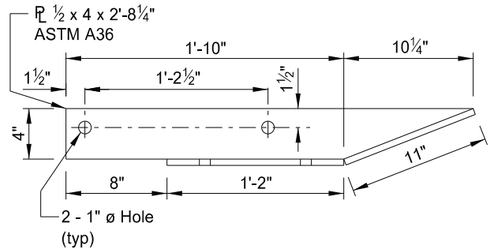


(A) Variable 1½" to 3"
(ASTM A709 GRADE 50)

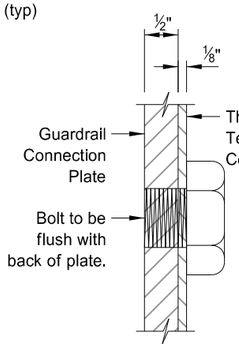
BASE PLATE DETAIL



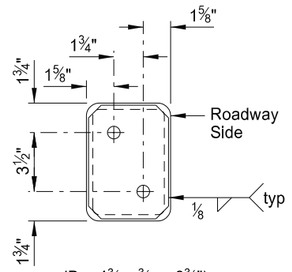
GUARDRAIL CONNECTION PLATE ELEVATION VIEW



GUARDRAIL CONNECTION PLATE PLAN VIEW

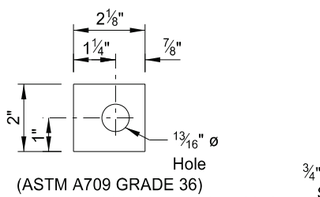


DETAIL "B"



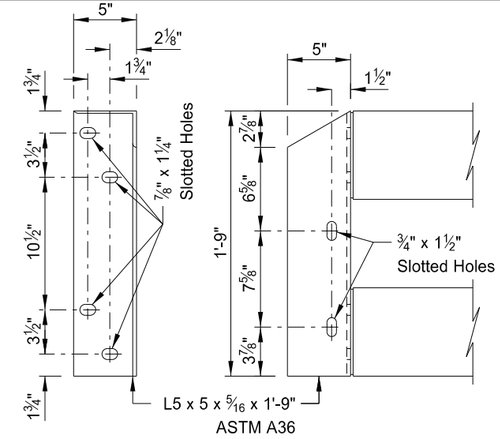
(Bar 4¾ x 3/16 x 6¾")
(ASTM A709 GRADE 36)
Cope corners 1" to provide zinc drains.

RAIL CAP END VIEW

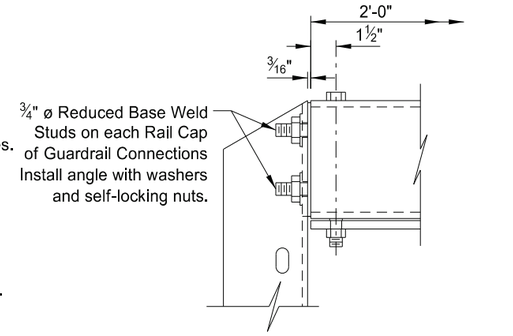


(ASTM A709 GRADE 36)
Position washers to completely cover slotted holes.

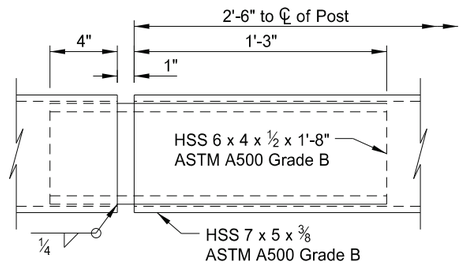
¼" BAR WASHER "C"



CONNECTION ANGLE DETAILS



RAIL CAP DETAIL



RAIL SPLICE DETAIL

NOTES:

Provide reduced base studs in accordance with ASTM A108 Grade 1010.

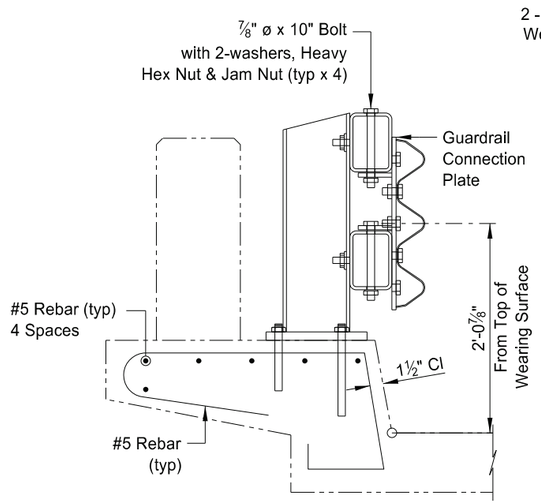
Provide ⅞" ø Anchor Bolts in accordance with ASTM F1554, Grade 105

Galvanize all steel components after fabrication according to Section 854.

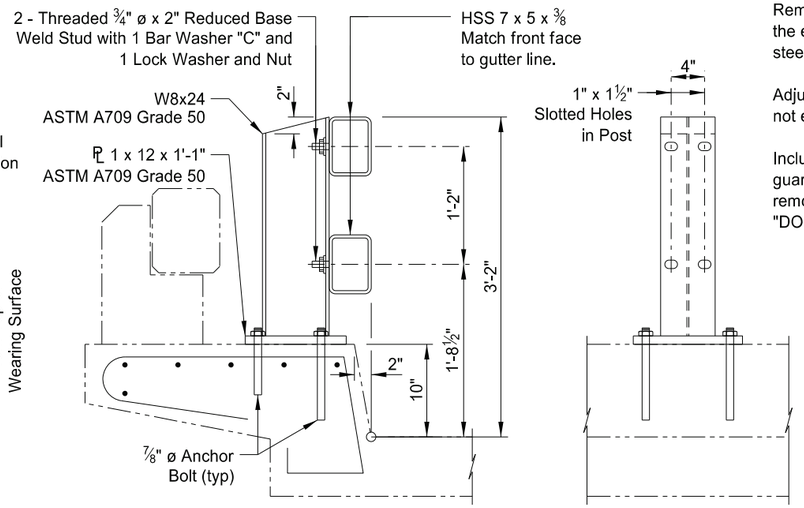
Remove existing double box beam retrofit railing, posts, and anchors. Cut the existing post anchors flush with the top of the concrete and coat exposed steel with epoxy.

Adjust interior post spacing as necessary to clear existing anchor bolts. Do not exceed 10'-0" post spacing.

Include all labor, equipment, and materials needed to furnish and install the guardrail connection plates, saw and remove portions of the curb, and to remove the existing double box beam rail retrofit-freestanding in the bid item "DOUBLE BOX BEAM RAIL RETROFIT-FREESTANDING."



CONNECTION DETAILS



CURB MOUNT POST DETAILS

REGISTERED PROFESSIONAL ENGINEER
ADAM M. KAYE
PE-40591
DATE
NORTH DAKOTA

QUANTITIES

RAIL RETROFIT - FREE STANDING	320 LF

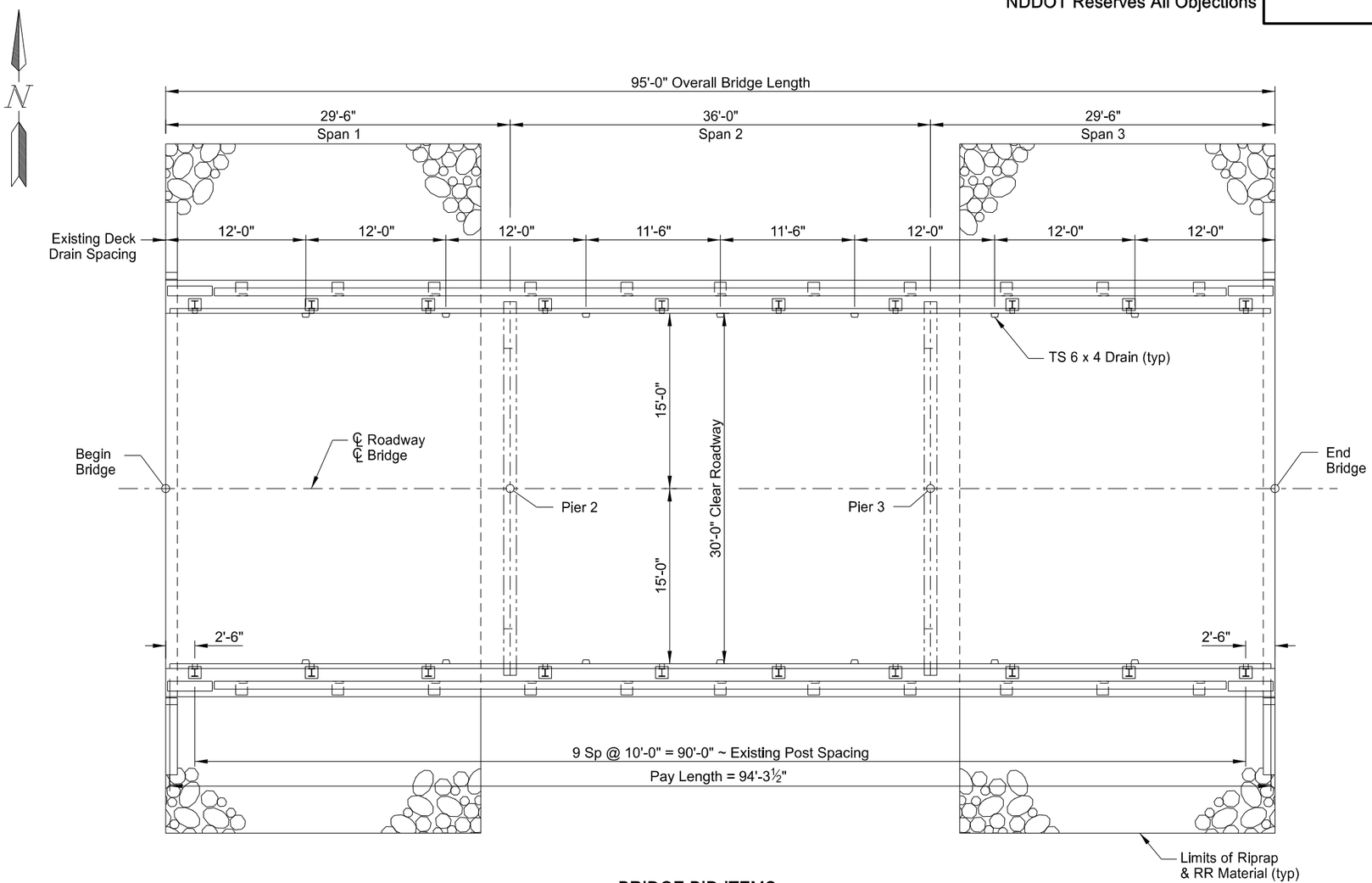
SHEYENNE RIVER
NELSON COUNTY, NORTH DAKOTA

SITE 1

DOUBLE BOX BEAM RAIL RETROFIT DETAILS (FREE STANDING)

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	170	8



BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
203	0140	BORROW-EXCAVATION	CY	217
256	0201	RIPRAP GRADE II	TON	426
602	1250	PENTRATING WATER REPELLENT TREATMENT	SY	317
602	7000	SPECIAL SURFACE FINISH	SF	681
624	3011	REMOVE & RESET DBL BOX BEAM RETROFIT - FREE STAND	LF	188.6
650	0704	OVERLAY CONCRETE	CY	18
650	0707	DECK CONCRETE	CY	2
650	0710	CLASS 1-H REMOVAL	SY	317
650	0720	CLASS 1 REMOVAL	SY	317
650	0723	CLASS 3 REMOVAL	SY	10
650	0724	CLASS 4 REMOVAL	SY	3
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	376
910	0565	CONTROLLED DENSITY FILL	CY	1
930	9223	CRACK SEALING	LF	66
930	9612	SPALL REPAIR	SF	102

REGISTERED PROFESSIONAL ENGINEER
ADAM M. KAYE
PE-40591
DATE
NORTH DAKOTA

SPECIAL PROVISIONS	
SP 150(23)	CONCRETE SPALL REPAIR
SP 648(23)	HYDRODEMOLITION AND OVERLAY OF CONCRETE BRIDGE DECKS

MAUVAIS COULEE
TOWNER COUNTY, NORTH DAKOTA

SITE 2

BRIDGE LAYOUT

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

Jason Thorenson
06/13/25

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	170	9

NOTES – SITE 2

100 SCOPE OF WORK: This project consists of placing a deck overlay, spall repair, crack sealing, and restoring and armoring channel embankments with riprap. Complete superstructure work at this site half the bridge at a time to maintain traffic.

100 EROSION REPAIR: The channel embankment exhibits localized erosion near the bridge abutments. Erosion repair is required at abutments and wingwalls as shown in the plans. Limits shown are approximate and will be determined by the Engineer in the field. Fill the eroded areas with Borrow-Excavation and Riprap as required to reshape the embankment to the original slopes shown in the plans.

203 BORROW-EXCAVATION: Acquire all borrow needed for the erosion repairs. No borrow is available within the highway right of way. Include the cost for the erosion control items for the borrow site in the contract unit price for the “Borrow-Excavation.” Compact the borrow according to Compaction Control, Type C. The Engineer determines the actual amount of borrow used. The contractor is paid for the actual amount of borrow put in place.

203 SHRINKAGE: 25 percent additional volume is included for shrinkage in earth embankment.

256 RIPRAP: Use Riprap Grade ll to the limits shown. The riprap quantity is based on the following:

1. West abutment: 213 TON
2. East abutment: 213 TON

The existing riprap may be salvaged and reused. Any riprap salvaged will be paid for as Riprap Grade ll. Basis of payment for salvaged riprap will be 1.7 tons per cubic yard and measured by placement area and plan depth. The Engineer will determine the final limits of riprap. Payment will be for the actual amount used and at the contract unit price of “Riprap Grade ll.”

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 SPECIAL SURFACE FINISH: Clean the front face and top of the bridge curb using sandblasting, shot blasting, or water-washing equipment to remove all dirt, grease, oil, efflorescence, laitance, and loose or flaking coatings. Fill cracks larger than 0.012” with Tex-Cote Skim Cote or an approved crack sealer compatible with Tex-Cote XL 70 Bridge Cote. Apply Tex-cote XL 70 Bridge Cote with Silane to the front face and top of the bridge curb. Use gray surface finish color 36424 meeting AMS-STD 595 with a medium texture finish.

602 PENETRATING WATER REPELLENT TREATMENT: Apply penetrating water repellent to the driving surface of the bridge deck. Apply penetrating water repellent solution prior to sealing any bridge deck cracks. Do not allow traffic until the solution has completely penetrated and the entire driving surface is dry.

650 CLASS 1-H REMOVAL: Monitor the depth of concrete removal while operating the hydrodemolition equipment on the bridge. Stop operating the hydrodemolition equipment and consult with the Engineer if the Class 1-H removal depth extends deeper than the existing top mats of reinforcing steel over any single area larger than 4 square feet.

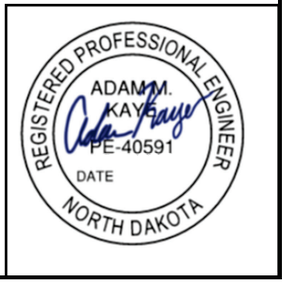
650 OVERLAY CONCRETE: An additional 1/2" depth of overlay concrete was included in the overlay concrete quantities to account for the irregular surface profile from hydrodemolition.

650 OVERLAY CONCRETE 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 its 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 limits of crack, including those portions that are narrower than 0.012” wide. The epoxy sealer may be Paulco TE-2501 (Viking Paints, Inc.), Dural 50 LM (Euclid Chemical Co.), TK-9000 or TK-2110 (TK Products), or an approved equal.

Include all work and materials associated in the deck overlay crack sealing in the bid item “Overlay Concrete.”



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	170	10

NOTES – SITE 2

910 CONTROLLED DENSITY FILL: Controlled density fill consists of cement, water, fly ash and aggregate at the ratio specified below. Place the controlled density fill as shown in the plans. Mix the material continuously during pumping or placement to keep the solution from separating.

Mix Design	
Materials	Weight (lbs)
Cement	70
Fly Ash	125
Fine Aggregate	2600
Water	416.5

At the contractor's option, the contractor may fill the void under the abutment using polyurethane foam in lieu of controlled density fill. Expansive foam insulation must consist of a high expansion hydrophobic polyurethane foam that is nontoxic, non-flammable, and meets the following requirements below.

Test	Requirement	Method
Tensile Strength	50 psi	ASTM D 638
Compressive Strength	90 psi	ASTM D 1621
Shear Strength	25 psi	ASTM D 732
Water Absorption	< 2% by volume	ASTM D 2842

Any additional cost for this option will be borne by the contractor.

930 CRACK SEALING: The Engineer will perform a visual inspection of the abutments to determine the need for crack sealing in addition to those shown in the plans. Repair all cracks designated by the Engineer at this time.

Perform a visual inspection of the abutments and mark all visible cracks appearing on the surface 0.012" or greater in width at its 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 limits of crack, including those portions that are narrower than 0.012" wide. The epoxy sealer may be Sikadur Crack Weld (Sika Corporation), Simpson Strong-Tie Crack-Pac (Euclid Chemical Co.), MasterFlow 647 (BASF Chemical Co.), or an approved equal.

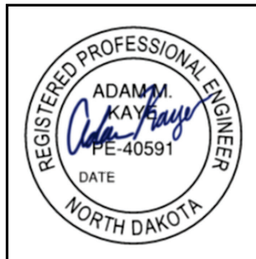
Include all work and materials associated with the abutment crack sealing in the bid item "Crack Sealing."

930 SPALL REPAIR: The structure has areas of spalling and concrete deterioration as indicated in the "Spall Repair" table below. Follow the repair procedures in accordance with SP 150(23) Concrete Spall Repair.

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. See Supplemental Data for photos.

A minimum area of 1 SF will be paid at each repair location. Include all labor, equipment and materials needed to repair the spall areas in the bid item "Spall Repair."

SPALL REPAIR		
PICTURE	LOCATION	QUANTITY (SF)
1	North Curb	1
2	South Curb	1
3 - 4	Abutment 1	14
5 - 7	Abutment 4	86



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NDDOT Reserves All Objections

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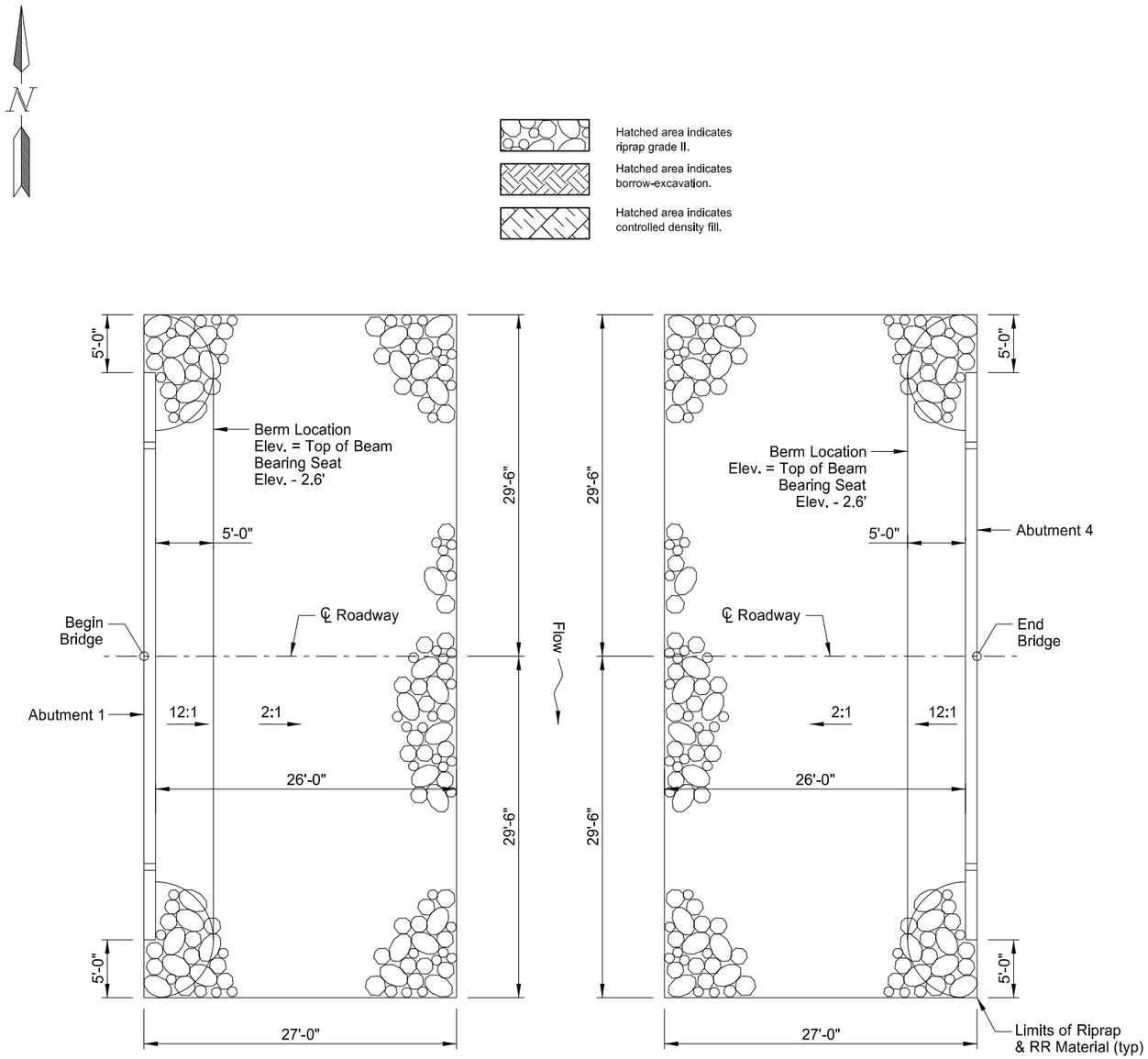
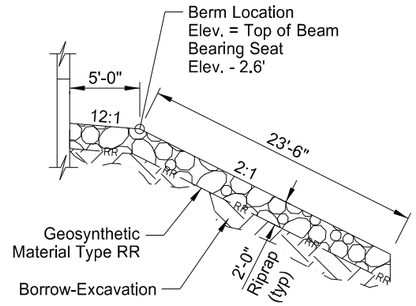
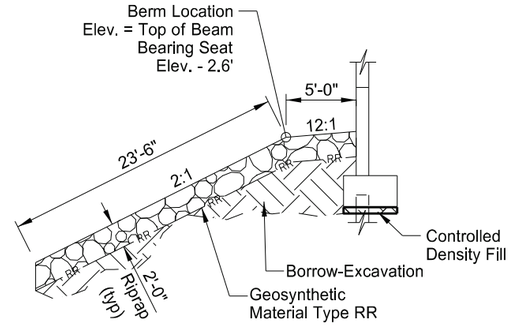


PLAN



ELEVATION
WEST ABUTMENT



ELEVATION
EAST ABUTMENT

QUANTITIES	
BORROW-EXCAVATION	217 CY
RIPRAP GRADE II	426 TON
GEOSYNTHETIC MATERIAL TYPE RR	376 SY
CONTROLLED DENSITY FILL	1 CY

REGISTERED PROFESSIONAL ENGINEER
ADAM M. KAYE
PE-40591
DATE
NORTH DAKOTA

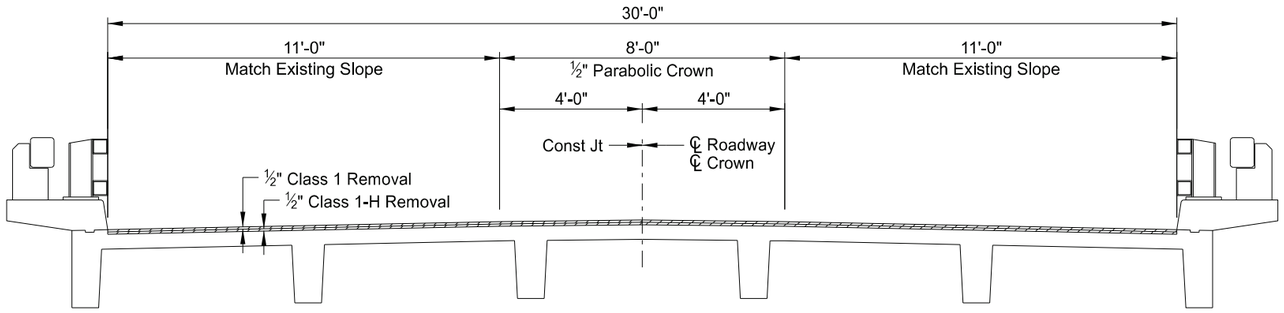
MAUVAIS COULEE
TOWNER COUNTY, NORTH DAKOTA

SITE 2

RIPRAP DETAILS

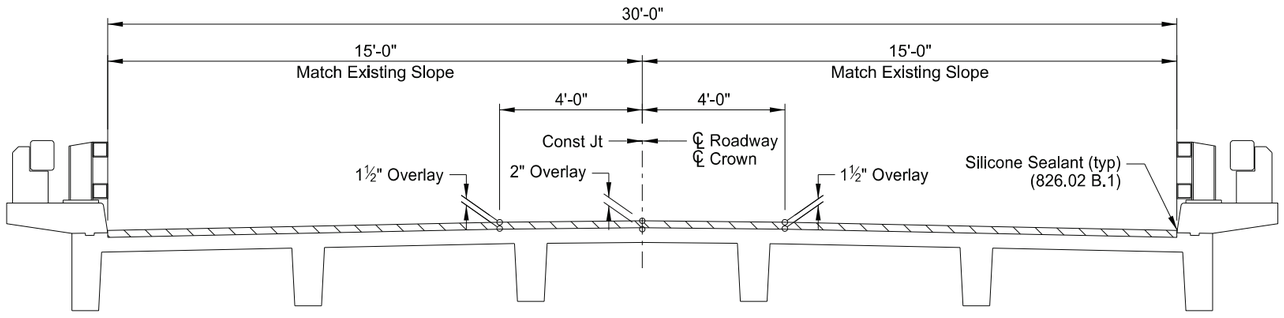
23 U.S.C. 407
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	170	12



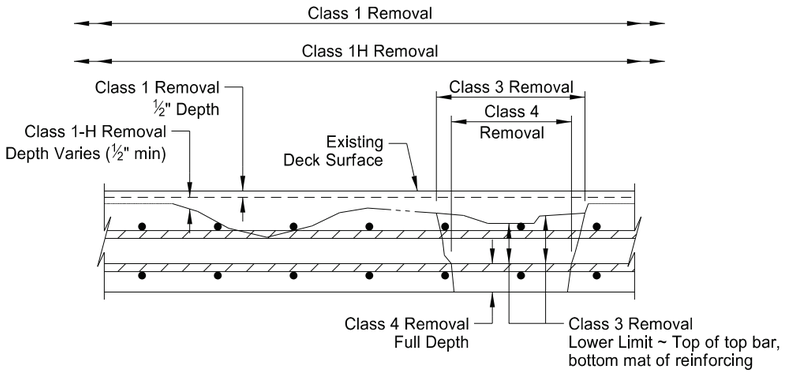
(SHOWING REMOVAL)

TYPICAL DECK SECTION



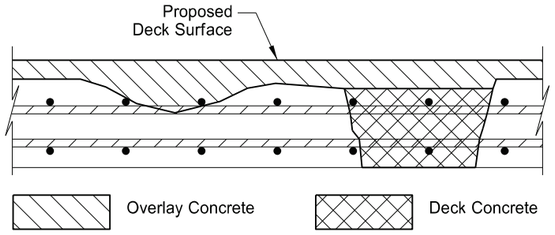
(SHOWING OVERLAY)

TYPICAL DECK SECTION



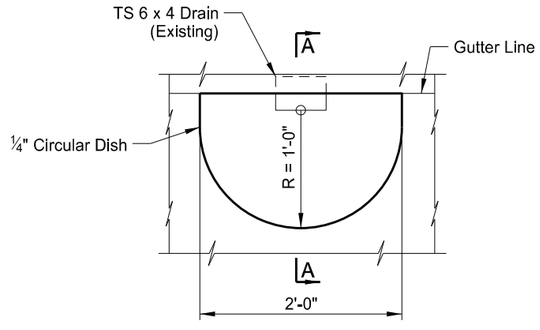
(SHOWING REMOVALS)

EXISTING BRIDGE DECK SECTION



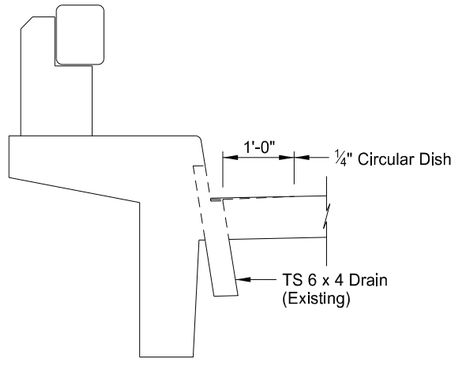
(SHOWING DECK & OVERLAY CONCRETE)

PROPOSED BRIDGE DECK SECTION



(14 Required)

DRAIN DISH DETAIL



A-A

QUANTITIES	
OVERLAY CONCRETE	18 CY
DECK CONCRETE	2 CY
CLASS 1 REMOVAL	317 SY
CLASS 1H REMOVAL	317 SY
CLASS 3 REMOVAL	10 SY
CLASS 4 REMOVAL	3 SY

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SITE 2

DECK OVERLAY DETAILS

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NDDOT Reserves All Objections

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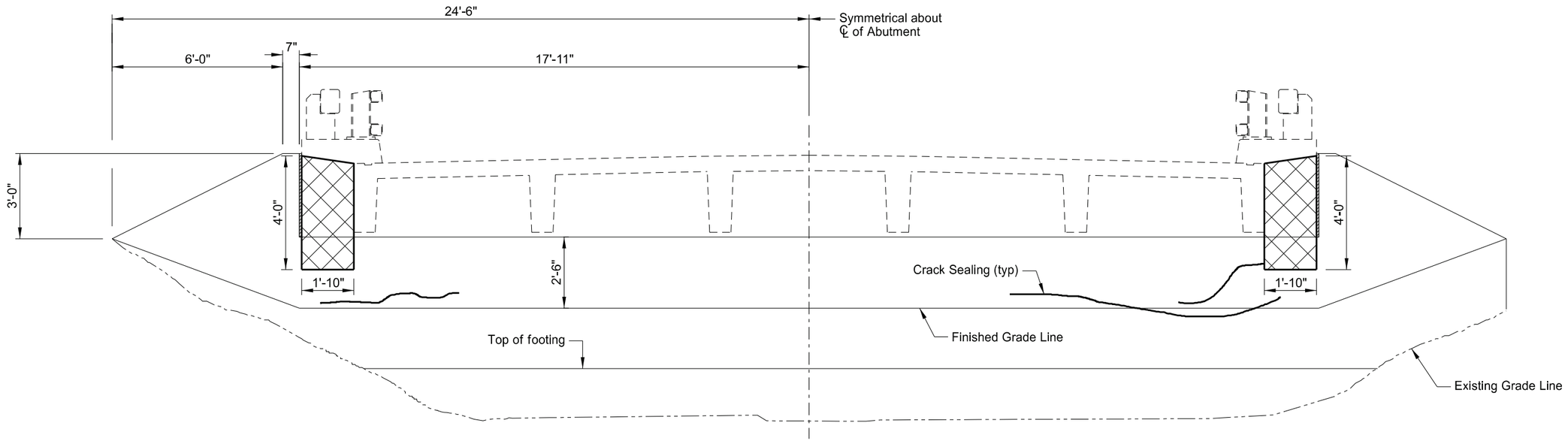
Indicates spall repair area.

NOTES:

All areas to be verified by the Engineer in the field prior to removal.



(LOOKING WEST)

ABUTMENT 1

QUANTITIES	
SPALL REPAIR	14 SF
CRACK SEALING	16 LF

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TOWNER COUNTY, NORTH DAKOTA

SITE 2

ABUTMENT REPAIR DETAILS

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

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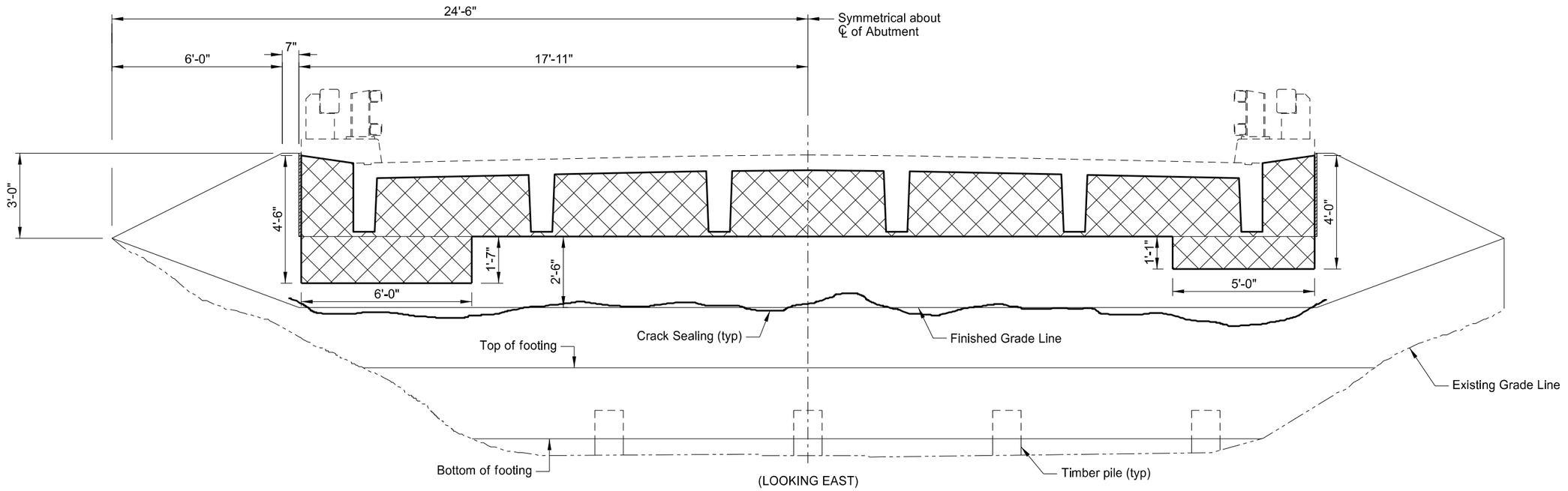
ND	SS-3-999(051)	170	14

Indicates spall repair area.

NOTES:

All areas to be verified by the Engineer in the field prior to removal.



ABUTMENT 4

QUANTITIES	
SPALL REPAIR	86 SF
CRACK SEALING	50 LF

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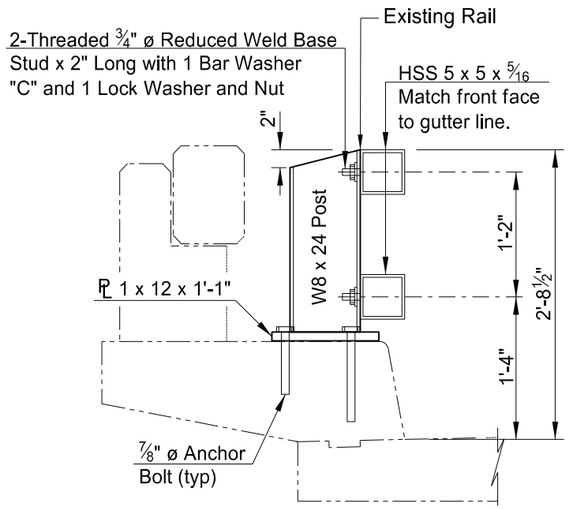
TOWNER COUNTY, NORTH DAKOTA

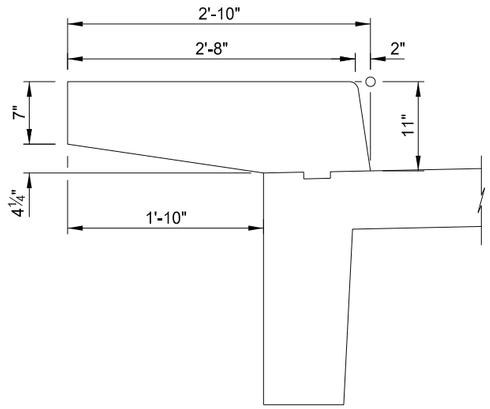
SITE 2

ABUTMENT REPAIR DETAILS

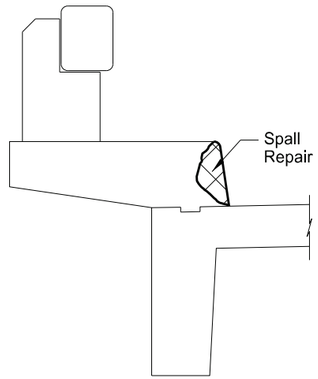
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	170	15



RAIL CONNECTION ANCHOR DETAIL
(For Informational Purposes Only)



CURB SECTION



SPALL AREA

Indicates spall repair area.

NOTES:

All areas to be verified by the Engineer in the field prior to removal.

See "Spall Repair" table on Dwg 17-042.967-3 for repair locations.

REGISTERED PROFESSIONAL ENGINEER
ADAM M. KAYE
PE-40591
DATE
NORTH DAKOTA

QUANTITIES	
SPALL REPAIR	2 SF

MAUVAIS COULEE
TOWNER COUNTY, NORTH DAKOTA

SITE 2

BARRIER DETAILS

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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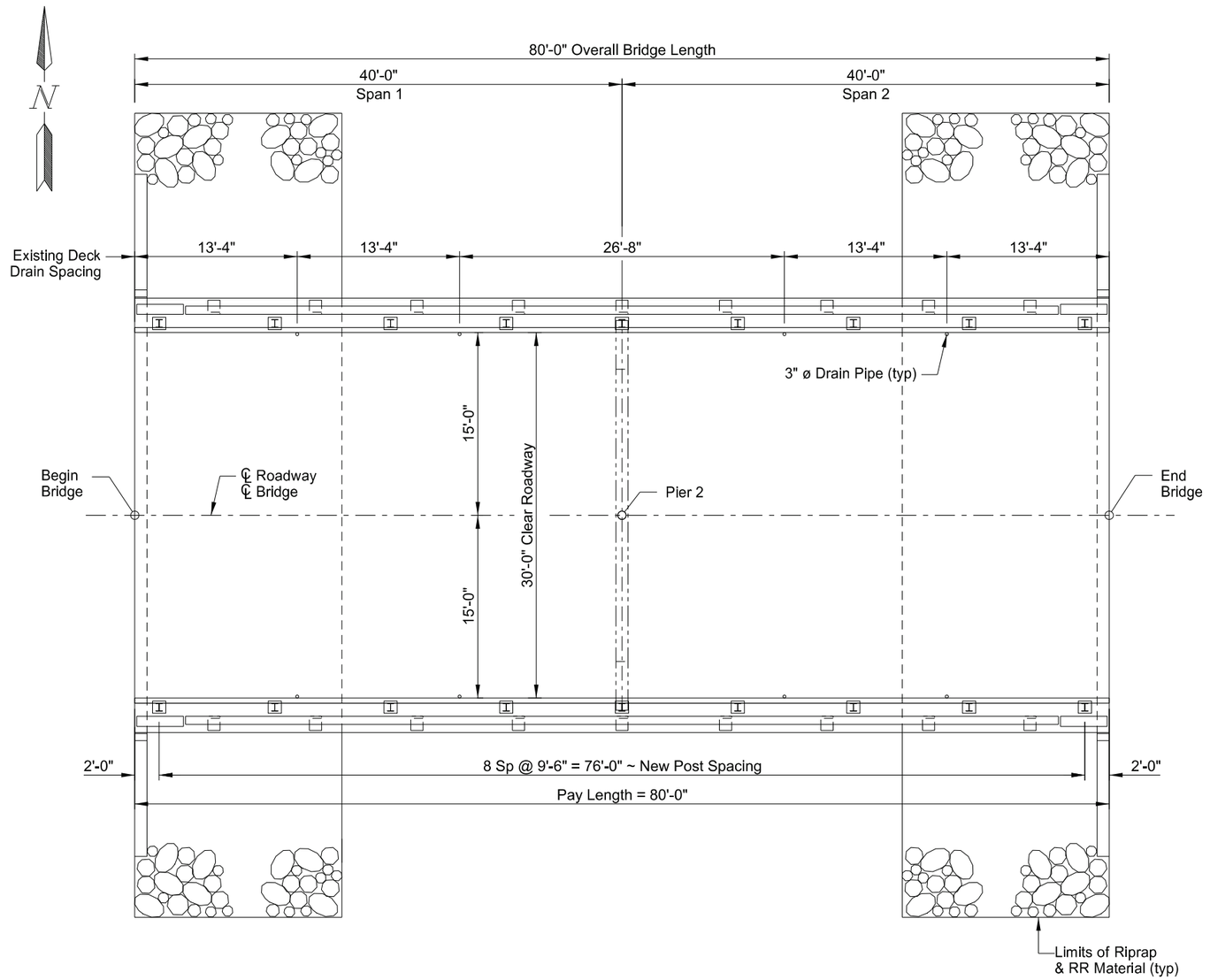

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
203	0140	BORROW-EXCAVATION	CY	55
256	0201	RIPRAP GRADE II	TON	290
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	267
602	7000	SPECIAL SURFACE FINISH	SF	574
624	3001	DOUBLE BOX BEAM RAIL RETROFIT-FREE STANDING	LF	160
650	0704	OVERLAY CONCRETE	CY	15
650	0707	DECK CONCRETE	CY	2
650	0710	CLASS 1-H REMOVAL	SY	267
650	0720	CLASS 1 REMOVAL	SY	267
650	0723	CLASS 3 REMOVAL	SY	8
650	0724	CLASS 4 REMOVAL	SY	3
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	256
930	9223	CRACK SEALING	LF	128
930	9612	SPALL REPAIR	SF	90

SPECIAL PROVISIONS	
SP 150(23)	CONCRETE SPALL REPAIR
SP 648(23)	HYDRODEMOLITION AND OVERLAY OF CONCRETE BRIDGE DECKS

REGISTERED PROFESSIONAL ENGINEER
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PE-40591
DATE
NORTH DAKOTA

BIG COULEE
BENSON COUNTY, NORTH DAKOTA

SITE 3

BRIDGE LAYOUT

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

Jason Thorenson
06/13/25

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	170	17

NOTES – SITE 3

100 SCOPE OF WORK: This project consists of placing a deck overlay, installing a double box beam rail retrofit, spall repair, crack sealing, and restoring and armoring channel embankments with riprap. Complete superstructure work at this site half the bridge at a time to maintain traffic.

100 EROSION REPAIR: The channel embankment exhibits localized erosion near the bridge abutments. Erosion repair is required at abutments and wingwalls as shown in the plans. Limits shown are approximate and will be determined by the Engineer in the field. Fill the eroded areas with Borrow-Excavation and Riprap as required to reshape the embankment to the original slopes shown in the plans.

203 BORROW-EXCAVATION: Acquire all borrow needed for the erosion repairs. No borrow is available within the highway right of way. Include the cost for the erosion control items for the borrow site in the contract unit price of the “Borrow-Excavation.” Compact the borrow according to Compaction Control, Type C. The Engineer determines the actual amount of borrow used. The contractor is paid for the actual amount of borrow put in place.

203 SHRINKAGE: 25 percent additional volume is included for shrinkage in earth embankment.

256 RIPRAP: Use Riprap Grade II to the limits shown. The riprap quantity is based on the following:

1. West abutment: 145 TON
2. East abutment: 145 TON

The Engineer will determine the final limits of riprap. Payment will be for the actual amount used and at the contract unit price of “Riprap Grade II.”

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 SPECIAL SURFACE FINISH: Clean the front face and top of the bridge curb using sandblasting, shot blasting, or water-washing equipment to remove all dirt, grease, oil, efflorescence, laitance, and loose or flaking coatings. Fill cracks larger than 0.012” with Tex-Cote Skim Cote or an approved crack sealer compatible with Tex-Cote XL 70 Bridge Cote. Apply Tex-Cote XL 70 Bridge Cote with Silane to the front face and top of the bridge curb. Use gray surface finish color 36424 meeting AMS-STD 595 with a medium texture finish.

602 PENETRATING WATER REPELLENT TREATMENT: Apply penetrating water repellent to the driving surface of the bridge deck. Apply penetrating water repellent solution prior to sealing any bridge deck cracks. Do not allow traffic until the solution has completely penetrated and the entire driving surface is dry.

650 CLASS 1-H REMOVAL: Monitor the depth of concrete removal while operating the hydrodemolition equipment on the bridge. Stop operating the hydrodemolition equipment and consult with the Engineer if the Class 1-H removal depth extends deeper than the existing top mats of reinforcing steel over any single area larger than 4 square feet.

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 hydrodemolition.

650 OVERLAY CONCRETE 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 its 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 limits of crack, including those portions that are narrower than 0.012” wide. The epoxy sealer may be Paulco TE-2501 (Viking Paints, Inc.), Dural 50 LM (Euclid Chemical Co.), TK-9000 or TK-2110 (TK Products), or an approved equal.

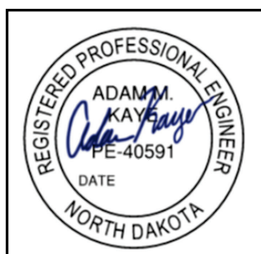
Include all work and materials associated in the deck overlay crack sealing in the bid item “Overlay Concrete.”

930 CRACK SEALING: The Engineer will perform a visual inspection of the abutments to determine the need for crack sealing in addition to those shown in the plans. Repair all cracks designated by the Engineer at this time.

Perform a visual inspection of the abutments and mark all visible cracks appearing on the surface 0.012" or greater in width at its 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 limits of crack, including those portions that are narrower than 0.012" wide. The epoxy sealer may be Sikadur Crack Weld (Sika Corporation), Simpson Strong-Tie Crack-Pac (Euclid Chemical Co.), MasterFlow 647 (BASF Chemical Co.), or an approved equal.

Include all work and materials associated with the abutment crack sealing in the bid item “Crack Sealing.”



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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NOTES – SITE 3

930 SPALL REPAIR: The structure has areas of spalling and concrete deterioration as indicated in the “Spall Repair” table below. Follow the repair procedures in accordance with SP 150(23) Concrete Spall Repair.

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. See Supplemental Data for photos.

A minimum area of 1 SF will be paid at each repair location. Include all labor, equipment and materials needed to repair the spall areas in the bid item “Spall Repair.”

SPALL REPAIR		
PICTURE	LOCATION	QUANTITY (SF)
1	North Curb	1
2	South Curb	1
3 - 4	Abutment 1	14
5 - 7	Abutment 4	86

REGISTERED PROFESSIONAL ENGINEER
ADAM M. KAYE
PE-40591
DATE
NORTH DAKOTA

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NDDOT Reserves All Objections

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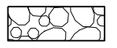
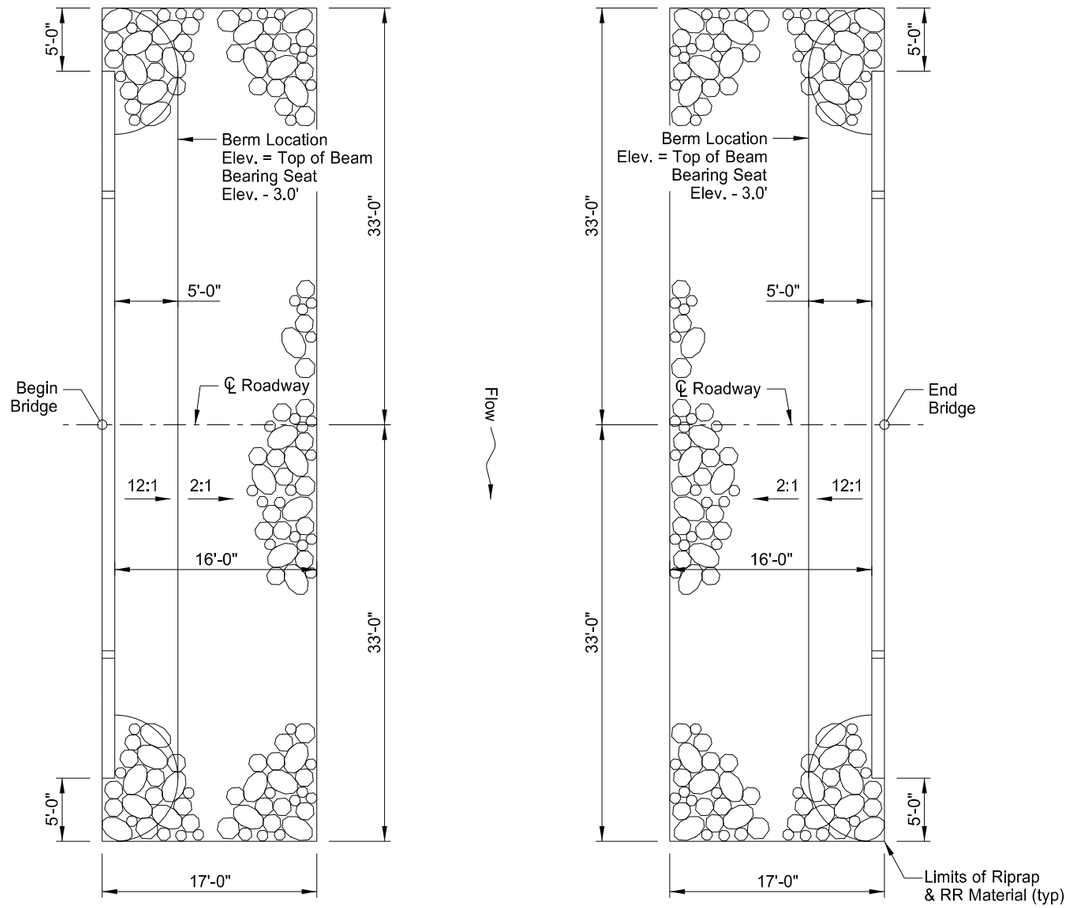
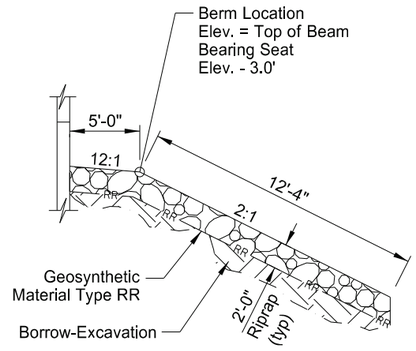
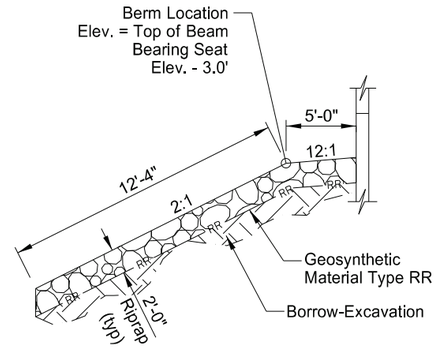




PLAN



ELEVATION
WEST ABUTMENT



ELEVATION
EAST ABUTMENT

QUANTITIES	
BORROW-EXCAVATION	55 CY
RIPRAP GRADE II	290 TON
GEOSYNTHETIC MATERIAL TYPE RR	256 SY

REGISTERED PROFESSIONAL ENGINEER
ADAM M. KAYE
PE-40591
DATE
NORTH DAKOTA

BIG COULEE
BENSON COUNTY, NORTH DAKOTA

SITE 3

RIPRAP DETAILS

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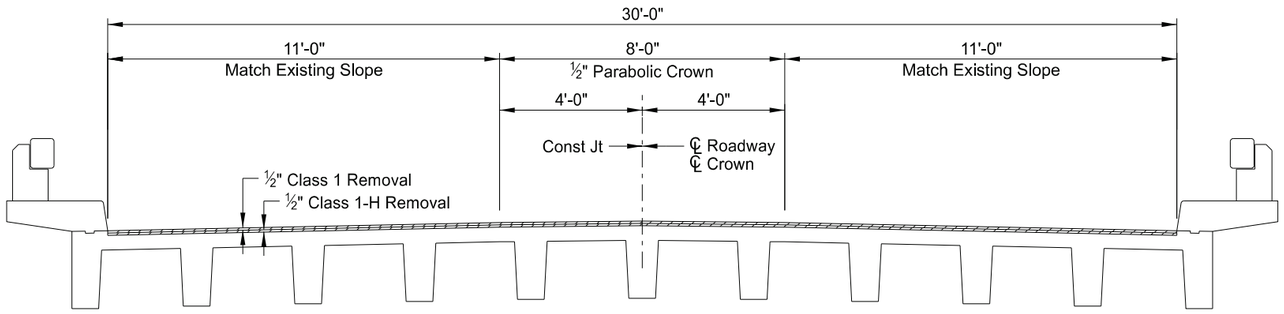
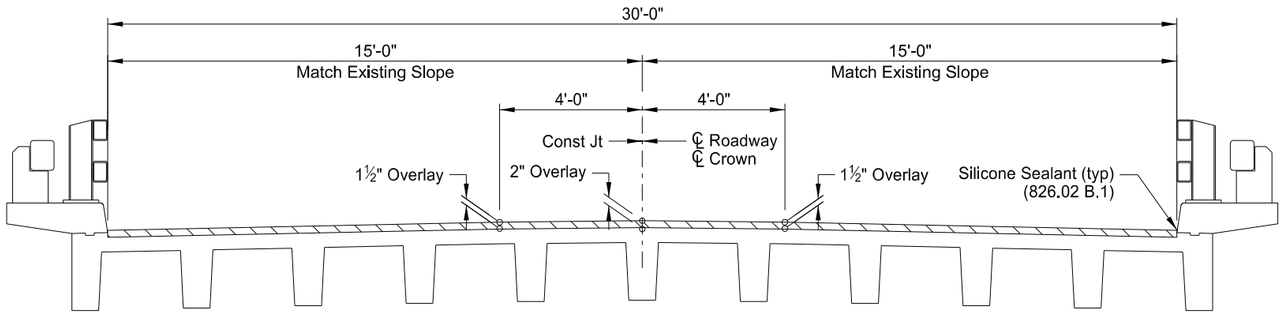


(SHOWING REMOVAL)

TYPICAL DECK SECTION



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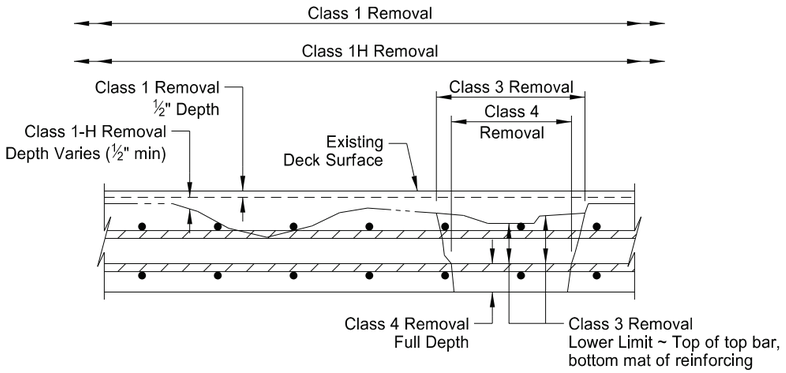
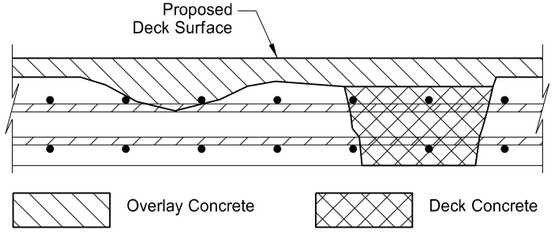
TYPICAL DECK SECTION



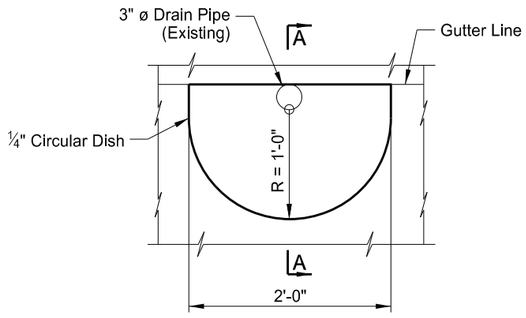
(SHOWING REMOVALS)

EXISTING BRIDGE DECK SECTION



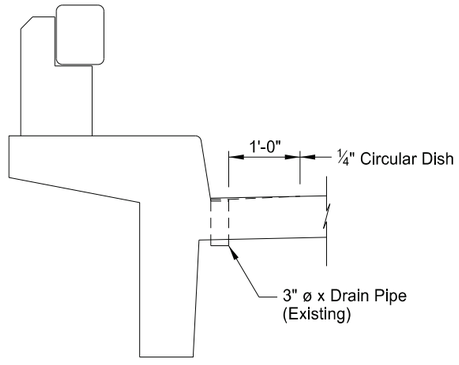
(SHOWING DECK & OVERLAY CONCRETE)

PROPOSED BRIDGE DECK SECTION



(8 Required)

DRAIN DISH DETAIL



A-A

QUANTITIES	
OVERLAY CONCRETE	15 CY
DECK CONCRETE	2 CY
CLASS 1 REMOVAL	267 SY
CLASS 1H REMOVAL	267 SY
CLASS 3 REMOVAL	8 SY
CLASS 4 REMOVAL	3 SY

REGISTERED PROFESSIONAL ENGINEER
ADAM M. KAYE
PE-40591
DATE
NORTH DAKOTA

BIG COULEE
BENSON COUNTY, NORTH DAKOTA

SITE 3

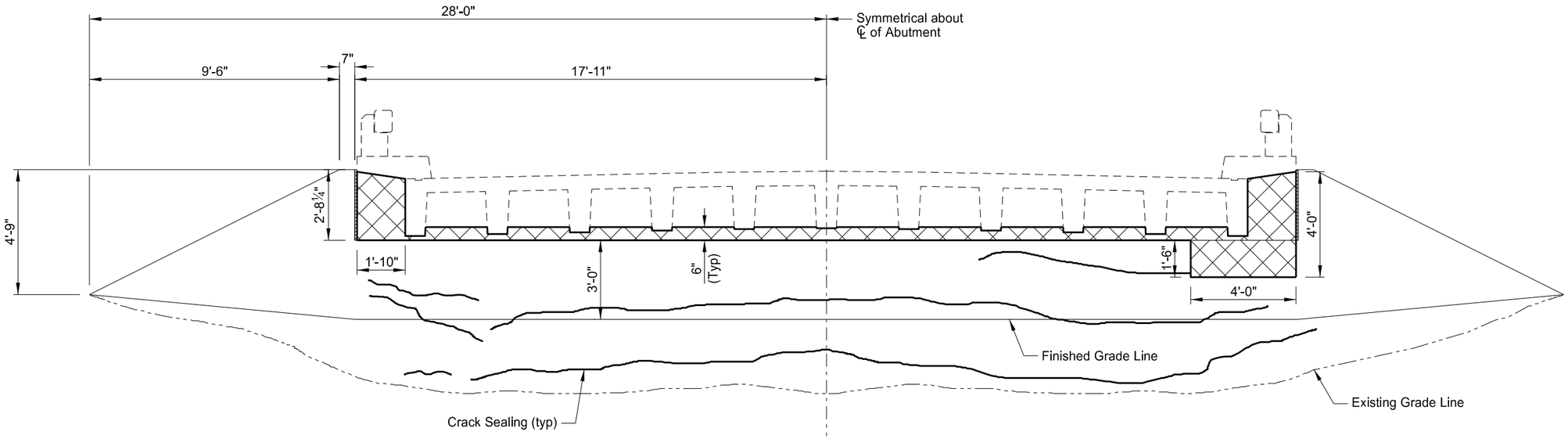
DECK OVERLAY DETAILS

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	170	21

Indicates spall repair area.

NOTES:

All areas to be verified by the Engineer in the field prior to removal.



(LOOKING WEST)

ABUTMENT 1

REGISTERED PROFESSIONAL ENGINEER
ADAM M. KAY
PE-40591
DATE
NORTH DAKOTA

QUANTITIES	
SPALL REPAIR	32 SF
CRACK SEALING	86 LF

BIG COULEE
BENSON COUNTY, NORTH DAKOTA

SITE 3

ABUTMENT REPAIR DETAILS

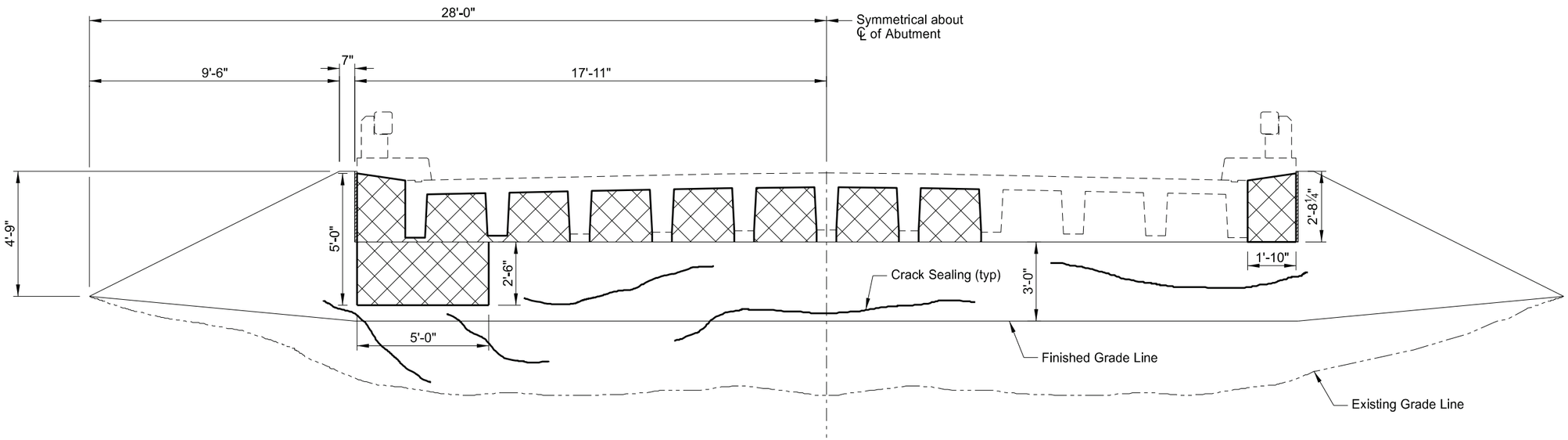
23 U.S.C. 407
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	170	22

Indicates spall repair area.

NOTES:

All areas to be verified by the Engineer in the field prior to removal.



(LOOKING EAST)

ABUTMENT 3

REGISTERED PROFESSIONAL ENGINEER
ADAM M. KAYE
PE-40591
DATE
NORTH DAKOTA

QUANTITIES	
SPALL REPAIR	58 SF
CRACK SEALING	42 LF

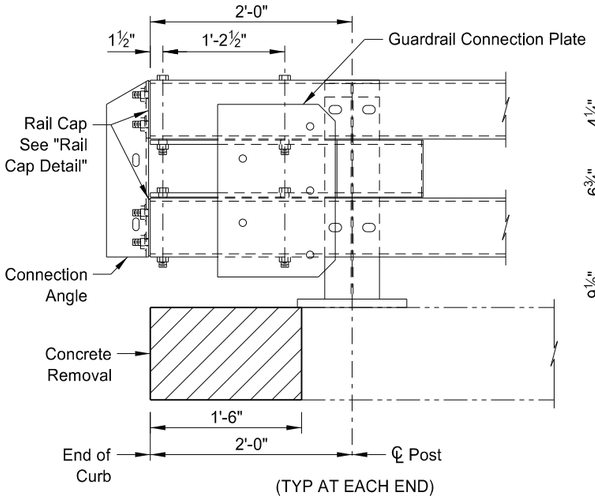
BIG COULEE
BENSON COUNTY, NORTH DAKOTA

SITE 3

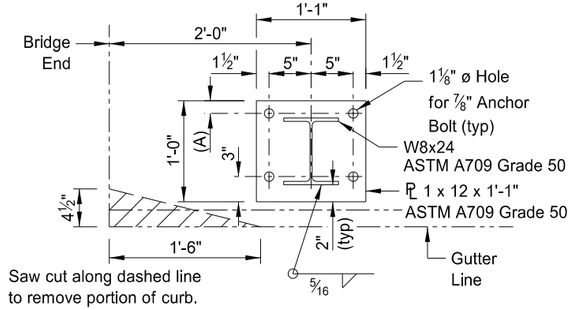
ABUTMENT REPAIR DETAILS

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	170	23

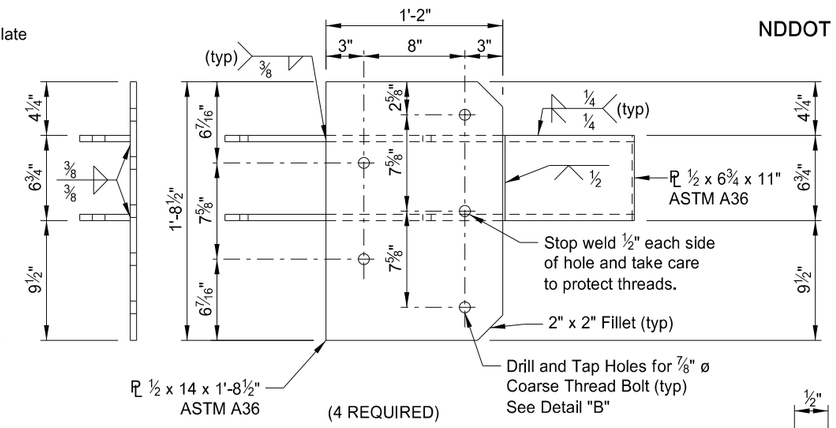


(TYP AT EACH END)

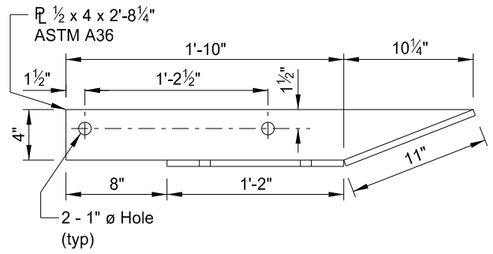


(A) Variable 1½" to 3"
(ASTM A709 GRADE 50)

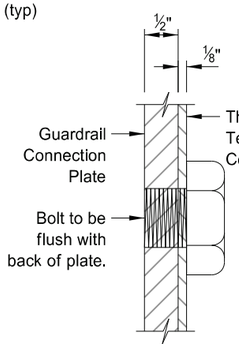
BASE PLATE DETAIL



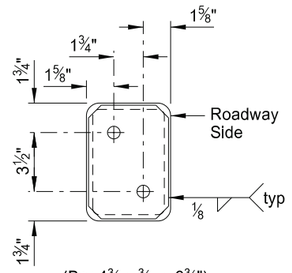
GUARDRAIL CONNECTION PLATE ELEVATION VIEW



GUARDRAIL CONNECTION PLATE PLAN VIEW

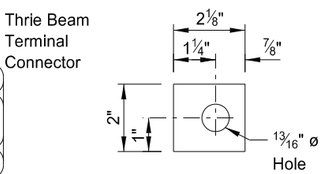


DETAIL "B"



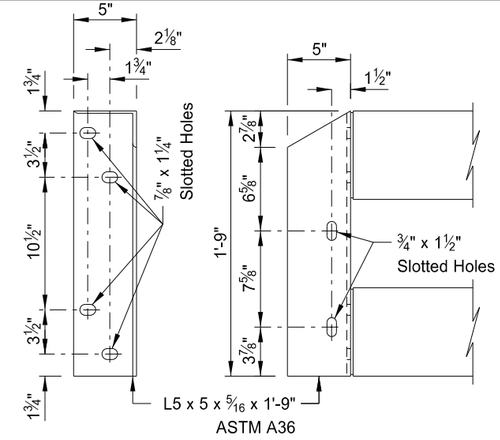
(Bar 4¾ x 3⁄16 x 6¾")
(ASTM A709 GRADE 36)
Cope corners 1" to provide zinc drains.

RAIL CAP END VIEW

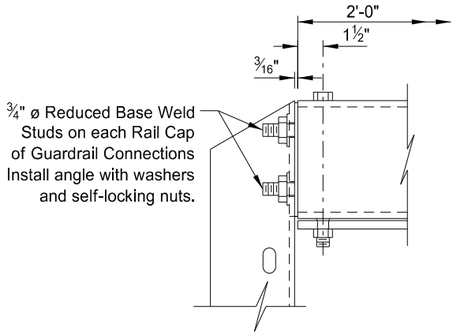


(ASTM A709 GRADE 36)
Position washers to completely cover slotted holes.

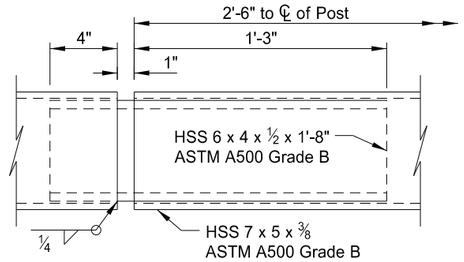
¼" BAR WASHER "C"



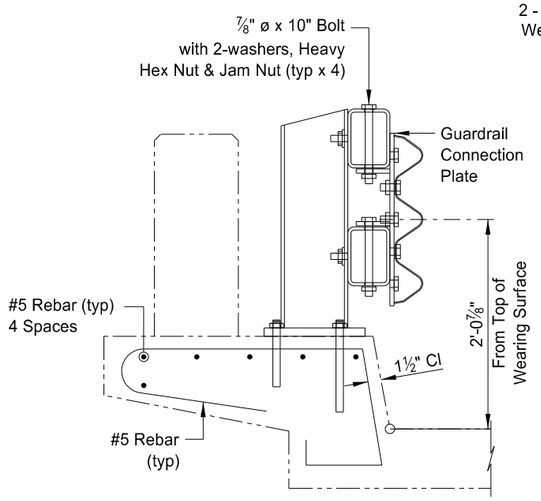
CONNECTION ANGLE DETAILS



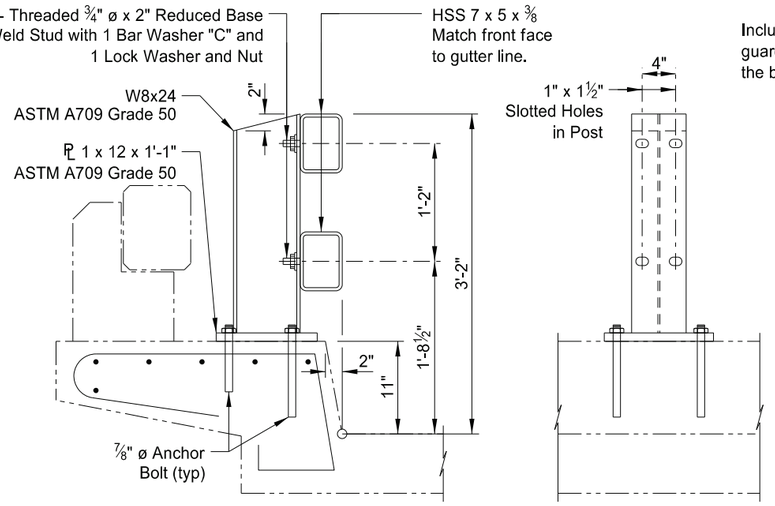
RAIL CAP DETAIL



RAIL SPLICE DETAIL



CONNECTION DETAILS



CURB MOUNT POST DETAILS

NOTES:

Provide reduced base studs in accordance with ASTM A108 Grade 1010.

Provide ⅞" ø Anchor Bolts in accordance with ASTM F1554, Grade 105

Galvanize all steel components after fabrication according to Section 854.

Include all labor, equipment, and materials needed to furnish and install the guardrail connection plates, and to saw and remove portions of the curb in the bid item "DOUBLE BOX BEAM RAIL RETROFIT-FREESTANDING."

REGISTERED PROFESSIONAL ENGINEER
ADAM M. KAYE
PE-40591
DATE
NORTH DAKOTA

QUANTITIES

RAIL RETROFIT - FREE STANDING	160 LF

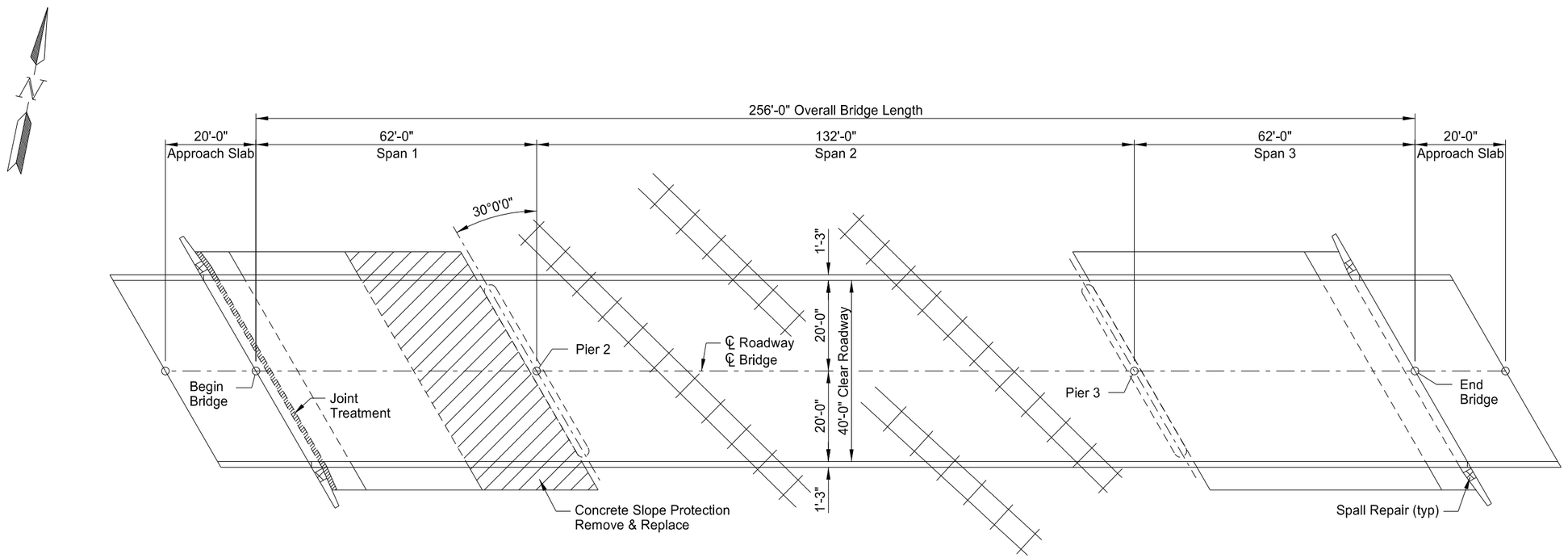
BIG COULEE
BENSON COUNTY, NORTH DAKOTA

SITE 3

DOUBLE BOX BEAM RAIL RETROFIT
DETAILS (FREE STANDING)

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	170	24



Hatched area indicates concrete to be removed & replaced.

Indicates joint treatment area.

Indicates spall repair area.

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
107	0100	RAILWAY PROTECTION INSURANCE	L SUM	1
107	0140	RAILROAD COORDINATION	L SUM	1
107	0151	RAILROAD FLAGGING	L SUM	1
258	0200	REMOVE & REPLACE CONCRETE SLOPE PROTECTION	SY	180
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	22
602	7000	SPECIAL SURFACE FINISH	SF	3,832
650	0805	DECK SPALL REPAIR	SF	198
930	8644	SILICONE SEALANT	LF	685
930	9223	CRACK SEALING	LF	100
930	9612	SPALL REPAIR	SF	43
950	9712	JOINT TREATMENT	LF	60

REGISTERED PROFESSIONAL ENGINEER
ADAM M. KAYE
PE-40591
DATE
NORTH DAKOTA

SPECIAL PROVISIONS	
SP 150(23)	CONCRETE SPALL REPAIR

STANDARD DRAWINGS
D-258-1

CANADIAN PACIFIC OVERHEAD
FOSTER COUNTY, NORTH DAKOTA

SITE 4

BRIDGE LAYOUT

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

Jason Thorenson
06/13/25

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	170	25

NOTES – SITE 4

100 SCOPE OF WORK: This project consists of spall repair, crack sealing, deck spall repair, and removing and replacing failed concrete slope protection. Complete superstructure work at this site half the bridge at a time to maintain traffic.

258 REMOVE AND REPLACE CONCRETE SLOPE PROTECTION: The concrete slope protection at the west abutment has multiple damaged rows at the bottom of the slope protection. Remove and replace the damaged rows in accordance with Standard D-258-1. Clean the concrete slope protection from all dirt and debris. The actual limits of repair will then be determined by the Engineer in the field.

Keep a minimum of 6” of wire mesh that will remain beyond the removal line. Do not damage the wire mesh that is to remain in place for the replacement of the concrete slope protection. Dispose of all concrete and debris that is removed, off the right of way.

The neoprene glands and mounting hardware are missing on the front faces of both abutments. Furnish and install new glands and hardware according to Standard D-258-1.

Include all labor, equipment, and materials required to remove and replace the concrete slope protection items in the bid item “Remove & Replace Concrete Slope Protection.”

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 SPECIAL SURFACE FINISH: Clean all bridge and approach slab barrier surfaces as well as the outside edges of deck using sandblasting, shot blasting, or water-washing equipment to remove all dirt, grease, oil, efflorescence, laitance, and loose or flaking coatings. Fill cracks larger than 0.012” with Tex-Cote Skim Cote or an approved crack sealer compatible with Tex-Cote XL 70 Bridge Cote. Apply Tex-Cote XL 70 Bridge Cote with Silane to all bridge and approach slab barrier surfaces including the outside edges of the deck. Use gray surface finish color 36424 meeting AMS-STD 595 with a medium texture finish.

602 PENETRATING WATER REPELLENT TREATMENT: Apply penetrating water repellent to the deck spall repair areas on the bridge deck and approach slabs. Do not allow traffic until the solution has completely penetrated and the entire driving surface is dry.

650 DECK SPALL REPAIR: The bridge deck and approach slabs have spall areas as shown. Construct the deck spall repair as a Bridge Deck Overlay meeting Section 650. Saw cut the perimeter of the repair area to a depth of 1”. Remove the concrete to a minimum depth of 2”.

A chain drag survey was conducted in May, 2022. See Supplemental Data for survey results. The actual limits of the areas to be repaired will be determined by the Engineer in the field.

Include saw cutting, all materials, labor, and equipment required to remove the concrete and repair the deck and approach slab spall areas in the bid item “Deck Spall Repair.”

930 SILICONE SEALANT: Remove and replace the silicone sealant at the approach slab joints. In addition, apply silicone sealant to the joint where the deck meets the barrier. Clean the joints of all foreign materials using sandblasting, shot blasting, or water-washing equipment prior to applying the silicone sealant.

Include all materials, labor, and equipment required for applying silicone sealant in the bid item “Silicone Sealant.”

930 CRACK SEALING: The Engineer will perform a visual inspection of the abutments and piers to determine the need for crack sealing in addition to those shown in the plans. Repair all cracks designated by the Engineer at this time.

Perform a visual inspection of the abutments and piers and mark all visible cracks appearing on the surface 0.012" or greater in width at its 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 limits of crack, including those portions that are narrower than 0.012" wide. The epoxy sealer may be Sikadur Crack Weld (Sika Corporation), Simpson Strong-Tie Crack-Pac (Euclid Chemical Co.), MasterFlow 647 (BASF Chemical Co.), or an approved equal.

Include all work and materials associated with abutment and pier crack sealing in the bid item “Crack Sealing.”

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	170	26

NOTES – SITE 4

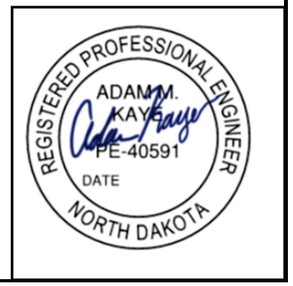
930 SPALL REPAIR: The structure has areas of spalling and concrete deterioration as indicated in the “Spall Repair” table below. Follow the repair procedures in accordance with SP 150(23) Concrete Spall Repair.

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. See Supplemental Data for photos.

A minimum area of 1 SF will be paid at each repair location. Include all labor, equipment and materials needed to repair the spall areas in the bid item “Spall Repair.”

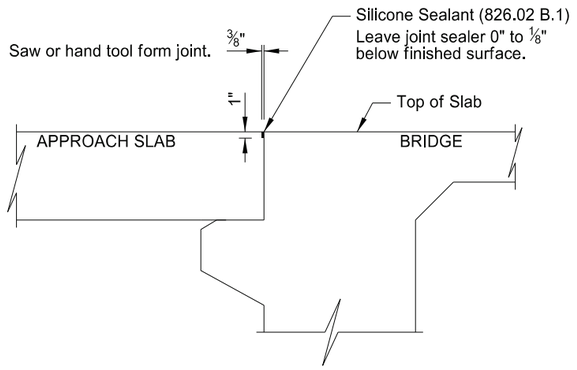
SPALL REPAIR		
PICTURE	LOCATION	QUANTITY (SF)
1 - 4	North Barrier	10
5 - 7	South Barrier	9
8 - 9	Abutment 1	12
10 - 11	Abutment 4	12

950 JOINT TREATMENT: The concrete slope protection has settled and pulled away from the west abutment leaving a variable width gap ranging from 2 – 6 inches. Clean all debris, soil, and vegetation from this opening and fill with non-reinforced concrete. Include all materials and labor required to place the concrete in the bid item “Joint Treatment.”



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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-3-999(051)	170	27

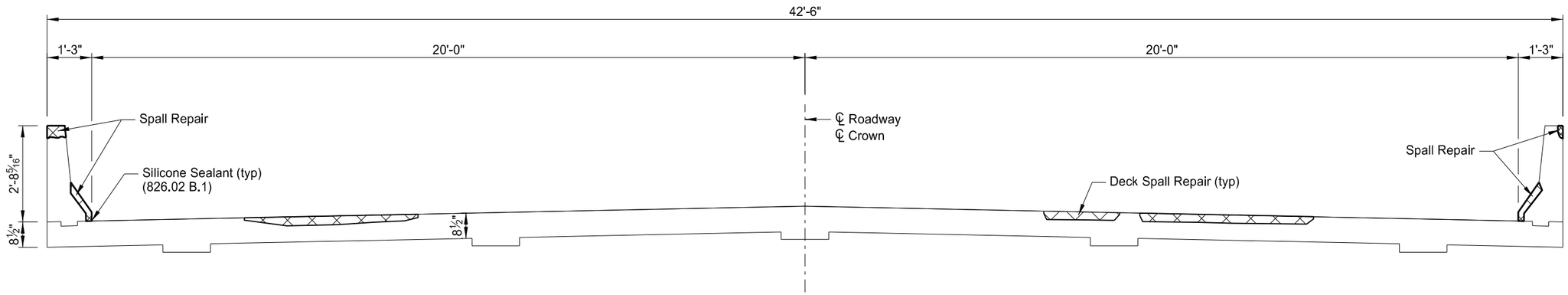


APPROACH SLAB JOINT DETAIL

Indicates spall repair area.

NOTES:

All areas to be verified by the Engineer in the field prior to removal.



TYPICAL DECK SECTION

QUANTITIES	
DECK SPALL REPAIR	198 SF
SPALL REPAIR	19 SF
SILICONE SEALANT	685 LF

REGISTERED PROFESSIONAL ENGINEER
ADAM M. KAYE
PE-40591
DATE
NORTH DAKOTA

CANADIAN PACIFIC OVERHEAD
FOSTER COUNTY, NORTH DAKOTA

SITE 4

SLAB SECTION

NDDOT ABBREVIATIONS

D-101-1

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

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

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

NDDOT ABBREVIATIONS

D-101-2

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

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Salv	salvage(d)
San	sanitary sewer line
Sec	section
SL	section line
Sep	separation
Seq	sequence
Serv	service
Sht	sheet
Shtng	sheeting
Shldr	shoulder
Sw or Sdwk	sidewalk
SD	sight distance
SN	sign number
Sig	signal
Sgl	single
SRCP	slotted reinforced concrete pipe
SC	slow curing
SS	slow setting
Sm	small
S	South
SE	South East
SW	South West
SB	Southbound
Sp	spaces
Spcl	special
SA	special assembly
SP	special provisions
G	specific gravity
Spk	spike
SB	split barrel sample
SH	sprinkler head
SV	sprinkler valve
Sq	square
Stk	stake
Std	standard
N	standard penetration test
Std Specs	standard specifications
Stm L	steam line
SEC	steel encased concrete
SMA	stone matrix asphalt
SSD	stopping sight distance
SD	storm drain
St	street
SPP	structural plate pipe
SPPA	structural plate pipe arch
Str	structure
Subd	subdivision
Sub	subgrade
Sub Prep	subgrade preperation
Ss	subsoil
SS	supplement specification
Supp	supplemental
Surf	surfacing
Surv	survey
Sym	symmetrical

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

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NDDOT ABBREVIATIONS

MEASUREMENTS

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

SURVEY DESCRIPTIONS

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

SOIL TYPES

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

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

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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

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LINE STYLES

D-101-21

Right Of Way

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

Boundary Control

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

Cross Sections and Typicals

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

Geotechnical

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

Countours

- Failure Line
- Depression Contours
- Supplemental Contour

Profile

- Subgrade, Subcut or Ditch Grade
- Topsoil Profile

Striping

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

Pavement Joints

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

Bridge Details

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

Erosion Control

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

Environmental

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

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SYMBOLS

D-101-30

North Arrow (Half Scale)

Alignment Data Point

Alignment Monument

Spot Elevation

Existing Miscellaneous Spot

Existing Access Control Arrow

Existing Benchmark

Reset USGS Marker

Iron Monument Found

Iron Pin R/W Monument

Property Corner

Iron Pin Reference Monument

Right of Way Marker (Exst, Ppsd, Reset)

Existing Federal Reference Corner

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

Existing Witness Corner

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

Existing Traverse PI Aerial Panel

Existing Reference Marker Point NGS

Existing EFB Misc

Existing Bush or Shrub

Existing Large Evergreen Tree

Existing Small Evergreen Tree

Existing Large Tree

Existing Small Tree

Existing Tree Trunk

Cairn or Stone Circle

Existing Artifact

Existing Satellite Dish

Existing Weather Station

Existing Windmill or Tower

Reinforced Pavement

CSB Continuous Split Barrel Sample

FA Flight Auger Sample

SB Split Barrel Sample

T Thinwall Tube Sample

N Standard Penetration Test

Incl Inclinometer Tube

Excavation Unit

Existing Ground Water Well Bore Hole

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SYMBOLS

D-101-31

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

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

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SYMBOLS

D-101-32

- Existing Luminaire
- Luminaire LED
- Existing Light Standard Luminaire
- Relocate Light Standard
- Light Standard Light LED Luminaire
- Light Standard 35 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 50 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 70 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 100 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 150 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 200 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 250 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 310 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 400 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 700 Watt High Pressure Sodium Vapor Luminaire
- Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire
- Emergency Vehicle Detector
- Video Detection Camera

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

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

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SYMBOLS

D-101-33

Existing Manhole (Electrical, Gas, Telephone)

Water Manhole (Exst, Exst with Valve)

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

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

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

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

Manhole (Ppsd, Ppsd 48 Inch, Exst Undefined)

Existing Water Appurtenance

Sprinkler Head (Exst, Ppsd)

Fire Hydrant (Exst, Ppsd)

Cleanout (Exst Sanitary, Underdrain)

Existing Catch Basin Inlet (Round, Square)

Existing Curb Inlet (Round, Square)

Existing Slotted Reinforced Concrete Pipe

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

Inlet Mountable Curb (Type A, Type B)

Inlet Saddle Base (Type 1, Type 2)

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

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

Median Drain

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

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

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

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

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

Pump
Sanitary, Storm Drain, Exst Water

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

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

Existing Utility Marker

Existing Meter

Existing Fuel Dispensers

Existing Fuel Filler Pipes

Existing Fuel Leak Sensors

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

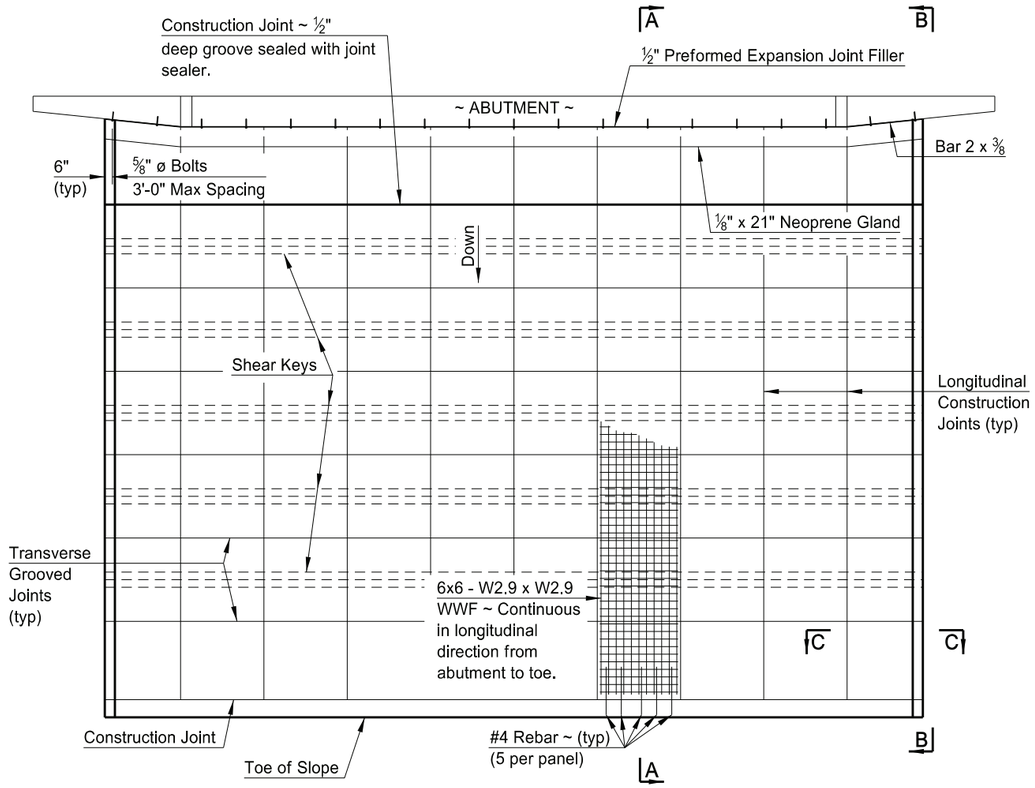
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

Kirk J Hoff

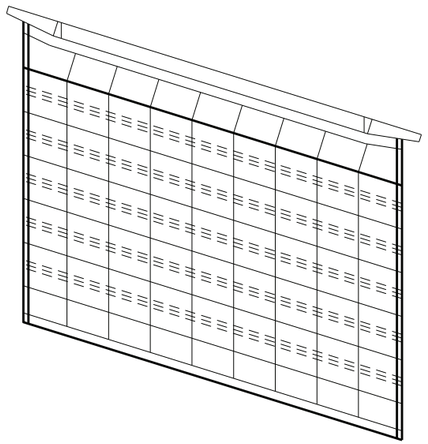
12 18 2020

STANDARD SLOPE PROTECTION UNDER BRIDGES

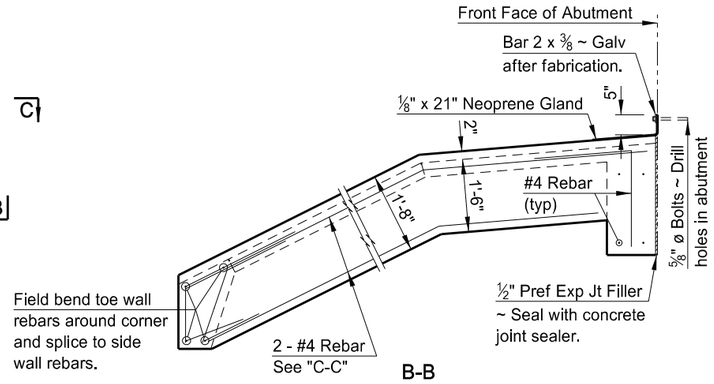
D-258-1



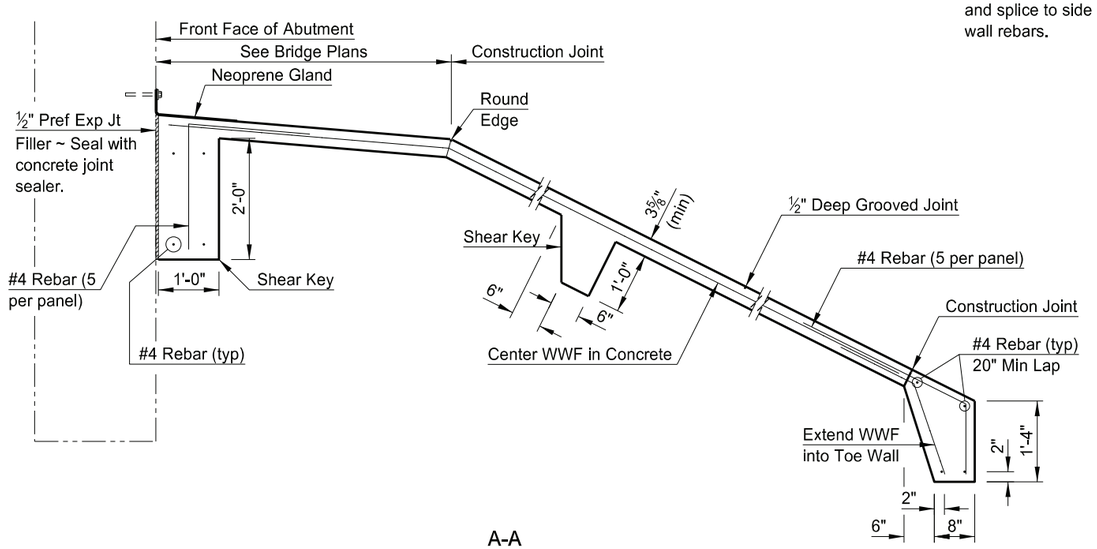
SLOPE PROTECTION LAYOUT



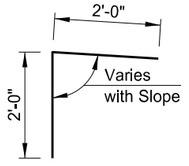
SKEWED SLOPE PROTECTION LAYOUT



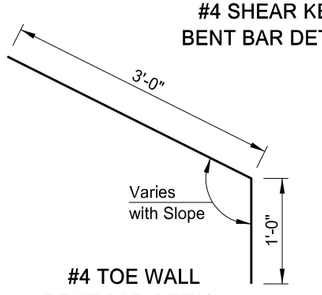
B-B



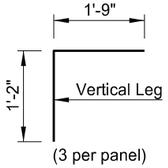
A-A



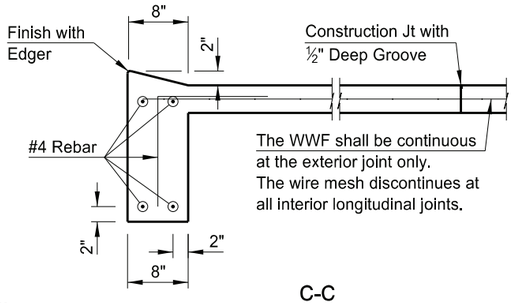
#4 SHEAR KEY BENT BAR DETAIL



#4 TOE WALL BENT BAR DETAIL



(3 per panel)
#4 SIDE WALL BENT BAR DETAIL



C-C

NOTES:

The toe wall shall be placed before concrete is placed on the slope.

All inside panels shall be 5'-6" square. All outside panels shall be adjustable from 5'-0" minimum to 8'-0" maximum.

All transverse joints shall be ½" deep grooved joints sealed with concrete joint sealer. All longitudinal joints shall be construction joints with ½" deep grooves sealed with concrete joint sealer. All cracks that may have developed before the project has been accepted shall also be sealed with concrete joint sealer. An elastomeric joint sealant which meets ASTM C-920, Cl 25, can be used in lieu of the sealants allowed in 826.02 of the ND Standard Specifications.

Wherever parts of a structure, such as piers, etc. are contacted by the slope protection, preformed expansion joint filler shall be installed between the contact areas as shown.

Shear keys shall be placed in every panel on the slope, as shown.

The welded wire fabric (WWF) shall be supplied in sheets. When it is necessary to make the WWF continuous, a lap splice at least 8" long shall be used.

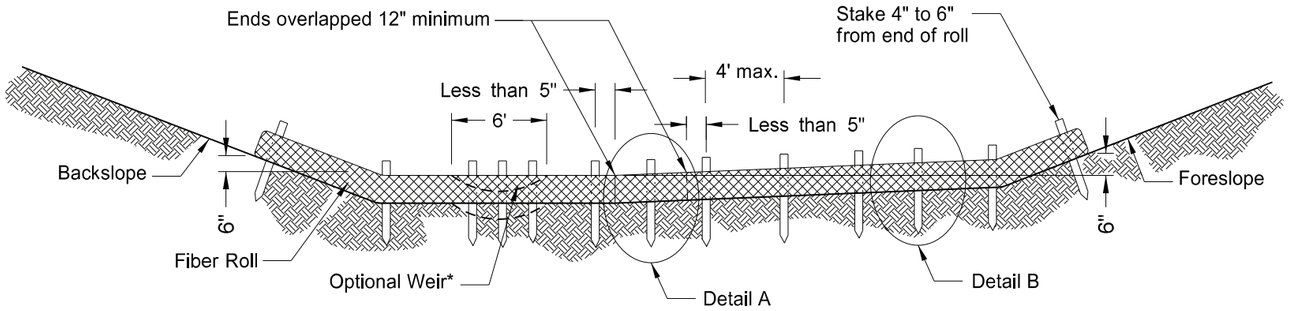
Several shorter bars may be substituted for the continuous Bar 2 x ⅜. If the substitution is made, the space from the end of the bar to the first hole shall not be more than 6 inches.

The bolts to hold the neoprene gland in place shall be installed into the abutment by a mechanical or chemically bonded method.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07/10/14	
REVISIONS	
DATE	CHANGE
07/10/14	CHANGED FROM D-708-1
09/03/19	UPDATED SIGNATURES

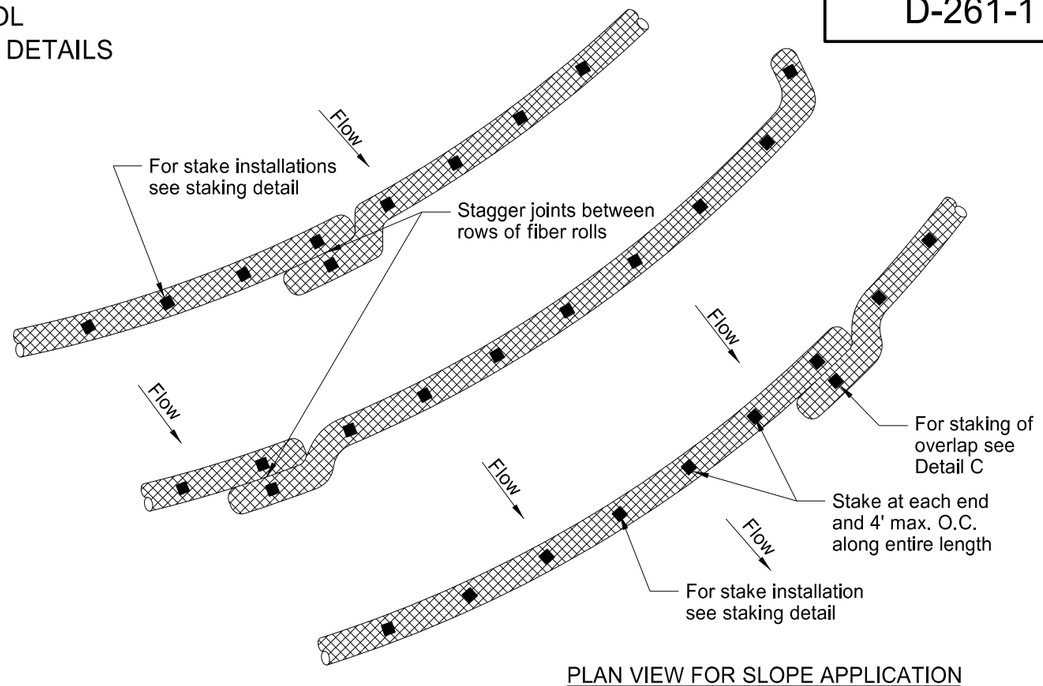
This document was originally issued and sealed by Jon Ketterling Registration Number PE-4684, on 09/03/19 and the original document is stored at the North Dakota Department of Transportation

EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS

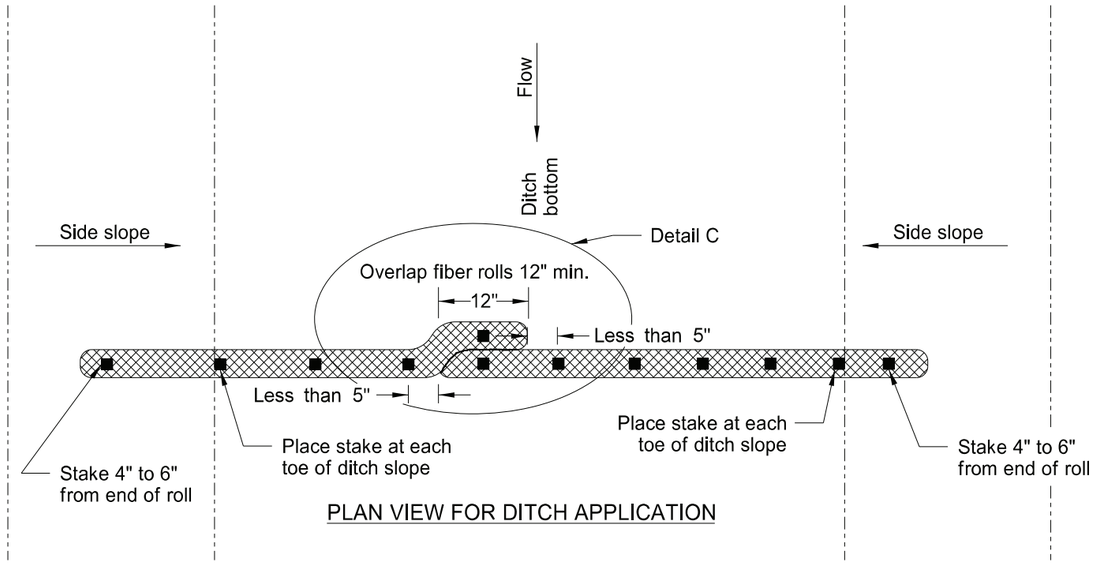


*Optional Weir. Use in flat areas, such as the Red River Valley, where there is potential for water to back up on adjacent property. Lower fiber roll enough to prevent water from backing up on adjacent property. Do not use 20-inch fiber rolls in flat areas where there is potential for water to back up on adjacent property.

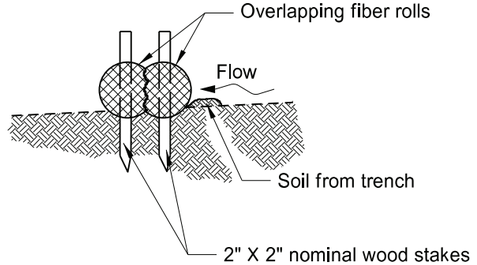
12 OR 20 INCH FIBER ROLL - DITCH BOTTOM



PLAN VIEW FOR SLOPE APPLICATION

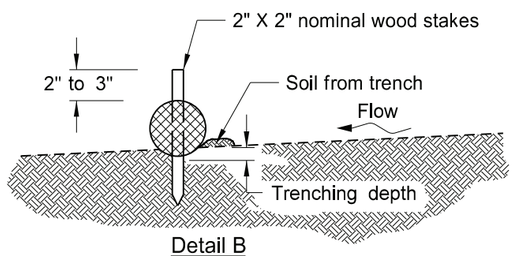


PLAN VIEW FOR DITCH APPLICATION



Detail A

Fiber Roll Overlapping Staking Detail



Detail B

Fiber Roll Staking Detail

FIBER ROLL DIAMETER	NOMINAL STAKE SIZE	MINIMUM STAKE LENGTH	MINIMUM TRENCH DEPTH	MAXIMUM TRENCH DEPTH
6"	2" x 2"	18"	2"	2"
12"	2" x 2"	24"	2"	3"
20"	2" x 2"	36"	3"	5"

NOTE: Runoff must not be allowed to run under or around roll.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

11-18-10

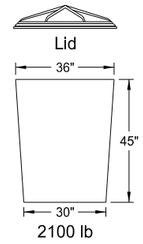
REVISIONS

DATE	CHANGE
06-10-13	Added plan view for ditch and slope application. Added table with values for stake and trench dimensions.
10-04-13	Revised fiber roll overlap detail.
06-26-14	Changed standard drawing number from D-708-7 to D-261-1.
08-27-19	New Design Engineer PE Stamp

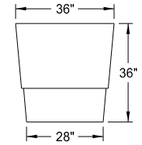
This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 08/27/19 and the original document is stored at the North Dakota Department of Transportation

ATTENUATION DEVICE

D-704-1

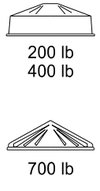


2100 lb

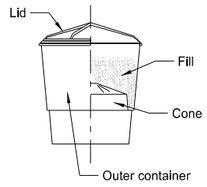


200, 400, 700 and 1400 lb

Outer Containers

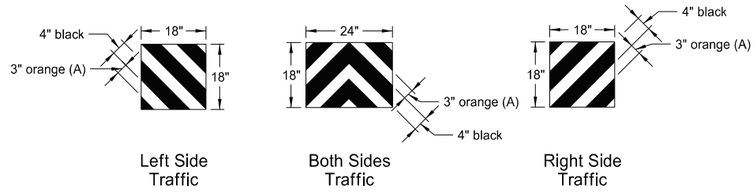


Cones



Typical Assembly

Typical Module Construction Detail



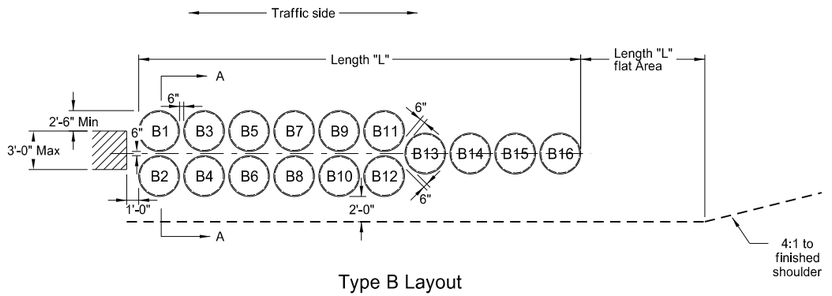
Left Side Traffic | Both Sides Traffic | Right Side Traffic

Reflective Sheet Detail

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

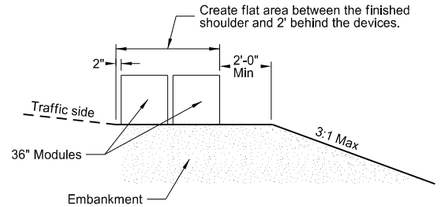
(A) Use 3" orange sheeting for temporary installations, and 3" yellow sheeting for permanent installations.

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



Type B Layout

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



Section A-A
(Type B Layout)

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

Notes:

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

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

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

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-25-12

REVISIONS

DATE	CHANGE
7-18-14	Revised sheeting in reflective sheet detail
9-27-17	Update to active voice
10-03-19	New Design Engr PE Stamp
8-01-24	Electronic Stamp/Signature

KIRK J. HOFF
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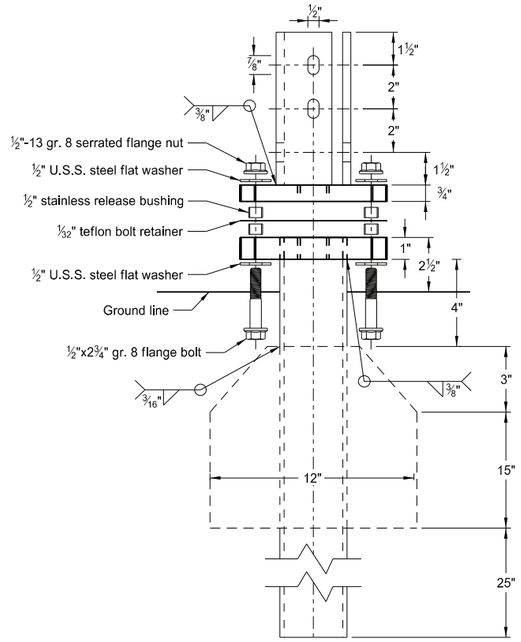
PE-4683
ENGINEER
NORTH DAKOTA

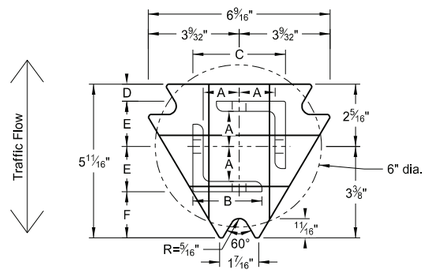
08/01/24

BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

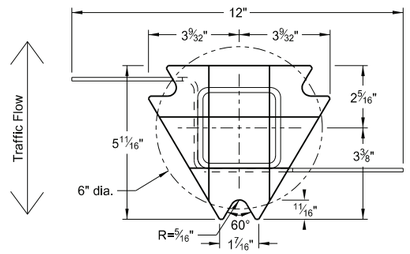
D-704-7



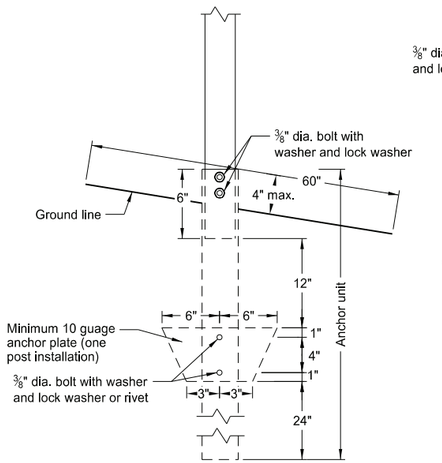
Multi-Directional
Slip Base Assembly



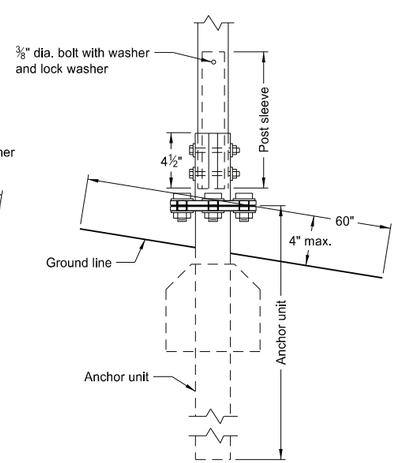
Top Post Receiver
Plate - ASTM A572 grade 50
Angle Receiver - 2½"x2½"x⅜" ASTM A36 structural angle



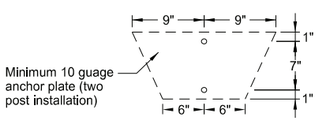
Bottom Soil Stub
Tube - 3"x3"x7 gauge ASTM A500 grade B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A1011
Plate - ASTM A572 grade 50

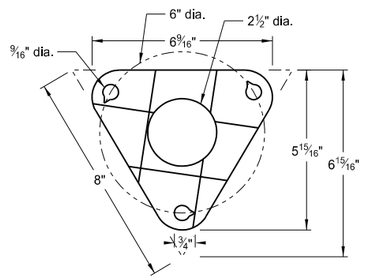


Anchor Unit and Post Assembly



Multi-Directional
Slip Base Anchor Unit
and Post Sleeve Assembly





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

Notes:

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

Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thick-ness Gauge	Sleeve Size in.	Wall Thick-ness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2¼
1	2¼	12			No	2½
1	2½	12			(A)	3
1	2½	10			Yes	
1	2¼	12	2	12	Yes	
1	2½	12	2¼	12	Yes	
2	2	12			No	2¼
2	2¼	12			No	2½
2	2½	12			Yes	
2	2½	12			Yes	
2	2¼	10	2	12	Yes	
2	2½	12	2¼	12	Yes	
3 & 4	2½	12			Yes	
3 & 4	2½	10			Yes	
3 & 4	2½	12	2¼	12	Yes	
3 & 4	2¼	12	2	12	Yes	
3 & 4	2½	10	2⅜16	10	Yes	

Properties of Telescoping Perforated Tube						
Tube Size in.	Wall Thickness in.	U.S. Standard Gauge	Weight per Foot lbs.	Moment of Inertia $in.^4$	Cross Sec. Area $in.^2$	Section Modulus $in.^3$
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2⅜16 x 2⅜16	0.135	10	3.432	0.605	0.841	0.590
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643
2½ x 2½	0.135	10	4.006	0.979	1.010	0.785

Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2⅜16"x10 ga.	1⁹⁄₆₄"	2½"	3¹⁄₃₂"	2⁵⁄₃₂"	1³³⁄₆₄"	1⅞"
2½"x10 ga.	1⁹⁄₃₂"	2½"	3⅝16"	⅝"	1²¹⁄₃₂"	1¾"

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

(B) For additional wind load, insert the 2⅜16"x10 ga. into 2½"x10 ga.

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

2-28-14

REVISIONS

DATE	CHANGE
9-27-17	Updated to active voice
10-03-19	New Design Engr PE Stamp
8-01-24	Electronic Stamp/Signature

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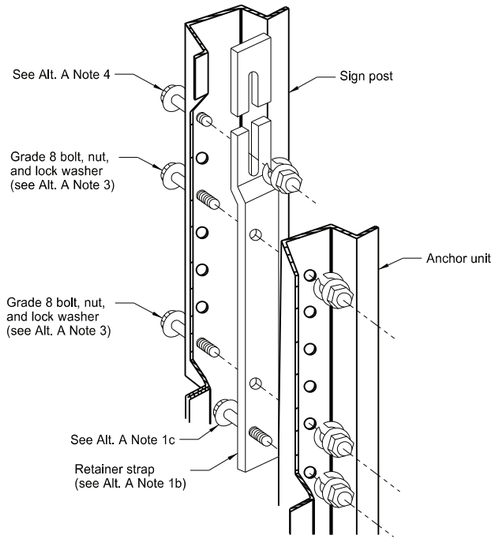
ENGINEER
NORTH DAKOTA

08/01/24

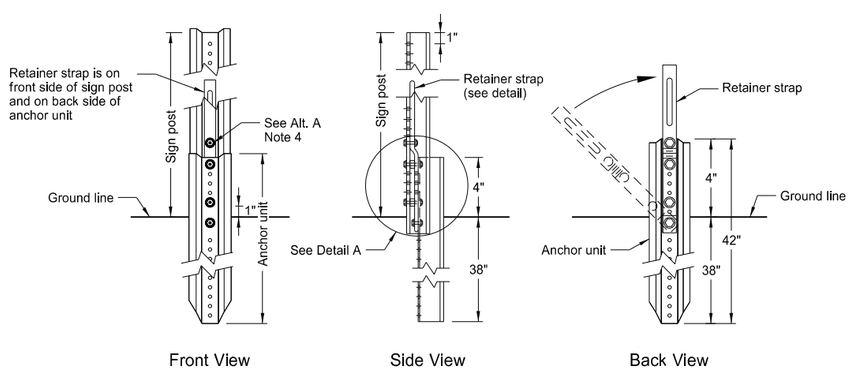
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



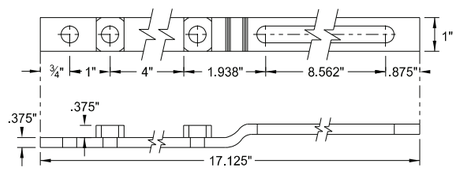
Detail A



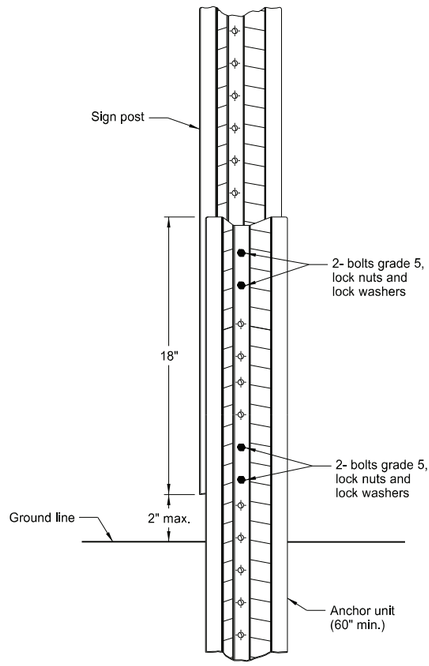
Front View | Side View | Back View

Breakaway U-Channel Detail Alternate A

Install a maximum of 2 posts within 7'.

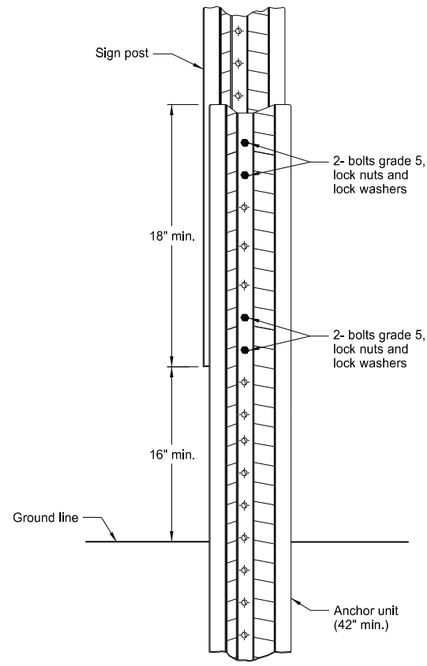


Retainer Strap Detail



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

Install a maximum of 3 posts within 7'.



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

Install a maximum of 3 posts within 7'.

Alternate A Steps of Installation:

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

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

KIRK J. HOFF
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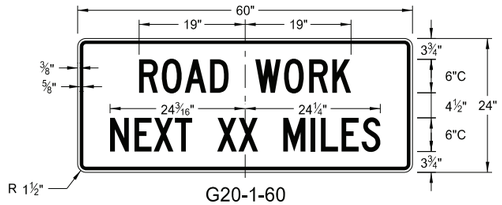
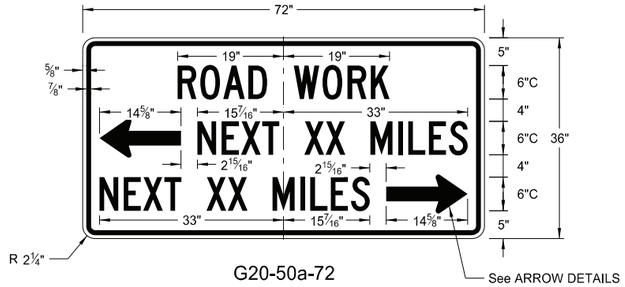
PE-4683
ENGINEER
NORTH DAKOTA

08/01/24

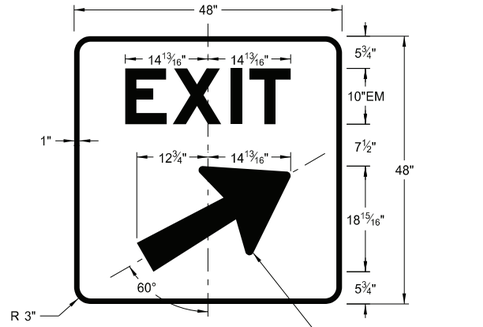
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



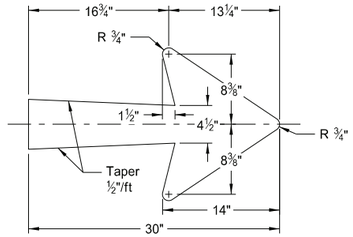
G20-1-60
Legend: black (non-refl)
Background: orange



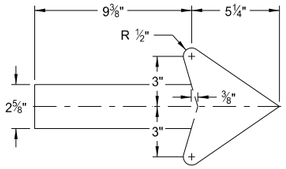
G20-50a-72
Legend: black (non-refl)
Background: orange



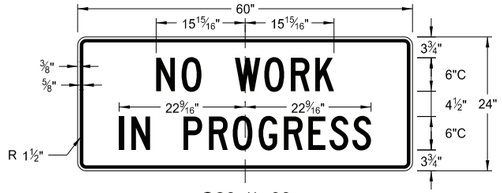
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



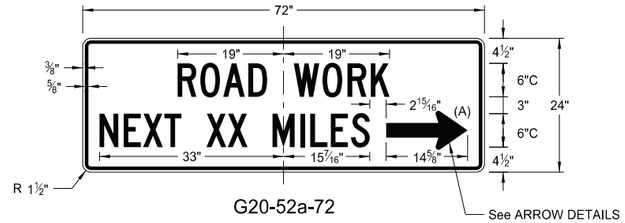
E5-1-48



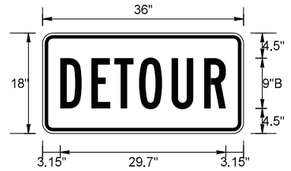
G20-50a-72
G20-52a-72



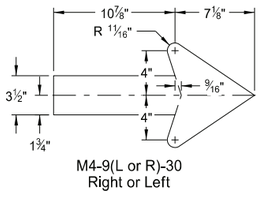
G20-1b-60
Legend: black (non-refl)
Background: orange



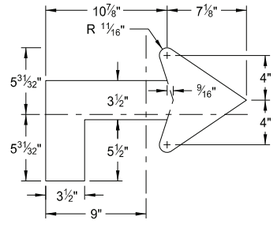
G20-52a-72
Legend: black (non-refl)
Background: orange



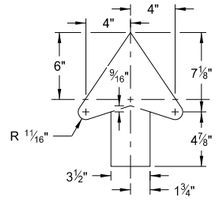
M4-8-36
Legend: black (non-refl)
Background: orange



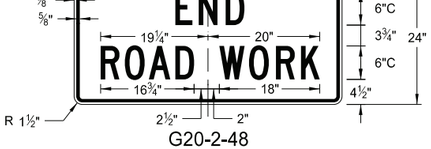
M4-9(L or R)-30
Right or Left



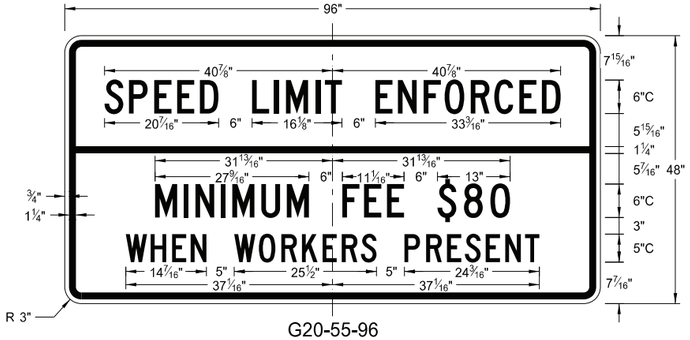
M4-9(L or R)-30
Advanced Right or Left



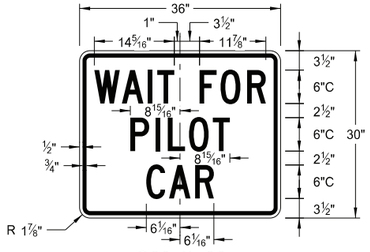
M4-9-30
Straight



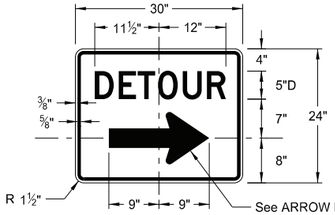
G20-2-48
Legend: black (non-refl)
Background: orange



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



G20-4b-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
8-17-17	Added sign & background color
10-03-19	New Design Engineer PE Stamp
8-01-24	Electronic Stamp/Signature

KIRK J. HOFF
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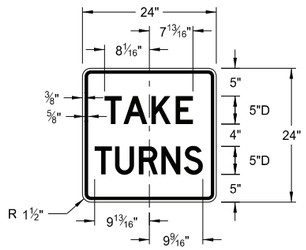
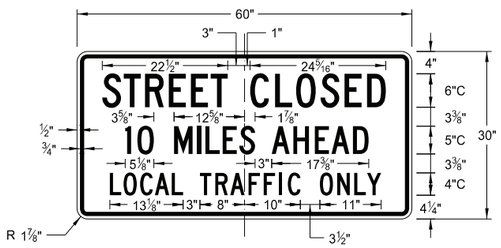
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA

08/01/24

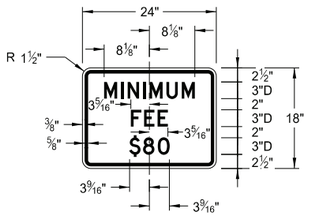
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



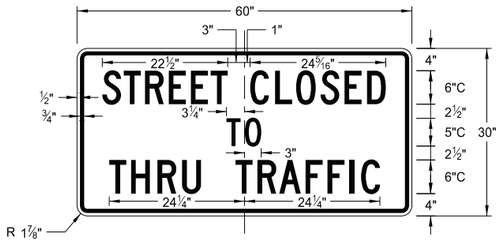
R1-50P-24
Legend: black (non-refl)
Background: white



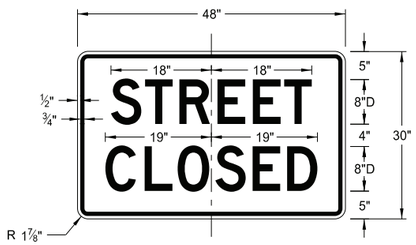
R11-3c-60
Legend: black (non-refl)
Background: white



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



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



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

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

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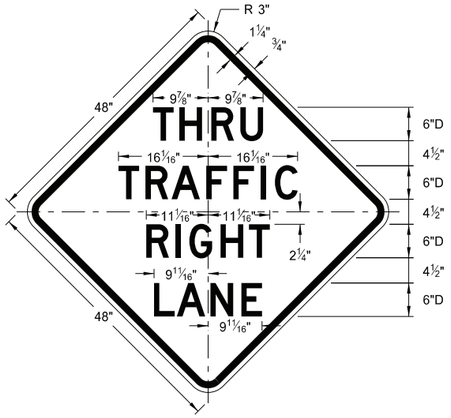
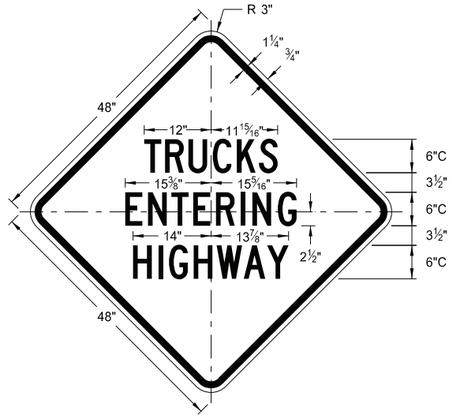
08/01/24

CONSTRUCTION SIGN DETAILS
WARNING SIGNS

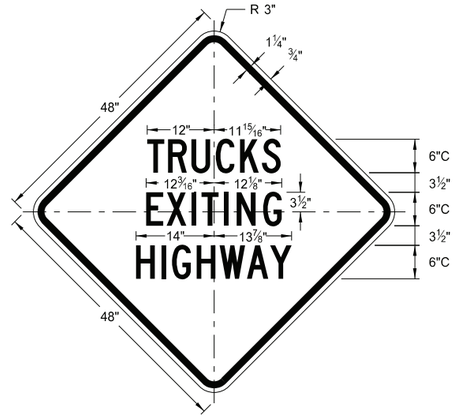
D-704-11



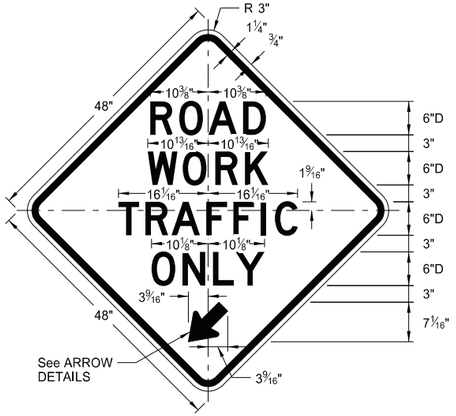
W5-8-48
Legend: black (non-refl)
Background: orange



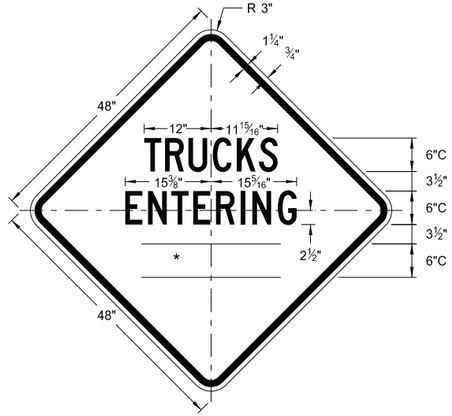
W8-53-48
Legend: black (non-refl)
Background: orange



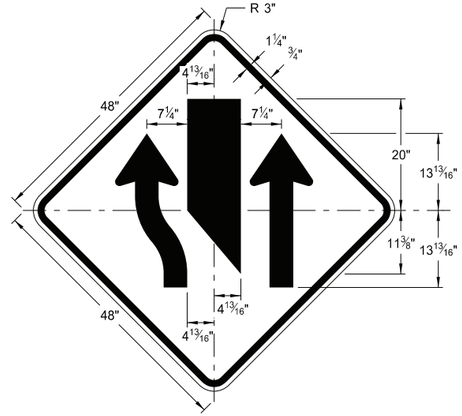
W8-56-48
Legend: black (non-refl)
Background: orange



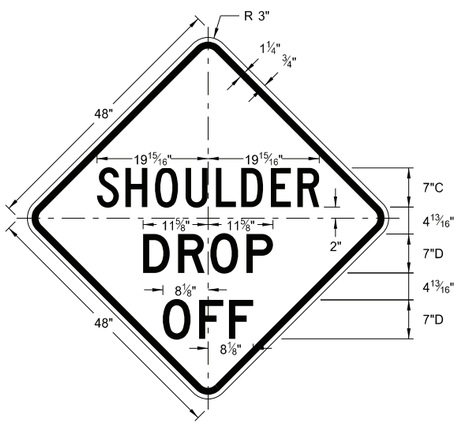
W5-9-48
Legend; black (non-refl)
Background: orange



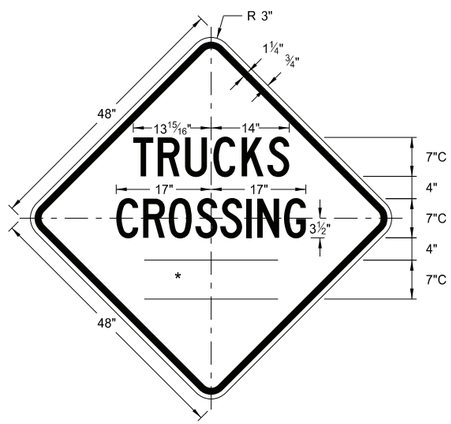
W8-54-48
Legend; black (non-refl)
Background: orange



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



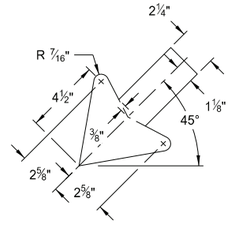
W8-9a-48
Legend: black (non-refl)
Background: orange



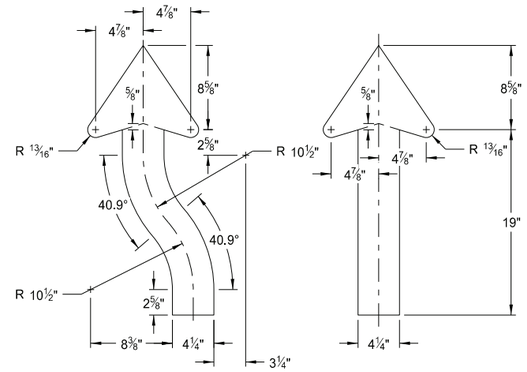
W8-55-48
Legend: black (non-refl)
Background: orange

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

* DISTANCE MESSAGES



W5-9-48



W9-3a-48

ARROW DETAILS

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

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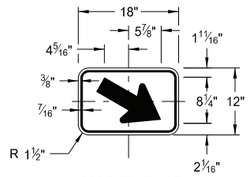
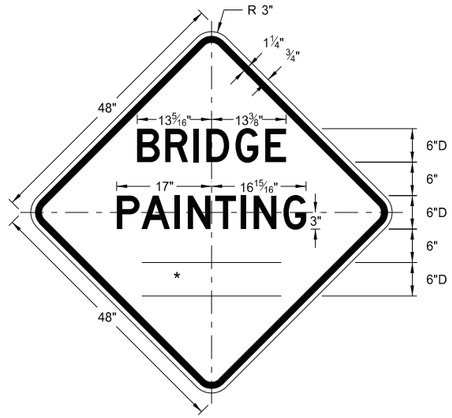
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

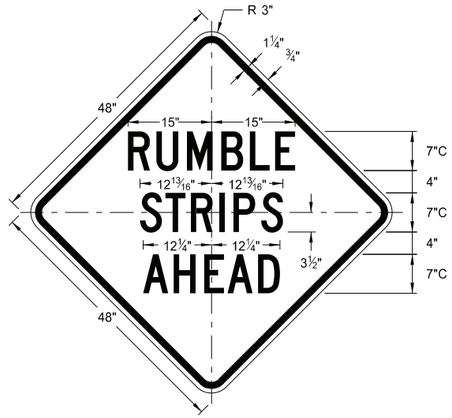
D-704-11A



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



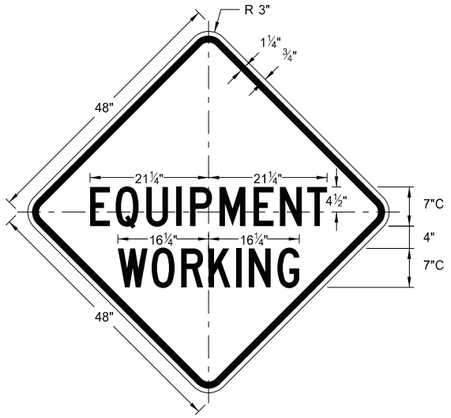
W21-50-48
Legend: black (non-refl)
Background: orange



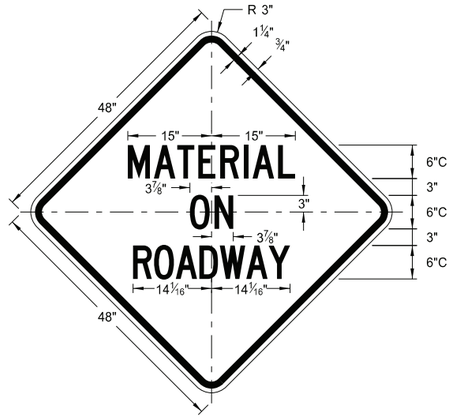
W21-53-48
Legend: black (non-refl)
Background: orange

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

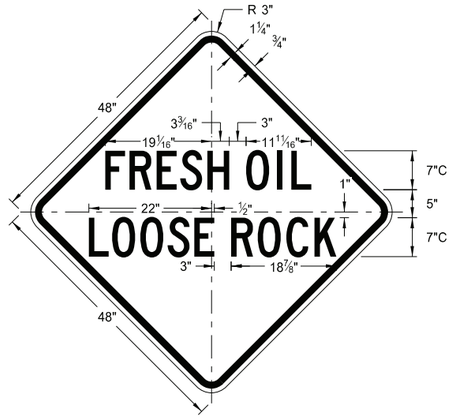
* DISTANCE MESSAGES



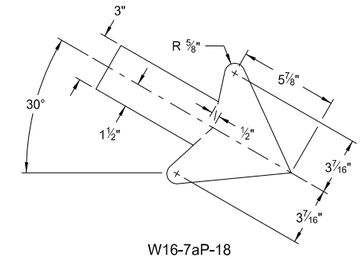
W20-51-48
Legend: black (non-refl)
Background: orange



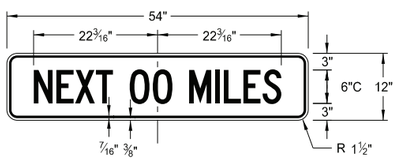
W21-51-48
Legend: black (non-refl)
Background: orange



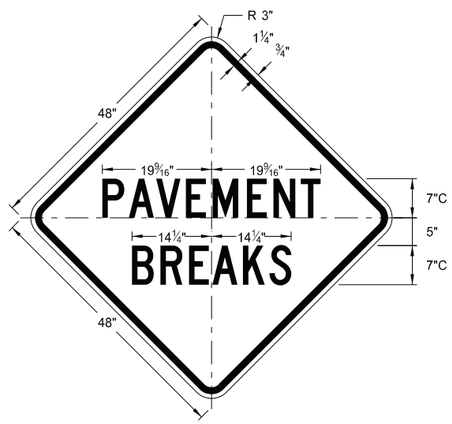
W22-8-48
Legend: black (non-refl)
Background: orange



W16-7aP-18



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



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

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

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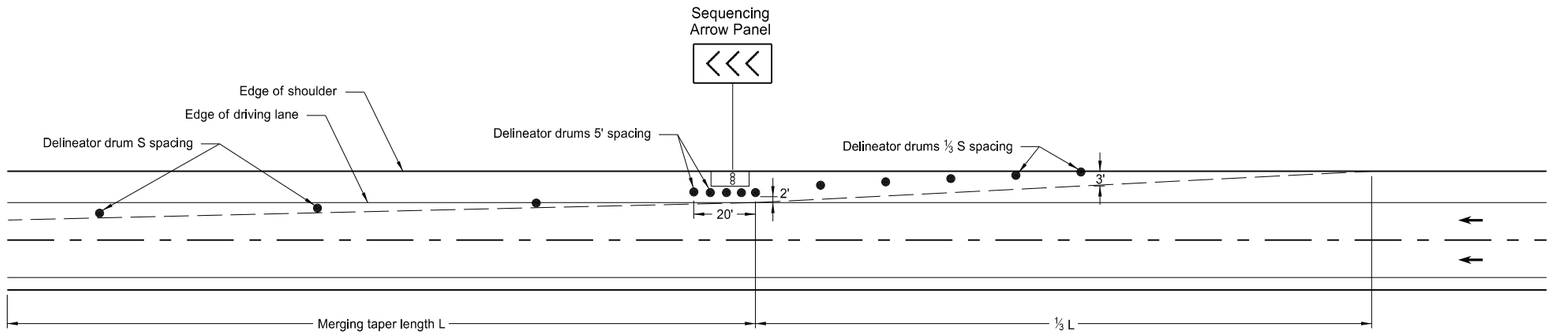
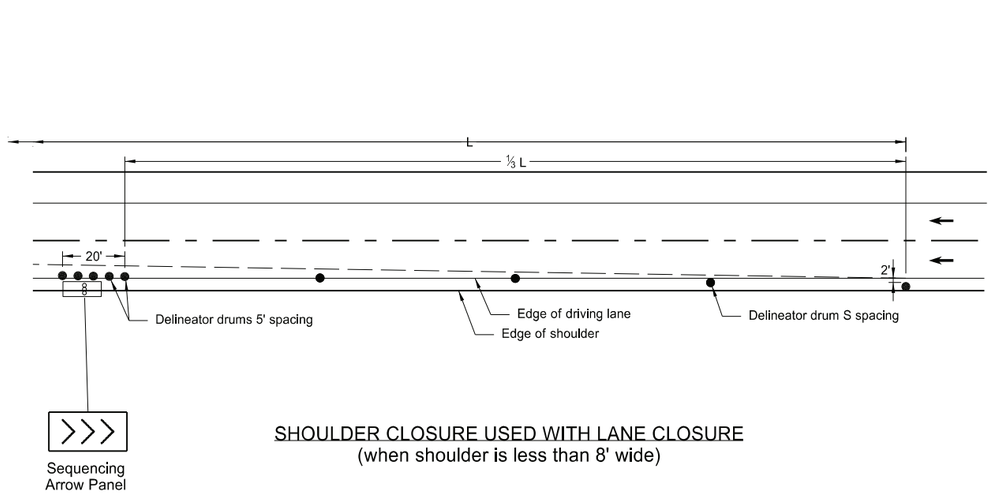
SHOULDER CLOSURE TAPERS

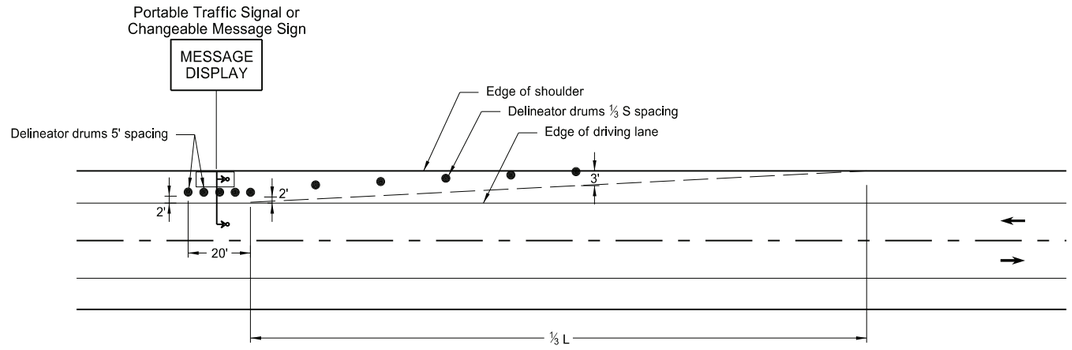
D-704-12



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



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



PORTABLE TRAFFIC SIGNAL OR CHANGEABLE MESSAGE SIGN ON SHOULDER

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

Notes:

1. S = Posted Speed Limit in mph
   W = Width of offset in feet
   L = Taper length in feet
   $L = WS^2/60$ (40mph or less)
   L = WS (45mph or more)

2. If a shoulder taper is used, use a length of approximately ⅓L. If a shoulder is used as a travel lane, use a normal merging or shifting taper.

3. When paved shoulders of 8 foot width or more are closed, use channelizing devices to close shoulder in advance, to delineate beginning of work space, and to direct vehicular traffic to remain within the traveled way.

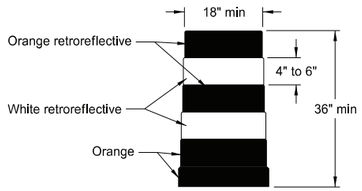
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active volce
10-25-19	Added L dimension to detail
8-01-24	Electronic Stamp/Signature

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

08/01/24

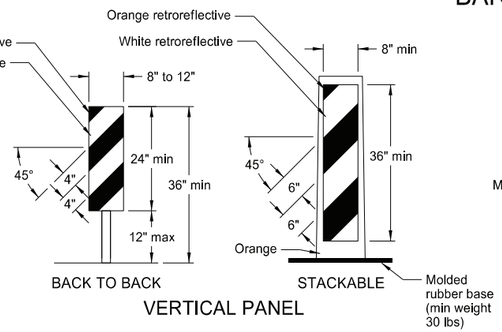
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



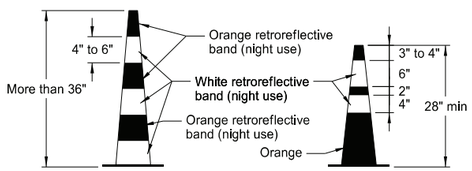
DELINEATOR DRUM

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



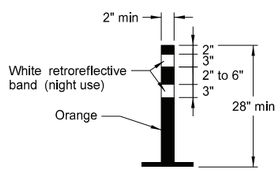
VERTICAL PANEL

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



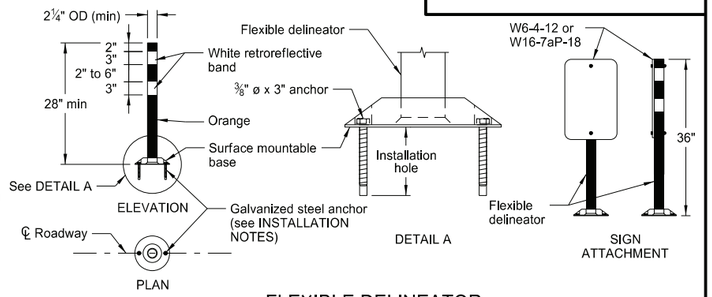
TRAFFIC CONE

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



TUBULAR MARKER

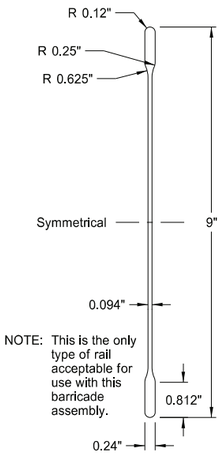
Provide retroreflectorization of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



FLEXIBLE DELINEATOR

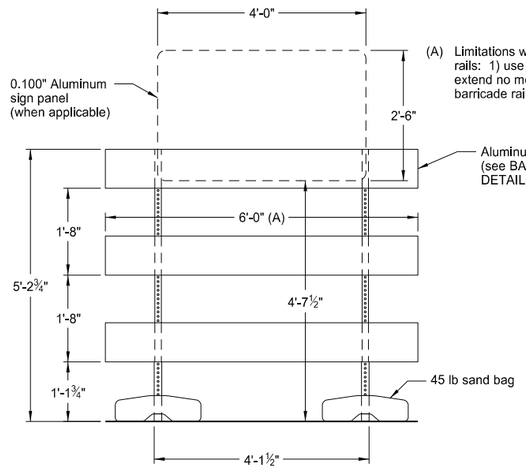
INSTALLATION NOTES:

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



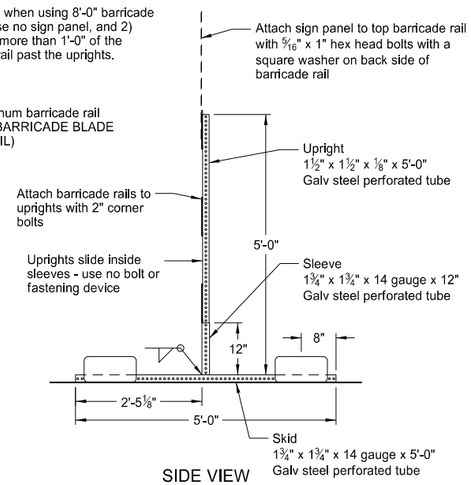
NOTE: This is the only type of rail acceptable for use with this barricade assembly.

BARRICADE BLADE DETAIL



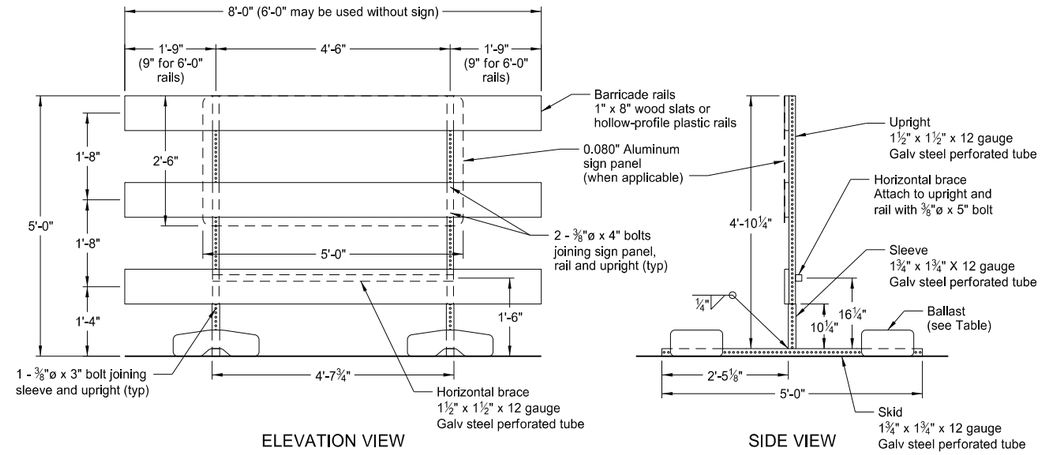
(A) Limitations when using 8'-0" barricade rails: 1) use no sign panel, and 2) extend no more than 1'-0" of the barricade rail past the uprights.

ELEVATION VIEW



SIDE VIEW

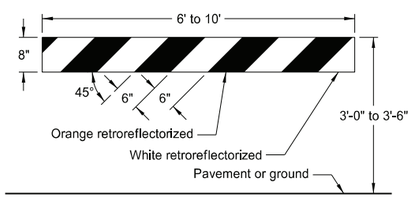
BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)



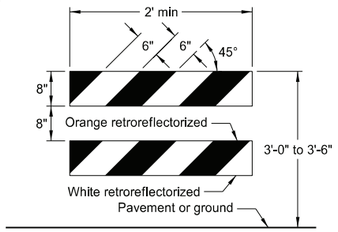
ELEVATION VIEW — SIDE VIEW

BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

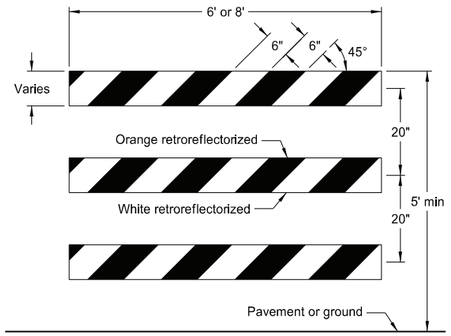
NOTE: For barricade markings use alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Place retroreflective sheeting on both sides of the rails with a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the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



TYPE I BARRICADE

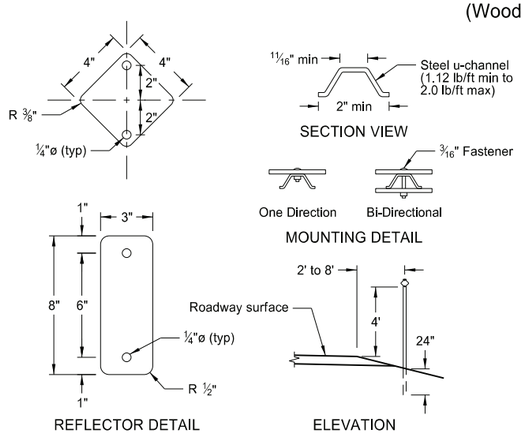


TYPE II BARRICADE



TYPE III BARRICADE

BARRICADE RAIL DETAILS



DELINEATORS

MINIMUM BALLAST
(For each side of barricade support)

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

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

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

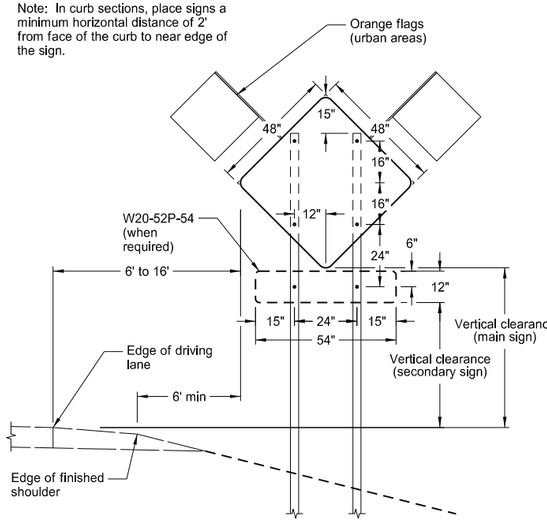
KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 ENGINEER NORTH DAKOTA

08/01/24

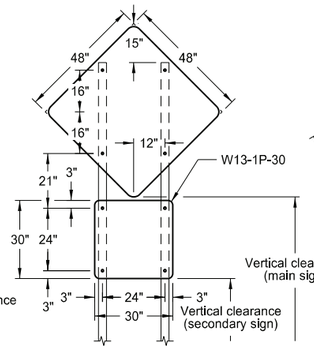
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

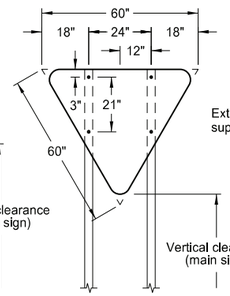
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



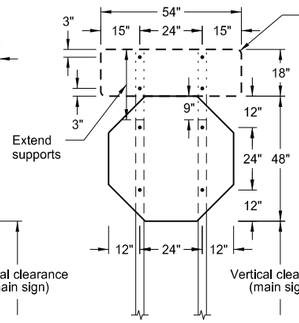
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



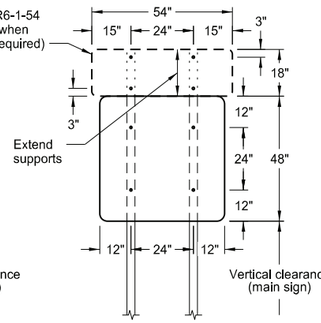
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



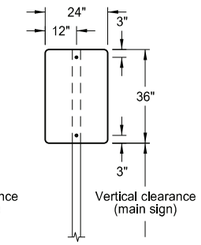
R1-2-60 - YIELD SIGN



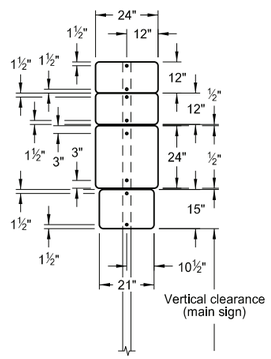
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



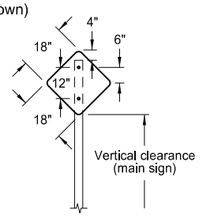
48" x 48" SIGN
(with R6-1-54 sign as required)



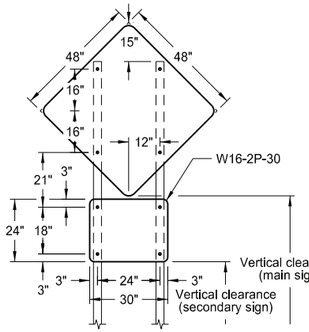
24" x 36" SIGN



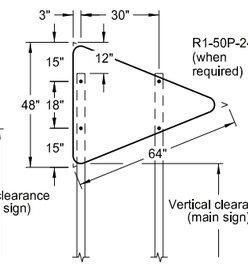
24" x 24"
ROUTE MARKER
ASSEMBLY



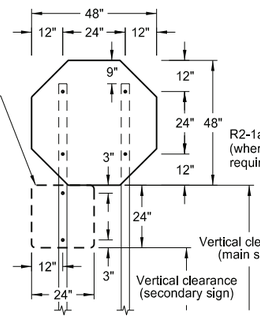
18" x 18"
DIAMOND SIGN



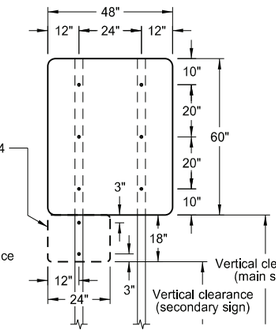
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



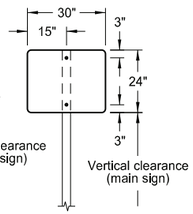
W14-3-64 - PENNANT SIGN



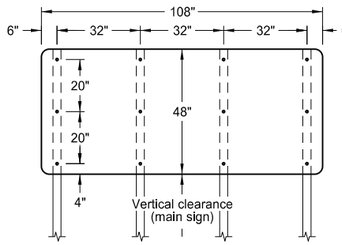
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



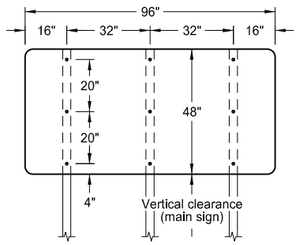
48" x 48" SIGN
(with R2-1aP-24 sign as required)



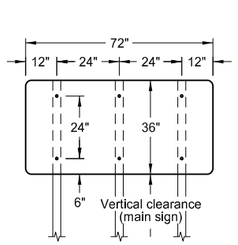
30" x 24" SIGN



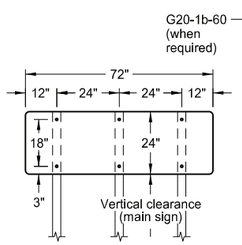
108" x 48" SIGN



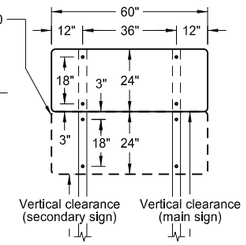
96" x 48" SIGN



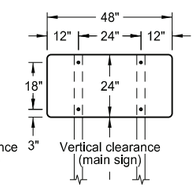
72" x 36" SIGN



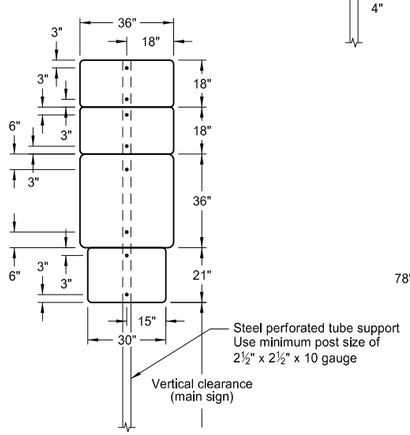
72" x 24" SIGN



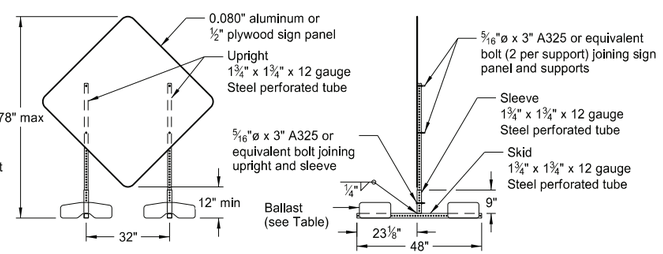
60" x 24" SIGN



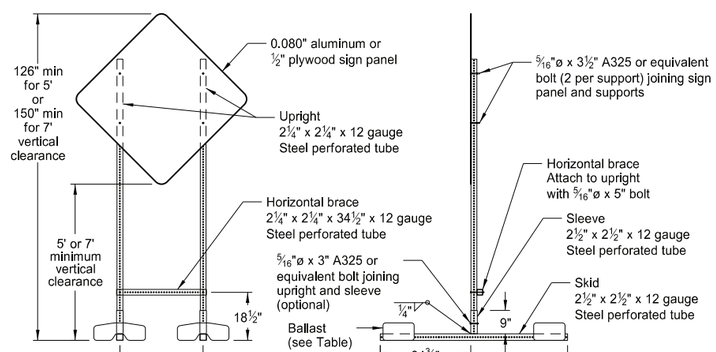
48" x 24" SIGN



36" x 36"
ROUTE MARKER
ASSEMBLY



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

MINIMUM BALLAST
(For each side of sign support base)

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

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

10-4-13

REVISIONS

DATE	CHANGE
11-14-13	Revised Note 6
9-27-17	Updated to active voice
11-01-19	Revised 60"x24" sign detail
8-01-24	Electronic Stamp/Signature

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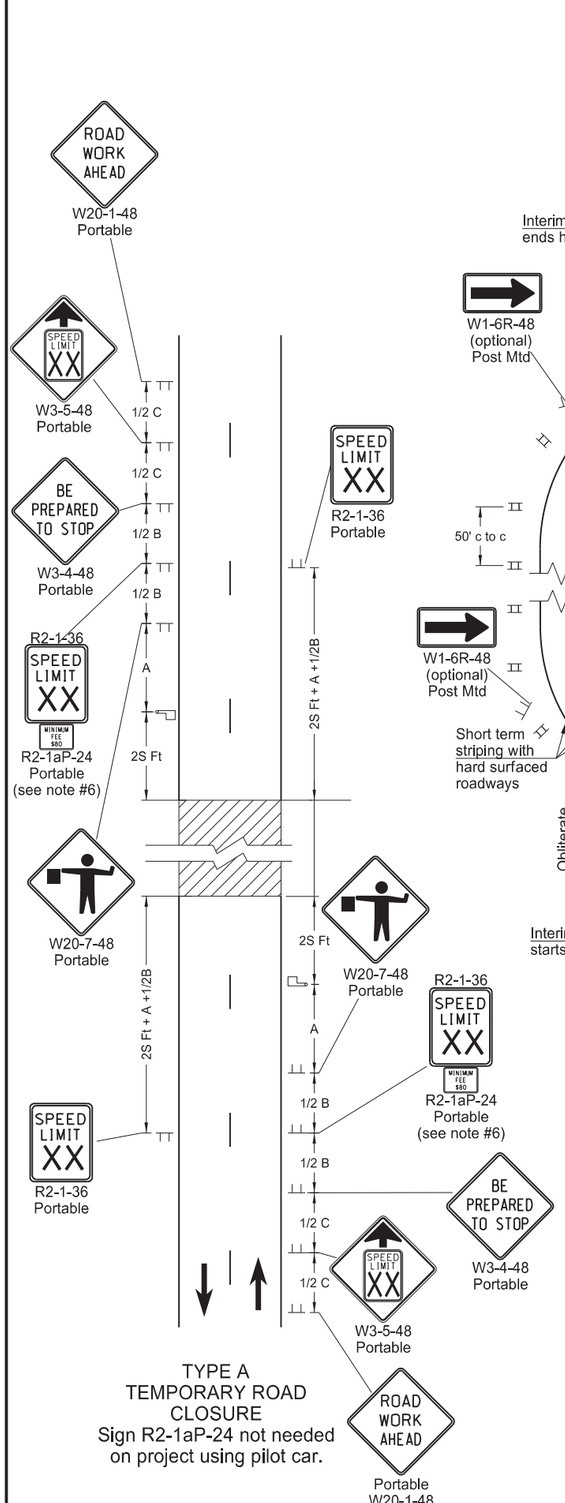
NORTH DAKOTA

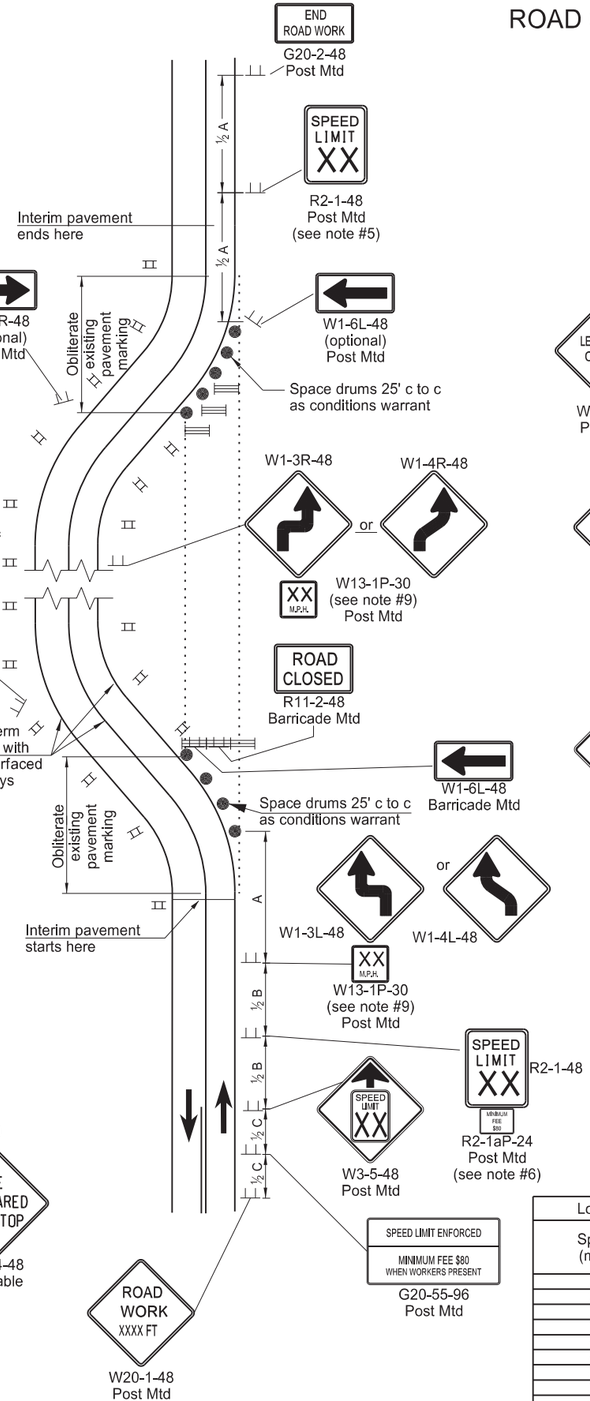
08/01/24

ROAD CLOSURE LAYOUTS

D-704-15



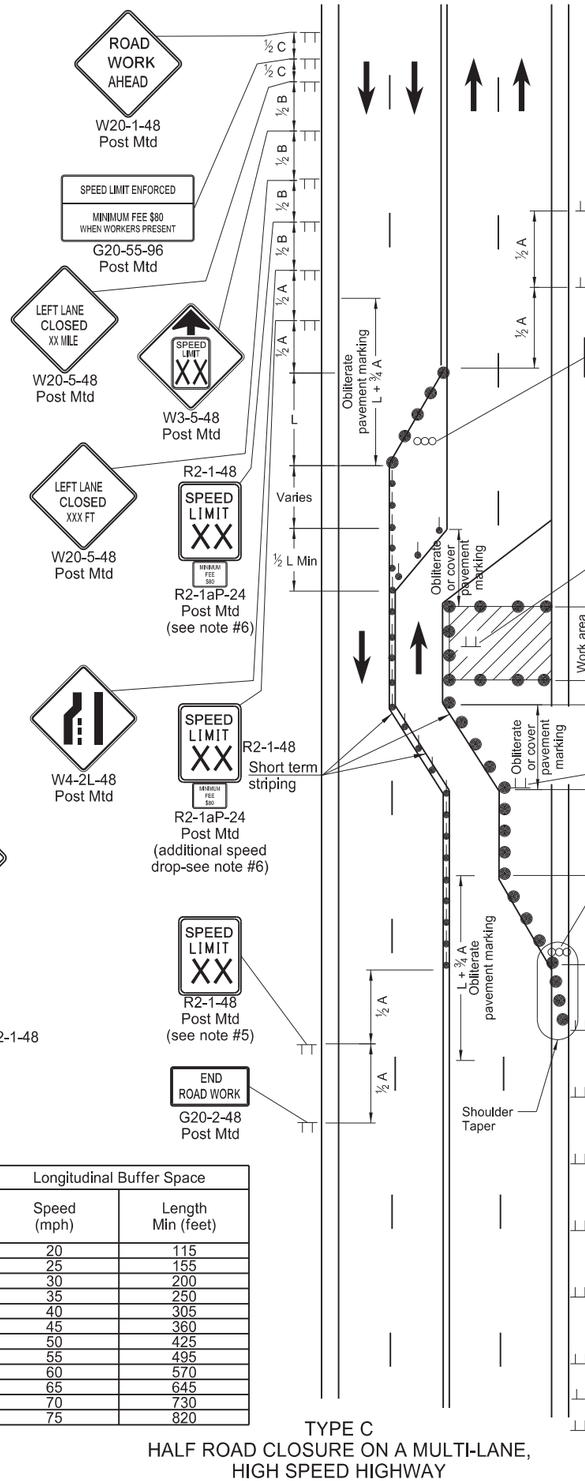
TYPE A
TEMPORARY ROAD CLOSURE
Sign R2-1aP-24 not needed on project using pilot car.



TYPE B
ROAD CLOSURE WITH A DIVERSION

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

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



TYPE C
HALF ROAD CLOSURE ON A MULTI-LANE, HIGH SPEED HIGHWAY
4 lane undivided highway with half the roadway closed.

Notes:
1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of taper in feet.
   L = Minimum length of taper, S x W for freeways, expressways, and other roads with speeds of 45 mph or greater, or W x $S^2/60$ for urban, residential, and other streets with speeds of 40 mph or less.
2. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
3. Place delineator drums, barricades or cones for tapering traffic at dimension "S" and for tangents space at 2 times dimension "S".
4. Place Sequencing Arrow Panels at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the work area and place on roadway surface. See Shoulder Closure Standard Drawing.
   Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
   Use Type B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
   Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
5. Re-establish speed. Determine exact speed limit in the field, dependent on location and conditions.
6. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½ B.
7. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
8. Cover existing speed limit signs within reduced speed zones.
9. Where necessary, engineer will determine safe speed.
10. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
11. Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or the work is less than 15 days.
12. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

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

KEY

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

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

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REGISTERED
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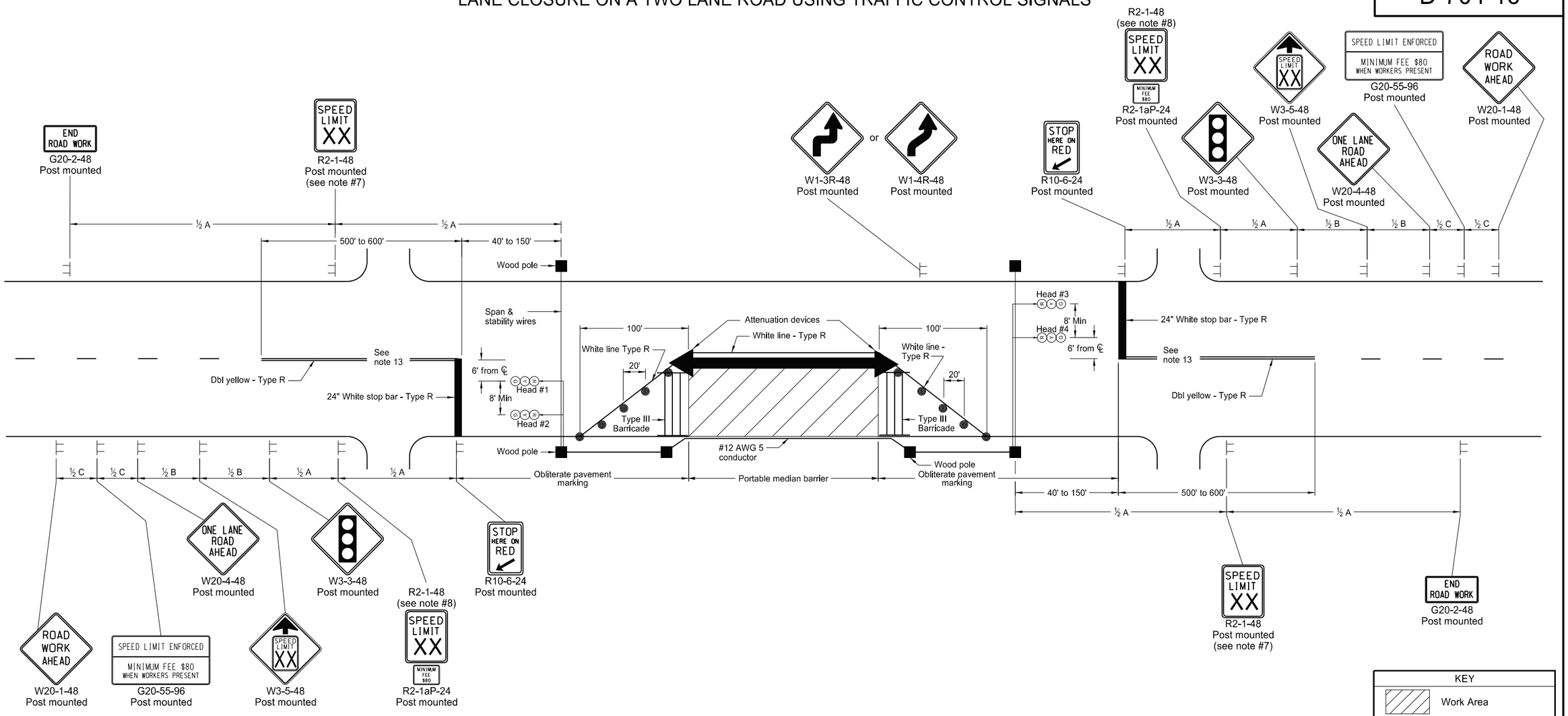
PE-4683
ENGINEER
NORTH DAKOTA

11/29/22

LANE CLOSURE ON A TWO LANE ROAD USING TRAFFIC CONTROL SIGNALS

D-704-16



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

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

KEY

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

Notes:

1. Span conductor overhead between poles except on bridges, where it may alternately be attached and supported by the bridge structure. When conductor is supported by the bridge structure, attach conductor to avoid interference with bridge construction. Attach conductor on either side of bridge as determined by field personnel.
2. Locate controller on a wood pole in the cable run between signal heads for through traffic movements.
3. The timing schedule is suggested trial setting. Check signals in operation frequently to obtain the most efficient timing schedule.
4. Place wood poles a minimum of 16 feet from edge of driving lane. Provide a minimum 16 to 19 feet clearance from the center line of the roadway to the bottom of traffic signal heads suspended over the roadway.
5. Place traffic signal heads with 12 inch red, yellow and green lenses and 5 inch louvered backplates.
6. See standard drawing "Span Wire Mounted Traffic Signals" for interim traffic construction details.
7. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
8. Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 MPH.) Place the second speed limit sign at ½ B.
9. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
10. Cover existing speed limit signs within a reduced speed zone.
11. Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
12. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
13. Continue double yellow centerline thru private drives.
14. Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or if work is less than 15 days.
15. Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.
16. As an option, use solar powered signals instead of wood pole signal system.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

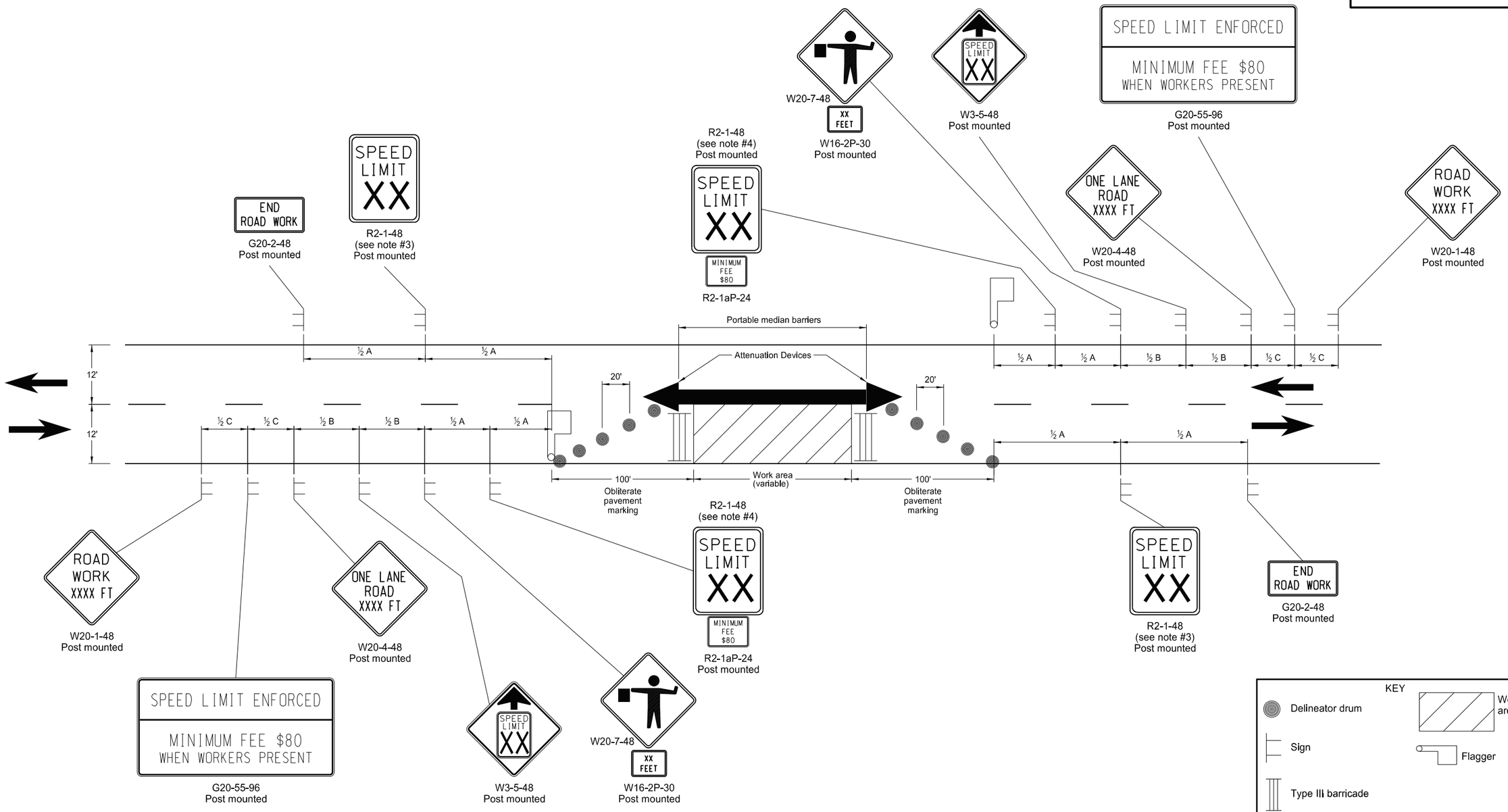
DATE	CHANGE
11-20-15	Revised Note 6 & Renumbered Minimum Fee plaque.
08-17-17	Revised notes & added note.
11-01-19	Revise sign #s & pvmt mk type.
12-08-21	Switched order of Road Work Ahead and Spd Limit Enforced & added Dollars At Work.
11-29-22	Removed Dollars At Work.
08-31-23	Corrected Note 14 grammar.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

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

08/21/24

SIGN LAYOUT FOR ONE LANE CLOSURE TWO LANE ROADWAY

D-704-17



KEY

- Delineator drum
- Work area
- Sign
- Flagger
- Type III barricade

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

Notes:

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE
08-17-17	Note update & sign numbers
11-01-19	Removed signs & revised note
12-08-21	Switched order of Road Work XXXX and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work
08-21-24	Pvmt Mkg Width & Med Barrier.

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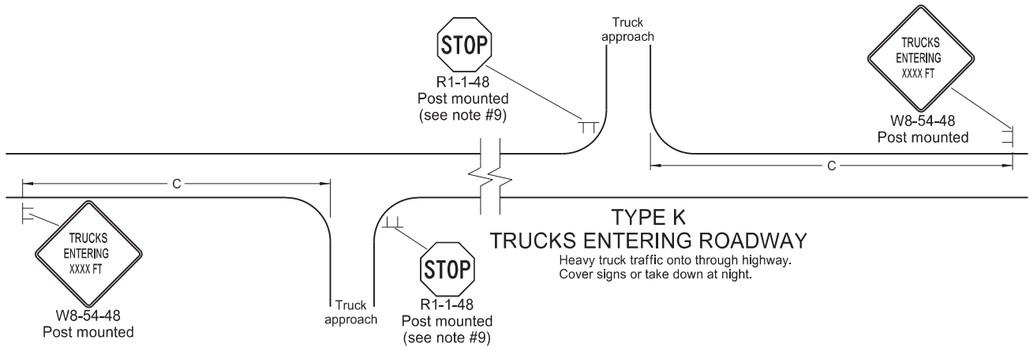
08/21/24

CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

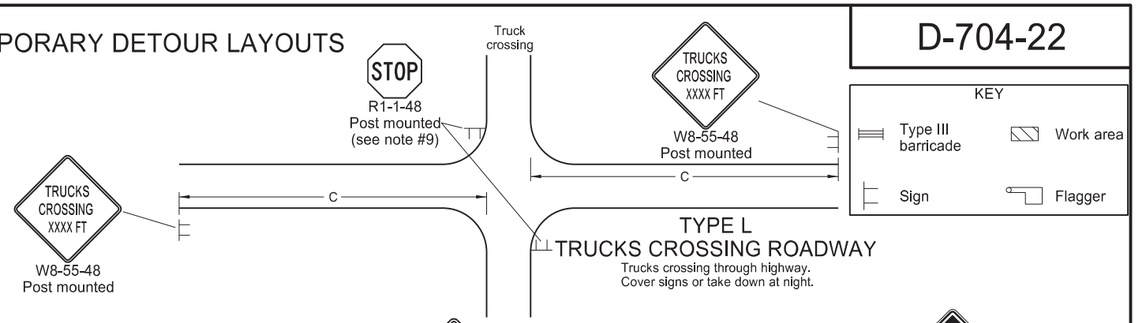
D-704-22

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



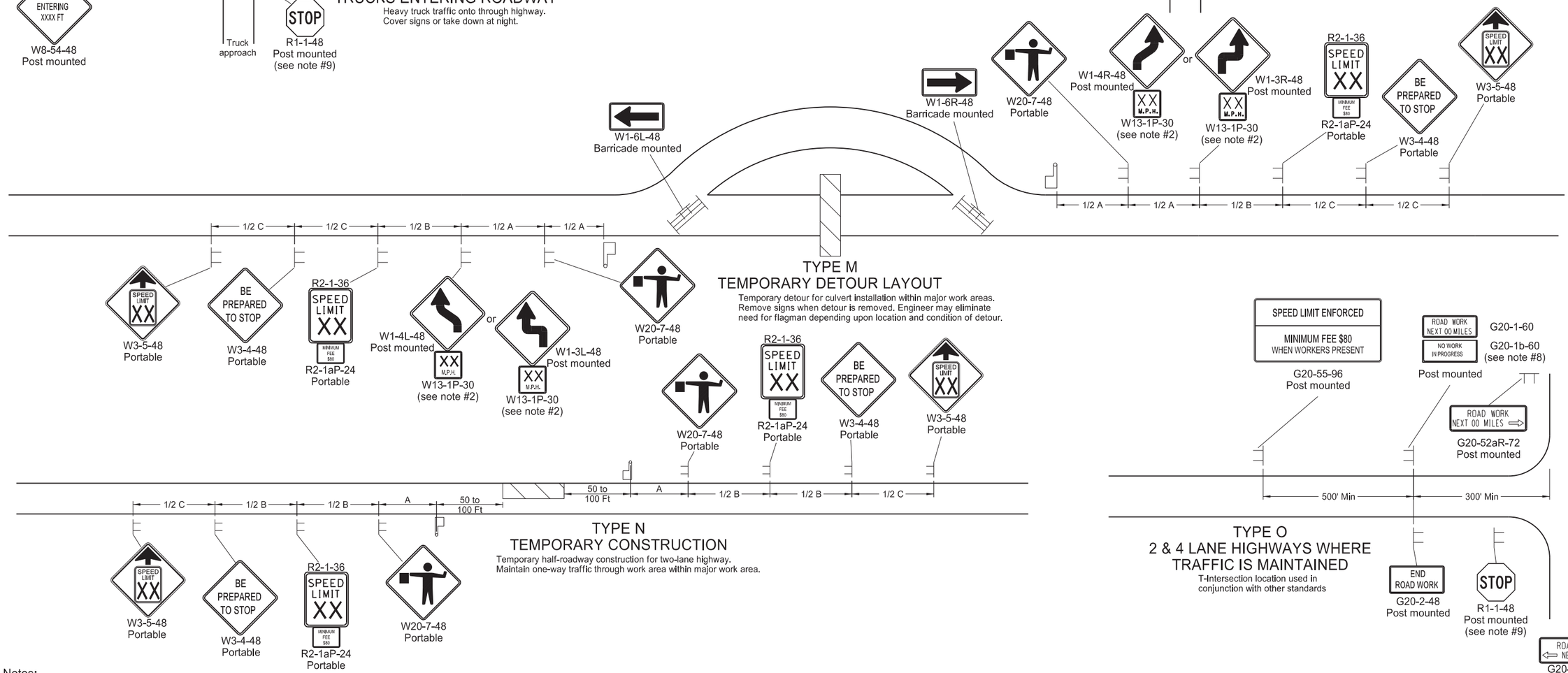
TYPE K
TRUCKS ENTERING ROADWAY

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



TYPE L
TRUCKS CROSSING ROADWAY

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

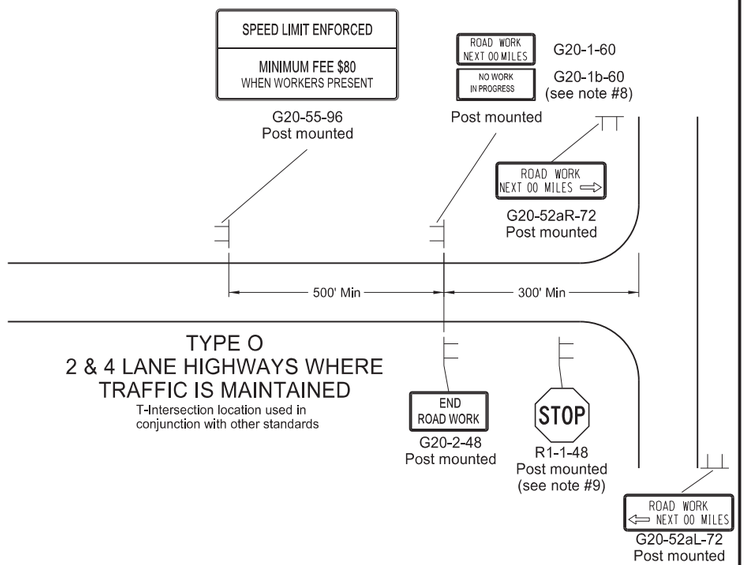


TYPE M
TEMPORARY DETOUR LAYOUT

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

TYPE N
TEMPORARY CONSTRUCTION

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



TYPE O
2 & 4 LANE HIGHWAYS WHERE TRAFFIC IS MAINTAINED

T-Intersection location used in conjunction with other standards

Notes:

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

ADVANCE WARNING SIGN SPACING

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

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

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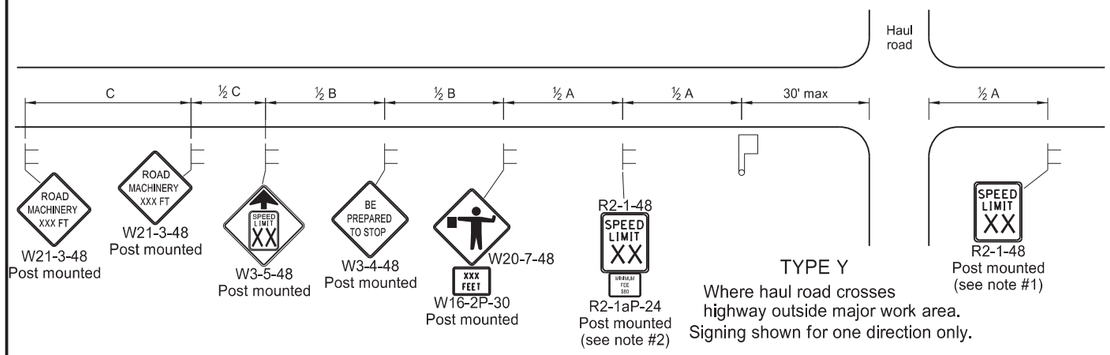
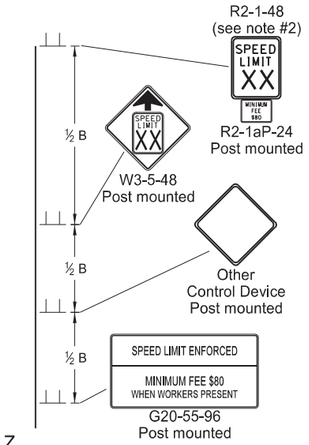
11/29/22

MISCELLANEOUS SIGN LAYOUTS

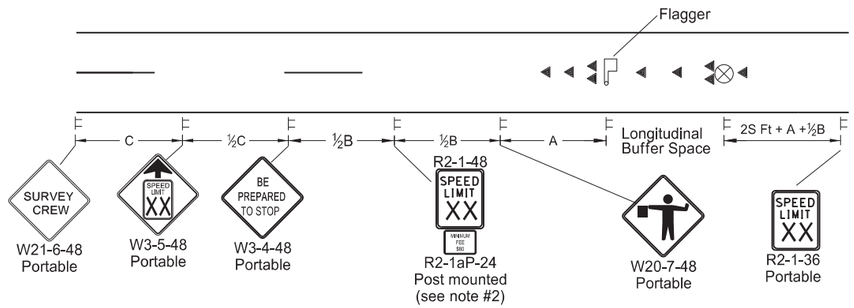
D-704-26



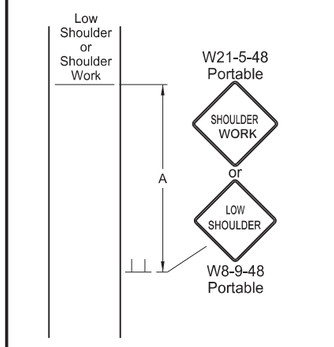
TYPE Y
Where haul road crosses highway outside major work area.
Signing shown for one direction only.



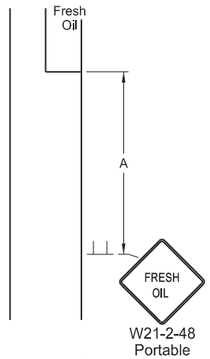
TYPE Z
Where speed zone is needed
Signing shown for one direction only.



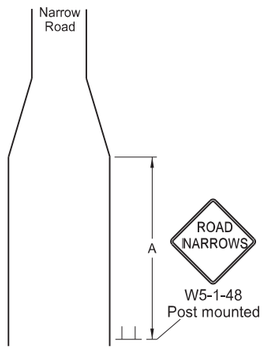
TYPE AA
Where survey crew is used
Signing shown for one direction only.



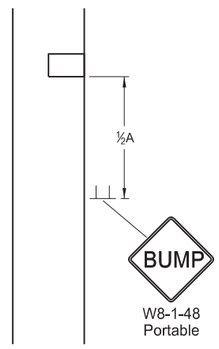
TYPE BB
Within major work area where sign conditions exist



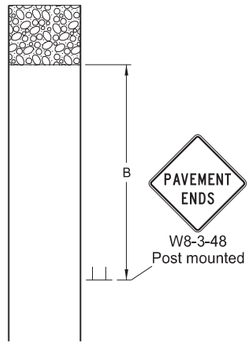
TYPE CC
Where sign conditions exist



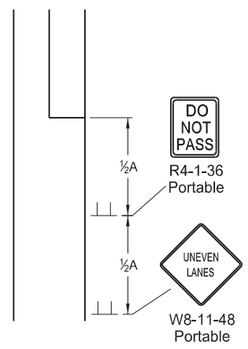
TYPE DD
Where sign conditions exist



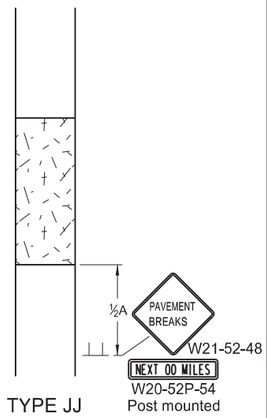
TYPE EE
Where sign conditions exist



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



TYPE GG
Where elevation difference exists between lanes

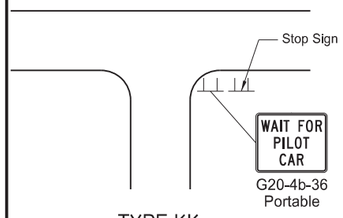


TYPE JJ
For break in pavement.
Install signs when conditions exist and remove when not applicable.
Signing shown for one direction only.

KEY

Flagger	Sign
Cones	Survey Equipment

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



TYPE KK
At major intersections within pilot car control area

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

ADVANCE WARNING SIGN SPACING

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

Longitudinal Buffer Space

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

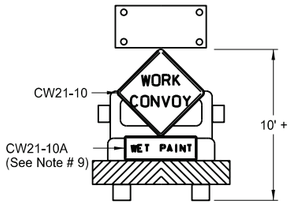
DATE	CHANGE
8-17-17	Added speed limit signs. Updated notes & sign numbers.
11-01-19	Revised note 5 & sign numbers.
2-23-23	Revised distance & removed signs.

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

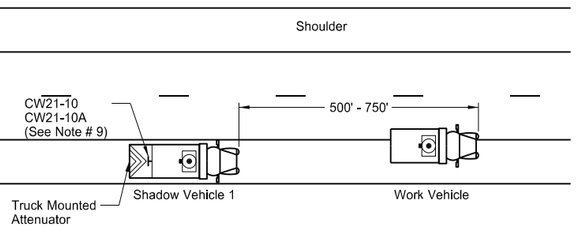
02/23/23

MOBILE OPERATION
(PAVEMENT MARKING)

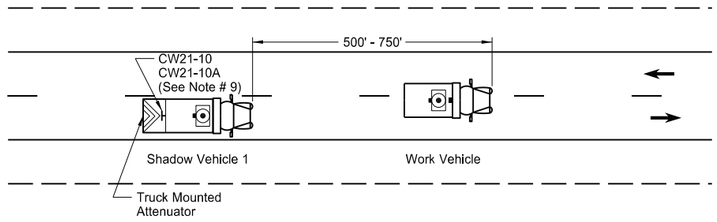
D-704-27



Typical Shadow Vehicle 1
Two-Way Roaday

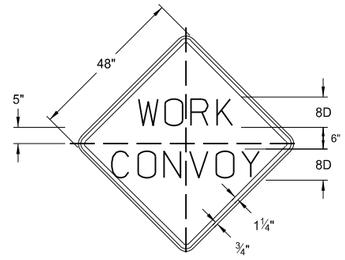


Two-Way Roadway with Paved Shoulders

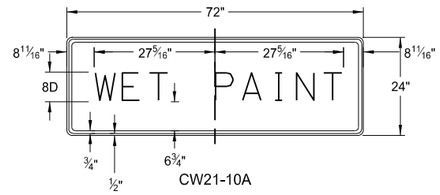


Two-Way Roadway without Paved Shoulders

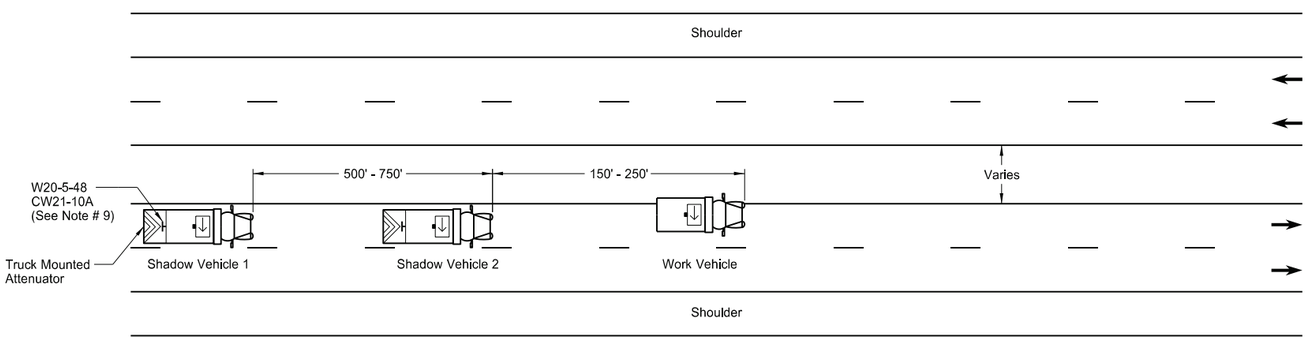
Sign Details



CW21-10

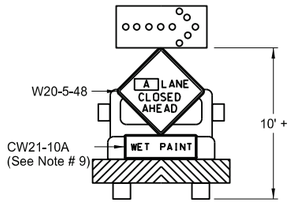


CW21-10A



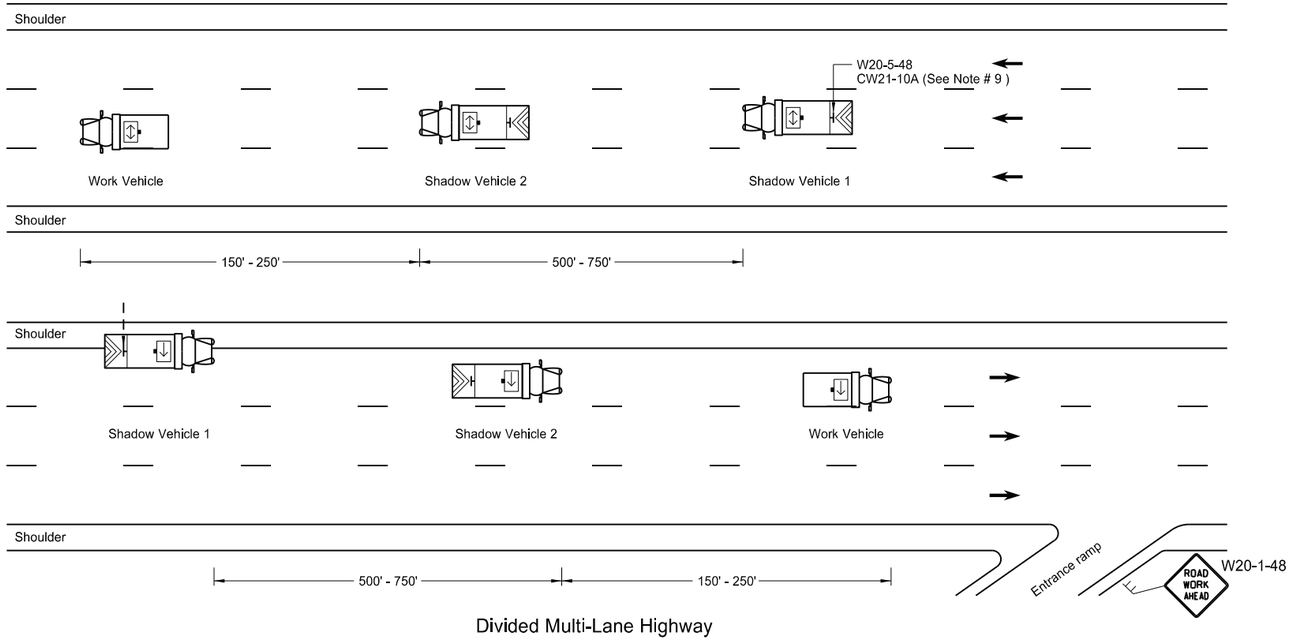
Undivided Multi-Lane Roadway

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



Typical Shadow Vehicle 1 & 2
Multi-Lane Highways

A = Left Right Center



Divided Multi-Lane Highway

KEY

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
6-18-14	Removed shadow vehicle 2 on two lane roadways
9-27-17	Updated to active voice
11-08-19	Changed Standard Heading
8-02-24	Electronic Stamp/Signature.

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08/02/24

Two-Lane Roadway Portable Rumble Strips

D-704-33

KEY

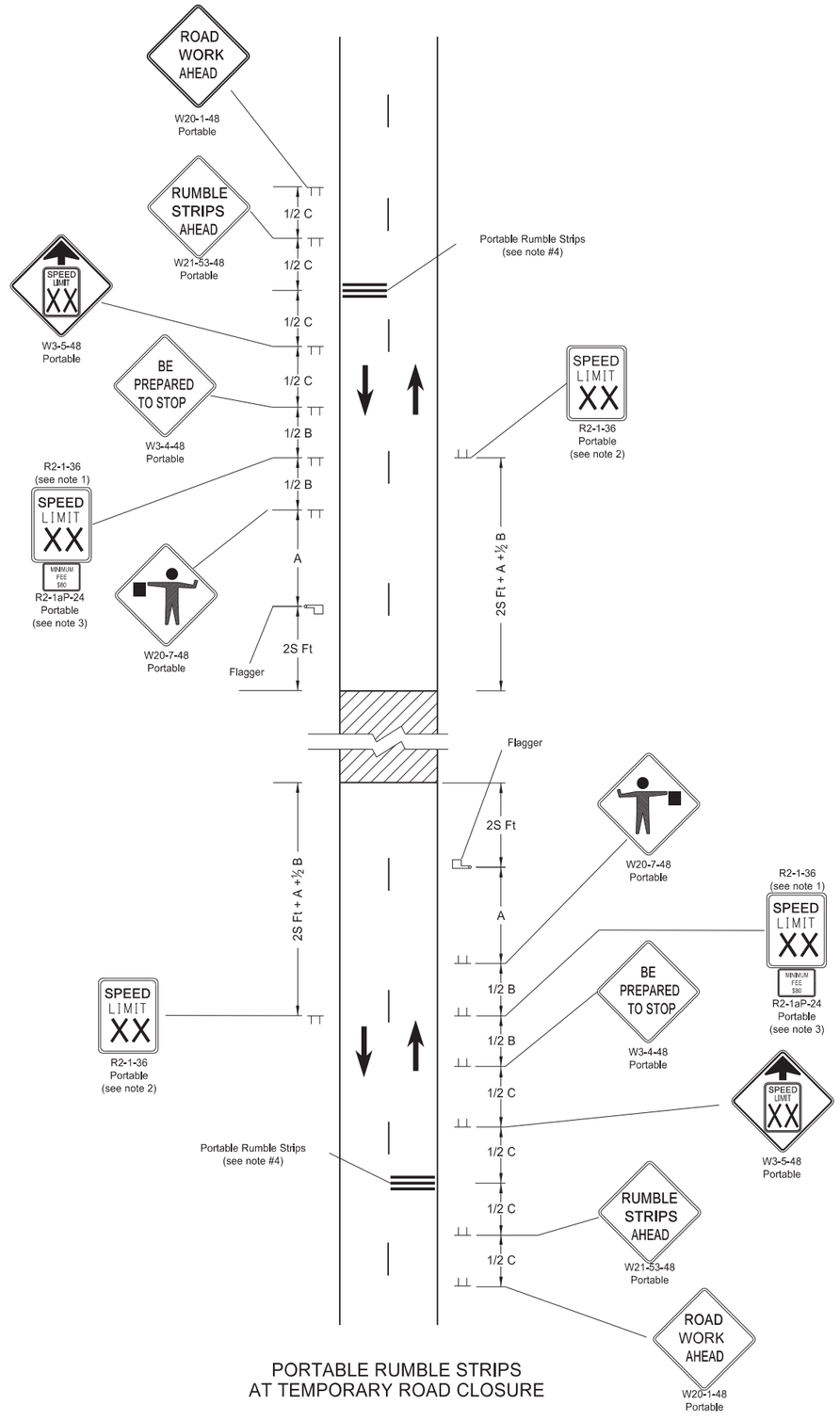
Work area

Flagger

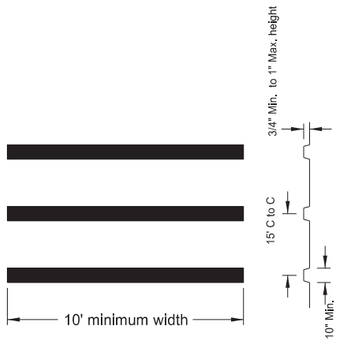
Sign

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

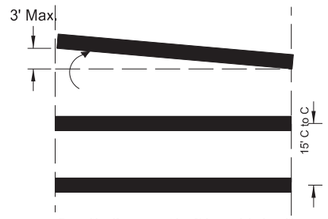
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - High Speed (over 45 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720



PORTABLE RUMBLE STRIPS
AT TEMPORARY ROAD CLOSURE



PORTABLE RUMBLE STRIPS ARRAY DETAIL

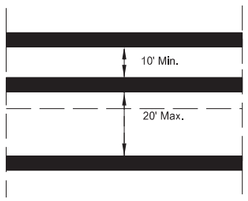


Reposition if movement is >3' from original position.

Skewing

Reposition if movement is >2' from original position.

Lateral



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

Perpendicular to Travel with or against traffic

PORTABLE RUMBLE STRIPS ARRAY TYPES OF MOVEMENT AND MAXIMUM ALLOWANCES

Notes:

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

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

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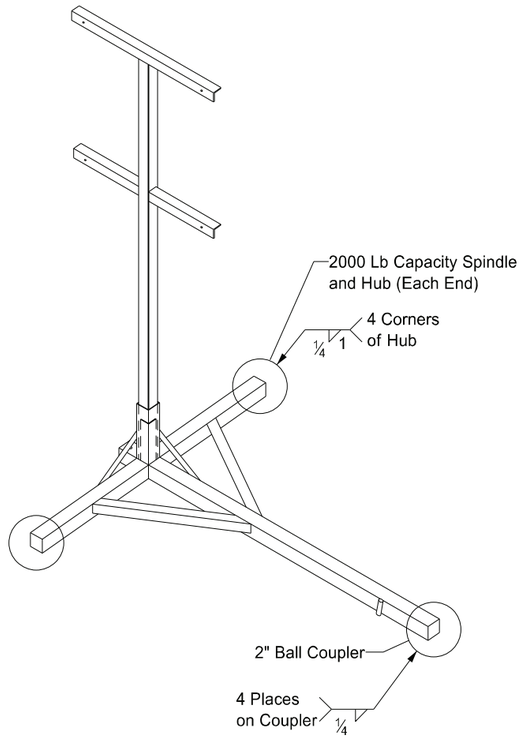
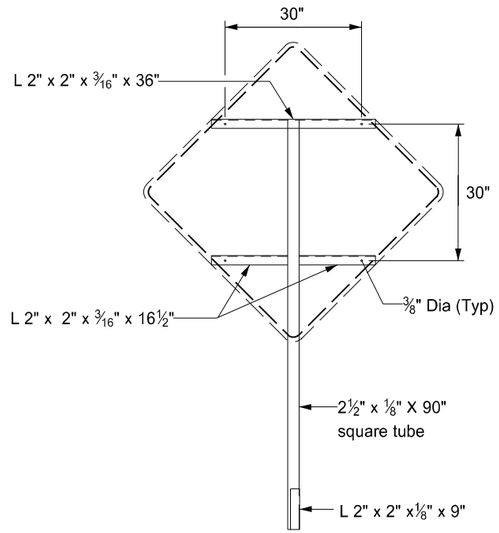
03/07/23

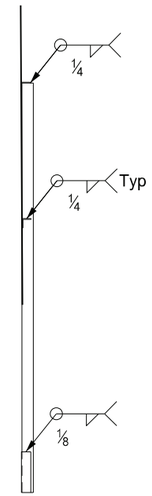
PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50





FRONT

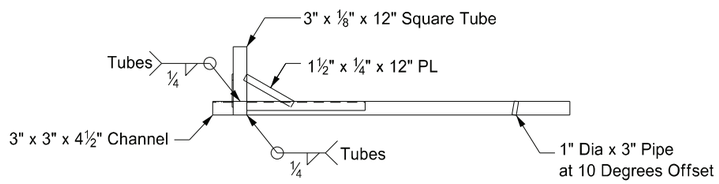


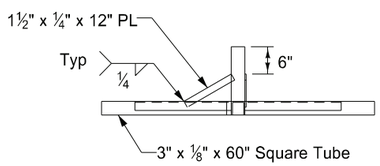
RIGHT

SIGN SUPPORT

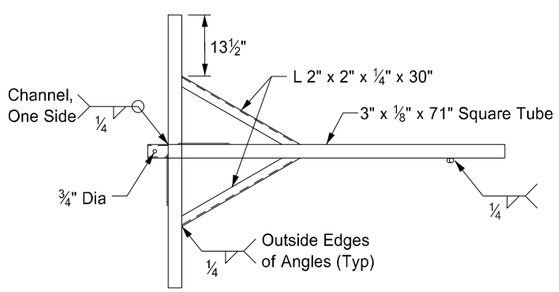
Notes:

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





RIGHT



TOP

TRAILER

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

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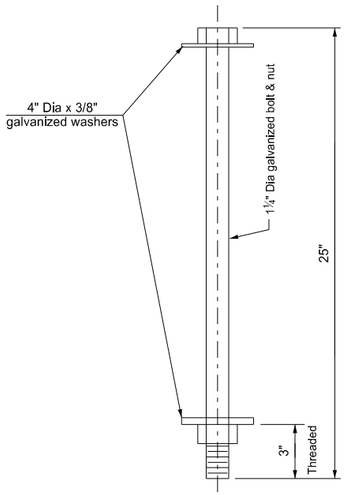
12 02 2020

CONCRETE MEDIAN BARRIER
(TEMPORARY USAGE)

D-704-51

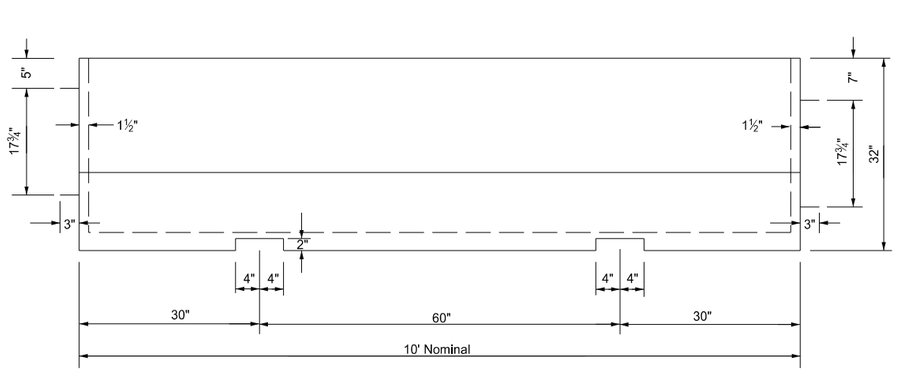
Notes:

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



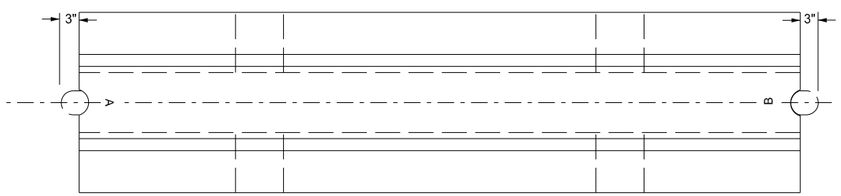
Connecting Bolt Detail

(One per 10 Ft section)

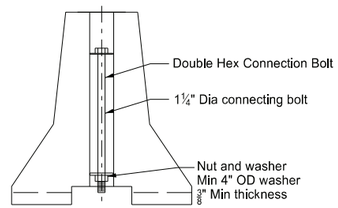


End View

Side View



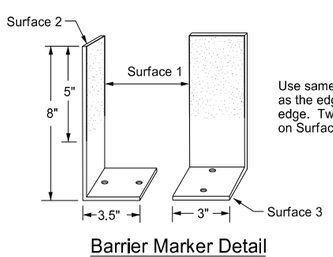
Plan View



Bolt Connection Detail

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

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



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

Barrier Marker Detail

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

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

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

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

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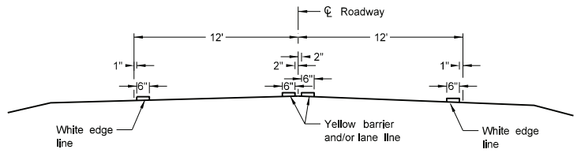
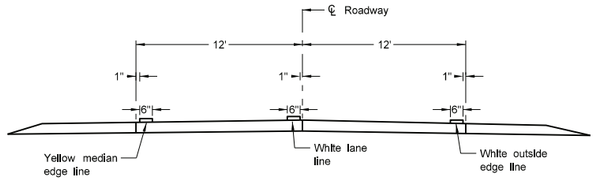
08/21/24

PAVEMENT MARKING

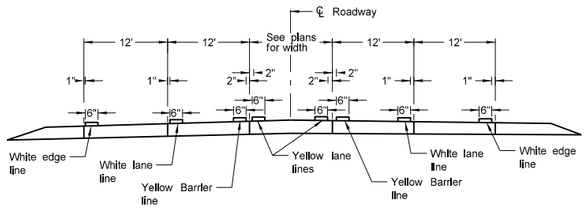
D-762-4



Two Lane Two Way
RURAL ROADWAY



Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



RURAL FIVE LANE ROADWAY
Concrete Section

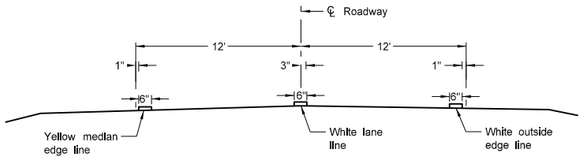
NOTES:

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

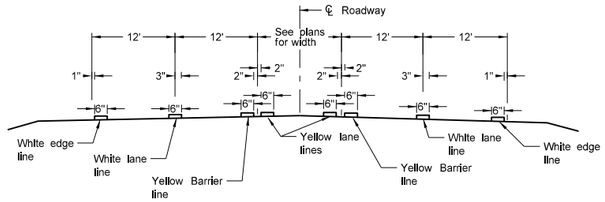
   For section lines, county roads, and street approaches, stripe the radii and edge lines of the paved surface within the right of way except where curb and gutter is present.

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

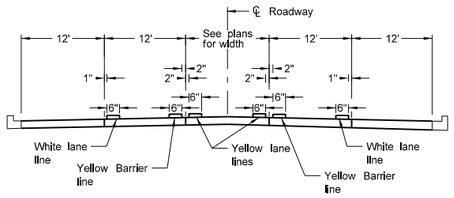
3. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits < 40 mph.



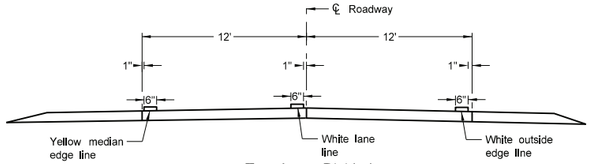
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



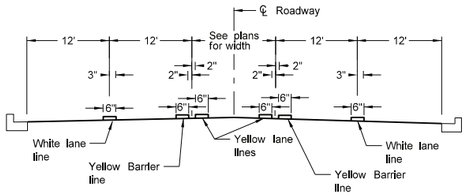
RURAL FIVE LANE ROADWAY
Asphalt Section



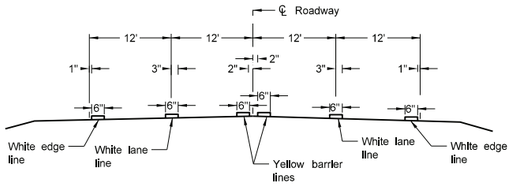
URBAN FIVE LANE SECTION
Concrete Section



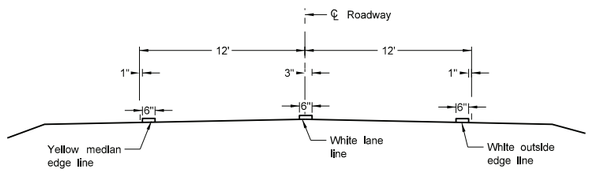
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



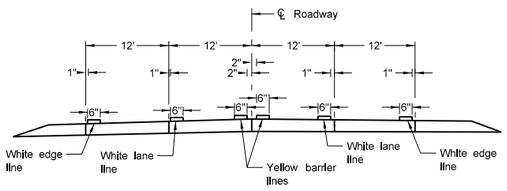
URBAN FIVE LANE SECTION
Asphalt Section



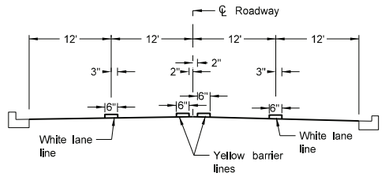
RURAL FOUR LANE ROADWAY
Asphalt Section



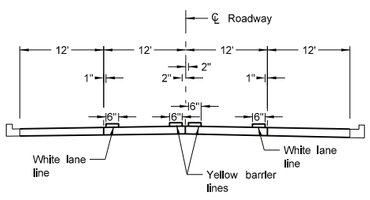
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



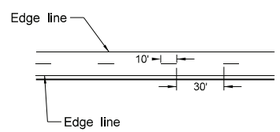
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

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

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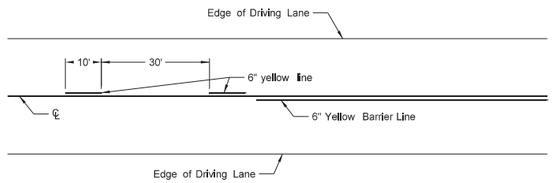
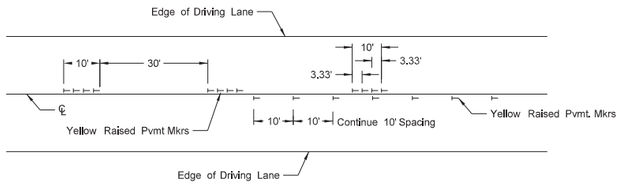
SHORT-TERM PAVEMENT MARKING

D-762-11

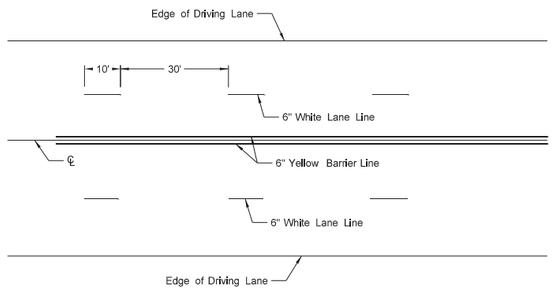


Painted or Tape Lines

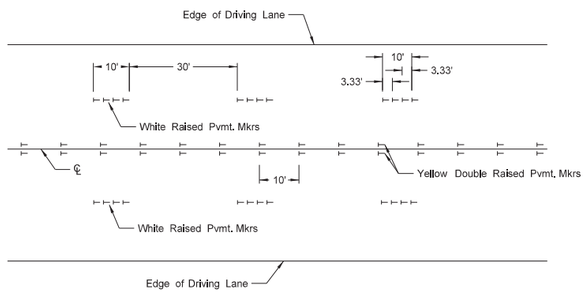


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

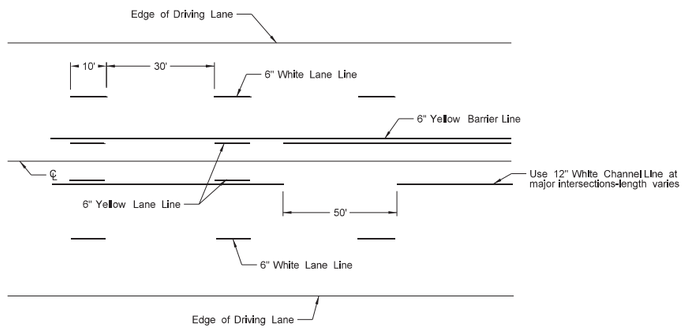


Painted or Tape Lines

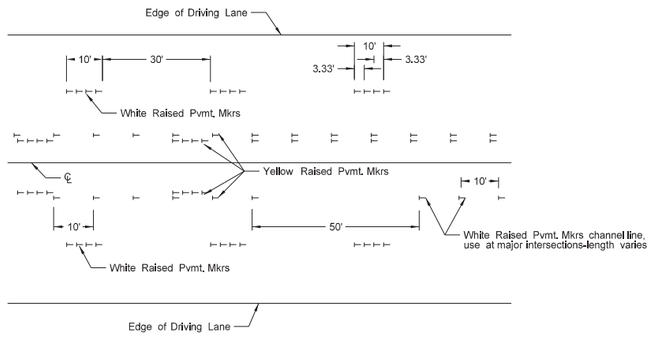


Raised Pavement Markers

FOUR LANE ROADWAY

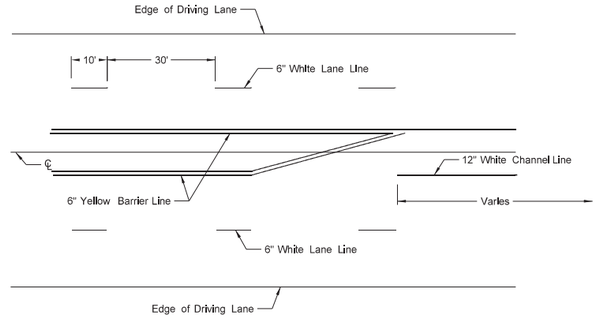


Painted or Tape Lines

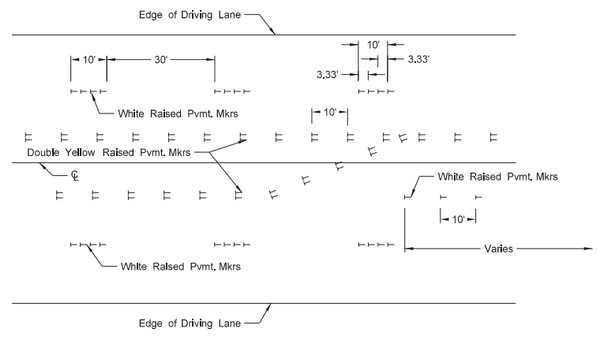


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

NOTES:

1. Place no passing zones on two-lane two-way roadways as shown. In lieu of short term no passing zone pavement markings, place no passing zone signs. Replace no passing zone signs with short term no passing zone pavement marking within three days.
2. Place short term center line stripe (paint) on top lift to match exact placement of permanent stripe.
3. Remove raised markers and tape markings after permanent pavement marking is installed.
4. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
5. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.
6. Wide lines - 8 inches wide if 4 inch normal width lines are used and 12 inches wide if 6 inch normal width lines are used.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

12-1-10

REVISIONS

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

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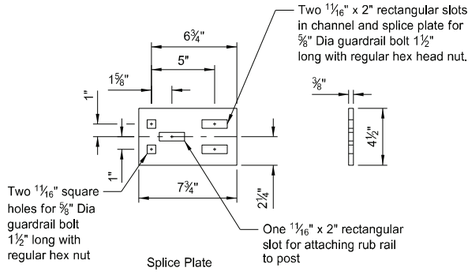
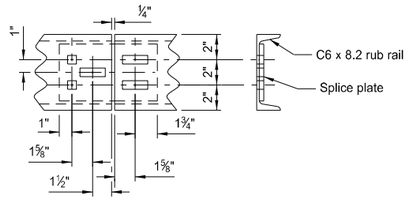
W-BEAM GUARDRAIL GENERAL DETAILS

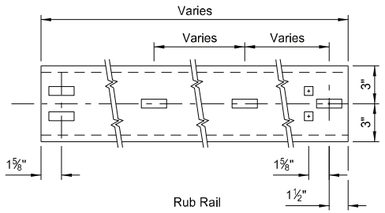
D-764-1



Splice Plate

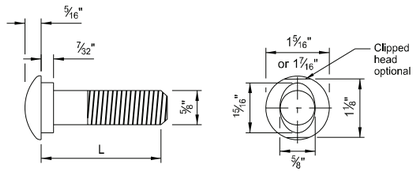


Splice Detail

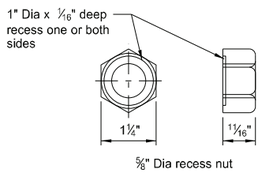


Rub Rail

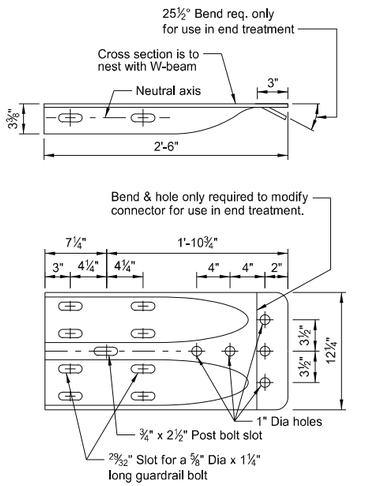
C6x8 RUB RAIL AND SPLICE PLATE



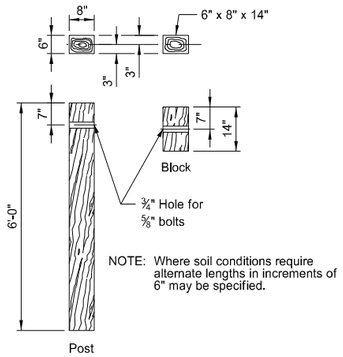
5/8" Diameter Guardrail Bolt	
L	Thread Length
1 1/4"	Full length thread
2"	1 3/4" Min thread length
9 1/2"	4" Min thread length
18"	4" Min thread length
20"	4" Min thread length
22"	4" Min thread length
25"	4" Min thread length



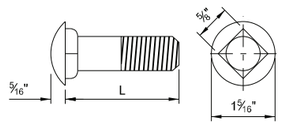
5/8" GUARDRAIL BOLT & RECESS NUT



W BEAM TERMINAL CONNECTOR

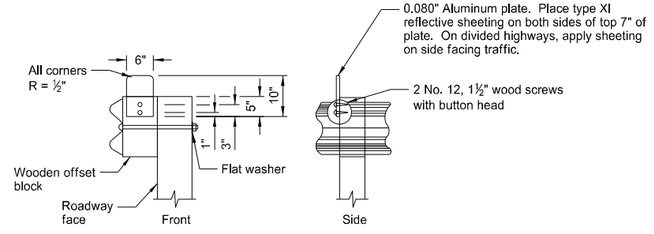


6"x8" TIMBER POST & BLOCK



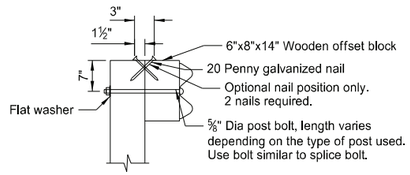
5/8" Diameter Carriage Bolt	
L	Thread Length
1 1/2"	Full length thread
3"	1 1/2" Min thread length
11"	1 3/4" Min thread length
13"	1 3/4" Min thread length

5/8" CARRIAGE BOLT & NUT

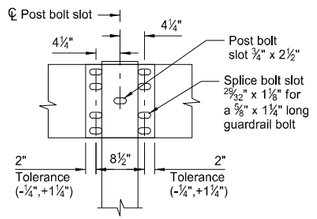


REFLECTORIZED PLATE DETAIL

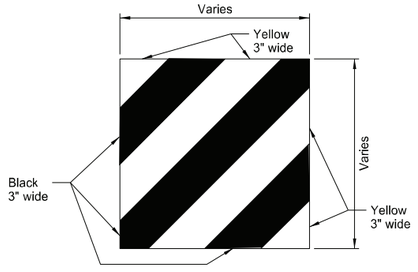
Additional reflectors are added to the W-beam guardrail quantities for placement on end treatment.



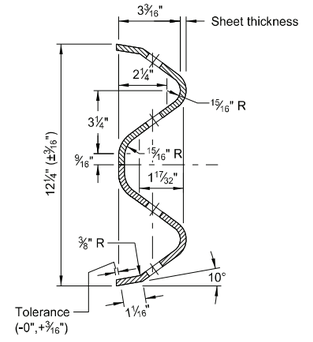
TYPICAL POST ATTACHMENT DETAIL



SPLICE DETAIL



IMPACT HEAD OBJECT MARKER



W-BEAM CROSS SECTION

NOTES:

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

10-11-13

REVISIONS

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

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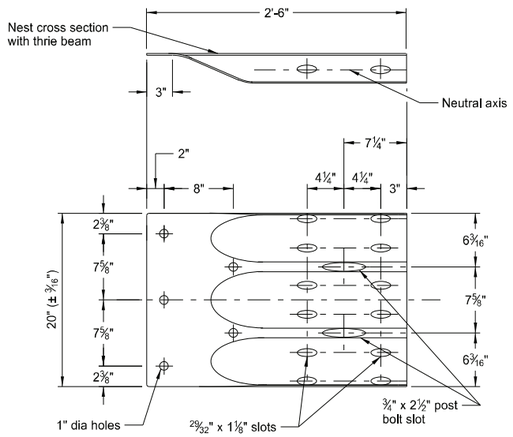
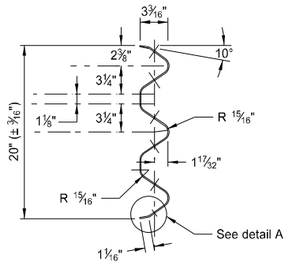
12 02 2020

THRIE BEAM TRANSITION TO DOUBLE BOX BEAM RETROFIT

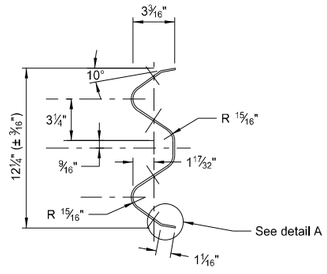
D-764-10



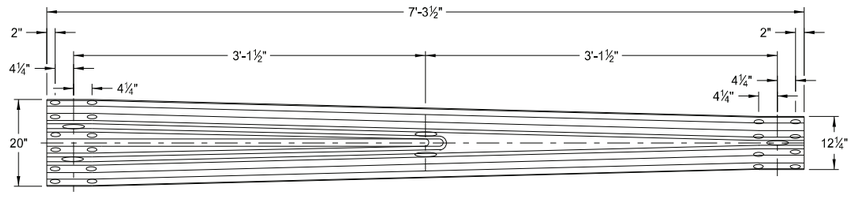
THRIE BEAM TERMINAL CONNECTOR



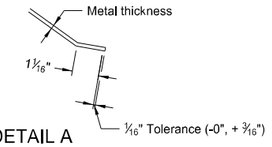
THRIE BEAM END VIEW



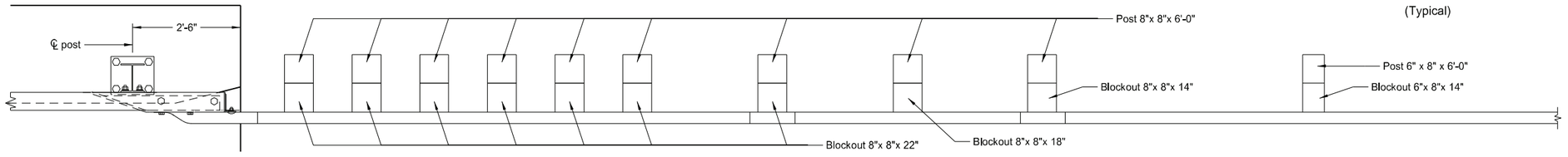
W-BEAM END VIEW



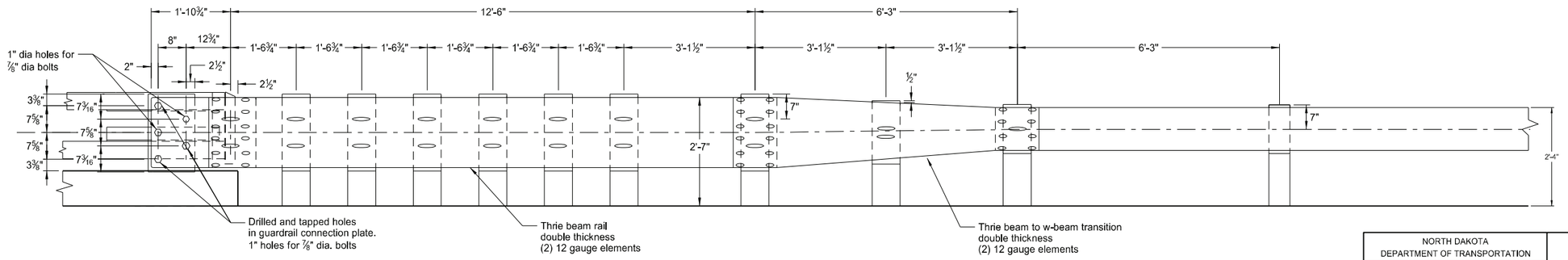
THRIE BEAM TO W-BEAM TRANSITION SECTION



DETAIL A
(Typical)



PLAN



ELEVATION

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

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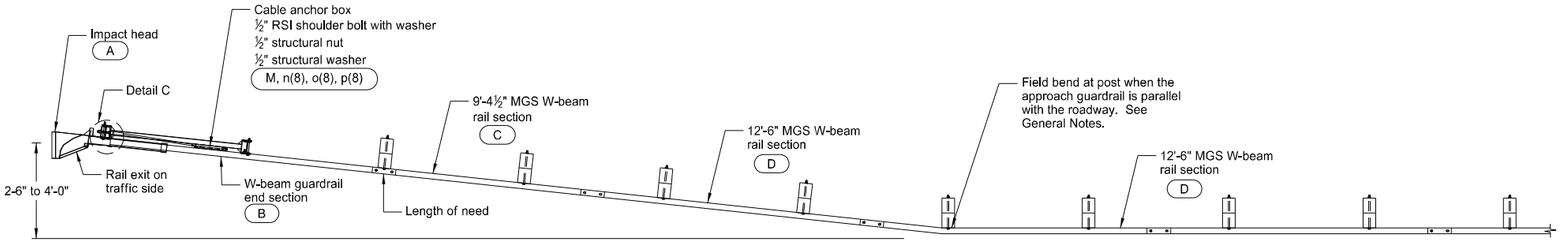
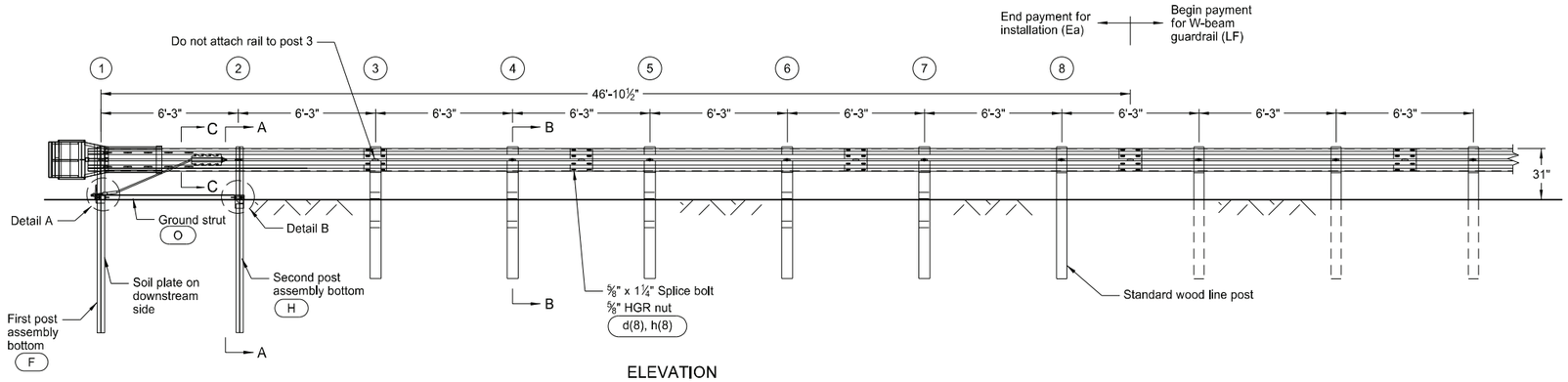
12 02 2020

MGS FLARED ENERGY ABSORBING TERMINAL - WOOD POST

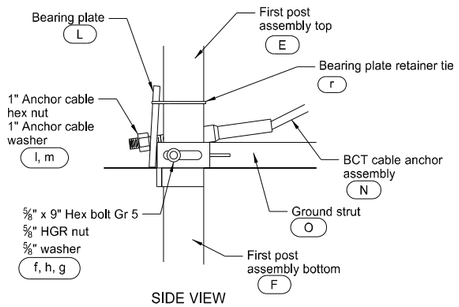
D-764-38



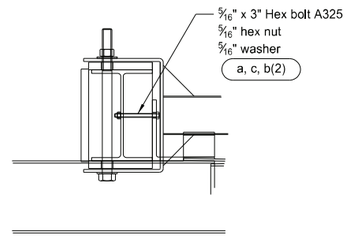
PLAN



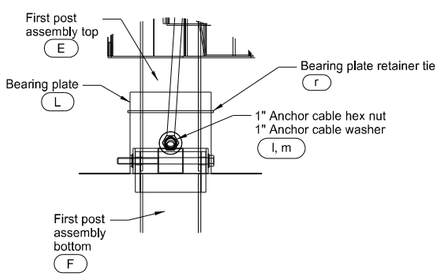
ELEVATION



SIDE VIEW

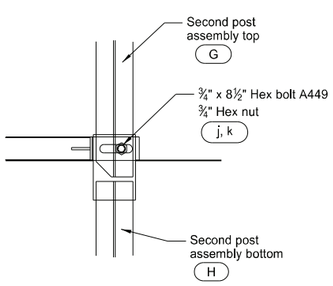


DETAIL C
Post 1 (Impact Head connection)

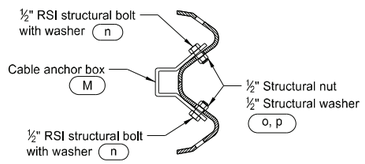


FRONT VIEW

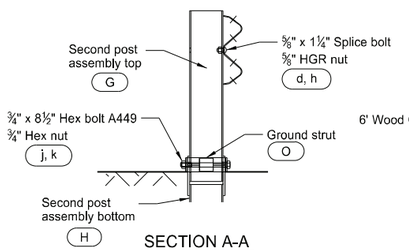
DETAIL A
Post 1



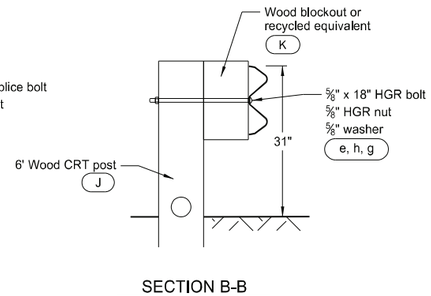
DETAIL B
Post 2



SECTION C-C



SECTION A-A
Post 2



SECTION B-B
Posts 3 through 7

ITEM	ITEM NO.	BILL OF MATERIALS	QTY
A	F3000	IMPACT HEAD	1
B	SF1303	W-BEAM GUARDRAIL END SECTION, 12 Ga	1
C	G12025	9'-4½" MGS W-BEAM RAIL SECTION, 12 Ga	1
D	G1203A	12'-6" MGS W-BEAM RAIL SECTION, 12 Ga	2
E	UHP1A	FIRST POST ASSEMBLY TOP	1
F	HP1B	FIRST POST ASSEMBLY BOTTOM	1
G	UHP2A	SECOND POST ASSEMBLY TOP	1
H	HP2B	SECOND POST ASSEMBLY BOTTOM	1
J	UP671	WOOD CRT POST	5
K	P675	WOOD BLOCKOUT OR RECYCLE EQUIVALENT	5
L	E750	BEARING PLATE	1
M	S760	CABLE ANCHOR BOX	1
N	E770	BCT CABLE ANCHOR ASSEMBLY	1
O	S785	GROUND STRUT HINGED POST	1
		HARDWARE	
a	B5160304A	⅝" x 3" HEX BOLT A325	2
b	W0516	⅝" WASHER	4
c	N0516	⅝" HEX NUT	2
d	B580122	⅝" Dia x 1¼" SPLICE BOLT	33
e	B581802	⅝" Dia X 18" HGR BOLT	5
f	B580904A	⅝" Dia x 9" HEX BOLT GRD 5	1
g	W050	⅝" WASHER	7
h	N050	⅝" Dia HGR NUT	39
j	B340854A	¾" Dia x 8½" HEX BOLT GRD A449	1
k	N030	¾" Dia HEX NUT	1
l	N100	1" ANCHOR CABLE HEX NUT	2
m	W100	1" ANCHOR CABLE WASHER	2
n	SB12A	½" RSI SHOULDER BOLT WITH WASHER	8
o	N012A	½" STRUCTURAL NUT	8
p	W012A	½" STRUCTURAL WASHER	8
r	CT-100ST	BEARING PLATE RETAINER TIE	1

NOTE: Standard wood line post, block, and associated hardware not included in Bill of Materials Table.

GENERAL NOTES:

1. Wood posts are required with the Flared Energy Absorbing Terminal except posts 1 and 2.
2. Galvanize all bolts, nuts, cable assemblies, cable anchors, and bearing plates.
3. Flare the Flared Energy Absorbing Terminal when the approach guardrail is parallel with the roadway. When the approach guardrail is flared at 16:1 to 10:1, ensure the Flared Energy Absorbing Terminal has only the flare rate of the guardrail. When the guardrail flare is between 10:1 and 7:1, ensure the Flared Energy Absorbing Terminal is turned parallel to the roadway.
4. Site grade as necessary to ensure the lower sections of the posts do not protrude more than 4" above the ground (measured along a 5' cord).
5. Install 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 to prevent settlement.
6. Install the breakaway cable assembly taut. Use a locking device (vice grips or channel lock pliers) to prevent cable from twisting when tightening nuts.
7. "Toe nail" the wood blockouts to the rectangular wood posts with two 20 penny galvanized nails to prevent them from turning when the wood shrinks.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

7-14-17

REVISIONS

DATE	CHANGE
12-02-20	Updated notes to active voice.

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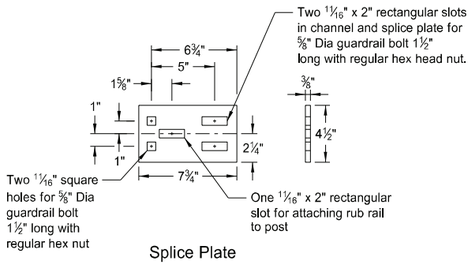
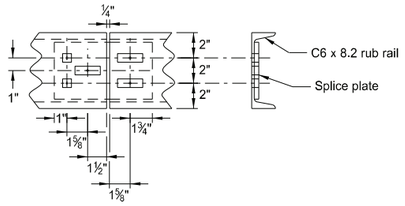
12 02 2020

MGS W-BEAM GUARDRAIL GENERAL DETAILS

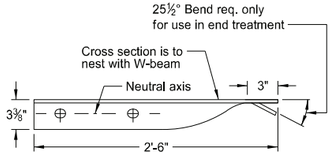
D-764-40

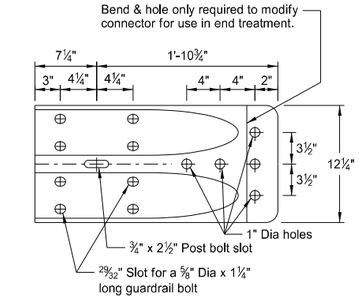


Splice Plate

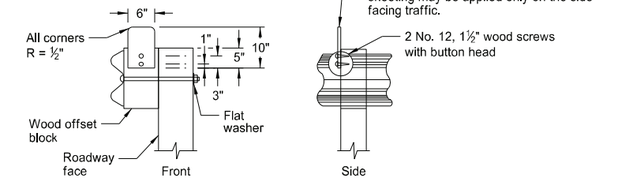


Splice Detail



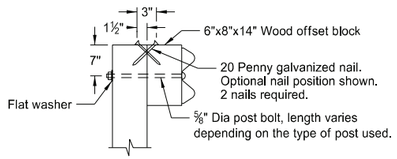


W BEAM TERMINAL CONNECTOR



REFLECTORIZED PLATE DETAIL

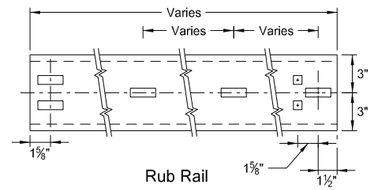
NOTE: Additional reflectors are added to the W-beam guardrail quantities for placement on end treatment.



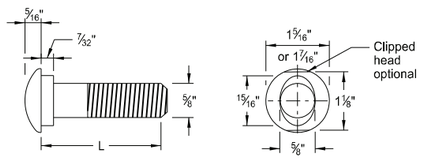
TYPICAL WOOD POST ATTACHMENT DETAIL

NOTES:

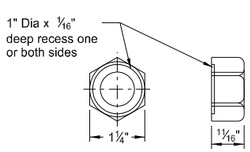
1. Begin reflector plates at the first post and space at 25' centers on guardrail less than 250' length and at 50' centers for guardrail over 250' length. Provide the reflector the same color as the pavement marking adjacent to it unless noted otherwise on the plans.
2. Replacing bituminous material at guardrail post: Dispose all excess earth from excavations for guard posts as directed by the engineer. Replace bituminous material wherever guardrail is installed after mat has been laid. Cost of excavation and replacing of bituminous material to be included in the price bid for other items.
3. Fit the Object Marker within the vertical edges of the Impact Plate. Provide type XI retroreflective sheeting meeting the requirements of Section 894.02.E of the standard specifications. Apply the sheeting to 0.100 Aluminum sheeting meeting the requirements of Section 894.01.A. Attach the Object Marker to the Impact Head Plate with rivets or other attachment device. Ensure the rivets or attachment device are non-rust. Slope the stripes downward toward the roadway side.
4. Guardrail installation height tolerance = ±1".



C6x8.2 RUB RAIL AND SPLICE PLATE

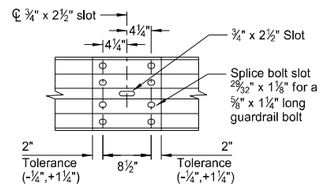


5/8" Diameter Guardrail Bolt	
L	Thread Length
1 1/4"	Full length thread
2"	1 3/4" Min thread length
9 1/2"	4" Min thread length
18"	4" Min thread length
20"	4" Min thread length
22"	4" Min thread length
25"	4" Min thread length



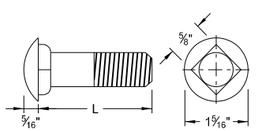
5/8" Dia recess nut

5/8" GUARDRAIL BOLT & RECESS NUT



SPLICE DETAIL

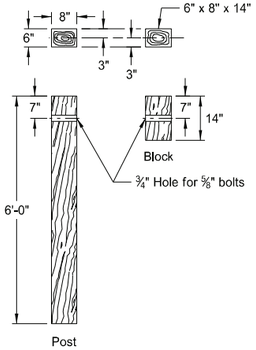
NOTE: Do not install center bolt in the 3/4" x 2 1/2" slot at mid span splices.



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

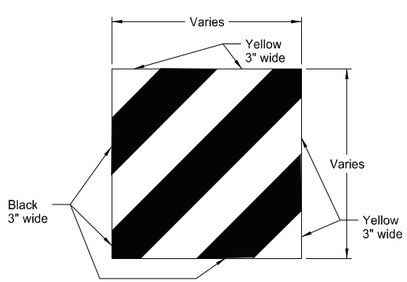
5/8" Dia hex nut

5/8" CARRIAGE BOLT & NUT

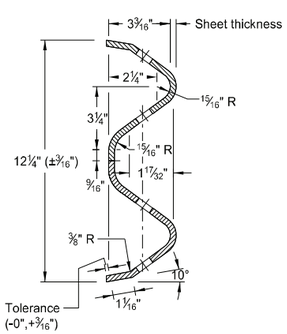


6" x 8" WOOD POST & BLOCK

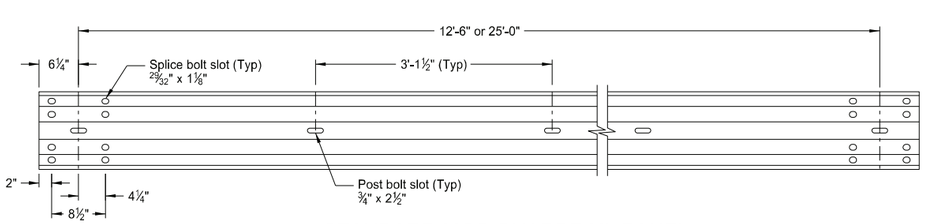
NOTE: Where soil conditions require, alternate lengths may be specified, in 6" increments.



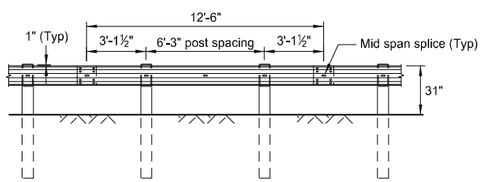
IMPACT HEAD OBJECT MARKER



W-BEAM CROSS SECTION



STANDARD MGS GUARDRAIL PANEL



STANDARD MGS GUARDRAIL SYSTEM

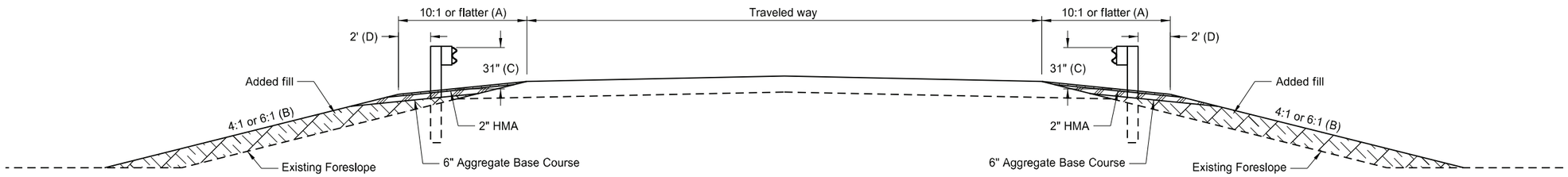
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-14-17	
REVISIONS	
DATE	CHANGE
12-02-20	Updated clipped head to optional

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

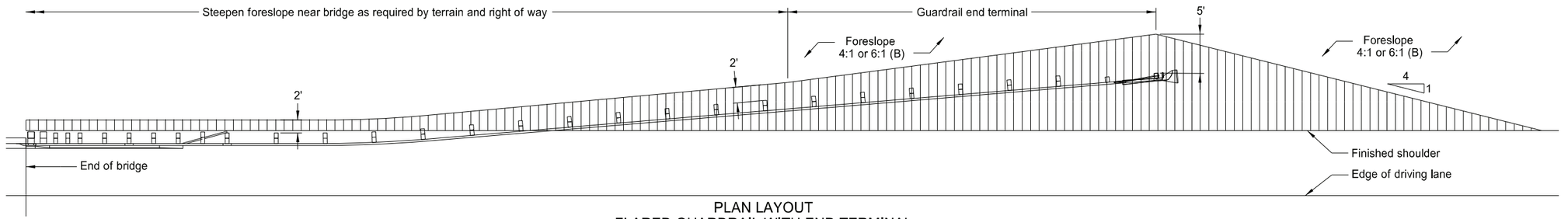
12 02 2020

TYPICAL GRADING AT BRIDGE ENDS WITH MGS W-BEAM GUARDRAIL

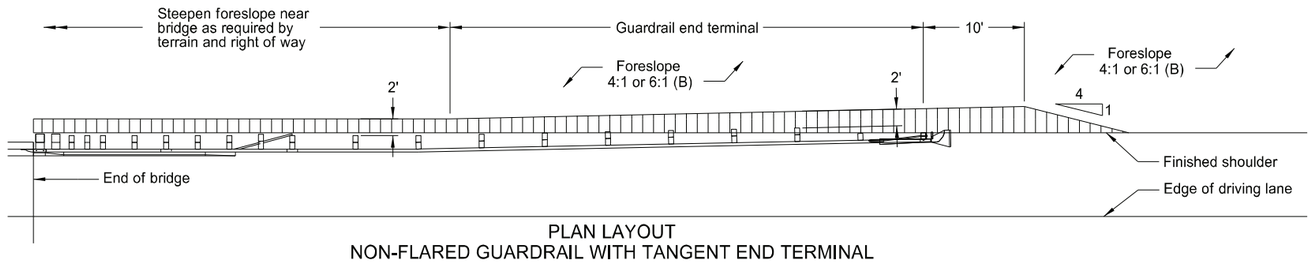
D-764-48



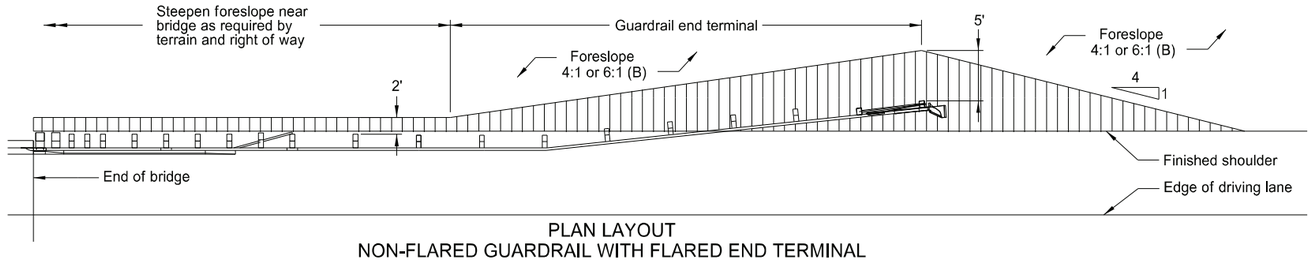
TYPICAL SECTION



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 required 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) Vary dimension at end terminals per Plan Layouts shown on this sheet.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-14-17	
REVISIONS	
DATE	CHANGE
12/02/20	Updated notes to active voice.

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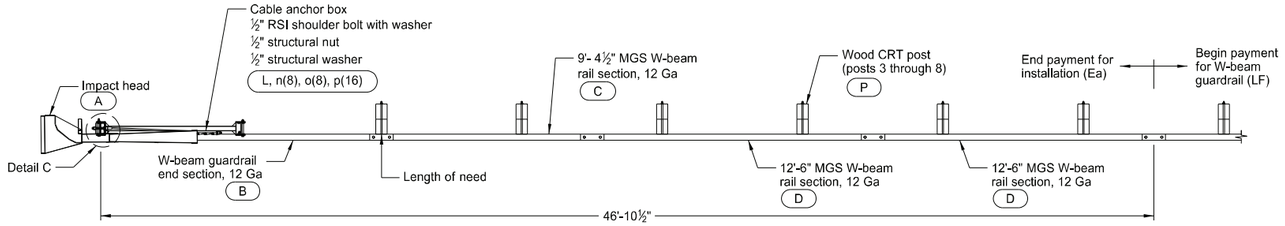
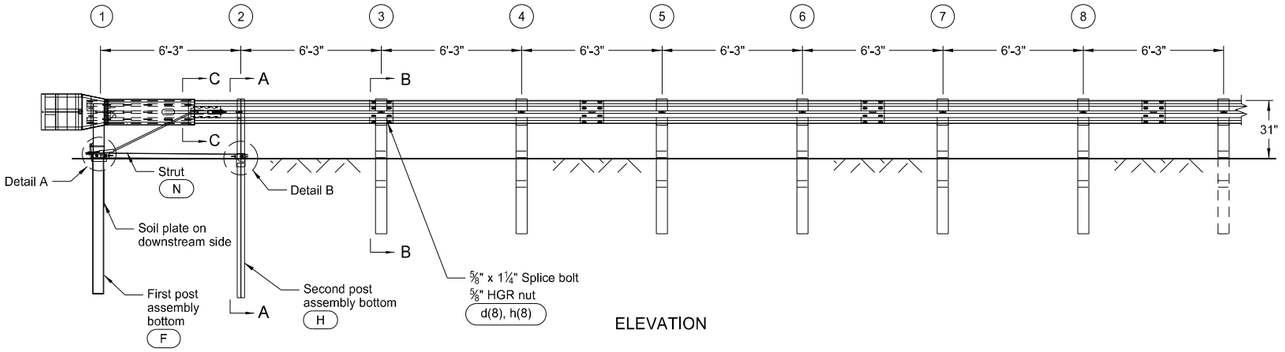
12 02 2020

MASH SEQUENTIAL KINKING TERMINAL - WOOD POST

D-764-51



PLAN

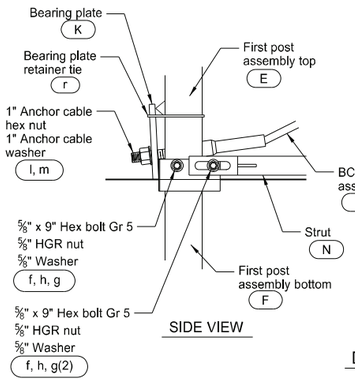


ELEVATION

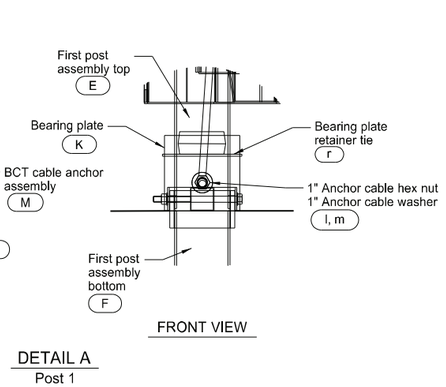
GENERAL NOTES:

1. Galvanize all bolts, nuts, cable assemblies, cable anchors, and bearing plates.
2. Flare the MSKT at a rate of up to 25:1, as needed to prevent the impact head from encroaching on the shoulder.
3. Site grade as necessary to ensure the lower sections of posts do not protrude more than 4" above the ground (measured along a 5' cord).
4. Install 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 to prevent settlement.
5. Install breakaway cable assembly taut. Use a locking device (vice grips or channel lock pliers) to prevent the cable from twisting when tightening nuts.
6. "Toe nail" the wood blockouts to the rectangular wood posts at post 3 through post 8 with two 20 penny galvanized nails to prevent them from turning when the wood warps.

ITEM	ITEM NO.	BILL OF MATERIALS	QTY
A	MS3000	IMPACT HEAD	1
B	SF1303	W-BEAM GUARDRAIL END SECTION, 12 Ga	1
C	G12025	9'-4½" MGS W-BEAM RAIL SECTION, 12 Ga	1
D	G1203A	12'-6" MGS W-BEAM RAIL SECTION, 12 Ga	2
E	MTPHP1A	FIRST POST ASSEMBLY TOP (6" X 6" X⅛" Tube)	1
F	MTPHP1B	FIRST POST ASSEMBLY BOTTOM (6' W6X15)	1
G	UHP2A	SECOND POST ASSEMBLY TOP	1
H	HP2B	SECOND POST ASSEMBLY BOTTOM	1
K	E750	BEARING PLATE	1
L	S760	CABLE ANCHOR BOX	1
M	E770	BCT CABLE ANCHOR ASSEMBLY	1
N	MS785	STRUT	1
P	UP671	6' WOOD CRT POST	6
R	P675	WOOD BLOCKOUT OR RECYCLED EQUIVALENT	6
		HARDWARE	
a	B5160104A	5/16" x 1" HEX BOLT GR 5	2
b	W0516	5/16" WASHER	4
c	N0516	5/16" HEX NUT	2
d	B580122	⅝" Dia x 1¼" SPLICE BOLT	33
e	B581802	⅝" Dia x 18" HGR BOLT (POSTS 3 THRU 8)	6
f	B580904A	⅝" x 9" HEX BOLT GR 5	2
g	W050	⅝" WASHER	9
h	N050	⅝" Dia HGR NUT	35
j	B340854A	¾" Dia x 8½" HEX BOLT GRD A449	1
k	N030	¾" Dia HEX NUT	1
l	N100	1" ANCHOR CABLE HEX NUT	2
m	W100	1" ANCHOR CABLE WASHER	2
n	SB12A	½" RSI SHOULDER BOLT WITH WASHER	8
o	N012A	½" STRUCTURAL NUT	8
p	W012A	½" STRUCTURAL WASHER	8
r	CT-100ST	BEARING PLATE RETAINER TIE	1

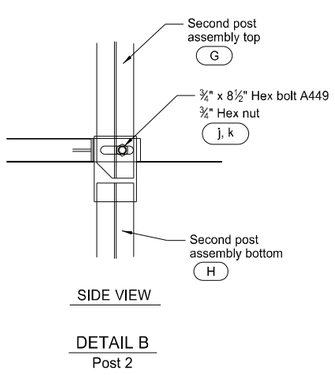


SIDE VIEW



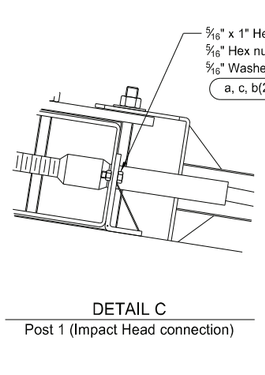
FRONT VIEW

DETAIL A
Post 1

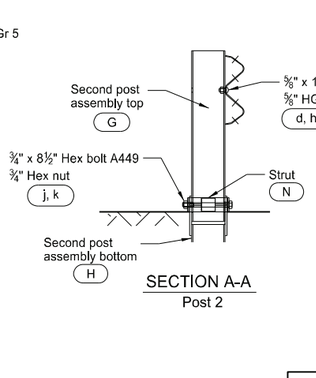


SIDE VIEW

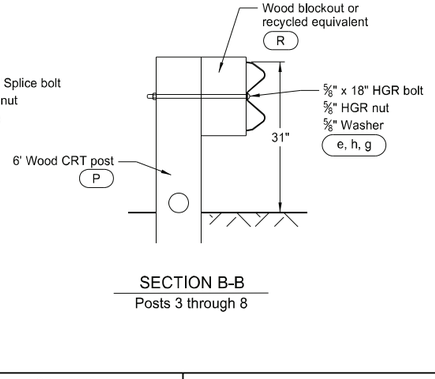
DETAIL B
Post 2



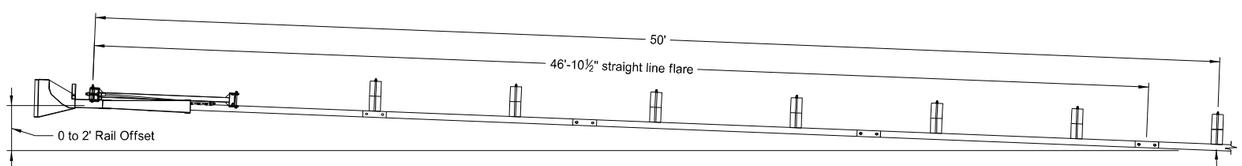
DETAIL C
Post 1 (Impact Head connection)



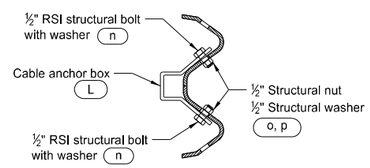
SECTION A-A
Post 2



SECTION B-B
Posts 3 through 8



FLARED INSTALLATION
25:1 maximum flare rate



SECTION C-C

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-14-17	
REVISIONS	
DATE	CHANGE
12-02-20	Updated notes to active voice.

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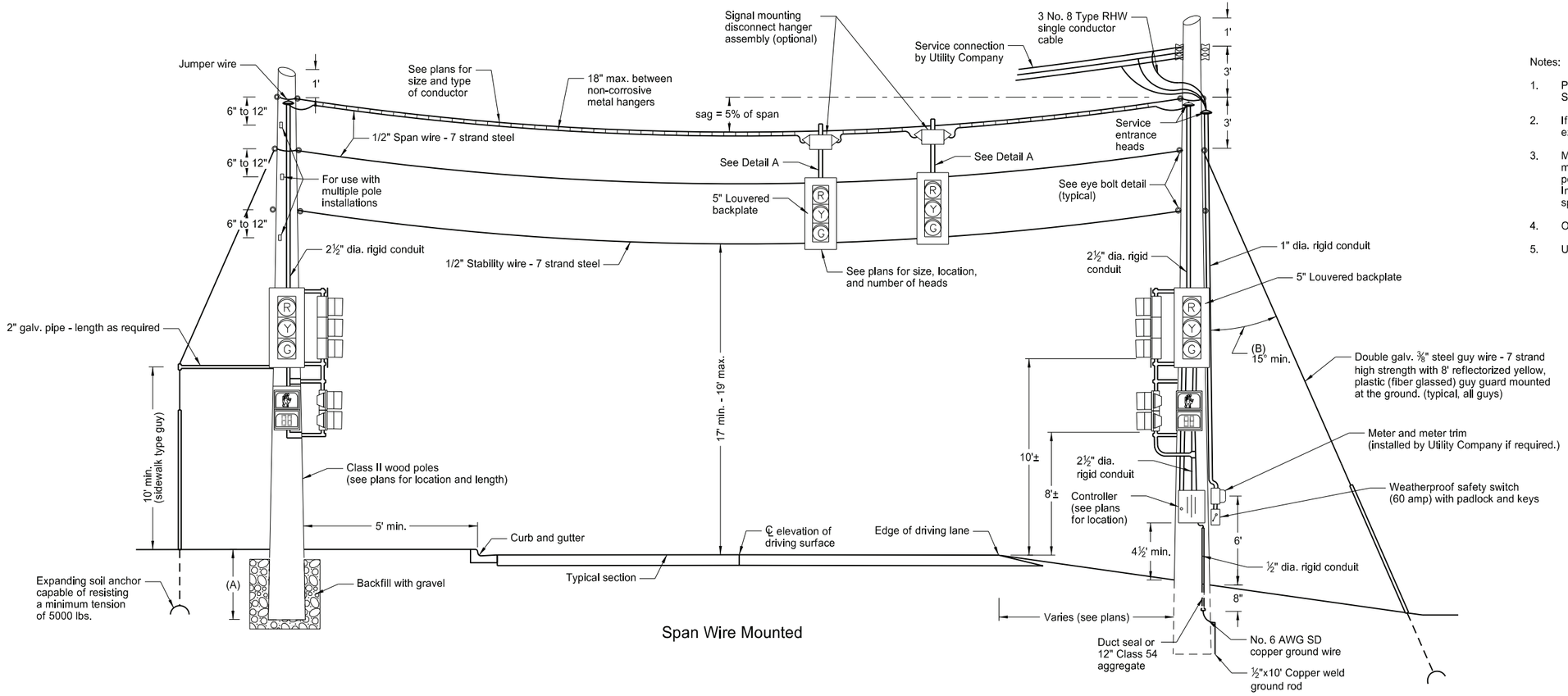
12 02 2020

SPAN WIRE MOUNTED TRAFFIC SIGNALS

D-772-6



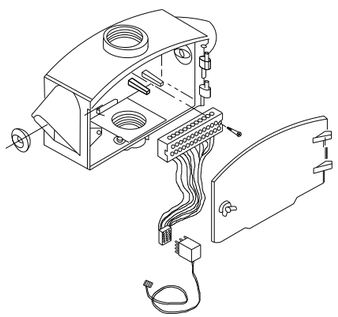
Span Wire Mounted

Notes:

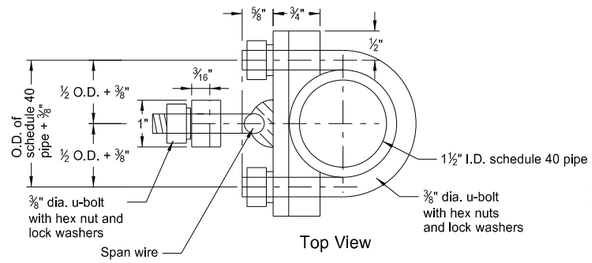
1. Place span wired mounted traffic signals in accordance with Standard Specifications Section 772 and 896.
2. If a guy wire angle of less than 45° is used, increase the capability of the expanding soil anchor to resist tensions on site.
3. Maintain the required 17 to 19 ft. signal height over the roadway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

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

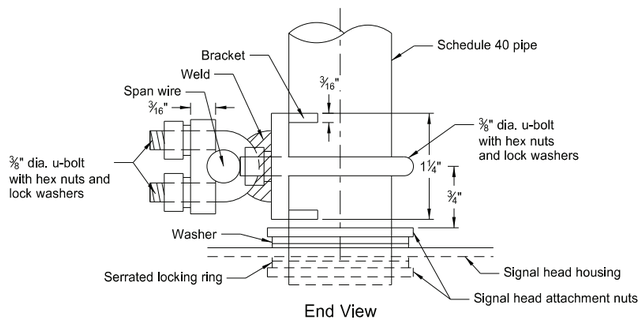
(B) Guy Wire	
Angle	Anchor Resistance min.
30°	12,000 lbs.
15°	24,500 lbs.



Signal Mounting Disconnect Hanger Assembly

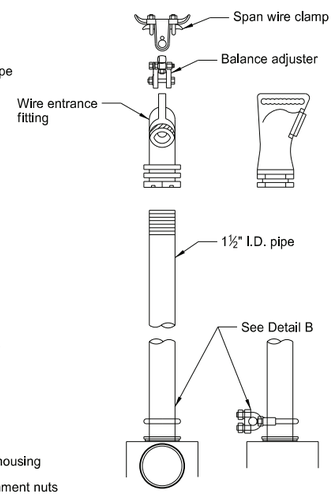


Top View

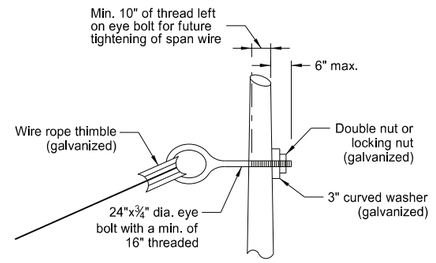


End View

Detail B



Detail A



Eye Bolt Detail

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE
7-8-14	Title change, span wire size and sag
10-17-17	Updated to active voice.
8-28-19	New Design Engineer PE Stamp.

This document was originally issued and sealed by Kirk J Hoff, Registration Number PE-4683, on 8/28/19 and the original document is stored at the North Dakota Department of Transportation