	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	NH-9-999(477)	23341	1	1

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

NH-9-999(477)

Traill, LaMoure, and Dickey Counties
Various Structures - Statewide

Box Culvert Joint Repairs, Spall Repairs, Wingwall Replacement, Scour Repair

GOVERNING SPECIFICATIONS	Date Published and Adopted by the North Dakota Department of Transportation
Standard Specifications	7/1/2024
Supplemental Specifications	NONE

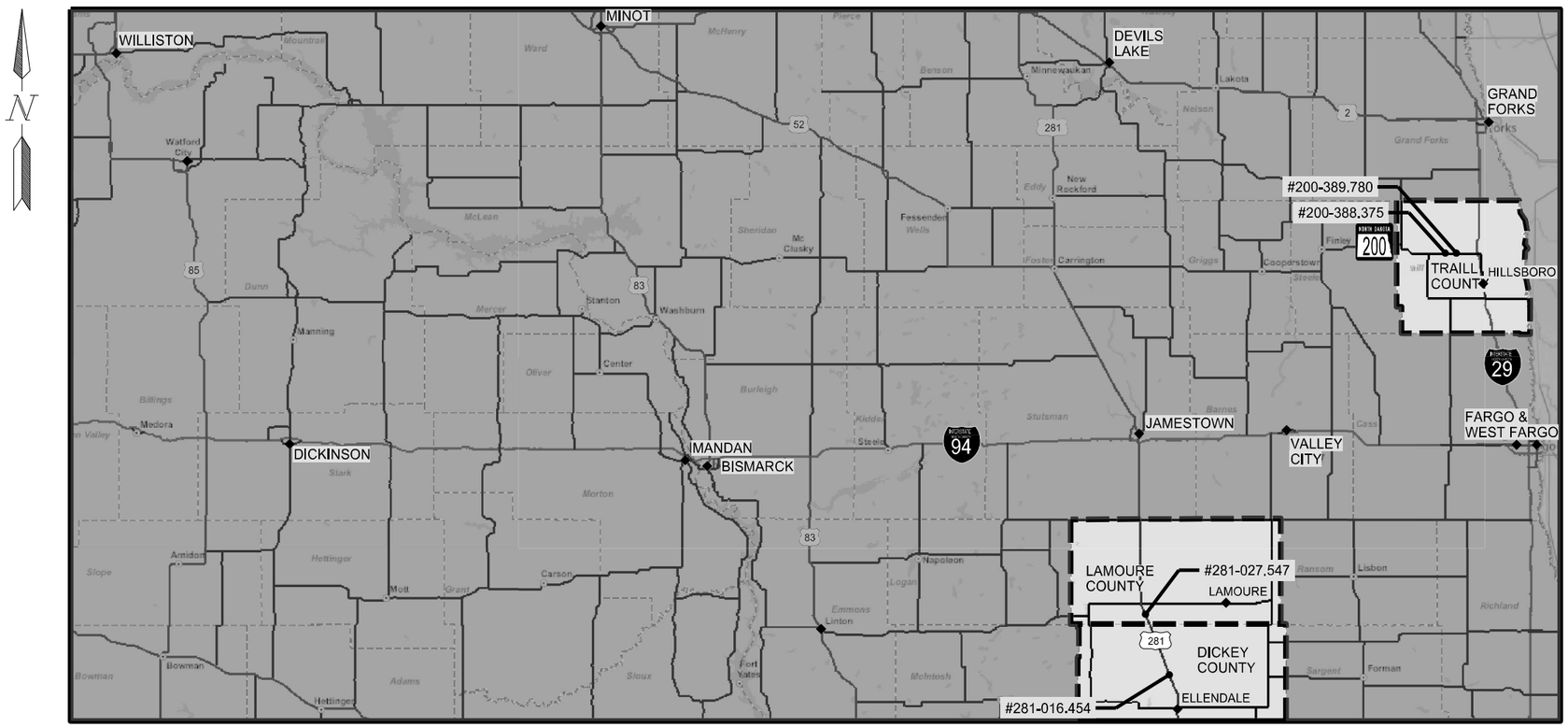
PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
NH-9-999(477)	Varies	Varies

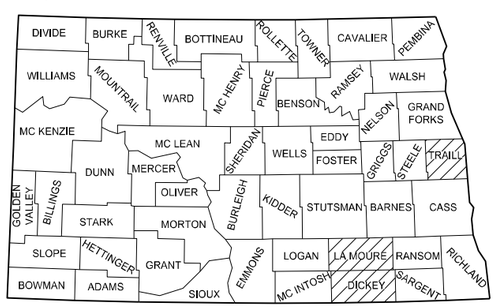
Structure #200-388.375
ND Hwy 200, RP 388.375
Section 1, T-146-N, R-52-W
Section 36, T-147-N, R-52-W

Structure #200-389.780
ND Hwy 200, RP 389.780
Section 6, T-146-N, R-51-W
Section 31, T-147-N, R-51-W

Structure #281-016.454
ND Hwy 281, RP 16.454
Section 17, T-131-N, R-63-W

Structure #281-027.547
ND Hwy 281, RP 27.547
Section 24, T-133-N, R-64-W





STATE COUNTY MAP

DESIGNER
Tatyana Fedorenko,PE Nikki Olson, PE
DESIGNER Charles Petersen, EIT Steven Hellman, Alex Rodriguez, EIT
DESIGNER Mary Boechler, PE Sam Boulton, EIT

ND DEPARTMENT OF TRANSPORTATION
OFFICE OF PROJECT DEVELOPMENT
Jason Thorenson
01/08/26

Ulteig Engineers, Inc.

REGISTERED PROFESSIONAL ENGINEER
MARY ANN BOECHLER
PE-28347
DATE 01/08/26
NORTH DAKOTA

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-9-999(477)	2	1

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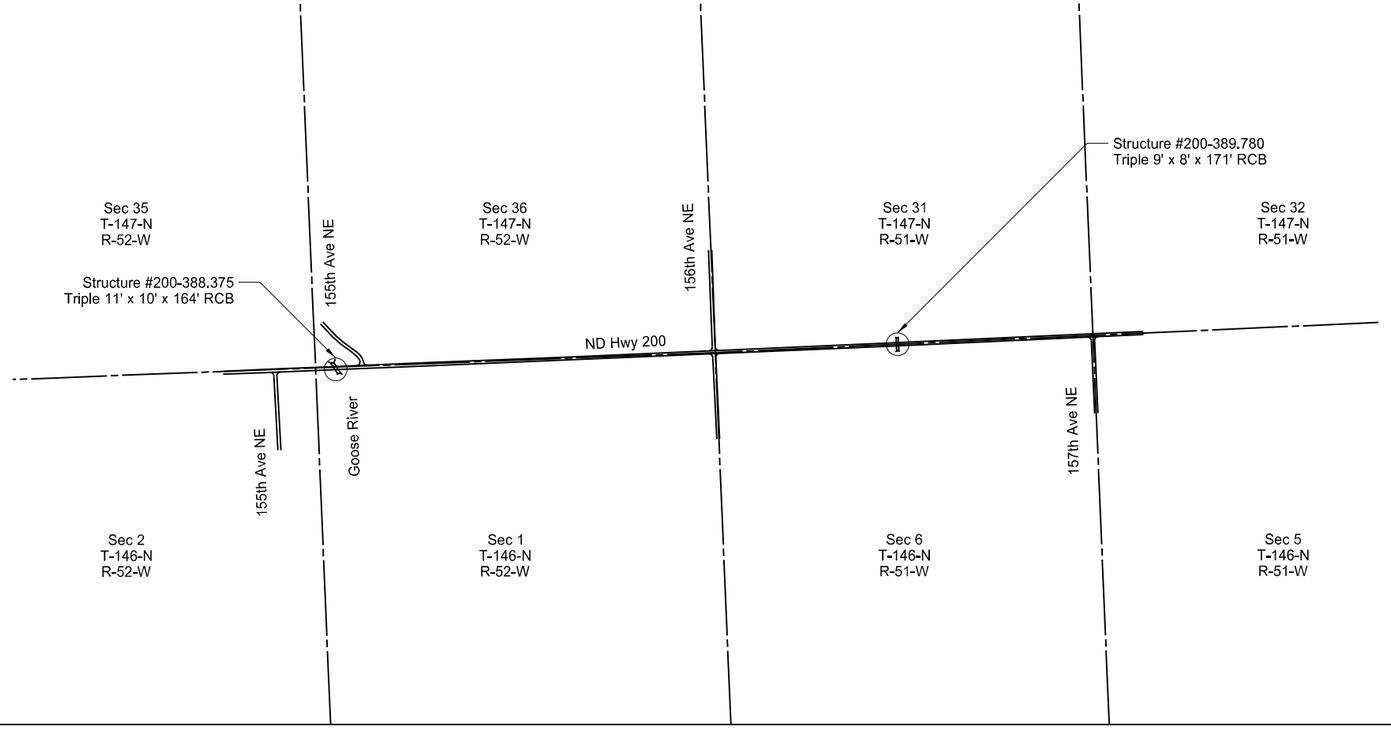
SPECIAL PROVISIONS



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-9-999(477)	4	1

REPAIR NOTES:

The general repairs of each structure are as follows:

Structure #200-388.375: Spall Repair, Box Culvert Joint Repair, Scour Repair, Topsoil
Structure #200-389.780: Spall Repair, Box Culvert Joint Repair, Scour Repair, Topsoil

Scope of Work

Structure #200-388.375
Structure #200-389.780

Structural Repair
Various Structures - Statewide

REGISTERED PROFESSIONAL ENGINEER
MARY ANN
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PE-28347
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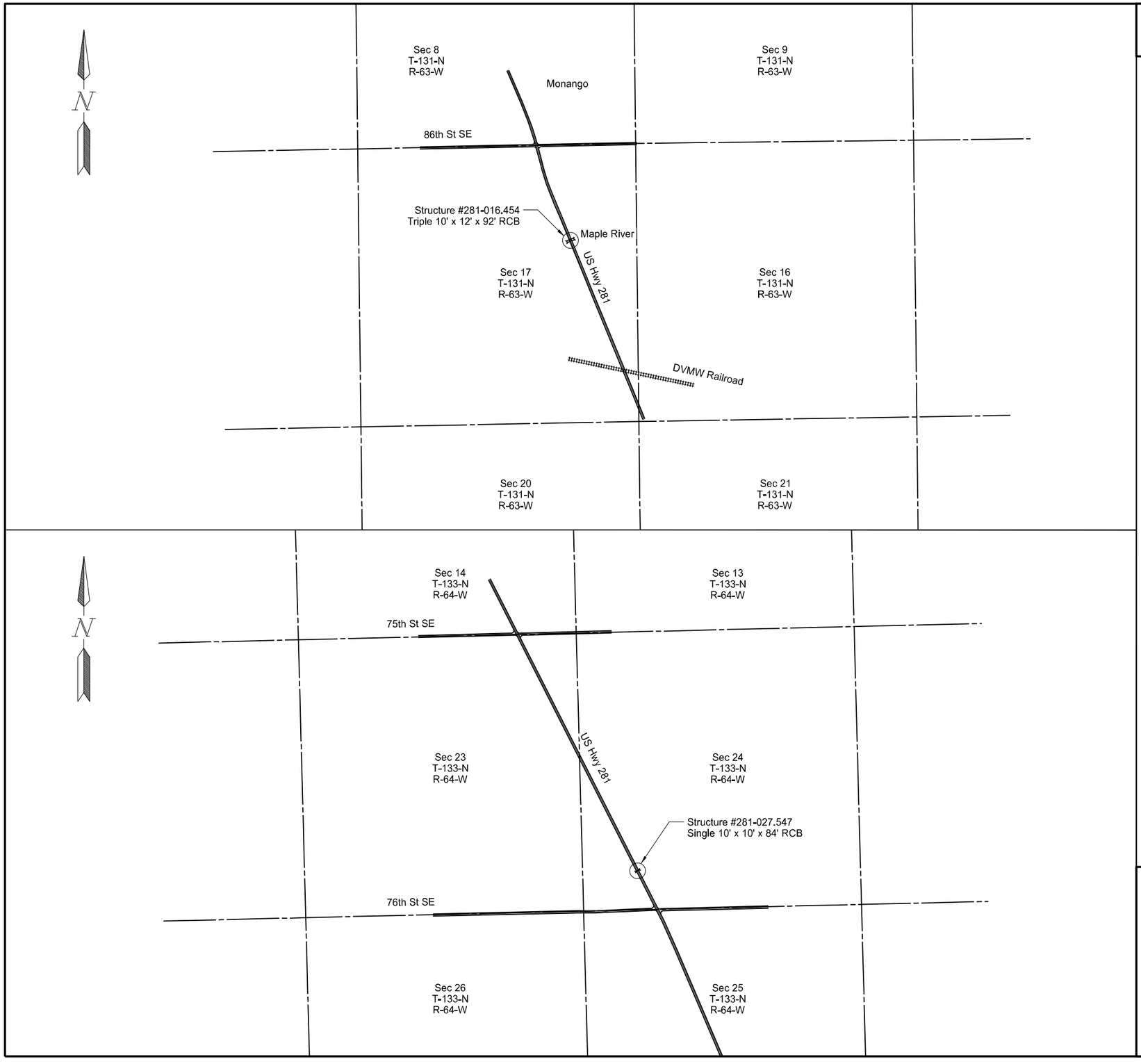

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-9-999(477)	4	2

REPAIR NOTES:

The general repairs of each structure are as follows:

Structure #281-016.454: Box Culvert Joint Repair, Wingwall Replacement, Scour Repair
Structure #281-027.547: Box Culvert Joint Repair, Scour Repair, Topsoil

Scope of Work

Structure #281-016.454
Structure #281-027.547

Structural Repair
Various Structures - Statewide

REGISTERED PROFESSIONAL ENGINEER
MARY ANN BOECHLER
PE-28347
DATE 01/08/2026
NORTH DAKOTA

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-9-999(477)	6	1

NOTES

100-P01 COORDINATION OF PROJECTS: Other projects in the vicinity of this project that could be under contract during the 2026 construction season:

Project 24043 is located on US 281 at N TWP LINE N ELLENDALE TO EDGELEY
Project 23583 is located on ND 18 at E JCT 200 W THRU PORTLAND

This list is not comprehensive and other projects may exist.

704-200 STATE FURNISHED MEDIAN BARRIERS: Obtain (61) 22.5" x 12.5' concrete barriers. They can be picked up and returned to the New Salem yard. Contact the Bismarck District office at 701-328-6950 to facilitate the exchanges.

Obtain (22) 22.5" x 12.5' 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-P01 TRAFFIC CONTROL FOR BOX CULVERTS: Provide traffic control consisting of a double lane shift for four box culvert locations.

Traffic control device quantities are based on two simultaneous double lane shifts, assuming a work space length of 100 feet. The Department will pay for additional devices if more locations are repaired concurrently.

See Double Lane Shift for:

Structure 200-388.375
Structure 200-389.780
Structure 281-016.454
Structure 281-027.547

Lane widths are to remain 12 feet minimum. Taper width "W" will be a minimum of 4 feet and field adjusted to provide a minimum work zone width of 12 feet.

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-9-999(477)	6	2

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 Sand Creek, Raymond Creek, Goose River, or Maple 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

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 01/08/2026
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-9-999(477)	8	1

Estimated Quantities

SPEC	CODE	ITEM DESCRIPTION	UNIT	Mainline:				TOTAL
103	0100	CONTRACT BOND	L SUM	1				1
202	0101	REMOVAL OF CONCRETE	EA	1				1
203	0119	TOPSOIL-IMPORTED	CY	34				34
203	0140	BORROW-EXCAVATION	CY	80				80
210	0210	FOUNDATION FILL	CY	185				185
256	0200	RIPRAP GRADE II	CY	293				293
602	1131	CLASS AE-3 CONCRETE-BOX CULVERT	CY	22				22
612	0114	REINFORCING STEEL-GRADE 60-BOX CULVERT	LBS	3475				3475
702	0100	MOBILIZATION	L SUM	1				1
704	1000	TRAFFIC CONTROL SIGNS	UNIT	1016				1016
704	1038	ATTENUATION DEVICE-TYPE B-40	EA	2				2
704	1060	DELINEATOR DRUMS	EA	88				88
704	1067	TUBULAR MARKERS	EA	48				48
704	3511	STATE FURNISHED MEDIAN BARRIER	LF	1038				1038
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	267				267
714	9900	INSTALL CONCRETE PIPE TIES	SET	122				122
900	1003	TEMPORARY STREAM DIVERSION - SITE 3	EA	4				4
930	3640	HIGH EXPANSION POLYURETHANE FOAM	GAL	1480				1480
930	8230	SHORING	EA	1				1
930	9612	SPALL REPAIR	SF	367				367
930	9671	BOX CULVERT JOINT REPAIR	EA	41				41
930	9672	BOX CULVERT JOINT REPAIR - FLOOR	EA	23				23

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-9-999(477)	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**	**4**	**26**	**104**
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)		18	
G20-4b-36	36"x30"	WAIT FOR PILOT CAR		18	
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS		43	
G20-52a-72	72"x24"	ROAD WORK NEXT __ MILES RT or LT ARROW		36	
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE $150 WHEN WORKERS PRESENT		59	
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		11	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)		7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)		7	
R1-1-48	48"x48"	STOP		32	
R1-2-60	60"x60"	YIELD		29	
R2-1-36	36"x48"	SPEED LIMIT __ (Portable only)		30	
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**8**	**39**	**312**
R2-1aP-24	**24"x18"**	**MINIMUM FEE $150 (Mounted on Speed Limit post)**	**4**	**10**	**40**
R3-2-48	48"x48"	NO LEFT TURN		35	
R4-1-48	48"x60"	DO NOT PASS		39	
R4-7-48	48"x60"	KEEP RIGHT		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-54	54"x18"	ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)		14	
R7-1-12	12"x18"	NO PARKING ANY TIME		11	
R10-6-24	24"x36"	STOP HERE ON RED		16	
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)		12	
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)		12	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)		15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)		15	
W1-3-48	**48"x48"**	**REVERSE TURN RIGHT or LEFT**	**8**	**35**	**280**
W1-4-48	48"x48"	REVERSE CURVE RIGHT or LEFT		35	
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT		35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD		35	
W3-3-48	48"x48"	SIGNAL AHEAD		35	
W3-4-48	48"x48"	BE PREPARED TO STOP		35	
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**4**	**35**	**140**
W4-2-48	48"x48"	LANE ENDS RIGHT or LEFT		35	
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC		35	
W8-1-48	48"x48"	BUMP		35	
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-11-48	48"x48"	UNEVEN LANES		35	
W8-12-48	48"x48"	NO CENTER LINE		35	
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or __ FT or _ MILE		35	
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __ FT or _ MILE		35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W13-1P-30	30"x30"	__ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)		14	
W14-3-64	64"x48"	NO PASSING ZONE		28	
W16-2P-30	30"x24"	__ FEET PLAQUE (Mounted on warning sign post)		10	
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**4**	**35**	**140**
W20-2-48	48"x48"	DETOUR AHEAD or __ FT or _ MILE		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT or _ MILE		35	
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or __ FT or _ MILE		35	
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or __ FT or _ MILE		35	
W20-7-48	48"x48"	FLAGGER		35	
W20-8-18	18"x18"	STOP - SLOW PADDLE Back to Back		5	
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	1016

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	FLAGGING	MHR	
704-1038	**ATTENUATION DEVICE-TYPE B-40**	**EA**	**2**
704-1048	PORTABLE RUMBLE STRIPS	EACH	
704-1050	TYPE I BARRICADES	EACH	
704-1052	TYPE III BARRICADES	EACH	
704-1060	**DELINEATOR DRUMS**	**EACH**	**88**
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**48**
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	
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
704-3511	**STATE FURNISHED MEDIAN BARRIER**	**LF**	**1038**
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF	

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

REGISTERED PROFESSIONAL ENGINEER
MARY ANN BOECHLER
PE-28347
DATE 01/08/2026
NORTH DAKOTA

Traffic Control Devices List

Structural Repair

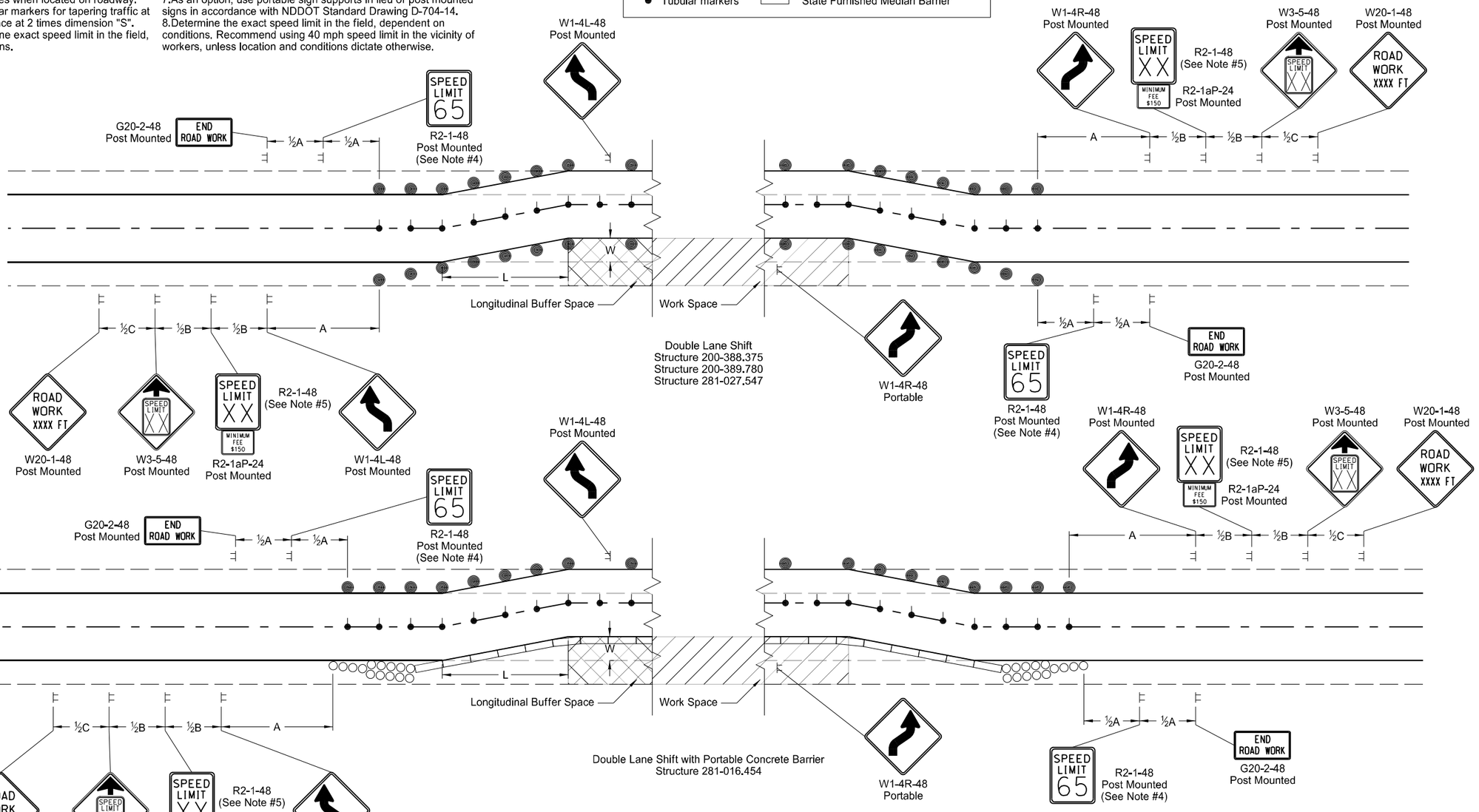
Various Structures - Statewide

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.
2. Place signs on portable assemblies when located on roadway.
3. Place delineator drums and tubular markers for tapering traffic at dimension "S" and for tangents space at 2 times dimension "S".
4. Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
5. Determine the reduced speed limit based on the in-place speedlimit before construction. Where speed reductions exceed 30 mph,install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.)
6. Cover existing speed limit signs within reduced speed zones.
7. As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
8. Determine the exact speed limit in the field, dependent on conditions. Recommend using 40 mph speed limit in the vicinity of workers, unless location and conditions dictate otherwise.

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-9-999(477)	100	2

KEY
- Delineator drum
- Tubular markers
- Sign
- Attenuation Device
- State Furnished Median Barrier



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

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

Work Zone Traffic Control

Double Lane Shift

Structural Repair
Various Structures - Statewide

REGISTERED PROFESSIONAL ENGINEER
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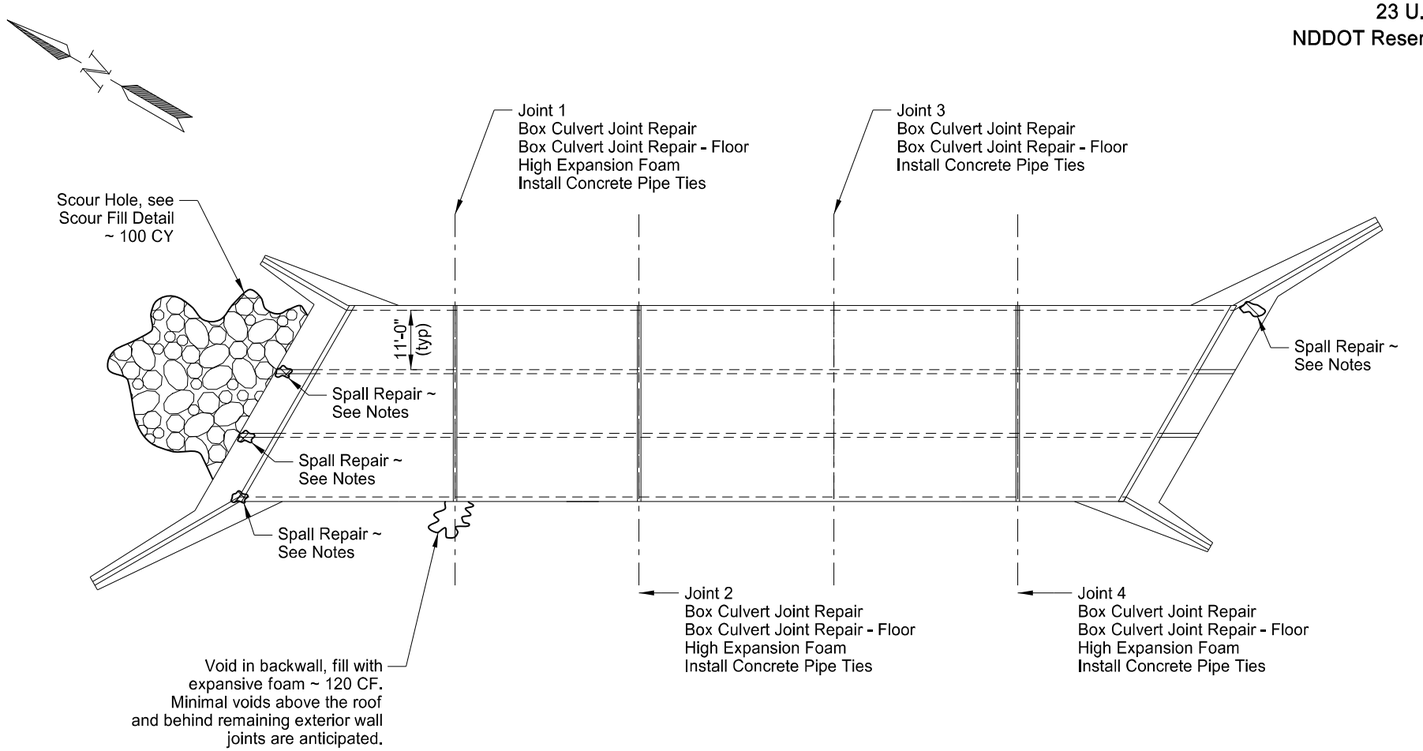
DATE 01/08/2026
NORTH DAKOTA

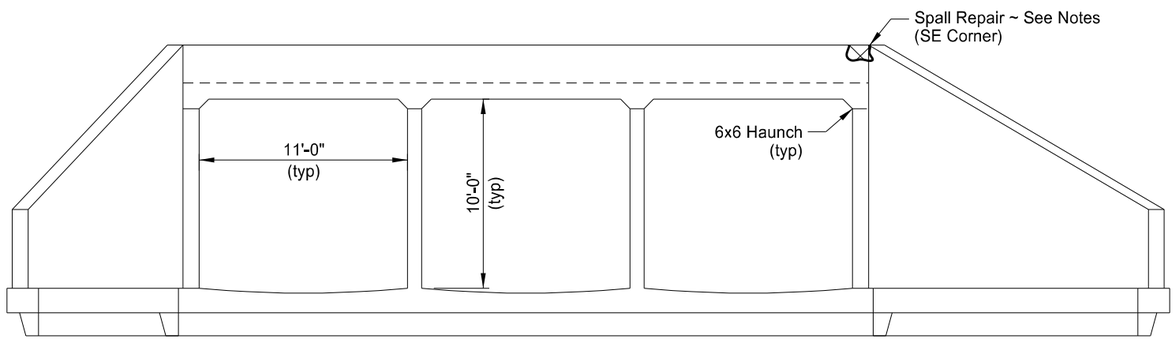
1/8/2026 1:29:06 PM mary.boechler G:\2021\21.10870\9999477\Design\Sheets\Updated Planset Jan 2026\100WZ_002_Double Lane Shift.dgn

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-9-999(477)	170	1



PLAN



END VIEW

BOX CULVERT BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
203	0140	BORROW - EXCAVATION	CY	33
256	0200	RIP RAP GRADE II	CY	67
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	100
714	9900	INSTALL CONCRETE PIPE TIES	SET	32
900	1003	TEMPORARY STREAM DIVERSION - SITE 3	EA	1
930	3640	HIGH EXPANSION POLYURETHANE FOAM	GAL	650
930	9612	SPALL REPAIR	SF	90
930	9671	BOX CULVERT JOINT REPAIR	EA	20
930	9672	BOX CULVERT JOINT REPAIR - FLOOR	EA	12

Indicates erosion hole to fill with topsoil.

Indicates scour hole area to fill with borrow and cover with riprap.

Indicates spall repair area.

SPECIAL PROVISIONS	
SSP 2	MIGRATORY BIRD TREATY ACT
SP 422(24)	CONCRETE SPALL REPAIR
SP 423(24)	TEMPORARY WATER DIVERSION
SP 456(24)	BOX CULVERT JOINT REPAIR

REGISTERED PROFESSIONAL ENGINEER
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DATE 01/08/26
NORTH DAKOTA

GOOSE RIVER
ND 200, 4 MI EAST OF MAYVILLE

BOX CULVERT REPAIRS
200-388.375

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

Jason Thorenson
01/08/26

NOTES

100 SCOPE OF WORK: Work at this site consists of repairing existing construction joints in the barrel of the box culvert, filling voids with high expansion foam, installing pipe ties at the joints, completing spall repair work, and completing scour and erosion repairs at the end of the box culvert.

203 BORROW EXCAVATION: The Engineer will verify the dimensions of the scour hole prior to commencing work. Fill the scour hole to the limits shown in the scour repair detail using clay material. Compact the borrow using Compaction Control, Type C.

256 RIPRAP GRADE II: Fill the top 2' of the scour hole with Riprap Grade II. Before placing the riprap, place Geosynthetic Material Type RR as shown in the scour repair detail.

714 INSTALL CONCRETE PIPE TIES: Install pipe ties at the joint locations as shown in the plans. Use tie bolts meeting ASTM A36. Use heavy hex nuts meeting ASTM A563 and washers meeting ASTM F436, Type 1. Galvanize all materials and hardware per Section 854.

Drill into the existing box culverts to accept the new ties. Install the ties into the holes using an epoxy adhesive meeting Section 806. Tighten the nuts at each end of the tie after the epoxy has cured.

Include all costs for labor, equipment and materials required to furnish and install the box culvert ties in the prices bid for "Install Concrete Pipe Ties". Each fully installed pipe tie will be paid for as one set.

900 TEMPORARY STREAM DIVERSION – SITE 3: It is anticipated that a temporary stream diversion will be required to complete the work at this site. Construct, maintain, and remove the temporary stream diversion in accordance with the Special Provision for Temporary Water Diversion.

Do not construct a temporary stream diversion if the Contractor and Engineer agree that no diversion is required at this site. No payment will be made for a temporary stream diversion at this site if the diversion is eliminated by agreement of the Contractor and Engineer.

930 SPALL REPAIR: The structure has areas of spalled and deteriorated concrete as indicated on the plans and the table provided below. The limits shown are approximations. Actual limits will be determined and marked by the Engineer. Repair the areas marked for spall repair in accordance with the Special Provision for Spall Repairs. Spall repairs using shotcrete will be required for all spall repair areas on this structure.

Location	Approximate Dimensions	Estimated Quantity
East Barrel – Exterior Wall (Adjacent to SE Wingwall)	10' Ht x 3' Lg	30 SF
SE Wingwall	Varies	50 SF
NW Wingwall	1' Ht x 1' Lg	4 SF
North Nose	1' Each Side	6 SF

930 BOX CULVERT JOINT REPAIR: Complete repairs to the box culvert joints noted in the table below in accordance with the Special Provision for Box Culvert Joint Repairs.

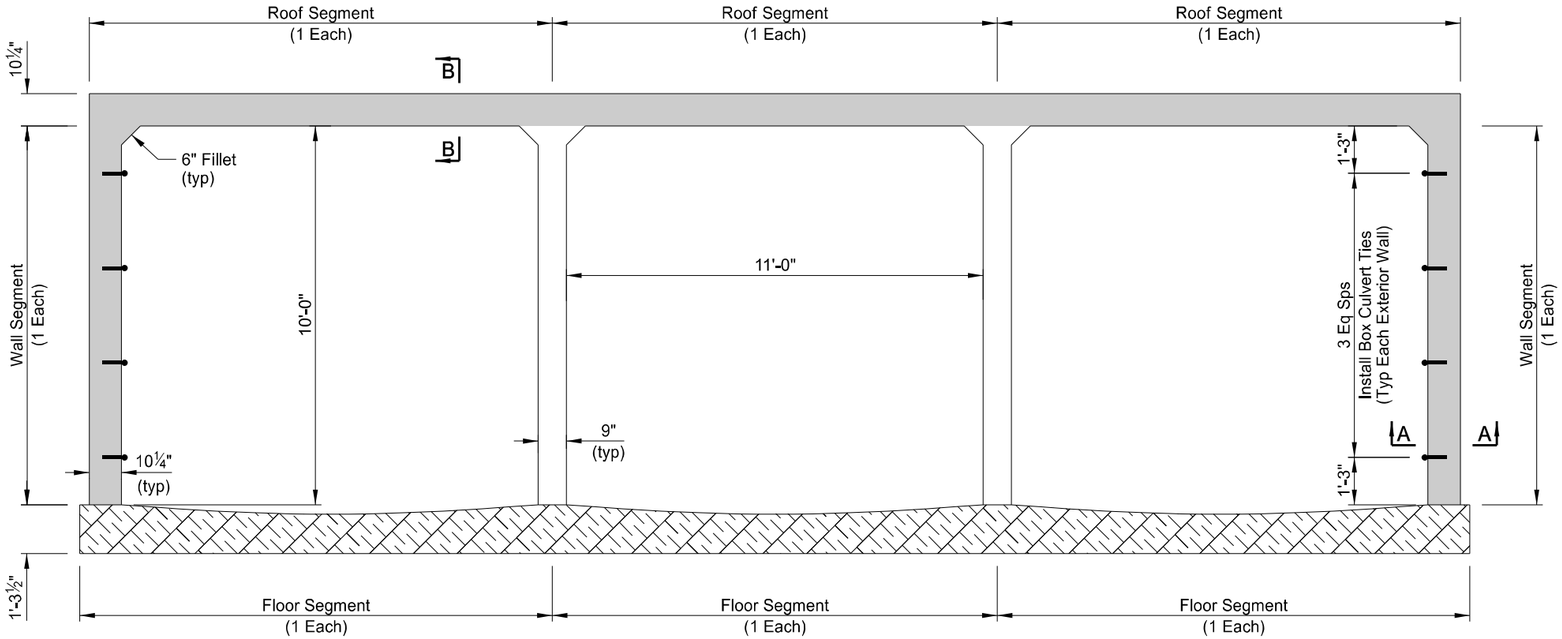
Existing plans indicate steel plates were installed on the outside of the box culvert to minimize fill loss through the joints. Fill loss is estimated to have occurred at joints where a foam quantity is provided in the table. The estimated foam quantities listed are prior to expansion and assume a 16x foam expansion rate. Foam quantities shown in the table have been increased by 25% to account for irregularities in the voids. Do not exceed the estimated quantity of foam without the permission of the Engineer.

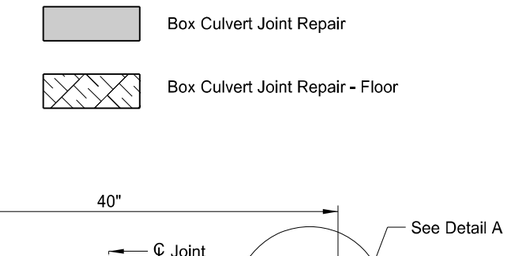
Joint Number	Install Concrete Pipe Ties	Approx. Joint Opening	Est. Void Depth	Box Culvert Joint Repair (Roof & Walls)	Box Culvert Joint Repair – Floor	Estimated Qty High Expansion Foam
Joint 1	Yes	Varies - 1.5" to 5.25"	24" - Roof 24" - East Wall 72" - West Wall	5 Segments	3 Segments	540 gallons
Joint 2	Yes	1.25"	12" - Roof 12" - Walls	5 Segments	3 Segments	55 gallons
Joint 3	Yes	1"	No Voids Estimated	5 Segments	3 Segments	0 gallons
Joint 4	Yes	1.5"	12" - Roof 12" - Walls	5 Segments	3 Segment	55 gallons

REGISTERED PROFESSIONAL ENGINEER
TATYANA FEDORENKO
PE-29340
Fedorenko
DATE 01/08/26
NORTH DAKOTA

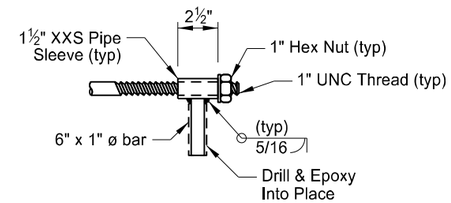
23 U.S.C. 407
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-9-999(477)	170	3

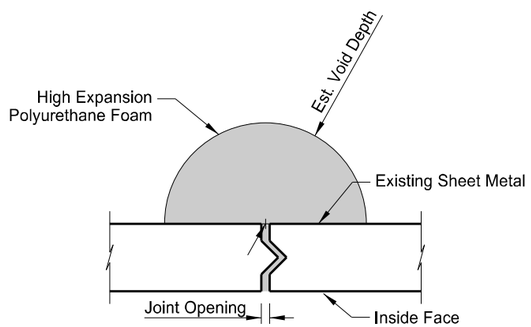




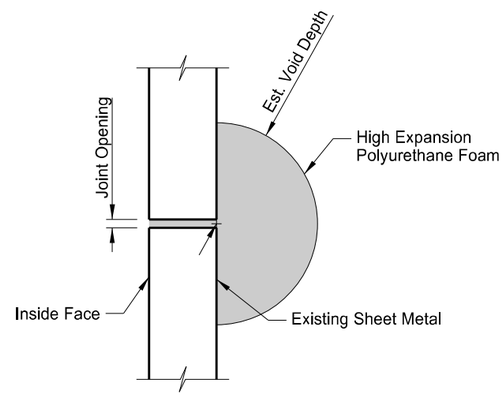
WALL REPAIR



DETAIL A
BOX CULVERT TIE DETAIL



(SECTION USED FOR QTY CALCS)
SECTION B-B



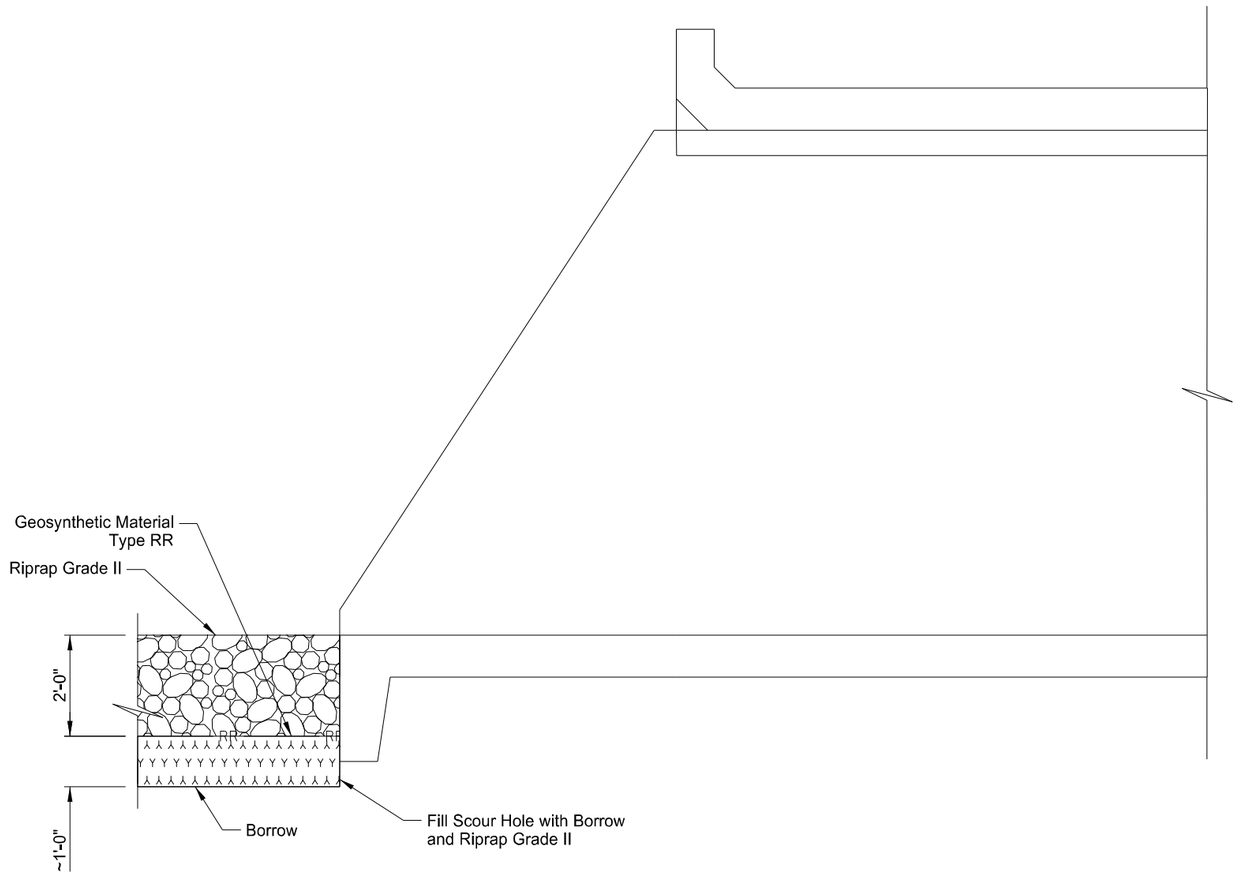
(SECTION USED FOR QTY CALCS)
SECTION A-A

REGISTERED PROFESSIONAL ENGINEER
TATYANA FEDORENKO
PE-29340
DATE 01/08/26
NORTH DAKOTA

GOOSE RIVER
ND 200, 4 MI EAST OF MAYVILLE

BOX CULVERT REPAIRS
200-388.375

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-9-999(477)	170	4



Indicates scour hole area to fill with borrow and cover with riprap.

Indicates borrow.

SCOUR FILL DETAIL

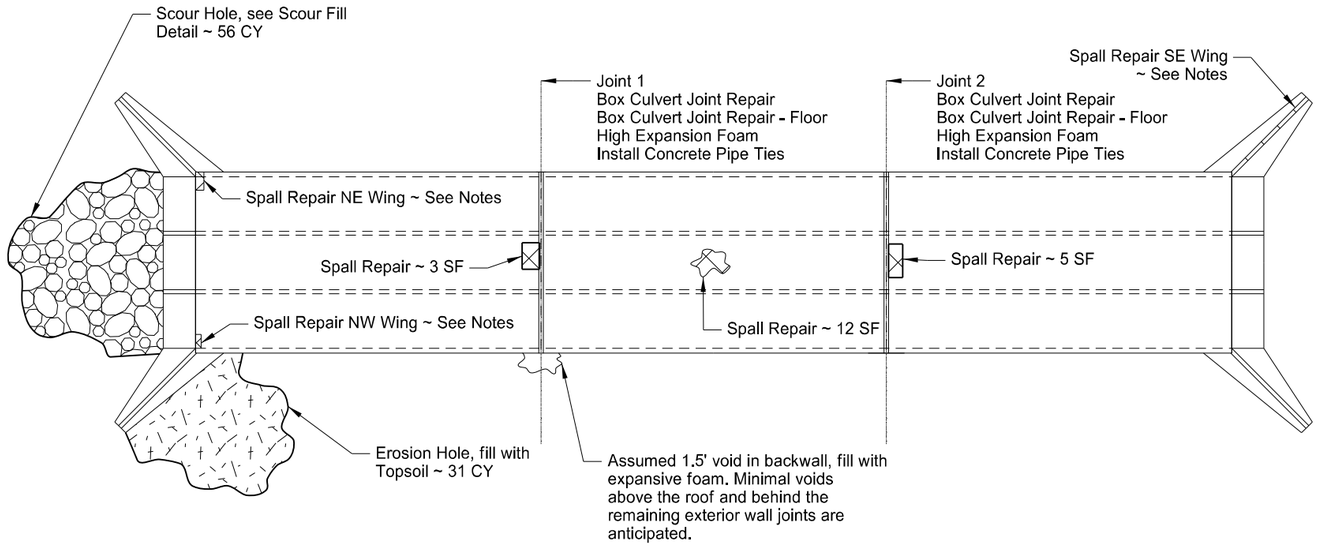
REGISTERED PROFESSIONAL ENGINEER
TATYANA FEDORENKO
PE-29340
DATE 01/08/26
NORTH DAKOTA

GOOSE RIVER
ND 200, 4 MI EAST OF MAYVILLE

BOX CULVERT REPAIRS
200-388.375

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-9-999(477)	170	5



PLAN

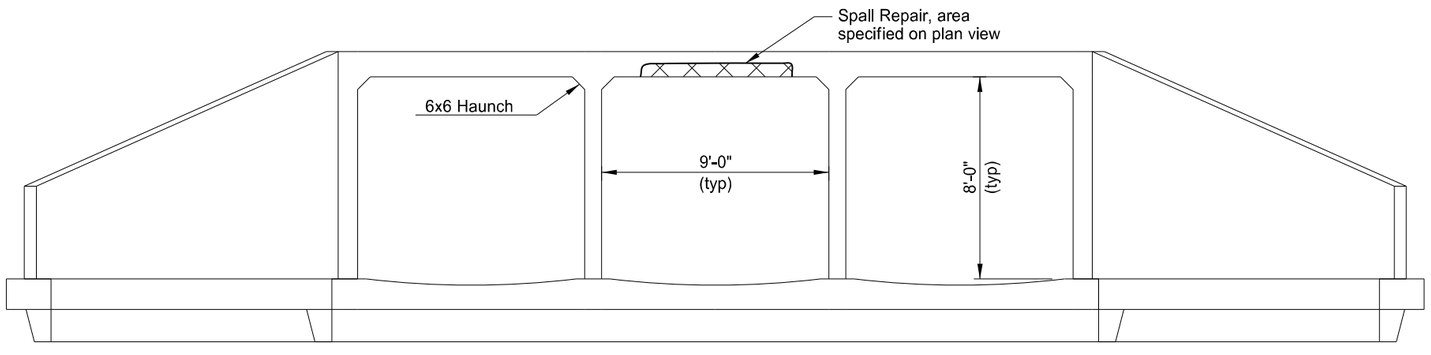
BOX CULVERT BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
203	0119	TOPSOIL - IMPORTED	CY	31
203	0140	BORROW - EXCAVATION	CY	22
256	0200	RIP RAP GRADE II	CY	44
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	67
714	9900	INSTALL CONCRETE PIPE TIES	SET	16
900	1003	TEMPORARY STREAM DIVERSION - SITE 3	EA	1
930	3640	HIGH EXPANSION POLYURETHANE FOAM	GAL	715
930	9612	SPALL REPAIR	SF	224
930	9671	BOX CULVERT JOINT REPAIR	EA	10
930	9672	BOX CULVERT JOINT REPAIR - FLOOR	EA	6

Indicates erosion hole to fill with topsoil.

Indicates scour hole area to fill with borrow and cover with riprap.

Indicates spall repair area.



END VIEW

SPECIAL PROVISIONS	
SSP 2	MIGRATORY BIRD TREATY ACT
SP 422(24)	CONCRETE SPALL REPAIR
SP 423(24)	TEMPORARY WATER DIVERSION
SP 456(24)	BOX CULVERT JOINT REPAIR

INTERMITTENT STREAM
ND 200, 5 MI EAST OF MAYVILLE

BOX CULVERT REPAIRS
200-389.780

REGISTERED PROFESSIONAL ENGINEER
TATYANA FEDORENKO
PE-29340
DATE 01/08/26
NORTH DAKOTA

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

Jason Thorenson
01/08/26

NOTES

100 SCOPE OF WORK: Work at this site consists of repairing existing construction joints in the barrel of the box culvert, filling voids with high expansion foam, installing pipe ties at the joints, completing spall repairs, and completing scour and erosion repairs at the end of the box culvert.

203 TOPSOIL - IMPORTED: Fill the erosion hole behind the NW wingwall using imported topsoil. After filling and leveling the topsoil, seed the disturbed area with a Class II seed mix and cover the area with ECB Type 2.

Include all labor, materials, and equipment required to complete this work in the price bid for "Topsoil – Imported".

203 BORROW EXCAVATION: The Engineer will verify the dimensions of the scour hole prior to commencing work. Fill the scour hole to the limits shown in the scour repair detail using clay material. Compact the borrow using Compaction Control, Type C.

256 RIPRAP GRADE II: Fill the top 2' of the scour hole with Riprap Grade II. Before placing the riprap, place Geosynthetic Material Type RR as shown in the scour repair detail.

714 INSTALL CONCRETE PIPE TIES: Install pipe ties at the joint locations as shown in the plans. Use tie bolts meeting ASTM A36. Use heavy hex nuts meeting ASTM A563 and washers meeting ASTM F436, Type 1. Galvanize all materials and hardware per Section 854.

Drill into the existing box culverts to accept the new ties. Install the ties into the holes using an epoxy adhesive meeting Section 806. Tighten the nuts at each end of the tie after the epoxy has cured.

Include all costs for labor, equipment and materials required to furnish and install the box culvert ties in the prices bid for "Install Concrete Pipe Ties". Each fully installed pipe tie will be paid for as one set.

900 TEMPORARY STREAM DIVERSION – SITE 3: It is anticipated that a temporary stream diversion will be required to complete the work at this site. Construct, maintain, and remove the temporary stream diversion in accordance with the Special Provision for Temporary Water Diversion.

Do not construct a temporary stream diversion if the Contractor and Engineer agree that no diversion is required at this site. No payment will be made for a temporary stream diversion at this site if the diversion is eliminated by agreement of the Contractor and Engineer.

930 SPALL REPAIR: The structure has areas of spalled and deteriorated concrete as indicated on the plans and the table provided below. The limits shown are approximations. Actual limits will be determined and marked by the Engineer. Repair the areas marked for spall repair in accordance with the Special Provision for Spall Repairs. Spall repairs using shotcrete will be required for all spall repair areas on this structure.

Location	Approximate Dimensions	Estimated Quantity
Joint 1 Roof – Center Barrel	3' Wd x 1' Lg	3 SF
Joint 2 Roof – Center Barrel	5' Wd x 1' Lg	5 SF
Roof Segment – Center Barrel	6' Wd x 2' Lg	12 SF
East Barrel – Exterior Wall (Adjacent to SE Wingwall	8' Ht x 2' Lg	16 SF
SE Wingwall	Dimensions Vary	50 SF
East Barrel – Exterior Wall (Adjacent to NE Wingwall	8' Ht x 2' Lg	16 SF
NE Wingwall	Dimensions Vary	60 SF
West Barrel – Exterior Wall (Adjacent to NW Wingwall)	6' Ht x 2' Lg	12 SF
NW Wingwall	Dimensions Vary	50 SF

930 BOX CULVERT JOINT REPAIR: Complete repairs to the box culvert joints noted in the table below in accordance with the Special Provision for Box Culvert Joint Repairs.

Existing plans indicate steel plates were installed on the outside of the box culvert to minimize fill loss through the joints. Fill loss is estimated to have occurred at joints where a foam quantity is provided in the table. The estimated foam quantities listed are prior to expansion and assume a 16x foam expansion rate. Foam quantities shown in the table have been increased by 25% to account for irregularities in the voids. Do not exceed the estimated quantity of foam without the permission of the Engineer.

Joint Number	Install Concrete Pipe Ties	Approx. Joint Opening	Est. Void Depth	Box Culvert Joint Repair (Roof & Walls)	Box Culvert Joint Repair – Floor	Estimated Qty High Expansion Foam
Joint 1	Yes	Varies - 4" to 5.5"	24" - Roof 24" - East Wall 72" - West Wall	5 Segments	3 Segments	440 gallons
Joint 2	Yes	Varies – 4" to 6"	24" - Roof 24" - East Wall 48" – West Wall	5 Segments	3 Segments	275 gallons

REGISTERED PROFESSIONAL ENGINEER
TATYANA FEDORENKO
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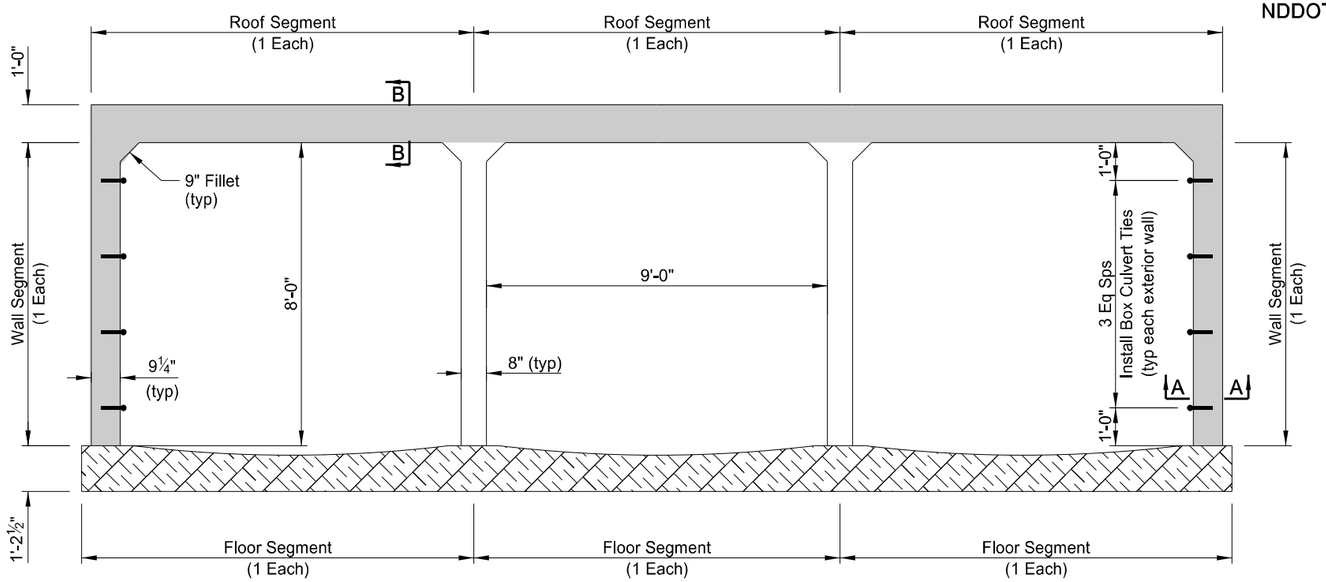
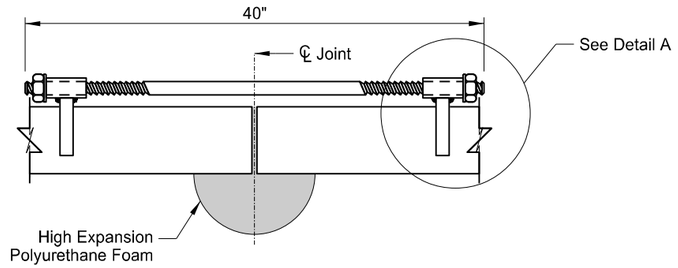
DATE 01/08/26
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-9-999(477)	170	7

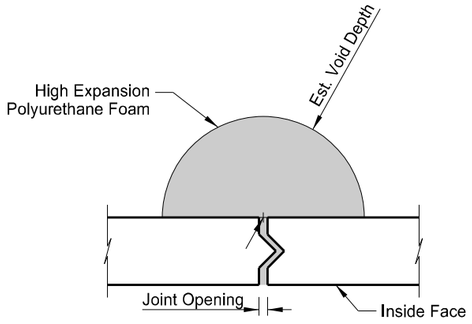


Box Culvert Joint Repair

Box Culvert Joint Repair - Floor

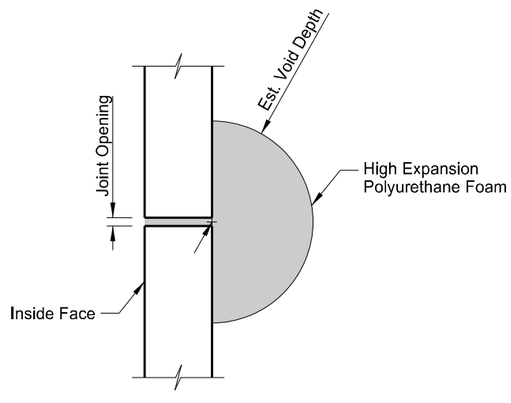


WALL REPAIR



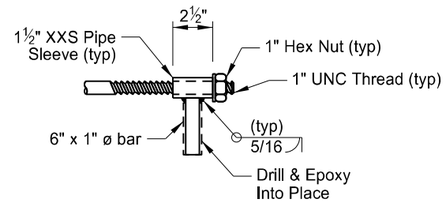
(SECTION USED FOR QTY CALCS)

SECTION B-B

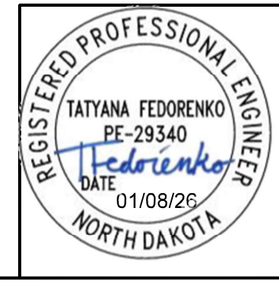


(SECTION USED FOR QTY CALCS)

SECTION A-A



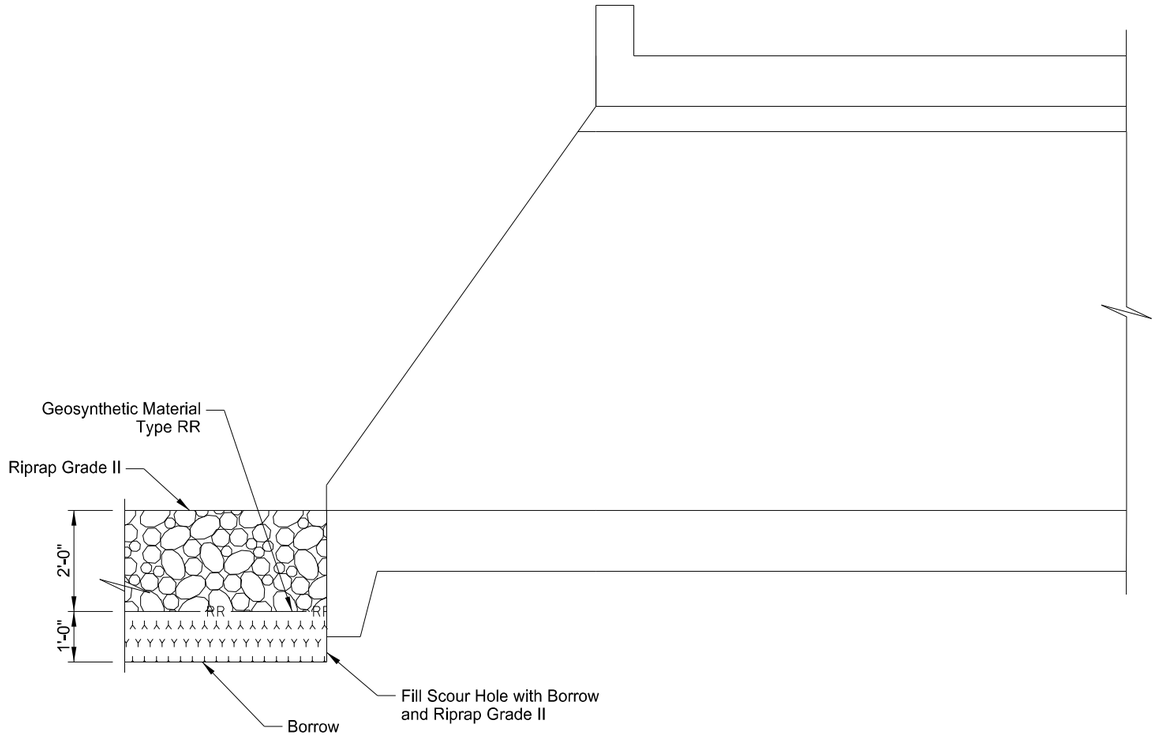
DETAIL A
BOX CULVERT TIE DETAIL



INTERMITTENT STREAM
ND 200, 5 MI EAST OF MAYVILLE

BOX CULVERT REPAIRS
200-389.780

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-9-999(477)	170	8



Indicates borrow.

Indicates scour hole area to fill with borrow and cover with riprap.

SCOUR FILL DETAIL

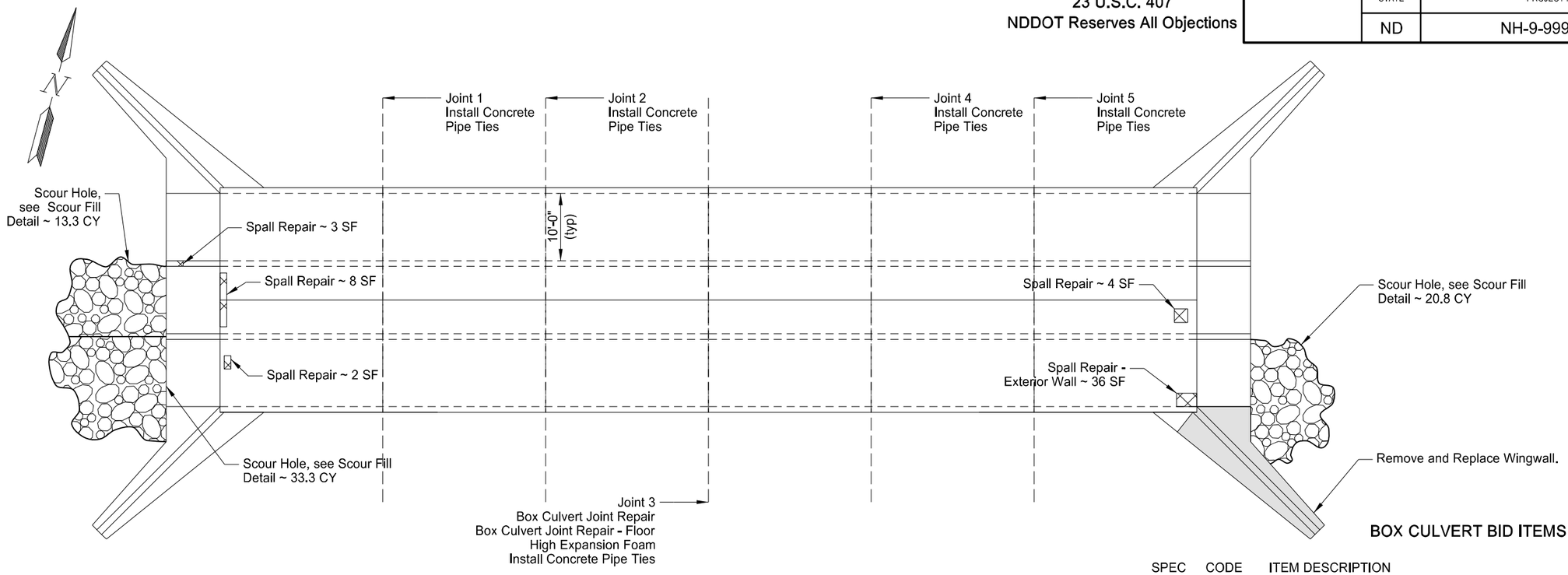
REGISTERED PROFESSIONAL ENGINEER
TATYANA FEDORENKO
PE-29340
DATE 01/08/26
NORTH DAKOTA

INTERMITTENT STREAM
ND 200, 5 MI EAST OF MAYVILLE

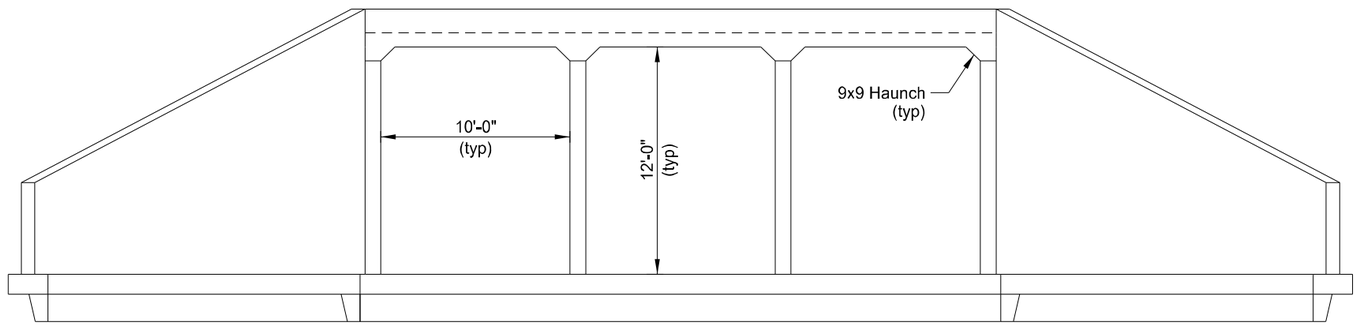
BOX CULVERT REPAIRS
200-389.780

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-9-999(477)	170	9



PLAN



END VIEW

Indicates spall repair area.

Indicates scour hole area to fill with borrow and cover with riprap.

Existing wingwall to be removed.

BOX CULVERT BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
202	0101	REMOVAL OF CONCRETE	EA	1
203	0140	BORROW - EXCAVATION	CY	15
210	0210	FOUNDATION FILL	CY	185
602	1131	CLASS AE-3 CONCRETE BOX CULVERT	CY	22
612	0114	REINFORCING STEEL-GRADE 60-BOX CULVERT	LBS	3475
714	9900	INSTALL CONCRETE PIPE TIES	SET	50
900	1003	TEMPORARY STREAM DIVERSION - SITE 3	EA	1
930	3640	HIGH EXPANSION POLYURETHANE FOAM	GAL	55
930	8230	SHORING	EA	1
930	9612	SPALL REPAIR	SF	53
930	9671	BOX CULVERT JOINT REPAIR	EA	5
930	9672	BOX CULVERT JOINT REPAIR - FLOOR	EA	3

SPECIAL PROVISIONS	
SSP 2	MIGRATORY BIRD TREATY ACT
SP 422(24)	CONCRETE SPALL REPAIR
SP 423(24)	TEMPORARY WATER DIVERSION
SP 456(24)	BOX CULVERT JOINT REPAIR

REGISTERED PROFESSIONAL ENGINEER
TATYANA FEDORENKO
PE-29340
DATE 01/08/26
NORTH DAKOTA

SOUTH FORK-MAPLE RIVER
US 281, 1 MI SOUTH OF MONANGO

BOX CULVERT REPAIRS
281-016.454

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

Jason Thorenson
01/08/26

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-9-999(477)	170	10

NOTES

100 SCOPE OF WORK: Work at this site consists repairing existing construction joints in the barrel of the box culvert, filling voids with high expansion foam, installing pipe ties at the joints, replacing the southeast wingwall, completing spall repairs, and completing scour repairs at both ends of the box culvert.

100 GENERAL: Include the cost of furnishing and placing concrete inserts, rebar couplers, silicone sealant, and other miscellaneous items in the price bid for “Class AE-3 Concrete – Box Culvert”.

202 REMOVAL OF CONCRETE: Remove the existing southeast wingwall, wingwall footing, and cutoff wall to the limits shown in the plans. Provide a 1” deep saw cut at the removal line to produce a clean edge. Remove the existing concrete taking care to prevent damage to existing reinforcement. Leave a minimum 3’-0” length of existing rebar in place for splicing to new rebar, or provide mechanical couplers if 3’-0” length of existing rebar cannot be provided. If existing rebar is cut or damaged and cannot be used for mechanical coupling, install new rebar per Note 602 POST INSTALLED ANCHORAGES. No additional compensation will be made for mechanical couplers or dowels required to be installed into the existing concrete.

203 BORROW EXCAVATION: The Engineer will verify the dimensions of the scour hole prior to commencing work. Fill the scour hole to the limits shown in the scour repair detail using clay material. Compact the borrow using Compaction Control, Type C.

210 FOUNDATION FILL: Place foundation fill to a minimum depth of 1’-0” beneath the wingwall footing, and between the wingwall and the temporary shoring. Payment for foundation fill will be made at plan quantity. 1’ is assumed between the wingwall and the temporary shoring for quantity calculation purposes.

210 ORDINARY BACKFILL: After completing construction of the new wingwall, place ordinary backfill in front of the wingwall so the new footing is covered by a minimum of 1’-0” of backfill material. Suitable material excavated from behind the wingwall may be used for ordinary backfill.

Include all costs for labor, equipment and materials required to backfill in front of the new wingwall in the price bid for "Foundation Fill".

602 CONCRETE: If the existing wall thickness is different than the new thickness, set the inner surfaces flush and the exterior surfaces tapered in the first 1’-6” of the wing.

602 CURING CONCRETE: Wet cure all concrete surfaces not covered by forms. Cover the concrete with a double thickness of burlap. Maintain surface moisture between the final finish and placement of burlap by periodic applications of a light fog spray of water. Keep the burlap continuously moist until the end of the curing period.

602 POST INSTALLED ANCHORAGES: Install new rebar dowels into the existing concrete for the wingwall repair where existing rebar cannot be salvaged. Provide a rebar dowel matching the size of the existing rebar with sufficient length to provide a 3’-0” lap to new reinforcing steel. Install the dowels using an epoxy adhesive with a minimum characteristic bond strength in uncracked concrete of 1.5 ksi. Install the dowels to the depth specified by the manufacturer for the size of rebar being used. Verify that no reinforcement will be encountered while drilling and any modifications to anchorage spacing will be approved by the Engineer prior to drilling.

Submit to the Engineer one system, including installation instructions, for approval prior to beginning work. Install all anchors as specified by the Manufacturer’s Printed Installation Instructions.

Meet the following conditions prior to installing:

- Ensure concrete surface is free of water prior to drilling
- Ensure the hole is dry
- Install anchorages per Manufacturer’s Printed Installation Instructions

612 REINFORCING STEEL: Dimensions of bent bars are given out to out.

714 INSTALL CONCRETE PIPE TIES: Install pipe ties at the joint locations as shown in the plans. Use tie bolts meeting ASTM A36. Use heavy hex nuts meeting ASTM A563 and washers meeting ASTM F436, Type 1. Galvanize all materials and hardware per Section 854.

Drill into the existing box culverts to accept the new ties. Install the ties into the holes using an epoxy adhesive meeting Section 806. Tighten the nuts at each end of the tie after the epoxy has cured.

Include all costs for labor, equipment and materials required to furnish and install the box culvert ties in the prices bid for “Install Concrete Pipe Ties”. Each fully installed pipe tie will be paid for as one set.

900 TEMPORARY STREAM DIVERSION – SITE 3: It is anticipated that a temporary stream diversion will be required to complete the work at this site. Construct, maintain, and remove the temporary stream diversion in accordance with the Special Provision for Temporary Water Diversion.

Do not construct a temporary stream diversion if the Contractor and Engineer agree that no diversion is required at this site. No payment will be made for a temporary stream diversion at this site if the diversion is eliminated by agreement of the Contractor and Engineer.

930 SHORING: Temporary shoring is required for the excavation and replacement of the wingwall. The Contractor will design, construct, maintain, and remove the temporary shoring. All excavation, labor, equipment, and material needed for this work shall be included in the bid item, “Shoring”.

930 SPALL REPAIR: The structure has areas of spalled and deteriorated concrete as indicated on the plans and the table provided below. The limits shown are approximations. Actual limits will be determined and marked by the Engineer. Repair the areas marked for spall repair in accordance with the Special Provision for Spall Repairs.

REGISTERED PROFESSIONAL ENGINEER
TATYANA FEDORENKO
PE-29340
Fedorenko
DATE 01/08/26
NORTH DAKOTA

NOTES

Location	Approximate Dimensions	Estimated Quantity
South Barrel – Exterior Wall (Adjacent to SE Wingwall)	12’ Ht x 3’ Lg	36 SF
West North Nose	(3) 1’ Ht x 1’ Lg	3 SF
West Headwall	2.5’ Ht x 8” Lg, 5” Ht x 2’ Lg	10 SF
East Headwall	(2) 5” Ht x 1’ Lg	4 SF

930 BOX CULVERT JOINT REPAIR: Complete repairs to the box culvert joints noted in the table below in accordance with the Special Provision for Box Culvert Joint Repairs.

Existing plans indicate steel plates were installed on the outside of the box culvert to minimize fill loss through the joints. Fill loss is estimated to have occurred at joints where a foam quantity is provided in the table. The estimated foam quantities listed are prior to expansion and assume a 16x foam expansion rate. Foam quantities shown in the table have been increased by 25% to account for irregularities in the voids. Do not exceed the estimated quantity of foam without the permission of the Engineer.

Joint Number	Install Concrete Pipe Ties	Approx. Joint Opening	Est. Void Depth	Box Culvert Joint Repair (Roof & Walls)	Box Culvert Joint Repair – Floor	Estimated Qty High Expansion Foam
Joint 1	Yes	No additional work required				
Joint 2	Yes	No additional work required				
Joint 3	Yes	1”	12” - Roof 12” – Walls	5 Segments	3 Segments	55 gallons
Joint 4	Yes	No additional work required				
Joint 5	Yes	No additional work required				

REGISTERED PROFESSIONAL ENGINEER
TATYANA FEDORENKO
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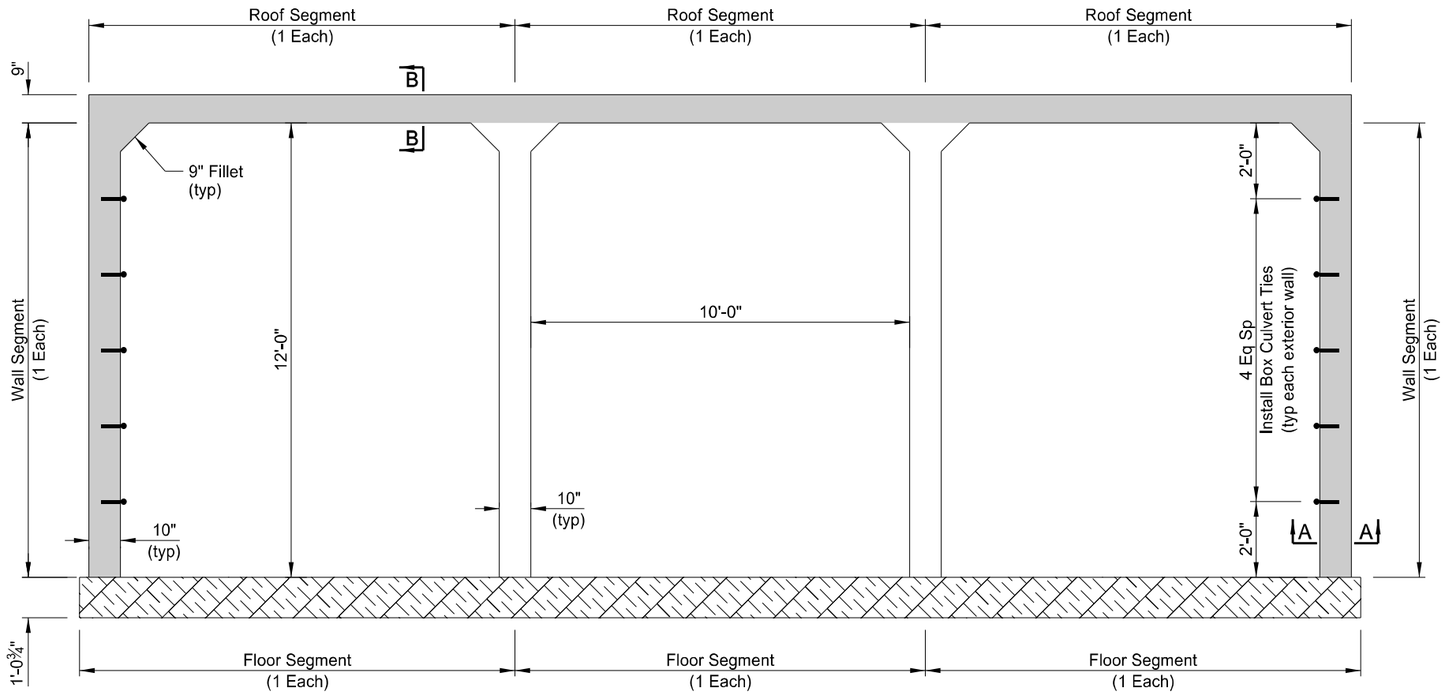
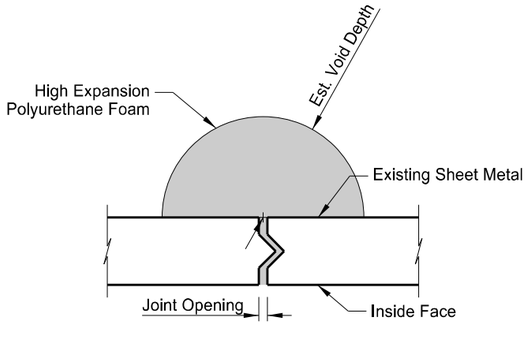
NORTH DAKOTA

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

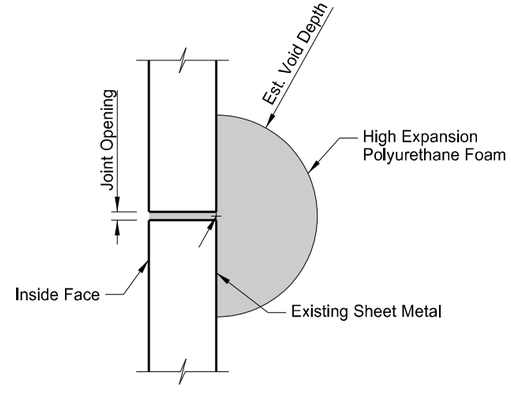
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-9-999(477)	170	12



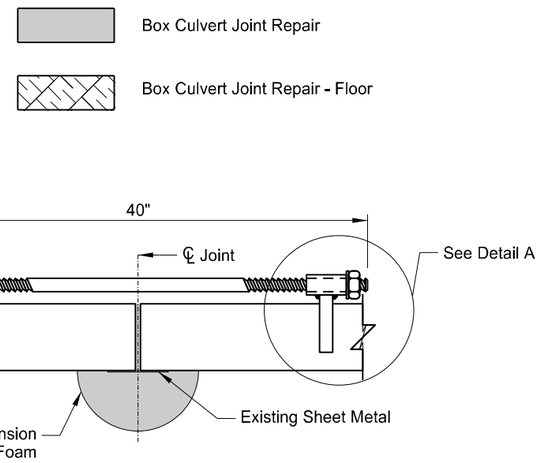
(AT CONSTRUCTION JOINT)
BARREL SECTION



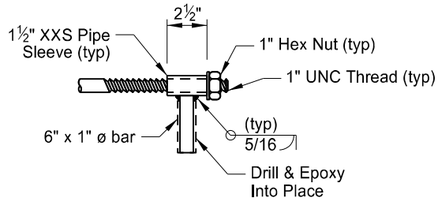
(SECTION USED FOR QTY CALCS)
SECTION B-B



(SECTION USED FOR QTY CALCS)
SECTION A-A



WALL REPAIR



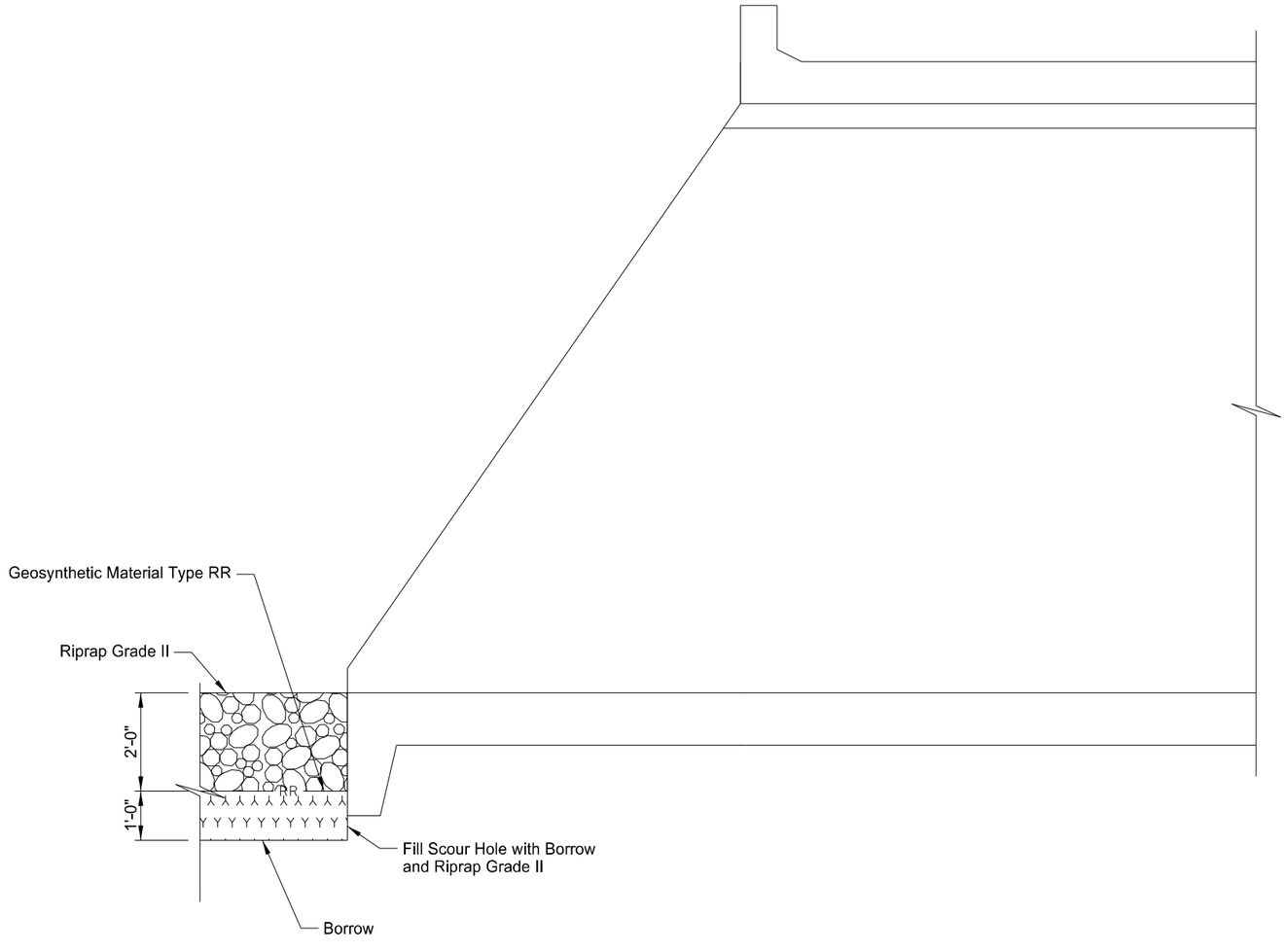
DETAIL A
BOX CULVERT TIE DETAIL

REGISTERED PROFESSIONAL ENGINEER
TATYANA FEDORENKO
PE-29340
DATE 01/08/26
NORTH DAKOTA

SOUTH FORK-MAPLE RIVER
US 281, 1 MI SOUTH OF MONANGO

BOX CULVERT REPAIRS
281-016.454

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-9-999(477)	170	13



SCOUR REPAIR DETAIL

Indicates borrow fill.

Indicates scour hole area to fill with borrow fill and cover with riprap.

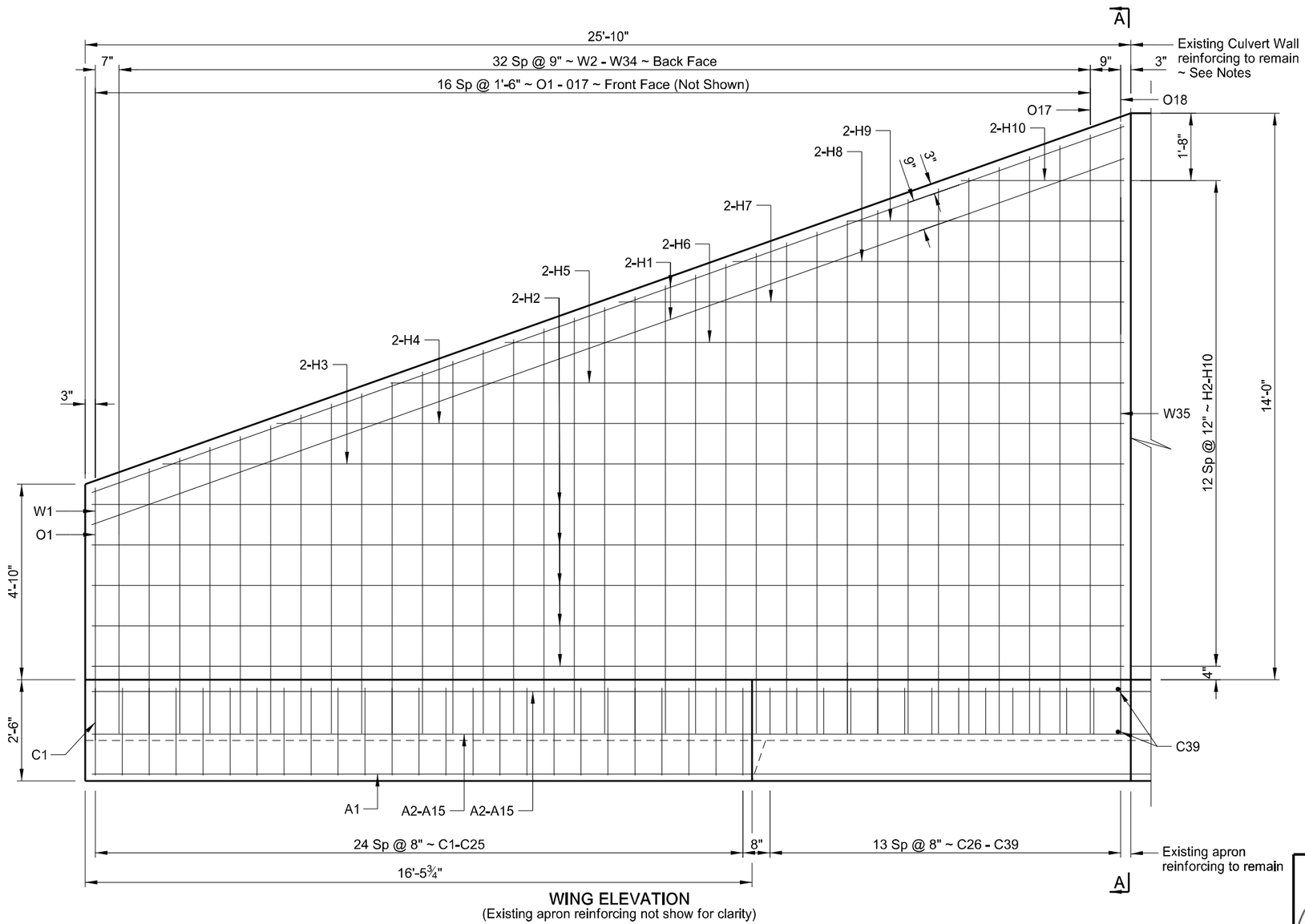
REGISTERED PROFESSIONAL ENGINEER
TATYANA FEDORENKO
PE-29340
DATE 01/08/26
NORTH DAKOTA

SOUTH FORK - MAPLE RIVER
US 281, 1 MI SOUTH OF MONANGO

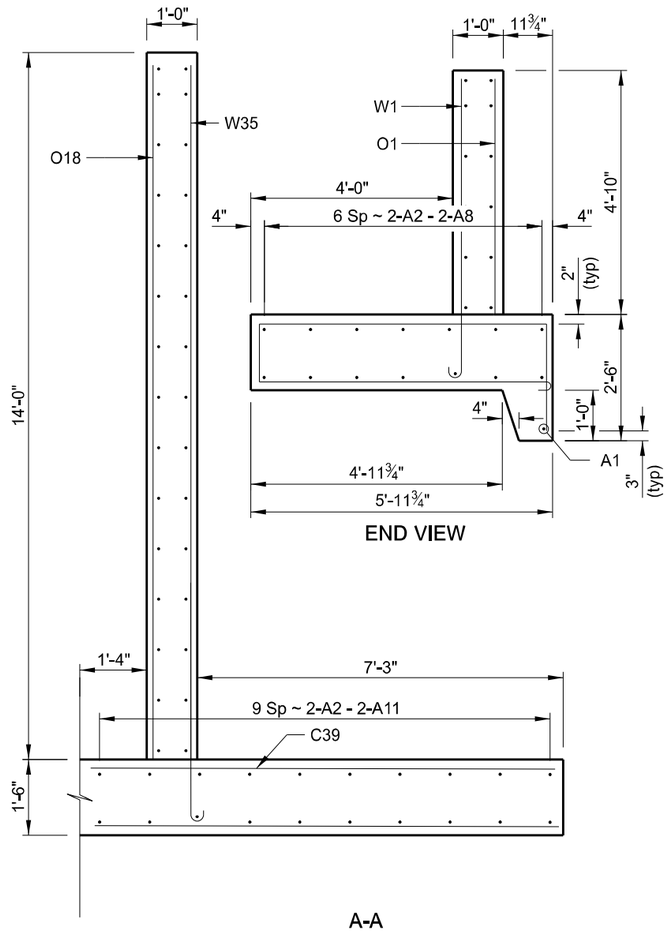
BOX CULVERT REPAIRS
281-016.454

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-9-999(477)	170	14



WING ELEVATION
(Existing apron reinforcing not show for clarity)



END VIEW

A-A

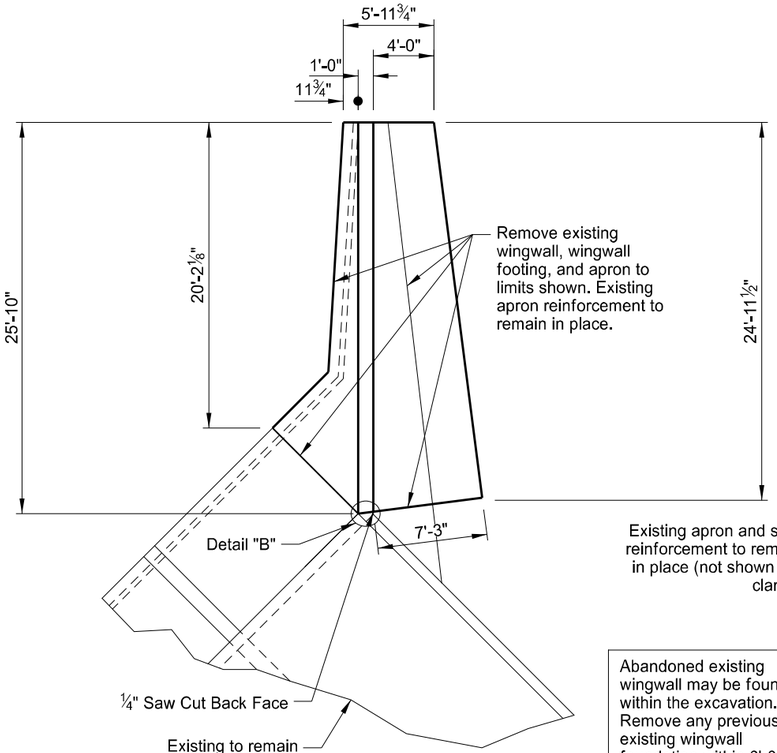
REGISTERED PROFESSIONAL ENGINEER
TATYANA FEDORENKO
PE-29340
DATE 01/08/26
NORTH DAKOTA

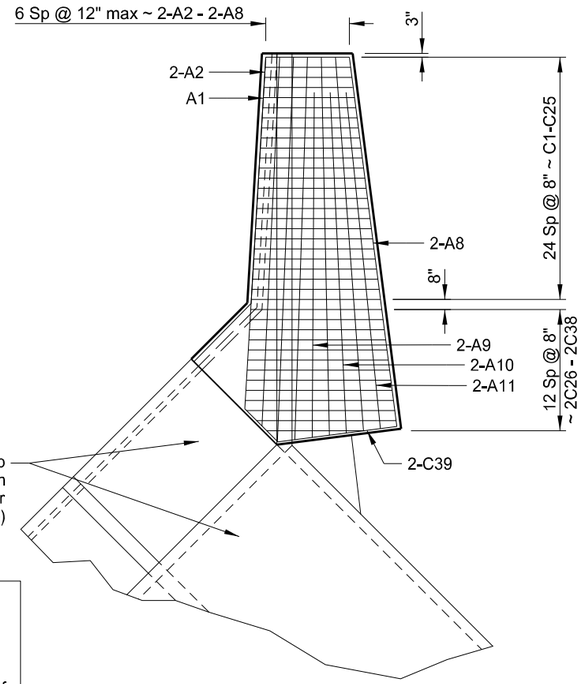
SOUTH FORK-MAPLE RIVER
US 281, 1 MI SOUTH OF MONANGO

BOX CULVERT REPAIRS
281-016.454

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-9-999(477)	170	15

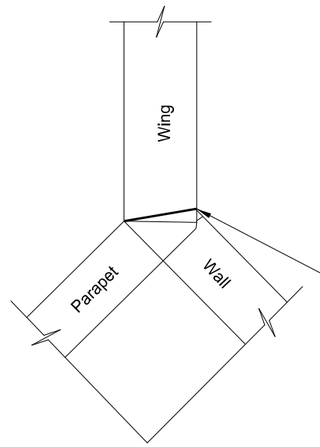




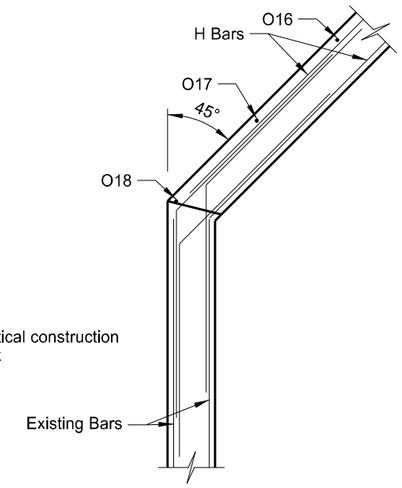
Abandoned existing wingwall may be found within the excavation. Remove any previous existing wingwall foundation within 3'-0" of proposed construction.

SHOWING DIMENSIONS ONLY

SHOWING PROPOSED FOOTING REINFORCEMENT ONLY
(Existing apron/floor reinforcing not show for clarity)



DETAIL "B"



DETAIL "C"

REGISTERED PROFESSIONAL ENGINEER
TATYANA FEDORENKO
PE-29340
DATE 01/08/26
NORTH DAKOTA

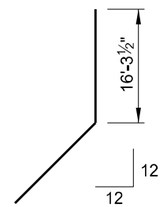
SOUTH FORK-MAPLE RIVER
US 281, 1 MI SOUTH OF MONANGO

BOX CULVERT REPAIRS
281-016.454

BAR LIST (CONSTANT)				
MARK	SIZE	NO.	LENGTH	SHAPE
W1	6	1	6'-8"	BENT
W2	6	1	6'-11"	BENT
W3	6	1	7'-3"	BENT
W4	6	1	7'-6"	BENT
W5	6	1	7'-9"	BENT
W6	6	1	8'-0"	BENT
W7	6	1	8'-3"	BENT
W8	6	1	8'-7"	BENT
W9	6	1	8'-10"	BENT
W10	6	1	9'-1"	BENT
W11	6	1	9'-4"	BENT
W12	6	1	9'-7"	BENT
W13	6	1	9'-11"	BENT
W14	6	1	10'-2"	BENT
W15	6	1	10'-5"	BENT
W16	6	1	10'-8"	BENT
W17	6	1	10'-11"	BENT
W18	6	1	11'-3"	BENT
W19	6	1	11'-6"	BENT
W20	6	1	11'-9"	BENT
W21	6	1	12'-0"	BENT
W22	6	1	12'-3"	BENT
W23	6	1	12'-7"	BENT
W24	6	1	12'-10"	BENT
W25	6	1	13'-1"	BENT
W26	6	1	13'-4"	BENT
W27	6	1	13'-7"	BENT
W28	6	1	13'-10"	BENT
W29	6	1	14'-2"	BENT
W30	6	1	14'-5"	BENT
W31	6	1	14'-8"	BENT
W32	6	1	14'-11"	BENT
W33	6	1	15'-2"	BENT
W34	6	1	15'-6"	BENT
W35	6	1	15'-9"	BENT
C1	7	1	15'-0"	BENT
C2	7	1	15'-4"	BENT
C3	7	1	15'-6"	BENT
C4	7	1	15'-8"	BENT
C5	7	1	16'-0"	BENT
C6	7	1	16'-4"	BENT
C7	7	1	16'-6"	BENT
C8	7	1	16'-10"	BENT
C9	7	1	17'-0"	BENT
C10	7	1	17'-4"	BENT
C11	7	1	17'-6"	BENT
C12	7	1	17'-10"	BENT
C13	7	1	18'-0"	BENT
C14	7	1	18'-4"	BENT
C15	7	1	18'-8"	BENT
C16	7	1	18'-10"	BENT
C17	7	1	19'-2"	BENT
C18	7	1	19'-4"	BENT
C19	7	1	19'-8"	BENT
C20	7	1	19'-10"	BENT
C21	7	1	20'-2"	BENT
C22	7	1	20'-4"	BENT

BAR LIST (CONSTANT)				
MARK	SIZE	NO.	LENGTH	SHAPE
C23	7	1	20'-8"	BENT
C24	7	1	20'-10"	BENT
C25	7	1	21'-2"	BENT
C26	7	2	10'-10"	BENT
C27	7	2	11'-0"	BENT
C28	7	2	11'-1"	BENT
C29	7	2	11'-3"	BENT
C30	7	2	11'-4"	BENT
C31	7	2	11'-6"	BENT
C32	7	2	11'-7"	BENT
C33	7	2	11'-9"	BENT
C34	7	2	11'-10"	BENT
C35	7	2	12'-0"	BENT
C36	7	2	11'-10"	BENT
C37	7	2	11'-3"	BENT
C38	7	2	9'-3"	BENT
C39	4	2	11'-0"	BENT*
H1	7	4	26'-11"	STR
H2	5	10	25'-6"	STR
H3	5	2	23'-7"	STR
H4	5	2	20'-8"	STR
H5	5	2	17'-11"	STR
H6	5	2	15'-0"	STR
H7	5	2	12'-1"	STR
H8	5	2	9'-2"	STR
H9	5	2	6'-7"	STR
H10	5	2	3'-9"	STR
A1	5	1	23'-3"	STR
A2	5	2	23'-3"	STR
A3	5	2	24'-4"	STR
A4	5	2	25'-4"	STR
A5	5	2	25'-3"	STR
A6	5	2	24'-11"	STR
A7	5	2	24'-9"	STR
A8	5	2	24'-7"	STR
A9	5	2	22'-9"	STR
A10	5	2	22'-6"	STR
A11	5	2	22'-4"	STR
O1-O18	4	1 SET	165'-0"	STR

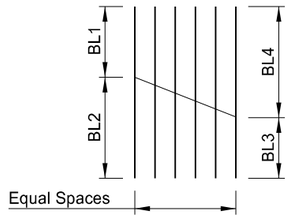
* Field Bend



A1

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-9-999(477)	170	16

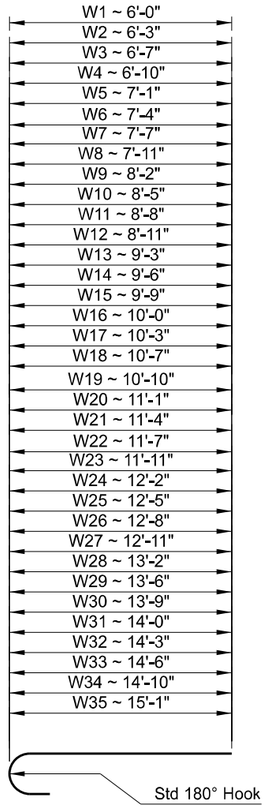


1 SET SHOWN

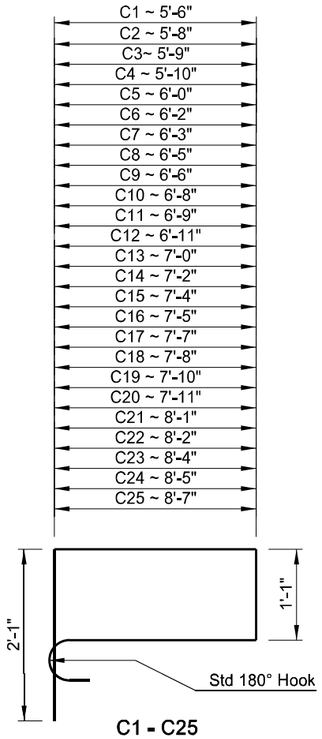
CONCRETE QUANTITIES (0° SKEW)	
FLOOR	13.0 CY
WINGWALL	8.9 CY
TOTAL	21.9 CY

MARK	LENGTH 1 SET	BL1	BL2	BL3	BL4	SPACES
O1-O18	165'-0"	4'-8"	13'-8"	9'-4½"	8'-10½"	8

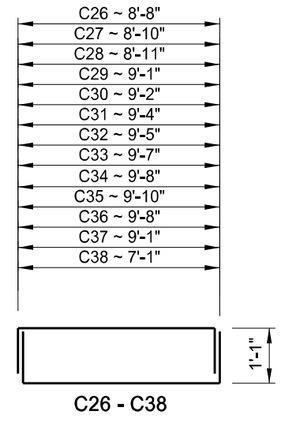
BAR CUTTING DETAILS



W1 - W35



C1 - C25



C26 - C38

REGISTERED PROFESSIONAL ENGINEER
TATYANA FEDORENKO
PE-29340
DATE 01/08/26
NORTH DAKOTA

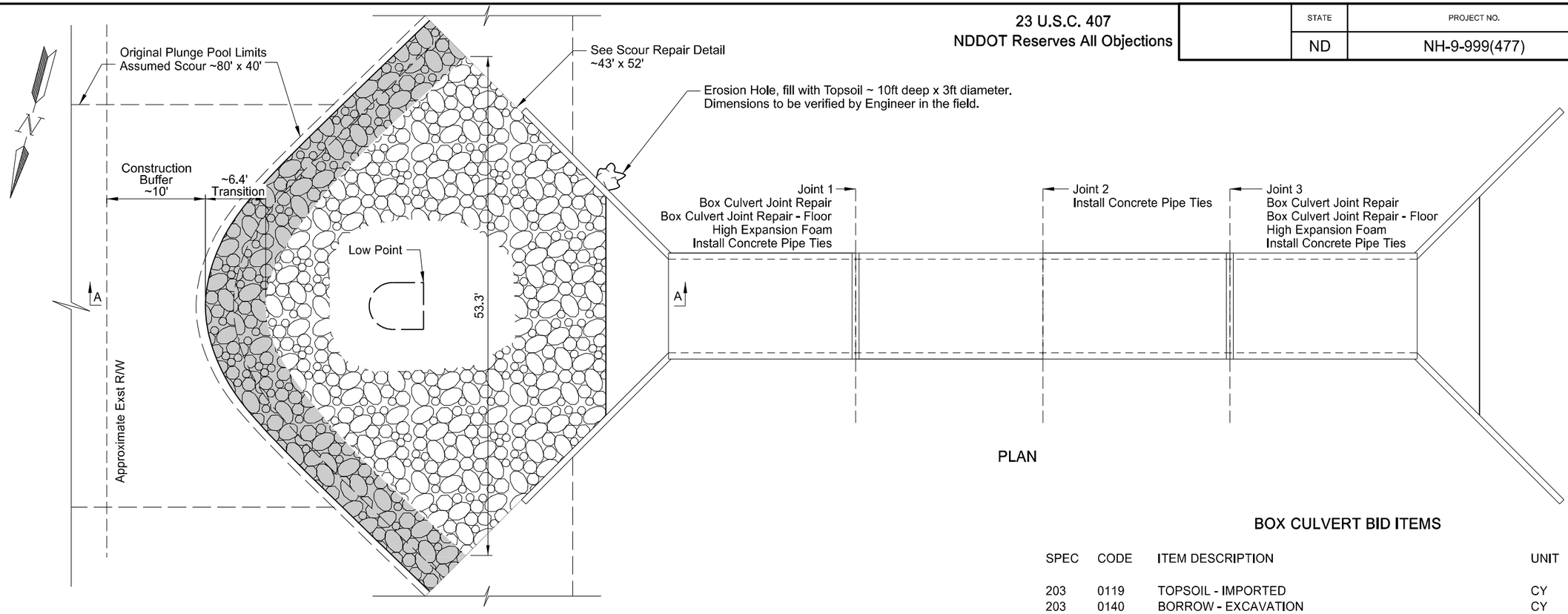
QUANTITIES	
CLASS AE-3 CONCRETE	21.9 CY
REINFORCING STEEL	3475 LBS

SOUTH FORK-MAPLE RIVER
US 281, 1 MI SOUTH OF MONANGO

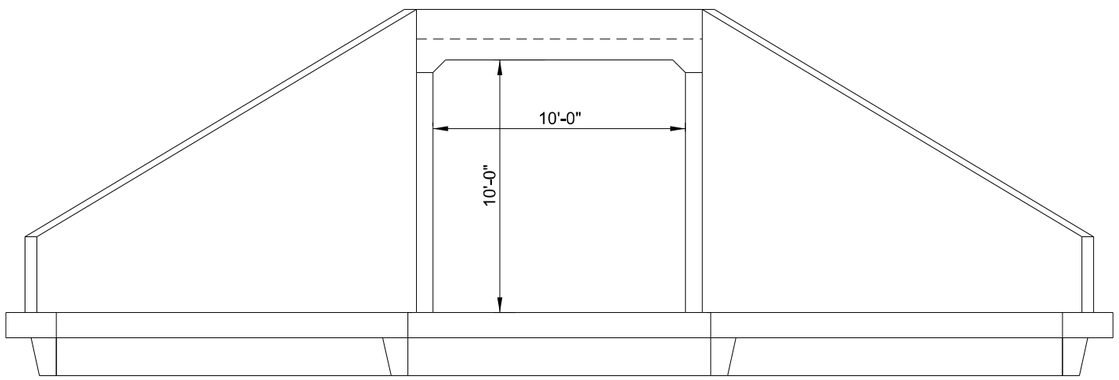
BOX CULVERT REPAIRS
281-016.454

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-9-999(477)	170	17



PLAN



END VIEW

BOX CULVERT BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
203	0119	TOPSOIL - IMPORTED	CY	3
203	0140	BORROW - EXCAVATION	CY	10
256	0200	RIP RAP GRADE II	CY	182
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	100
714	9900	INSTALL CONCRETE PIPE TIES	SET	24
900	1003	TEMPORARY STREAM DIVERSION - SITE 3	EA	1
930	3640	HIGH EXPANSION POLYURETHANE FOAM	GAL	60
930	9671	BOX CULVERT JOINT REPAIR	EA	6
930	9672	BOX CULVERT JOINT REPAIR - FLOOR	EA	2

SPECIAL PROVISIONS	
SSP 2	MIGRATORY BIRD TREATY ACT
SP 422(24)	CONCRETE SPALL REPAIR
SP 423(24)	TEMPORARY WATER DIVERSION
SP 456(24)	BOX CULVERT JOINT REPAIR

Indicates erosion hole area to fill with topsoil.

Indicates scour hole area to fill with foundation fill and cover with riprap.

REGISTERED PROFESSIONAL ENGINEER
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PE-29340
Fedorenko
DATE 01/08/26
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CREEK
US 281, 3 MI SOUTH OF ND 13

BOX CULVERT REPAIRS
281-027.547

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

Jason Thorenson
01/08/26

NOTES

100 SCOPE OF WORK: Work at this site consists of repairing existing construction joints in the barrel of the box culvert, filling voids with high expansion foam, installing pipe ties at the joints, completing erosion repairs, and reconstructing a plunge pool at the east end of the box culvert.

203 TOPSOIL - IMPORTED: Fill the erosion hole behind the SE wingwall using imported topsoil. After filling and leveling the topsoil, seed the disturbed area with a Class II seed mix and cover the area with ECB Type 2.

Include all labor, materials, and equipment required to complete this work in the price bid for "Topsoil – Imported".

203 BORROW EXCAVATION: The Engineer will verify the dimensions of the plunge pool to be constructed at the east end of the box culvert. Fill scour holes and low areas within the limits of the plunge pool reconstruction area using clay material. Compact the borrow using Compaction Control, Type C.

256 RIPRAP GRADE II: Construct the plunge pool to the dimensions shown in the plans. Adjust the dimensions near the R/W line as needed to maintain a 10' buffer from the existing R/W. The Engineer will verify the existing field conditions and dimensions of the plunge pool to be constructed prior to commencing work.

In areas where there is no riprap in place, place borrow material and Geosythetic Material Type RR as shown in the details prior to placing new riprap. In areas where there is existing riprap in place, install new riprap directly atop the existing riprap to meet the proposed conditions.

714 INSTALL CONCRETE PIPE TIES: Install pipe ties at the joint locations as shown in the plans. Use tie bolts meeting ASTM A36. Use heavy hex nuts meeting ASTM A563 and washers meeting ASTM F436, Type 1. Galvanize all materials and hardware per Section 854.

Drill into the existing box culverts to accept the new ties. Install the ties into the holes using an epoxy adhesive meeting Section 806. Tighten the nuts at each end of the tie after the epoxy has cured.

Include all costs for labor, equipment and materials required to furnish and install the box culvert ties in the prices bid for "Install Concrete Pipe Ties". Each fully installed pipe tie will be paid for as one set.

900 TEMPORARY STREAM DIVERSION – SITE 3: It is anticipated that a temporary stream diversion will be required to complete the work at this site. Construct, maintain, and remove the temporary stream diversion in accordance with the Special Provision for Temporary Water Diversion.

Do not construct a temporary stream diversion if the Contractor and Engineer agree that no diversion is required at this site. No payment will be made for a temporary stream diversion at this site if the diversion is eliminated by agreement of the Contractor and Engineer.

930 BOX CULVERT JOINT REPAIR: Complete repairs to the box culvert joints noted in the table below in accordance with the Special Provision for Box Culvert Joint Repairs.

Existing plans indicate steel plates were installed on the outside of the box culvert to minimize fill loss through the joints. Fill loss is estimated to have occurred at joints where a foam quantity is provided in the table. The estimated foam quantities listed are prior to expansion and assume a 16x foam expansion rate. Foam quantities shown in the table have been increased by 25% to account for irregularities in the voids. Do not exceed the estimated quantity of foam without the permission of the Engineer.

Joint Number	Install Concrete Pipe Ties	Approx. Joint Opening	Est. Void Depth	Box Culvert Joint Repair (Roof & Walls)	Box Culvert Joint Repair – Floor	Estimated Qty High Expansion Foam
Joint 1	Yes	1.5"	12" - Roof 12" - Walls	3 Segments	1 Segment	30 gallons
Joint 2	Yes	No additional work required				
Joint 3	Yes	1.25"	12" - Roof 12" - Walls	3 Segments	1 Segment	30 gallons

REGISTERED PROFESSIONAL ENGINEER
TATYANA FEDORENKO
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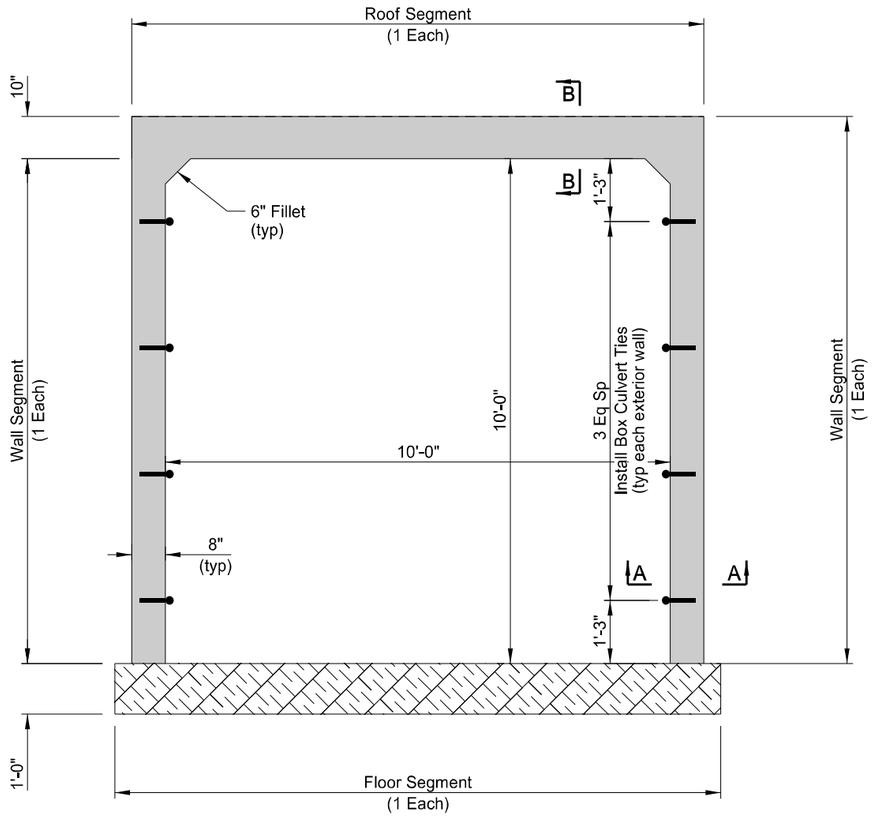
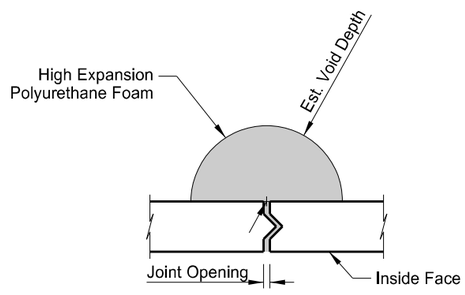
23 U.S.C. 407
NDDOT Reserves All Objections

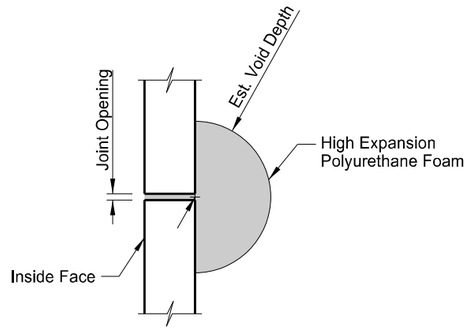
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-9-999(477)	170	19



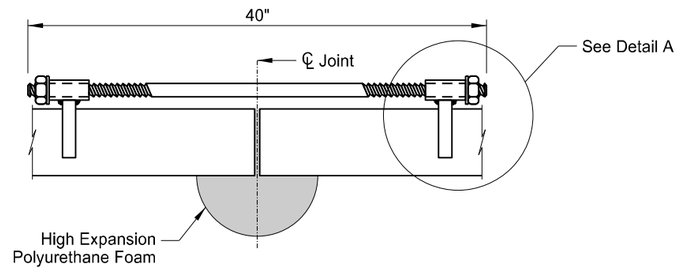
(AT CONSTRUCTION JOINT)
BARREL SECTION



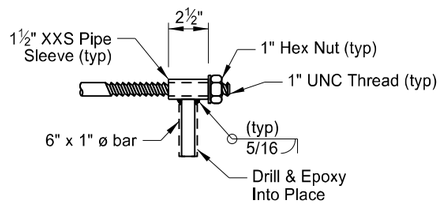
(SECTION USED FOR QTY CALCS)
SECTION B-B



(SECTION USED FOR QTY CALCS)
SECTION A-A



WALL REPAIR



DETAIL A
BOX CULVERT TIE DETAIL

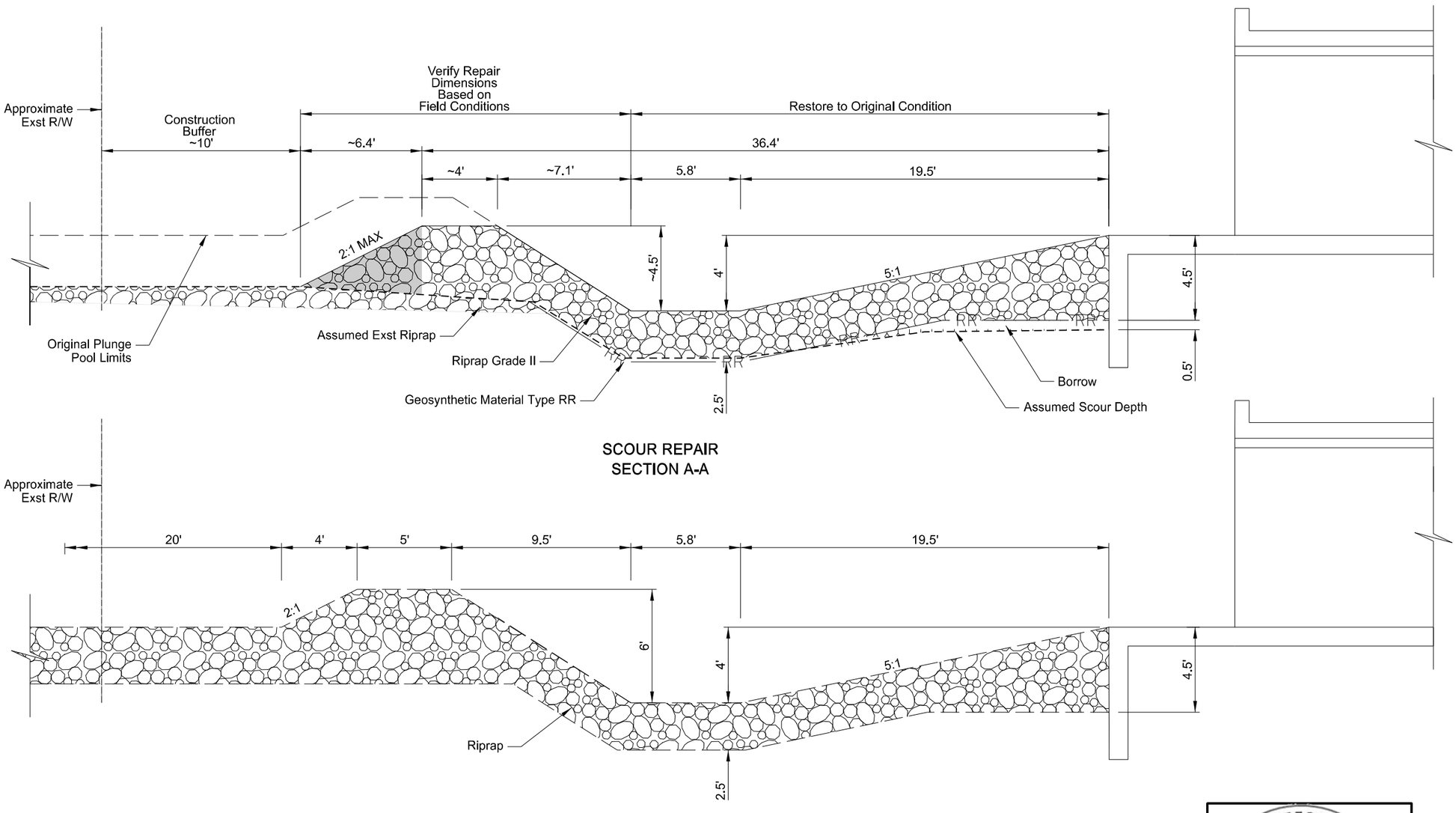
REGISTERED PROFESSIONAL ENGINEER
TATYANA FEDORENKO
PE-29340
Fedorenko
DATE 01/08/26
NORTH DAKOTA

CREEK
US 281, 3 MI SOUTH OF ND 13

BOX CULVERT REPAIRS
281-027.547

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-9-999(477)	170	20



SCOUR REPAIR
SECTION A-A

ORIGINAL PLUNGE POOL
SECTION A-A

Indicates borrow fill.

Indicates scour hole area to fill with borrow and cover with riprap.

REGISTERED PROFESSIONAL ENGINEER
TATYANA FEDORENKO
PE-29340
Fedorienko
DATE 01/08/26
NORTH DAKOTA

CREEK
US 281, 3 MI SOUTH OF ND 13

BOX CULVERT REPAIRS
281-027.547

NDDOT ABBREVIATIONS

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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REVISIONS	
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09-20-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions
04-14-25	General Revisions

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NDDOT ABBREVIATIONS

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

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NDDOT ABBREVIATIONS

D-101-3

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

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

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NDDOT ABBREVIATIONS

MEASUREMENTS

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

SURVEY DESCRIPTIONS

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

SOIL TYPES

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

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

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LINE STYLES

D-101-20

Existing Topography

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

Proposed Topography

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

Existing Utilities

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

Proposed Utilities

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

Traffic Utilities

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

Sign Structures

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

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

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LINE STYLES

D-101-21

Right Of Way

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

Boundary Control

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

Cross Sections and Typicals

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

Geotechnical

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

Countours

- Depression Contours
- Supplemental Contour

Profile

- Subgrade, Subcut or Ditch Grade
- Topsoil Profile

Striping

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

Pavement Joints

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

Bridge Details

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

Erosion Control

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

Environmental

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

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

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12 18 2020

SYMBOLS

D-101-30

North Arrow (Half Scale)

Alignment Data Point

Alignment Monument

Spot Elevation

Existing Miscellaneous Spot

Existing Access Control Arrow

Existing Benchmark

Reset USGS Marker

Iron Monument Found

Iron Pin R/W Monument

Property Corner

Iron Pin Reference Monument

Right of Way Marker (Exst, Ppsd, Reset)

Existing Federal Reference Corner

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

Existing Witness Corner

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

Existing Traverse PI Aerial Panel

Existing Reference Marker Point NGS

Existing EFB Misc

Existing Bush or Shrub

Existing Large Evergreen Tree

Existing Small Evergreen Tree

Existing Large Tree

Existing Small Tree

Existing Tree Trunk

Cairn or Stone Circle

Existing Artifact

Existing Satellite Dish

Existing Weather Station

Existing Windmill or Tower

Reinforced Pavement

CSB Continuous Split Barrel Sample

FA Flight Auger Sample

SB Split Barrel Sample

T Thinwall Tube Sample

N Standard Penetration Test

Incl Inclinometer Tube

Excavation Unit

Existing Ground Water Well Bore Hole

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

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12 18 2020

SYMBOLS

D-101-31

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

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

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

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12 18 2020

SYMBOLS

D-101-32

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

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

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

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

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12 18 2020

SYMBOLS

D-101-33

Existing Manhole (Electrical, Gas, Telephone)

Water Manhole (Exst, Exst with Valve)

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

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

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

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

Manhole (Ppsd, Ppsd 48 Inch, Exst Undefined)

Existing Water Appurtenance

Sprinkler Head (Exst, Ppsd)

Fire Hydrant (Exst, Ppsd)

Cleanout (Exst Sanitary, Underdrain)

Existing Catch Basin Inlet (Round, Square)

Existing Curb Inlet (Round, Square)

Existing Slotted Reinforced Concrete Pipe

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

Inlet Mountable Curb (Type A, Type B)

Inlet Saddle Base (Type 1, Type 2)

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

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

Median Drain

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

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

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

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

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

Pump
Sanitary, Storm Drain, Exst Water

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

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

Existing Utility Marker

Existing Meter

Existing Fuel Dispensers

Existing Fuel Filler Pipes

Existing Fuel Leak Sensors

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

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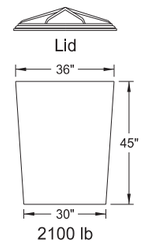
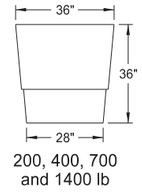
12 18 2020

ATTENUATION DEVICE

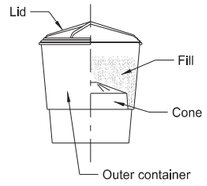
D-704-1





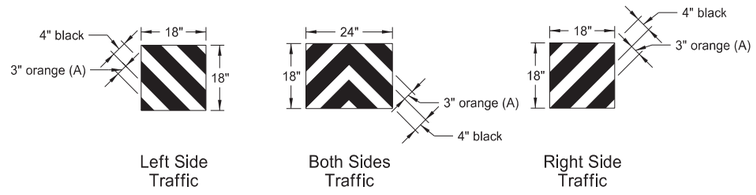
Outer Containers

Cones



Typical Assembly

Typical Module
Construction Detail

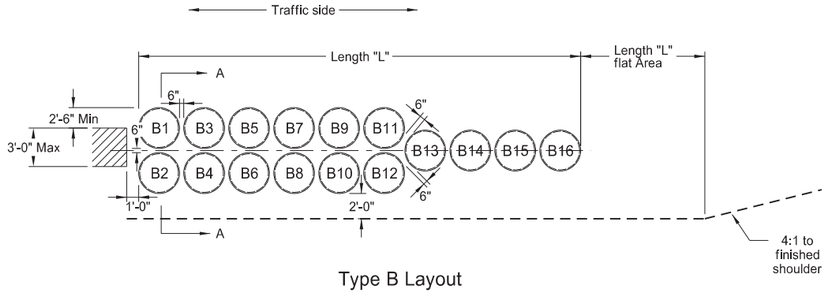


Reflective Sheet Detail

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.

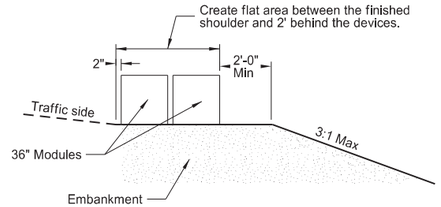
(A) Use 3" orange sheeting for temporary installations, and 3" yellow sheeting for permanent installations.

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

Notes:

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

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

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

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

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

9-25-12

REVISIONS

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

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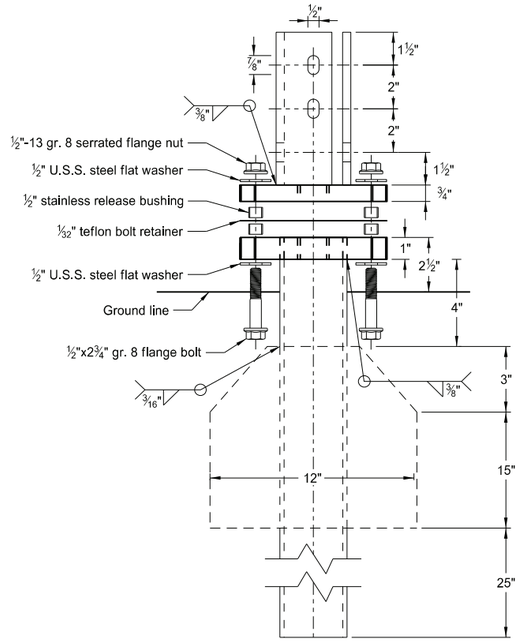
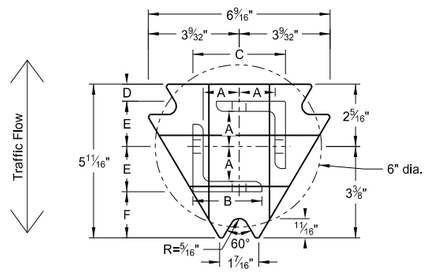
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

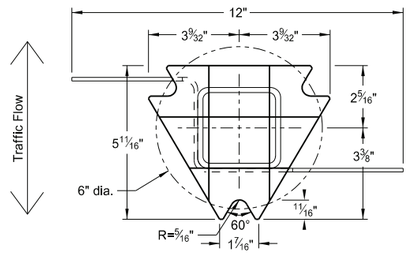


Multi-Directional
Slip Base Assembly

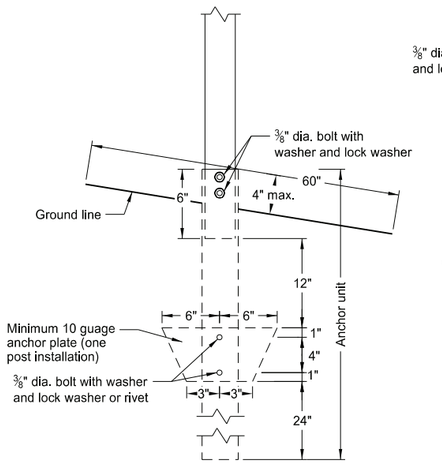
Perforated Tube



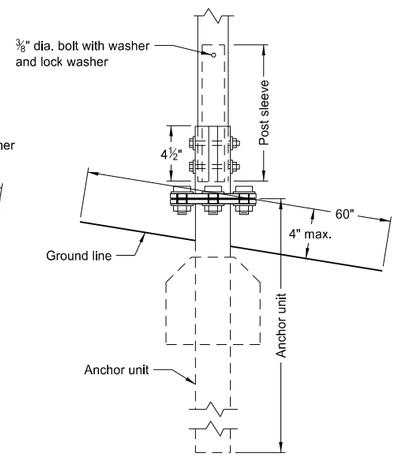
Top Post Receiver
Plate - ASTM A572 grade 50
Angle Receiver - 2½"x2½"x⅜" ASTM A36 structural angle



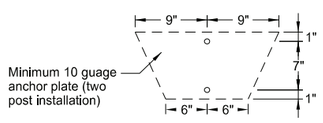
Bottom Soil Stub
Tube - 3"x3"x7 gauge ASTM A500 grade B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A1011
Plate - ASTM A572 grade 50

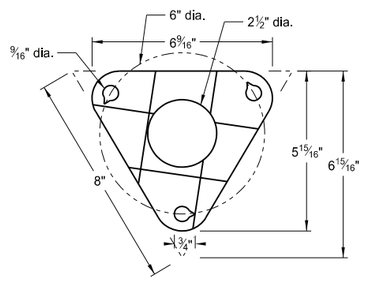


Anchor Unit and Post Assembly



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	2 3/16	10	Yes	

Properties of Telescoping Perforated Tube						
Tube Size in.	Wall Thickness in.	U.S. Standard Gauge	Weight per Foot lbs.	Moment of Inertia in.⁴	Cross Sec. Area in.²	Section Modulus in.³
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643
2½ x 2½	0.135	10	4.006	0.979	1.010	0.785

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

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

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

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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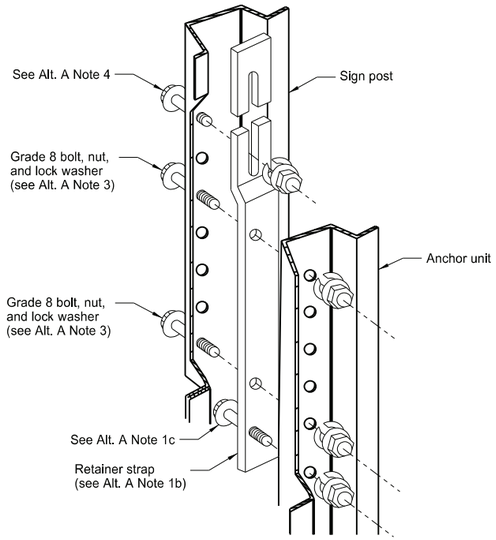
08/01/24

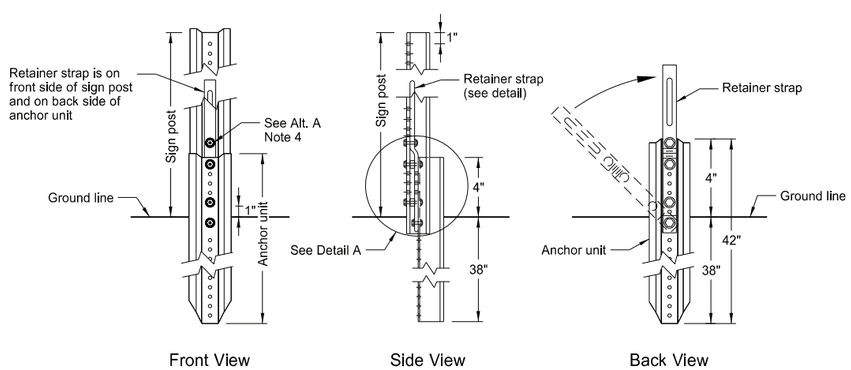
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



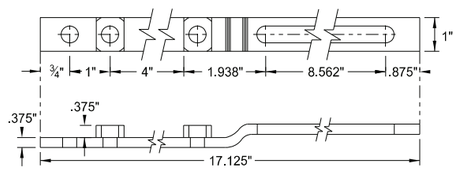
Detail A



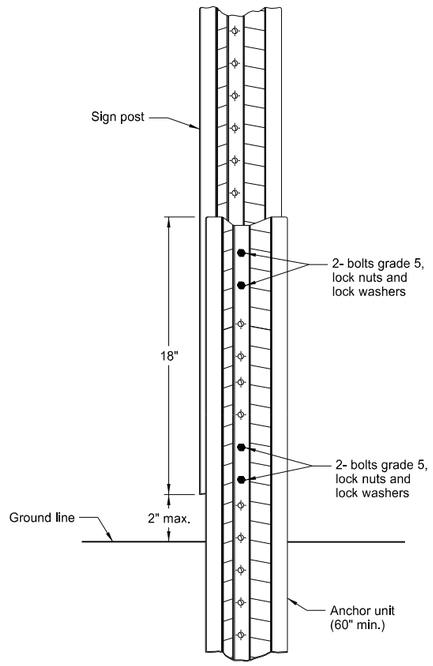
Front View | Side View | Back View

Breakaway U-Channel Detail Alternate A

Install a maximum of 2 posts within 7'.

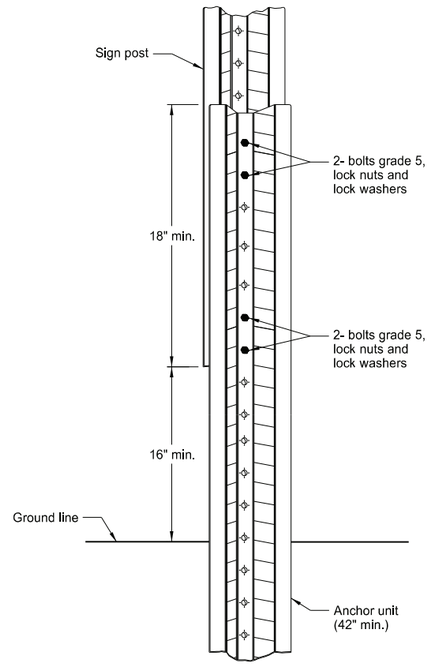


Retainer Strap Detail



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

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PROFESSIONAL
PE-4683
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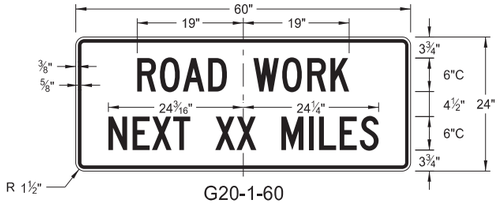
NORTH DAKOTA

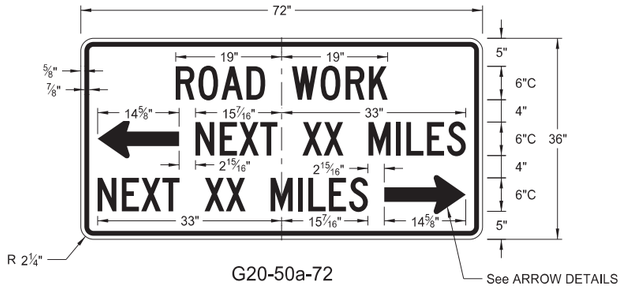
08/01/24

CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS

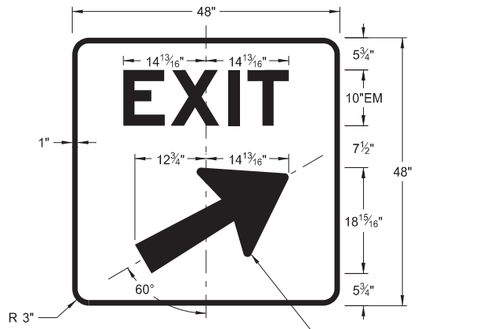
D-704-9



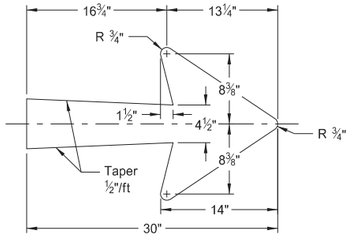
G20-1-60
Legend: black (non-refl)
Background: orange



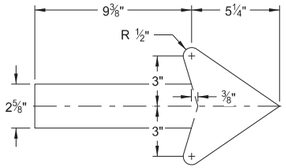
G20-50a-72
Legend: black (non-refl)
Background: orange



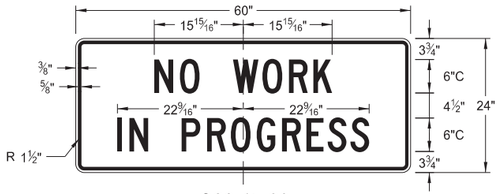
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



E5-1-48



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



G20-1b-60
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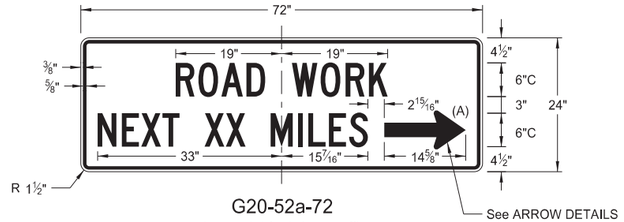
Background: orange



G20-52a-72
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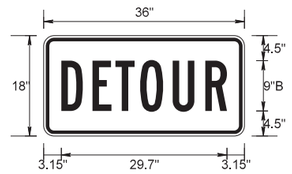
Background: orange



M4-8-36
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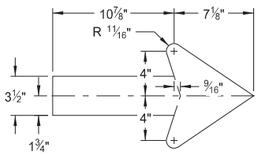
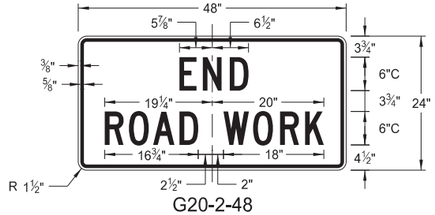
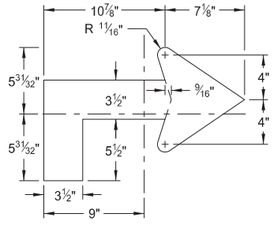
Background: orange



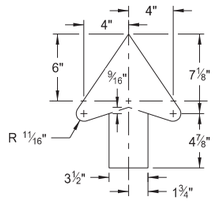
M4-9(L or R)-30
Right or Left



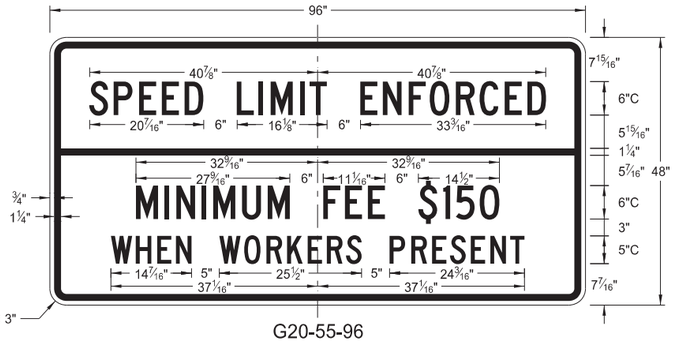
G20-2-48
Legend: black (non-refl)
Background: orange



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

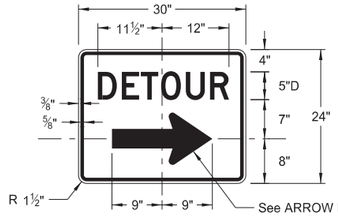


M4-9-30
Straight



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
08-17-17	Added sign & background color
10-03-19	New Design Engineer PE Stamp
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes

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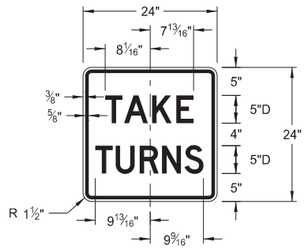
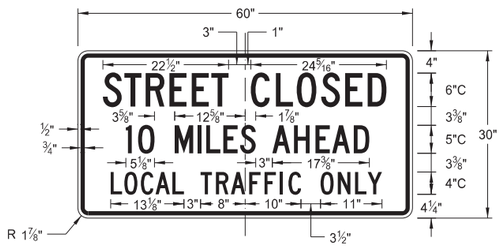
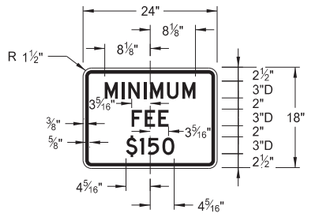
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



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



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



R2-1aP-24
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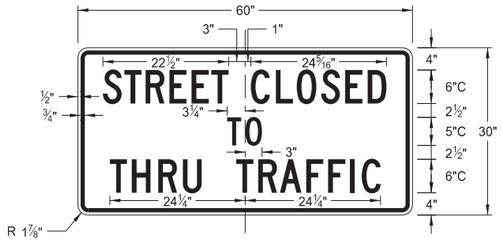
Background: white



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

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

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

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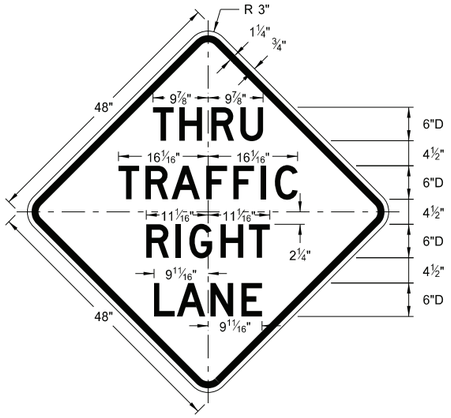
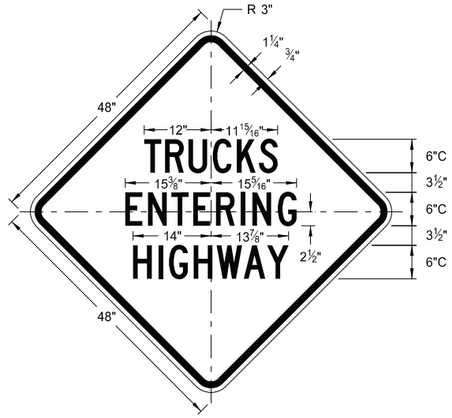
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

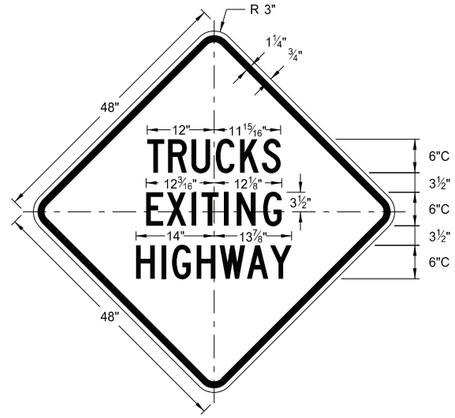
D-704-11



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



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



W8-56-48
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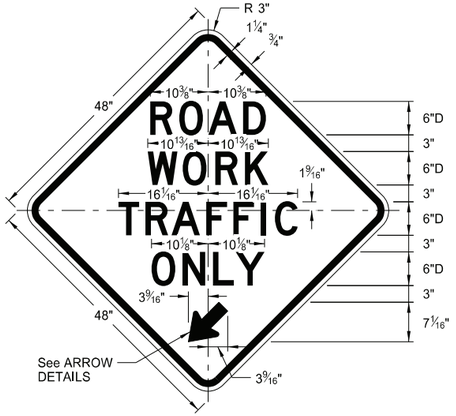
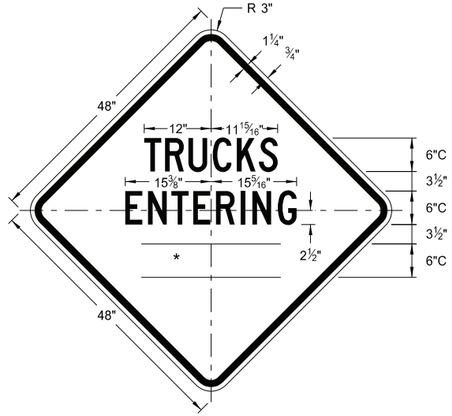
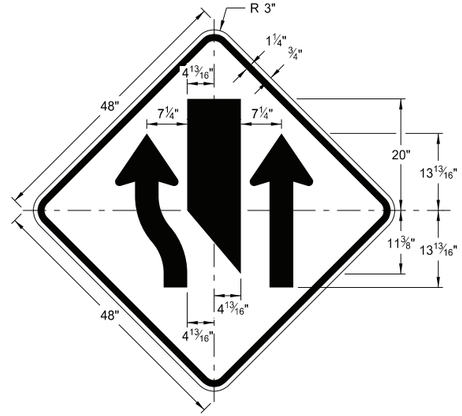
Background: orange



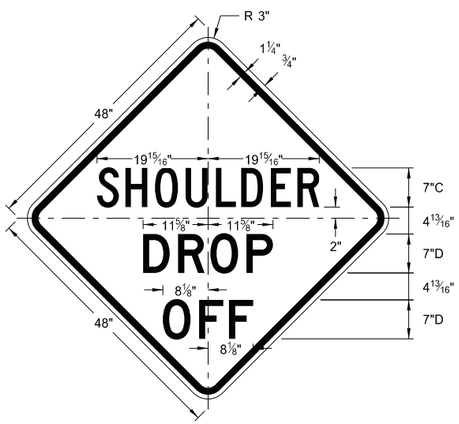
W5-9-48
Legend; black (non-refl)
Background: orange



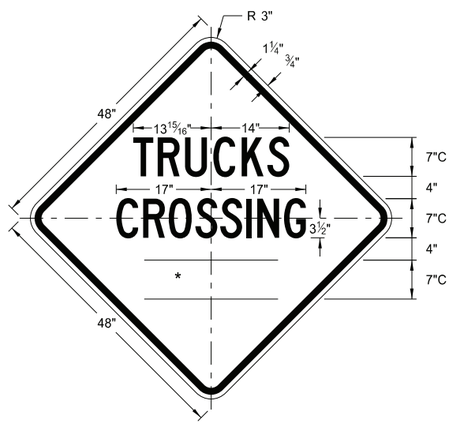
W8-54-48
Legend; black (non-refl)
Background: orange



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



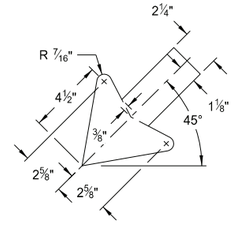
W8-9a-48
Legend: black (non-refl)
Background: orange



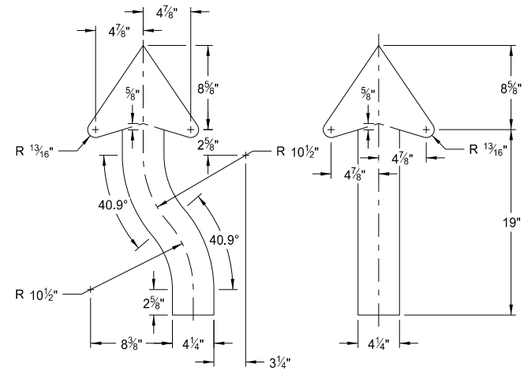
W8-55-48
Legend: black (non-refl)
Background: orange

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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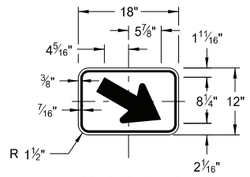
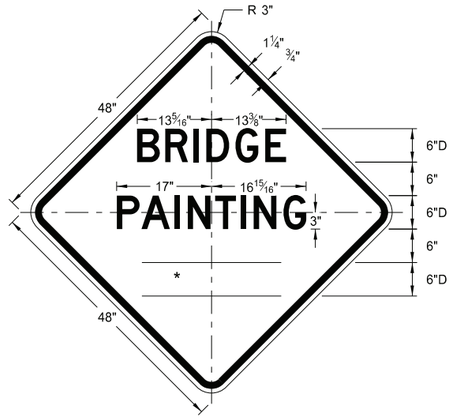
08/01/24

CONSTRUCTION SIGN DETAILS
WARNING SIGNS

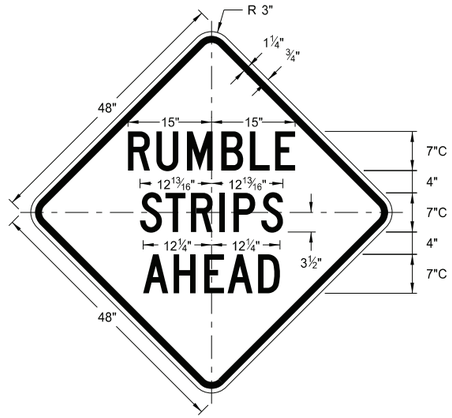
D-704-11A



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



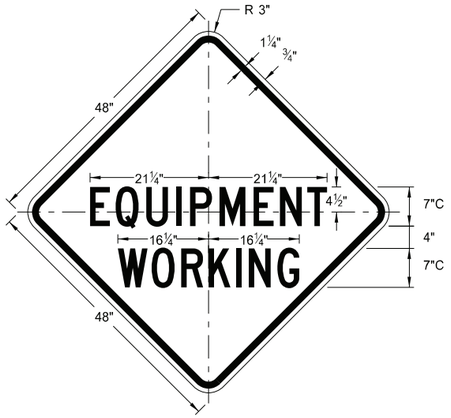
W21-50-48
Legend: black (non-refl)
Background: orange



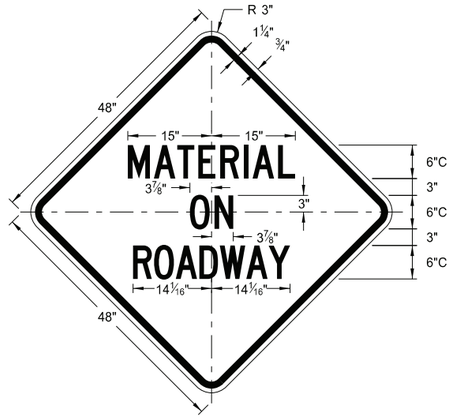
W21-53-48
Legend: black (non-refl)
Background: orange

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

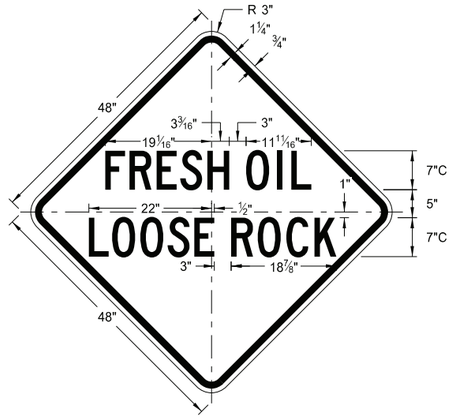
* DISTANCE MESSAGES



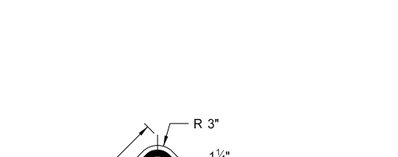
W20-51-48
Legend: black (non-refl)
Background: orange



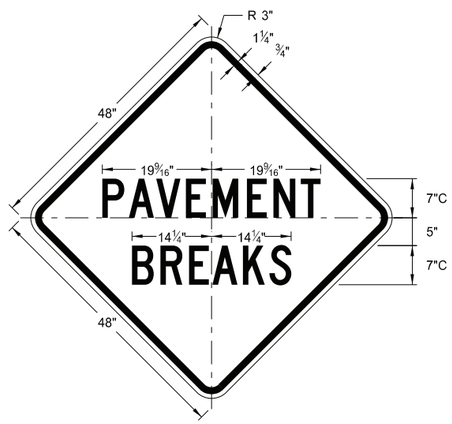
W21-51-48
Legend: black (non-refl)
Background: orange



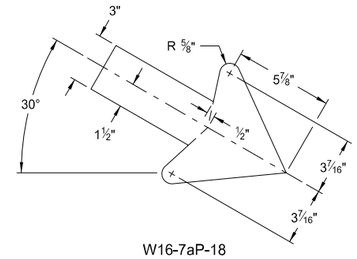
W22-8-48
Legend: black (non-refl)
Background: orange



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



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



W16-7aP-18

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

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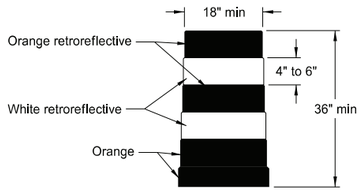
08/01/24

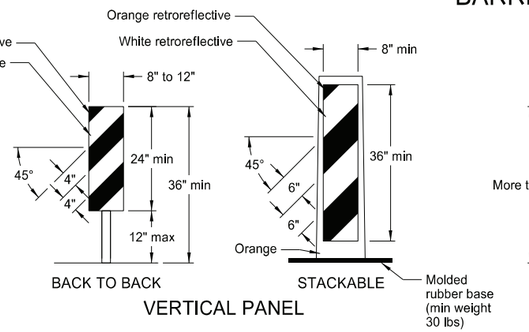
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



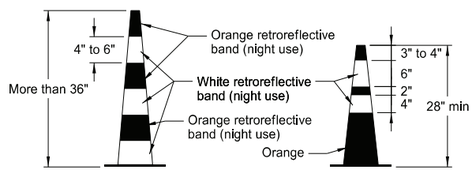
DELINEATOR DRUM

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.



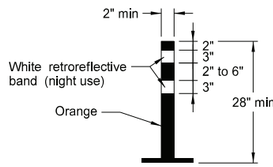
VERTICAL PANEL

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.



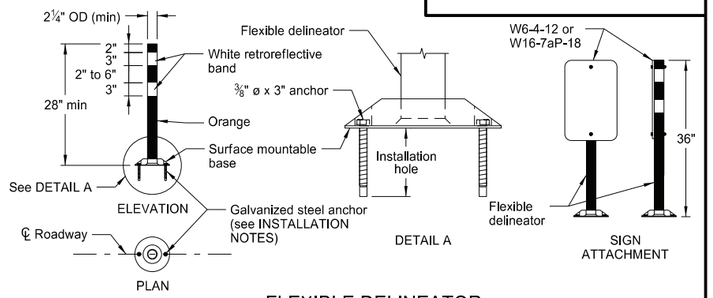
TRAFFIC CONE

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

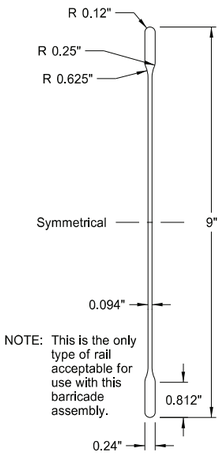
Provide retroreflectorization of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



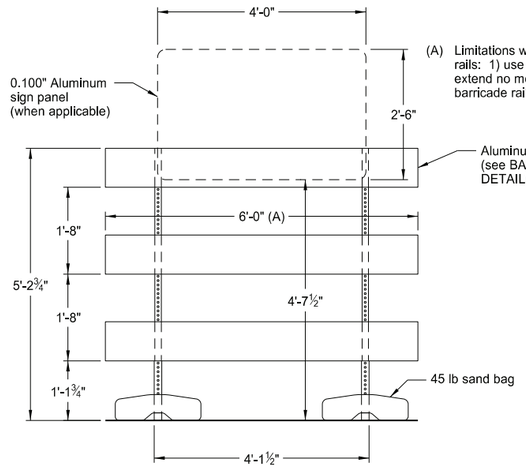
FLEXIBLE DELINEATOR

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.

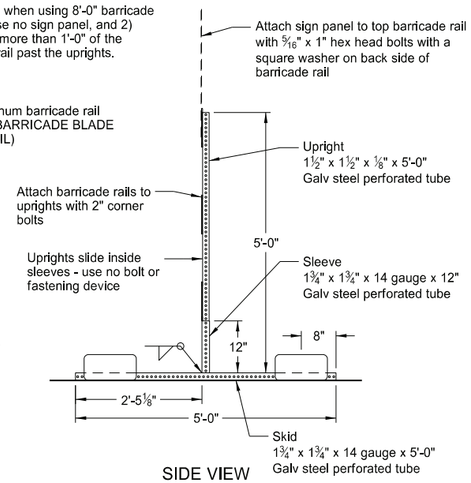


BARRICADE BLADE DETAIL



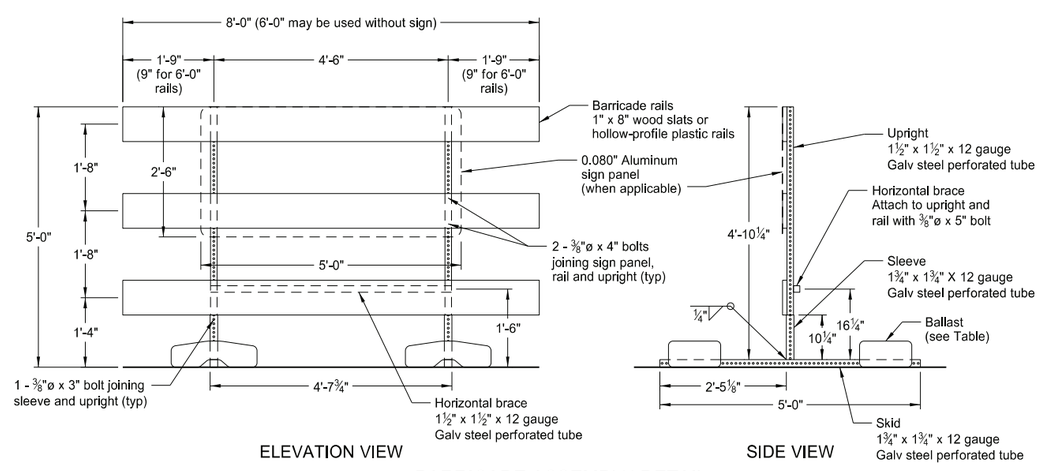
ELEVATION VIEW

(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.



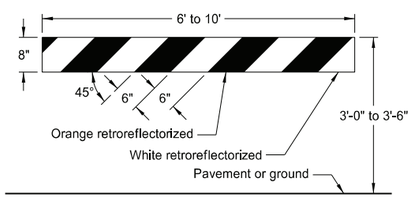
SIDE VIEW

BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

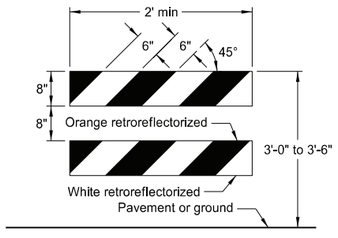


BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

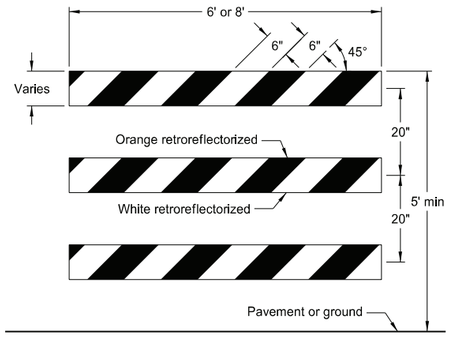
NOTE: For barricade markings use alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Place retroreflective sheeting on both sides of the rails with a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the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



TYPE I BARRICADE

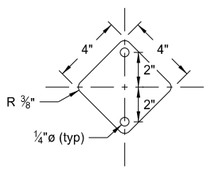


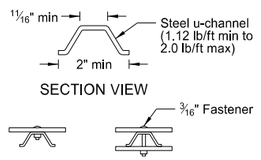
TYPE II BARRICADE

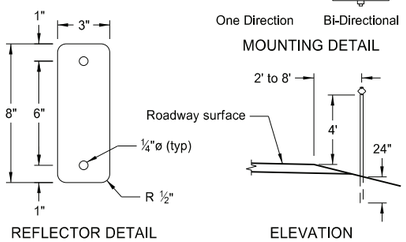


TYPE III BARRICADE

BARRICADE RAIL DETAILS







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

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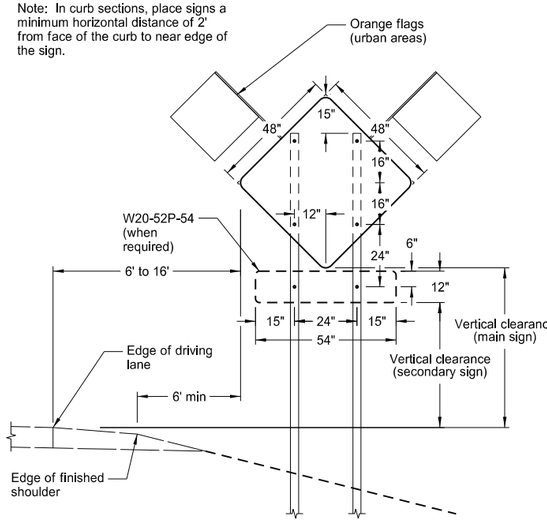
NORTH DAKOTA

08/01/24

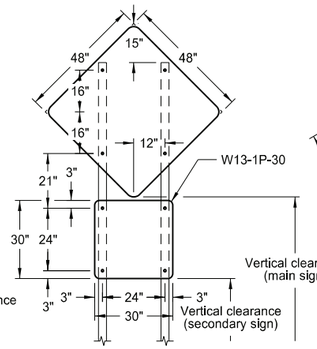
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

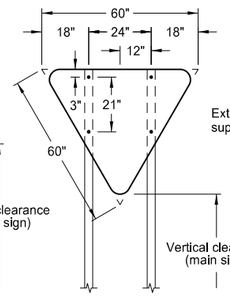
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



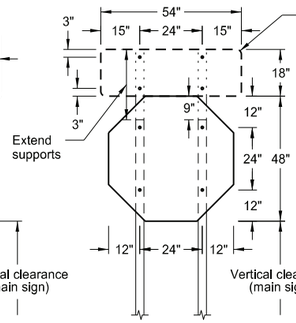
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



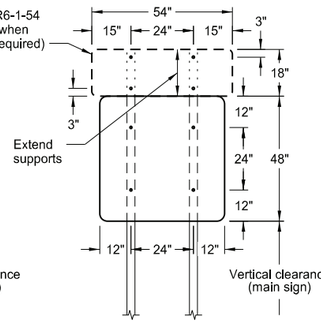
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



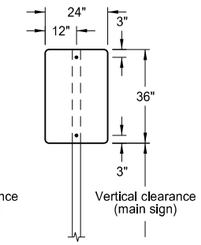
R1-2-60 - YIELD SIGN



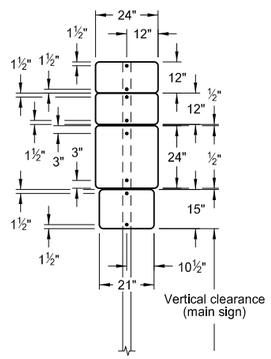
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



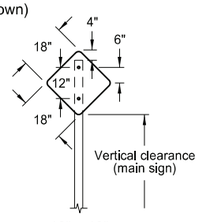
48" x 48" SIGN
(with R6-1-54 sign as required)



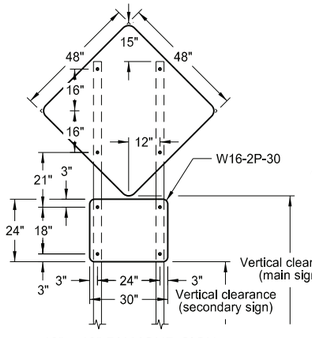
24" x 36" SIGN



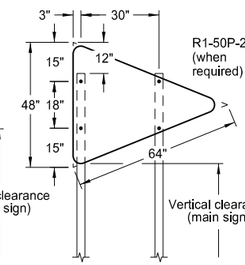
24" x 24"
ROUTE MARKER
ASSEMBLY



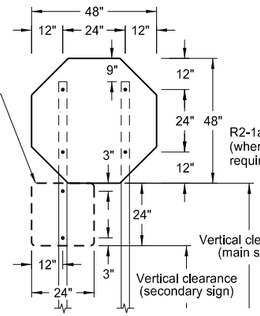
18" x 18"
DIAMOND SIGN



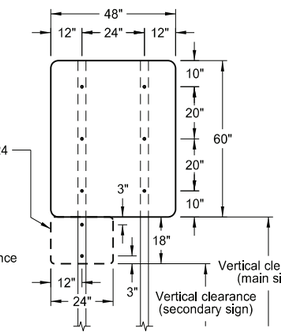
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



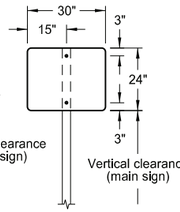
W14-3-64 - PENNANT SIGN



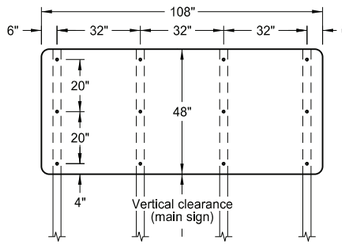
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



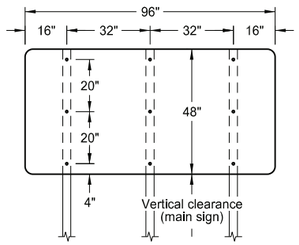
48" x 48" SIGN
(with R2-1aP-24 sign as required)



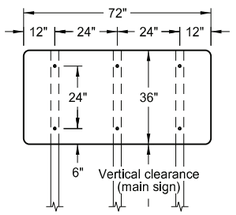
30" x 24" SIGN



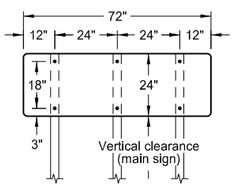
108" x 48" SIGN



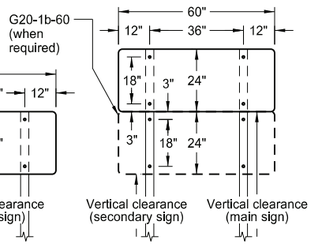
96" x 48" SIGN



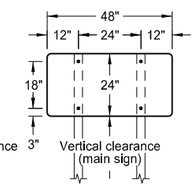
72" x 36" SIGN



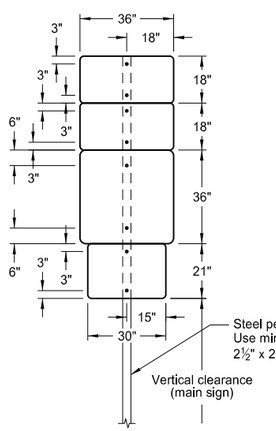
72" x 24" SIGN



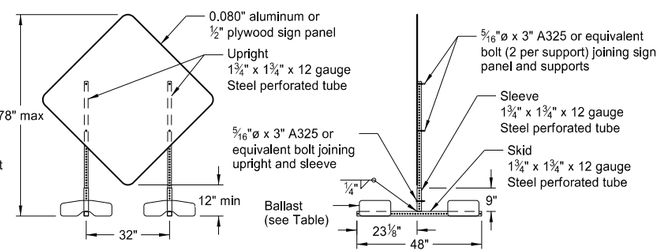
60" x 24" SIGN



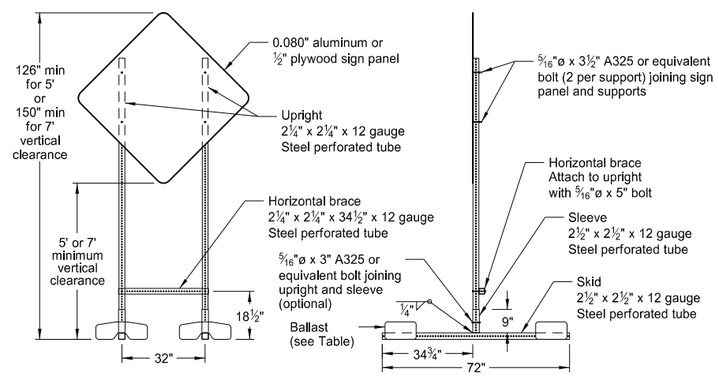
48" x 24" SIGN



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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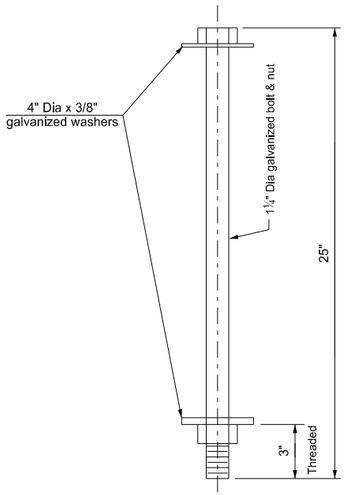
08/01/24

CONCRETE MEDIAN BARRIER
(TEMPORARY USAGE)

D-704-51

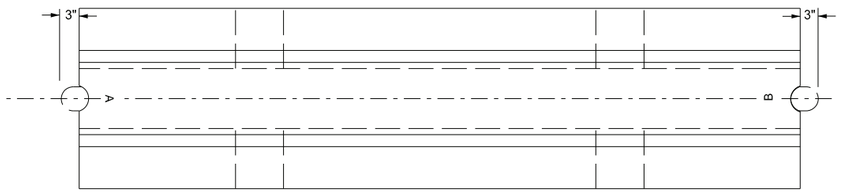
Notes:

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

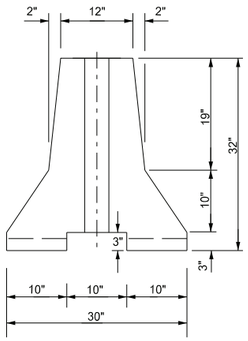


Connecting Bolt Detail

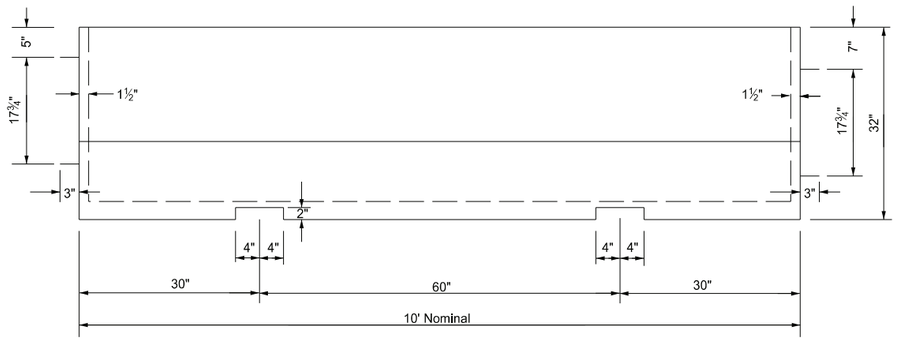
(One per 10 Ft section)



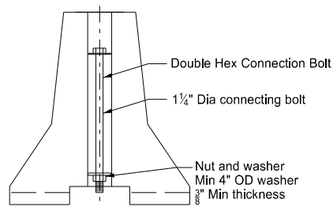
Plan View



End View



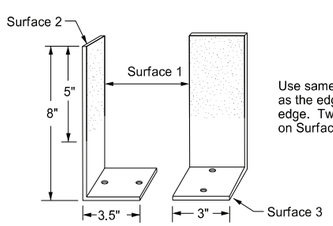
Side View



Bolt Connection Detail

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

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



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

Barrier Marker Detail

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

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

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

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

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08/21/24