	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	NH-7-002(172)053	22605	1	1

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

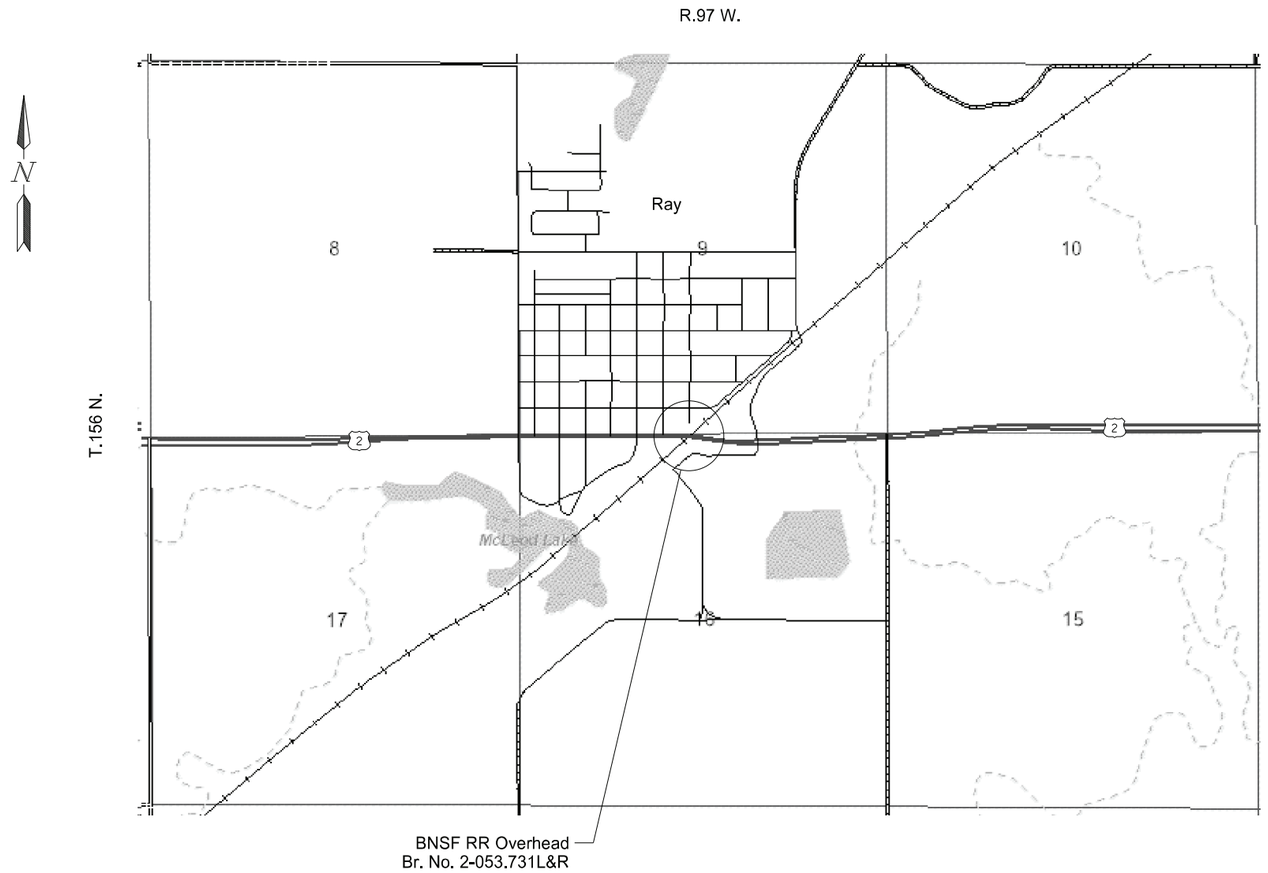
NH-7-002(172)053

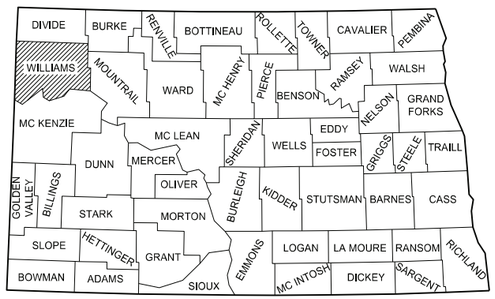
Williams County
City of Ray - EB/WB

Abutment Endwall Replacement, Approach Slabs, Concrete Spall Repair
Bridge Deck Crack Sealing, Surface Finish, Roadway Pavement, Guardrail

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

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
NH-7-002(172)053	N/A	N/A





STATE COUNTY MAP

ND DEPARTMENT OF TRANSPORTATION
OFFICE OF PROJECT DEVELOPMENT
Jason Thorenson
12/01/25

BRIDGE DIVISION

REGISTERED PROFESSIONAL ENGINEER
JASON R. THORENSON
PE - 5048
DATE
12/01/25
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	2	1

TABLE OF CONTENTS

PLAN SECTIONS

SPECIAL PROVISIONS

Number	Description
SSP 2	Federal Migratory Bird Treaty Act
SP 87(25)	Concrete Spall Repair
SP 112(25)	Railroad Requirements
SP 113(25)	Commercial Grade Asphalt

LIST OF STANDARD DRAWINGS

Number	Description
D-101-1, 2, 3, 4	NDDOT Abbreviations
D-101-10	NDDOT Utility Company and Organization Abbreviations
D-101-20, 21	Line Styles
D-101-30, 31, 32, 33	Symbols
D-550-2	Longitudinal Joint Details
D-550-3	Transverse Contraction Joint Details
D-704-7	Breakaway Systems For Construction Zone Signs - Perforated Tube
D-704-8	Breakaway Systems For Construction Zone Signs - U-Channel Post
D-704-9	Construction Sign Details - Terminal And Guide Signs
D-704-10	Construction Sign Details - Regulatory Signs
D-704-11, 11A	Construction Sign Details - Warning Signs
D-704-12	Shoulder Closure Tapers
D-704-13	Barricade And Channelizing Device Details
D-704-14	Construction Sign Punching And Mounting Details
D-704-20	Terminal And Seal Coat Sign Layouts
D-704-22	Construction Truck And Temporary Detour Layouts
D-704-26	Miscellaneous Sign Layouts
D-704-27	Mobile Operation (Pavement Marking)
D-704-34	Sign Layout For One Lane Closure
D-704-50	Portable Sign Support Assembly
D-704-63	One Road Closure Four-Lane Divided Highway - For Access to Two-Way Two-Lane Roadway
D-714-18	Precast Concrete Headwall Details
D-748-1	Curb & Gutter And Valley Gutter
D-750-2	Sidewalk
D-762-1	Pavement Marking Message Details
D-762-4	Pavement Marking
D-762-11	Short-Term Pavement Marking
D-764-1	W-Beam Guardrail General Details
D-764-5	Sequential Kinking Terminal
D-764-6	Flared Energy Absorbing Terminal
D-764-9	W-Beam Transition To Concrete Jersey Barrier With Approach Curb
D-764-11	W-Beam Transition To In Place Concrete Safety Shape Transition
D-764-22	Typical Grading At Bridge Ends With W-Beam Guardrail
D-900-1	Bridge Bench Marks

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	6	1

NOTES

202-P01 REMOVAL OF TEMPORARY BYPASS: Remove the temporary bypasses from the median when no longer needed to maintain traffic. This work will consist of:

1. Returning the median to the condition, cross section, and profile existing before the start of the project (without damaging the shoulder).
2. Removal, hauling, and disposal of all materials.

203-P01 TOPSOIL: The class II seeding, mulching and erosion control required to restore the median for the temporary bypass in the existing grassed median will not be paid for separately. Include all labor, material, and equipment costs for this work in the unit price bid for “Topsoil”.

302-P01 WATER: Water for compaction of aggregate will not be measured. Include all costs for water in the unit price bid for “Aggregate Base Course Class 5”.

550-P01 3IN EXPANSION JOINT: Install expansion joints consisting of a pre-compressed polymer impregnated self-expanding polyurethane foam joint seal coated with a silicone surface providing a permanent weather tight seal. The joint seal may be:

1. Wabo FS Bridge Seal (Watson Bowman Acme);
2. BEJS Bridge Expansion Joint System (EMSEAL);
3. Iso-Flex Silfast XL (LymTal International), or
4. Polytite N (Schul International).

Prepare the joint opening and install the joint seal according to the manufacturer's recommendations.

Follow the manufacturer’s recommendation for attaching the expansion joint seal to the concrete and for splicing foam together. Install the membrane sealant material into the joint, positioning it with the manufacturer’s recommended recess from the top surface of the concrete. Do not stretch or compress the membrane sealant material.

Fabricate and install protection armor angles on each side of the expansion joint as shown in the Sec 20 Details. Galvanize the armor angles according to Section 854.01, “Galvanizing”. Splices are permitted. Weld spliced ends. Coat weld splices or damaged coating areas with galvanizing paint according to Section 854.02, “Damaged Galvanized Coatings”.

Include all work and materials associated with the expansion joint seal and protection armor angles in the contract unit price of "3 IN Expansion Joint."

550-P02 CONCRETE SLEEPER SLAB: This work consists of constructing a concrete sleeper slab at the location of an expansion joint in the PCC pavement.

Finish the surface of the sleeper slab smooth. Allow the sleeper slab to cure for 24 hours before performing additional work on or adjacent to the slab. Cover the sleeper slab with a double layer of 4 or 6 mil polyethylene sheeting covering the slab with the concrete roadway.

Include all costs for any excavation, removal of existing sleeper slab, aggregate base, reinforcing steel, labor, and equipment in the contract unit price of “Concrete Sleeper Slab”.

570-P01 CONCRETE PAVEMENT REPAIR: At areas of concrete pavement repair, fill any void 1” or greater in depth (in the base section) with Aggregate Base Course Class 5. Include all costs for aggregate in the unit price bid for “13 ½” Concrete Pavement Repair – Full-Depth - Doweled”.

Re-establish tie bars around the edges of the concrete pavement repairs. Include all cost in the price bid for “13 ½“ Concrete Pavement Repair – Full-Depth – Doweled”.

704-301 SEQUENCING ARROW PANEL – TYPE C – CROSSOVER: Provide solar powered arrow panels that meet the requirements of the MUTCD and ITE and that are capable of operating for 20 days without a solar charge.

Include all costs for materials, equipment, labor, and incidentals in the contract unit price for "Sequencing Arrow Panel – Type C - Crossover".

704-510 OBLITERATION OF PAVEMENT MARKINGS: Masking of pavement markings designated for obliteration is allowed. Choose to remove marking as specified in Section 704.04 N, "Obliteration of Pavement Markings" or mask markings. Mask markings using removable, non-reflective preformed tape that is approximately the same color as the pavement surface and that overlaps the marking a minimum of 1 inch on each side.

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	6	2

NOTES

704-P01 PHASING: Phase 1: Close median lanes in both directions.

- Construct median crossovers,
- place temporary median guardrail at the south-west corner of the north bridge.

Phase 1 & 2: Remove existing median concrete and fill void with aggregate base.

Phase 2: Shift eastbound traffic to the north roadway (2-way, 2-lane):

- Place shoring for bridge work;
- remove guardrail and barrier, sidewalk, and guardrail surfacing from the west end of the south bridge;
- remove barrier from the north-west corner of the south bridge;
- complete roadway work, approach slab work, and bridge work on the south roadway and bridge;
- replace the sidewalk and guardrail surfacing, and remove and reset the guardrail at the south-west corner of the south bridge;
- place temporary guardrail at the north-east corner of the south bridge; and

Phase 3: Shift eastbound and westbound traffic to the south roadway (2-way, 2-lane):

- Remove temporary guardrail from the south-west corner of the north bridge;
- complete roadway work, approach slab work, and bridge work on the north roadway and bridge;
- remove and reset the guardrail at the north-east corner of the north bridge, and place guardrail surfacing and median surfacing on the north bridge.

Phase 4: Shift westbound traffic back to the north roadway (normal divided traffic with median lane closed in both directions):

- remove shoring;
- remove the median crossovers;
- remove the temporary median guardrail from the north-east corner of the south bridge;
- replace the median surfacing;
- remove lane closure from the north roadway and bridge.

Phase 5: Switch eastbound traffic to the median lane on the south roadway:

- replace the sidewalk and barrier taper on the south-east corner of the south bridge.

704-P02 TRAFFIC CONTROL: Provide traffic control consisting of temporary lane closures and flagging. The traffic control device list has been developed using the layouts shown in the plans and the following layouts shown on the Standard Drawings.

D-704-20 Layout Type G: Terminal Sign Layout for project;
D-704-26 Layouts Type Y: for truck haul road crossing highway;
D-704-22 Layouts Type K & L: for trucks entering or crossing highway;
D-704-63: for maintaining access to 2-way, 2-lane roadway at approaches;

Phase 1: D-704-34: Median lane closure in each direction;

Phase 2: Section 100 layouts for working on south roadway;

Phase 3: Section 100 layouts for working on north roadway;

Phase 4: D-704-34: Median lane closure in each direction;

Phase 5: D-704-34: Outside lane closure on south roadway;

Return traffic to normal 4-lane divided highway operation with no closure.

748-P01 CURB AND GUTTER – TYPE I: Place 3 inch high curb under guardrail at locations shown on the plans. Include all costs for the 3 inch curb & gutter in the price bid for “Curb & Gutter-Type I”.

930-P03 PRESSURE RELIEF JOINT: This work consists of sawing a joint with a 3” wide opening into the existing outside jersey barrier and reinforced footing slab (approximately 8” thick slab - 4’-9” wide), median barrier and 4” thick concrete median pavement to line up with the newly constructed 3” expansion joint on the roadways. The pressure relief joints are located (west and east of the bridges) at the locations shown in Section 20 details.

Saw the relief joint full depth of the concrete median pavement and the entire thickness of the concrete median barrier and reinforced footing slab (approximately 8” thick slab – 4’-0” wide). Remove the concrete from the 3” joint opening and fill with the same 3” pre-compressed polymer impregnated self-expanding polyurethane foam joint seal as described in Note 550-P01 3IN EXPANSION JOINT. Seal the concrete median pavement, barrier, median barrier and barrier slab with the expansion joint seal.

Construct the pressure relief joint in the existing barrier and median pavement concurrently with the 3” expansion joint and CPR work. Include all costs for this described work in the unit price bid for “Pressure Relief Joint”.

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	6	3

NOTES

SECTION 100

202-P02 REMOVAL OF CONCRETE: Remove a portion of the existing 32“ height reinforced concrete jersey barriers and the approximately 8” thick reinforced concrete slabs at the ends of the Burlington Northern RR Overhead, RP 53.731, as shown in the plans. Saw cut through the entire slab and barrier at the end farthest from the approach slab.

Include all costs to remove the existing reinforced concrete jersey barrier and slab in the contract unit price bid for “Removal of Concrete.”

764-P01 W-BEAM GUARDRAIL END TERMINALS FOR TWO-WAY TRAFFIC: Two W-beam guardrail end terminals are required for protection on the Burlington Northern RR Overhead, RP 53.731, roadway during two-way traffic operation.

For traffic on the north roadway install a W-beam terminal connector, a 12'-6" W-beam section (double thickness), two 12’-6” W-beam rail sections, and a W-beam guardrail end terminal, as shown in the plans. Install approximately 15.8 tons of 4” thick aggregate base course CL 5 in the area of the removed pavement. Remove the extra aggregate base when the end terminal is removed to install concrete median pavement.

For traffic on the south roadway install a W-beam terminal connector, a 12'-6" W-beam section (double thickness), two 12’-6” W-beam rail sections, a rub rail and end shoe, as shown in the plans (and Standard Drawing D-764-9). Install approximately 22.8 tons of 4” thick aggregate base course CL 5 in the area of the removed pavement. Remove the extra aggregate base when the end terminal is removed to install concrete median pavement.

The W-beam guardrail end terminals, additional guardrail materials, and the removed portions of aggregate base course CL 5, required for two-way traffic will remain the property of the contractor and be removed when no longer needed for two-way traffic operation.

The W-beam guardrail end terminals will be measured and paid for by the number of W-beam guardrail end terminals required and accepted by the engineer and include all materials; aggregate base course CL 5, W-beam terminal connector and W-beam rail sections, rub rail sections, end shoe, and all necessary posts, blocks, hardware, equipment, and labor.

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 12/03/25
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	6	4

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

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

*Time frames can differ slightly, depending on the year

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

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12/04/25

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY	TOTAL
103	0100	CONTRACT BOND	L SUM	1	1
107	0100	RAILWAY PROTECTION INSURANCE	L SUM	1	1
107	0140	RAILROAD COORDINATION	L SUM	1	1
202	0111	REMOVAL OF CONCRETE	L SUM	1	1
202	0113	REMOVAL OF CONCRETE	CY	14	14
202	0114	REMOVAL OF CONCRETE PAVEMENT	SY	145	145
202	0132	REMOVAL OF BITUMINOUS SURFACING	SY	80	80
202	0350	REMOVAL OF TEMPORARY BYPASS	EA	1	1
210	0099	CLASS 1 EXCAVATION	L SUM	1	1
302	0120	AGGREGATE BASE COURSE CL 5	TON	167	167
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT	TON	142	142
550	1013	3IN EXPANSION JOINT	LF	112	112
550	1031	CONCRETE SLEEPER SLAB	SY	65	65
570	0240	DOWELED CONTRACTION JOINT ASSEMBLY	LF	192	192
570	0706	13.5IN CONCRETE PAVEMENT REPAIR-FULL DEPTH-DOWELED	SY	585	585
602	0130	CLASS AAE-3 CONCRETE	CY	79.9	79.9
602	1133	CONCRETE BRIDGE APPROACH SLAB	SY	291.4	291.4
602	1134	PILE SUPPORTED APPROACH SLAB	SY	328	328
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	3,035	3,035
602	1260	BRIDGE DECK CRACK SEALING	LF	1,950	1,950
602	7000	SPECIAL SURFACE FINISH	SF	4,976	4,976
612	0115	REINFORCING STEEL-GRADE 60	LBS	1,788	1,788
612	0116	REINFORCING STEEL-GRADE 60-EPOXY COATED	LBS	11,768	11,768
624	0126	PEDESTRIAN CANOPY	LF	15.7	15.7
650	0805	DECK SPALL REPAIR	SF	67	67
702	0100	MOBILIZATION	L SUM	1	1
704	0100	FLAGGING	MHR	200	200
704	1000	TRAFFIC CONTROL SIGNS	UNIT	2,009	2,009
704	1052	TYPE III BARRICADE	EA	14	14
704	1060	DELINEATOR DRUMS	EA	98	98
704	1067	TUBULAR MARKERS	EA	112	112
704	1072	FLEXIBLE DELINEATORS	EA	144	144
704	1087	SEQUENCING ARROW PANEL-TYPE C	EA	2	2

ESTIMATE NUMBER: 24774 ESTIMATE TYPE: FINAL FINALIZED: Y RUN DATE: 12/04/2025 TIME: 11:08:10

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	8	2

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY	TOTAL
704	1088	SEQUENCING ARROW PANEL-TYPE C-CROSSOVER	EA	2	2
704	1500	OBLITERATION OF PAVEMENT MARKING	SF	5,624	5,624
748	0120	CURB & GUTTER MOUNTABLE-TYPE I	LF	18	18
748	0140	CURB & GUTTER-TYPE I	LF	75	75
762	0111	EPOXY PVMT MK 12IN LINE	LF	1,450	1,450
762	0112	EPOXY PVMT MK MESSAGE	SF	240	240
762	0114	EPOXY PVMT MK 6IN LINE	LF	17,234	17,234
762	0117	EPOXY PVMT MK 24IN LINE	LF	160	160
762	0131	EPOXY PVMT MK 6IN LINE-GROOVED	LF	42	42
762	0422	SHORT TERM 6IN LINE-TYPE R	LF	16,946	16,946
762	0426	SHORT TERM 24IN LINE-TYPE R	LF	160	160
764	0145	W-BEAM GUARDRAIL END TERMINAL	EA	2	2
764	0150	REMOVE & RESET GUARDRAIL	LF	129	129
930	8230	SHORING	EA	2	2
930	8644	SILICONE SEALANT	LF	1,243	1,243
930	9537	ABUTMENT UNDERDRAIN SYSTEM	EA	4	4
930	9586	PRESSURE RELIEF JOINT	LF	48	48
930	9612	SPALL REPAIR	SF	19	19
930	9660	ABUTMENT REPAIR	L SUM	1	1

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-002(172)053	10	1

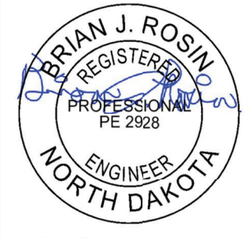
		HMA PAVING					
		SW Corner-South Bridge/NE Corner-North Bridge			STA 2856+25 to STA 2858+90		
		Guardrail Paving			Median Cross Over		
Material	Unit	Width	Phase 2-S Bridge	Phase 3-N Bridge	Width (ft)	Cross Sectional Area (SF)	Total Quantity
AGGREGATE BASE COURSE CL 5 @ 1.5 TON/CY + 25%	TON	Varies	-	-	22'	9.09	167
COMMERCIAL GRADE HOT MIX ASPHALT @ 2 TON/CY	TON	Varies	x	x	22'	6.77	133

762-0422 Short Term 6IN Line - Type R		Phase 2-S Br Closure
Location	Basis	Quantity
Centerline	Barrier Stripe (Double Yellow)	6,824 LF
Centerline	Barrier Stripe (Yellow)	394 LF
Edgeline	Inside Edge (Yellow)	1,266 LF
Edgeline	Outside Edge (White)	402 LF
762-0426 Short Term 24IN Line - Type R		Phase 2-S Br Closure
Intersections	Stop Bar (White)	70 LF

762-0422 Short Term 6IN Line - Type R		Phase 3-S Br Closure
Location	Basis	Quantity
Centerline	Barrier Stripe (Double Yellow)	6,000 LF
Centerline	Barrier Stripe (Yellow)	295 LF
Edgeline	Inside Edge (Yellow)	1,463 LF
Edgeline	Outside Edge (White)	302 LF
762-0426 Short Term 24IN Line - Type R		Phase 3-S Br Closure
Intersections	Stop Bar (White)	90 LF

Permanent Pavement Marking			
Description		Basis	Quantity
762-0131	Epoxy Pvmt Mk 6IN Line-Grooved	Center Skip - White @ 1320 LF/mile	42 LF
762-0114	Epoxy Pvmt Mk 6IN LIne	Edge Line- Yellow @ 5,280 LF/mile	8,000 LF
	Epoxy Pvmt Mk 6IN LIne	Edge Line - White @ 5,280 LF/mile	7,000 LF
	Epoxy Pvmt Mk 6IN LIne	Center Skip - Yellow @ 1,320 LF/mile	234 LF
	Epoxy Pvmt Mk 6IN Line	Center Skip - White @ 1,320 LF/mile	2,000 LF
762-0111	Epoxy Pvmt Mk 12IN Line	Channel Line - White	1,450 LF
762-0117	Epoxy Pvmt Mk 24IN Line	Stop Bar - White	160 LF
762-0112	Epoxy Pvmt Mk Message	Arrows - White @ 16 SF/Ea	240 SF

704-1500 Obliteration of Pavement Marking						
Pavement Marking	Phase 2		Phase 3		Total Length	Quantity
	S Rdwy	N Rdwy	S Rdwy	N Rdwy		
Centerline Dash	300 LF	3,700 LF	3,400 LF	360 LF	7,760 LF	970 SF
Lane Line Solid/Dash	125 LF	125 LF	250 LF	250 LF	750 LF	375 SF
Edgeline	100 LF	3,275 LF	3,085 LF	100 LF	6,560 LF	3,281 SF
Channel Line		325 LF	500 LF		825 LF	550 SF
Stop Bar	70 LF			90 LF	160 LF	320 SF
Message-Turn Arrow		5 Ea	3 Ea		8 Ea	128 SF

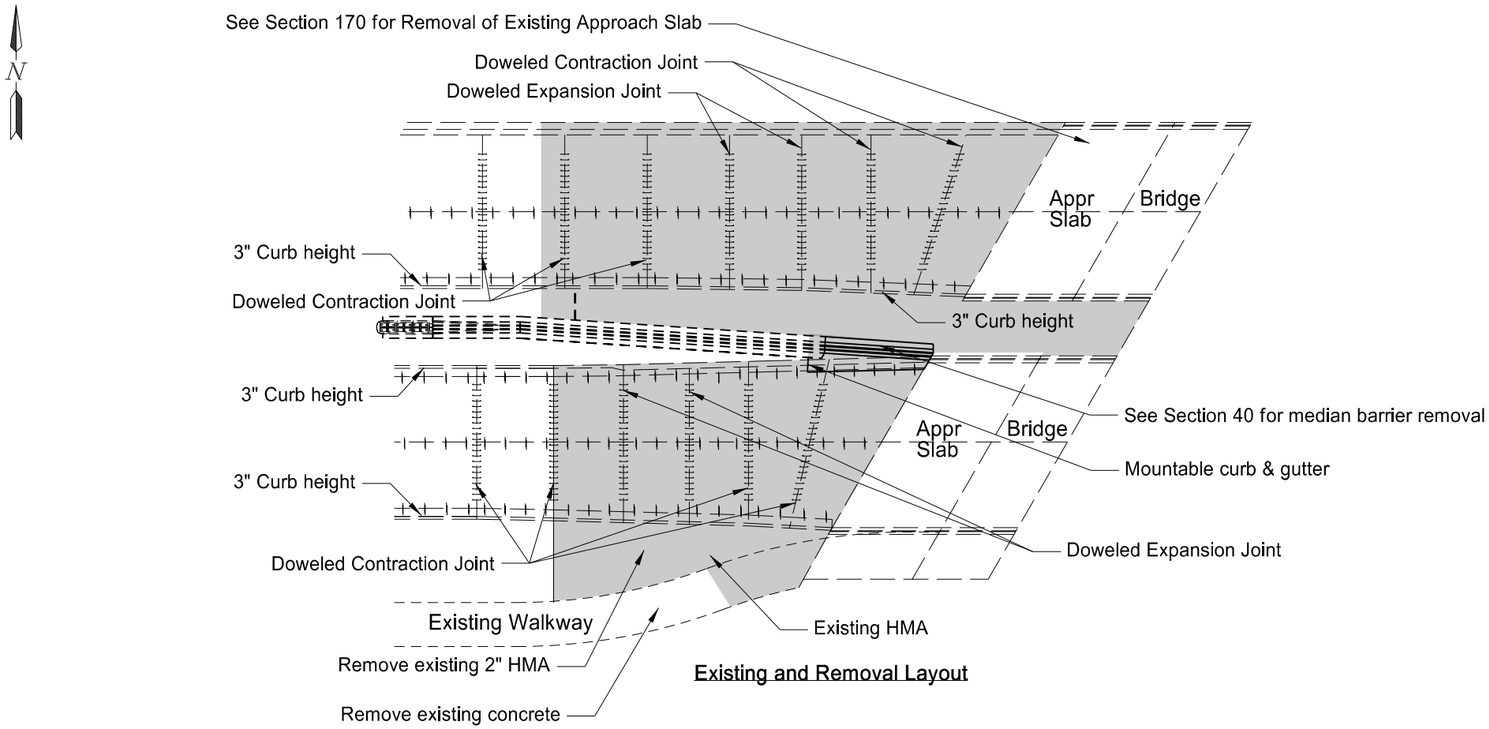


12/04/25

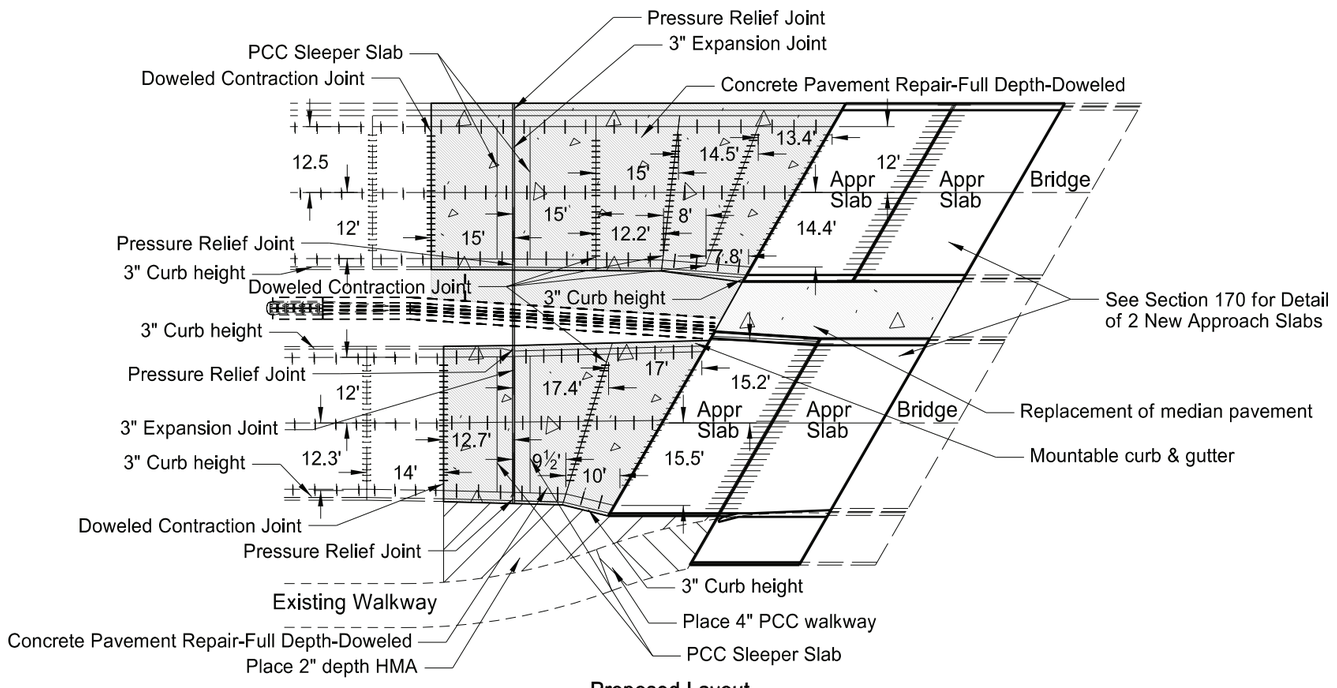
Basis of Estimate

Approach Slab Repair/Spall Repair/Joint Repair
City of Ray - US Hwy 2

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-002(172)053	20	1



Existing and Removal Layout



Proposed Layout

SPEC	CODE	BID ITEM		UNIT	QUANTITY
202	114	REMOVAL OF CONCRETE PAVEMENT			
		Median and Sidewalk		SY	34.5
202	0132	REMOVAL OF BITUMINOUS SURFACING			
		South Roadway		SY	59
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT			
		South Roadway		TON	7
550	1013	3 IN EXPANSION JOINT			
		North Roadway		LF	26
		South Roadway		LF	29
			Total	LF	55
550	1031	CONCRETE SLEEPER SLAB			
		North Roadway (6' x 24')		SY	16
		South Roadway (6' x 25')		SY	16.6
570	0240	DOWELED CONTRACTION JOINT ASSEMBLY			
		North Roadway		LF	72
		South Roadway		LF	24
			Total	LF	96
570	0706	13 1/2" CONCRETE PAVEMENT REPAIR-FULL DEPTH-DOWELED			
		North Roadway		SY	179
		South Roadway		SY	112
			Total	SY	291
748	0120	CURB & GUTTER MOUNTABLE-TYPE I			
		South Roadway		LF	17.4
748	0140	CURB & GUTTER-TYPE 1			
		North Roadway Median		LF	15.6
		South Roadway		LF	25.3
			Total	LF	40.9
750	100	SIDEWALK CONCRETE			
		Median and Sidewalk		SY	34.5
930	9586	PRESSURE RELIEF JOINT			
		North Roadway (Outside Barrier & shldr)		LF	4.3
		Median (Curb & Gutter, Median Barrier Pvmt)		LF	18
		South Roadway (Outside Curb & Gutter)		LF	2
			Total	LF	24.3

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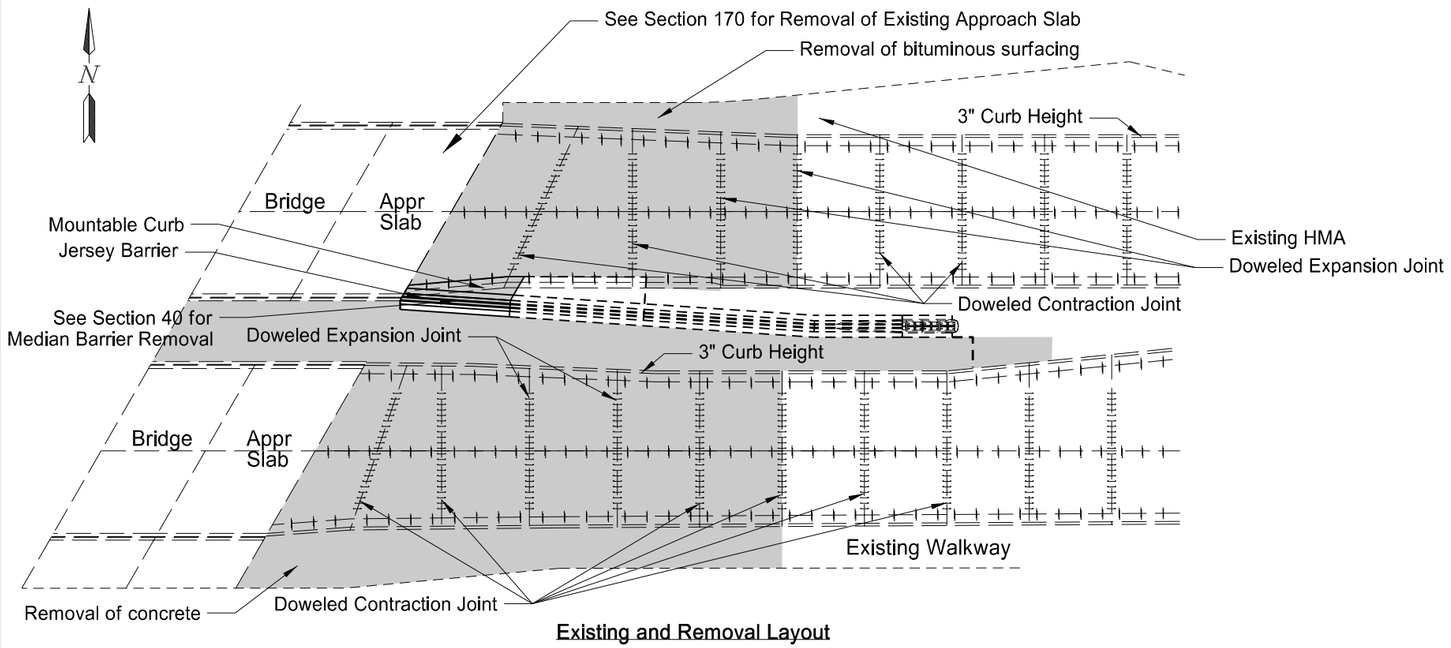
12/04/25

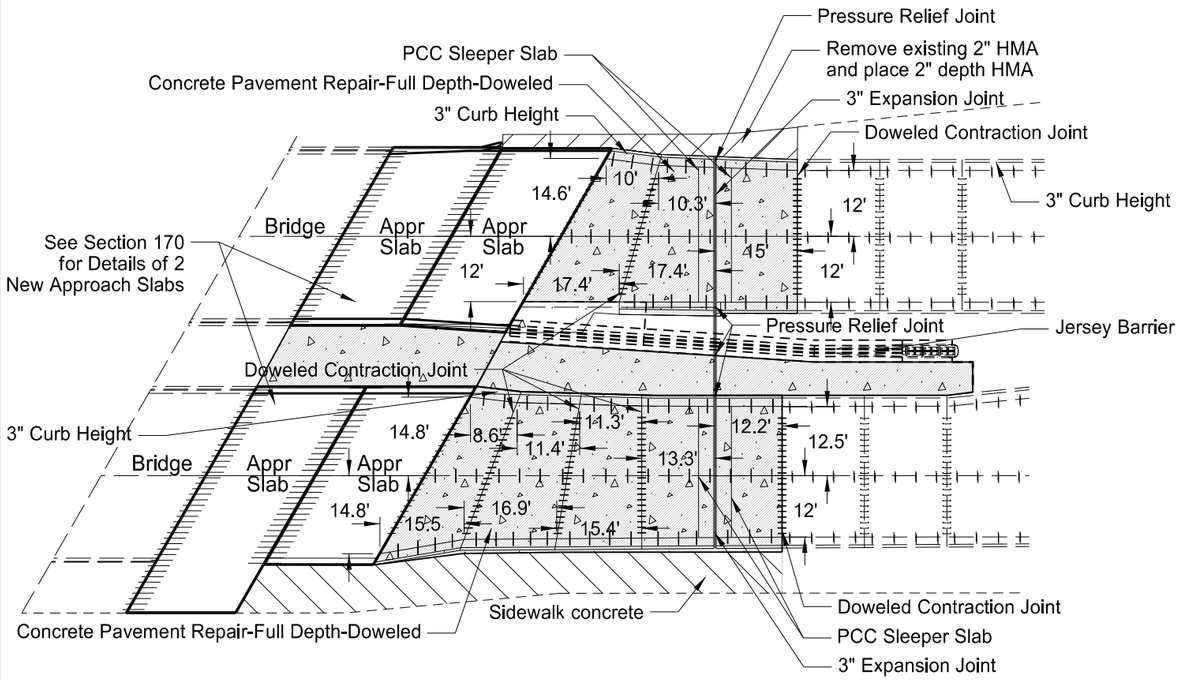
Expansion Joint Detail - West End of Structures
West End of Structures

Structure Repair

City of Ray EB & WB



Existing and Removal Layout



Proposed Layout

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-002(172)053	20	2

SPEC	CODE	BID ITEM		UNIT	QUANTITY
202	114	REMOVAL OF CONCRETE PAVEMENT			
		Median and Sidewalk		SY	110
202	0132	REMOVAL OF BITUMINOUS SURFACING			
		North Roadway		SY	21
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT			
		North Roadway		TON	2
570	0240	DOWELED CONTRACTION JOINT ASSEMBLY			
		North Roadway		LF	24
		South Roadway		LF	72
			Total	LF	96
570	0706	13 1/2" CONCRETE PAVEMENT REPAIR-FULL DEPTH-DOWELED			
		North Roadway		SY	117
		South Roadway		SY	177
			Total	SY	294
748	0140	CURB & GUTTER-TYPE 1			
		North Roadway		LF	9.5
		South Roadway Median		LF	24.1
			Total	LF	33.6
750	100	SIDEWALK CONCRETE			
		Median and Sidewalk		SY	110
550	1013	3 IN EXPANSION JOINT			
		North Roadway		LF	29
		South Roadway		LF	28
			Total	LF	57
550	1031	CONCRETE SLEEPER SLAB			
		North Roadway (6' x 25')		SY	16.6
		South Roadway (6' x 24')		SY	16
			Total	SY	32.6
930	9586	PRESSURE RELIEF JOINT			
		North Roadway (Curb & Gutter)		LF	2
		Median (Curb & Gutter, Median Barrier & Pvmt)		LF	18.9
		South Roadway (Outside Curb & Gutter)		LF	2
			Total		22.9

BRIAN J. ROSIN
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ENGINEER
NORTH DAKOTA

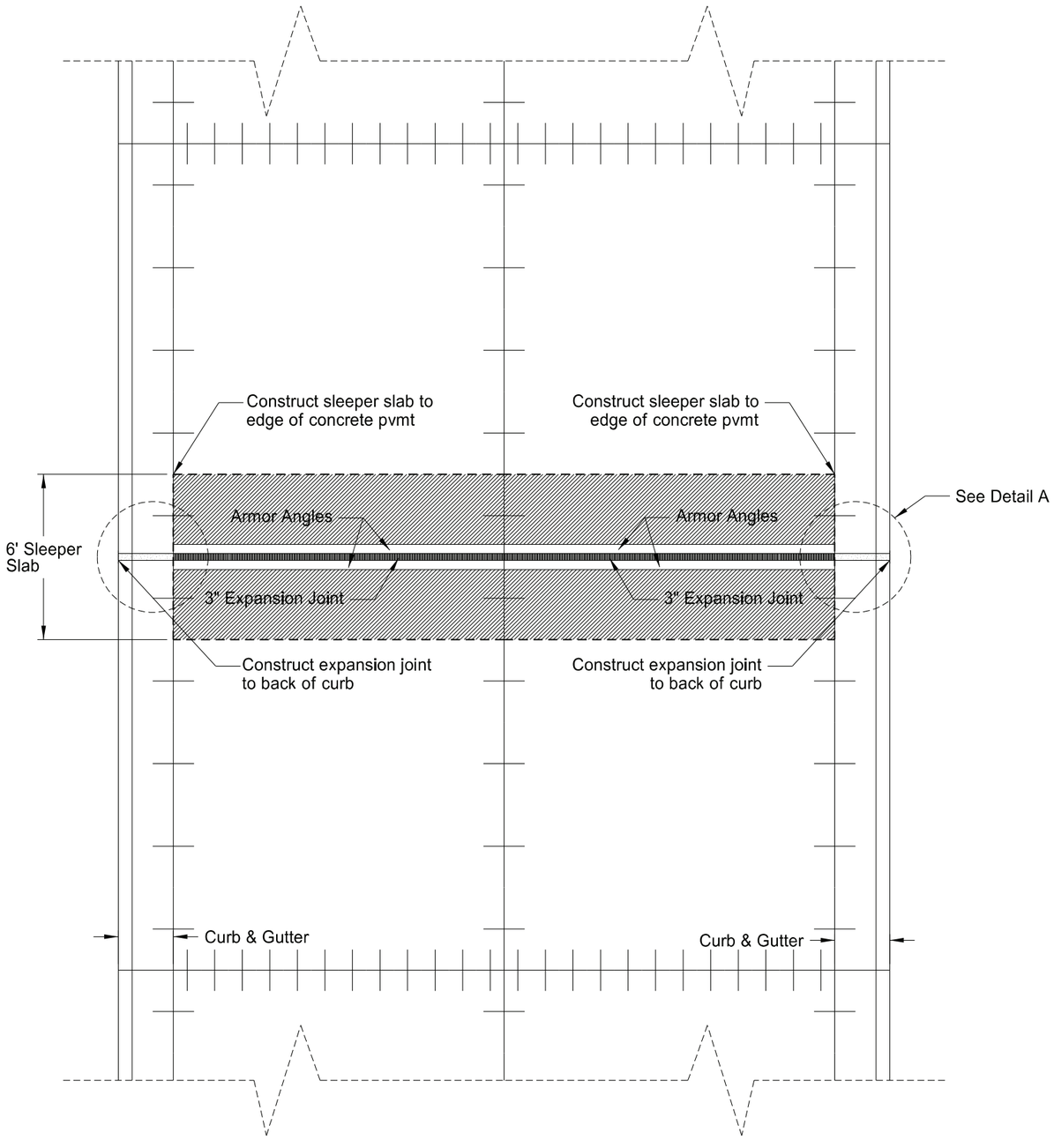
12/04/25

Pavement and Expansion Joint Detail
East End of Structures

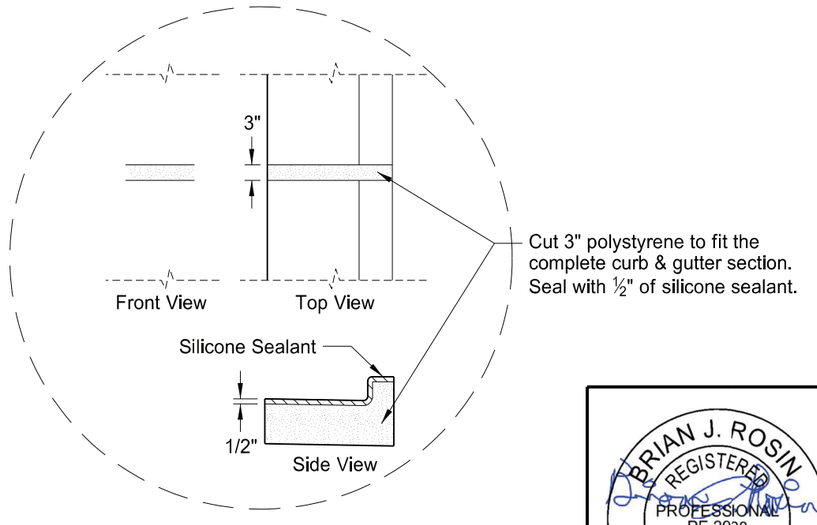
Structure Repair

City of Ray EB & WB

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-002(172)053	20	3



Top View
WB Roadway w/Curb & Gutter and Raised Median
(Section Reversed for EB Roadway)



Detail A

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ENGINEER
NORTH DAKOTA

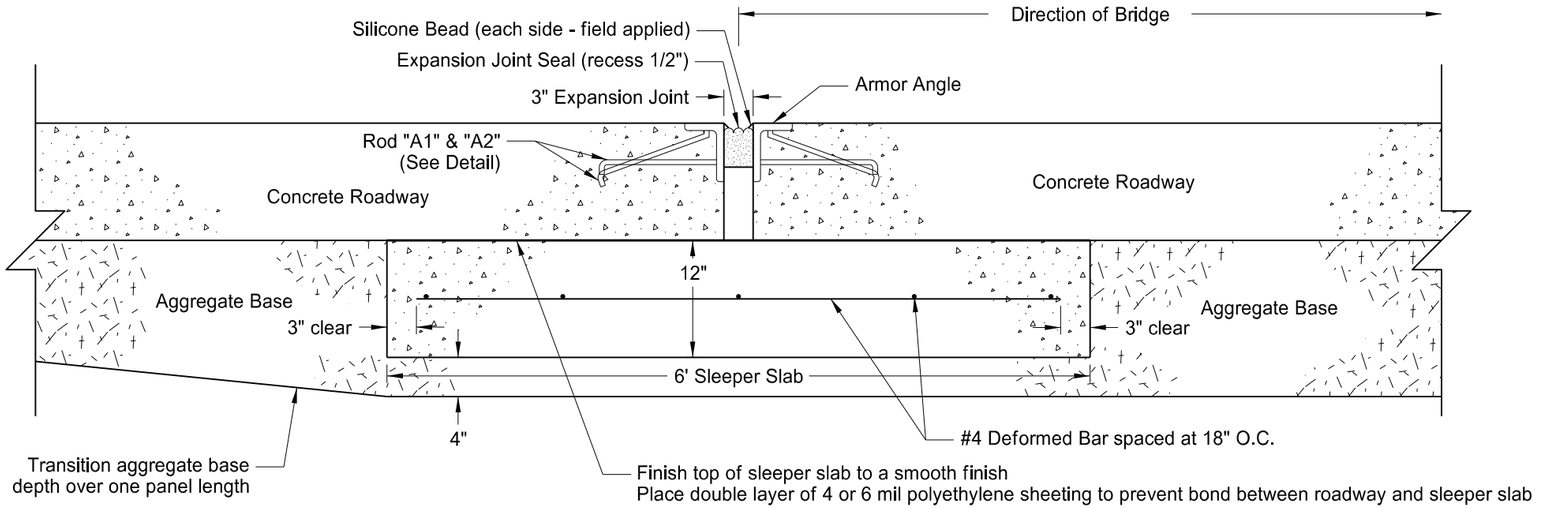
12/04/25

Expansion Joint Detail

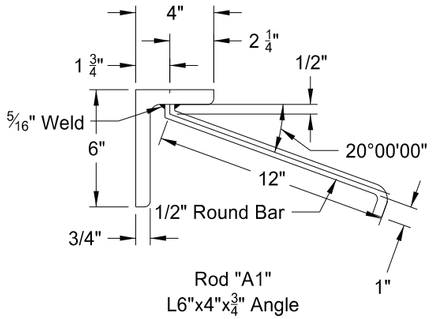
Structure Repair

City of Ray EB & WB

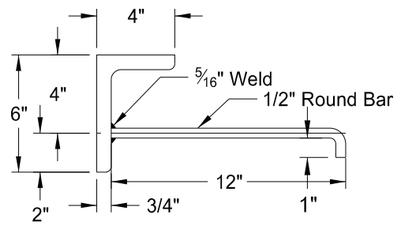
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-002(172)053	20	4



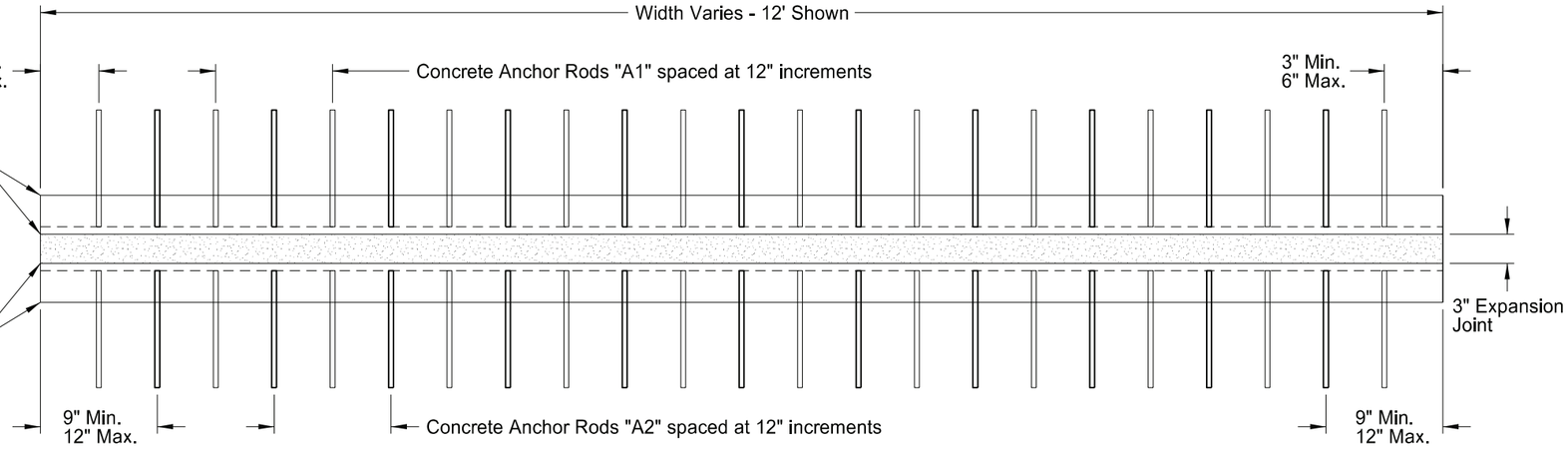
Profile View



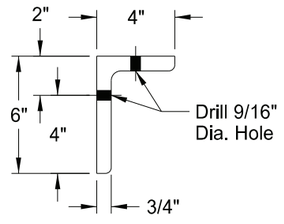
Rod "A1"
L6"x4"x3/4" Angle



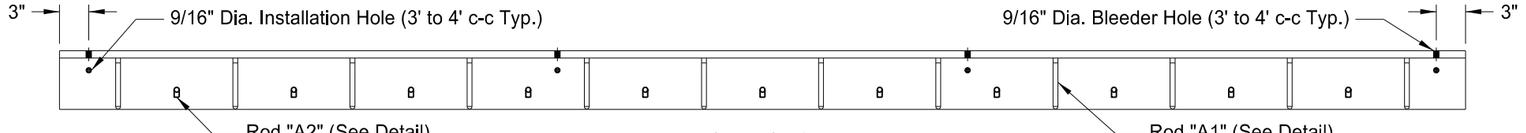
Rod "A2"
L6"x4"x3/4" Angle



Armor Angle
Top View



9/16" Drilled Holes
L6"x4"x3/4" Angle



Armor Angle
Side View

BRIAN J. ROSIN
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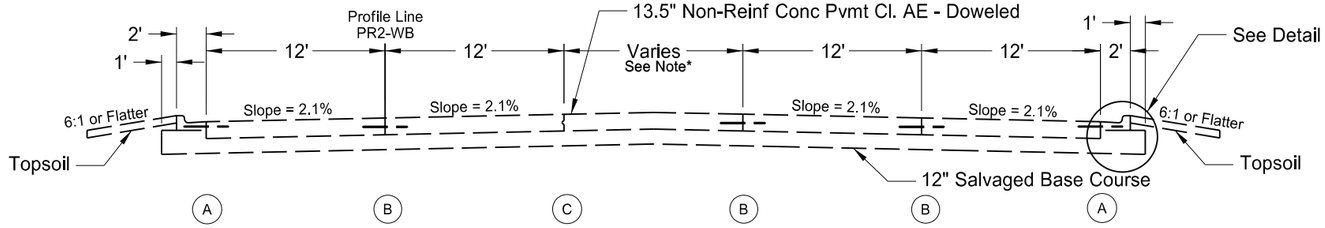
12/04/25

Expansion Joint Detail

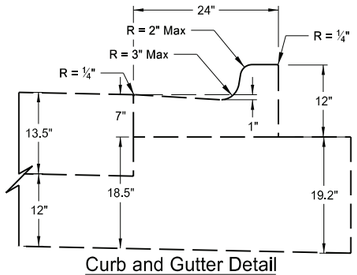
Structure Repair

City of Ray EB & WB

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-002(172)053	30	1

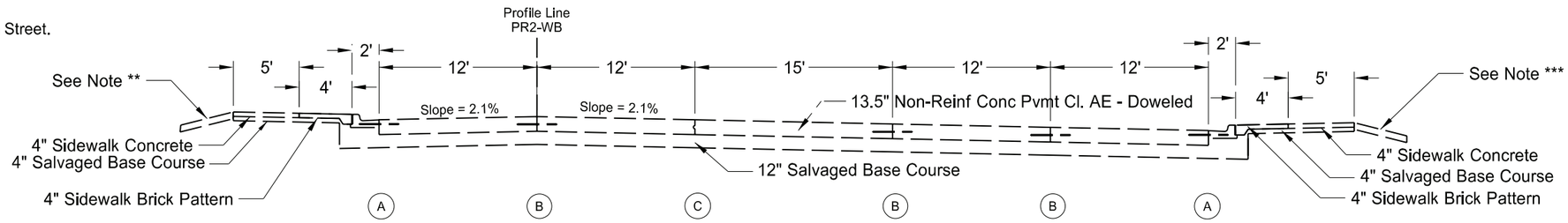


Proposed Typical Section
Sta 2804+95.00 to Sta 2809+86.74

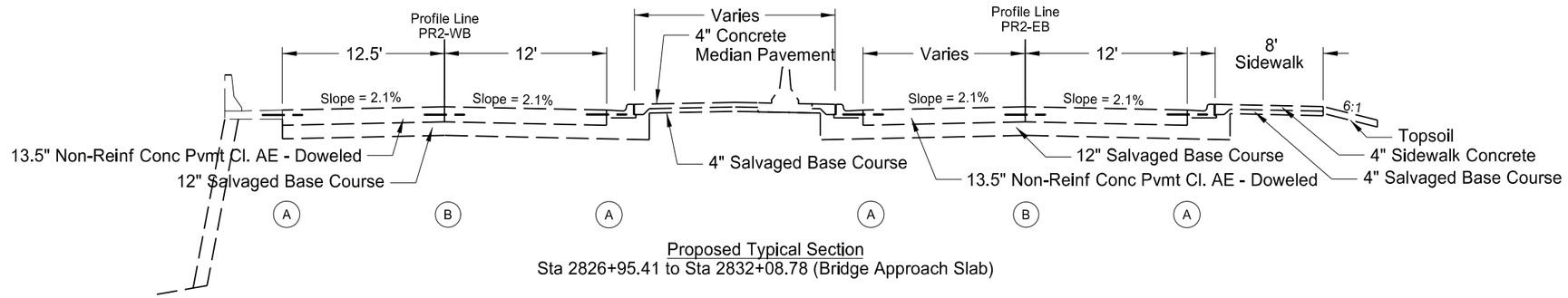


Curb and Gutter Detail

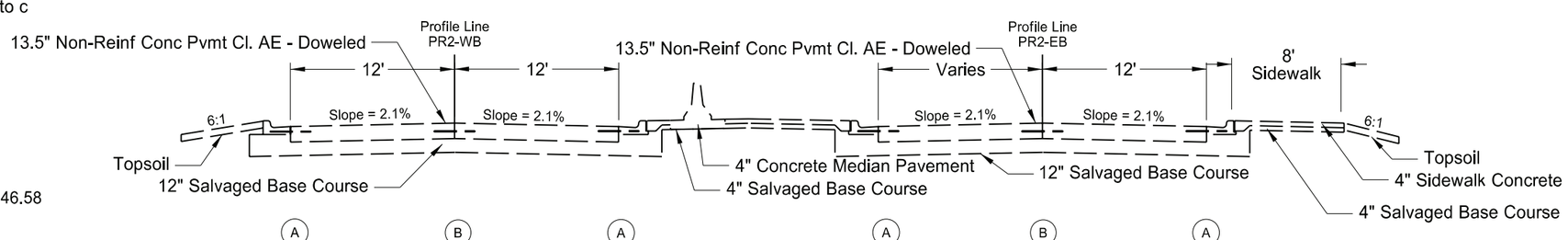
NOTE: North sidewalk ends at NE Church Street.



Proposed Typical Section
Sta 2809+86.74 to Sta 2826+95.41



Proposed Typical Section
Sta 2826+95.41 to Sta 2832+08.78 (Bridge Approach Slab)



Proposed Typical Section
2835+74.39 (Bridge Approach Slab) to 2842+87.12

(A) No. 3 x 18" Tie Bars @ 4' c to c

(B) Tied Joint (Sawed)

(C) Keyed Joint (Non-tied)

Note*

Lane width transitions from 12' at Sta 2808+79.17 to 15' at Sta 2809+46.58

Note**

Co. Rd. 17 to Lake Street - Varied Slope; 4" PCC over 4" Salvaged Base Course
Lake Street to West Street - Varied Slope; 6" Topsoil
West Street to Score Street - Varied Slope; 6" Aggregate

Note***

Co. Rd. 17 to Lake Street - 4:1 Slope; 6" Salvaged Base Course
Lake Street to Winther Street - 6:1 Slope; 6" Salvaged Base Course
Winther Street to Church Street - Varied Slope; 6" Salvaged Base Course
Church Street to West Street - Varied Slope; 6" Topsoil
West Street to Score Street - Varied Slope; 4" HBP over 4" Salvaged Base Course

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NORTH DAKOTA

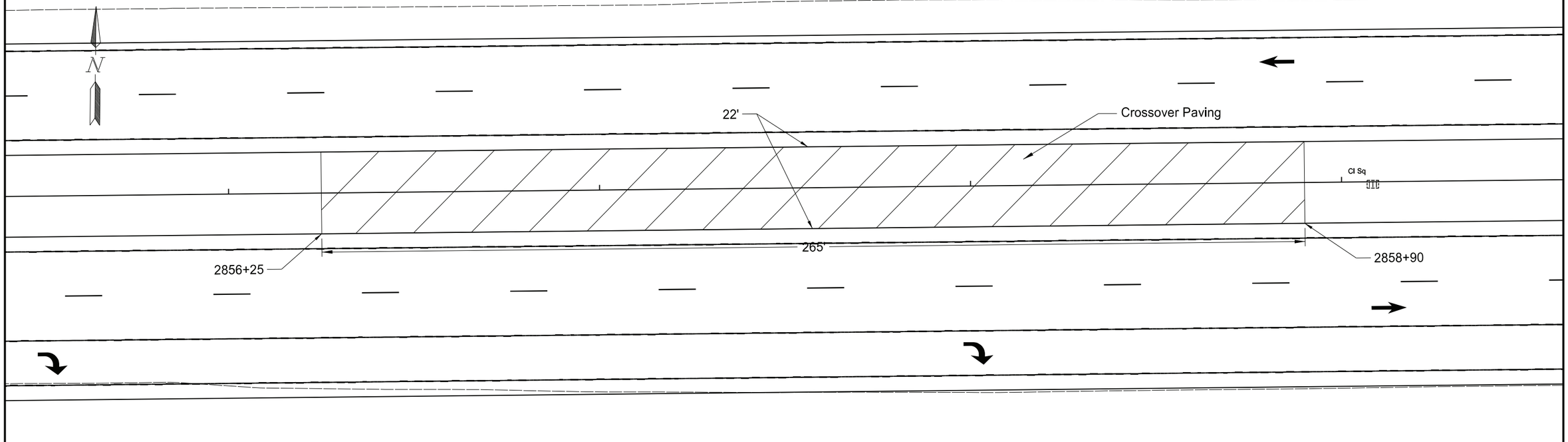
12/04/25

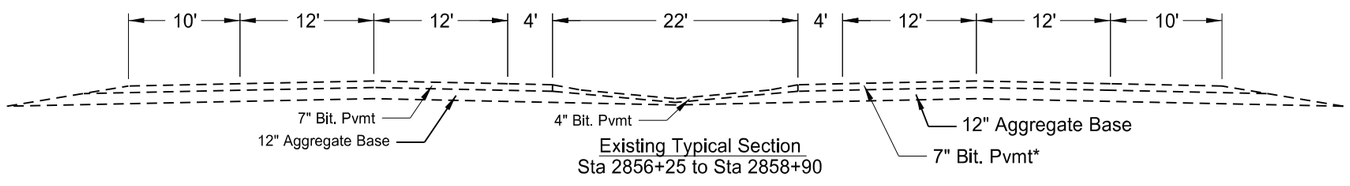
Existing Typical Sections

Structure Repair

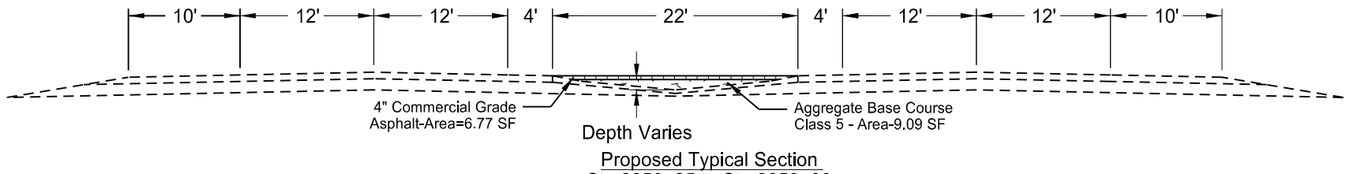
City of Ray, EB & WB

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-002(172)053	30	2





Existing Typical Section
Sta 2856+25 to Sta 2858+90



Proposed Typical Section
Sta 2856+25 to Sta 2858+90

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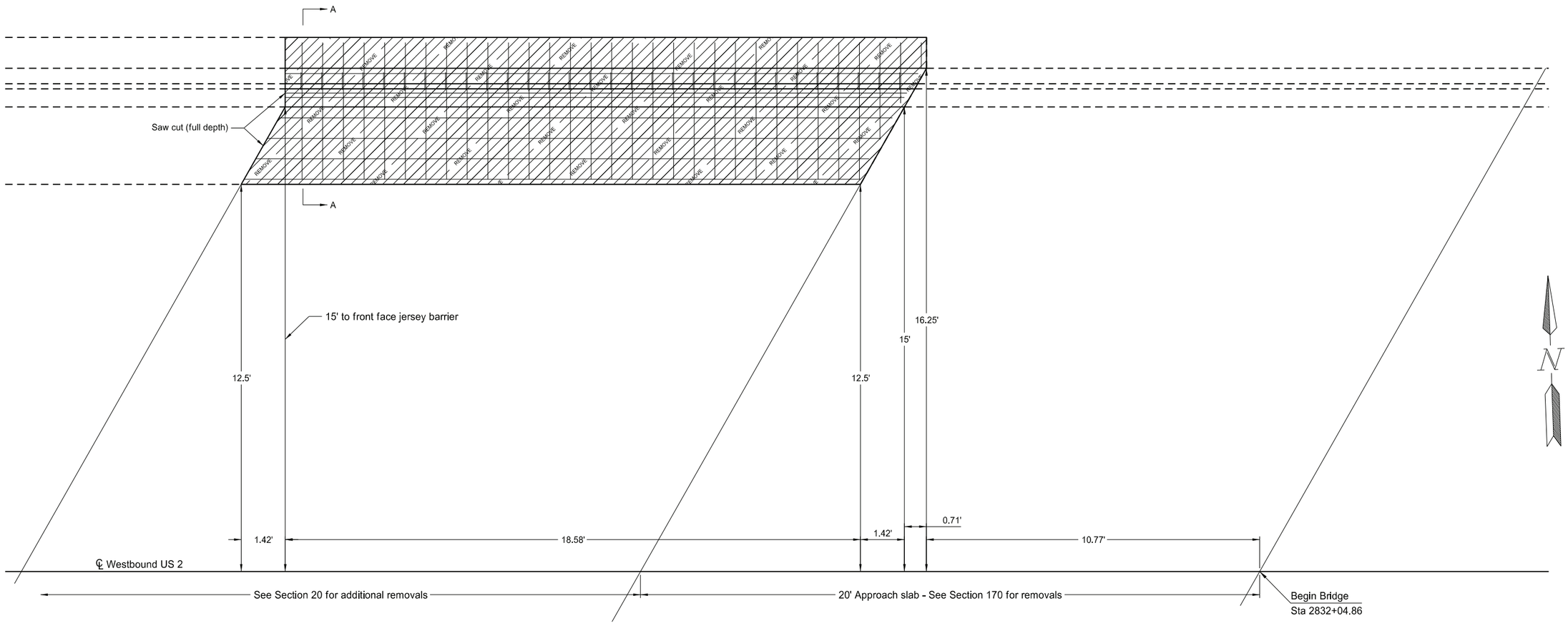
NORTH DAKOTA

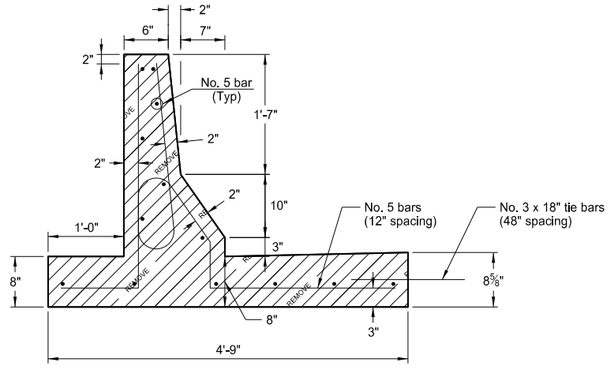
12/04/25

Crossover Typical Sections

Approach Slab Repair/Spall Repair/Joint Repair
City of Ray - US Hwy 2

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-002(172)053	40	1





Removal Section A-A

SPEC	CODE	BID ITEM	QTY	UNIT
202	0113	REMOVAL OF CONCRETE		
		Sta 2831+71.96 to 2831+94.09 Lt	4.0	CY

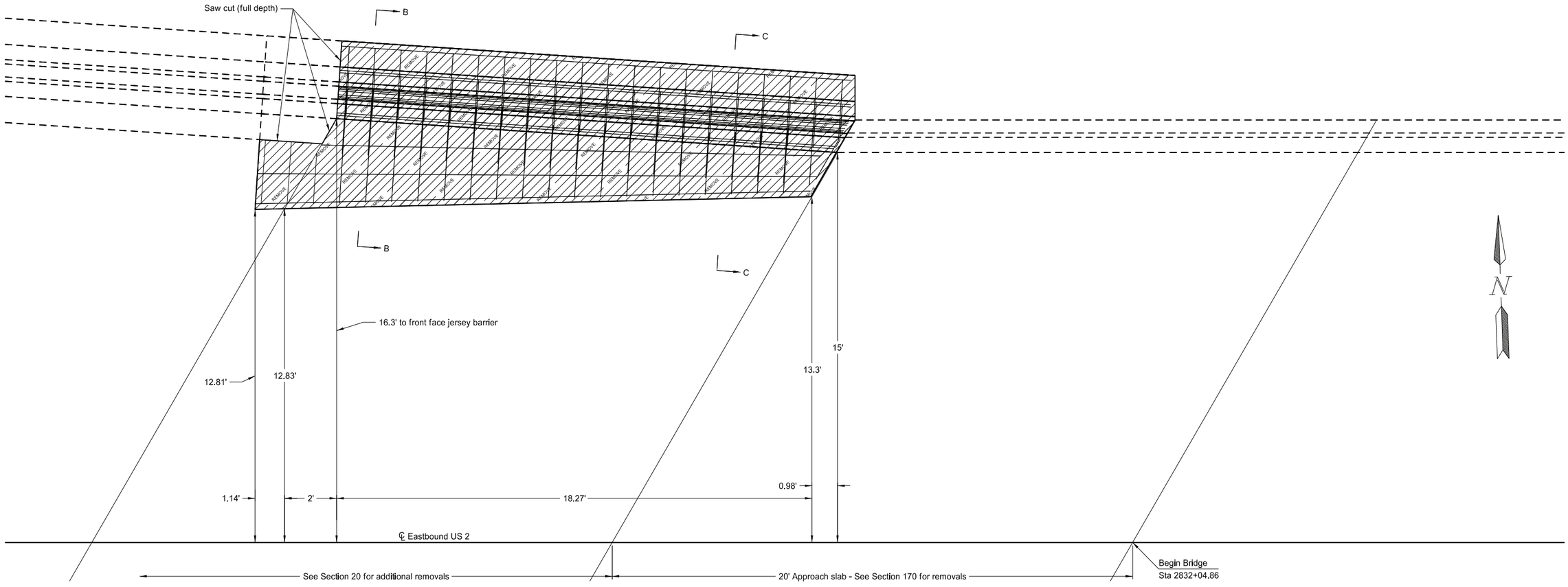
Removal of Jersey Barrier
At West End of Bridge

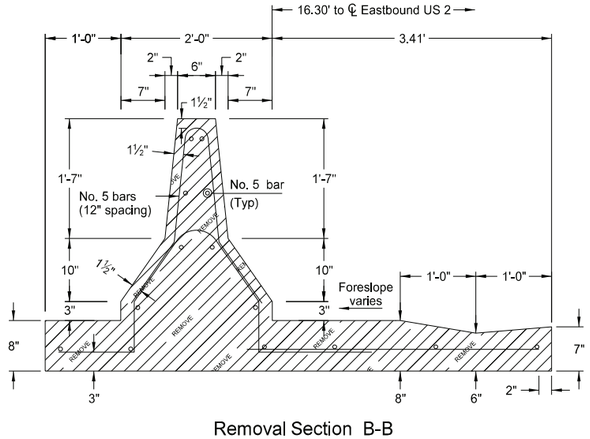
Burlington Northern RR Overhead
RP 53.731

US 2

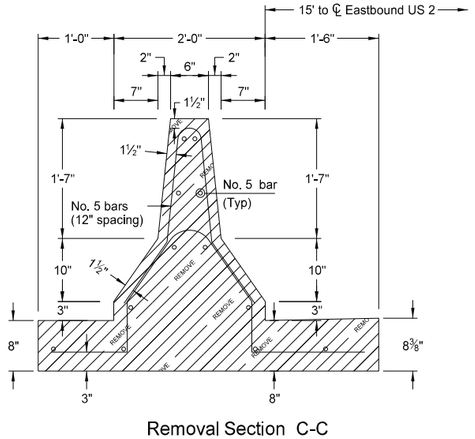
REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 12/03/25
NORTH DAKOTA

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-002(172)053	40	2





Removal Section B-B



Removal Section C-C

SPEC	CODE	BID ITEM	QTY	UNIT
202	0113	REMOVAL OF CONCRETE		
		Sta 2831+71.13 to 2831+94.19 Lt	4.7	CY

Removal of Jersey Median Barrier
At West End of Bridge

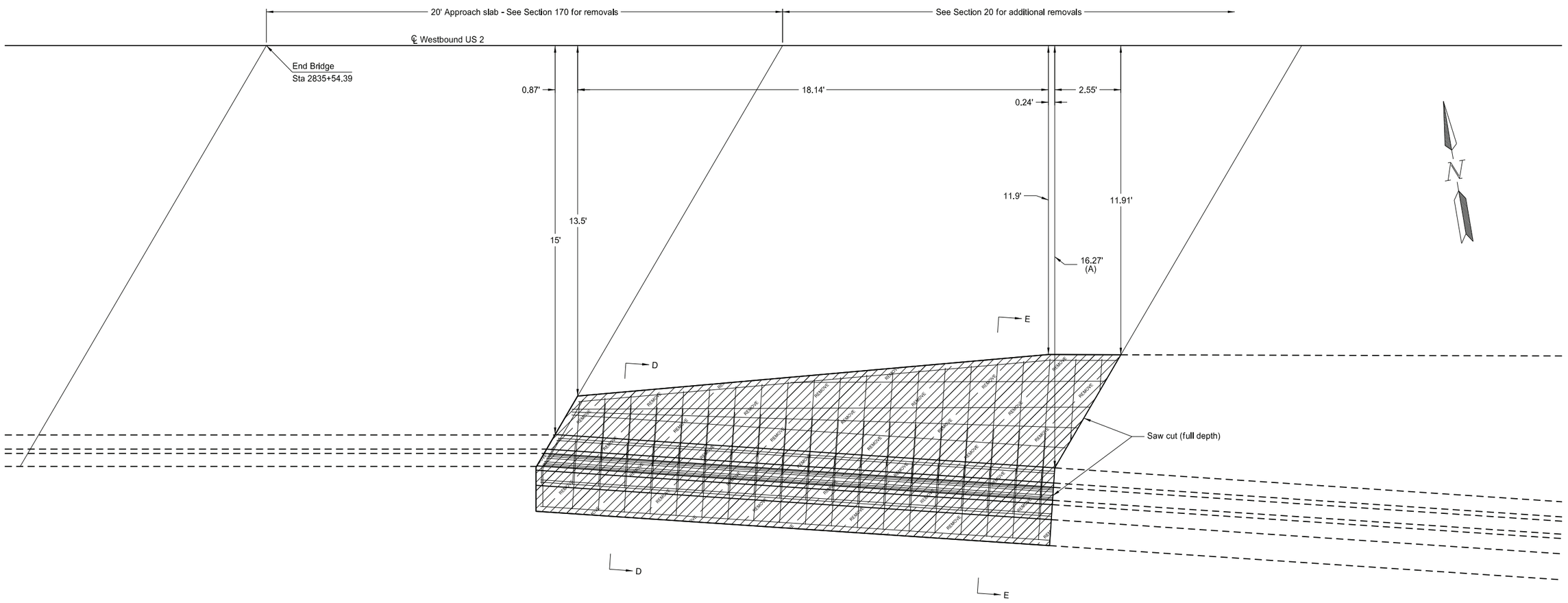
Burlington Northern RR Overhead
RP 53.731

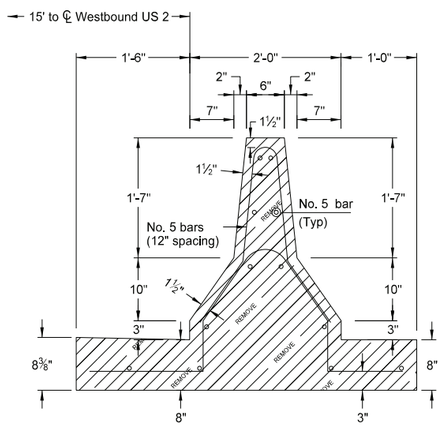
US 2

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE
12/03/25
NORTH DAKOTA

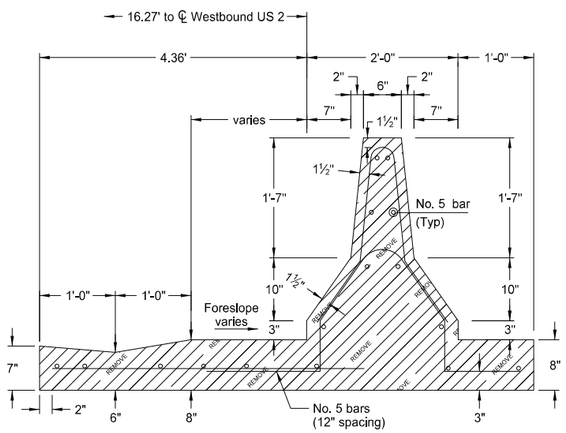
Docusign Envelope ID: 0C56BA17-E8F4-41EA-9EAF-8A2C61AA6819

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-002(172)053	40	3





Removal Section D-D



Removal Section E-E

(A) Offset to front face jersey barrier

SPEC	CODE	BID ITEM	QTY	UNIT
202	0113	REMOVAL OF CONCRETE		
		Sta 2835+65.51 to 2835+87.31 Rt	5.0	CY

Removal of Jersey Median Barrier
At East End of Bridge

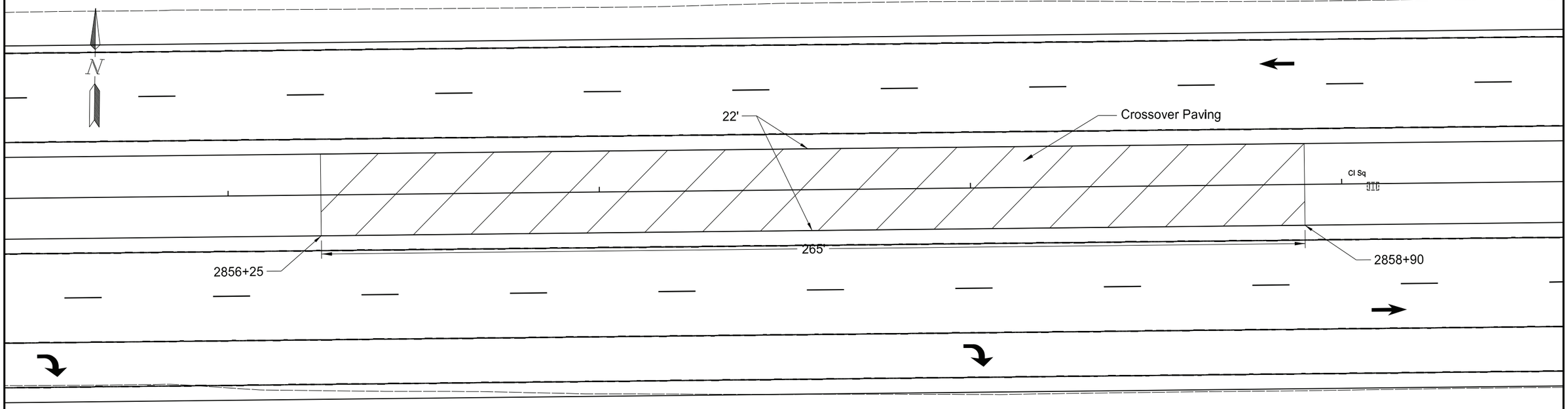
Burlington Northern RR Overhead
RP 53.731

US 2

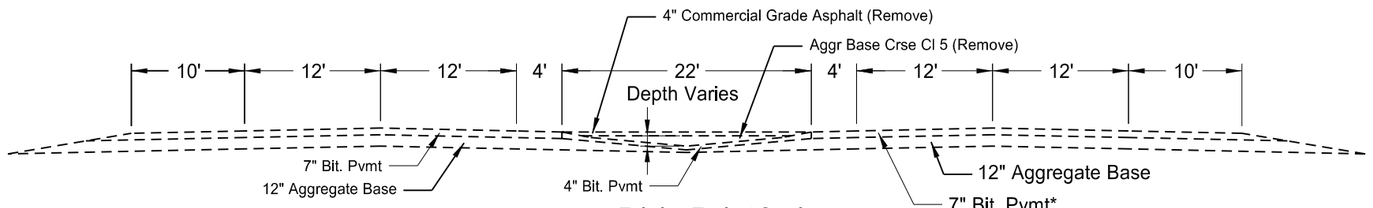
REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE
12/03/25
NORTH DAKOTA

12/3/2025 1:22:44 PM kaltepeter R:\project\70002053.172\traffic\040RM_002_Dbarrier_Mdn.dgn

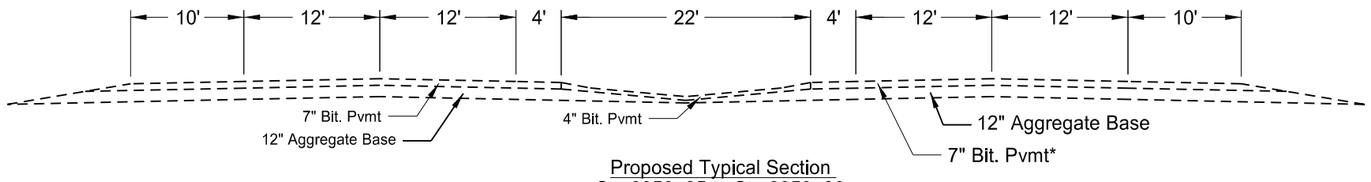
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-002(172)053	40	4



SPEC	CODE	BID ITEM	UNIT	QUANTITY
202	0350	REMOVAL OF TEMPORARY BYPASS	EA	1



Existing Typical Section
Sta 2856+25 to Sta 2858+90



Proposed Typical Section
Sta 2856+25 to Sta 2858+90

BRIAN J. ROSIN
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PROFESSIONAL
PE 2928
ENGINEER
NORTH DAKOTA

12/04/25

Crossover Removal
Phase 4

Approach Slab Repair/Spall Repair/Joint Repair
City of Ray - US Hwy 2

PRELIMINARY SURVEY COORDINATE AND CURVE DATA - City of Ray EB - WB

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	81	1

HORIZONTAL ALIGNMENT

PNT	STATION	NORTHING	EASTING
Hwy 2 (Chain: EX_HWY2)			
Begin	2809+06.19	500,996.38	1,318,487.63
PC	2832+39.02	500,912.06	1,320,818.94
PI C501	2833+35.00	500,908.59	1,320,914.85
PT	2834+30.70	500,892.45	1,321,009.46
PC	2840+51.49	500,788.08	1,321,621.42
PI C502	2841+54.75	500,770.72	1,321,723.21
PT	2842+57.45	500,771.83	1,321,826.46
PC	2862+47.79	500,793.22	1,323,816.69
PI C503	2866+00.54	500,797.01	1,324,169.42
PT	2869+53.06	500,822.49	1,324,521.24
End	2873+96.79	500,854.54	1,324,963.80

CURVE DATA

ARC DEFINITION

C501

PI STA = 2833+35.00
Delta = 7° 36' 27" RT
D_a = 3° 58' 09"
R = 1,443.57'
T = 95.98'
L = 191.67'

C502

PI STA = 2841+54.75
Delta = 10° 17' 41" LT
D_a = 4° 59' 54"
R = 1,146.28'
T = 103.26'
L = 205.96'

C503

PI STA = 2866+00.54
Delta = 3° 31' 35" LT
D_a = 0° 30' 00"
R = 11,459.16'
T = 352.74'
L = 705.27'

US PUBLIC LAND SURVEY DATA

CORNER	IRN	NORTHING	EASTING

SURVEY CONTROL POINTS

PNT	NORTHING	EASTING	ELEV	STATION	OFFSET
MONUMENT DESCRIPTION					
PRIMARY CONTROL					
RTK 50000	501,239.84	1,313,243.46	2,313.41	N/A	N/A
1.5" Alum cap					
RTK 50001	500,722.70	1,325,081.06	2,272.39	N/A	N/A
#4 Rebar					

REFERENCE MARKERS

R Mkr #	NORTHING	EASTING	STATION	OFFSET	ALIGNMENT
RM54	500,834.43	1,322,259.35	N/A	58' Lt	EX_HWY2
RM54	500,718.38	1,322,263.02	N/A	58' Rt	EX_HWY2
RM55	500,703.48	1,327,618.58	N/A	N/A	EX_HWY2
RM55	500,855.36	1,327,620.45	N/A	N/A	EX_HWY2

NOTES: Alignment per NDDOT Proj# 7-002(119)053

Date Survey Completed 06/02/2021

☐ Assumed Coordinates

☒ All coordinates on this sheet are Williams County ground coordinates. They are derived from the NAD83(2011) reference frame; North Dakota North Zone Combination Factor (cf) = 0.9998445

All coordinates and measurements on this document derived from the International Foot definition.

INITIALIZING BENCH MARK
NDGPS Stations (OPUS)

☒ NAVD-88
☐ _____

☐ GEOID12B ☐ _____
☒ GEOID18

REGISTERED PROFESSIONAL LAND SURVEYOR
Kristofer Johnson
LS-10169
DATE 11/04/25
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED BY PHASE NO. 1	2	3	4	5	TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE							35	
G20-1-60	60"x24"	ROAD WORK NEXT __ MILES							28	
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)							18	
G20-2-48	**48"x24"**	**END ROAD WORK**	**2**	**2**	**2**	**2**	**1**	**2**	**26**	**52**
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)							18	
G20-4b-36	36"x30"	WAIT FOR PILOT CAR							18	
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS							43	
G20-52a-72	72"x24"	ROAD WORK NEXT __ MILES RT or LT ARROW							36	
G20-55-96	**96"x48"**	**SPEED LIMIT ENFORCED - MINIMUM FEE $150 WHEN WORKERS PRESENT**	**2**	**2**	**2**	**2**	**1**	**2**	**59**	**118**
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)							11	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)							10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)							10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)							7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)							7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)							7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)							7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)							7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT							15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)							7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)							7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)							9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)							7	
M6-1-21	**21"x15"**	**DIRECTIONAL ARROW RT or LT (Mounted on route marker post)**	**1**	**1**	**1**	**1**		**1**	**7**	**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**	**6**	**2**	**2**	**2**	**1**	**6**	**32**	**192**
R1-2-60	**60"x60"**	**YIELD**		**2**	**2**			**2**	**29**	**58**
R2-1-36	36"x48"	SPEED LIMIT __ (Portable only)							30	
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**8**	**4**	**4**	**4**	**2**	**8**	**39**	**312**
R2-1aP-24	**24"x18"**	**MINIMUM FEE $150 (Mounted on Speed Limit post)**	**6**	**3**	**3**	**4**	**2**	**6**	**10**	**60**
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)**		**3**	**3**			**3**	**12**	**36**
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)							12	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)							15	
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)							15	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC (Mounted on barricade)							15	
W1-3-48	48"x48"	REVERSE TURN RIGHT or LEFT							35	
W1-4-48	**48"x48"**	**REVERSE CURVE RIGHT or LEFT**		**2**	**2**			**2**	**35**	**70**
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT							35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW							26	
W3-1-48	48"x48"	STOP AHEAD							35	
W3-3-48	48"x48"	SIGNAL AHEAD							35	
W3-4-48	48"x48"	BE PREPARED TO STOP							35	
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**4**			**2**	**1**	**4**	**35**	**140**
W4-2-48	**48"x48"**	**LANE ENDS RIGHT or LEFT**	**2**	**2**	**2**	**2**	**1**	**2**	**35**	**70**
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**		**2**	**2**			**2**	**35**	**70**
W8-1-48	48"x48"	BUMP							35	
W8-3-48	48"x48"	PAVEMENT ENDS							35	
W8-7-48	48"x48"	LOOSE GRAVEL							35	
W8-11-48	48"x48"	UNEVEN LANES							35	
W8-12-48	48"x48"	NO CENTER LINE							35	
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL							35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY							35	
W8-54-48	**48"x48"**	**TRUCKS ENTERING AHEAD or __ FT or _ MILE**	**2**					**2**	**35**	**70**
W8-55-48	**48"x48"**	**TRUCKS CROSSING AHEAD or __ FT or _ MILE**	**2**					**2**	**35**	**70**
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY							35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL							35	
W13-1P-30	30"x30"	__ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)							14	
W14-3-64	64"x48"	NO PASSING ZONE							28	
W16-2P-30	**30"x24"**	**__ FEET PLAQUE (Mounted on warning sign post)**	**2**					**2**	**10**	**20**
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**2**	**6**	**6**	**2**	**1**	**6**	**35**	**210**
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**	**2**	**2**	**2**	**2**	**1**	**2**	**35**	**70**
W20-7-48	**48"x48"**	**FLAGGER**	**4**			**2**	**1**	**4**	**35**	**140**
W20-8-18	**18"x18"**	**STOP - SLOW PADDLE Back to Back**	**2**			**2**	**1**	**2**	**5**	**10**
W20-52P-54	**54"x12"**	**NEXT __ MILES (Mounted on warning sign post)**		**2**	**2**			**2**	**12**	**24**
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**	**4**					**4**	**35**	**140**
W21-5-48	48"x48"	SHOULDER WORK							35	
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED							35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED BY PHASE NO. 1	2	3	4	5	TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT or _ MILE							35	
W21-6-48	48"x48"	SURVEY CREW							35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT							35	
W21-51-48	48"x48"	MATERIAL ON ROADWAY							35	
W21-52-48	48"x48"	PAVEMENT BREAKS							35	
W21-53-48	**48"x48"**	**RUMBLE STRIPS AHEAD**	**2**			**2**	**1**	**2**	**35**	**70**
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK							35	
W24-1-48	48"x48"	DOUBLE REVERSE CURVE							35	

SPECIAL SIGNS

SPEC & CODE

704-1000	TRAFFIC CONTROL SIGNS	TOTAL UNITS	2009

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY BY PHASE NO. 1	2	3	4	5	TOTAL QUANTITY
704-0100	**FLAGGING**	MHR	**50**	**25**	**25**	**50**	**50**	**200**
704-1048	**PORTABLE RUMBLE STRIPS**	EACH	**2**			**2**	**1**	**2**
704-1050	TYPE I BARRICADES	EACH						
704-1052	**TYPE III BARRICADES**	EACH	**14**	**9**	**6**	**14**	**7**	**14**
704-1060	**DELINEATOR DRUMS**	EACH	**6**	**94**	**98**	**6**	**14**	**98**
704-1065	TRAFFIC CONES	EACH						
704-1067	**TUBULAR MARKERS**	EACH	**112**			**112**	**56**	**112**
704-1070	DELINEATOR	EACH						
704-1072	**FLEXIBLE DELINEATORS**	EACH		**138**	**144**			**144**
704-1080	STACKABLE VERTICAL PANELS	EACH						
704-1081	VERTICAL PANELS - BACK TO BACK	EACH						
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH						
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH						
704-1087	**SEQUENCING ARROW PANEL - TYPE C**	EACH	**2**			**2**	**1**	**2**
704-1088	**SEQUENCING ARROW PANEL - TYPE C - CROSSOVER**	EACH		**2**	**2**			**2**
704-1500	**OBLITERATION OF PVMT MK**	SF		**2750**	**2873**			**5623**
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF						
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH						
762-0200	RAISED PAVEMENT MARKERS	EACH						
762-0420	SHORT TERM 4IN LINE - TYPE R	LF						
762-0422	**SHORT TERM 6IN LINE - TYPE R**	LF		**8886**	**8060**			**16946**
762-0426	**SHORT TERM 24IN LINE- TYPE R**	LF		**70**	**90**			**160**
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF						

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

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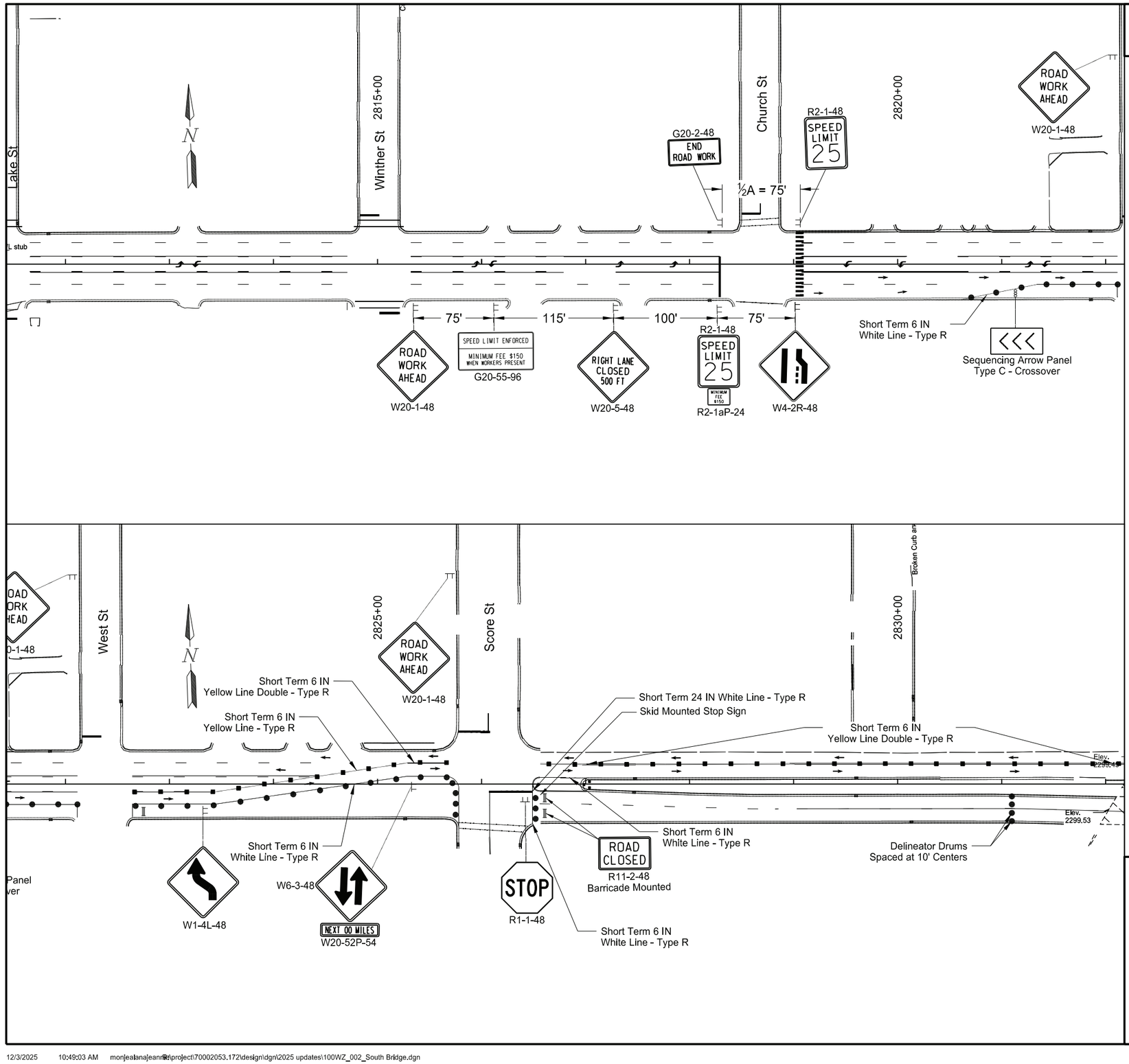
Traffic Control Devices List

Approach Slab, Spall, and Joint Repair
City of Ray - US Hwy 2

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	100	2



LEGEND

- Delineator Drums Spaced at 25' Centers (unless otherwise stated)
- Flexible Delineators Spaced at 25' Centers (unless otherwise stated)
- Type III Barricade
- Sign Hwy
- Work Area

Traffic Control Layout
Phase 2

Approach Slab Repair/Spall Repair/Joint Repair
City of Ray - US Hwy 2
South Bridge Closure

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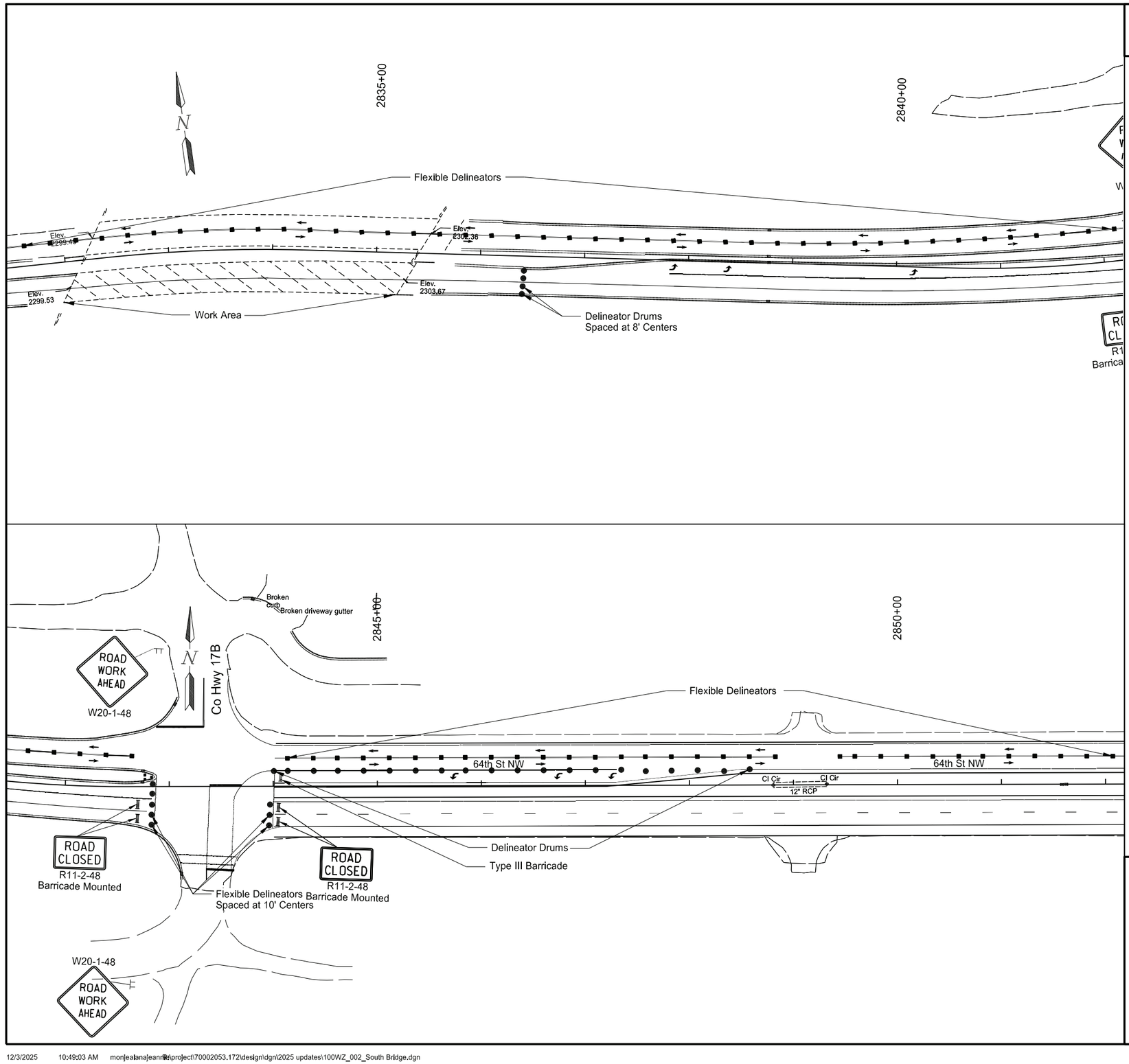
12/04/25

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-002(172)053	100	3



LEGEND

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- Flexible Delineators Spaced at 25' Centers (unless otherwise stated)
- Type III Barricade
- Sign Hwy
- Work Area

Traffic Control Layout
Phase 2

Approach Slab Repair/Spall Repair/Joint Repair
City of Ray - US Hwy 2
South Bridge Closure

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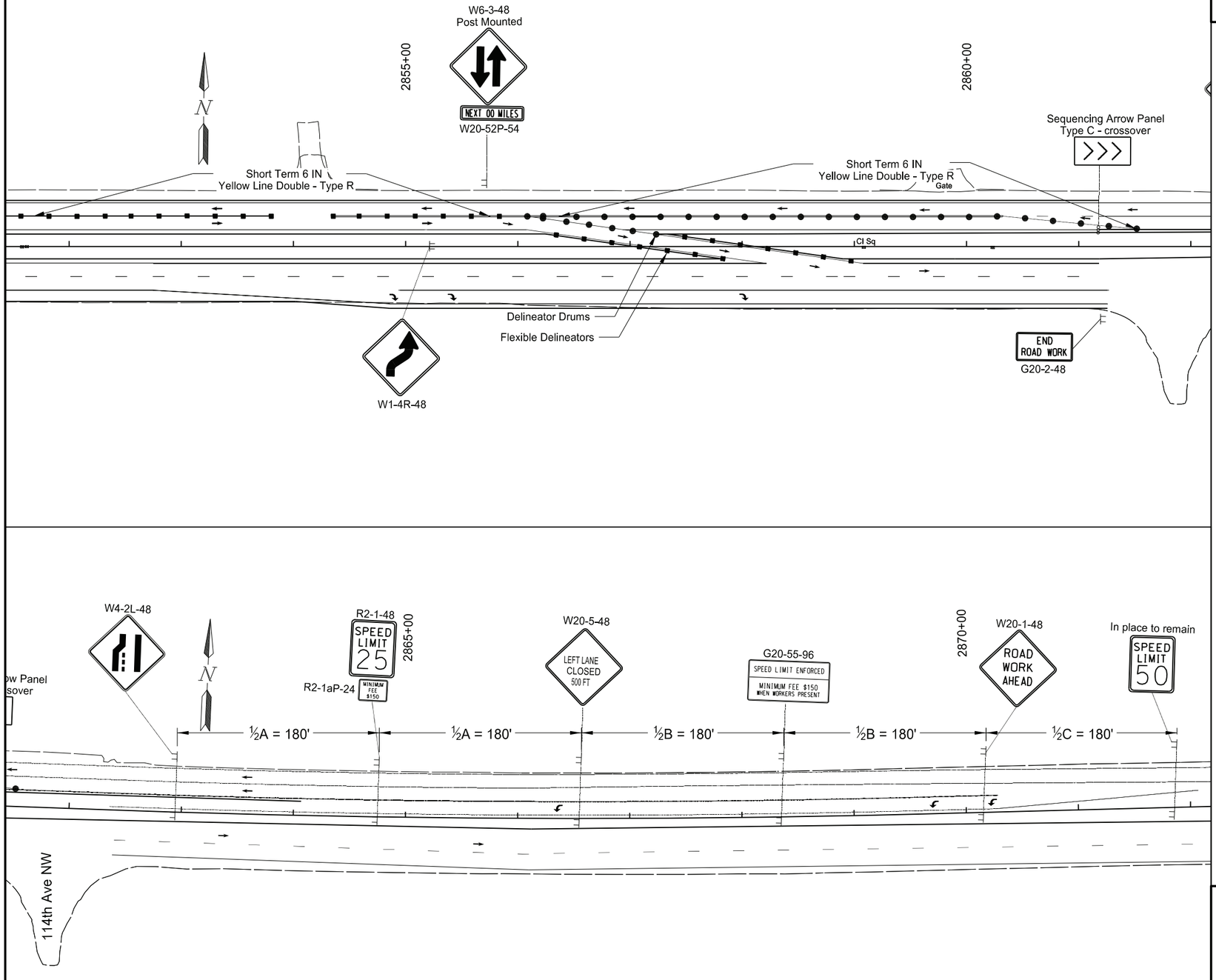
12/04/25

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	100	4



LEGEND

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- Flexible Delineators Spaced at 25' Centers (unless otherwise stated)
- Type III Barricade
- Sign Hwy
- Work Area

Traffic Control Layout
Phase 2

Approach Slab Repair/Spall Repair/Joint Repair
City of Ray - US Hwy 2
South Bridge Closure

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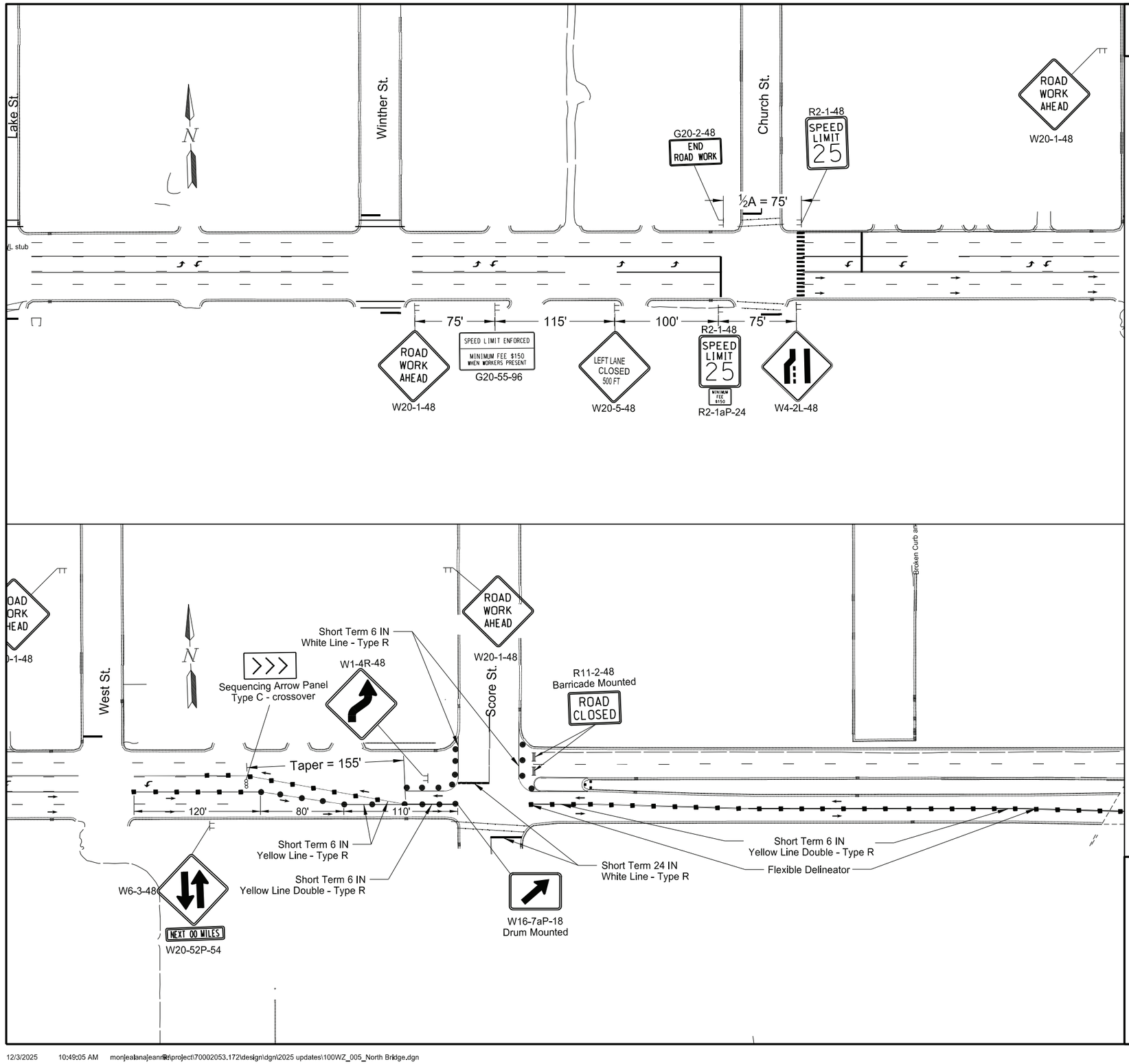
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	100	5



LEGEND

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- Flexible Delineators Spaced at 25' Centers (unless otherwise stated)
- Type III Barricade
- Sign Hwy
- Work Area

Traffic Control Layout
Phase 3

Approach Slab Repair/Spall Repair/Joint Repair
City of Ray - US Hwy 2
North Bridge Closure

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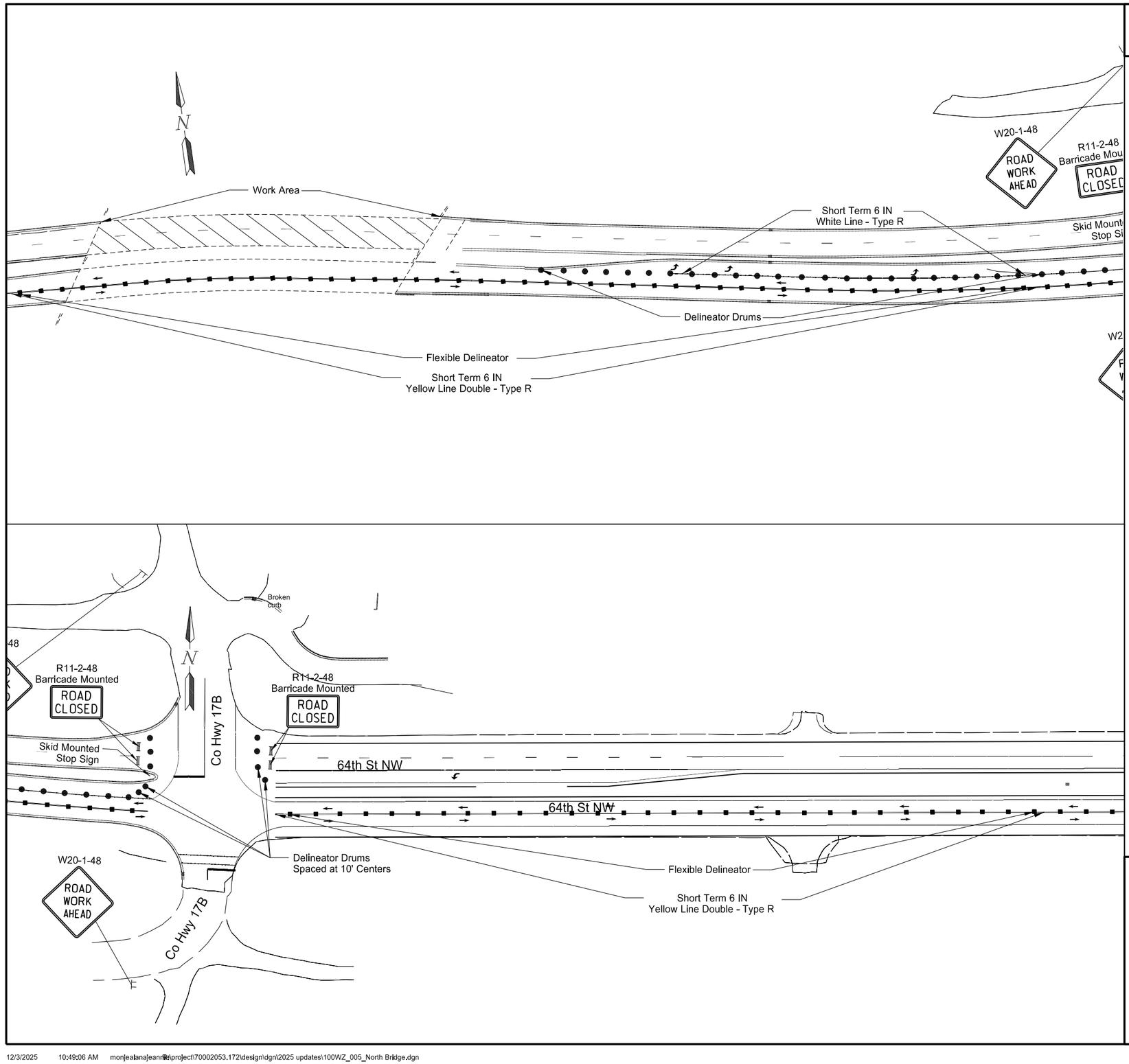
12/04/25

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	100	6



LEGEND

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- Flexible Delineators Spaced at 25' Centers (unless otherwise stated)
- Type III Barricade
- Sign Hwy
- Work Area

Traffic Control Layout
Phase 3

Approach Slab Repair/Spall Repair/Joint Repair
City of Ray - US Hwy 2
North Bridge Closure

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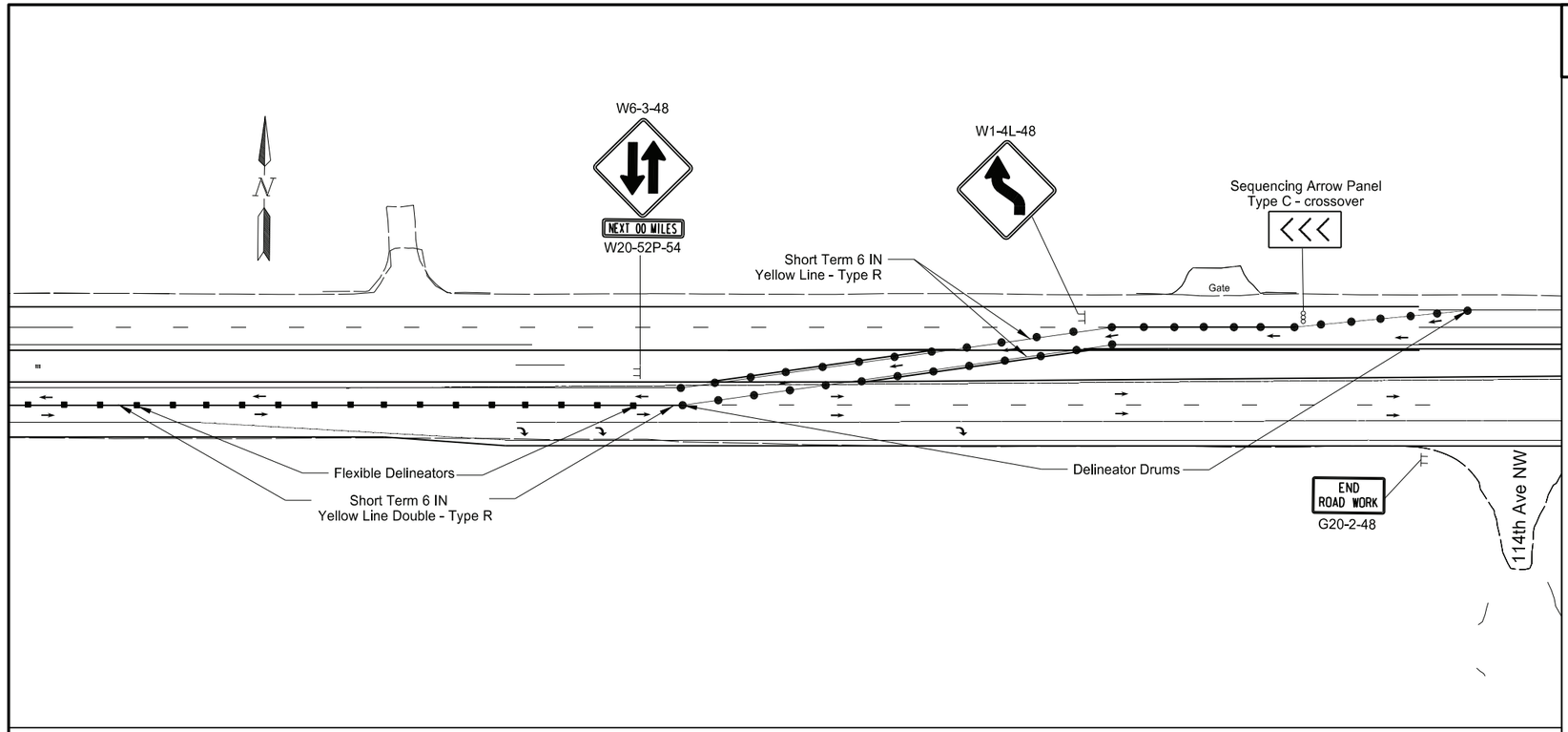
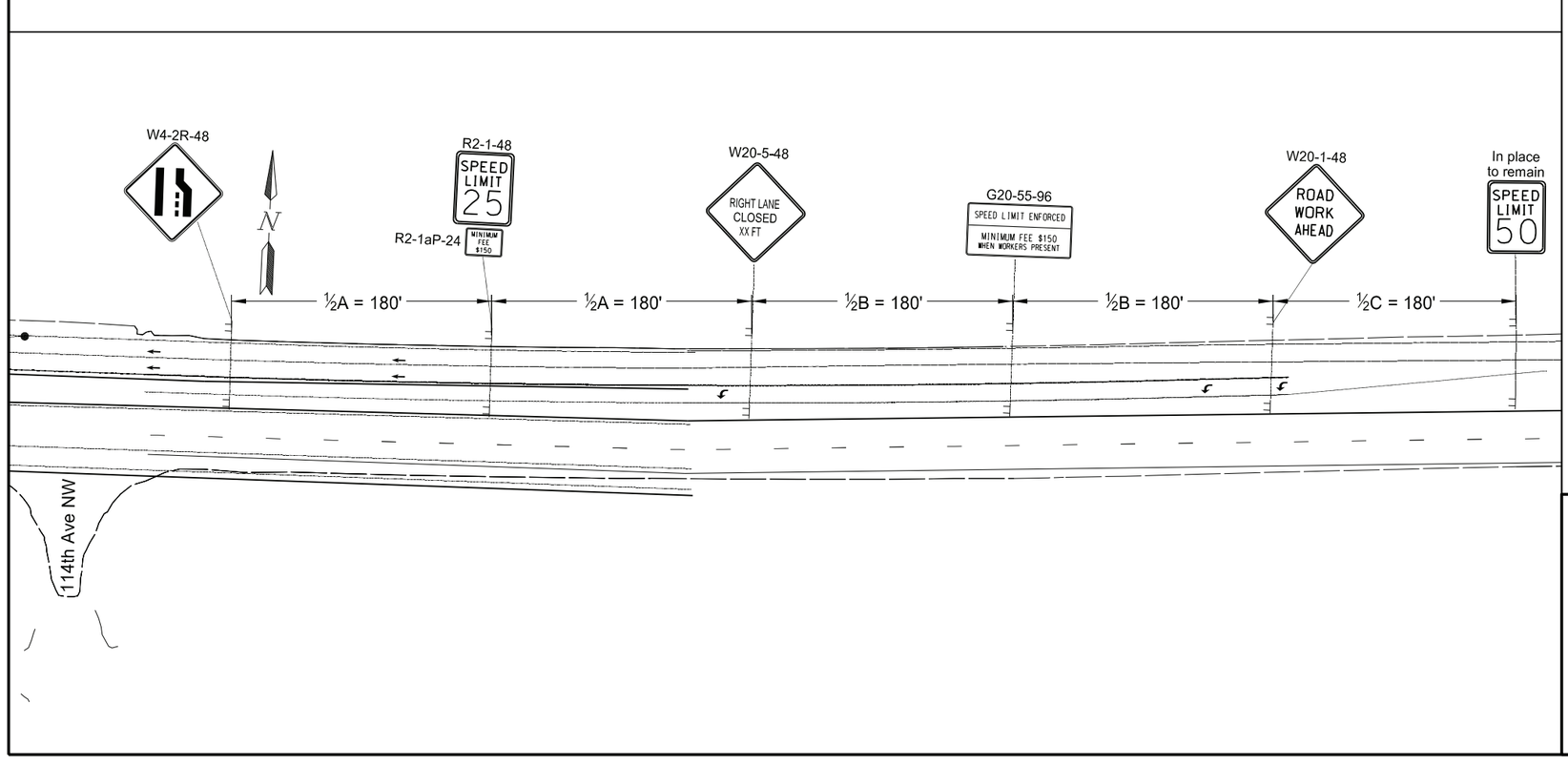
12/04/25

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-7-002(172)053	100	7





LEGEND

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- Flexible Delineators Spaced at 25' Centers (unless otherwise stated)
- Type III Barricade
- Sign Hwy
- Work Area

Traffic Control Layout
Phase 3

Approach Slab Repair/Spall Repair/Joint Repair
City of Ray - US Hwy 2
North Bridge Closure

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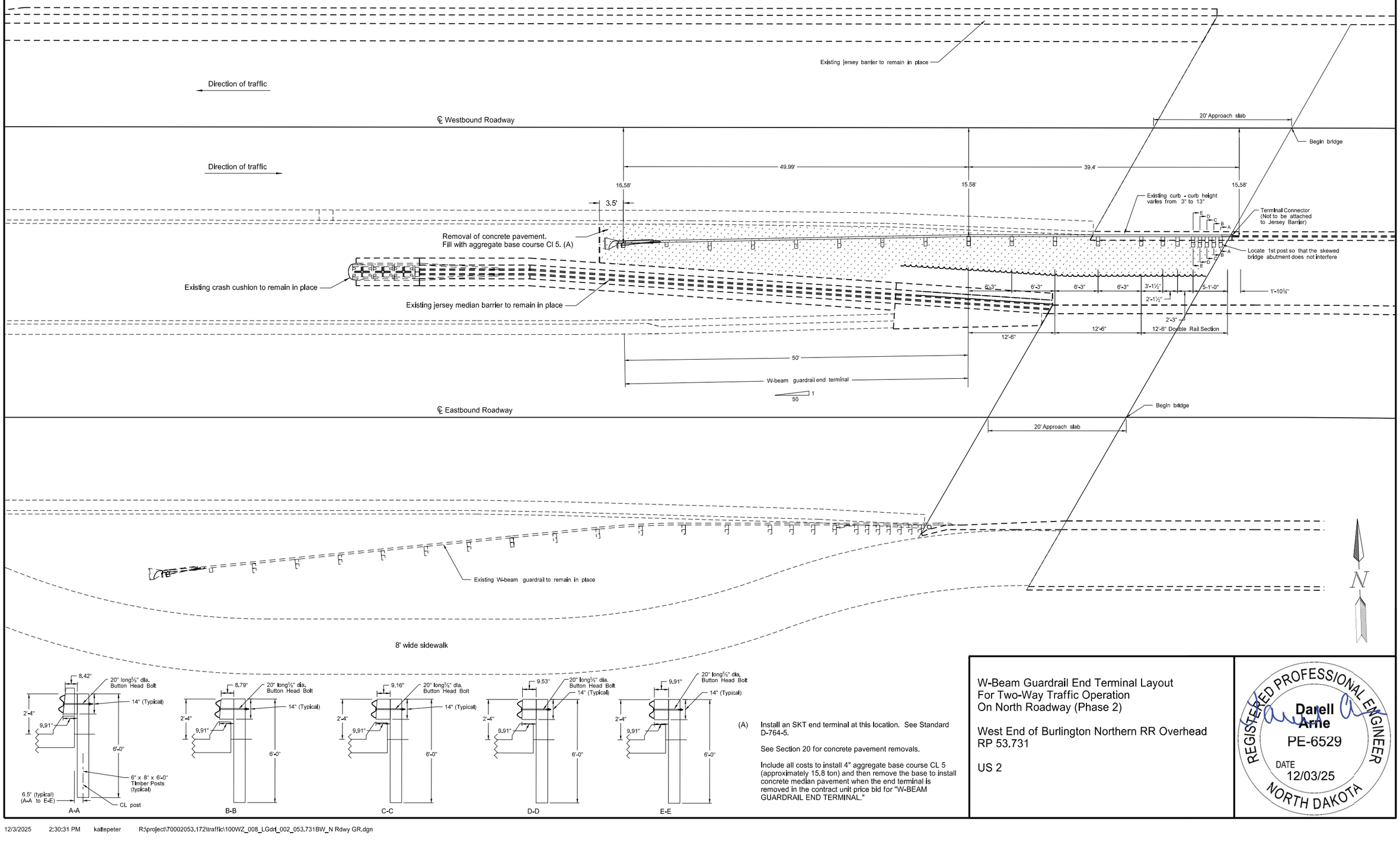
12/04/25

SPEC	CODE	BID ITEM	QTY	UNIT
764	0145	W-BEAM GUARDRAIL END TERMINAL	1	EA

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	100	8



(A) Install an SKT end terminal at this location. See Standard D-764-5.

See Section 20 for concrete pavement removals.

Include all costs to install 4" aggregate base course CL 5 (approximately 15.8 ton) and then remove the base to install concrete median pavement when the end terminal is removed in the contract unit price bid for "W-BEAM GUARDRAIL END TERMINAL."

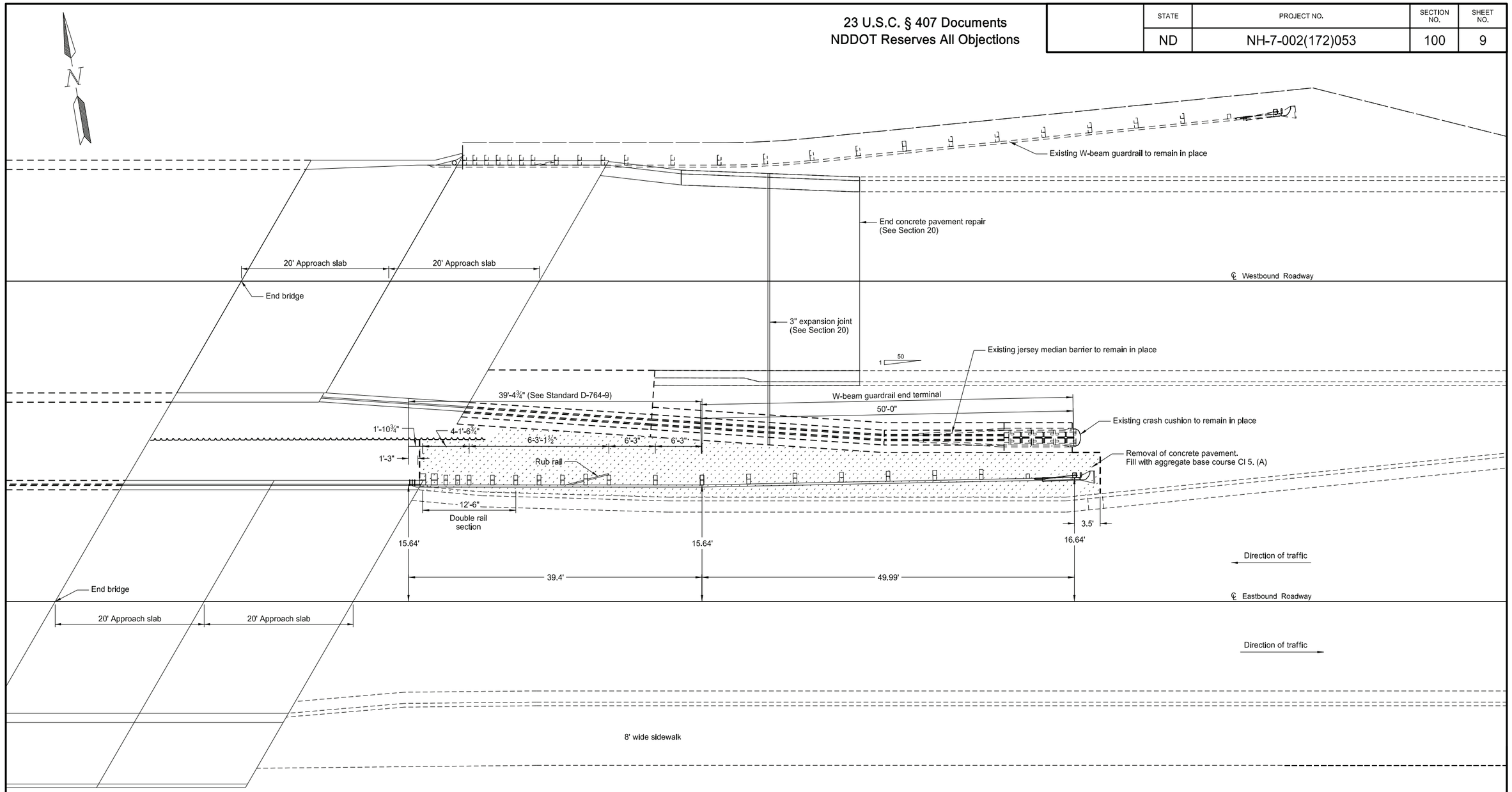
W-Beam Guardrail End Terminal Layout
For Two-Way Traffic Operation
On North Roadway (Phase 2)

West End of Burlington Northern RR Overhead
RP 53.731

US 2

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 12/03/25
NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	100	9



(A) Install an SKT end terminal at this location. See Standard D-764-5.

See Section 20 for concrete pavement removals.

Include all costs to install 4" aggregate base course CL 5 (approximately 22.8 ton) and then remove the base to install concrete median pavement when the end terminal is removed in the contract unit price bid for "W-BEAM GUARDRAIL END TERMINAL."

SPEC	CODE	BID ITEM	QTY	UNIT
764	0145	W-BEAM GUARDRAIL END TERMINAL	1	EA

W-Beam Guardrail End Terminal Layout
For Two-Way Traffic Operation
On South Roadway (Phase 3)

East End of Burlington Northern RR Overhead
RP 53.731

US 2

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 12/03/25
NORTH DAKOTA

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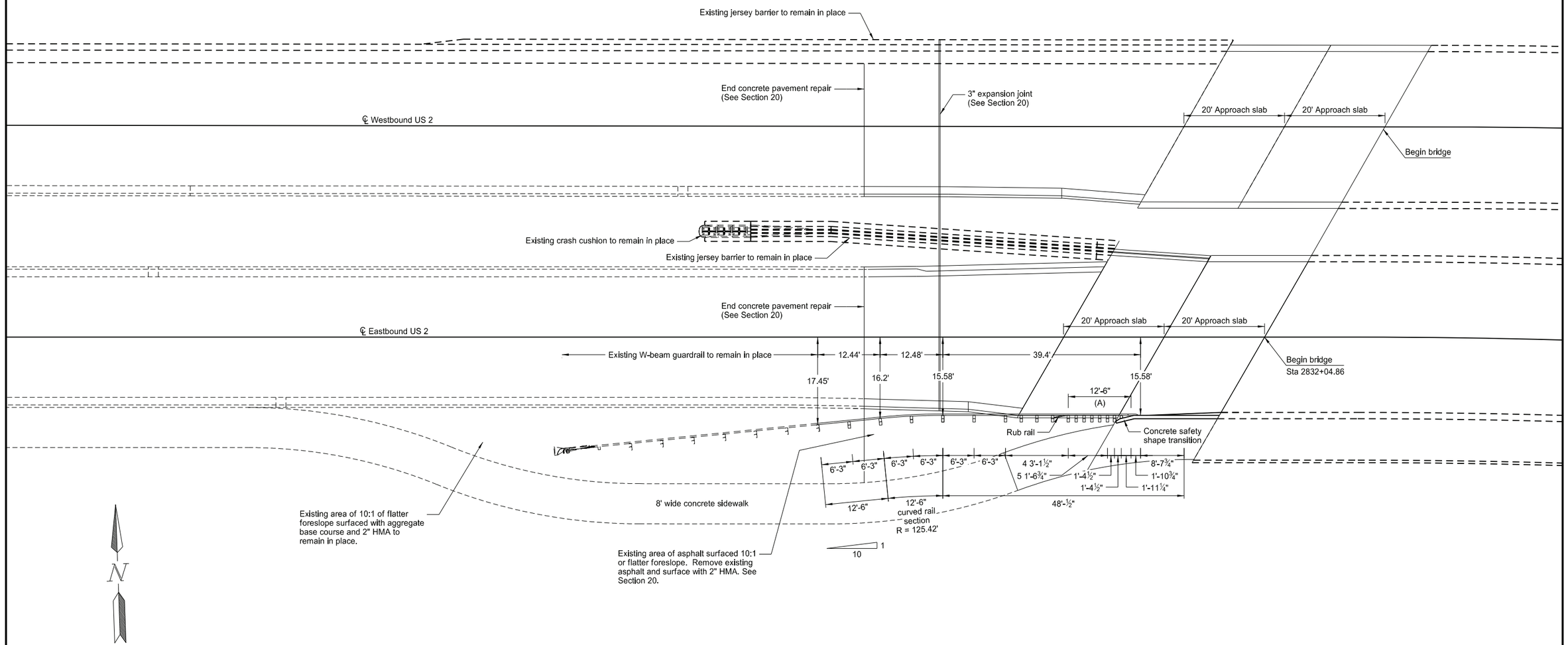
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	130	1



SPEC	CODE	BID ITEM	QTY	UNIT
764	0150	REMOVE & RESET GUARDRAIL Sta 2831+15.14 to 2831+79.46 Rt	64.4	LF

(A) 12'-6" double rail section.

W-Beam Guardrail Layout

West End of Burlington Northern RR Overhead
RP 53.731

US 2

REGISTERED PROFESSIONAL ENGINEER
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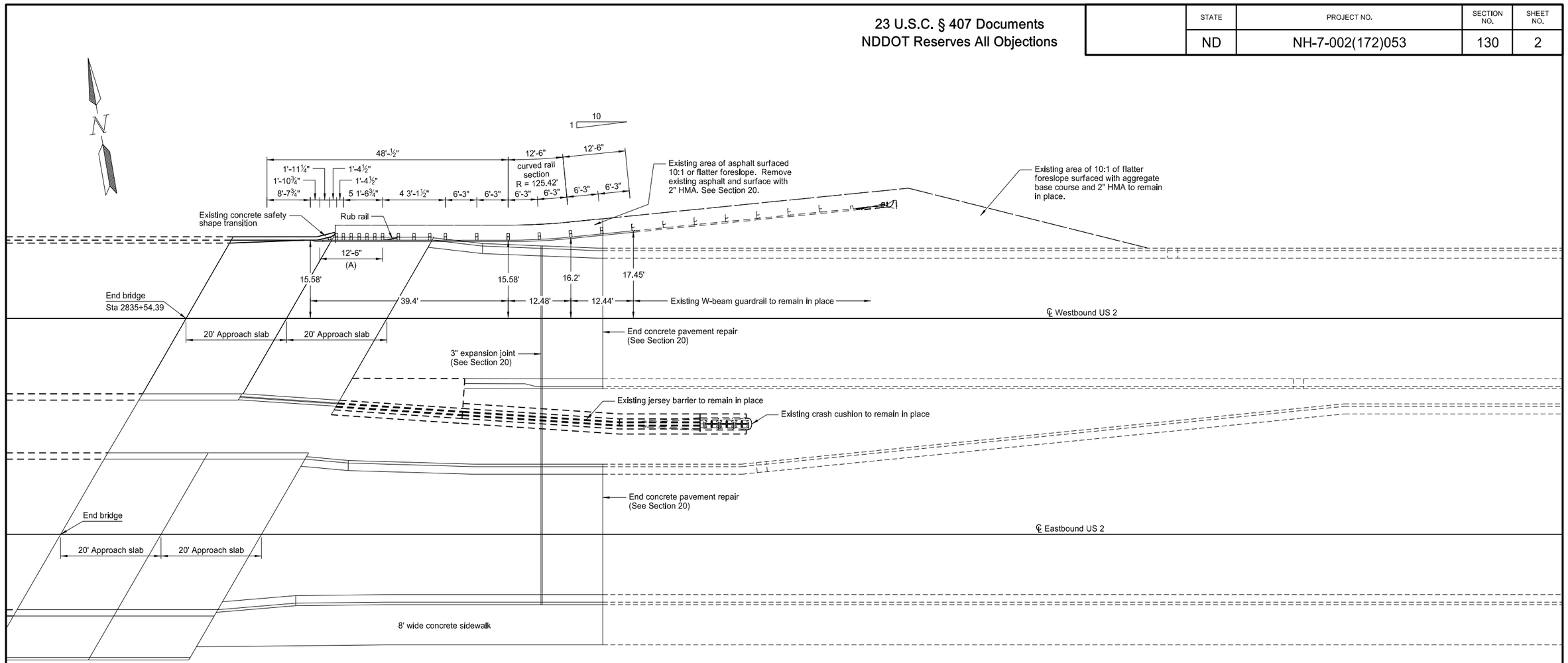
PE-6529
DATE 12/03/25
NORTH DAKOTA

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	130	2



SPEC	CODE	BID ITEM	QTY	UNIT
764	0150	REMOVE & RESET GUARDRAIL Sta 2835+79.49 to 2836+43.81 Lt	64.4	LF

(A) 12'-6" double rail section.

W-Beam Guardrail Layout

East End of Burlington Northern RR Overhead
RP 53.731

US 2

REGISTERED PROFESSIONAL ENGINEER
Darell Arne
PE-6529
DATE 12/03/25
NORTH DAKOTA

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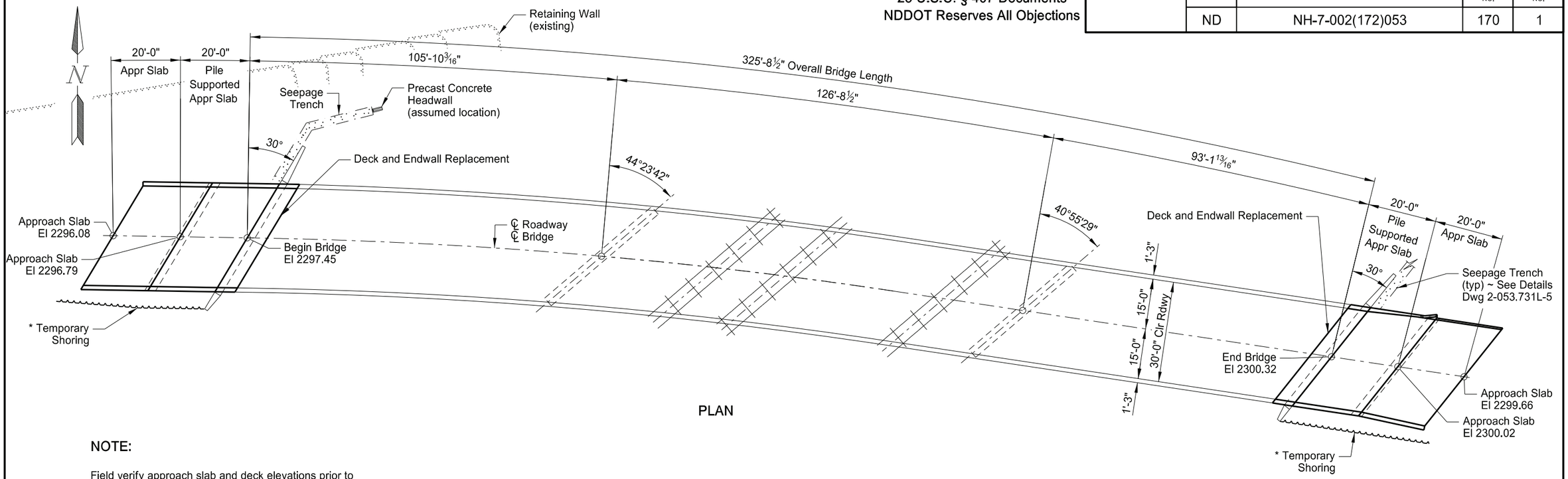
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	1



PLAN

NOTE:

Field verify approach slab and deck elevations prior to removal. Adjust approach slab elevations as necessary to match approach roadway elevations and to provide drainage.

* Refer to Dwg 2-053.731R-1 and note on Dwg 2-053.731R-3.

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
107	0100	RAILWAY PROTECTION INSURANCE	L SUM	0.5
107	0140	RAILROAD COORDINATION	L SUM	0.5
202	0111	REMOVAL OF CONCRETE	L SUM	0.5
210	0099	CLASS 1 EXCAVATION	L SUM	0.5
602	0130	CLASS AAE-3 CONCRETE	CY	34.9
602	1133	CONCRETE BRIDGE APPROACH SLAB	SY	145.7
602	1134	PILE SUPPORTED APPROACH SLAB	SY	144.6
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	1,352
602	1260	BRIDGE DECK CRACK SEALING	LF	1,060
602	7000	SPECIAL SURFACE FINISH	SF	2,506
612	0115	REINFORCING STEEL-GRADE 60	LBS	789
612	0116	REINFORCING STEEL-GRADE 60-EPOXY COATED	LBS	5,285
650	0805	DECK SPALL REPAIR	SF	7
930	8644	SILICONE SEALANT	LF	627
930	9537	ABUTMENT UNDERDRAIN SYSTEM	EA	2
930	9660	ABUTMENT REPAIR	L SUM	0.5

DESIGN STRENGTHS:

f'c = 4,000 psi ~ Class AAE-3 Concrete
fy = 60,000 psi ~ Reinforcing Steel

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SPECIAL PROVISIONS	
SP 87(25)	CONCRETE SPALL REPAIR
SP 112(25)	RAILROAD REQUIREMENTS

STANDARD DRAWINGS

D-714-18, D-900-1

BURLINGTON NORTHERN OVERHEAD
RAY

(WESTBOUND)

BRIDGE LAYOUT

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

Jason Thorenson
12/01/25

DRAWING NO. 2-053.731L-1

12/1/2025 8:02:47 AM braschke R:\project\70002053.172\bridge\dgn\2-053.731L\170BR_001_BRLO.dgn ATC BWR

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	2

NOTES

100 SCOPE OF WORK: Work at this site consists of removing and replacing approach slabs, removing and replacing the abutment endwalls and portion of deck at bridge ends, repairing concrete spall areas on the bridge deck surface, abutment backwall, and abutment wingwalls, applying penetrating water repellent treatment and sealing cracks on the bridge deck.and approach slabs, and applying a surface finish to the bridge and approach slab barriers.

100 GENERAL: Include the cost of furnishing and placing preformed expansion joint filler, concrete inserts, waterproof membrane, and other miscellaneous items in the price bid for Class AAE-3 concrete.

202 REMOVAL OF CONCRETE: Remove the concrete in a manner that prevents damage to the remaining structure. Include the barrier, deck, abutment endwall, and approach slab concrete removal in the lump sum bid item “Removal of Concrete.” Include the steel piling removal in the lump sum bid item “Removal of Concrete.”

210 EXCAVATION: Include the excavation costs at the abutments and approach slab footings, as shown in the “Detail at Abutment”, in the lump sum bid item “Class 1 Excavation.”

602 CLASS AAE-3 CONCRETE: Design a mix that meets Section 802 and will attain a minimum compressive strength of 4,000 psi at 28 days.

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

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

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

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

Include all work and materials associated with the bridge deck crack sealing in the bid item “Bridge Deck Crack Sealing.” Include all work and materials associated with the approach slab crack sealing in the bid items “Pile Supported Approach Slab” and “Concrete Bridge Approach Slab.”

602 SPECIAL SURFACE FINISH: Clean the surfaces that are to receive the Tex-Cote surface finish using sandblasting, shot blasting, or water-washing equipment to remove all dirt, grease, oil, efflorescence, and laitance. Ensure any curing compounds and release agents have been completely removed from the surfaces to receive the Tex-Cote surface finish.

Apply Tex-Cote XL 70 Bridge Cote with Silane to the areas listed below. Apply the surface finish in accordance with the manufacturer’s recommended application procedures to attain a dry film thickness of 15 mils.

- Barrier inside and top surfaces

Finish the surface with a uniform texture, color, and appearance free from fins, projections, cavities, and porous areas. Use a “sand” textured finish. Use gray surface finish color number 36424 meeting AMS-STD-595.

612 REBAR COUPLERS: Use approved mechanical connectors for the couplers capable of developing 125% of the reinforcing steel specified yield strength. Provide epoxy coated couplers according to Section 836.02 A and repair any damaged epoxy coating according to Section 612.04 E. Include the cost of furnishing and placing rebar couplers in the price bid for Grade 60 reinforcing steel.

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	3

NOTES

650 DECK SPALL REPAIR: Complete the deck spall repair in accordance with the construction requirements of Section 650.04 with the following exceptions.

- Saw cut the perimeter of the repair area to a depth of 1". Remove all concrete to a depth of 2" or to sound concrete, whichever is greater.
- Complete removals using mechanical equipment, with the exception that a milling machine specified for Class 1 removals will not be required.
- Use Class AE concrete meeting 602.03 B to restore the full depth of the repair area. Provide a mix that will attain a compressive strength of 4,000 psi at 28 days.
- Concrete placement using a buggy or pump is not required.
- Section 650.04 E “Mixing of Materials” is waived. Use of a mobile mixer is not required.
- Perform grooving according to Section 602.04 D.2 “Approach Slab Tining.”

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

900 ELEVATION CHECK POINTS: Prior to removal of the existing concrete, the District will record the elevations of the existing elevation check points at all substructures. Place four new carriage bolts on the top of the barrier at the abutments to serve as elevation check points. Include the cost for this item in the unit price bid for “Class AAE-3 Concrete.”

930 SILICONE SEALANT: Include all work associated with the silicone sealant installation at the existing bridge barrier/deck joint interface (gutter line entire length) in the bid item “Silicone Sealant.” Include all other silicone sealant installations shown in plans in other bid items.

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

LOCATION	PHOTO	QUANTITY (SF)
ABUTMENT BACKWALL	#1	7
ABUTMENT WINGWALLS	#2, #3	15

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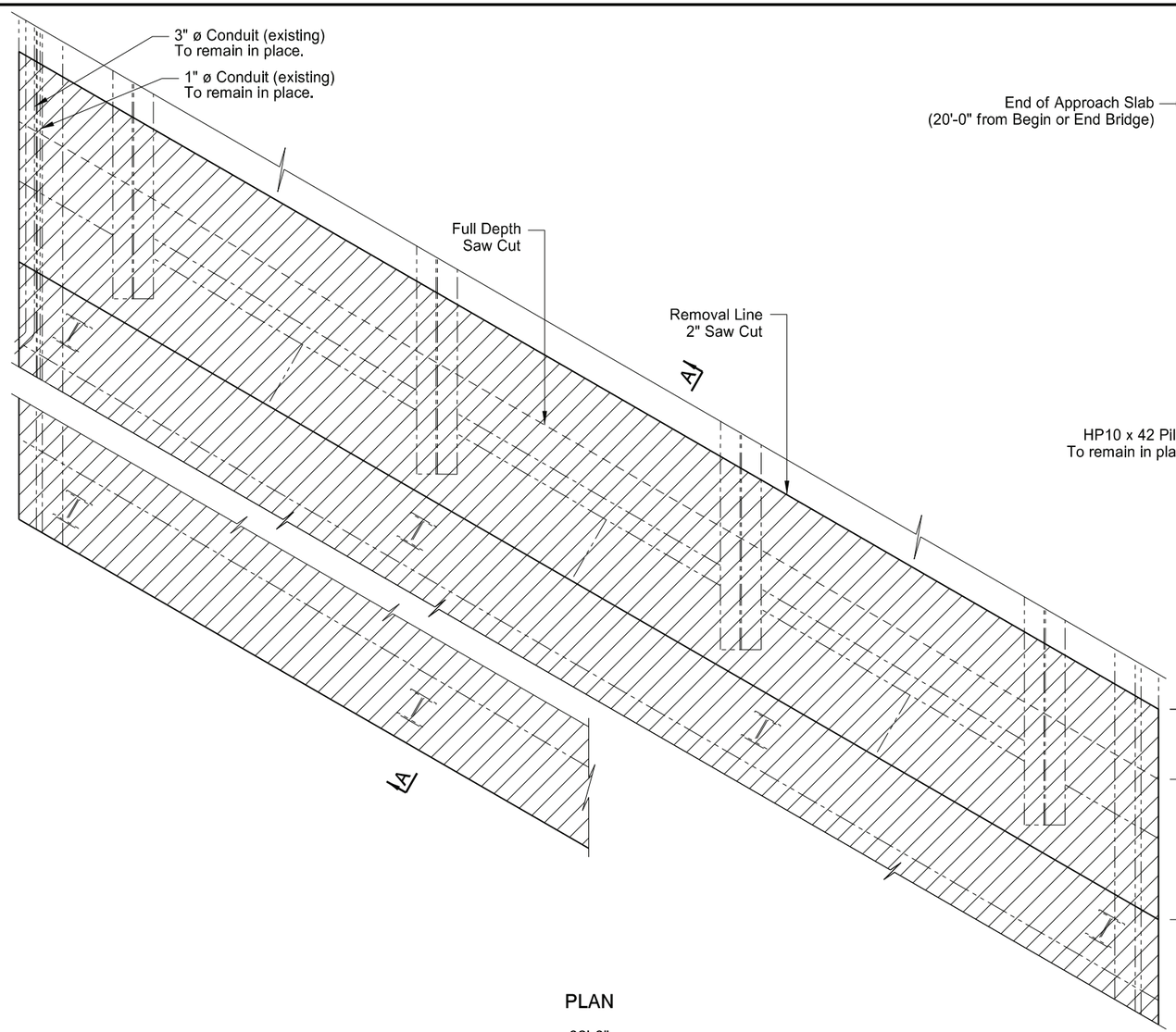
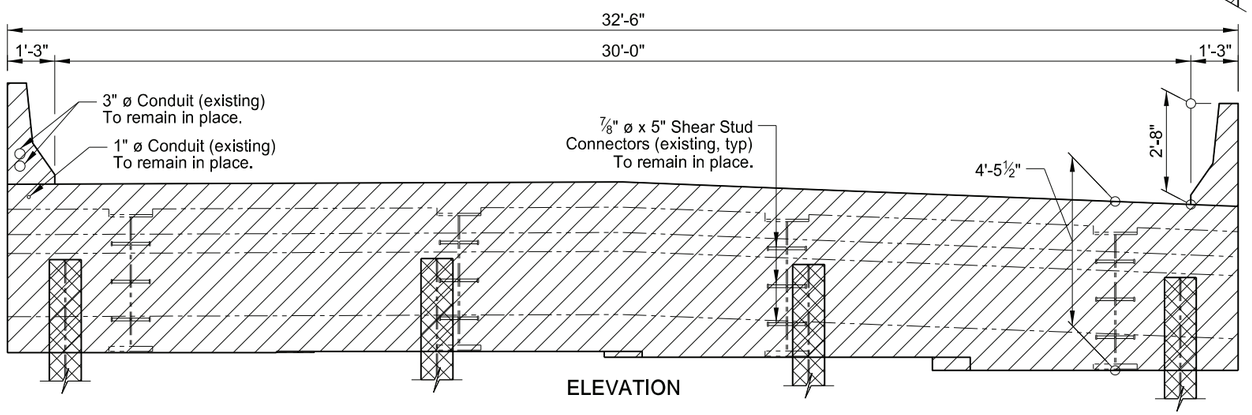
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

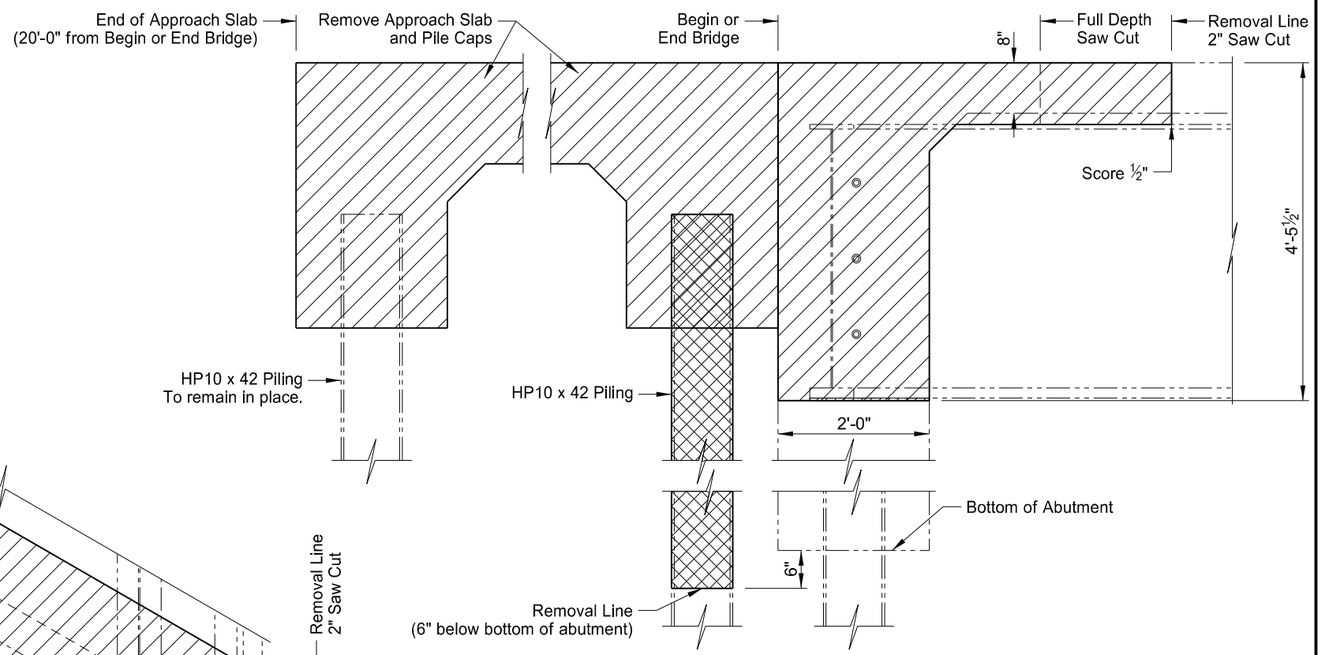
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	4



PLAN



ELEVATION



A-A

Hatched area indicates concrete to be removed.

Hatched area indicates steel piling to be removed.

NOTES:

Score ½" from the bottom of the deck prior to the full depth saw cut. Saw cut the deck full depth 2'-0" from the removal line. Saw cut the deck to a depth of 2" at the removal line to produce a neat line between the concrete to be removed and the concrete to remain. Saw cut existing barriers to a depth of 1" at the removal line to produce a neat line between the concrete to be removed and the concrete to remain. Carefully remove concrete to ensure no damage is done to the existing reinforcing steel and girder shear stud connectors that are to remain in place. Sand blast clean the exposed existing reinforcing bars from any rust scale.

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APPROACH SLAB, DECK, &
ENDWALL REMOVAL DETAILS

DRAWING NO. 2-053.731L-4

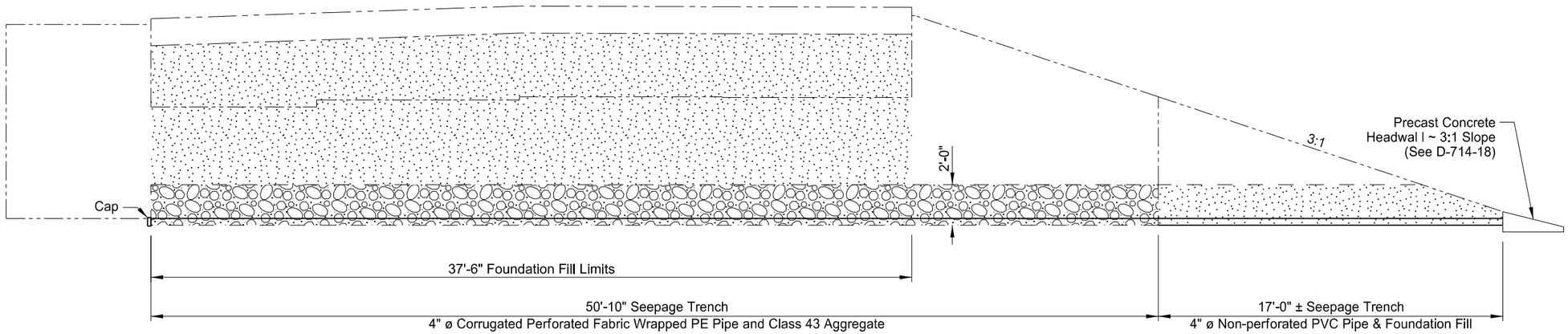
12/1/2025 8:02:51 AM braschke R:\project\70002053,172\bridge\dgn\2-053,731L\170BR_004_REMOVAL.dgn ATC BWR

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	5

NOTES:

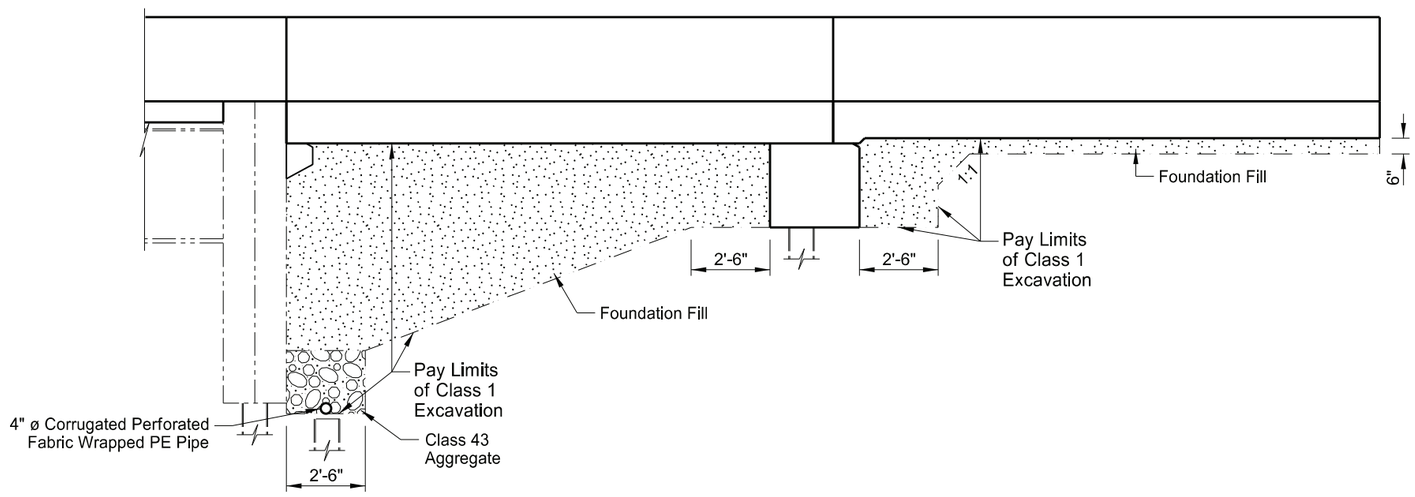
Use corrugated perforated fabric wrapped PE pipe that meets the requirements of Section 830.03 A.4. Provide fabric wrapping for the pipe that meets the requirements of Section 858.01 for D3 or D4 drainage fabric. Provide aggregate that meets the requirements of Section 816.03, Class 43. Provide foundation fill that meets the requirements of Section 210.

Include the cost to furnish and place the foundation fill, aggregate, corrugated perforated pipe and headwalls in the pay item "Abutment Underdrain System."



(EAST ABUTMENT SHOWN)

BACK FACE OF ABUTMENT



DETAIL AT ABUTMENT

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ABUTMENT UNDERDRAIN &
EXCAVATION DETAILS

DRAWING NO.	2-053.731L-5

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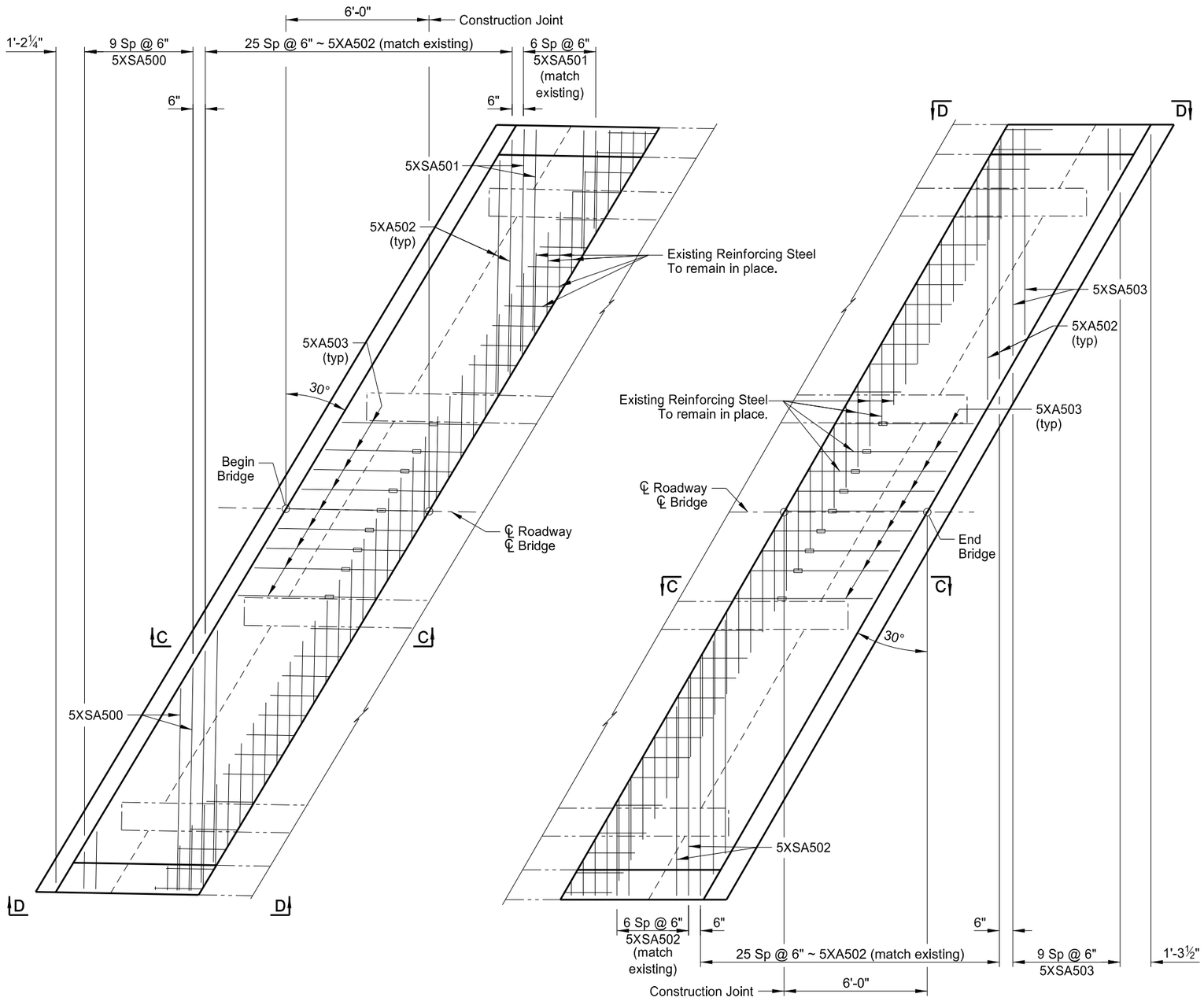
ATC BWR

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	6



PARTIAL PLAN

NOTES:

Couple the 5XA503 bars to the existing reinforcing steel.

See Dwg 2-053.731L-8 for Sections C-C & D-D.

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QUANTITIES

SEE DWG 2-053.731L-10

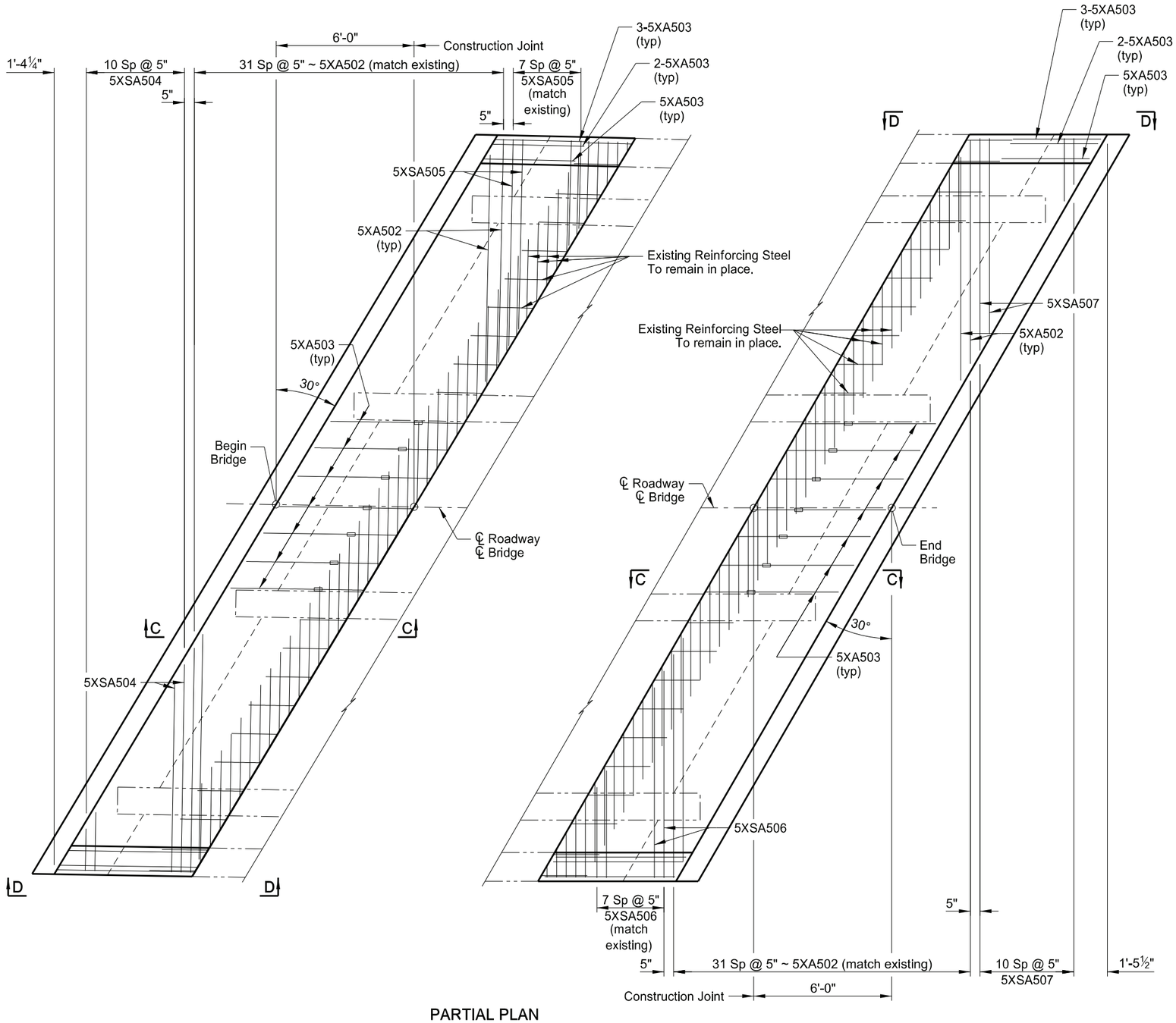
BURLINGTON NORTHERN OVERHEAD
RAY

(SHOWING BOTTOM REINFORCING)

PARTIAL SLAB LAYOUT

DRAWING NO. 2-053.731L-6

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	7



PARTIAL PLAN

NOTES:

Couple the 5XA503 bars to the existing reinforcing steel.

See Dwg 2-053.731L-8 for Sections C-C & D-D.

QUANTITIES

SEE DWG 2-053.731L-10

BURLINGTON NORTHERN OVERHEAD
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(SHOWING TOP REINFORCING)

PARTIAL SLAB LAYOUT

DRAWING NO.	2-053.731L-7

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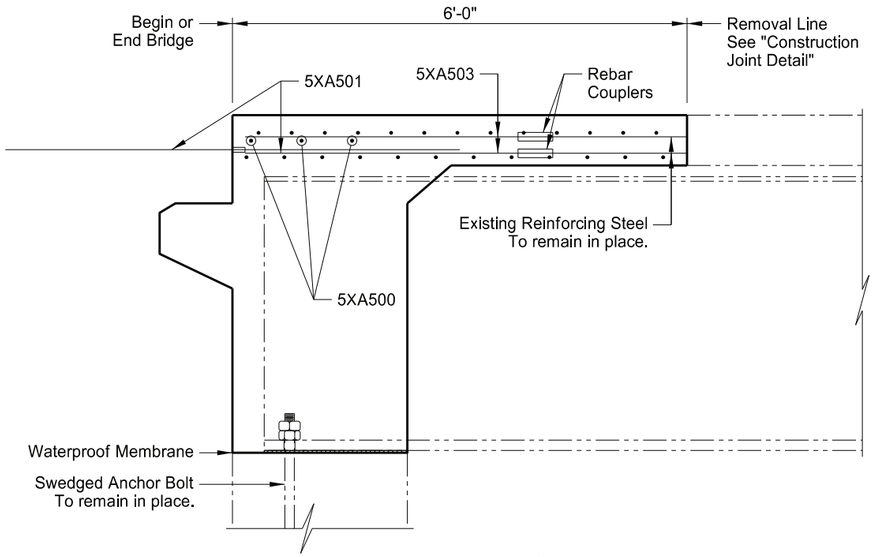
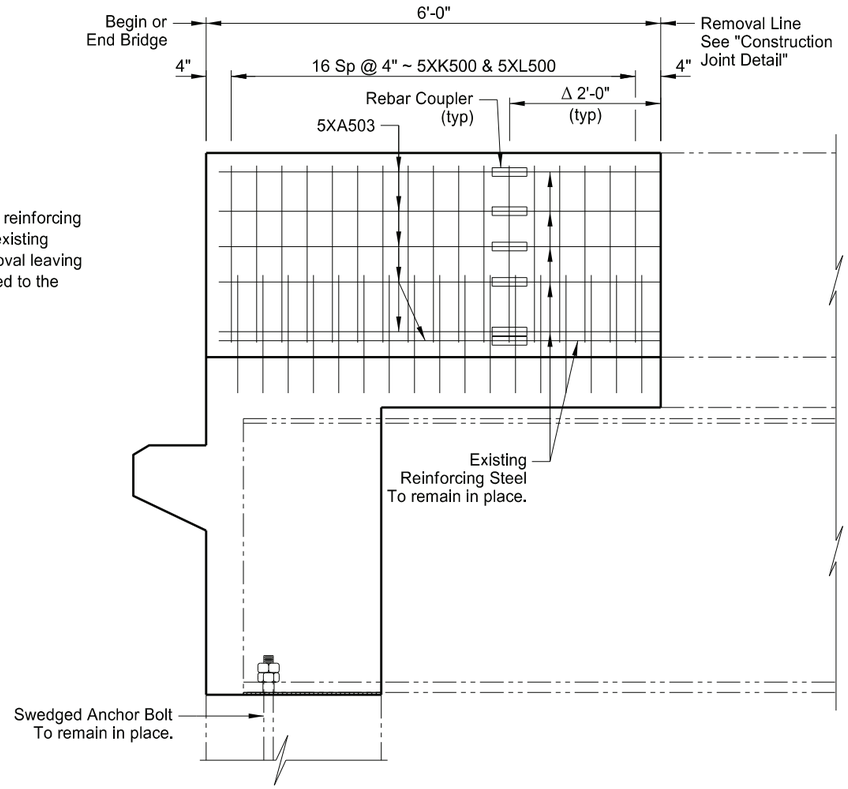
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	8

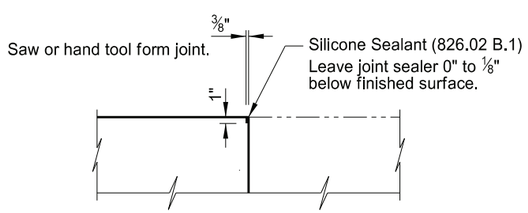


C-C

Δ Cut the existing horizontal reinforcing steel protruding from the existing concrete barrier after removal leaving a minimum of 2'-0" exposed to the new barrier.



D-D



Include the work and material to install the joint in the pay item "Class AAE-3 Concrete."

CONSTRUCTION JOINT DETAIL

NOTES:

Couple the 5XA503 bars to the existing reinforcing steel.

See Dwgs 2-053.731L-6 & 7 for location of Sections C-C & D-D.

Use waterproof membrane that meets the requirements of Section 602.03 B. Center the waterproof membrane (1'-0" minimum width) on the joint.

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QUANTITIES

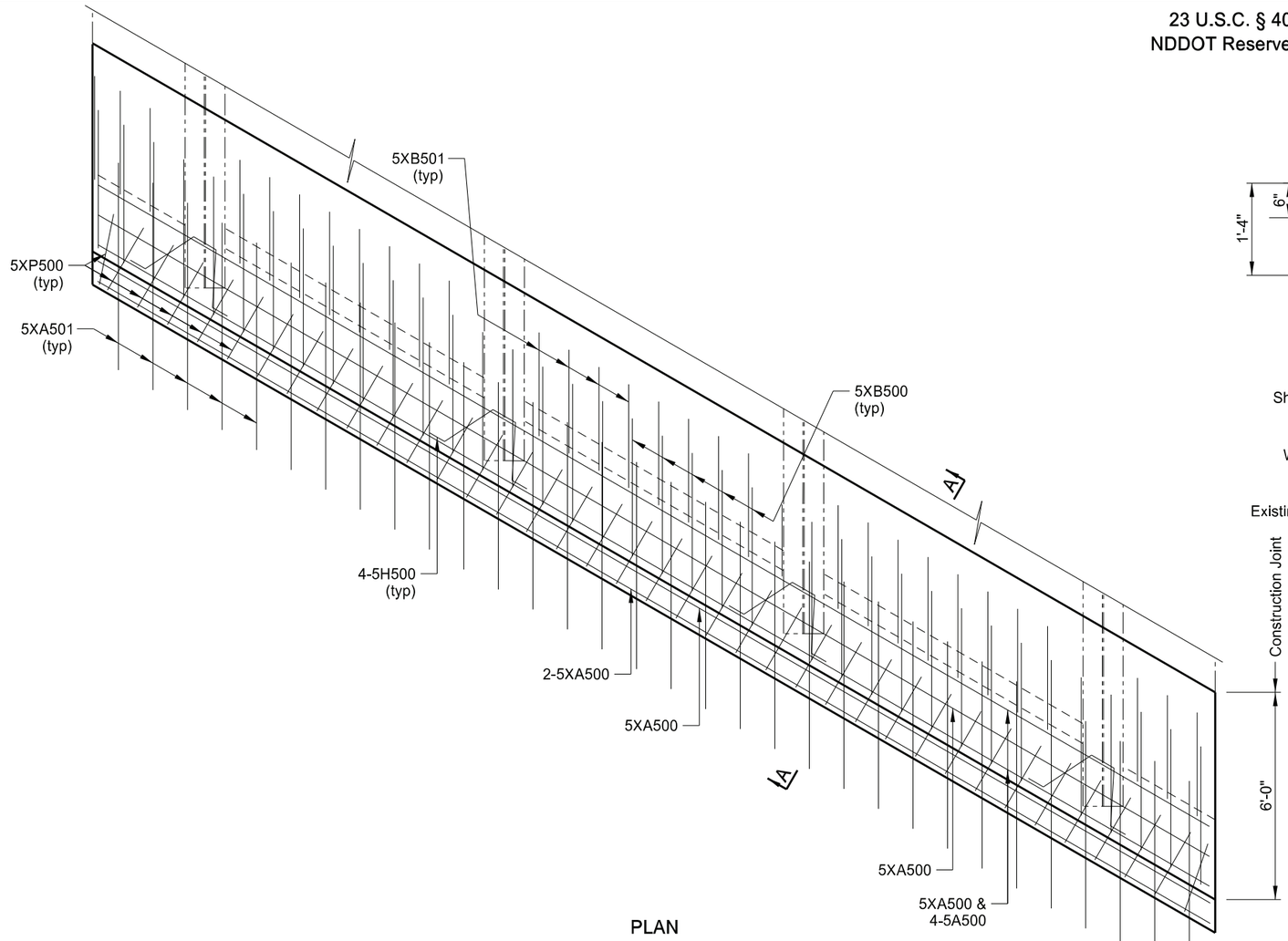
SEE DWG 2-053.731L-10

BURLINGTON NORTHERN OVERHEAD
RAY

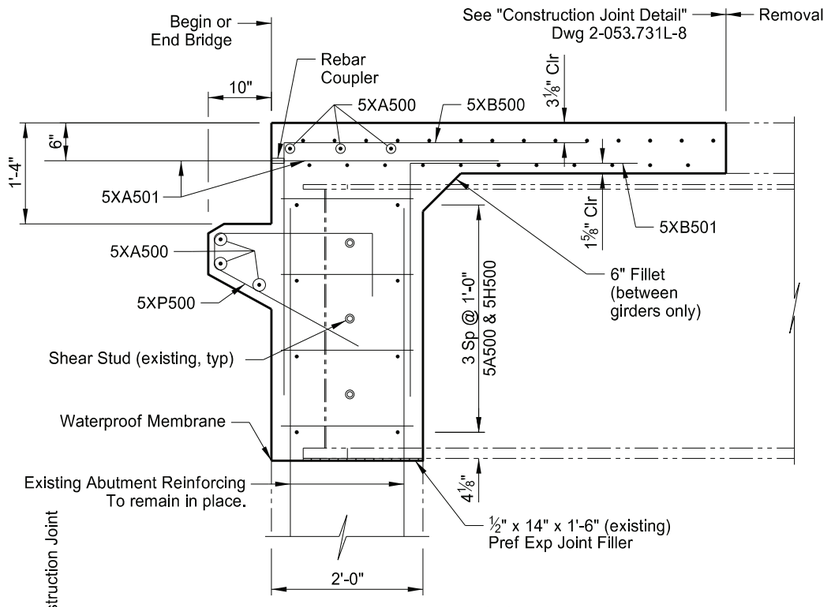
SUPERSTRUCTURE DETAILS

DRAWING NO. 2-053.731L-8

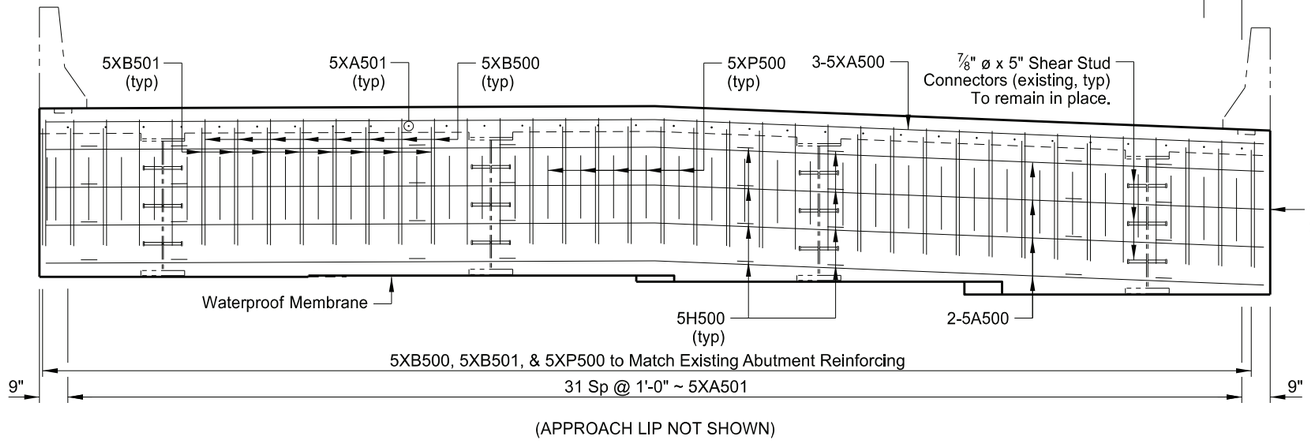
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	9



PLAN



A-A



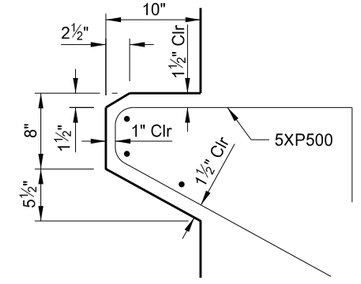
(APPROACH LIP NOT SHOWN)

ELEVATION

NOTES:

Do not install the 5XA501 bars into the approach slab until all of the foundation fill is in place.

Use waterproof membrane that meets the requirements of Section 602.03 B. Center the waterproof membrane (1'-0" minimum width) on the joint.



APPROACH LIP DETAIL

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QUANTITIES

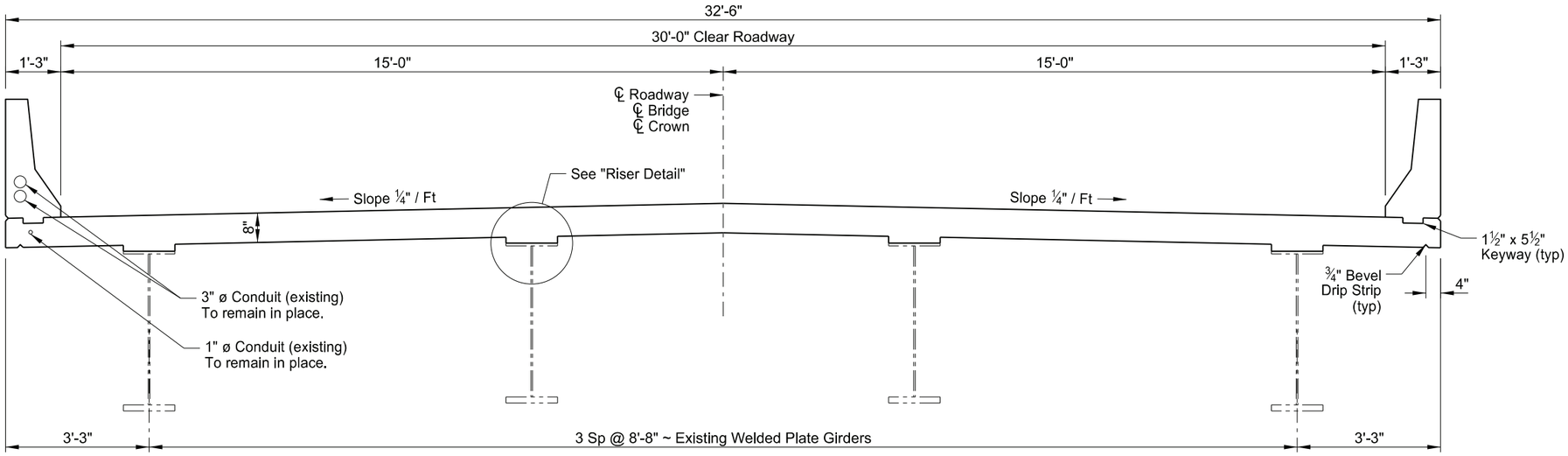
SEE DWG 2-053.731L-10

BURLINGTON NORTHERN OVERHEAD
RAY

ENDWALL DETAILS

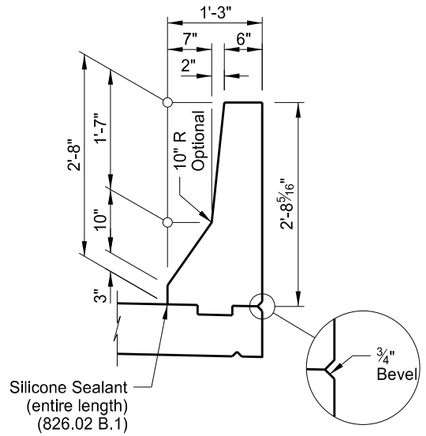
DRAWING NO. 2-053.731L-9

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	10

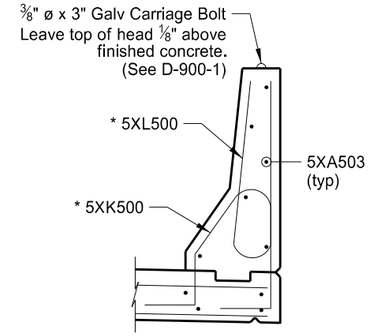


(SHOWING DIMENSIONS)

SLAB SECTION



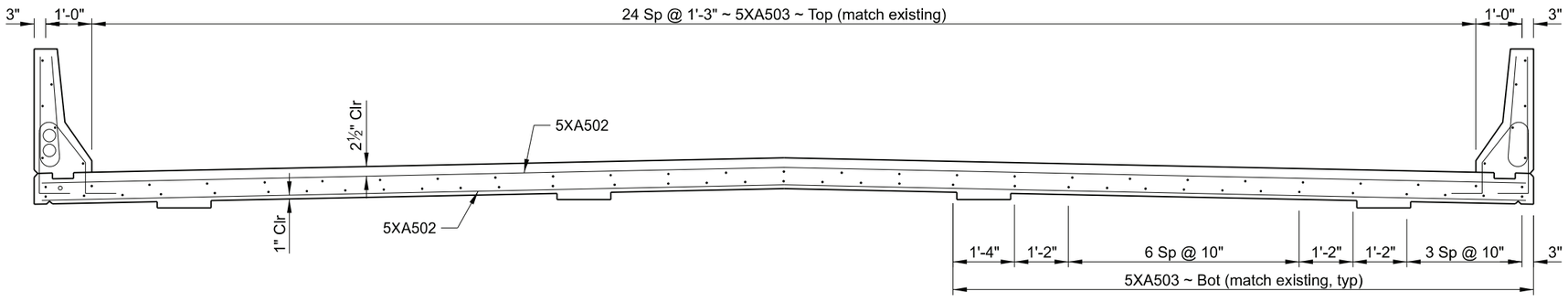
SHOWING DIMENSIONS



* Provide a 1½" clearance
to the barrier reinforcing.

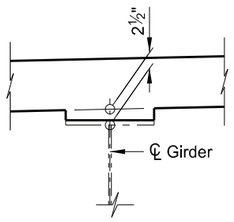
SHOWING REINFORCING

BARRIER DETAIL



(SHOWING REINFORCING)

SLAB SECTION



RISER DETAIL

QUANTITIES	
CLASS AAE-3 CONCRETE	34.9 CY
REINFORCING STEEL	789 LBS
REINFORCING STEEL (EPOXY)	5,285 LBS

BURLINGTON NORTHERN OVERHEAD
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SLAB SECTION

DRAWING NO.	2-053.731L-10

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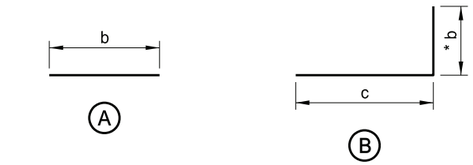
BILL OF REINFORCING STEEL, GRADE 60

LETTER PREFIX OF BAR MARK DENOTES SHAPE ~ SEE BAR DETAILS

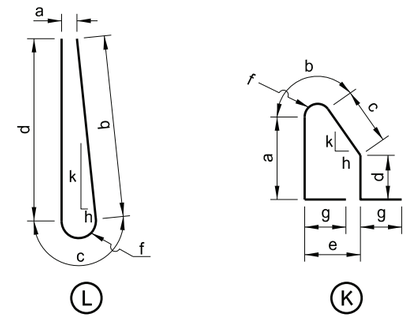
LOCATION		SIZE	MARK	NO. EACH /SET	NOMINAL LENGTH	DETAILING DIMENSIONS								
						a	b	c	d	e	f	g	h	k
SUPERSTRUCTURE	REGULAR	5	A500	16	37'-1"		37'-1"							
		5	H500	32	5'-1"	6"	1'-8"	9"					6	12
	EPOXY	5	XA500	12	37'-1"		37'-1"							
		5	XA501	128	3'-0"		3'-0"							
		5	XA502	116	9'-8"		9'-8"							
		5	XA503 **	148	3'-10"		3'-10"							
		5	XB500	76	8'-1"		4'-1"	4'-0"						
		5	XB501	60	6'-10"		3'-10"	3'-0"						
		5	XK500	68	4'-11"	1'-4"	8"	11"	8"	1'-0"	2.5"	8"	8.5	12
		5	XL500	68	5'-1"	3"	2'-2"	9"	2'-2"		2.25"		1.25	12
		5	XP500	76	5'-6"	5"	2'-1"	2'-2"			1.25"	10"	12	6.5
		5	XSA500	1	54'-2"	1'-6"	9'-4"			9				
		5	XSA501	1	46'-8"	4'-1"	9'-3"			6				
		5	XSA502	1	45'-6"	3'-11"	9'-1"			6				
		5	XSA503	1	55'-10"	1'-8"	9'-6"			9				
		5	XSA504	1	59'-7"	1'-10"	9'-0"			10				
		5	XSA505	1	52'-8"	4'-1"	9'-1"			7				
		5	XSA506	1	51'-8"	3'-11"	9'-0"			7				
		5	XSA507	1	61'-5"	2'-0"	9'-2"			10				

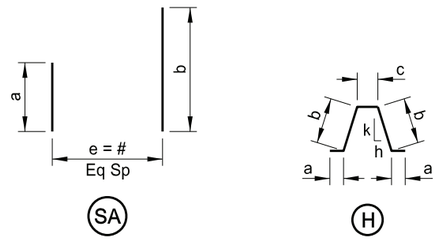
** Coupled to existing #5 reinforcing steel.

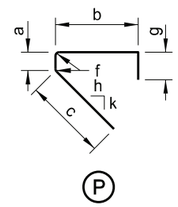
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	11



* b = Vertical Leg for XB500 and XB501







NOTES:

1. Verify the quantity, size, and shape of the bar reinforcement against the structure drawings and immediately notify the Engineer of any discrepancies. Discrepancies in the bar list will not be cause for adjustment of the contract unit price.
2. All dimensions are out to out of bars.
3. Nominal length of each bent bar or cut bar is the sum total of the detailing dimensions for that bar, unless otherwise noted.
4. The "f" dimension indicates the inside radius unless otherwise noted.
5. An "X" preceding a bar designation indicates an epoxy coated bar.

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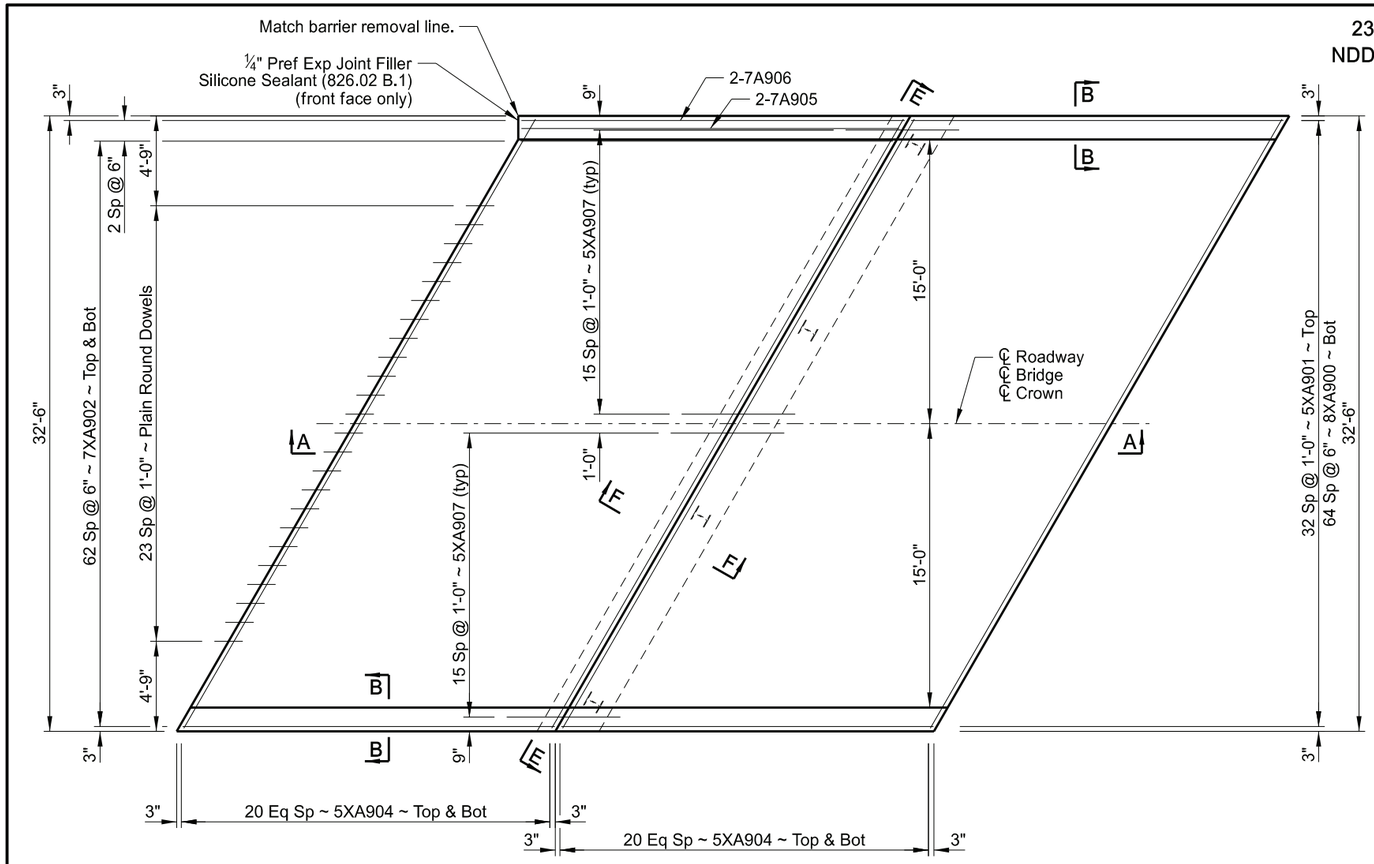
BURLINGTON NORTHERN OVERHEAD
RAY

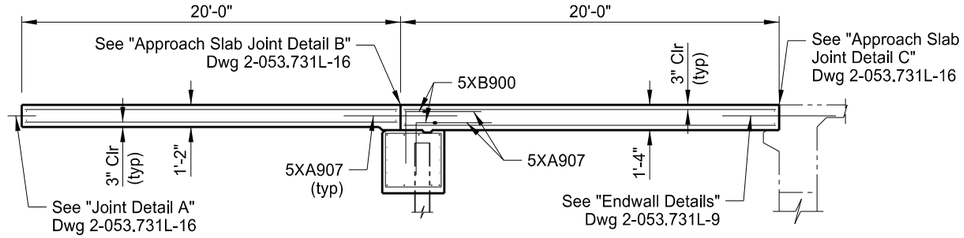
REINFORCING BAR LIST & DETAILS

DRAWING NO. 2-053.731L-11

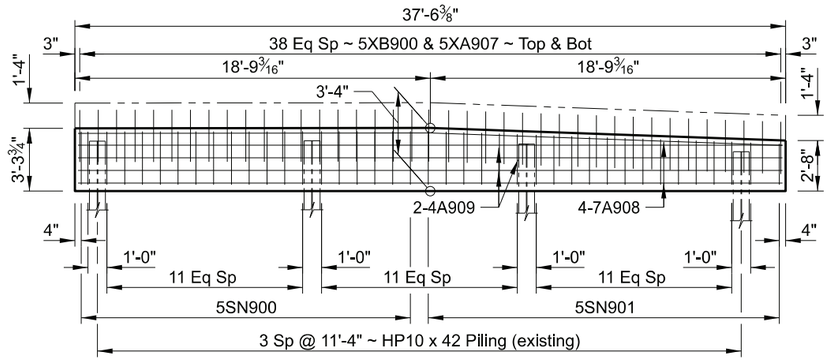
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	12



PLAN

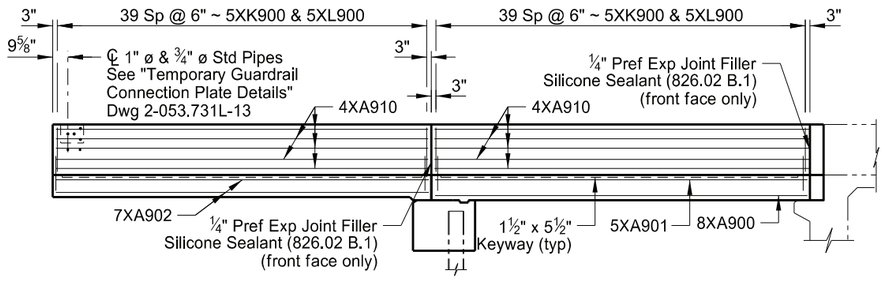


A-A



E-E

FOOTING ELEVATION



ELEVATION

NOTE:

See Dwg 2-053.731L-16 for Sections B-B & F-F.

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QUANTITIES

SEE DWG 2-053.731L-13

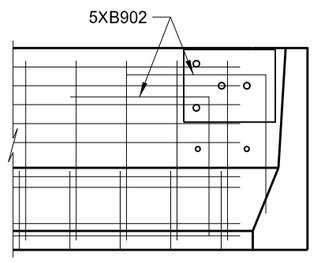
BURLINGTON NORTHERN OVERHEAD
RAY

(WEST END)

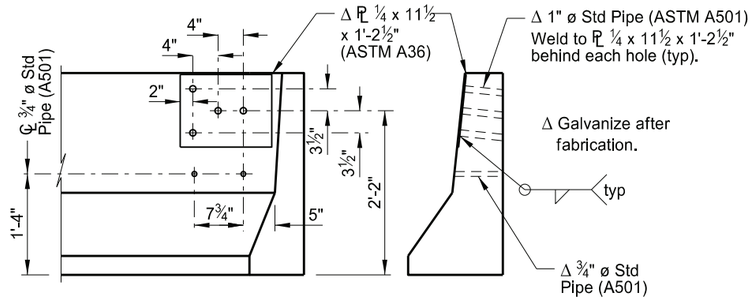
APPROACH SLAB DETAILS

DRAWING NO. 2-053.731L-12

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	13



SHOWING REINFORCING



SHOWING DIMENSIONS

(SHOWING FRONT FACE)

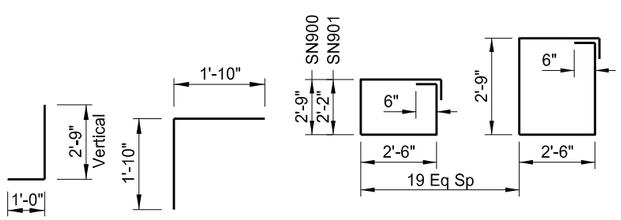
TEMPORARY GUARDRAIL CONNECTION PLATE DETAILS

SKEW ANGLE = 30°			
BAR LIST			
SIZE	MARK	NO.	LENGTH
8	XA900	65	19'-8"
5	XA901	33	19'-8"
7	XA902	126	19'-8"
5	XA904	84	37'-1"
7	XA905	2	19'-11"
7	XA906	2	20'-2"
5	XA907	142	3'-0"
7	A908	8	37'-1"
4	A909	6	37'-1"
4	XA910	36	19'-8"
5	XB900	78	3'-9"
5	XB902	2	3'-8"
5	XK900	160	5'-7"
5	XL900	160	5'-1"
5	SN900	1	230'-0"
5	SN901	1	218'-4"

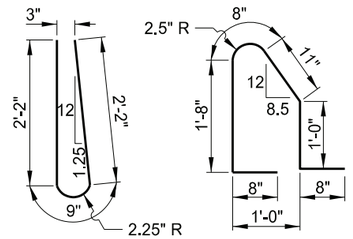
ESTIMATED MATERIAL QUANTITIES	
REINFORCING STEEL (LBS)	CONCRETE (CY)
16,801	78.9

NOTES:

The bar marks beginning with an "X" indicate an epoxy coated bar. The dimensions shown in the "Bent Bar Details" are out to out.



XB900 XB902 SN900 & SN901



XL900 XK900

BENT BAR DETAILS

QUANTITIES	
APPROACH SLAB	72.2 SY
PILE SUPPORTED APPROACH SLAB	72.2 SY

BURLINGTON NORTHERN OVERHEAD
RAY

(WEST END)

APPROACH SLAB DETAILS

DRAWING NO.	2-053.731L-13

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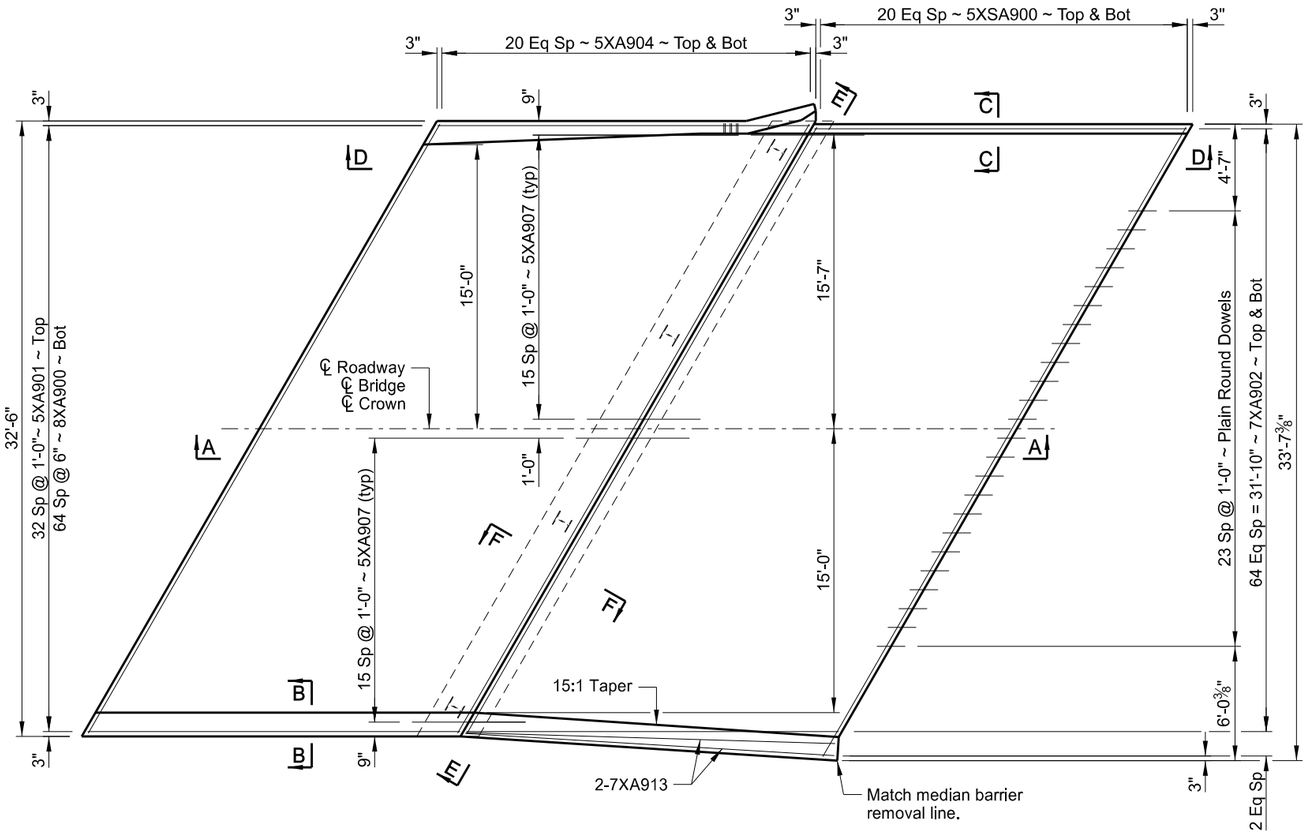
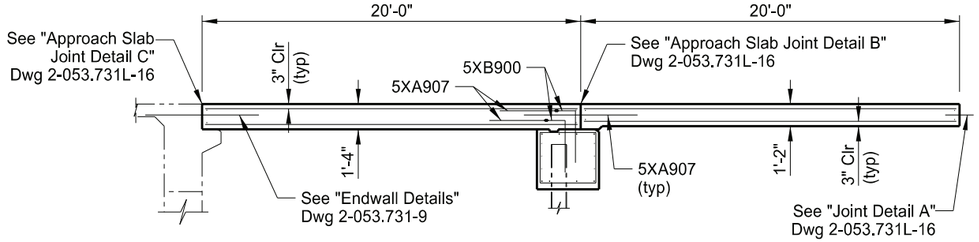
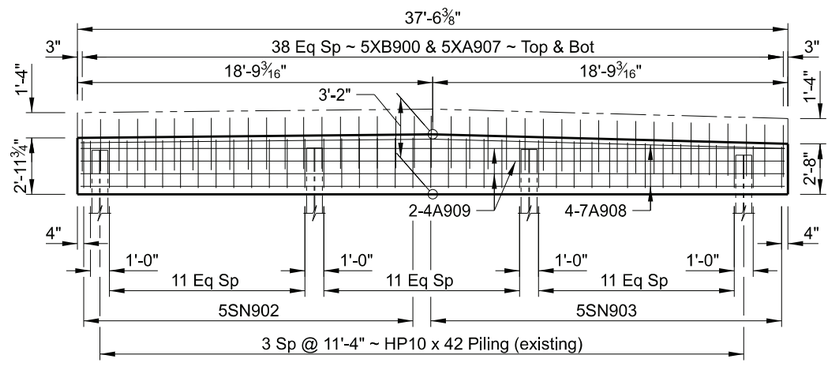
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	14



PLAN

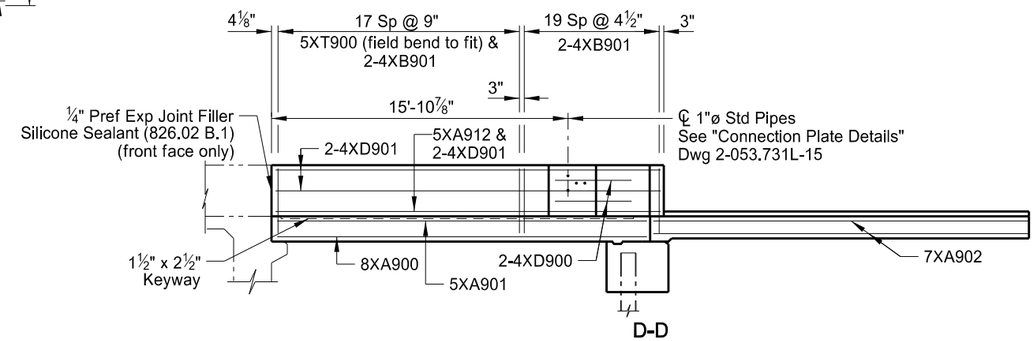


A-A

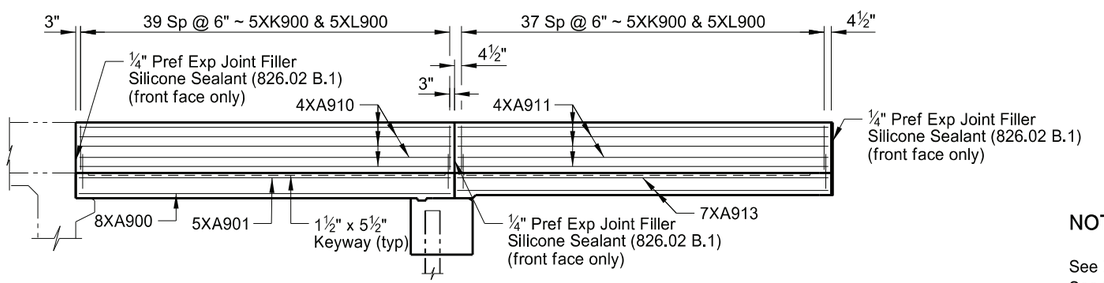


E-E

FOOTING ELEVATION



D-D



ELEVATION

NOTE:

See Dwg 2-053.731L-16 for Sections B-B & F-F.
See Dwg 2-053.731L-15 for Section C-C.

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PE 4361
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ENGINEER
NORTH DAKOTA

QUANTITIES

SEE DWG 2-053.731L-15

BURLINGTON NORTHERN OVERHEAD
RAY

(EAST END)

APPROACH SLAB DETAILS

DRAWING NO.	2-053.731L-14

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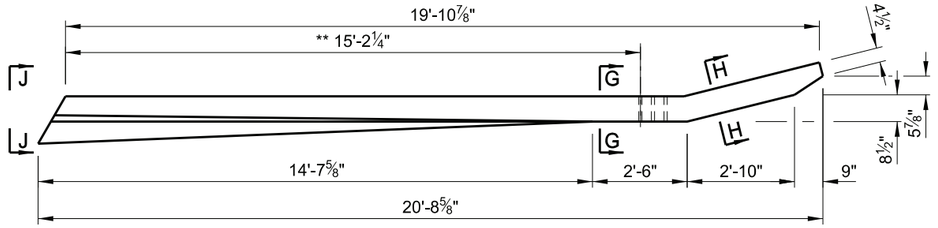
ATC BWR

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	15



SAFETY SHAPE BARRIER TRANSITION PLAN

** Field verify existing guardrail connection.

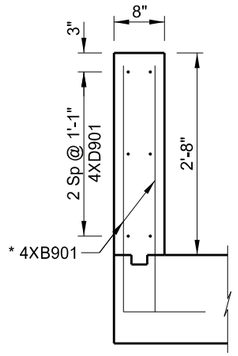
NOTES:

The bar marks beginning with an "X" indicate an epoxy coated bar. The dimensions shown in the "Bent Bar Details" are out to out.

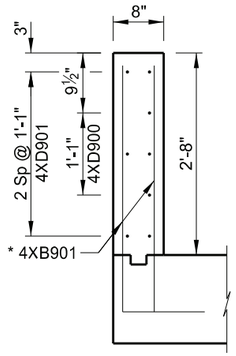
See Dwg 2-053.731L-14 for location of Section C-C.

SKEW ANGLE = 30°			
BAR LIST			
SIZE	MARK	NO.	LENGTH
8	XA900	65	19'-8"
5	XA901	33	19'-8"
7	XA902	130	19'-8"
5	XA904	42	37'-1"
5	XA907	142	3'-0"
7	A908	8	37'-1"
4	A909	6	37'-1"
4	XA910	9	19'-8"
4	XA911	9	18'-11"
5	XA912	1	14'-5"
7	XA913	4	19'-6"
5	XB900	78	3'-9"
4	XB901	76	4'-2"
4	XD900	2	4'-0"
4	XD901	6	19'-9"
5	XK900	78	5'-7"
5	XL900	78	5'-1"
5	XT900	18	3'-0"
5	XSA900	2	790'-2"
5	SN902	1	220'-0"
5	SN903	1	215'-0"

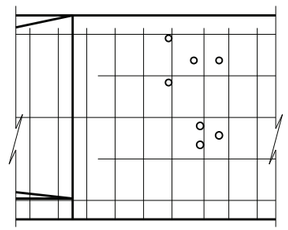
ESTIMATED MATERIAL QUANTITIES	
REINFORCING STEEL (LBS)	CONCRETE (CY)
16,173	77.2



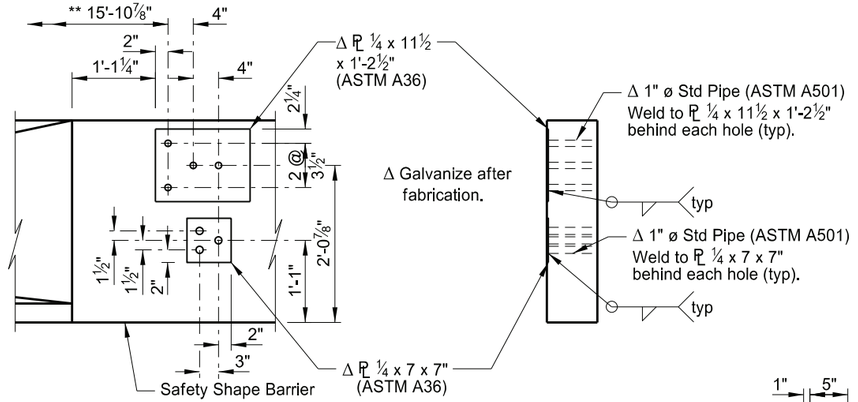
G-G



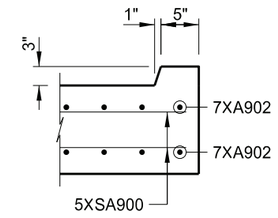
H-H



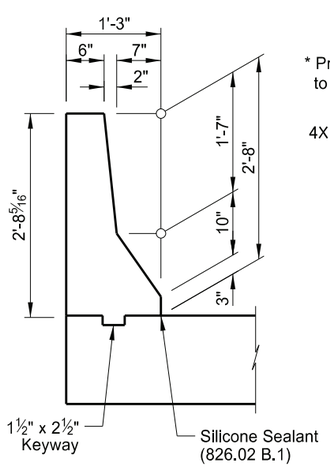
SHOWING REINFORCING



SHOWING DIMENSIONS

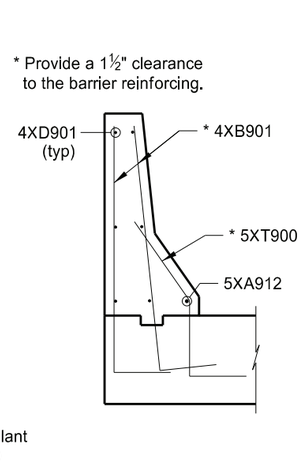


C-C



SHOWING DIMENSIONS

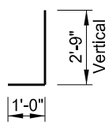
J-J



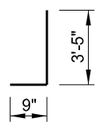
SHOWING REINFORCING

(SHOWING FRONT FACE)

CONNECTION PLATE DETAILS



XB900



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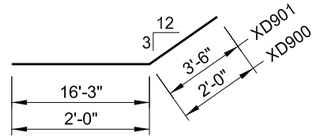
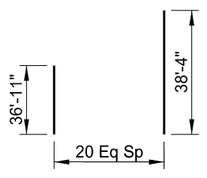
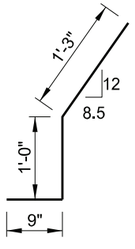


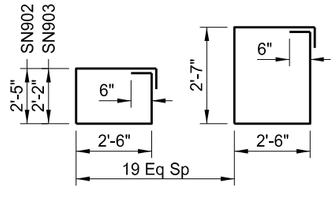
XD900 & XD901



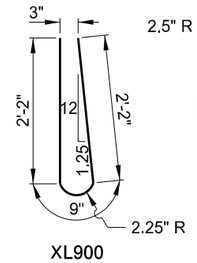
XSA900



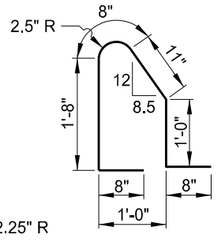
XT900



SN902 & SN903



XL900



XK900

BENT BAR DETAILS

QUANTITIES	
APPROACH SLAB	73.5 SY
PILE SUPPORTED APPROACH SLAB	72.4 SY

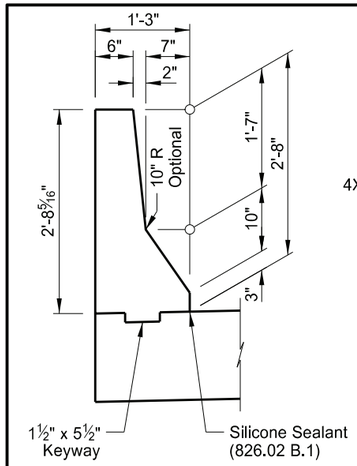
BURLINGTON NORTHERN OVERHEAD
RAY

(EAST END)

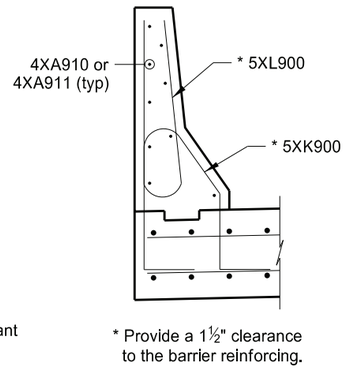
APPROACH SLAB DETAILS

DRAWING NO.	2-053.731L-15

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	16



SHOWING DIMENSIONS

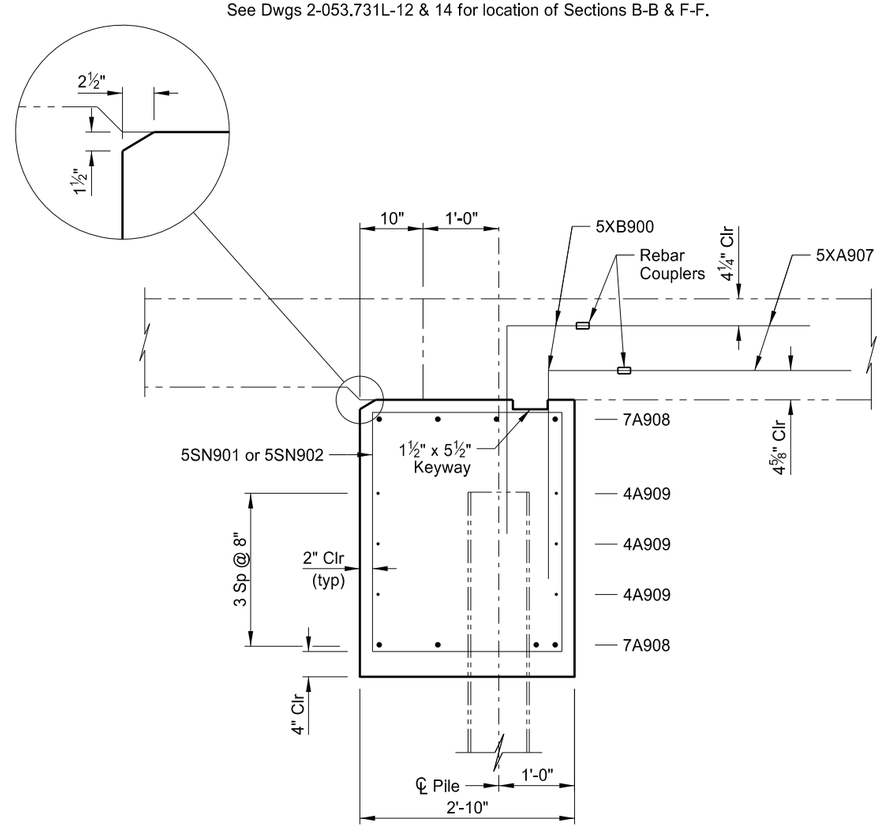


SHOWING REINFORCING

B-B

NOTE:

See Dwgs 2-053.731L-12 & 14 for location of Sections B-B & F-F.



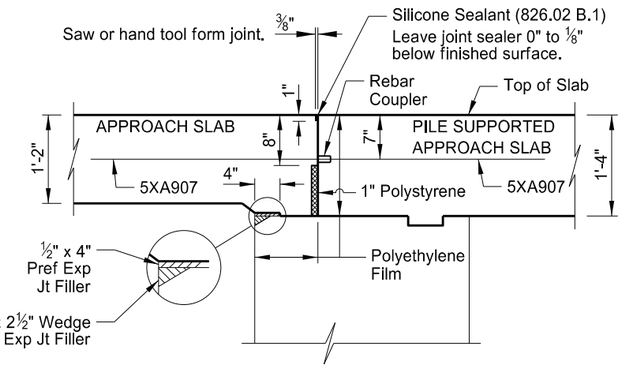
F-F

NOTES:

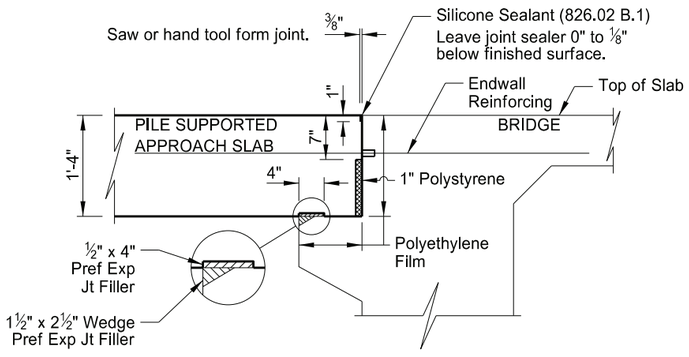
Couple the 5XA907 bars to the 5XB900 bars extending out of the approach slab footing. Use approved mechanical connectors for the couplers capable of developing 125% of the reinforcing steel specified yield strength. Provide epoxy coated couplers according to Section 836.02 A and repair any damaged epoxy coating according to Section 612.04 E.

The estimated material quantities shown are for information purposes only. Include the concrete, reinforcing bars, rebar couplers, polyethylene film, preformed joint filler, polystyrene, silicone sealant, connection plates and pipes, and labor required to build the approach slabs, barriers, and curb in the pay items "Concrete Bridge Approach Slab" and "Pile Supported Approach Slab." Include the dowel bars in the concrete pavement pay item.

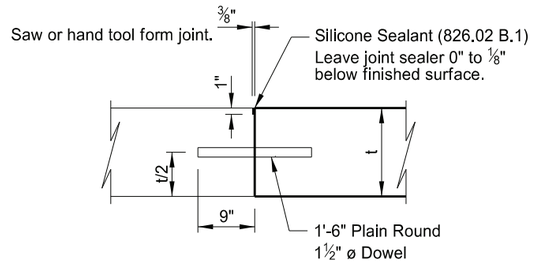
Provide Class AE concrete meeting Section 602.03 B. Provide a mix that will attain a compressive strength of 4,000 psi at 28 days. Use Grade 60 reinforcing steel that meets the requirements of Section 612. Provide polystyrene meeting AASHTO M230, preformed joint filler meeting Section 826.02 C or 826.02 F, and polyethylene film that meets ASTM C171.



APPROACH SLAB JOINT DETAIL B



APPROACH SLAB JOINT DETAIL C



t = Approach Slab Thickness

JOINT DETAIL A

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12/01/25
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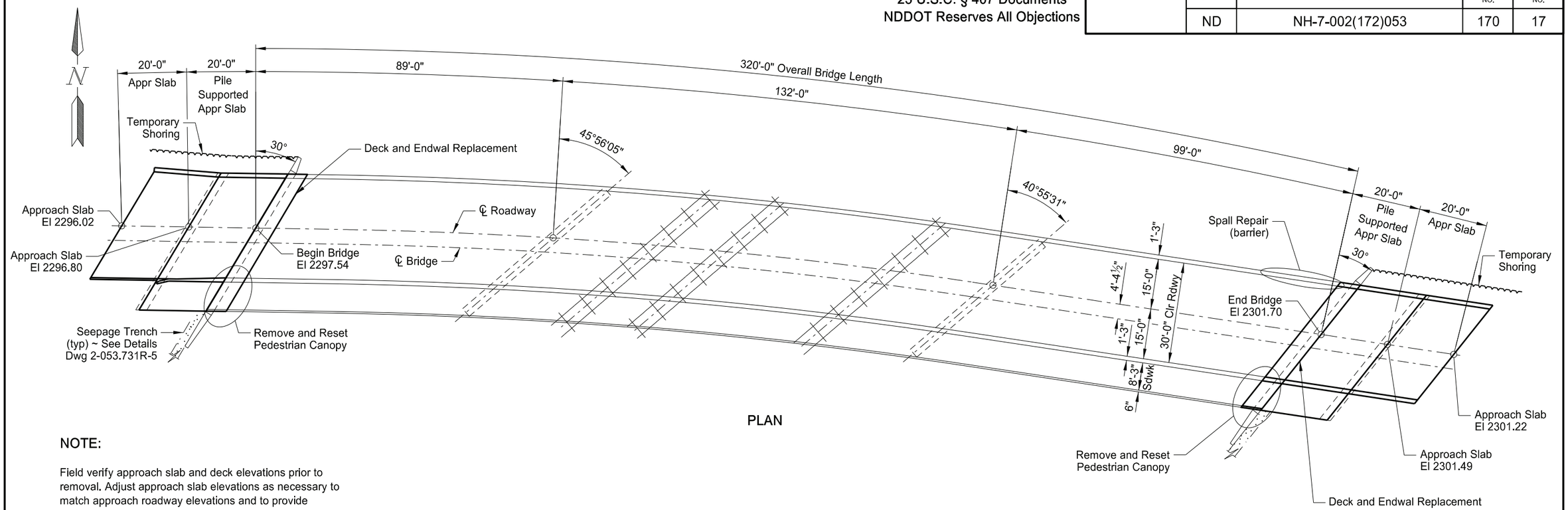
NORTH DAKOTA

BURLINGTON NORTHERN OVERHEAD
RAY

APPROACH SLAB DETAILS

DRAWING NO. 2-053.731L-16

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	17



PLAN

NOTE:

Field verify approach slab and deck elevations prior to removal. Adjust approach slab elevations as necessary to match approach roadway elevations and to provide drainage.

BRIDGE BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
107	0100	RAILWAY PROTECTION INSURANCE	L SUM	0.5
107	0140	RAILROAD COORDINATION	L SUM	0.5
202	0111	REMOVAL OF CONCRETE	L SUM	0.5
210	0099	CLASS 1 EXCAVATION	L SUM	0.5
602	0130	CLASS AAE-3 CONCRETE	CY	45.0
602	1133	CONCRETE BRIDGE APPROACH SLAB	SY	145.7
602	1134	PILE SUPPORTED APPROACH SLAB	SY	183.4
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	1,683
602	1260	BRIDGE DECK CRACK SEALING	LF	890
602	7000	SPECIAL SURFACE FINISH	SF	2,470
612	0115	REINFORCING STEEL-GRADE 60	LBS	999
612	0116	REINFORCING STEEL-GRADE 60-EPOXY COATED	LBS	6,483
624	0126	PEDESTRIAN CANOPY	LF	15.7
650	0805	DECK SPALL REPAIR	SF	60
930	8230	SHORING	EA	2
930	8644	SILICONE SEALANT	LF	616
930	9537	ABUTMENT UNDERDRAIN SYSTEM	EA	2
930	9612	SPALL REPAIR	SF	19
930	9660	ABUTMENT REPAIR	L SUM	0.5

DESIGN STRENGTHS:

f'c = 4,000 psi ~ Class AAE-3 Concrete
fy = 60,000 psi ~ Reinforcing Steel

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12/01/25
ENGINEER
NORTH DAKOTA

SPECIAL PROVISIONS	
SP 87(25)	CONCRETE SPALL REPAIR
SP 112(25)	RAILROAD REQUIREMENTS

STANDARD DRAWINGS
D-714-18, D-900-1

BURLINGTON NORTHERN OVERHEAD
RAY

(EASTBOUND)

BRIDGE LAYOUT

ND DEPARTMENT OF TRANSPORTATION
BRIDGE DIVISION

Jason Thorenson
12/01/25

DRAWING NO. 2-053.731R-1

12/1/2025 8:09:17 AM braschke R:\project\70002053.172\bridge\dgn\2-053.731R\170BR_017_BRLO.dgn

ATC BWR

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	18

NOTES

100 SCOPE OF WORK: Work at this site consists of removing and replacing approach slabs, removing and replacing the abutment endwalls and portion of deck at bridge ends, repairing concrete spall areas on the bridge deck surface, abutment backwall, abutment wingwalls, and barriers, applying penetrating water repellent treatment and sealing cracks on the bridge deck.and approach slabs, and applying a surface finish to the bridge and approach slab barriers.

100 GENERAL: Include the cost of furnishing and placing preformed expansion joint filler, concrete inserts, waterproof membrane, and other miscellaneous items in the price bid for Class AAE-3 concrete.

202 REMOVAL OF CONCRETE: Remove the concrete in a manner that prevents damage to the remaining structure. Include the barrier, deck, abutment endwall, and approach slab concrete removal in the lump sum bid item “Removal of Concrete.” Include the steel piling removal in the lump sum bid item “Removal of Concrete.”

210 EXCAVATION: Include the excavation costs at the abutments and approach slab footings, as shown in the “Detail at Abutment”, in the lump sum bid item “Class 1 Excavation.”

602 CLASS AAE-3 CONCRETE: Design a mix that meets Section 802 and will attain a minimum compressive strength of 4,000 psi at 28 days.

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

602 PENETRATING WATER REPELLENT TREATMENT: In addition to the top of the new approach slabs and bridge deck surfaces, apply the penetrating water repellent solution to the top of the existing bridge deck including the sidewalk area. Apply penetrating water repellent solution prior to sealing any bridge deck and approach slab cracks. Do not apply pavement marking or allow traffic until the solution has completely penetrated and the entire driving surface is dry.

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

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

Include all work and materials associated with the bridge deck crack sealing in the bid item “Bridge Deck Crack Sealing.” Include all work and materials associated with the approach slab crack sealing in the bid items “Pile Supported Approach Slab” and “Concrete Bridge Approach Slab.”

602 SPECIAL SURFACE FINISH: Clean the surfaces that are to receive the Tex-Cote surface finish using sandblasting, shot blasting, or water-washing equipment to remove all dirt, grease, oil, efflorescence, and laitance. Ensure any curing compounds and release agents have been completely removed from the surfaces to receive the Tex-Cote surface finish.

Apply Tex-Cote XL 70 Bridge Cote with Silane to the areas listed below. Apply the surface finish in accordance with the manufacturer’s recommended application procedures to attain a dry film thickness of 15 mils.

- Barrier inside and top surfaces
- Barrier outside surface (sidewalk side only)

Finish the surface with a uniform texture, color, and appearance free from fins, projections, cavities, and porous areas. Use a “sand” textured finish. Use gray surface finish color number 36424 meeting AMS-STD-595.

612 REBAR COUPLERS: Use approved mechanical connectors for the couplers capable of developing 125% of the reinforcing steel specified yield strength. Provide epoxy coated couplers according to Section 836.02 A and repair any damaged epoxy coating according to Section 612.04 E. Include the cost of furnishing and placing rebar couplers in the price bid for Grade 60 reinforcing steel.

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	19

NOTES

650 DECK SPALL REPAIR: Complete the deck spall repair in accordance with the construction requirements of Section 650.04 with the following exceptions.

- Saw cut the perimeter of the repair area to a depth of 1". Remove all concrete to a depth of 2" or to sound concrete, whichever is greater.
- Complete removals using mechanical equipment, with the exception that a milling machine specified for Class 1 removals will not be required.
- Use Class AE concrete meeting 602.03 B to restore the full depth of the repair area. Provide a mix that will attain a compressive strength of 4,000 psi at 28 days.
- Concrete placement using a buggy or pump is not required.
- Section 650.04 E “Mixing of Materials” is waived. Use of a mobile mixer is not required.
- Perform grooving according to Section 602.04 D.2 “Approach Slab Tining.”

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

900 ELEVATION CHECK POINTS: Prior to removal of the existing concrete, the District will record the elevations of the existing elevation check points at all substructures. Place four new carriage bolts on the top of the barrier at the abutments to serve as elevation check points. Include the cost for this item in the unit price bid for “Class AAE-3 Concrete.”

930 SILICONE SEALANT: Include all work associated with the silicone sealant installation at the existing bridge barrier/deck joint interface (gutter line entire length) in the bid item “Silicone Sealant.” Include all other silicone sealant installations shown in plans in other bid items.

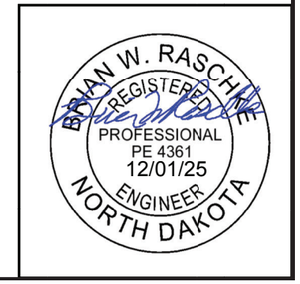
930 SPALL REPAIR: The structure has areas of spalling and concrete deterioration as indicated in the table below. See supplemental bid information for photos of concrete spalling. The extents of repairs as shown in the “Spall Repair” table are approximations. The actual limits and number of repair locations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

LOCATION	PHOTO	QUANTITY (SF)
BARRIER	#6	19

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

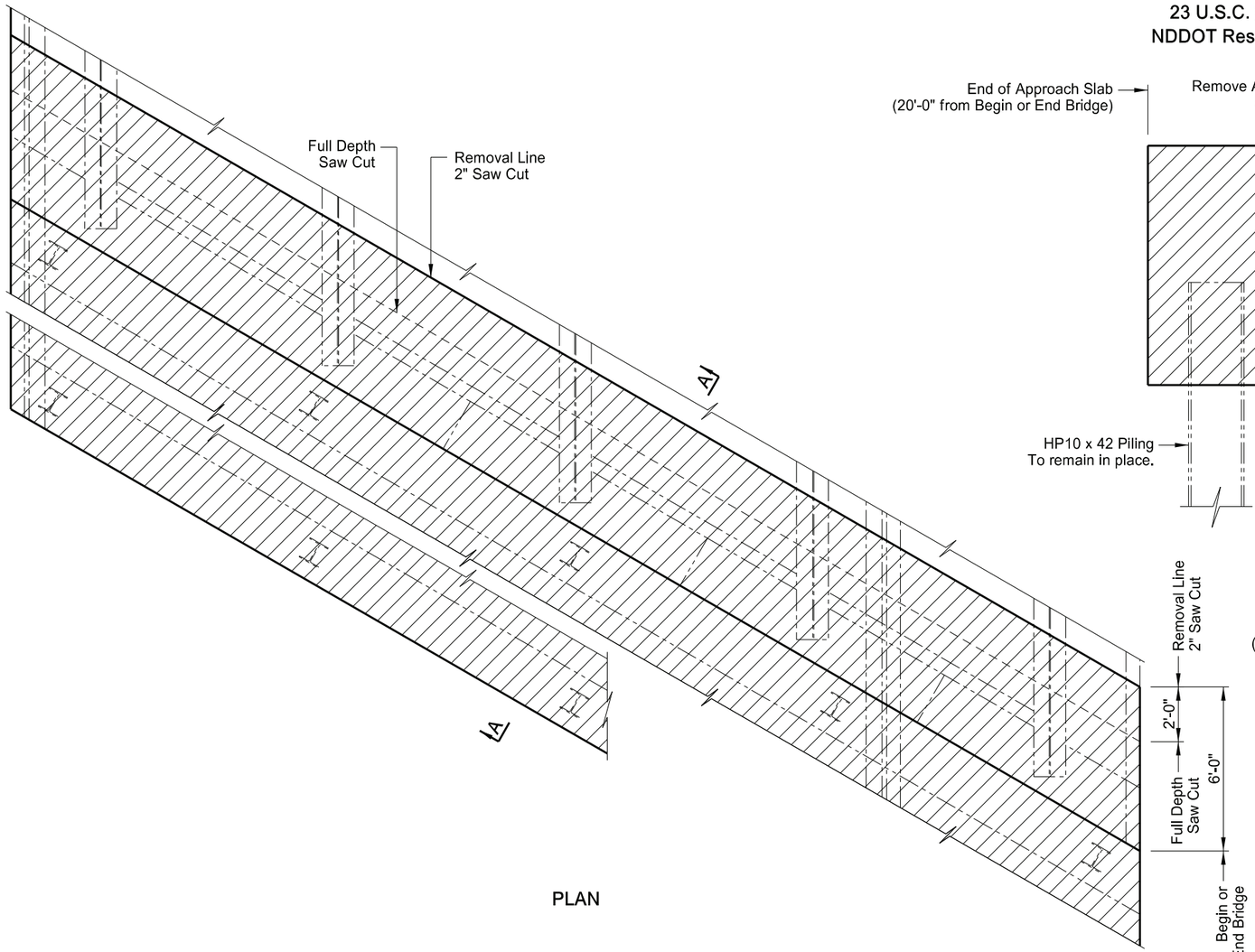
LOCATION	PHOTO	QUANTITY (SF)
ABUTMENT BACKWALL	#4	5
ABUTMENT WINGWALLS	#5	9

930 SHORING: Install temporary shoring in the median between the eastbound and westbound bridges at both end embankments, as shown on drawings 2-053.731L-1 & 2-053.731R-1, to facilitate excavation and construction of the bridge abutment endwalls and approach slabs while the other bridge is used for traffic control. Include all costs associated with design, materials, installation, and removal of the temporary shoring in the price bid for “Shoring.” The quantity of 2 each is for shoring required at each embankment.

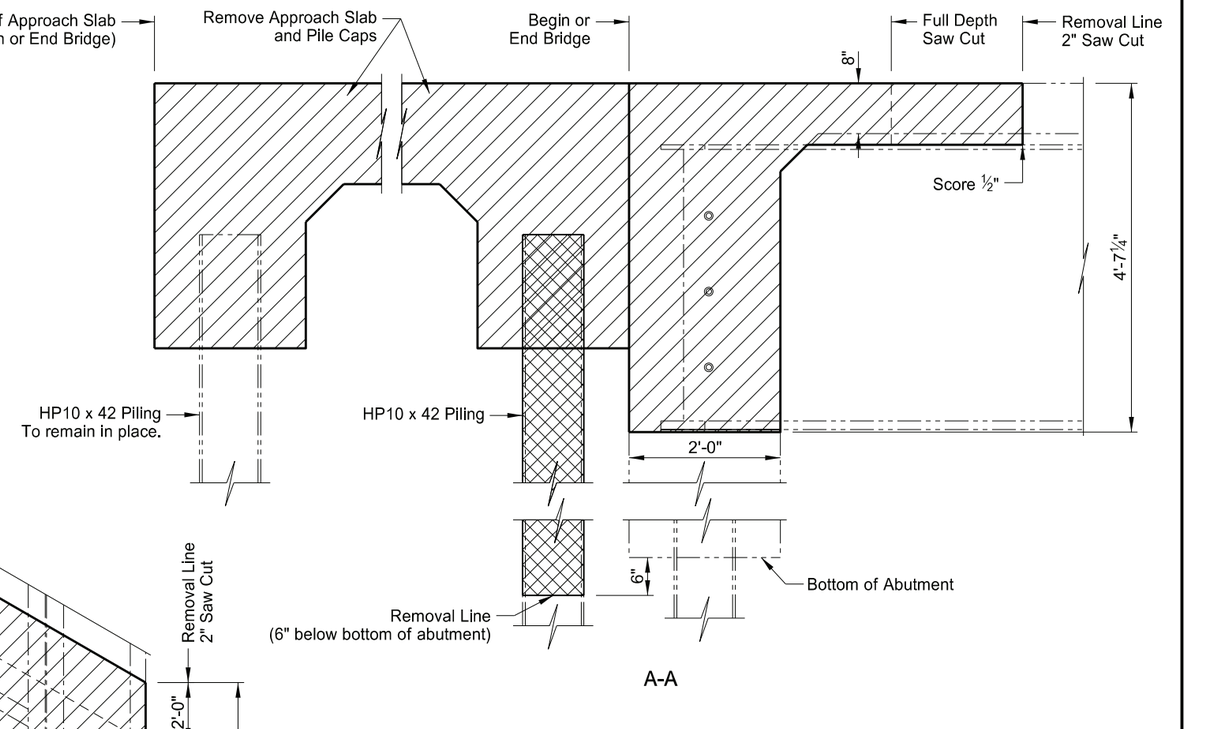


23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

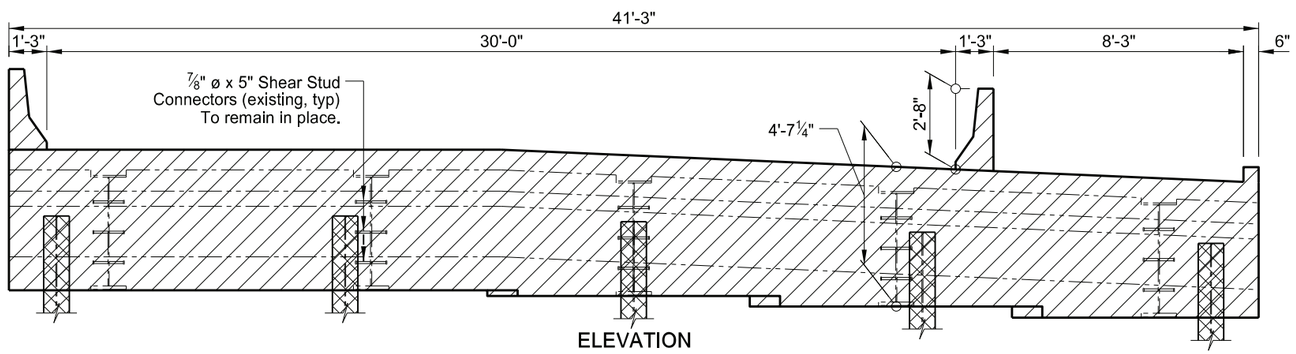
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	20



PLAN



A-A



ELEVATION

Hatched area indicates concrete to be removed.

Hatched area indicates steel piling to be removed.

NOTES:

Score ½" from the bottom of the deck prior to the full depth saw cut. Saw cut the deck full depth 2'-0" from the removal line. Saw cut the deck to a depth of 2" at the removal line to produce a neat line between the concrete to be removed and the concrete to remain. Saw cut existing barriers to a depth of 1" at the removal line to produce a neat line between the concrete to be removed and the concrete to remain. Carefully remove concrete to ensure no damage is done to the existing reinforcing steel and girder shear stud connectors that are to remain in place. Sand blast clean the exposed existing reinforcing bars from any rust scale.

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BURLINGTON NORTHERN OVERHEAD
RAY

APPROACH SLAB, DECK, &
ENDWALL REMOVAL DETAILS

DRAWING NO. 2-053.731R-4

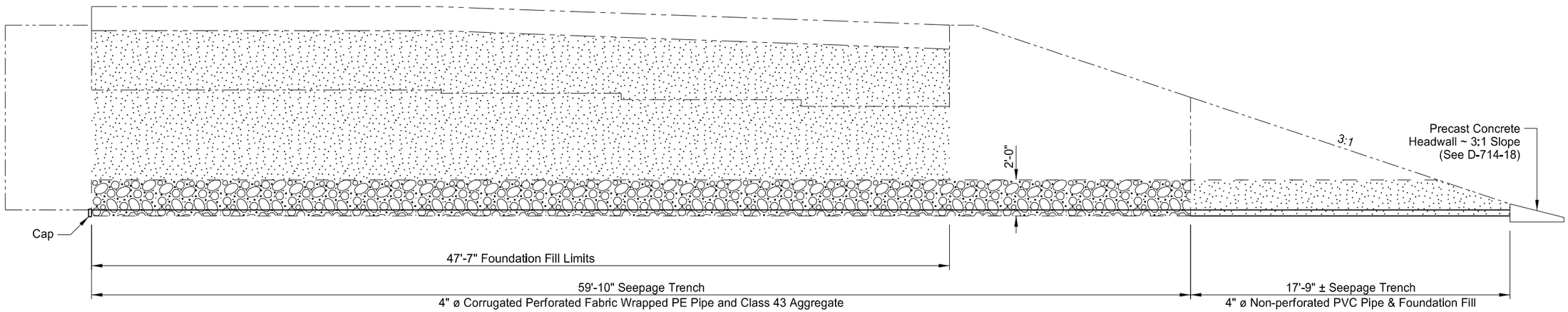
12/1/2025 8:09:23 AM braschke R:\project\70002053.172\bridge\dgn\2-053.731R\170BR_020_REMOVAL.dgn ATC BWR

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	21

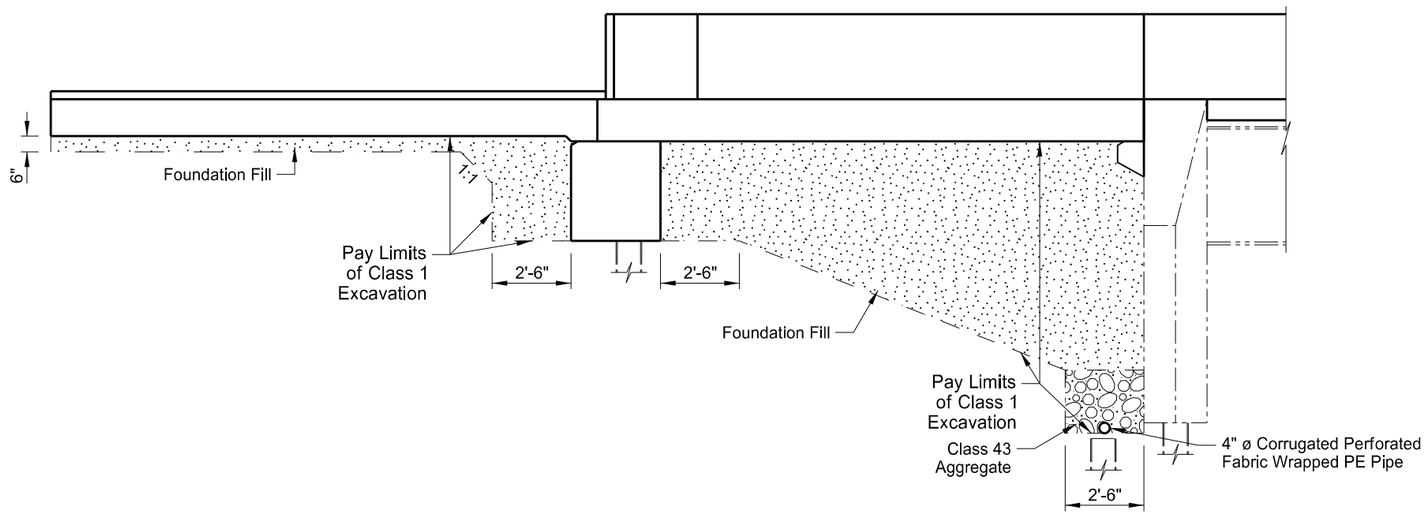
NOTES:

Use corrugated perforated fabric wrapped PE pipe that meets the requirements of Section 830.03 A.4. Provide fabric wrapping for the pipe that meets the requirements of Section 858.01 for D3 or D4 drainage fabric. Provide aggregate that meets the requirements of Section 816.03, Class 43. Provide foundation fill that meets the requirements of Section 210.

Include the cost to furnish and place the foundation fill, aggregate, corrugated perforated pipe and headwalls in the pay item "Abutment Underdrain System."



BACK FACE OF ABUTMENT



DETAIL AT ABUTMENT

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BURLINGTON NORTHERN OVERHEAD
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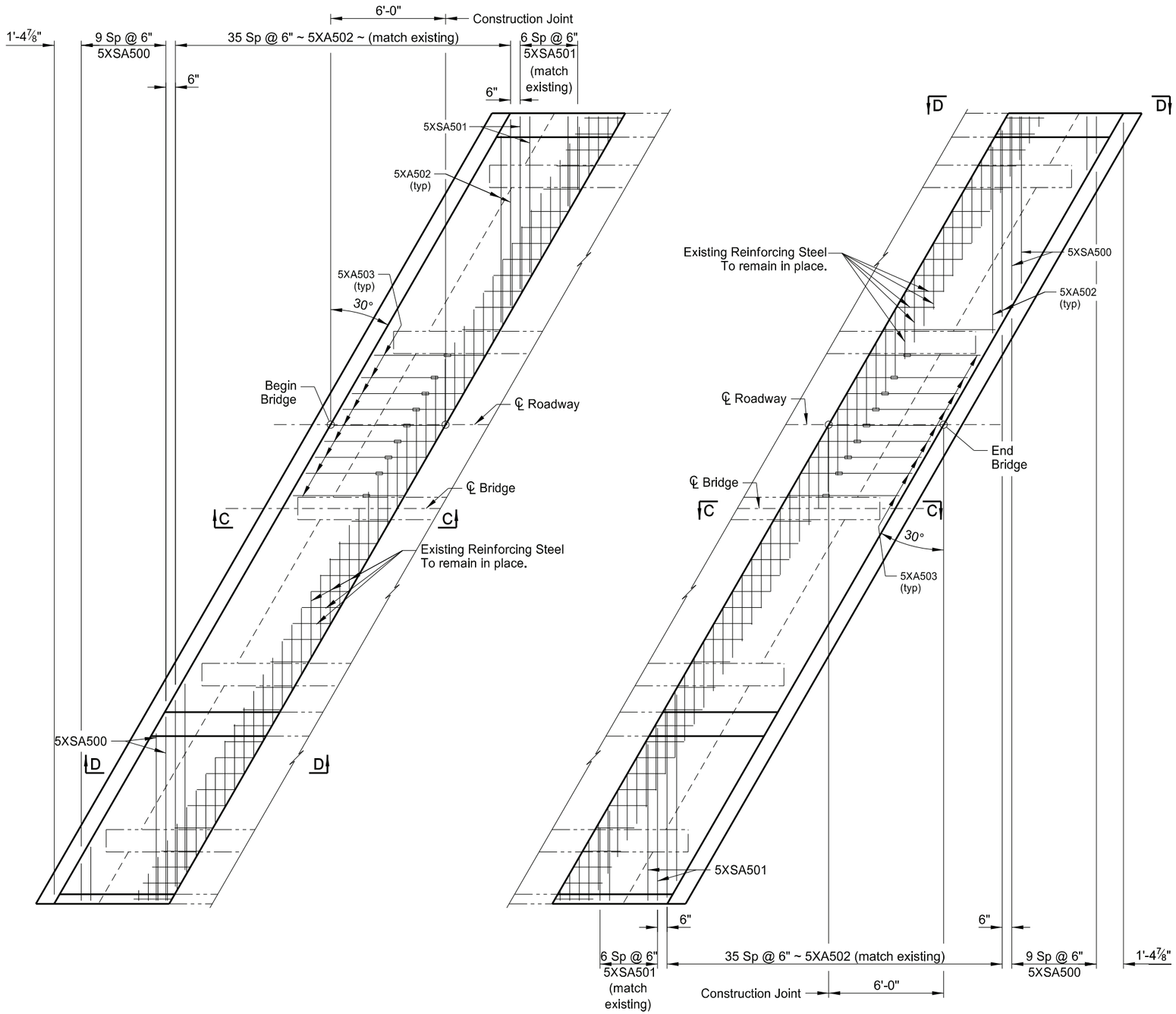
ABUTMENT UNDERDRAIN &
EXCAVATION DETAILS

DRAWING NO. 2-053.731R-5

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	22



PARTIAL PLAN

NOTES:

Couple the 5XA503 bars to the existing reinforcing steel.

See Dwg 2-053.731R-8 for Sections C-C & D-D.

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QUANTITIES

SEE DWG 2-053.731R-10

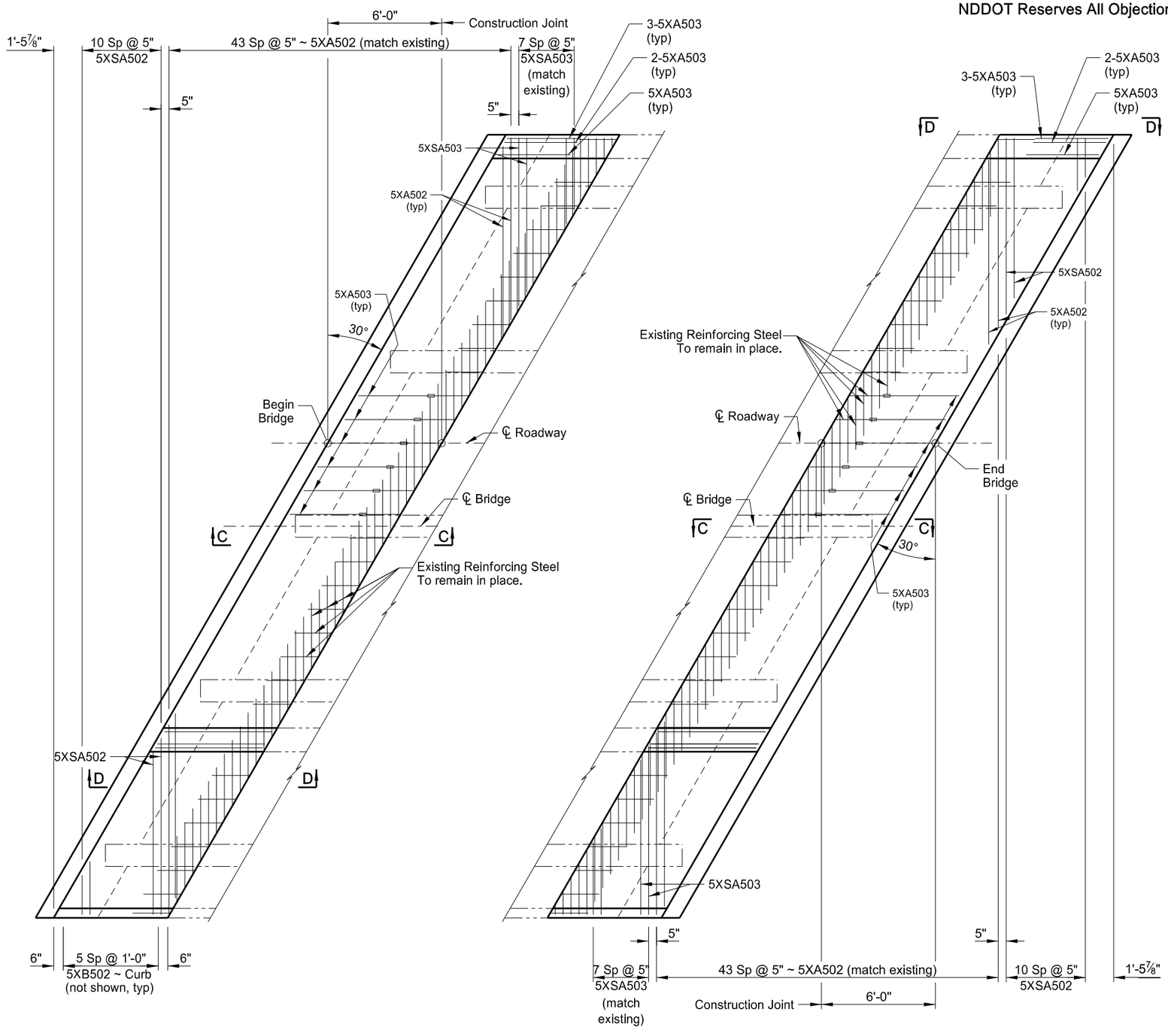
BURLINGTON NORTHERN OVERHEAD
RAY

(SHOWING BOTTOM REINFORCING)

PARTIAL SLAB LAYOUT

DRAWING NO.	2-053.731R-6

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	23



PARTIAL PLAN

NOTES:

Couple the 5XA503 bars to the existing reinforcing steel.

See Dwg 2-053.731R-8 for Sections C-C & D-D.

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QUANTITIES

SEE DWG 2-053.731R-10

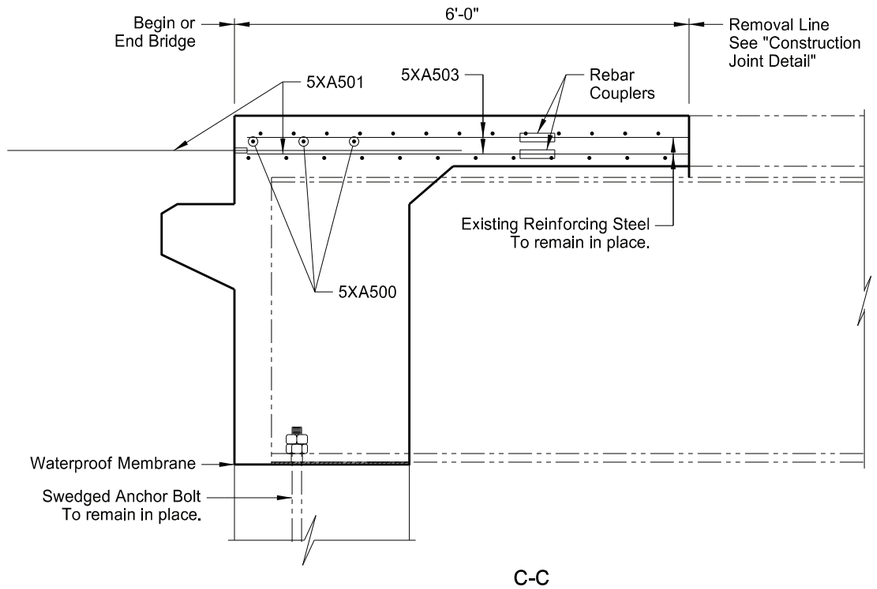
BURLINGTON NORTHERN OVERHEAD
RAY

(SHOWING TOP REINFORCING)

PARTIAL SLAB LAYOUT

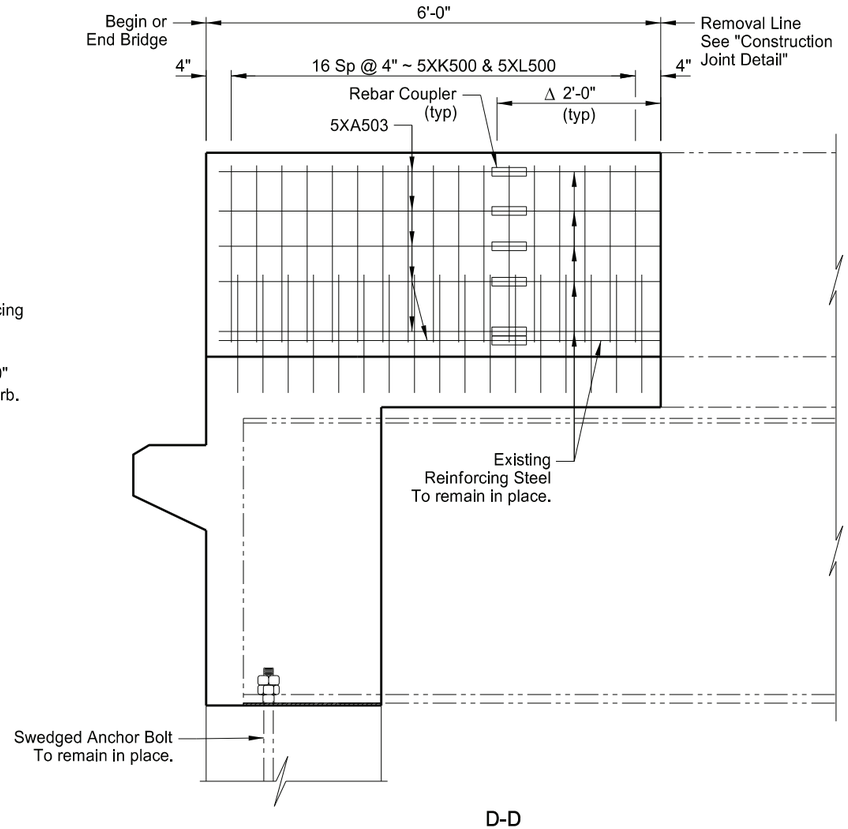
DRAWING NO. 2-053.731R-7

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	24

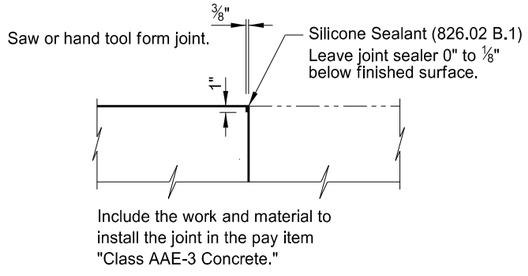


C-C

Δ Cut the existing horizontal reinforcing steel protruding from the existing concrete barrier and curb after removal leaving a minimum of 2'-0" exposed to the new barrier and curb.



D-D



Include the work and material to install the joint in the pay item "Class AAE-3 Concrete."

CONSTRUCTION JOINT DETAIL

NOTES:

Couple the 5XA503 bars to the existing reinforcing steel.

See Dwgs 2-053.731R-6 & 7 for location of Section C-C & D-D.

Use waterproof membrane that meets the requirements of Section 602.03 B. Center the waterproof membrane (1'-0" minimum width) on the joint.

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QUANTITIES

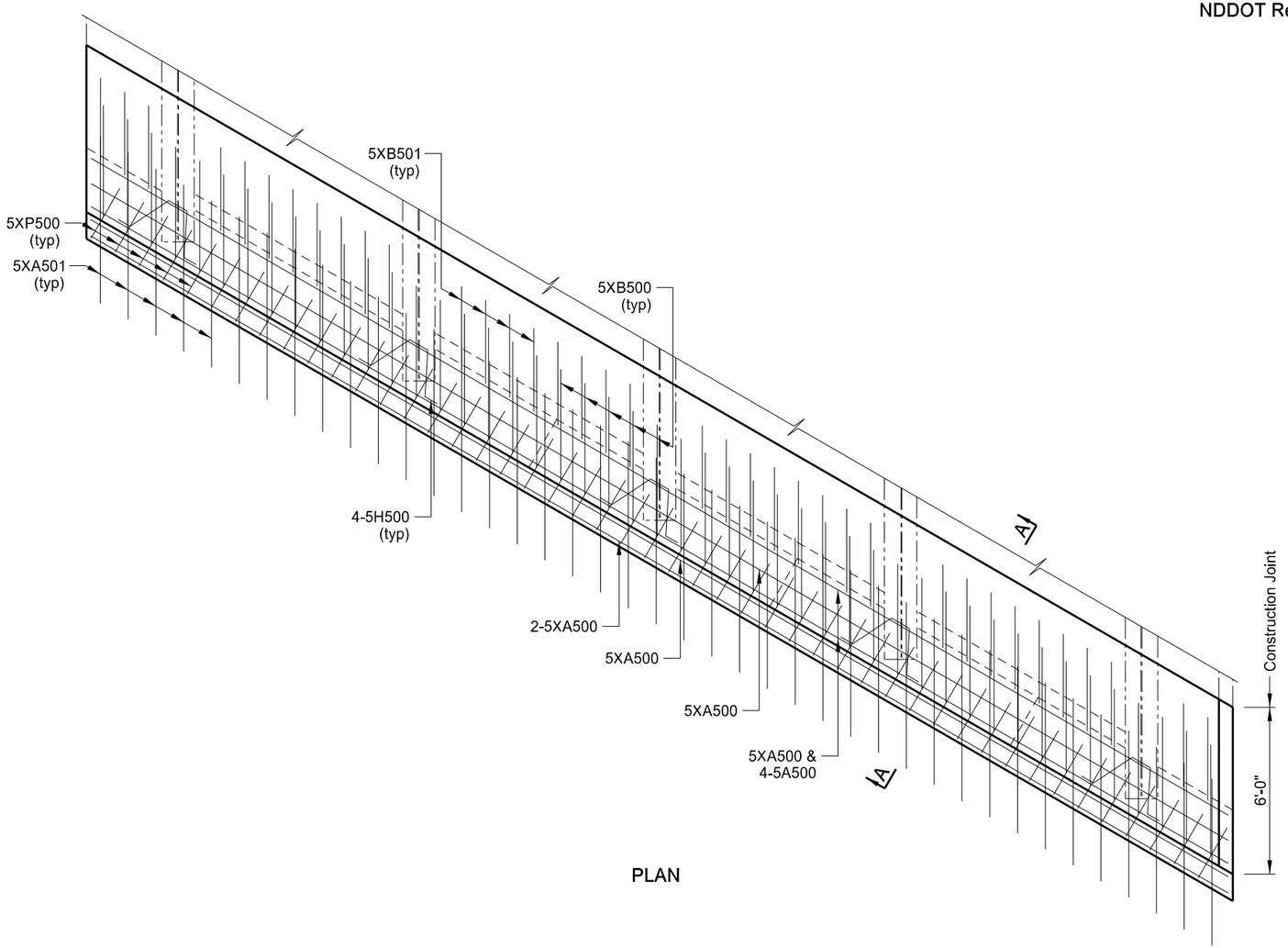
SEE DWG 2-053.731R-10

BURLINGTON NORTHERN OVERHEAD
RAY

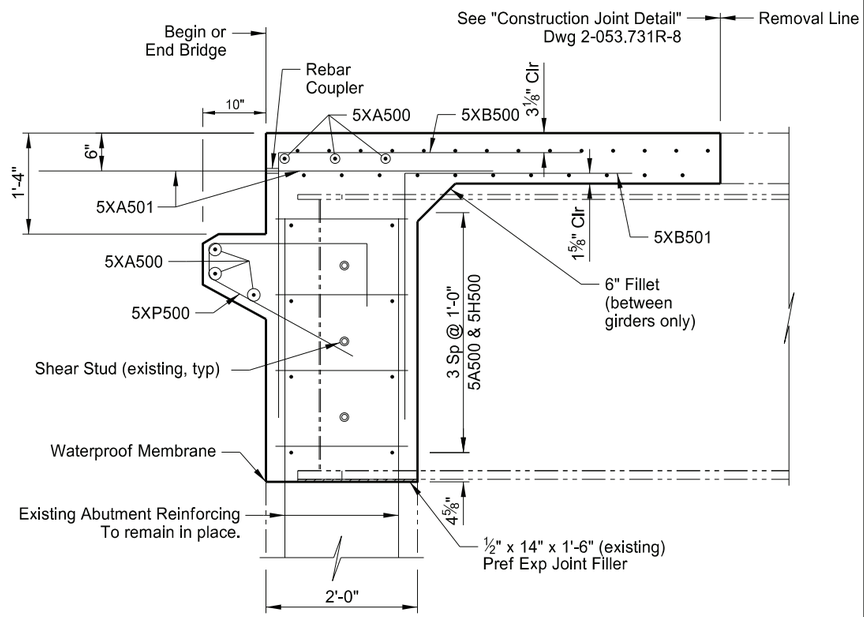
SUPERSTRUCTURE DETAILS

DRAWING NO. 2-053.731R-8

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	25



PLAN

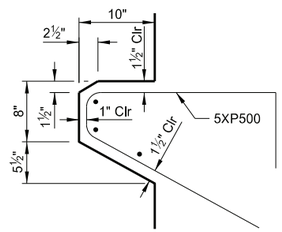


A-A

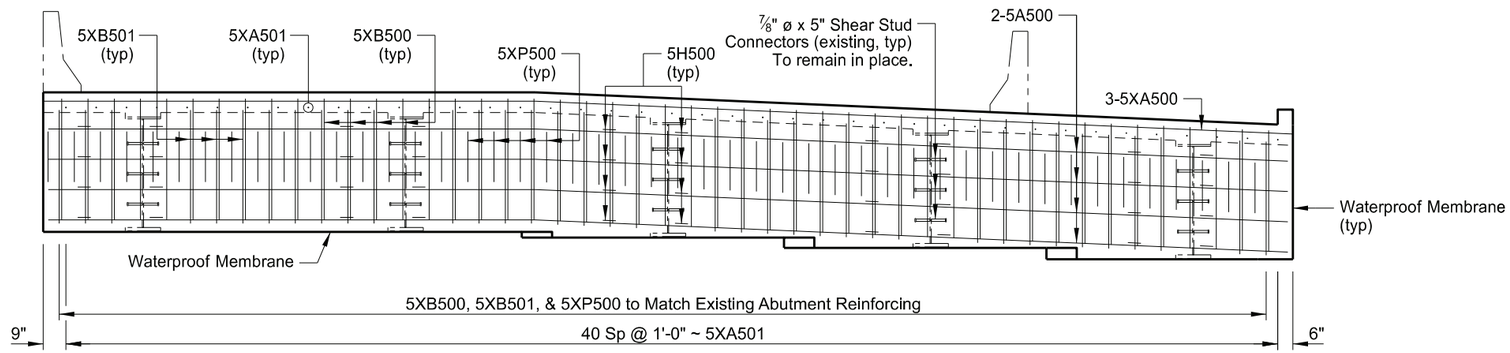
NOTES:

Do not install the 5XA501 bars into the approach slab until all of the foundation fill is in place.

Use waterproof membrane that meets the requirements of Section 602.03 B. Center the waterproof membrane (1'-0" minimum width) on the joint.



APPROACH LIP DETAIL



(APPROACH LIP NOT SHOWN)

ELEVATION

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QUANTITIES

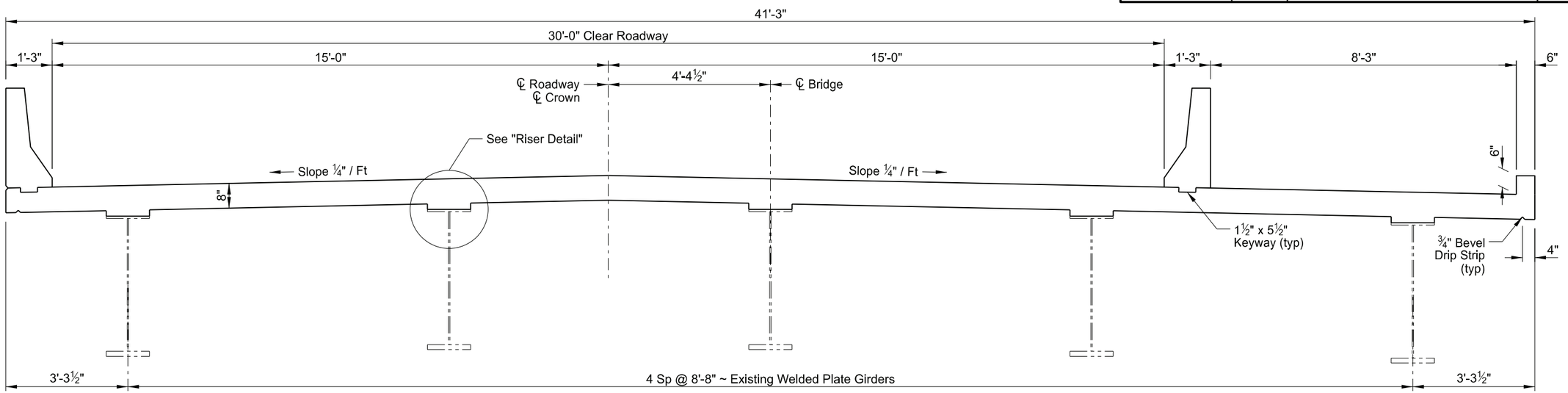
SEE DWG 2-053.731R-10

BURLINGTON NORTHERN OVERHEAD
RAY

ENDWALL DETAILS

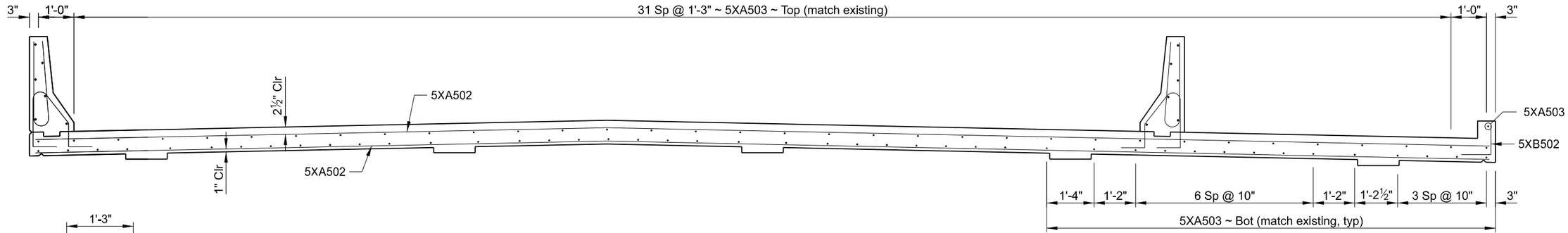
DRAWING NO.	2-053.731R-9

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	26



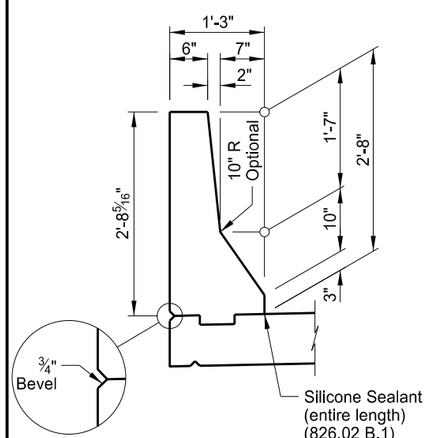
(SHOWING DIMENSIONS)

SLAB SECTION

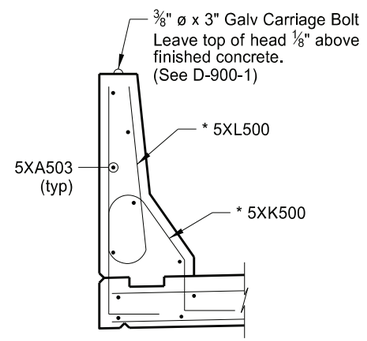


(SHOWING REINFORCING)

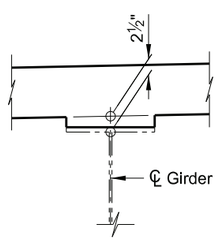
SLAB SECTION



SHOWING DIMENSIONS



SHOWING REINFORCING



RISER DETAIL

BARRIER DETAIL

QUANTITIES	
CLASS AAE-3 CONCRETE	45.0 CY
REINFORCING STEEL	999 LBS
REINFORCING STEEL (EPOXY)	6,483 LBS

BURLINGTON NORTHERN OVERHEAD
RAY

SLAB SECTION

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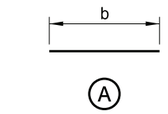
DRAWING NO.	2-053.731R-10

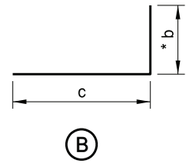
BILL OF REINFORCING STEEL, GRADE 60

LETTER PREFIX OF BAR MARK DENOTES SHAPE ~ SEE BAR DETAILS

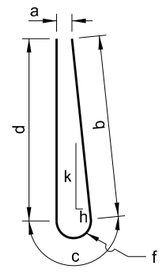
LOCATION		SIZE	MARK	NO. EACH /SET	NOMINAL LENGTH	DETAILING DIMENSIONS								
						a	b	c	d	e	f	g	h	k
SUPERSTRUCTURE	REGULAR	5	A500	16	47'-2"		47'-2"							
		5	H500	40	5'-1"	6"	1'-8"	9"					6	12
	EPOXY	5	XA500	12	47'-2"		47'-2"							
		5	XA501	164	3'-0"		3'-0"							
		5	XA502	160	9'-8"		9'-8"							
		5	XA503 **	182	3'-10"		3'-10"							
		5	XB500	94	8'-1"		4'-1"	4'-0"						
		5	XB501	74	6'-10"		3'-10"	3'-0"						
		5	XB502	12	1'-8"		10"	10"						
		5	XK500	68	4'-11"	1'-4"	8"	11"	8"	1'-0"	2.5"	8"	8.5	12
		5	XL500	68	5'-1"	3"	2'-2"	9"	2'-2"		2.25"		1.25	12
		5	XP500	94	5'-6"	5"	2'-1"	2'-2"			1.25"	10"	12	6.5
		5	XSA500	2	57'-6"	1'-11"	9'-7"			9				
		5	XSA501	2	44'-8"	3'-9"	9'-0"			6				
		5	XSA502	2	61'-5"	2'-1"	9'-1"			10				
		5	XSA503	2	51'-8"	3'-11"	9'-0"			7				

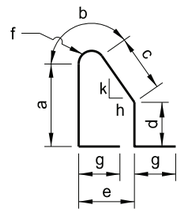
** Coupled to existing #5 reinforcing steel.

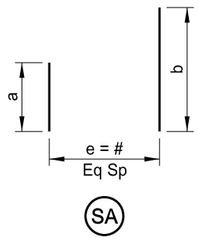


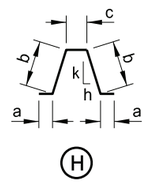


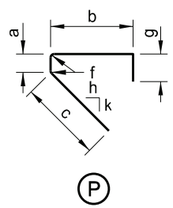
* b = Vertical Leg for XB500 and XB501











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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	27

NOTES:

1. Verify the quantity, size, and shape of the bar reinforcement against the structure drawings and immediately notify the Engineer of any discrepancies. Discrepancies in the bar list will not be cause for adjustment of the contract unit price.
2. All dimensions are out to out of bars.
3. Nominal length of each bent bar or cut bar is the sum total of the detailing dimensions for that bar, unless otherwise noted.
4. The "f" dimension indicates the inside radius unless otherwise noted.
5. An "X" preceding a bar designation indicates an epoxy coated bar.

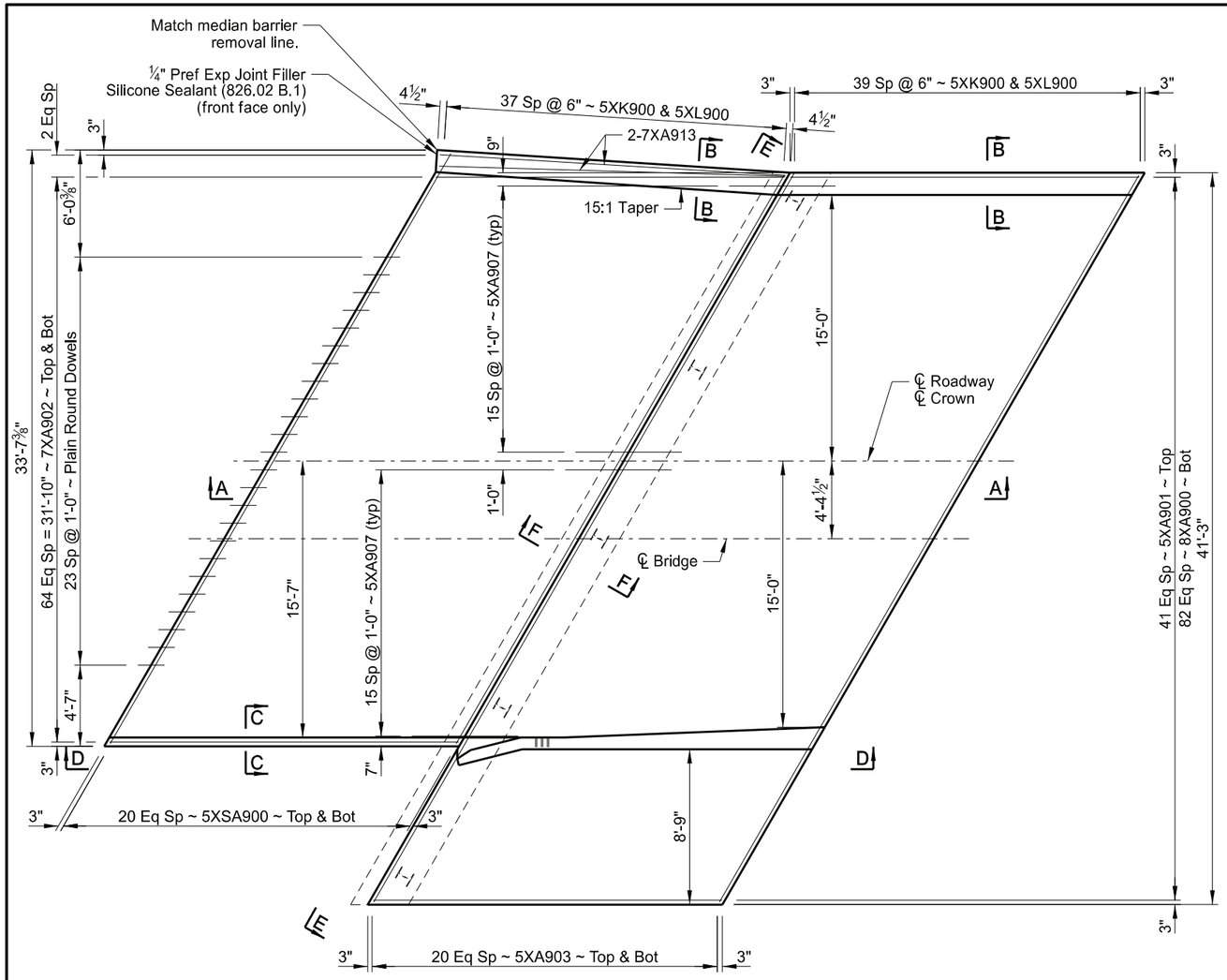
BURLINGTON NORTHERN OVERHEAD
RAY

REINFORCING BAR LIST & DETAILS

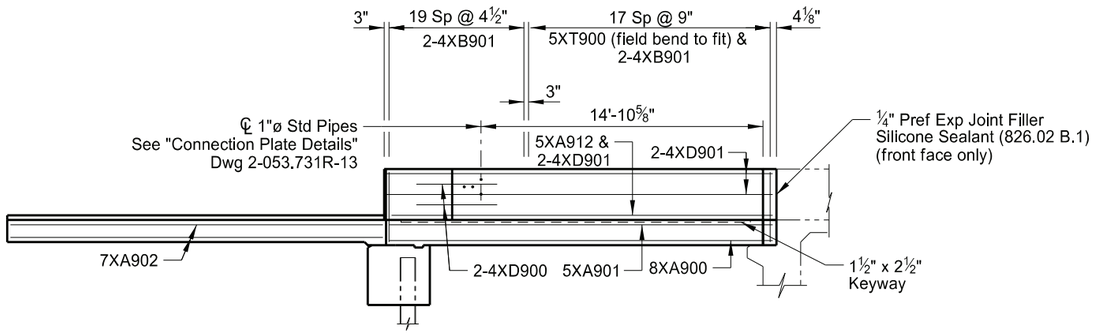
DRAWING NO. 2-053.731R-11

12/1/2025 8:09:56 AM braschke R:\project\70002053.172\bridge\dgn\2-053.731R\170BR_027_REBAR.dgn ATC BWR

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	28

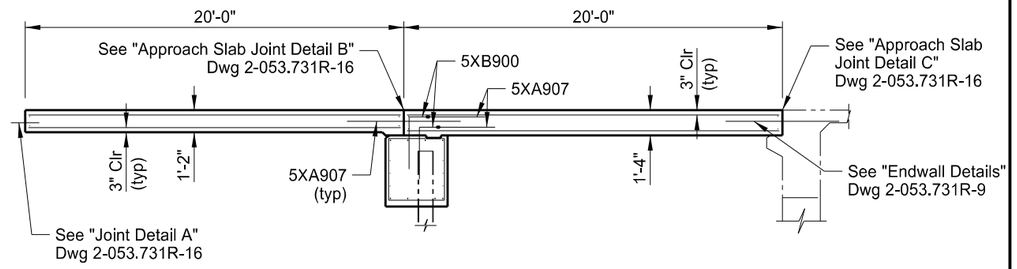


PLAN

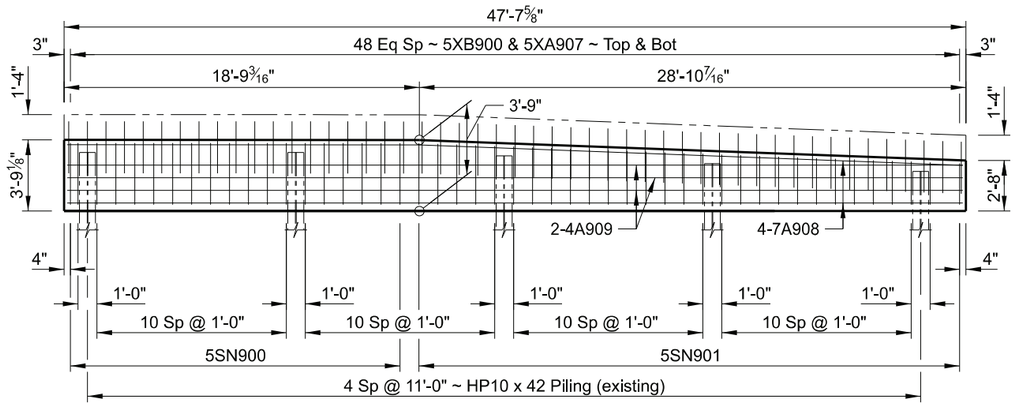


D-D

ELEVATION



A-A



E-E

FOOTING ELEVATION

NOTE:

See Dwg 2-053.731R-16 for Sections B-B & F-F.
See Dwg 2-053.731R-13 for Section C-C.

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QUANTITIES
SEE DWG 2-053.731R-13

BURLINGTON NORTHERN OVERHEAD
RAY

(WEST END)

APPROACH SLAB DETAILS

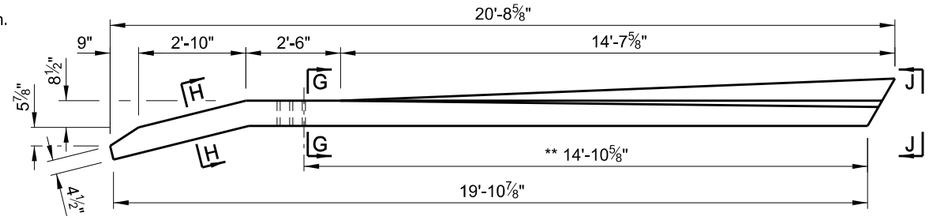
DRAWING NO.	2-053.731R-12

12/1/2025 8:10:00 AM braschke R:\project\70002053.172\bridge\dgn\2-053.731R\170BR_028_APPRSLAB1.dgn

ATC BWR

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	29

** Field verify existing guardrail connection.



SAFETY SHAPE BARRIER TRANSITION PLAN

NOTES:

The bar marks beginning with an "X" indicate an epoxy coated bar. The dimensions shown in the "Bent Bar Details" are out to out.

See Dwg 2-053.731R-12 for location of Section C-C.

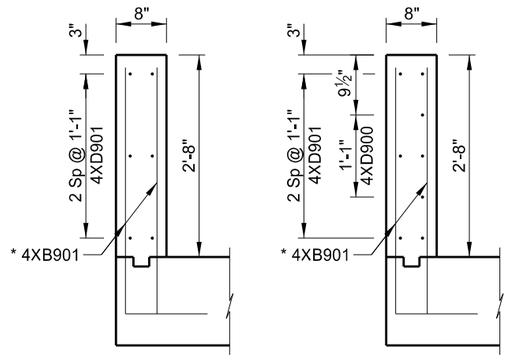
SKEW ANGLE = 30°

BAR LIST

SIZE	MARK	NO.	LENGTH
8	XA900	83	19'-8"
5	XA901	42	19'-8"
7	XA902	130	19'-8"
5	XA903	42	47'-2"
5	XA907	162	3'-0"
7	A908	8	47'-2"
4	A909	6	47'-2"
4	XA910	9	19'-8"
4	XA911	9	18'-11"
5	XA912	1	14'-5"
7	XA913	4	19'-6"
5	XB900	98	3'-9"
4	XB901	76	4'-2"
4	XD900	2	4'-0"
4	XD901	6	19'-9"
5	XK900	78	5'-7"
5	XL900	78	5'-1"
5	XT900	18	3'-0"
5	XSA900	2	790'-2"
5	SN900	1	237'-6"
5	SN901	1	331'-1"

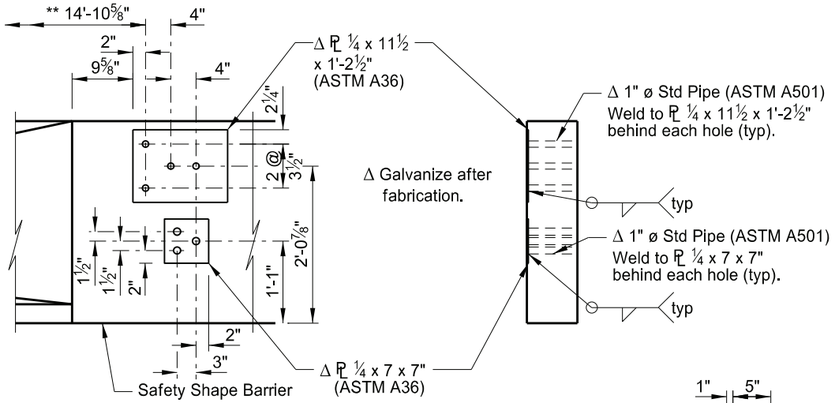
ESTIMATED MATERIAL QUANTITIES

REINFORCING STEEL (LBS)	CONCRETE (CY)
18,230	91.1

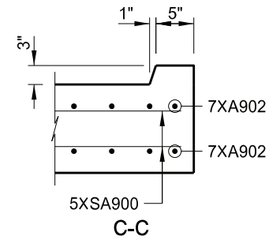


G-G H-H

SHOWING REINFORCING



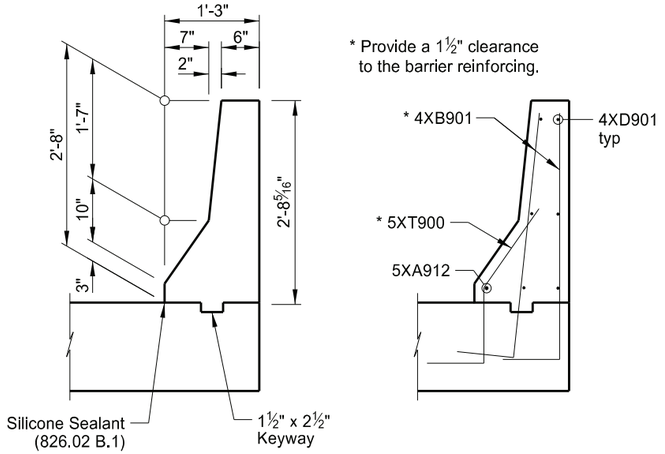
SHOWING DIMENSIONS



C-C

(SHOWING FRONT FACE)

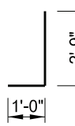
CONNECTION PLATE DETAILS



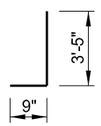
SHOWING DIMENSIONS

J-J

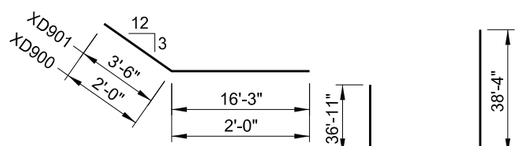
SHOWING REINFORCING



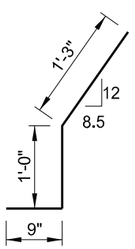
XB900



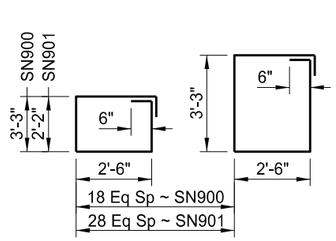
XB901



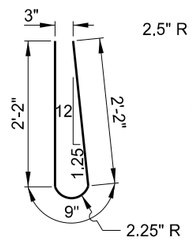
XD900 & XD901 XSA900



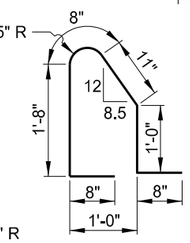
XT900



SN900 & SN901



XL900



XK900

BENT BAR DETAILS

QUANTITIES

APPROACH SLAB	73.5 SY
PILE SUPPORTED APPROACH SLAB	91.7 SY

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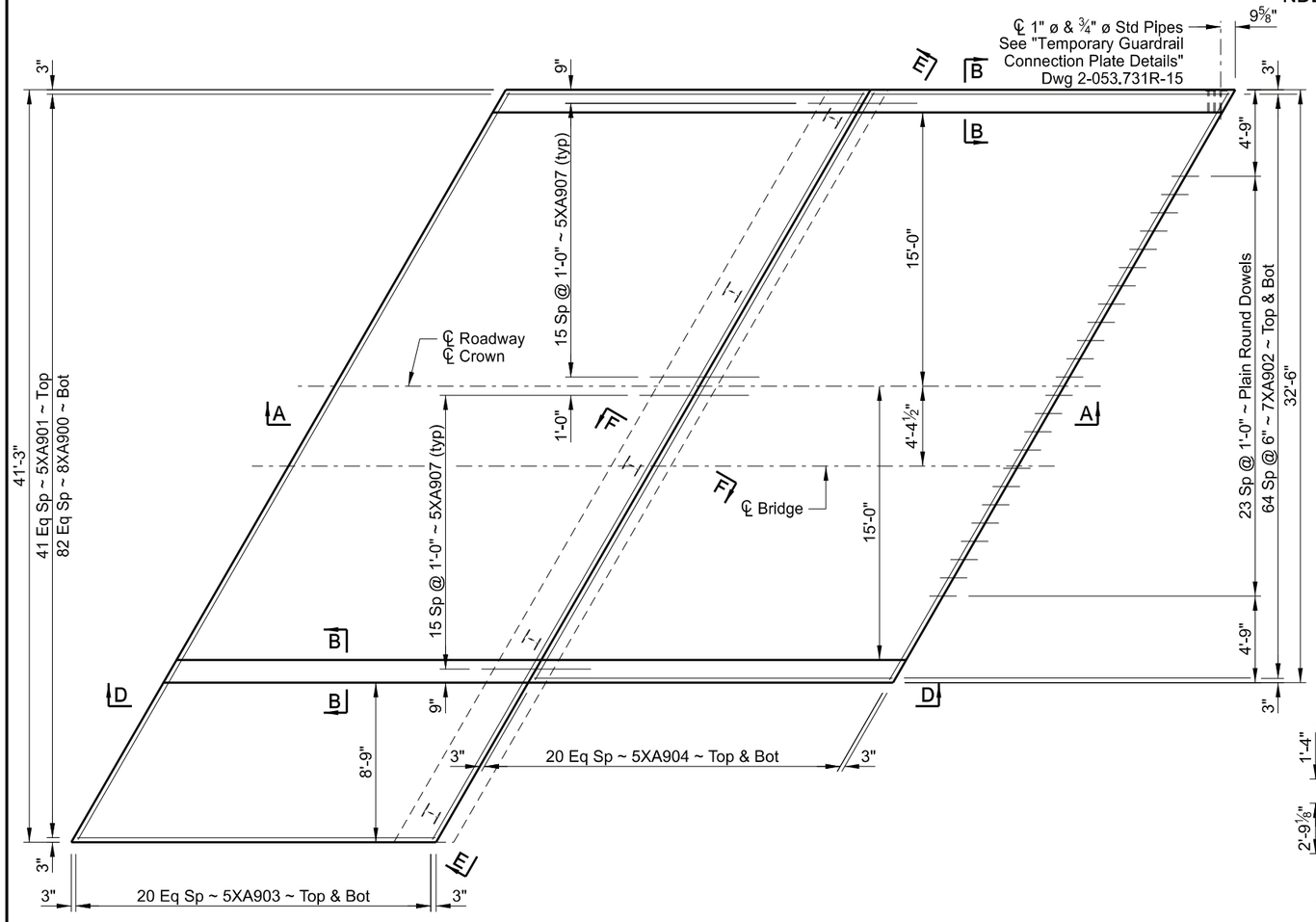
BURLINGTON NORTHERN OVERHEAD
RAY

(WEST END)

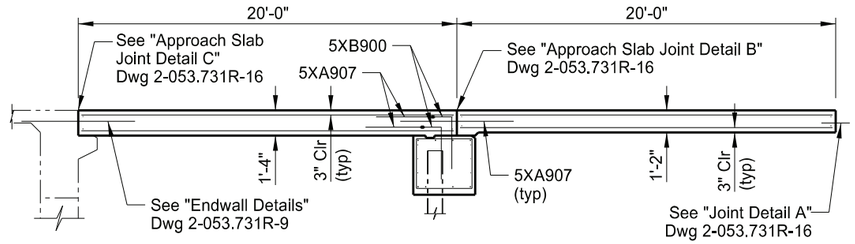
APPROACH SLAB DETAILS

DRAWING NO. 2-053.731R-13

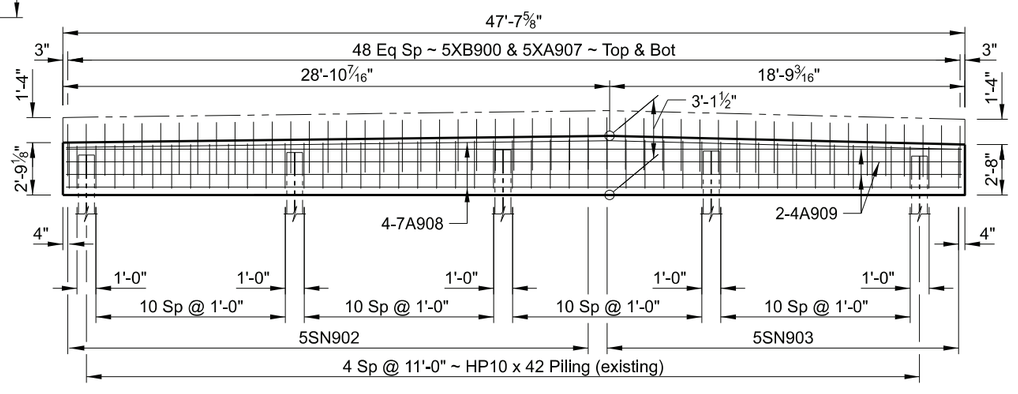
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	30



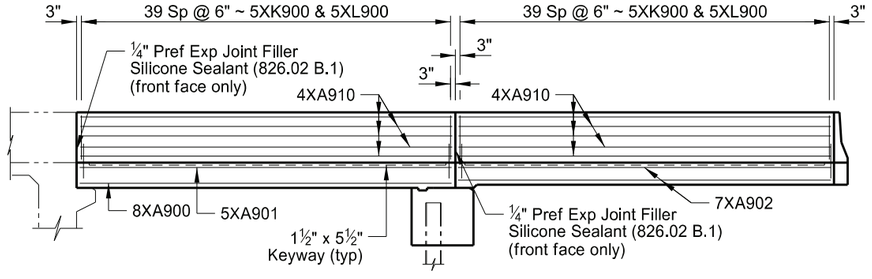
PLAN



A-A



E-E
FOOTING ELEVATION



D-D
ELEVATION

NOTE:

See Dwg 2-053.731R-16 for Sections B-B & F-F.

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PE 4361
12/01/25
ENGINEER
NORTH DAKOTA

QUANTITIES

SEE DWG 2-053.731R-15

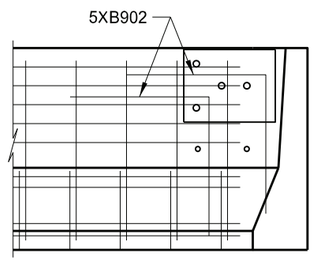
BURLINGTON NORTHERN OVERHEAD
RAY

(EAST END)

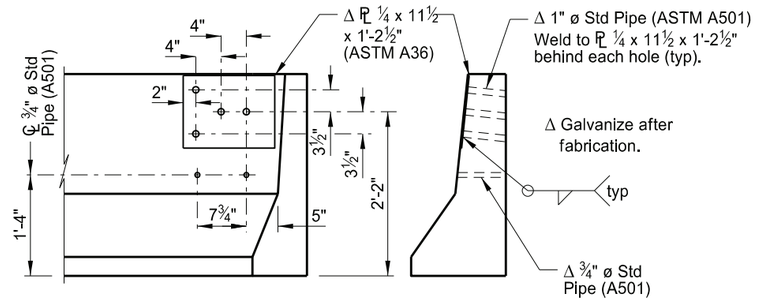
APPROACH SLAB DETAILS

DRAWING NO.	2-053.731R-14

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	31



SHOWING REINFORCING



SHOWING DIMENSIONS

(SHOWING FRONT FACE)

TEMPORARY GUARDRAIL CONNECTION PLATE DETAILS

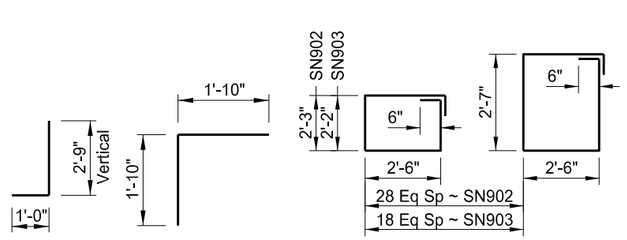
SKEW ANGLE = 0°

BAR LIST

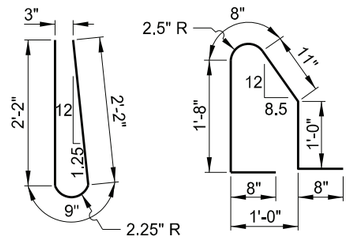
SIZE	MARK	NO.	LENGTH
8	XA900	83	19'-8"
5	XA901	42	19'-8"
7	XA902	130	19'-8"
5	XA903	42	47'-2"
5	XA904	42	37'-1"
5	XA907	162	3'-0"
7	A908	8	47'-2"
4	A909	6	47'-2"
4	XA910	36	19'-8"
5	XB900	98	3'-9"
5	XB902	2	3'-8"
5	XK900	160	5'-7"
5	XL900	160	5'-1"
5	SN902	1	314'-2"
5	SN903	1	204'-3"

ESTIMATED MATERIAL QUANTITIES

REINFORCING STEEL (LBS)	CONCRETE (CY)
18,788	88.2



XB900 XB902 SN902 & SN903



XL900 XK900

BENT BAR DETAILS

QUANTITIES

APPROACH SLAB	72.2 SY
PILE SUPPORTED APPROACH SLAB	91.7 SY

BURLINGTON NORTHERN OVERHEAD
RAY

(EAST END)

APPROACH SLAB DETAILS

BRIAN W. RASCHKE REGISTERED PROFESSIONAL PE 4361 12/01/25 ENGINEER NORTH DAKOTA

DRAWING NO. 2-053.731R-15

12/1/2025 8:10:14 AM braschke R:\project\70002053.172\bridge\dgn\2-053.731R\170BR_031_APPRSLAB4.dgn

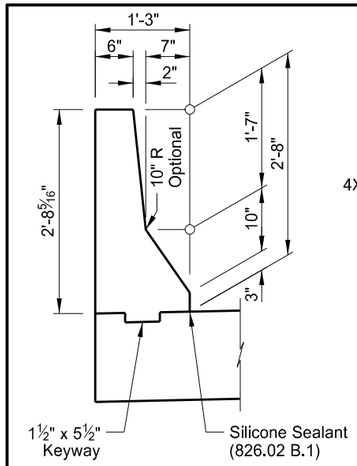
ATC BWR

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

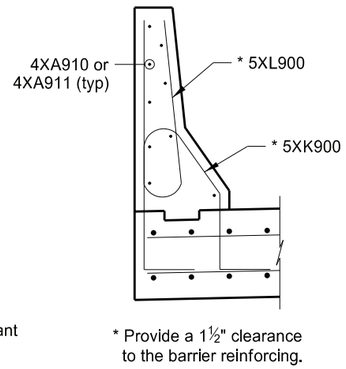
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	32

NOTE:

See Dwgs 2-053.731R-12 & 14 for location of Sections B-B & F-F.

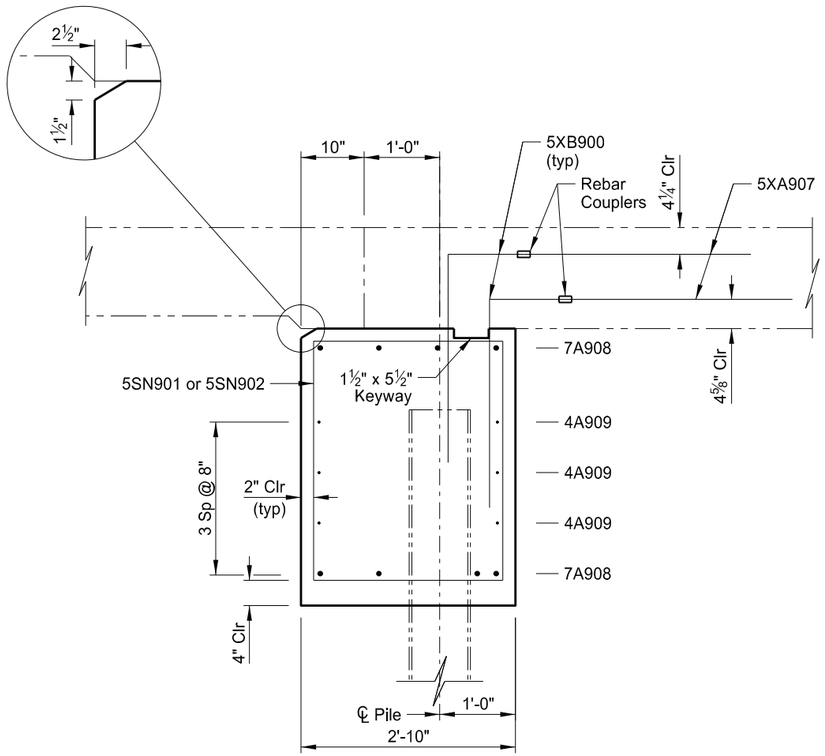


SHOWING DIMENSIONS



SHOWING REINFORCING

B-B



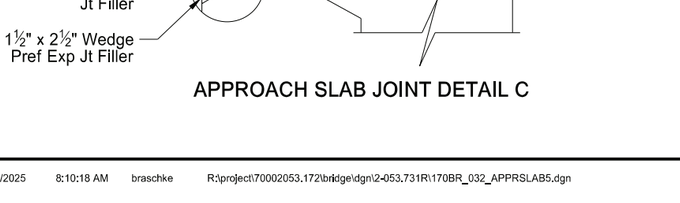
F-F

NOTES:

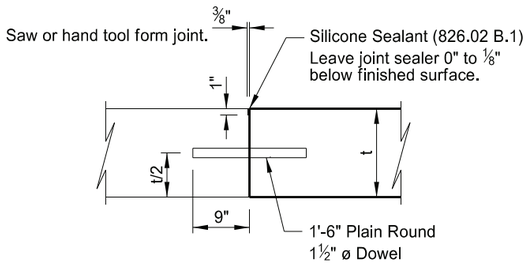
Couple the 5XA907 bars to the 5XB900 bars extending out of the approach slab footing. Use approved mechanical connectors for the couplers capable of developing 125% of the reinforcing steel specified yield strength. Provide epoxy coated couplers according to Section 836.02 A and repair any damaged epoxy coating according to Section 612.04 E.

The estimated material quantities shown are for information purposes only. Include the concrete, reinforcing bars, rebar couplers, polyethylene film, preformed joint filler, polystyrene, silicone sealant, connection plates and pipes, and labor required to build the approach slabs, barriers, and curb in the pay items "Concrete Bridge Approach Slab" and "Pile Supported Approach Slab." Include the dowel bars in the concrete pavement pay item.

Provide Class AE concrete meeting Section 602.03 B. Provide a mix that will attain a compressive strength of 4,000 psi at 28 days. Use Grade 60 reinforcing steel that meets the requirements of Section 612. Provide polystyrene meeting AASHTO M230, preformed joint filler meeting Section 826.02 C or 826.02 F, and polyethylene film that meets ASTM C171.

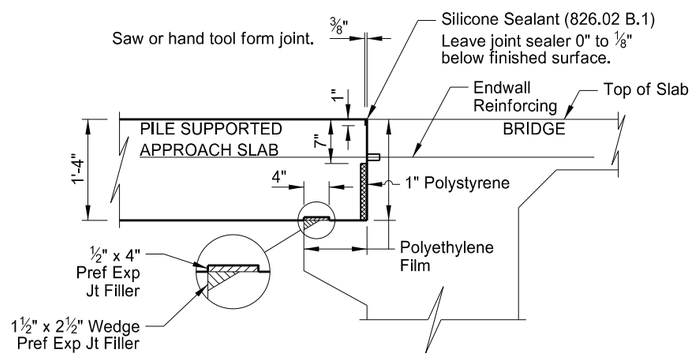


APPROACH SLAB JOINT DETAIL B



t = Approach Slab Thickness

JOINT DETAIL A



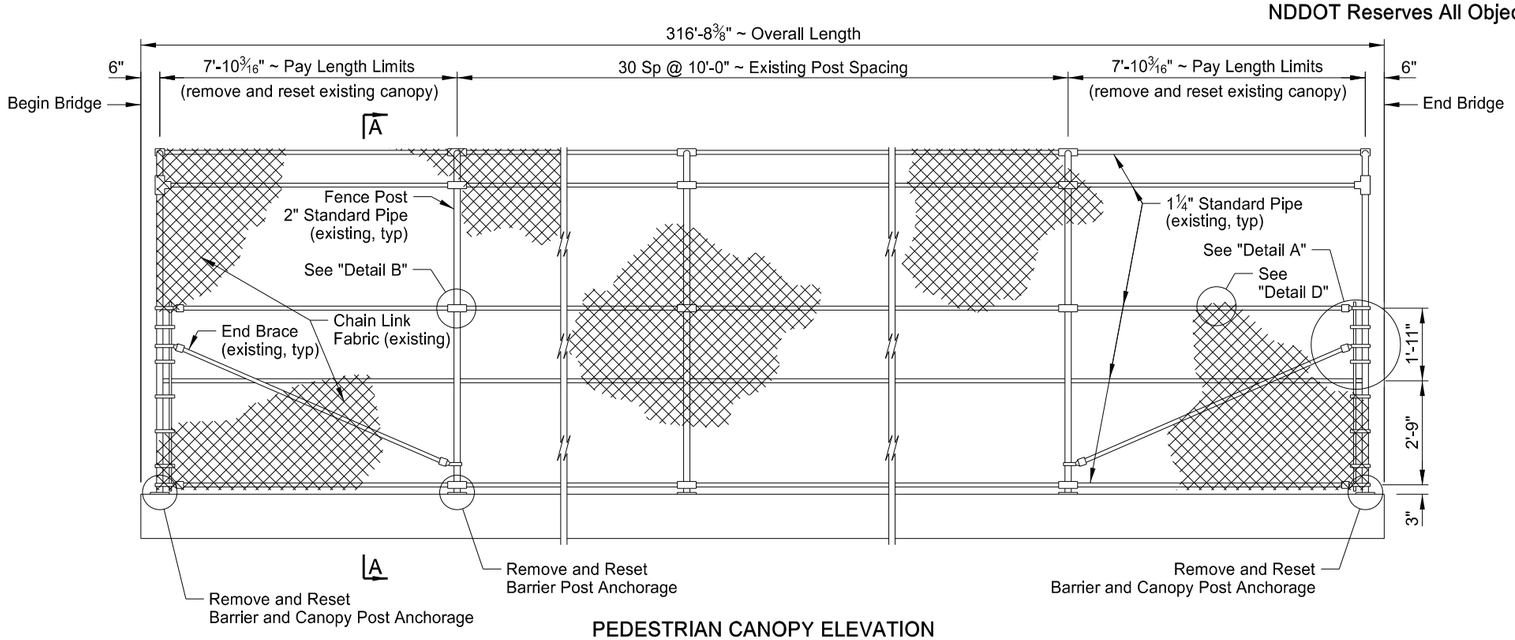
APPROACH SLAB JOINT DETAIL C

BURLINGTON NORTHERN OVERHEAD
RAY

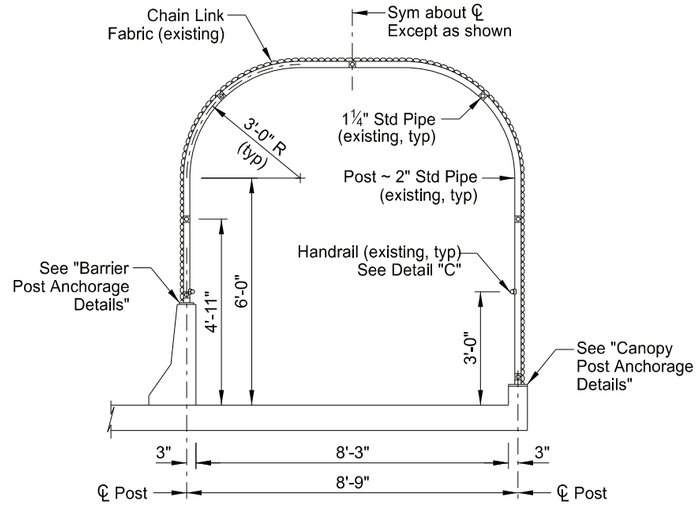
APPROACH SLAB DETAILS

DRAWING NO. 2-053.731R-16

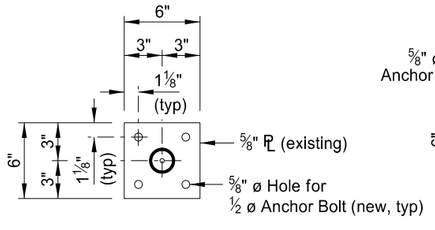
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-7-002(172)053	170	33



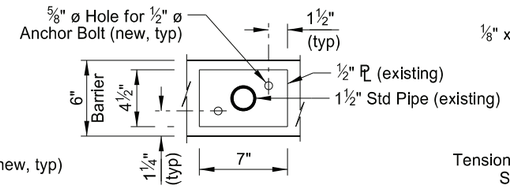
PEDESTRIAN CANOPY ELEVATION



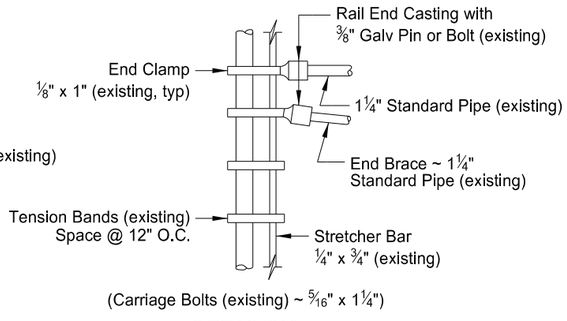
A-A



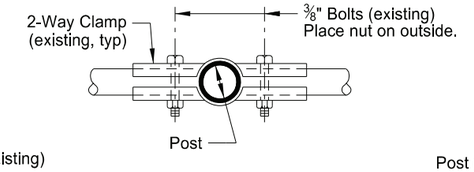
BASE PLATE PLAN



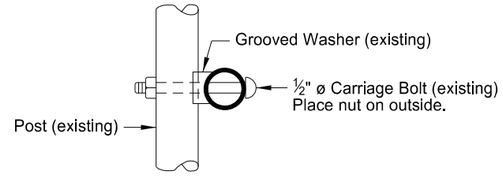
BASE PLATE PLAN



DETAIL "A"



DETAIL "B"

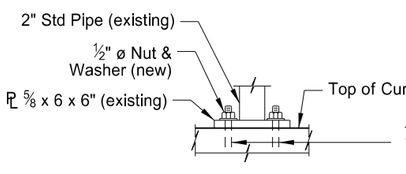


HANDRAIL CONNECTION AT POSTS

DETAIL "C"

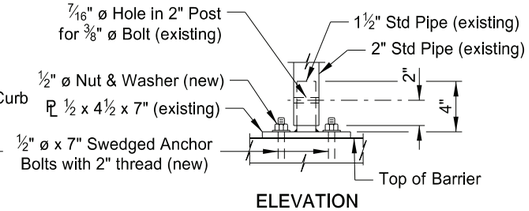
NOTES:

Epoxy in new ½" ø anchor bolts or place them in the concrete at the time of pouring. Place the existing base plates longitudinally along the barrier and curb as shown in the "Base Plate Plan" views.



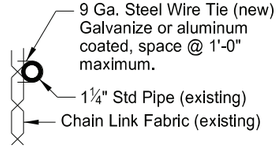
ELEVATION

CANOPY POST ANCHORAGE DETAILS



ELEVATION

BARRIER POST ANCHORAGE DETAILS



TYPICAL FABRIC
ATTACHMENT

DETAIL "D"

QUANTITIES

PEDESTRIAN CANOPY	15.7 LF

BURLINGTON NORTHERN OVERHEAD
RAY

PEDESTRIAN CANOPY DETAILS

DRAWING NO. 2-053.731R-17

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	
07-01-14	
REVISIONS	
DATE	CHANGE
04-23-18	General Revisions
09-20-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions
04-14-25	General Revisions

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
04/14/25
ENGINEER
NORTH DAKOTA

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

07-01-14

REVISIONS

DATE	CHANGE
08-03-15	General Revisions
04-23-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions
04-14-25	General Revisions

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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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
07-01-14

REVISIONS	
DATE	CHANGE
08-03-15	General Revisions
04-23-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions
04-14-25	General Revisions

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NDDOT ABBREVIATIONS

MEASUREMENTS

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

SURVEY DESCRIPTIONS

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

SOIL TYPES

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

07-01-14

REVISIONS

DATE	CHANGE
12-18-20	Sheet Added - Continued from D-101-3
4-14-25	General Revisions

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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

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

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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	
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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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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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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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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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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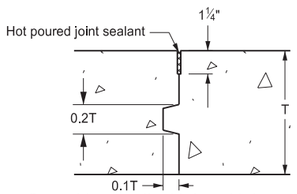
12 18 2020

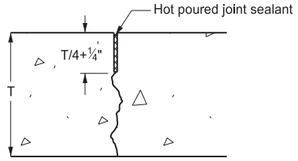
LONGITUDINAL JOINT DETAILS

D-550-2

UNTIED JOINTS

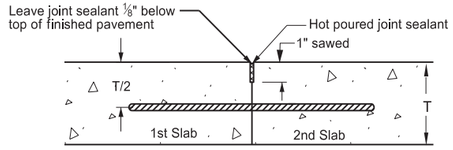


Sawed longitudinal joint with keyway



Sawed longitudinal joint without keyway

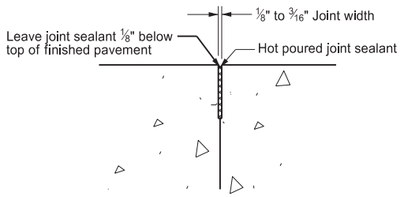
TIED JOINTS



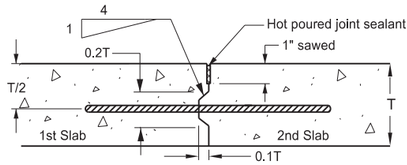
Longitudinal construction joint (tied butt joint)

Notes:

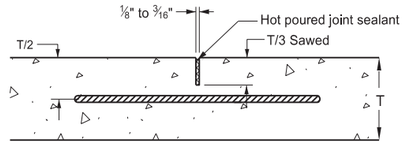
1. Provide hot poured joint sealant meeting the requirements of Section 826.02A.2 of the Standard Specifications.
2. Include all costs of the longitudinal joint and seal in the price bid for the PCC pavement.
3. Do not place tie bars within 18 inches of a transverse joint.
4. Use Grade 40 steel for tie bars installed bent and later straightened.
5. Increase the maximum tie bar spacing up to 10%, when necessary to facilitate construction.
6. Place tie Bars at a 48 inch maximum spacing.
7. A "Warp" joint is a sawed joint or a construction joint with a keyway.
8. A "Butt joint" is a construction joint with no keyway.



Contraction joint



Longitudinal construction joint (tied keyed joint)

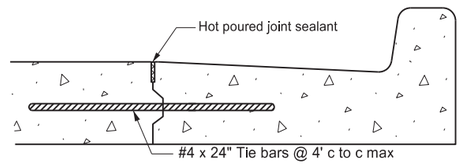


Sawed longitudinal joint

TIEBAR SPACINGS (In)*

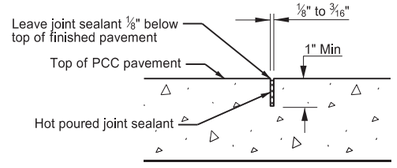
TIE BARS	STEEL GRADE	40				60						40					60						40						60						40						60					
	SIZE & LENGTH	#3x24" BARS				#3x30" BARS						#4x24" BARS					#4x36" BARS							#5x30" BARS						#5x42" BARS						#6x36" BARS						#6x48" BARS					
DIST TO NEAREST FREE EDGE		4	6	8	10	4	6	8	10	12	14	8	10	12	14	16	8	10	12	14	16	22	24	10	12	14	16	22	24	10	12	14	16	22	24	10	12	14	16	19	22	24	10	12	14	16	19	22	24
PCC PVMT DEPTH	JOINT TYPE																																															
6"	WARP		48	39			48	48				48					48																														
	BUTT		37	27			48	42				48					48																														
8"	WARP	48	39	29	24	48	48	44	35	29	25	48	42	35	30	26	48	48	48	45	39	28	26	48	48	47	41	30	27	48	48	48	48	45	41	48	48	48	48	48	43	39	48	48	48	48	48	48	48
	BUTT	42	27			48	42	31	25			37	29	24			48	44	37	32	27			46	39	33	29			48	48	48	43	32	29	48	48	48	48	35	30	27	48	48	48	48	48	45	41
8½"	WARP	48	37	28		48	48	42	33	28	24	48	39	33	28	24	48	48	48	42	37	27	24	48	48	44	38	28	25	48	48	48	48	42	38	48	48	48	48	47	40	37	48	48	48	48	48	48	48
	BUTT	39	26			44	39	29				35	27				48	42	35	29	26			44	36	31	27			48	48	47	41	30	27	48	48	45	39	33	28	26	48	48	48	48	48	42	39
9"	WARP	48	35	26		48	48	39	31	26		47	37	31	26		48	48	47	40	35	25		48	48	42	36	26	24	48	48	48	48	40	36	48	48	48	48	44	38	35	48	48	48	48	48	48	48
	BUTT	37	24			48	37	27				33	26				48	40	33	28	25			41	34	29	25			48	48	44	39	28	25	48	48	42	37	31	26	24	48	48	48	48	47	40	37
9½"	WARP	48	33	25		48	48	37	30	25		44	35	29	25		48	48	44	38	33	24		48	46	39	34	25		48	48	48	48	38	34	48	48	48	48	42	36	33	48	48	48	48	48	48	48
	BUTT	35				48	35	26				31	25				47	37	31	27				39	32	27	25			48	48	42	37	27	24	48	47	40	35	29	25		48	48	48	48	44	38	35
10"	WARP	47	31			48	47	35	28			42	34	28	24		48	48	42	36	31			48	44	37	33	24		48	48	48	48	36	33	48	48	48	48	40	34	31	48	48	48	48	48	48	47
	BUTT	33				48	33	25				29	24				45	36	29	25				37	31	26	24			48	46	40	35	25		48	45	38	33	28	24		48	48	48	48	42	36	33
10½"	WARP	45	30			48	45	34	27			40	32	26			48	48	40	34	30			48	42	36	31			48	48	48	47	34	31	48	48	48	45	38	33	30	48	48	48	48	48	48	45
	BUTT	32				48	32	24				28					42	34	28	24				35	29	25				48	44	38	33	24		48	42	36	32	27			48	48	48	48	40	34	31
11"	WARP	43	28			48	43	32	26			38	31	25			48	46	38	33	28			48	40	34	30			48	48	48	45	32	30	48	48	48	43	36	31	28	48	48	48	48	48	47	43
	BUTT	30				46	30					27					40	32	27					34	28	24				48	42	36	32			48	40	35	30	25			48	48	48	46	38	33	30
11½"	WARP	41	27			48	41	31	24			36	29	24			48	44	36	31	27			46	38	32	28			48	48	48	43	31	28	48	48	47	41	34	30	27	48	48	48	48	48	45	41
	BUTT	29				44	29					25					39	31	25					32	27					48	40	35	30			46	39	33	29	24			48	48	48	44	37	31	29
12"	WARP	39	26			48	39	29				35	28				48	42	35	30	26			44	36	31	28			48	48	47	41	30	27	48	48	45	40	33	28	26	48	48	48	48	48	43	39
	BUTT	27				42	27					25					37	30	25					31	25					48	44	38	33	29		46	39	33	29				48	48	48	42	35	30	27
12½"	WARP	38	25			48	38	28				33	27				48	40	33	29	25			42	35	30	26			48	48	45	39	28	26	48	48	43	38	32	27	25	48	48	48	48	48	41	38
	BUTT	27				40	27										35	28						29	25					44	37	32	27			42	35	30	27				48	48	45	40	34	29	26
13"	WARP	36	24			48	36	27				32	26				48	39	32	27	24			40	33	29	25			48	48	43	38	27	25	48	48	41	36	30	26	24	48	48	48	48	46	40	36
	BUTT	25				38	25										34	27						28						42	35	30	27			41	34	29	25				48	48	44	38	32	28	25
13½"	WARP	35				48	35	26				31	25				47	37	31	26				39	32	28	24			48	48	42	36	26	24	48	47	40	35	29	25		48	48	48	48	48	38	35
	BUTT	25				37	25										33	26						27						41	34	29	25			39	33	28	25				48	48	42	37	31	27	24
14"	WARP	34				48	34	25				30	24				45	36	30	25				37	31	27				48	47	40	35	25		48	45	38	34	28	24		48	48	48	48	43	37	34
	BUTT	24				35	24										32	25						26						39	33	28	25			38	32	27	24				48	47	40	35	30	26	
14½"	WARP	32				48	32	24				29					43	35	29	25				36	30	26				48	45	39	34	24		48	43	37	32	27			48	48	48	48	41	35	32
	BUTT					34											30	25						25						38	32	27	24			36	30	26					48	46	39	34	29	25	
15"	WARP	31				47	31					28					42	33	28	24				35	29	25				48	44	37	33	24		48	42	36	31	26			48	48	48	47	40	34	31
	BUTT					33											29							25						37	31	26				35	29	25					48	44	38	33	28	24	

*Spacing where the calculated pullout strength of the tiebar equals the calculated yield strength of the tiebar - 48 inch spacing indicates a calulated spacing of 4 feet or greater.



Curb and gutter sections

JOINT SEALER DETAILS



Typical section

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-15-2010	
REVISIONS	
DATE	CHANGE
10/23/2012	Expanded Tie Bar Table
03/16/2016	Updated Jt Details & notes
10/25/2019	Corrected "Typo" in Note 3
03/13/2025	Revised C&G Tie Bar Size

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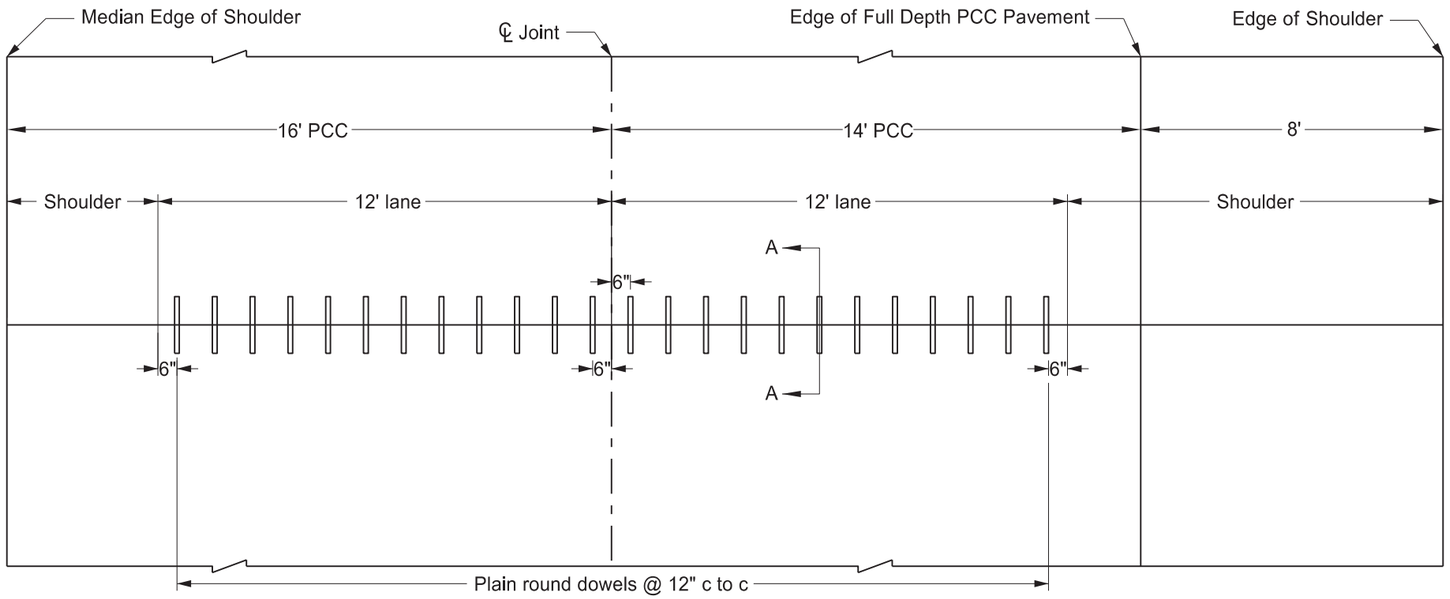
Kirk J Hoff

03/13/25

TRANSVERSE CONTRACTION JOINT DETAILS

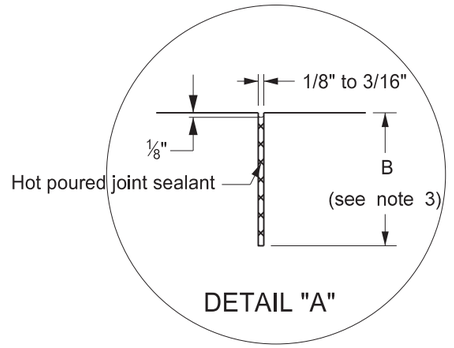
D-550-3



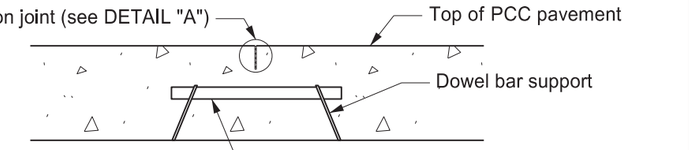
CONTRACTION JOINT DOWEL ASSEMBLY
INTERSTATE

Notes

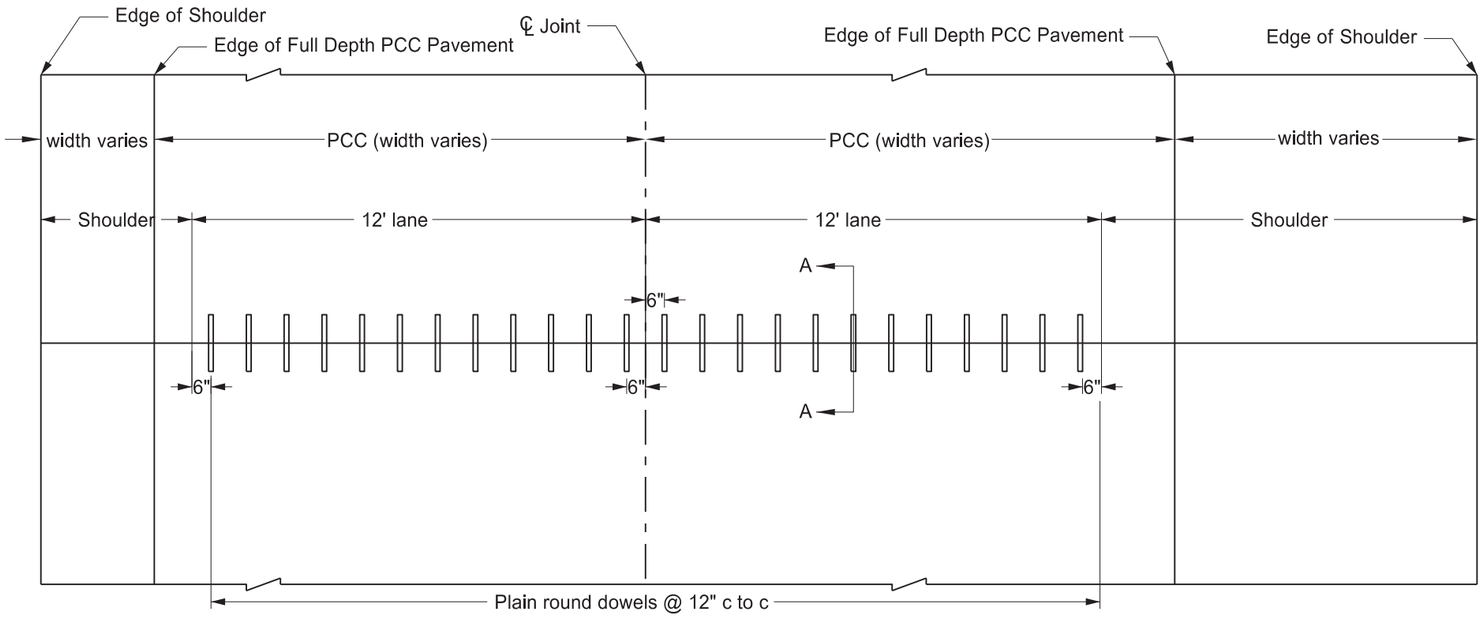
1. The joint seal details apply to both doweled and non-doweled (plain) transverse joints.
2. T = Thickness of pavement.
3. B = T/4 + ¼" for AE or non-dowelled concrete pavement or
   B = T/3 for AAE or dowelled concrete pavement



DETAIL "A"



SECTION A-A



CONTRACTION JOINT DOWEL ASSEMBLY
NON-INTERSTATE

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-15-10	
REVISIONS	
DATE	CHANGE
6/23/2014	Removed dowel size reference
3/16/2016	Revised Joint Details and notes
10/25/2019	Expanded Details for clarity
03/13/2025	Revised # of Dowels & Note 3.

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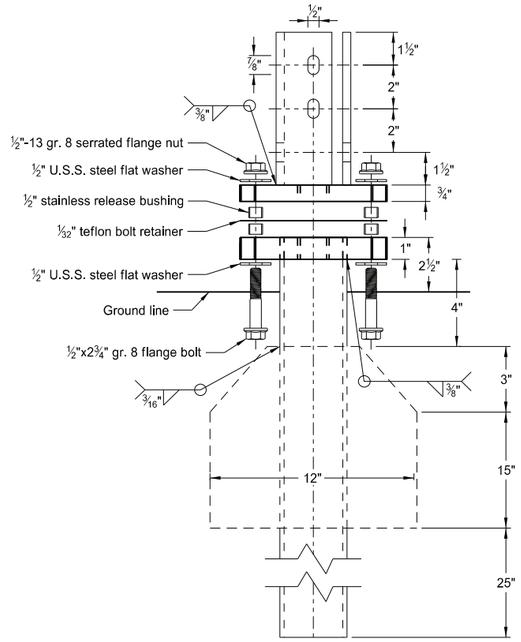
03/13/25

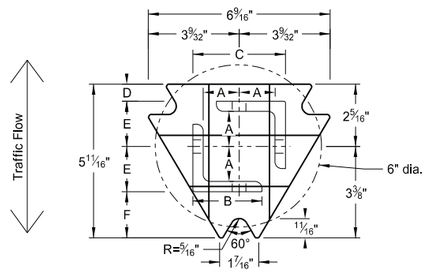
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

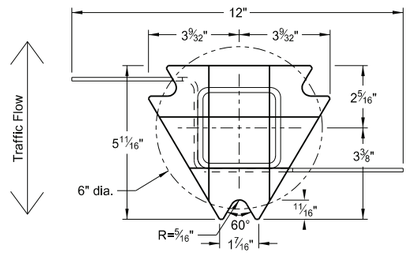


Multi-Directional
Slip Base Assembly

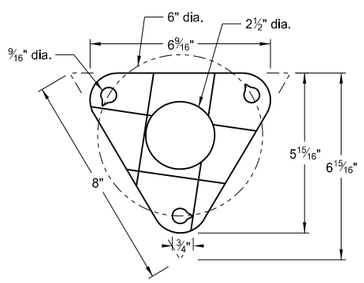
Perforated Tube



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



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



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

Notes:

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

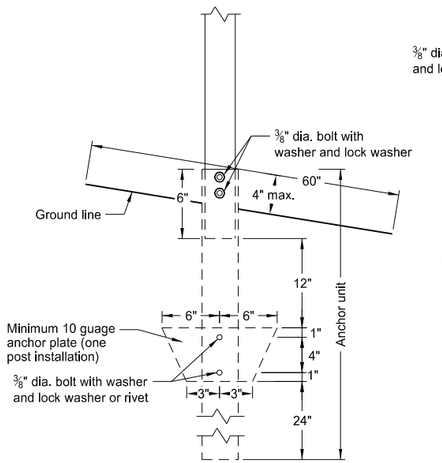
Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thick-ness Gauge	Sleeve Size in.	Wall Thick-ness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2¼
1	2¼	12			No	2½
1	2½	12			(A)	3
1	2½	10			Yes	
1	2¼	12	2	12	Yes	
1	2½	12	2¼	12	Yes	
2	2	12			No	2¼
2	2¼	12			No	2½
2	2½	12			Yes	
2	2½	12			Yes	
2	2¼	10	2	12	Yes	
2	2½	12	2¼	12	Yes	
3 & 4	2½	12			Yes	
3 & 4	2½	10			Yes	
3 & 4	2½	12	2¼	12	Yes	
3 & 4	2¼	12	2	12	Yes	
3 & 4	2½	10	2 3/16	10	Yes	

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

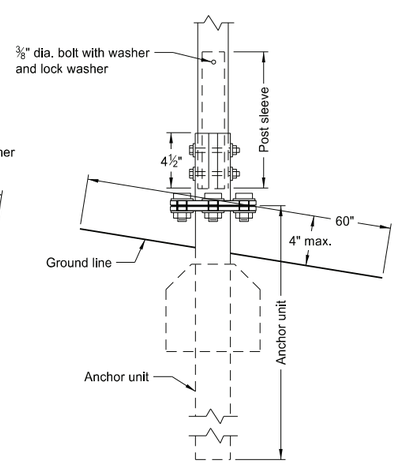
Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2 3/16"x10 ga.	1 9/64"	2½"	3 1/32"	25/32"	1 33/64"	1 7/8"
2½"x10 ga.	1 9/32"	2½"	3 5/16"	⅝"	1 21/32"	1¾"

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

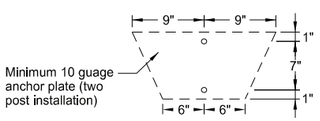
(B) For additional wind load, insert the 2 3/16"x10 ga. into 2½"x10 ga.



Anchor Unit and Post Assembly



Multi-Directional
Slip Base Anchor Unit
and Post Sleeve Assembly



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

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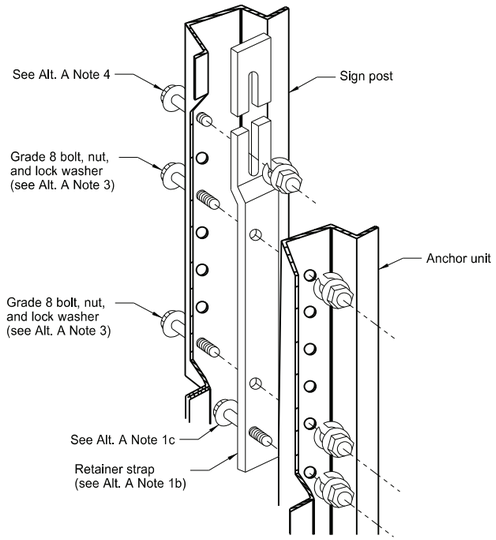
08/01/24

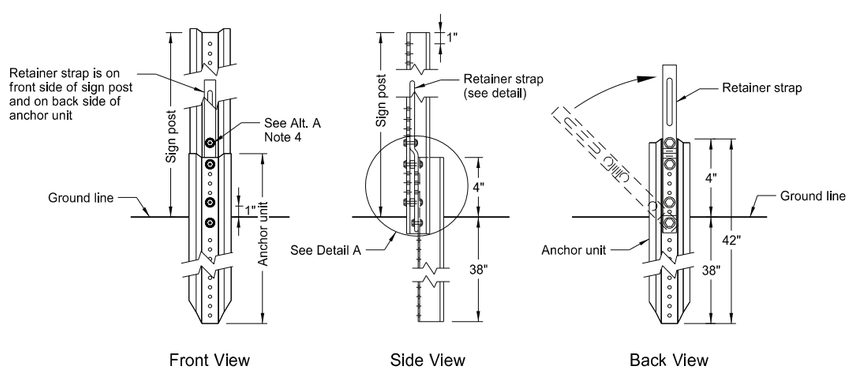
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



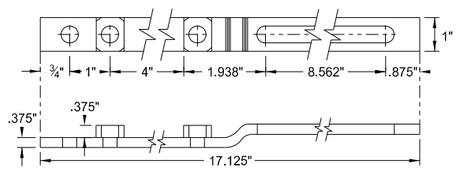
Detail A



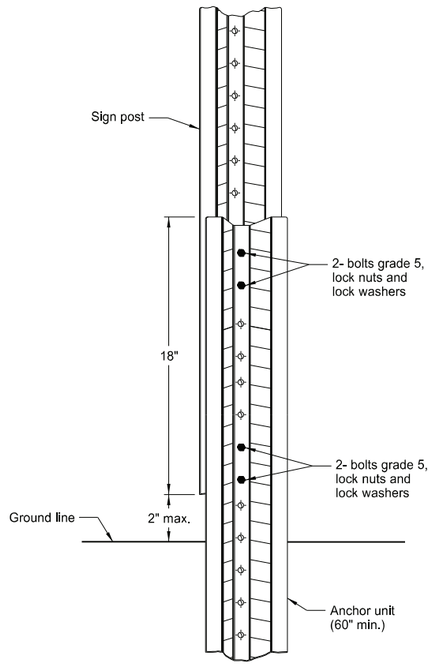
Front View | Side View | Back View

Breakaway U-Channel Detail Alternate A

Install a maximum of 2 posts within 7'.

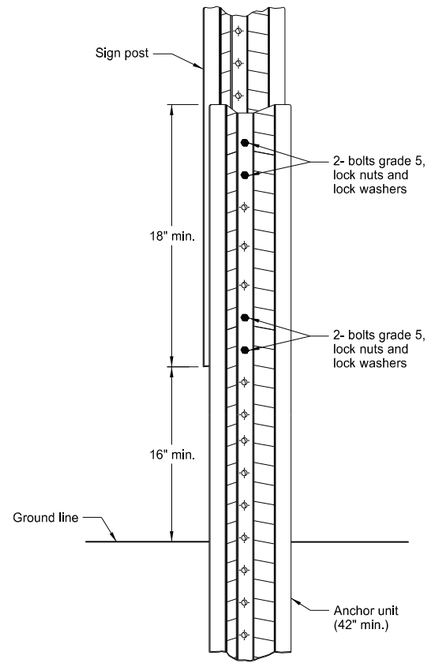


Retainer Strap Detail



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

KIRK J. HOFF
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PROFESSIONAL
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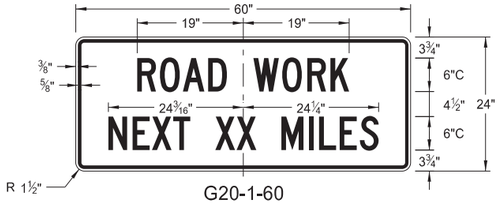
ENGINEER
NORTH DAKOTA

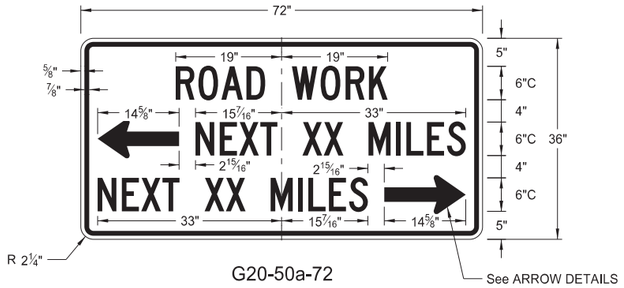
08/01/24

CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS

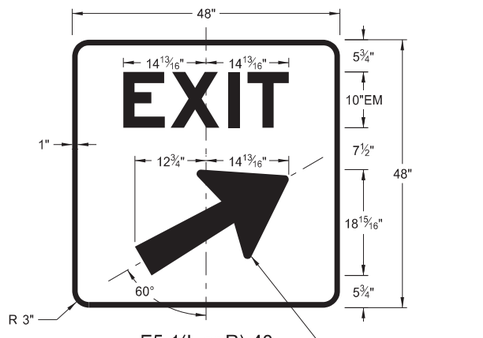
D-704-9



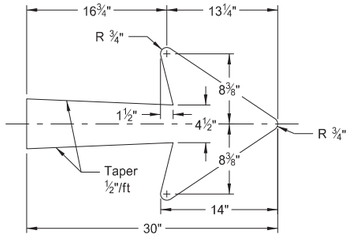
G20-1-60
Legend: black (non-refl)
Background: orange



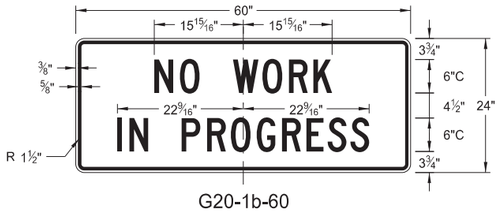
G20-50a-72
Legend: black (non-refl)
Background: orange



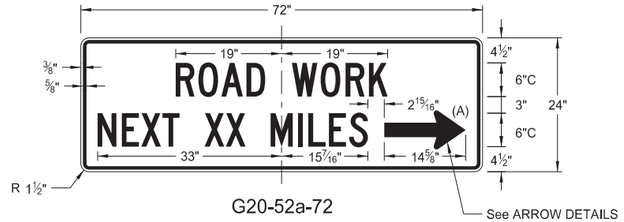
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



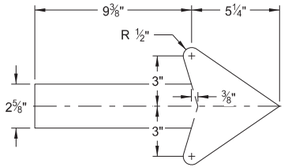
E5-1-48



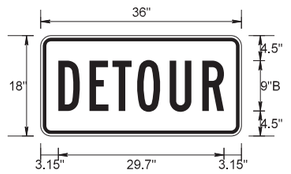
G20-1b-60
Legend: black (non-refl)
Background: orange



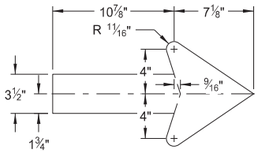
G20-52a-72
Legend: black (non-refl)
Background: orange



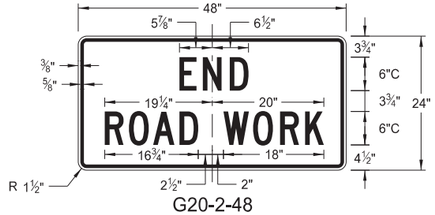
G20-50a-72
G20-52a-72



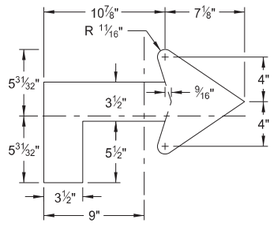
M4-8-36
Legend: black (non-refl)
Background: orange



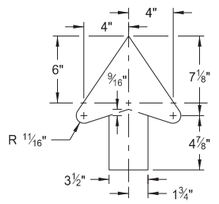
M4-9(L or R)-30
Right or Left



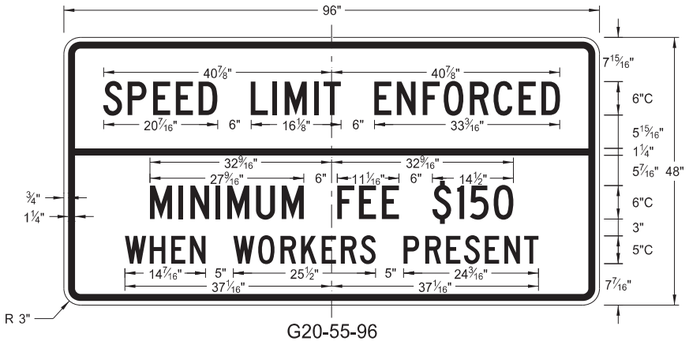
G20-2-48
Legend: black (non-refl)
Background: orange



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

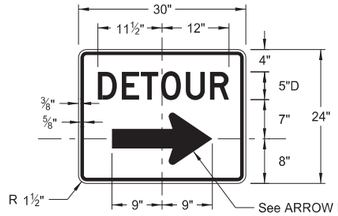


M4-9-30
Straight



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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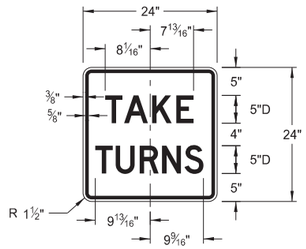
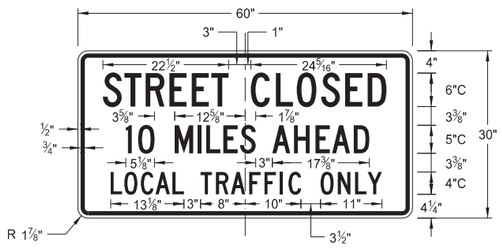
PE-4683
06/30/25
ENGINEER
NORTH DAKOTA

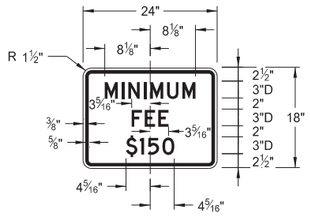
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



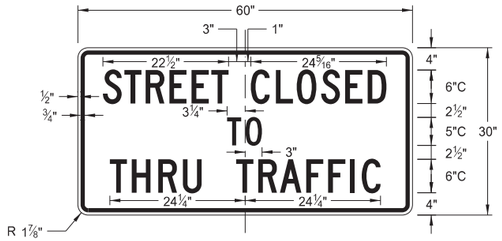
R1-50P-24
Legend: black (non-refl)
Background: white



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



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



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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
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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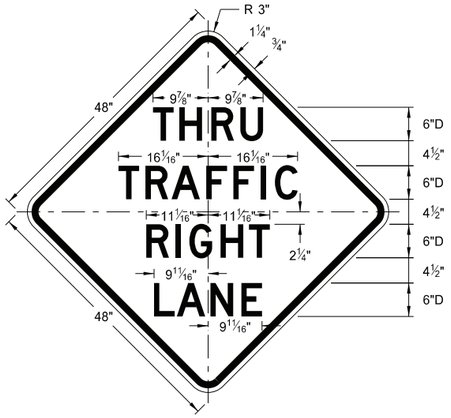
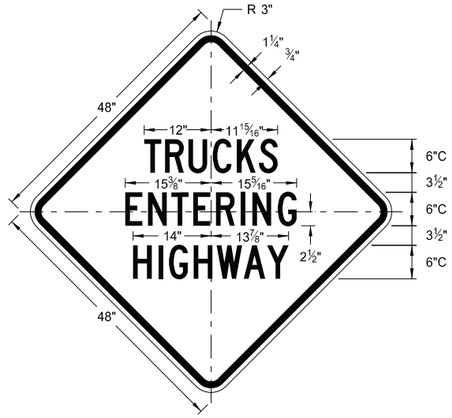
NORTH DAKOTA

CONSTRUCTION SIGN DETAILS
WARNING SIGNS

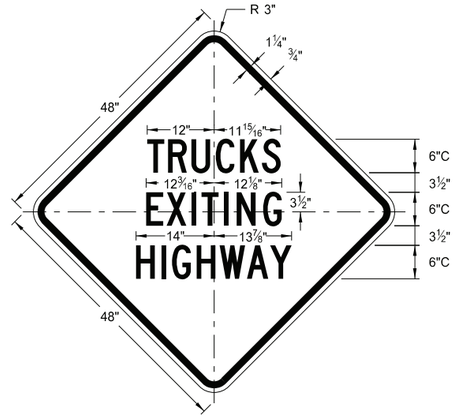
D-704-11



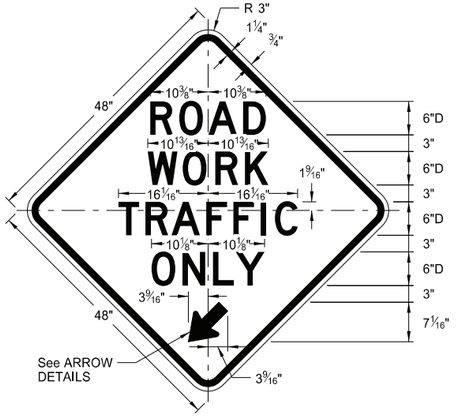
W5-8-48
Legend: black (non-refl)
Background: orange



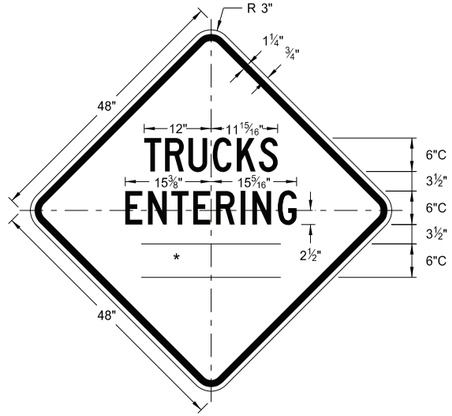
W8-53-48
Legend: black (non-refl)
Background: orange



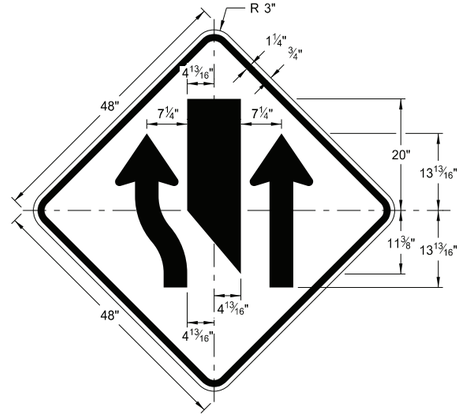
W8-56-48
Legend: black (non-refl)
Background: orange



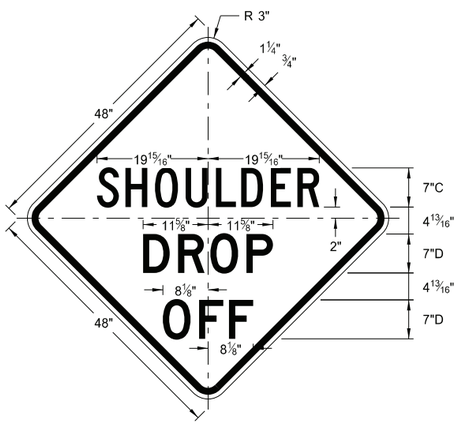
W5-9-48
Legend; black (non-refl)
Background: orange



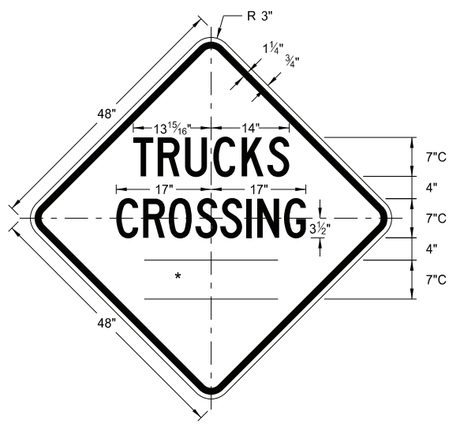
W8-54-48
Legend; black (non-refl)
Background: orange



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



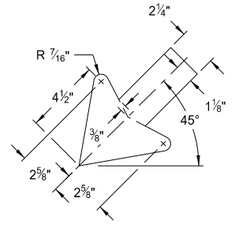
W8-9a-48
Legend: black (non-refl)
Background: orange



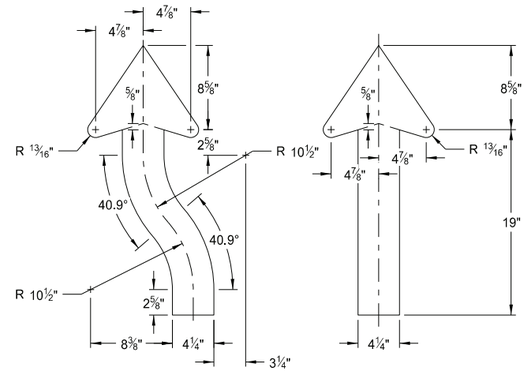
W8-55-48
Legend: black (non-refl)
Background: orange

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

* DISTANCE MESSAGES



W5-9-48



W9-3a-48

ARROW DETAILS

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

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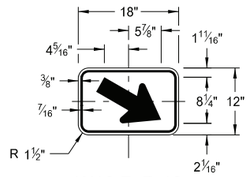
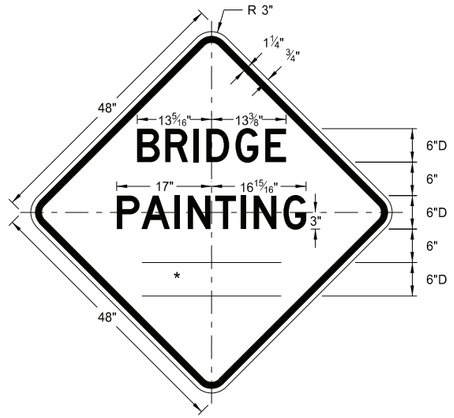
08/01/24

CONSTRUCTION SIGN DETAILS
WARNING SIGNS

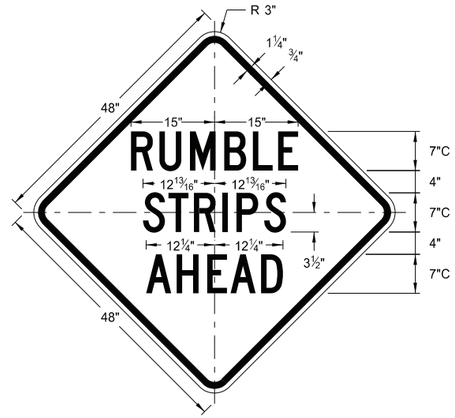
D-704-11A



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



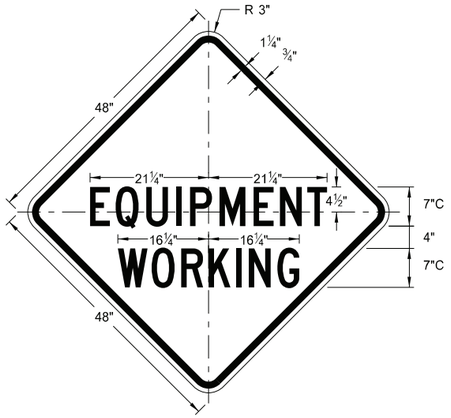
W21-50-48
Legend: black (non-refl)
Background: orange



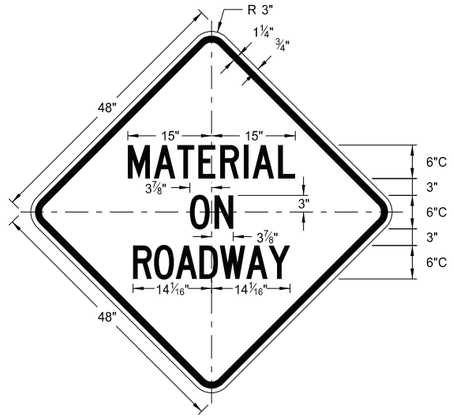
W21-53-48
Legend: black (non-refl)
Background: orange

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

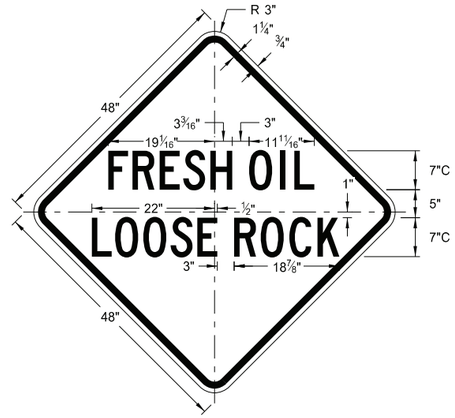
* DISTANCE MESSAGES



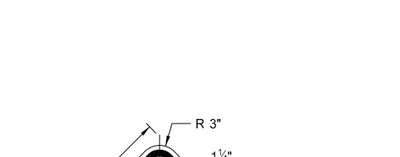
W20-51-48
Legend: black (non-refl)
Background: orange



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

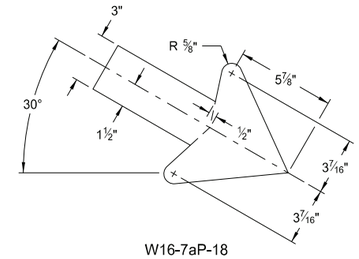


W22-8-48
Legend: black (non-refl)
Background: orange



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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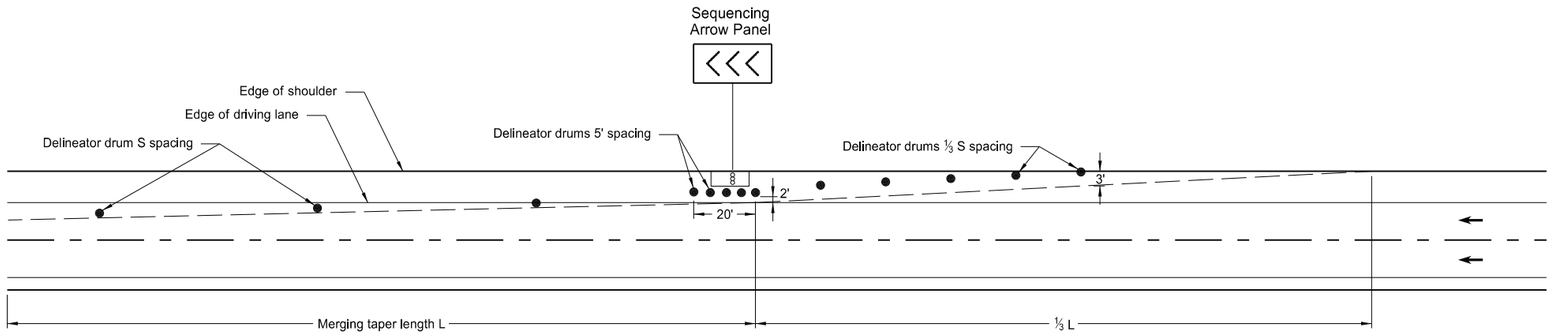
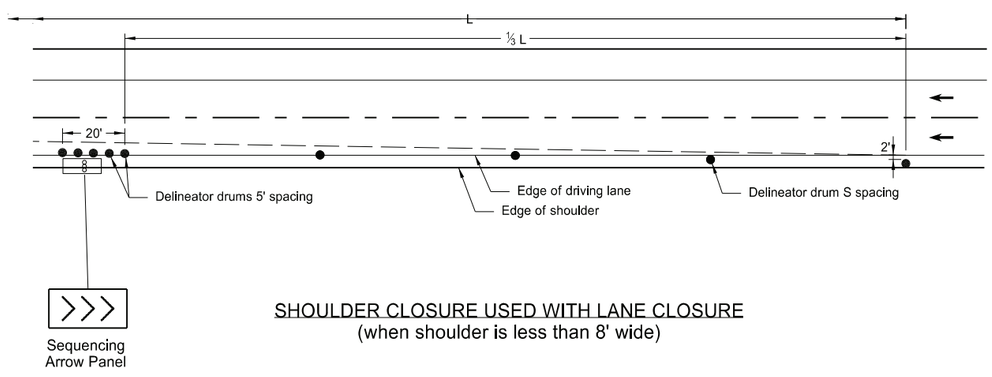
08/01/24

SHOULDER CLOSURE TAPERS

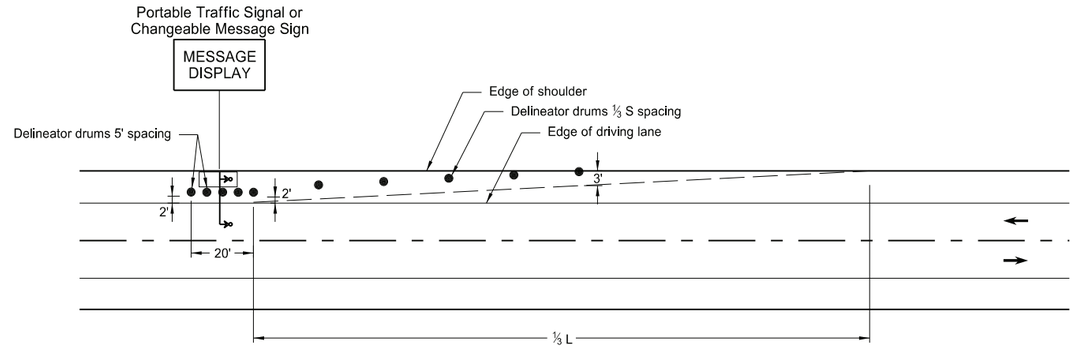
D-704-12



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



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



PORTABLE TRAFFIC SIGNAL OR CHANGEABLE MESSAGE SIGN ON SHOULDER

KEY

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

Notes:

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

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

KIRK J. HOFF
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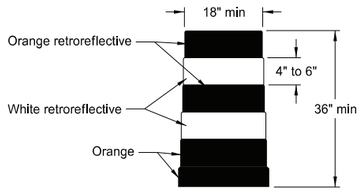
ENGINEER
NORTH DAKOTA

08/01/24

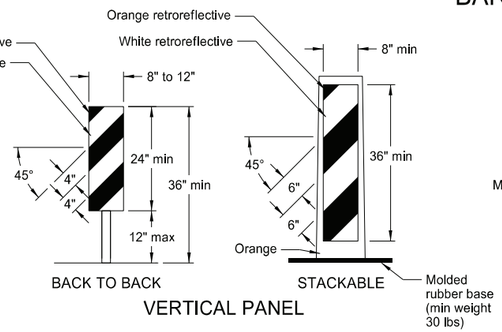
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



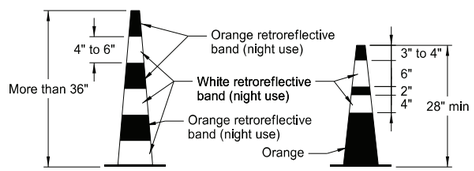
DELINEATOR DRUM

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



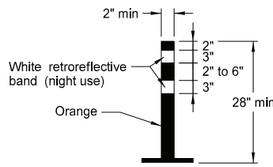
VERTICAL PANEL

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



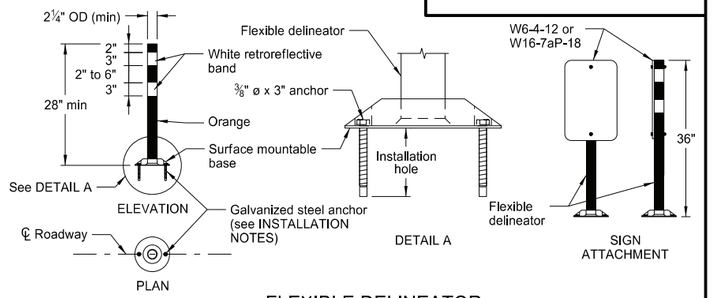
TRAFFIC CONE

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



TUBULAR MARKER

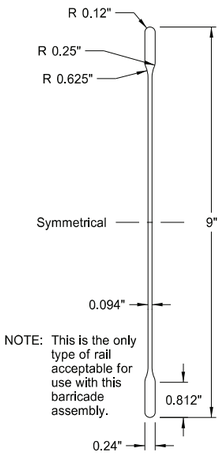
Provide retroreflectorization of tubular markers more than 42" in height by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



FLEXIBLE DELINEATOR

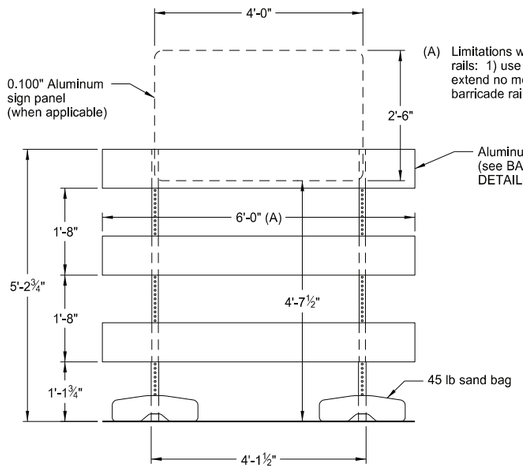
INSTALLATION NOTES:

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



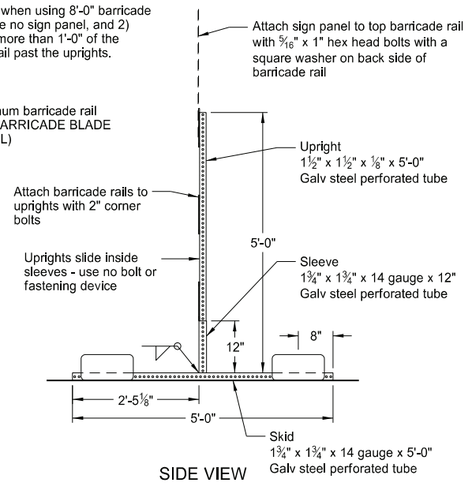
NOTE: This is the only type of rail acceptable for use with this barricade assembly.

BARRICADE BLADE DETAIL



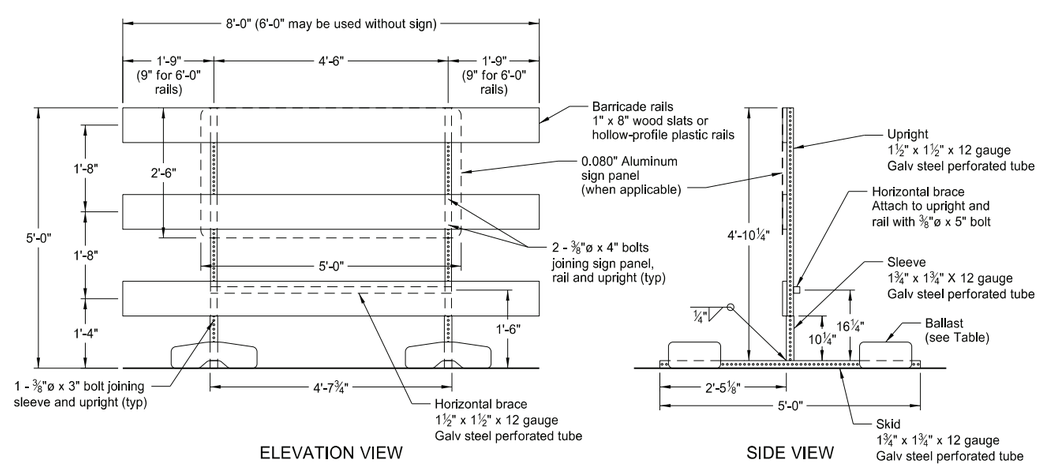
(A) Limitations when using 8'-0" barricade rails: 1) use no sign panel, and 2) extend no more than 1'-0" of the barricade rail past the uprights.

ELEVATION VIEW



SIDE VIEW

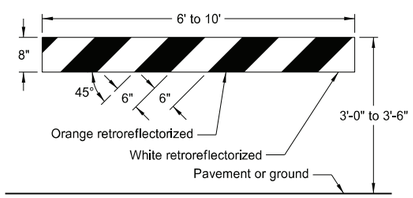
BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)



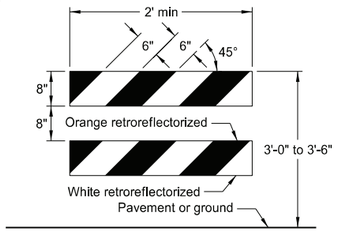
ELEVATION VIEW — SIDE VIEW

BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

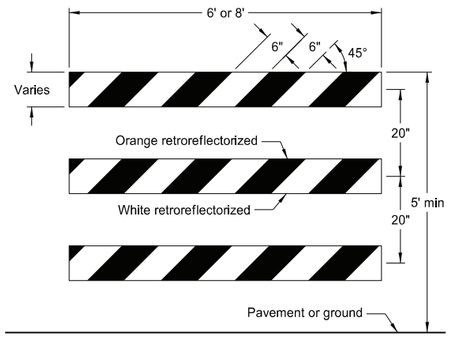
NOTE: For barricade markings use alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Place retroreflective sheeting on both sides of the rails with a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the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



TYPE I BARRICADE

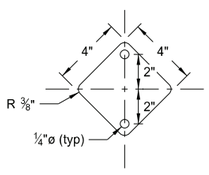


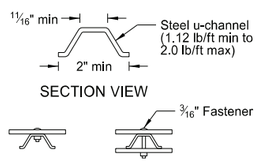
TYPE II BARRICADE

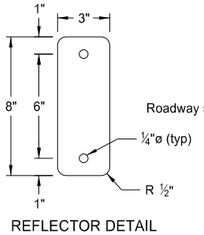


TYPE III BARRICADE

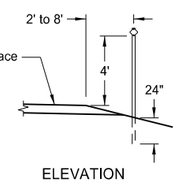
BARRICADE RAIL DETAILS







REFLECTOR DETAIL



ELEVATION

DELINEATORS

MINIMUM BALLAST
(For each side of barricade support)

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

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

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

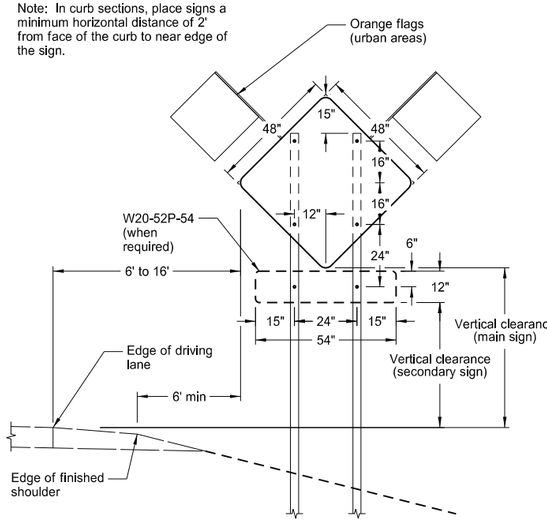
KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 ENGINEER NORTH DAKOTA

08/01/24

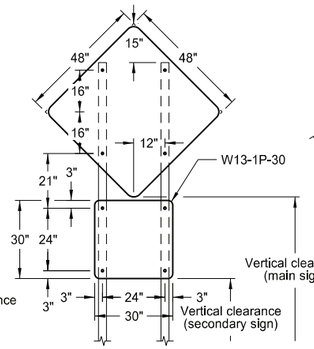
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

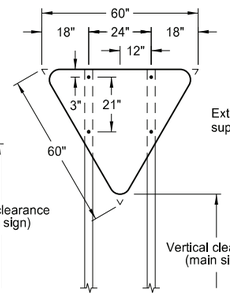
Note: In curb sections, place signs a minimum horizontal distance of 2' from face of the curb to near edge of the sign.



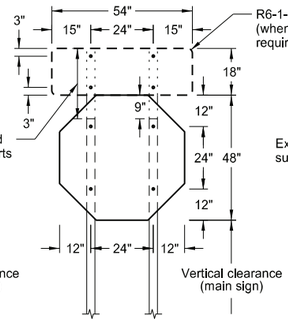
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



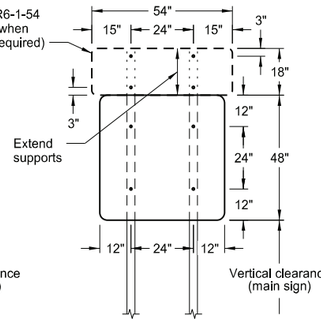
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



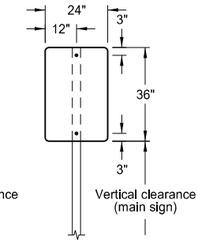
R1-2-60 - YIELD SIGN



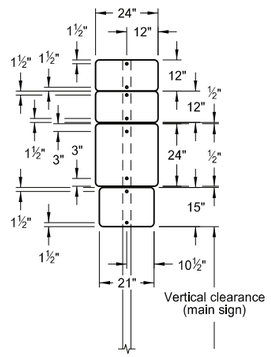
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



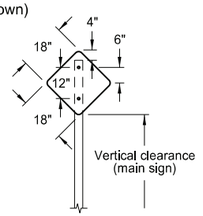
48" x 48" SIGN
(with R6-1-54 sign as required)



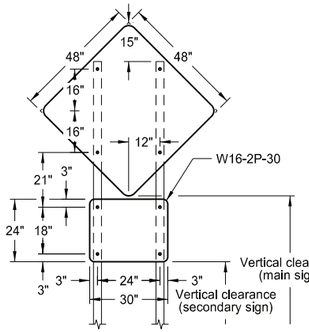
24" x 36" SIGN



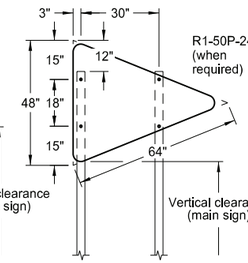
24" x 24"
ROUTE MARKER
ASSEMBLY



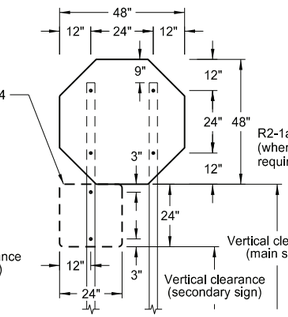
18" x 18"
DIAMOND SIGN



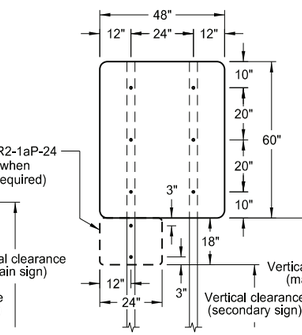
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



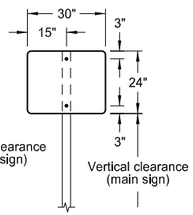
W14-3-64 - PENNANT SIGN



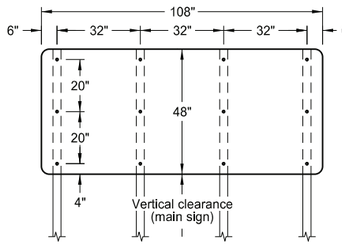
R1-1-48 - STOP SIGN
(with R1-50P-24 sign as required)



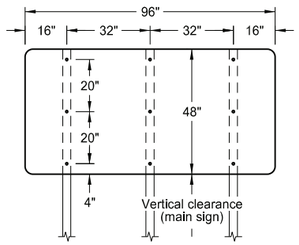
48" x 48" SIGN
(with R2-1aP-24 sign as required)



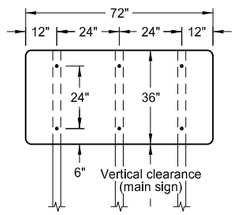
30" x 24" SIGN



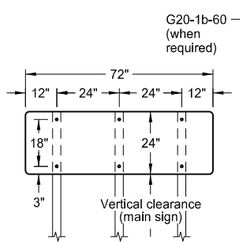
108" x 48" SIGN



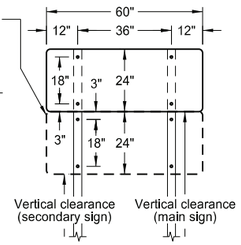
96" x 48" SIGN



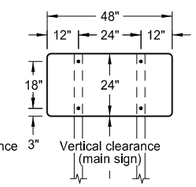
72" x 36" SIGN



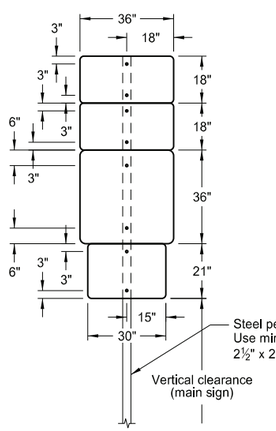
72" x 24" SIGN



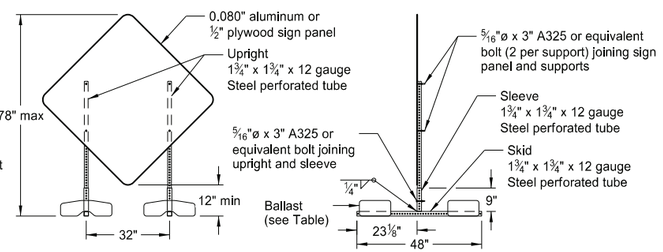
60" x 24" SIGN



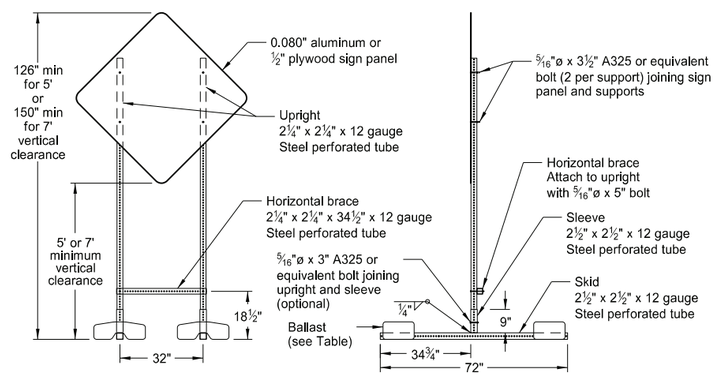
48" x 24" SIGN



36" x 36"
ROUTE MARKER
ASSEMBLY



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

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

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

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

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

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

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

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

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

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

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

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

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

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

MINIMUM BALLAST
(For each side of sign support base)

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

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

10-4-13

REVISIONS

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

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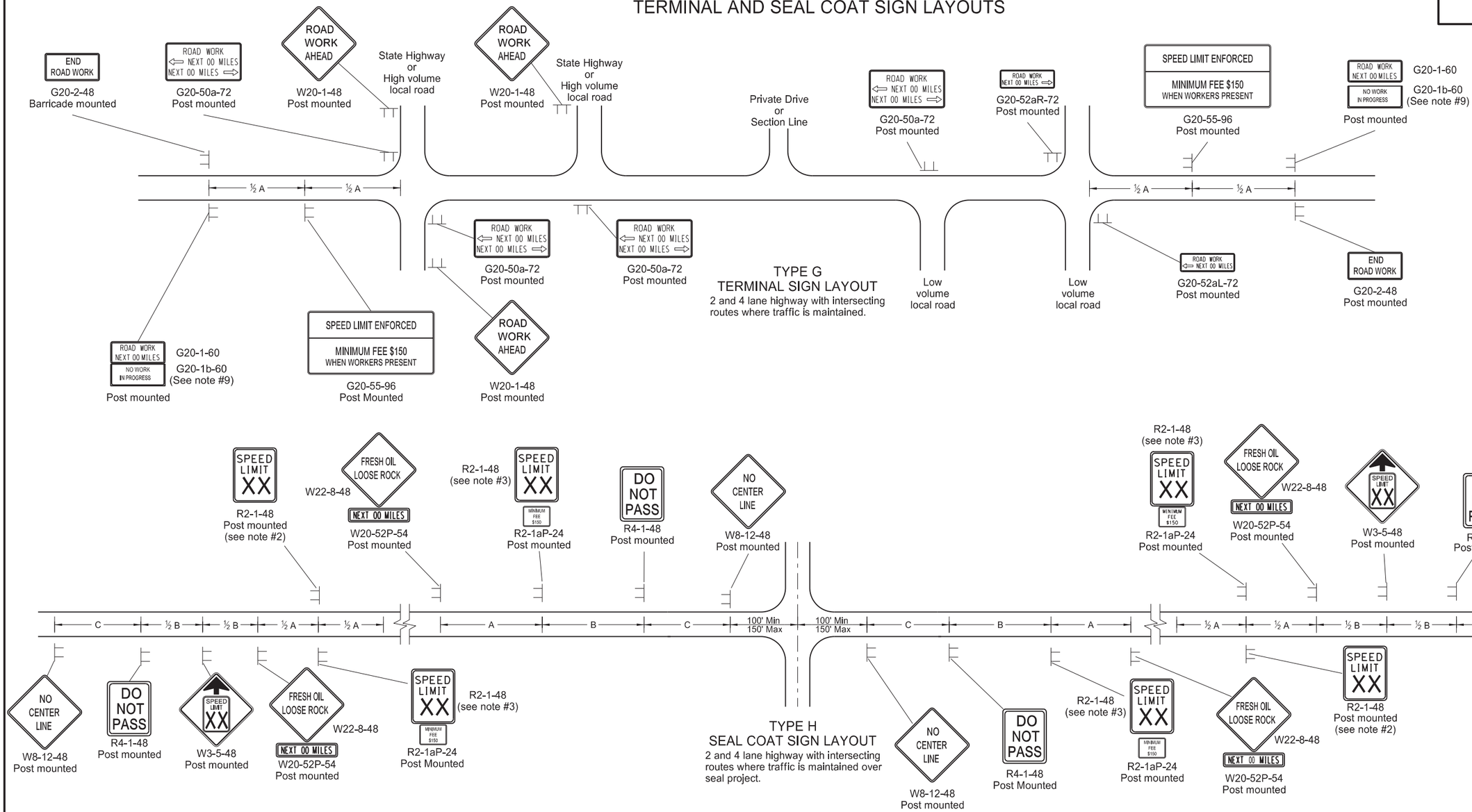
08/01/24

TERMINAL AND SEAL COAT SIGN LAYOUTS

D-704-20



Notes:

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE
08-17-17	Updated notes & sign numbers
11-01-19	Updated note & sign
12-08-21	Switched order of Road Work and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes

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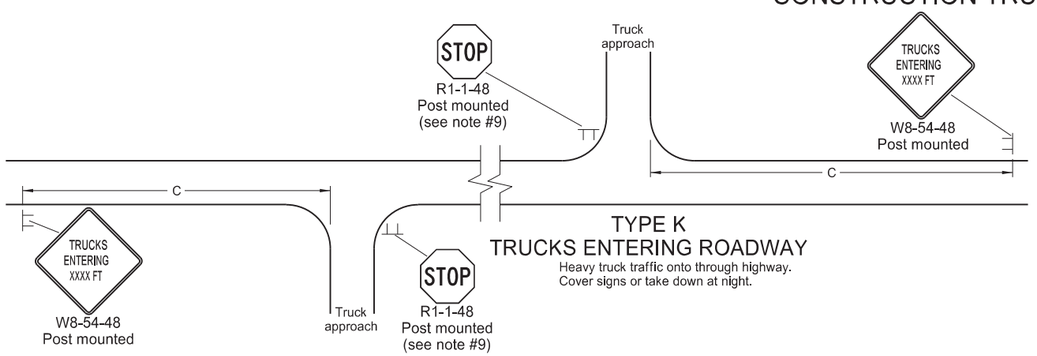
CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

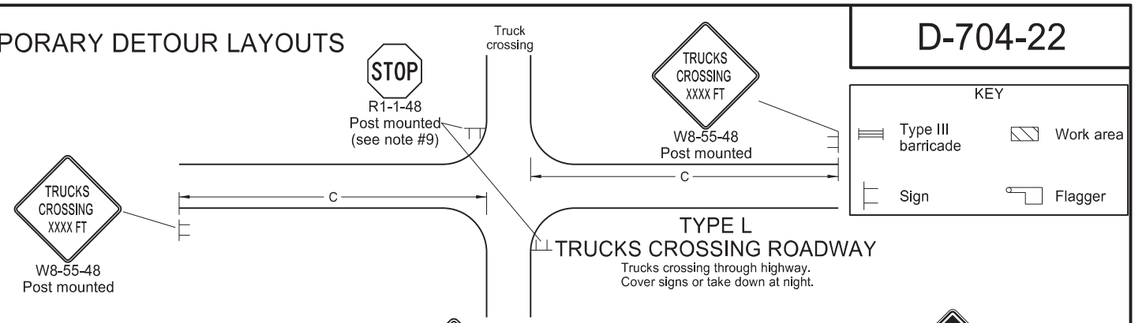
D-704-22

KEY: Type III barricade; Work area; Sign; Flagger



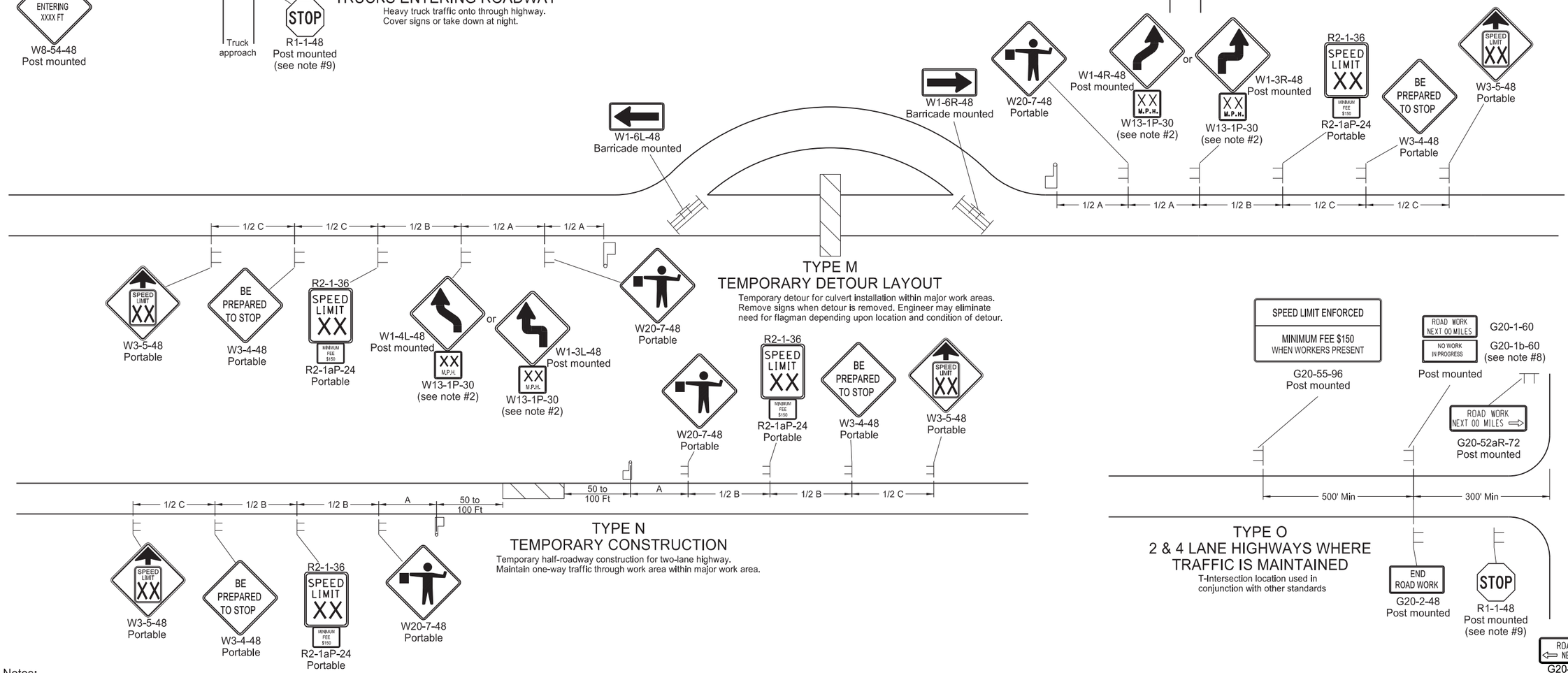
TYPE K
TRUCKS ENTERING ROADWAY

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



TYPE L
TRUCKS CROSSING ROADWAY

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



TYPE M
TEMPORARY DETOUR LAYOUT

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

TYPE N
TEMPORARY CONSTRUCTION

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

TYPE O
2 & 4 LANE HIGHWAYS WHERE TRAFFIC IS MAINTAINED

T-Intersection location used in conjunction with other standards

Notes:

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

ADVANCE WARNING SIGN SPACING

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

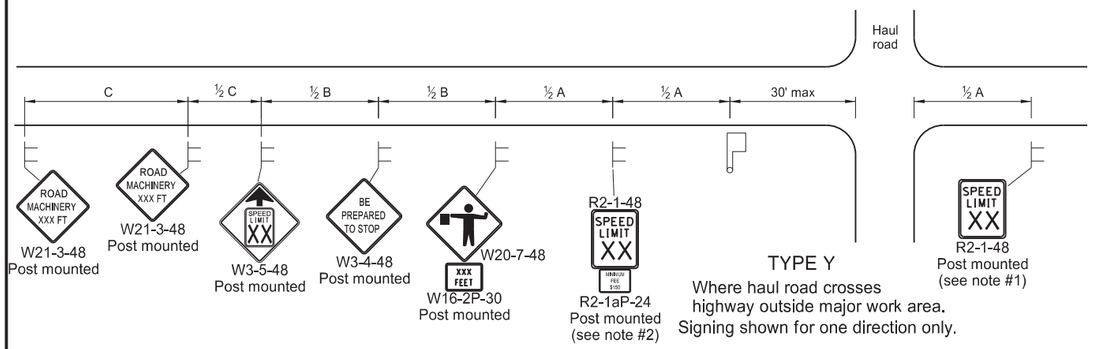
REVISIONS

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

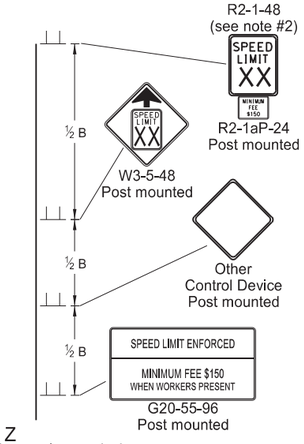
KIRK J. HOFFMANN REGISTERED PROFESSIONAL PE-4683 06/30/25 ENGINEER NORTH DAKOTA

MISCELLANEOUS SIGN LAYOUTS

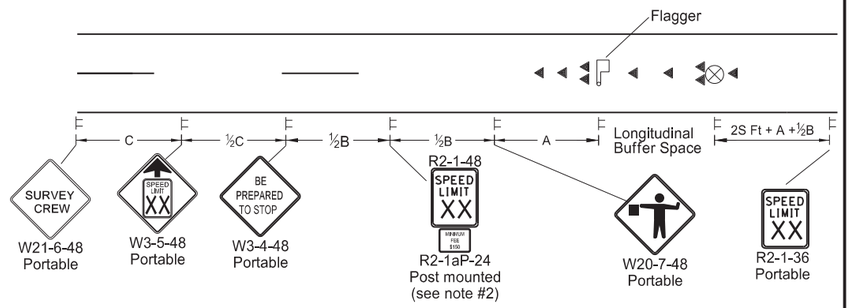
D-704-26



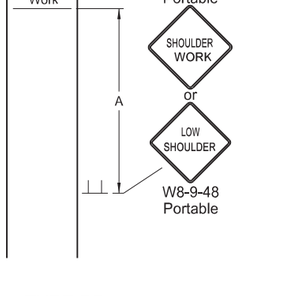
TYPE Y
Where haul road crosses highway outside major work area.
Signing shown for one direction only.



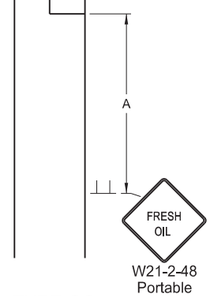
TYPE Z
Where speed zone is needed
Signing shown for one direction only.



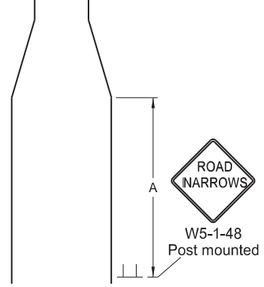
TYPE AA
Where survey crew is used
Signing shown for one direction only.



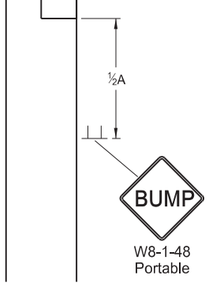
TYPE BB
Within major work area where sign conditions exist



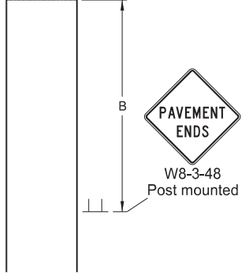
TYPE CC
Where sign conditions exist



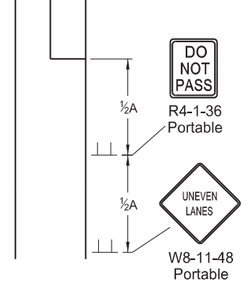
TYPE DD
Where sign conditions exist



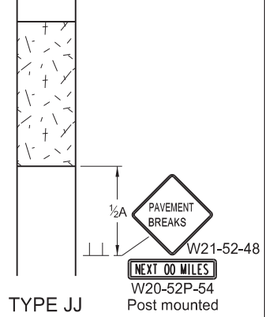
TYPE EE
Where sign conditions exist



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



TYPE GG
Where elevation difference exists between lanes

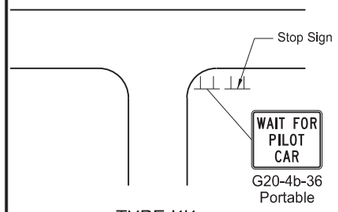


TYPE JJ
For break in pavement.
Install signs when conditions exist and remove when not applicable.
Signing shown for one direction only.

KEY

Flagger	Sign
Cones	Survey Equipment

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



TYPE KK
At major intersections within pilot car control area

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

ADVANCE WARNING SIGN SPACING

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

Longitudinal Buffer Space

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

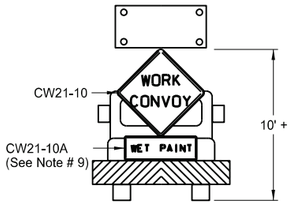
REVISIONS

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

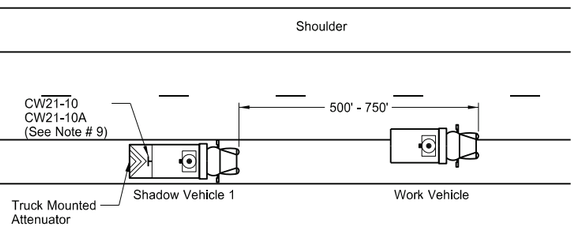
KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 06/30/25 ENGINEER NORTH DAKOTA

MOBILE OPERATION
(PAVEMENT MARKING)

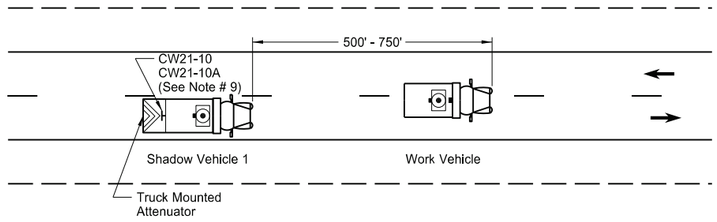
D-704-27



Typical Shadow Vehicle 1
Two-Way Roaday

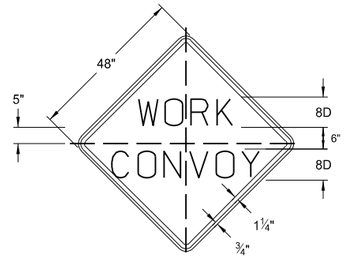


Two-Way Roadway with Paved Shoulders

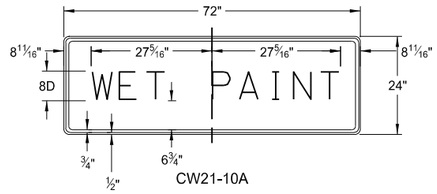


Two-Way Roadway without Paved Shoulders

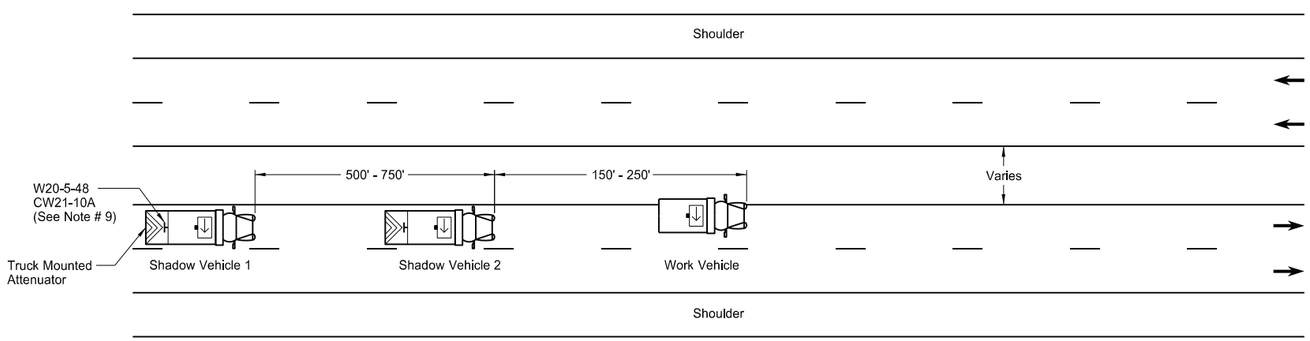
Sign Details



CW21-10

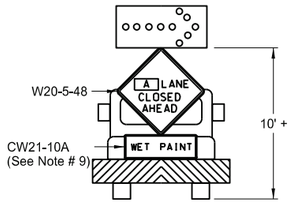


CW21-10A



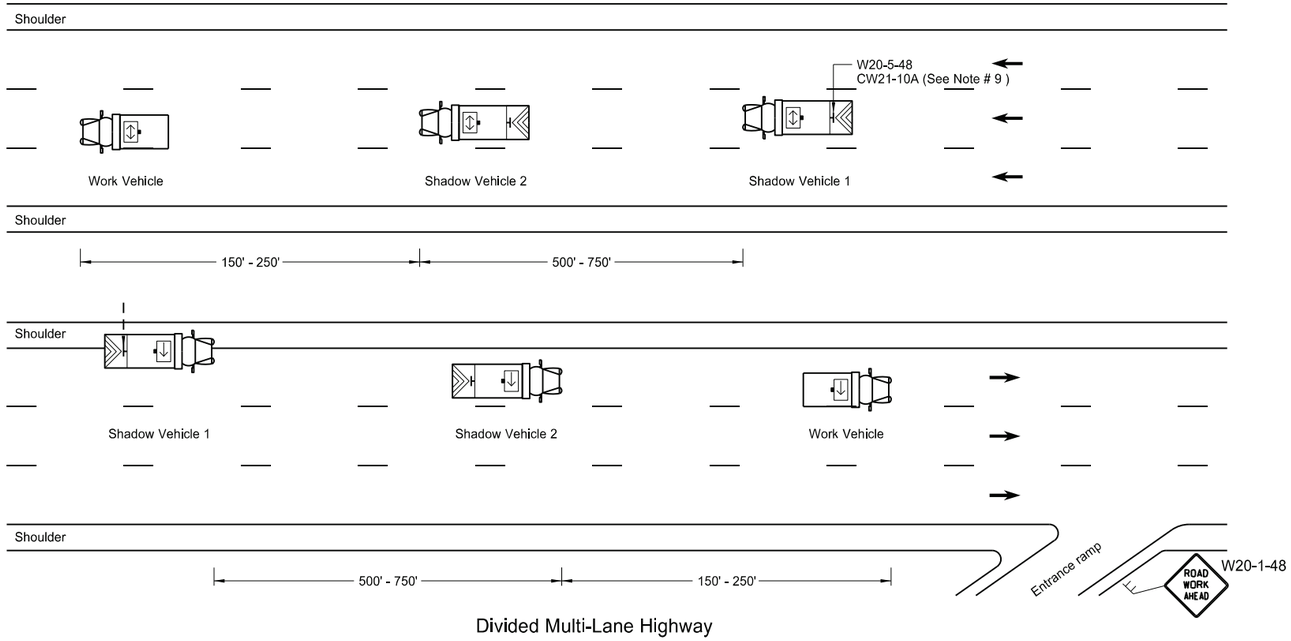
Undivided Multi-Lane Roadway

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



Typical Shadow Vehicle 1 & 2
Multi-Lane Highways

A = Left Right Center



Divided Multi-Lane Highway

KEY

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

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

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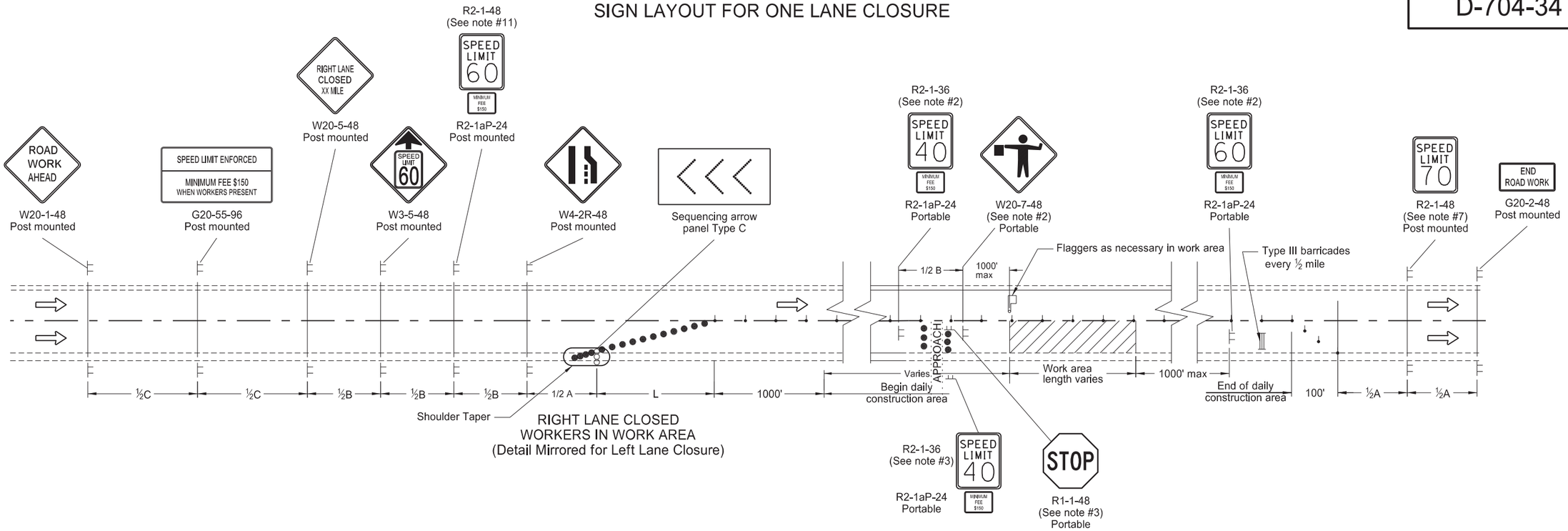
08/02/24

SIGN LAYOUT FOR ONE LANE CLOSURE

D-704-34



RIGHT LANE CLOSED
WORKERS IN WORK AREA
(Detail Mirrored for Left Lane Closure)

Notes:

1. Install advance signs for flagging when flaggers are flagging.
2. Move the advanced flagger sign and speed limit signs as the work area moves through the construction zone. When the work area is not visible from the flagger, move the flagger station so the work area is visible. Place the 40 mph speed limit sign at ½A in advance of the flagger sign and move the 60 mph speed limit sign. Cover or remove the 40 mph speed limit and the Minimum Fee $150 signs upon completion of the work day or when workers are not present. Determine the exact speed limit in the field, dependent on location and conditions.
3. Approaches: When the work area encompasses an approach, install a 40 mph speed limit sign to control the approach. Cover the existing stop sign and install a new portable stop sign when the approach is on the side of the lane closure. Remove the approach speed limit sign once the main line 40 mph speed zone is moved past the approach.
4. Variables:
   S=Numerical value of speed limit or 85th percentile
   W=The width of taper.
   L=Minimum length of taper, or SxW for freeways, expressways, and all other roads with speeds of 45 mph or greater, or
   (WxSxS)/60 for urban, residential, and other streets with speeds of 40 mph or less.
5. Space delineator drums for tapering traffic at the dimension "S". Space tubular markers used for tangents at 2 times dimension "S".
6. Place sequencing arrow panels at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the work area and place on the roadway surface.
   Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
   Use Type B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
   Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
7. Re-establish the speed limit. Determine the exact speed limit in the field, dependent on location and conditions.
8. Cover existing speed limit signs within a reduced speed zone.
9. Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the diamond sign, and at such a distance above the edge that the flag does not touch the sign when limp.
10. Determine the reduced speed limit dependent on the in place speed limit before construction. Where speed limits are to be reduced more than 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at ½B.
11. As an option use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
12. Sign G20-55-96 is not required if this layout is part of other traffic control that contains this sign, or the work is less than 15 days.

KEY

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

ADVANCE WARNING SIGN SPACING

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-26-2012

REVISIONS

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

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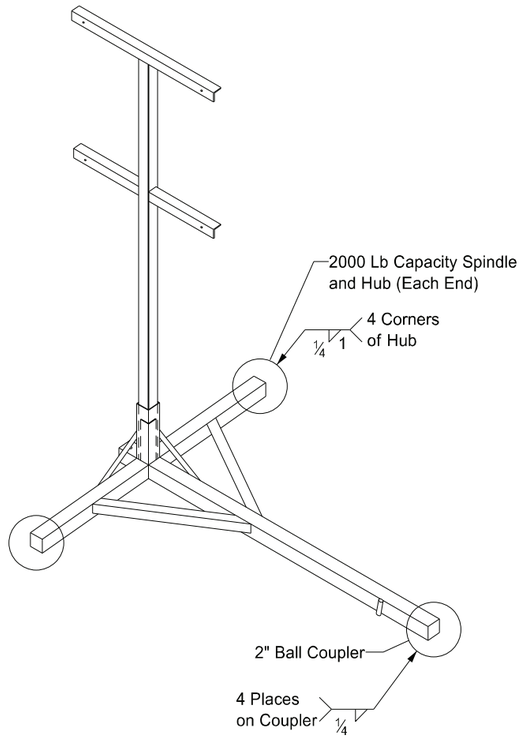
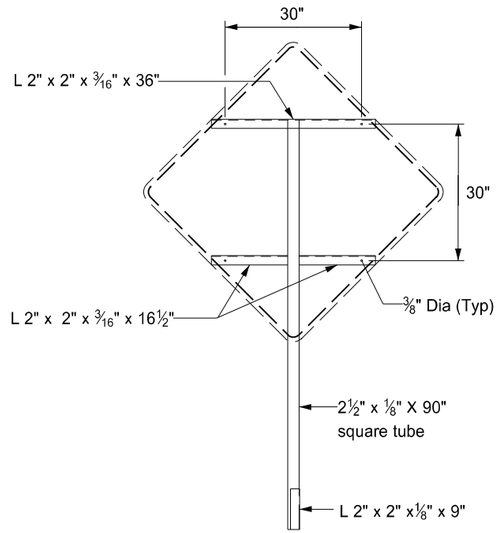
06/30/25
ENGINEER
NORTH DAKOTA

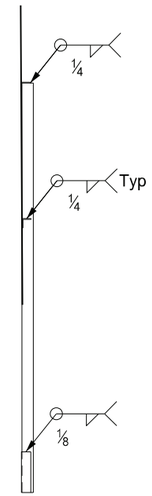
PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50





FRONT

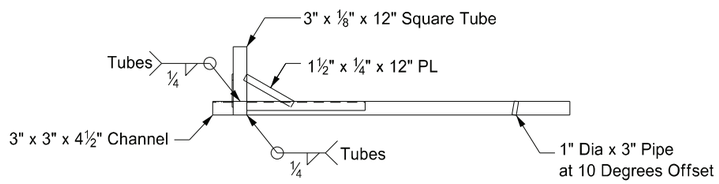


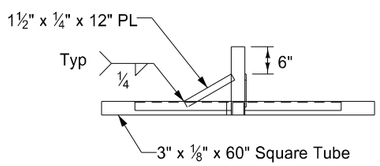
RIGHT

SIGN SUPPORT

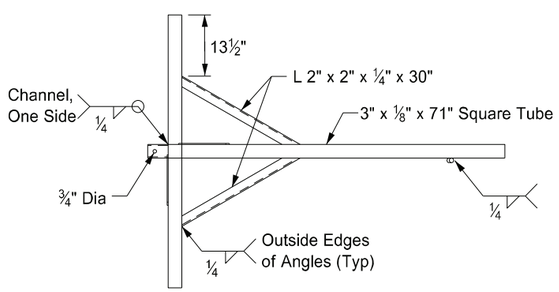
Notes:

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





RIGHT



TOP

TRAILER

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

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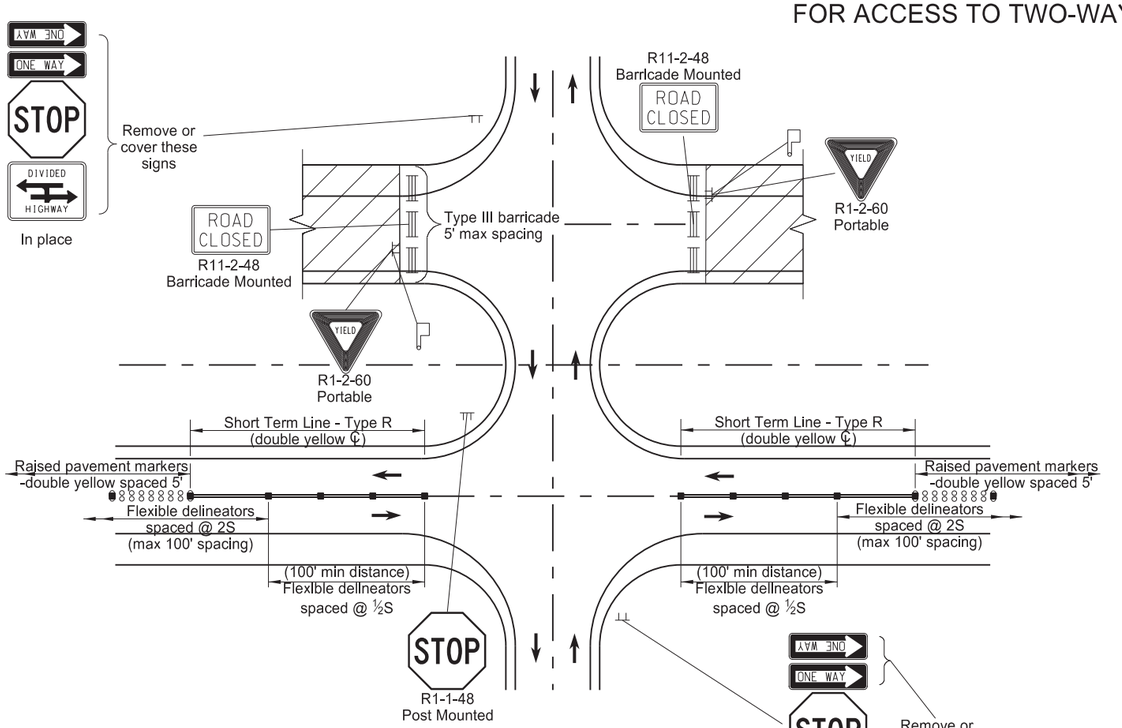
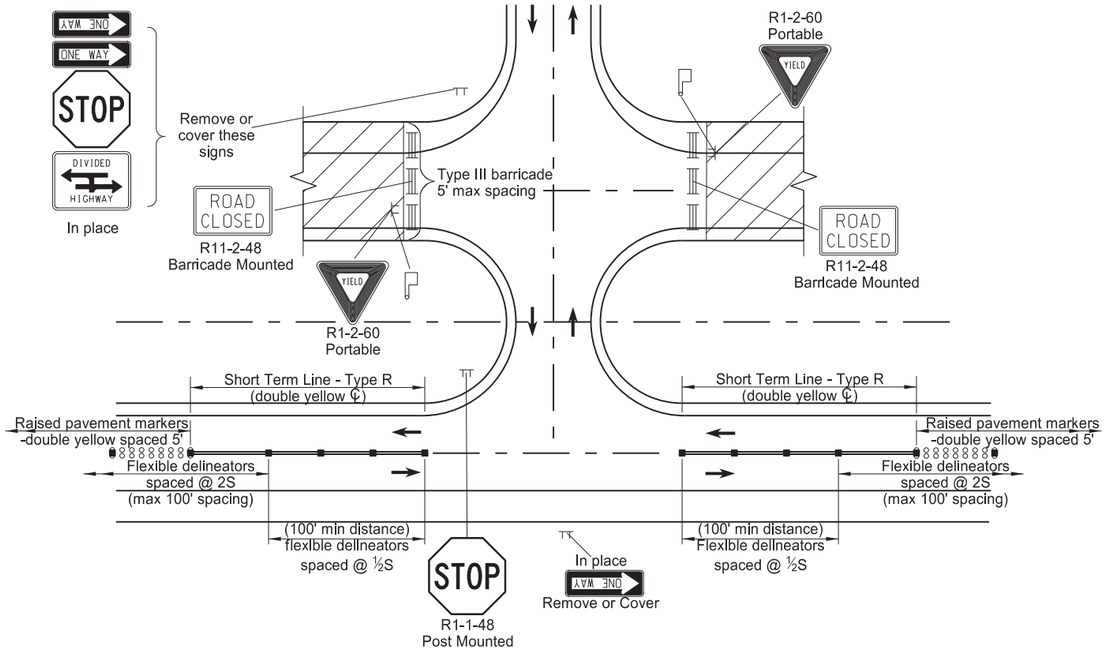
12 02 2020

ONE ROAD CLOSURE FOUR-LANE DIVIDED HIGHWAY FOR ACCESS TO TWO-WAY TWO-LANE ROADWAY

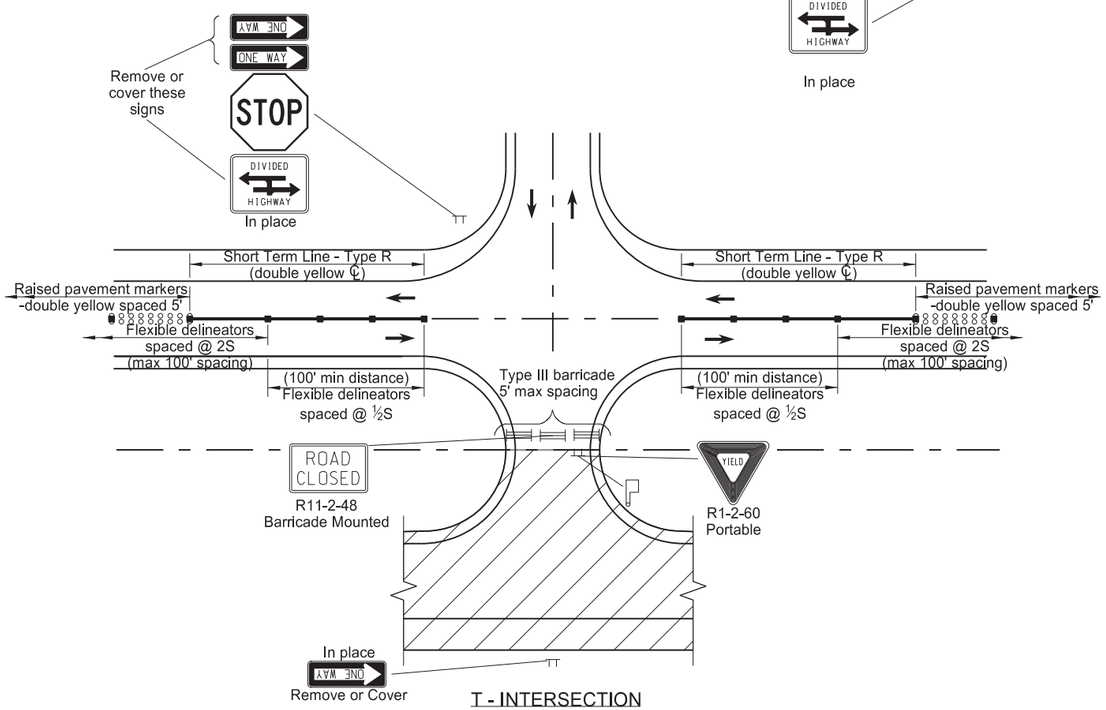
D-704-63



FULL INTERSECTION



T - INTERSECTION



T - INTERSECTION

Notes:

1. S = Construction zone speed limit established for the roadway carrying two way traffic on the four lane divided highway.
2. Roadway under construction is expected to be closed to all traffic. If the contractor chooses to use the roadway under construction for access via the cross road or chooses to use the roadway under construction as a haul road, provide the following traffic control: Place yield signs for construction traffic at low volume crossings. Place yield sign and a flagger for construction traffic at high volume crossroads. Do not stop public traffic on the crossroads for construction traffic. Engineer determines which cross roads are low or high volume.
3. To gain access to the closed roadway, position barricades in a location that will not interfere with the sight distance of haul vehicles. Place barricades in their original position at the end of the work day.

KEY

- Work Area
- Flagger
- Type III Barricade
- Sign
- Tubular Markers
- Sequencing Arrow Panel
- Raised Pavement Marker
- Flexible Delineator

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

11-15-12

REVISIONS

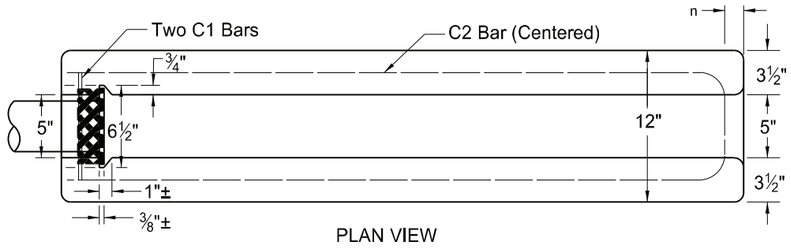
DATE	CHANGE
8-17-17	Updated notes & sign support.
10-03-19	New Design Engineer PE Stamp.
7-15-22	Clarified Dimensioning & Notes.
10-11-24	Removed pvmt mkg widths.

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

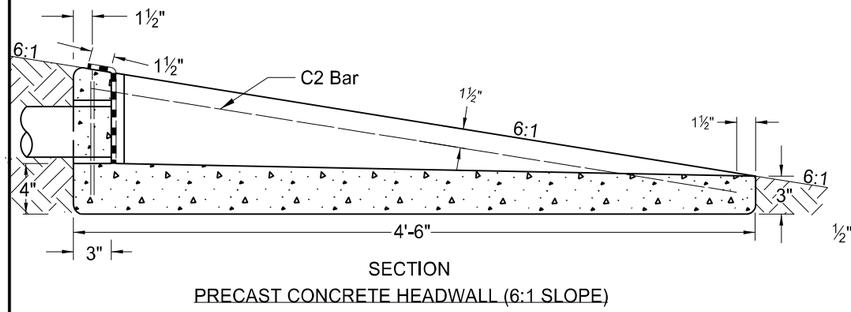
10/11/24

PRECAST CONCRETE HEADWALL DETAILS

D-714-18

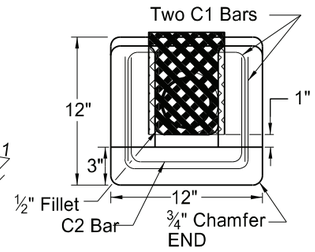


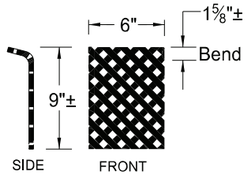
PLAN VIEW



SECTION

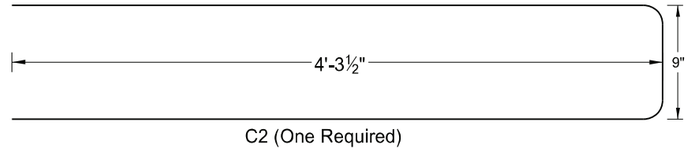
PRECAST CONCRETE HEADWALL (6:1 SLOPE)



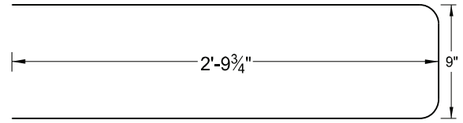


RODENT SCREEN

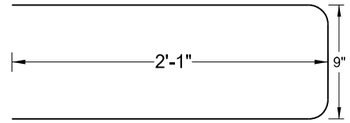
Dimensions are approximate to allow bend and a snug fit in headwall slot



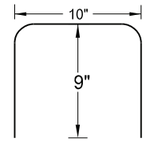
C2 (One Required)



C3 (One Required)

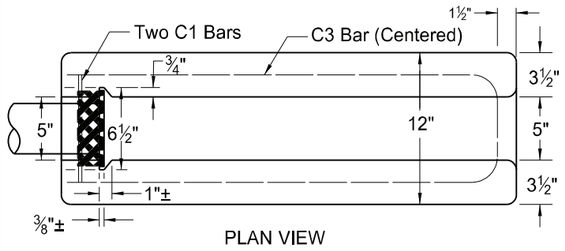


C4 (One Required)

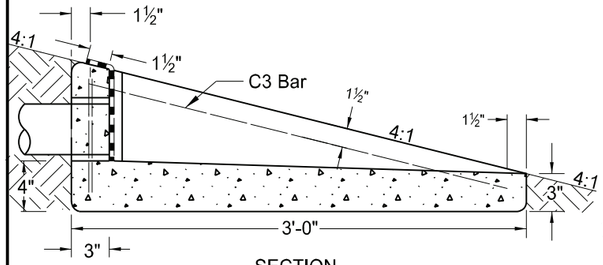


C1 (Two Required)

BENT BAR DETAILS

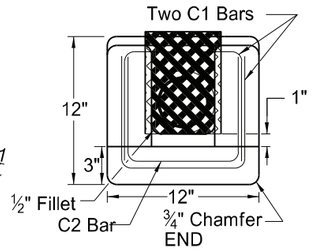


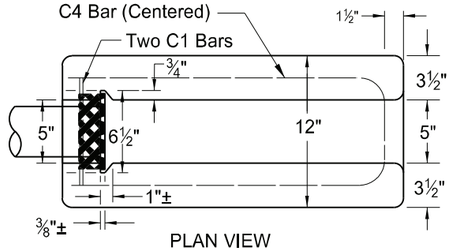
PLAN VIEW



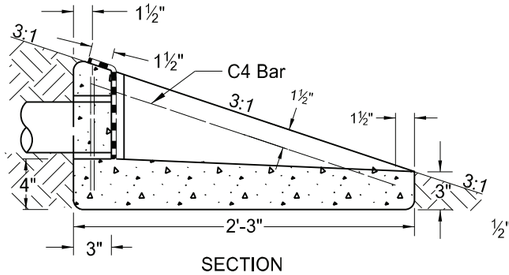
SECTION

PRECAST CONCRETE HEADWALL (4:1 SLOPE)



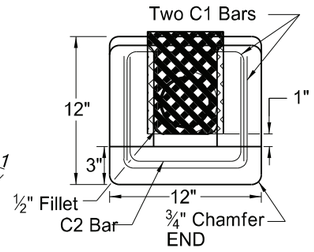


PLAN VIEW



SECTION

PRECAST CONCRETE HEADWALL (3:1 SLOPE)



NOTES:

RODENT SCREEN: Fabricate rodent screen from flattened expanded metal with screen openings of approximately 0.25 square inches. Use 16 ga metal, hot dip galvanized after fabrication, for the screen.

REINFORCING BARS: Use No. 4 deformed steel reinforcing bars.

BENT BARS: Bent bar dimensions given out to out.

SLOPE: Match headwall slope to foreslope.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

10-27-2010

REVISIONS

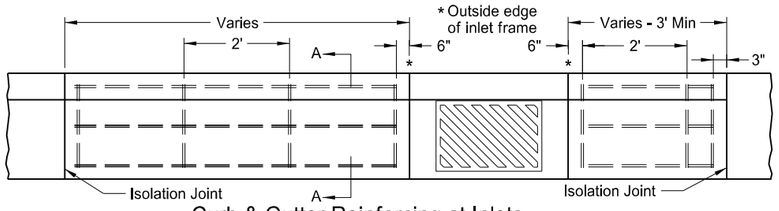
DATE	CHANGE
12/02/2020	Removed drainable base details Added 4:1 and 3:1 Headwalls

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

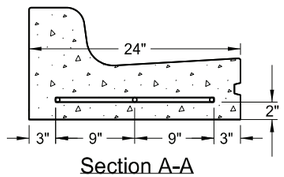
12 02 2020

Curb & Gutter and Valley Gutter

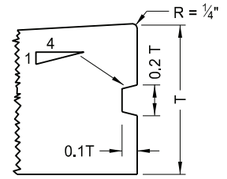
D-748-1



Curb & Gutter Reinforcing at Inlets



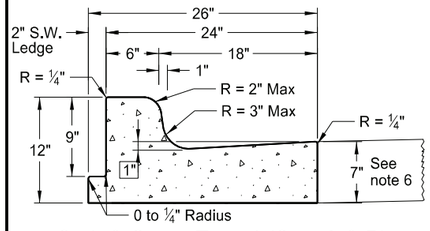
Section A-A



Keyway Detail for Curb & Gutter

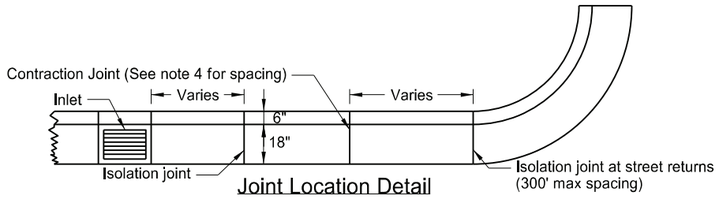
(To be used with PCC Pavement and Drives)

T= Thickness of pavement unless otherwise noted on plans.

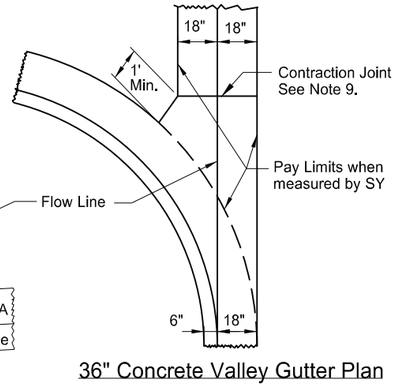


Curb & Gutter Type 1 (Sec. A & B)

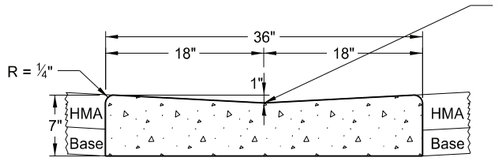
Adjacent to Concrete Sidewalk, Median, or Parking Lot. (Sec. A shown. See Sec B for additional details.)



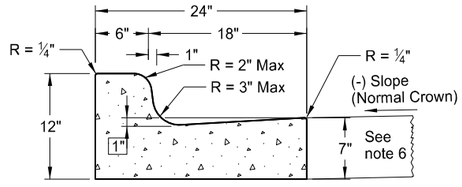
Joint Location Detail



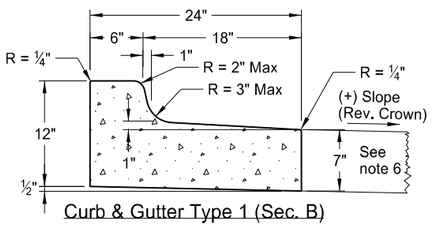
36" Concrete Valley Gutter Plan



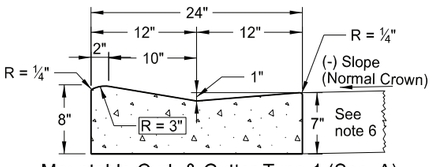
36" Concrete Valley Gutter Detail



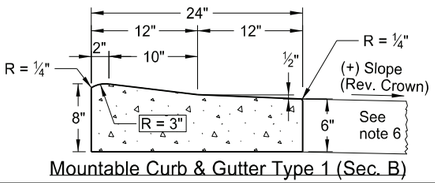
Curb & Gutter Type 1 (Sec. A)



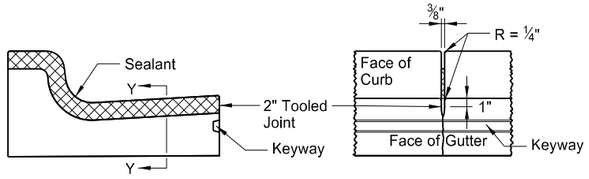
Curb & Gutter Type 1 (Sec. B)



Mountable Curb & Gutter Type 1 (Sec. A)



Mountable Curb & Gutter Type 1 (Sec. B)

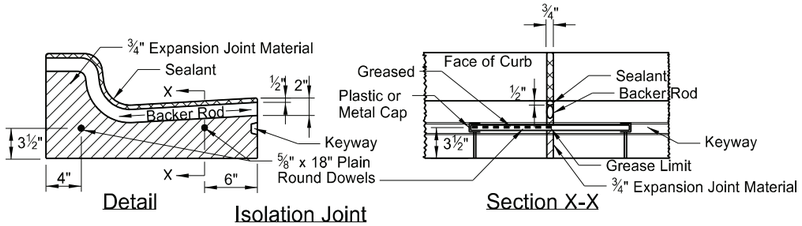


Detail

(10' Max Spacing)

Contraction Joint

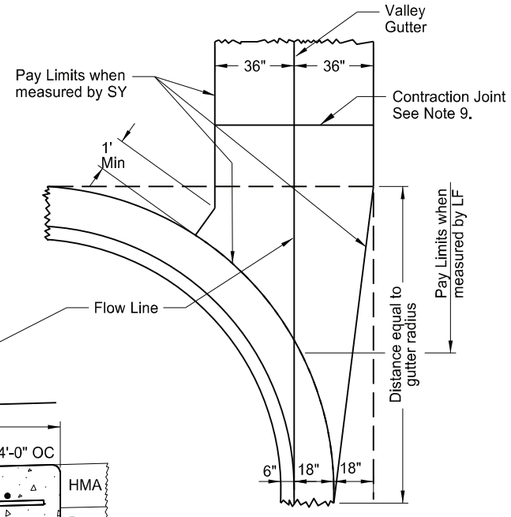
Section Y-Y



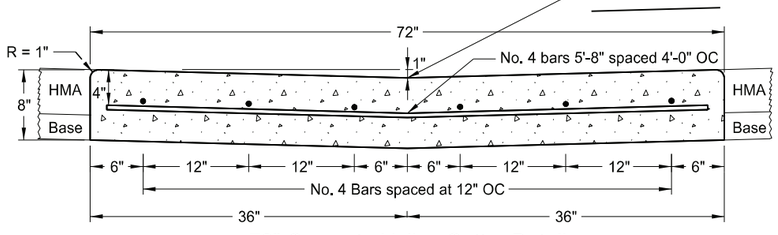
Detail

Isolation Joint

Section X-X



72" Concrete Valley Gutter Plan



72" Concrete Valley Gutter Detail

NOTES:

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

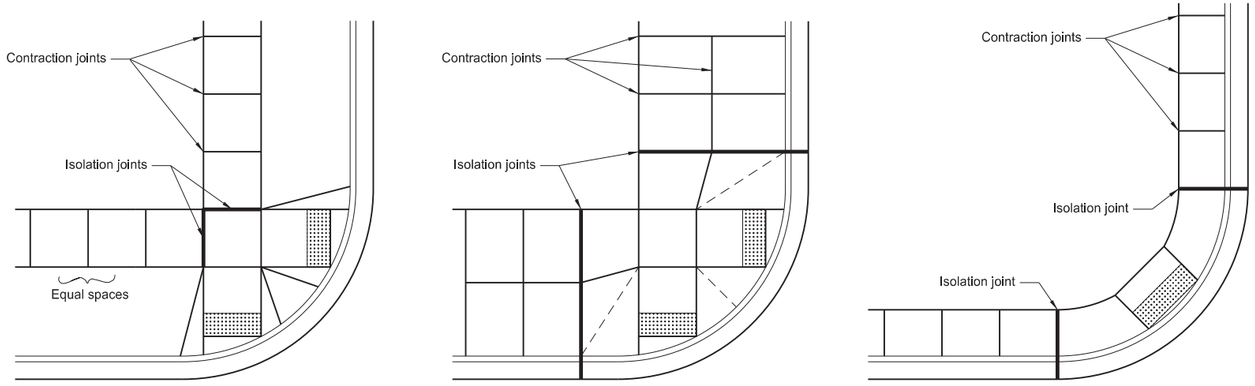
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-7-2013	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engr PE Stamp.
10-30-24	Revised bar size & notes.

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

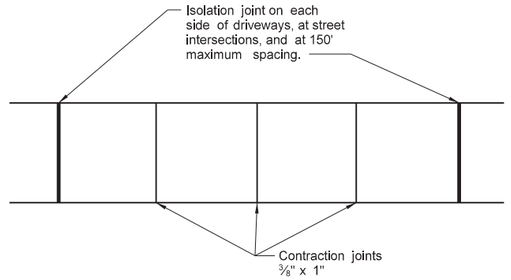
10/30/24

SIDEWALK

D-750-2



Typical Joint Layouts



NOTES:

1. Curb ramp and detectable warning panel layouts for informational purposes only. See Standard Drawing D-750-3 for curb ramp and detectable warning panel details.
2. Joint Spacing: Vary transverse contraction joint spacing from 4' to 6' to create approximate square panels.

   Use longitudinal contraction joints when sidewalk width is 8' or greater, and space at half the sidewalk width.

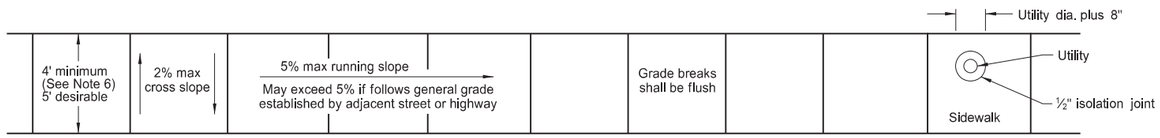
   Saw or groove contraction joints to a minimum depth of 1/3 the depth of the concrete.

   When sidewalk is adjacent to curb & gutter, vary the sidewalk joint spacing to match curb & gutter joints.

   Use isolation joints between separate concrete pours, or between old and new concrete.
3. Include all costs for labor, equipment, and material necessary to construct contraction and isolation joints in the price bid for sidewalk concrete.
4. Use 4" sidewalk concrete thickness unless otherwise specified.
5. Use 4" base material thickness unless otherwise specified. Include all costs for labor and materials necessary to place the base material in the price bid for "Salvage Base Course" or "Aggregate Base Course CL 5."

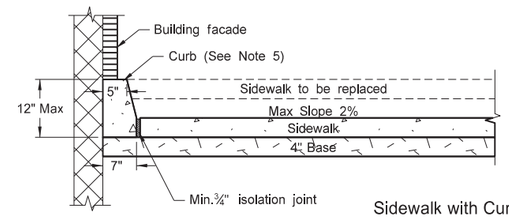
   Modify existing ground slope with landscaping as needed. If not possible, such as adjacent buildings, use a vertical curb as shown in the detail below. The Engineer will measure curb at the unit price bid for "Curb - Type I" per lineal foot.
6. Sidewalk Width & Grade: Provide a continuous 4' min clear width pedestrian access route with max 2% concrete cross slope, excluding flares. The width of the curb cannot be counted as part of the pedestrian access route.

   When clear width of pedestrian access routes is less than 5.0', provide passing spaces at a maximum of 200' with a minimum size of 5.0' by 5.0'.

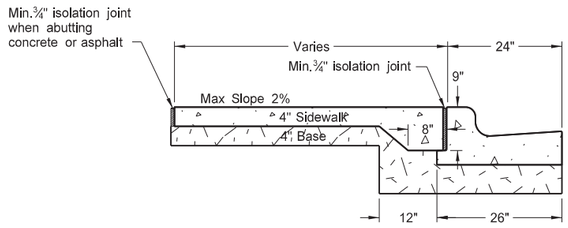


Sidewalk Width and Grade

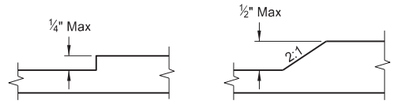
Utility Blockout



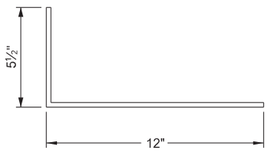
Sidewalk with Curb Detail
(Building face application)



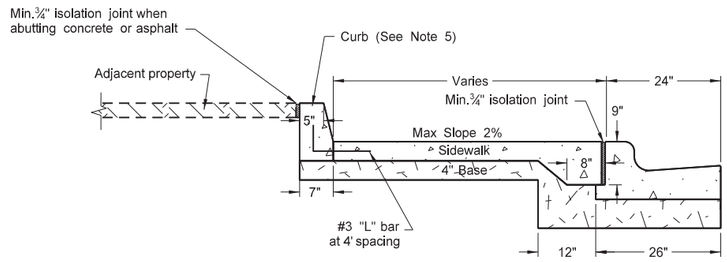
Sidewalk Detail
(Installed adjacent to curb and gutter)



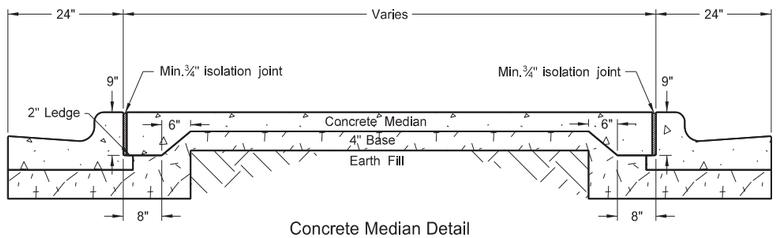
Vertical Discontinuities
(As needed for utility covers, vaults, grating, etc..)



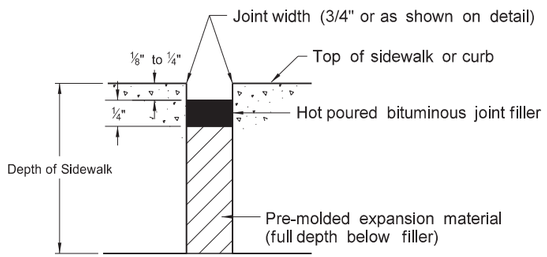
"L"Bar Detail
#3 Bar



Sidewalk with Curb Detail
(Adjacent property application)



Concrete Median Detail



Typical Isolation Joint Seal
(longitudinal and transverse)

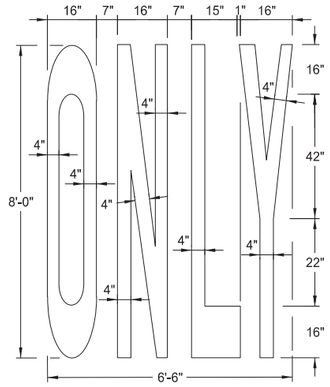
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-26-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
09-05-18	Added sidewalk details for width & grade & passing lane requirements.
08-27-19	New Design Engineer PE Stamp.
08-09-24	Electronic Stamp/Signature.

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

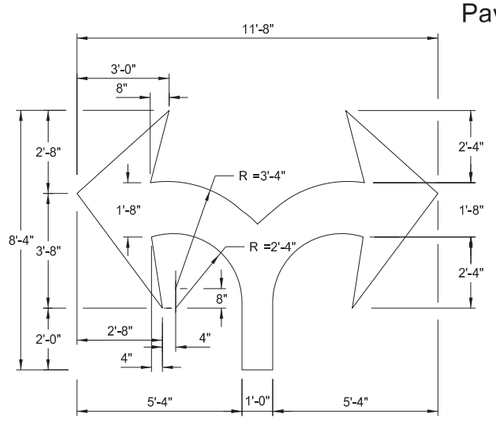
08/09/24

Pavement Marking Message Details

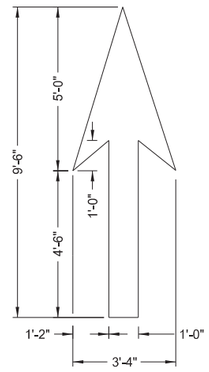
D-762-1



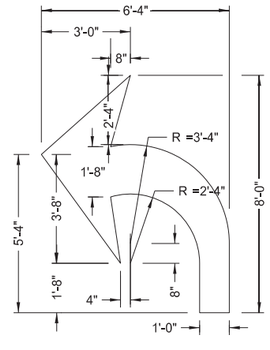
22 S. F.



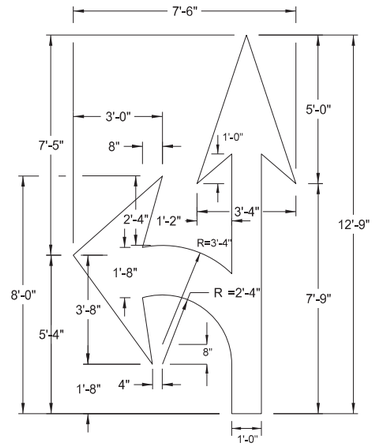
29 S. F.



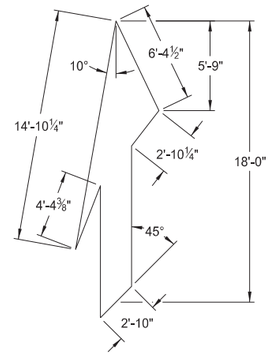
12 S. F.



16 S. F.

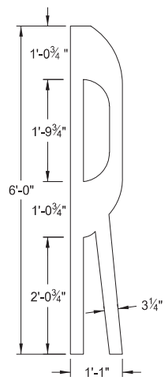


27 S. F.

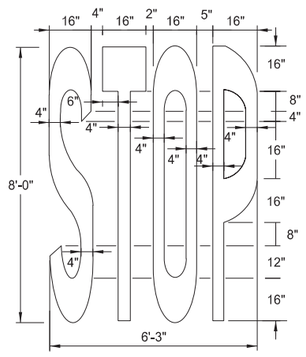


41 S. F.

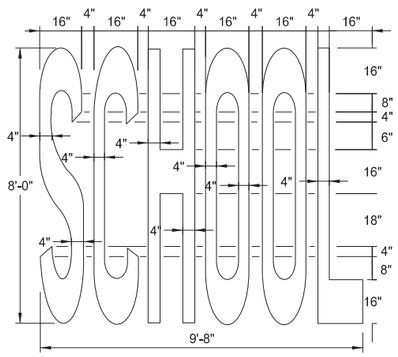
Note: Rotate merge arrow 20° from edge of roadway.



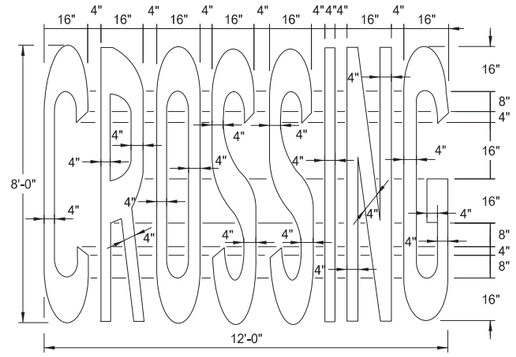
4 S. F.



22 S. F.



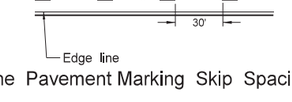
34.5 S. F.



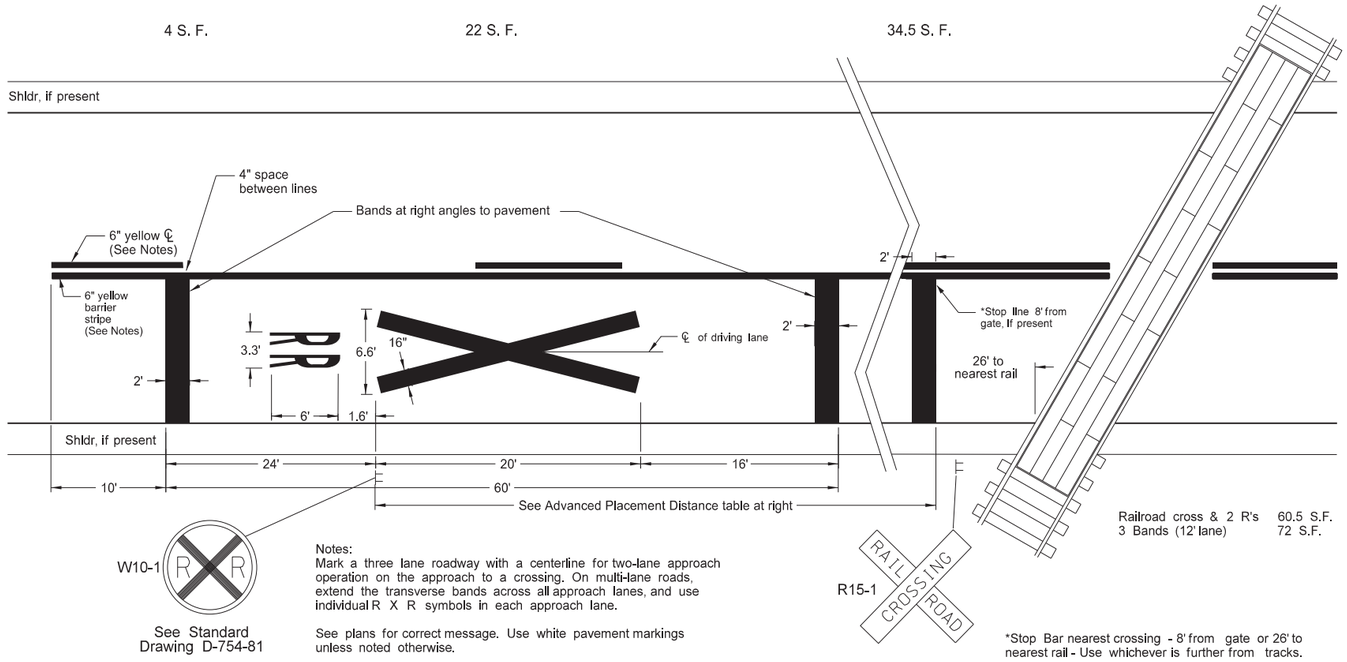
46 S. F.

Speed Limit	Chevron Width	Chevron Spacing 45° to Traffic
0-25 mph	8"	5'
30-40 mph	8"	15'
45 mph and above	12"	25'

Chevron Crosshatching Table



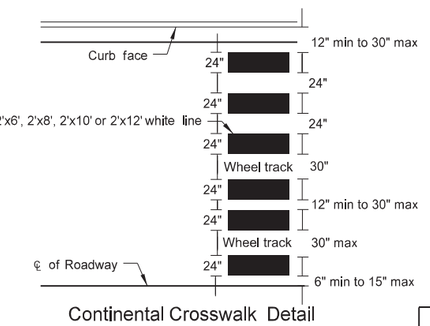
Centerline Pavement Marking Skip Spacing Detail



Notes:
Mark a three lane roadway with a centerline for two-lane approach operation on the approach to a crossing. On multi-lane roads, extend the transverse bands across all approach lanes, and use individual R X R symbols in each approach lane.

See plans for correct message. Use white pavement markings unless noted otherwise.

Advance Placement Distance for Railroad Warning Signs	
Posted or 85th Percentile Speed	Advance Distance
20 mph	min. 100 ft
25 mph	min. 100 ft
30 mph	min. 100 ft
35 mph	min. 100 ft
40 mph	125 ft
45 mph	175 ft
50 mph	250 ft
55 mph	325 ft
60 mph	400 ft
65 mph	475 ft
70 mph	550 ft



Continental Crosswalk Detail

NOTES:

1. Normal width line - 6 inches wide for freeways, expressways, and ramps; 6 inches for all other roadways with speed limits > 40 mph.
2. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits ≤ 40 mph.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

12-6-11

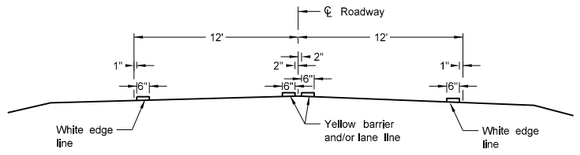
REVISIONS

DATE	CHANGE
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.
01-28-2020	Revised min Stop Bar distance to rail.
11-22-2023	Revised pavement marking widths.

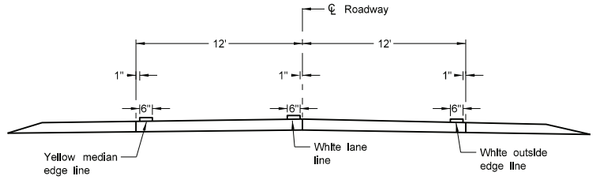
KIRK J. HOFFMAN REGISTERED PROFESSIONAL PE-4683 11/22/23 ENGINEER NORTH DAKOTA

PAVEMENT MARKING

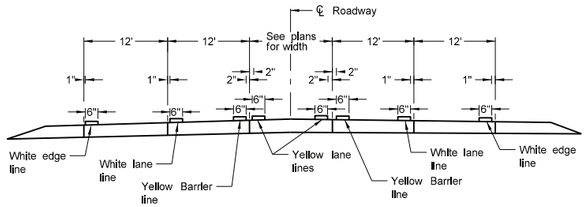
D-762-4



Two Lane Two Way
RURAL ROADWAY



Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



RURAL FIVE LANE ROADWAY
Concrete Section

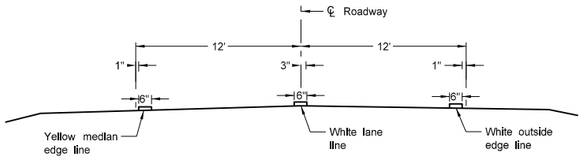
NOTES:

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

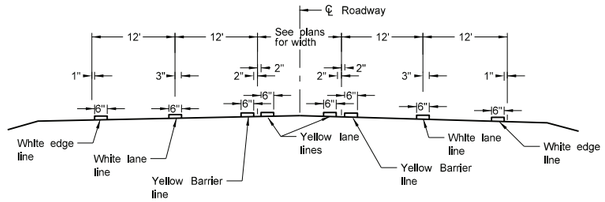
   For section lines, county roads, and street approaches, stripe the radii and edge lines of the paved surface within the right of way except where curb and gutter is present.

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

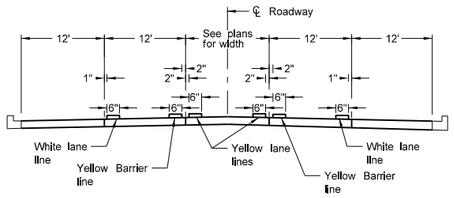
3. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits < 40 mph.



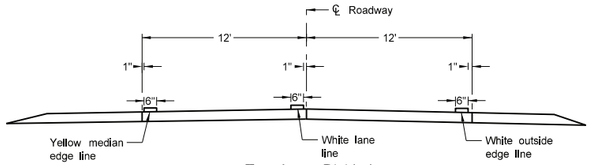
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



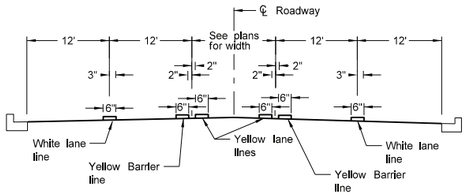
RURAL FIVE LANE ROADWAY
Asphalt Section



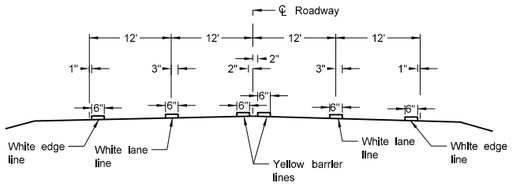
URBAN FIVE LANE SECTION
Concrete Section



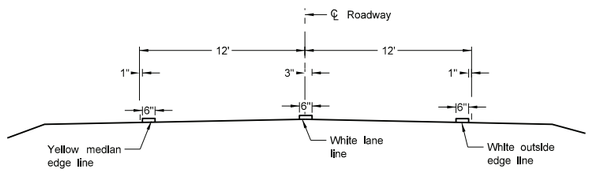
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



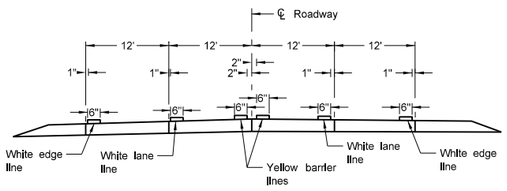
URBAN FIVE LANE SECTION
Asphalt Section



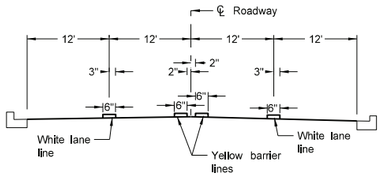
RURAL FOUR LANE ROADWAY
Asphalt Section



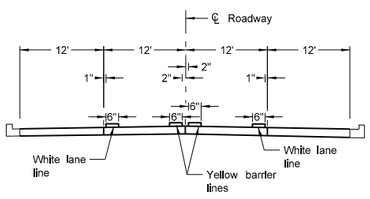
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



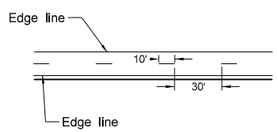
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



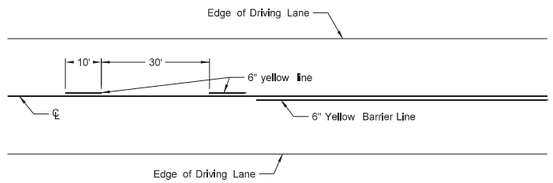
CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

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

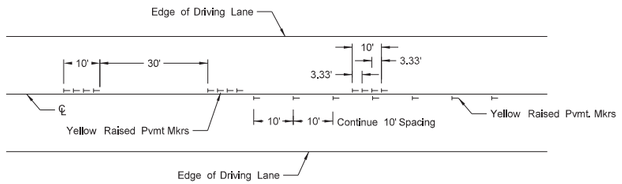
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
07/09/24
ENGINEER
NORTH DAKOTA

SHORT-TERM PAVEMENT MARKING

D-762-11

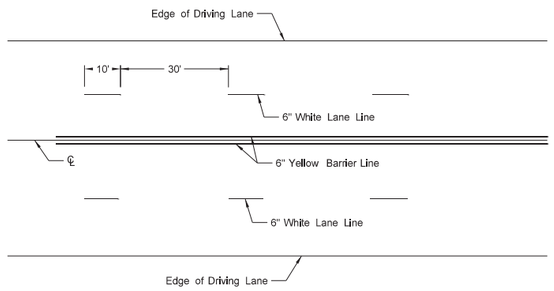


Painted or Tape Lines

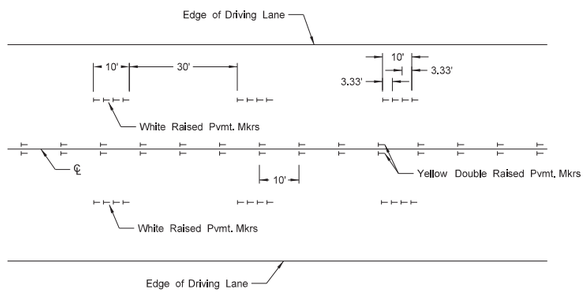


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

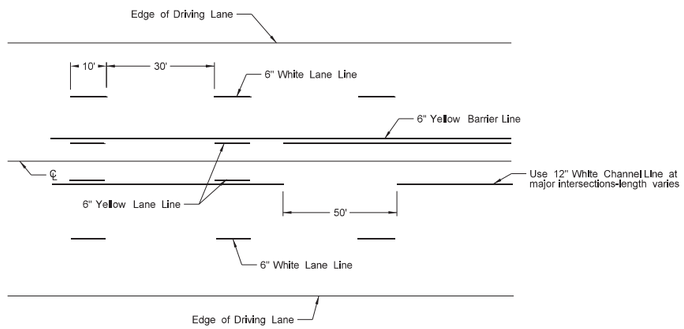


Painted or Tape Lines

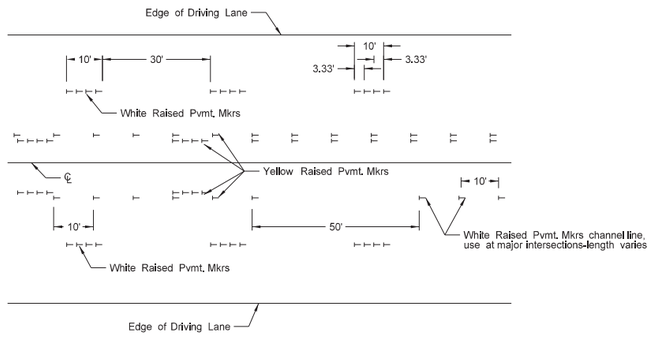


Raised Pavement Markers

FOUR LANE ROADWAY

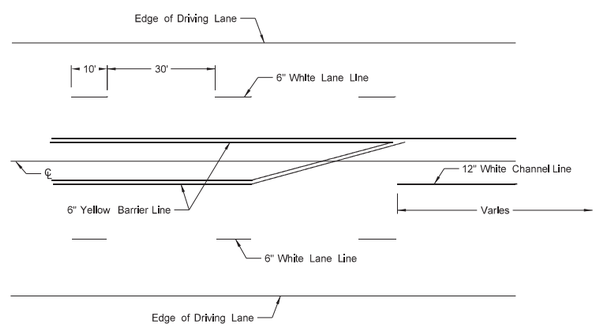


Painted or Tape Lines

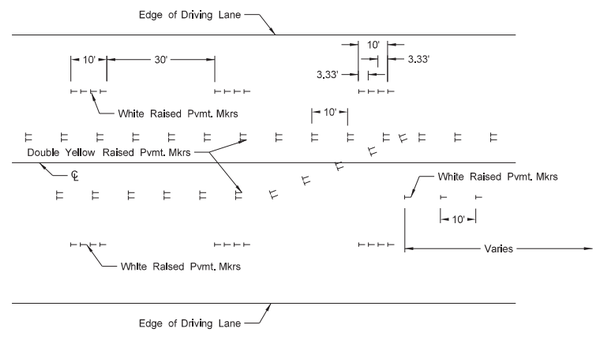


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

NOTES:

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

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

KIRK J. HOFF
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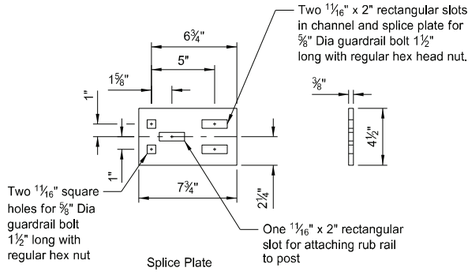
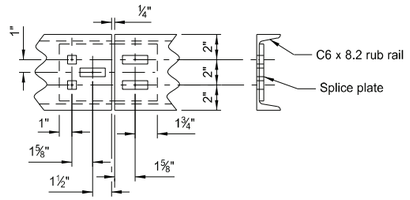
01/17/24
ENGINEER
NORTH DAKOTA

W-BEAM GUARDRAIL GENERAL DETAILS

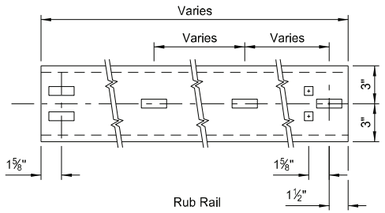
D-764-1



Splice Plate

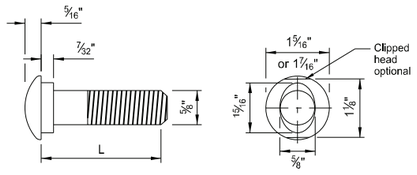


Splice Detail

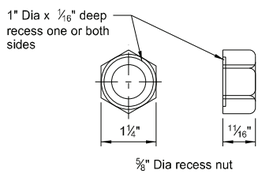


Rub Rail

C6x8 RUB RAIL AND SPLICE PLATE

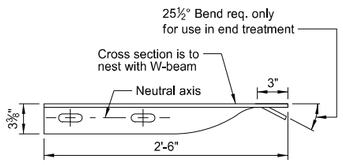


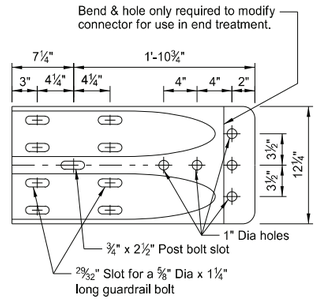
5/8" Diameter Guardrail Bolt	
L	Thread Length
1 1/4"	Full length thread
2"	1 3/4" Min thread length
9 1/2"	4" Min thread length
18"	4" Min thread length
20"	4" Min thread length
22"	4" Min thread length
25"	4" Min thread length



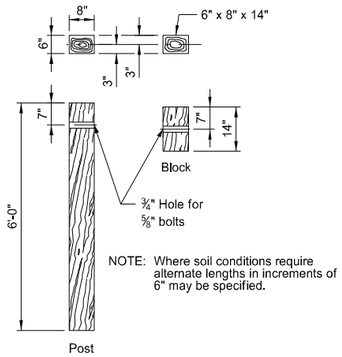
5/8" Dia recess nut

5/8" GUARDRAIL BOLT & RECESS NUT



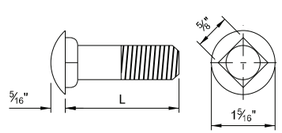


W BEAM TERMINAL CONNECTOR



Post

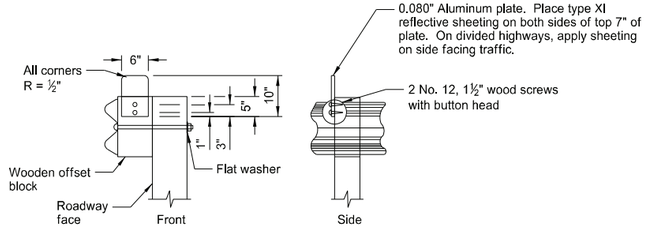
6"x8" TIMBER POST & BLOCK



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

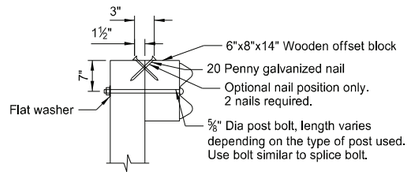
5/8" Hex nut

5/8" CARRIAGE BOLT & NUT

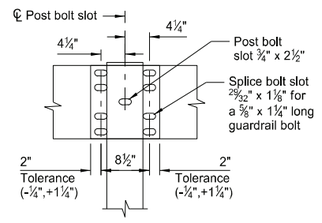


REFLECTORIZED PLATE DETAIL

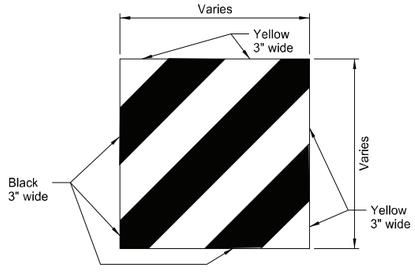
Additional reflectors are added to the W-beam guardrail quantities for placement on end treatment.



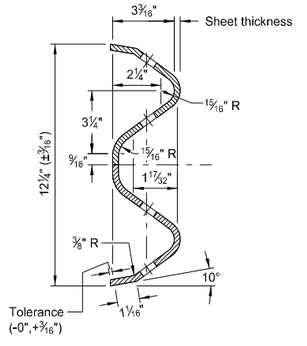
TYPICAL POST ATTACHMENT DETAIL



SPLICE DETAIL



IMPACT HEAD OBJECT MARKER



W-BEAM CROSS SECTION

NOTES:

1. Place reflector plates at the first post and spaced at 25' centers on guardrail less than 250' in length and at 50' centers for guardrail over 250' in length. Use reflector the same color as the pavement marking adjacent to that reflector unless noted otherwise on the plans.
2. Dispose of excess earth from excavations for guard posts as directed by the engineer. Replace bituminous material where guardrail is installed after mat is placed. Include cost of excavation and replacing of bituminous material in the price bid for other items.
3. Place Object Marker within the vertical edges of the Impact Plate. Use type XI retroreflective sheeting meeting the requirements of Section 894.02.E of the standard specifications. Apply sheeting to 0.100 Aluminum sheeting meeting the requirements Section 894.01.A. Attach the Object Marker to the Impact Head Plate with non-rust rivets or some other non-rust attachment device. Slope stripes downward toward the roadway side.
4. Guardrail installation height tolerance = - ¼" , + 1".
5. Standard W-Beam rail post bolt slot spacing is 6'-3". Post bolt slot spacing of 3'-1½" is acceptable.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

10-11-13

REVISIONS

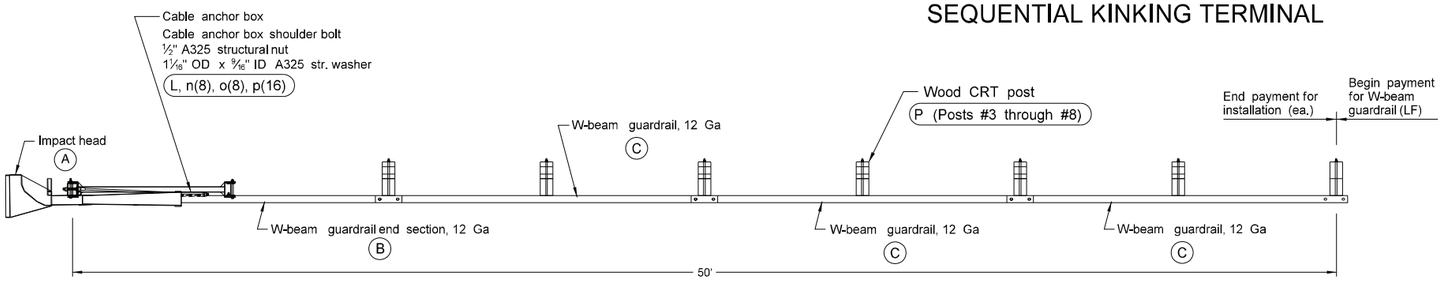
DATE	CHANGE
10-25-19	Updated notes to active voice and added Note 5.
12-02-20	Updated clipped head to optional

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

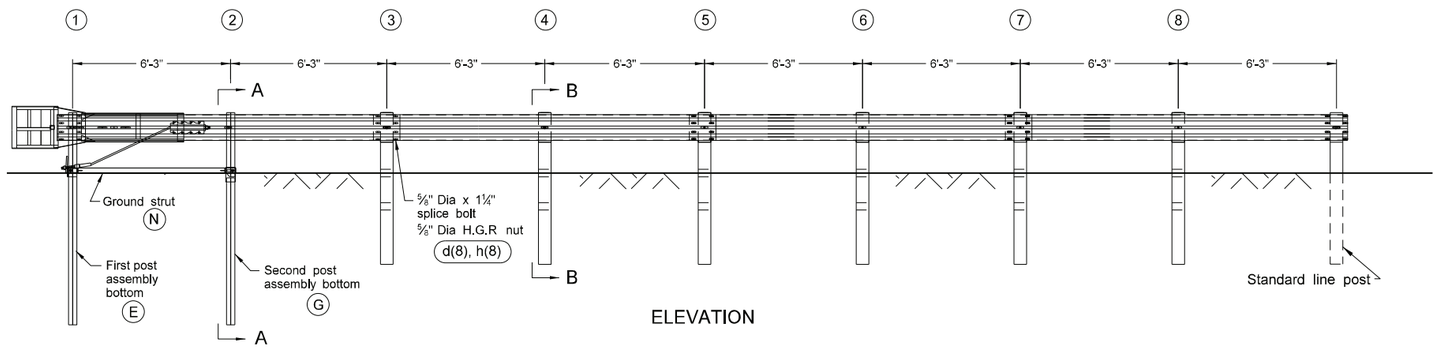
12 02 2020

SEQUENTIAL KINKING TERMINAL

D-764-5



PLAN

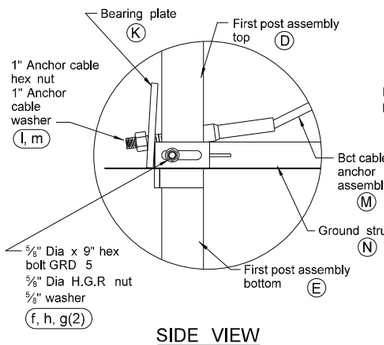


ELEVATION

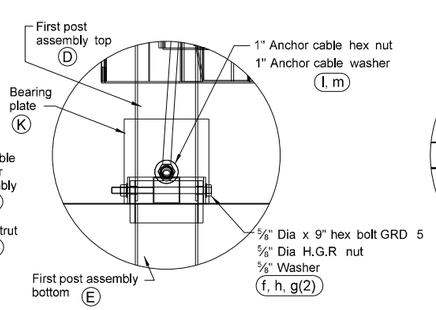
ITEM	QTY	BILL OF MATERIALS
A	1	IMPACT HEAD
B	1	W-BEAM GUARDRAIL END SECTION, 12 Ga
C	3	W-BEAM GUARDRAIL, 12 Ga
D	1	FIRST POST ASSEMBLY TOP
E	1	FIRST POST ASSEMBLY BOTTOM
F	1	SECOND POST ASSEMBLY TOP
G	1	SECOND POST ASSEMBLY BOTTOM
K	1	BEARING PLATE
L	1	CABLE ANCHOR BOX
M	1	BCT CABLE ANCHOR ASSEMBLY
N	1	GROUND STRUT HINGED POST
P	6	WOOD CRT POST
R	6	TIMBER BLOCKOUT/RCY EQUIVALENT
		HARDWARE
a	2	1/4 " x 4" HEX BOLT Grade 5
b	4	¼" WASHER
c	2	¼" HEX NUT
d	25	⅝" Dia X 1¼" SPLICE BOLT, POST #2
e	6	⅝" Dia X 18" H.G.R. BOLT (POSTS 3 THRU 8)
f	1	⅝" Dia X 9" HEX BOLT GRD 5
g	8	⅝" WASHER
h	32	⅝" Dia H.G.R. NUT
j	1	¾" Dia X 8½" HEX BOLT GRD A449
k	1	¾" Dia HEX NUT
l	2	1" ANCHOR CABLE HEX NUT
m	2	1" ANCHOR CABLE WASHER
n	8	GROUND STRUT HINGED POST
o	8	½" A325 STRUCTURAL NUT
p	16	1⅛" OD X ⅜" ID A325 STR. WASHER

GENERAL NOTES:

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

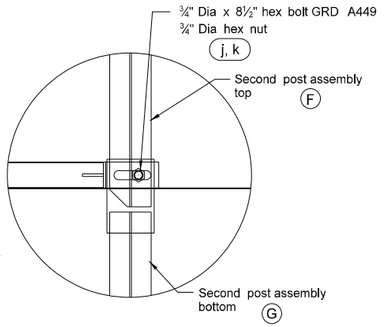


SIDE VIEW

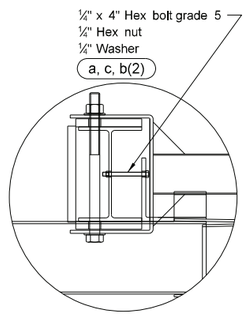


FRONT VIEW

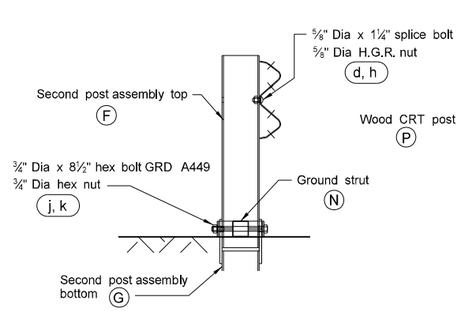
POST #1 CONNECTION DETAILS



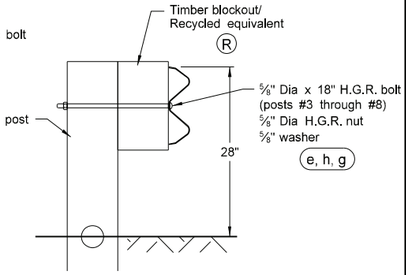
SIDE VIEW DETAIL OF POST #2



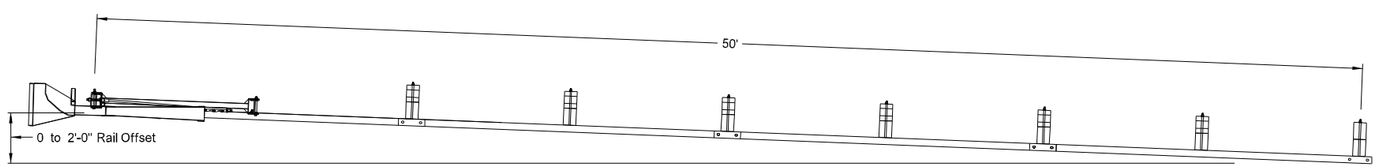
IMPACT HEAD CONNECTION DETAIL



SECTION A-A
Post #2



SECTION B-B
Posts #3 through #8



FLARED INSTALLATION
25:1 maximum flare rate

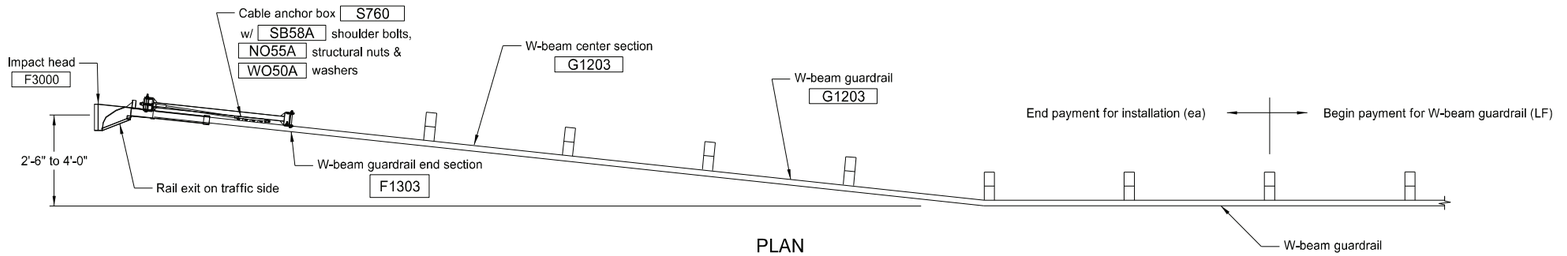
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-11-13	
REVISIONS	
DATE	CHANGE
12-02-20	Updated notes to active voice.

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

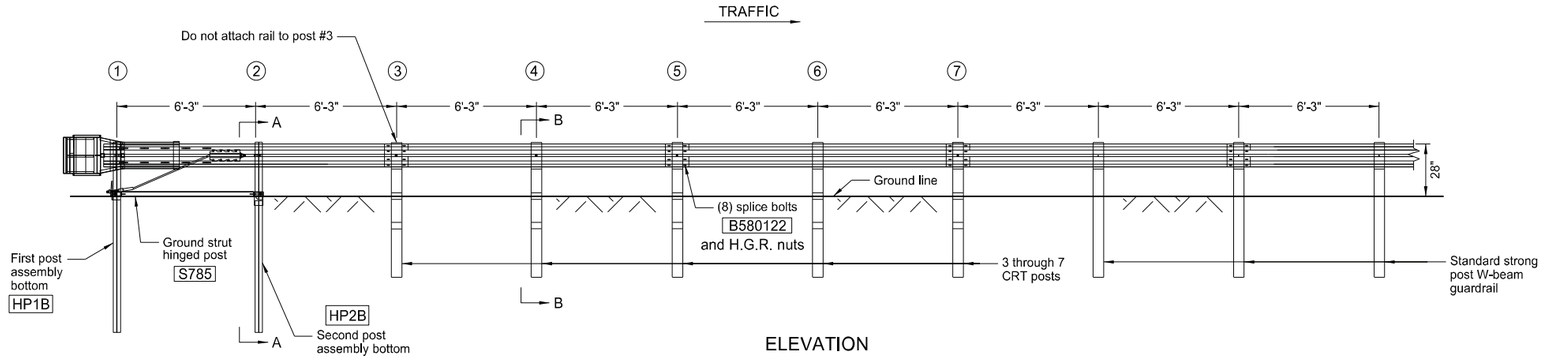
12 02 2020

FLARED ENERGY ABSORBING TERMINAL

D-764-6



PLAN

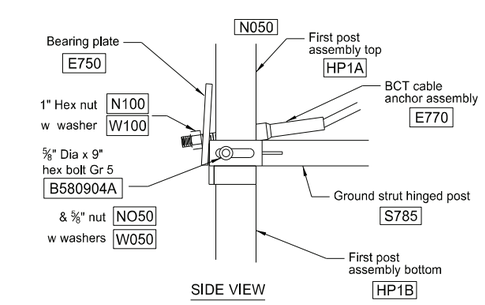


ELEVATION

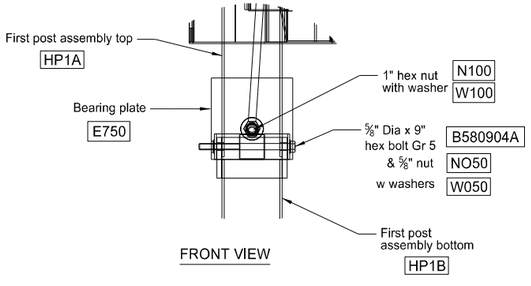
ITEM #	QTY	BILL OF MATERIALS
F3000	1	IMPACT HEAD
F1303	1	W-BEAM GUARDRAIL END SECTION, 12 GA
G1203	2	W-BEAM GUARDRAIL, 12 GA
HP1A	1	FIRST POST ASSEMBLY TOP
HP1B	1	FIRST POST ASSEMBLY BOTTOM
HP2A	1	SECOND POST ASSEMBLY TOP
HP2B	1	SECOND POST ASSEMBLY BOTTOM
P671	5	WOOD CRT POST
P675	5	TIMBER BLOCKOUT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

GENERAL NOTES

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

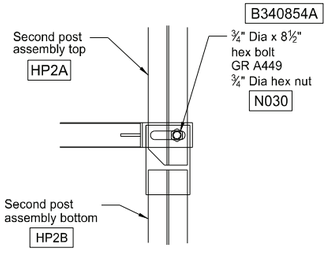


SIDE VIEW

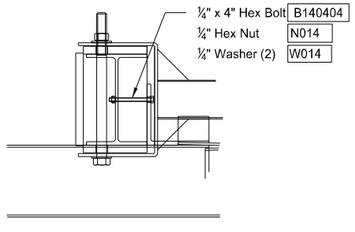


FRONT VIEW

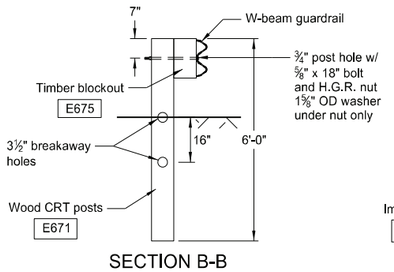
POST #1 CONNECTION DETAILS



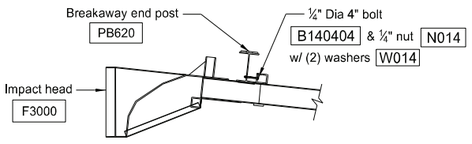
SIDE VIEW DETAIL OF POST #2



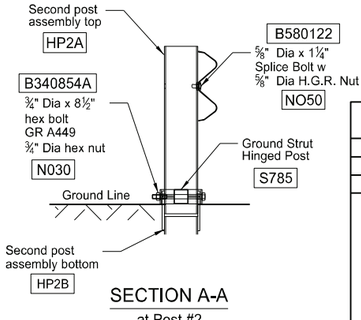
IMPACT HEAD CONNECTION DETAIL



SECTION B-B
POST 3 THRU 7



IMPACT HEAD CONNECTING DETAIL



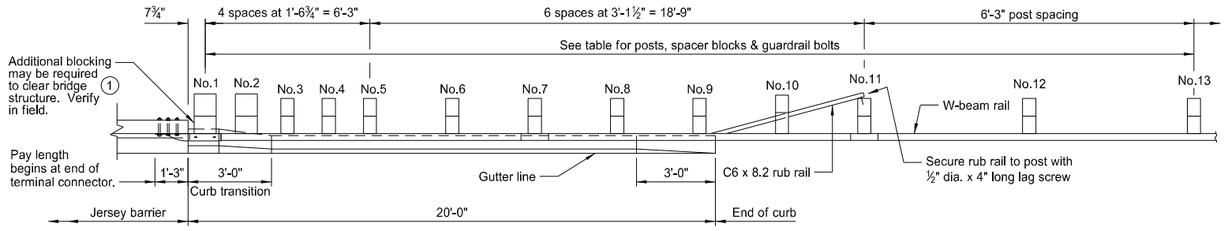
SECTION A-A
at Post #2

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

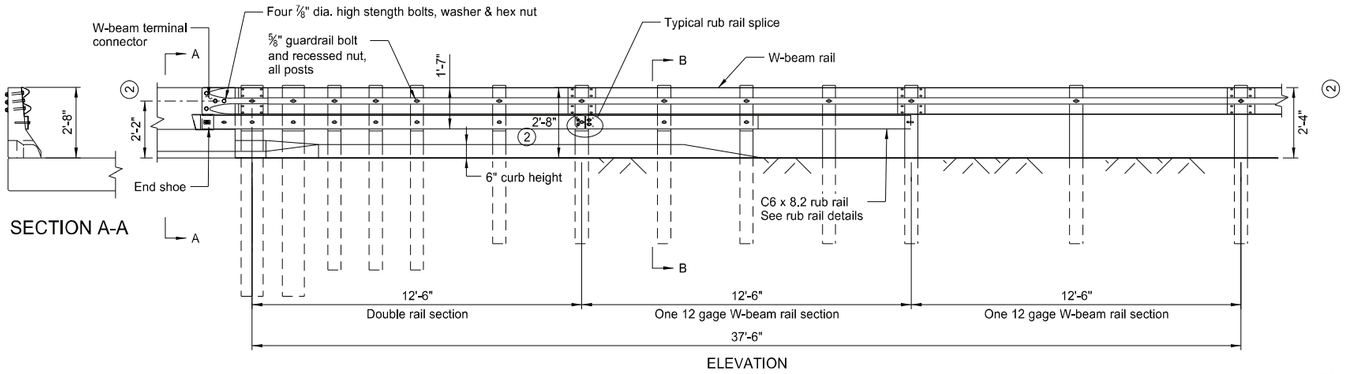
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
12 02 2020

W-BEAM TRANSITION TO CONCRETE JERSEY BARRIER WITH APPROACH CURB

D-764-9



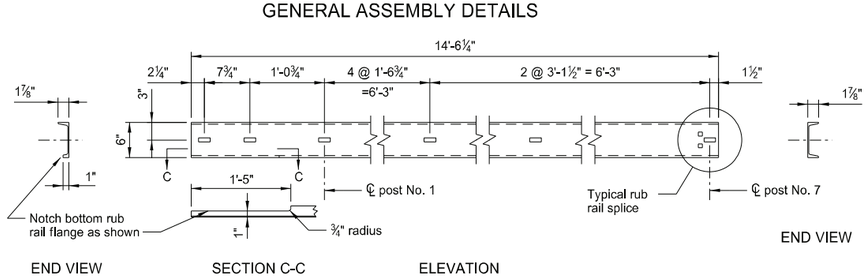
PLAN



ELEVATION

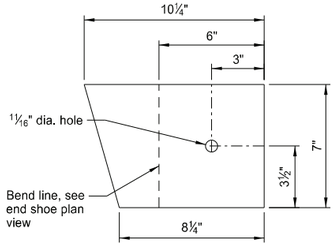
GENERAL ASSEMBLY DETAILS

TOP PLATE

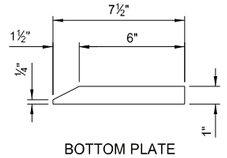


END VIEW SECTION C-C ELEVATION END VIEW

RUB RAIL STRAIGHT SECTION



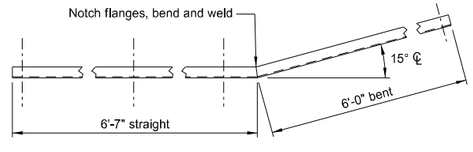
FRONT PLATE



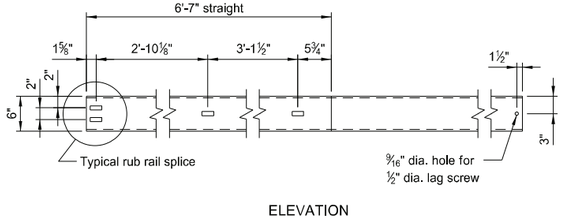
BOTTOM PLATE

END SHOE PLATE DETAILS

(¼" plate)

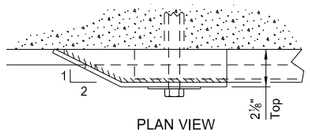


PLAN VIEW

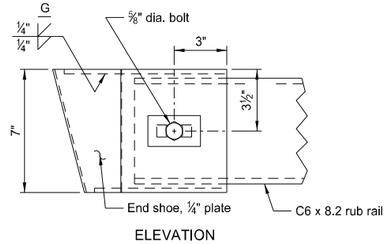


ELEVATION

RUB RAIL BENT SECTION

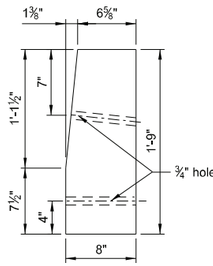


PLAN VIEW



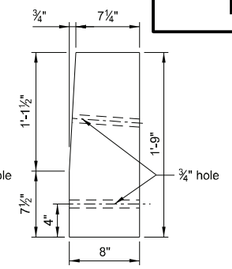
ELEVATION

RUB RAIL END SHOE ASSEMBLY



END VIEW

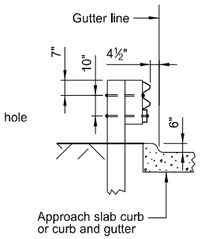
Block No. 1 (width = 10")



END VIEW

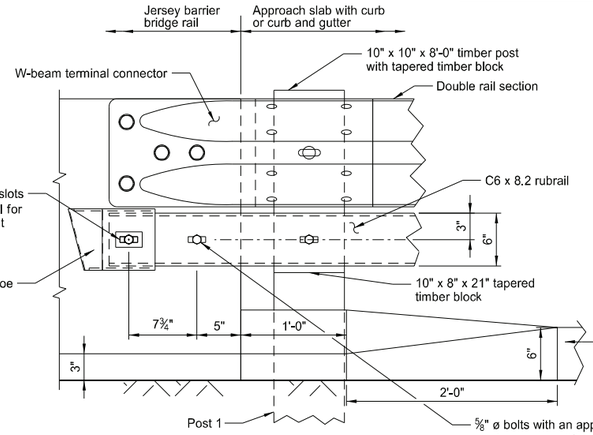
Block No. 2 (Width = 10")

TAPERED TIMBER BLOCK DETAILS

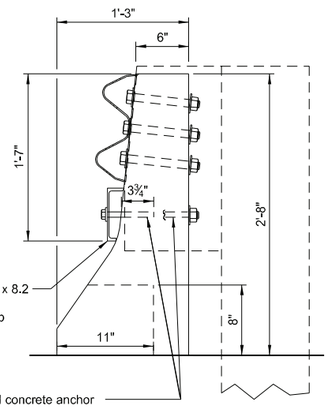


SECTION B-B

POST, TIMBER BLOCK & BOLT TABLE		
DESCRIPTION	POST NO.	SIZE
Post	1 & 2	10" X 10" X 8'-0" min long
	3-5	6" X 8"X 7'-0" min long
	6-13	6" X 8"X 6'-0" min long
Spacer block	1-2	10" X 8" X 21" tapered block
	3-9	6" X 8" X 21"
	10	6" X 9 3/4" X 14"
	11-13	6" X 8" X 14"
Guardrail bolt & recessed nut	1 & 2 & 10	5/8" Dia X 20" - guardrail
	3-9,11-13	5/8" Dia X 18" - guardrail
	1-2	5/8" Dia X 22"- rub rail
	3-9	5/8" Dia X 20"- rub rail



TRAFFIC SIDE ELEVATION



END VIEW

RAIL ATTACHMENT AND CURB DETAIL

(1) Additional blocking may be required at post No.1.

(2) Height is 2'-8" from 0' to 12'-6" from bridge. Height tapers from 2'-8" to 2'-4" between 12'-6" to 37'-6" from bridge.

NOTES:

Galvanize all hardware in accordance with AASHTO M232.

Use AASHTO 270M Grade 250 C6 x 8.2 rub rail and structural steel galvanized after fabrication in accordance with AASHTO M111.

All rub rail slotted holes are $^{1}1_{6}$"x 2".

All rub rail square holes are $^{1}1_{6}$".

Use timber posts and blocks for the W-beam guardrail.

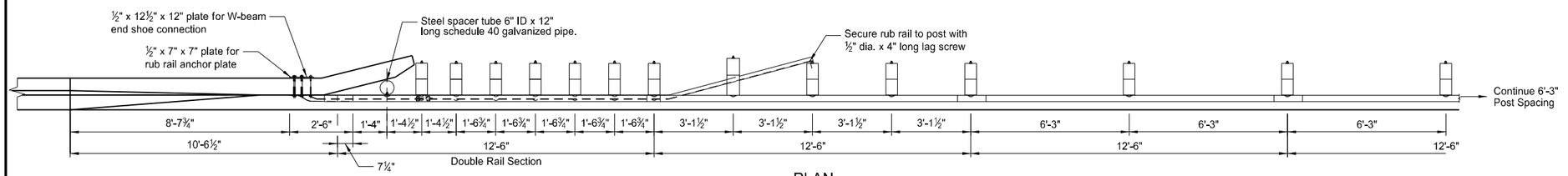
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-11-13	
REVISIONS	
DATE	CHANGE
12-02-20	Updated notes to active voice.

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

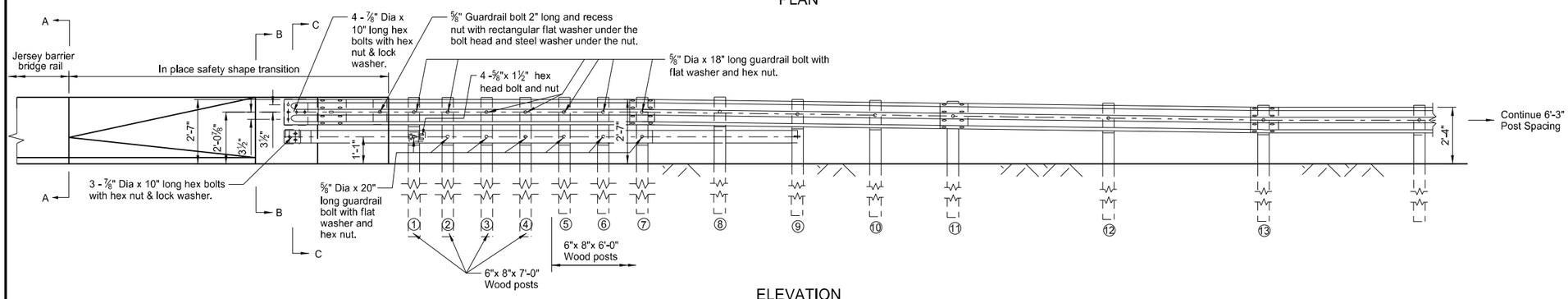
12 02 2020

W-BEAM TRANSITION TO IN PLACE CONCRETE SAFETY SHAPE TRANSITION

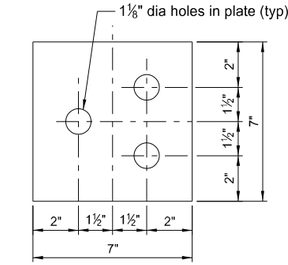
D-764-11



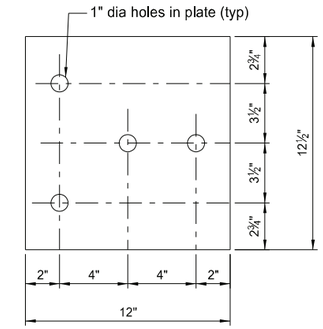
PLAN



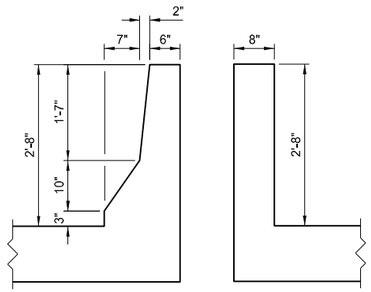
ELEVATION



RUB RAIL ANCHOR PLATE
(7"x 7"x ½")

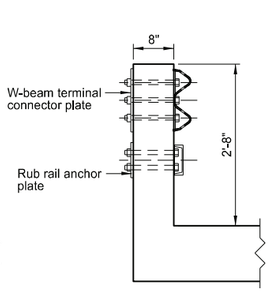


W-BEAM TERMINAL CONNECTOR PLATE
(12"x12½" x⅝")



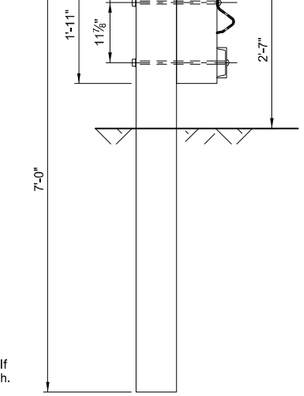
SECTION A-A

SECTION B-B

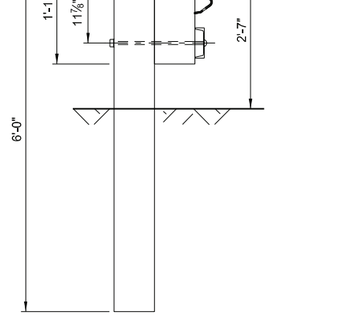


SECTION C-C

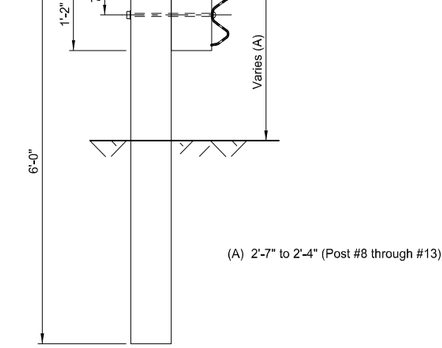
Note:
Drill bolt holes through Safety Shape wall. If reinforcing steel is encountered drill through.



Detail
Post #1 to #4

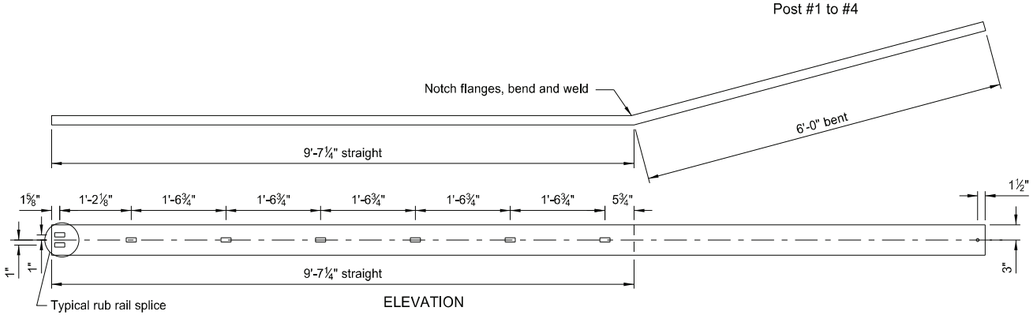


Detail
Post #5 to #7

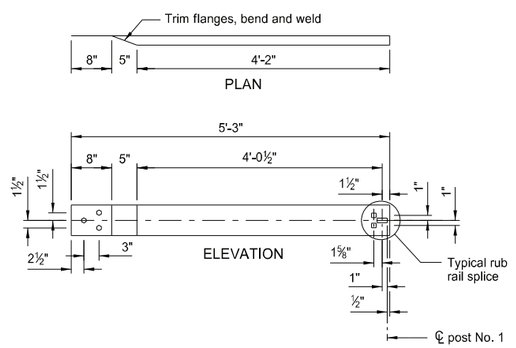


(A) 2'-7" to 2'-4" (Post #8 through #13)

Detail
Post #8 to #13



C6 x 8.2 RUB RAIL BENT SECTION



C6 x 8.2 RUB RAIL STRAIGHT SECTION

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

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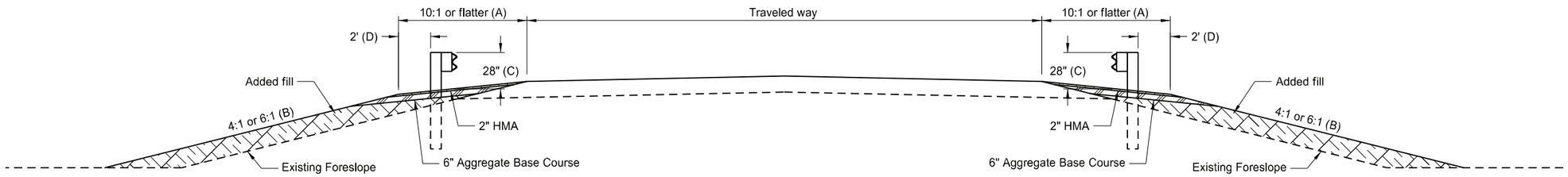
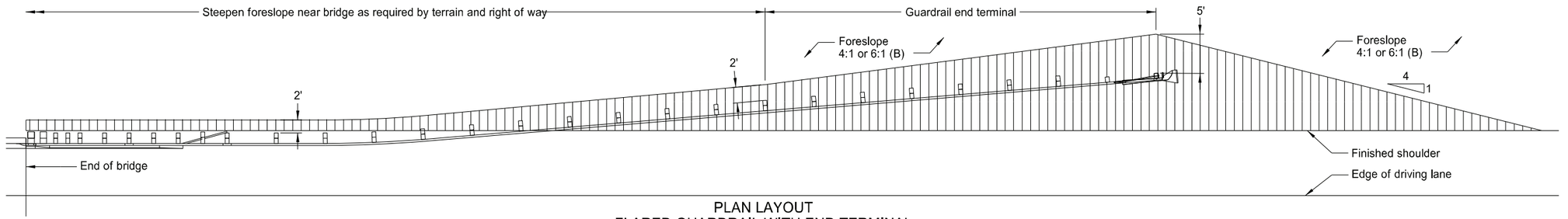
12 02 2020

D-764-22

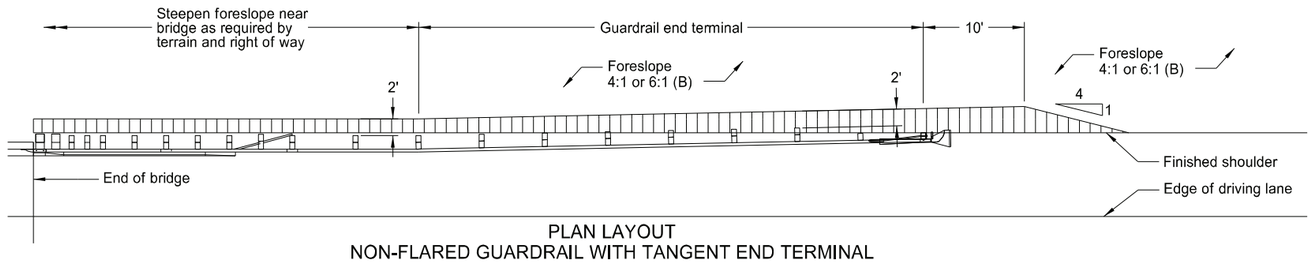
TYPICAL GRADING AT BRIDGE ENDS WITH W-BEAM GUARDRAIL



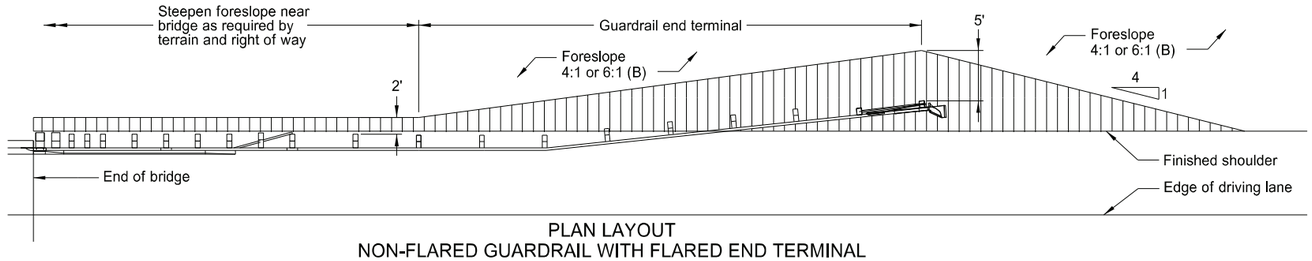
TYPICAL SECTION



PLAN LAYOUT
FLARED GUARDRAIL WITH END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH TANGENT END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH FLARED END TERMINAL

NOTES:

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

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

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

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

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

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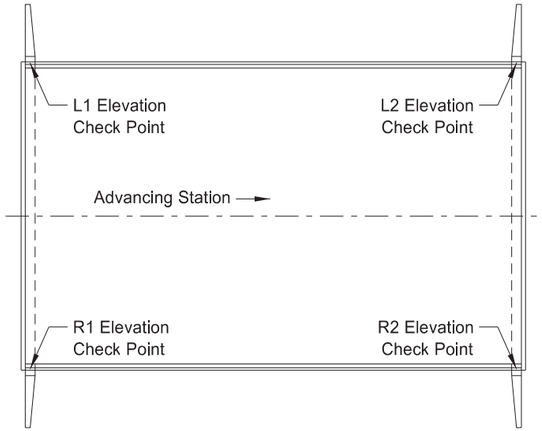
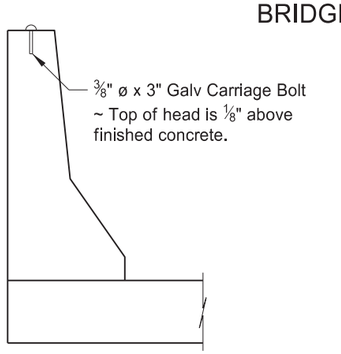
12 02 2020

BRIDGE BENCH MARKS

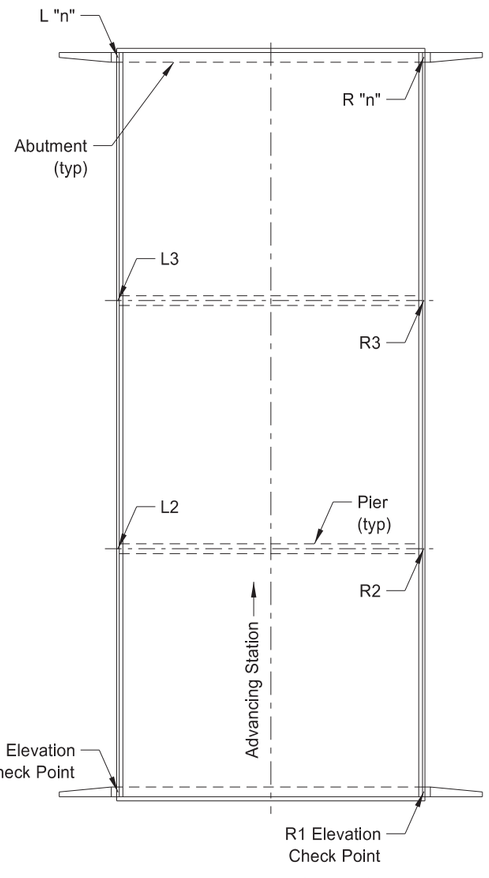
D-900-1



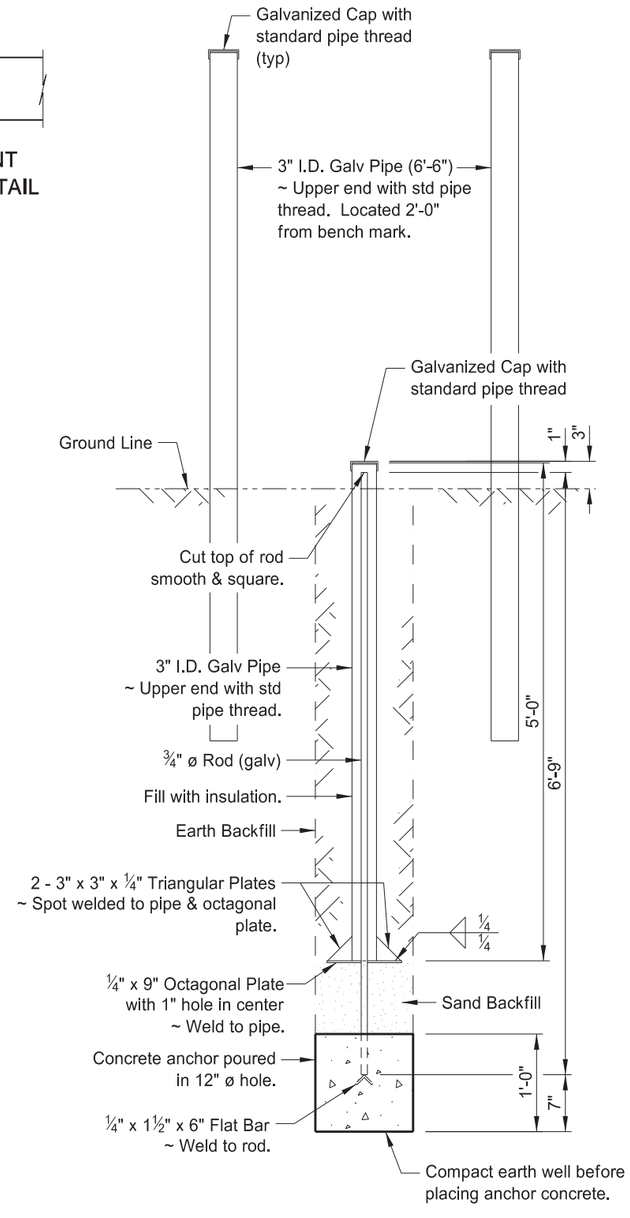
GENERAL LAYOUT FOR
SINGLE SPAN



CHECK POINT
LOCATION DETAIL



GENERAL LAYOUT FOR
MULTIPLE SPAN



BENCH MARK DETAIL

NOTES:

Install elevation check points in the top of the concrete barriers at the locations shown in the General Layout view. Install the checkpoints in the barriers over each substructure unit at each bridge location. Use 3/8" diameter x 3" long galvanized carriage bolts set with the top of the bolt head projected 1/8" above the top of the finished concrete.

Set two bench marks as shown in the Bench Mark Detail at each bridge location. Locate the bench marks diagonally from one another at opposite corners of each bridge. Set the bench marks near the Right of Way line at least 300 feet from the nearest point of the structure. Extend two of the galvanized steel pipes 4'-0" above ground and paint with white paint suitable for painting over galvanized steel surfaces.

The Project Engineer will run a set of levels to determine the elevation of the bridge bench marks and elevation check points immediately after completion of the bridge. List the elevation of Bench Mark #1 as elevation 1,000, or as the actual surveyed elevation. The Project Engineer will record the information of SFN 13420 and submit to the Bridge Engineer.

Galvanize all metal parts per Section 854 after fabrication.

At the time of installation, coat the threads with synthetic grease containing teflon. Screw the cap to a snug fit.

Include the cost of furnishing and installing two bridge bench marks and the number of elevation check points required for one structure in the price bid for each set of Bridge Bench Marks.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
09/14/11	
REVISIONS	
DATE	CHANGE
09/03/19	UPDATED SIGNATURE
02/23/24	Updated Signature Revised notes & updated to active voice

REGISTERED PROFESSIONAL ENGINEER
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PE - 5048
DATE
02/23/24
NORTH DAKOTA