

DESIGN DATA: SS-5-085(086)012				
Traffic	Average Daily			
Current 2024	Pass: 1,000	Trucks: 385	Total: 1,385	
Forecast 2044	Pass: 1,350	Trucks: 555	Total: 1,905	
Clear Zone Distance: 32 ft		Design Speed: 65		
Minimum Sight Dist. for Stopping: 682 ft		Bridges: HL-93 Design Loading		
Sight Dist. for No Passing Zone: NA				
Pavement Design Life 20 (years)				
Design Accumulated One-way Flexible ESALs: 1,326,095				

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

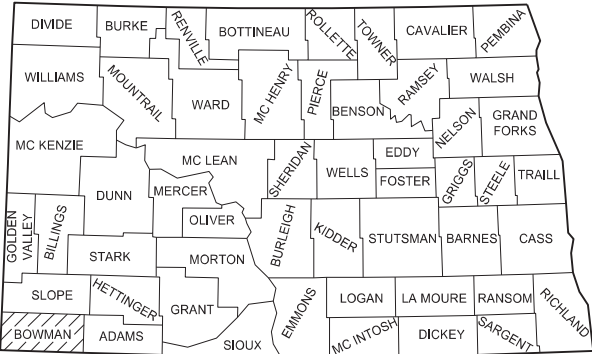
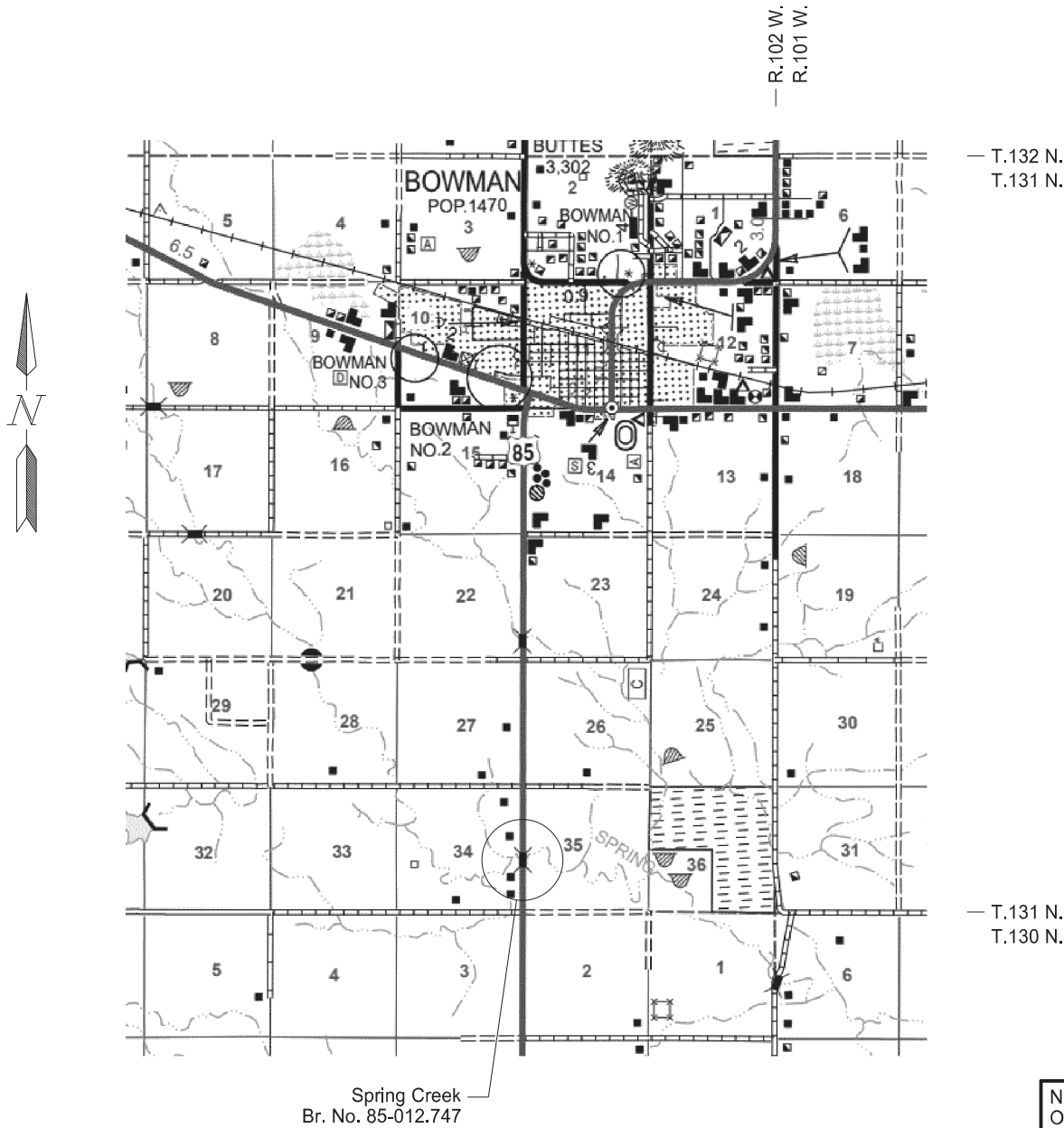
SS-5-085(086)012

Bowman County
Spring Creek
4 Miles South of JCT US 12
Bridge Replacement

	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	23772	1	1

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

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
SS-5-085(086)012	0.24	0.24



STATE COUNTY MAP

ND DEPARTMENT OF TRANSPORTATION
OFFICE OF PROJECT DEVELOPMENT

Jason Thorenson

Jason Thorenson
11/18/25

NDDOT BRIDGE DIVISION

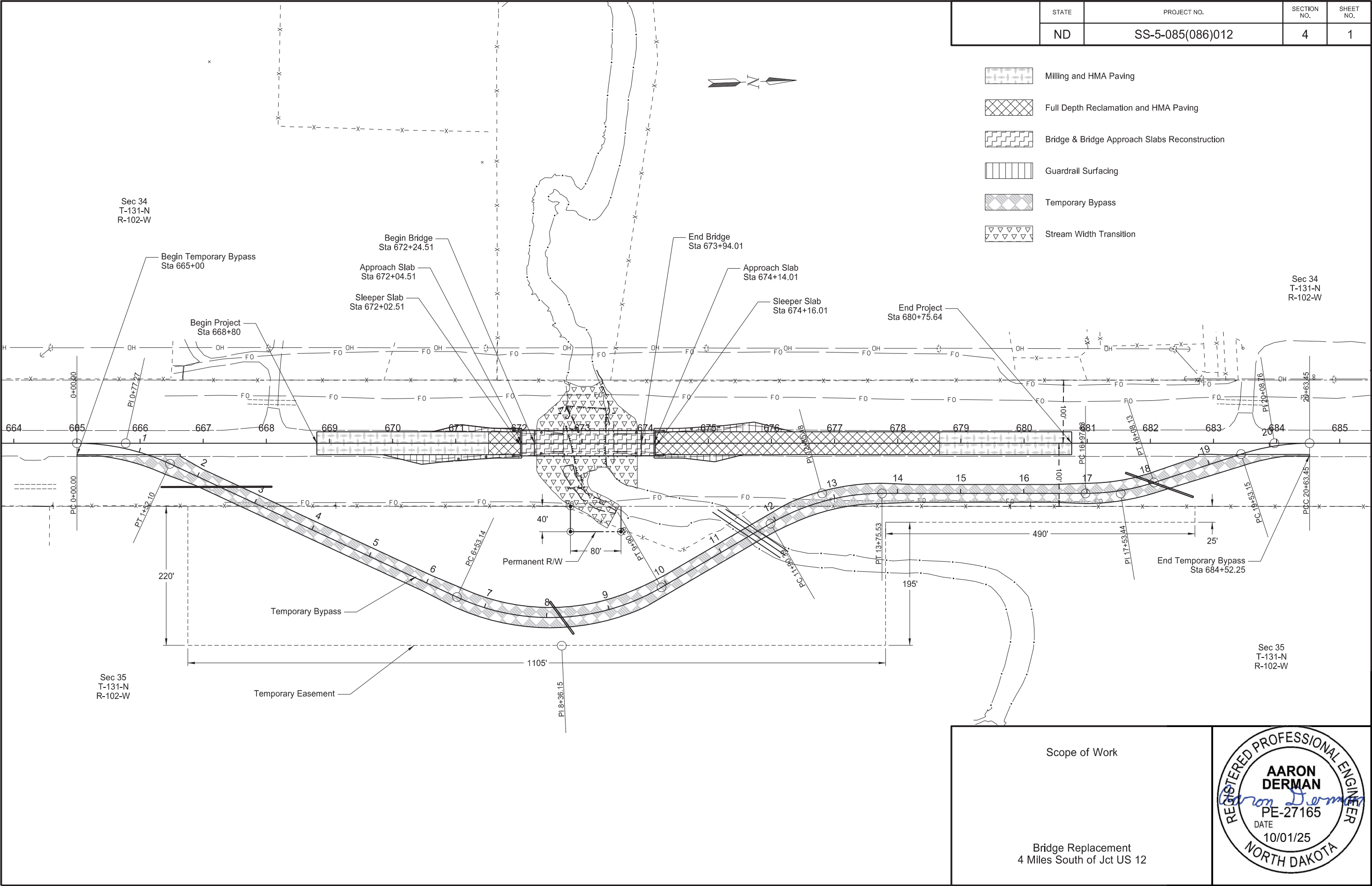


TABLE OF CONTENTS						
				STATE	PROJECT NO.	SECTION NO.
				ND	SS-5-085(086)012	2
			PLAN SECTIONS			
Section	Page(s)	Description	Section	Page(s)	Description	
1	1	Title Sheet				
2	1 - 2	Table of Contents				
4	1	Scope of Work				
6	1 - 4	Notes				
6	5	Environmental Notes				
8	1 - 3	Quantities				
10	1 - 2	Basis of Estimate				
11	1	Earthwork Tables				
20	1 - 6	General Details				
30	1 - 5	Typical Sections				
40	1	Removals				
51	1	Allowable Pipe List				
60	1 - 7	Plan & Profile				
70	1	Contours				
75	1 - 2	Wetland Impacts				
76	1	Temporary Erosion Control				
77	1	Permanent Erosion Control				
80	1 - 3	Layouts				
81	1	Survey Coordinate and Curve Data				
82	1 - 2	Survey Data Layouts				
90	1 - 4	Paving Layouts				
100	1 - 8	Work Zone Traffic Control				
110	1	Signing				
130	1 - 2	Guardrail				
170	1 - 26	Bridges and Box Culverts				
175	1 - 2	Soil Boring Logs				
200	1 - 28	Cross Sections				
SPECIAL PROVISIONS						
Number	Description					
SSP 1	Temporary Erosion and Sediment Best Management Practices					
SSP 2	Federal Migratory Bird Treaty Act					
PSP 10(25)	Permits and Environmental Considerations					
SP 46(25)	Temporary Water Diversion					
SP 47(25)	Utility Coordination					
SP 48(25)	Soil Stabilizer					
SP 49(25)	Pile Dynamic Analyzer (PDA) Testing and Analysis					
SP 56(25)	Architectural Form Liner					
SP 68(25)	Full Depth Reclamation					

TABLE OF CONTENTS
LIST OF STANDARD DRAWINGS

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	2	2

Number	Description	Number	Description
D-101-1, 2,3,4	NDDOT Abbreviations	D-900-1	Bridge Bench Marks
D-101-10	NDDOT Utility Company and Organization Abbreviations		
D-101-20, 21	Line Styles		
D-101-30, 31,32,33	Symbols		
D-101-40	Cross Section Legend		
D-255-1	Bridge Approach Slab Drainage Detail		
D-255-2	Erosion And Siltation Control - Erosion Control Blanket Installation		
D-260-1	Erosion And Siltation Controls - Silt Fence		
D-261-1	Erosion Control - Fiber Roll Placement Details		
D-622-1	Pile Splice Details		
D-704-2	Traffic Control For Coring Of Hot Bituminous Pavement		
D-704-7, 8	Breakaway Systems For Construction Zone Signs - Perforated Tube		
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-704-13	Barricade And Channelizing Device Details		
D-704-14	Construction Sign Punching And Mounting Details		
D-704-15	Road Closure Layouts		
D-704-22	Construction Truck And Temporary Detour Layouts		
D-704-24	Shoulder Closures And Bridge Painting Layouts		
D-704-27	Mobile Operation (Pavement Marking)		
D-704-33	Two-Lane Roadway Portable Rumble Strips		
D-704-50	Portable Sign Support Assembly		
D-706-1	Bituminous Laboratory		
D-714-1	Reinforced Concrete Pipe Culverts And End Sections (Round Pipe)		
D-714-2	Reinforced Concrete Pipe Arch Culverts And End Sections		
D-714-4	Round Corrugated Steel Pipe Culverts And End Sections		
D-714-5	Corrugated Steel Pipe Arch Culverts And End Sections		
D-714-18	Precast Concrete Headwall Details		
D-714-22	Concrete Pipe, Cattle Pass, or Precast Concrete Box Culvert Ties		
D-714-27	Pipe Installation Detail for Longitudinal Mainline Pipe or Pipe Not Under the Roadway		
D-714-27M	Pipe Installation Detail for Multiple Longitudinal Mainline Pipe or Pipe Not Under the Roadway		
D-720-1	Standard Monuments And Right Of Way Markers		
D-748-1	Curb & Gutter And Valley Gutter		
D-752-1	Standard Barbed Wire Fence		
D-752-3	Standard Woven Wire Fence		
D-754-83	Object Markers - Culverts		
D-760-3	Rumble Strips Undivided Highways (Shoulders 4' Or Greater)		
D-762-4	Pavement Marking		
D-762-11	Short-Term Pavement Marking		
D-764-38	MGS Flared Energy Absorbing Terminal - Wood Post		
D-764-40	MGS W-Beam Guardrail General Details		
D-764-48	Typical Grading at Bridge Ends with MGS W-Beam Guardrail		
D-764-60	MGS W-Beam Transition with Approach Curb to Concrete Single Slope or Jersey Barrier		
D-764-61	Single Slope to Thrie Beam Connector Plate Details		



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-085(086)012	6	1

NOTES

- 105-P01 MAINTENANCE OF TRAVELED ROADWAY: The Contractor will be fully responsible for monitoring the condition of the temporary bypass and approaching roadway during the active construction season.

If it is determined in the field that repairs are necessary to facilitate public traffic through the paved portion of the construction zone, perform such work in accordance with Section 109.03 E of the Standard Specifications, "Force Account."
- 107-P01 MAINTAINING ACCESS: Before starting any work, coordinate with the landowners the details and locations of access points to farmsteads affected by this project.
- 108-100 WEEKLY PLANNING & REPORTING MEETING: A weekly planning and reporting meeting is required.
- 108-P01 TEMPORARY BYPASS SEQUENCING: Construct a temporary bypass in the following sequence:

1. Strip topsoil from areas outside wetlands where the temporary bypass will be constructed.

2. Construct a temporary bypass starting at the shoulders and work your way towards the creek. Place Clean Rock wrapped with Geosynthetic Material Type S1 fabric to prevent soil/water interaction in wetlands and stream bed.

3. Install temporary culverts to provide positive drainage from the upstream to the downstream ends of the culverts.

4. Construct a temporary bypass across stream and culverts. Minimize streambed and streambank impacts to the extent practicable.

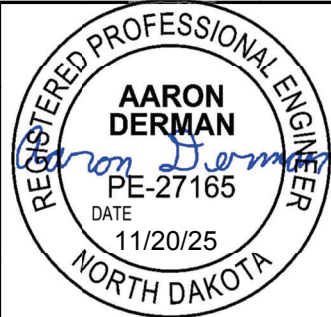
5. Place riprap on the temporary bypass embankment to elevation shown in the plans, upstream and downstream. If water elevation is higher than given, install riprap 1’ above the water line. Place soil stabilizer on the temporary bypass above the water line upstream and downstream. See Section 76 for more information.
- 202-P01 REMOVAL OF TEMPORARY BYPASS: Obtain the Engineer’s approval before removing the temporary bypass. Restore the area impacted by the construction, use, and removal of the temporary bypass to its original contours and condition. Remove the bypass starting at the shoulders and work your way towards the creek. Minimize the streambed and streambank impacts to the extent practicable. The pipes should be the last thing removed.

Include all costs associated with the removal of the earth embankment, aggregate, riprap, pipe, and any geosynthetic fabric in the contract unit price for “Removal of Temporary Bypass”.

The contractor may elect to incorporate the removed riprap in the areas identified for the permanent riprap installation on the creek banks.
- 203-010 SHRINKAGE: 25 percent additional volume has been included for shrinkage in earth embankment.

- 203-385 AVERAGE HAUL: No average haul has been computed for this project.
- 203-P01 SUBGRADE SURFACE TOLERANCE: Construct the final subgrade elevation to be within 0.08 feet of the proposed subgrade elevation.
- 203-P02 COMPACTION AND DENSITY CONTROL: Compact material as specified in Section 203.04 G.3.
- 203-P03 COMMON EXCAVATION: Pay plan quantity for “Common Excavation – Type B”.
- 230-P04 RESHAPING CONNECTION: Blade, shape, compact, and maintain the temporary bypass when required. Add additional Cl. 13 aggregate to the temporary bypass to correct any surface deficiencies such as holes, depressions, blowouts, and ruts. Include all labor and equipment costs for the work associated with the temporary bypass maintenance in the unit price bid for “Reshaping Connection”.
- 256-P01 REMOVE & REPLACE RIPRAP: Remove and salvage existing riprap from the areas identified in the plans. Include all costs for labor and equipment to remove and salvage riprap in the contract unit price for “Remove and Replace Riprap.”

Incorporate stockpiled riprap in the areas identified for riprap installation under the bridge and on the creek banks. Before placing any salvaged riprap, make sure it is clean and free of any contaminants. Include all costs for labor and equipment to install salvaged riprap in the contract unit price for “Riprap Grade II.”
- 302-P01 SALVAGED BASE COURSE: Utilize all excess reclaimed material before placing any Aggregate Base Course Cl 5 material for permanent proposed section. The material will be removed and salvaged from Sta 672+02.5 to Sta 672+50.86 and Sta 673+70.5 to Sta 674+16. An estimated 240 CY of reclaimed material will be available from these areas and will be paid for under the “Salvaged Base Course” bid item, which includes the removal and placement of the material. Section 817 specifications will not apply to this material.



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-085(086)012	6	2

NOTES

302-P02 CLEAN ROCK: Place the aggregate in the water by controlled dumping methods in uniform lifts that create a stable base for traffic. Prevent segregation, displacement, and downstream migration of aggregate during placement. Aggregate must meet the gradation shown below.

	Sieve No.				
	1.5 Inches	1 Inch	0.50 Inches	4	8
Percent Passing	100	95 - 100	25 - 60	0 - 10	0 - 5

411-P01 MILLING SECTIONS: At the beginning and end of the milling sections, remove the existing bituminous material forming a straight vertical edge to allow placement of the full depth of surfacing.

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

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

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

Install PRS that meet the following criteria:

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

Use individual PRS constructed in one of the following manners:

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

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

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

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

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

D-704-15 Layout Type B: For the temporary bypass when the bridge and roadway construction is taking place.

D-704-22 Layout Type K: For construction trucks entering from a borrow site, aggregate source, or a Contractor's jobsite.

D-704-24 Layout Type R: For temporary roadway closure during the construction and removal of the temporary bypass.

D-704-33: For utilizing flagging operations during the construction and removal of the temporary bypass.

The department will pay for all necessary devices, regardless of the length of the lane closure.

704-P02 PROJECT PHASING: The traffic control details, as indicated in the plans, have been developed on the basis that this project will be constructed in three phases. The work zone traffic control summary list includes the required numbers of devices for each phase.

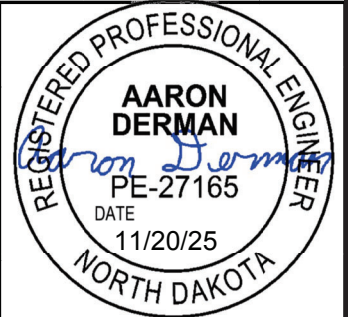
Phase 1: Construct the temporary bypass. Maintain traffic on US Hwy 85 while constructing the bypass. During working hours use signing Layout Type R on Standard Drawing D-704-24.

Phase 2: Place the traveling public on the temporary bypass using signing layout Type B on Standard Drawing D-704-15. Use the temporary bypass while completing all work on US Hwy 85.

Phase 3: Remove the temporary bypass while maintaining traffic on US Hwy 85 using signing Layout Type R on Standard Drawing D-704-24.

706-P01 FIELD OFFICE: Provide a field office which meets the following requirements:

1. Be completely insulated and weather tight.
2. Minimum total area of 450 square feet.
3. Indoor bathroom facilities, sewer, and potable water.
4. Have a dependable source of electricity for power and lights with a minimum of 6 electrical outlets spaced throughout the building and light fixtures spaced to uniformly light the entire interior (lumens required to be 110 foot-candles).
5. Be wired for DSL Broadband internet with wireless Wi-Fi and have the capability to allow for hard wiring the computer. Include the cost of the installation and monthly fees.



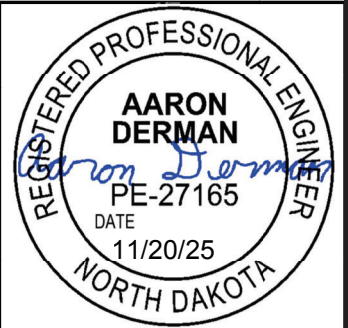
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-085(086)012	6	3

NOTES

- 6. A heating and cooling system that can maintain the temperature between 65°F and 78°F year around.
- 7. A minimum of 3 desks and 3 desk chairs, 3 extra chairs, a drawer file cabinet with at least two drawers, one table minimum of 2.5 ft x 5 ft.
- 8. Photocopy machine/Printer capable of 11x17 photocopies/prints and toner to last the duration of the project. The Engineer will provide paper. Other features are to include digital copying & scanning. (Fax capabilities can be included but not necessary).
- 9. The location of the field office will be on, or as close to the project as possible and approved by the Engineer. Any rental fees will be paid by the Contractor.
- 10. Make the field office available for occupancy one week before the start of the project and remain through project completion. Provide a field office that is separate or independent from the contractor’s field office.
- 11. Heat, electric, internet service, sewer, and water hookups to be furnished by the contractor. Utility fees will be paid by the Contractor.

All requirements of the Field Office are subject to approval by the Engineer. Include the costs for the field office in the bid item “Field Office” and the Schedule of Payment is as follows:

- 25% when set up on site.
- 50% when 30% of the work is complete.
- 75% when 60% of the work is complete.
- 100% when project is complete.



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-085(086)012	6	4

NOTES

SECTION 110

754-P01 SIGN AND DELINEATOR REMOVAL: Removed signs and delineators become the property of the contractor.

Include all costs for the removal of signs and delineators in the contract unit price bid for “Remove W-Beam Guardrail & Posts.”

SECTION 130

748-P01 CURB & GUTTER – TYPE 1 SPECIAL: Install curb and gutter at the Spring Creek Bridge, RP 12.747, in accordance with Standard Drawing D-748-1, except for a 3’ long curb height transition from 6" to 0" on the end farthest from the approach slab, as shown on Standard Drawing D-764-60. Install #4 rebar with a length that will provide 3” clear distance on each end. Use grade 60 reinforcing steel meeting Section 612.

Include all work and materials for constructing the curb and gutter as described above, in the contract unit price bid for “Curb & Gutter – Type 1 Special.”

764-P01 REMOVED W-BEAM GUARDRAIL MATERIALS: Deliver the removed guardrail materials to the NDDOT Maintenance Storage Yard in Bowman and neatly stack them at a location designated by the Engineer. The address of the NDDOT Maintenance Storage Yard is:

BOWMAN NDDOT
8507 147th Ave SW
Bowman, ND 58623-9619

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



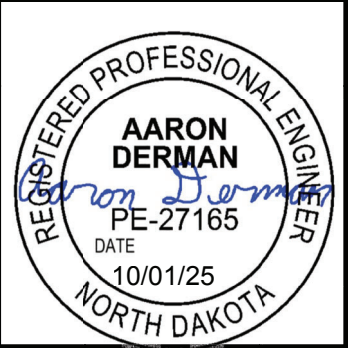
ENVIRONMENTAL NOTES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-085(086)012	6	5

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 required to comply with these commitments:

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

EN-2 TEMPORARY WETLAND IMPACT: Temporary impact areas within wetlands and/or other waters are incorporated into the plans for this project. Remove temporary fill placed and sedimentation in wetlands or other waters. Restore these wetlands to preconstruction contours.



ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-085(086)012	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
----	----	-----	----	-----	-----
103	0100	CONTRACT BOND	L SUM	1	1
202	0105	REMOVAL OF STRUCTURE	L SUM	1	1
202	0136	REMOVAL OF PAVEMENT	TON	354	354
202	0312	REMOVE EXISTING FENCE	LF	1,630	1,630
202	0350	REMOVAL OF TEMPORARY BYPASS	EA	1	1
203	0102	COMMON EXCAVATION-TYPE B	CY	93	93
203	0109	TOPSOIL	CY	2,854	2,854
203	0140	BORROW-EXCAVATION	CY	9,249	9,249
210	0099	CLASS 1 EXCAVATION	L SUM	1	1
210	0111	CLASS 2 EXCAVATION	L SUM	1	1
210	0127	CHANNEL EXCAVATION	L SUM	1	1
210	0201	FOUNDATION PREPARATION	EA	1	1
216	0100	WATER	M GAL	195	195
230	0104	RESHAPING CONNECTION	EA	1	1
251	0200	SEEDING CLASS II	ACRE	4.5	4.5
251	2000	TEMPORARY COVER CROP	ACRE	3.6	3.6
253	0051	SOIL STABILIZER	ACRE	3.6	3.6
253	0201	HYDRAULIC MULCH	ACRE	4.4	4.4
255	0102	ECB TYPE 2	SY	516	516
255	0201	TRM TYPE 1	SY	128	128
256	0200	RIPRAP GRADE II	CY	1,405	1,405
256	0701	REMOVE AND REPLACE RIPRAP	CY	129	129
260	0300	SILT FENCE	LF	1,248	1,248
260	0301	REMOVE SILT FENCE	LF	1,248	1,248
261	0112	FIBER ROLLS 12IN	LF	4,035	4,035
261	0113	REMOVE FIBER ROLLS 12IN	LF	1,027	1,027
262	0100	FLOTATION SILT CURTAIN	LF	60	60
262	0101	REMOVE FLOTATION SILT CURTAIN	LF	60	60
302	0101	SALVAGED BASE COURSE	CY	240	240
302	0120	AGGREGATE BASE COURSE CL 5	TON	969	969
302	0160	AGGREGATE BASE COURSE CL 13	TON	2,854	2,854
302	2000	CLEAN ROCK	TON	792	792
306	0510	FULL DEPTH RECLAMATION	SY	2,823	2,823

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-085(086)012	8	2

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
----	----	-----	----	-----	-----
401	0050	TACK COAT	GAL	409	409
401	0060	PRIME COAT	GAL	612	612
411	0105	MILLING PAVEMENT SURFACE	SY	2,140	2,140
430	0045	SUPERPAVE FAA 45	TON	1,246	1,246
430	1000	CORED SAMPLE	EA	19	19
430	5818	PG 58H-34 ASPHALT CEMENT	TON	74	74
602	0500	BRIDGE SUBSTRUCTURE CONCRETE	CY	200.4	200.4
602	0510	BRIDGE DECK CONCRETE	CY	225.4	225.4
602	0520	BRIDGE BARRIER CONCRETE	CY	45.2	45.2
602	1133	CONCRETE BRIDGE APPROACH SLAB	SY	191.2	191.2
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	612	612
604	9600	PRESTRESSED BOX BEAM-21IN	LF	825	825
612	0116	REINFORCING STEEL-GRADE 60-EPOXY COATED	LBS	59,206	59,206
616	0360	STRUCTURAL STEEL	LBS	1,016	1,016
622	0020	STEEL PILING HP 10 X 42	LF	360	360
622	0060	STEEL PILING HP 14 X 73	LF	540	540
622	7001	DYNAMIC PILE TEST	EA	4	4
702	0100	MOBILIZATION	L SUM	1	1
704	0100	FLAGGING	MHR	300	300
704	1000	TRAFFIC CONTROL SIGNS	UNIT	1,674	1,674
704	1048	PORTABLE RUMBLE STRIPS	EA	2	2
704	1052	TYPE III BARRICADE	EA	8	8
704	1060	DELINEATOR DRUMS	EA	31	31
704	1067	TUBULAR MARKERS	EA	12	12
704	1081	VERTICAL PANELS-BACK TO BACK	EA	73	73
704	1500	OBLITERATION OF PAVEMENT MARKING	SF	1,349	1,349
706	0400	FIELD OFFICE	EA	1	1
706	0500	AGGREGATE LABORATORY	EA	1	1
706	0550	BITUMINOUS LABORATORY	EA	1	1
706	0600	CONTRACTOR'S LABORATORY	EA	1	1
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	1,815	1,815
709	0161	GEOSYNTHETIC MATERIAL TYPE S1	SY	435	435
714	4106	PIPE CONDUIT 24IN-APPROACH	LF	290	290

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-085(086)012	8	3

SPEC CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
714	4234 PIPE CONDUIT ARCH 66IN X 51IN	LF	380	380
720	0110 RIGHT OF WAY MARKERS	EA	3	3
720	0130 IRON PIN R/W MONUMENTS	EA	3	3
748	0141 CURB & GUTTER-TYPE 1 SPECIAL	LF	52	52
752	0700 FENCE WOVEN WIRE	LF	1,530	1,530
752	0905 TEMPORARY FENCE	LF	2,036	2,036
752	2995 CORNER ASSEMBLY-WOOD POST	EA	5	5
760	0025 SINUSOIDAL RUMBLE STRIP - ASPHALT SHOULDER	MILE	0.466	0.466
760	0027 SINUSOIDAL RUMBLE STRIP - ASPHALT CENTERLINE	MILE	0.233	0.233
762	0422 SHORT TERM 6IN LINE-TYPE R	LF	452	452
762	1106 PVMT MK PAINTED 6IN LINE	LF	4,684	4,684
764	0131 W-BEAM GUARDRAIL	LF	333	333
764	0145 W-BEAM GUARDRAIL END TERMINAL	EA	4	4
764	0151 REMOVE W-BEAM GUARDRAIL & POSTS	LF	433	433
764	2081 REMOVE END TREATMENT & TRANSITION	EA	4	4
900	1000 TEMPORARY STREAM DIVERSION	EA	1	1
930	3000 BRIDGE BENCH MARKS	SET	1	1
930	8600 ELASTOMERIC BEARING PAD	SF	68	68
930	8670 CONCRETE SLEEPER SLAB	EA	2	2
930	8850 POLYURETHANE FOAM JOINT SEAL	LF	82	82
930	9537 ABUTMENT UNDERDRAIN SYSTEM	EA	2	2

Basis of Estimate Bridge Replacement 4 Miles South of Jct US 12	
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	10	2

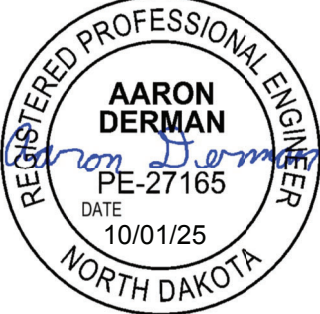
BYPASS QUANTITIES TABLE				Proposed Typical #1				Proposed Typical #2				Proposed Typical #3				Transition Areas			
				Sta 2+02.10 to Sta 6+03.14 Sta 14+25.53 to Sta 16+47.83				Sta 6+53.14 to Sta 9+37.80 Sta 12+42.97 to Sta 13+75.53 Sta 16+97.83 to Sta 18+08.13				Sta 9+90.39 to Sta 11+90.39				Sta 0+00 to Sta 2+02.10 Sta 6+03.14 to Sta 6+53.14 Sta 9+37.80 to Sta 9+90.39 Sta 11+90.39 to Sta 12+42.97 Sta 13+75.53 to Sta 14+25.53 Sta 16+47.83 to Sta 16+97.83 Sta 18+08.13 to Sta 20+63.45			
				Length (Ft) = 623.34				Length (Ft) = 527.52				Length (Ft) = 200				Length (Ft) = 712.59			
SPEC	CODE	BID ITEM	UNIT	Area (SF)	Depth (In)	Width (Ft)	SubTotal	Area (SF)	Depth (In)	Width (Ft)	SubTotal	Plan Area (SF)	Depth (In)	Width (Ft)	SubTotal	Plan Area (SF)	Depth (in)	SubTotal	SUBTOTAL TABLE 1
Temporary Bypass																			
256	0200	RIPRAP GRADE II	CY	—	—	—	—	—	—	—	—	2627.97	24	varies	195	—	—	—	195
302	0160	AGGREGATE BASE COURSE CL 13 @ 1.875 TON/CY	TON	20.61	8	28	892	23.12	8	32	847	20.61	8	28	286	16193.62	8	829	2,854
302	2000	CLEAN ROCK	TON	—	—	—	—	—	—	—	—	5399.76	Varies	Varies	792	—	—	—	792
709	0161	GEOSYNTHETIC MATERIAL TYPE S1	SY	—	—	—	—	—	—	—	—	3917.62	Varies	Varies	435	—	—	—	435

HWY 85 QUANTITIES TABLE				Proposed Typical				Milling Tapers				SUBTOTAL TABLE 2
				Sta 671+51.8 to Sta 672+02.5 Sta 674+16 to Sta 678+66				Sta 668+80 to Sta 671+51.8 Sta 678+66 to Sta 680+75.64				
				Length (Ft) = 500.7				Length (Ft) = 481.44				
SPEC	CODE	BID ITEM	UNIT	Area	Depth	Width	SubTotal	Area	Depth	Width	SubTotal	
				(SF)	(In)	(Ft)		(SF)	(In)	(Ft)		
Hwy 85												
302	0101	SALVAGED BASE COURSE	CY	—	0 - 19	43.4	162	—	—	—	—	162
302	0120	AGGREGATE BASE COURSE CL 5 @ 1.875 TON/CY	TON	—	0 - 19	43.4	876	—	—	—	—	876
401	0050	TACK COAT @ 0.05 GAL/SY (2nd Lift)	GAL	—	—	41	114	—	—	40	39	153
401	0050	TACK COAT @ 0.05 GAL/SY (3rd Lift)	GAL	—	—	43	120	—	—	40	107	227
401	0060	PRIME COAT @ 0.25 GAL/SY	GAL	—	—	44	612	—	—	—	—	612
430	0045	SUPERPAVE FAA 45 @ 2 TON/CY	TON	21.5142	6.5	36	798	—	2 - 6.5	36.6	367	1,165
430	5818	PG 58H-34 ASPHALT CEMENT @ 5.9% SUPERPAVE FAA 45	TON	—	—	—	47	—	—	—	22	69

GUARDRAIL SURFACING QUANTITIES TABLE				Proposed Typical #2				SUBTOTAL TABLE 3
				Sta 669+84.1 to Sta 672+04.5 Sta 674+14 to Sta 676+34.5				
				Length (Ft) = 439				
SPEC	CODE	BID ITEM	UNIT	Area	Depth	Width	SubTotal	
				(SF)	(In)	(Ft)		
Hwy 85								
302	0101	SALVAGED BASE COURSE	CY	—	5	Varies	78	78
302	0120	AGGREGATE BASE COURSE CL 5 @ 1.875 TON/CY	TON	—	6	Varies	93	93
401	0050	TACK COAT @ 0.05 GAL/SY	GAL	—	—	Varies	30	30
430	0045	SUPERPAVE FAA 45 @ 2 TON/CY	TON	—	2	Varies	78	78
430	5818	PG 58H-34 ASPHALT CEMENT @ 5.9% SUPERPAVE FAA 45	TON	—	—	—	5	5

Paving Quantities

Bridge Replacement
4 Miles South of Jct US 12



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	11	1

Earthwork Summary					
	Excavation (CY)	Embankment (CY)	Common Exc - Type B (CY)	Borrow - Excavation (CY)	Topsoil (CY)
			(Pay Item)	(Pay Item)	(Pay Item)
South Reconstruction	15	102	15	87	125
North Reconstruction	18	1,269	18	1,251	777
Temp Bypass	60	7,971	60	7,911	1,702
Total	93	9,342	93	9,249	2,604

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

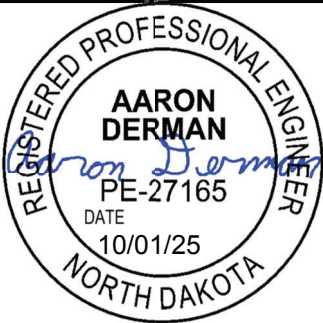
Channel Excavation					
	Excavation* (CY)	Embankment* (CY)	Channel Excavation** (CY)	Borrow - Excavation (CY)	Topsoil (CY)
			(Pay Item)	(Pay Item)	(Pay Item)
Sta 672+16.13 - Sta 674+01.96	3,606	66	3,606	—	250

*Quantities shown are for estimation purposes only.

**To be paid for as a Lump Sum quantity.

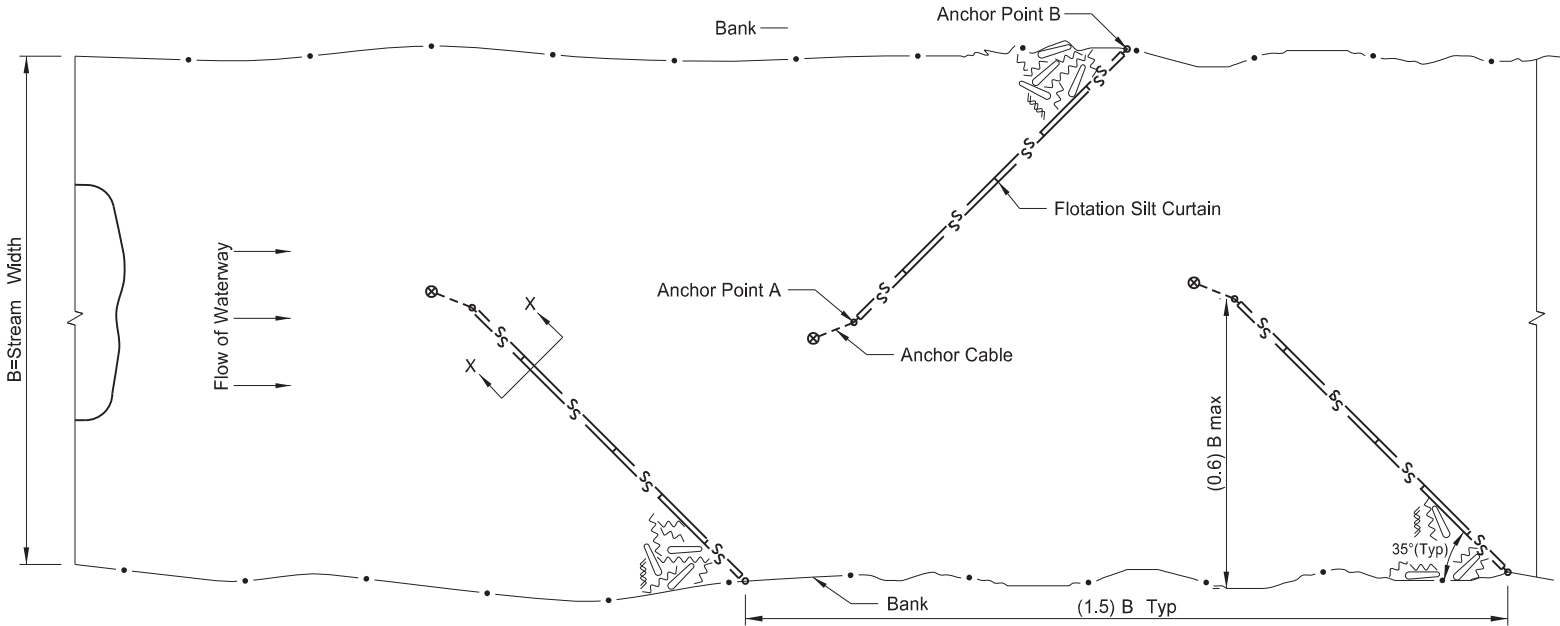
Earthwork Tables

Bridge Replacement
4 Miles South of Jct US 12



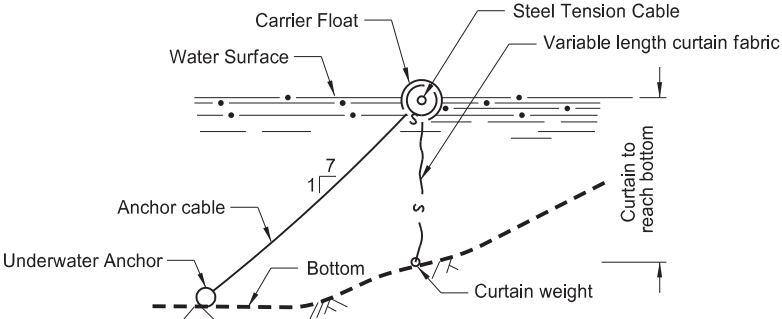
TYPICAL INSTALLATIONS
May vary with conditions

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	20	1



PLAN VIEW
FLOTATION SILT CURTAIN - TYPE HERRING BONE PATTERN

DESIGN GUIDELINES:
When temporary work encroaches more than 1/3 width of the stream
Or where stream width doesn't allow use of Type Moving Water



SECTION X-X
FLOTATION SILT CURTAINS

Note:
Maximum water velocity for moving water = 5 ft/sec

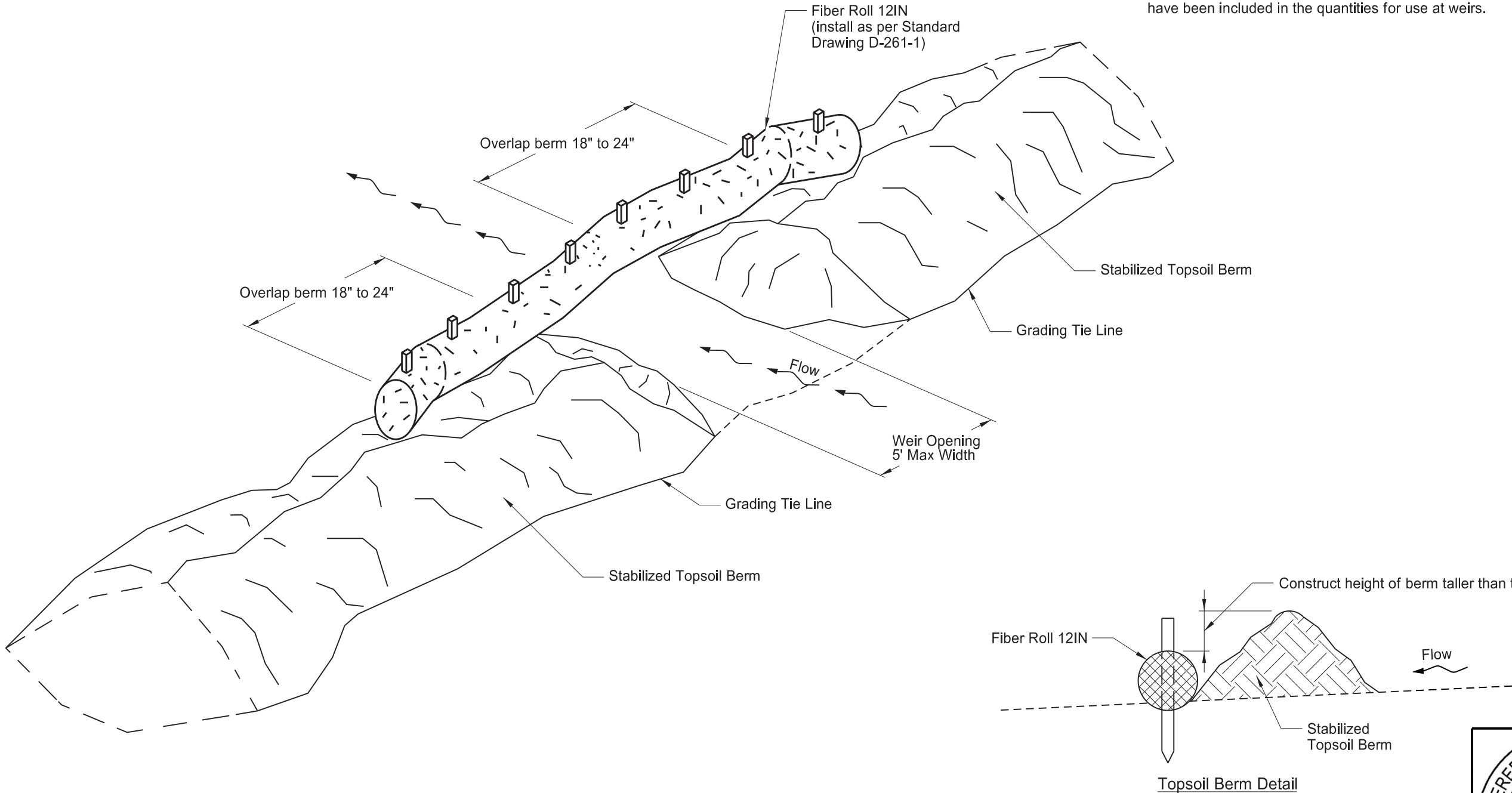


Temporary Erosion Control - Flotation Silt Curtain

Bridge Replacement
4 Miles South of Jct US 12

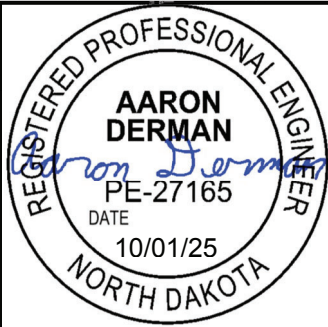
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	20	2

Quantities of 50 LF of Fiber Roll 12IN and 50 LF of Remove Fiber Roll 12IN have been included in the quantities for use at weirs.



Notes:

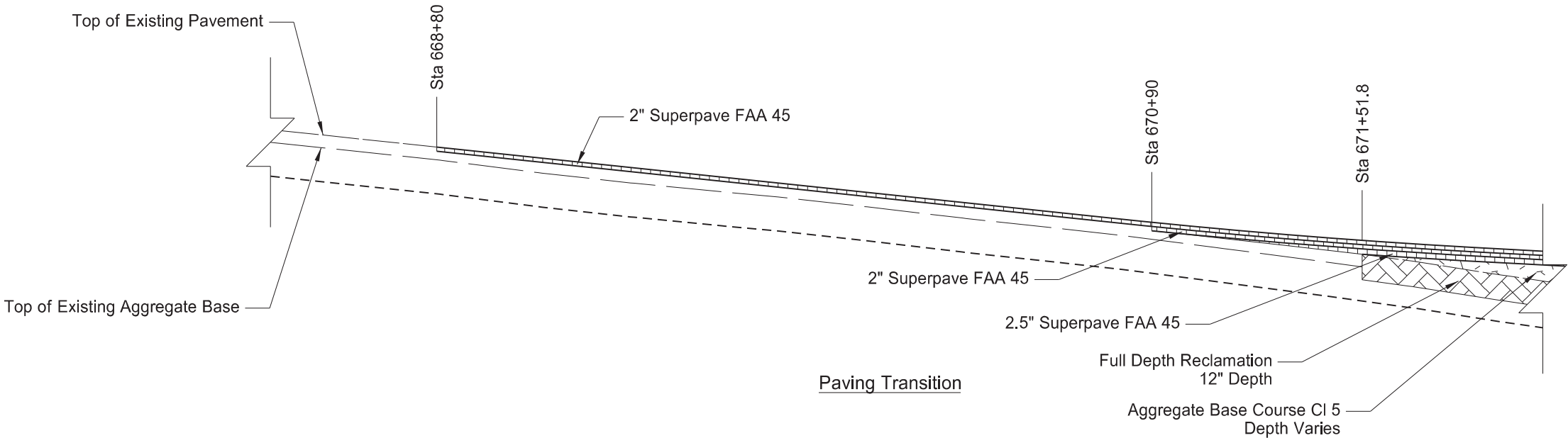
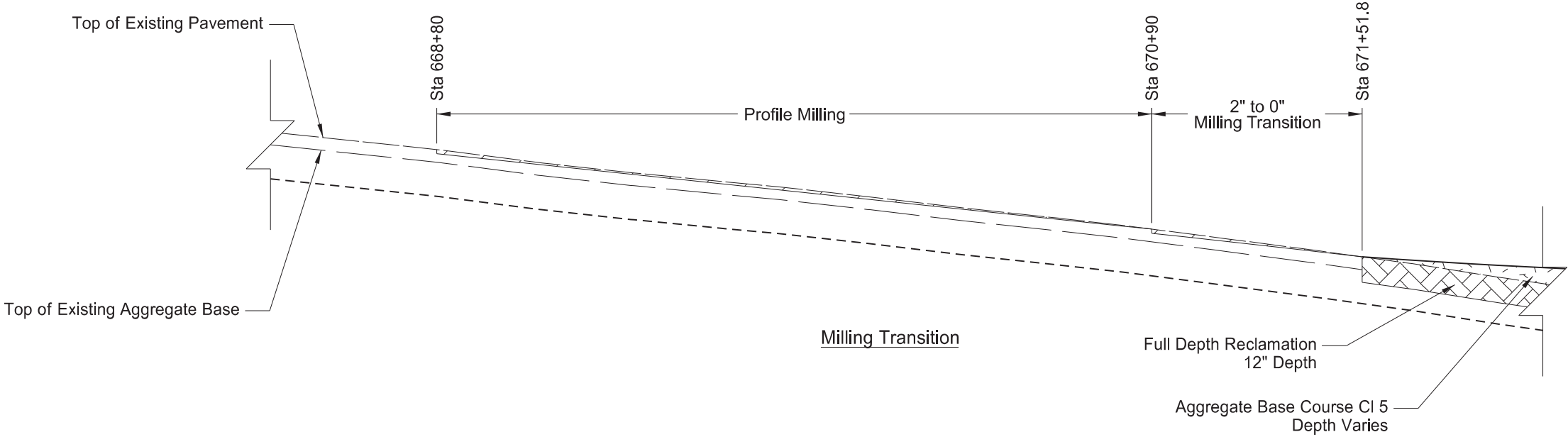
1. Windrow the existing topsoil from the foreslope to create a berm at the grading tie line.
2. Stabilize berms in accordance with the Construction General Permit.
3. Place weirs intermittently throughout the length of the berm to allow stormwater to drain through the berm.
4. Avoid placing weirs adjacent to waterbodies.
5. Install fiber rolls as the weirs are created in the topsoil berm.
6. The Engineer will measure and pay for fiber rolls separately.
7. The Engineer will measure and pay for removal of fiber rolls separately when required by the specifications.
8. The Engineer will measure and pay for soil stabilization and temporary cover crop separately.
9. Include the costs to create, maintain, and dismantle the berm in the unit price bid for "Topsoil".



Temporary Topsoil Berm and Weir Detail

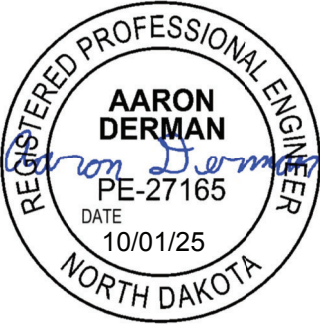
Bridge Replacement
4 Miles South of Jct US 12

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	20	3

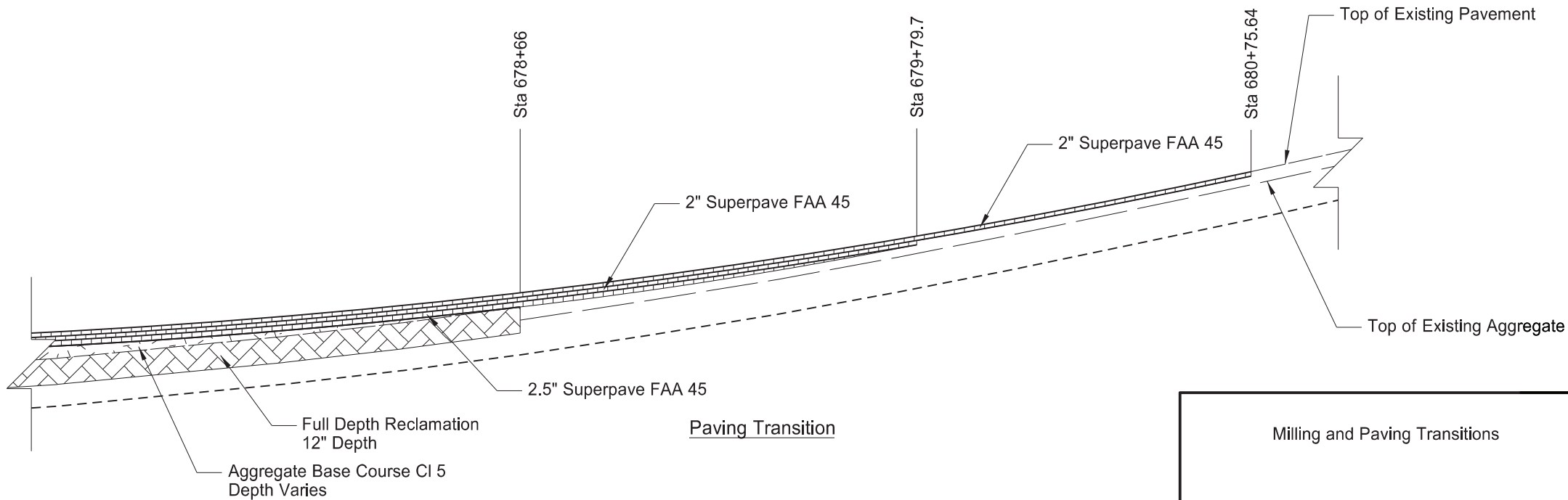
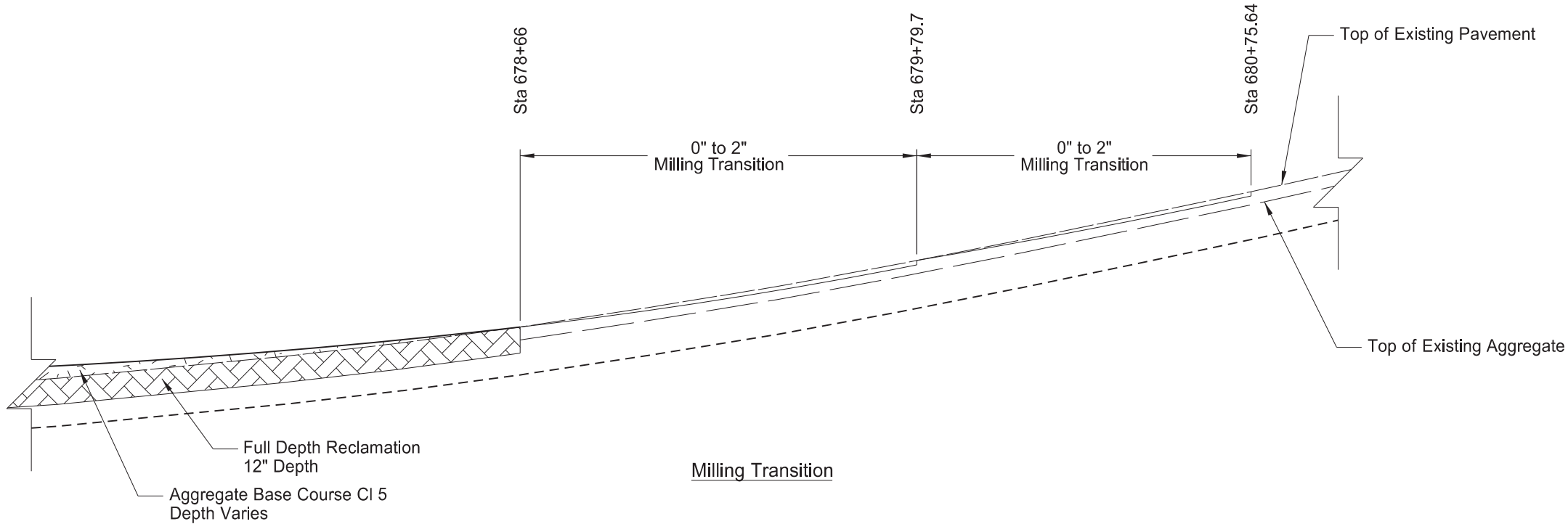


Milling and Paving Transitions

Bridge Replacement
4 Miles South of Jct US 12

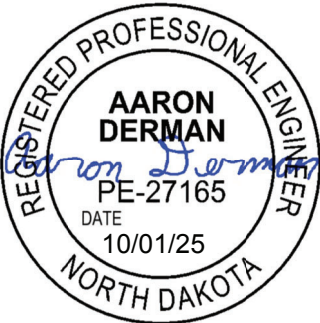


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	20	4

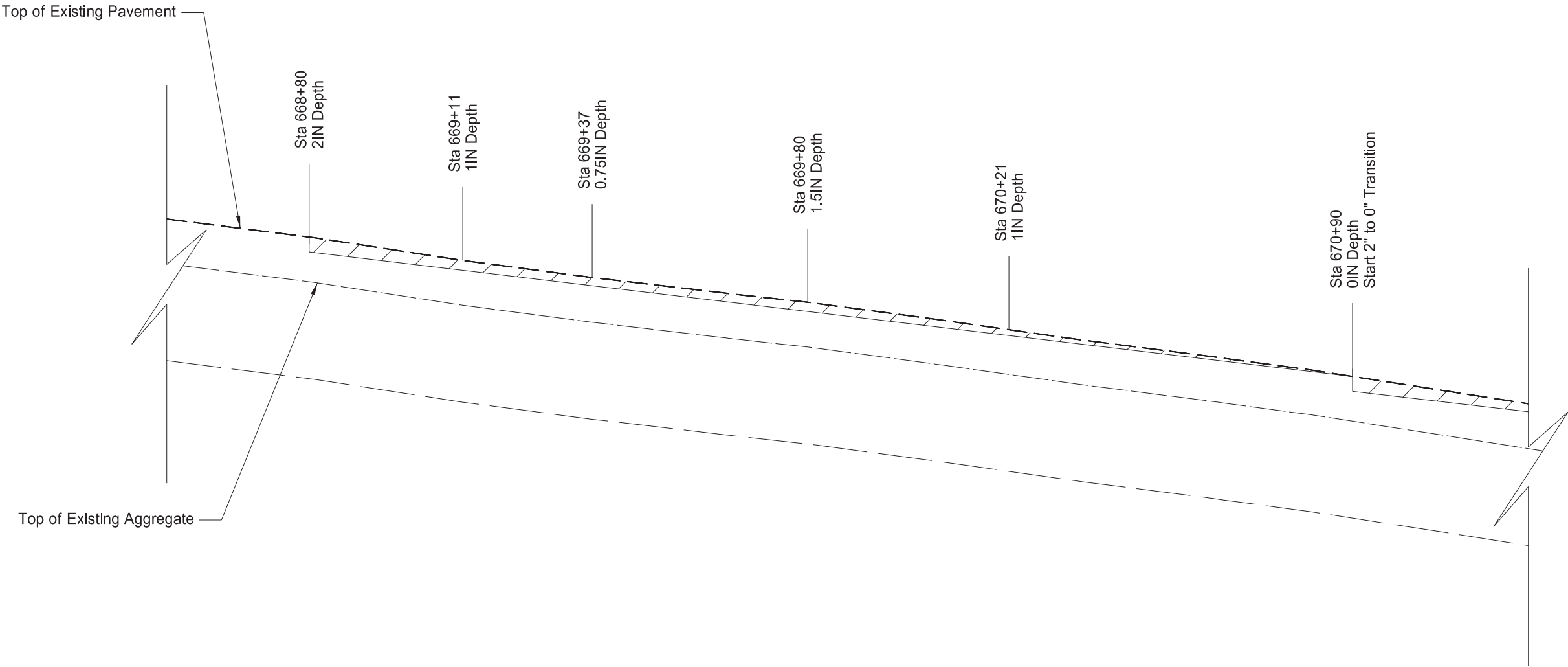


Milling and Paving Transitions

Bridge Replacement
4 Miles South of Jct US 12

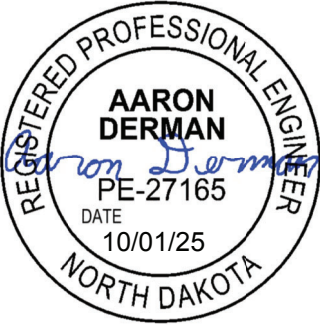


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	20	5



Profile Milling
Depths and Stationing

Bridge Replacement
4 Miles South of Jct US 12



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	20	6

P.C. Station	6+53.14
P.I. Station	8+36.15
Delta =	55° 12' 28.00" (LT)
Degree =	16° 22' 13.00"
Tangent =	183.01
Length =	337.25
Radius =	350.00
External =	44.957
P.T. Station	9+90.39

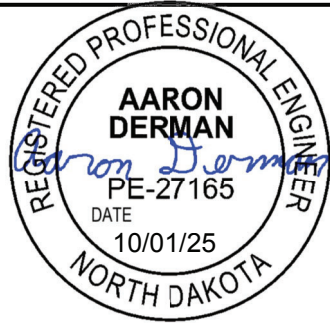
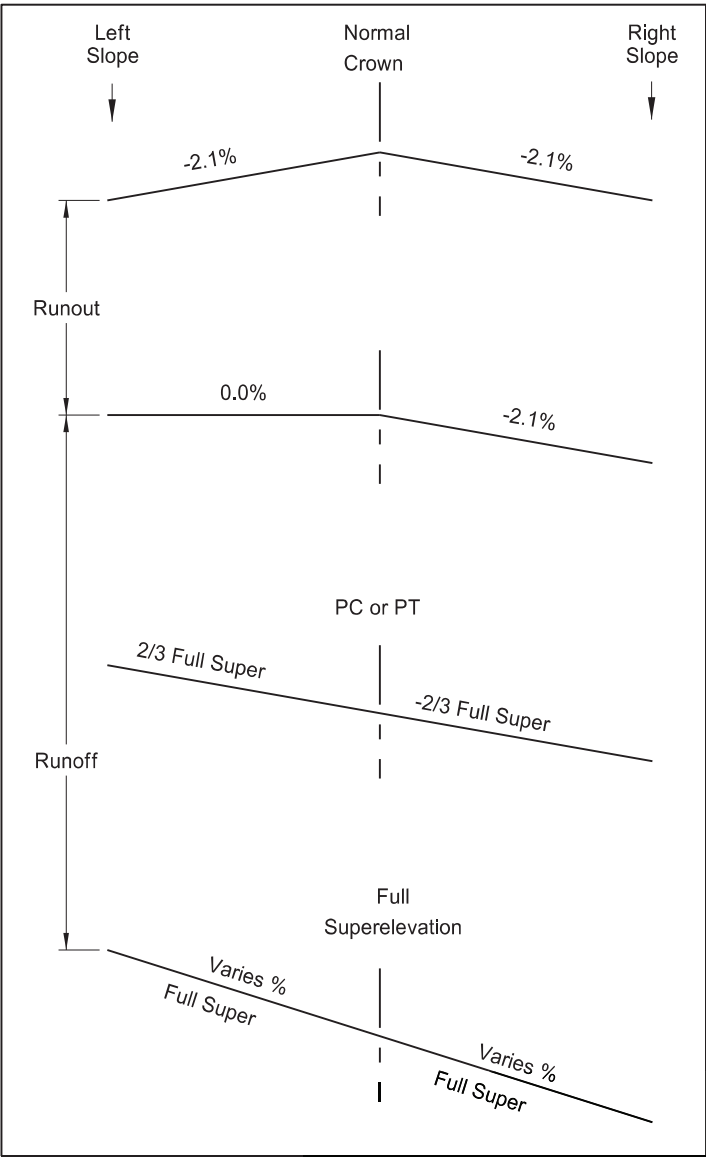
Station	Left Slope	Right Slope
PC - 60'	-2.1	-2.1
PC - 24'	-2.1	0.0
PC	-2.1	1.4
PC + 12'	-2.1	2.1
PT - 12'	-2.1	2.1
PT	-2.1	1.4
PT + 24'	-2.1	0.0
PT + 60'	-2.1	-2.1

P.C. Station	11+90.39
P.I. Station	12+85.18
Delta =	30° 18' 29.00" (RT)
Degree =	16° 22' 13.00"
Tangent =	94.79
Length =	185.14
Radius =	350.00
External =	12.61
P.T. Station	13+75.53

Station	Left Slope	Right Slope
PC - 60'	-2.1	-2.1
PC - 24'	0.0	-2.1
PC	1.4	-2.1
PC + 12'	2.1	-2.1
PT - 12'	2.1	-2.1
PT	1.4	-2.1
PT + 24'	0.0	-2.1
PT + 60'	-2.1	-2.1

P.C. Station	16+97.83
P.I. Station	17+53.44
Delta =	18° 03' 20.00" (LT)
Degree =	16° 22' 13.00"
Tangent =	55.61
Length =	110.30
Radius =	350.00
External =	4.390
P.T. Station	18+08.13

Station	Left Slope	Right Slope
PC - 60'	-2.1	-2.1
PC - 24'	-2.1	0.0
PC	-2.1	1.4
PC + 12'	-2.1	2.1
PT - 12'	-2.1	2.1
PT	-2.1	1.4
PT + 24'	-2.1	0.0
PT + 60'	-2.1	-2.1

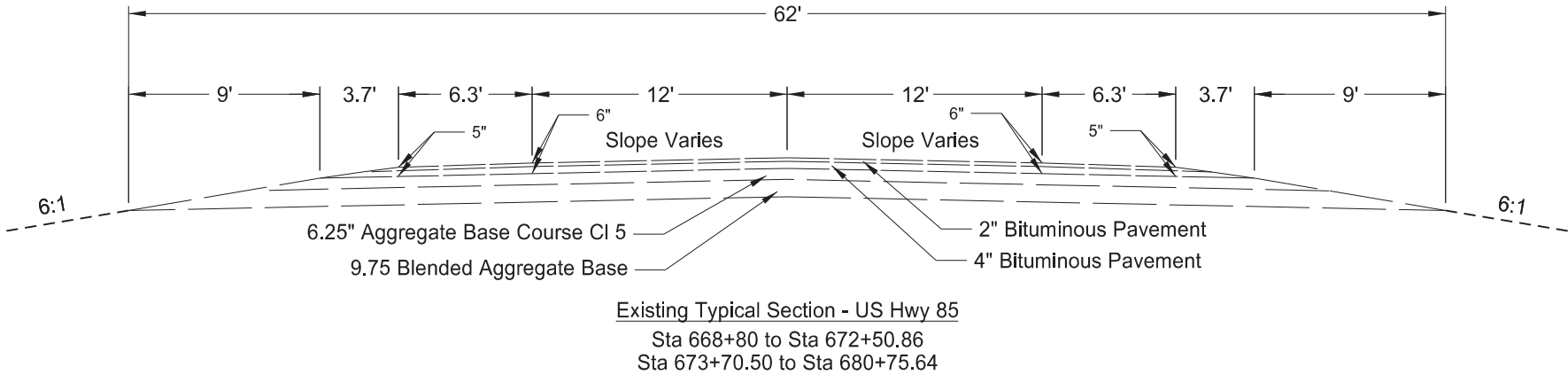


Superelevation Table
Temporary Bypass

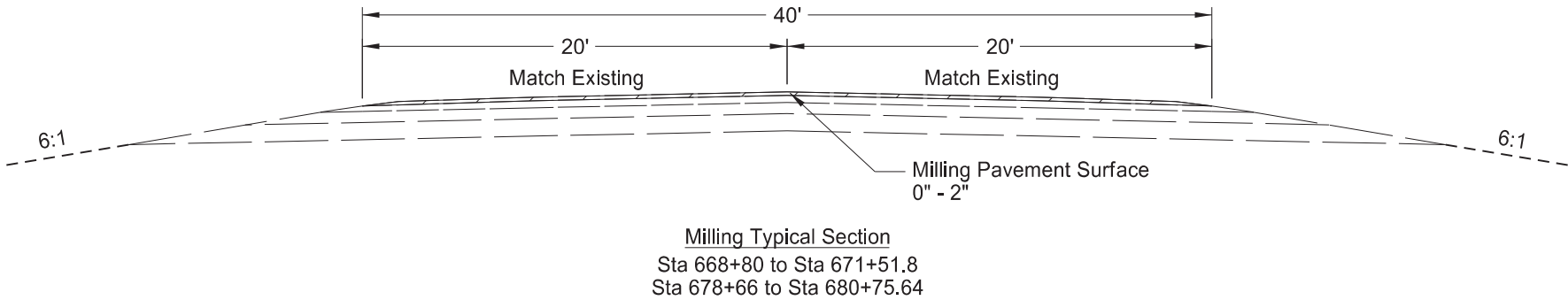
Bridge Replacement
4 Miles South of Jct US 12

Note: Calculations based on AASHTO method five. A design speed of 30 mph and maximum superelevation of 2.1% were used.

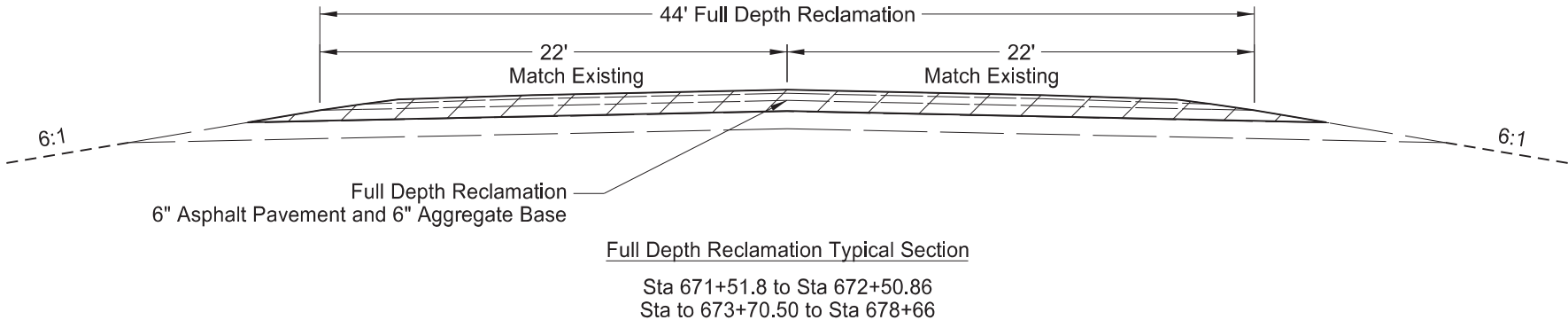
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	30	1



Note: Shoulders taper from 6.3' to 2'
Sta 671+50.86 to Sta 672+50.86
Sta 673+70.5 to Sta 674+70.5

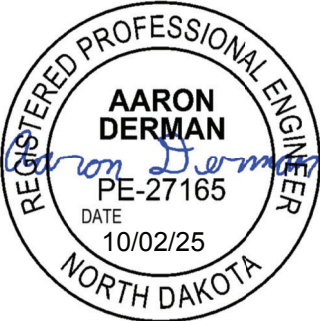


Note: See Sec 20 and 40 for milling transitions

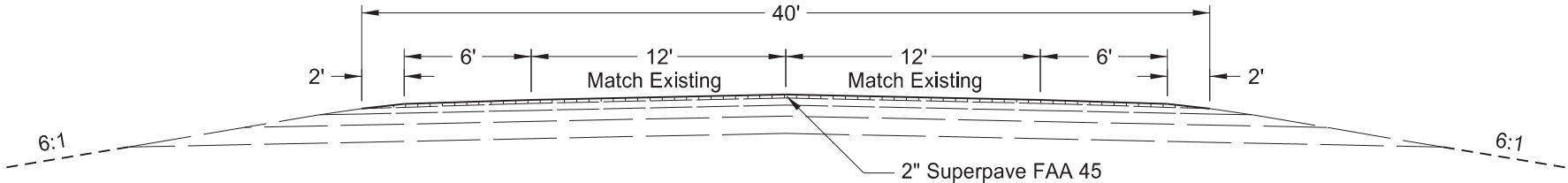


Existing, Milling, & Full Depth Reclamation
Typical Sections

Bridge Replacement
4 Miles South of Jct US 12

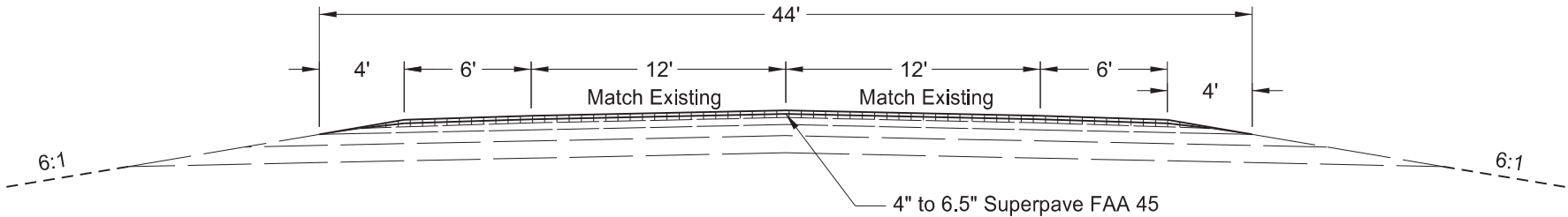


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	30	2



Overlay Typical Section
Sta 668+80 to Sta 670+90
Sta 679+79.7 to Sta 680+75.64

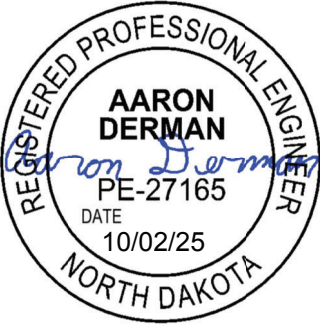
Note: See Sec 20 for paving transitions



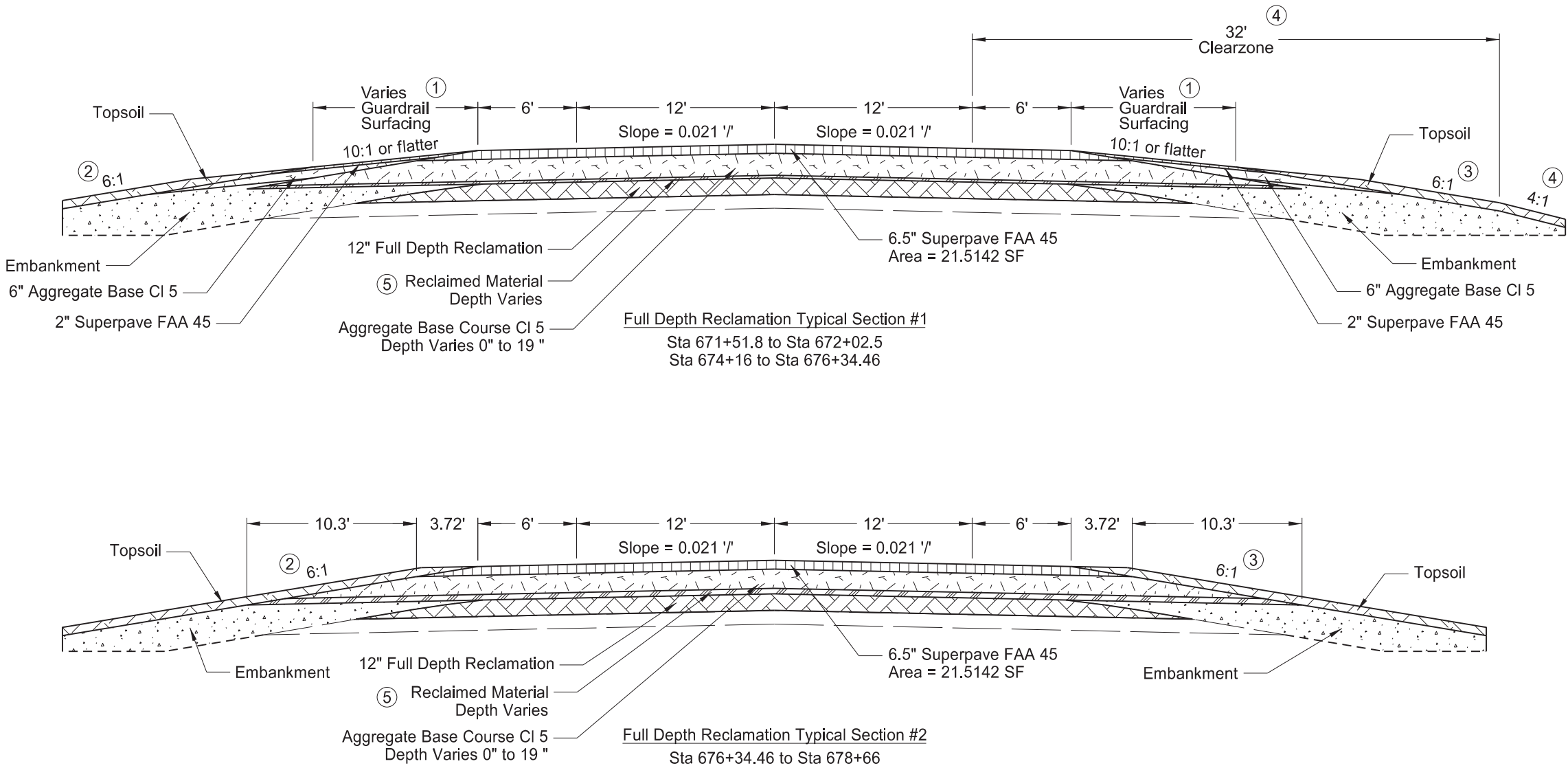
Overlay Typical Section
Sta 670+90 to Sta 671+51.8
Sta 678+66 to Sta 679+79.7

Proposed Typical Sections
Hwy 85

Bridge Replacement
4 Miles South of Jct US 12



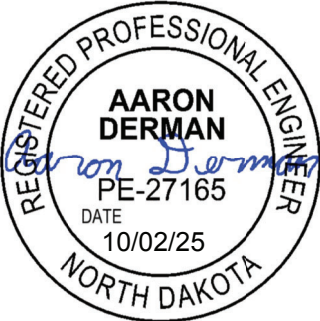
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	30	3



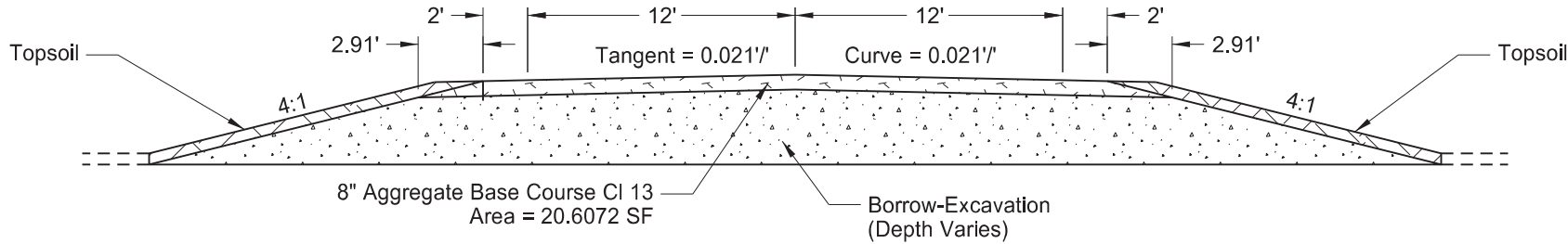
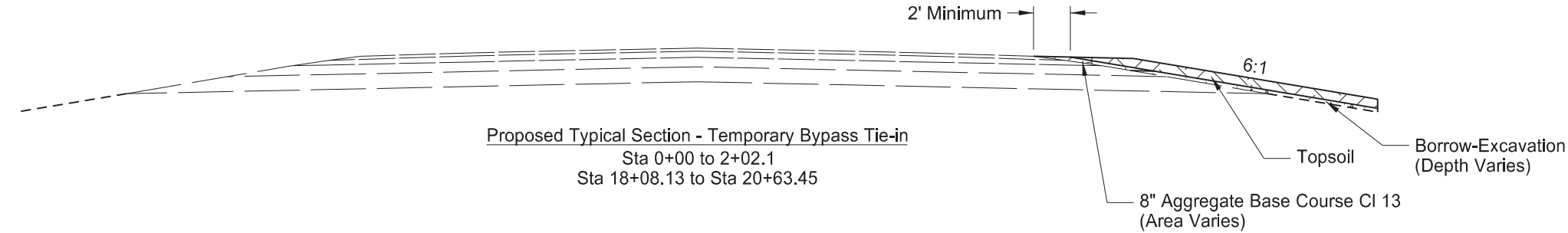
- Notes:
- ① See Section 130 for Guardrail Installation
 - ② Transition 6:1 to 5:1
Sta 671+89.51 to Sta 672+04.51
4:1 Slope
Sta 674+01.96 to Sta 674+29.01
Transition 4:1 to 6:1
Sta 674+29.01 to Sta 674+54.25
 - ③ 3.5:1 Slope
Sta 674+01.96 to Sta 674+29.01
Transition from 3:5 to 6:1
Sta 674+29.01 to Sta 674+54.25
 - ④ Utilize 6:1 slope for all fill slopes beyond
Clear Zone not noted below
3.5:1 Slope
Sta 674+01.96 to Sta 674+29.01
Transition from 3:5 to 4:1
Sta 674+29.01 to Sta 674+44.25
Transition from 4:1 to 6:1
Sta 676+00 to Sta 676+34.46
 - ⑤ Depth of Reclaimed Material is
included in total depth of
Aggregate Base Course CI 5.
This reclaimed material to be
paid for under the "Salvaged Base
Course" bid item.

Proposed Typical Sections
Hwy 85

Bridge Replacement
4 Miles South of Jct US 12



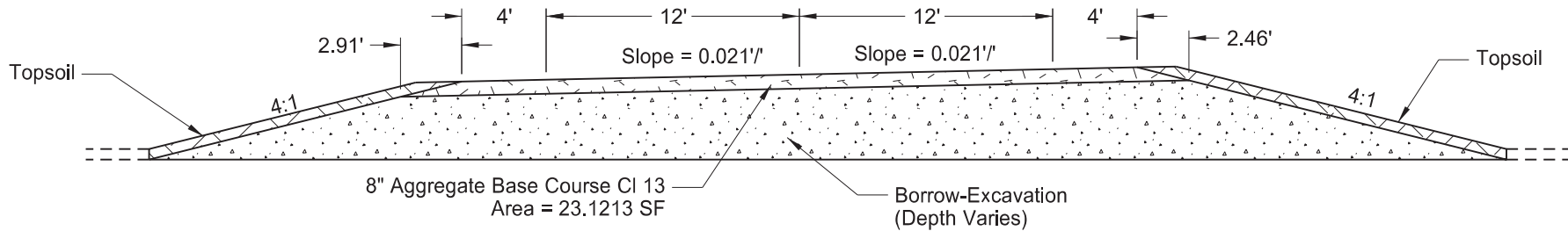
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	30	4



Proposed Typical Section - Temporary Bypass #1

Sta 2+02.1 to Sta 6+03.14
Sta 9+90.39 to Sta 10+96
Sta 14+25.53 to Sta 16+47.83

NOTES:
Sta 6+03.14 to Sta 6+53.14, shoulder transition from 2' to 4'
Sta 9+37.80 to Sta 9+90.39, shoulder transition from 4' to 2'
Sta 11+90.39 to Sta 12+42.97, shoulder transition from 2' to 4'
Sta 13+75.53 to Sta 14+25.53, shoulder transition from 4' to 2'
Sta 16+47.83 to Sta 16+97.83, shoulder transition from 2' to 4'

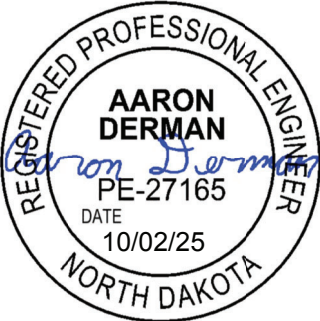


Proposed Typical Section - Temporary Bypass #2

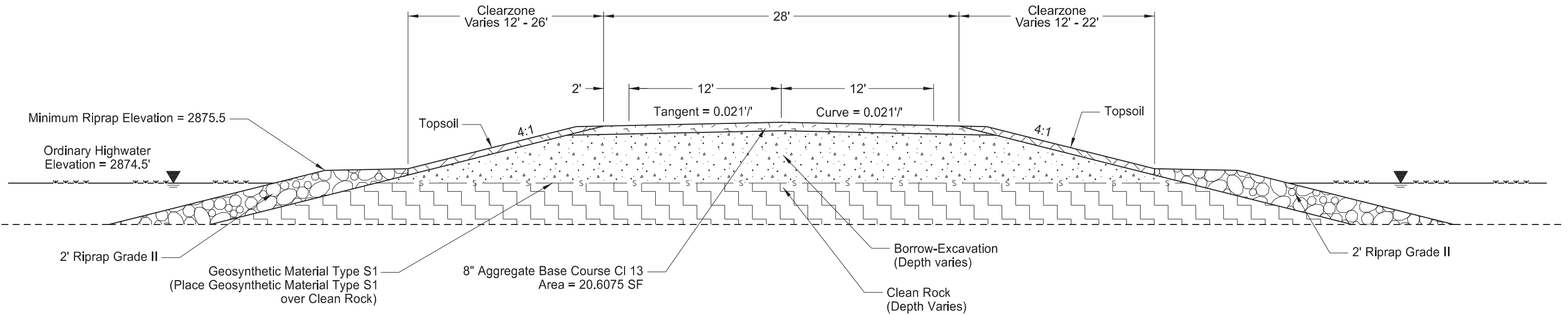
Sta 6+53.14 to Sta 9+37.8
Sta 12+42.97 to Sta 13+75.53
Sta 16+97.83 to Sta 18+08.13

Proposed Typical Sections
Temporary Bypass

Bridge Replacement
4 Miles South of Jct US 12



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	30	5



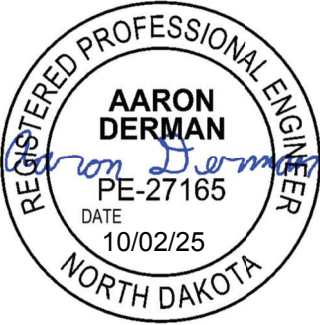
Proposed Typical Section #3 - Temporary Bypass
Sta 10+96 to Sta 12+00

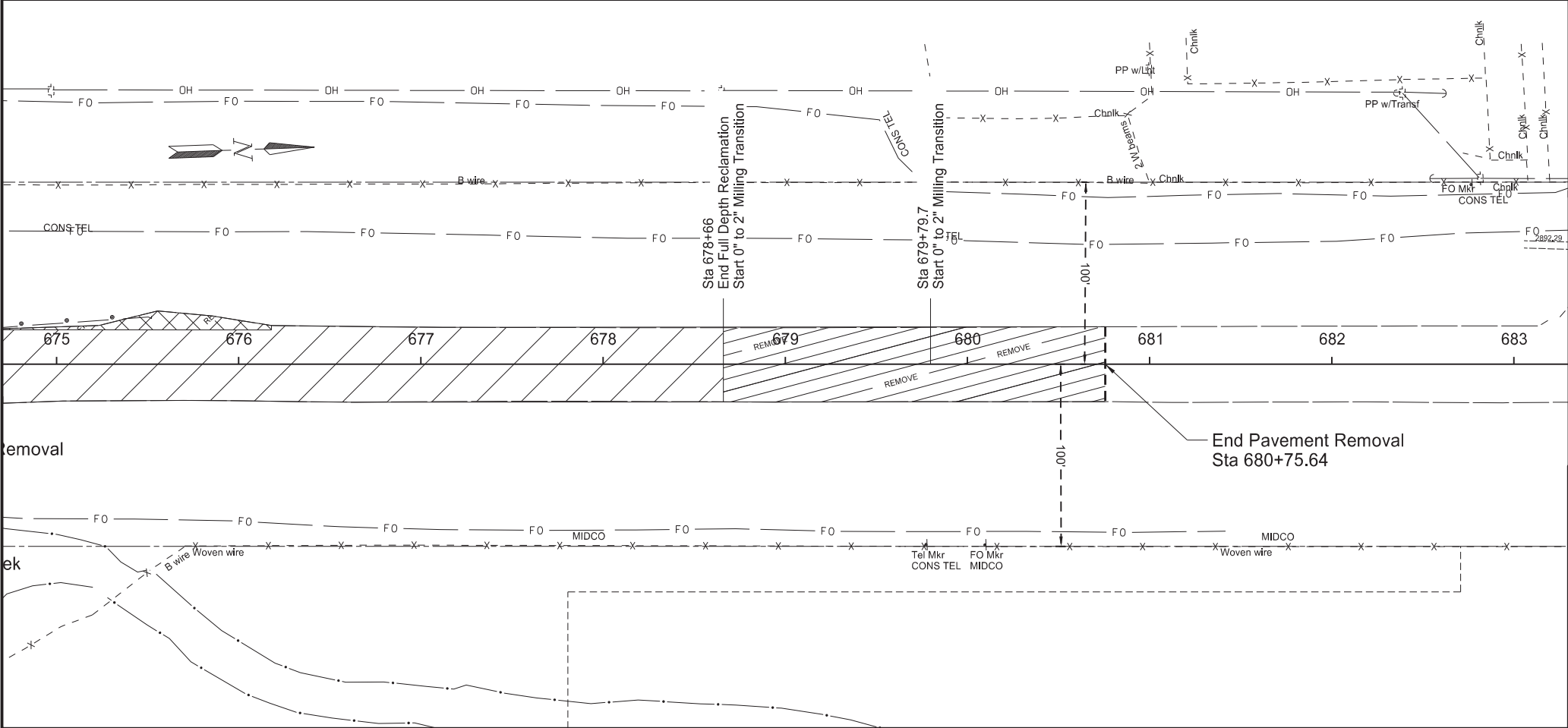
NOTES:

Place riprap on the west side of the bypass from Sta 10+96 to Sta 11+60
Place riprap on the east side of the bypass from Sta 11+57 to Sta 12+00
Place Clean Rock at existing water level or Ordinary Highwater Elevation, whichever is higher.

Proposed Typical Sections
Temporary Bypass

Bridge Replacement
4 Miles South of Jct US 12





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	40	1

SPEC	CODE	BID ITEM	QTY	UNIT
202	0136	REMOVAL OF PAVEMENT		
		Asphalt Pavement		
		Sta 669+64 to Sta 672+70.5 (2" Guardrail Surfacing)	42	TON
		Sta 673+54.56 to Sta 676+18 (2" Guardrail Surfacing)	19	TON
		Aggregate		
		Sta 669+64 to Sta 672+70.5 (6" Guardrail Surfacing)	195	TON
		Sta 673+54.56 to Sta 676+18 (6" Guardrail Surfacing)	98	TON
		TOTAL	354	
256	0701	REMOVE AND REPLACE RIPRAP		
		Sta 672+69.6 to 673+53.7 -111' Rt	99	CY
		Sta 672+72.1 to 673+43.7 - 90' Lt	30	CY
306	0510	FULL DEPTH RECLAMATION		
		Sta 671+51.8 to Sta 672+50.86	442	SY
		Sta 673+70.5 to Sta 678+66	2381	SY
411	0105	MILLING PAVEMENT SURFACE		
		Sta 668+80 to Sta 671+51.8	1208	SY
		Sta 678+66 to Sta 680+75.64	932	SY



Full Depth Reclamation



Milling Pavement Surface



Guardrail Surfacing Removal



Riprap Removal



Removal of Structure

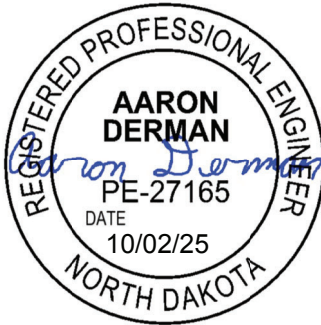
See Section 170

Milling & Removal Layout

Hwy 85

Bridge Replacement

4 Miles South of Jct US 12



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	51	1

Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coatings	Steel Pipe Corrugations or Spral Ribs	Steel Pipe Minlmm Thickness	Geosythetic Material - Type G (Pay Item)	End Sections		Applicable Backfill
													Begin	End	
				In	Bid Item	LF		In	Type		In	SY	EA	EA	
1+54.7 Bypass	39.4' Rt	3+14.2 Bypass	35.1' Lt	24	Pipe Conduit 24IN-Approach	176	Reinforced Concrete Pipe - Class III (barrel length = 176 LF)	24							Specification 714.04 A
							Polyvinyl Chloride (PVC)	24							
							High-Density Polyethylene	24							
							Spiral Rib Steel Pipe	24	Z, A, P	3/4, 1	0.064				
							Corrugated Steel Pipe	24	Z, A, P	2	0.064				
8+05 Bypass	25.5' Lt	8+40 Bypass	28.0' Rt	24	Pipe Conduit 24IN - Approach	64	Reinforced Concrete Pipe - Class III (barrel length = 64 LF)	24							Specification 714.04 A
11+20.1 Bypass	62.3' Lt	11+76.4 Bypass	54.8' Rt	66" x 51"	Pipe Conduit Arch 66IN X 51IN-Approach	130	Reinforced Concrete Pipe - Class III (barrell length = 130 LF)	66" x 51"							Specification 714.04 A
							Spiral Rib Steel Pipe	66" x 51"	Z, A, P	3/4, 1	0.109				
							Corrugated Steel Pipe	66' x 51'	Z, A, P	3	0.079				
							Corrugated Steel Pipe	66' x 51'	Z, A, P	5	0.109				
11+29.1 Bypass	61.5' Lt	11+85.4 Bypass	55.7' Rt	66" x 51"	Pipe Conduit Arch 66IN X 51IN-Approach	130	Reinforced Concrete Pipe - Class III (barrell length = 130 LF)	66" x 51"							Specification 714.04 A
							Spiral Rib Steel Pipe	66" x 51"	Z, A, P	3/4, 1	0.109				
							Corrugated Steel Pipe	66' x 51'	Z, A, P	3	0.079				
							Corrugated Steel Pipe	66' x 51'	Z, A, P	5	0.109				
11+40.4 Bypass	55.7' Lt	11+92.7 Bypass	52.4' Rt	66" x 51"	Pipe Conduit Arch 66IN X 51IN-Approach	120	Reinforced Concrete Pipe - Class III (barrell length = 120 LF)	66" x 51"							Specification 714.04 A
							Spiral Rib Steel Pipe	66" x 51"	Z, A, P	3/4, 1	0.109				
							Corrugated Steel Pipe	66' x 51'	Z, A, P	3	0.079				
							Corrugated Steel Pipe	66' x 51'	Z, A, P	5	0.109				
17+66.8 Bypass	26.3' Lt	18+60.2 Bypass	41.1' Rt	24	Pipe Conduit 24IN-Approach	114	Reinforced Concrete Pipe - Class III (barrel length = 114 LF)	24							Specification 714.04 A

Corrugations: 2 = 2-2/3"x1/2"
3 = 3"x1"
5 = 5"x1"

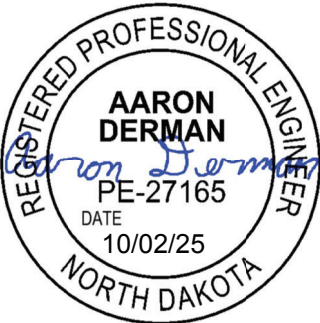
Coatings: Z = Zinc
A = Aluminum
P = Polymeric (over Zinc or Aluminum)

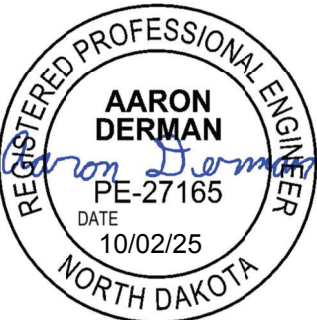
Spiral Ribs: 3/4 = 3/4"x3/4"@7-1/2"
1 = 3/4"x1"@11-1/2"

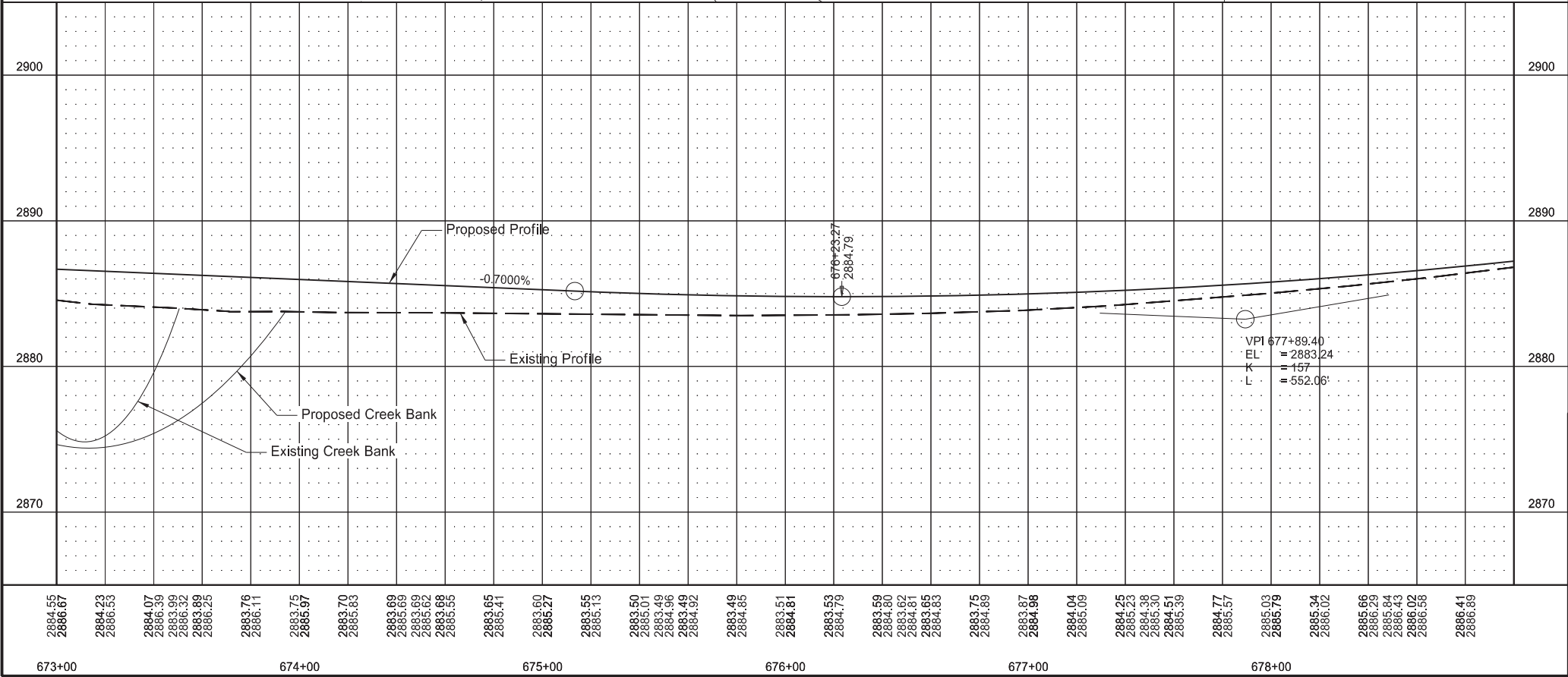
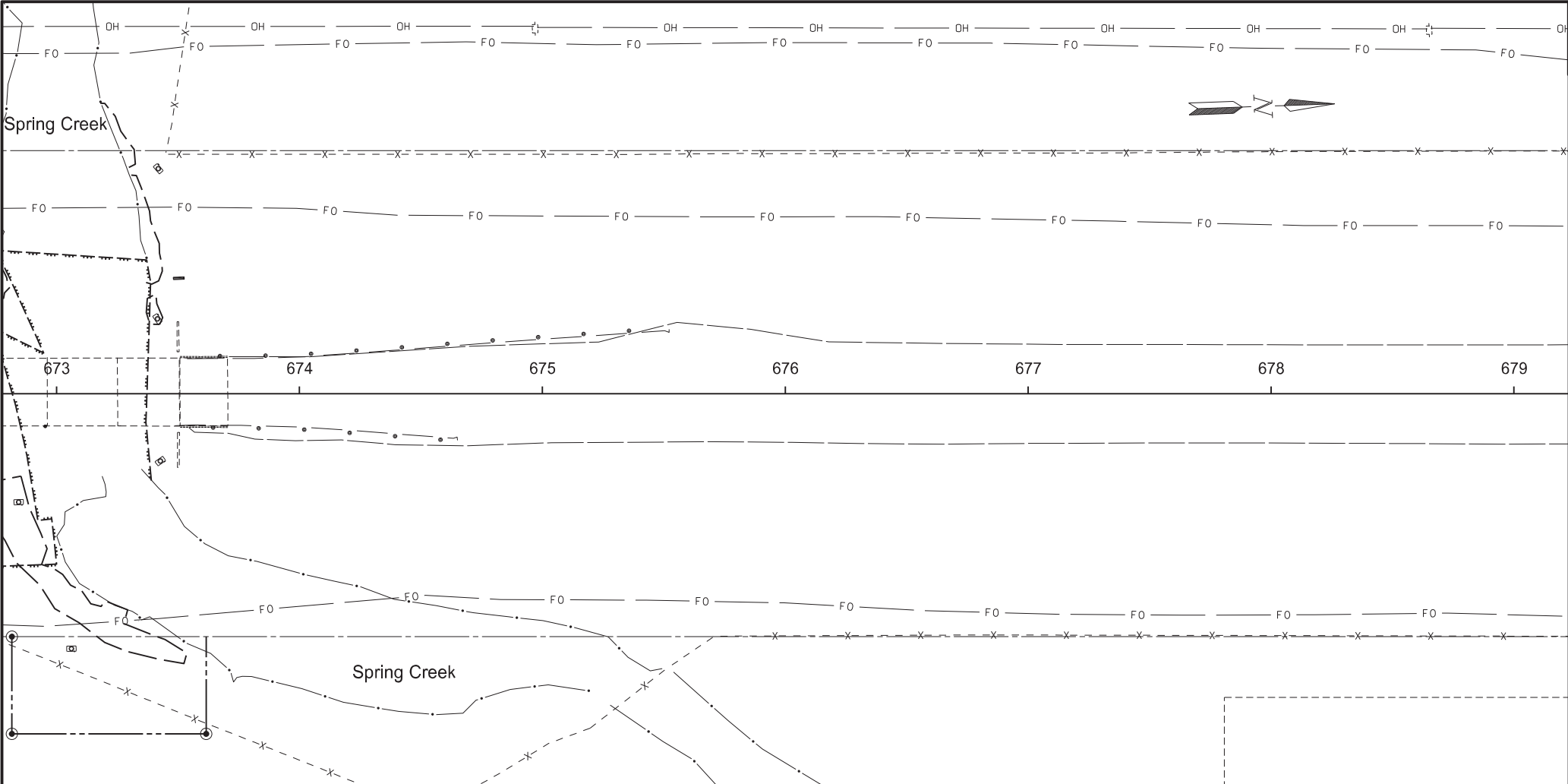
FES = Flared End Section
TES = Traversable End Section

Allowable Pipe List

Bridge Replacement
4 Miles South of Jct US 12

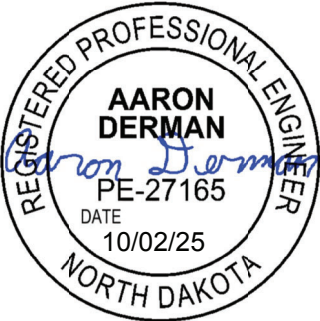


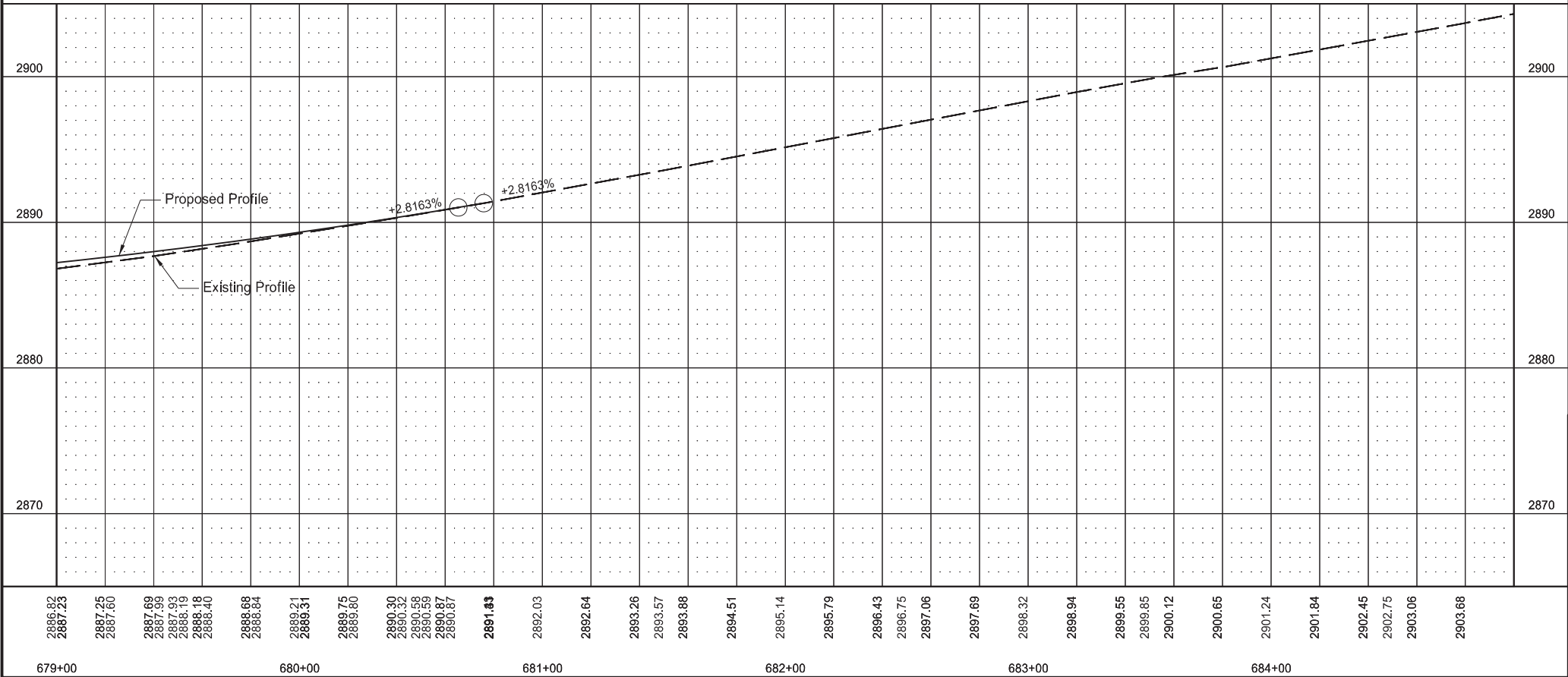




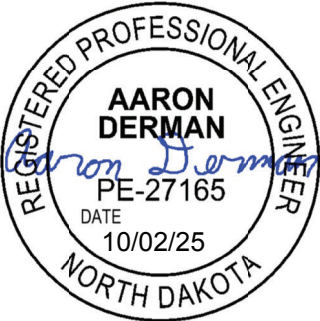
Plan and Profile
Hwy 85

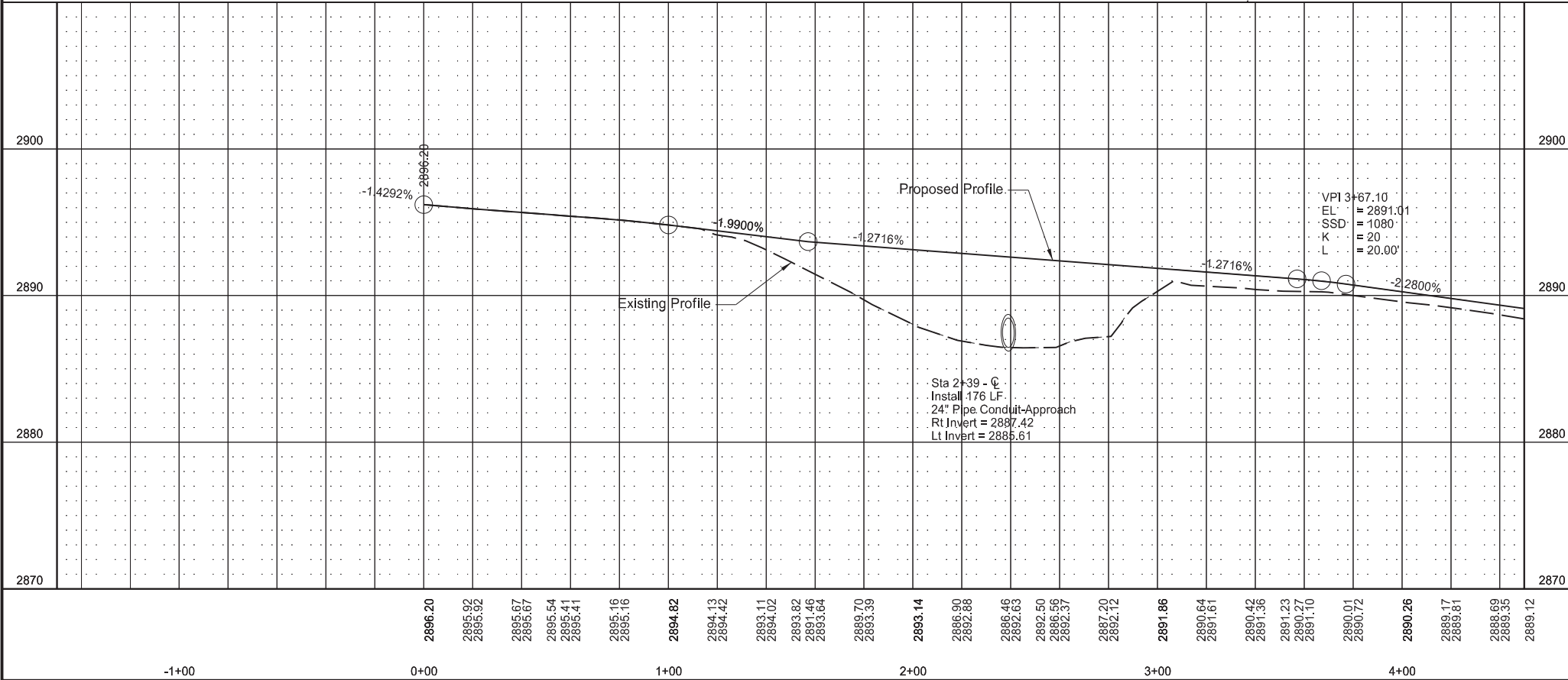
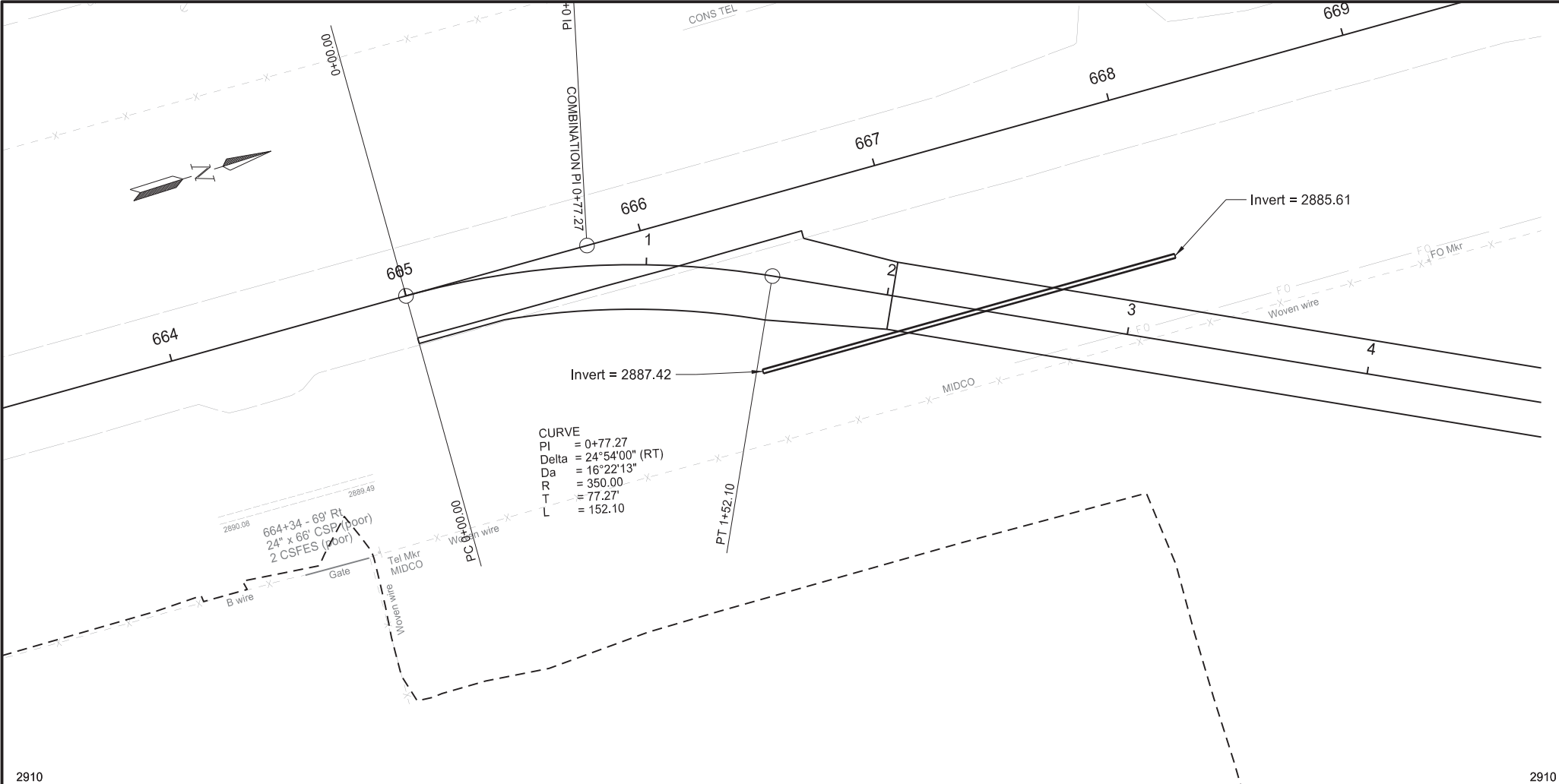
Bridge Replacement
4 Miles South of Jct US 12





Bridge Replacement 4 Miles South of Jct US 12



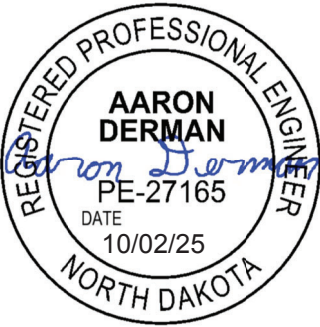


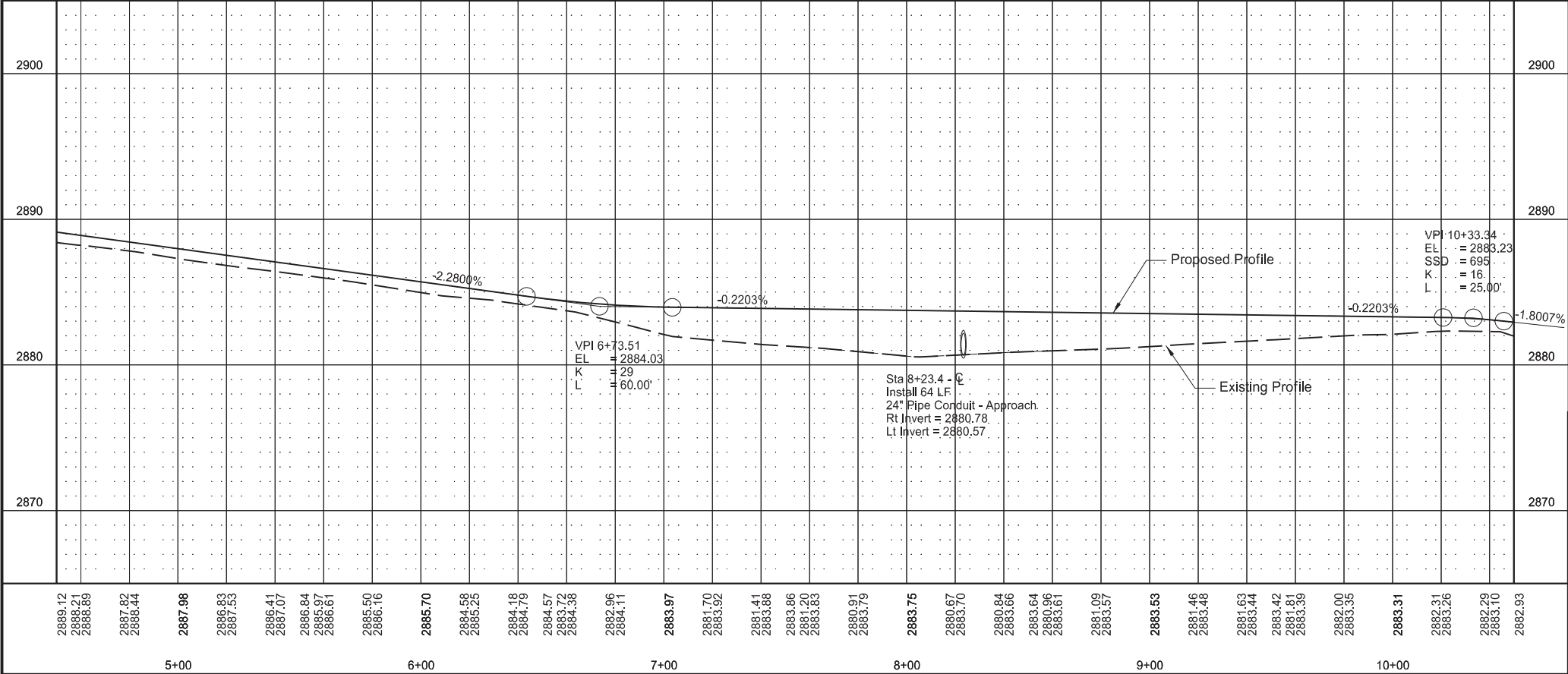
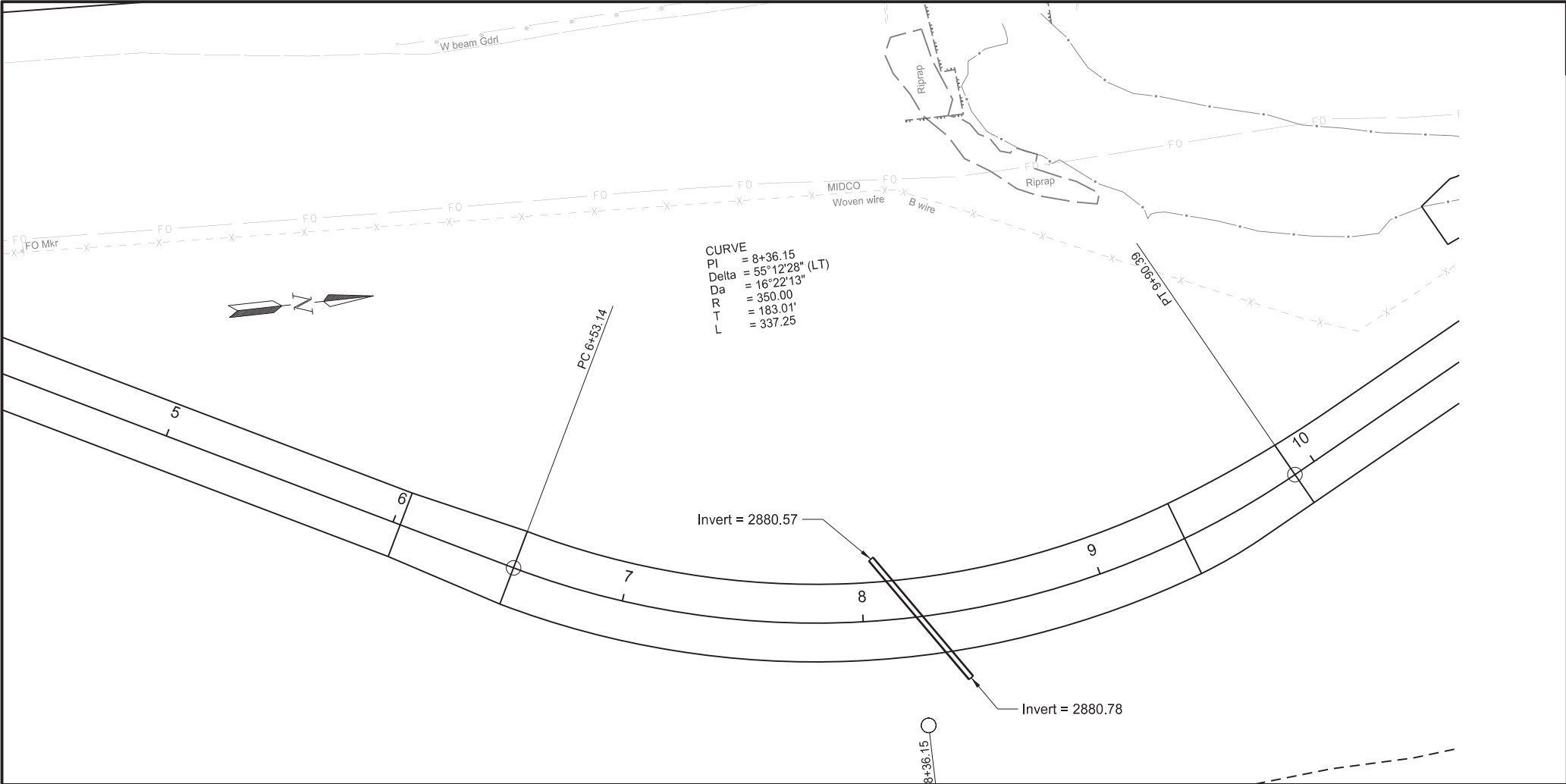
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	60	4

SPEC	CODE	BID ITEM	QTY	UNIT
714	4106	PIPE CONDUIT 24IN-APPROACH		
		Sta 1+54.7 Rt to Sta 3+14.2 Lt (Temp Bypass)	176	LF

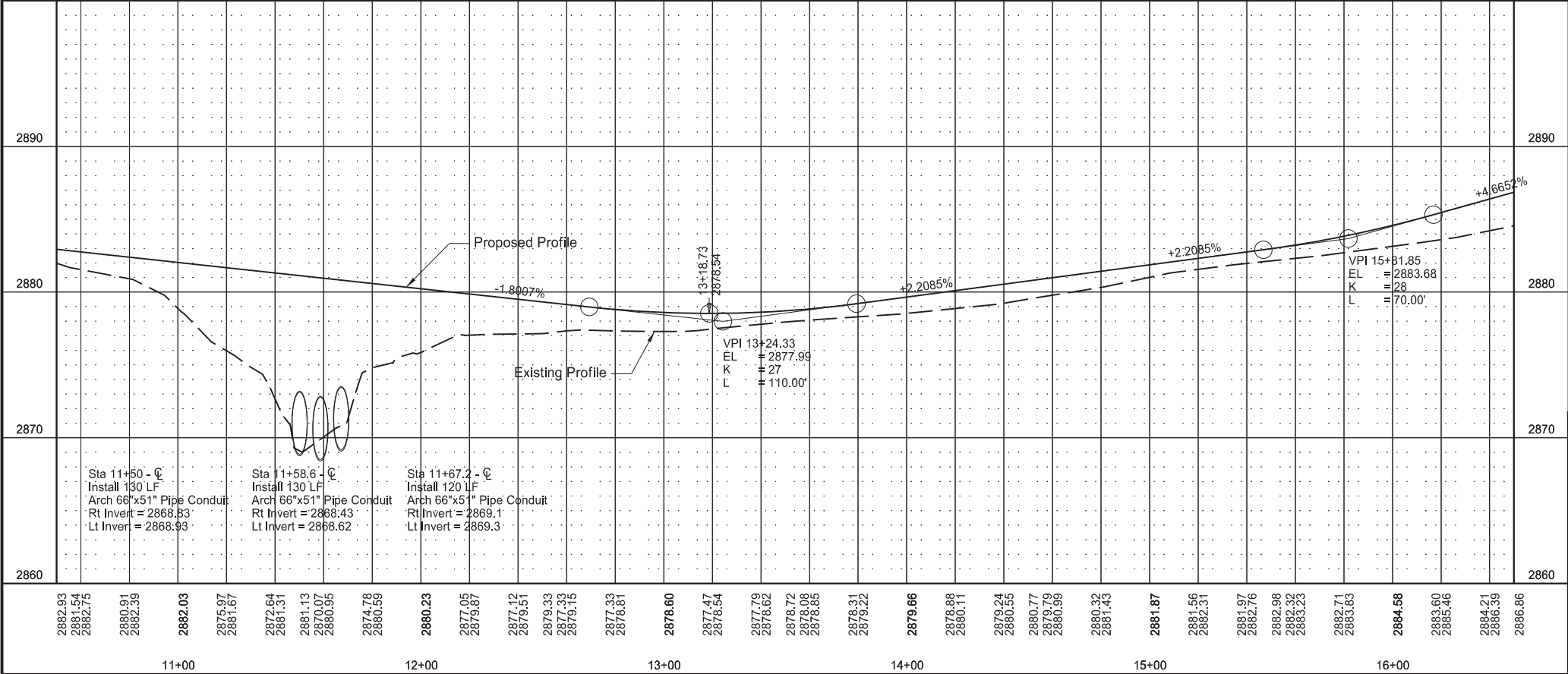
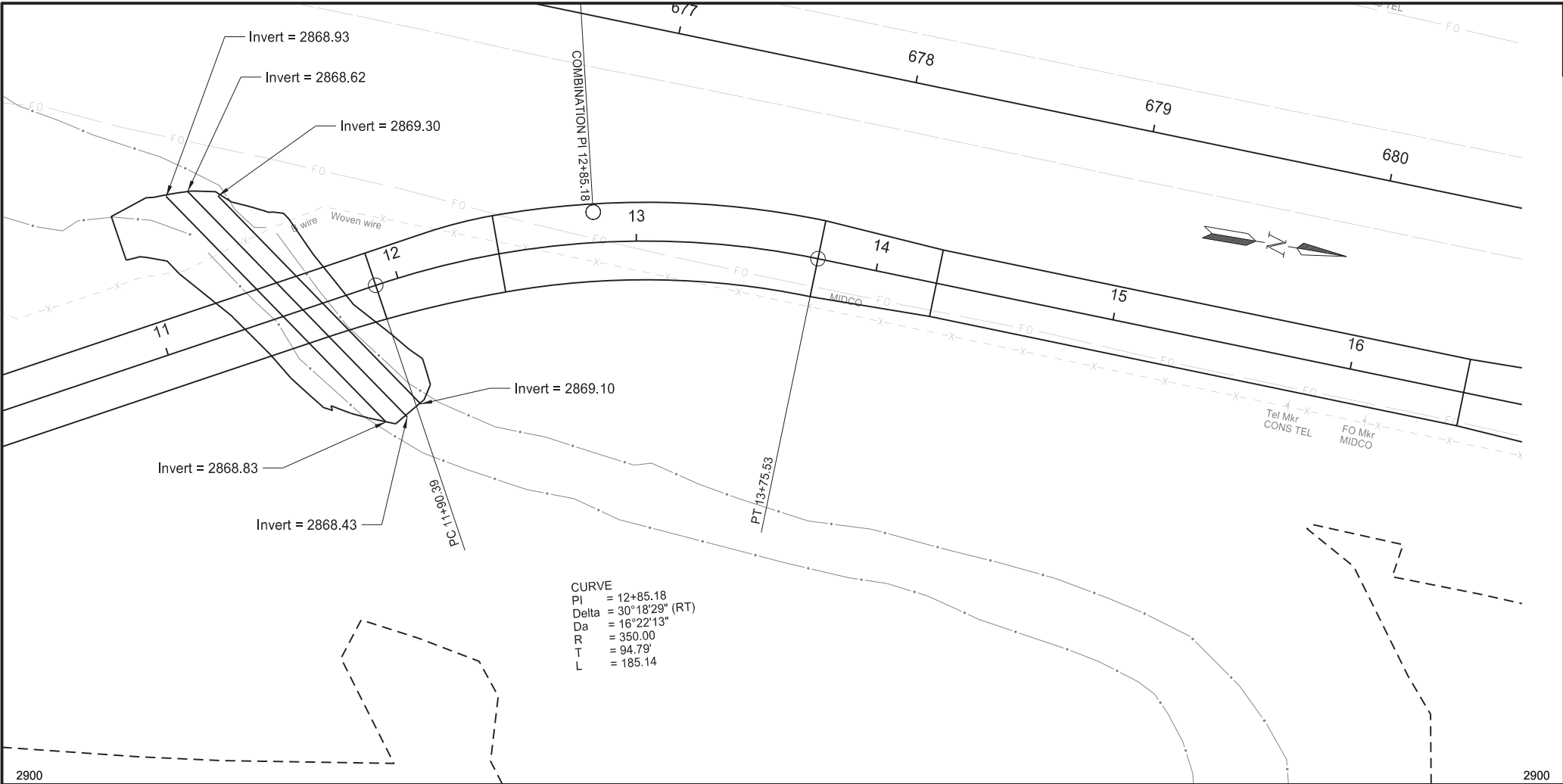
Plan and Profile
Temporary Bypass

Bridge Replacement
4 Miles South of Jct US 12





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	60	5
SPEC CODE		BID ITEM	QTY	UNIT
714	4106	PIPE CONDUIT 24IN-APPROACH		
Sta 8+05 Lt to Sta 8+40 Rt (Temp Bypass)			64	LF

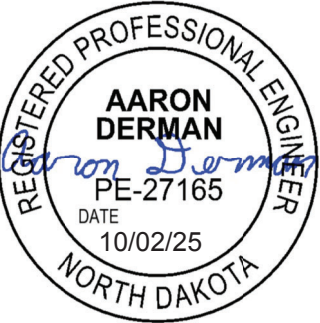


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	ND	SS-5-085(086)012	60	6

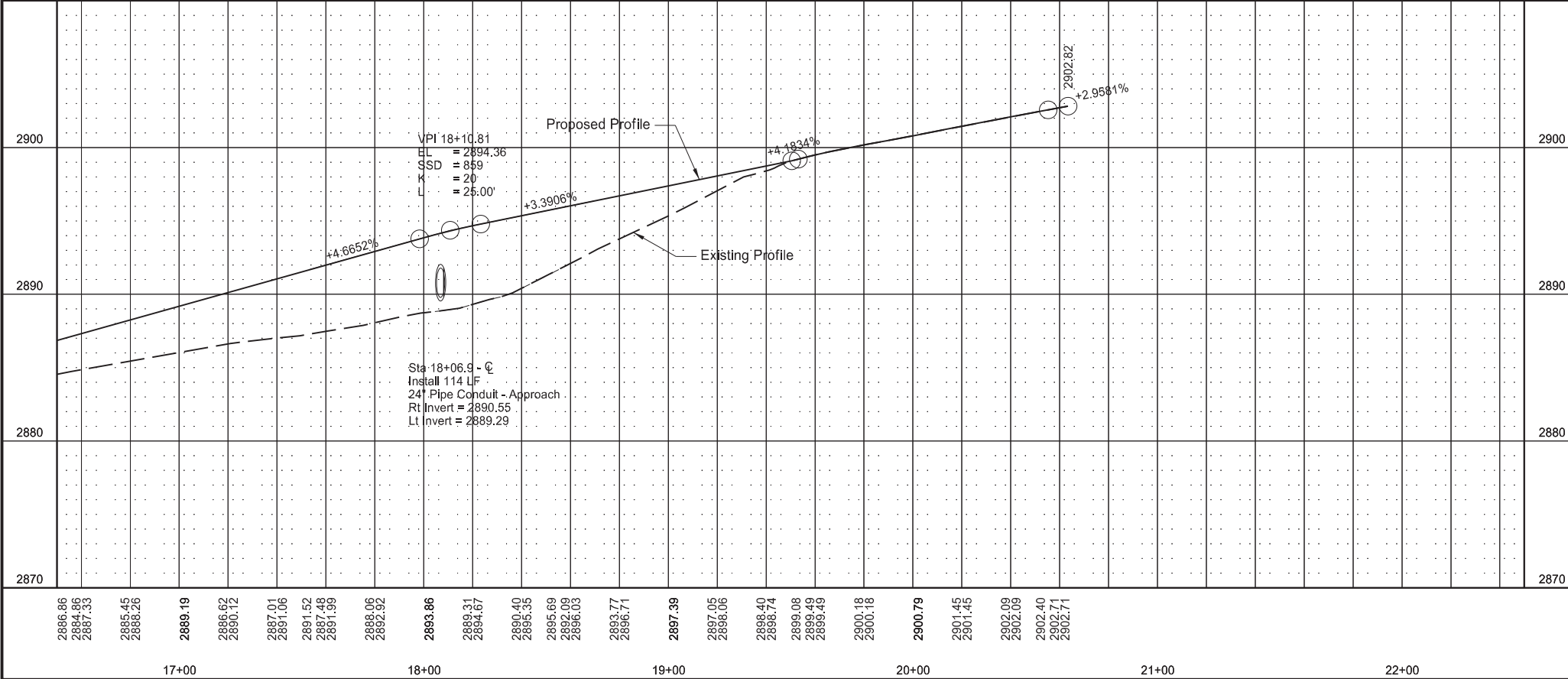
SPEC	CODE	BID ITEM	QTY	UNIT
714	4234	PIPE CONDUIT ARCH 66IN X 51IN-APPROACH		
		Sta 11+20.1 Lt to Sta 11+76.4 Rt (Temp Bypass)	130	LF
		Sta 11+29.1 Lt to Sta 11+85.4 Rt (Temp Bypass)	130	LF
		Sta 11+40.4 Lt to Sta 11+92.4 Rt (Temp Bypass)	120	LF

Plan and Profile
Temporary Bypass

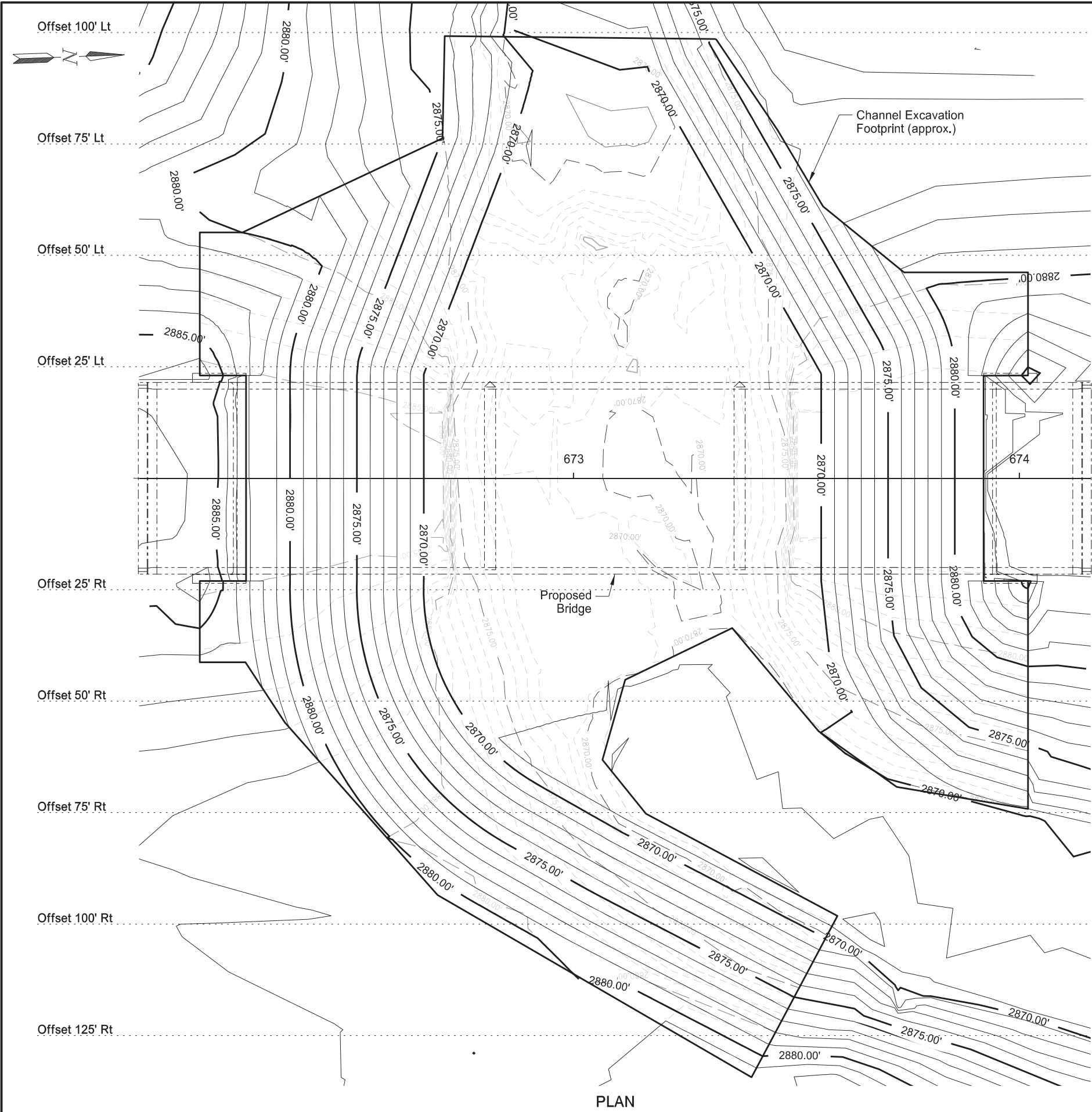
Bridge Replacement
4 Miles South of Jct US 12



SPEC	CODE	BID ITEM	QTY	UNIT
714	4106	PIPE CONDUIT 24IN-APPROACH		
		Sta 17+66.8 Lt to Sta 18+60.2 Rt (Temp Bypass)	114	LF



A circular professional engineer seal for Aaron Derman, North Dakota. The outer ring contains the text "REGISTERED PROFESSIONAL ENGINEER" at the top and "NORTH DAKOTA" at the bottom. The center of the seal contains the name "AARON DERMAN" in bold, the license number "PE-27165", the expiration date "10/02/25", and the word "DATE". A handwritten signature "Aaron Derman" is written across the center of the seal.



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	70	1

LEGEND

- Existing Contour (Major Interval ~ 5')
- Existing Contour (Minor Interval ~ 1')
- Proposed Contour (Major Interval ~ 5')
- Proposed Contour (Minor Interval ~ 1')



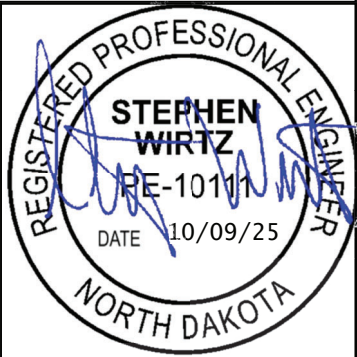
QUANTITIES	
SEE SEC 170	
SPRING CREEK 4 SOUTH OF JCT US 12	
CHANNEL EXCAVATION CONTOURS	
DRAWING NO.	

Other Waters Impact Table													
Number	Location	Type	Feature	USACE Jurisdictional ¹	Impacts to Other Waters						Other Water Mitigation		
					Acres			Linear Feet			Mititgation Proposed		
					Temp.	Perm. (Fill/Drain)	Perm. (Cut)	Temp.	Perm. (Loss)	Perm. (No Loss)	EO 11990	USACE	USFWS
OW-1b	Sec 34, T131N, R102W	Stream	Natural	Y	0.407	0.000	0.067	490.135	0.000	27.013	N	N	N
1a ²	Sec 34, T131N, R102W	Fringe	Natural	Y	0.011	0.000	0.139	0.000	0.000	121.640	N	N	N
				Totals	0.418	0.000	0.207	490.135	0.000	148.653			

¹ A wetland Jurisdictional Determination was issued by the USACE on 08/02/2023; NWO-2023-01184-BIS.

² Wetland 1a is treated as a stream for permitting and mitigation.

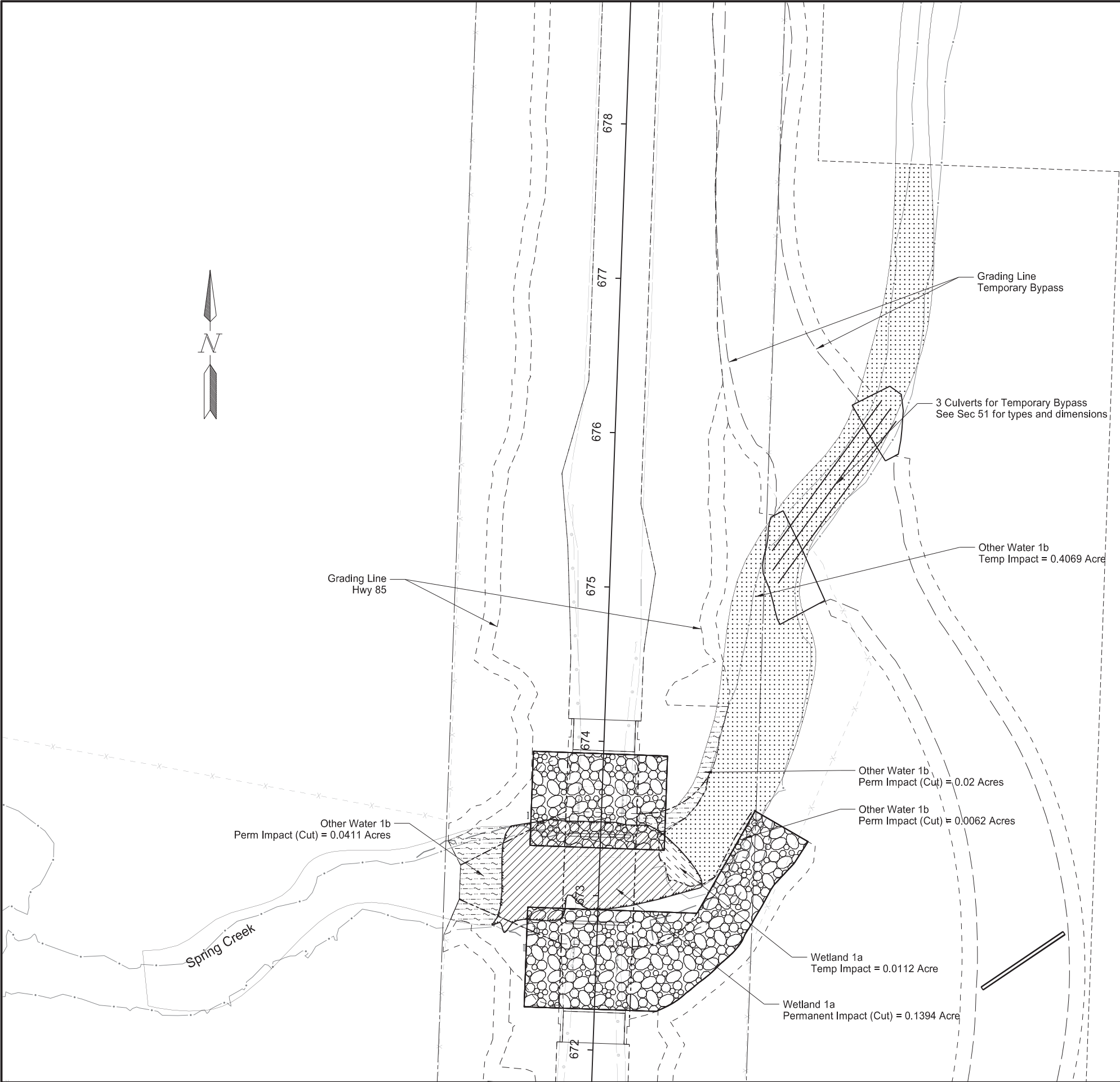
Impact Summary Table			
Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total (Acres)	Water Type	Total (Acres)
Natural/JD (Fill/Drain)	0.00	Temporary Wetland JD	0.00
Natural/Non-JD (Fill/Drain)	0.00	Non-JD Wetland Temporary	0.00
Artificial/JD (Fill/Drain)	0.00		
Artificial/Non-JD (Fill/Drain)	0.00	Permanent OW	0.207
Total	0.00	Temporary OW	0.418
JD Natural (Cut)	0.00	Permanent OW-d	0.00
JD Artificial (Cut)	0.00	Temporary OW-d	0.00
Non-JD Natural (Cut)	0.00		
Non-JD Artificial (Cut)	0.00		
Total	0.00		

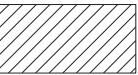
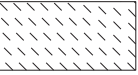
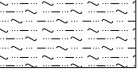
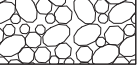
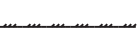


Wetland Impact Table

Structure Replacement
4 South of Jct US 12

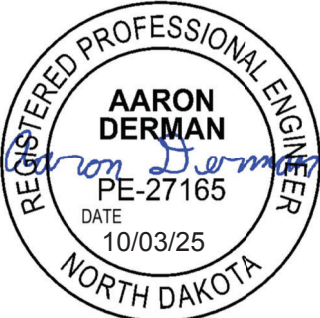
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	75	2



-  Wetland Impacts Permanent
-  Wetland Impacts Temporary
-  Other Water Impacts Permanent
-  Other Water Impacts Temporary
-  Riprap Limits
-  Existing Delineated Wetlands
-  Existing Other Waters

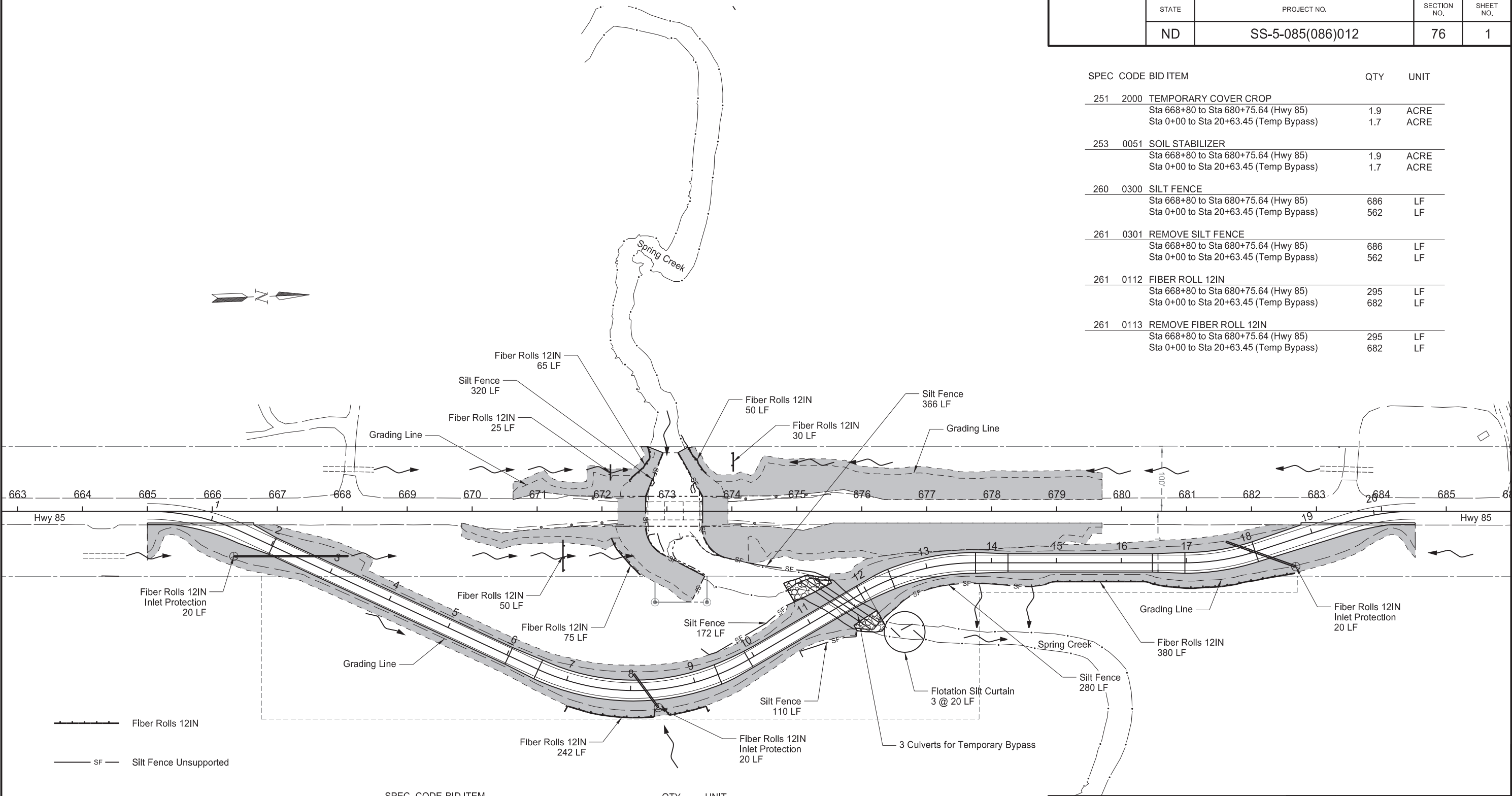
Wetland Impacts

Bridge Replacement
4 Miles South of Jct US 12



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	76	1

SPEC	CODE	BID ITEM	QTY	UNIT
251	2000	TEMPORARY COVER CROP		
		Sta 668+80 to Sta 680+75.64 (Hwy 85)	1.9	ACRE
		Sta 0+00 to Sta 20+63.45 (Temp Bypass)	1.7	ACRE
253	0051	SOIL STABILIZER		
		Sta 668+80 to Sta 680+75.64 (Hwy 85)	1.9	ACRE
		Sta 0+00 to Sta 20+63.45 (Temp Bypass)	1.7	ACRE
260	0300	SILT FENCE		
		Sta 668+80 to Sta 680+75.64 (Hwy 85)	686	LF
		Sta 0+00 to Sta 20+63.45 (Temp Bypass)	562	LF
261	0301	REMOVE SILT FENCE		
		Sta 668+80 to Sta 680+75.64 (Hwy 85)	686	LF
		Sta 0+00 to Sta 20+63.45 (Temp Bypass)	562	LF
261	0112	FIBER ROLL 12IN		
		Sta 668+80 to Sta 680+75.64 (Hwy 85)	295	LF
		Sta 0+00 to Sta 20+63.45 (Temp Bypass)	682	LF
261	0113	REMOVE FIBER ROLL 12IN		
		Sta 668+80 to Sta 680+75.64 (Hwy 85)	295	LF
		Sta 0+00 to Sta 20+63.45 (Temp Bypass)	682	LF

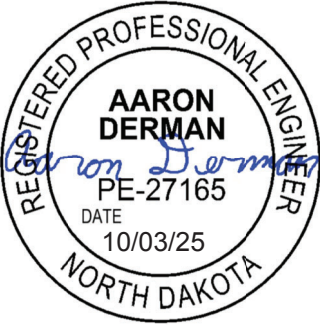


- Fiber Rolls 12IN
- SF Silt Fence Unsupported
- Flotation Silt Curtain
- Temporary Cover Crop and Soil Stabilizer
- Riprap Grade II

SPEC	CODE	BID ITEM	QTY	UNIT
256	0200	RIPRAP GRADE II		
		Sta 10+96 to Sta 11+60 Lt (Temp Bypass)	123	CY
		Sta 11+57 to Sta 12+00 Rt (Temp Bypass)	72	CY
262	0100	FLOTATION SILT CURTAIN		
		Sta 12+00 - 75' Rt (Temp Bypass)	60	LF
262	0101	REMOVE FLOTATION SILT CURTAIN		
		Sta 12+00 - 75' Rt (Temp Bypass)	60	LF

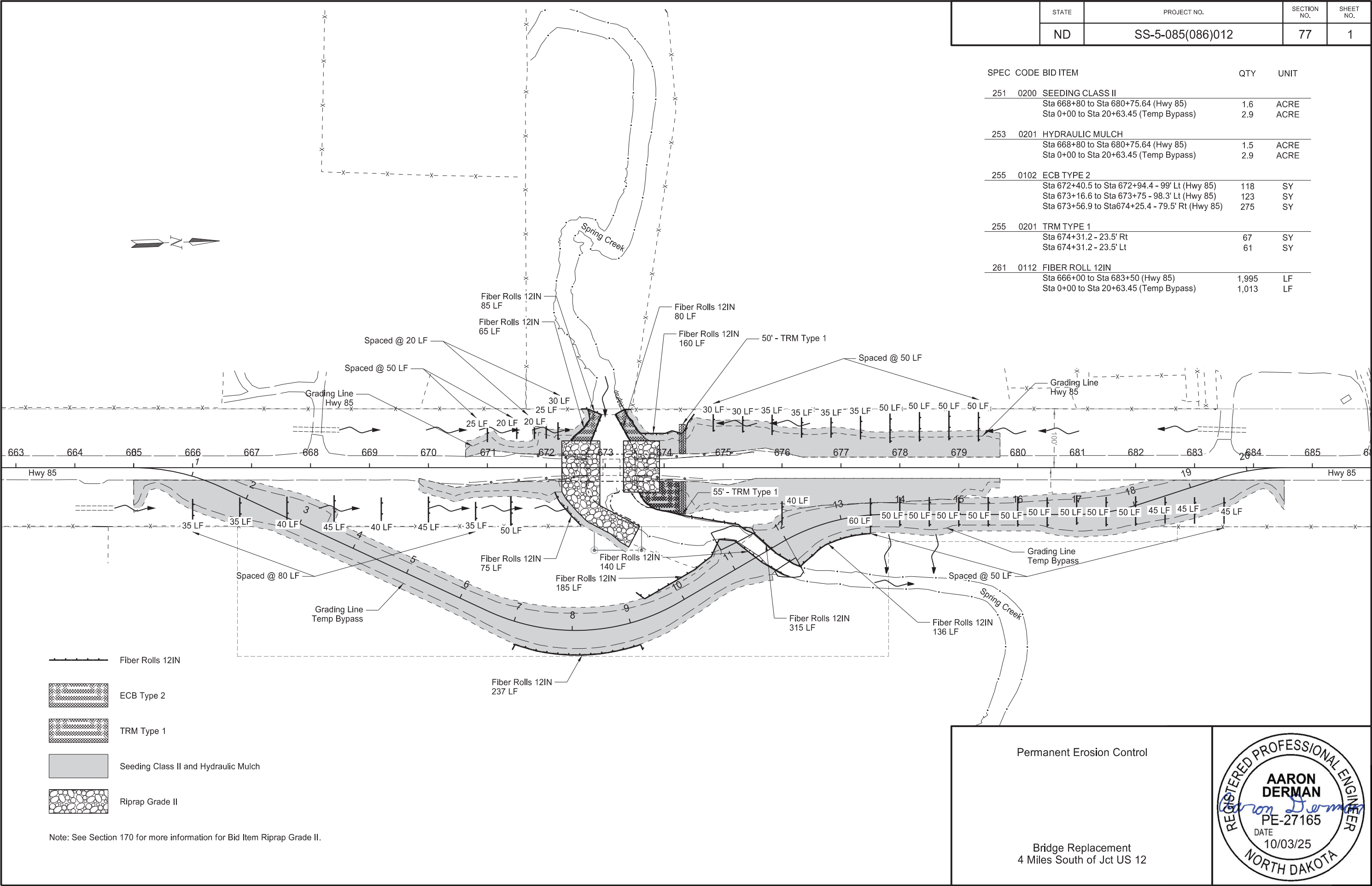
Temporary Erosion Control

Bridge Replacement
4 Miles South of Jct US 12



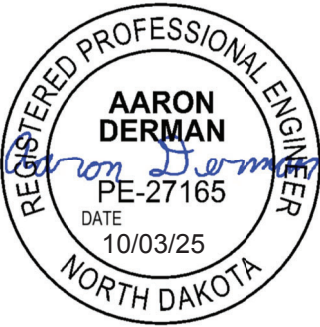
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	77	1

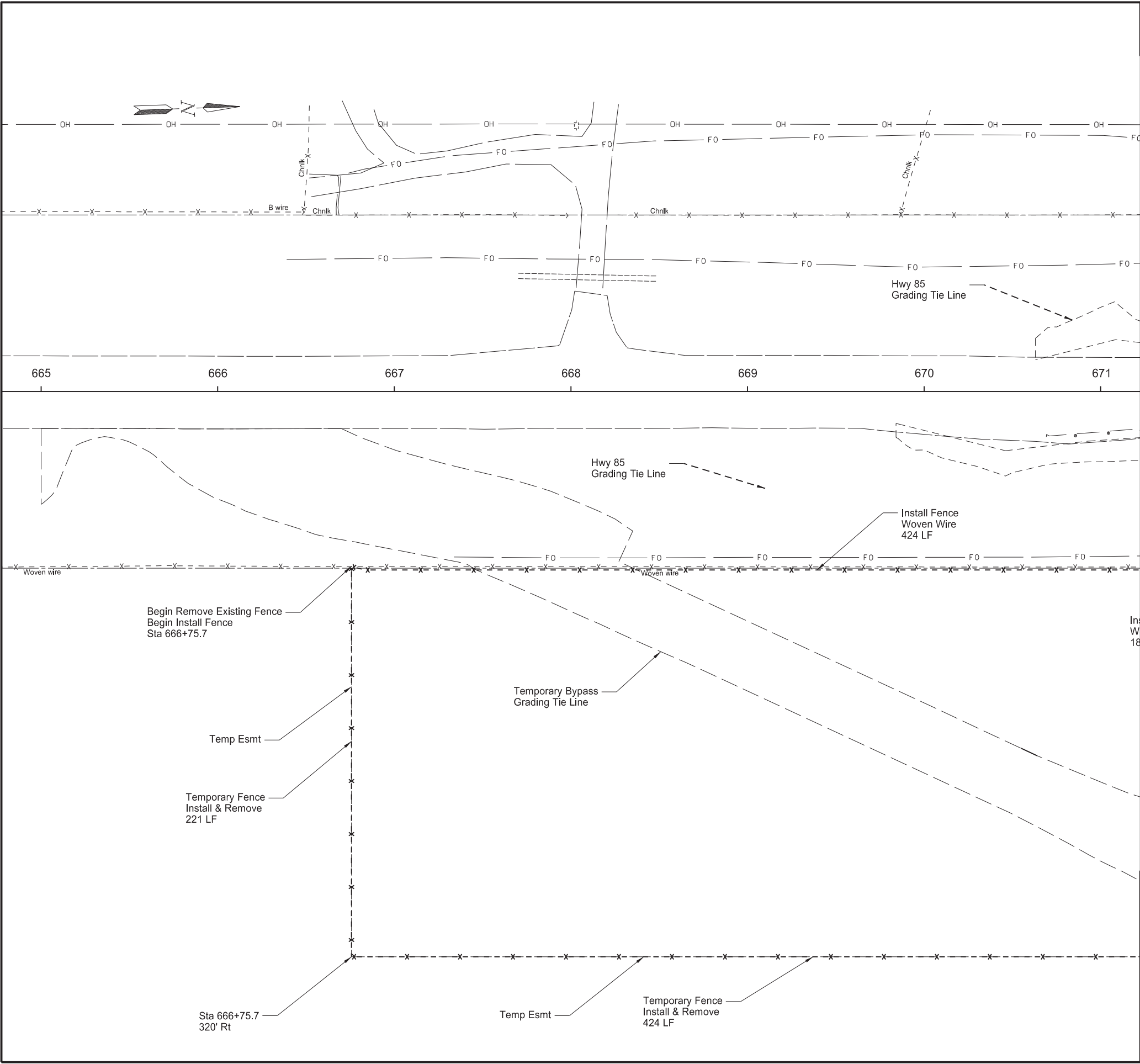
SPEC	CODE	BID ITEM	QTY	UNIT
251	0200	SEEDING CLASS II		
		Sta 668+80 to Sta 680+75.64 (Hwy 85)	1.6	ACRE
		Sta 0+00 to Sta 20+63.45 (Temp Bypass)	2.9	ACRE
253	0201	HYDRAULIC MULCH		
		Sta 668+80 to Sta 680+75.64 (Hwy 85)	1.5	ACRE
		Sta 0+00 to Sta 20+63.45 (Temp Bypass)	2.9	ACRE
255	0102	ECB TYPE 2		
		Sta 672+40.5 to Sta 672+94.4 - 99' Lt (Hwy 85)	118	SY
		Sta 673+16.6 to Sta 673+75 - 98.3' Lt (Hwy 85)	123	SY
		Sta 673+56.9 to Sta 674+25.4 - 79.5' Rt (Hwy 85)	275	SY
255	0201	TRM TYPE 1		
		Sta 674+31.2 - 23.5' Rt	67	SY
		Sta 674+31.2 - 23.5' Lt	61	SY
261	0112	FIBER ROLL 12IN		
		Sta 666+00 to Sta 683+50 (Hwy 85)	1,995	LF
		Sta 0+00 to Sta 20+63.45 (Temp Bypass)	1,013	LF



Permanent Erosion Control

Bridge Replacement
4 Miles South of Jct US 12





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	80	1

SPEC	CODE	BID ITEM	UNIT	QUANTITY
202	0312	REMOVE EXISTING FENCE		
		Sta 666+75.7 - 99' RT to	LF	424
		Sta 671+00 - 99' Rt		
752	0700	FENCE WOVEN WIRE		
		Sta 666+76 - 99' RT to	LF	424
		Sta 671+00 -101' Rt		
752	0905	TEMPORARY FENCE		
		Sta 666+76 - 99' RT to	LF	645
		Sta 671+00 - 320' Rt		

Fencing Layout

Bridge Replacement
4 Miles South of Jct US 12

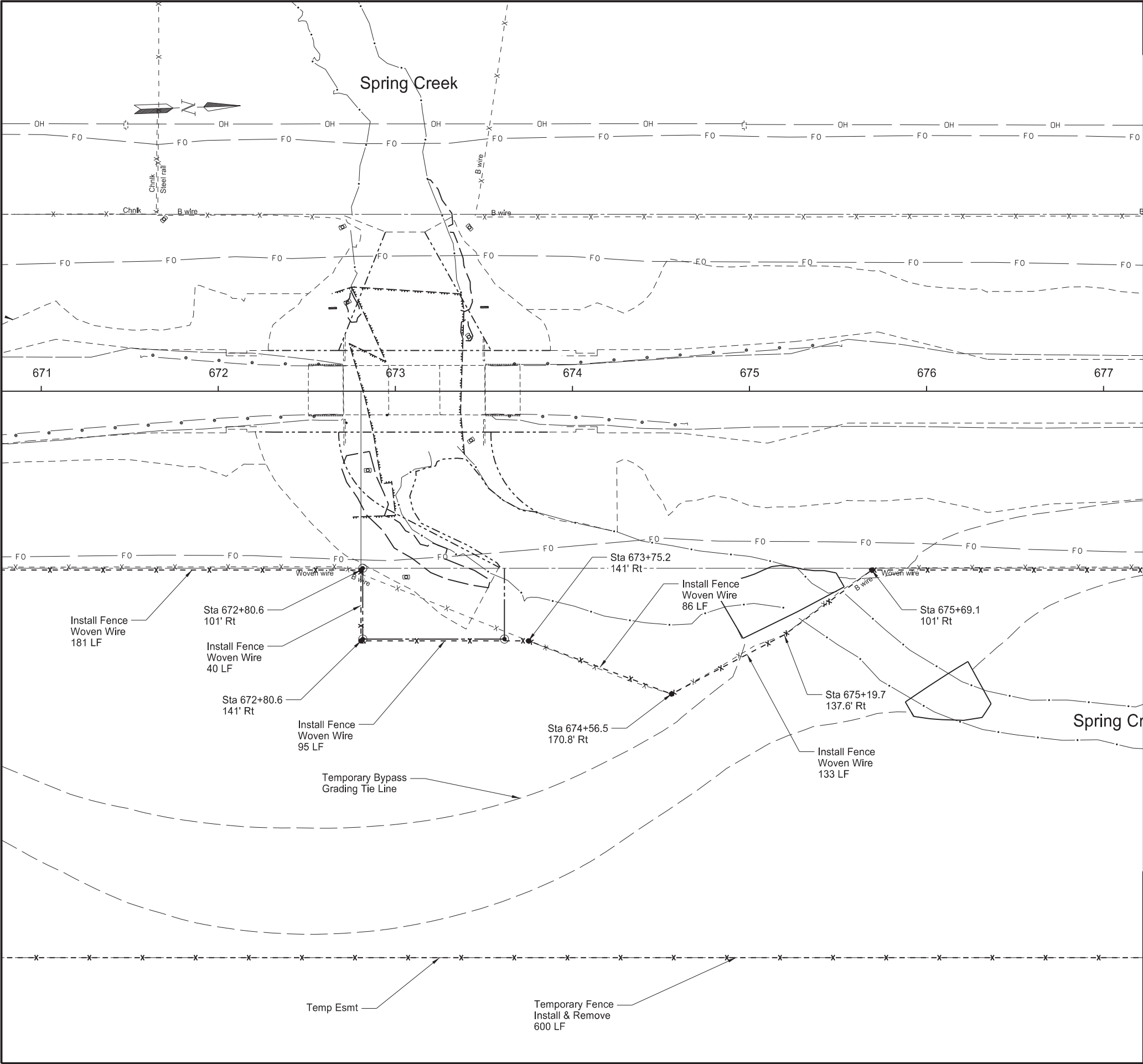
REGISTERED PROFESSIONAL ENGINEER

AARON
DERMAN

PE-27165

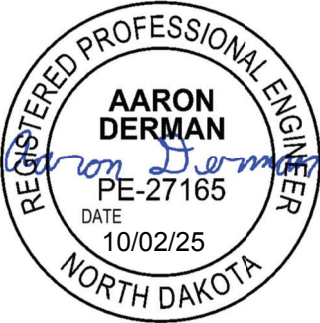
DATE
10/02/25

NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	80	2

SPEC	CODE	BID ITEM	UNIT	QUANTITY
202	0312	REMOVE EXISTING FENCE		
		Sta 671+00 - 99" Rt to	LF	635
		Sta 677+00 - 99' Rt		
752	0700	FENCE WOVEN WIRE		
		Sta 671+00 - 101' Rt to	LF	535
		Sta 677+00 - 101' Rt		
752	0905	TEMPORARY FENCE		
		Sta 671+00 - 320' Rt to	LF	600
		Sta 677+00 - 320' Rt		
752	2995	CORNER ASSEMBLY-WOOD POST		
		Sta 672+80.6 - 101' Rt	EA	1
		Sta 672+80.6 - 141' Rt	EA	1
		Sta 673+75.2 - 141' Rt	EA	1
		Sta 674+56.6 - 170.8' Rt	EA	1
		Sta 675+69.1 - 101' Rt	EA	1

Fencing Layout	
Bridge Replacement	
4 Miles South of Jct US 12	

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	80	3

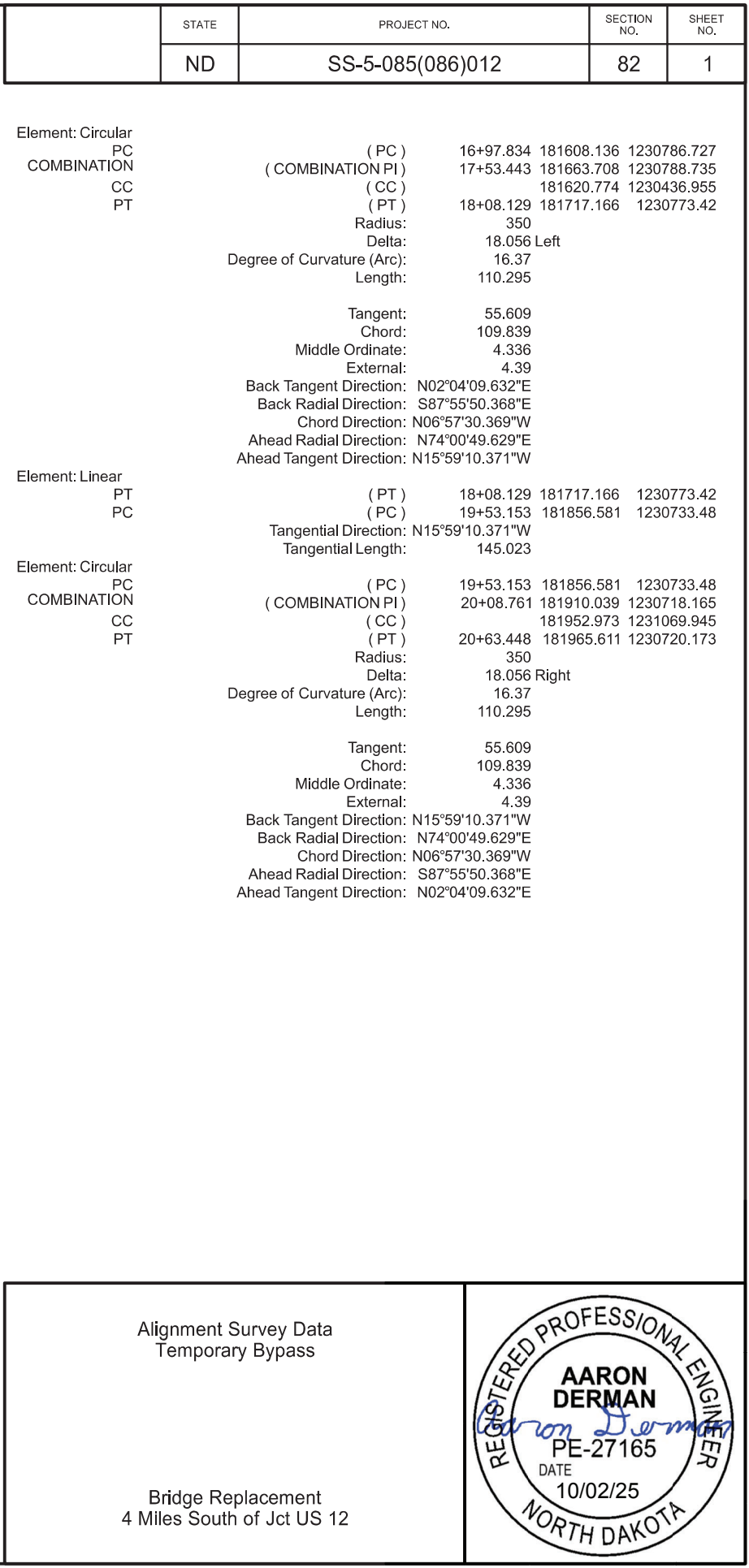
SPEC	CODE	BID ITEM	UNIT	QUANTITY
202	0312	REMOVE EXISTING FENCE		
		Sta 677+00 - 99' RT to	LF	571
		Sta 682+70.7 - 100' RT		
752	0700	FENCE WOVEN WIRE		
		Sta 677+00 - 101' RT to	LF	571
		Sta 682+70.7 - 100' RT		
752	0905	TEMPORARY FENCE		
		Sta 677+00 - 320' RT to	LF	791
		Sta 682+70.7 - 100' RT		

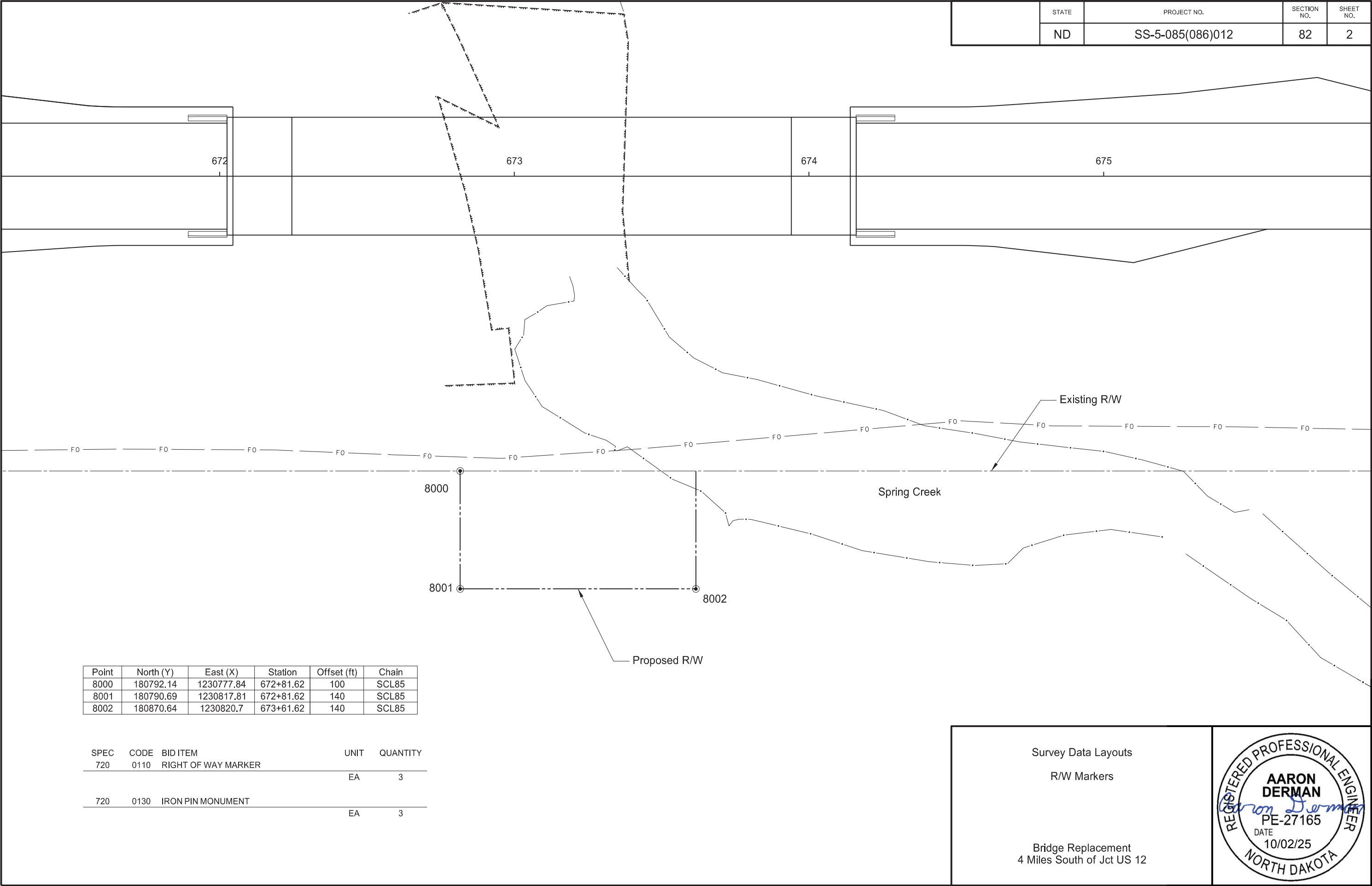
Fencing Layout

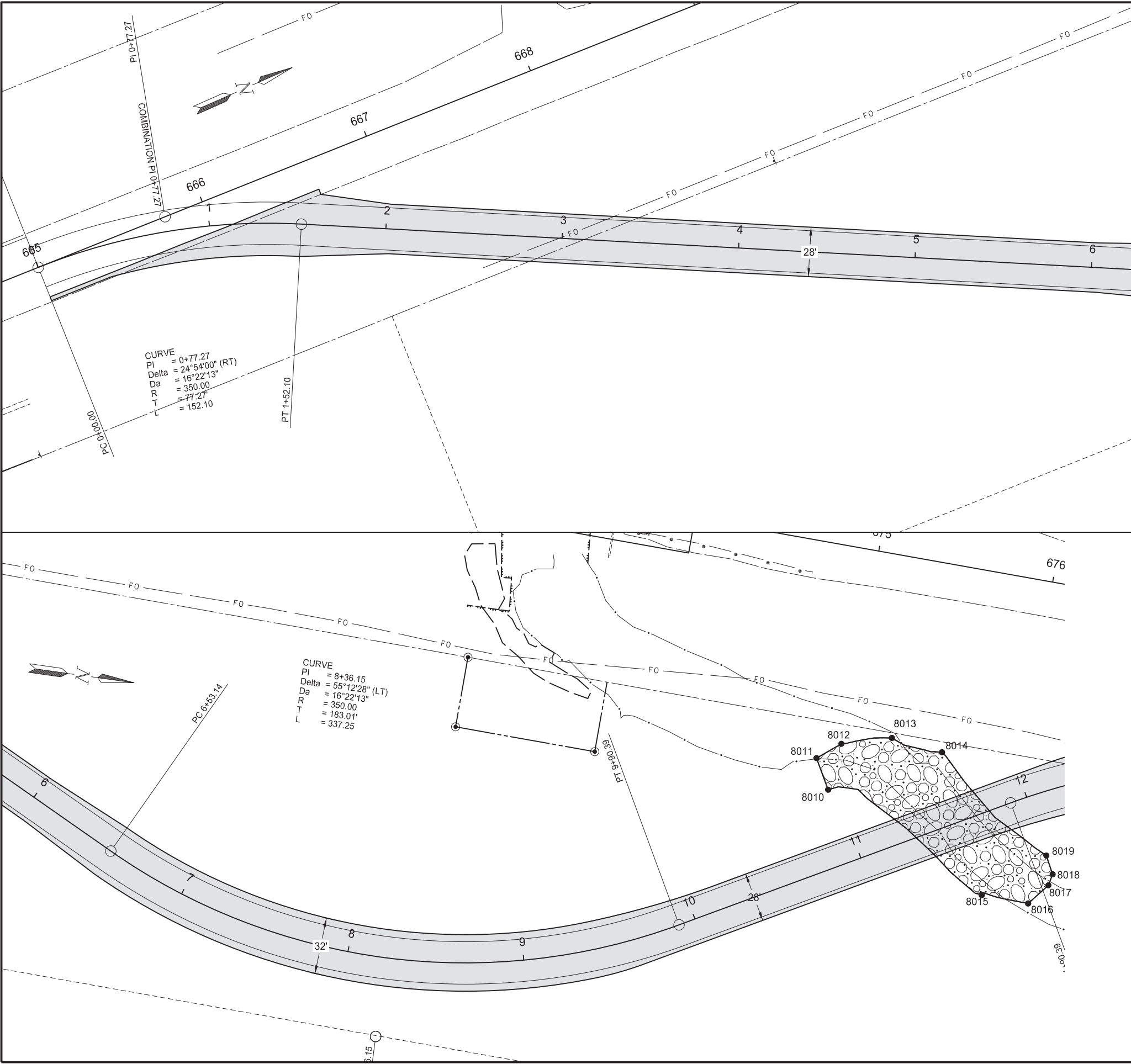
Bridge Replacement

4 Miles South of Jct US 12

[illegible]







		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	SS-5-085(086)012	90	1

SPEC	CODE	BID ITEM	QTY	UNIT
302	0160	AGGREGATE BASE COURSE CL 13		
Sta 0+00 to Sta 12+00 (PR_BYPASS)			1663	TON
302	2000	CLEAN ROCK		
Sta 10+96 - 62' Lt to Sta 12+00 - 46' Rt (PR_BYPASS)			792	TON
709	0161	GEOSYNTHETIC MATERIAL TYPE S1		
Sta 10+96 - 62' Lt to Sta 12+00 - 46' Rt (PR_BYPASS)			435	SY

Point	North (Y)	East (X)	Station	Offset (ft)	Chain
8010	181004.47	1230823.61	10+96	-42.6	PR_BYPASS
8011	180995.44	1230806.79	10+96	-61.7	PR_BYPASS
8012	181008.24	1230796.81	11+12	-64.5	PR_BYPASS
8013	181036.12	1230789.53	11+40	-57.7	PR_BYPASS
8014	181065.31	1230793.56	11+63.8	-40.3	PR_BYPASS
8015	181098.90	1230870.51	11+57	43.4	PR_BYPASS
8016	181125.55	1230871.53	11+80	56.8	PR_BYPASS
8017	181135.49	1230859.74	11+95	51.2	PR_BYPASS
8018	181136.99	1230853.23	12+00	46.0	PR_BYPASS
8019	181131.97	1230843.23	12+00	34.8	PR_BYPASS

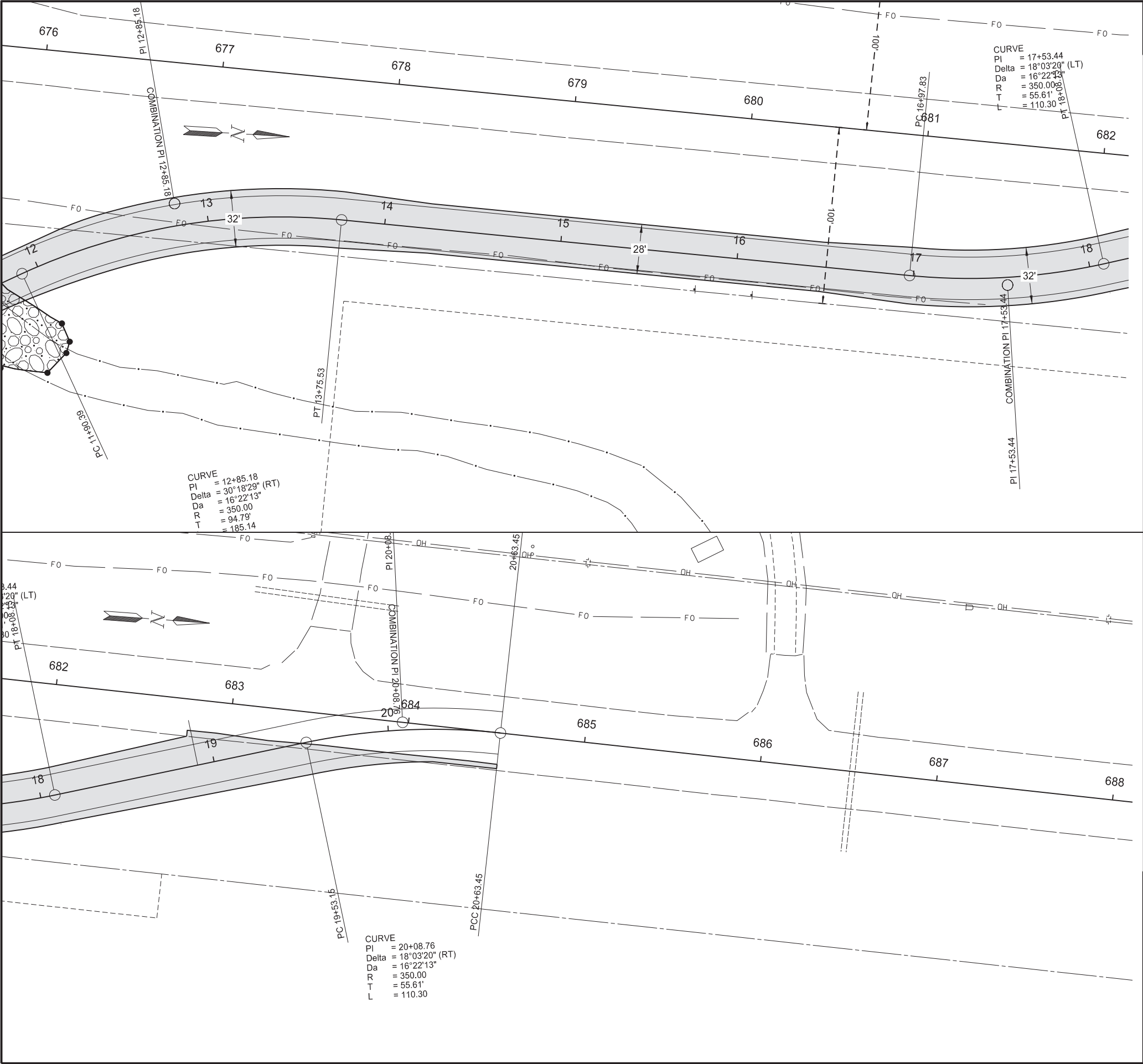
8" Aggregate Base Course Cl 13

Clean Rock and Geosynthetic Material Type S1

Paving Layout
Temporary Bypass

Bridge Replacement
4 Miles South of Jct US 12

REGISTERED PROFESSIONAL ENGINEER
AARON Derman
PE-27165
DATE 10/02/25
NORTH DAKOTA



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	SS-5-085(086)012	90	2
SPEC	CODE	BID ITEM	QTY	UNIT	
302	0160	AGGREGATE BASE COURSE CL 13			
Sta 12+00 to Sta 20+63.45 (PR_BYPASS)			1191	TON	

8" Aggregate Base Course Cl 13

Clean Rock and Geosynthetic Material Type S1

Paving Layout
Temporary Bypass

Bridge Replacement
4 Miles South of Jct US 12

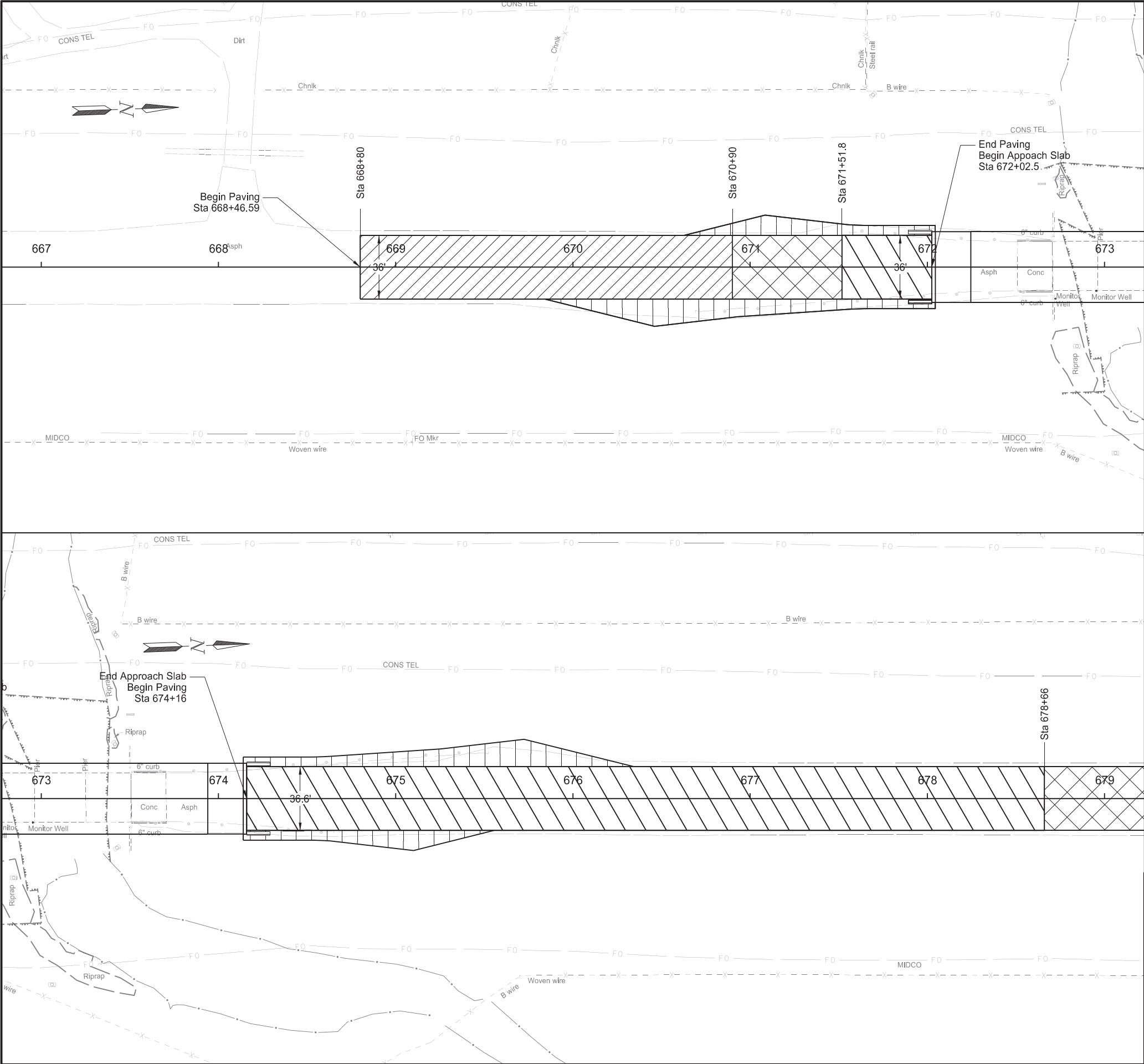
REGISTERED PROFESSIONAL ENGINEER

AARON DERMAN

PE-27165

DATE 10/02/25

NORTH DAKOTA



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	SS-5-085(086)012	90	3

SPEC	CODE	BID ITEM	QTY	UNIT
302	0101	SALVAGED BASE COURSE		
		Sta 671+51.8 to Sta 672+02.5 - ML	25	CY
		Sta 669+85.25 to Sta 672+04.5 - Guardrail R	51	CY
		Sta 670+64.25 to Sta 672+04.5 - Guardrail L	27	CY
		Sta 674+16 to Sta 678+66 - ML	137	CY
302	0120	AGGREGATE BASE COURSE CL 5		
		Sta 674+16 to Sta 678+66 - ML	876	TON
		Sta 674+14 to Sta 675+54.27 - Guardrail R	32	TON
		Sta 674+14 to Sta 676+33.26 - Guardrail L	61	TON
401	0050	TACK COAT		
		Sta 670+90 to Sta 672+02.5 (2nd Lift)	25	GAL
		Sta 668+80 to Sta 672+02.5 (3rd Lift)	73	GAL
		Sta 669+85.25 to Sta 672+04.5 - Guardrail R	10	GAL
		Sta 670+64.25 to Sta 672+04.5 - Guardrail L	5	GAL
		Sta 674+16 to Sta 679+00 (2nd Lift)	109	GAL
		Sta 674+16 to Sta 679+00 (3rd Lift)	115	GAL
		Sta 674+14 to Sta 675+54.27 - Guardrail R	5	GAL
		Sta 674+14 to Sta 676+33.26 - Guardrail L	10	GAL
401	0060	PRIME COAT		
		Sta 671+51.8 to Sta 672+02.5	62	GAL
		Sta 674+16 to Sta 678+66	550	GAL
430	0045	SUPERPAVE FAA 45		
		Sta 668+80 to Sta 672+02.5 - ML	258	TON
		Sta 669+85.25 to Sta 672+04.5 - Guardrail R	26	TON
		Sta 670+64.25 to Sta 672+04.5 - Guardrail L	13	TON
		Sta 674+16 to Sta 679+00 - ML	769	TON
		Sta 674+14 to Sta 675+54.27 - Guardrail R	13	TON
		Sta 674+14 to Sta 676+33.26 - Guardrail L	26	TON
430	5818	PG 58H-34 ASPHALT CEMENT		
		Sta 668+80 to Sta 672+02.5 - ML	15	TON
		Sta 669+85.25 to Sta 672+04.5 - Guardrail R	2	TON
		Sta 670+64.25 to Sta 672+04.5 - Guardrail L	1	TON
		Sta 674+16 to Sta 679+00 - ML	45	TON
		Sta 674+14 to Sta 675+54.27 - Guardrail R	1	TON
		Sta 674+14 to Sta 676+33.26 - Guardrail L	2	TON



2" Superpave FAA 45



2" Superpave FAA 45
6" Aggregate Base Course CL 5



6.5" to 4"
Superpave FAA 45



6.5" Superpave FAA 45
Depth Varies Aggregate Base Course CL 5/Salvaged Base Course

Paving Layout
Hwy 85

Bridge Replacement
4 Miles South of Jct US 12

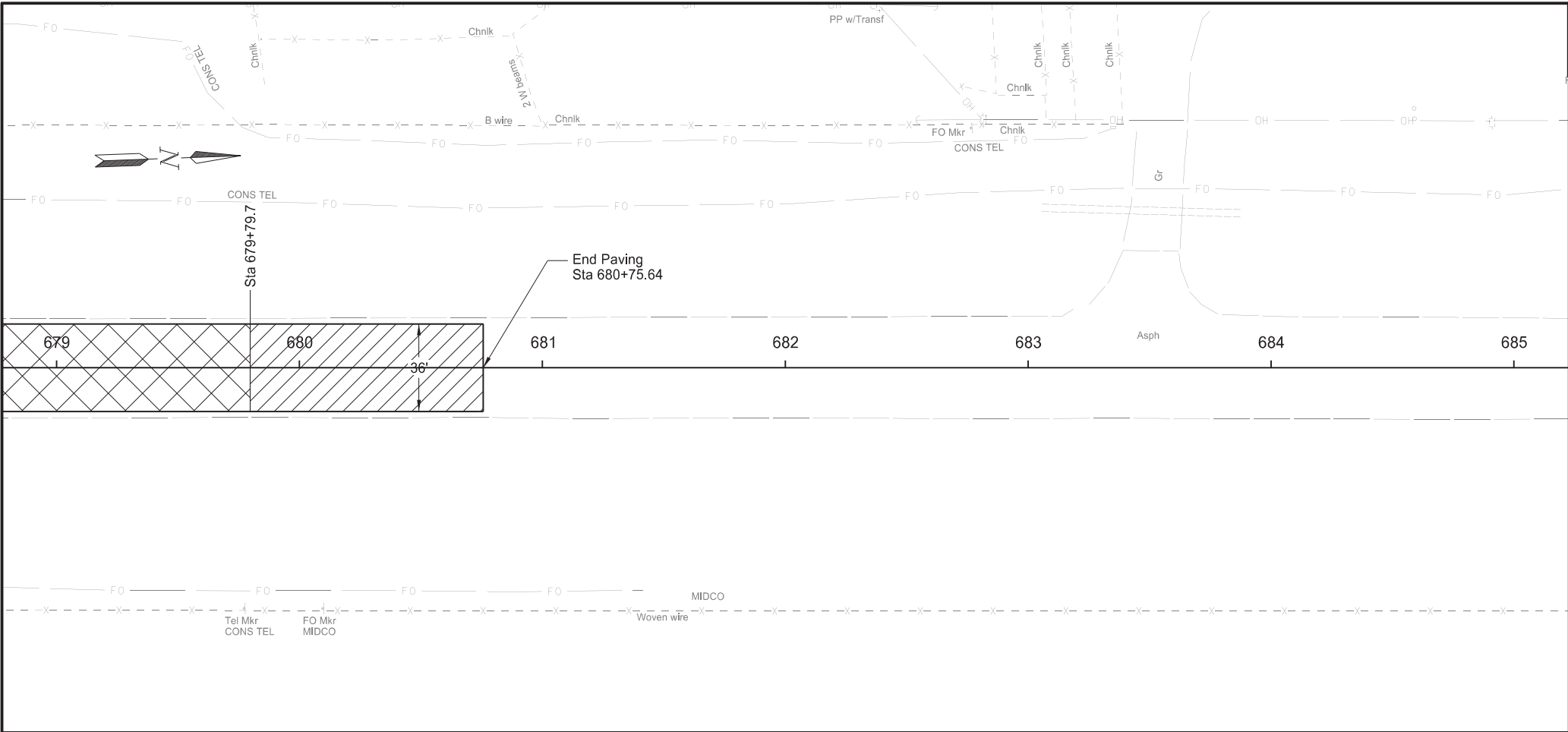
REGISTERED PROFESSIONAL ENGINEER

AARON
DERMAN

PE-27165

DATE
10/02/25

NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	90	4

SPEC	CODE	BID ITEM	QTY	UNIT
401	0050	TACK COAT		
		Sta 679+00 to Sta 679+75.64 (2nd Lift)	18	GAL
		Sta 679+00 to Sta 680+75.64 (3rd Lift)	39	GAL
430	0045	SUPERPAVE FAA 45		
		Sta 679+00 to Sta 680+75.64	141	TON
430	5818	PG 58H-34 ASPHALT CEMENT		
		Sta 679+00 to Sta 680+75.64	8	TON



2" Superpave FAA 45



6.5" to 4"
Superpave FAA 45

Paving Layout
Hwy 85

Bridge Replacement
4 Miles South of Jct US 12

REGISTERED PROFESSIONAL ENGINEER

AARON
DERMAN

PE-27165

DATE
10/02/25

NORTH DAKOTA

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-085(086)012	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED		TOTAL AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
			BY PHASE NO.				
			1	2			
E5-1-48	48"x48"	EXIT GORE				35	
G20-1-60	60"x24"	ROAD WORK NEXT __ MILES	1		1	28	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	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	59	118
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)				11	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)				10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)				10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)				7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)				7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)				7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)				7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)				7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT				15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)				7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)				7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)				9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)				7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)				9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)				7	
R1-1-48	48"x48"	STOP		2	2	32	64
R1-2-60	60"x60"	YIELD		1	1	29	29
R2-1-36	36"x48"	SPEED LIMIT __ (Portable only)	6		6	30	180
R2-1-48	48"x60"	SPEED LIMIT __		6	6	39	234
R2-1aP-24	24"x18"	MINIMUM FEE \$150 (Mounted on Speed Limit post)	3	4	4	10	40
R3-2-48	48"x48"	NO LEFT TURN				35	
R4-1-48	48"x60"	DO NOT PASS				39	
R4-7-48	48"x60"	KEEP RIGHT				39	
R5-1-48	48"x48"	DO NOT ENTER				35	
R6-1-54	54"x18"	ONE WAY RIGHT or LEFT (Mounted on STOP or DO NOT ENTER post)				14	
R7-1-12	12"x18"	NO PARKING ANY TIME				11	
R10-6-24	24"x36"	STOP HERE ON RED				16	
R11-2-48	48"x30"	ROAD CLOSED (Mounted on barricade)		1	1	12	12
R11-2a-48	48"x30"	STREET CLOSED (Mounted on barricade)				12	
R11-3a-60	60"x30"	ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY (Mtd on barricade)	1		1	15	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		8	8	35	280
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT				35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW	2		2	26	52
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	2		2	35	70
W3-5-48	48"x48"	SPEED REDUCTION AHEAD	3	4	4	35	140
W4-2-48	48"x48"	LANE ENDS RIGHT or LEFT				35	
W5-1-48	48"x48"	ROAD NARROWS				35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE				35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW				35	
W6-3-48	48"x48"	TWO WAY TRAFFIC				35	
W8-1-48	48"x48"	BUMP				35	
W8-3-48	48"x48"	PAVEMENT ENDS				35	
W8-7-48	48"x48"	LOOSE GRAVEL				35	
W8-11-48	48"x48"	UNEVEN LANES				35	
W8-12-48	48"x48"	NO CENTER LINE				35	
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL				35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY				35	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or __ FT or __ MILE	2		2	35	70
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or __ FT or __ MILE				35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY				35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL				35	
W13-1P-30	30"x30"	__ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)				14	
W14-3-64	64"x48"	NO PASSING ZONE				28	
W16-2P-30	30"x24"	__ FEET PLAQUE (Mounted on warning sign post)				10	
W20-1-48	48"x48"	ROAD WORK AHEAD or __ FT or __ MILE	3	2	3	35	105
W20-2-48	48"x48"	DETOUR AHEAD or __ FT or __ MILE				35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT or __ MILE				35	
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or __ FT or __ MILE				35	
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or __ FT or __ MILE				35	
W20-7-48	48"x48"	FLAGGER	2		2	35	70
W20-8-18	18"x18"	STOP - SLOW PADDLE Back to Back	2		2	5	10
W20-52P-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)				12	
W21-1-48	48"x48"	WORKERS				35	
W21-2-48	48"x48"	FRESH OIL				35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT or __ MILE				35	
W21-5-48	48"x48"	SHOULDER WORK	1		1	35	35
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED				35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT or __ MILE				35	

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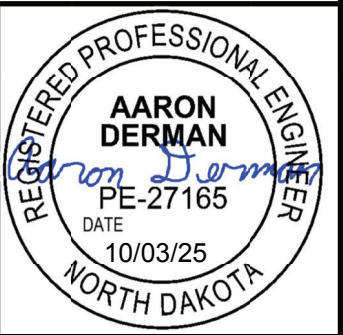
SPECIAL SIGNS

SPEC & CODE

704-1000	TRAFFIC CONTROL SIGNS	TOTAL UNITS	1674
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SPEC & CODE	DESCRIPTION	UNIT	QUANTITY			TOTAL QUANTITY
			BY PHASE NO.			
			1	2		
704-0100	FLAGGING	MHR	300			300
704-1048	PORTABLE RUMBLE STRIPS	EACH	2			2
704-1050	TYPE I BARRICADES	EACH				
704-1052	TYPE III BARRICADES	EACH		8		8
704-1060	DELINEATOR DRUMS	EACH	20	31		31
704-1065	TRAFFIC CONES	EACH				
704-1067	TUBULAR MARKERS	EACH	12			12
704-1070	DELINEATOR	EACH				
704-1072	FLEXIBLE DELINEATORS	EACH				
704-1080	STACKABLE VERTICAL PANELS	EACH				
704-1081	VERTICAL PANELS - BACK TO BACK	EACH		73		73
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH				
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH				
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH				
704-1500	OBLITERATION OF PVMT MK	SF		380		380
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		452		452
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF				

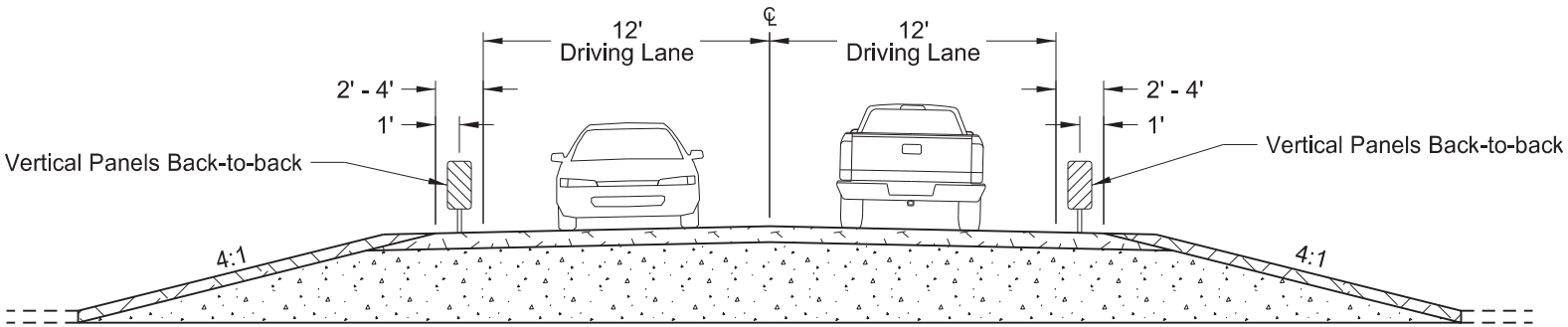
NOTE:
If additional signs are required, units will be calculated using the formula from Section III-18.06 of the Design Manual.
<http://www.dot.nd.gov/>



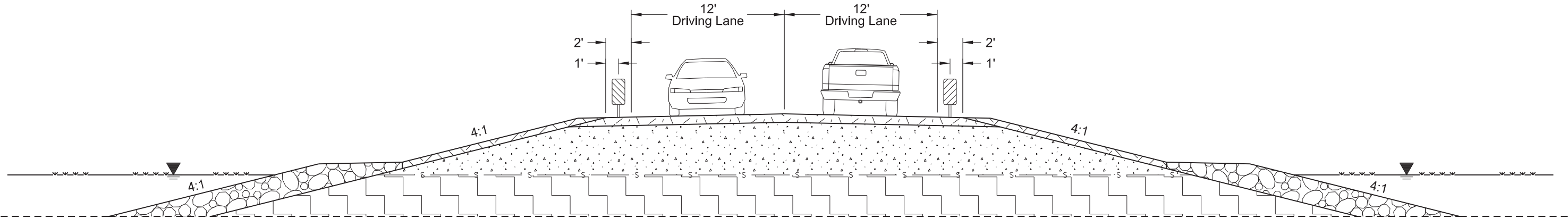
Traffic Control Devices List

Bridge Replacement
4 Miles South of Jct US 12

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	100	2



Proposed Typical Section #1 - Temporary Bypass
Sta 0+00 to Sta 10+96
Sta 12+00 to Sta 20+63.45



Proposed Typical Section #2 - Temporary Bypass
Sta 10+96 to Sta 12+00

Traffic Control Typical Sections

Bridge Replacement
4 Miles South of Jct US 12

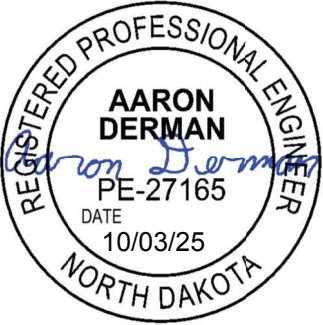
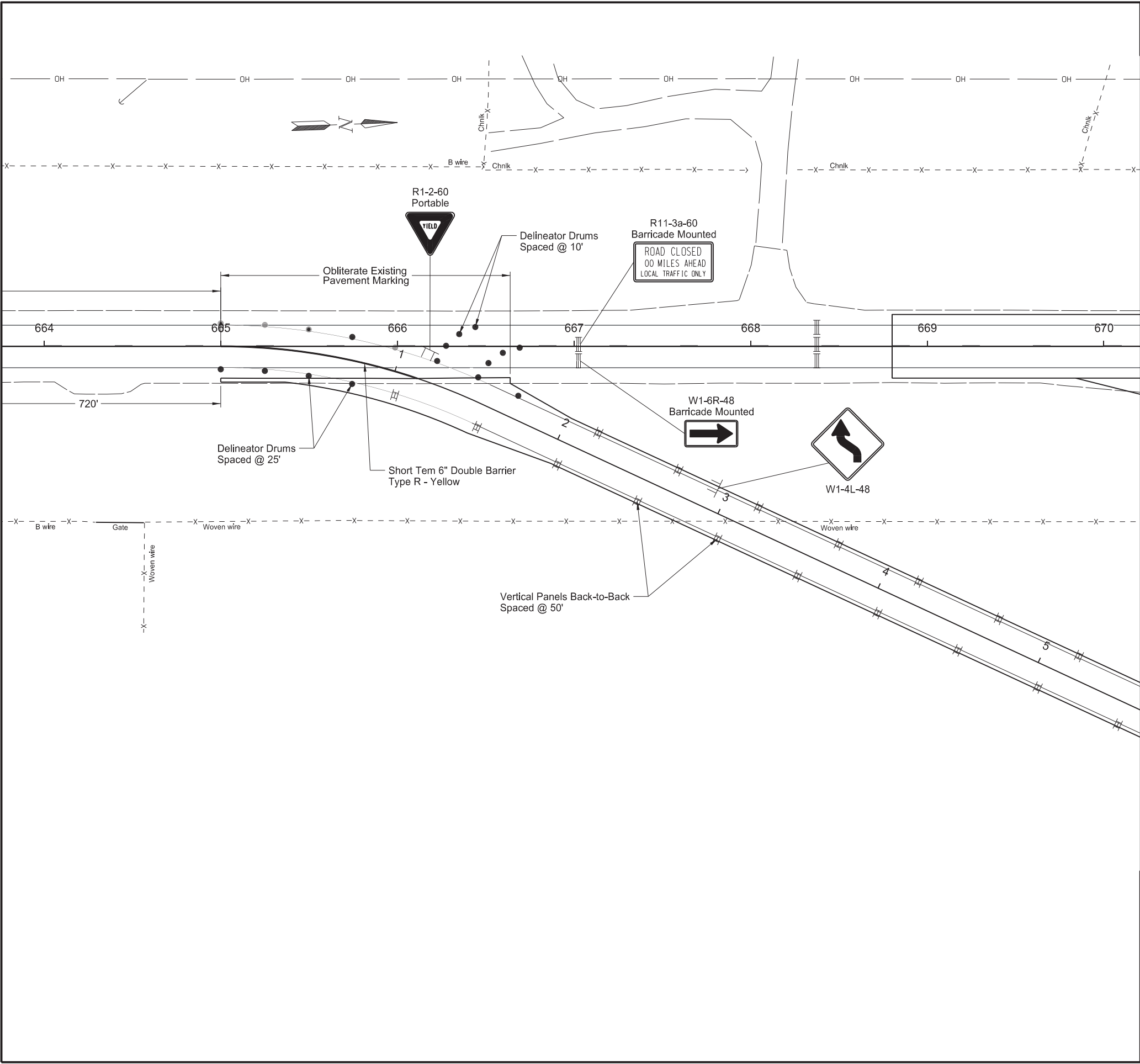


Diagram illustrating the layout of a road with various signs and dimensions:

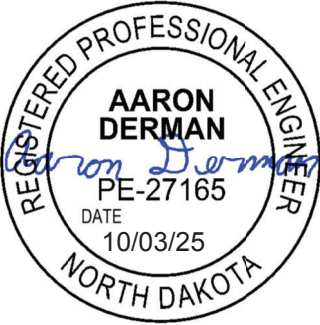
- Top line: 360' intervals between sign locations.
- Bottom line: 360' intervals between sign locations.
- Signs and their dimensions:
 - W20-1-48 (ROAD WORK AHEAD)
 - G20-55-96 (SPEED LIMIT ENFORCED, MINIMUM FEE \$150 WHEN WORKERS PRESENT)
 - W3-5-48 (SPEED LIMIT 45)
 - R2-1-48 (SPEED LIMIT 45, MINIMUM FEE \$150)
 - W3-5-48 (SPEED LIMIT 25)
 - R2-1aP-24 (SPEED LIMIT 25, MINIMUM FEE \$150)
 - W1-4R-48 (RIGHT TURN AHEAD)
- Dimensions: 360' intervals between signs, and 720' for the final segment.
- Labels: B wire, Woven wire, Gate.

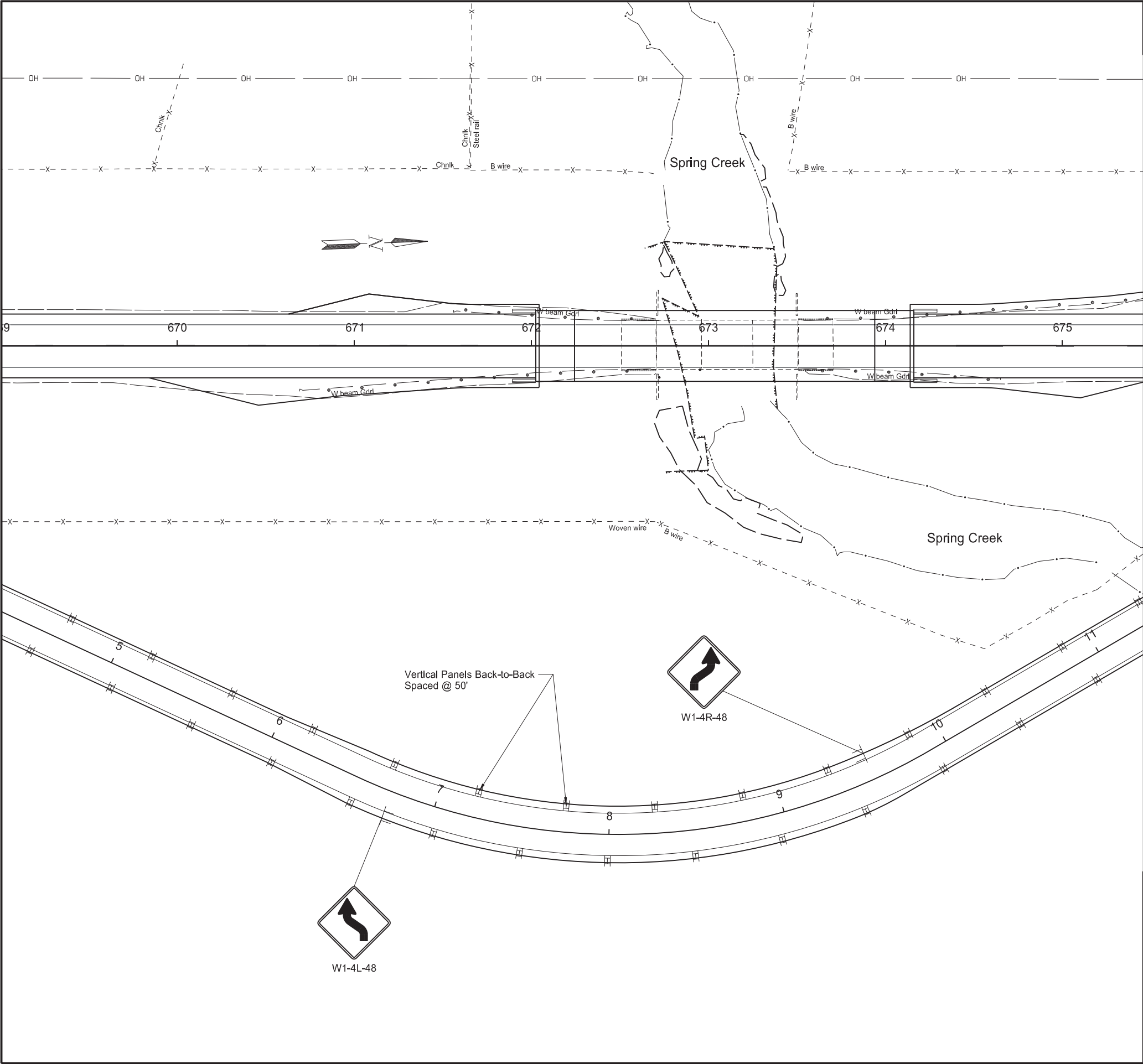


STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-085(086)012	100	4

Work Zone Traffic Control
Temporary Bypass

Bridge Replacement
4 Miles South of Jct US 12

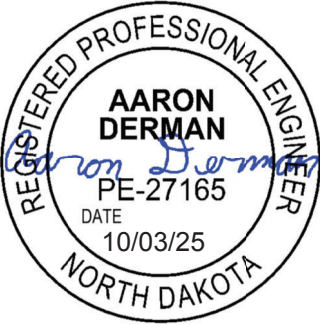


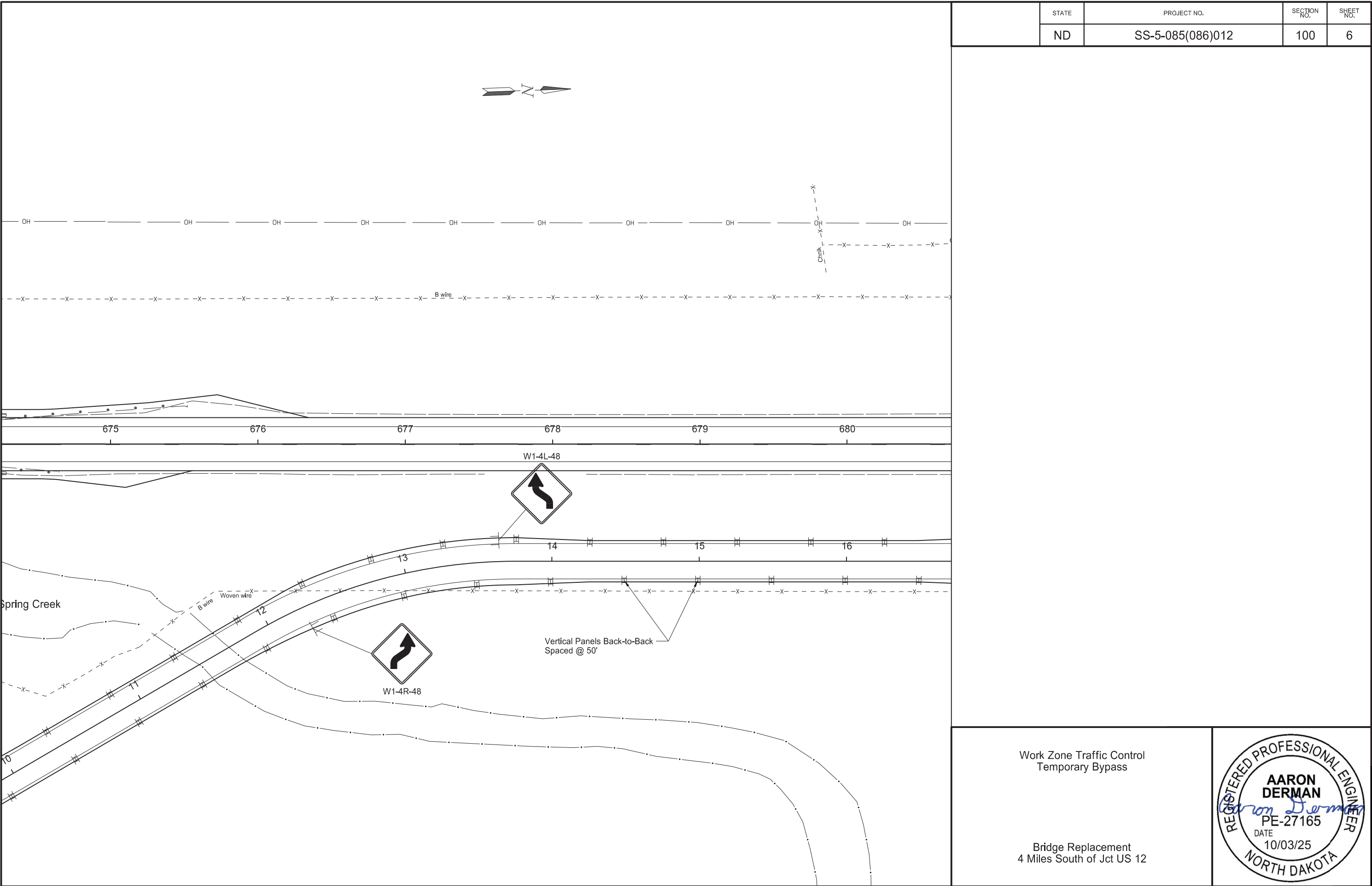


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	100	5

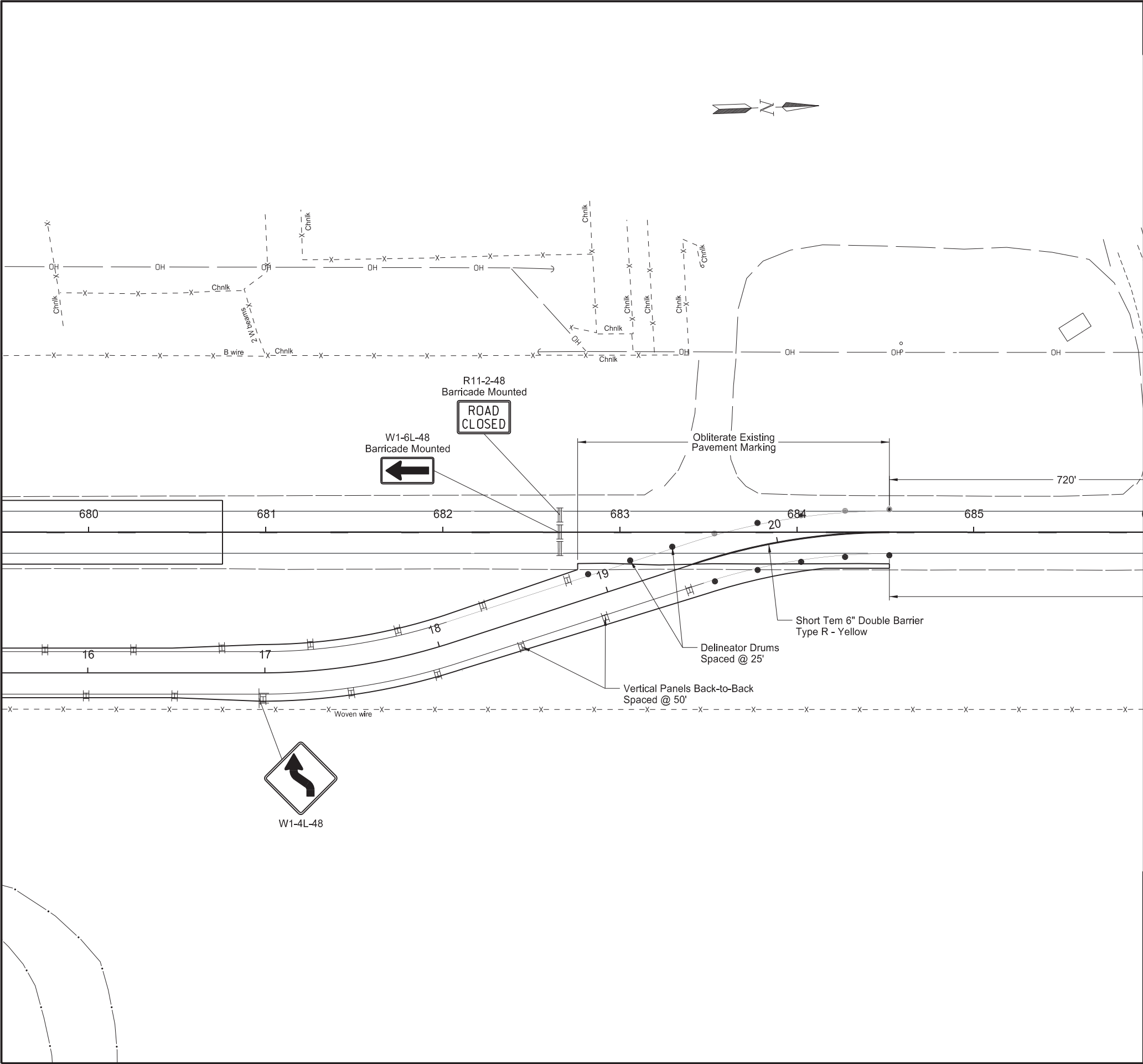
Work Zone Traffic Control
Temporary Bypass

Bridge Replacement
4 Miles South of Jct US 12





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-085(086)012	100	6



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-085(086)012	100	7

Work Zone Traffic Control
Temporary Bypass

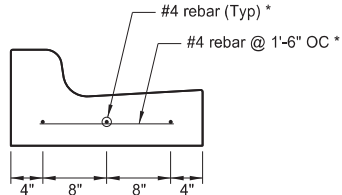
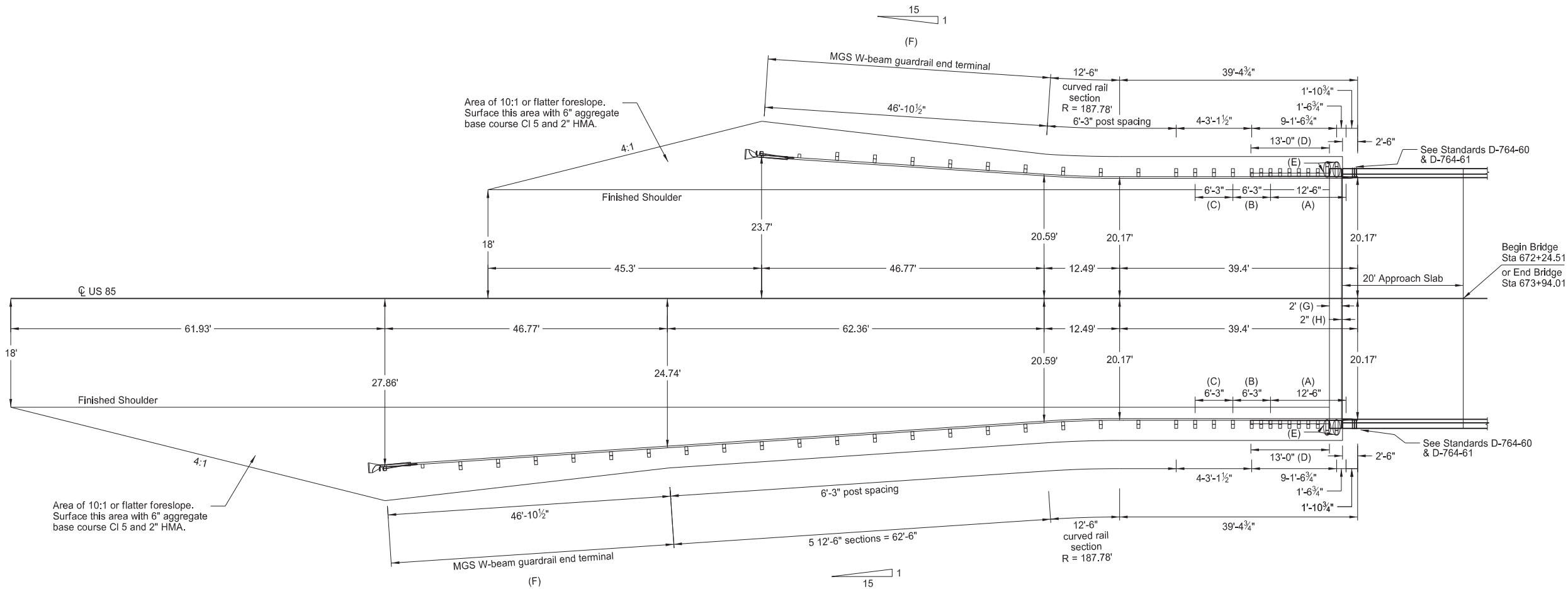
Bridge Replacement
4 Miles South of Jct US 12

REGISTERED PROFESSIONAL ENGINEER
AARON DERMAN
PE-27165
DATE 10/03/25
NORTH DAKOTA

Sign Layout	
4 South of JCT US 12	
US Hwy 85	

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

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	130	1



Curb & Gutter Detail

* Install #4 rebar in the curb and gutter section as shown. Use a length of rebar that will provide 3" clear distance to the concrete at each end. Include the cost to furnish and install rebar in the unit cost for "Curb & Gutter - Type 1 Special".

- (A) Thrie beam rail section (double thickness)
- (B) Thrie beam rail section
- (C) Asymmetrical W-Thrie beam transition section
- (D) Curb & gutter - type 1 special. Install in accordance with Standard Drawing D-748-1, except for a 3' long curb height transition from 6" to 0" on the end farthest from the approach slab, as shown on Standard Drawing D-764-60.
- (E) Install a 6" x 19" x 20" block with a 30" long guardrail bolt.
- (F) Install an MGS FLEAT end terminal at this location. See Standard D-764-38.
- (G) 2' concrete sleeper slab header. See Section 170 and Standard Drawing D-764-60 for curb transition.
- (H) 2" expansion joint. See Section 170.

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

Spring Creek Bridge
RP 12.747

US 85



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

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	130	2

MGS W-BEAM GUARDRAIL SUMMARY OF QUANTITIES															
THRIE/MGS W-BEAM GUARDRAIL AT BRIDGE ENDS															
LOCATION	(A) 5/8" Ø x 18" LONG GUARD- RAIL BOLT	(A) 6" x 8" x 6'-0" TIMBER POST	(A) 6" x 8" x 14" TIMBER BLOCK	(A) 5/8" Ø x 1 1/4" LONG GUARD- RAIL BOLT	(A) 12'- 6" STRAIGHT W-BEAM RAIL SECTION	(A) 12'- 6" CURVED W-BEAM RAIL SECTION	(A) REFL- ECTOR- IZED PLATES	(A) 6" x 8" x 7' WOOD POST	(A) 6" x 8" x 19" WOOD OFF- SET BLOCK	(A) 6'-3" W-THRIE BEAM TRANS- ITION SECTION	(A) 6'-3" THRIE BEAM SECTION	(A) 12'-6" DOUBLE THRIE BEAM SECTION	(A) 2'-6" THRIE BEAM TERM- INAL CON- NECTOR	(A) 7/8" Ø x 18" LONG HEX HEAD BOLT	(A) SINGLE SLOPE TO THRIE BEAM CONN- ECTOR PLATE
	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH	EACH
Sta 670+92.76 to 672+07.01 Rt	36	21	15	100	6	1	8	6	10	1	1	1	1	5	1
Sta 671+55.12 to 672+07.01 Lt	26	11	5	60	1	1	6	6	10	1	1	1	1	5	1
Sta 674+11.51 to 674+63.40 Rt	26	11	5	60	1	1	6	6	10	1	1	1	1	5	1
Sta 674+11.51 to 675+25.76 Lt	36	21	15	100	6	1	8	6	10	1	1	1	1	5	1
TOTAL	124	64	40	320	14	4	28	24	40	4	4	4	4	20	4

- (A) Include these items in the contract unit price bid for "W-Beam Guardrail".
- (B) Install a total of 8 (2 at each corner) 6" x 19" x 20" blocks with 30" long guardrail bolts.

SPEC	CODE	BID ITEM	QTY	UNIT	SPEC	CODE	BID ITEM	QTY	UNIT
748	0141	CURB & GUTTER - TYPE 1 SPECIAL			764	0151	REMOVE W-BEAM GUARDRAIL & POSTS		
		Sta 671+89.34 to 672+02.34 Rt	13	LF			Sta 671+21.90 to 672+73.54 Rt	151.9	LF
		Sta 671+89.34 to 672+02.34 Lt	13	LF			Sta 672+09.18 to 672+73.54 Lt	64.4	LF
		Sta 674+16.18 to 674+29.18 Rt	13	LF			Sta 673+49.20 to 674+13.56 Rt	64.4	LF
		Sta 674+16.18 to 674+29.18 Lt	13	LF			Sta 673+49.20 to 675+00.84 Lt	151.9	LF
		Total	52	LF			Total	432.6	LF
764	0131	W-BEAM GUARDRAIL			764	2081	REMOVE END TREATMENT & TRANSITION		
		Sta 670+92.76 to 672+07.01 Rt	114.4	LF (B)			Sta 670+72.03 to 671+21.90 Rt	1	Ea
		Sta 671+55.12 to 672+07.01 Lt	51.9	LF (B)			Sta 671+59.31 to 672+09.18 Lt	1	Ea
		Sta 674+11.51 to 674+63.40 Rt	51.9	LF (B)			Sta 674+13.56 to 674+63.43 Rt	1	Ea
		Sta 674+11.51 to 675+25.76 Lt	114.4	LF (B)			Sta 675+00.84 to 675+50.71 Lt	1	Ea
		Total	332.6	LF			Total	4	Ea
764	0145	W-BEAM GUARDRAIL END TERMINAL							
		Sta 670+45.99 to 670+92.76 Rt	1	Ea					
		Sta 671+08.35 to 671+55.12 Lt	1	Ea					
		Sta 674+63.40 to 675+10.17 Rt	1	Ea					
		Sta 675+25.76 to 675+72.53 Lt	1	Ea					
		Total	4	Ea					



Thrie/MGS W-Beam Guardrail Quantities

Spring Creek Bridge

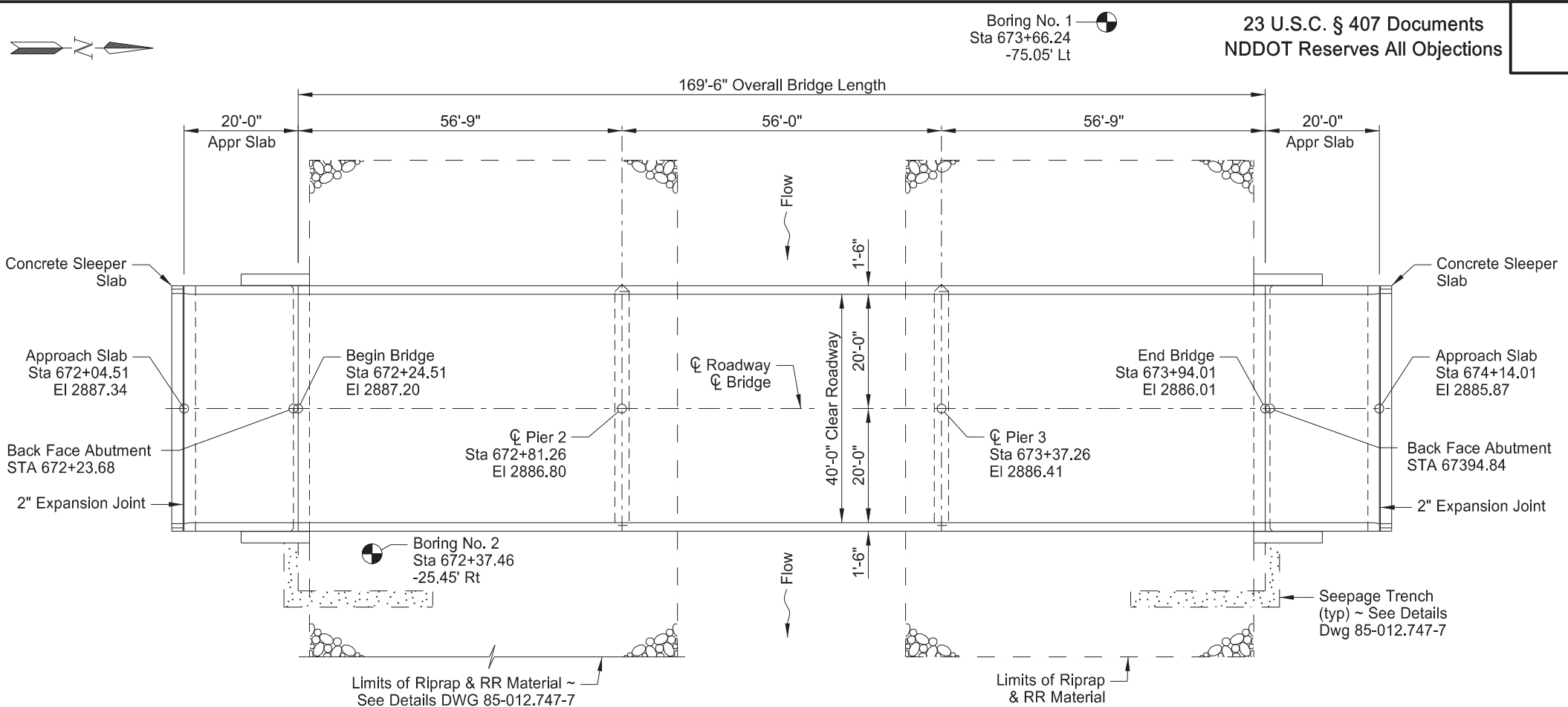
RP 12.747

US 85

Boring No. 1
Sta 673+66.24
-75.05' Lt

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-085(086)012	170	1



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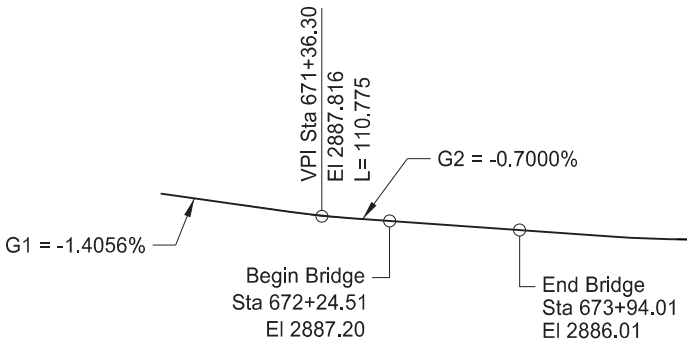
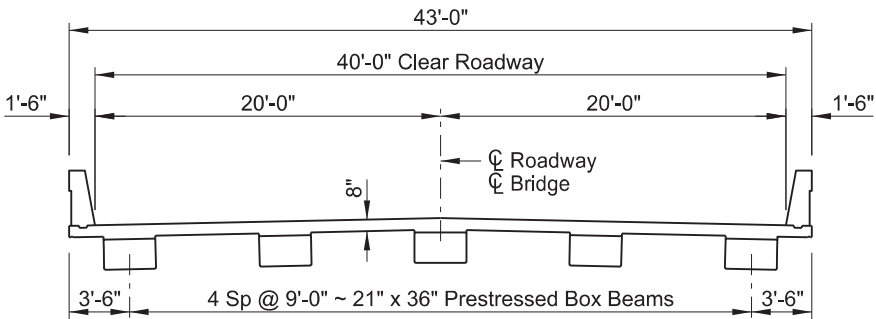
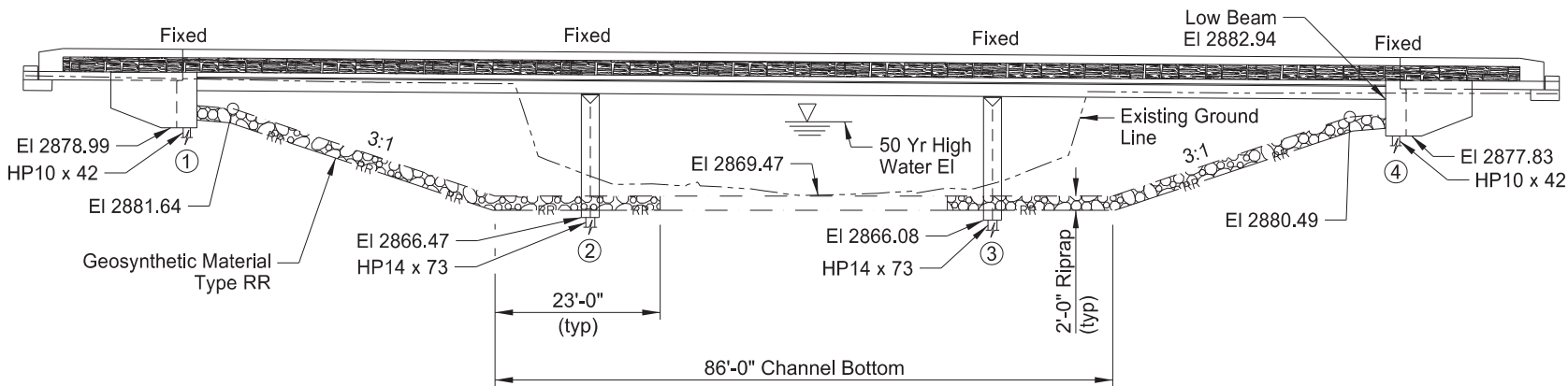
Drainage Area	52.9	sq mi
Design Frequency	50	yr
Design Discharge	2,366.3	cfs
Design Stage (upstream)	2,879.79	ft
Stream Gradient	0.000902	ft/ft
Waterway Provided Below Design Stage	1,149.56	sq ft
Waterway Provided Below Clearance Elevation	1,734.68	sq ft
Average Velocity of Flow in Natural Channel	3.11	fps
Depth of Flow	10.28	ft
Velocity of Flow Under Bridge	2.06	fps
100-Year Frequency Discharge	2,923.3	cfs
100-Year Frequency Stage	2,880.37	ft
Overtopping Stage	2,886.01	ft
Overtopping Discharge	11,750	cfs

DESIGN STRENGTHS:

f'c = 4,000 psi ~ Bridge Substructure Concrete
f'c = 4,000 psi ~ Bridge Deck Concrete
f'c = 4,000 psi ~ Bridge Barrier Concrete
f'c = 7,000 psi ~ Prestressed Beam Concrete
fy = 60,000 psi ~ Reinforcing Steel

Load & Resistance Factor Design

SURVEY CONTROL POINTS			
POINT	NORTHING	EASTING	ELEVATION
RTK 51772	180,817.250	1,230,787.235	2879.801
RTK 51773	180,863.897	1,230,606.643	2875.867



SPECIAL PROVISIONS	
SSP 2	MIGRATORY BIRD TREATY ACT
49(25)	PILE DYNAMIC ANALYZER (PDA)
SP 56(25)	ARCHITECTURAL FORM LINER
STANDARD DRAWINGS	
D-622-1, D-714-18, D-754-83, D-900-1	
F.W.S. 15 PSF	
HL-93 DESIGN LOADING	
SPRING CREEK 4 SOUTH OF JCT US 12	
BRIDGE LAYOUT	
ND DEPARTMENT OF TRANSPORTATION BRIDGE DIVISION	
Jason Thorenson 11/18/25	
DRAWING NO.	85-012.747-1

NOTES		23 U.S.C. § 407 Documents NDDOT Reserves All Objections		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
				ND	SS-5-085(086)012	170	2

100

SCOPE OF WORK: This project consists of building a new 3-span prestressed concrete box beam bridge with an overall bridge length of 169'-6" and a clear roadway width of 40'-0".

100

GENERAL: Include the cost of furnishing and placing preformed expansion joint filler, concrete inserts, rebar couplers, silicone sealant, waterproof membrane, and other miscellaneous items in the price bid for the appropriate concrete bid items.

202

REMOVAL OF STRUCTURE: The existing structure is a 3-span reinforced concrete slab bridge, 80'-0" long with a clear roadway width of 28'-0". The substructure consists of reinforced concrete abutments and piers, supported on timber piling. The structure has abandoned stream crest gauges attached to the south abutment and south pier.

Remove the abutment concrete in its entirety. Remove the pier concrete to 1 foot below the bottom of rip rap elevation. Remove all timber piling at the abutments to 1'-0" below the bottom of the rip rap elevation. Explosives are not permitted.

Install a below-deck containment system over the river to capture any falling deconstruction materials, debris, or slurry. Construct the system to capture debris or slurry and allow removal without releasing debris or slurry into the river.

Remove all deconstruction materials or debris and capture all slurry generated in removal.

Remove any deconstruction materials, debris, or material within 14 days that accidentally falls or escapes containment during construction or demolition.

Large structural elements may be dropped and removed if the elements are large enough to be visible and remain intact after dropping. Remove these elements within 48 hours of dropping and dispose or stockpile in an upland area.

Include all costs for the removals, including the abandoned stream gauges, and the containment system in the contract unit price for "Removal of Structure."

210

EXCAVATION: Include the excavation cost at the abutments, as shown in the "Detail at Abutment", in the lump sum bid item, "Class 1 Excavation." Include the excavation costs at the piers, as shown, in the lump sum bid item, "Class 2 Excavation."

210

CHANNEL EXCAVATION: Include all excavation required to shape the channel in the lump sum bid item "Channel Excavation." The extents of the channel excavation are detailed in Section 70 and the estimated quantities are provided in the Section 11 Earthwork Tables. Suitable material from channel excavation can be used in place of borrow for embankment construction, if approved by the Engineer. If the Contractor elects to use channel excavation material as embankment, include the costs for placing the embankment, in accordance with 203.04 G.1 & G.3, in the price bid for channel excavation. Excess material not used as embankment becomes property of the Contractor.

602

BRIDGE CONCRETE: Design a mix the meets Section 802 and will attain a minimum compressive strength of 4,000 psi at 28-days.

The Engineer will verify the mix design using materials that are to be used on the project. Supply samples of materials as specified in the table below. Provide additional materials upon request.

Material	Sample Size
Cement	100 lbs
SCM	35 lbs
Aggregate	1000 lbs
Admixtures	½ pint each

Deliver the samples and the mix design, including the test results, to the Materials and Research Division a minimum of 14 calendar days before placing concrete. Attach a tag to all samples identifying the Department's project number and the type of material. On the day the material is delivered, provide the Engineer with a copy of the mix design and test results, and notify the Engineer the samples have been delivered.

602

FALSEWORK: Brace the exterior beams to prevent rotation during deck placement. Design the strength of the bracing to resist the forces induced by the weight of the concrete, forms, equipment, and workers. Submit a bracing plan and design, stamped by a Professional Engineer, to the Engineer for review.

602

DIAPHRAGMS AND ENDWALLS: Place the pier diaphragm and endwall concrete at the same time as the deck concrete.

602

DECK PLACEMENT: Place the deck concrete at a minimum rate of 35 CY per hour.

602

FORM LINERS: Include the cost to provide and install the form liners in the price bid for the appropriate concrete bid items.

602

BARRIERS: Do not construct V-grooves through form liner areas.

602

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

602

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

REGISTERED PROFESSIONAL ENGINEER
DUSTIN WING
PE-7128
DATE 11/18/25
NORTH DAKOTA

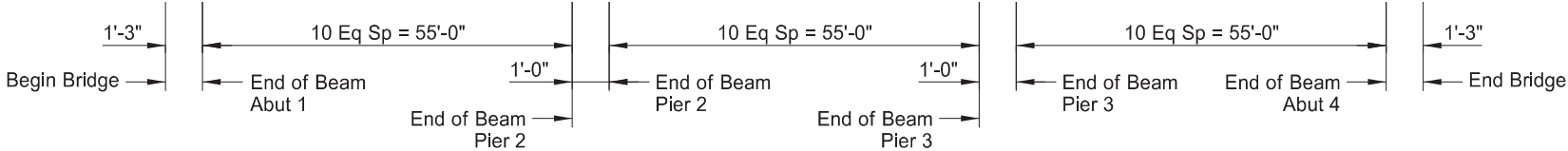
NOTES		23 U.S.C. § 407 Documents NDDOT Reserves All Objections	STATE ND	PROJECT NO. SS-5-085(086)012	SECTION NO. 170	SHEET NO. 3
602	CRACK SEALING: After the penetrating water repellent has been applied and is dry, the Engineer will perform a visual inspection of the bridge deck and approach slabs to determine the need for crack sealing. Mark and repair all visible cracks on the top surface measuring 0.012" or greater in width at the widest segment or as directed by the Engineer. Immediately before applying the sealer, clean the cracks by removing all dust and debris with compressed air. Seal the cracks with a two-part epoxy in accordance with the manufacturer's recommendations. Chase crack with the sealant application to the limits of the crack, including those portions that are narrower than 0.012" wide. Use Paulco TE-2501 (Viking Paints, Inc.), Dural 50 LM (Euclid Chemical Co.), TK-9000 or TK-2110 (TK Products), or an approved equal epoxy sealer. Include all material, labor, and equipment required to crack seal the bridge deck and approach slabs in the price bid for Bridge Deck Concrete.	622	PILING: Drive piling using a diesel hammer meeting the minimum specifications listed below for each substructure unit. The operating energy is the energy a hammer is capable of producing during pile driving under actual project conditions, and shall be estimated to be no greater than 85% of the hammer's maximum rated energy as specified in the manufacturer's literature. Submit specifications for all pile hammers proposed for use on the project to the Engineer for review at least 14 calendar days prior to beginning pile driving operations. Abutment Piling: Minimum Ram Weight = 2,500 lbs Minimum Operating Energy = 29,000 foot-pounds Pier Piling: Minimum Ram Weight = 5,500 lbs Minimum Operating Energy = 56,000 foot-pounds Run the hammer at an energy that produces a penetration at bearing between ½" and 3 inches in the last 10 blows. If the pile has not reached bearing 10 feet beyond the estimated depth, stop driving the pile and wait 24 hours to allow pile setup to occur. After 24 hours, warm the hammer with a minimum of 20 blows by striking the ground or timber mats. If bearing was not achieved during restrike, continue to drive the pile until bearing is achieved.			
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. Do not apply Tex-Cote special surface finish to any form liner areas. - All exposed substructure surfaces - Outside edges of the bridge deck - Underside of the bridge deck overhang - Outside and bottom surfaces of the exterior beams - Exposed endwall areas outside the exterior beams - All bridge and approach slab barrier surfaces (except form liner areas) 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 for the inside and top surfaces of the bridge and approach slab barriers. Use a color matching the lightest shade of brown used in the Architectural Surface Finish, as it looks applied to the barrier form liner areas, for all other surfaces. Submit to the Engineer a 1' x 1' sample of the brown surface finish. Include all special surface finish costs in the price bid for the appropriate concrete bid items.	930	CONCRETE SLEEPER SLAB: Construct a concrete sleeper slabs at the ends of the bridge approach slabs as shown in the plans. The sleeper slab includes a concrete header adjacent to the HMA approach roadway, forming a sealed butt joint with the HMA pavement. Provide Bridge Concrete in accordance with Section 602 and reinforcing steel in accordance with Section 612. 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. Place a double layer of 4 or 4 mil polyethylene sheeting as a bond breaker between the sleeper slab and approach slab interface. Include all to labor, materials and equipment needed to install the sleeper slab and header in the contract unit price of "Concrete Sleeper Slab".			
602	WEATHER LIMITATIONS: All requests in accordance with 602.04 C.4 "Weather Limitations" require approval from the NDDOT Bridge Division.	930	POLYURETHANE FOAM JOINT SEAL: Install a pre-compressed, polymer-impregnated polyurethane foam expansion joint seal at the sleeper slab, with a nominal joint width as specified in the plans. Provide a seal coated with highway-grade silicone providing a permanent, weather-tight barrier. Use a compatible two-component epoxy adhesive to bond the seal to the joint faces. The joint seal may be Wabo FS Bridge Seal (Watson Bowman Acme); BEJS Bridge Expansion Joint System (Emseal); Iso-Flex Silfast XL (LymTal International); or an approved equal. Prepare the joint opening and install the joint seal according to the manufacturer's recommendations. Do not install the joint until the approach slab concrete has been in place for a minimum of 21 days. Provide a joint seal the full length of the clear roadway width between barriers, with an additional 6 inches at each end to be turned up vertically matching the inside face of the curb. Include all to labor, materials and equipment needed to install the polyurethane foam joint seal in the unit price bid for "Polyurethane Foam Joint Seal."			
602	REMOVAL OF FORMS: Leave deck slab forms in place for a minimum of 1 day after completion of curing period and the bridge deck concrete has reached 70 percent of the required design strength.					
604	PRESTRESSED BEAMS: Set prestressed beams on bearing seats without field bending substructure or beam reinforcing steel.					
616	STRUCTURAL STEEL: Approximately 1,016 lbs of structural steel has been estimated for the ice noses. Provide steel in accordance with 834.01 A. Include all costs to provide and install the ice noses in the price bid for "Structural Steel." Shop drawings for ice nose structural steel are not required.					



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

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	170	4

℄ BEAM 5	℄ BEAM 4	℄ BEAM 3	℄ BEAM 2	℄ BEAM 1
2886.82	2887.01	2887.20	2887.01	2886.82
2886.81	2887.00	2887.19	2887.00	2886.81
2886.82	2887.01	2887.19	2887.01	2886.82
2886.82	2887.00	2887.19	2887.00	2886.82
2886.81	2887.00	2887.18	2887.00	2886.81
2886.79	2886.98	2887.16	2886.98	2886.79
2886.76	2886.94	2887.13	2886.94	2886.76
2886.71	2886.90	2887.09	2886.90	2886.71
2886.65	2886.84	2887.03	2886.84	2886.65
2886.59	2886.77	2886.96	2886.77	2886.59
2886.51	2886.70	2886.89	2886.70	2886.51
2886.43	2886.62	2886.80	2886.62	2886.43
2886.42	2886.61	2886.80	2886.61	2886.42
2886.43	2886.61	2886.80	2886.61	2886.43
2886.43	2886.61	2886.80	2886.61	2886.43
2886.42	2886.60	2886.79	2886.60	2886.42
2886.40	2886.58	2886.77	2886.58	2886.40
2886.36	2886.55	2886.74	2886.55	2886.36
2886.32	2886.51	2886.69	2886.51	2886.32
2886.26	2886.45	2886.64	2886.45	2886.26
2886.19	2886.38	2886.57	2886.38	2886.19
2886.12	2886.31	2886.49	2886.31	2886.12
2886.04	2886.23	2886.41	2886.23	2886.04
2886.03	2886.22	2886.41	2886.22	2886.03
2886.03	2886.22	2886.41	2886.22	2886.03
2886.03	2886.22	2886.41	2886.22	2886.03
2886.02	2886.21	2886.40	2886.21	2886.02
2886.00	2886.19	2886.38	2886.19	2886.00
2885.97	2886.16	2886.35	2886.16	2885.97
2885.93	2886.11	2886.30	2886.11	2885.93
2885.87	2886.06	2886.25	2886.06	2885.87
2885.80	2885.99	2886.18	2885.99	2885.80
2885.73	2885.91	2886.10	2885.91	2885.73
2885.65	2885.83	2886.02	2885.83	2885.65
2885.64	2885.82	2886.01	2885.82	2885.64

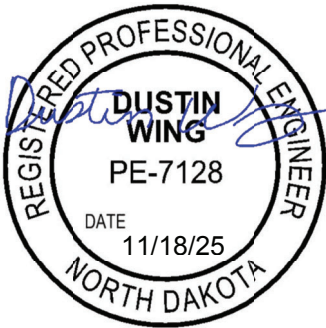


Beam 1 is the west beam.

SCREED ELEVATION

BRIDGE BID ITEMS

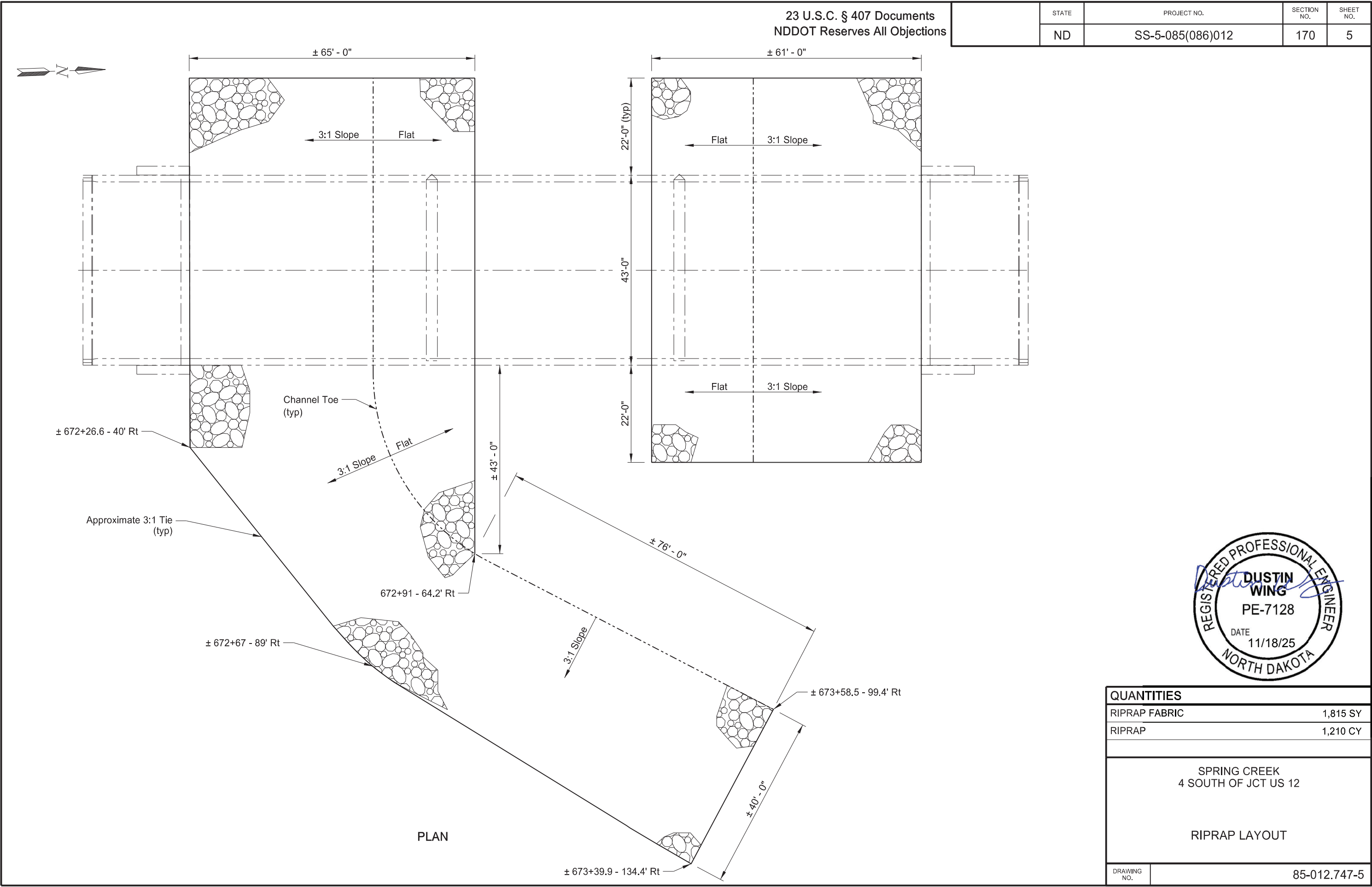
SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
202	0105	REMOVAL OF STRUCTURE	L SUM	1
210	0099	CLASS 1 EXCAVATION	L SUM	1
210	0111	CLASS 2 EXCAVATION	L SUM	1
210	0127	CHANNEL EXCAVATION	L SUM	1
210	0201	FOUNDATION PREPARATION	EA	1
256	0200	RIPRAP GRADE II	CY	1,210
602	0500	BRIDGE SUBSTRUCTURE CONCRETE	CY	200.4
602	0510	BRIDGE DECK CONCRETE	CY	225.4
602	0520	BRIDGE BARRIER CONCRETE	CY	45.2
602	1133	CONCRETE BRIDGE APPROACH SLAB	SY	191.2
602	1250	PENETRATING WATER REPELLENT TREATMENT	SY	612.0
604	9600	PRESTRESSED BOX BEAM-21IN	LF	825
612	0116	REINFORCING STEEL-GRADE 60-EPOXY COATED	LBS	59,206
616	0360	STRUCTURAL STEEL	LBS	1,016
622	0020	STEEL PILING HP 10 X 42	LF	360
622	0060	STEEL PILING HP 14 X 73	LF	540
622	7001	DYNAMIC PILE TEST	EA	4
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	1,815
930	3000	BRIDGE BENCH MARKS	SET	1
930	8600	ELASTOMERIC BEARING PAD	SF	68
930	8670	CONCRETE SLEEPER SLAB	EA	2
930	8850	POLYURETHANE FOAM JOINT SEAL	LF	82
930	9537	ABUTMENT UNDERDRAIN SYSTEM	EA	2



SPRING CREEK
4 SOUTH OF JCT US 12

SCREED ELEVATIONS &
BID ITEM QUANTITIES

DRAWING NO.	85-012.747-4
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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-085(086)012	170	6

NOTE:

For double acting or single acting diesel hammers, calculate the bearing resistance of piles by the following formula:

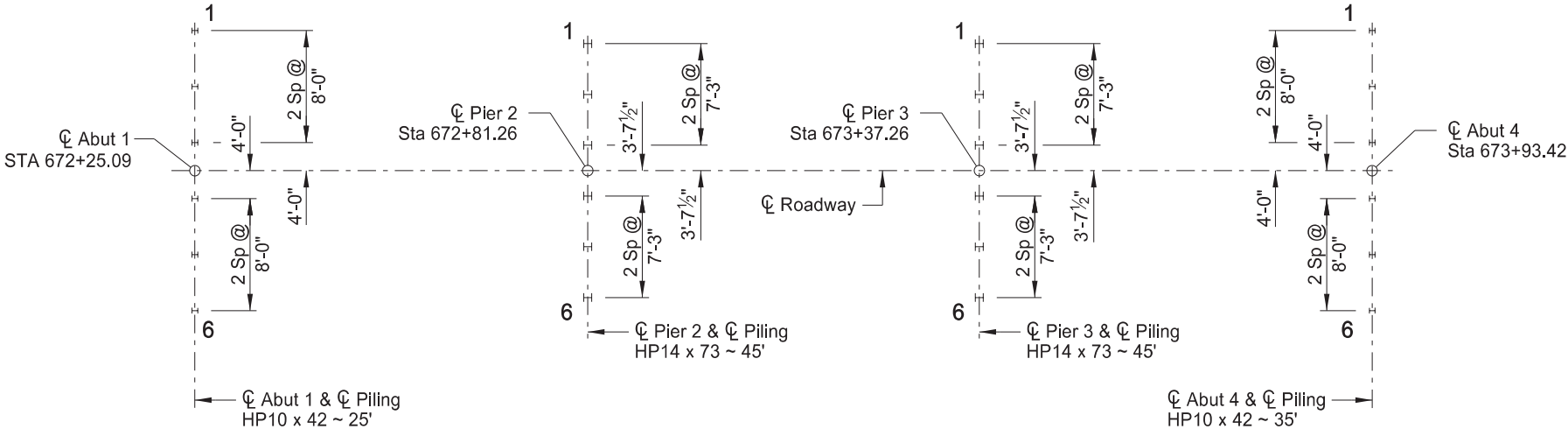
$$\Phi R_n = \frac{4.5E}{S + 0.2} \times \frac{W + 0.2M}{W + M}$$

Where:

ΦR_n = Factored pile bearing resistance, in pounds. The Φ factor is included in equation.
W = Weight of striking parts (ram), in pounds.
M = Weight of parts being driven, in pounds. Includes pile weight, anvil (if any), driving cap, etc.
E = Energy per blow, in foot-pounds.
S = Average penetration of pile in inches per blow for last ten blows.

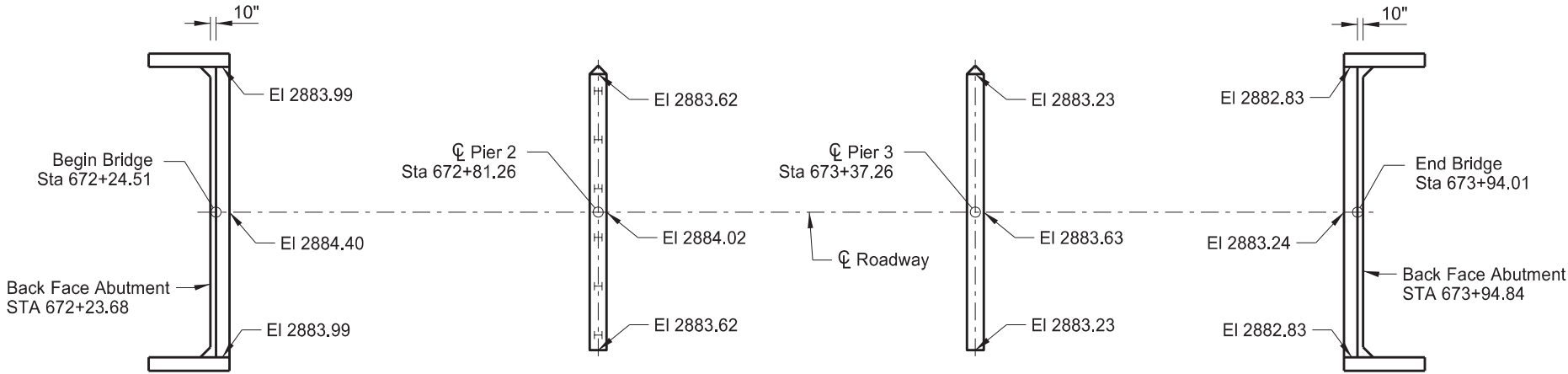
For single acting hammers, calculate E by multiplying observed stroke (ft) and W (lbs).

PILE COORDINATES			
	PILE	NORTHING	EASTING
ABUT 1	1	180,739.97	1,230,655.87
	6	180,738.53	1,230,695.84
PIER 2	1	180,796.04	1,230,659.78
	6	180,794.73	1,230,696.00
PIER 3	1	180,852.00	1,230,661.80
	6	180,850.69	1,230,698.02
ABUT 4	1	180,908.20	1,230,661.95
	6	180,906.75	1,230,701.93



Drive the HP10 x 42 Pile to a bearing resistance of 105 tons.
Drive the HP14 x 73 Pile to a bearing resistance of 180 tons.

PILING LAYOUT



Elevations shown are to top of finished concrete.

BEARING ELEVATIONS



SPRING CREEK
4 SOUTH OF JCT US 12

PILING LAYOUT &
BEARING ELEVATIONS

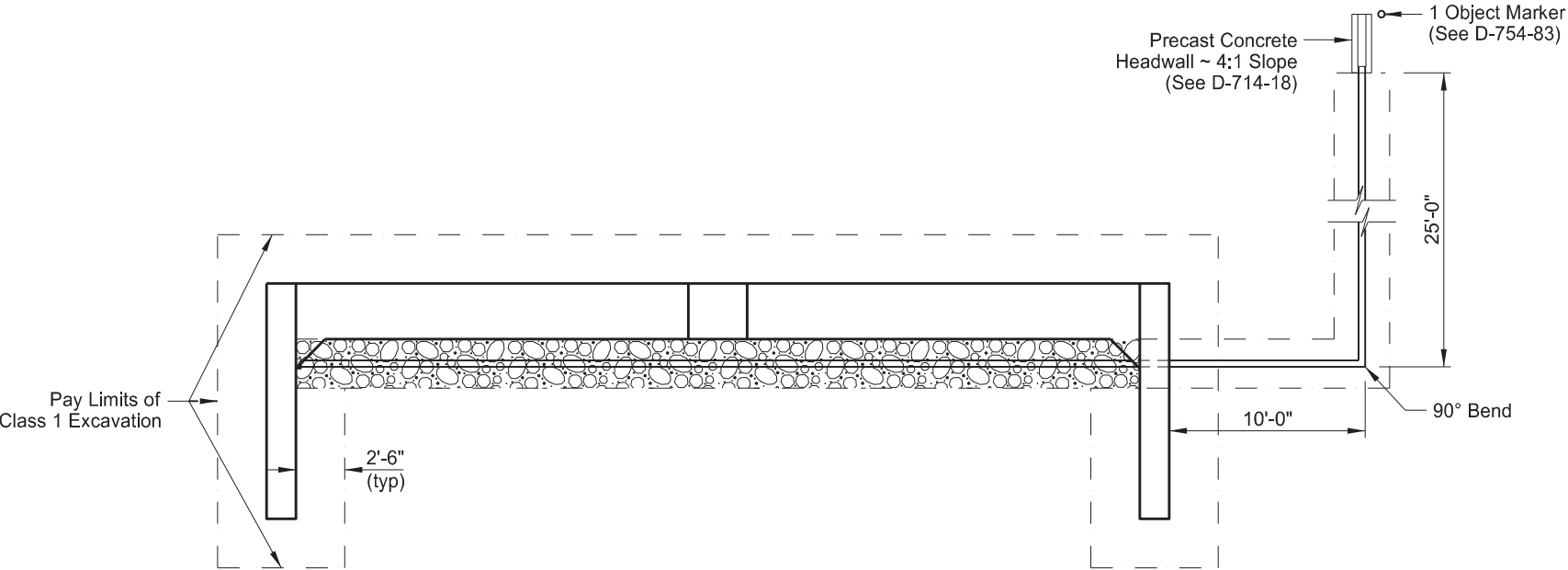
DRAWING NO.	85-012.747-6
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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-085(086)012	170	7

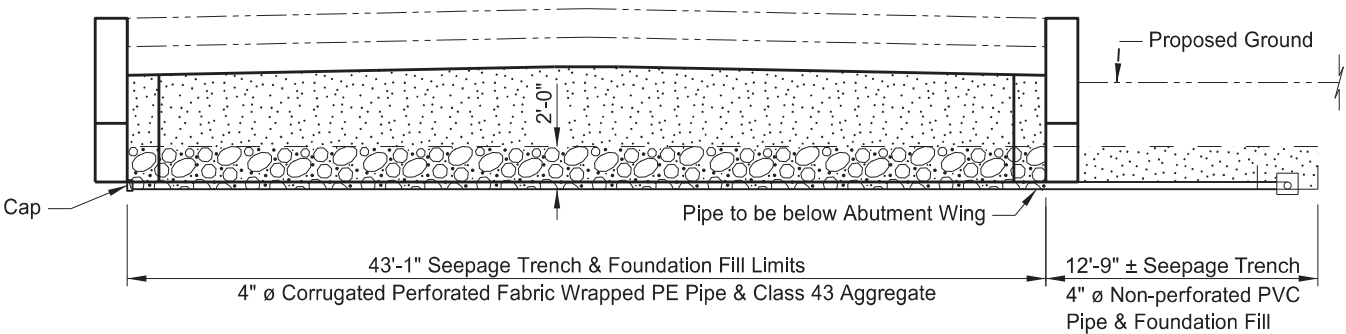
NOTES:

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. Use non-perforated PVC pipe that meets the requirements of Section 830.03 A.3. Provide aggregate that meets the requirements of Section 816.03, Class 43. Provide foundation fill that meets the requirements of Section 210. Compact the foundation fill beneath the approach slab according to Section 714.04 A.10

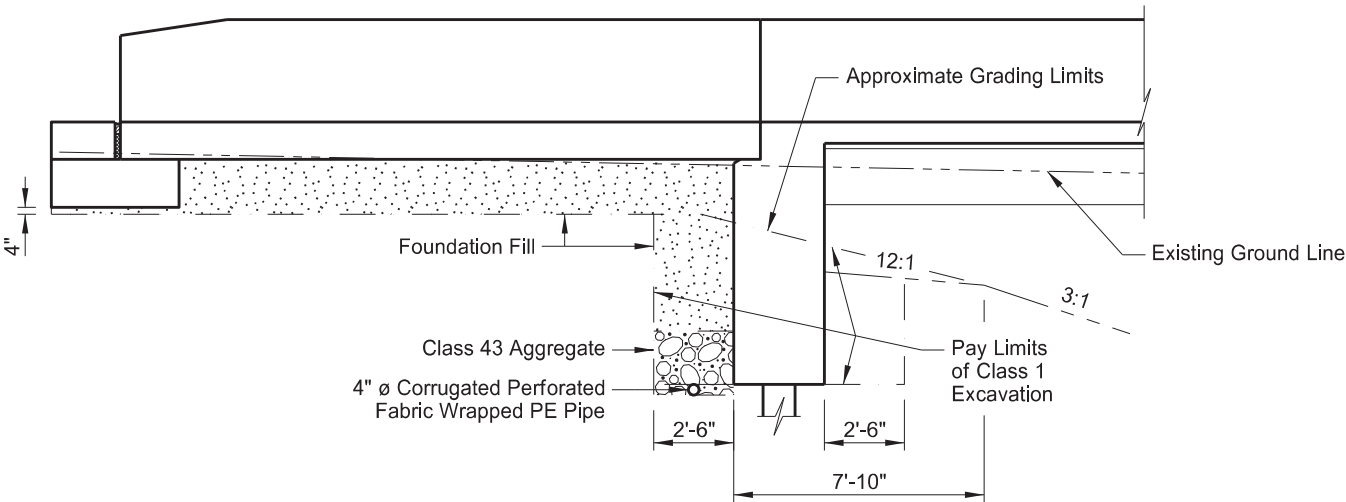
Include the cost to furnish and place the foundation fill, aggregate,corrugated perforated pipe, non-perforated pipe, object marker and headwalls in the pay item "Abutment Underdrain System."



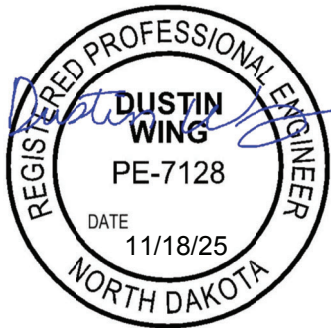
ABUTMENT PLAN



BACK FACE OF ABUTMENT



DETAIL AT ABUTMENT



SPRING CREEK
4 SOUTH OF JCT US 12

ABUTMENT UNDERDRAIN &
EXCAVATION DETAILS

DRAWING NO.	85-012.747-7
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Diagram illustrating the cross-section of a bridge deck. The total width is 43'-1". The deck is supported by a central pier and two side abutments. Key dimensions and components include:

- Overall width: 43'-1"
- Abutment width: 21'-6½"
- Central pier width: 3'-0"
- Deck thickness: 12'-0"
- Top layer thickness: 1'-6" (typ)
- Bottom layer thickness: 1'-5"
- Keyway dimensions: 1½" x 9¼" (typ)
- Bridge components: 1'-6" x 1'-6" Fillet (typ), 10" (typ), 1'-6" x 1'-6" Fillet (typ), 1'-6" x 1'-6" Fillet (typ)
- Labels: Abutment, Bridge, Begin or End Bridge, Keyway (typ)

Waterproof Membrane

1½" x 9¼"
Keyway (typ)

2'-10"

Diagram illustrating the cross-section of a bridge structure, showing dimensions and components:

- Overall width: 46'-1"
- Overall height: 7'-9" (typ)
- Top width: 1'-6" (typ)
- Internal width: 5'-0"
- Internal height: 5'-4 7/8"
- Spacing between internal components: 3'-0" (typ)
- Level: 3'-0"
- Keyway: 1 1/2" x 9 1/4"
- Waterproof Membrane (typ)
- 5 Sp @ 8'-0" ~ HP10 x 42 Piling
- Bottom width: 3'-0 1/2"

Technical drawing of a composite shape with the following dimensions and features:

- Overall Dimensions:**
 - Width: 12'-0"
 - Height: 7'-9"
- Internal Dimensions and Features:**
 - Top-left horizontal segment: 2'-10"
 - Top-right vertical segment: 5'-0"
 - Bottom-left horizontal segment: 5'-0"
 - Bottom-right horizontal segment: 7'-0"
 - Bottom-right vertical segment: 2'-9"
 - A fillet (1'-6" x 1'-6") is shown at the top-right corner of the internal rectangular area.
 - A dashed line indicates a vertical cut or section line.
 - A break symbol (zigzag line) is located on the bottom-left horizontal segment.

NOTE:

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

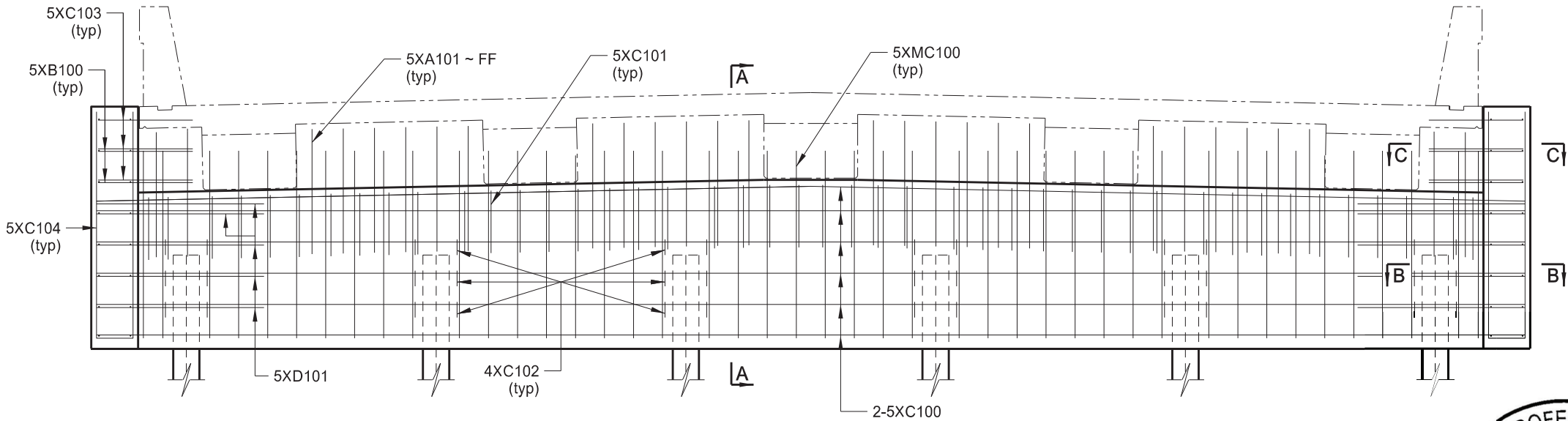
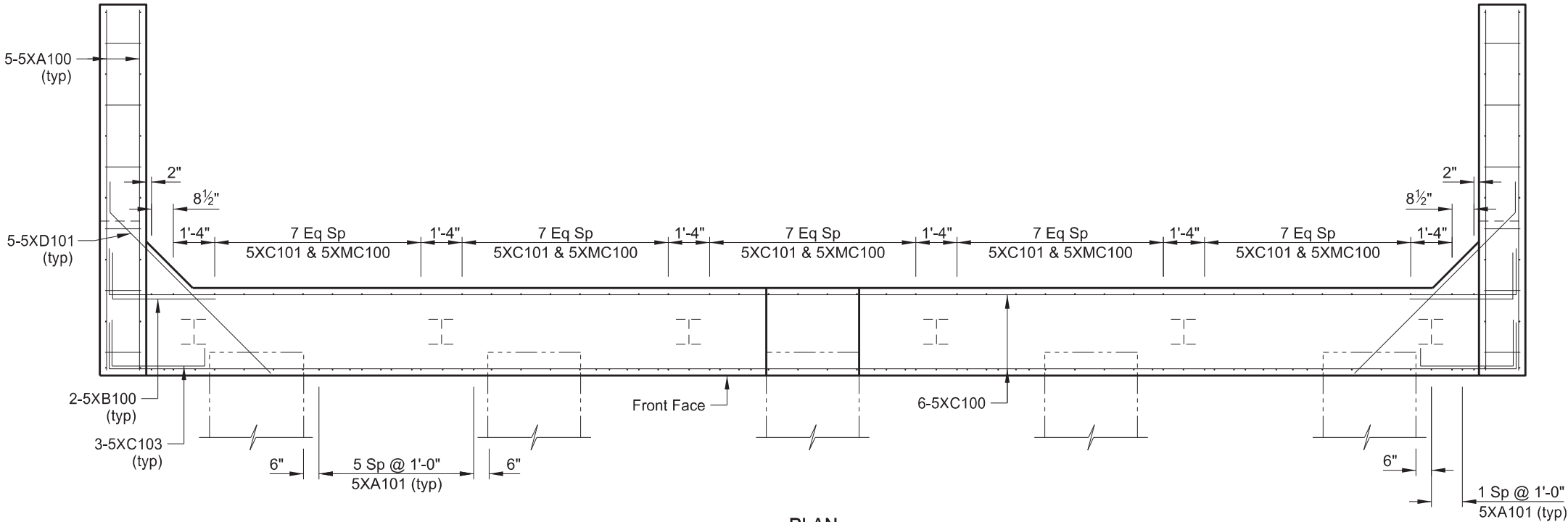


QUANTITIES	
SEE DWG 85-012.747-10	
SPRING CREEK 4 SOUTH OF JCT US 12 (SHOWING DIMENSIONS) ABUTMENT DETAILS	
DRAWING NO.	85-012.747-8

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-085(086)012	170	9

NOTE:
See Dwg 85-012.747-10 for Wing Elevation
and Sections A-A, B-B and C-C.



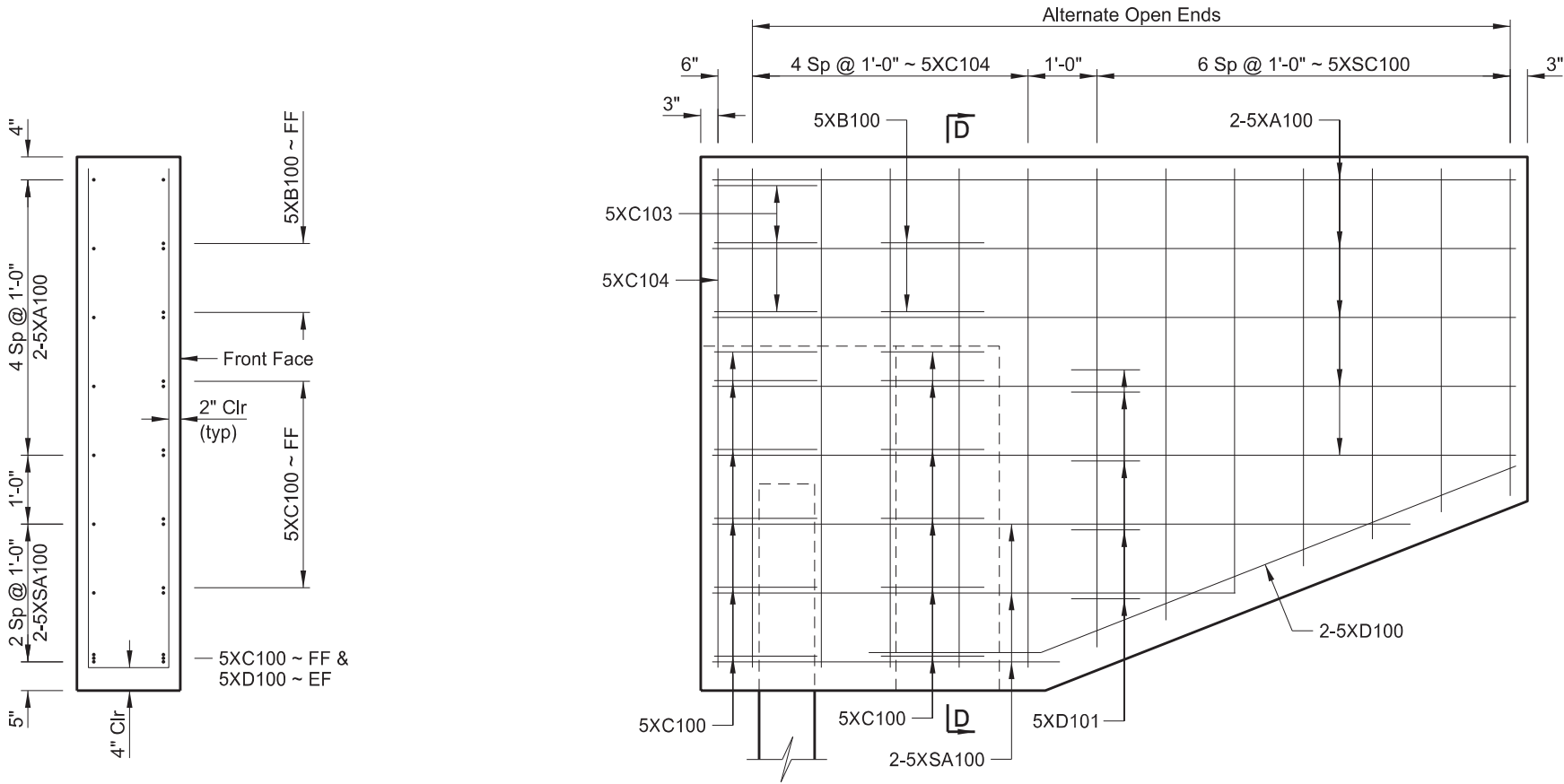
NOMENCLATURE:
FF = Front Face
BF = Back Face
EF = Each Face



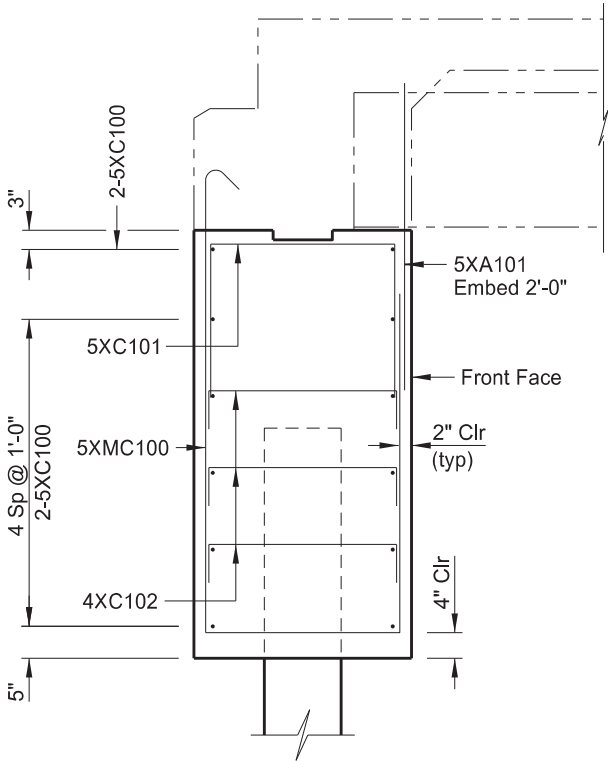
QUANTITIES	
SEE DWG 85-012.747-10	
SPRING CREEK 4 SOUTH OF JCT US 12 (SHOWING REINFORCING) ABUTMENT DETAILS	
DRAWING NO.	85-012.747-9

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-085(086)012	170	10

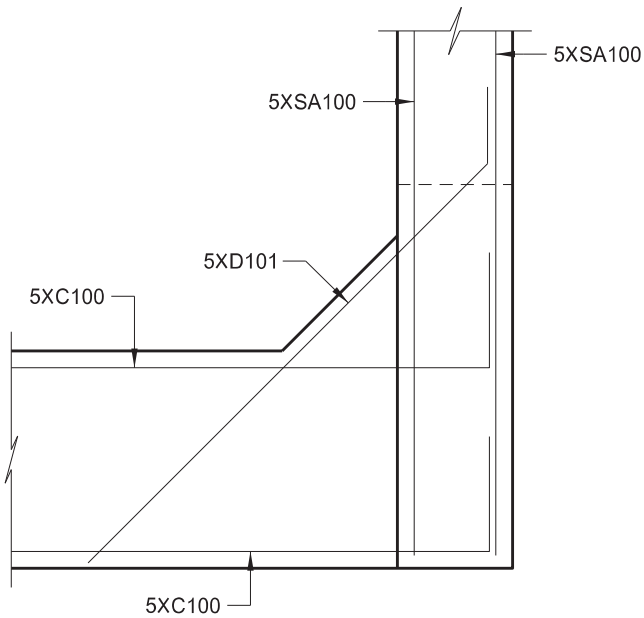


WING ELEVATION

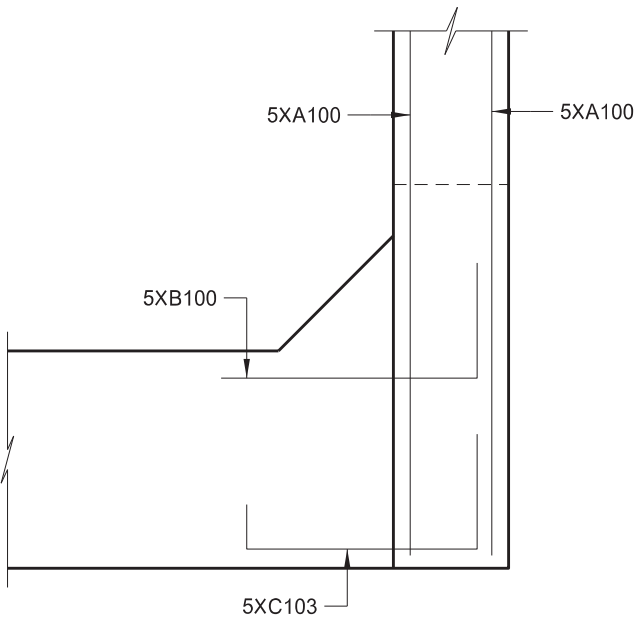


A-A

NOTE:
See Dwg 85-012.746-9 for locations of Section A-A, B-B & C-C.



B-B



C-C



QUANTITIES (ONE ABUTMENT)	
BRIDGE SUBSTRUCTURE CONCRETE	33.3 CY
REINFORCING STEEL	2,576 LBS
SPRING CREEK 4 SOUTH OF JCT US 12 (SHOWING REINFORCING) ABUTMENT DETAILS	
DRAWING NO.	85-012.747-10

Plan view of a bridge structure. The overall length is 42'-3". The structure is divided into sections with the following dimensions from left to right: 1'-3" (width), 19'-0" (length), 3'-0" (length), and 19'-0" (length). The width of the structure is 2'-6". The distance between the centerline of the pier and the centerline of the bridge is 9'-0" (typ). The distance between the centerline of the pier and the centerline of the roadway is 1'-6". The structure is labeled with "CL Pier", "CL Roadway", and "CL Bridge". The structure is labeled with "1 1/2 x 9 1/4 Keyway" and "1 1/2 Bevel (typ)".

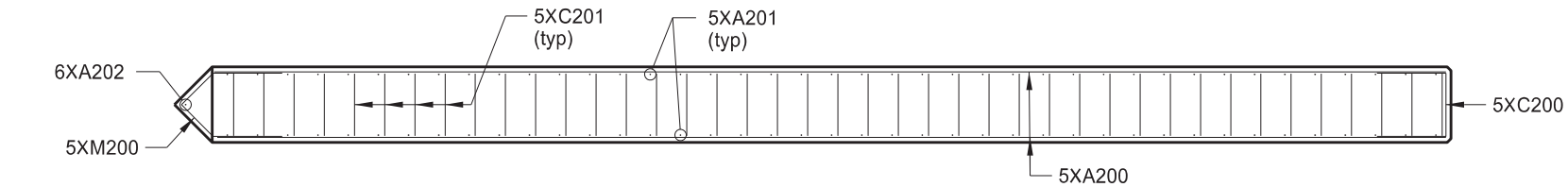
[illegible]

Technical drawing of a 3-sided L-shaped beam. The main view shows a beam with a total length of 11'-8". It features four open holes, each 1'-8" in diameter, spaced at 4 Sp @ 2'-0" intervals. The beam has a 3-sided profile with a 1'-0" wide flange and a 1'-8" wide web. The beam is labeled L8 x 8 x 3/4. The beam is supported by two 2 x 3/8 x 1'-8" bars (both legs). The beam is shown in a 3/4 view, indicating it is a 3-sided beam. The beam is shown in a 3/4 view, indicating it is a 3-sided beam. The beam is shown in a 3/4 view, indicating it is a 3-sided beam.

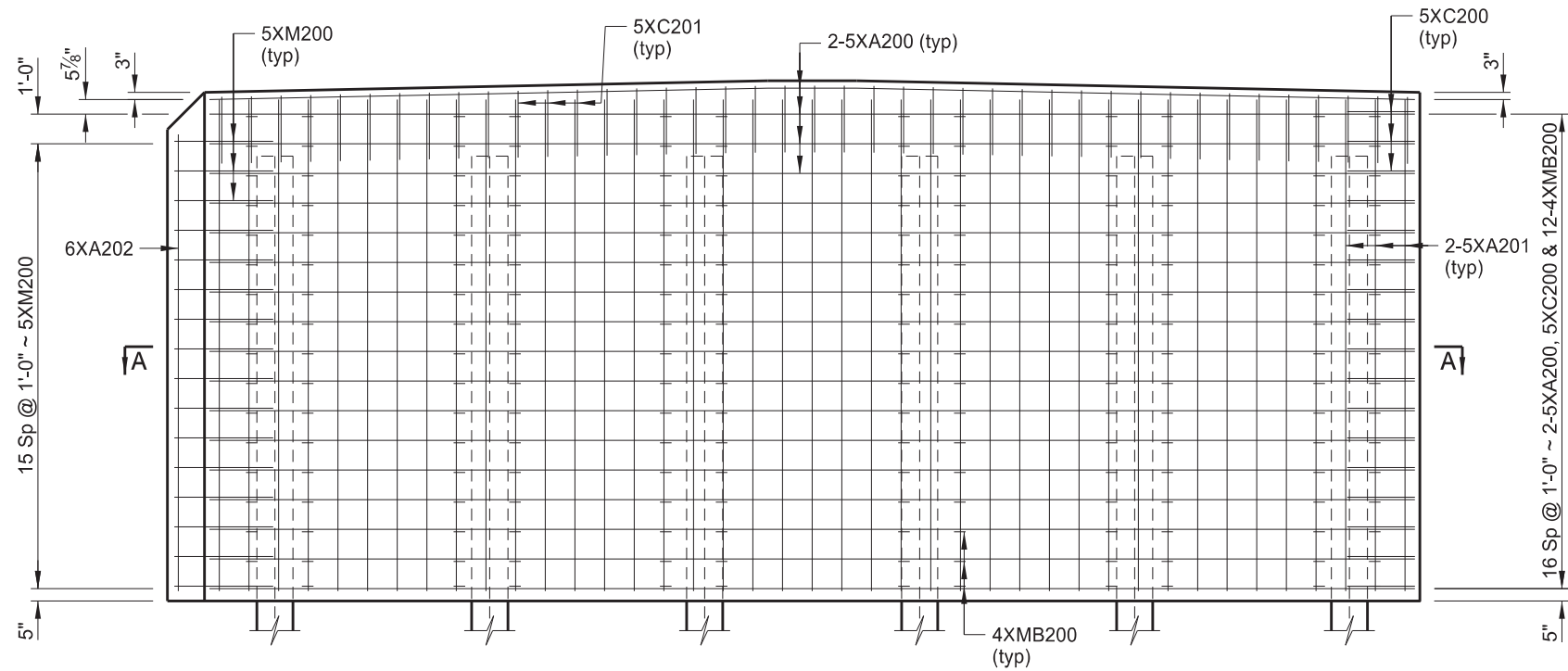
Diagram illustrating the Pay Limits of Class 2 excavation. The excavation is shown as a long, narrow trench with a pointed left end and a flat right end. The width of the excavation is 2'-6" at both the top and bottom. The depth of the excavation is 2'-6". The trench is labeled "Pay Limits of Class 2 excavation".

DWW

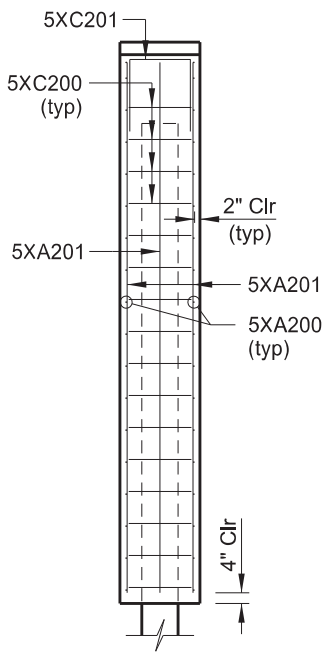
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	170	12



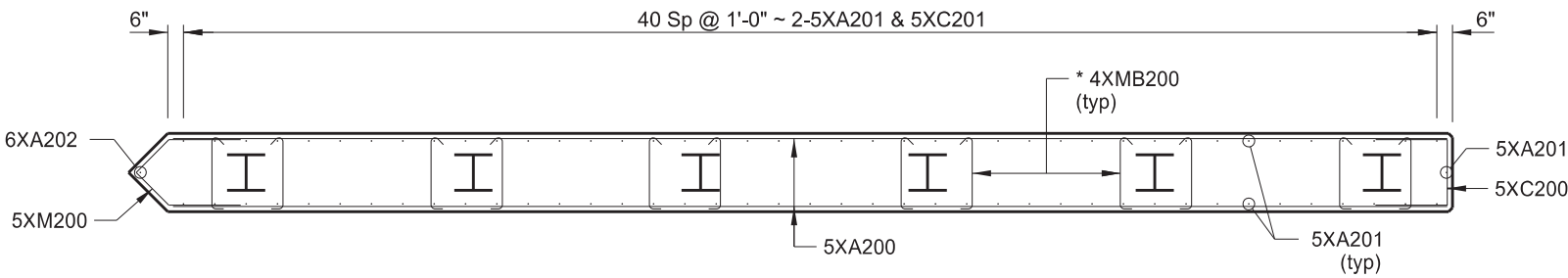
PLAN



ELEVATION



END VIEW



A-A

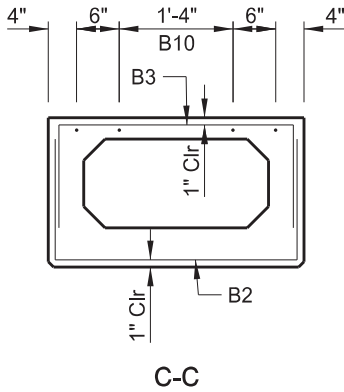
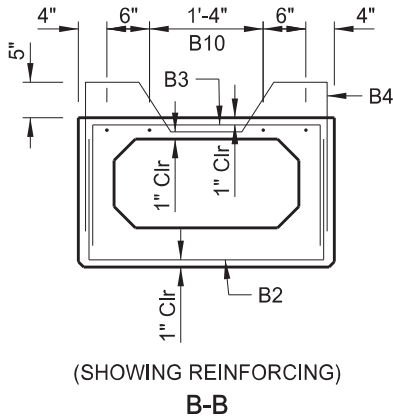
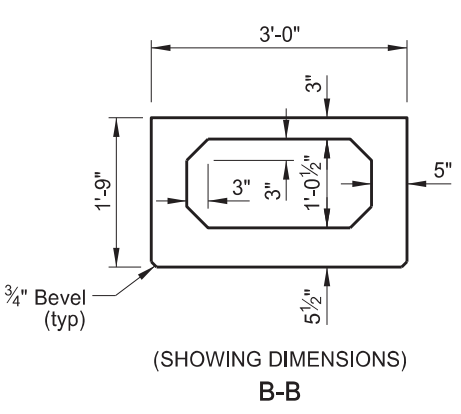
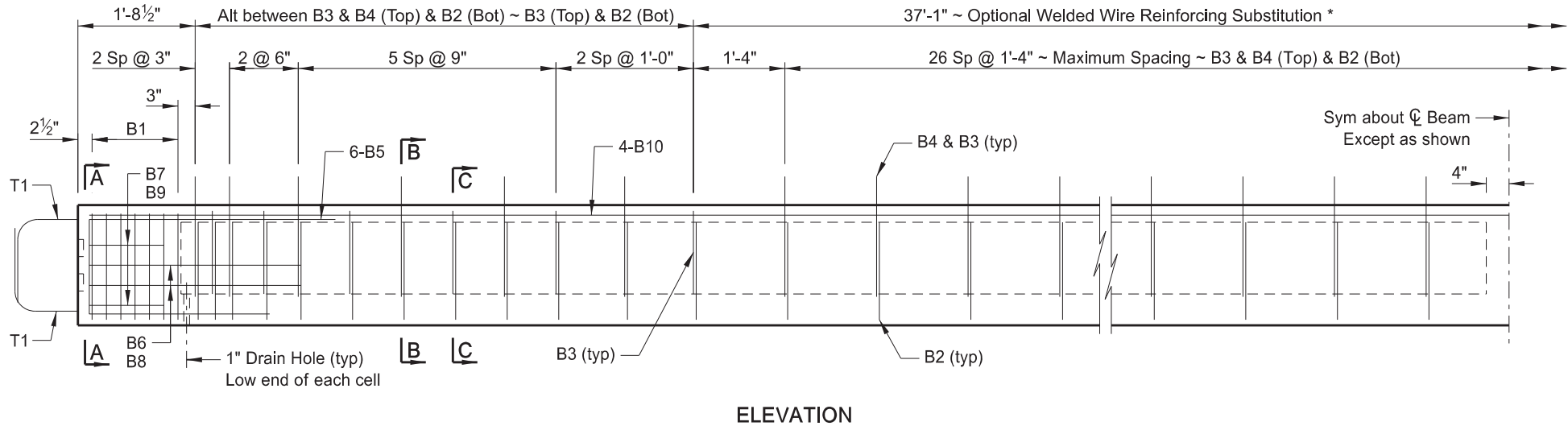
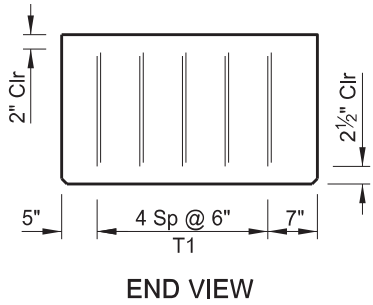
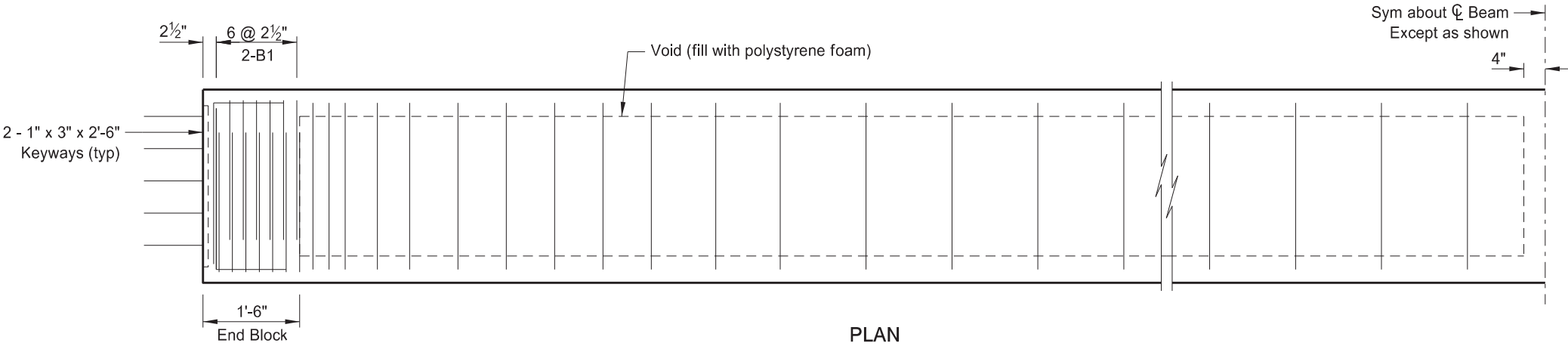
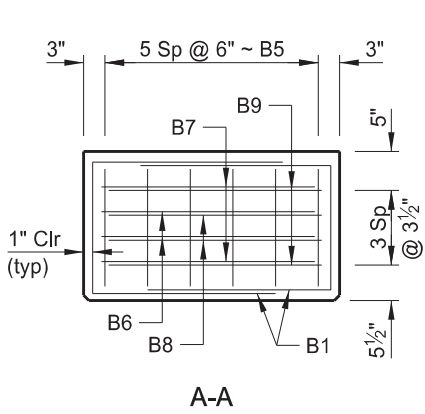
* Alternate the 90° and 135° hook position at each layer.



QUANTITIES		(ONE PIER)
BRIDGE SUBSTRUCTURE CONCRETE		66.9 CY
REINFORCING STEEL		1,019 LBS
STRUCTURAL STEEL		508 LBS
SPRING CREEK 4 SOUTH OF JCT US 12 (SHOWING REINFORCING) PIER DETAILS		
DRAWING NO.	85-012.747-12	

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

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-085(086)012	170	13



BAR LIST ~ ONE BEAM				
MARK	SIZE	NO.	LENGTH	SHAPE
B1	4	28	5'-11"	BENT
* B2	4	51	5'-8"	BENT
* B3	4	51	5'-8"	BENT
*** B4	4	28	7'-0"	BENT
B5	5	12	7'-7"	BENT
B6	4	4	5'-7"	BENT
B7	4	4	4'-0"	BENT
B8	4	4	5'-7"	BENT
B9	4	4	4'-0"	BENT
B10	4	8	28'-1"	STR
** T1	4	20	4'-0"	STR

- * Welded Wire Reinforcing with minimum circumferential steel area of 0.15 sq in per ft may be substituted for B2 and B3 bars at 1'-4" spacing.
- ** Field bend as shown with a 2 1/2" minimum bar bend diameter (Grade 60).
- *** Epoxy Coated



NOTE:

All bar dimensions are out-to-out.

Unless noted otherwise, bend bars to the bend diameter (D) listed below.

#3 Bar ~ D = 1 1/2"

#4 Bar ~ D = 2"

#5 Bar ~ D = 2 1/2"

QUANTITIES	
SEE DWG 85-012.747-14	
SPRING CREEK 4 SOUTH OF JCT US 12	
PRE-TENSIONED 21" X 36" PRESTRESSED SPREAD BOX BEAM	
DRAWING NO.	85-012.747-13



The required Detensioning Strength indicates the minimum required concrete strength at the time of prestress transfer. The required Acceptance Strength indicates the minimum required concrete strength prior to transporting and erecting the beams.

Minor changes to the shape of the beam and to the reinforcing steel may be made to accommodate the forms of various Contractors and their construction methods with the approval of the Engineer.



-

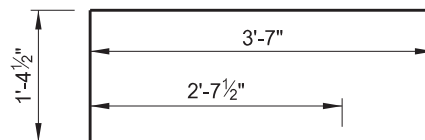
BEAM END PLAN AT PIER

MINIMUM CONCRETE COMPRESSIVE STRENGTH		
Detensioning Strength (f _{ci})	7.00	ksi
Acceptance Strength (f _c)	7.00	ksi

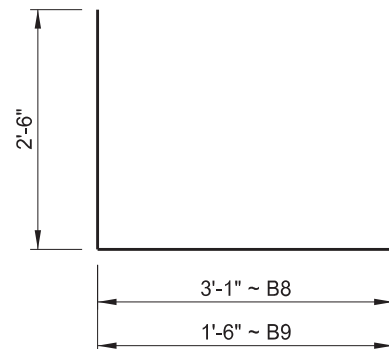
PRESTRESS LOSSES		
Elastic Shortening Loss	18	ksi
Long Term Losses	26.42	ksi
Total Losses	44.42	ksi

PRESTRESS FORCES		
Initial Prestress Force	1186.4	kips
Final P/S Force after Losses	926.2	kips

QUANTITIES		(ONE BEAM)
BEAM LENGTH		55.0 LF
SPRING CREEK 4 SOUTH OF JCT US 12 PRE-TENSIONED 21" X 36" PRESTRESSED SPREAD BOX BEAM		
DRAWING NO.	85-012.747-14	



B5



B8 & B9

Diagram illustrating the end of a beam with a 3" R (typical) fillet. The beam length is 2'-0" and the fillet radius is 3" R (typical). The fillet is 11" wide and 8" high.

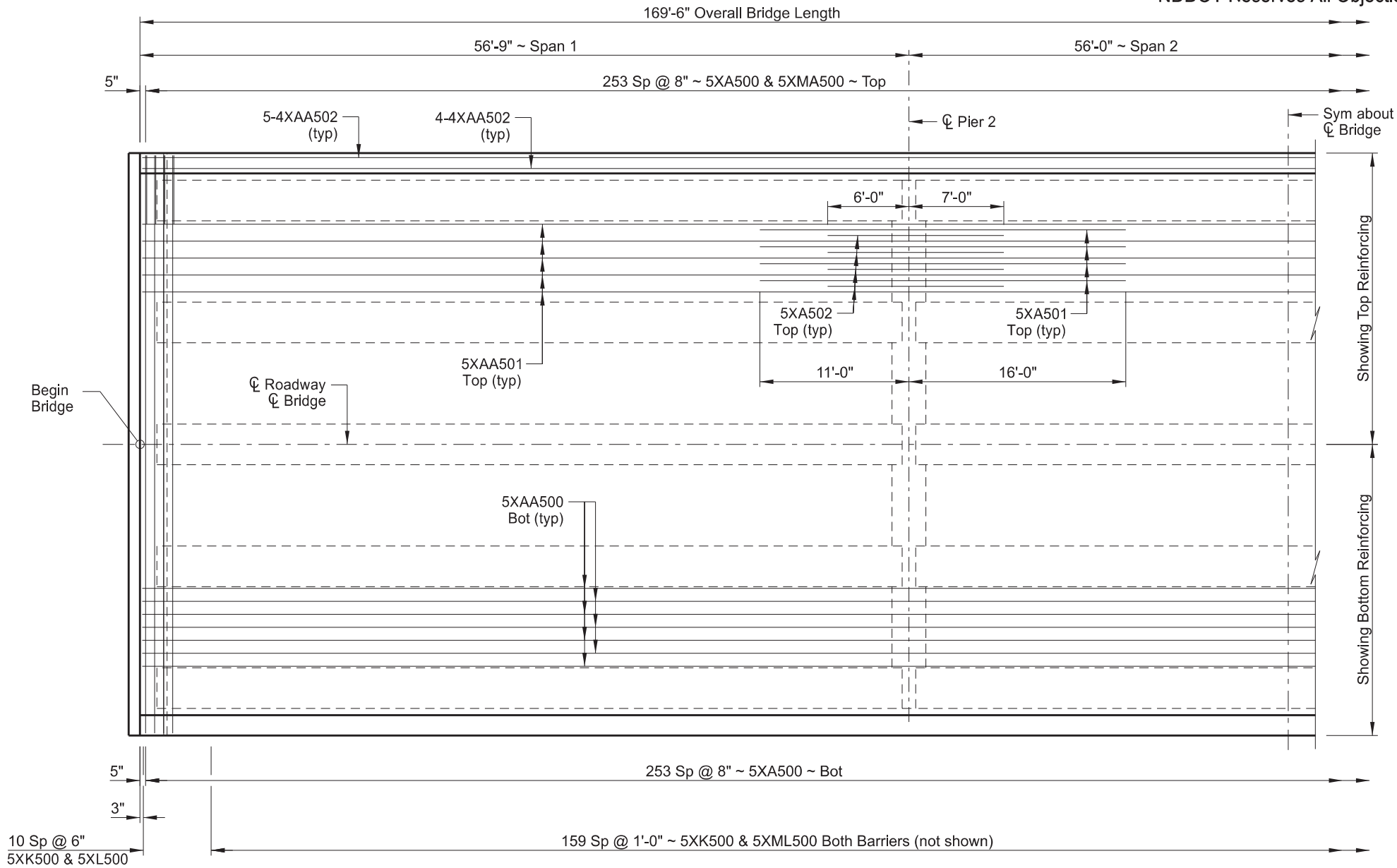
T1

BENT BAR DETAILS

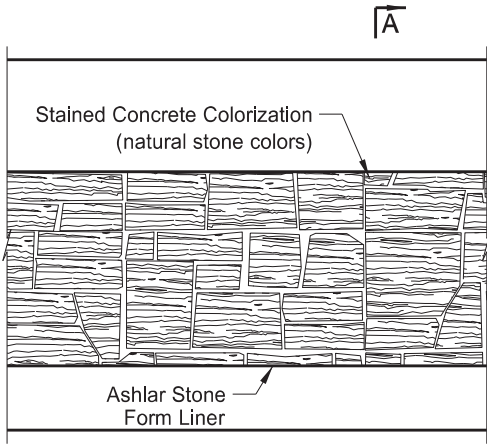


23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

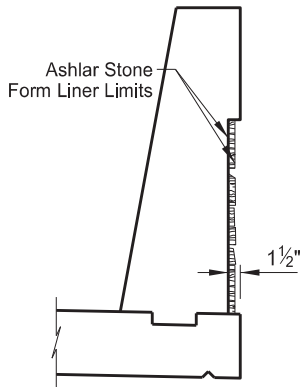
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-085(086)012	170	15



HALF PLAN



(SHOWING FORM LINER ~ BACK FACE)
BARRIER ELEVATION



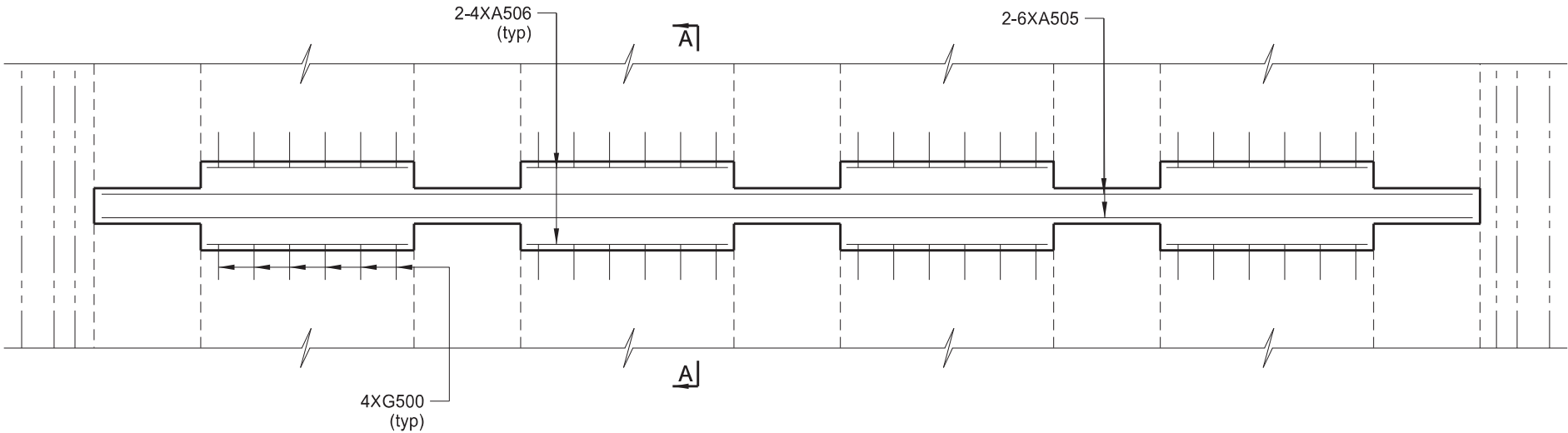
A-A



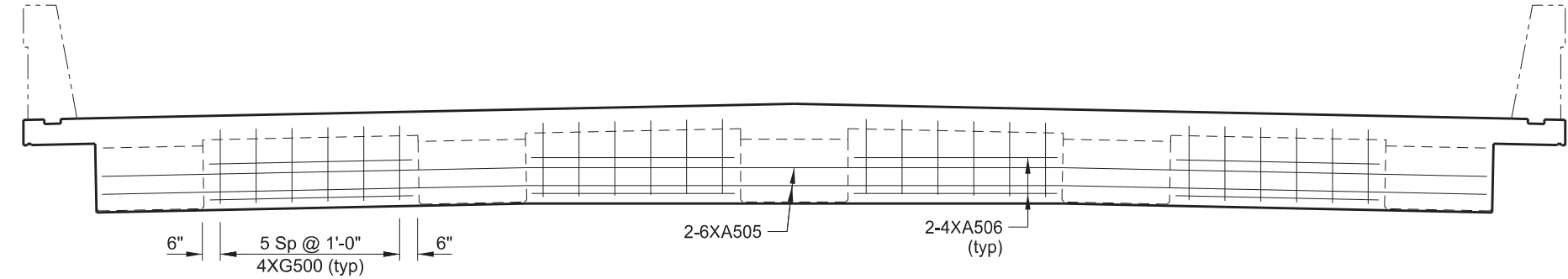
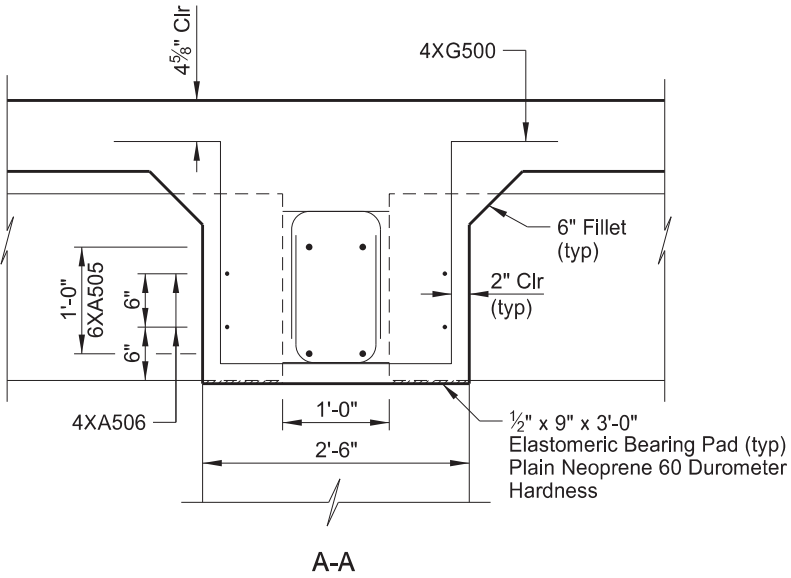
QUANTITIES	
SEE DWG 85-012.747-18	
SPRING CREEK 4 SOUTH OF JCT US 12	
HALF SLAB LAYOUT	
DRAWING NO.	85-012.747-15

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

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	170	16



PLAN



ELEVATION



QUANTITIES	
SEE DWG 85-012.747-18	
SPRING CREEK 4 SOUTH OF JCT US 12	
PIER DIAPHRAGM DETAILS	
DRAWING NO.	85-012.747-16

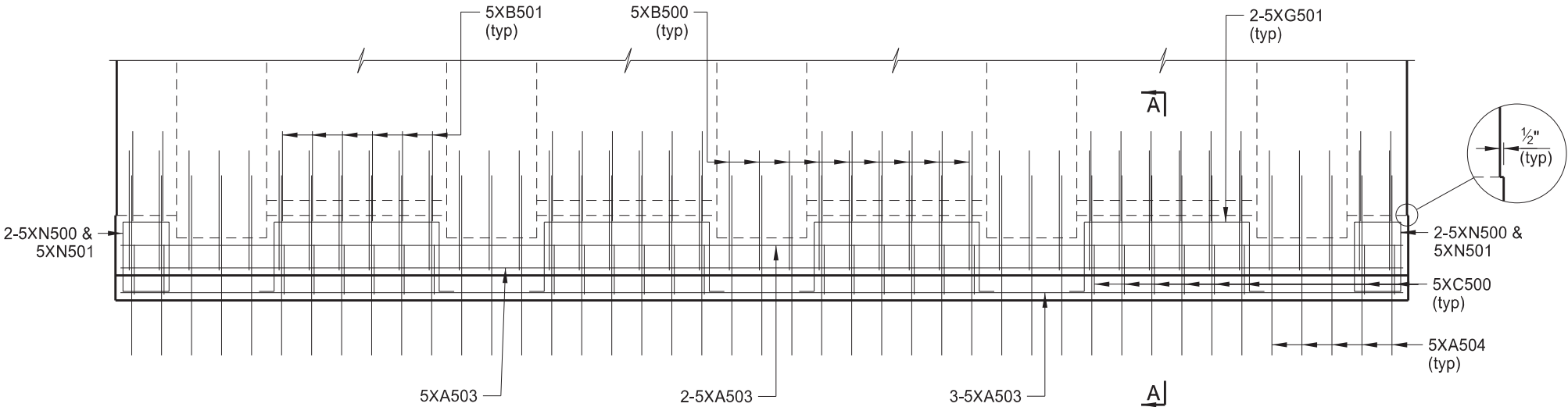
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-085(086)012	170	17

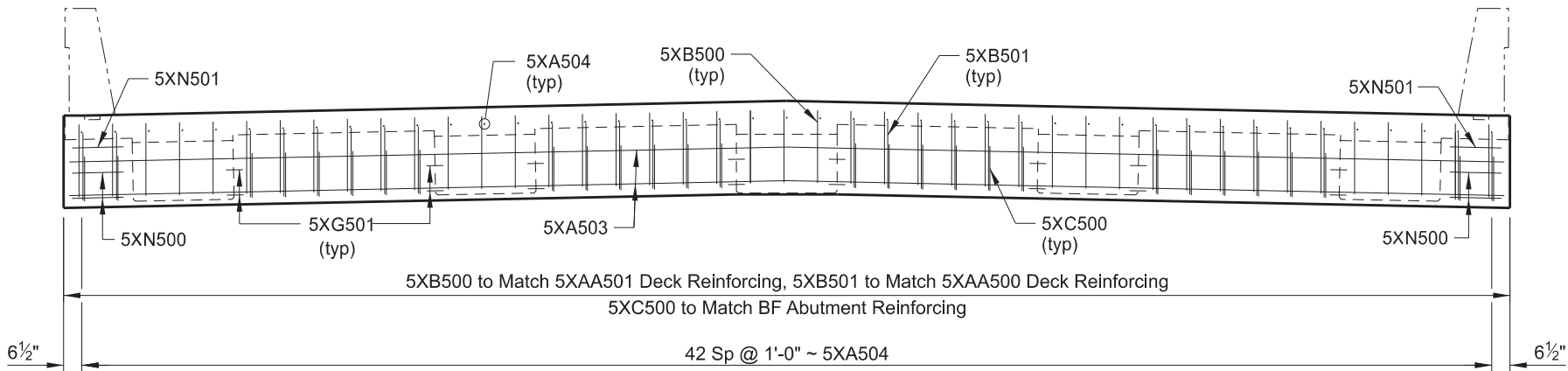
NOTE:

Do not install the 5XA504 bars into the approach slab until all of the foundation fill is in place.

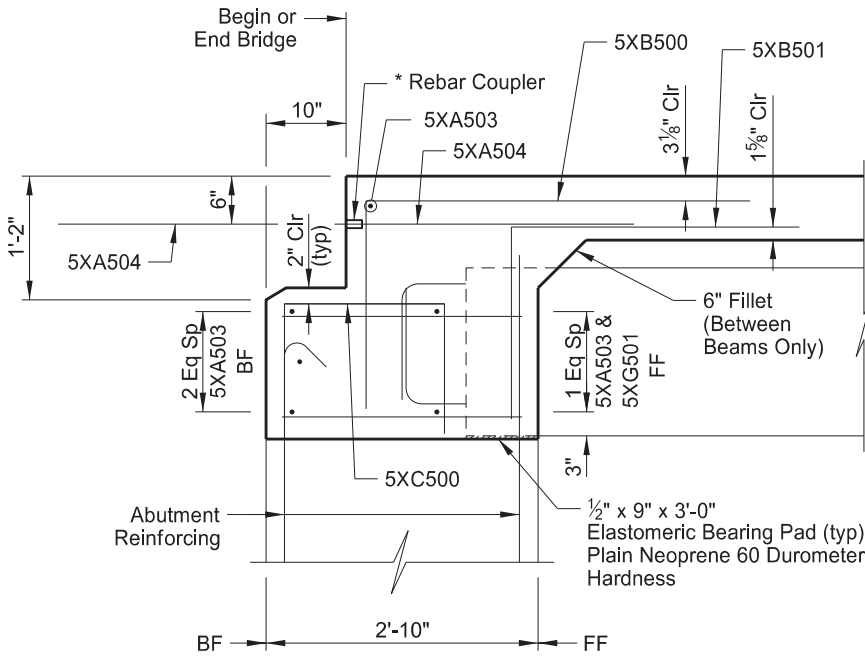
* Use mechanical connectors for the couplers capable of developing 125% of the reinforcing steel specified yield strength. Provide epoxy coated couplers according to Section 836.02 A and repair any damaged epoxy coating according to Section 612.04 E.



PLAN



ELEVATION



A-A

NOMENCLATURE:

FF = Front Face
BF = Back Face

QUANTITIES

SEE DWG 85-012.747-18

SPRING CREEK
4 SOUTH OF JCT US 12

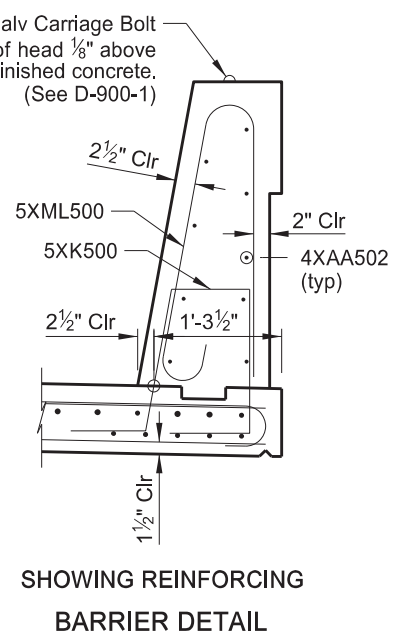
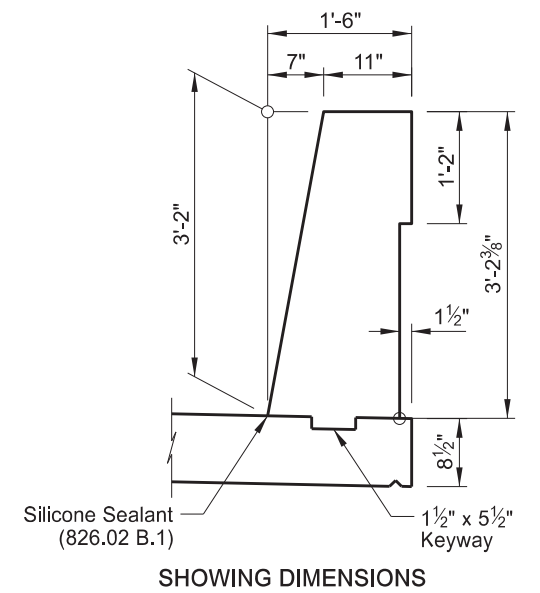
ENDWALL DETAILS

DRAWING NO.

85-012.747-17



QUANTITIES	
BRIDGE DECK CONCRETE	225.4 CY
BRIDGE BARRIER CONCRETE	48.3 CY
REINFORCING STEEL (EPOXY)	52,016 LBS
SPRING CREEK 4 SOUTH OF JCT US 12 SLAB SECTION	
DRAWING NO.	85-012.747-18

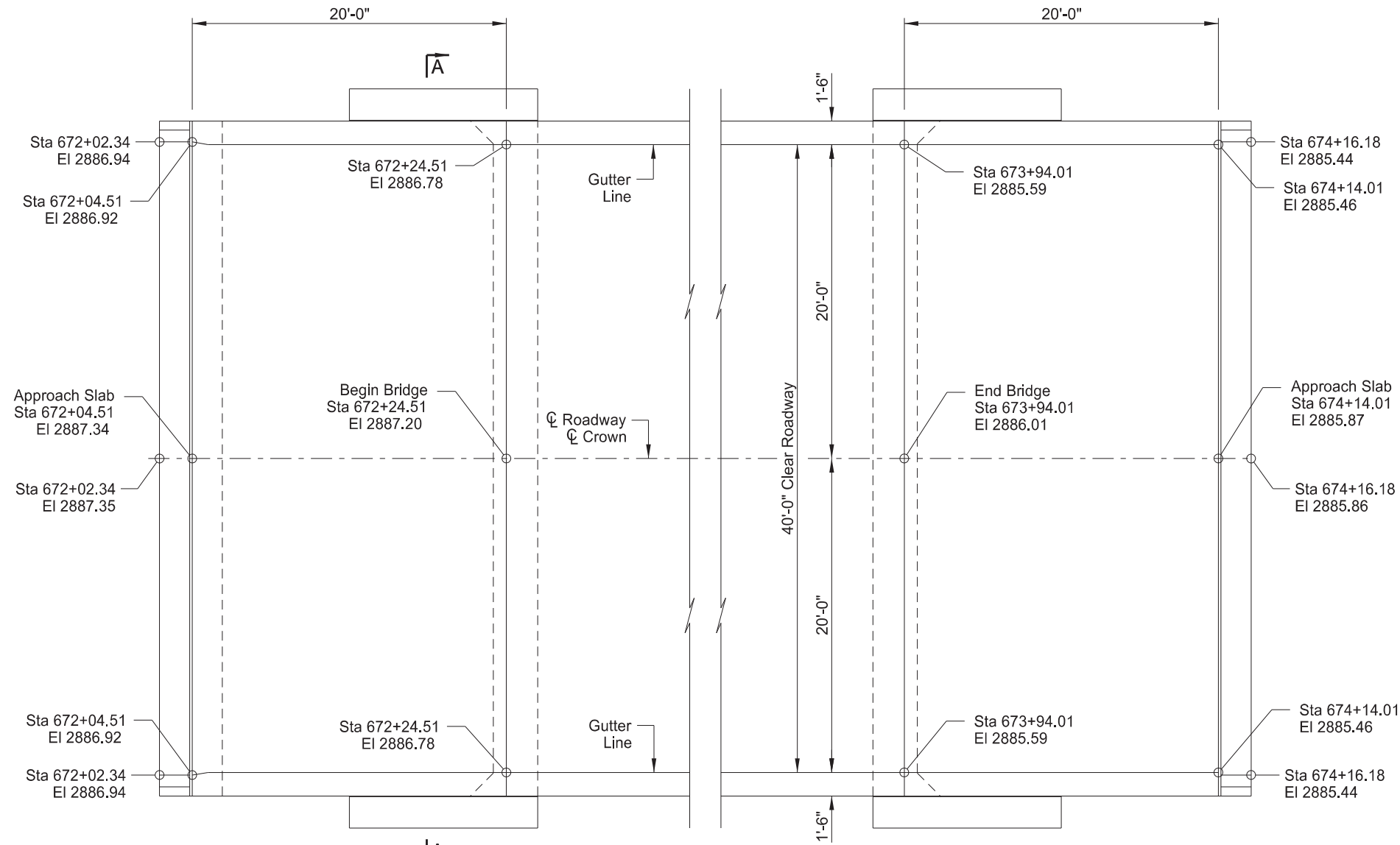


RISER DETAIL A

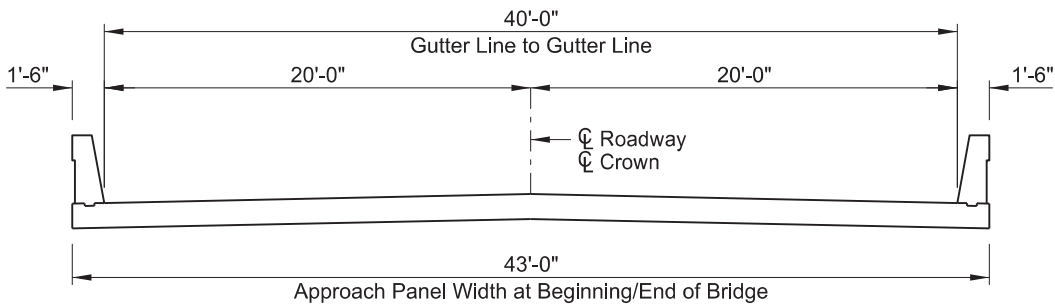
23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-085(086)012	170	19

NOTE: Verify elevations shown with roadway plans prior to construction.



PLAN



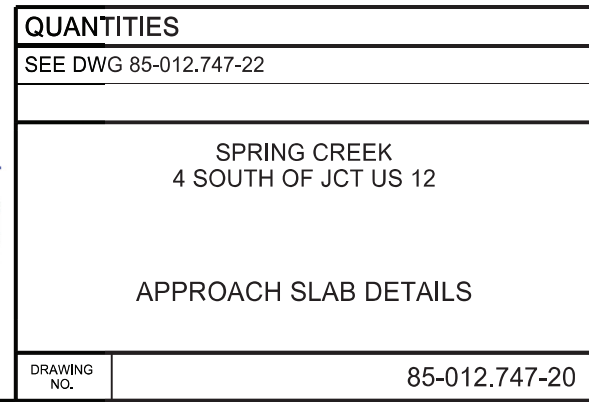
A-A



SPRING CREEK
4 SOUTH OF JCT US 12

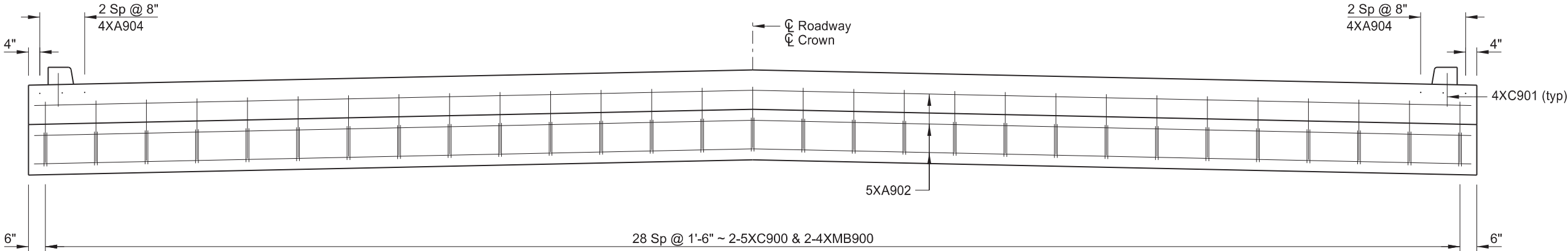
BRIDGE APPROACH PANEL LAYOUT

DRAWING NO.	85-012.747-19
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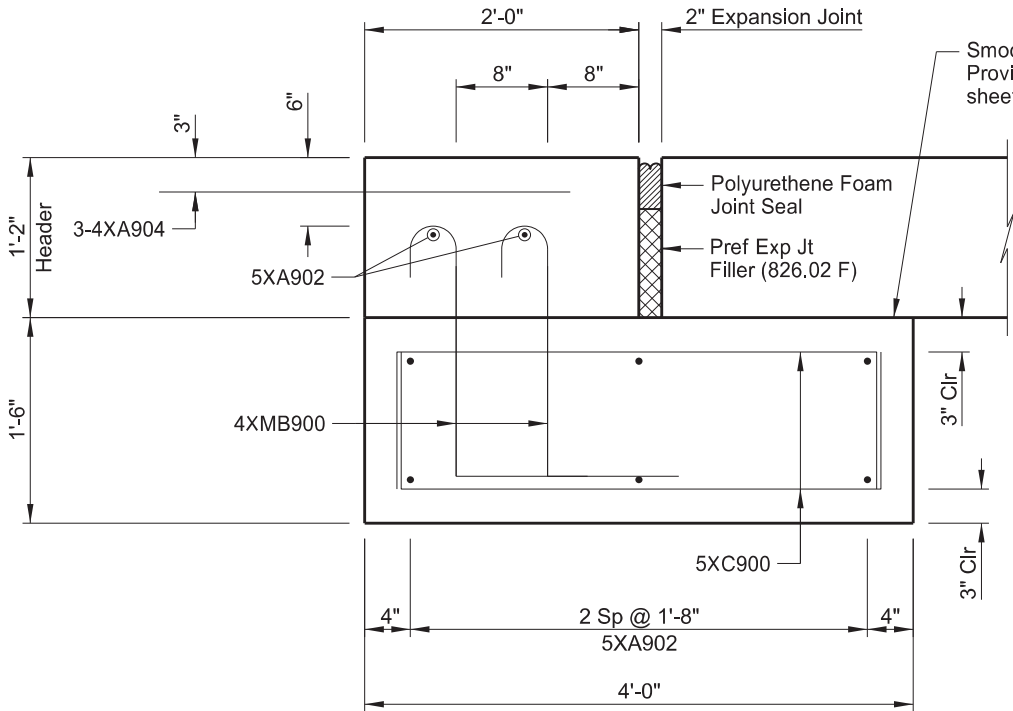


23 U.S.C. § 407 Documents
NDDOT Reserves All Objections

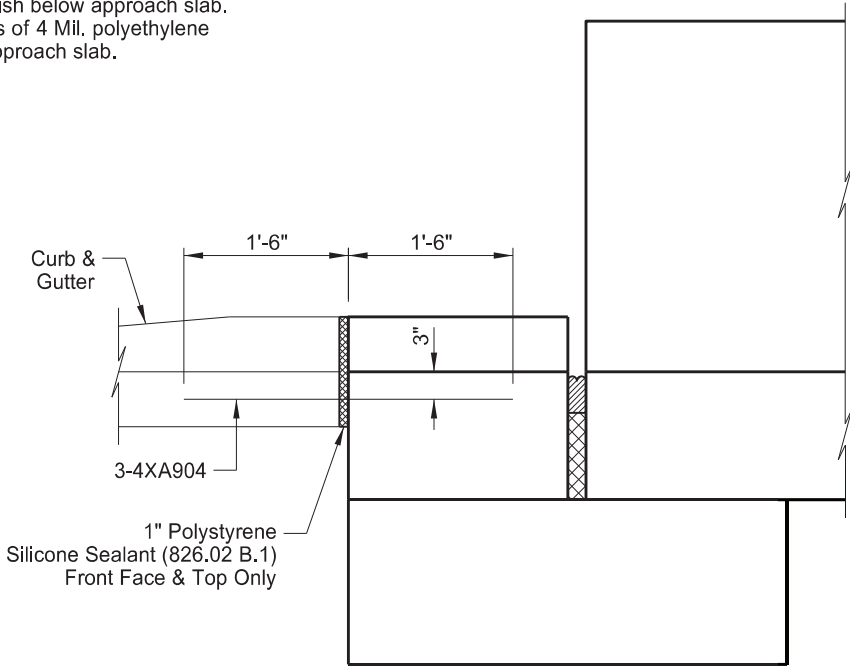
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SS-5-085(086)012	170	21



ELEVATION



CONCRETE SLEEPER SLAB



DETAIL "A"

NOTE:
See Dwg 85-012.747-20 for Detail "A" location.



SPRING CREEK
4 SOUTH OF JCT US 12

CONCRETE SLEEPER SLAB

DRAWING NO. 85-012.747-21

The estimated material quantities shown are for information purposes only. Include the concrete, reinforcing bars, polyethylene film, preformed joint filler, polystyrene, silicone sealant, connection plates and pipes, and labor required to build the approach slabs and barriers in the Approach Slab pay item. Use concrete that meets the requirements of Section 602. Provide reinforcing steel that meets the requirements of Section 612. Use polyethylene film that meets the requirements of ASTM C171.

Technical drawing of a window frame assembly. The drawing shows a cross-section of the frame with various dimensions and components labeled.

Dimensions:

- Top width: 1'-6"
- Top left section width: 7"
- Top right section width: 11"
- Left vertical height: 3'-2"
- Right vertical height (top section): 1'-2"
- Right vertical height (bottom section): 3'-2 3/8"
- Right vertical height (bottom section, alternative): 1'-2"
- Bottom right section width: 1 1/2"

Components and Labels:

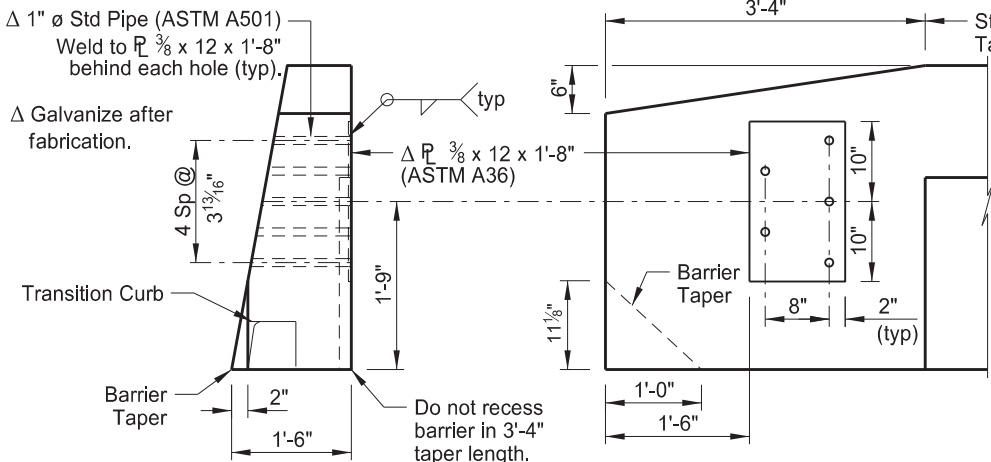
- Sealant (2 B.1)
- Keyway
- 1 1/2" x 5 1/2"

See Dwg 85-012.747-20 for Sections C-C and B-B locations.

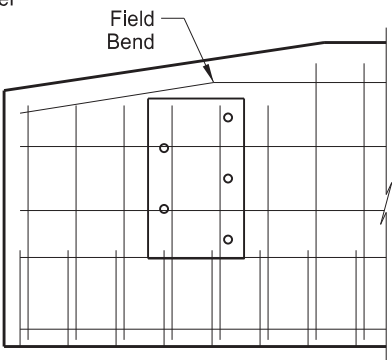
SPRING CREEK
4 SOUTH OF JCT US 12

APPROACH SLAB DETAILS

C-C



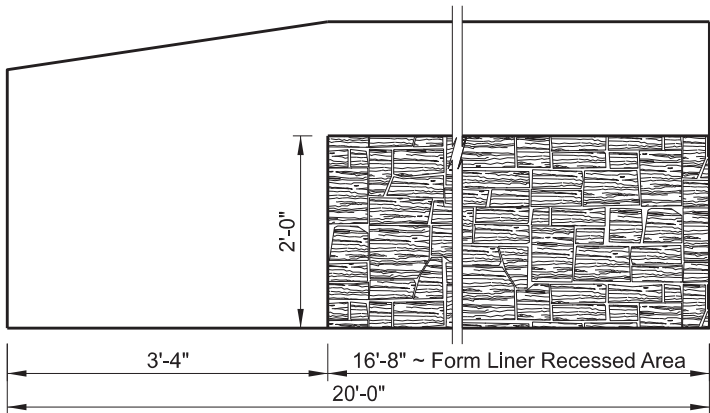
SHOWING DIMENSIONS



SHOWING REINFORCING

(SHOWING BACK FACE)

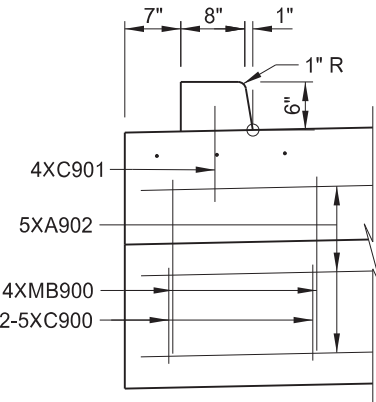
CONNECTION PLATE DETAILS



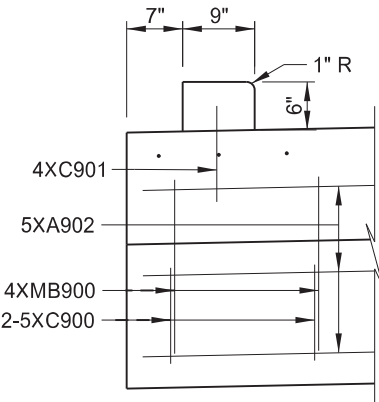
(SHOWING FORM LINER ~ BACK FACE)
BARRIER ELEVATION

NOTE:

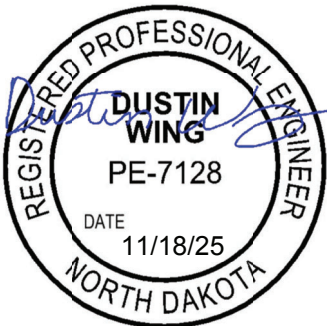
See "A-A" Dwg 85-012.747-15
for Form Liner Limits.



E-E

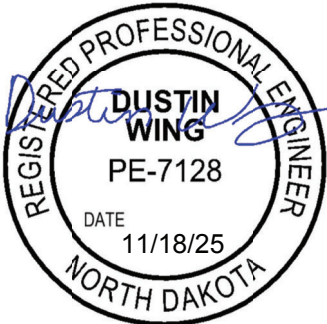


F-F



[illegible]

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



SPRING CREEK
4 SOUTH OF JCT US 12

REINFORCING BAR LIST

DRAWING
NO.

85-012.747-23

EAJ DWW

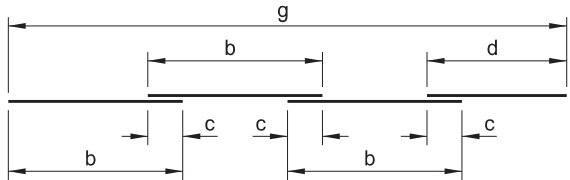
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	170	26

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

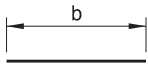
NOTES:

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. Turn adjacent "AA" bars end for end so that the splice locations are staggered.
5. The "f" dimension indicates the inside radius unless otherwise noted.
6. An "X" preceding a bar designation indicates an epoxy coated bar.
7. Reinforcing steel bid items do not include bar list quantity of approach slab reinforcing steel. Include the approach slab bar list quantity in the approach slab pay items.

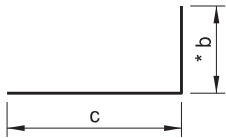


c = Lap Splice (typ)
e = # of "b" Length Pieces in a Set
Total Length per Set = e x b + d

AA

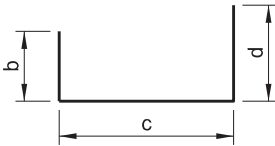


A

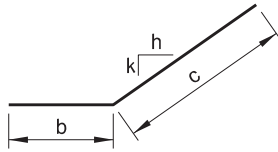


B

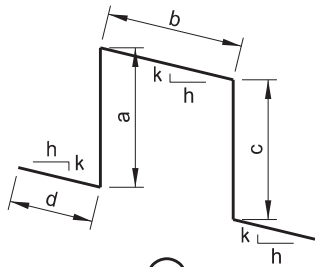
* b = Vertical Leg for
XB500 and XB501



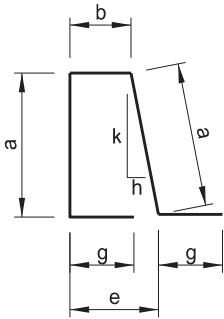
C



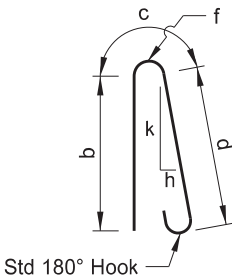
D



G

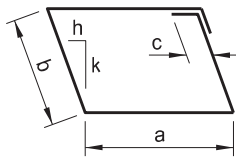


K

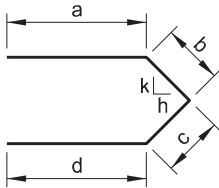


ML

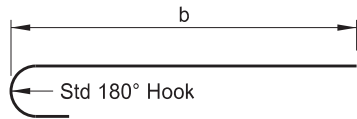
Std 180° Hook



N

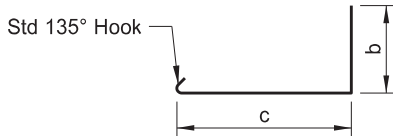


M



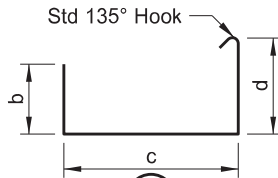
MA

Std 180° Hook



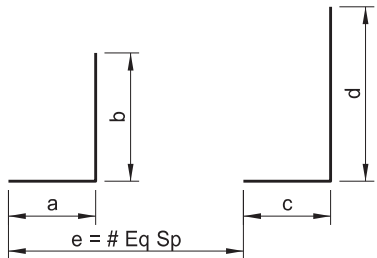
MB

Std 135° Hook

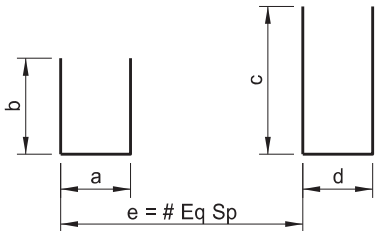


MC

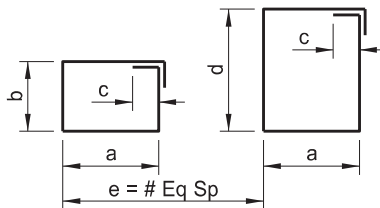
Std 135° Hook



SB



SC



SN



SPRING CREEK
4 SOUTH OF JCT US 12

REINFORCING BAR LIST

DRAWING
NO.

85-012.747-26



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
300 AIRPORT ROAD
BISMARCK, ND 58504

LOG OF BORING SB - 1
PAGE 1 OF 1

PROJECT NUMBER

SS-5-085(086)012

DATE STARTED

7/15/24

COMPLETED

7/16/24

PCN

23772

ELEVATION

2876 ft

LOCATION

Bowman County

Northing

5117411.48 ft

Easting

159208.16 ft

DRILLED BY

Dallan

LOGGED BY

Jamie

RP+Feet

12+3995 ft

Offset

60 Lt

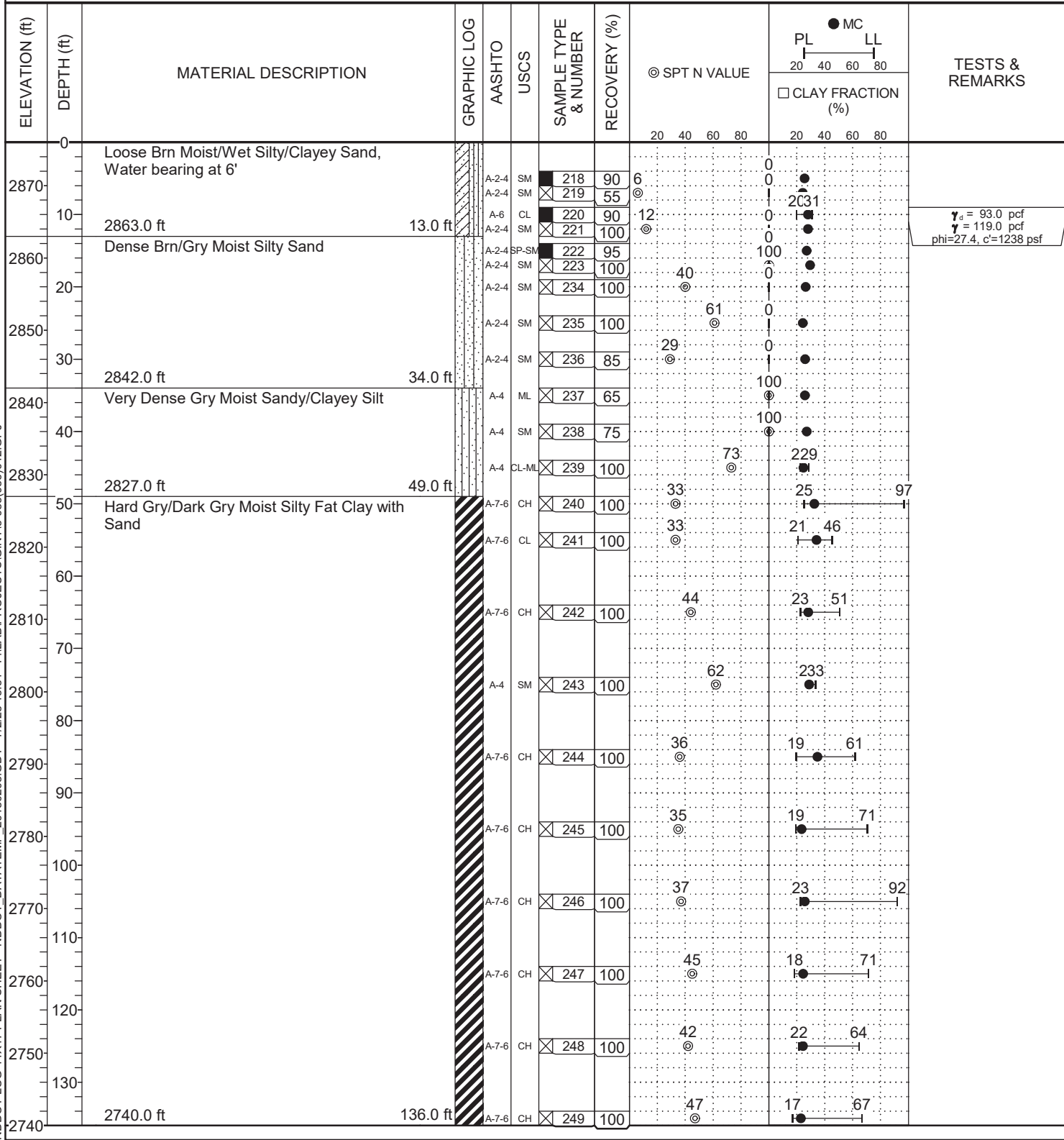
ENGINEER

DRILLING METHOD

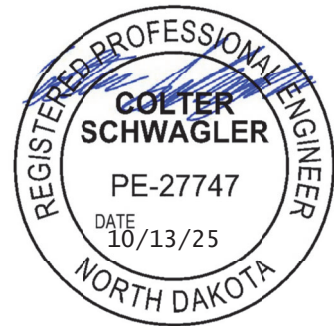
NOTES

Coordinate System: NAD 1983 UTM Zone 14N

NDDOT LOG 11X17 PLAN SHEET - NDDOT_DATA\TEMP - 20180208.GDT - 7/2/25 13:51 - F:\LAB\PROJECTS\GINT\5-085(086)012.GPJ



Bottom of borehole at 136.0 ft



Boring Log 1



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION
300 AIRPORT ROAD
BISMARCK, ND 58504

LOG OF BORING SB - 2
PAGE 1 OF 1

PROJECT NUMBER

SS-5-085(086)012

DATE STARTED

7/16/24

COMPLETED

7/18/24

PCN

23772

ELEVATION

2885 ft

LOCATION

Bowman County

Northing

5117370.58 ft

Easting

159236.63 ft

DRILLED BY

Dallan

LOGGED BY

Jamie

RP+Feet

12+3888 ft

Offset

19 Rt

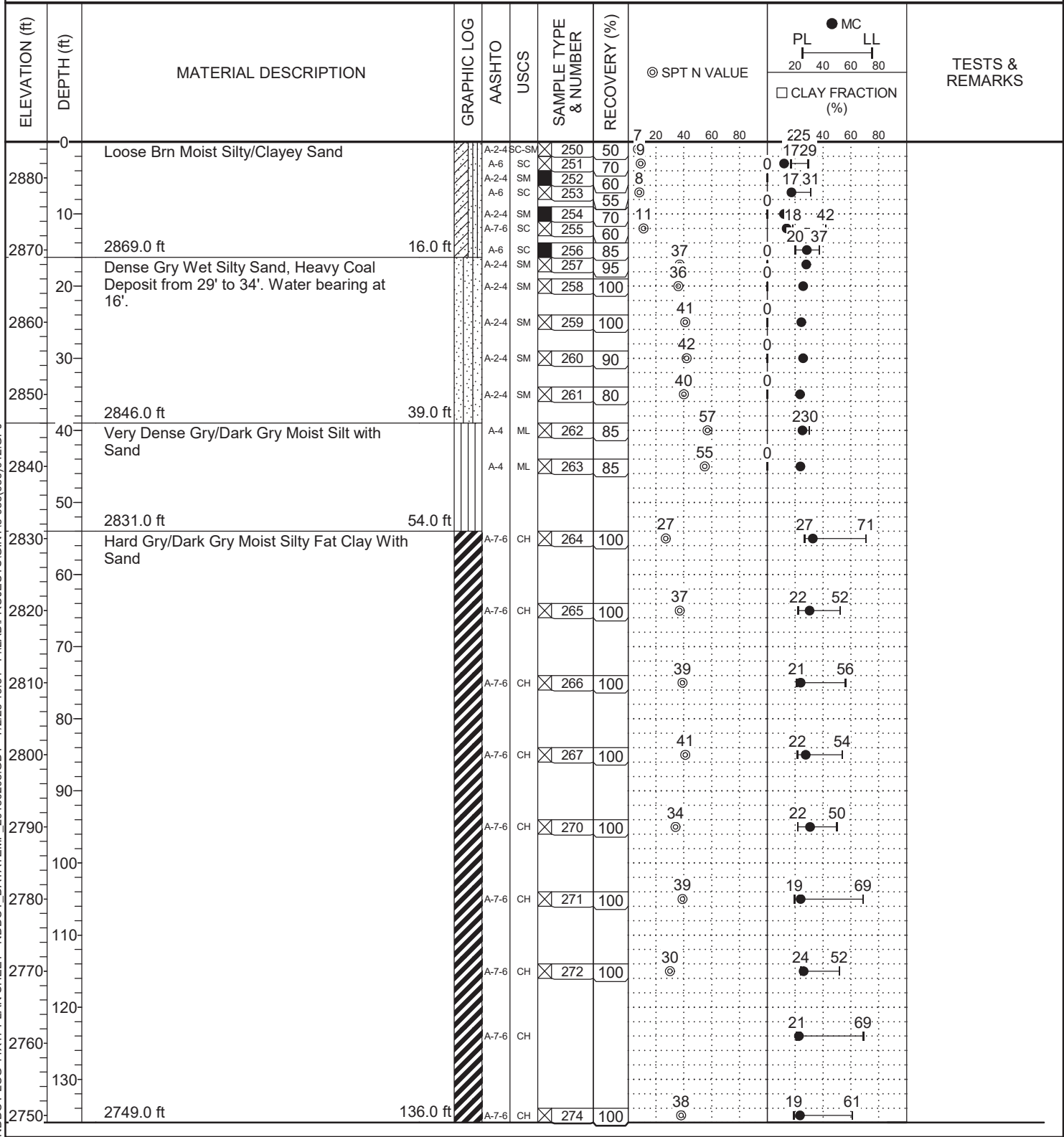
ENGINEER

DRILLING METHOD

NOTES

Coordinate System: NAD 1983 UTM Zone 14N

NDDOT LOG 11X17 PLAN SHEET - NDDOT_DATA\TEMP_20180208.GDT - 7/2/25 13:51 - F:\LAB\PROJECTS\GINT\5-085(086)012.GPJ



Bottom of borehole at 136.0 ft



Boring Log 2

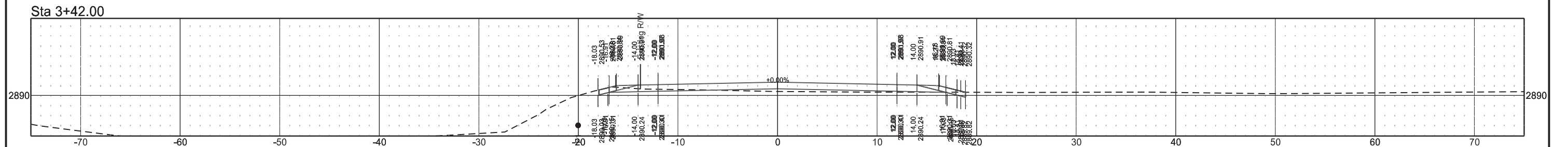
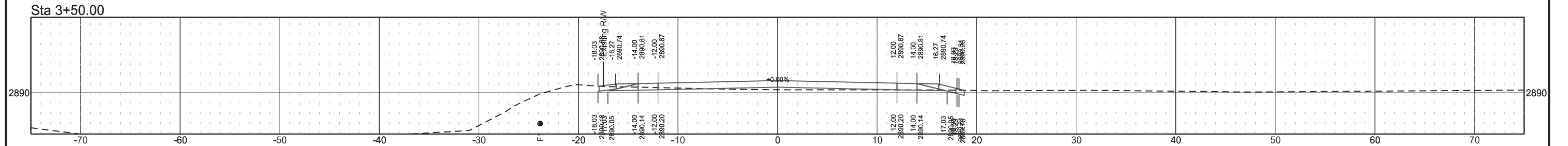
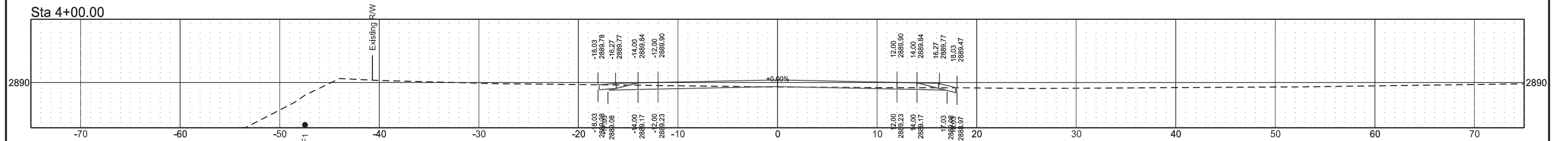
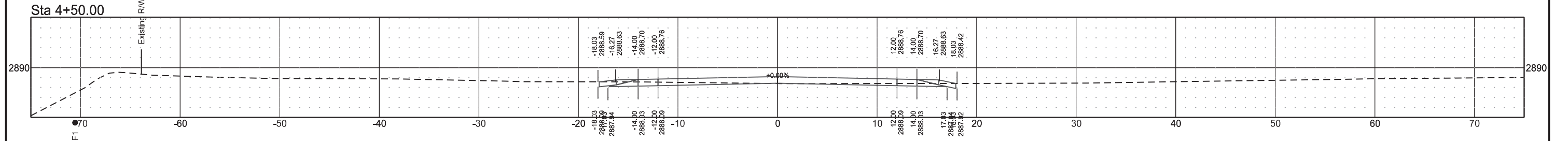
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	ND	SS-5-085(086)012	200	1



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	200	2



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	200	3



Temporary Bypass

STATE

PROJECT NO.

SECTION NO.

SHEET NO.

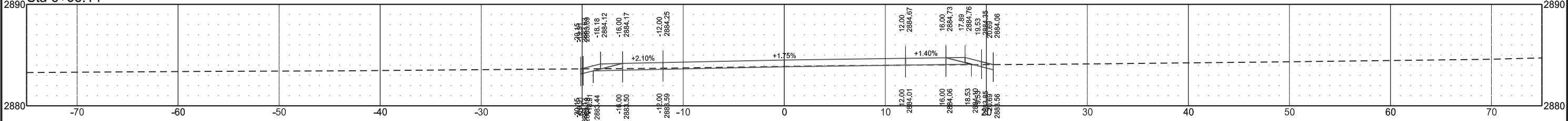
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SS-5-085(086)012

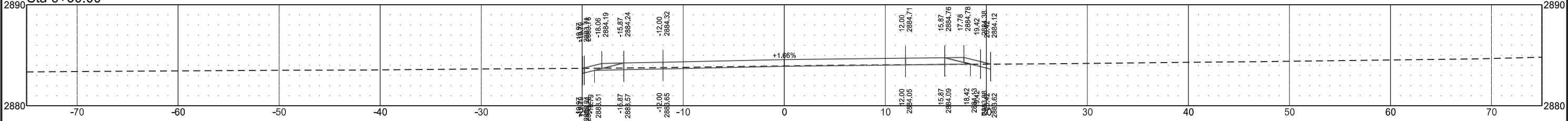
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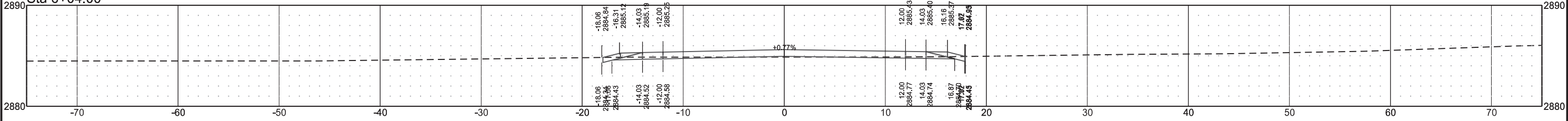
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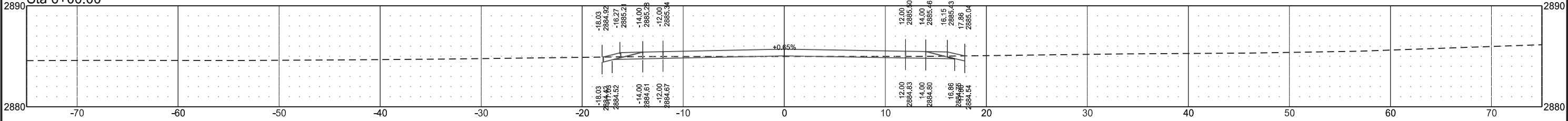
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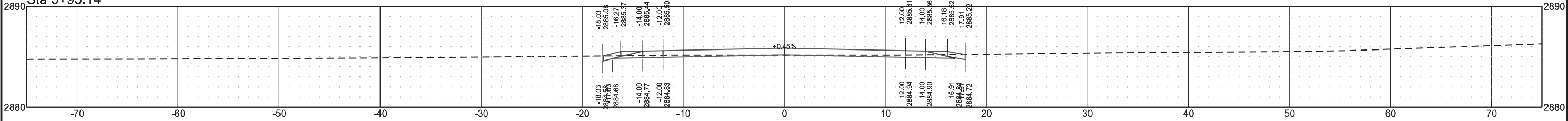
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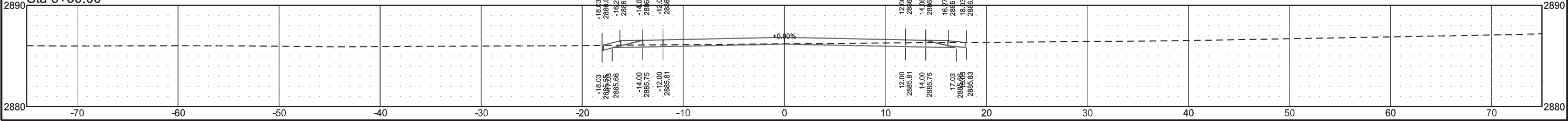
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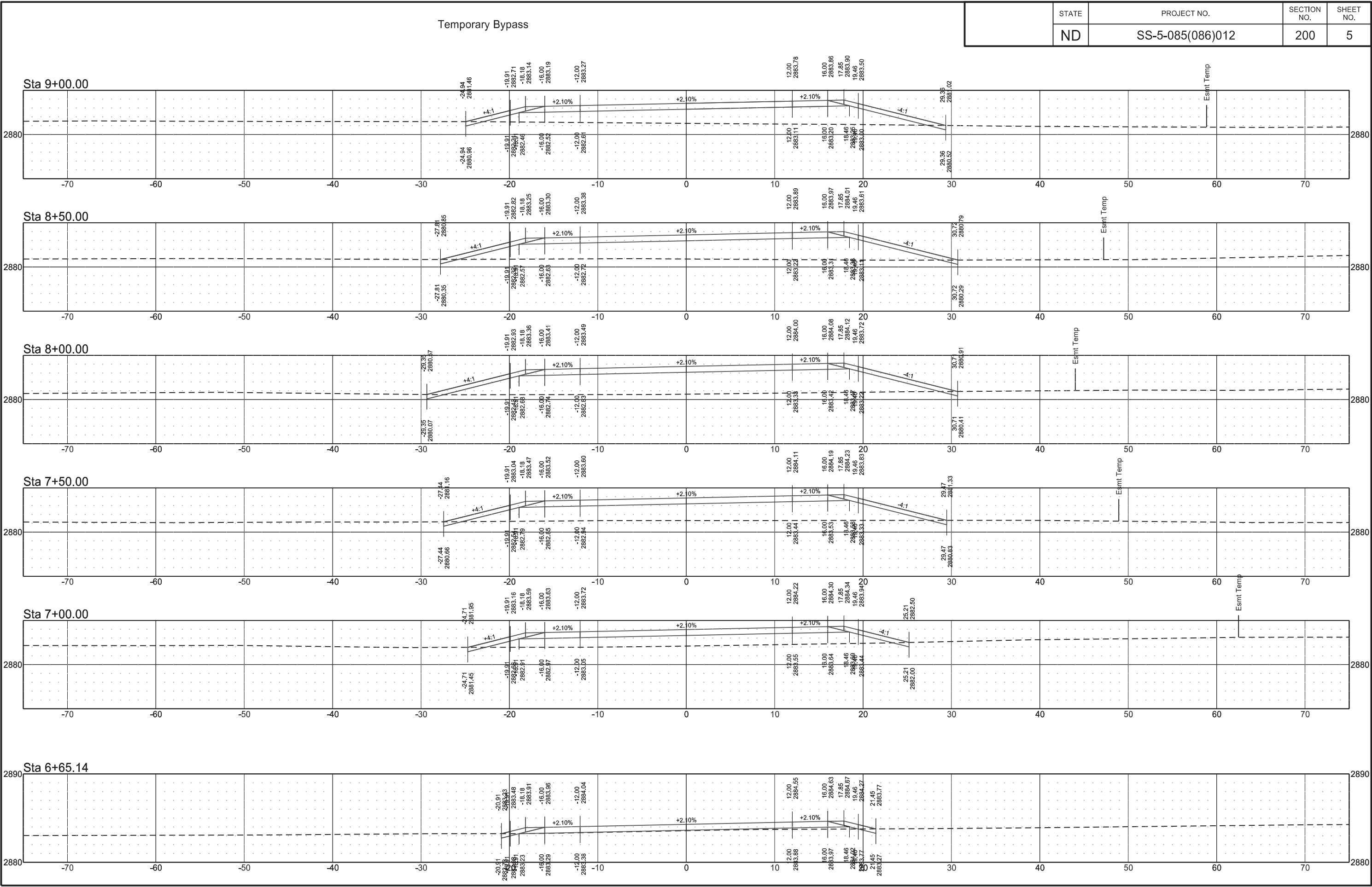


Sta 5+93.14



Sta 5+50.00





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	ND	SS-5-085(086)012	200	6



Temporary Bypass

STATE

PROJECT NO.

SECTION NO.

SHEET NO.

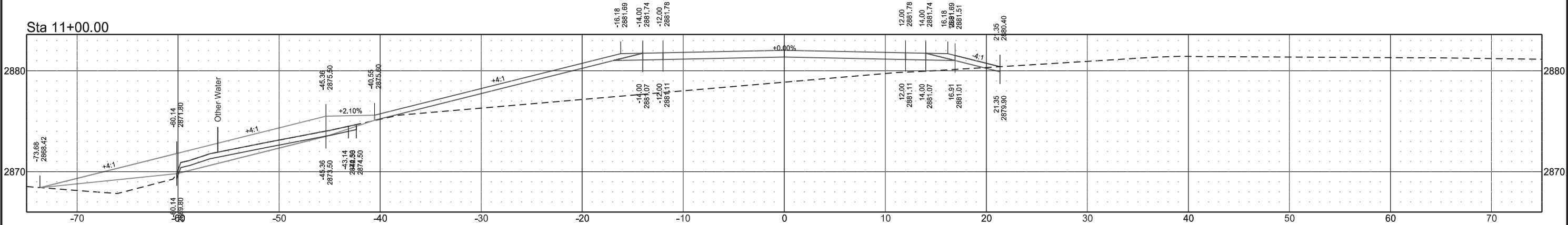
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SS-5-085(086)012

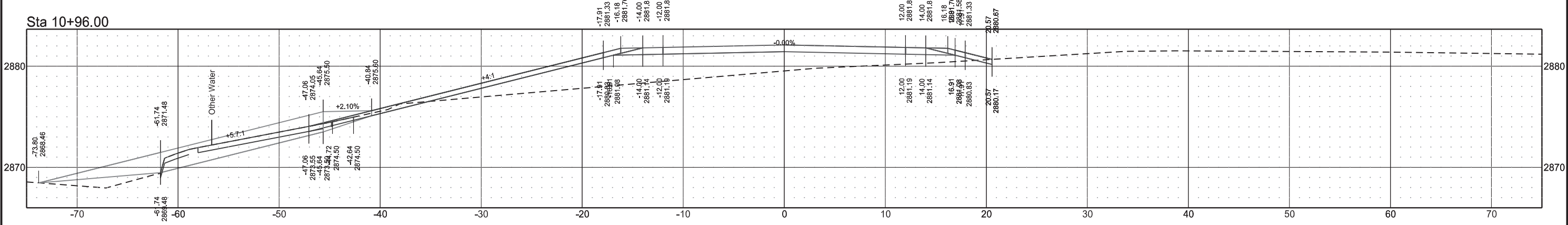
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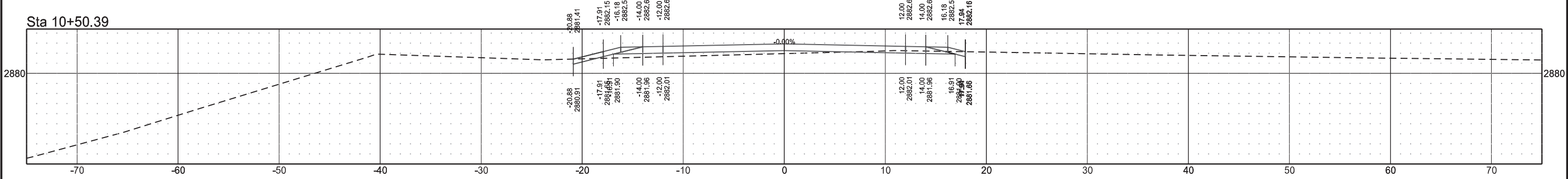
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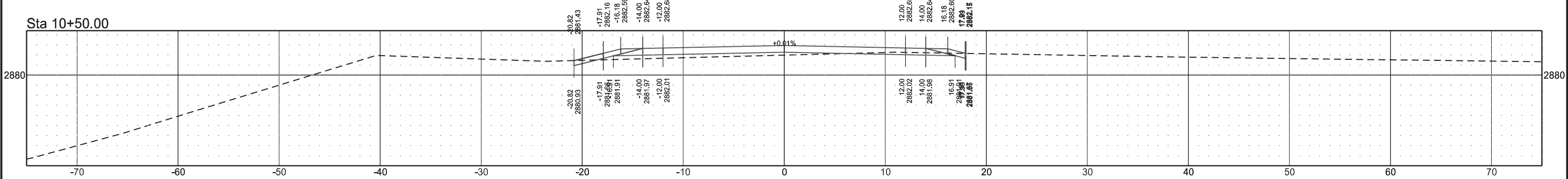
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Sta 10+50.39



Sta 10+50.00



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	200	10



Temporary Bypass

STATE

PROJECT NO.

SECTION NO.

SHEET NO.

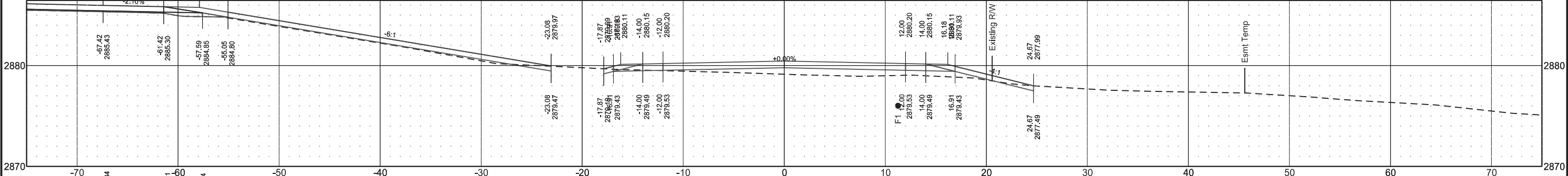
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SS-5-085(086)012

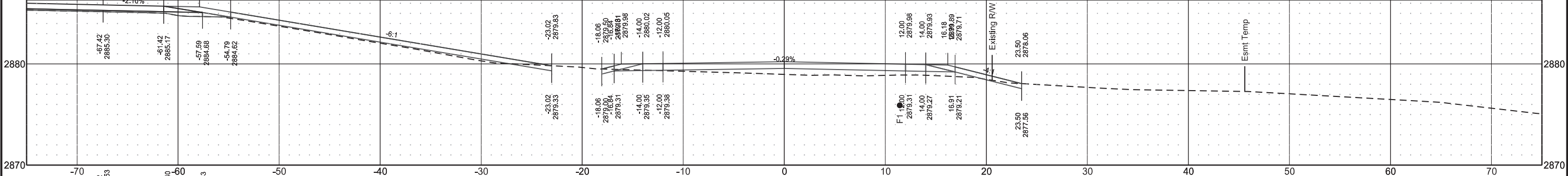
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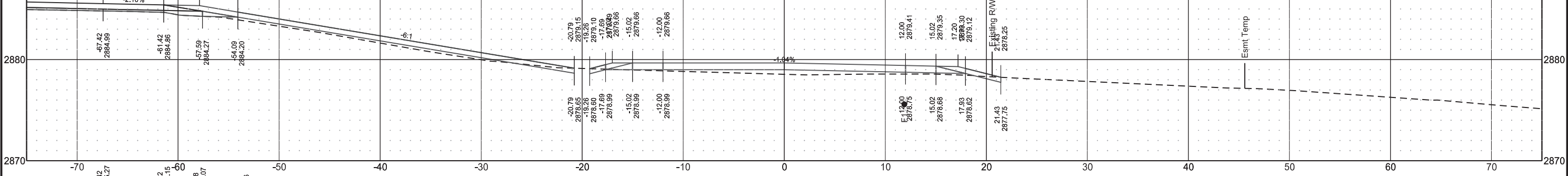
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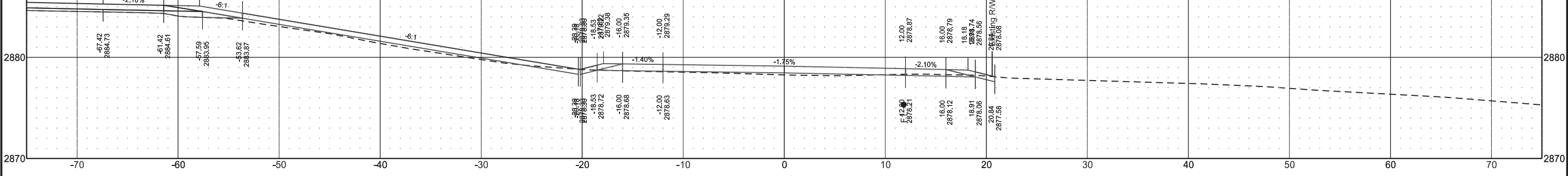
Sta 14+25.53



Sta 14+00.00



Sta 13+75.53



Temporary Bypass

STATE

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SECTION NO.

SHEET NO.

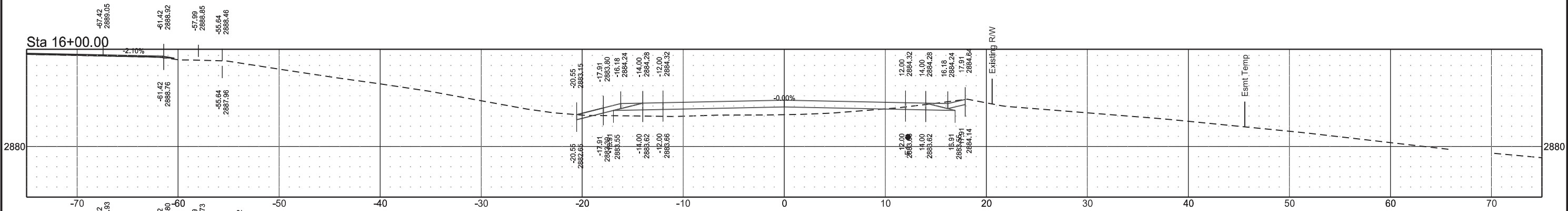
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SS-5-085(086)012

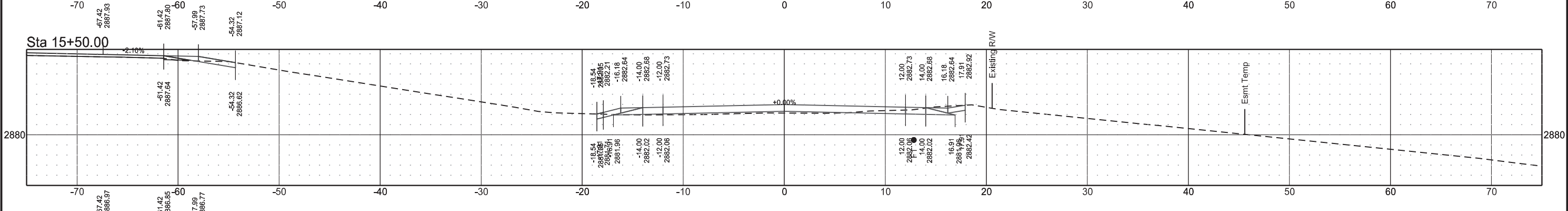
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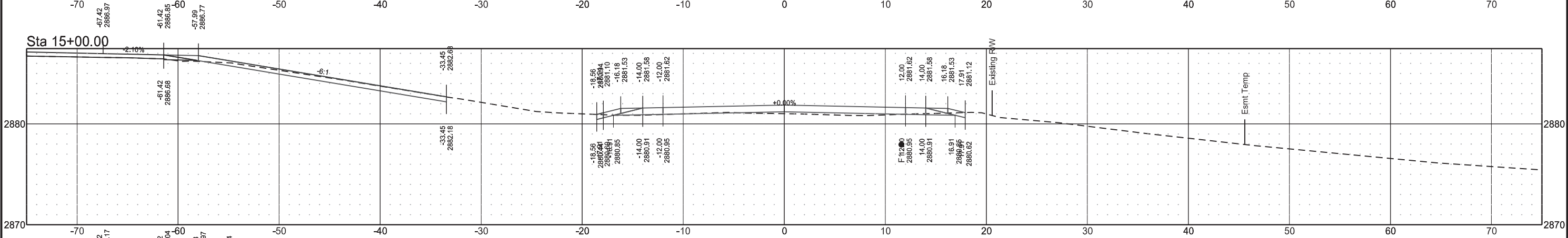
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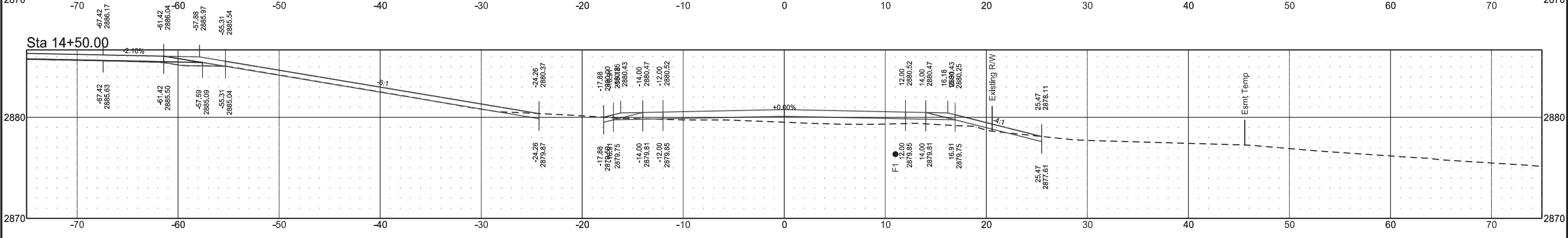
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Sta 15+00.00



Sta 14+50.00



Temporary Bypass

STATE

PROJECT NO.

SECTION NO.

SHEET NO.

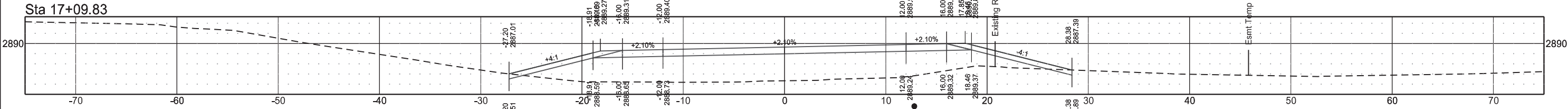
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SS-5-085(086)012

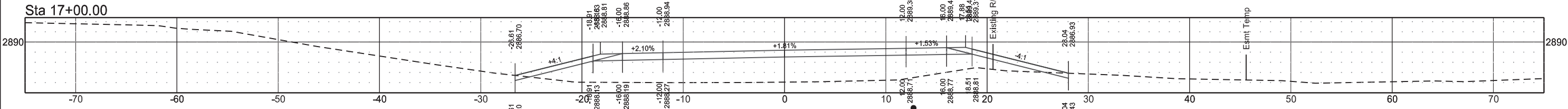
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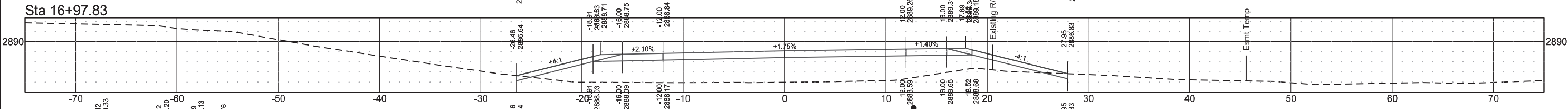
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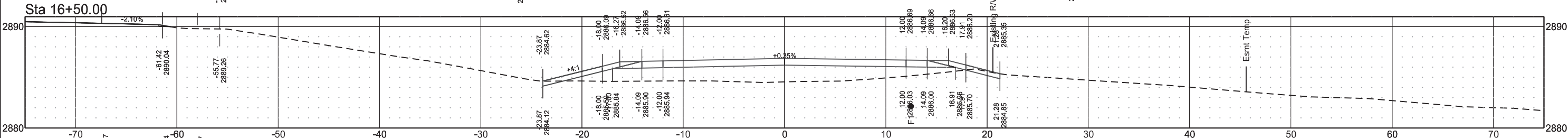
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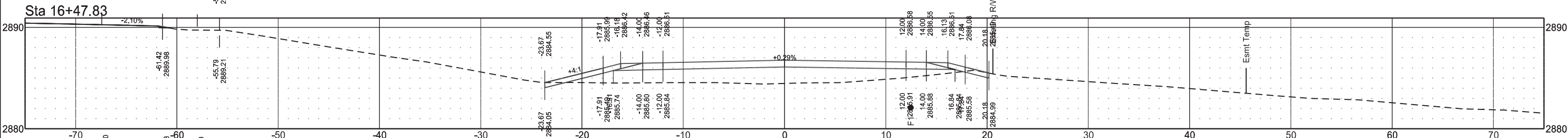
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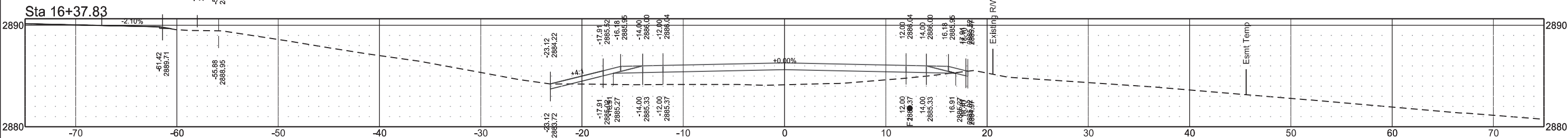
Sta 16+50.00



Sta 16+47.83



Sta 16+37.83



Temporary Bypass

STATE

PROJECT NO.

SECTION NO.

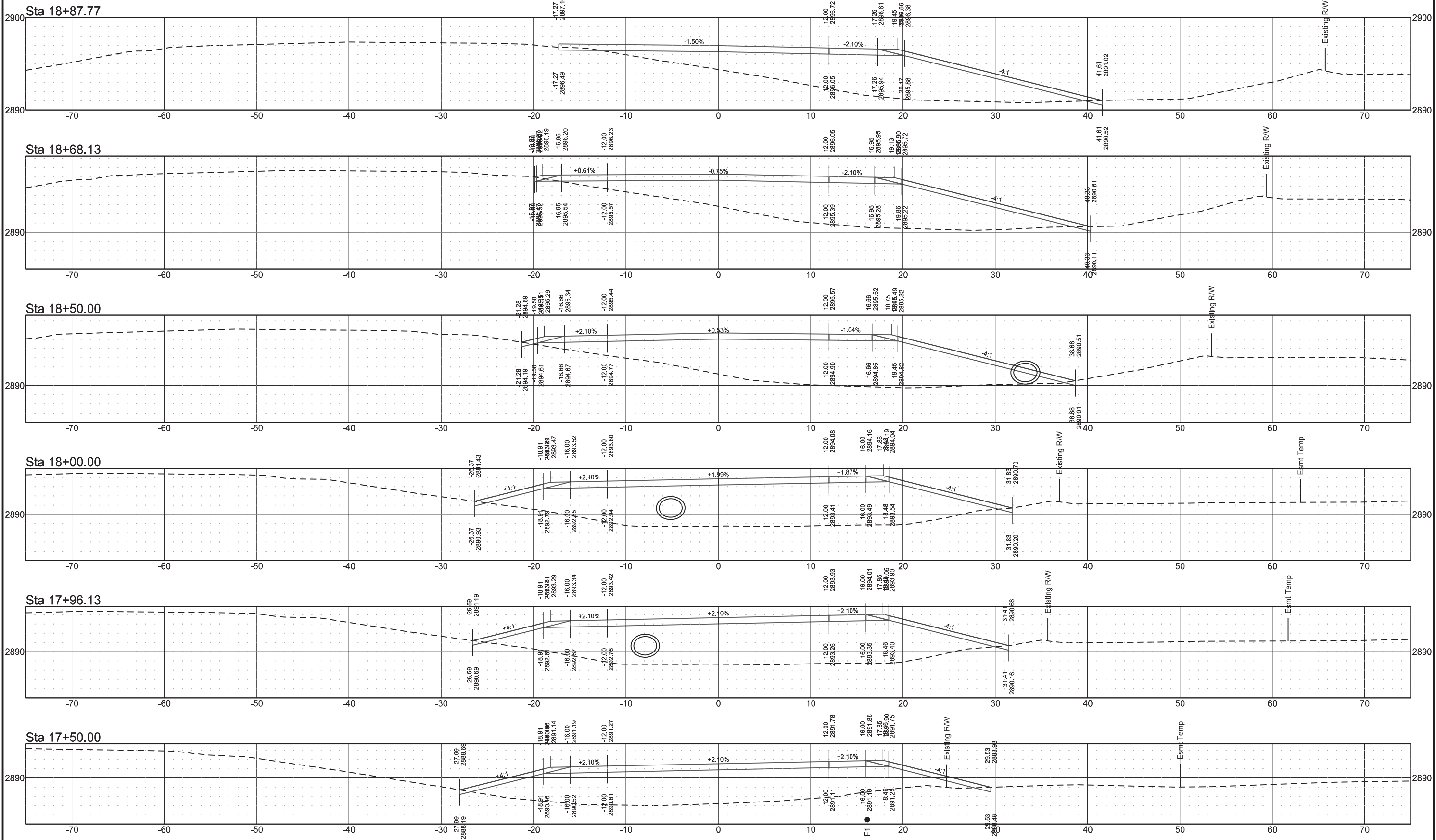
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ND

SS-5-085(086)012

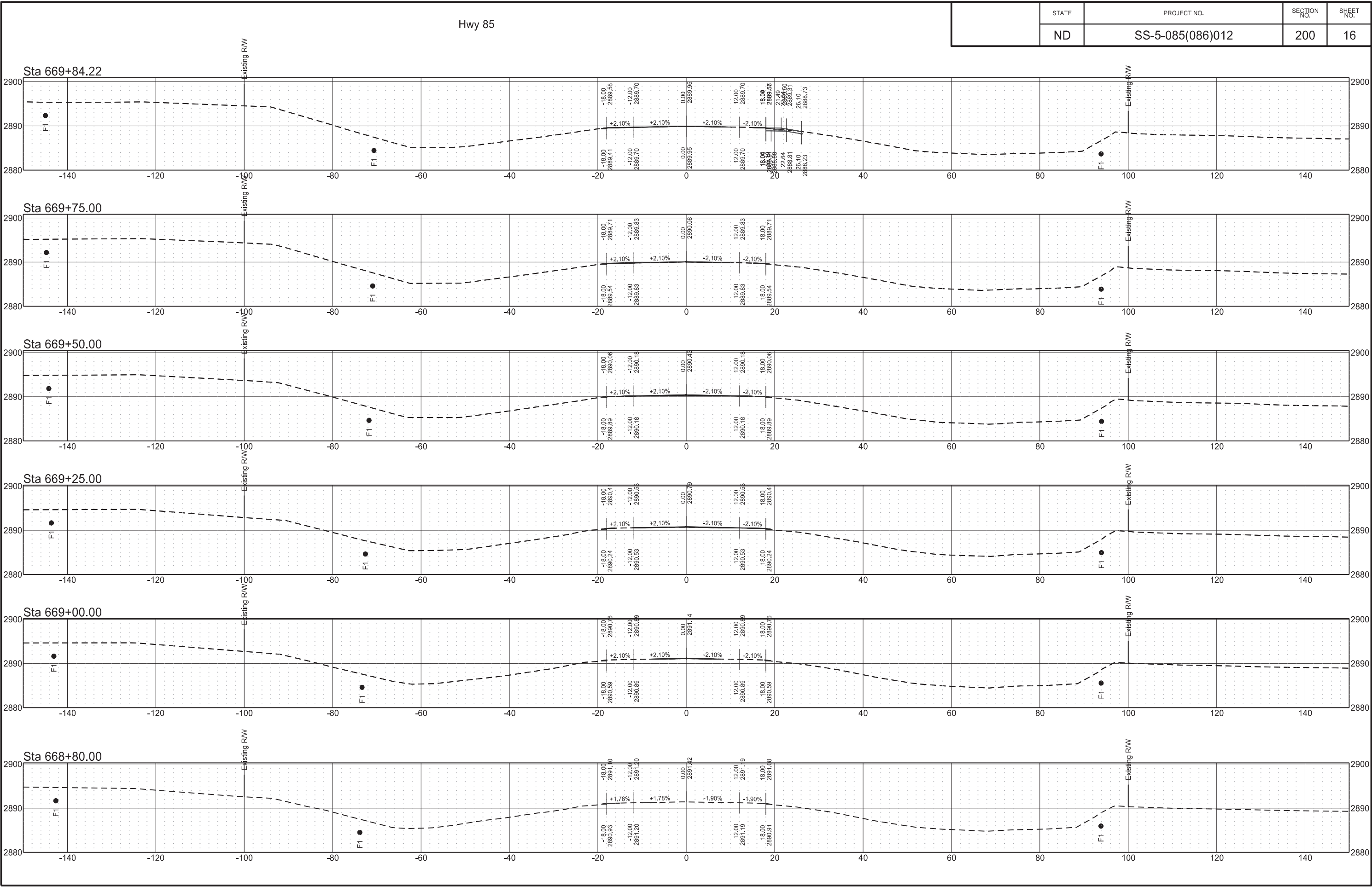
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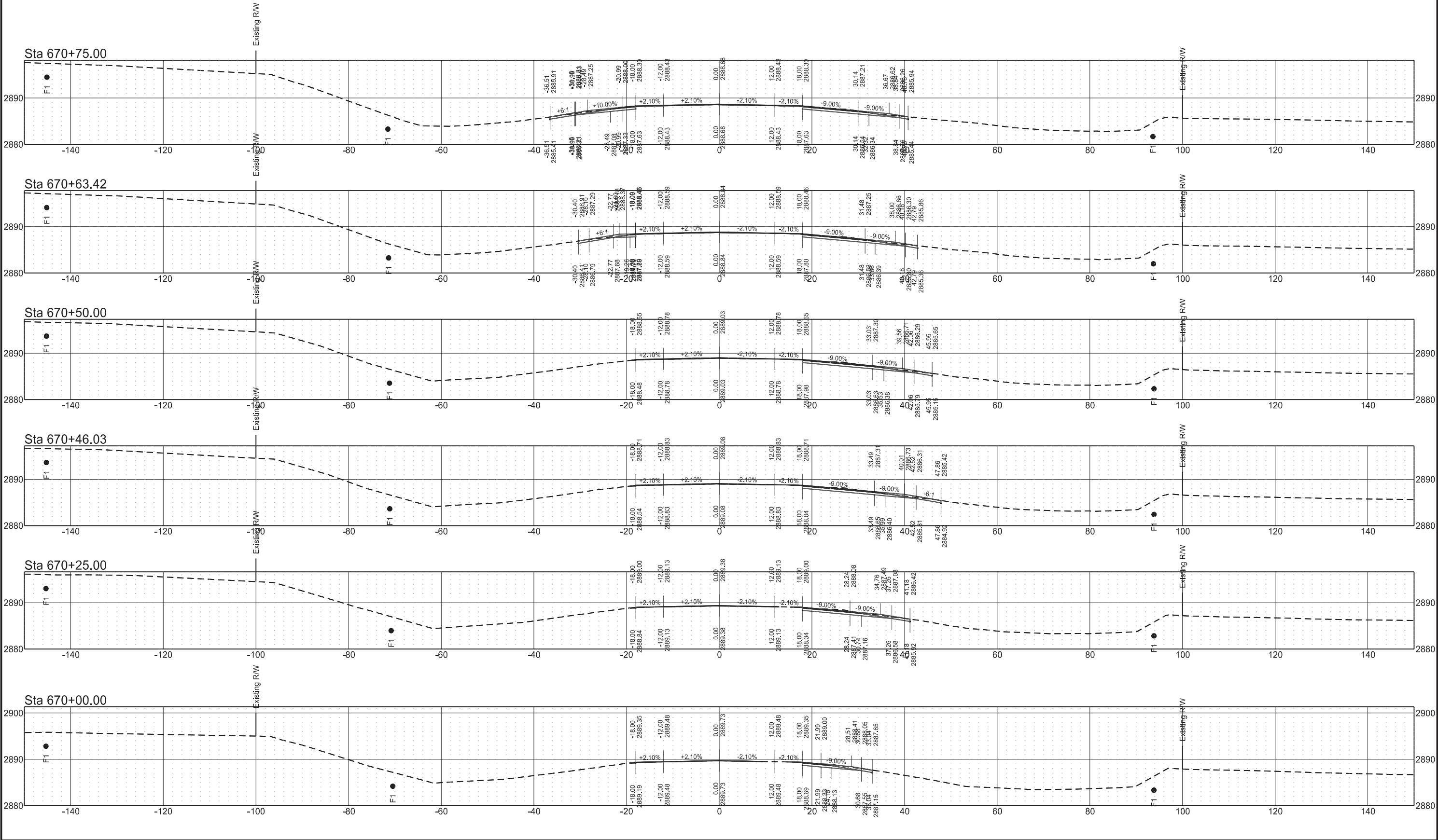


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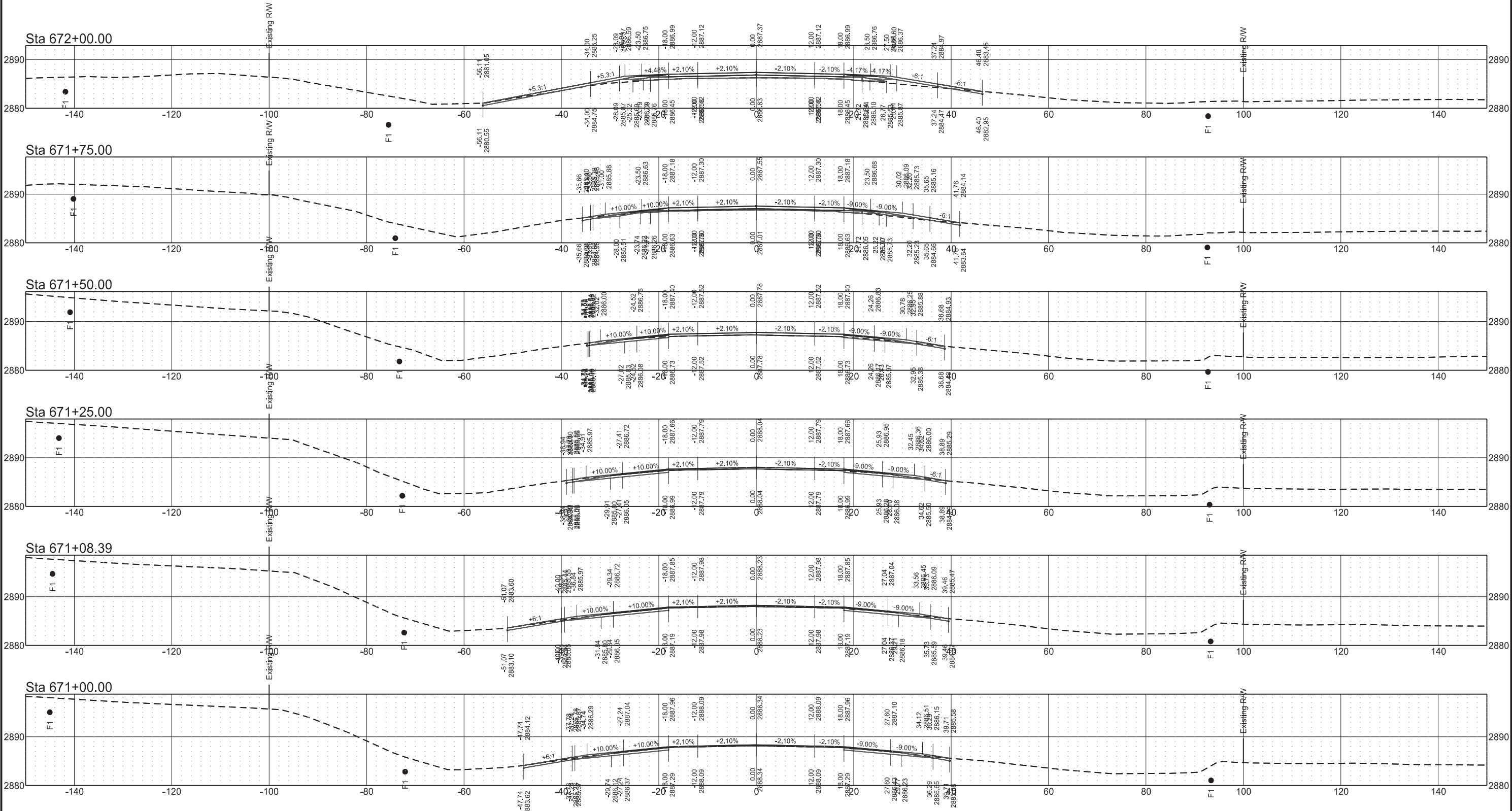




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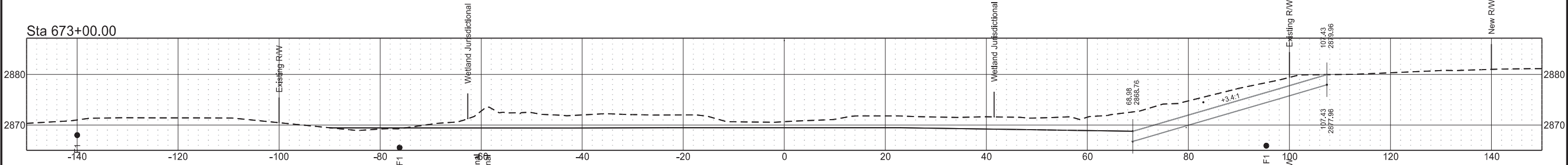


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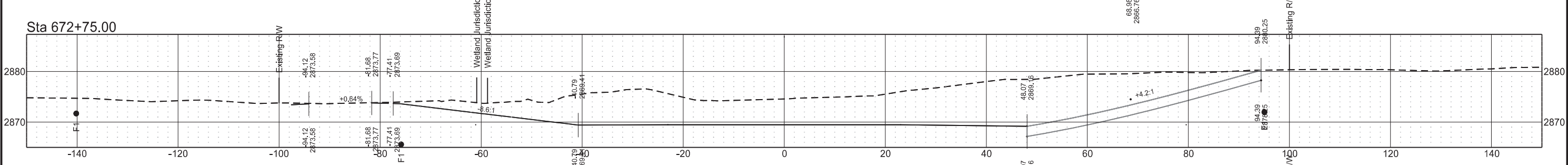


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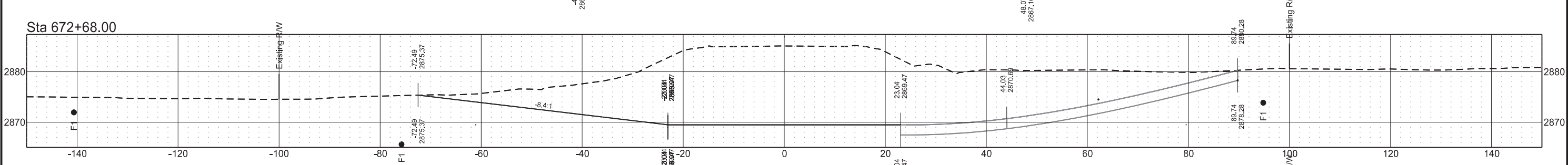
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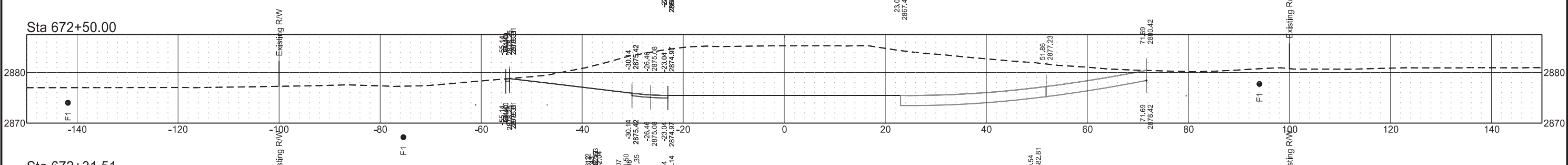
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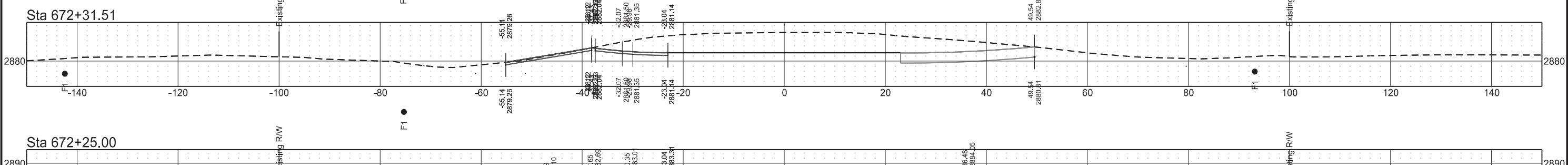
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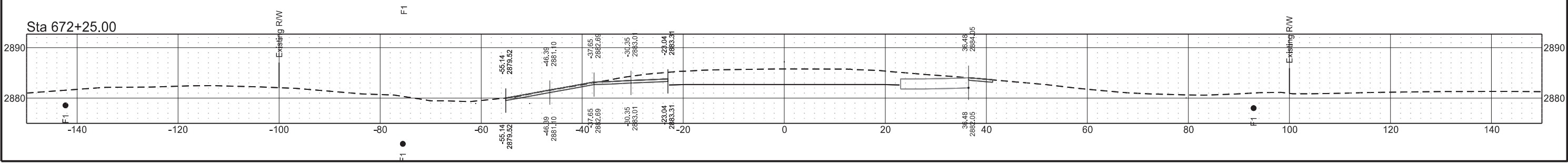
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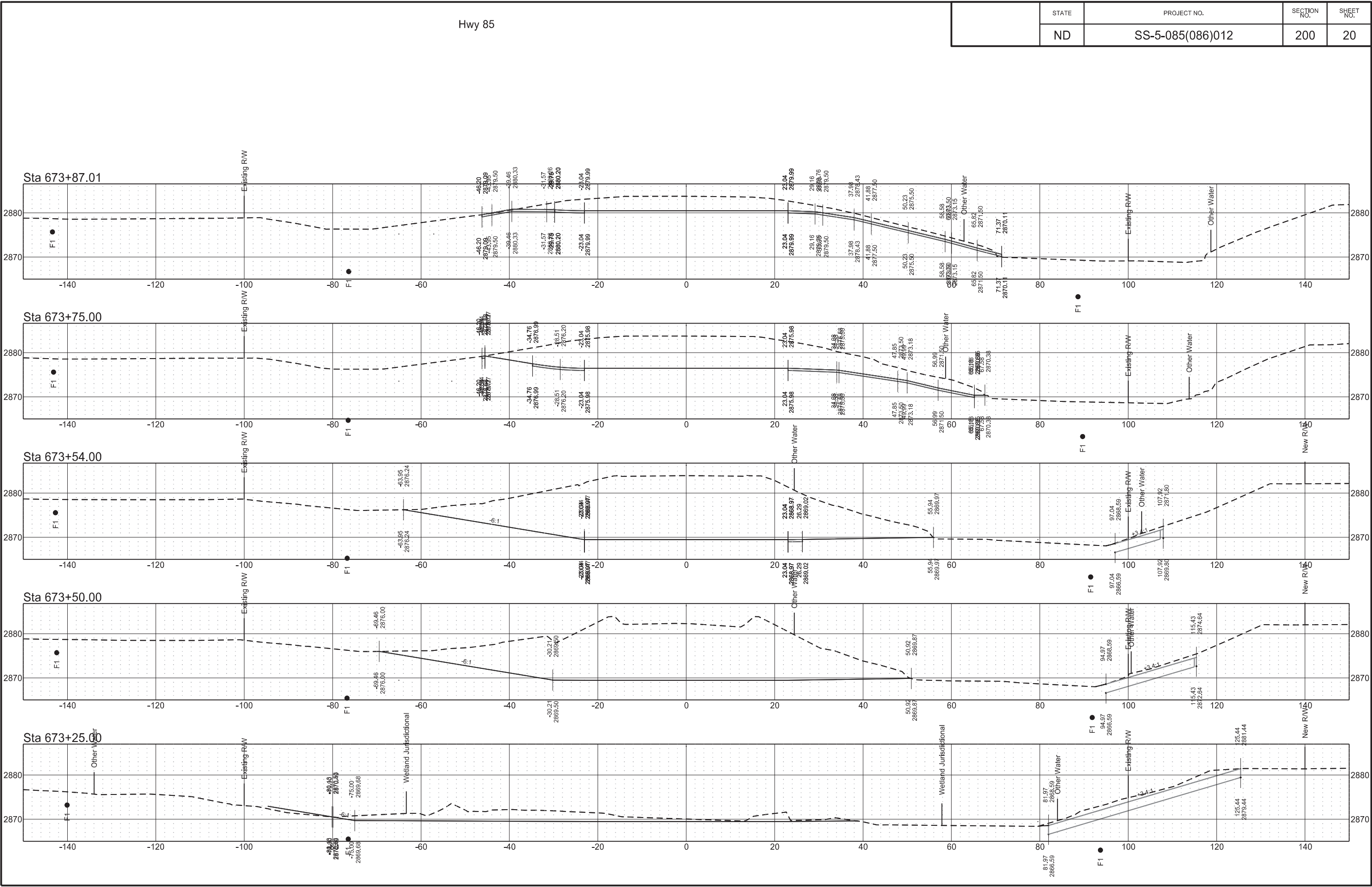


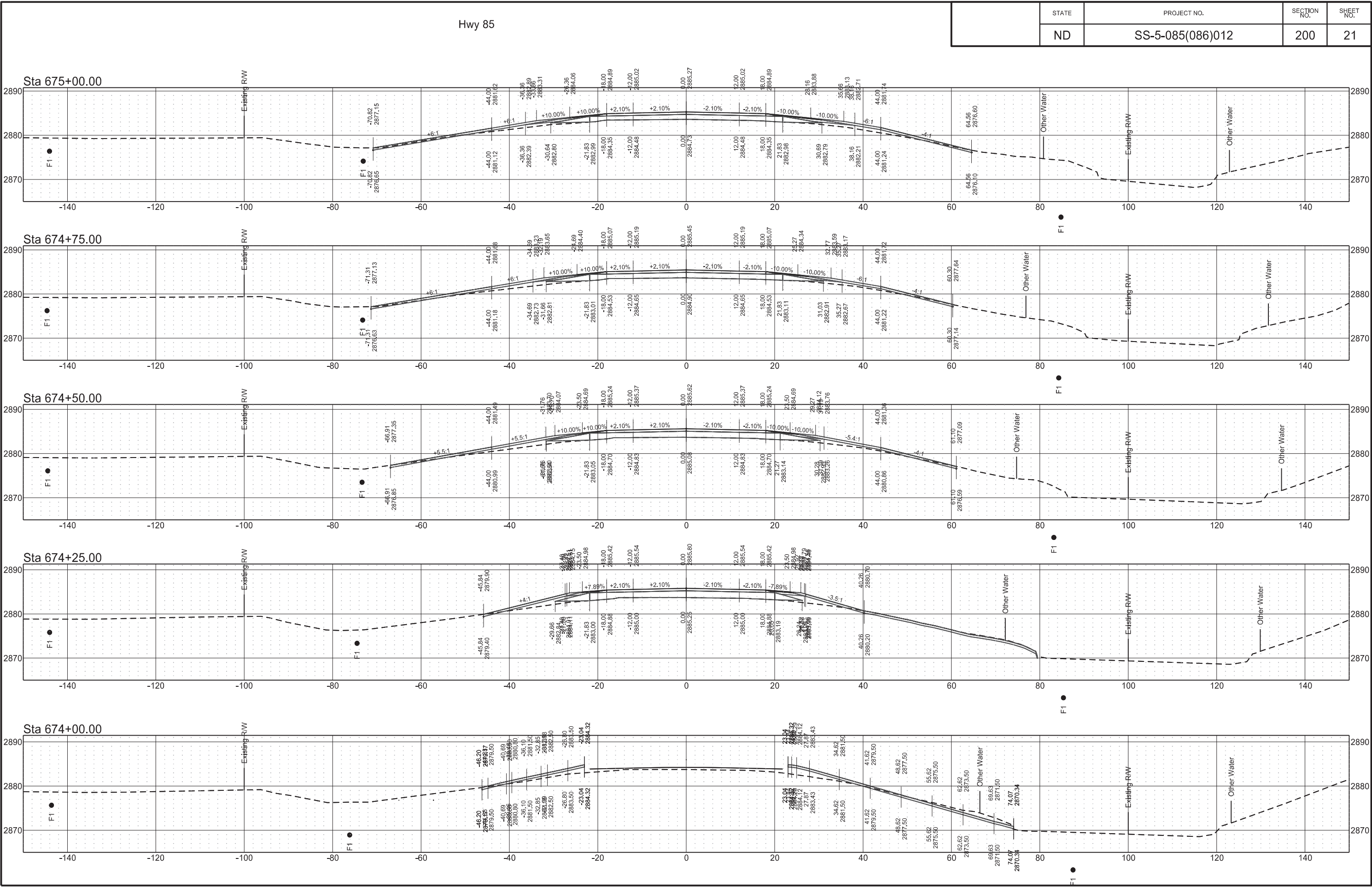
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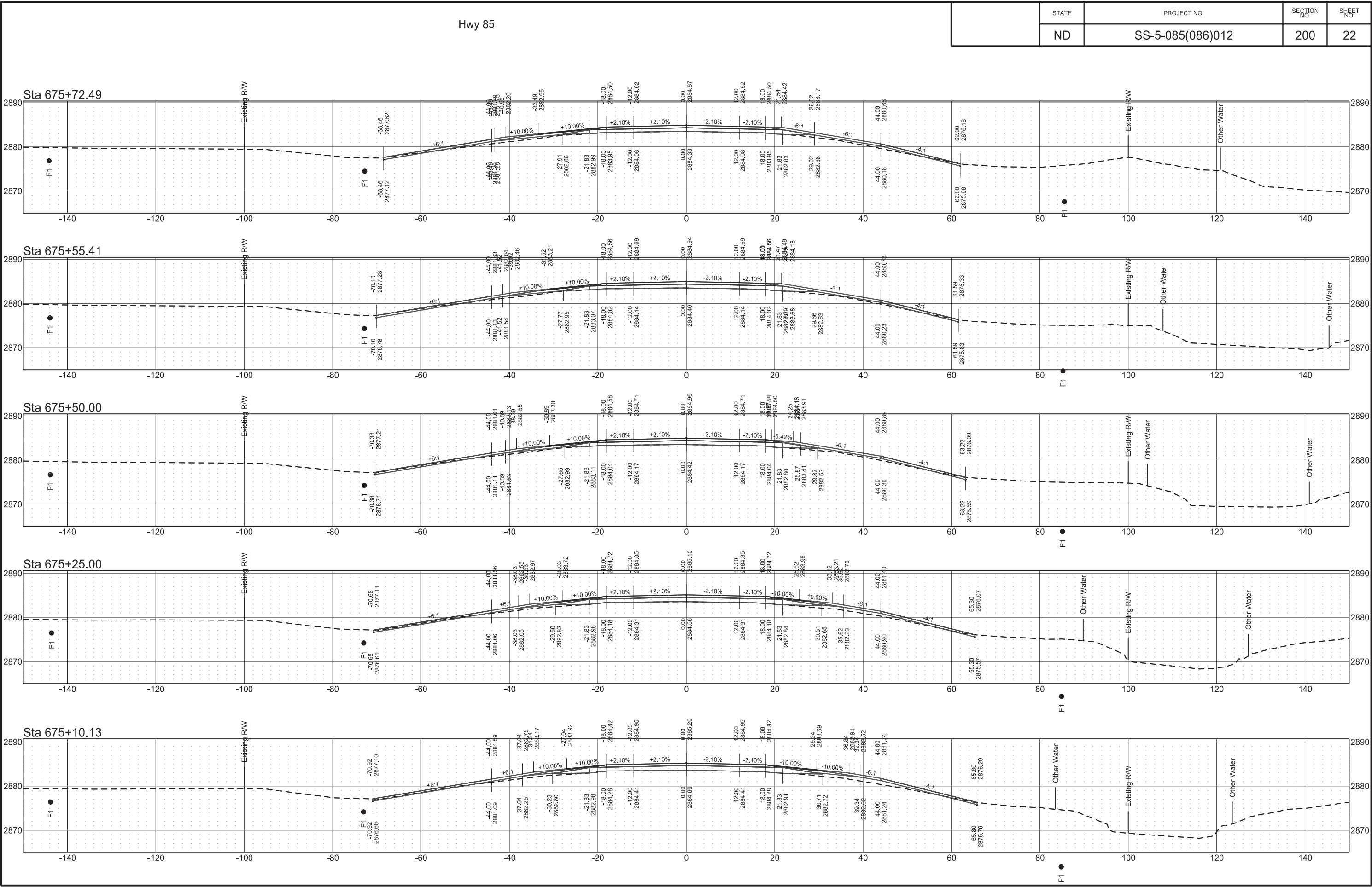


Sta 672+25.00





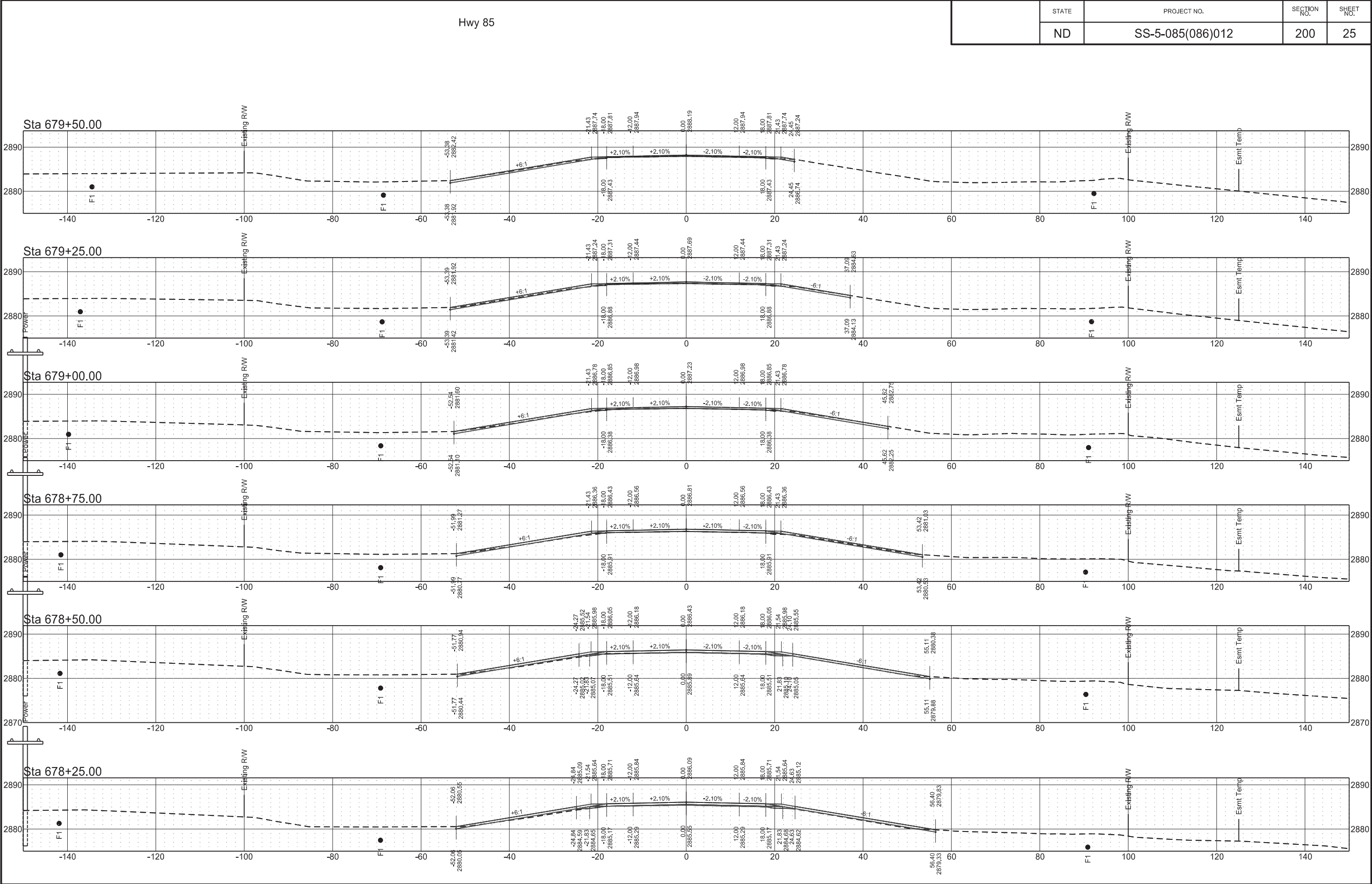




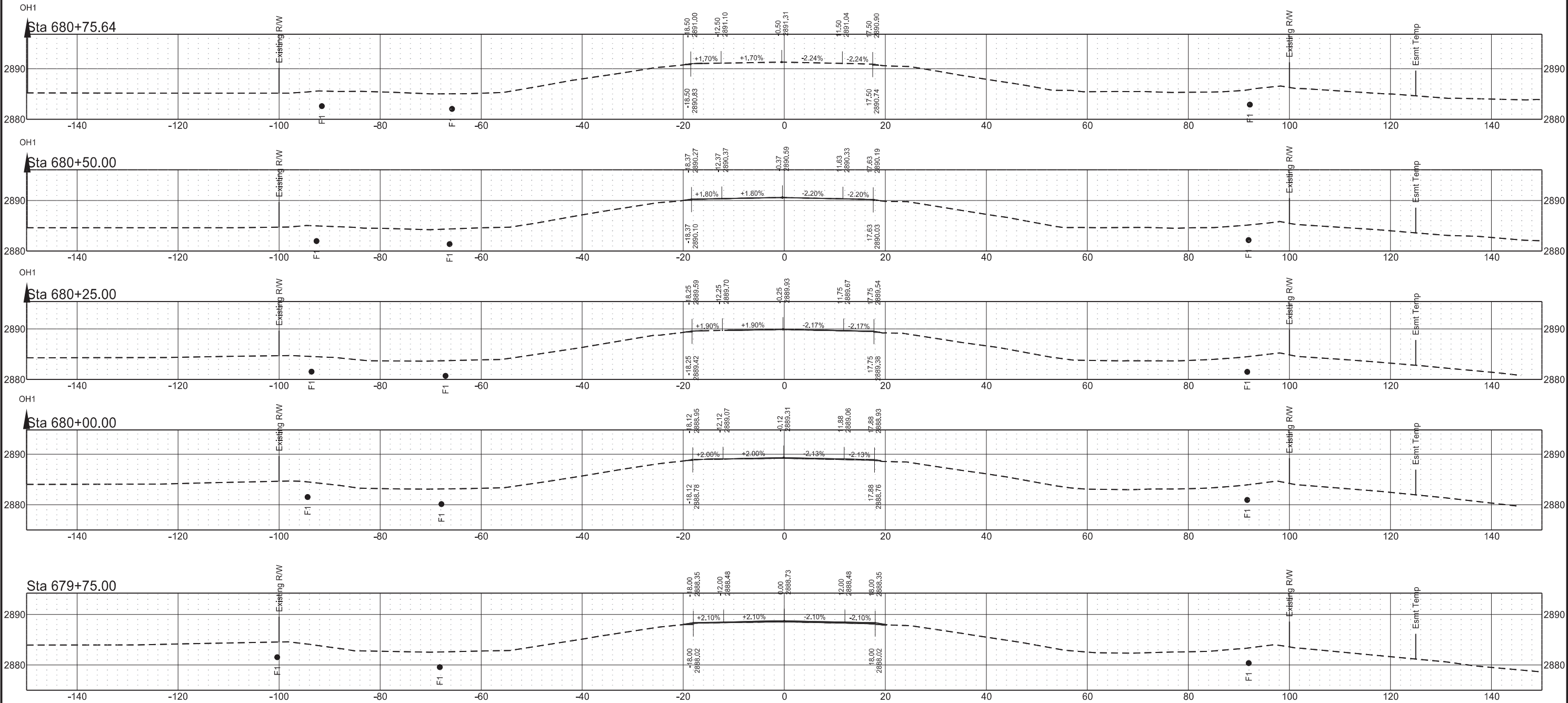
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	ND	SS-5-085(086)012	200	23







	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	200	26



Spring Creek Culverts

STATE

PROJECT NO.

SECTION NO.

SHEET NO.

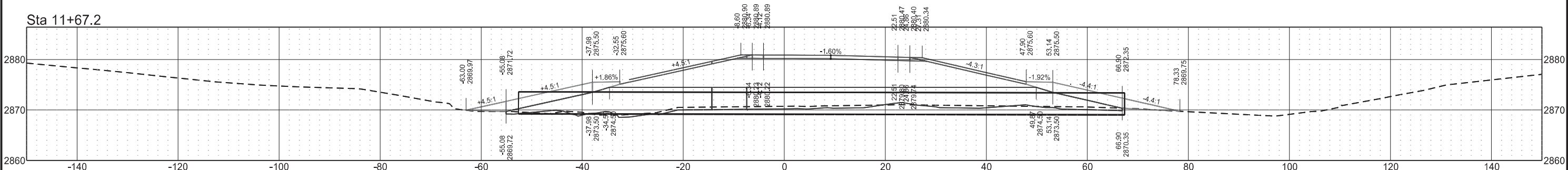
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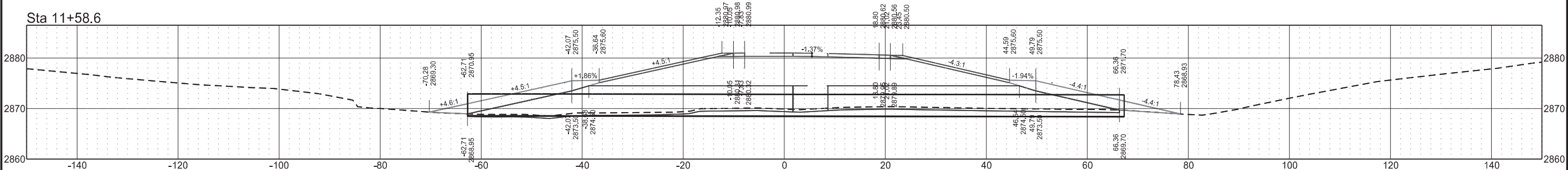
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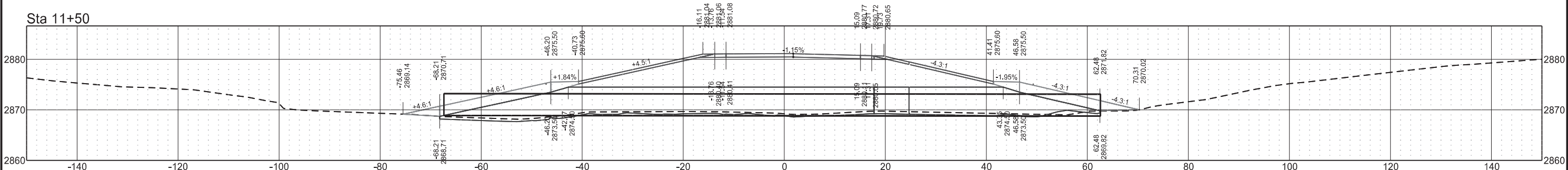
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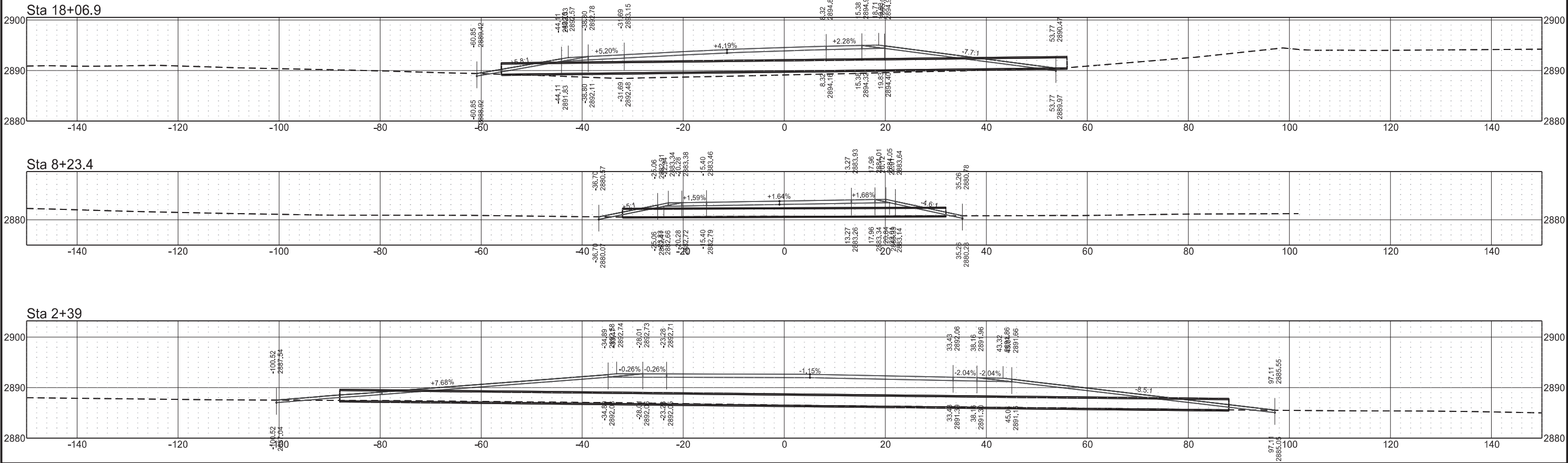


Sta 11+50



Temporary Culverts

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SS-5-085(086)012	200	28



NDDOT ABBREVIATIONS

D-101-1

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

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



NDDOT ABBREVIATIONS

D-101-2

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

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



NDDOT ABBREVIATIONS

D-101-3

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

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



NDDOT ABBREVIATIONS

D-101-4

MEASUREMENTS

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

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

SURVEY DESCRIPTIONS

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

SOIL TYPES

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

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



NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

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

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

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

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

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

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



LINE STYLES

D-101-20

Existing Topography

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

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

Proposed Topography

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

Existing Utilities

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

Proposed Utilities

	24 Inch Pipe
	Reinforced Concrete Pipe
	Under Drain
	Edge Drain

Traffic Utilities

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

Sign Structures

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

07-01-14

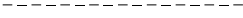
REVISIONS

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

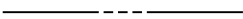
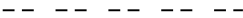
LINE STYLES

D-101-21

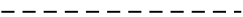
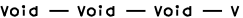
Right Of Way

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

Boundary Control

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

Cross Sections and Typicals

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

Geotechnical

	Geotextile Fabric Type D
	Geogrid
	Geotextile Fabric Type R
	Geotextile Fabric Type R1
	Geotextile Fabric Type RR
	Geotextile Fabric Type S

	Subgrade Reinforcement
	Failure Line

Countours

	Depression Contours
	Supplemental Contour

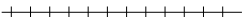
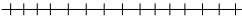
Profile

	Subgrade, Subcut or Ditch Grade
	Topsoil Profile

Striping

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

Pavement Joints

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

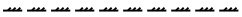
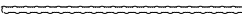
Bridge Details

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

Erosion Control

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

Environmental

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

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

KIRK J. HOFF

REGISTERED

PROFESSIONAL

PE-4683

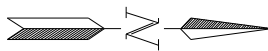
ENGINEER

NORTH DAKOTA

12 18 2020

SYMBOLS

D-101-30

 North Arrow (Half Scale)

 Alignment Data Point

 Alignment Monument

 Spot Elevation

 Existing Miscellaneous Spot

 Existing Access Control Arrow

 Existing Benchmark

 Reset USGS Marker

 Iron Monument Found

 Iron Pin R/W Monument

 Property Corner

 Iron Pin Reference Monument

   Right of Way Marker (Exst, Ppsd, Reset)

 Existing Federal Reference Corner

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

 Existing Witness Corner

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

 Existing Traverse PI Aerial Panel

 Existing Reference Marker Point NGS

 Existing EFB Misc

 Existing Bush or Shrub

 Existing Large Evergreen Tree

 Existing Small Evergreen Tree

 Existing Large Tree

 Existing Small Tree

 Existing Tree Trunk

 Cairn or Stone Circle

 Existing Artifact

 Existing Satellite Dish

 Existing Weather Station

 Existing Windmill or Tower

 Reinforced Pavement

 Continuous Split Barrel Sample

 Flight Auger Sample

 Split Barrel Sample

 Thinwall Tube Sample

 Standard Penetration Test

 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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REGISTERED

PROFESSIONAL

PE-4683

ENGINEER

NORTH DAKOTA

12 18 2020

SYMBOLS

D-101-31

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

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

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
12 18 2020

SYMBOLS

D-101-32

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

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



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



12 18 2020

SYMBOLS

D-101-33

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

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

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
12 18 2020

Cross Section Legend

D-101-40

Description

Longitudinal
Parallel to Roadway

Transverse
Perpendicular to Roadway*

Cable Line

CBL1

CBL2

Conduit Line

CDU1

CDU2

Electric Line

E1

E2

Fiber Optic Line

F1

F2

Gas Main Line

GM1

GM2

Gas Service Line

GS1

GS2

Gas Transmission Line

GT1

GT2

Fuel Pipeline

PL1

PL2

Sanitary Sewer
Force Main

SSF1

SSF2

Sanitary Sewer

SS1

SS2

Steam Line

STE1

STE2

Storm Drain
(Assumed Depth)

SD1

SD2

Telephone Line

T1

T2

TV Line

TV1

TV2

Water Main Line

WM1

WM2

Water Service Line

WS1

WS2

Description

Longitudinal
Parallel to Roadway

Transverse
Perpendicular to Roadway*

Overhead Power
Transmission Line

OHT1

OHT2

Overhead Line

OH1

OH2

* Usually the transverse utilities are shown on a cross section with 2 or more symbols.
The utility runs from one symbol to the other, but the connection may not be shown.

E2

E2

Connection to infer that
probably will not be displayed

Light Standard - Multiple Variations

Concrete

Steel

Wood

with Traffic Signal

Manhole - Multiple Variations

Electric

Fiber Optic

Gas

Inlet

Sanitary Force Main

Sanitary

Sanitary with Valve

Steam

Storm

Storm Force Main

Storm with Valve

Telephone

Water

Water with Meter

Water with Valve

Water with Air Release Valve

Anchor

Pole - Multiple Variations

Utility

Brace

Feed Point

Guy

Power

Power Structure

Power with Light

Power with Transformer

Storm Drain
(Assumed Depth)

When storm drain invert elevations are NOT used to draw pipe, they will
appear as shown to the left. When invert elevations are used to draw
pipe, they will be a cross section similar to the graphics shown below.

Circle

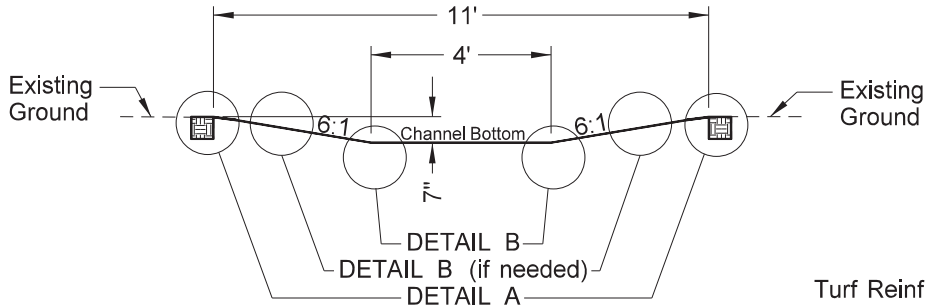
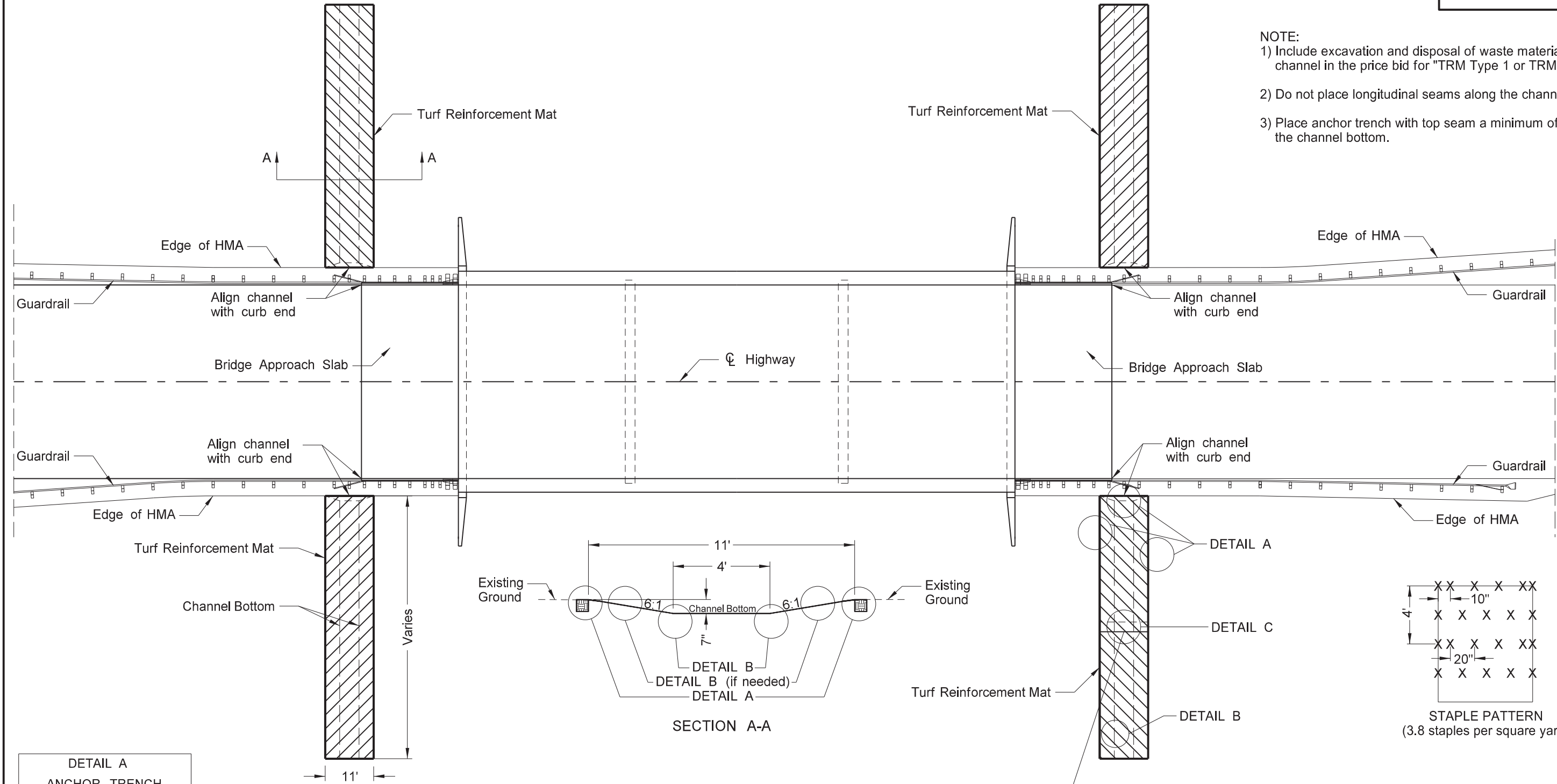
Oval

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		KIRK J. HOFF REGISTERED PROFESSIONAL PE-4683 ENGINEER NORTH DAKOTA 06/14/23
9-20-18		
REVISIONS		
DATE	CHANGE	
6/14/2023	CADD Standards Update	

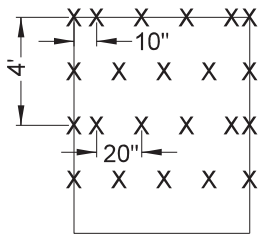
BRIDGE APPROACH SLAB DRAINAGE DETAIL

D-255-1

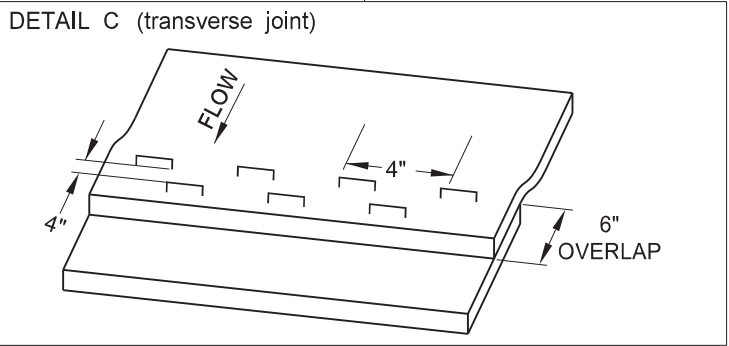
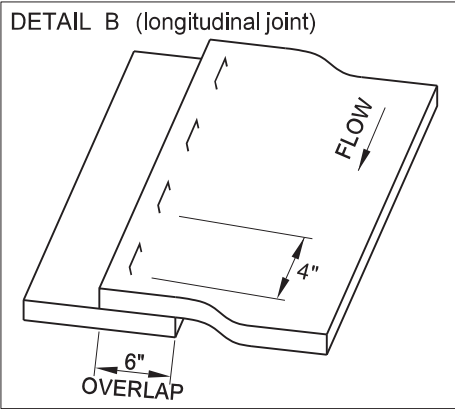
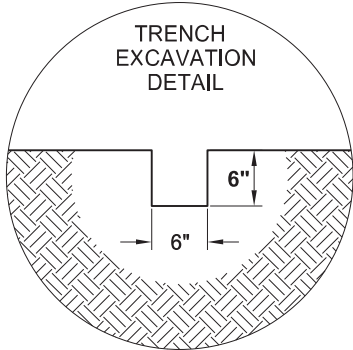
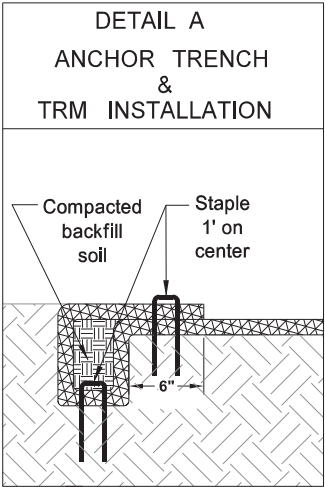
- NOTE:
- 1) Include excavation and disposal of waste material for the channel in the price bid for "TRM Type 1 or TRM Type 2".
 - 2) Do not place longitudinal seams along the channel bottom.
 - 3) Place anchor trench with top seam a minimum of 6" above the channel bottom.



SECTION A-A



STAPLE PATTERN
(3.8 staples per square yard)

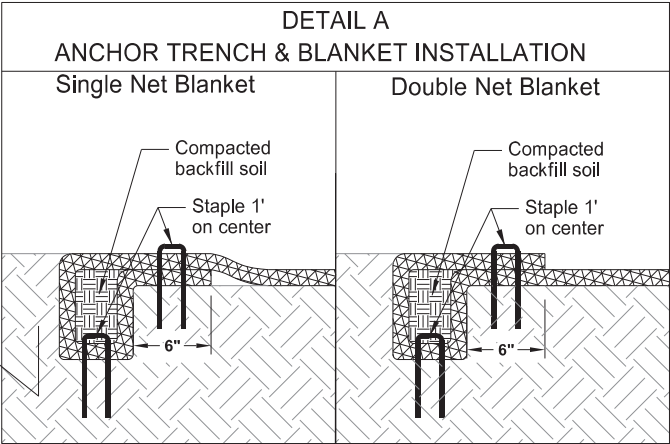
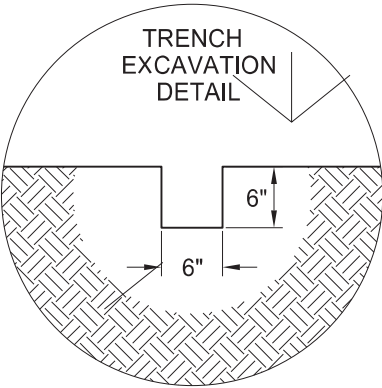


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-23-10	
REVISIONS	
DATE	CHANGE
06-26-14	Changed standard drawing number from D-708-4 to D-255-1
07-27-15	Changed installation details
08-27-19	New Design Engineer PE Stamp
08-27-25	Minor detail changes for clarity

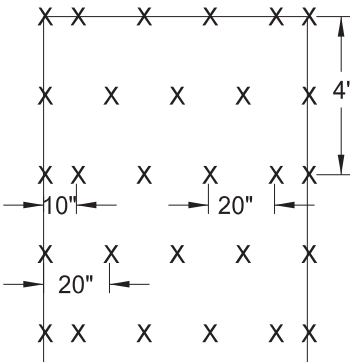
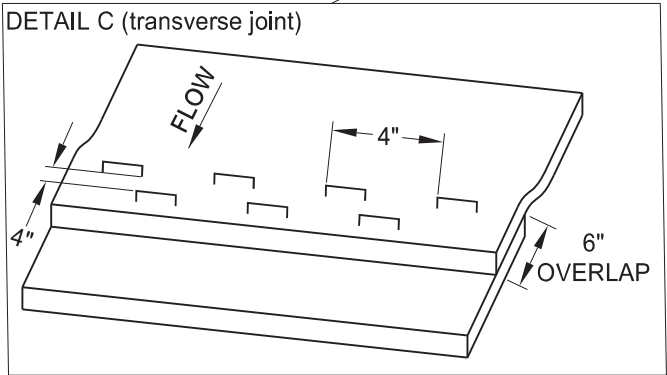
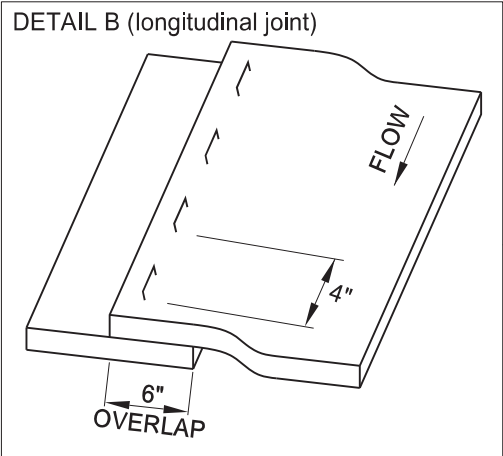


08/27/25

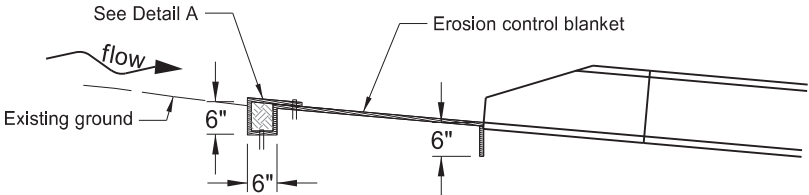
EROSION AND SILTATION CONTROL
EROSION CONTROL BLANKET INSTALLATION



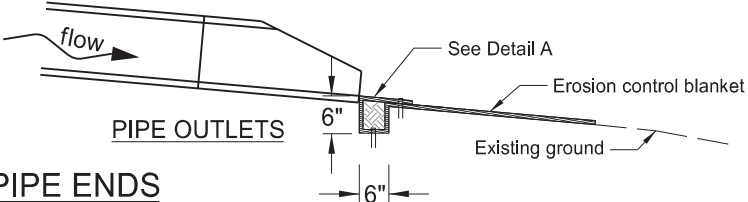
NOTE:
If a Single Net Blanket is used, the side with the netting should be on the top once the blanket is installed.



STAPLE PATTERN
(3.8 staples per square yard)

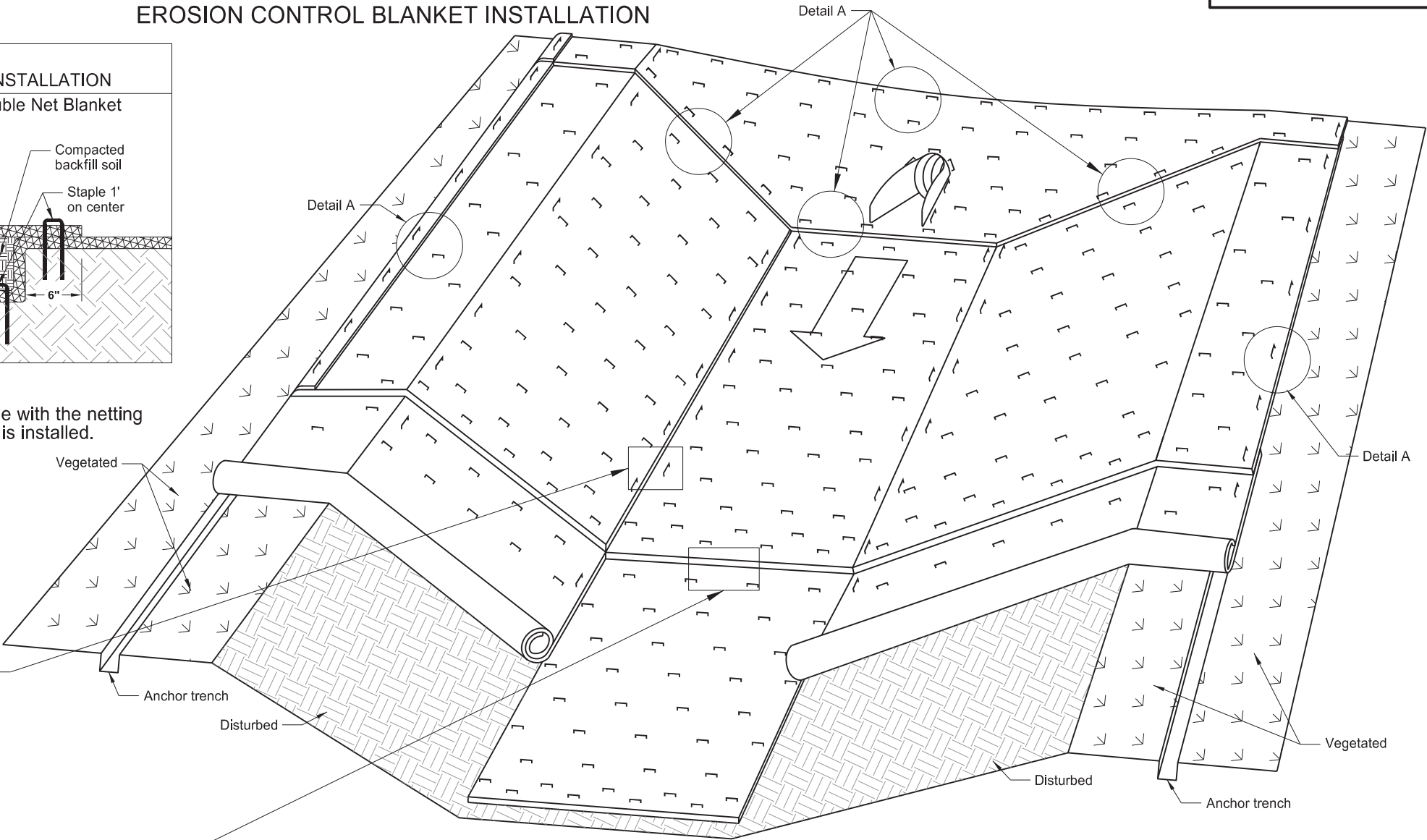


PIPE INLETS



PIPE OUTLETS

INSTALLATION AT PIPE ENDS



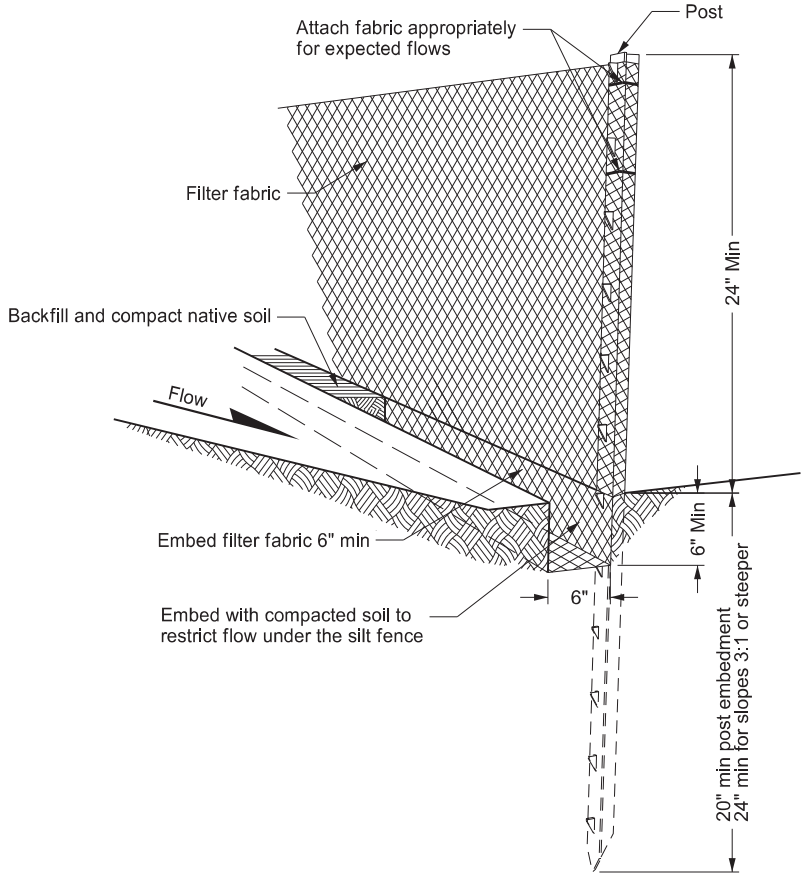
BLANKET LAYOUT
CHANNEL INSTALLATION

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Changed standard drawing number from D-708-6 to D-255-2
07-27-15	Changed installation details such as trench depth and overlap dimensions
08-27-19	New Design Engineer PE Stamp
08-27-25	Revised minor details for clarity

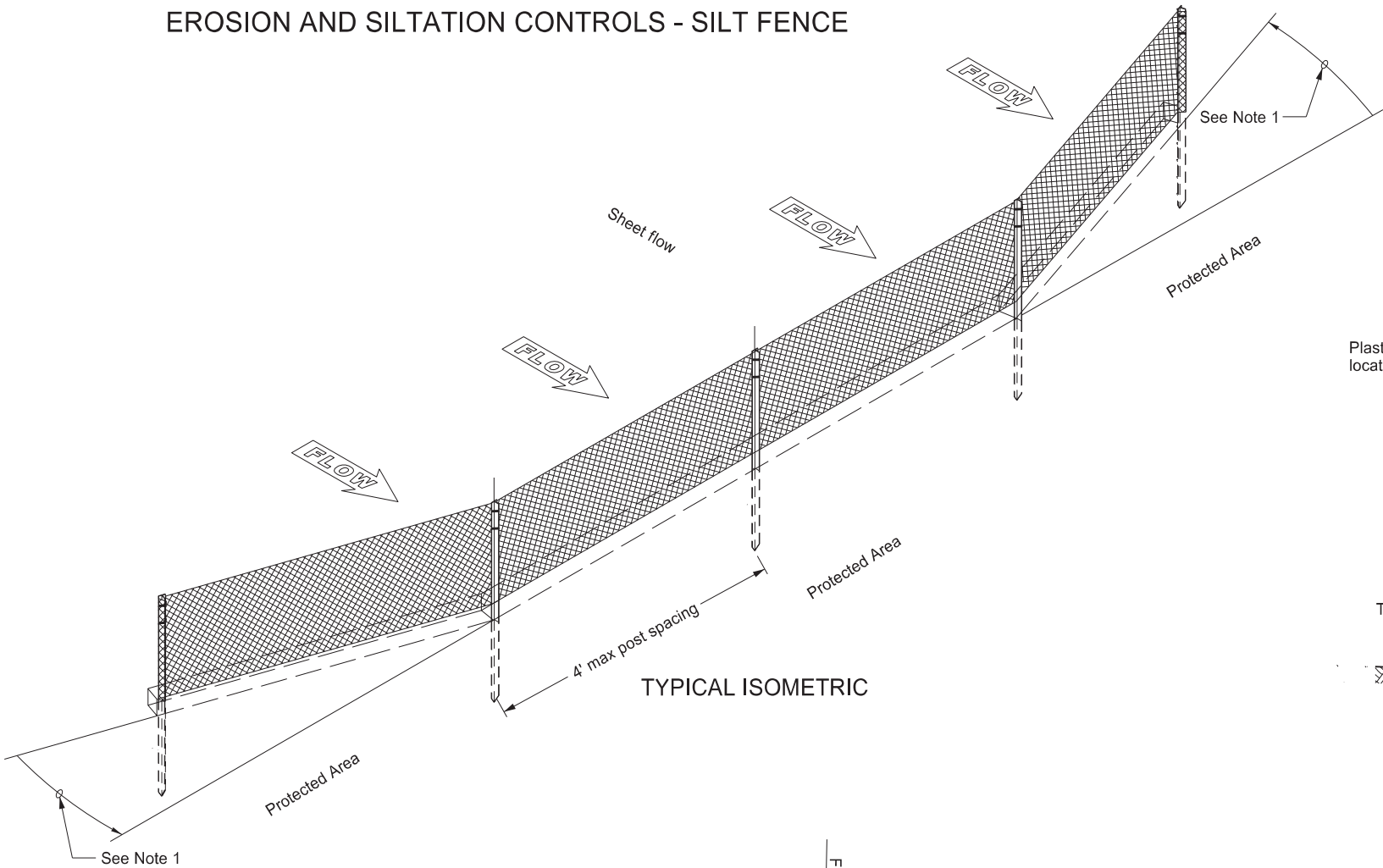


08/27/25

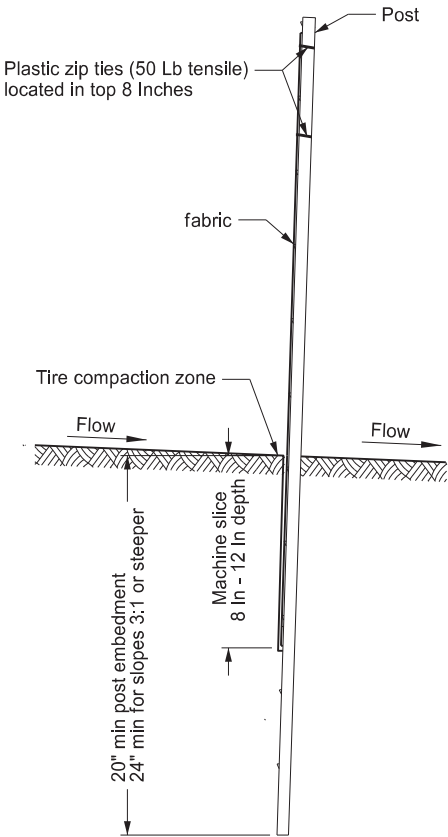
EROSION AND SILTATION CONTROLS - SILT FENCE



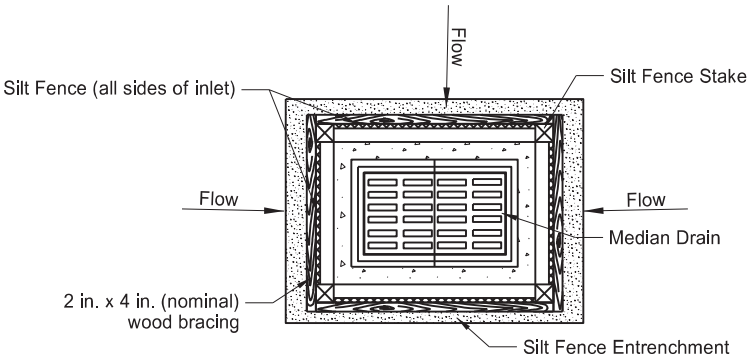
HAND PLACED INSTALLATION DETAIL
Minimize disturbance of ground around trench and smooth surface after excavation to avoid concentrating flows. Compact to prevent undercutting flows.



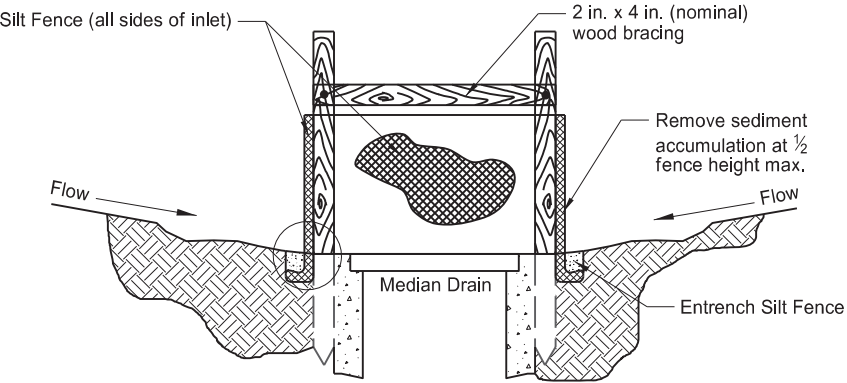
TYPICAL ISOMETRIC



MACHINE SLICED INSTALLATION DETAIL

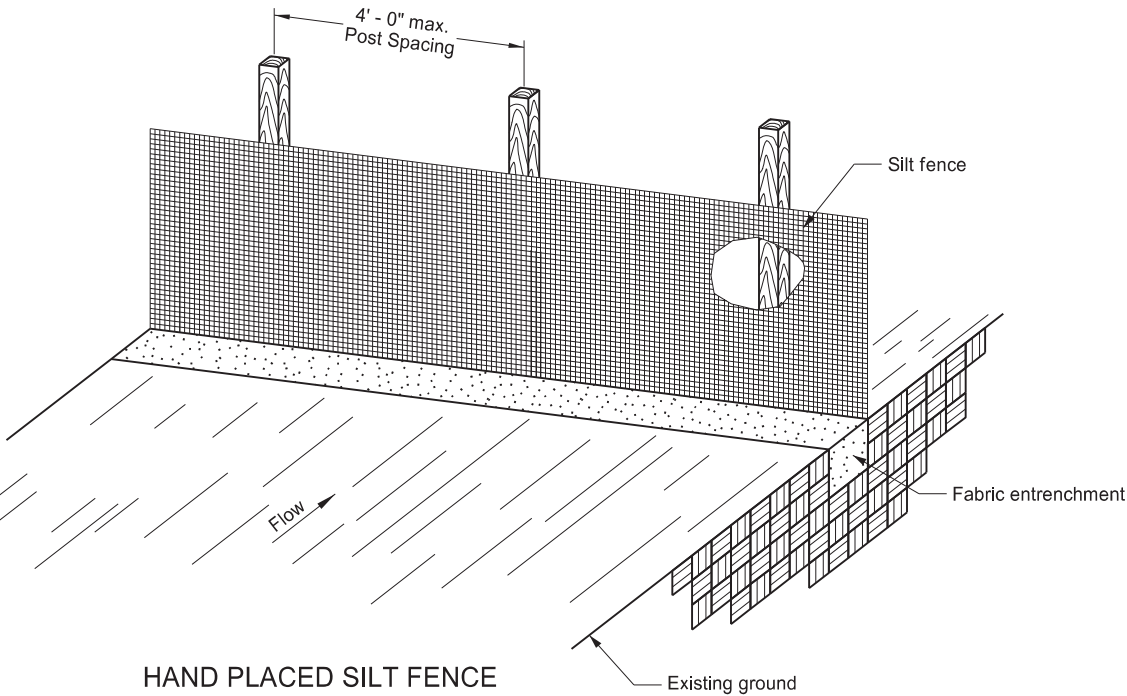


PLAN VIEW



PROFILE VIEW

SILT FENCE PROTECTION
(MEDIAN OR DITCH INLET)



HAND PLACED SILT FENCE

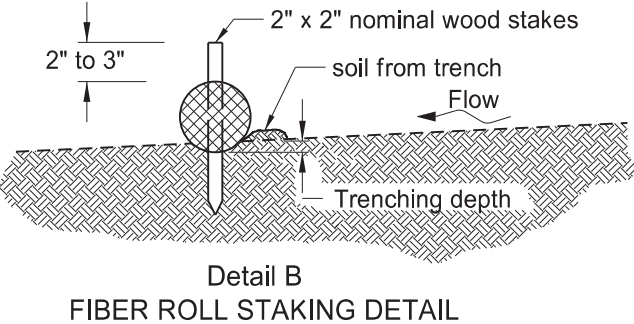
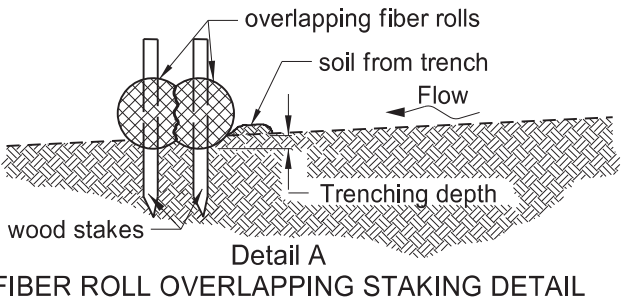
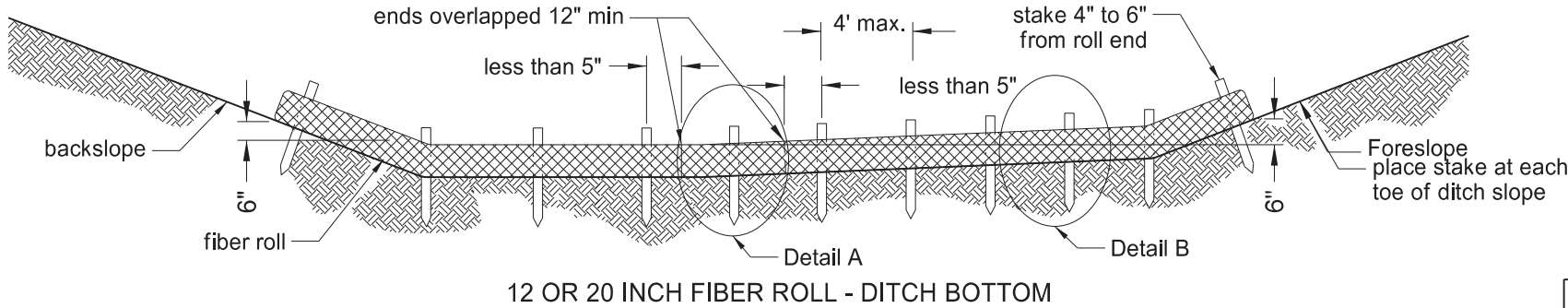
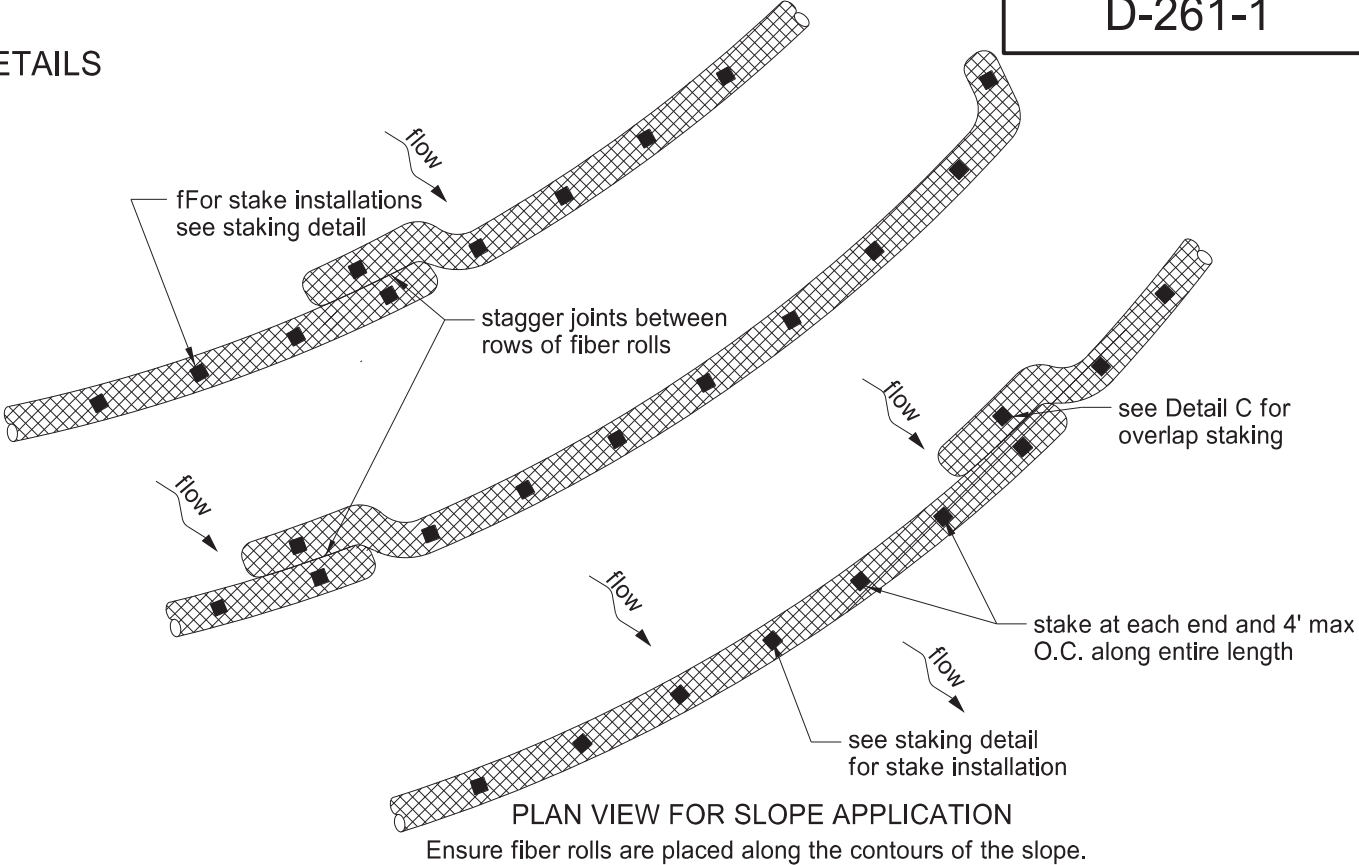
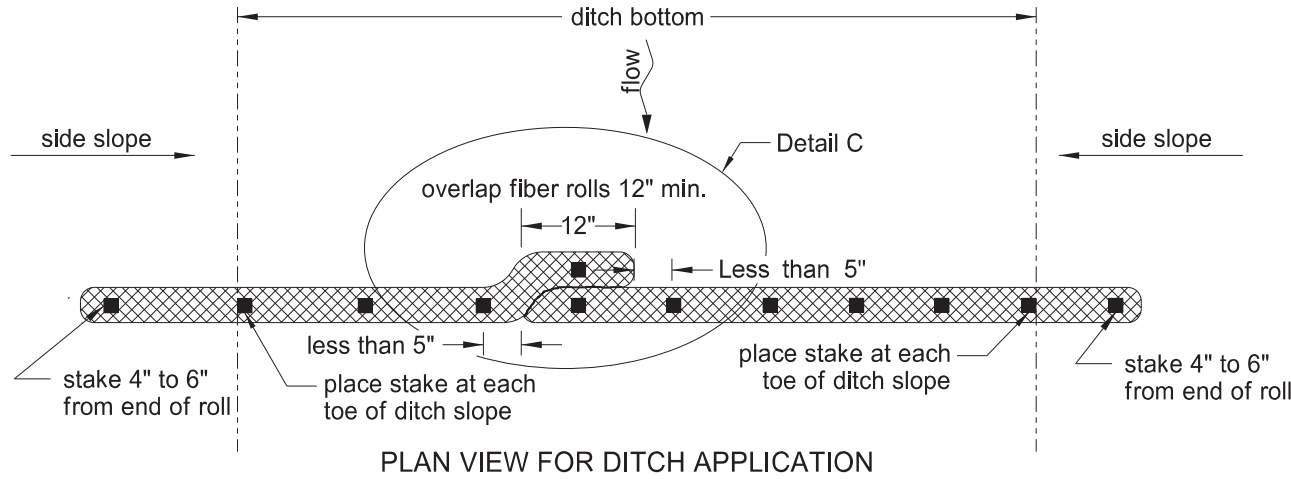
- NOTES:
1. Install the ends of the silt fence to point slightly upslope to prevent sediment from flowing around the ends of the fence.
 2. Place splices outside low spots.
 3. Do not embed silt fence placed in standing water.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Standard drawing resulted from splitting standard D-708-2
06-27-16	Revised details & added new ones
08-27-19	New Design Engineer PE Stamp
07-22-25	Matched revised silt fence specs
09-04-25	Added median-ditch inlet protection

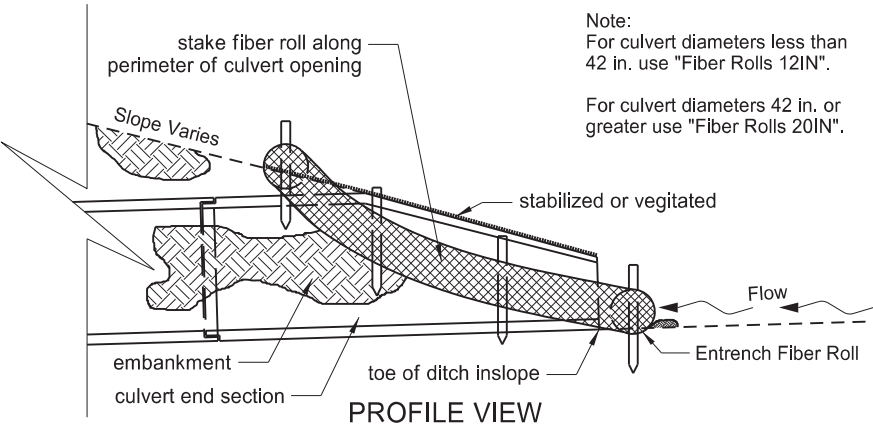
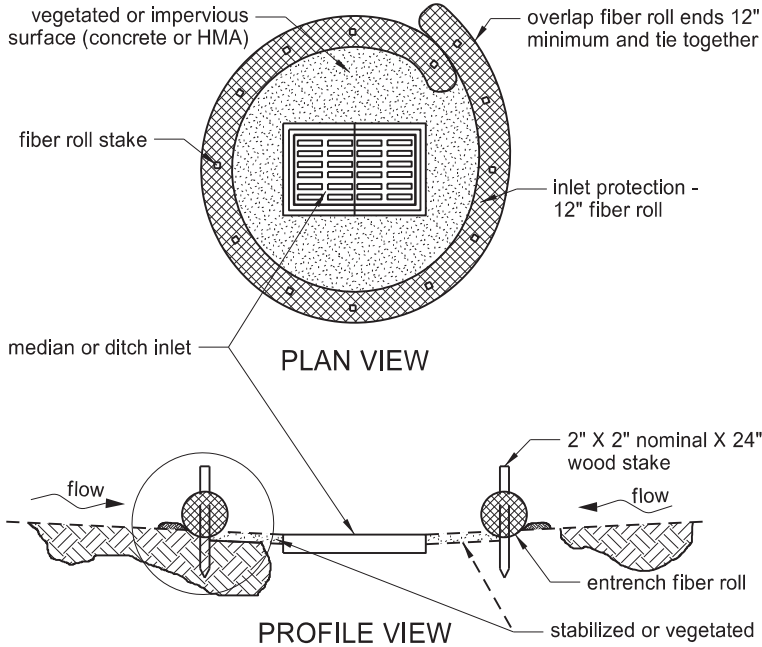


09/04/25

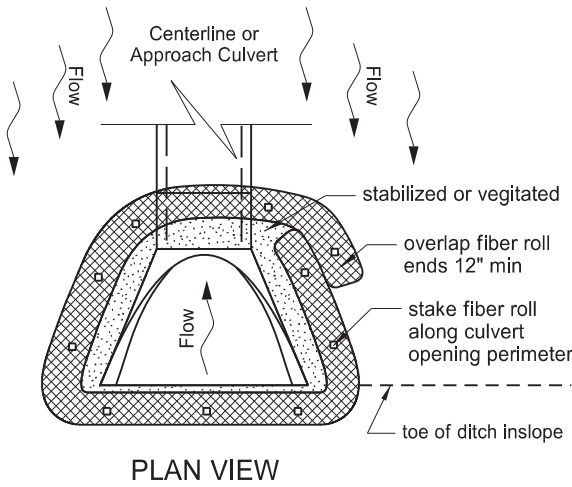
EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS



NOTE: Do not allow runoff to run under or around roll.



Note:
For culvert diameters less than 42 in. use "Fiber Rolls 12IN".
For culvert diameters 42 in. or greater use "Fiber Rolls 20IN".



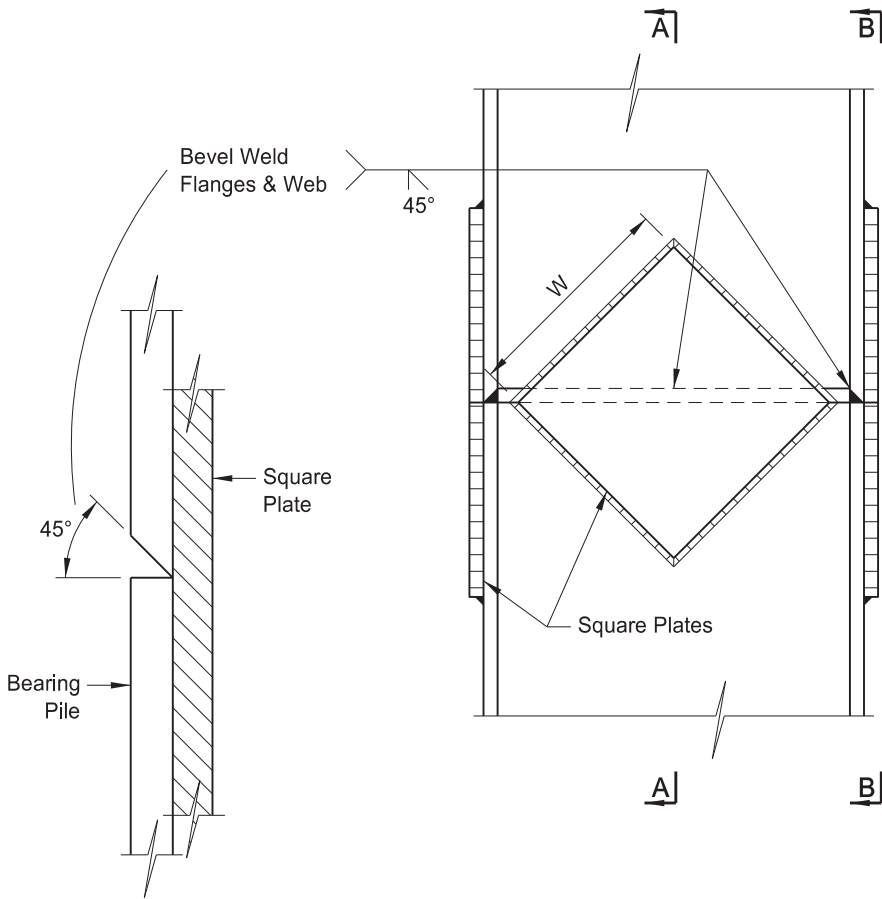
FIBER ROLL DIAMETER	NOMINAL STAKE SIZE	MINIMUM STAKE LENGTH	TRENCH DEPTH	
			MINIMUM	MAXIMUM
12"	2" x 2"	24"	2"	3"
20"	2" x 2"	36"	3"	5"

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-18-10	
REVISIONS	
DATE	CHANGE
06-10-13	Added plan view for ditch and slope application. Added table with values for stake and trench dimensions.
10-04-13	Revised fiber roll overlap detail.
06-26-14	Changed standard drawing number from D-708-7 to D-261-1.
08-27-19	New Design Engineer PE Stamp.
04-22-24	Slope Plan View-overlap change.
03-13-25	Added D-708-6 Culvert Inlet detail.
09-02-25	Added D-708-6 Inlet detail.

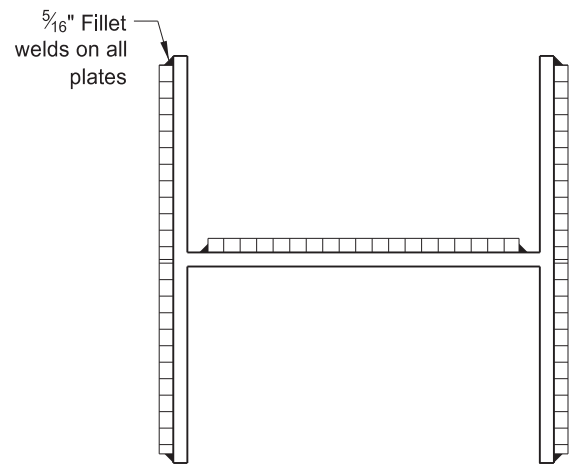


09/02/25

PILE SPLICE DETAILS

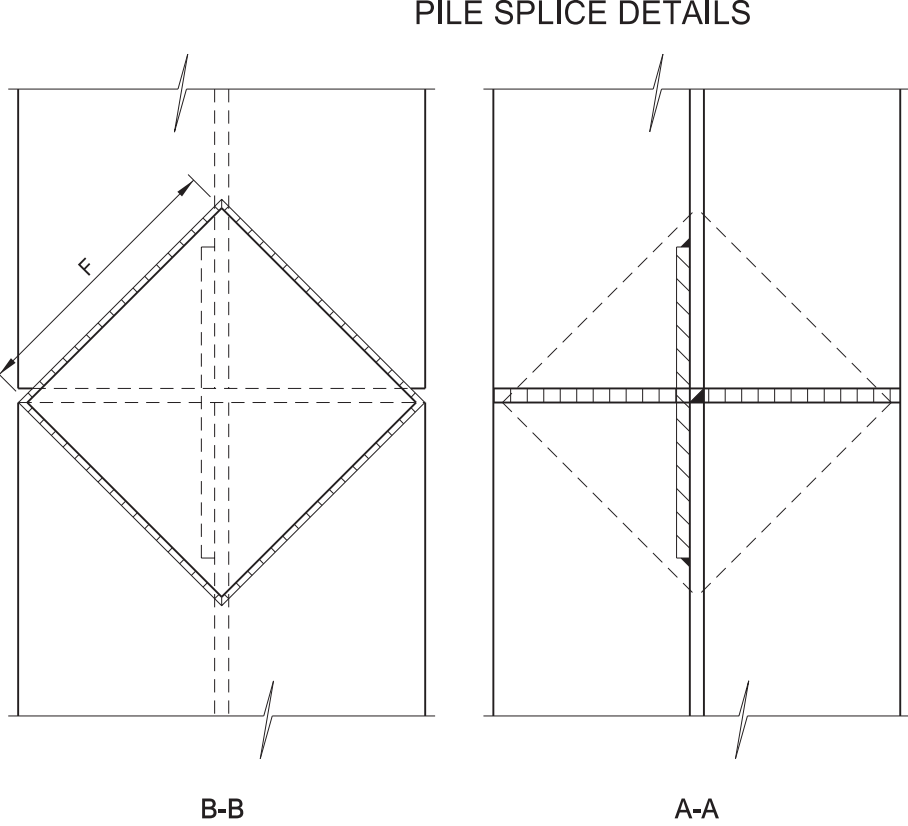


ENLARGED VIEW

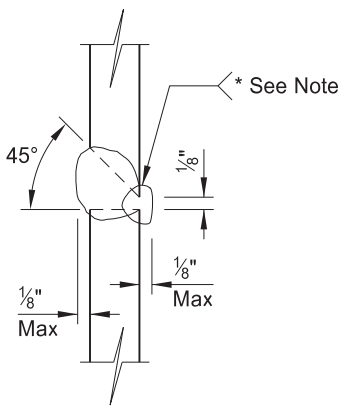


PILE	8"	10"	12"	14"
"F" FLANGE	5"	6½"	8"	10"
"W" WEB	4"	5½"	6½"	8"

H-PILE SPLICE DETAIL



Flame scarf inside of both flanges and one side of web of upper section.



ALTERNATE H-PILE SPLICE DETAIL

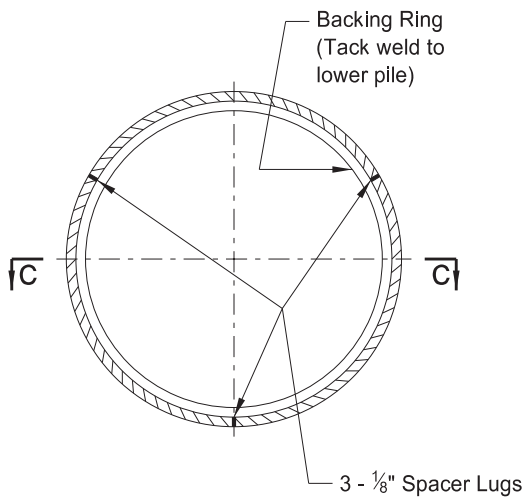
NOTES:

Construct splices in accordance with Section 622. Weld as specified in the latest AASHTO/AWS D 1.5 Bridge Welding Code.

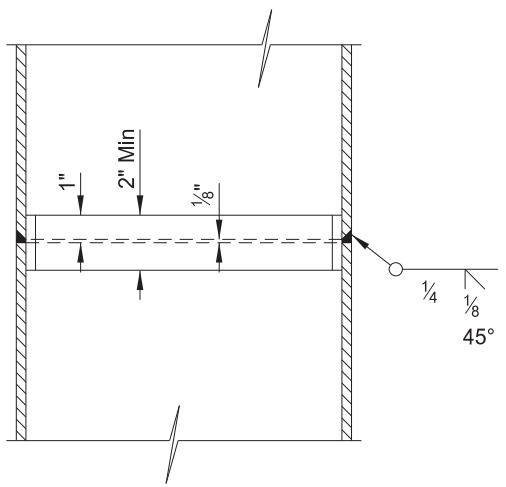
Construct splices in steel H-Piles utilizing complete penetration groove welds in both flanges and the web, or using steel reinforcing plates as shown. If reinforcing plates are used to construct the pile splice, use plates with a minimum thickness equal to the flange thickness of the H-Pile and matching the steel grade of the H-pile.

Use electrodes that meet the requirements of AWS-A5.1, Classification E6010, E6011, or E7018.

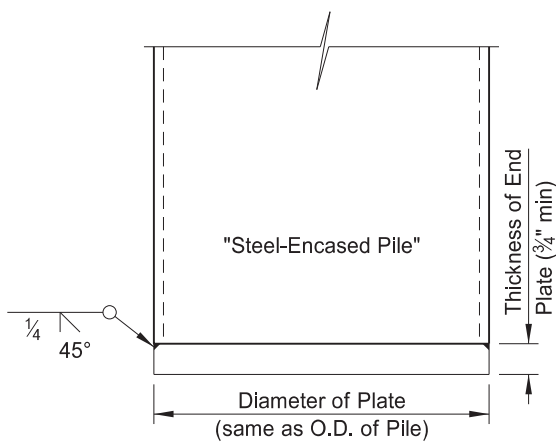
* Root gouge to sound metal and weld from the second side if backing material is not used.



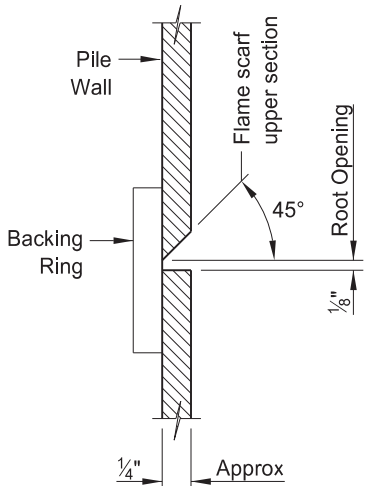
Backing Ring may be made from pile cut-offs or other material of a like quality.



C-C
STEEL-ENCASED CONCRETE
PILE SPLICE DETAIL



END PLATE DETAIL



ENLARGED VIEW

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

REGISTERED PROFESSIONAL ENGINEER

JASON R. THORENSEN

PE - 5048

DATE

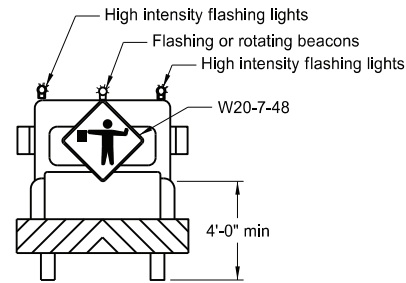
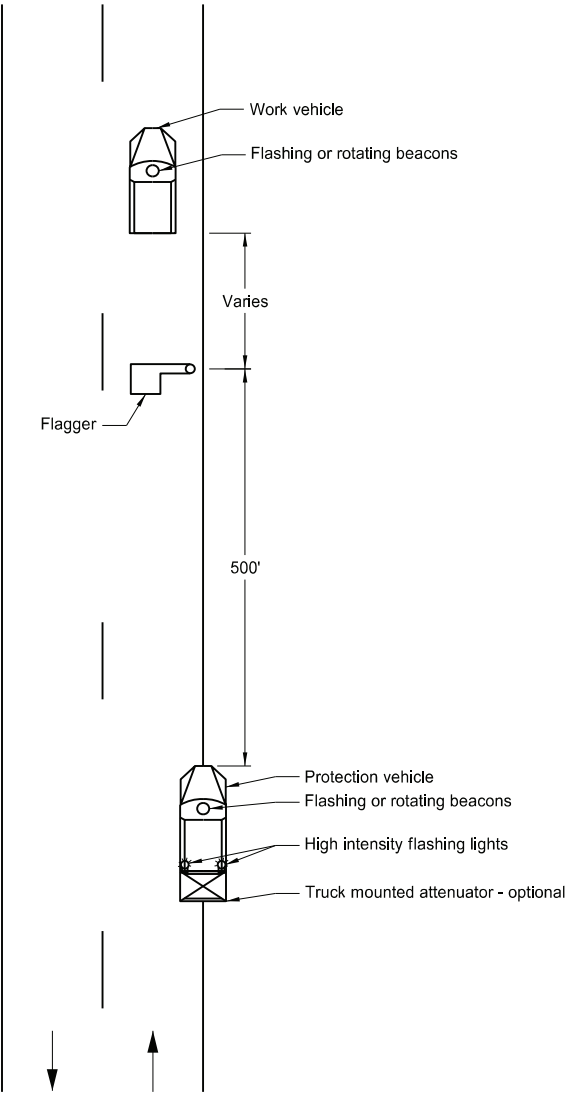
02/23/24

NORTH DAKOTA

TRAFFIC CONTROL FOR CORING OF HOT BITUMINOUS PAVEMENT

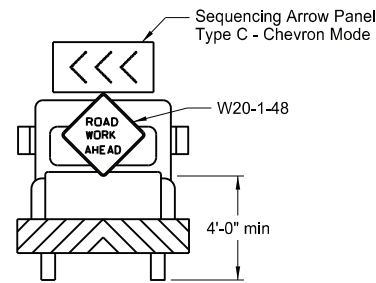
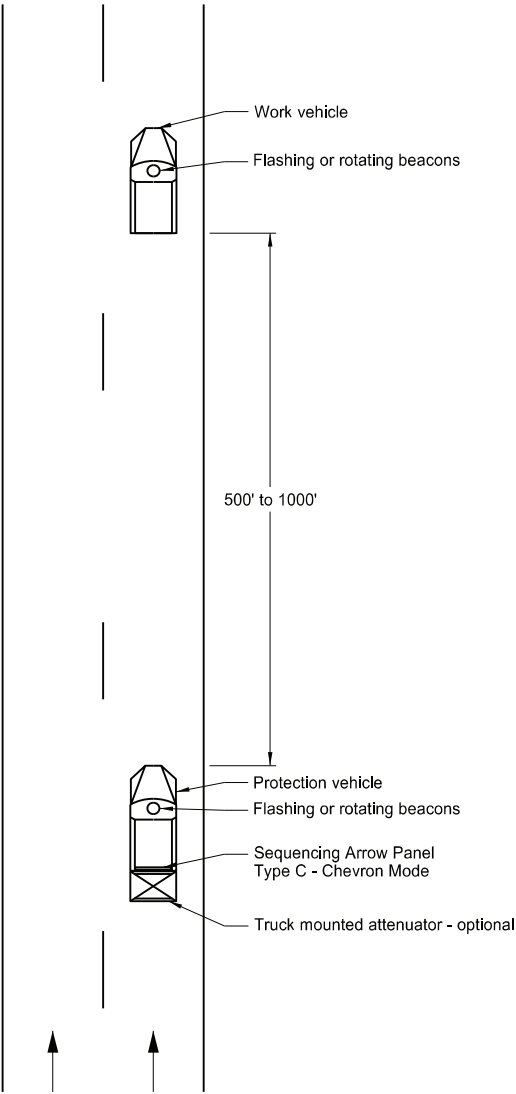
D-704-2

Two Lane, Two Way Roadways



Typical Protection Vehicle

Multilane Roadways

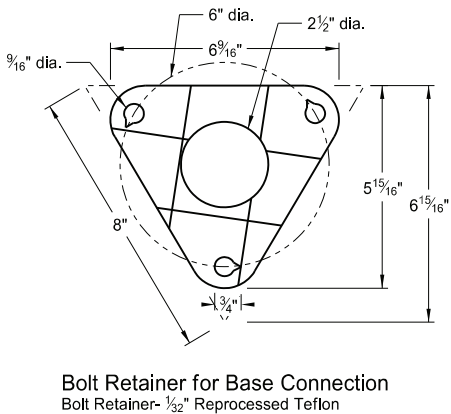


Typical Protection Vehicle

- Notes:
- 1. Display a 360 degree rotating, flashing, oscillating or strobe light on the working vehicle.
 - 2. Display a 360 degree rotating, flashing, oscillating or strobe light on the shadow vehicle. Operate a sequencing arrow panel Type C in chevron mode on the shadow vehicle for Multilane Roadway.
 - 3. Use these layouts during daylight hours and in areas of good visibility only.
 - 4. Use flagger to protect the work area and warn oncoming traffic for two lane, two way roadway.

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

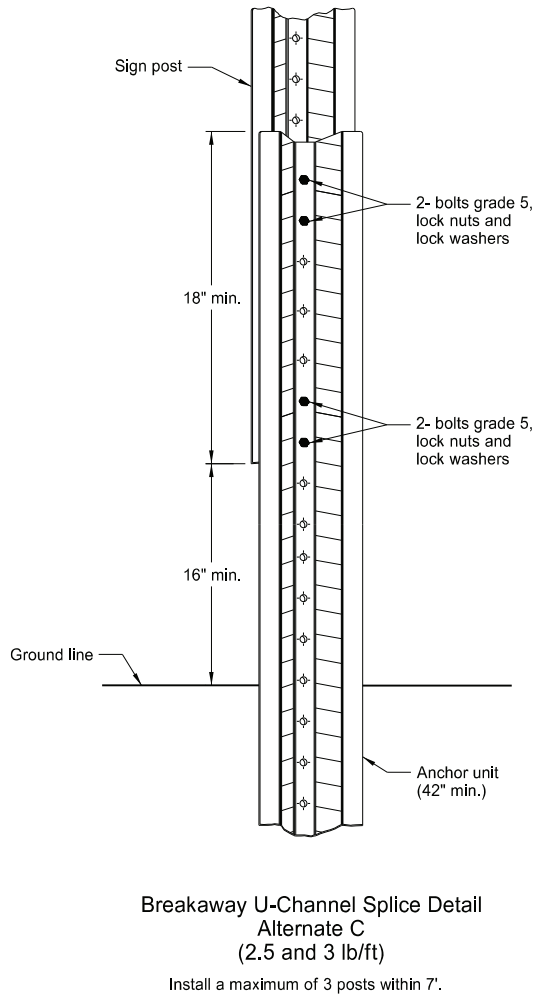
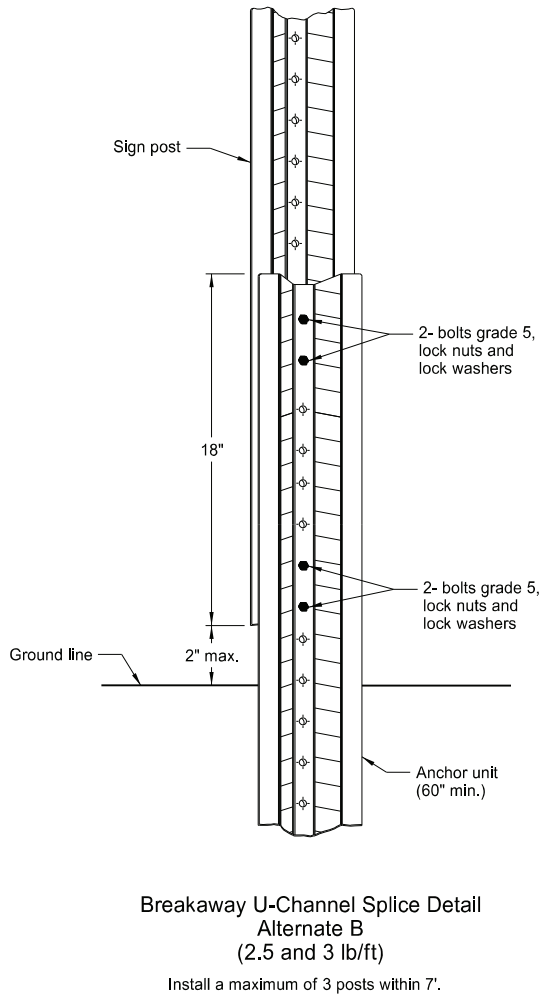
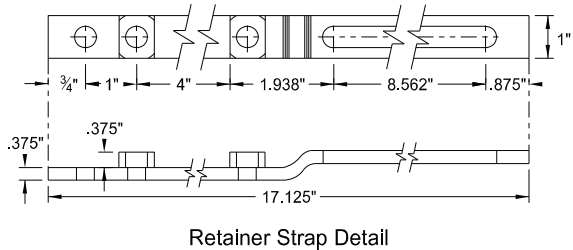
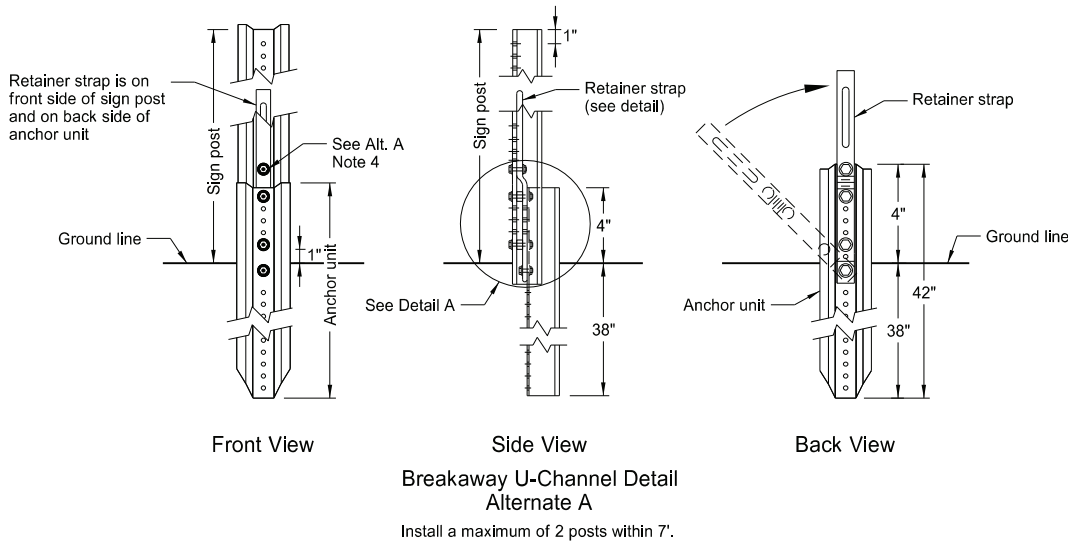
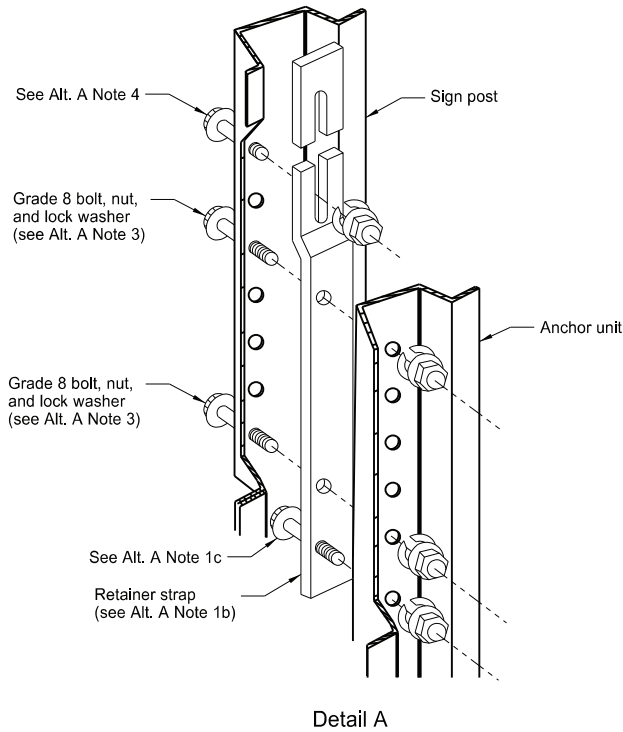
08/01/24



BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



Alternate A Steps of Installation:

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

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

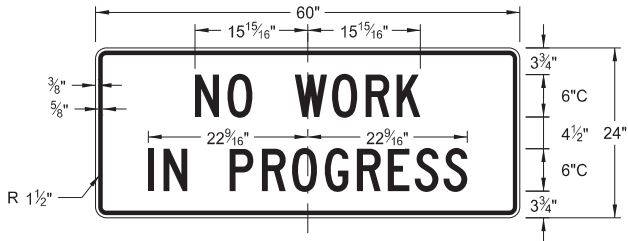


08/01/24

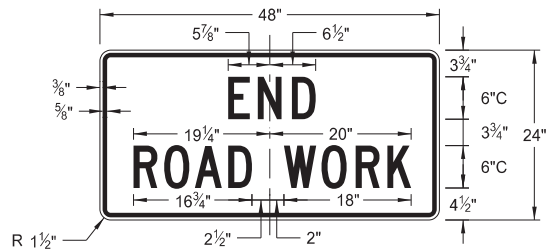
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



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



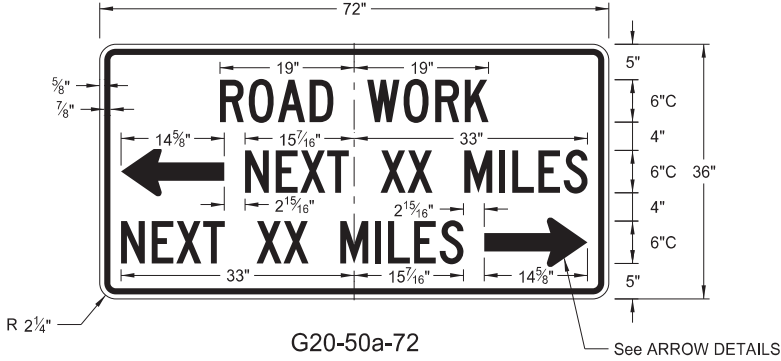
G20-1b-60
Legend: black (non-refl)
Background: orange



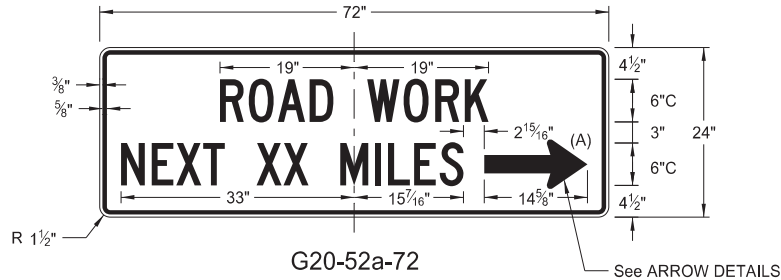
G20-2-48
Legend: black (non-refl)
Background: orange



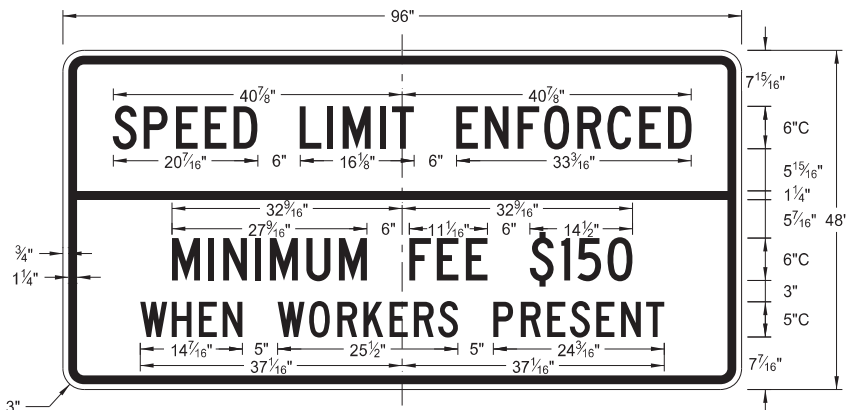
G20-4b-36
Legend: black (non-refl)
Background: orange



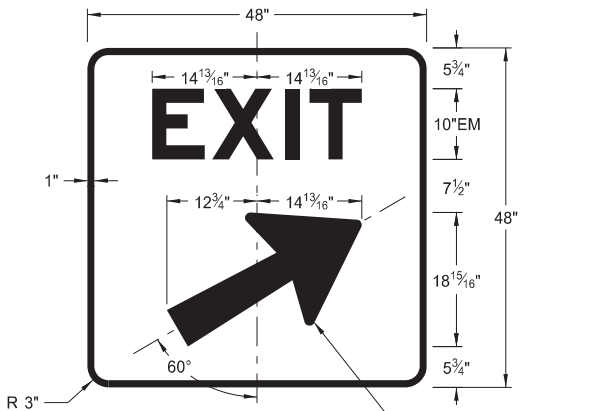
G20-50a-72
Legend: black (non-refl)
Background: orange



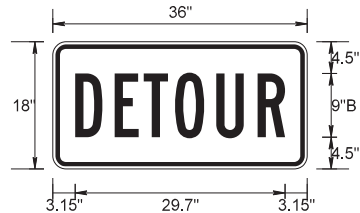
G20-52a-72
Legend: black (non-refl)
Background: orange



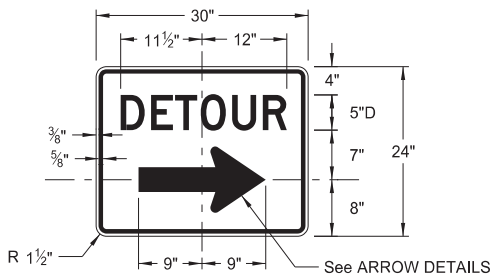
G20-55-96
Legend: black (non-refl)
Background: orange



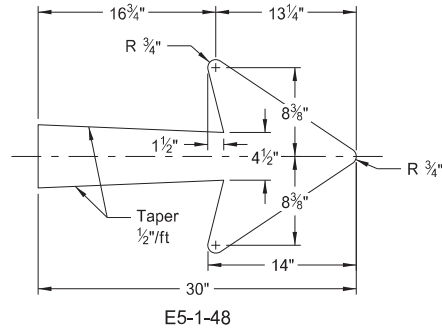
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



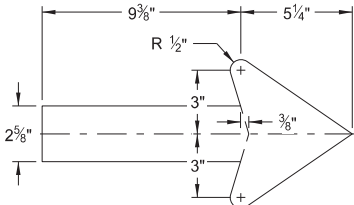
M4-8-36
Legend: black (non-refl)
Background: orange



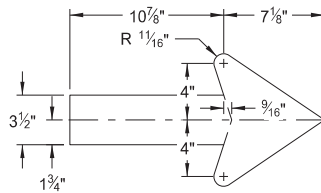
M4-9(L or R)-30 &
M4-9-30
Legend: black (non-refl)
Background: orange



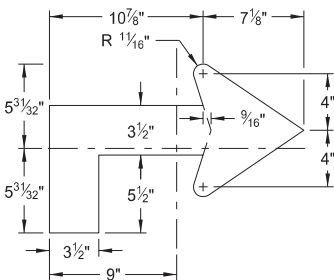
E5-1-48



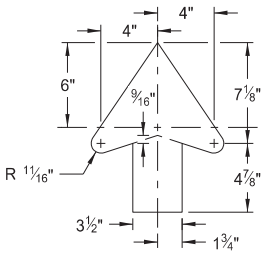
G20-50a-72
G20-52a-72



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



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



M4-9-30
Straight

ARROW DETAILS

NOTES:

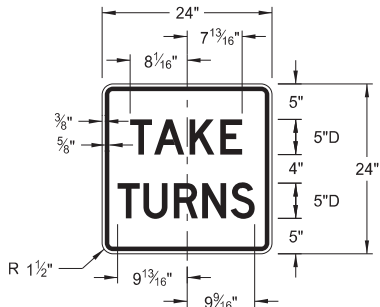
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

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

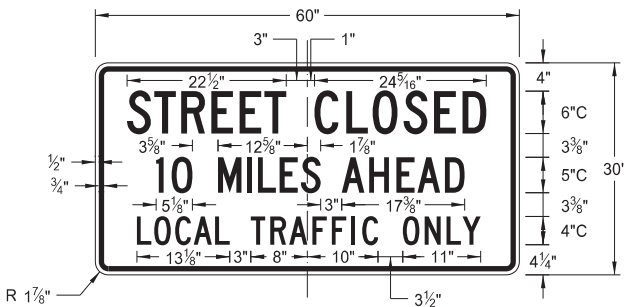


CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS

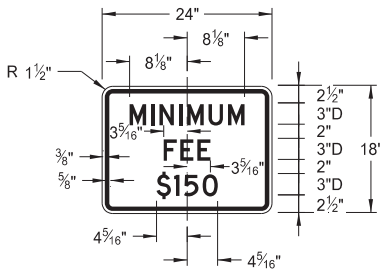
D-704-10



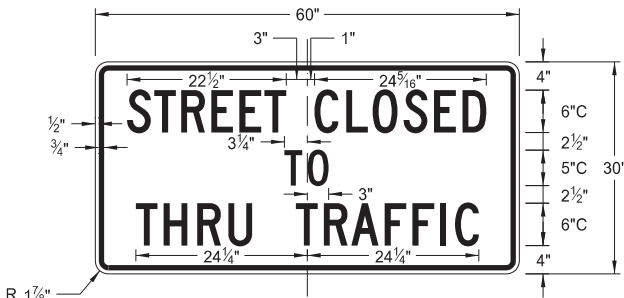
R1-50P-24
Legend: black (non-refl)
Background: white



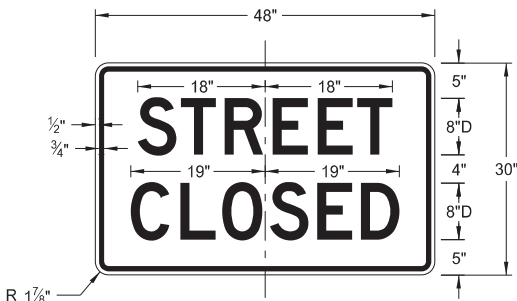
R11-3c-60
Legend: black (non-refl)
Background: white



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



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

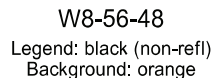
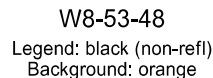
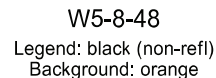


R11-2a-48
Legend: black (non-refl)
Background: white

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

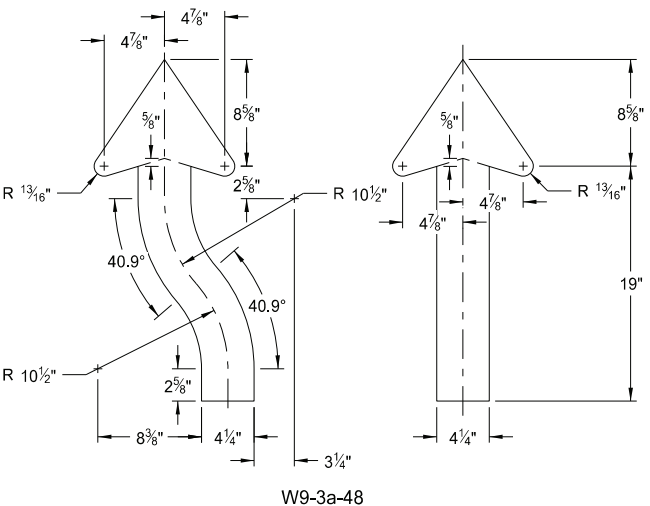
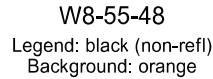
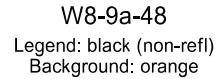
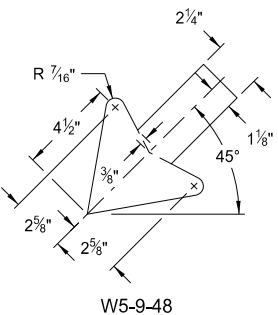
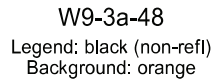
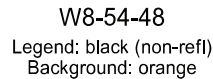
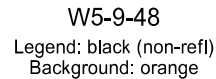


D-704-11



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



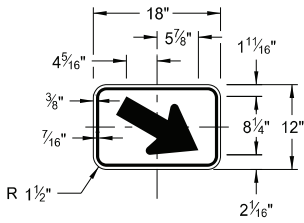
ARROW DETAILS

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

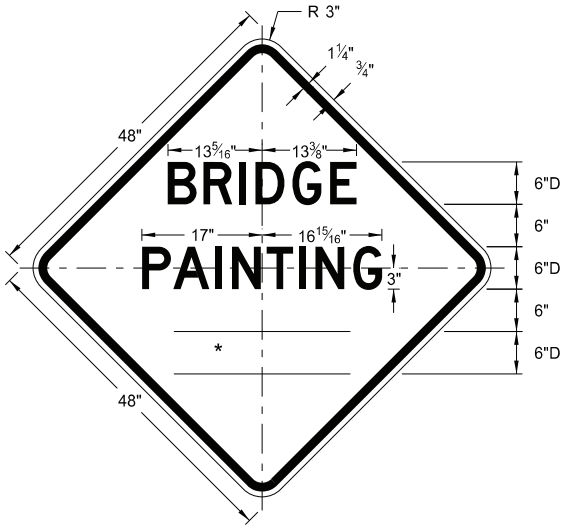


08/01/24

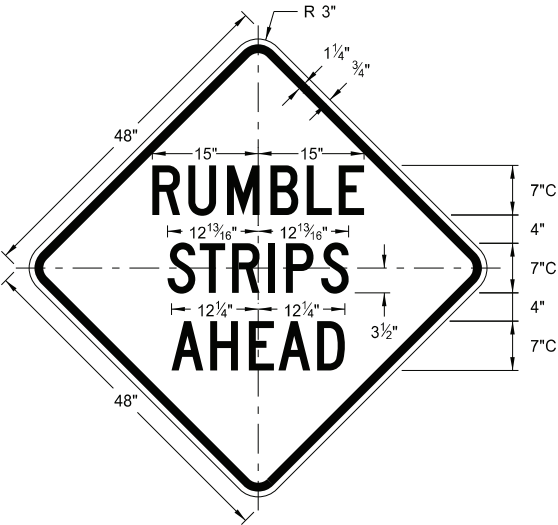
CONSTRUCTION SIGN DETAILS
WARNING SIGNS



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



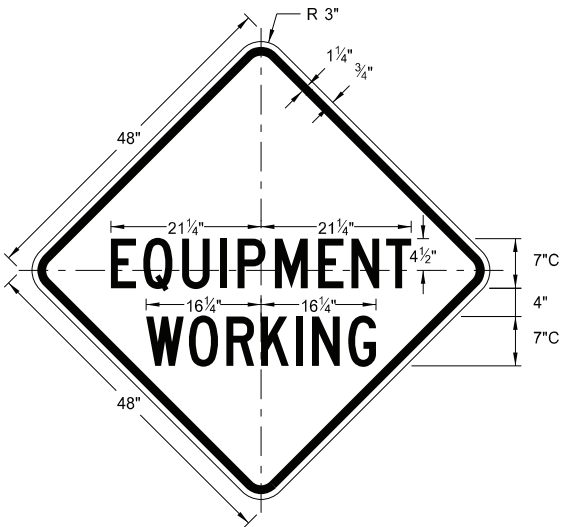
W21-50-48
Legend: black (non-refl)
Background: orange



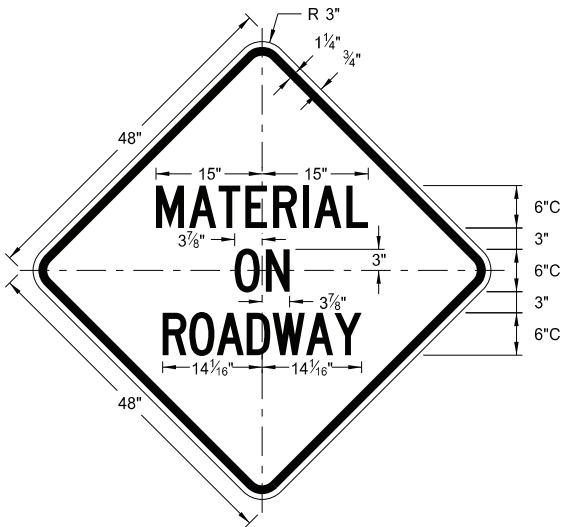
W21-53-48
Legend: black (non-refl)
Background: orange

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

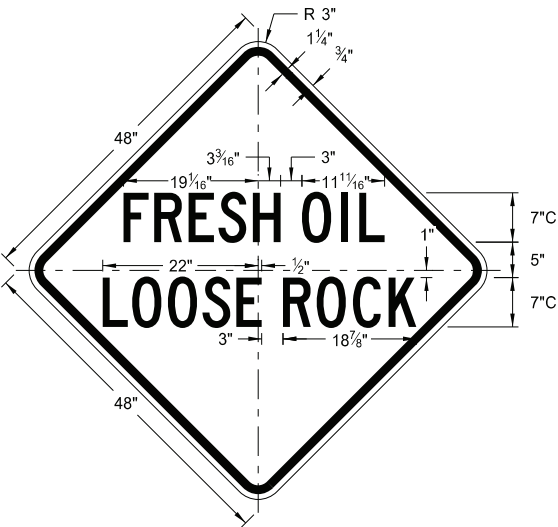
* DISTANCE MESSAGES



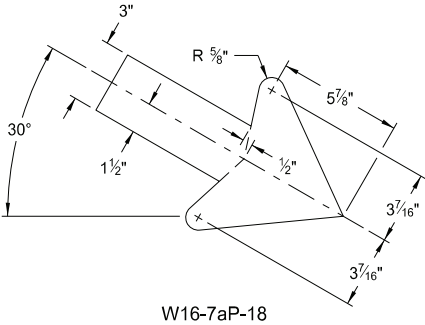
W20-51-48
Legend: black (non-refl)
Background: orange



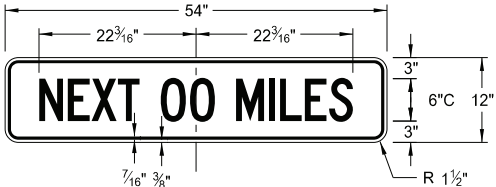
W21-51-48
Legend: black (non-refl)
Background: orange



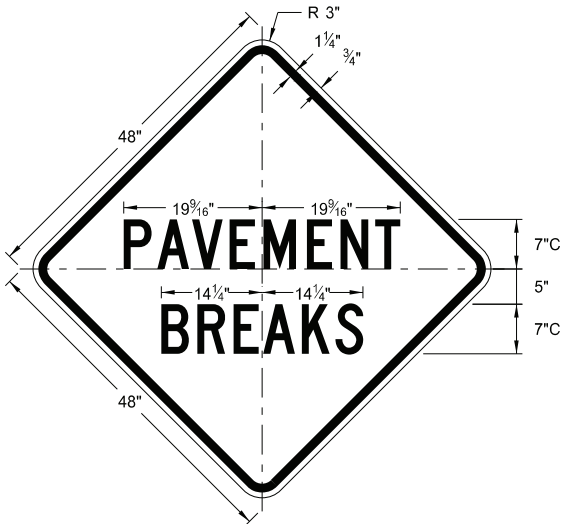
W22-8-48
Legend: black (non-refl)
Background: orange



W16-7aP-18



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



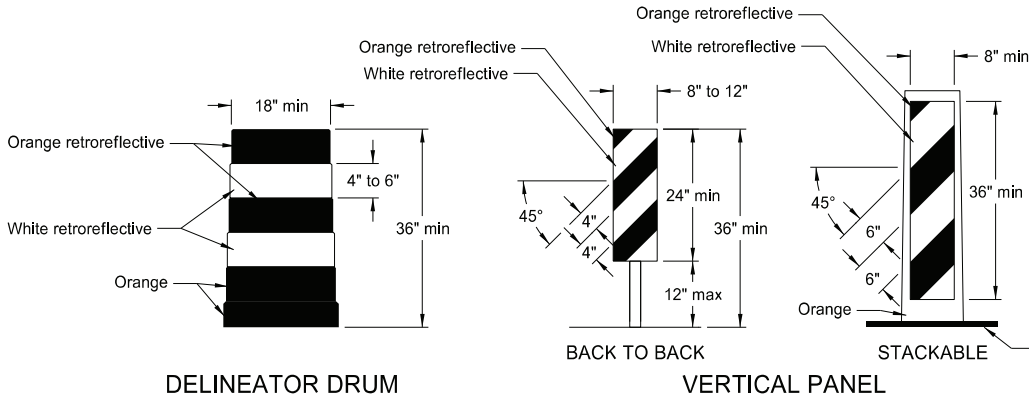
W21-52-48
Legend: black (non-refl)
Background: orange

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



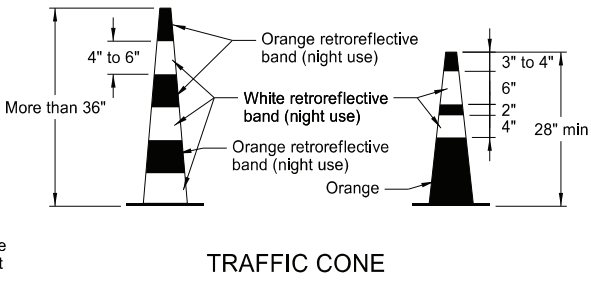
08/01/24

BARRICADE AND CHANNELIZING DEVICE DETAILS

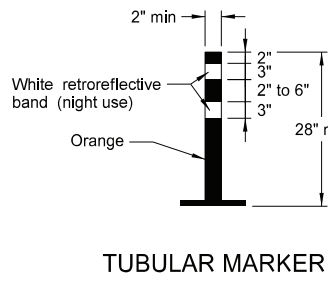


Provide horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide for drum markings. Use a minimum of two orange and two white stripes with the top stripe being orange for each drum. Do not exceed 3" nonretroreflectORIZED spaces between the horizontal orange and 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.

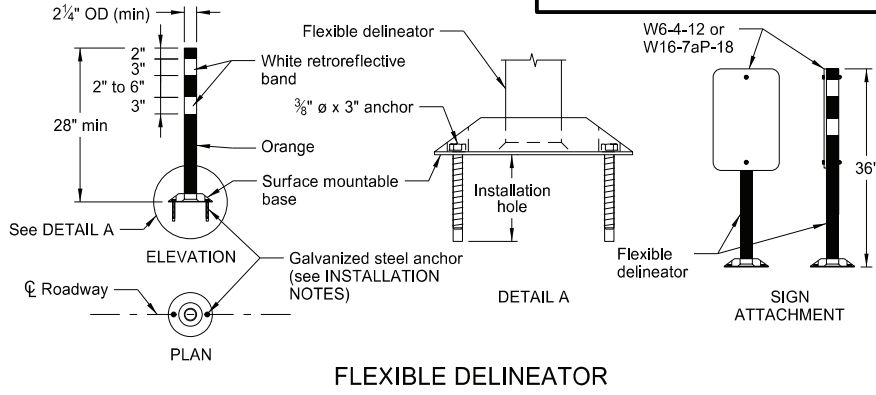
Provide alternating orange and white retroreflective stripes, sloping downward in direction vehicular traffic is to pass. Place retroreflective sheeting on both sides of panel with a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective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



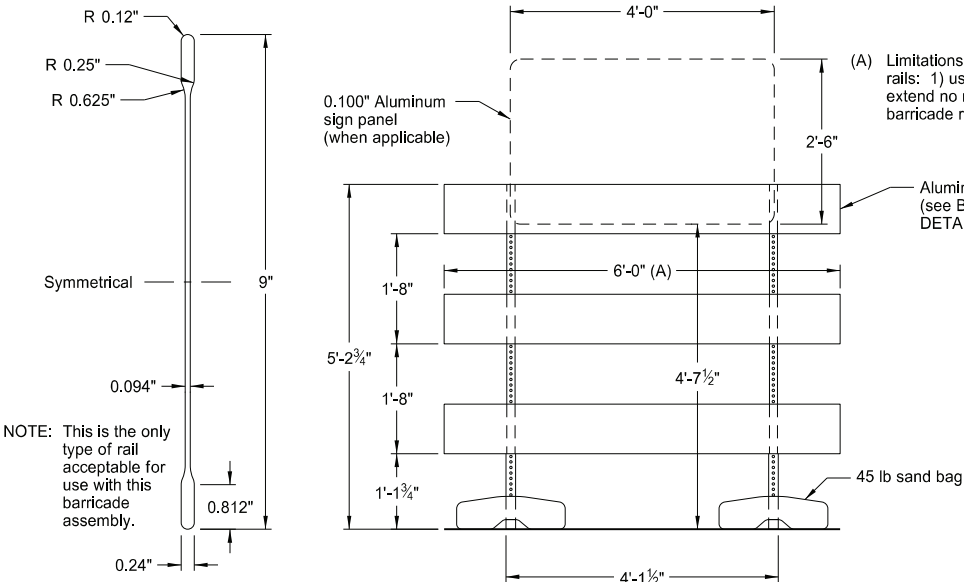
Provide retroreflectORIZATION of cones more than 36" in height by alternating orange and white retroreflective stripes. Use a minimum of two orange and two white stripes for each cone with the top stripe being orange. Use maximum 3" nonretroreflectORIZED space between the orange and white stripes.



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



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



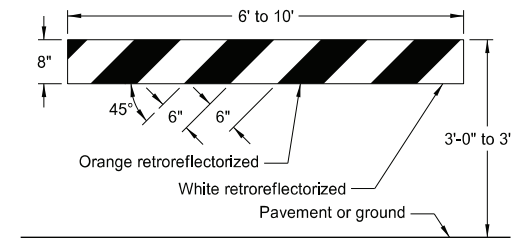
BARRICADE BLADE DETAIL

ELEVATION VIEW

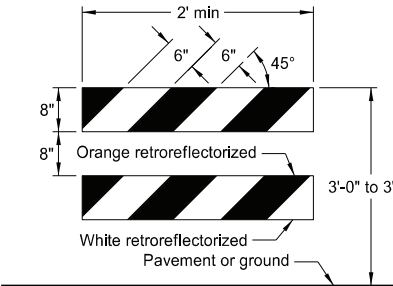
SIDE VIEW

BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

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

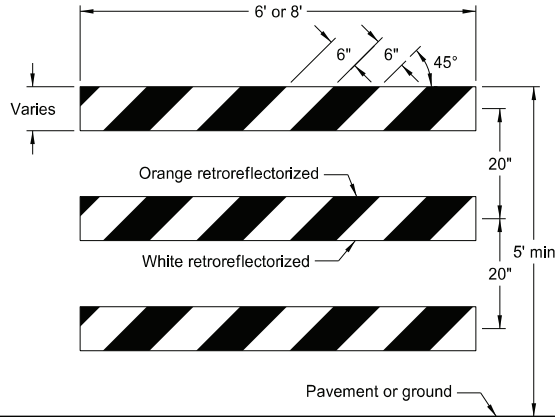


TYPE I BARRICADE

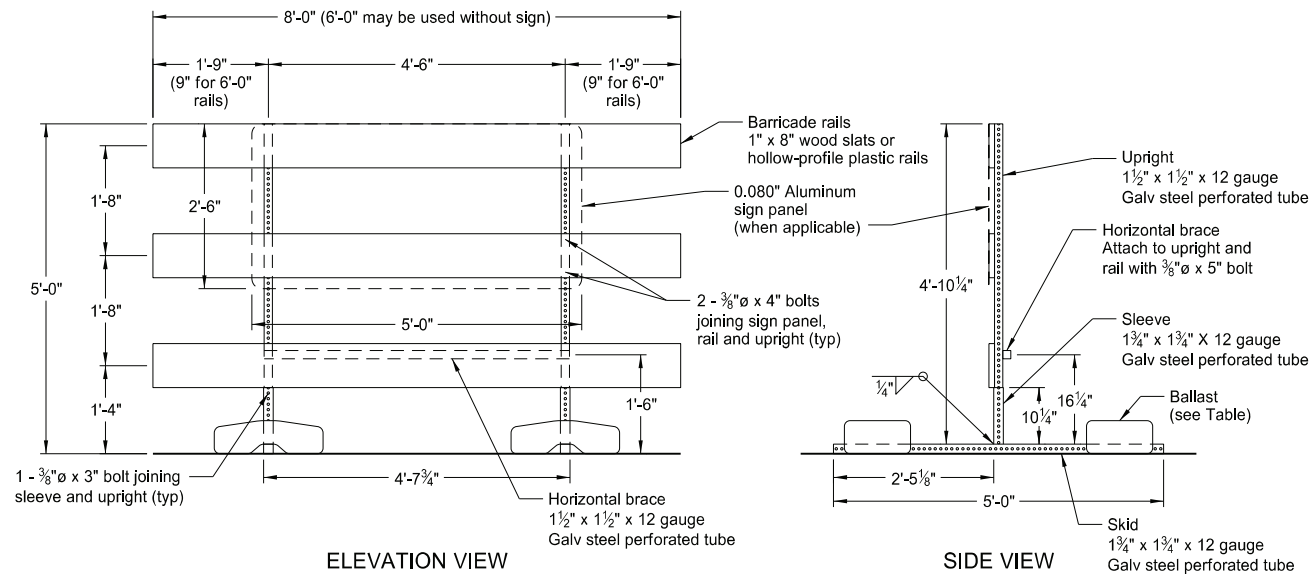


TYPE II BARRICADE

BARRICADE RAIL DETAILS



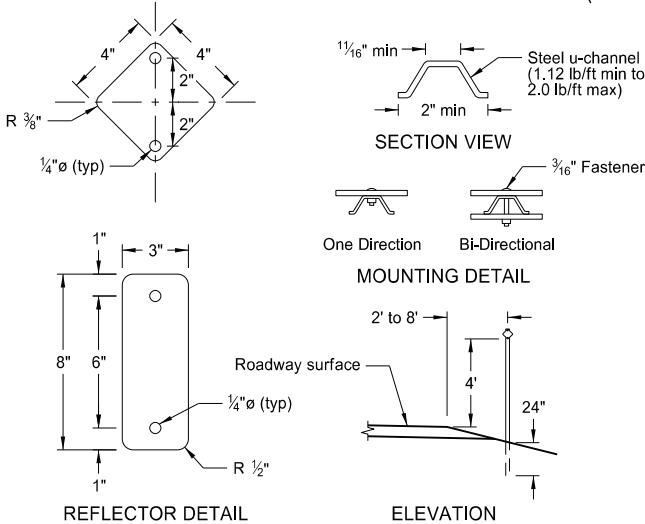
TYPE III BARRICADE



ELEVATION VIEW

SIDE VIEW

BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)



REFLECTOR DETAIL

ELEVATION

DELINEATORS

MINIMUM BALLAST (For each side of barricade support)

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

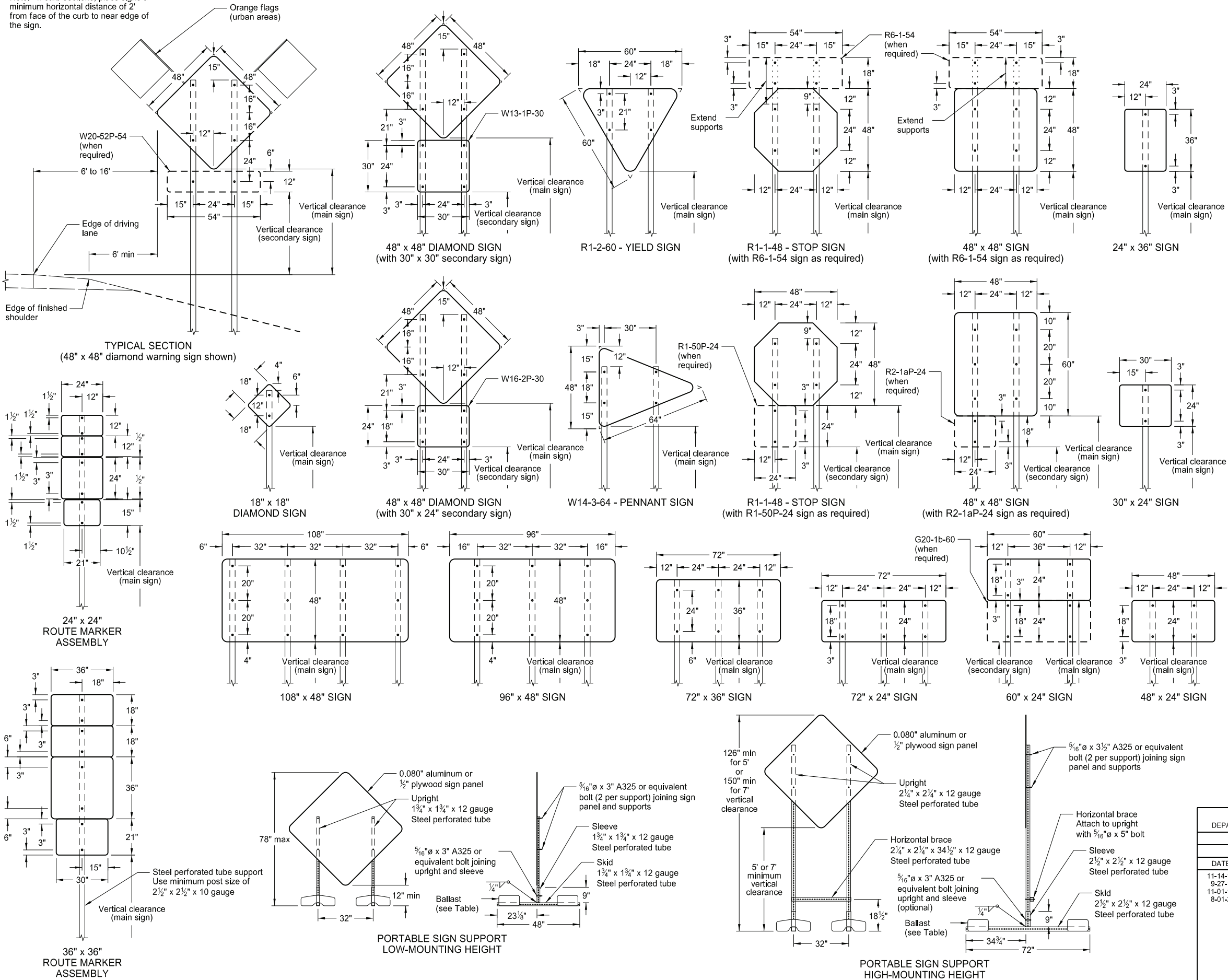
Note: Number of sandbags based on a wind speed of 55 MPH. Sandbags assumed to be placed at or near the ends of the skids.

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



CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

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



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 unforeseen circumstances, such as equipment breakdown, rain, subgrade failures, etc., will not accrue towards the 5 day period. Use of R9-8 through R9-11a series, W1-6 through W1-8 series, M4-10, and E5-1 is allowed for longer than 5 days.

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

MINIMUM BALLAST
(For each side of sign support base)

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

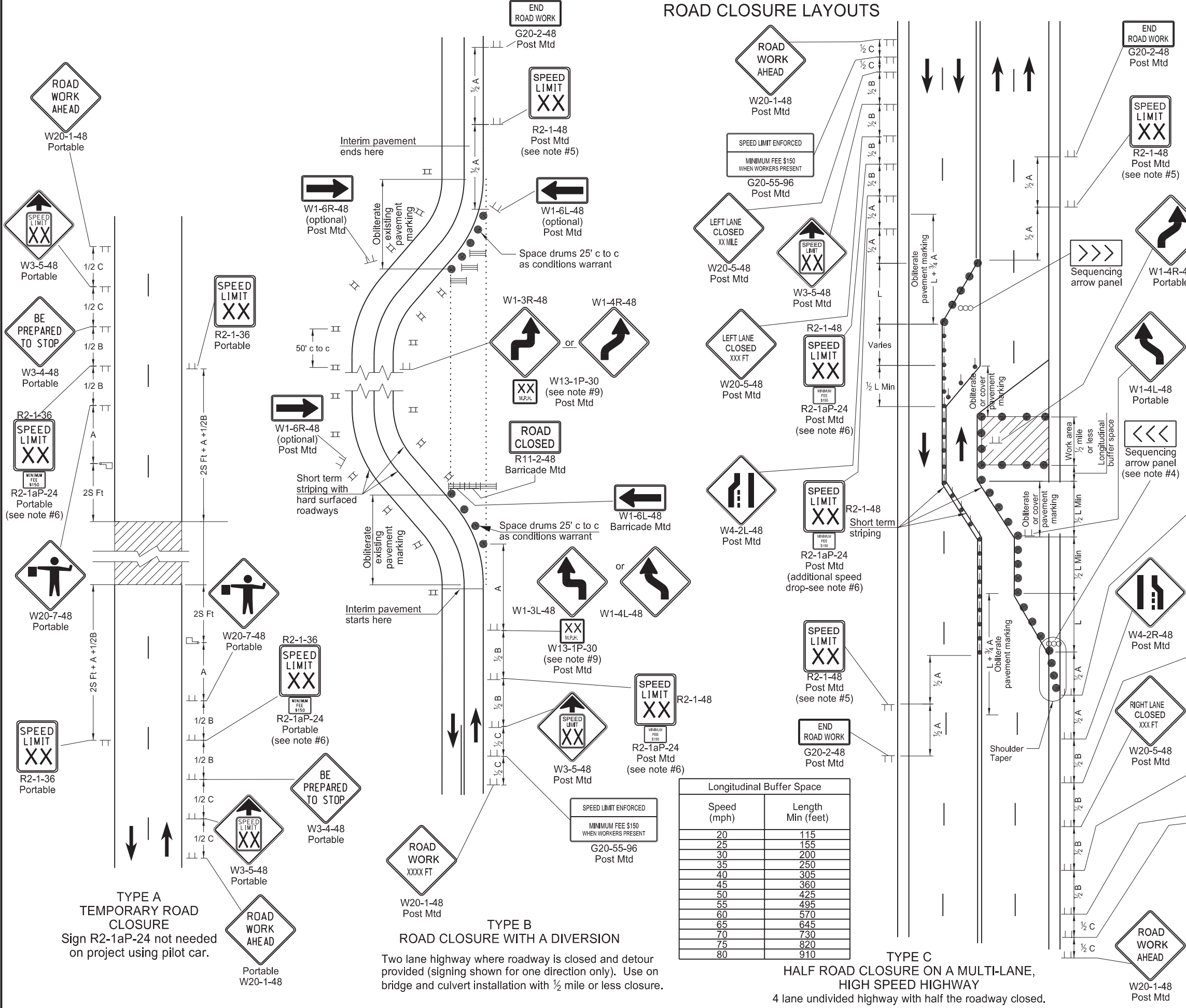
Note: The number of sandbags are based on a wind speed of 55 MPH. Place sandbags at or near the ends of skids.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE
11-14-13	Revised Note 6
9-27-17	Updated to active voice
11-01-19	Revised 60"x24" sign detail
8-01-24	Electronic Stamp/Signature



08/01/24

ROAD CLOSURE LAYOUTS



- Notes:
- Variables
 - S = Numerical value of speed limit or 85th percentile.
 - W = The width of taper in feet.
 - L = Minimum length of taper, S x W for freeways, expressways, and other roads with speeds of 45 mph or greater, or W x S²/60 for urban, residential, and other streets with speeds of 40 mph or less.
 - Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
 - Place delineator drums, barricades or cones for tapering traffic at dimension "S" and for tangents space at 2 times dimension "S".
 - Place Sequencing Arrow Panels at the beginning of the taper when possible. Where shoulder width does not provide sufficient room, move the panel closer to the work area and place on roadway surface. See Shoulder Closure Standard Drawing.
 - Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
 - Use Type B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
 - Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
 - Re-establish speed. Determine exact speed limit in the field, dependent on location and conditions.
 - Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2 B.
 - 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.
 - Cover existing speed limit signs within reduced speed zones.
 - Where necessary, engineer will determine safe speed.
 - As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
 - 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.
 - 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	

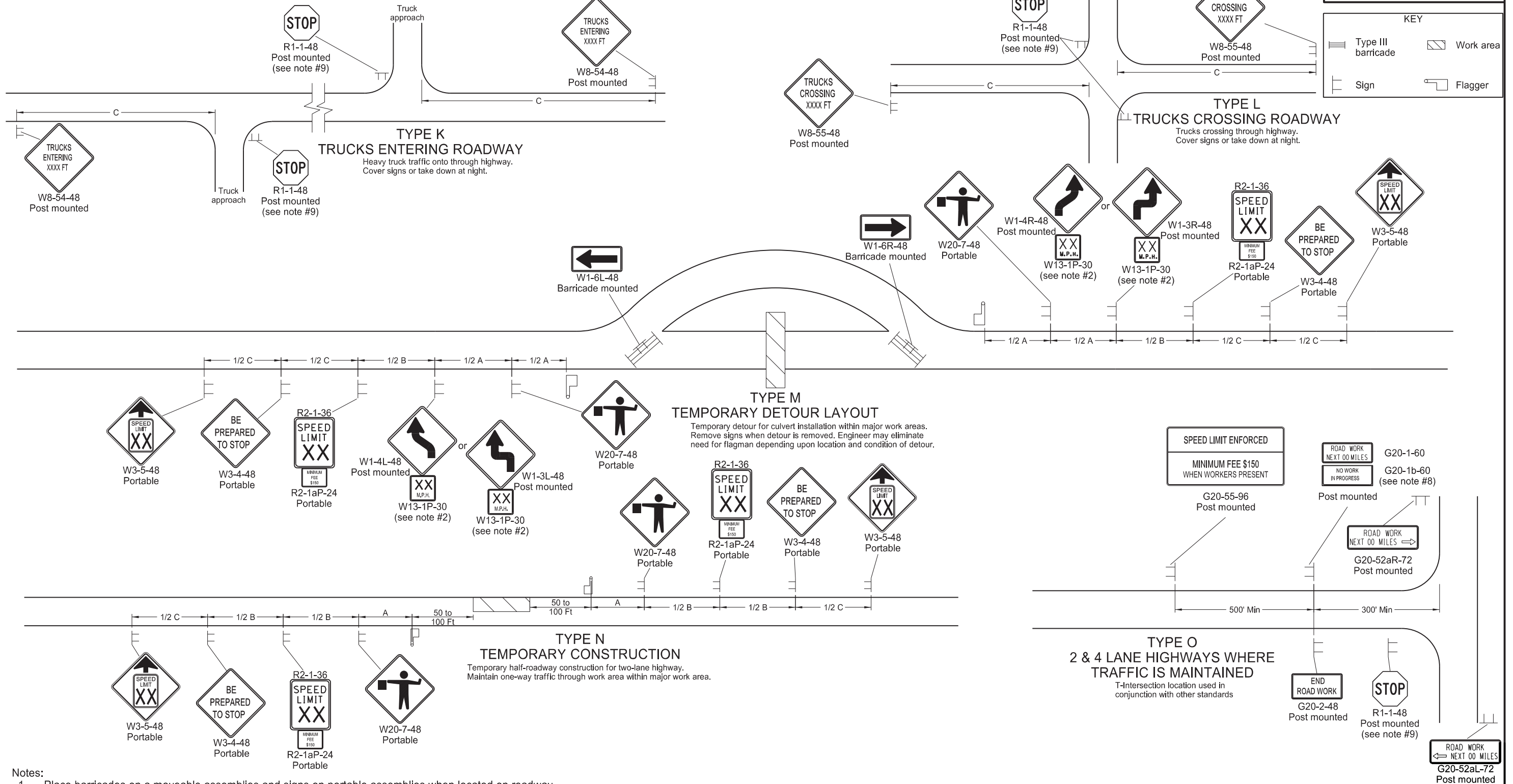
KEY			
	Type III barricade		Work area
	Sign		Flagger
	Delineator drum		Sequencing arrow panel
	Tubular markers		Vertical panels back to back

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Updated Notes & Spd Limit signs
11-01-19	Sign, Notes, & Pmnt Mk updates
12-08-21	Switched order of Road Work Ahead and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes



CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22



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.

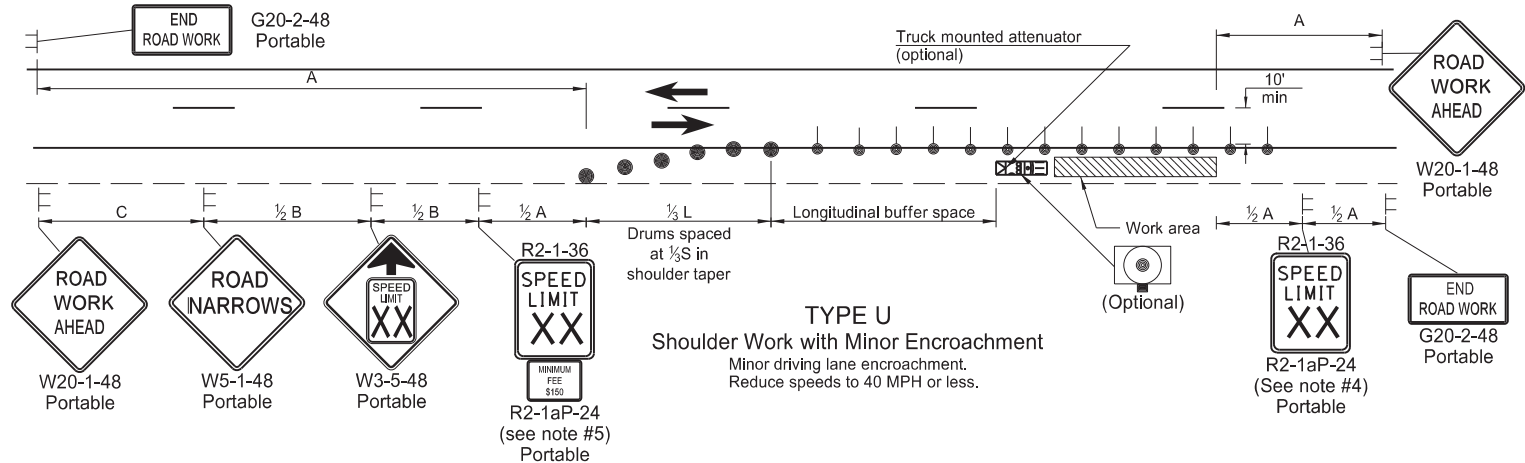
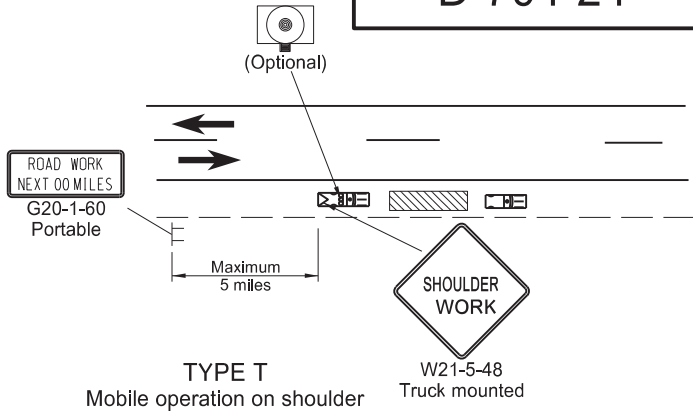
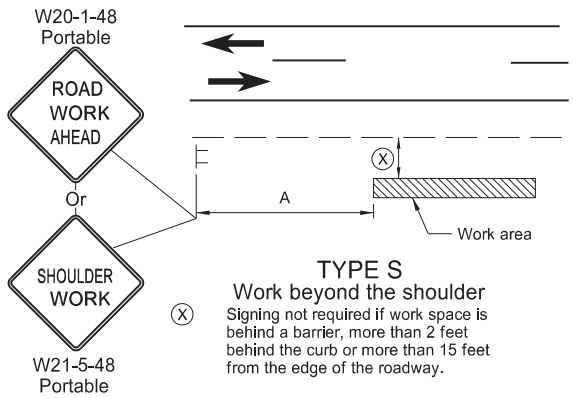
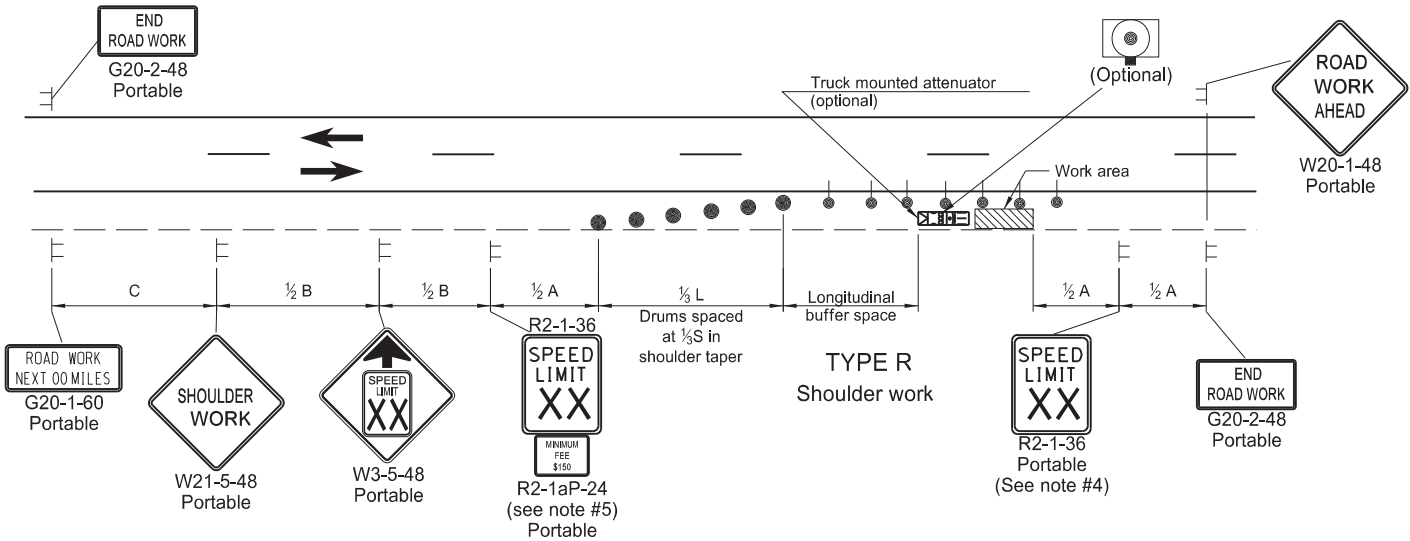
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway 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 11-01-19 12-09-21	Update notes & sign numbers Revised sign numbers & note Added Speed Limit Enforced and Dollars At Work signs
11-29-22 06-30-25	Removed Dollars At Work Legislative Changes

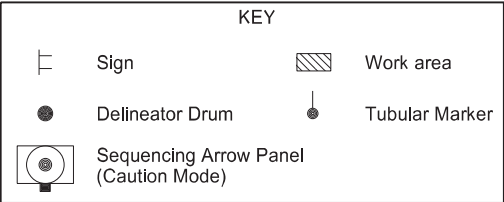
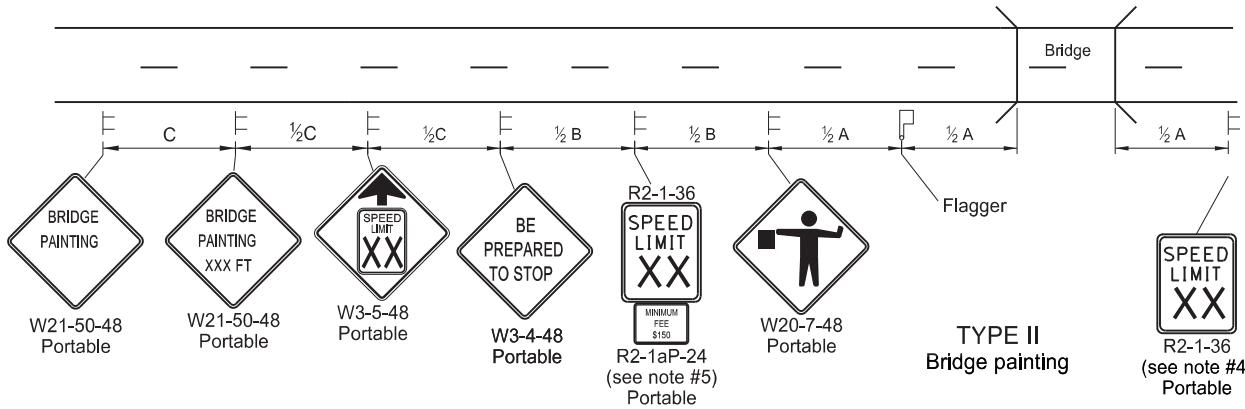
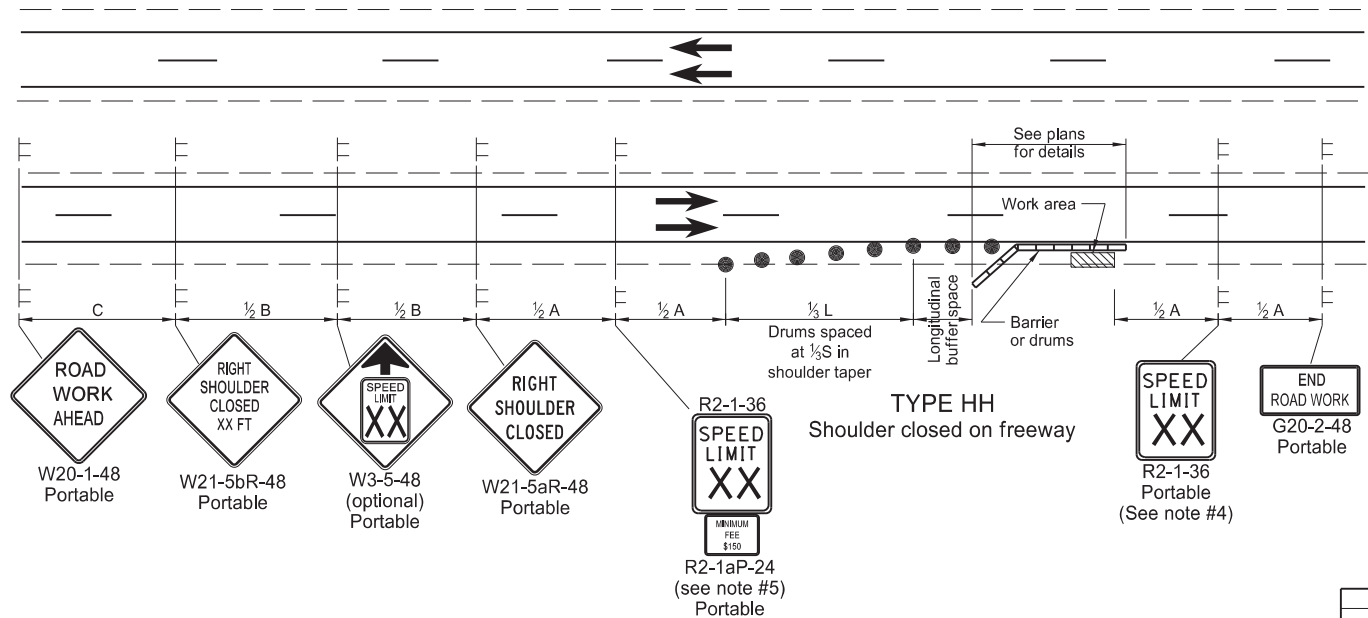


SHOULDER CLOSURES AND BRIDGE PAINTING LAYOUTS

D-704-24



- Notes
- Variables
 - S = Numerical value of speed limit or 85th percentile.
 - W = The width of the taper in feet.
 - L = Minimum length of taper, $S \times W$ for freeways, expressways, and all other roads with speeds of 45 mph or greater, or $W \times S^2 / 60$ for urban, residential, and other streets with speeds of 40 mph or less.
 - Space delineator drums for tapering traffic at dimension "S". Space delineator drums or tubular markers for tangents at 2 times "S".
 - Sequencing Arrow Panels
 - 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).
 - Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
 - Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2 B.
 - 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.
 - Cover existing speed limit signs within a reduced speed zone.
 - As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
 - Recommend 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

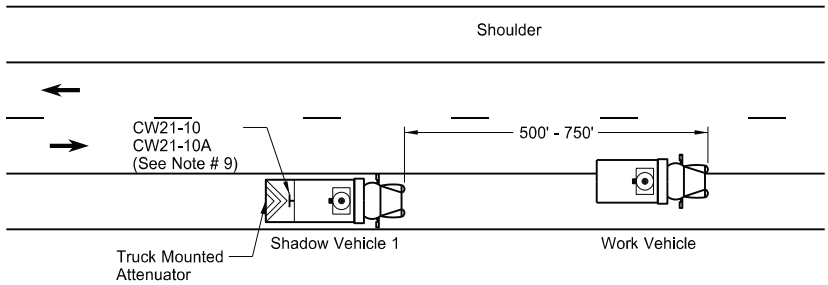
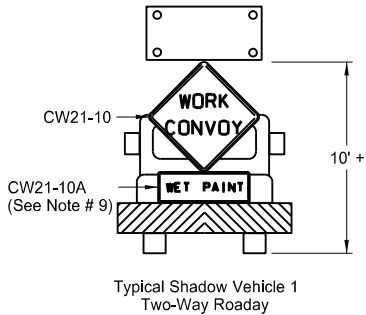
Longitudinal Buffer Space	
Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820
80	910

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Updated notes & revised signs
11-01-19	Revised drum spacing & signs nos
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes

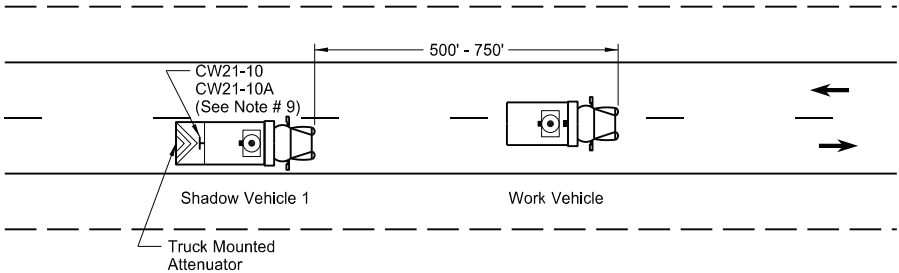


MOBILE OPERATION
(PAVEMENT MARKING)

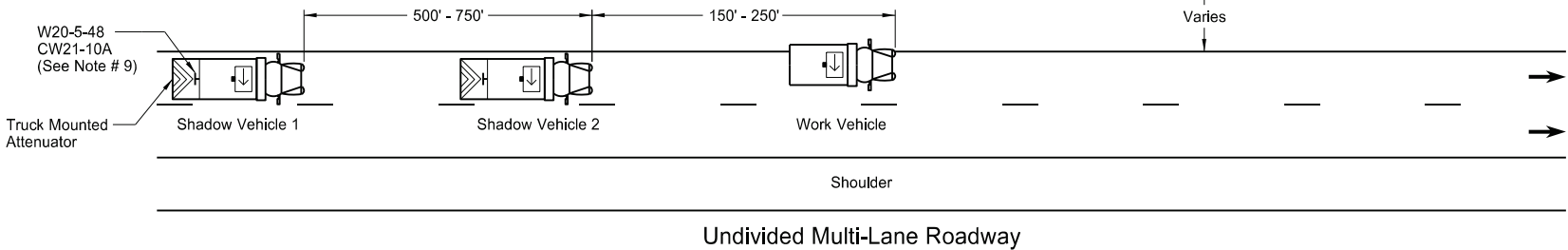
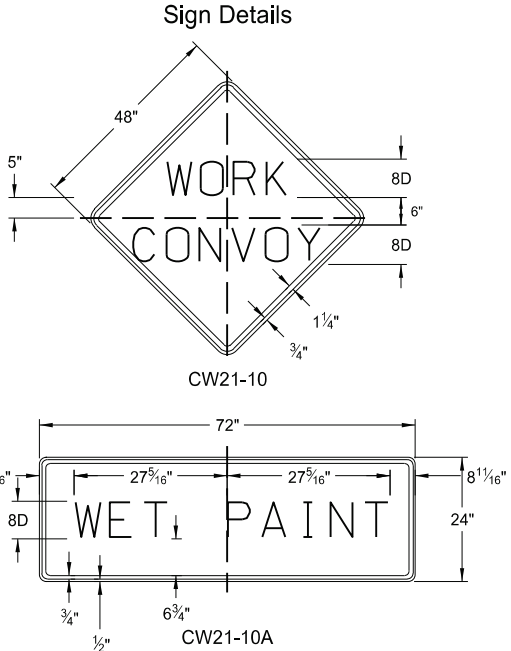
D-704-27



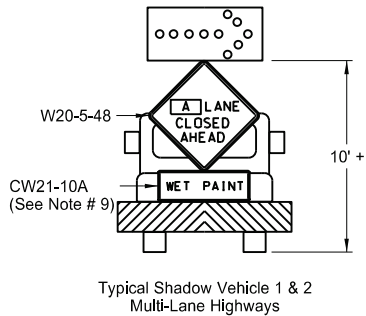
Two-Way Roadway with Paved Shoulders



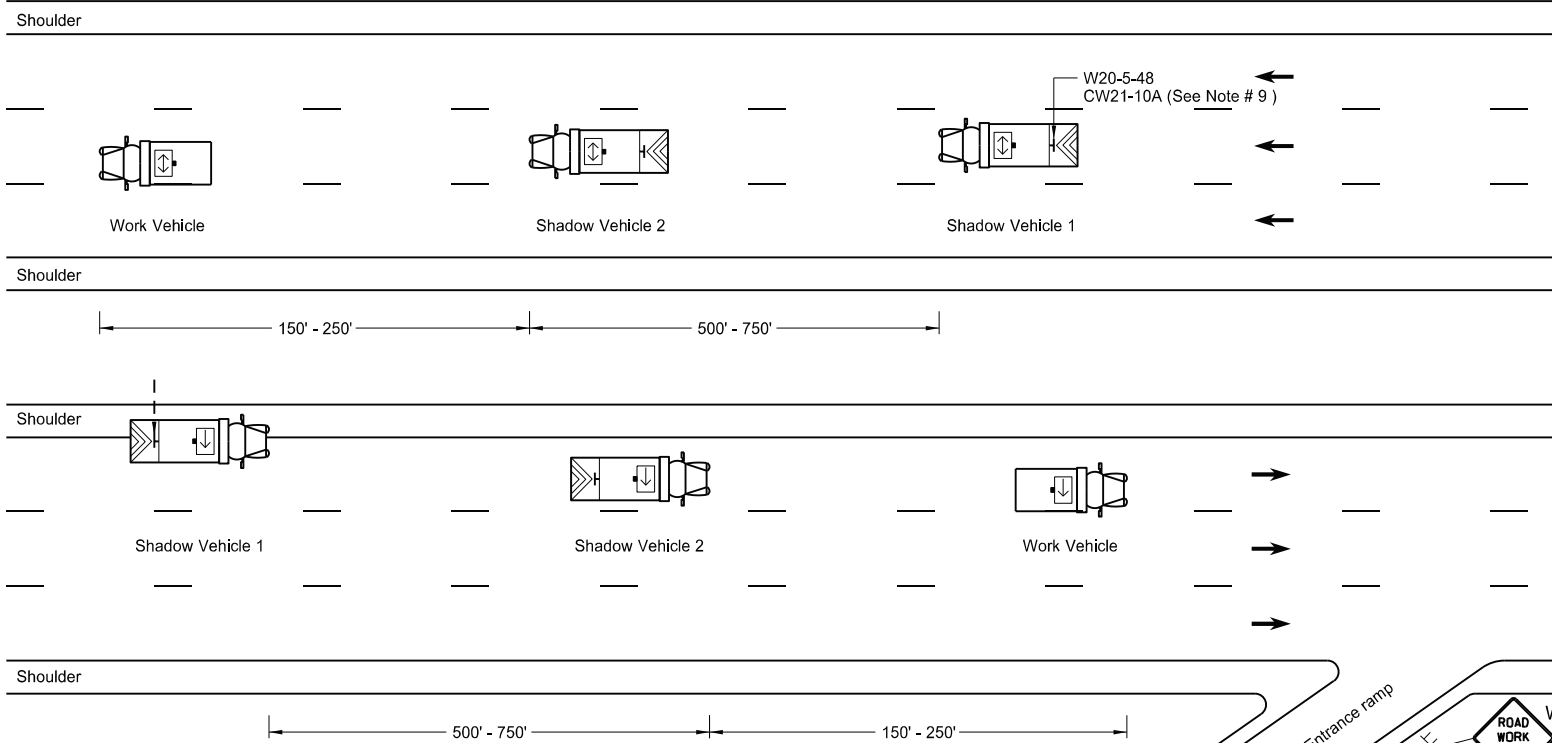
Two-Way Roadway without Paved Shoulders



Undivided Multi-Lane Roadway

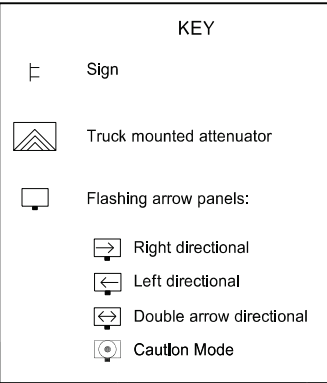


A = ☐ Left ☐ Right ☐ Center



Divided Multi-Lane Highway

- 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 strobe 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.



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
6-02-24	Electronic Stamp/Signature.



08/02/24

Two-Lane Roadway Portable Rumble Strips

D-704-33

Work area

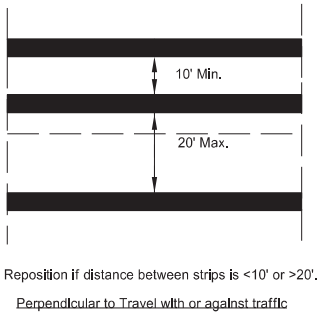
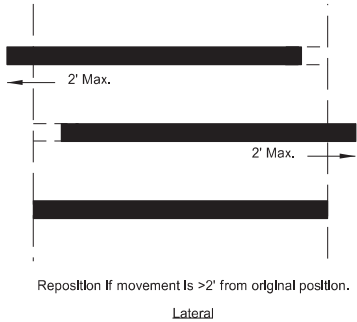
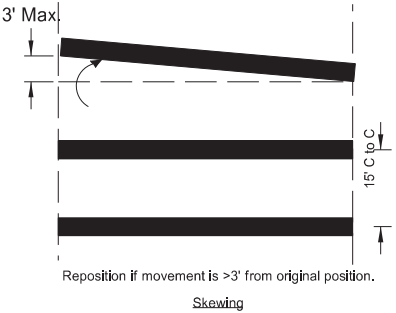
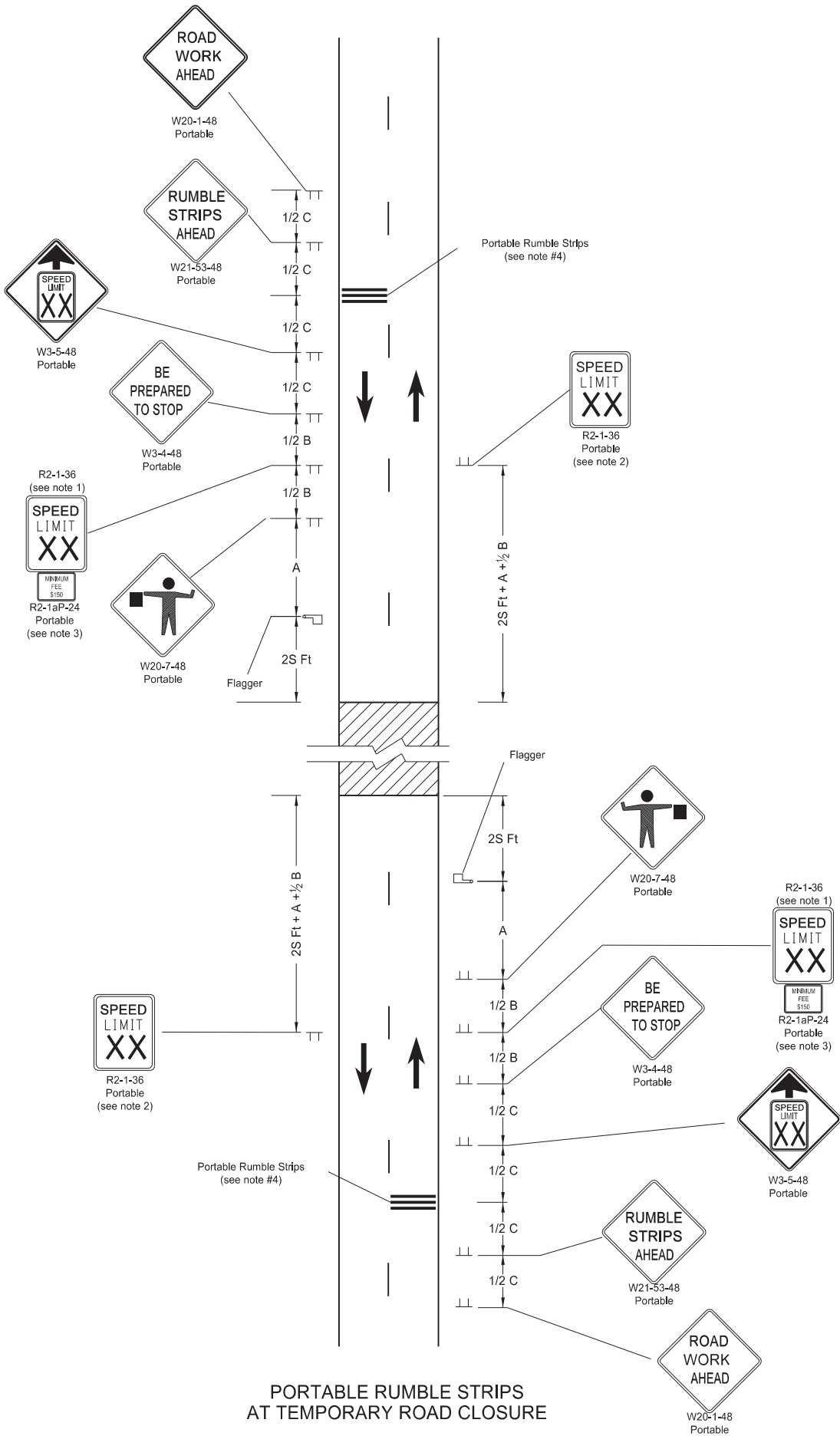
Flagger

Sign

KEY

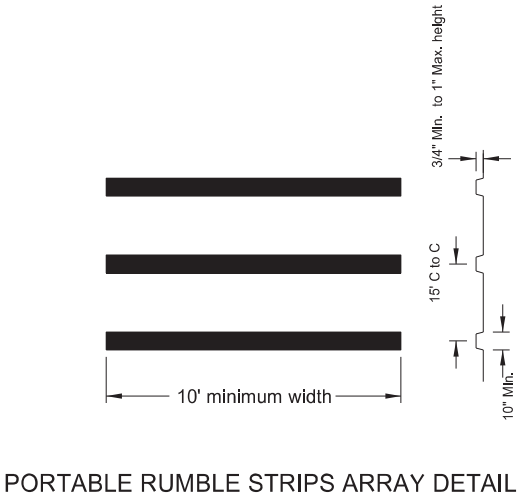
S = Numerical value of speed limit or 85th percentile.

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



PORTABLE RUMBLE STRIPS ARRAY
TYPES OF MOVEMENT AND MAXIMUM ALLOWANCES

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



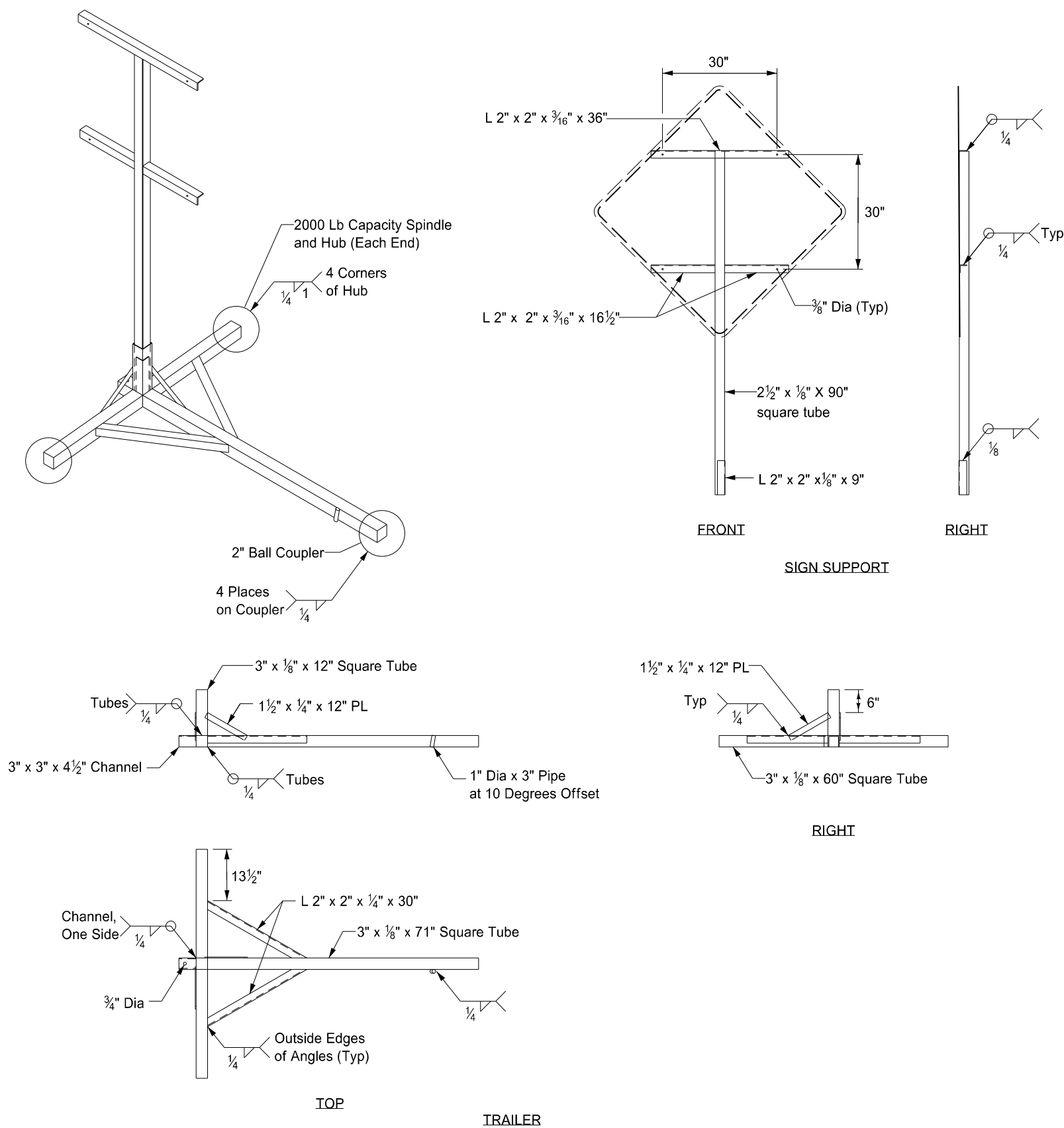
PORTABLE RUMBLE STRIPS
AT TEMPORARY ROAD CLOSURE

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

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

PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50

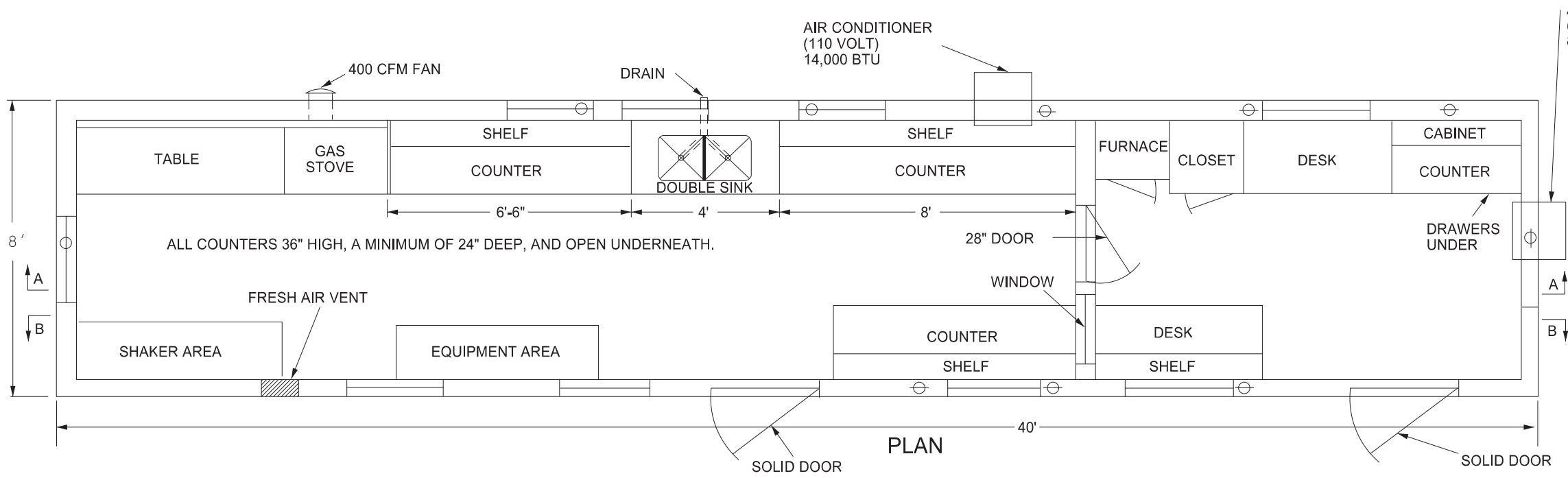


- Notes:
- 1. Maximum 250 pound weight of assembly.
 - 2. Use a 14" wheel and tire.
 - 3. Use no automotive and equipment axle assemblies for trailer-mounted sign supports.
 - 4. Other NCHRP 350 or MASH crash tested assemblies are acceptable.

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

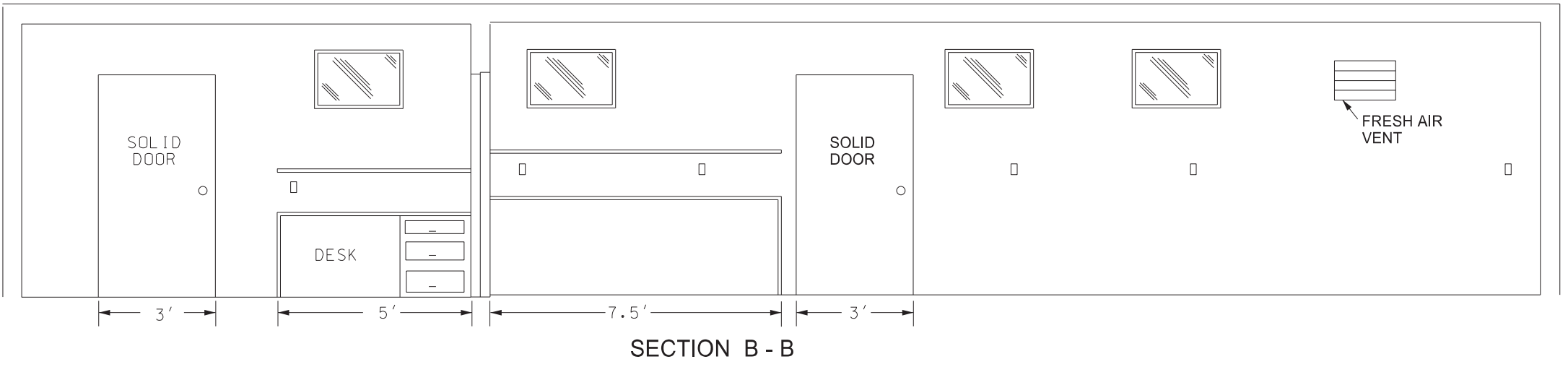
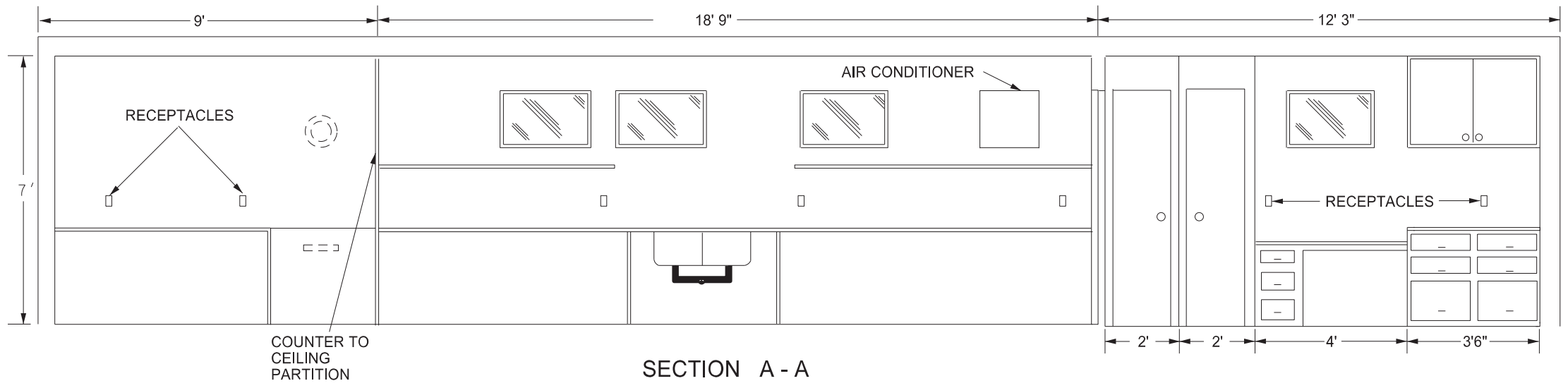


D-706-1



Provide a laboratory with the following:

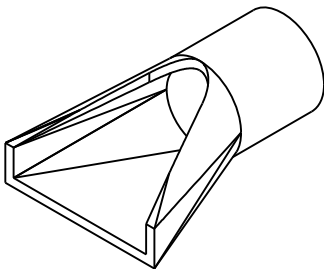
1. A 1'x1' shelf at 36" above the regular countertop.
2. Double compartment stainless steel sink, with each compartment a minimum of 16"x14"x10" deep. Provide water service lines made of copper or plastic and a diameter of ½ inch.
3. An exhaust fan capable of removing inside air at a rate of 400 CFM.
4. Fresh air vent hinged to open or close manually.
5. 24" x 48" table capable of holding a 200 lb masonry saw with a minimum clearance of 36" above the table.
6. A water supply tank with a capacity of 500 gallons and a 20 gallon capacity pressure tank on the pump.
7. Heavy duty type locks, latches, and hinges for doors made to withstand the intense use in service.
8. A wall between the office and the work area properly insulated to prevent the transmission of heat and noise.
9. The steel cable tie downs and ground anchors at each corner of the lab.
10. Electrical service entrance wired for 100 amps and separate circuits for air conditioners. Space convenience outlets in counter areas a minimum of four feet apart.



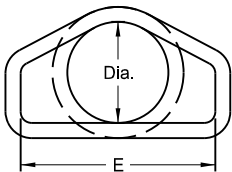
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
07-30-14	Changed standard's title and revised notes.
01-11-16	Revised notes.
08-27-19	New Design Engineer PE Stamp
08-09-24	Electronic Stamp/Signature.



FLARED END SECTION						
TERMINAL DIMENSIONS						
DIA	A	B	C	D	E	U
12	0'-4"	2'-0"	4'-0 ⁷ / ₈ "	6'-0 ⁷ / ₈ "	2'-0"	2"
15	0'-6"	2'-3"	3'-10"	6'-1"	2'-6"	2 ¹ / ₄ "
18	0'-9"	2'-3"	3'-10"	6'-1"	3'-0"	2 ¹ / ₂ "
21	0'-9"	3'-0"	3'-1"	6'-1"	3'-6"	2 ³ / ₄ "
24	0'-9 ¹ / ₂ "	3'-7 ¹ / ₂ "	2'-6"	6'-1 ¹ / ₂ "	4'-0"	3"
27	0'-10 ¹ / ₂ "	4'-0"	2'-1 ¹ / ₂ "	6'-1 ¹ / ₂ "	4'-6"	3 ¹ / ₄ "
30	1'-0"	4'-6"	1'-7 ³ / ₄ "	6'-1 ³ / ₄ "	5'-0"	3 ¹ / ₂ "
36	1'-3"	5'-3"	2'-9"	8'-0"	6'-0"	4"
42	1'-9"	5'-3"	2'-9"	8'-0"	6'-6"	4 ¹ / ₂ "
48	2'-0"	6'-0"	2'-0"	8'-0"	7'-0"	5"
54	2'-3"	5'-5"	2'-9 ¹ / ₄ "	8'-2 ¹ / ₄ "	7'-6"	5 ¹ / ₂ "
60	2'-11"	5'-0"	3'-3"	8'-3"	8'-0"	5"
66	2'-6"	6'-0"	2'-3"	8'-3"	8'-6"	5 ¹ / ₂ "
72	3'-0"	6'-6"	1'-9"	8'-3"	9'-0"	6"
78	3'-0"	7'-6"	1'-9"	9'-3"	9'-6"	6 ¹ / ₂ "
84	3'-0"	7'-6 ¹ / ₂ "	1'-9"	9'-3 ¹ / ₂ "	10'-0"	6 ¹ / ₂ "
90	3'-5"	7'-3 ¹ / ₂ "	2'-0"	9'-3 ¹ / ₄ "	11'-0"	6 ¹ / ₂ "

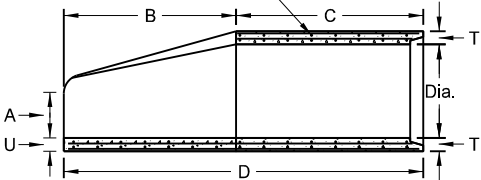


PERSPECTIVE

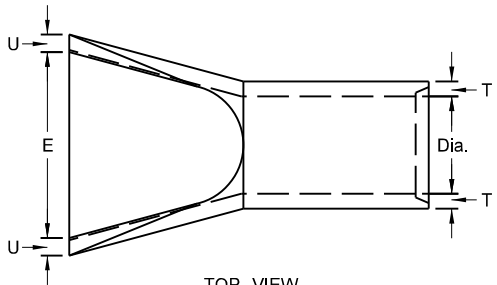


END VIEW

Standard Reinforcement for Class III pipe reinforced as per AASHTO M170



SIDE VIEW



TOP VIEW

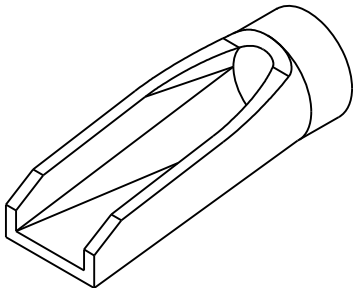
NOTES:

1. All reinforcing steel shall meet AASHTO M170 requirements.
2. All circular, longitudinal, and elliptical reinforcement shall be assembled and securely fastened in cage fashion so as to maintain reinforcement in exact shape and correct positions within the forms.
3. Laying length of pipe: 12" to 66" (incl.) = not less than 4 feet
66" to 108" (incl.) = not less than 6 feet
4. Joints shall be sealed with rubber gaskets or with sealer approved by the engineer whenever pipe are specified for storm drain or sanitary sewers.
5. For Class IV and Class V reinforced concrete pipe and end section sizes which do not have reinforcement specified by AASHTO M170, shop drawings and design calculations shall be prepared and sealed by a Professional Engineer and submitted for the Engineer's review.

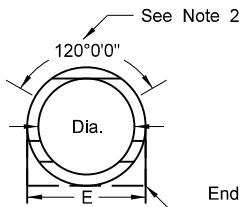
REINFORCED CONCRETE PIPE - FLARED END SECTION

Reinforcement to be equivalent to Class III RCP

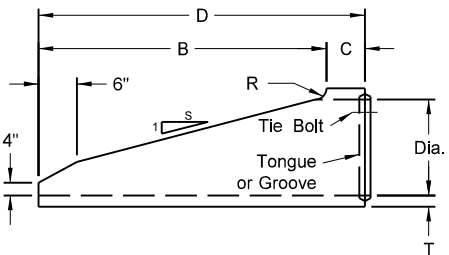
TRAVERSABLE END SECTION						
DIA	B	C	D	E	R	S
15"	4'	9"	4'-9"	1'-7 ¹ / ₂ "	3"	6
18"	5'-9"	9"	6'-6"	1'-11"	3"	6
24"	6'	1'	7'	2'-6"	3"	4
30"	7'-6"	1'	8'-6"	3'-1"	3 ¹ / ₂ "	4
36"	7'-3"	15"	8'-6"	3'-8"	3"	4



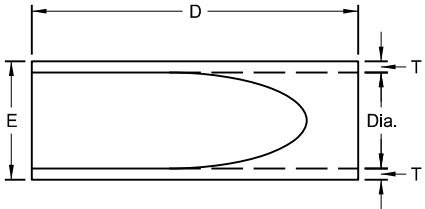
PERSPECTIVE



END VIEW



SIDE VIEW



TOP VIEW

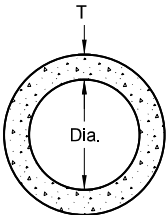
NOTES (Traversable End Section):

1. Manufactured in accordance with applicable portions of ASTM C76/AASHTO M170.
2. Reinforcement per Class III RCP with double reinforcement in the upper 120° of the full barrel portion.

REINFORCED CONCRETE PIPE - TRAVERSABLE END SECTION

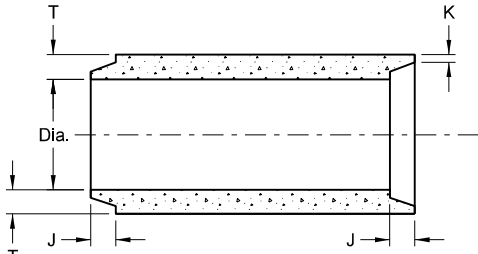
Reinforcement to be equivalent to Class III RCP

All Classifications of Round Concrete Pipe						
Internal Dia. of pipe in Inches	Cross-Sectional Water Area	Weight per Lin. Foot of pipe Std. Wall	Joint J Groove End Min./Max.	Joint K Tongue Min.	Minimum Wall Thickness (T)	
Dia	Sq. ft.	Lbs.	In.	In.	In.	
12	0.79	92	1 ⁵ / ₈ -2 ³ / ₈	3/4	2	
15	1.23	127	1 ³ / ₄ -2 ¹ / ₄	7/8	2 ¹ / ₄	
18	1.77	168	1 ¹ / ₂ -2 ¹ / ₂	1	2 ¹ / ₂	
21	2.40	214	1 ¹ / ₂ -3 ¹ / ₈	1 ¹ / ₈	2 ³ / ₄	
24	3.14	265	2 ³ / ₄ -3 ¹ / ₄	1 ¹ / ₈	3	
27	3.98	322	2 ³ / ₄ -4	1 ¹ / ₄	3 ¹ / ₄	
30	4.91	384	3 ¹ / ₄ -4 ¹ / ₄	1 ¹ / ₄	3 ¹ / ₂	
33	5.94	452	3 ¹ / ₄ -4 ¹ / ₄	1 ¹ / ₂	3 ³ / ₄	
36	7.07	524	3 ¹ / ₄ -4 ¹ / ₄	1 ¹ / ₂	4	
42	9.62	685	3 ³ / ₄ -4 ³ / ₄	1 ³ / ₄	4 ¹ / ₂	
48	12.57	685	3 ³ / ₄ -4 ³ / ₄	1 ³ / ₄	5	
54	15.90	1070	4 ¹ / ₂ -5 ¹ / ₄	2	5 ¹ / ₂	
60	19.63	1296	4 ¹ / ₂ -5 ¹ / ₂	2 ¹ / ₄	6	
66	23.76	1542	5-6	2 ³ / ₈	6 ¹ / ₂	
72	28.27	1810	5 ⁵ / ₈ -6 ³ / ₄	2 ³ / ₈	7	
78	33.18	2098	6 ¹ / ₄ -7 ¹ / ₄	2 ³ / ₈	7 ¹ / ₂	
84	38.48	2410	5 ⁵ / ₈ -7 ³ / ₄	3 ³ / ₈	8	
90	44.18	2793	6 ³ / ₄ -8 ¹ / ₂	3 ³ / ₈	8 ¹ / ₂	
96	50.27	3092	7-8 ¹ / ₄	3 ¹ / ₂	9	
102	56.75	3466	7-8 ¹ / ₄	3 ¹ / ₂	9 ¹ / ₂	
108	63.62	3864	7 ¹ / ₄ -8 ¹ / ₂	3 ³ / ₄	10	

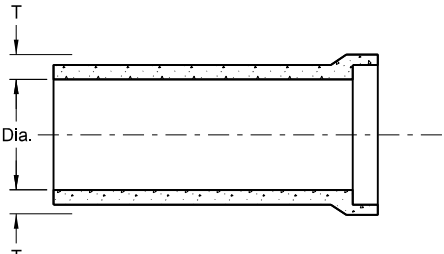


END VIEW

CIRCULAR PIPE

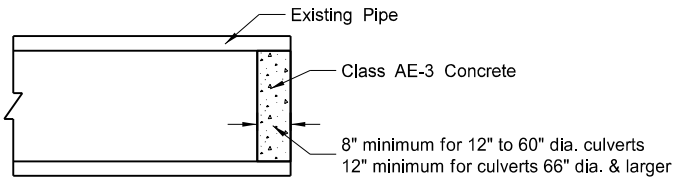


TONGUE & GROOVE JOINT



BELL & SPIGOT JOINT

JOINTS FOR REINFORCED CONCRETE PIPE



CONCRETE PIPE PLUG

SEE STANDARD DRAWING D-714-22 FOR DETAILS OF CONCRETE PIPE TIES (TIE BOLTS).

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
05-12-14	
REVISIONS	
DATE	CHANGE
01-21-15	Revised Note 5
11-21-16	Revised End Section Dimensions
09-18-19	Updated Perspective View Details

This document was originally issued and sealed by
Jon Ketterling
Registration Number
PE- 4684 ,
on 9/18/19 and the original document is stored at the
North Dakota Department
of Transportation

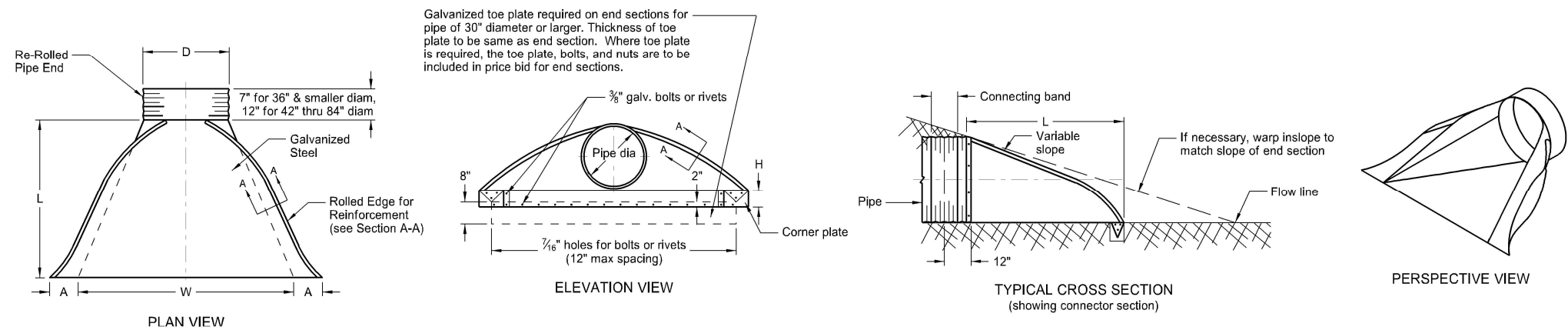
D-714-2

This document was originally issued and sealed by Jon Ketterling, Registration Number PE- 4684, on 9/18/19 and the original document is stored at the North Dakota Department of Transportation

END SECTION
FOR ARCHES SMALLER THAN 90"

ROUND CORRUGATED STEEL PIPE CULVERTS AND END SECTIONS

D-714-4



PIPE DIA.	GALVANIZED THICKNESS	END SECTION DIMENSIONS						APPROX. SLOPE RATE	BODY
		A	B	H	L	W			
15	0.064 - 0.079	7	8	6	26	30	2 1/2:1	1	
18	0.064 - 0.109	8	10	6	31	36	2 1/2:1	1	
24	0.064 - 0.109	10	13	6	41	48	2 1/2:1	1	
30	0.064 - 0.109	12	16	8	51	60	2 1/2:1	1 or 2	
36	0.064 - 0.109	14	19	9	60	72	2 1/2:1	2	
42	0.064 - 0.138	16	22	11	69	84	2 1/2:1	2	
48	0.064 - 0.168	18	27	12	78	90	2 1/2:1	2	
54	0.064 - 0.168	18	30	12	84	102	2:1	2	
* 60	0.064 - 0.168	18	33	12	87	114	1 1/2:1	3	
* 66	0.064 - 0.168	18	36	12	87	120	1 1/2:1	3	
* 72	0.064 - 0.168	18	39	12	87	126	1 1/2:1	3	
* 78	0.064 - 0.168	18	42	12	87	132	1 1/2:1	3	
* 84	0.064 - 0.168	18	45	12	87	138	1 1/2:1	3	

* These sizes have 0.109" sides and 0.138" center panels.

** Pipe diameter is equal to dimension "D" of end section.

Manufacturers tolerances of above dimensions will be allowed.

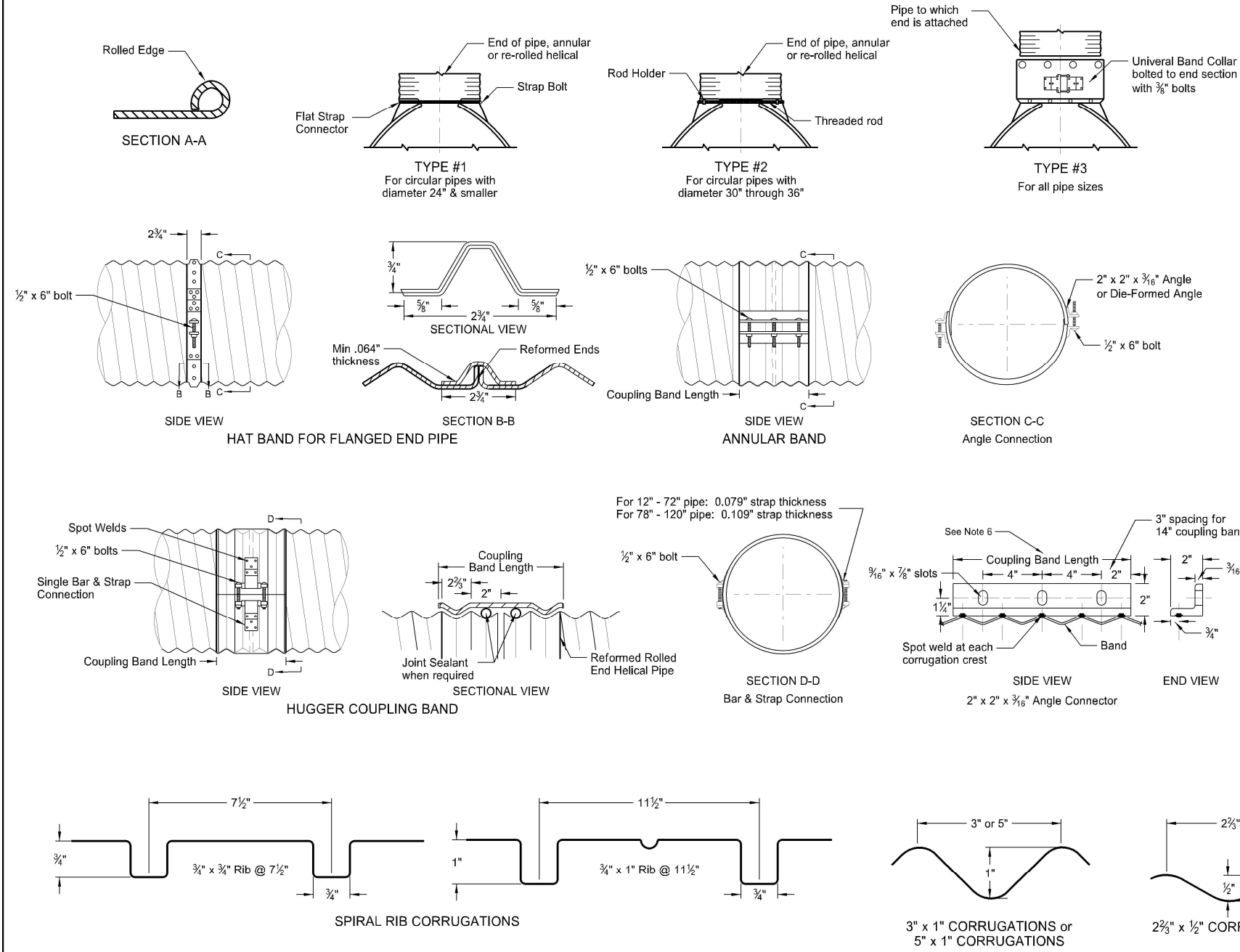
Splices to be the lap riveted type.

Multiple panel bodies shall have lap seams which are to be tightly joined with 3/8" dia. galv. bolts or rivets. Nuts to be torqued to 25 foot-lbs ±.

NOTES:

- Pipes and connecting bands shall conform to applicable sections of NDDOT Standard Specifications and to AASHTO M-36.
- Top edge of all end sections to have rolled edges for reinforcement (see Section A-A). The reinforced edges are to be supplemented with 2" x 2" x 1/4" galv. angle for 60" through 72" dia. and 2 1/2" x 2 1/2" x 1/4" galv. angle for 78" and 84" dia.. Angles to be attached by galv. 3/8" dia. bolts and nuts. Angles are to extend from pipe to the corner wing bend.
- Elongated pipes shall be factory preformed so that the vertical diameter shall be 5% greater and the horizontal diameter 5% less than a circular pipe.
- Coupling bands shall be two-piece for pipes larger than 36" as shown in Section C-C & D-D details. For pipes 36" and smaller, a one-piece band is acceptable.
- 1/2" x 8" bolts may be used as a substitute for the 1/2" x 6" bolts shown in the details.
- Coupling bands wider than 14" may be used if a minimum of four 1/2" bolts with maximum spacing of 5 1/2" are used for the connection.
- Length of spot welds shall be minimum 1/2".

COUPLING BAND DIMENSIONS				
COUPLING TYPE	CORRUGATION PITCH x DEPTH	PIPE SIZE	COUPLING BAND LENGTH	MIN. BAND THICKNESS
Hat Band	2 3/8" x 1/2"	12" - 48"	2 3/4"	.064"
Annular Band	2 3/8" x 1/2"	12" - 72"	12"	.052"
		78" - 84"	12"	.079"
Hugger Band	2 3/8" x 1/2" Rerolled End	12" - 72"	10 1/2"	.052"
		78" - 84"	10 1/2"	.079"
	3" x 1" Rerolled End	48" - 120"	10 1/2"	.052"
		48" - 120"	12"	.064"



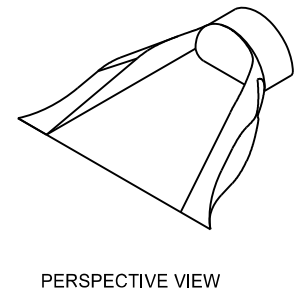
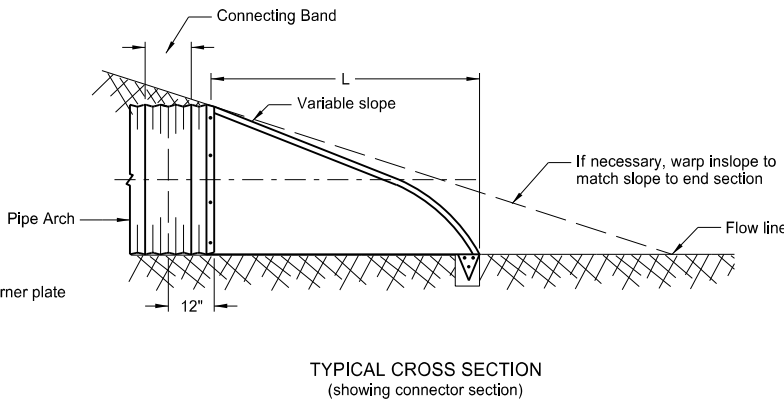
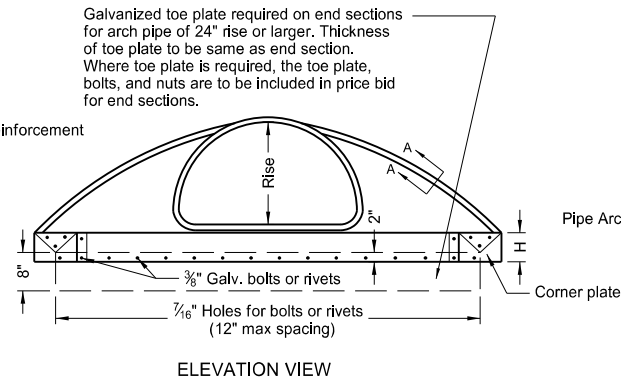
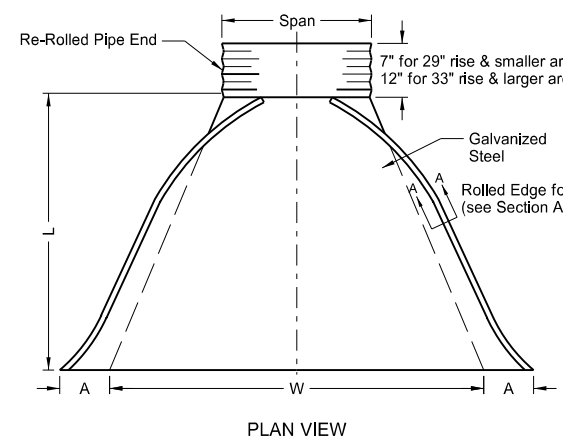
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
08-16-13	
REVISIONS	
DATE	CHANGE
01-07-14	End Section Plan View
02-27-14	3" x 1" Corrugation Detail
09-18-19	Added Perspective View Detail
09-23-22	Galvanized Thickness Table



09/23/22

CORRUGATED STEEL PIPE ARCH CULVERTS AND END SECTIONS

D-714-5



PIPE ARCH DIMENSION		GALV. THICK.	END SECTION DIMENSIONS						APPROX. SLOPE	BODY
SPAN	RISE		A	B	H	L	W			
IN	IN	IN	IN	IN	IN	IN	IN	RATE	PIECE	
17	13	0.064	7	9	6	19	30	2½:1	1	
21	15	0.064	7	10	6	23	36	2½:1	1	
24	18	0.064	8	12	6	28	42	2½:1	1	
28	20	0.064	9	14	6	32	48	2½:1	1	
35	24	0.079	10	16	6	39	60	2½:1	1 or 2	
42	29	0.079	12	18	8	46	75	2½:1	1 or 2	
49	33	0.109	13	21	9	53	85	2½:1	2	
57	38	0.109	18	26	12	63	90	2½:1	2	
64	43	0.109	18	30	12	70	102	2½:1	2	
* 71	47	0.109	18	33	12	77	114	2½:1	3	
* 77	52	0.109	18	36	12	77	126	2:1	3	
* 83	57	0.109	18	39	12	77	138	2:1	3	

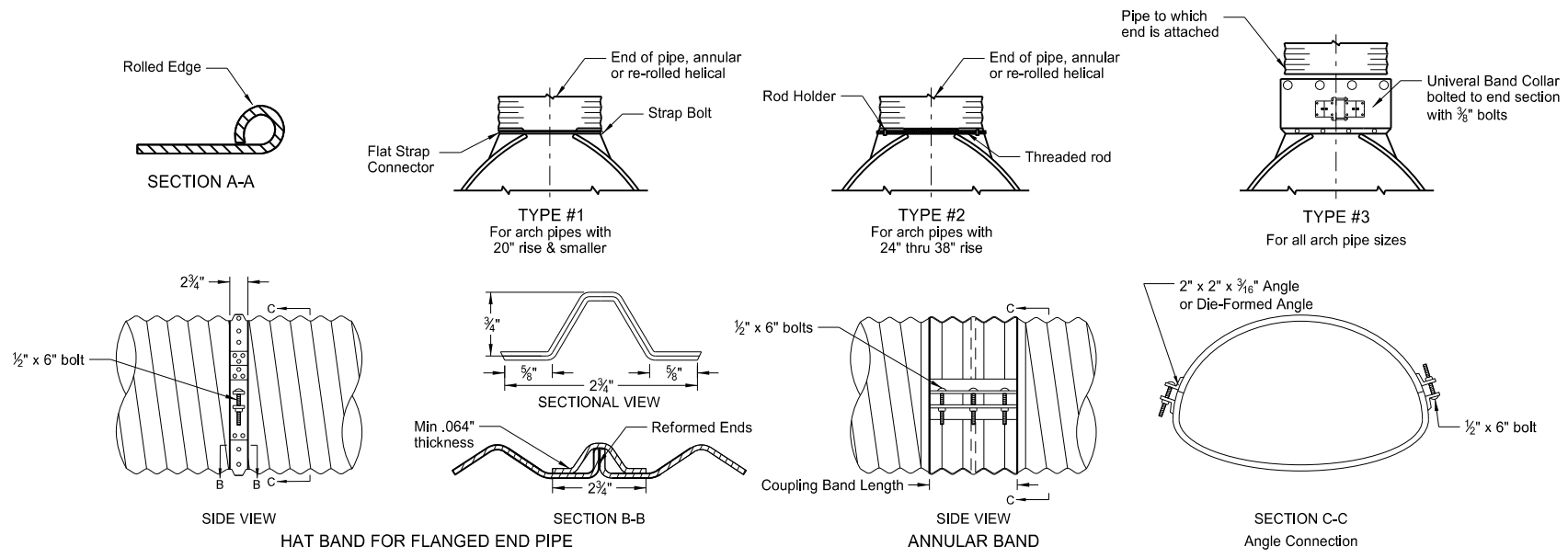
* These sizes have 0.109" sides and 0.138" center panels.

Manufacturers tolerances of above dimensions will be allowed.

Splices to be the lap riveted type.

Multiple panel bodies shall have lap seams which are to be tightly joined with 3/8" dia. galv. bolts or rivets. Nuts to be torqued to 25 foot-lbs ±.

① Applicable to equivalent sizes of 3"x1" corrugations.



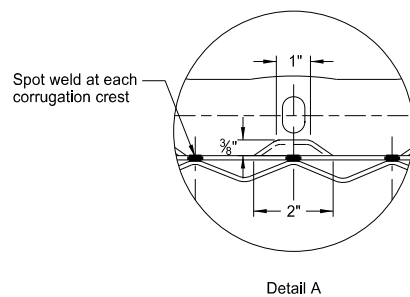
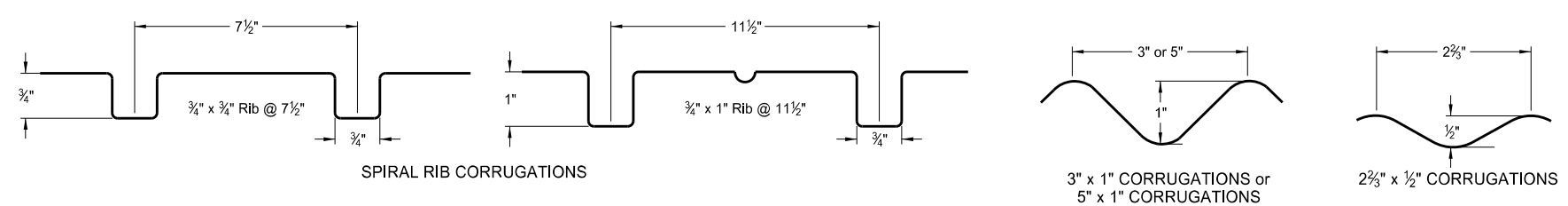
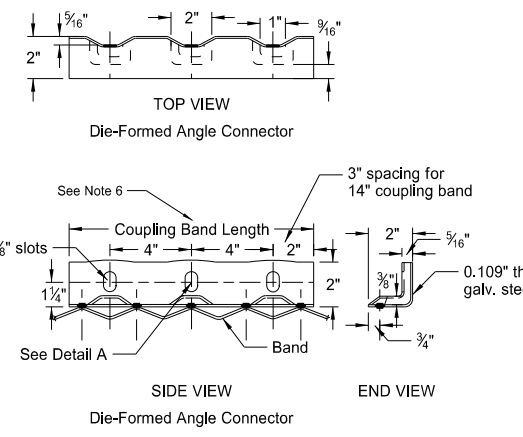
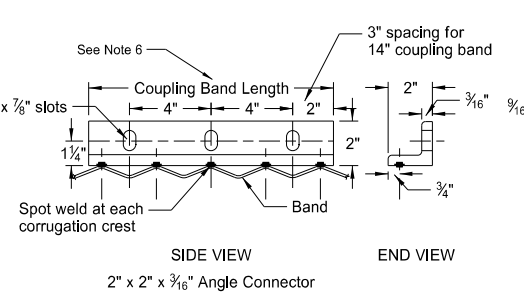
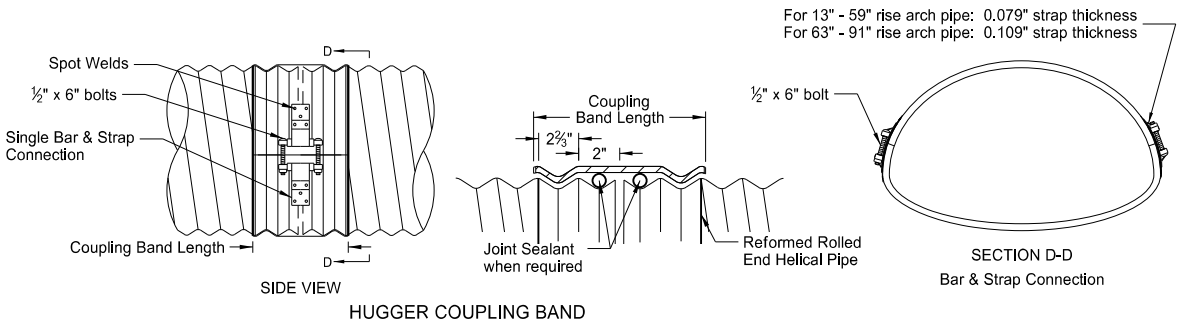
2 1/2" x 1/2" CORRUGATIONS			EQUIV PIPE DIA.
SPAN	RISE	IN	
17	13	15	
21	15	18	
24	18	21	
28	20	24	
35	24	30	
42	29	36	
49	33	42	
57	38	48	
64	43	54	
71	47	60	
77	52	66	
83	57	72	

3" x 1" CORRUGATIONS			EQUIV PIPE DIA.
SPAN	RISE	IN	
53	41	48	
60	46	54	
66	51	60	
73	55	66	
81	59	72	
87	63	78	
95	67	84	
103	71	90	
112	75	96	
117	79	102	
128	83	108	
137	87	114	
142	91	120	

For pipe arches use the same width band as for circular pipe of equal periphery.

COUPLING BAND DIMENSIONS				
COUPLING TYPE	CORRUGATION PITCH x DEPTH	ARCH PIPE RISE	COUPLING BAND LENGTH	MIN. BAND THICKNESS
Hat Band	2 2/3" x 1/2"	13" - 38"	2 3/4"	.064"
Annular Band	2 2/3" x 1/2"	13" - 57"	12"	.052"
	3" x 1"	41" - 91"	14"	.052"
Hugger Band	2 2/3" x 1/2" Rerolled End	13" - 57"	10 1/2"	.052"
		63" - 67"	10 1/2"	.079"
	3" x 1" Rerolled End	41" - 91"	10 1/2"	.052"
	5" x 1" Rerolled End	41" - 91"	12"	.064"

- NOTES:
- Pipe and connecting bands shall conform to applicable sections of NDDOT Standard Specifications and to AASHTO M-36.
 - Top edge of all end sections to have rolled edges for reinforcement (see Section A-A). The reinforced edges are to be supplemented with 2" x 2" 1/4" galv. angle for 77"x52" and 83"x57" sizes. Angles to be attached by galv. 3/8" dia. bolts and nuts. Angles are to extend from pipe to the corner wing bend.
 - Coupling bands shall be two-piece for all arch pipes.
 - 1/2" x 8" bolts may be used as a substitute for the 1/2" x 6" bolts shown in the details.
 - Coupling bands wider than 14" may be used if a minimum of four 1/2" bolts with maximum spacing of 5 1/2" are used for the connection
 - Length of spot welds shall be minimum 1/2".



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
08-16-13	
REVISIONS	
DATE	CHANGE
01-07-14	End Section Plan View
02-27-14	3" x 1" Corrugation Detail
09-18-19	Added Perspective View Detail

This document was originally issued and sealed by

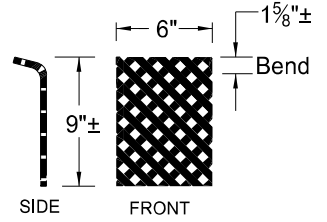
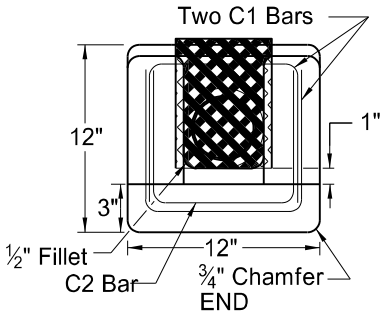
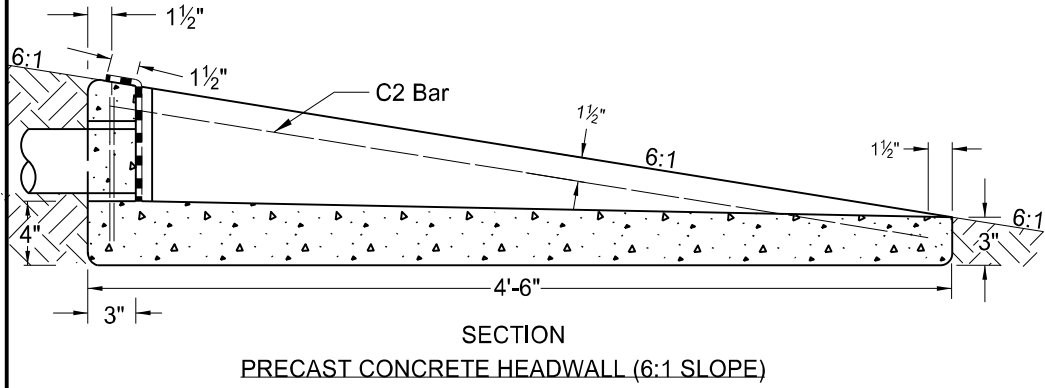
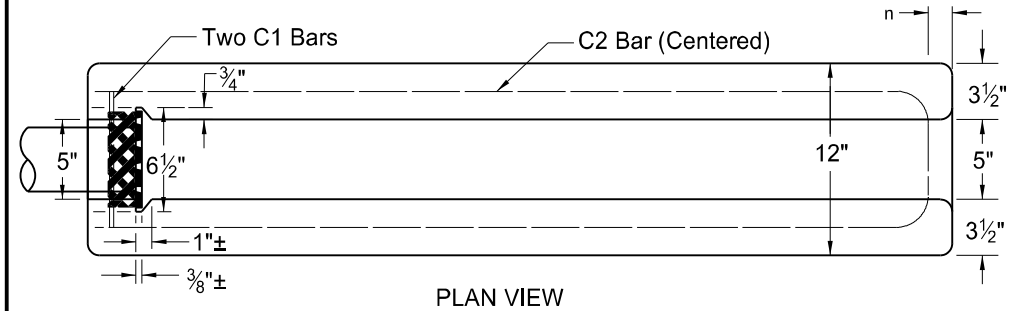
Jon Ketterling

Registration Number PE-4684,

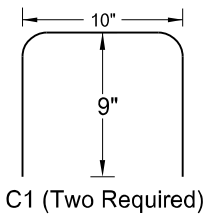
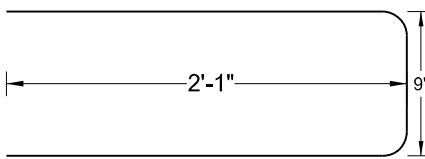
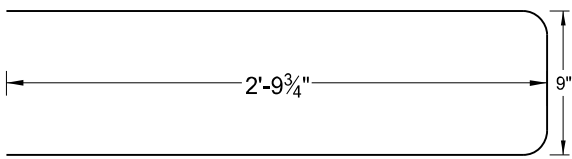
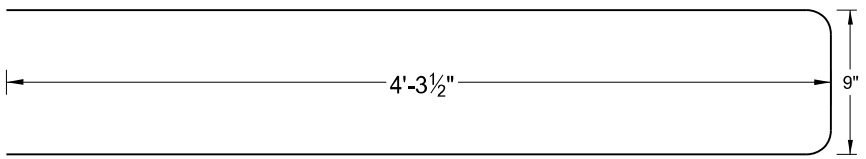
on 9/18/19 and the original document is stored at the North Dakota Department of Transportation

PRECAST CONCRETE HEADWALL DETAILS

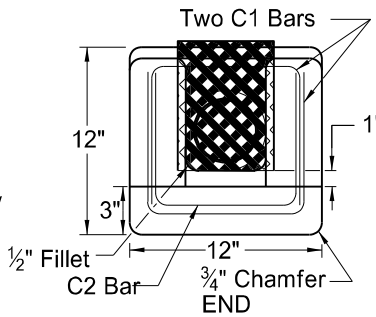
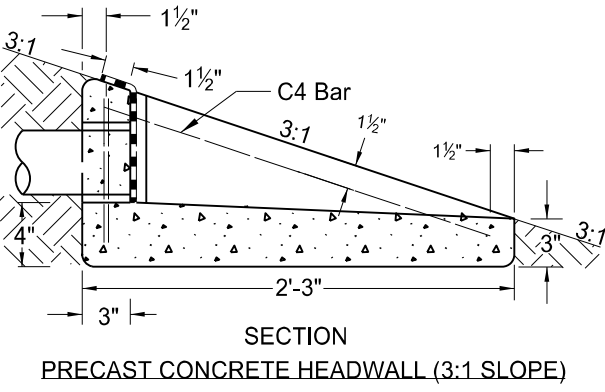
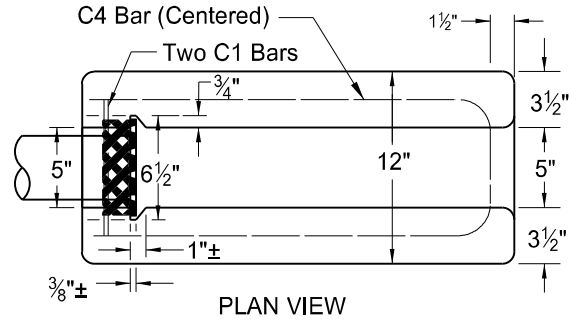
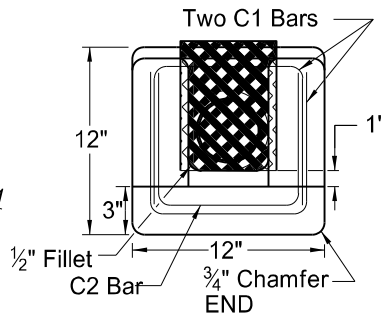
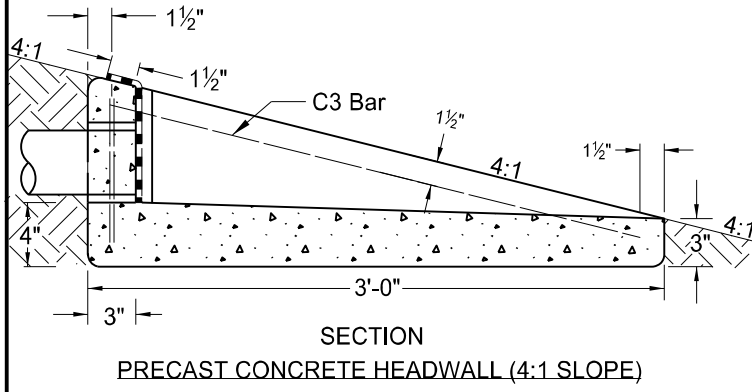
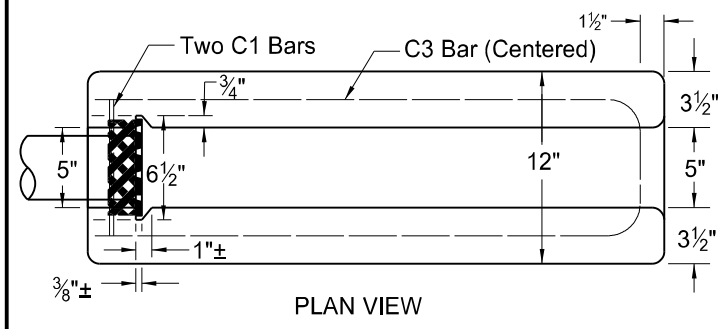
D-714-18



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



BENT BAR DETAILS



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.

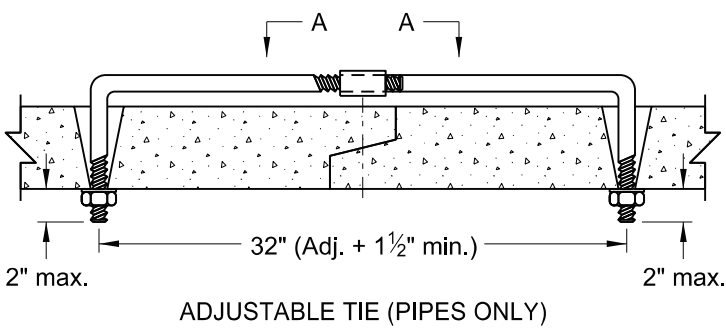
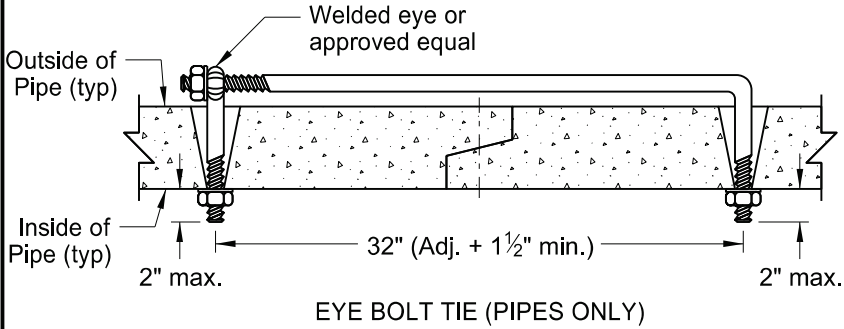
BENT BARS: Bent bar dimensions given out to out.

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



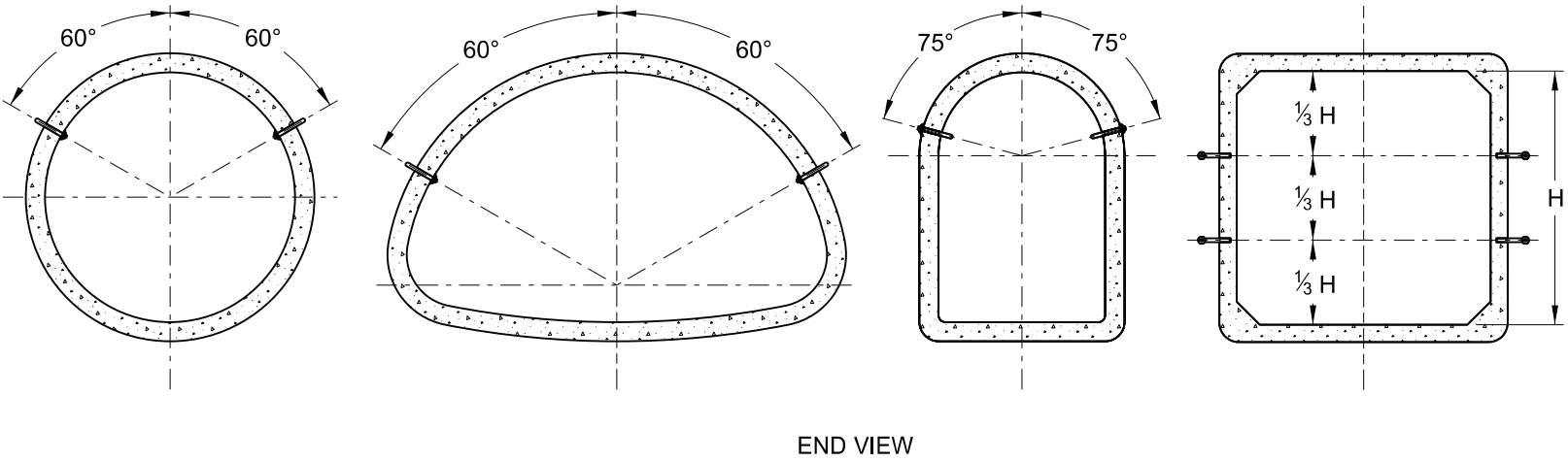
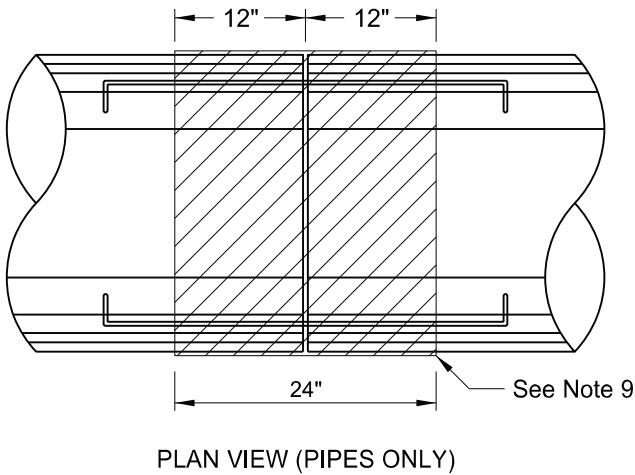
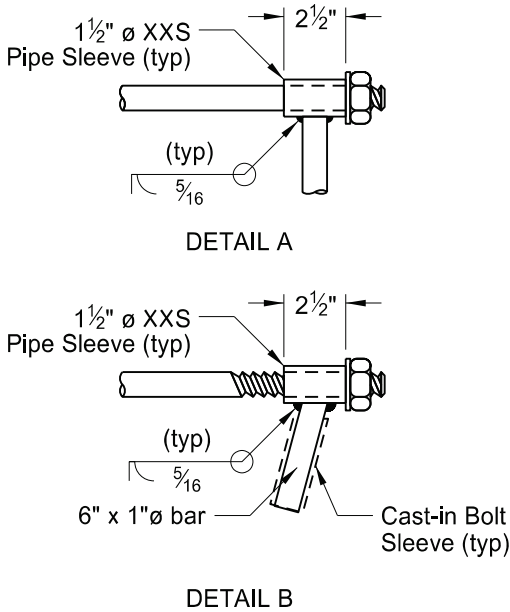
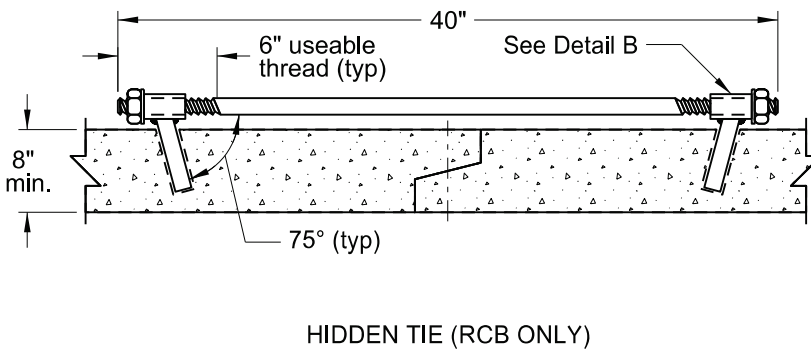
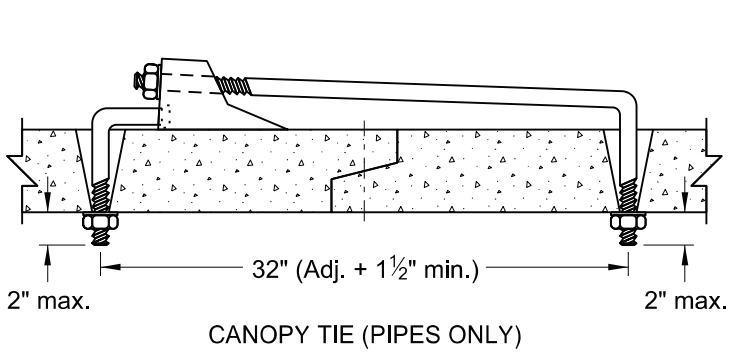
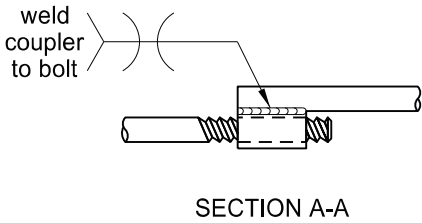
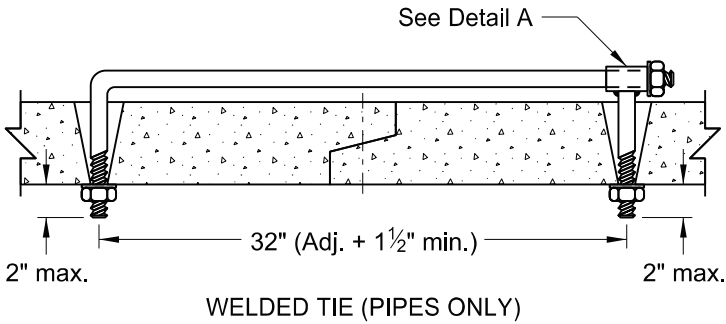
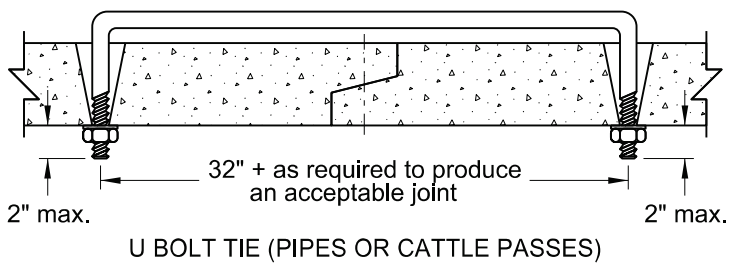
CONCRETE PIPE, CATTLE PASS, OR
PRECAST CONCRETE BOX CULVERT TIES



REQUIRED SIZE OF TIE BOLTS		
PIPE SIZE	THREAD Ø	XXS PIPE SLEEVE INNER Ø
18" - 24"	5/8"	3/4"
30" - 66"	3/4"	1"
72" - 120"	1"	1 1/4"
RCB/CATTLE PASS	1"	1 1/4"

NOTES:

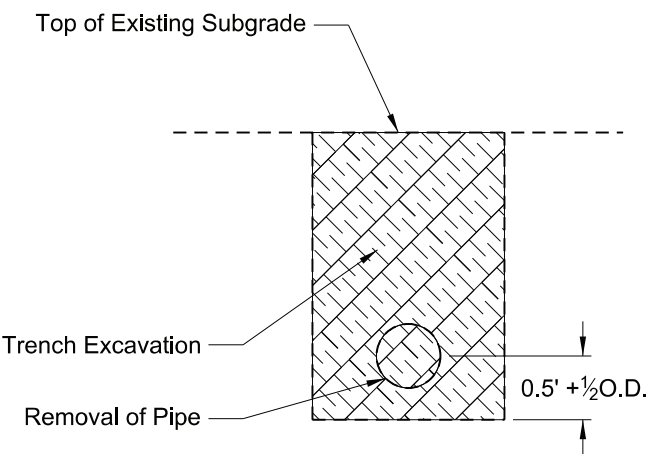
1. The pipe size listed is the inside diameter of round pipe or the equivalent diameter of pipe arch.
2. Insert pipe ties from the inside of the pipes and grout into place for Cattle Pass and Jacked and Bored pipes. Jacked and bored pipes with a diameter of 24" or less do not require pipe ties.
3. Nuts and washers are not required on Jacked and Bored pipes or pipes with a 24" diameter or less. Insert and grout tie bars into place where nuts and washers are not used.
4. Do not use pipe ties to pull the pipe or RCB sections tight. The ties are only for holding sections together.
5. Use only tie bolt assemblies that have been hot dip galvanized in accordance with ASTM A 153.
6. Holes in pipes to accommodate tie bolts will be precast. Tapered holes are permitted. Use holes that have a diameter 1/4" larger than the diameter of the thread. In precast RCB's, use holes that contain cast-in bolt sleeves with an inside diameter of 1 1/4".
7. Include the cost of precasting the required holes and furnishing and installing the tie bolts in the price bid for the appropriate conduit or RCB pay item.
8. Tie all centerline and approach RCP culvert joints. Tie all joints including the end sections of all free ends of storm drain systems. Free ends are defined as any storm drain end which does not terminate at an inlet or manhole. Outfall culverts with end sections which drain adjacent ditches are examples of free ends.
9. Place joint wrap prior to installing ties. Firmly secure the wrap around the full perimeter. For concrete pipes, use Type S2 geotextile fabric and overlap the joint by 12" in both directions. For box culverts, use a waterproof membrane that meets ASTM C990. Provide a membrane that is a minimum of 12" wide and center it at the joint. Provide a minimum overlap of 2.5" at the seams.
10. Use tie bolts that conform to ASTM A 36. Use heavy hex nuts that conform to ASTM A 563. Use washers that conform to ASTM F 436, Type 1. Use welded pipe sleeves and cast-in bolt sleeves that conform to ASTM A 53, Grade B.
11. Provide lock washers or burr threads of concrete box ties after installation and tightening to prevent nut rotation.
12. Tie RCB's as noted in the plans.



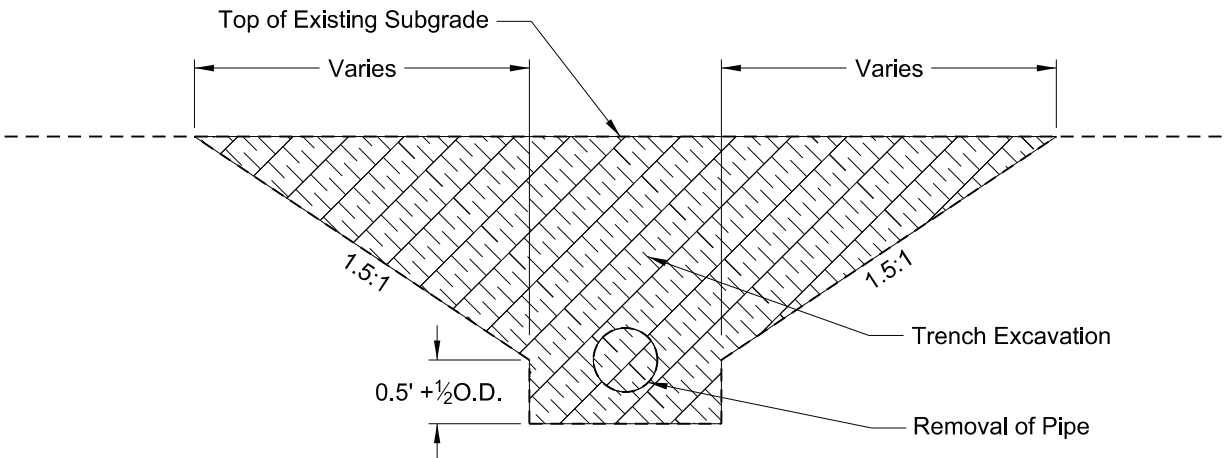
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
3-18-14	
REVISIONS	
DATE	CHANGE
7-21-15	Note 8
6-6-17	Notes 2-11 Table, Title, Labels
8-11-21	Notes 2-12 Table, Label
01-17-25	Notes 9-13 Table, Labels Section A-A, End View



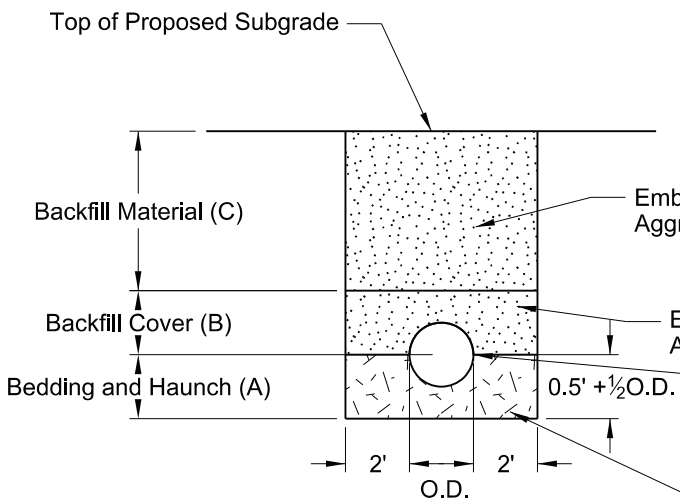
PIPE INSTALLATION DETAIL FOR LONGITUDINAL MAINLINE PIPE
OR PIPE NOT UNDER THE ROADWAY



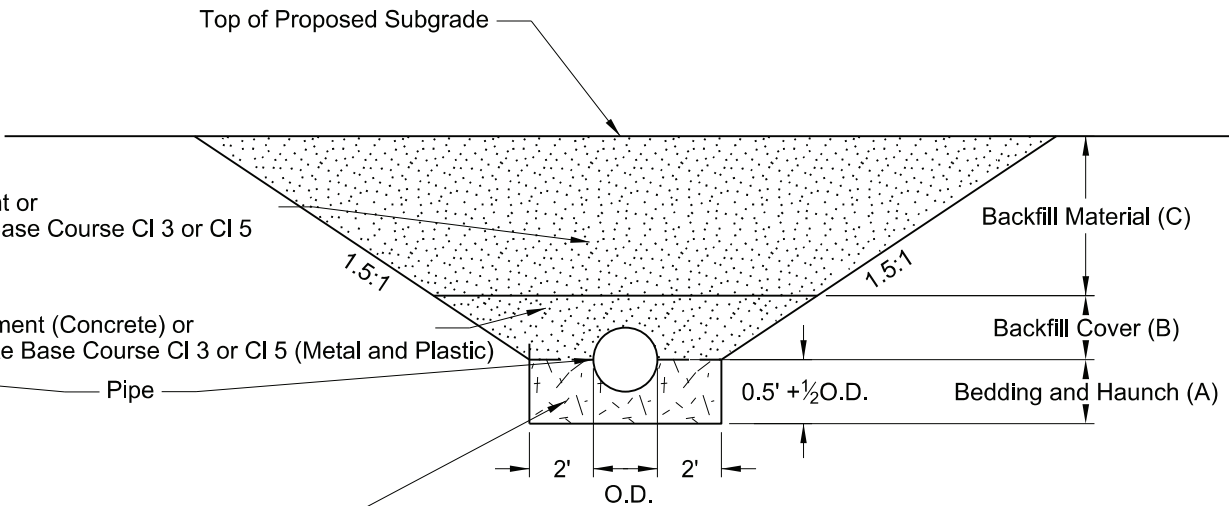
EXCAVATION DETAIL A



EXCAVATION DETAIL B



BACKFILL DETAIL A



BACKFILL DETAIL B

Pay Items
1) Pipe*
2) Removal of Pipe (if required)

*Included in Pipe Pay Item
1) Pipe
2) Trench excavation
3) Aggregate base course CI 3 or CI 5
4) Embankment

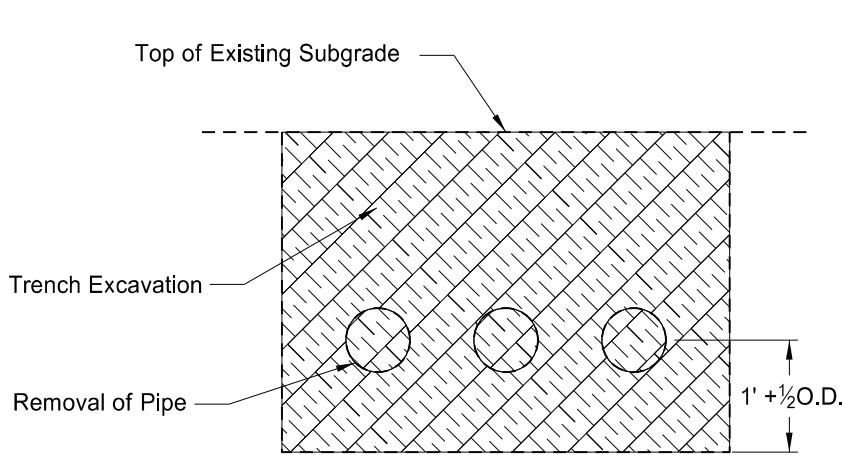
NOTES:
1) This drawing does not apply to pipes in approaches.
2) It is the contractor's option to select Detail A or B.
3) Embankment may be either Borrow Excavation or Common Excavation - Type A

Bedding and Haunch (A)
Pipes Not Under Roadway = 0.5 O.D. + 0.5 Feet
Pipes Under the Roadway = 0.5 O.D. + 0.5 Feet
Backfill Cover (B)
Concrete Pipe = 0.5 O.D.
Metal and Plastic = 0.5 O.D. + 1 Foot
Backfill Material (C)
Top of Pipe 4 Feet or Less Below the Top of Proposed Subgrade = Aggregate Base Course CI3 or CI 5
Top of Pipe Greater than 4 Feet Below the Top of Proposed Subgrade = Common Excavation - Type A
Pipe Not Under Roadway = Common Excavation - Type B

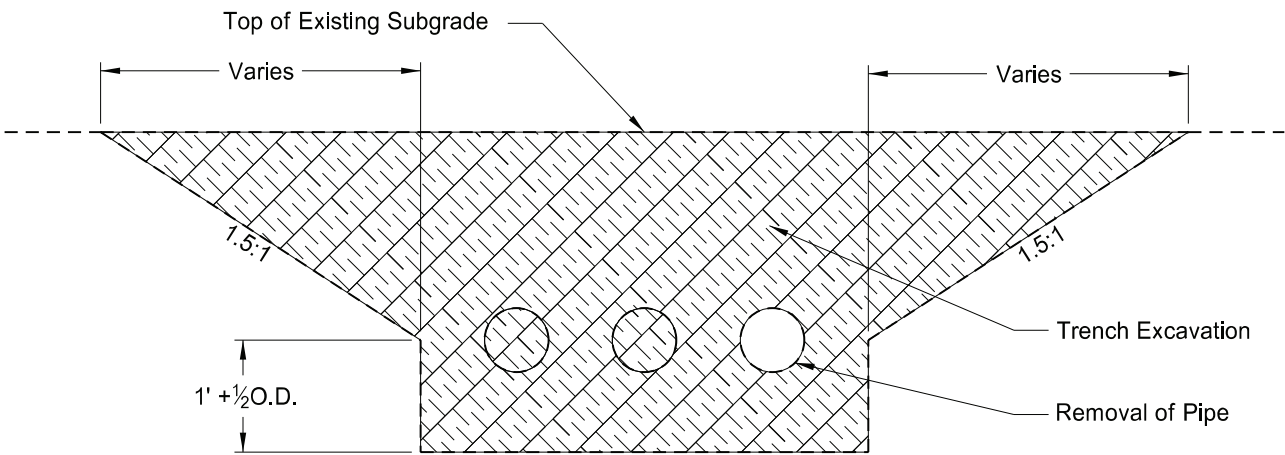
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-26-13	
REVISIONS	
DATE	CHANGE
10-15-13	Label Formatting
1-21-15	Nomenclature
12-10-15	Added Plastic Pipe
5-27-20	Changed bedding depth and updated table



PIPE INSTALLATION DETAIL FOR MULTIPLE LONGITUDINAL MAINLINE PIPE
OR PIPE NOT UNDER THE ROADWAY



EXCAVATION DETAIL A



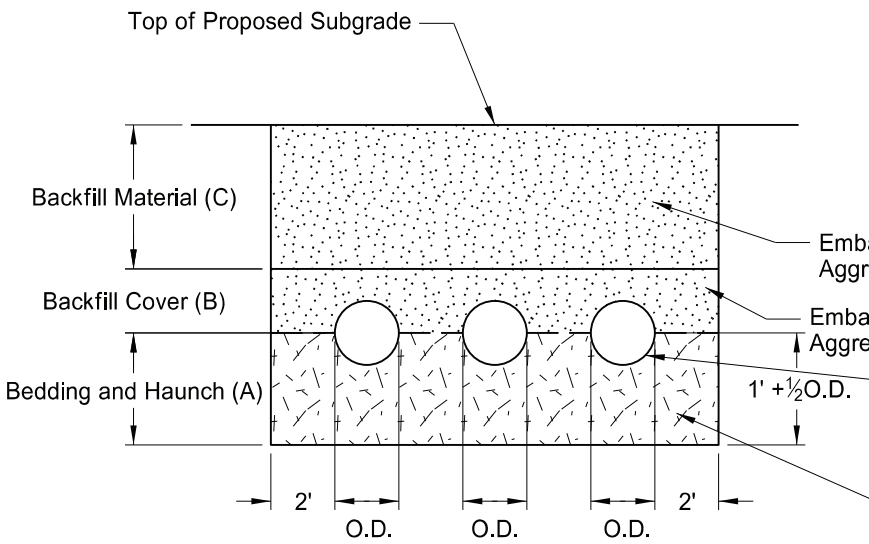
EXCAVATION DETAIL B

Pay Items
1) Pipe*
2) Removal of Pipe (if required)

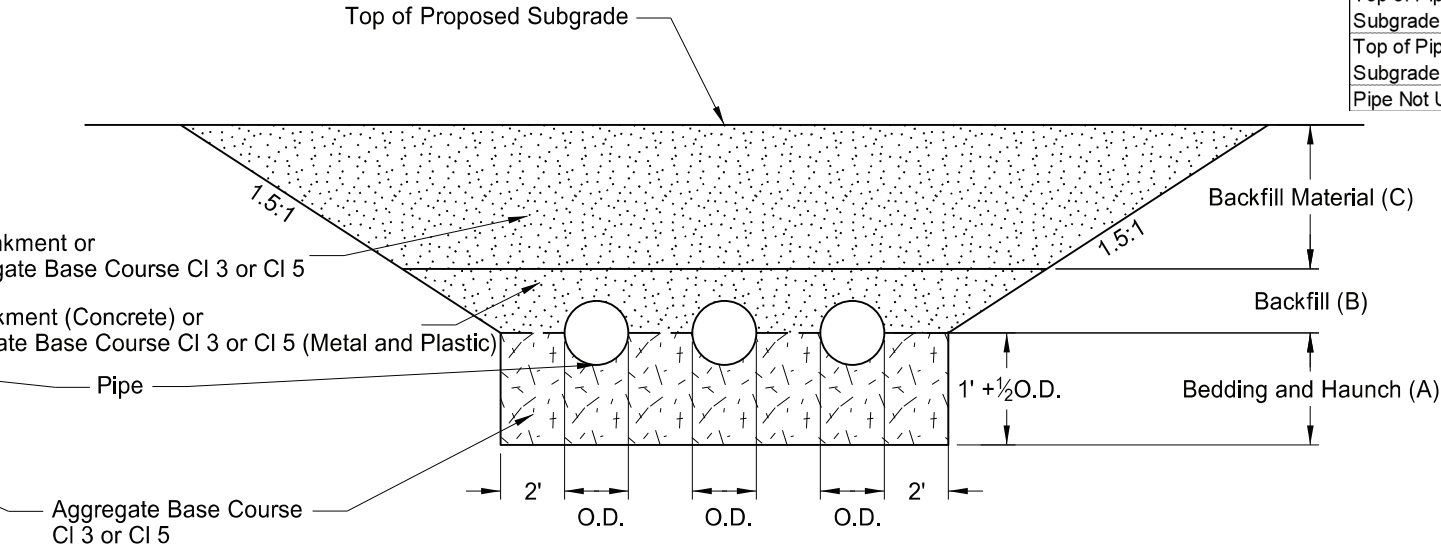
*Included in Pipe Pay Item
1) Pipe
2) Trench excavation
3) Aggregate base course CI 3 or CI 5
4) Embankment

NOTES:
1) This drawing applies to new/extended mainline and paved intersection roadway pipes only (including ramps). It does not include pipes in approaches.
2) It is the contractor's option to select Detail A or B.
3) The exact location of the pipes will be shown in the plans.
4) Embankment may be either Borrow Excavation or Common Excavation - Type A

Bedding and Haunch (A)
Pipes Not Under Roadway = 0.5 O.D. + 1 Foot
Pipes Under the Roadway = 0.5 O.D. + 1 Foot
Backfill Cover (B)
Concrete Pipe = 0.5 O.D.
Metal and Plastic = 0.5 O.D. + 1 Foot
Backfill Material (C)
Top of Pipe 4 Feet or Less Below the Top of Proposed Subgrade = Aggregate Base Course CI3 or CI 5
Top of Pipe Greater than 4 Feet Below the Top of Proposed Subgrade = Common Excavation - Type A
Pipe Not Under Roadway = Common Excavation - Type B



BACKFILL DETAIL A



BACKFILL DETAIL B

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-4-14	
REVISIONS	
DATE	CHANGE
1-21-15 12-10-15 5-27-20	Nomenclature Added Plastic Pipe Changed bedding depth and updated table



STANDARD MONUMENTS AND RIGHT OF WAY MARKERS

D-720-1

NOTES:

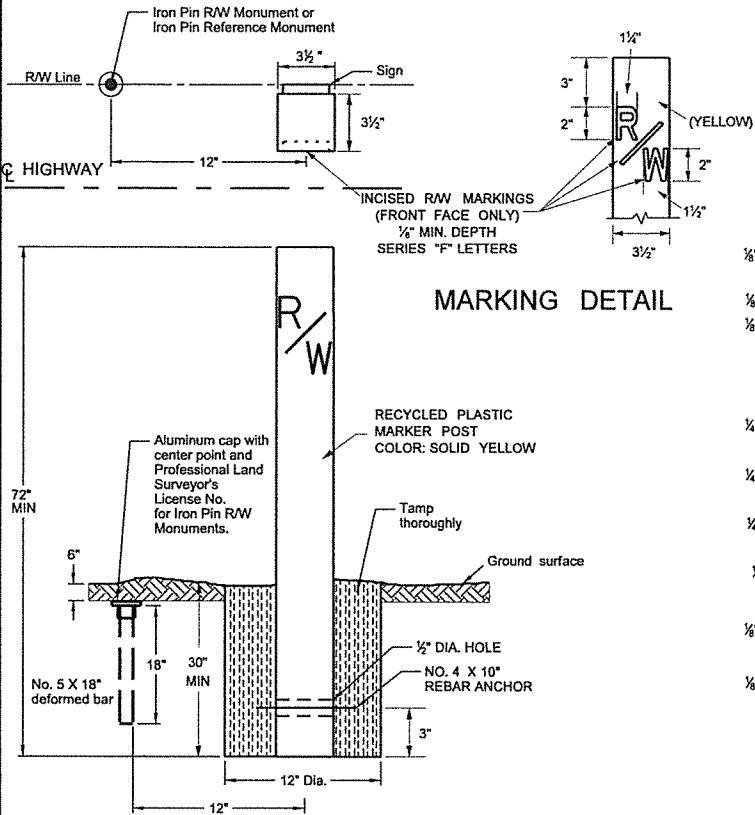
Construct and install Alignment Monuments, Iron Pin Reference Monuments, Iron Pin R/W Monuments, and Right of Way Markers (witness posts) according to Section 720 of the Standard Specifications.

ALIGNMENT MONUMENTS: Place Iron Pin or Precast Concrete Alignment Monuments with aluminum caps on the centerline alignment PI's, section corners, quarter corners, section line crossings, quarter line crossings, and at curve points (PC's, PT's, TS's, and ST's) on the centerline.

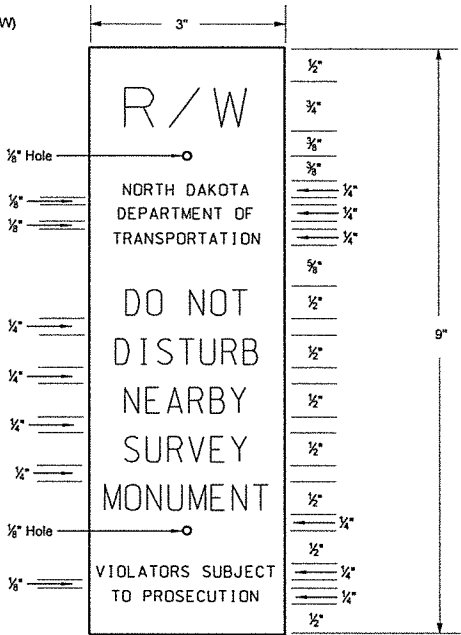
IRON PIN R/W MONUMENT: Place Iron Pins with aluminum caps (No. 5 X 18") at breaks on the Right of Way line, and at curve points (PC's, PT's, TS's and ST's) on the Right of Way line.

IRON PIN REFERENCE MONUMENT: Place Iron Pins without aluminum caps (No. 5 X 18") as reference monuments on the Right of Way line at section corners, quarter corners, section line crossings, and quarter line crossings.

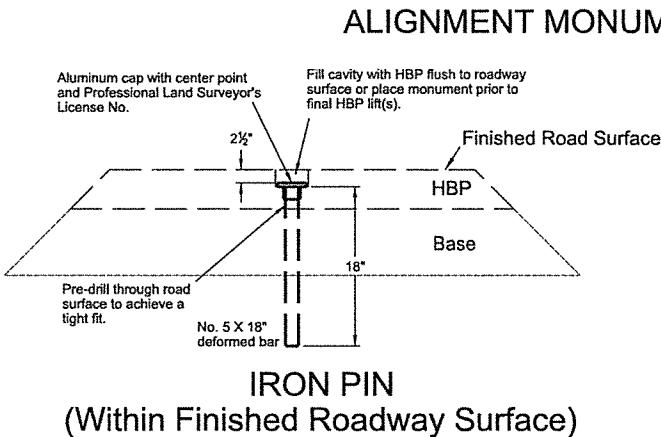
R/W MARKERS (WITNESS POST) WITHIN DRIVEWAYS: If a single iron Pin R/W or Reference Monument is within a driveway, place right of way marker (witness post) 50 feet back, in stationing, from the Iron Pin Monument along the R/W line. If R/W break is within a driveway, place right of way markers (witness posts) 50 feet back, or ahead from respective Iron Pin R/W Monuments along the R/W lines. Maintain Iron Pin R/W or Reference Monument original position within driveway.



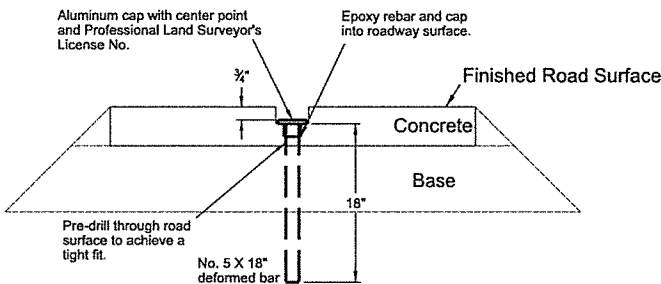
RECYCLED PLASTIC RIGHT OF WAY MARKER (WITNESS POST) DETAILS & IRON PIN REFERENCE AND R/W MONUMENT DETAILS



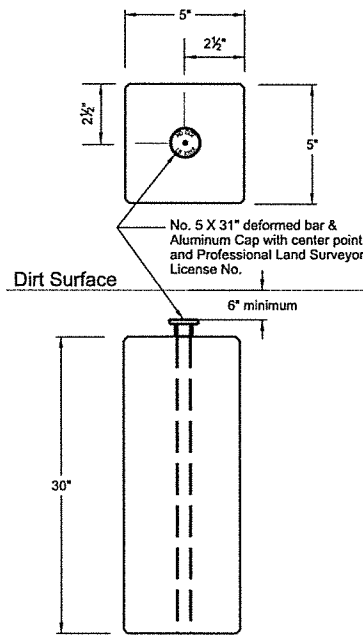
Black letters on orange high intensity background sheeting meeting ASTM D-4956 Type III or higher on 80 gauge 5052-H38 aluminum. Silk screen graphics. One color print. Attach sign by drilling two holes in the face of the post (side facing the private owner, away from the Department of Transportation right of way). Put inserts into the holes and mount the sign with #4 vandal proof screws. Install sign 2" from top of post.



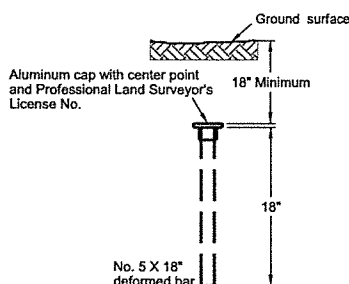
IRON PIN (Within Finished Roadway Surface)



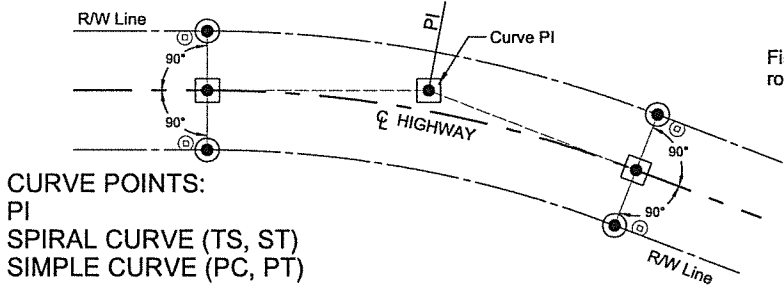
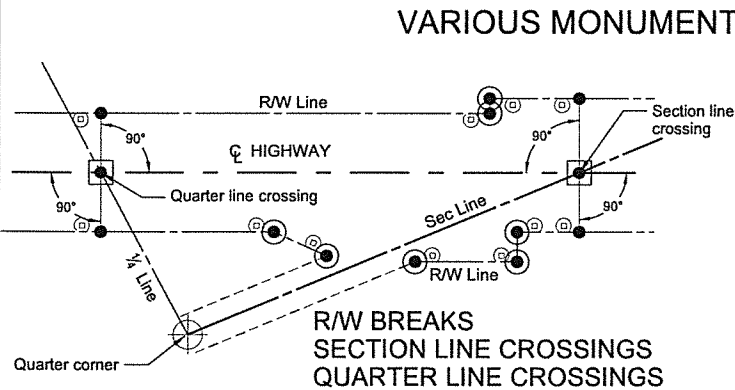
IRON PIN (Within Finished Roadway Surface) (Outside Finished Roadway Surface) (Inside R/W Limits)



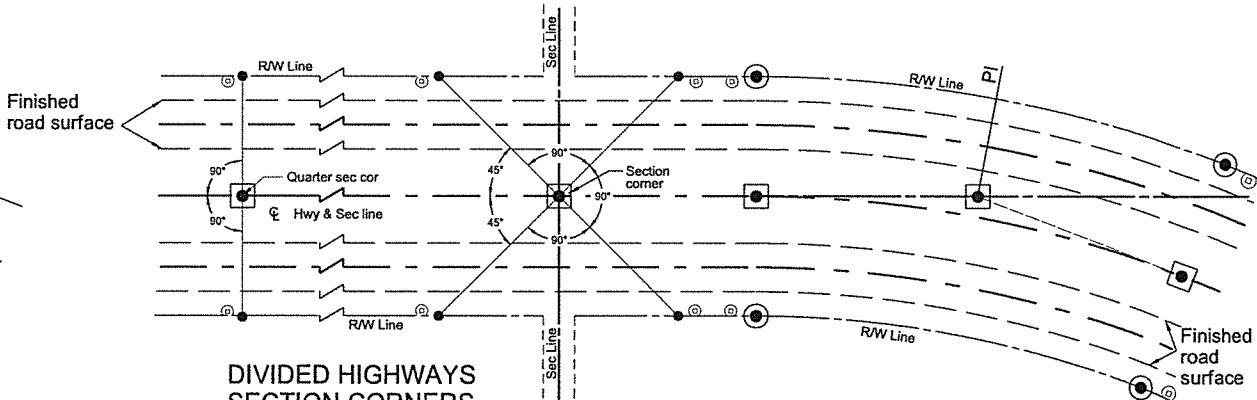
PRECAST CONCRETE (Inside R/W Limits)



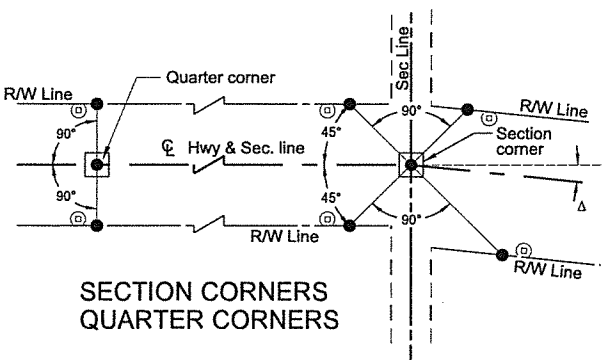
IRON PIN (Outside Finished Roadway Surface) (Outside R/W Limits)



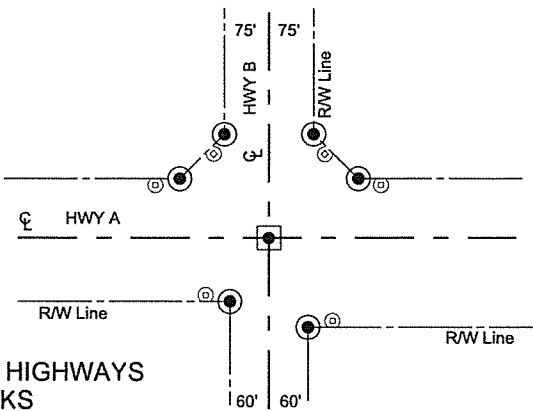
CURVE POINTS: PI SPIRAL CURVE (TS, ST) SIMPLE CURVE (PC, PT)



DIVIDED HIGHWAYS SECTION CORNERS QUARTER CORNERS



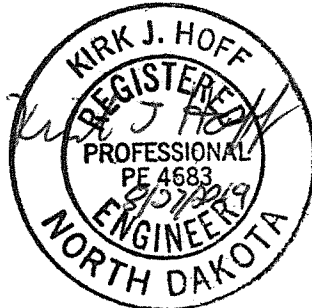
SECTION CORNERS QUARTER CORNERS



INTERSECTION OF HIGHWAYS FLARED R/W BREAKS

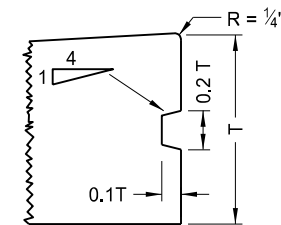
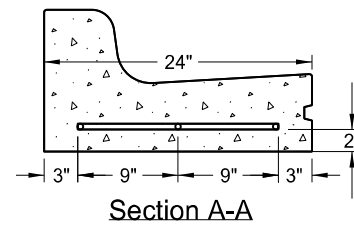
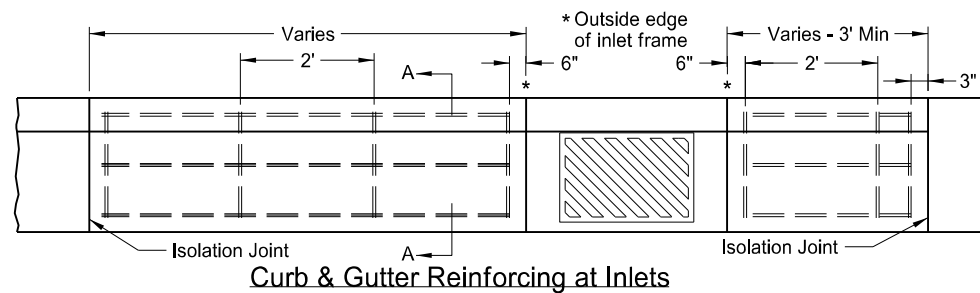
- LEGEND
- Iron Pin Reference Monument
 - ⊙ R/W Marker (witness post)
 - Alignment Monument
 - Iron Pin R/W Monument

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-2013	
REVISIONS	
DATE	CHANGE
11/12/13	Note for SIGN DETAIL modified to meet ASTM D-4956 Type III or higher on 80 gauge 5052-H38
10/17/17	Updated to active voice.
08/27/19	New Design Engr PE Stamp.



Curb & Gutter and Valley Gutter

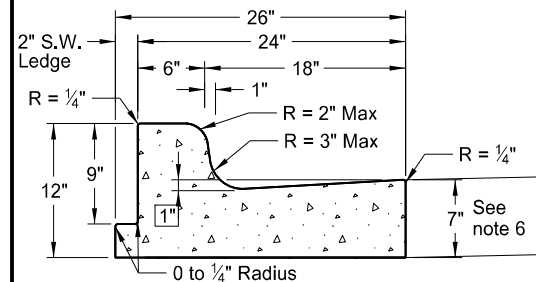
D-748-1



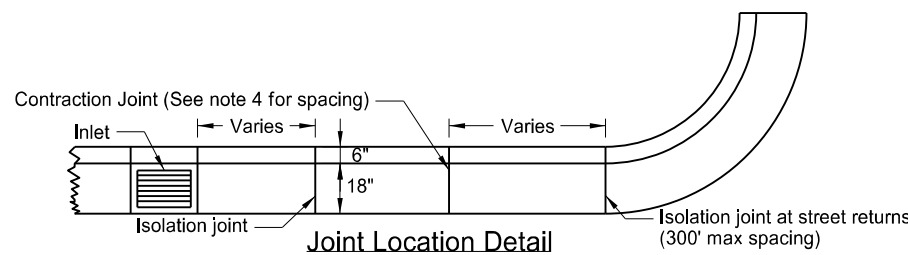
Keyway Detail for Curb & Gutter

(To be used with PCC Pavement and Drives)

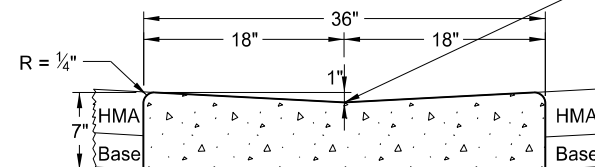
T= Thickness of pavement unless otherwise noted on plans.



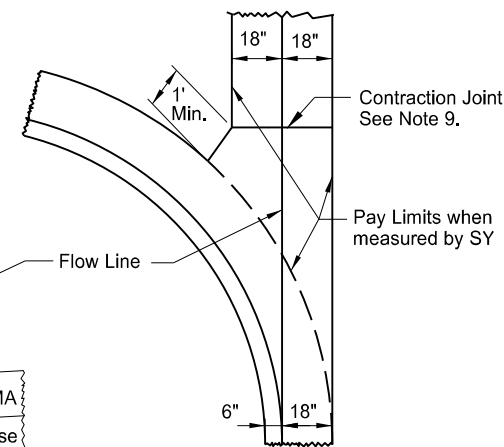
Curb & Gutter Type 1 (Sec. A & B)
Adjacent to Concrete Sidewalk, Median,
or Parking Lot. (Sec. A shown. See
Sec B for additional details.)



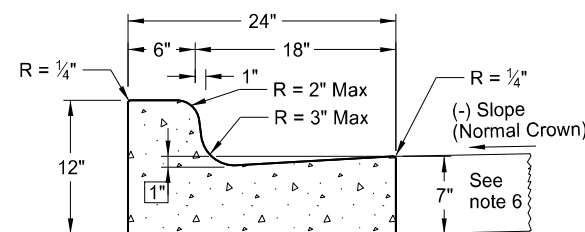
Joint Location Detail



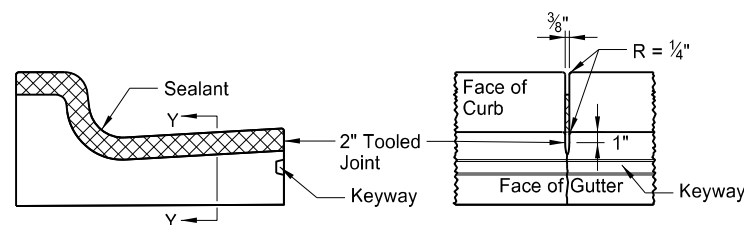
36" Concrete Valley Gutter Detail



36" Concrete Valley Gutter Plan

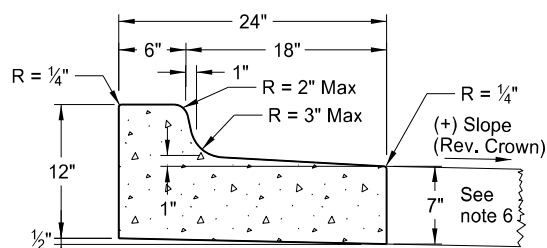


Curb & Gutter Type 1 (Sec. A)

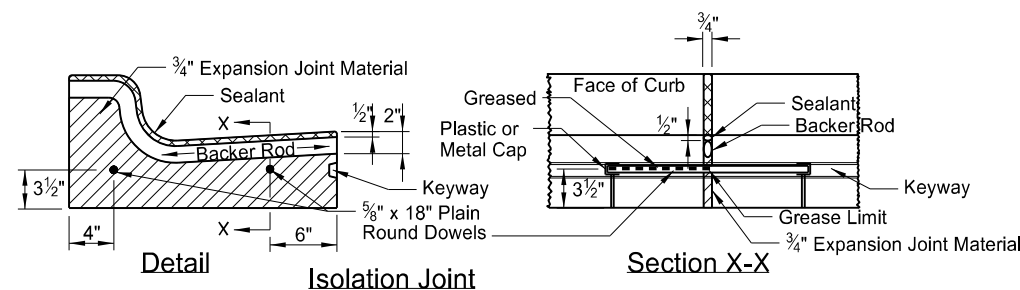


Detail

Section Y-Y



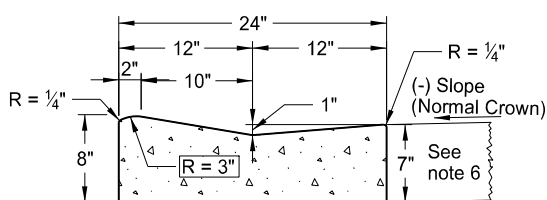
Curb & Gutter Type 1 (Sec. B)



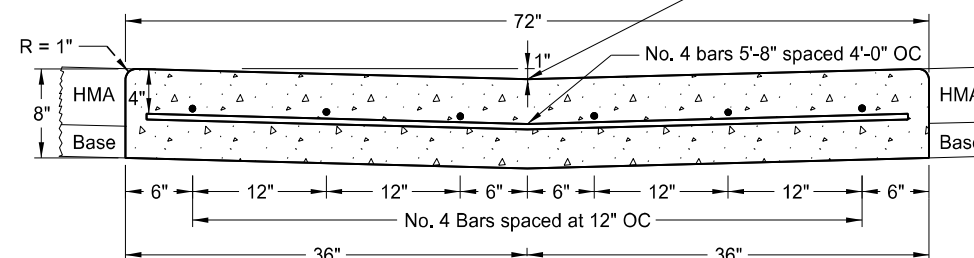
Detail

Isolation Joint

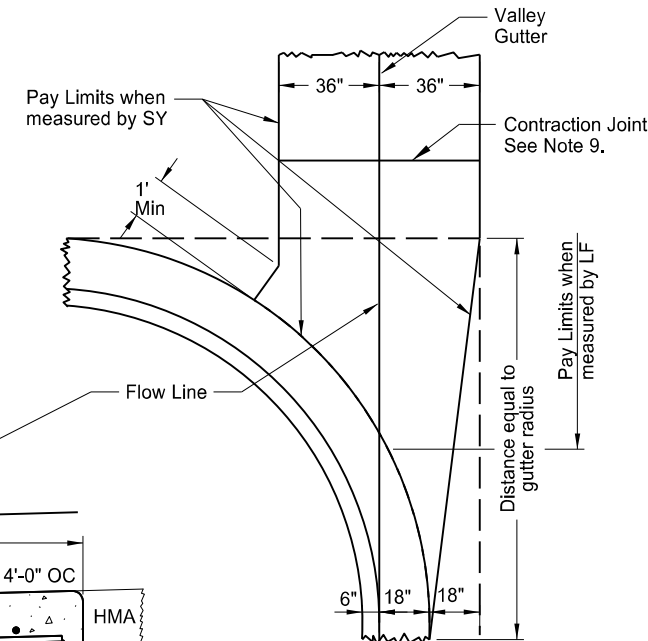
Section X-X



Mountable Curb & Gutter Type 1 (Sec. A)



72" Concrete Valley Gutter Detail



72" Concrete Valley Gutter Plan

NOTES:

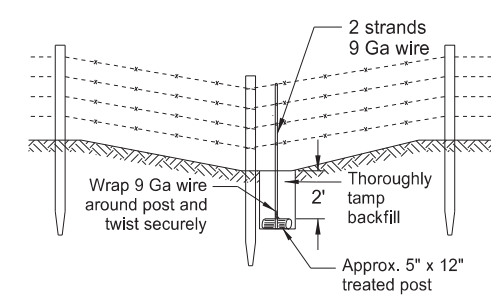
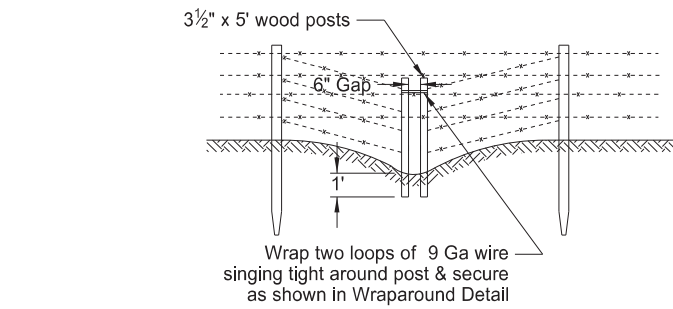
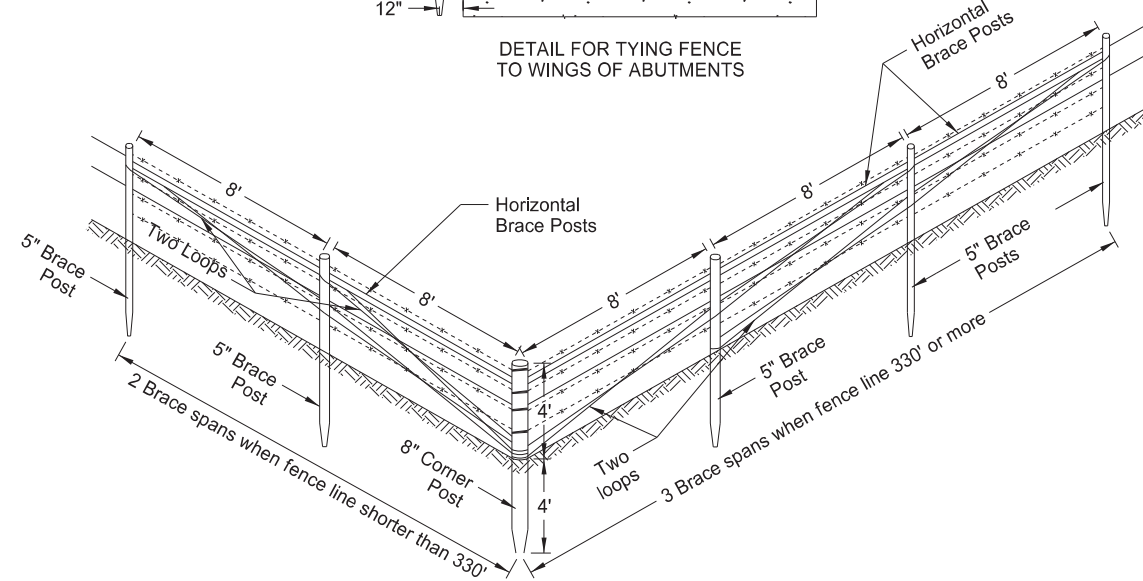
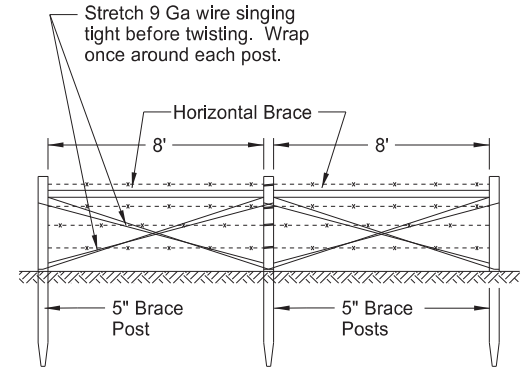
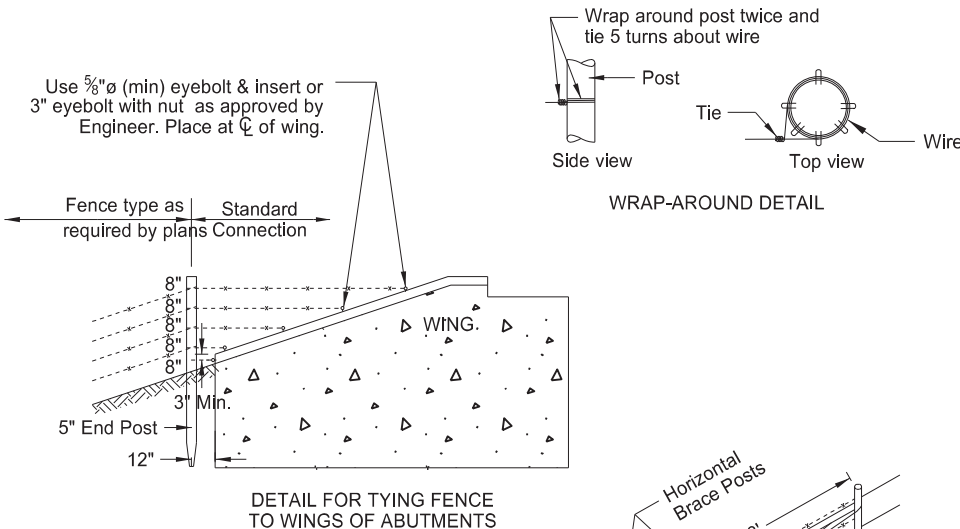
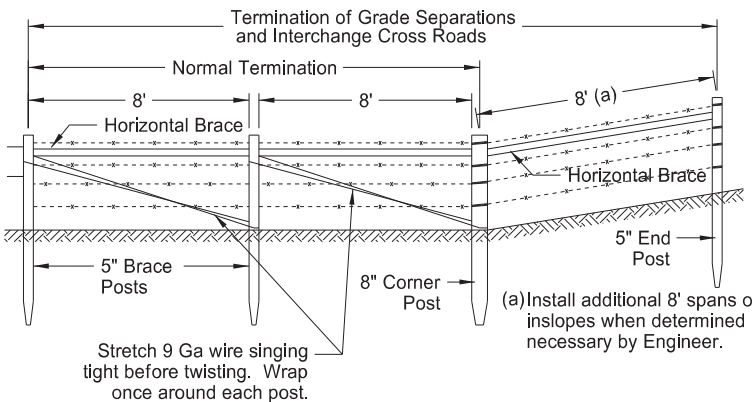
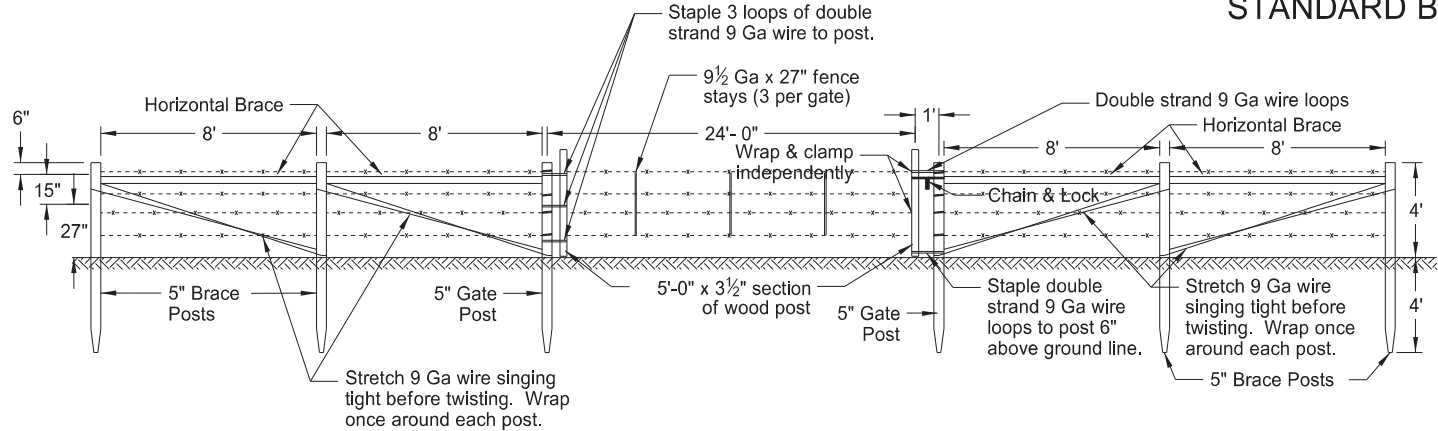
1. Use Curb and Gutter Type 1 (Sec. A & B). Use section "A" with (-) pavement slopes and section "B" with (+) pavement slopes.
2. Contraction Joints: Tool the Curb & Gutter 2" as shown on the contraction joint details.
3. Isolation Joints: Use $\frac{3}{4}$ " expansion joint material for isolation joints.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

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

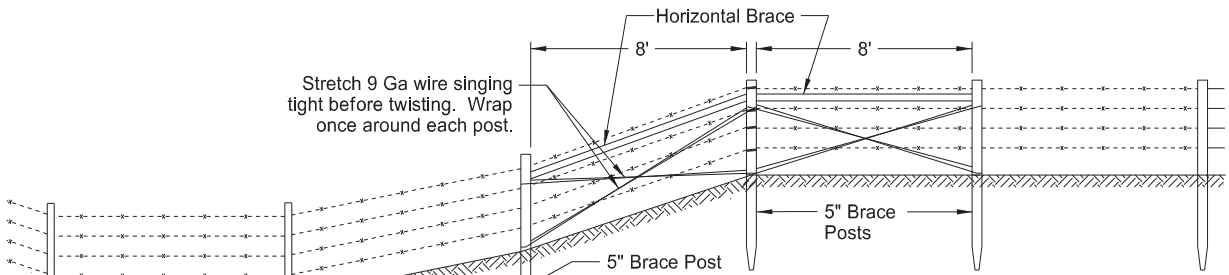
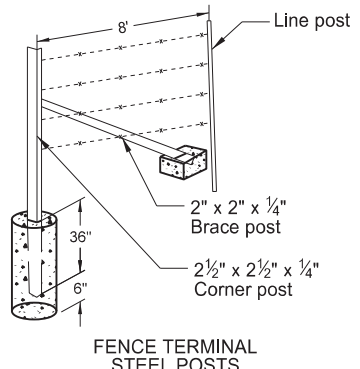
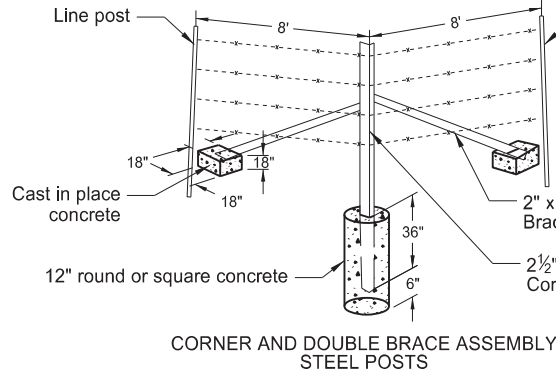
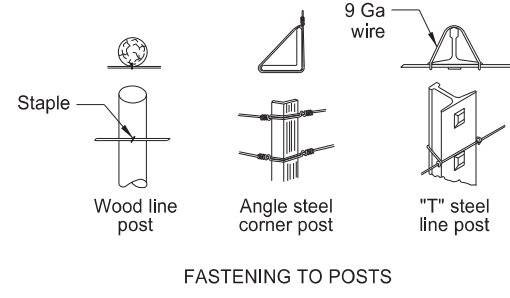
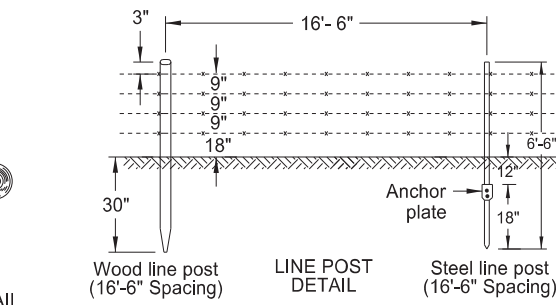


10/30/24

STANDARD BARBED WIRE FENCE



*Determine locations in the field and include in price bid for fencing. Use other methods of anchoring fence if approved by the Engineer.



Use double brace installation, as shown, on opposite side of depression.

Decrease line post spacing as needed due to terrain.

NOTES

1. No deduction in measured pay length of fence made for gates, corner assemblies, double brace assemblies, fence terminals, or depression fencing. Include all costs for abutment fencing in the price bid for fencing bid items.
2. Install double brace assemblies at locations shown on the plans or established by the Engineer. Place adjacent fence terminals, corner assemblies, or double brace assemblies at a maximum spacing of 1,320 feet.
3. Include all costs of furnishing and installing inserts and eyebolts in the unit price bid for fencing bid items. Use eyebolts galvanized according to AASHTO designation M-30; inserts of corrosion resistant material do not require galvanization. Use concrete inserts capable of developing the full strength of the 5/8" diameter threaded eyebolt, when installed in concrete.
4. Determine post type used, either wood or steel, unless otherwise specified in the plans.
5. Include the cost of bracing at vehicle gates in the price bid for "Vehicle Gate."

POST SIZES					
USE OF POST	TREATED WOOD		STEEL		
	Post dia.	Post length	Post length	Post wt. Lbs./Ft.	Anchor wt. Lbs.
Line post	3 1/2"	6'-6"	6'-6"	1.33	0.67
Corner post	8"	8'	7'	4.10	(Conc.)
End post	5"	8'			
Brace post	5"	8'	7'	3.19	(Conc.)
Gate post	5"	8'			
Horizontal brace	4"	8'	As approved by the Engineer		

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-2-10	
REVISIONS	
DATE	CHANGE
10-02-12	Notes, steel assemblies/posts.
11-25-13	Revised Vehicle Gate.
10-17-17	Updated to active voice.
02-23-23	Revised post spacing/brace size.



02/23/23

STANDARD WOVEN WIRE FENCE

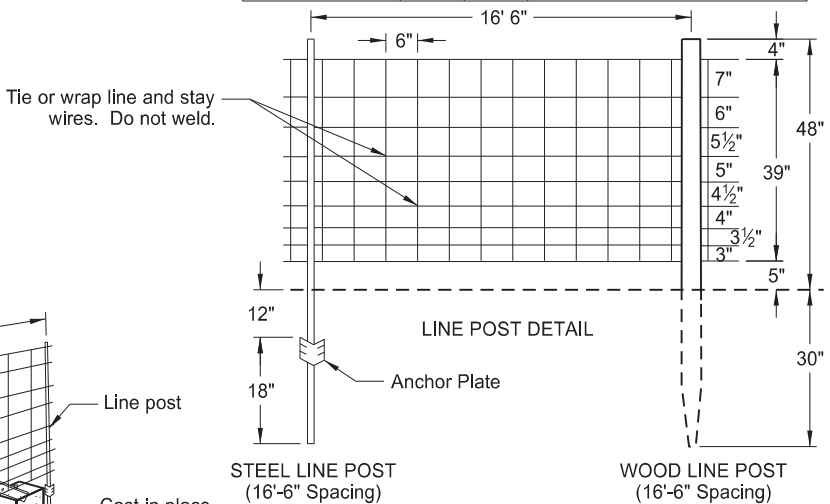
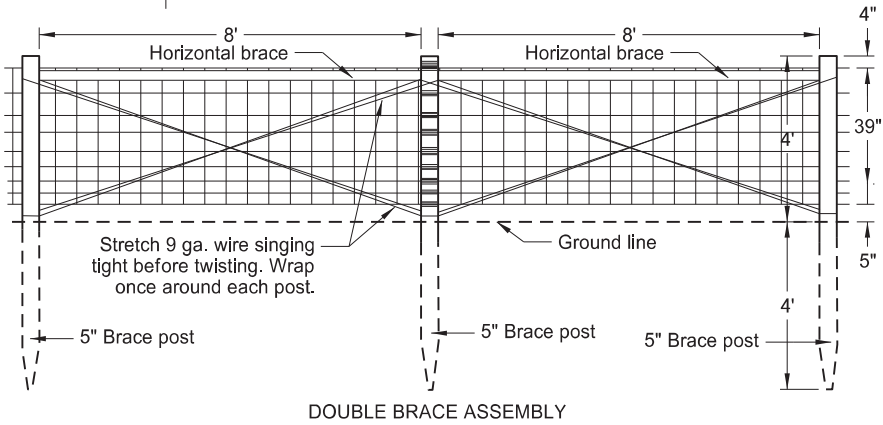
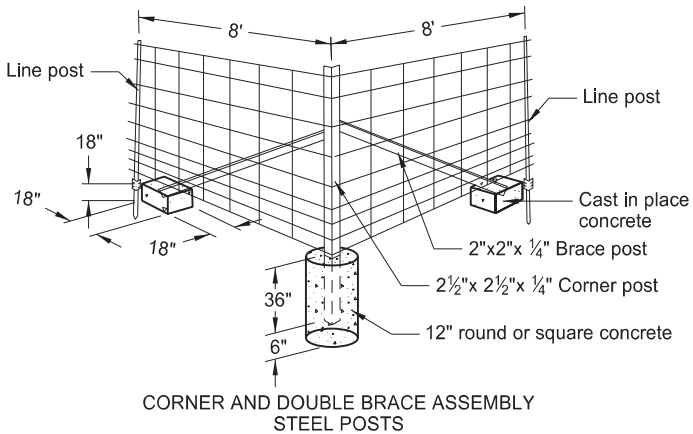
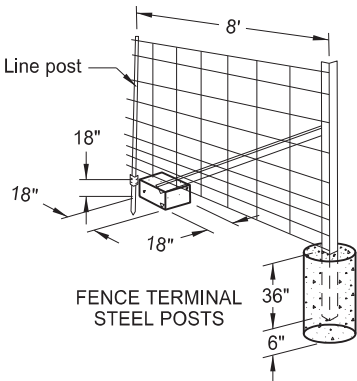
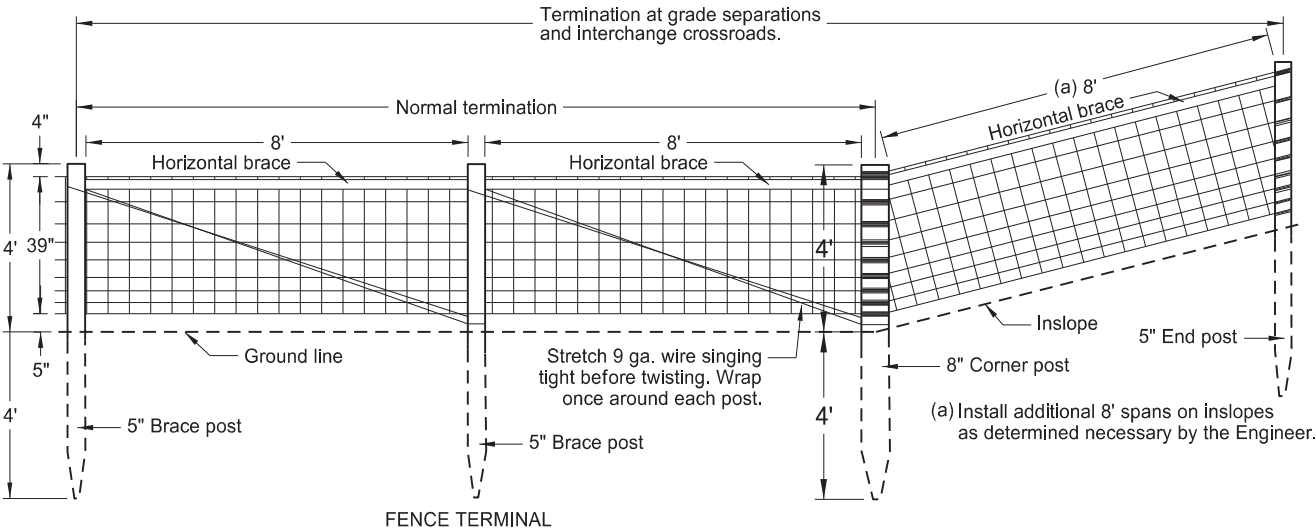
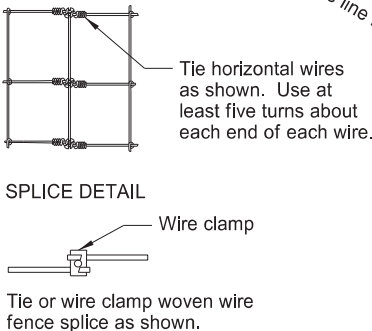
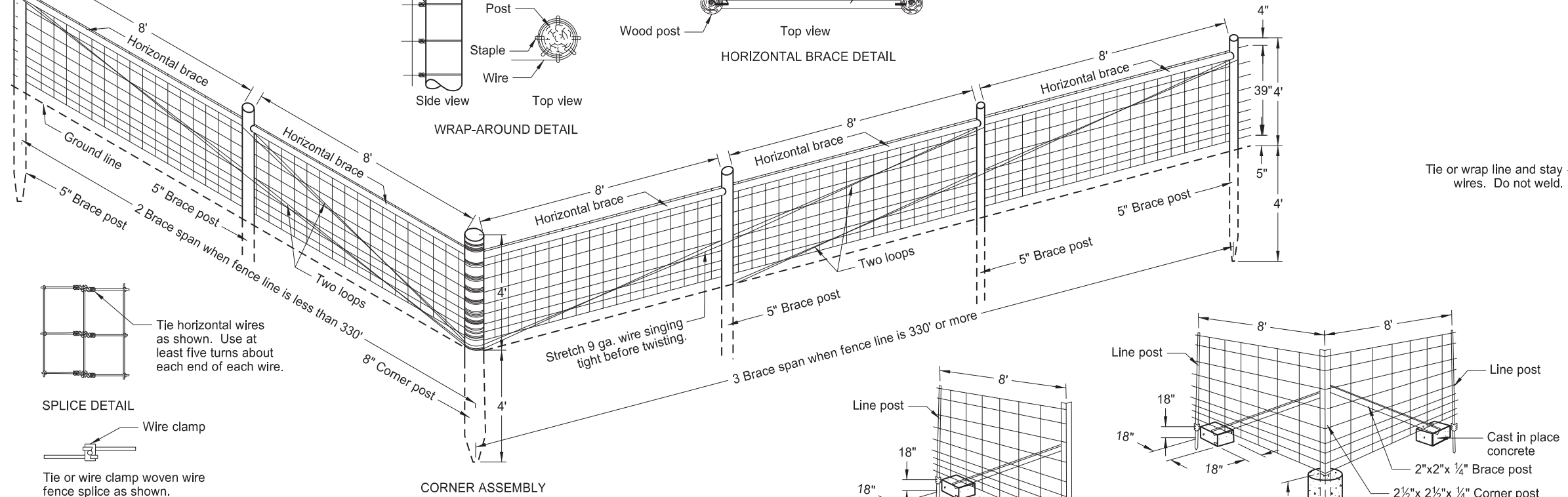
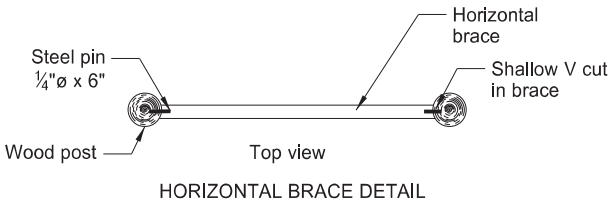
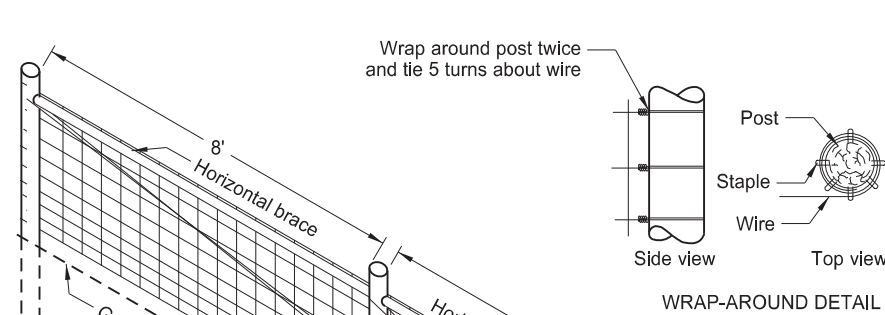
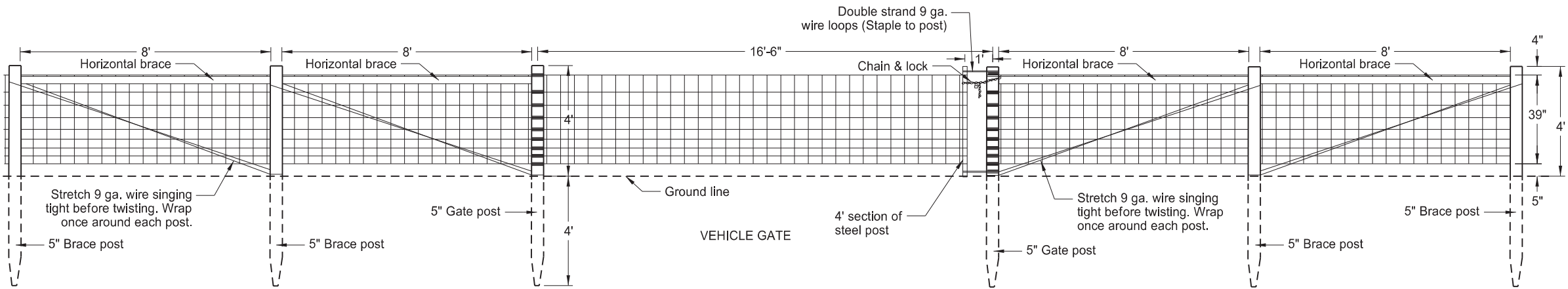
D-752-3

NOTES

1. No deduction in measured pay length of woven wire fence for gates, corner assemblies, double brace assemblies or fence terminals.
2. Install double brace assembly at locations shown on the plans or established by the Engineer. Space adjacent fence terminals, corner assemblies or double brace assemblies a maximum of 1320 feet.
3. Staple the top wire of woven wire fence separately. Staple intermediate wires a maximum spacing of 10" apart. Staple bottom wire.
4. If in the opinion of the Engineer the change in grade is so sharp that woven wire will not conform to the grade, install a double brace.
5. Determine post type used, either wood or steel, unless otherwise specified in the plans.
6. Include the cost of bracing at vehicle gates in the price bid for "Vehicle Gate."

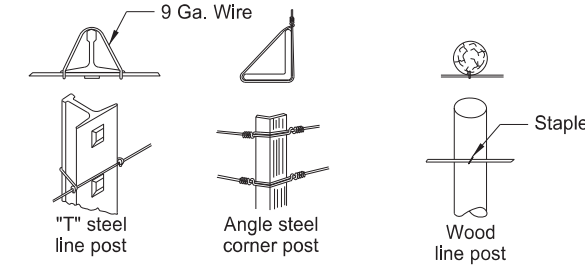
POST SIZES

USE OF POST	Treated wood		Steel		
	Post dia.	Post length	Post length	Post wt. Lbs/Ft	Anchor wt. Lbs
Line post	3 1/2"	6'-6"	6'-6"	1.33	0.67
Corner post	8"	8'	7'	4.10	(Conc.)
End post	5"	8'			
Brace post	5"	8'	7'	3.19	(Conc.)
Gate post	5"	8'			
Horizontal brace	4"	8'	As approved by the Engineer		



STEEL LINE POST (16'-6" Spacing)

WOOD LINE POST (16'-6" Spacing)

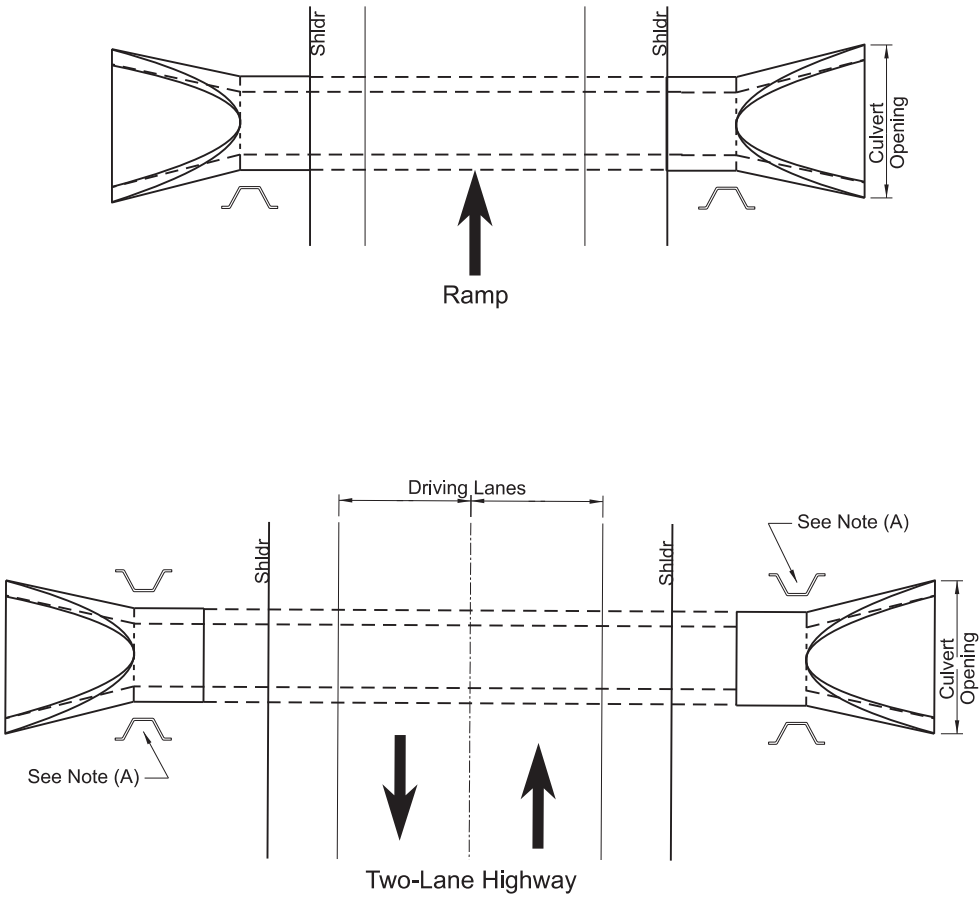


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-02-12	
REVISIONS	
DATE	CHANGE
10-17-17 02-09-23	Updated to active voice. Revised post spacing & brace size

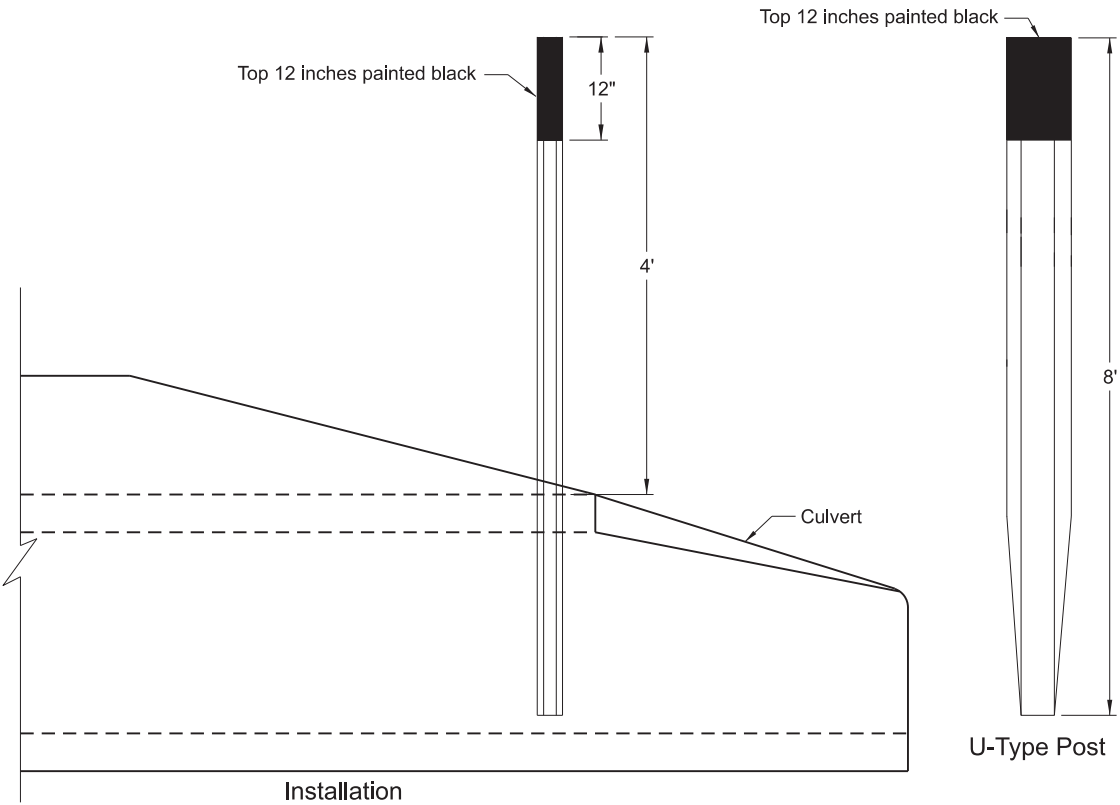
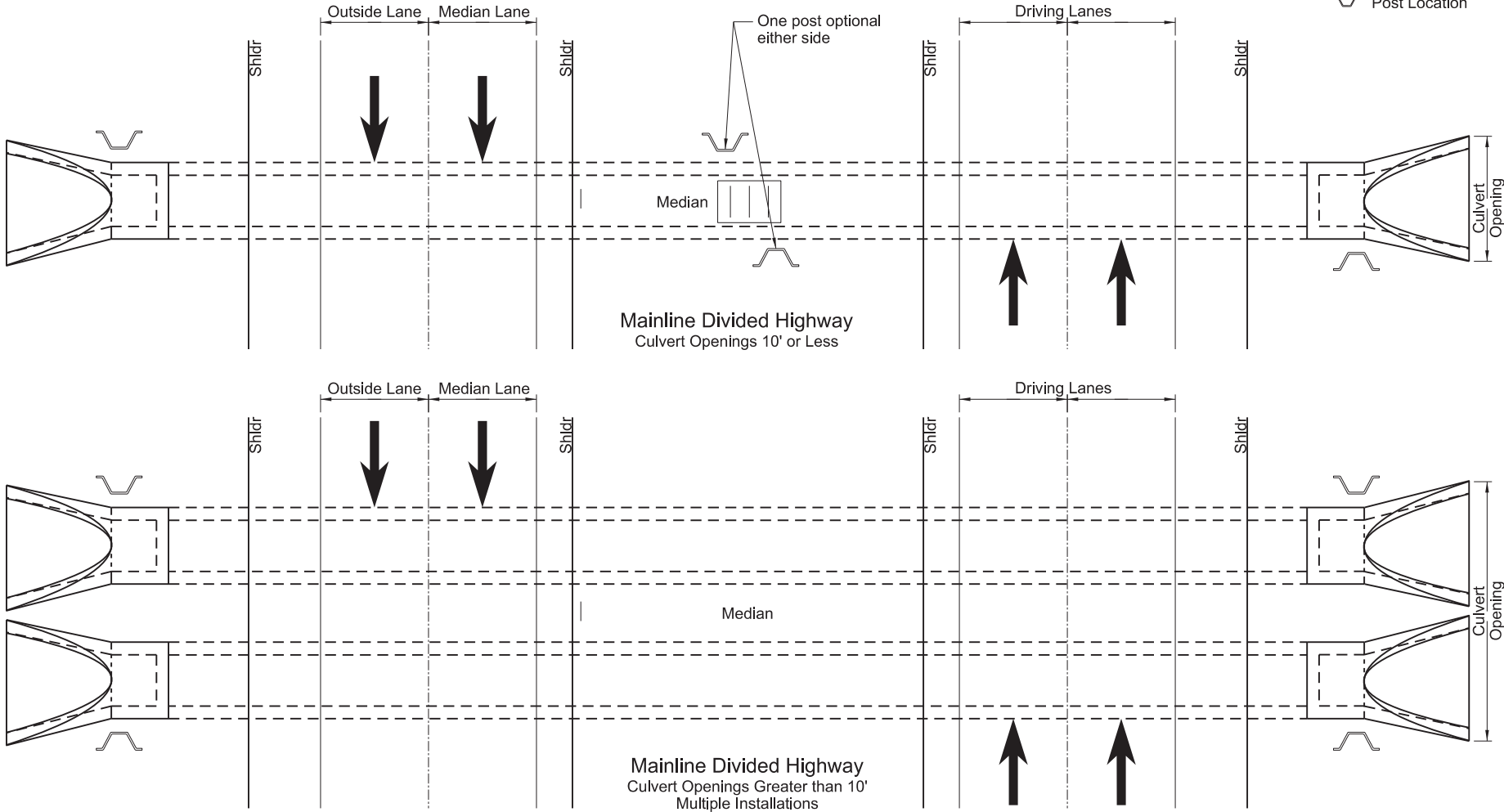
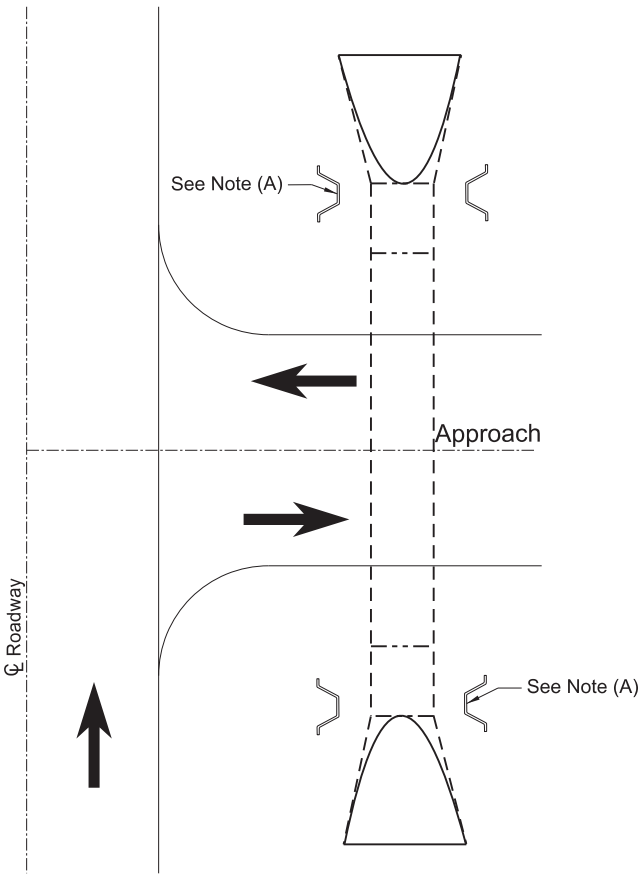


OBJECT MARKERS - CULVERTS

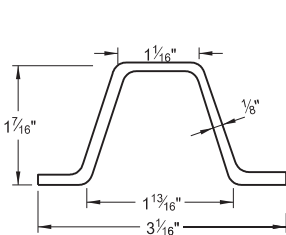
D-754-83



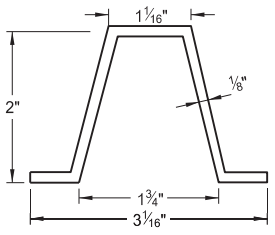
(A) Install additional marker where multiple pipe installations have a width greater than 10'.



Note:
Mark each end of culverts within the right-of-way with a post. Install posts in front of culvert in direction of travel along the side of culvert and one foot from culvert opening unless shown otherwise in plans.



Steel Post Detail
Approx. 2.0 lbs/ft



Aluminum Post Detail
Approx. 0.88 lbs/ft

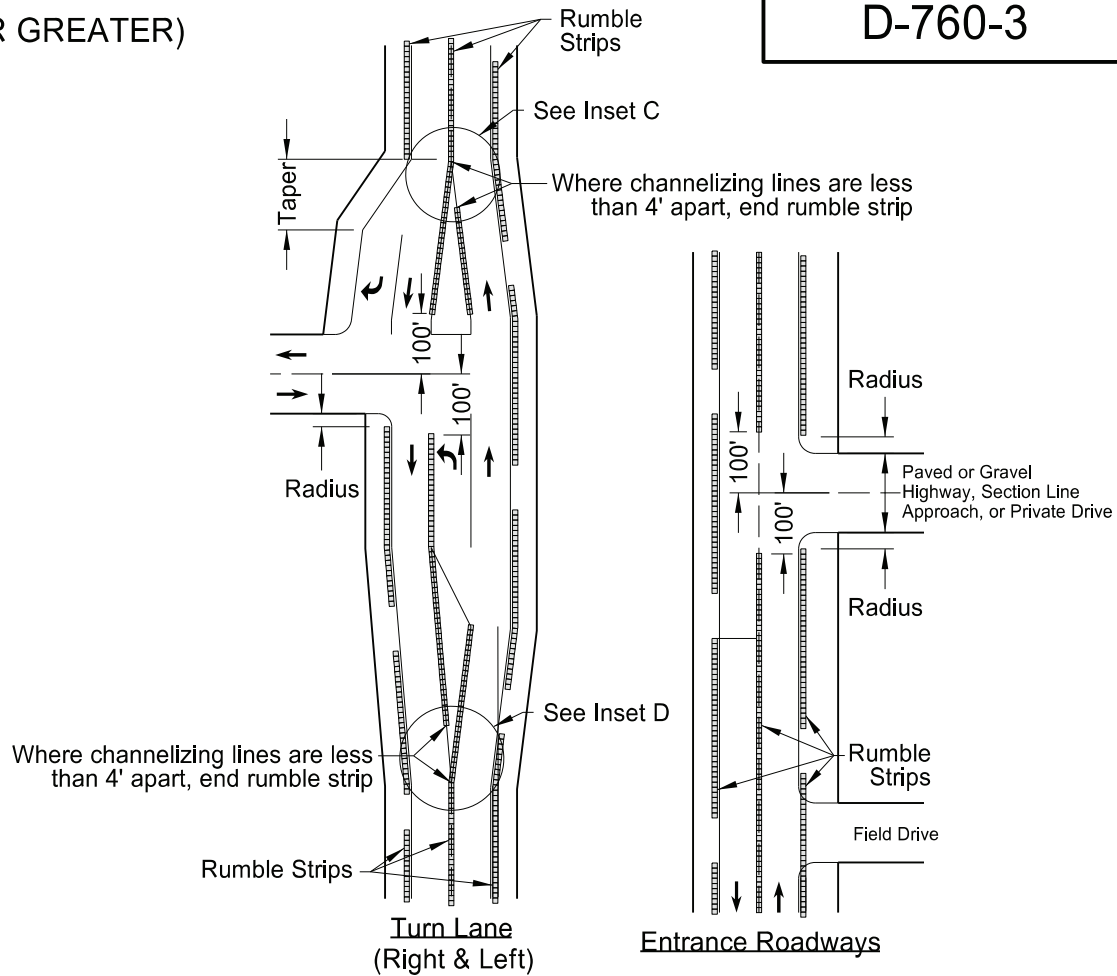
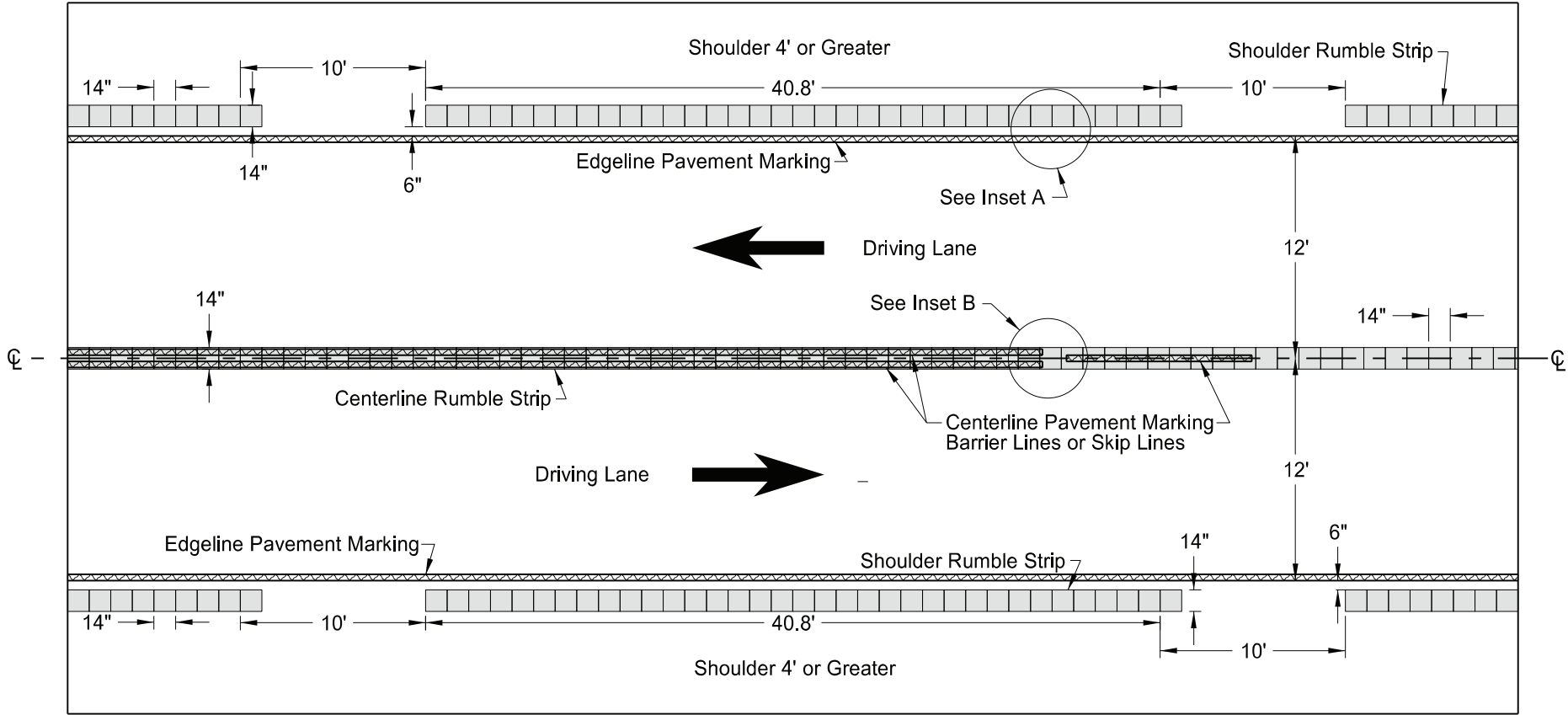
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-05-13	
REVISIONS	
DATE	CHANGE
7-7-14	Revised Notes
8-30-18	Updated notes to active voice.
9-05-19	New Design Engineer PE Stamp.
3-13-25	Added Approach Pipe Detail.



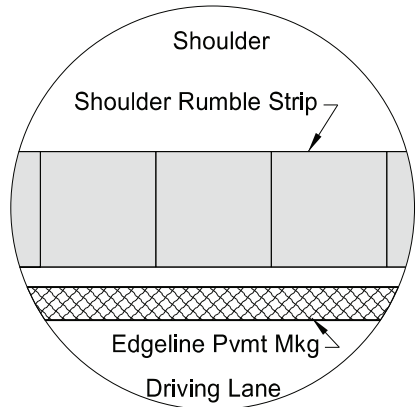
03/13/25

RUMBLE STRIPS UNDIVIDED HIGHWAYS (SHOULDERS 4' OR GREATER)

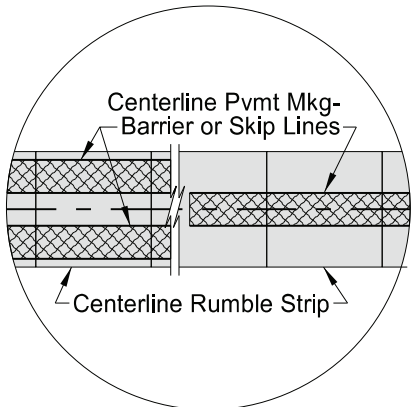
D-760-3



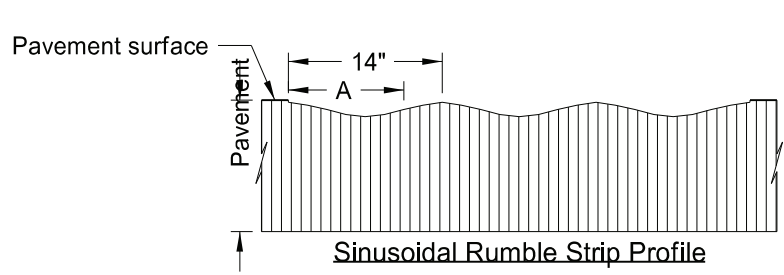
Undivided Highways (Shoulders 4' or Greater)



Inset A - Shoulder Rumble Strip
(Layout for opposite shoulder reversed)

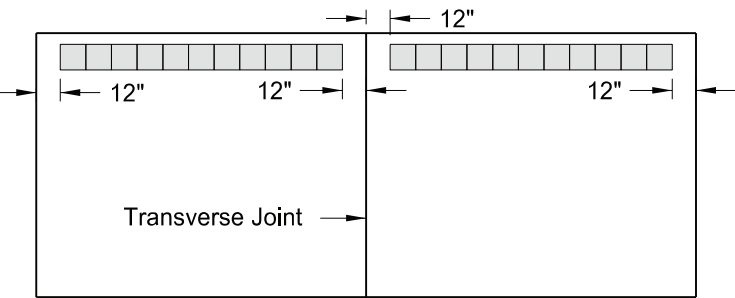


Inset B - Centerline Rumble Strip

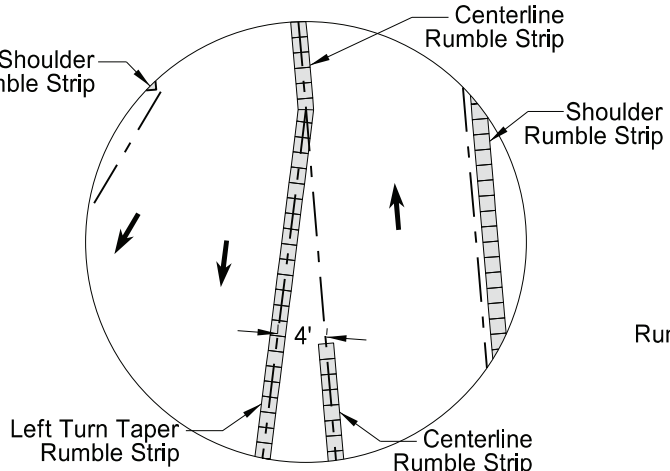


Milling Depths		
Location A (in)	MIL	in
0	62.5	1/16
1 3/4	156	5/32
3 1/2	281	9/32
5 1/4	438	7/16
7	500	1/2
8 3/4	438	7/16
10 1/2	281	9/32
12 1/4	156	5/32
14	62.5	1/16

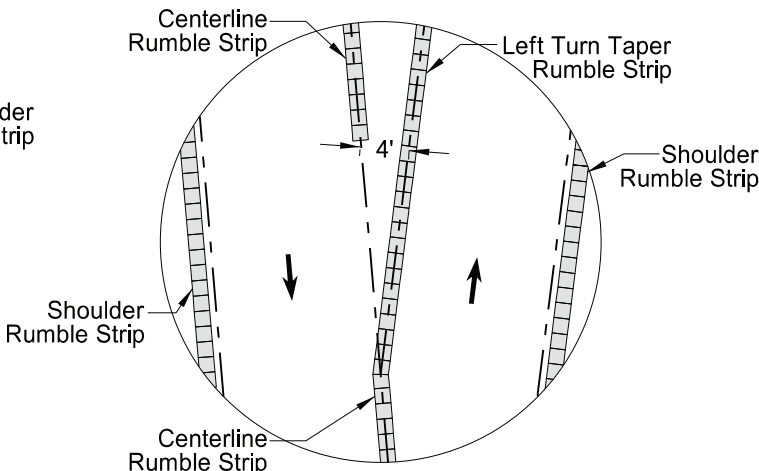
- NOTES:
- 1) Discontinue shoulder rumble strips through the entire length of right turn lanes and tapers, and at the radius of paved or gravel highways, section line approaches, or private drives.
 - 2) Discontinue centerline rumble strips 100' before and after paved or gravel highways, section line approaches, or private drives. Place rumble strips at left turn lanes as shown below.
 - 3) No additional quantity provided for centerline rumble strips on left turn tapers. Include all costs for centerline rumble strips on left turn tapers in the price bid for "Sinusoidal Rumble Strip - Asphalt Centerline" or "Sinusoidal Rumble Strip - Concrete Centerline".



Discontinue rumble strip approx. 12" on both sides of PCC transverse joint



Inset C



Inset D

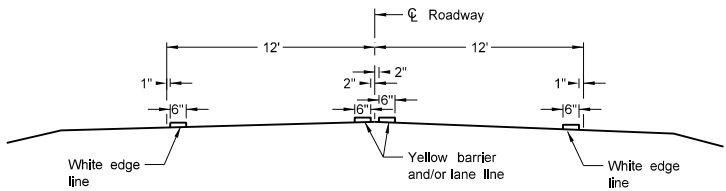
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-29-09	
REVISIONS	
DATE	CHANGE
2-25-10	Note 4 was added.
4-19-10	Revised Note 5, Note 6, and Turn Lane (Right & Left).
9-08-11	Revised Notes and D-760-3.
10-25-19	Added missing dimensions.
11-16-21	Changed turn lane rumble layouts.
3-07-23	Added Note 3.
5-26-23	Made rumble strips sinusoidal.



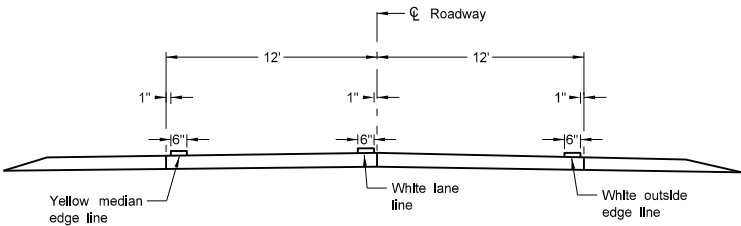
05/26/23

PAVEMENT MARKING

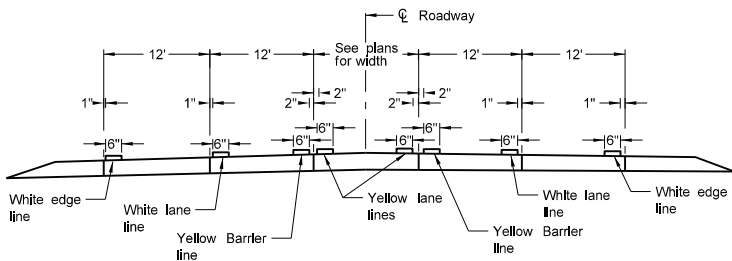
D-762-4



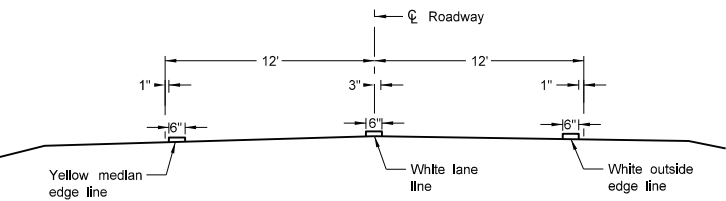
Two Lane Two Way
RURAL ROADWAY



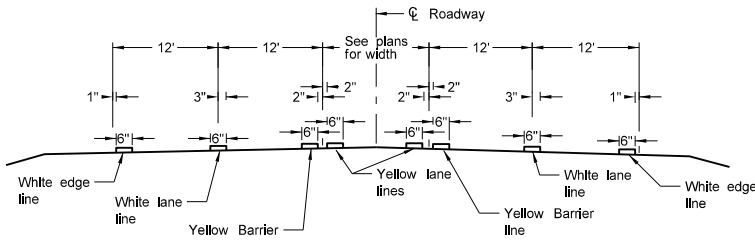
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



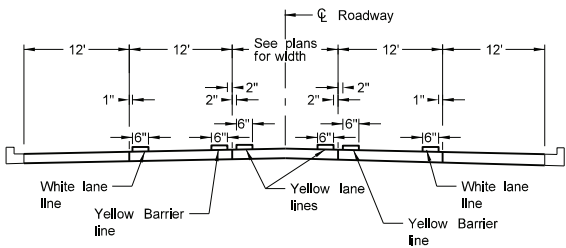
RURAL FIVE LANE ROADWAY
Concrete Section



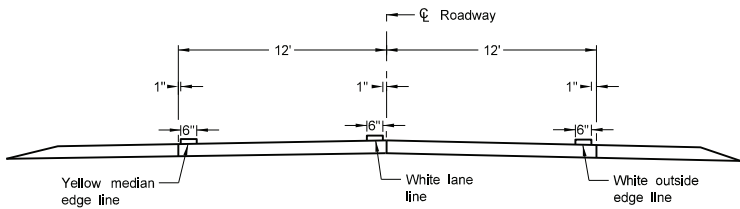
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



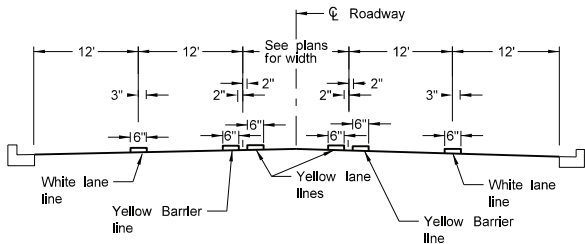
RURAL FIVE LANE ROADWAY
Asphalt Section



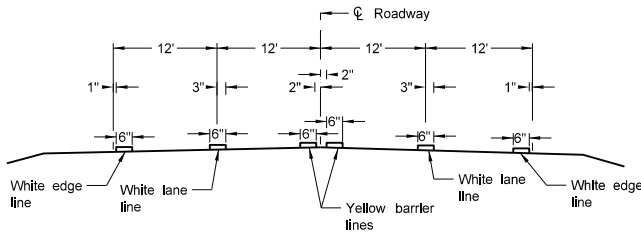
URBAN FIVE LANE SECTION
Concrete Section



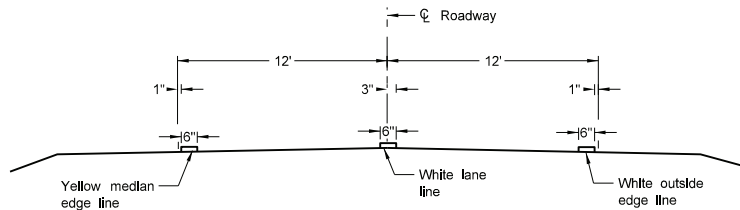
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Concrete Section



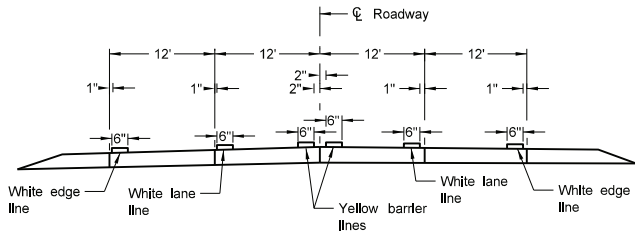
URBAN FIVE LANE SECTION
Asphalt Section



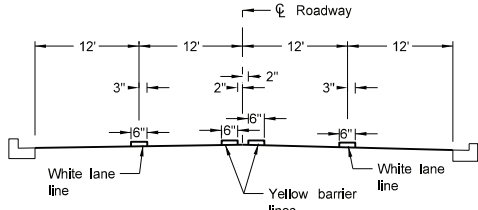
RURAL FOUR LANE ROADWAY
Asphalt Section



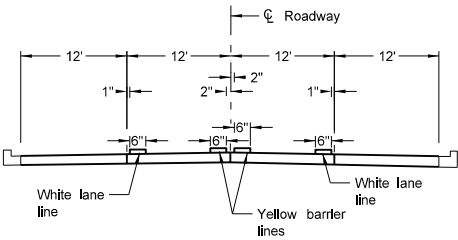
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



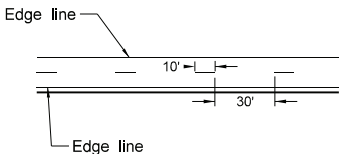
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

NOTES:

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

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,

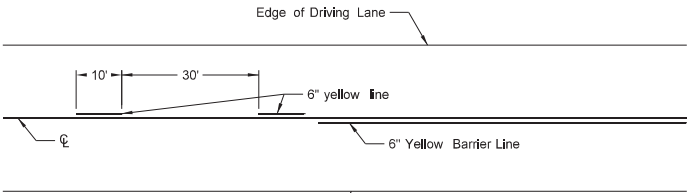
3. Use 4 or 6 inch wide pavement marking for all other roadways with speed limits < 40 mph.

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

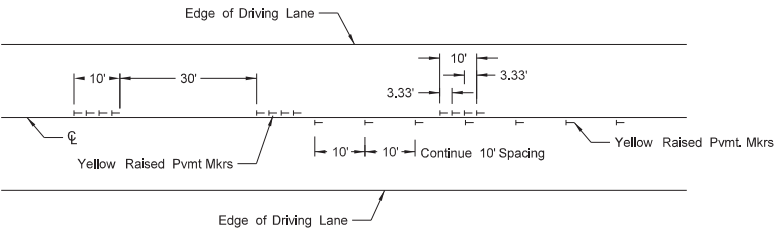


SHORT-TERM PAVEMENT MARKING

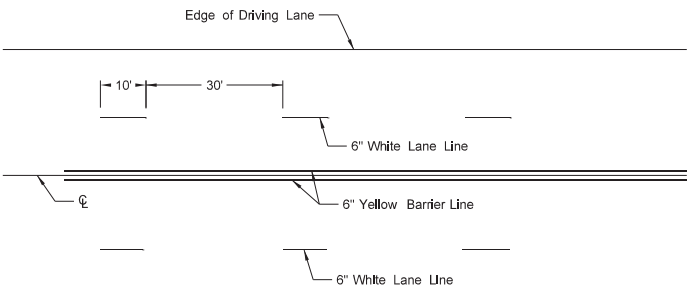
D-762-11



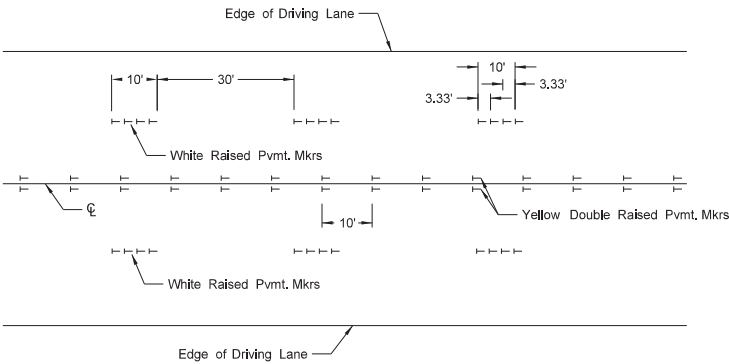
Painted or Tape Lines



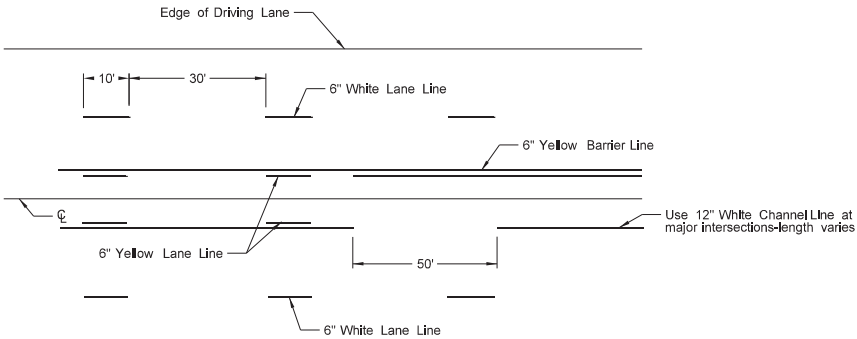
Raised Pavement Markers
TWO-LANE TWO-WAY ROADWAY



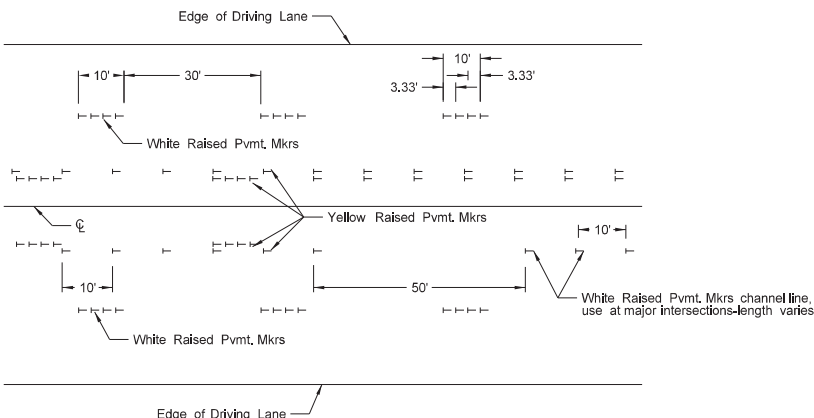
Painted or Tape Lines



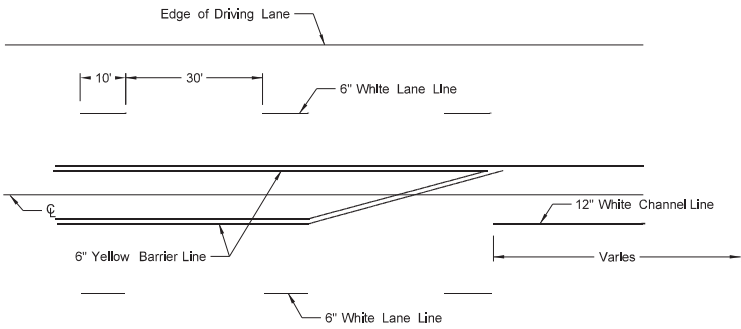
Raised Pavement Markers
FOUR LANE ROADWAY



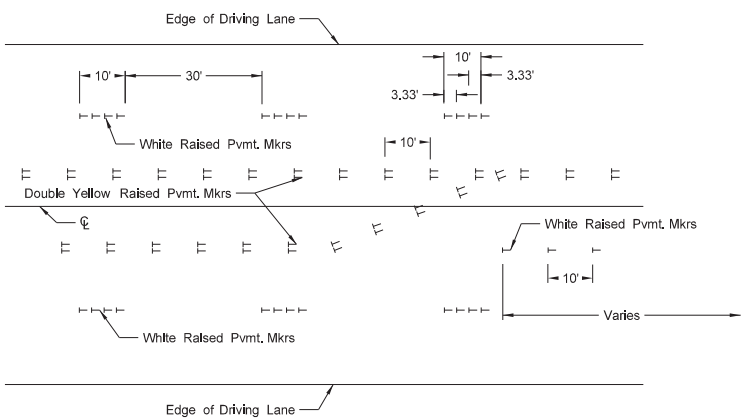
Painted or Tape Lines



Raised Pavement Markers
FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers
FIVE LANE ROADWAY WITH MARKED ISLANDS

NOTES:

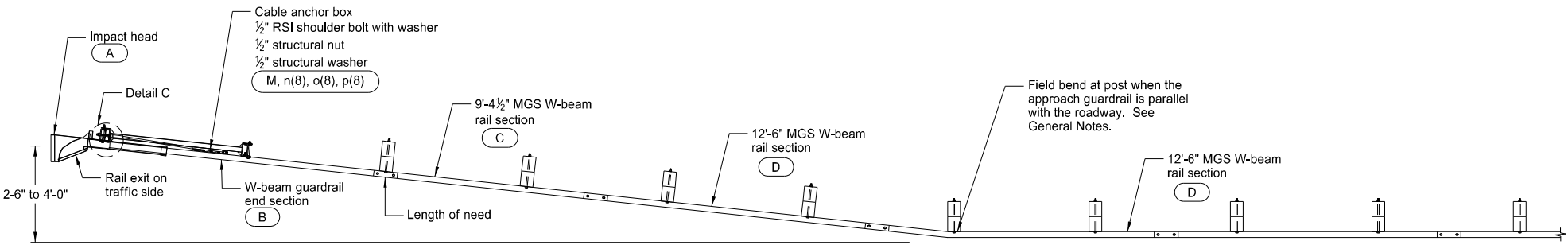
1. Place no passing zones on two-lane two-way roadways as shown. In lieu of short term no passing zone pavement markings, place no passing zone signs. Replace no passing zone signs with short term no passing zone pavement marking within three days.
2. Place short term center line stripe (paint) on top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

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

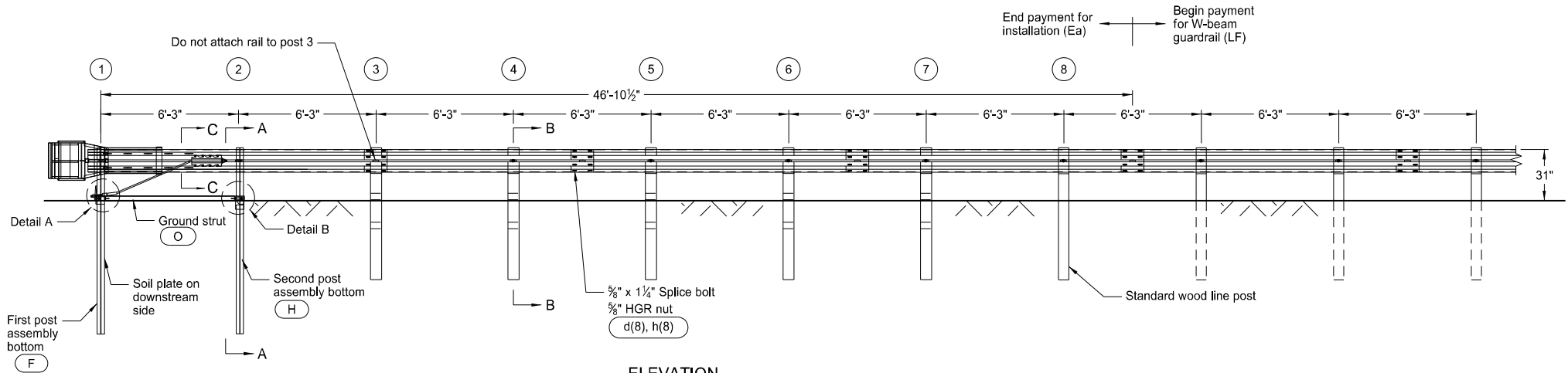


MGS FLARED ENERGY ABSORBING TERMINAL - WOOD POST

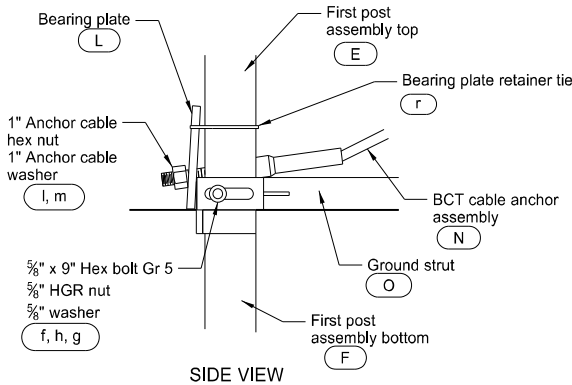
D-764-38



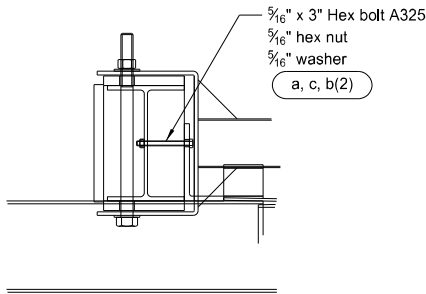
PLAN



ELEVATION

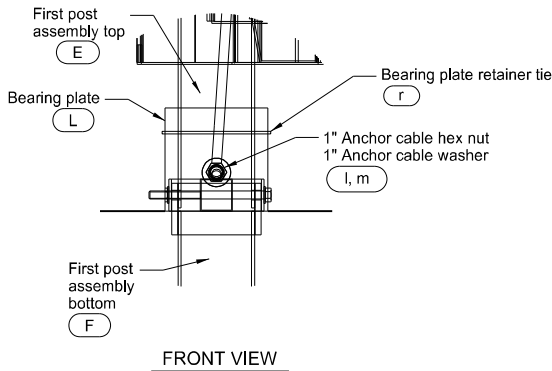


SIDE VIEW



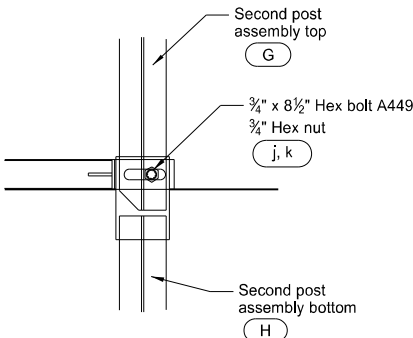
DETAIL C

Post 1 (Impact Head connection)

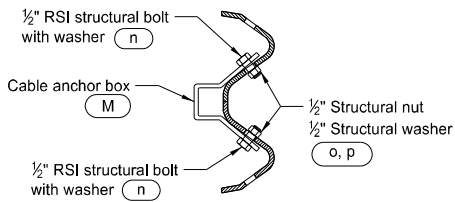


FRONT VIEW

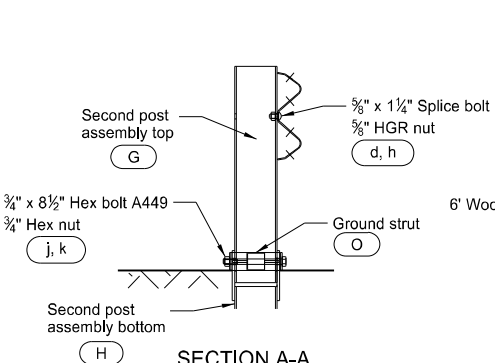
DETAIL A
Post 1



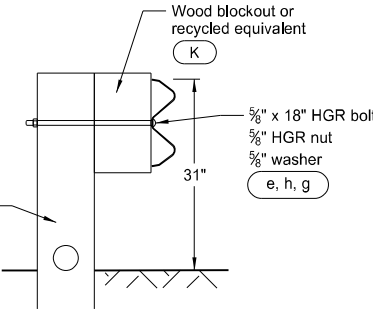
DETAIL B
Post 2



SECTION C-C



SECTION A-A
Post 2



SECTION B-B
Posts 3 through 7

ITEM	ITEM NO.	BILL OF MATERIALS	QTY
A	F3000	IMPACT HEAD	1
B	SF1303	W-BEAM GUARDRAIL END SECTION, 12 Ga	1
C	G12025	9'-4½" MGS W-BEAM RAIL SECTION, 12 Ga	1
D	G1203A	12'-6" MGS W-BEAM RAIL SECTION, 12 Ga	2
E	UHP1A	FIRST POST ASSEMBLY TOP	1
F	HP1B	FIRST POST ASSEMBLY BOTTOM	1
G	UHP2A	SECOND POST ASSEMBLY TOP	1
H	HP2B	SECOND POST ASSEMBLY BOTTOM	1
J	UP671	WOOD CRT POST	5
K	P675	WOOD BLOCKOUT OR RECYCLE EQUIVALENT	5
L	E750	BEARING PLATE	1
M	S760	CABLE ANCHOR BOX	1
N	E770	BCT CABLE ANCHOR ASSEMBLY	1
O	S785	GROUND STRUT HINGED POST	1
HARDWARE			
a	B5160304A	5/16" x 3" HEX BOLT A325	2
b	W0516	5/16" WASHER	4
c	N0516	5/16" HEX NUT	2
d	B580122	5/8" Dia x 1¼" SPLICE BOLT	33
e	B581802	5/8" Dia X 18" HGR BOLT	5
f	B580904A	5/8" Dia x 9" HEX BOLT GRD 5	1
g	W050	5/8" WASHER	7
h	N050	5/8" Dia HGR NUT	39
j	B340854A	¾" Dia x 8½" HEX BOLT GRD A449	1
k	N030	¾" Dia HEX NUT	1
l	N100	1" ANCHOR CABLE HEX NUT	2
m	W100	1" ANCHOR CABLE WASHER	2
n	SB12A	½" RSI SHOULDER BOLT WITH WASHER	8
o	N012A	½" STRUCTURAL NUT	8
p	W012A	½" STRUCTURAL WASHER	8
r	CT-100ST	BEARING PLATE RETAINER TIE	1

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

GENERAL NOTES:

- Wood posts are required with the Flared Energy Absorbing Terminal except posts 1 and 2.
- Galvanize all bolts, nuts, cable assemblies, cable anchors, and bearing plates.
- Flare the Flared Energy Absorbing Terminal when the approach guardrail is parallel with the roadway. When the approach guardrail is flared at 16:1 to 10:1, ensure the Flared Energy Absorbing Terminal has only the flare rate of the guardrail. When the guardrail flare is between 10:1 and 7:1, ensure the Flared Energy Absorbing Terminal is turned parallel to the roadway.
- Site grade as necessary to ensure the lower sections of the posts do not protrude more than 4" above the ground (measured along a 5' cord).
- Install the lower section of the hinged posts without the upper post attached. If the post is placed in a drilled hole, compact the backfill material to prevent settlement.
- Install the breakaway cable assembly taut. Use a locking device (vice grips or channel lock pliers) to prevent cable from twisting when tightening nuts.
- "Toe nail" the wood blockouts to the rectangular wood posts with two 20 penny galvanized nails to prevent them from turning when the wood shrinks.

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

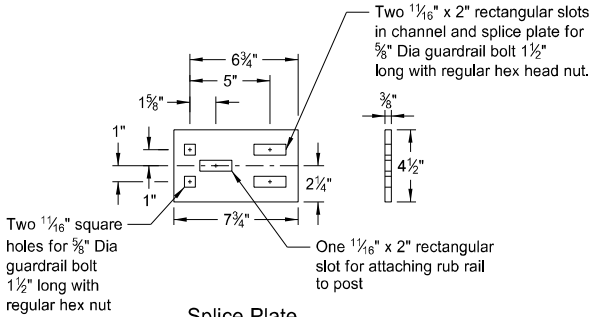


MGS W-BEAM GUARDRAIL GENERAL DETAILS

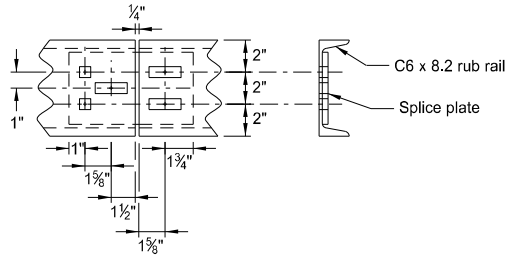
D-764-40

NOTES:

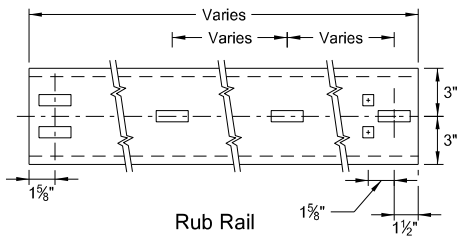
1. Begin reflector plates at the first post and space at 25' centers on guardrail less than 250' length and at 50' centers for guardrail over 250' length. Provide the reflector the same color as the pavement marking adjacent to it unless noted otherwise on the plans.
2. Replacing bituminous material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



Splice Plate

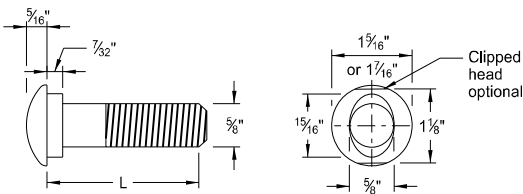


Splice Detail

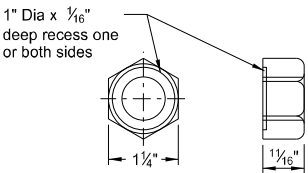


Rub Rail

C6x8.2 RUB RAIL AND SPLICE PLATE

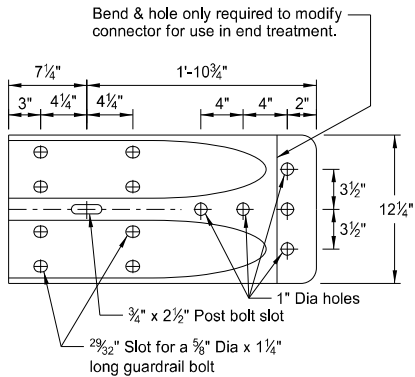
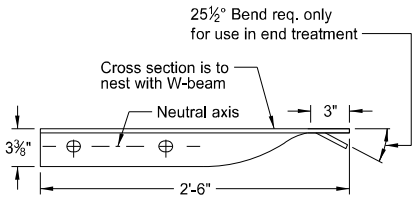


$\frac{5}{8}"$ Diameter Guardrail Bolt	
L	Thread Length
1 $\frac{1}{4}"$	Full length thread
2"	1 $\frac{3}{4}"$ Min thread length
9 $\frac{1}{2}"$	4" Min thread length
18"	4" Min thread length
20"	4" Min thread length
22"	4" Min thread length
25"	4" Min thread length

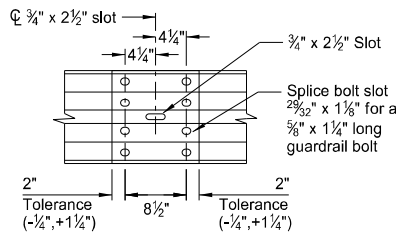


$\frac{5}{8}"$ Dia recess nut

$\frac{5}{8}"$ GUARDRAIL BOLT & RECESS NUT

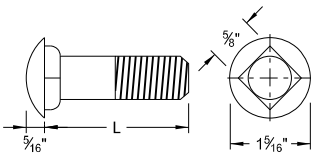


W BEAM TERMINAL CONNECTOR



SPLICE DETAIL

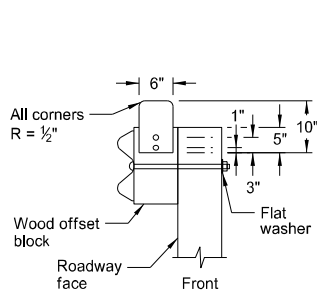
NOTE: Do not install center bolt in the $\frac{3}{4}"$ x 2 $\frac{1}{2}"$ slot at mid span splices.



$\frac{5}{8}"$ Diameter Carriage Bolt	
L	Thread Length
1 $\frac{1}{2}"$	Full length thread
3"	1 $\frac{1}{2}"$ Min thread length
11"	1 $\frac{3}{4}"$ Min thread length
13"	1 $\frac{3}{4}"$ Min thread length

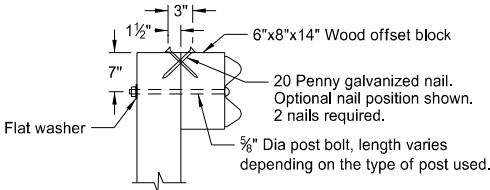


$\frac{5}{8}"$ CARRIAGE BOLT & NUT

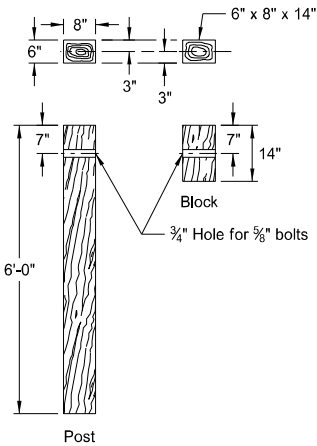


REFLECTORIZED PLATE DETAIL

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

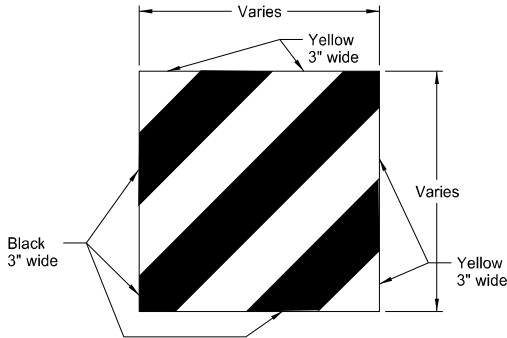


TYPICAL WOOD POST ATTACHMENT DETAIL

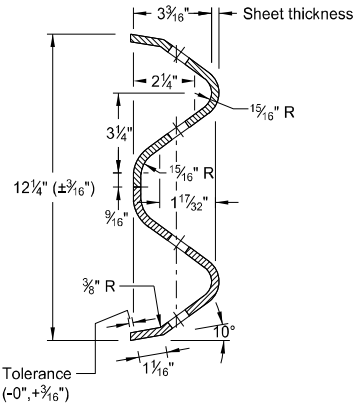


6" x 8" WOOD POST & BLOCK

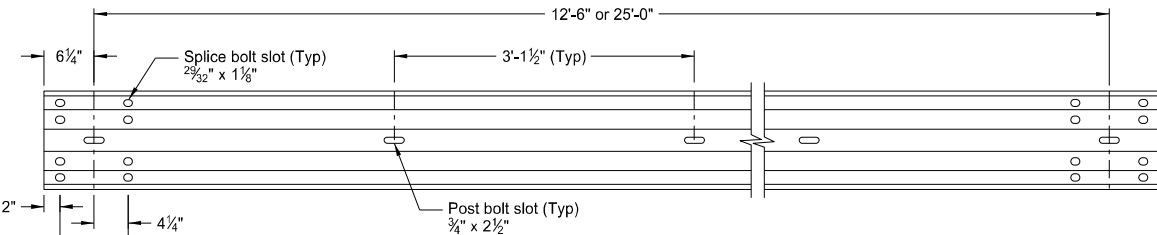
NOTE: Where soil conditions require, alternate lengths may be specified, in 6" increments.



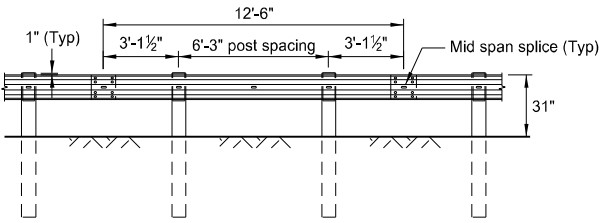
IMPACT HEAD OBJECT MARKER



W-BEAM CROSS SECTION



STANDARD MGS GUARDRAIL PANEL



STANDARD MGS GUARDRAIL SYSTEM

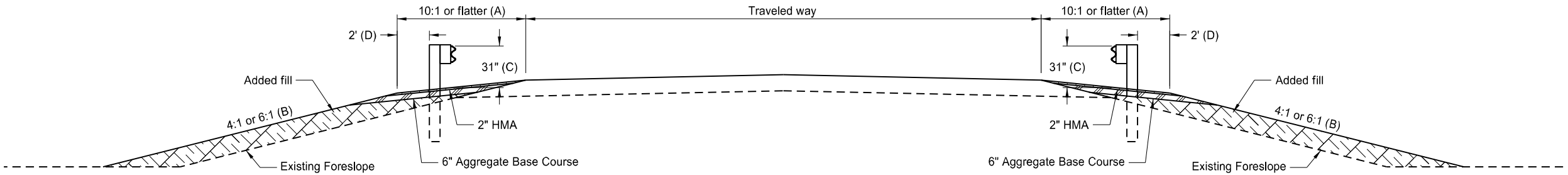
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-14-17	
REVISIONS	
DATE	CHANGE
12-02-20	Updated clipped head to optional



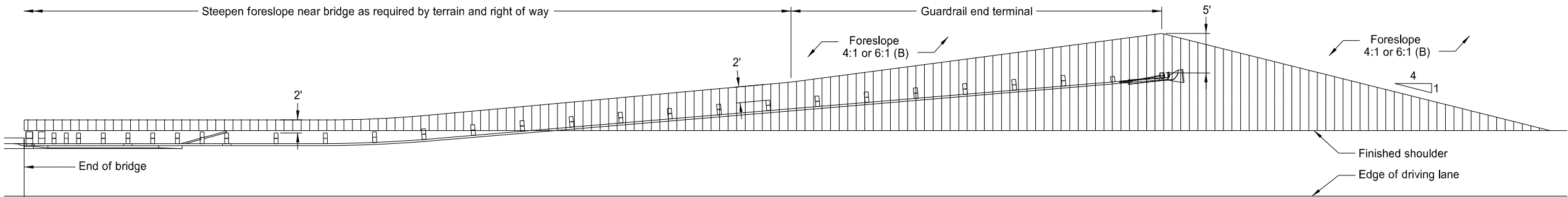
12 02 2020

TYPICAL GRADING AT BRIDGE ENDS
WITH MGS W-BEAM GUARDRAIL

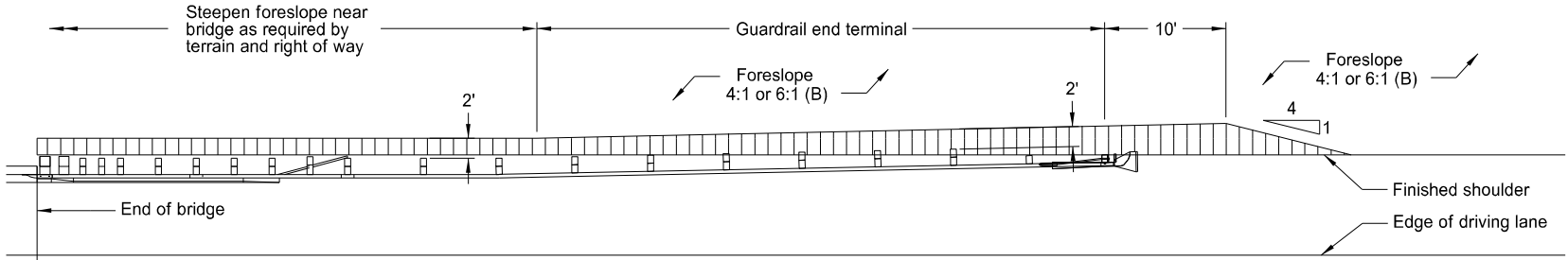
D-764-48



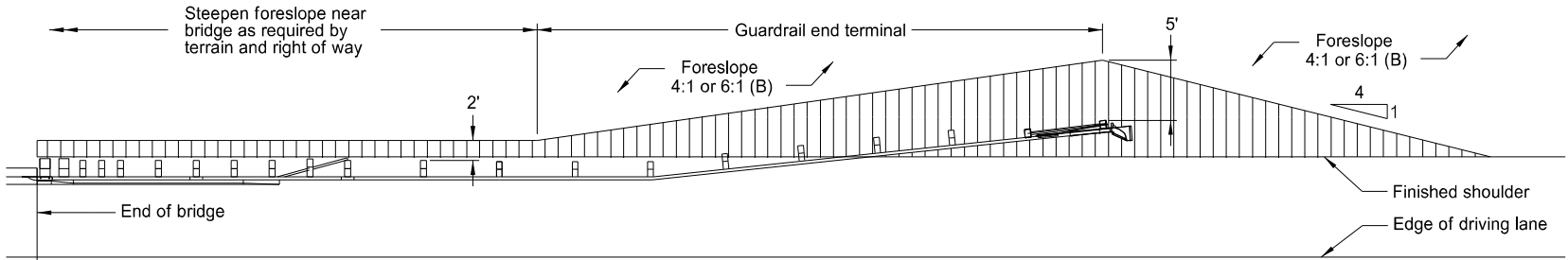
TYPICAL SECTION



PLAN LAYOUT
FLARED GUARDRAIL WITH END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH TANGENT END TERMINAL



PLAN LAYOUT
NON-FLARED GUARDRAIL WITH FLARED END TERMINAL

NOTES:

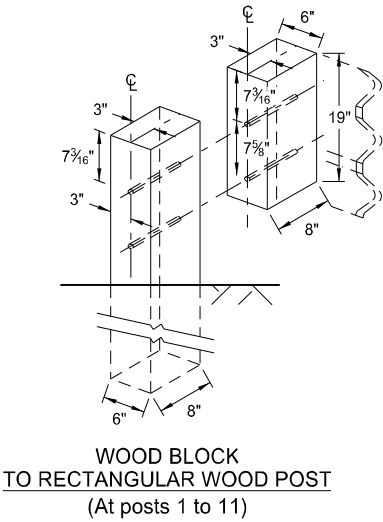
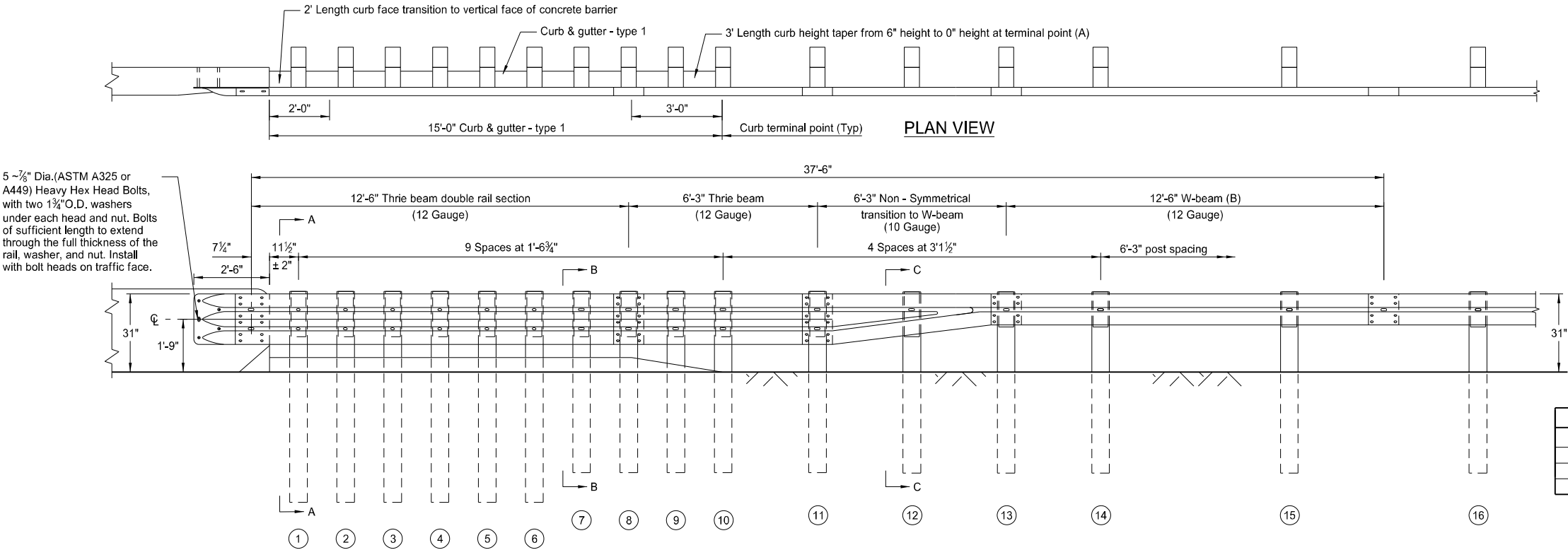
- (A) Use slope flatter than 10:1 when required to provide proper guardrail height.
- (B) When normal foreslope is 4:1, use added fill slope of 4:1. When normal foreslope is 6:1, use added fill slope of 6:1.
- (C) Measure from top of guardrail to top of surfacing at front face of guardrail.
- (D) Vary dimension at end terminals per Plan Layouts shown on this sheet.

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

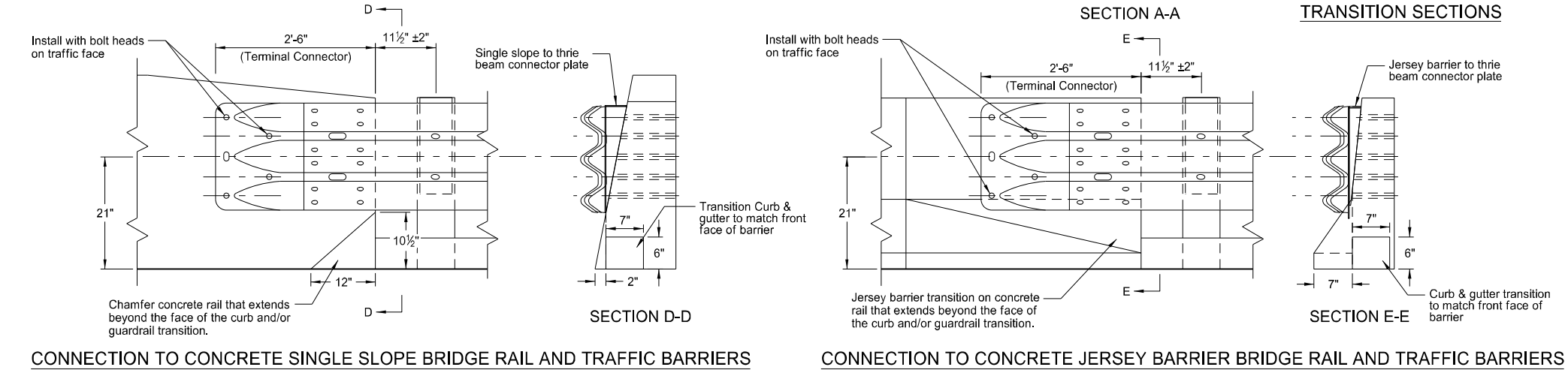
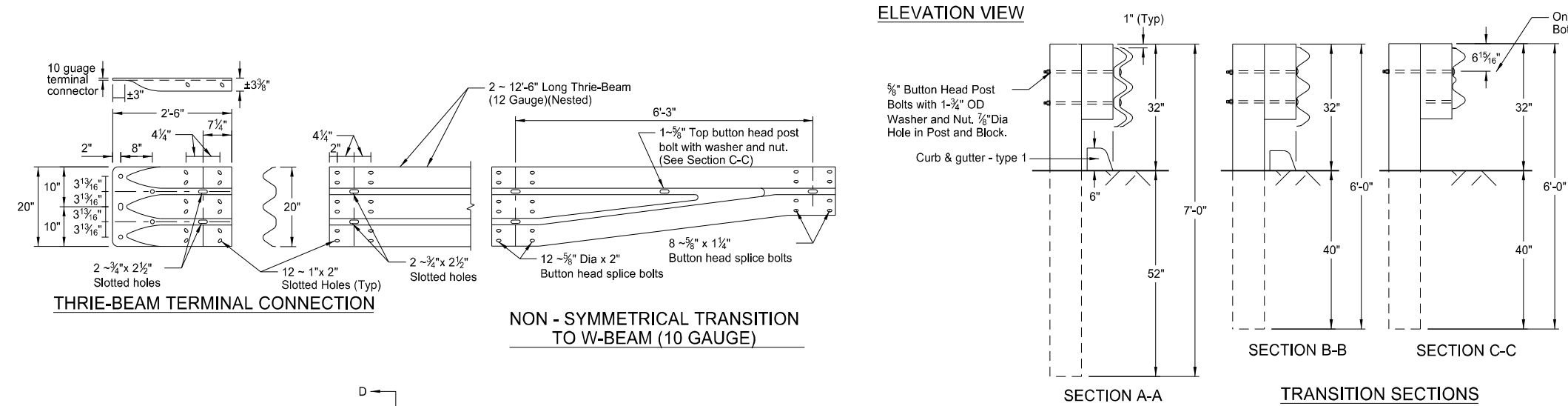


MGS W-BEAM TRANSITION WITH APPROACH CURB TO CONCRETE SINGLE SLOPE OR JERSEY BARRIER

D-764-60



TRANSITION POST AND TIMBER BLOCKOUT SIZING		
POST NO.	POST SIZE	BLOCKOUT SIZE
1-6	6" X 8" X 7'-0" long	6" X 8" X 19"
7-12	6" X 8" X 6'-0" long	6" X 8" X 19"
13-16	6" X 8" X 6'-0" long	6" X 8" X 14"

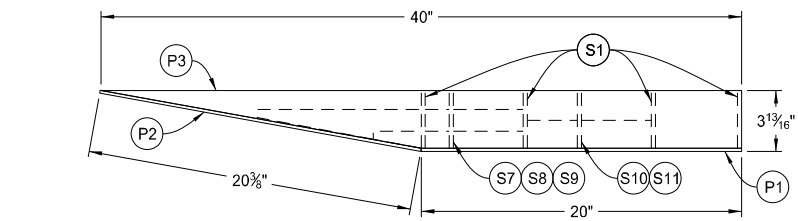


- (A) Where curb is required to continue past 15' length, taper the curb down to 3" height at the terminal point shown above, instead of 0" height. Use 3" height curb between posts 10 and 16.
- (B) Install 12'-6" length W-beam double rail section at location where curb extends past 15' length.

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

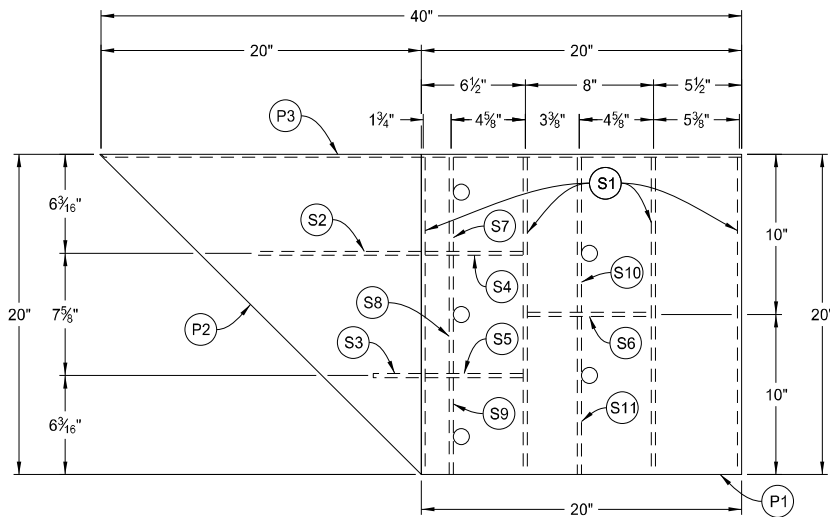
KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
12 02 2020

SINGLE SLOPE TO THRIE BEAM CONNECTOR PLATE DETAILS



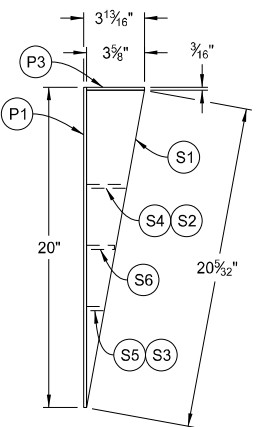
PLAN

NOTE: Assembly Detail is shown for guardrail installation on right hand side of entrance end of bridge barrier. Mirror for opposite side installation.

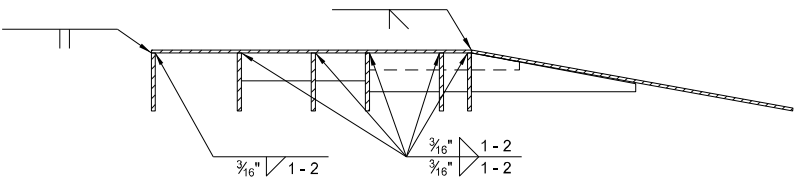


ELEVATION

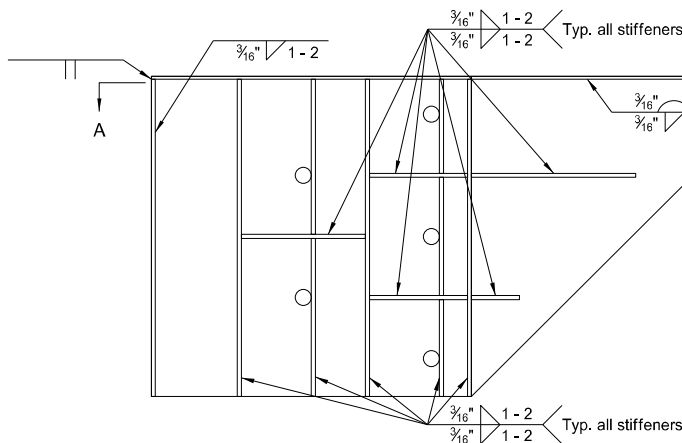
ASSEMBLY DETAIL
(Front View)



END

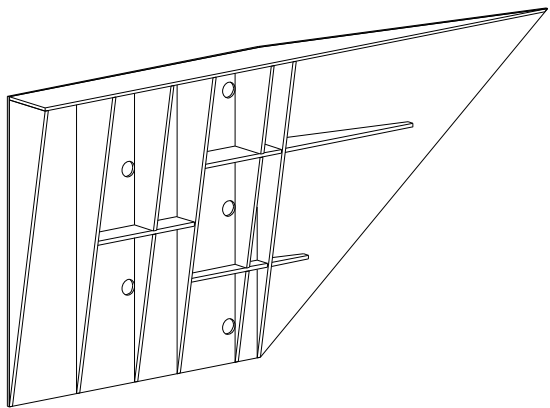


SECTION A-A



ELEVATION

WELDING DETAIL
(Back View)



PICTORIAL DRAWING
(Showing Back of Connector Plate)

WELDING INSTRUCTIONS:

- Weld cover plate P3 as follows:
 $\frac{3}{16}$ " continuous back weld on exterior sides and $\frac{3}{16}$ " fillet weld 1" long spaced at 2" center-to-center on interior sides.
- Weld stiffeners located on the inside of the cover plates as follows:
 $\frac{3}{16}$ " fillet weld 1" long spaced at 2" center-to-center.
- Weld cover plates P1 and P2 together with full penetration groove weld.

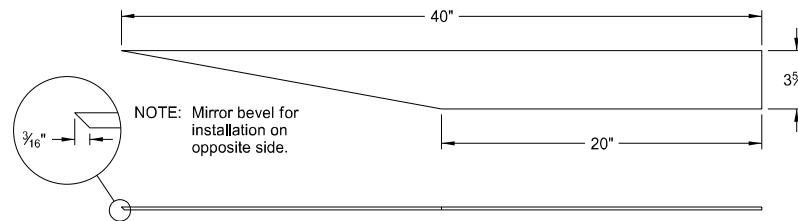


PLATE P3
Quantity: 1

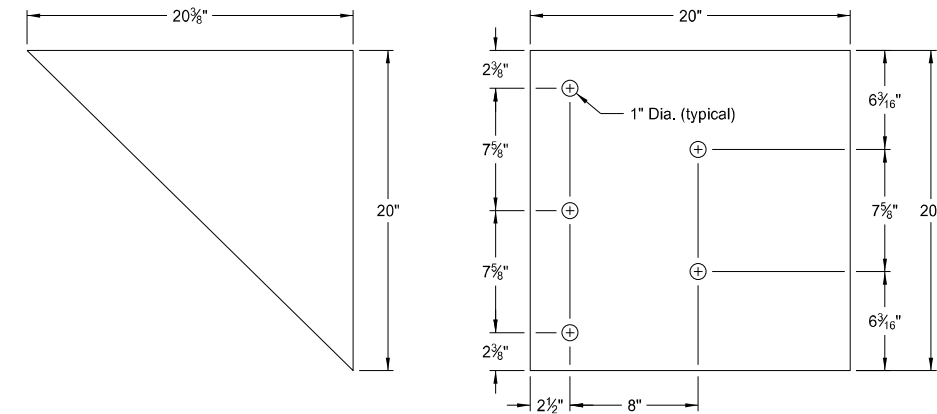
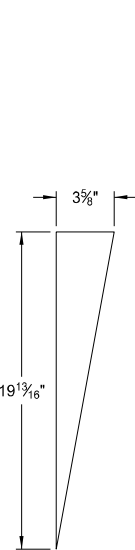


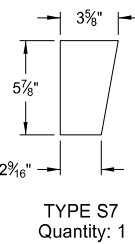
PLATE P2
Quantity: 1

PLATE P1
Quantity: 1

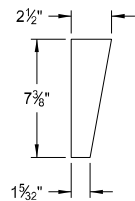
COVER PLATES



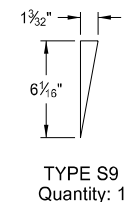
TYPE S1
Quantity: 4



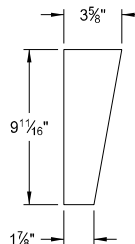
TYPE S7
Quantity: 1



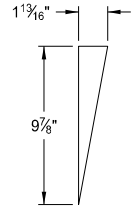
TYPE S8
Quantity: 1



TYPE S9
Quantity: 1

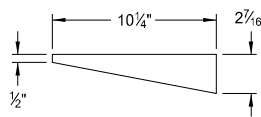


TYPE S10
Quantity: 1

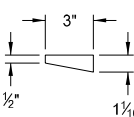


TYPE S11
Quantity: 1

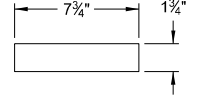
VERTICAL PLATES



TYPE S2
Quantity: 1

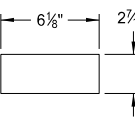


TYPE S3
Quantity: 1

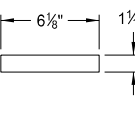


TYPE S6
Quantity: 1

HORIZONTAL PLATES



TYPE S4
Quantity: 1



TYPE S5
Quantity: 1

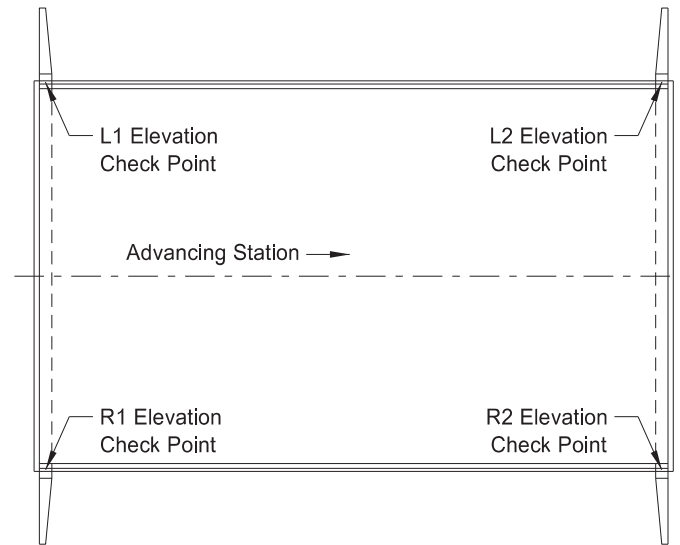
NOTES:

- Fabricate cover plates P1, P2, and P3 from $\frac{3}{16}$ " thick ASTM A36 Grade structural steel.
- Fabricate stiffener plates from $\frac{1}{4}$ " thick ASTM A36 Grade structural steel.
- Galvanize connector plate in accordance with AASHTO M111.

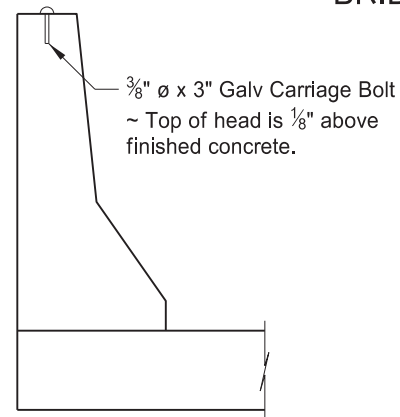
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-14-17	
REVISIONS	
DATE	CHANGE
12-02-20	Updated notes to active voice.



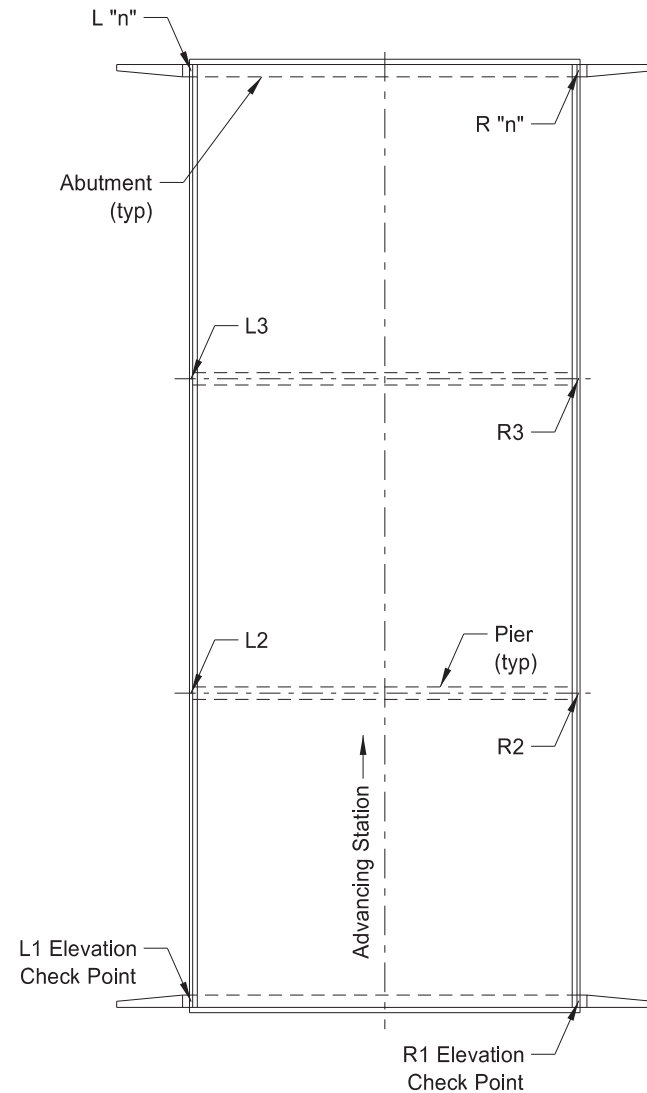
12 02 2020



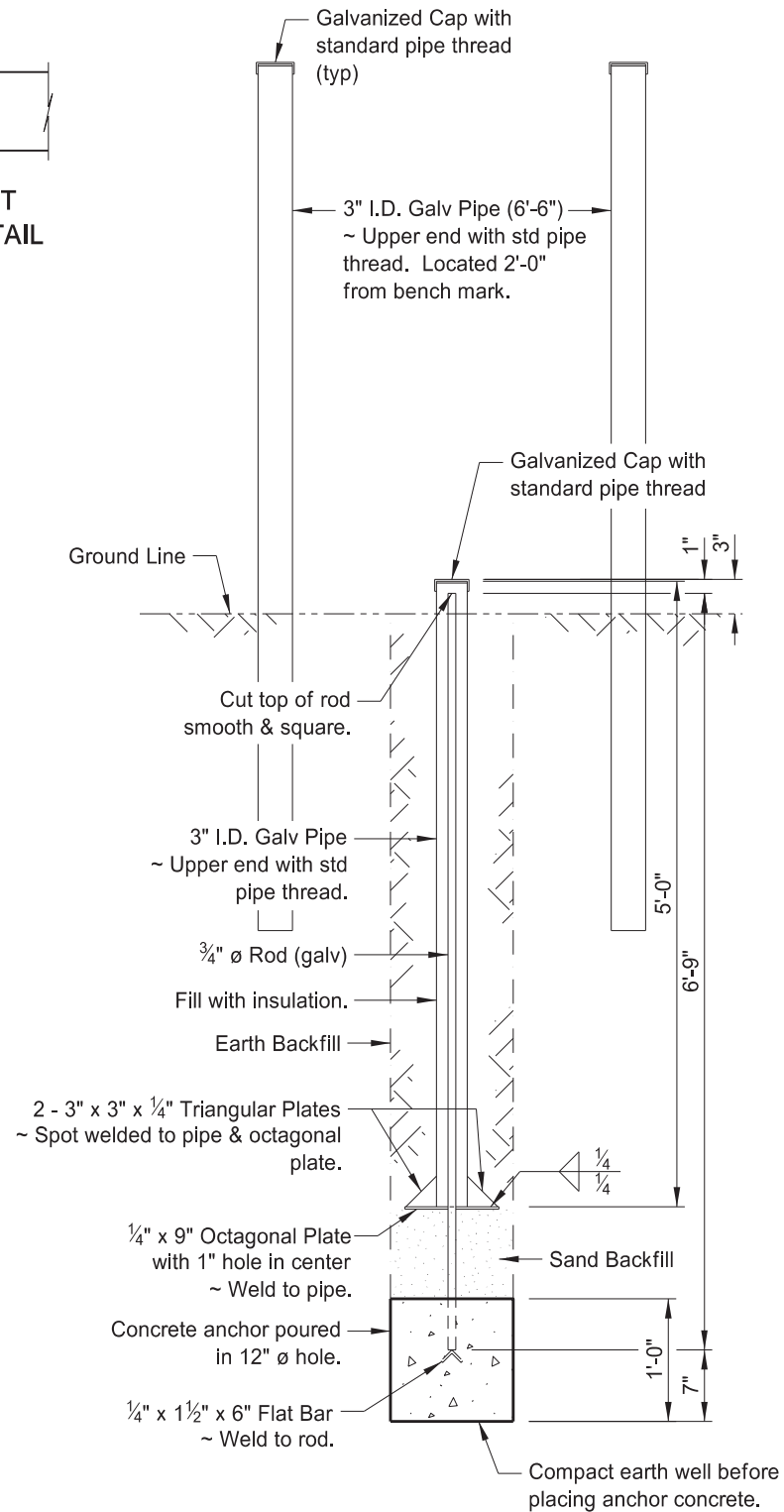
GENERAL LAYOUT FOR SINGLE SPAN



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