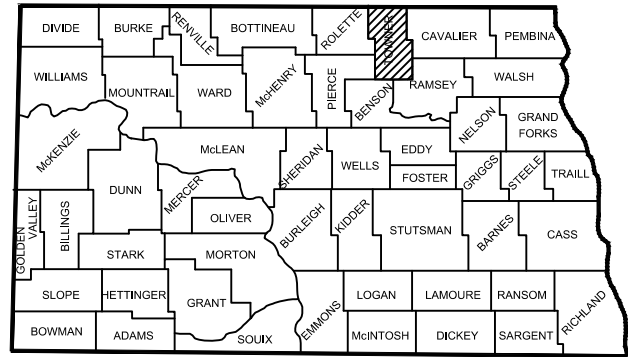




STATE OF NORTH DAKOTA
SHOWING COUNTIES

TOWNER COUNTY, NORTH DAKOTA PLANS FOR FEDERAL AID PROJECT PROJECT NUMBER BRJ-0048(050) STRUCTURE REPLACEMENTS

Project Consists of Construction of Reinforced Concrete Box Culverts, Aggregate Surfacing, Grading, Removals, Pipe Replacements, Fencing, Signing, and Incidentals.

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	BRJ-0048(050)	23975	1	1

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

PROJECT LENGTH

PROJECT ~ BRJ-0048(050)	GROSS MILES	NET MILES
Site 1 - Structure 48-105-41.2	0.066	0.066
Site 2 - Structure 48-119-37.1	0.117	0.117
TOTAL	0.183	0.183

DESIGN DATA - Site 1

TRAFFIC		AVERAGE DAILY			EST. 30th MAX. HR.
		PASSENGER	TRUCKS	TOTAL	
CURRENT TRAFFIC	2022	LESS THAN 100 VPD			
TRAFFIC FORECAST	2042				

DESIGN SPEED 55 MPH
MINIMUM SIGHT DISTANCE (STOPPING) 495 FEET
DESIGN LOADS FOR STRUCTURE: HL-93

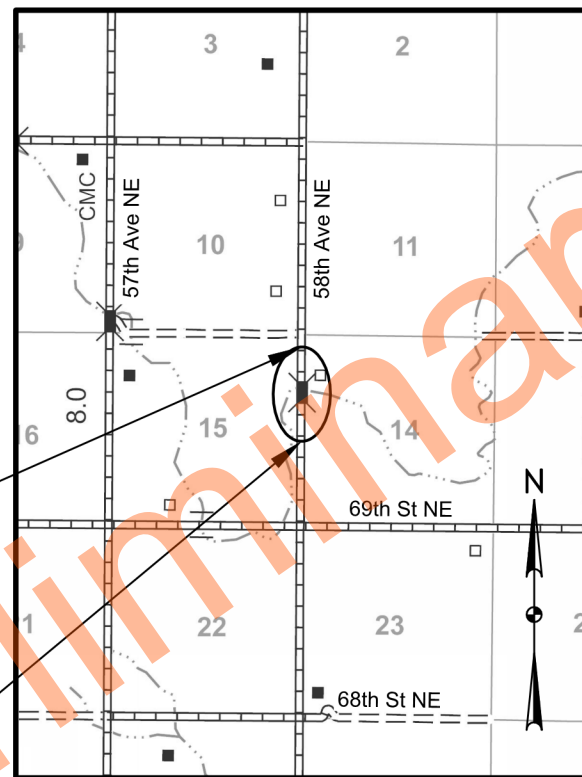
DESIGN DATA - Site 2

TRAFFIC		AVERAGE DAILY			EST. 30th MAX. HR.
		PASSENGER	TRUCKS	TOTAL	
CURRENT TRAFFIC	2022	LESS THAN 100 VPD			
TRAFFIC FORECAST	2042				

DESIGN SPEED 55 MPH
MINIMUM SIGHT DISTANCE (STOPPING) 495 FEET
DESIGN LOADS FOR STRUCTURE: HL-93

SITE 1 EXISTING STRUCTURE NO. 48-105-41.1 NEW STRUCTURE NO. 48-105-41.2

Project is located approximately 9 miles West and 5 miles South of Cando, ND

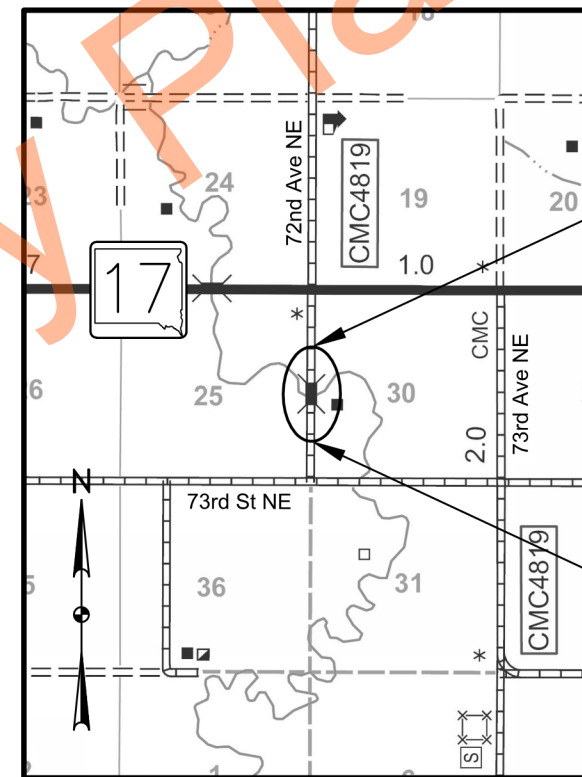


END PROJECT
STA 108+30 = A POINT APPROXIMATELY 1,391 FEET SOUTH AND 14 FEET EAST OF THE NORTHEAST CORNER OF SEC. 15, TWP. 157 N., RGE. 68 W.

BEGIN PROJECT
STA 104+80 = A POINT APPROXIMATELY 3,544 FEET NORTH AND 49 FEET WEST OF THE SOUTHEAST CORNER OF SEC. 15, TWP. 157 N., RGE. 68 W.

SITE 2 EXISTING STRUCTURE NO. 48-119-37.0 NEW STRUCTURE NO. 48-119-37.1

Project is located approximately 5 miles East and 1 mile South of Cando, ND

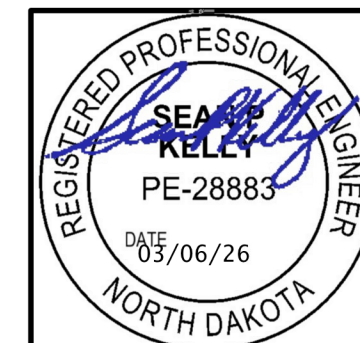


END PROJECT
STA 7+75 = A POINT APPROXIMATELY 2,382 FEET SOUTH AND 31 FEET EAST OF THE NORTHEAST CORNER OF SEC. 25, TWP. 158 N., RGE. 66 W.

BEGIN PROJECT
STA 1+55 = A POINT APPROXIMATELY 2,286 FEET NORTH AND 36 FEET WEST OF THE SOUTHEAST CORNER OF SEC. 25, TWP. 158 N., RGE. 66 W.

DESIGNER	Sean Kelly, PE
DESIGNER	Alex Glowacki, EI
DESIGNER	Alex Boechler, PE
DESIGNER	Austin Chmielewski, PE
DESIGNER	-

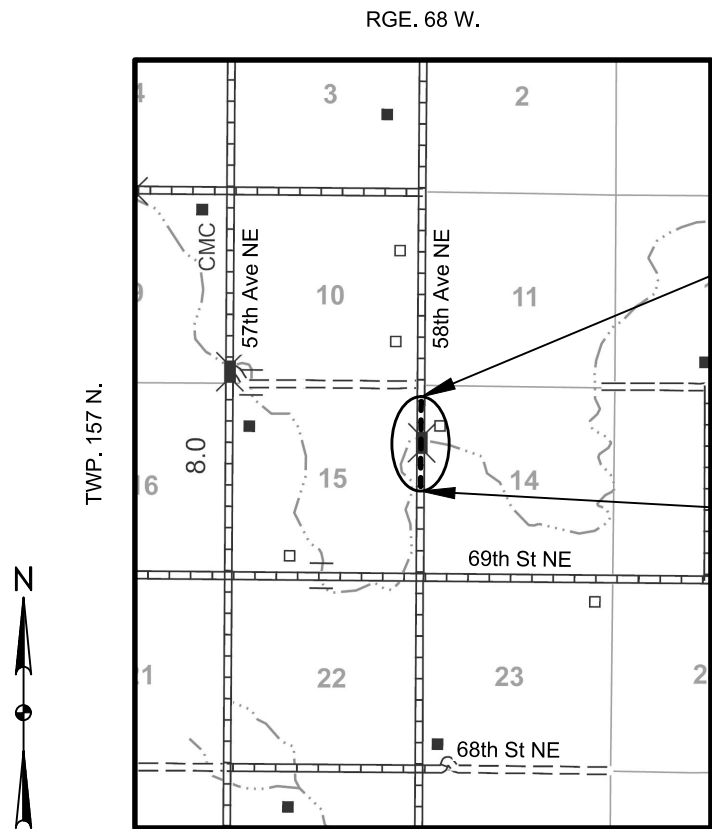
PS&E Corrections Made February 2026
Surveyed & Designed Date April 2025 & January 2026



1820 WALNUT STREET EAST, SUITE 6
DEVILS LAKE, ND 58301-3411
(701) 662-1960, FAX (855) 288-8055

TABLE OF CONTENTS						STATE	PROJECT NO.	SECTION NO.	SHEET NO.
						ND	BRJ-0048(050)	2	1
PLAN SECTIONS					LIST OF STANDARD DRAWINGS				
Section	Page(s)	Description	Number	Description					
1	1	Title Sheet	D-101-1, 2, 3, 4	NDDOT Abbreviations					
2	1	Table of Contents	D-101-10	NDDOT Utility Company and Organization Abbreviations					
4	1	Scope of Work	D-101-20, 21	Line Styles					
6	1	Notes	D-101-30, 31, 32, 33	Symbols					
6	2	Environmental Notes	D-101-40	Cross Section Legend					
8	1	Quantities	D-203-8	Standard Rural Approaches					
10	1	Basis of Estimate	D-255-2	Erosion And Siltation Control - Erosion Control Blanket Installation					
20	1 - 2	General Details	D-260-1	Erosion And Siltation Controls - Silt Fence					
30	1 - 2	Typical Sections	D-261-1	Erosion Control - Fiber Roll Placement Details					
40	1 - 3	Removals	D-704-7	Breakaway Systems For Construction Zone Signs - Perforated Tube					
60	1 - 3	Plan & Profile	D-704-9	Construction Sign Details - Terminal And Guide Signs					
75	1 - 5	Wetland Impacts	D-704-10	Construction Sign Details - Regulatory Signs					
76	1 - 3	Temporary Erosion Control	D-704-11, 11A	Construction Sign Details - Warning Signs					
77	1 - 3	Permanent Erosion Control	D-704-13	Barricade And Channelizing Device Details					
80	1 - 2	Layouts	D-704-14	Construction Sign Punching And Mounting Details					
81	1 - 2	Survey Coordinate and Curve Data	D-704-19	Road Closure And Lane Closure On A Two Way Road Layouts					
100	1 - 3	Work Zone Traffic Control	D-704-20	Terminal And Seal Coat Sign Layouts					
110	1 - 3	Signing	D-704-21	Detour And Roadway Diversion Sign Layouts					
170	1 - 6	Bridges and Box Culverts	D-704-22	Construction Truck And Temporary Detour Layouts					
200	1 - 15	Cross Sections	D-708-6	Erosion And Siltation Controls - Median Or Ditch Inlet Protection					
			D-714-4	Round Corrugated Steel Pipe Culverts And End Sections					
			D-714-28	Transverse Mainline Pipe Installation Detail for Pipes Installed in New Embankment Areas					
			D-752-1	Standard Barbed Wire Fence					
			D-754-1	Pipe Or W-Shape Assembly Details					
			D-754-2	Breakaway Coupler System For Standard Pipe - Stub Post					
			D-754-3	Breakaway System for Standard Pipe - Stub Post					
			D-754-23	Perforated Tube Assembly Details					
			D-754-24	Mounting Details Perforated Tube					
			D-754-82	Object Markers					
SPECIAL PROVISIONS									
Number	Description								
PSP 51(25)	Permits and Environmental Considerations								
SP 315(25)	Temporary Water Diversion								
SP 316(25)	Utility Coordination								
SSP 1	Temporary Erosion and Sediment Best Management Practices								
SSP 2	Federal Migratory Bird Treaty Act								
SSP 3	Local Agency Contracts								

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	BRJ-0048(050)	4	1



SITE 1
EXISTING STRUCTURE NO. 48-105-41.1
NEW STRUCTURE NO. 48-105-41.2

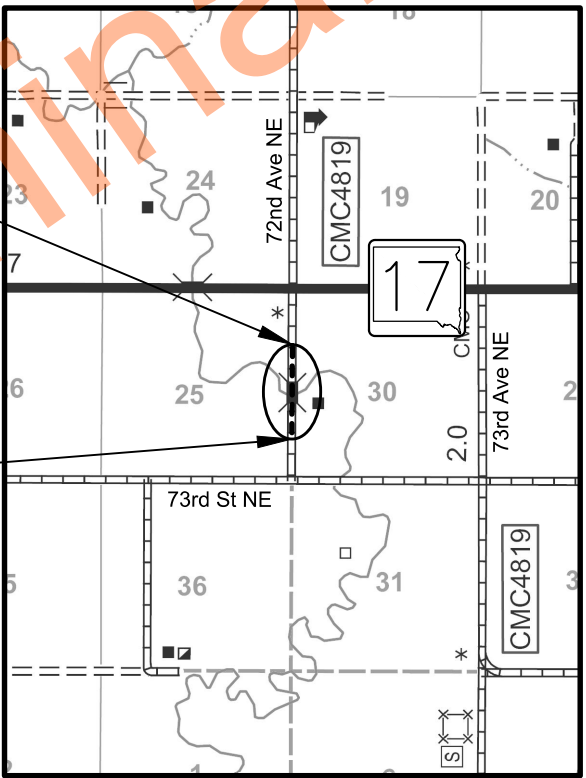
END PROJECT
STA 108+30 = A POINT APPROXIMATELY
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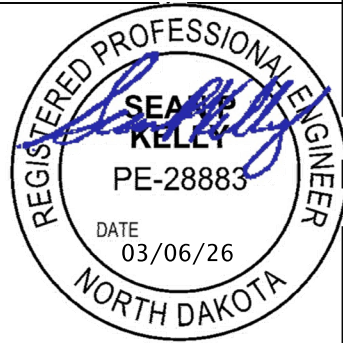
SITE 2
EXISTING STRUCTURE NO. 48-119-37.0
NEW STRUCTURE NO. 48-119-37.1

END PROJECT
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2,286 FEET NORTH AND 36 FEET WEST
OF THE SOUTHEAST CORNER OF SEC. 25,
TWP. 158 N., RGE. 66 W.



- GRADING & SURFACING
- STRUCTURE REPLACEMENT



BRJ-0048(050) TOWNER COUNTY, NORTH DAKOTA STRUCTURE NO. 48-105-41.2 & 48-119-37.1		
SITE 1 & 2 SCOPE OF WORK		
DRWN. BY ACG	CHKD BY SPK	PROJECT NO. 2302-00625

PLAN NOTES

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	BRJ-0048(050)	6	1

105-P01 UTILITIES: Utilities that the Engineer has been made aware of are shown in the plans. Other utilities may exist that are not shown. The horizontal utility locations shown in the plans are approximate. Plan locations should not be interpreted as exact for bidding or construction purposes.

108-P01 CONTRACT TIME FOR COMPLETION: Complete all work and open the roadway to traffic on or before July 31st, 2027. The Contractor will be allowed to close the roadway for 45 calendar days, at each Site. Liquidated damages will be assessed for each day beyond the 45-day closure limit or each day beyond the completion date in accordance with Section 108.07 B.1.

202-P01 REMOVAL OF AGGREGATE MATERIALS: Removal of aggregate material is included in the excavation quantity shown in Section 10.

202-P02 REMOVE EXISTING FENCE: Notify landowners in writing, with a copy to the Engineer, a minimum of 30 days in advance of fence removal. Just prior to removing fence, coordinate verbally with the adjacent landowners. Install the new fence before the removal of the old fence. Additional information, including the property owners' contact information, is available from the Engineer.

Payment for fence removal will be paid based upon the length of fence removed regardless of the presence of gates, corner assemblies, brace assemblies, and depression fencing. Include all costs associated with removing the aforementioned items in the contract unit price bid for "REMOVE EXISTING FENCE".

203-010 SHRINKAGE: 35 percent additional volume is included for shrinkage in earth embankment.

203-385 AVERAGE HAUL: No average haul has been computed for this project.

203-P01 TOPSOIL: Make arrangements for topsoil storage areas if sufficient room is not available within the right of way. No payment will be made for additional handling of topsoil that must be moved to provide additional excavation area between the proposed grading limits and the right of way. Re-spread topsoil evenly over the areas to be seeded. Include all costs of labor, materials, and equipment associated with stripping, stockpiling, and re-spreading the existing topsoil in the unit price bid for "TOPSOIL".

203-P02 COMMON EXCAVATION-TYPE B: Include all costs associated with excavating, transporting, and placing the material in the contract unit price bid for "COMMON EXCAVATION-TYPE B". "COMMON EXCAVATION-TYPE B" will be paid at plan quantity. Any change to plan quantity must be approved by the Owner or Engineer.

262-P01 FLOTATION SILT CURTAIN: Flotation Silt Curtain must be installed prior to any work taking place in and around the channel.

Place the flotation silt curtain at a location that allows for sufficient area to construct the project without placing material against the flotation silt curtain. Place no material against the flotation silt curtain.

714-P01 APPROACH PIPE: Install approach pipe culverts in accordance with Section 714.04A of the Standard Specifications.

704-P01 TRAFFIC CONTROL FOR STRUCTURE REPLACEMENT: Use the construction signing layout on Section 100, Sheet 3 and Sheet 4 for the removal of the existing structure and installation of the proposed structure. Coordinate scheduling with the Engineer and the County to ensure the least amount of downtime and disruption to traffic. Provide additional signs at no cost to the Owner if needed for Contractor operations.

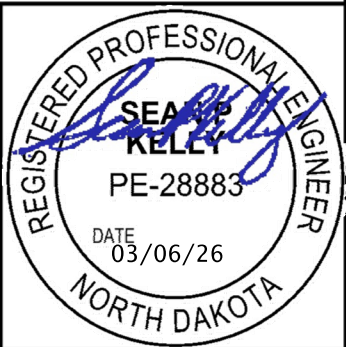
The traffic control devices list has been developed using the following layouts on the Standard Drawings for traffic control:

- Standard Drawing D-704-19, Type E: For road closure to all traffic.
- Standard Drawing D-704-7, 8, 9, 10, 11, 11A, 13, 14, 19, and 50 are applicable.

No signed detour is required. The Contractor will maintain reasonable access for adjacent landowners.

754-P01 OBJECT MARKERS – TYPE III: Use the Perforated Tube Anchor Unit Assembly as shown on Standard Drawing D-754-82 for "OBJECT MARKERS – TYPE III". Include all costs associated with labor, materials, and equipment in the unit price for "OBJECT MARKERS – TYPE III".

754-P02 REMOVE SIGNS: Remove and stockpile all signs designated for removal and all the existing road closure devices. All removed signs and devices will become the property of the Towner County Highway Department. Coordinate with the Towner County Highway Department for delivery or pickup of removed signs. Contact Kevin Rinas, Towner County Road Superintendent, at (701) 968-4366 to get the contact information to set up delivery. Removed signs and supports will not be measured for payment. Include all costs associated with labor, materials, and equipment for removing signs and supports in the unit price for "REMOVAL OF STRUCTURE-SITE 1" and "REMOVAL OF STRUCTURE-SITE 2".



BRJ-0048(050) TOWNER COUNTY, NORTH DAKOTA STRUCTURE NO. 48-105-41.2 & 48-119-37.1		
SITE 1 & 2 PLAN NOTES		
DRWN. BY ACG	CHKD. BY SPK	PROJECT NO. 2302-00625



ENVIRONMENTAL NOTES

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	BRJ-0048(050)	6	2

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

EN-1 SPAWNING RESTRICTION: Do not work within the Mauvais Coulee (Site 2) from April 15 to June 1.

EN-2 AQUATIC NUISANCE SPECIES (ANS): Equipment that was last used outside of North Dakota or within a Class I infested waterbody (identified on the North Dakota Game and Fish Department (NDGFD) website) requires an inspection by NDGFD. Notify the NDGFD at least 10 business days prior to pumps, watercraft, or any equipment entering a public water to allow the NDGFD sufficient time to inspect any and all such equipment for ANS. Contact the NDGFD ANS Coordinator, Benjamin Holen, by email 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). If an inspection is not required, no follow up documentation is required.

EN-3 TEMPORARY WETLAND IMPACT: Temporary impact areas within aquatic resources are incorporated into the plans for this project. Remove temporary fill placed and sedimentation in aquatic resources. Restore these areas to preconstruction contours.

EN-4 WETLAND MITIGATION CREDITS: Prior to beginning any work on the project at all sites, purchase exactly 0.572 acres of wetland mitigation credits from Ducks Unlimited to satisfy the Environmental Commitments shown in Section 75 of the plans and the Section 404 permits issued for this project (see PSP 51(25)). No work can begin on the project until a Credit Sales Letter from Ducks Unlimited is submitted to and accepted by the US Army Corps of Engineers (USACE), North Dakota Regulatory Office. Reference project number BRJ-0048(050) when contacting Ducks Unlimited.

Purchase wetland mitigation credits as follows:

Devils Lake Basin Area:

Site 1: 0.242 Credits @ \$75,000/credit = \$18,150

Site 2: 0.330 Credits @ \$75,000/credit = \$24,750

Total: 0.572 Credits @ \$75,000/credit = \$42,900

The contact information to purchase the wetland mitigation credits from Ducks Unlimited is

Trenton Hieb
Regional Biologist – Ecosystem Services – Mitigation
Ducks Unlimited (Great Plains Region)
2525 River Road
Bismarck, ND 58503
Phone: (701) 355-3573
Email: thieb@ducks.org

EN-5 BORROW SITE: Provide the location of the proposed borrow site to the Engineer at least 30 days prior to the beginning of construction. The Engineer will notify the USACE of the location of the proposed borrow site to obtain clearance. No work may occur at the borrow site until clearance has been granted from the USACE.

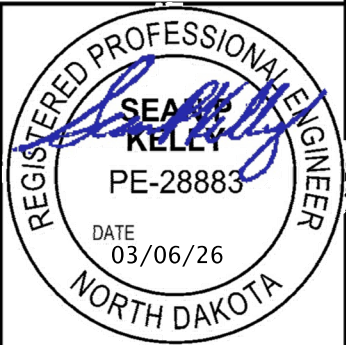
PERMITS REQUIRED:

United States Army Corp of Engineers – Section 404 Permit
Status: To be Acquired by Towner County.

North Dakota Department of Environmental Quality – NDPDES Permit
Status: To be obtained by the Contractor prior to construction. Owner is to be listed as Towner County on the permit.

NOTIFICATIONS REQUIRED TO BE FILED BY CONTRACTOR:

SFN 17987 “Asbestos Notification of Demolition and Renovation” to be submitted to the NDDEQ. An asbestos inspection has not been performed on any of the structures. See 202.04 B of the Standard Specifications for more information.



BRJ-0048(050) TOWNER COUNTY, NORTH DAKOTA STRUCTURE NO. 48-105-41,2 & 48-119-37,1		
SITE 1 & 2 ENVIRONMENTAL NOTES		
DRWN. BY ACG	CHKD. BY SPK	PROJECT NO. 2302-00625



Estimated Quantities						STATE	PROJECT NO.	SECTION NO.	SHEET NO.
						ND	BRJ-0048(050)	8	1
SPEC	CODE	ITEM DESCRIPTION	UNIT	SITE 1 48-105-41.2	SITE 2 48-119-37.1	TOTAL			
103	0100	CONTRACT BOND	L SUM	0.34	0.66	1			
202	0108	REMOVAL OF STRUCTURE-SITE 1	L SUM	1		1			
202	0109	REMOVAL OF STRUCTURE-SITE 2	L SUM		1	1			
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES	LF		23	23			
202	0312	REMOVE EXISTING FENCE	LF		281	281			
203	0102	COMMON EXCAVATION-TYPE B	CY	234	262	496			
203	0109	TOPSOIL	CY	311	589	900			
203	0140	BORROW-EXCAVATION	CY	1077	3228	4305			
210	0051	BOX CULVERT EXCAVATION - SITE 1	EA	1		1			
210	0052	BOX CULVERT EXCAVATION - SITE 2	EA		1	1			
210	0210	FOUNDATION FILL	CY	399	946	1345			
210	0405	FOUNDATION PREPARATION-BOX CULVERT	EA	1	1	2			
216	0100	WATER	M GAL	45	72	117			
251	0200	SEEDING CLASS II	ACRE	0.33	0.64	0.97			
251	2000	TEMPORARY COVER CROP	ACRE	0.33	0.64	0.97			
253	0101	STRAW MULCH	ACRE	0.66	1.28	1.94			
256	0200	RIPRAP GRADE II	CY	105	198	303			
260	0200	SILT FENCE SUPPORTED	LF	302	372	674			
260	0201	REMOVE SILT FENCE SUPPORTED	LF	302	372	674			
261	0112	FIBER ROLLS 12IN	LF	1047	1768	2815			
261	0113	REMOVE FIBER ROLLS 12IN	LF	529	895	1424			
262	0100	FLOTATION SILT CURTAIN	LF	60	150	210			
262	0101	REMOVE FLOTATION SILT CURTAIN	LF	60	150	210			
302	0356	AGGREGATE SURFACE COURSE CL 13	TON	314	594	908			
606	1009	10FT X 9FT PRECAST RCB CULVERT	LF	120		120			
606	3412	DBL 14FT X 12FT PRECAST RCB CULVERT	LF		108	108			
606	5009	10FT X 9FT PRECAST RCB END SECTION	EA	4		4			
606	7412	DBL 14FT X 12FT PRECAST RCB END SECTION	EA		2	2			
702	0100	MOBILIZATION	L SUM	0.34	0.66	1			
704	1000	TRAFFIC CONTROL SIGNS	UNIT	194	124	318			
704	1052	TYPE III BARRICADE	EA	8	8	16			
709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	302	738	1040			
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	158	297	455			
714	5015	PIPE CORR STEEL .064IN 18IN	LF		40	40			
714	5810	END SECT CORR STEEL .064IN 18IN	EA		2	2			
752	0300	FENCE BARBED WIRE 4 STRAND-WOOD POST	LF		290	290			
752	2100	VEHICLE GATE	EA		1	1			
752	3150	CORNER ASSEMBLY BARBED WIRE-WOOD POST	EA		2	2			
754	0803	OBJECT MARKERS - TYPE III	EA	4	4	8			
900	1001	TEMPORARY STREAM DIVERSION - SITE 1	EA	1		1			
900	1002	TEMPORARY STREAM DIVERSION - SITE 2	EA		1	1			
900	2001	WETLAND MITIGATION SITE 1	ACRE	0.242		0.242			
900	2002	WETLAND MITIGATION SITE 2	ACRE		0.33	0.33			

SPEC CODE	BID ITEM	QTY	UNIT
203 0102	COMMON EXCAVATION-TYPE B Common Excavation-Type B	496	CY
203 0109	TOPSOIL Topsoil	900	CY
203 0140	BORROW-EXCAVATION Borrow-Excavation	4,305	CY
216 0100	WATER Water	117	M GAL
302 0356	AGGREGATE SURFACE COURSE CL 13 Aggregate Surface Course CL 13	908	TON

Notes:

¹ Includes existing aggregate.

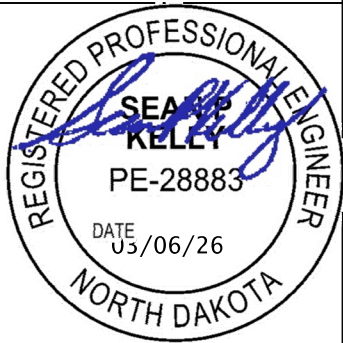
² Embankment quantities include 35% for shrinkage.

³ Topsoil quantities based on 6" stripping and 6" spreading. Excess topsoil shall be uniformly spread on the site within the R/W.

Notes:
¹ 50' Transition sections based on average end areas.

MATERIALS

AGGREGATE SURFACE COURSE @ 1.875 TON/CY



BRJ-0048(050) TOWNER COUNTY, NORTH DAKOTA STRUCTURE NO. 48-105-41.2 & 48-119-37.1			
	SITE 1 & 2 BASIS OF ESTIMATE		
	DRWN. BY ACG	CHKD BY SPK	PROJECT NO. 2302-00625

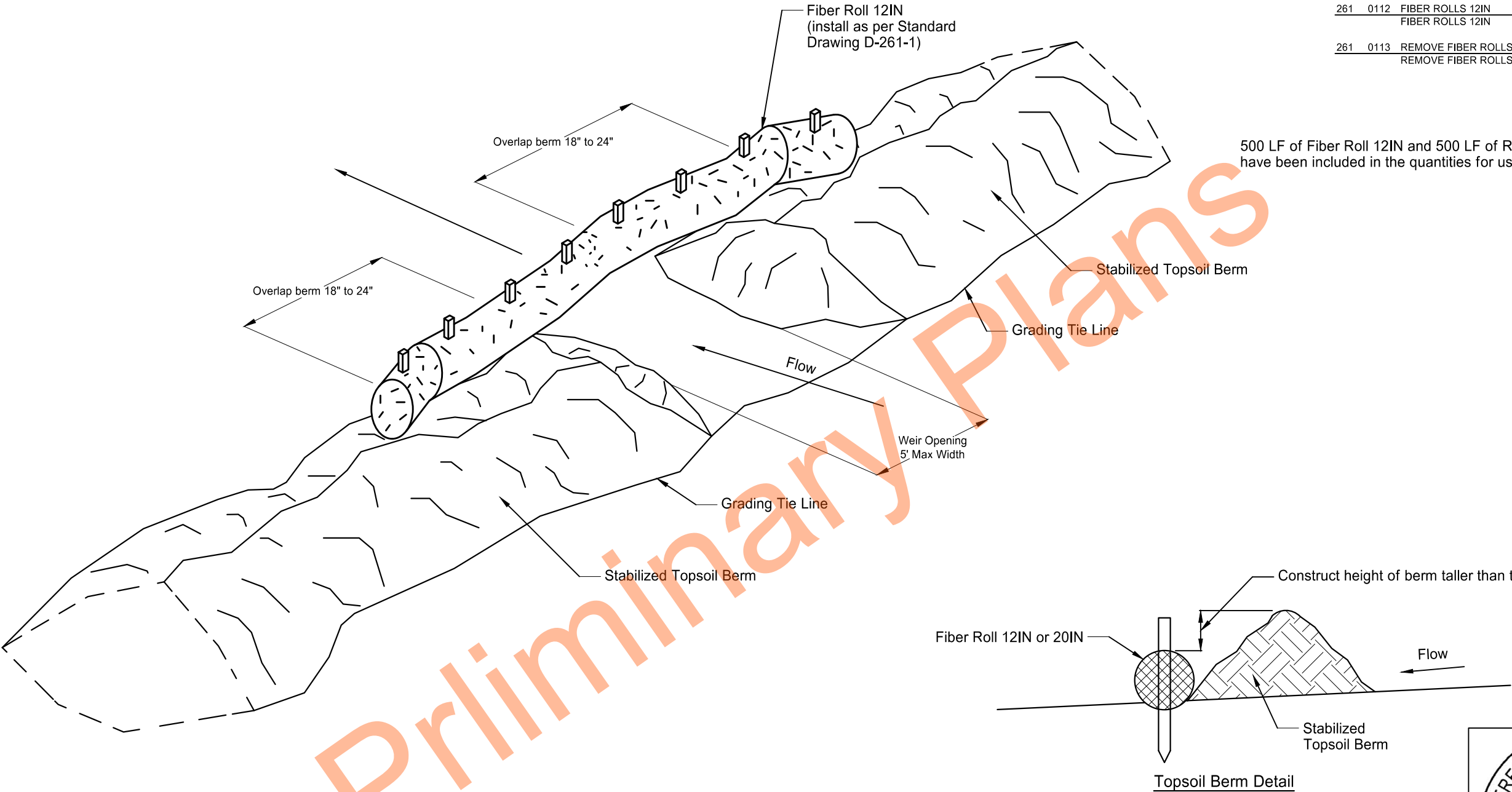
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRJ-0048(050)	20	1

SPEC CODE BID ITEM QTY UNIT

261 0112 FIBER ROLLS 12IN
FIBER ROLLS 12IN 500 LF

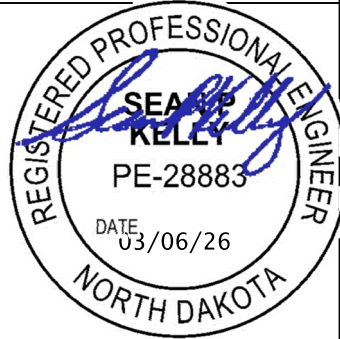
261 0113 REMOVE FIBER ROLLS 12IN
REMOVE FIBER ROLLS 12IN 500 LF

500 LF of Fiber Roll 12IN and 500 LF of Remove Fiber Roll 12IN have been included in the quantities for use at weirs.



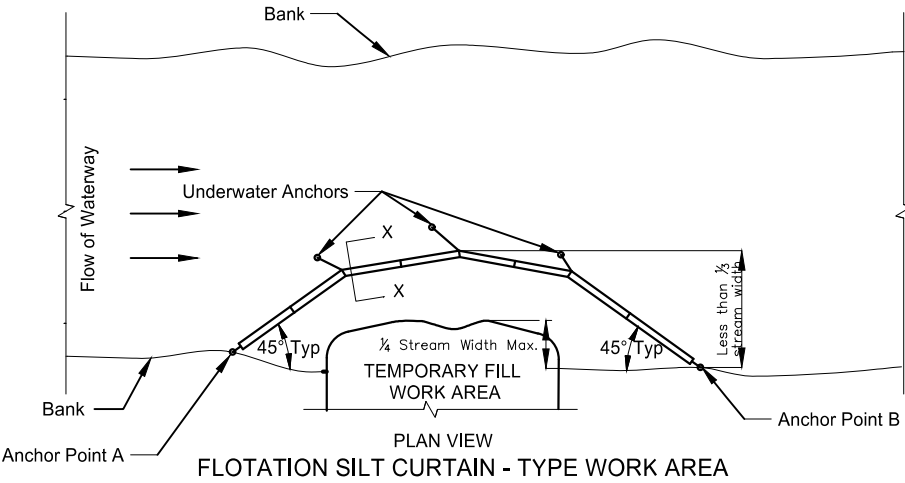
Notes:

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".

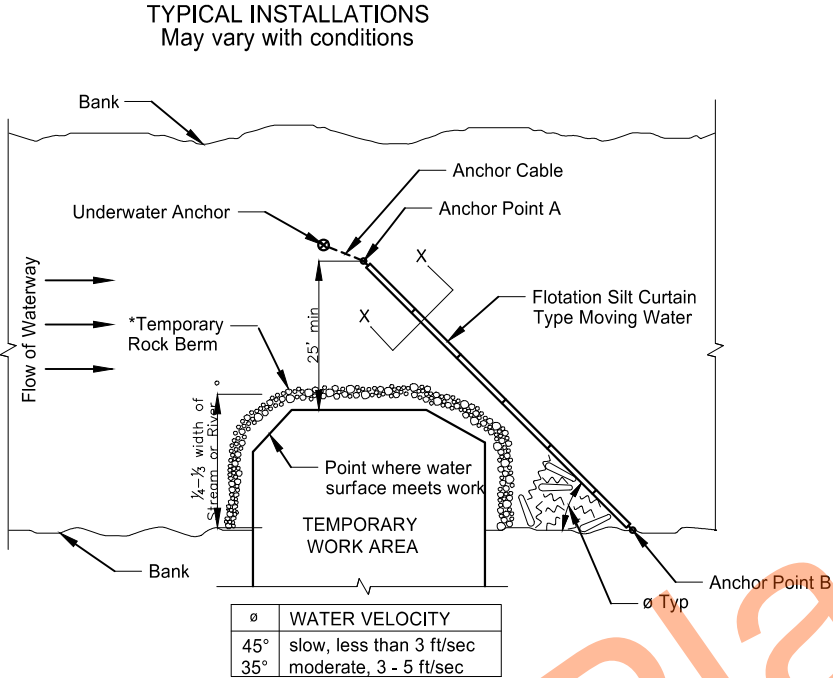


BRJ-0048(050) TOWNER COUNTY, NORTH DAKOTA STRUCTURE NO. 48-105-41.2 & 48-119-37.1		
SITE 1 & 2 GENERAL DETAILS TOPSOIL BERM AND WEIR		
DRWN. BY ACG	CHKD BY SPK	PROJECT NO. 2302-00625

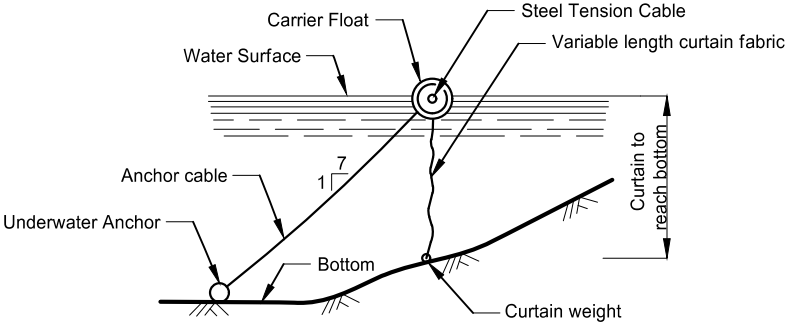
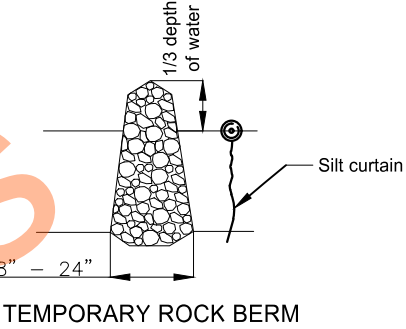
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	BRJ-0048(050)	20	2



DESIGN GUIDELINES:
When temporary work encroaches less than $\frac{1}{4}$ of the width of stream.

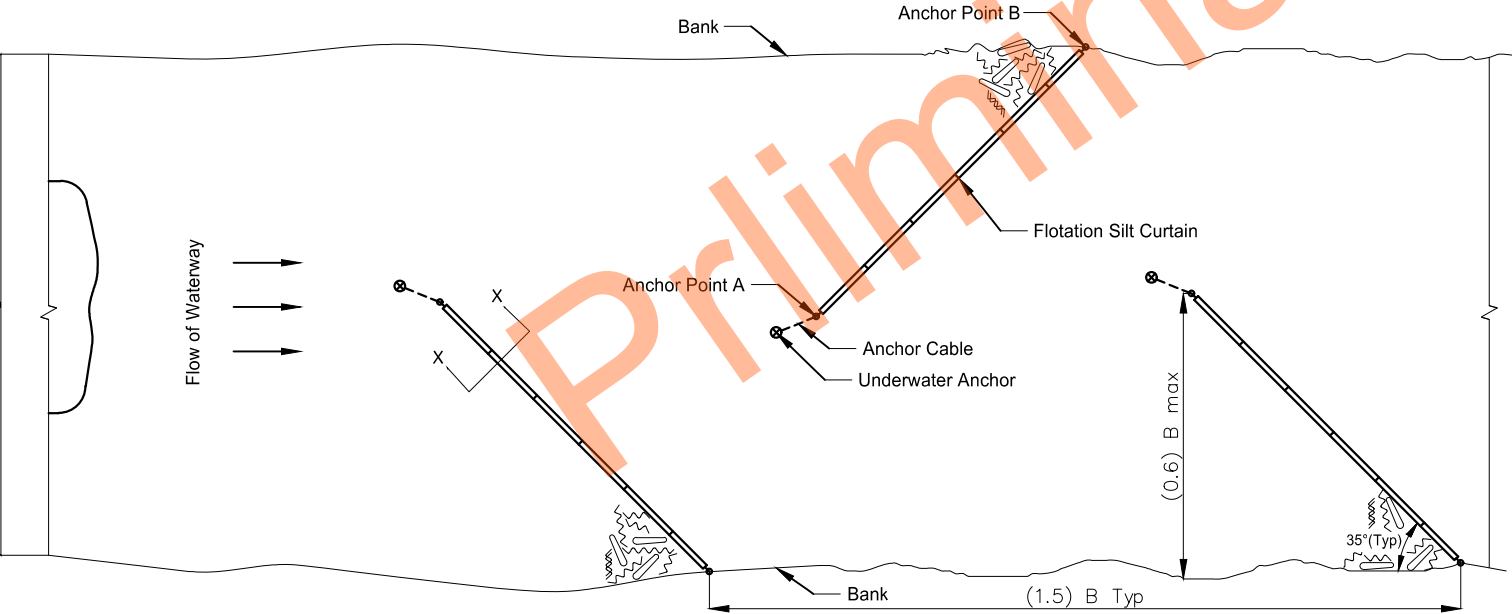


DESIGN GUIDELINES:
When temporary work encroaches more than $\frac{1}{4}$ but less than $\frac{1}{3}$ width of the stream.
For narrow waterways, the curtain may be placed 1 foot above the bottom of waterway to allow water flow.
*In areas where the plans call for riprap at the bridge, provide a temporary rock berm. Include all costs for the temporary rock berm in price bid for the "Riprap".



SECTION X-X
FLOTATION SILT CURTAINS

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



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



BRJ-0048(050)
TOWNER COUNTY, NORTH DAKOTA
STRUCTURE NO. 48-105-41.2 & 48-119-37.1

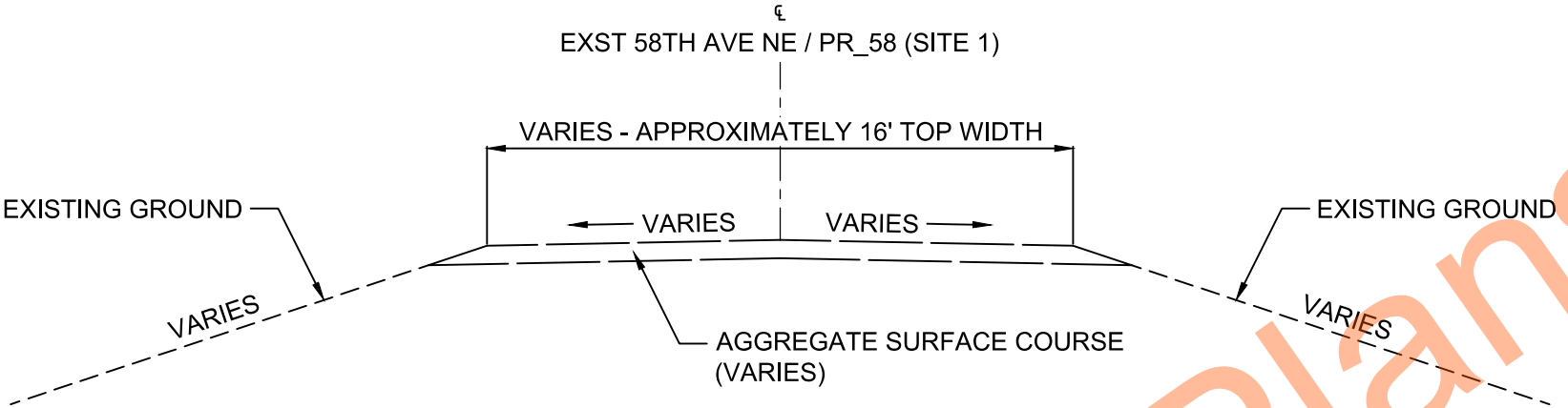
SITE 1 & 2
GENERAL DETAILS
FLOTATION SILT CURTAIN

DRWN. BY
ACG

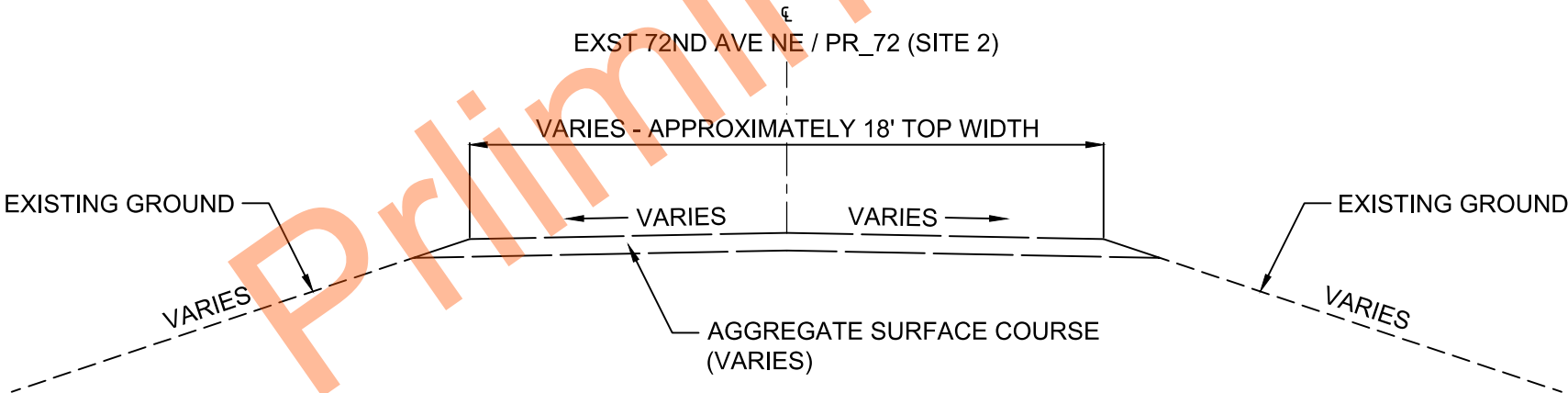
CHKD BY
SPK

PROJECT NO.
2302-00625

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	BRJ-0048(050)	30	1



EXISTING TYPICAL SECTION #1
STA 104+80.00 TO STA 108+30.00 (SITE 1)

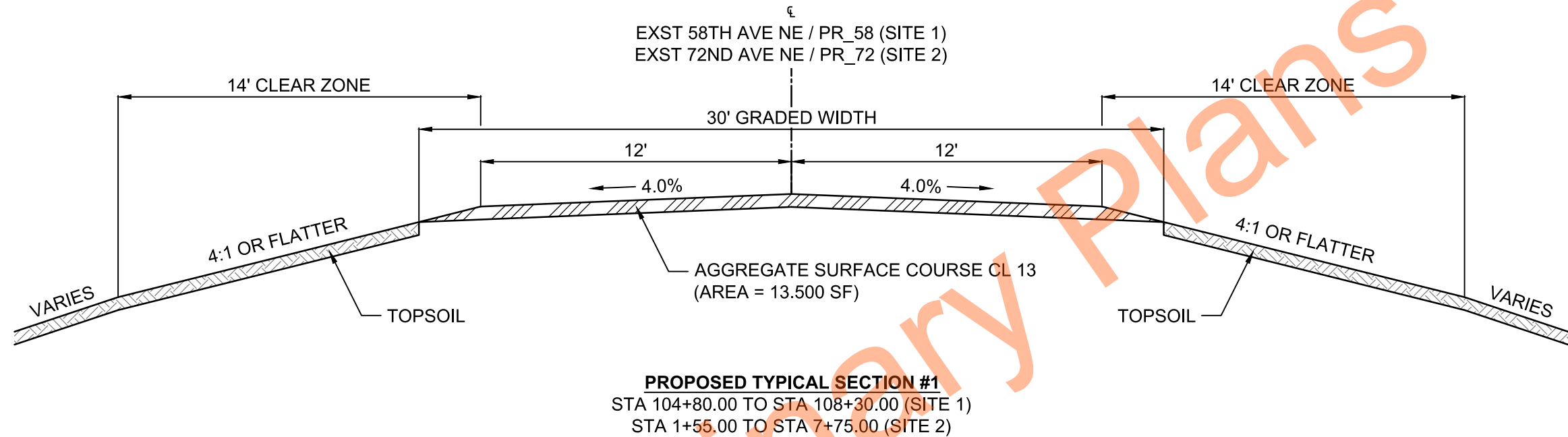


EXISTING TYPICAL SECTION #2
STA 1+55.00 TO STA 7+75.00 (SITE 2)



BRJ-0048(050) TOWNER COUNTY, NORTH DAKOTA STRUCTURE NO. 48-105-41.2 & 48-119-37.1		
		
SITE 1 & 2 TYPICAL SECTIONS		
DRWN. BY ACG	CHKD BY SPK	PROJECT NO. 2302-00625

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	BRJ-0048(050)	30	2



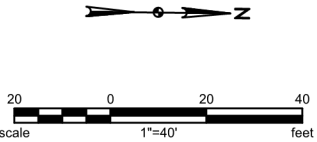
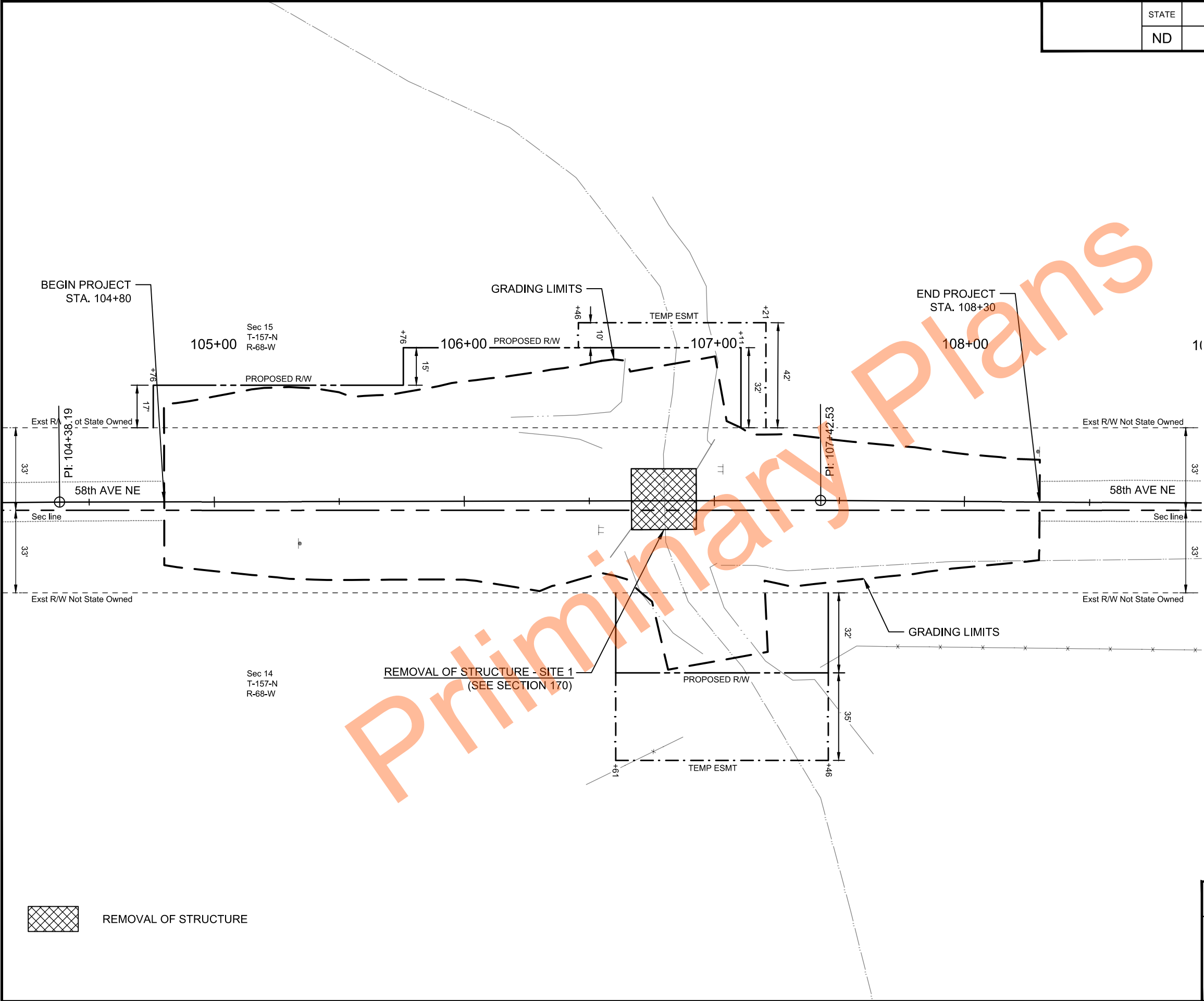
NOTES:

- From Sta 104+80 to Sta 105+30, and Sta 107+80 to Sta 108+30, transition from the existing typical section to the proposed typical section.
- From Sta 1+55 to Sta 2+35, and Sta 7+25 to Sta 7+75, transition from the existing typical section to the proposed typical section.
- Refer to Section 200 for grading outside the clear zone.



BRJ-0048(050) TOWNER COUNTY, NORTH DAKOTA STRUCTURE NO. 48-105-41.2 & 48-119-37.1		
KLJ		
SITE 1 & 2 TYPICAL SECTIONS		
DRWN. BY ACG	CHKD BY SPK	PROJECT NO. 2302-00625

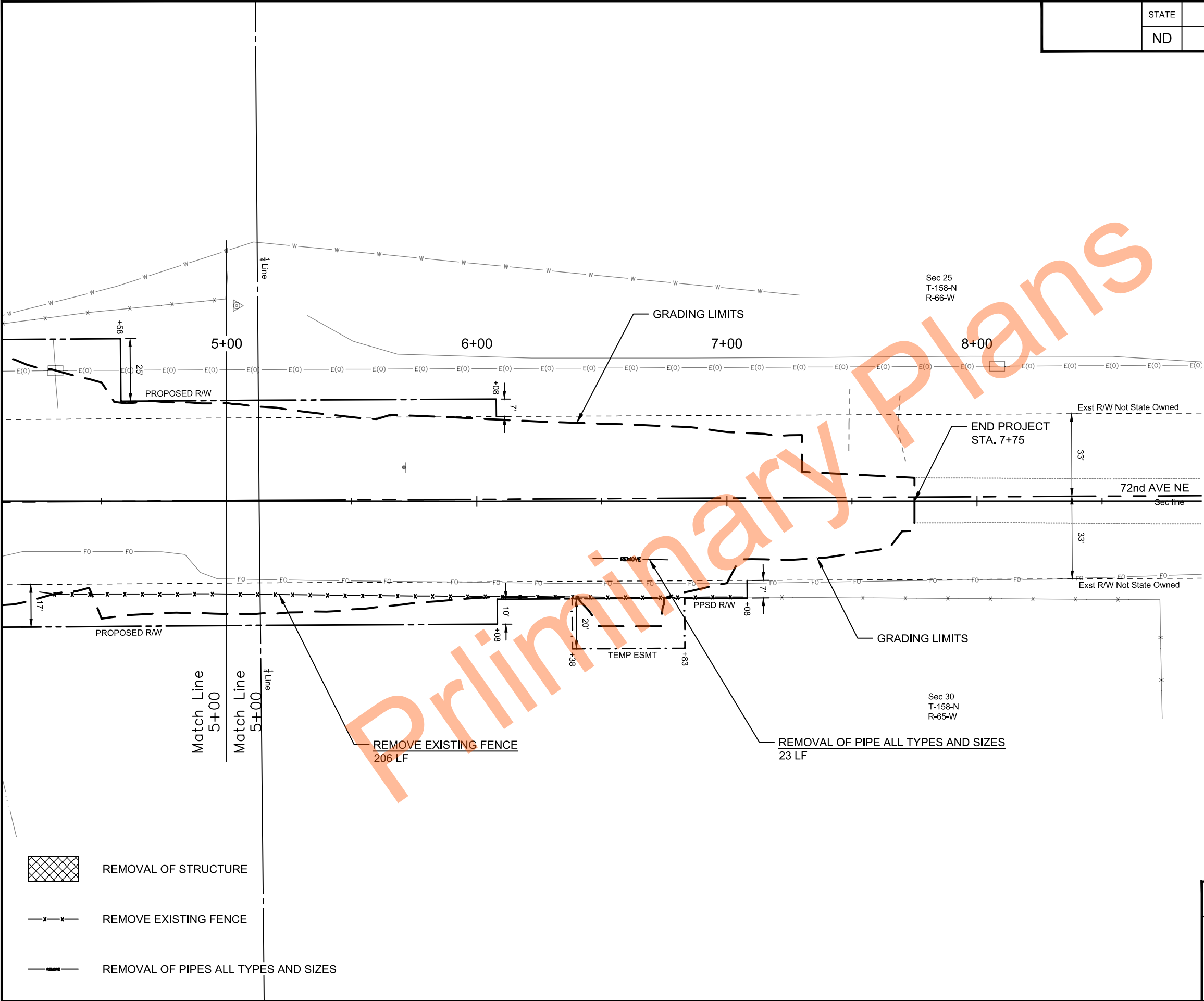
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	BRJ-0048(050)	40	1

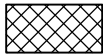
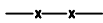


BRJ-0048(050) TOWNER COUNTY, NORTH DAKOTA STRUCTURE NO. 48-105-41.2		
	SITE 1 REMOVALS STA 104+80 TO 108+30	
	DRWN. BY ACG	CHKD BY SPK
PROJECT NO. 2302-00625		

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRJ-0048(050)	40	3

SPEC CODE	BID ITEM	QTY	UNIT
202 0174	REMOVAL OF PIPE ALL TYPES AND SIZES Sta 6+61.47, 23.1' Rt	23	LF
202 0312	REMOVE EXISTING FENCE Sta 5+00.00 to 7+06.43 Rt	206	LF



-  REMOVAL OF STRUCTURE
-  REMOVE EXISTING FENCE
-  REMOVAL OF PIPES ALL TYPES AND SIZES





BRJ-0048(050)
TOWNER COUNTY, NORTH DAKOTA
STRUCTURE NO. 48-119-37.1

SITE 2

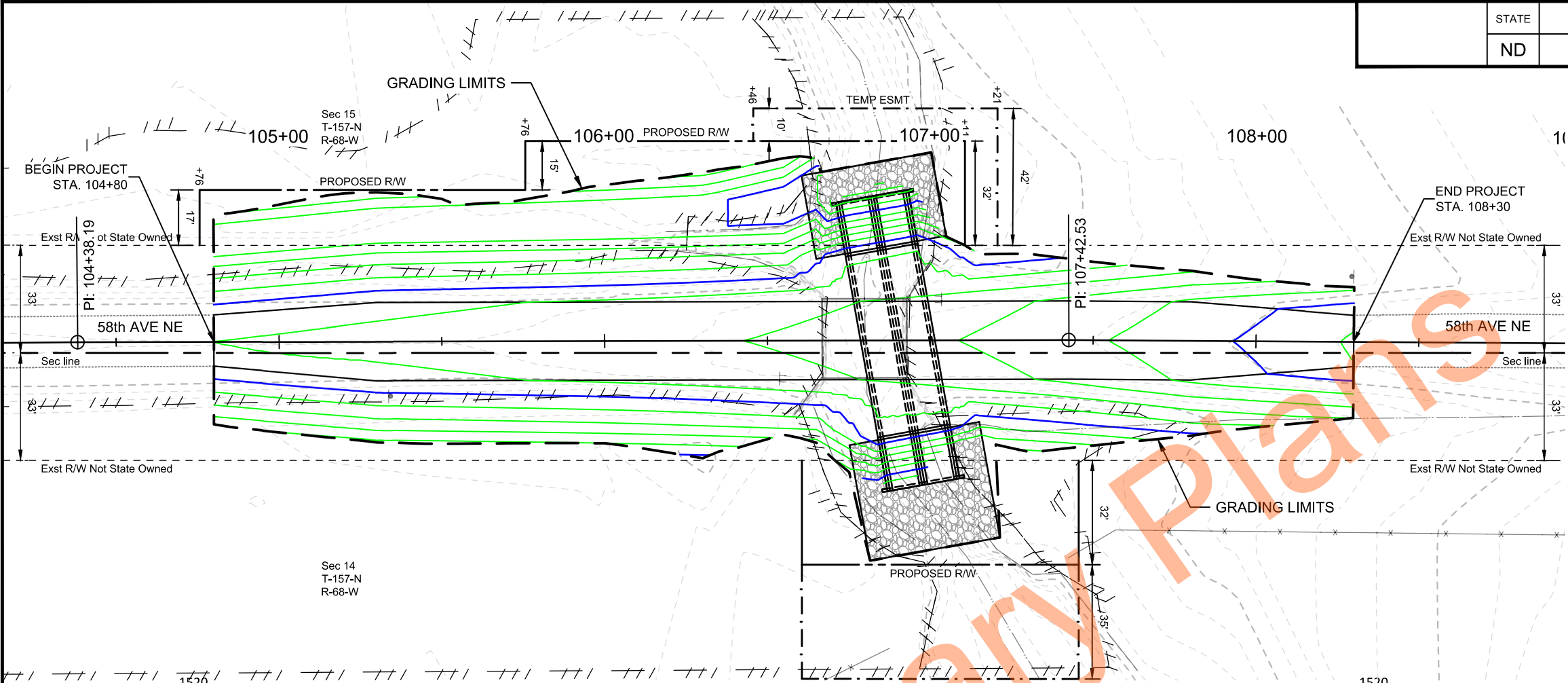
REMOVALS
STA 5+00 TO 7+75

DRWN. BY
ACG

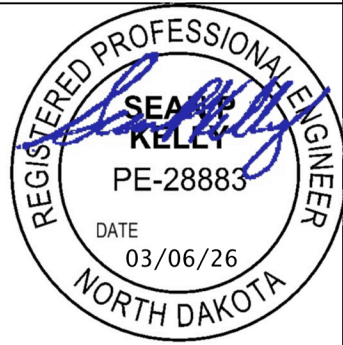
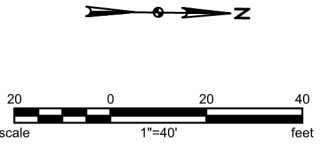
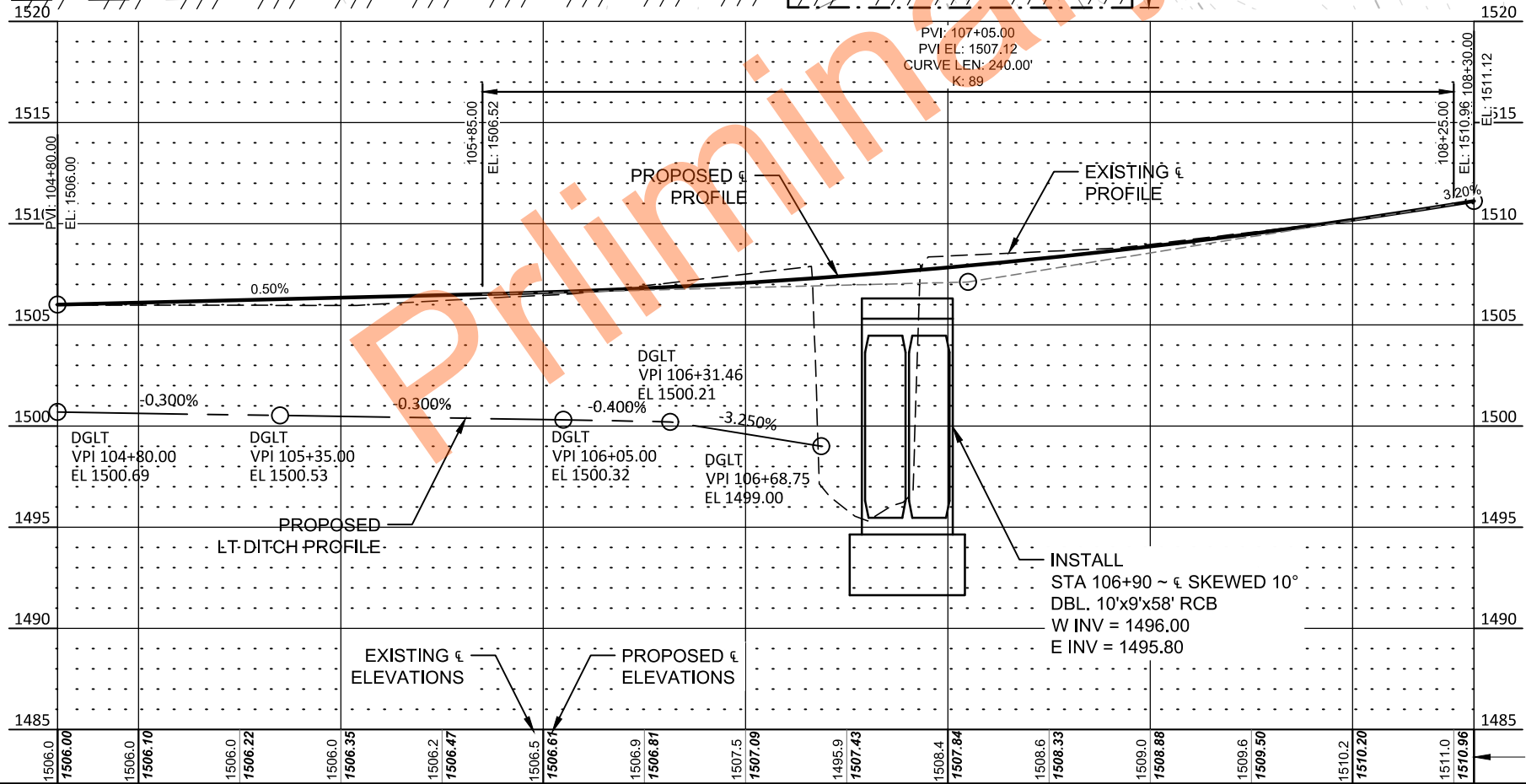
CHKD BY
SPK

PROJECT NO.
2302-00625

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRJ-0048(050)	60	1



COORDINATE SYSTEM: US STATE PLANE 1983 ND NORTH 3301
HORIZ. DATUM: NAD 83 (CORS 96) OPUS
VERT. DATUM: NAVD 88
GEOID MODEL: GEOID 12A
UNITS: INTERNATIONAL FOOT

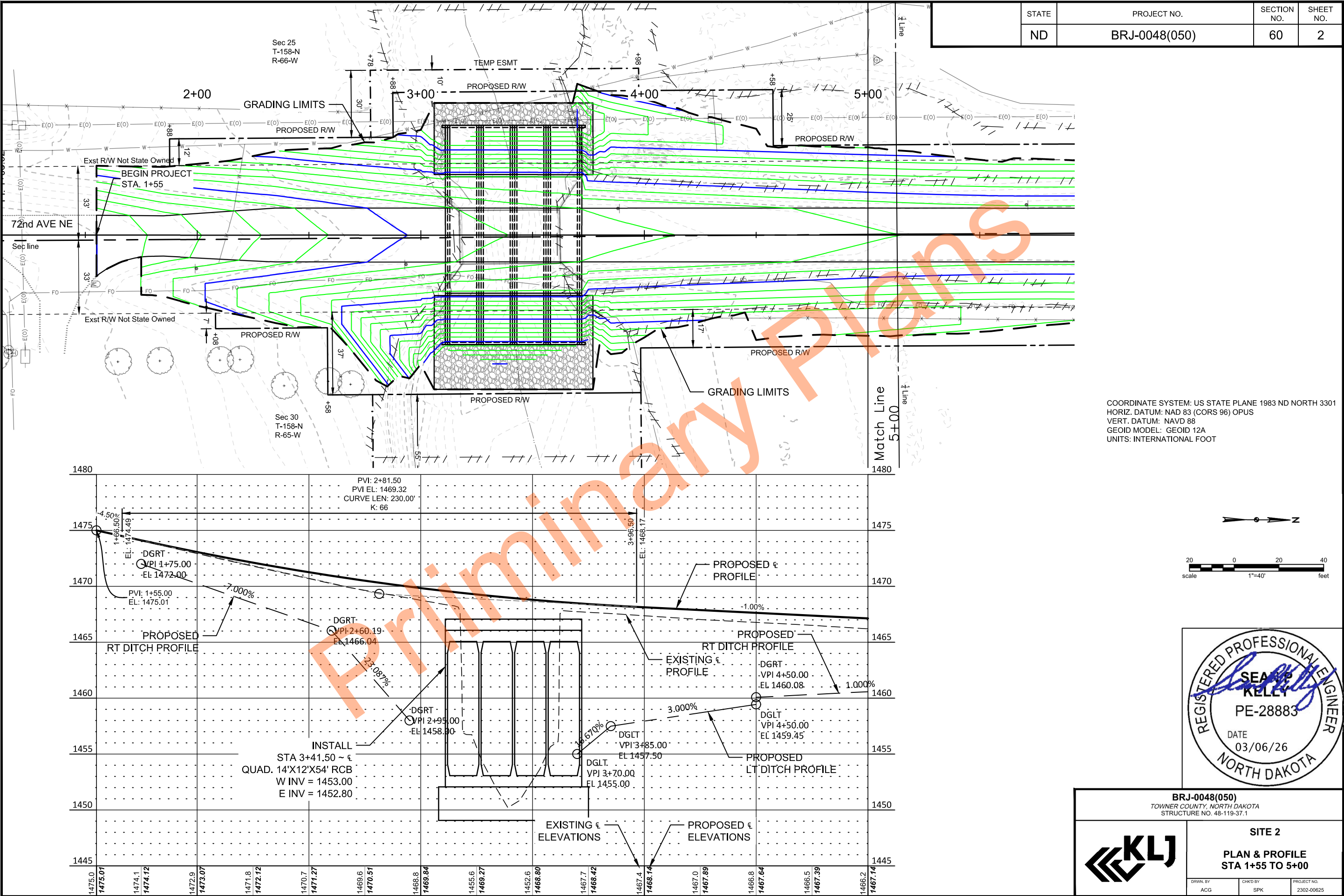


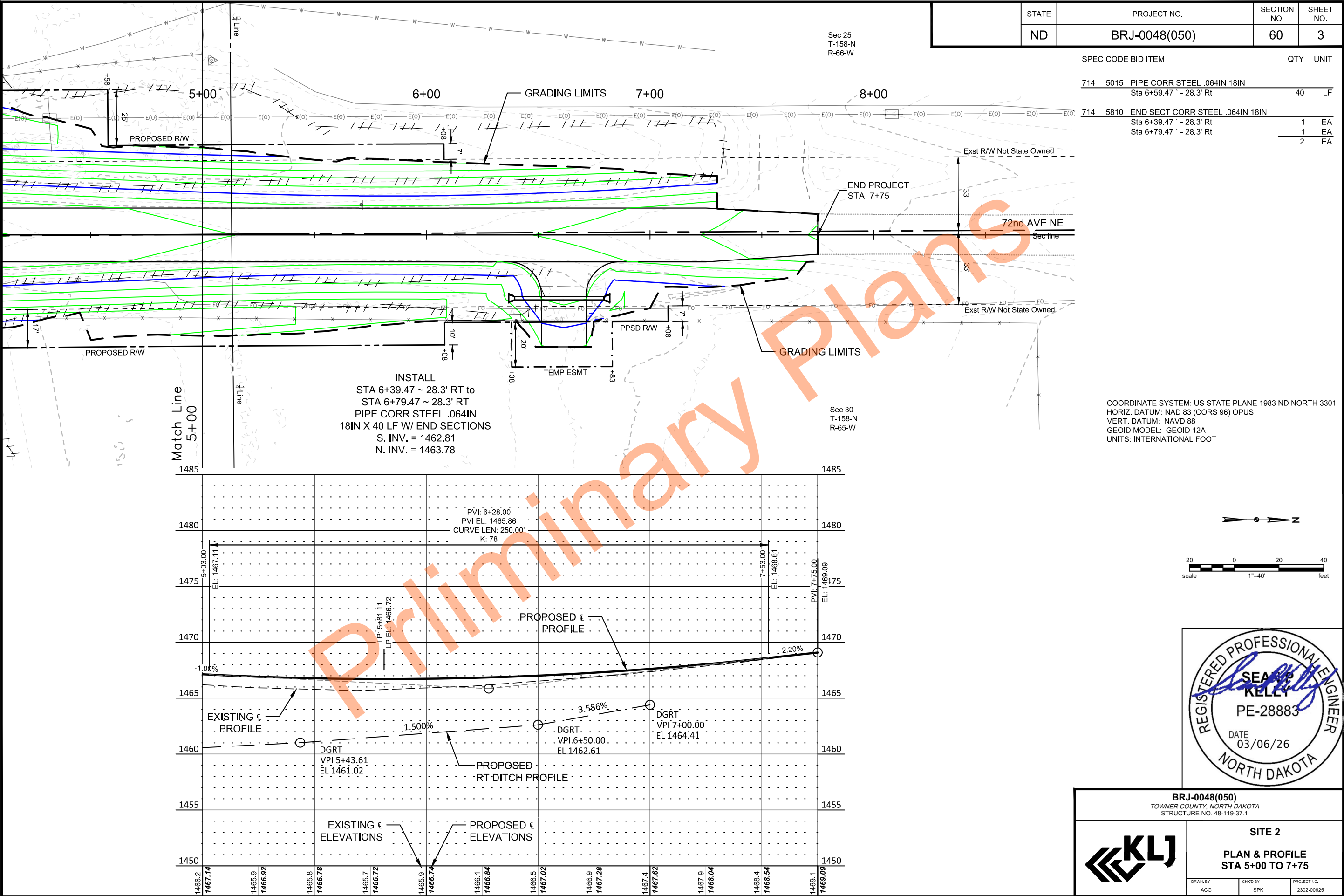
BRJ-0048(050)
TOWNER COUNTY, NORTH DAKOTA
STRUCTURE NO. 48-105-41.2

SITE 1

PLAN & PROFILE
STA 104+80 TO 108+30

DRWN. BY ACG	CHKD BY SPK	PROJECT NO. 2302-00625
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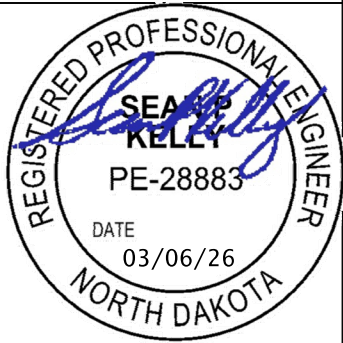
Wetland Impact Table												
Wetland Number	Location	Wetland Type	Wetland Feature	USACE Jurisdictional Wetlands¹	Wetland Impact		Wetland Mitigation					
					Wetland Impacts Acre(s)		Mitigation Proposed		USACE/11990 Bank		11990 Bank	
					Temp.	Perm.	EO 11990	USACE	Location	Acre(s)	Location	Acre(s)
1a	Sec 15, T-157-N, R-68-W	Riverine	Natural	Y	0.092	0.029	Y	N	-	-	ILF 1:1	0.029
1c	Sec 14, T-157-N, R-68-W	Riverine	Natural	Y	0.012	0.017	Y	N	-	-	ILF 1:1	0.017
1d	Sec 14, T-157-N, R-68-W	Riverine	Natural	Y	0.047	0.052	Y	N	-	-	ILF 1:1	0.052
Totals					0.151	0.098				0.000		0.098

Other Waters and Streams Impact Table												
Number	Location	Type	Feature	USACE Jurisdictional'	Impacts to Other Waters				Other Water Mitigation			
					Acre(s)				Mitigation Proposed		USACE Mitigation Bank	
					Temp.	Perm. (total Loss + no Loss)	Perm. (Loss)	Perm. (No Loss)	EO 11990	USACE	Location	Acre(s)
OW1b	Sec 14 & 15, T-157-N, R-68-W	River	Natural	Y	0.039	0.108	0.072	0.036	Y	Y	ILF 2:1	0.144
Totals					0.039	0.108						0.144

¹All aquatic resources were assumed to be jurisdictional.

Impact Summary Table			
Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total Acre(s)	WaterType	Total Acre(s)
Natural/JD (Fill/Drain)	0.098	Temporary Wetland JD	0.151
Natural/Non-JD (Fill/Drain)	0.000	Non-JD Wetland Temporary	0.000
Artificial/JD (Fill/Drain)	0.000		
Artificial /Non-JD (Fill/Drain)	0.000	Permanent OW	0.108
Total	0.098	Temporary OW	0.039

Mitigation Summary Table						
	Location	Ditch Shift Acre(s)	Onsite Acre(s)	11990 Bank Acre(s)	USACE/11990 Bank Acre(s)	USFWS Bank Acre(s)
USACE Only	Mitigation Bank	-	-		0.144	
EO 11990 Only	Mitigation Bank	-	-	0.098		
USACE/11990	Mitigation Bank	-	-		-	
USFWS	-	-				-
	Total	-	-	0.098	0.144	-



BRJ-0048(050)
TOWNER COUNTY, NORTH DAKOTA
STRUCTURE NO. 48-105-41.2



SITE 1
WETLAND IMPACTS
WETLAND IMPACT TABLES

DRWN. BY
ACG

CHKD BY
SPK

PROJECT NO.
2302-00625

Wetland Impact Table												
Wetland Number	Location	Wetland Type	Wetland Feature	USACE Jurisdictional Wetlands¹	Wetland Impact		Wetland Mitigation					
					Wetland Impacts Acre(s)		Mitigation Proposed		USACE/11990 Bank		11990 Bank	
					Temp.	Perm.	EO 11990	USACE	Location	Acre(s)	Location	Acre(s)
2a	Sec 25, T-158-N, R-66-W	Basin	Natural	Y	0.073	0.094	Y	Y	ILF 1:1	0.094	-	-
2c	Sec 30, T-158-N, R-65-W	Ditch	Created	Y	0.005	0.076	N	Y	ILF 1:1	0.076	-	-
Totals					0.078	0.170				0.170		0.000

Other Waters and Streams Impact Table												
Number	Location	Type	Feature	USACE Jurisdictional'	Impacts to Other Waters				Other Water Mitigation			
					Acre(s)				Mitigation Proposed		USACE Mitigation Bank	
					Temp.	Perm. (total Loss + no Loss)	Perm. (Loss)	Perm. (No Loss)	EO 11990	USACE	Location	Acre(s)
OW2b	Sec 25, T-158-N, R-66-W	River	Natural	Y	0.029	0.078	0.010	0.068	Y	Y	ILF 2:1	0.020
	Sec 30, T-158-N, R-65-W	River	Natural	Y	0.048	0.107	0.070	0.037	Y	Y	ILF 2:1	0.140
Totals					0.077	0.185						0.160

¹All aquatic resources were assumed to be jurisdictional.

Impact Summary Table			
Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total Acre(s)	WaterType	Total Acre(s)
Natural/JD (Fill/Drain)	0.094	Temporary Wetland JD	0.078
Natural/Non-JD (Fill/Drain)	0.000	Non-JD Wetland Temporary	0.000
Artificial/JD (Fill/Drain)	0.076		
Artificial /Non-JD (Fill/Drain)	0.000	Permanent OW	0.185
Total	0.170	Temporary OW	0.077

Mitigation Summary Table						
	Location	Ditch Shift Acre(s)	Onsite Acre(s)	11990 Bank Acre(s)	USACE/11990 Bank Acre(s)	USFWS Bank Acre(s)
USACE Only	Mitigation Bank	-	-		0.160	
EO 11990 Only	Mitigation Bank	-	-	-		
USACE/11990	Mitigation Bank	-	-		0.170	
USFWS	-	-				-
	Total	-	-	-	0.330	-



BRJ-0048(050)
TOWNER COUNTY, NORTH DAKOTA
STRUCTURE NO. 48-119-37.1



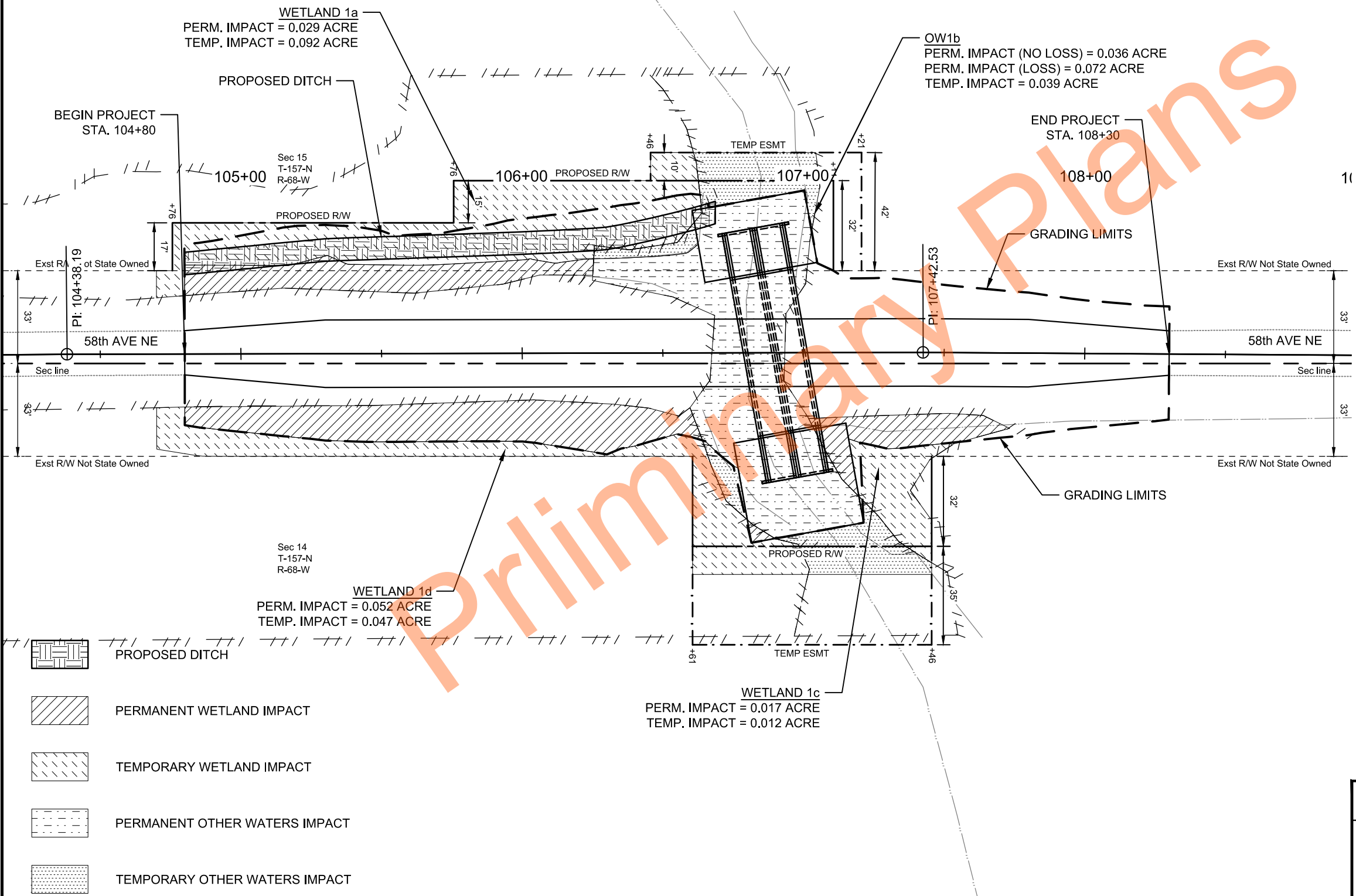
SITE 2
WETLAND IMPACTS
WETLAND IMPACT TABLES

DRWN. BY
ACG

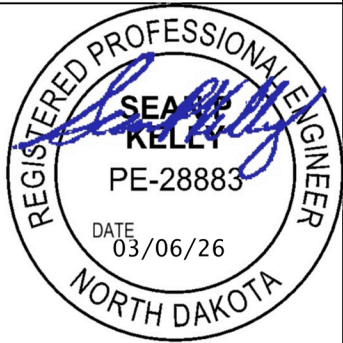
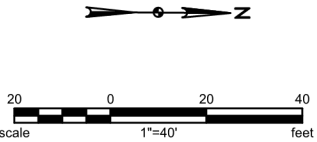
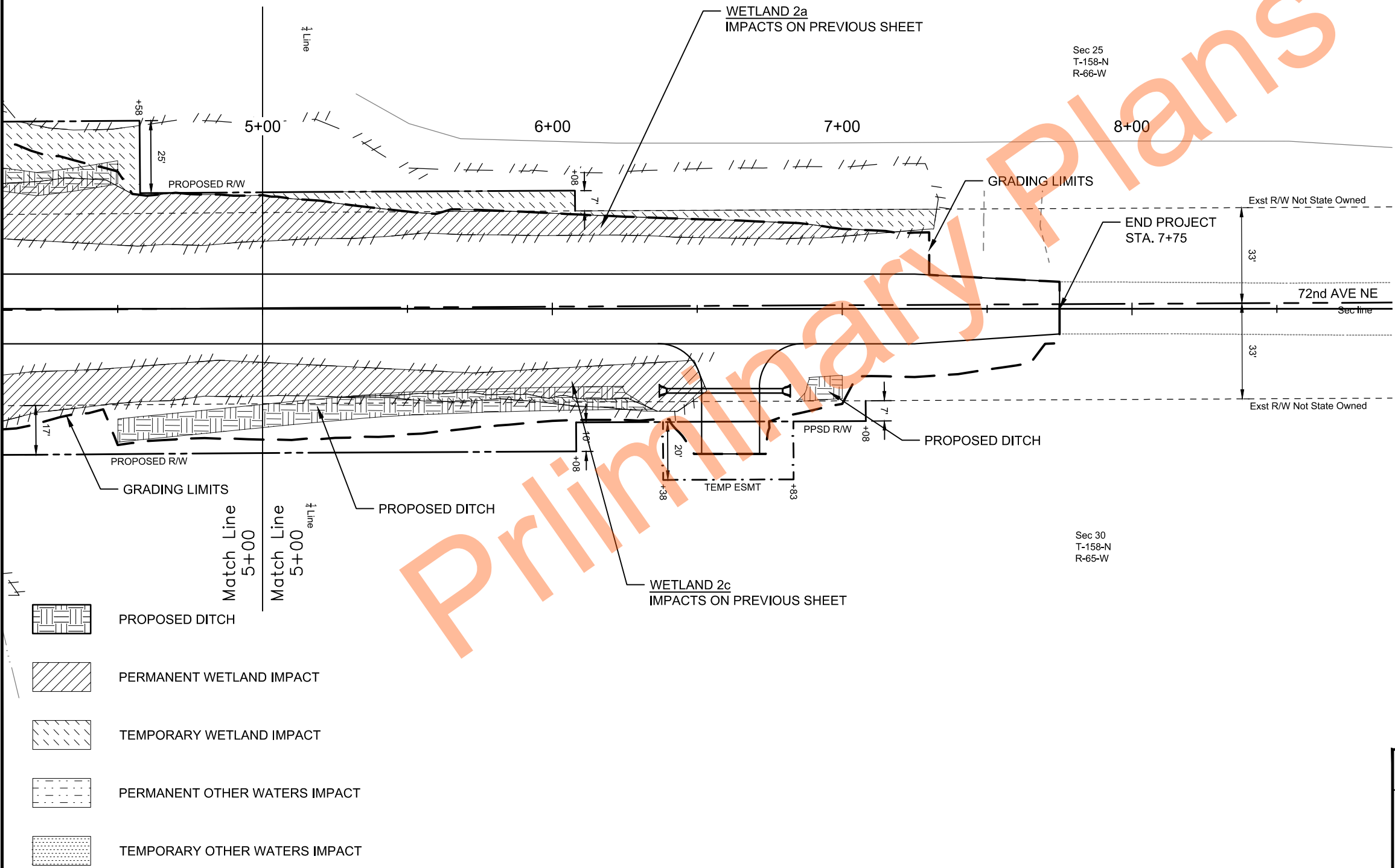
CHKD BY
SPK

PROJECT NO.
2302-00625

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	BRJ-0048(050)	75	3



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	BRJ-0048(050)	75	5



BRJ-0048(050) TOWNER COUNTY, NORTH DAKOTA STRUCTURE NO. 48-119-37.1		
SITE 2 WETLAND IMPACTS STA 5+00 TO 7+75		
DRWN. BY ACG	CHKD BY SPK	PROJECT NO. 2302-00625

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRJ-0048(050)	76	1

SPEC CODE BID ITEM QTY UNIT

251	2000	TEMPORARY COVER CROP		
		Sta 104+80.00 to 108+30.00 Lt	0.19	ACRE
		Sta 104+80.00 to 108+30.00 Rt	0.14	ACRE
			0.33	ACRE

253	0101	STRAW MULCH		
		Sta 104+80.00 to 108+30.00 Lt	0.19	ACRE
		Sta 104+80.00 to 108+30.00 Rt	0.14	ACRE
			0.33	ACRE

260	0300	SILT FENCE		
		Sta 104+80.00 to 108+30.00 Lt	42	LF
		Sta 104+80.00 to 108+30.00 Rt	260	LF
			302	LF

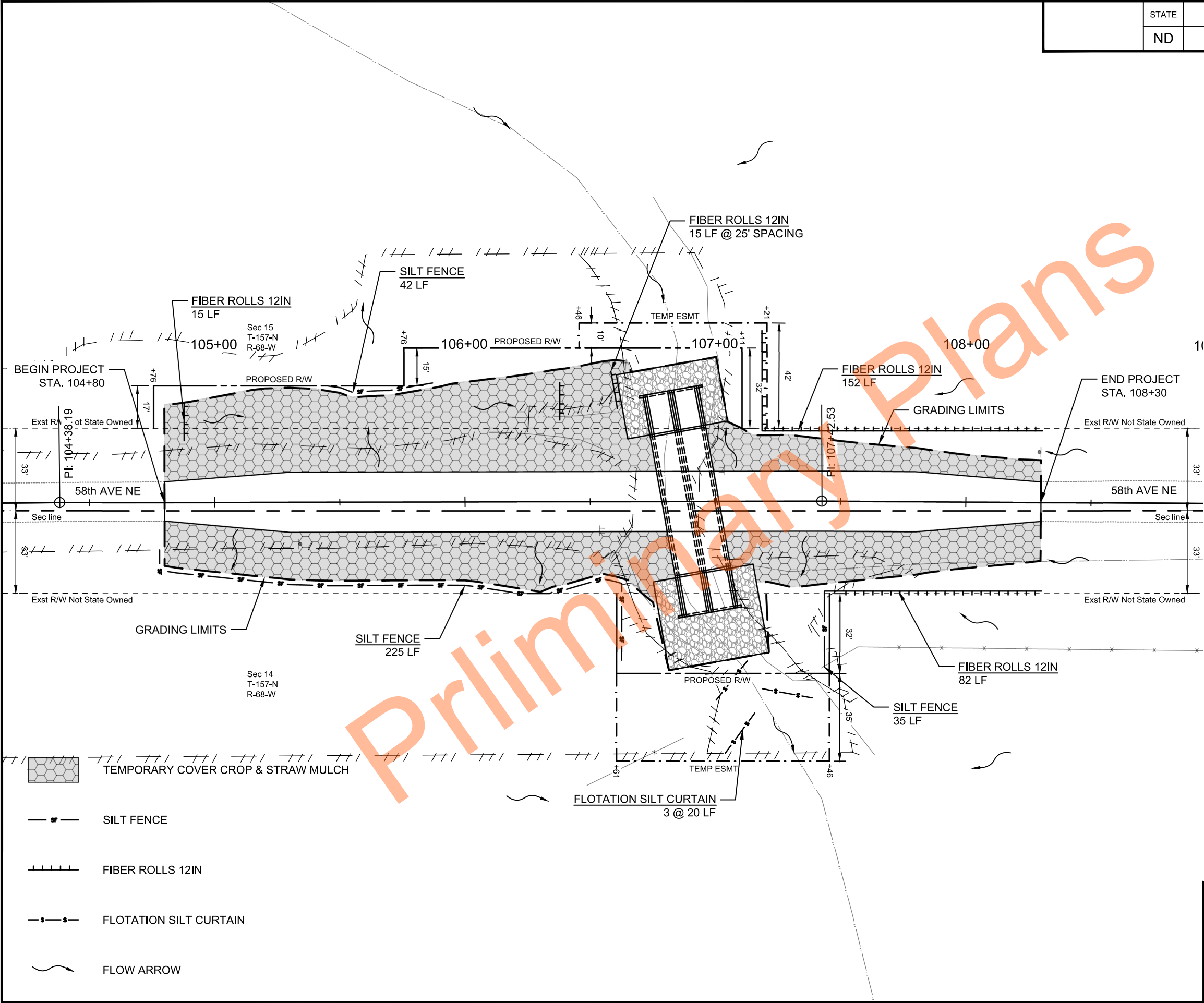
260	0301	REMOVE SILT FENCE		
		Sta 104+80.00 to 106+75.00 Rt	302	LF

261	0112	FIBER ROLLS 12IN		
		Sta 104+80.00 to 108+30.00 Lt	197	LF
		Sta 104+80.00 to 108+30.00 Rt	82	LF
			279	LF

261	0113	REMOVE FIBER ROLLS 12IN		
		Sta 104+80.00 to 108+30.00	279	LF

262	0100	FLOTATION SILT CURTAIN		
		Sta 107+00.00 to 107+26.00 Rt	60	LF

262	0101	REMOVE FLOTATION SILT CURTAIN		
		Sta 107+00.00 to 107+26.00 Rt	60	LF



TEMPORARY COVER CROP & STRAW MULCH



SILT FENCE



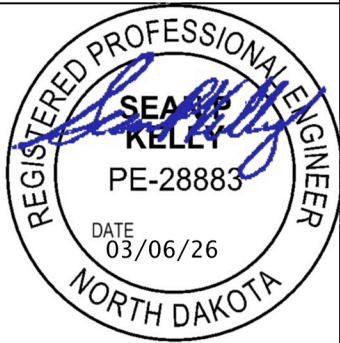
FIBER ROLLS 12IN



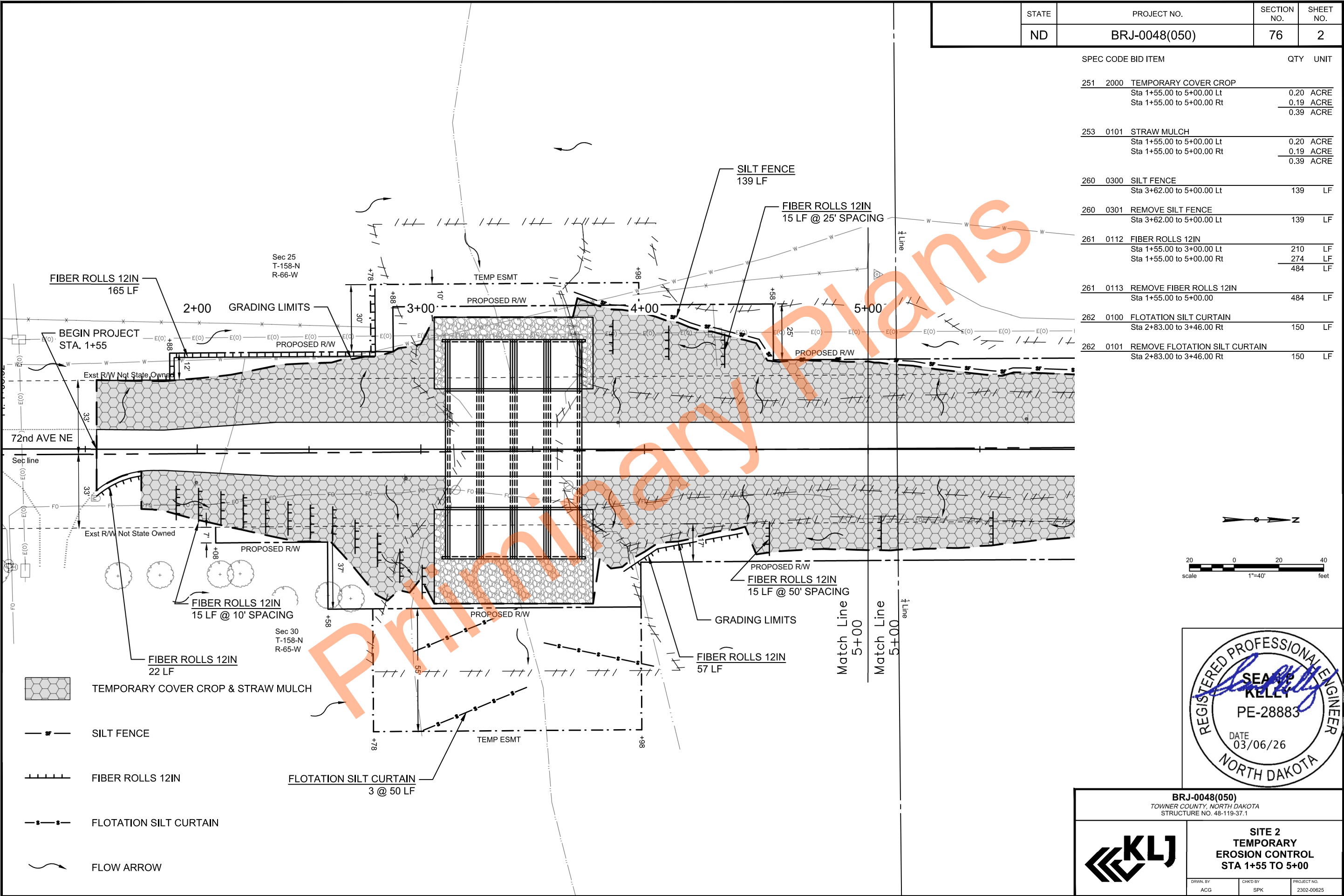
FLOTATION SILT CURTAIN



FLOW ARROW



BRJ-0048(050) TOWNER COUNTY, NORTH DAKOTA STRUCTURE NO. 48-105-41.2		
	SITE 1 TEMPORARY EROSION CONTROL STA 104+80 TO 108+30	
	DRWN. BY ACG	CHKD BY SPK
	PROJECT NO. 2302-00625	



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRJ-0048(050)	76	2

SPEC CODE	BID ITEM	QTY	UNIT
251 2000	TEMPORARY COVER CROP		
	Sta 1+55.00 to 5+00.00 Lt	0.20	ACRE
	Sta 1+55.00 to 5+00.00 Rt	0.19	ACRE
		0.39	ACRE
253 0101	STRAW MULCH		
	Sta 1+55.00 to 5+00.00 Lt	0.20	ACRE
	Sta 1+55.00 to 5+00.00 Rt	0.19	ACRE
		0.39	ACRE
260 0300	SILT FENCE	139	LF
260 0301	REMOVE SILT FENCE	139	LF
261 0112	FIBER ROLLS 12IN	210	LF
	Sta 1+55.00 to 3+00.00 Lt	274	LF
	Sta 1+55.00 to 5+00.00 Rt	484	LF
261 0113	REMOVE FIBER ROLLS 12IN	484	LF
262 0100	FLOTATION SILT CURTAIN	150	LF
262 0101	REMOVE FLOTATION SILT CURTAIN	150	LF

BRJ-0048(050)

TOWNER COUNTY, NORTH DAKOTA

STRUCTURE NO. 48-119-37.1

KLJ

DRWN. BY: ACG

CHKD BY: SPK

PROJECT NO.: 2302-00625

SITE 2

TEMPORARY

EROSION CONTROL

STA 1+55 TO 5+00

DATE: 03/06/26

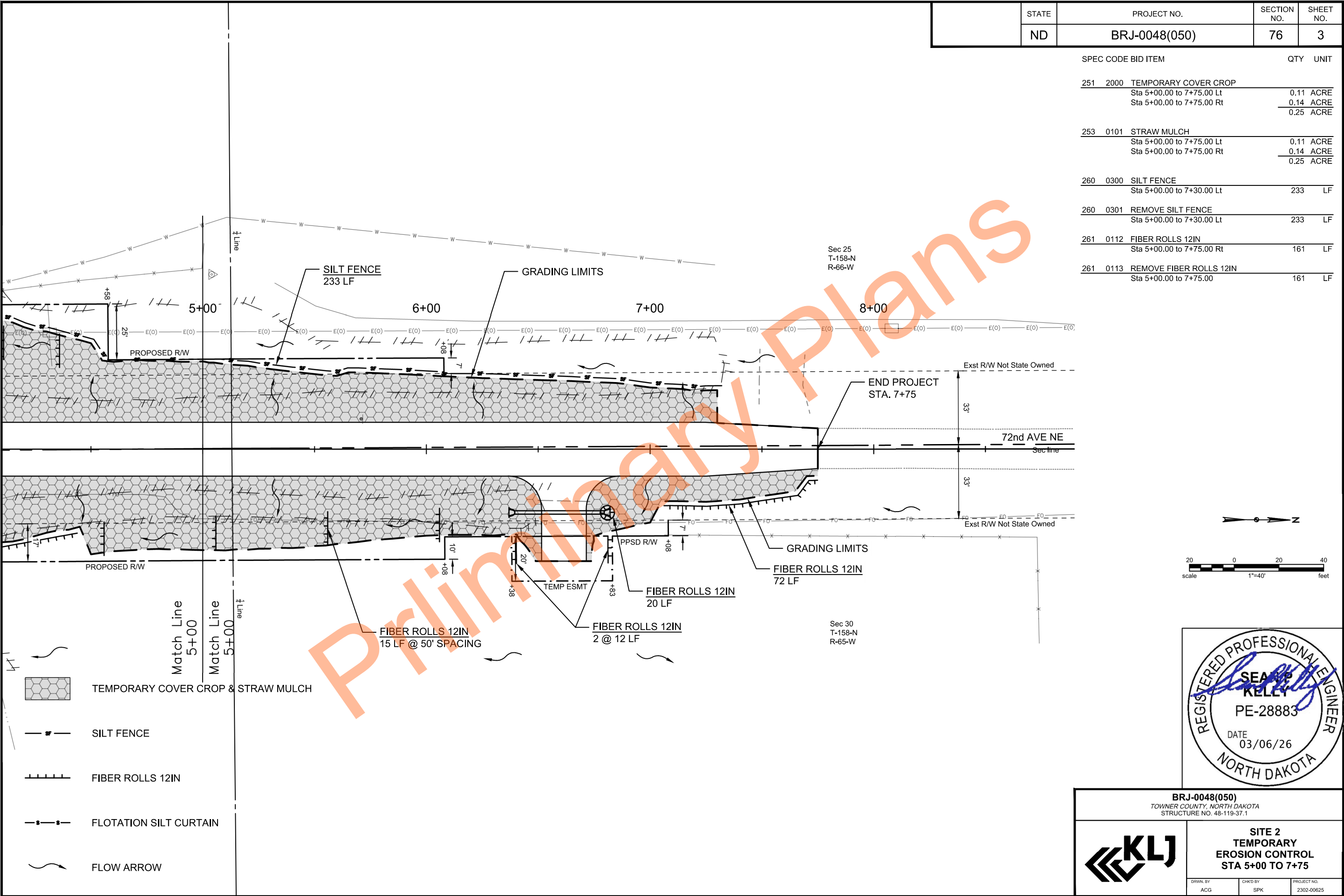
REGISTERED PROFESSIONAL ENGINEER

SEALED

KELLY

PE-28883

NORTH DAKOTA



20

0

20

40

scale

1"=40'

feet

REGISTERED PROFESSIONAL ENGINEER

SEAN P. KELLY

PE-28883

DATE

03/06/26

NORTH DAKOTA

BRJ-0048(050)

TOWNER COUNTY, NORTH DAKOTA

STRUCTURE NO. 48-119-37.1

KLJ

SITE 2

TEMPORARY

EROSION CONTROL

STA 5+00 TO 7+75

DRWN. BY

ACG

CHKD BY

SPK

PROJECT NO.

2302-00625

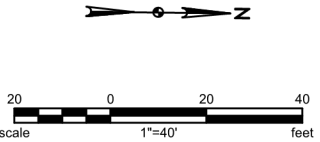
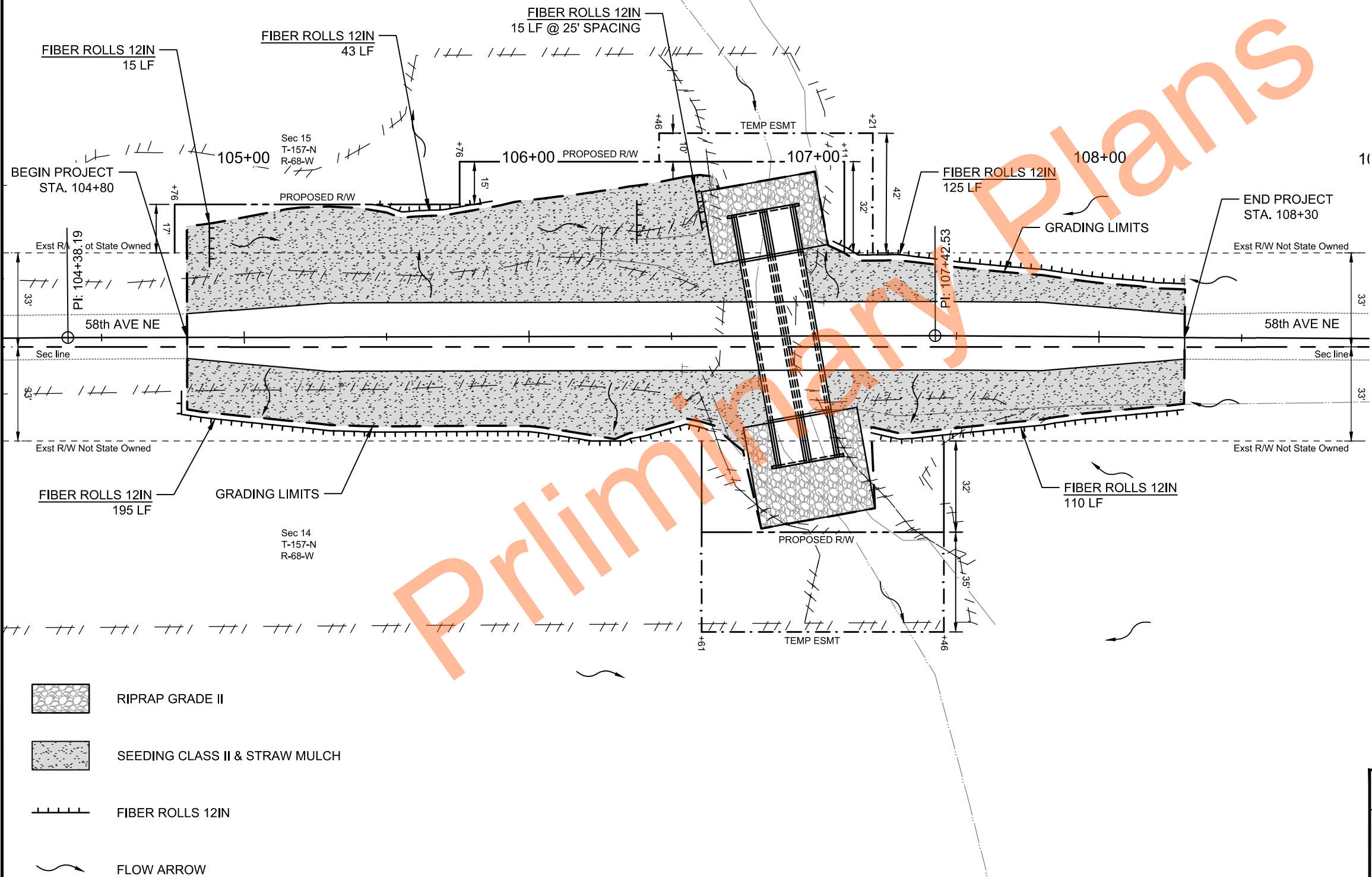
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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRJ-0048(050)	77	1

SPEC CODE BID ITEM QTY UNIT

251	0200	SEEDING CLASS II		
		Sta 104+80.00 to 108+30.00 Lt	0.19	ACRE
		Sta 104+80.00 to 108+30.00 Rt	0.14	ACRE
			0.33	ACRE
253	0101	STRAW MULCH		
		Sta 104+80.00 to 108+30.00 Lt	0.19	ACRE
		Sta 104+80.00 to 108+30.00 Rt	0.14	ACRE
			0.33	ACRE
261	0112	FIBER ROLLS 12IN		
		Sta 104+80.00 to 108+30.00 Lt	213	LF
		Sta 104+80.00 to 108+30.00 Rt	305	LF
			518	LF



BRJ-0048(050)
TOWNER COUNTY, NORTH DAKOTA
STRUCTURE NO. 48-105-41.2

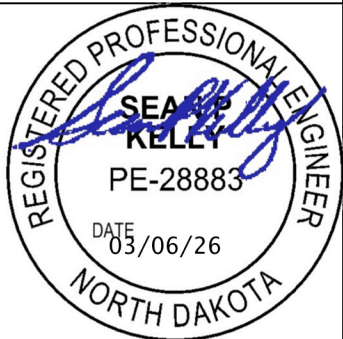
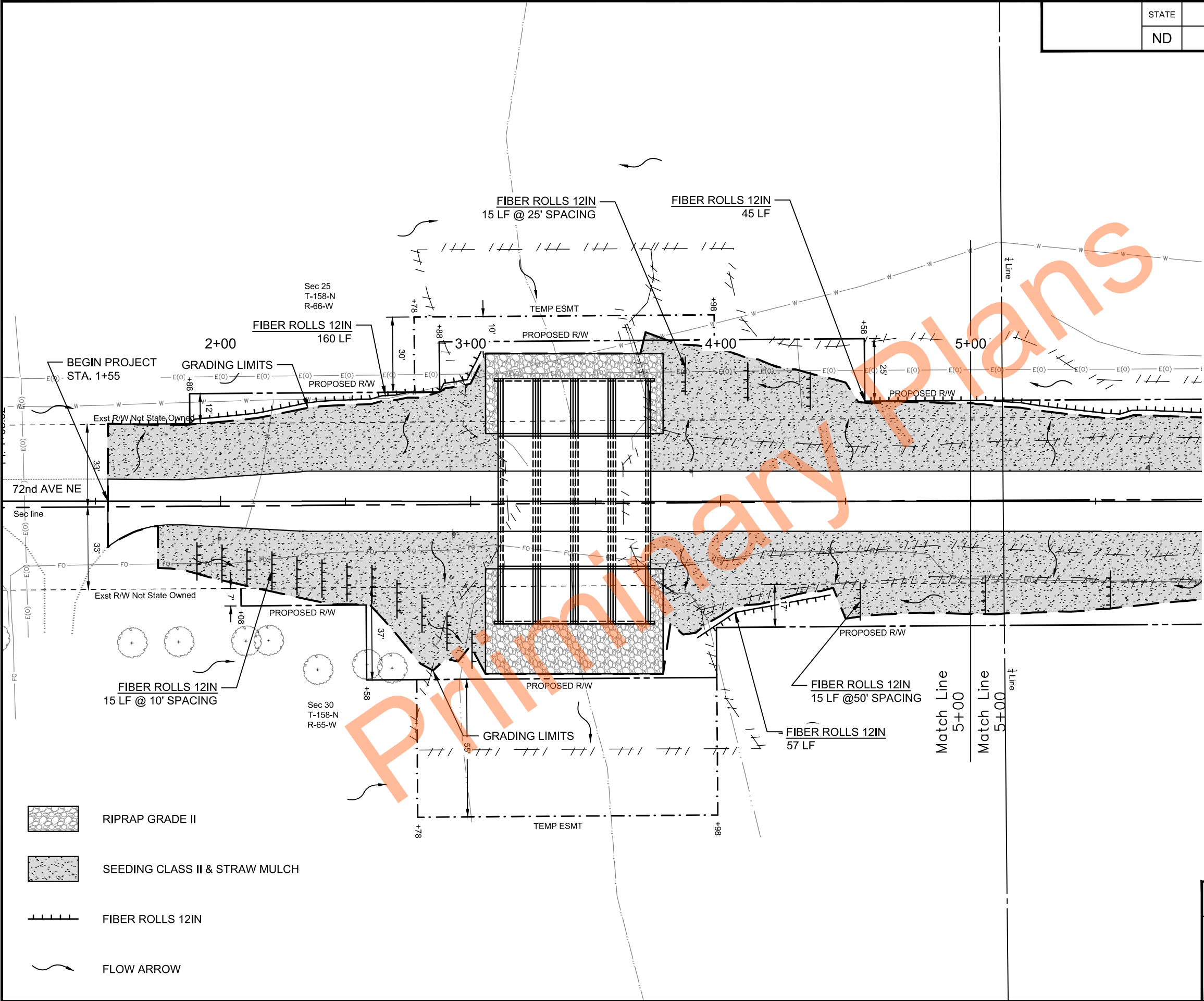
**SITE 1
PERMANENT
EROSION CONTROL
STA 104+80 TO 108+30**

DRWN. BY ACG	CHKD BY SPK	PROJECT NO. 2302-00625
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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRJ-0048(050)	77	2

SPEC CODE BID ITEM QTY UNIT

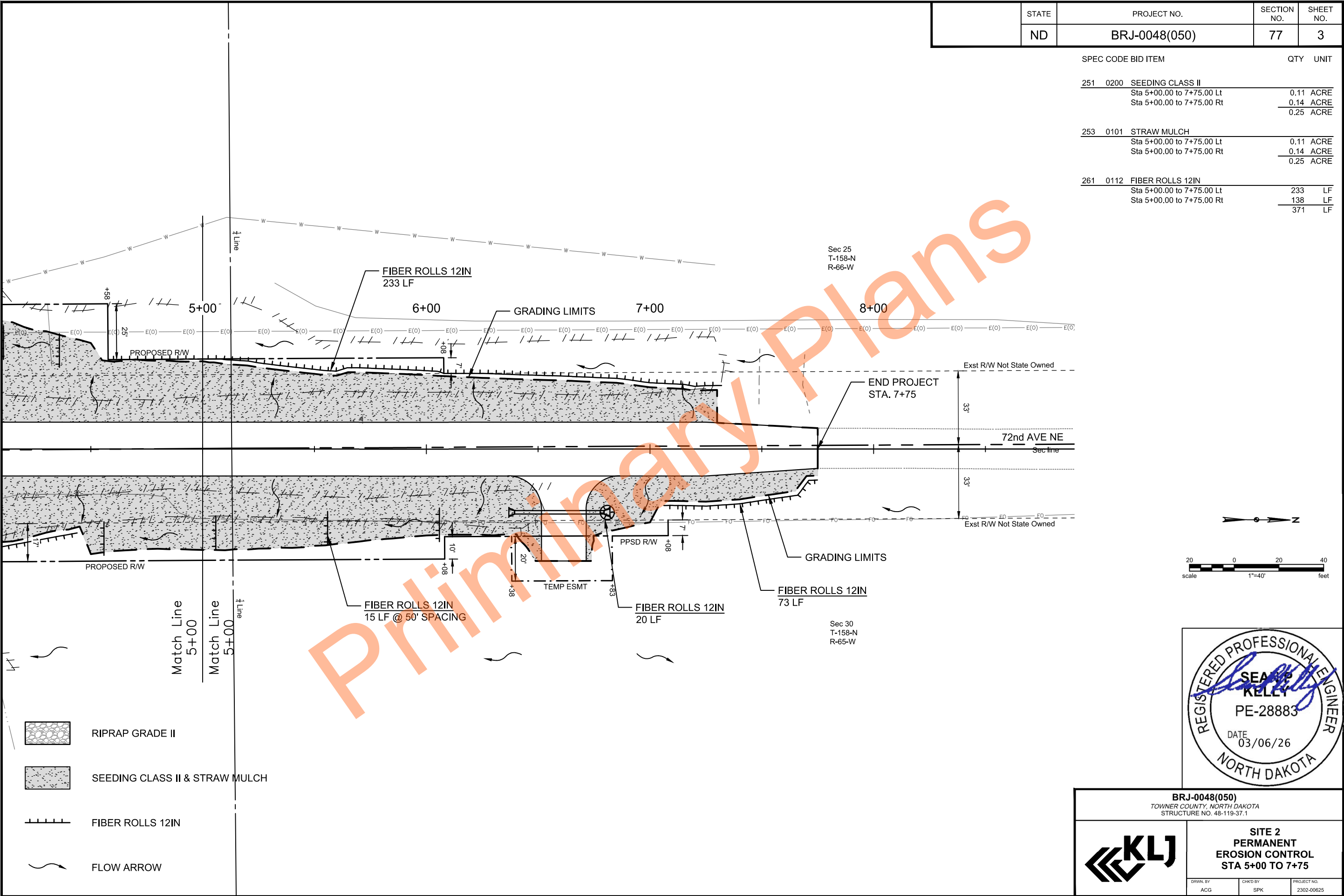
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		Sta 1+55.00 to 5+00.00 Lt	0.20	ACRE
		Sta 1+55.00 to 5+00.00 Rt	0.19	ACRE
			0.39	ACRE
253	0101	STRAW MULCH		
		Sta 1+55.00 to 5+00.00 Lt	0.20	ACRE
		Sta 1+55.00 to 5+00.00 Rt	0.19	ACRE
			0.39	ACRE
261	0112	FIBER ROLLS 12IN		
		Sta 1+55.00 to 5+00.00 Lt	250	LF
		Sta 1+55.00 to 5+00.00 Rt	252	LF
			502	LF



BRJ-0048(050)
TOWNER COUNTY, NORTH DAKOTA
STRUCTURE NO. 48-119-37.1

**SITE 2
PERMANENT
EROSION CONTROL
STA 1+55 TO 5+00**

DRWN. BY ACG	CHKD BY SPK	PROJECT NO. 2302-00625
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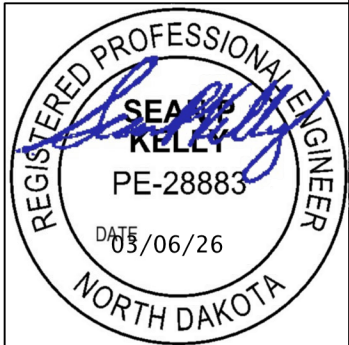
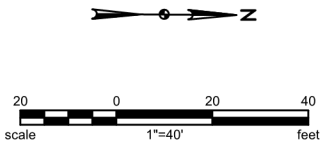
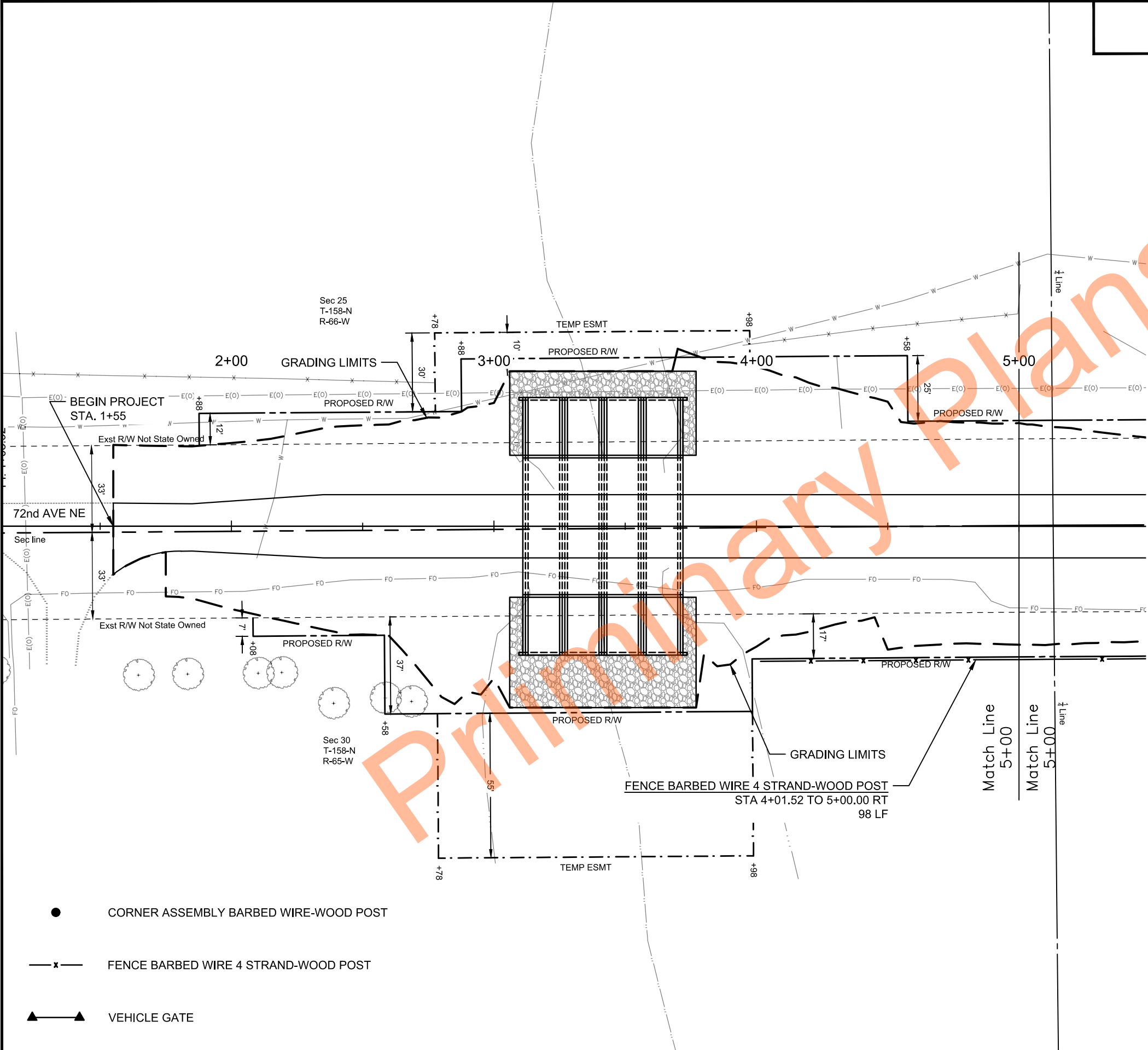
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	BRJ-0048(050)	80	1

SPEC CODE BID ITEM QTY UNIT

752 0300 FENCE BARBED WIRE 4 STRAND-WOOD POST
Sta 4+01.52 to 5+00.00 Rt 98 LF

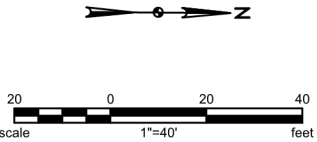
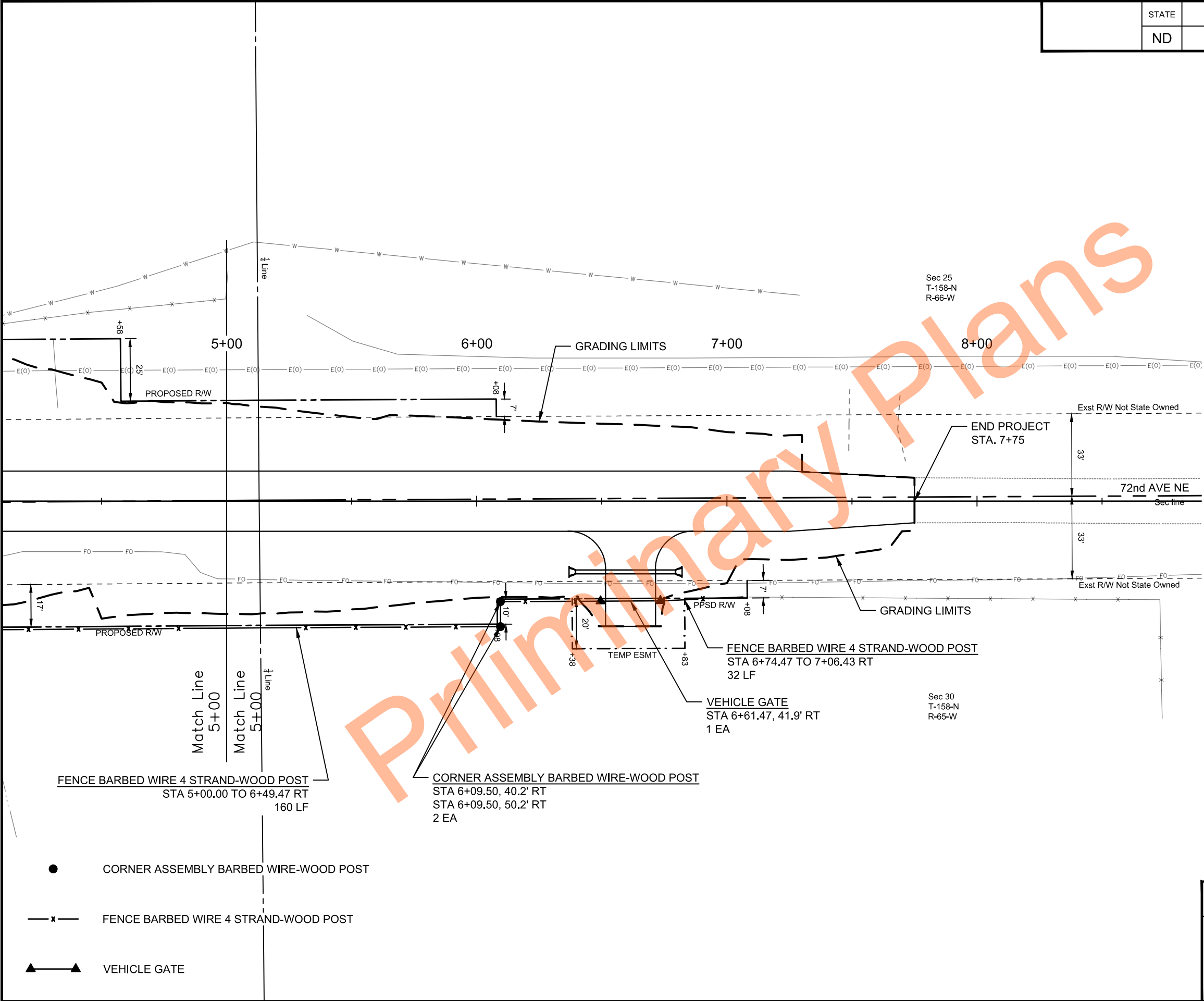


BRJ-0048(050) TOWNER COUNTY, NORTH DAKOTA STRUCTURE NO. 48-119-37.1		
SITE 2 FENCING LAYOUT STA 1+55 TO 5+00		
DRWN. BY ACG	CHKD BY SPK	PROJECT NO. 2302-00625

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	BRJ-0048(050)	80	2

SPEC CODE BID ITEM QTY UNIT

752	0300	FENCE BARBED WIRE 4 STRAND-WOOD POST		
		Sta 5+00.00 to 6+49.47 Rt	160	LF
		Sta 6+74.47 to 7+06.43 Rt	32	LF
			192	LF
752	2100	VEHICLE GATE		
		Sta 6+61.47, 41.9' Rt	1	EA
752	3150	CORNER ASSEMBLY BARBED WIRE-WOOD POST		
		Sta 6+09.50, 40.2' Rt	1	EA
		Sta 6+09.50, 50.2' Rt	1	EA
			2	EA



BRJ-0048(050)
TOWNER COUNTY, NORTH DAKOTA
STRUCTURE NO. 48-119-37.1



SITE 2
FENCING LAYOUT
STA 5+00 TO 7+75

DRWN. BY
ACG

CHKD BY
SPK

PROJECT NO.
2302-00625

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRJ-0048(050)	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
E5-1-48	48"x48"	EXIT GORE		35	
G20-1-60	60"x24"	ROAD WORK NEXT _____ MILES		28	
G20-1b-60	60"x24"	NO WORK IN PROGRESS (Sign and installation only)		18	
G20-2-48	48"x24"	END ROAD WORK		26	
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)		18	
G20-4b-36	36"x30"	WAIT FOR PILOT CAR		18	
G20-50a-72	72"x36"	ROAD WORK NEXT _____ MILES RT & LT ARROWS		43	
G20-52a-72	72"x24"	ROAD WORK NEXT _____ MILES RT or LT ARROW		36	
G20-55-96	96"x48"	SPEED LIMIT ENFORCED - MINIMUM FEE \$150 WHEN WORKERS PRESENT		59	
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		11	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR (INSIDE ARROW) RIGHT or LEFT (Mounted on barricade)		7	
M5-1-21	21"x15"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		7	
M5-1-30	30"x21"	ADVANCE TURN ARROW RT or LT(Mounted on route marker post)		9	
M6-1-21	21"x15"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		7	
M6-1-30	30"x21"	DIRECTIONAL ARROW RT or LT (Mounted on route marker post)		9	
M6-3-21	21"x15"	DIRECTIONAL ARROW UP (Mounted on route marker post)		7	
R1-1-48	48"x48"	STOP		32	
R1-2-60	60"x60"	YIELD		29	
R2-1-36	36"x48"	SPEED LIMIT _____ (Portable only)		30	
R2-1-48	48"x60"	SPEED LIMIT _____		39	
R2-1aP-24	24"x18"	MINIMUM FEE \$150 (Mounted on Speed Limit post)		10	
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)	4	12	48
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)	4	15	60
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		35	
W1-4b-48	48"x48"	TWO LANE REVERSE CURVE RIGHT or LEFT		35	
W1-6-48	48"x24"	ONE DIRECTION LARGE ARROW		26	
W3-1-48	48"x48"	STOP AHEAD		35	
W3-3-48	48"x48"	SIGNAL AHEAD		35	
W3-4-48	48"x48"	BE PREPARED TO STOP		35	
W3-5-48	48"x48"	SPEED REDUCTION AHEAD		35	
W4-2-48	48"x48"	LANE ENDS RIGHT or LEFT		35	
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC		35	
W8-1-48	48"x48"	BUMP		35	
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-11-48	48"x48"	UNEVEN LANES		35	
W8-12-48	48"x48"	NO CENTER LINE		35	
W8-17-48	48"x48"	SHOULDER DROP-OFF SYMBOL		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	48"x48"	TRUCKS ENTERING AHEAD or _____ FT or _____ MILE		35	
W8-55-48	48"x48"	TRUCKS CROSSING AHEAD or _____ FT or _____ MILE		35	
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W13-1P-30	30"x30"	_____ MPH ADVISORY SPEED PLAQUE (Mounted on warning sign post)		14	
W14-3-64	64"x48"	NO PASSING ZONE		28	
W16-2P-30	30"x24"	_____ FEET PLAQUE (Mounted on warning sign post)		10	
W20-1-48	48"x48"	ROAD WORK AHEAD or _____ FT or _____ MILE		35	
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	6	35	210
W20-4-48	48"x48"	ONE LANE ROAD AHEAD or _____ FT or _____ MILE		35	
W20-5-48	48"x48"	RIGHT or CENTER or LEFT LANE CLOSED AHEAD or _____ FT or _____ MILE		35	
W20-7-48	48"x48"	FLAGGER		35	
W20-8-18	18"x18"	STOP - SLOW PADDLE Back to Back		5	
W20-52P-54	54"x12"	NEXT _____ MILES (Mounted on warning sign post)		12	
W21-1-48	48"x48"	WORKERS		35	
W21-2-48	48"x48"	FRESH OIL		35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or _____ FT or _____ MILE		35	
W21-5-48	48"x48"	SHOULDER WORK		35	
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or _____ FT or _____ MILE		35	

[illegible][illegible]

SPEC & CODE			
704-1000	TRAFFIC CONTROL SIGNS	TOTAL UNITS	318

[illegible]

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

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	BRJ-0048(050)	100	2

----- PROPOSED WORK AREA

ROAD CLOSED
XX MILES AHEAD
LOCAL TRAFFIC ONLY
R11-3a-60
(1) TYPE III BARRICADE

ROAD
CLOSED
1500 FT
W20-3-48
Post Mounted

ROAD
CLOSED
500 FT
W20-3-48
Post Mounted

ROAD
CLOSED
(1) R11-2-48
(3) TYPE III BARRICADE

ROAD
CLOSED
(1) R11-2-48
(3) TYPE III BARRICADE

ROAD
CLOSED
500 FT
W20-3-48
Post Mounted

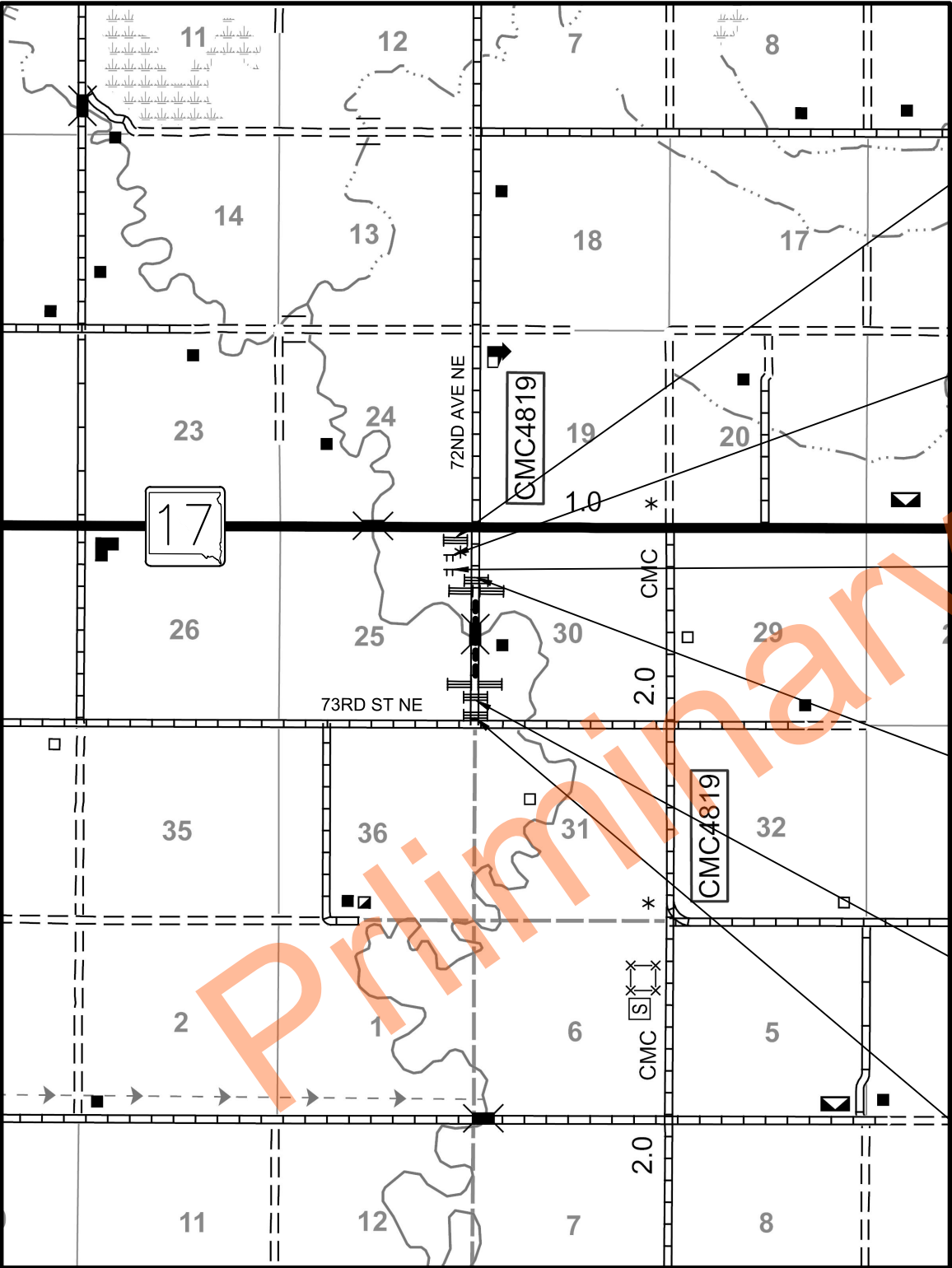
ROAD
CLOSED
1500 FT
W20-3-48
Post Mounted

ROAD CLOSED
XX MILES AHEAD
LOCAL TRAFFIC ONLY
R11-3a-60
(1) TYPE III BARRICADE



BRJ-0048(050) TOWNER COUNTY, NORTH DAKOTA STRUCTURE NO. 48-105-41.2		
	SITE 1 TRAFFIC CONTROL TERMINAL SIGNING	
	DRWN. BY ACG	CHKD BY SPK
PROJECT NO. 2302-00625		

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	BRJ-0048(050)	100	3



----- PROPOSED WORK AREA

ROAD CLOSED
XX MILES AHEAD
LOCAL TRAFFIC ONLY

R11-3a-60
(1) TYPE III BARRICADE

ROAD
CLOSED
1500 FT

W20-3-48
Post Mounted

ROAD
CLOSED
500 FT

W20-3-48
Post Mounted

ROAD
CLOSED

(1) R11-2-48
(3) TYPE III BARRICADE

ROAD
CLOSED

(1) R11-2-48
(3) TYPE III BARRICADE

ROAD CLOSED
XX MILES AHEAD
LOCAL TRAFFIC ONLY

R11-3a-60
(1) TYPE III BARRICADE

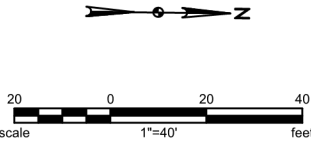
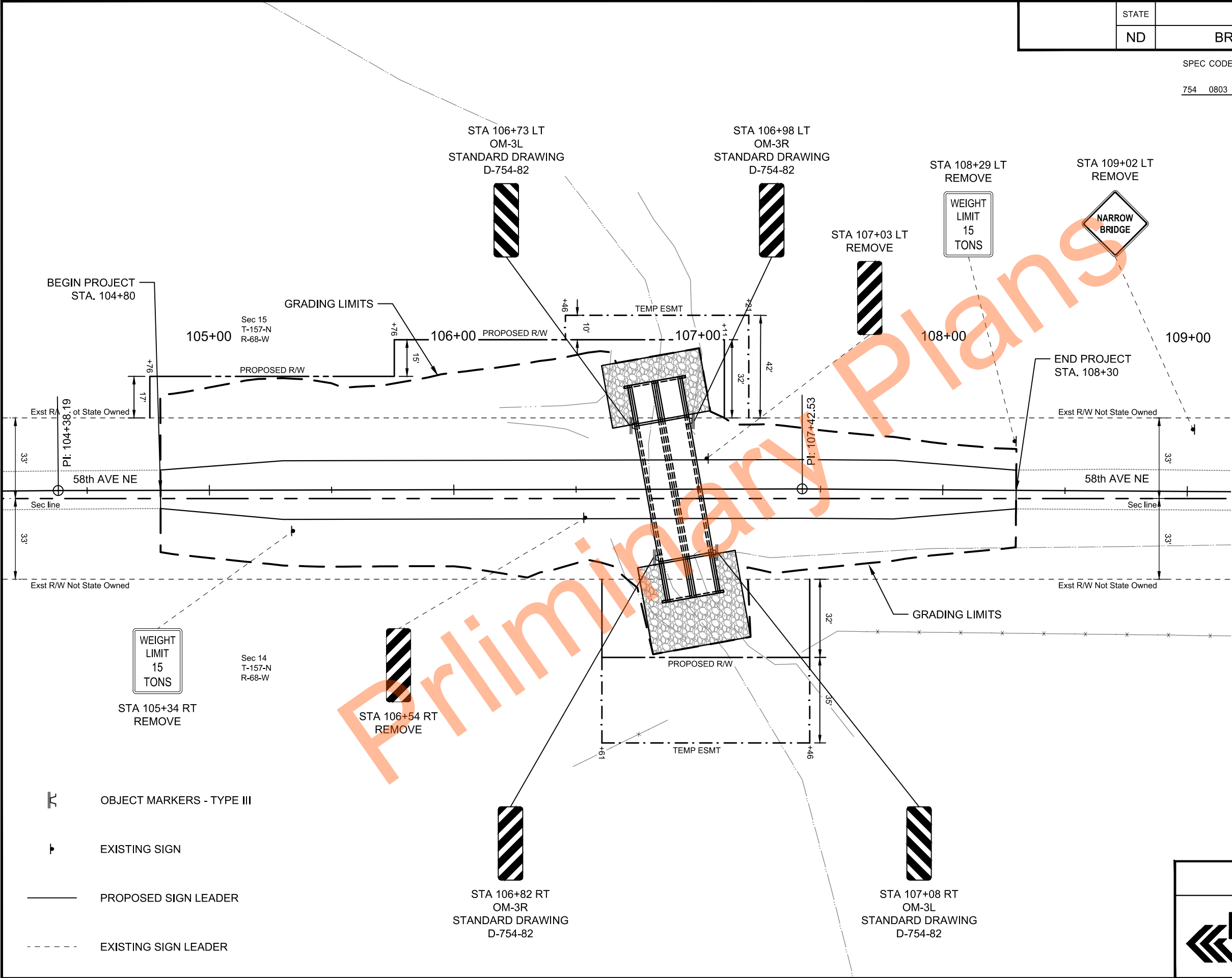


BRJ-0048(050) TOWNER COUNTY, NORTH DAKOTA STRUCTURE NO. 48-119-37.1		
SITE 2 TRAFFIC CONTROL TERMINAL SIGNING		
DRWN. BY ACG	CHKD BY SPK	PROJECT NO. 2302-00625

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	BRJ-0048(050)	110	1

SPEC CODE BID ITEM QTY UNIT

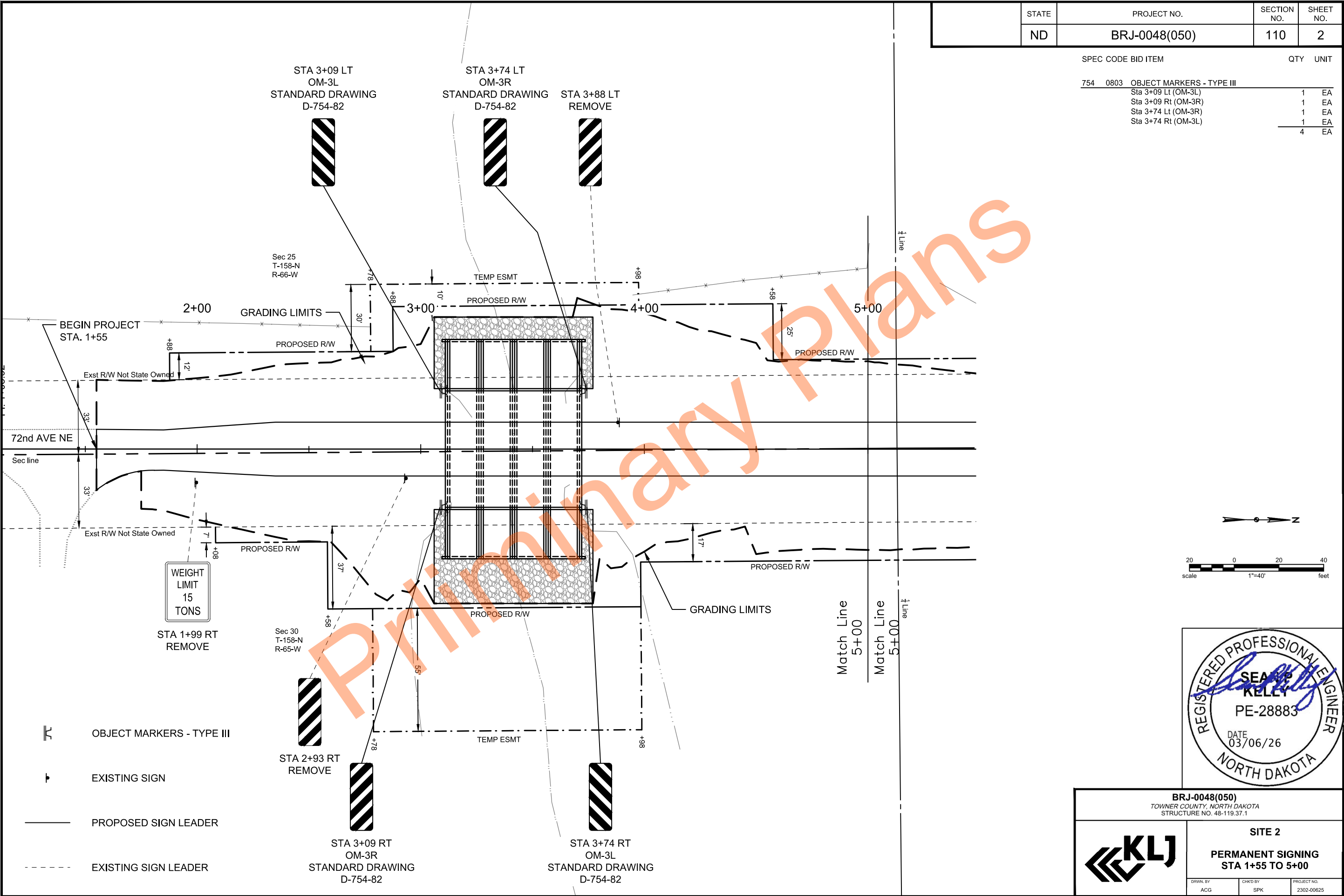
754	0803	OBJECT MARKERS - TYPE III		
		Sta 106+73 Lt (OM-3L)	1	EA
		Sta 106+82 Rt (OM-3R)	1	EA
		Sta 106+98 Lt (OM-3R)	1	EA
		Sta 107+08 Rt (OM-3L)	1	EA
			4	EA



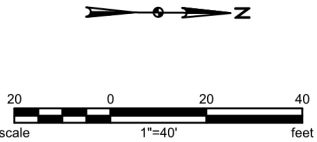
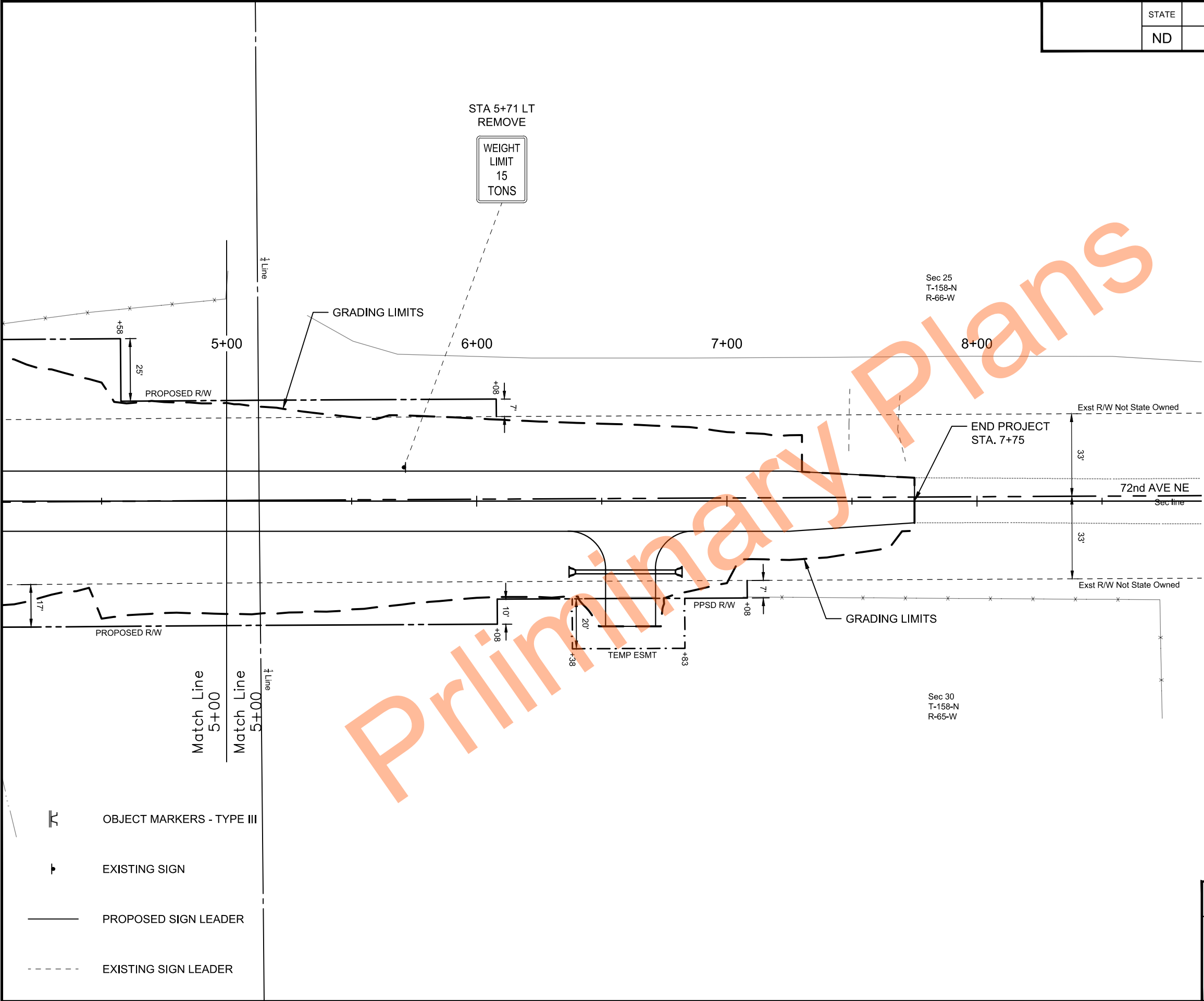
BRJ-0048(050)
TOWNER COUNTY, NORTH DAKOTA
STRUCTURE NO. 48-105-41.2

SITE 1
PERMANENT SIGNING
STA 104+80 TO 108+30

DRWN. BY ACG	CHKD BY SPK	PROJECT NO. 2302-00625
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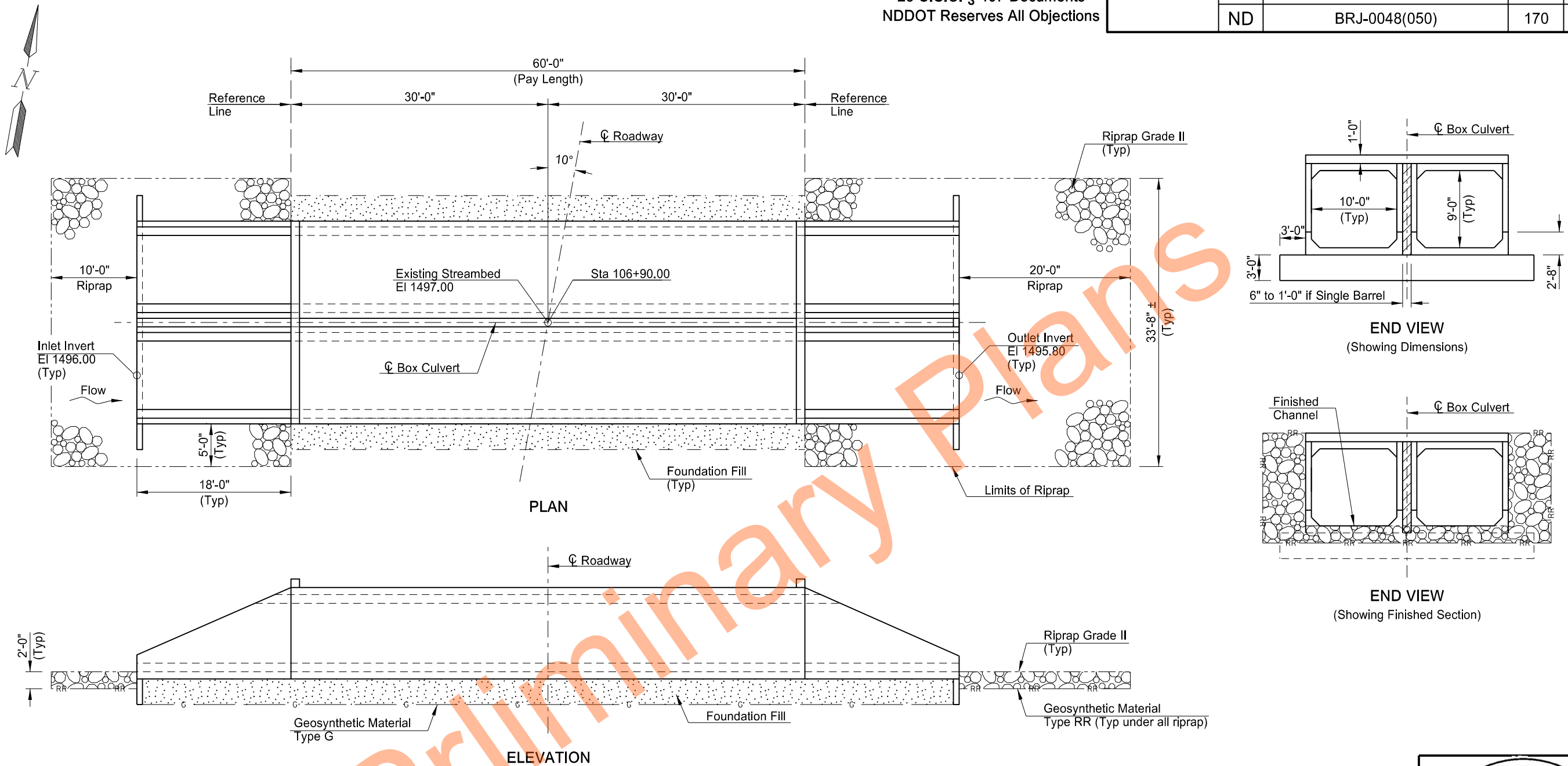


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	BRJ-0048(050)	110	3



BRJ-0048(050) TOWNER COUNTY, NORTH DAKOTA STRUCTURE NO. 48-119.37.1		
SITE 2 PERMANENT SIGNING STA 5+00 TO 7+75		
DRWN. BY ACG	CHKD BY SPK	PROJECT NO. 2302-00625

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRJ-0048(050)	170	1



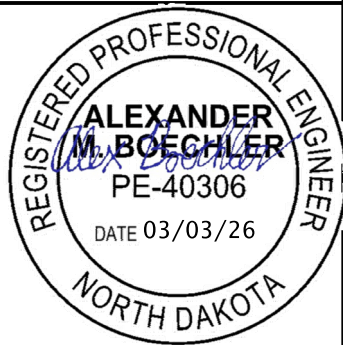
NOTE:
Invert elevation shown represents an elevation
1 foot below the existing streambed.

PRECAST BOX CULVERT BID ITEMS

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY
202	0108	REMOVAL OF STRUCTURE - SITE 1	L SUM	1
210	0051	BOX CULVERT EXCAVATION - SITE 1	EA	1
210	0210	FOUNDATION FILL	CY	399
210	0405	FOUNDATION PREPARATION-BOX CULVERT	EA	1
256	0200	RIPRAP GRADE II	CY	105
606	1009	10FT X 9FT PRECAST RCB CULVERT	LF	120
606	5009	10FT X 9FT PRECAST RCB END SECTION	EA	4
709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	302
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	158

HYDRAULIC DATA:

Drainage Area	72.4	sq mi
Stream Gradient	0.0006	ft/ft
Design Frequency	25	yr
Design Discharge	1011	cfs
Design Headwater Stage	1505.3	ft
Design Tailwater Stage	1503.9	ft
Velocity of Flow Through Culvert	7.3	fps
100-Year Frequency Discharge	1745	cfs
100-Year Frequency Stage	1506.6	ft
Overtopping Stage	1506.0	ft
Overtopping Discharge	1300	cfs



BRJ-0048(050)
TOWNER COUNTY, NORTH DAKOTA
STRUCTURE NO. 48-105-41.2

KLJ

SITE 1
PRECAST BOX CULVERT LAYOUT

DRAWN BY BJJ CHCKD BY AMB PROJECT NO. 2302-00625

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	BRJ-0048(050)	170	2

STRUCTURAL NOTES

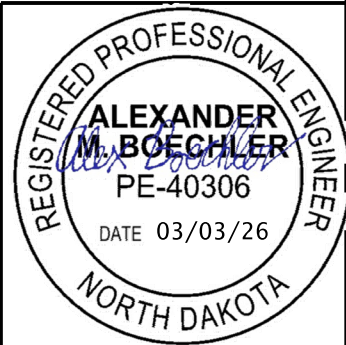
- 100 **SCOPE OF WORK:** Work at this site consists of removing the existing single span 26 ft timber bridge and replacing it with a new double cell 10'x9'x60' precast reinforced concrete box culvert.
- 202 **REMOVAL OF STRUCTURE:** The existing structure is single span 26 ft timber bridge with timber abutments.
- 210 **FOUNDATION FILL:** Use CL 3 or CL 5 as specified in Section 816 of the Standard Specifications.
- Notify the Engineer if the Contractor elects to use a coarse rock material under the box culvert as replacement for a portion or all of the foundation fill. The replacement of the foundation fill with coarse rock under the box culvert is subject to the approval of the Engineer. No additional payment will be made for the substitution of the foundation fill. All foundation fill and coarse rock used will be paid at the unit price bid for "FOUNDATION FILL".
- "FOUNDATION FILL" will be paid at plan quantity. Include any additional material required by the manufacturer in the price bid for "FOUNDATION FILL".
- 210 **ORDINARY BACKFILL:** Compact material as specified in Section 203.04 G.3, "Compaction Control, Type B." Use a maximum lift thickness of 6 inches.
- 606 **PRECAST SECTION:** Tie the barrel sections together using the 1" ø "Hidden Tie" detail as shown on Standard Drawing D-714-22. Place ties in the exterior walls of each precast segment. Use two ties per wall joint, located at the one-third points of the wall's clear height. Install the barrel sections with a maximum gap of ¾" wide.
- The "10FT X 9FT PRECAST RCB END SECTION" or "DBL 10FT X 9FT PRECAST RCB END SECTION" bid items consist of the cutoff wall, parapet, and sloped end section. Attach the end section to the last barrel section by the use of tie bolts or another approved method so the inside surface is smooth. After backfilling, end sections are to be in line. If the end sections are not in line, remove and reset the end sections to be in proper alignment. Any foundation fill not shown in plans that is required to facilitate the installation of the end sections is to be included in the price bid for "10FT X 9FT PRECAST RCB END SECTION" or "DBL 10FT X 9FT PRECAST RCB END SECTION".
- Separate single cell precast units may be used as alternatives to a multi cell culvert. Provide a minimum distance of 6" between separate precast units and a maximum distance of 1'-0". Fill this gap with a controlled density backfill. Use a controlled density backfill consisting of cement, water, pozzolanic materials, and fillers. Use a material that is able to support normal loads after 6 hours and have a compressive strength in the range of 75 psi to 125 psi at 28 days. The Contractor shall provide mix designs and compression strength test results of the material to the Engineer for approval 5 days prior to placement.
- Cast holes at 3'-0" centers through the last end section and into the cutoff wall to receive ¾" diameter reinforcing bars. Cast holes in the last barrel section at 2'-0" centers for ½" diameter reinforcing bars to attach the parapet. Cast the parapet against the section. Install the bars according to the manufacturer's recommendation, with a high strength adhesive specifically intended for concrete anchorage, in accordance with Section 806.02 of the Standard Specifications.
- Provide lifting holes or cast-in-place anchors that are designed for lifting and handling the precast sections. Galvanize all components of the lifting system that will remain part of the precast structure, including sleeves used to form lifting holes. If lifting holes are used, plug all lifting holes after installation and seal using a 12"x12" square waterproof membrane centered on each lifting hole.
- Place 12" wide joint wrap per Standard Drawing D-714-22.

DESIGN LOADS:

- A. HL-93 Loading
B. Fill Height = 1'-0" to 2'-6"

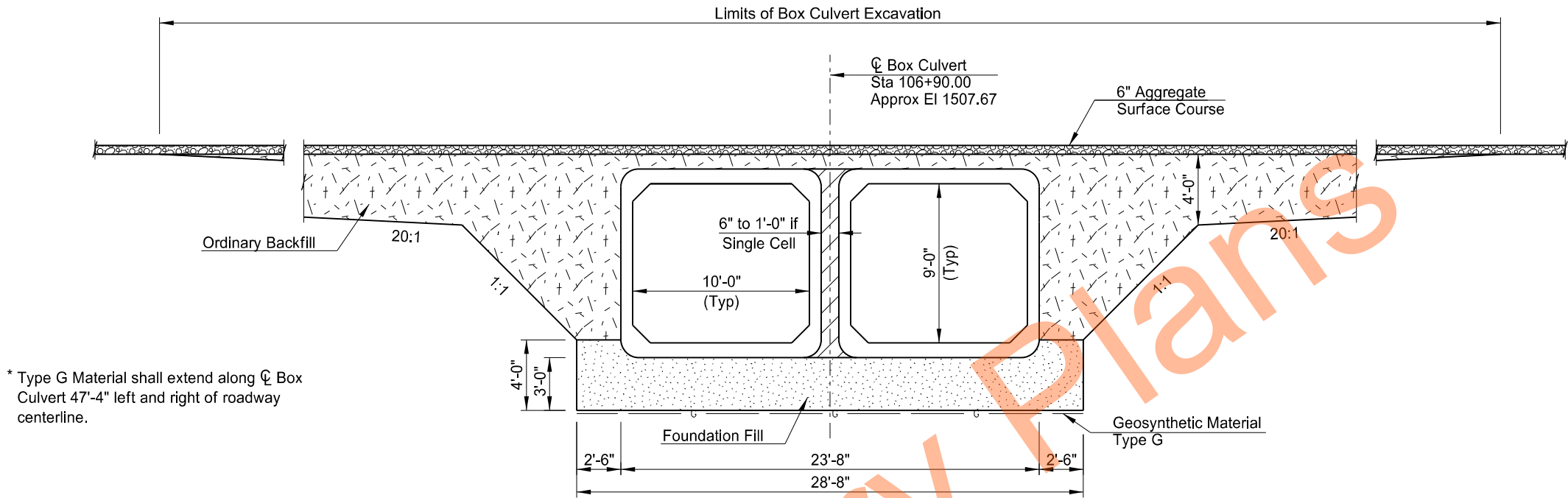
WORK DRAWINGS: Submit the following work drawings to the Engineer of Record:

10FT X 9FT PRECAST RCB CULVERT
10FT X 9FT PRECAST RCB END SECTION
or
DBL 10FT X 9FT PRECAST RCB CULVERT
DBL 10FT X 9FT PRECAST RCB END SECTION

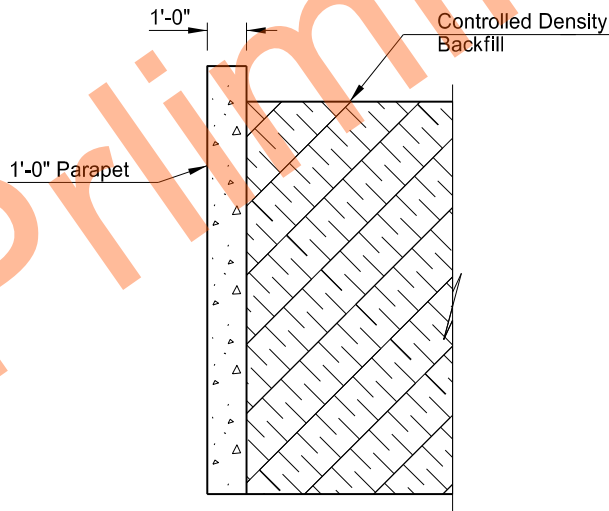


BRJ-0048(050) TOWNER COUNTY, NORTH DAKOTA STRUCTURE NO. 48-105-41.2		
	SITE 1 PRECAST BOX CULVERT STRUCTURAL NOTES	
	DRAWN BY BJJ	PROJECT NO. 2302-00625

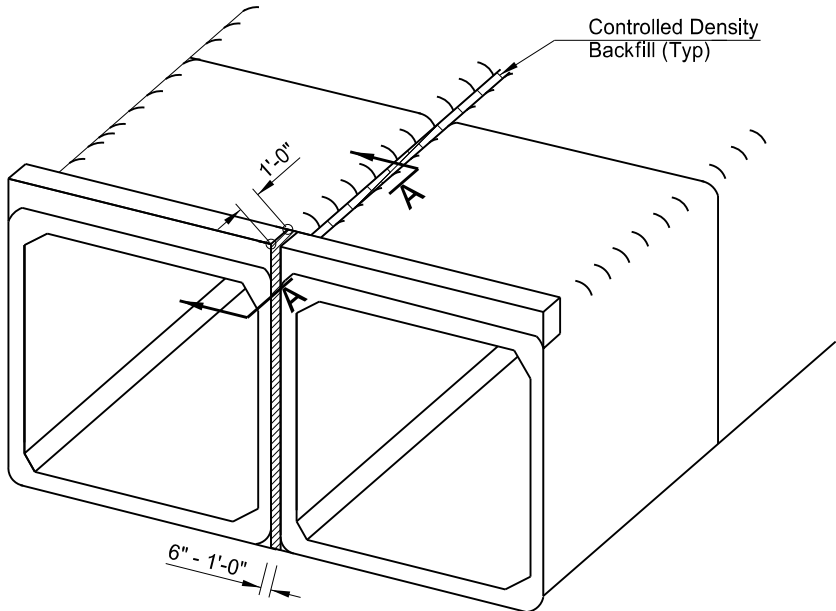
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	BRJ-0048(050)	170	3



BOX CULVERT EXCAVATION AND BACKFILL



SECTION A-A

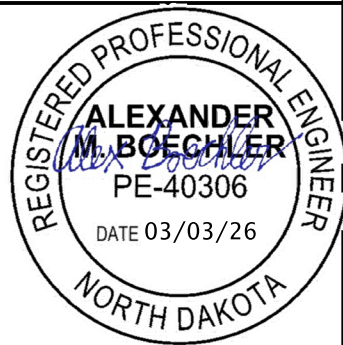


MULTIPLE CELL INSTALLATION
(End Sections and Cutoff Wall Not Shown)

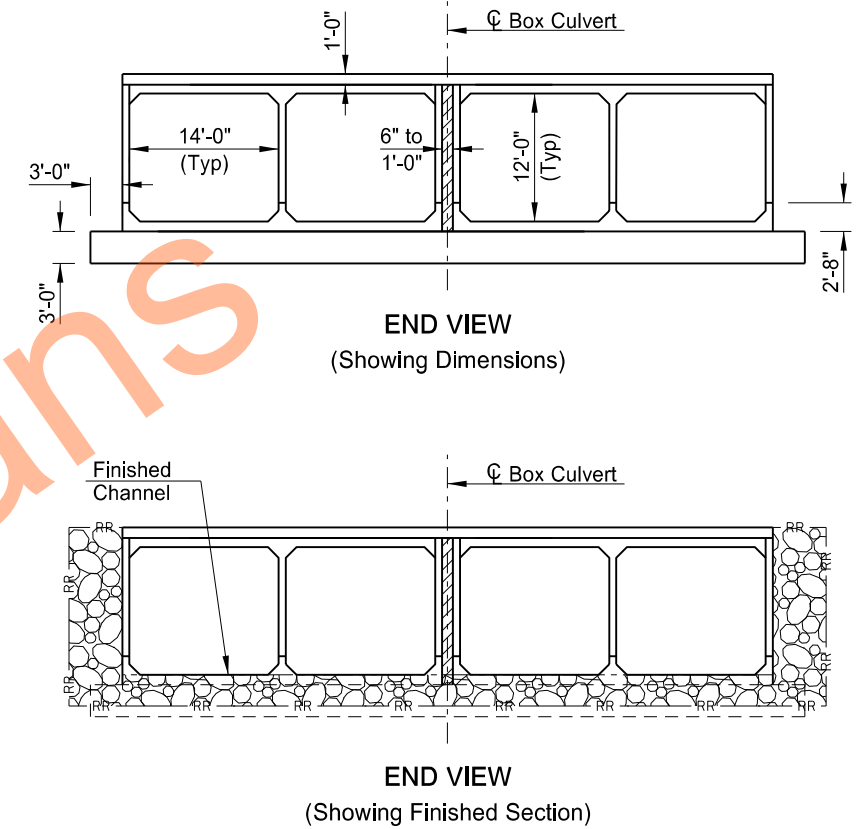
NOTES:

Place a 3'-0" minimum depth of foundation fill under the floor. Remove and replace all unsound material under the box with foundation fill. The Engineer will determine the depth required.

The intent of this drawing is to show only the placement of the controlled density backfill between adjacent barrels. The representation of the number of barrels is arbitrary.



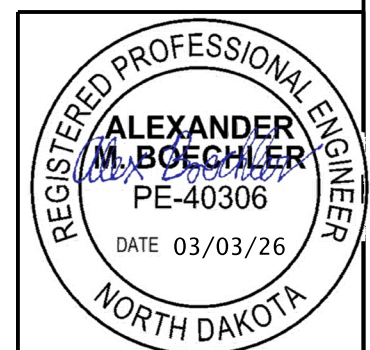
BRJ-0048(050) TOWNER COUNTY, NORTH DAKOTA STRUCTURE NO. 48-105-41.2		SITE 1 PRECAST BOX CULVERT BACKFILL DETAILS	
KLJ	KLJ	KLJ	KLJ
DRAWN BY BJJ	CHECKED BY AMB	PROJECT NO. 2302-00625	



Invert elevation shown represents an elevation 1 foot below the existing streambed.

HYDRAULIC DATA:

Drainage Area	398	sq mi
Stream Gradient	0.0004	ft/ft
Design Frequency	25	yr
Design Discharge	3523	cfs
Design Headwater Stage	1465.9	ft
Design Tailwater Stage	1465.3	ft
Velocity of Flow Through Culvert	5.7	fps
100-Year Frequency Discharge	5751	cfs
100-Year Frequency Stage	1468.0	ft
Overtopping Stage	1466.7	ft
Overtopping Discharge	3700	cfs



BRJ-0048(050)
TOWNER COUNTY, NORTH DAKOTA
STRUCTURE NO. 48-119-37.1

SITE 2

PRECAST BOX CULVERT LAYOUT



DRWN. BY BJJ	CHK'D. BY AMB	PROJECT NO. 2302-00625
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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	BRJ-0048(050)	170	5

STRUCTURAL NOTES

- 100
- SCOPE OF WORK: Work at this site consists of removing the existing single span 45 ft concrete beam bridge and replacing it with a new quad cell 14'x12'x54' precast reinforced concrete box culvert.
- 202
- REMOVAL OF STRUCTURE: The existing structure is single span 45 ft concrete beam bridge with timber abutments.
- 210
- FOUNDATION FILL: Use CL 3 or CL 5 as specified in Section 816 of the Standard Specifications.

Notify the Engineer if the Contractor elects to use a coarse rock material under the box culvert as replacement for a portion or all of the foundation fill. The replacement of the foundation fill with coarse rock under the box culvert is subject to the approval of the Engineer. No additional payment will be made for the substitution of the foundation fill. All foundation fill and coarse rock used will be paid at the unit price bid for "FOUNDATION FILL".

"FOUNDATION FILL" will be paid at plan quantity. Include any additional material required by the manufacturer in the price bid for "FOUNDATION FILL".
- 210
- ORDINARY BACKFILL: Compact material as specified in Section 203.04 G.3, "Compaction Control, Type B." Use a maximum lift thickness of 6 inches.
- 606
- PRECAST SECTION: Tie the barrel sections together using the 1" ø "Hidden Tie" detail as shown on Standard Drawing D-714-22. Place ties in the exterior walls of each precast segment. Use two ties per exterior wall joint, located at the one-third points of the wall's clear height. Install the barrel sections with a maximum gap of ¾ inch wide.

The "14FT X 12FT PRECAST RCB END SECTION" or "DBL 14FT X 12FT PRECAST RCB END SECTION" bid items consist of the cutoff wall, parapet, and sloped end section. Attach the end section to the last barrel section by the use of tie bolts or another approved method so the inside surface is smooth. After backfilling, end sections are to be in line. If the end sections are not in line, remove and reset the end sections to be in proper alignment. Any foundation fill not shown in plans that is required to facilitate the installation of the end sections is to be included in the price bid for "14FT X 12FT PRECAST RCB END SECTION" or "DBL 14FT X 12FT PRECAST RCB END SECTION".

Separate single cell precast units may be used as alternatives to a multi cell culvert. Provide a minimum distance of 6" between separate precast units and a maximum distance of 1'-0". Fill this gap with a controlled density backfill. Use a controlled density backfill consisting of cement, water, pozzolanic materials, and fillers. Use a material that is able to support normal loads after 6 hours and have a compressive strength in the range of 75 psi to 125 psi at 28 days. The Contractor shall provide mix designs and compression strength test results of the material to the Engineer for approval 5 days prior to placement.

Cast holes at 3'-0" centers through the last end section and into the cutoff wall to receive ¾" diameter reinforcing bars. Cast holes in the last barrel section at 2'-0" centers for ½" diameter reinforcing bars to attach the parapet. Cast the parapet against the section. Install the bars according to the manufacturer's recommendation, with a high strength adhesive specifically intended for concrete anchorage, in accordance with Section 806.02 of the Standard Specifications.

Provide lifting holes or cast-in-place anchors that are designed for lifting and handling the precast sections. Galvanize all components of the lifting system that will remain part of the precast structure, including sleeves used to form lifting holes. If lifting holes are used, plug all lifting holes after installation and seal using a 12"x12" square of waterproof membrane centered on each lifting hole.

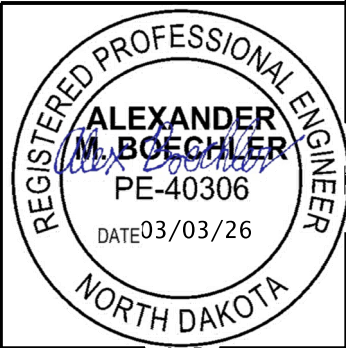
Place 12" wide joint wrap per Standard Drawing D-714-22.

DESIGN LOADS:

- A.
- HL-93 Loading
- B.
- Fill Height = 2'-0" to 4'-0"

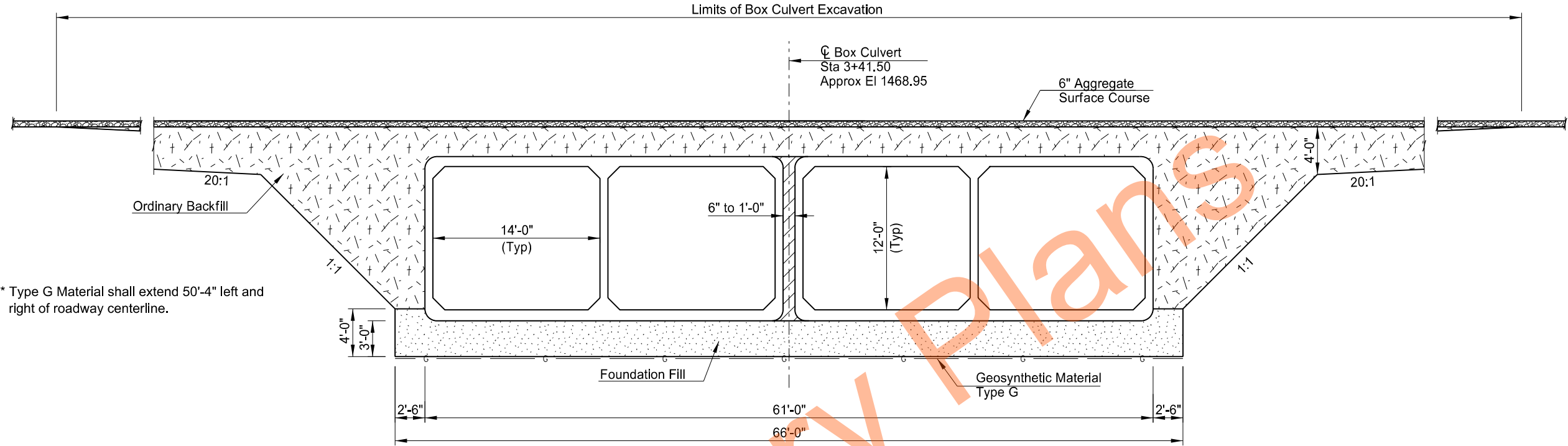
WORK DRAWINGS: Submit the following work drawings to the Engineer of Record:

14FT X 12FT PRECAST RCB CULVERT
14FT X 12FT PRECAST RCB END SECTION
OR
DBL 14FT X 12FT PRECAST RCB CULVERT
DBL 14FT X 12FT PRECAST RCB END SECTION



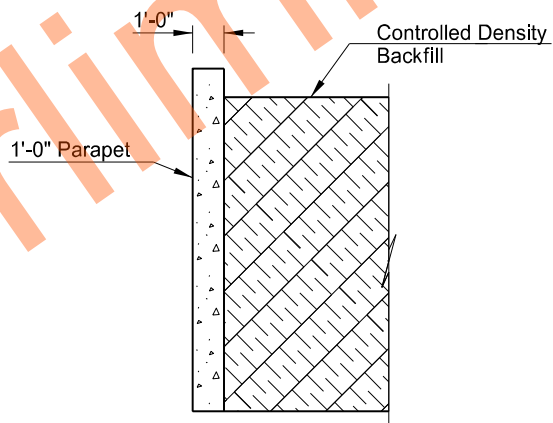
BRJ-0048(050) TOWNER COUNTY, NORTH DAKOTA STRUCTURE NO. 48-119-37.1		
	SITE 2 PRECAST BOX CULVERT STRUCTURAL NOTES	
	DRAWN BY BJJ	CHECKED BY AMB PROJECT NO. 2302-00625

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	BRJ-0048(050)	170	6



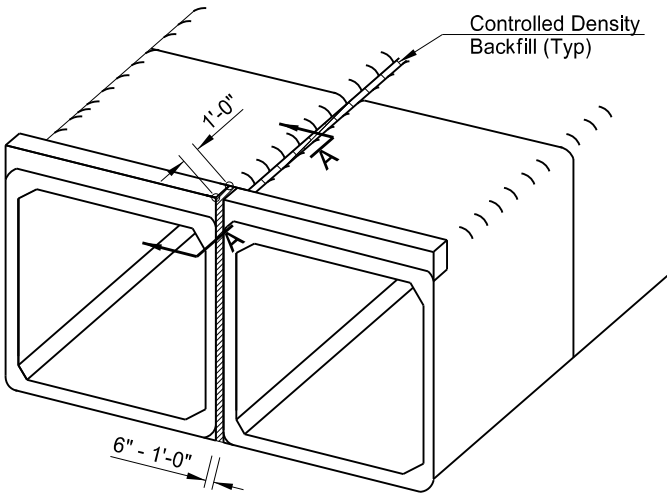
* Type G Material shall extend 50'-4" left and right of roadway centerline.

BOX CULVERT EXCAVATION AND BACKFILL



SECTION A-A

The intent of this drawing is to show only the placement of the controlled density backfill between adjacent barrels. The representation of the number of barrels is arbitrary.



MULTIPLE CELL INSTALLATION
(End Sections and Cutoff Wall Not Shown)



NOTES:

Place a 3'-0" minimum depth of foundation fill and bedding under the floor. Remove and replace all unsound material under the box with foundation fill. The Engineer will determine the depth required.

BRJ-0048(050)
TOWNER COUNTY, NORTH DAKOTA
STRUCTURE NO. 48-119-37.1



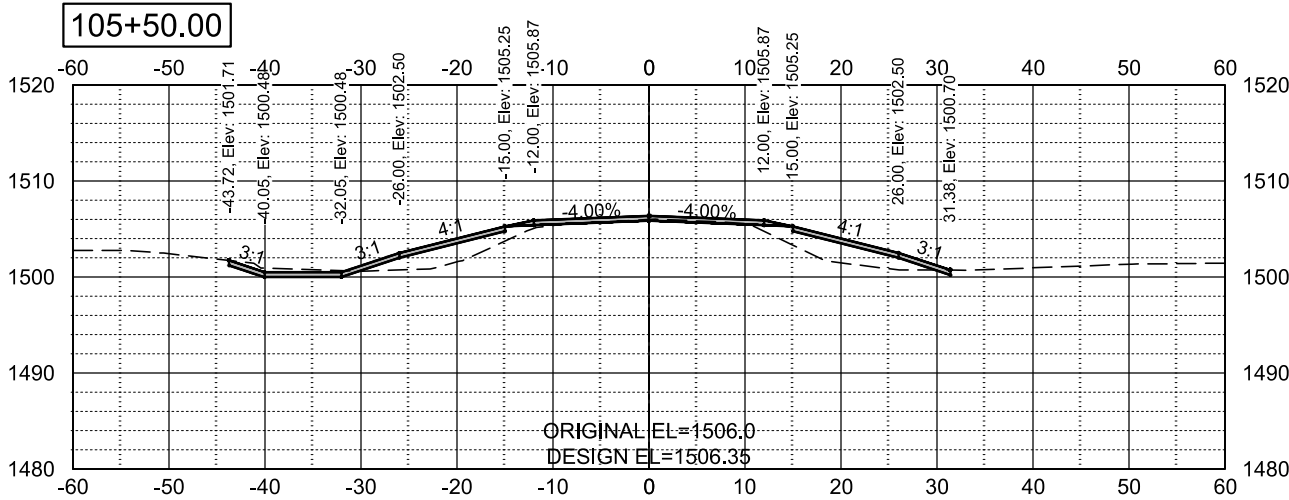
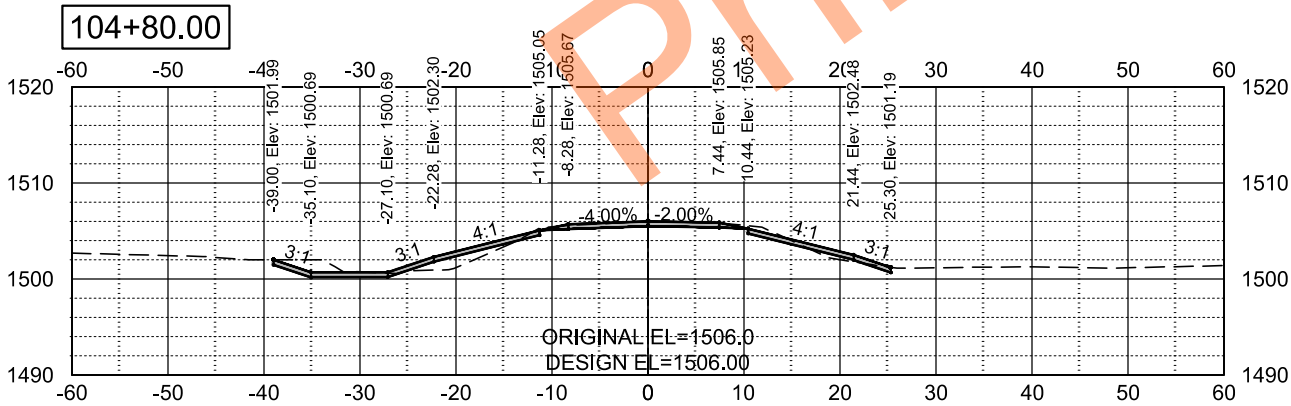
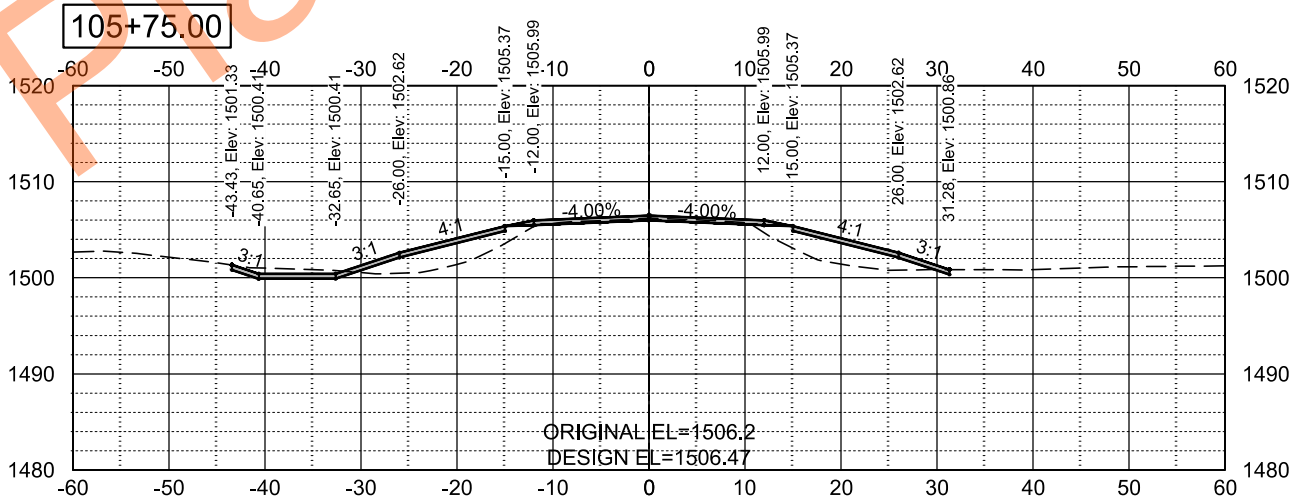
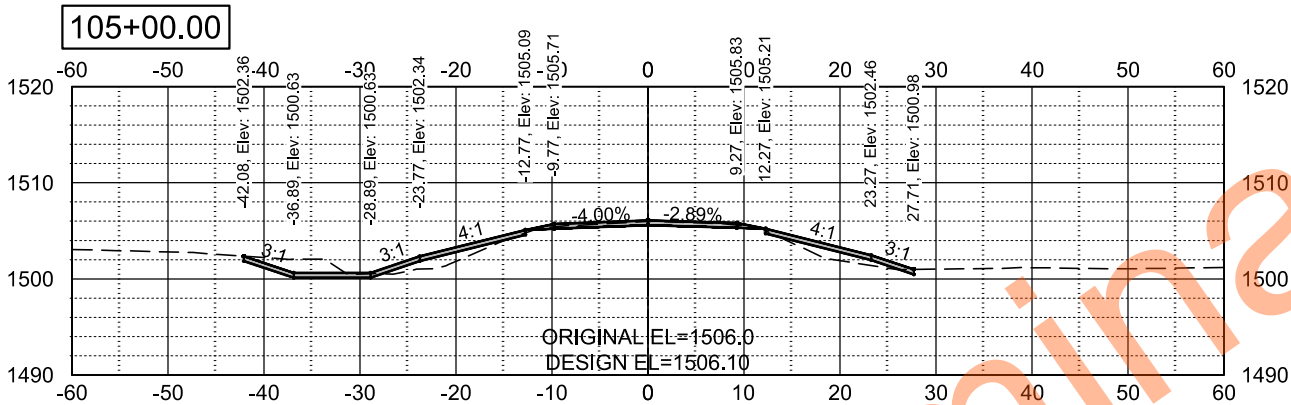
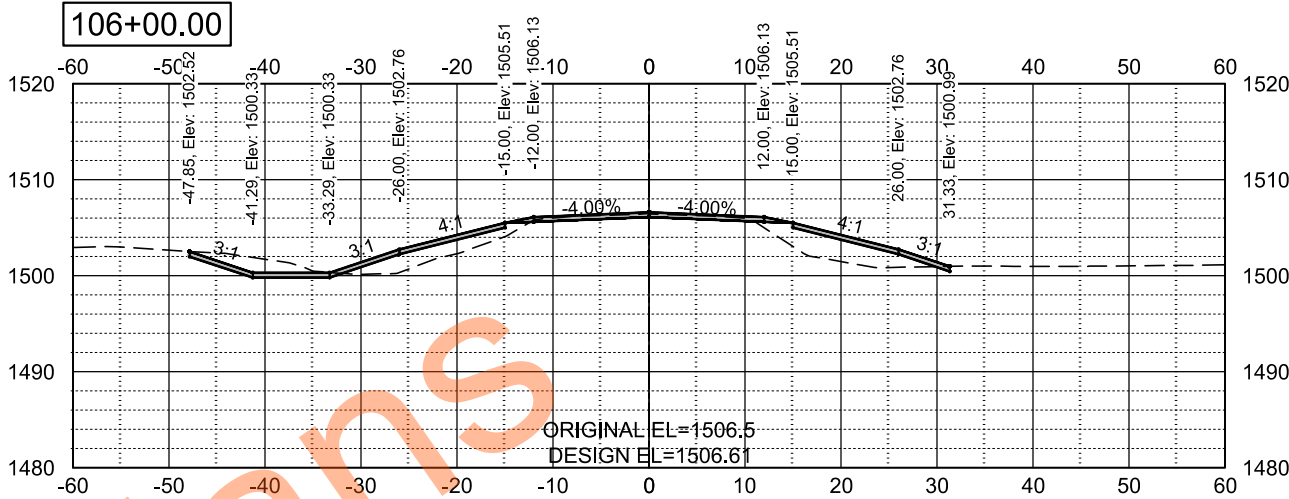
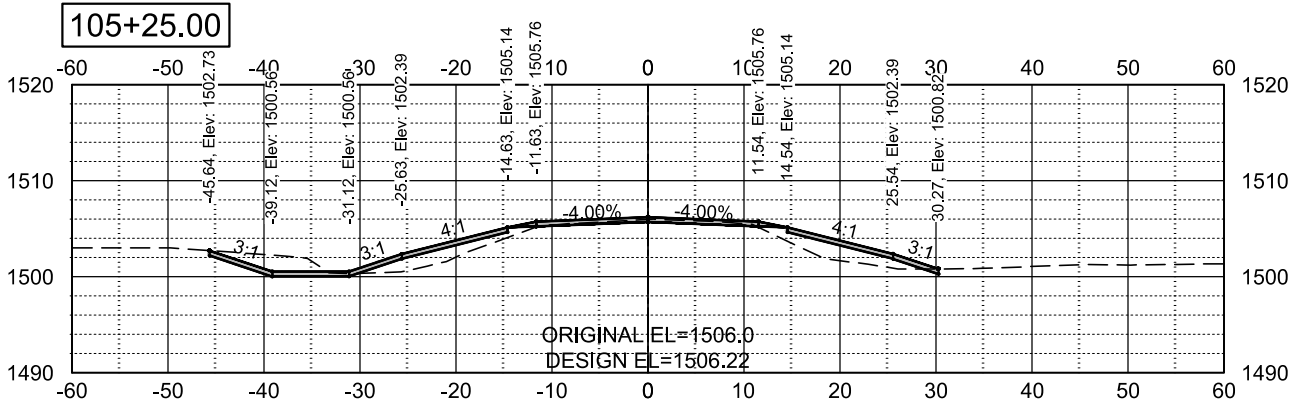
SITE 2
PRECAST BOX CULVERT
BACKFILL DETAILS

DRAWN BY BJJ	CHECKED BY AMB	PROJECT NO. 2302-00625
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CROSS-SECTIONS



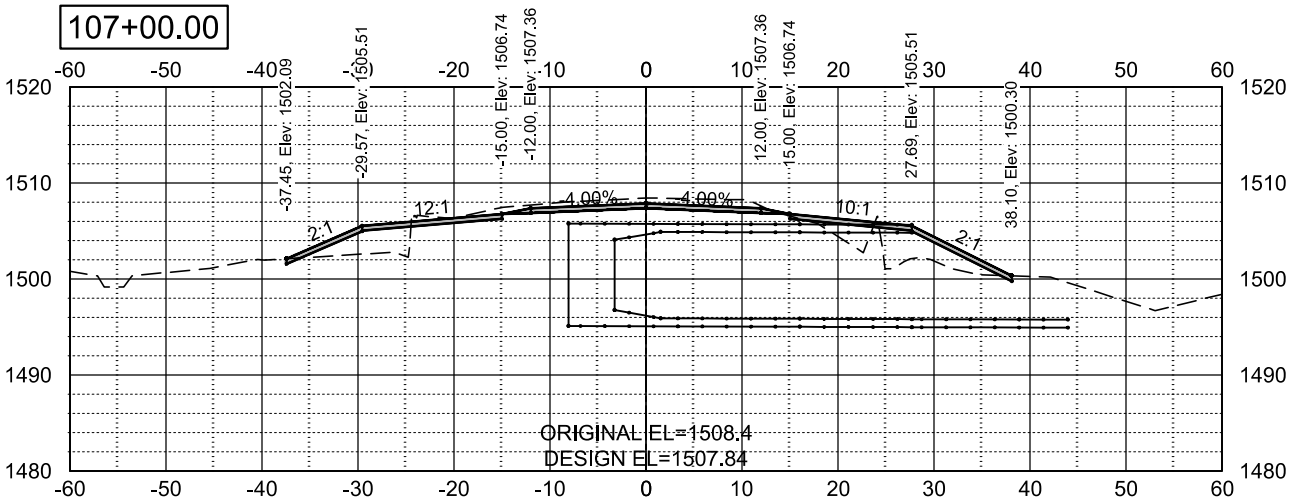
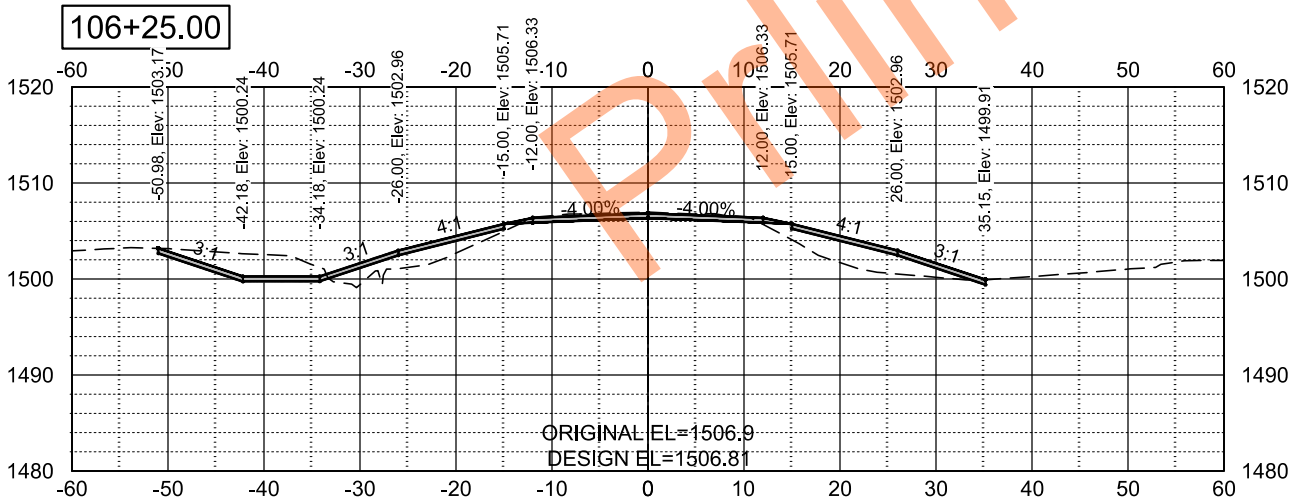
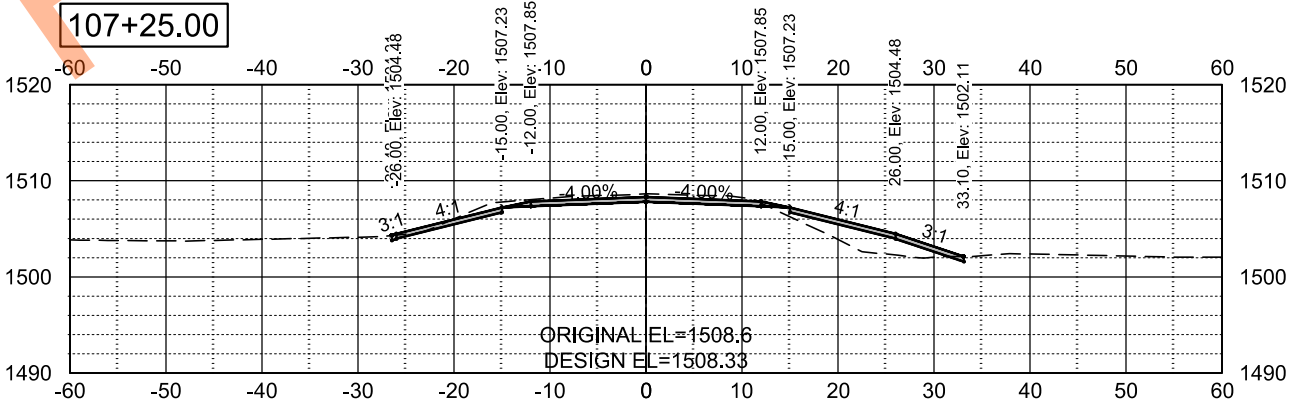
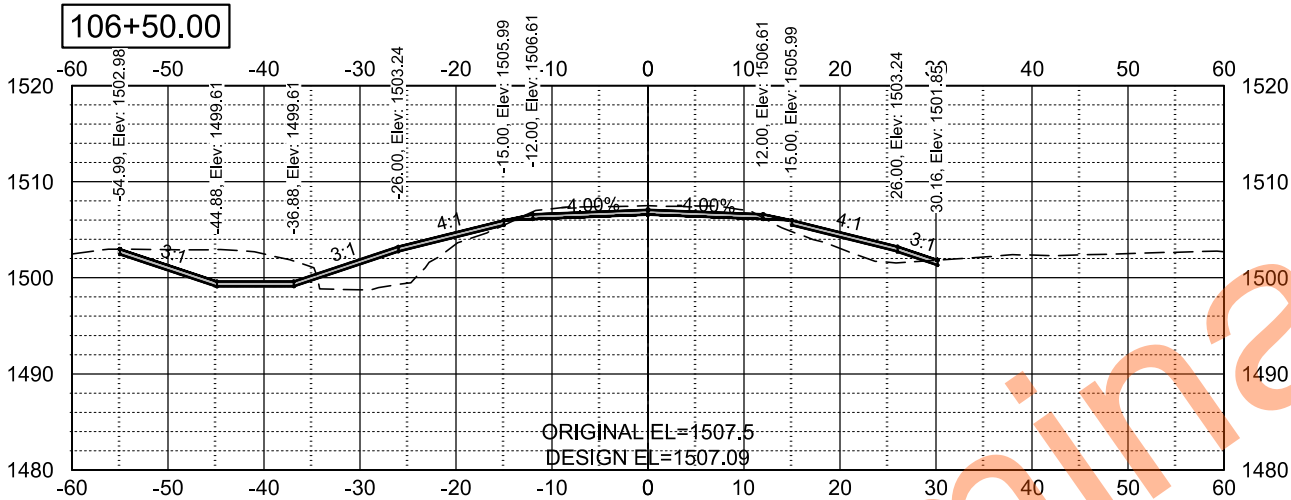
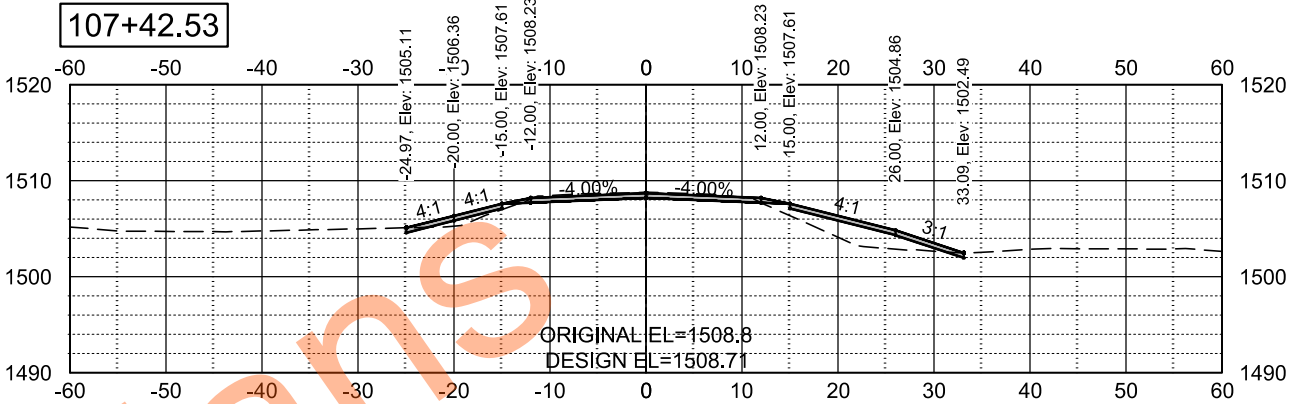
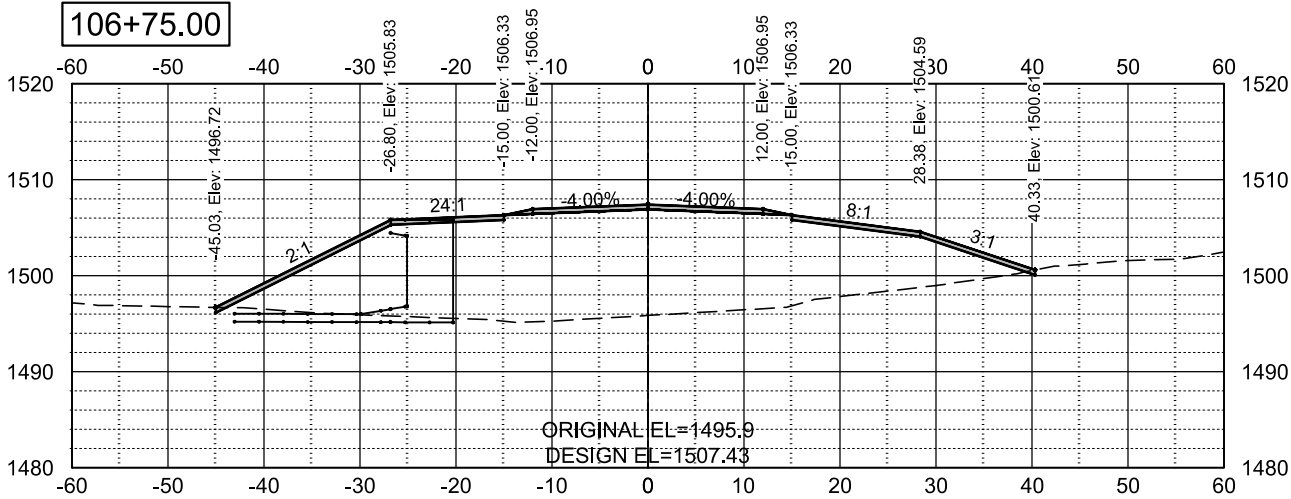
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	ND	BRJ-0048(050)	200	1



CROSS-SECTIONS



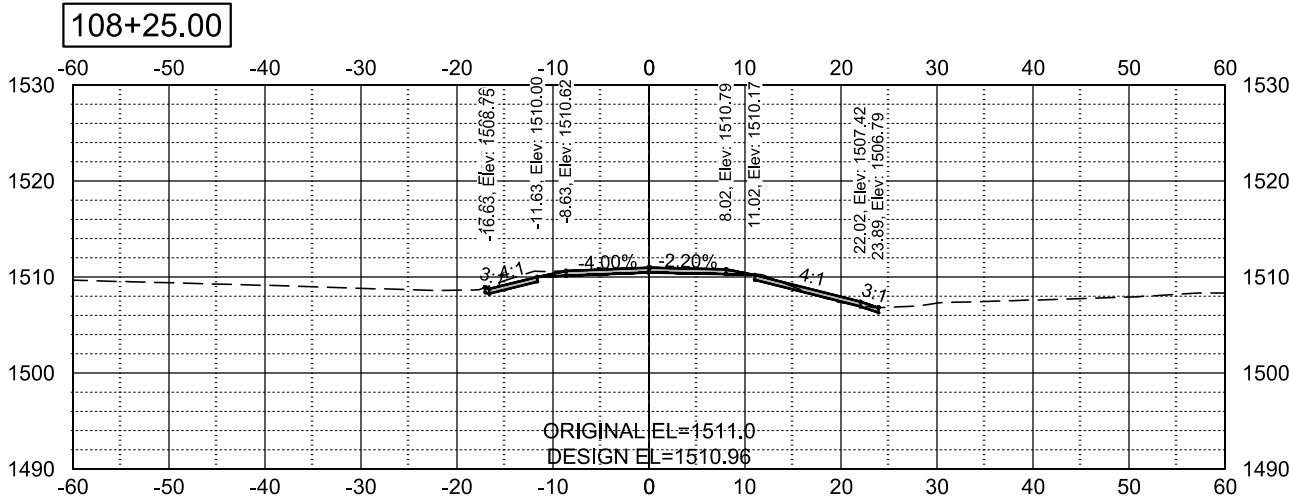
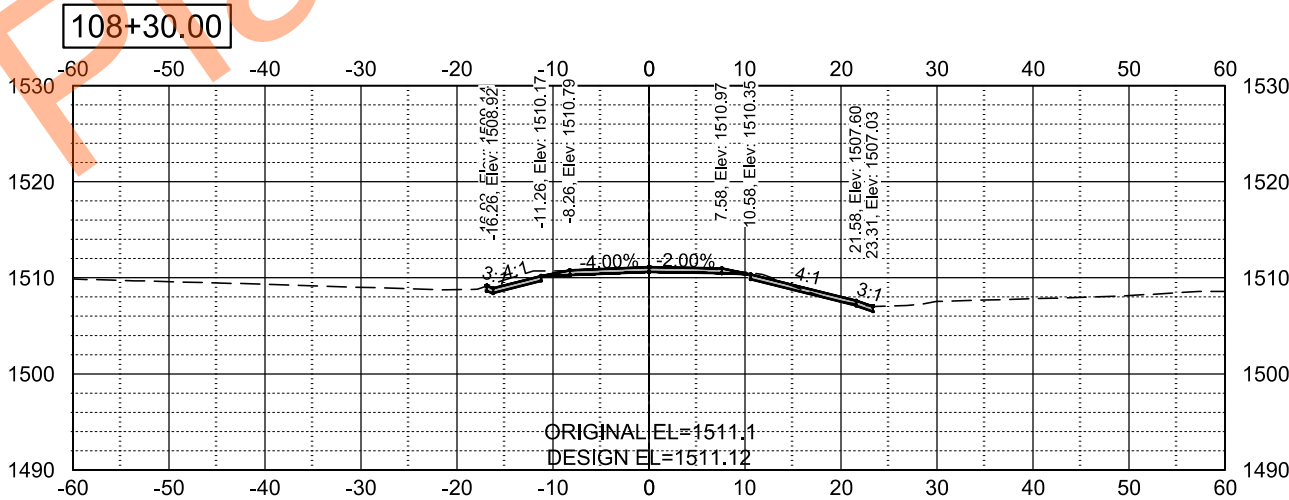
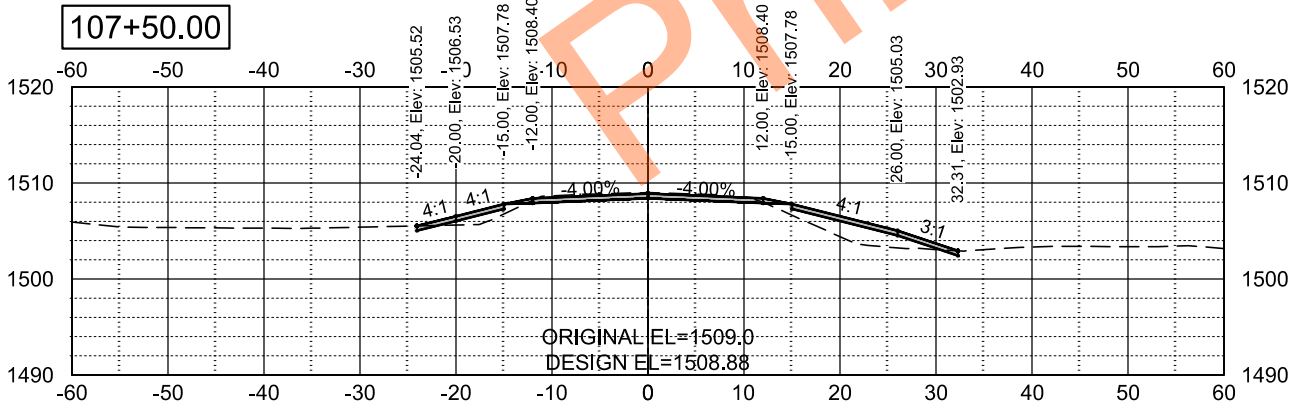
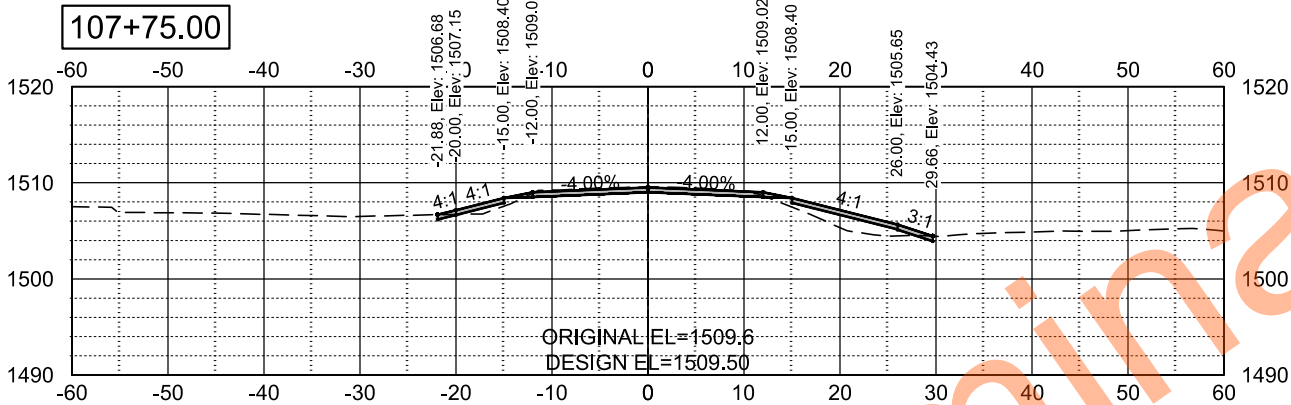
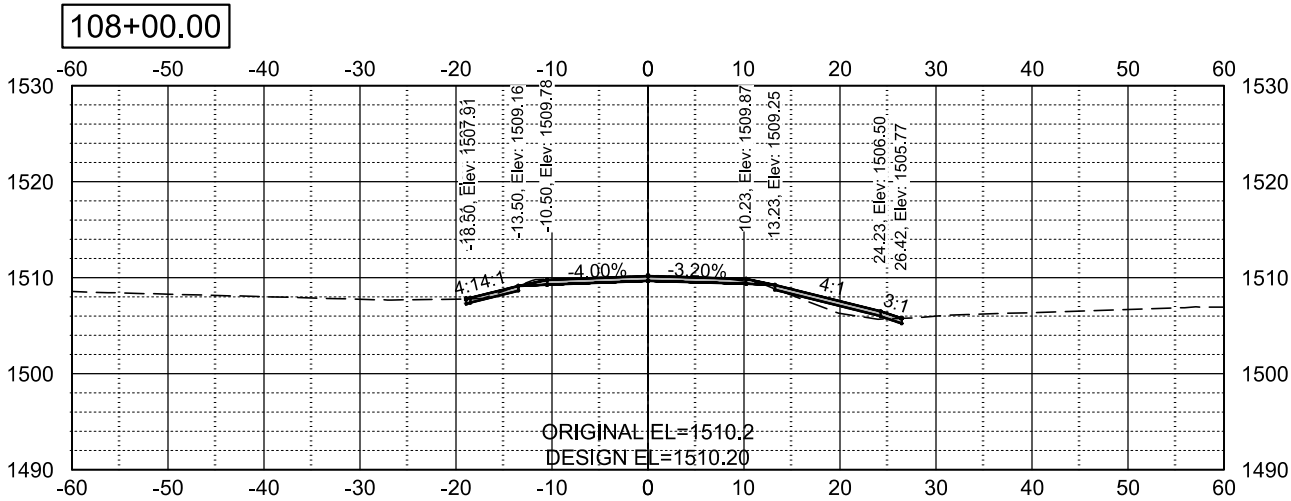
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CROSS-SECTIONS



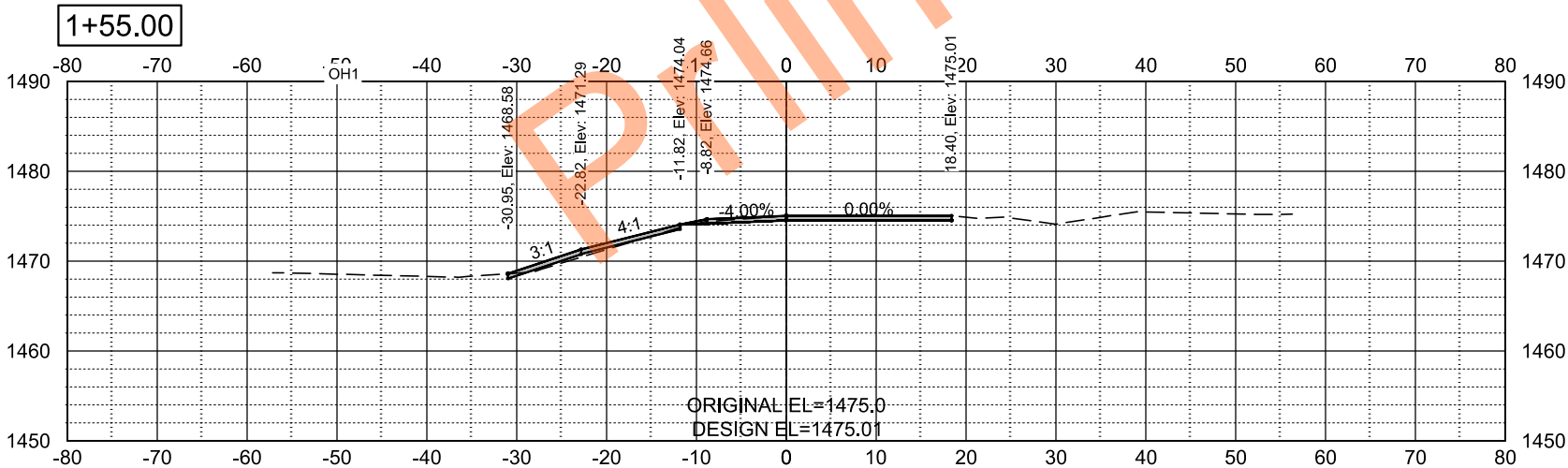
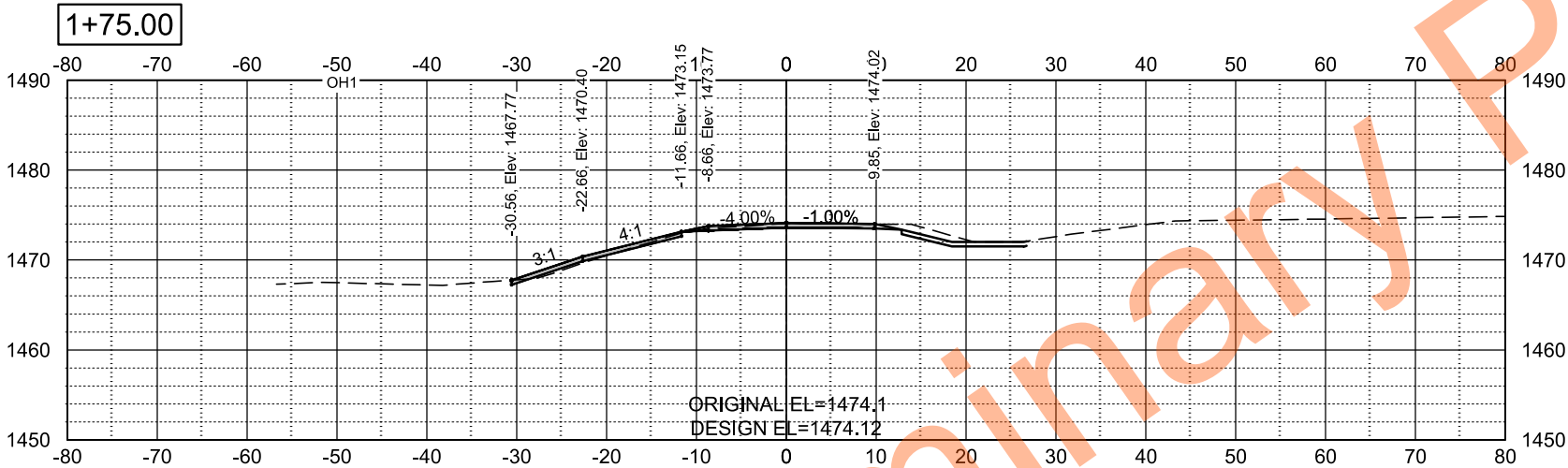
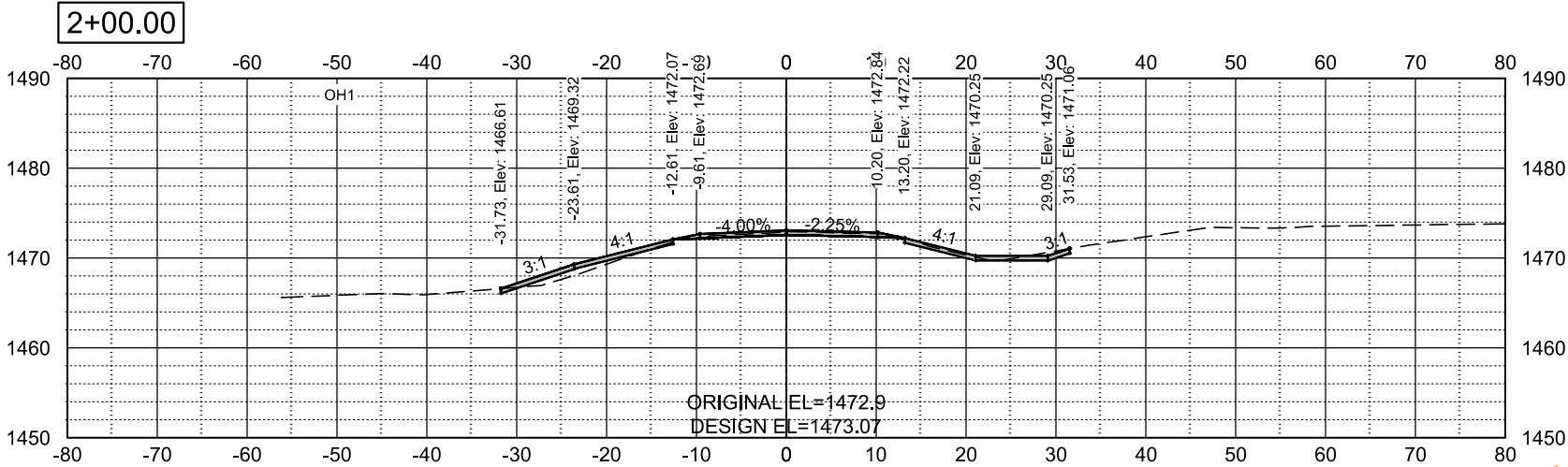
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CROSS-SECTIONS



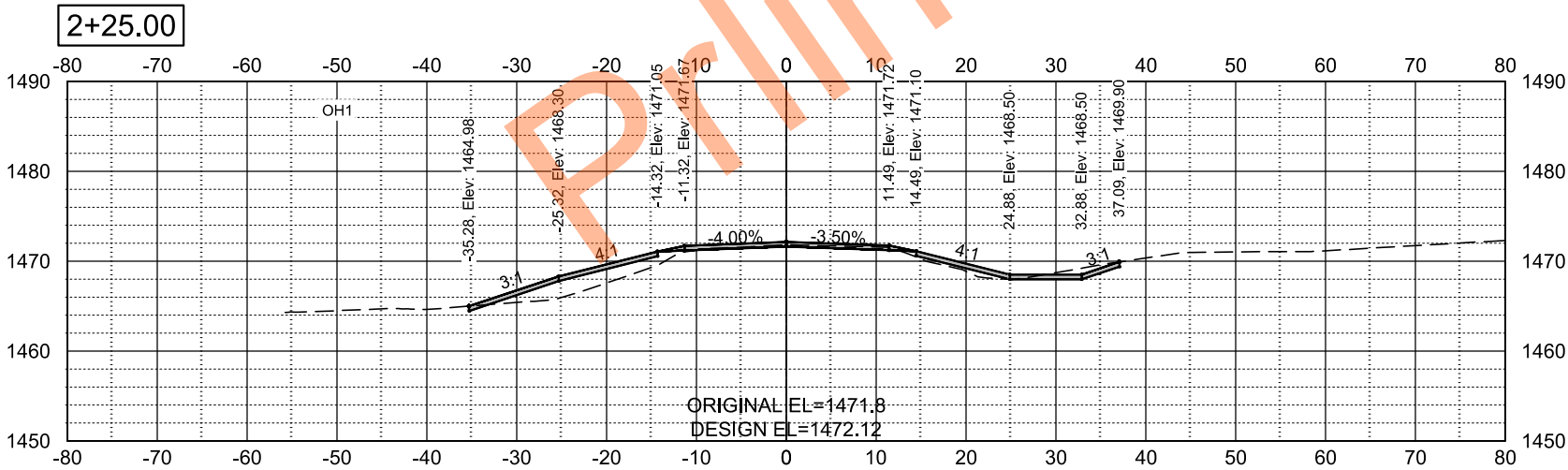
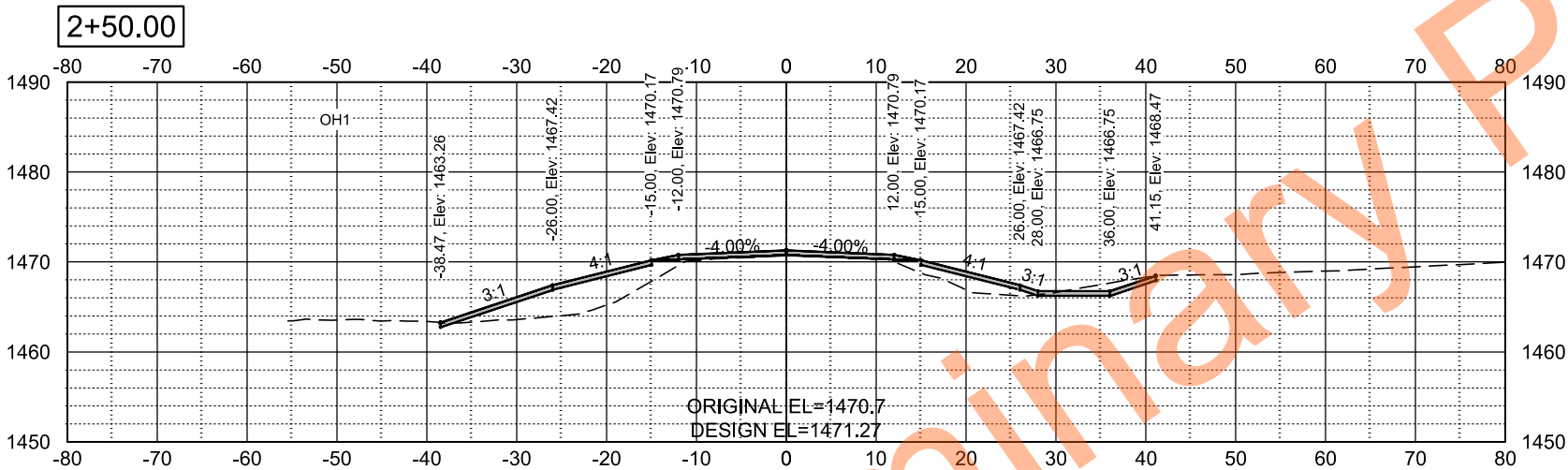
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CROSS-SECTIONS



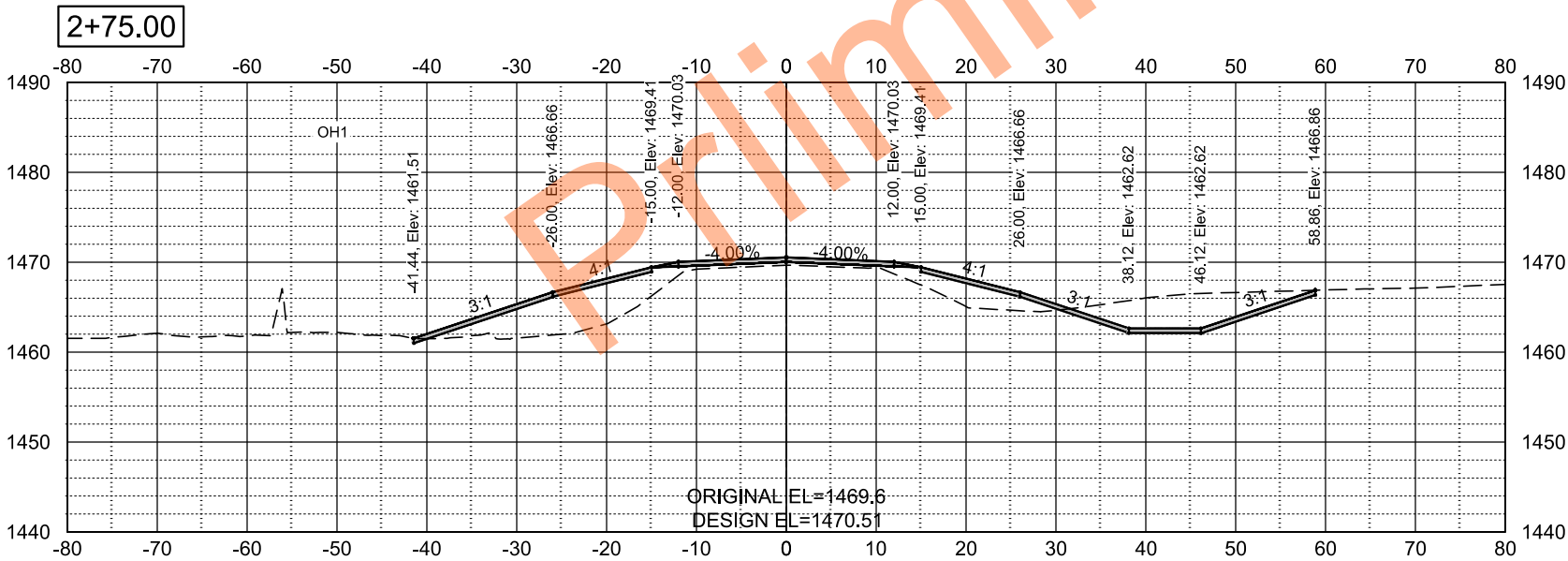
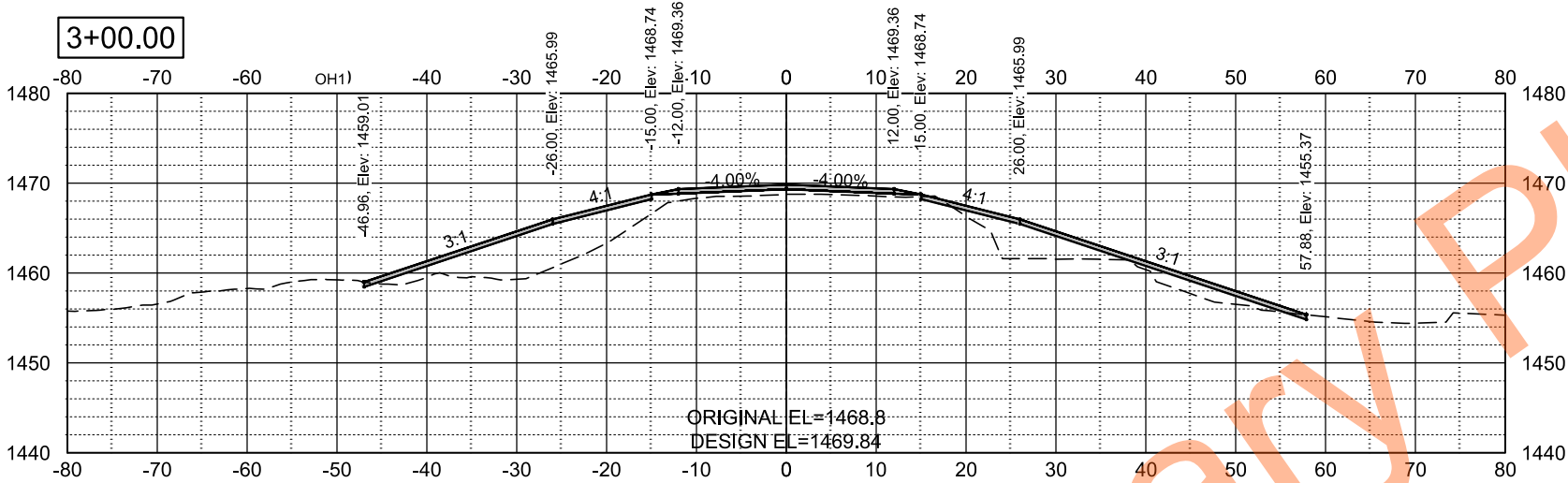
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CROSS-SECTIONS



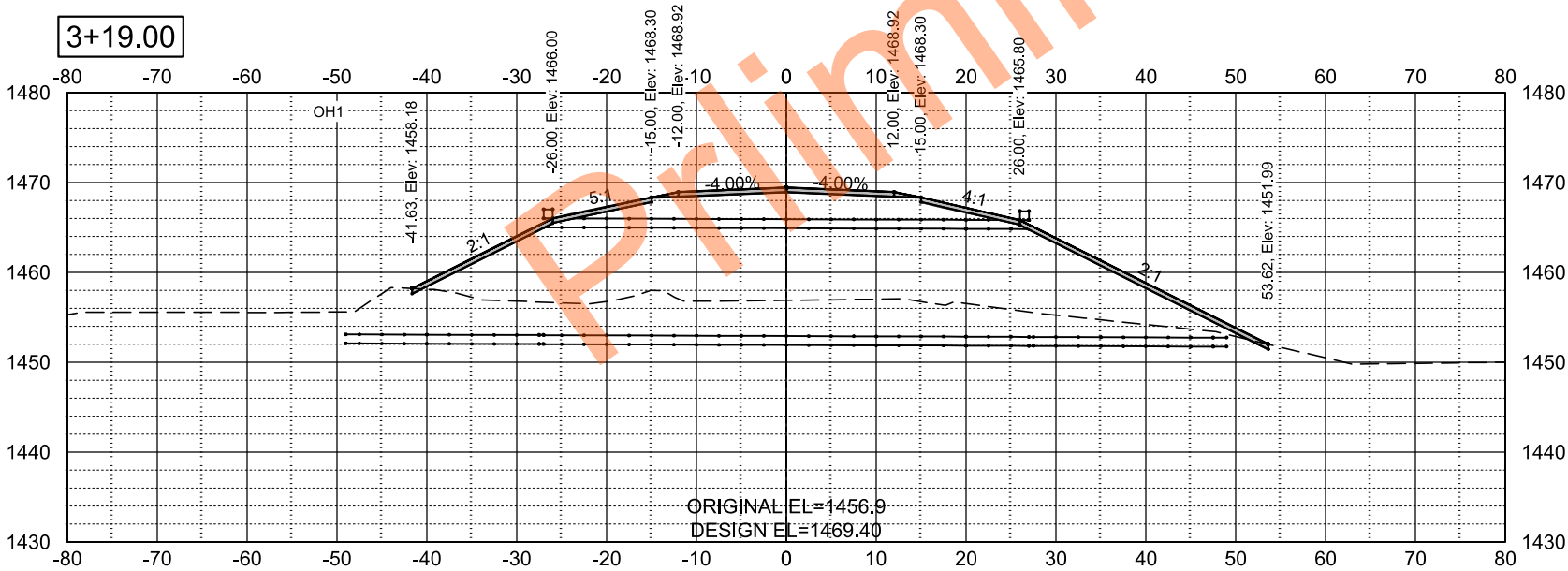
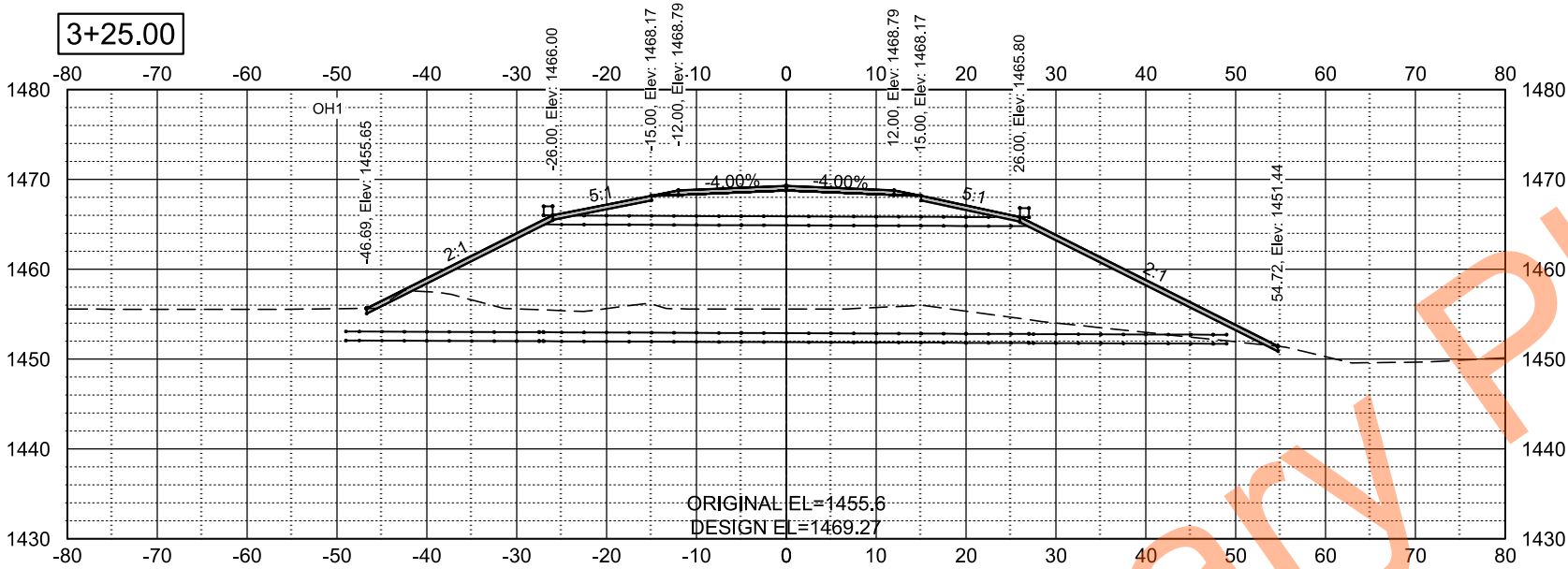
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CROSS-SECTIONS



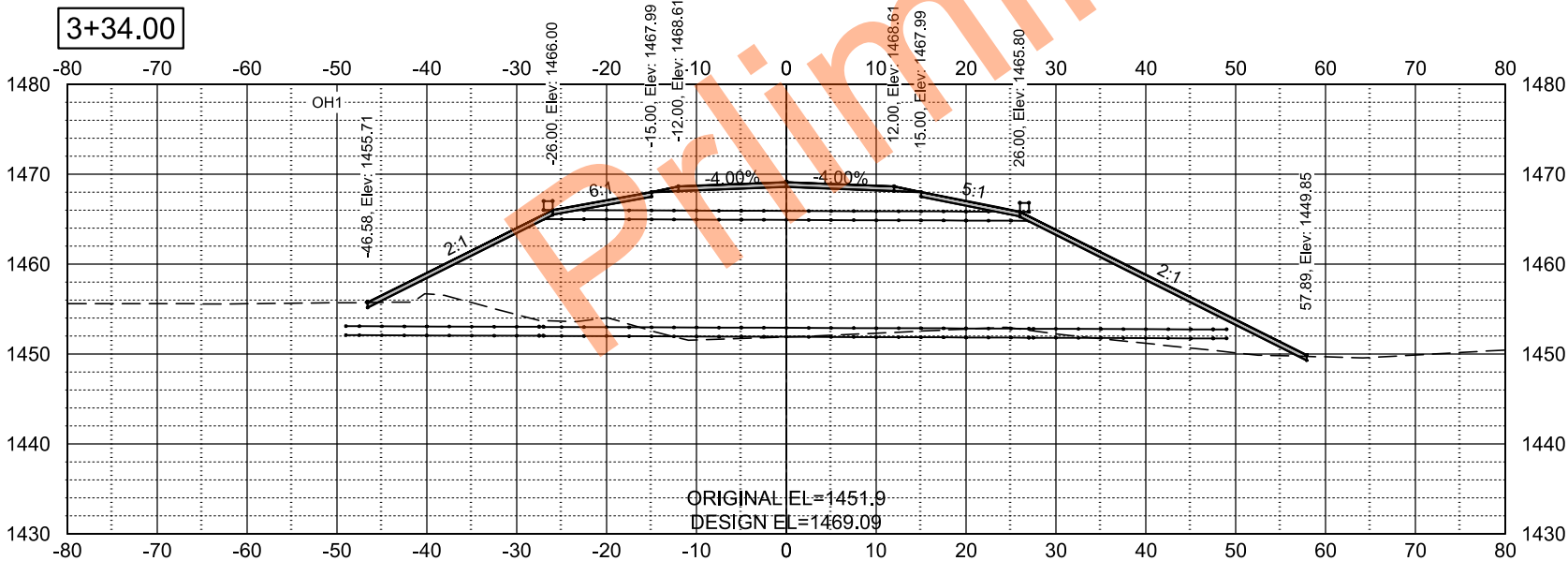
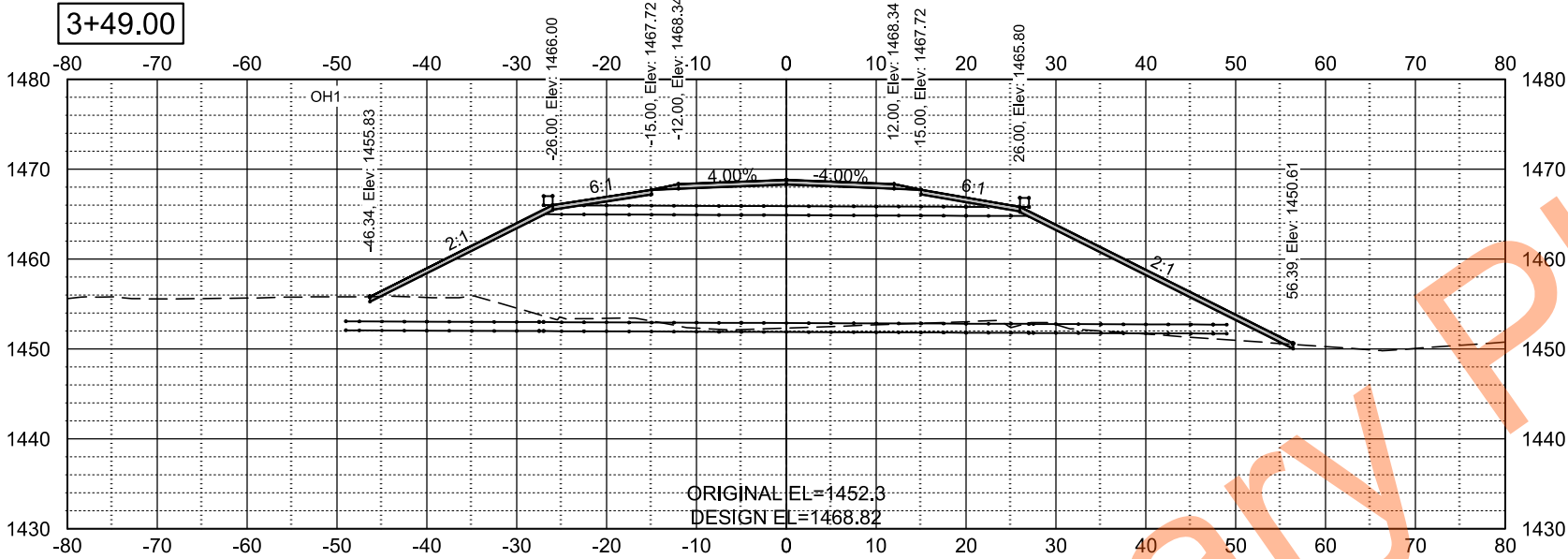
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CROSS-SECTIONS



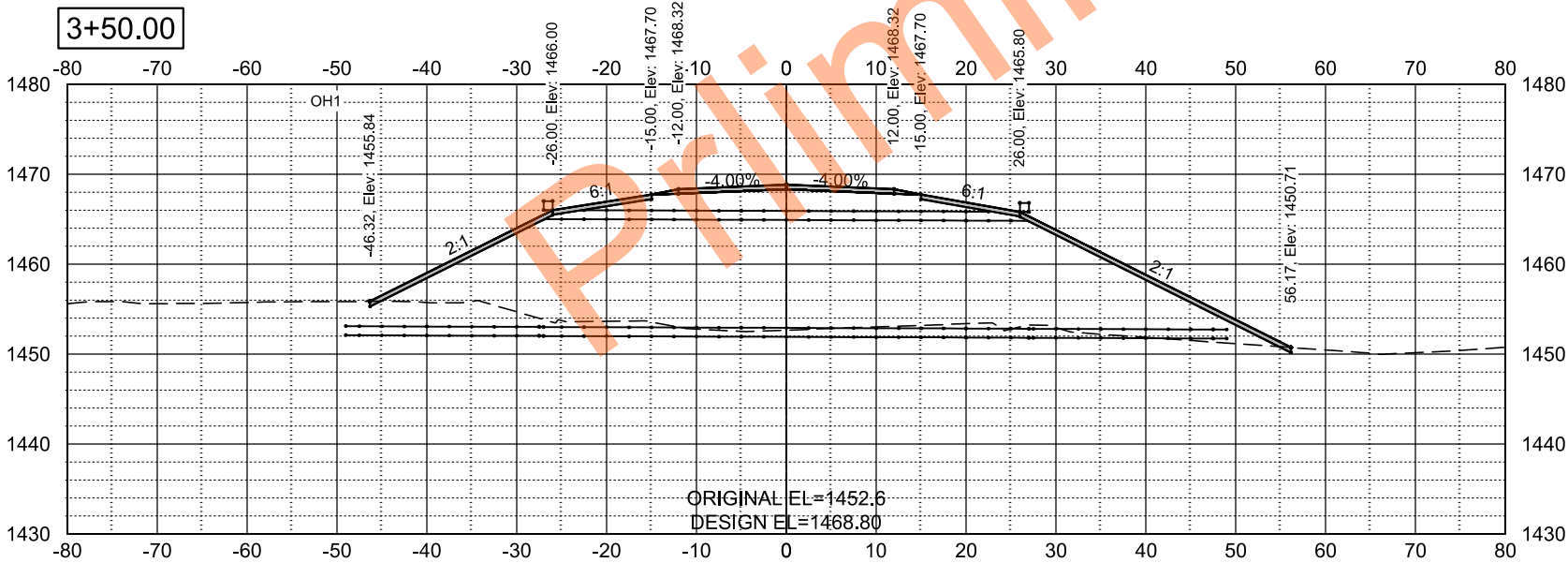
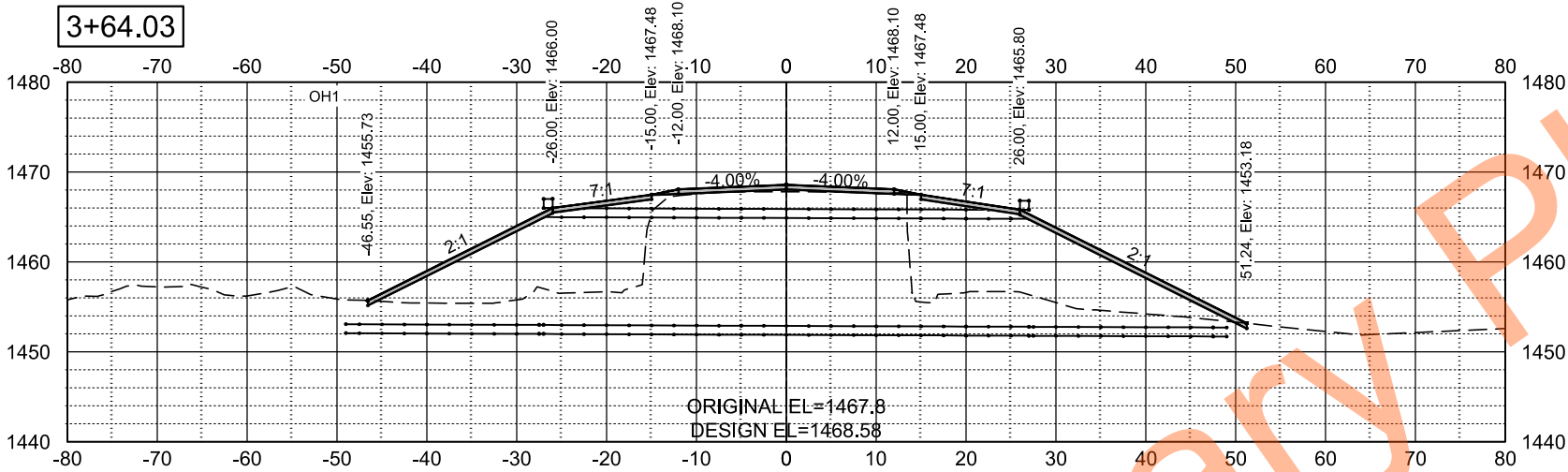
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CROSS-SECTIONS



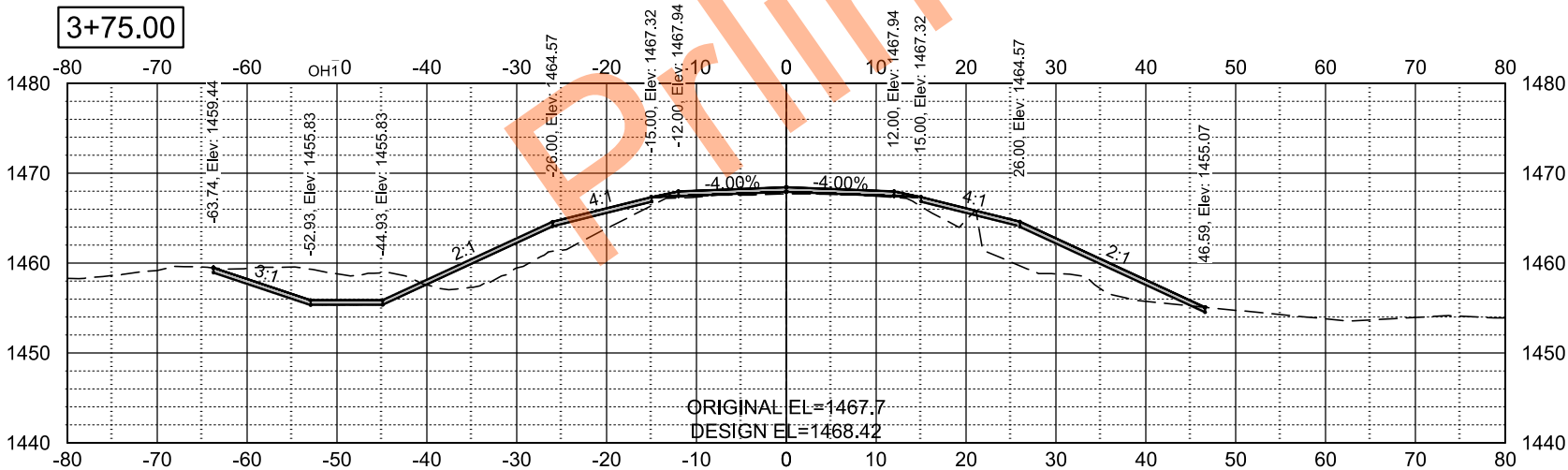
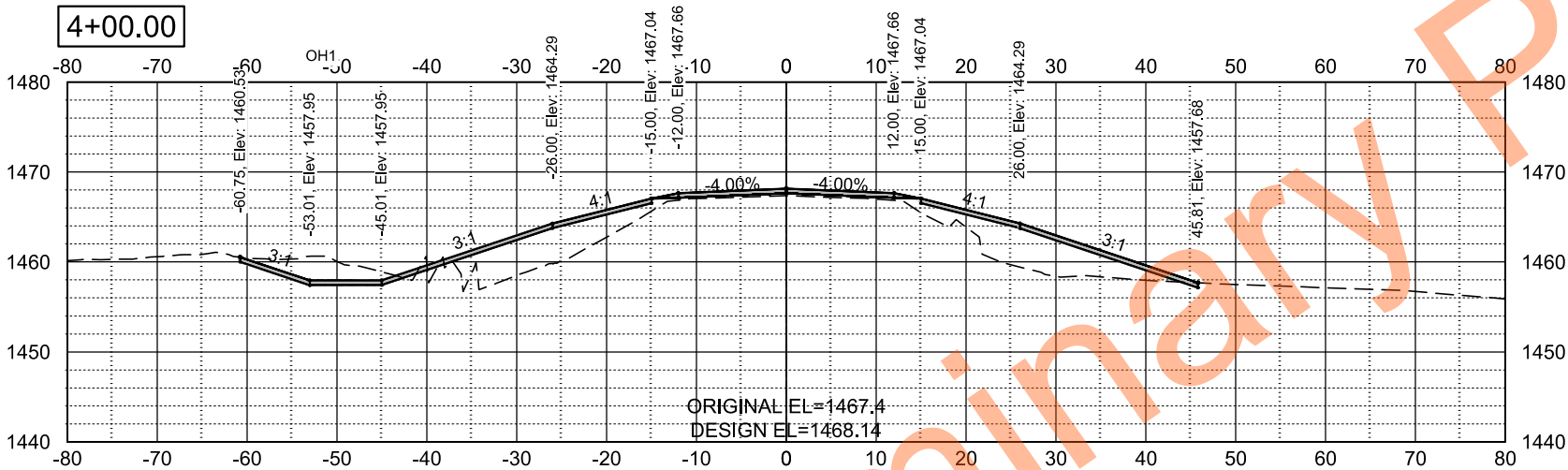
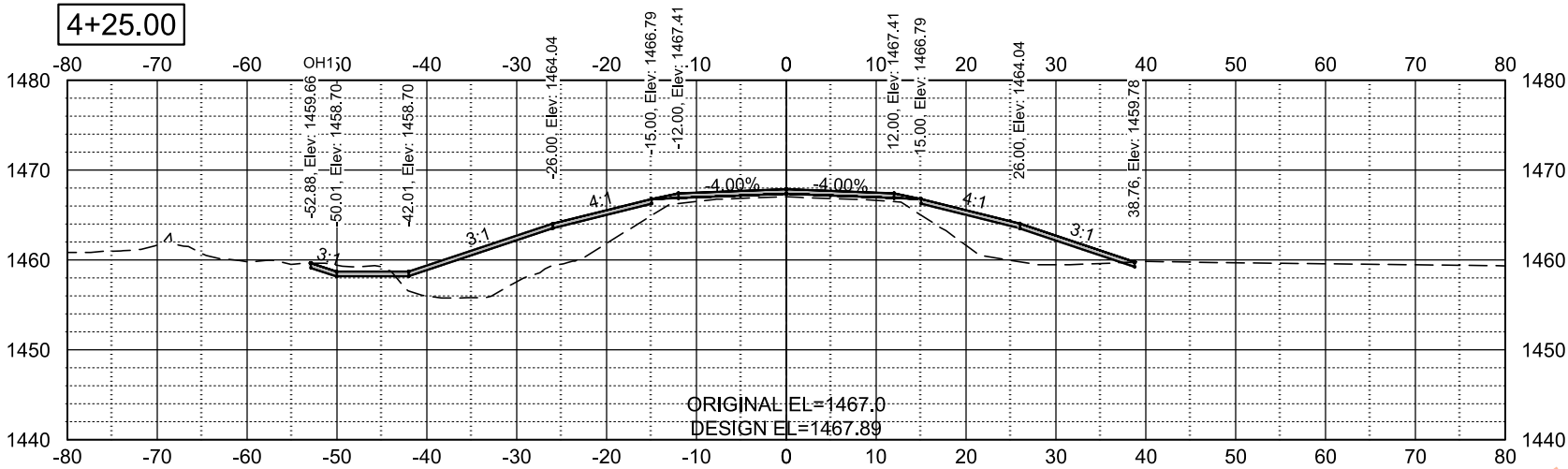
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CROSS-SECTIONS



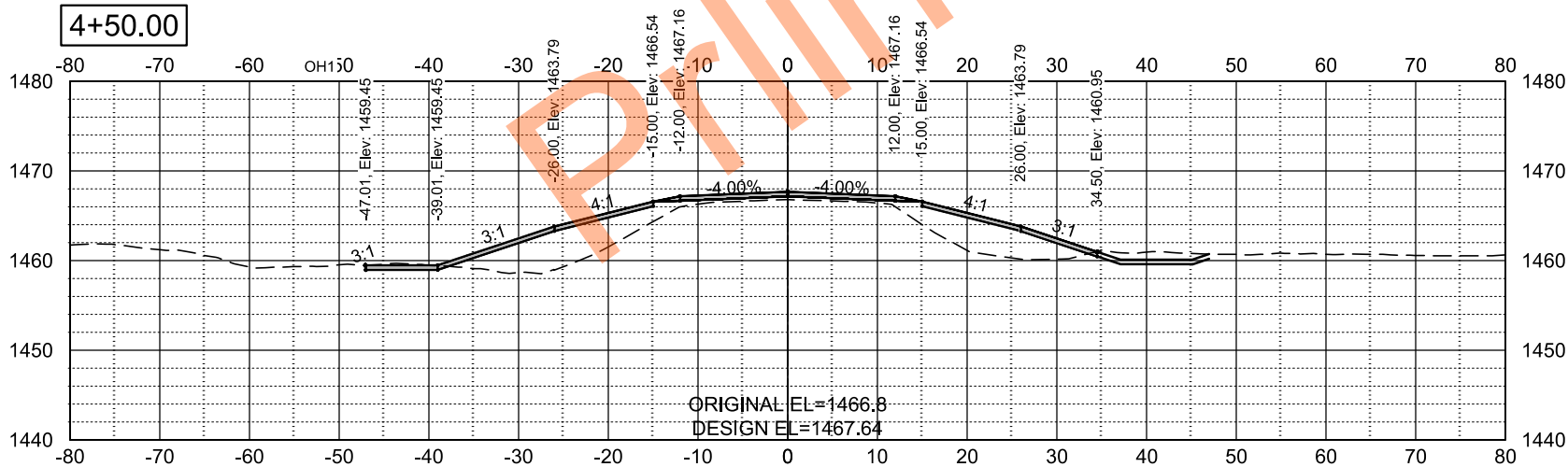
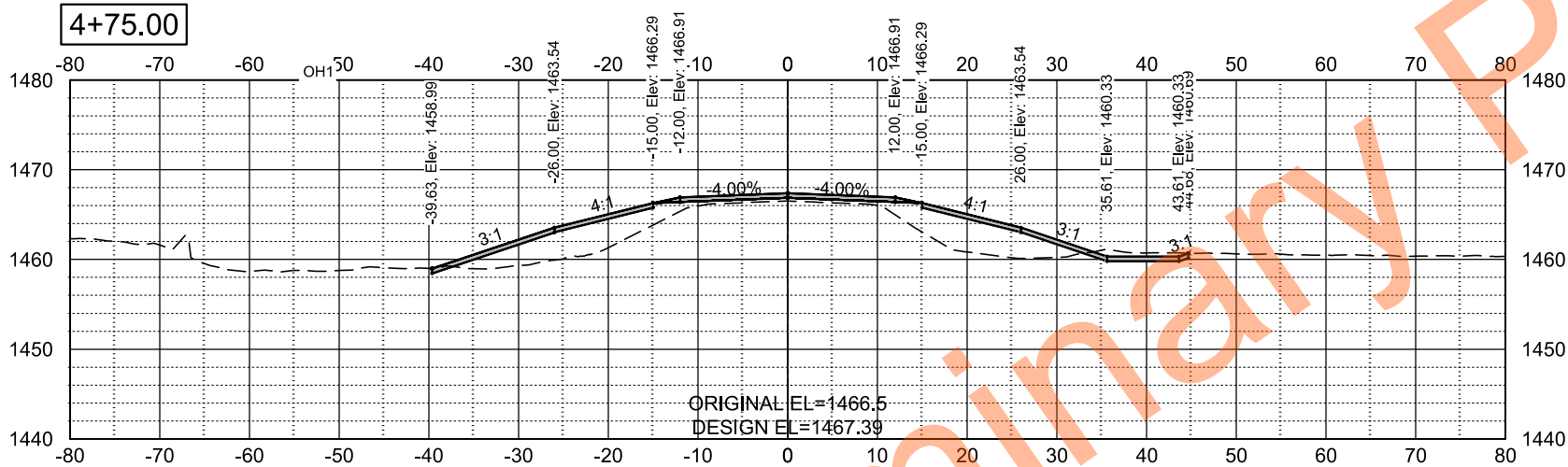
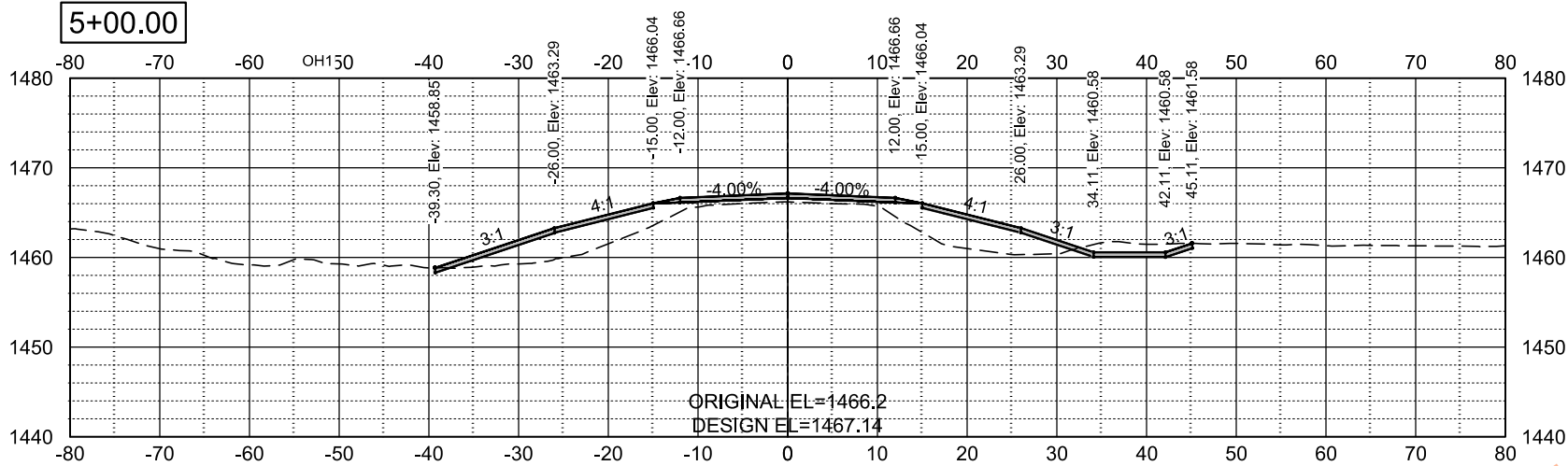
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ND	BRJ-0048(050)	200	10



CROSS-SECTIONS



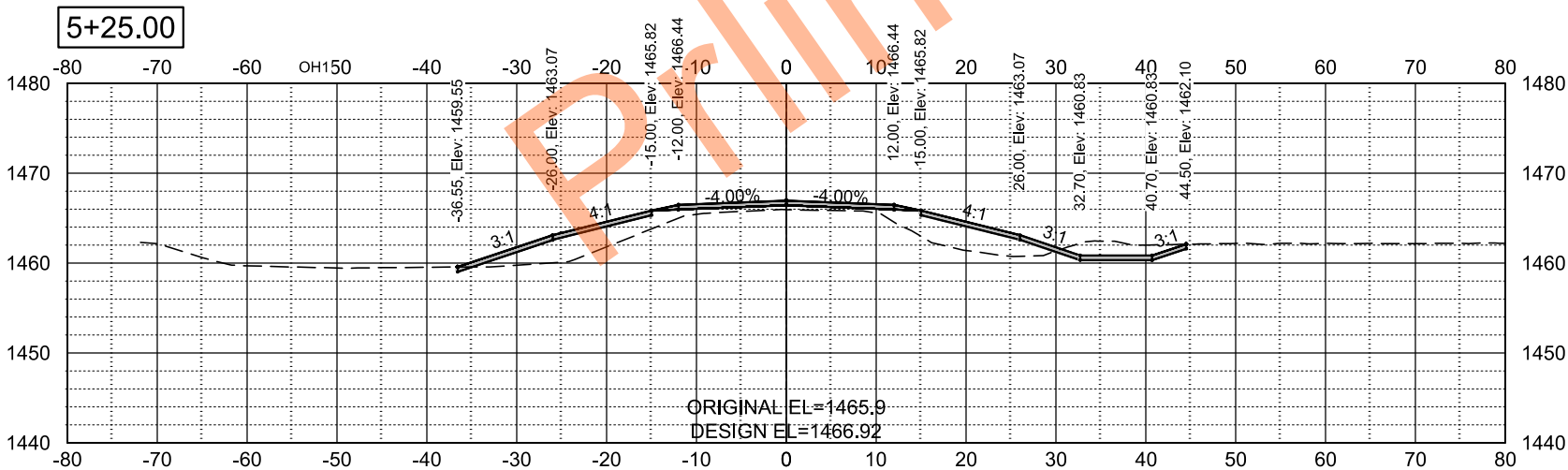
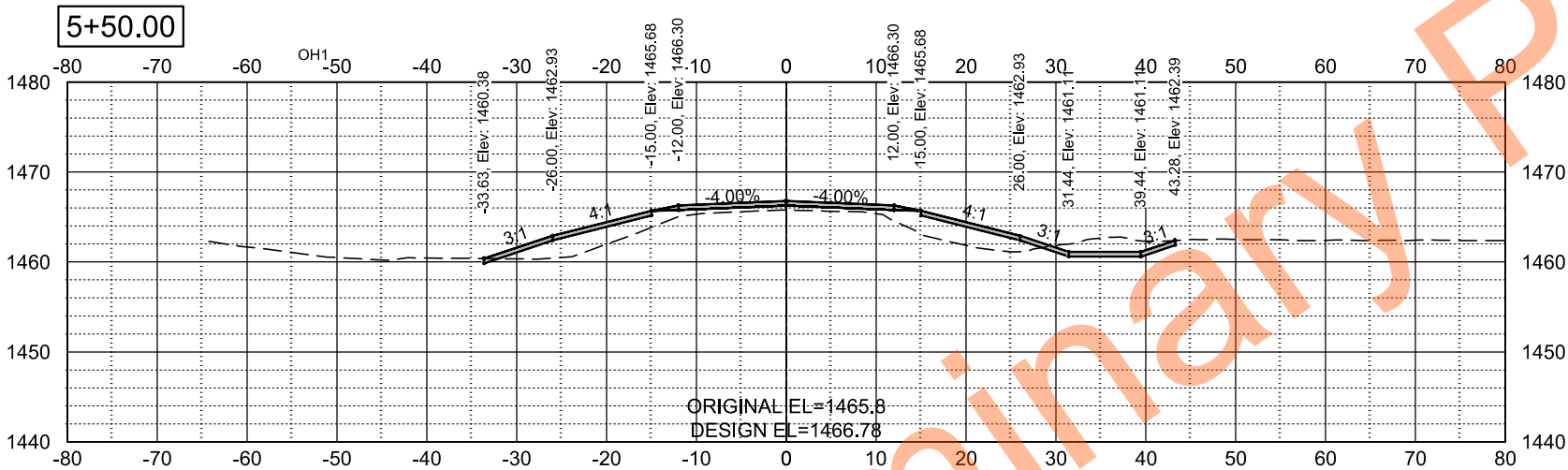
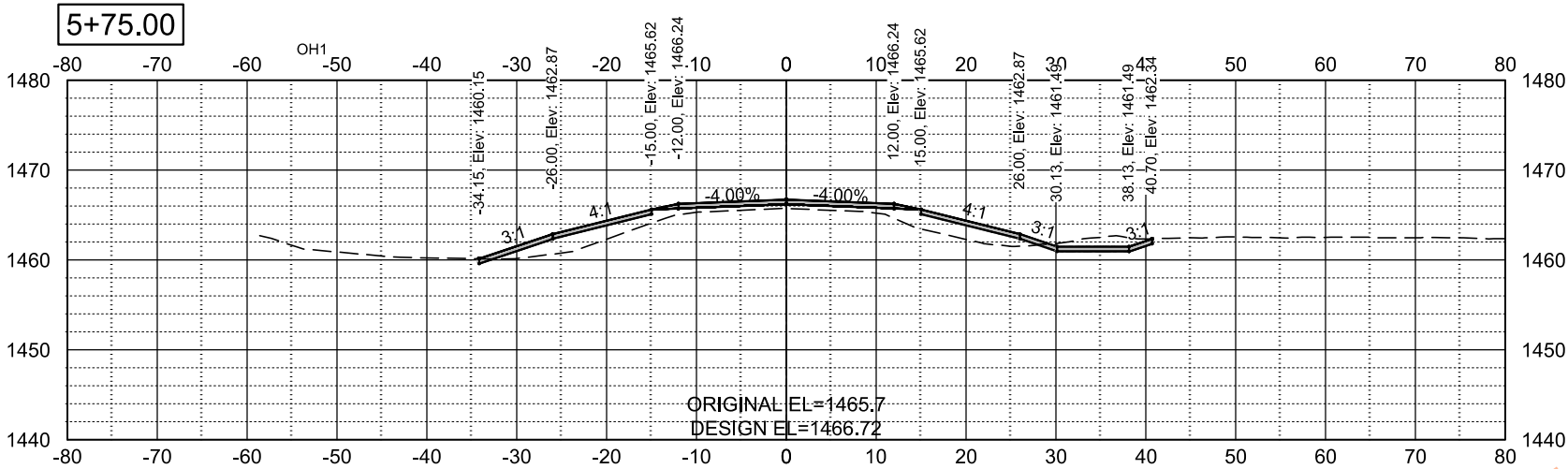
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CROSS-SECTIONS



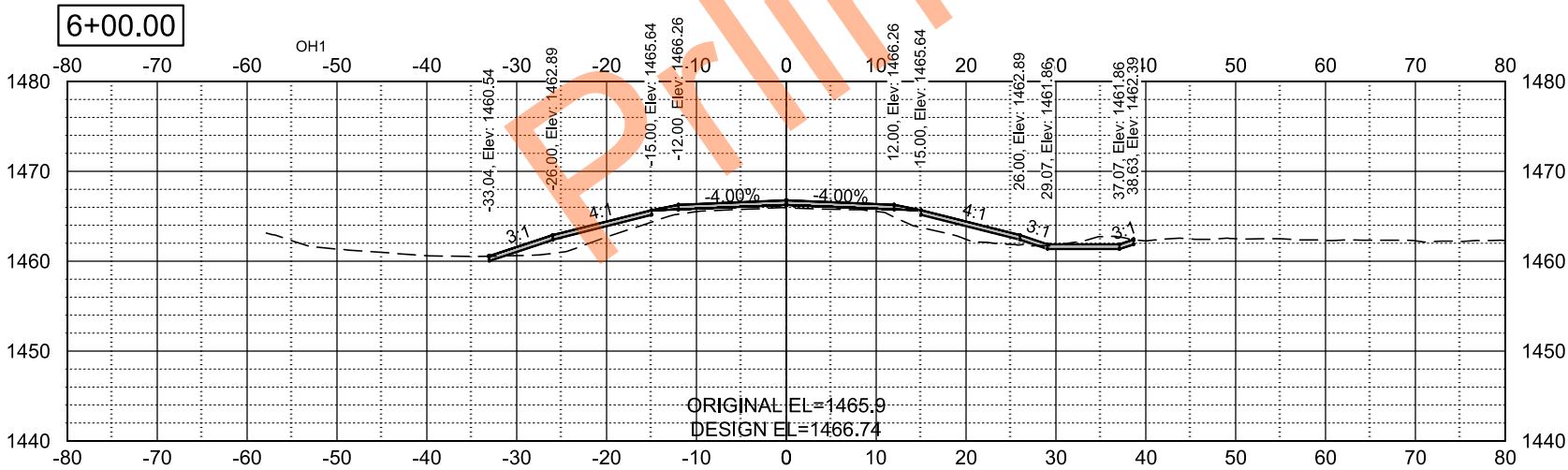
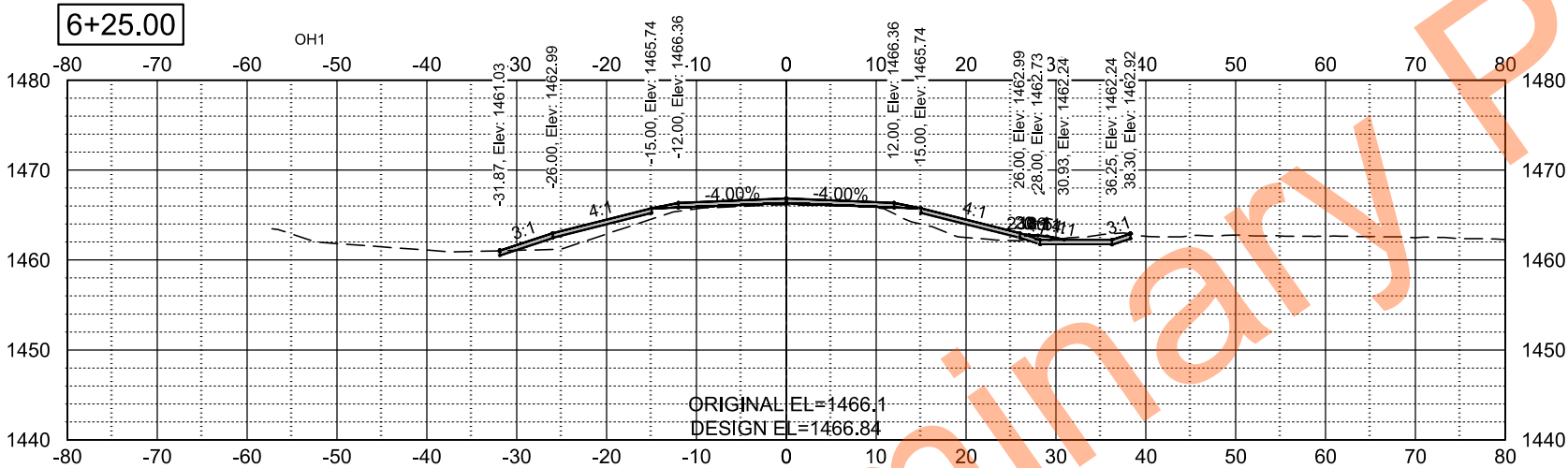
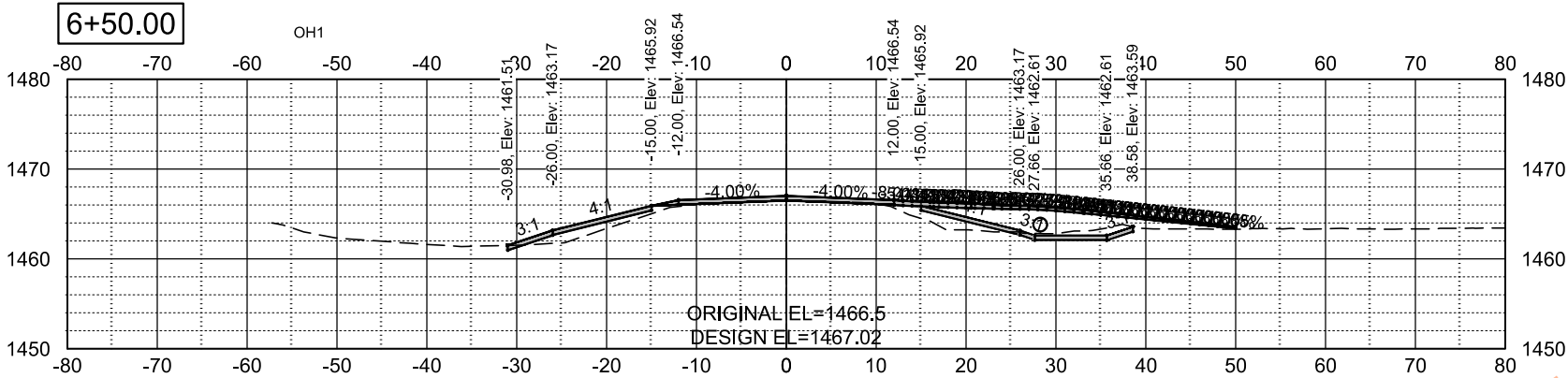
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CROSS-SECTIONS



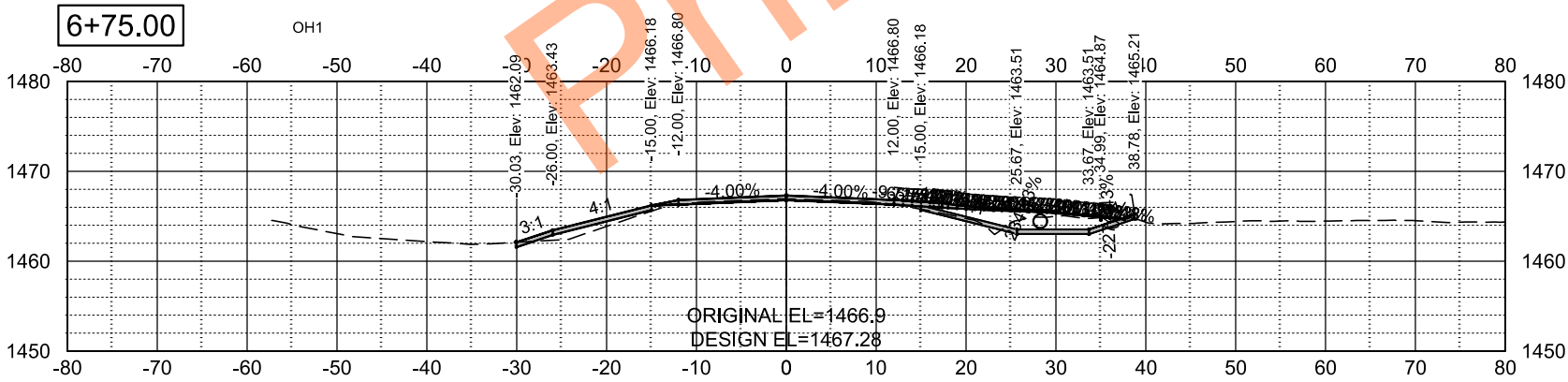
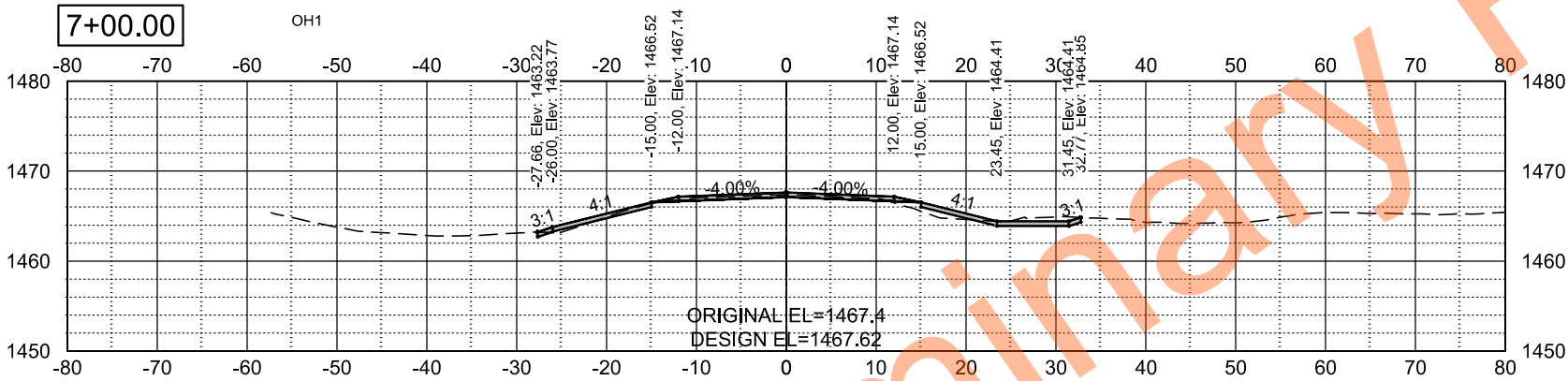
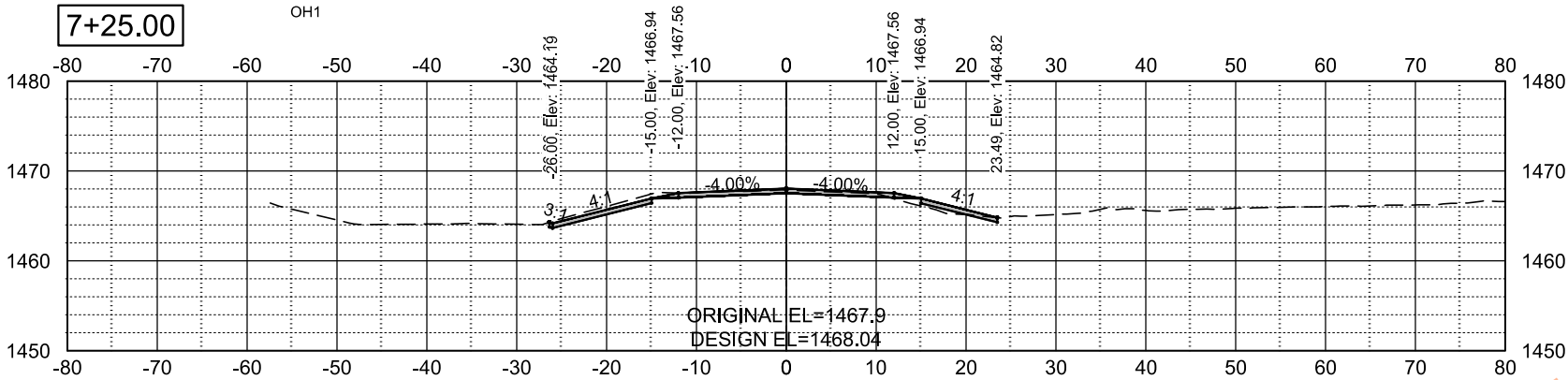
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CROSS-SECTIONS



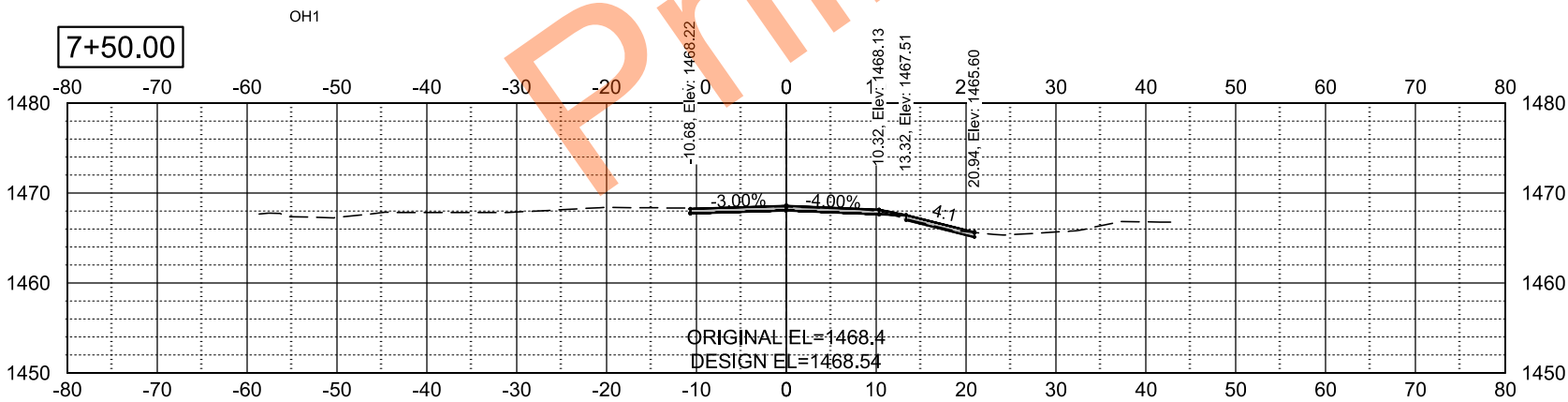
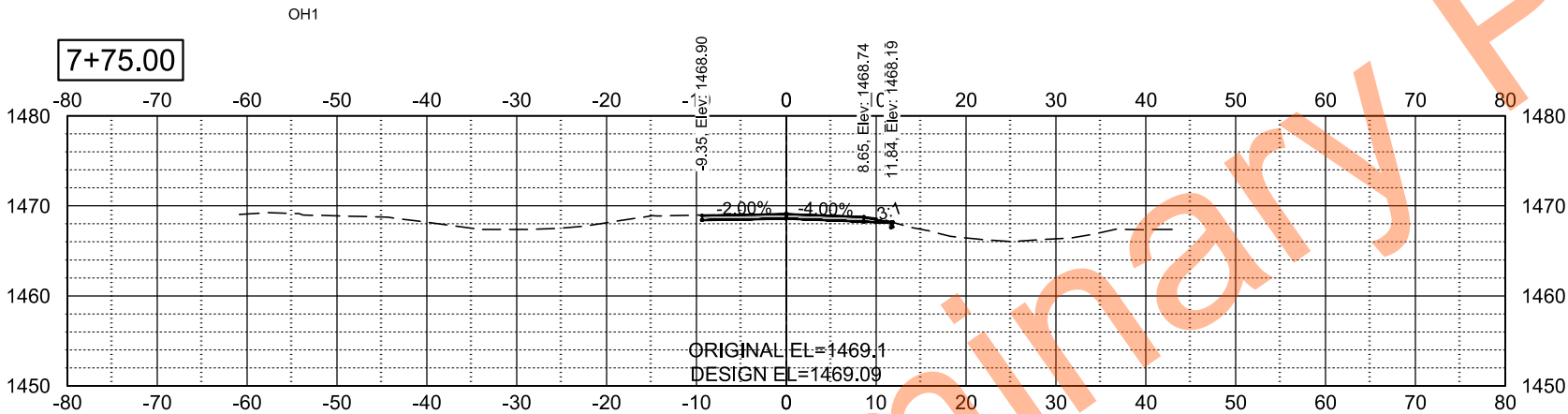
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CROSS-SECTIONS



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	BRJ-0048(050)	200	15



NDDOT ABBREVIATIONS

D-101-1

Ⓢ This is a special text character used in the labeling of existing features. It indicates a feature that has an unknown characteristic, potentially based on: lack of description, location accuracy or purpose.

Abn abandoned
Abut abutment
Adj adjusted
Aggr aggregate
Ahd ahead
ARV air release valve
Align alignment
Al alley
Alt alternate
Alum aluminum
ADA Americans with Disabilities Act
& and
Appr approach
Approx approximate
ACP asbestos cement pipe
Asph asphalt
AC asphalt cement
Assmd assumed
@ at
Atten attenuation
ATR automatic traffic recorder
Ave Avenue
Avg average
ADT average daily traffic

Bk back
BF back face
Balc balcony
B Wire barbed wire
Barr barricade
Btry battery
BI beehive inlet
Beg begin
BG below grade
BM bench mark
Bkwy bikeway
Bit bituminous
Blk block
BH bore hole
Bot bottom
Blvd Boulevard
Bndry boundary
Brkwy breakaway
Br bridge
Bldg building
Bus. business
BV butterfly valve
Byp bypass

C Gdrl cable guardrail
Calc calculate
CIP cast iron pipe
CB catch basin
CRS cationic rapid setting
C Gd cattle guard
C To C center to center
CL or ☐ centerline
Ch chain
Chnlk chain-link
Ch Blk channel block
Ch Ch channel change
Chk check
Chsld chiseled
Cir circle
Cl class
Clnt clean-out
Clr clear
Cl&gr clearing & grubbing
Comb. combination
Coml commercial
Compr compression
CADD computer aided drafting & design
Conc concrete
CECB concrete erosion control blanket
Cond conductor
Const construction
Cont continuous
CSB continuous split barrel sample
Contr contraction
Contr contractor
CP control point
Coord coordinate
Cor corner
Corr corrected
CAES corrugated aluminum end section
CAP corrugated aluminum pipe
CMES corrugated metal end section
CMP corrugated metal pipe
CPVCP corrugated poly-vinyl chloride pipe
CSES corrugated steel end section
CSFES corrugated steel flared end section
CSP corrugated steel pipe
CSTES corrugated steel traversable end section
Co County
Crse course
Ct Court
Xarm cross arm
Xbuck cross buck
Xsec cross sections
Xing crossing
Xrd crossroad
Crm crown

Culv culvert
C&G curb & gutter
CI curb inlet
CR curb ramp
C cut

Dd Ld dead load
Defl deflection
Defm deformed
DInt delineate
DIntr delineator
Depr depression
Desc description
Det detail
DWP detectable warning panel
Dtr detour
Dia or ø diameter
Dir direction
Dist distance
DM disturbed material
DB ditch block
DG ditch grade
Dbl double
Dn down
Dwg drawing
Dr drive
Drwy driveway
DI drop inlet
D dry density

Ea each
Esmt easement
E East
EB Eastbound
Elast elastomeric
EL electric locker
E Mtr electric meter
EVSE electric vehicle supply equipment
Elec electric/al
EDM electronic distance meter
Elev or El elevation
Ellipt elliptical
Emb embankment
Emuls emulsion/emulsified
ES end section
Engr engineer
ESS environmental sensor station
Eq equal
Evgr evergreen
Exc excavation
Exst existing
Exp expansion
Expy Expressway
E external of curve
Extru extruded

FOS factor of safety
Fed Federal
FP feed point
Fn fence
Fn P fence post
FO fiber optic
FD field drive
F fill
FAA fine aggregate angularity
FH fire hydrant
Fl flange
Flrd flared
FES flared end section
F Bcn flashing beacon
FA flight auger sample
FL flow line
Ftg footing
FM force main
Fnd found
Fdn foundation
Frac fractional
Frwy freeway
Frt front
FF front face
F Disp fuel dispenser
FFP fuel filler pipes
FLS fuel leak sensor
Furn furnish/ed

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



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 P _L	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
4-14-25	- Continued from D-101-3 General Revisions



NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

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

GTR RAMSEY WD
GT PLNS NAT GAS
HALS TEL
IDEA1
INT-COMM TEL
KANEB PL
KEM ELEC
KOCH GATH SYS
LKHD PL
LWR YELL R ELEC
LUMEN
MCKNZ CON
MCKNZ ELEC
MCKNZ WRD
MCLEOD
MCLN ELEC
MCLN-SHRDN R WAT
MDU
MIDCO
MIDSTATE TEL
MINOT CABLE
MINOT TEL
MISS VALL COMM
MISS W W S
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
Praeliands Energy Marketing
Polar Communications
Private Electric
Qwest Communications
R & T Water District

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

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

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



LINE STYLES

D-101-20

Existing Topography

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

	Existing 3-Cable w Posts
	Site Boundary
	Existing Berm, Dike, Pit, or Earth Dam
	Existing Ditch Block
	Existing Tree Boundary
	Existing Brush or Shrub Boundary
	Existing Retaining Wall
	Existing Planter or Wall
	Existing W-Beam Guardrail with Posts
	Existing Railroad Switch
	Gravel Pit - Borrow Area
	Existing Wet Area-Vegetation Break
	Existing High Tension Cable Guardrail
	Existing High Tension Cable Guardrail with Posts
	Proposed Topography
	3-Cable w Posts
	Flow
	Fence
	Remove Line
	Wall
	Retaining Wall (Plan View)
	W-Beam w Posts
	High Tension Cable Guardrail with Posts

Existing Utilities

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

Proposed Utilities

	24 Inch Pipe
	Reinforced Concrete Pipe
	Under Drain
	Edge Drain

Traffic Utilities

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

Sign Structures

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

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

LINE STYLES

D-101-21

Right Of Way

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

Boundary Control

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

Cross Sections and Typicals

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

Geotechnical

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

	Subgrade Reinforcement
	Failure Line

Countours

	Depression Contours
	Supplemental Contour

Profile

	Subgrade, Subcut or Ditch Grade
	Topsoil Profile

Striping

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

Pavement Joints

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

Bridge Details

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

Erosion Control

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

Environmental

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

07-01-14

REVISIONS

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

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12 18 2020

SYMBOLS

D-101-30



North Arrow (Half Scale)

Alignment Data Point

Alignment Monument

Spot Elevation

Existing Miscellaneous Spot

Existing Access Control Arrow

Existing Benchmark

Reset USGS Marker

Iron Monument Found

Iron Pin R/W Monument

Property Corner

Iron Pin Reference Monument

Right of Way Marker (Exst, Ppsd, Reset)

Existing Federal Reference Corner

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

Existing Witness Corner

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

Existing Traverse PI Aerial Panel

Existing Reference Marker Point NGS

Existing EFB Misc



Existing Bush or Shrub



Existing Large Evergreen Tree



Existing Small Evergreen Tree



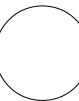
Existing Large Tree



Existing Small Tree



Existing Tree Trunk



Cairn or Stone Circle



Existing Artifact



Existing Satellite Dish



Existing Weather Station



Existing Windmill or Tower



Reinforced Pavement



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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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



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

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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

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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

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

Connection to infer that
probably will not be displayed

E2

E2

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.

* 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.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-20-18	
REVISIONS	
DATE	CHANGE
6/14/2023	CADD Standards Update

KIRK J. HOFF

REGISTERED

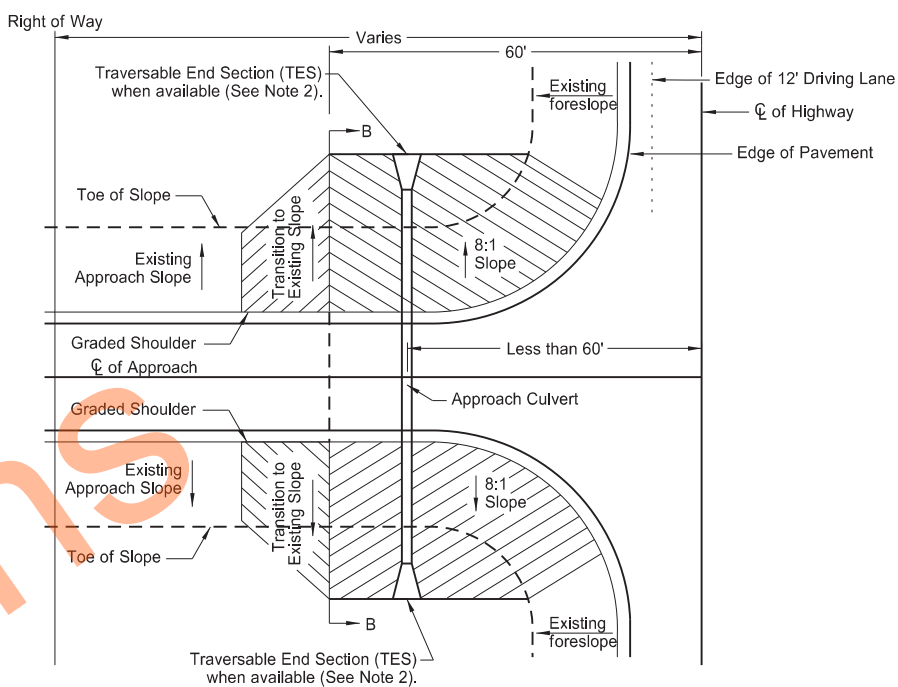
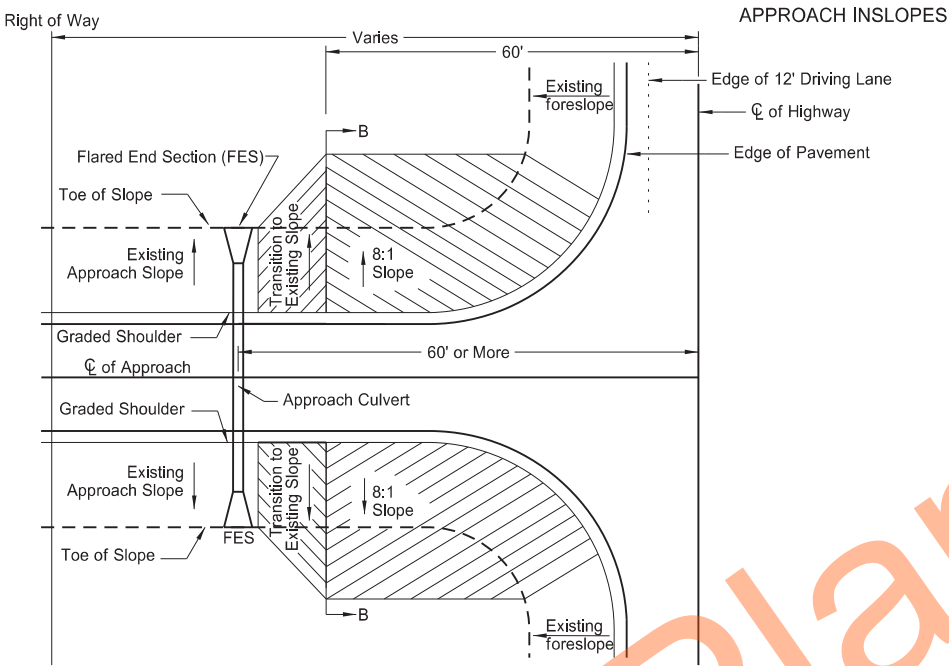
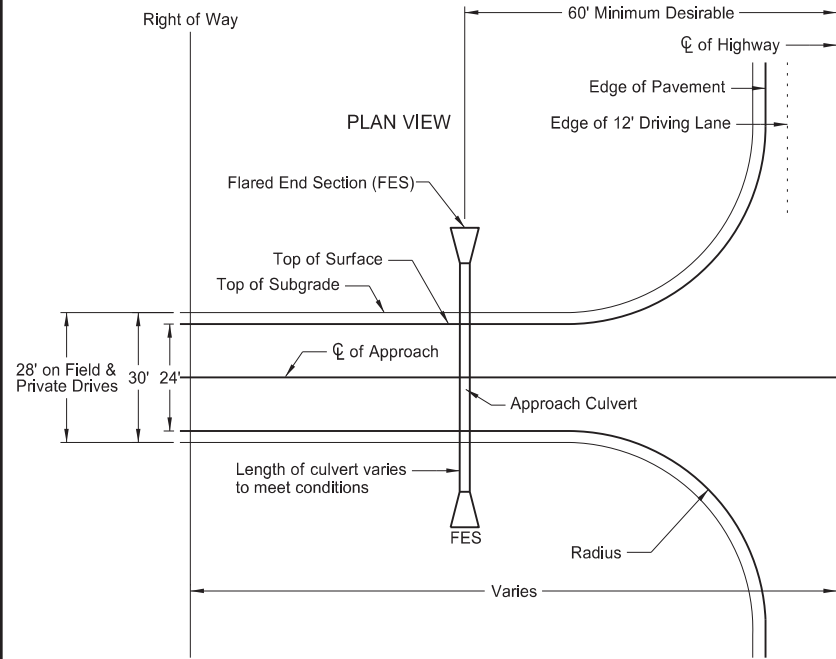
PROFESSIONAL
PE-4683

ENGINEER
NORTH DAKOTA

06/14/23

STANDARD RURAL APPROACHES

D-203-8



CASE 1
APPROACH PIPE LOCATED
60' OR MORE FROM C

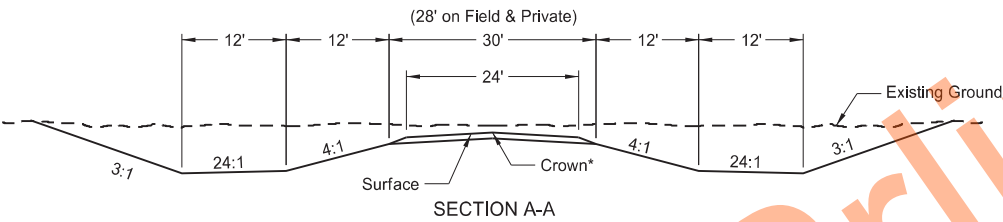
CASE 2
APPROACH PIPE LOCATED
LESS THAN 60' FROM C

Approach Pipe Traversable End Sections (TES)

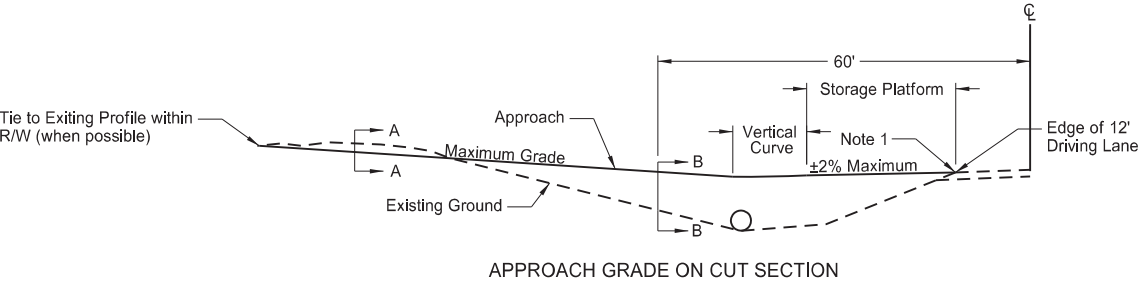
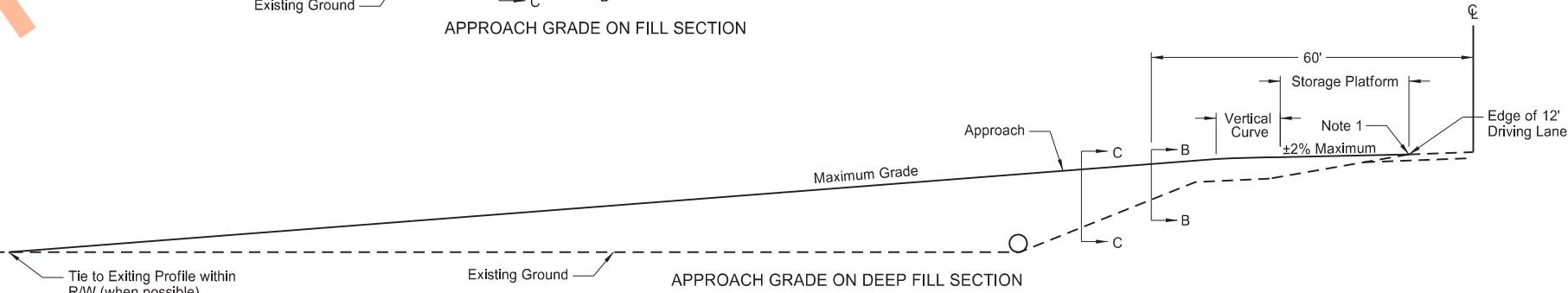
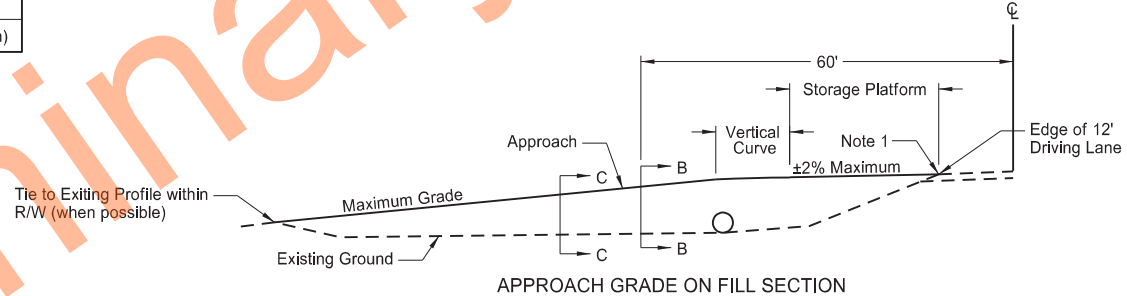
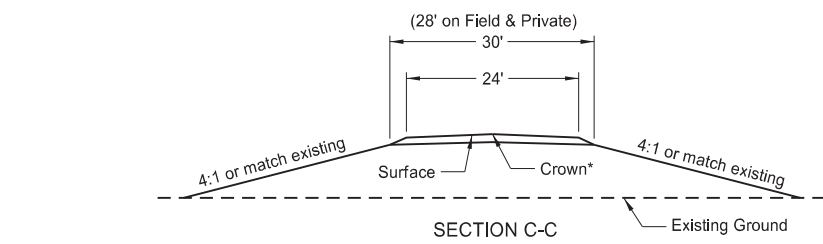
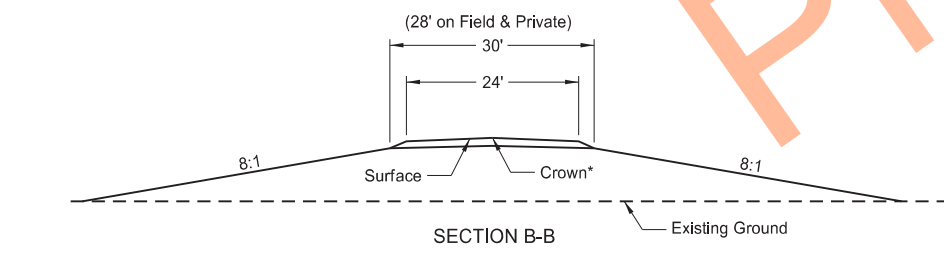
RCP	CSP	CSP Arch
15"	15"	
18"	18"	21"x15"
		24"x18"
24"	24"	28"x20"

CRITERIA FOR RURAL APPROACH TYPES

	Field Drives	Private Drives	Low Volume Public Roads
Radius	R=40 ft	R=40 ft	R=50 ft
Maximum Grade	10%	7%	7%
Storage Platform	24 ft	24 ft	50 ft
Vertical Curve Length	10 ft	10 ft	Varies (Min. 20 mph)



*2.1% crown for paved surface
*3.0% crown for gravel surface



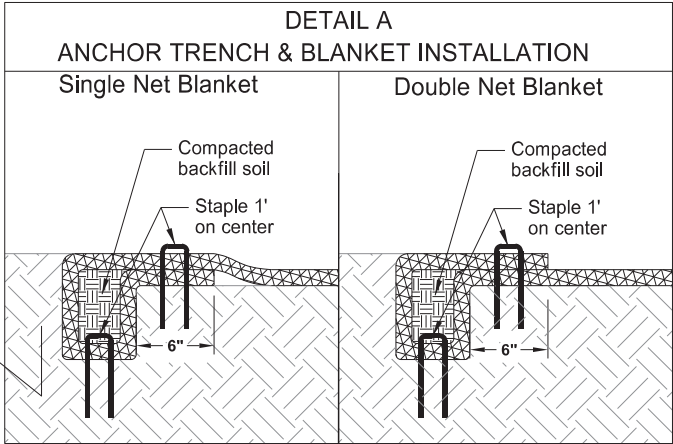
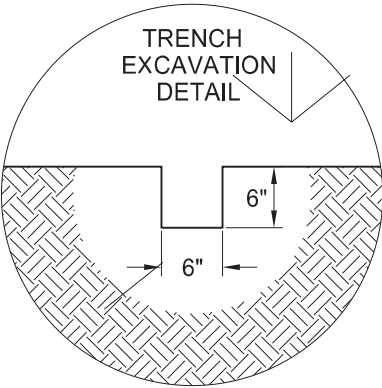
- NOTES:
- 5% Max Rollover between approach storage platform and highway.
 - Approach pipes up to 24" diameter are acceptable (with traversable end sections) for Case 2. Install approach pipes larger than 24" diameter in accordance with Case 1.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-25-14	
REVISIONS	
DATE	CHANGE
06-30-17	Revised Radius, Storage Platform, Inslope dimensions, and Note 1
10-25-19	Changed "Inslope" to "Foreslope"
06-29-22	Added "TES", Table, and Note 2

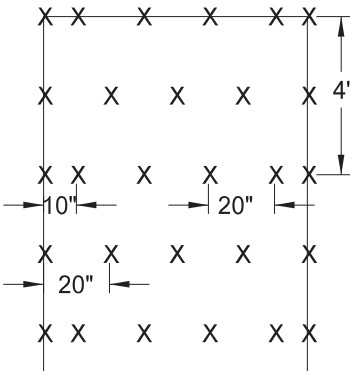
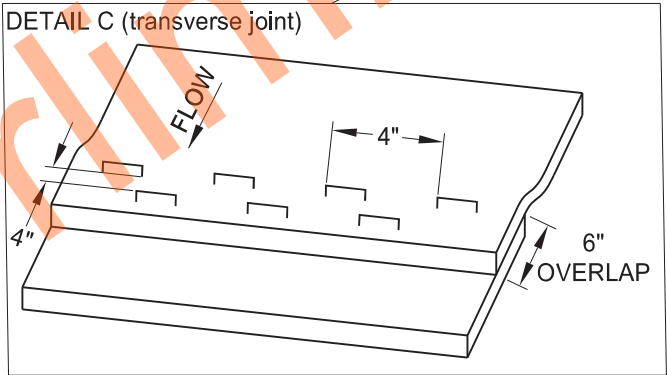
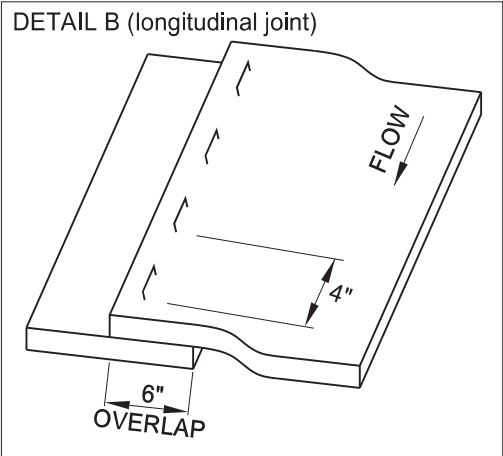


06/29/22

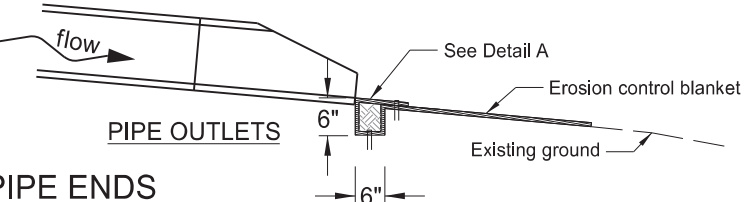
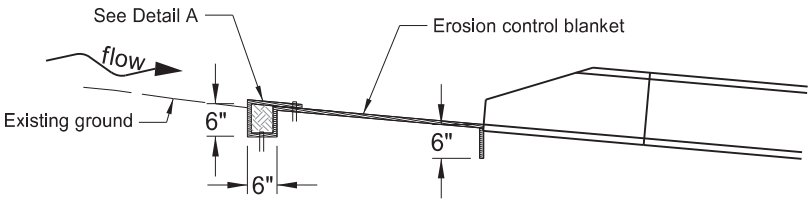
EROSION AND SILTATION CONTROL
EROSION CONTROL BLANKET INSTALLATION



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



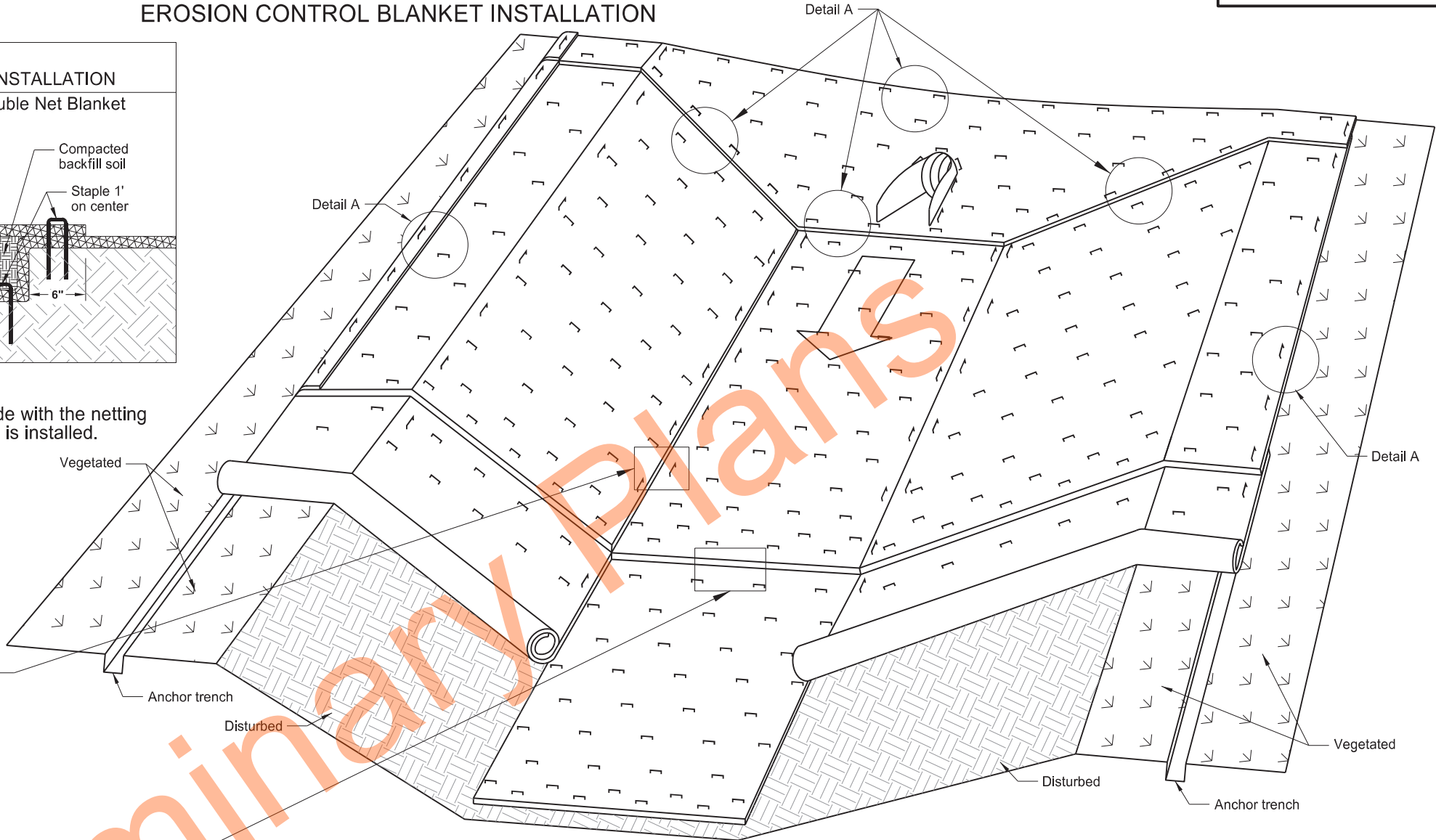
STAPLE PATTERN
(3.8 staples per square yard)



PIPE INLETS

PIPE OUTLETS

INSTALLATION AT PIPE ENDS



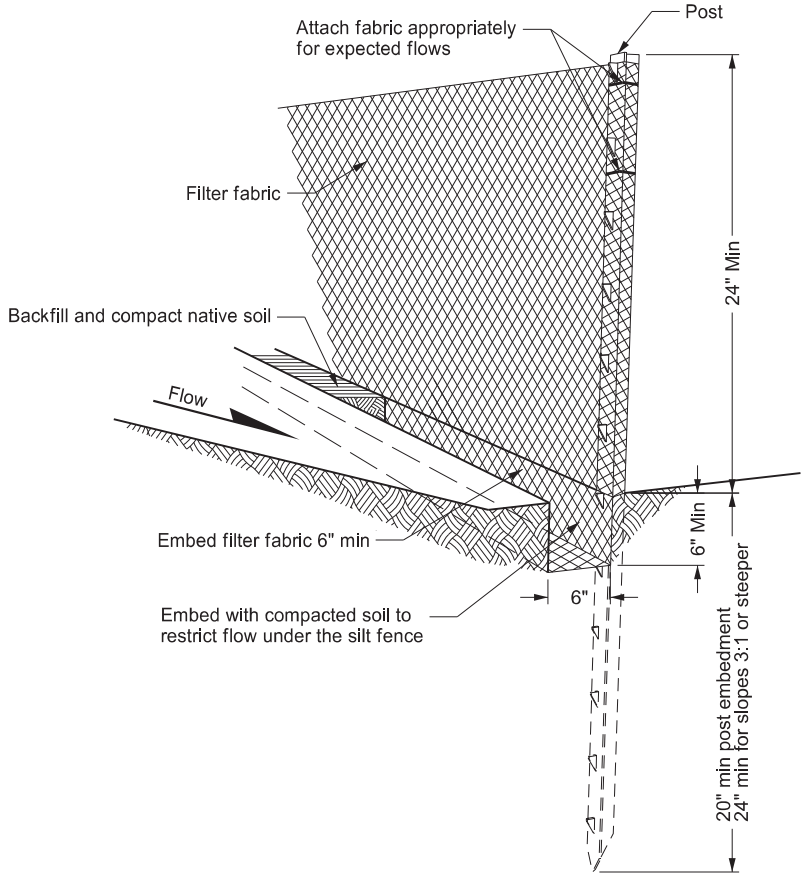
BLANKET LAYOUT
CHANNEL INSTALLATION

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

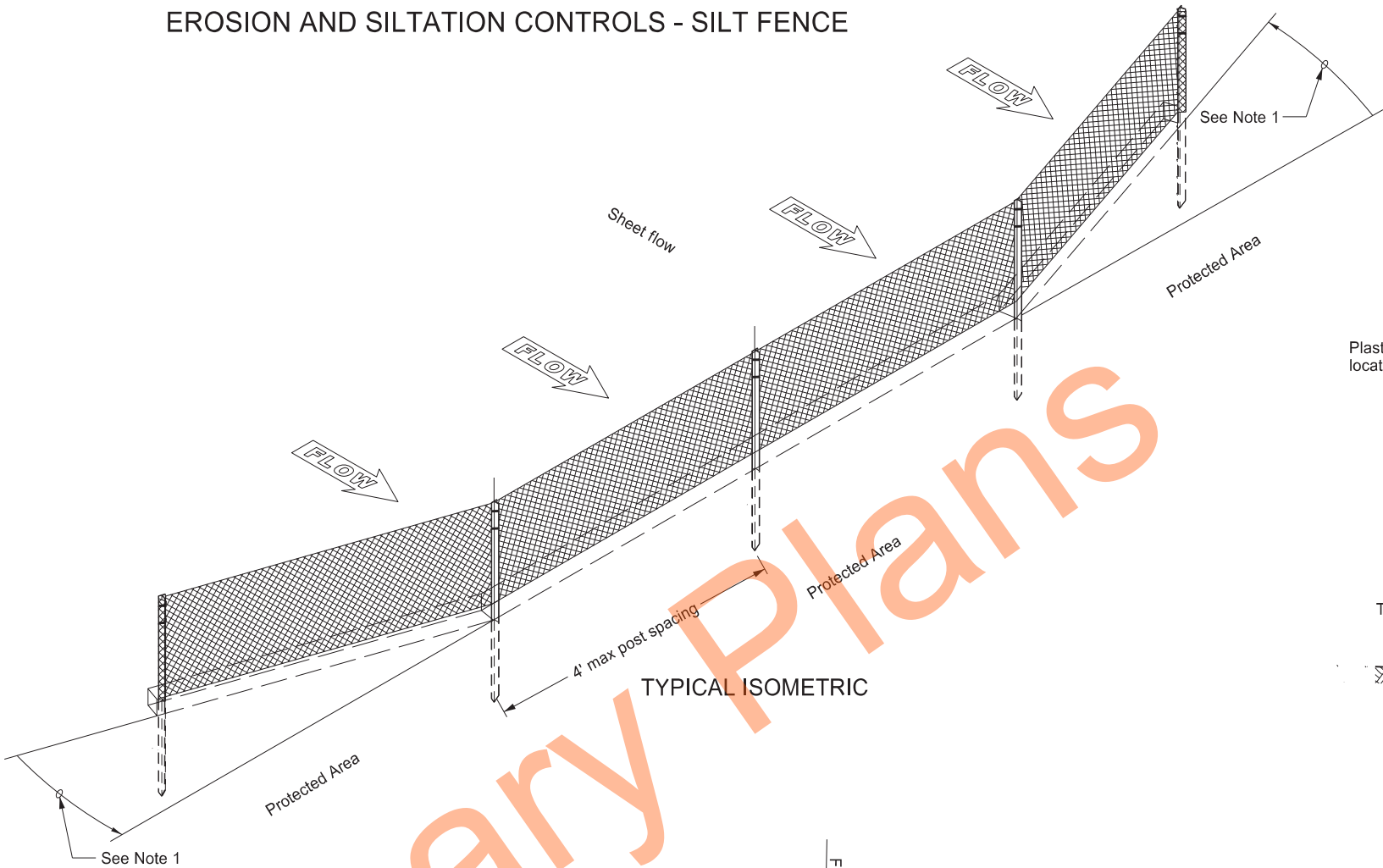


08/27/25

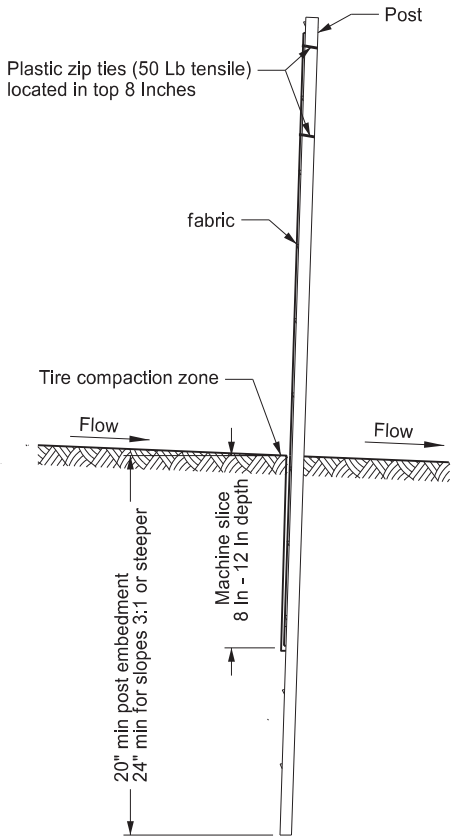
EROSION AND SILTATION CONTROLS - SILT FENCE



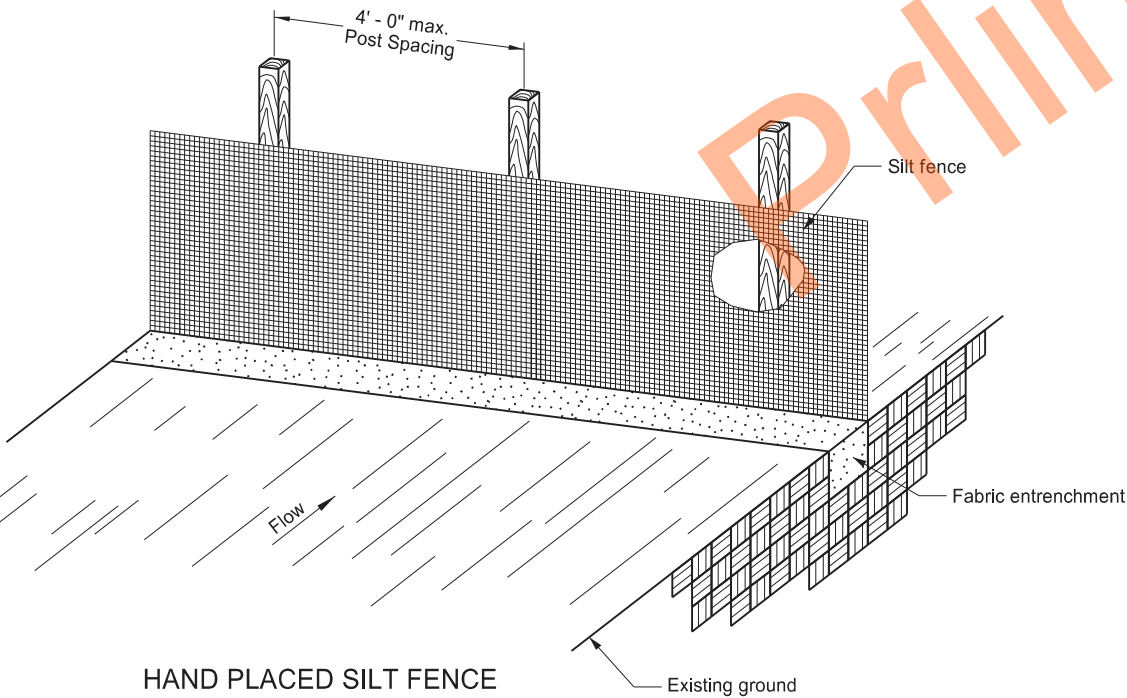
HAND PLACED INSTALLATION DETAIL
Minimize disturbance of ground around trench and smooth surface after excavation to avoid concentrating flows. Compact to prevent undercutting flows.



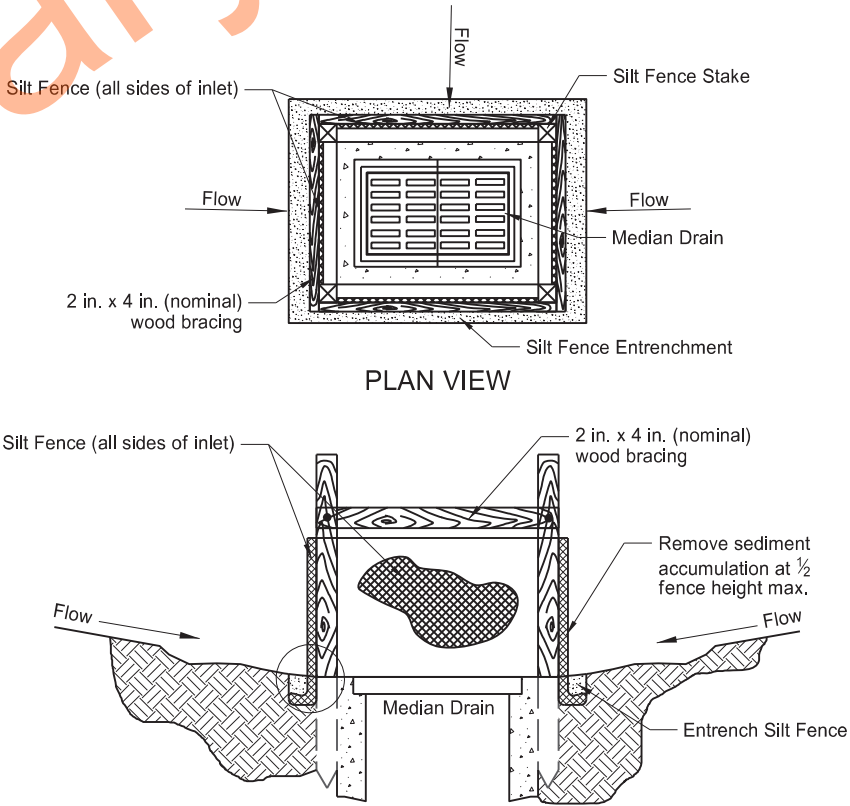
TYPICAL ISOMETRIC



MACHINE SLICED INSTALLATION DETAIL



HAND PLACED SILT FENCE



PLAN VIEW

PROFILE VIEW

SILT FENCE PROTECTION
(MEDIAN OR DITCH INLET)

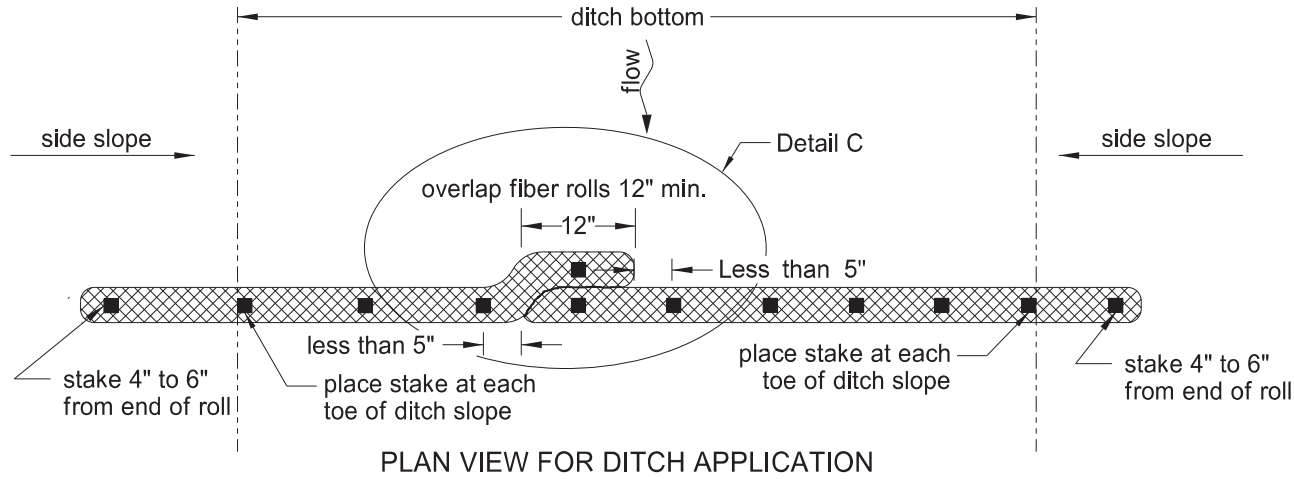
- NOTES:
1. Install the ends of the silt fence to point slightly upslope to prevent sediment from flowing around the ends of the fence.
 2. Place splices outside low spots.
 3. Do not embed silt fence placed in standing water.

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

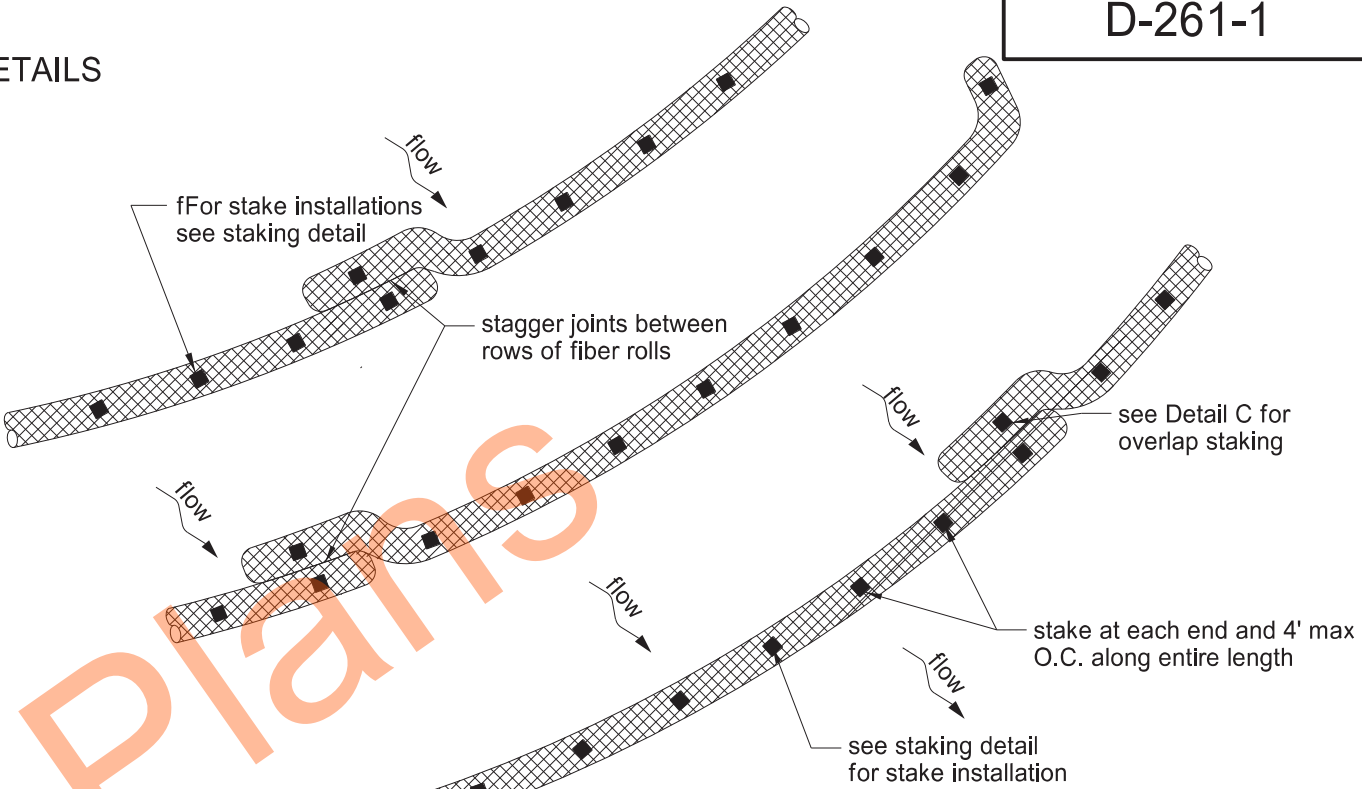


09/04/25

EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS

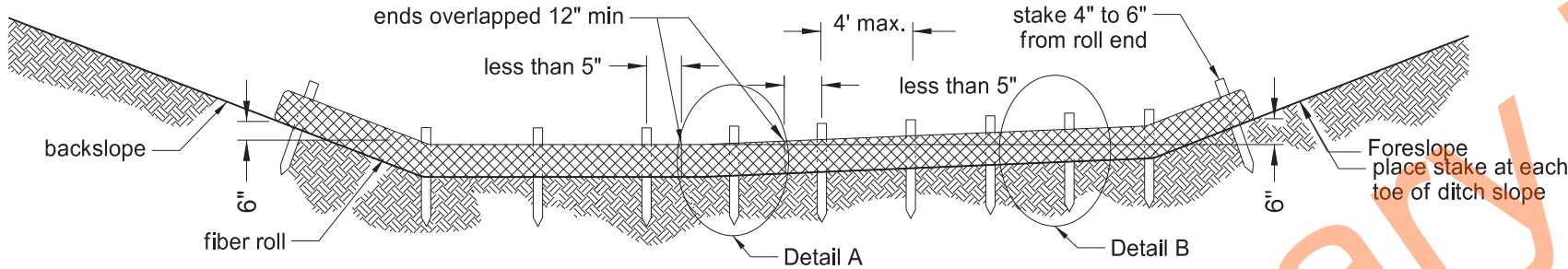


PLAN VIEW FOR DITCH APPLICATION

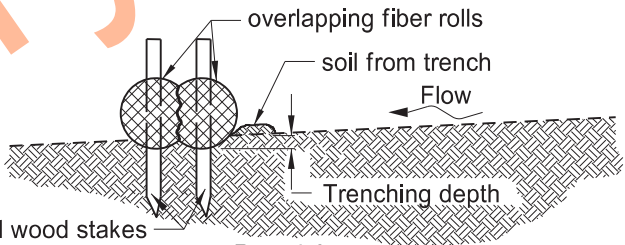


PLAN VIEW FOR SLOPE APPLICATION

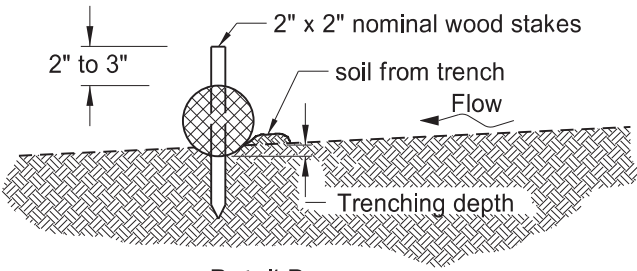
Ensure fiber rolls are placed along the contours of the slope.



12 OR 20 INCH FIBER ROLL - DITCH BOTTOM

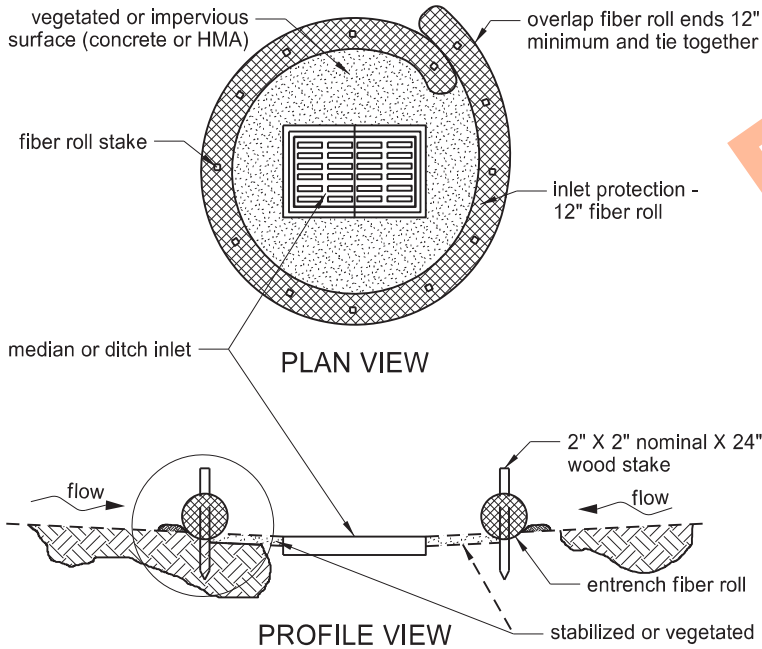


Detail A
FIBER ROLL OVERLAPPING STAKING DETAIL



Detail B
FIBER ROLL STAKING DETAIL

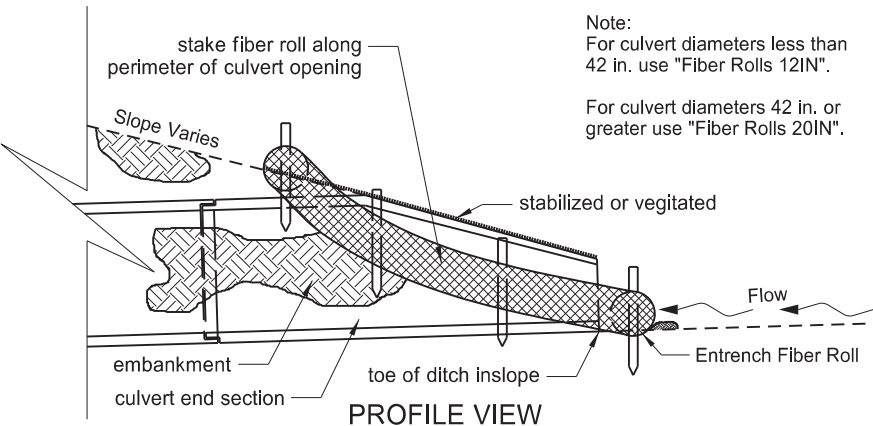
NOTE: Do not allow runoff to run under or around roll.



PLAN VIEW

PROFILE VIEW

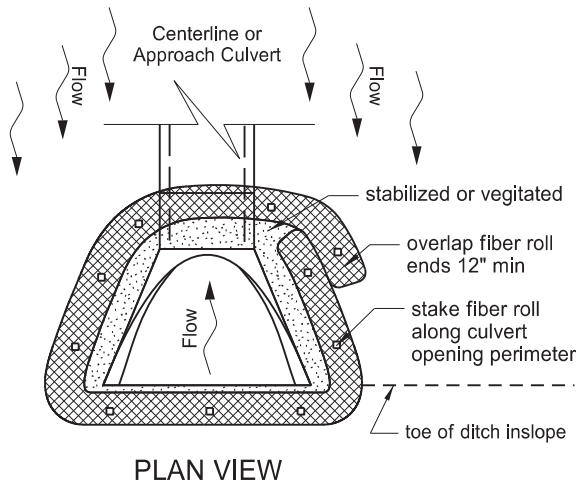
FIBER ROLL PROTECTION (MEDIAN OR DITCH INLET)



PROFILE VIEW

FIBER ROLL PROTECTION (INLET OF CULVERT)

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



PLAN VIEW

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"

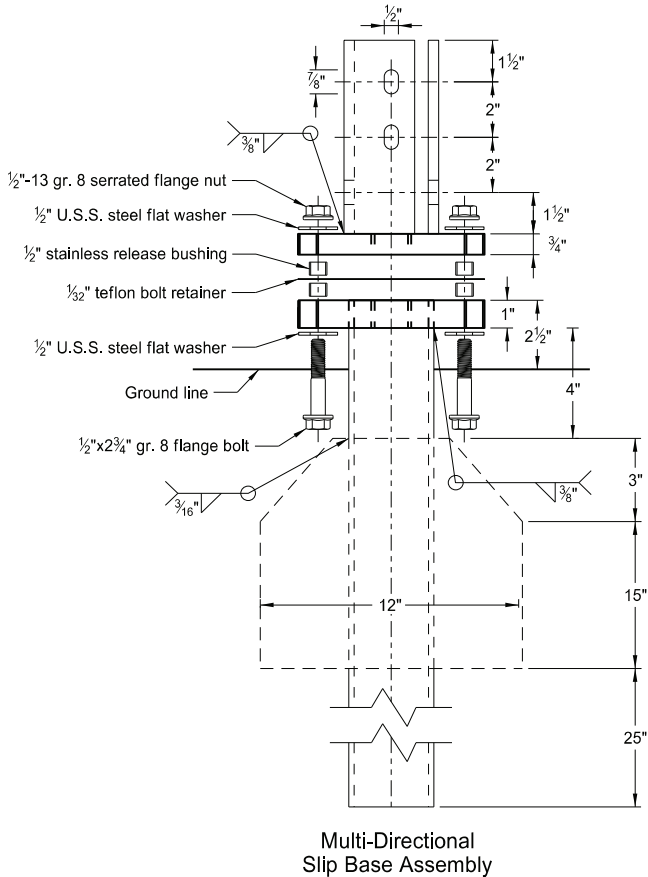
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-18-10	
REVISIONS	
DATE	CHANGE
06-10-13	Added plan view for ditch and slope application. Added table with values for stake and trench dimensions.
10-04-13	Revised fiber roll overlap detail.
06-26-14	Changed standard drawing number from D-708-7 to D-261-1.
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.



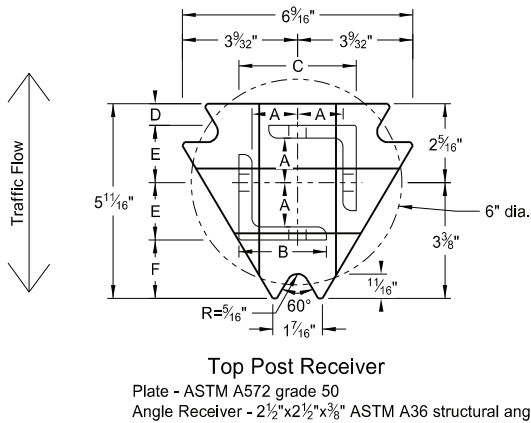
09/02/25

BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7



Perforated Tube



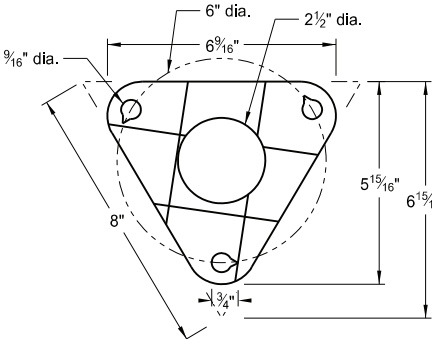
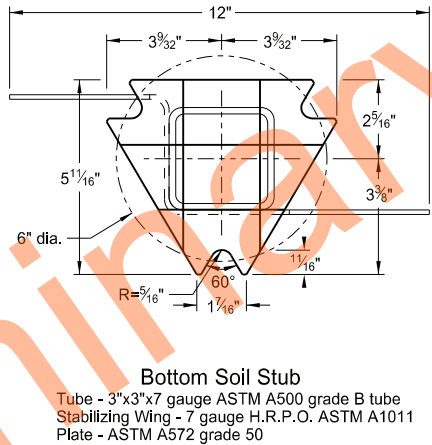
Notes:

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

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

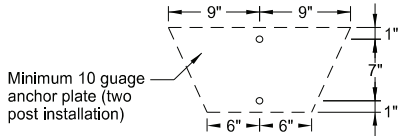
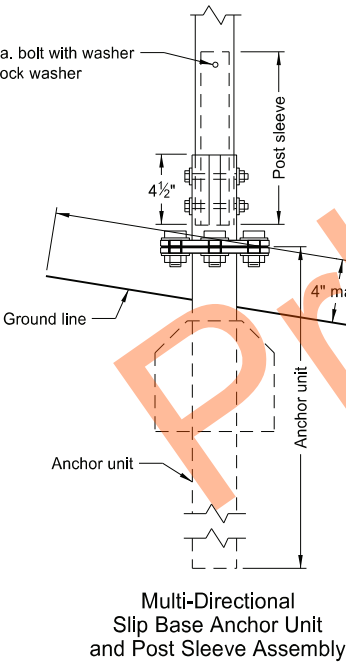
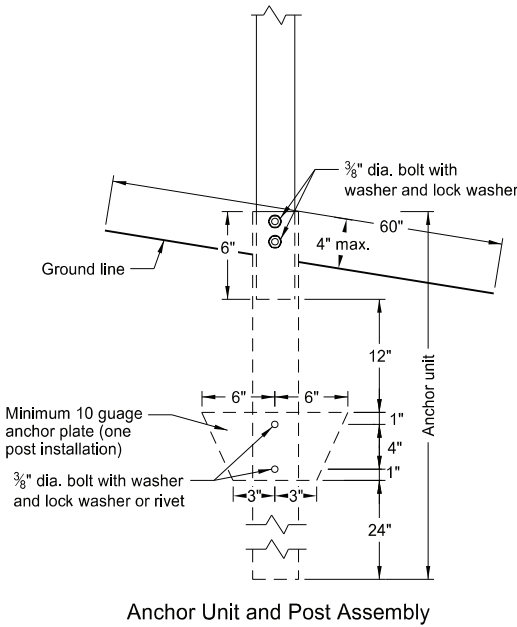
Properties of Telescoping Perforated Tube						
Tube Size in.	Wall Thickness in.	U.S. Standard Gauge	Weight per Foot lbs.	Moment of Inertia in. ⁴	Cross Sec. Area in. ²	Section Modulus in. ³
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2 1/4 x 2 1/4	0.105	12	2.773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

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



Bolt Retainer for Base Connection
Bolt Retainer- 1/2" Reprocessed Teflon

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



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

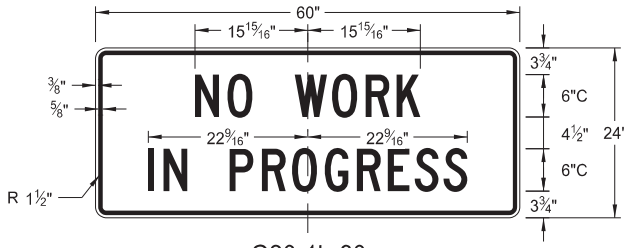


08/01/24

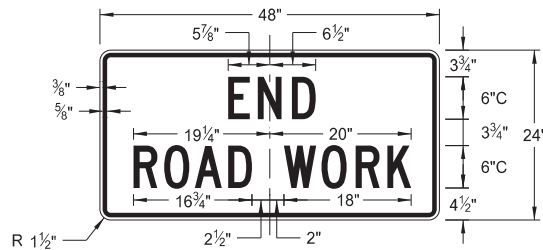
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



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



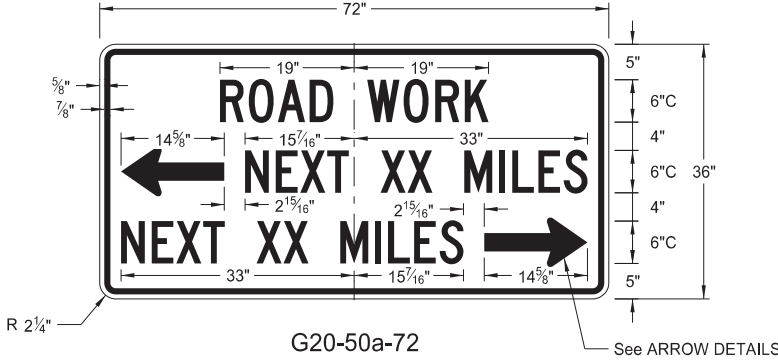
G20-1b-60
Legend: black (non-refl)
Background: orange



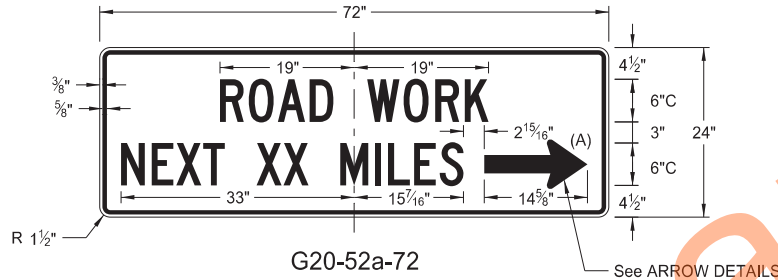
G20-2-48
Legend: black (non-refl)
Background: orange



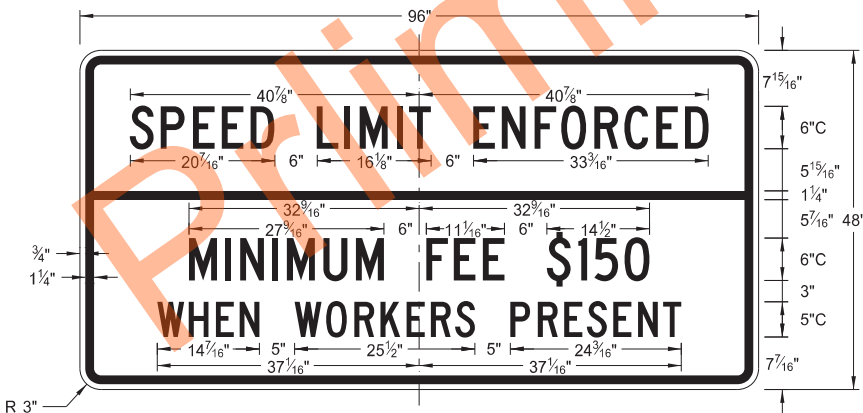
G20-4b-36
Legend: black (non-refl)
Background: orange



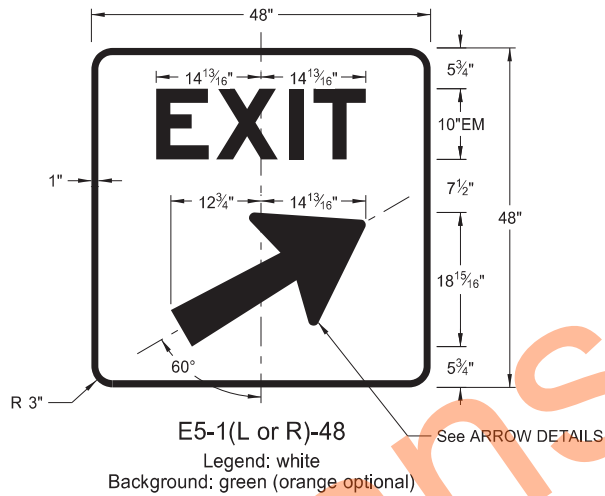
G20-50a-72
Legend: black (non-refl)
Background: orange



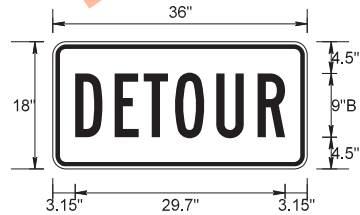
G20-52a-72
Legend: black (non-refl)
Background: orange



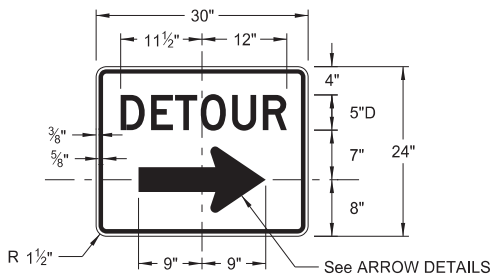
G20-55-96
Legend: black (non-refl)
Background: orange



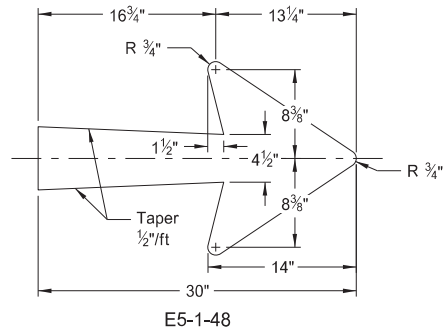
E5-1(L or R)-48
Legend: white
Background: green (orange optional)



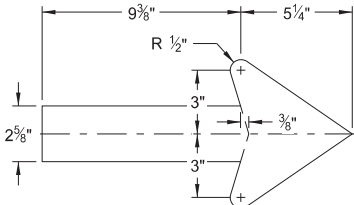
M4-8-36
Legend: black (non-refl)
Background: orange



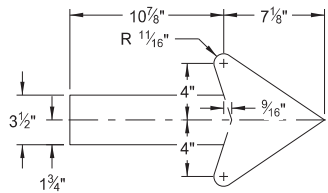
M4-9(L or R)-30 &
M4-9-30
Legend: black (non-refl)
Background: orange



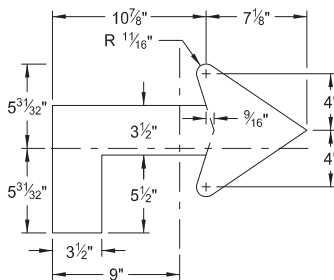
E5-1-48



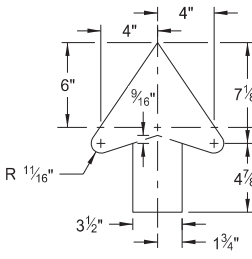
G20-50a-72
G20-52a-72



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



[illegible]

Technical drawing of a rectangular sign with dimensions and text. The sign is 24" wide and 18" high. The text on the sign reads "MINIMUM FREE \$150". The dimensions are as follows:

- Overall width: 24"
- Overall height: 18"
- Top left corner radius: R 1 1/2"
- Top left corner chamfer: 3/8"
- Top left corner chamfer: 5/8"
- Top left corner chamfer: 4 5/16"
- Top left corner chamfer: 3 5/16"
- Top left corner chamfer: 8 1/8"
- Top left corner chamfer: 8 1/8"
- Top left corner chamfer: 2 1/2"
- Top left corner chamfer: 3"D
- Top left corner chamfer: 2"
- Top left corner chamfer: 3"D
- Top left corner chamfer: 2"
- Top left corner chamfer: 3"D
- Top left corner chamfer: 2"

Technical drawing of a rectangular sign with a black border. The sign text is "STREET CLOSED TO THRU TRAFFIC". Dimensions are provided in inches:

- Overall width: 60"
- Overall height: 30"
- Top mounting hole spacing: 3" (center-to-center), 1" (edge-to-center)
- Text "STREET" width: 22 1/2"
- Text "CLOSED" width: 24 5/16"
- Text "TO" width: 3"
- Text "THRU" width: 24 1/4"
- Text "TRAFFIC" width: 24 1/4"
- Left side mounting hole spacing: 1/2" (top), 3/4" (bottom)
- Right side mounting hole spacing: 4" (top), 6"C (center), 2 1/2" (bottom), 5"C (center), 2 1/2" (bottom), 6"C (center), 4" (bottom)
- Bottom mounting hole spacing: 4"
- Bottom left corner radius: R 1 1/8"

Diagram of a rectangular sign with the text "STREET CLOSED". The sign has a white background and a black border. The text is in bold, black, sans-serif capital letters. The dimensions are as follows:

- Overall width: 48"
- Overall height: 30"
- Top border: 5"
- Bottom border: 5"
- Left border: 1 1/2"
- Right border: 1 1/2"
- Text "STREET" width: 18" (split into two 9" segments)
- Text "CLOSED" width: 19" (split into two 9.5" segments)
- Vertical spacing between "STREET" and "CLOSED": 8" (split into two 4" segments)

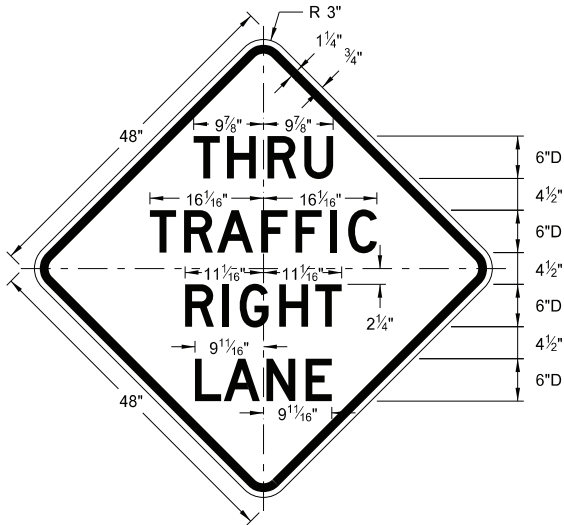
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
08-17-17	Revised sign number
10-03-19	New Design Engineer PE Stamp
08-01-24	Electronic Stamp/Signature
06-30-25	Legislative Changes



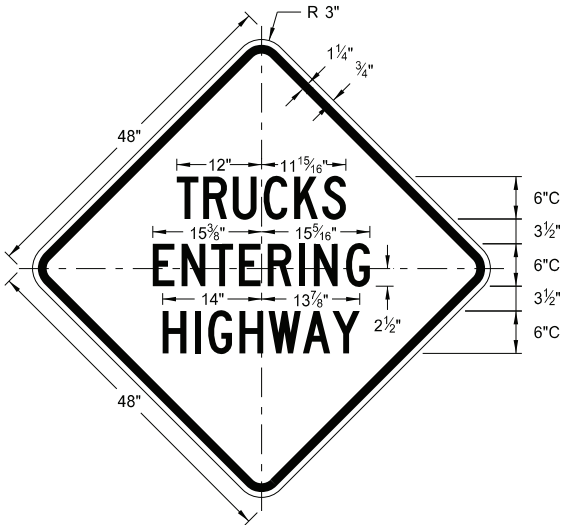
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

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

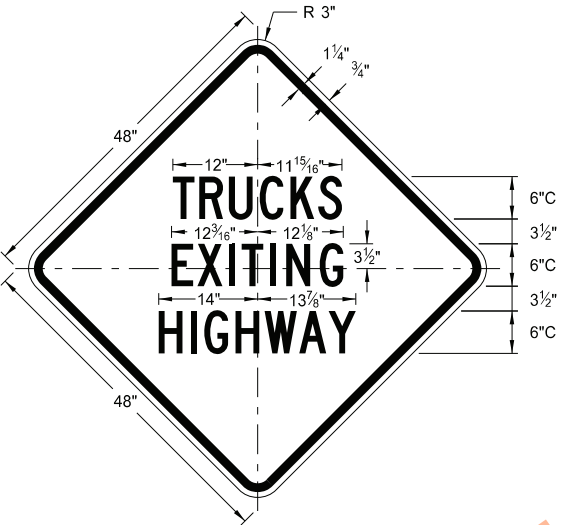
* DISTANCE MESSAGES



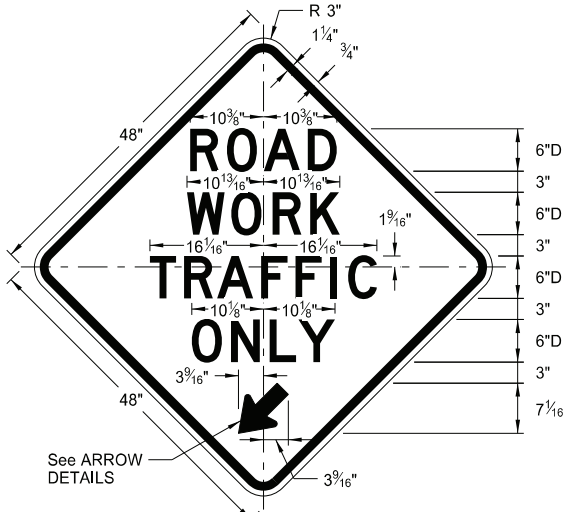
W5-8-48
Legend: black (non-refl)
Background: orange



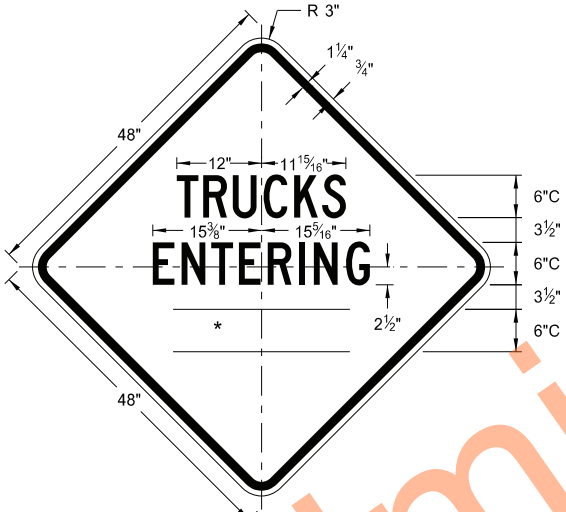
W8-53-48
Legend: black (non-refl)
Background: orange



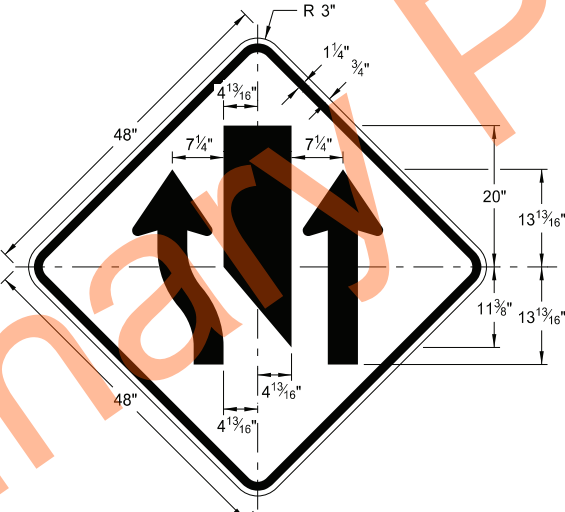
W8-56-48
Legend: black (non-refl)
Background: orange



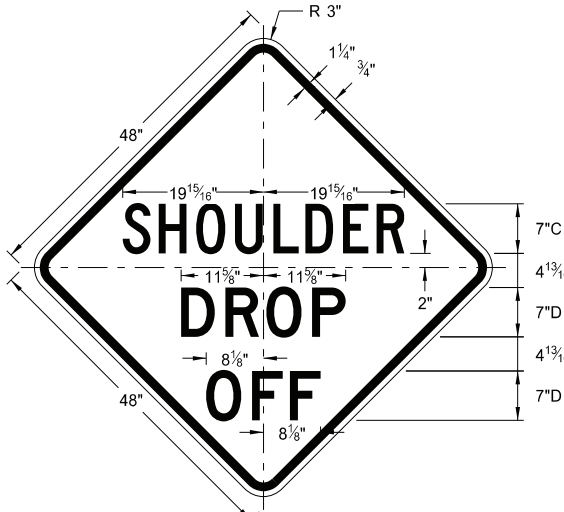
W5-9-48
Legend: black (non-refl)
Background: orange



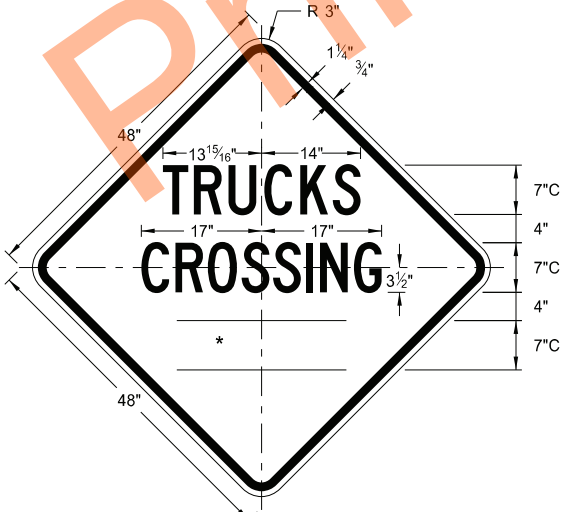
W8-54-48
Legend: black (non-refl)
Background: orange



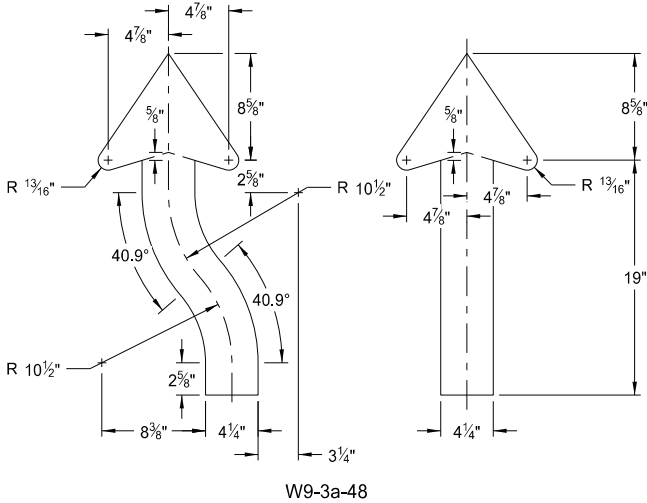
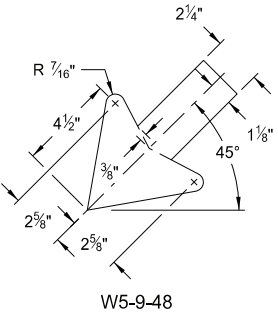
W9-3a-48
Legend: black (non-refl)
Background: orange



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



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



ARROW DETAILS

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

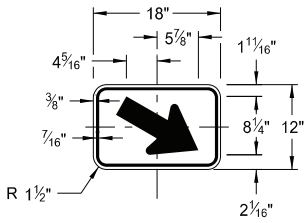


08/01/24

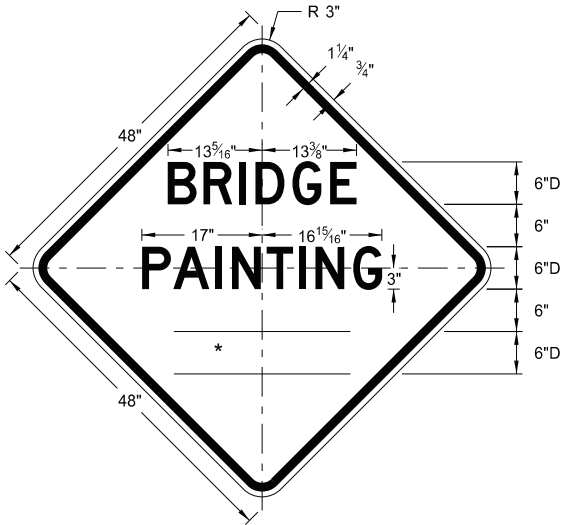
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

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

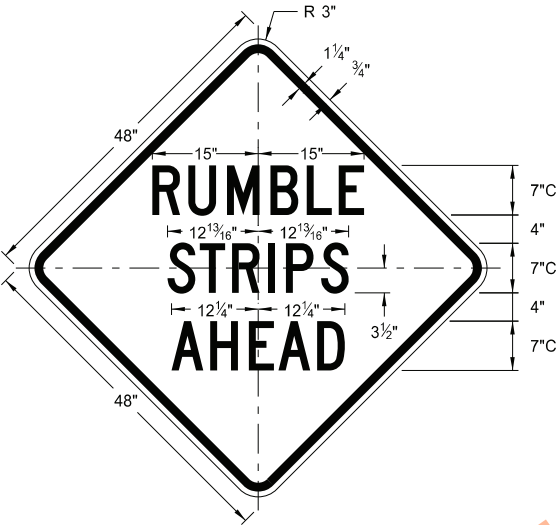
* DISTANCE MESSAGES



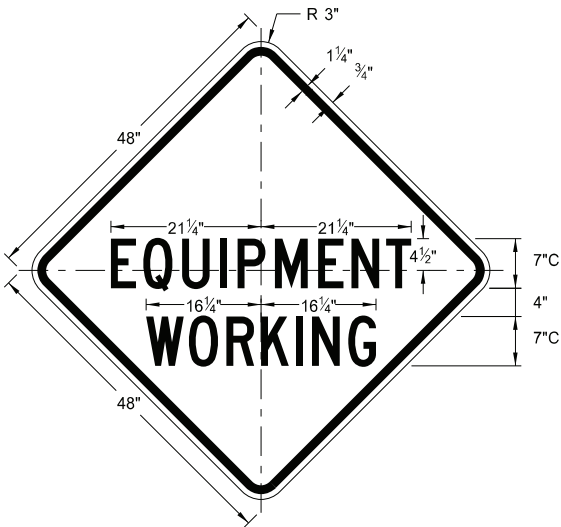
W16-7aP-18
Legend: black (non-refl)
Background: orange



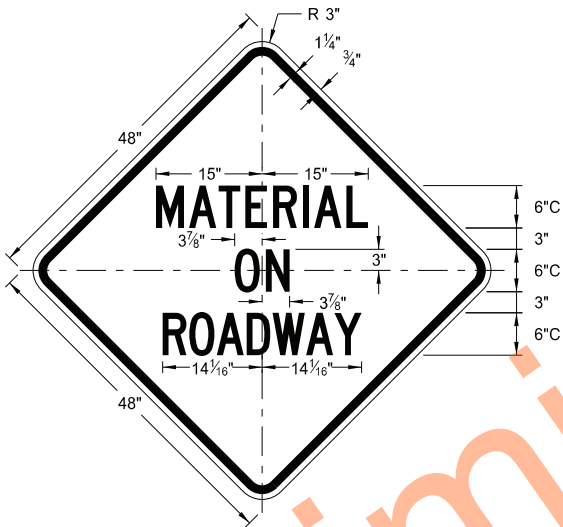
W21-50-48
Legend: black (non-refl)
Background: orange



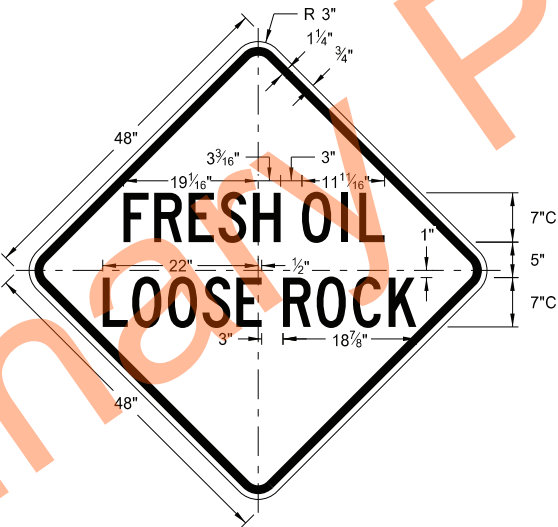
W21-53-48
Legend: black (non-refl)
Background: orange



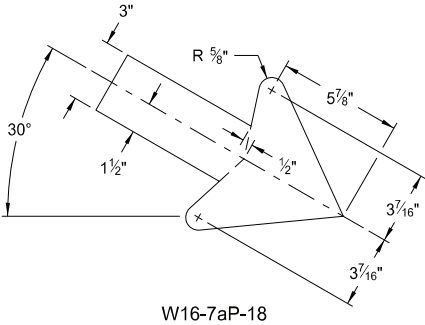
W20-51-48
Legend: black (non-refl)
Background: orange



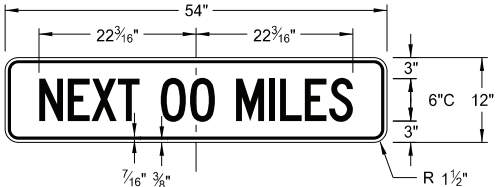
W21-51-48
Legend: black (non-refl)
Background: orange



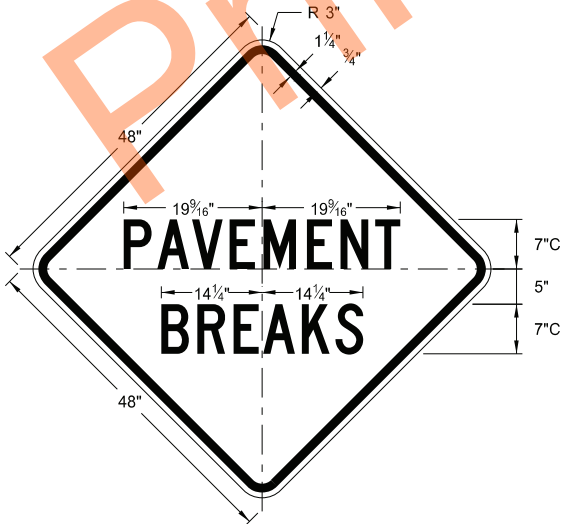
W22-8-48
Legend: black (non-refl)
Background: orange



W16-7aP-18



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



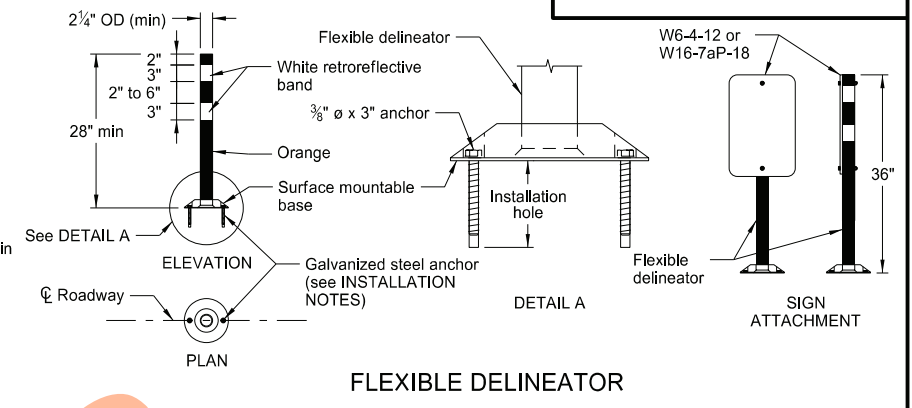
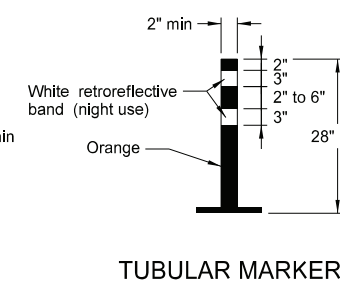
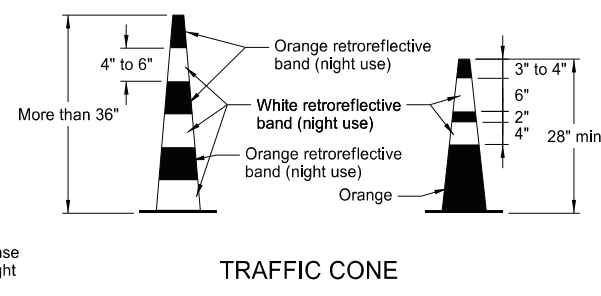
W21-52-48
Legend: black (non-refl)
Background: orange

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

D-704-13



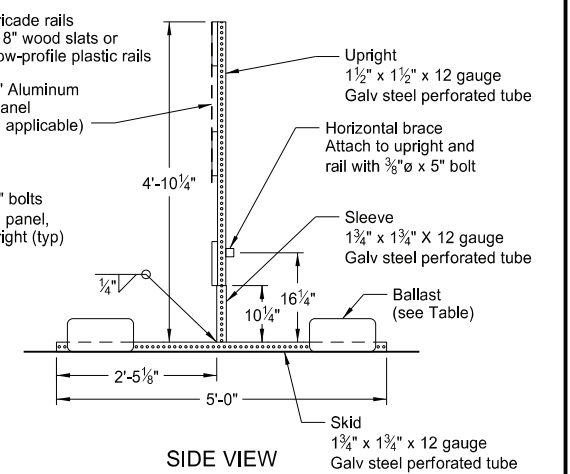
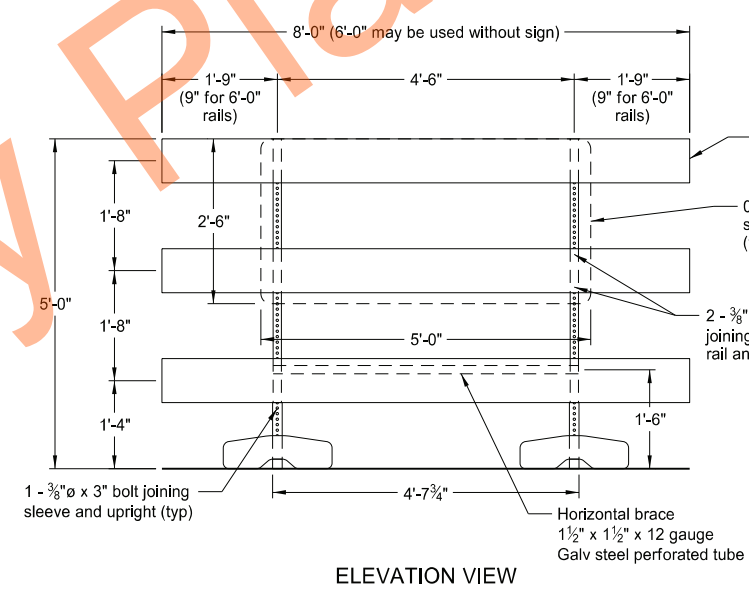
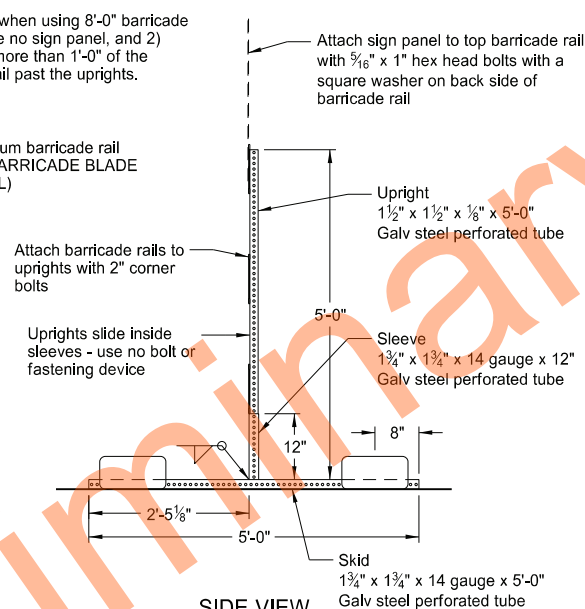
Provide alternating orange and white retroreflective stripes, sloping downward in direction vehicular traffic is to pass. Place retroreflective sheeting on both sides of panel with a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective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

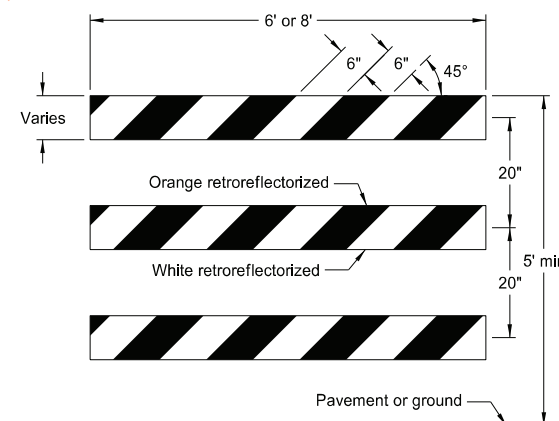


BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

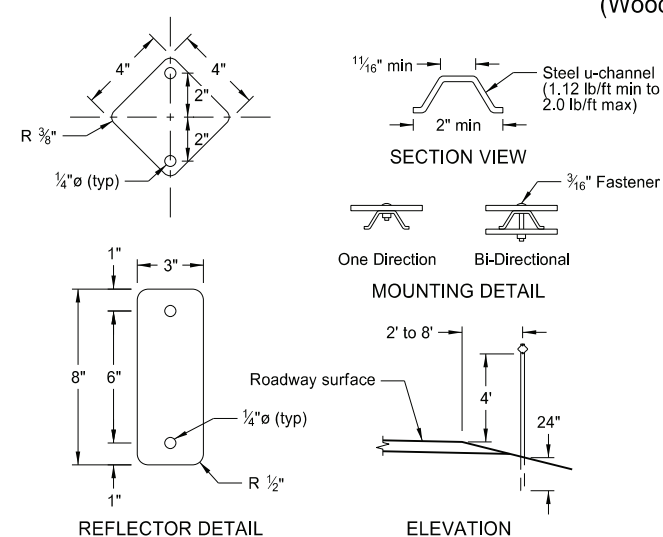
Diagram illustrating the standard crosswalk dimensions and materials:

- Length: 6' to 10'
- Width: 8"
- Stripe Angle: 45°
- Stripe Width: 6"
- Stripe Spacing: 6"
- Materials: Orange retroreflectORIZED, White retroreflectORIZED
- Height: 3'-0" to 3'-6"
- Surface: Pavement or ground

BARRICADE RAIL DETAILS



TYPE III BARRICADE



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.

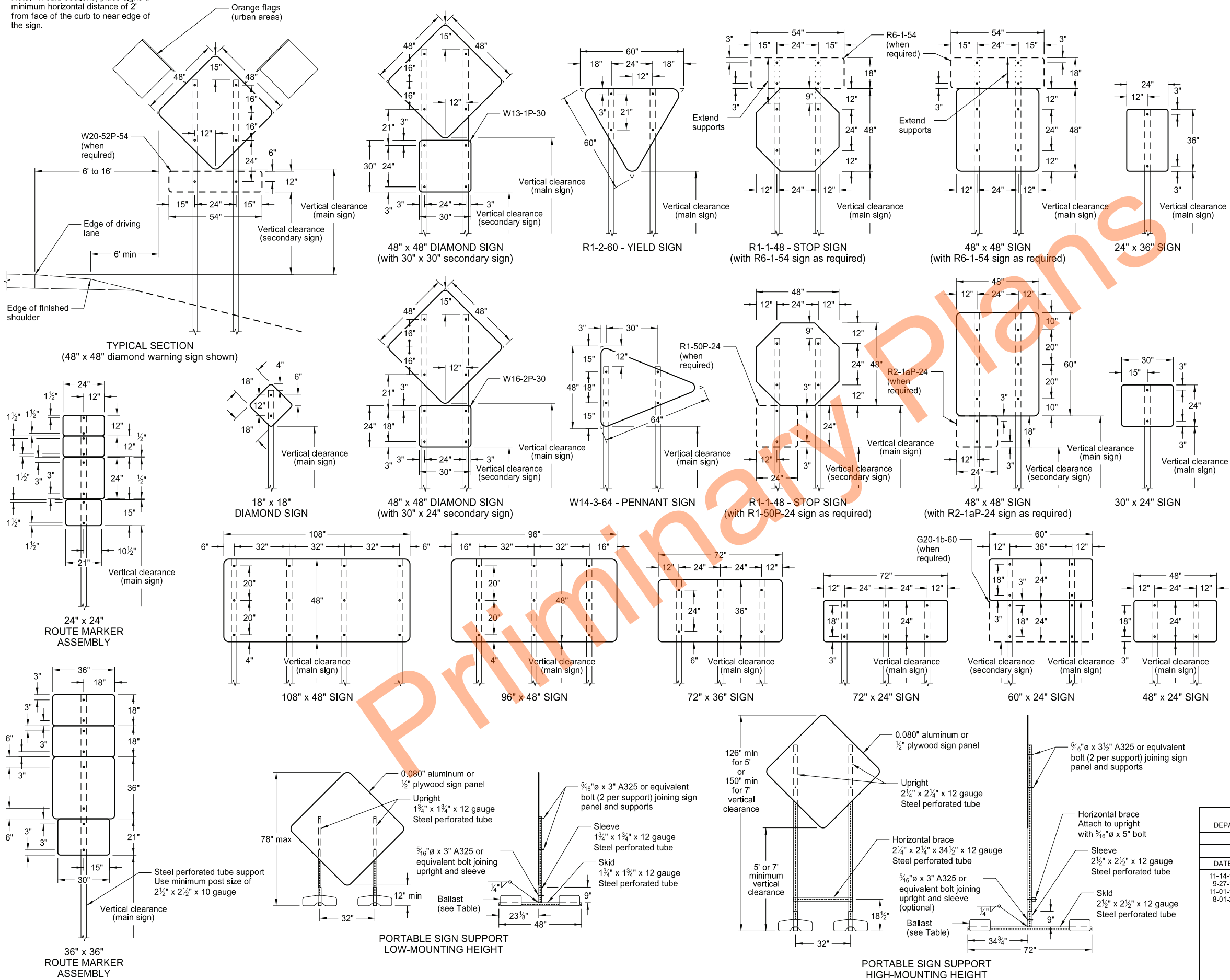
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
11-01-19	Revised details for Flexible Delineator
8-01-24	Electronic Stamp/Signature



08/01/24

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

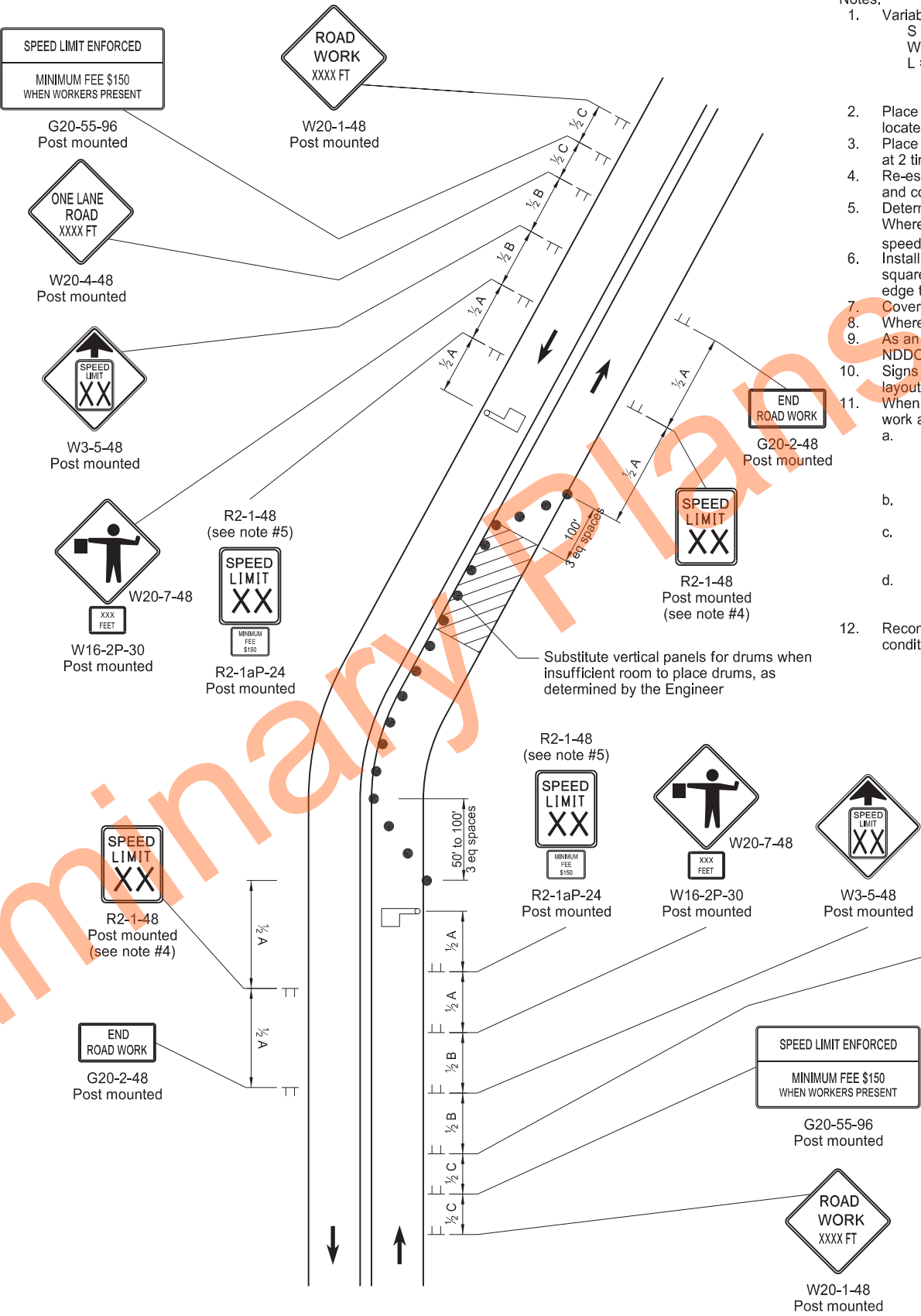
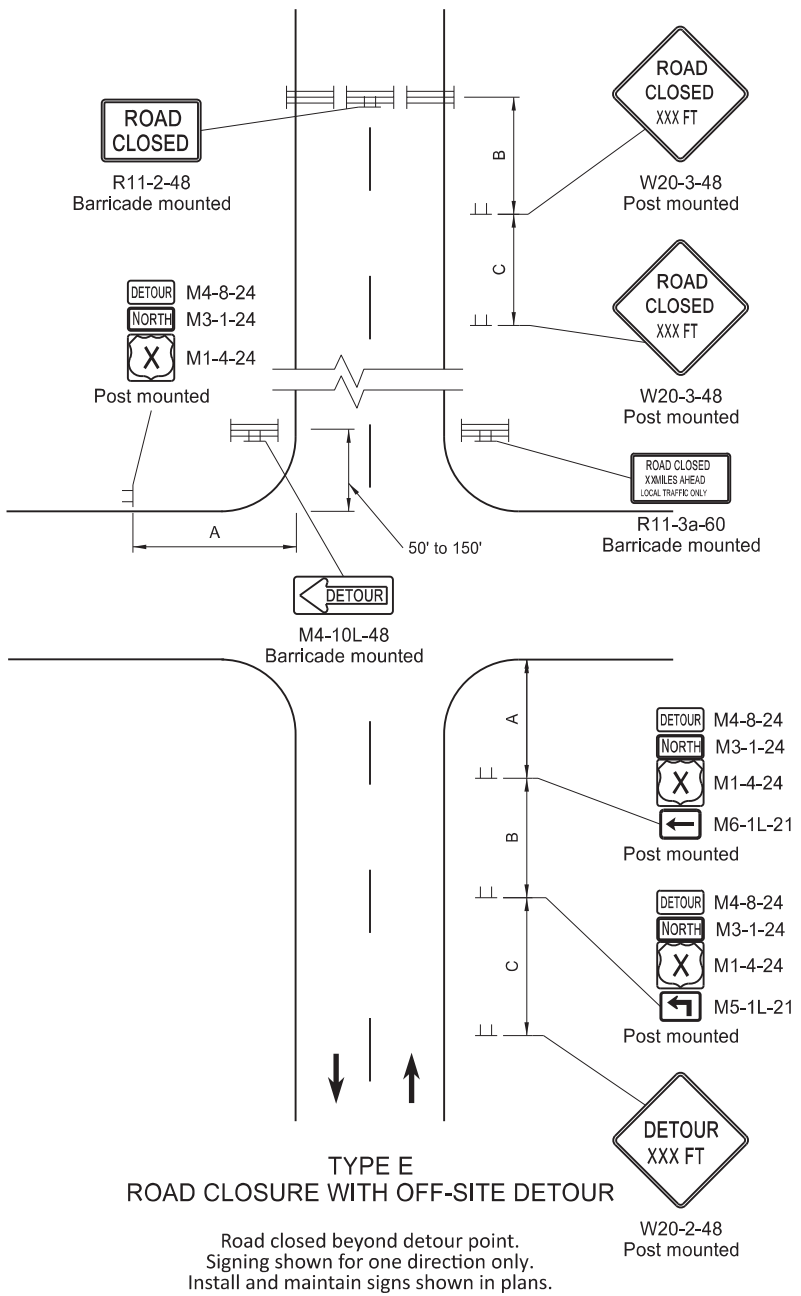
Note: The number of sandbags are based on a wind speed of 55 MPH. Place sandbags at or near the ends of skids.

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 AND LANE CLOSURE ON A TWO WAY ROAD LAYOUTS



- Notes:
- Variables
 - S = Numerical value of speed limit or 85th percentile.
 - W = The width of taper in feet
 - L = Minimum length of taper in feet. $S \times W$ for freeways, expressways, and roads with speeds of 45 mph or greater, or $W \times S^2/60$ for urban, residential, and streets with speeds of 40 mph or less.
 - Place barricades on moveable assemblies and signs on portable assemblies when located on the roadway.
 - Place delineator drums for tapering traffic at 3 equal spaces and for tangents space them at 2 times dimension "S".
 - 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 second speed limit sign at $\frac{1}{2}B$.
 - 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.
 - Where necessary, safe speed to be determined by the Engineer.
 - As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
 - Signs G20-55-96 or R2-1aP-24 are not required when pilot car operation is used, if this layout is part of other traffic control that contains this sign, or if work is less than 15 days.
 - When highway-rail grade crossings exist either within or in the vicinity of the roadway work activities:
 - Extra care shall be taken to minimize the probability of conditions being created, either by lane restrictions, flagging or other operations, where vehicles might be stopped within the highway-rail grade crossing (considered as being 15 feet on either side of the closest and farthest rail.)
 - Place "Do Not Stop on Tracks" sign (R8-8-24) near cross buck in each direction while lane closure is near tracks.
 - Extend buffer space between work zone and lane closure transition upstream of the highway-rail grade crossing to prevent flagging queue from extending across highway-rail grade crossing.
 - If queuing extends across highway-rail crossing, provide flagger at crossing to prevent vehicles from stopping within the crossing (even when automatic warning devices are in place.)
 - 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

KEY

- Delineator Drum
- Sign
- Type III Barricade
- Work/Hazard Area
- Flagger

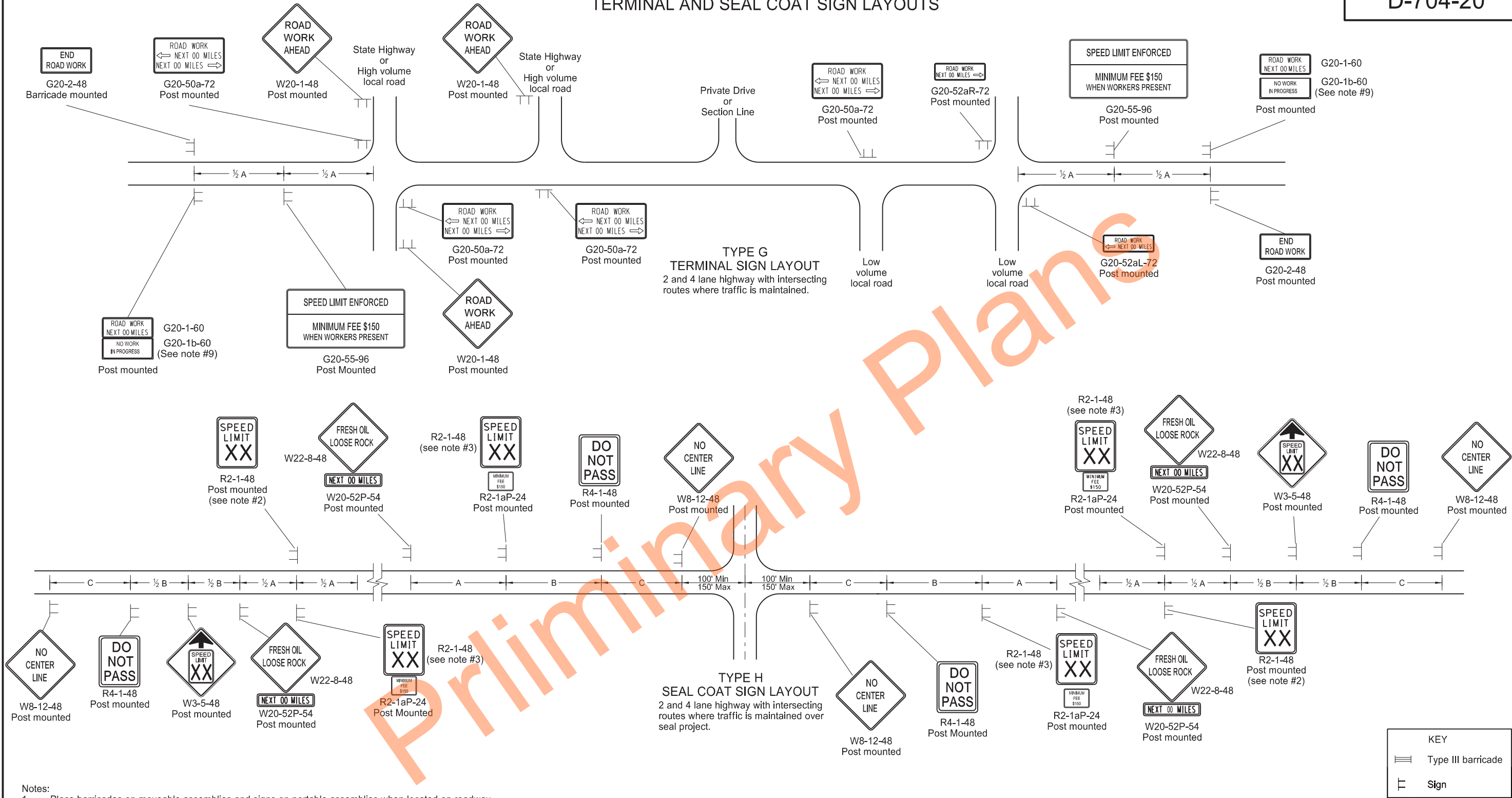
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
03-13-14	Revised Sign Cell "ROAD WORK XXX FT"
08-17-17	Update notes & sign numbers
11-01-19	Revised signs, sign #s, & notes
12-08-21	Switched order of Road Work XXX and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes



TYPE F
LANE CLOSURE ON A TWO LANE ROAD USING FLAGGERS
Two lane highway with one lane closed.
Flagger at point visible to approaching traffic.

TERMINAL AND SEAL COAT SIGN LAYOUTS

D-704-20



Notes:

- Place barricades on moveable assemblies and signs on portable assemblies when located on roadway.
- Determine the exact speed limit in the field, based on location and conditions.
- Determine the reduced speed limit based on the in place speed limit before construction. Where speed limit reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 MPH.) Place the second speed limit sign at $\frac{1}{2}$ 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.
- On seal coat projects, place signs R2-1-48, R2-1aP-24, R4-1-48, W22-8-48 and W20-52P-54 after all important intersections and at five mile intervals. Place sign W8-12-48 after all important intersections and at 2 mile intervals until short term center line pavement marking is placed.
- As an option, use portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Drawing D-704-14.
- Cover or remove speed limit signs from layout Type H when loose aggregate is removed.
- Install sign G20-1b-60 when work is suspended for winter.
- Use other traffic control layouts in immediate work areas. Place sign R2-1aP-24 below speed limit signs in reduced speed limit work areas.
- 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.

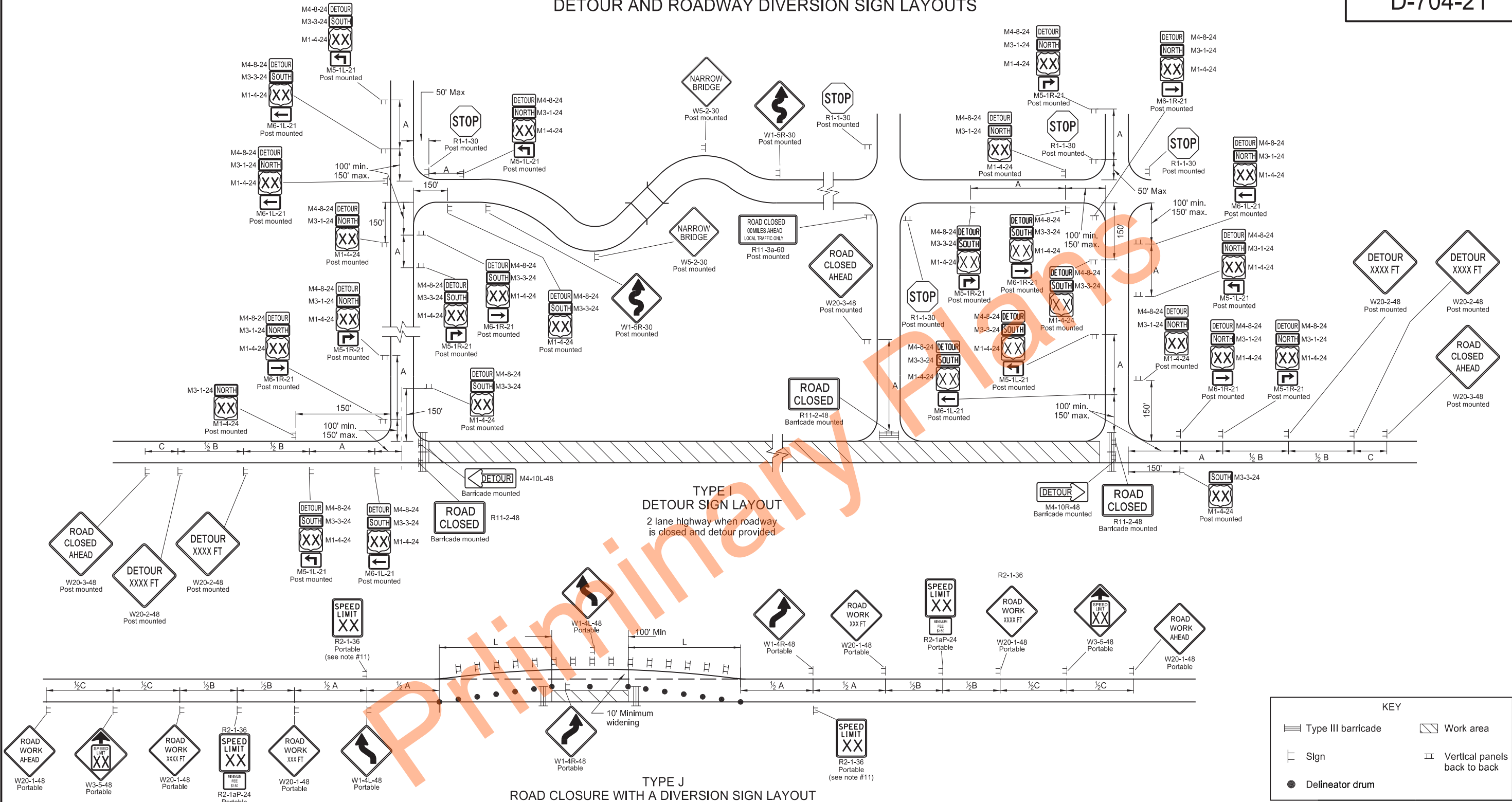
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway and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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Updated notes & sign numbers
11-01-19	Updated note & sign
12-08-21	Switched order of Road Work and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes



DETOUR AND ROADWAY DIVERSION SIGN LAYOUTS

D-704-21



- Notes:
- Variables
S=Numerical value of speed limit or 85th percentile. W=The width of taper.
L=Minimum length of taper, or S x 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.
 - Place barricades on moveable assemblies and signs on portable assemblies when on roadway.
 - Space delineator drums and vertical panels at dimension "S" for tapering traffic. Space delineator drums, tubular markers and vertical panels at 2 times "S" for tangents.
 - Determine the reduced speed limit based on the in place speed limit before construction. Where speed limits 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 $\frac{1}{2}$ B.
 - Install flags on warning signs in urban areas when signs are not portable. Mount 24 inches 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 limit zone.
 - Covered (when approved by engineer) or obliterated pavement marking measured as Obliteration of Pavement Marking.
 - As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
 - If the tangent between tapers is less than 600', as an option, use sign W20-1-48 in place of double reverse curve signs.
 - Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.
 - Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.

TYPE J
ROAD CLOSURE WITH A DIVERSION SIGN LAYOUT

2 lane highway with widened section,
traffic maintained in both directions.
Use layout when work is less than 5 days or is within a project.

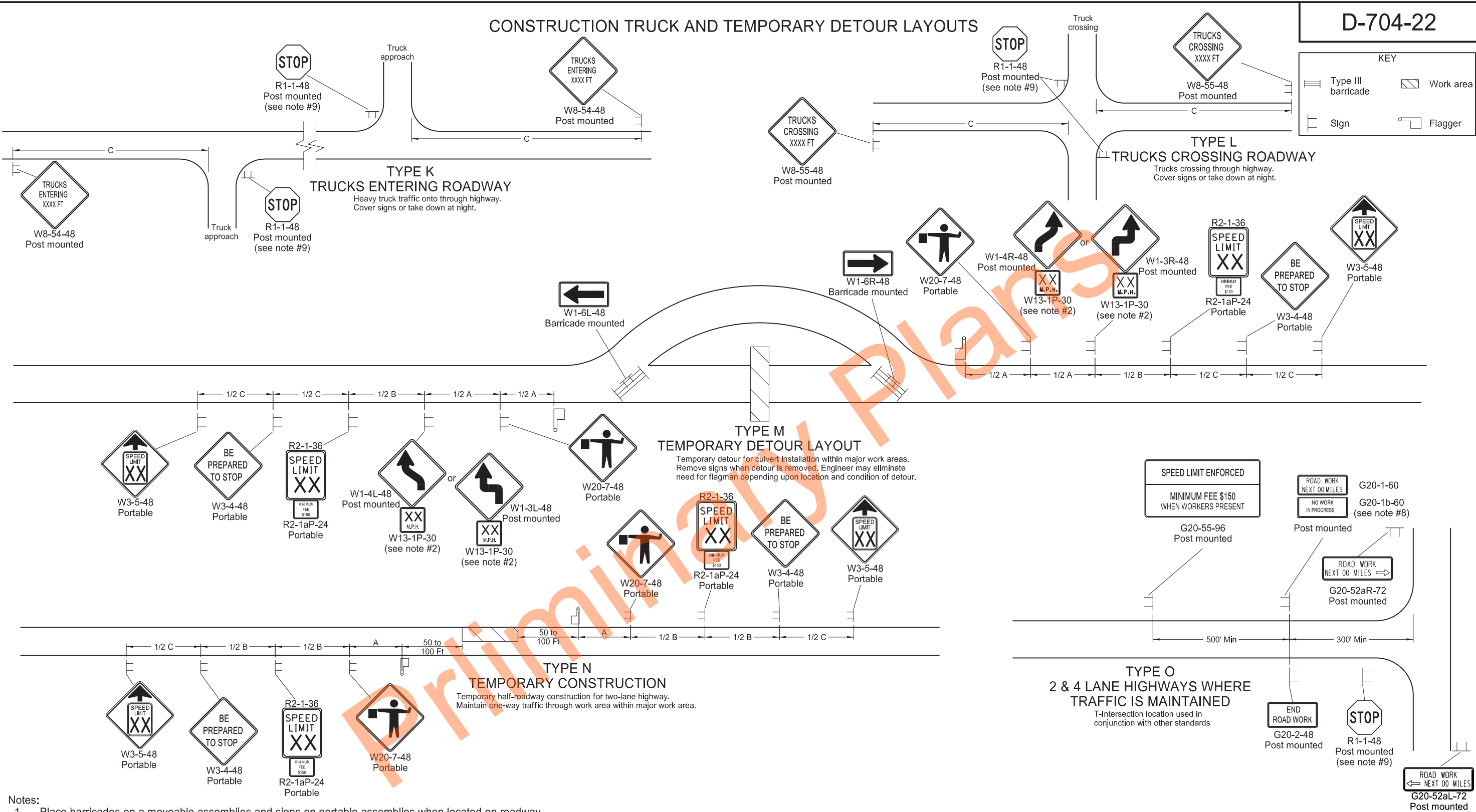
ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40 mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Updated notes & added spd limit
11-01-19	Revised sign #s and note 8
12-08-21	Added Dollars At Work sign
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes



CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22

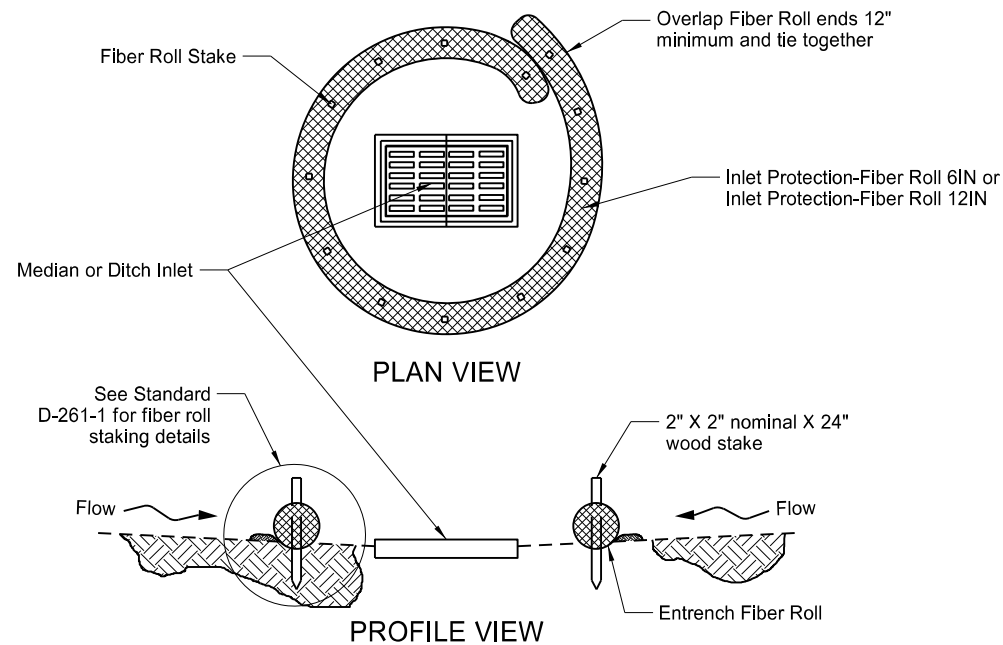


ADVANCE WARNING SIGN SPACING			
Road Type	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway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

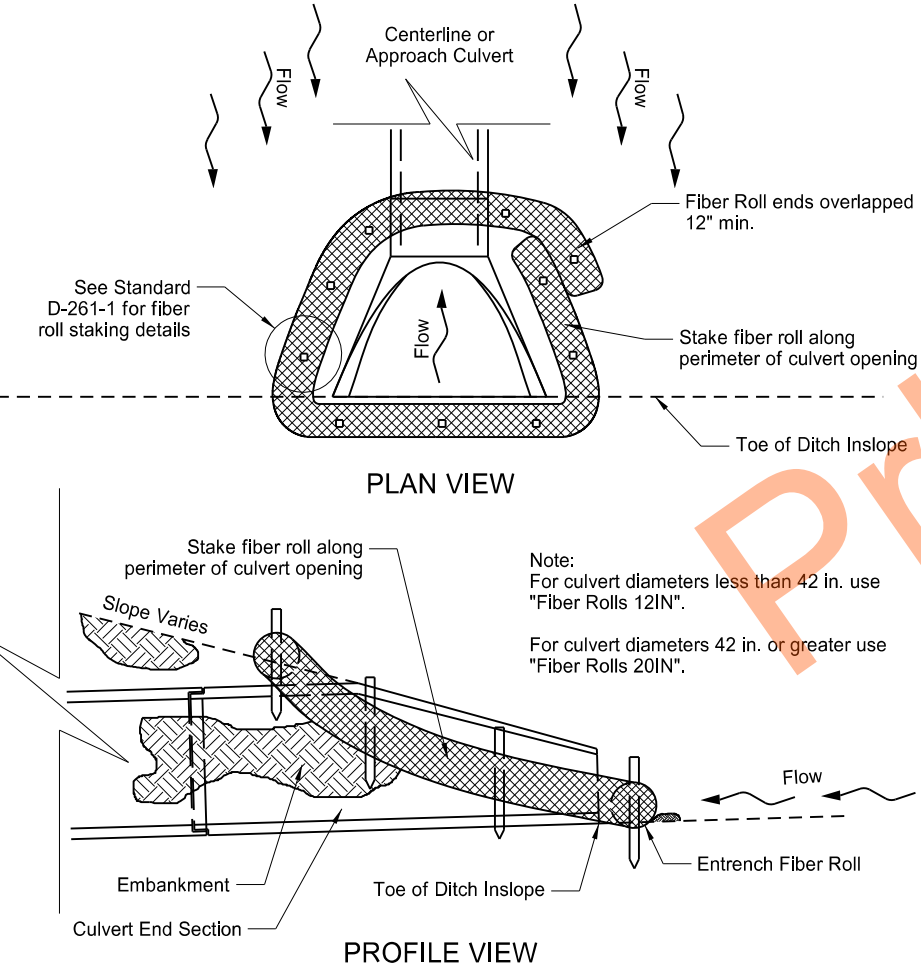
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Update notes & sign numbers
11-01-19	Revised sign numbers & note 7
12-09-21	Added Speed Limit Enforced and Dollars At Work signs
11-29-22	Removed Dollars At Work
06-30-25	Legislative Changes



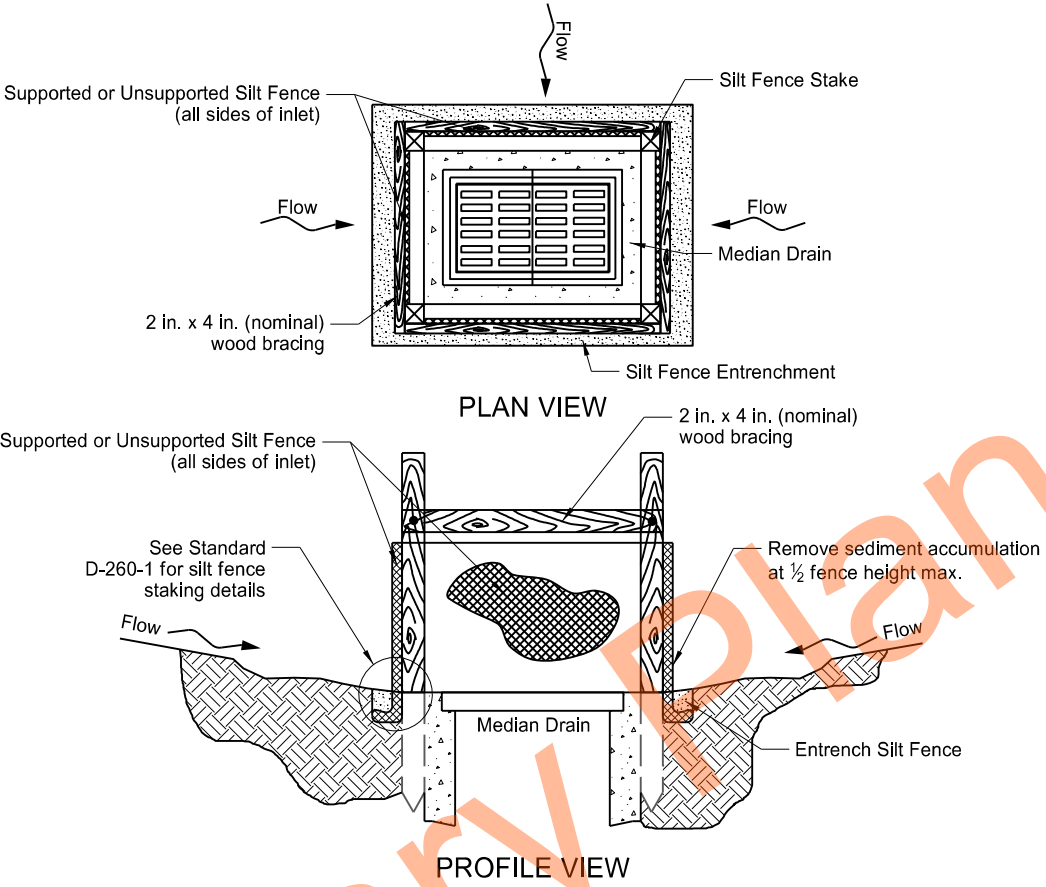
EROSION AND SILTATION CONTROLS
MEDIAN OR DITCH INLET PROTECTION



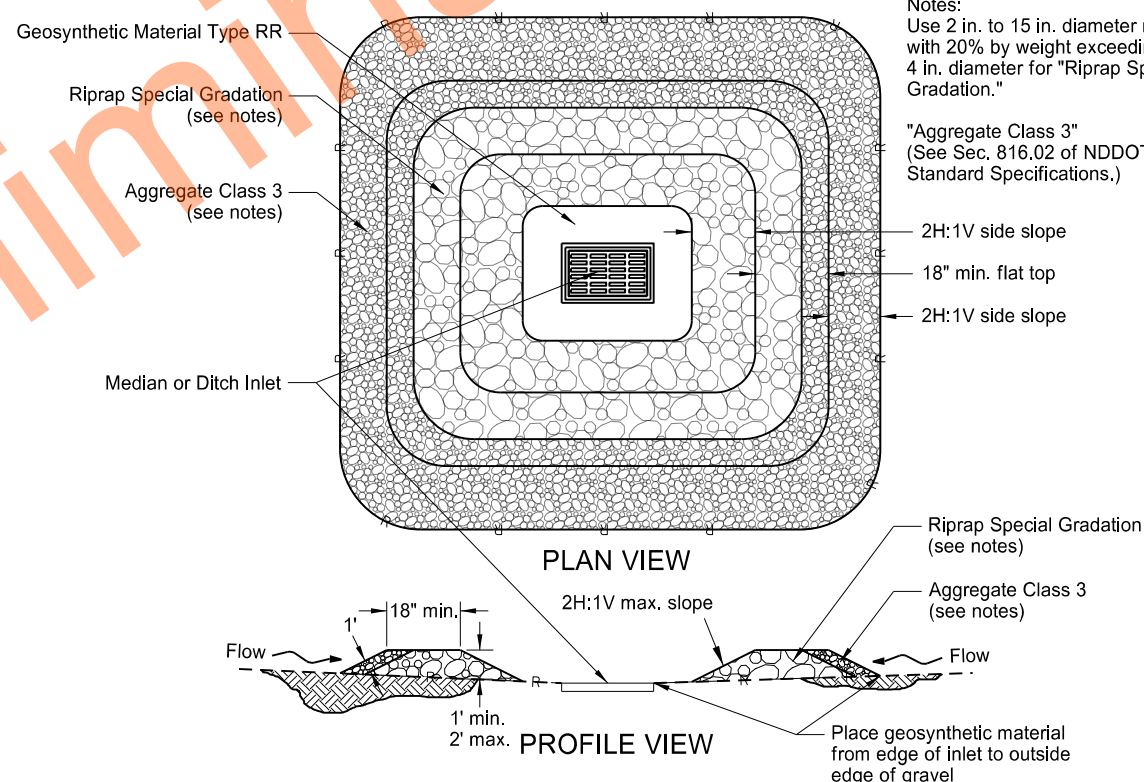
FIBER ROLL PROTECTION
(MEDIAN OR DITCH INLET)



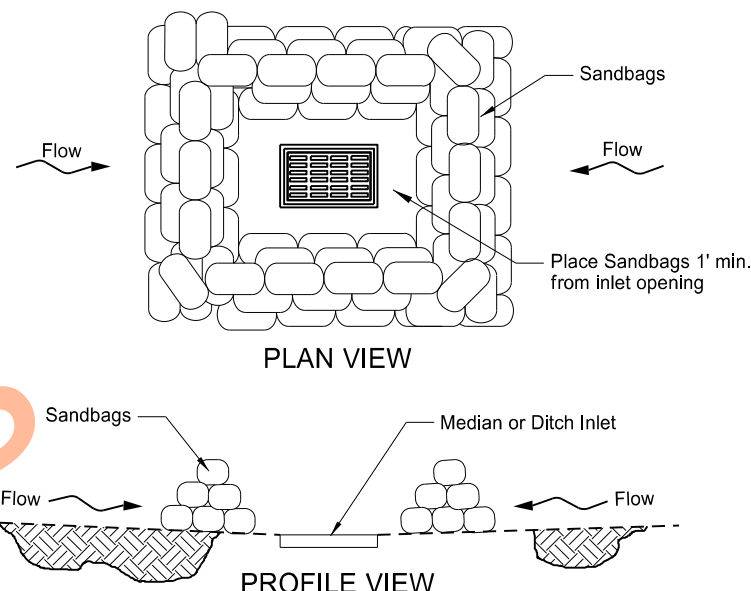
FIBER ROLL PROTECTION
(INLET OF CULVERT)



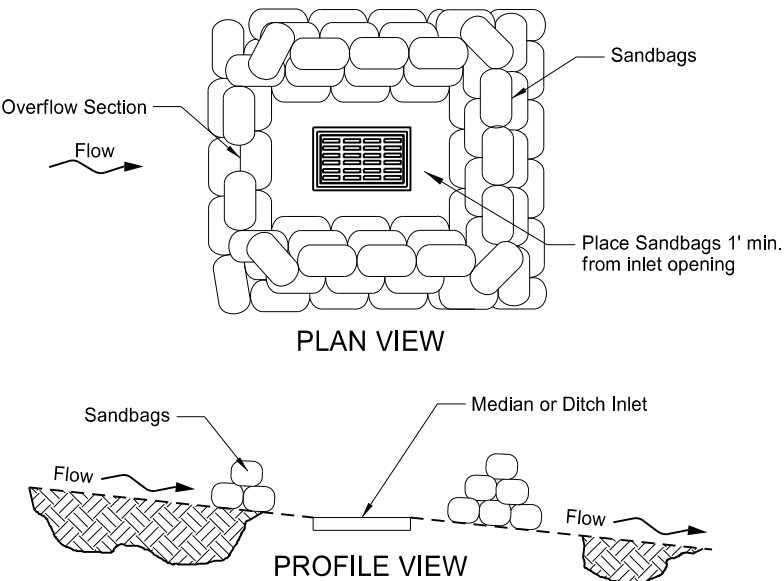
SILT FENCE PROTECTION
(MEDIAN OR DITCH INLET)



GRAVEL INLET PROTECTION
(MEDIAN OR DITCH INLET)



SANDBAG PROTECTION
(LOW POINT)



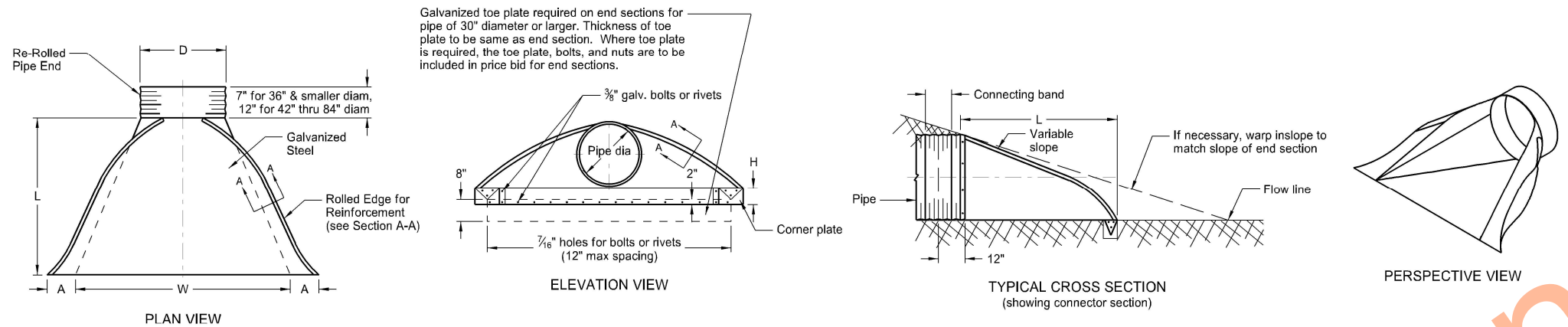
SANDBAG PROTECTION
(ON SLOPE)

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Updated reference to standard drawing number for fiber roll staking details.
10-01-14	Updated reference to standard drawing number for silt fence.
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.

This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on 8-27-19 and the original document is stored at the
North Dakota Department
of Transportation

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.

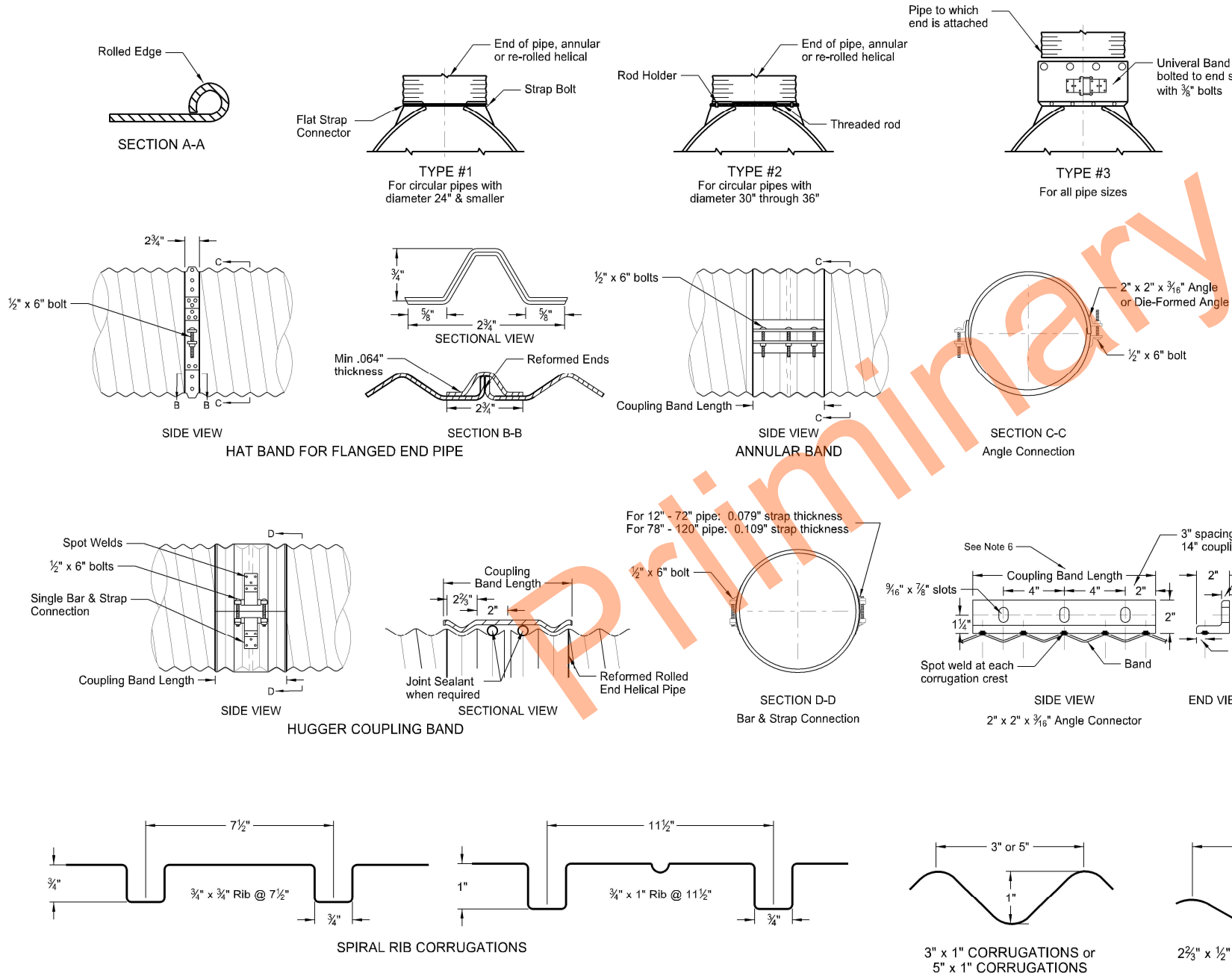
Splices to be the lap riveted type.

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 1/8" galv. angle for 60" through 72" dia. and 2 1/2" x 2 1/2" x 1/8" 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"	12" - 72"	10 1/2"	.052"
		78" - 84"	10 1/2"	.079"
	3" x 1"	48" - 120"	10 1/2"	.052"
		5" x 1"	48" - 120"	.064"

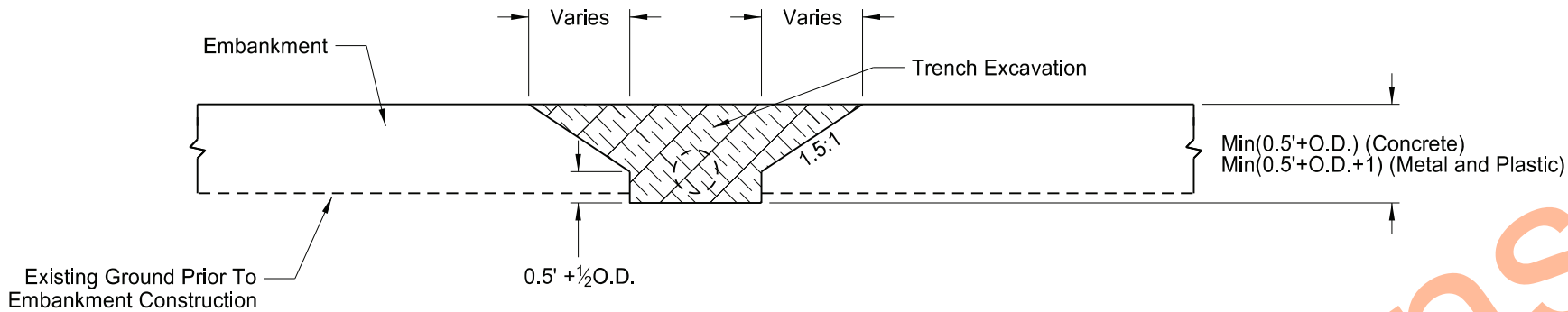


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
08-16-13	
REVISIONS	
DATE	CHANGE
01-07-14	End Section Plan View
02-27-14	3" x 1" Corrugation Detail
09-18-19	Added Perspective View Detail
09-23-22	Galvanized Thickness Table



09/23/22

TRANSVERSE MAINLINE PIPE INSTALLATION DETAIL FOR PIPES INSTALLED IN NEW EMBANKMENT AREAS



EXCAVATION DETAIL

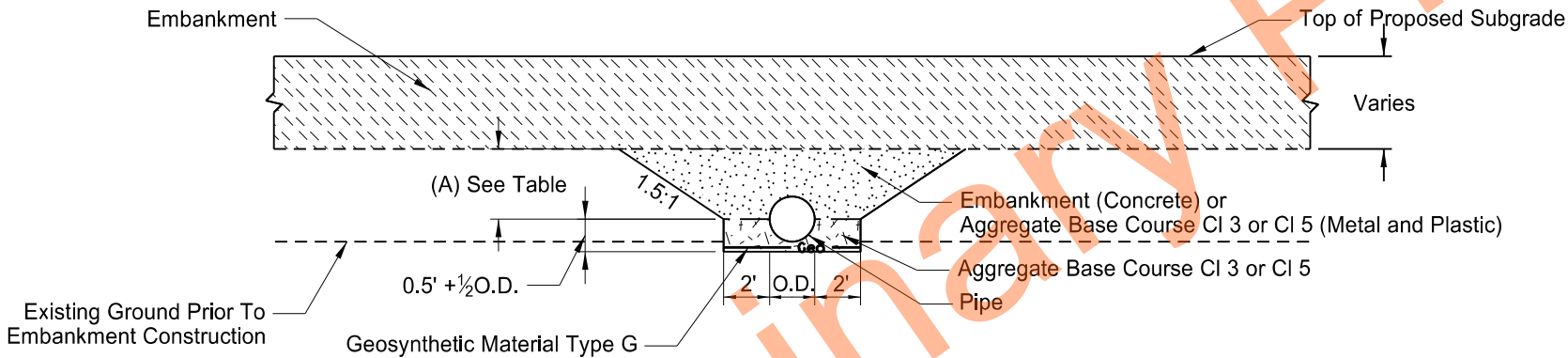
- Pay Items
- 1) Pipe*
 - 2) Geosynthetic Material Type G

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

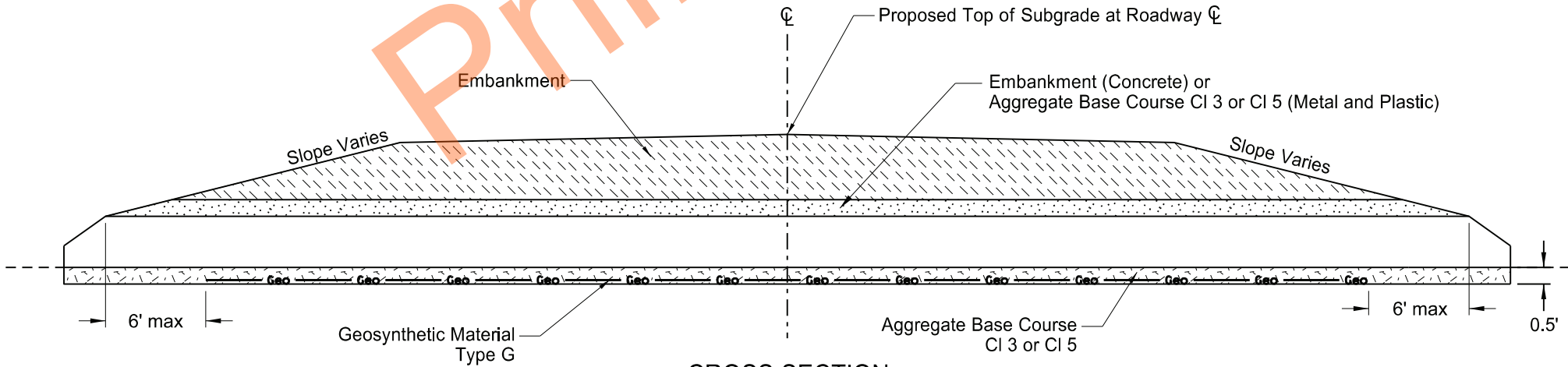
NOTES:

- 1) This drawing applies to new/extended mainline and paved intersection roadway pipes only (including ramps). It does not include pipes in approaches
- 2) Embankment may be either Borrow Excavation or Common Excavation - Type A

Backfill Dimensions	
Pipe Materials	Dimension (A)
Concrete	0.5 O.D.
Metal and Plastic	0.5 O.D. + 1 Foot



INSTALLATION DETAIL



CROSS SECTION

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	Replaced R1 fabric with Geogrid Changed bedding depth

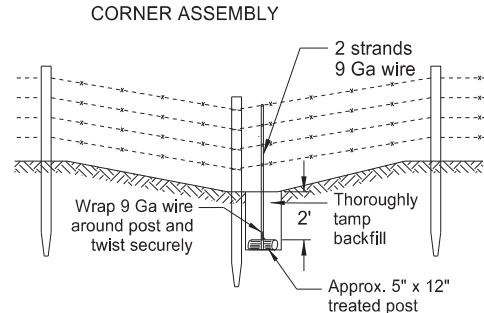
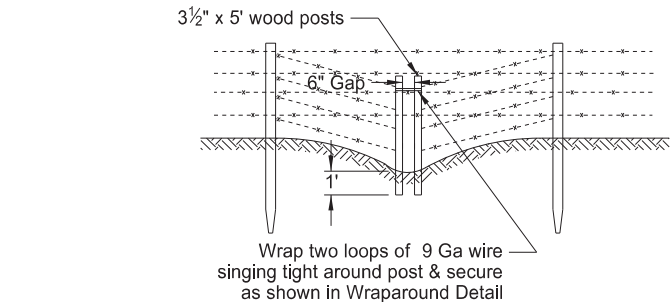
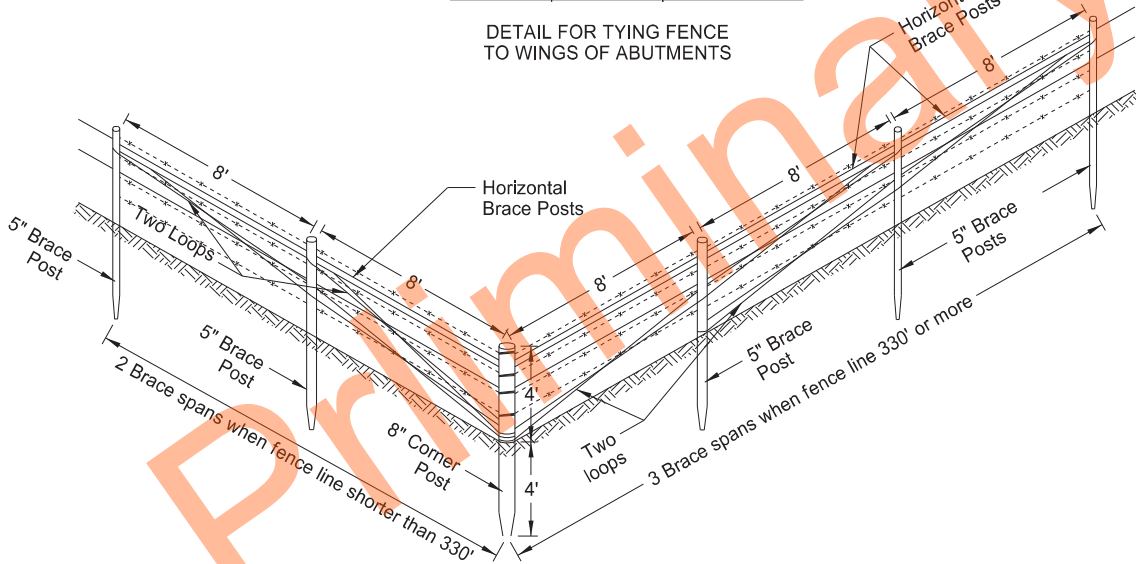
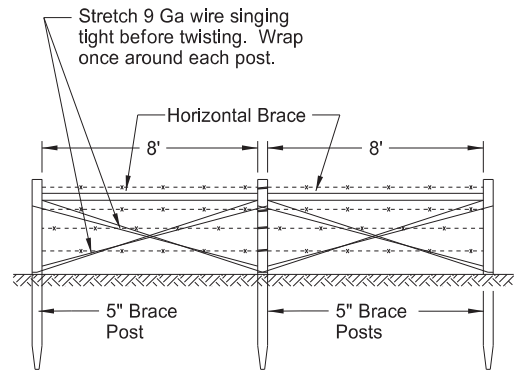
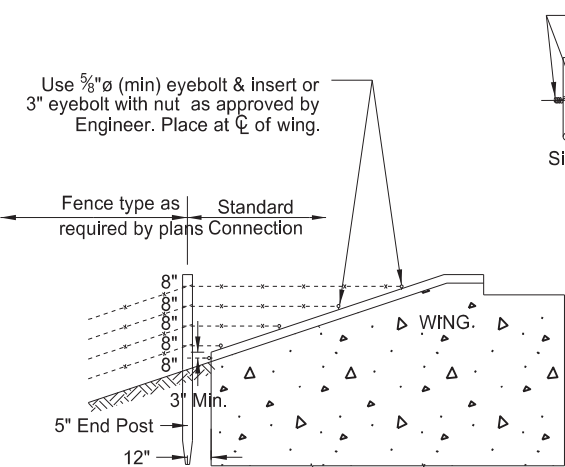
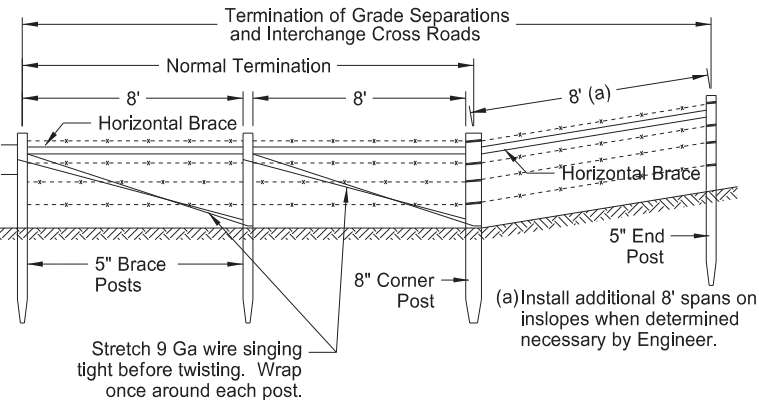
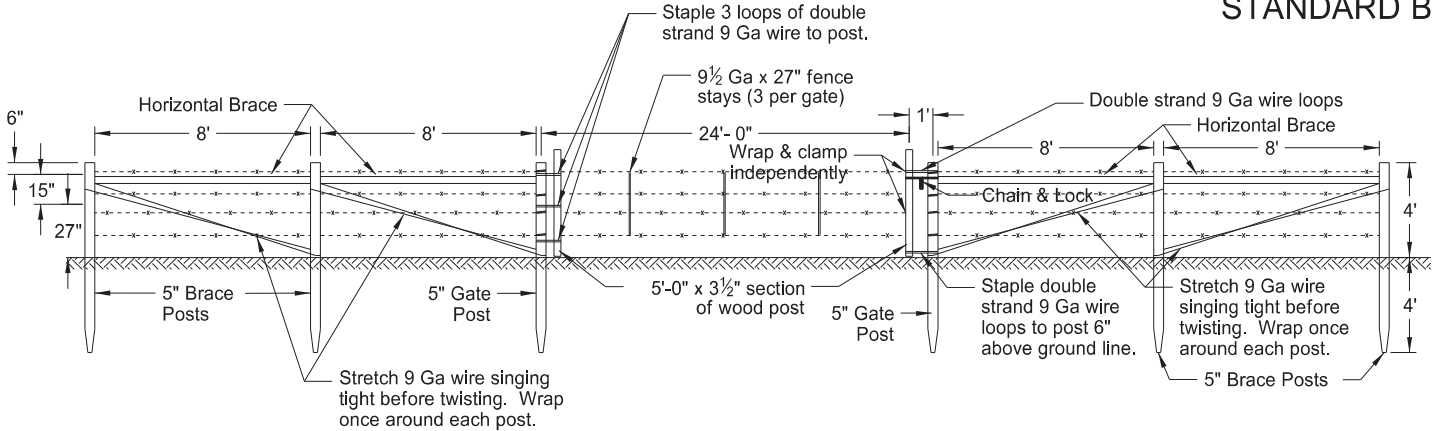


STANDARD BARBED WIRE FENCE

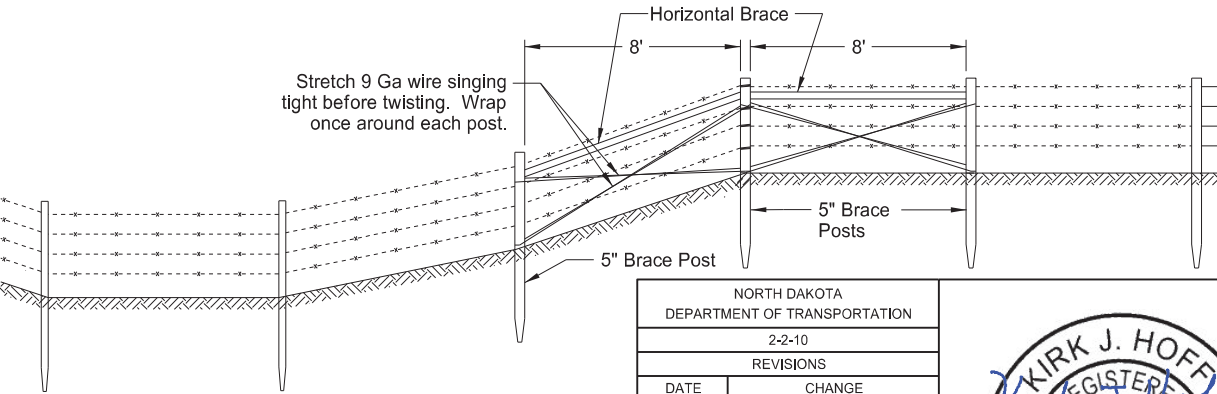
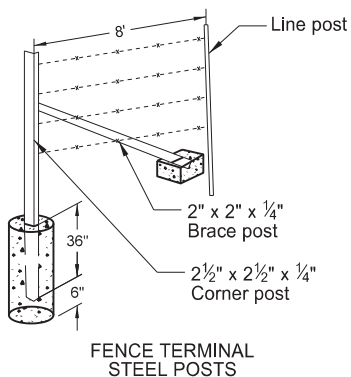
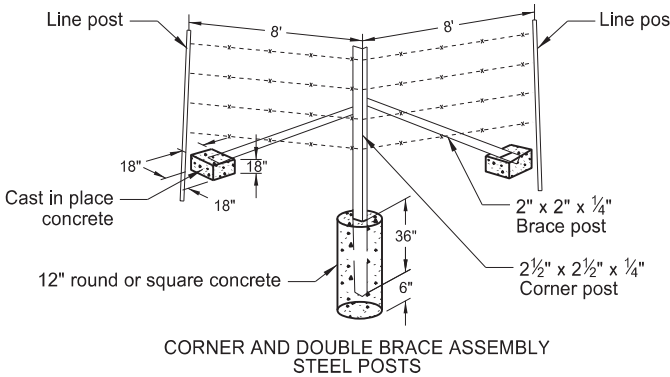
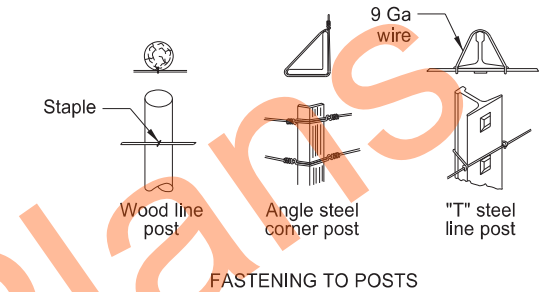
NOTES

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		



*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.

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.

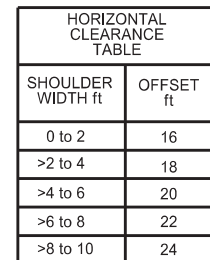


02/23/23

D-754-1

MINIMUM VERTICAL CLEARANCE:
Install signs with a minimum 5 foot vertical clearance from bottom of sign to top edge of the driving lane or auxiliary lane in rural locations. Provide a minimum 7 foot vertical clearance where parking or pedestrian movements occur. Install signs with a minimum 7 foot vertical clearance on freeways, expressways, and multi-lane conventional roadways.

Place signs a maximum of 6" above the vertical clearance specified above.



TYPICAL SECTION (Foreslope SIGNS) PIPE OR W-SHAPE



EXIT RAMP GORE SIGN PLACEMENT

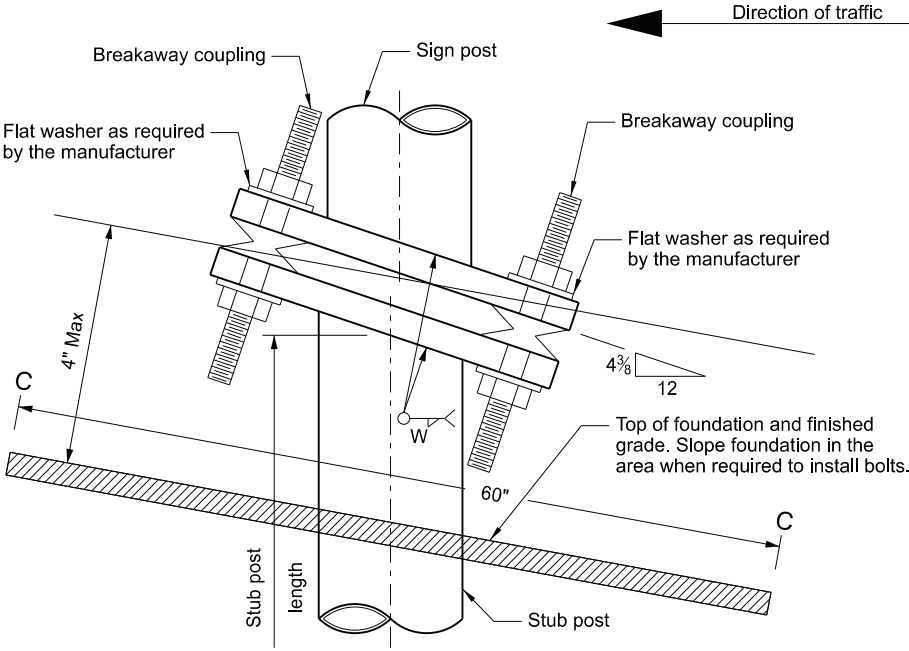


11/26/21

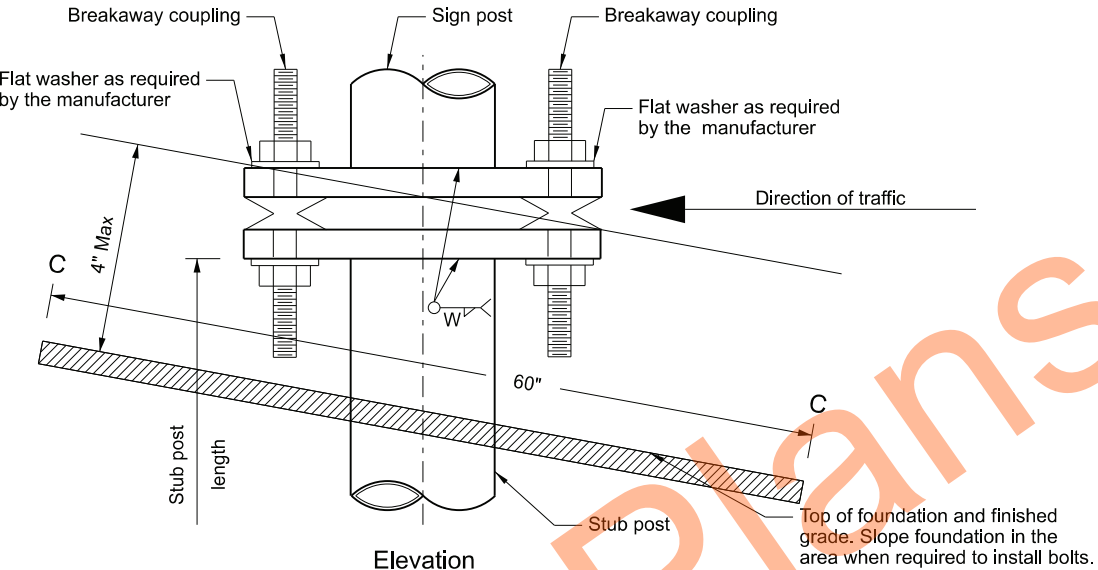
Breakaway Coupler System
for Standard Pipe
Stub Post

Notes:

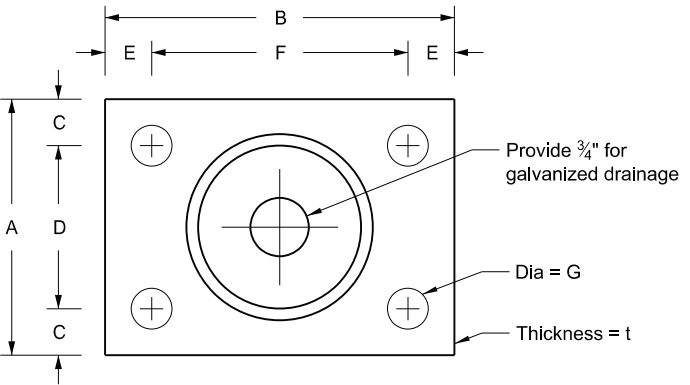
1. In lieu of the breakaway base system on standards D-754-3 and D-754-4, use a breakaway coupler system. Manufacture the breakaway coupler system from material meeting the requirements of ASTM A325 fasteners with the special requirements as specified by DENT BREAKAWAY IND., INC. which meets the requirements of NCHRP Report 350.
2. Fuse Joint Cuts - For steel posts cut after galvanizing, either galvanize cut after fabrication, or treat cut surface in accordance with ASTM A780. Aluminum posts need no treatment.
3. Shim as required to plumb post.
4. Tighten all bolts the maximum possible with 12" to 15" wrench.



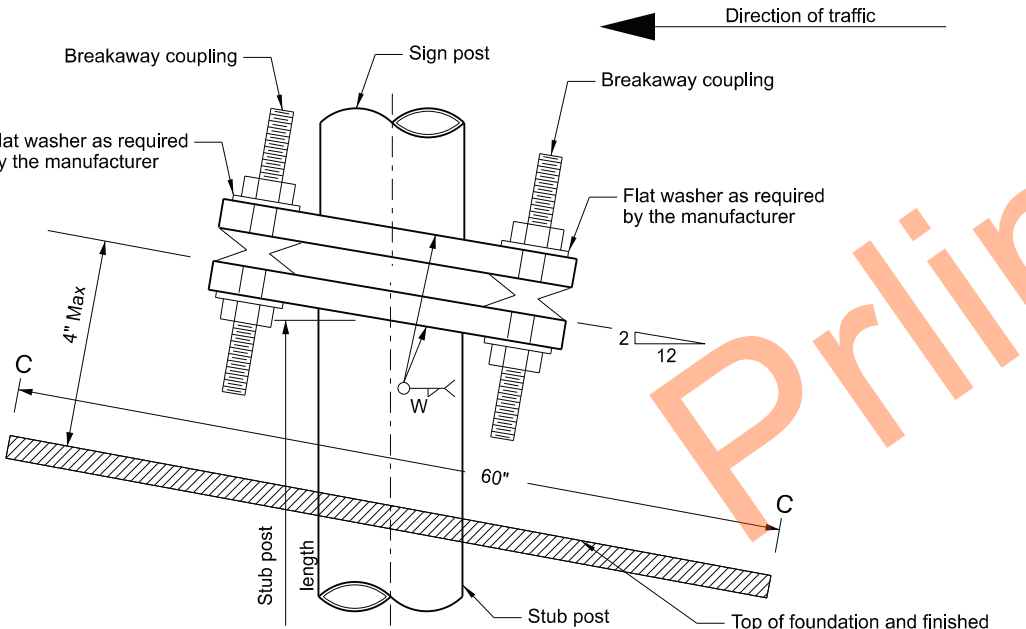
Single Post Sign and Stub Post
Type A



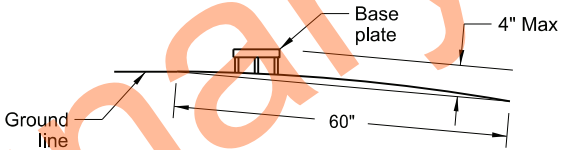
Two or More Post Sign and Stub Post
For two post signs with 8' or more post spacing
and all three or more post signs
Type C



Plan Base Plate

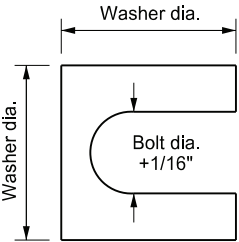


Two Post Sign and Stub Post
For signs with less than 8' post spacing
Type B



Section C - C

Max. protection of the stub post is 4" above a 60" chord aligned radially to the center line of the highway and connecting any point, within the length of the chord, on the ground surface on one side of the support to a point in the ground surface on the other side.



Shim Detail

Furnish 2 - .012"± thick and 2 - .032"± thick shims per post. Fabricate shims from brass shim stock or strip conforming to ASTM B36.

Dimension Nom. Pipe Size	Base Table Data										
	Breakaway Coupling	A	B	C	D	E	F	G	t	W	Stub Post Length
Steel											
3½"	½" x 4½"	5½"	8⅜"	1⅜"	3⅞"	1⅜"	6¾"	9⅛"	¾"	⅜"	1'-6"
4"	⅝" x 4½"	5½"	8¾"	1"	3½"	1"	6¾"	1⅛"	¾"	⅜"	1'-6"
5"	¾" x 5¼"	6½"	10"	1⅛"	4¼"	1⅛"	7¾"	1⅜"	1"	⅞"	2'-0"
6"	1" x 5¼"	7½"	11¾"	1⅜"	4¾"	1⅜"	9"	1⅛"	1¼"	⅞"	2'-0"
8"	1" x 5¼"	9½"	13¼"	1⅜"	6¾"	1⅜"	10½"	1⅛"	1¼"	⅞"	2'-6"
10"	1" x 5¼"	11¾"	15¼"	1⅜"	9"	1⅜"	12½"	1⅛"	1¼"	½"	3'-0"
12"	1" x 7"	13¾"	18"	1⅝"	10 ½"	1⅝"	14¾"	1⅛"	1½"	½"	3'-0"
Aluminum											
3½"	½" x 4½"	5½"	8⅜"	1⅜"	3⅞"	1⅜"	6¾"	9⅛"	¾"	⅜"	1'-6"
4"	⅝" x 4½"	5½"	8¾"	1"	3½"	1"	6¾"	1⅛"	1"	⅞"	1'-6"
5"	¾" x 5¼"	6½"	10"	1⅛"	4¼"	1⅛"	7¾"	1⅜"	1"	½"	2'-0"
6"	1" x 5¼"	7½"	11¾"	1⅜"	4¾"	1⅜"	9"	1⅛"	1¼"	½"	2'-0"
8"	1" x 5¼"	9½"	13¼"	1⅜"	6¾"	1⅜"	10½"	1⅛"	1¼"	½"	2'-6"
10"	1" x 5¼"	11¾"	15¼"	1⅜"	9"	1⅜"	12½"	1⅛"	1½"	⅞"	3'-0"
12"	1" x 7"	13¾"	18"	1⅝"	10¼"	1⅝"	14¾"	1⅛"	1¾"	1⅛"	3'-0"

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-2013	
REVISIONS	
DATE	CHANGE
8-30-2018	Updated notes to active voice.
8-29-2019	New Design Engineer PE Stamp.
8-05-2024	Electronic Stamp/Signature.

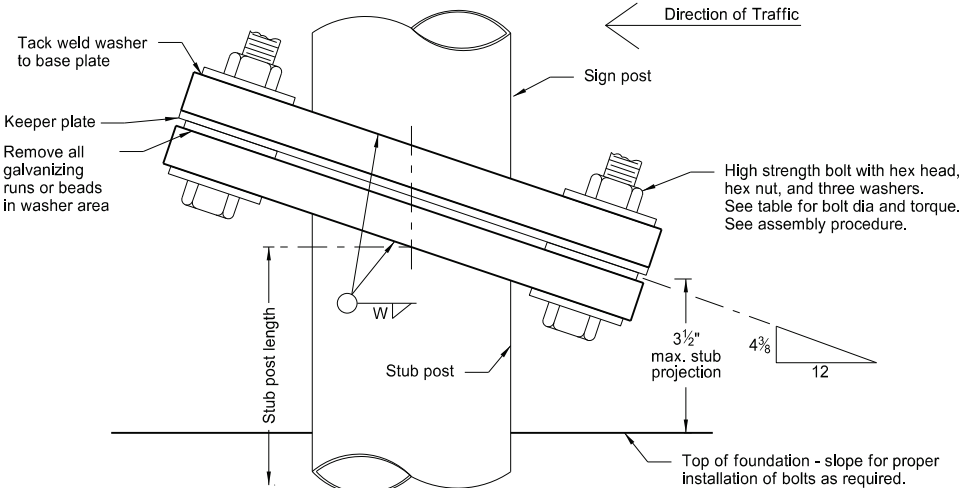


08/05/24

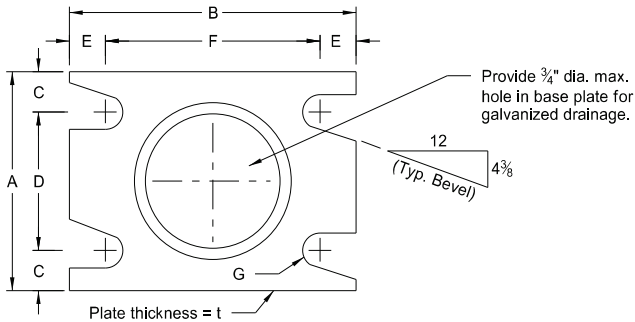
Breakaway System
for Standard Pipe
Stub Post

Notes:
Tack weld aluminum base plate washers to the base, when the base plate is aluminum.
Use standard drawing D-754-6 for fuse plate, hinge plate, and foundation details.

- Assembly Procedure:
- Assemble post to stub with bolts and one flat washer between base plate and keeper plate.
 - Shim as required.
 - Tighten all bolts the maximum possible with 12" to 15" wrench to bed washers and shims and to clean bolt threads, then loosen.
 - Retighten bolts in a systematic order to prescribed torque. (see table)
 - Loosen each bolt and fill the gaps between the thread and mating surface with thread locking liquid resin, conforming to ASTM D5363-03 (2008), forming solid, one part assemblies secure from vibration, pressure, and corrosion.
 - Retighten each bolt to prescribed torque in the same order as initial retightening.

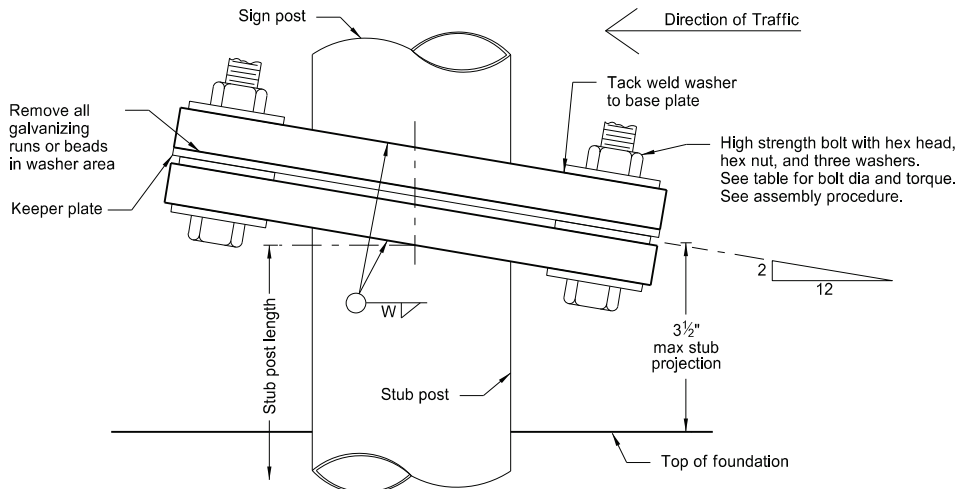


Stub Post Connection - Type A
Elevation View
(Single Post)

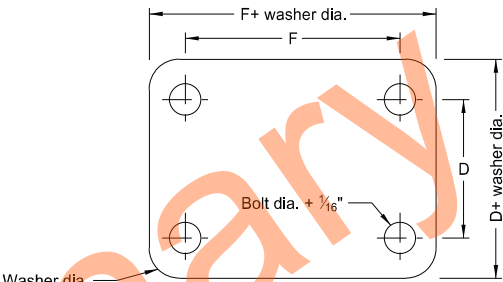


Base Plate Plan View

Place bevel toward roadway on approach side and away on the other side.

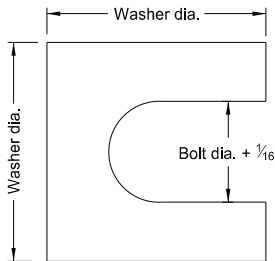


Stub Post Connection - Type B
Elevation View
(Two Posts)



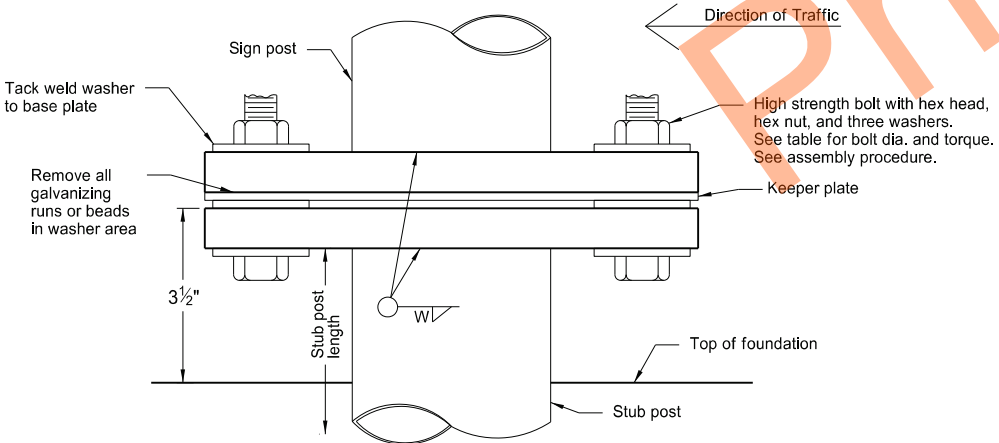
Keeper Plate Detail

Place keeper plate above center washer between top and bottom slip bases. Fabricate keeper plate from 28 gauge material and galvanize after fabrication in conformance with ASTM A653 G60 coating.



Shim Detail

Furnish 2 each $\pm .012$ " thick and 2 each $\pm .032$ " thick shims per post. Fabricate shims from brass shim stock or strip in conformance with ASTM B36.



Stub Post Connection - Type C
Elevation View
(Two Posts)

Base Data Table												
Nominal Post Size dia.	Bolt Size (dia. x length)	Base Bolt Torque ft. lb.	A	B	C	D	E	F	G	t	W	Stub Post Length
Steel												
3 1/2"	1/2"x2 1/2"	12	5 1/2"	8 3/8"	1 3/16"	3 7/8"	1 3/16"	6 3/4"	9/32"	3/4"	3/8"	1'-6"
4"	5/8"x2 3/4"	29	5 1/2"	8 3/4"	1"	3 1/2"	1"	6 3/4"	1 1/32"	3/4"	3/8"	1'-6"
5"	3/4"x3 1/2"	46	6 1/2"	10"	1 1/8"	4 1/4"	1 1/8"	7 3/4"	1 3/32"	1"	7/16"	2'-0"
6"	1"x4 1/4"	61	7 1/2"	11 3/4"	1 3/8"	4 3/4"	1 3/8"	9"	1 7/32"	1 1/4"	7/16"	2'-0"
Aluminum												
3 1/2"	1/2"x2 1/2"	12	5 1/2"	8 3/8"	1 3/16"	3 7/8"	1 3/16"	6 3/4"	9/32"	3/4"	3/8"	1'-6"
4"	5/8"x2 3/4"	29	5 1/2"	8 3/4"	1"	3 1/2"	1"	6 3/4"	1 1/32"	1"	7/16"	1'-6"
5"	3/4"x3 1/2"	46	6 1/2"	10"	1 1/8"	4 1/4"	1 1/8"	7 3/4"	1 3/32"	1"	1/2"	2'-0"
6"	1"x4 1/4"	61	7 1/2"	11 3/4"	1 3/8"	4 3/4"	1 3/8"	9"	1 7/32"	1 1/4"	1/2"	2'-0"

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-21-11	
REVISIONS	
DATE	CHANGE
2-28-14	Removed lower post and foundation details.
8-30-18	Updated notes to active voice.
8-29-19	New Design Engineer PE Stamp.
8-05-24	Electronic Stamp/Signature.



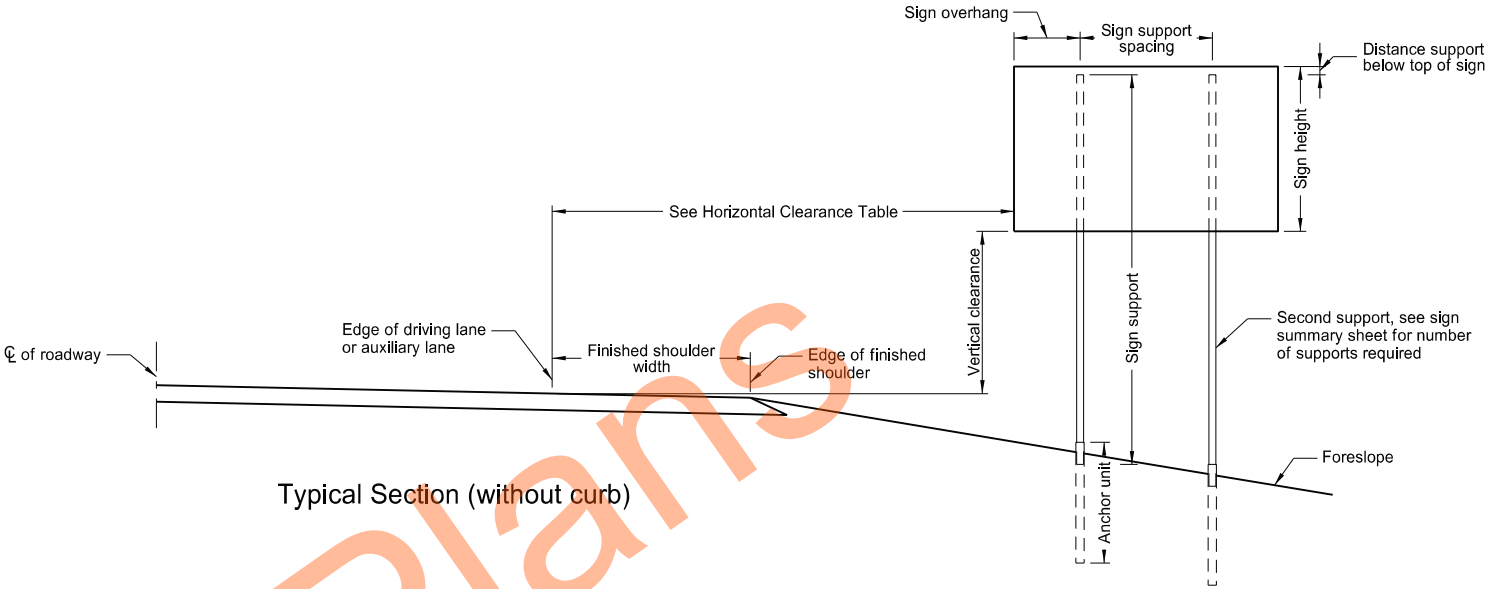
08/05/24

PERFORATED TUBE ASSEMBLY DETAILS

D-754-23

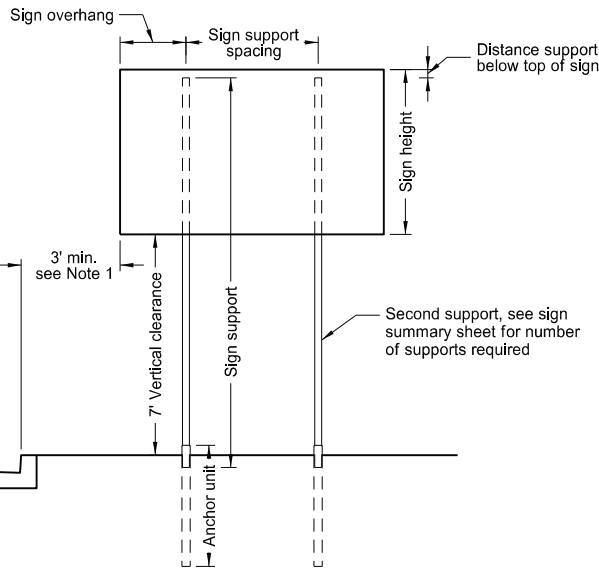
Notes:

1. Curbed Roadways: Use a 3' clearance from face of the curb except where right of way or sidewalk width is limited; Use a minimum 2' clearance. Increase the horizontal clearance if required to maintain a minimum sidewalk clear width of 4' from the sign support, not including any attached curb.
2. Minimum vertical clearance: Provide at least 5' measured from the bottom of the sign to the edge of the driving lane or auxiliary lane at the side of the road in rural districts. Provide at least 7' clearance to the bottom of the sign, where parking or pedestrian movements occur.
- Install signs on expressways a minimum height of 7'.
- Install adopt-a-highway signs on Freeways at least 7' above the edge of the driving lane.
- Maximum vertical clearance is 6" greater than the minimum vertical clearance.
3. Offset signs: Use a vertical clearance of 5' above the edge of the driving lane for signs placed 30 feet or more from the edge of the traveled way.
4. Provide a horizontal clearance from edge of shared use path to edge of sign of 3', except where width is limited. Provide a minimum clearance of 2'.

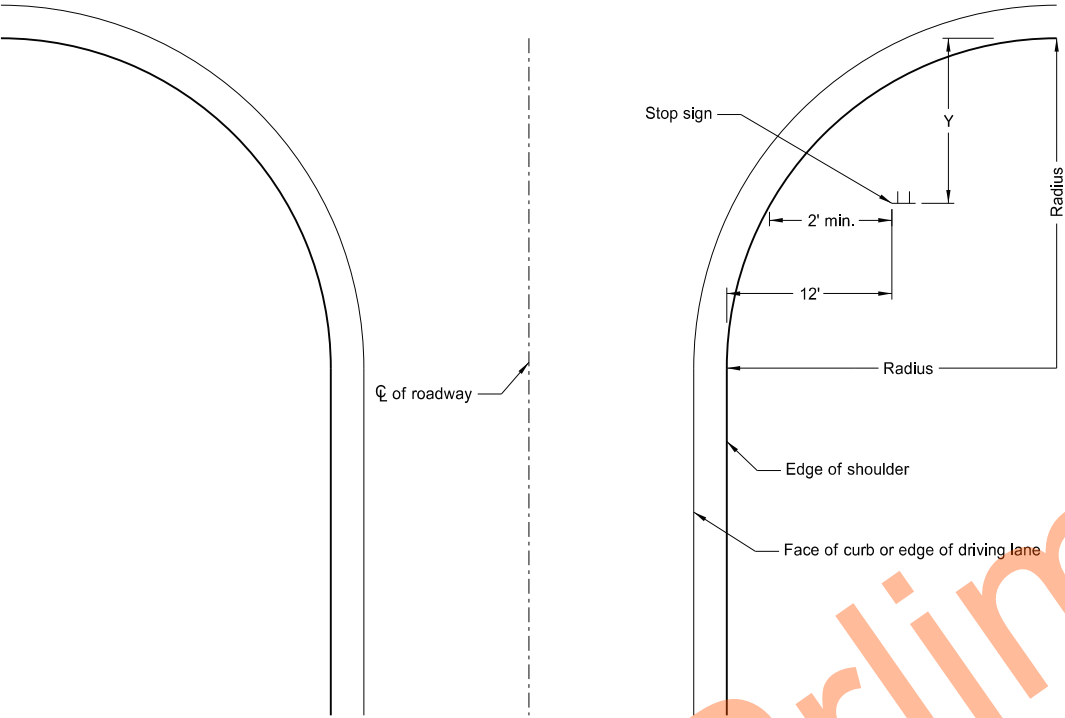


Typical Section (without curb)

Horizontal Clearance Table	
Shoulder Width ft	Offset ft
0 to 2	16
>2 to 4	18
>4 to 6	20
>6 to 8	22
>8 to 10	24

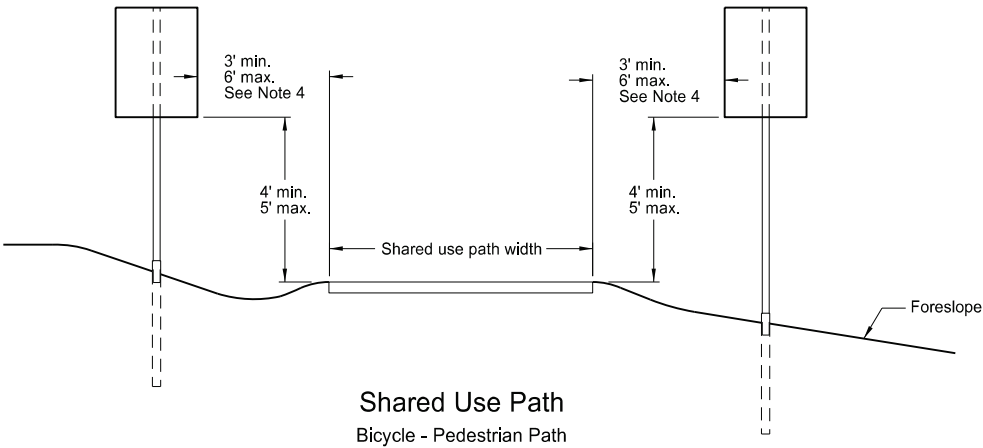


Typical Section (with curb)
Residential or Business District



Stop Sign Location
Wide Throat Intersection
Use layout for the placement of "Stop" signs.

Radius ft.	Y-max. ft.	Y-min. ft.
40	50	15
45	50	18
50	50	21
55	50	25
60	50	28
65	50	32
70	50	35
75	50	39
80	50	43



Shared Use Path
Bicycle - Pedestrian Path

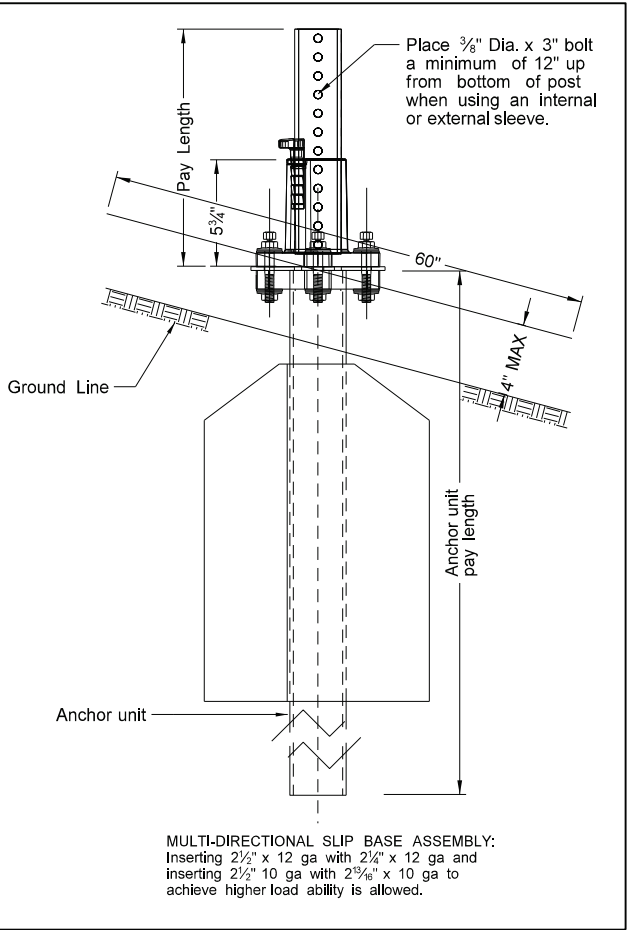
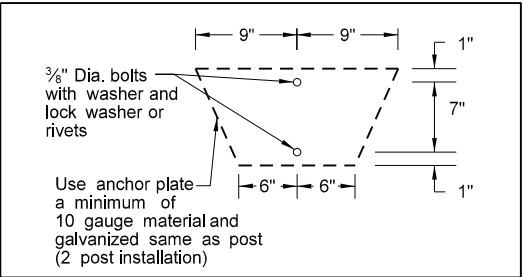
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
7-8-14	Revised note 2, added note 4.
8-30-18	Updated notes to active voice.
8-29-19	New Design Engineer PE Stamp.
8-05-24	Electronic Stamp/Signature.



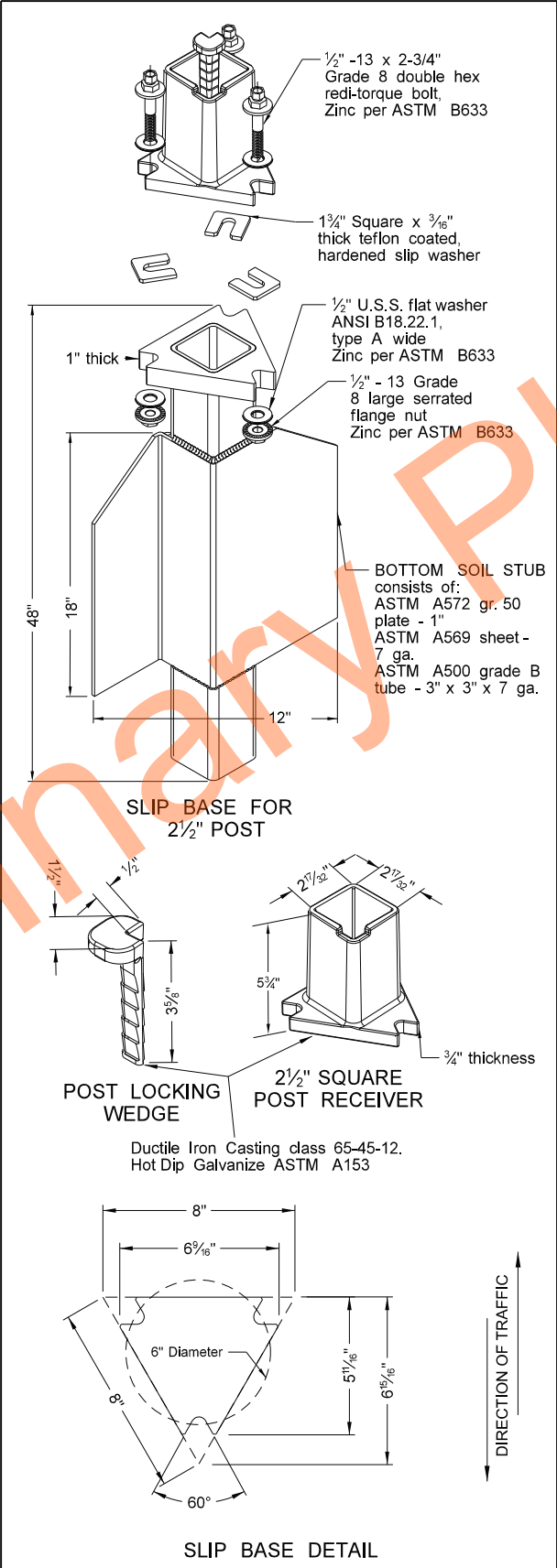
08/05/24

Telescoping Perforated Tube							
Number of Posts	Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thick-ness Gauge
1	2	12			No	2 1/4	12
1	2 1/4	12			No	2 1/2	12
1	2 1/2	12			(B)	3(C)	7
1	2 1/2	10			Yes		7
1	2 1/4	12	2 1/2(D)	12	Yes		7
1	2 1/2	12	2 1/4	12	Yes		7
2	2 1/2	10			Yes		7
2	2 1/4	12	2 1/2(D)	12	Yes		7
2	2 1/2	12	2 1/4	12	Yes		7
3 & 4	2 1/2	12			Yes		7
3 & 4	2 1/2	10			Yes		7
3 & 4	2 1/2	12	2 1/4	12	Yes		7
3 & 4	2 1/4	12	2 1/2(D)	12	Yes		7
3 & 4	2 1/2	10	2 3/16	10	Yes		7

(B) - Provide a shim as specified by the manufacturer when placing 2 1/2", 12 gauge posts in standard soils without breakaway bases. Provide breakaway base when placing the support in weak soils. The Engineer will determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.
(C) - 3" anchor unit
(D) - 2 1/2" x 12 ga. x 18" minimum length external sleeve required.

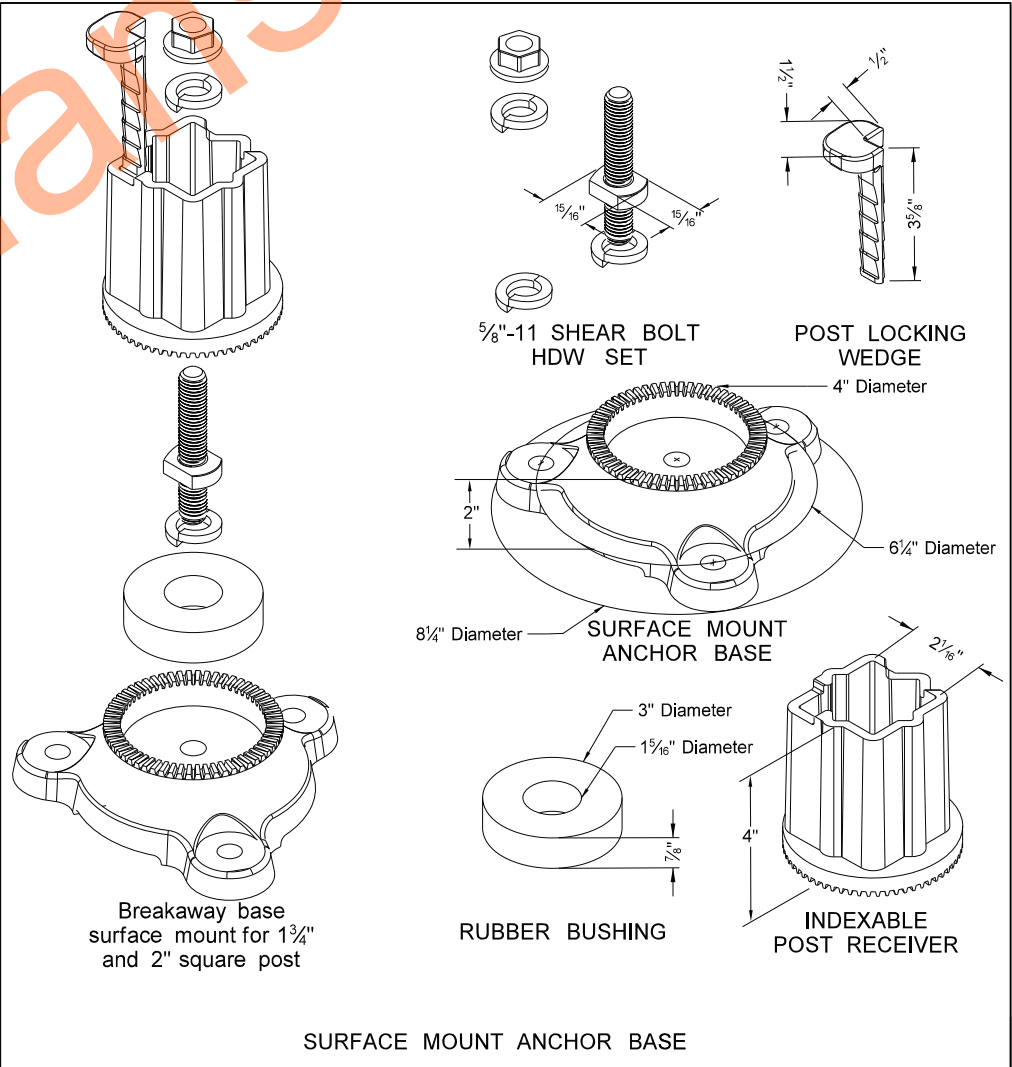


Mounting Details Perforated Tube



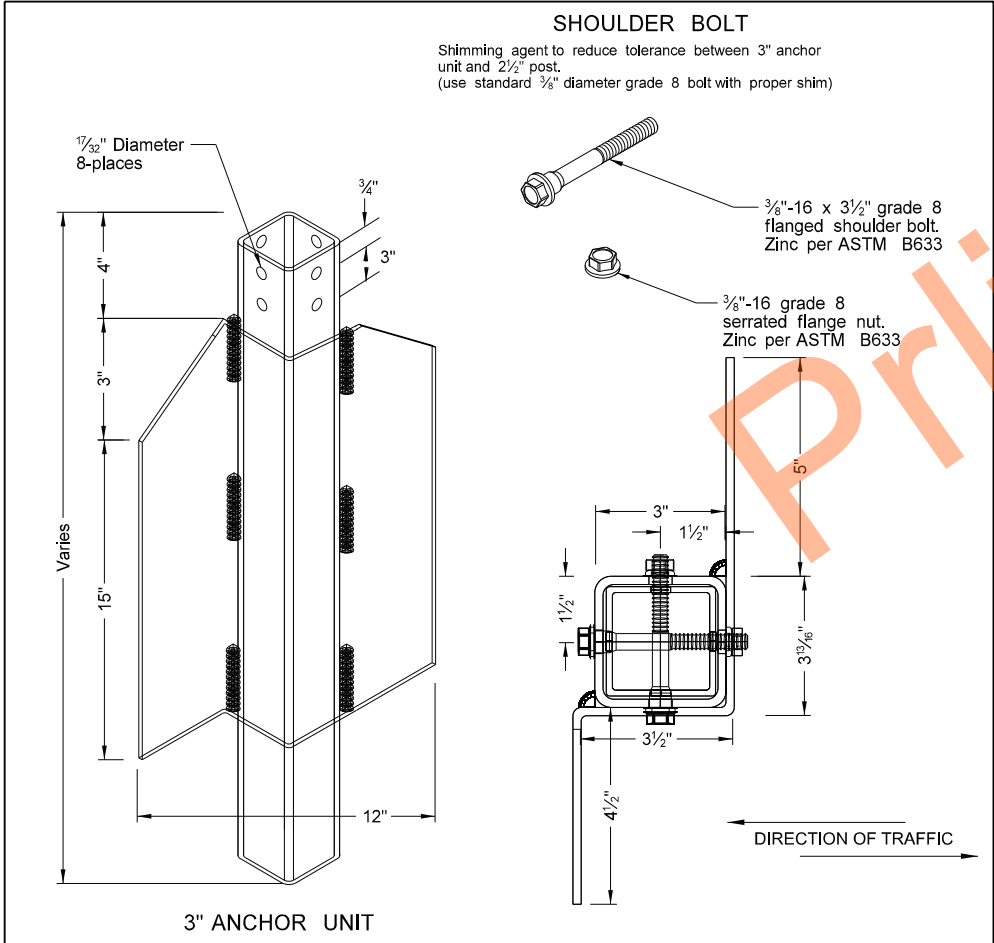
Properties of Telescoping Perforated Tubes							
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In. ⁴	Cross Sect. Area In. ²	Section Modulus In. ³	
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172	
2 x 2	0.105	12	2.416	0.372	0.590	0.372	
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499	
2 3/16 x 2 3/16	0.135	10	3.432	0.605	0.841	0.590	
2 1/2 x 2 1/2	0.105	12	3.141	0.804	0.803	0.643	
2 1/2 x 2 1/2	0.135	10	4.006	0.979	1.010	0.783	

The 2 3/16 size 10 gauge is shown as 2.19" size on the plans;
The 2 1/2 size is shown as 2.51" size on the plans.



NOTE:

- 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement is above and below post location and also back and ahead of post.
- Provide 7 gauge HRPO commercial quality ASTM A569 and 3" x 3" x 7" gauge ASTM A500 grade B anchor material with 43.9 KSI yield strength and 59.3 KSI tensile strength. Hot dip galvanize anchor per ASTM A123/153. Tolerances on anchor unit and slip base bottom assembly are +/- 0.005" unless otherwise noted.
- Eliminate wings when anchor is used in concrete sidewalk.
- Provide a minimum 8" distance between the first and fourth post on four post signs.
- Install in accordance with manufacturers recommendation.
- Use a minimum 1/2" diameter x 4" grade 8 concrete fastener for surface mount breakaway base.



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice & corrected max height of base.
8-29-19	New Design Engineer PE Stamp.
8-05-24	Electronic Stamp/Signature.

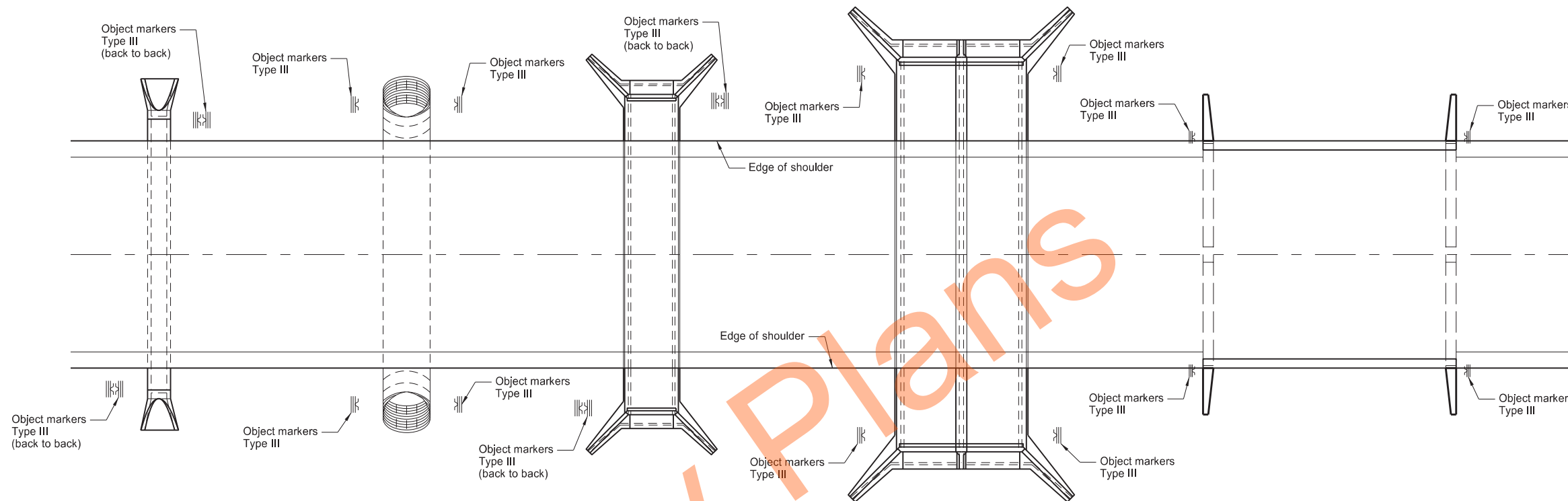


08/05/24

Perforated Tube Anchor Unit Assembly

U-Channel Anchor Unit Assembly

Steel Post Detail
Approx. 2 lb/ft



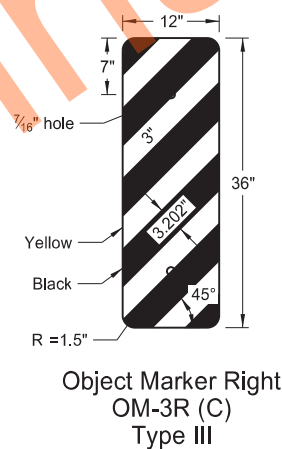
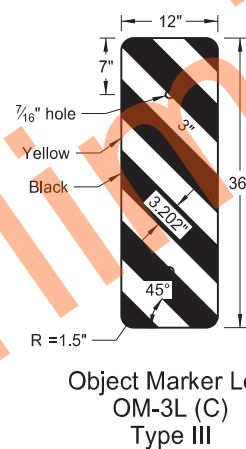
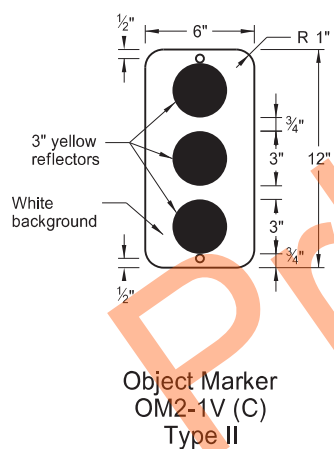
Pipe Culverts
10' max

Pipe Culverts
greater than 10'

Box Culverts
10' max

Box Culverts
greater than 10'

Bridges (B)



Fastener Detail

Object Marker Installation Detail

Notes:

- (A) Use 3/8" dia. tensiion pin type or other non-rust vandal resistant fastener with min. outside dia. 1 3/16" flat washer.
- (B) At locations of approach guardrail with reflectors and end terminal with impact head object markers, do not install object markers.
- (C) Use two object markers for back to back mountings. On bridges where the distance between wheel guards is less than the approach width, mount object markers vertically on steel posts in front of the bridge railing on each side of highway to mark the horizontal clearance. Use 0.100" minimum thickness sheet aluminum for sign backing material. Use ASTM Type XI sheeting for Type III object markers and ASTM Type IV background sheeting with ASTM Type XI reflectors for Type II object markers.
- (D) When object marker is located 8' or less from shoulder or curb, provide 4' minimum vertical clearance from near edge of traveled way to bottom of sign. When located more than 8' from shoulder or curb provide 4' minimum vertical clearance from ground to bottom of sign.
- (E) Use 4" vertical clearance for anchor or breakaway base. Provide 4"x60" measurement above and below post location and back and ahead of post.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
7-18-14	Revised Note C
8-30-18	Updated notes to active voice and removed note.
9-05-19	New Design Engineer PE Stamp
8-08-24	Electronic Stamp/Signature.



08/08/24