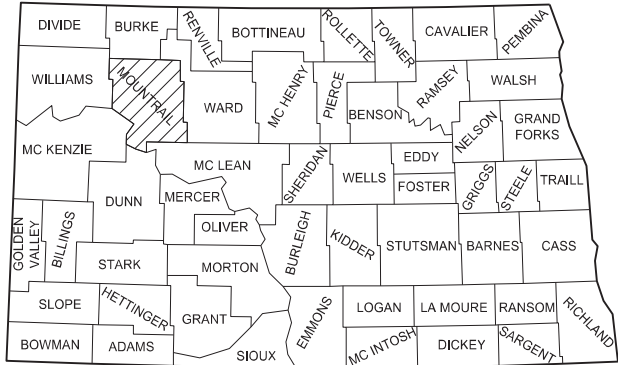


DESIGN DATA				
Traffic	Average Daily			
Current 2024	Pass: 1560	Trucks: 1265	Total: 2825	
Forecast 2044	Pass: 2015	Trucks: 1635	Total: 3650	
Clear Zone Distance: 30'		Design Speed: 55 mph		
Minimum Sight Dist. for Stopping: ____		Bridges: N/A		
Sight Dist. for No Passing Zone: ____				
Pavement Design Life _ (years)				
Design Accumulated One-way ____ ESALs: ____				



DESIGNER Stacy Flaten
DESIGNER Austin Becker
DESIGNER Dylan Weber, Matt Werlinger

STATE COUNTY MAP



Reference Points	
RP	Station (ND 23B Alignment)
926	48892+80
927	48945+60

NORTH DAKOTA

DEPARTMENT OF TRANSPORTATION

TAC-7-023(069)926
Mountrail County
ND 23B, 0.5 Mi W of ND 1804, N for 0.5 Mi
Bikeway/Walkway and
Double Prefabricated Outdoor Vault Toilet

	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	23923	1	1

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

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
TAC-7-023(069)926	1.032	1.032

Fort Berthold
Reservation Boundary

Begin Project TAC-7-023(069)926
Sta 1000+00
RP 926.023

End Project TAC-7-023(069)926
Sta 1054+48.94
RP 926.988

Fort Berthold
Reservation Boundary

T 152 N

ND DEPARTMENT OF TRANSPORTATION
OFFICE OF PROJECT DEVELOPMENT
Jon Ketterling
03/14/25



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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 - 2	Quantities	D-203-8	Standard Rural Approaches					
10	1	Basis of Estimate	D-255-2	Erosion And Siltation Control - Erosion Control Blanket Installation					
11	1	Earthwork Summary	D-261-1	Erosion Control - Fiber Roll Placement Details					
20	1 - 5	Details	D-704-7	Breakaway Systems For Construction Zone Signs - Perforated Tube					
30	1 - 2	Typical Sections	D-704-8	Breakaway Systems For Construction Zone Signs - U-Channel Post					
40	1 - 2	Removals	D-704-9	Construction Sign Details - Terminal And Guide Signs					
50	1	Manhole Summary	D-704-10	Construction Sign Details - Regulatory Signs					
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60	1 - 14	Plan & Profile	D-704-12	Shoulder Closure Tapers					
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76	1 - 7	Temporary Erosion Control	D-704-14	Construction Sign Punching And Mounting Details					
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80	1 - 2	Layouts	D-704-20	Terminal And Seal Coat Sign Layouts					
81	1	Survey Coordinate and Curve Data	D-704-22	Construction Truck And Temporary Detour Layouts					
82	1 - 5	Survey Data Layouts	D-704-24	Shoulder Closures And Bridge Painting Layouts					
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110	1 - 9	Signing and Pavement Marking Layout	D-708-6	Erosion And Siltation Controls - Median Or Ditch Inlet Protection					
200	1 - 16	Cross Sections	D-714-1	Reinforced Concrete Pipe Culverts And End Sections (Round Pipe)					
			D-714-4	Round Corrugated Steel Pipe Culverts And End Sections					
			D-714-22	Concrete Pipe, Cattle Pass, or Precast Concrete Box Culvert Ties					
			D-714-27	Pipe Installation Detail for Longitudinal Mainline Pipe or Pipe Not Under the Roadway					
			D-722-5	Manhole Details					
			D-750-2	Sidewalk					
			D-750-3	Curb Ramp Retrofit Details					
			D-750-4	Curb Ramp Retrofit Transitional Area Details					
			D-752-1	Standard Barbed Wire Fence					
			D-754-21B	Reflectorized Delineators - Two-Lane Two-Way Highway					
			D-754-23	Perforated Tube Assembly Details					
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			D-754-28, 29, 31	Sign Punching, Stringer and Support Location Details Regulatory, Warning and Guide Signs					
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			D-754-83	Object Markers - Culverts					
			D-754-87	Sign Punching, Stringer And Support Location Details For Street Name Signs And 911 Signs					
SPECIAL PROVISIONS									
Number	Description								
SSP 1	Temporary Erosion and Sediment Best Management Practices								
SSP 3	Local Agency Contracts								
SSP 10	E-Ticketing								
SP 273(24)	Tribal Employment Rights Ordinance (TERO)								
SP 274(24)	Utility Coordination								
SP 275(24)	Precast Double Vaulted Toilet								
SP 468(24)	Commercial Grade Hot Mix Asphalt								

NOTES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-7-023(069)926	6	1

100-P01 LIFT STATION ACCESS: Access to existing lift station at Sta 1052+48.82 is to be maintained throughout construction. If access is to be restricted, provide the City of New Town City Coordinator 48 hours notice.

City Coordinator – Scott Andersen
sandersen@cityofnewtown.net
office: 701-627-4812
cell phone: 701-898-4812

105-200 UTILITY COORDINATION: A utility coordination meeting is required.

107-100 LAWS TO BE OBSERVED: All or a portion of this project lies within the exterior boundaries of an Indian Reservation. Review laws and ordinances pertaining to the work contained within the boundaries of the reservation.

107-900 THREE AFFILIATED TRIBES BIA COORDINATION: Coordinate work on lands held in trust by the Bureau of Indian Affairs (BIA), allotted and tribally owned trust land, through the Environmental/Compliance Officer.

Contact:
Jeff Desjarlais
Environmental/Compliance Officer, Ft. Berthold
(701) 627-4707, ext. 244

Coordinate work regarding materials sources, staging areas, office locations, and other activities that are not expressly detailed in the contract documents.

108-500 TERO COORDINATION: Invite the Tribal TERO Office to the Preconstruction Conference.

202-P01 REMOVAL OF BITUMINOUS SURFACING: The removal of bituminous surfacing includes the removal of aggregate at the Edgewater Country Club cart path at Sta 1000+00.

203-010 SHRINKAGE: 25 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 COMPACTION AND DENSITY CONTROL: Compact material for embankment as specified in Section 203.04 G.3, Compaction Control, Type B.

203-P02 COMMON EXCAVATION-TYPE B: The Engineer will measure and pay for Common Excavation-Type B at plan quantity.

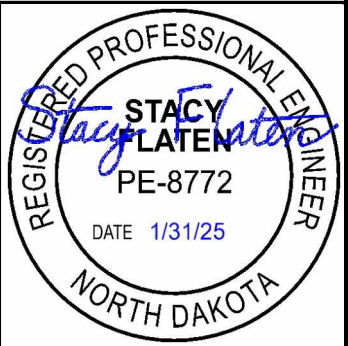
302-P01 WATER: The cost of water needed for compaction is incidental to Aggregate Base Course CL 5 and Borrow-Excavation.

704-P01 TRAFFIC CONTROL FOR CONSTRUCTION: Provide traffic control consisting of a temporary shoulder closure and flagging.

1. Standard D-704-15, Type A: To be used any time conditions exist.
2. Standard D-704-20, Type G: Basis of the terminal signing.
3. Standard D-704-22, Types K and L: For construction trucks hauling material.
4. Standard D-704-24, Type R and U: For shoulder work.

The Department will pay for all necessary deployed devices, regardless of the length of the lane closures.

752-P01 FENCE POST: Use wood posts for fence adjacent to Edgewater Country Club.



ENVIRONMENTAL NOTES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-7-023(069)926	6	2

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

EN-1 TEMPORARY WETLAND IMPACT: Temporary impact areas within wetlands and or other waters are incorporated into the plans for this project. Remove temporary fill placed and sedimentation in wetlands or other waters. Restore these wetlands to preconstruction contours.

NOTIFICATIONS TO BE FILED BY CONTRACTOR:

EN-2 FAA Notice: Notification is required for work within 3 nautical miles of the airport. Complete the Federal Aviation Administration Notice of Proposed Construction or Alteration Form 7460-1 in accordance with 14 CFR 77.7 and 77.9 (at least 45 days before the start date of the proposed construction or alteration or the date an application for a construction permit is filed, whichever is earliest) (online at <http://oeaaa.faa.gov>).



Estimated Quantities

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-7-023(069)926	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY	TOTAL
103	0100	CONTRACT BOND	L SUM	1	1
201	0330	CLEARING & GRUBBING	L SUM	1	1
202	0132	REMOVAL OF BITUMINOUS SURFACING	SY	63	63
202	0169	REMOVAL OF END SECTION-ALL TYPES & SIZES	EA	1	1
202	0174	REMOVAL OF PIPE ALL TYPES AND SIZES	LF	29	29
202	0312	REMOVE EXISTING FENCE	LF	71	71
203	0102	COMMON EXCAVATION-TYPE B	CY	4182	4182
203	0109	TOPSOIL	CY	3002	3002
203	0140	BORROW-EXCAVATION	CY	13553	13553
230	0165	SUBGRADE PREPARATION-TYPE A-12IN	STA	49.58	49.58
251	0200	SEEDING CLASS II	ACRE	8.09	8.09
251	2000	TEMPORARY COVER CROP	ACRE	8.09	8.09
253	0101	STRAW MULCH	ACRE	16.18	16.18
255	0102	ECB TYPE 2	SY	2823	2823
256	0701	REMOVE AND REPLACE RIPRAP	CY	9	9
261	0112	FIBER ROLLS 12IN	LF	5455	5455
261	0113	REMOVE FIBER ROLLS 12IN	LF	1804	1804
302	0120	AGGREGATE BASE COURSE CL 5	TON	2335	2335
430	0500	COMMERCIAL GRADE HOT MIX ASPHALT	TON	1023	1023
702	0100	MOBILIZATION	L SUM	1	1
704	0100	FLAGGING	MHR	300	300
704	1000	TRAFFIC CONTROL SIGNS	UNIT	1330	1330
704	1054	SIDEWALK BARRICADE	EA	7	7
704	1060	DELINEATOR DRUMS	EA	51	51
704	1067	TUBULAR MARKERS	EA	110	110
704	1500	OBLITERATION OF PAVEMENT MARKING	SF	100	100
706	0500	AGGREGATE LABORATORY	EA	1	1
709	0155	GEOSYNTHETIC MATERIAL TYPE RR	SY	13	13
714	0820	PIPE CONC REINF 30IN CL III	LF	4	4
714	0905	PIPE CONC REINF 36IN CL III	LF	22	22
714	4100	PIPE CONDUIT 18IN	LF	37	37
714	4105	PIPE CONDUIT 24IN	LF	104	104
714	4116	PIPE CONDUIT 36IN-APPROACH	LF	34	34
714	4120	PIPE CONDUIT 42IN	LF	9	9
714	9660	REMOVE & RELAY END SECTION-ALL TYPE & SIZES	EA	2	2
722	0120	MANHOLE 72IN	EA	1	1
722	1120	MANHOLE RISER 72IN	LF	5	5
744	0050	INSULATION BOARD	CF	128	128
750	0115	SIDEWALK CONCRETE 4IN	SY	40	40
750	2115	DETECTABLE WARNING PANELS	SF	88	88
752	0201	FENCE SMOOTH WIRE 4 STRAND	LF	48	48
752	0993	FENCE TERMINAL	EA	4	4
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	18	18
754	0112	FLAT SHEET FOR SIGNS-TYPE IV REFL SHEETING	SF	23	23
754	0155	DELINEATORS-TYPE A-DOUBLE SIDED	EA	4	4
754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	207	207
754	0592	RESET SIGN PANEL	EA	3	3

Estimated Quantities						STATE	PROJECT NO.	SECTION NO.	SHEET NO.
						ND	TAC-7-023(069)926	8	2
SPEC	CODE	ITEM DESCRIPTION	UNIT	QUANTITY					TOTAL
754	0805	OBJECT MARKERS - CULVERTS	EA	11					11
762	0114	EPOXY PVMT MK 6IN LINE	LF	245					245
762	0117	EPOXY PVMT MK 24IN LINE	LF	52					52
920	0470	PREFABRICATED OUTDOOR REST ROOM-SITE 1	L SUM	1					1

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-7-023(069)926	10	1

BASIS OF ESTIMATE

Water (incidental)
25 MGal/Mile for Dust Palliative
20 Gal/Ton for Aggregates
10 Gal/CY for Embankment

Pavement
Aggregate Base Course CL 5 @ 1.875 Ton/CY
Commercial Grade Hot Mix Asphalt @ 2 Ton/CY

Remove and Replace Riprap @ 24 inches depth (riprap grade 1)

Topsoil Depths
4" within NDDOT Right of Way
6" Edgewater Country Club Golf Course

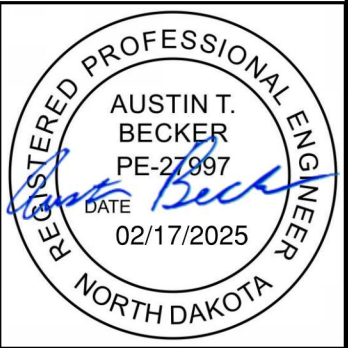
Subgrade Preparation-Type A-12IN		
Station		Length (STA)
From	To	
1000+00	1027+10	27.1
1027+48	1027+74	0.26
1028+17	1029+10	0.93
1030+53	1035+05	4.52
1035+16	1040+73	5.57
1041+55	1041+89	0.34
1042+57	1051+88	9.31
1052+37	1052+70	0.33
1053+27	1054+49	1.22
Total		49.58



Earthwork Summary

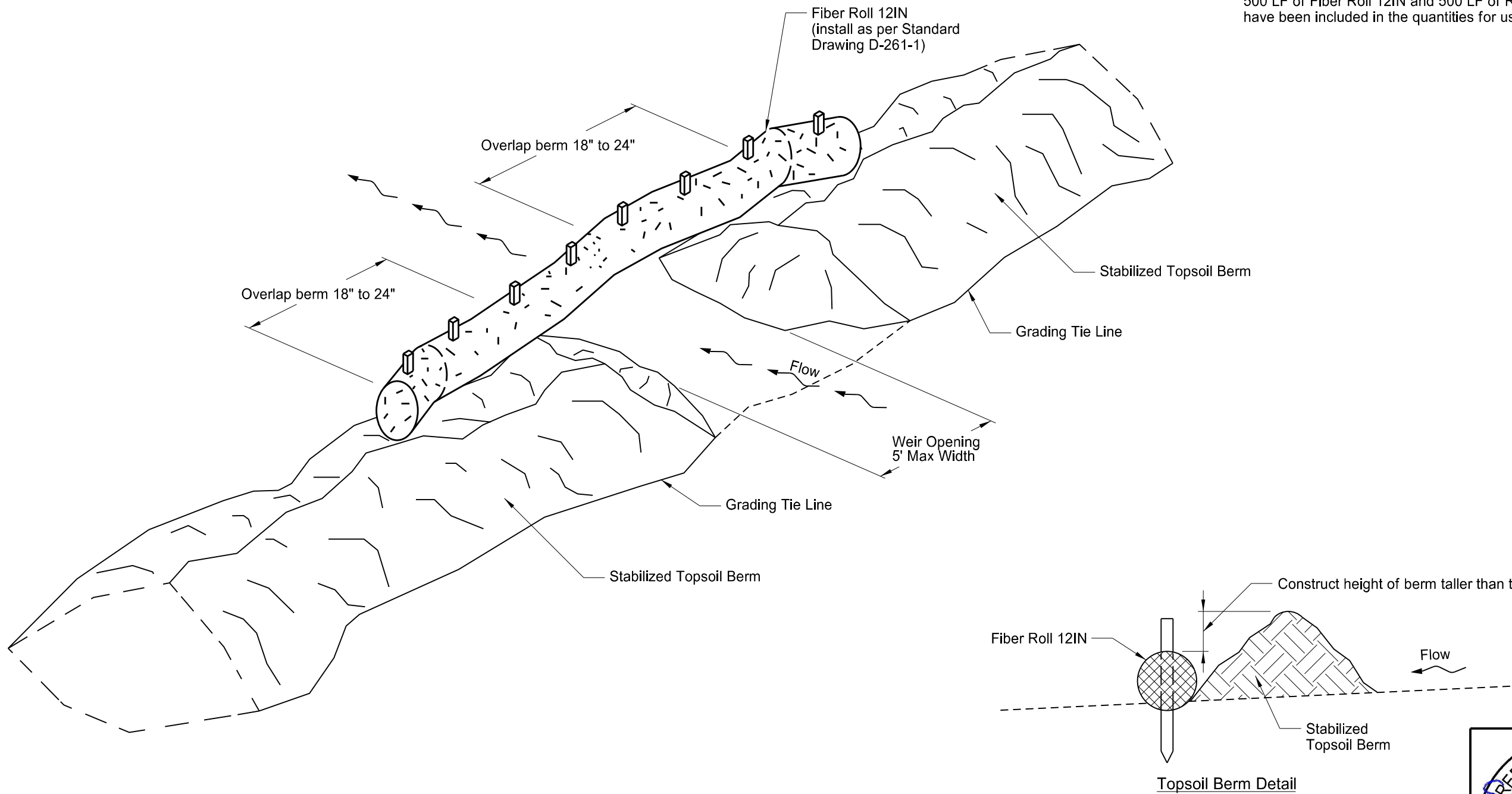
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-7-023(069)926	11	1

Location	Excavation Volume	Embankment Volume	Compacted Volume	Common Excavation – Type B (Pay Item)	Borrow-Excavation (Pay Item)	Topsoil (Pay Item)
	(CY)	(CY)	(CY)	(CY)	(CY)	(CY)
	A	B	C = B * 1.25	D = A	E = C - A	
	ND 23B Path	4,182	14,188	17,735	4,182	13,553
						3,002



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	20	1

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 straw mulch and temporary cover crop separately.
 9. Include the costs to create, maintain, and dismantle the berm in the unit price bid for "Topsoil".

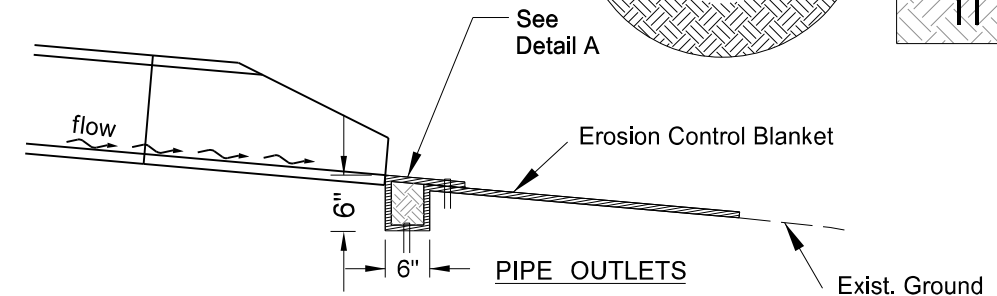
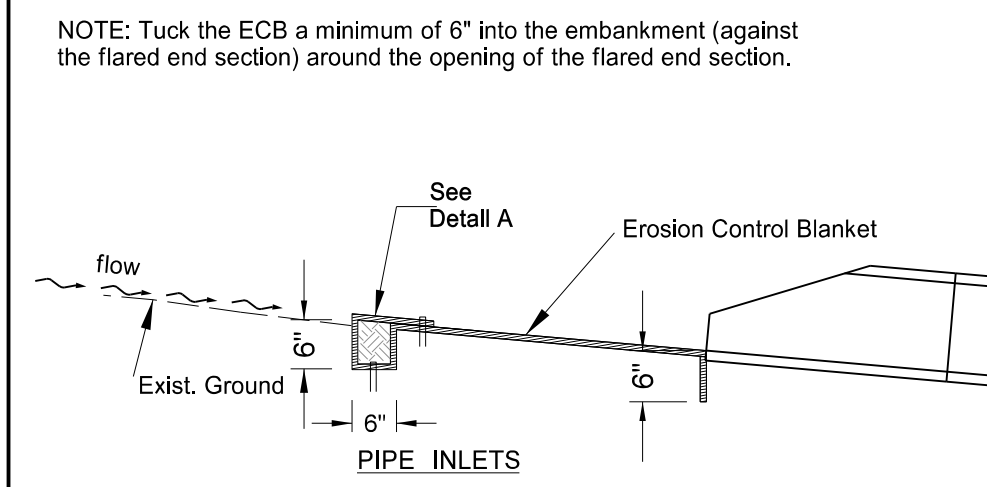
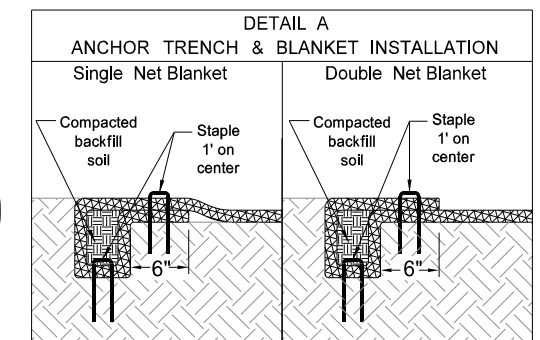
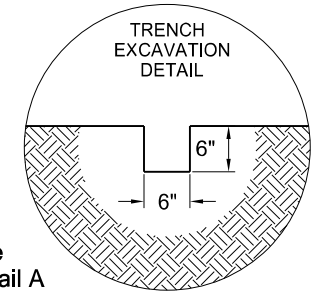
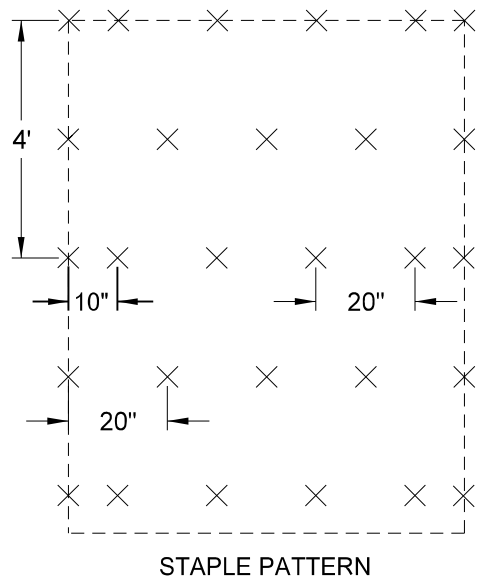
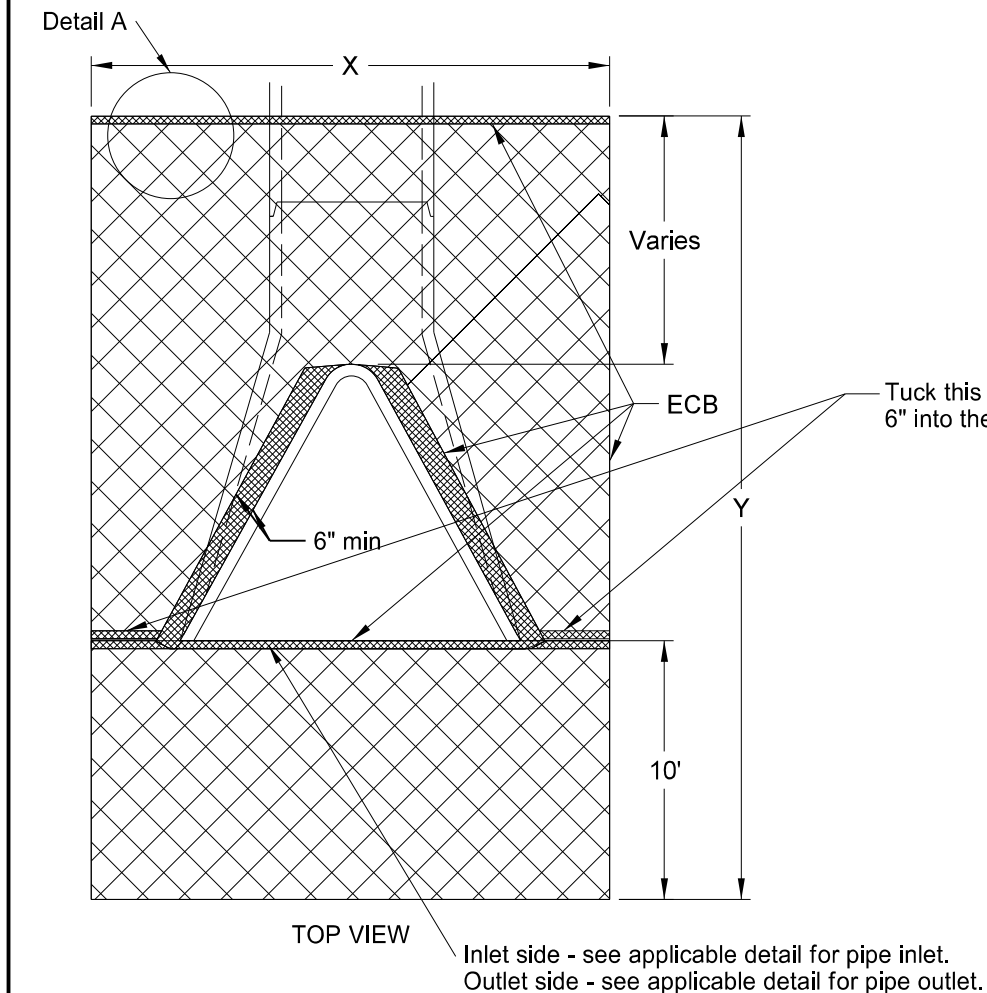
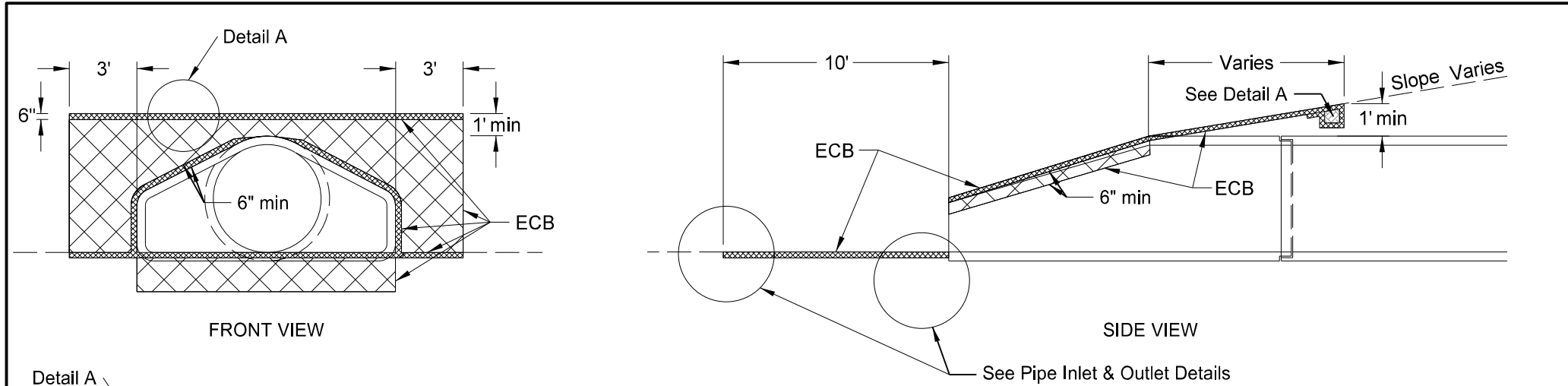


Details

ND 23B

0.5 Mi W of ND 1804, N for 0.5 Mi

Temporary Topsoil Berm and Weir Detail



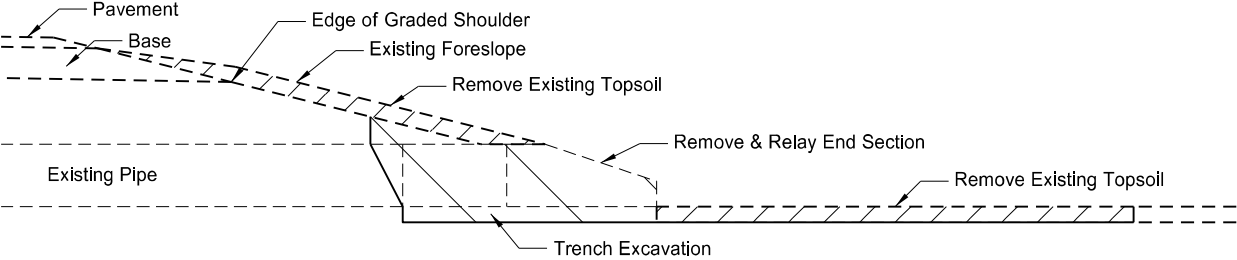
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	20	2

Location to be Protected	Culvert Type Appr/CL	Pipe Diam. (inch)	No.	Unit Quantity (SY)	Total Quantity
Station					ECB Type 2 (SY)
1005+15 Lt	CL (existing)	42	1	25	25
1018+25 Lt	CL	30	1	22	22
1028+01 Rt	CL	18	1	18	18
1028+12 Lt	CL	18	1	18	18
1029+75 Rt	CL	24	1	20	20
1029+82 Lt	CL	24	1	20	20
1041+05 Rt	CL	24	1	20	20
1041+46 Lt	CL	24	1	20	20
1041+73 Lt	Appr (existing)	24	1	20	20
1042+77 Lt	Appr (existing)	24	1	20	20
1052+32 Lt	Appr	36	1	24	24
1052+66 Lt	Appr	36	1	24	24
1052+75 Lt	CL	36	1	24	24
1054+20 Lt	CL	42	1	25	25
Total =					300

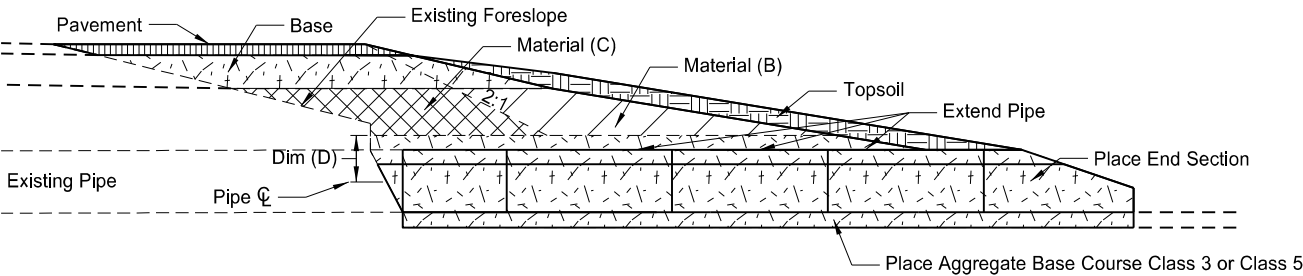
CULVERTS				
DIA	X	Y	Surface area to be protected	ECB
In	Ft	Ft	SF	SY
18	9.5	16.3	162.0	18
24	10.5	17.6	172.1	20
36	12.7	19.2	216.7	24
42	13.3	19.2	225.2	25
Note: Quantities based on 4:1 slope.				



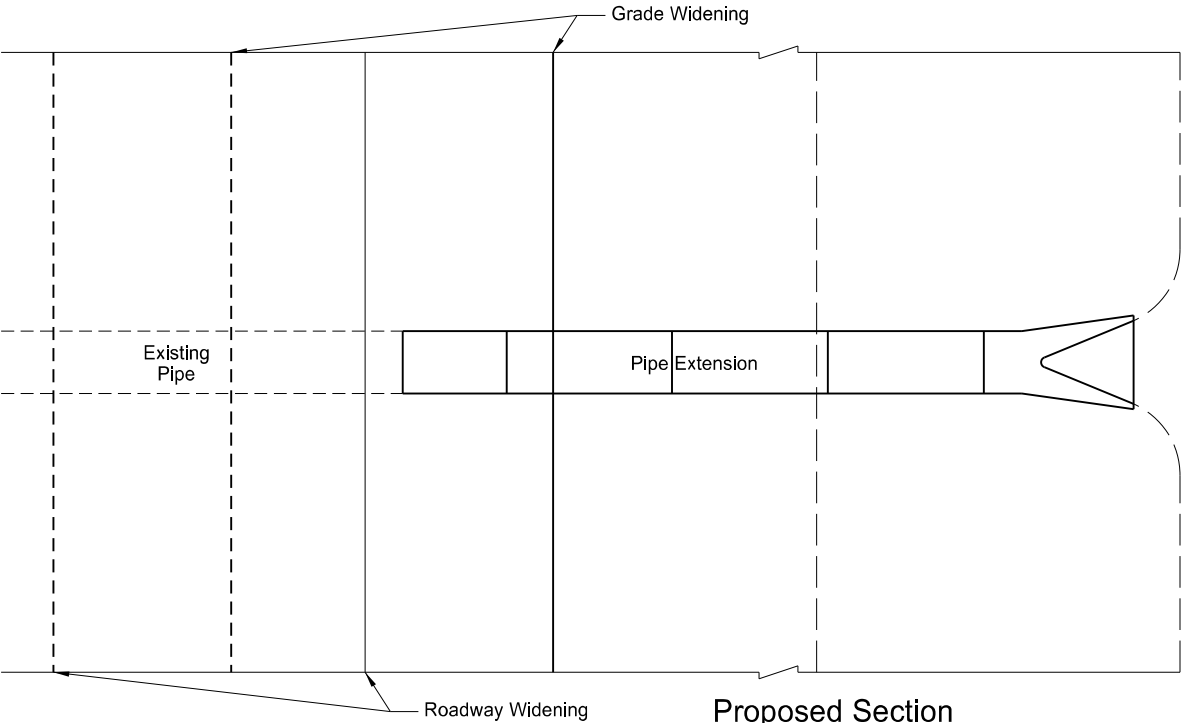
Details
ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi
Erosion Control at Culvert Flared End Sections



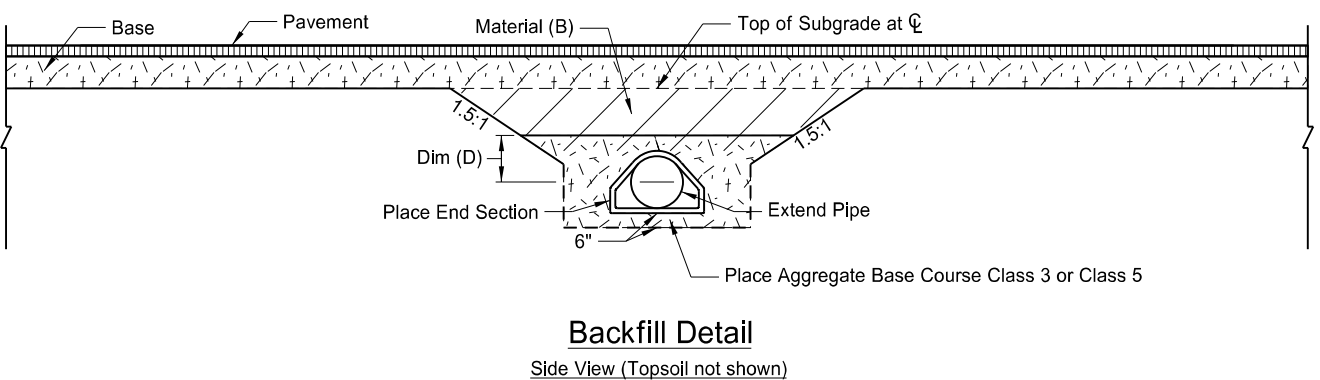
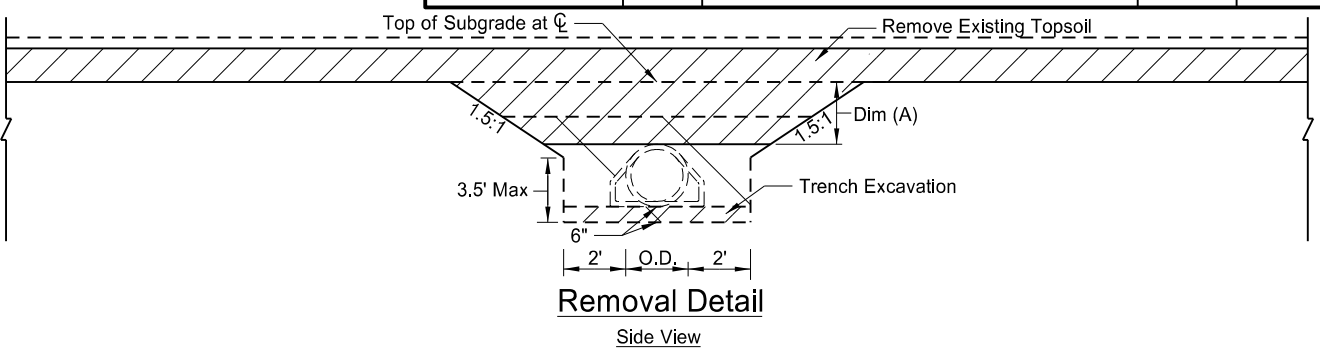
Removal Section
Cross Section View



Proposed Section
Cross Section View



Proposed Section
Plan View



- Pay Items**
- 1) Pipe*
 - 2) Remove & Relay End Section
 - 3) Borrow Excavation or Common Excavation
 - 4) Topsoil
 - 5) Seeding
 - 6) Mulching

- *Included in Pipe Pay Item**
- 1) Pipe
 - 2) Trench excavation
 - 3) Aggregate Base Course Class 3 or Class 5

Pipe Materials	Dim (A) <= 4 Feet		Backfill Dimension
	Material (B)	Material (C)	Dim (D)
Concrete	Embank or Aggr	Aggregate	0.5 O.D.

Pipe Materials	Dim (A) > 4 Feet		Backfill Dimension
	Material (B)	Material (C)	Dim (D)
Concrete	Embankment	Embankment	0.5 O.D.

- NOTES:**
- 1. Embankment may be either Borrow Excavation or Common Excavation
 - 2. Aggregate may be either Class 3 or Class 5 Aggregate Base Course.

LOCATION:
1018+25 Lt
1052+75 Lt

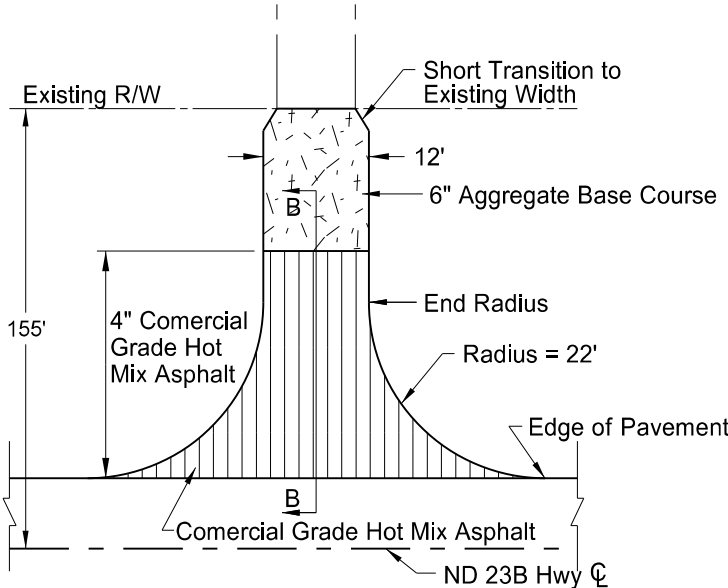


Details
ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi
Mainline Widening CL Pipe Extension Detail

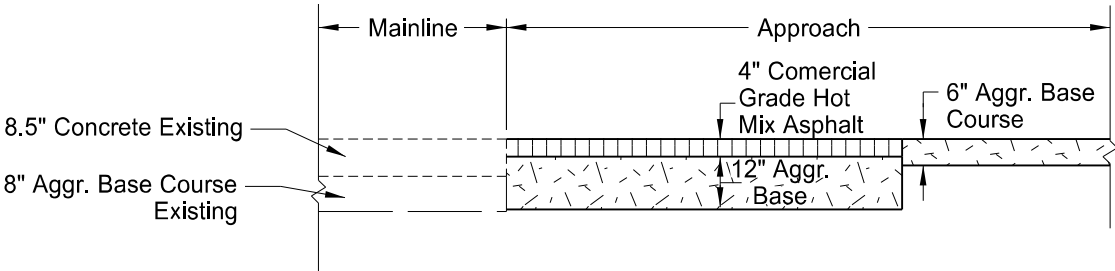
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	20	4

Notes:

- 1. Actual HMA paving and aggregate base course locations may vary in the field, as approved by the Engineer.
- 2. Quantity totals have been included in the bid items of the "Estimate of Quantities" of the plans.
- 3. 12" minimum cover over approach pipe.



(1) Gravel Lift Station Approach
1052+48.82



Section B-B
(not to scale)

Basis of Estimate				(1)
Spec	Code	Item	Unit	Gravel Drive
		Number of Locations	#	1
302	0120	Aggregate Base Course CL 5 @ 1.875 Ton/CY	TON	104
430	0500	Commercial Grade Hot Mix Asphalt @ 2 Ton/CY	TON	21

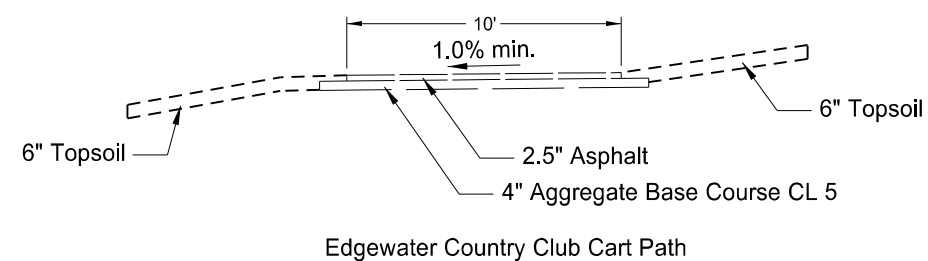
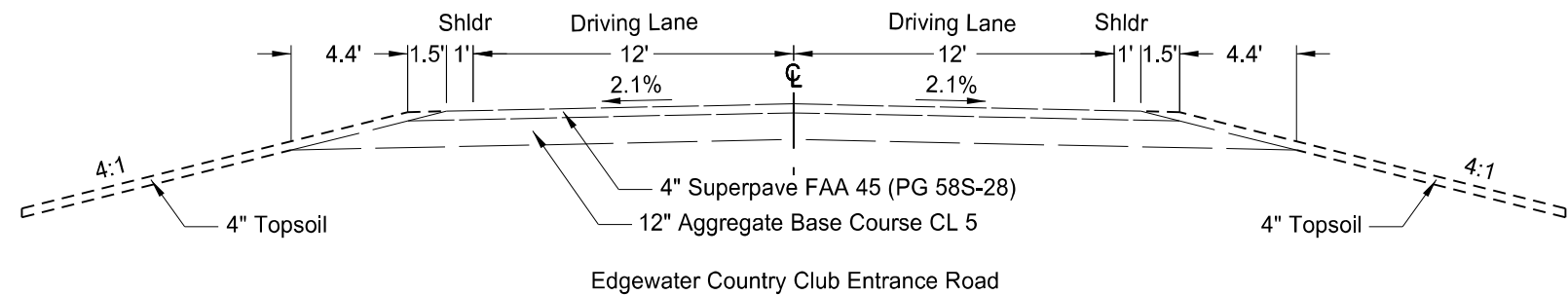
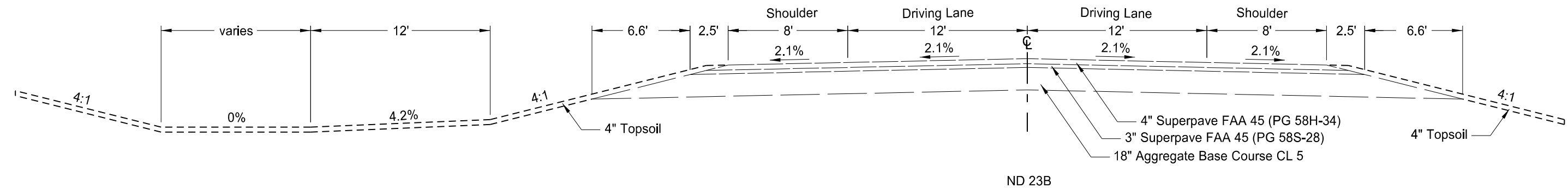


Details

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

Approach Paving Details for
New or Regrading Rural Approaches

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	30	1



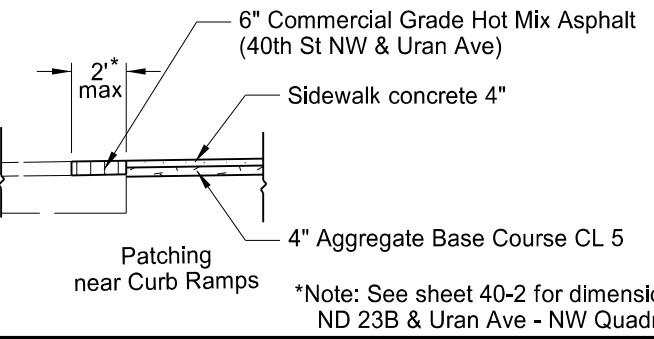
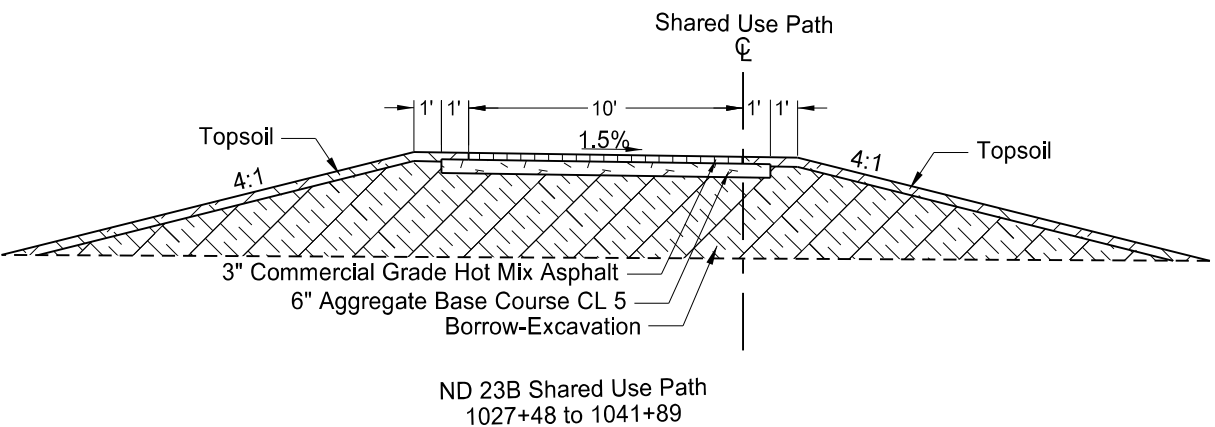
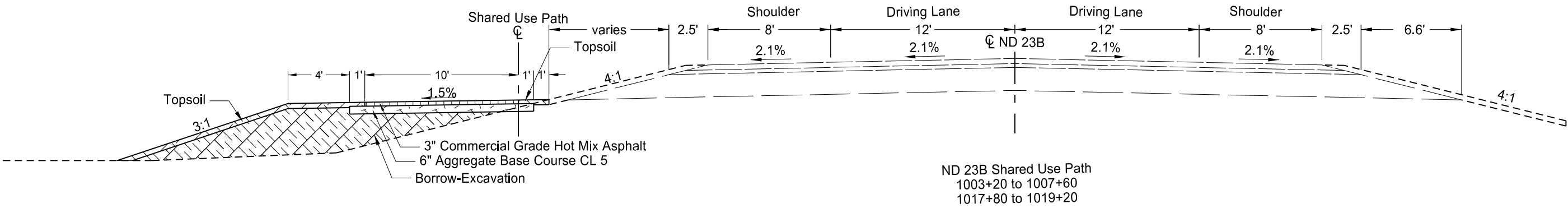
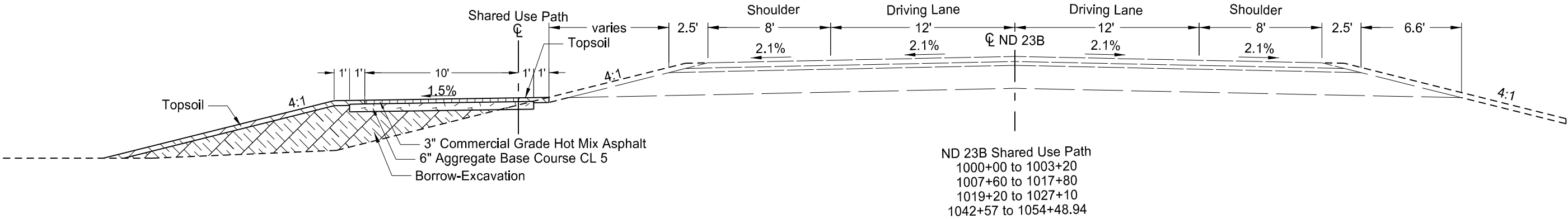
Existing Typical Sections

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

ND 23B
Edgewater Country Club Entrance Road
Edgewater Country Club Cart Path



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-7-023(069)926	30	2

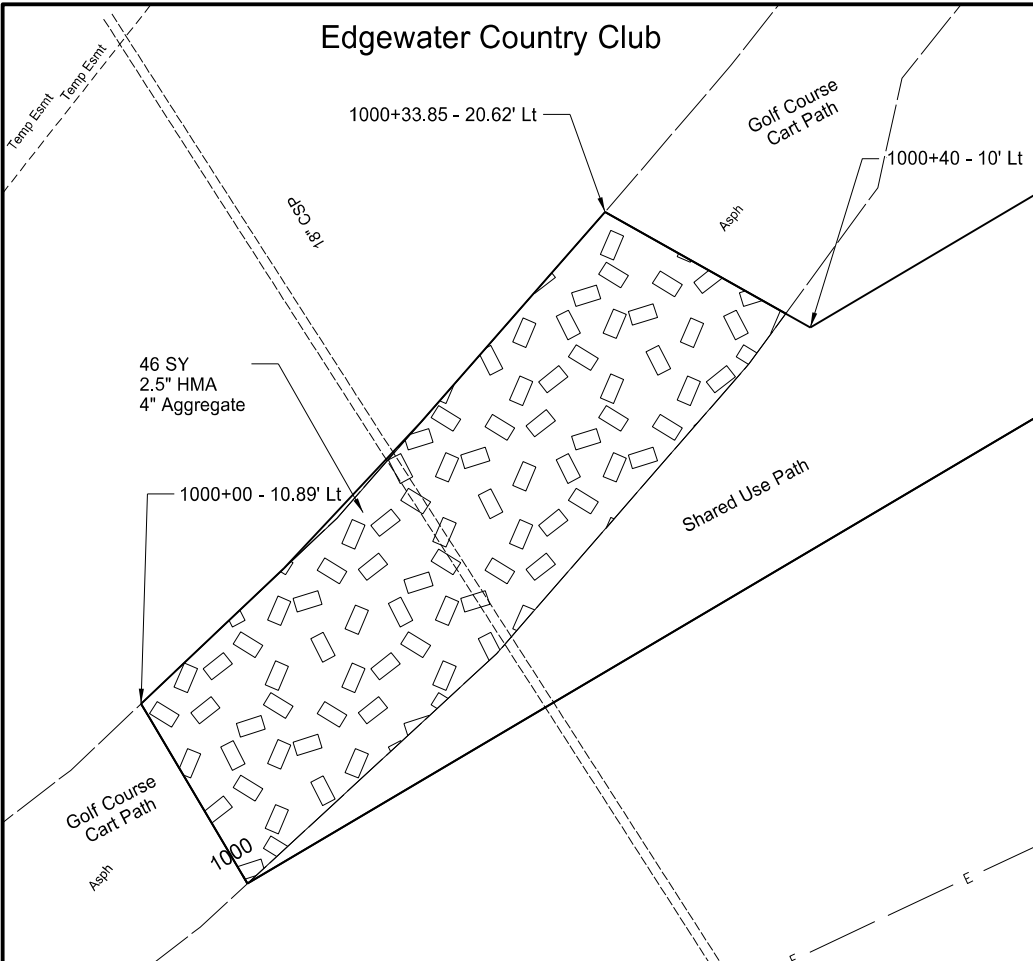


Proposed Typical Sections

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

ND 23B Shared Use Path
Patching near Curb Ramps

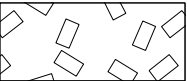




	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	40	1

SPEC	CODE	BID ITEM	UNIT	QUANTITY
202	132	REMOVAL OF BITUMINOUS SURFACING		
		1000+00 to 1000+40 Lt	SY	46

LEGEND



Removal of Bituminous Surfacing

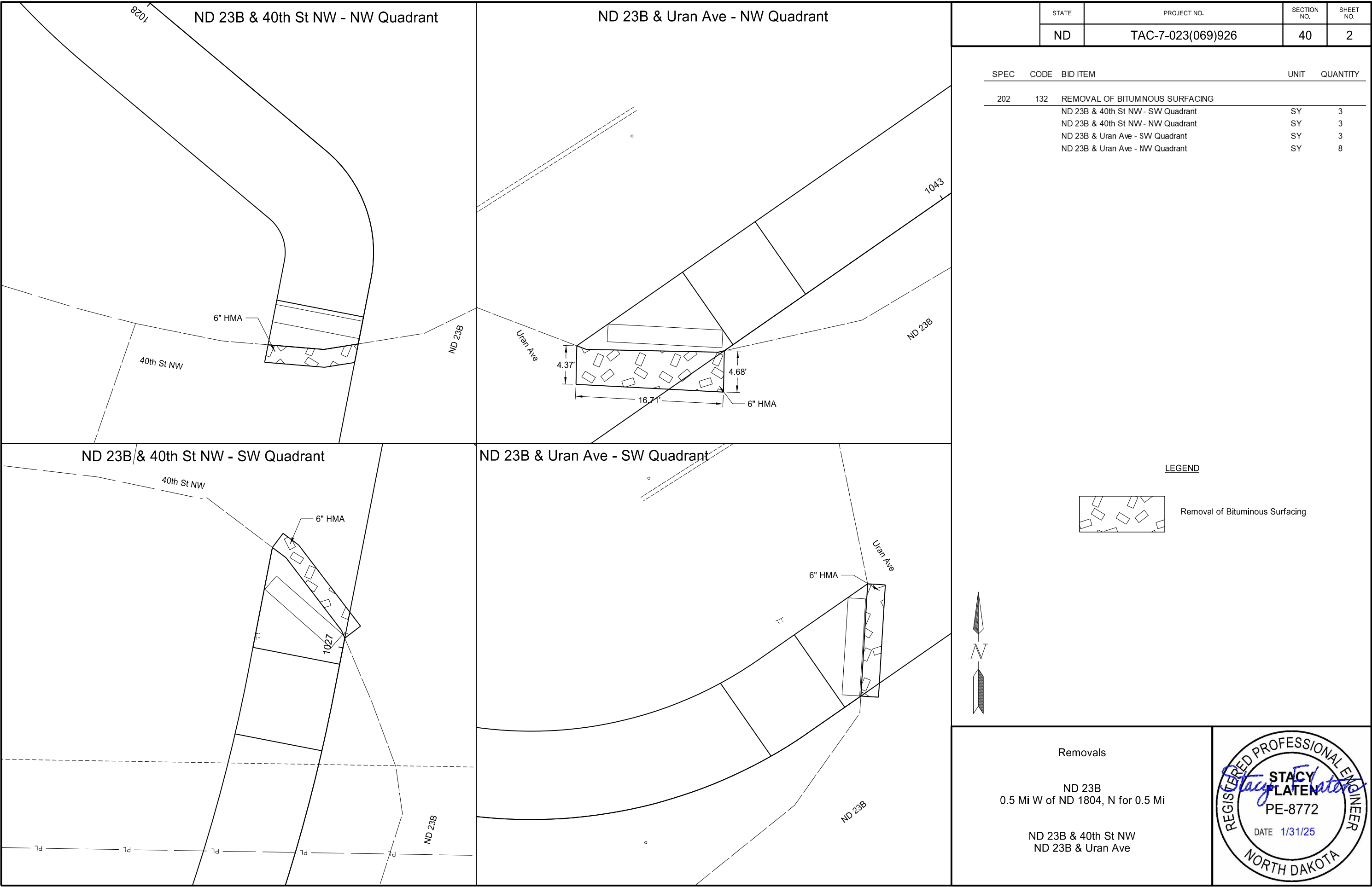


Removals

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

Edgewater Country Club





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-7-023(069)926	50	1

MANHOLE SUMMARY

Manhole No.1 – 72 In.

Sta1054+26.3 – 12.7’ Lt

Top Elev.1958.23

Base Elev.1951.56

Invert Elev.1951.89

Riser5.0 ft

42 In CSP E (existing)1951.89

42 In Conduit NW1952.00



Begin Station / Location	Begin Offset	End Station / Location	End Offset	Pipe Installation (Pay Item)			Allowable Material	Required Diameter	Steel Pipe Coatings	Steel Pipe Corrugations or Spiral Ribs	Steel Pipe Minimum Thickness	Geosynthetic Material - Type G (Pay Item)	(*) End Sections		Applicable Backfill
				In	Bid Item	LF							Begin	End	
															EA
1018+25	44' Lt	1018+25	40' Lt	30	Pipe Conc. Reinf. CL III (Extension)	4	Reinforced Concrete Pipe - Class III (barrel length = 4 LF)	30					Remove & Relay		See Section 20
1028+12	18' Lt	1028+01	18' Rt	18	Pipe Conduit	37	Reinforced Concrete Pipe - Class III (barrel length = 30 LF)	18					FES	FES	Standard D-714-27
							Corrugated Steel Pipe	18	A, P	2	0.064				
							Spiral Rib Steel Pipe	18	A, P	3/4, 1	0.064				
							High-Density Polyethylene	18							
							Polypropylene Pipe (AASHTO M330, Type S)	18							
1029+82	24' Lt	1029+75	17' Rt	24	Pipe Conduit	42	Reinforced Concrete Pipe - Class III (barrel length = 38 LF)	24					FES	FES	Standard D-714-27
							Corrugated Steel Pipe	24	A, P	2	0.064				
							Spiral Rib Steel Pipe	24	A, P	3/4, 1	0.064				
							High-Density Polyethylene	24							
							Polypropylene Pipe (AASHTO M330, Type S)	24							
1041+46	29' Lt	1041+05	23' Rt	24	Pipe Conduit	62	Reinforced Concrete Pipe - Class III (barrel length = 58 LF)	24					FES	FES	Standard D-714-27
							Corrugated Steel Pipe	24	A, P	2	0.064				
							Spiral Rib Steel Pipe	24	A, P	3/4, 1	0.064				
							High-Density Polyethylene	24							
							Polypropylene Pipe (AASHTO M330, Type S)	24							
1052+32	49' Lt	1052+66	49' Lt	36	Pipe Conduit-Approach	34	Reinforced Concrete Pipe - Class III (barrel length = 30 LF)	36					FES	FES	Standard D-714-27
							Corrugated Steel Pipe	36	A, P	2	0.064				
							Spiral Rib Steel Pipe	36	A, P	3/4, 1	0.064				
							High-Density Polyethylene	36							
							Polypropylene Pipe (AASHTO M330, Type S)	36							
1052+75	28' Lt	1052+75	6' Lt	36	Pipe Conc. Reinf. CL III (Extension)	22	Reinforced Concrete Pipe - Class III (barrel length = 22 LF)	36					Remove & Relay		See Section 20
1054+20	21' Lt	1054+25	14' Lt	42	Pipe Conduit	9	Reinforced Concrete Pipe - Class III (barrel length = 6 LF)	42					FES		Standard D-714-27

Corrugations:

2 = 2-2/3"x1/2"

3 = 3"x1"

5 = 5"x1"

Coatings:

Z = Zinc

A = Aluminum

P = Polymeric (over Zinc or Aluminum)

Spiral Ribs:

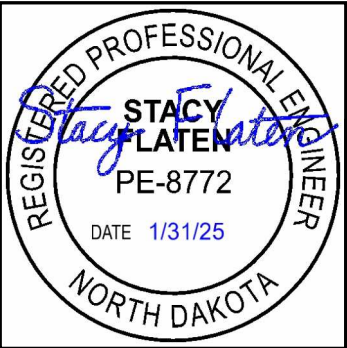
3/4 = 3/4"x3/4"@7-1/2"

1 = 3/4"x1"@11-1/2"

(*) End sections are measured and paid for separately for pipe extensions.

FES = Flared End Section

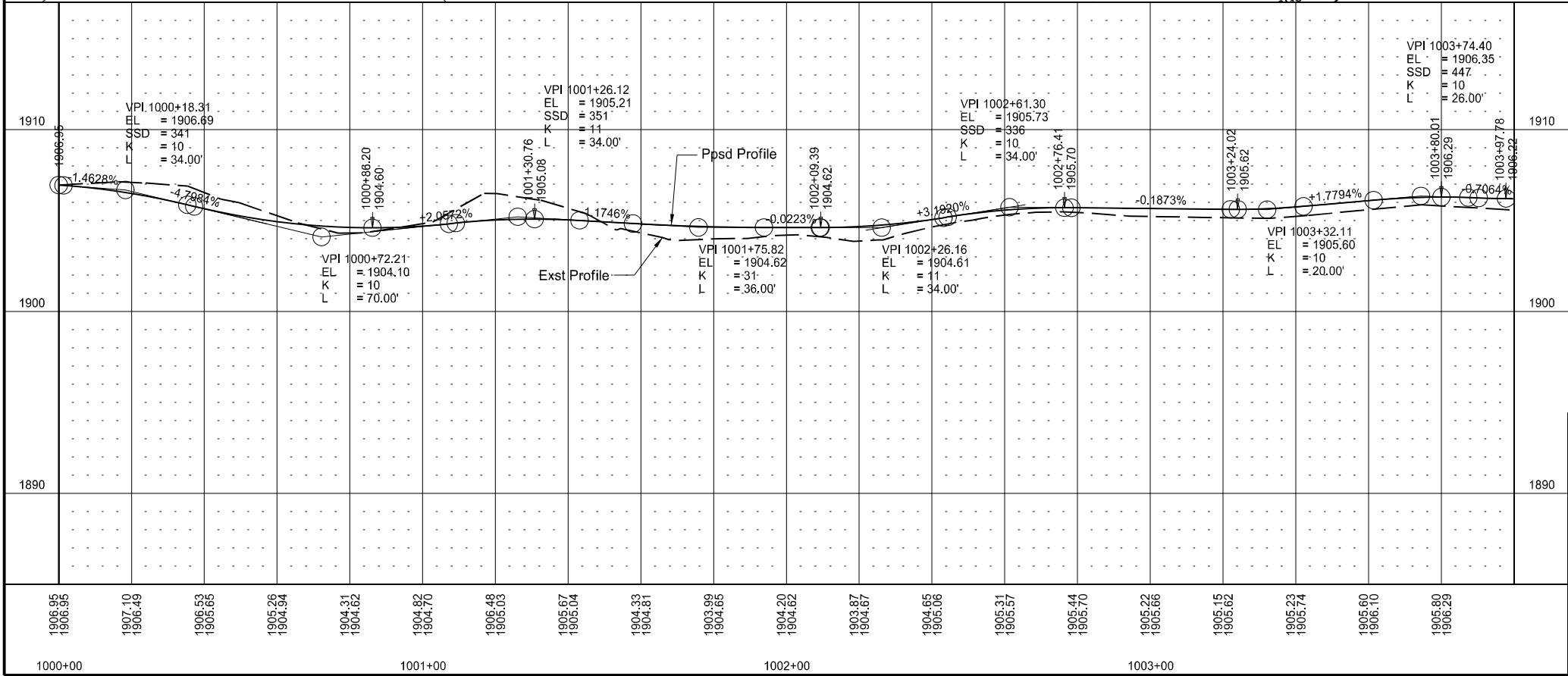
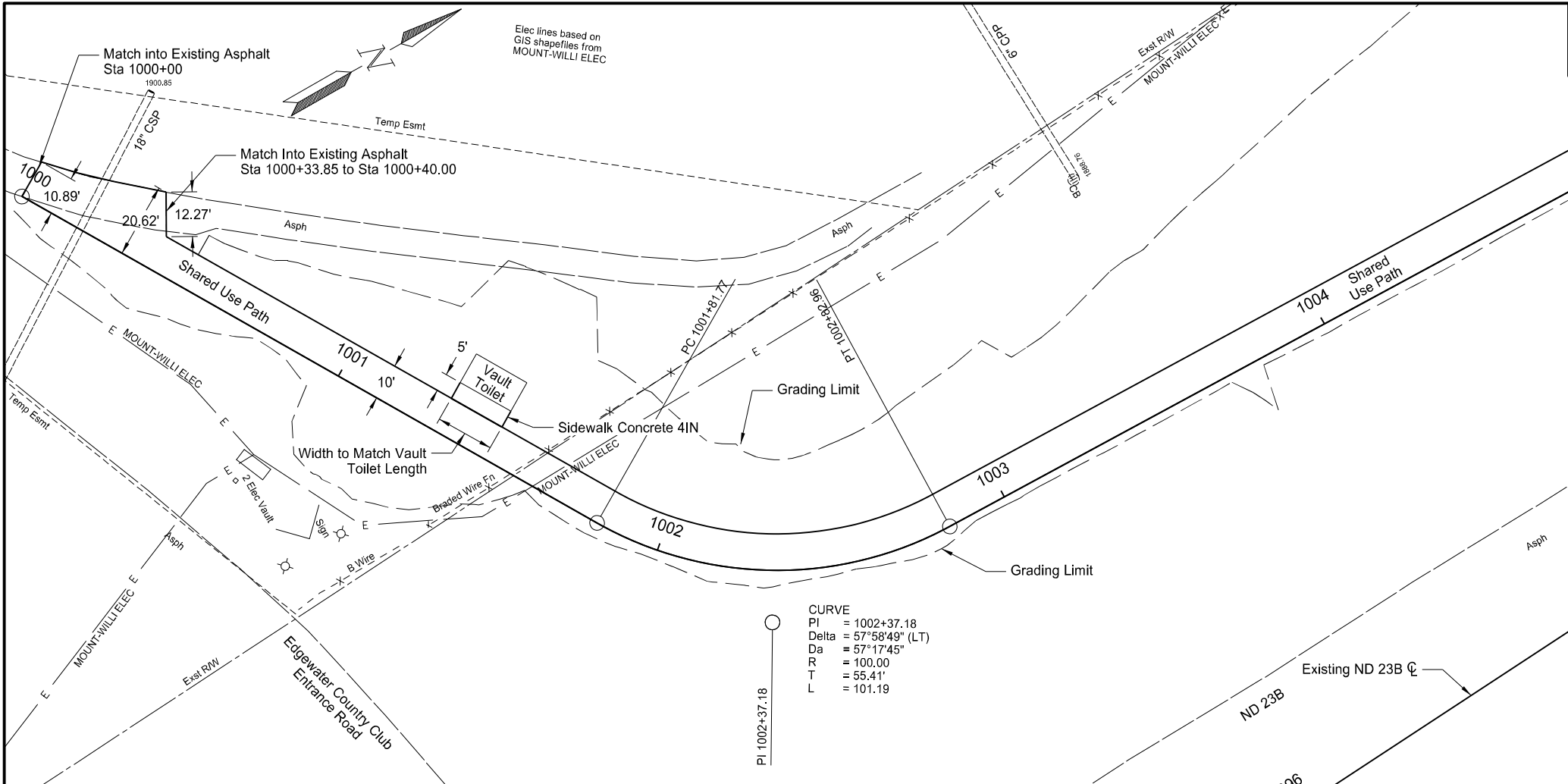
TES = Traversable End Section



Allowable Pipe List

ND 23B

0.5 Mi W of ND 1804, N for 0.5 Mi



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-7-023(069)926	60	1

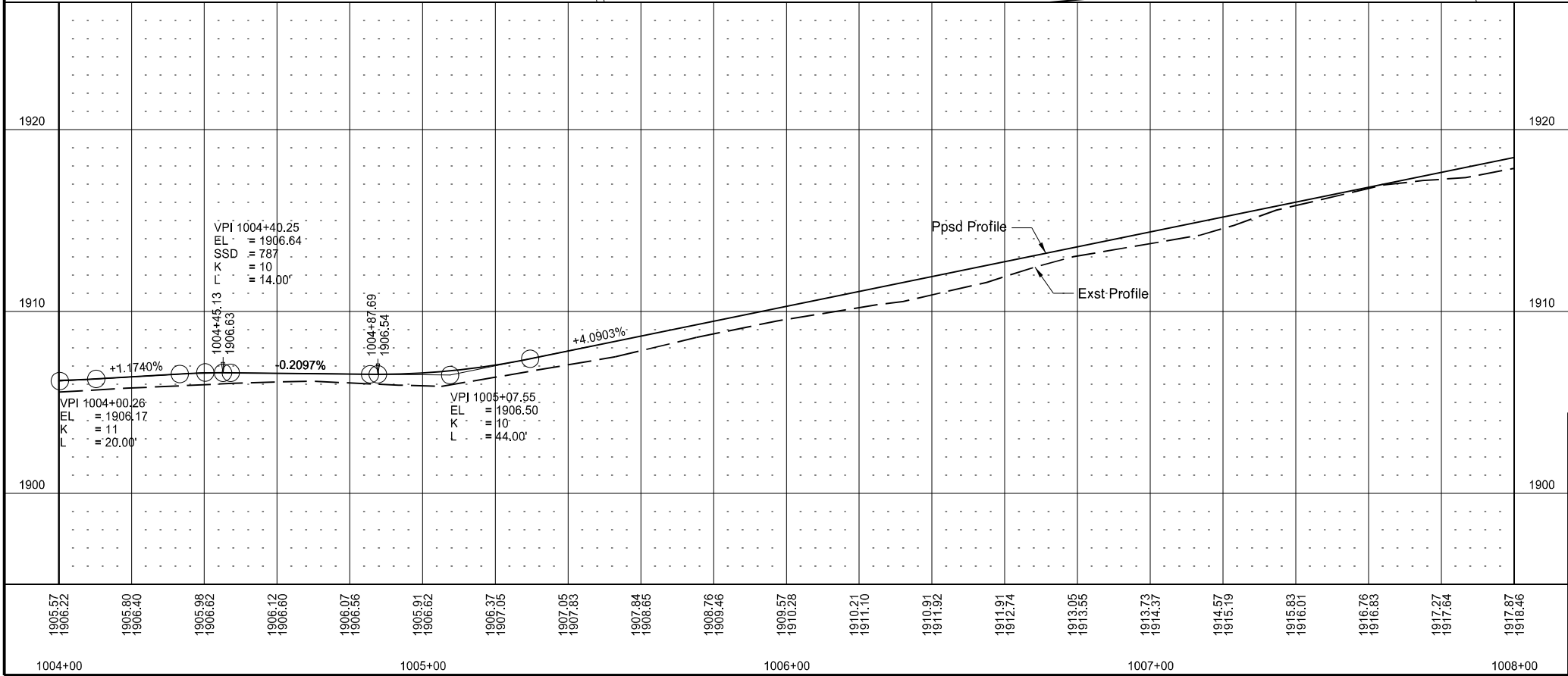
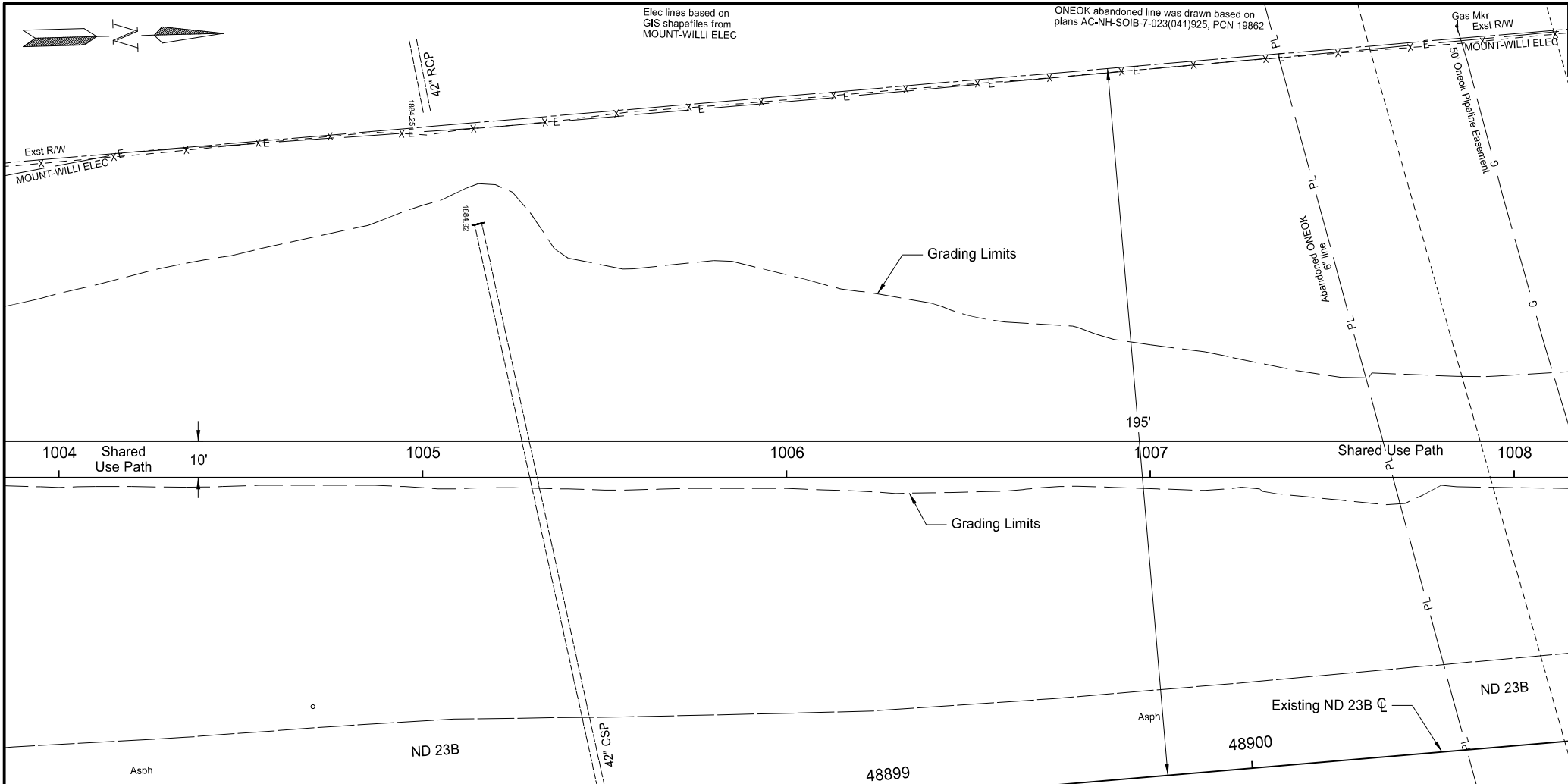
SPEC	CODE	BID ITEM	UNIT	QUANTITY
302	120	AGGREGATE BASE COURSE CL 5		
		1000+00 to 1004+00	TON	172
		1001+29 to 1001+47 ('0' Lt to 15' Lt)	TON	2
430	500	COMMERCIAL GRADE HOT MIX ASPHALT		
		1000+00 to 1004+00	TON	78
750	115	SIDEWALK CONCRETE 4IN		
		1001+30 to 1001+46 ('0' Lt to 15' Lt)	SY	9
920	470	PREFABRICATED OUTDOOR REST ROOM-SITE 1		
		1001+38 Lt	L SUM	1

Plan & Profile

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

1000+00 to 1004+00





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-7-023(069)926	60	2

SPEC	CODE	BID ITEM	UNIT	QUANTITY
302	120	AGGREGATE BASE COURSE CL 5		
		1004+00 to 1008+00	TON	167
430	500	COMMERCIAL GRADE HOT MIX ASPHALT		
		1004+00 to 1008+00	TON	75

Plan & Profile

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

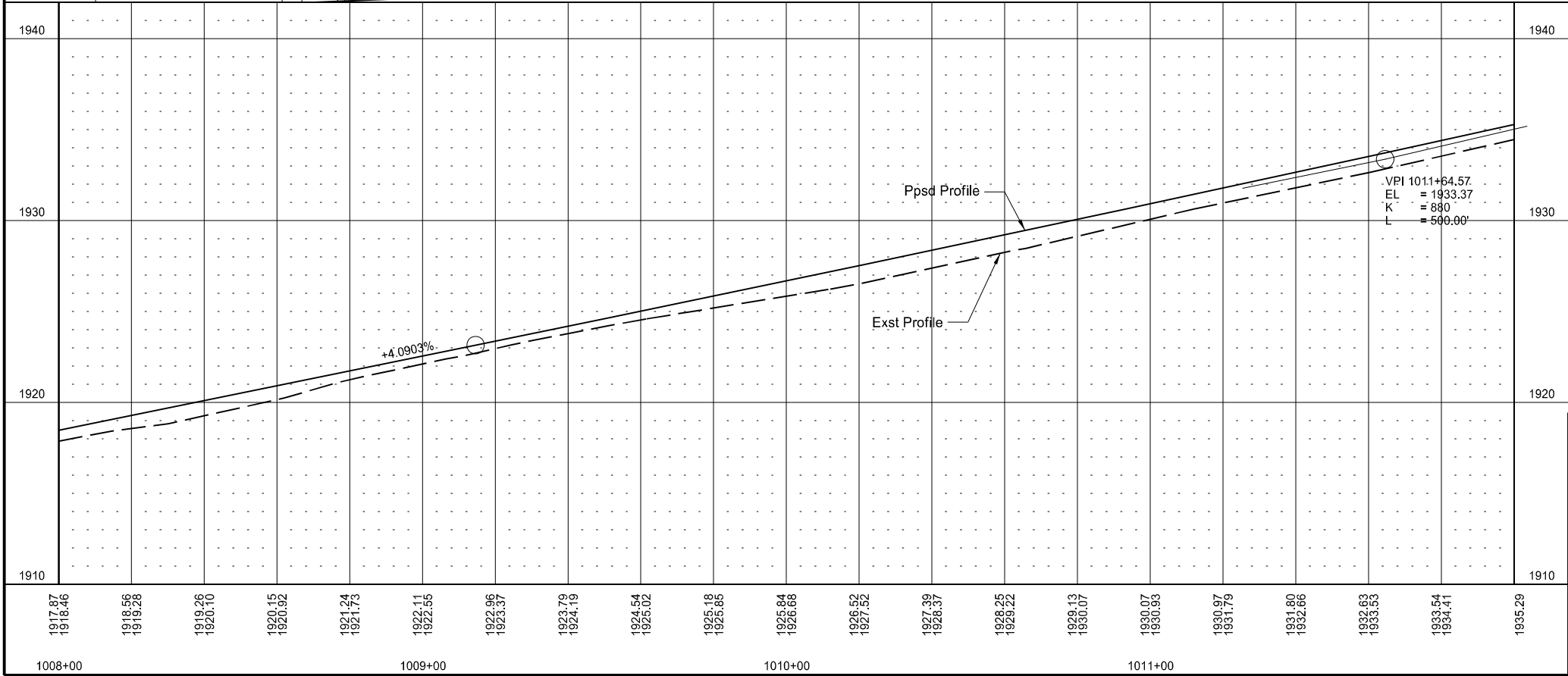
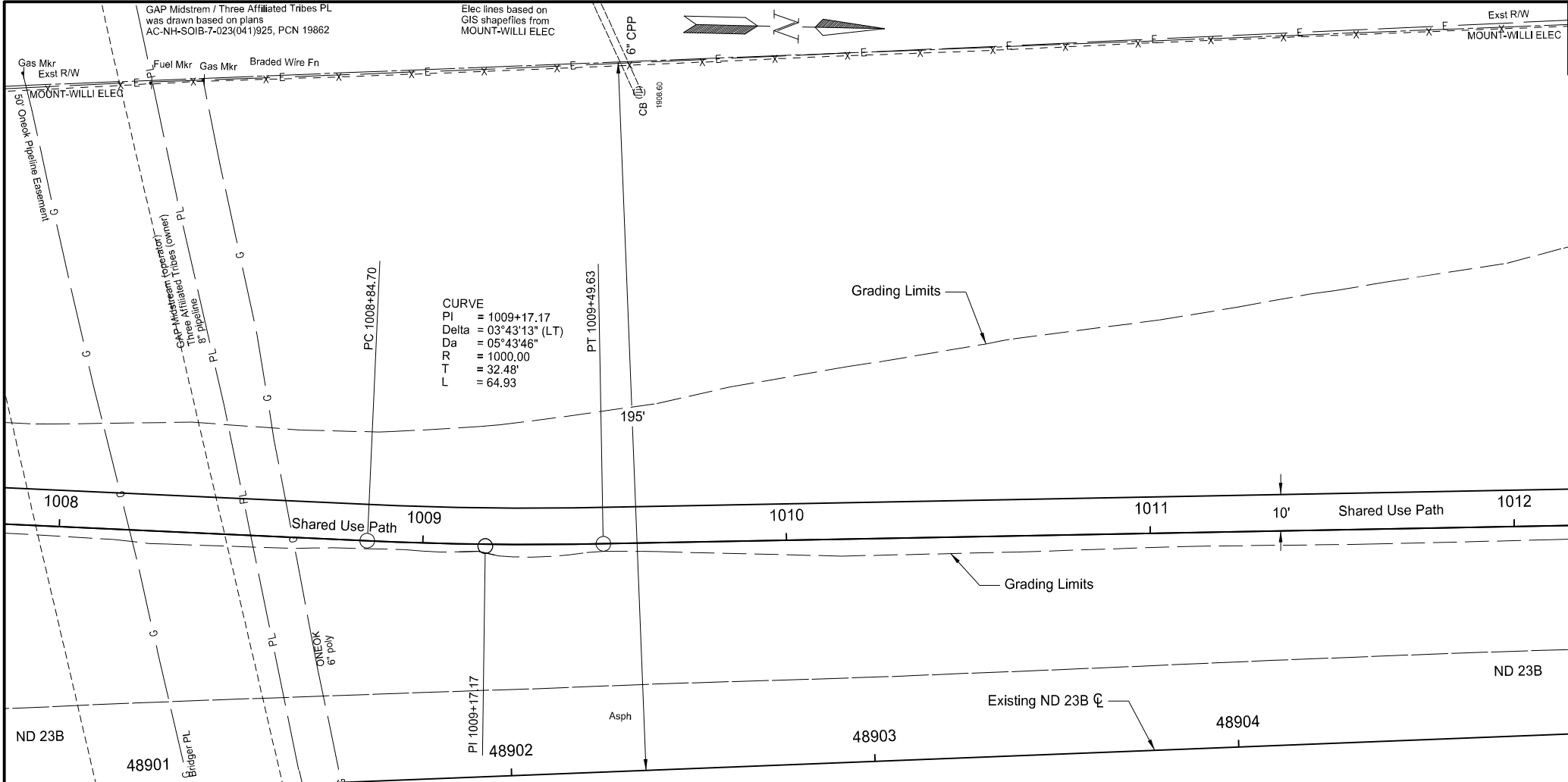
1004+00 to 1008+00

REGISTERED PROFESSIONAL ENGINEER

AUSTIN T. BECKER
PE-27997

DATE 02/17/2025

NORTH DAKOTA



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-7-023(069)926	60	3

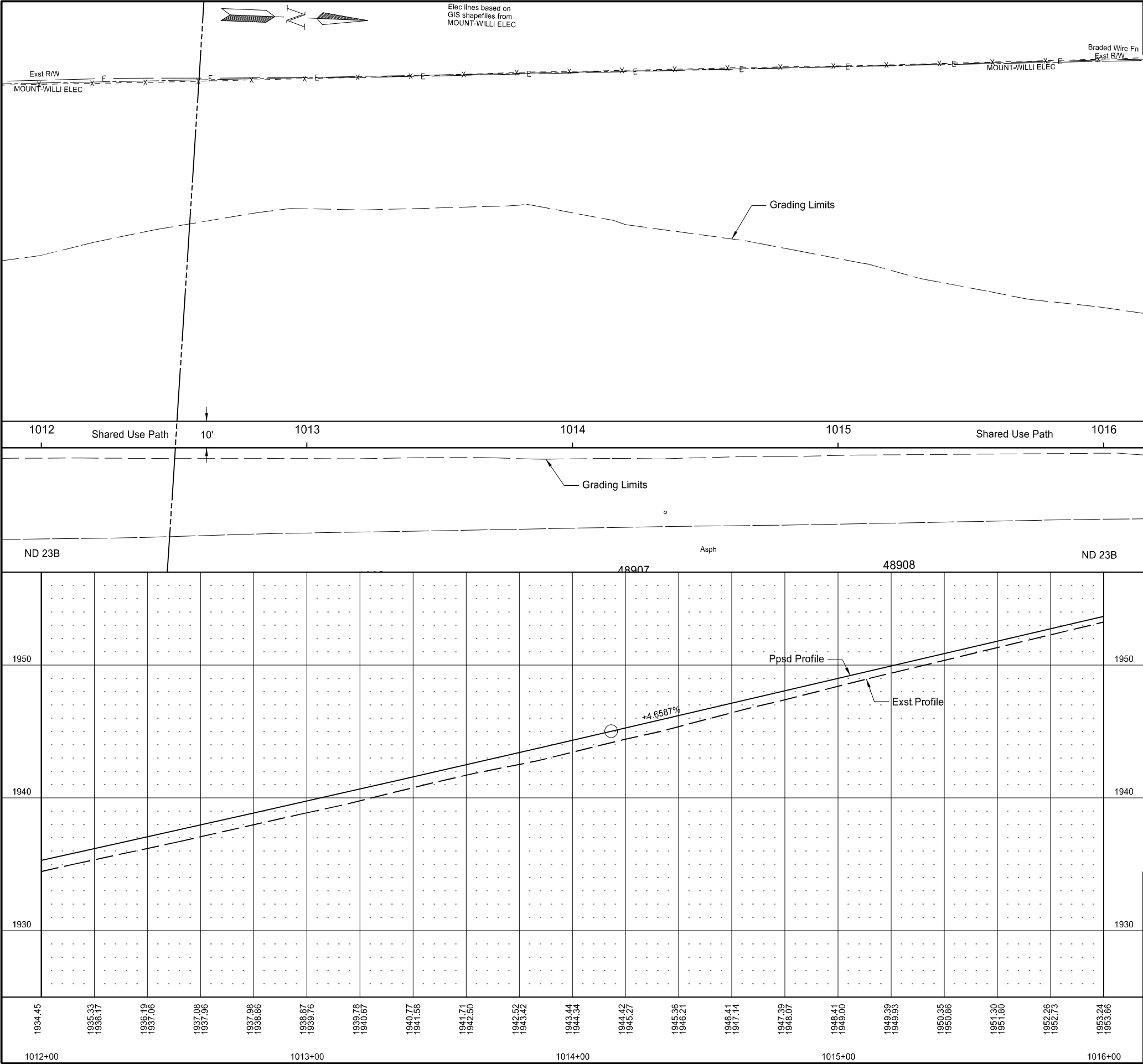
SPEC	CODE	BID ITEM	UNIT	QUANTITY
302	120	AGGREGATE BASE COURSE CL 5 1008+00 to 1012+00	TON	167
430	500	COMMERCIAL GRADE HOT MIX ASPHALT 1008+00 to 1012+00	TON	75

Plan & Profile

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

1008+00 to 1012+00





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-7-023(069)926	60	4

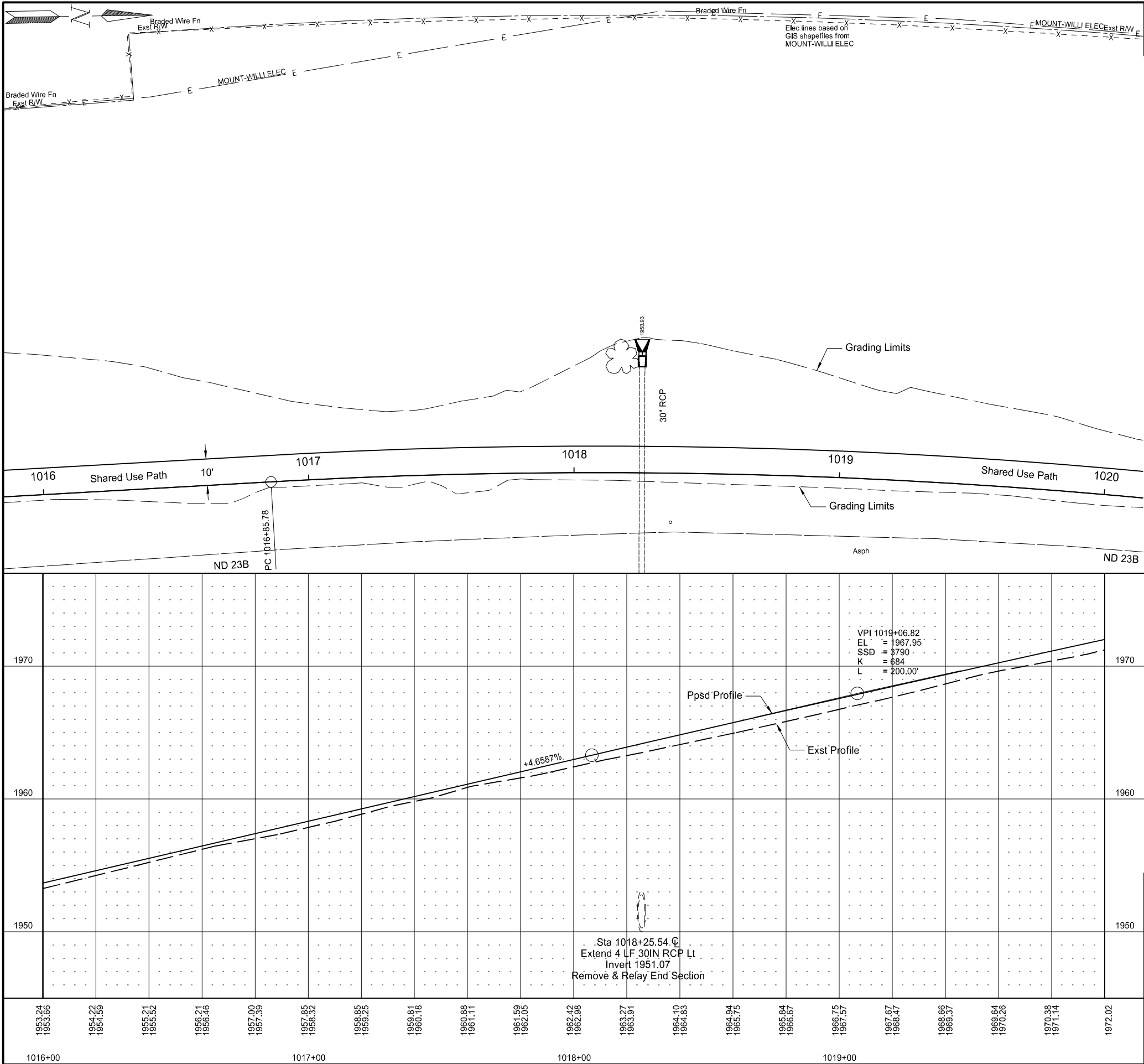
SPEC	CODE	BID ITEM	UNIT	QUANTITY
302	120	AGGREGATE BASE COURSE CL 5 1012+00 to 1016+00	TON	167
430	500	COMMERCIAL GRADE HOT MIX ASPHALT 1012+00 to 1016+00	TON	75

Plan & Profile

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

1012+00 to 1016+00





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-7-023(069)926	60	5

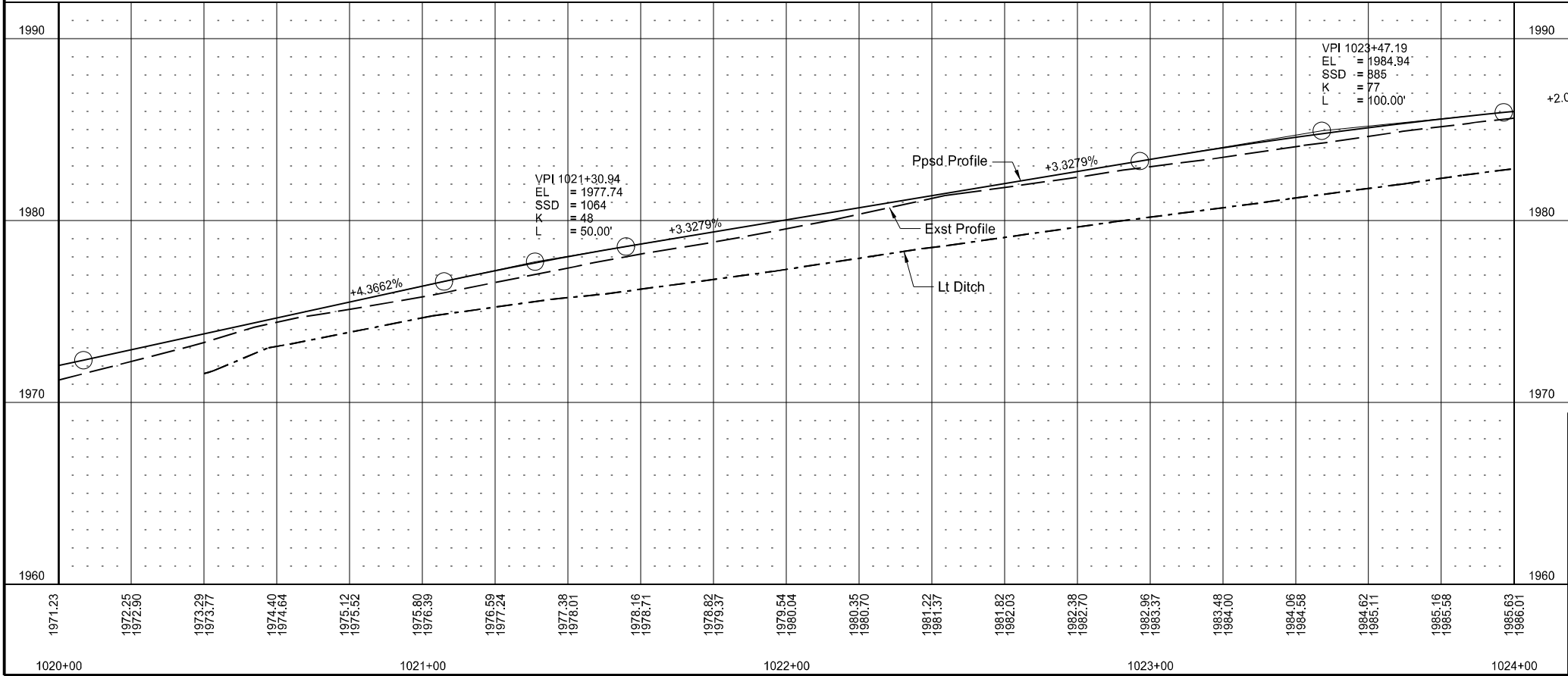
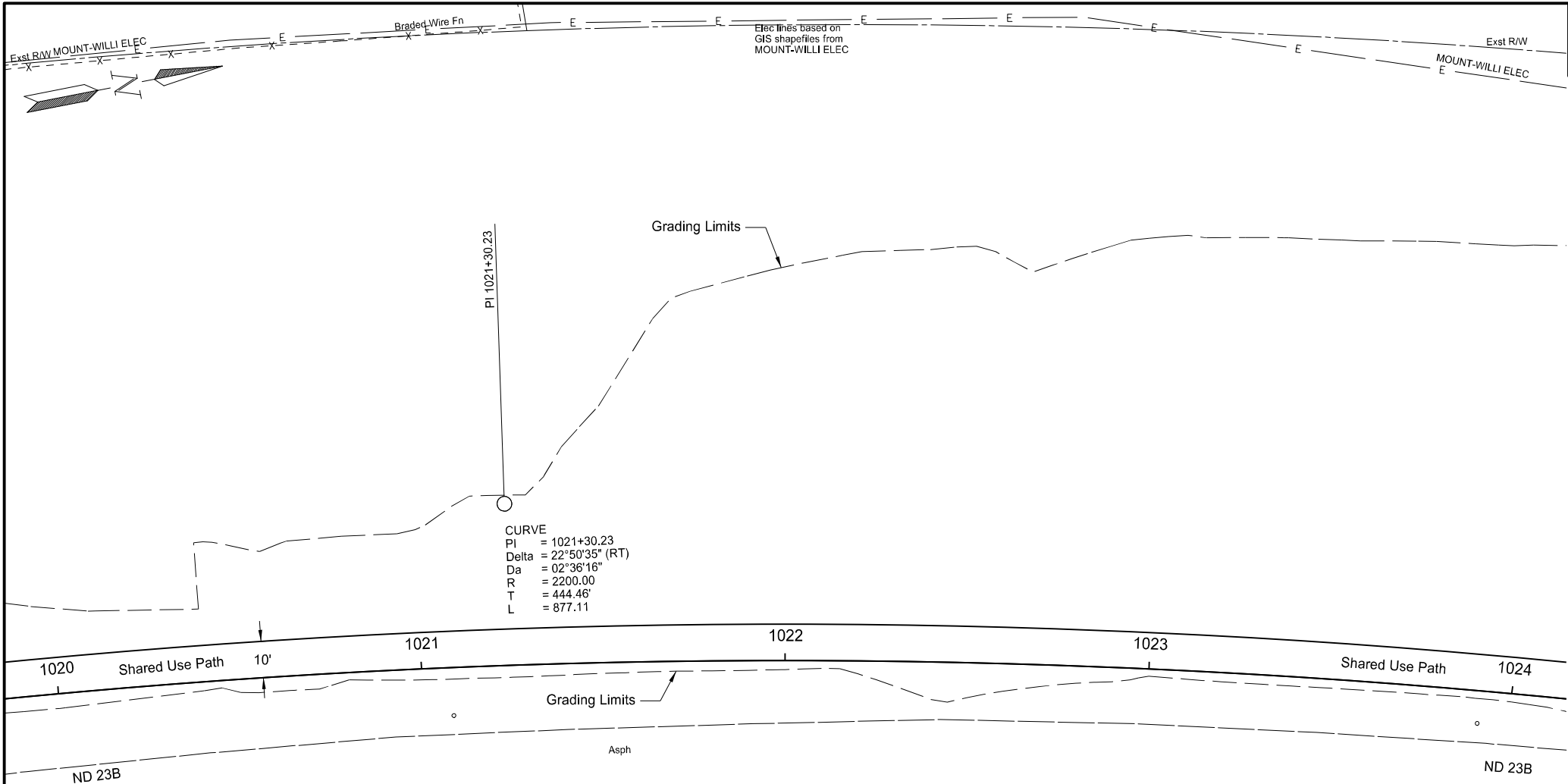
SPEC	CODE	BID ITEM	UNIT	QUANTITY
302	120	AGGREGATE BASE COURSE CL 5 1016+00 to 1020+00	TON	167
430	500	COMMERCIAL GRADE HOT MIX ASPHALT 1016+00 to 1020+00	TON	75
714	820	PIPE CONC REINF 30IN CL III 1018+25 - 44' Lt to 1018+25 - 40' Lt	LF	4
714	9660	REMOVE & RELAY END SECTION-ALL TYPE & SIZES 1018+25 Lt	EA	1
754	805	OBJECT MARKERS - CULVERTS 1018+25 Lt	EA	1

Plan & Profile

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

1016+00 to 1020+00



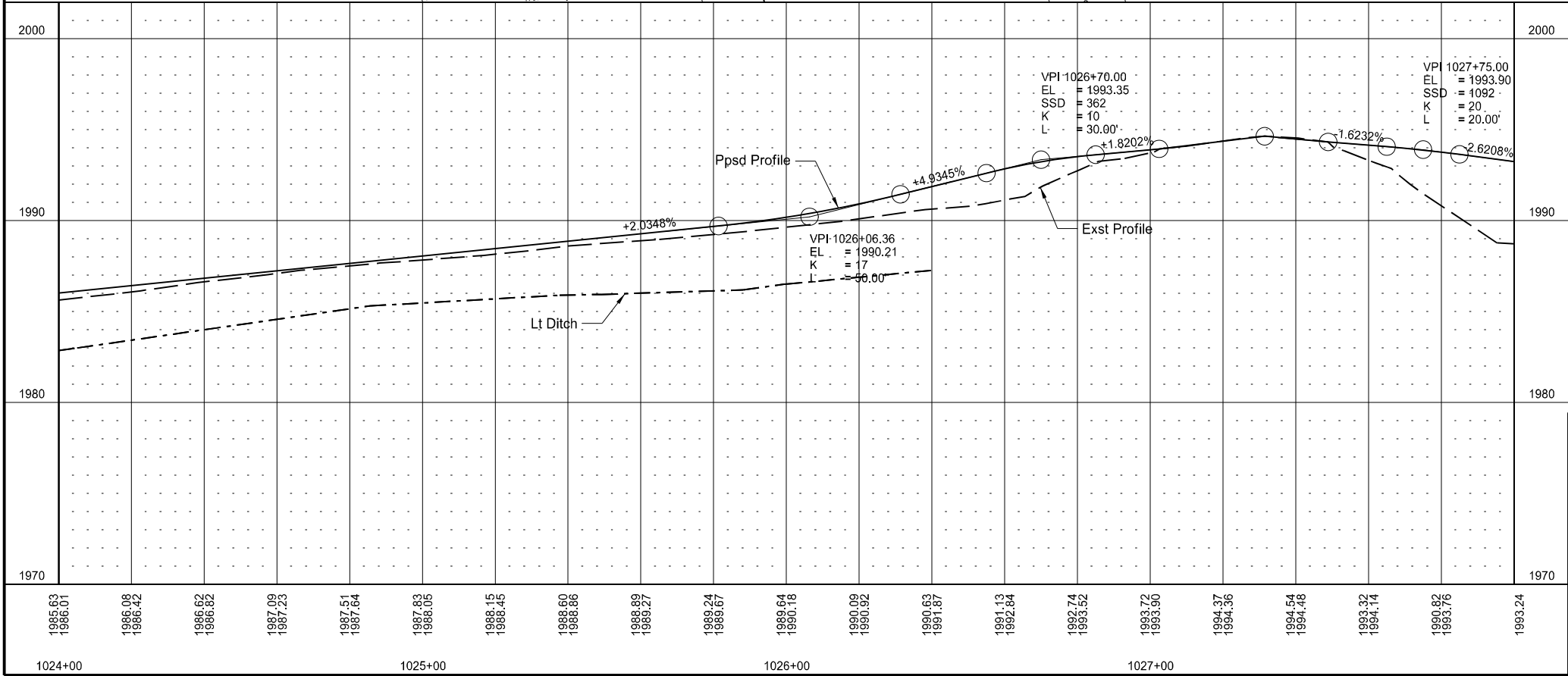
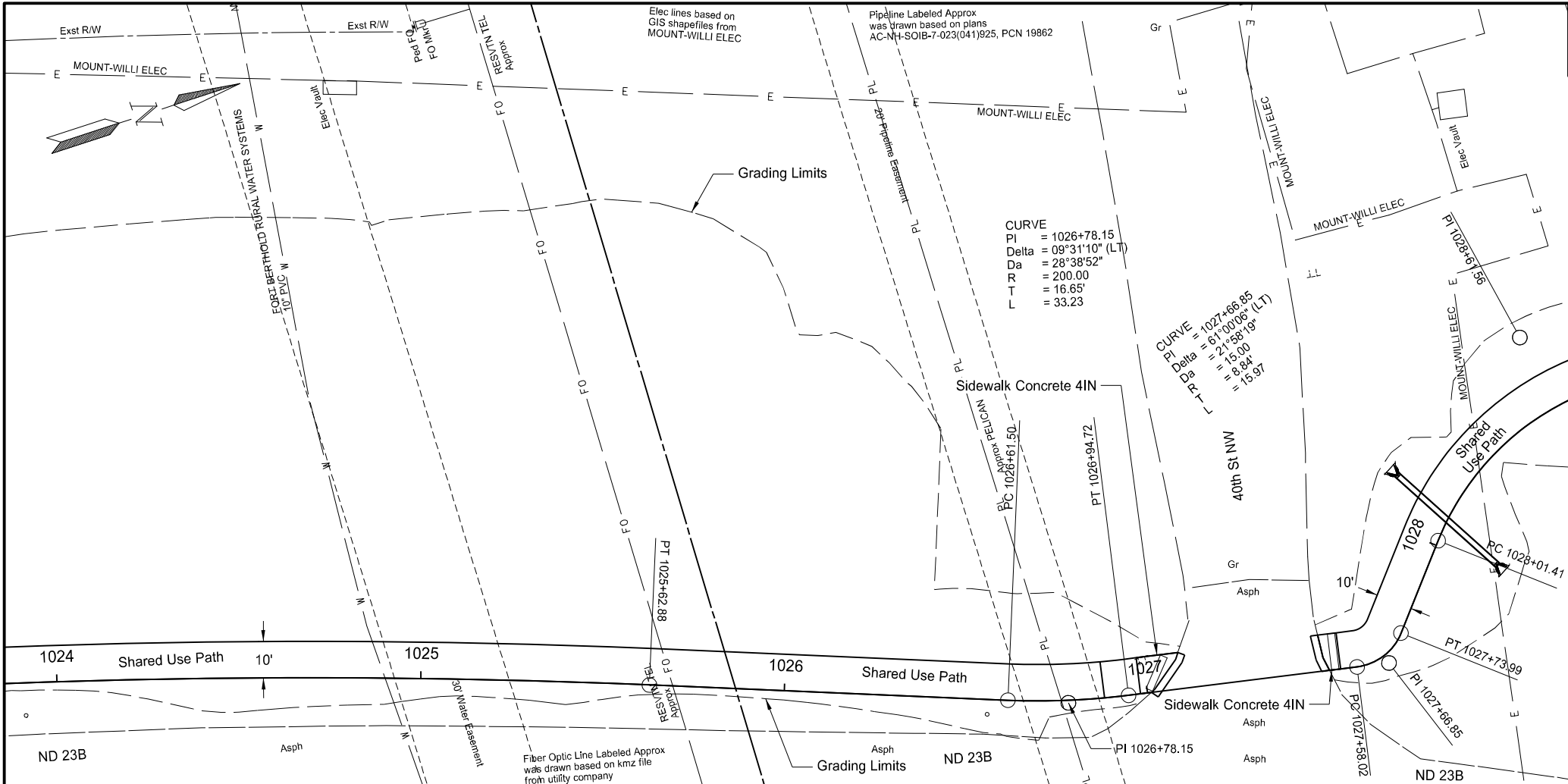


STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-7-023(069)926	60	6

SPEC	CODE	BID ITEM	UNIT	QUANTITY
302	120	AGGREGATE BASE COURSE CL 5 1020+00 to 1024+00	TON	168
430	500	COMMERCIAL GRADE HOT MIX ASPHALT 1020+00 to 1024+00	TON	75

Plan & Profile
ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi
1020+00 to 1024+00





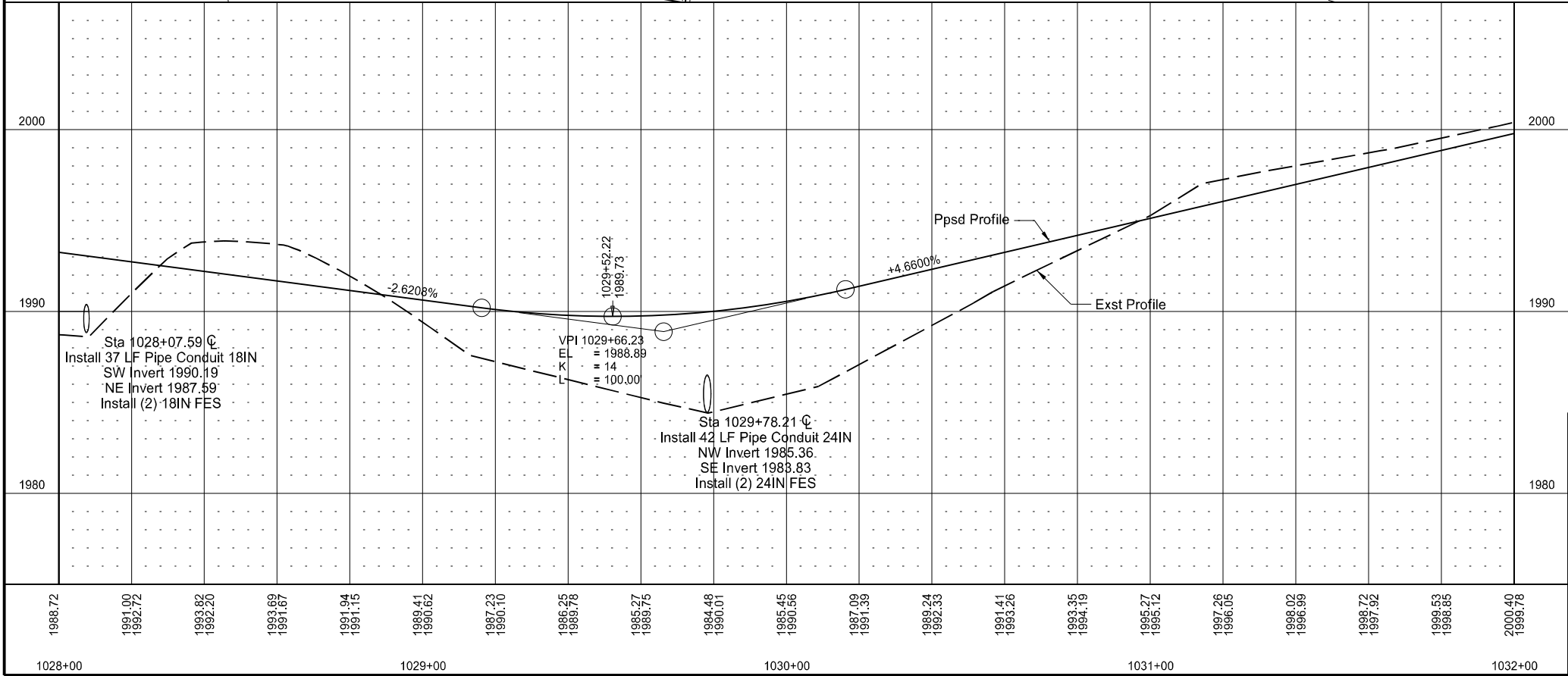
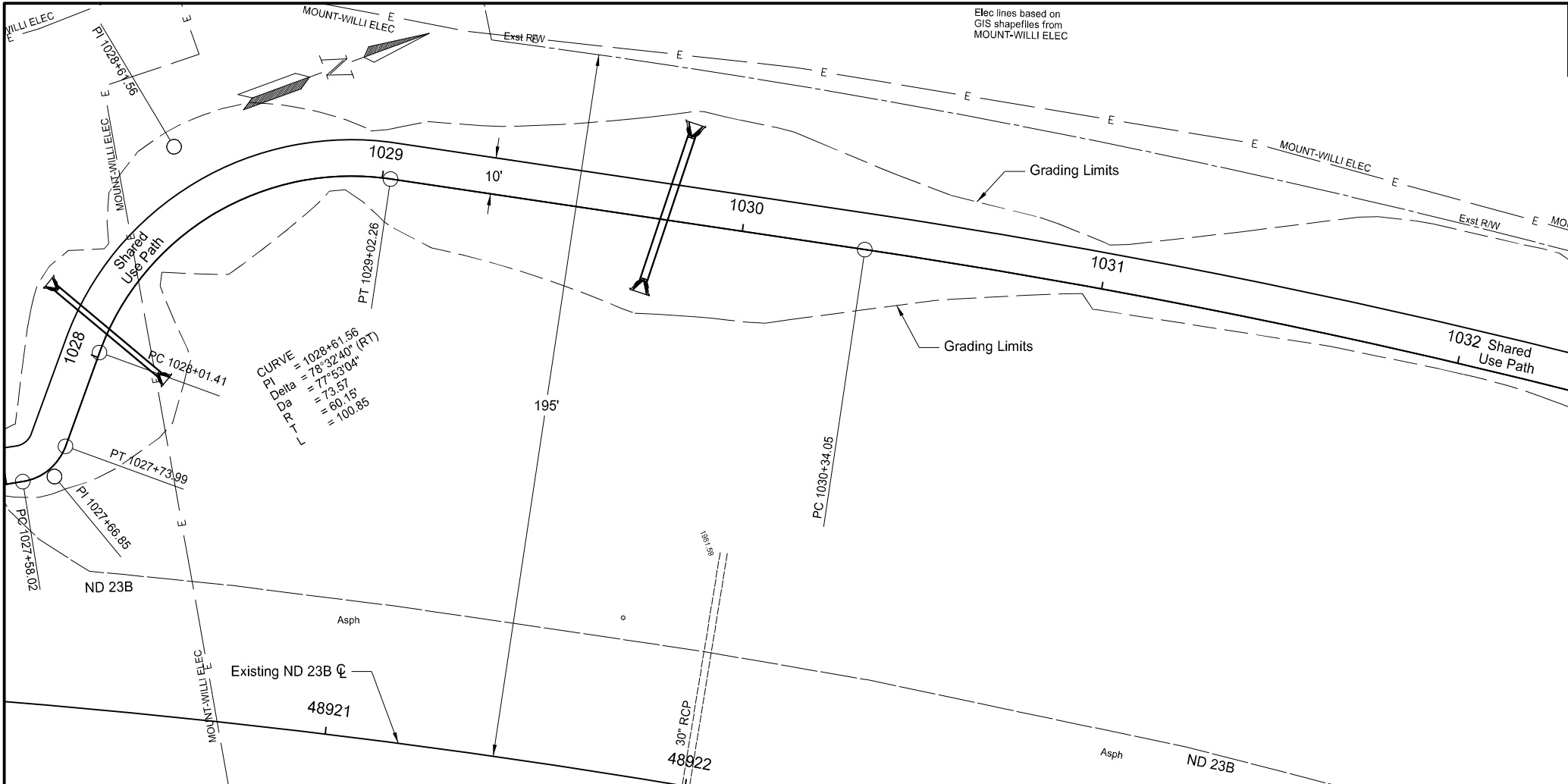
STATE		PROJECT NO.	SECTION NO.	SHEET NO.
ND		TAC-7-023(069)926	60	7

SPEC	CODE	BID ITEM	UNIT	QUANTITY
302	120	AGGREGATE BASE COURSE CL 5		
		1024+00 to 1026+98	TON	125
		1027+53 to 1028+00	TON	17
430	500	COMMERCIAL GRADE HOT MIX ASPHALT		
		1024+00 to 1026+98	TON	56
		1027+53 to 1028+00	TON	8

Plan & Profile

ND 23B
0.5 MI W of ND 1804, N for 0.5 MI

1024+00 to 1028+00

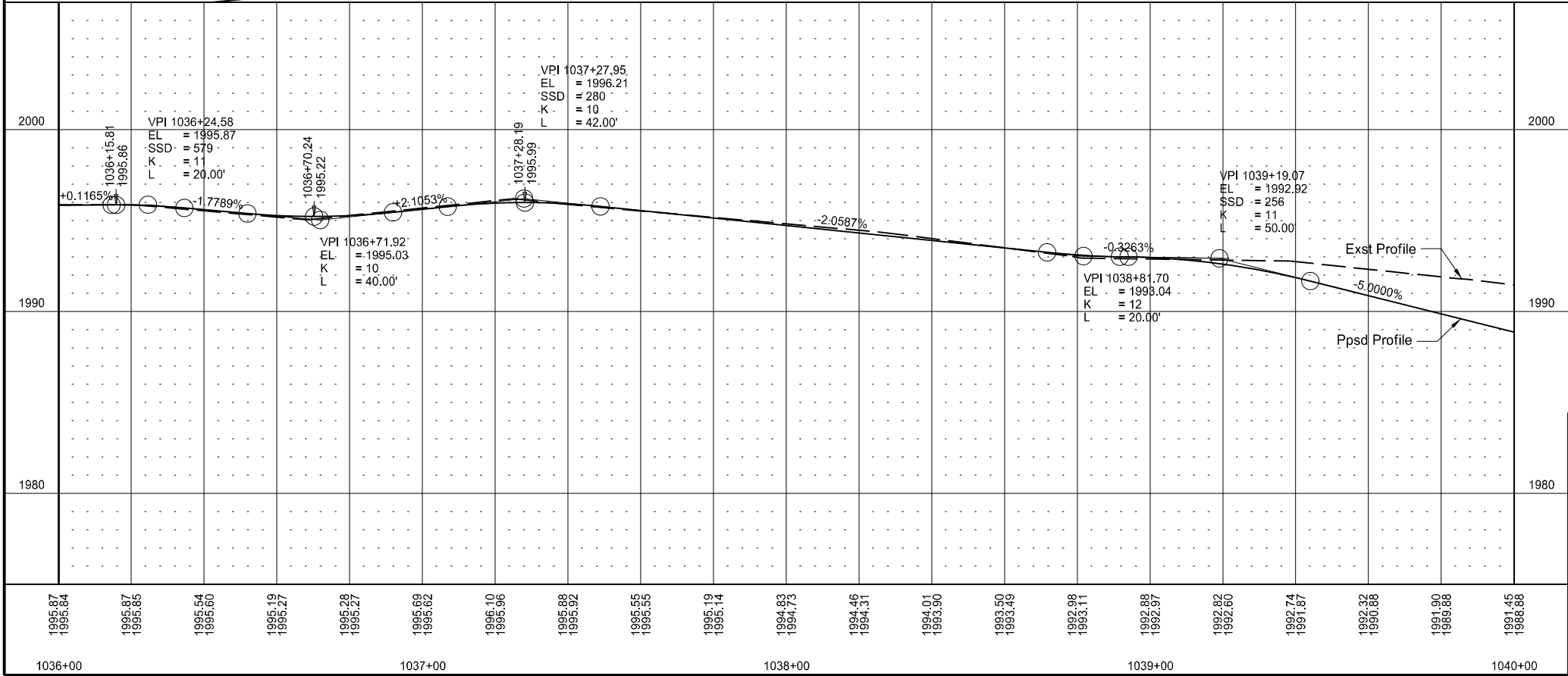
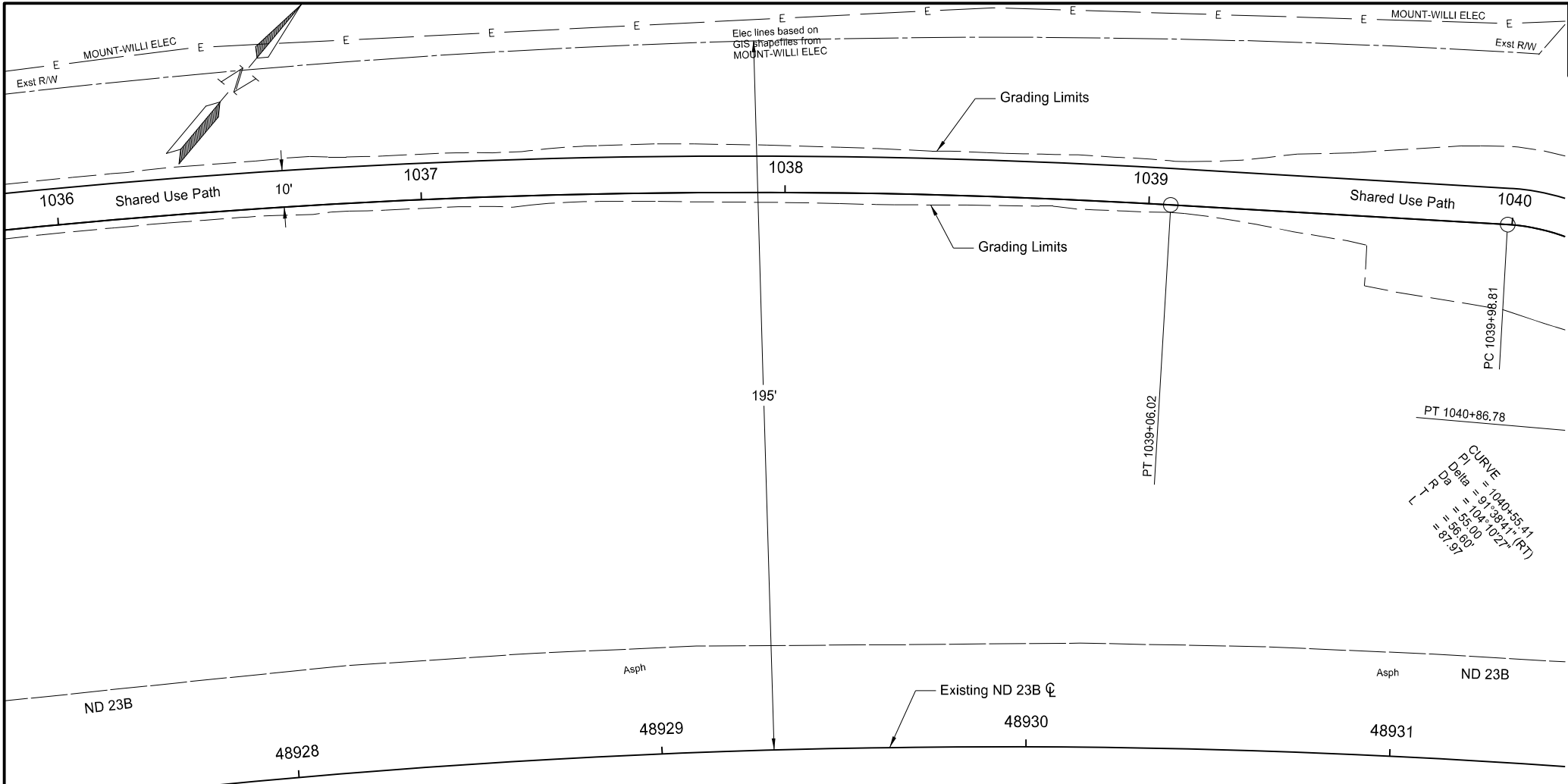


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	60	8

SPEC	CODE	BID ITEM	UNIT	QUANTITY
302	120	AGGREGATE BASE COURSE CL 5 1028+00 to 1032+00	TON	171
430	500	COMMERCIAL GRADE HOT MIX ASPHALT 1028+00 to 1032+00	TON	76
714	4100	PIPE CONDUIT 18IN 1028+12 - 18' Lt to 1028+01 - 18' Rt	LF	37
714	4105	PIPE CONDUIT 24IN 1029+82 - 24' Lt to 1029+75 - 17' Rt	LF	42
754	805	OBJECT MARKERS - CULVERTS		
		1028+05 Rt	EA	1
		1028+12 Lt	EA	1
		1029+75 Rt	EA	1
		1029+82 Lt	EA	1

Plan & Profile
ND 23B
0.5 MI W of ND 1804, N for 0.5 MI
1028+00 to 1032+00



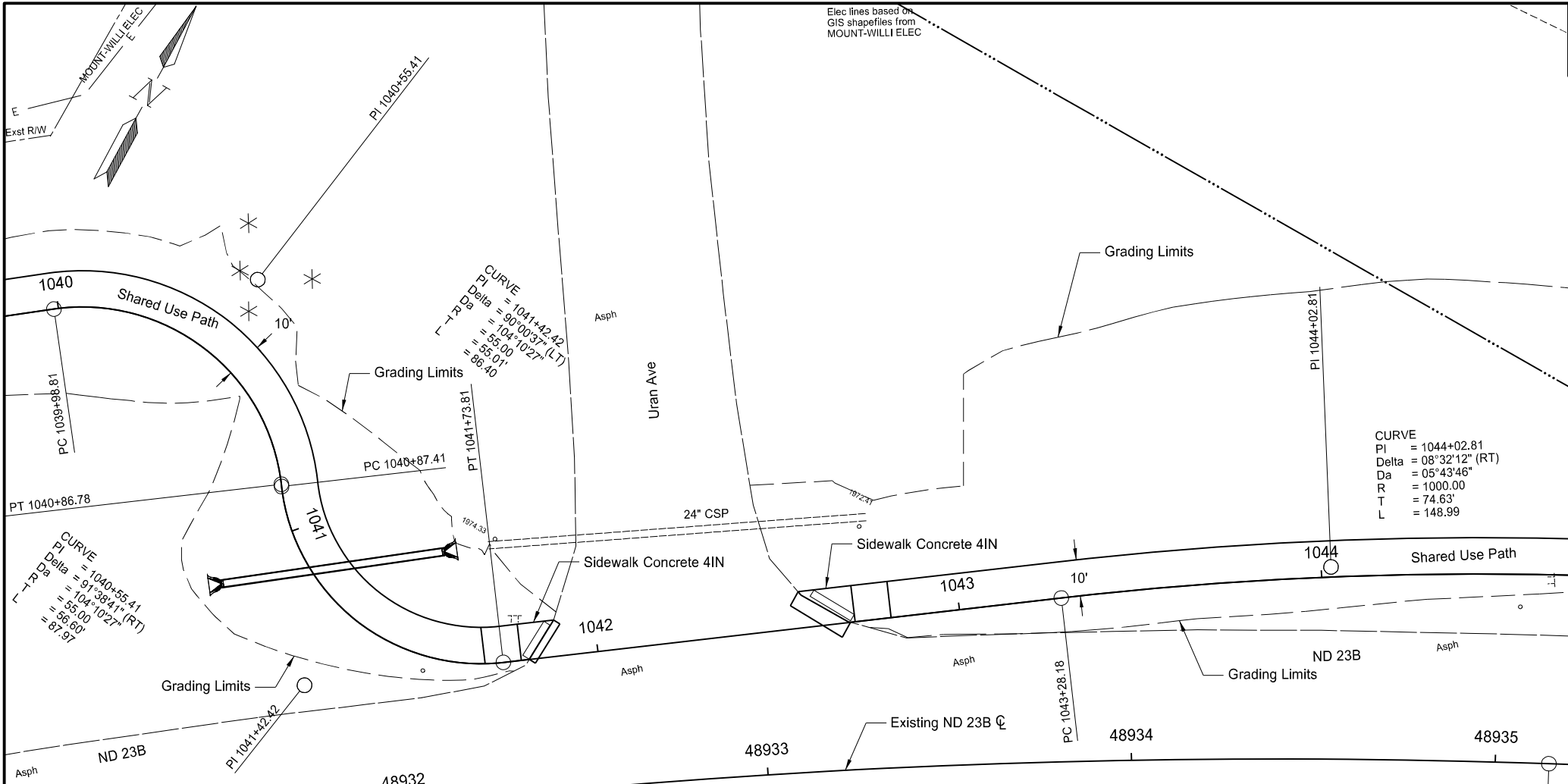


STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-7-023(069)926	60	10

SPEC	CODE	BID ITEM	UNIT	QUANTITY
302	120	AGGREGATE BASE COURSE CL 5 1036+00 to 1040+00	TON	168
430	500	COMMERCIAL GRADE HOT MIX ASPHALT 1036+00 to 1040+00	TON	75

Plan & Profile
ND 23B
0.5 MI W of ND 1804, N for 0.5 MI
1036+00 to 1040+00



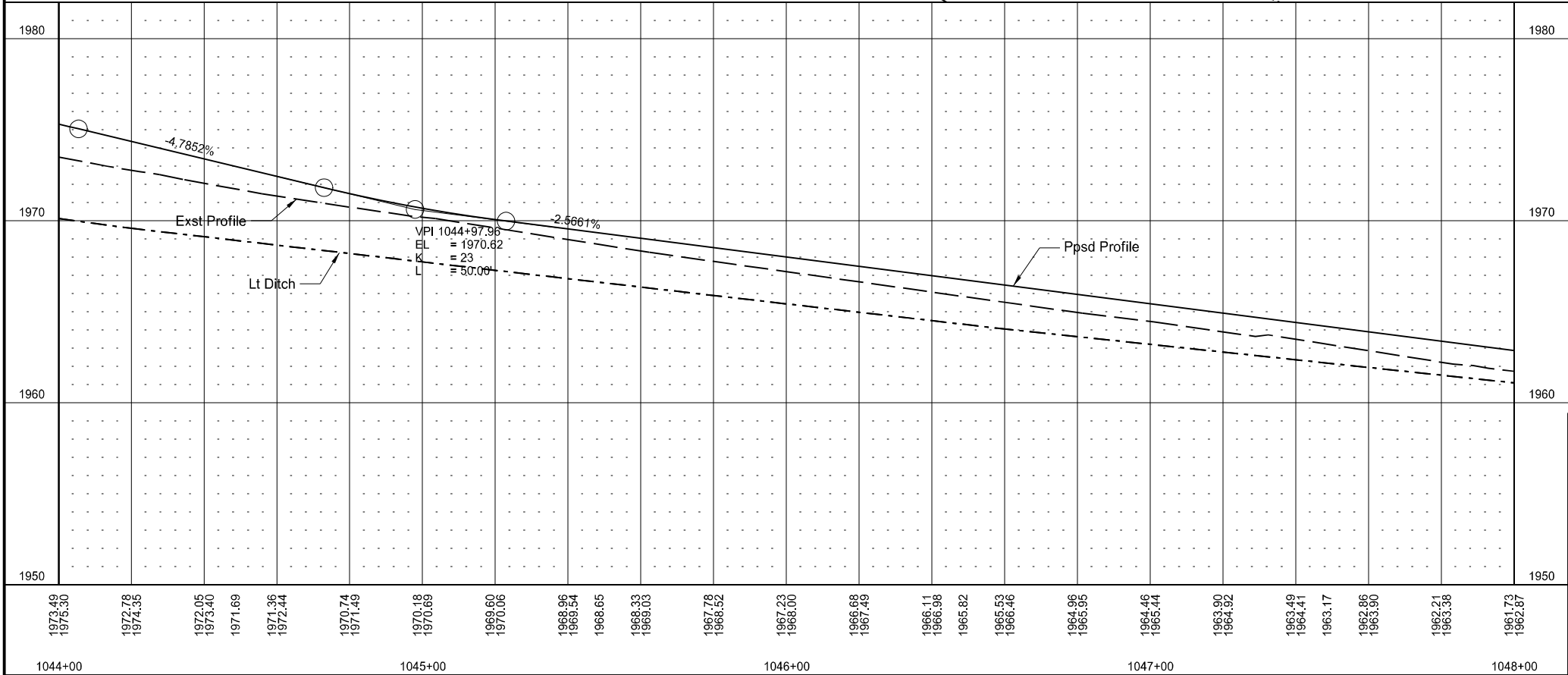
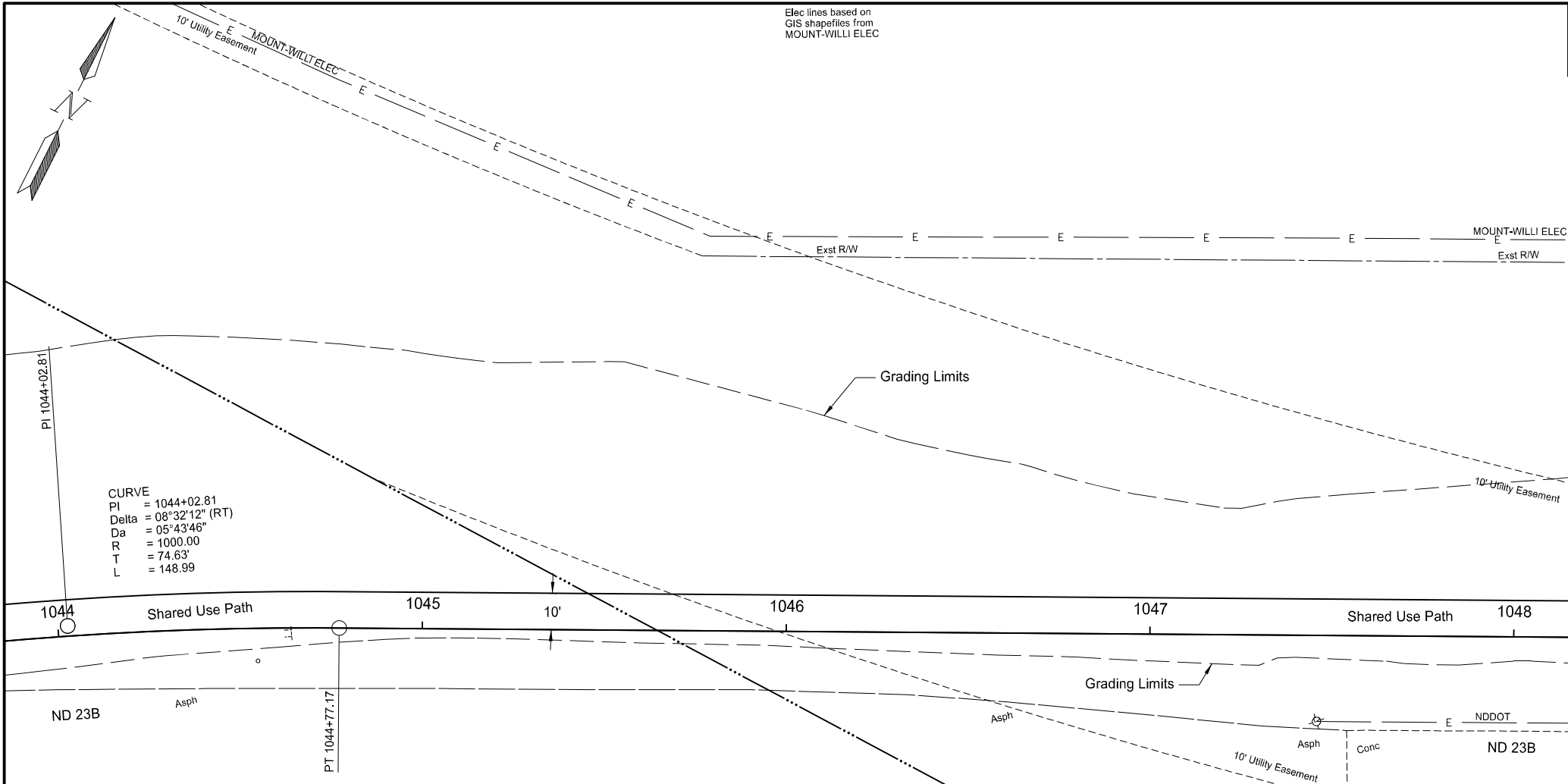


STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-7-023(069)926	60	11

SPEC	CODE	BID ITEM	UNIT	QUANTITY
302	120	AGGREGATE BASE COURSE CL 5		
		1040+00 to 1041+79	TON	75
		1042+71 to 1044+00	TON	54
430	500	COMMERCIAL GRADE HOT MIX ASPHALT		
		1040+00 to 1041+79	TON	34
		1042+71 to 1044+00	TON	24
714	4105	PIPE CONDUIT 24IN		
		1041+46 - 29' Lt to 1041+05 - 23' Rt	LF	62
754	805	OBJECT MARKERS - CULVERTS		
		1041+05 Rt	EA	1
		1041+46 Lt	EA	1

Plan & Profile
ND 23B
0.5 Mi W of ND 1804, N for 0.5 MI
1040+00 to 1044+00





STATE

PROJECT NO.

SECTION NO.

SHEET NO.

ND

TAC-7-023(069)926

60

12

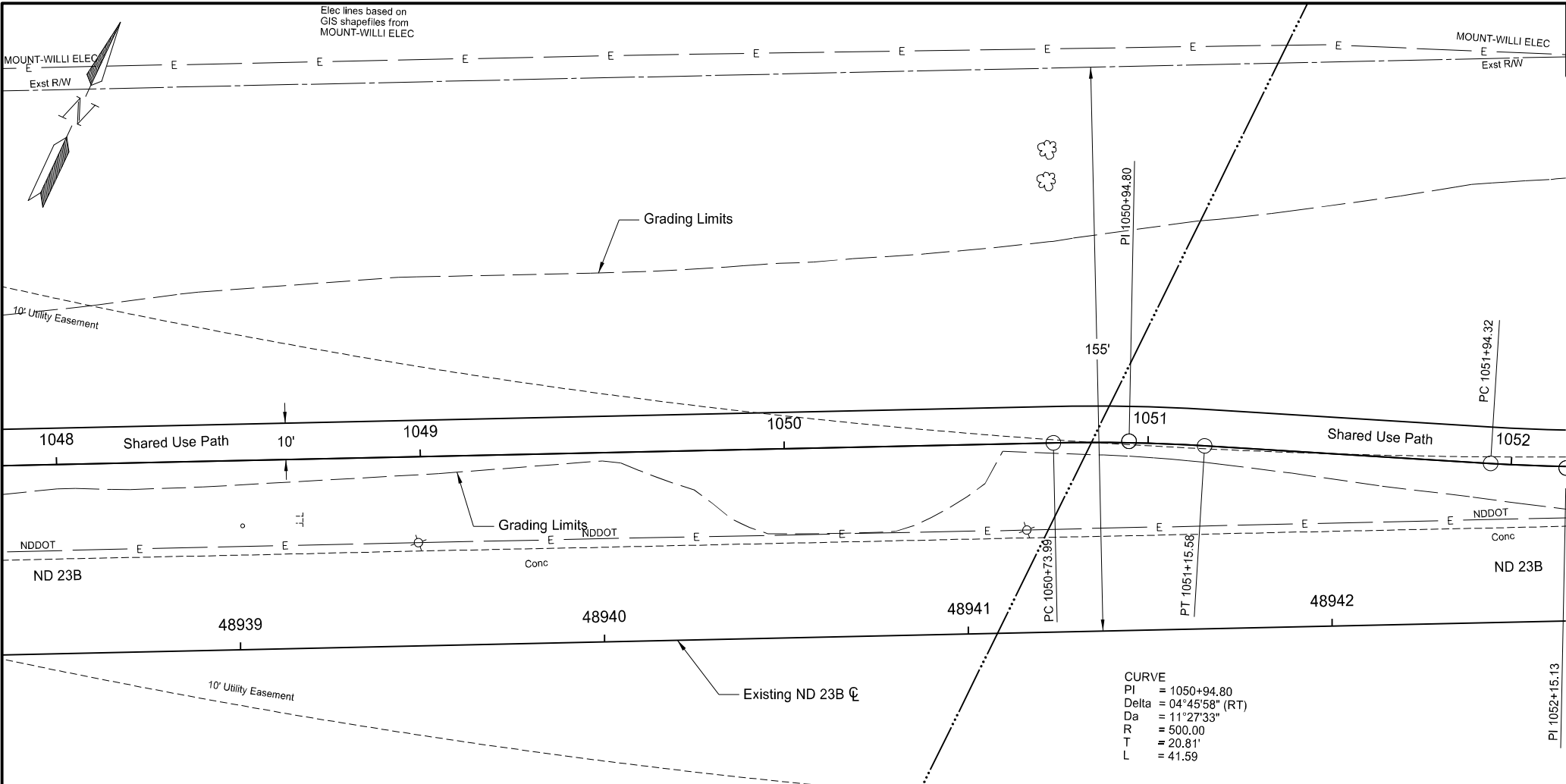
SPEC	CODE	BID ITEM	UNIT	QUANTITY
302	120	AGGREGATE BASE COURSE CL 5 1044+00 to 1048+00	TON	167
430	500	COMMERCIAL GRADE HOT MIX ASPHALT 1044+00 to 1048+00	TON	75

Plan & Profile

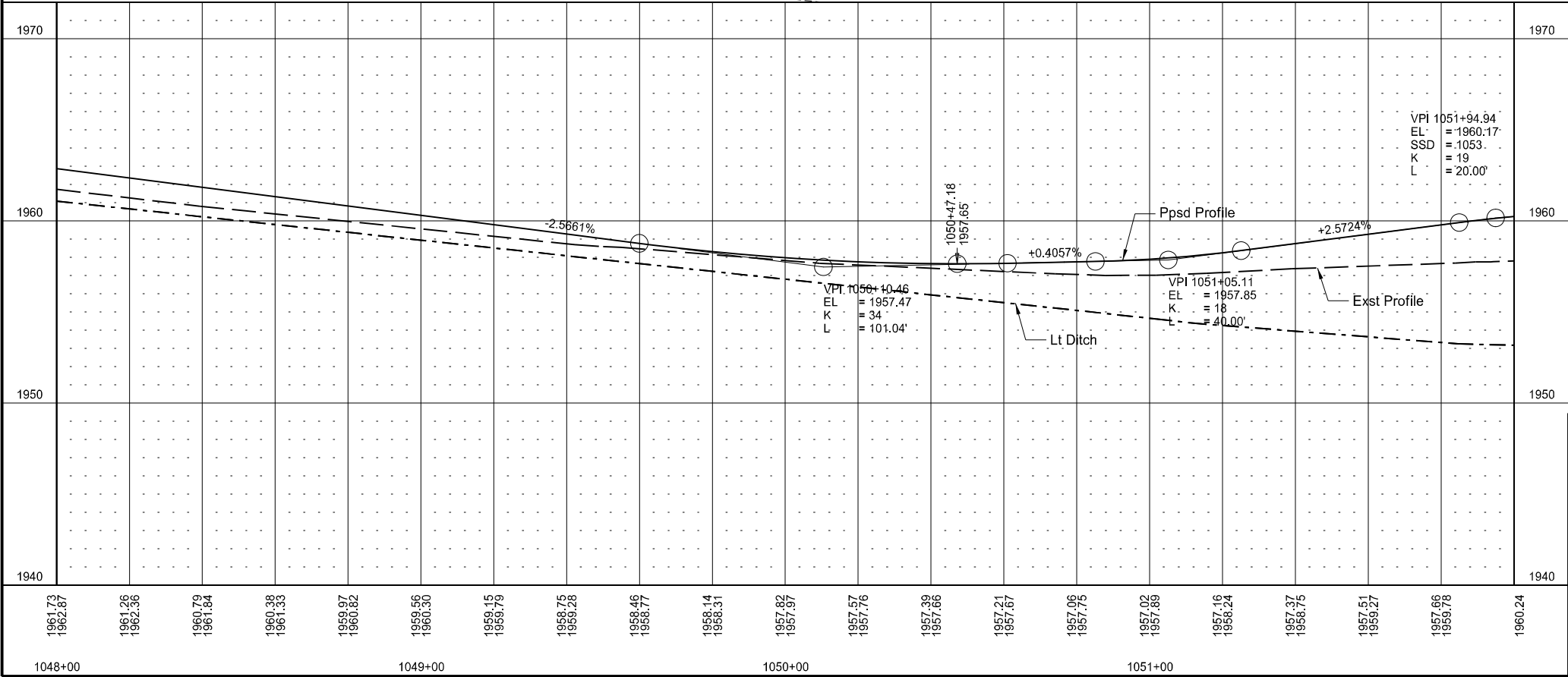
ND 23B
0.5 Mi W of ND 1804, N for 0.5 MI

1044+00 to 1048+00





CURVE
PI = 1050+94.80
Delta = 04°45'58" (RT)
Da = 11°27'33"
R = 500.00
T = 20.81'
L = 41.59



STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-7-023(069)926	60	13

SPEC	CODE	BID ITEM	UNIT	QUANTITY
302	120	AGGREGATE BASE COURSE CL 5 1048+00 to 1052+00	TON	167
430	500	COMMERCIAL GRADE HOT MIX ASPHALT 1048+00 to 1052+00	TON	75

Plan & Profile
ND 23B
0.5 Mi W of ND 1804, N for 0.5 MI
1048+00 to 1052+00



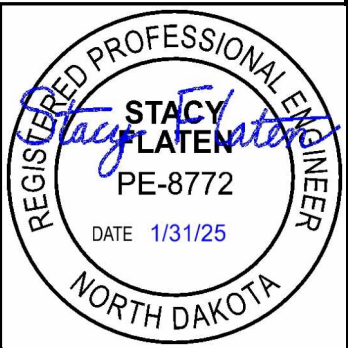
Wetland Impact Table									
Wetland Number	Location	Wetland Type	Wetland Feature	USACE Jurisdictional Wetlands¹	Wetland Impact				
					Wetland Impacts Acre(s)			USFWS Easement Impacts Acre(s)	
					Temp.	Perm. (Fill/Drain)	Perm. (Cut)	Temp.	Perm.
1	Sec 7 T-152-N R-92-W	Ditch	Created	No	0.002	0.057			
Totals					0.002	0.057	0.000	0.000	0.000

¹ A wetland Jurisdictional Determination was issued by the USACE on 10/15/2024; NWO-2015-02027-BIS.

² Previous permanent wetland impacts of 0.007 acres from NDS-SS-7-804(070)247, PCN 23396 were removed from the wetland boundary.

Impact Summary Table			
Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total Acre(s)	WaterType	Total Acre(s)
Natural/JD (Fill/Drain)	0.000	Temporary Wetland JD	0.000
Natural/Non-JD (Fill/Drain)	0.000	Non-JD Wetland Temporary	0.002
Artificial/JD (Fill/Drain)	0.000		
Artificial /Non-JD (Fill/Drain))	0.057	Permanent OW	0.000
Total	0.057	Temporary OW	0.000
JD Natural (Cut)	0.000	Permanent OW-d	0.000
JD Artificial (Cut)	0.000	Temporary OW-d	0.000
Non-JD Natural (Cut)	0.000		
Non-JD Artificial (Cut)	0.000		
Total	0.000		

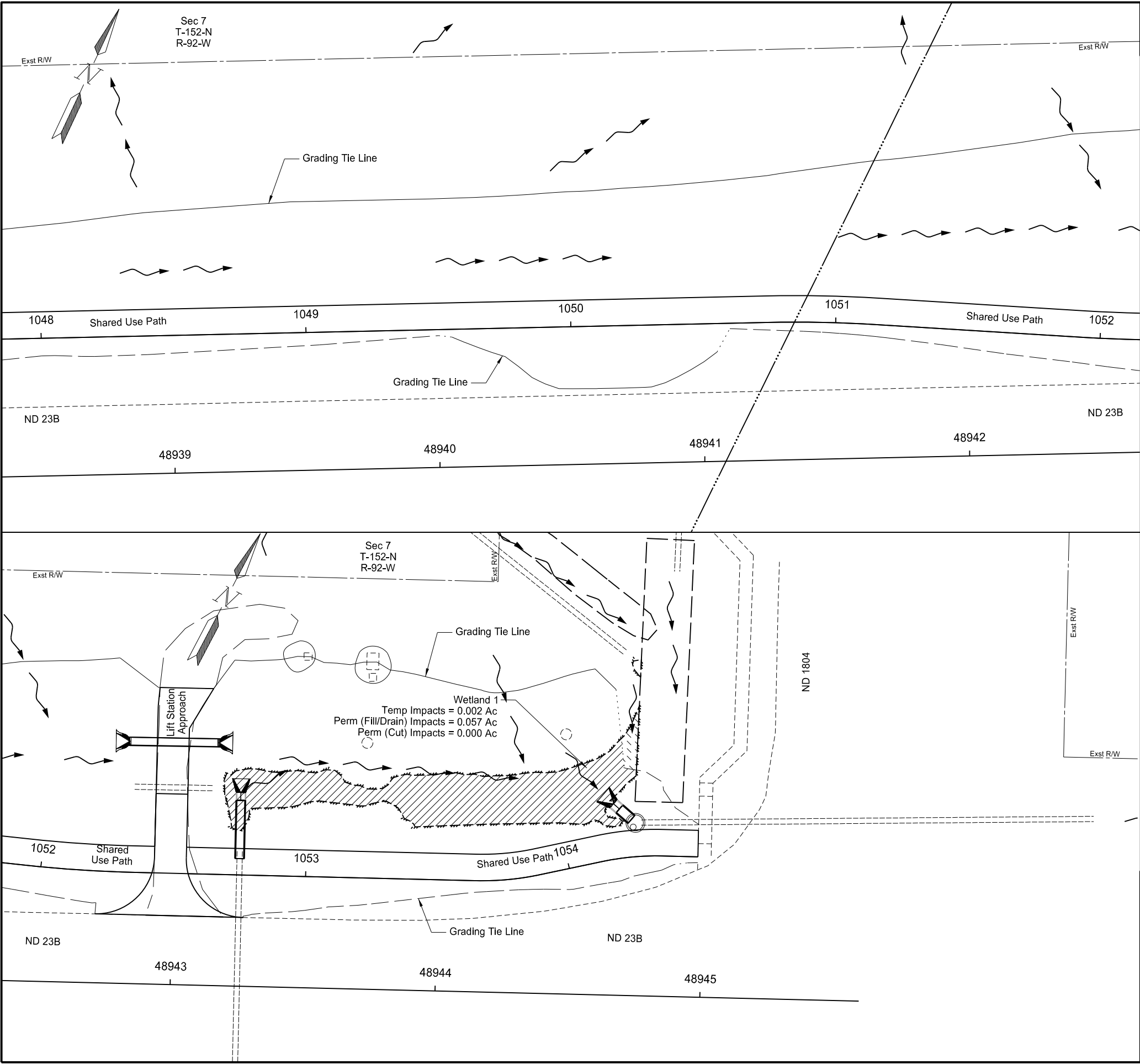
Mitigation Summary Table						
	Location	Ditch Shift Acre(s)	Onsite Acre(s)	11990 Bank Acre(s)	USACE/11990 Bank Acre(s)	USFWS Bank Acre(s)
USACE Only						
EO 11990 Only						
USACE/11990						
USFWS						
Total		0	0	0	0	0



Wetlands Mitigation and Environmental

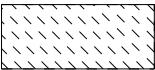
ND 23B

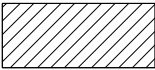
0.5 Mi W of ND 1804, N for 0.5 Mi

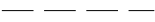


STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-7-023(069)926	75	2

LEGEND

 Temporary Impact

 Permanent Impact (Fill/Drain)

 Grading Tie Line (Fill)

 Grading Tie Line (Cut)

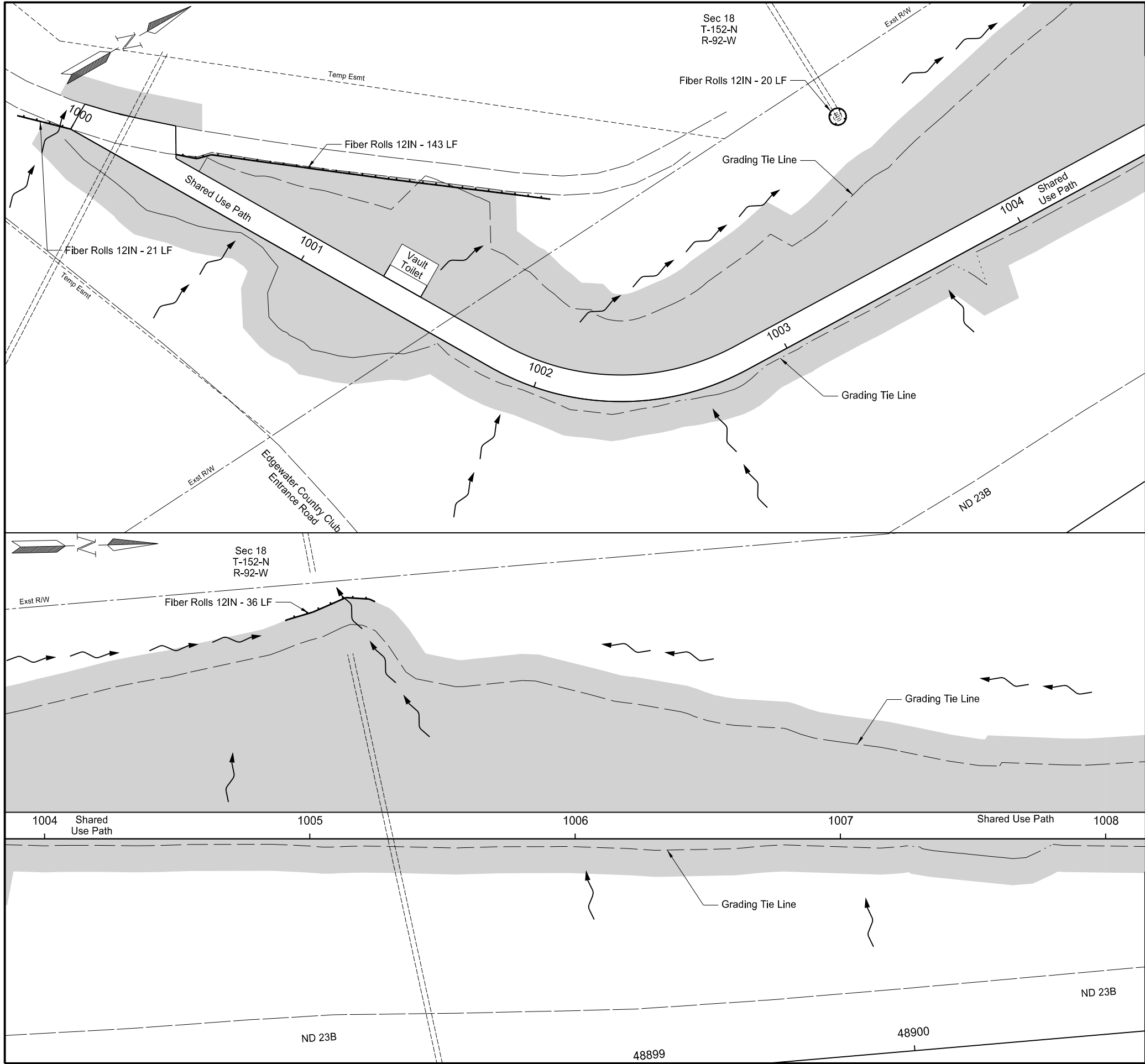
 Grading Tie Line (Transition)

Wetland Impacts

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

1048+00 to 1054+48.94





		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	TAC-7-023(069)926	76	1
SPEC	CODE	BID ITEM		UNIT	QUANTITY
251	2000	TEMPORARY COVER CROP		ACRE	1.04
		1000+00 to 1008+00			
253	101	STRAW MULCH		ACRE	1.04
		1000+00 to 1008+00			
261	112	FIBER ROLLS 12IN		LF	21
		999+80 to 1000+00 Rt		LF	143
		1000+39 to 1001+70 Lt		LF	20
		1003+59 - 68' Lt (culvert)		LF	36
		1004+91 to 1005+25 Lt			
261	113	REMOVE FIBER ROLLS 12IN		LF	21
		999+80 to 1000+00 Rt		LF	143
		1000+39 to 1001+70 Lt		LF	20
		1003+59 - 68' Lt (culvert)		LF	36
		1004+91 to 1005+25 Lt			

LEGEND

Temporary Cover Crop
Straw Mulch

Fiber Rolls 12IN

Grading Tie Line (Fill)

Grading Tie Line (Cut)

Grading Tie Line (Transition)

Temporary Erosion Control

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

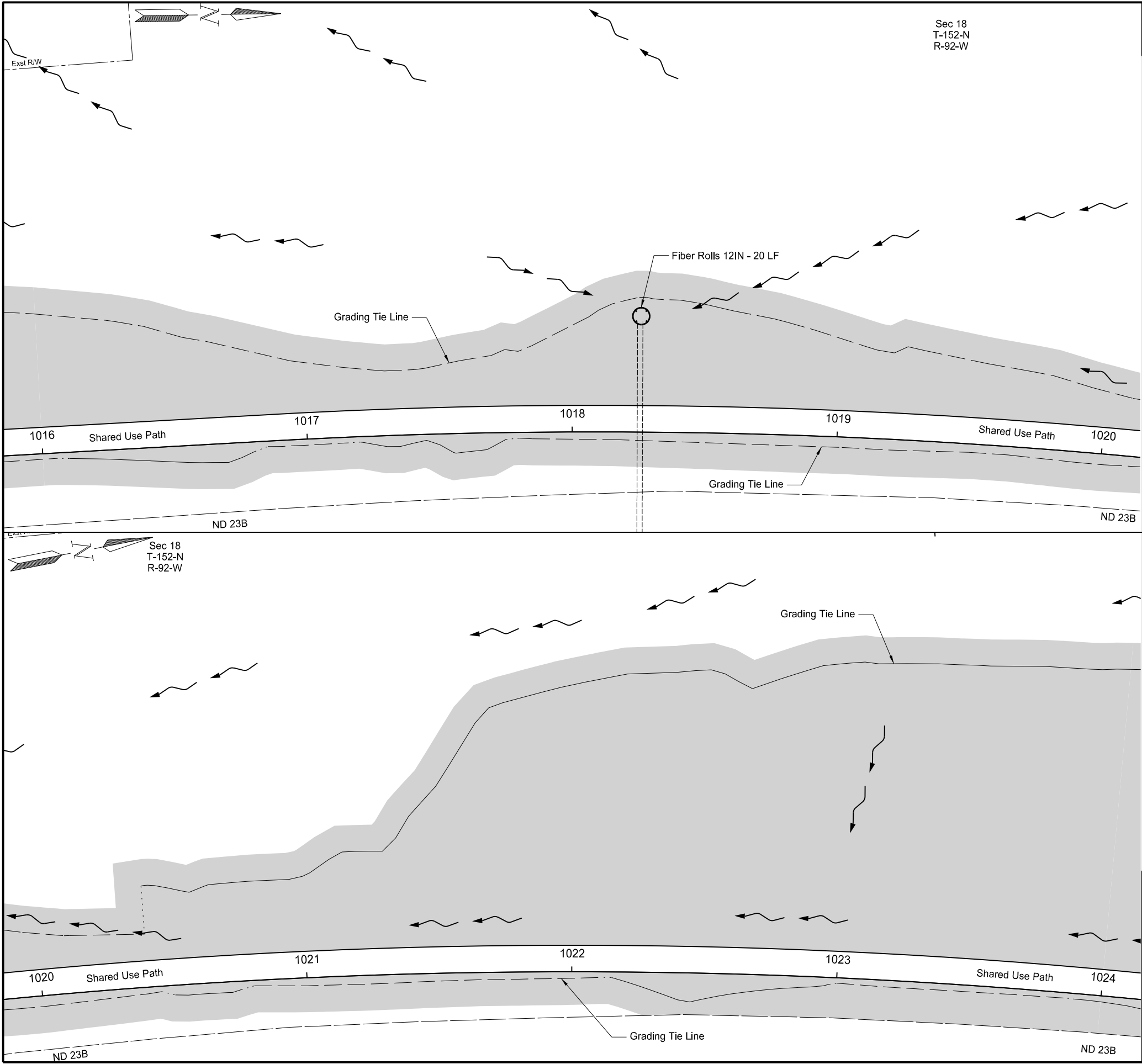
1000+00 to 1008+00

REGISTERED PROFESSIONAL ENGINEER

STACY FLATEN
PE-8772

DATE 2/1/25

NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	76	3

SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	2000	TEMPORARY COVER CROP		
		1016+00 to 1024+00	ACRE	1.41
253	101	STRAW MULCH		
		1016+00 to 1024+00	ACRE	1.41
261	112	FIBER ROLLS 12IN		
		1018+25 - 42' Lt (culvert)	LF	20
261	113	REMOVE FIBER ROLLS 12IN		
		1018+25 - 42' Lt (culvert)	LF	20

LEGEND

Temporary Cover Crop
Straw Mulch

.....

Fiber Rolls 12IN

— — — —

Grading Tie Line (Fill)

—————

Grading Tie Line (Cut)

.....

Grading Tie Line (Transition)

Temporary Erosion Control

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

1016+00 to 1024+00

REGISTERED PROFESSIONAL ENGINEER

STACY FLATEN

PE-8772

DATE 2/1/25

NORTH DAKOTA



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	TAC-7-023(069)926	76	4
SPEC	CODE	BID ITEM		UNIT	QUANTITY
251	2000	TEMPORARY COVER CROP		ACRE	1.30
		1024+00 to 1032+00			
253	101	STRAW MULCH		ACRE	1.30
		1024+00 to 1032+00			
261	112	FIBER ROLLS 12IN		LF	20
		1030+08 - 88' Rt (culvert)			
261	113	REMOVE FIBER ROLLS 12IN		LF	20
		1030+08 - 88' Rt (culvert)			

Temporary Erosion Control

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

1024+00 to 1032+00

LEGEND

- Temporary Cover Crop
- Straw Mulch
- Fiber Rolls 12IN
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)

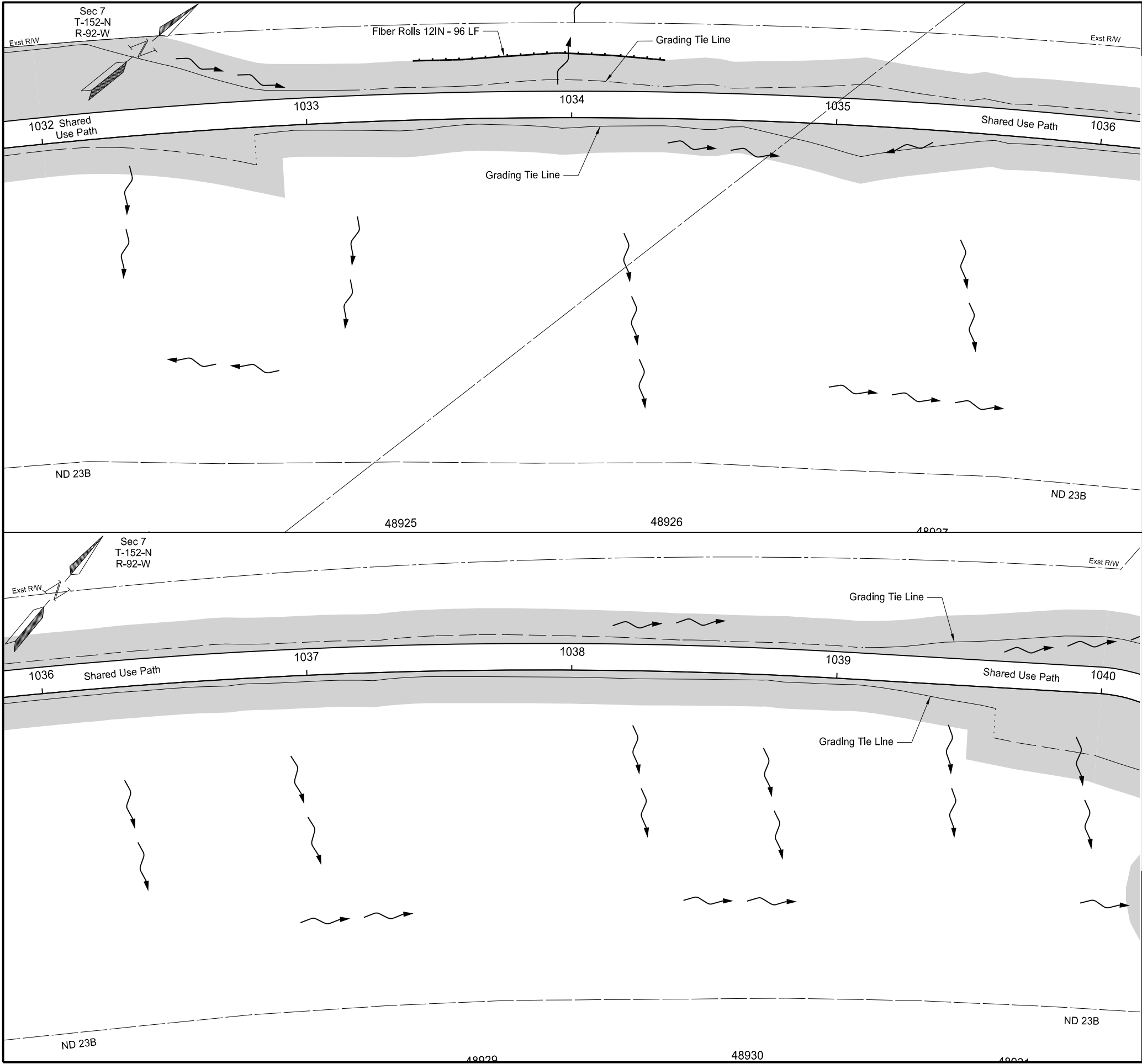
REGISTERED PROFESSIONAL ENGINEER

STACY FLATEN

PE-8772

DATE 2/1/25

NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	76	5

SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	2000	TEMPORARY COVER CROP 1032+00 to 1040+00	ACRE	0.55
253	101	STRAW MULCH 1032+00 to 1040+00	ACRE	0.55
261	112	FIBER ROLLS 12IN 1033+41 to 1034+35 Lt	LF	96
261	113	REMOVE FIBER ROLLS 12IN 1033+41 to 1034+35 Lt	LF	96

LEGEND

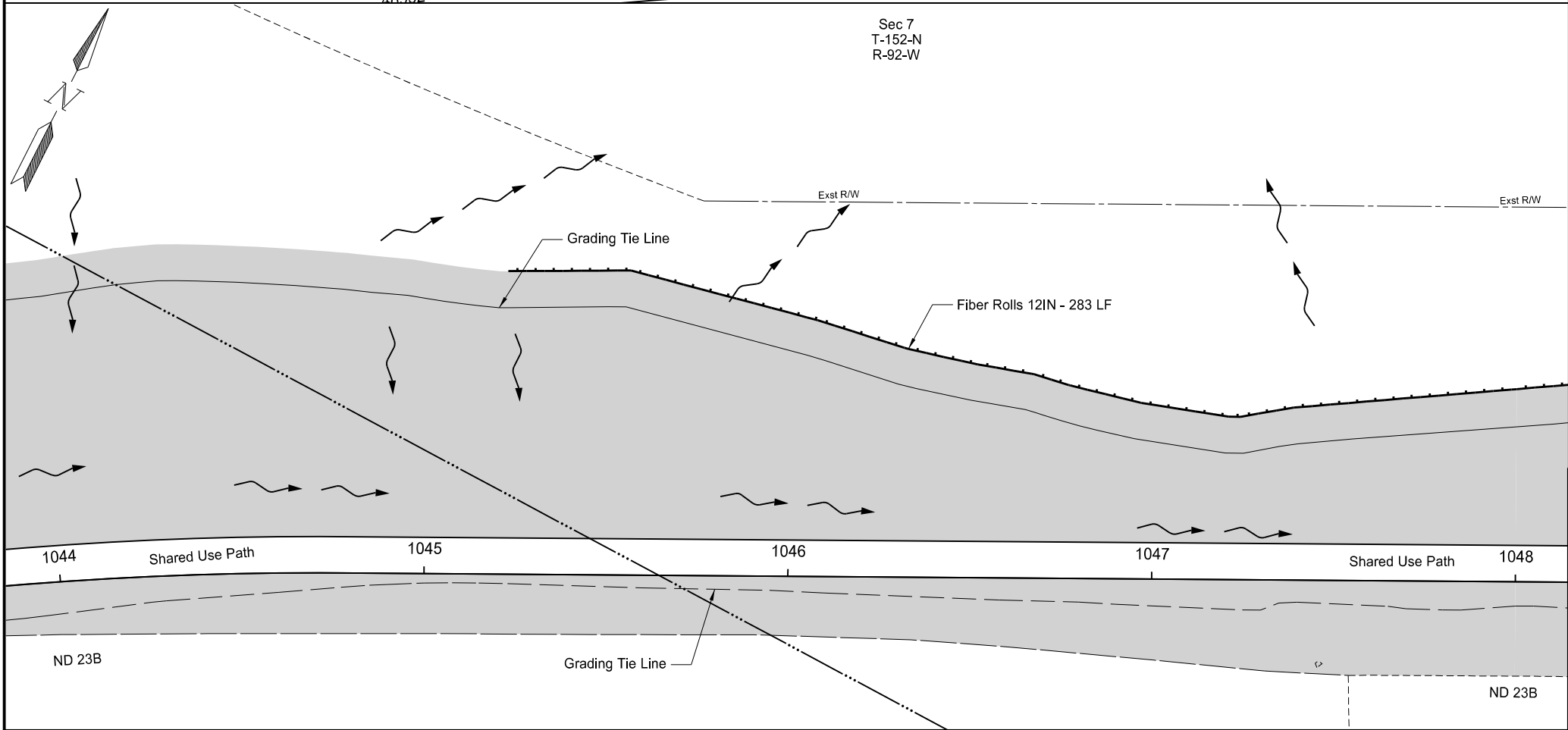
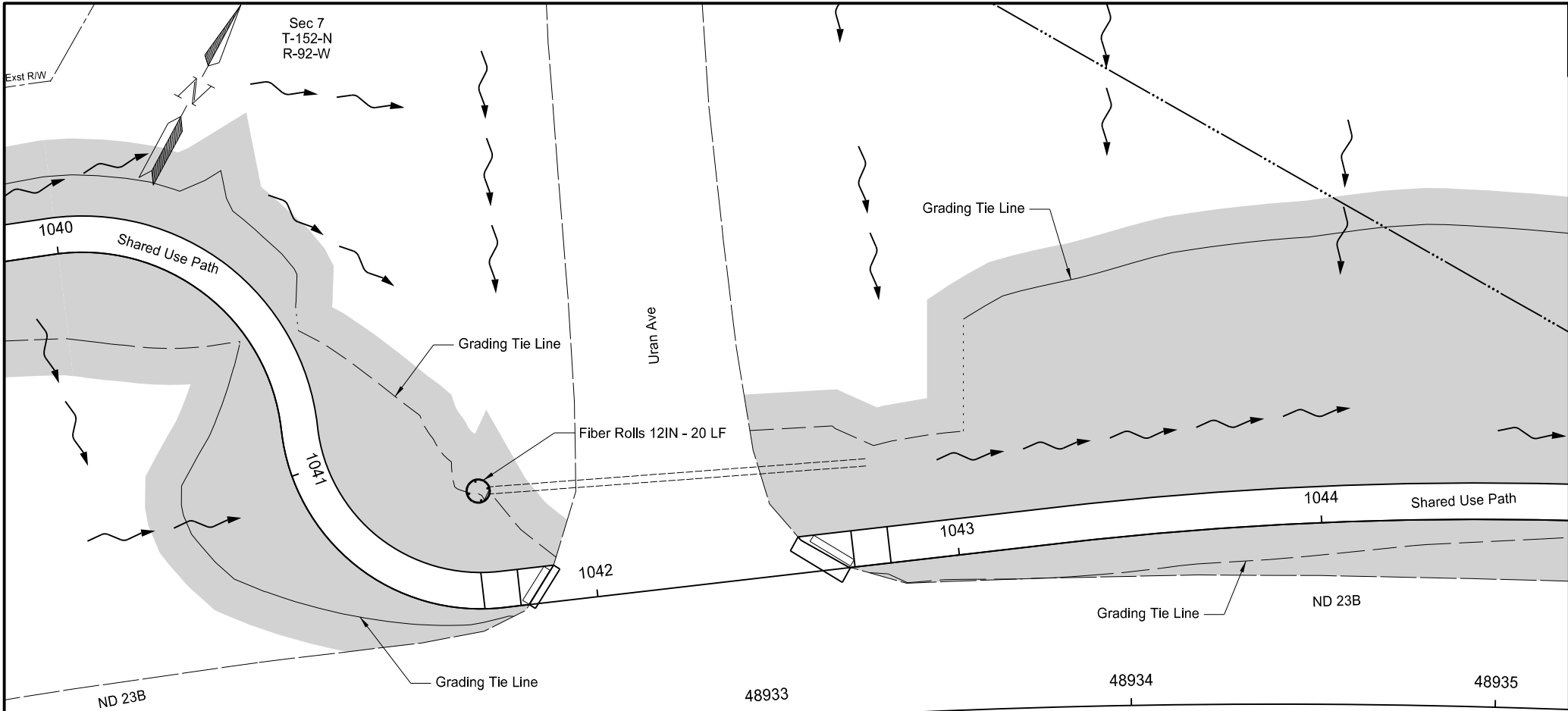
- Temporary Cover Crop
Straw Mulch
- Fiber Rolls 12IN
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)

Temporary Erosion Control

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

1032+00 to 1040+00





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-7-023(069)926	76	6

SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	2000	TEMPORARY COVER CROP 1040+00 to 1048+00	ACRE	1.21
253	101	STRAW MULCH 1040+00 to 1048+00	ACRE	1.21
261	112	FIBER ROLLS 12IN 1041+73 - 32' Lt (culvert) 1045+23 to 1048+00 Lt	LF LF	20 283
261	113	REMOVE FIBER ROLLS 12IN 1041+73 - 32' Lt (culvert) 1045+23 to 1048+00 Lt	LF LF	20 283

LEGEND

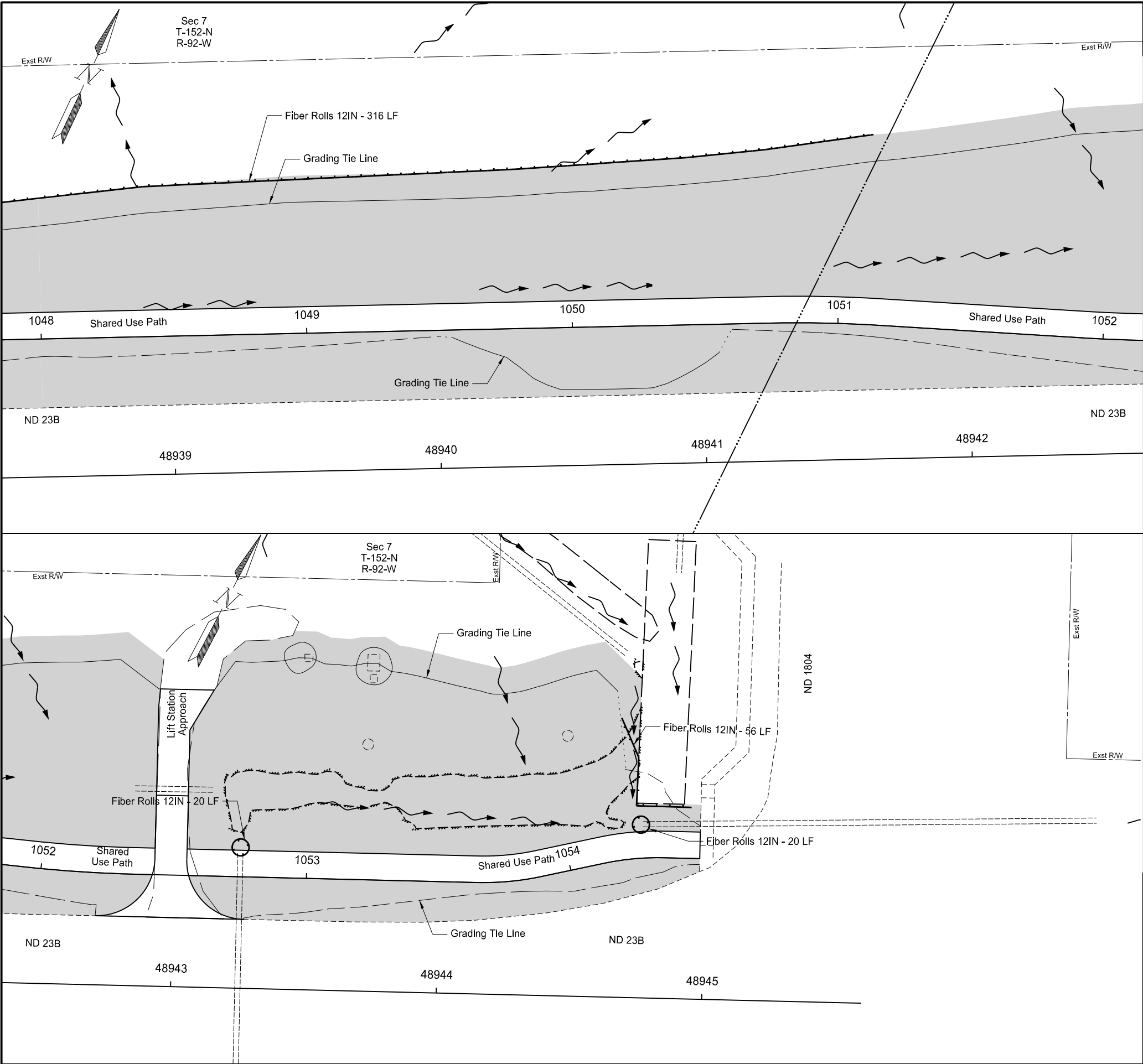
- Temporary Cover Crop
- Straw Mulch
- Fiber Rolls 12IN
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)

Temporary Erosion Control

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

1040+00 to 1048+00





		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	TAC-7-023(069)926	76	7
SPEC	CODE	BID ITEM		UNIT	QUANTITY
251	2000	TEMPORARY COVER CROP		ACRE	1.18
		1048+00 to 1054+48.94			
253	101	STRAW MULCH		ACRE	1.18
		1048+00 to 1054+48.94			
261	112	FIBER ROLLS 12IN		LF	316
		1048+00 to 1051+10 Lt		LF	20
		1052+75 - 9' Lt (culvert)		LF	20
		1054+28 - 13' Lt (culvert)		LF	56
261	113	REMOVE FIBER ROLLS 12IN		LF	316
		1048+00 to 1051+10 Lt		LF	20
		1052+75 - 9' Lt (culvert)		LF	20
		1054+28 - 13' Lt (culvert)		LF	56
		1054+24 to 1054+45 Lt			

LEGEND

Temporary Cover Crop
Straw Mulch

Fiber Rolls 12IN

Grading Tie Line (Fill)

Grading Tie Line (Cut)

Grading Tie Line (Transition)

Temporary Erosion Control

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

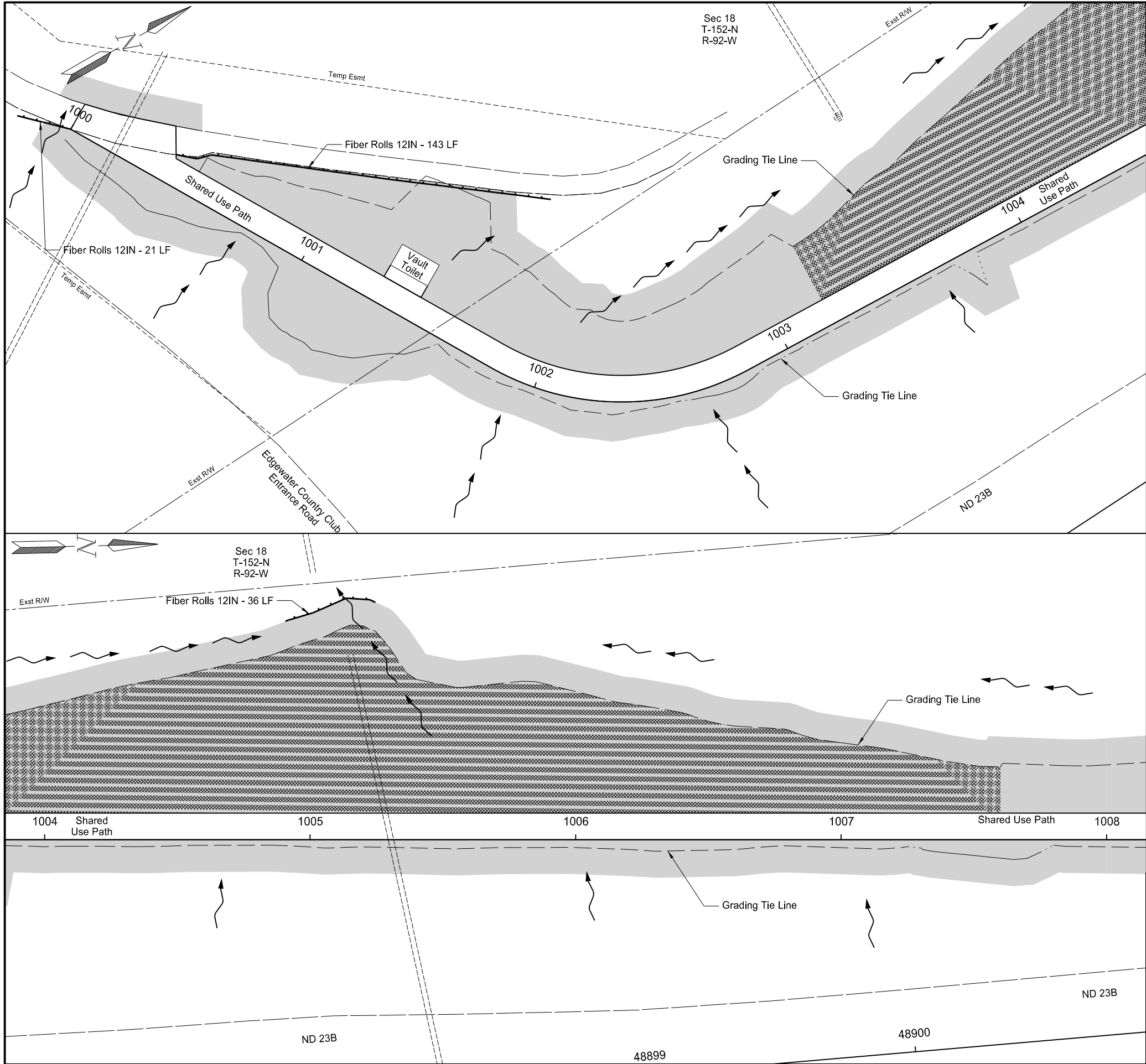
1048+00 to 1054+48.94

REGISTERED PROFESSIONAL ENGINEER

STACY FLATEN
PE-8772

DATE 2/1/25

NORTH DAKOTA



STATE		PROJECT NO.	SECTION NO.	SHEET NO.
ND		TAC-7-023(069)926	77	1

SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	200	SEEDING CLASS II 1000+00 to 1008+00	ACRE	1.04
253	101	STRAW MULCH 1000+00 to 1008+00	ACRE	1.04
255	102	ECB TYPE 2 1003+20 to 1007+60	SY	2009
261	112	FIBER ROLLS 12IN 999+80 to 1000+00 Rt	LF	21
		1000+39 to 1001+70 Lt	LF	143
		1004+91 to 1005+25 Lt	LF	36

LEGEND

- Seeding Class II
Straw Mulch
- ECB Type 2
- Remove and Replace Riprap
- Fiber Rolls 12IN
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Ditch

Permanent Erosion Control

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

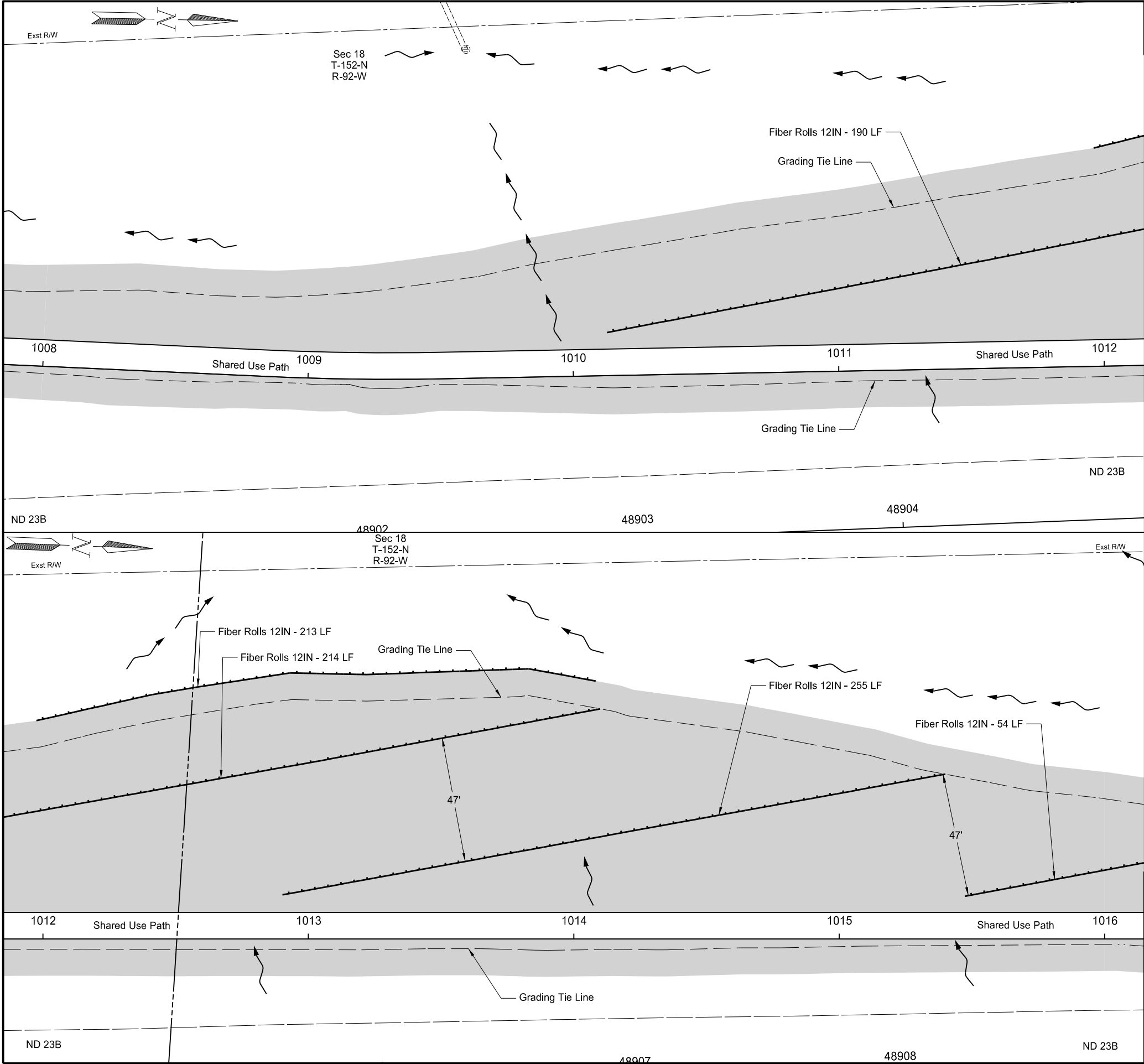
1000+00 to 1008+00

REGISTERED PROFESSIONAL ENGINEER

STACY FLATEN
PE-8772

DATE 2/1/25

NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	77	2
SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	200	SEEDING CLASS II 1008+00 to 1016+00	ACRE	1.40
253	101	STRAW MULCH 1008+00 to 1016+00	ACRE	1.40
261	112	FIBER ROLLS 12IN 1010+13 to 1012+00 Lt 1012+00 to 1014+10 Lt 1011+98 Lt to 1014+08 Lt 1012+90 to 1015+40 Lt 1015+47 to 1016+00 Lt	LF	190 214 213 255 54

LEGEND

Seeding Class II
Straw Mulch

ECB Type 2

Remove and Replace Riprap

Fiber Rolls 12IN

Grading Tie Line (Fill)

Grading Tie Line (Cut)

Grading Tie Line (Transition)

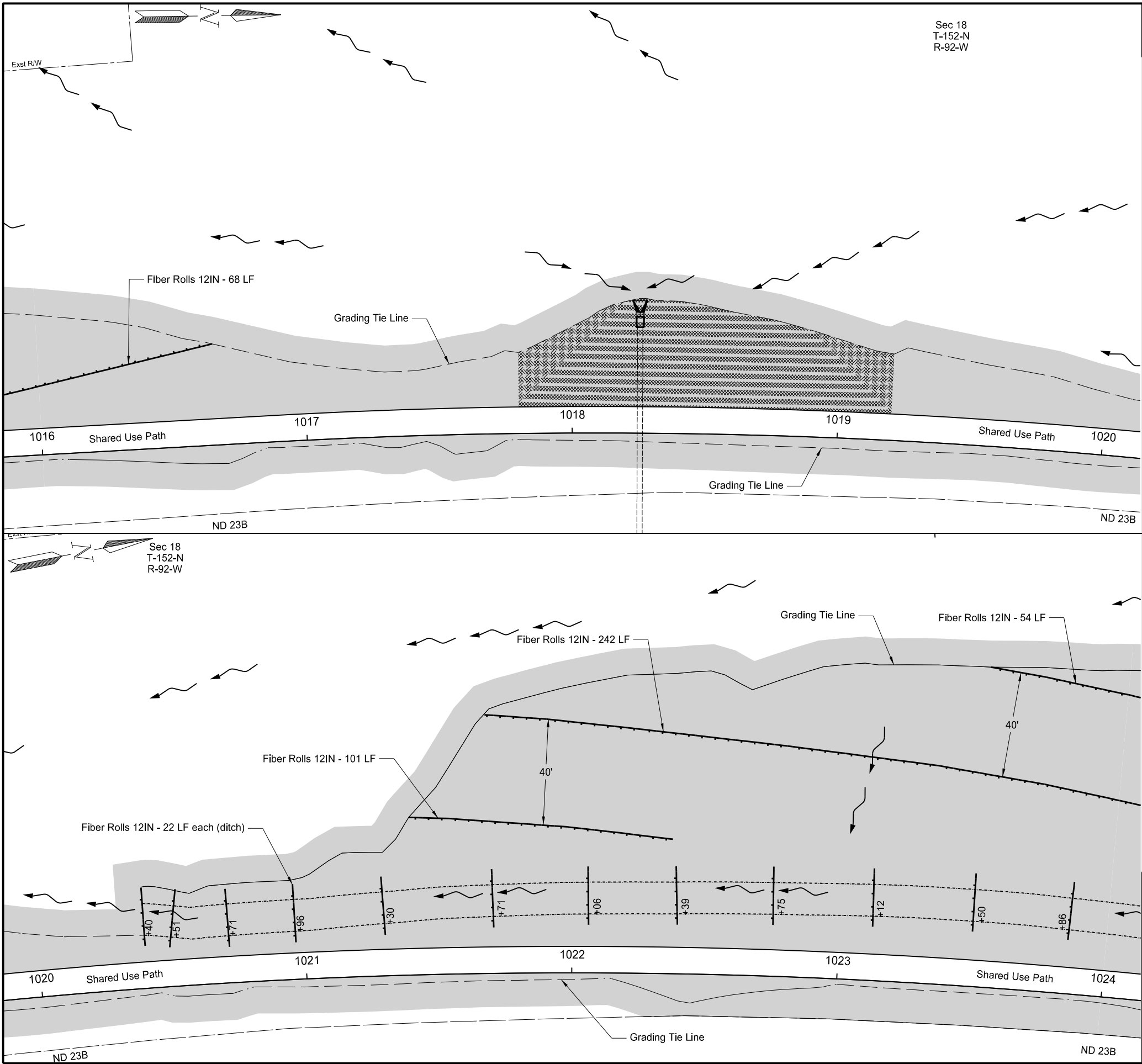
Ditch

Permanent Erosion Control

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

1008+00 to 1016+00

REGISTERED PROFESSIONAL ENGINEER
STACY FLATEN
PE-8772
DATE 2/1/25
NORTH DAKOTA



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	TAC-7-023(069)926	77	3

SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	200	SEEDING CLASS II		
		1016+00 to 1024+00	ACRE	1.41
253	101	STRAW MULCH		
		1016+00 to 1024+00	ACRE	1.41
255	102	ECB TYPE 2		
		1017+80 to 1019+20 Lt	SY	514
261	112	FIBER ROLLS 12IN		
		1016+00 to 1016+66 Lt	LF	68
		1021+40 to 1022+37 Lt	LF	101
		1021+68 to 1024+00 Lt	LF	242
		1023+50 to 1024+00 Lt	LF	54
		1020+40 to 1024+00 Lt (ditch)	LF	264

LEGEND

Seeding Class II
Straw Mulch

ECB Type 2

Remove and Replace Riprap

Fiber Rolls 12IN

Grading Tie Line (Fill)

Grading Tie Line (Cut)

Grading Tie Line (Transition)

Ditch

Permanent Erosion Control

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

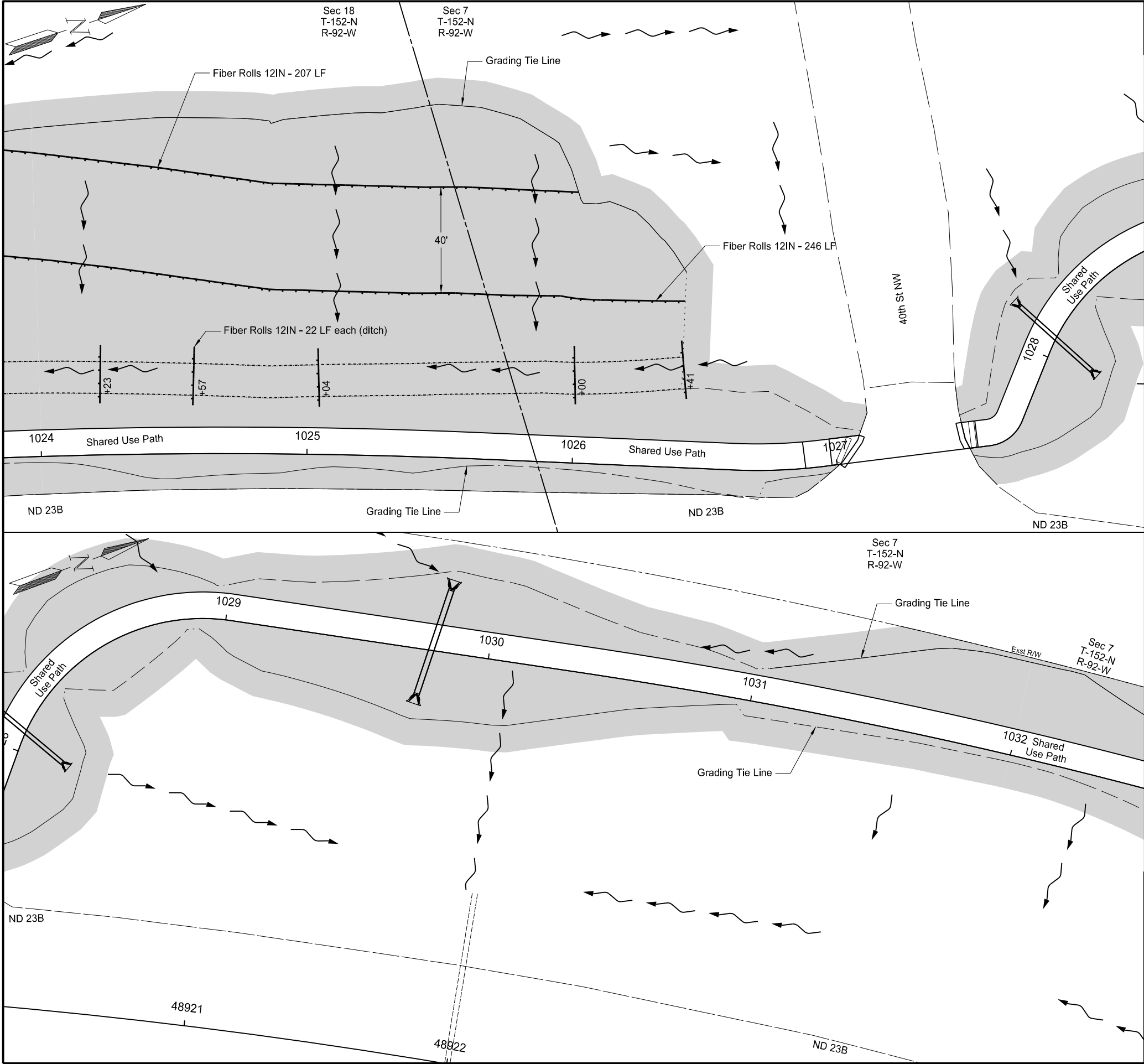
1016+00 to 1024+00

REGISTERED PROFESSIONAL ENGINEER

STACY FLATEN
PE-8772

DATE 2/1/25

NORTH DAKOTA



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	TAC-7-023(069)926	77	4
SPEC	CODE	BID ITEM		UNIT	QUANTITY
251	200	SEEDING CLASS II			
		1024+00 to 1032+00		ACRE	1.30
253	101	STRAW MULCH			
		1024+00 to 1032+00		ACRE	1.30
261	112	FIBER ROLLS 12IN			
		1024+00 to 1025+98 Lt		LF	207
		1024+00 to 1026+40 Lt		LF	246
		1024+00 to 1026+41 Lt (ditch)		LF	110

LEGEND

Seeding Class II
Straw Mulch

ECB Type 2

Remove and Replace Riprap

Fiber Rolls 12IN

Grading Tie Line (Fill)

Grading Tie Line (Cut)

Grading Tie Line (Transition)

Ditch

Permanent Erosion Control

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

1024+00 to 1032+00

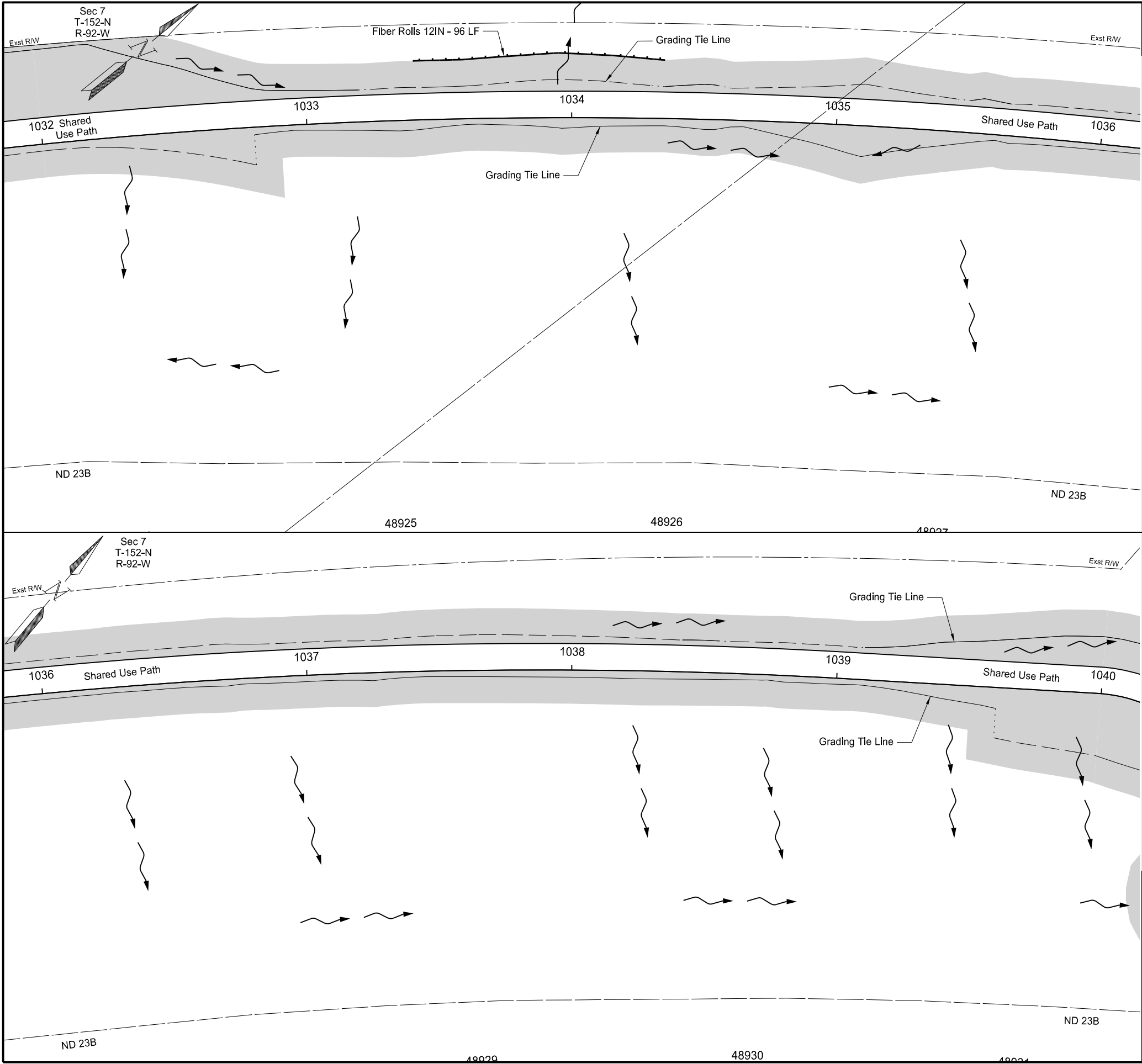
REGISTERED PROFESSIONAL ENGINEER

STACY FLATEN

PE-8772

DATE 2/1/25

NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	77	5

SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	200	SEEDING CLASS II 1032+00 to 1040+00	ACRE	0.55
253	101	STRAW MULCH 1032+00 to 1040+00	ACRE	0.55
261	112	FIBER ROLLS 12IN 1033+41 to 1034+35 Lt	LF	96

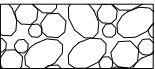
LEGEND



Seeding Class II
Straw Mulch



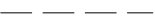
ECB Type 2



Remove and Replace Riprap



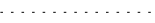
Fiber Rolls 12IN



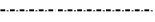
Grading Tie Line (Fill)



Grading Tie Line (Cut)



Grading Tie Line (Transition)



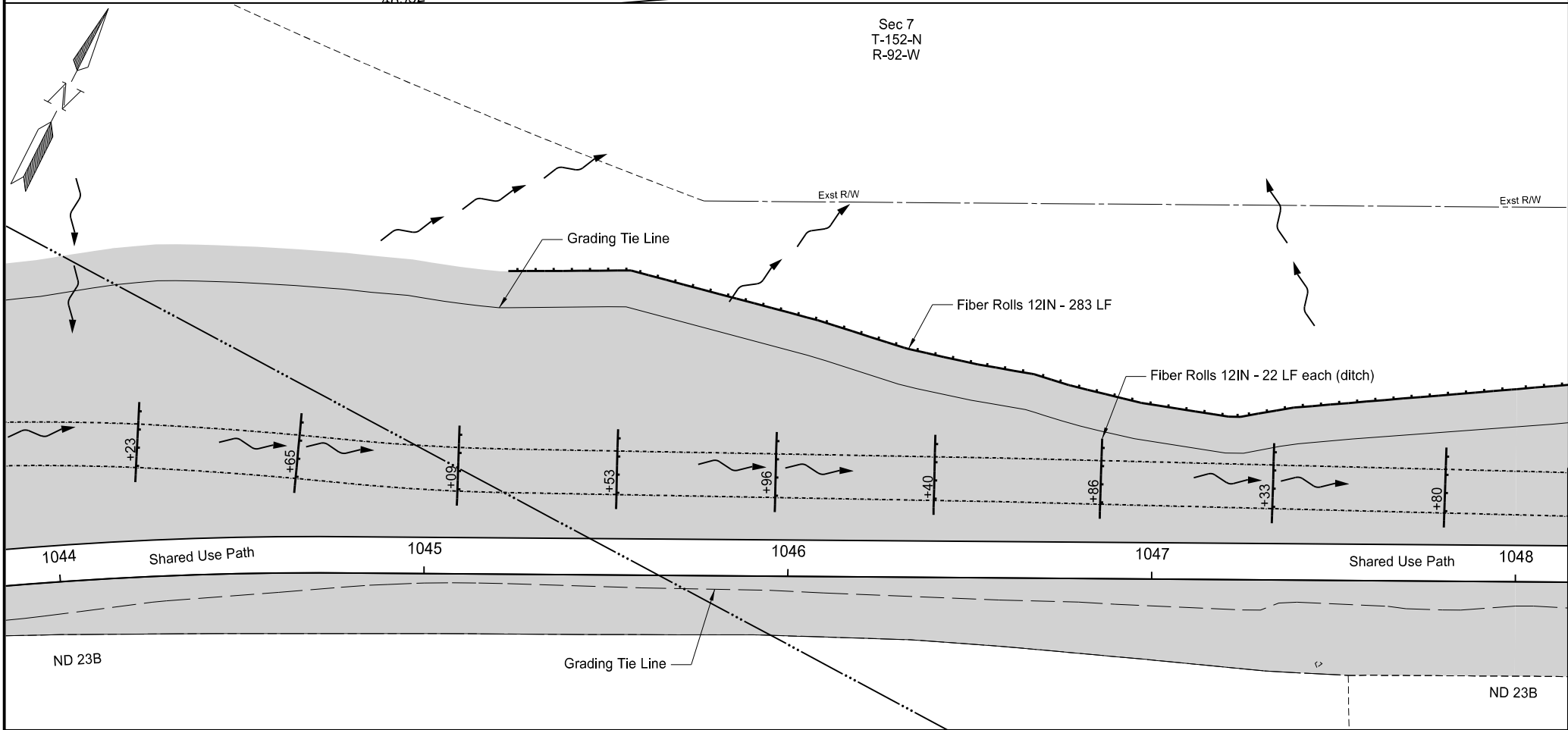
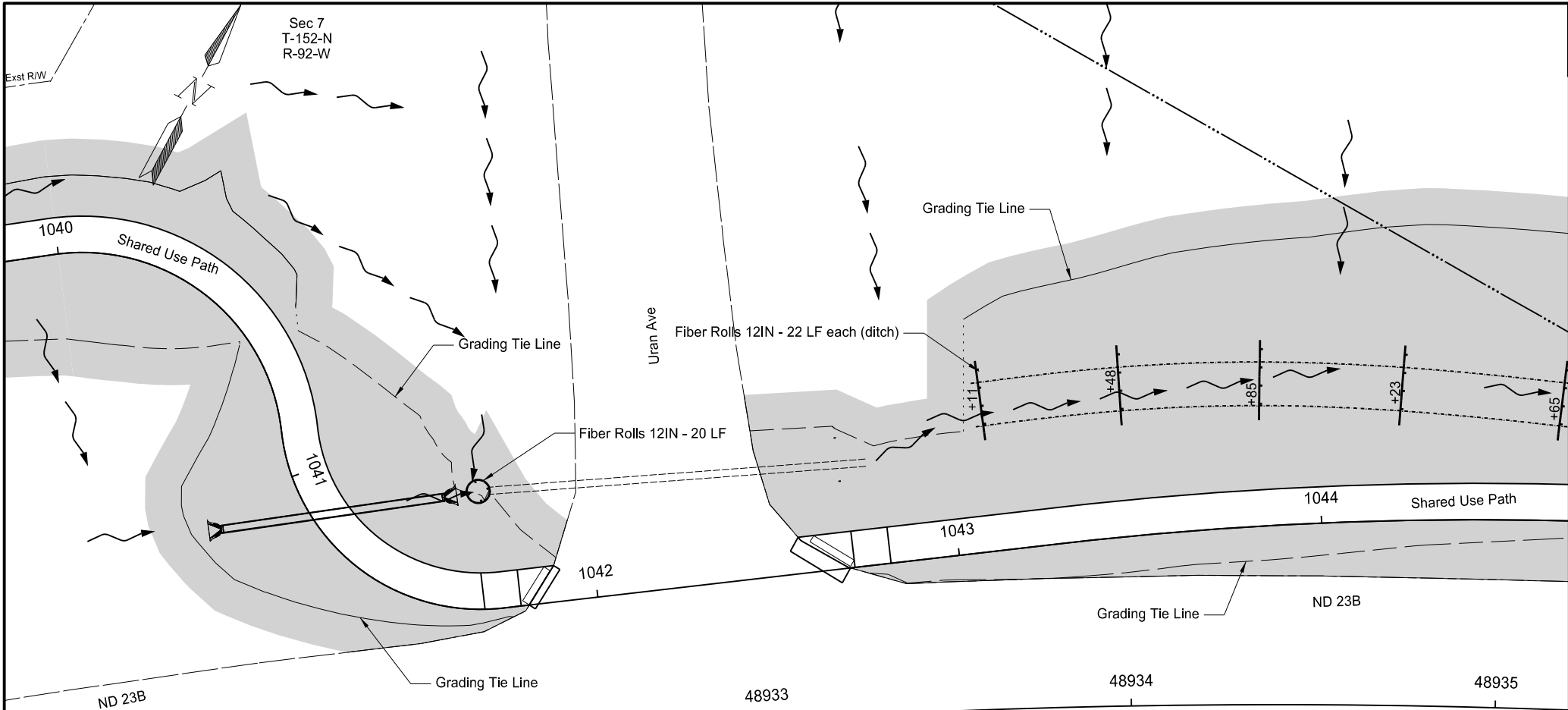
Ditch

Permanent Erosion Control

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

1032+00 to 1040+00





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-7-023(069)926	77	6

SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	200	SEEDING CLASS II 1040+00 to 1048+00	ACRE	1.21
253	101	STRAW MULCH 1040+00 to 1048+00	ACRE	1.21
261	112	FIBER ROLLS 12IN 1041+73 - 32' Lt (culvert) 1043+11 to 1048+00 Lt (ditch) 1045+23 to 1048+00 Lt	LF LF LF	20 264 283

LEGEND

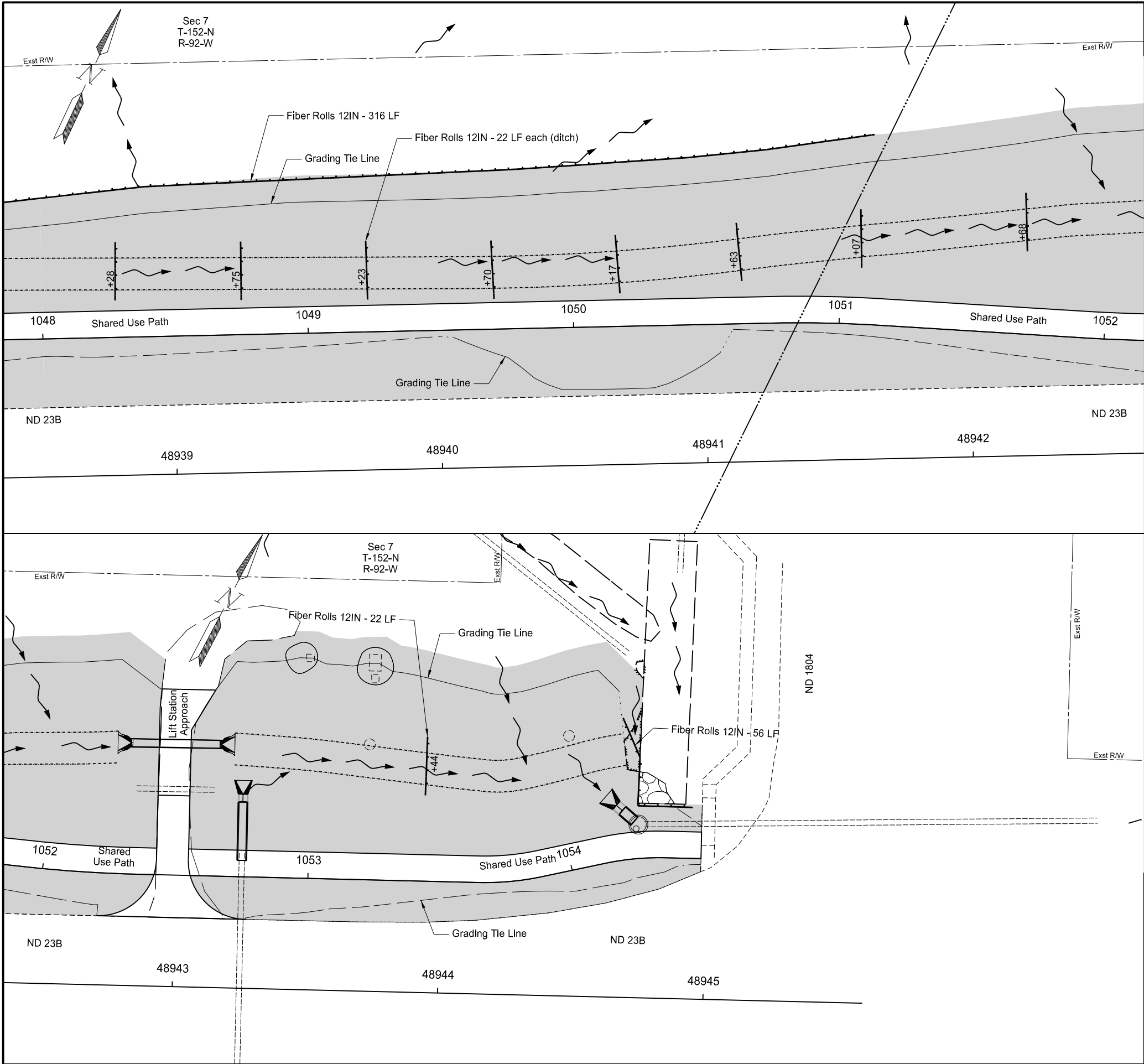
- Seeding Class II
Straw Mulch
- ECB Type 2
- Remove and Replace Riprap
- Fiber Rolls 12IN
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Ditch

Permanent Erosion Control

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

1040+00 to 1048+00





STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	TAC-7-023(069)926	77	7

SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	200	SEEDING CLASS II 1048+00 to 1054+48.94	ACRE	1.18
253	101	STRAW MULCH 1048+00 to 1054+48.94	ACRE	1.18
256	701	REMOVE AND REPLACE RIPRAP 1054+26 to 1054+39 Lt	CY	9
261	112	FIBER ROLLS 12IN 1048+00 to 1051+10 Lt 1048+00 to 1051+68 Lt (ditch) 1053+44 Lt (ditch) 1054+24 to 1054+45 Lt	LF LF LF LF	316 176 22 56
709	155	GEOSYNTHETIC MATERIAL TYPE RR 1054+26 to 1054+39 Lt	SY	13

LEGEND

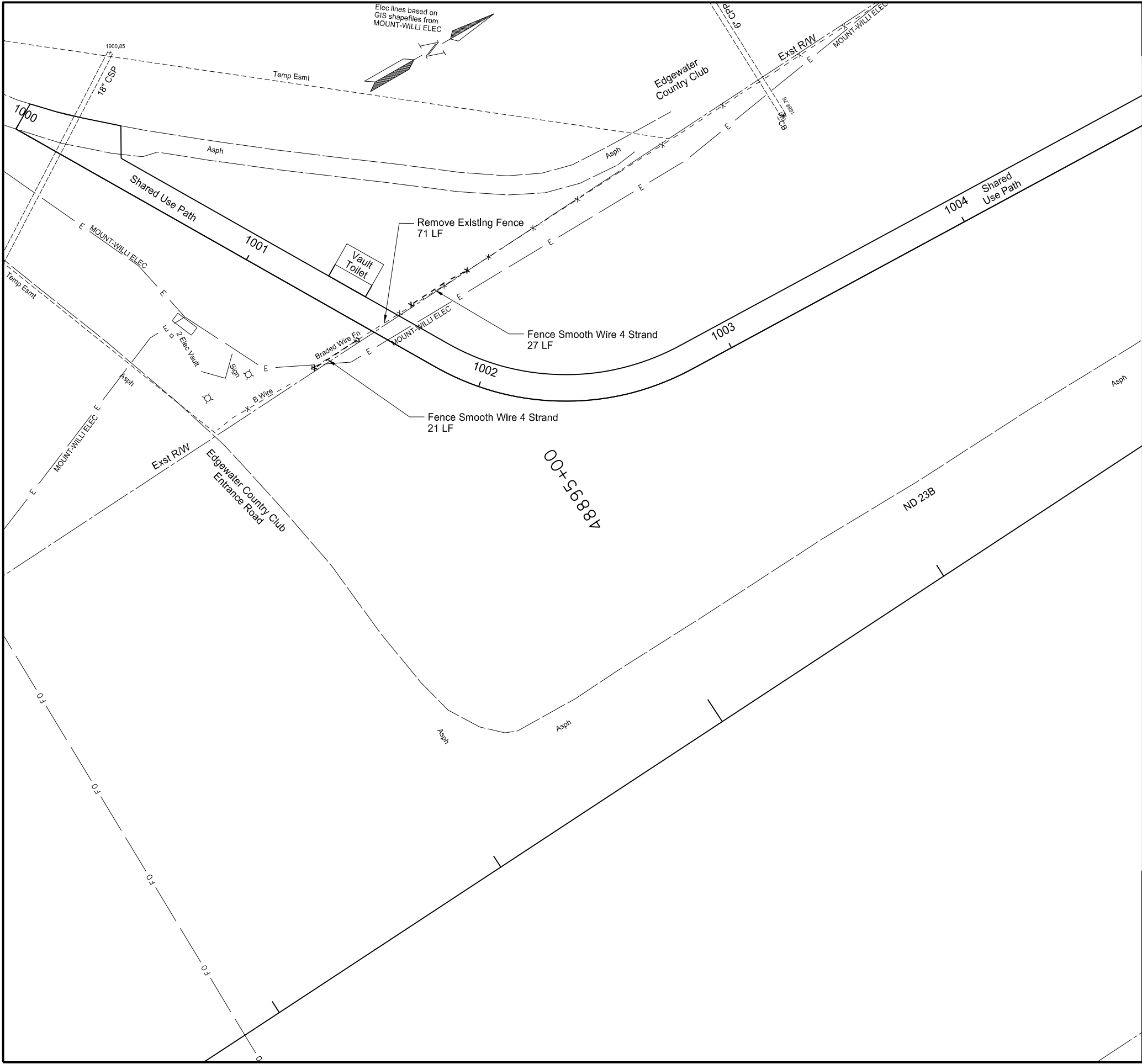
- Seeding Class II
Straw Mulch
- ECB Type 2
- Remove and Replace Riprap
- Fiber Rolls 12IN
- Grading Tie Line (Fill)
- Grading Tie Line (Cut)
- Grading Tie Line (Transition)
- Ditch

Permanent Erosion Control

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

1048+00 to 1054+48.94





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	80	1

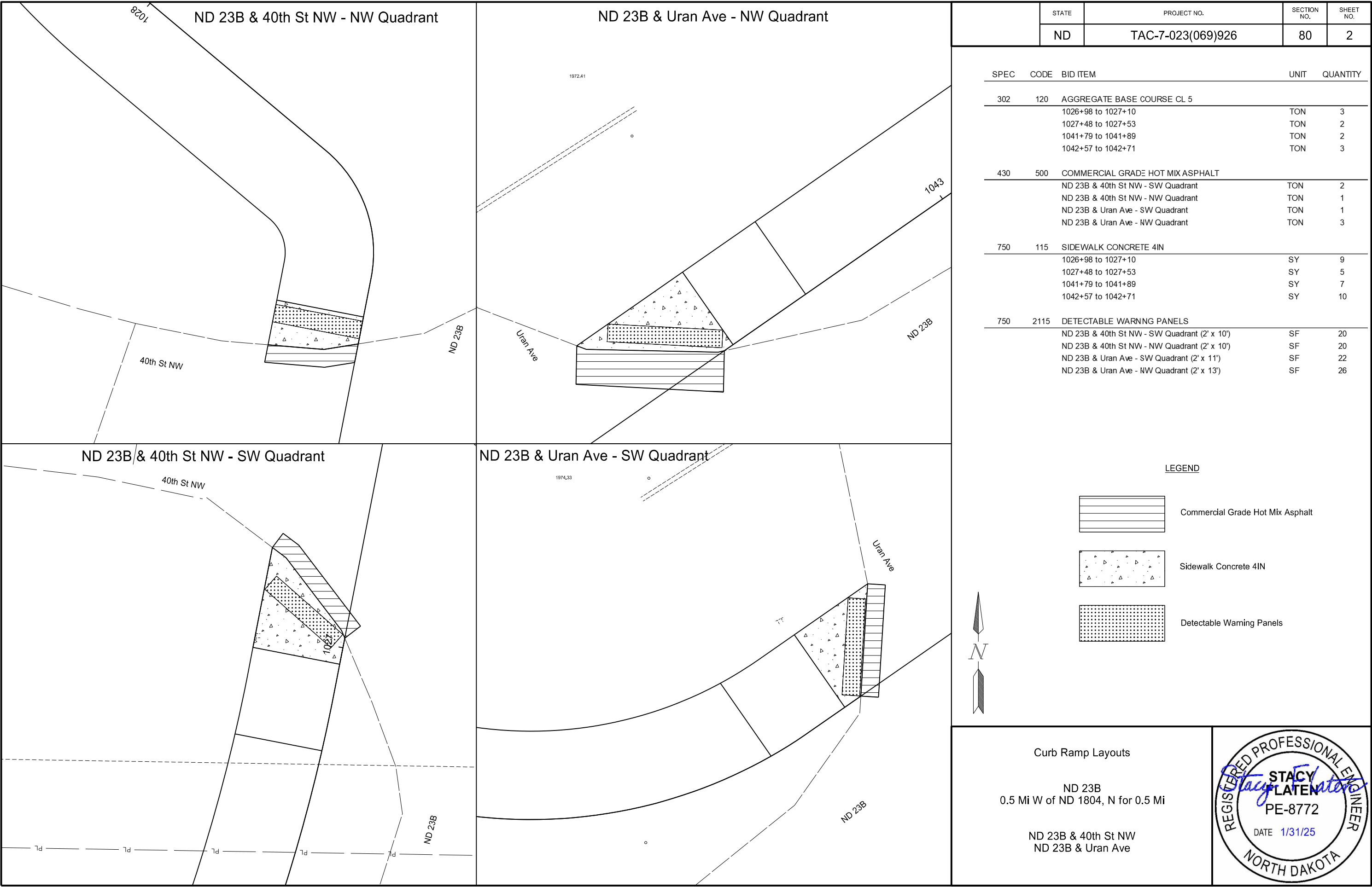
SPEC	CODE	BID ITEM	UNIT	QUANTITY
202	312	REMOVE EXISTING FENCE		
		1001+42.11 - 23.75' R: to 1001+74.97 - 38.42' Lt	LF	71
752	201	FENCE SMOOTH WIRE 4 STRAND		
		1001+42.11 - 23.75' R: to 1001+52 - 5' Rt	LF	21
		1001+62 - 15' Lt to 1001+74.97 - 38.42' Lt	LF	27
752	993	FENCE TERMINAL		
		1001+42.11 - 23.75' R:	EA	1
		1001+52 - 5' Rt	EA	1
		1001+62 - 15' Lt	EA	1
		1001+74.97 - 38.42' Lt	EA	1

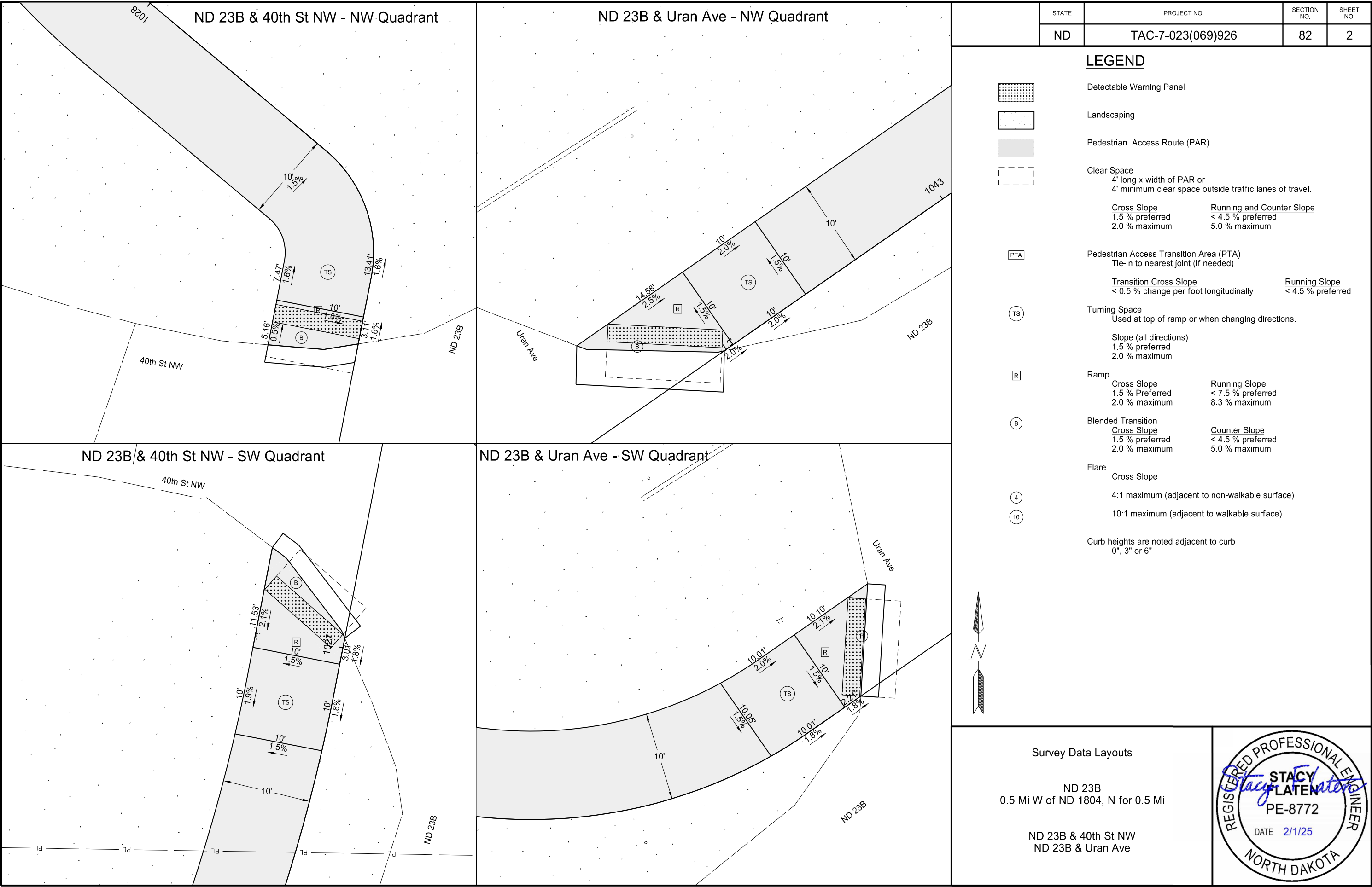
Fencing Layout

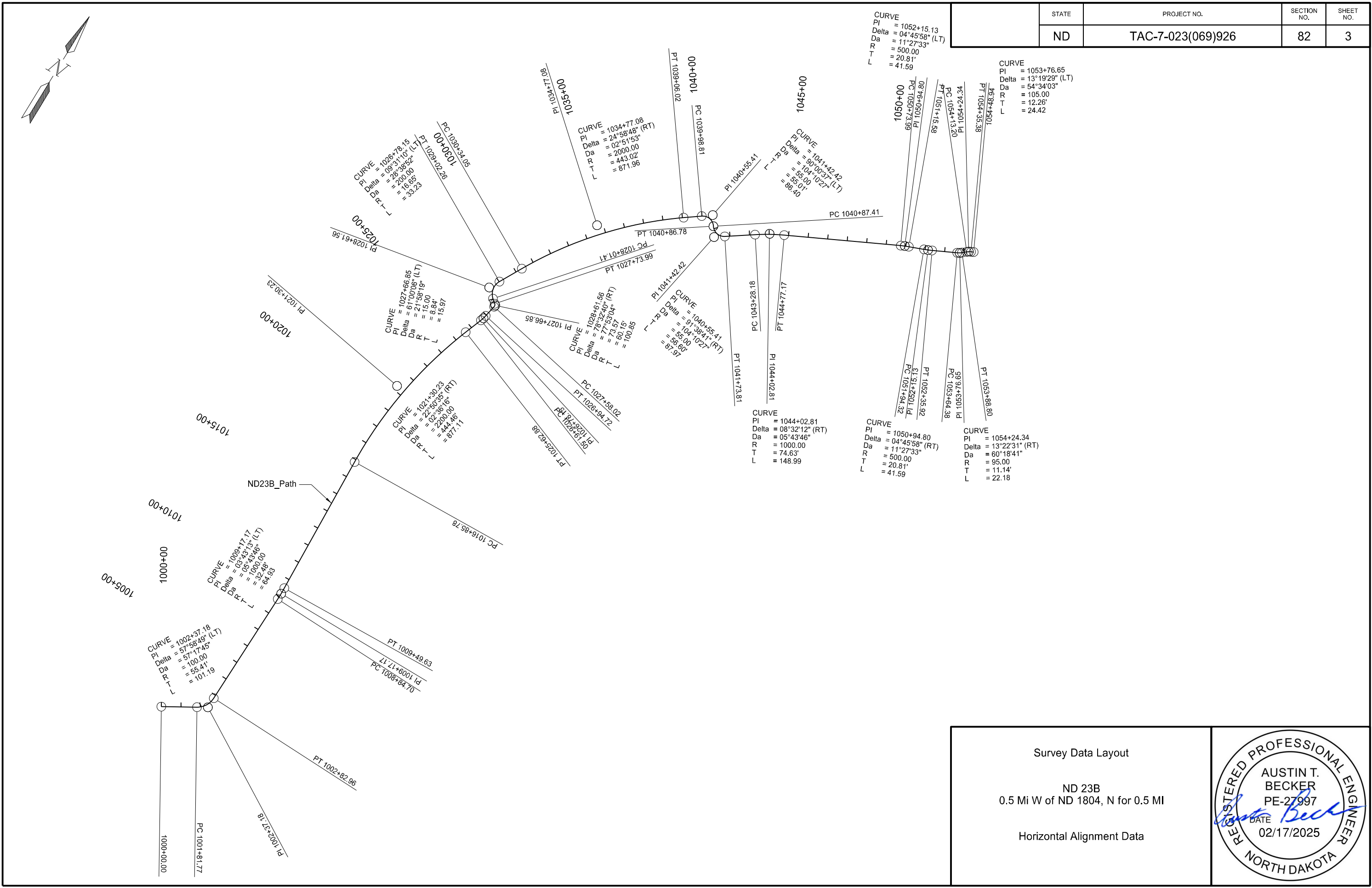
ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

1000+00 to 1004+00









	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	82	4

		Alignment Name:	ND23B_Path		
		Alignment Description:	PPSD Path Alignment		
		Alignment Style:	Alignment\Horizontal\	Small Scale\	Alignment 1 S
			Station	Northing	Easting
Element: Linear					
	START	()	1000+00.000 R1	365956.799	1477407.8
	PC	()	1001+81.770 R1	366049.357	1477564.239
		Tangential Direction:	N59.389°E		
		Tangential Length:	181.77		
Element: Circular					
	PC	()	1001+81.770 R1	366049.357	1477564.239
	COMBINATION PI	()	1002+37.178 R1	366077.571	1477611.926
	CC	()		366135.421	1477513.319
	PT	()	1002+82.965 R1	366132.963	1477613.289
		Radius:	100		
		Delta:	57.980°	Left	
		Degree of Curvature (Arc):	57.296°		
		Length:	101.195		
		Tangent:	55.408		
		Chord:	96.932		
		Middle Ordinate:	12.53		
		External:	14.325		
		Back Tangent Direction:	N59.389°E		
		Back Radial Direction:	S30.611°E		
		Chord Direction:	N30.399°E		
		Ahead Radial Direction:	S88.591°E		
		Ahead Tangent Direction:	N1.409°E		
Element: Linear					
	PT	()	1002+82.965 R1	366132.963	1477613.289
	PC	()	1008+84.697 R1	366734.513	1477628.083
		Tangential Direction:	N1.409°E		
		Tangential Length:	601.732		
Element: Circular					
	PC	()	1008+84.697 R1	366734.513	1477628.083
	COMBINATION PI	()	1009+17.173 R1	366766.979	1477628.881
	CC	()		366759.099	1476628.385
	PT	()	1009+49.626 R1	366799.429	1477627.572
		Radius:	1000		
		Delta:	3.720°	Left	
		Degree of Curvature (Arc):	5.730°		
		Length:	64.929		
		Tangent:	32.476		
		Chord:	64.917		
		Middle Ordinate:	0.527		
		External:	0.527		
		Back Tangent Direction:	N1.409°E		
		Back Radial Direction:	S88.591°E		
		Chord Direction:	N0.451°W		
		Ahead Radial Direction:	N87.689°E		
		Ahead Tangent Direction:	N2.311°W		
Element: Linear					
	PT	()	1009+49.626 R1	366799.429	1477627.572
	PC	()	1016+85.779 R1	367534.982	1477597.883
		Tangential Direction:	N2.311°W		
		Tangential Length:	736.153		

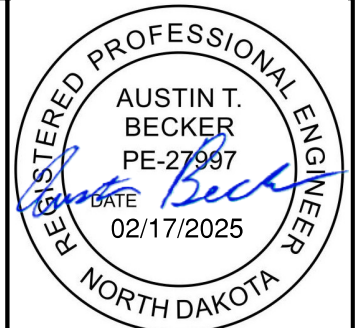
		Station	Northing	Easting
Element: Circular				
PC	()	1016+85.779 R1	367534.982	1477597.883
COMBINATION PI	()	1021+30.234 R1	367979.076	1477579.958
CC	()		367623.707	1479796.093
PT	()	1025+62.884 R1	368395.299	1477735.84
	Radius:	2200		
	Delta:	22.843°	Right	
	Degree of Curvature (Arc):	2.604°		
	Length:	877.105		
	Tangent:	444.455		
	Chord:	871.308		
	Middle Ordinate:	43.566		
	External:	44.447		
	Back Tangent Direction:	N2.311°W		
	Back Radial Direction:	N87.689°E		
	Chord Direction:	N9.110°E		
	Ahead Radial Direction:	S69.468°E		
	Ahead Tangent Direction:	N20.532°E		
Element: Linear				
PT	()	1025+62.884 R1	368395.299	1477735.84
PC	()	1026+61.495 R1	368487.647	1477770.425
	Tangential Direction:	N20.532°E		
	Tangential Length:	98.612		
Element: Circular				
PC	()	1026+61.495 R1	368487.647	1477770.425
COMBINATION PI	()	1026+78.148 R1	368503.242	1477776.266
CC	()		368557.792	1477583.129
PT	()	1026+94.725 R1	368519.589	1477779.447
	Radius:	200		
	Delta:	9.519°	Left	
	Degree of Curvature (Arc):	28.648°		
	Length:	33.229		
	Tangent:	16.653		
	Chord:	33.191		
	Middle Ordinate:	0.69		
	External:	0.692		
	Back Tangent Direction:	N20.532°E		
	Back Radial Direction:	S69.468°E		
	Chord Direction:	N15.772°E		
	Ahead Radial Direction:	S78.988°E		
	Ahead Tangent Direction:	N11.012°E		
Element: Linear				
PT	()	1026+94.725 R1	368519.589	1477779.447
COMBINATION PI	()	1027+58.016 R1	368581.714	1477791.536
	Tangential Direction:	N11.012°E		
	Tangential Length:	63.291		
Element: Circular				
PC	()	1027+58.016 R1	368581.714	1477791.536
COMBINATION PI	()	1027+66.852 R1	368590.388	1477793.224
CC	()		368584.580	1477776.812
PT	()	1027+73.986 R1	368596.069	1477786.456
	Radius:	15		
	Delta:	61.002°	Left	
	Degree of Curvature (Arc):	21.972°		
	Length:	15.97		
	Tangent:	8.836		
	Chord:	15.227		
	Middle Ordinate:	2.076		
	External:	2.409		
	Back Tangent Direction:	N11.012°E		
	Back Radial Direction:	S78.988°E		
	Chord Direction:	N19.489°W		
	Ahead Radial Direction:	N40.010°E		
	Ahead Tangent Direction:	N49.990°W		

			Station	Northing	Easting
Element: Linear					
	PT	()	1027+73.986 R1	368596.069	1477786.456
	PC	()	1028+01.408 R1	368613.699	1477765.453
		Tangential Direction:	N49.990°W		
		Tangential Length:	27.422		
Element: Circular					
	PC	()	1028+01.408 R1	368613.699	1477765.453
COMBINATION	PI	()	1028+61.561 R1	368652.373	1477719.380
	CC	()		368670.044	1477812.750
	PT	()	1029+02.255 R1	368705.208	1477748.133
		Radius:	73.565		
		Delta:	78.544°	Right	
		Degree of Curvature (Arc):	77.885°		
		Length:	100.847		
		Tangent:	60.153		
		Chord:	93.134		
		Middle Ordinate:	16.615		
		External:	21.462		
		Back Tangent Direction:	N49.990°W		
		Back Radial Direction:	N40.010°E		
		Chord Direction:	N10.717°W		
		Ahead Radial Direction:	S61.445°E		
		Ahead Tangent Direction:	N28.555°E		
Element: Linear					
	PT	()	1029+02.255 R1	368705.208	1477748.133
	PC	()	1030+34.054 R1	368820.976	1477811.133
		Tangential Direction:	N28.555°E		
		Tangential Length:	131.799		
Element: Circular					
	PC	()	1030+34.054 R1	368820.976	1477811.133
COMBINATION	PI	()	1034+77.076 R1	369210.108	1478022.897
	CC	()		367864.977	1479567.854
	PT	()	1039+06.019 R1	369473.412	1478379.183
		Radius:	2000		
		Delta:	24.980°	Right	
		Degree of Curvature (Arc):	2.865°		
		Length:	871.964		
		Tangent:	443.022		
		Chord:	865.075		
		Middle Ordinate:	47.332		
		External:	48.48		
		Back Tangent Direction:	N28.555°E		
		Back Radial Direction:	S61.445°E		
		Chord Direction:	N41.045°E		
		Ahead Radial Direction:	S36.465°E		
		Ahead Tangent Direction:	N53.535°E		
Element: Linear					
	PT	()	1039+06.019 R1	369473.412	1478379.183
	PC	()	1039+98.808 R1	369528.56	1478453.807
		Tangential Direction:	N53.535°E		
		Tangential Length:	92.79		

Survey Data Layout

ND 23B
0.5 Mi W of ND 1804, N for 0.5 MI

Horizontal Alignment Data

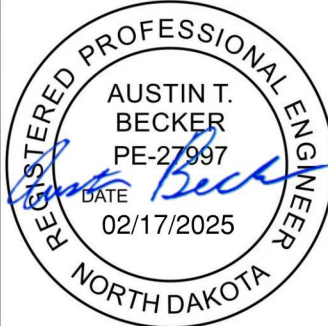


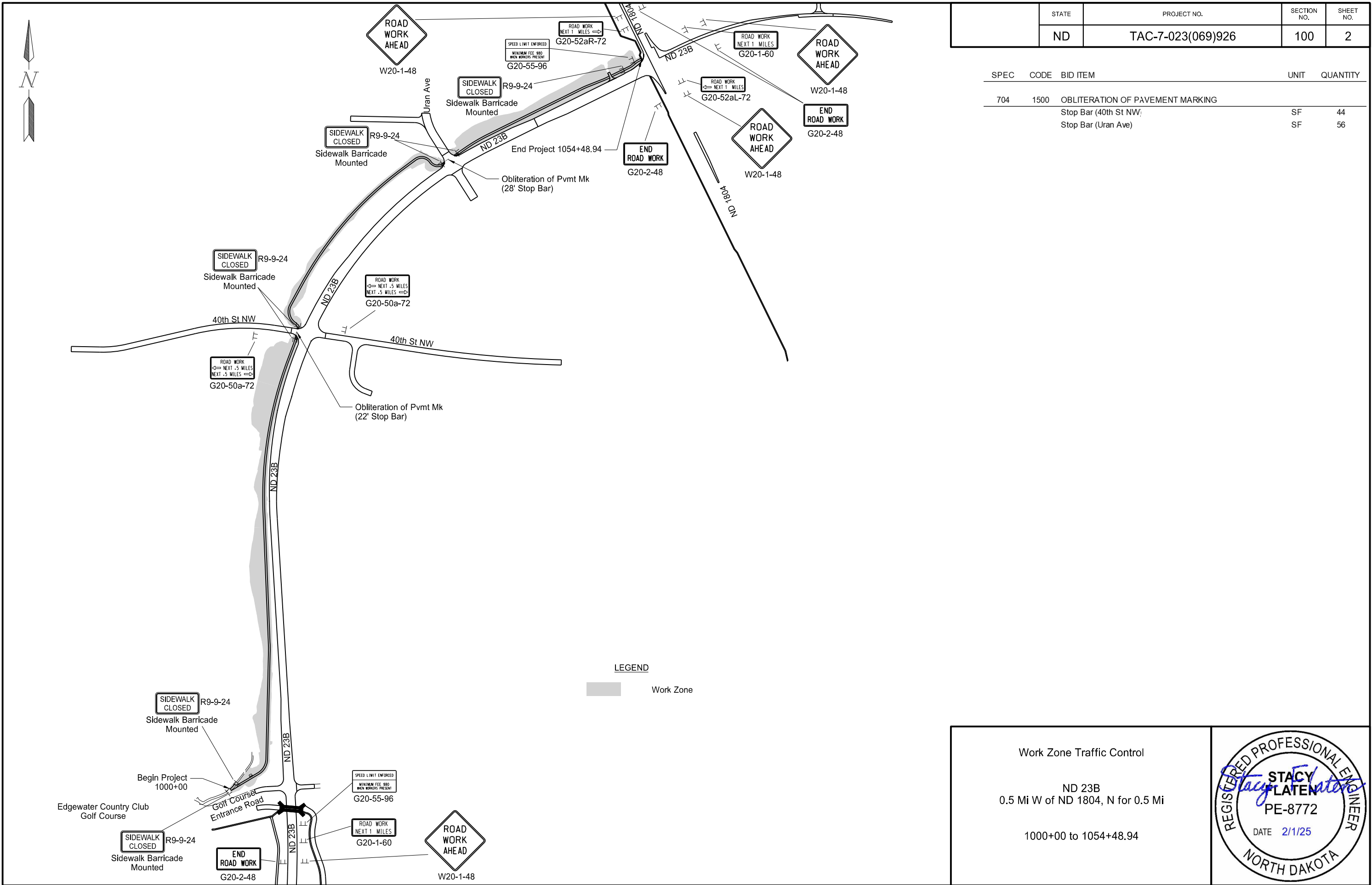
											STATE	PROJECT NO.			SECTION NO.	SHEET NO.			
											ND	TAC-7-023(069)926			82	5			
													Station	Northing	Easting				
Element: Circular																			
PC																			
COMBINATION PI																			
CC																			
PT																			
Radius:																			
Delta:																			
Degree of Curvature (Arc):																			
Length:																			
Tangent:																			
Chord:																			
Middle Ordinate:																			
External:																			
Back Tangent Direction:																			
Back Radial Direction:																			
Chord Direction:																			
Ahead Radial Direction:																			
Ahead Tangent Direction:																			
Element: Linear																			
PT																			
PC																			
Tangential Direction:																			
Tangential Length:																			
Element: Circular																			
PC																			
COMBINATION PI																			
CC																			
PT																			
Radius:																			
Delta:																			
Degree of Curvature (Arc):																			
Length:																			
Tangent:																			
Chord:																			
Middle Ordinate:																			
External:																			
Back Tangent Direction:																			
Back Radial Direction:																			
Chord Direction:																			
Ahead Radial Direction:																			
Ahead Tangent Direction:																			
Element: Linear																			
PT																			
PC																			
Tangential Direction:																			
Tangential Length:																			
Element: Circular																			
PC																			
COMBINATION PI																			
CC																			
PT																			
Radius:																			
Delta:																			
Degree of Curvature (Arc):																			
Length:																			
Tangent:																			
Chord:																			
Middle Ordinate:																			
External:																			
Back Tangent Direction:																			
Back Radial Direction:																			
Chord Direction:																			
Ahead Radial Direction:																			
Ahead Tangent Direction:																			
Element: Linear																			
PT																			
PC																			
Tangential Direction:																			
Tangential Length:																			
Element: Circular																			
PC																			
COMBINATION PI																			
CC																			
PT																			
Radius:																			
Delta:																			
Degree of Curvature (Arc):																			
Length:																			
Tangent:																			
Chord:																			
Middle Ordinate:																			
External:																			
Back Tangent Direction:																			
Back Radial Direction:																			
Chord Direction:																			
Ahead Radial Direction:																			
Ahead Tangent Direction:																			
Element: Linear																			
PT																			
PC																			
Tangential Direction:																			
Tangential Length:																			
Element: Circular																			
PC																			
COMBINATION PI																			
CC																			
PT																			
Radius:																			
Delta:																			
Degree of Curvature (Arc):																			
Length:																			
Tangent:																			
Chord:																			
Middle Ordinate:																			
External:																			
Back Tangent Direction:																			

Survey Data Layout

ND 23B
0.5 Mi W of ND 1804, N for 0.5 MI

Horizontal Alignment Data





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	100	2

SPEC	CODE	BID ITEM	UNIT	QUANTITY
704	1500	OBLITERATION OF PAVEMENT MARKING		
		Stop Bar (40th St NW)	SF	44
		Stop Bar (Uran Ave)	SF	56

Work Zone Traffic Control

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

1000+00 to 1054+48.94

REGISTERED PROFESSIONAL ENGINEER

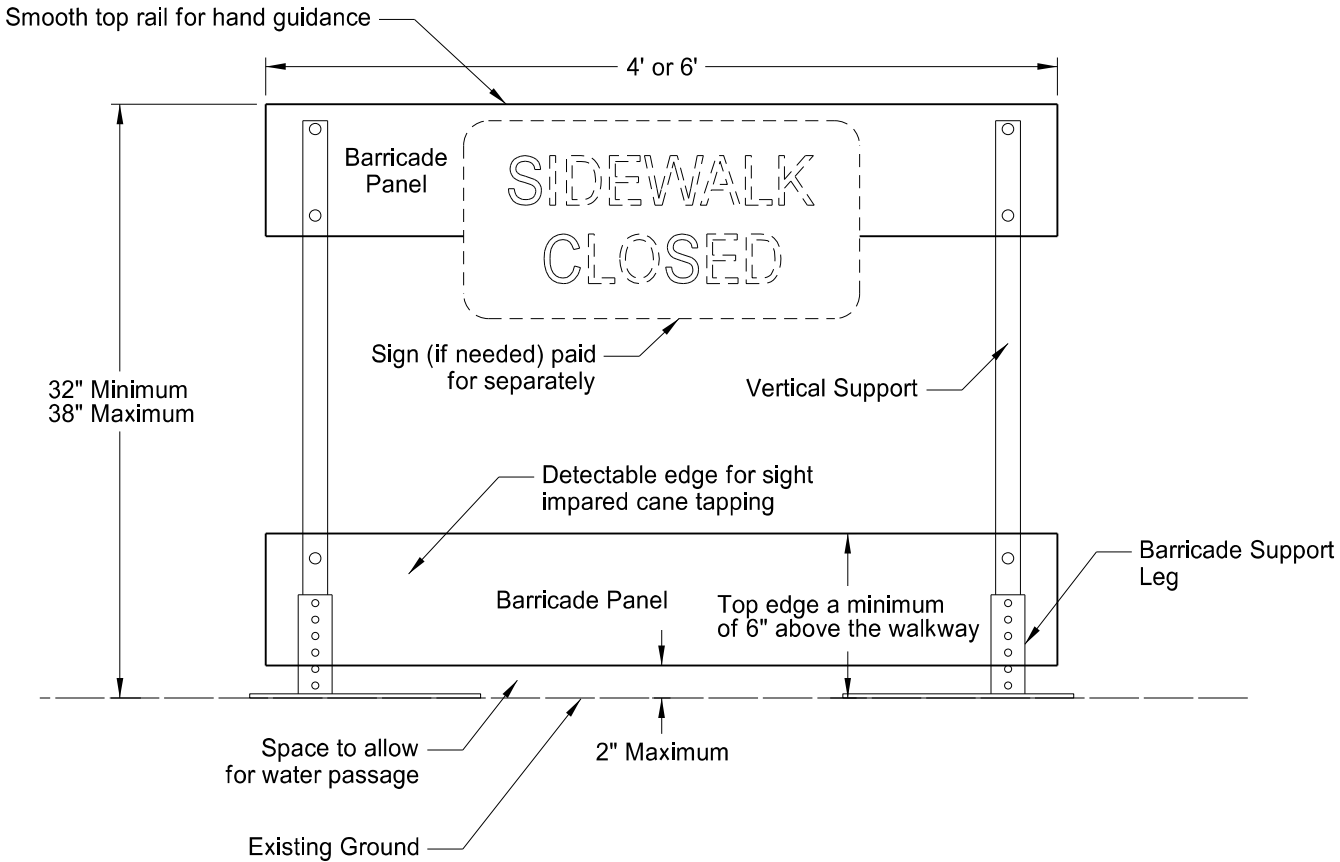
STACY FLATEN

PE-8772

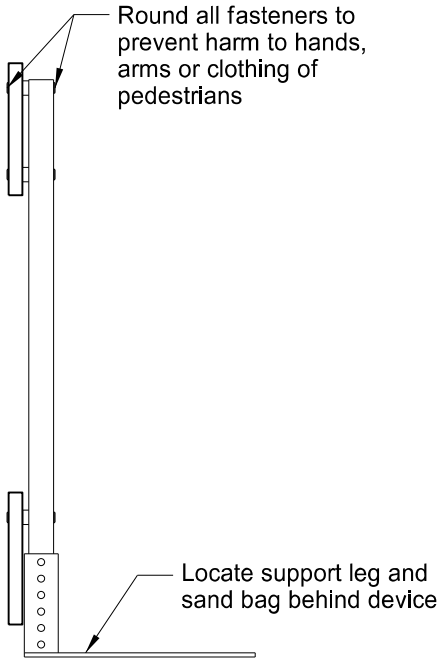
DATE 2/1/25

NORTH DAKOTA

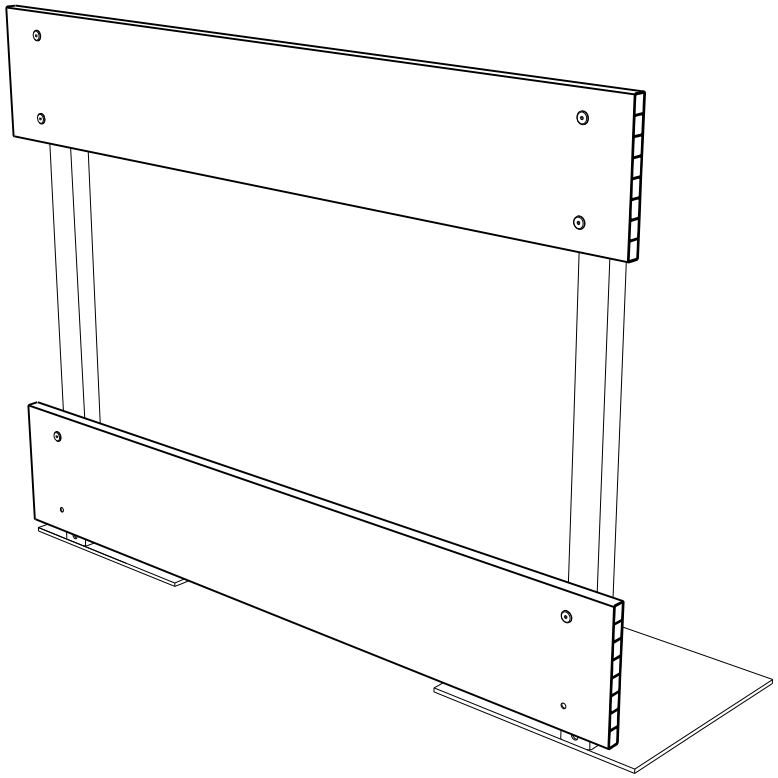
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	100	3



Front View



End View



Perspective View

NOTES:

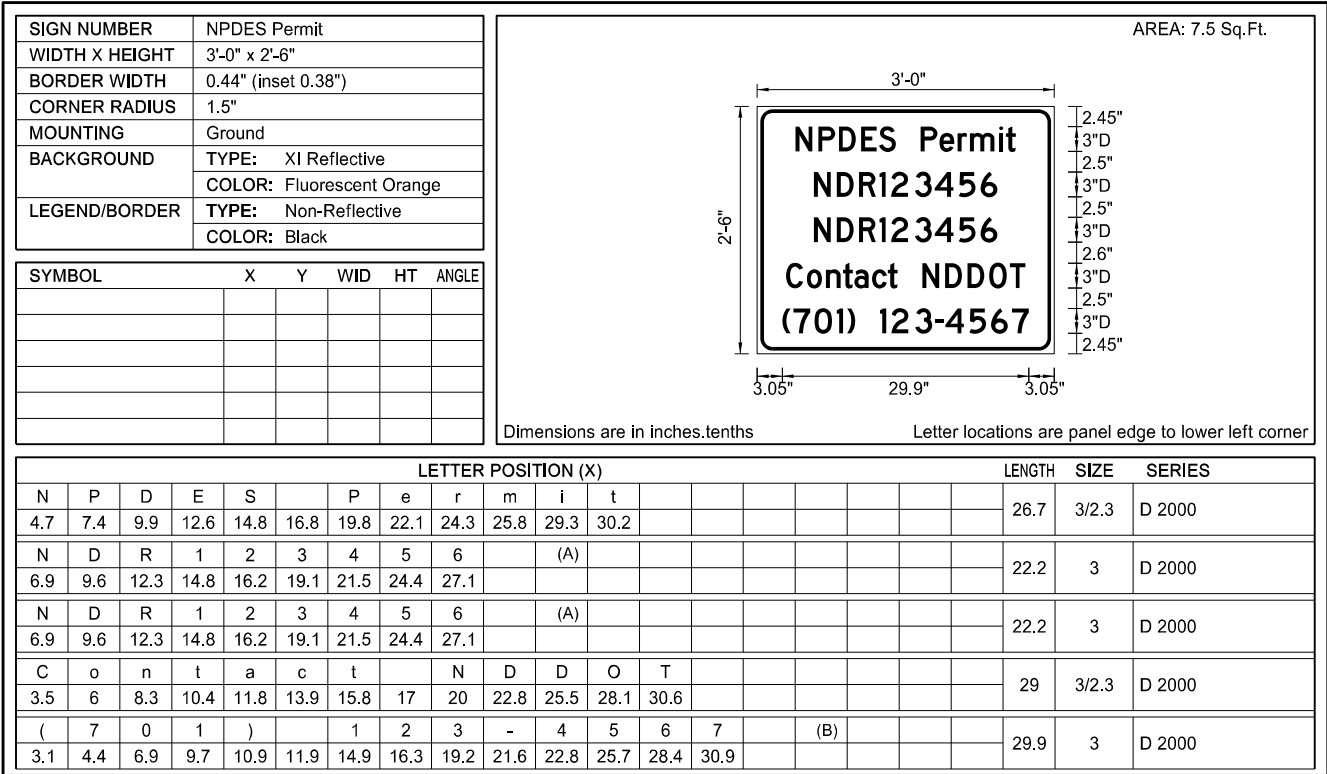
Sidewalk Barricades

1. Provide self standing sidewalk barricade with no supports extending into the pedestrians path.
2. Use orange or orange and white diagonal striped barricade panels contrasting with the walkway surface.
3. Provide ADA compliant and NCHRP 350 or Mash Test Level 3 (TL3) approved sidewalk barricades.
4. Include all costs to furnish, maintain and remove sidewalk barricades in the price bid for "Sidewalk Barricade".



Sidewalk Barricade

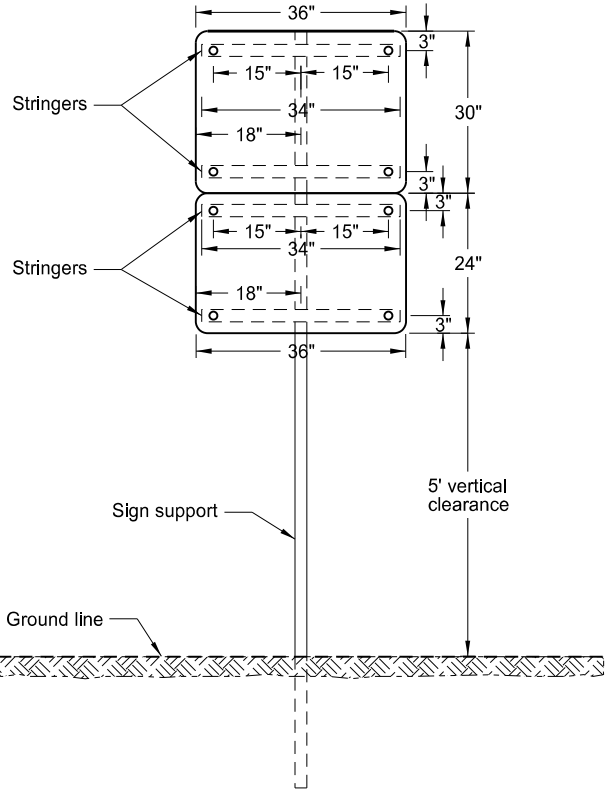
ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi



(A) Obtain NPDES Permit tracking numbers from the EPA Notice of Permit Coverage received by the Contractor and the NDDOT District.

(B) Obtain appropriate NDDOT-district phone number from project engineer.

Place one sign at each end of the project, near an accessible approach to allow traffic to safely access the sign without impeding traffic. Place sign 60' from roadway centerline, on the right hand side visible to traffic entering the project. Maximum of 2 signs per project.



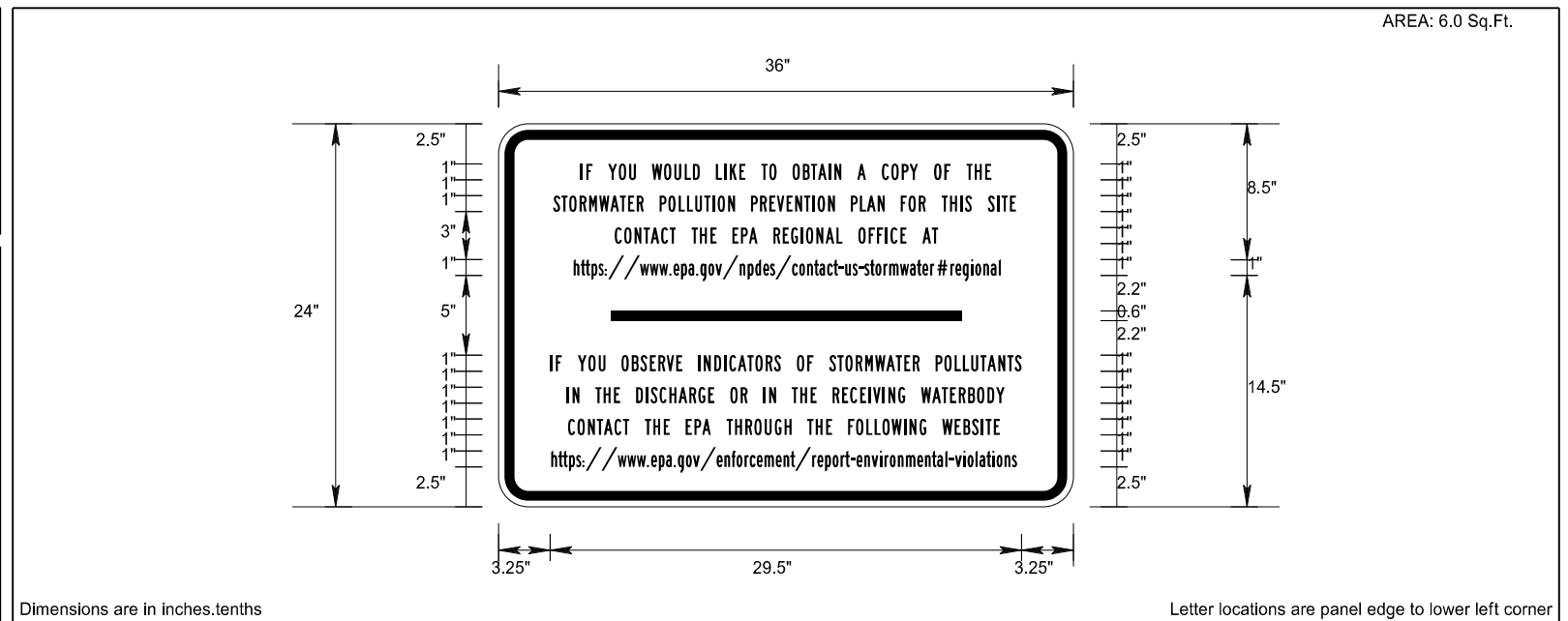
NPDES Permit Sign at construction site



Sign Details
ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi
NPDES Permit Sign

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	100	5

SIGN NUMBER	EPA Permit Notification
WIDTH X HEIGHT	3'-0" x 2'-0"
BORDER WIDTH	0.63" (inset 0.38")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: XI Reflective
	COLOR: Fluorescent Orange
LEGEND/BORDER	TYPE: Non-reflective
	COLOR: Black

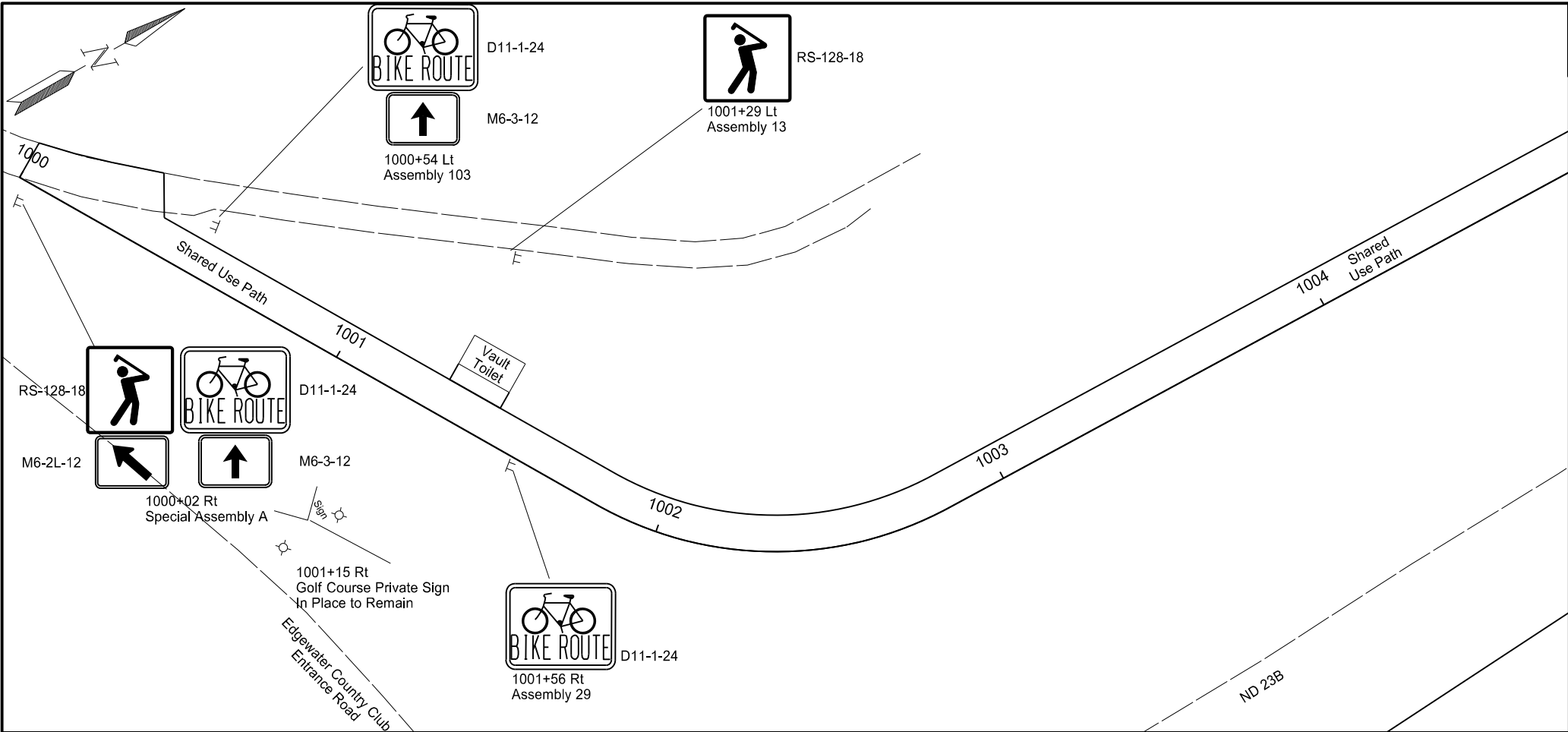
[illegible][illegible]

Sign Details

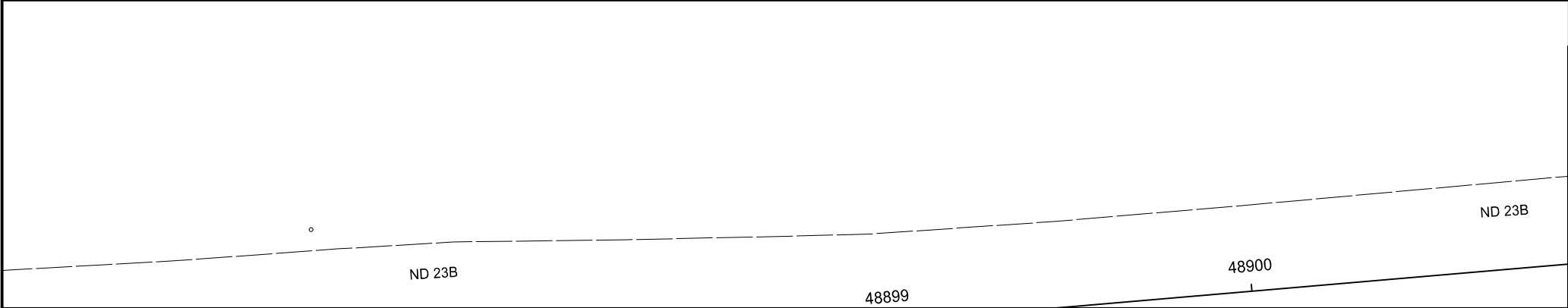
ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

EPA Permit Notification Sign

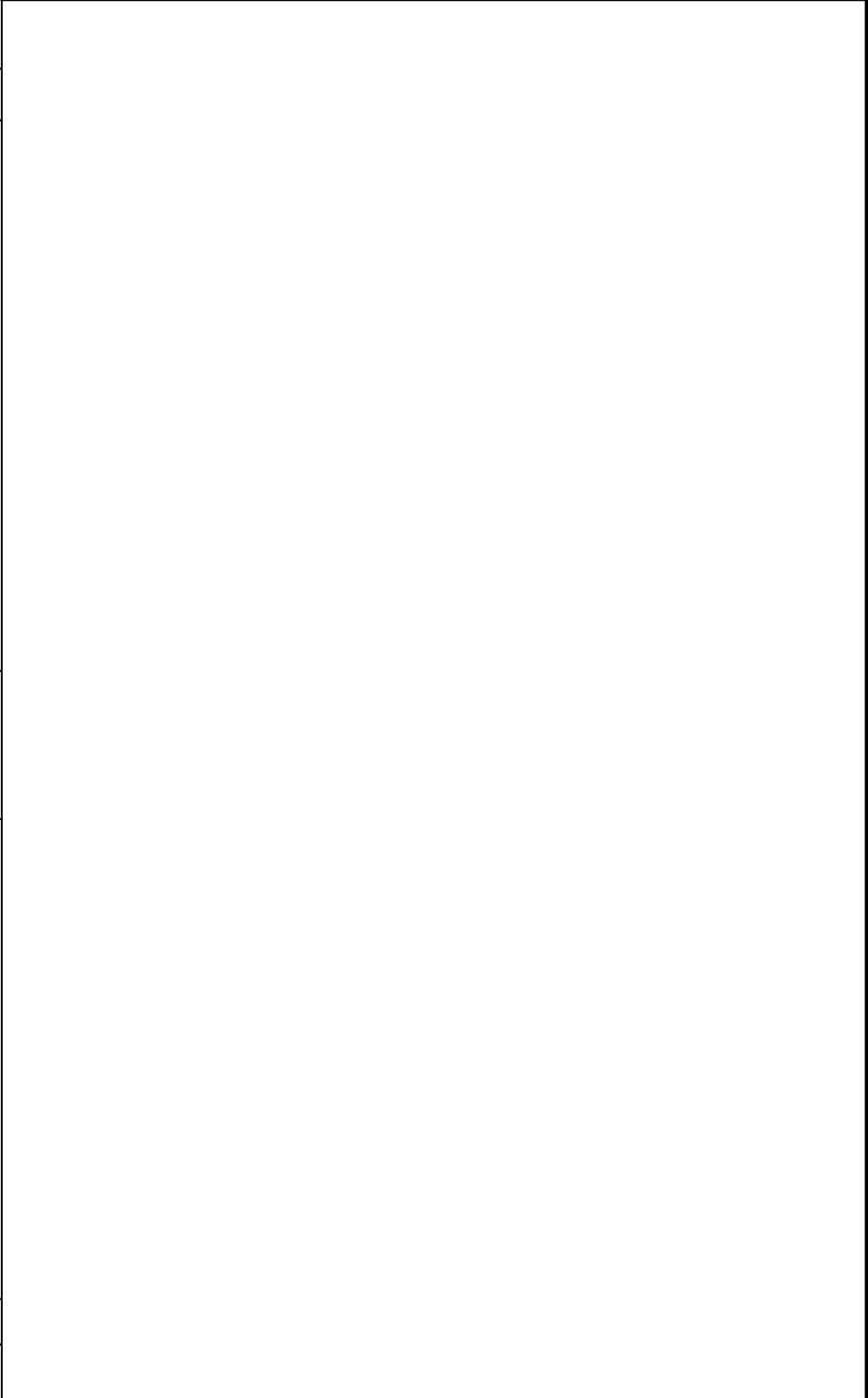
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1004 Shared Use Path 1005 1006 1007 Shared Use Path 1008



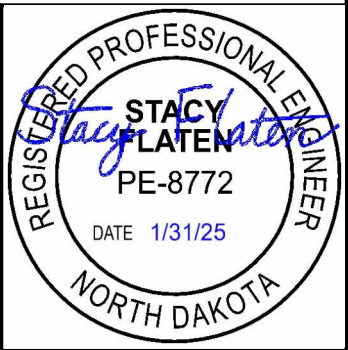
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	110	2

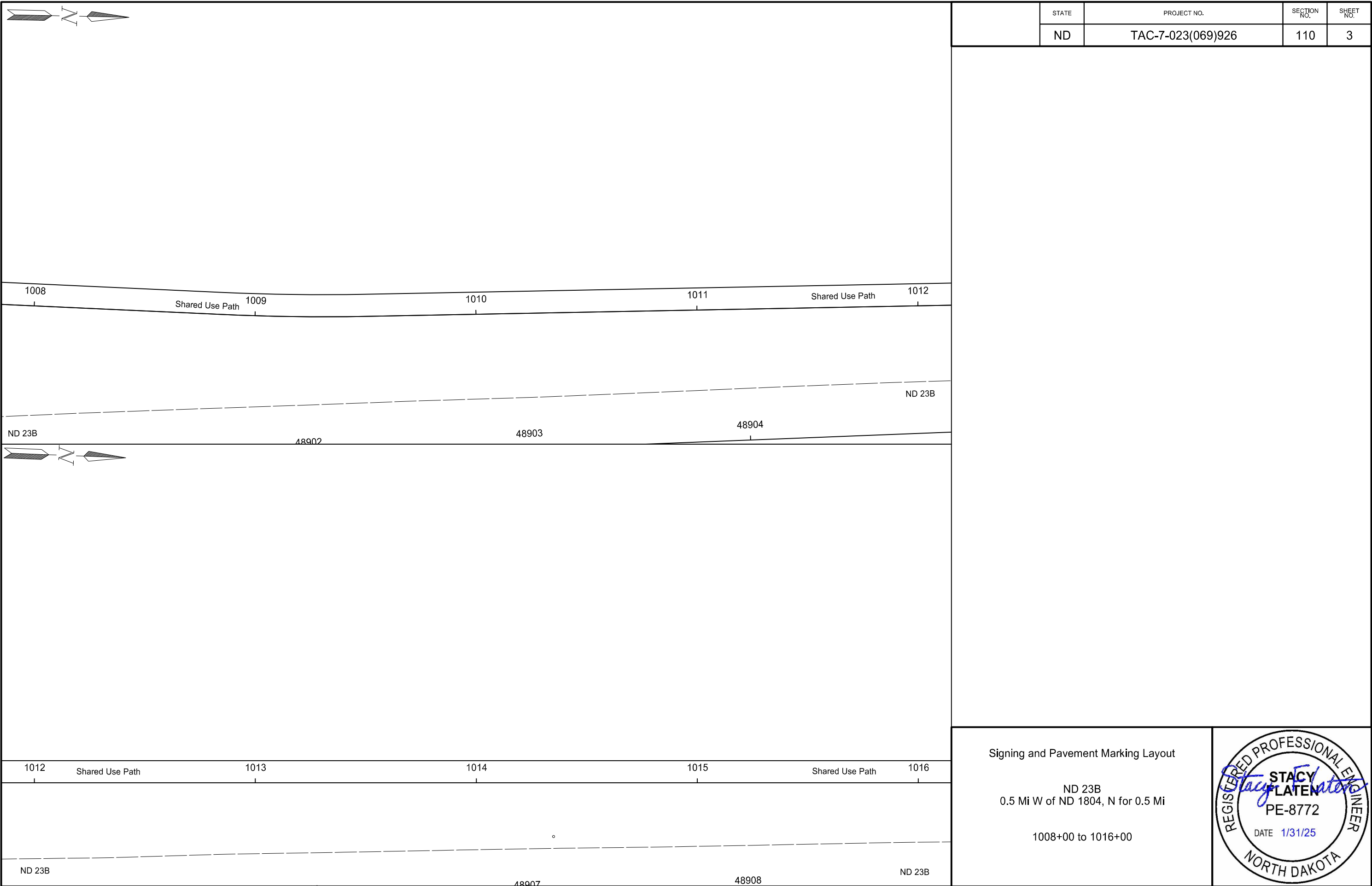


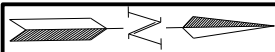
Signing and Pavement Marking Layout

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

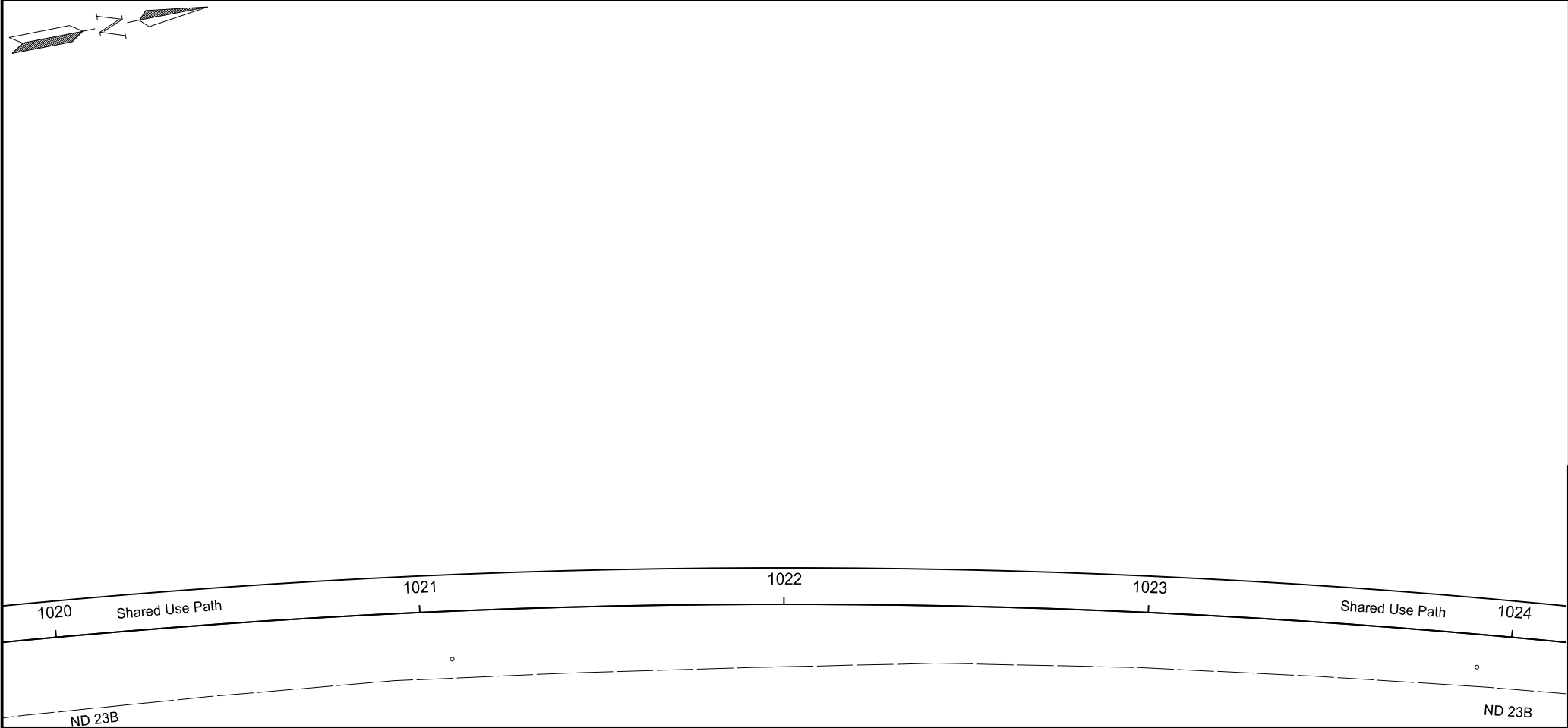
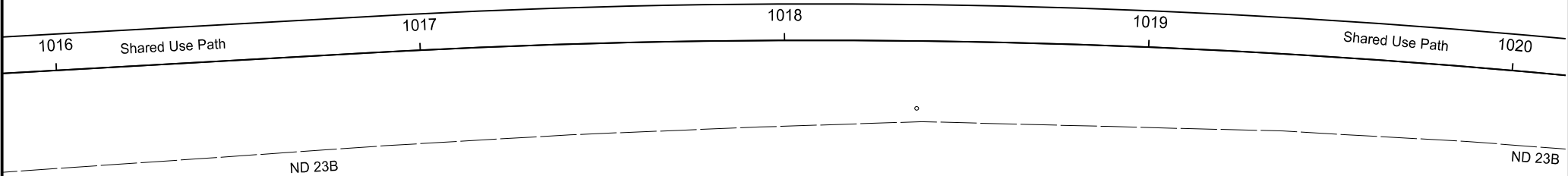
1000+00 to 1008+00







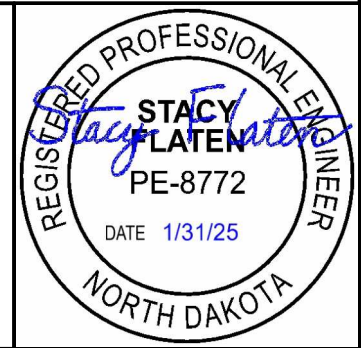
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	110	4

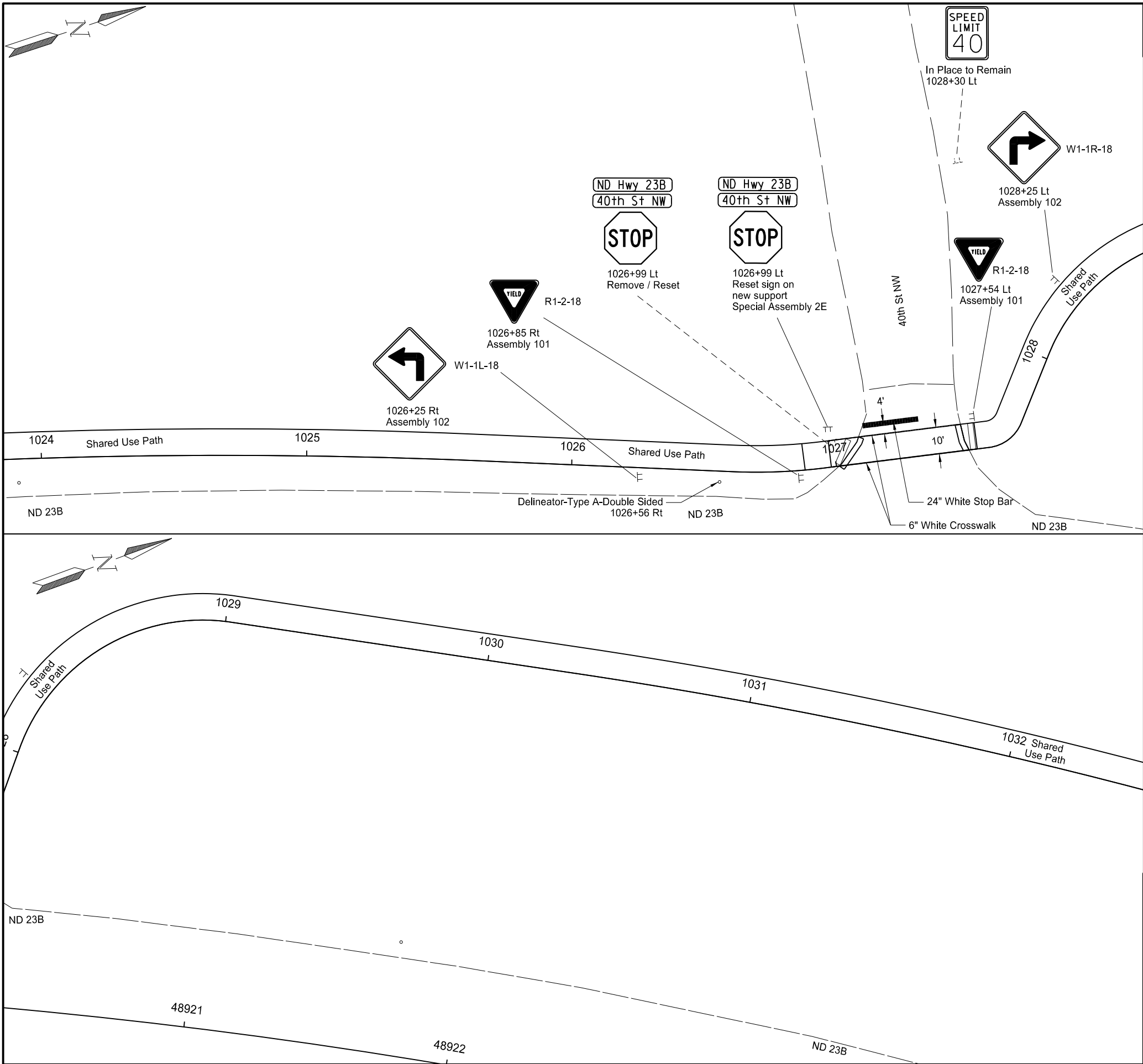


Signing and Pavement Marking Layout

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

1016+00 to 1024+00





		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	TAC-7-023(069)926	110	5
SPEC	CODE	BID ITEM		UNIT	QUANTITY
754	155	DELINEATORS-TYPE A-DOUBLE SIDED			
		1026+56 Rt		EA	1
762	114	EPOXY PVMT MK 6IN LINE			
		White Crosswalk		LF	88
762	117	EPOXY PVMT MK 24N LINE			
		Stop Bar		LF	22

Signing and Pavement Marking Layout

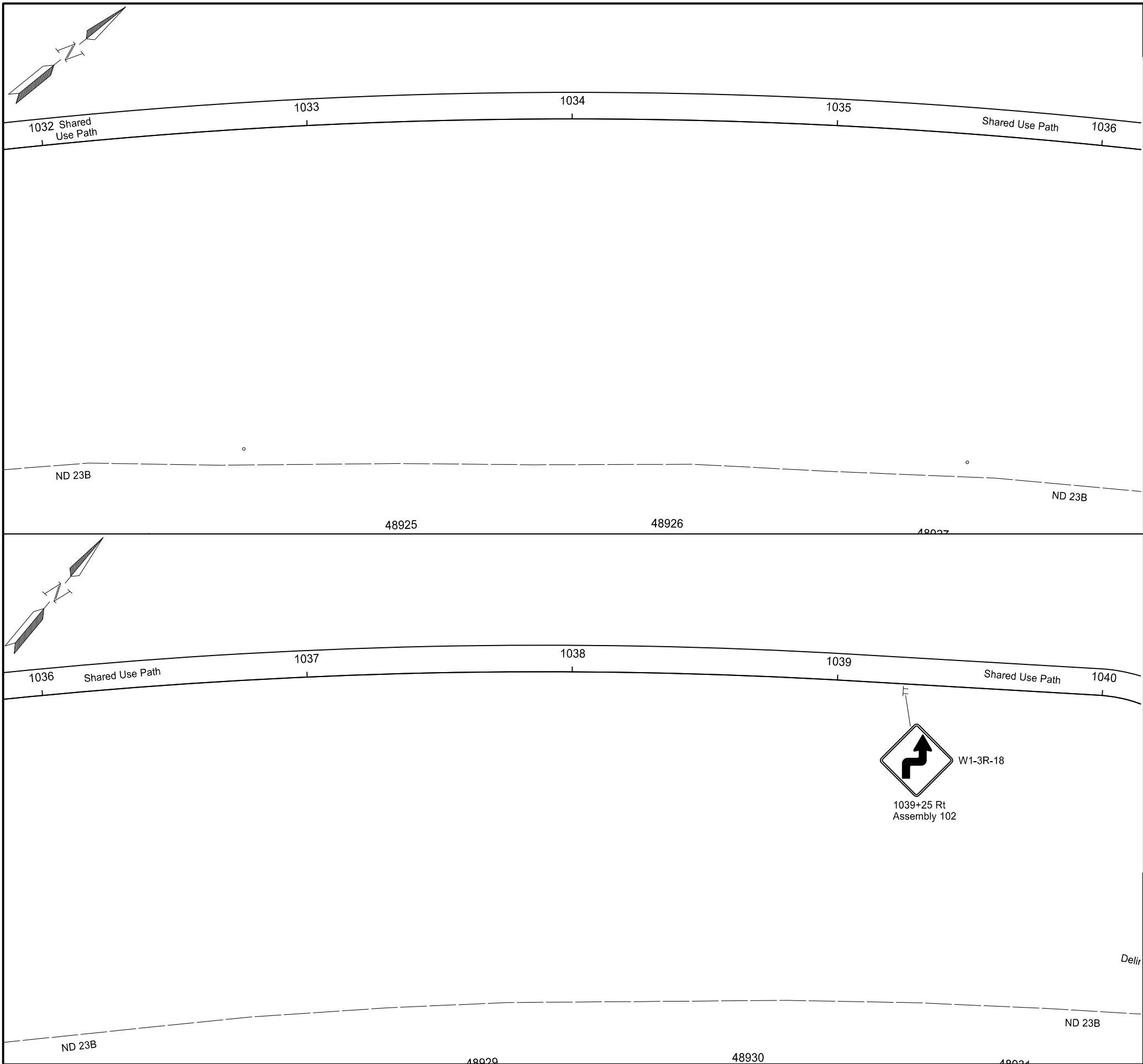
ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

1024+00 to 1032+00

REGISTERED PROFESSIONAL ENGINEER

STACY FLATEN
PE-8772
DATE 1/31/25

NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	110	6

Signing and Pavement Marking Layout

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

1032+00 to 1040+00

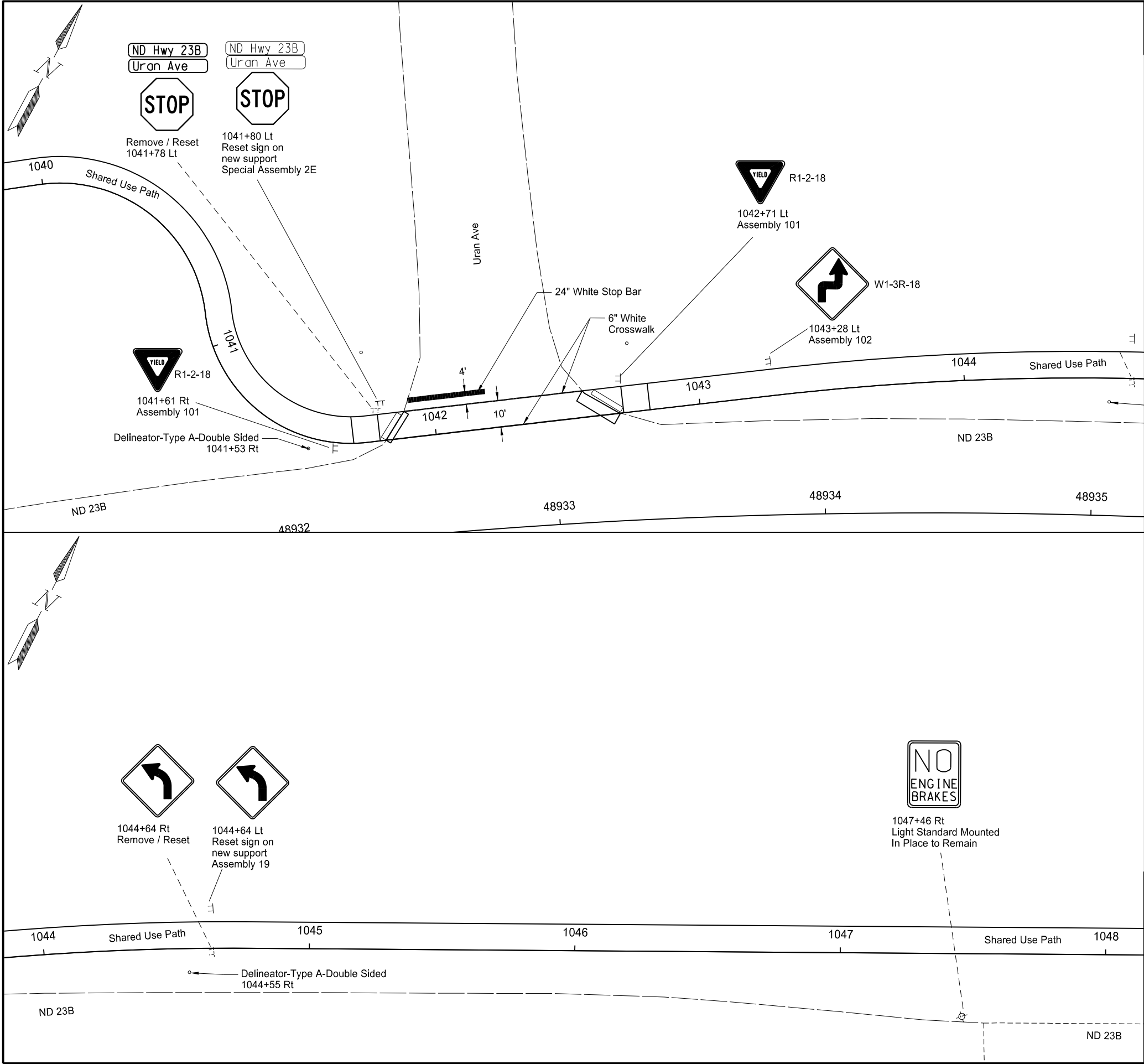
REGISTERED PROFESSIONAL ENGINEER

STACY FLATEN

PE-8772

DATE 1/31/25

NORTH DAKOTA



		STATE	PROJECT NO.	SECTION NO.	SHEET NO.
		ND	TAC-7-023(069)926	110	7
SPEC	CODE	BID ITEM		UNIT	QUANTITY
754	155	DELINEATORS-TYPE A-DOUBLE SIDED			
		1041+53 Rt		EA	1
		1044+55 Rt		EA	1
762	114	EPOXY PVMT MK 6IN LINE			
		White Crosswalk		LF	157
762	117	EPOXY PVMT MK 24IN LINE			
		Stop Bar		LF	30

Signing and Pavement Marking Layout

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi
1040+00 to 1048+00

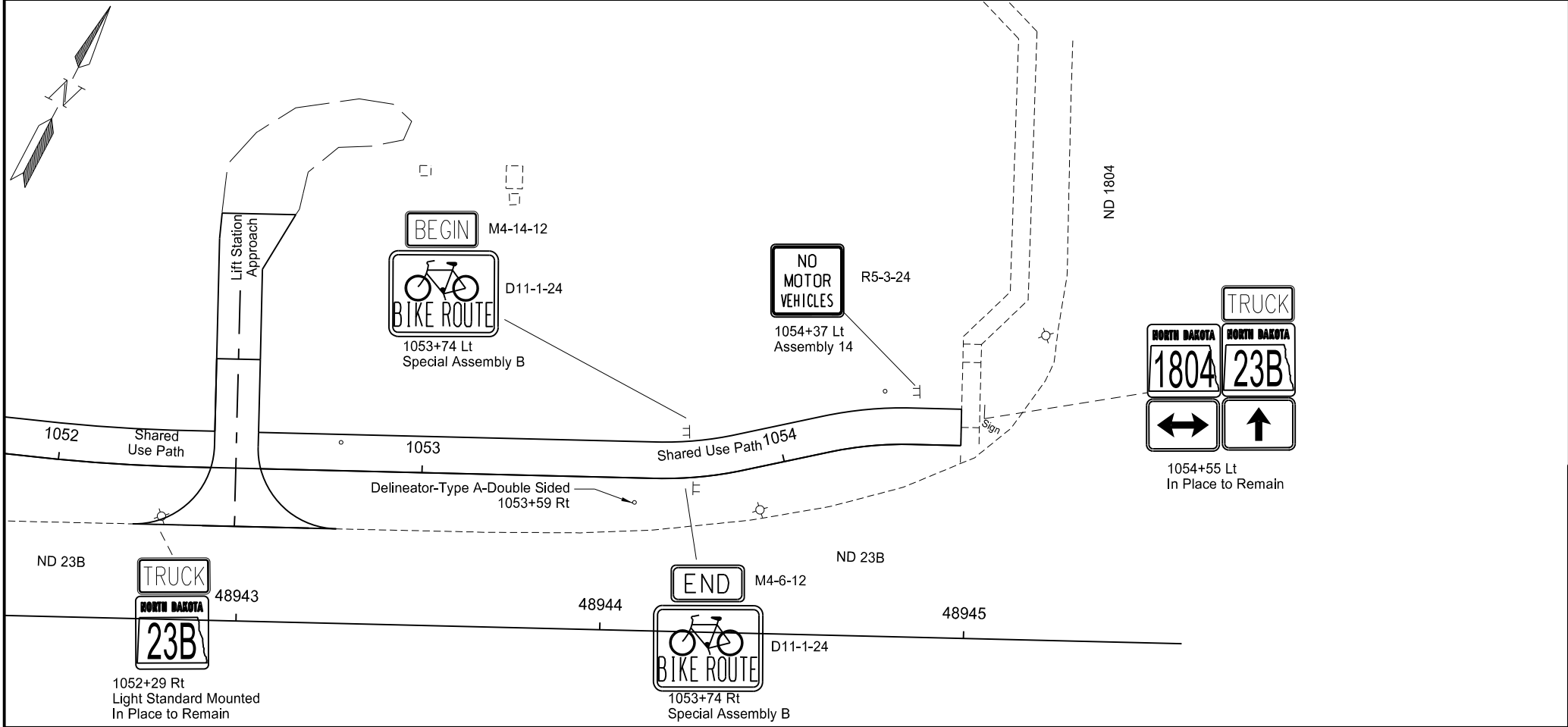
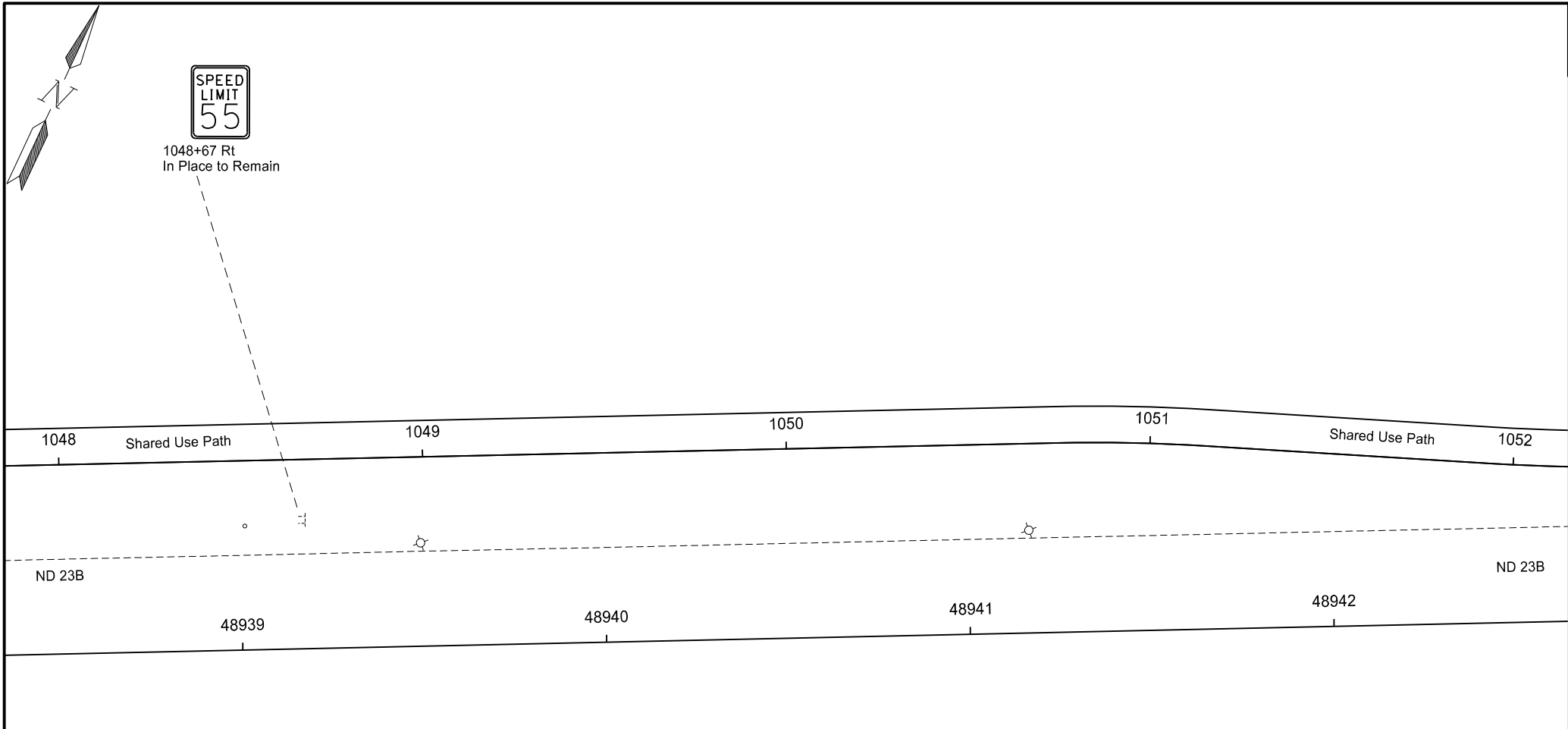
REGISTERED PROFESSIONAL ENGINEER

STACY FLATEN

PE-8772

DATE 1/31/25

NORTH DAKOTA



	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	110	8

SPEC	CODE	BID ITEM	UNIT	QUANTITY
754	155	DELINEATORS-TYPE A-DOUBLE SIDED		
		1053+59 Rt	EA	1

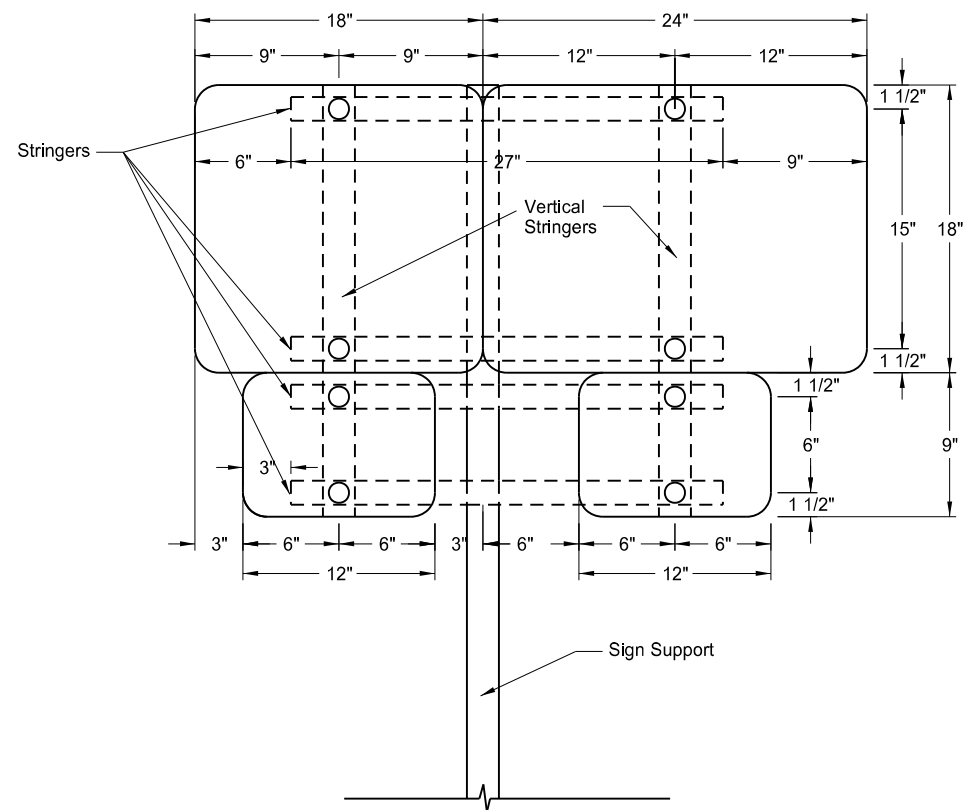
Signing and Pavement Marking Layout

ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

1048+00 to 1054+48.94

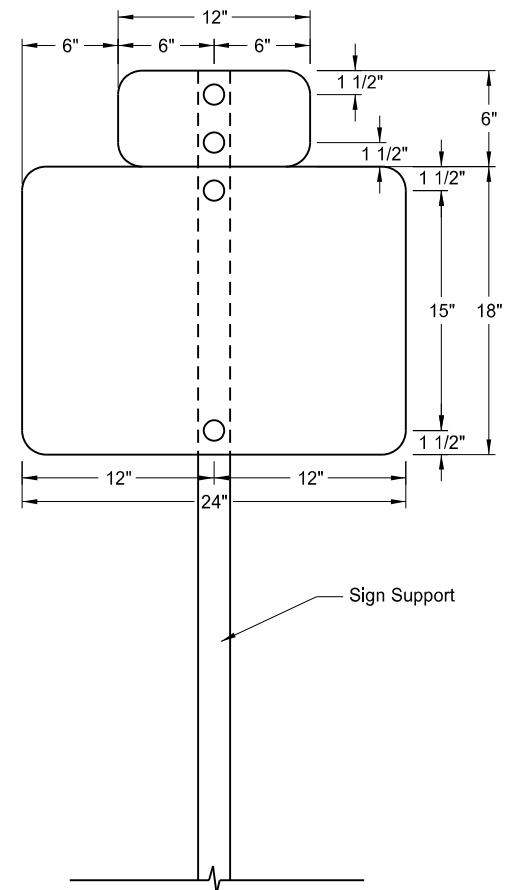


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	110	9



Special Assembly A
Sta 1000+02 Rt

Design Area: 6.8 SF
Pay Area: 6.8 SF



Special Assembly B
Sta 1053+74 Rt
Sta 1053+74 Lt

Design Area: 3.5 SF
Pay Area: 3.5 SF

Signing Details

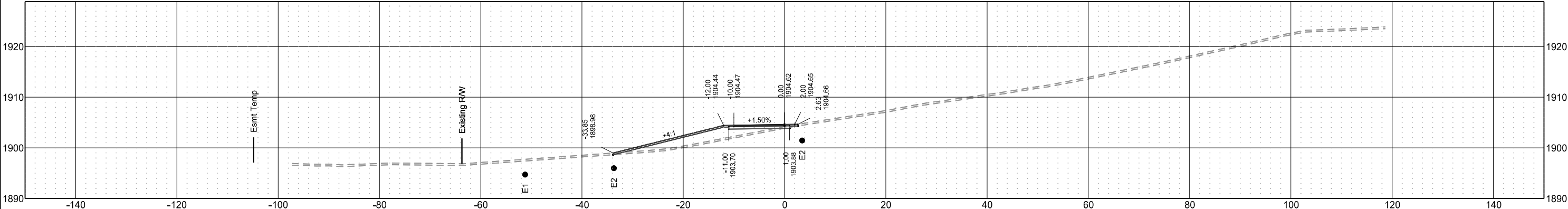
ND 23B
0.5 Mi W of ND 1804, N for 0.5 Mi

Special Assemblies

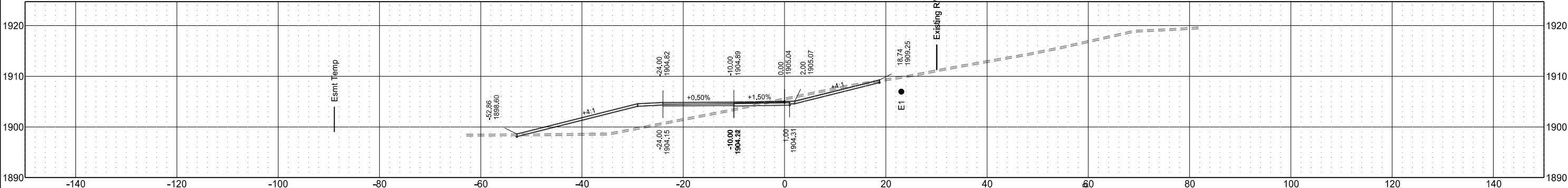


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	200	1

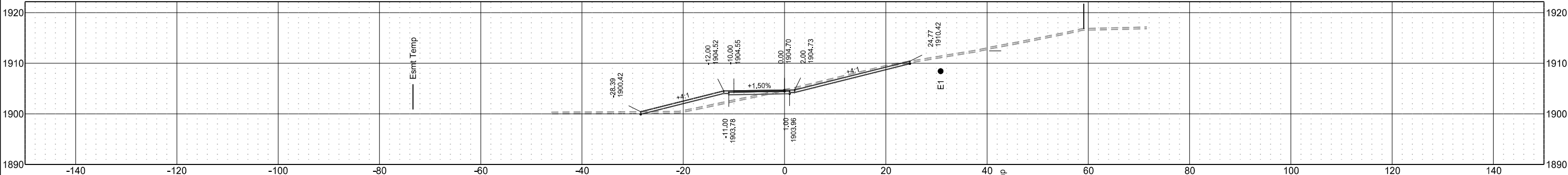
Sta 1002+00.00



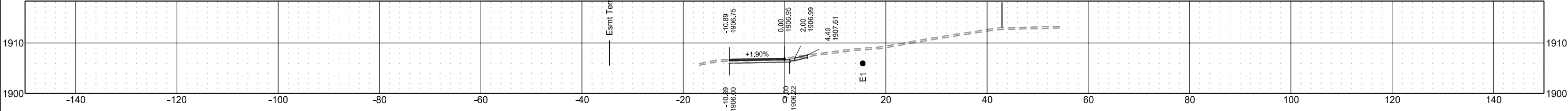
Sta 1001+40.00



Sta 1001+00.00

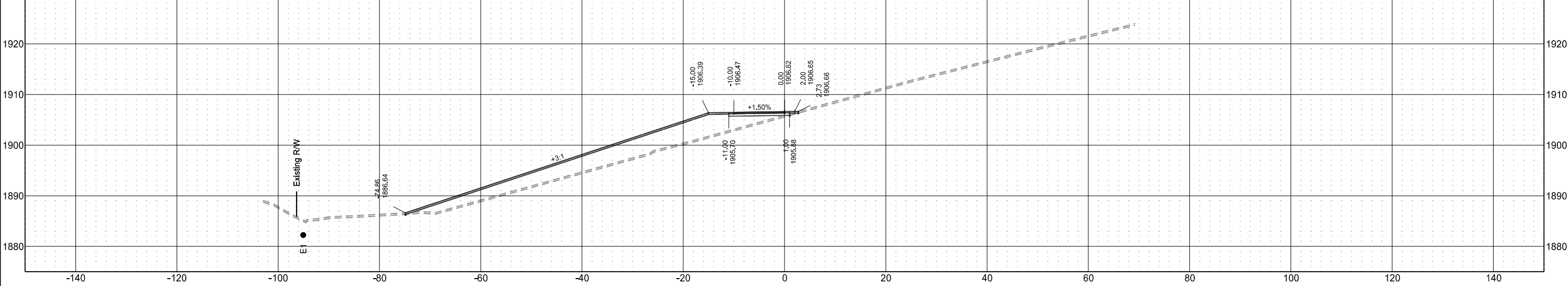


Sta 1000+00.00

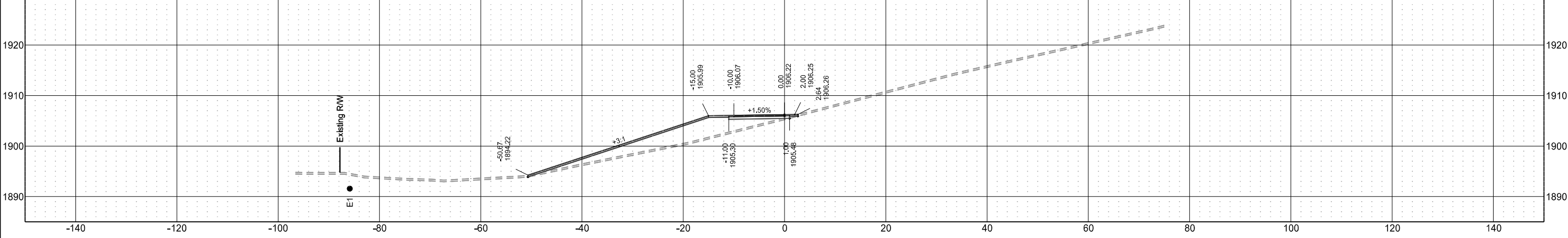


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	200	2

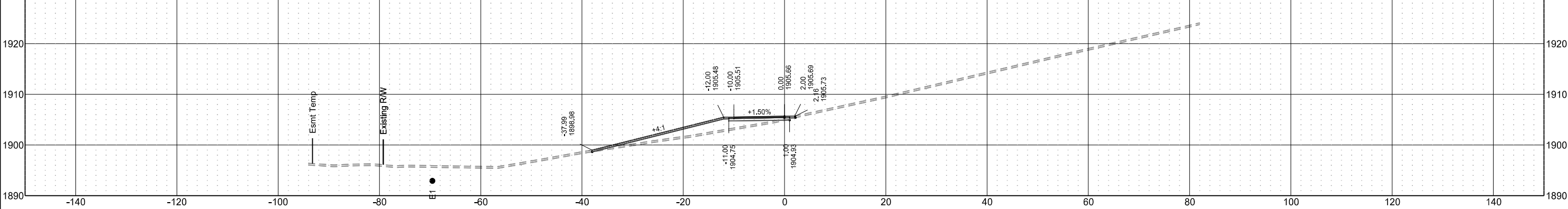
Sta 1005+00.00



Sta 1004+00.00

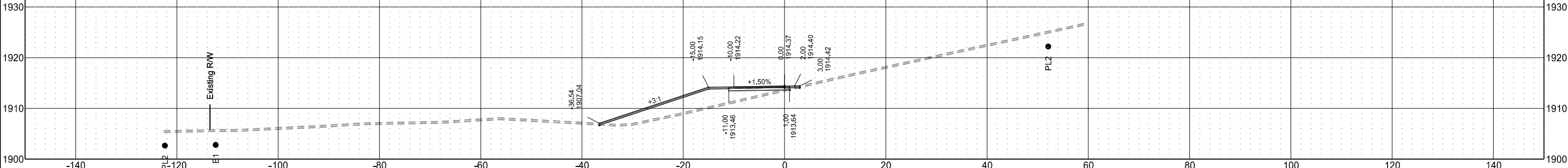


Sta 1003+00.00

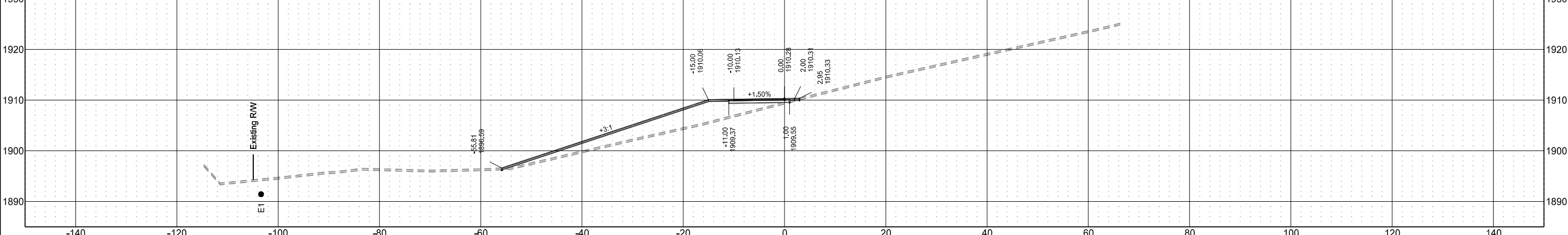


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	200	3

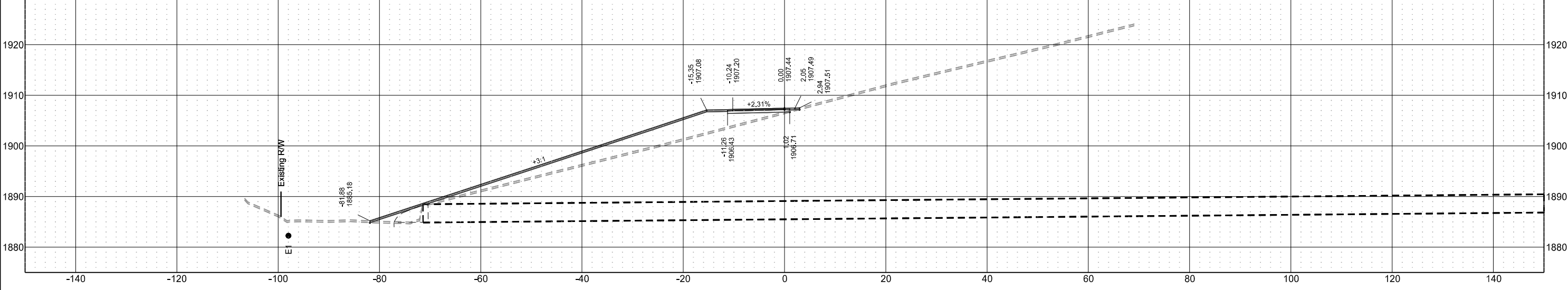
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Sta 1006+00.00

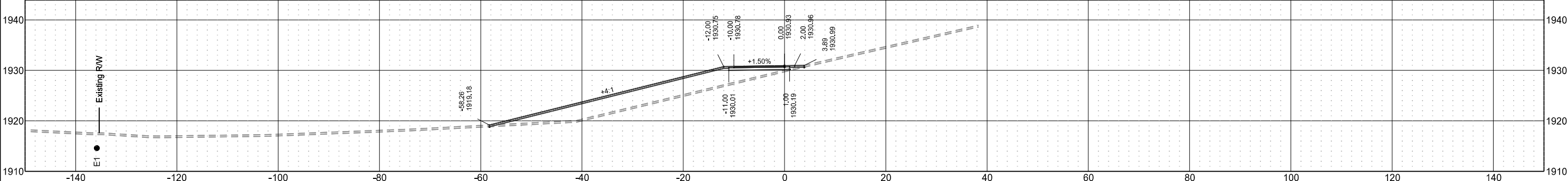


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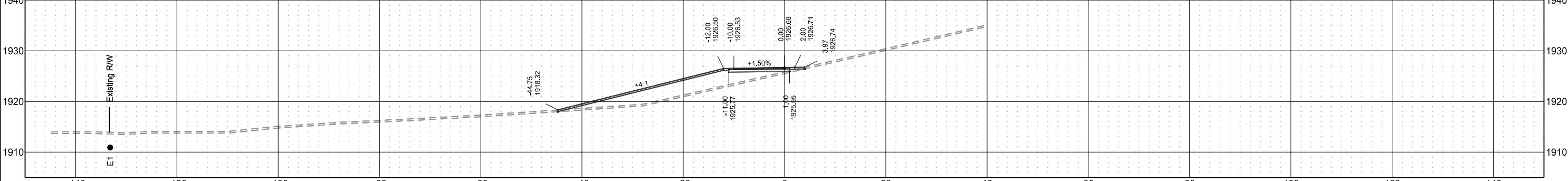


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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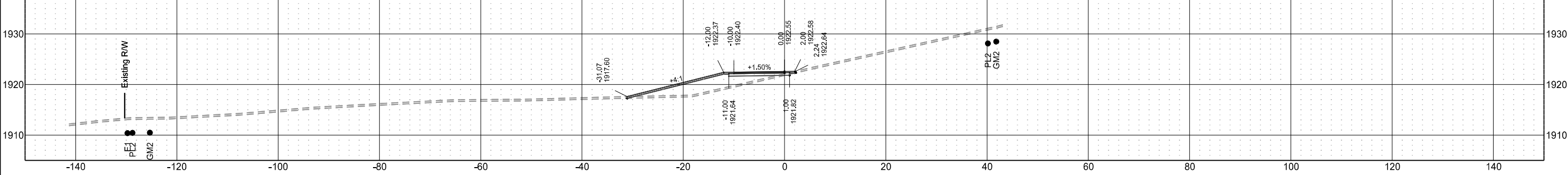
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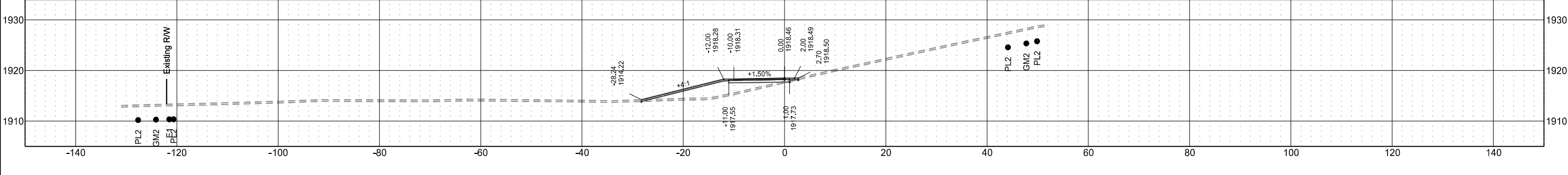
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Sta 1009+00.00

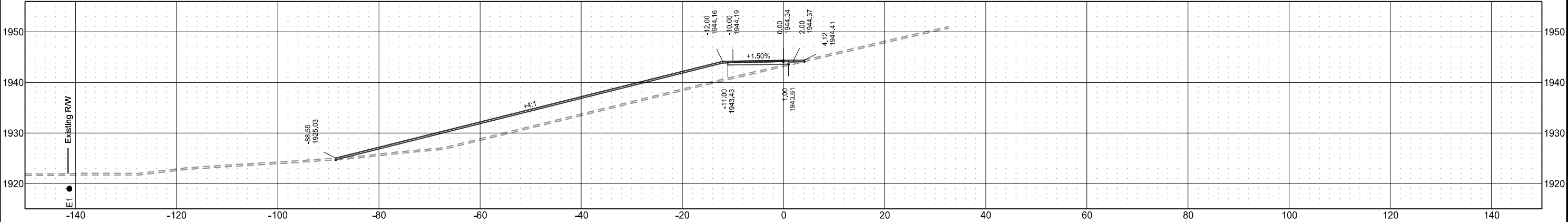


Sta 1008+00.00

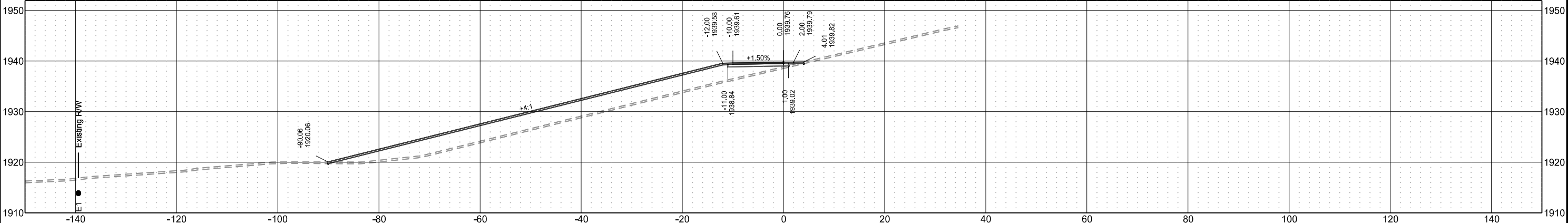


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	200	5

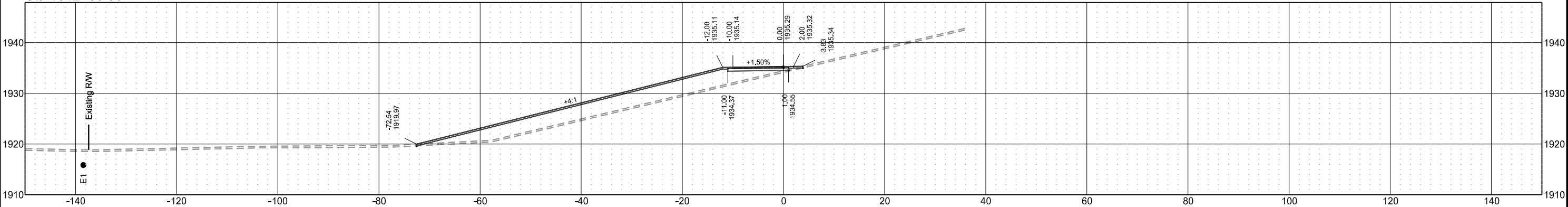
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Sta 1013+00.00

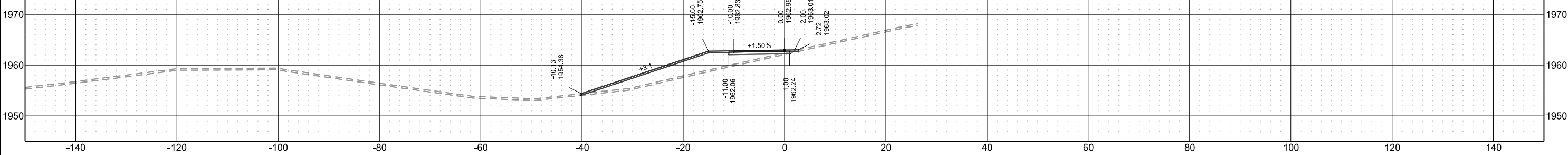


Sta 1012+00.00

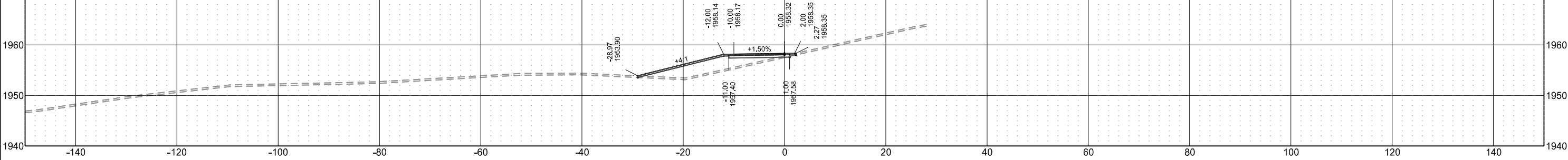


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	200	6

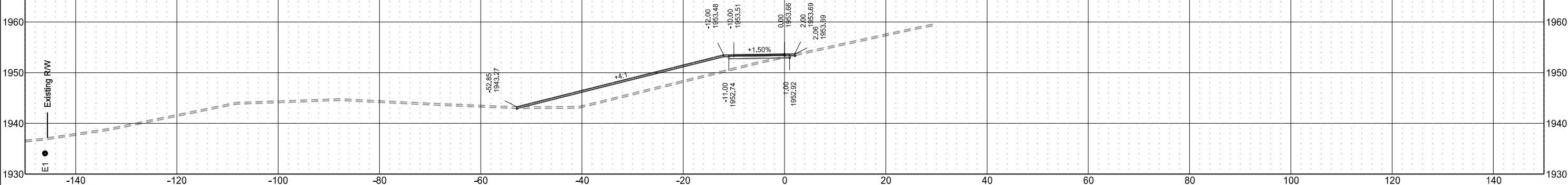
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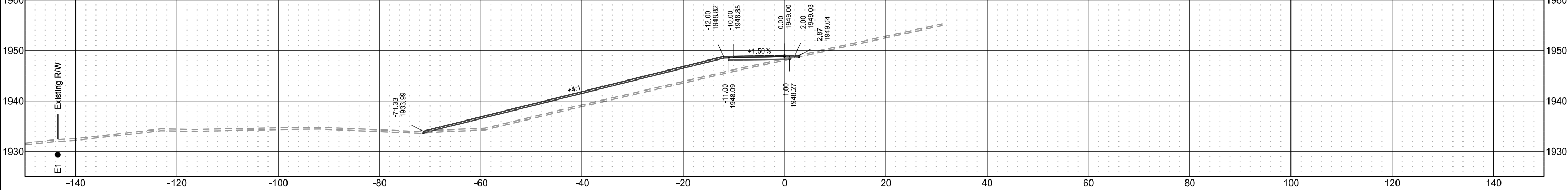
Sta 1017+00.00



Sta 1016+00.00

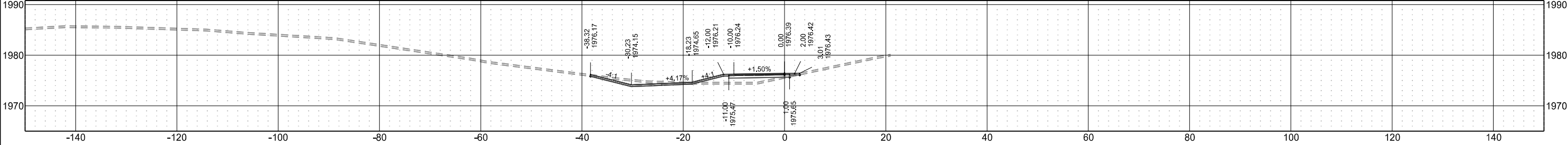


Sta 1015+00.00

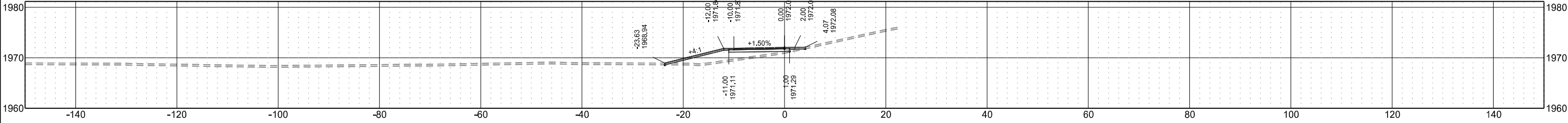


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	200	7

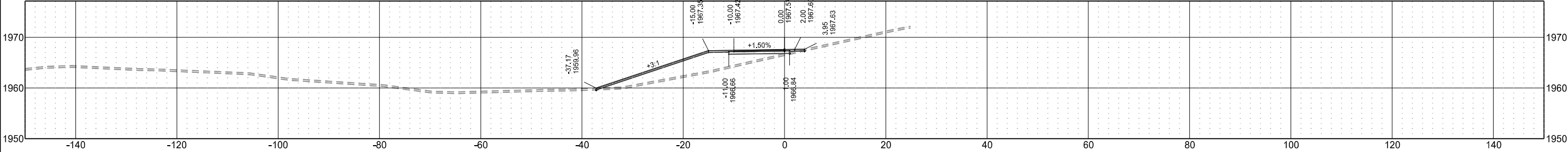
Sta 1021+00.00



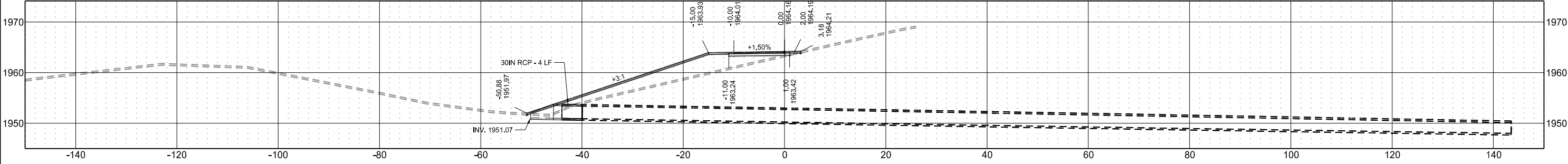
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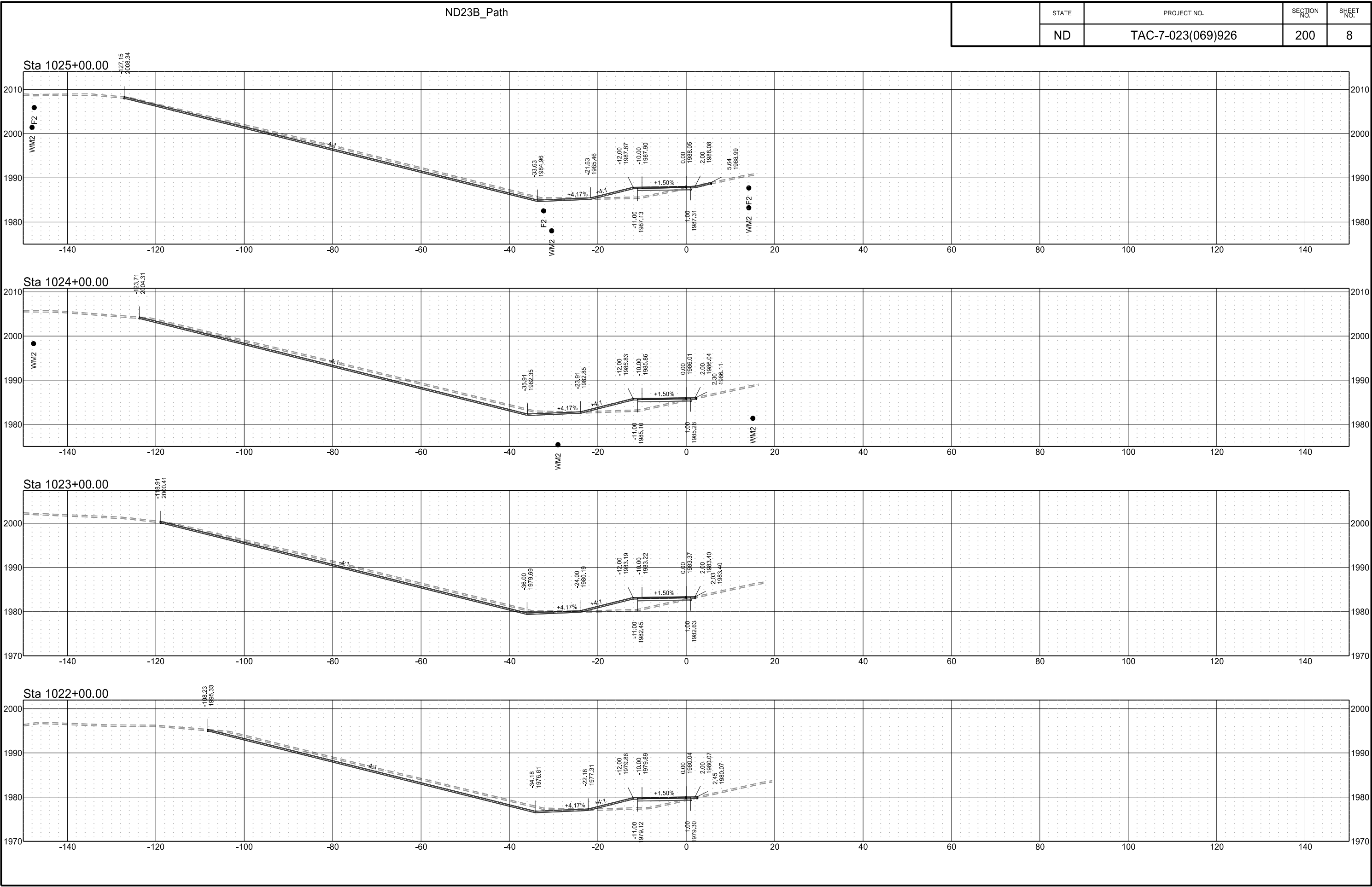


Sta 1019+00.00



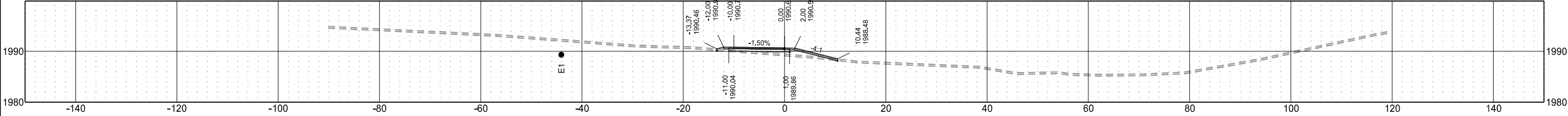
Sta 1018+25.39



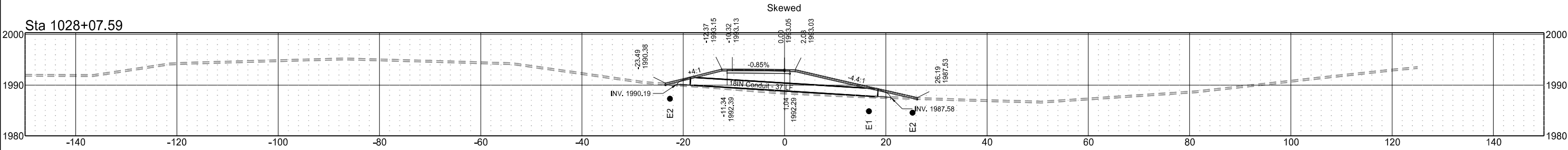


	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	TAC-7-023(069)926	200	9

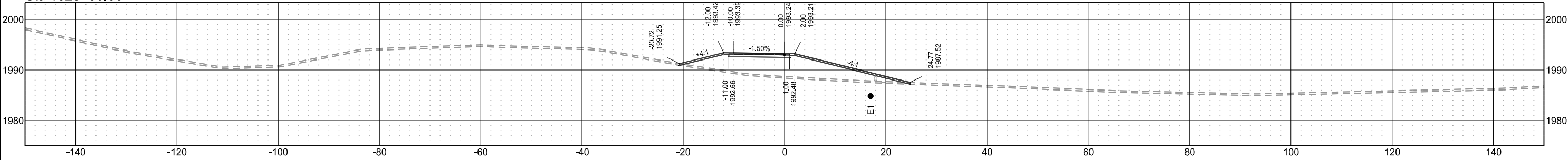
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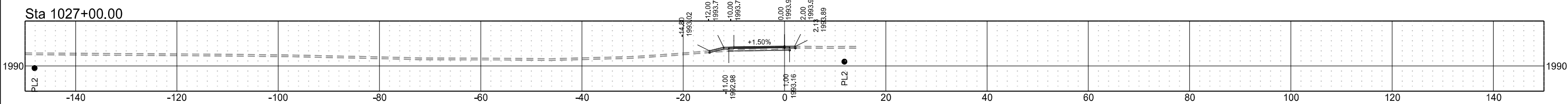
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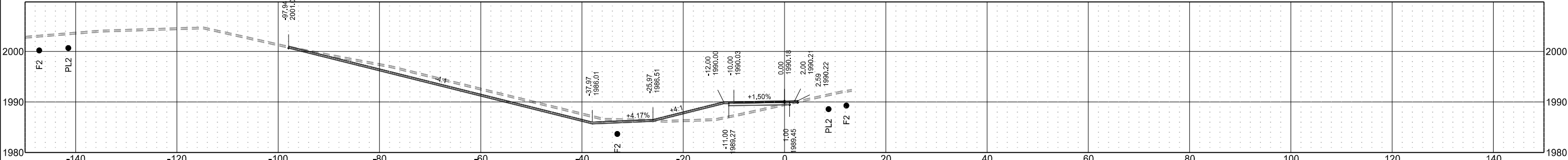
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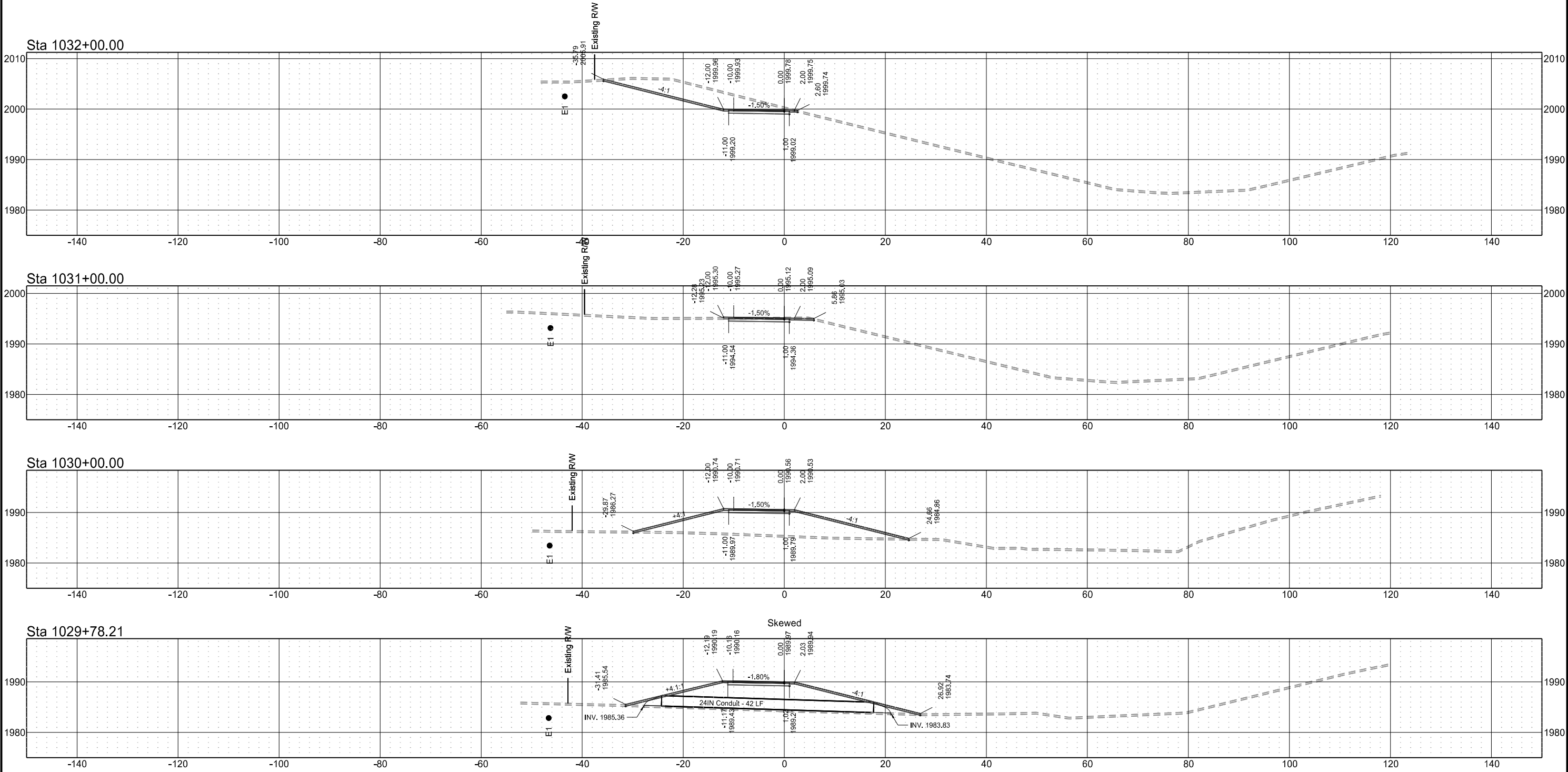
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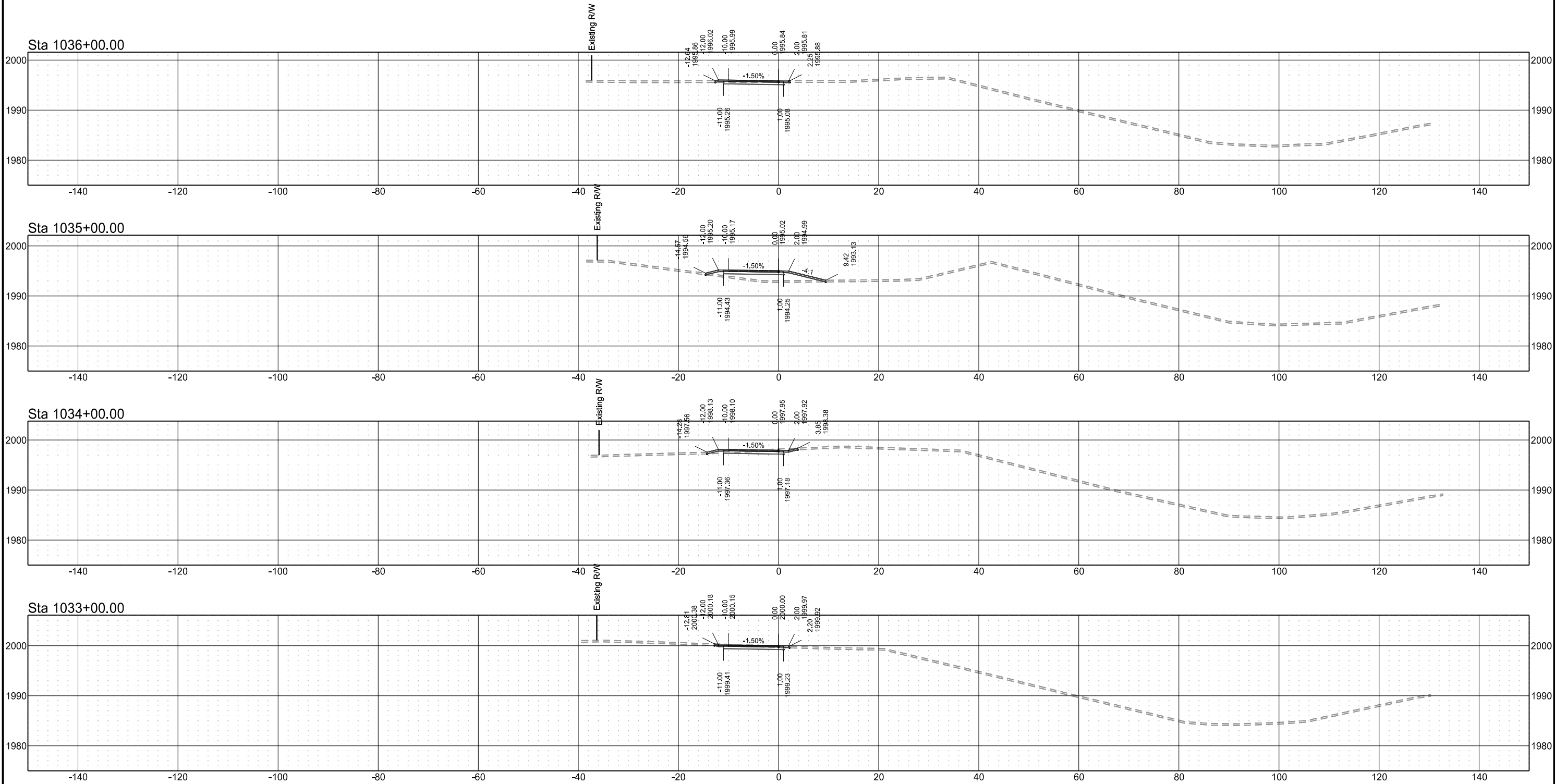
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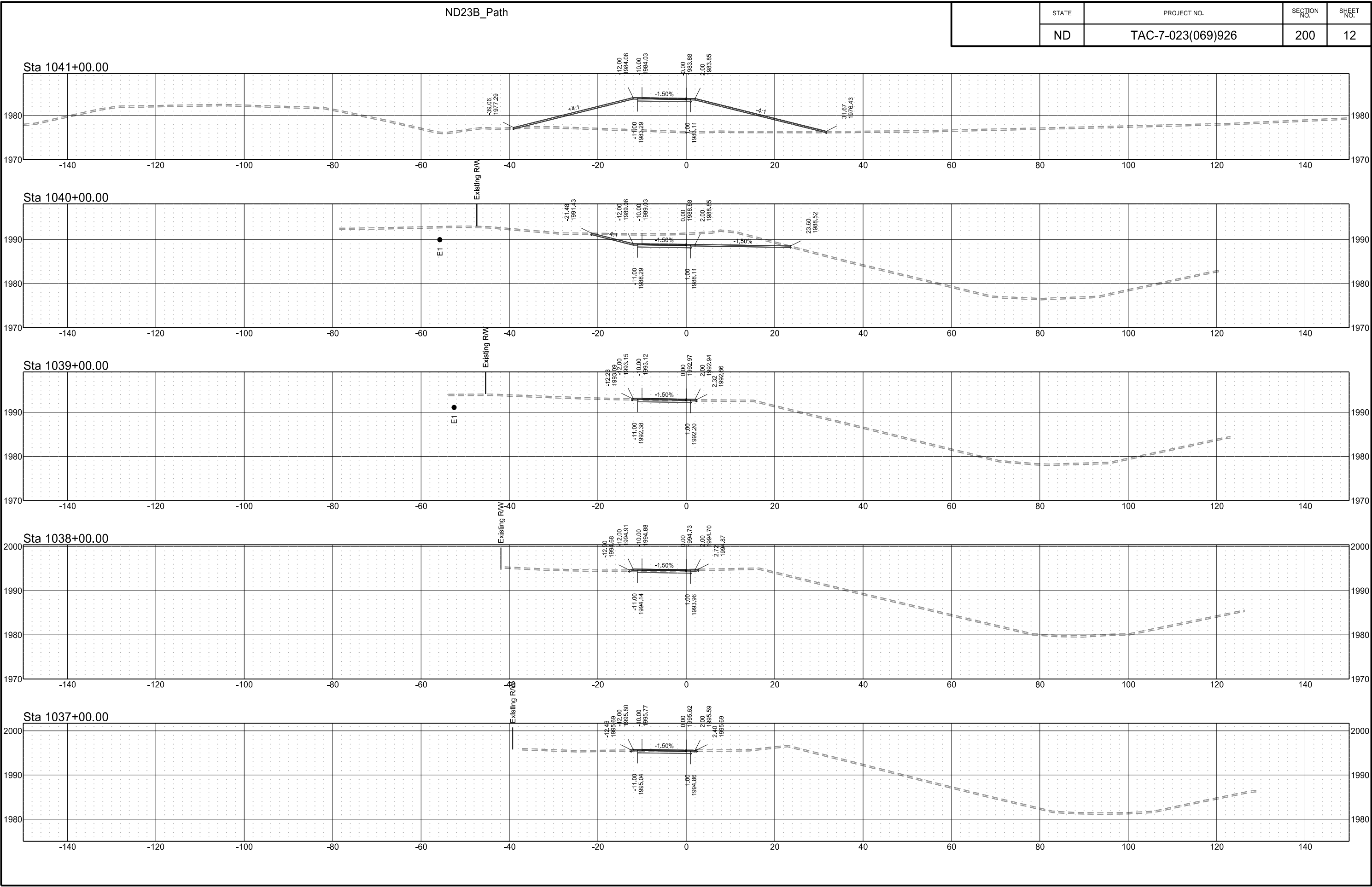


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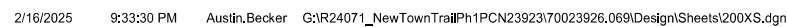


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	ND	TAC-7-023(069)926	200	11





	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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ND23B_Path

STATE

PROJECT NO.

SECTION NO.

SHEET NO.

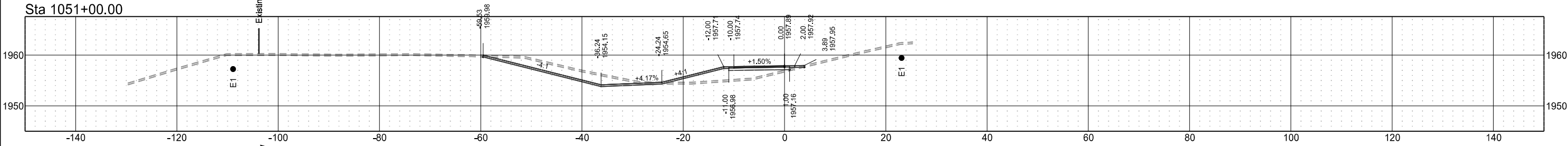
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TAC-7-023(069)926

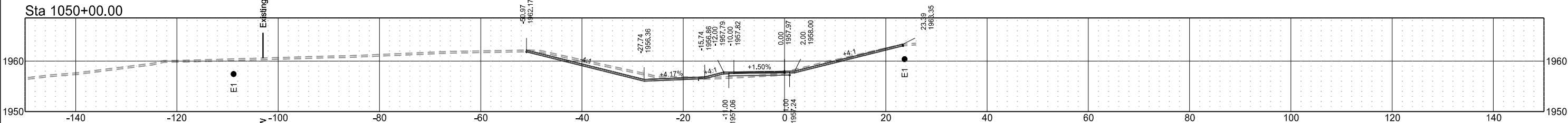
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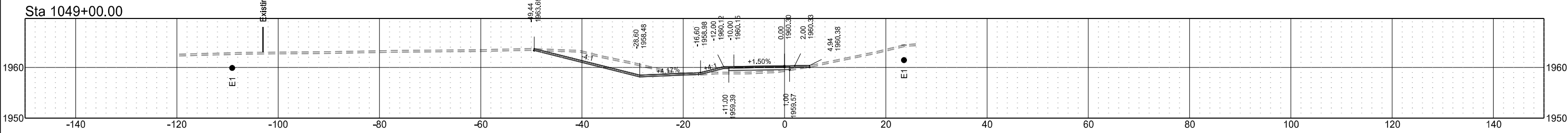
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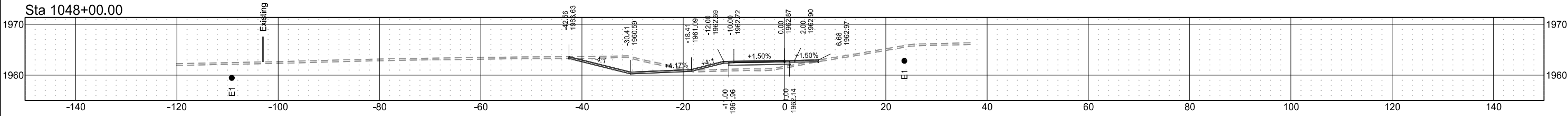
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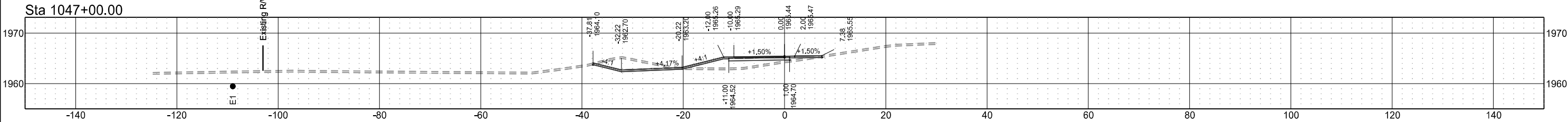
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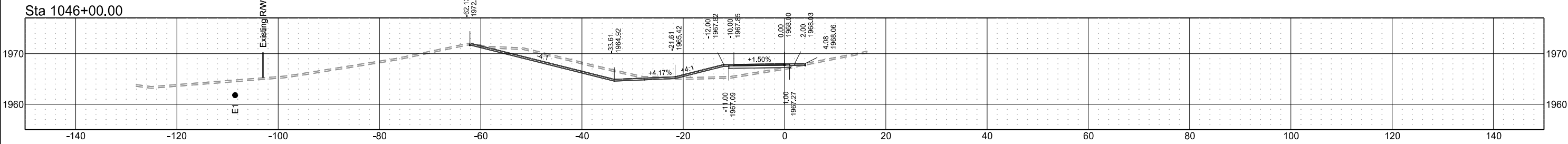
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Sta 1047+00.00



Sta 1046+00.00



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PROJECT NO.

SECTION NO.

SHEET NO.

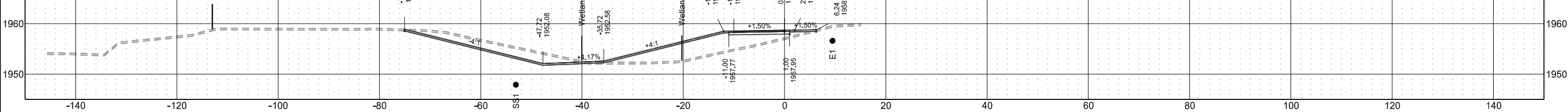
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TAC-7-023(069)926

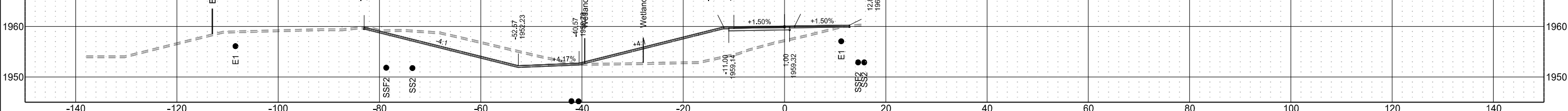
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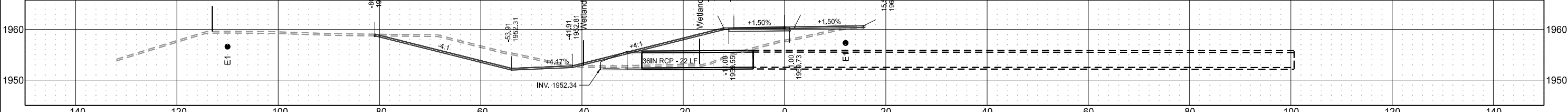
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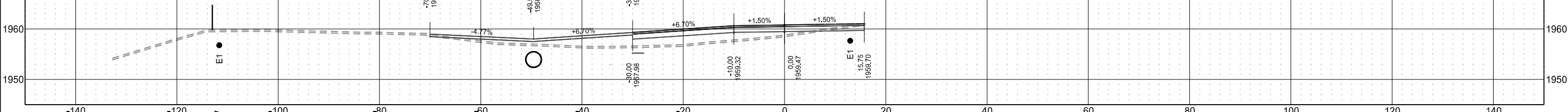
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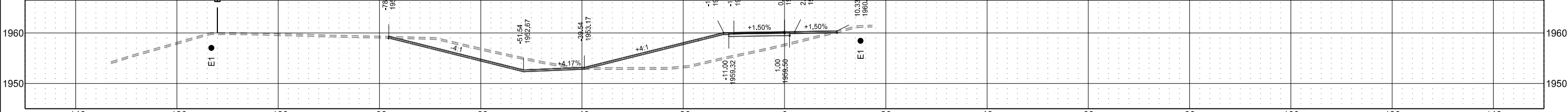
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Sta 1052+48.84

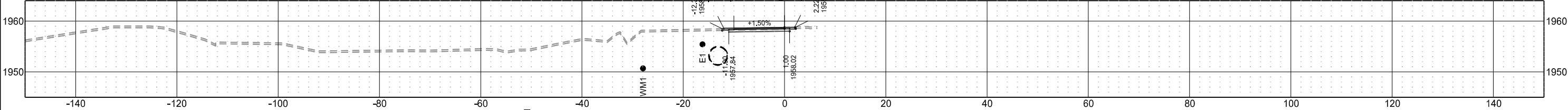


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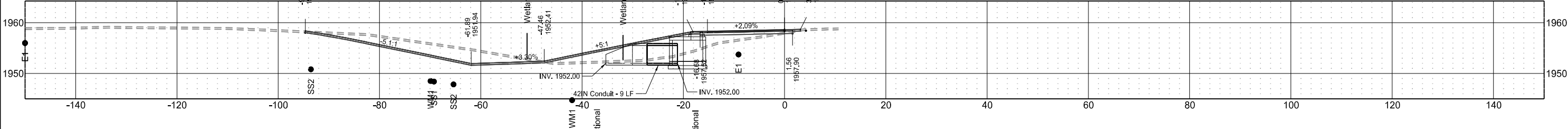


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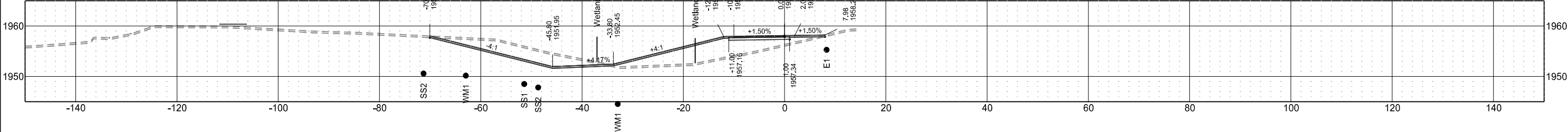
Sta 1054+48.90



Sta 1054+39.77



Sta 1054+00.00



NDDOT ABBREVIATIONS

D-101-1

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
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04-23-18 09-20-18 12-10-20 08-16-22	General Revisions General Revisions General Revisions General Revisions

08/16/22

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	MC	meander corner	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	Pl 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			Prod.	production/produce		
Jct	junction	Neop	neoprene	Prog	programmed		
		Ntwk	network	Prop.	property		
		N	North	Prop Ln	property line		
		NE	North East	Ppsd	proposed		
		NW	North West	PB	pull box		
		NB	Northbound				
		No. or #	number				

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04-23-18	General Revisions
12-18-20	General Revisions
08-16-22	General Revisions



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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	South East	TERO	tribal employment rights ordinance
SW	South West	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 preparation	WB	westbound
Ss	subsoil	Wrng	wiring
SS	supplement specification	W/	with
Supp	supplemental	W/o	without
Surf	surfacing	WC	witness corner
Surv	survey		
Sym	symmetrical		

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MEASUREMENTS

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

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

SURVEY DESCRIPTIONS

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

SOIL TYPES

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

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12-18-20	Sheet Added - Continued from D-101-3

KIRK J. HOFF

REGISTERED

PROFESSIONAL

PE-4683

ENGINEER

NORTH DAKOTA

12 18 2020

NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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DATE	CHANGE
04-23-18	General Revisions
09-20-18	General Revisions
12-10-20	General Revisions
08-16-22	General Revisions

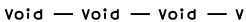
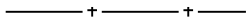
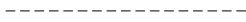
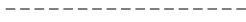
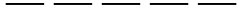


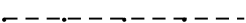
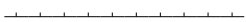
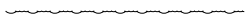
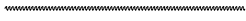
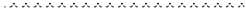
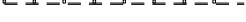
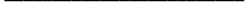
08/16/22

LINE STYLES

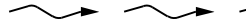
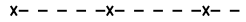
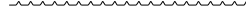
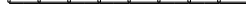
D-101-20

Existing Topography

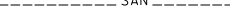
	Existing Ground Void
	Existing Cemetary Boundary
	Existing Box Culvert Bridge
	Existing Concrete Surface
	Existing Drainage Structure
	Existing Gravel Surface
	Existing Riprap
	Existing Dirt Surface
	Existing Asphalt Surface
	Existing Tie Point Line
	Existing Railroad Centerline
	Existing Guardrail Cable
	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

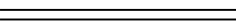
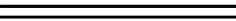
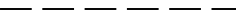
Proposed Topography

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

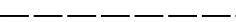
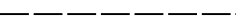
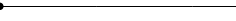
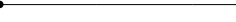
Existing Utilities

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

KIRK J. HOFF

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PE-4683

ENGINEER

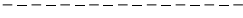
NORTH DAKOTA

12 18 2020

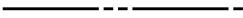
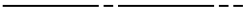
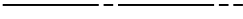
LINE STYLES

D-101-21

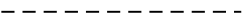
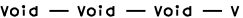
Right Of Way

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

Boundary Control

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

Cross Sections and Typicals

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

Geotechnical

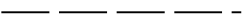
	Geotextile Fabric Type D
	Geogrid
	Geotextile Fabric Type R
	Geotextile Fabric Type R1
	Geotextile Fabric Type RR
	Geotextile Fabric Type S

	Subgrade Reinforcement
	Failure Line

Countours

	Depression Contours
	Supplemental Contour

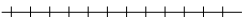
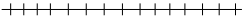
Profile

	Subgrade, Subcut or Ditch Grade
	Topsoil Profile

Striping

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

Pavement Joints

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

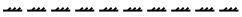
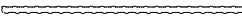
Bridge Details

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

Erosion Control

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

Environmental

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

NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

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

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NORTH DAKOTA

12 18 2020

SYMBOLS

D-101-30



North Arrow (Half Scale)

Alignment Data Point

Alignment Monument

Spot Elevation

Existing Miscellaneous Spot

Existing Access Control Arrow

Existing Benchmark

Reset USGS Marker

Iron Monument Found

Iron Pin R/W Monument

Property Corner

Iron Pin Reference Monument

Right of Way Marker (Exst, Ppsd, Reset)

Existing Federal Reference Corner

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

Existing Witness Corner

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

Existing Traverse PI Aerial Panel

Existing Reference Marker Point NGS

Existing EFB Misc

Existing Bush or Shrub

Existing Large Evergreen Tree

Existing Small Evergreen Tree

Existing Large Tree

Existing Small Tree

Existing Tree Trunk

Cairn or Stone Circle

Existing Artifact

Existing Satellite Dish

Existing Weather Station

Existing Windmill or Tower

Reinforced Pavement

Continuous Split Barrel Sample

Flight Auger Sample

Split Barrel Sample

Thinwall Tube Sample

Standard Penetration Test

Inclinometer Tube

Excavation Unit

Existing Ground Water Well Bore Hole

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NORTH DAKOTA

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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	
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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					

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NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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12-18-20	General Revisions



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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	
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12-18-20	General Revisions Sheet added - Continued from D-101-32

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12 18 2020

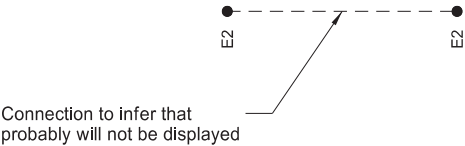
Cross Section Legend

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

* 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.



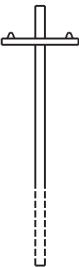
When storm drain invert elevations are NOT used to draw pipe, they will appear as shown to the left. When invert elevations are used to draw pipe, they will be a cross section similar to the graphics shown below.



Light Standard - Multiple Variations
Concrete
Steel
Wood
with Traffic Signal



Pole - Multiple Variations
Utility
Brace
Feed Point
Guy
Power
Power Structure
Power with Light
Power with Transformer



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



High Tension Cable Guardrail



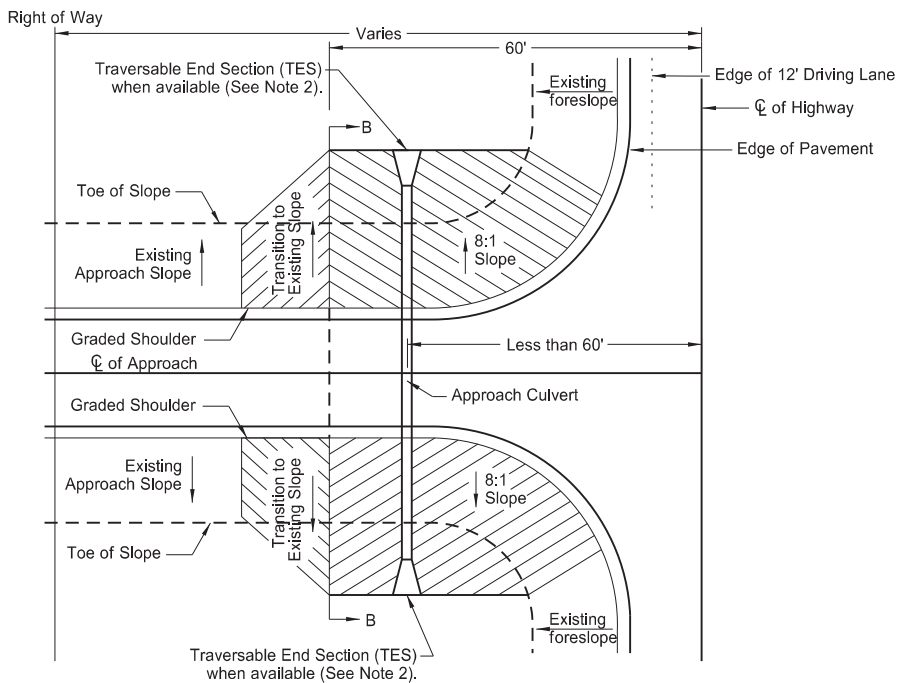
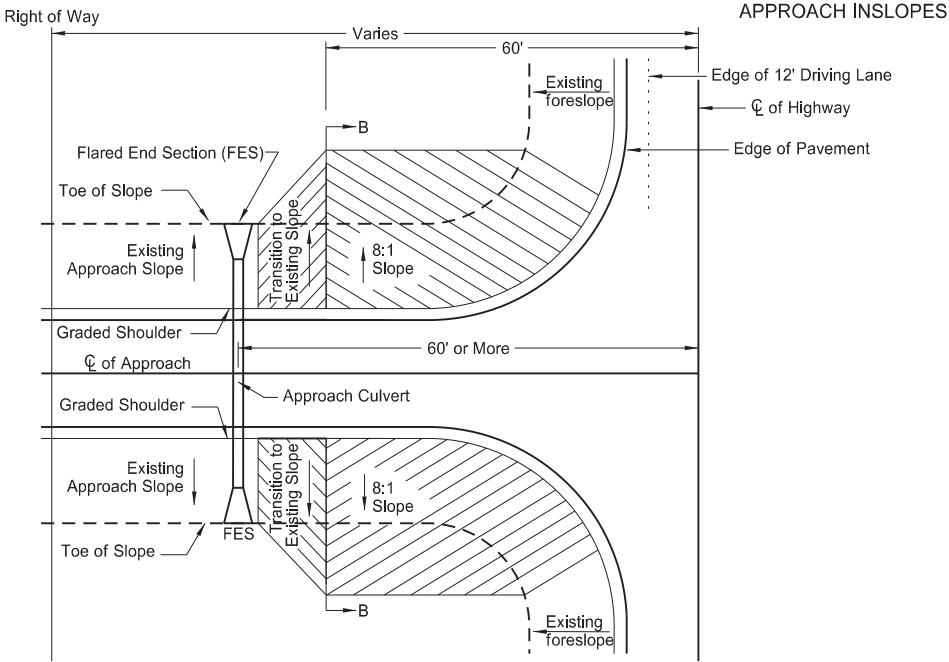
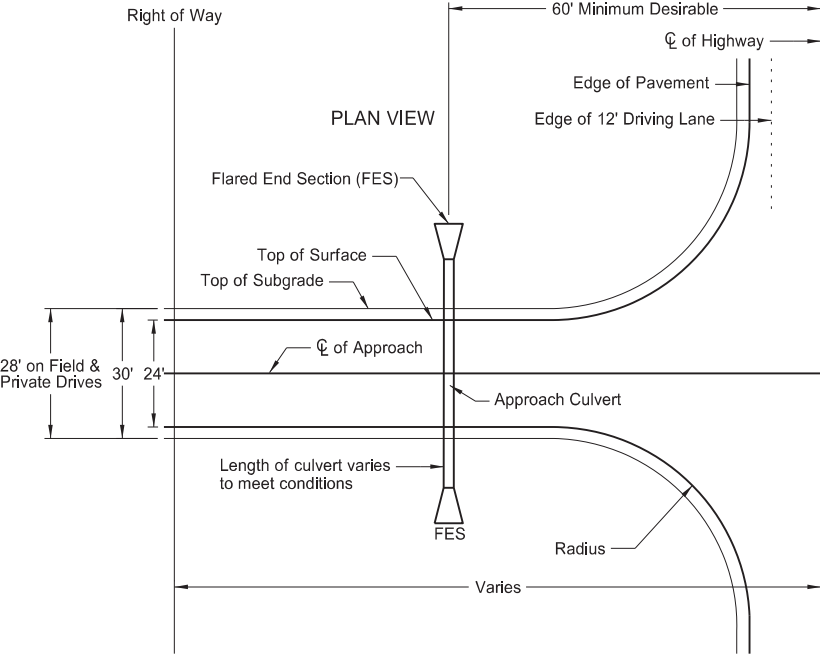
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-20-18	
REVISIONS	
DATE	CHANGE
6/14/2023	CADD Standards Update



06/14/23

STANDARD RURAL APPROACHES

D-203-8



CASE 1

APPROACH PIPE LOCATED
60' OR MORE FROM C

CASE 2

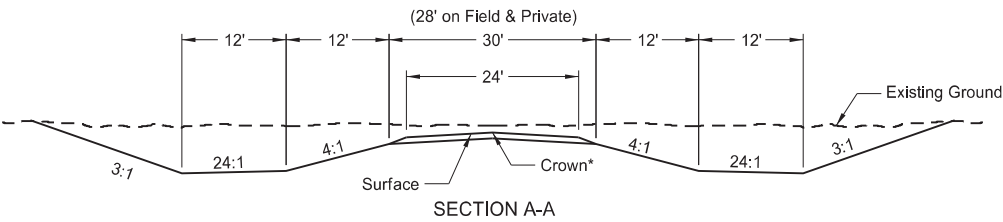
APPROACH PIPE LOCATED
LESS THAN 60' FROM C

Approach Pipe Traversable End Sections (TES)

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

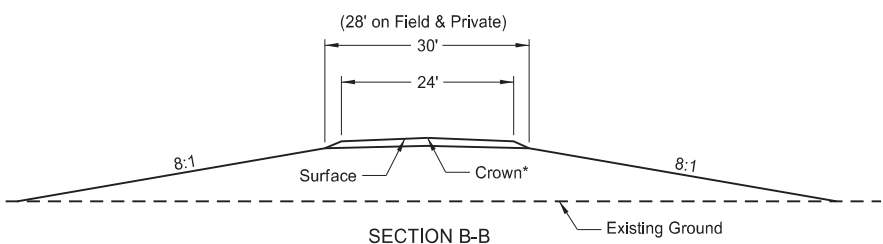
CRITERIA FOR RURAL APPROACH TYPES

	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)

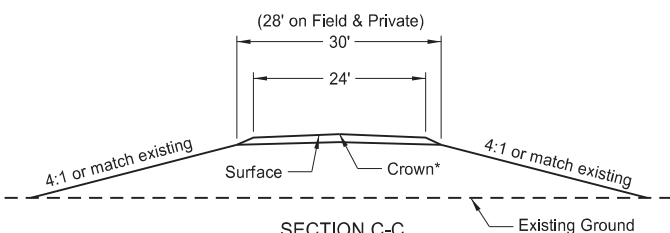


SECTION A-A

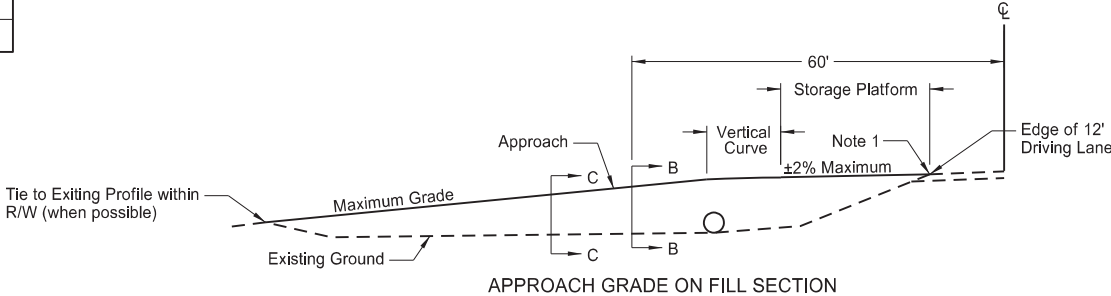
*2.1% crown for paved surface
*3.0% crown for gravel surface



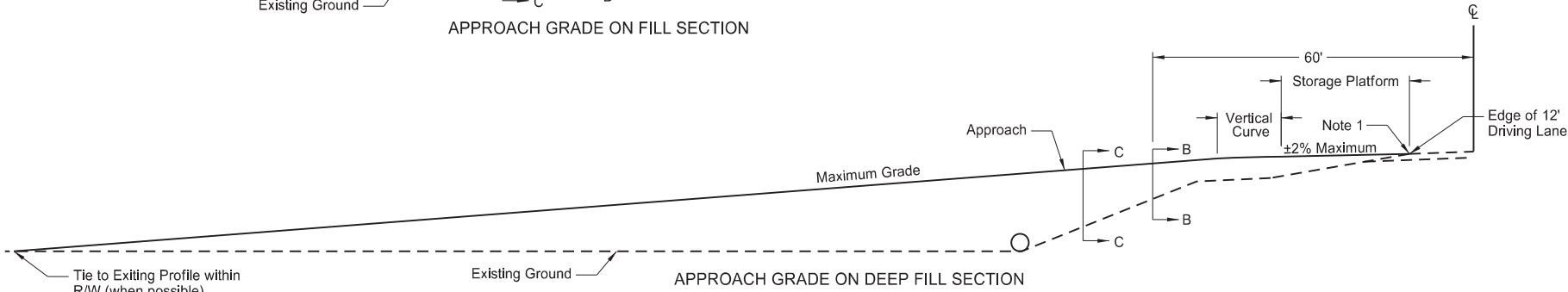
SECTION B-B



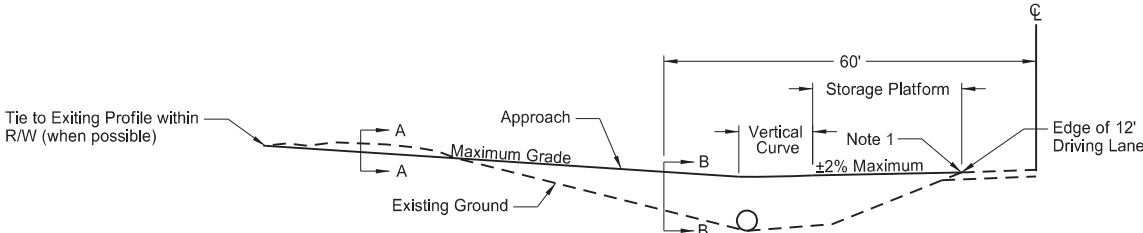
SECTION C-C



APPROACH GRADE ON FILL SECTION



APPROACH GRADE ON DEEP FILL SECTION



APPROACH GRADE ON CUT SECTION

NOTES:

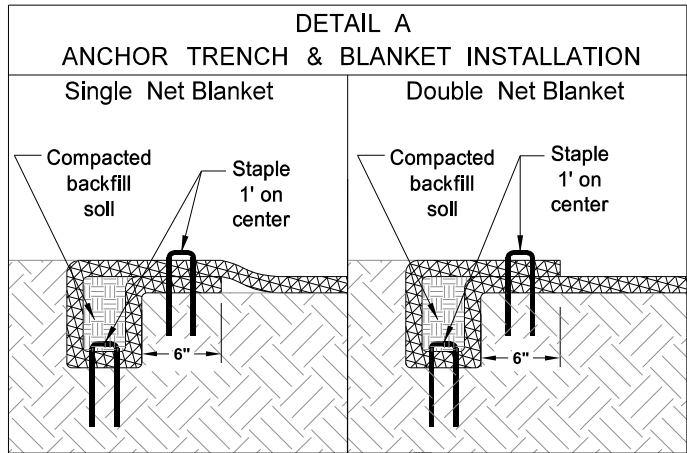
1. 5% Max Rollover between approach storage platform and highway.
2. Approach pipes up to 24" diameter are acceptable (with traversable end sections) for Case 2. Install approach pipes larger than 24" diameter in accordance with Case 1.

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

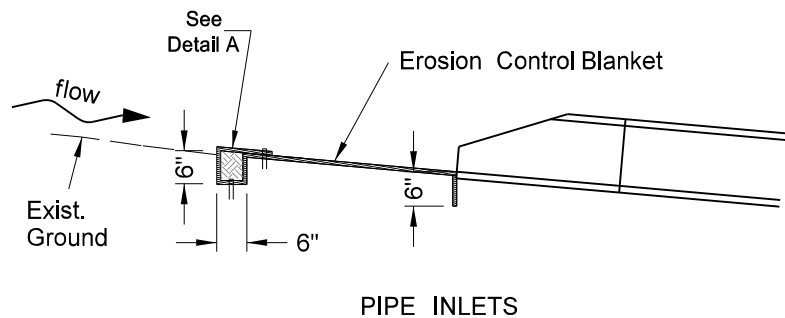
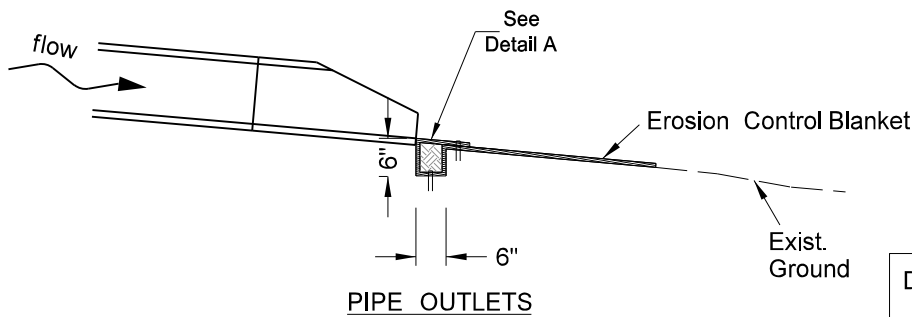


06/29/22

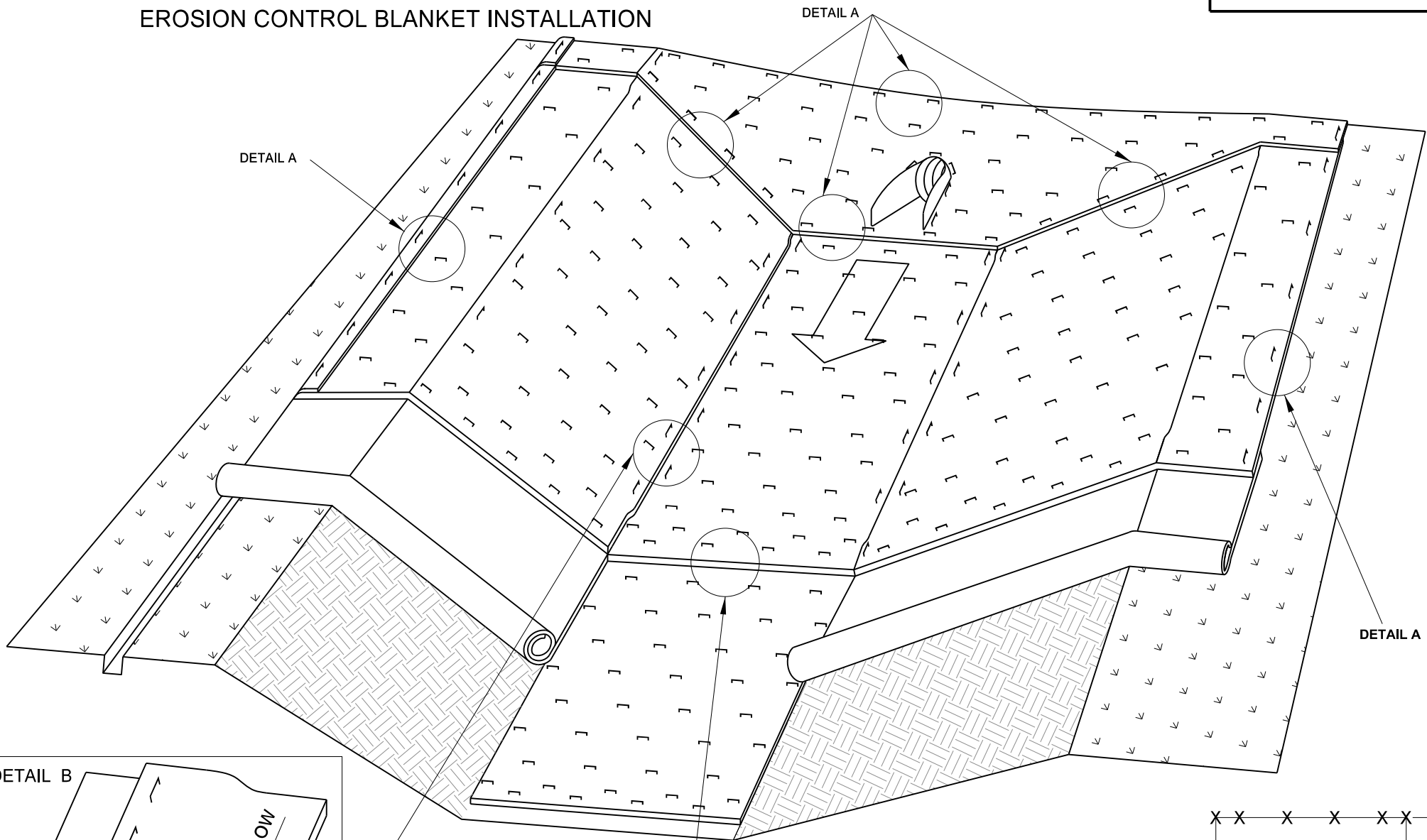
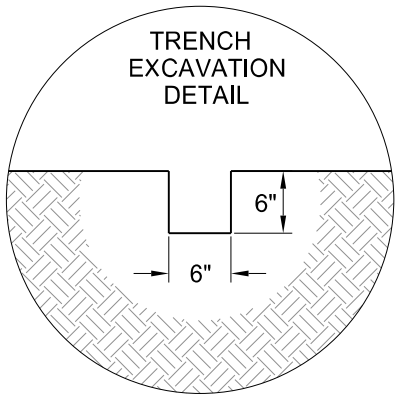
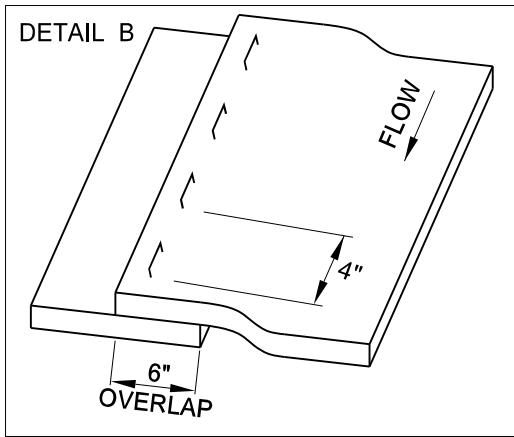
EROSION AND SILTATION CONTROL
EROSION CONTROL BLANKET INSTALLATION



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

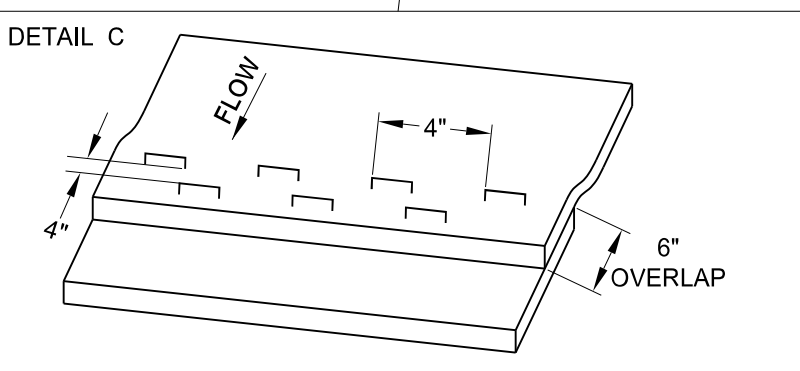
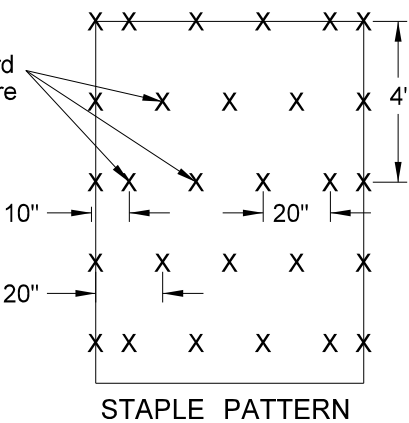


INSTALLATION AT PIPE ENDS



BLANKET LAYOUT
CHANNEL OR SLOPE INSTALLATION

3.8 staples per square yard
using 8-inch 11 gauge wire
"u" staples.

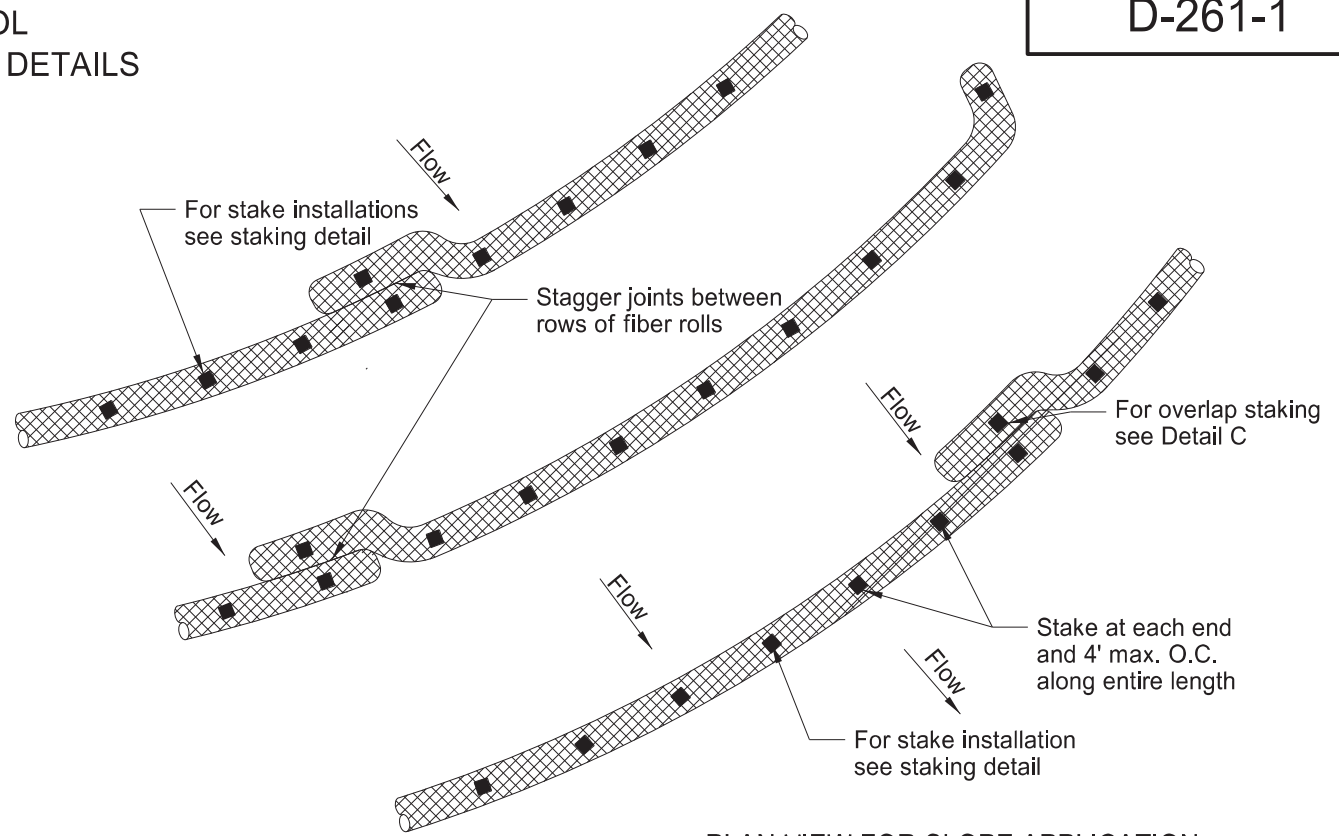
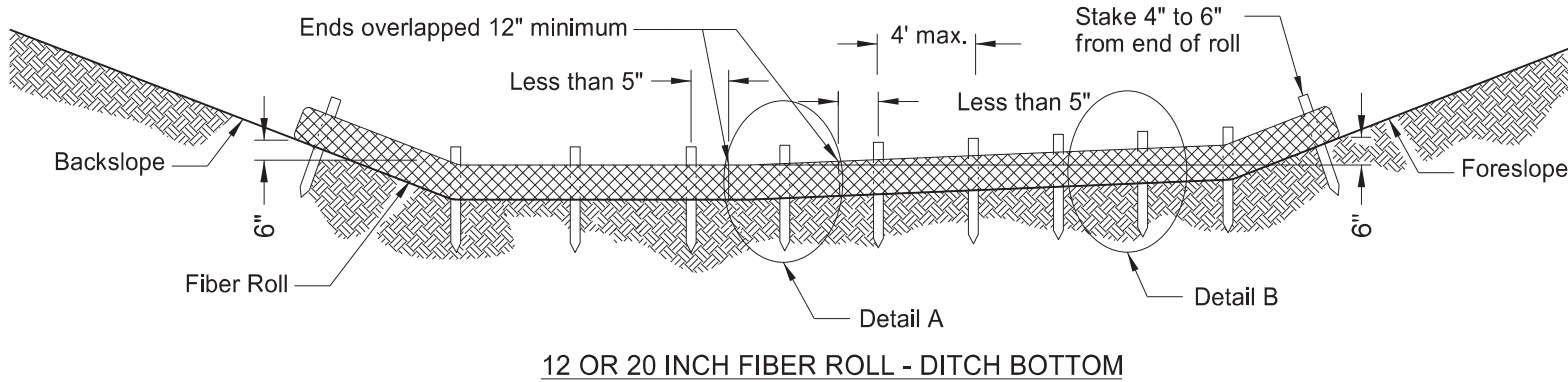


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Changed standard drawing number from D-708-S to D-255-2.
07-27-15	Changed installation details such as trench depth and overlap dimensions.
08-27-19	New Design Engineer PE Stamp.

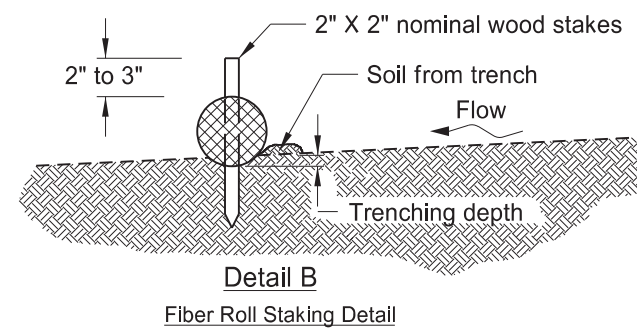
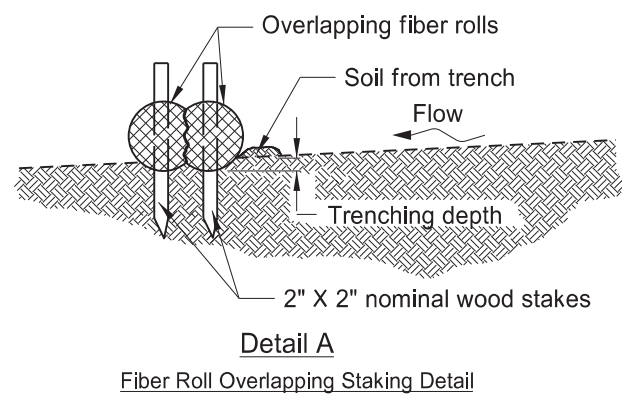
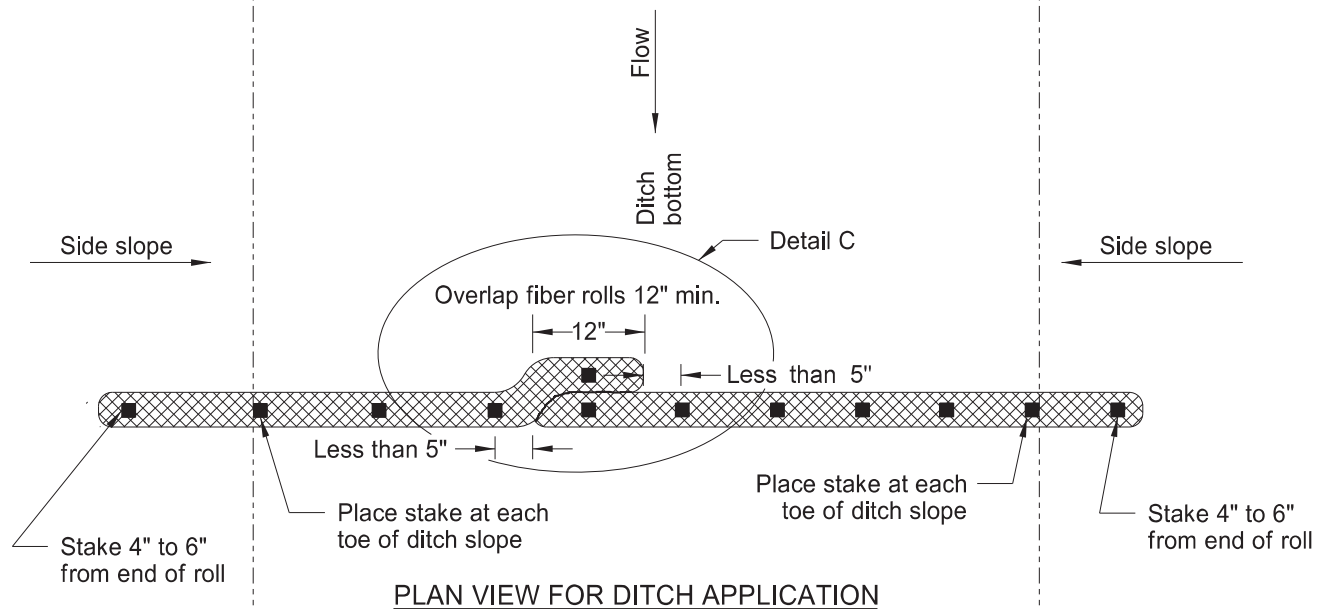
This document was originally issued and sealed by
Kirk J Hoff,
Registration Number
PE- 4683,
on 08/27/19 and the original document is stored at the
North Dakota Department
of Transportation

EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS

D-261-1



PLAN VIEW FOR SLOPE APPLICATION
Ensure fiber rolls are placed along the contours of the slope.



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

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

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



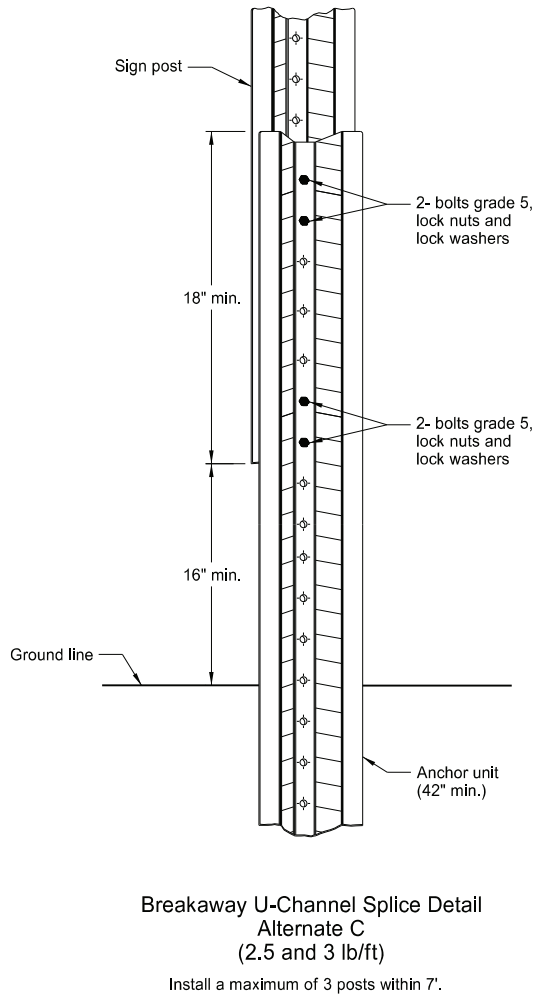
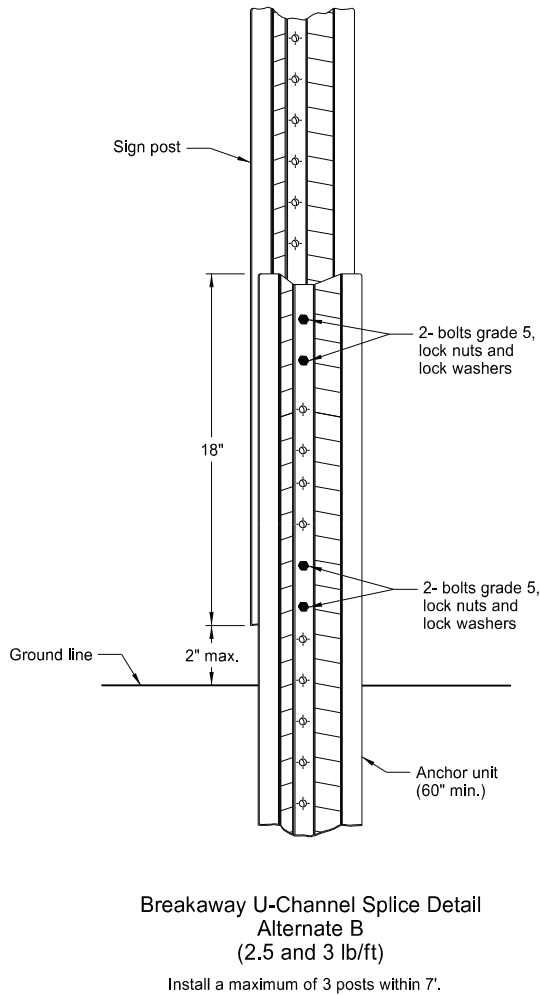
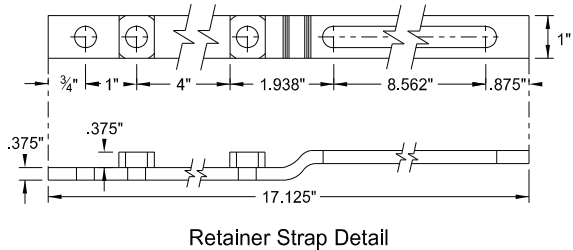
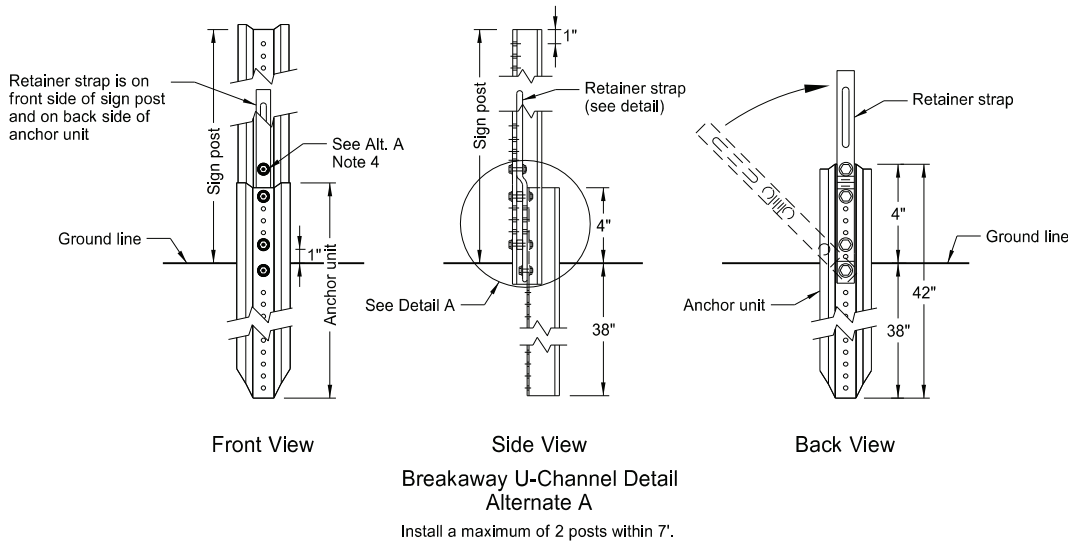
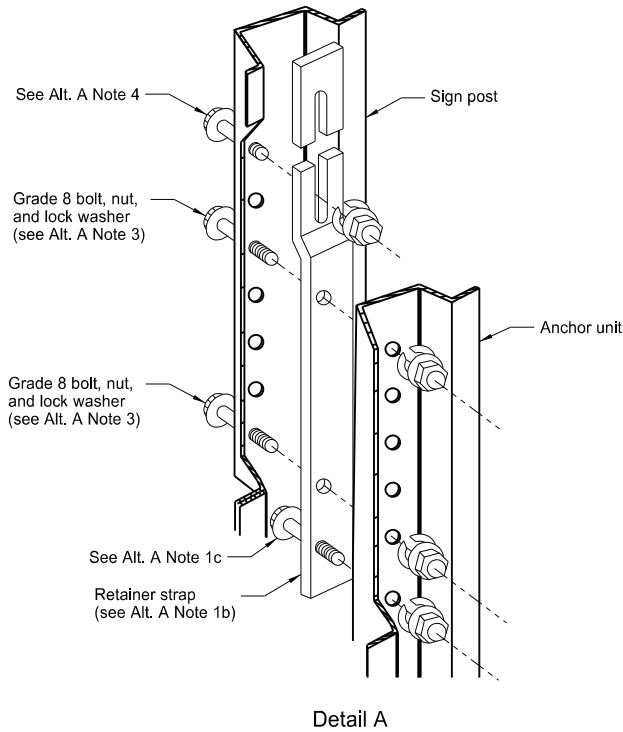
04/22/24



BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



Alternate A Steps of Installation:

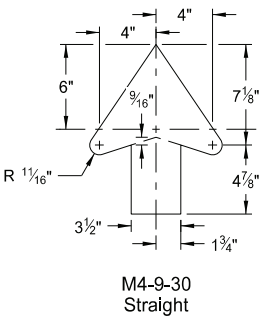
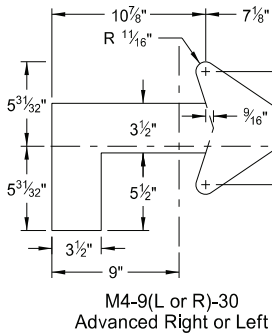
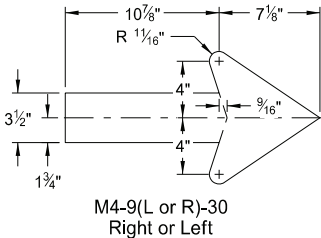
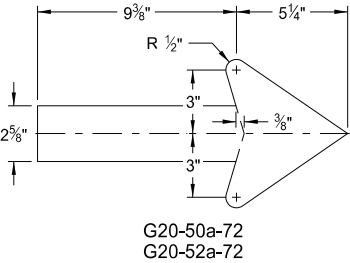
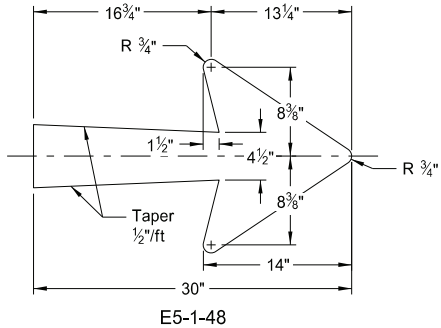
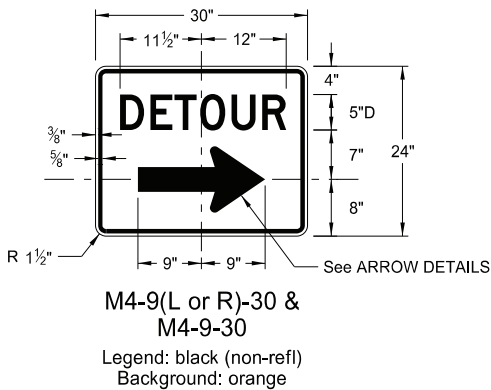
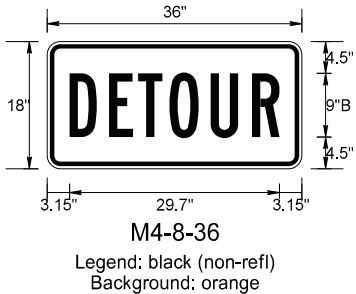
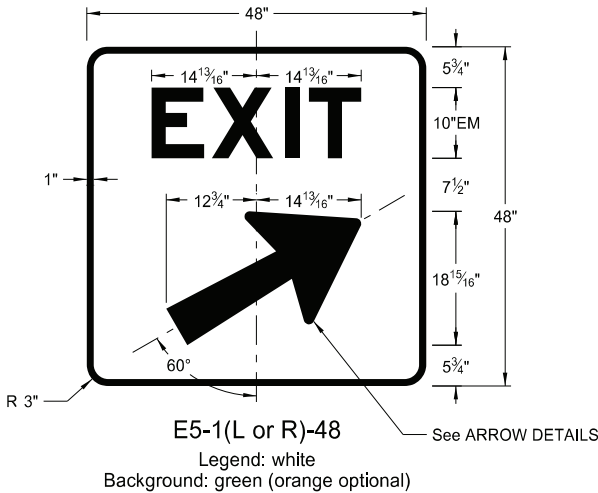
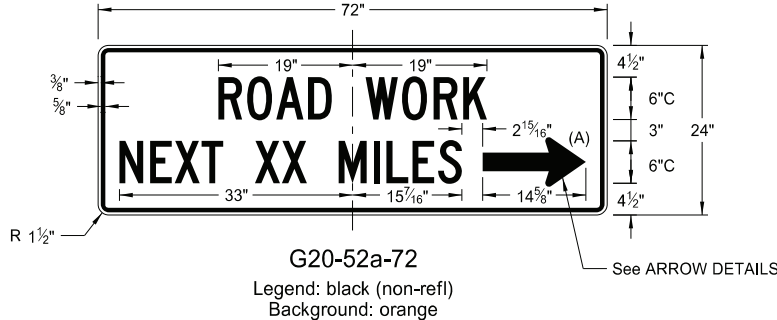
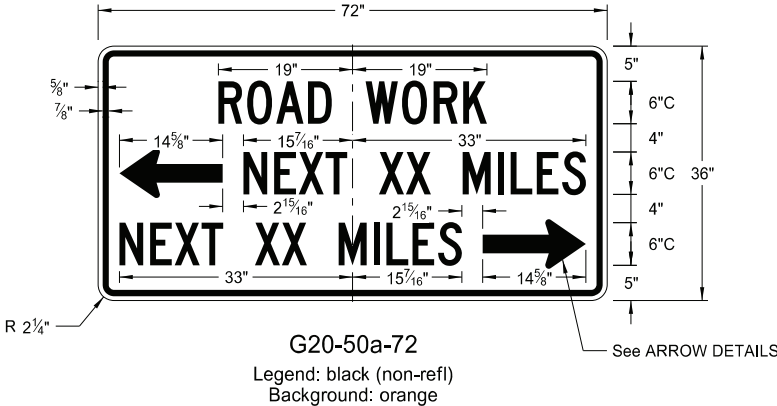
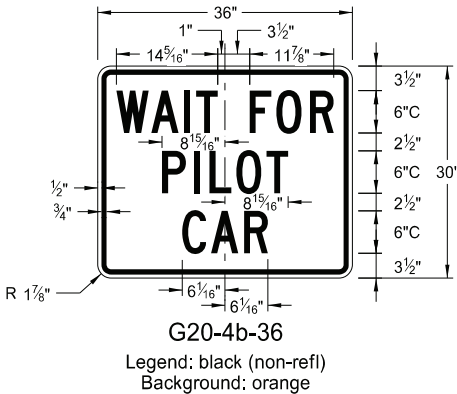
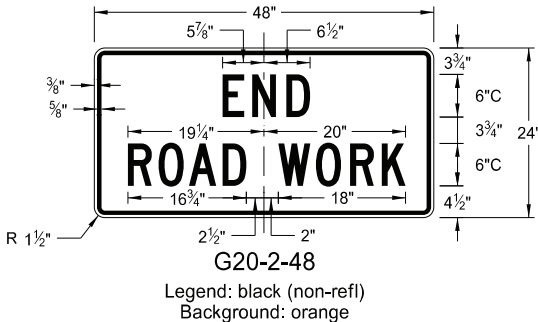
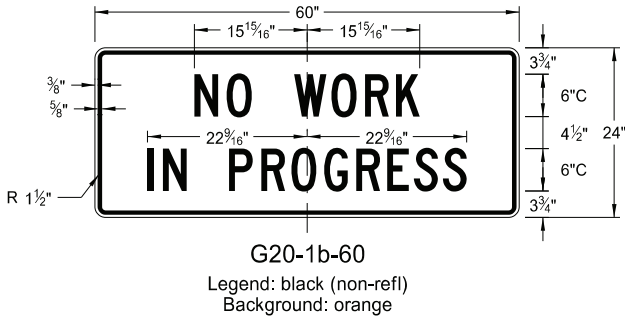
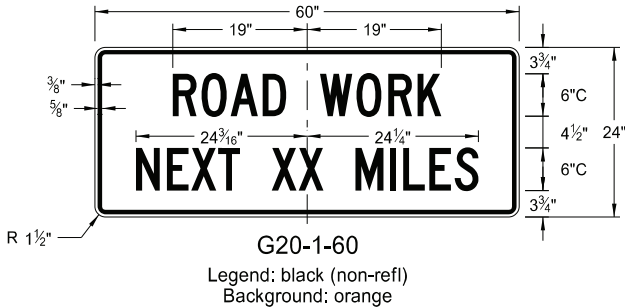
- a) Drive anchor unit to within 12" of ground level.
b) Establish proper assembly by lining up bottom hole of retainer strap with 6th hole from the top of the anchor unit.
c) Assemble strap to back of anchor unit using 5/16"x2" bolt, lock washer and nut.
d) Rotate strap 90° to left.
- a) Drive anchor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

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



08/01/24

CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS



ARROW DETAILS

NOTES:

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

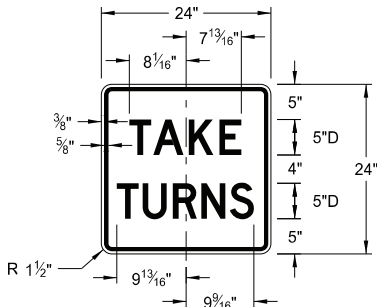
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
DATE	CHANGE
8-17-17	Added sign & background color
10-03-19	New Design Engineer PE Stamp
8-01-24	Electronic Stamp/Signature



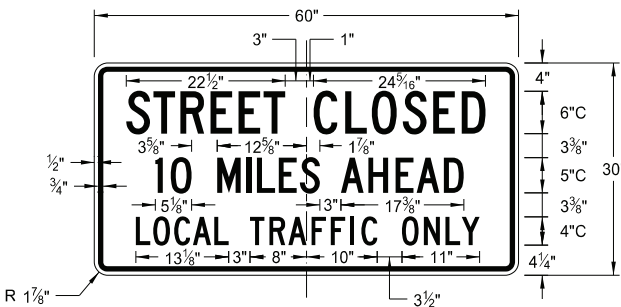
08/01/24

CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS

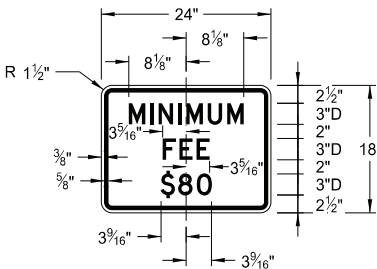
D-704-10



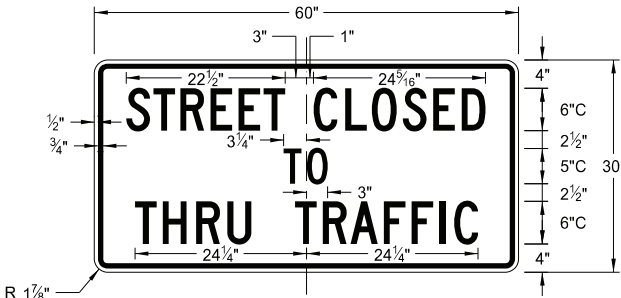
R1-50P-24
Legend: black (non-refl)
Background: white



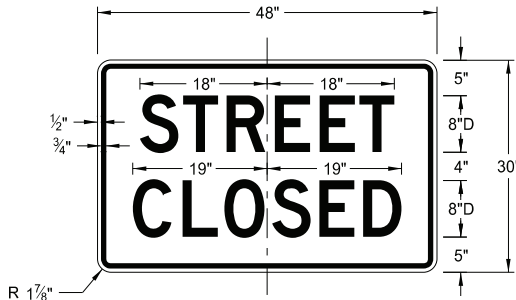
R11-3c-60
Legend: black (non-refl)
Background: white



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



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



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

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

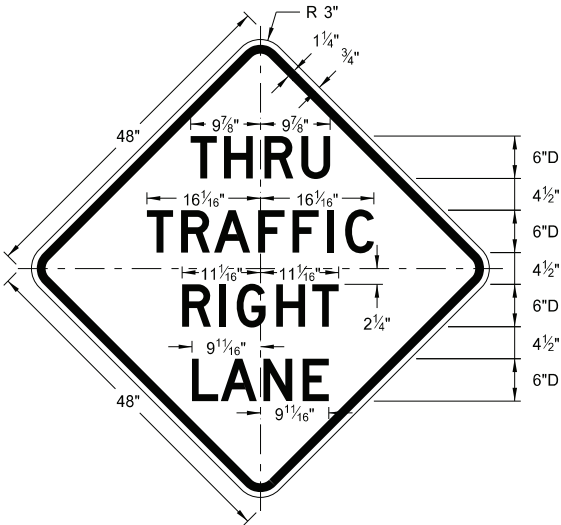


08/01/24

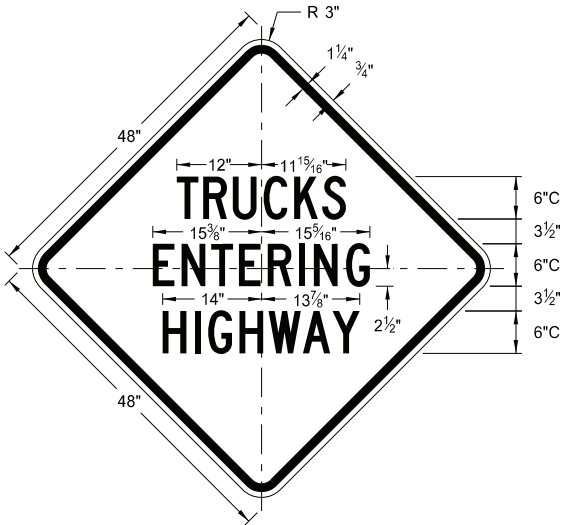
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

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

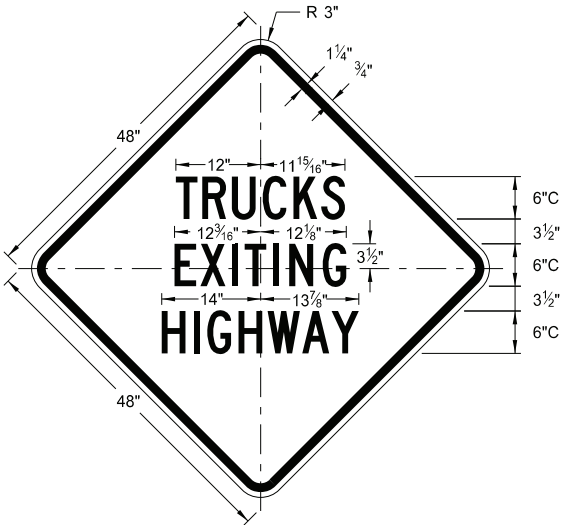
* DISTANCE MESSAGES



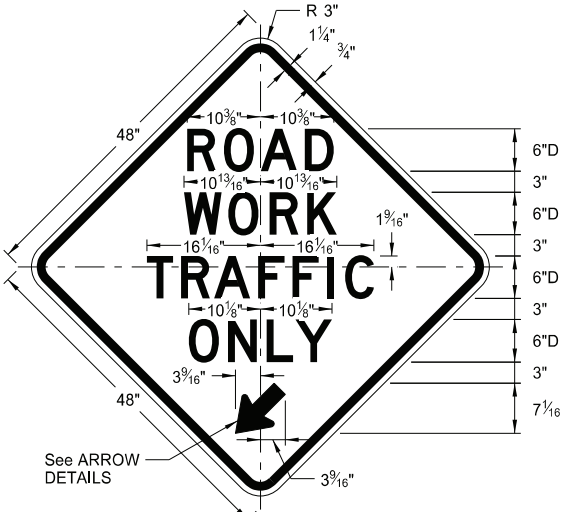
W5-8-48
Legend: black (non-refl)
Background: orange



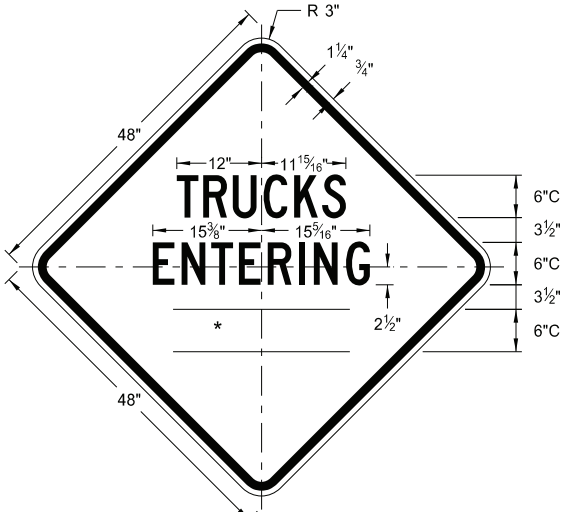
W8-53-48
Legend: black (non-refl)
Background: orange



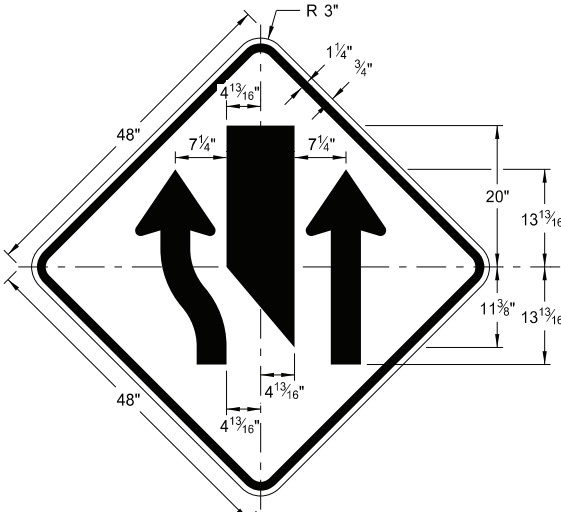
W8-56-48
Legend: black (non-refl)
Background: orange



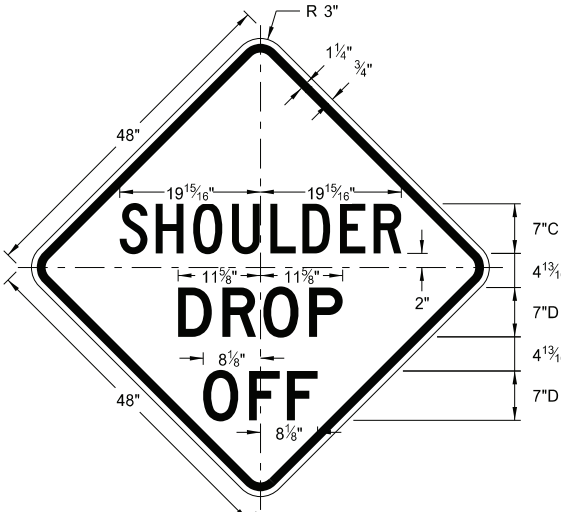
W5-9-48
Legend: black (non-refl)
Background: orange



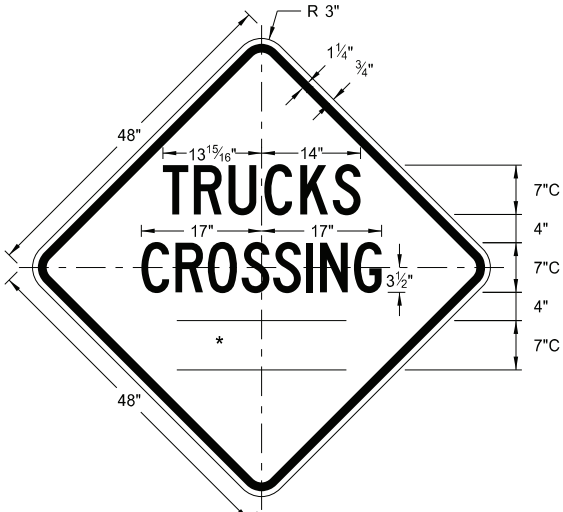
W8-54-48
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Background: orange



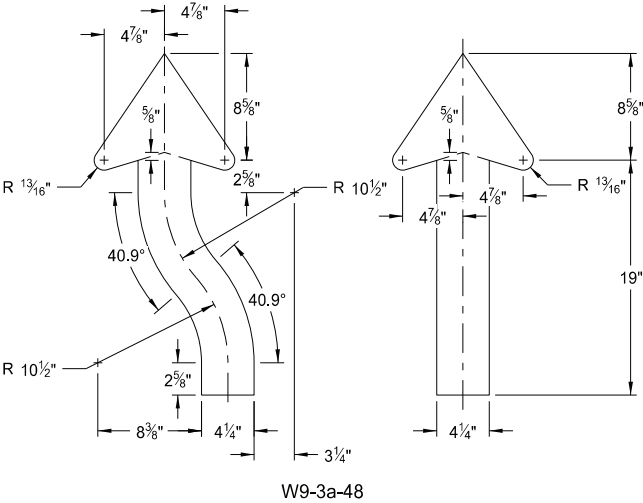
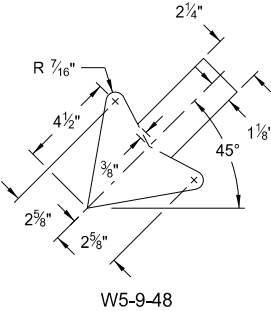
W9-3a-48
Legend: black (non-refl)
Background: orange



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



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



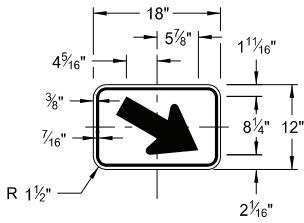
ARROW DETAILS

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

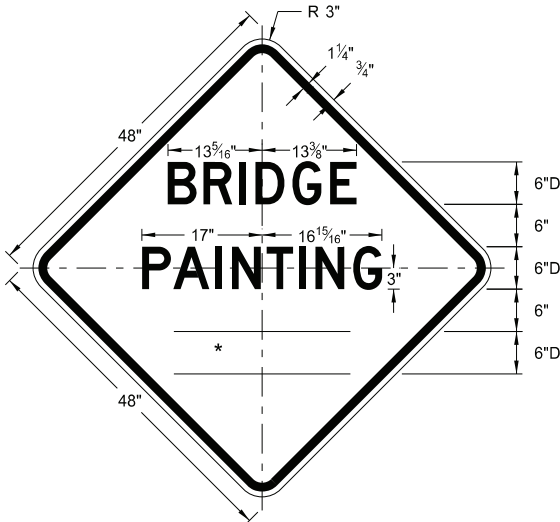


08/01/24

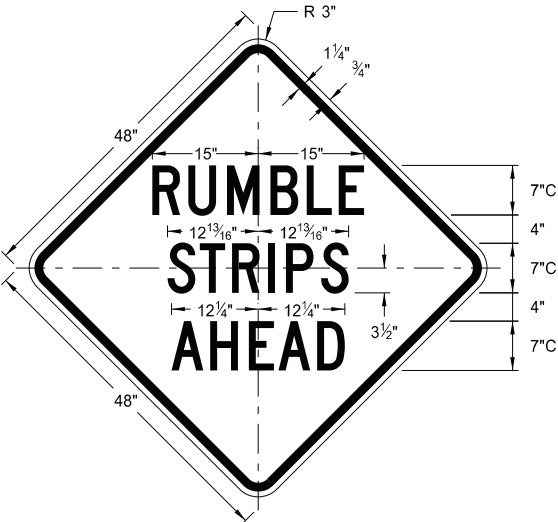
CONSTRUCTION SIGN DETAILS
WARNING SIGNS



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



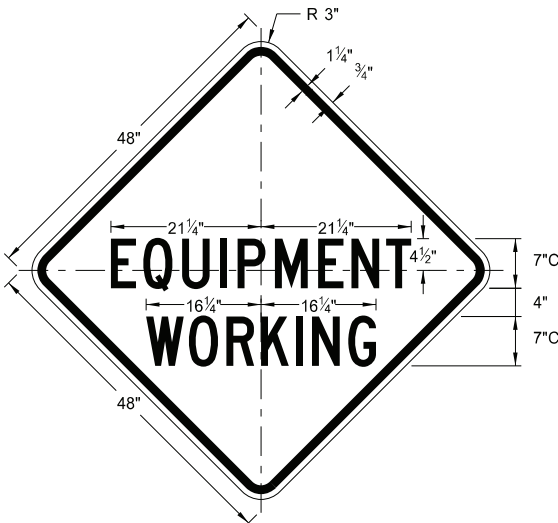
W21-50-48
Legend: black (non-refl)
Background: orange



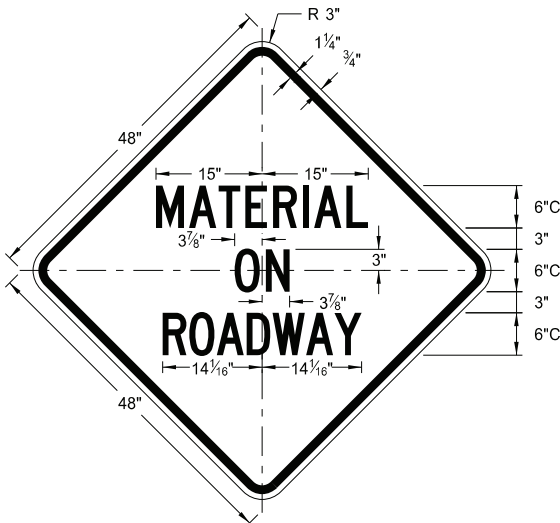
W21-53-48
Legend: black (non-refl)
Background: orange

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

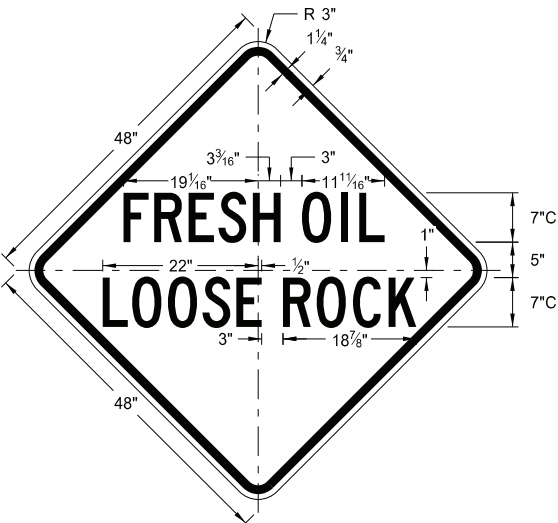
* DISTANCE MESSAGES



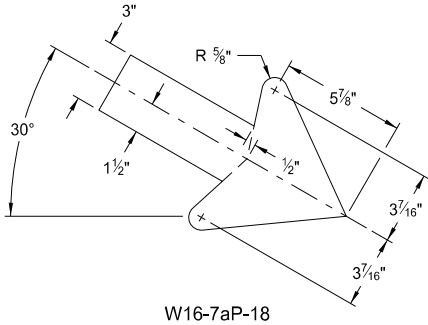
W20-51-48
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Background: orange



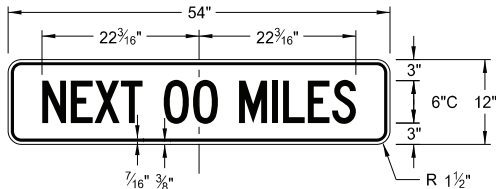
W21-51-48
Legend: black (non-refl)
Background: orange



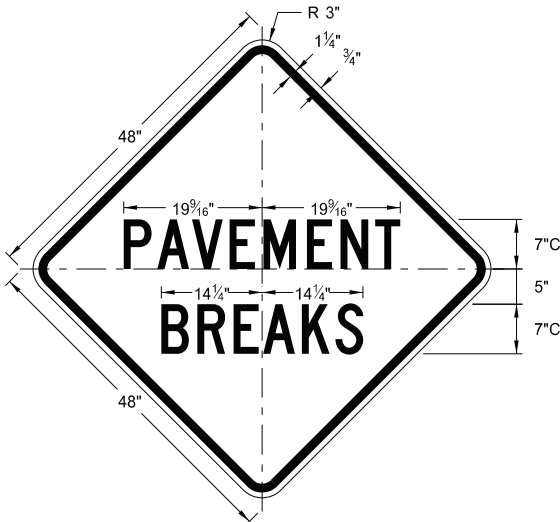
W22-8-48
Legend: black (non-refl)
Background: orange



W16-7aP-18



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



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

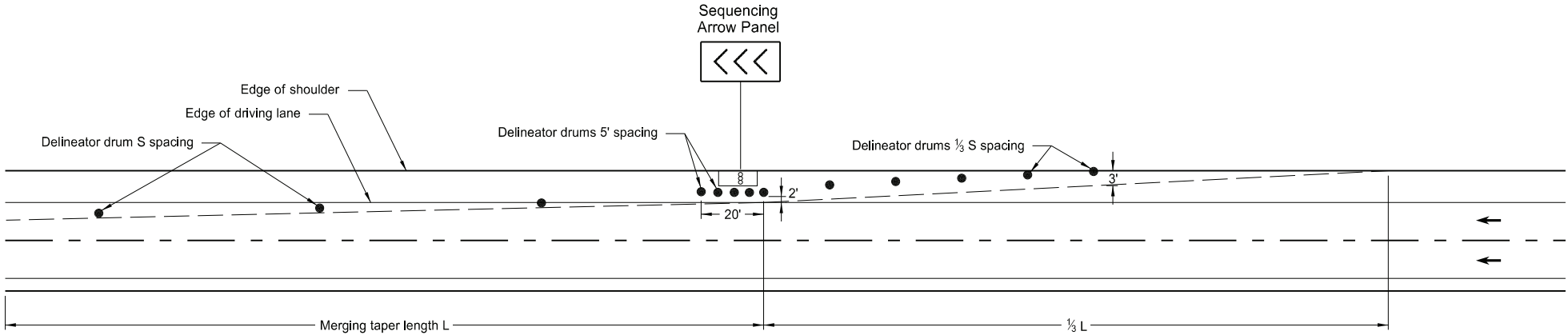
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
5-31-18	
REVISIONS	
DATE	CHANGE
11-01-19	Added details for sign W16-7aP-18.
8-01-24	Electronic Stamp/Signature.



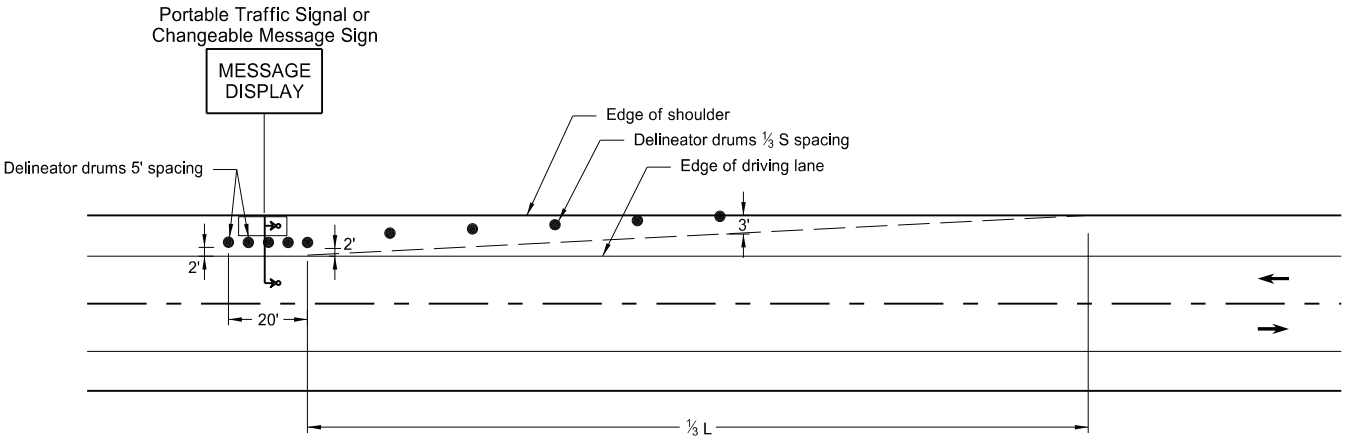
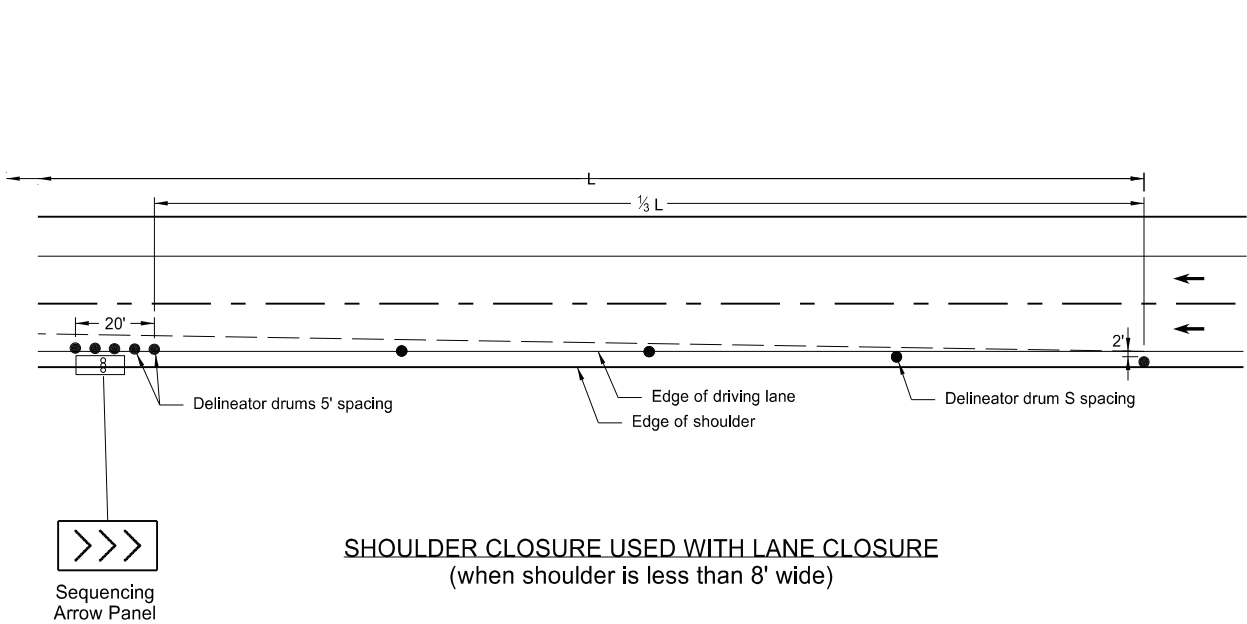
08/01/24

SHOULDER CLOSURE TAPERS

D-704-12



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



PORTABLE TRAFFIC SIGNAL OR CHANGEABLE MESSAGE SIGN ON SHOULDER

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

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

Notes:

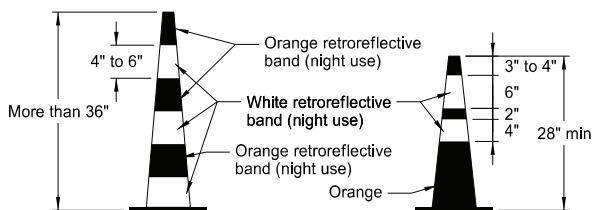
- S = Posted Speed Limit in mph
W = Width of offset in feet
L = Taper length in feet
L = WS²/60 (40mph or less)
L = WS (45mph or more)
- If a shoulder taper is used, use a length of approximately 1/3 L. If a shoulder is used as a travel lane, use a normal merging or shifting taper.
- When paved shoulders of 8 foot width or more are closed, use channelizing devices to close shoulder in advance, to delineate beginning of work space, and to direct vehicular traffic to remain within the traveled way.

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

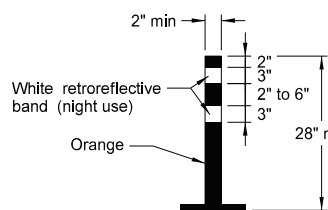


08/01/24

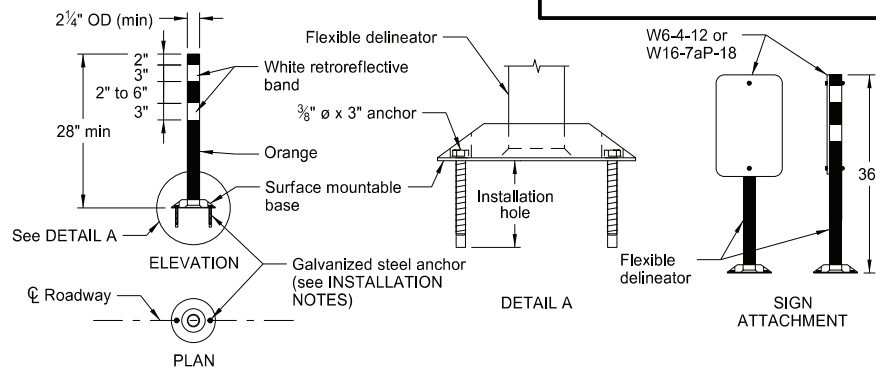
D-704-13



TRAFFIC CONE



TUBULAR MARKER



FLEXIBLE DELINEATOR

INSTALLATION NOTES:

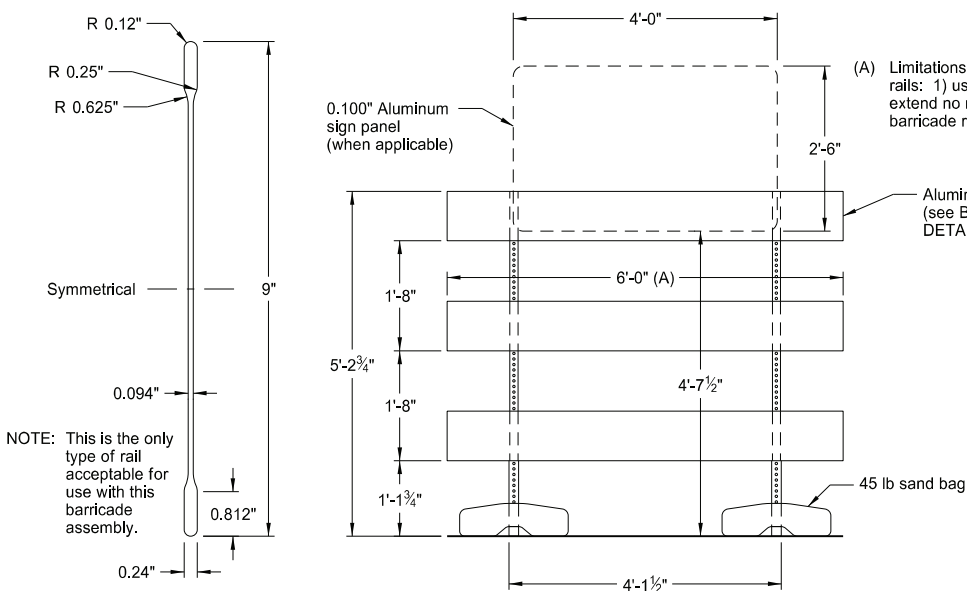
1. Drill installation holes to diameter and depth required by manufacturer's specifications.
2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
3. In lieu of bolted down base, use an 8" x 8" butyl pad or hot melt butyl. Remove butyl as close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

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

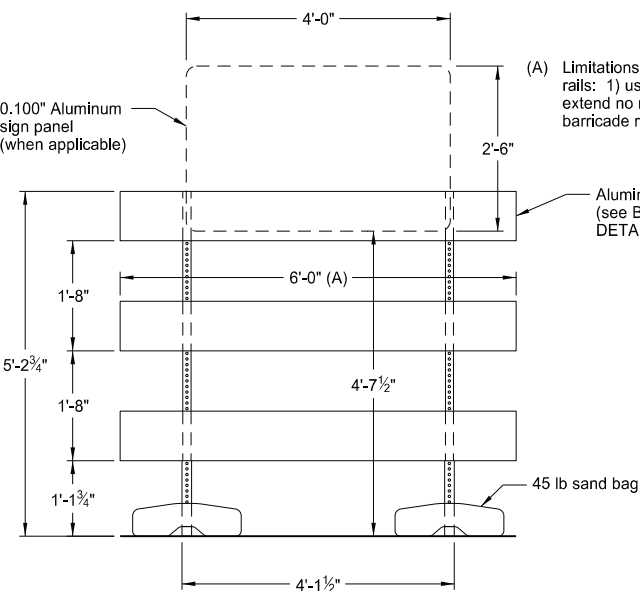
Provide alternating orange and white retroreflective stripes, sloping downward in direction vehicular traffic is to pass. Place retroreflective sheeting on both sides of panel with a minimum of 270 square inches of retroreflective area facing vehicular traffic. Where the height of the retroreflective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

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

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



BARRICADE BLADE DETAIL



ELEVATION VIEW

BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

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

Aluminum barricade rail
(see BARRICADE BLADE
DETAIL)

Attach barricade rails to
uprights with 2" corner
bolts

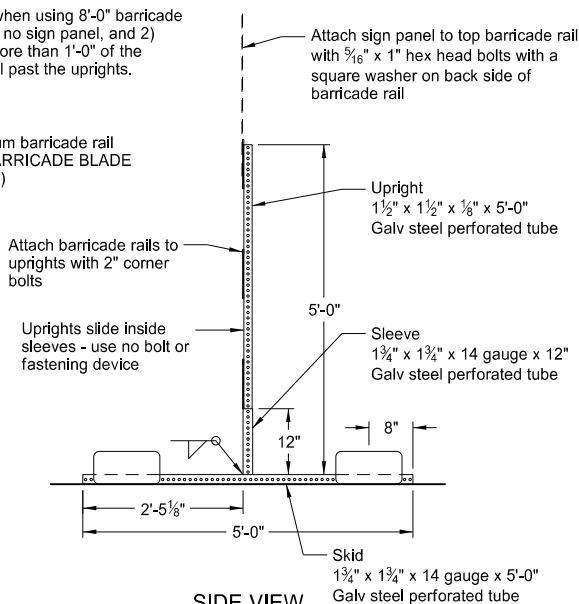
sleeves - use no bolt or
fastening device

- Attach sign panel to top barricade rail with $\frac{5}{16}$ " x 1" hex head bolts with a square washer on back side of barricade rail

right
" x 1½" x ⅛" x 5'-0"
lv steel perforated tube

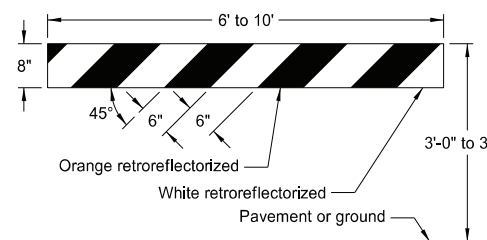
1" x 1 3/4" x 14 gauge x 12
stainless steel perforated tube

Skid
1 3/4" x 1 3/4" x 14 gauge x 5'-0"
Galv steel perforated tube



SIDE VIEW

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

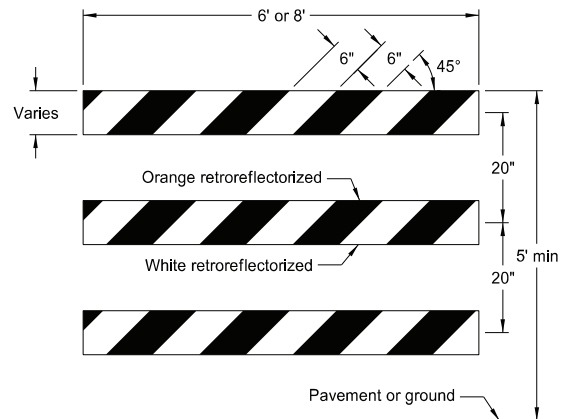


TYPE I BARRICADE

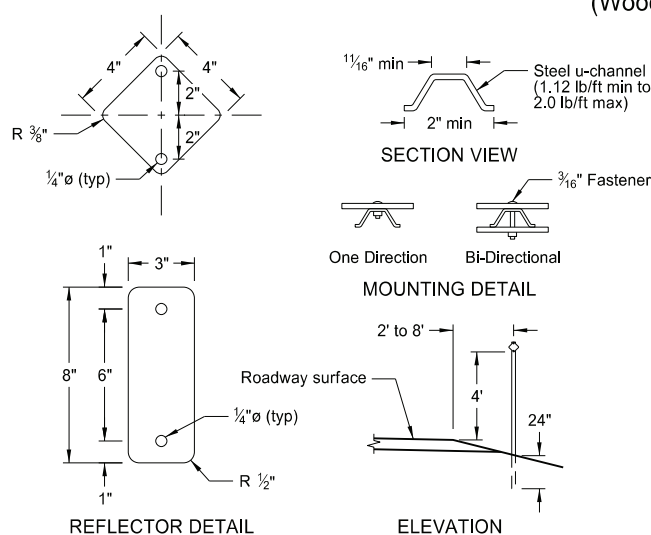
Diagram illustrating the double chevron taper for a 3'-0" to 3'-6" wide area. The chevrons are 6" wide and 8" high. The distance between the start of the two rows is 2' min. The angle of the chevrons is 45°. The top row is labeled "Orange retroreflectORIZED" and the bottom row is labeled "White retroreflectORIZED". The total width of the area is 3'-0" to 3'-6".

TYPE II BARRICADE

BARRICADE RAIL DETAILS



TYPE III BARRICADE



DELINEATORS

BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

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.

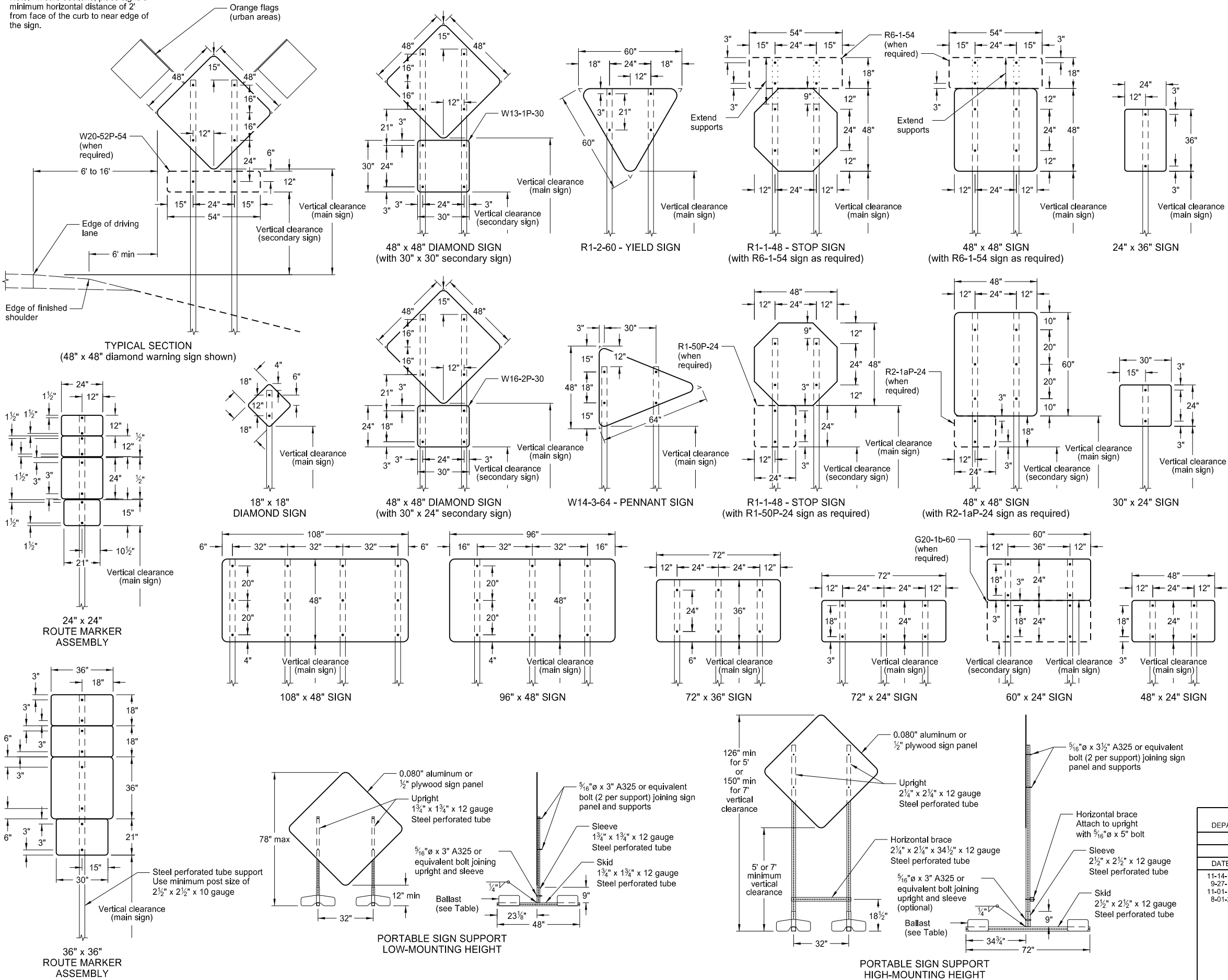
NORTH DAKOTA	
DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
9-27-17	Updated to active voice
11-01-19	Revised details for Flexible Delineator
8-01-24	Electronic Stamp/Signature



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

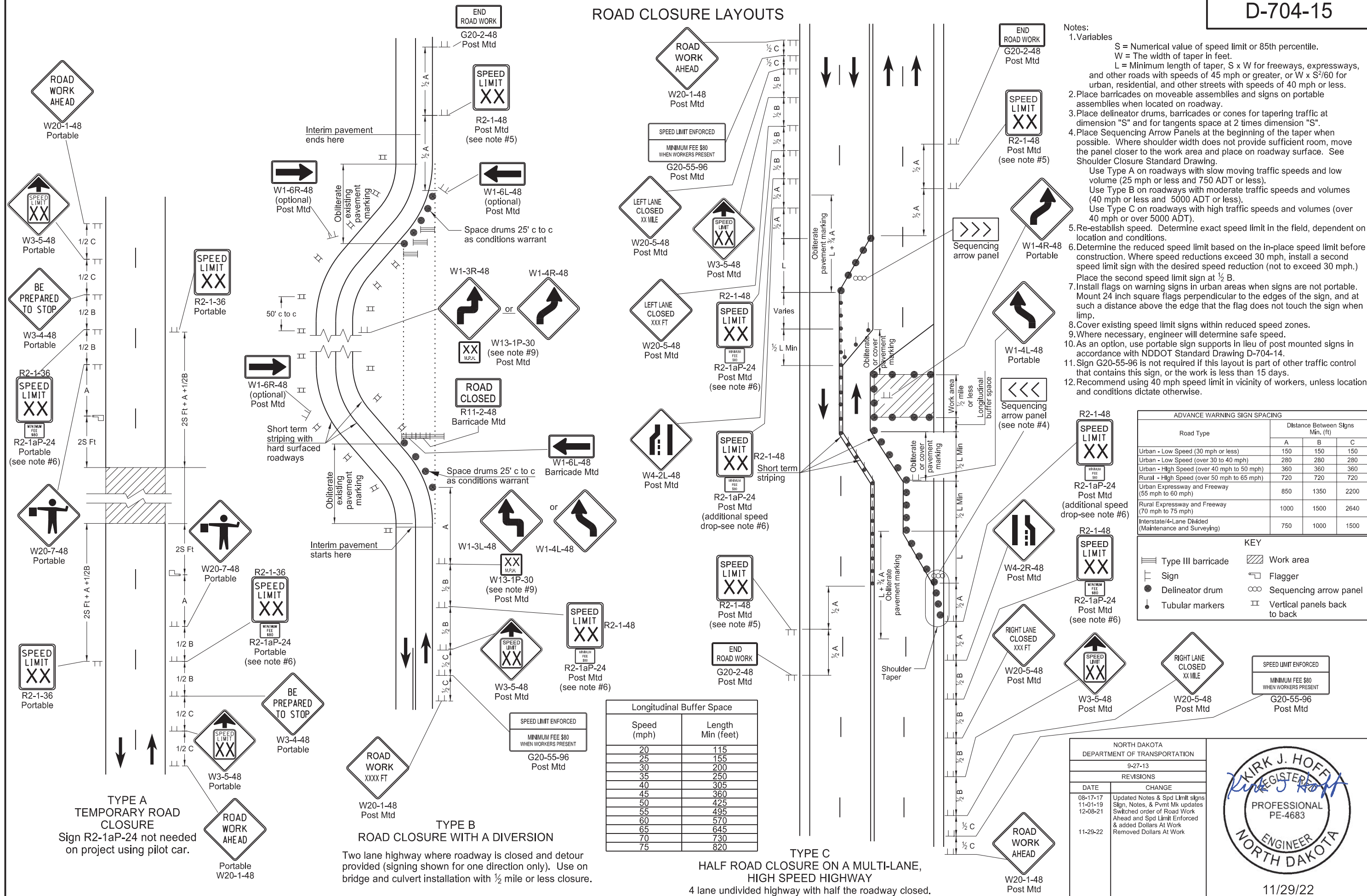
Note: The number of sandbags are based on a wind speed of 55 MPH. Place sandbags at or near the ends of skids.

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 LAYOUTS



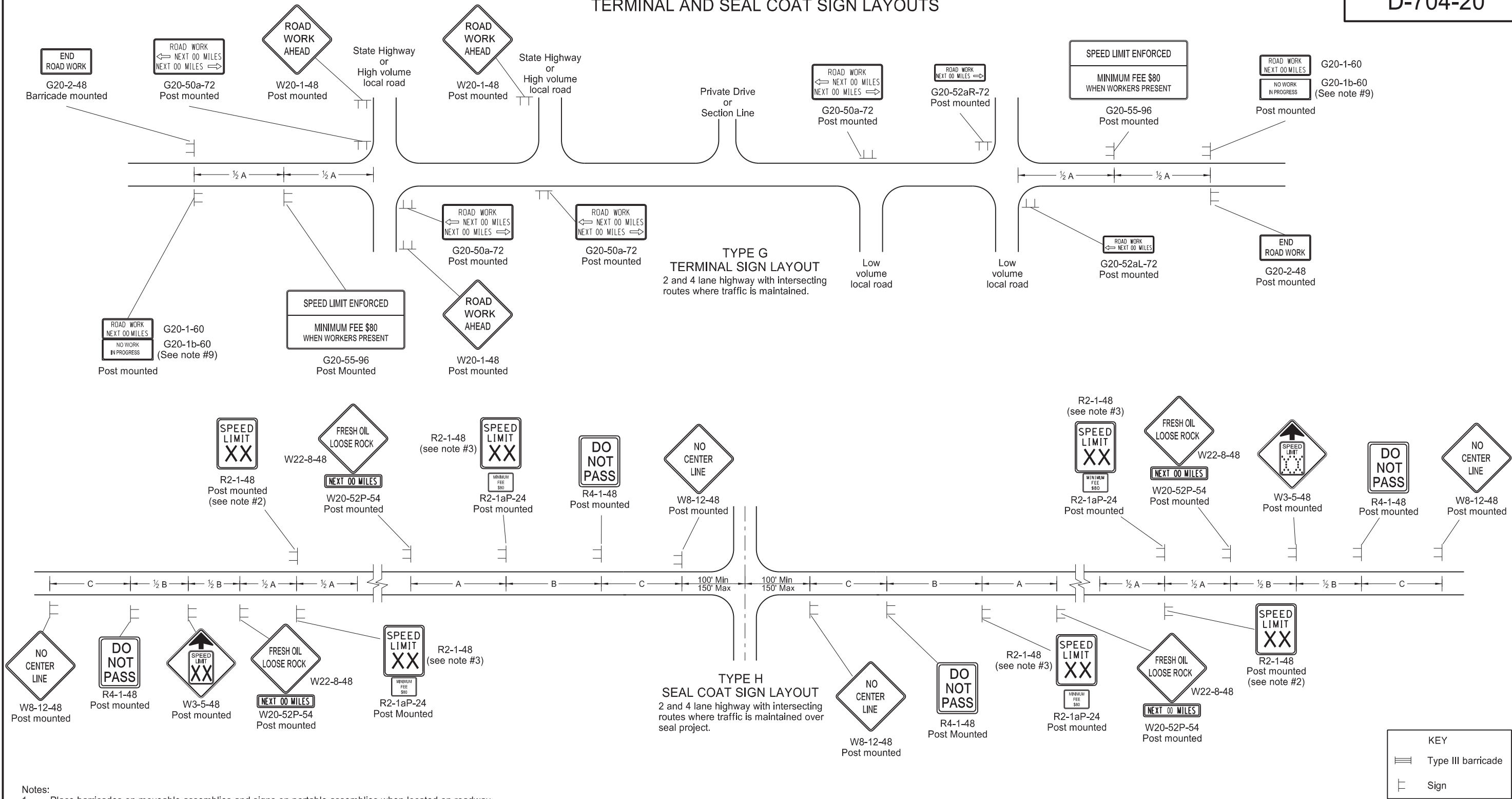
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION
9-27-13
REVISIONS
DATE CHANGE
08-17-17 Updated Notes & Spd Limit signs
11-01-19 Sign, Notes, & Pmt Mk updates
12-08-21 Switched order of Road Work
Ahead and Spd Limit Enforced
& added Dollars At Work
11-29-22 Removed Dollars At Work



11/29/22

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

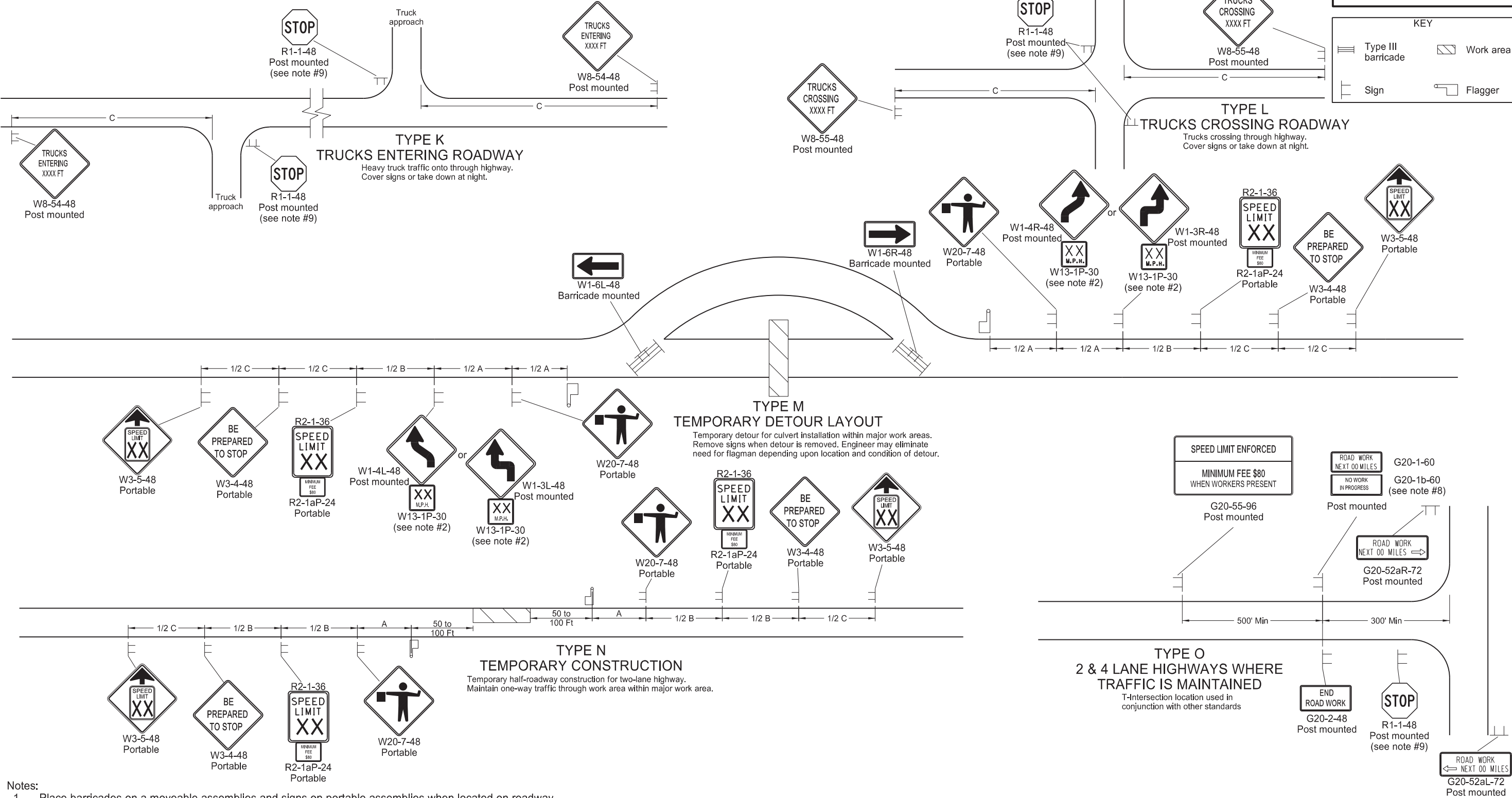
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Updated notes & sign numbers
11-01-19	Updated note & sign
12-08-21	Switched order of Road Work and Spd Limit Enforced & added Dollars At Work
11-29-22	Removed Dollars At Work



11/29/22

CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22



Notes:

- Place barricades on a moveable assemblies and signs on portable assemblies when located on roadway.
- Where necessary, safe speed to be determined by the Engineer.
- Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 mph, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2 B.
- Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
- Cover existing speed limit signs within a reduced speed zone.
- 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.
- Install sign G20-1b-60 when work is suspended for winter.
- If existing stop sign is in place, a 48" stop sign is not required.
- Sign G20-55-96 is not required if layout is part of other traffic control that contains this sign, or if work is less than 15 days.
- Recommend using 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.

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

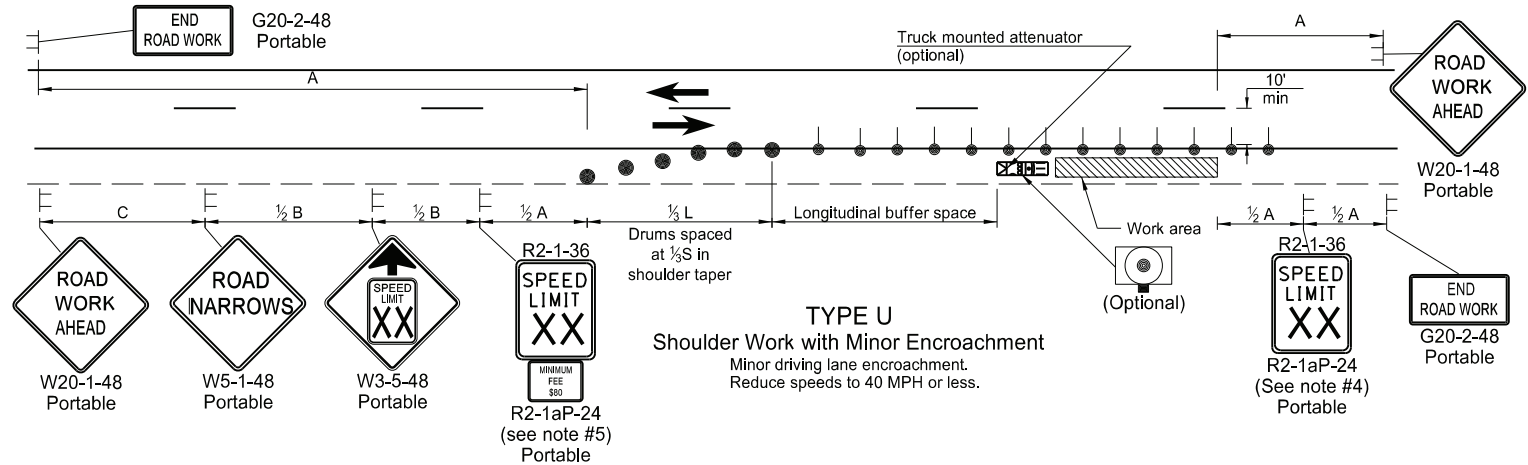
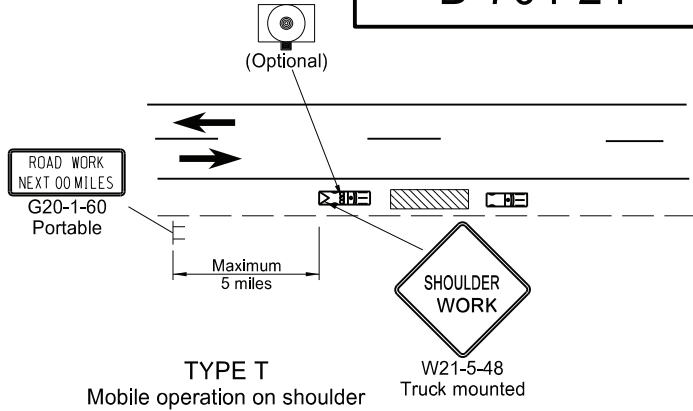
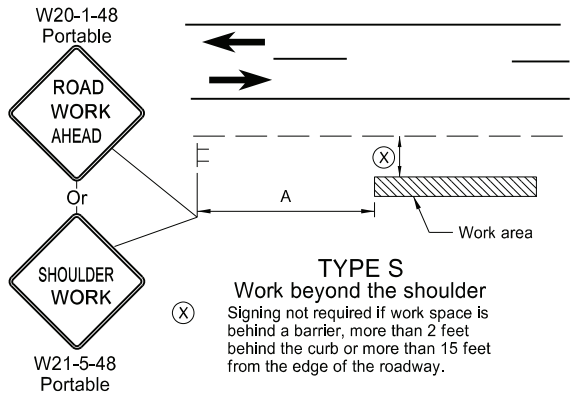
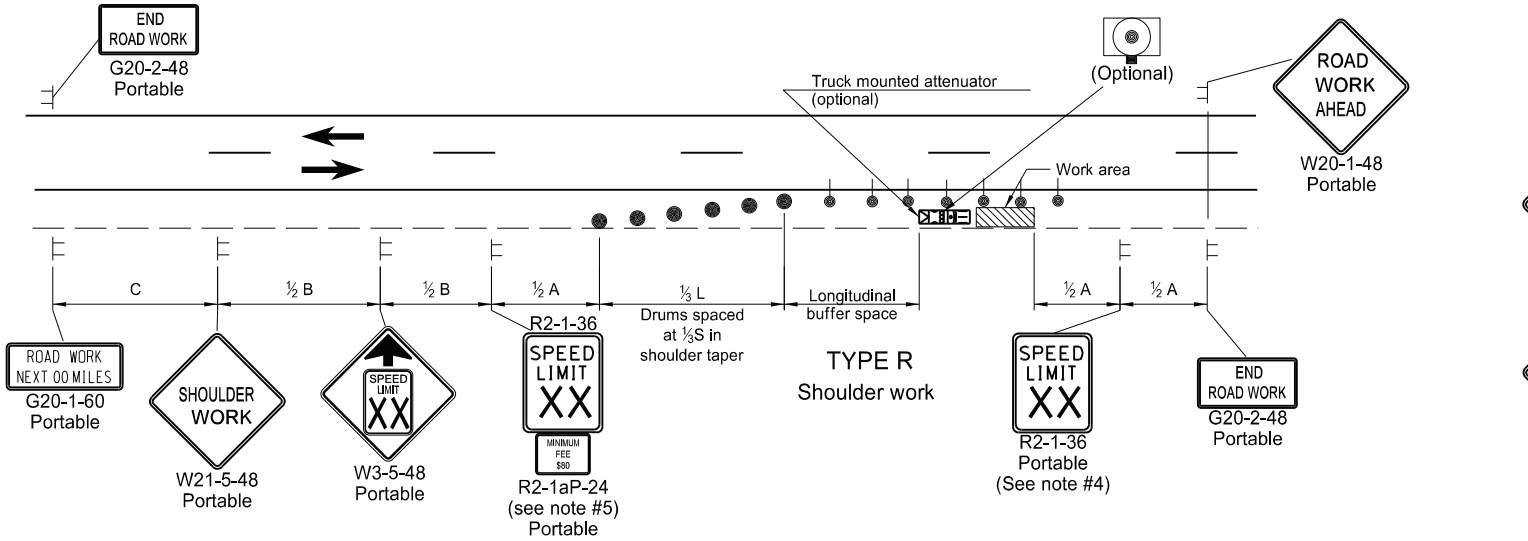
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
08-17-17	Update notes & sign numbers
11-01-19	Revised sign numbers & note 7
12-09-21	Added Speed Limit Enforced and Dollars At Work signs
11-29-22	Removed Dollars At Work



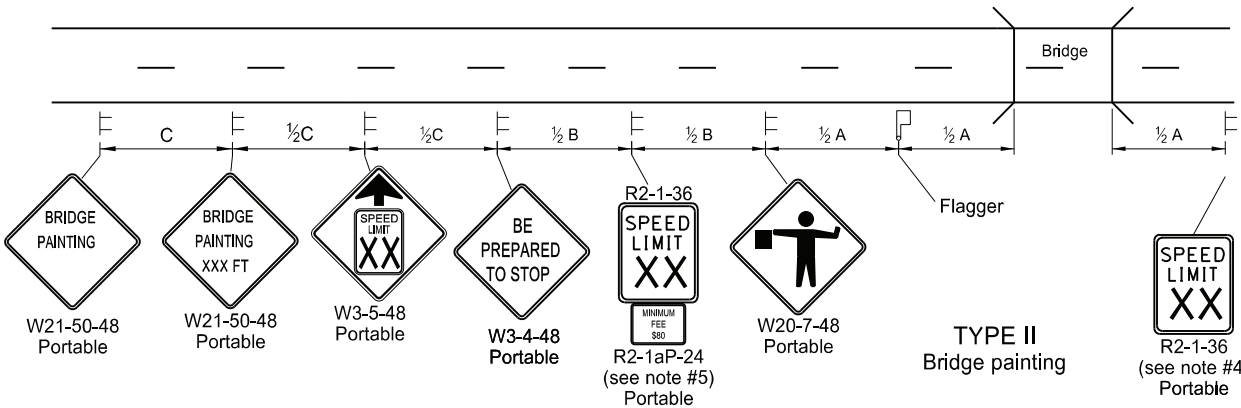
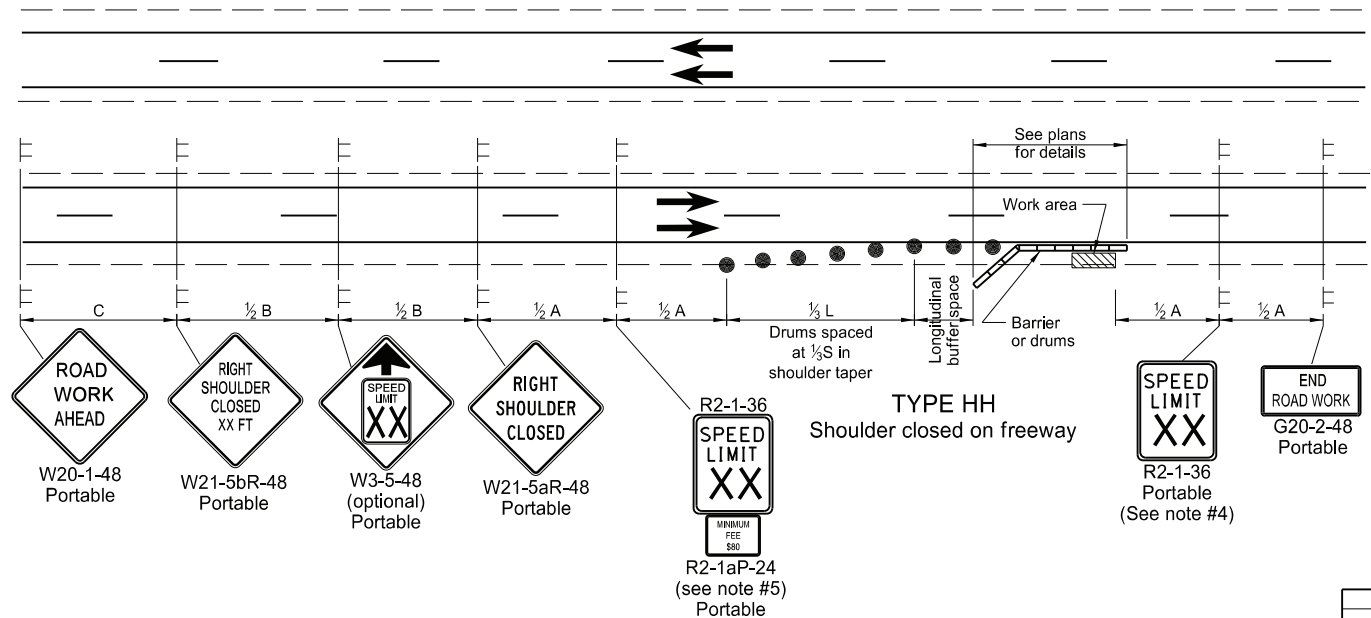
11/29/22

SHOULDER CLOSURES AND BRIDGE PAINTING LAYOUTS

D-704-24



- Notes
- Variables
 - S = Numerical value of speed limit or 85th percentile.
 - W = The width of the taper in feet.
 - L = Minimum length of taper, $S \times W$ for freeways, expressways, and all other roads with speeds of 45 mph or greater, or $W \times S^2/60$ for urban, residential, and other streets with speeds of 40 mph or less.
 - Space delineator drums for tapering traffic at dimension "S". Space delineator drums or tubular markers for tangents at 2 times "S".
 - Sequencing Arrow Panels
 - Use Type A on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
 - Use Type B on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
 - Use Type C on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
 - Re-establish speed limit. Determine exact speed limit in the field, dependent on location and conditions.
 - Determine the reduced speed limit based on the in-place speed limit before construction. Where speed reductions exceed 30 MPH, install a second speed limit sign with the desired speed reduction (not to exceed 30 mph.) Place the second speed limit sign at 1/2 B.
 - Install flags on warning signs in urban areas when signs are not portable. Mount 24 inch square flags perpendicular to the edges of the sign, and at such a distance above the edge that the flag does not touch the sign when limp.
 - Cover existing speed limit signs within a reduced speed zone.
 - As an option, use portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Drawing D-704-14.
 - Recommend 40 mph speed limit in vicinity of workers, unless location and conditions dictate otherwise.



KEY

- Sign
- Delineator Drum
- Sequencing Arrow Panel (Caution Mode)
- Work area
- Tubular Marker

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

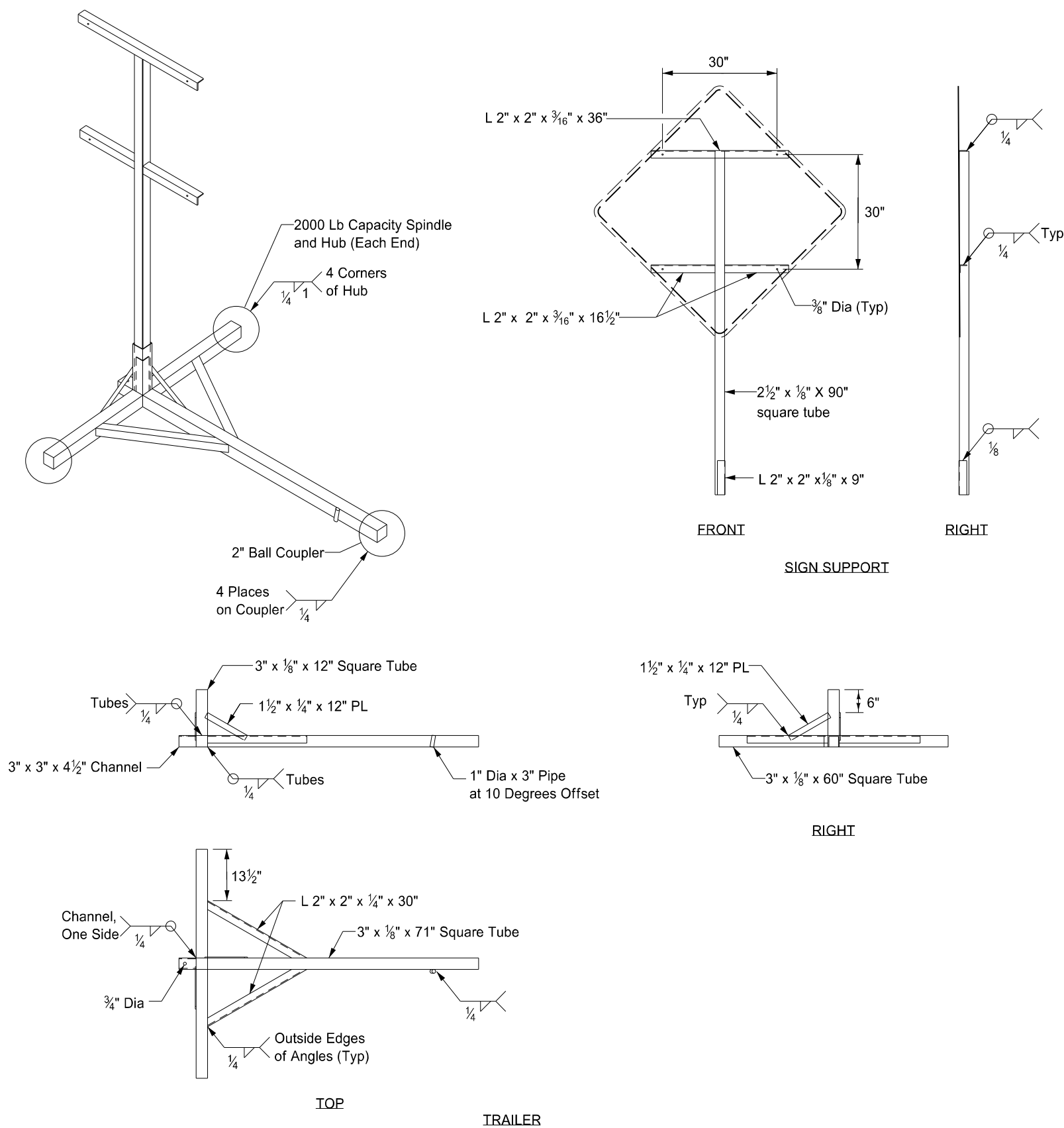
Longitudinal Buffer Space	
Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
8-17-17	Updated notes & revised signs
11-01-19	Revised drum spacing & signs nos.
8-01-24	Electronic Stamp/Signature

KIRK J. HOFF
REGISTERED
PROFESSIONAL
PE-4683
ENGINEER
NORTH DAKOTA
08/01/24

PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



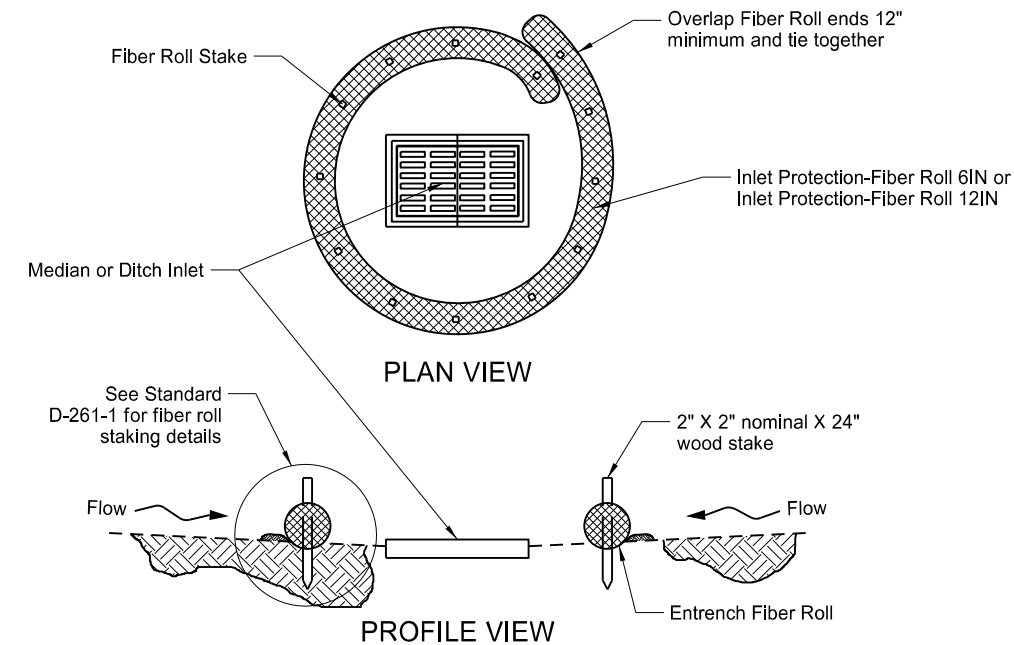
Notes:

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

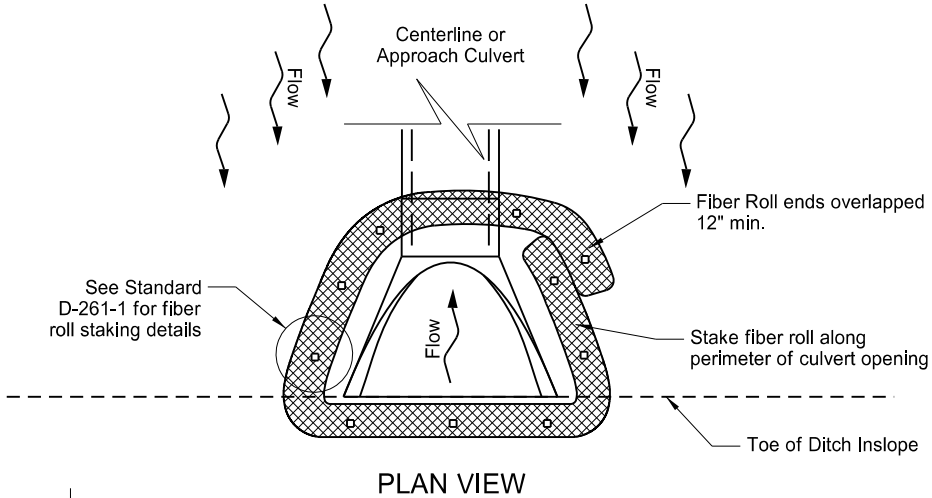
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-23-10	
REVISIONS	
DATE	CHANGE
12/02/2020	Updated Note to active voice.



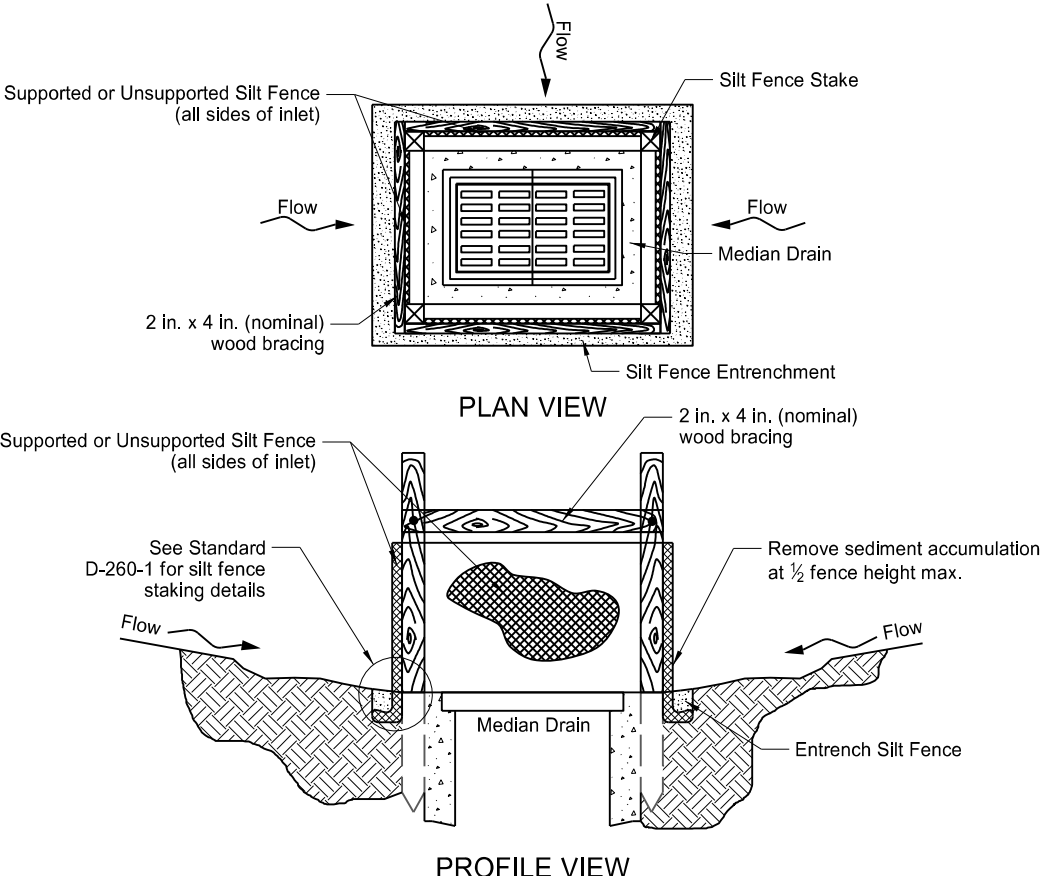
EROSION AND SILTATION CONTROLS
MEDIAN OR DITCH INLET PROTECTION



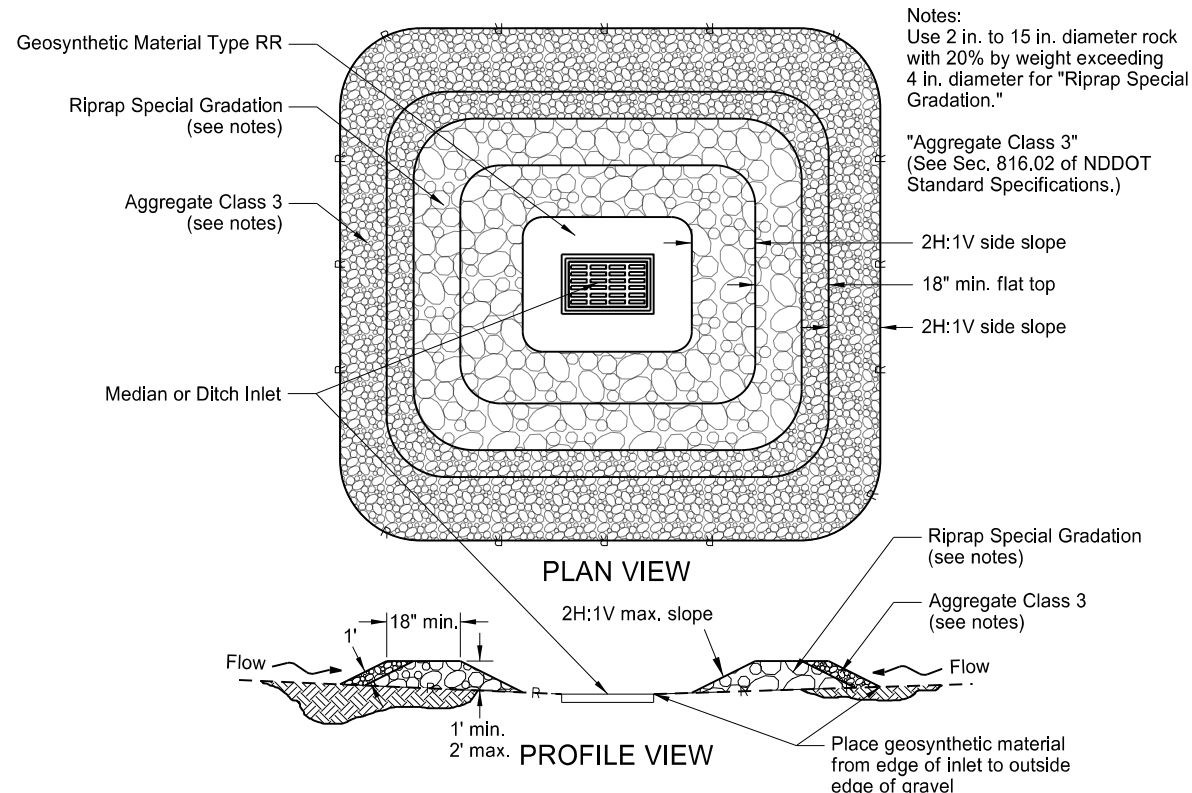
FIBER ROLL PROTECTION
(MEDIAN OR DITCH INLET)



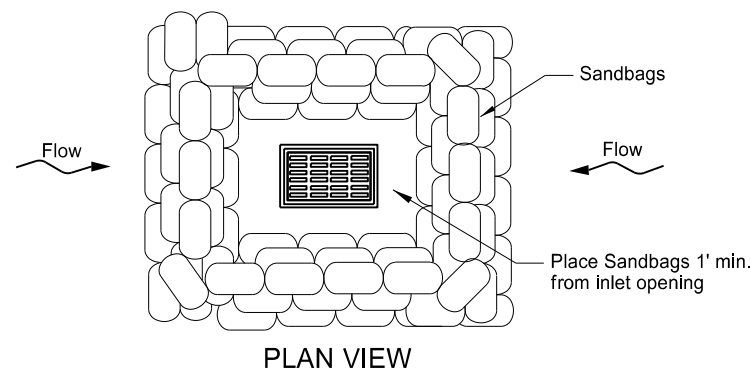
FIBER ROLL PROTECTION
(INLET OF CULVERT)



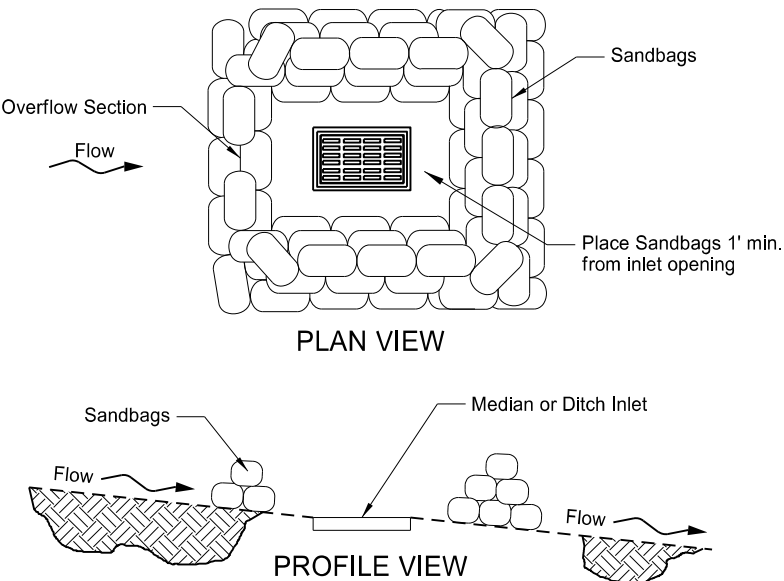
SILT FENCE PROTECTION
(MEDIAN OR DITCH INLET)



GRAVEL INLET PROTECTION
(MEDIAN OR DITCH INLET)



SANDBAG PROTECTION
(LOW POINT)

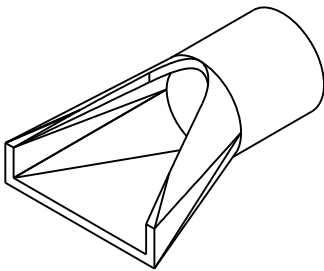


SANDBAG PROTECTION
(ON SLOPE)

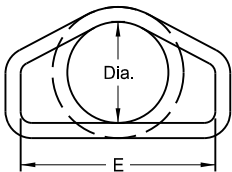
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Updated reference to standard drawing number for fiber roll staking details.
10-01-14	Updated reference to standard drawing number for silt fence.
10-17-17	Updated to active voice.
08-27-19	New Design Engineer PE Stamp.

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

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

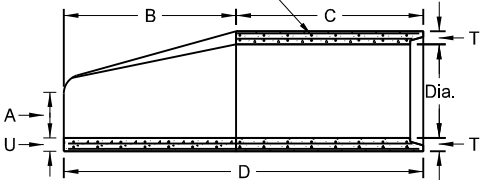


PERSPECTIVE

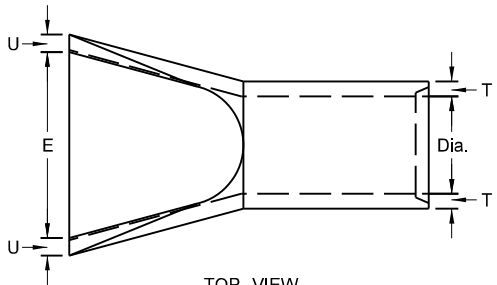


END VIEW

Standard Reinforcement for Class III pipe reinforced as per AASHTO M170



SIDE VIEW



TOP VIEW

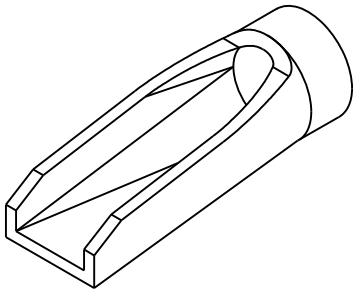
NOTES:

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

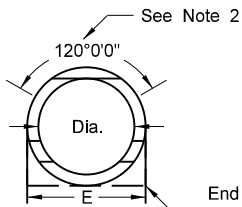
REINFORCED CONCRETE PIPE - FLARED END SECTION

Reinforcement to be equivalent to Class III RCP

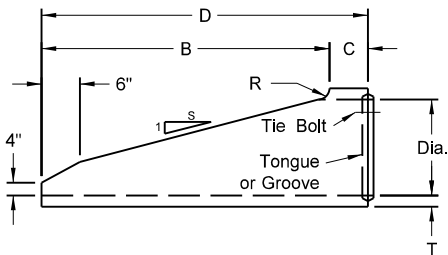
TRAVERSABLE END SECTION						
DIA	B	C	D	E	R	S
15"	4'	9"	4'-9"	1'-7 ¹ / ₂ "	3"	6
18"	5'-9"	9"	6'-6"	1'-11"	3"	6
24"	6'	1'	7'	2'-6"	3"	4
30"	7'-6"	1'	8'-6"	3'-1"	3 ¹ / ₂ "	4
36"	7'-3"	15"	8'-6"	3'-8"	3"	4



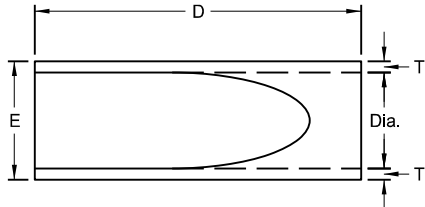
PERSPECTIVE



END VIEW



SIDE VIEW



TOP VIEW

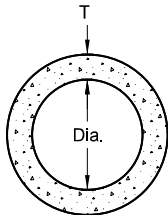
NOTES (Traversable End Section):

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

REINFORCED CONCRETE PIPE - TRAVERSABLE END SECTION

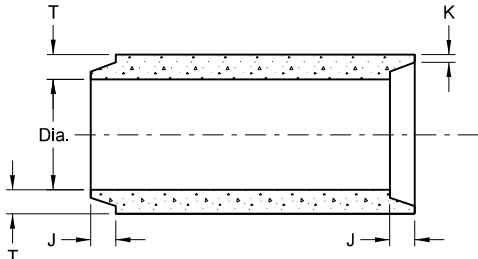
Reinforcement to be equivalent to Class III RCP

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

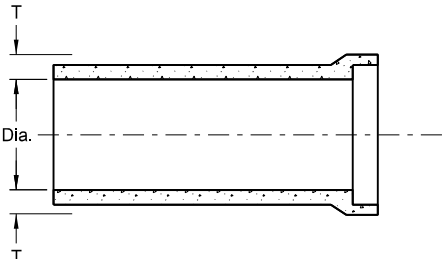


END VIEW

CIRCULAR PIPE

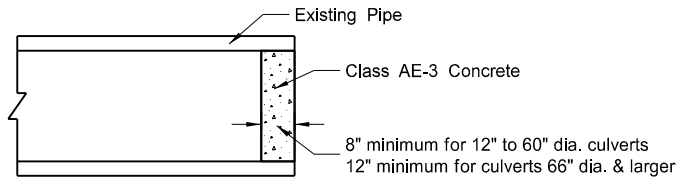


TONGUE & GROOVE JOINT



BELL & SPIGOT JOINT

JOINTS FOR REINFORCED CONCRETE PIPE



CONCRETE PIPE PLUG

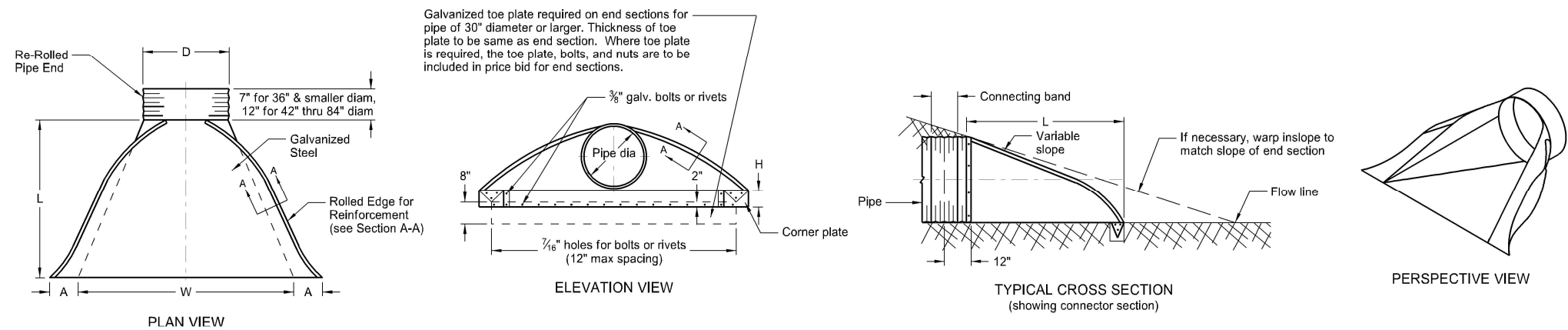
SEE STANDARD DRAWING D-714-22 FOR DETAILS OF CONCRETE PIPE TIES (TIE BOLTS).

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

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

ROUND CORRUGATED STEEL PIPE CULVERTS AND END SECTIONS

D-714-4



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

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

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

Manufacturers tolerances of above dimensions will be allowed.

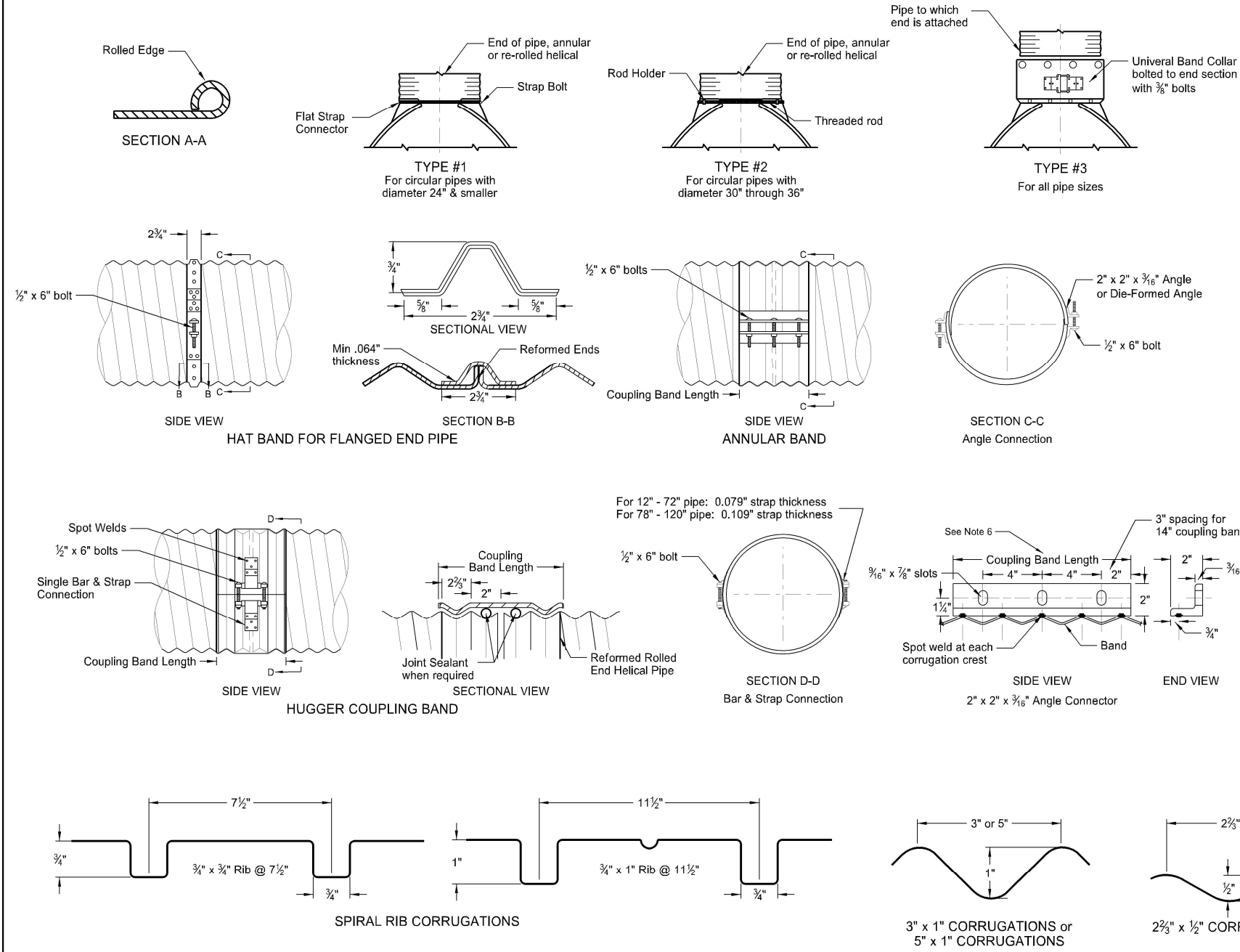
Splices to be the lap riveted type.

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

NOTES:

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

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



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

Professional Engineer Seal for Nathan D Kettering, State of North Dakota, License No. PE-4684. The seal is circular with the text 'NORTH DAKOTA ENGINEER' and 'NATHAN D KETTERING' around the perimeter. The date '09/23/22' is stamped at the bottom.

Welded eye or approved equal

Outside of Pipe (typ)

Inside of Pipe (typ)

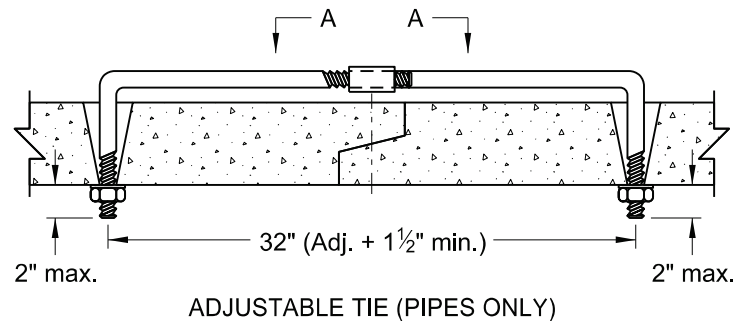
2" max.

32" (Adj. + 1½" min.)

2" max.

EYE BOLT TIE (PIPES ONLY)

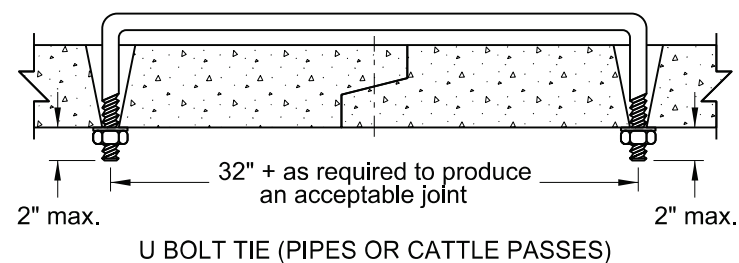
EYE BOLT TIE (PIPES ONLY)



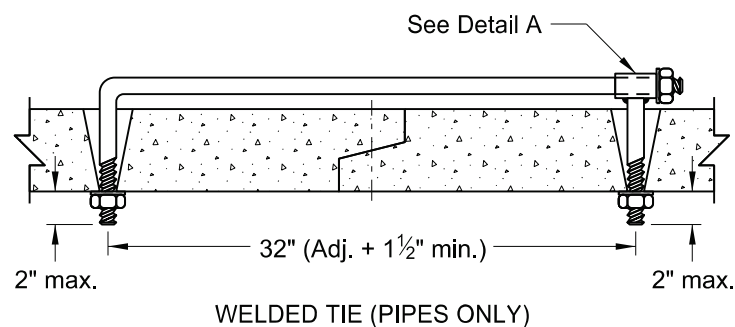
ADJUSTABLE TIE (PIPES ONLY)

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

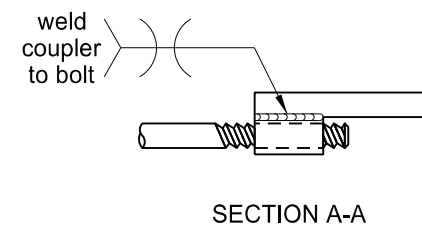
1. The pipe size listed is the inside diameter of round pipe or the equivalent diameter of pipe arch.
2. Insert pipe ties from the inside of the pipes and grout into place for Cattle Pass and Jacked and Bored pipes. Jacked and bored pipes with a diameter of 24" or less do not require pipe ties.
3. Nuts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



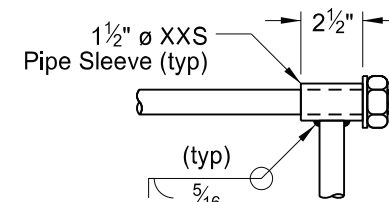
U BOLT TIE (PIPES OR CATTLE PASSES)



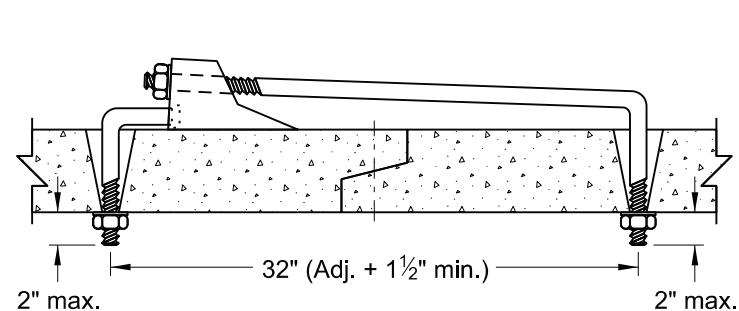
WELDED TIE (PIPES ONLY)



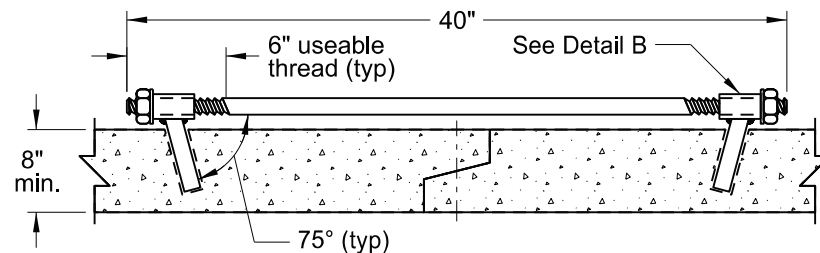
SECTION A-A



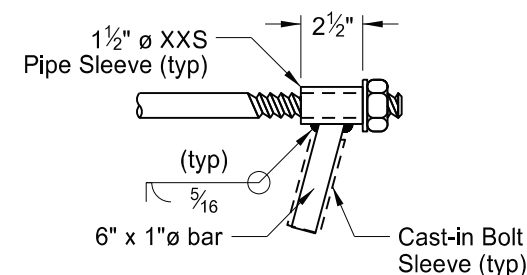
DETAIL A



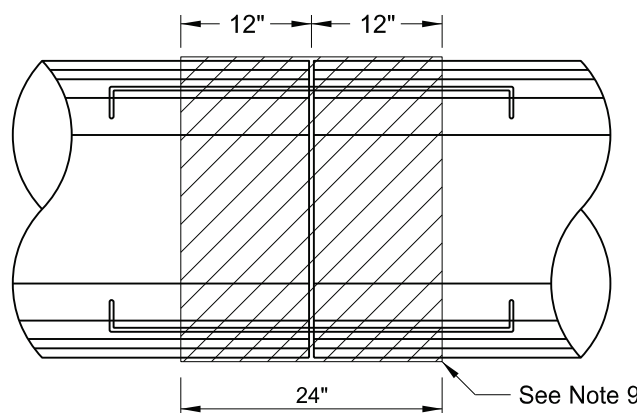
CANOPY TIE (PIPES ONLY)



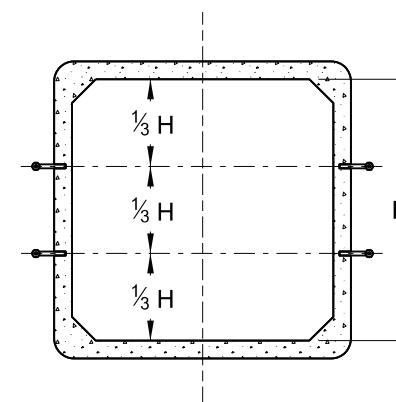
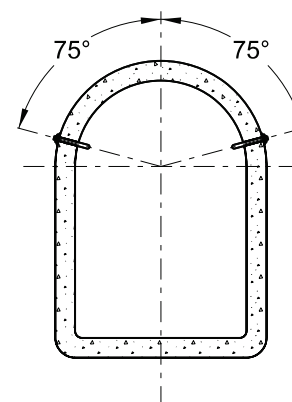
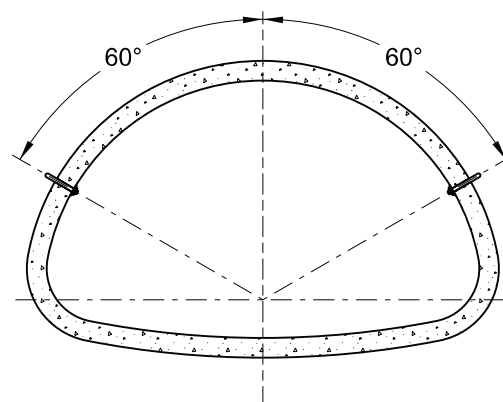
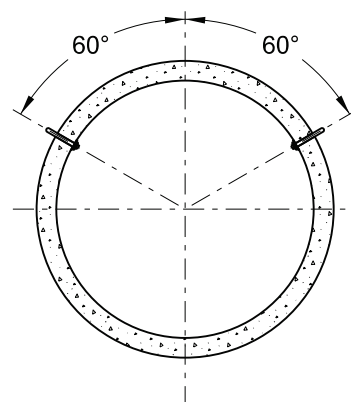
HIDDEN TIE (RCB ONLY)



DETAIL B

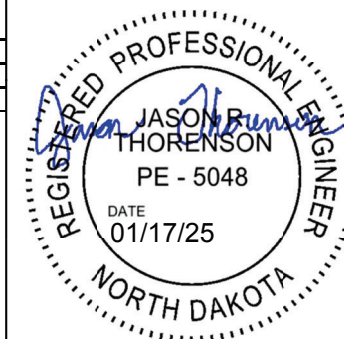


PLAN VIEW (PIPES ONLY)

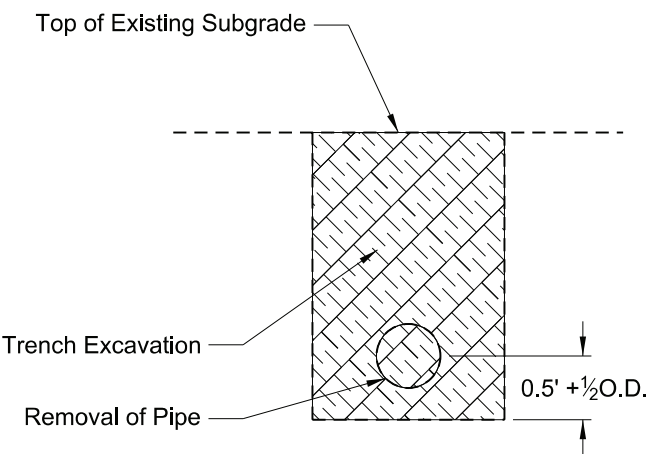


END VIEW

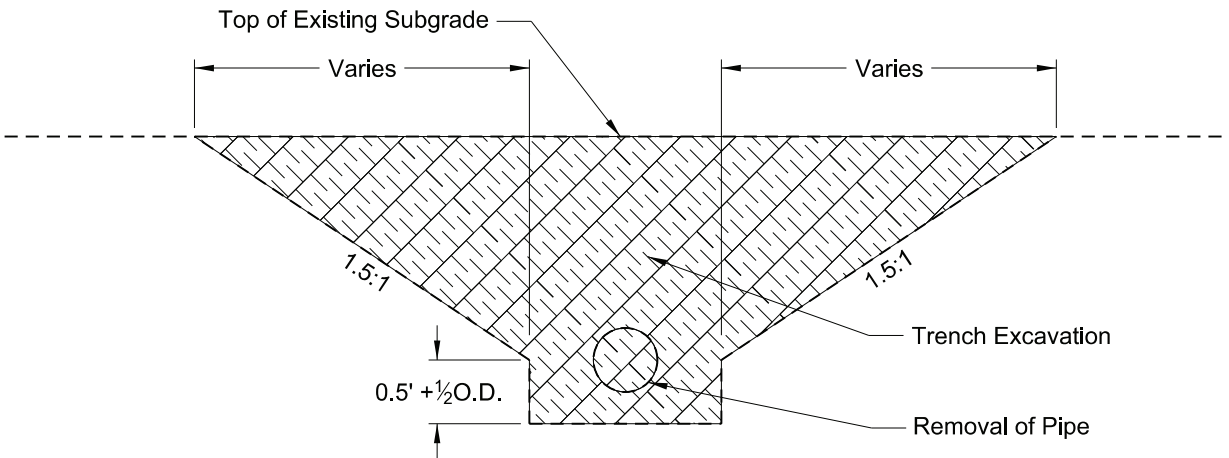
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
3-18-14	
REVISONS	
DATE	CHANGE
7-21-15	Note 8
6-6-17	Notes 2-11 Table, Title, Labels
8-11-21	Notes 2-12 Table, Label
01-17-25	Notes 9-13 Table, Labels Section A-A. End View



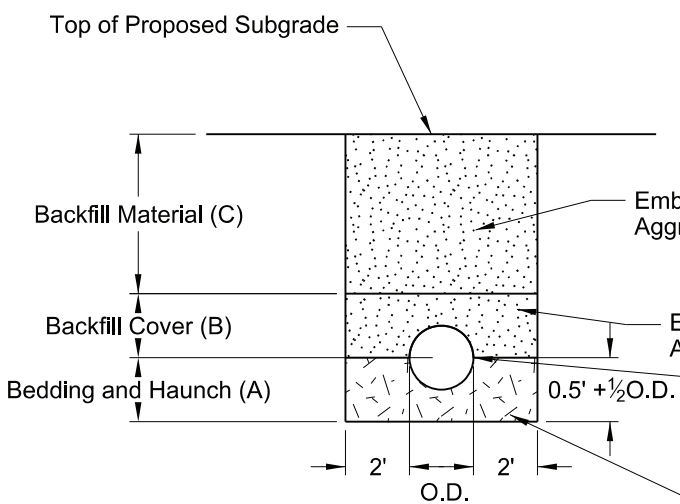
PIPE INSTALLATION DETAIL FOR LONGITUDINAL MAINLINE PIPE
OR PIPE NOT UNDER THE ROADWAY



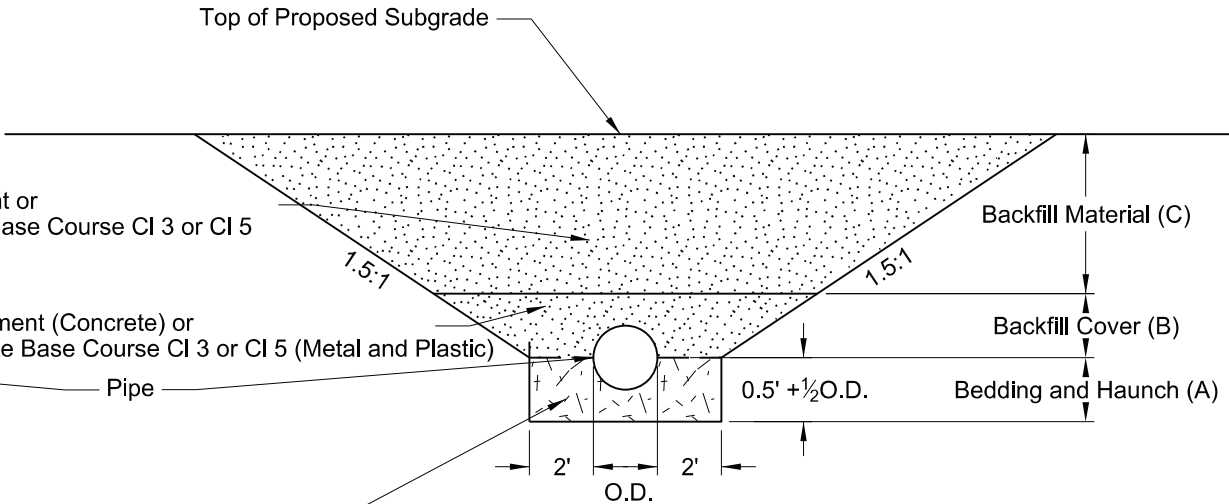
EXCAVATION DETAIL A



EXCAVATION DETAIL B



BACKFILL DETAIL A



BACKFILL DETAIL B

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

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

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

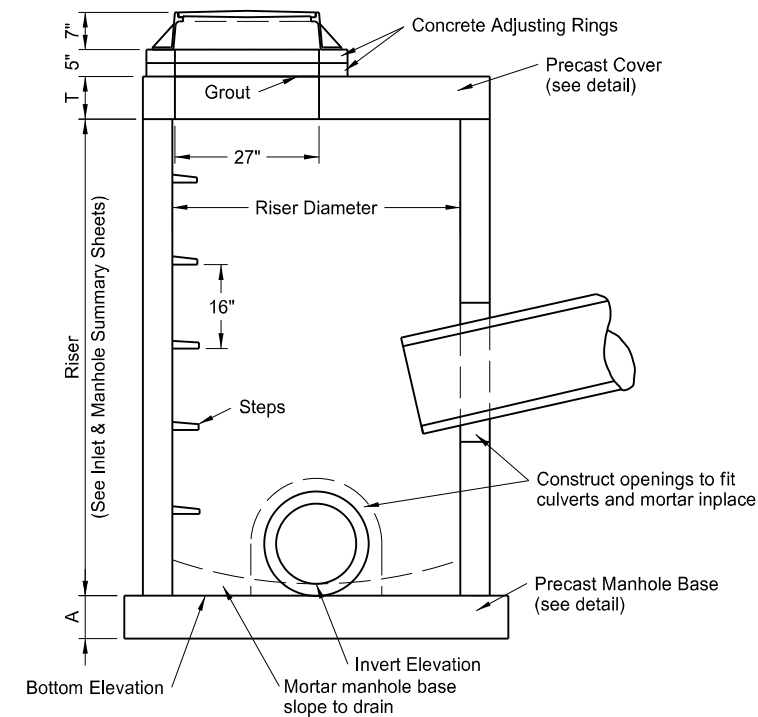
Bedding and Haunch (A)
Pipes Not Under Roadway = 0.5 O.D. + 0.5 Feet
Pipes Under the Roadway = 0.5 O.D. + 0.5 Feet
Backfill Cover (B)
Concrete Pipe = 0.5 O.D.
Metal and Plastic = 0.5 O.D. + 1 Foot
Backfill Material (C)
Top of Pipe 4 Feet or Less Below the Top of Proposed Subgrade = Aggregate Base Course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

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

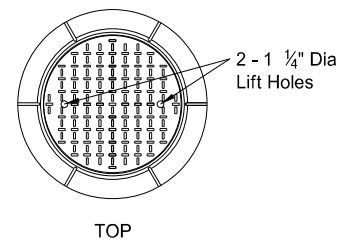


MANHOLE DETAILS

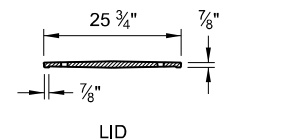
D-722-5



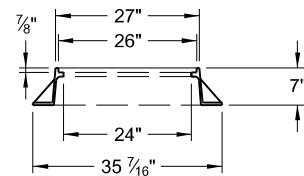
ELEVATION



TOP

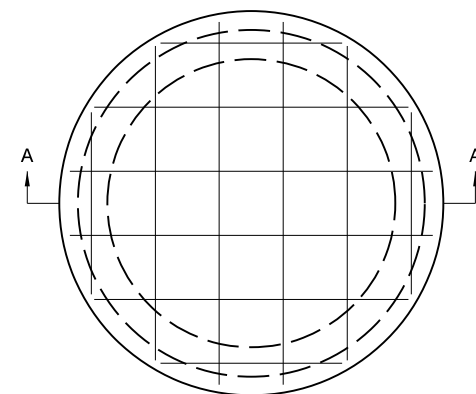


LID

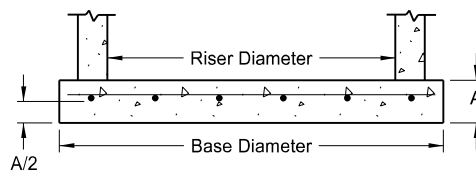


FRAME

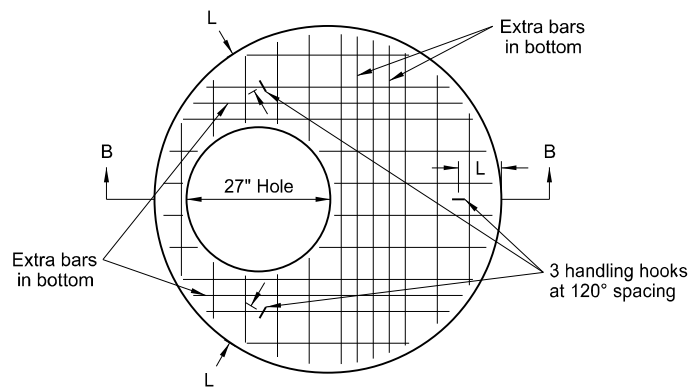
MANHOLE CAST IRON RING & COVER



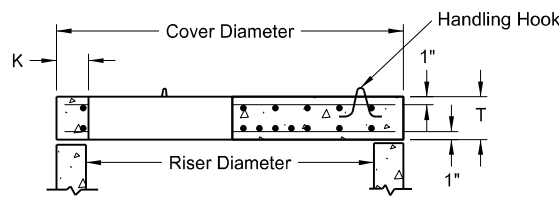
TOP VIEW



SECTION A-A
PRECAST MANHOLE BASE



TOP VIEW



SECTION B-B
PRECAST COVER

PRECAST MANHOLE COVERS

RISER DIAMETER	COVER DIAMETER	WEIGHT OF SECTION	T	K	L	BOTTOM * BARS	TOP * BARS
48"	58"	1,080 Lb	6"	6"	8"	#4 at 6"	-----
54"	65"	1,910 Lb	8"	6"	8"	#4 at 6"	-----
60"	72"	2,430 Lb	8"	7"	9"	#4 at 6"	#4 at 11"
66"	79"	3,010 Lb	8"	7"	9"	#4 at 6"	#4 at 11"
72"	86"	3,640 Lb	8"	8"	10"	#4 at 6"	#4 at 11"
84"	100"	5,060 Lb	8"	9"	11"	#5 at 6"	#5 at 11"
96"	114"	6,695 Lb	8"	9"	11"	#5 at 6"	#5 at 11"
108"	128"	12,810 Lb	12"	10"	12"	#5 at 6"	#5 at 11"
120"	142"	15,900 Lb	12"	11"	13"	#5 at 6"	#5 at 11"

* - Place reinforcement listed in each direction.

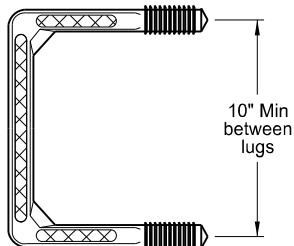
MANHOLE BASES

RISER DIAMETER	BASE DIAMETER	WEIGHT OF SECTION	A	BARS *
48"	66"	1,785 Lb	6"	#4 at 12"
54"	72"	2,830 Lb	8"	#4 at 12"
60"	78"	3,320 Lb	8"	#4 at 12"
66"	86"	4,035 Lb	8"	#4 at 12"
72"	92"	4,620 Lb	8"	#4 at 12"
84"	107"	6,245 Lb	8"	#4 at 12"
96"	120"	7,855 Lb	8"	#4 at 12"
108"	132"	14,255 Lb	12"	#4 at 8"
120"	148"	17,925 Lb	12"	#4 at 8"

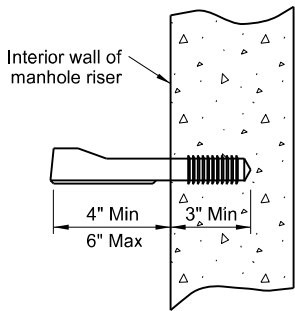
* - Place reinforcement listed in each direction.

NOTES:

1. Use class AE concrete precast or cast-in-place bases constructed in accordance with NDDOT Standard Specifications. Use aggregate size approved by the engineer.
2. Use precast concrete manholes, risers and steps conforming to AASHTO M199.
3. Reinforce precast concrete bases and covers as shown in the table for the corresponding riser diameter.
4. Use Grade 60 reinforcing steel.
5. Cut or Precast manhole riser bottoms square to fit the manhole base. Grout joint between base and riser with cement mortar.
6. The manhole riser length listed in the plans is based on a 7" manhole casting, plus 2 concrete adjusting rings (5"), plus the "T" dimension shown in the Precast Manhole Covers table.
7. Use corrosion resistant manhole steps with a minimum 800 pound vertical load resistance and a minimum 400 pound horizontal pull-out resistance. Use configuration of steps approved by the Engineer.
8. Precast concrete manhole covers shown are designed for an HS-20 wheel load and maximum fill height of 15'-0". Special design is required for heavier wheel loads and/or greater fill heights.
9. Use of other castings, similar in dimension, is allowed if the casting conforms to the manhole cover and has a lid style specified in the plans. Modifications to the manhole cover to facilitate similar castings are only allowed with written approval from the Engineer.
10. Use castings manufactured in accordance with AASHTO M306-09. Use metal conforming to AASHTO M105 Class 35B in the manufacture of castings.



TOP VIEW



STEP DETAIL

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
05-14-2013	
REVISIONS	
DATE	CHANGE
6-24-14	Revised notes 1 & 6, added dimensions to Elev. drawing.
10-17-17	Updated to active voice.
12-02-20	Updated PE stamp and signature.



SIDEWALK

D-750-2

NOTES:

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

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

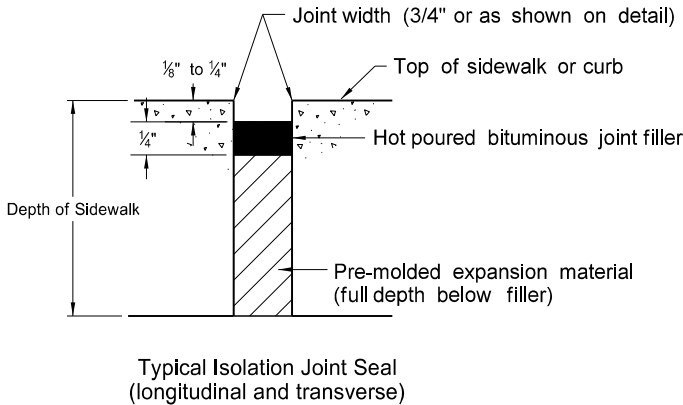
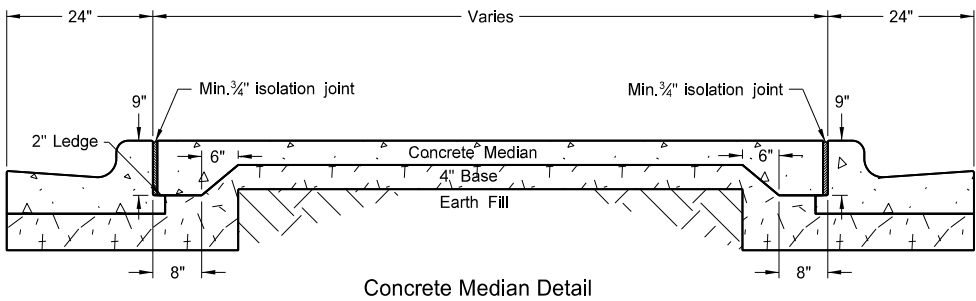
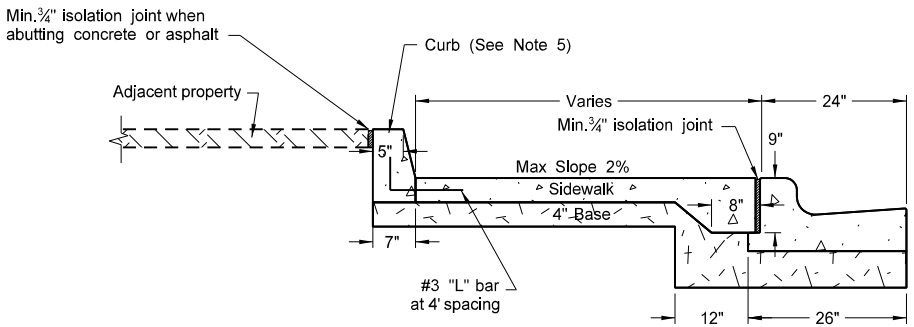
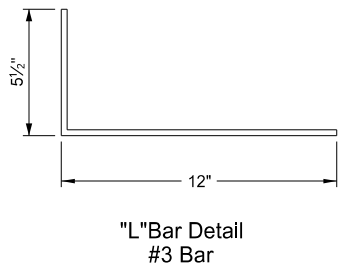
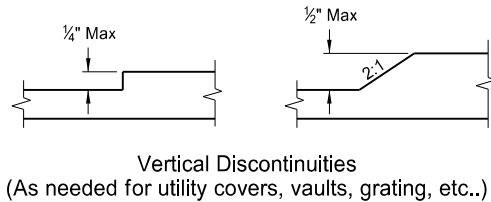
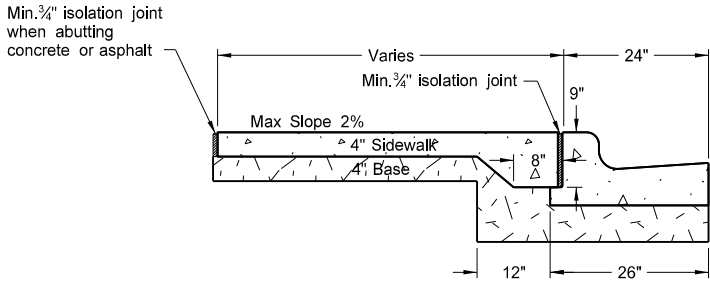
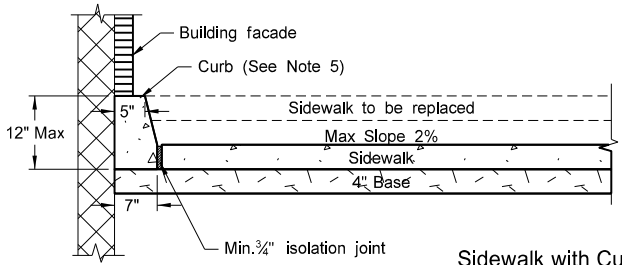
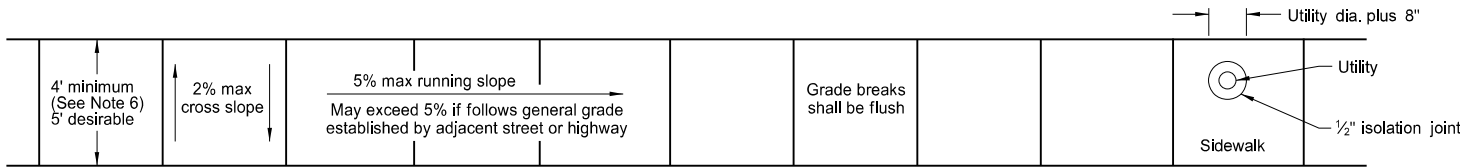
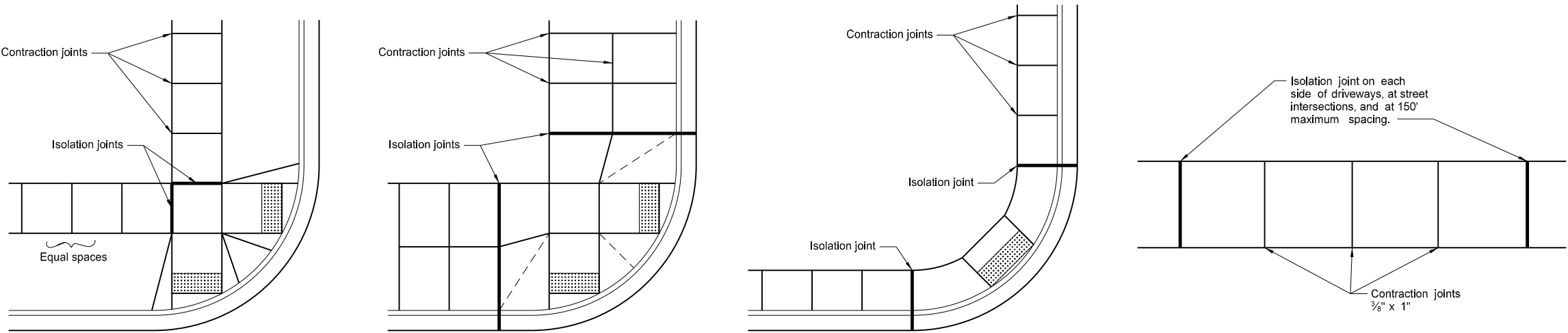
Saw or groove contraction joints to a minimum depth of 1/3 the depth of the concrete.

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

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

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

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



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

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

CURB RAMP RETROFIT DETAILS

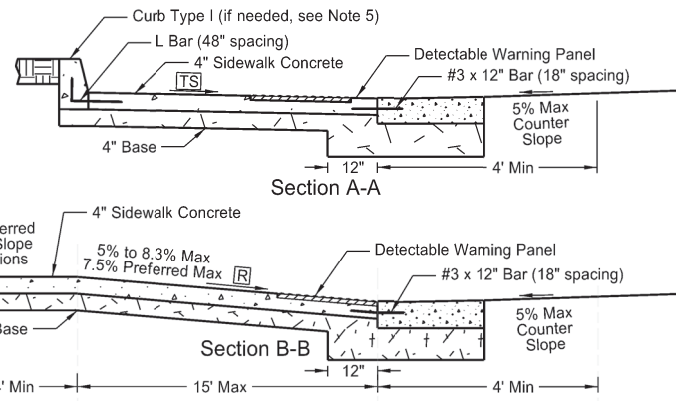
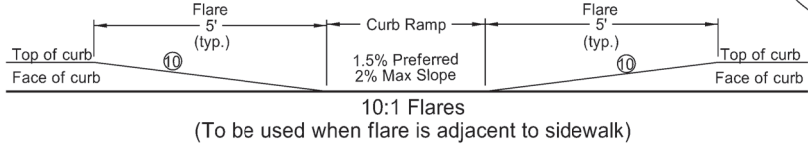
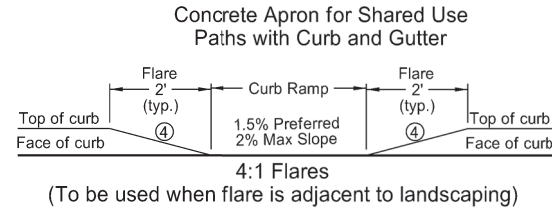
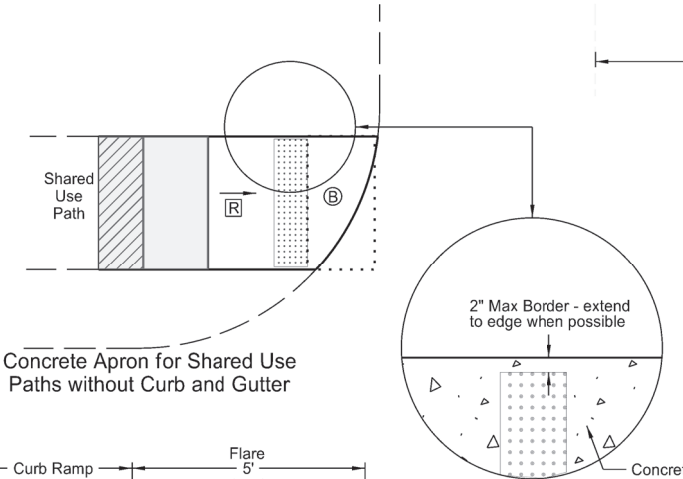
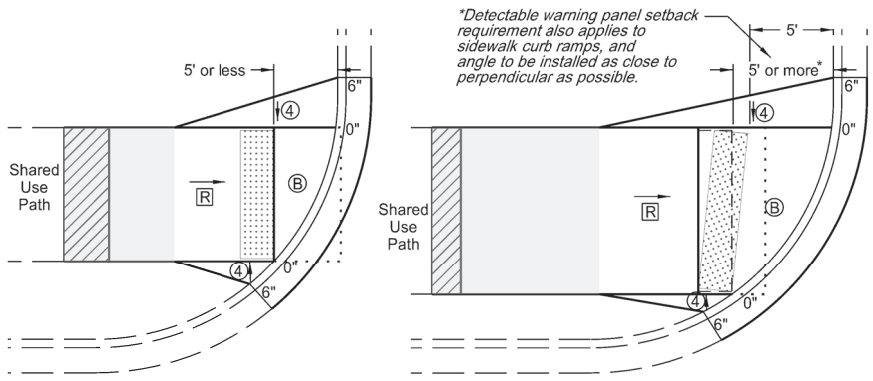
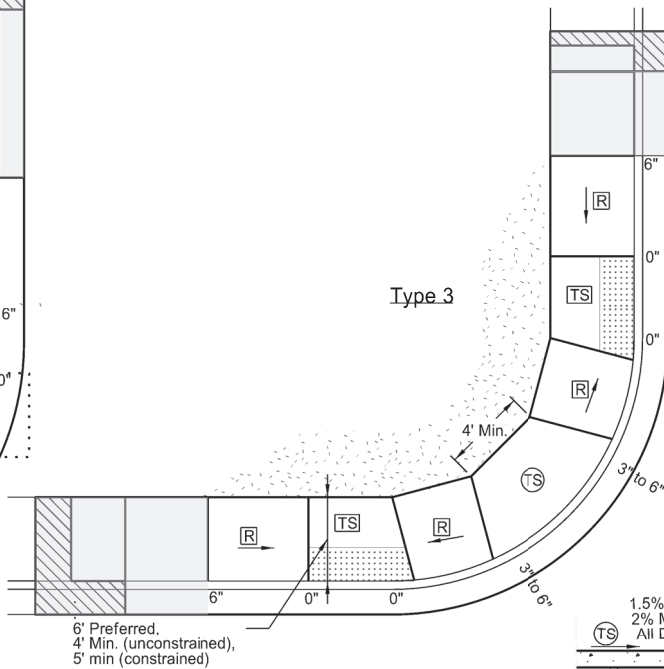
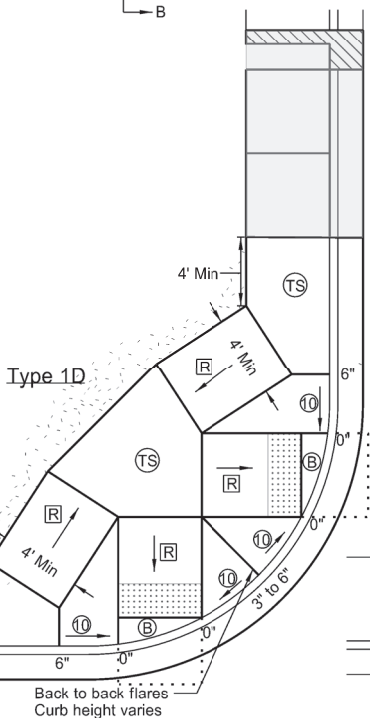
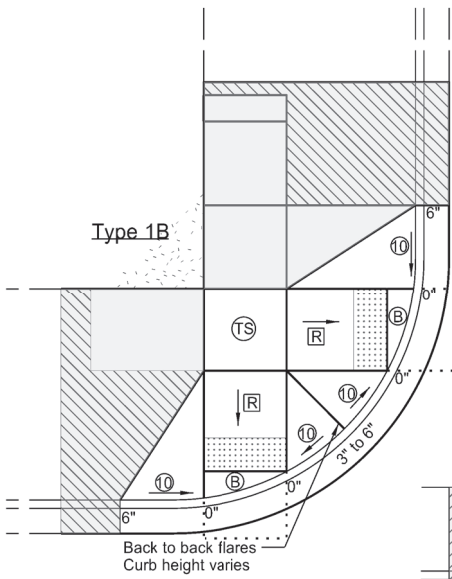
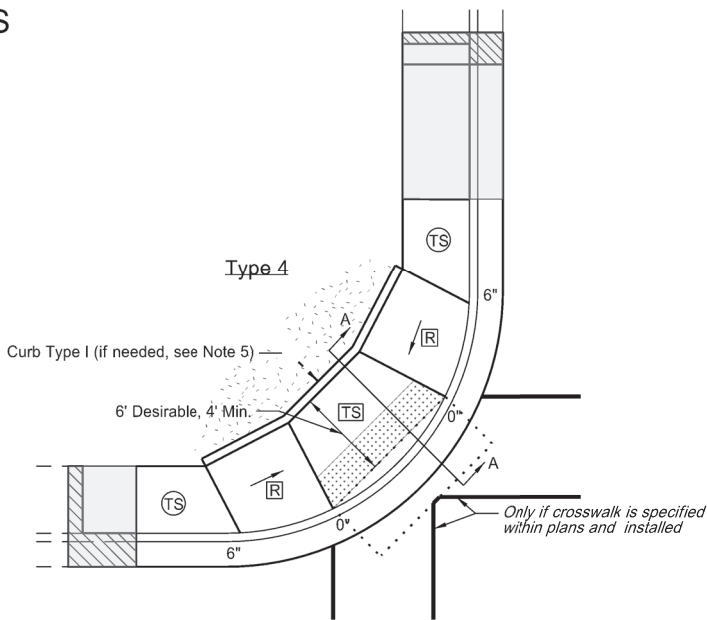
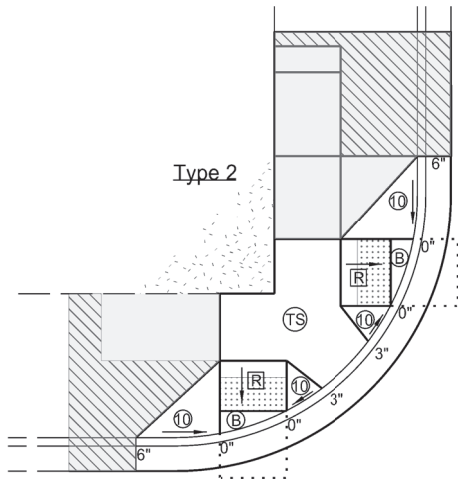
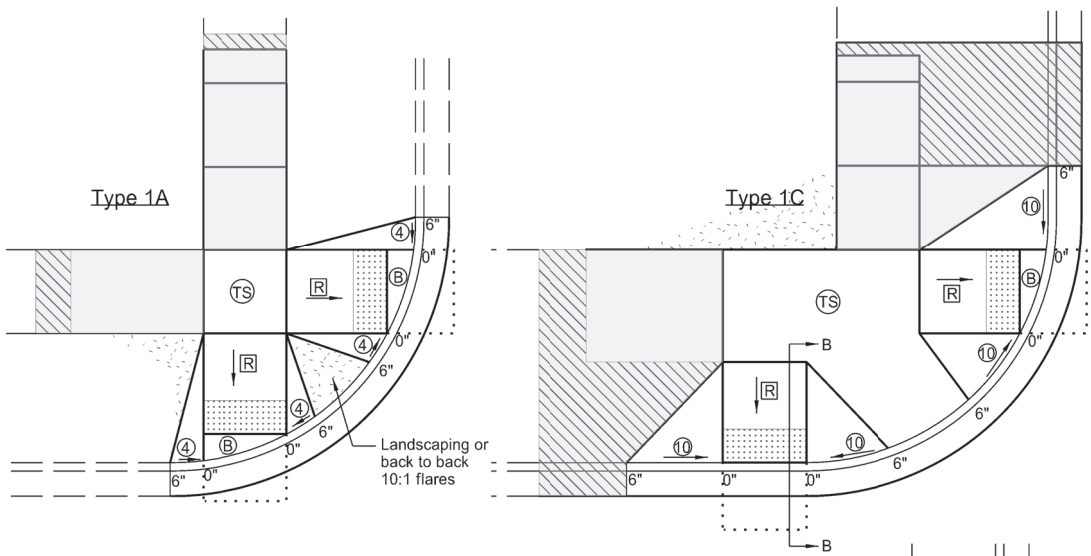
D-750-3

NOTES:

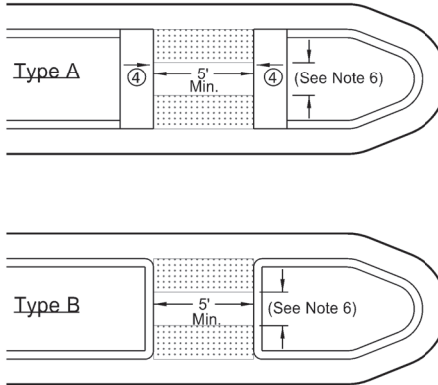
1. Ramp width is the useable portion of the ramp, excluding flares. Match curb ramp width to Existing Pedestrian Facility (EPF) width (4' minimum or 5' for island ramps.) Match ramp width to existing shared use path width. Maximum ramp length is 15'.
2. Provide turning space with desirable 5' x 5' size or larger and minimum 4' x 4' unconstrained size, for any change of direction. Provide landing 5' long x width of path at the bottom and top of parallel ramps and at the top of perpendicular ramps. Turning spaces and Landings may overlap.
3. Match detectable warning panel width to ramp width. Radial panels are allowed. Place detectable warning panel within the lower turning space.
4. Provide a continuous 4' minimum width EPF with 1.5% preferred cross slope and max 2% constructed cross slope.
5. Modify existing ground slope with landscaping, as needed. If not possible, use a vertical curb as detailed on Standard D-750-2. The Engineer will measure curb at the unit price bid for "Curb - Type I" per lineal foot.
6. Islands: If the profile of the island curb ramp is 2% or less, provide a minimum distance of 2' between warning panels. If the profile of the island curb ramp is steeper than 2%, provide a turning space between the ramps.
7. Provide generally planar vertical alignments. Provide grade breaks, perpendicular to the direction of the pedestrian travel, at the top and bottom of curb ramps (1.5% preferred, 2% max constructed cross slope).
8. See Curb Ramp Retrofit Transition Details Standard D-750-4 for additional information. Also See PROWAG for full compliance in the curb ramp area.
9. Grade transitions shall be flush.

LEGEND:

- : Detectable Warning Panel.
- : Landscaping.
- : Transitional tie-in to nearest joint, if needed.
- : Curb Ramp Retrofit Transitional Area (See Standard Drawing D750-4)
- : 4' long x width of EPF or 4' minimum Clear space outside traffic lanes of travel. 1.5% preferred cross slope 2% maximum cross slope 4.7% preferred running and counter slope 5% maximum running and counter slope
- (TS) : Turning Space Use at top of ramp or when changing directions. 1.5% preferred slope (2% maximum) all directions.
- (R) : Preferred Ramp Grade = 5% to 7.5%. Maximum Constructed Grade = 8.3%. Preferred Cross Slope = 1.5%. Maximum Constructed Cross Slope = 2%.
- (B) : 1.5% preferred cross slope 2% maximum constructed cross slope running slope consistent with the EPF 4.7% preferred max counter slope 5.0% max constructed counter slope
- (10) : 10:1 maximum constructed slope.
- (4) : 4:1 maximum constructed slope.
- 0", 3", or 6" : Curb Height.



Median Refuge Islands (Cut-Through)

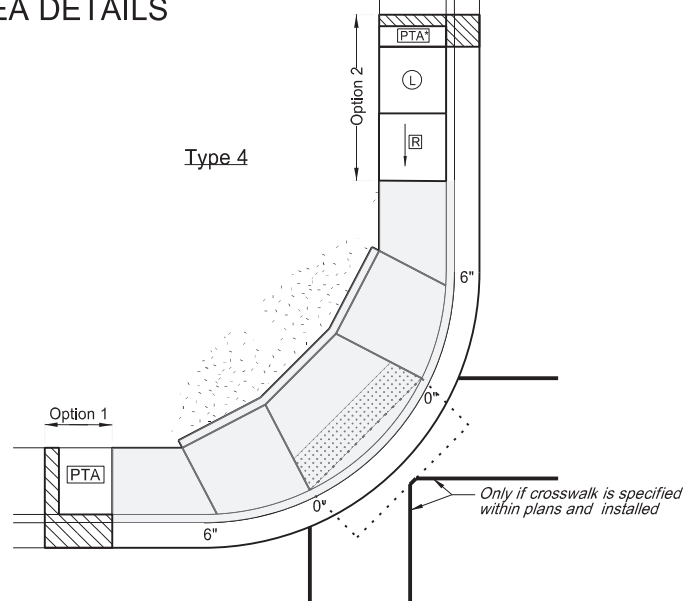
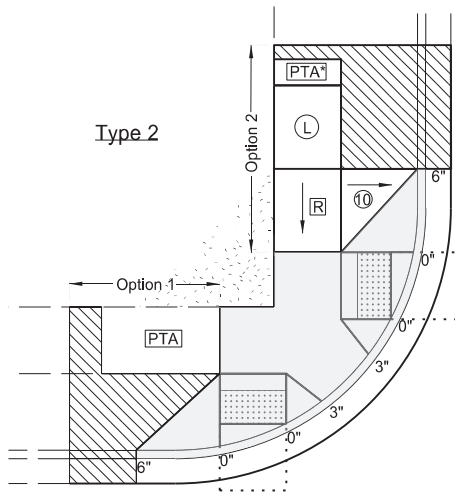
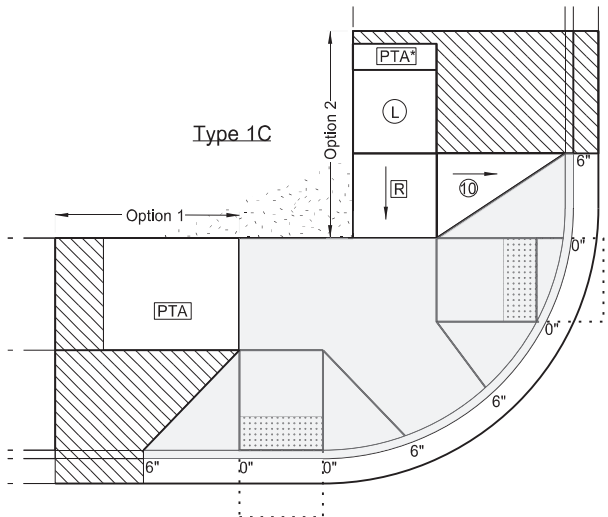
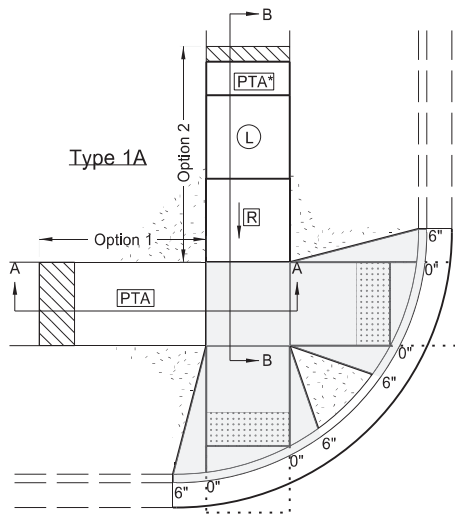


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-26-13	
REVISIONS	
DATE	CHANGE
10-17-17	Updated to active voice.
09-05-18	Revised Notes, Revision for Turning Space, Added Passing Space Requirements, Turned Detectable Warning Panel
03-15-21	Slope & other clarifications.
05-19-21	Separate Curb Ramp Transition Area from Curb Ramp area



CURB RAMP RETROFIT TRANSITIONAL AREA DETAILS

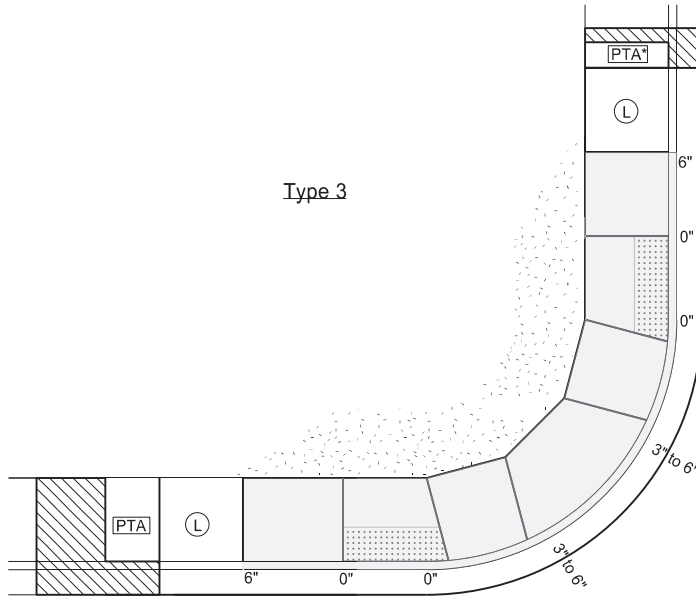
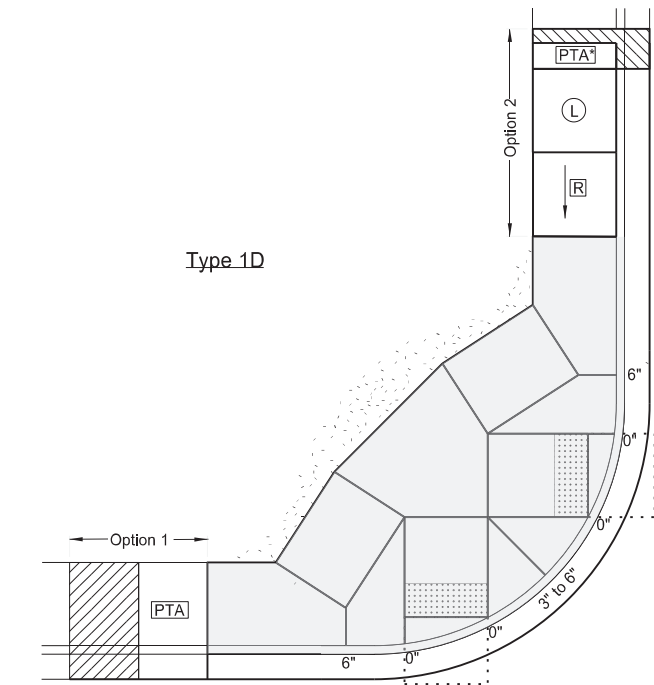
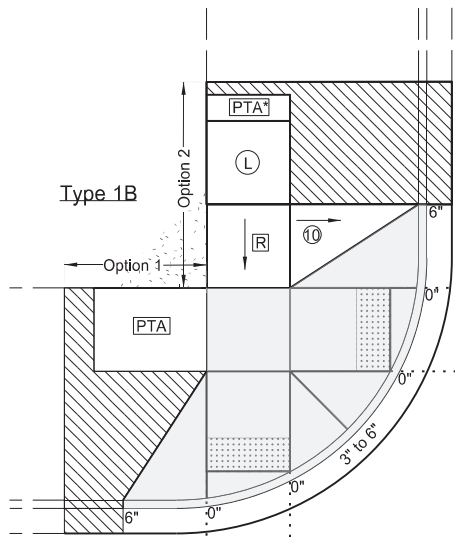
D-750-4



NOTES:

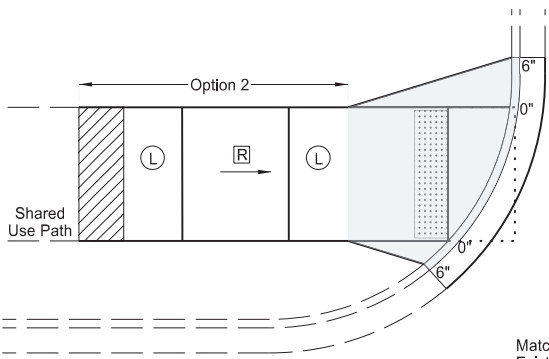
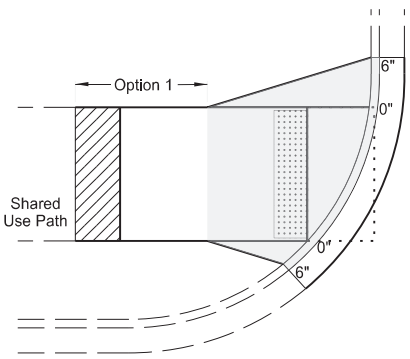
1. Curb Ramp Transitional Areas are to transition from the Curb Ramp area into the Existing Pedestrian Facility (EPF). Each layout shows example transitions. Use any combination for transitions from the Ramp Area into the EPF that allows for similar or gentler slopes to that of the existing condition, yet transitions in the shortest distance possible. In some cases, if grades allow, the Ramp area can immediately transition into the EPF and no transitional area is needed.
2. Option 1: Use this transition when existing running slope grades are less than 5%. Transition from the ramp area to the EPF using the Pedestrian Access Transition Area (PTA) transition rates and in less than 20 feet.
3. Option 2: Use this transition when existing running slopes are greater than 5% and option 1 is not able to be met.

Add a ramp and a landing immediately after the ramp area. Then transition from the compliant landing into the EPF using the PTA rates (preferred), or in less than 15 feet (which ever is shorter).
4. Transitional Areas for Shared Use Paths can be concrete or asphalt.
5. See Curb Ramp Retrofit Details Standard D-750-3 for additional information.

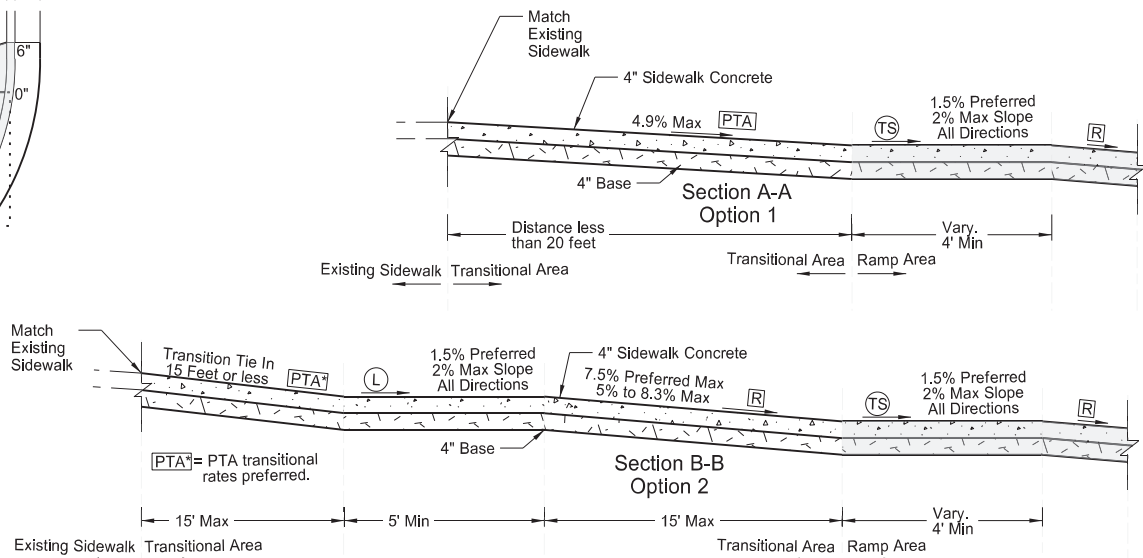


LEGEND:

- : Detectable Warning Panel.
- : Landscaping.
- : Transitional tie-in to nearest joint, if needed.
- : Curb Ramp Retrofit Area (See Standard Drawing D750-3)
- : 4' long x width of EPF or 4' minimum Clear space outside traffic lanes of travel.
1.5% preferred cross slope
2% maximum cross slope
4.7% preferred running slope
5% maximum running slope
- : Pedestrian Access Transition Area
Running Slope less than 4.9%.
Transition Cross Section at 1/2 percent per foot from the from Ramp Area to EPF.
- : Turning Space/Landing
Use at top of ramp or when changing directions.
1.5% preferred slope (2% maximum) all directions.
- : Preferred Ramp Grade = 5% to 7.5%.
Maximum Constructed Grade = 8.3%.
Preferred Cross Slope = 1.5%.
Maximum Constructed Cross Slope = 2%.
Maximum Length = 15 feet
- : 10:1 maximum constructed slope.
- : 4:1 maximum constructed slope.
- 0", 3", or 6" : Curb Height.



Transition Areas for Shared Use Paths



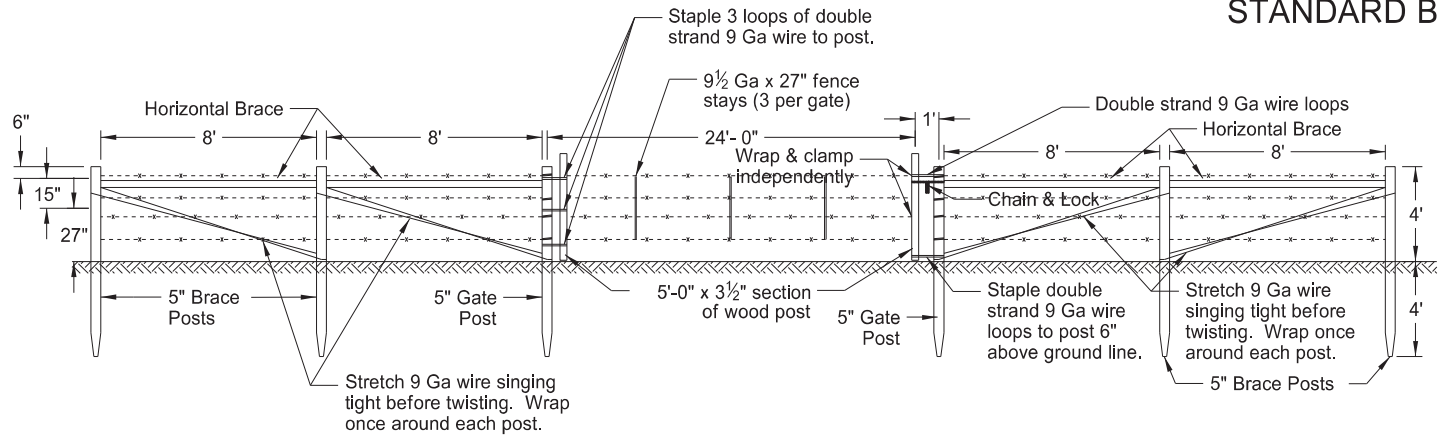
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
05-19-21	
REVISIONS	
DATE	CHANGE



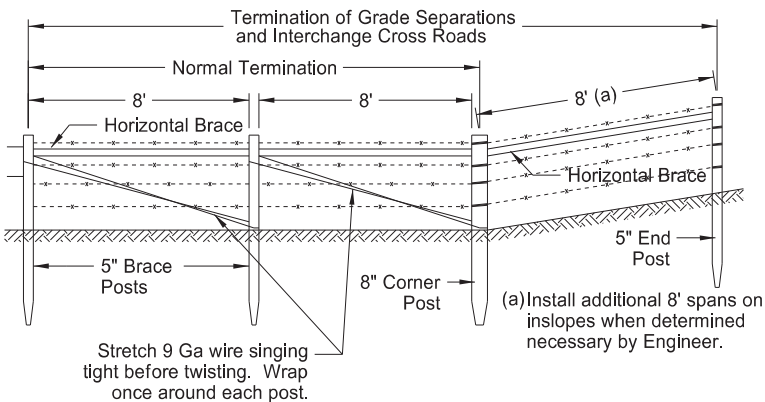
STANDARD BARBED WIRE FENCE

NOTES

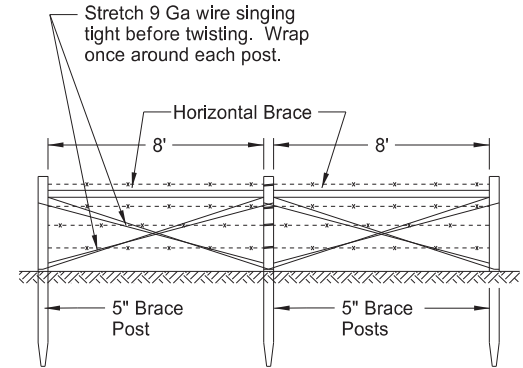
1. No deduction in measured pay length of fence made for gates, corner assemblies, double brace assemblies, fence terminals, or depression fencing. Include all costs for abutment fencing in the price bid for fencing bid items.
2. Install double brace assemblies at locations shown on the plans or established 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."



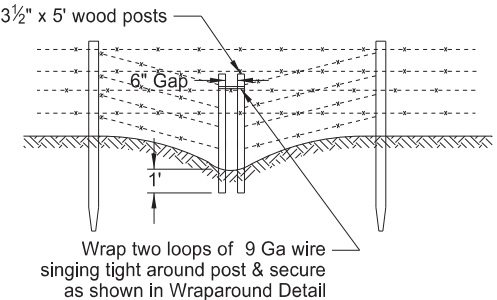
VEHICLE GATE



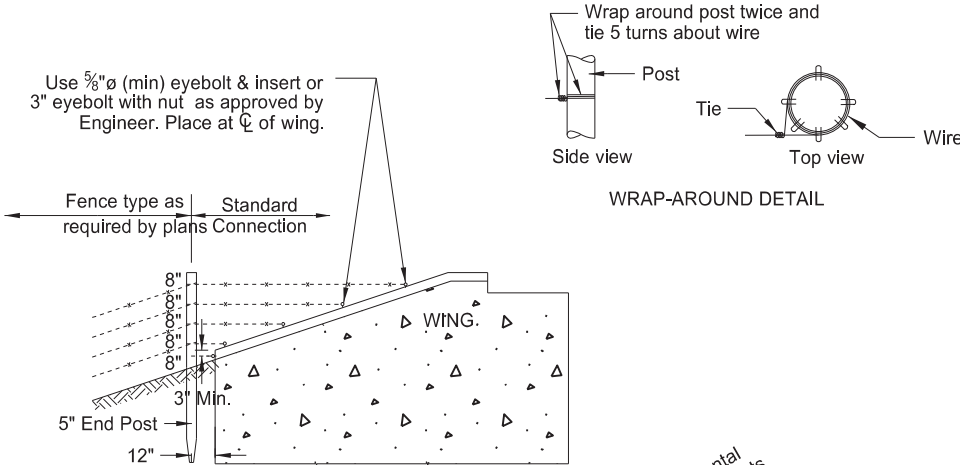
FENCE TERMINAL



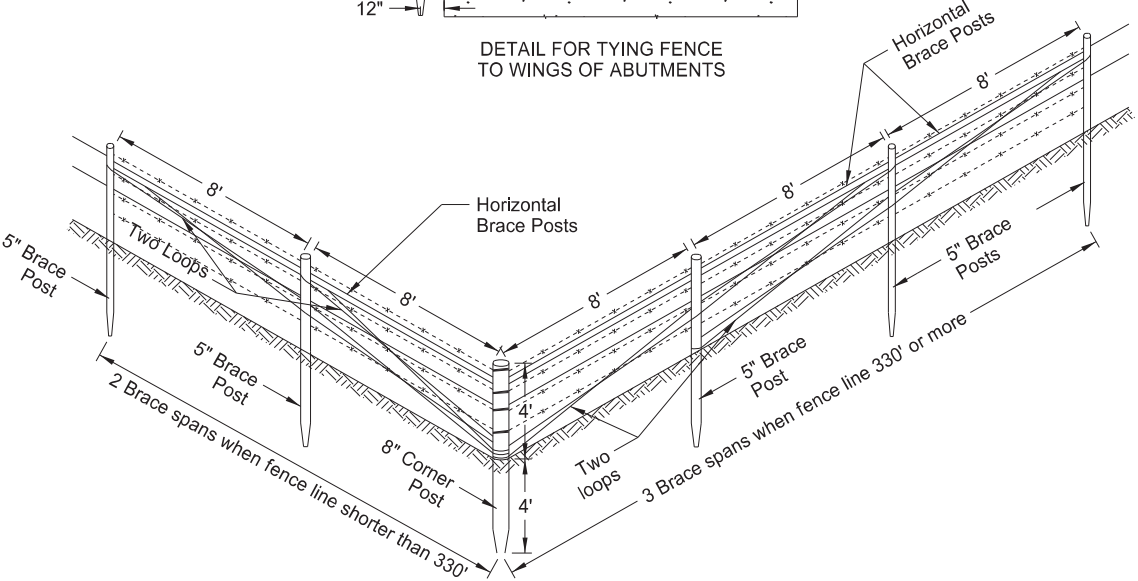
DOUBLE BRACE ASSEMBLY



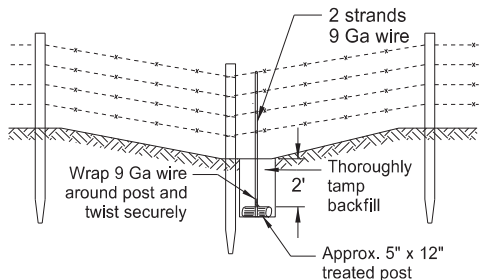
BREAK-AWAY FENCE FOR NARROW DEPRESSIONS SUBJECT TO FLOODING



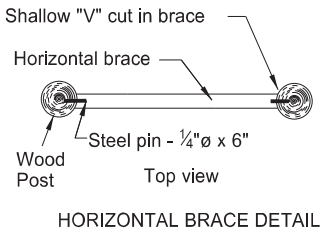
WRAP-AROUND DETAIL



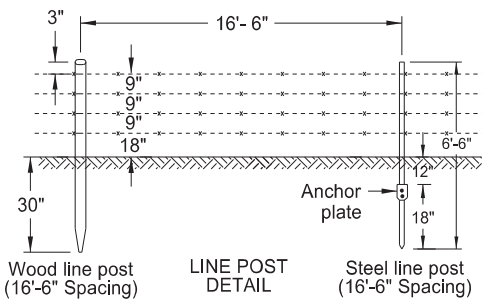
CORNER ASSEMBLY



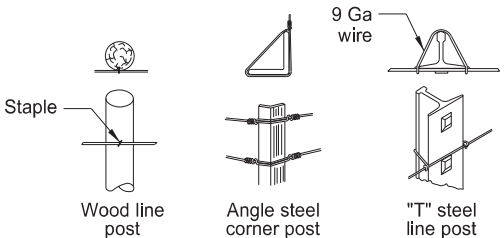
DETAIL FOR ANCHORING FENCES IN DEPRESSIONS*
*Determine locations in the field and include in price bid for fencing. Use other methods of anchoring fence if approved by the Engineer.



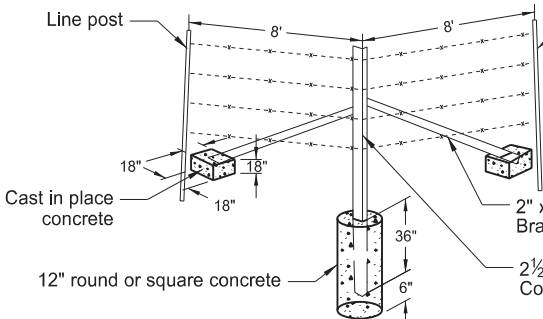
HORIZONTAL BRACE DETAIL



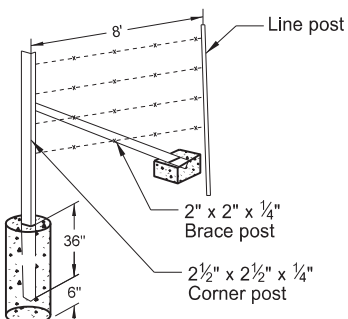
LINE POST DETAIL



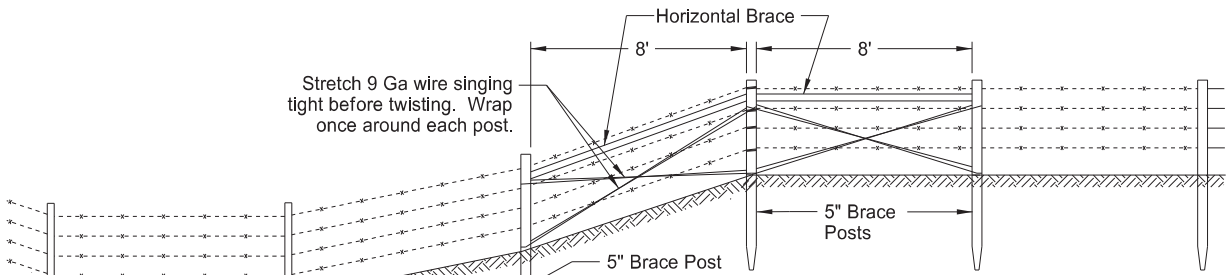
FASTENING TO POSTS



CORNER AND DOUBLE BRACE ASSEMBLY STEEL POSTS



FENCE TERMINAL STEEL POSTS

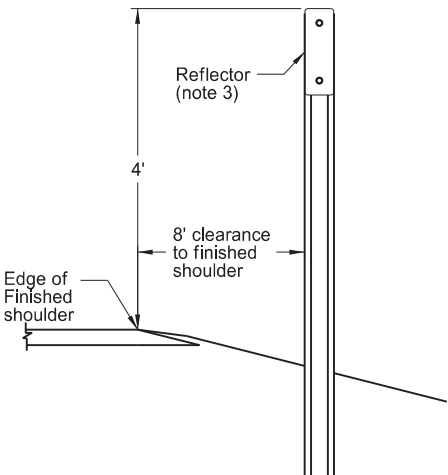


FENCING FOR WIDE DEPRESSIONS
Use double brace installation, as shown, on opposite side of depression.
Decrease line post spacing as needed due to terrain.

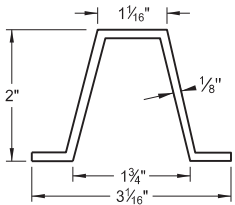
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-2-10	
REVISIONS	
DATE	CHANGE
10-02-12	Notes, steel assemblies/posts.
11-25-13	Revised Vehicle Gate.
10-17-17	Updated to active voice.
02-23-23	Revised post spacing/brace size.



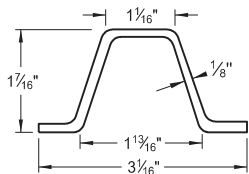
REFLECTORIZED DELINEATORS - TWO-LANE TWO-WAY HIGHWAY



Installation
(Type A and C)



Aluminum Post Detail
Approx. 0.88 lbs/ft



Steel Post Detail
Approx. 2.0 lbs/ft

Delineator Details

Type A and C

Installation: Install posts along the right shoulder line, in the direction of travel, unless shown otherwise on the plans.

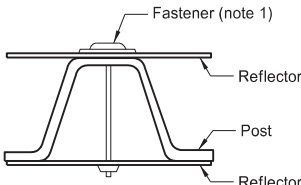
Reflectors: Use reflector of the same color as the adjacent pavement marking with a 0.080 inch minimum thickness sign backing material.

(1) Use fasteners that are a minimum 1/4" diameter. Use double headed rivet or other non-rust vandal resistant fastener.

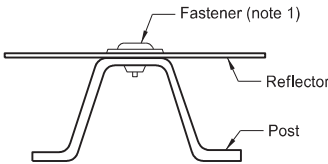
(2) Drill only those holes required to attach the number of reflectors on that post, or drill all the posts the same so that any number of reflectors may be added.

(3) Mount reflector facing traffic at an angle of 90° away from oncoming traffic.

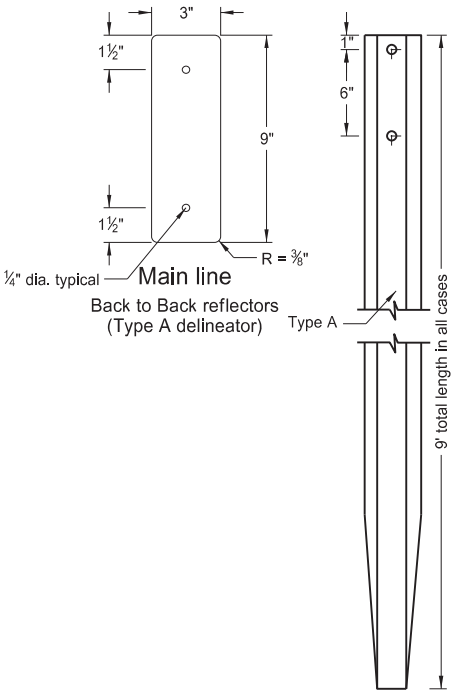
(4) Include all costs for materials, labor, and equipment to install double sided type A delineators in the unit price bid for "Delineators-Type A-Double Sided." Include all costs for materials, labor, and equipment to install type C delineators in the unit price bid for "Delineators-Type C."



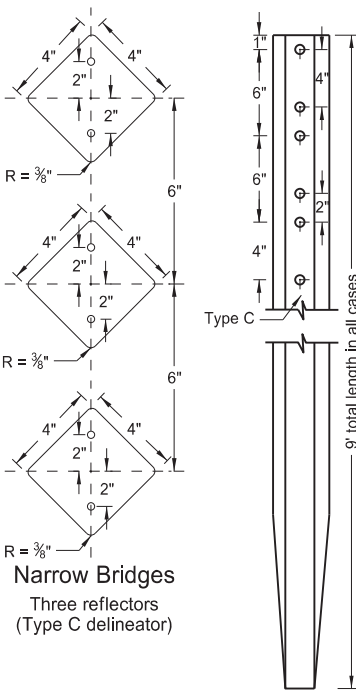
Delineators-Type A-Double Sided Attachment Detail



Delineators-Type C Attachment Detail



U-type Post
(Delineators-Type A-Double Sided)



U-type Post
(Delineators-Type C)

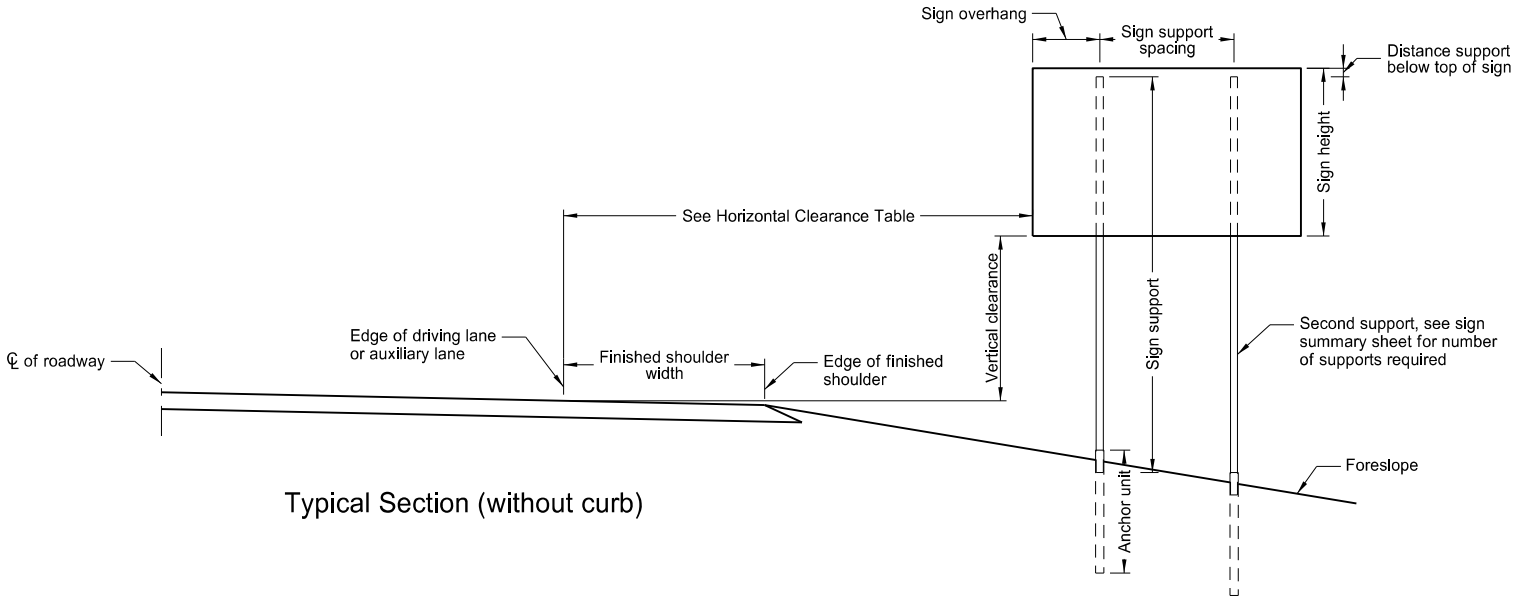
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12/16/22	
REVISIONS	
DATE	CHANGE



12/16/22

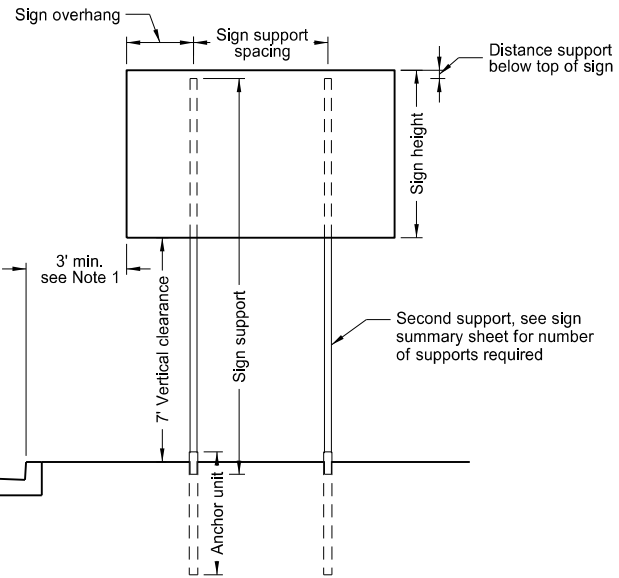
Notes:

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'.

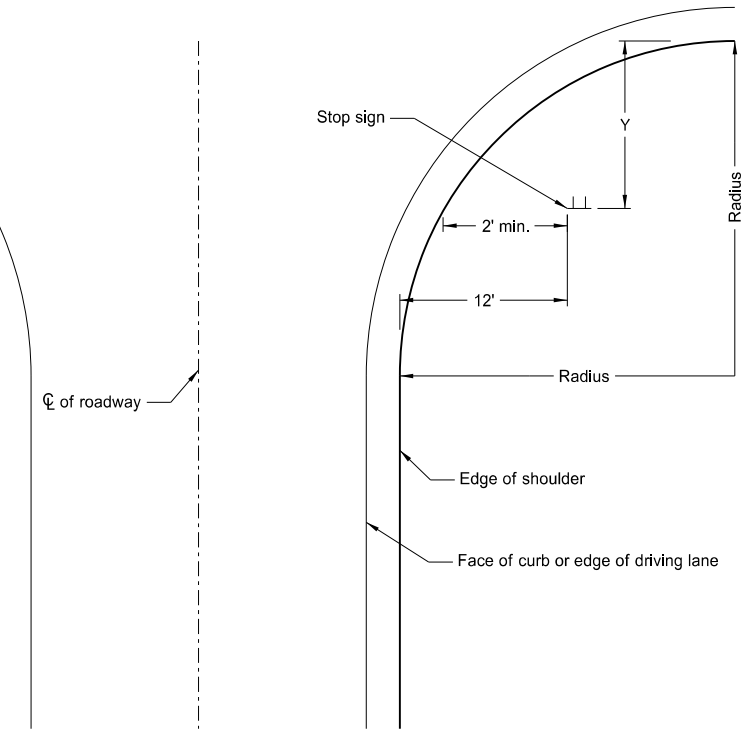


Typical Section (without curb)

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

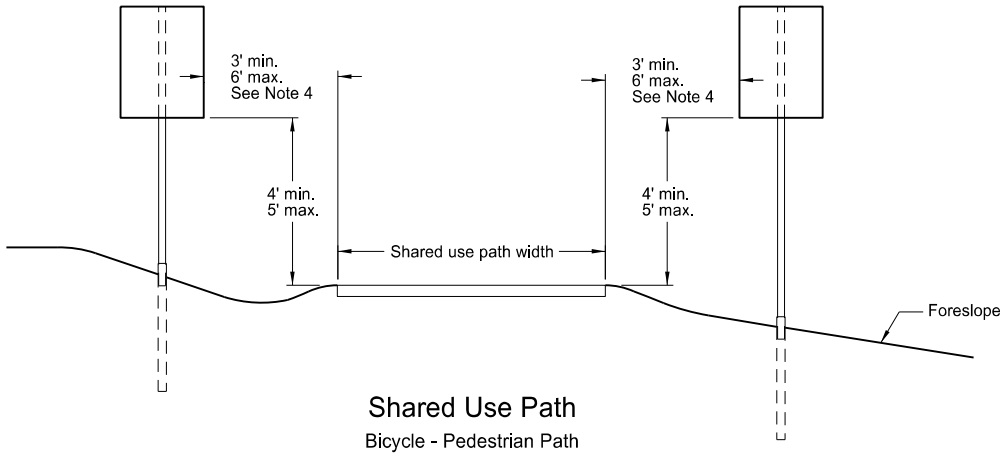


Typical Section (with curb)
Residential or Business District



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.

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Kirk J Hoff,
Registration Number
PE- 4683,
on **8/29/19** and the original document is stored at the
North Dakota Department
of Transportation

Breakaway Coupler System
for Perforated Tubes

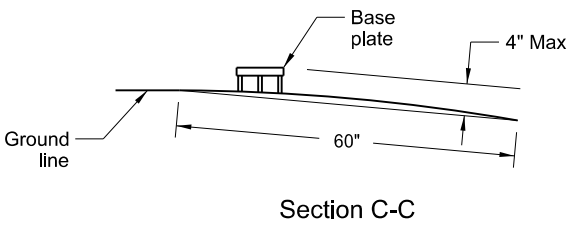
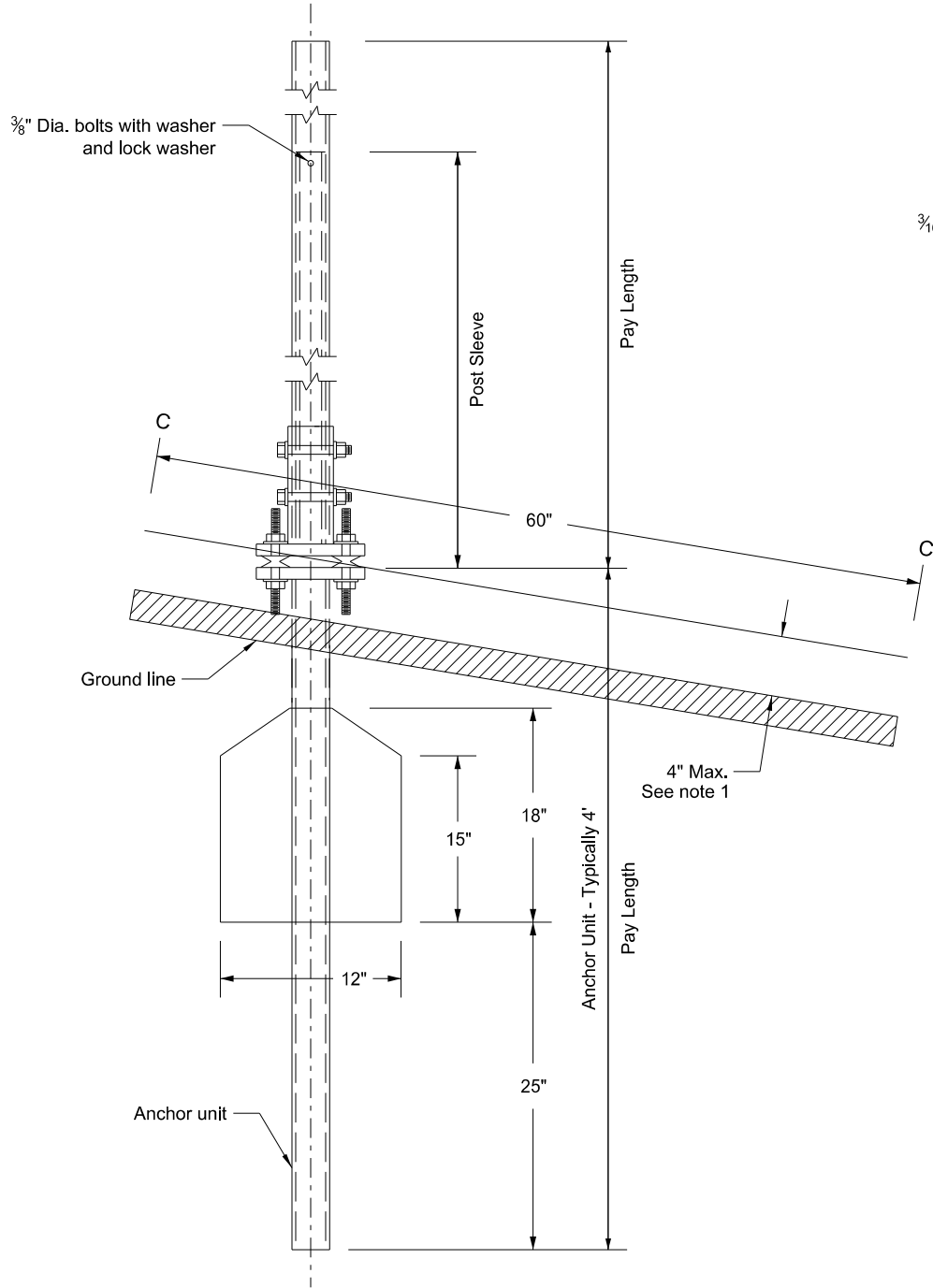
Notes:

- 1. 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.
- 2. Use anchor unit of the same size and specification as the post.
- 3. Provide a minimum 8' distance between the first and fourth post on four post signs.
- 4. Use the breakaway base system on standard D-754-24 or the breakaway coupling system manufactured from material meeting the requirements of ASTM A325 fasteners with the special requirements specified by DENT BREAKAWAY IND., INC. which meets the test requirements of NCHRP Report 350.

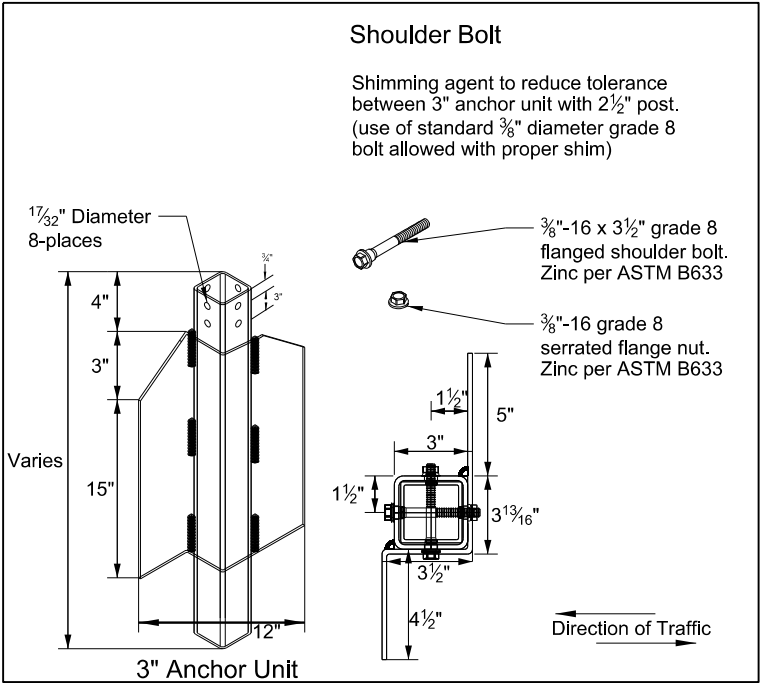
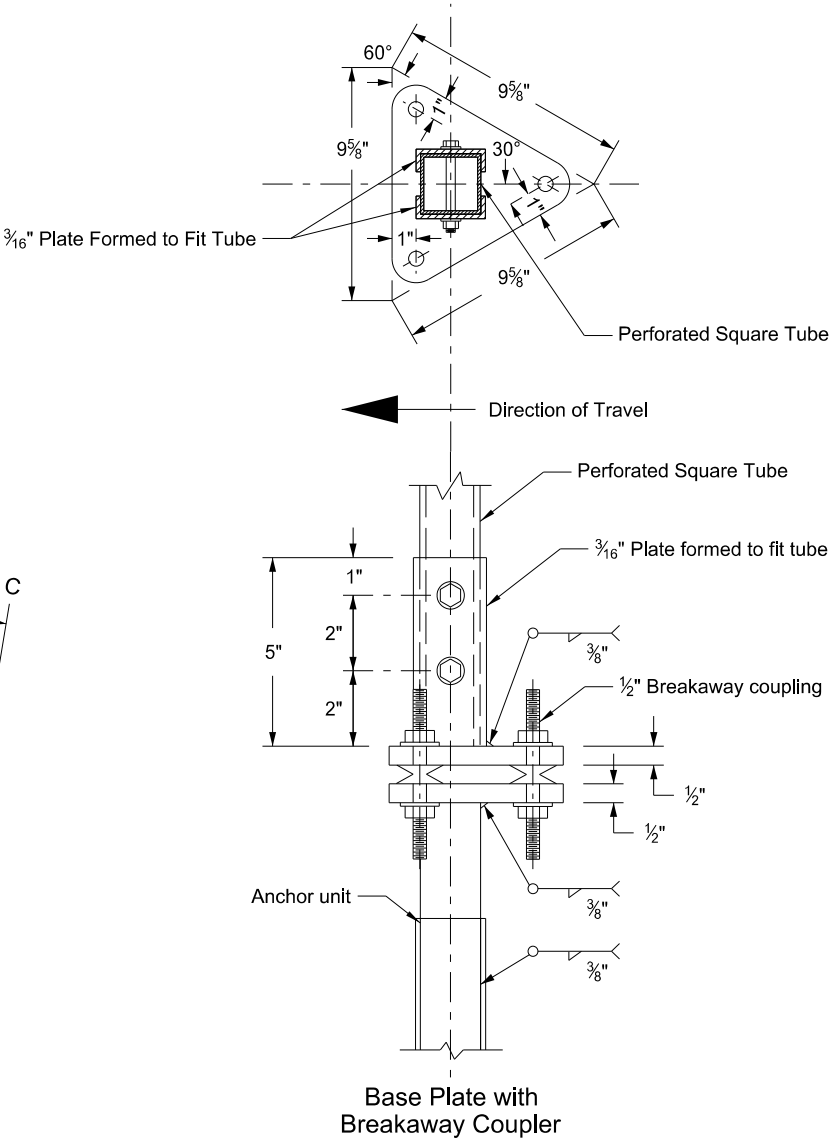
Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thick-ness Gauge	Sleeve Size In.	Wall Thick-ness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thickness Guage
1	2	12			No	2¼	12
1	2¼	12			No	2½	12
1	2½	12			(B)	3(C)	7
1	2½	10			Yes		7
1	2¼	12	2	12	Yes		7
1	2½	12	2¼	12	Yes		7
2	2½	10			Yes		7
2	2¼	12	2	12	Yes		7
2	2½	12	2¼	12	Yes		7
3 & 4	2½	12			Yes		7
3 & 4	2½	10			Yes		7
3 & 4	2½	12	2¼	12	Yes		7
3 & 4	2¼	12	2	12	Yes		7
3 & 4	2½	10	2¾	10	Yes		7

(B) - 2½" 12 gauge posts do not need breakaway bases unless support is placed in boggy, wet, or loose soil areas.

(C) - 3" anchor unit

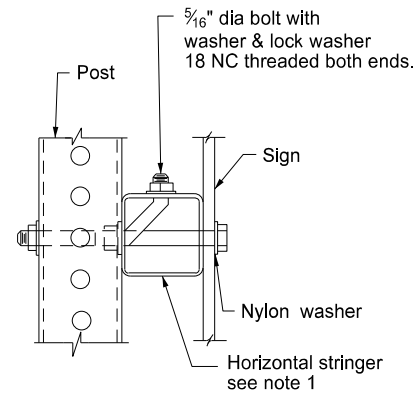


Max protection of the stub post is 4" above a 60" chord aligned radially to the center line of the highway and connecting any point, within the length of the chord, on the ground surface on one side of the support to a point in the ground surface on the other side.

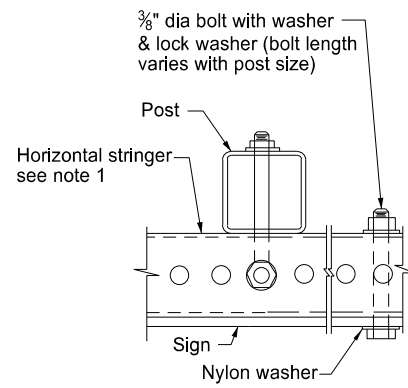


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION		This document was originally issued and sealed by Kirk J Hoff, Registration Number PE- 4683, on 8/30/19 and the original document is stored at the North Dakota Department of Transportation
10-3-2013		
REVISIONS		
DATE	CHANGE	
8-30-18 8-30-19	Updated notes to active voice. New Design Engr PE Stamp.	

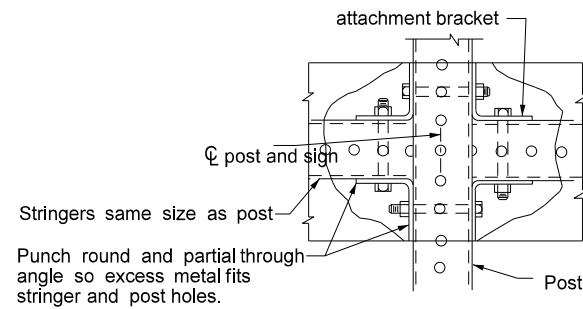
Mounting Details Perforated Tube



Side View



Top View



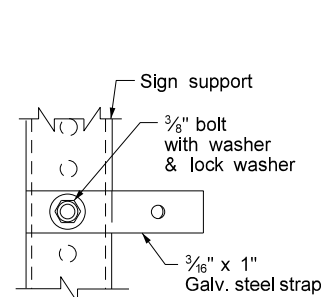
Punch round and partial through angle so excess metal fits stringer and post holes.

STREET NAME SIGNS AND ONE WAY SIGNS
SINGLE POST ASSEMBLY
ONE STRINGER OR BACK TO BACK MOUNTING

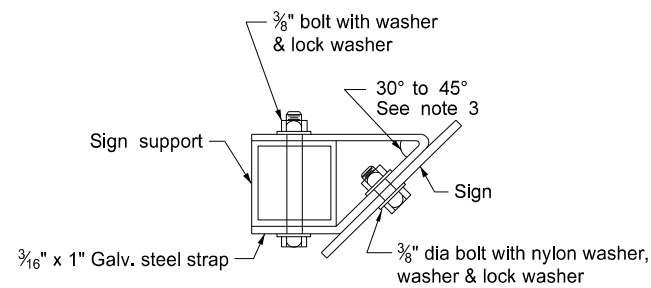
Note:

1. Horizontal stringers - Use perforated tubes or $1\frac{3}{4}$ " x $\frac{3}{16}$ " thick, 1.08 lbs./ft aluminum or 3.16 lbs./ft steel z bar stringers.
2. Use minimum outside diameter $\frac{15}{16}$ " $\pm \frac{1}{16}$ " and 10 gauge thick metal washers on sign face.
3. Place No Parking signs with directional arrows at a 30 to 45 degree angle with the line of traffic flow. Turning the support to the correct angle for No Parking signs requiring the above angles is allowed. If the No Parking sign is placed with another sign that requires placement at a 90 degree angle with the line of traffic flow, use the detailed angle strap to mount the No Parking sign. Use flat washers and lock washers with all nylon washers.
4. Punching the sign backing and placing the bolt through the sign, the stringer and the post is allowed in lieu of using the bent bolt to attach the post to the stringer.
5. 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.

STRINGER MOUNTING (WITH STRINGER IN FRONT OF POST)

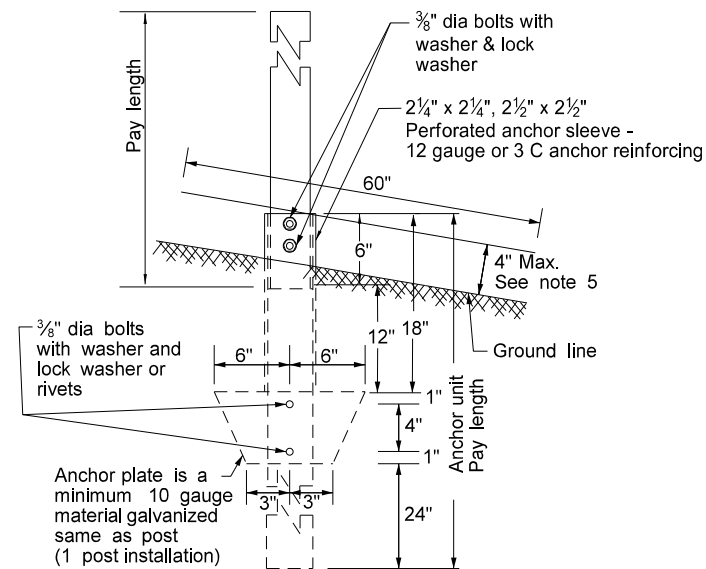


Side View

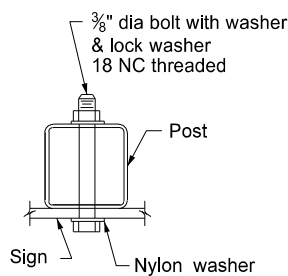


Top View

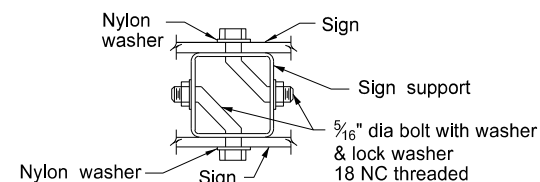
STRAP DETAIL



ANCHOR UNIT AND POST ASSEMBLY

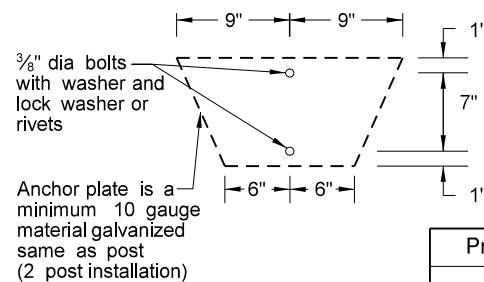


BOLT MOUNTING



Top View

BACK TO BACK MOUNTING



Properties of Telescoping Perforated Tubes

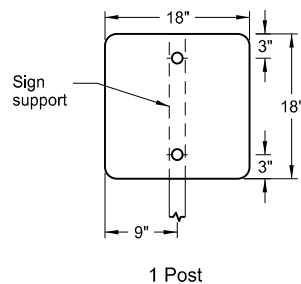
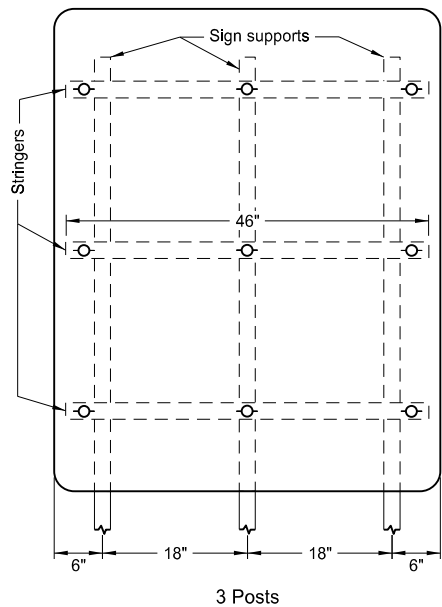
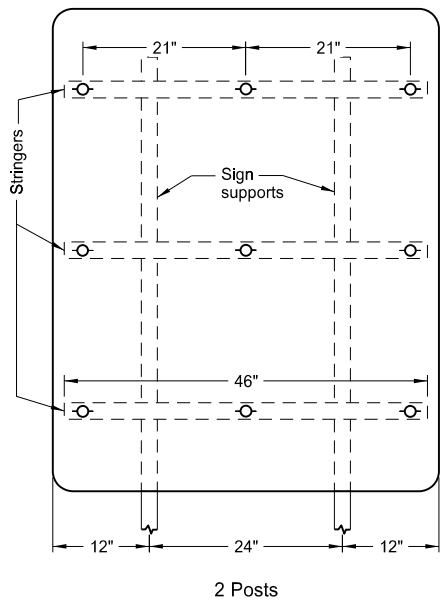
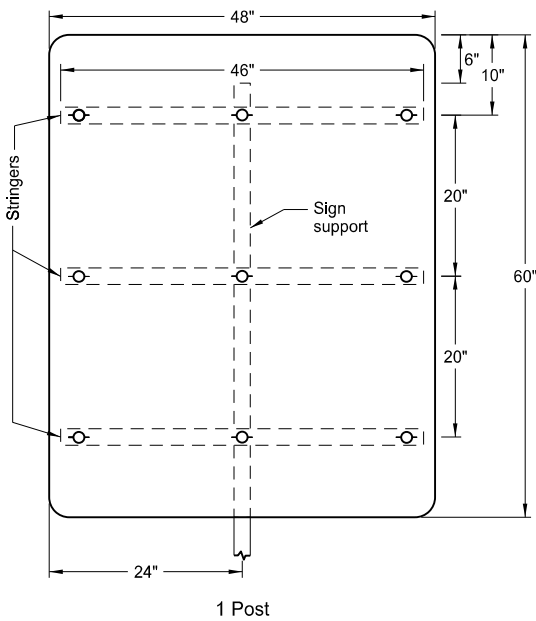
Tube Size In.	Wall Thickness In.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In. ⁴	Cross Sect. area In. ²	Section Modulus In. ³
1½ x 1½	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2¼ x 2¼	0.105	12	2.773	0.561	0.695	0.499
2⅜ x 2⅜	0.135	10	3.432	0.605	0.841	0.590
2½ x 2½	0.105	12	3.141	0.804	0.803	0.643
2½ x 2½	0.135	10	4.006	0.979	1.010	0.783

The 2 $\frac{3}{16}$ " size 10 gauge is shown as 2.19" size on the plans.
The 2 $\frac{1}{2}$ " size is shown as 2.51" size on the plans.

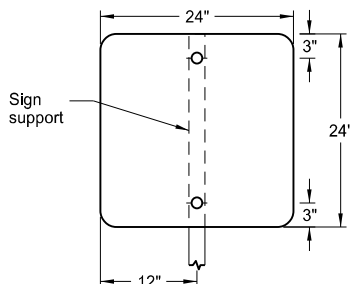
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE
7-8-14	Revised Note 3.
8-30-18	Updated notes to active voice.
8-30-19	New Design Engr PE Stamp.

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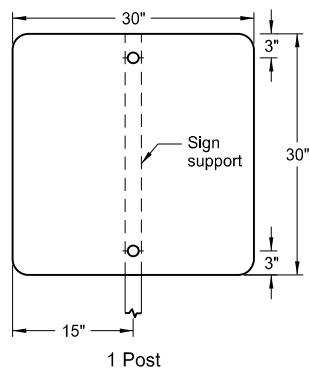
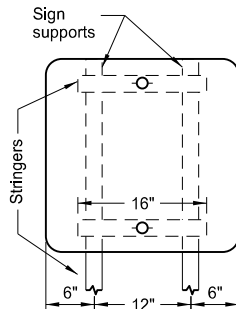
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION
DETAILS REGULATORY, WARNING AND GUIDE SIGNS



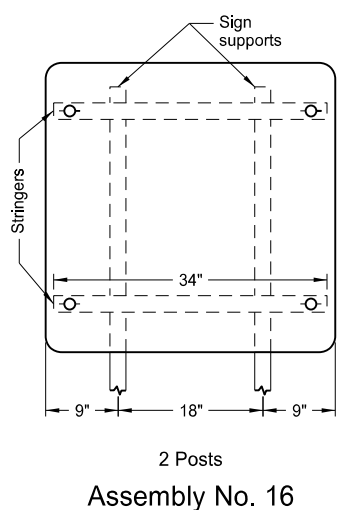
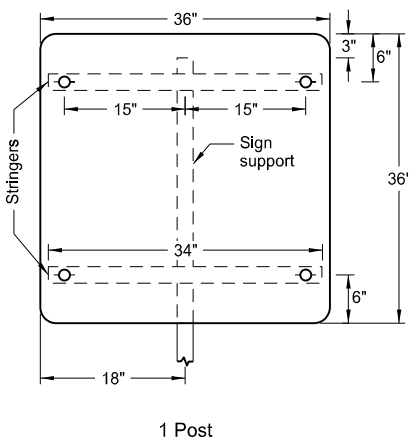
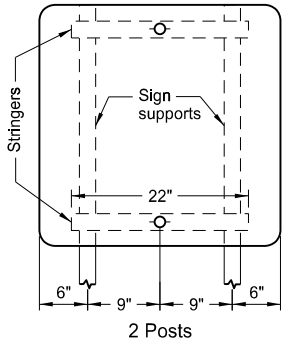
Assembly No. 13



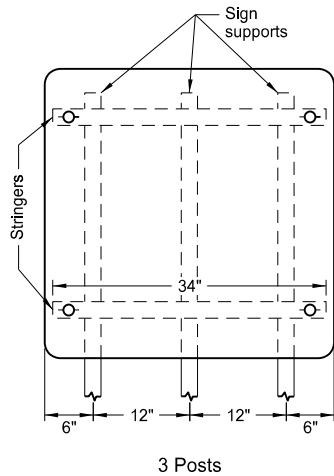
Assembly No. 14



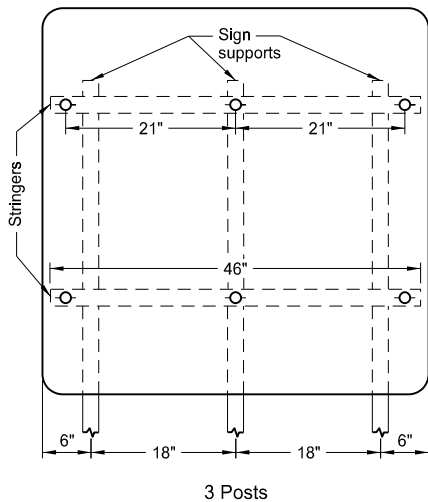
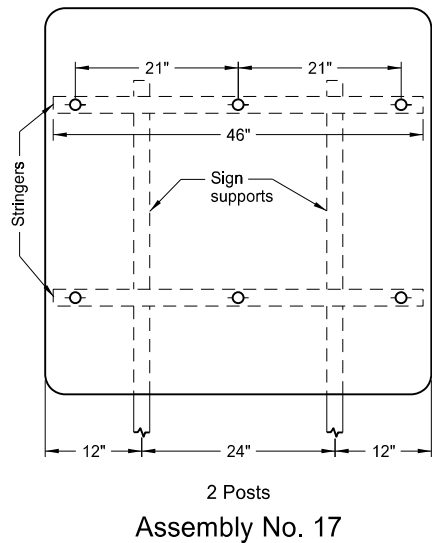
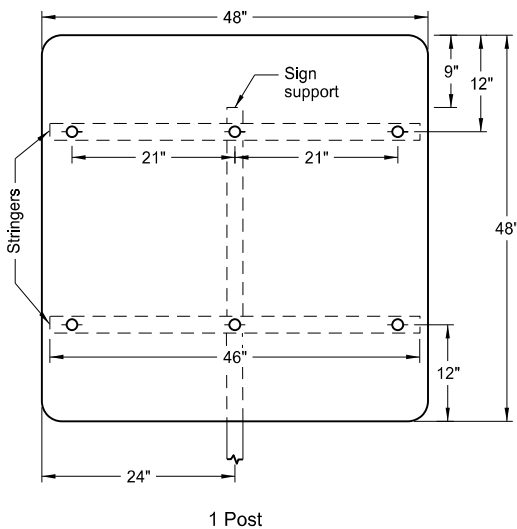
Assembly No. 15



Assembly No. 16



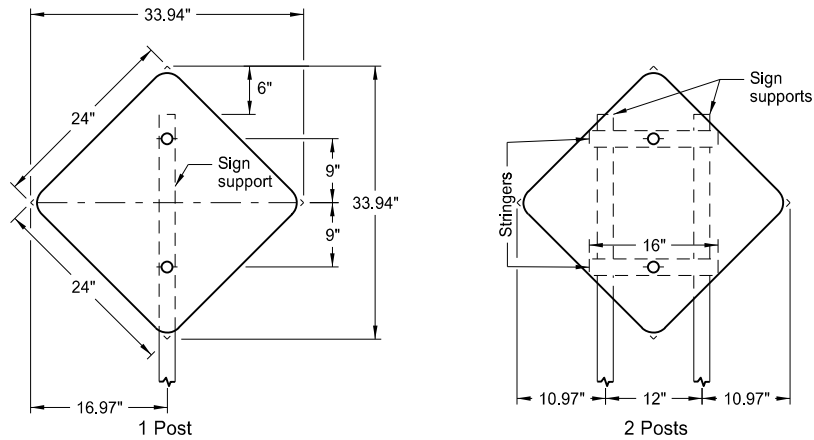
- Notes:
1. Use 0.100 inch minimum thickness sign backing material.
 2. Use 1½" x 1½" perforated square tube stringers.
 3. Punch holes round for ⅜" bolt.



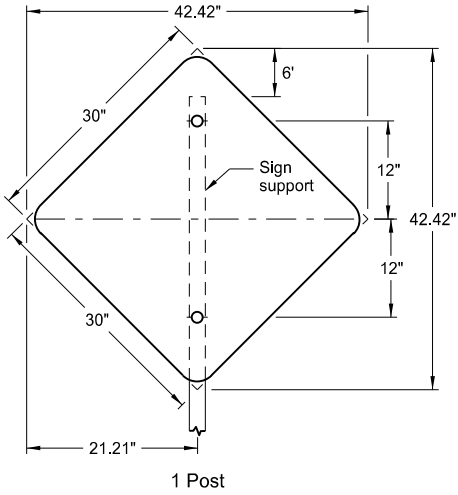
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18	Updated to active voice & changed Assembly 16 post spacing.
8-30-19	New Design Engineer PE Stamp.

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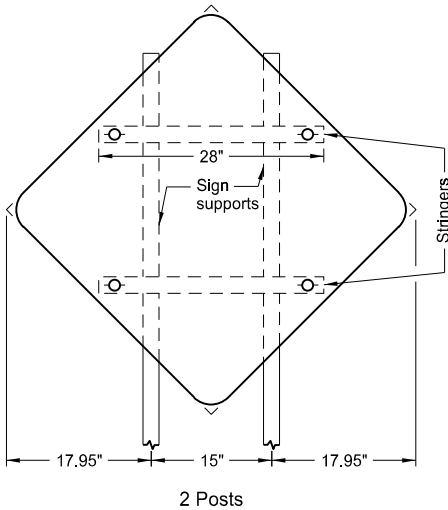
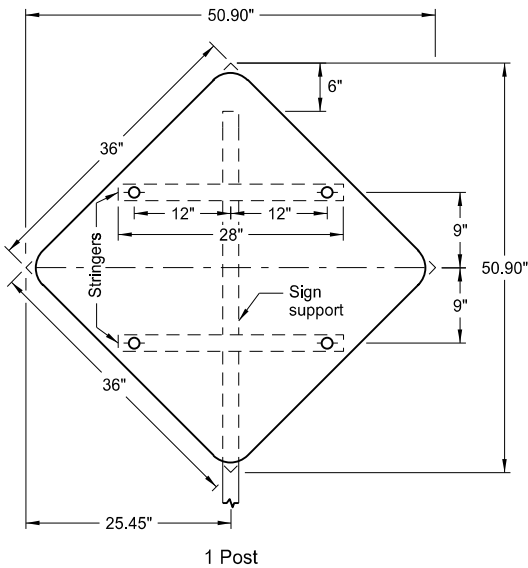
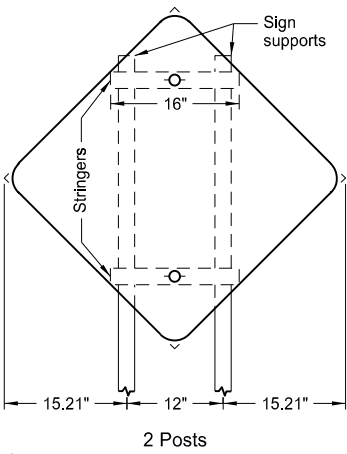
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION
DETAILS REGULATORY, WARNING AND GUIDE SIGNS



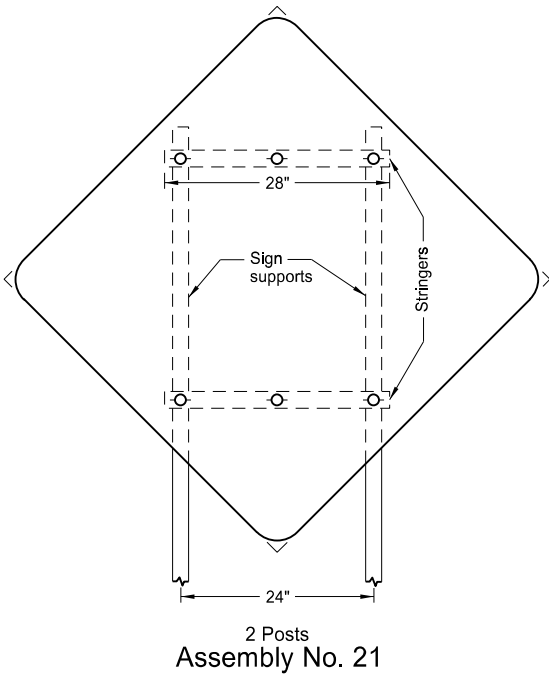
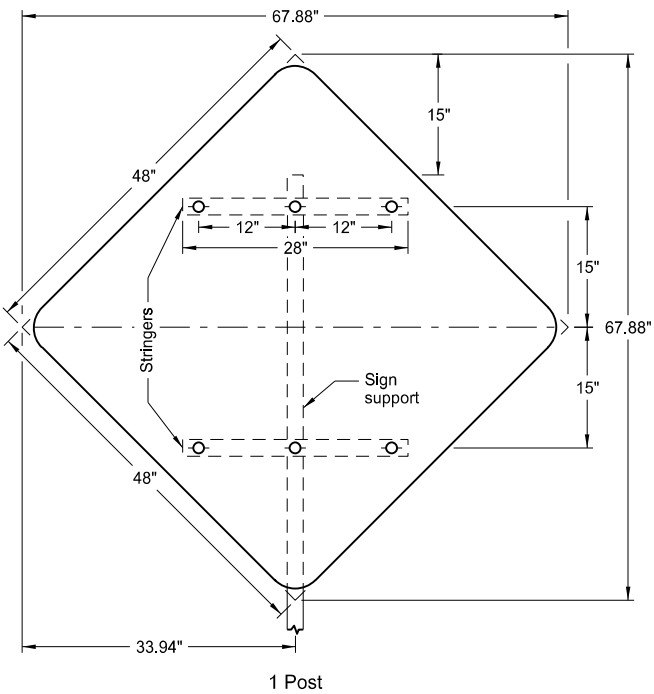
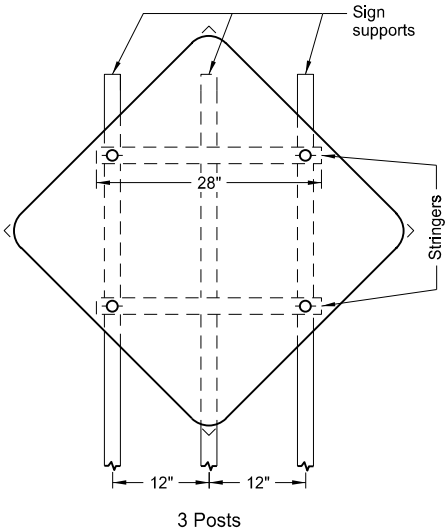
Assembly No. 18



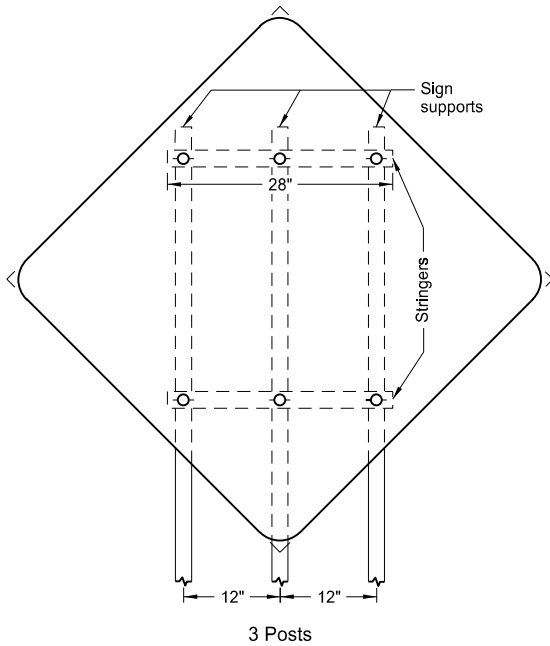
Assembly No. 19



Assembly No. 20



Assembly No. 21

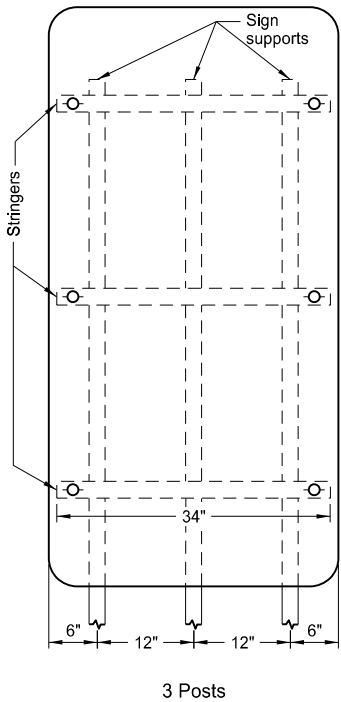
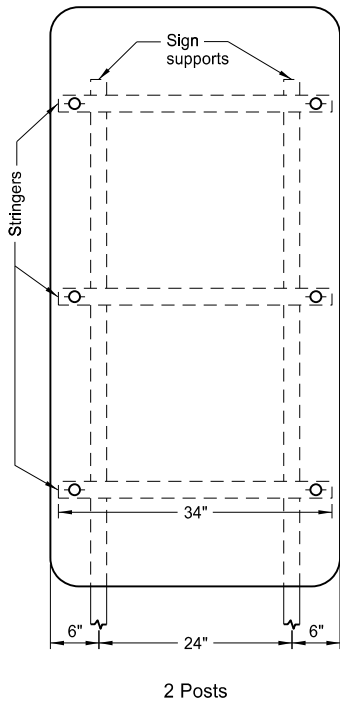
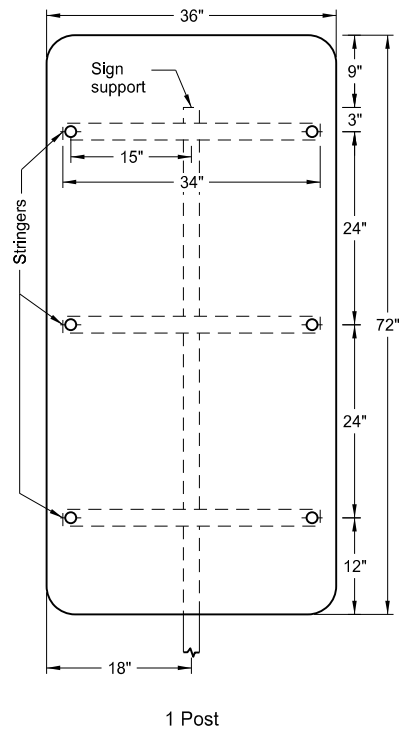


- Notes:
1. Use 0.100 inch minimum thickness sign backing material.
 2. Use 1½" x 1½" perforated square tube stringers.
 3. Punch holes round for ⅜" bolt.

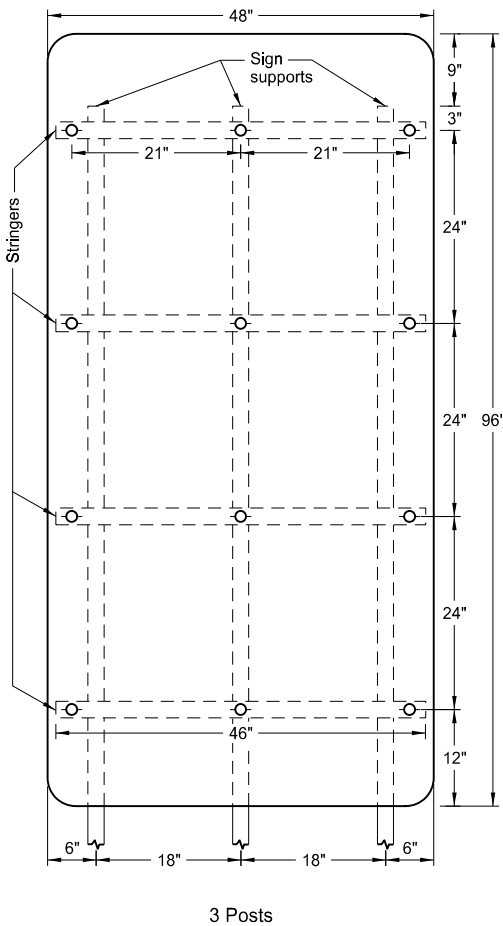
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
8-30-19	New Design Engineer PE Stamp.

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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION
DETAILS REGULATORY, WARNING AND GUIDE SIGNS

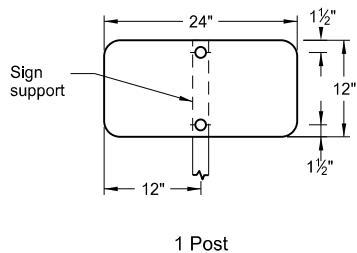


Assembly No. 24

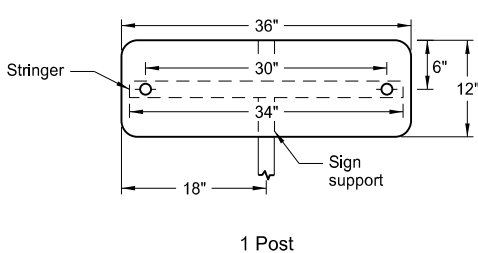


Assembly No. 25

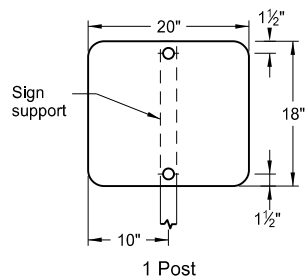
- Notes:
1. Use 0.100 inch minimum thickness sign backing material.
 2. Use 1½" x 1½" perforated square tube stringers.
 3. Punch holes round for ⅜" bolt.



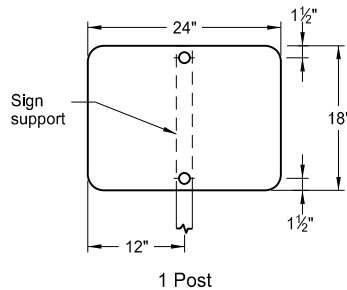
Assembly No. 26



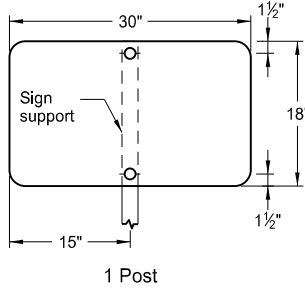
Assembly No. 27



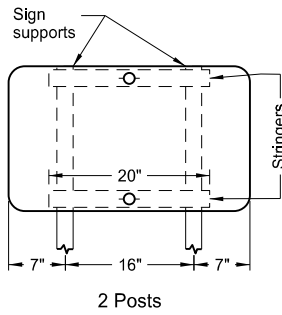
Assembly No. 28



Assembly No. 29



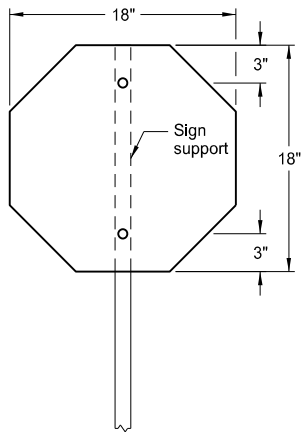
Assembly No. 30



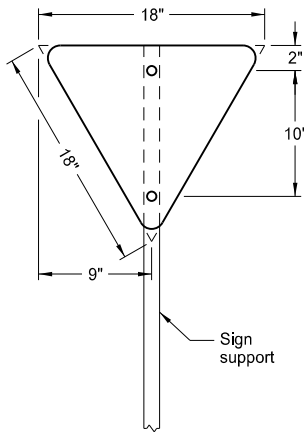
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
8-30-18	Updated notes to active voice.
8-30-19	New Design Engineer PE Stamp.

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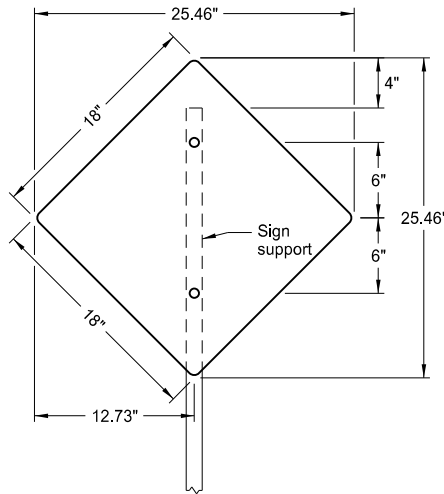
PUNCHING, STRINGER, AND SUPPORT LOCATION DETAILS
FOR REGULATORY, WARNING AND GUIDE BIKE ROUTE SIGNS



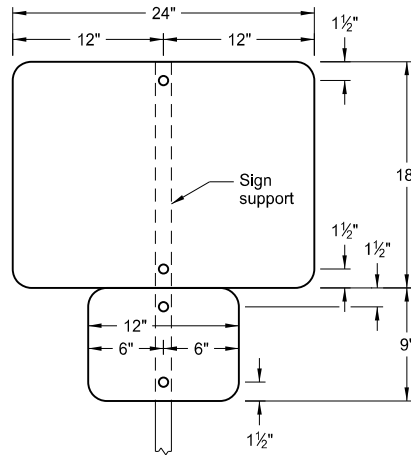
1 Post
Assembly No. 100



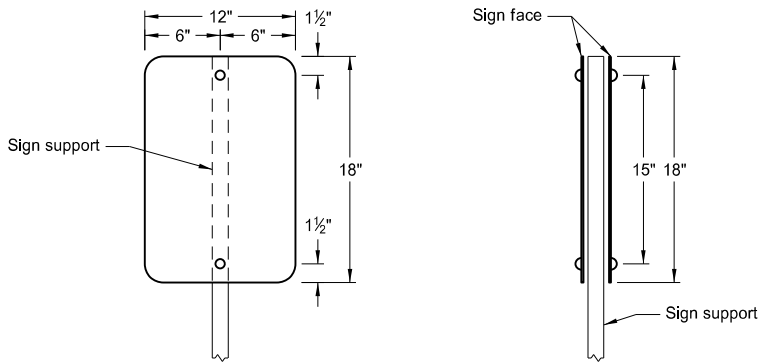
1 Post
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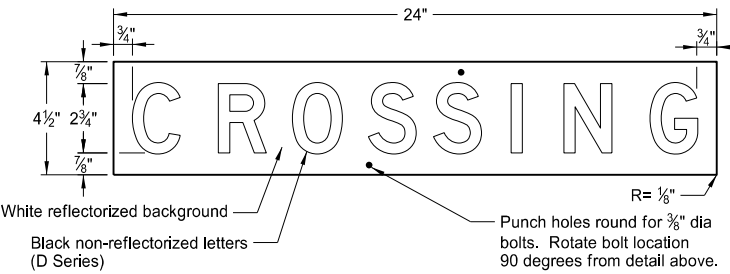
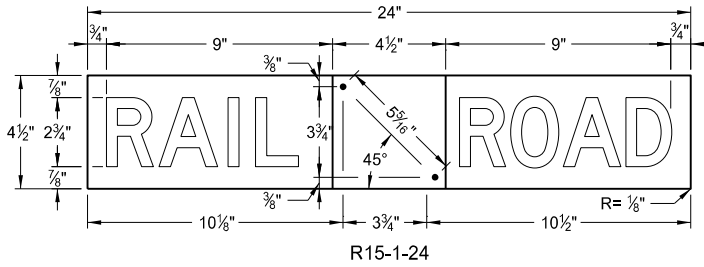
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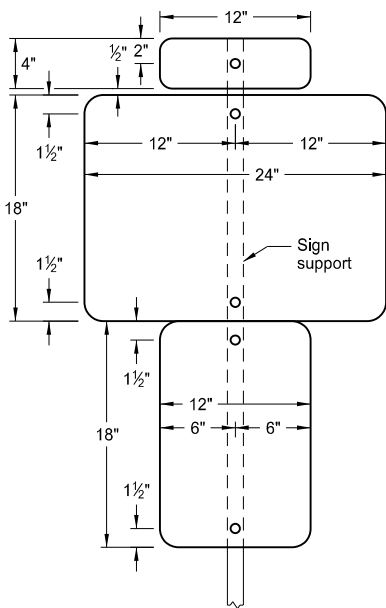
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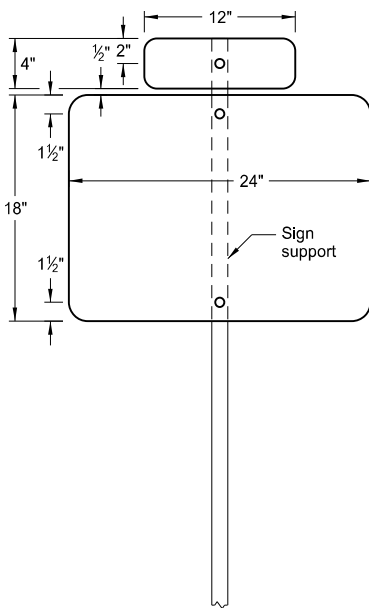
1 Post
back to back
Assembly No. 104



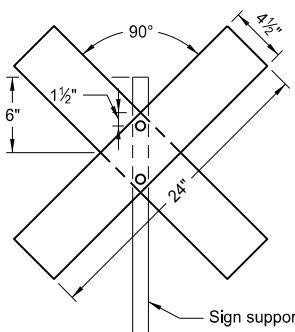
R15-1-24
Railroad Crossing Sign Details



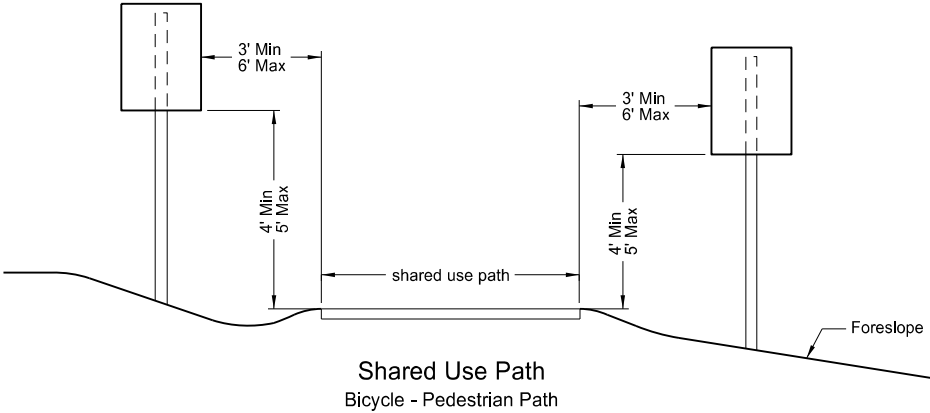
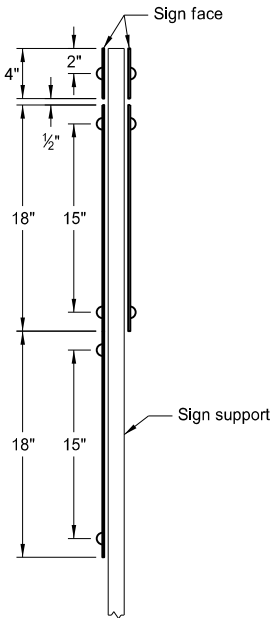
1 Post
back to back
Assembly No. 105



1 Post
Assembly No. 106



1 Post
Assembly No. 107



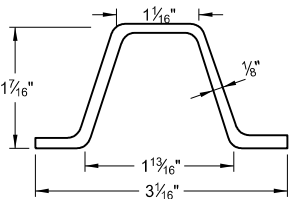
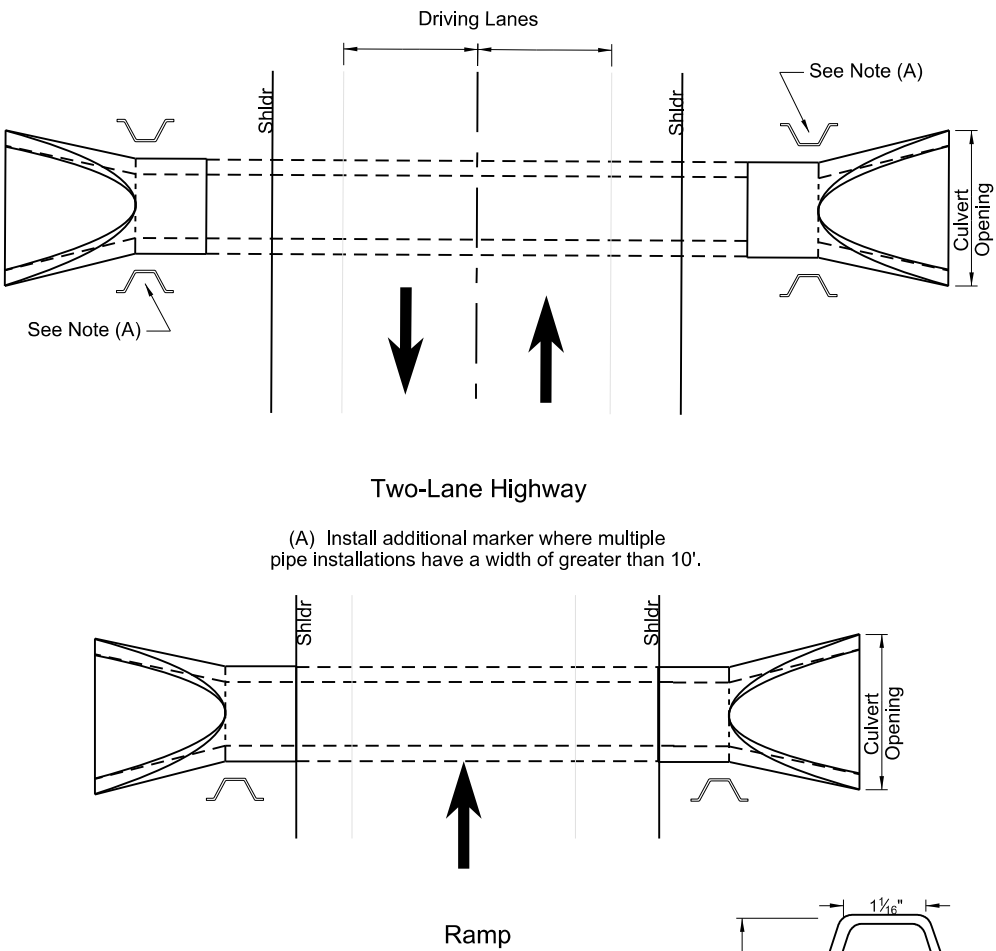
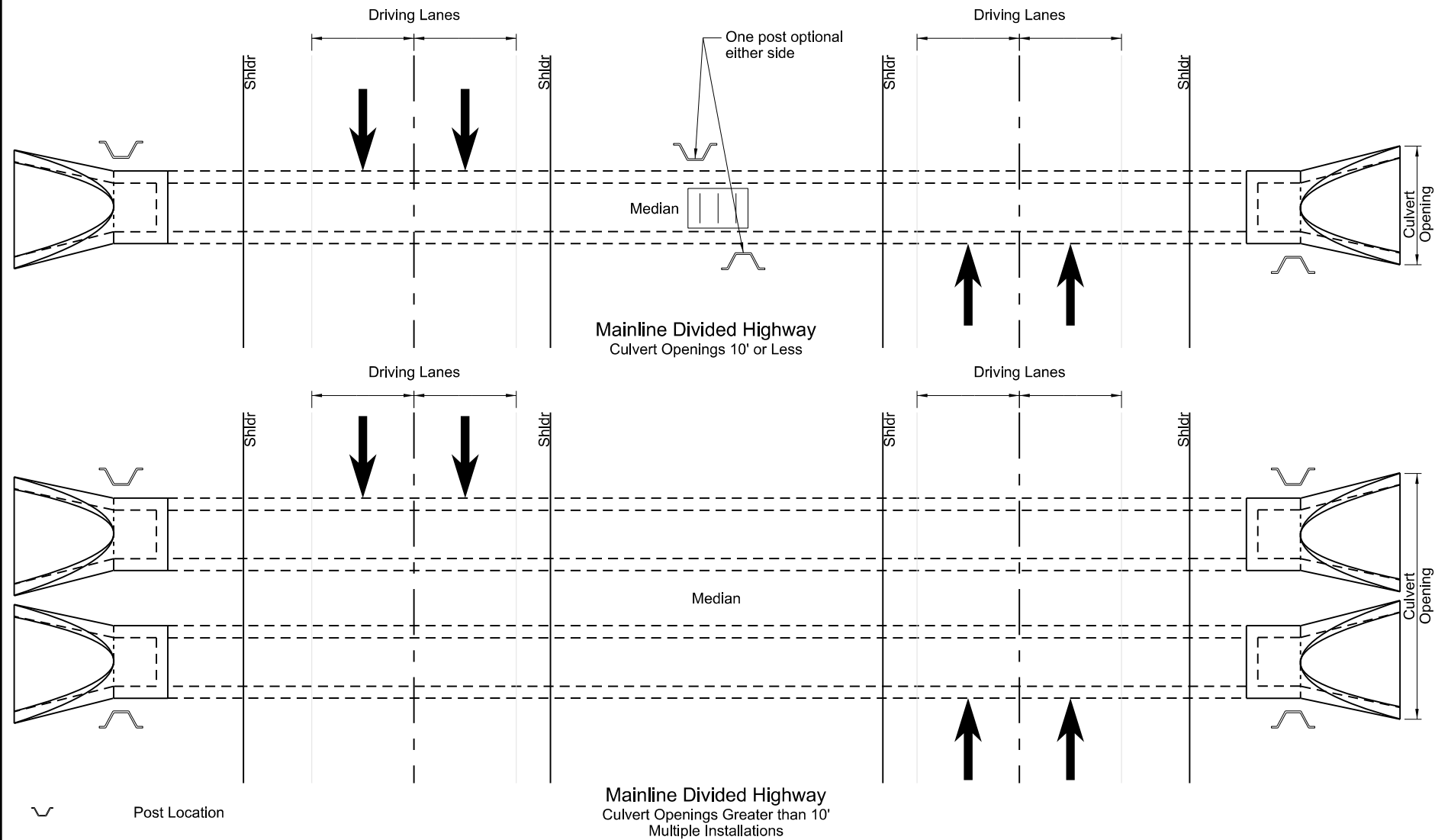
- Notes:
1. Use 0.100 inch minimum thickness sign backing material.
 2. Punch holes round for 3/8\"/>

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE
9-18-15	Revised Title Name.
8-30-18	Updated notes to active voice.
9-04-19	New Design Engineer PE Stamp.

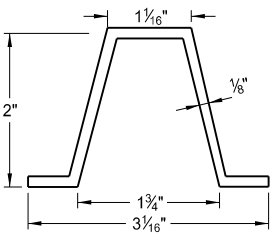
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OBJECT MARKERS - CULVERTS

D-754-83



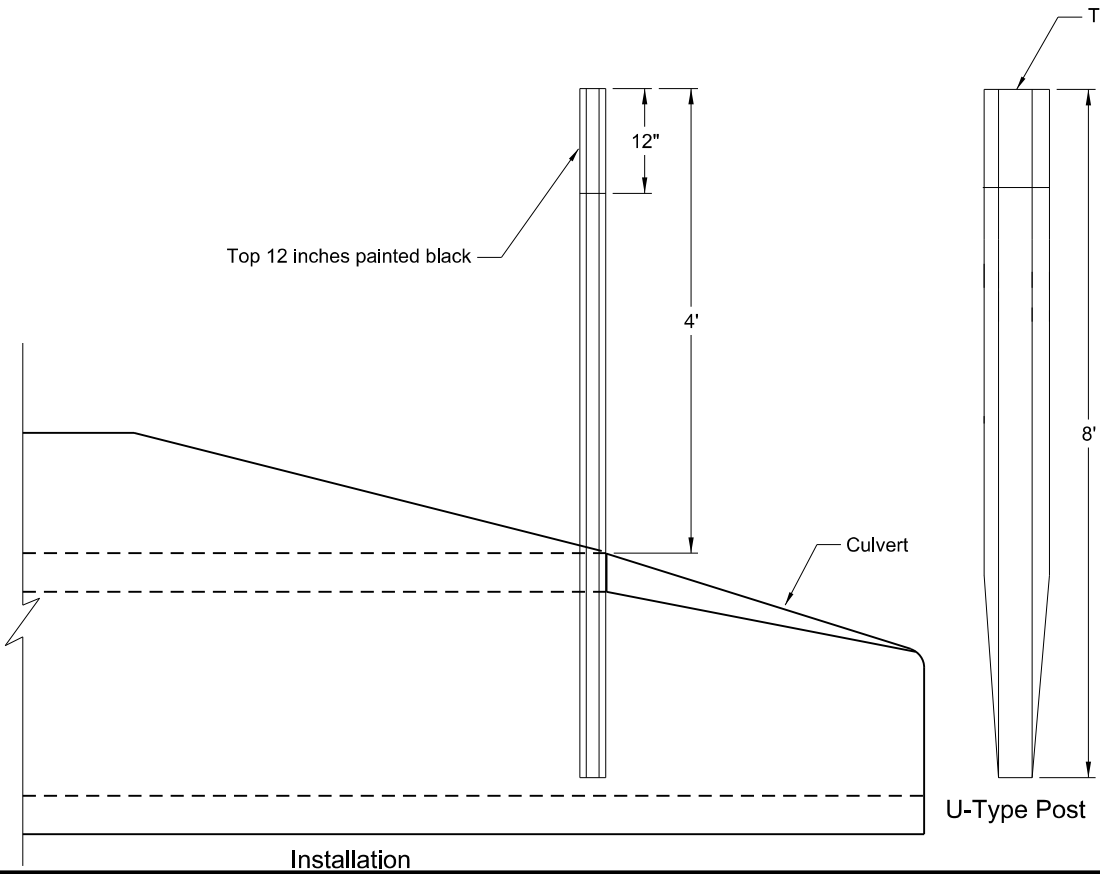
Steel Post Detail
Approx. 2.0 lbs/ft



Aluminum Post Detail
Approx. 0.88 lbs/ft

Notes:

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

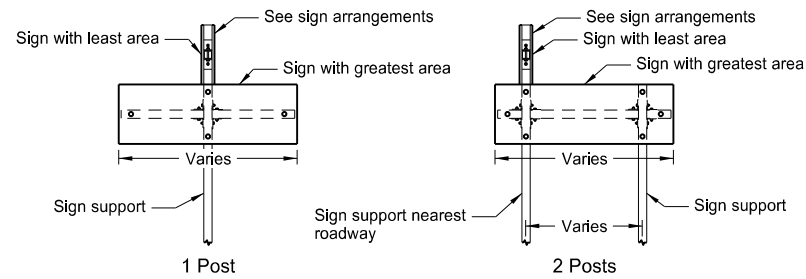


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-05-13	
REVISIONS	
DATE	CHANGE
7-7-14	Revised Notes
8-30-18	Updated notes to active voice.
9-05-19	New Design Engineer PE Stamp.

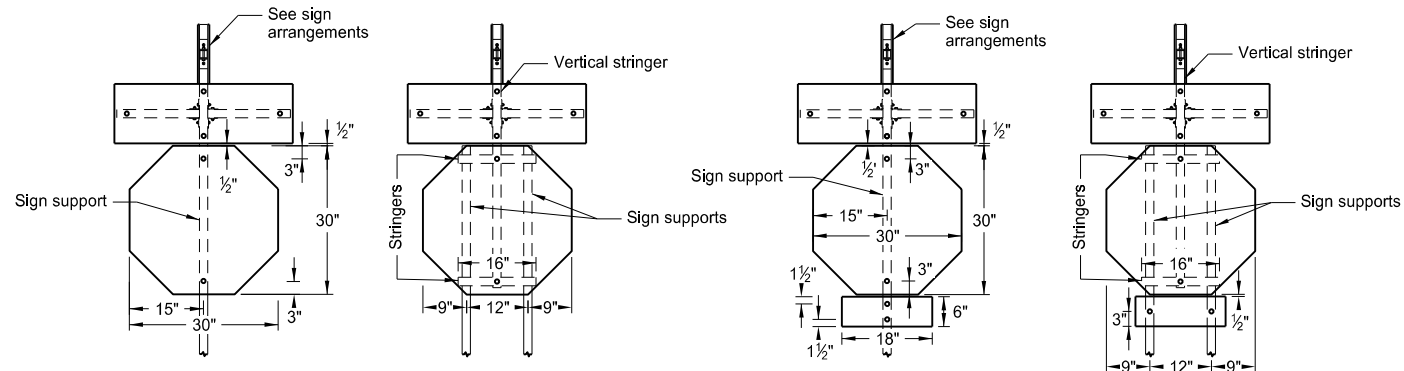
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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS FOR STREET NAME SIGNS AND 911 SIGNS

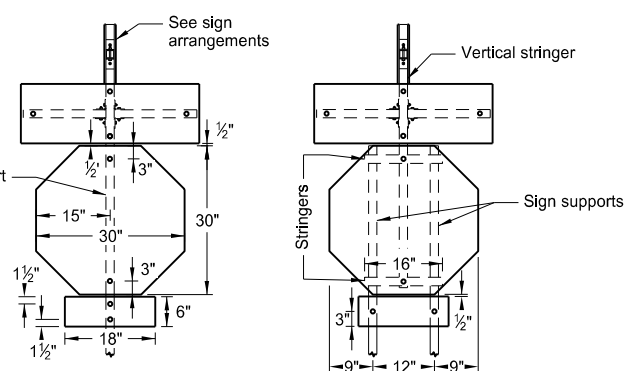
- A - Single sign
- B - Single sign back to back
- C - Single sign each direction
- D - Single sign one direction,
back to back other direction
- E - Back to back both directions



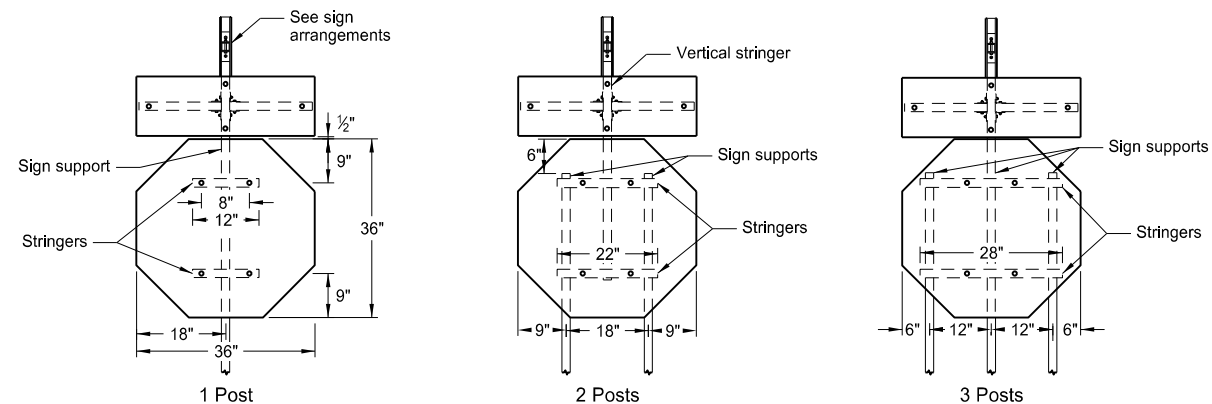
Special Assembly 1 (A, B, C, D or E)



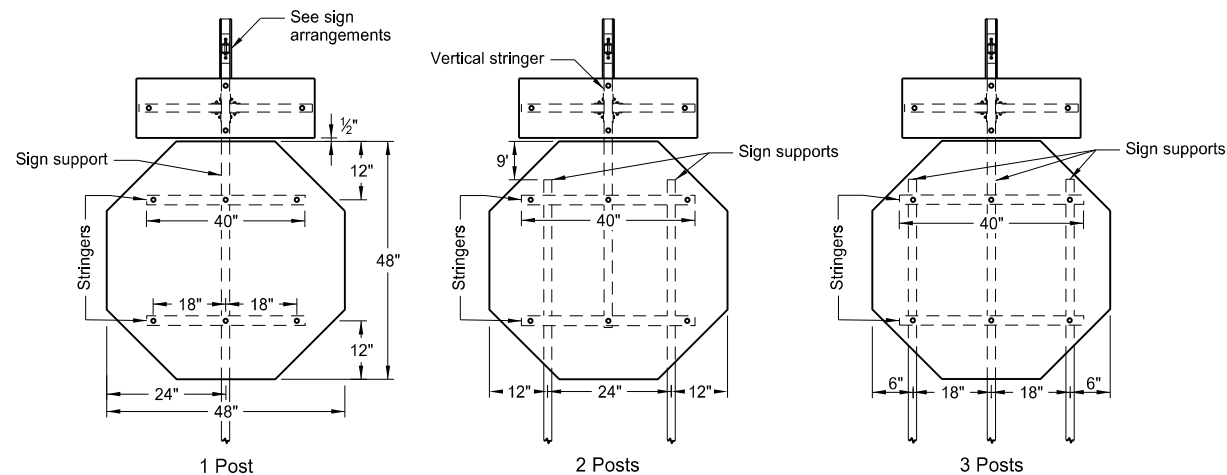
1 Post	2 Posts
Special Assembly 2 (A, B, C, D or E)	



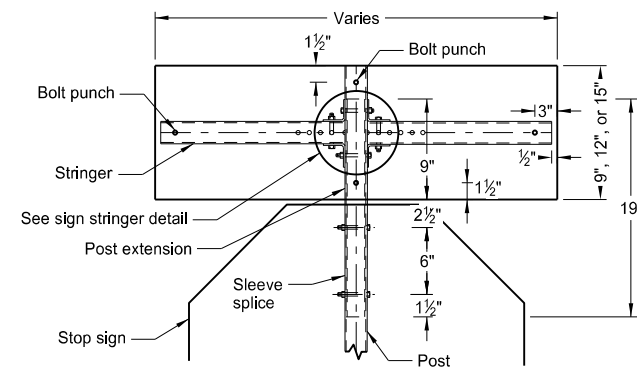
Special Assembly 3 (A, B, C, D or E)



Special Assembly 4 (A, B, C, D or E)

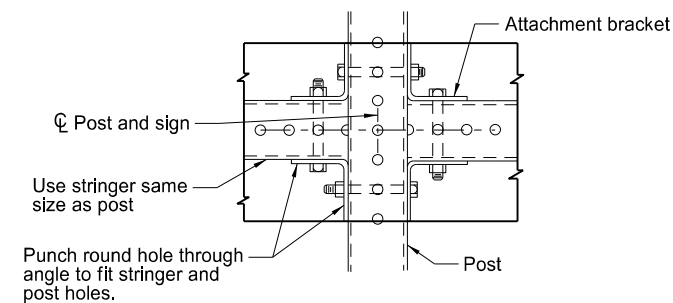


Special Assembly 5 (A, B, C, D or E)

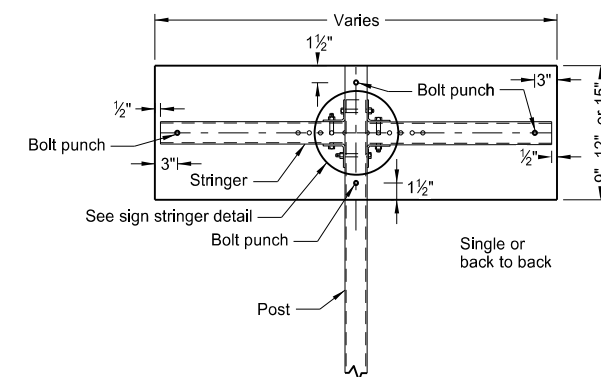


Front View
Sleeve Splice Detail

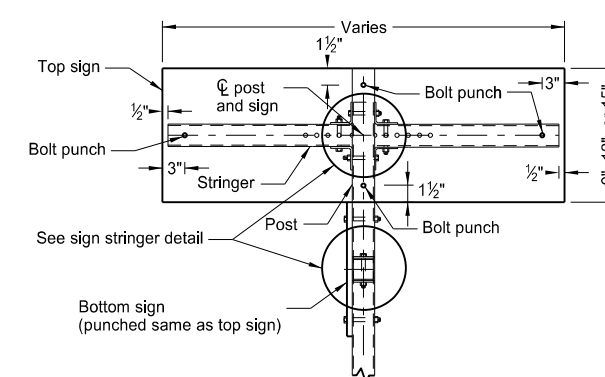
Note: Only use splice method with approval of engineer.



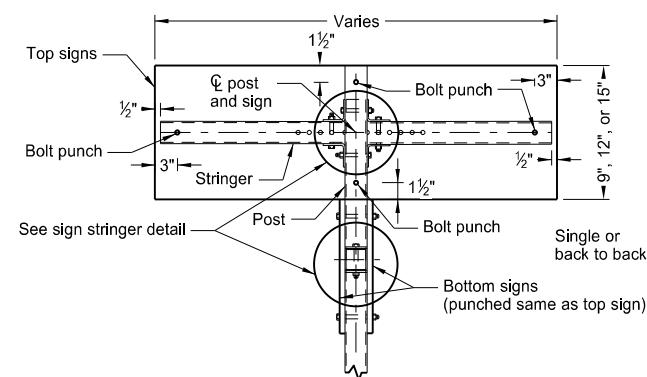
Sign Stringer Detail



Detail A or B

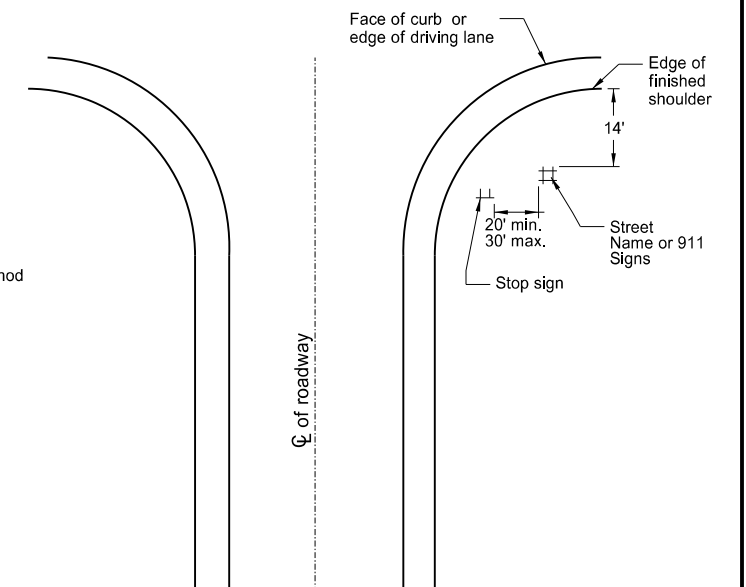


Detail C



Detail D or E

Note: See Standard Drawing D-754-86 for 911 support information and sign layout details.



Intersection Layout

Note: Use layout for street name signs or 911 signs with Special Assembly 1 .

Sign Arrangements

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
8-30-18	Added 2 post layout for SA1 and
9-05-19	Updated notes to active voice. New Design Engineer PE Stamp

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