

DESIGN DATA			
Traffic	Average Daily		
Current 2014	Pass: 385	Trucks: 90	Total: 475
Forecast 2034	Pass: 555	Trucks: 125	Total: 680
Clear Zone Distance: 18'(10:1) & 26'(4:1)		Design Speed: 65	
Minimum Sight Dist. for Stopping: 645		Bridges: N/A	
Sight Dist. for No Passing Zone: 1100			
Pavement Design Life 20 (years)			
Design Accumulated One-way 295,405 ESALs:			

JOB # 3
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

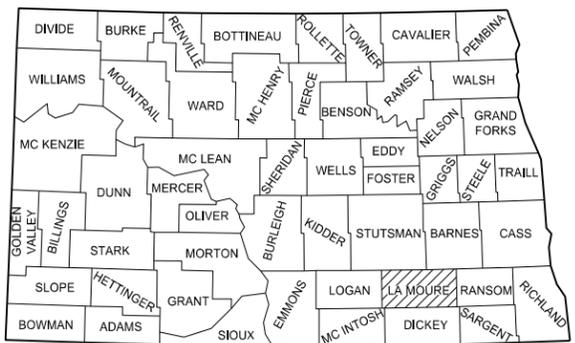
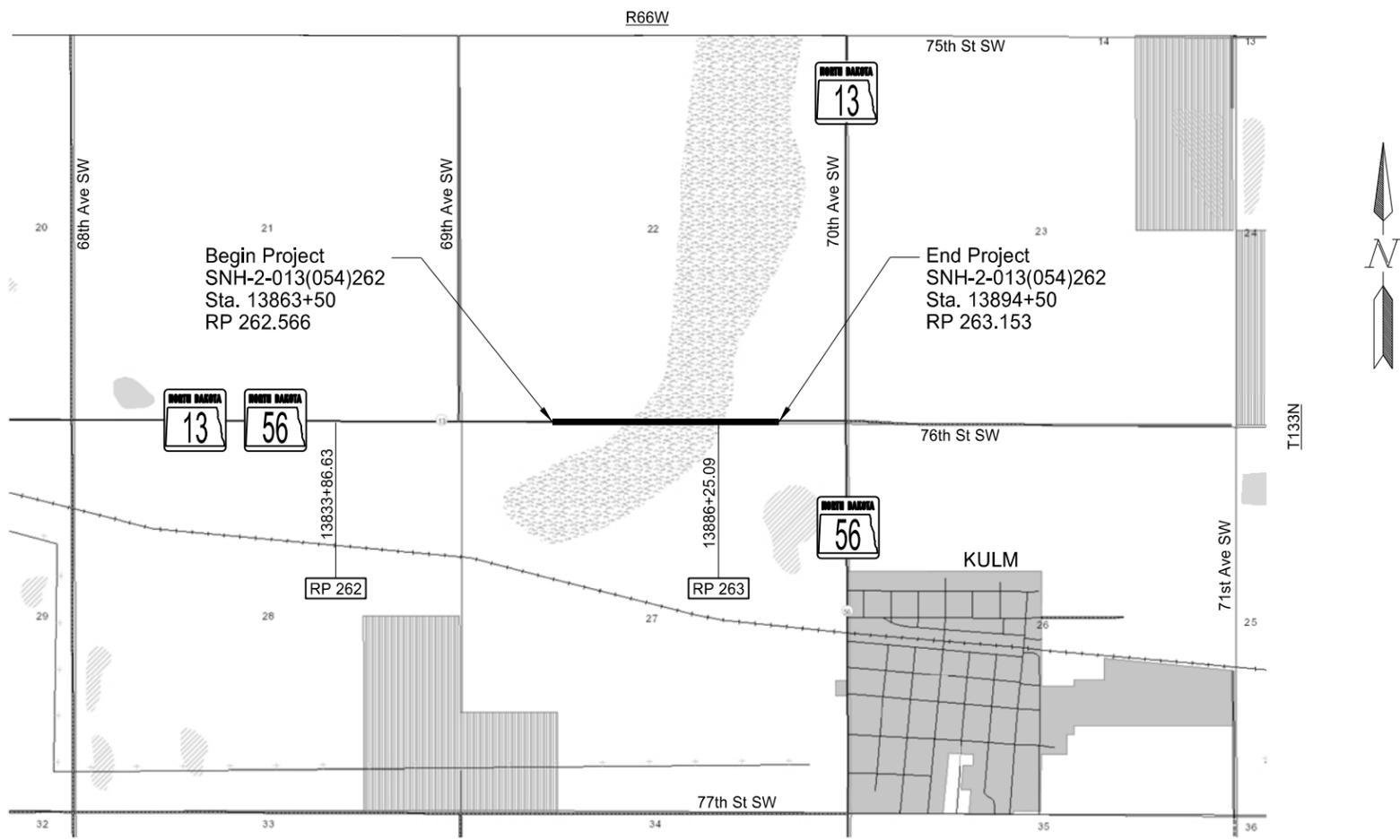
SNH-2-013(054)262

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	SNH-2-013(054)262	20819	1	1

GOVERNING SPECIFICATIONS:
2014 Standard Specifications adopted by the North Dakota Department of Transportation and the Supplemental Specifications effective on the date the project is advertised.

LaMoure County
ND 13 - 0.5 Miles W of E Jct ND 56 near Kulm
Grade Raise & Bituminous Surfacing

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
SNH-2-013(054)262	0.587	0.587



STATE COUNTY MAP

DESIGNERS
Damon DeVillers, PE
Steve Thompson
Paul Sharp
Jeff Nording

APPROVED DATE 12/03/15
Roger Weigel /S/
OFFICE OF PROJECT DEVELOPMENT
ND DEPARTMENT OF TRANSPORTATION

I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of ND.
APPROVED DATE 11/24/15
Damon DeVillers /S/
INTERSTATE ENGINEERING, INC.

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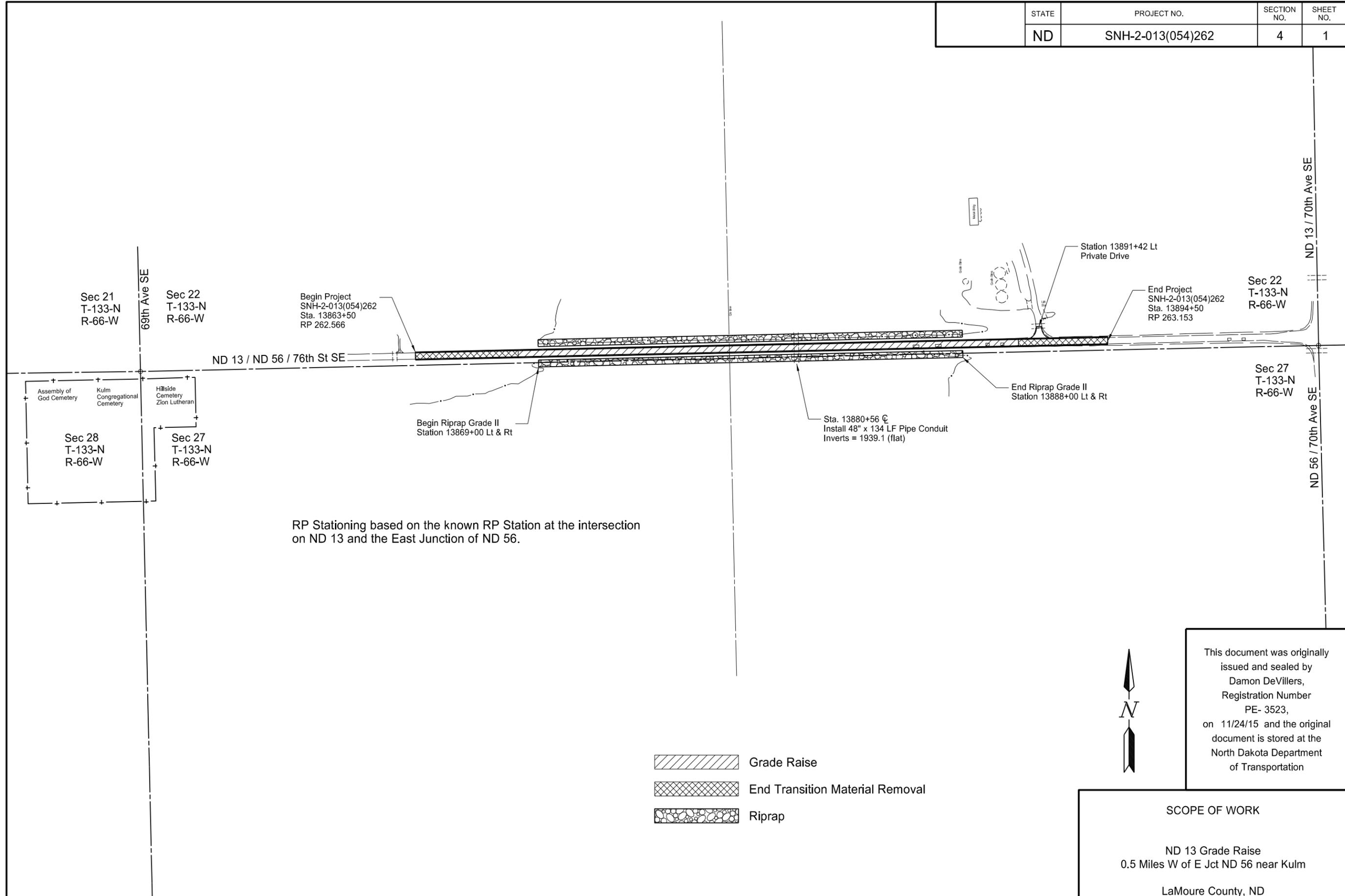
Number	Description
SP 0003(14)	Temporary Erosion and Sediment Best Management Practices
SP 5068(14)	Permits and Environmental Considerations

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D-101-10	NDDOT Utility Company and Organization Abbreviations	D-766-1	Mailbox Location Details
D-101-20, & 21	Line Styles		
D-101-30, 31, & 32	Symbols		
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107-700 HAUL ROADS: The Engineer will not designate paved roads off the state system as haul roads.

107-710 HAUL ROADS: Before submitting a proposal, contact the appropriate State, County, Township, or City officials to determine if there are any roadways that will be designated as "no haul routes".

107-P01 HAUL ROAD RESTORATION: All gravel used for haul road restoration will be CL-5 aggregate.

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

203-P01 TOPSOIL: The existing topsoil located above the water elevation within the areas of construction will be stripped, stockpiled and replaced.

203-P02 BORROW EXCAVATION: The borrow source and material will be acquired by the Contractor.

256-P01 RIPRAP GRADE II: There is approximately 5,200 CY of existing riprap that was placed on the roadway slopes from a previous construction project.

Should the Contractor choose to utilize the existing riprap, the salvaged riprap will be clean and free of debris and will meet gradation requirements in Section 256.03 C.1 of the Standard Specifications. Dispose of any riprap removed and not deemed salvageable by the Engineer in accordance with Standard Specification 107.17.

Salvaged riprap will be paid for as "RIPRAP GRADE II".

262-P01 FLOTATION SILT CURTAIN: Install the Flotation Silt Curtain before any existing riprap is removed and before any fill for road embankment is placed. A quantity of "Flotation Silt Curtain" has been provided to allow for installation of curtain along both sides of the roadway within the closed water basin as shown in the plans, without requiring curtain to be moved from one location to the next.

401-P01 APPLICATION OF BLOTTER MATERIAL: Include the cost of blotter material in the contract unit price for "Prime".

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

D-704-2 – Coring Bituminous Pavement

D-704-5 – Contractor Sign

D-704-15 Layout Type A: to be used throughout the limits of the project. Flag persons and pilot car will be required.

D-704-22 and D-704-26, Layouts Type K, Type L, and Type Y for construction trucks hauling material.

D-704-20 Layout Type G for construction sign layout.

D-704-26 Layouts Type BB, CC, EE, FF, and GG as needed.

D-704-27 – Striping Operations

D-704-56 – Shoulder Rumble strip operations

704-P02 TRAFFIC CONTROL – GRADE RAISE: During daylight hours, single lane traffic will be allowed with the use of flaggers and a pilot car. Two way traffic must be restored for night hours.

704-P03 TRAFFIC CONTROL – PIPE INSTALLATION: The only time period when single lane traffic control will be allowed at night is during the pipe installation. The maximum amount of time allowed for the Contractor to maintain single lane traffic is 5 days. The Engineer will apply a contract price reduction of \$1,000.00 per day for every calendar day in excess of 5.

704-P04 TRAFFIC CONTROL FOR BITUMINOUS PAVEMENT: Provide traffic control consisting of a temporary road closure, flagging, and a pilot car. Traffic control device quantities are based on a half mile limitation and the list below. Provide additional devices at no additional cost to the Department.

- 1) Standard D-704-15, layout A
- 2) Standard D-704-20, layout G
- 3) Standard D-704-22, layouts K and L
- 4) Standard D-704-26, layouts CC, EE, and GG.

When installing layout G from Standard Drawing D-704-20, move sign W3-5-48 and the sign assembly containing signs R2-1-48 and R2-1a-24 with the work area as it progresses through the construction zone. Place the R2-1-48 assembly a minimum of 500 feet in advance of flagging signs.

Place flaggers and traffic control devices as shown on Standard Drawing D704-15, layout A at the following locations when the lane closure spans across them:

- 1) Station 13891+42 LT

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NOTES

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709-P01 GEOSYNTHETIC MATERIAL TYPE-RR: The estimated quantity of Geosynthetic Material Type-RR includes the 3 foot length for the keyway at the top of the riprap wherever the riprap is placed.

714-P01 PIPE CONDUIT 48IN: Provide dewatering according to site conditions at the location designated for centerline pipe installation. Design any cofferdam, structure or berm used in the dewatering process and remove it in its entirety when installation is complete. All costs associated with dewatering shall be included in the price bid for "Pipe Conduit 48IN".

754-P01 REMOVED SIGNS: All signing removed is the property of the Contractor.

760-P01 RUMBLE STRIPS – INTERSECTION: The bid item for Rumble Strips – Intersection, includes 4 of the 6 saw slotted rumble strips. The remaining two are outside of the project limits and shall remain as they currently exist.

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ENVIRONMENTAL COMMITMENTS

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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ENVIRONMENTAL COMMITMENTS (EC): The North Dakota Department of Transportation and the Federal Highway Administration have made environmental commitments to secure approval of this project. The environmental commitments are as follows:

EC-1: Unavoidable impacts to wetlands will be mitigated onsite, adjacent to the project, or at a NDDOT approved mitigation site or bank.

ACTION REQUIRED /TAKEN: 0.00 acres of permanent USACE impacts to jurisdictional waters and 0.70 acres of permanent impacts to EO11990 wetlands will require mitigation. The NDDOT will mitigate EO 11990 impacts at (FHWA EO 11990 Mitigation Bank Vollrath 16/17) in the (Red River) Regional Service Area. 0.06 acres of temporary impacts will result from construction. Temporary impact areas will be graded to preconstruction contours.

Wetland Impact Table															
Wetland Number	Location	Cowardin Class.	Wetland Type	Wetland Size Ac.	Wetland Feature	USACE Jurisdictional Wetlands*	Wetland Impacts (acres)		USFWS Easement Impacts		Wetland Mitigation				
							Temp. Ac.	Perm. Ac.	Temp.	Perm.	Mitigation Required			Location; Acreage; Wetland#; Ratio	Onsite Mitigation Acres
											EO 11990	USACE	USFWS		
1a	Sec. 22, T133N, R66W	PEMAx	Ditch	0.19	Artificial	No	0.00	0.09	0.00	0	N	N	N		0.00
1b	Sec. 22, T133N, R66W	PEMF	Basin	2.98	Natural	No	0.03	0.35	0.00	0	Y	N	N	Vollrath, 0.35 (1:1)	0.00
1c	Sec. 22, T133N, R66W	PEMAx	Ditch	0.30	Artificial	No	0.00	0.10	0.00	0	N	N	N		0.00
1d	Sec. 27, T133N, R66W	PEMAx	Ditch	0.10	Artificial	No	0.00	0.07	0.00	0.00	N	N	N		0.00
1e	Sec. 27, T133N, R66W	PEMF	Basin	2.92	Natural	No	0.03	0.35	0.03	0	Y	N	N	Vollrath, 0.35 (1:1)	0.00
1f	Sec. 27, T133N, R66W	PEMAx	Ditch	0.17	Artificial	No	0.00	0.06	0.00	0.00	N	N	N		0.00
Totals				6.66			0.06	1.02	0.03	0.00					0.00

* A wetland Jurisdictional Determination was issued by the USACE on 03/17/2015; NWO-2005-60648-BIS.

**All impacts to natural wetlands (natural/jurisdictional and natural/non-jurisdictional), regardless of size, as well as impacts greater than 0.10 acre to artificial/jurisdictional wetlands require mitigation.

***All artificial/non-jurisdictional, deep water (impacts greater than 6.6 feet), Other Waters less than 300 linear feet (determined by the USACE on a case by case), and temporary impacts do not require mitigation.

Summary Impact Table			
Total Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	Total (Acres)	Wetland Type	Total (Acres/Lf)
Natural/JD	0.00	Temporary JD	0.00
Natural/Non-JD	0.70	Non-JD Temporary	0.06
Artificial/JD	0.00	Permanent JD > 0.10	0.00
Artificial /Non-JD	0.32	Permanent OW	0.00
Total	1.02	Temporary OW	0.00

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QUANTITIES

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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SPEC	CODE	ITEM DESCRIPTION	UNIT	TOTAL
103	0100	Contract Bond	L SUM	1.0
202	0137	Removal of Pavement	SY	2,943
202	0170	Removal of Culverts-All Types and Sizes	LF	136
203	0101	Common Excavation-Type A	CY	627
203	0109	Topsoil	CY	1,150
203	0119	Topsoil-Imported	CY	518
203	0121	Topsoil - Wetland	CY	258
203	0140	Borrow-Excavation	CY	53,149
216	0100	Water	M GAL	805
251	0200	Seeding Class II	ACRE	3.68
251	1000	Wetland Seed	ACRE	0.26
251	2000	Temporary Cover Crop	ACRE	3.68
253	0101	Straw Mulch	ACRE	7.36
256	0201	Riprap Grade II	TON	15,498
260	0100	Silt Fence Unsupported	LF	775
260	0101	Remove Silt Fence Unsupported	LF	775
261	0112	Fiber Rolls 12IN	LF	3,657
261	0113	Removal of Fiber Rolls 12IN	LF	1,241
262	0100	Flotation Silt Curtain	LF	3,975
262	0101	Remove Flotation Silt Curtain	LF	3,975
302	0120	Aggregate Base Course Cl. 5	TON	10,222
302	0314	Temporary Traffic Surface Aggregate	TON	2,399
401	0050	Tack	GAL	1,129
401	0060	Prime	GAL	2,759
430	0040	Superpave FAA 40	TON	2,653
430	1000	Cored Sample	EA	17
430	5828	PG 58-28 Asphalt Cement	TON	160
702	0100	Mobilization	L SUM	1.0
704	0100	Flagging	M HR	720
704	1000	Traffic Control Signs	UNIT	2,232
704	1052	Type III Barricades	EA	4
704	1060	Delineator Drums	EA	12
704	1067	Tubular Markers	EA	63

SPEC	CODE	ITEM DESCRIPTION	UNIT	TOTAL
704	1080	Stackable Vertical Panels	EA	126
704	1081	Vertical Panels (back to back)	EA	10
704	1185	Pilot Car	HR	360
706	0500	Aggregate Laboratory	EA	1
706	0600	Contractor's Laboratory	EA	1
709	0151	Geosynthetic Material - Type R1	SY	478
709	0155	Geosynthetic Material - Type RR	SY	18,578
714	4125	Pipe Conduit 48 IN	LF	134
754	0110	Flat Sheet For Signs - Type XI Refl. Sheeting	SF	11.3
754	0112	Flat Sheet For Signs - Type IV Refl. Sheeting	SF	24.4
754	0206	Steel Galv. Posts - Telescoping Perforated Tube	LF	67
754	0563	Reference Marker - Type C	EA	1
760	0005	Rumble Strips - Asphalt Shoulder	MILE	1.2
760	0007	Rumble Strips - Asphalt Centerline	MILE	0.6
760	0009	Rumble Strips - Intersection	EA	1
762	0430	Short Term 4IN Line - Type NR	LF	2,325
762	1104	Pvmt Mk Painted 4IN Line	LF	6,975

QUANTITIES
 ND 13 Grade Raise
 0.5 Miles W of E Jct ND 56 near Kulm

 LaMoure County, ND

BASIS OF ESTIMATE

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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Stations			
Sta 13863+50 to Sta 13894+50			
Tangent			
Material	Unit	Width (ft)	Quantity per Station
Aggregate Base Course CL 5 @ 1.875 Ton/CY	Ton	36	323
Temporary Traffic Surface Aggregate	Ton	24	56
Prime Coat @ 0.25 Gal/SY	Gal	32	89
Blotter Material CI 44 @ 15 lbs/SY	Ton	24	2
Tack Coat @ 0.05 Gal/SY (1 st Lift)	Gal	32	18
Tack Coat @ 0.05 Gal/SY (2 nd Lift)	Gal	32	18
Superpave FAA 40 @ 2 Ton/CY	Ton	28	83.3
PG 58-28 Asphalt Cement @ 6.0%	Ton	28	5.00
Riprap – Grade II	1.7 Tons / CY		

Permanent Pavement Marking		
Location - Type	Basis	Quantity
Yellow Centerline – Pvmk MK Painted 4 IN Line	Centerline Skips 1,320 LF/mile	775 LF
White Edge Lines – Pvmk MK Painted 4 IN Line	10,560 LF/mile	6,200 LF

Short Term 4 IN Line-Type NR		
Location	Basis	Quantity
Centerline – Top of rumble strip	Centerline Skips 1,320 LF/mile	775 LF
Centerline – Top of 1 st Lift	Centerline Skips 1,320 LF/mile	775 LF
Centerline – Top of 2 nd Lift	Centerline Skips 1,320 LF/mile	775 LF

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

HBP Cored Samples							
	A	B	C	D			
Specification Section	Distance(Ft)±2000	Lanes	Lifts	Sublots (A x B x C)	Quantity (D x 2)	Quantity (1 per mile)	Unit
430.04 1.2.b(1), "General"	2	2	2	8	16	N/A	EA
430.04 1.2.b(2), "Pavement Thickness Determination Cores"					N/A	1	EA
Total					16	1	EA

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Earthwork Summary

Location	Excavation (CY)	Aggregate Removal (CY)	Common Excavation - Type A (CY) PAY ITEM	Embankment (See Note 2) (CY)	Borrow Excavation (CY) PAY ITEM	Topsoil from Stripping (CY) PAY ITEM	Topsoil Required (CY)	Topsoil – Imported (CY) PAY ITEM	Topsoil – Wetland (CY) PAY ITEM
	A	B	C = B + A	D	E = D – C	F	G	H = G – F	I
ND Hwy 13									
Sta. 13863+50 to Sta. 13894+50	90	537	627	53,776	53,049	1,150	1,668	518	258
Approach									
Sta. 13891+42 Lt					100				
TOTALS	90	537	627	53,776	53,149	1,150	1,668	518	258

Notes:

1. This computation report summary is not a balance sheet. The Contractor shall calculate their own balance of material for the project.
2. The quantity shown for Embankment CY's has been increased by 30% above the water & 50% below the water to adjust for shrinkage.

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EARTHWORK SUMMARY

ND 13 Grade Raise
0.5 Miles W of E Jct ND 56 near Kulm

LaMoure County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-2-013(054)262	11	2

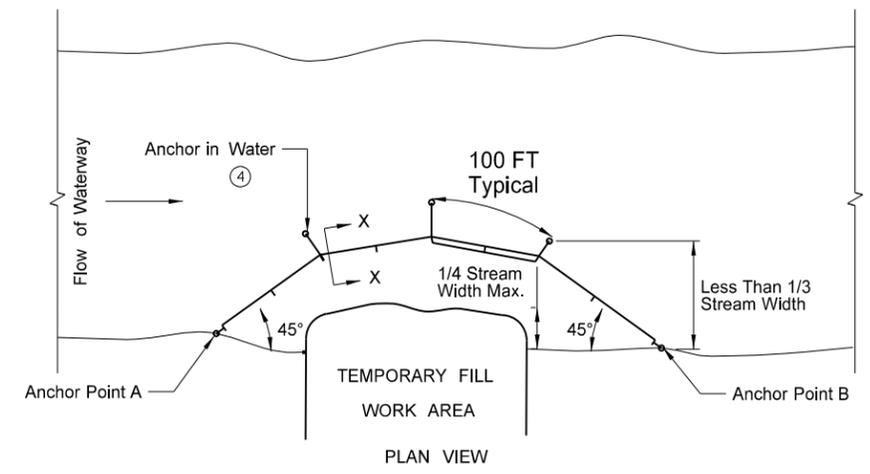
Station	End Area (SF)			Volume (CY)			Mass Ordinate
	Excavation (Includes Aggregate Removal)	Fill Below Water	Fill Above Water	Excavation (Includes Aggregate Removal)	Adjusted Fill Below Water 50% Shrinkage	Adjusted Fill Above Water 30% Shrinkage	
13864+00.00	32.70	0.00	37.60	0	0.00	0.00	0.00
13865+00.00	27.60	0.00	36.10	112	0.00	177.40	-65.80
13866+00.00	24.40	0.00	58.10	96	0.00	226.80	-196.30
13867+00.00	0.00	0.00	91.20	45	0.00	359.40	-510.50
13868+00.00	0.00	0.00	228.60	0	0.00	769.90	-1280.40
13869+00.00	0.00	0.00	381.40	0	0.00	1468.50	-2748.90
13870+00.00	0.00	26.30	456.20	0	73.10	2016.40	-4838.40
13871+00.00	0.00	21.80	447.70	0	133.60	2176.10	-7148.10
13872+00.00	0.00	28.20	435.30	0	138.90	2125.70	-9412.70
13873+00.00	0.00	34.90	449.50	0	175.30	2130.10	-11718.10
13874+00.00	0.00	39.10	445.90	0	205.60	2155.60	-14079.30
13875+00.00	0.00	70.60	454.90	0	304.70	2168.60	-16552.60
13876+00.00	0.00	48.10	438.10	0	329.70	2149.80	-19032.10
13877+00.00	0.00	56.80	465.90	0	291.40	2176.30	-21499.80
13878+00.00	0.00	77.80	473.80	0	373.90	2262.20	-24135.90
13879+00.00	0.00	90.70	482.10	0	468.10	2301.20	-26905.20
13880+00.00	0.00	84.10	482.50	0	485.60	2322.20	-29713.00
13880+55.66	0.00	101.00	462.30	0	286.20	1266.00	-31265.20
13881+00.00	0.00	59.50	463.60	0	197.70	988.30	-32451.20
13882+00.00	0.00	103.10	463.00	0	451.70	2230.70	-35133.60
13883+00.00	0.00	88.40	459.80	0	531.90	2221.60	-37887.10
13884+00.00	0.00	72.40	453.20	0	446.70	2198.00	-40531.80
13885+00.00	0.00	58.20	428.70	0	362.80	2123.10	-43017.70
13886+00.00	0.00	36.10	432.40	0	261.90	2073.00	-45352.60
13887+00.00	0.00	21.30	426.00	0	159.40	2066.50	-47578.50
13888+00.00	0.00	5.00	404.60	0	73.10	1999.60	-49651.20
13889+00.00	0.00	0.00	257.10	0	13.90	1593.00	-51258.10
13890+00.00	0.00	0.00	146.90	0	0.00	972.60	-52230.70
13891+00.00	0.00	0.00	80.70	0	0.00	547.90	-52778.60
13891+42.50	29.20	0.00	86.20	23	0.00	170.80	-52926.40
13891+42.51	Approach					100.00	-53026.40
13892+00.00	31.70	0.00	60.80	65	0.00	203.50	-53165.90
13893+00.00	29.20	0.00	25.60	113	0.00	208.00	-53262.90
13894+00.00	32.90	0.00	0.00	115	0.00	61.60	-53209.80
13895+00.00	0.00	0.00	0.00	61	0.00	0.00	-53149.00

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EARTHWORK DATA TABLE

ND 13 Grade Raise
0.5 Miles W of E Jct ND 56 near Kulm

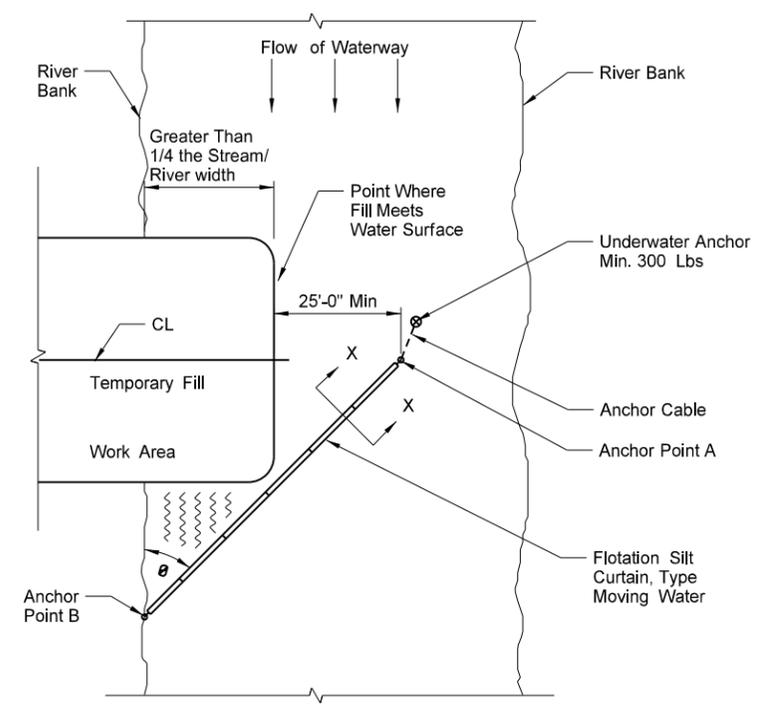
LaMoure County, ND



PLAN VIEW
FLOTATION SILT CURTAIN - TYPE WORK AREA

FOR CONTAINING OVERFLOWS FROM WEIRS, STANDPIPES, SETTLING PONDS

DESIGN GUIDELINES:
WHEN TEMPORARY FILL ENCLOSES LESS THAN 1/4 OF THE WIDTH OF STREAM.
MAXIMUM WATER VELOCITY: 5 FT./SEC.
MAXIMUM WATER DEPTH: 11 FT.

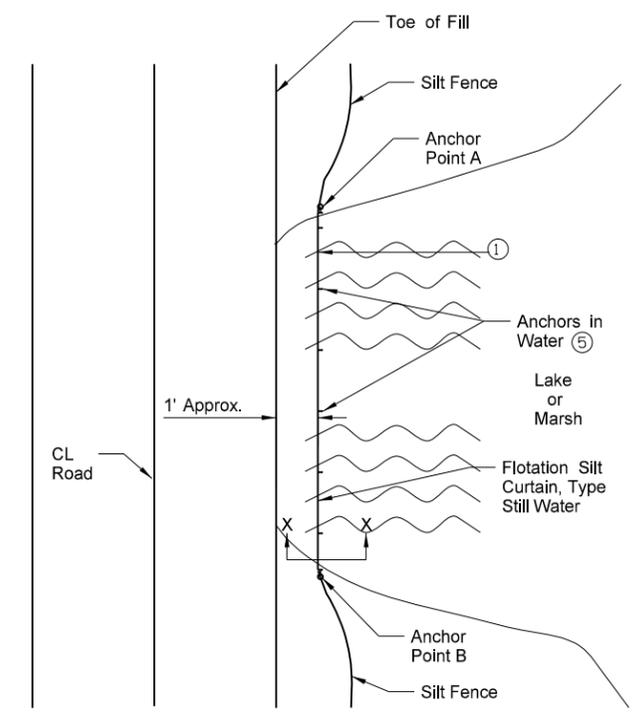


$\angle \theta$	RIVER VELOCITY
45°	SLOW, LESS THAN 3 FT./SEC.
35°	MODERATE, 3 - 5 FT./SEC.

PLAN VIEW
FLOTATION SILT CURTAIN - TYPE MOVING WATER

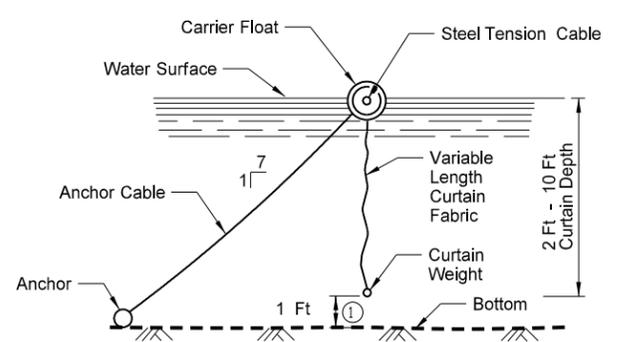
DESIGN GUIDELINES:
WHEN TEMPORARY FILL ENCLOSES MORE THAN 1/4 BUT LESS THAN 1/3 WIDTH OF THE STREAM.
MAXIMUM WATER DEPTH: 11 FT. ①
MINIMUM WATER DEPTH: 3 FT.
MAXIMUM WATER VELOCITY: 5 FT./SEC.

- Notes:
- ① Curtain 1 FT from Bottom
 - ② W = 10 FT Min, 20 FT Max
 - ③ D = 2 FT
 - ④ 100 FT Max Spacing Between Anchors, Min 40 LBS
 - ⑤ Use enough Anchors to Hold Silt Curtain in Place

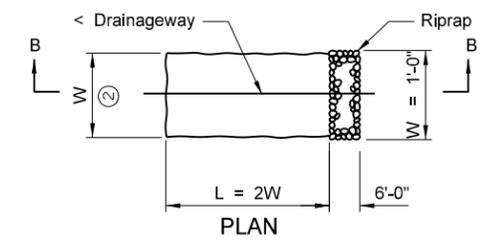


PLAN VIEW
FLOTATION SILT CURTAIN - TYPE STILL WATER

DESIGN GUIDELINES:
MAXIMUM WATER DEPTH: 11 FT. ①
MINIMUM WATER DEPTH: 3 FT.



SECTION X-X
FLOTATION SILT CURTAINS

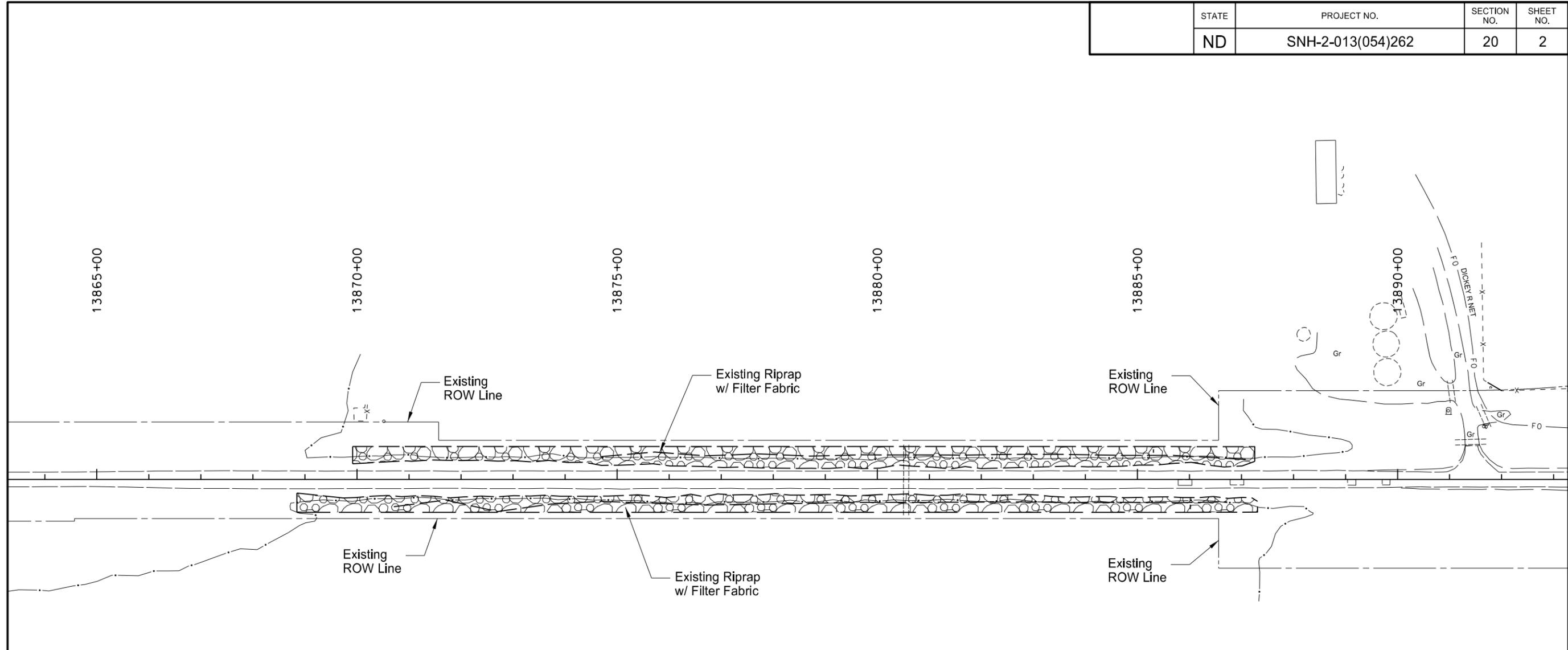


PLAN
SECTION B-B
SEDIMENT TRAP DETAIL

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TEMPORARY EROSION CONTROL
FLOTATION SILT CURTAIN
ND 13 Grade Raise
0.5 Miles W of E Jct ND 56 near Kulm
LaMoure County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-2-013(054)262	20	2



NOTE: The existing riprap and filter fabric shown on this detail were placed in 1996 and supplemented in subsequent years.

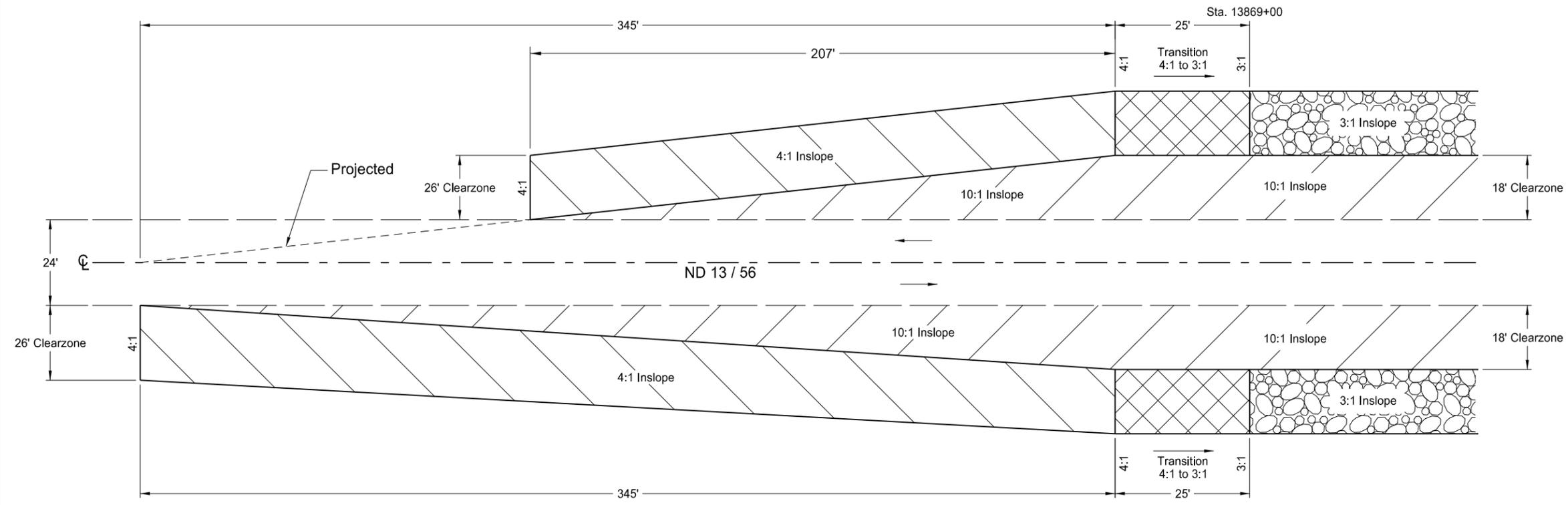


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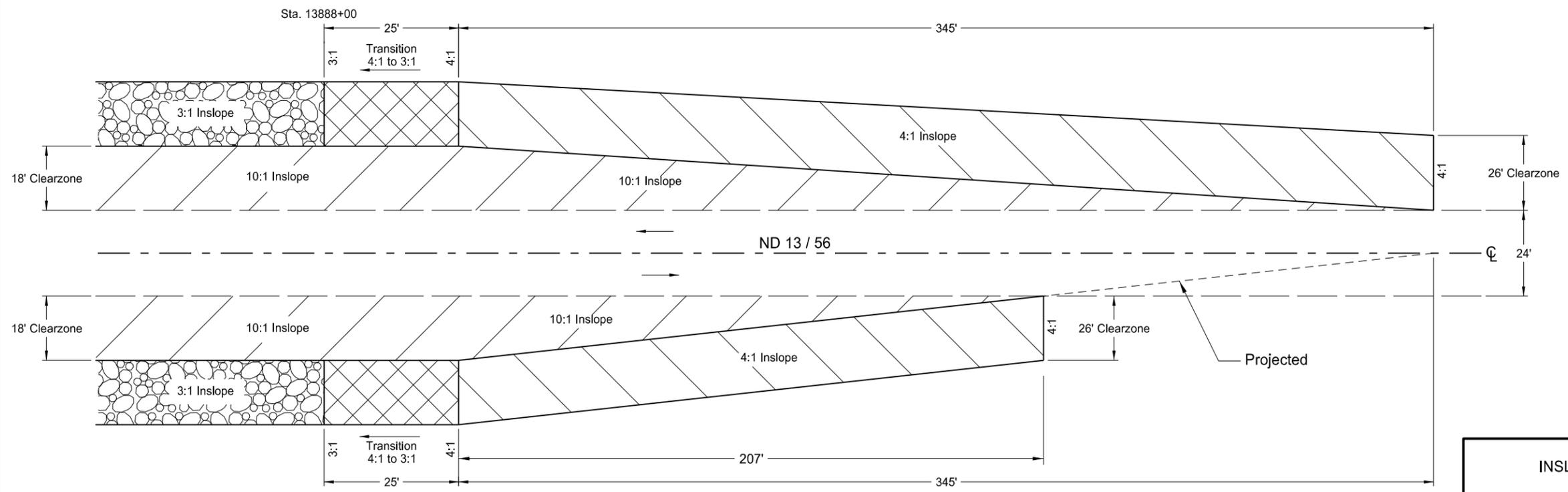
EXISTING RIPRAP & FILTER FABRIC DETAIL

ND 13 Grade Raise
 0.5 Miles W of E Jct ND 56 near Kulm
 LaMoure County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-2-013(054)262	20	3



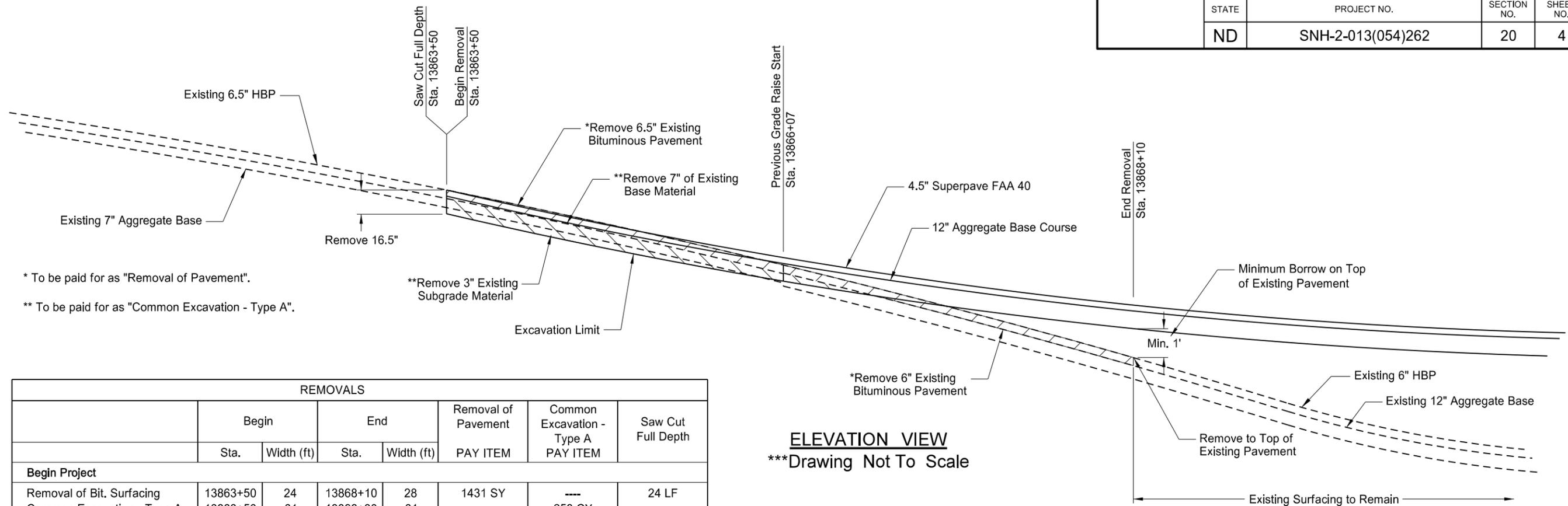
West End of Project



East End of Project

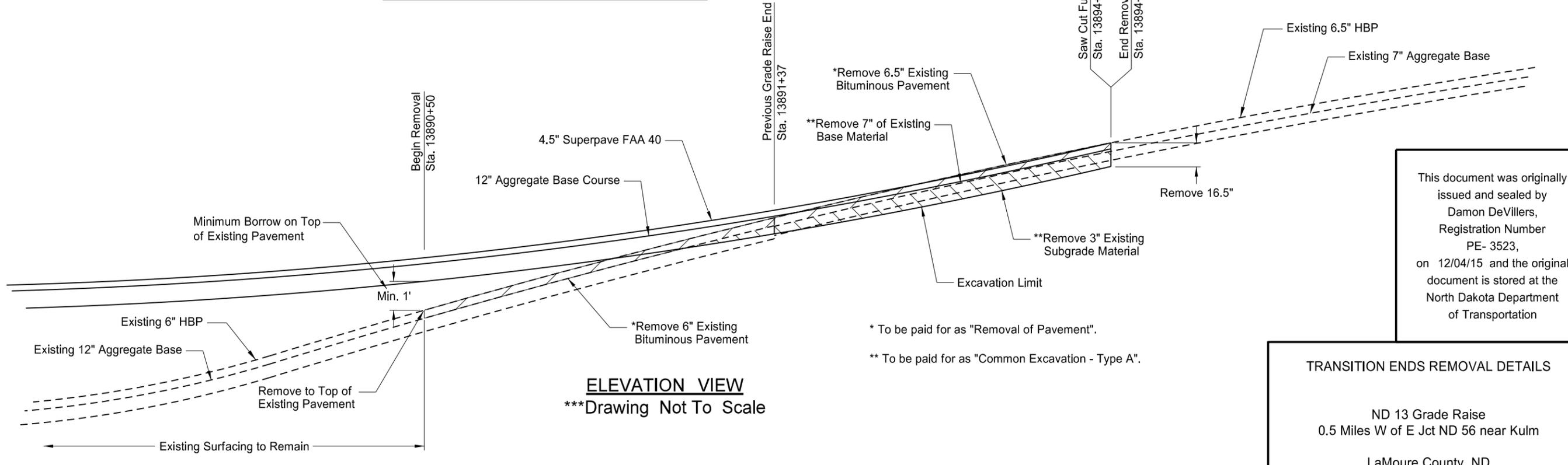
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INSLOPE TRANSITION DETAIL
 ND 13 Grade Raise
 0.5 Miles W of E Jct ND 56 near Kulm
 LaMoure County, ND



ELEVATION VIEW
***Drawing Not To Scale

REMOVALS							
	Begin		End		Removal of Pavement PAY ITEM	Common Excavation - Type A PAY ITEM	Saw Cut Full Depth
	Sta.	Width (ft)	Sta.	Width (ft)			
Begin Project							
Removal of Bit. Surfacing	13863+50	24	13868+10	28	1431 SY	----	24 LF
Common Excavation - Type A	13863+50	31	13866+30	31	----	253 CY	----
End Project							
Removal of Bit. Surfacing	13890+50	24	13894+50	28	1245 SY	----	24 LF
Common Excavation - Type A	13891+00	31	13894+50	31	----	374 CY	----
			TOTAL		2675 SY	627 CY	48 LF



ELEVATION VIEW
***Drawing Not To Scale

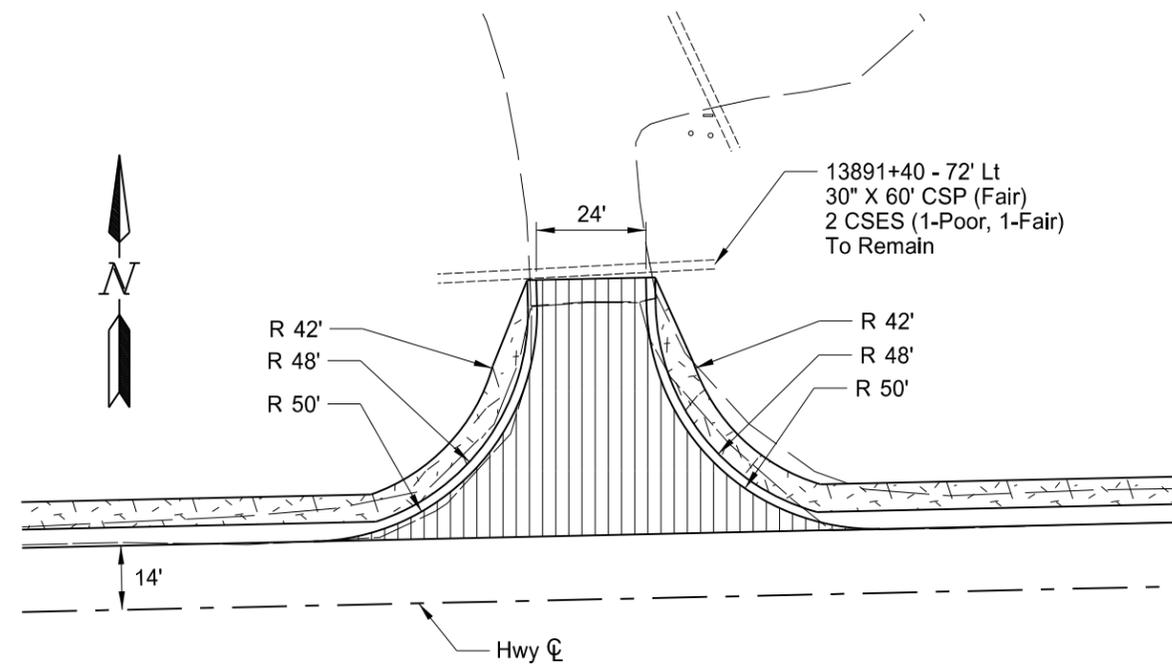
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TRANSITION ENDS REMOVAL DETAILS

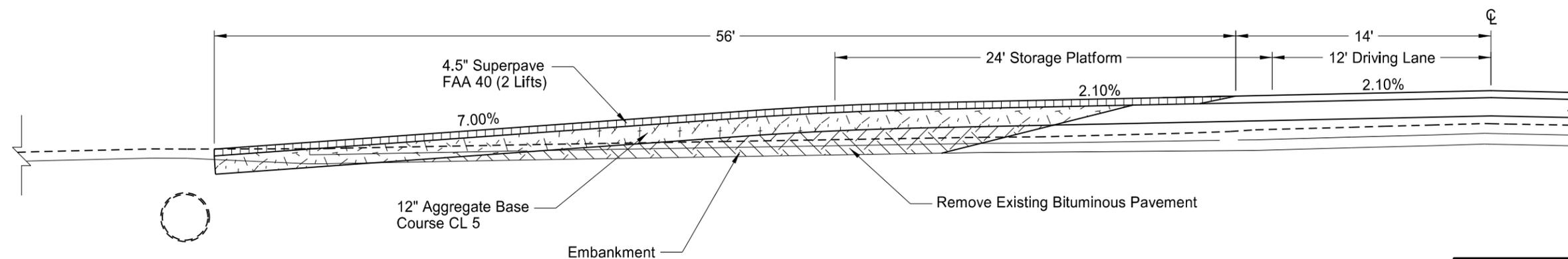
ND 13 Grade Raise
0.5 Miles W of E Jct ND 56 near Kulm

LaMoure County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-2-013(054)262	20	5



BASIS OF ESTIMATE		
ITEM	UNIT	TOTALS
Number of Locations	#	1
Removal of Pavement	SY	268
Borrow-Excavation	CY	100
Aggregate Base Course Cl. 5	TON	209
Tack	GAL	13
Superpave FAA 40	TON	71
PG 58-28 Asphalt Cement	TON	4.3



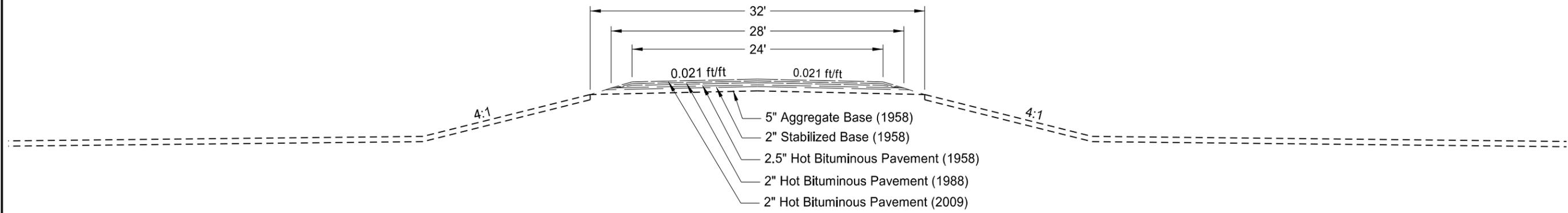
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PRIVATE DRIVE DETAILS
 STATION 13891+42 LT

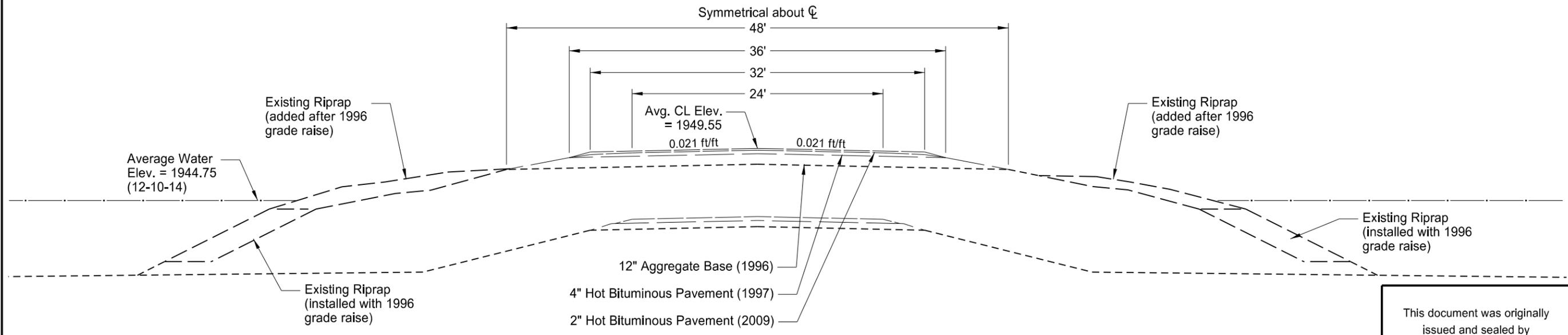
 ND 13 Grade Raise
 0.5 Miles W of E Jct ND 56 near Kulm

 LaMoure County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-2-013(054)262	30	1



Existing Typical Section
 Sta. 13863+50 Lt to Sta. 13869+92 Lt
 Sta. 13863+50 Rt to Sta. 13868+85 Rt
 Sta. 13887+26 Lt to Sta. 13894+50 Lt
 Sta. 13887+31 Rt to Sta. 13894+50 Rt

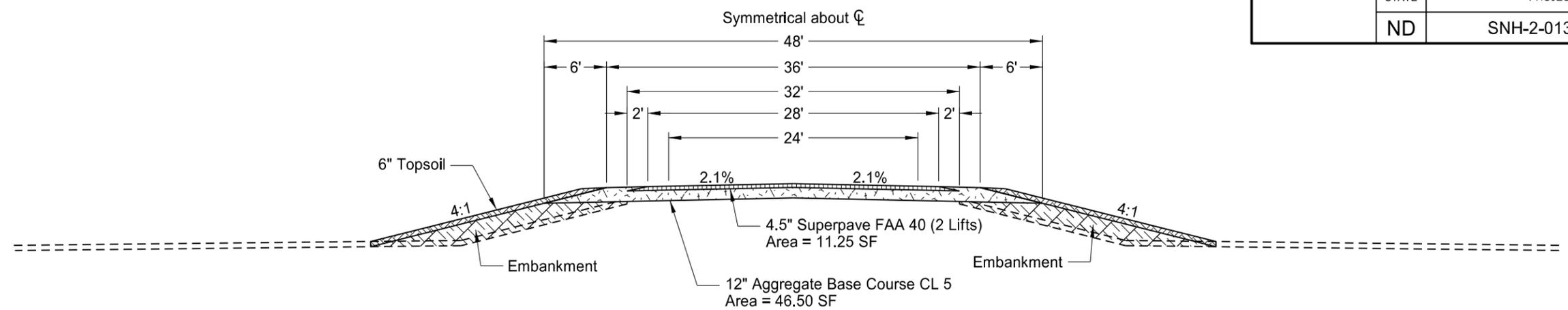


Existing Typical Section
 Sta. 13869+92 Lt to Sta. 13887+26 Lt
 Sta. 13868+85 Rt to Sta. 13887+31 Rt

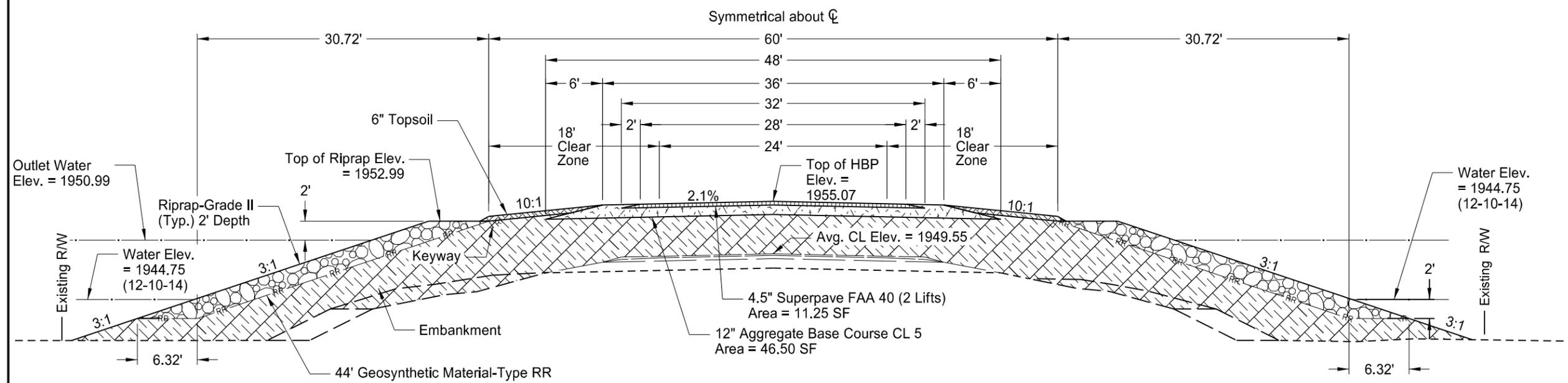
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TYPICAL SECTIONS - EXISTING
 ND 13 Grade Raise
 0.5 Miles W of E Jct ND 56 near Kulm
 LaMoure County, ND

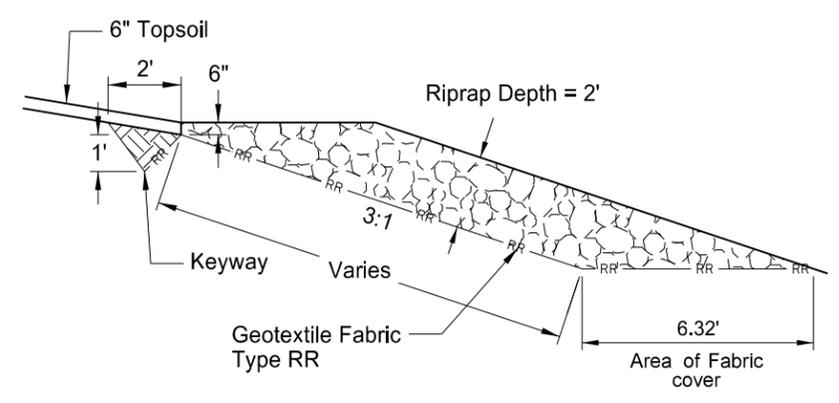
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-2-013(054)262	30	2



Proposed Typical Section
 Sta. 13863+50 to Sta. 13869+00
 Sta. 13888+00 to Sta. 13894+50



Proposed Typical Section
 Sta. 13869+00 to Sta. 13888+00



GEOTEXTILE FABRIC & RIPRAP PLACEMENT DETAIL
 LEFT AND RIGHT FORESLOPES

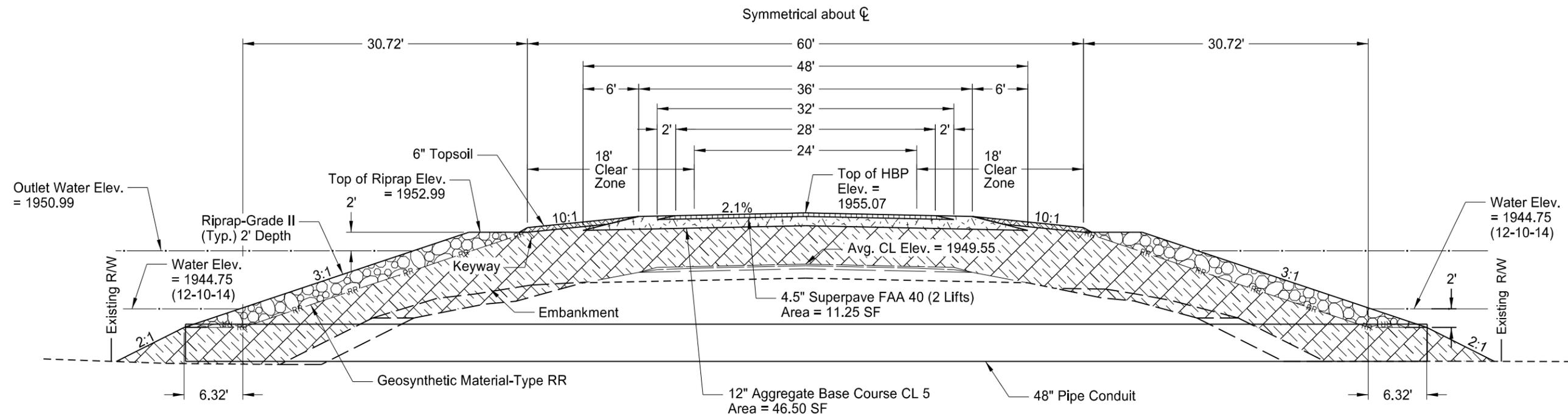
- NOTES:**
- 1) An extra 3 feet at the top of the riprap for the keyway will be added to the width of the fabric and paid for as "Geotextile Fabric - Type RR".
 - 2) Backfill the keyway with "Borrow - Excavation" and compact prior to riprap placement.

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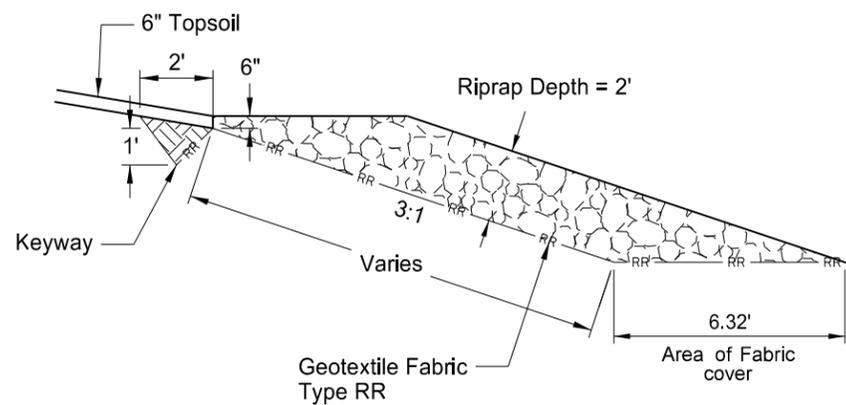
TYPICAL SECTIONS - PROPOSED

ND 13 Grade Raise
 0.5 Miles W of E Jct ND 56 near Kulm
 LaMoure County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-2-013(054)262	30	3



Proposed Typical Section
Sta. 13869+00 to Sta. 13888+00



GEOTEXTILE FABRIC & RIPRAP PLACEMENT DETAIL
LEFT AND RIGHT FORESLOPES

- NOTES:
- 1) An extra 3 feet at the top of the riprap for the keyway will be added to the width of the fabric and paid for as "Geotextile Fabric - Type RR".
 - 2) Backfill the keyway with "Borrow - Excavation" and compact prior to riprap placement.

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TYPICAL SECTIONS - PROPOSED
AT MAINLINE CENTERLINE PIPE

ND 13 Grade Raise
0.5 Miles W of E Jct ND 56 near Kulm

LaMoure County, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SNH-2-013(054)262	50	1

HYDRAULIC DATA FOR SNH-2-013(054)262 (A)									
STATION	EXISTING PIPE	PROPOSED PIPE SIZE	DRAINAGE AREA (ACRES)	25-YEAR DATA				100-YEAR DATA	
				DESIGN DISCHARGE (CFS)	DESIGN HEADWATER (FT)	DESIGN VELOCITY (FPS)	DESIGN STAGE (NAVD 88)	100-YEAR DISCHARGE (CFS)	100-YEAR STAGE (NAVD 88)
13880+56	42" CSP	48"	2512.6 (B)	-	-	-	-	-	-

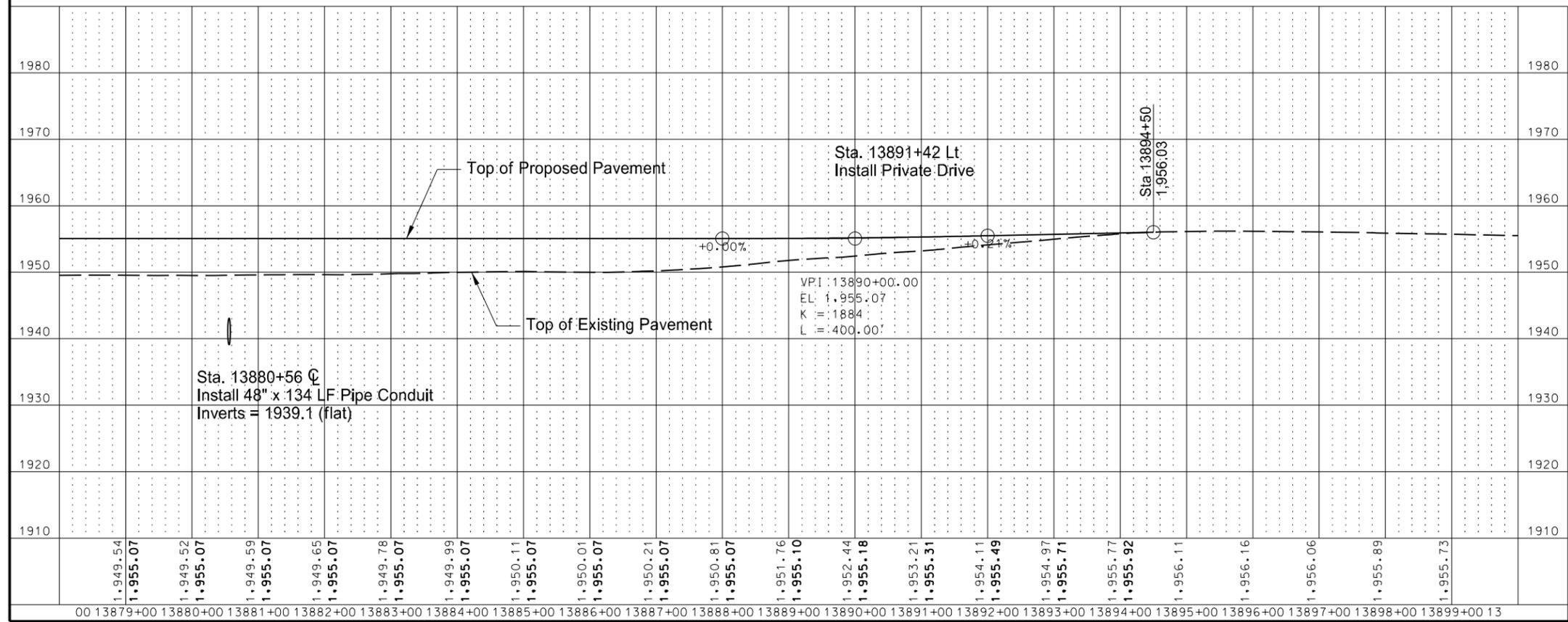
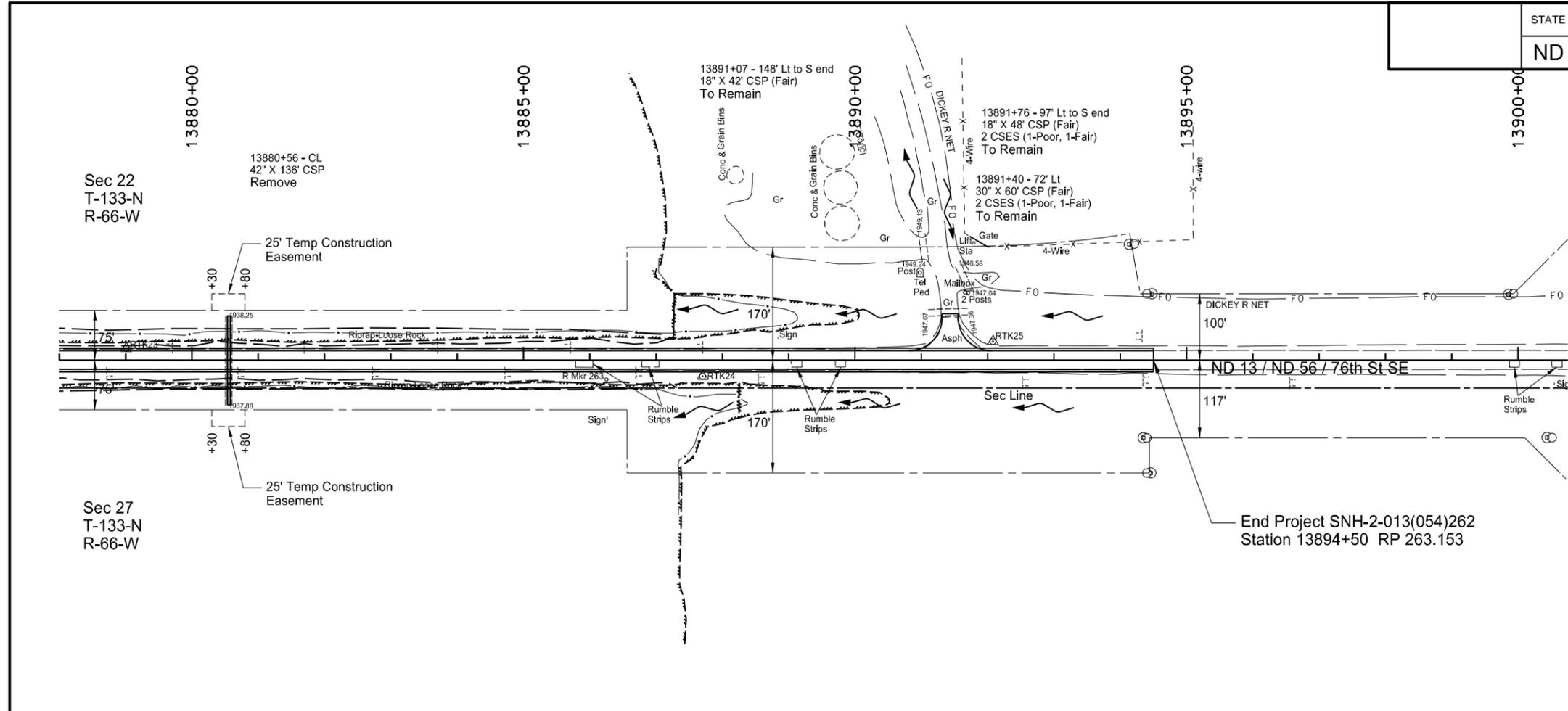
(A) Hydraulic data provided is for smooth-walled (Manning's n=0.012) type conduits.
(B) Equalizer.

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Culvert Hydraulic Data
ND 13
0.5 Miles W of the E Jct ND 56 near Kulm

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-2-013(054)262	60	2

SPEC	CODE	BID ITEM	UNIT	QTY
202	0170	Removal of Culverts-All Types & Sizes	LF	136
		13880+56 CL		
714	4125	Pipe Conduit 48 IN	LF	134
		13880+56 CL		



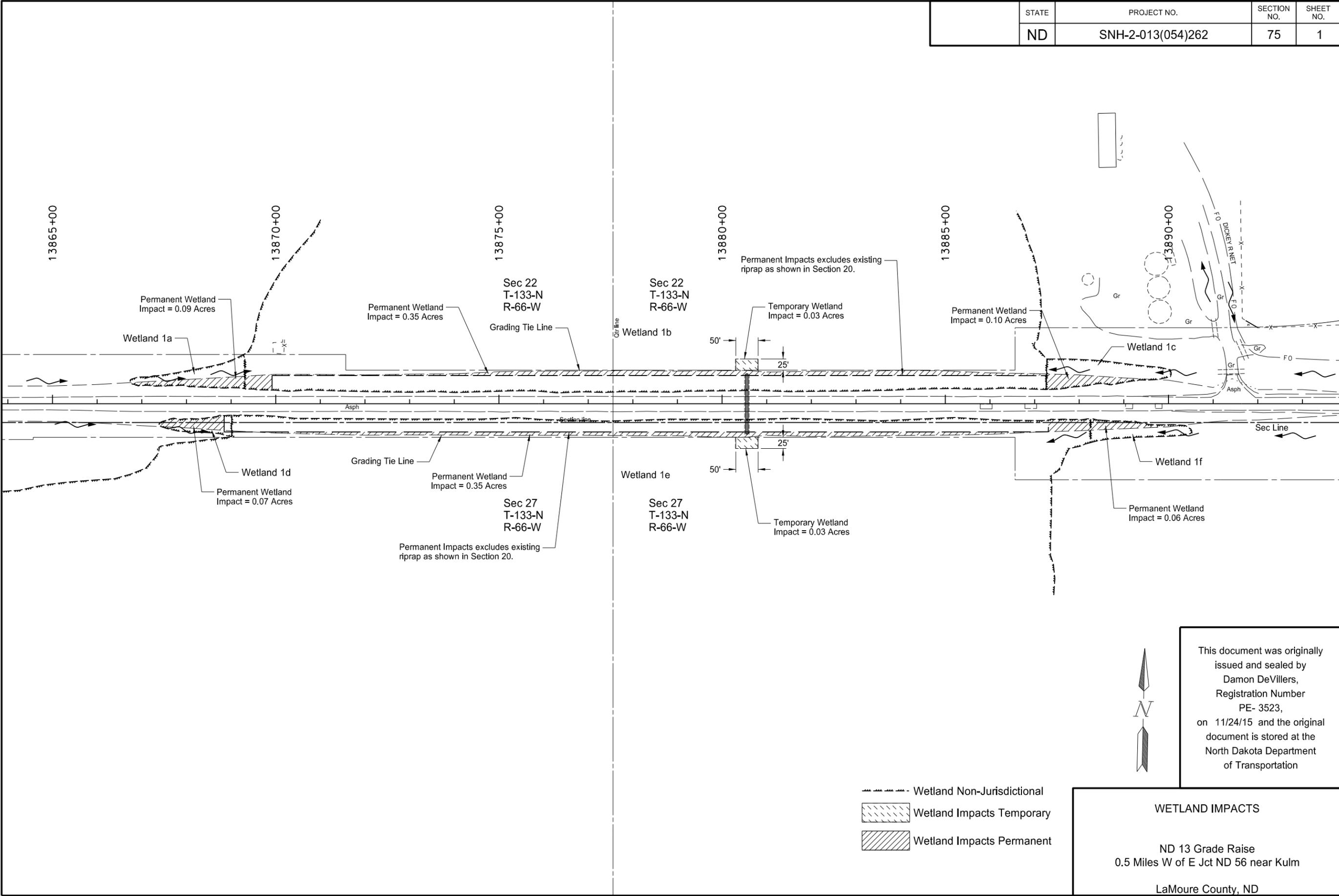
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PLAN AND PROFILE SHEET
 Station 13879+00 to Station 13899+00

ND 13 Grade Raise
 0.5 Miles W of E Jct ND 56 near Kulm

LaMoure County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-2-013(054)262	75	1



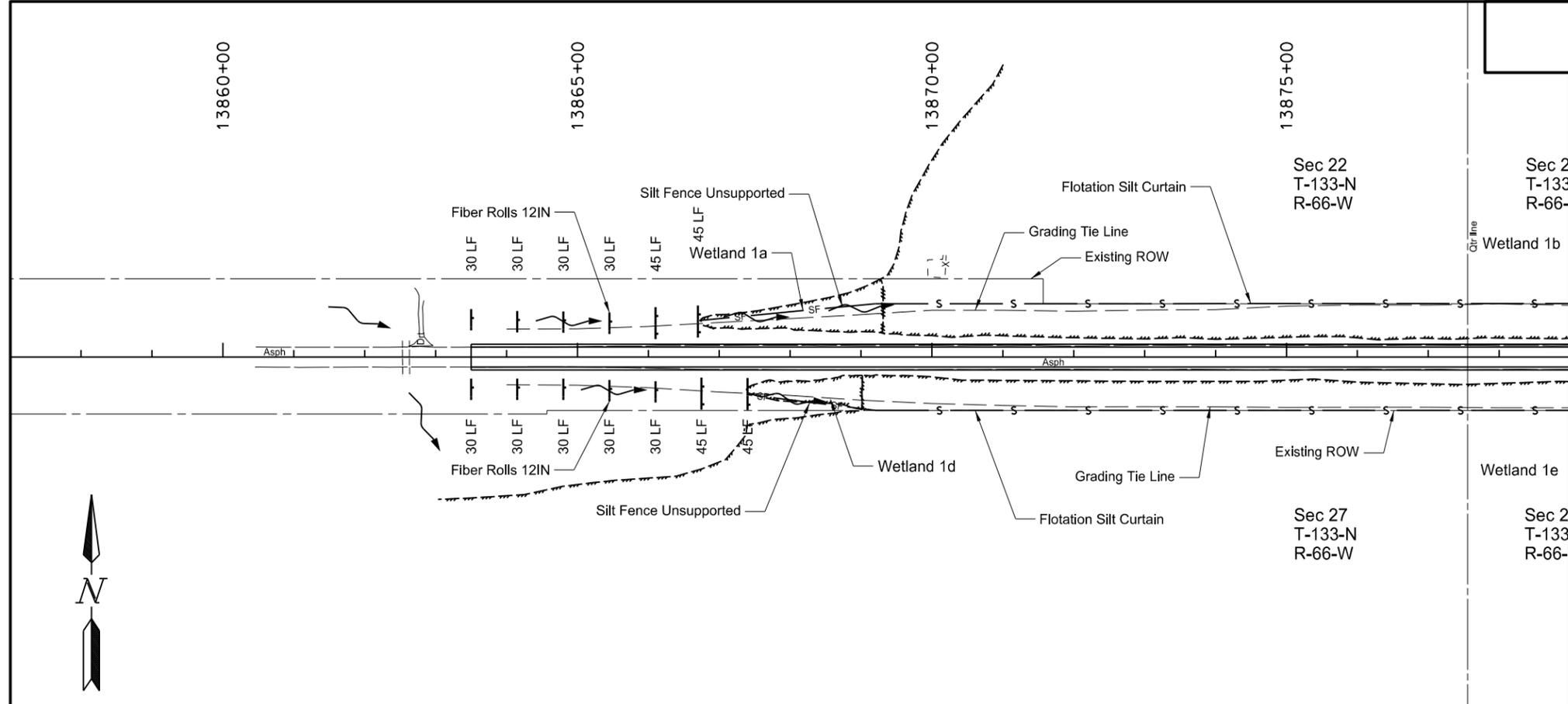
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- Wetland Non-Jurisdictional
- Wetland Impacts Temporary
- Wetland Impacts Permanent

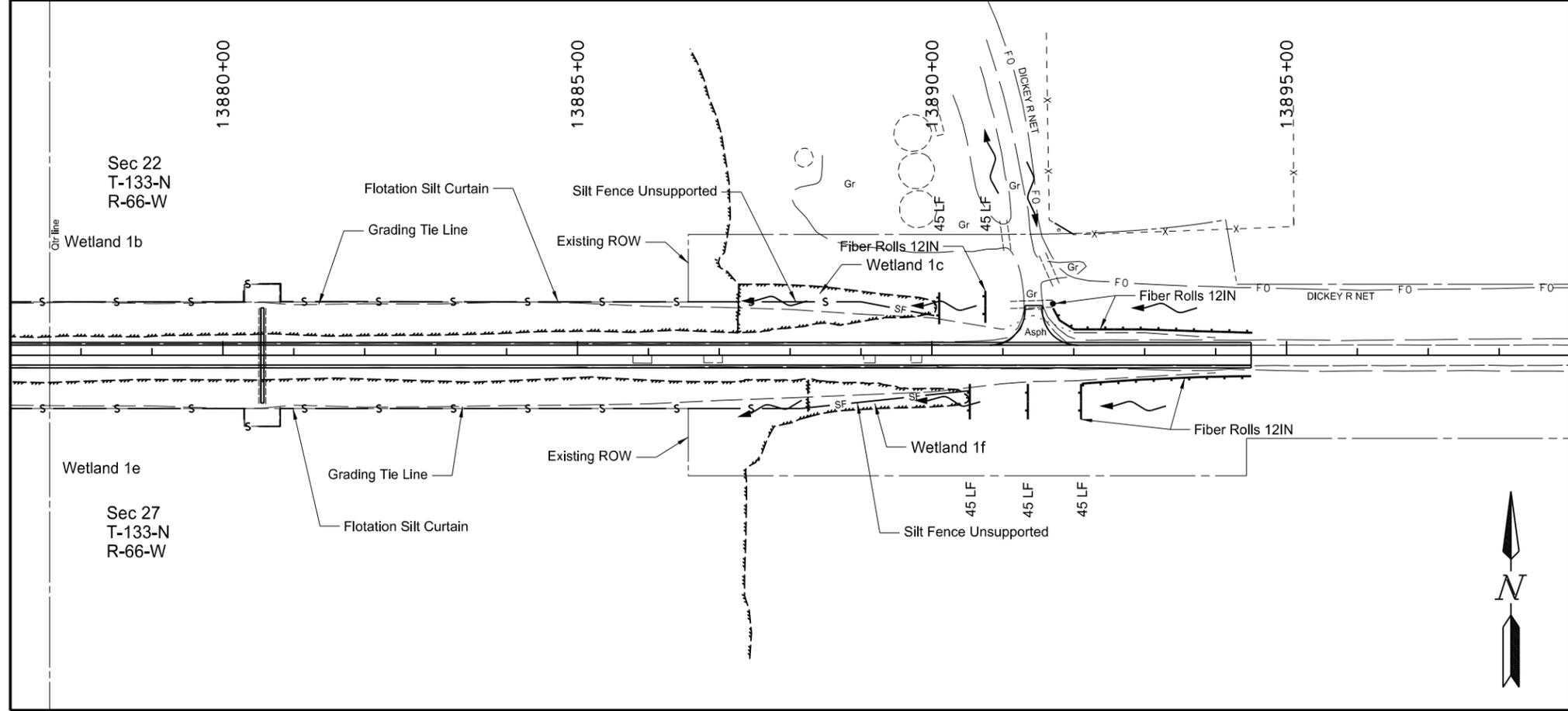
WETLAND IMPACTS

ND 13 Grade Raise
 0.5 Miles W of E Jct ND 56 near Kulm
 LaMoure County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-2-013(054)262	76	1



SPEC	CODE	BID ITEM	UNIT	QTY
253	0101	Straw Mulch		
		13863+50 Lt - 13894+50 Lt	Acre	1.83
		13863+50 Rt - 13894+50 Rt	Acre	1.85
260	0100	Silt Fence Unsupported		
		13866+72 Lt - 13869+20 Lt	LF	250
		13867+40 Rt - 13869+21 Rt	LF	180
		13888+15 Rt - 13890+53 Rt	LF	240
		13889+00 Lt - 13890+02 Lt	LF	105
260	0101	Remove Silt Fence Unsupported		
		13866+72 Lt - 13869+20 Lt	LF	250
		13867+40 Rt - 13869+21 Rt	LF	180
		13888+15 Rt - 13890+53 Rt	LF	240
		13889+00 Lt - 13890+02 Lt	LF	105
261	0112	Fiber Rolls 12IN		
		13863+50 Lt - 13866+70 Lt	LF	210
		13863+50 Rt - 13867+40 Rt	LF	240
		13890+10 Lt - 13890+75 Lt	LF	90
		13890+53 Rt - 13894+50 Rt	LF	390
		13891+71 Lt	LF	16
		13891+71 Lt - 13894+52 Lt	LF	295
261	0113	Remove Fiber Rolls 12IN		
		13863+50 Lt - 13866+70 Lt	LF	210
		13863+50 Rt - 13867+40 Rt	LF	240
		13890+10 Lt - 13890+75 Lt	LF	90
		13890+53 Rt - 13894+50 Rt	LF	390
262	0100	Flotation Silt Curtain		
		13869+20 Lt - 13889+00 Lt	LF	2030
		13869+20 Rt - 13888+15 Rt	LF	1945
262	0101	Remove Flotation Silt Curtain		
		13869+20 Lt - 13889+00 Lt	LF	2030
		13869+20 Rt - 13888+15 Rt	LF	1945



- SF — Silt Fence Unsupported
- s — Flotation Silt Curtain
- [Symbol] — 12IN Fiber Roll

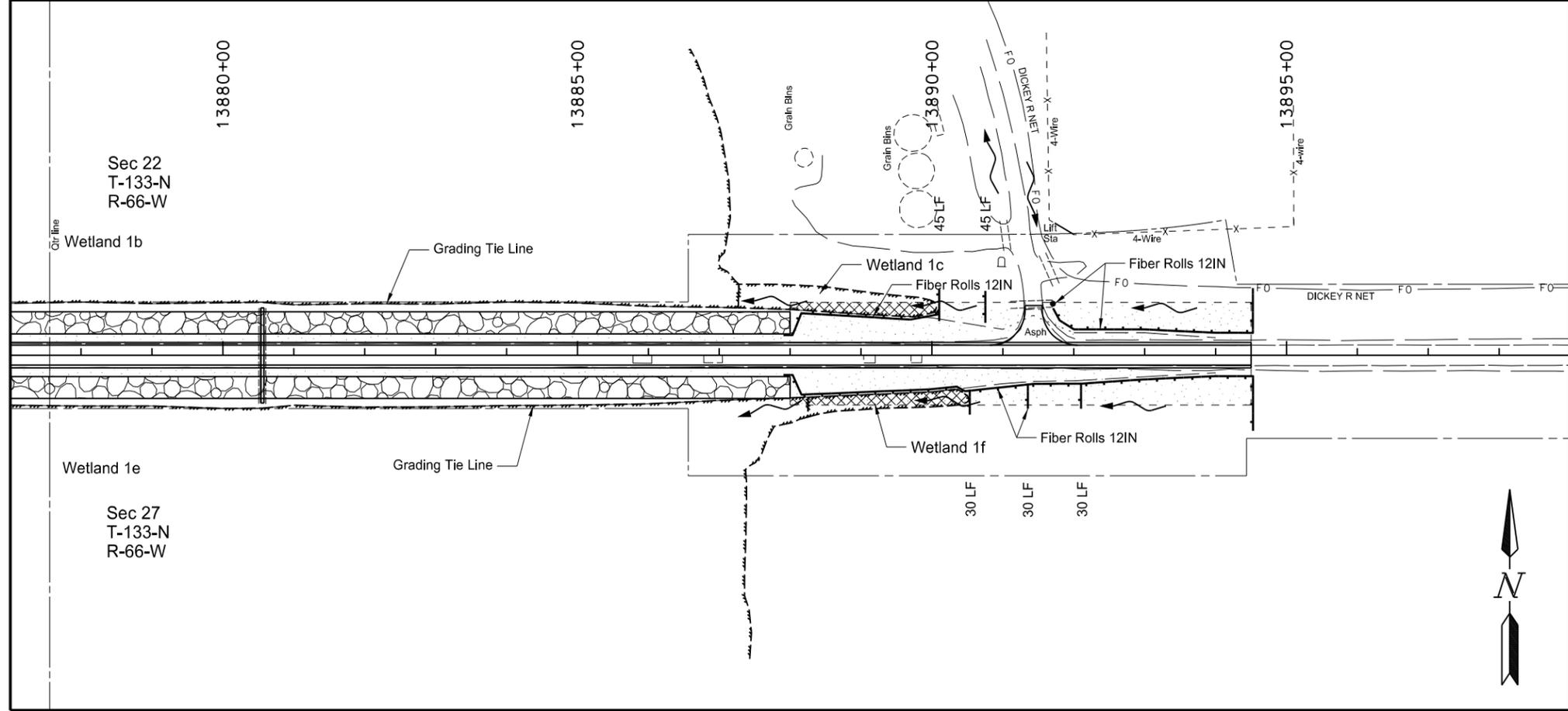
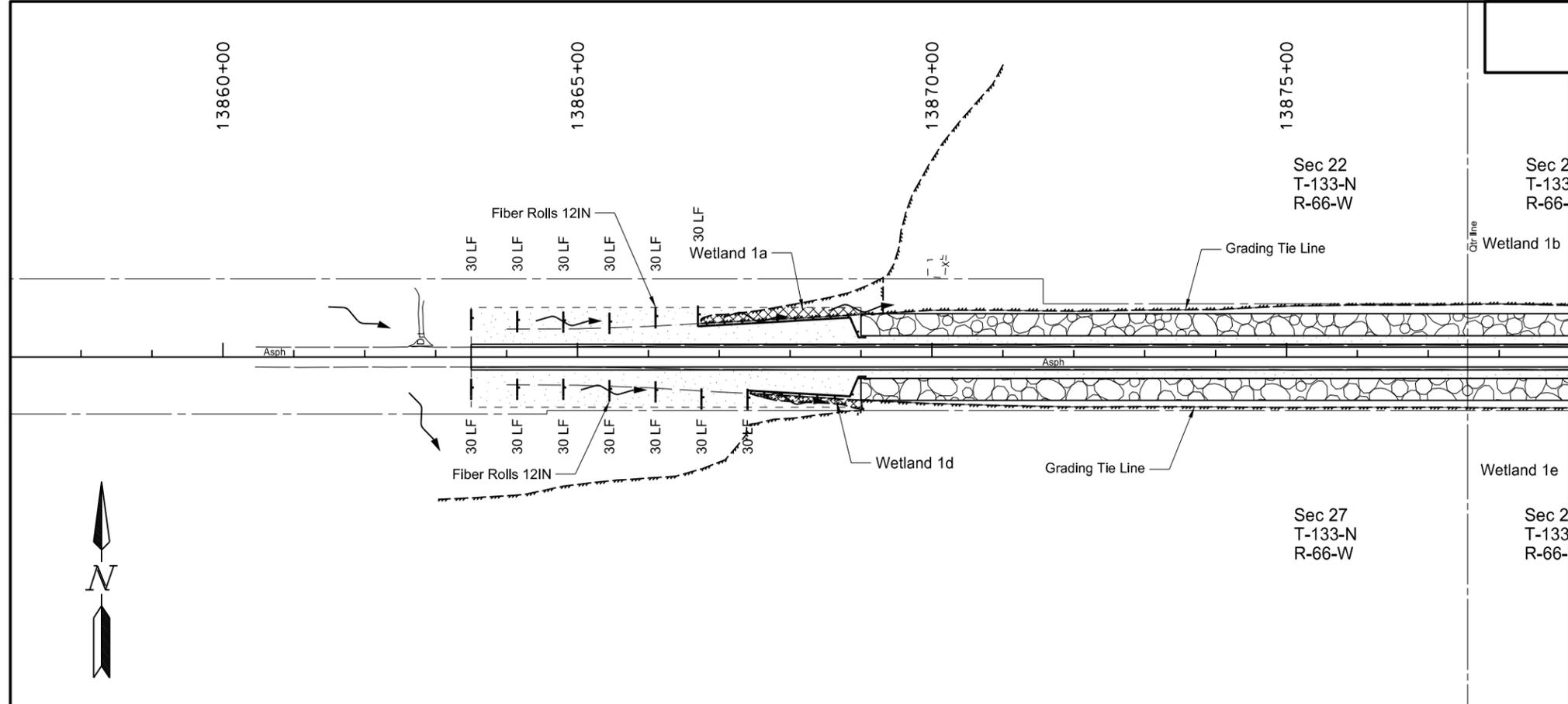
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TEMPORARY EROSION CONTROL LAYOUT

ND 13 Grade Raise
0.5 Miles W of E Jct ND 56 near Kulm
LaMoure County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-2-013(054)262	77	1

SPEC	CODE	BID ITEM	UNIT	QTY
251	0200	Seeding Class II		
		13863+50 Lt - 13894+50 Lt	Acre	1.83
		13863+50 Rt - 13894+50 Rt	Acre	1.85
251	1000	Wetland Seed		
		13863+50 Lt - 13894+50 Lt	Acre	0.14
		13863+50 Rt - 13894+50 Rt	Acre	0.12
251	2000	Temporary Cover Crop		
		13863+50 Lt - 13894+50 Lt	Acre	1.83
		13863+50 Rt - 13894+50 Rt	Acre	1.85
253	0101	Straw Mulch		
		13863+50 Lt - 13894+50 Lt	Acre	1.83
		13863+50 Rt - 13894+50 Rt	Acre	1.85
256	0201	Riprap Grade II		
		13869+00 Lt - 13888+00 Lt	Ton	7,749
		13869+00 Rt - 13888+00 Rt	Ton	7,749
261	0112	Fiber Rolls 12IN		
		13863+49 Lt - 13869+08 Lt	LF	440
		13863+49 Rt - 13869+08 Rt	LF	400
		13887+90 Lt - 13891+75 Lt	LF	335
		13887+90 Rt - 13894+53 Rt	LF	865
		13891+71 Lt	LF	16
		13891+72 Lt - 13894+53 Lt	LF	360
709	0155	Geosynthetic Material Type RR		
		13869+00 Lt - 13888+00 Lt	SY	9,289
		13869+00 Rt - 13888+00 Rt	SY	9,289



- 12IN Fiber Roll
- Topsoil, Seeding, & Mulching
- Wetland Topsoil & Seeding
- Riprap Grade II

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PERMANENT EROSION CONTROL LAYOUT

ND 13 Grade Raise
 0.5 Miles W of E Jct ND 56 near Kulm

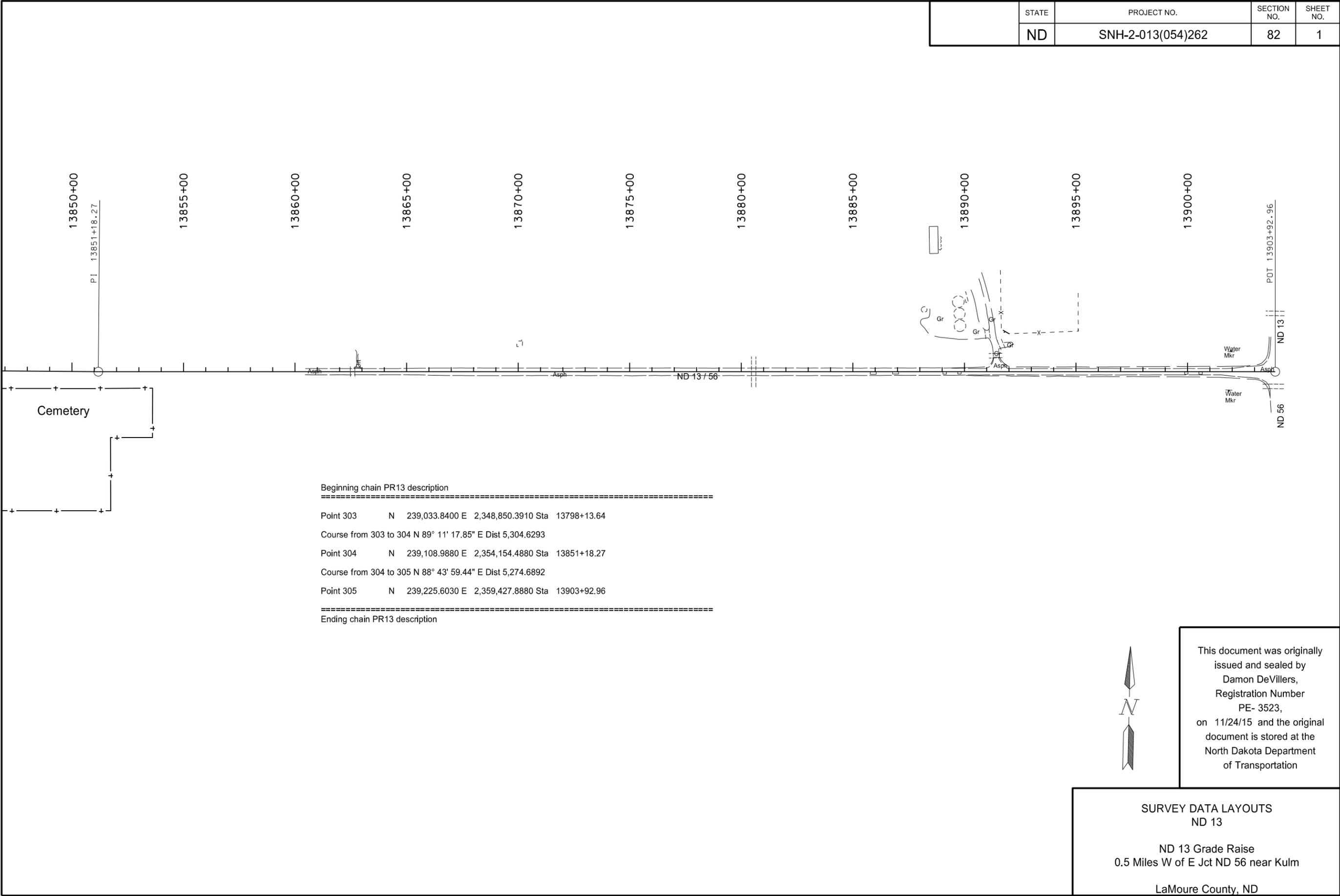
LaMoure County, ND

SURVEY COORDINATE AND CURVE DATA - ND 13 0.5 MILE W OF E. JCT ND 56 - KULM

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-2-013(054)262	81	1

HORIZONTAL ALIGNMENT				REFERENCE MARKERS				US PUBLIC LAND SURVEY DATA				SURVEY CONTROL POINTS					
PNT	STATION	NORTHING	EASTING	R Mkr #	NORTHING	EASTING	STATION OFFSET	DESC.	SEC-TWP-RGE	NORTHING	EASTING	PNT	NORTHING	EASTING	ELEV	STATION	OFFSET
												CONTROL POINT DESCRIPTION					
ND 13 (PR13)				262	239057.42	2352423.41	13833+87 27' Rt	W Qtr Cor Sec 15 T-133-N R-66-W		247011.95	2353971.01						
PI	13798+13.64	239033.84	2348850.39	263	239157.29	2357661.10	13886+25 29' Rt	NE Sec Cor Sec 23 T-133-N R-66-W		244566.72	2364603.19	BM R43	236233.47	2361960.91	1966.90	N/A	N/A
PI	13851+18.27	239108.99	2354154.49					S Qtr Cor Sec 23 T-133-N R-66-W		239224.52	2362074.49	Bench Mark Disk set in Concrete					
PI	13903+92.96	239225.60	2359427.89					NW Sec Cor Sec 27 T-133-N R-66-W		239066.99	2354155.08	GPS10	239207.43	2354213.94	1993.80	13851+80	97' Lt
								W Qtr Cor Sec 27 T-133-N R-66-W		236430.37	2354214.39	#6 Rebar					
								SW Sec Cor Sec 27 T-133-N R-66-W		233793.47	2354273.61	GPS11	239014.65	2353641.85	1999.35	13846+04	87' Rt
								S Qtr Cor Sec 27 T-133-N R-66-W		233841.64	2356920.19	#6 Rebar					
								SE Sec Cor Sec 27 T-133-N R-66-W		233890.19	2359566.76	GPS14	238501.93	2359505.94	1955.06	13904+55	725' Rt
								NE Sec Cor Sec 29 T-133-N R-66-W		238991.85	2348850.99	#6 Rebar					
												GPS15	240872.14	2359309.83	1957.70	13903+11	1649' Lt
												#6 Rebar					
												RTK21	239187.36	2355313.39	1959.48	13862+79	53' Lt
												#6 Rebar					
												RTK22	239127.49	2356005.79	1948.75	13869+70	22' Rt
												#6 Rebar					
												RTK23	239187.99	2356935.89	1948.74	13879+01	17' Lt
												#6 Rebar					
												RTK24	239165.26	2357805.97	1948.47	13887+70	24' Rt
												#6 Rebar					
												RTK25	239227.39	2358242.62	1952.65	13892+08	28' Lt
												#6 Rebar					
NOTES:												All coordinates and measurements on this document derived from the International Foot definition.					
Date Survey Completed 12/10/14												INITIALIZING BENCH MARK NDGPS Stations (OPUS)					
<input type="checkbox"/> Assumed Coordinates <input checked="" type="checkbox"/> All coordinates on this sheet are LaMoure County ground coordinates. They are derived from the NAD83(2011) reference frame; North Dakota South Zone Combination Factor (cf) = 0.9998850												<input checked="" type="checkbox"/> NAVD-88 <input type="checkbox"/> NGVD-29 <input type="checkbox"/> GEOID 09 <input type="checkbox"/> _____ <input checked="" type="checkbox"/> GEOID 12A					
												This document was originally issued and sealed by Rodney Ceroll, Registration Number PE- 5772, on 11/24/15 and the original document is stored at the North Dakota Department of Transportation					

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SNH-2-013(054)262	82	1



Beginning chain PR13 description
=====

Point 303 N 239,033.8400 E 2,348,850.3910 Sta 13798+13.64
Course from 303 to 304 N 89° 11' 17.85" E Dist 5,304.6293
Point 304 N 239,108.9880 E 2,354,154.4880 Sta 13851+18.27
Course from 304 to 305 N 88° 43' 59.44" E Dist 5,274.6892
Point 305 N 239,225.6030 E 2,359,427.8880 Sta 13903+92.96
=====

Ending chain PR13 description



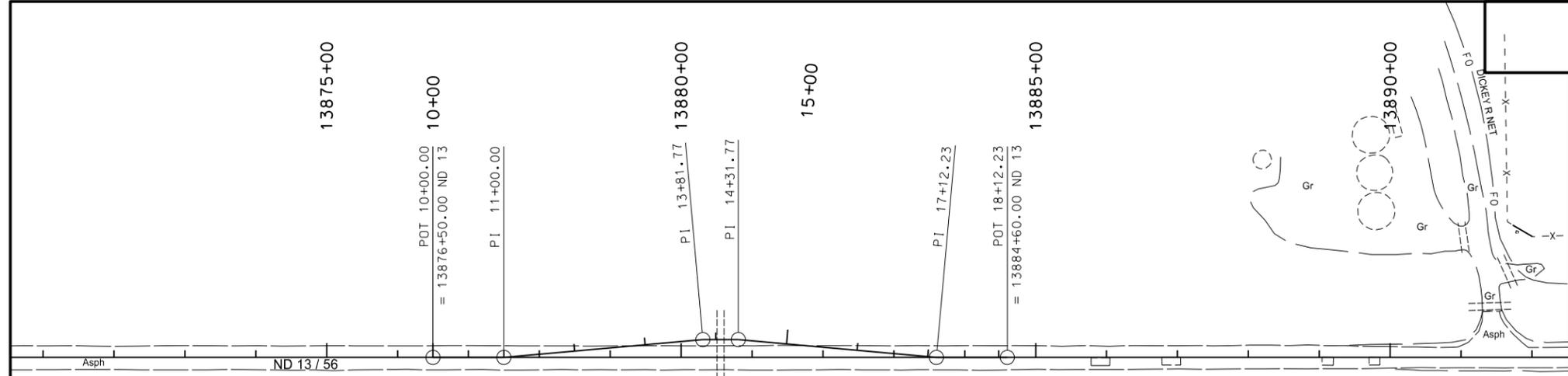
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SURVEY DATA LAYOUTS
ND 13

ND 13 Grade Raise
0.5 Miles W of E Jct ND 56 near Kulm

LaMoure County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-2-013(054)262	82	2

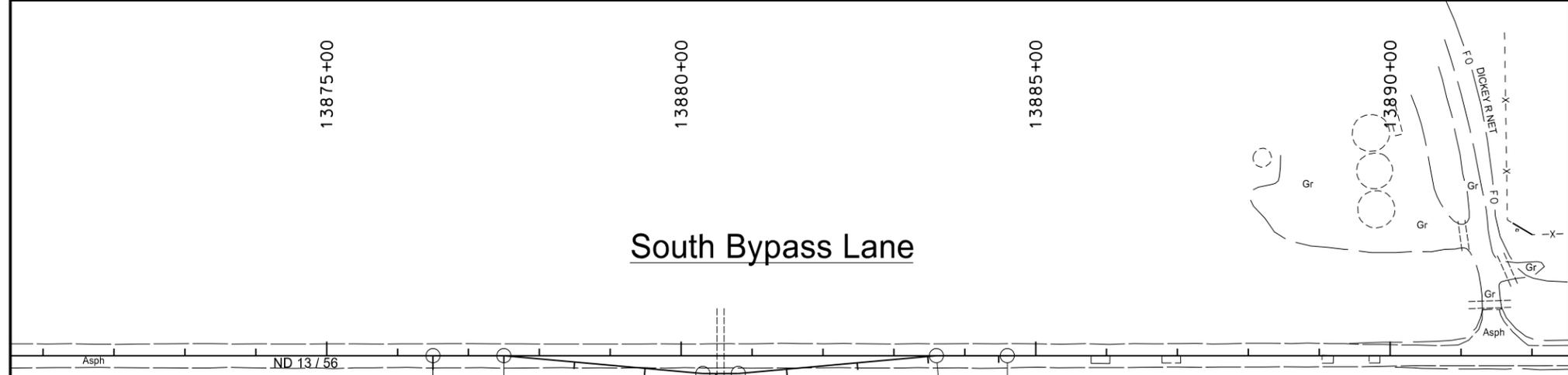


North Bypass Lane

South Bypass Lane
Beginning chain OL N description

Point 5	N	239,164.9605 E	2,356,685.5999 Sta	10+00.00
Course from 5 to 10 N 88° 43' 59.44" E Dist 100.0000				
Point 10	N	239,167.1714 E	2,356,785.5754 Sta	11+00.00
Course from 10 to 15 N 83° 38' 34.61" E Dist 281.7712				
Point 15	N	239,198.3702 E	2,357,065.6141 Sta	13+81.77
Course from 15 to 20 N 88° 43' 59.44" E Dist 50.0000				
Point 20	N	239,199.4756 E	2,357,115.6019 Sta	14+31.77
Course from 20 to 25 S 86° 09' 09.60" E Dist 280.4565				
Point 25	N	239,180.6575 E	2,357,395.4263 Sta	17+12.23
Course from 25 to 30 N 88° 43' 59.44" E Dist 100.0000				
Point 30	N	239,182.8684 E	2,357,495.4019 Sta	18+12.23

Ending chain OL N description



South Bypass Lane

South Bypass Lane
Beginning chain OL S description

Point 55	N	239,164.9605 E	2,356,685.5999 Sta	30+00.00
Course from 55 to 60 N 88° 43' 59.44" E Dist 100.0000				
Point 60	N	239,167.1714 E	2,356,785.5754 Sta	31+00.00
Course from 60 to 65 S 86° 10' 35.73" E Dist 281.7712				
Point 65	N	239,148.3824 E	2,357,066.7195 Sta	33+81.77
Course from 65 to 70 N 88° 43' 59.44" E Dist 50.0000				
Point 70	N	239,149.4879 E	2,357,116.7073 Sta	34+31.77
Course from 70 to 75 N 83° 37' 08.48" E Dist 280.4565				
Point 75	N	239,180.6575 E	2,357,395.4263 Sta	37+12.23
Course from 75 to 80 N 88° 43' 59.44" E Dist 100.0000				
Point 80	N	239,182.8684 E	2,357,495.4019 Sta	38+12.23

Ending chain OL S description



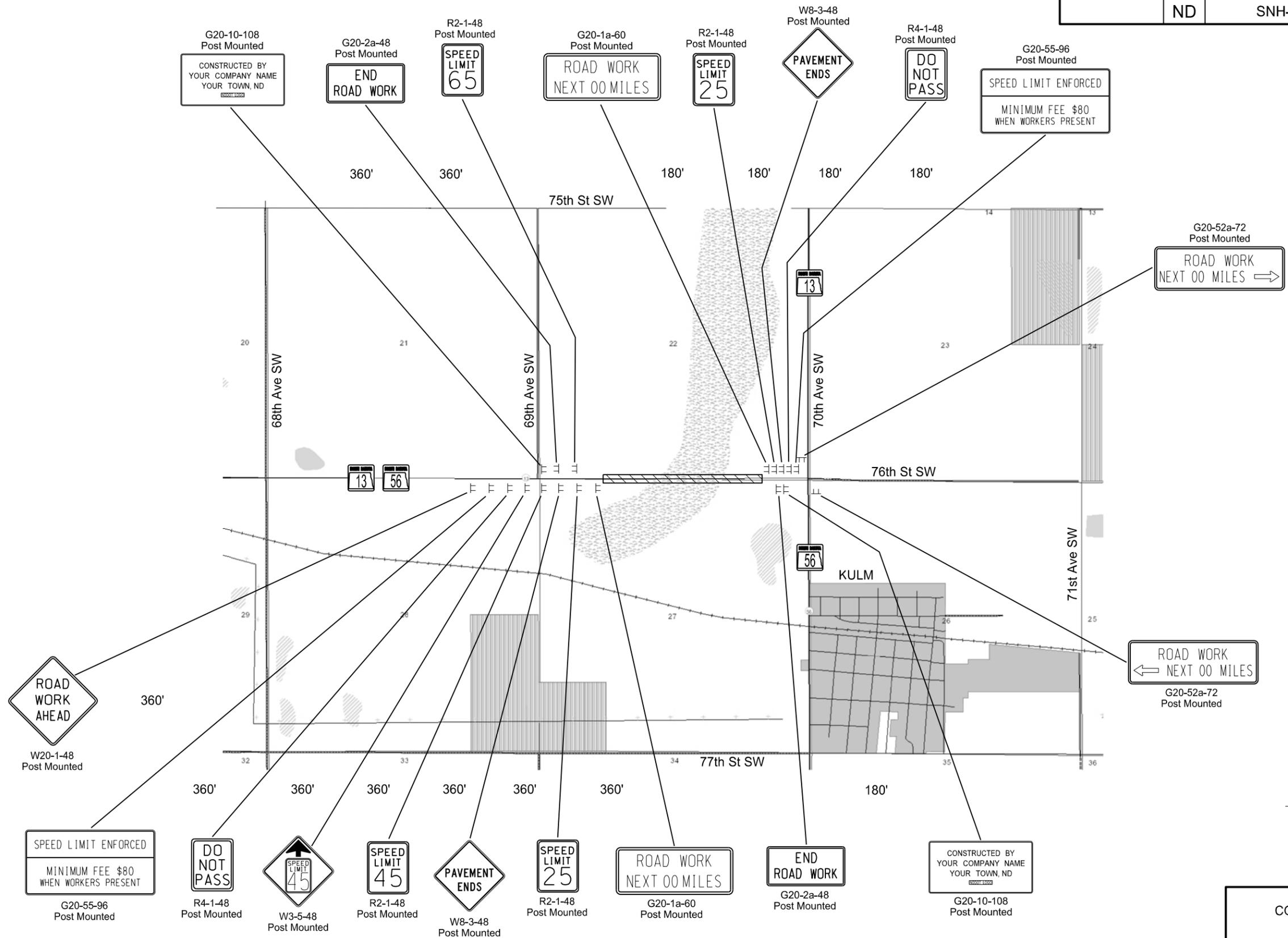
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SURVEY DATA LAYOUTS
NORTH AND SOUTH BYPASS LANES

ND 13 Grade Raise
0.5 Miles W of E Jct ND 56 near Kulm

LaMoure County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-2-013(054)262	100	2



When flaggers and/or pilot car is used on site, reference Standard Drawing D-704-20 for construction signing layout.

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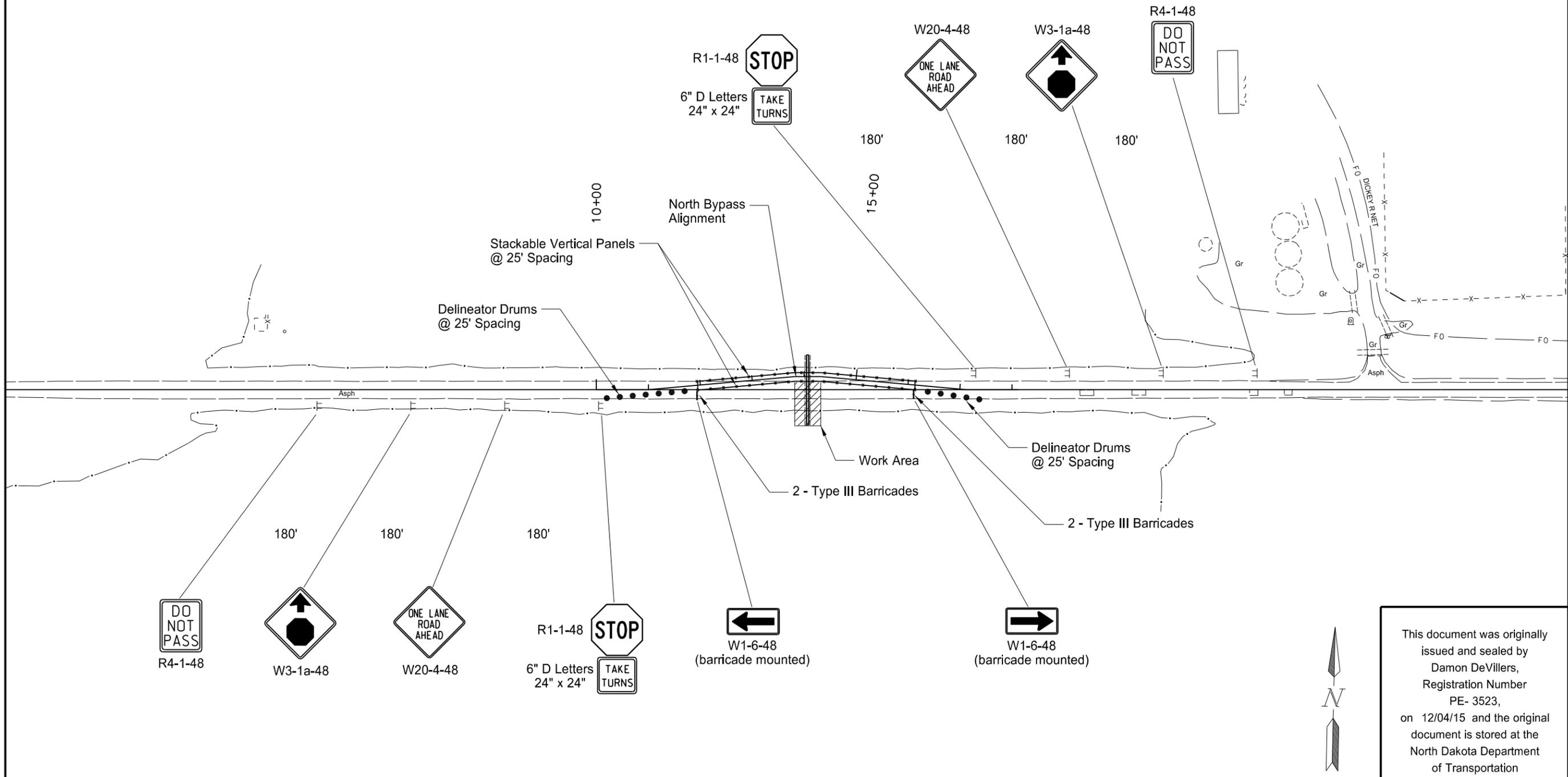


CONSTRUCTION SIGNING LAYOUT

ND 13 Grade Raise
 0.5 Miles W of E Jct ND 56 near Kulm
 LaMoure County, ND

The sign layout as shown is for general information purposes only. The Contractor will be required to conform to MUTCD and the Standard Drawings when installing the traffic control signing.

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-2-013(054)262	100	3



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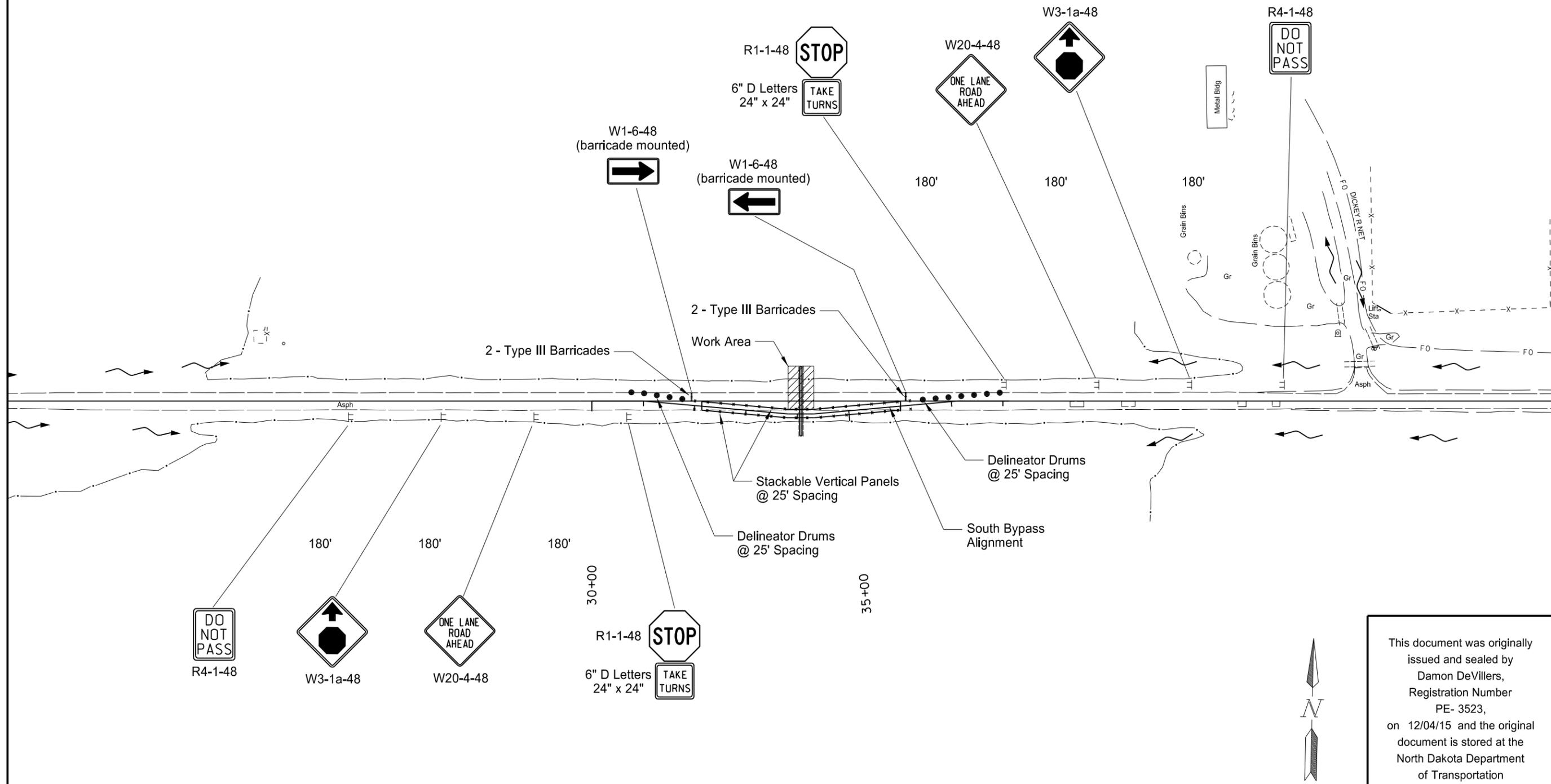
- NOTE:
1. This layout is only intended to be used for single lane, night time traffic control during centerline pipe installation and is limited to 5 days. See note P704-P03 for additional information.
 2. See Standard Drawing D-704-31 for sign spacing.

CONSTRUCTION SIGN LAYOUT
NON-WORKING HOURS - SINGLE LANE OPEN
 South Phase

ND 13 Grade Raise
 0.5 Miles W of E Jct ND 56 near Kulm

LaMoure County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-2-013(054)262	100	4



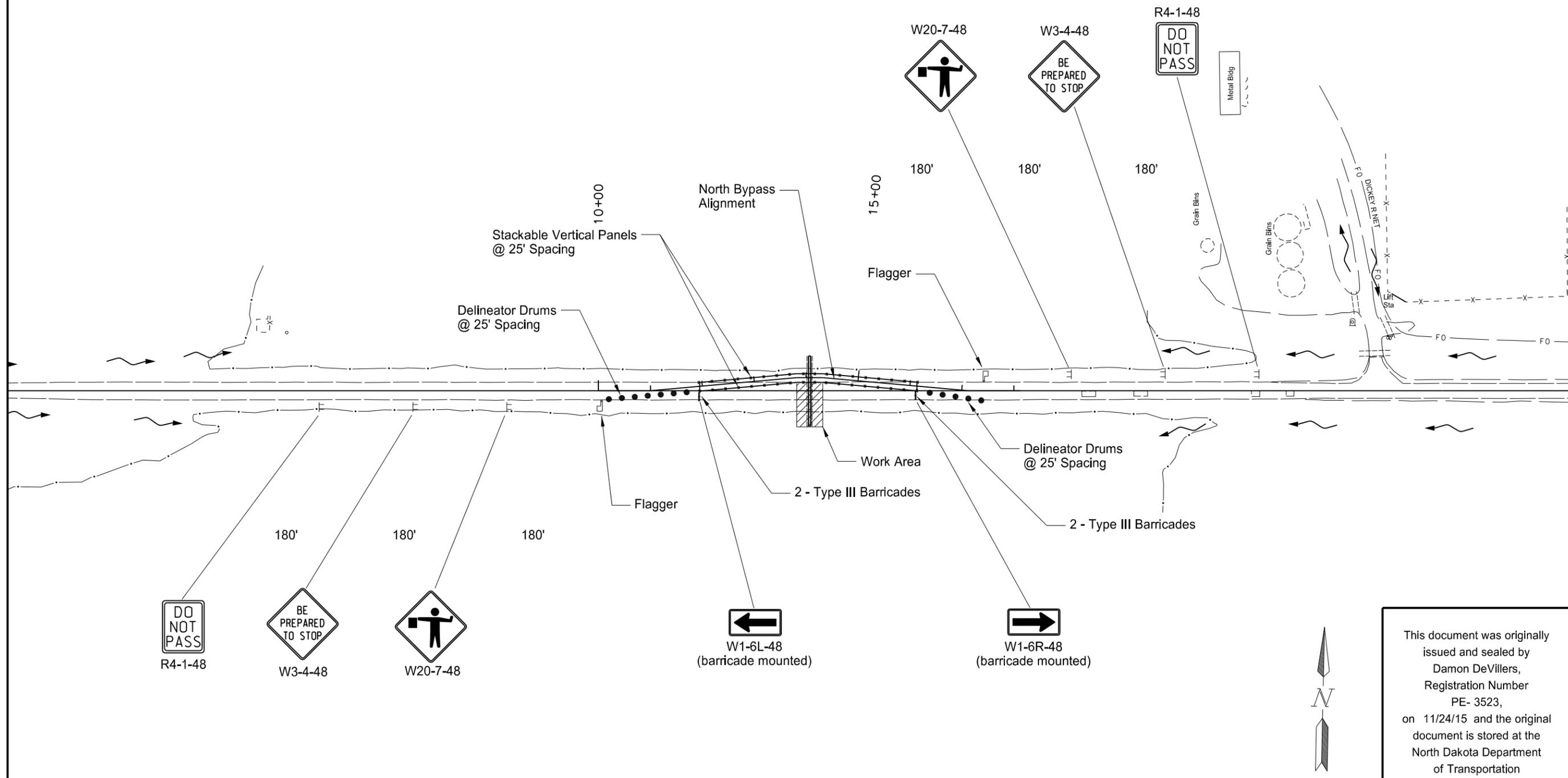
NOTE:
 1. This layout is only intended to be used for single lane, night time traffic control during centerline pipe installation and is limited to 5 days. See note P704-P03 for additional information.
 2. See Standard Drawing D-704-31 for sign spacing.

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**CONSTRUCTION SIGN LAYOUT
 NON-WORKING HOURS - SINGLE LANE OPEN
 North Phase**

ND 13 Grade Raise
 0.5 Miles W of E Jct ND 56 near Kulm
 LaMoure County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-2-013(054)262	100	5



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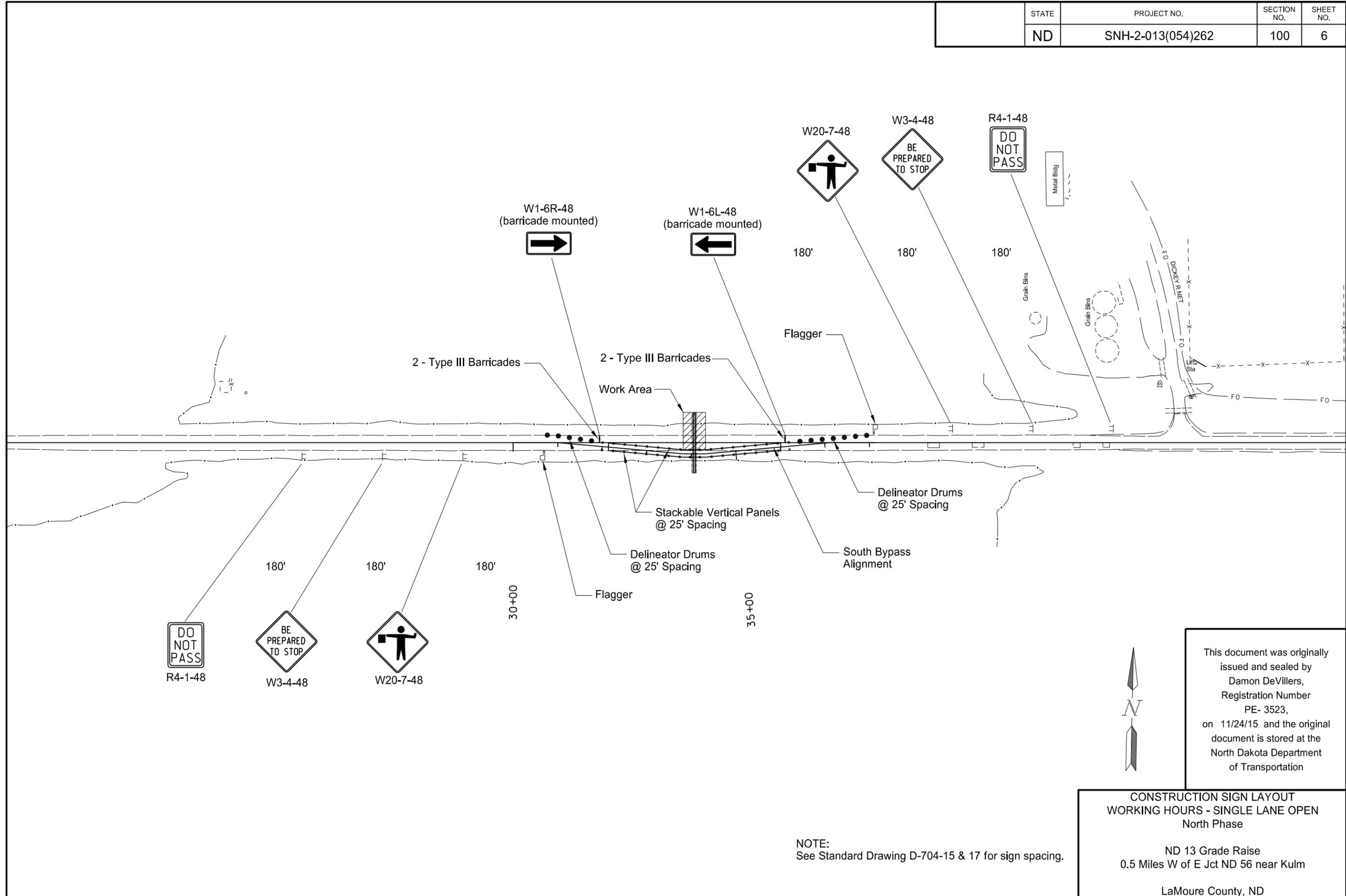
CONSTRUCTION SIGN LAYOUT
WORKING HOURS - SINGLE LANE OPEN
 South Phase

ND 13 Grade Raise
 0.5 Miles W of E Jct ND 56 near Kulm

LaMoure County, ND

NOTE:
 See Standard Drawing D-704-15 & 17 for sign spacing.

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-2-013(054)262	100	6



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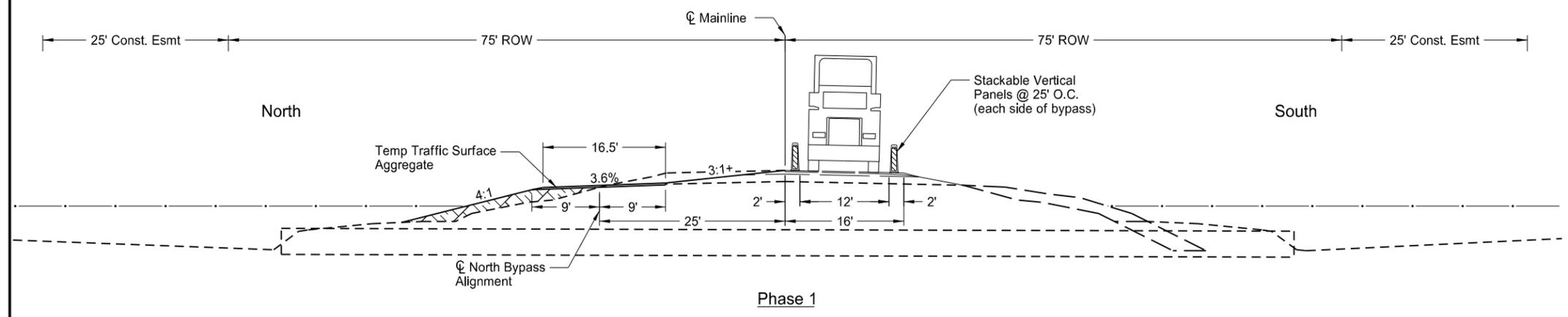
CONSTRUCTION SIGN LAYOUT
WORKING HOURS - SINGLE LANE OPEN
 North Phase

ND 13 Grade Raise
 0.5 Miles W of E Jct ND 56 near Kulm

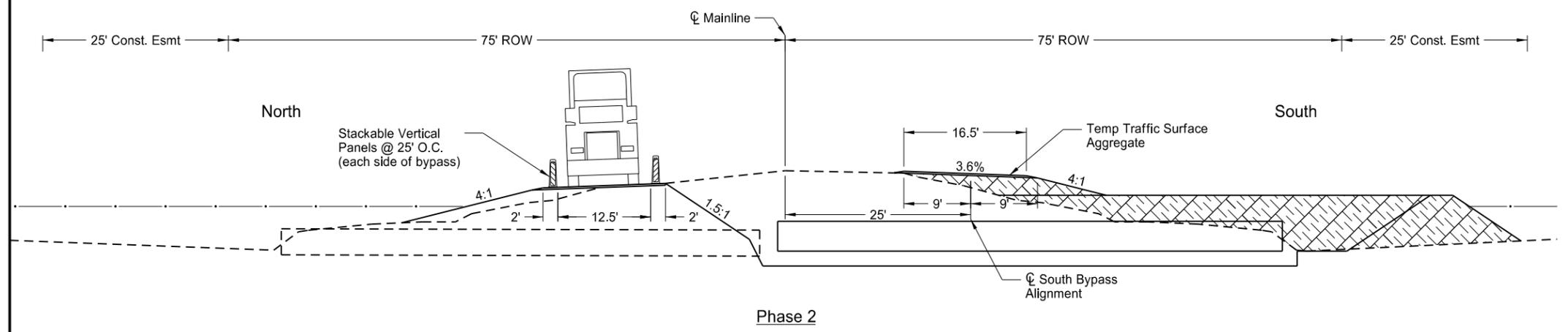
LaMoure County, ND

NOTE:
 See Standard Drawing D-704-15 & 17 for sign spacing.

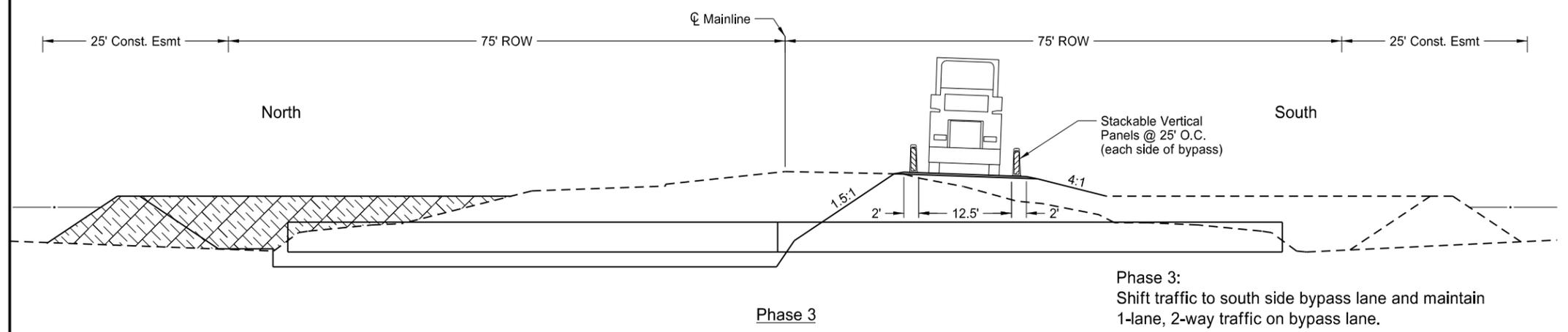
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-2-013(054)262	100	7



Phase 1:
 Maintain 1-lane, 2-way traffic on south side existing roadway while constructing north side bypass lane.
 Shift traffic to north side bypass lane and maintain 1-lane, 2-way traffic on bypass lane.



Phase 2:
 Maintain 1-lane, 2-way traffic on north side bypass lane.
 Remove south half of existing pipe and place approx. 68 LF of proposed pipe.
 Place backfill for new pipe and construct south side bypass lane over new pipe.



Phase 3:
 Shift traffic to south side bypass lane and maintain 1-lane, 2-way traffic on bypass lane.
 Remove north half of existing pipe and place approx. 66 LF of proposed pipe.
 Place backfill for new pipe.

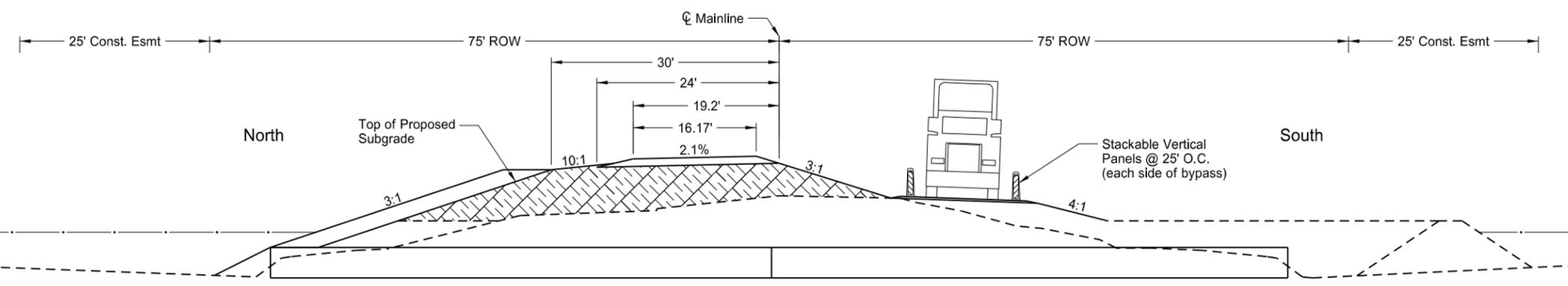
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WORK ZONE TRAFFIC CONTROL
 Construction Phasing for Pipe Replacement

ND 13 Grade Raise
 0.5 Miles W of E Jct ND 56 near Kulm

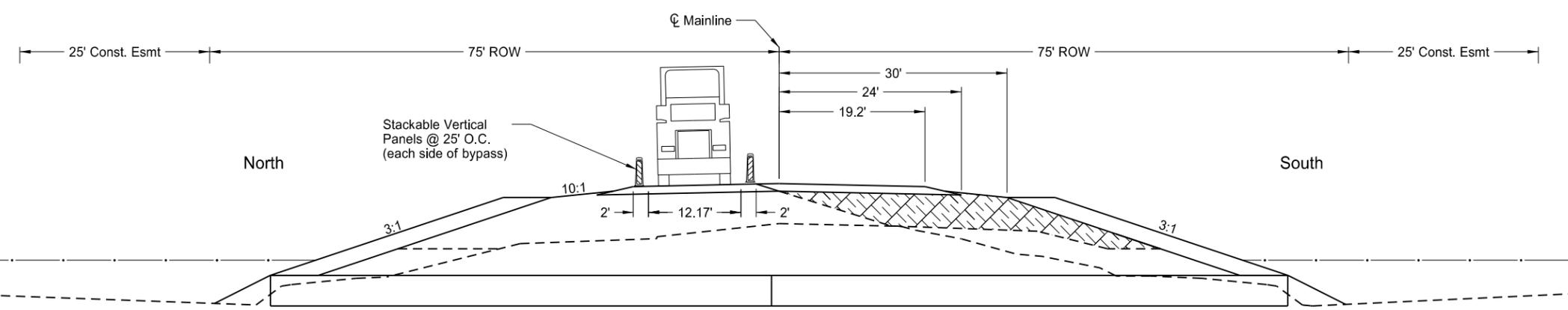
LaMoure County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-2-013(054)262	100	8



Phase 4:
 Maintain 1-lane, 2-way traffic on south side bypass lane.
 Place backfill for roadway cross section on north side as per final typical section.

Phase 4



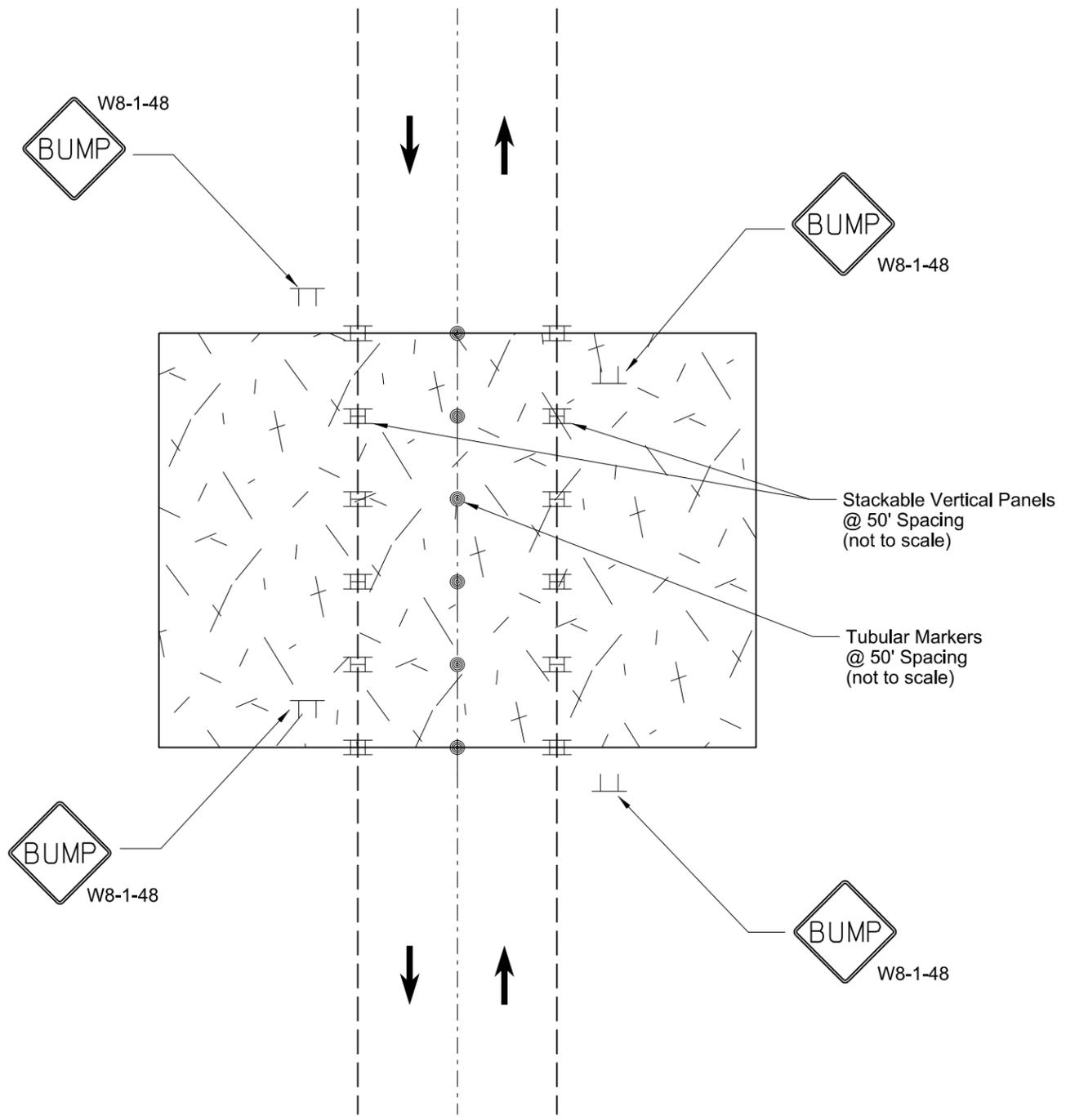
Phase 5:
 Shift traffic to north side roadway lane and maintain 1-lane, 2-way traffic on lane.
 Place backfill for roadway cross section on south side as per final typical section.

Phase 5

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WORK ZONE TRAFFIC CONTROL
 Construction Phasing for Pipe Replacement
 ND 13 Grade Raise
 0.5 Miles W of E Jct ND 56 near Kulm
 LaMoure County, ND

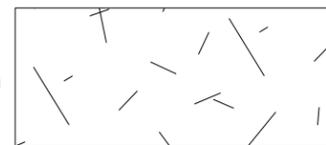
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SNH-2-013(054)262	100	9



NOTES:

- * See Standard D-704-15 Type A for when work is present.
- * See Standard D-704-26 for sign spacing.

Grade Raise Area



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CONSTRUCTION SIGNING DETAIL
 FOR NON-WORKING HOURS

ND 13 Grade Raise
 0.5 Miles W of E Jct ND 56 near Kulm

LaMoure County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-2-013(054)262	110	1

Sta/RP	Sign No.	Assembly No.	Flat Sheet For Signs		Sign Support Length				Support Size	Max Post Len LF	Sleeve Length				Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
			IV SF	XI SF	1st LF	2nd LF	3rd LF	4th LF			1st LF	2nd LF	3rd LF	4th LF								
13888+55 Rt		19		6.3		12.8				2.5 x 2.5 12 ga	14.5					1	4	3 x 3 7 ga				
13895+50 Lt		9		5.0		12.6				2.25 x 2.25 12 ga	15.0					1	4	2.5 x 2.5 12 ga				
13896+55 Rt		405	12.4			12.6				2.5 x 2.5 12 ga	13.5	4.2		2.25 x 2.25 12 ga	1	4	3 x 3 7 ga				1	
13901+50 Lt		375	12.0			12.9				2.5 x 2.5 12 ga	13.8	4.5		2.25 x 2.25 12 ga	1	4	3 x 3 7 ga				1	
Sub Total			24.4	11.3		Total 50.9									Total 16				0	0	2	
Grand Total			24.4	11.3		Total 50.9									Total 16				0	0	2	

Basis of Estimate
Sign Support Lengths

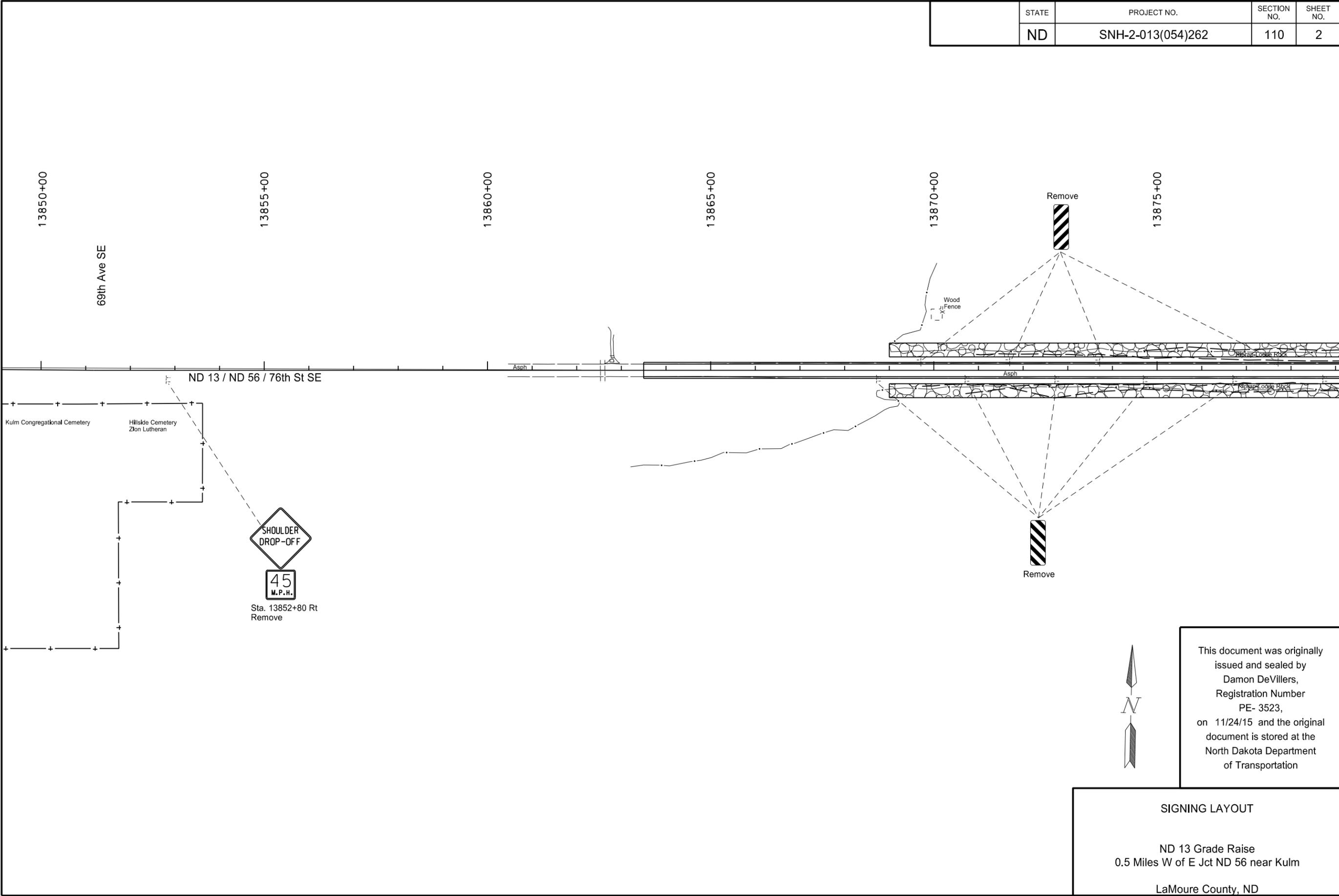
The sign support lengths have been calculated using the following vertical clearances:

Rural Roadway - 60"

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Sign Summary
Perforated Tube
ND 13 Grade Raise
0.5 Miles W of the E Jct ND 56 near Kulm
LaMoure County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-2-013(054)262	110	2



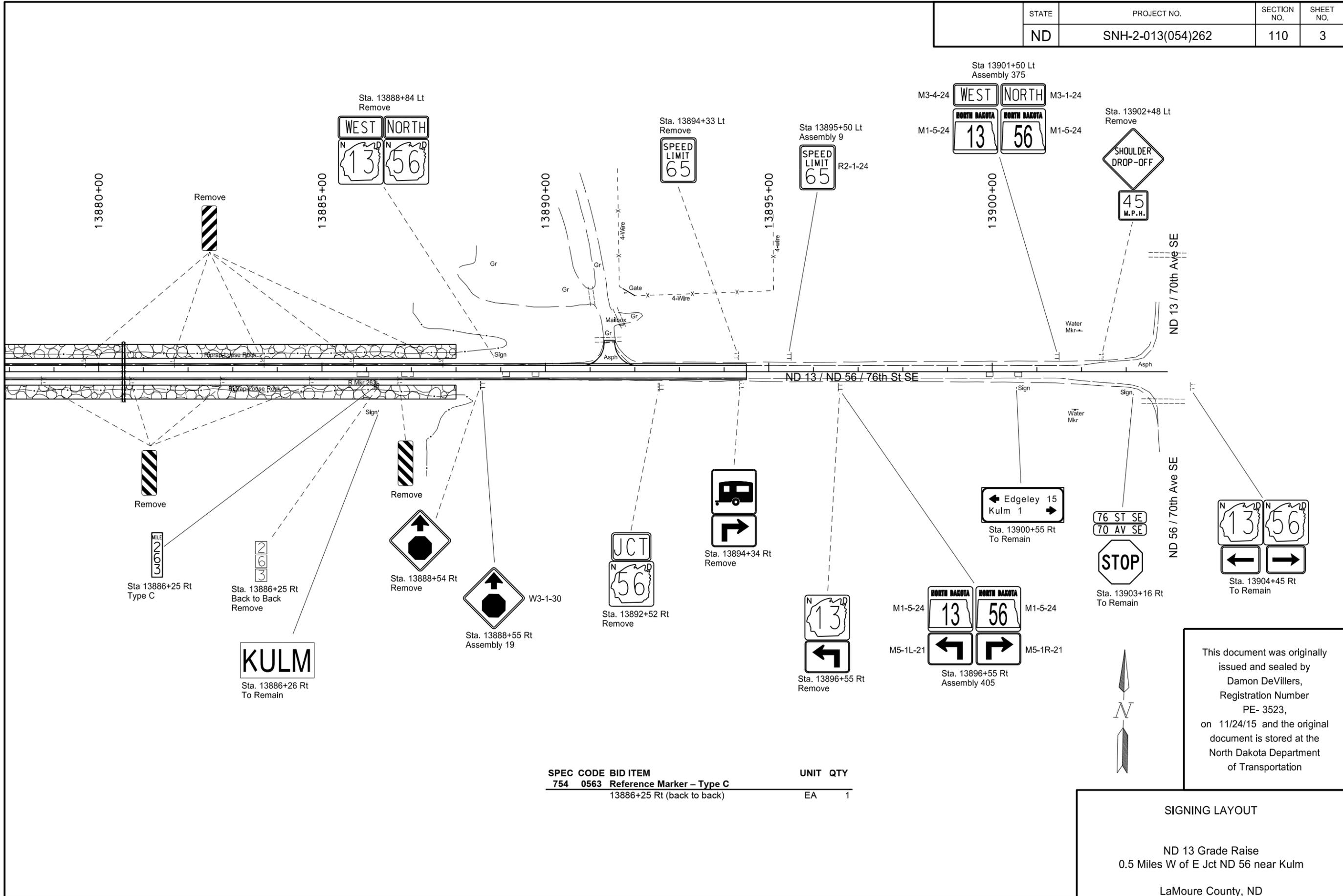
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SIGNING LAYOUT

ND 13 Grade Raise
 0.5 Miles W of E Jct ND 56 near Kulm

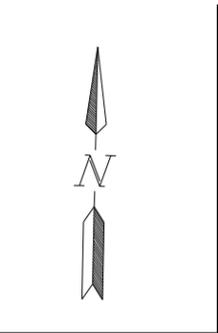
LaMoure County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SNH-2-013(054)262	110	3



SPEC CODE	BID ITEM	UNIT	QTY
754 0563	Reference Marker - Type C	EA	1
	13886+25 Rt (back to back)		

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SIGNING LAYOUT

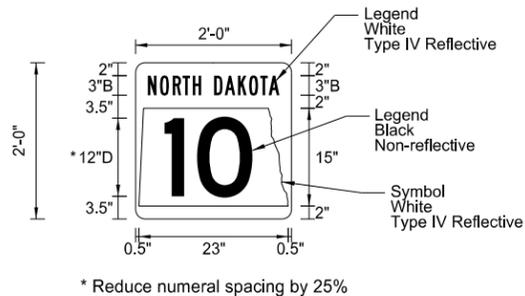
ND 13 Grade Raise
 0.5 Miles W of E Jct ND 56 near Kulm

LaMoure County, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SNH-2-013(054)262	110	4

SIGN NUMBER	M1-5-24
WIDTH x HEIGHT	2'-0" x 2'-0"
BORDER WIDTH	0" (inset 0")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: Non-reflective COLOR: Black
LEGEND/BORDER	TYPE: Non-refl / IV Reflective COLOR: White/Black

STATION(S): Conventional Roadways
AREA: 4.0 Sq.Ft.



* Reduce numeral spacing by 25%

Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

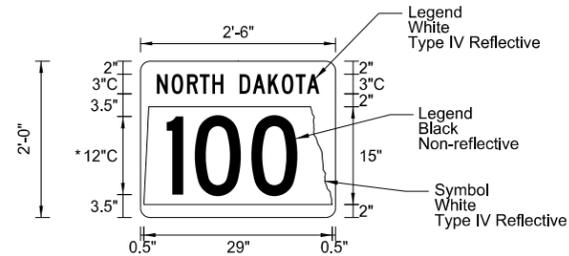
PANEL STYLE: ND_Misc_Gulde.ssi

SYMBOL	X	Y	WID	HT	ANGLE
ND_1-2	0.5	2	23	15	0

LETTER POSITION (X)											LENGTH	SIZE	SERIES
N	O	R	T	H	D	A	K	O	T	A	20.2	3	B 2000
1.9	3.8	5.7	7.2	8.8	12.1	13.7	15.7	17.5	19.2	20.5			
1	0										Varies	12	D 2000
(A)	(A)												

SIGN NUMBER	M1-5-30
WIDTH x HEIGHT	2'-6" x 2'-0"
BORDER WIDTH	0" (inset 0")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: Non-reflective COLOR: Black
LEGEND/BORDER	TYPE: Non-refl / IV Reflective COLOR: White/Black

STATION(S): Conventional Roadways
AREA: 5.0 Sq.Ft.



* Reduce numeral spacing by 25%

Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

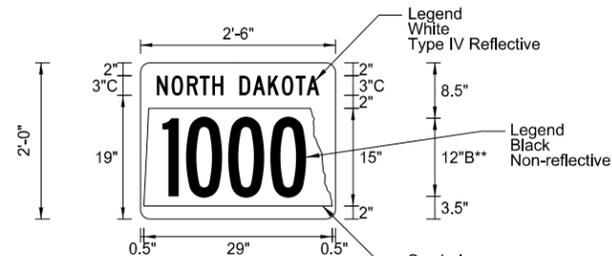
PANEL STYLE: ND_Misc_Gulde.ssi

SYMBOL	X	Y	WID	HT	ANGLE
ND_3-4	0.5	2	29	15	0

LETTER POSITION (X)											LENGTH	SIZE	SERIES
N	O	R	T	H	D	A	K	O	T	A	25	3	C 2000
2.5	4.8	7.1	9.1	11	15.2	17.3	19.6	21.7	23.9	25.6			
1	0	0									Varies	12	C 2000
(A)	(A)	(A)											

SIGN NUMBER	M1-5-30
WIDTH x HEIGHT	2'-6" x 2'-0"
BORDER WIDTH	0" (inset 0")
CORNER RADIUS	1.5"
MOUNTING	Ground
BACKGROUND	TYPE: Non-reflective COLOR: Black
LEGEND/BORDER	TYPE: Non-refl / IV Reflective COLOR: White/Black

STATION(S): Conventional Roadways
AREA: 5.0 Sq.Ft.



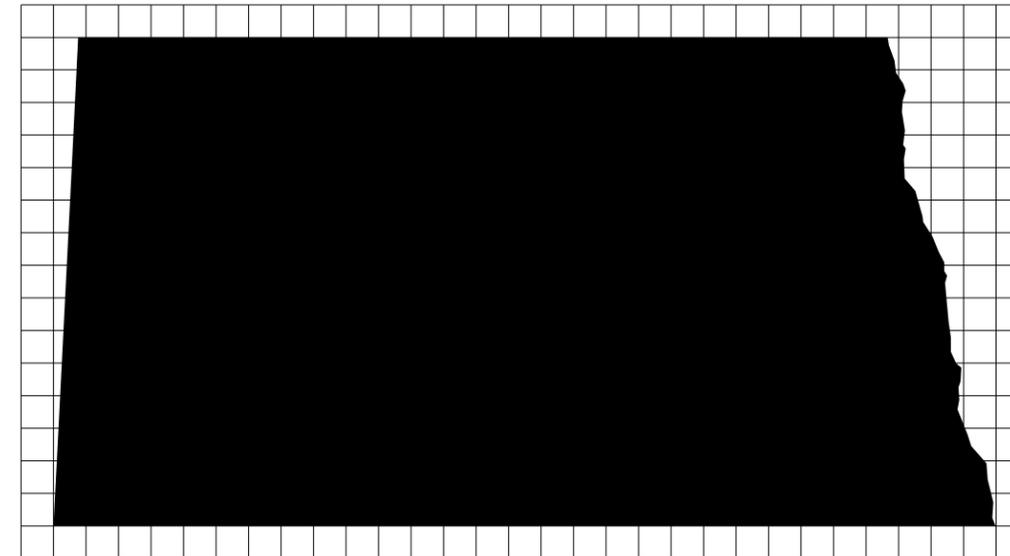
** Reduce numeral spacing by 50%

Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

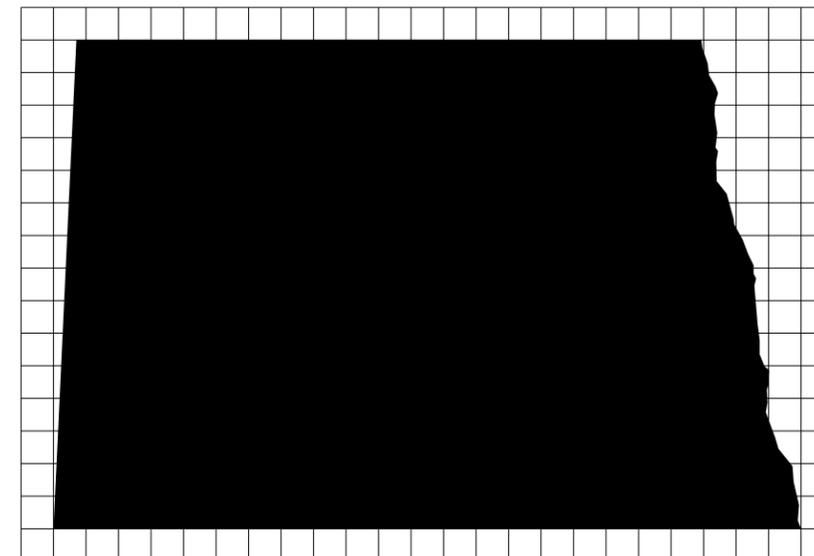
PANEL STYLE: ND_Misc_Gulde.ssi

SYMBOL	X	Y	WID	HT	ANGLE
ND_3-4	0.5	2	29	15	0

LETTER POSITION (X)											LENGTH	SIZE	SERIES
N	O	R	T	H	D	A	K	O	T	A	25	3	C 2000
2.5	4.8	7.2	9.1	11.1	15.2	17.3	19.6	21.7	23.9	25.6			
1	0	0	0								Varies	12	B 2000
(A)	(A)	(A)	(A)										



ND 3-4



ND 1-2

Note: Contact NDDOT Design Division for the North Dakota symbol.

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SIGN DETAILS

ND 13 Grade Raise
0.5 Miles W of E Jct ND 56 near Kulm

LaMoure County, ND

(A) Optically space numerals about vertical centerline.

NDDOT ABBREVIATIONS

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

Abn abandoned
 Abut abutment
 Ac acres
 Adj adjusted
 Aggr aggregate
 Ahd ahead
 ARV air release valve
 Align alignment
 Al alley
 Alt alternate
 Alum aluminum
 ADA Americans with Disabilities Act
 A ampere
 & and
 Appr approach
 Approx approximate
 ACP asbestos cement pipe
 Asph asphalt
 AC asphalt cement
 Assmd assumed
 @ at
 Atten attenuation
 ATR automatic traffic recorder
 Ave Avenue
 Avg average
 ADT average daily traffic
 Az azimuth
 Bk back
 BF back face
 Bs backsight
 Balc balcony
 B Wire barbed wire
 Barr barricade
 Btry battery
 Brg bearing
 BI beehive inlet
 Beg begin
 BM bench mark
 Bkwy bikeway
 Bit bituminous
 Blk block
 Bd Ft board feet
 BH bore hole
 BS both sides
 Bot bottom
 Blvd Boulevard
 Bndry boundary
 BC brass cap
 Brkwy breakaway
 Br bridge
 Bldg building

BV butterfly valve
 Byp bypass
 C Gdrl cable guardrail
 Calc calculate
 Cd candela
 CIP cast iron pipe
 CB catch basin
 CRS cationic rapid setting
 C Gd cattle guard
 C To C center to center
 Cl or C centerline
 Cm centimeter
 Ch chain
 Chnlk chain-link
 Ch Blk channel block
 Ch Ch channel change
 Chk check
 Chsld chiseled
 Cir circle
 Cl class
 Cl clay
 Cl F clay fill
 Cl Hvy clay heavy
 Cl Lm clay loam
 Clnt clean-out
 Clr clear
 Cl&gr clearing & grubbing
 Co S coal slack
 Comb. combination
 Coml commercial
 Compr compression
 CADD computer aided drafting & design
 Conc concrete
 Cond conductor
 Const construction
 Cont continuous
 CSB continuous split barrel sample
 Contr contraction
 Contr contractor
 CP control point
 Coord coordinate
 Cor corner
 Corr corrected
 CAES corrugated aluminum end section
 CAP corrugated aluminum pipe
 CMES corrugated metal end section
 CMP corrugated metal pipe
 CPVCP corrugated poly-vinyl chloride pipe
 CSES corrugated steel end section
 CSP corrugated steel pipe
 C coulomb
 Co County
 Crse course
 C Gr course gravel
 CS course sand

Ct Court
 Xarm cross arm
 Xbuck cross buck
 Xsec cross sections
 Xing crossing
 Xrd Crossroad
 Crn crown
 CF cubic feet
 M3 cubic meter
 M3/s cubic meters per second
 CY cubic yard
 Cy/mi cubic yards per mile
 Culv culvert
 C&G curb & gutter
 CI curb inlet
 CR curb ramp
 CS curve to spiral
 C cut
 Dd Ld dead load
 Defl deflection
 Defm deformed
 Deg or D degree
 DInt delineate
 DIntr delineator
 Depr depression
 Desc description
 Det detail
 DWP detectable warning panel
 Dtr detour
 Dia diameter
 Dir direction
 Dist distance
 DM disturbed material
 DB ditch block
 DG ditch grade
 Dbl double
 Dn down
 Dwg drawing
 Dr drive
 Drwy driveway
 DI drop inlet
 D dry density
 Ea each
 Esmt easement
 E East
 EB Eastbound
 Elast elastomeric
 EL electric locker
 E Mtr electric meter
 Elec electric/al
 EDM electronic distance meter
 Elev or El elevation
 Ellipt elliptical
 Emb embankment
 Emuls emulsion/emulsified

ES end section
 Engr engineer
 ESS environmental sensor station
 Eq equal
 Eq equation
 Evgr evergreen
 Exc excavation
 Exst existing
 Exp expansion
 Expy Expressway
 E external of curve
 Extru extruded
 FOS factor of safety
 F Fahrenheit
 FS far side
 F farad
 Fed Federal
 FP feed point
 Ft feet/foot
 Fn fence
 Fn P fence post
 FO fiber optic
 FB field book
 FD field drive
 F fill
 FAA fine aggregate angularity
 FS fine sand
 FH fire hydrant
 Fl flange
 Flrd flared
 FES flared end section
 F Bcn flashing beacon
 FA flight auger sample
 FL flow line
 Ftg footing
 FM force main
 Fs foresight
 Fnd found
 Fdn foundation
 Frac fractional
 Frwy freeway
 Frt front
 FF front face
 F Disp fuel dispenser

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE

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NDDOT ABBREVIATIONS

D-101-2

FFP	fuel filler pipes	IPn	Iron Pin	MC	medium curing	Ped	pedestal
FLS	fuel leak sensor	IP	iron Pipe	M	mega	Ped	pedestrian
Furn	furnish/ed	Jt	joint	Mer	meridian	PPP	pedestrian pushbutton post
Gal	gallon	J	joule	M	meter	Pen.	penetration
Galv	galvanized	Jct	junction	M/s	meters per second	Perf	perforated
Gar	garage	K	kelvin	M	mid ordinate of curve	Per.	perimeter
Gs L	gas line	Kn	kilo newton	Mi	mile	PL	pipeline
G Reg	gas line regulator	Kpa	kilo pascal	MM	mile marker	PI	place
GMV	gas main valve	Kg	kilogram	MP	mile post	P&P	plan & profile
G Mtr	gas meter	Kg/m3	kilogram per cubic meter	MI	milliliter	PL	plastic limit
GSV	gas service valve	Km	kilometer	Mm	millimeter	PI	plate
GVP	gas vent pipe	K	Kip(s)	Mm/hr	millimeters per hour	Pt	point
GV	gate valve	LS	Land Surveyor (licensed)	Min	minimum	PCC	point of compound curve
Ga	gauge	LSIT	Land Surveyor In Training	Misc	miscellaneous	PC	point of curve
Geod	geodetic	Ln	lane	Mon	monument	PI	point of intersection
GIS	Geographical Information System	Lg	large	Mnd	mound	PRC	point of reverse curvature
G	giga	Lat	latitude	Mtbl	mountable	PT	point of tangent
GPS	Global Positioning System	Lt	left	Mtd	mounted	POC	point on curve
Gov	government	L	length of curve	Mtg	mounting	POT	point on tangent
Grd	graded/grade	Lens	lenses	Mk	muck	PE	polyethylene
Gr	gravel	Lvl	level	Mun	municipal	PVC	polyvinyl chloride
Grnd	ground	LB	level book	N	nano	PCC	Portland Cement concrete
GWM	ground water monitor	Lvng	leveling	NGS	National Geodetic Survey	Lb or #	pounds
Gdrl	guardrail	Lht	light	NS	near side	PP	power pole
Gtr	gutter	LP	light pole	Neop	neoprene	Preempt	preemption
H Plg	H piling	Ltg	lighting	Ntwk	network	Prefab	prefabricated
Hdwl	headwall	Lig Co	lignite coal	N	newton	Prfmd	performed
Ha	hectare	Lig Sl	lignite slack	N	North	Prep	preparation
Ht	height	LF	linear foot	NE	North East	Press.	pressure
HI	height of instrument	Liq	liquid	NW	North West	PRV	pressure relief valve
Hel	helical	LL	liquid limit	NB	Northbound	Prestr	prestressed
H	henry	L	litre	No. or #	number	Pvt	private
HZ	hertz	Lm	loam	Obsc	obscure(d)	PD	private drive
HDPE	high density polyethylene	Loc	location	Obsn	observation	Prod.	production/produce
HM	high mast	LC	long chord	Ocpd	occupied	Prog	programmed
HP	high pressure	Long.	longitude	Ocpy	occupy	Prop.	property
HPS	high pressure sodium	Lp	loop	Off Loc	office location	Prop Ln	property line
Hwy	highway	LD	loop detector	O/s	offset	Ppsd	proposed
Hor	horizontal	Lm	lumen	OC	on center	PB	pull box
HBP	hot bituminous pavement	Lum	luminaire	C	one dimensional consolidation		
HMA	hot mix asphalt	L Sum	lump sum	OC	organic content		
Hr	hour(s)	Lx	lux	Orig	original		
Hyd	hydrant	ML	main line	O To O	out to out		
Ph	hydrogen ion content	M Hr	man hour	OD	outside diameter		
Id	identification	MH	manhole	OH	overhead		
In or "	inch	Mkd	marked	PMT	pad mounted transformer		
Incl	inclinometer tube	Mkr	marker	Pg	pages		
IMH	inlet manhole	Mkg	marking	Pntd	painted		
ID	inside diameter	MA	mast arm	Pr	pair		
Inst	instrument	Matl	material	Pnl	panel		
Intchg	interchange	Max	maximum	Pk	park		
Intmdt	intermediate	MC	meander corner	PK	Parker-Kalon nail		
Intscn	intersection	Meas	measure	Pa	pascal		
Inv	invert	Mdn	median	PSD	passing sight distance		
IM	iron monument	MD	median drain	Pvmt	pavement		

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NDDOT ABBREVIATIONS

D-101-3

Qty	quantity	SN	sign number	Tan	tangent	Wb	weber
Qtr	quarter	Sig	signal	T	tangent (semi)	WIM	weigh in motion
Rad or R	radius	Si Cl	silt clay	TS	tangent to spiral	W	west
RR	railroad	Si Cl Lm	silty clay loam	Tel	telephone	WB	westbound
Rlwy	railway	Si Lm	silty loam	Tel B	Telephone Booth	Wrng	wiring
Rsd	raised	Sgl	single	Tel P	telephone pole	W/	with
RTP	random traverse point	SC	slow curing	Tv	television	W/o	without
Rge or R	range	SS	slow setting	Temp	temperature	WC	witness corner
RC	rapid curing	Sm	small	Temp	temporary	WGS	world geodetic system
Rec	record	S	South	TBM	temporary bench mark	Z	zenith
Rcy	recycle	SE	South East	T	tesla		
RAP	recycled asphalt pavement	SW	South West	T	thinwall tube sample		
RPCC	recycled portland cement concrete	SB	Southbound	T/mi	tons per mile		
Ref	reference	Sp	spaces	Ts	topsoil		
R Mkr	reference marker	Spcl	special	Twp or T	township		
RM	reference monument	SA	special assembly	Traf	traffic		
Refl	reflectorized	SP	special provisions	TSCB	traffic signal control box		
RCB	reinforced concrete box	G	specific gravity	Tr	trail		
RCES	reinforced concrete end section	Spk	spike	Transf	transformer		
RCP	reinforced concrete pipe	SC	spiral to curve	TB	transit book		
RCPS	reinforced concrete pipe sewer	ST	spiral to tangent	Trans	transition		
Reinf	reinforcement	SB	split barrel sample	TT	transmission tower		
Res	reservation	SH	sprinkler head	Trans	transverse		
Ret	retaining	SV	sprinkler valve	Trav	traverse		
Rev	reverse	Sq	square	TP	traverse point		
Rt	right	SF	square feet	Trtd	treated		
R/W	right of way	Km2	square kilometer	Trmt	treatment		
Riv	river	M2	square meter	Qc	triaxial compression		
Rd	road	SY	square yard	TERO	tribal employment rights ordinance		
Rdbd	road bed	Stk	stake	Tpl	triple		
Rdwy	roadway	Std	standard	TP	turning point		
RWIS	roadway weather information system	N	standard penetration test	Typ	typical		
Rk	rock	Std Specs	standard specifications	Qu	unconfined compressive strength		
Rt	route	Sta	station	Ugrnd	underground		
Salv	salvage(d)	Sta Yd	station yards	USC&G	US Coast & Geodetic Survey		
Sd	sand	Stm L	steam line	USGS	US Geologic Survey		
Sdy Cl	sandy clay	SEC	steel encased concrete	Util	utility		
Sdy Cl Lm	sandy clay loam	SMA	stone matrix asphalt	VG	valley gutter		
Sdy Fl	sandy fill	SSD	stopping sight distance	Vap	vapor		
Sdy Lm	sandy loam	SD	storm drain	Vert	vertical		
San	sanitary sewer line	St	street	VC	vertical curve		
Sc	scoria	SPP	structural plate pipe	VCP	vitrified clay pipe		
Sec	seconds	SPPA	structural plate pipe arch	V	volt		
Sec	section	Str	structure	Vol	volume		
SL	section line	Subd	subdivision	Wkwy	walkway		
Sep	separation	Sub	subgrade	W	water content		
Seq	sequence	Sub Prep	subgrade preperation	WGV	water gate valve		
Serv	service	Ss	subsoil	WL	water line		
Sh	shale	SE	superelevation	WM	water main		
Sht	sheet	SS	supplement specification	WMV	water main valve		
Shtng	sheeting	Supp	supplemental	W Mtr	water meter		
Shldr	shoulder	Surf	surfacing	WSV	water service valve		
Sw	sidewalk	Surv	survey	WW	water well		
S	siemens	Sym	symmetrical	W	watt		
SD	sight distance	SI	systems international	Wrng	wearing		

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NDDOT UTILITY COMPANY AND ORGANIZATION ABBREVIATIONS

D-101-10

702COM 702 Communications
 ACCENT Accent Communications
 AGASSIZ WU Agassiz Water Users Incorporated
 AGC Associated General Contractors of America
 All PI Alliance Pipeline
 ALL SEAS WU All Seasons Water Users Association
 AMOCO PI Amoco Pipeline Company
 AMRDA HESS Amerada Hess Corporation
 AT&T AT&T Corporation
 B PAW Bear Paw Energy Incorporated
 BAKER ELEC Baker Electric
 BASIN ELEC Basin Electric Cooperative Incorporated
 BEK TEL Bek Communications Cooperative
 BELLE PL Belle Fourche Pipeline Company
 BLM Bureau of Land Management
 BNSF Burlington Northern Santa Fe Railway
 BOEING Boeing
 BRNS RWD Barnes Rural Water District
 BURK-DIV ELEC Burke-Divide Electric Cooperative
 BURL WU Burleigh Water Users
 Cable One Cable One
 CABLE SERV Cable Services
 CAP ELEC Capital Electric Cooperative Incorporat
 CASS CO ELEC Cass County Electric Cooperative
 CASS RWU Cass Rural Water Users Incorporated
 CAV ELEC Cavalier Rural Electric Cooperative
 CBLCOM Cablecom Of Fargo
 CENEX PL Cenex Pipeline
 CENT PL WATER DIST Central Pipe Line Water District
 CENT PWR ELEC Central Power Electric Cooperative
 COE Corps of Engineers
 CONS TEL Consolidated Telephone
 CONT RES Continental Resource Inc
 CPR Canadian Pacific Railway
 D O E Department Of Energy
 DAK CARR Dakota Carrier Network
 DAK CENT TEL Dakota Central Telephone
 DAK RWD Dakota Rural Water District
 DGC Dakota Gasification Company
 DICKEY R NET Dickey Rural Networks
 DICKEY RWU Dickey Rural Water Users Association
 DICKEY TEL Dickey Telephone
 DNRR Dakota Northern Railroad
 DOME PL Dome Pipeline Company
 DVELEC Dakota Valley Electric Cooperative
 DVMW Dakota, Missouri Valley & Western
 ENBRDG Enbridge Pipelines Incorporated
 ENVENTIS Enventis Telephone
 FALK MNG Falkirk Mining Company
 FHWA Federal Highway Administration
 G FKS-TRL WD Grand Forks-traill Water District
 GETTY TRD & TRAN Getty Trading & Transportation
 GLDN W ELEC Golden West Electric Cooperative
 GRGS CO TEL Griggs County Telephone

GT PLNS NAT GAS Great Plains Natural Gas Company
 HALS TEL Halstad Telephone Company
 IDEA1 Idea1
 INT-COMM TEL Inter-Community Telephone Company
 KANEB PL Kaneb Pipeline Company
 KEM ELEC Kem Electric Cooperative Incorporated
 KOCH GATH SYS Koch Gathering Systems Incorporated
 LKHD PL Lakehead Pipeline Company
 LNGDN RWU Langdon Rural Water Users Incorporated
 LWR YELL R ELEC Lower Yellowstone Rural Electric
 MCKNZ CON McKenzie Consolidated Telcom
 MCKENZIE ELEC McKenzie Electric Cooperative
 MCKNZ WRD McKenzie County Water Resource District
 MCLEOD McLeod USA
 MCLN ELEC McLean Electric Cooperative
 MCLN-SHRDN R WAT McLean-Sheridan Rural Water
 MDU Montana-dakota Utilities
 MID-CONT CABLE Mid-Continent Cable
 MIDSTATE TEL Midstate Telephone Company
 MINOT CABLE Minot Cable Television
 MINOT TEL Minot Telephone Company
 MISS W W S Missouri West Water System
 MNKOTA PWR Minnkota Power
 MOR-GRAN-SOU ELEC Mor-gran-sou Electric Cooperative
 MOUNT-WILLI ELEC Mountrail-williams Electric Cooperative
 MRE LBTY TEL Moore & Liberty Telephone
 MUNICIPAL City Water And Sewer
 MUNICIPAL City Of '.....'
 N CENT ELEC North Central Electric Cooperative
 N VALL W DIST North Valley Water District
 ND PKS & REC North Dakota Parks And Recreation
 ND TEL North Dakota Telephone Company
 NDDOT North Dakota Department of Transportation
 NDSU SOIL SCI DEPT NDSU Soil Science Department
 NEMONT TEL Nemont Telephone
 NODAK R ELEC Nodak Rural Electric Cooperative
 NOON FRMS TEL Noonan Farmers Telephone Company
 NPR Northern Plains Railroad
 NSP Northern States Power
 NTH PRAIR RW Northern Prairie Rural Water Association
 NTHN BRDR PL Northern Border Pipeline
 NTHN PLNS ELEC Northern Plains Electric Cooperative Incorporated
 NTHWSTRN REF Northwestern Refinery Company
 NW COMM Northwest Communication Cooperation
 ONEOK Oneok gas
 OSHA Occupational Safety and Health Administration
 OTTR TL PWR Otter Tail Power Company
 P L E M Prairielands Energy Marketing
 POLAR COM Polar Communications
 PVT ELEC Private Electric
 QWEST Qwest Communications
 R & T W SUPPLY R & T Water Supply Association
 RAMSEY R SEW Ramsey Rural Sewer Association
 RAMSEY RW Ramsey Rural Water Association
 RAMSEY UTIL Ramsey County Rural Utilities

RED RIV TEL Red River Rural Telephone
 RESVTN TEL Reservation Telephone
 ROBRTS TEL Roberts Company Telephone
 R-RIDER ELEC Roughrider Electric Coop
 RRVW Red River Valley & Western Railroad
 RSR ELEC R.S.R. Electric Cooperative
 S E W U South East Water Users Incorporated
 SCOTT CABLE Scott Cable Television Dickinson
 SHERDN ELEC Sheridan Electric Cooperative
 SHEYN VLY ELEC Sheyenne Valley Electric Cooperative
 SKYTECH Skyland Technologies Incorporated
 SLOPE ELEC Slope Electric Cooperative Incorporated
 SOURIS RIV TELCOM Souris River Telecommunications
 ST WAT COMM State Water Commission
 STATE LN WATER State Line Water Cooperative
 STER ENG Sterling Energy
 STUT RWU Stutsman Rural Water Users
 SW PL PRJ Southwest Pipeline Project
 T M C Turtle Mountain Communications
 TCI TCI of North Dakota
 TESORO GHG PLNS PL Tesoro High Plains Pipeline
 TRI-CNTY WU Tri-County Water Users Incorporated
 TRL CO RWU Traill County Rural Water Users
 UNTD TEL United Telephone
 UPPR SOUR WUA Upper Souris Water Users Association
 US SPRINT U.S. Sprint
 USAF MSL CABLE U.S.A.F. Missile Cable
 USFWS US Fish and Wildlife Service
 USW COMM U.S. West Communications
 VRNDRY ELEC Verendrye Electric Cooperative
 W RIV TEL West River Telephone Incorporated
 WEB W. E. B. Water Development Association
 WILLI RWA Williams Rural Water Association
 WILSTN BAS PL Williston Basin Interstate Pipeline Company
 WLSH RWD Walsh Water Rural Water District
 WOLVRTN TEL Wolverton Telephone
 XLENER Xcel Energy
 YSVR Yellowstone Valley Railroad

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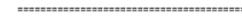
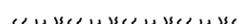
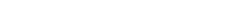
Line Styles

.....	Limits of Const Transition Line	—— s —— s ——	Floating Silt Curtain	—— ——— ———	Existing Aggregate (Cross Section View)	- - - - -	Existing Centerline
.....	Bale Check	—— ——— T ——	Existing Telephone Line	—— ——— ———	Existing Curb and Gutter (Cross Section View)	- - - - -	Supplemental Contour
.....	Rock Check	—— ——— TV ——	Existing TV Line	—— ——— ———	Existing Riprap	—— - - - - -	Right of Way
.....	Sight Distance Triangle Line	Void — void — void — v	Existing Assumed Ground (Not Surveyed)	—— ——— ———	Existing Underground Vault or Lift Station	—— - - - - -	Existing Right of Way
- - - - -	Small Hidden Object	Void — void — void — v	Tentative Ground Line	—— ——— ———	Tangent Line	—— - - - - -	Existing Right of Way Railroad
- - - - -	Dimension Leader	—— ——— w ——	Existing Water or Steam Line	- - - - -	Hidden Object	- - - - -	Failure Line
- - - - -	Existing Ground	=====	Existing Under Drain	—— ——— ———	Existing Dirt Surface	- - - - -	Existing Conditions
- - - - -	Existing Topsoil (Cross Section View)	=====	Under Drain	—— ——— ———	Existing Conduit	- - - - -	Existing Ground (Details)
—— ——— ———	Large Hidden Object	=====	Wall	—— ——— ———	Topsoil Profile	—— - - - - -	Existing Sixteenth Section Line
—— ——— ———	Edge Drain	=====	Existing Slotted Drain	- - - - -	Existing Conductor	- - - - -	Existing Right of Way Not State Owned
—— D —— D ——	Geotextile Fabric Type D	—— + —— + ——	Existing Cemetary Boundary	- - - - -	Conductor	- - - - -	Phantom Object
—— ——— E ——	Existing Electrical	—— ——— ———	Centerline Pavement Marking	- - - - -	Fiber Optic	- - - - -	Centerline Main
—— ——— FO ——	Existing Fiber Optic Line	=====	Barrier with Centerline Pavement Marking	- - - - -	Existing Loop Detector	-	Existing Guardrail Cable
—— ——— FO ——	Existing TV Fiber Optic	=====	Barrier Pavement Marking	- - - - -	Subgrade, Subcut or Ditch Grade	— • — • — • — •	Existing Guardrail Metal
—— ——— G ——	Existing Gas Pipe	- - - - -	Stripe 4 IN Dotted Extension White	—— ——— ———	Existing Asphalt Surface	—— . ——— . ——— .	Existing Edge of Water
—— Geo —— Geo ——	Geogrid	- - - - -	Stripe 8 IN Dotted Extension White	—— ——— ———	Existing Asphalt (Cross Section View)	- - - - -	Excavation Limits
—— ——— OH ——	Existing Overhead Utility Line	- - - - -	Stripe 8 IN Lane Drop	—— ——— ———	Existing Reinforcement Rebar	——	Existing Government Lot Line
—— ——— P ——	Existing Power	—— v v v v ——	Wetland Mitigation	—— ——— ———	Existing Tie Point Line	Existing Adjacent Block Lines
—— ——— PL ——	Existing Fuel Pipeline	- - - - -	Existing Box Culvert Bridge	—— ——— ———	Existing State or International Line	Existing Adjacent Lot Lines
—— ——— PL ——	Existing Undefined Above Ground Pipe Line	- - - - -	Existing Concrete Surface	—— ——— ———	Existing Quarter Section Line	Existing Adjacent Property Line
—— ——— R —— R ——	Geotextile Fabric Type R	- - - - -	Existing Drainage Structure	—— ——— ———	Existing County	Existing Adjacent Subdivision Lines
—— ——— R —— R ——	Geotextile Fabric Type R1	- - - - -	Easement	—— ——— ———	Existing Section Line		
—— REMOVE —— REMOVE ——	Remove Line	- - - - -	Existing Concrete	—— ——— ———	Existing Township		
—— RR —— RR ——	Geotextile Fabric Type RR	- - - - -	Existing Easement	—— ——— ———	Existing Railroad Centerline		
—— S —— S ——	Geotextile Fabric Type S	—— ——— ———	Existing Gravel Surface	—— - - - - -	Centerline		

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	Subgrade Reinforcement		Existing Railroad Switch		Sheet Piling
	Existing Down Guy Wire Down Guy		Overhead Sign Structure Cantilever		W-Beam w Posts
	Existing Fence		24 Inch Pipe		Existing W-Beam Guardrail with Posts
	Existing Railroad		Reinforced Concrete Pipe		Exst Wet Area-Vegetation Break
	Existing Sanitary Sewer		Signal Head with Mast Arm		Existing Wetland Delineated
	Existing Sanitary Force Main		Existing Signal Head with Mast Arm		
	Existing Storm Drain		Tie Bar at Random Spacing		
	Existing Storm Drain Force Main		3-Cable w Posts		
	Fence		Existing 3-Cable w Posts		
	Silt Fence		Site Boundary		
	Existing Field Line		Fiber Rolls		
	Exst Flow		Doweled Joint		
	Flow		Tie Bar 30 Inch 4 Foot Center to Center		
	Existing Culvert		Tie Bar 18 Inch 3 Foot Center to Center		
	Existing Curb		Existing Berm, Dike, Pit, or Earth Dam		
	Existing Valley Gutter		Existing Ditch Block		
	Existing Driveway Gutter		Depression Contours		
	Existing Curb and Gutter		Existing City Corporate Limits or Reservation Boundary		
	Existing Mountable Curb and Gutter		Gravel Pit - Borrow Area		
	Existing Double Micro Loop Detector		Existing Tree Boundary		
	Micro Loop Detector Double		Tree Row		
	Existing Overhead Sign Structure		Existing Brush or Shrub Boundary		
	Existing Micro Loop Detector		Existing Retaining Wall		
	Micro Loop Detector		Existing Planter or Wall		
	Existing Overhead Sign Structure Cantilever		Retaining Wall (Plan View)		

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Symbols

	North Arrow (Half Scale)		Attenuation Device		Existing Railroad Battery Box		Existing Delineator Type E
	Truck Mounted Attenuator		Diamond Grade Delineator Type A		Existing Bush or Shrub		Existing EFB Misc
	Type I Barricade		Diamond Grade Delineator Type B		Existing Gas Cap or Stub		Existing Flashing Beacon
	Type II Barricade		Diamond Grade Delineator Type C		Existing Sanitary Cap or Stub		Existing Pipe Mounted Flasher
	Type III Barricade		Diamond Grade Delineator Type D		Existing Storm Drain Cap or Stub		Existing Pad Mounted Feed Point
	Catch Basin		Diamond Grade Delineator Type E		Existing Water Cap or Stub		Existing Pipe Mounted Feed Point with Pad
	Cairn or Stone Circle		Flexible Delineator		Existing Sanitary Cleanout		Existing Pole Mounted Feed Point
	Video Detection Camera		Flexible Delineator Type A		Existing Concrete Foundation		Existing Railroad Frog
	Storm Drain Cap or Stub		Flexible Delineator Type B		Existing Traffic Signal Controller		Existing Snow Gate 18
	Corrugated Metal End Section 18 Inch		Flexible Delineator Type C		Existing Pad Mounted Signal Controller		Existing Snow Gate 28
	Corrugated Metal End Section 24 Inch		Flexible Delineator Type D		Existing Sixteenth Section Corner		Existing Snow Gate 40
	Corrugated Metal End Section 30 Inch		Flexible Delineator Type E		Existing Quarter Section Corner		Existing Headwall
	Corrugated Metal End Section 36 Inch		Delineator Type A		Existing Section Corner		Existing Pedestrian Head with Number
	Corrugated Metal End Section 42 Inch		Delineator Type A Reset		Existing Railroad Crossbuck		Existing Signal Head
	Corrugated Metal End Section 48 Inch		Delineator Type B		Existing Satellite Dish		Existing Sprinkler Head
	Concrete Foundation		Delineator Type B Reset		Existing Fuel Dispensers		Existing Fire Hydrant
	Ground Connection Conductor		Delineator Type C		Existing Flexible Delineator Type A		Existing Catch Basin Drop Inlet
	Neutral Connection Conductor		Delineator Type D		Existing Flexible Delineator Type B		Existing Curb Inlet
	Phase 1 Connection Conductor		Delineator Type E		Existing Flexible Delineator Type C		Existing Manhole Inlet
	Phase 2 Connection Conductor		Delineator Drums		Existing Flexible Delineator Type D		Existing Junction Box
	Traffic Cone		Spot Elevation		Existing Flexible Delineator Type E		
	Signal Controller		Existing Access Control Arrow		Existing Delineator Type A		
	Pad Mounted Signal Controller		Existing Artifact		Existing Delineator Type B		
	Alignment Data Point		Existing Flashing Beacon		Existing Delineator Type C		
	Emergency Vehicle Detector		Existing Benchmark		Existing Delineator Type D		

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	Existing Light Standard		Existing Manhole with Valve Water		Existing Telephone Pole		Existing Undefined Manhole
	Existing High Mast Light Standard 10 Luminaire		Existing Water Manhole		Existing Wood Pole		Existing Undefined Pull Box
	Existing High Mast Light Standard 3 Luminaire		Existing Mile Post Type A		Existing Post		Existing Undefined Pedestal
	Existing High Mast Light Standard 4 Luminaire		Existing Mile Post Type B		Existing Pedestrian Push Button Post		Existing Undefined Valve
	Existing High Mast Light Standard 5 Luminaire		Existing Mile Post Type C		Existing Control Point CP		Existing Undefined Pipe Vent
	Existing High Mast Light Standard 6 Luminaire		Existing Reference Marker		Existing Control Point GPS-RTK		Existing Gas Valve
	Existing High Mast Light Standard 7 Luminaire		Existing RW Marker		Existing Control Point TRI		Existing Water Valve
	Existing High Mast Light Standard 8 Luminaire		Existing Utility Marker		Existing Reference Marker Point NGS		Existing Fuel Pipe Vent
	Existing High Mast Light Standard 9 Luminaire		Iron Monument Found		Existing Pull Box		Existing Gas Pipe Vent
	Existing Overhead Sign Structure Load Center		Iron Pin R/W Monument		Existing Intelligent Transportation Pull Box		Existing Sanitary Pipe Vent
	Existing Luminaire		Existing Object Marker Type I		Existing Water Pump		Existing Storm Drain Pipe Vent
	Existing Light Standard Luminaire		Existing Object Marker Type II		Existing Slotted Reinforced Concrete Pipe		Existing Water Pipe Vent
	Existing Federal Mailbox		Existing Object Marker Type III		Existing RR Profile Spot		Existing Weather Station
	Existing Private Mailbox		Existing Electrical Pedestal		Existing Fuel Leak Sensors		Existing Ground Water Well Bore Hole
	Existing Meander Section Corner		Existing Telephone Pedestal		Existing Highway Sign		Existing Windmill or Tower
	Existing Meter		Existing Fiber Optic Telephone Pedestal		Existing Miscellaneous Spot		Existing Witness Corner
	Existing Electrical Manhole		Existing TV Pedestal		Existing Lighting Standard Pole		Flashing Beacon
	Existing Gas Manhole		Existing Fiber Optic TV Pedestal		Existing Traffic Signal Standard		Flagger
	Existing Sanitary Manhole		Existing Fuel Filler Pipes		Existing Transformer		Pipe Mounted Flasher
	Existing Sanitary Force Main Manhole		Existing Traverse PI Aerial Panel		Existing Large Evergreen Tree		Sanitary Force Main with Valve
	Existing Sanitary Manhole with Valve		Existing Pole		Existing Small Evergreen Tree		
	Existing Storm Drain Manhole		Existing Power Pole		Existing Large Tree		
	Existing Force Main Storm Drain Manhole		Existing Power Pole with Transformer		Existing Small Tree		
	Existing Force Main Storm Drain Manhole with Valve		Existing Tree Trunk		Existing Tree Trunk		
	Existing Telephone Manhole		Existing Pad Mounted Traffic Signal Control Box		Existing Pad Mounted Traffic Signal Control Box		

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Symbols

D-101-32

 Pad Mounted Feed Point  Pipe Mounted Feed Point with Pad  Pole Mounted Feed Point  Headwall  Double Headwall with Vegetation Barrier  Single Headwall with Vegetation Barrier  Pole Mounted Head  Sprinkler Head  Fire Hydrant  Inlet Type 1  Inlet Type 2  Double Inlet Type 2  Inlet Gate Type 2  Junction Box  High Mast Light Standard 10 Luminaire  High Mast Light Standard 3 Luminaire  High Mast Light Standard 4 Luminaire  High Mast Light Standard 5 Luminaire  High Mast Light Standard 6 Luminaire  High Mast Light Standard 7 Luminaire  High Mast Light Standard 8 Luminaire  High Mast Light Standard 9 Luminaire  Relocate Light Standard  Overhead Sign Structure Load Center  Light Standard 100 Watt High Pressure Sodium Vapor Luminaire	 Light Standard 1000 Watt High Pressure Sodium Vapor Luminaire  Light Standard 150 Watt High Pressure Sodium Vapor Luminaire  Light Standard 175 Watt High Pressure Sodium Vapor Luminaire  Light Standard 200 Watt High Pressure Sodium Vapor Luminaire  Light Standard 250 Watt High Pressure Sodium Vapor Luminaire  Light Standard 310 Watt High Pressure Sodium Vapor Luminaire  Light Standard 35 Watt High Pressure Sodium Vapor Luminaire  Light Standard 400 Watt High Pressure Sodium Vapor Luminaire  Light Standard 50 Watt High Pressure Sodium Vapor Luminaire  Light Standard 70 Watt High Pressure Sodium Vapor Luminaire  Light Standard 700 Watt High Pressure Sodium Vapor Luminaire  Manhole  Manhole 48 Inch  Sanitary Force Main Manhole  Sanitary Sewer Manhole  Storm Drain Manhole  Storm Drain Manhole with Inlet  Reset Mile Post  Mile Post Type A  Mile Post Type B  Mile Post Type C  Right of Way Marker  Tubular Marker  Alignment Monument  Iron Pin Reference Monument	 Object Marker Type I  Object Marker Type II  Object Marker Type III  Caution Mode Arrow Panel  Back to Back Vertical Panel Sign  Double Direction Arrow Panel  Left Directional Arrow Panel  Right Directional Arrow Panel  Sequencing Arrow Panel  Truck Mounted Arrow Panel  Power Pole  Wood Pole  Pedestrian Push Button Post  Property Corner  Pull Box  Intelligent Transportation Pull Box  Sanitary Pump  Storm Drain Pump  Reinforced Pavement  Reinforced Concrete End Section 15 Inch  Reinforced Concrete End Section 18 Inch  Reinforced Concrete End Section 24 Inch  Reinforced Concrete End Section 30 Inch  Reinforced Concrete End Section 36 Inch  Reinforced Concrete End Section 42 Inch	 Reinforced Concrete End Section 48 Inch  Reinforced Concrete End Section 54 Inch  Reset Right of Way Marker  Reset USGS Marker  Right of Way Markers  Riser 30 Inch  Continuous Split Barrel Sample  Flight Auger Sample  Split Barrel Sample  Thinwall Tube Sample  Highway Sign  SNOW GATE 18 FT  SNOW GATE 28 FT  SNOW GATE 40 FT  Standard Penetration Test  Transformer  Inclinometer Tube  Underdrain Cleanout  Excavation Unit  Water Valve
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NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
DATE	CHANGE

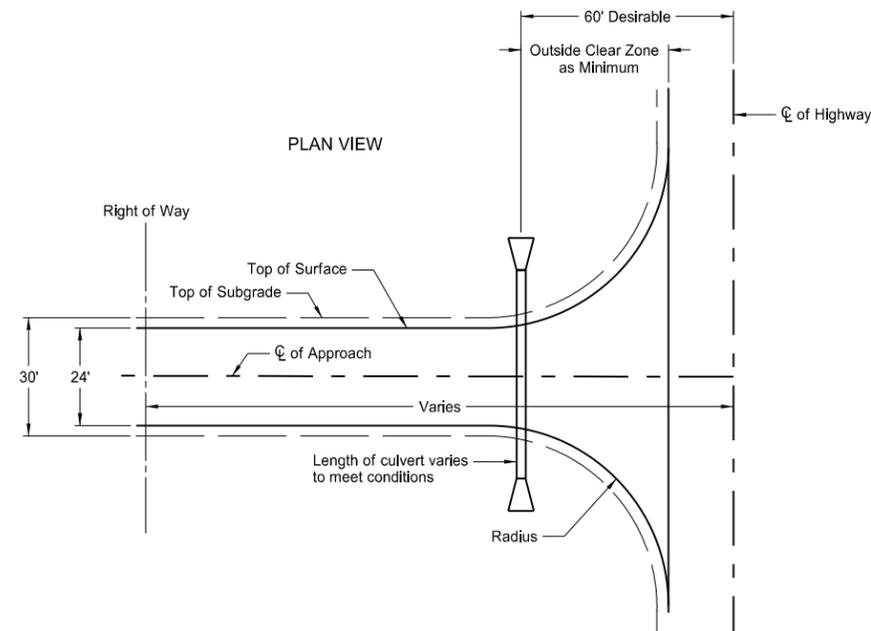
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STANDARD RURAL APPROACHES

D-203-8

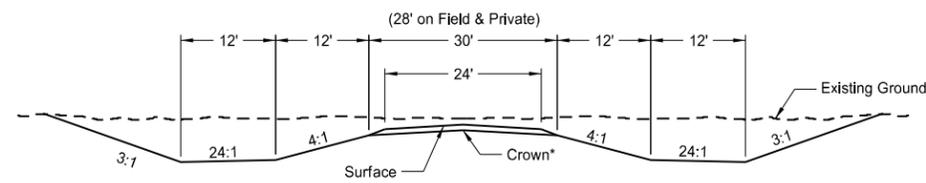
NOTES:

1. Max breakover between approach storage platform and highway shall not exceed 5%.
2. The approach slope shall be measured outside the area of mainline inslope influence.



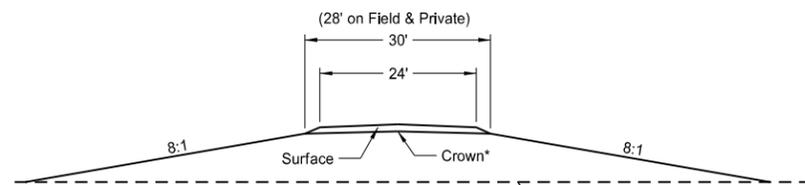
CRITERIA FOR RURAL APPROACH TYPES

	Field Drives	Private Drives	Low Volume Public Roads
Radius	R=24 ft	R=30 ft	R=40 ft
Maximum Grade	10%	7%	7%
Storage Platform	20 ft	24 ft	30 ft
Vertical Curve Length	10 ft	10 ft	Varies (Min. 20 mph)

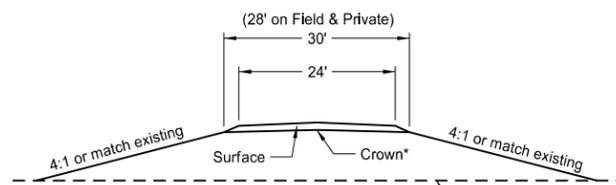


SECTION A-A

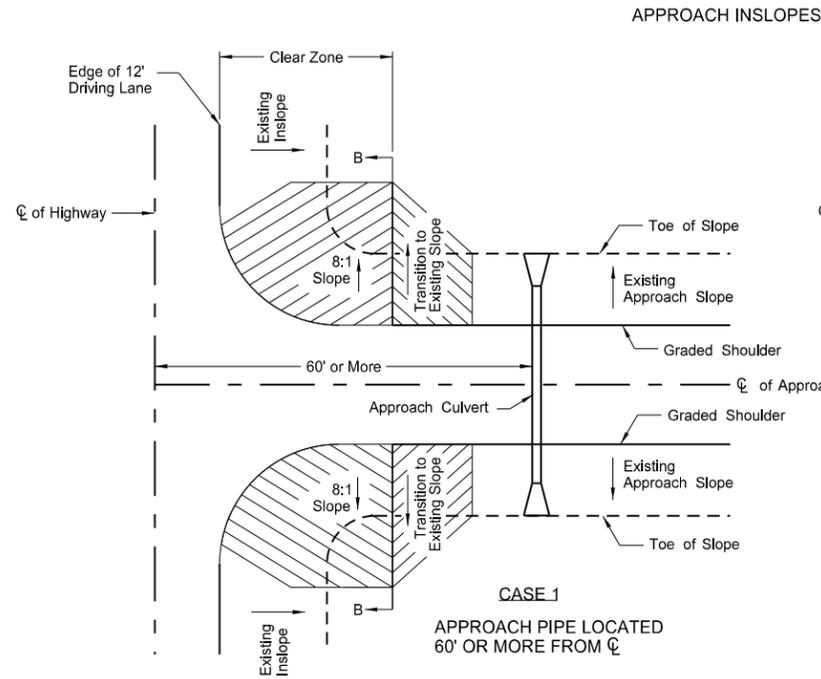
*2.1% crown for paved surface
*3.0% crown for gravel surface



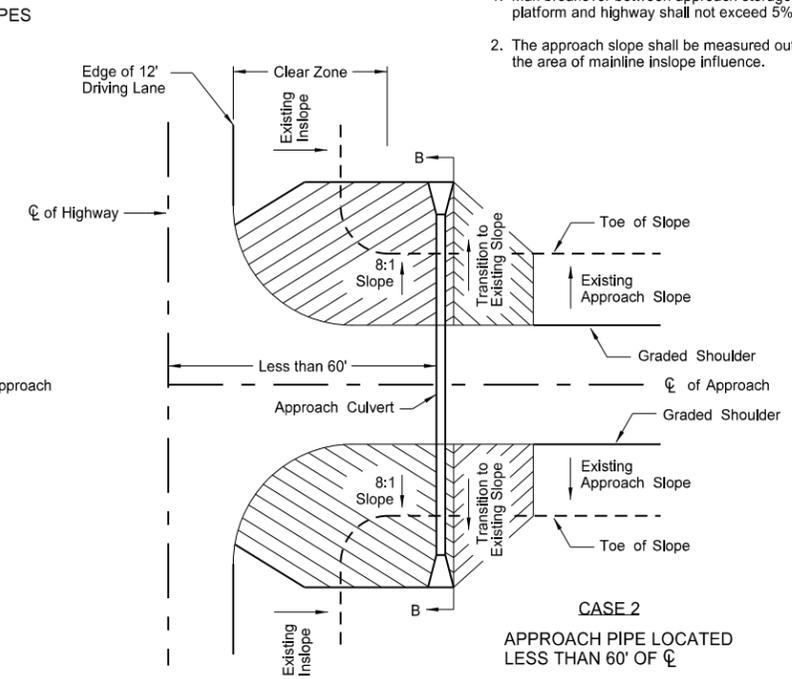
SECTION B-B



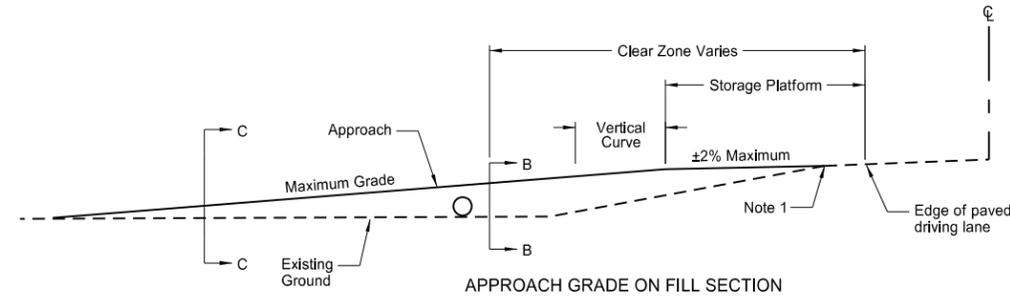
SECTION C-C



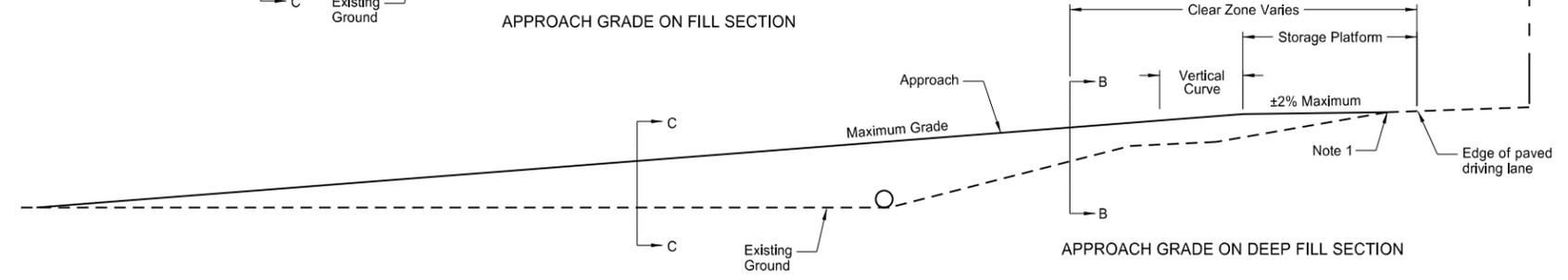
CASE 1
APPROACH PIPE LOCATED
60' OR MORE FROM C



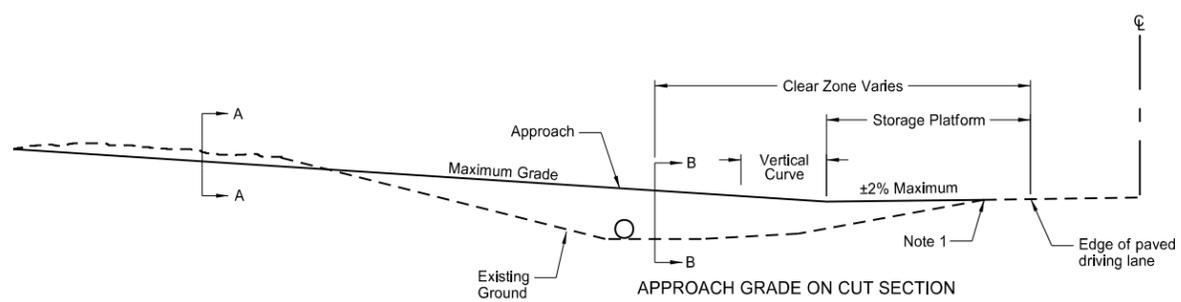
CASE 2
APPROACH PIPE LOCATED
LESS THAN 60' OF C



APPROACH GRADE ON FILL SECTION



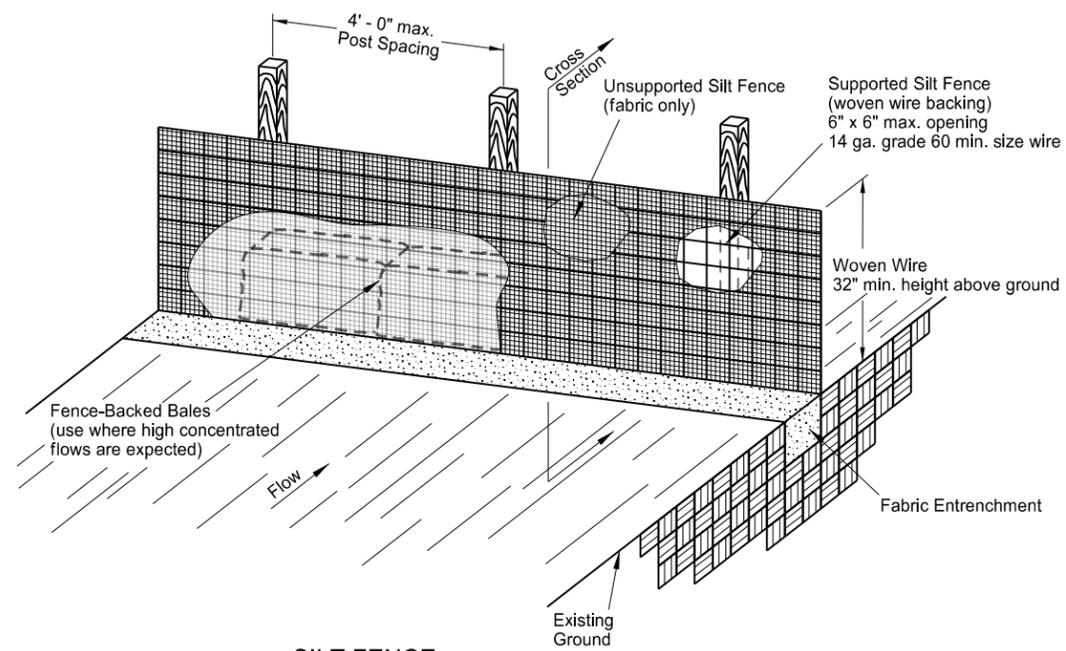
APPROACH GRADE ON DEEP FILL SECTION



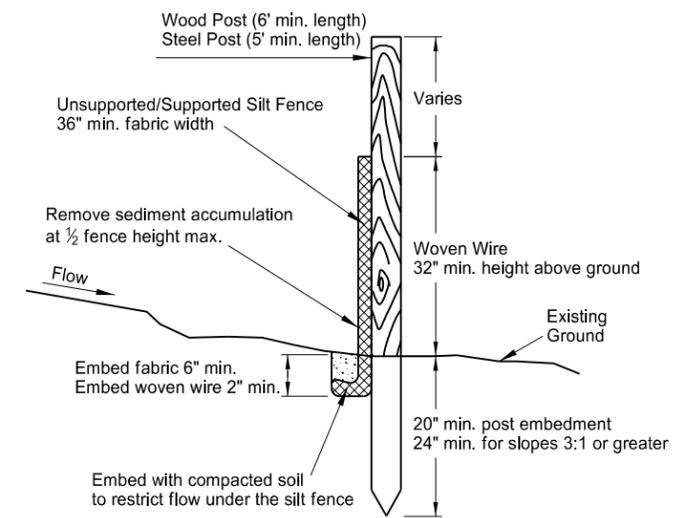
APPROACH GRADE ON CUT SECTION

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-25-14	
REVISIONS	
DATE	CHANGE

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SILT FENCE SUPPORTED AND UNSUPPORTED

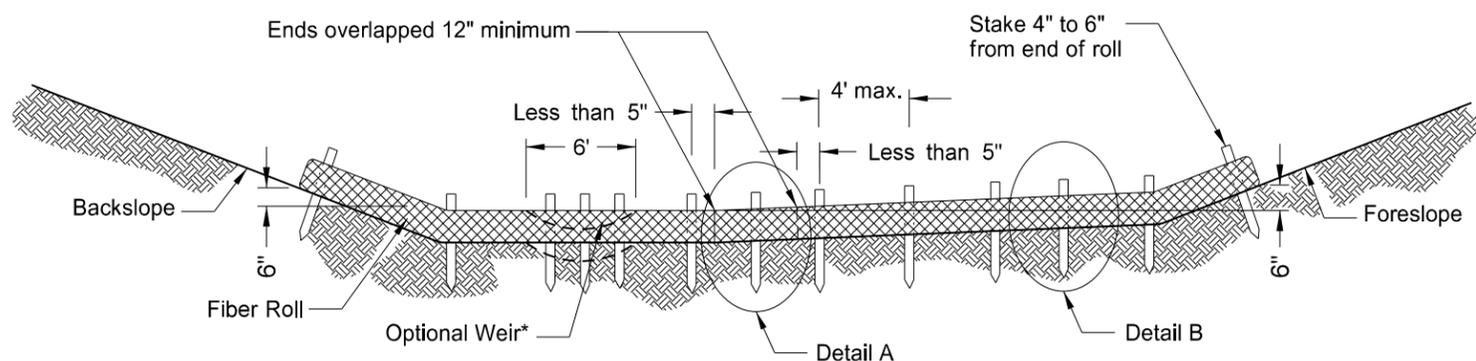


SILT FENCE CROSS SECTION

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Standard drawing resulted from splitting standard D-708-2.

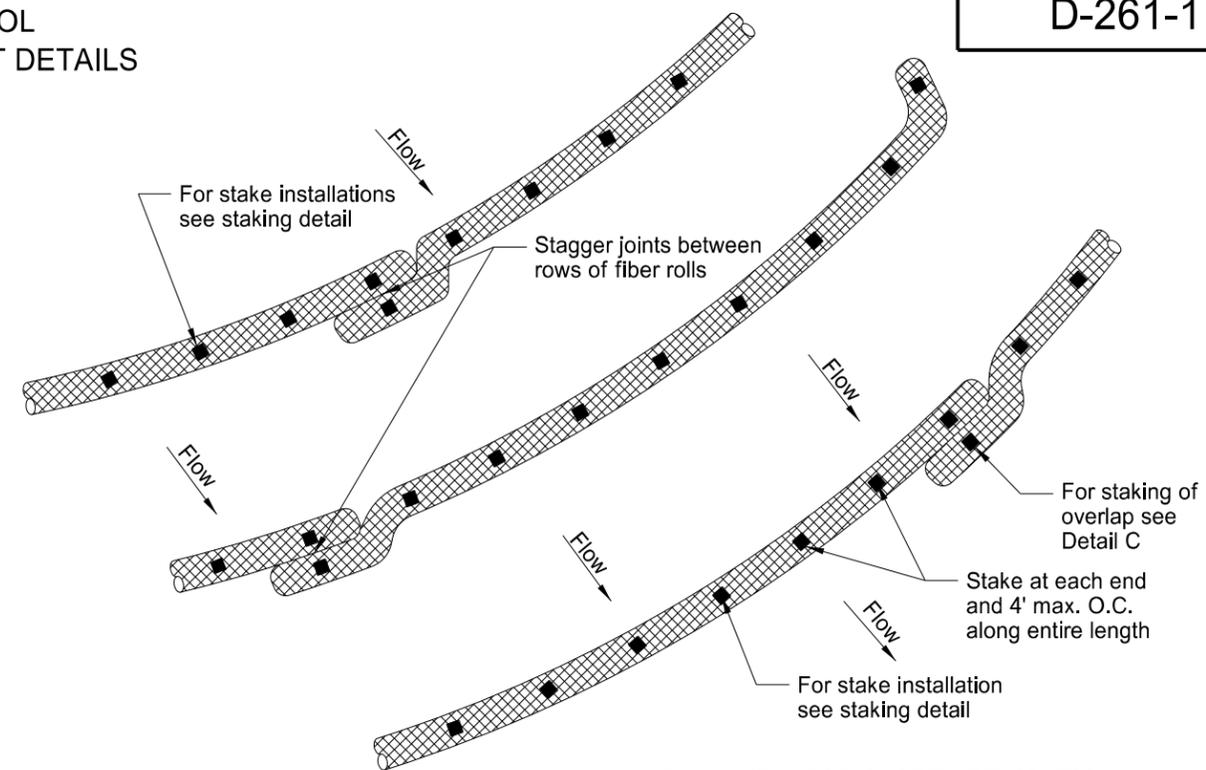
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EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS

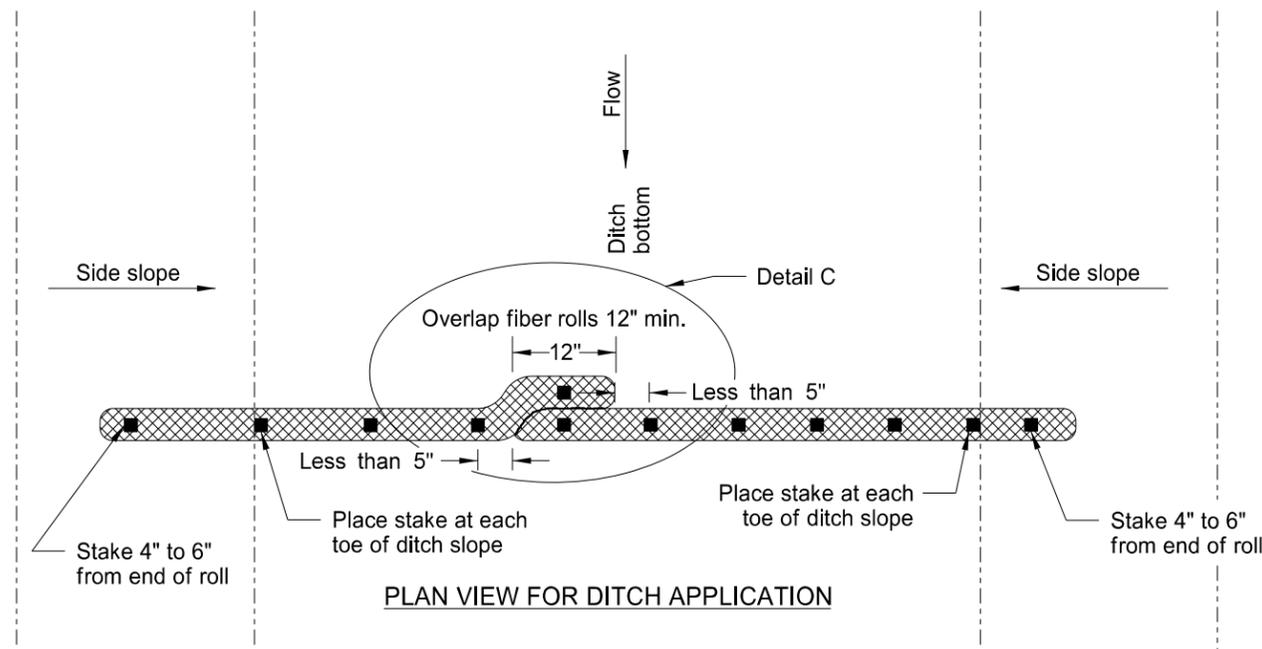


*Optional Weir. Use in flat areas, such as the Red River Valley, where there is potential for water to back up on adjacent property. Lower fiber roll enough to prevent water from backing up on adjacent property. Do not use 20-inch fiber rolls in flat areas where there is potential for water to back up on adjacent property.

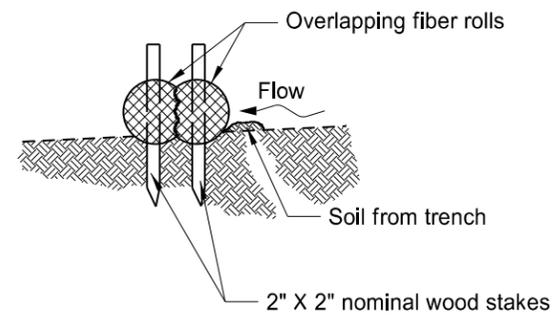
12 OR 20 INCH FIBER ROLL - DITCH BOTTOM



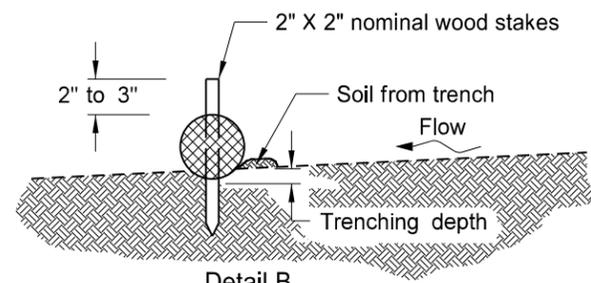
PLAN VIEW FOR SLOPE APPLICATION



PLAN VIEW FOR DITCH APPLICATION



Detail A
Fiber Roll Overlapping Staking Detail



Detail B
Fiber Roll Staking Detail

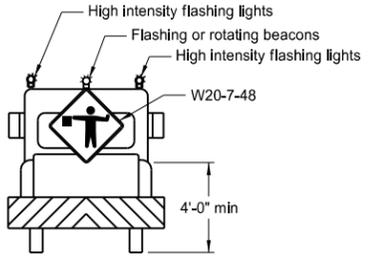
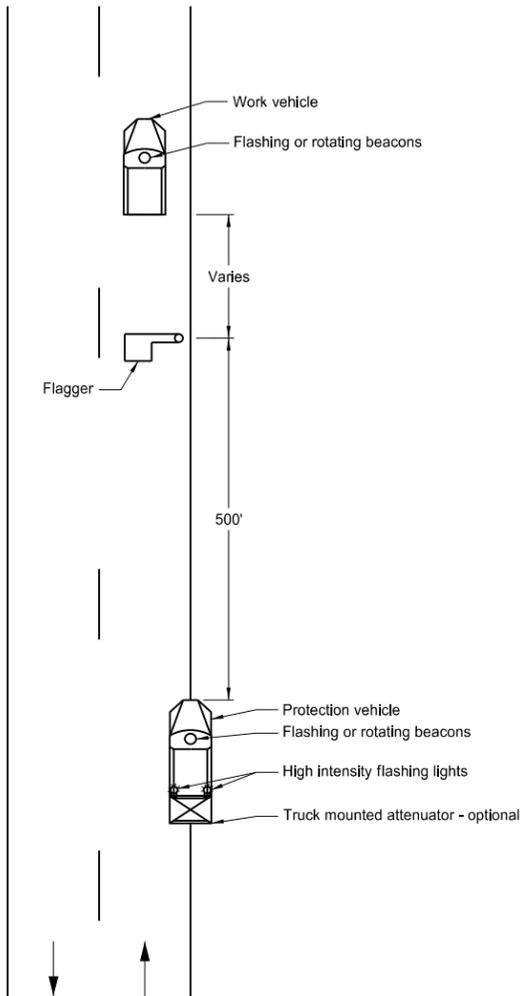
FIBER ROLL DIAMETER	NOMINAL STAKE SIZE	MINIMUM STAKE LENGTH	MINIMUM TRENCH DEPTH	MAXIMUM TRENCH DEPTH
6"	2" x 2"	18"	2"	2"
12"	2" x 2"	24"	2"	3"
20"	2" x 2"	36"	3"	5"

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

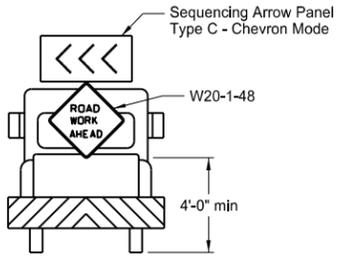
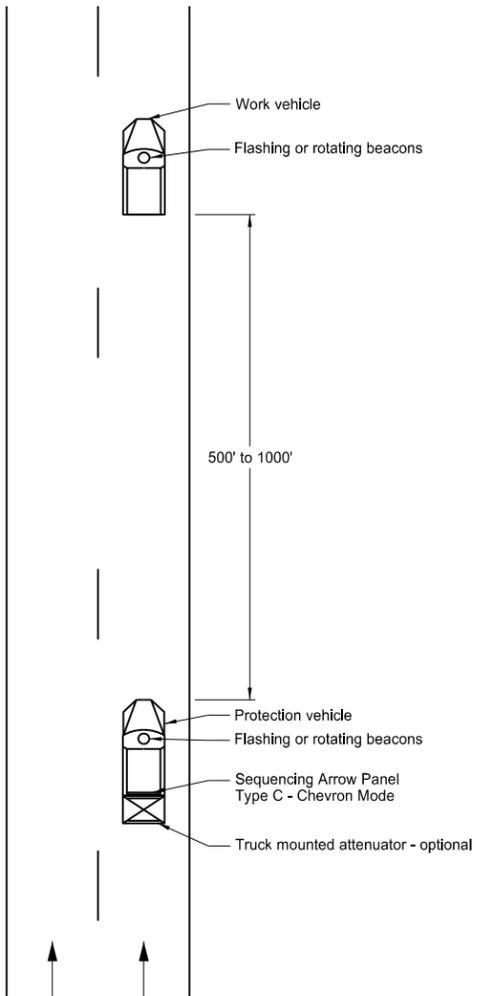
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Two Lane, Two Way Roadways



Typical Protection Vehicle

Multilane Roadways



Typical Protection Vehicle

- Notes:
1. The working vehicle shall display a 360 degree rotating, flashing, oscillating or strobe light.
 2. The shadow vehicle shall display a 360 degree rotating, flashing, oscillating or strobe light. The shadow vehicle for Multilane Roadway shall also have a sequencing arrow panel Type C operated in the chevron mode.
 3. This application is for use during daylight hours and in areas of good visibility only.
 4. Two lane, two way roadway, a flagger shall be used to protect the work area and warn oncoming traffic.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-25-12	
REVISIONS	
DATE	CHANGE

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CONSTRUCTION SIGN DETAIL

D-704-5

SIGN NUMBER	G20-10-108	STATION(S):	AREA: 36.0 Sq.Ft.
WIDTH x HEIGHT	9'-0" x 4'-0"		
BORDER WIDTH	1.25" (Inset 0.75")		
CORNER RADIUS	3"		
MOUNTING	Ground		
BACKGROUND	TYPE: IV Reflective COLOR: Fluorescent Orange		
LEGEND/BORDER	TYPE: Non-Refl COLOR: Black		

Dimensions are in inches.tenths Letter locations are panel edge to lower left corner

LETTER POSITION (X)														LENGTH	SIZE	SERIES
C	O	N	S	T	R	U	C	T	E	D	B	Y		69.7	6	D 2000
19.2	24.5	30	35.1	39.7	44.3	49.4	54.8	59.7	64.3	69	73.1	79.1	83.7			
Y	O	U	R		C	O	M	P	A	N	Y		N	A	M	E
8.3	14.2	19.8	25.3	29.4	35.4	40.7	46.2	52.4	56.8	62.8	67.8	72.9	78.9	83.9	89.9	96
Y	O	U	R		T	O	W	N								
21.7	27.6	33.2	38.7	42.8	48.8	53.3	58.4	64.6	69.6	70.7	76.7	82.2				

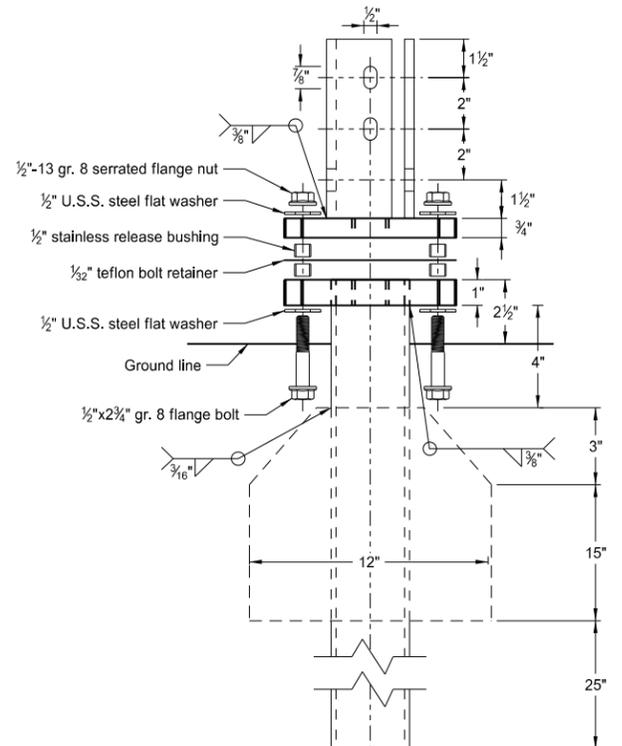
Notes:

1. Sign shall be placed a distance of 1/2A following the End Road Work (G20-2a-48) sign. There shall be a maximum of 2 signs per project.
2. Sign shall be post mounted.
3. Sign required on rural projects with a 30 day or longer duration and it is not required on seal coat projects or other short duration projects.
4. Sign shall not be placed in urban areas or within city limits.

Advance Warning Sign Spacing (A)			
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

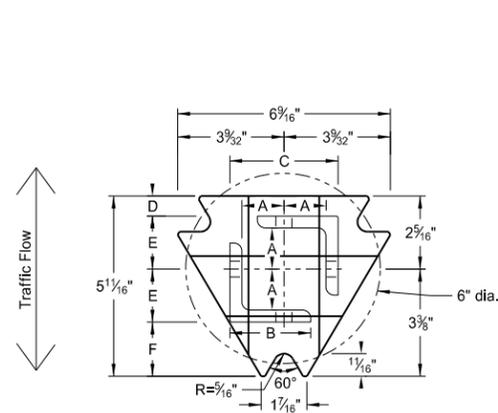
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE
7-18-14	Revise sheeting to type IV

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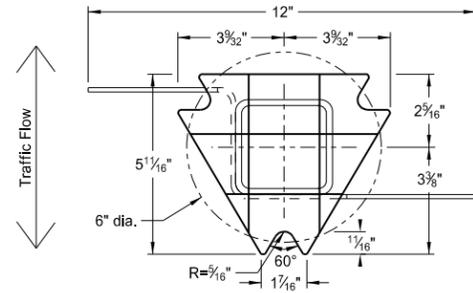


Multi-Directional Slip Base Assembly

Perforated Tube



Top Post Receiver
Plate - ASTM A572 grade 50
Angle Receiver - 2 1/2" x 2 1/2" x 3/8" ASTM A36 structural angle



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

Notes:

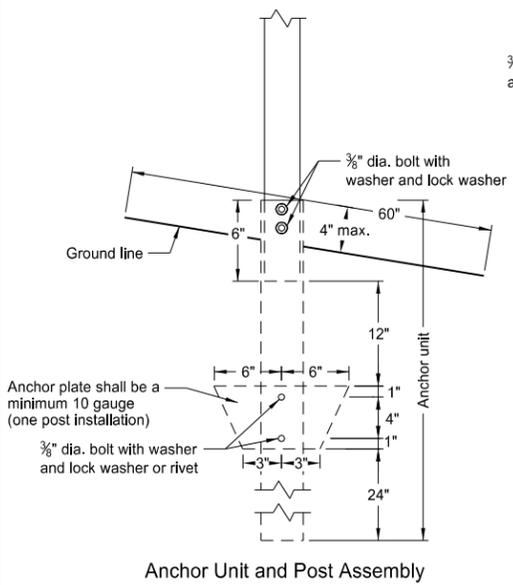
1. Slip base bolts shall be torqued as specified by the manufacturer.
2. Anchor shall have a yield strength of 43.9 KSI and tensile strength of 59.3 KSI.
3. The 4" vertical clearance is required for the anchor or breakaway base. The 4"x60" measurement shall be made above and below post location and also back and ahead of the post.
4. When used in concrete sidewalk, anchor shall be same except without the wings.
5. Four post signs shall have over 7' between the first and the fourth posts.

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

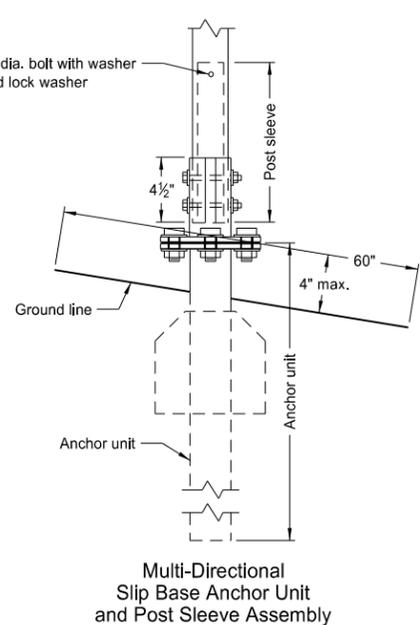
Properties of Telescoping Perforated Tube						
Tube Size in.	Wall Thickness in.	U.S. Standard Gauge	Weight per Foot lbs.	Moment of Inertia in. ⁴	Cross Sec. Area in. ²	Section Modulus in. ³
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2 1/4 x 2 1/4	0.105	12	2.773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

Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2 3/16" x 10 ga.	1 9/64"	2 1/2"	3 1/32"	2 5/32"	1 33/64"	1 1/8"
2 1/2" x 10 ga.	1 9/32"	2 1/2"	3 5/16"	5/8"	1 21/32"	1 3/4"

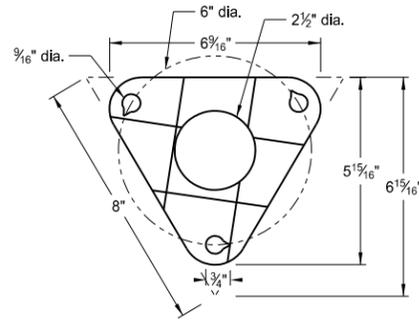
- (A) The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak.
 (B) The 2 3/16" x 10 ga. may be inserted into 2 1/2" x 10 ga. for additional wind load.



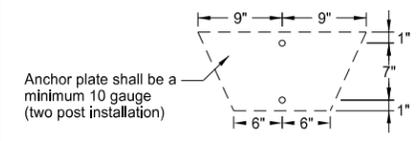
Anchor Unit and Post Assembly



Multi-Directional Slip Base Anchor Unit and Post Sleeve Assembly



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

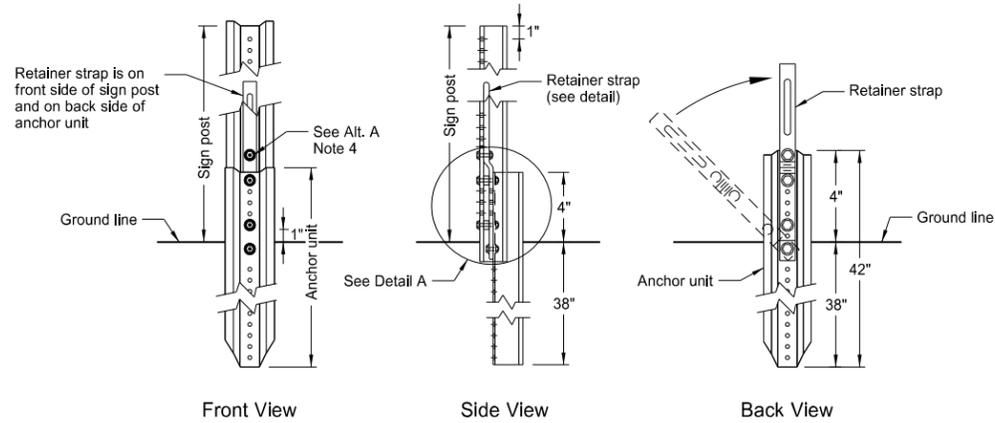
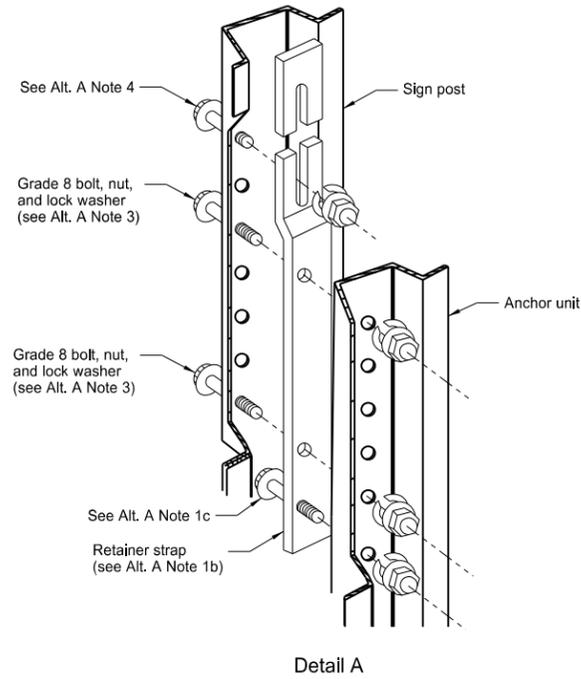


Anchor plate shall be a minimum 10 gauge (two post installation)

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-28-14	
REVISIONS	
DATE	CHANGE

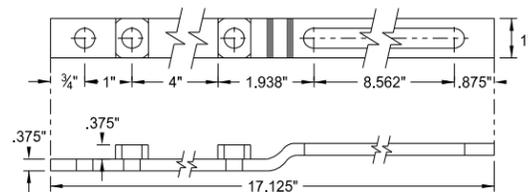
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U-Channel Post

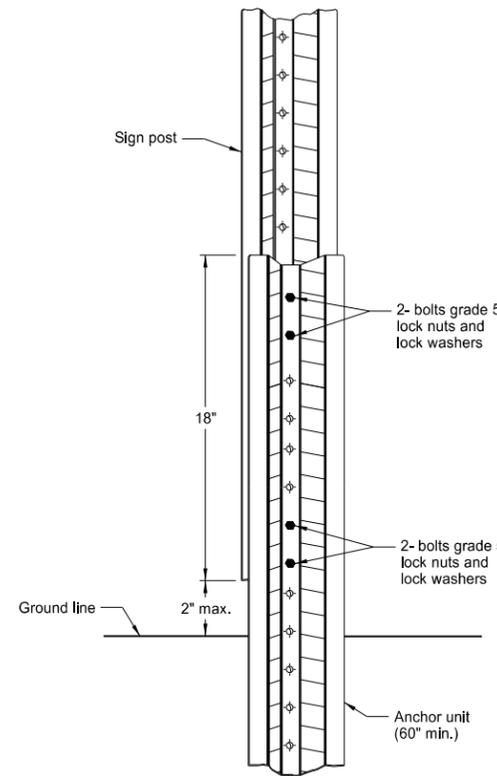


Breakaway U-Channel Detail Alternate A

A maximum of 2 posts shall be installed within 7'.

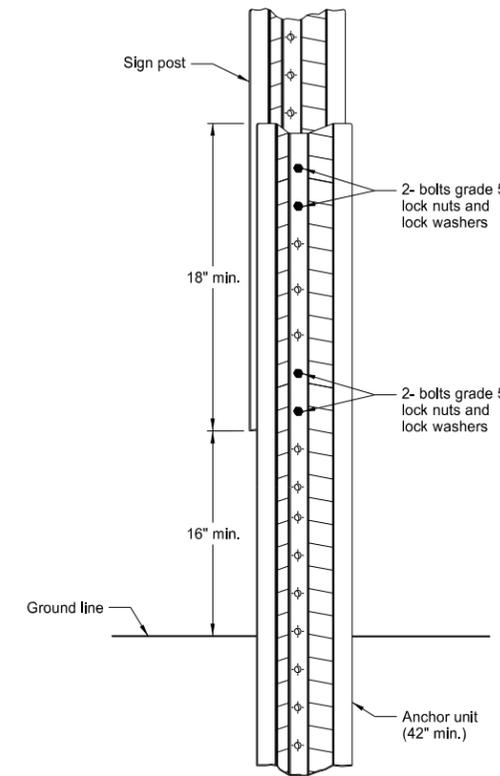


Retainer Strap Detail



Breakaway U-Channel Splice Detail Alternate B (2.5 and 3 lb/ft)

A maximum of 3 posts shall be installed within 7'.



Breakaway U-Channel Splice Detail Alternate C (2.5 and 3 lb/ft)

A maximum of 3 posts shall be installed within 7'.

Alternate A Steps of Installation:

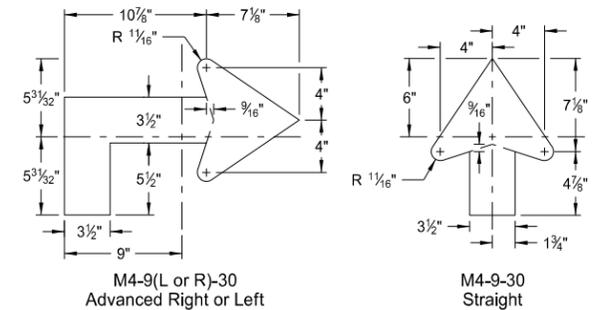
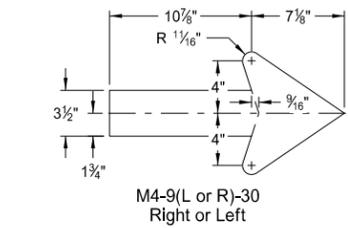
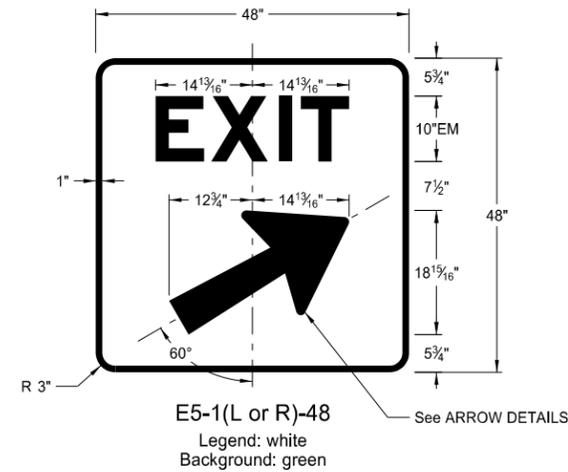
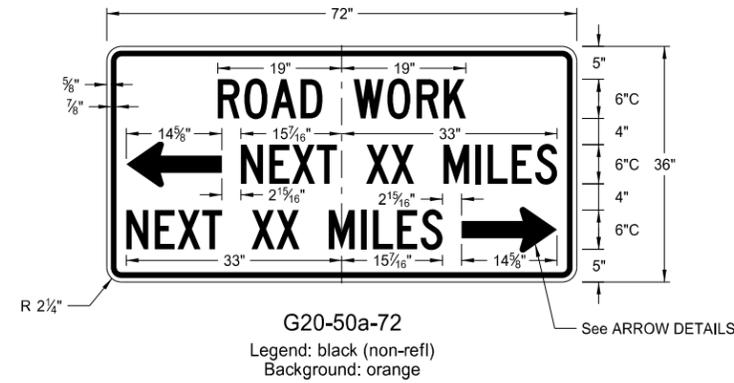
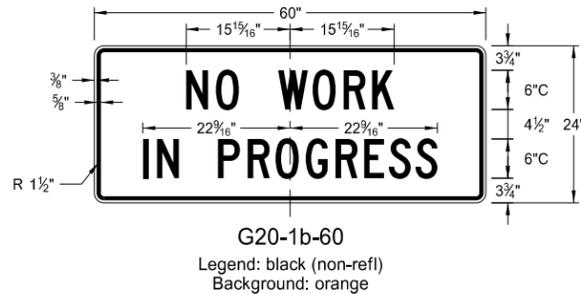
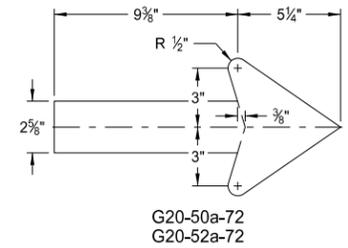
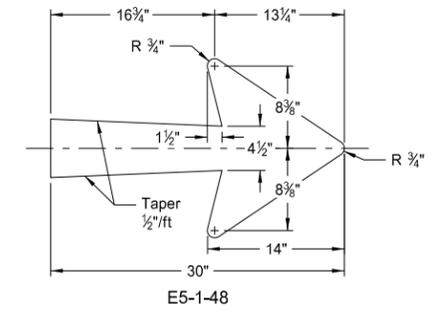
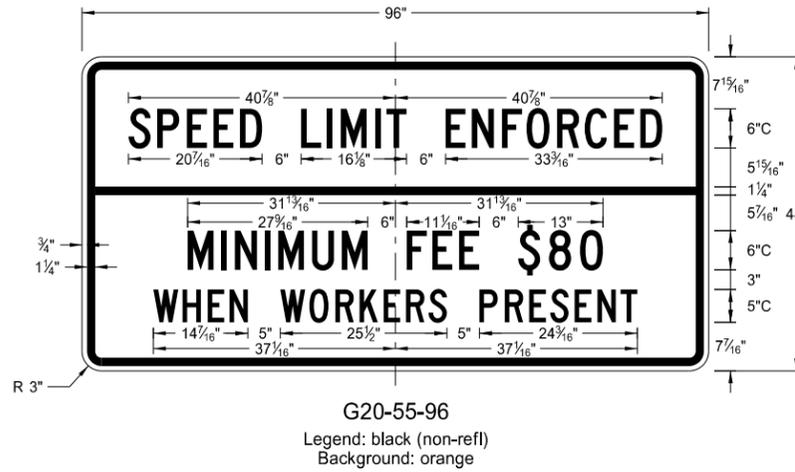
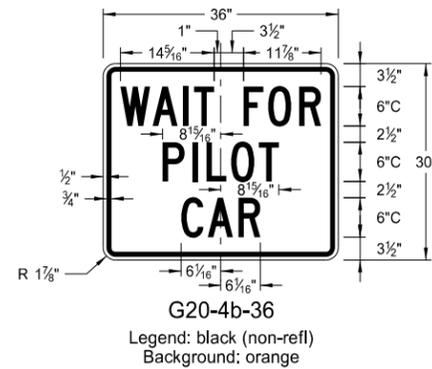
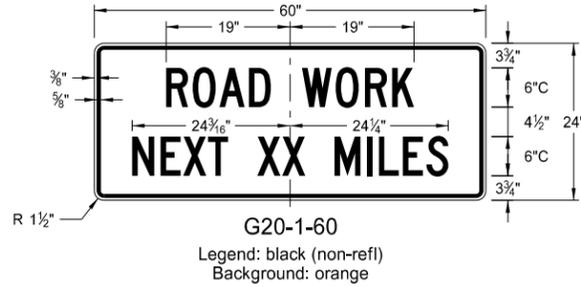
1. a) Drive anchor unit to within 12" of ground level.
b) Proper assembly established by lining up the bottom hole of retainer strap with the 6th hole from the top of the anchor unit.
c) Assemble strap to back of anchor unit using 5/16"x2" bolt, lock washer and nut.
d) Rotate strap 90° to left.
2. a) Drive anchor unit to 4" above ground.
b) Rotate strap to vertical position.
3. a) Place 5/16"x2" bolt, lock washer and nut in bottom of sign post to facilitate alignment of sign post with proper hole in anchor unit.
b) Alternately tighten two connector bolts.
4. Complete assembly by tightening 5/16"x2" bolt (this fastens sign post to retainer strap).
5. The base post, strap and sign post shall be properly nested. 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

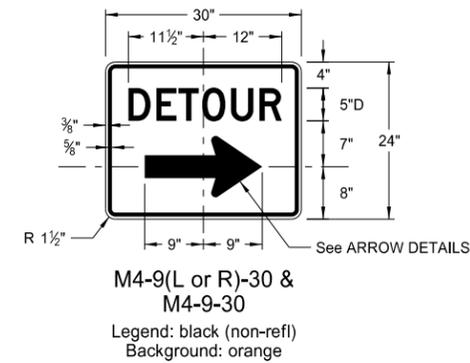
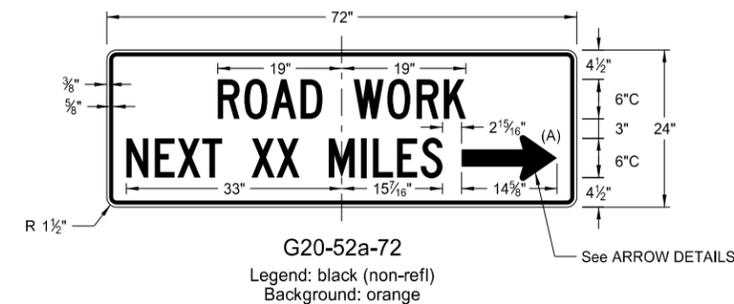
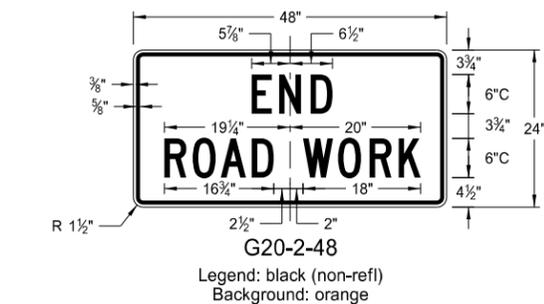
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CONSTRUCTION SIGN DETAILS
 TERMINAL AND GUIDE SIGNS

D-704-9



ARROW DETAILS



NOTES:

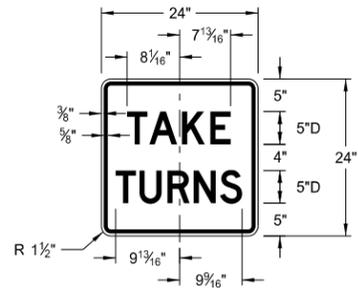
(A) Arrow may be right or left of the legend to indicate construction to the right or left.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-13-13	
REVISIONS	
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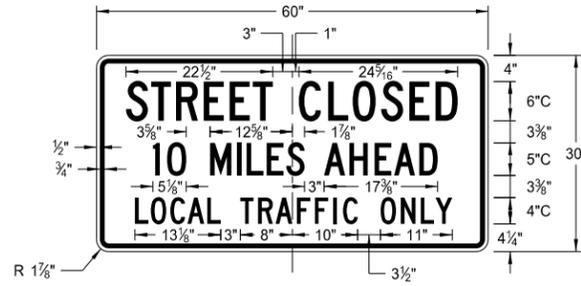
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS

D-704-10



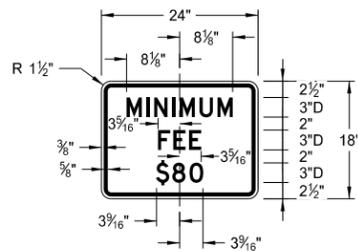
R1-50-24

Legend: black (non-refl)
Background: white



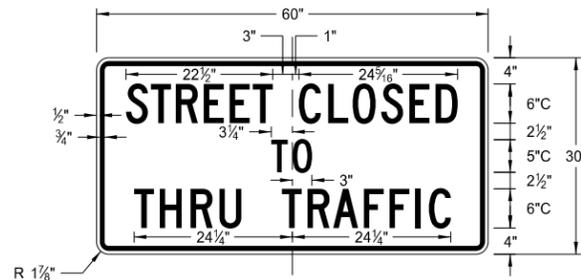
R11-3c-60

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Background: white



R2-1a-24

Legend: black (non-refl)
Background: white



R11-4a-60

Legend: black (non-refl)
Background: white



R11-2a-48

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Background: white

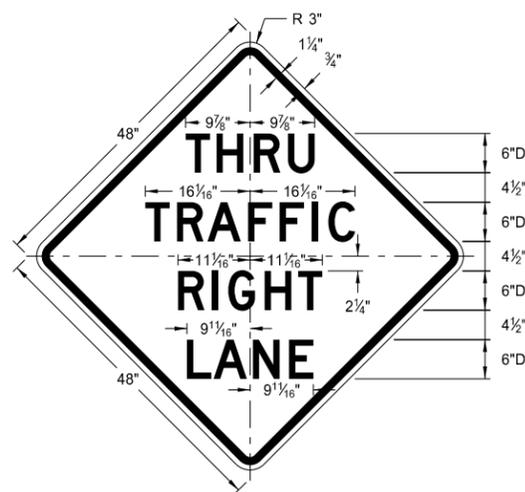
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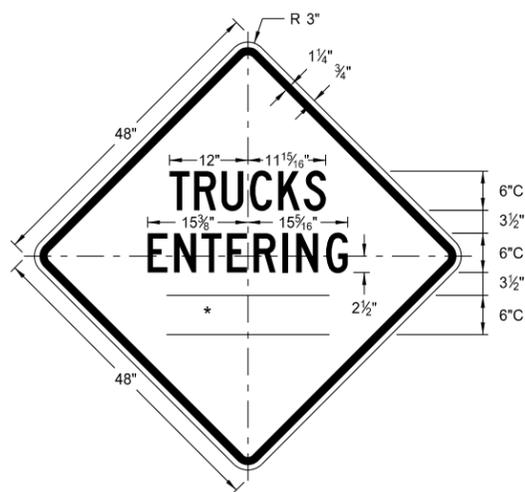
CONSTRUCTION SIGN DETAILS
WARNING SIGNS

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

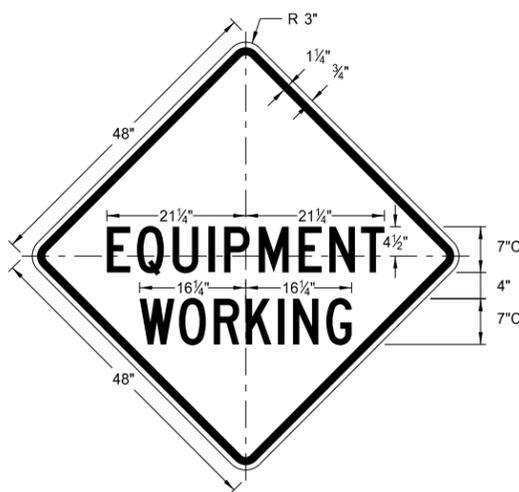
* DISTANCE MESSAGES



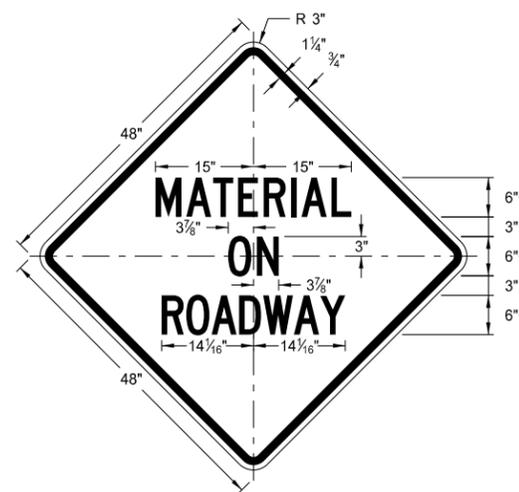
W5-8-48
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Background: orange



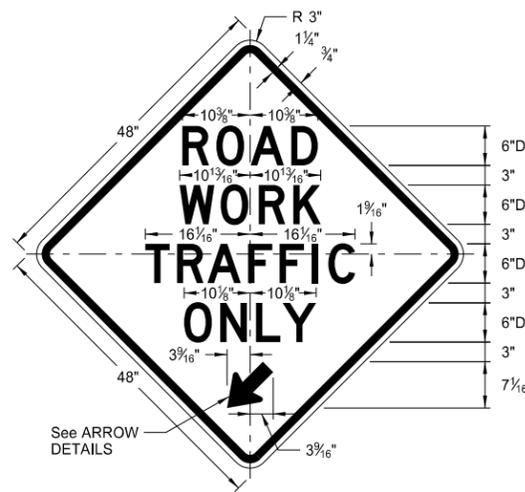
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Background: orange



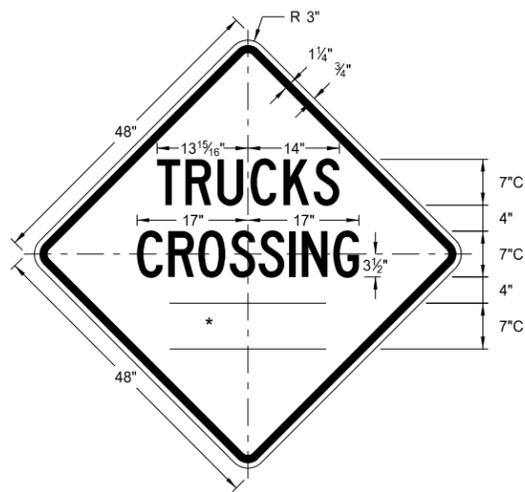
W20-51-48
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Background: orange



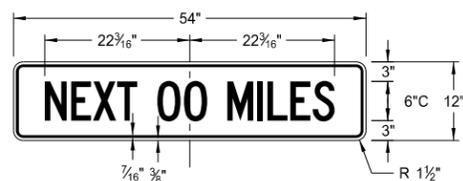
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Background: orange



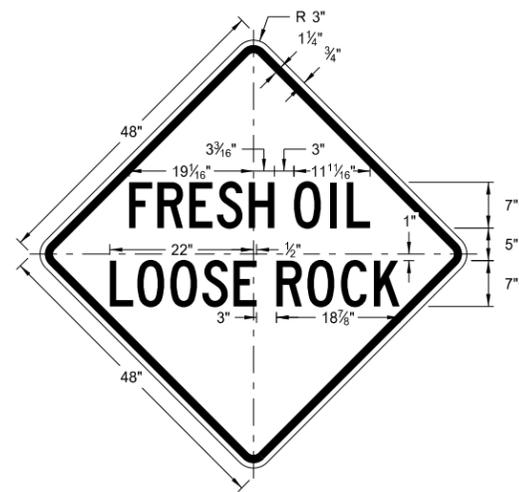
W5-9-48
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Background: orange



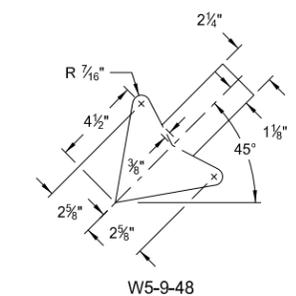
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Background: orange



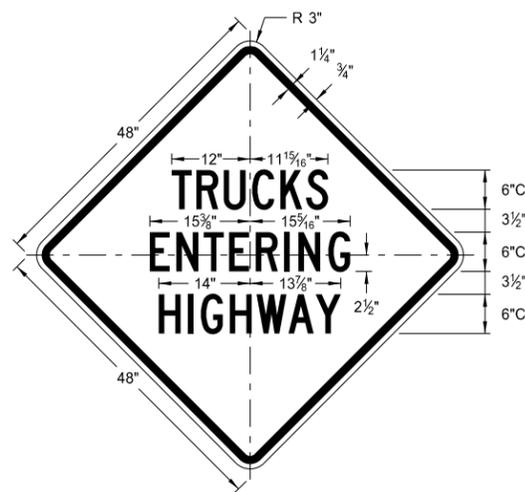
W20-52-54
Legend: black (non-refl)
Background: orange



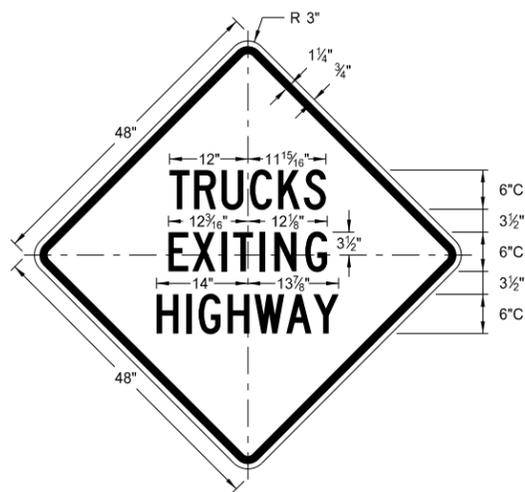
W22-8-48
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Background: orange



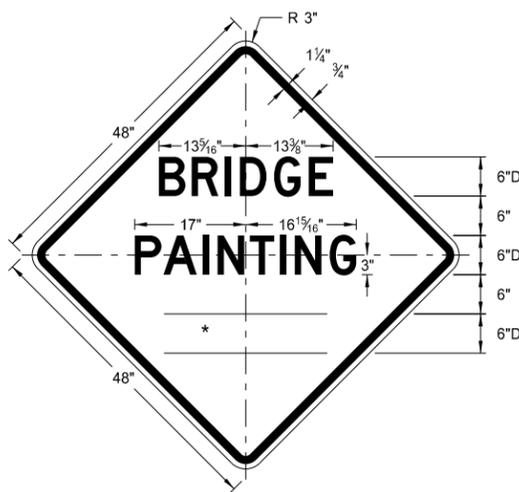
W5-9-48
ARROW DETAILS



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



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

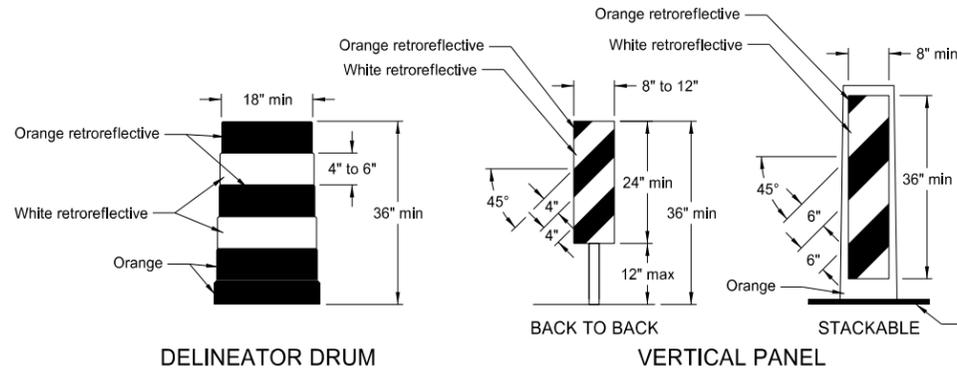


W21-50-48
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Background: orange

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8-13-13	
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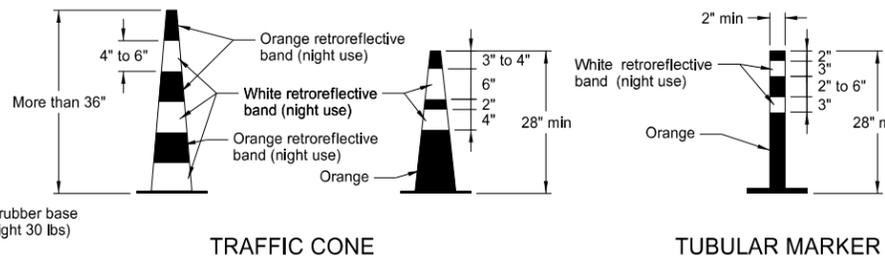
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BARRICADE AND CHANNELIZING DEVICE DETAILS



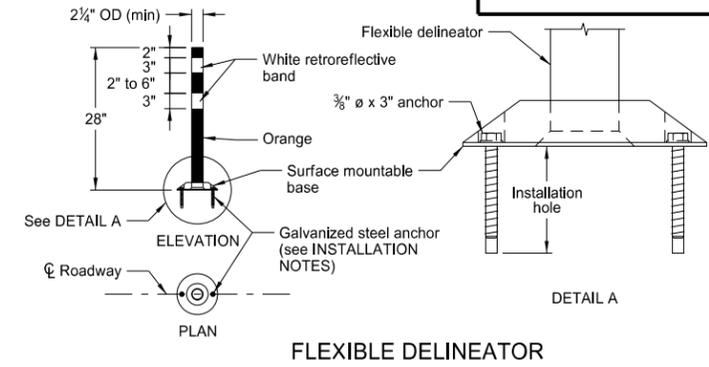
The markings on drums shall be horizontal, circumferential, alternating orange and white retroreflective stripes 4" to 6" wide. Each drum shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectORIZED spaces between the horizontal orange and white stripes shall not exceed 3" wide. Stripes shall not be placed on ribs or indentations in the drum. Drums shall have closed tops that will not allow collection of construction debris or other debris. Ballast shall not be placed on the top of a drum.

Markings for vertical panels shall be alternating orange and white retroreflective stripes, sloping downward in the direction vehicular traffic is to pass. Retroreflective sheeting shall be placed on both sides of panel and shall have 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, a stripe width of 6 inches shall be used.



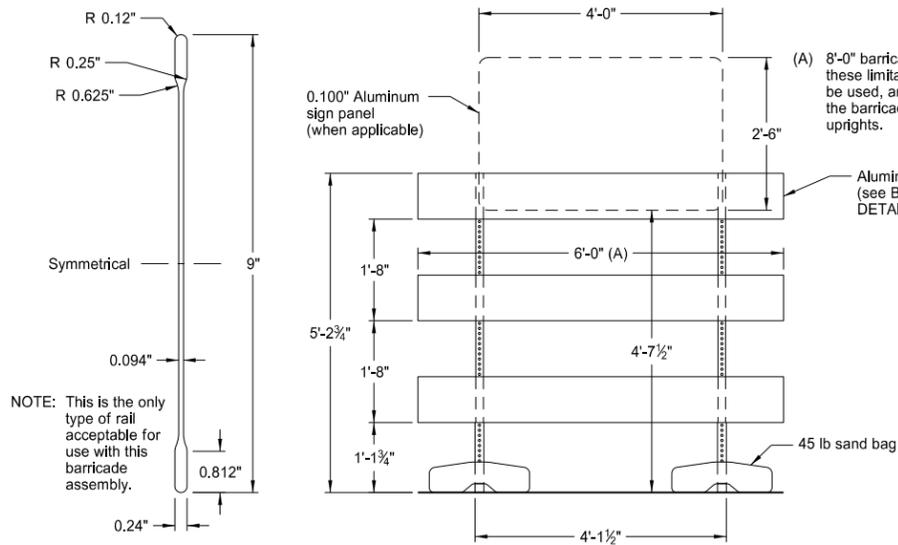
RetroreflectORIZATION of cones more than 36" in height shall be provided by alternating orange and white retroreflective stripes. Each cone shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflectORIZED space between the orange and white stripes shall not exceed 3" wide.

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



INSTALLATION NOTES:

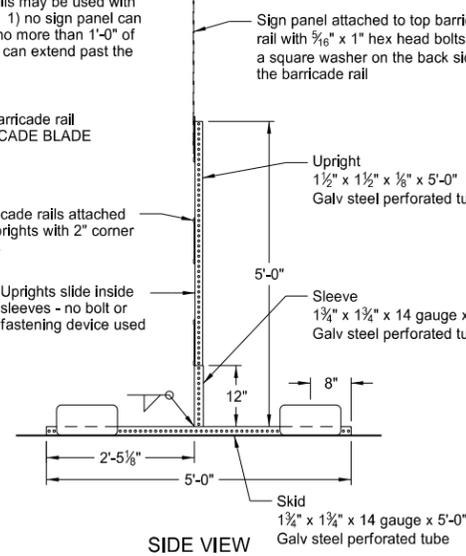
1. Drill installation holes to diameter and depth as required by manufacturer's specifications.
2. For removal, remove anchors and fill installation hole with an epoxy designed to bond to pavement surface.
3. In lieu of bolted down base, the contractor may use an 8" x 8" butyl pad or hot melt butyl.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



BARRICADE BLADE DETAIL

ELEVATION VIEW

BARRICADE ASSEMBLY DETAIL (Aluminum Barricade Rails)

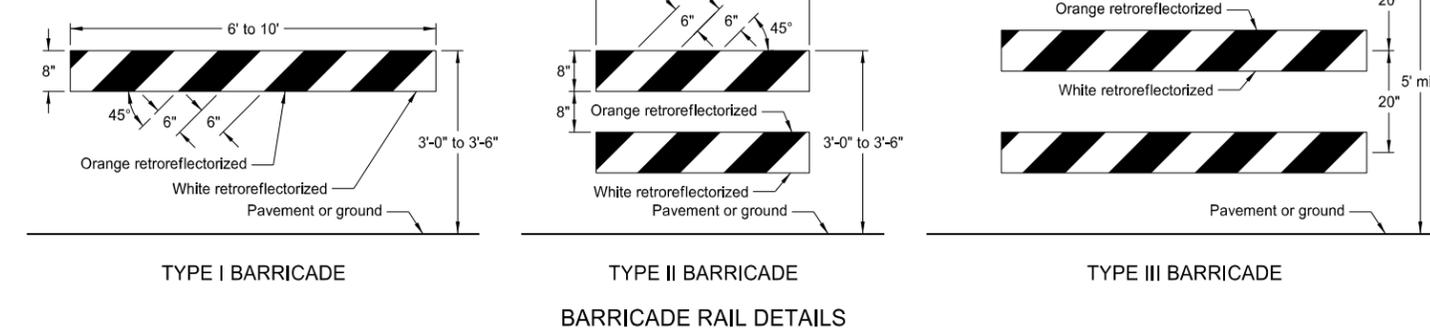


ELEVATION VIEW

SIDE VIEW

BARRICADE ASSEMBLY DETAIL (Wood or Plastic Rails)

NOTE: Markings for barricades shall be alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Retroreflective sheeting shall be placed on both sides of the rails and shall have a minimum of 270 square inches of visible retroreflective area facing vehicular traffic. When the barricade length is less than 36", the rail stripe width shall be 4".

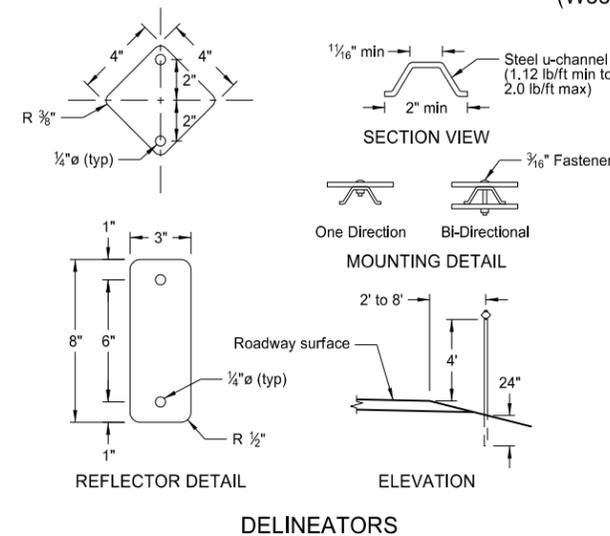


TYPE I BARRICADE

TYPE II BARRICADE

BARRICADE RAIL DETAILS

TYPE III BARRICADE



REFLECTOR DETAIL

DELINEATORS

MINIMUM BALLAST (For each side of barricade support)

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

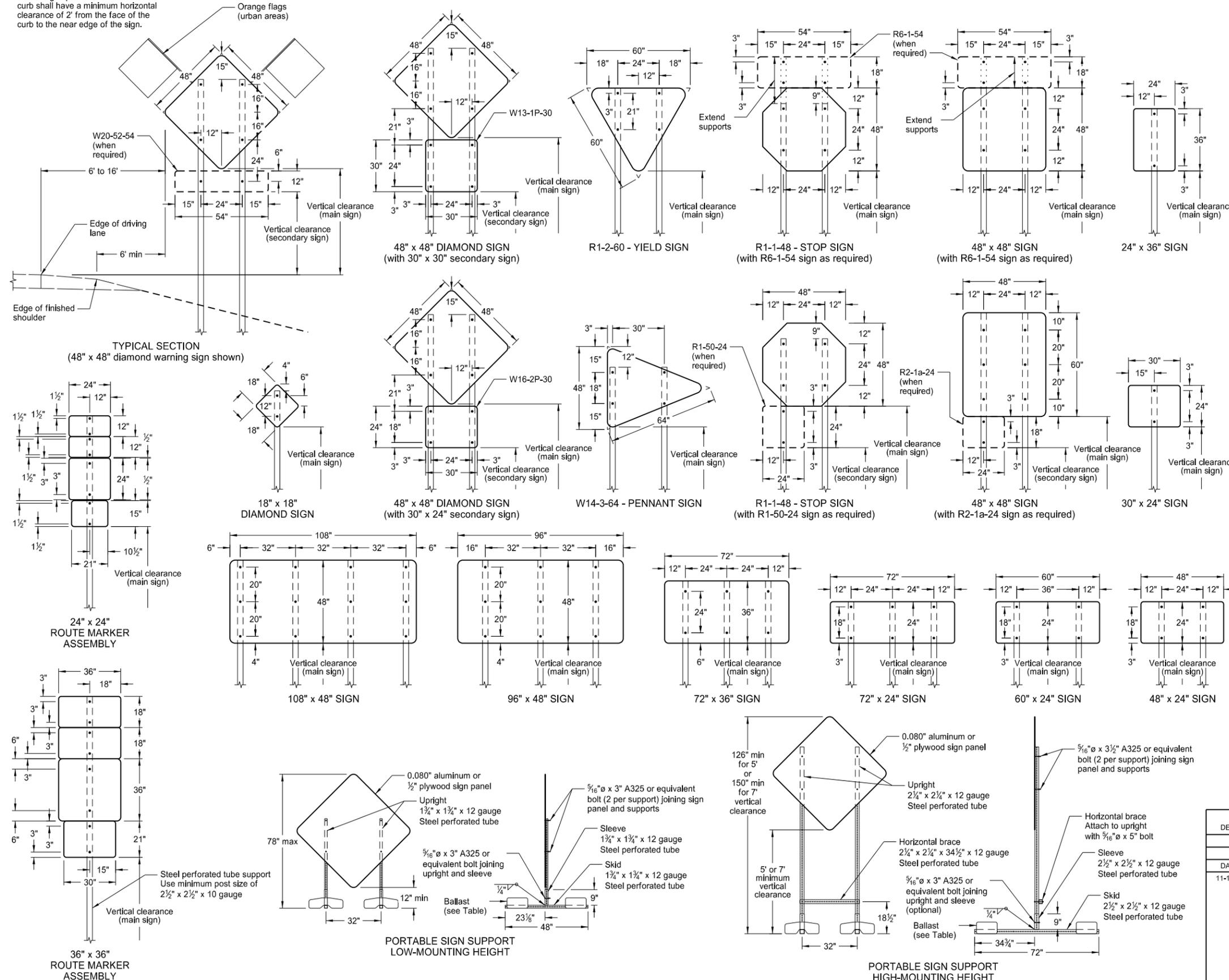
Note: The number of sandbags are based on a wind speed of 55 MPH. The sandbags are assumed to be placed at or near the ends of the skids.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE

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CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

Note: Signs placed in sections with curb shall have a minimum horizontal clearance of 2' from the face of the curb to the near edge of the sign.



- NOTES:
1. Sign Supports: Supports shall be galvanized or painted. 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, the minimum post size for assemblies containing a secondary sign is 3.0 lb/ft. Post sizes are based on a wind speed of 55 MPH.

Signs over 50 square feet should be installed on 2 1/2" x 2 1/2" perforated tube supports as a minimum.

Guy wires shall not be attached to sign supports. Wind beams may be attached to u-posts behind the sign panels.

2. Sign Panels: Provide sign panels made of 0.100" aluminum, 1/2" plywood, or other approved material, except where noted. All holes to be punched round for 3/8" bolts.

3. Alternate Messages: The signs that have alternate messages may have these alternate messages placed on a reflectorized plate (without a border) and installed and removed as required. (i.e. "Left" and "Right" message on a 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 as stated above.

Large signs having an area exceeding 50 square feet shall have a minimum clearance of 7'-0" from the ground at the post.

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

When portable signs are used for 5 days or less, low-mounting height (minimum 12" vertical clearance) sign supports may be used 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. The R9-8 through R9-11a series, W1-5 through W1-8 series, M4-10, and E5-1 may be used for longer than 5 days.

Signs mounted to the portable sign supports shown in the LOW-MOUNTING HEIGHT and HIGH-MOUNTING HEIGHT Details shall have 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. The sandbags are assumed to be placed at or near the ends of the skids.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-4-13	
REVISIONS	
DATE	CHANGE
11-14-13	Revised Note 6.

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ROAD CLOSURE LAYOUTS

Notes

- Variables
 S = Numerical value of speed limit or 85th percentile.
 W = The width of taper.
 L = Minimum length of taper, or S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater, or $W \times S^2/60$ for urban, residential, and other streets with speeds of 40 mph or less.
- Barricades placed on roadway shall be on a moveable assembly. Signs placed on roadway shall be placed on skid mounted assemblies.
- Delineator drums, barricades or cones used for tapering traffic shall be spaced at the dimension "S". Delineator drums or cones used for tangents shall be spaced at 2 times dimension "S".
- Sequencing Arrow Panels
 Panels should normally be placed at the beginning of the taper. Where shoulder width does not provide sufficient room, the panel should be moved closer to the work area so that it can be placed on the roadway surface. See Shoulder Closure Standard Drawing.
 Type A shall be used on roadways with slow moving traffic speeds and low volume (25 mph or less and 750 ADT or less).
 Type B shall be used on roadways with moderate traffic speeds and volumes (40 mph or less and 5000 ADT or less).
 Type C shall be used on roadways with high traffic speeds and volumes (over 40 mph or over 5000 ADT).
- The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
- The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at 1/2 B.
- Use when work area is 1 mile or longer.
- When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
- Existing speed limit signs within a reduced speed zone shall be covered.
- Where necessary, safe speed to be determined by the Engineer.
- The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
- G20-55-96 sign is not required if this standard is part of other traffic control layouts, or the work is less than 15 days.

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

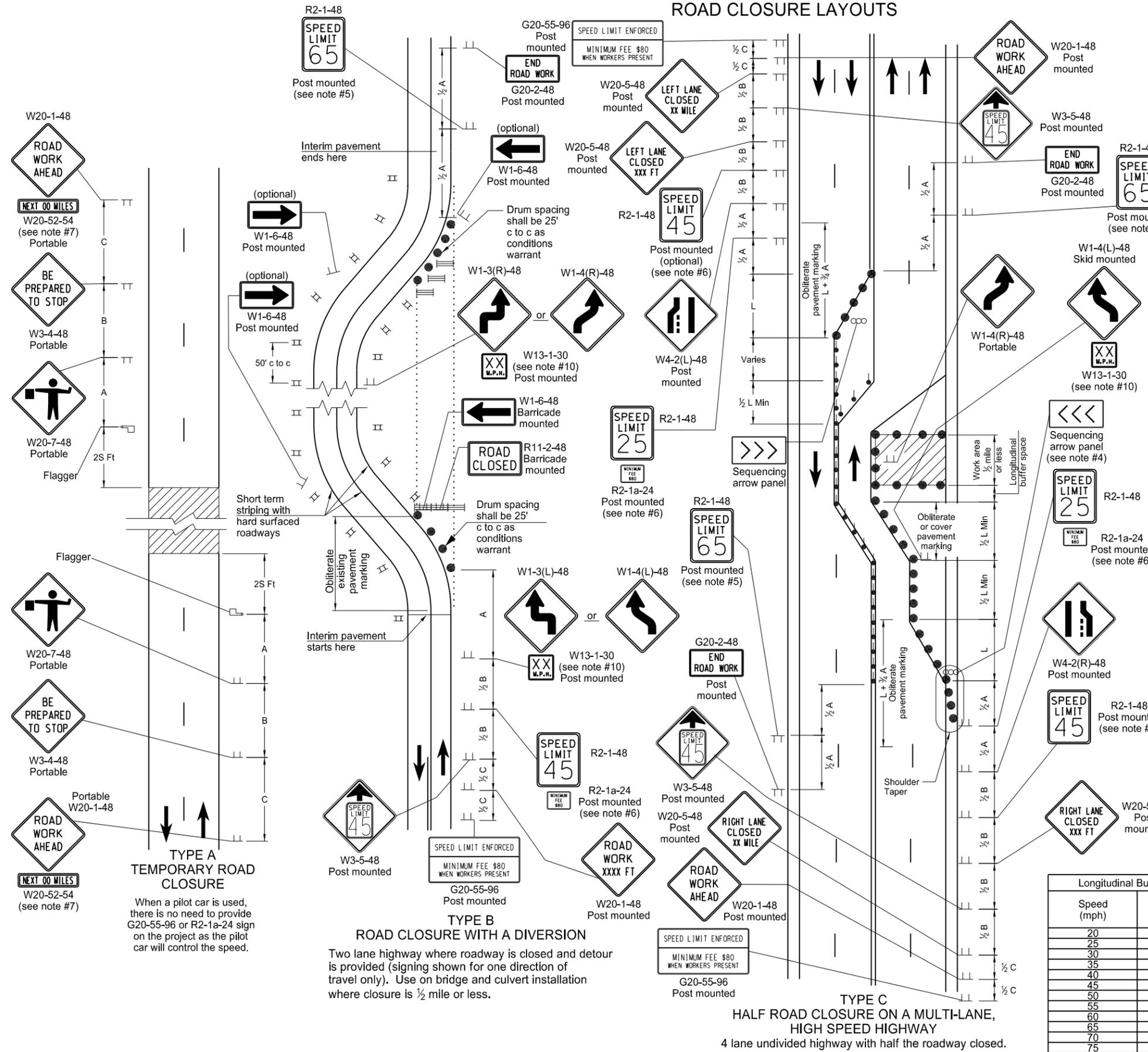
KEY

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

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

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9-27-13	
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TYPE A TEMPORARY ROAD CLOSURE
 When a pilot car is used, there is no need to provide G20-55-96 or R2-1a-24 sign on the project as the pilot car will control the speed.

TYPE B ROAD CLOSURE WITH A DIVERSION
 Two lane highway where roadway is closed and detour is provided (signing shown for one direction of travel only). Use on bridge and culvert installation where closure is 1/2 mile or less.

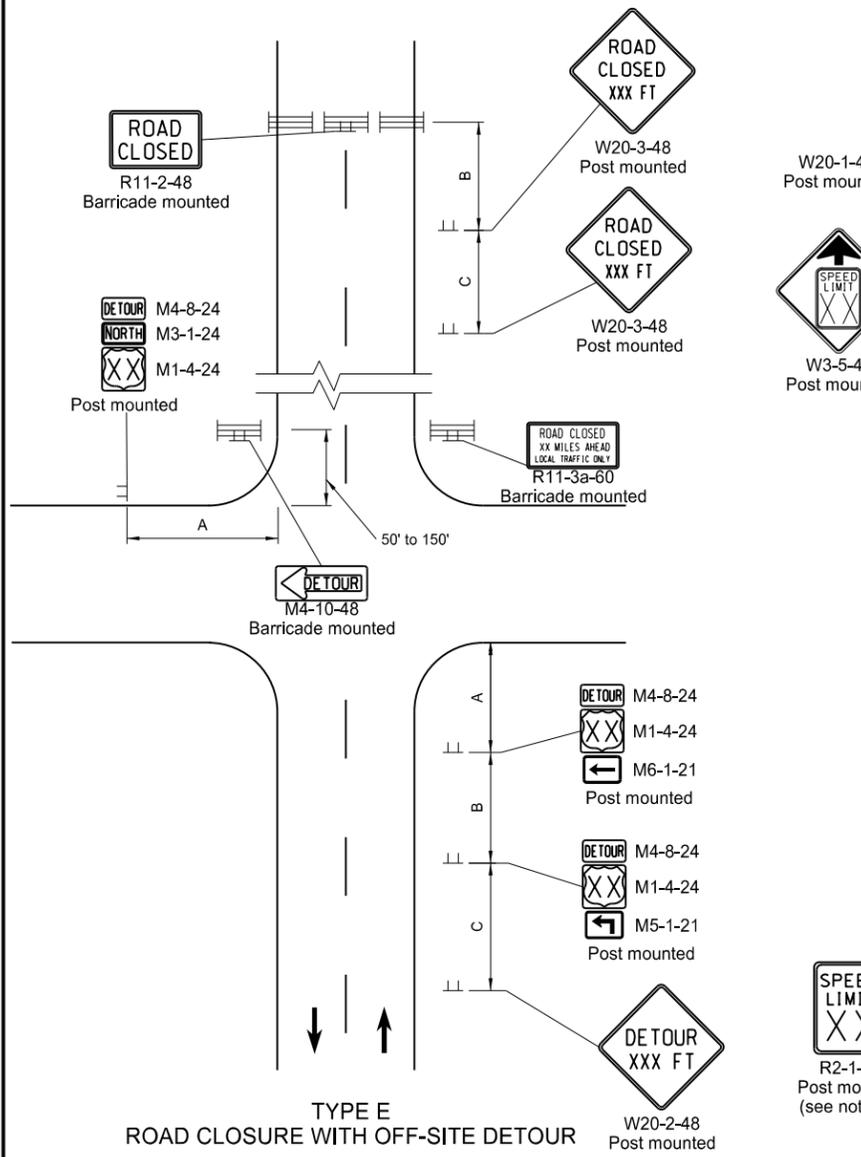
TYPE C HALF ROAD CLOSURE ON A MULTI-LANE, HIGH SPEED HIGHWAY
 4 lane undivided highway with half the roadway closed.

ROAD CLOSURE AND LANE CLOSURE ON A TWO WAY ROAD LAYOUTS

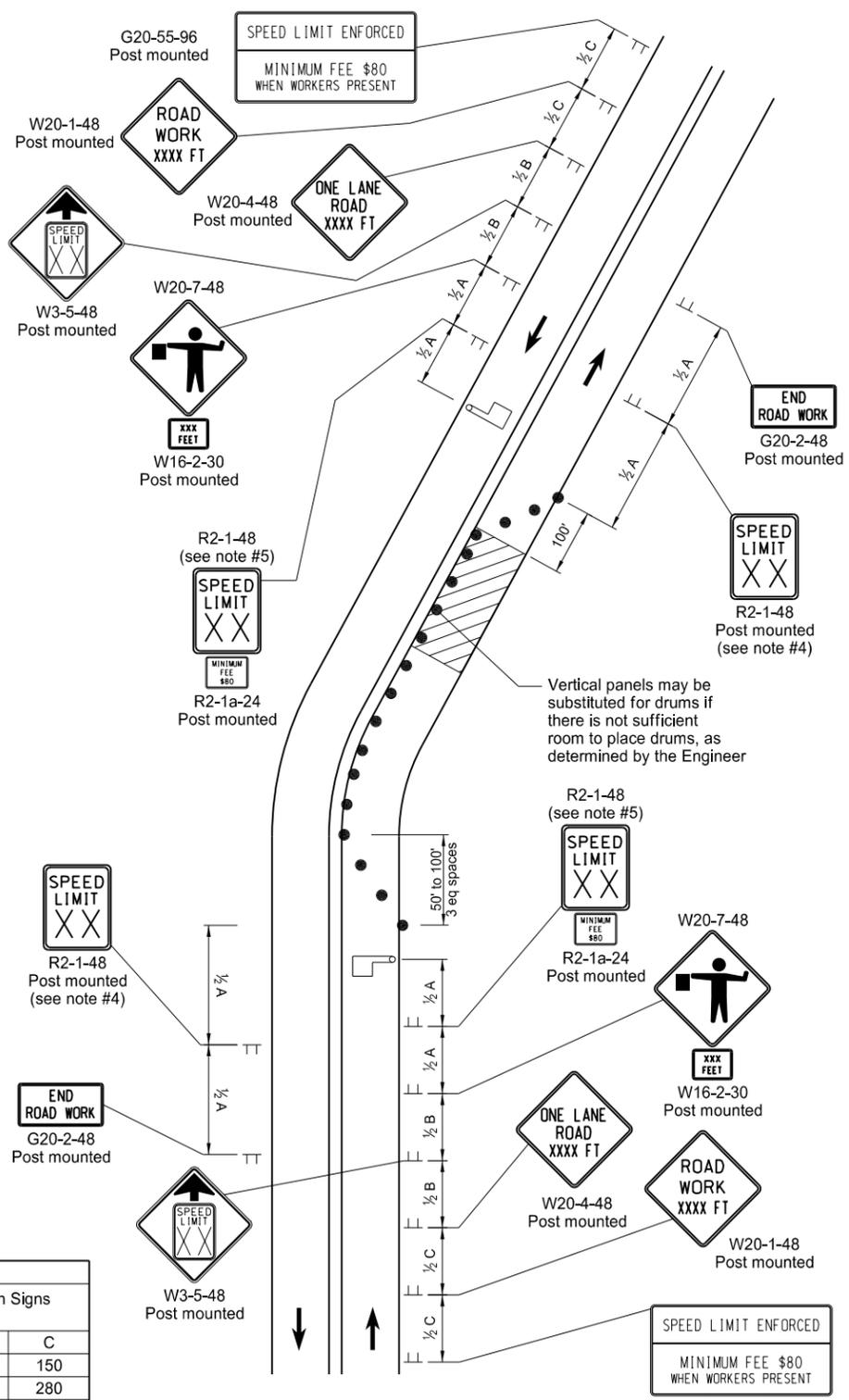
D-704-19

Notes

- Variables
 S = Numerical value of speed limit or 85th percentile.
 W = The width of taper
 L = Minimum length of taper, or S x W for freeways, expressways, and all other roads with speeds of 45 mph or greater, or W x S²/60 for urban, residential, and other streets with speeds of 40 mph or less.
- Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies.
- Delineator drums used for tapering traffic shall be placed at 3 equal spaces. Delineator drums for tangents shall be spaced at 2 times dimension "S".
- The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
- The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at 1/2 B.
- When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
- Existing speed limit signs within a reduced speed zone shall be covered.
- Where necessary, safe speed to be determined by the Engineer.
- The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
- G20-55-96 or R2-1a-24 sign are not required when a pilot car operation is used, if this standard is part of other traffic control layouts, or the work is less than 15 days.
- When highway-rail grade crossings exist either within or in the vicinity of the roadway work activities:
 - Extra care shall be taken to minimize the probability of conditions being created, either by lane restrictions, flagging or other operations, where vehicles might be stopped within the highway-rail grade crossing (considered as being 15 feet on either side of the closest and farthest rail.)
 - A "Do Not Stop on Tracks" sign (R8-8-24) should be placed near the cross buck in each direction while the lane closure is in the vicinity of the tracks.
 - A buffer space between the work zone and the lane closure transition should be extended upstream of the highway-rail grade crossing so a queue created by the flagging operation will not extend across the highway-rail grade crossing.
 - If the queuing of vehicles across active rail tracks cannot be avoided, a flagger shall be provided at the highway-rail grade crossing to prevent vehicles from stopping within the highway-rail grade crossing, even if automatic warning devices are in place.



TYPE E
ROAD CLOSURE WITH OFF-SITE DETOUR
 Used where a road is closed beyond a detour point. Signing shown for one direction only. Sign not shown on detour shall be shown in plans and installed and maintained by the contractor.



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

Road Type	ADVANCE WARNING SIGN SPACING		
	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

KEY

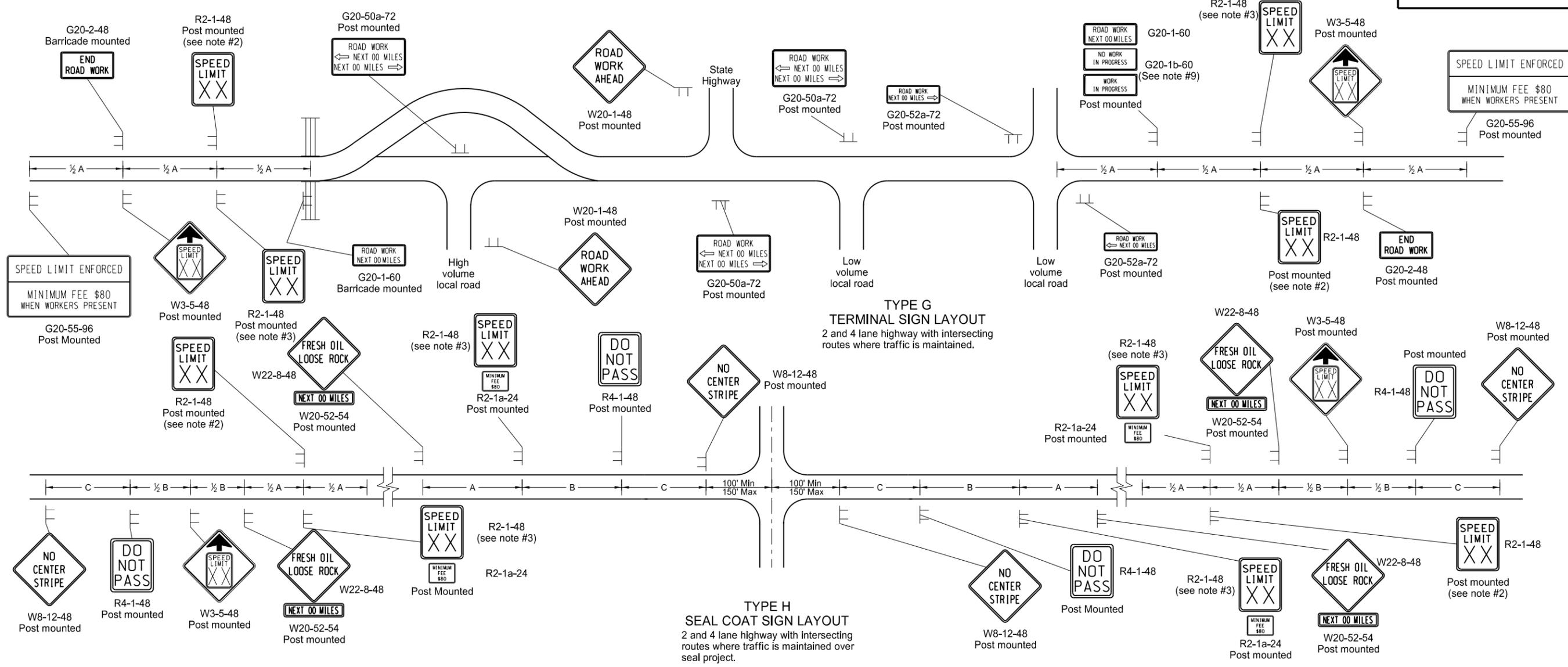
- Delineator Drum
- ▬ Sign
- ▬ Type III Barricade
- ▨ Work/Hazard Area
- ☞ Flagger

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
3-13-14	Revised Sign Cell "ROAD WORK XXX FT"

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TERMINAL AND SEAL COAT SIGN LAYOUTS

D-704-20



- Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies.
- The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
- The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 MPH below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 MPH. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at 1/2 B.
- When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
- Existing speed limit signs within a reduced speed zone shall be covered.
- On seal projects, signs R2-1-48, R2-1a-24, R4-1-48, W22-8-48 and W20-52-54 shall be placed just after all important intersections and at five mile intervals thereafter. Sign W8-12-48 shall be placed just after all important intersections and at 2 mile intervals thereafter until the short term center line pavement marking is in place. No short term pavement markings are placed when traffic volumes are 750 ADT or less.
- The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
- Type H construction sign traffic control shall have the speed limit signs covered or removed once the loose aggregate has been removed.
- The contractor shall install the G20-1b-60 sign when work is suspended for winter.
- Other traffic control layouts will be required in the immediate work areas. If the speed limit is reduced in the work area, speed limit signs shall have the R2-1a-24 sign placed below.
- G20-55-96 sign is not required if work is less than 15 days.

KEY

≡ Type III barricade

⊥ Sign

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

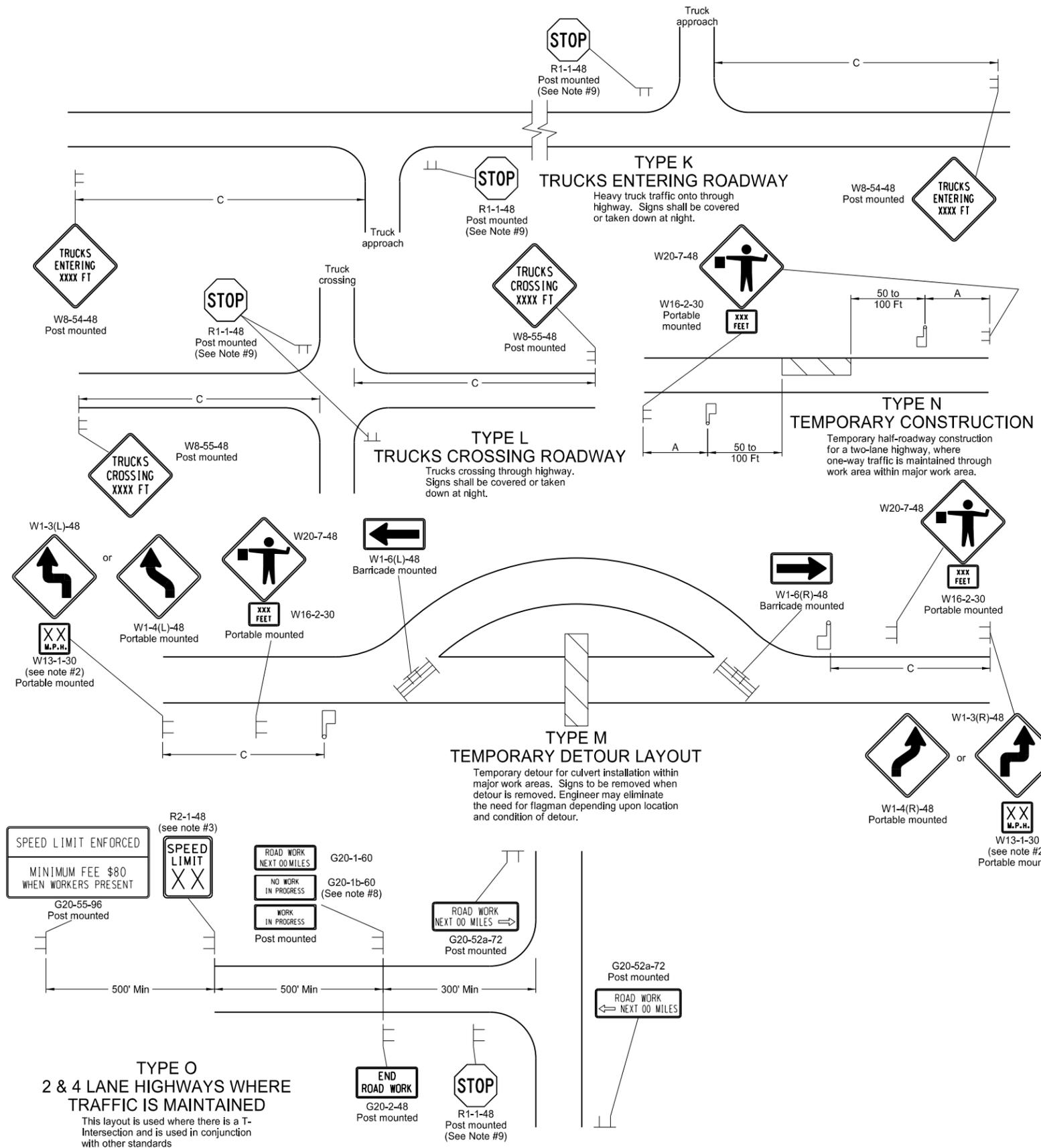
NORTH DAKOTA
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9-27-13
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DATE	CHANGE

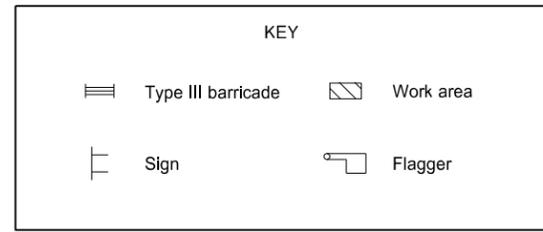
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CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

D-704-22



- Notes
1. Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies. Where necessary, safe speed to be determined by the Engineer.
 2. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at 1/2 B.
 3. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
 4. Existing speed limit signs within a reduced speed zone shall be covered. Obliterated or covered pavement marking shall be paid for as Obliteration of Pavement Marking. The covering shall be approved by the engineer.
 5. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
 6. The contractor shall install the G20-1b-60 sign when work is suspended for winter.
 7. If existing stop sign is in place, a 48" stop sign is not required.
 8. G20-55-96 sign is not required if this standard is part of other traffic control layouts with this sign or the work is less than 15 days.



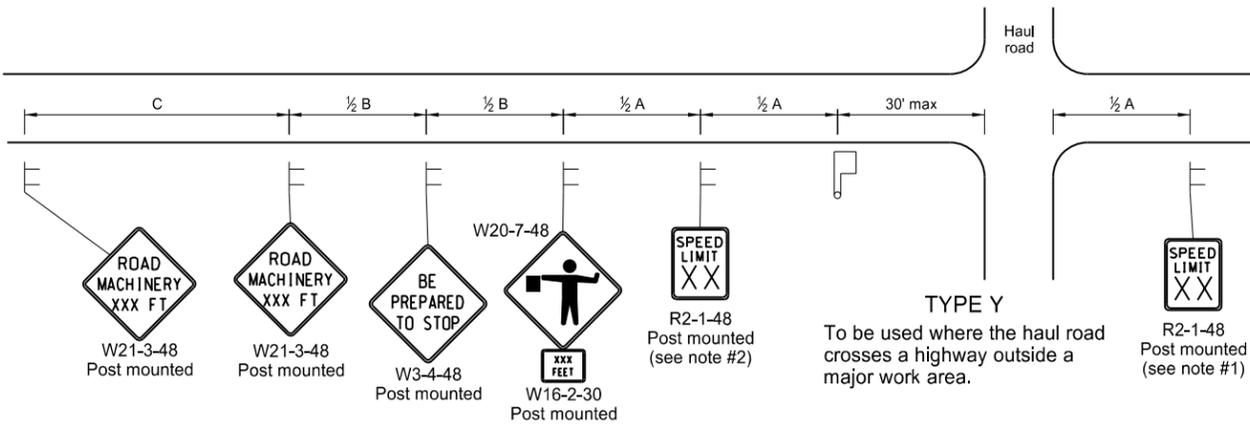
Road Type	ADVANCE WARNING SIGN SPACING		
	Distance Between Signs Min. (ft)		
	A	B	C
Urban - Low Speed (30 mph or less)	150	150	150
Urban - Low Speed (over 30 to 40mph)	280	280	280
Urban - High Speed (over 40 mph to 50 mph)	360	360	360
Rural - High Speed (over 50 mph to 65 mph)	720	720	720
Urban Expressway 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

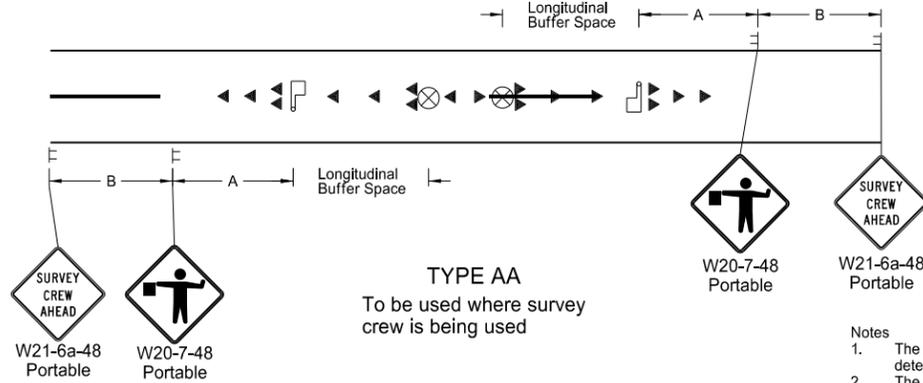
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MISCELLANEOUS SIGN LAYOUTS

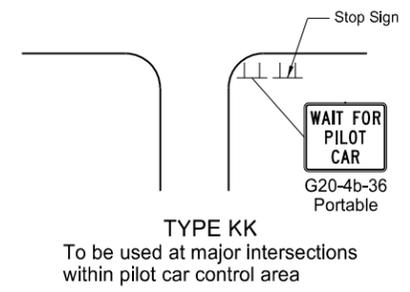
D-704-26



TYPE Y
To be used where the haul road crosses a highway outside a major work area.

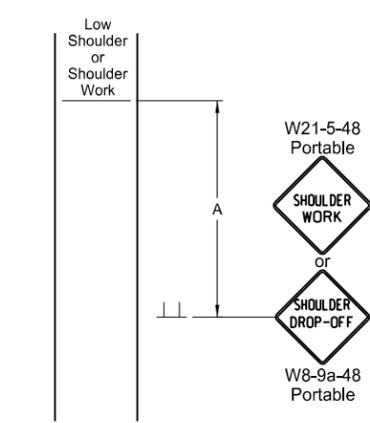


TYPE AA
To be used where survey crew is being used

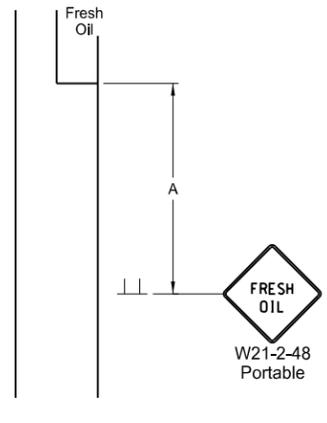


TYPE KK
To be used at major intersections within pilot car control area

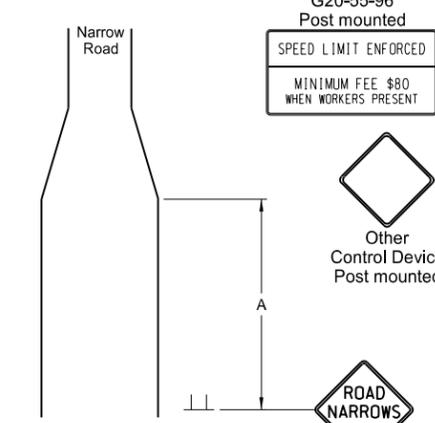
- Notes
1. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
 2. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at 1/2 B.
 3. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
 4. Existing speed limit signs within a reduced speed zone shall be covered.
 5. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
 6. G20-55-96 signs are not required if this standard is part of other traffic control layouts, or the work is less than 15 days.
 7. When a pilot car operation is used, place a G20-4b-36 "Wait For Pilot Car" sign at major intersections within pilot car control area.



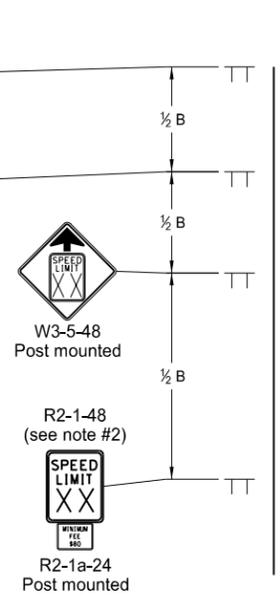
TYPE BB
To be used within a major work area where the sign conditions exist



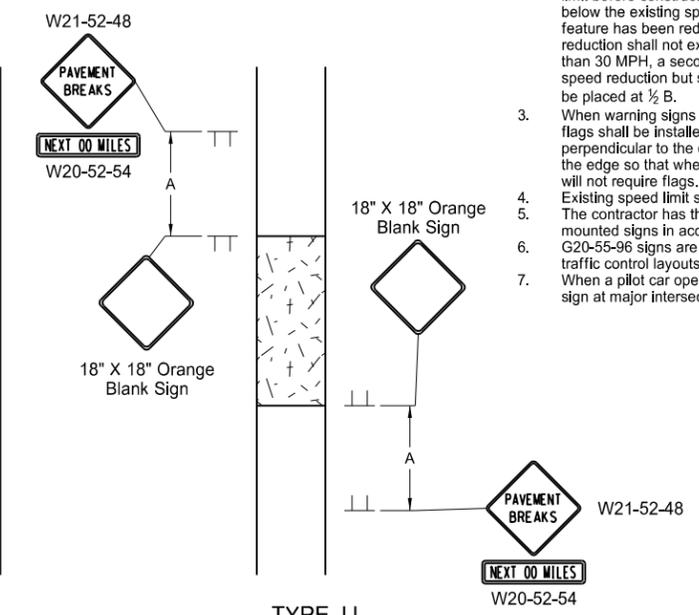
TYPE CC
To be used where the sign conditions exist



TYPE DD
To be used where the sign conditions exist



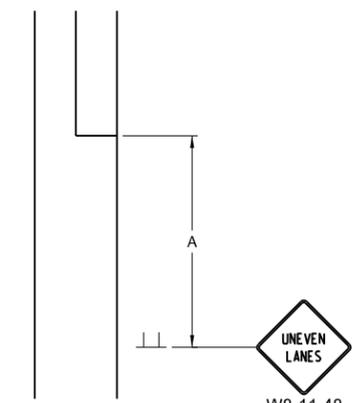
TYPE Z
To be used where speed zone is needed



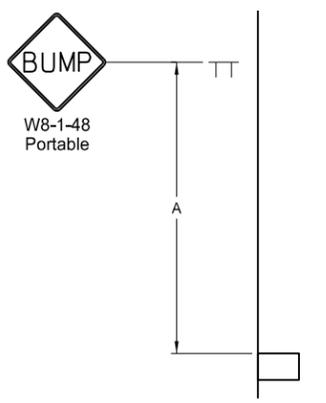
TYPE JJ
To be used where there is a break in the pavement. These signs may be skid mounted or post mounted and shall be installed when conditions exist and removed when not applicable.

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

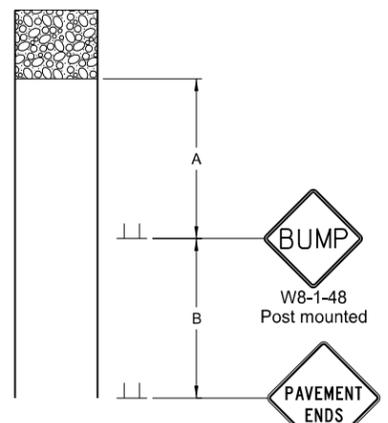
* Posted speed, off-peak 85th percentile speed prior to work starting, or the anticipated operating speed in mph.



TYPE GG
To be used where a difference of elevation between lanes exist



TYPE EE
To be used where the sign conditions exist



TYPE FF
To be used where the sign conditions exist

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

KEY

Sign (represented by a vertical line with a horizontal bar)

Flagger (represented by a square with a diagonal line)

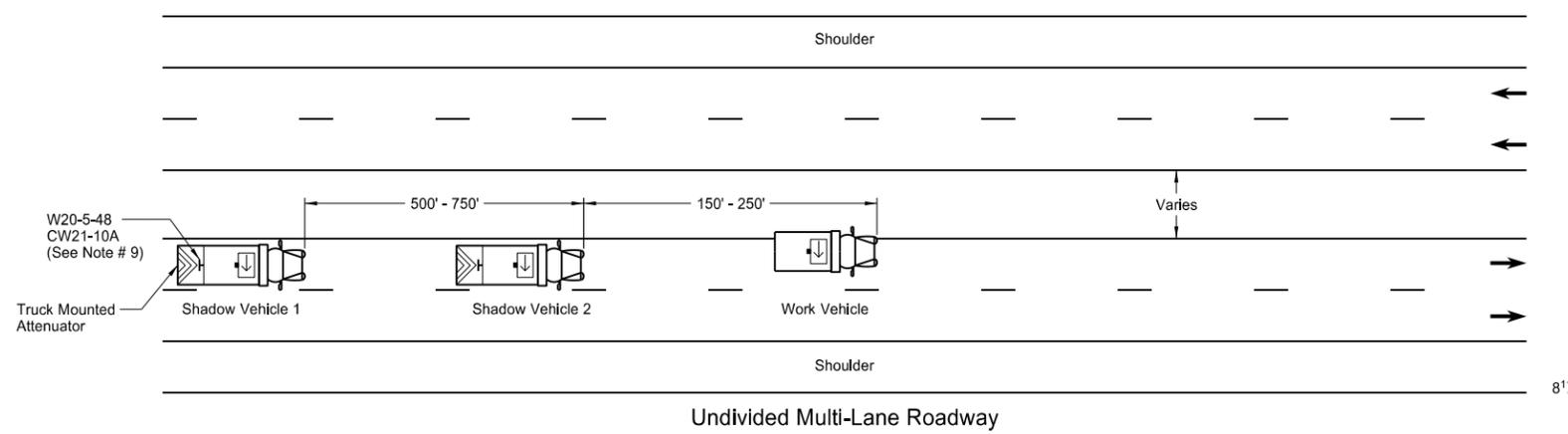
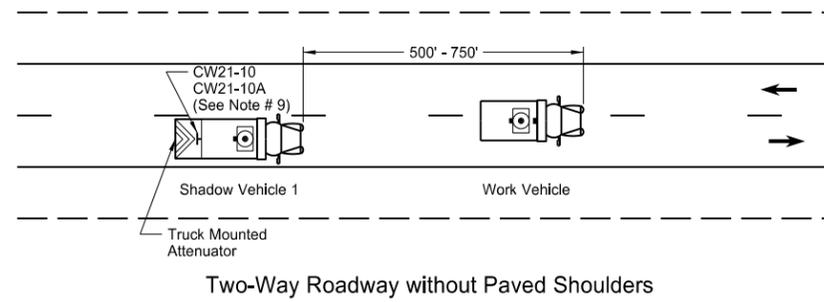
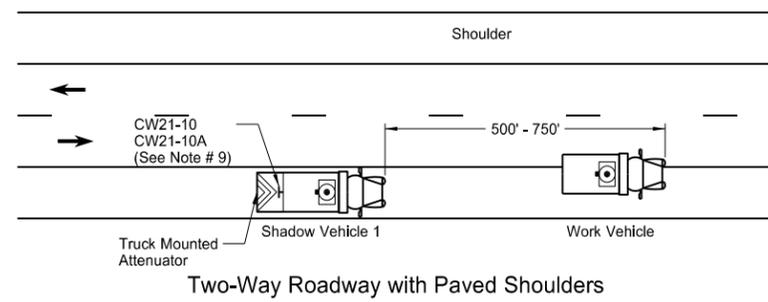
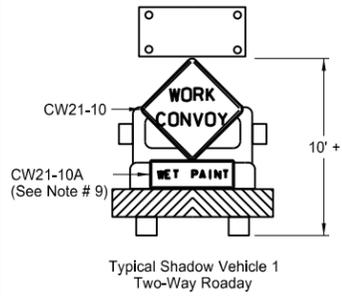
Cones (represented by a triangle)

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9-27-13	
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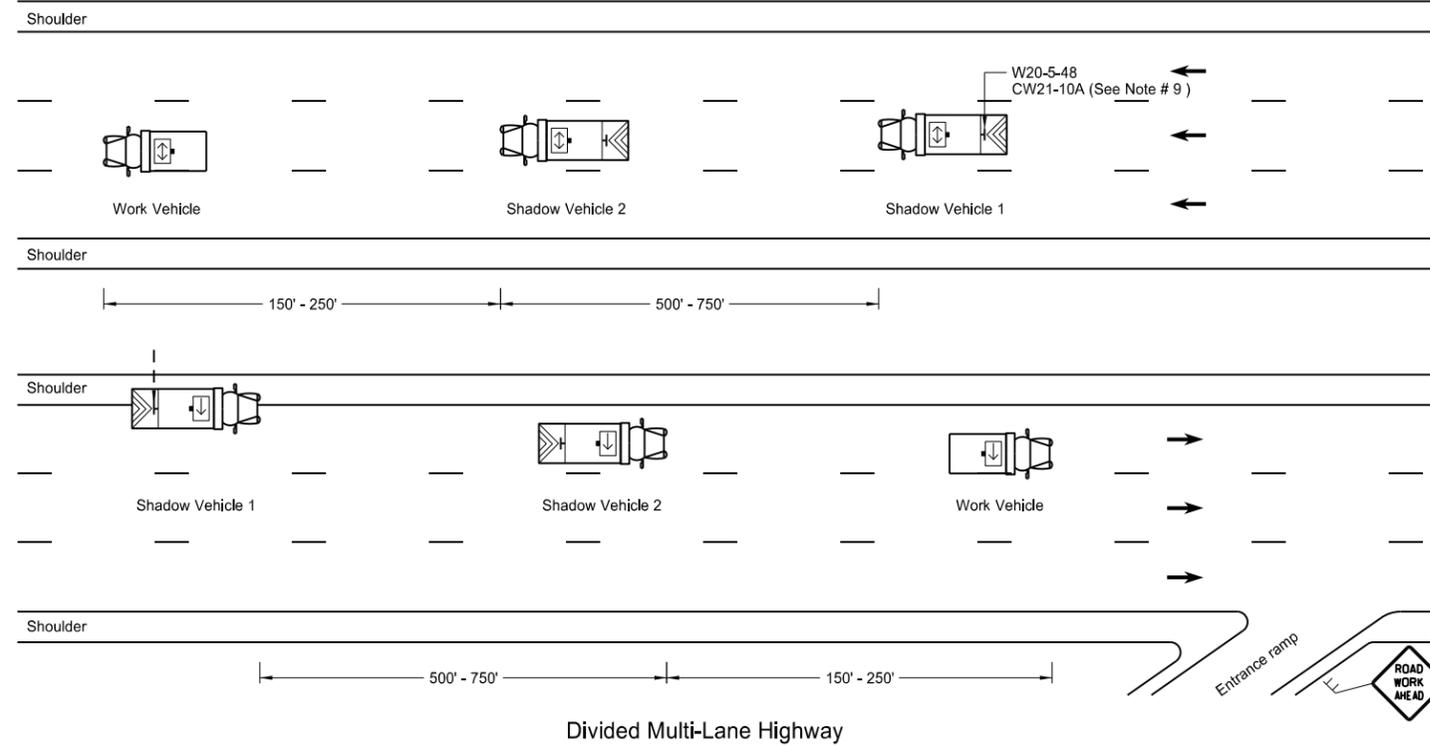
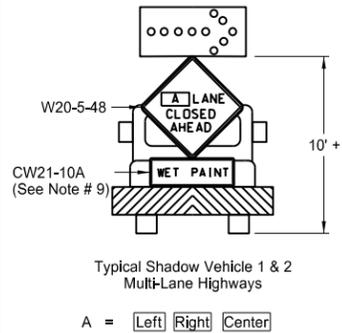
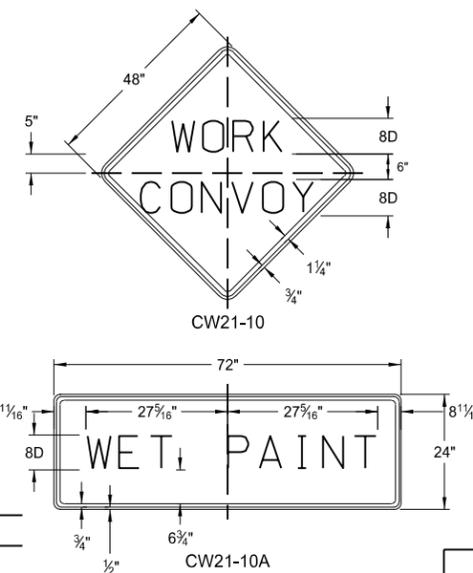
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TRAFFIC CONTROL PLAN FOR MOVING OPERATIONS

D-704-27



Sign Details



Notes

- If the contractor chooses to place more vehicles in the convoy than are shown, these vehicles shall have the truck mounted attenuator and shall be at the contractor's expense.
- Shadow and work vehicles shall display yellow rotating beacons or strobe lights unless otherwise stated elsewhere in the plans.
- Flashing arrow panels shall be Type B or Type C. The panel operation shall be controlled from inside the vehicle.
- Each vehicle shall have two-way electronic communication capability.
- When work convoys must change lanes, shadow vehicle 1 should change lanes first to shadow other convoy vehicles.
- Vehicle spacing between the shadow vehicle 1 and shadow vehicle 2 will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the trail vehicle in time to slow down and/or change lanes as they approach the shadow vehicle.
- Sign Colors
Letters = Black
Border = Black
Background = Orange
- Shadow vehicle 2 may be used as the paint tender vehicle.
- Sign CW21-10A shall only be used during a painting operation.
- On two lane - two way roadways, the work and shadow vehicles should pull over periodically to allow motor vehicle traffic to pass.

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

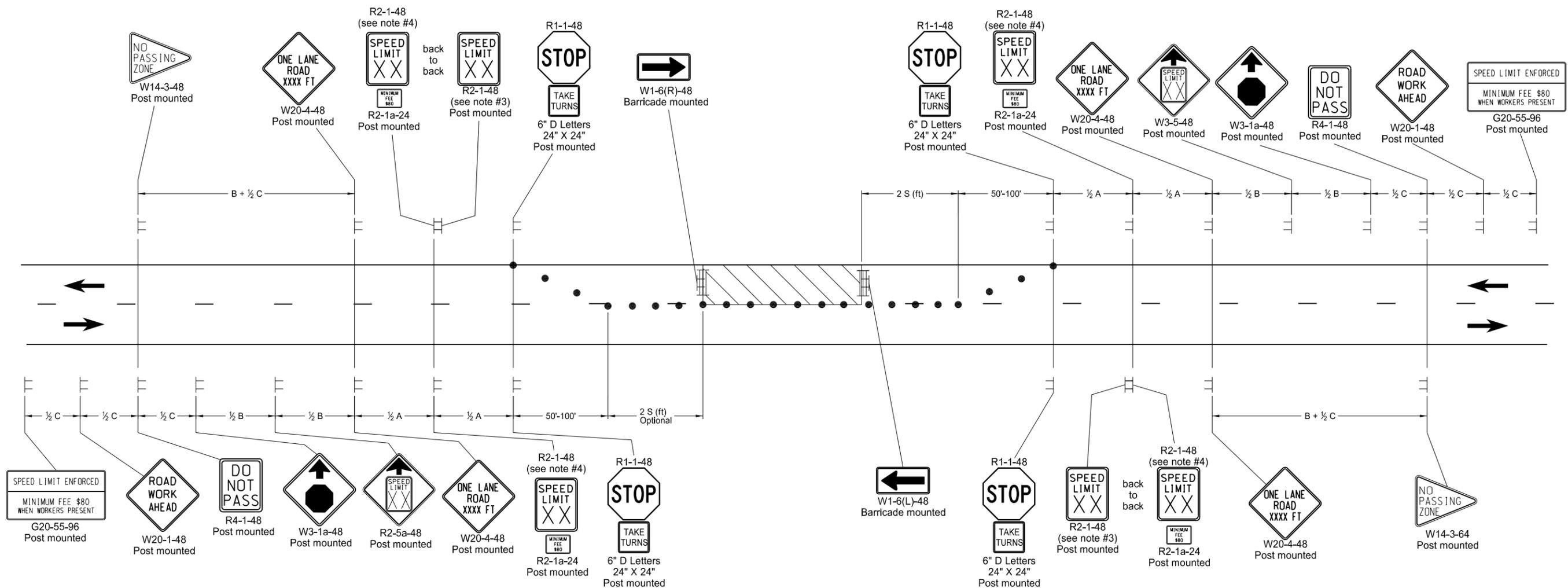
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
6-18-14	Removed shadow vehicle 2 on two lane roadways

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CONSTRUCTION SIGN LAYOUT

Non-signalized Low Volume One Lane Closure

D-704-31



Notes

1. Barricades placed on roadway shall be on a moveable assembly.
2. Signs placed on the roadway shall be placed on skid mounted assemblies. Delineator drums or cones used for tapering traffic shall be placed at 3 equal spaces. Delineator drums for tangents shall be spaced at dimension "S". "S" = the numerical value of speed limit.
3. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
4. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at 1/2 B.
5. When warning signs are used in urban areas and the signs are not portable, flags shall be installed. The flags shall be 24 inches square, mounted perpendicular to the edges of the diamond sign, and at such a distance above the edge so that when the flag is limp it will not touch the sign. Rural areas will not require flags.
6. Existing speed limit signs within a reduced speed zone shall be covered. Obliterated or covered pavement marking shall be paid for as Obliteration of Pavement Marking. The covering shall be approved by the engineer.
7. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
8. G20-55-96 signs are not required if this standard is part of other traffic control layouts, or the work is less than 15 days.

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

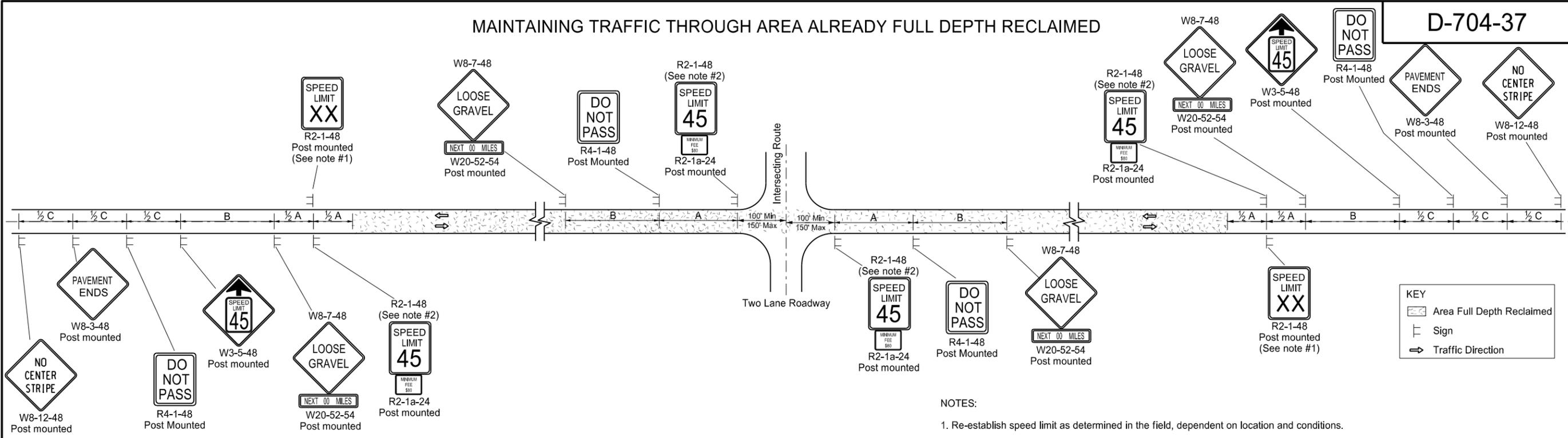
KEY	
	Type III barricade
	Sign
	Work area
	Delineator drum

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE

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MAINTAINING TRAFFIC THROUGH AREA ALREADY FULL DEPTH RECLAIMED

D-704-37



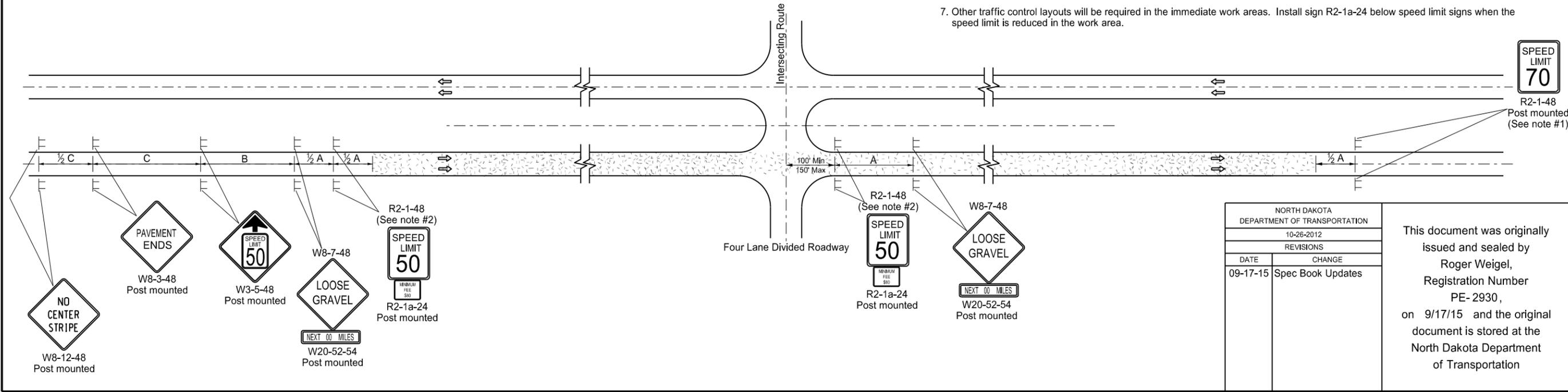
KEY

- Area Full Depth Reclaimed
- Sign
- Traffic Direction

- NOTES:**
1. Re-establish speed limit as determined in the field, dependent on location and conditions.
 2. Determine the reduced speed limit based on the in-place speed limit before construction. Do not reduce the speed limit more than 10 mph below the existing speed limit, unless the work zone feature design speed has been reduced more than 10 mph. In that case, the speed limit reduction shall not exceed 30 mph.

Where speed limits are to be reduced more than 30 MPH, install a second speed limit reduction sign that does not exceed 30 mph. Place the second speed limit sign $\frac{1}{2}$ B after the first speed limit sign and $\frac{1}{2}$ A before the end of the pavement.
 3. Install flags on non-portable warning signs in urban areas. Mount the 24 inch square flags, perpendicular to the edges of the diamond sign, above the edge so the limp flag will not touch the sign. Rural areas will not require flags.
 4. Cover existing speed limit signs within reduced speed zone.
 5. Place signs R2-1-48, R2-1a-24, W8-7-48, W20-52-54 and R4-1-48 for two lane, two way operation just after all important intersections and at 5 mile intervals thereafter. Place sign W8-12-48 just after all important intersections and at 2 mile intervals thereafter until the short term center line pavement marking is in place. Place no short term pavement markings after the mine and blend operation until after the prime operation.
 6. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with NDDOT Standard Specifications.
 7. Other traffic control layouts will be required in the immediate work areas. Install sign R2-1a-24 below speed limit signs when the speed limit is reduced in the work area.

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

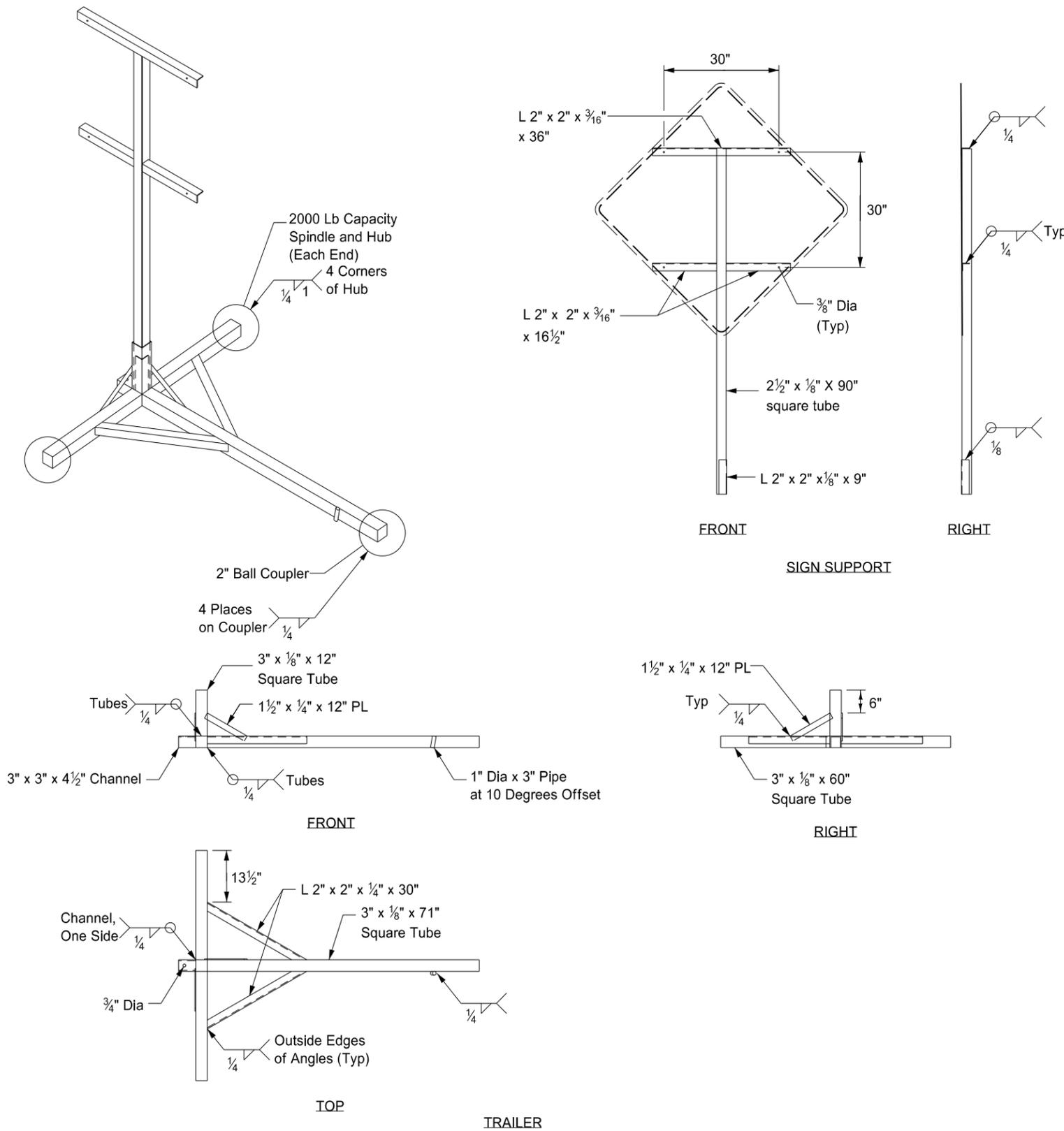


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-26-2012	
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DATE	CHANGE
09-17-15	Spec Book Updates

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PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



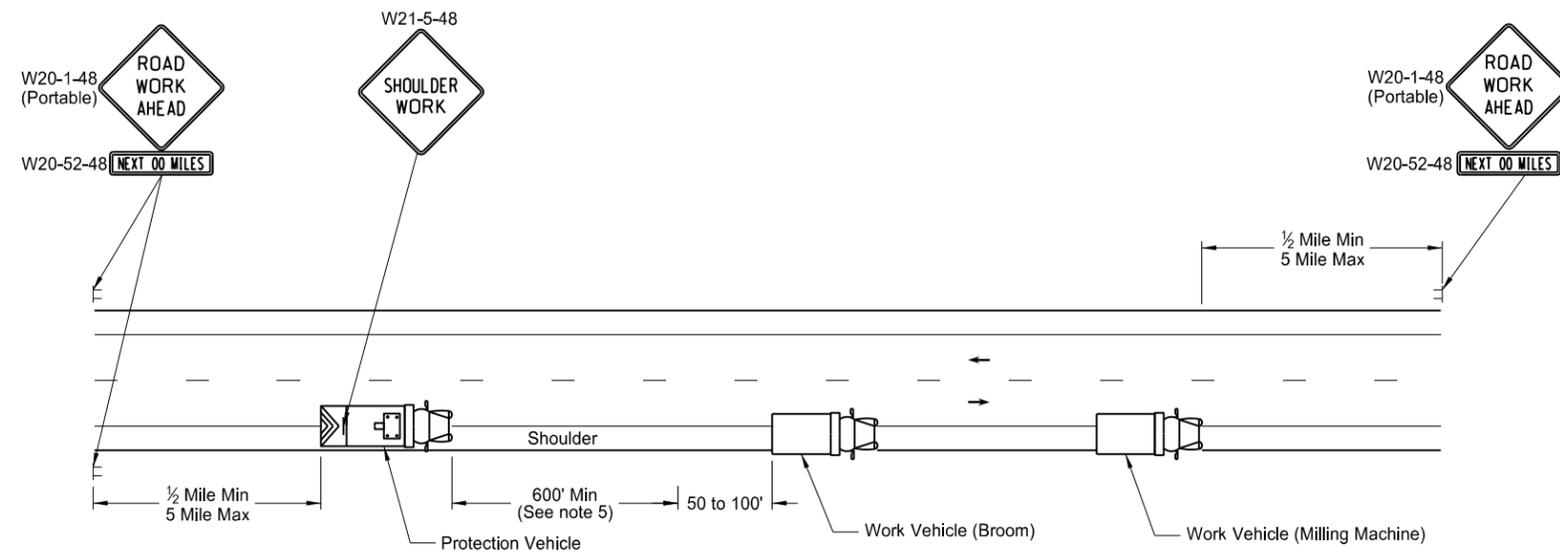
Notes:

- ① The maximum weight of the assembly is 250 pounds.
- ② Use a 14" wheel and tire.
- ③ Automotive and equipment axle assemblies may not be used for trailer-mounted sign supports.
- ④ Other NCHRP 350 crash tested assemblies are acceptable.

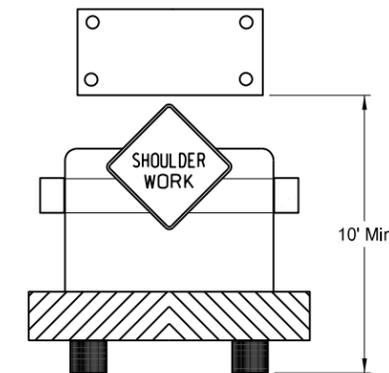
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11-23-10	
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MOBILE OPERATION
Grinding Shoulder Rumble Strips



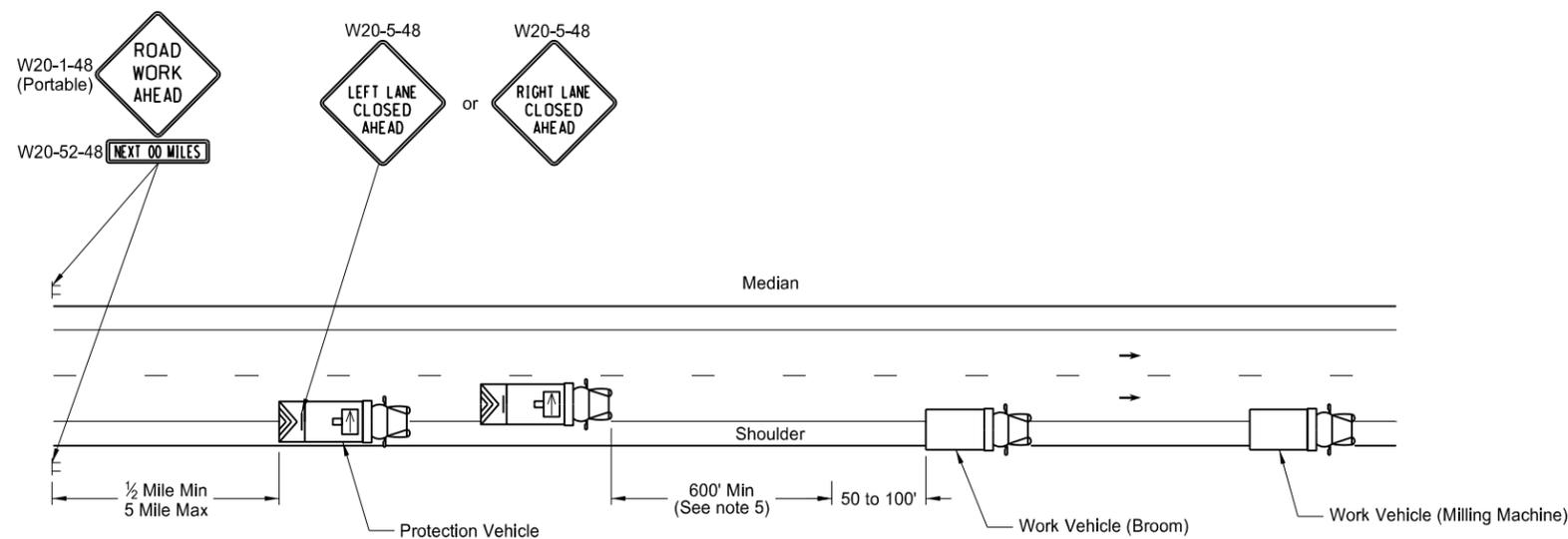
TWO LANE - TWO WAY ROADWAY



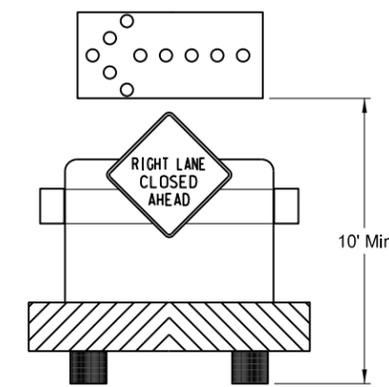
TWO LANE - TWO WAY ROADWAY
Typical Protection Vehicle with
Flashing Arrow Panel In Caution Mode

Notes:

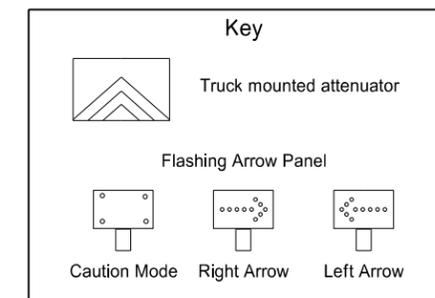
1. If the contractor chooses to place more vehicles in the convoy than are shown, these vehicles shall have the truck mounted attenuator and shall be at the contractors expense.
2. Vehicles shall have a rotating, flashing, oscillating or strobe lights.
3. Flashing arrow panels shall be Type B or Type C. The panel operation shall be controlled from inside the vehicle.
4. Each vehicle shall have two - way electronic communication capability.
5. Vehicle spacing between the protection vehicle and work vehicle will vary depending on sight distance restrictions. Motorists approaching the work convoy should be able to see the protection vehicle in time to slow down and safely pass the work vehicles.
6. ROAD WORK AHEAD SIGN: Advance Road Work Ahead signs shall be moved as the work area moves through the construction zone.
7. Next XX Miles sign required when the distance from Road Work Ahead sign to the work location is two miles or greater.



INTERSTATE & 4 LANE DIVIDED HIGHWAY



INTERSTATE & 4 LANE DIVIDED HIGHWAY
Typical Protection Vehicle with Flashing Arrow
Panel In Flashing Arrow Mode

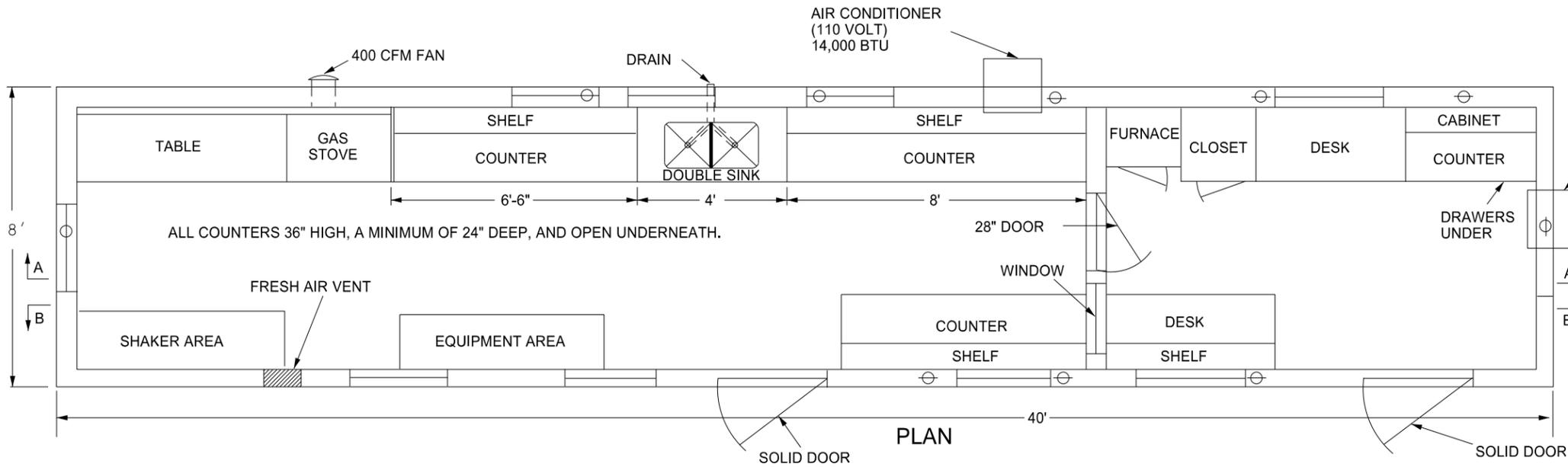


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11-15-12	
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BITUMINOUS LABORATORY

D-706-1



AIR CONDITIONER (110 VOLT) 8,000 BTU

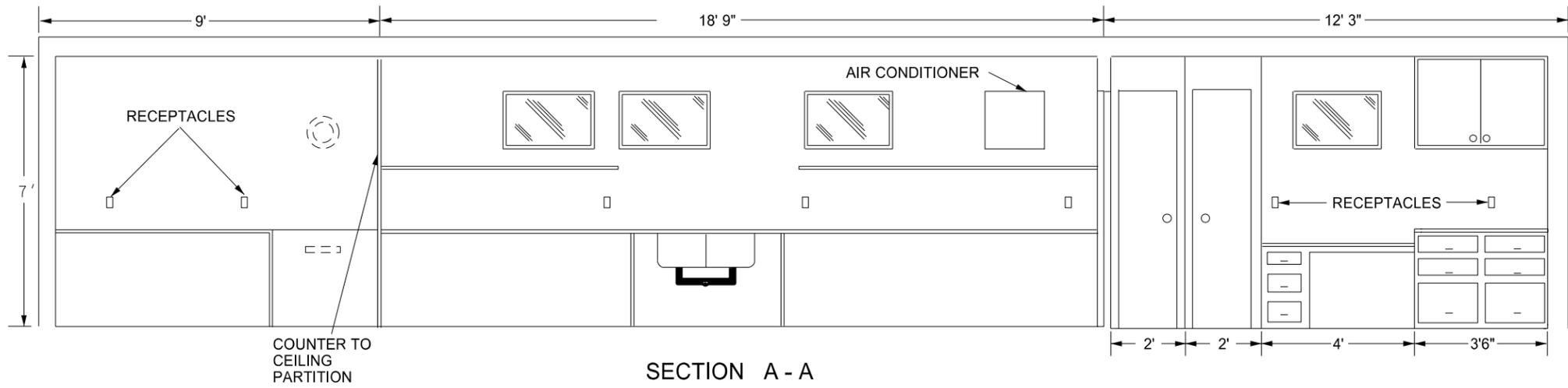
NOTES:

There shall be a minimum of six screened exterior windows on two or more sides, with a minimum of one window in each room. Windows shall have a minimum area of 4 square feet each. Suggested locations are shown on drawing.

The lab shall be equipped with a 1'x1' shelf at 36" above the regular countertop to hold the stock solution container for the Sand Equivalent test.

The sink shall be double compartment stainless steel. Each compartment shall be a minimum of 16"x14"x10" deep. The sink shall be drained to an outside waste line. A trap is not required. Water service lines shall be copper or plastic having a diameter of 1/2 inch.

The lab shall be equipped with an exhaust fan capable of removing inside air at a rate of 400 CFM.



The fresh air vent shall be hinged to open or close manually.

24" x 48" table shall be provided capable of holding a 200 lb. masonry saw. The table shall have a minimum clearance of 36" overhead.

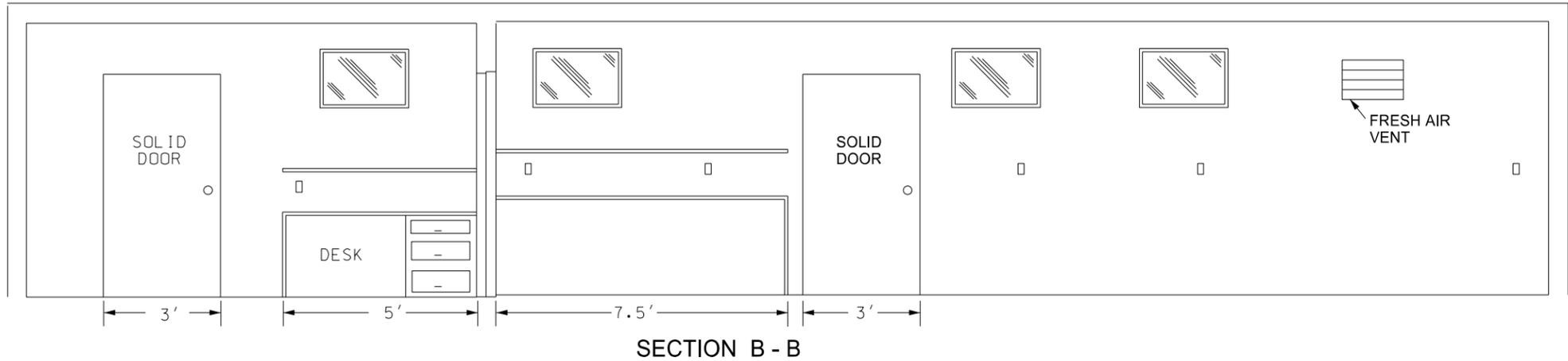
The water supply tank shall have a capacity of 500 gallons.

Steps and a landing for each set of steps shall be provided for each of two entrance doors. Steps for each area shall be made of, or covered with, a material providing for a non-slip surface. They shall be heavy duty steps that are capable of withstanding heavy loadings and extensive use.

The pressure tank on the pump shall be 20 gallon capacity.

Locks, latches, and hinges for main doors shall be heavy duty type to withstand the intense use in service.

The wall between the office and the work area shall be properly insulated to prevent the transmission of heat and noise.



The floor beneath the marshall area shall be heavily reinforced.

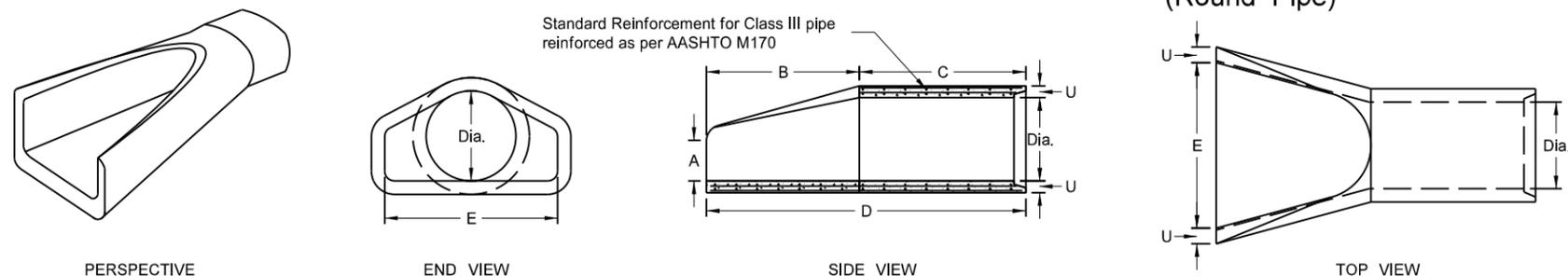
The lab shall be equipped with steel cable tie downs and ground anchors at each corner of the lab.

Electrical service entrance shall be wired for 100 amps, and have separate circuits for air conditioners. Convenience outlets shall have a minimum spacing of four feet in counter areas.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
07-30-14	Changed standard's title and revised notes.

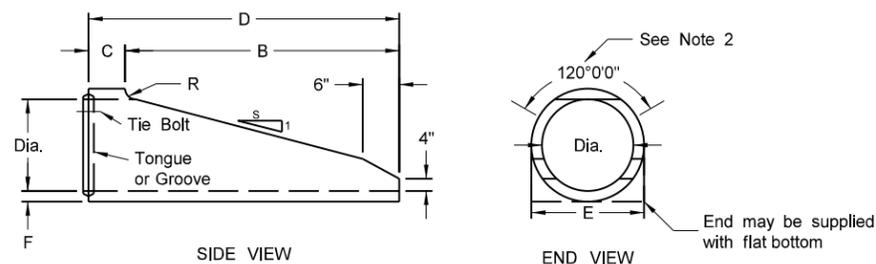
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REINFORCED CONCRETE PIPE CULVERTS AND END SECTIONS
(Round Pipe)



REINFORCED CONCRETE PIPE - FLARED END SECTION
Reinforcement to be equivalent to Class III RCP

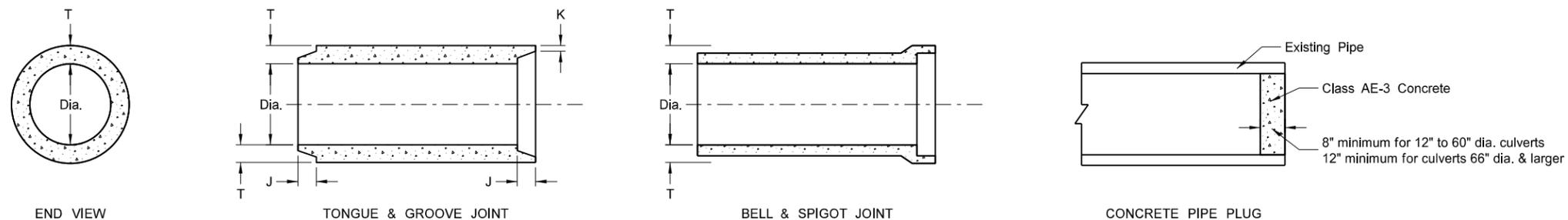
TRAVERSABLE END SECTION							
DIA	B	C	D	E	F	R	S
15"	4'	9"	4'-9"	1'-7½"	2½"	3"	6
18"	5'-9"	9"	6'-6"	1'-11"	2½"	3"	6
24"	6'	1'	7'	2'-6"	3"	3"	4
30"	7'-6"	1'	8'-6"	3'-1"	3½"	3½"	4
36"	7'-3"	15"	8'-6"	3'-8"	4"	3"	4



NOTES (Traversable End Section):

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

REINFORCED CONCRETE PIPE - TRAVERSABLE END SECTION
Reinforcement to be equivalent to Class III RCP



CIRCULAR PIPE

JOINTS FOR REINFORCED CONCRETE PIPE

FLARED END SECTION						
TERMINAL DIMENSIONS						
DIA	A	B	C	D	E	U
12	0'-4"	2'-0"	4'-0½"	6'-0½"	2'-0"	2"
15	0'-6"	2'-3"	3'-10"	6'-1"	2'-6"	2½"
18	0'-9"	2'-3"	3'-10"	6'-1"	3'-0"	2½"
21	0'-9"	3'-0"	3'-1"	6'-1"	3'-6"	2½"
24	0'-9½"	3'-7½"	2'-6"	6'-1½"	4'-0"	3"
27	0'-10½"	4'-0"	2'-1½"	6'-1½"	4'-6"	3½"
30	1'-0"	4'-6"	1'-7¾"	6'-1¾"	5'-0"	3½"
36	1'-3"	5'-3"	2'-9"	8'-0"	6'-0"	4"
42	1'-9"	5'-3"	2'-9"	8'-0"	6'-6"	4½"
48	2'-0"	6'-0"	2'-0"	8'-0"	7'-0"	5"
54	2'-3"	5'-5"	2'-9½"	8'-2½"	7'-6"	5½"
60	2'-11"	5'-0"	3'-3"	8'-3"	8'-0"	5"
66	2'-6"	6'-0"	2'-3"	8'-3"	8'-6"	5½"
72	3'-0"	6'-6"	1'-9"	8'-3"	9'-0"	6"
78	3'-0"	7'-6"	1'-9"	9'-3"	9'-6"	6½"
84	3'-0"	7'-6½"	1'-9"	9'-3½"	10'-0"	6½"
90	3'-5"	7'-3½"	2'-0"	9'-3½"	11'-0"	6½"

All Classifications of Round Concrete Pipe

Internal Dia. of Pipe (In.)	Cross-Sectional Water Area (Sq. ft.)	Weight per Lin. Foot of Pipe (Lbs.)	Joint Groove End Min./Max. (In.)	Joint Tongue End Min./Max. (In.)	Minimum Wall Thickness (In.)
12	0.79	92	1½-2¾	¾	2
15	1.23	127	1¾-2¾	¾	2½
18	1.77	168	1¾-2¾	1	2½
21	2.40	214	1¾-3¾	1½	2¾
24	3.14	265	2¾-3¾	1½	3
27	3.98	322	2¾-4	1¾	3¼
30	4.91	384	3¼-4¼	1¾	3½
33	5.94	452	3¼-4¼	1½	3¾
36	7.07	524	3¼-4¼	1½	4
42	9.62	685	3¼-4¼	1¾	4½
48	12.57	885	3¼-4¼	1¾	5
54	15.90	1070	4½-5½	2	5½
60	19.63	1296	4½-5½	2¼	6
66	23.76	1542	5-6	2½	6½
72	28.27	1810	5½-6¾	2½	7
78	33.18	2098	6¼-7¼	2½	7½
84	38.48	2410	5½-7¼	3¾	8
90	44.18	2793	6¾-8½	3¾	8½
96	50.27	3092	7-8¼	3½	9
102	56.75	3466	7-8¼	3½	9½
108	63.62	3864	7¼-8½	3¾	10

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

NOTES:

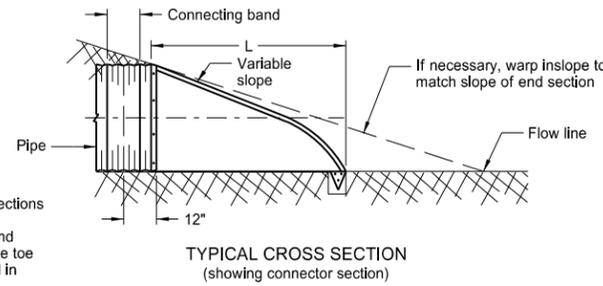
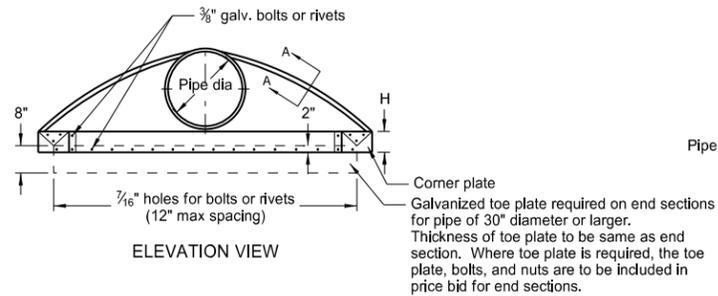
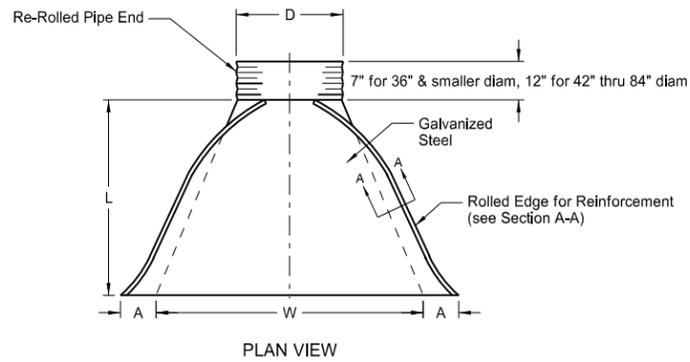
1. All reinforcing steel shall meet AASHTO M170 requirements.
2. All circular, longitudinal, and elliptical reinforcement shall be assembled and securely fastened in cage fashion so as to maintain reinforcement in exact shape and correct positions within the forms.
3. Laying length of pipe: 12" to 66"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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
05-12-14	
REVISIONS	
DATE	CHANGE
01-21-15	Revised Note 5

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ROUND CORRUGATED STEEL PIPE CULVERTS AND END SECTIONS

D-714-4



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

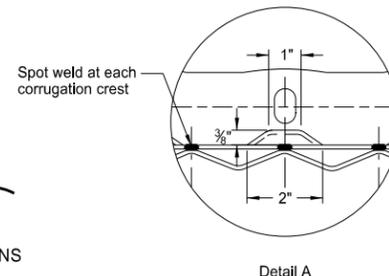
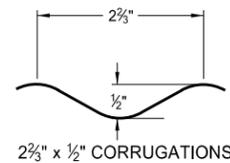
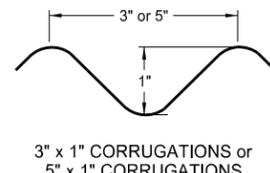
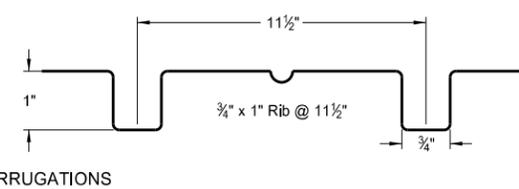
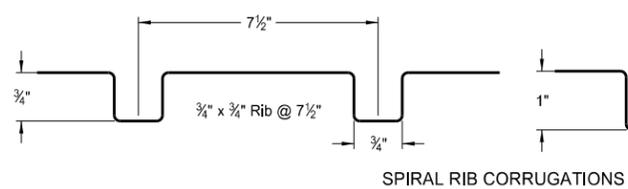
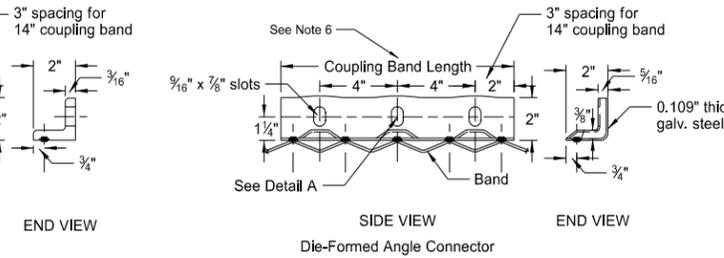
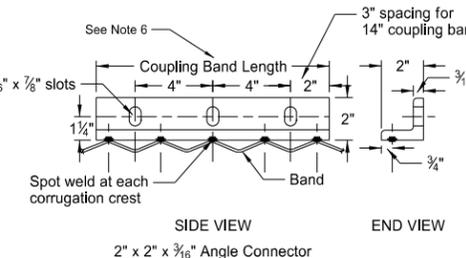
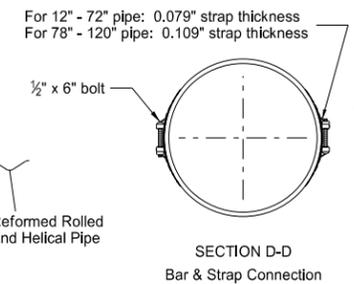
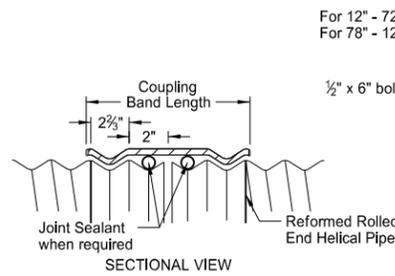
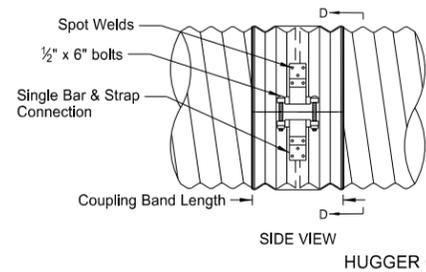
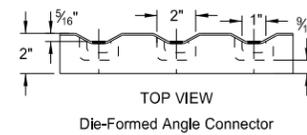
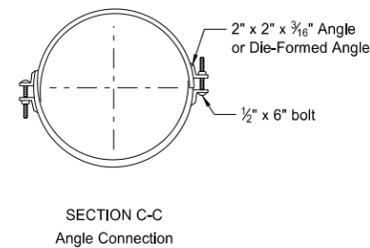
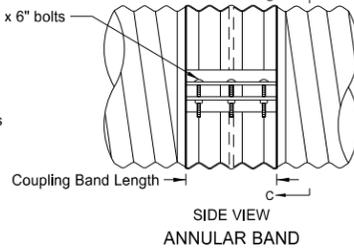
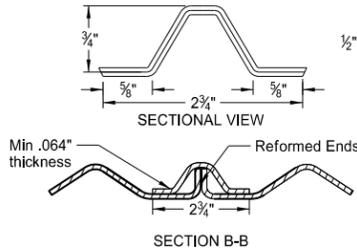
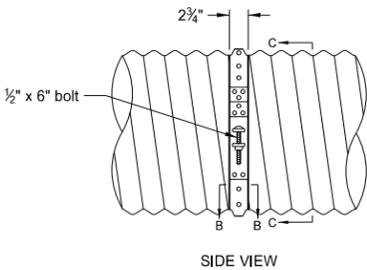
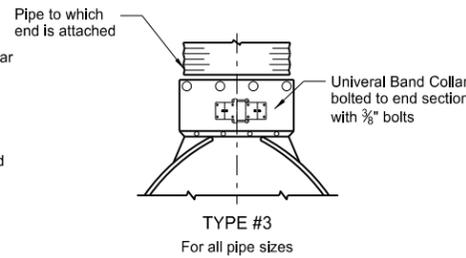
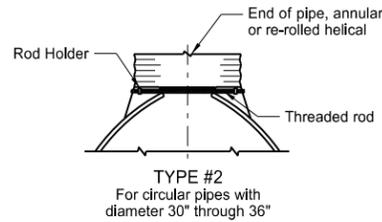
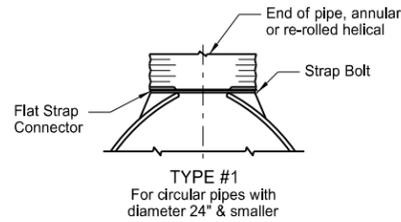
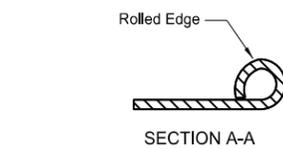
- These sizes have 0.109" sides and 0.138" center panels.
 - Pipe diameter is equal to dimension "D" of end section.
- Manufacturers tolerances of above dimensions will be allowed.
- Splices to be the lap riveted type.

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:

1. Pipes and connecting bands shall conform to applicable sections of NDDOT Standard Specifications and to AASHTO M-36.
2. 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.
3. 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.
4. 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.
5. 1/2" x 8" bolts may be used as a substitute for the 1/2" x 6" bolts shown in the details.
6. 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.
7. Length of spot welds shall be minimum 1/2".

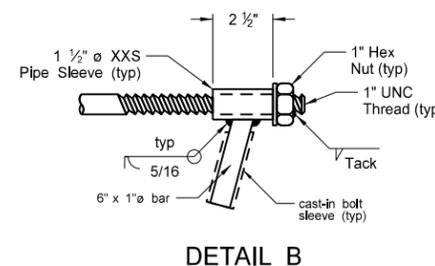
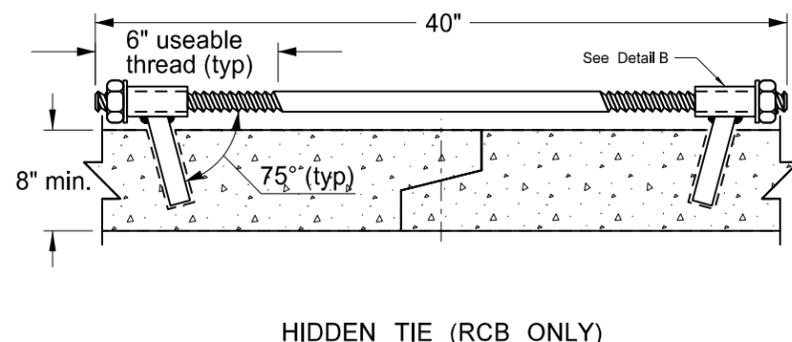
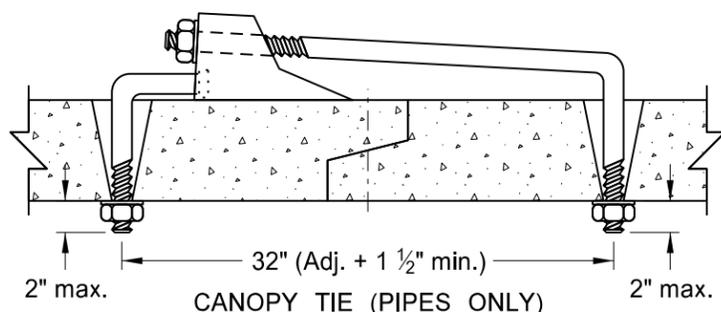
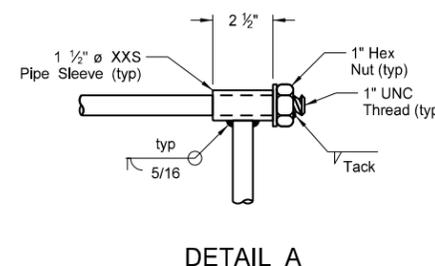
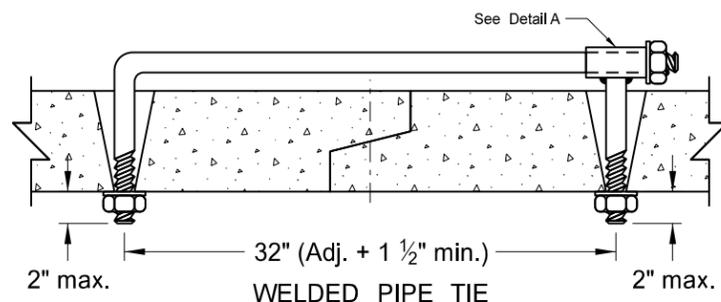
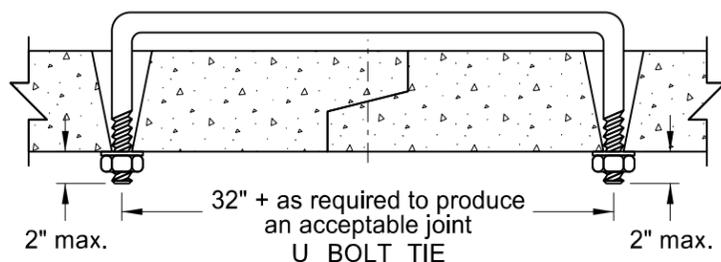
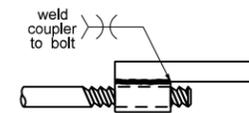
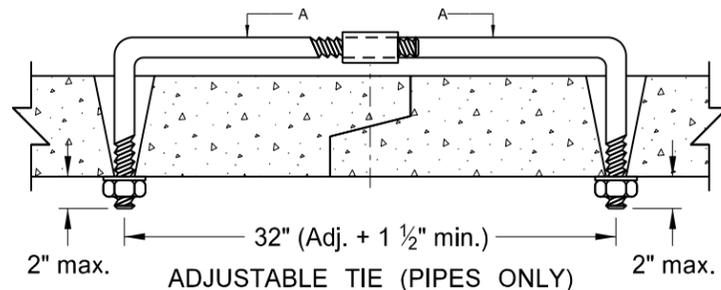
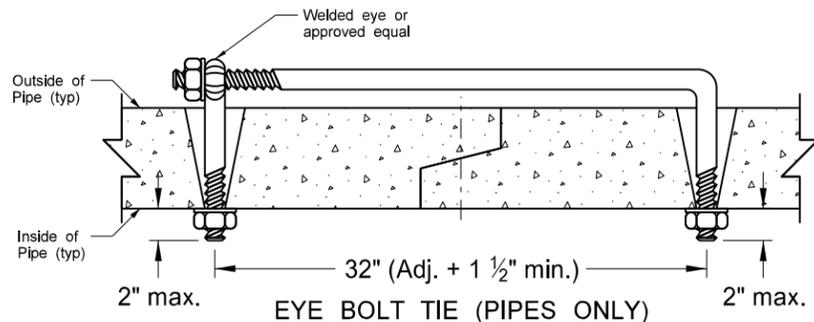
COUPLING BAND DIMENSIONS				
COUPLING TYPE	CORRUGATION PITCH x DEPTH	PIPE SIZE	COUPLING BAND LENGTH	MIN. BAND THICKNESS
Hat Band	2 3/8" x 1/2"	12" - 48"	2 3/4"	.064"
Annular Band	2 3/8" x 1/2"	12" - 72"	12"	.052"
		78" - 84"	12"	.079"
Hugger Band	2 5/8" x 1/2" Rerolled End	12" - 72"	10 1/2"	.052"
		78" - 84"	10 1/2"	.079"
	3" x 1" Rerolled End	48" - 120"	10 1/2"	.052"
	5" x 1" Rerolled End	48" - 120"	12"	.064"



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
08-06-13	
REVISIONS	
DATE	CHANGE
01-07-14	End Section Plan View
02-27-14	3" x 1" Corrugation Detail

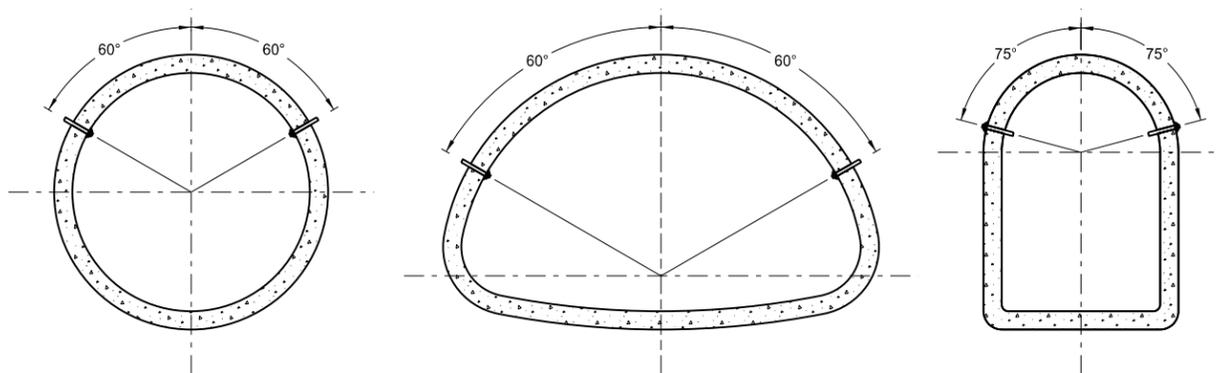
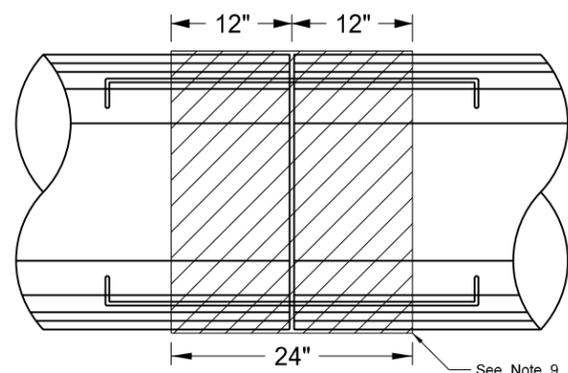
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CONCRETE PIPE OR PRECAST CONCRETE BOX CULVERT TIES



REQUIRED SIZE OF TIE BOLTS		
Pipe Size	Thread ϕ	XXS Pipe Sleeve Inner ϕ
18" - 24"	5/8" See note 2	3/4"
30" - 66"	3/4"	1"
72" - 78"	1"	1 1/4"
RCB		

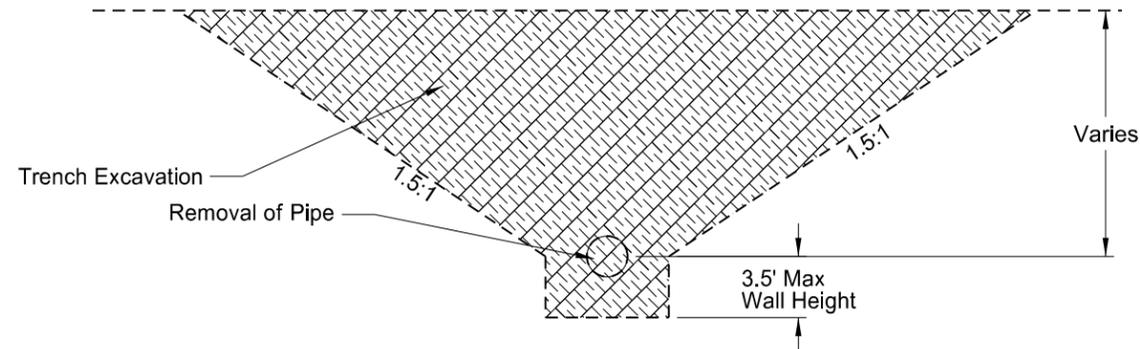
- NOTES:
- The pipe size listed is the inside diameter of round pipe or the equivalent diameter of pipe arch.
 - Nuts and washers are not required on Jacked and Bored pipes or pipes with a 24" diameter or less. Where nuts and washers are not used, the tie bars shall be inserted and grouted into place.
 - Ties are only for holding pipe or RCB sections together, not for pulling sections tight.
 - Tie bolt assembly shall be hot dip galvanized in accordance with AASHTO M232.
 - Holes in pipes to accommodate tie bolts can be precast or drilled. Tapered holes are permitted when precast. Holes shall have a diameter 1/4" larger than the diameter of the thread. Holes in precast RCB's shall contain cast-in bolt sleeves with an inside diameter of 1 1/4".
 - The contractor has the option of selecting the type of tie bolt used from those shown.
 - The cost of precasting or drilling the required holes and furnishing and installing the tie bolts shall be included in the price bid for the appropriate conduit or RCB pay item.
 - All centerline and approach RCP culvert joints shall be tied. Storm drain systems shall have the first three joints including the end section of all free ends tied. 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.
 - When joint wrap is specified in the plans, place wrap beneath ties. Overlap the joint by 12" in both directions.
 - Tie bolts shall conform to ASTM A 36. Nuts shall be heavy hex and conform to ASTM A 563. Washers shall conform to ASTM F 436, Type 1. Welded pipe sleeves and cast-in bolt sleeves shall conform to ASTM A 53, Grade B.
 - Cattle Pass and Jacked and Bored pipes shall have pipe ties inserted from the inside of the pipes and grouted into place. Jacked and bored pipes with a diameter of 24" or less do not require pipe ties.
 - RCB tie locations shall be as shown on the plans.



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
3-18-14	
REVISIONS	
DATE	CHANGE
7-21-15	Note 8

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TRANSVERSE MAINLINE PIPE INSTALLATION DETAIL
PIPES MORE THAN 4 FEET BELOW TOP OF SUBGRADE



Pay Items

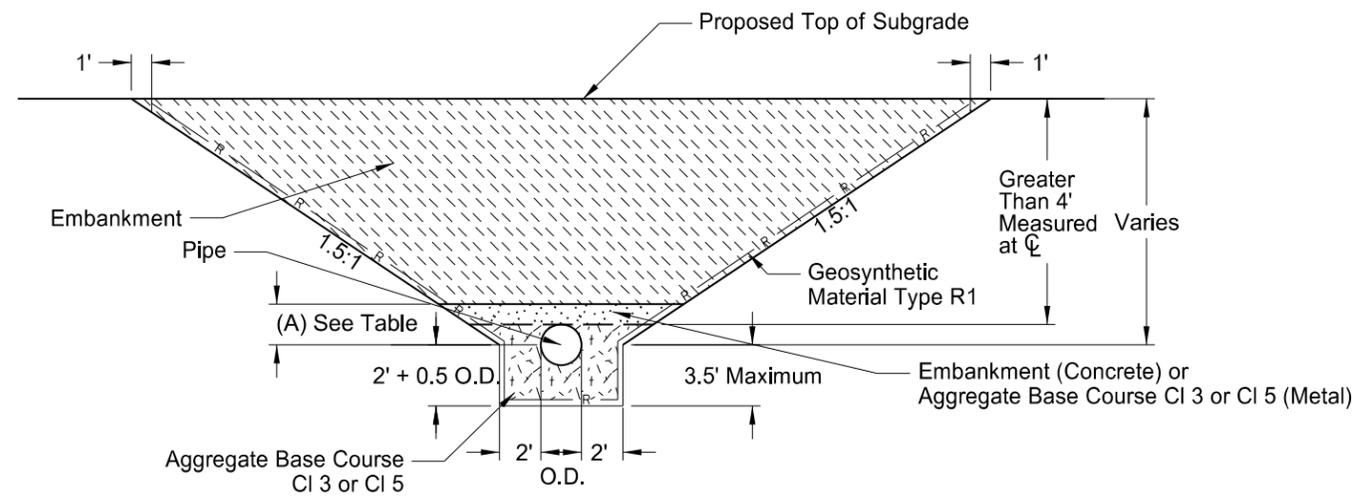
- 1) Pipe*
- 2) Geosynthetic Material Type R1
- 3) Removal of Pipe (if required)

*Included in Pipe Pay Item

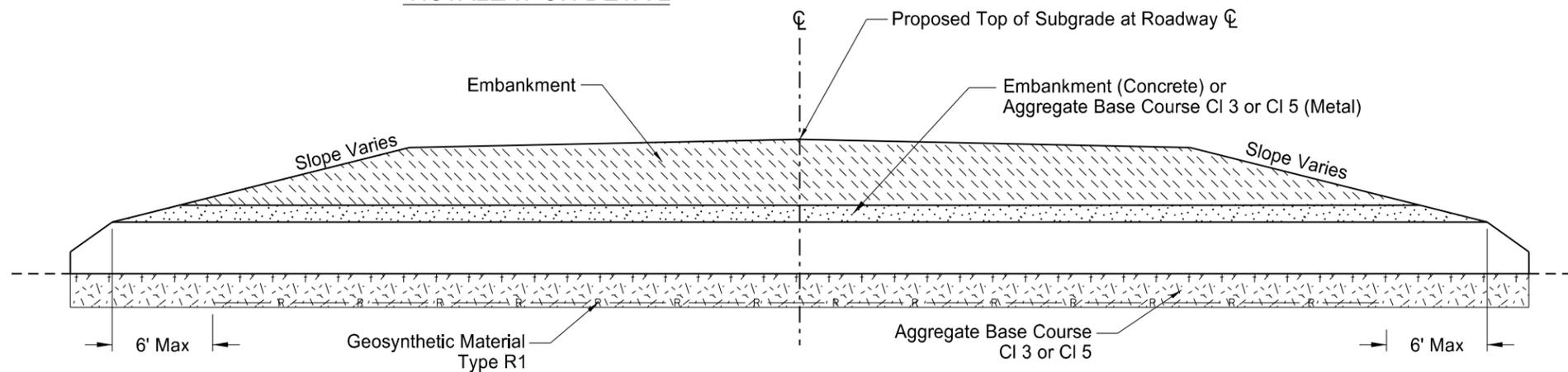
- 1) Pipe
- 2) Trench excavation
- 3) Aggregate Base Course CI 3 or CI 5
- 4) Embankment

NOTES:

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



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

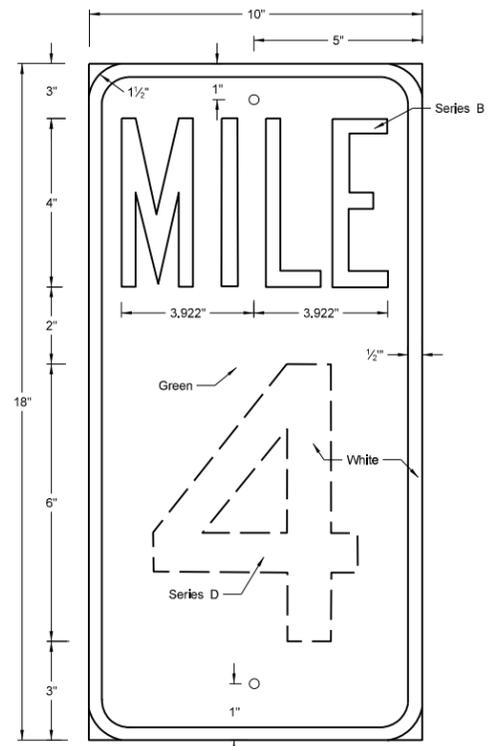


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-26-13	
REVISIONS	
DATE	CHANGE
10-15-13	Label Formatting Nomenclature Title Rewording
1-21-14	
9-18-15	

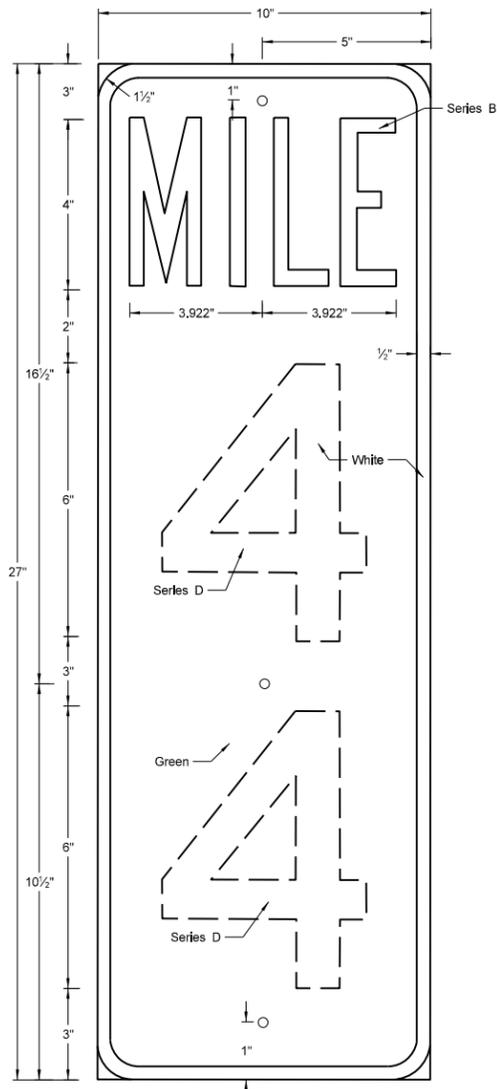
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(CONVENTIONAL USE) REFERENCE MARKERS

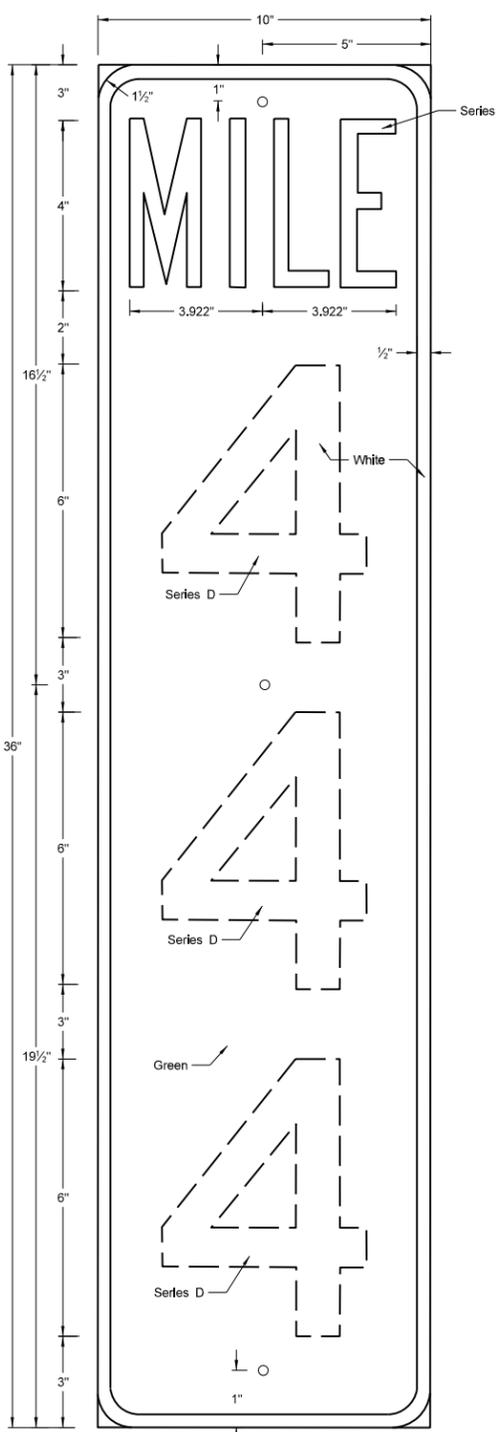
D-754-19



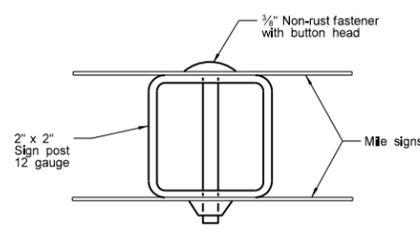
TYPE A
Area = 1.25 S.F.



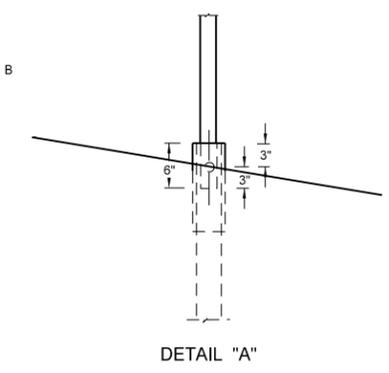
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Area = 1.88 S.F.



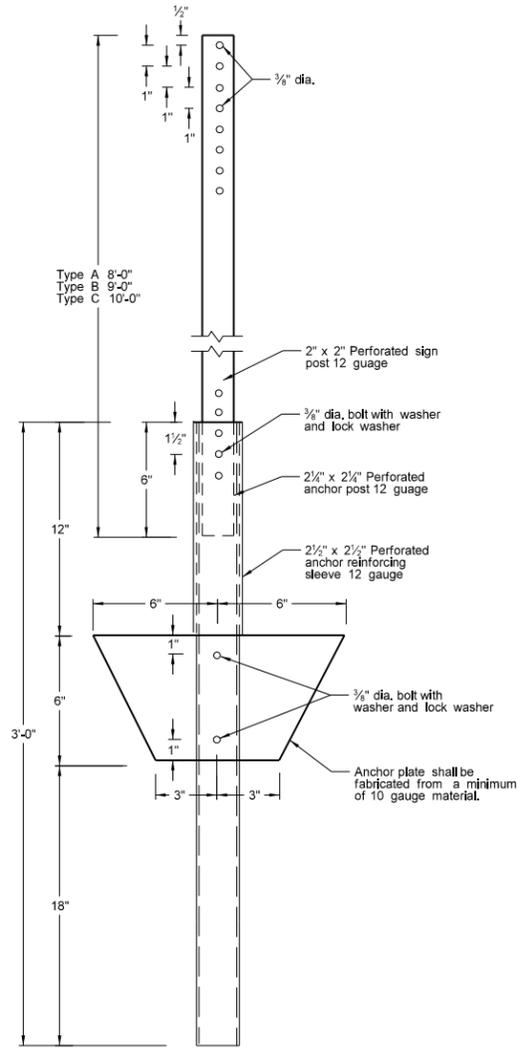
TYPE C
Area = 2.50 S.F.



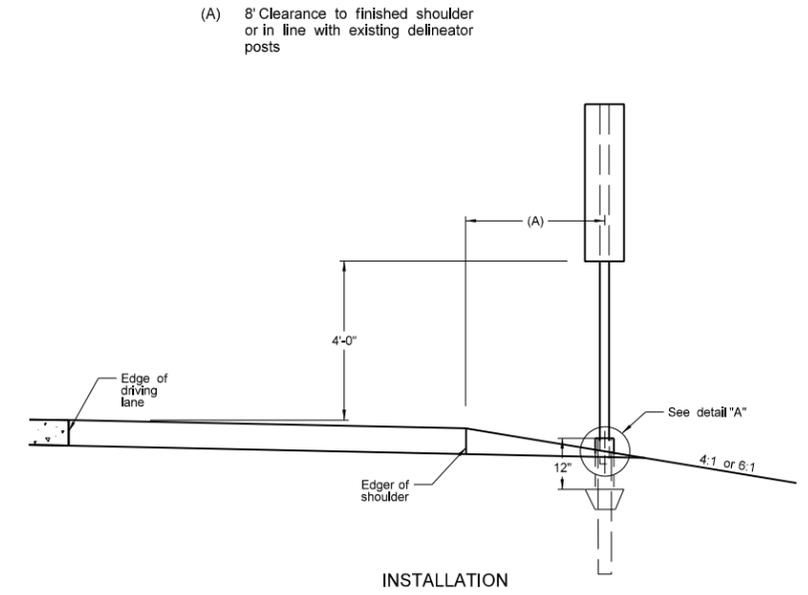
ASSEMBLY DETAIL
(back to back)



DETAIL "A"



POST AND ANCHOR PLATE DETAIL



INSTALLATION

- NOTES:
 Installation: Posts shall be installed along right shoulder.
 Sign: Backing shall be fabricated of 0.080 aluminum. Sheeting shall conform to section 894.01 of the Standard Specifications.
 Posts: Posts shall conform to section 894.03 of the Standard Specifications.
 Fasteners: The signs shall be attached to the post by tension pin type fastener or other suitable vandal resistant non-rust fastener.
 Reflective Sheeting: Sheeting shall be Type IV.
 Numbers: Numbers shall be of the series shown and may be screened or applied copy. Screening and reflective sheeting for applied copy shall conform to section 754 & 894 of the Standard Specifications.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE
7-8-14	Revised post and reflective sheeting notes

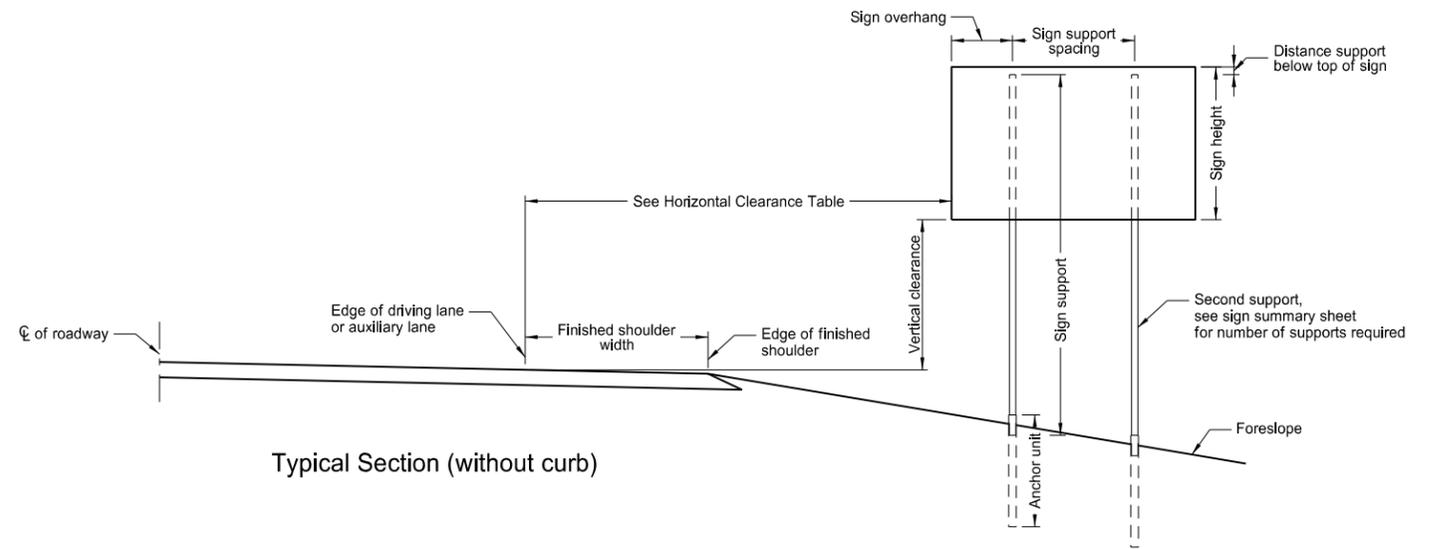
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PERFORATED TUBE ASSEMBLY DETAILS

D-754-23

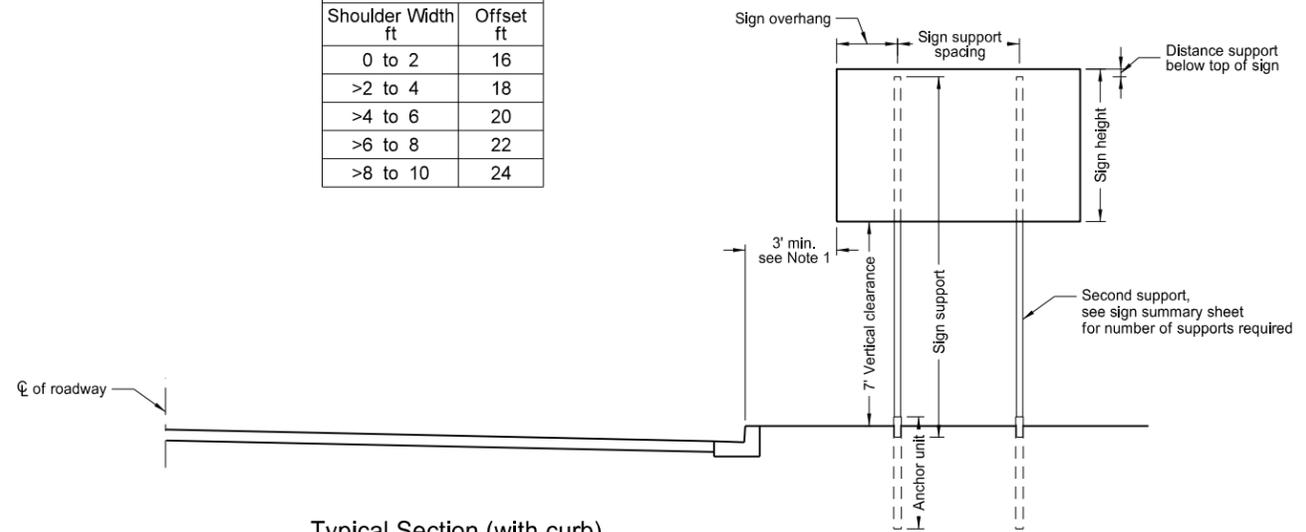
Notes:

1. Curbed Roadways: The clearance from the face of the curb should be 3' except where right of way or sidewalk width is limited, a minimum clearance of 2' shall be provided. The horizontal clearance may need to be increased to maintain a minimum sidewalk clear width of 4' from the sign support, not including any attached curb.
2. Minimum vertical clearance: Signs installed at the side of the road in rural districts shall be at least 5' measured from the bottom of the sign to the edge of the driving lane or auxiliary lane. Where parking or pedestrian movements occur, the clearance to the bottom of the sign shall be at least 7'.
- Signs on expressways shall be installed with a minimum height of 7'.
- Adopt-a-highway signs installed on Freeways shall be at least 7' above the edge of the driving lane.
- The vertical clearance shall have a maximum height of 6" above the vertical clearance specified above.
3. Offset signs: Where signs are placed at least 30 feet or more from the edge of the traveled way, the height to the bottom of such sign shall be 5' above the edge of the driving lane.
4. The clearance from edge of shared use path to edge of sign should be 3' except where width is limited, a minimum clearance of 2' shall be provided.

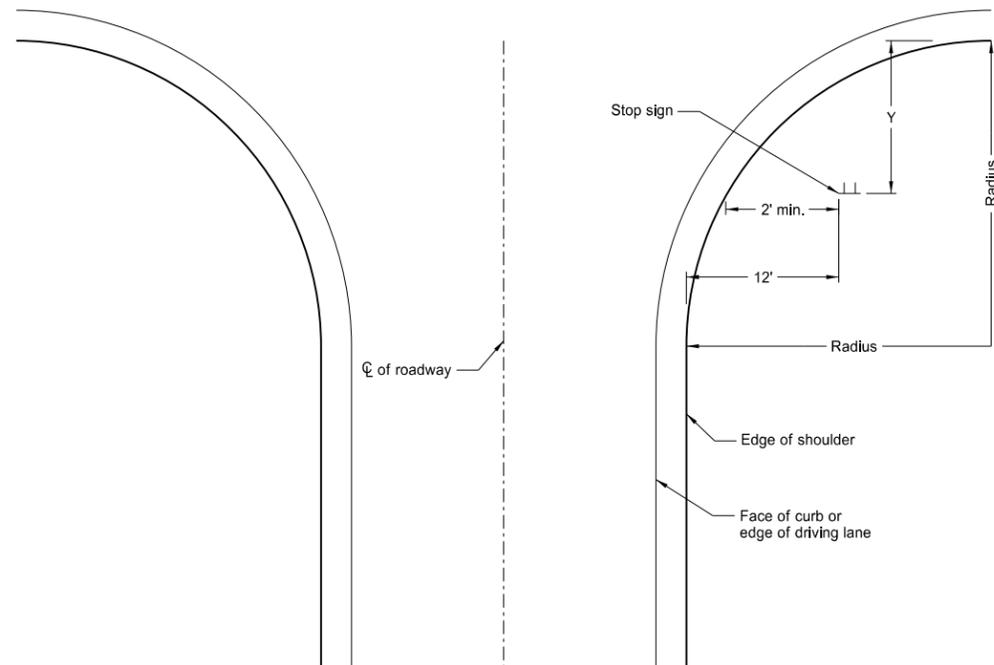


Typical Section (without curb)

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



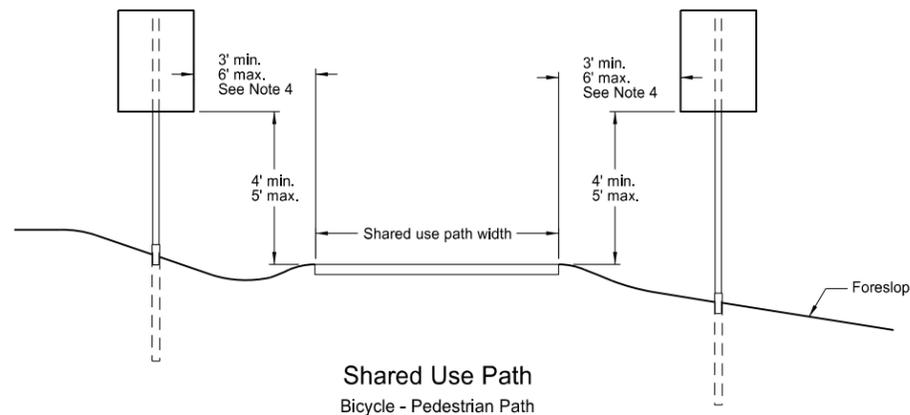
Typical Section (with curb)
Residential or Business District



Stop Sign Location
Wide Throat Intersection

This layout is to be used 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



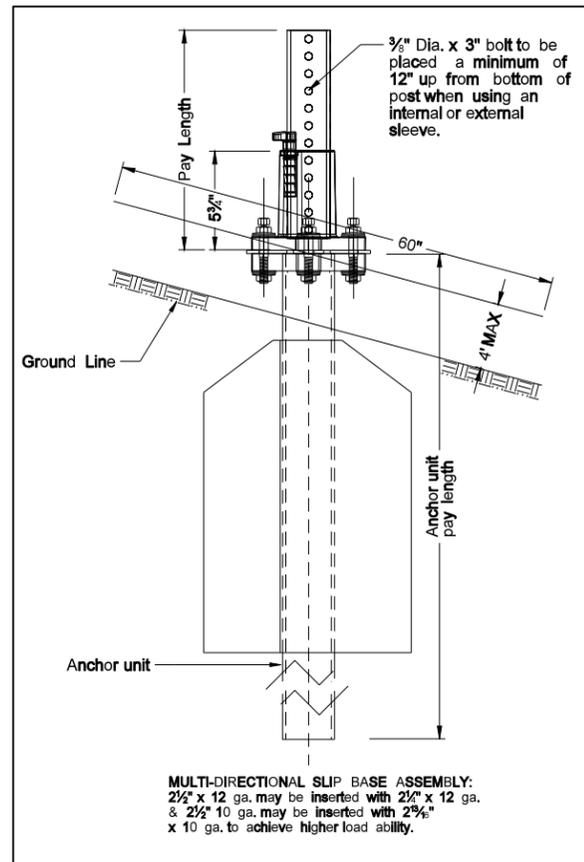
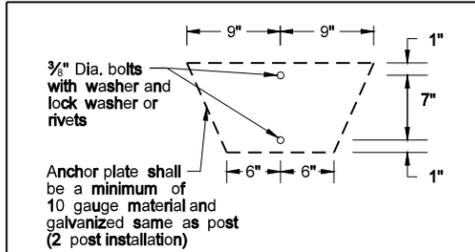
Shared Use Path
Bicycle - Pedestrian Path

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
7-8-14	Revised note 2, added note 4.

This document was originally issued and sealed by
Roger Weigel
 Registration Number
 PE-2930,
 on 7/8/14 and the original document is stored at the
 North Dakota Department
 of Transportation

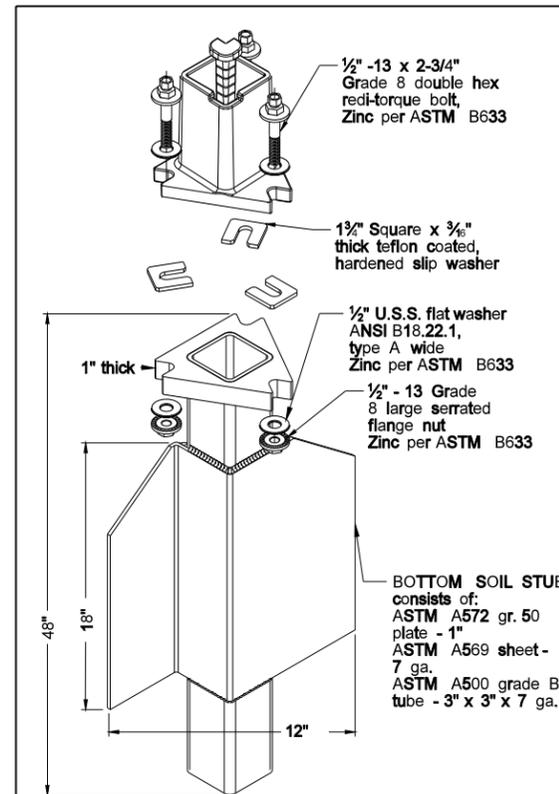
Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thickness Gauge	Sleeve Size In.	Wall Thickness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thickness Gauge
1	2	12			No	2 1/2	12
1	2 1/2	12			No	2 1/2	12
1	2 1/2	12			(B)	3(C)	7
1	2 1/2	10			Yes	7	7
1	2 1/2	12	2 1/2(D)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

(B) - The 2 1/2", 12 gauge posts do not need breakaway bases when placed in standard soils, but require a shim as specified by the manufacturer. The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.
 (C) - 3" anchor unit
 (D) - 2 1/2" x 12 ga. x 18" minimum length external sleeve required.

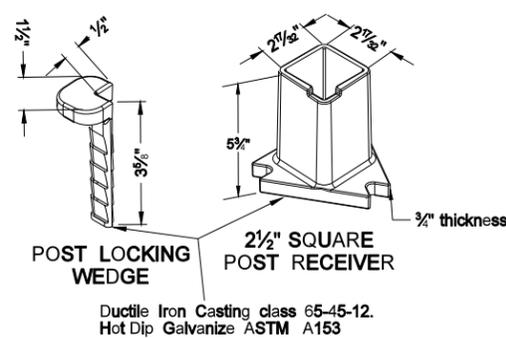


MULTI-DIRECTIONAL SLIP BASE ASSEMBLY:
 2 1/2" x 12 ga. may be inserted with 2 1/2" x 12 ga. & 2 1/2" 10 ga. may be inserted with 2 3/8" x 10 ga. to achieve higher load ability.

Mounting Details Perforated Tube



SLIP BASE FOR 2 1/2" POST



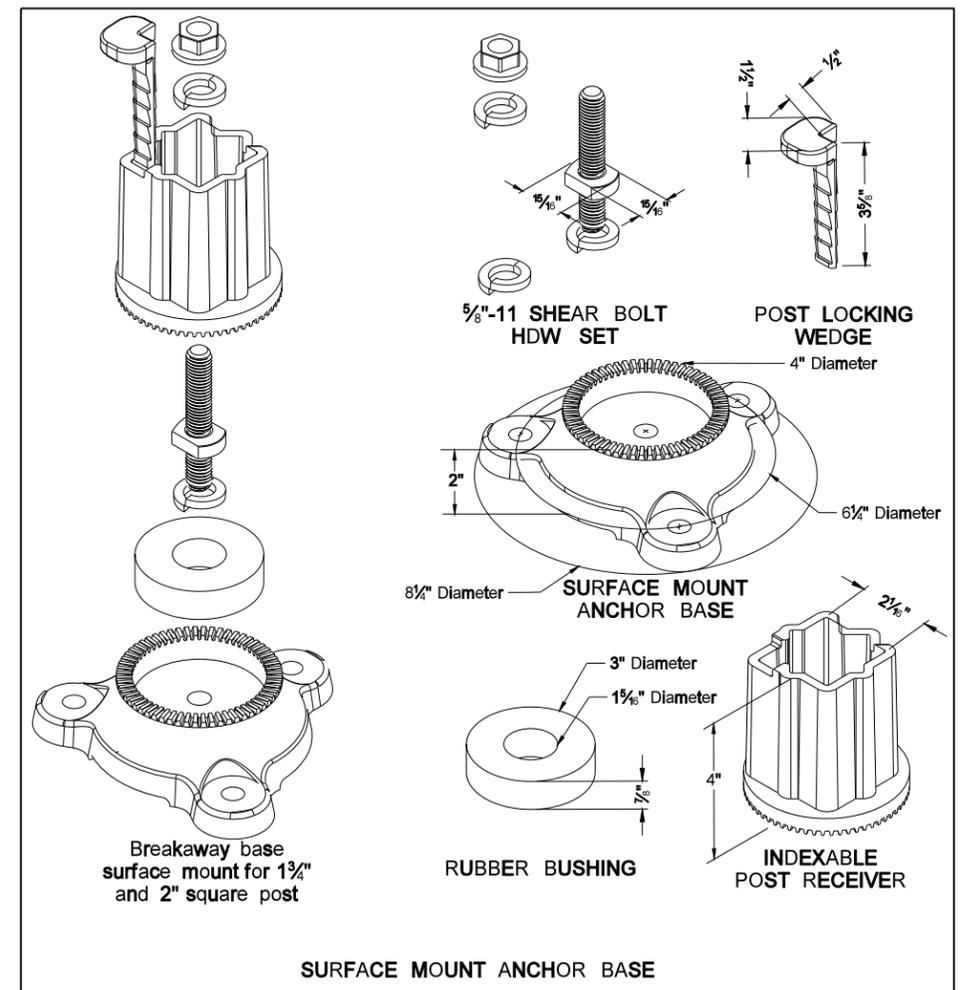
SLIP BASE DETAIL

Properties of Telescoping Perforated Tubes						
Tube Size In.	Wall Thickness in.	U.S. Standard Gauge	Weight Per Foot Lbs.	Moment of Inertia In. ⁴	Cross Sect. Area In. ²	Section Modulus In. ³
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2 1/2 x 2 1/2	0.105	12	2.773	0.561	0.695	0.499
2 3/8 x 2 3/8	0.135	10	3.432	0.605	0.841	0.590
2 1/2 x 2 1/2	0.105	12	3.141	0.804	0.803	0.643
2 1/2 x 2 1/2	0.135	10	4.006	0.979	1.010	0.783

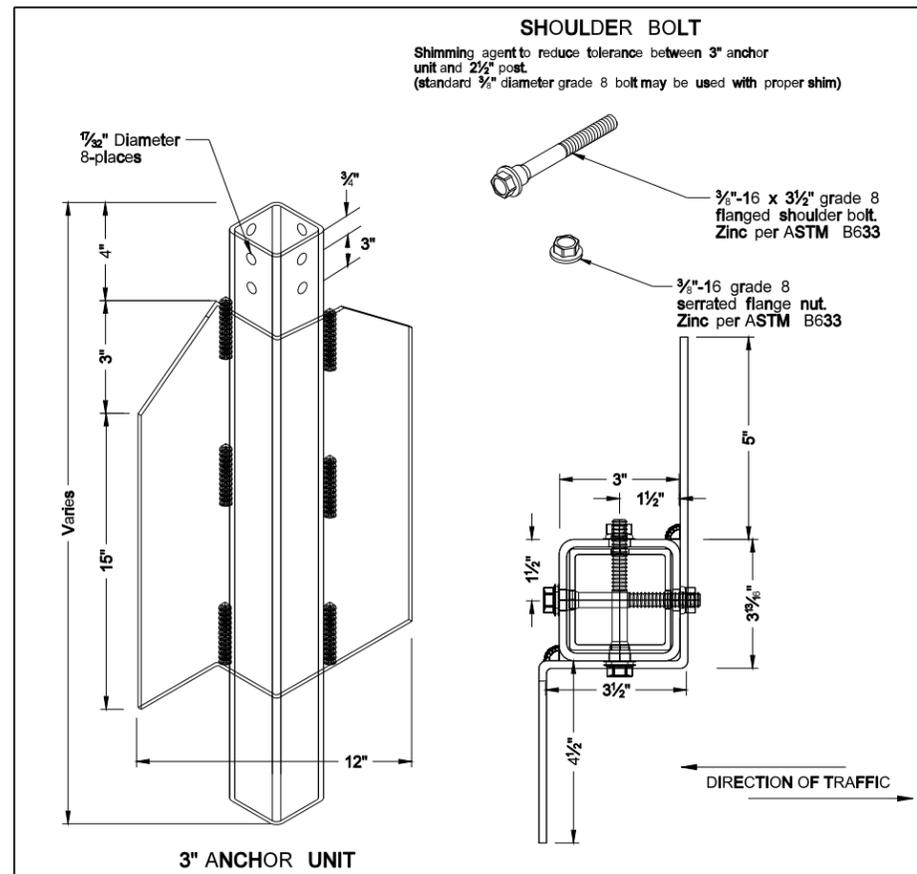
The 2 3/8" size 10 gauge is shown as 2.19" size on the plans; The 2 1/2" size is shown as 2.51" size on the plans.

NOTE:

- 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement shall be made above and below post location and also back and ahead of post.
- Anchor material shall be 7 gauge H.R.P.O. Commercial quality ASTM A569 and 3" x 3" x 7" gauge ASTM A500 grade B. Anchor shall have a yield strength 43.9 KSI and tensile strength of 59.3 KSI. Anchor shall be hot dipped galvanized per ASTM A123/153. All tolerances on anchor unit and slip base bottom assembly are +/- 0.005" unless otherwise noted.
- When used in concrete sidewalk, anchor shall be the same concept without the wings.
- Four post signs shall have over 8" between the first and fourth posts.
- Installation procedures as per manufacturers recommendation.
- Concrete fasteners for surface mount breakaway base shall be a minimum 1/2" diameter x 4" grade 8.



SURFACE MOUNT ANCHOR BASE



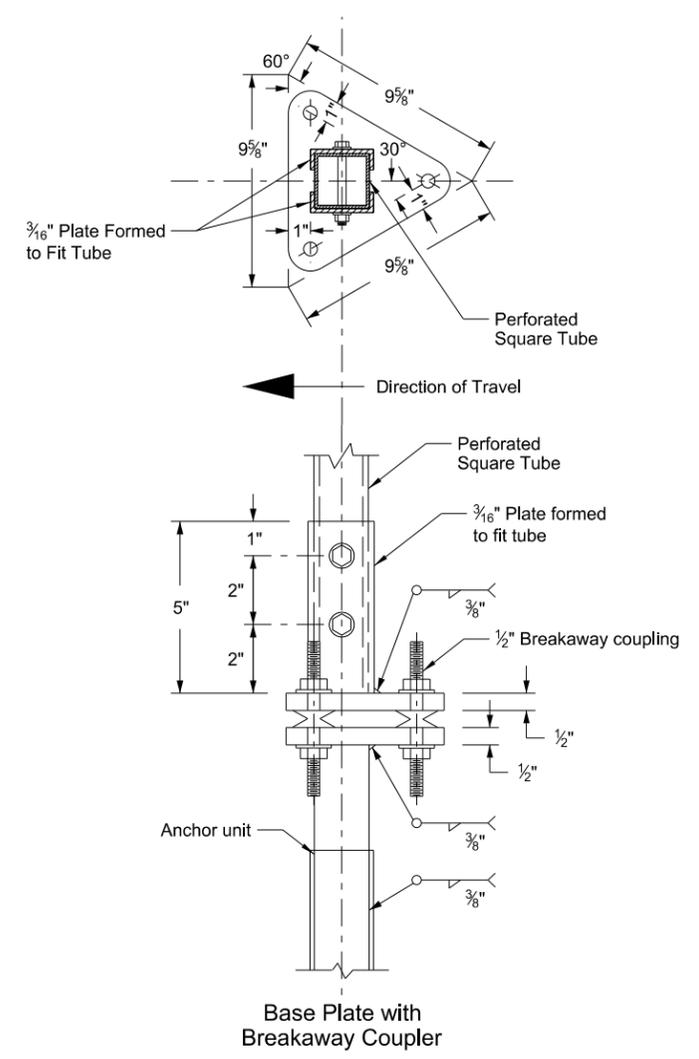
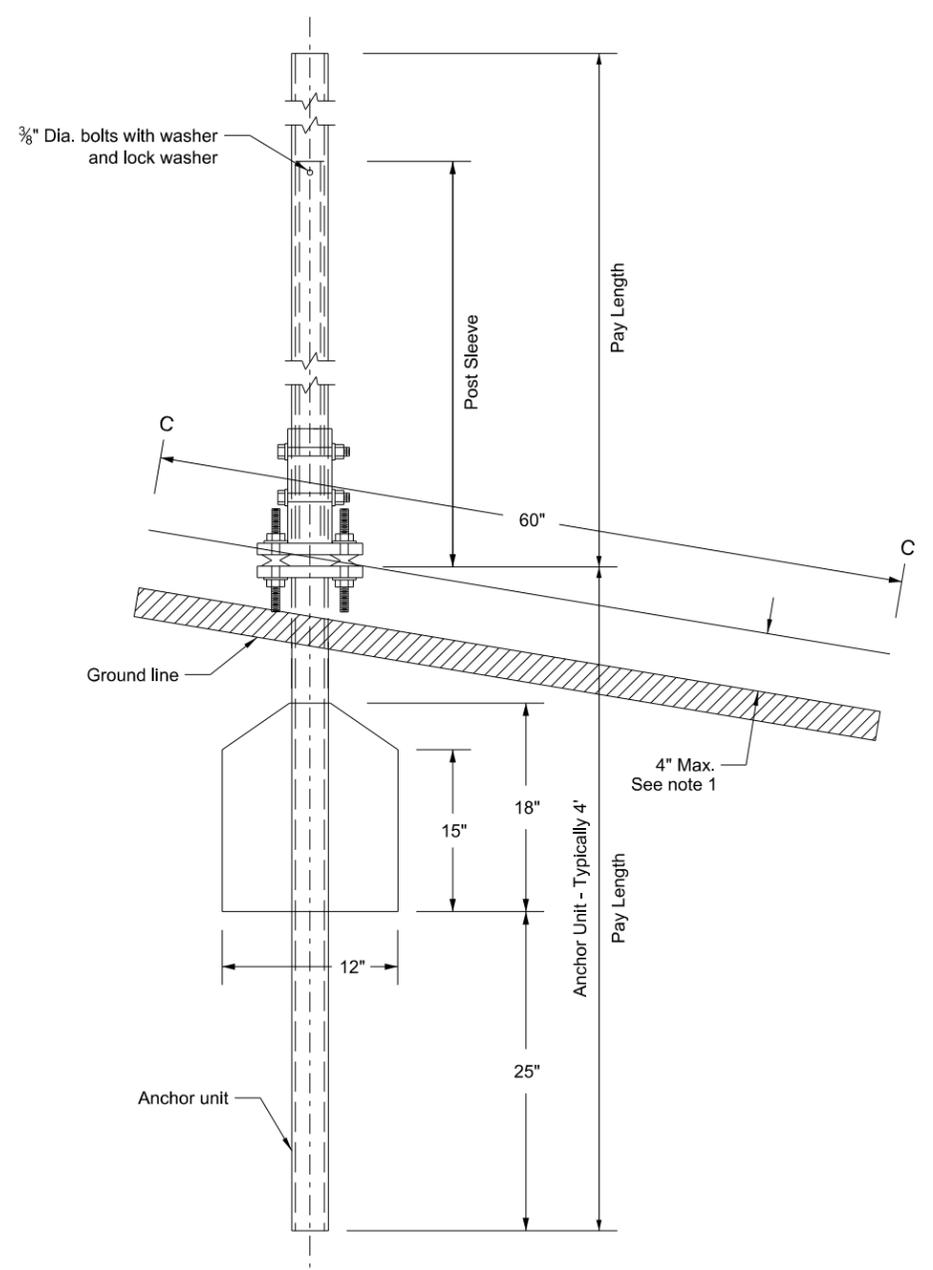
3" ANCHOR UNIT

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE

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Breakaway Coupler System for Perforated Tubes

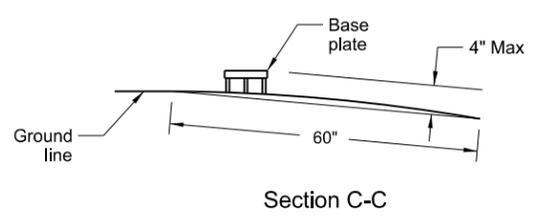
- Notes:
- 4" Vertical clearance of anchor or breakaway base. The 4" x 60" measurement shall be made above and below post location and also back and ahead of post.
 - Anchor unit shall be the same size as the post and shall have the same specification as the post.
 - Four post signs shall have over 8' between the first and fourth post.
 - In lieu of the breakaway base system on standard D-754-24 the breakaway coupling system may be used. The breakaway coupler system shall be manufactured from material meeting the requirements of ASTM A325 fasteners with the special requirements as specified by DENT BREAKAWAY IND., INC. which meets the test requirements of NCHRP Report 350.



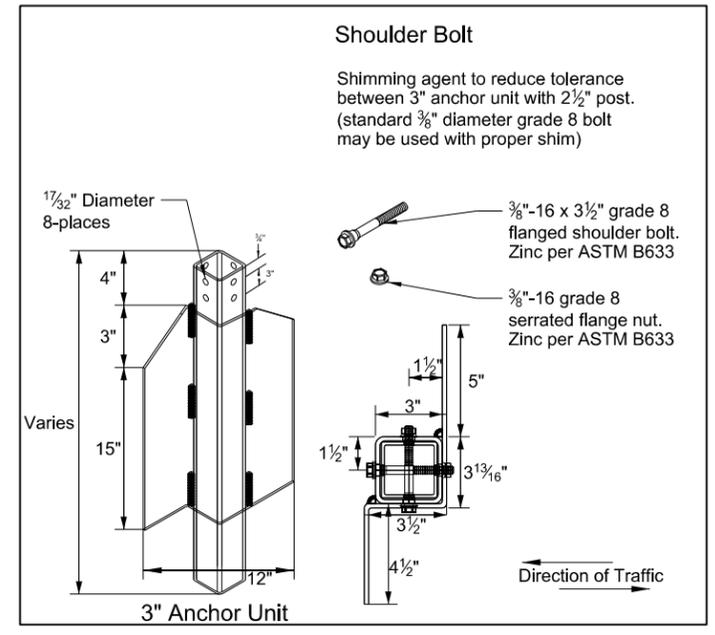
Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thickness Gauge	Sleeve Size In.	Wall Thickness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thickness Gauge
1	2	12			No	2 1/4	12
1	2 1/4	12			No	2 1/2	12
1	2 1/2	12			(B)	3(C)	7
1	2 1/2	10			Yes		7
1	2 1/4	12	2	12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

(B) - The 2 1/2" 12 gauge posts do not need breakaway bases when placed in standard soils. The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak. Weak soils are classified as 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.



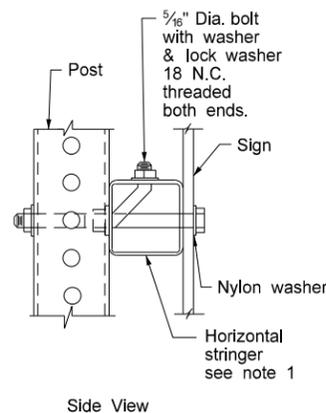
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-2013	
REVISIONS	
DATE	CHANGE

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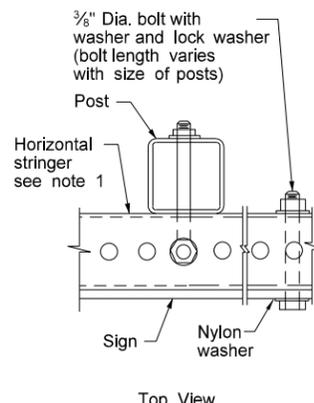
Mounting Details Perforated Tube

Note:

- Horizontal stringers - In lieu of perforated tubes, the contractor may substitute z bar stringers. The z bar stringers shall be 1 1/2" x 3/16" thick, 1.08 lbs./ft aluminum or 3.16 lbs./ft steel.
- Metal washers used on sign face shall have a minimum outside diameter of 5/16" ± 1/65" and 10 gauge thickness.
- No Parking Signs: All no parking signs with directional arrows shall be placed at a 30 to 45 degree angle with the line of traffic flow. No parking signs required at the above angles may have the support turned to the correct angle. If the no parking sign is placed with another sign that has to be placed at a 90 degree angle with the line of traffic flow, the detailed angle strap should be used to mount the no parking sign. Flat washers and lock washers shall be used with all nylon washers.
- In lieu of using the bent bolt to attach the post to the stringer, the contractor may choose to punch the sign backing and place the bolt through the sign, the stringer and the post.
- 4" vertical clearance of anchor or breakaway base. The 4" x 60" measurement shall be made above and below post location and also back and ahead of post.

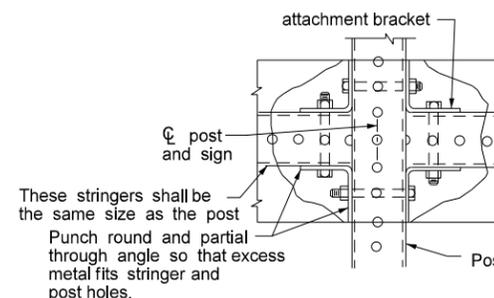


Side View



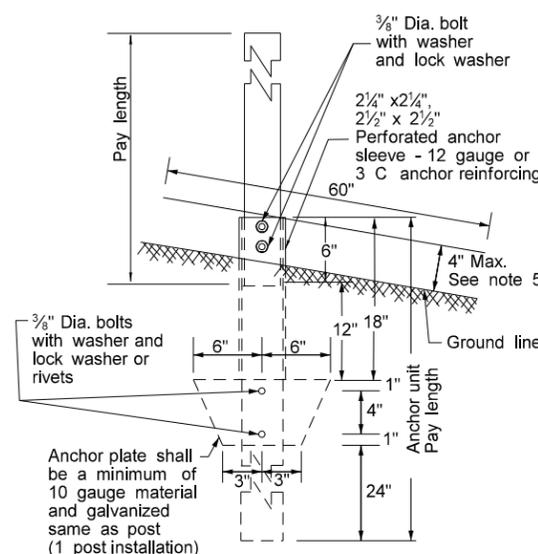
Top View

STRINGER MOUNTING
(WITH STRINGER IN FRONT OF POST)

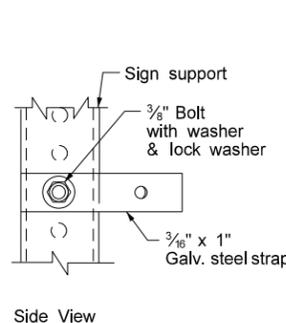


These stringers shall be the same size as the post. Punch round and partial through angle so that excess metal fits stringer and post holes.

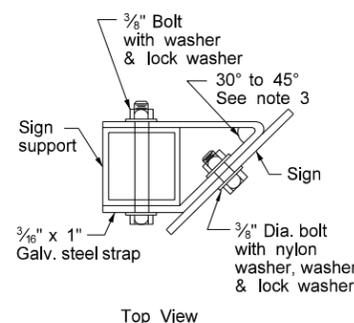
STREET NAME SIGNS
AND ONE WAY SIGNS
SINGLE POST ASSEMBLY
ONE STRINGER OR
BACK TO BACK MOUNTING



ANCHOR UNIT AND
POST ASSEMBLY

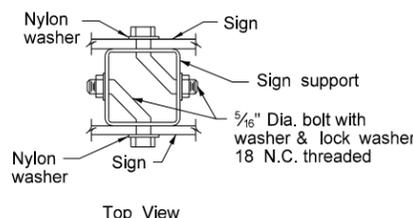
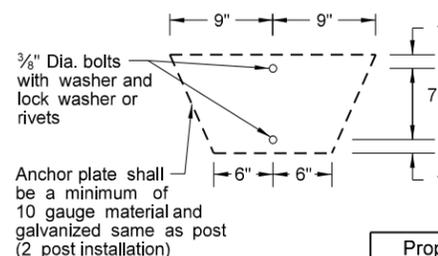


Side View



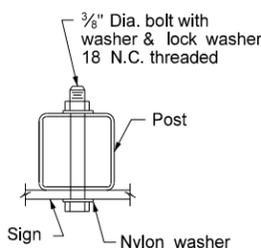
Top View

STRAP DETAIL



Top View

BACK TO BACK
MOUNTING



BOLT 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
1 1/2 x 1 1/2	0.105	12	1.702	0.129	0.380	0.172
2 x 2	0.105	12	2.416	0.372	0.590	0.372
2 1/4 x 2 1/4	0.105	12	2.773	0.561	0.695	0.499
2 3/8 x 2 3/8	0.135	10	3.432	0.605	0.841	0.590
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2 1/2 x 2 1/2	0.135	10	4.006	0.979	1.010	0.783

The 2 3/8" size 10 gauge is shown as 2.19" size on the plans. The 2 1/2" size is shown as 2.51" size on the plans.

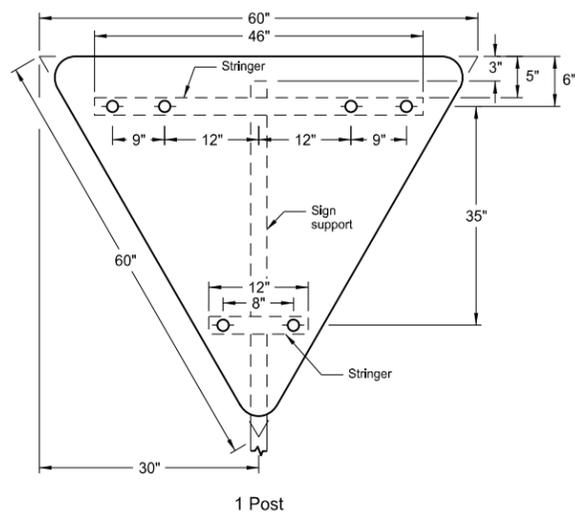
Number of Posts	Telescoping Perforated Tube						
	Post Size In.	Wall Thickness Gauge	Sleeve Size In.	Wall Thickness Gauge	Slip Base	Anchor Size Without Slip Base In.	Anchor Wall Thickness Gauge
1	2	12			No	2 1/4	12
1	2 1/4	12			No	2 1/2	12
1	2 1/2	12			(B)	3(C)	7
1	2 1/2	10			Yes		7
1	2 1/4	12	2 1/2(D)	12	Yes		7
1	2 1/2	12	2 1/4	12	Yes		7
2	2 1/2	10			Yes		7
2	2 1/4	12	2 1/2(D)	12	Yes		7
2	2 1/2	12	2 1/4	12	Yes		7
3 & 4	2 1/2	12			Yes		7
3 & 4	2 1/2	10			Yes		7
3 & 4	2 1/2	12	2 1/4	12	Yes		7
3 & 4	2 1/4	12	2 1/2(D)	12	Yes		7
3 & 4	2 1/2	10	2 3/8	10	Yes		7

(B) - The 2 1/2", 12 gauge posts do not need breakaway bases when placed in standard soils, but require a shim as specified by the manufacturer. The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak. Weak soils are classified as boggy, wet, or loose soil areas.
(C) - 3" anchor unit
(D) - 2 1/2" x 12 ga. x 18" minimum length external sleeve required.

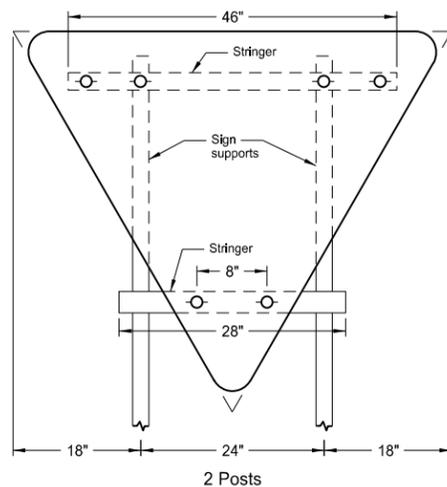
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-6-09	
REVISIONS	
DATE	CHANGE
7-8-14	Revised Note 3

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Roger Weigel,
Registration Number
PE- 2930 ,
on 7/8/14 and the original document is stored at the
North Dakota Department
of Transportation

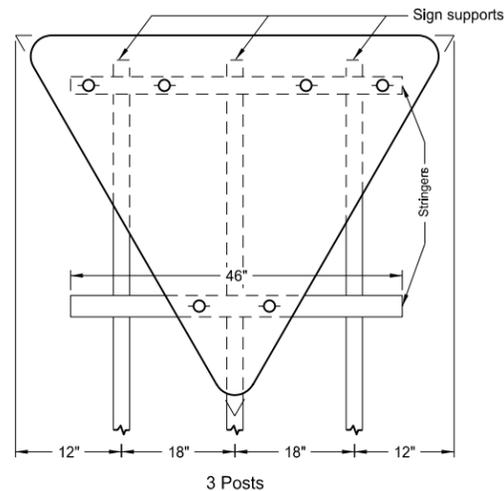
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION
DETAILS REGULATORY, WARNING AND GUIDE SIGNS



1 Post



2 Posts

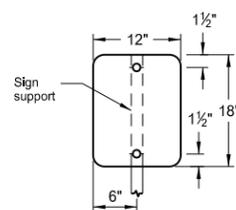


3 Posts

Assembly No. 6

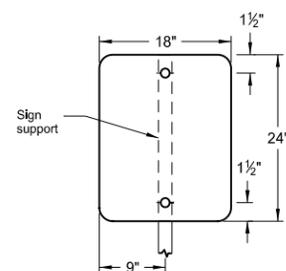
Notes:

1. See Standard D-754-25 for mounting details.
2. The minimum sign backing material thickness shall be 0.100 inch.
3. Perforated square tube stringer shall be 1½" x 1½".
4. All holes shall be punched round for ⅜" bolt.



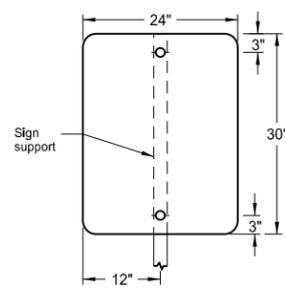
1 Post

Assembly No. 7



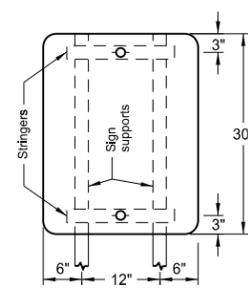
1 Post

Assembly No. 8

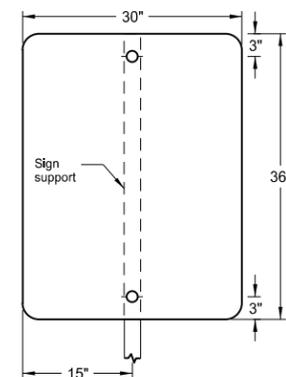


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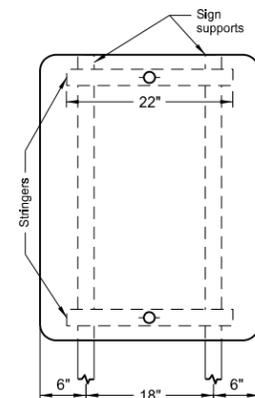
Assembly No. 9



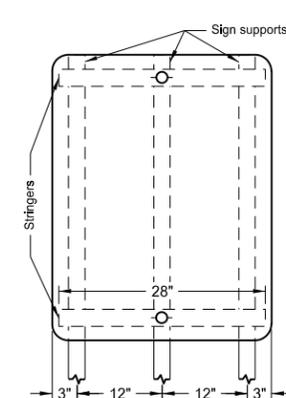
2 Posts



1 Post

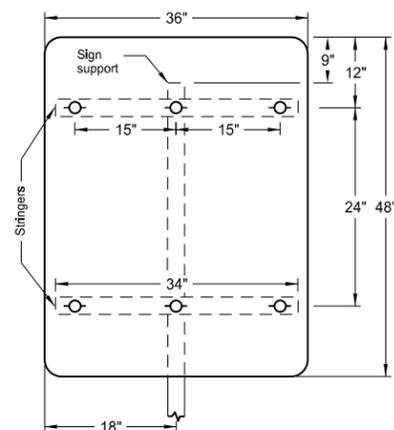


2 Posts

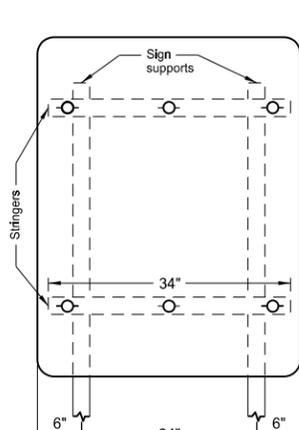


3 Posts

Assembly No. 10

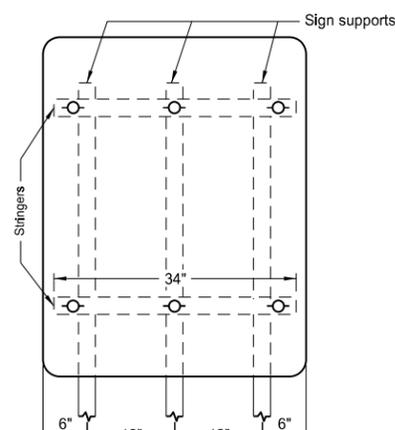


1 Post



2 Posts

Assembly No. 11

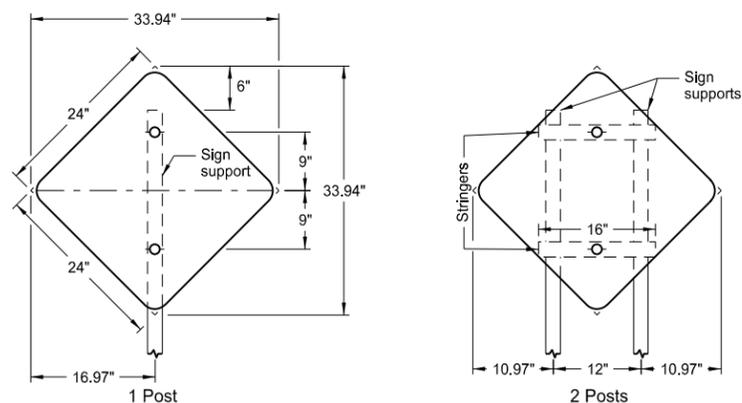


3 Posts

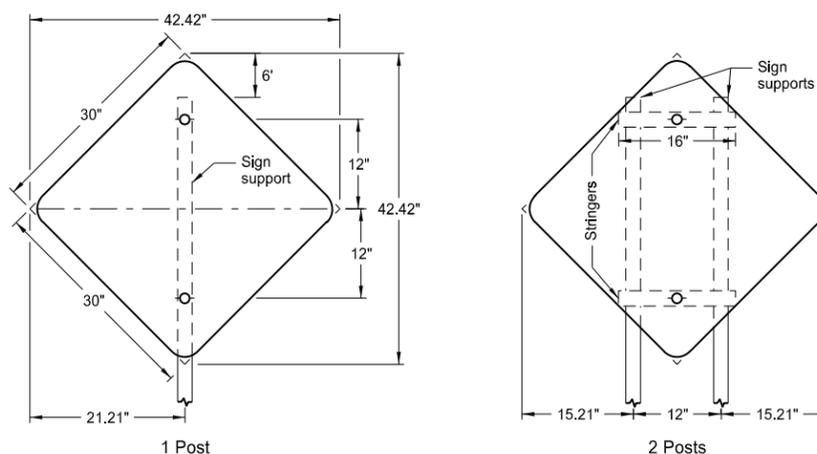
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

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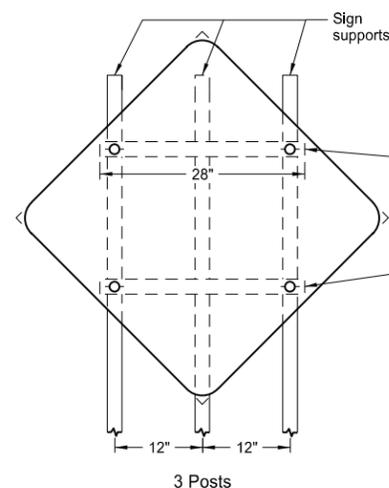
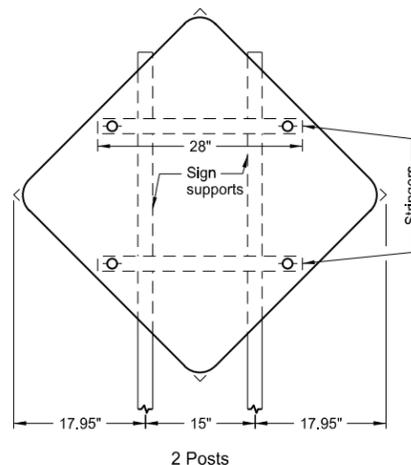
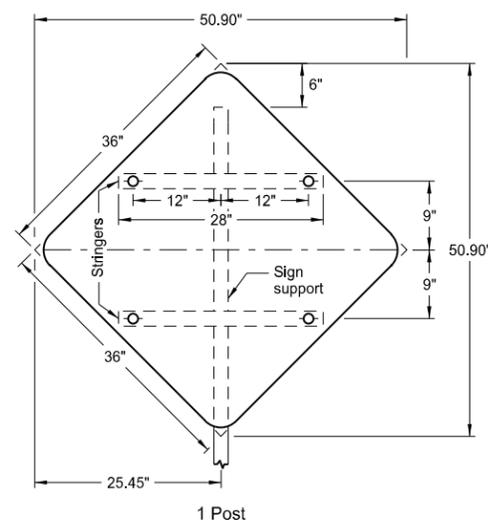
SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS REGULATORY, WARNING AND GUIDE SIGNS



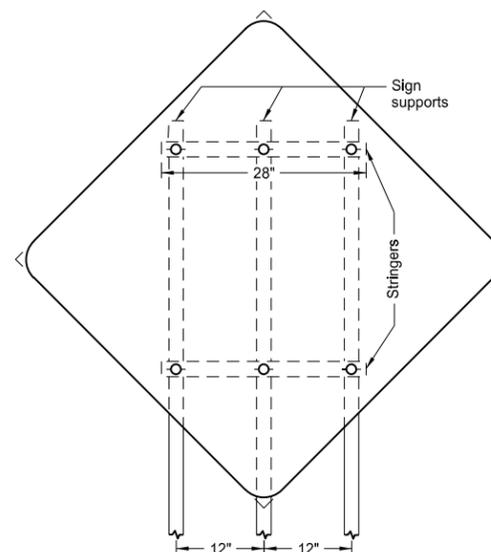
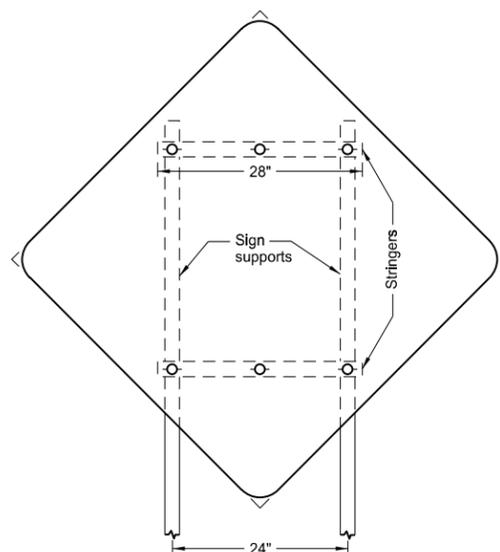
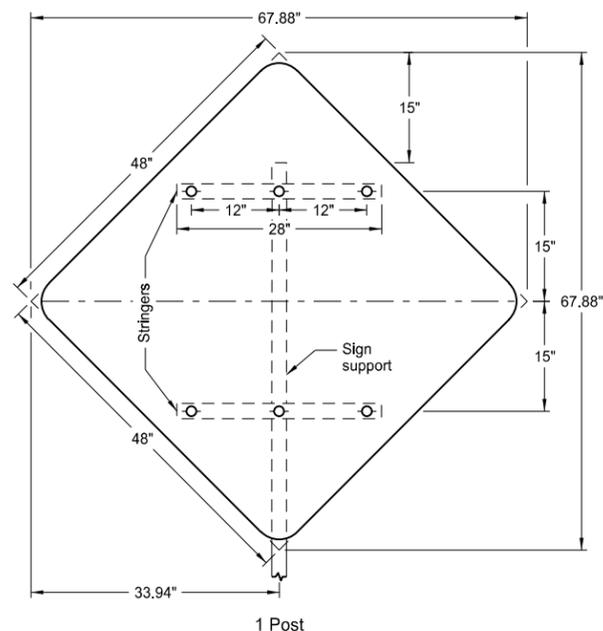
Assembly No. 18



Assembly No. 19



Assembly No. 20



Assembly No. 21

Notes:

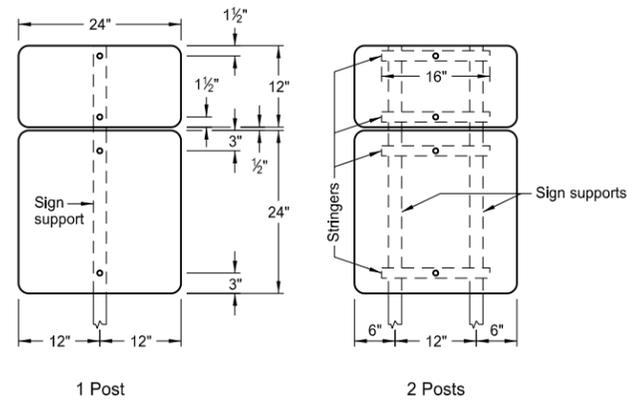
1. See Standard D-754-25 for mounting details.
2. The minimum sign backing material thickness shall be 0.100 inch.
3. Perforated square tube stringer shall be 1½" x 1½".
4. All holes shall be punched round for ⅜" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

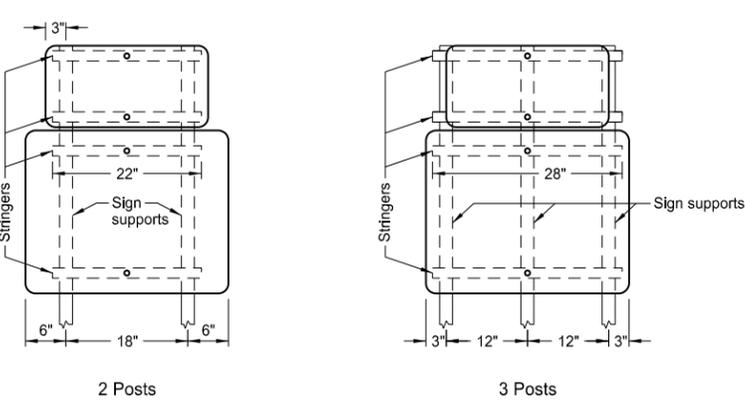
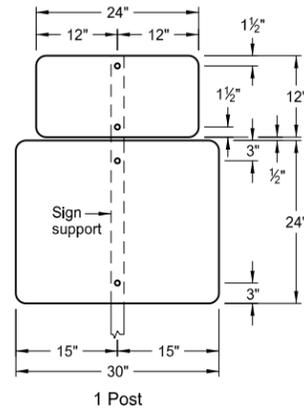
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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS - ROUTE MARKER SIGNS

D-754-51

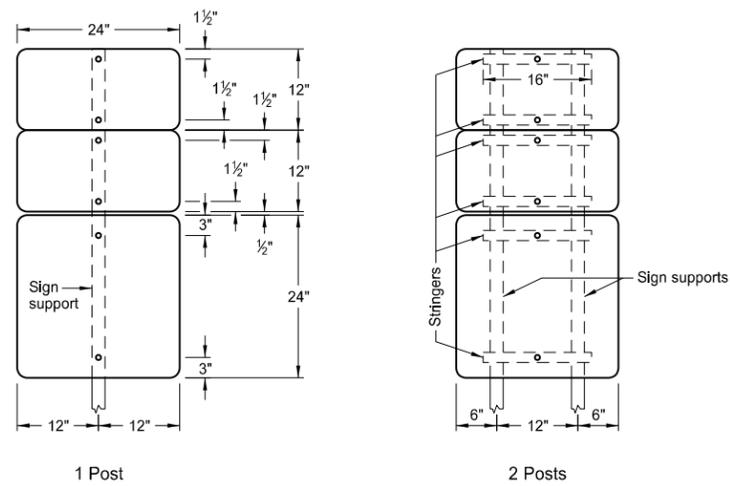


ASSEMBLY NO. 371

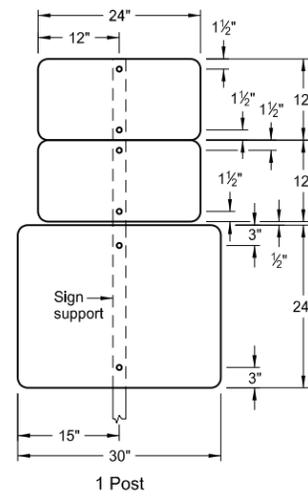
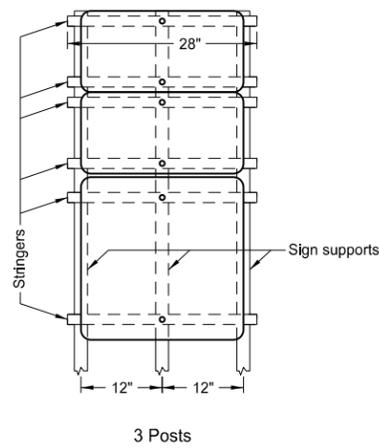


ASSEMBLY NO. 372

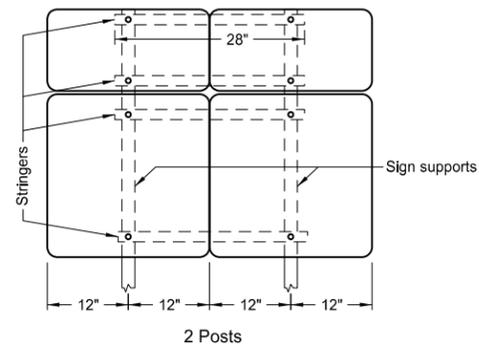
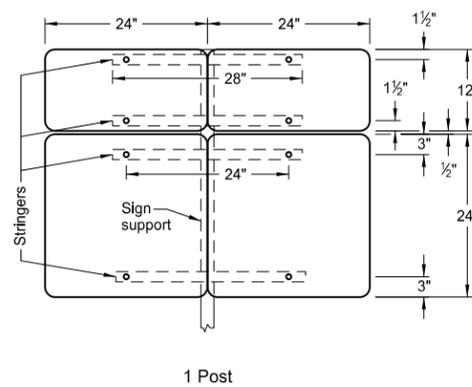
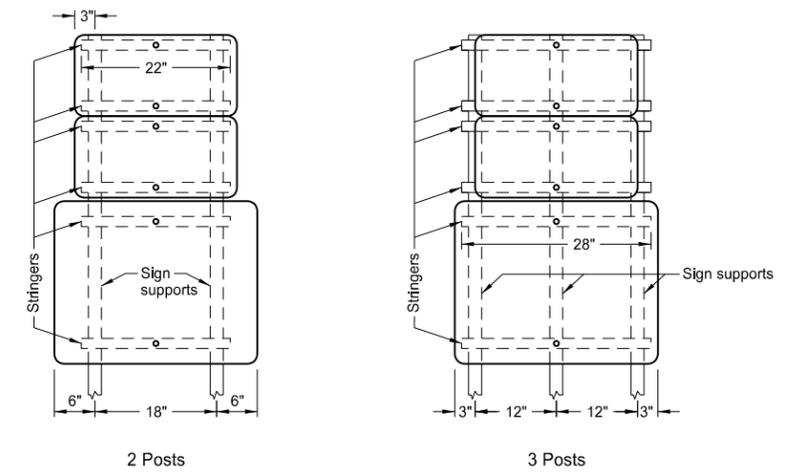
- Notes:
1. The minimum sign backing material thickness shall be 0.100 inch.
 2. Perforated square tube stringer shall be 1 1/2"x1 1/2".
 3. All holes shall be punched round for 3/8" bolt.



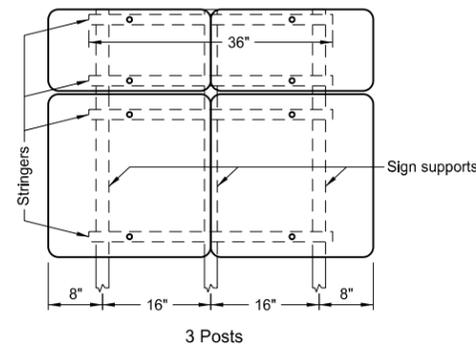
ASSEMBLY NO. 373



ASSEMBLY NO. 374



ASSEMBLY NO. 375

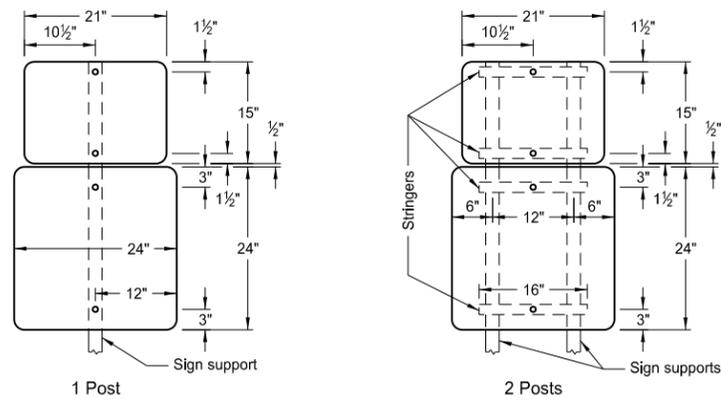


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE

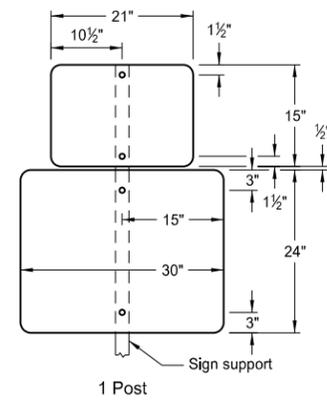
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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS - ROUTE MARKER SIGNS

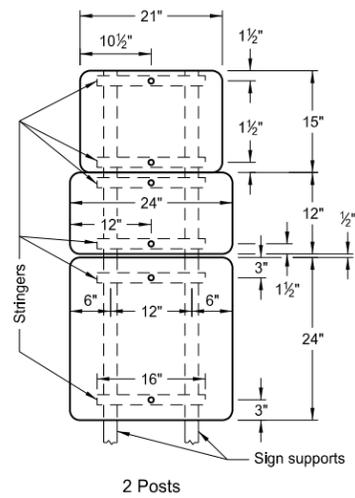
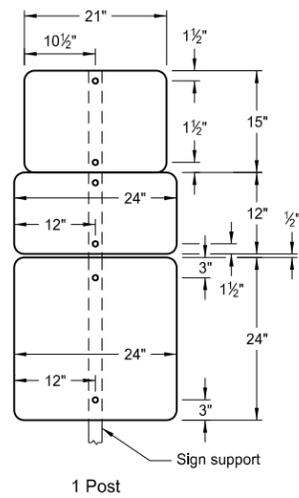
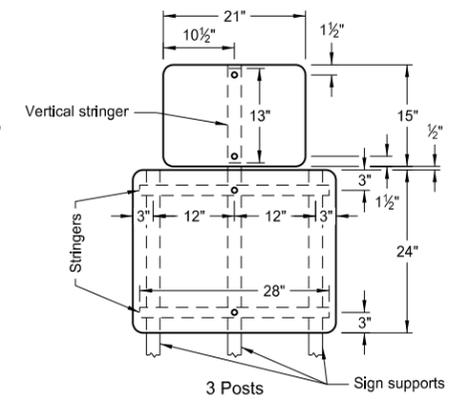
D-754-57



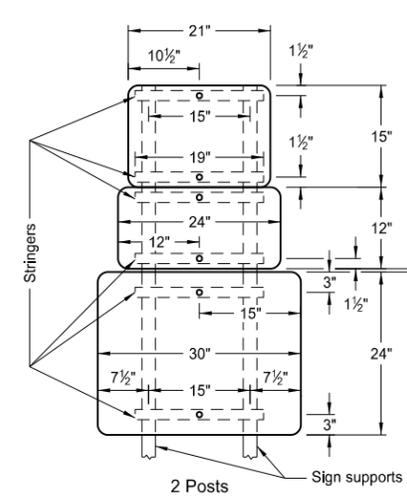
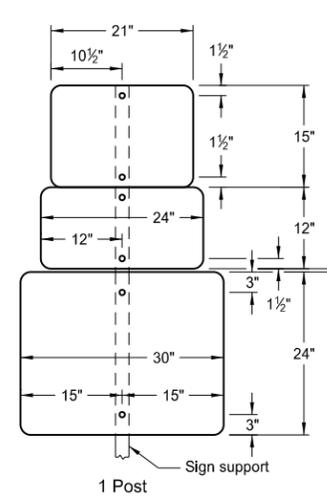
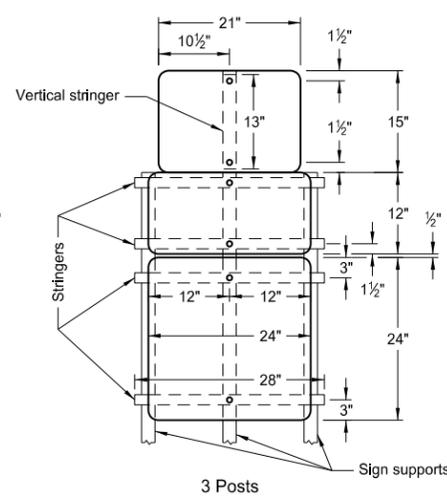
ASSEMBLY 391



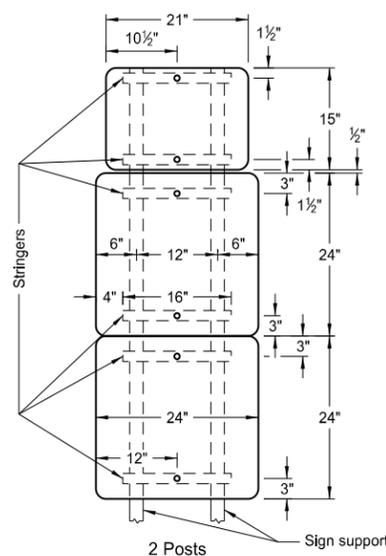
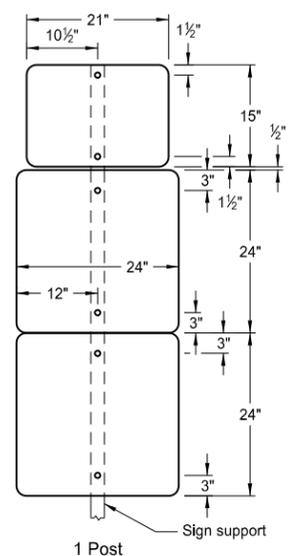
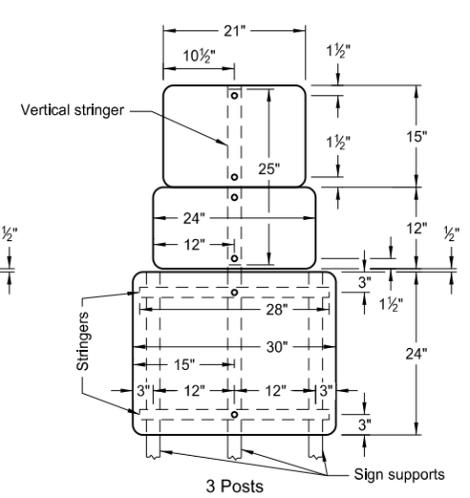
ASSEMBLY 392



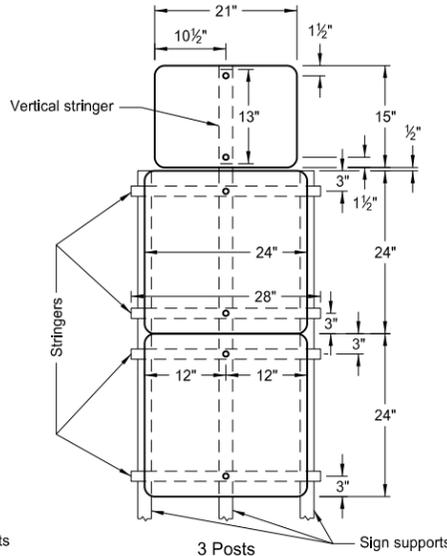
ASSEMBLY 393



ASSEMBLY 394



ASSEMBLY 395



Notes:

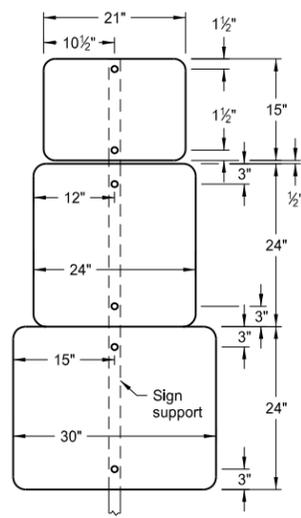
1. The minimum sign backing material thickness shall be 0.100 inch.
2. Perforated square tube stringer shall be 1 1/2"x1 1/2".
3. All holes shall be punched round for 3/8" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-22-12	
REVISIONS	
DATE	CHANGE

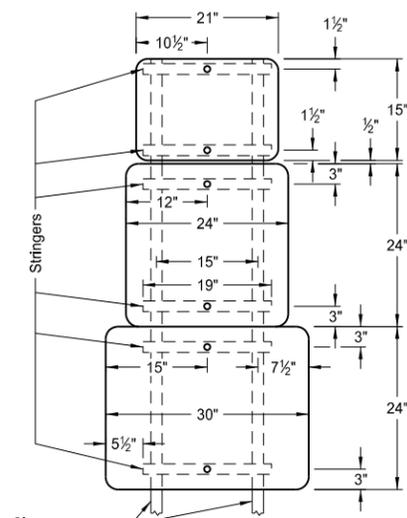
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SIGN PUNCHING, STRINGER AND SUPPORT LOCATION DETAILS - ROUTE MARKER SIGNS

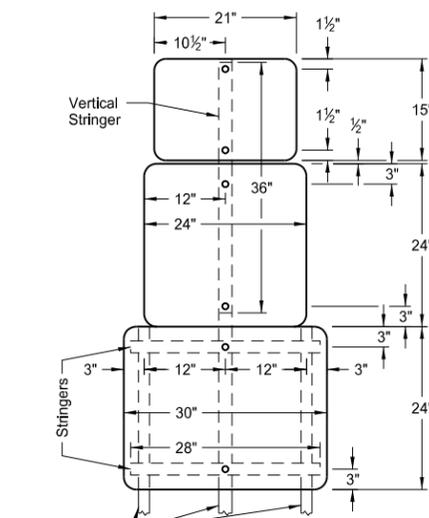
D-754-58



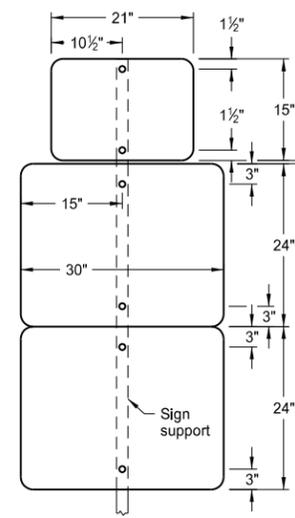
1 Post



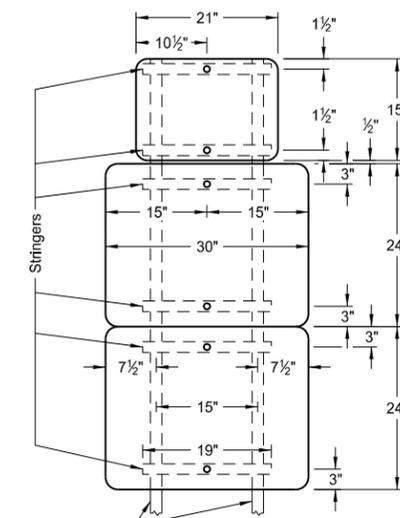
2 Posts
ASSEMBLY 396



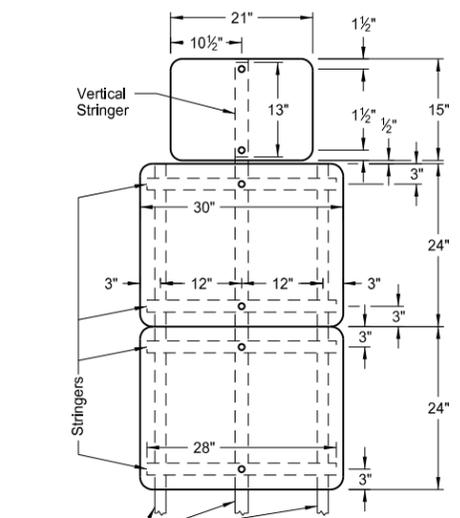
3 Posts



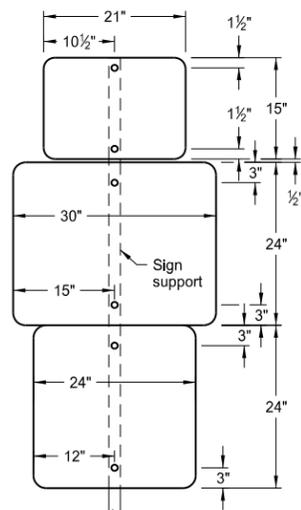
1 Post



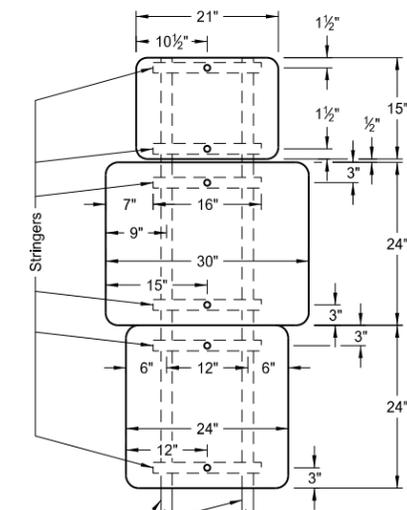
2 Posts
ASSEMBLY 397



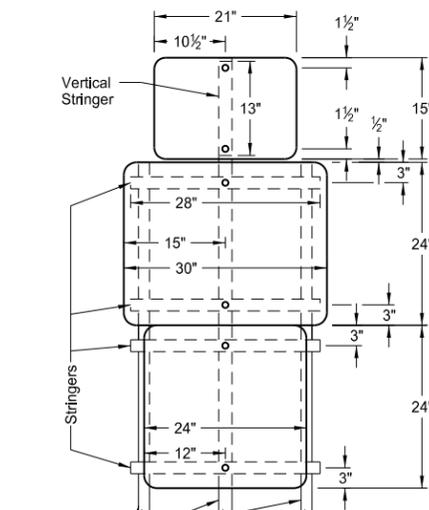
3 Posts



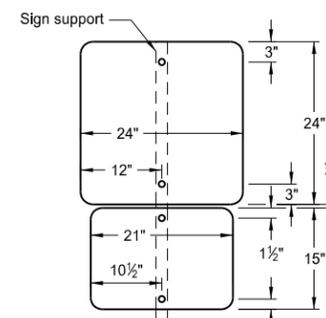
1 Post



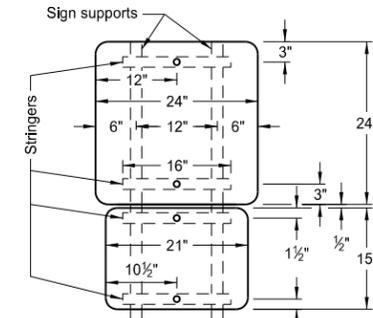
2 Posts
ASSEMBLY 398



3 Posts



1 Post



2 Posts

ASSEMBLY 399

Notes:

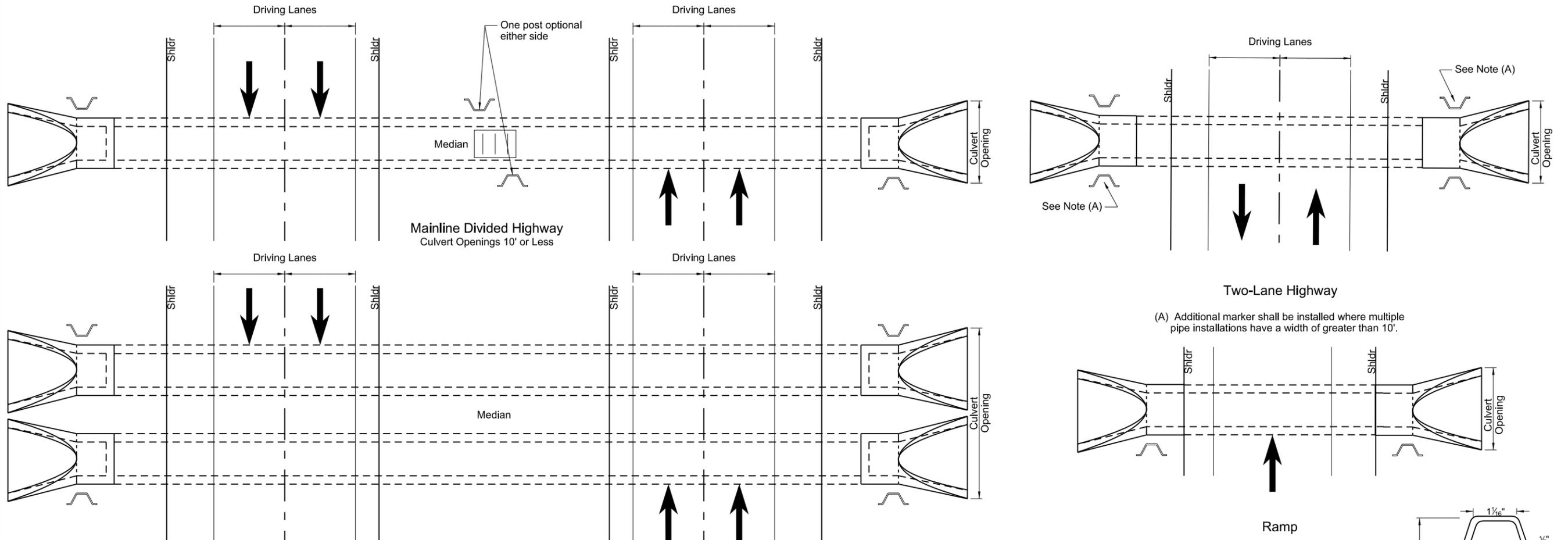
1. The minimum sign backing material thickness shall be 0.100 inch.
2. Perforated square tube stringer shall be 1 1/2"x1 1/2".
3. All holes shall be punched round for 3/8" bolt.

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION 8-22-12	
REVISIONS	
DATE	CHANGE

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OBJECT MARKERS - CULVERTS

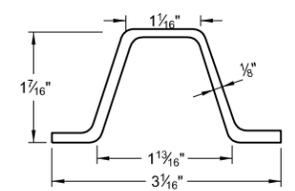
D-754-83



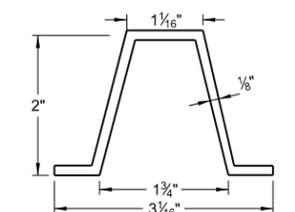
Post Location

Mainline Divided Highway
Culvert Openings Greater than 10'
Multiple Installations

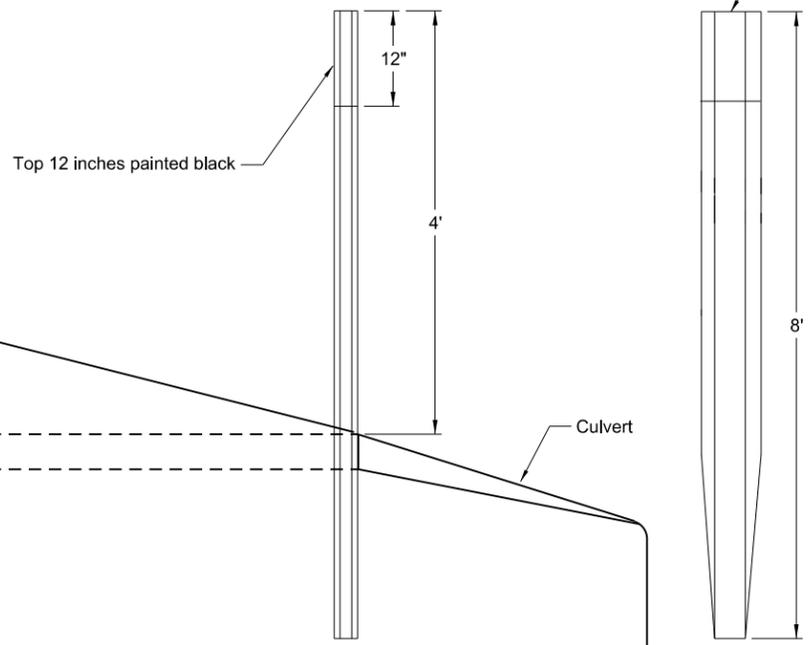
(A) Additional marker shall be installed where multiple pipe installations have a width of greater than 10'.



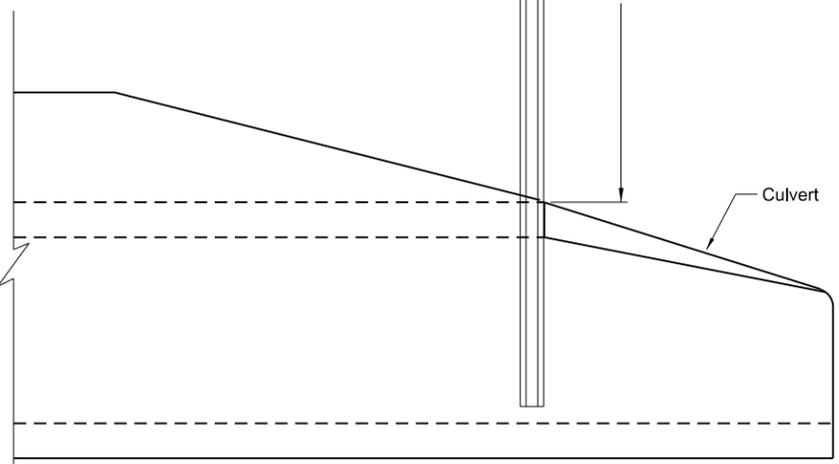
Steel Post Detail
Approx. 2.0 lbs/ft



Aluminum Post Detail
Approx. 0.88 lbs/ft



U-Type Post



Installation

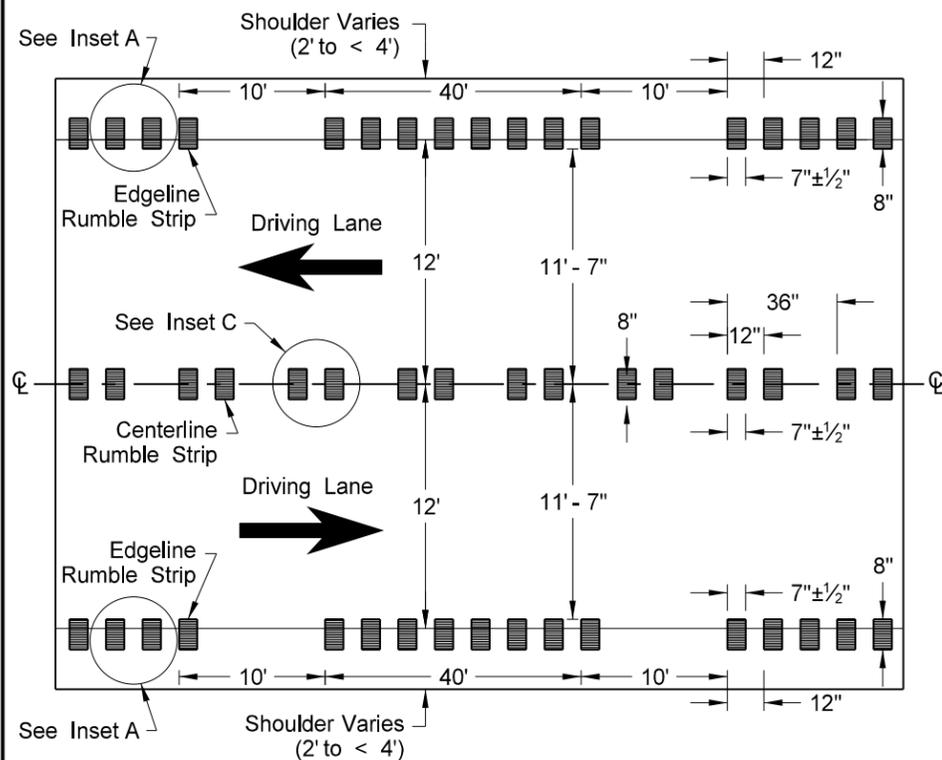
Notes:

- Installation:** Construction requirements shall meet 754.04D. Each end of culverts crossing the roadway within the right-of-way shall be marked with a post as shown. Posts are to be installed in front of the culvert in the direction of travel along the side of the culvert and one foot from the culvert opening unless shown otherwise on the plans.
- Posts:** Posts shall conform to section 894.04A of the Standard Specifications with the exception that the post may or may not have holes drilled.
- Basis of Payment:** The quantity will be measured by the number of object markers each installed. All costs for furnishing and installing the markers shall be included in the price bid for the item "Object Markers - Culverts".

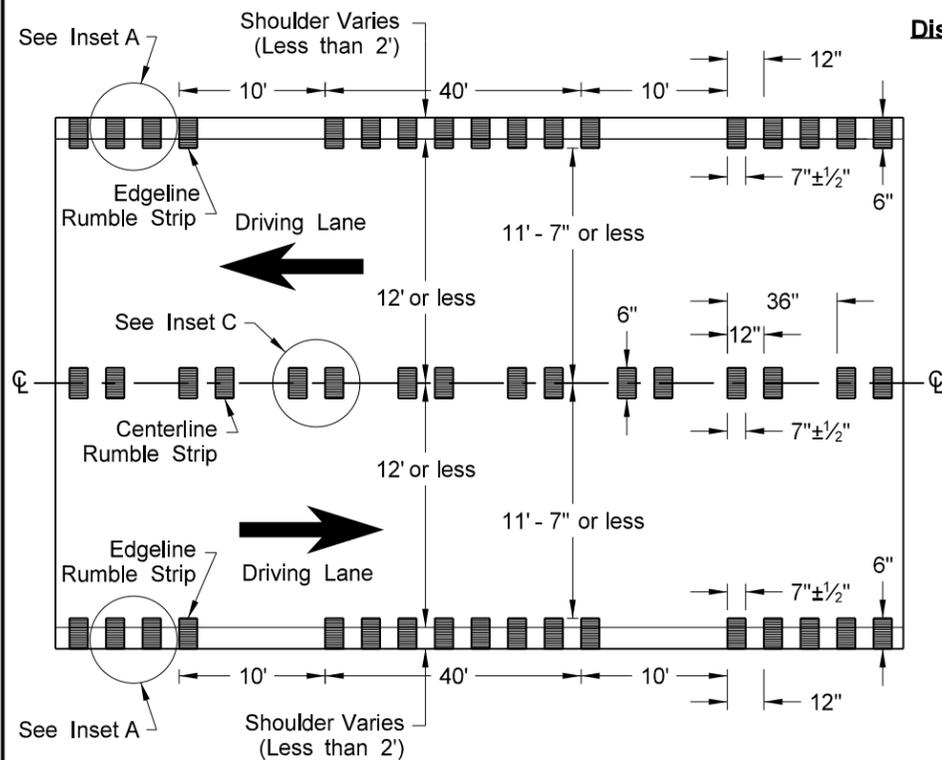
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION 8-05-13	
REVISIONS	
DATE	CHANGE
7-7-14	Revised Notes

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Registration Number
PE-2930,
on 7/7/2014 and the original document is stored at the North Dakota Department of Transportation

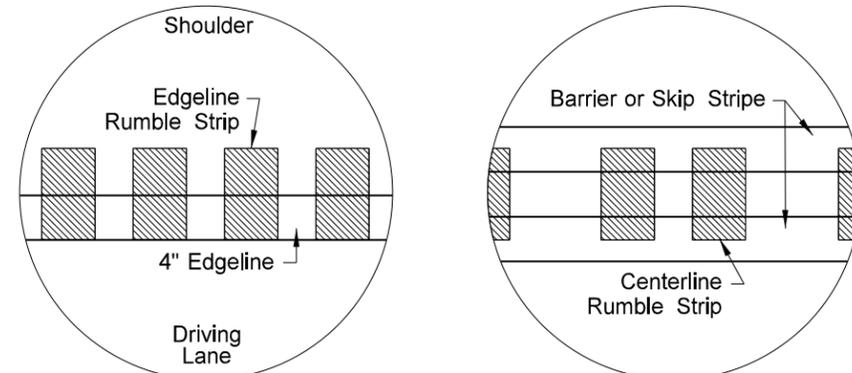
RUMBLE STRIPS
UNDIVIDED HIGHWAYS (SHOULDERS LESS THAN 4')



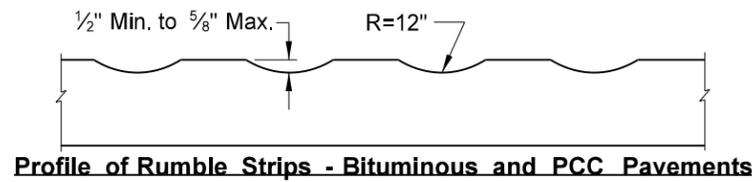
Undivided Highways (12' Driving Lanes & Shoulders 2' to < 4')



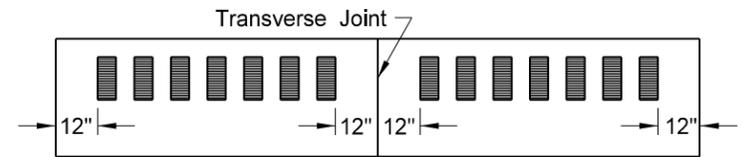
Undivided Highways (12' Driving Lanes or less & Shoulders Less than 2')



Inset A - Edgeline Rumble Strip Inset C - Centerline Rumble Strip



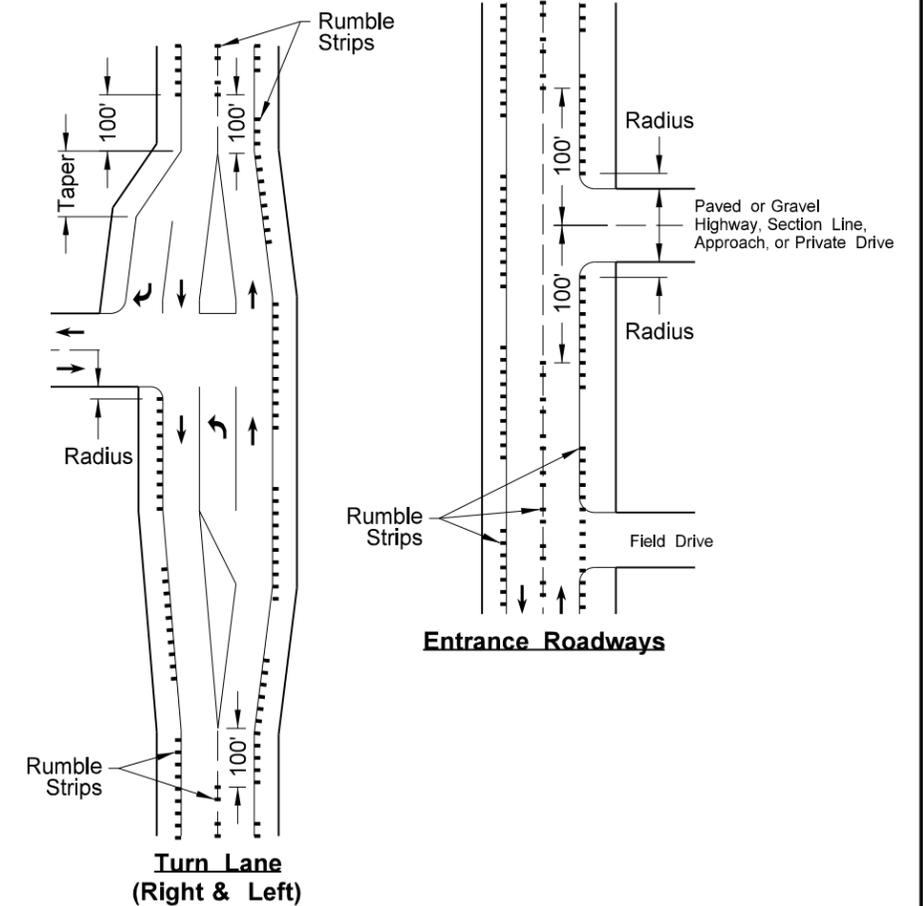
Profile of Rumble Strips - Bituminous and PCC Pavements



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

NOTES:

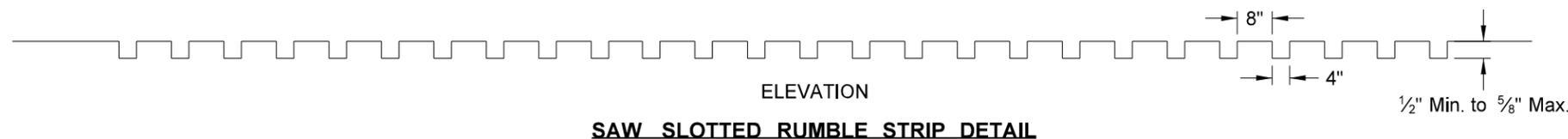
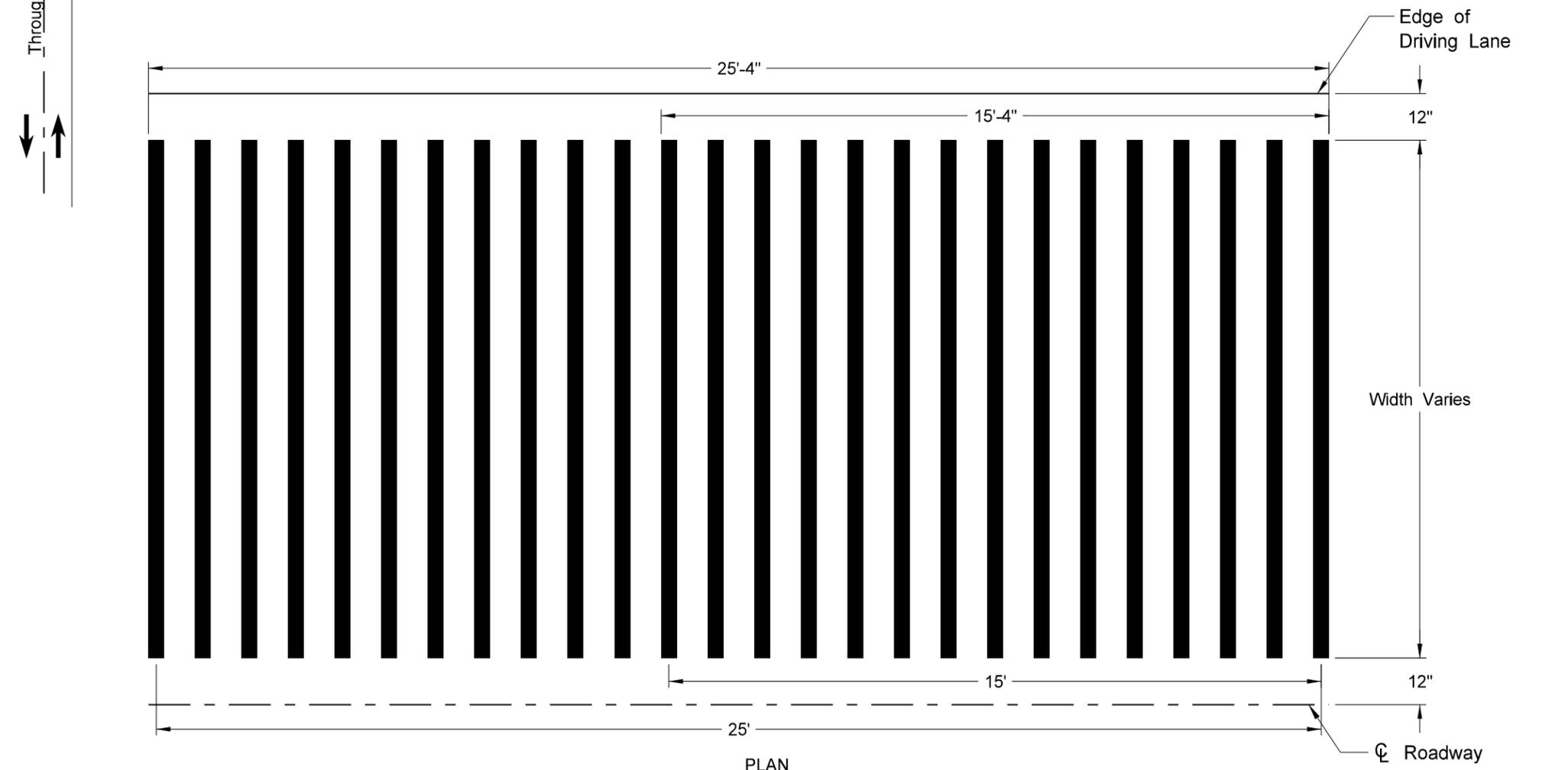
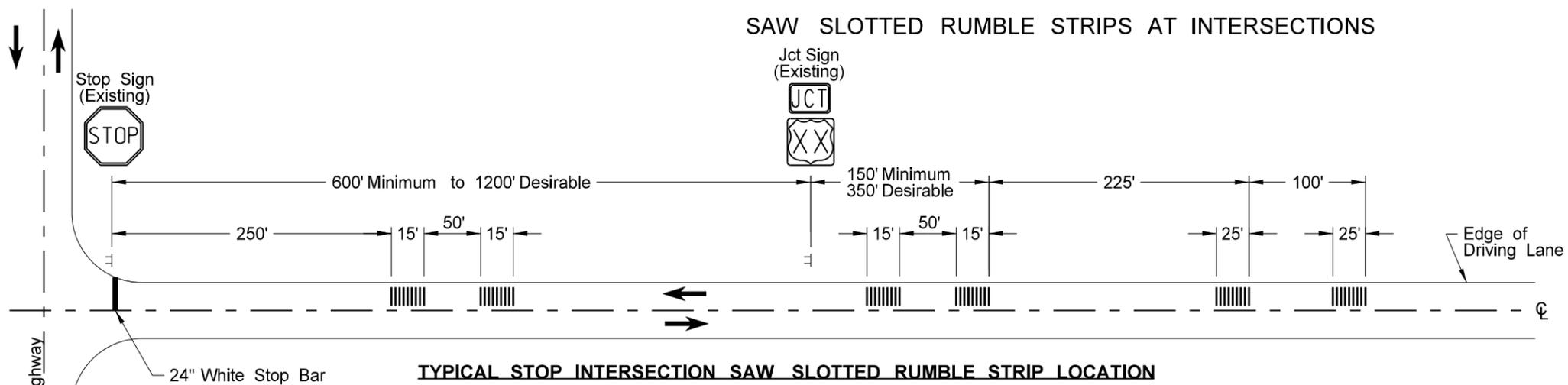
- 1) Discontinue edgeline rumble strips through the entire length of right turn lanes, 100' before right turn lane tapers, and at the radius of a paved or gravel highway, section line, approach, or private drive.
- 2) Discontinue centerline rumble strips through the entire length of left turn lanes, 100' before left turn lane tapers and median islands, 100' before and after a paved or gravel highway, section line, approach, or private drive.



NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-29-09	
REVISIONS	
DATE	CHANGE
2-25-10	Note 4 was added.
4-19-10	Revised Note 5, Note 6, and Turn Lane (Right & Left).
9-8-11	Revised Notes and D-760-4.
1-26-12	Revised details for rumble strip widths and dimensions.

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SAW SLOTTED RUMBLE STRIPS AT INTERSECTIONS

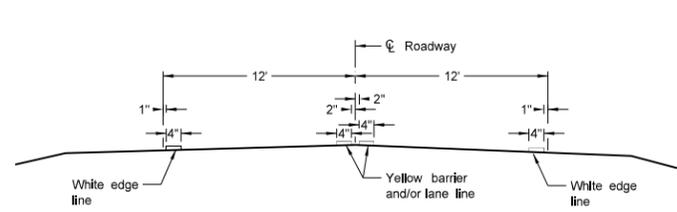


NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-29-09	
REVISIONS	
DATE	CHANGE
2-22-10	Saw Slotted width revised.
2-25-10	Note 7 was added.
9-8-11	Revised Notes and D-760-5.
7-7-14	Deleted Notes.

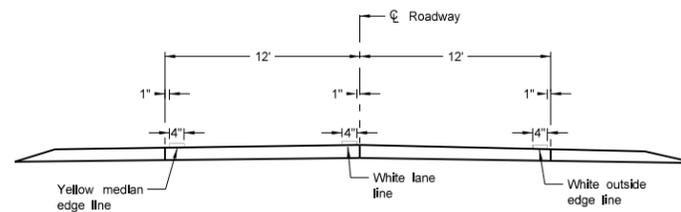
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PAVEMENT MARKING

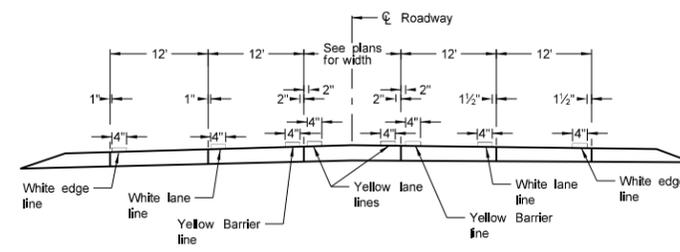
D-762-4



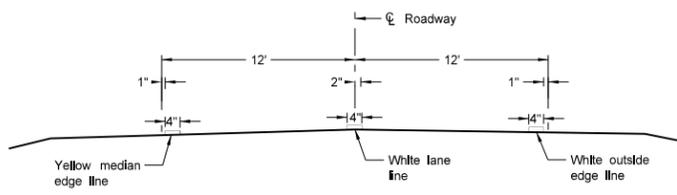
Two Lane Two Way
RURAL ROADWAY



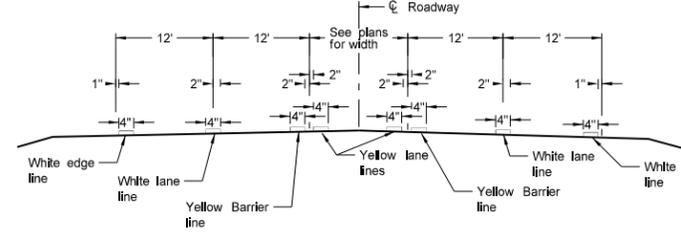
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



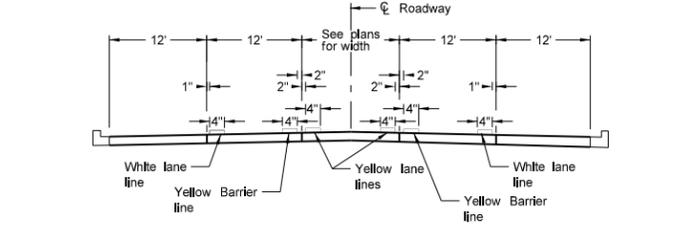
RURAL FIVE LANE ROADWAY
Concrete Section



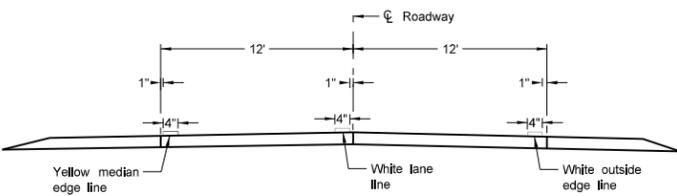
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



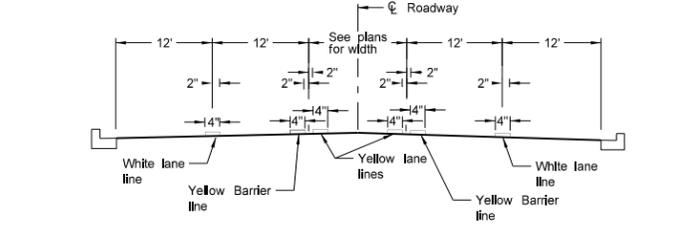
RURAL FIVE LANE ROADWAY
Asphalt Section



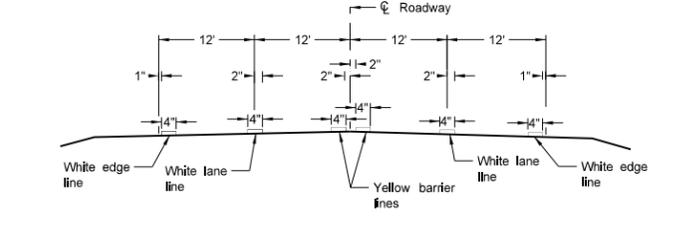
URBAN FIVE LANE SECTION
Concrete Section



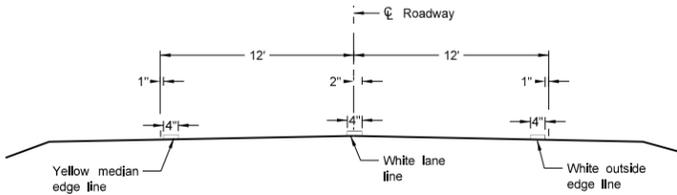
Two Lane Roadway
PRIMARY HIGHWAY
Concrete Section



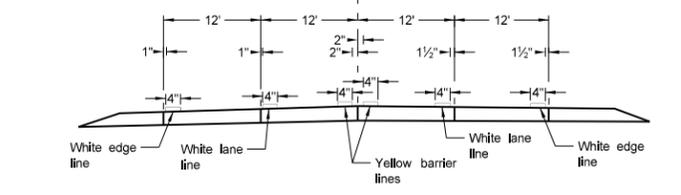
URBAN FIVE LANE SECTION
Asphalt Section



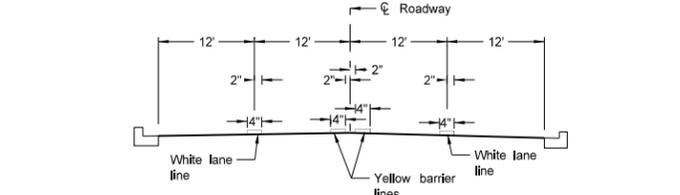
RURAL FOUR LANE ROADWAY
Asphalt Section



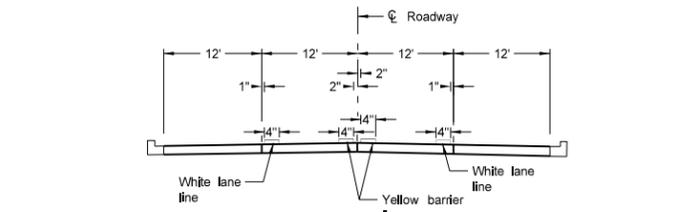
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



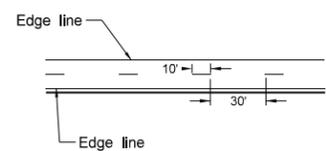
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

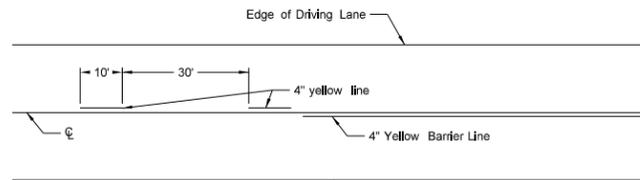
NOTES:

- 1. Edge lines shall be continued through private drives and field drives and broken for intersections.

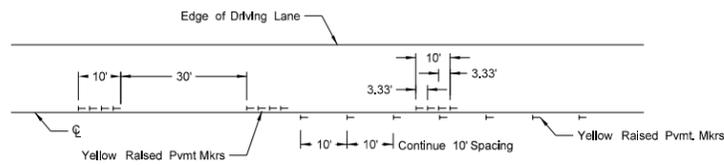
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

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SHORT-TERM PAVEMENT MARKING

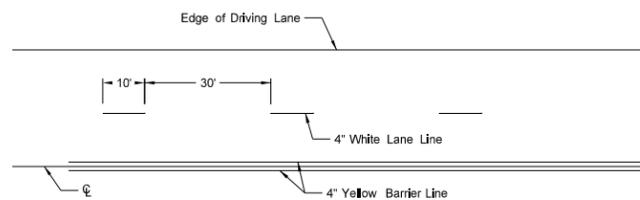


Painted or Tape Lines

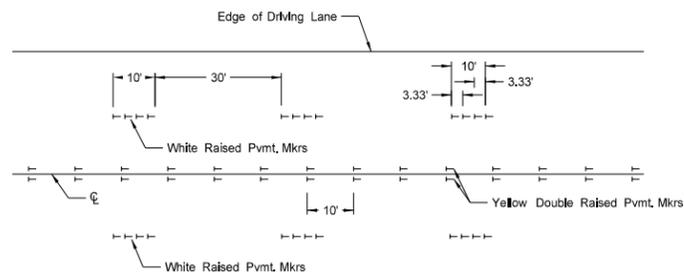


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

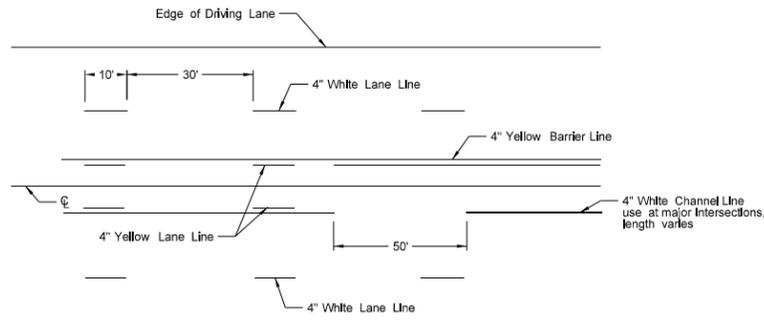


Painted or Tape Lines

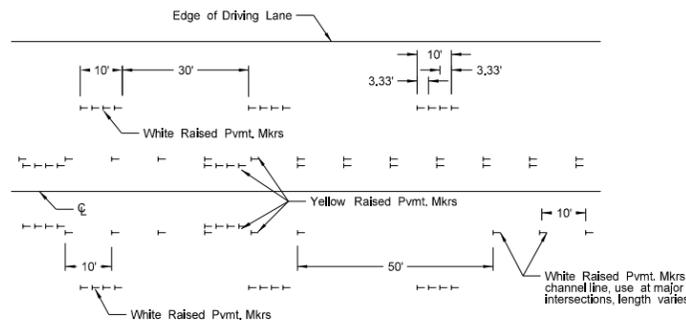


Raised Pavement Markers

FOUR LANE ROADWAY

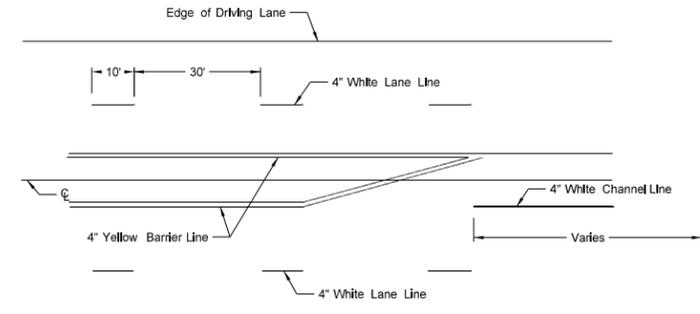


Painted or Tape Lines

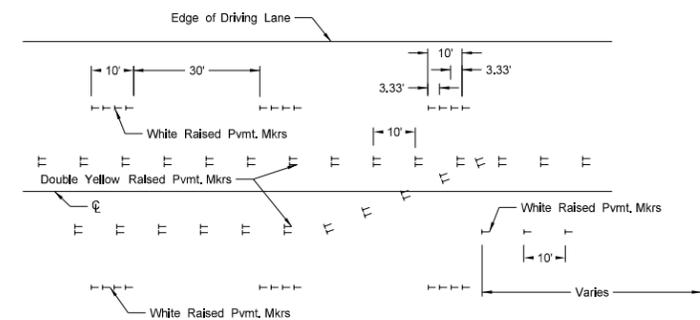


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

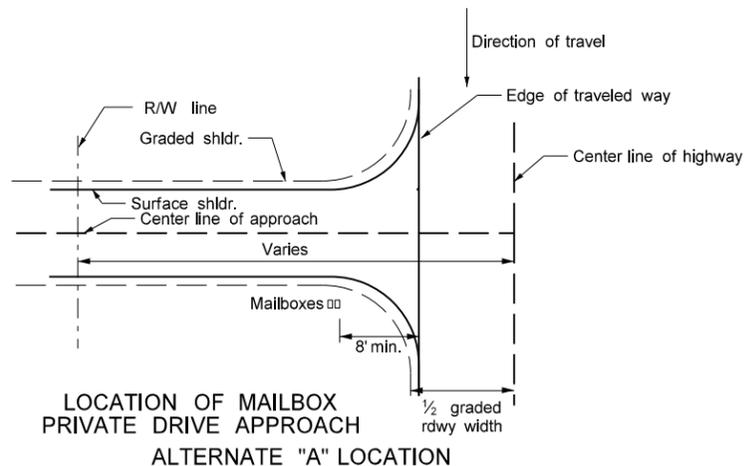
NOTES:

1. Two-lane two-way roadways shall have no passing zones placed as shown. No passing zone signs may be placed in lieu of short term no passing zone pavement markings. These signs will be allowed to remain in place for three days, at which time the short term no passing zone pavement marking shall be placed.
2. Short term center line stripe (paint) on top lift shall be carefully placed with exact spacing so that the permanent stripe will match when applied.
3. Raised markers and tape markings shall be removed after permanent pavement marking has been installed. Removed markings shall become the property of the contractor.

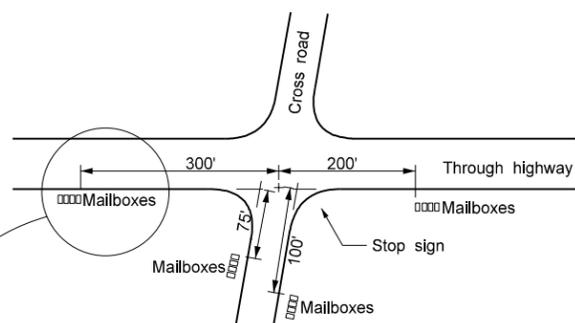
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-1-10	
REVISIONS	
DATE	CHANGE

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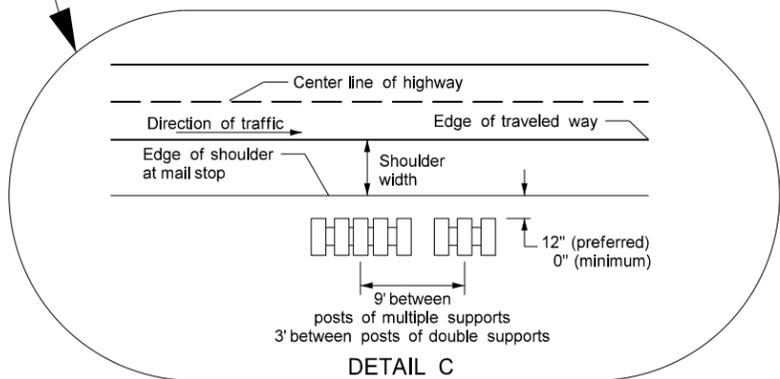
MAILBOX LOCATION DETAILS



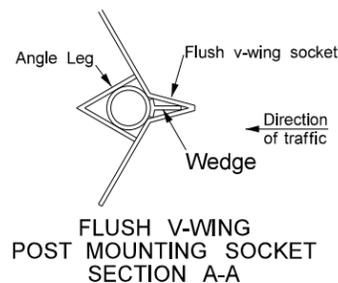
LOCATION OF MAILBOX PRIVATE DRIVE APPROACH ALTERNATE "A" LOCATION



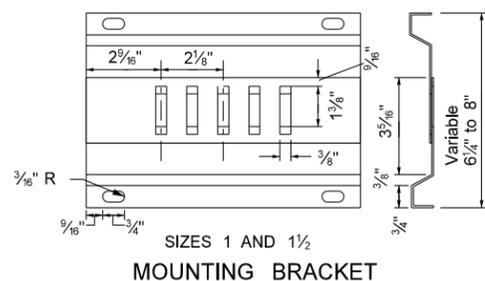
MINIMUM CLEARANCE DISTANCE TO NEAREST MAILBOX ALONG ROADWAY AT INTERSECTIONS ALTERNATE "B" LOCATION



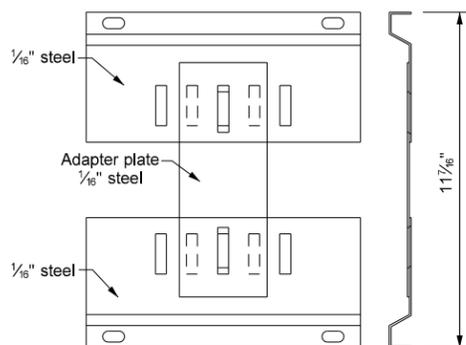
DETAIL C



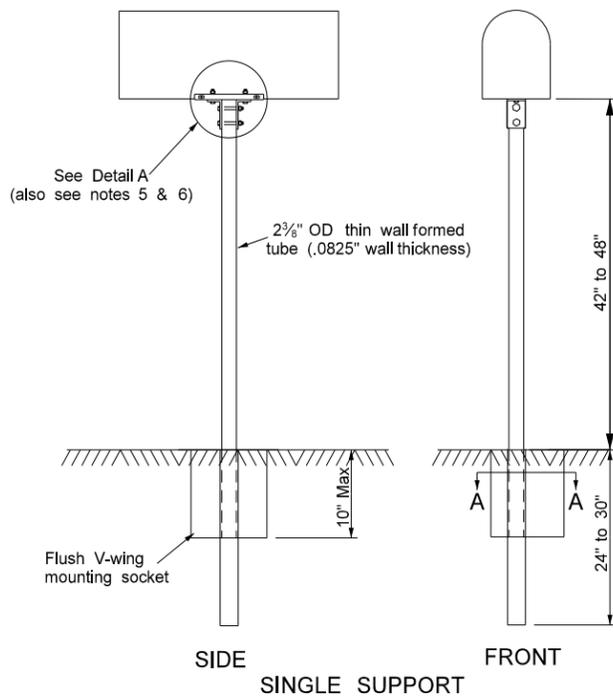
FLUSH V-WING POST MOUNTING SOCKET SECTION A-A



SIZES 1 AND 1/2 MOUNTING BRACKET



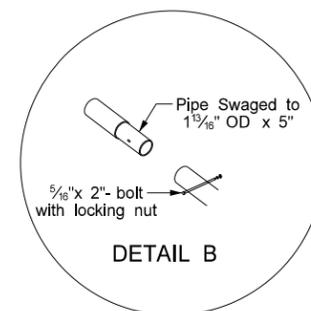
SIZE 2 WITH ADAPTOR PLATE MOUNTING BRACKET



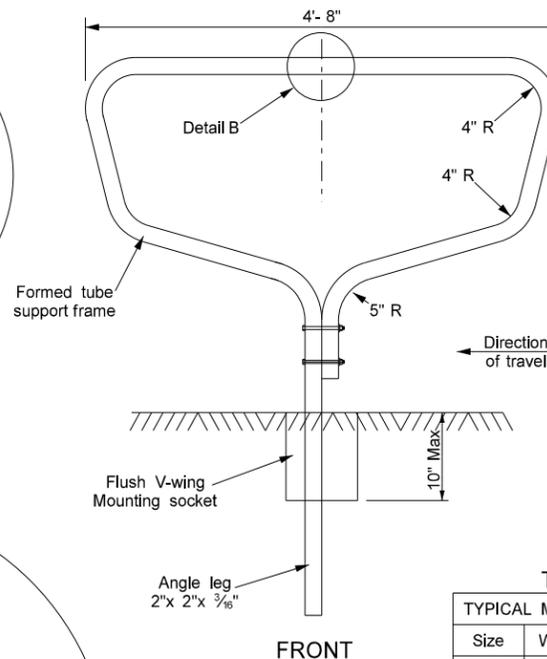
SIDE FRONT SINGLE SUPPORT

Notes:

- The mailbox support and hardware details shall consist of the "V-Loc Mailbox Support System" manufactured by: Tapco Traffic & Parking Control Co. Inc. Any other equal support system meeting the requirements of NCHRP Report 350, which has been crash tested, and approved by the Federal Highway Administration may be used. Approved alternate mailbox assemblies shall be installed in the manner and arrangement crash tested.
- The preferred location for all mailboxes is the Alternate "A" location. However, the Engineer may approve the Alternate "B" location if warranted by existing field conditions.
- Postal regulations require that mailboxes must be located on the right-hand side of the road in the direction traveled by the carrier. Therefore, the Engineer shall contact the local carrier or postmaster before installing new mailboxes to verify the direction of travel.
- Mailboxes installed on private drive approaches must always be located on the downstream side of the approach.
- Install angle connection parallel to traffic flow for size 2 mailbox mounted on single posts.
- Size 2 mailbox mounted on multiple support requires 2 each, 3/8" by 3/4" bolts with lock washers and nuts to attach the adaptor plate to mounting bracket. The unit will then require 4 angle connections to attach to the formed tube support frame. See Detail A.
- Space multiple support frames a minimum of 4 feet apart. Space single support frames a minimum of 3 ft apart. Do not place more than five No. 1 mailboxes, three No. 2 mailboxes, or any combination of four No. 1-A and No. 2 mailboxes on multiple support frames.



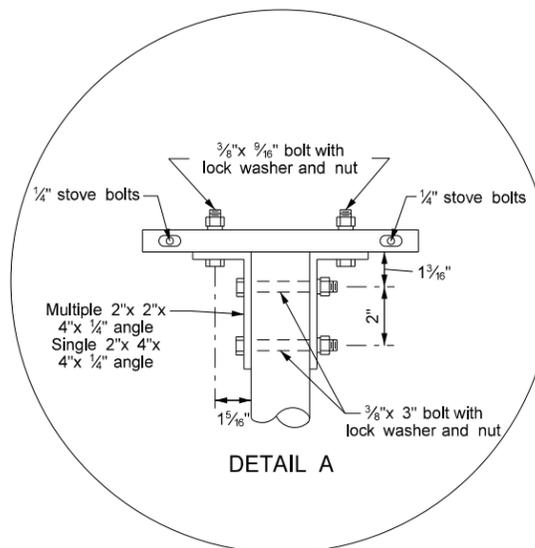
DETAIL B



FRONT

TABLE A

TYPICAL MAILBOX DIMENSIONS			
Size	Width	Height	Length
1	6.5"	8.5"	19"
1A	8"	10.5"	21"
2	11.5"	13.5"	23.5"



DETAIL A

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-15-2010	
REVISIONS	
DATE	CHANGE

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