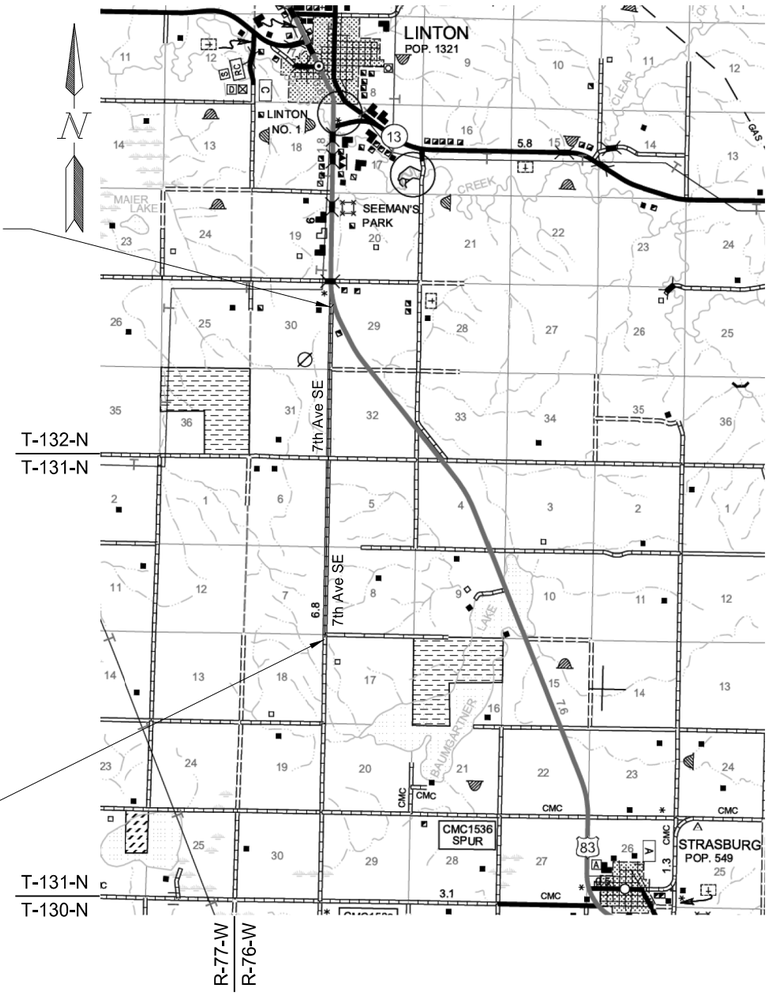
DESIGN DATA				
Traffic	Average Daily			Max.Hr.
Current 2017	Pass: NA	Trucks: NA	Total: <150	NA
Forecast 2037	Pass: NA	Trucks: NA	Total: <150	NA
Clear Zone Distance: 18'		Design Speed: 55 MPH		
Minimum Sight Dist. for Stopping: 495'		Bridges: N/A		
Minimum Sight Dist. for Safe Passing: NA				

STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
ND	SC-CNOB-CNOC-1517(001)	21769	1	1

JOB # 2
EMMONS COUNTY
NORTH DAKOTA

Federal Aid Project SC-CNOB-CNOC-1517(001)
7th Ave SE Grading, Culverts, Aggregate Surfacing, & Incidentals

Project begins at the intersection of 7th Ave SE and US Hwy 83,
extending 3.834 miles



Begin 7th Ave SE
Sta 11+57.3

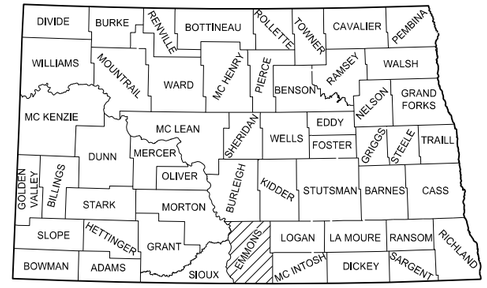
a point .91 feet
West and 1038.45
feet South of the NE
Corner of Section 30
Township 132
North, Range 76
West, 5th P.M.,
Emmons County, North
Dakota.

End 7th Ave SE
Sta 214+00

a point .91 feet
East and 100
feet South of the NE
Corner of Section 18
Township 131
North, Range 76
West, 5th P.M.,
Emmons County, North
Dakota.

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.

DESCRIPTION	NET MILES	GROSS MILES
CMC 1517 / 7th Ave SE	3.834	3.834



STATE COUNTY MAP

DESIGNERS

Dan Green, PE

Andrew Gottsman, PE

Josh Forsgren, EIT

Bartlett & West
Driving Community and Industry Forward, Together.
3456 E. Century Avenue
Bismarck, ND 58503
(701) 258-1110

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 05/12/17

Dan Green, PE
BARTLETT & WEST, INC.

This document was originally issued and sealed by Daniel N. Green Registration Number PE- 7616, on 05/12/17 and the original document is stored at the office of Bartlett & West

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-CNOB-CNOC-1517(001)	2	1

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Special Provisions

0003(14) Temporary Erosion and Sediment Best Management Practices

5613(14) Permits and Environmental Considerations

LIST OF STANDARD DRAWINGS

Standard No.	Description
D-101-1, 2, 3	NDDOT Abbreviations
D-101-10	NDDOT Utility Company and Organization Abbreviations
D-101-20, 21	Line Styles
D-101-30, 31, 32	Symbols
D-203-8	Standard Rural Approaches
D-261-1	Erosion Control – Fiber Roll Placement Details
D-704-7, 8, 9, 11	Construction Sign Details
D-704-13	Barricade and Channelizing Device Details
D-704-14	Construction Sign Punching and Mounting Details
D-704-15	Road Closure Layouts
D-704-22	Construction Truck and Temporary Detour Layouts
D-704-26	Miscellaneous Sign Layouts
D-704-30	Windrow Marking
D-704-31	Construction Sign Layout
D-704-50	Portable Sign Support Assembly
D-708-6	Erosion and Siltation Controls
D-714-1	Reinforced Concrete Pipe Culverts and End Sections (Round Pipe)
D-714-4	Round Corrugated Steel Pipe Culverts and End Sections
D-714-22	Concrete Pipe or Precast Concrete Box Culvert Ties
D-714-25	Transverse Mainline Pipe Excavation and Installation Detail for Pipes More Than 4 Feet Below the Top of Proposed Subgrade
D-714-26	Transverse Mainline Pipe Excavation and Installation Detail for Pipes 4 Feet or Less Below the Top of Proposed Subgrade
D-714- 27	Pipe Excavation and Installation Detail for Longitudinal Mainline Pipe or Pipe Not Under the Roadway
D-752-1	Standard Barbed Wire Fence
D-754-23	Perforated Tube Assembly Details
D-754-26	Sign Punching, Stringer, and Support Location Details Regulatory, Warning, and Guide Signs
D-754-86	911 Support Information and Sign Details
D-754-87	Sign Punching, Stringer and Support Location Details for Street Name Signs and 911 Signing
D-766-01	Mailbox Location Details

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-CNOB-CNOC-1517(001)	6	1

NOTES

105-P01 **UTILITY COORDINATION:** Arrange a post bid utility coordination meeting with affected utilities, Emmons County, and the Project Engineer. Hold meeting no later than two (2) weeks after the Contract has been signed. Provide an agenda, tentative construction schedule for planning utility relocations, and publish minutes for the meeting within 7 days of the meeting.

One-Call Service: 1-800-795-0555 or 811 in North Dakota.

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”.

201-P01 **CLEARING AND GRUBBING:** Clearing and grubbing includes the removal and disposal of shrubs, stumps, roots, brush, signs and other surface objects from the excavation and embankment areas along this project.

203-P01 **BORROW-EXCAVATION:** The borrow material required for the project is not available within the highway right of way. Locate and furnish the borrow material.

203-P02 **COMMON EXCAVATION – TYPE A:** During construction of the roadway, operate a motor grader and water truck within the construction area at all times to obtain uniform mixing, proper moisture content and density as determined by the engineer.

Complete finish grading work around the existing facilities in the construction area. Level any earth mounds, etc. that remain around the facilities. Include finish grading work in the bid price for “Common Excavation – Type A”.

Backslope rounding is required on cut sections. Include in the bid price for “Common Excavation – Type A”.

203-P03 **COMMON EXCAVATION - SUBCUT:** 200 CY of “Common Excavation – Subcut” has been included to be used at the engineer’s discretion. Construction requirements are outlined in Section 203.04 C.

203-P04 **TOPSOIL:** Quantities for topsoil are based upon an average depth of four (4) inches. Include hauling for spreading in the bid price for “Topsoil.” Payment will be made as outlined in Section 203.05 C.

203-010 **SHRINKAGE:** Twenty-five percent (25%) additional volume is included for shrinkage in earth embankment.

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

216-P01 **WATER:** Obtain all necessary permits prior to using any water source.

251-P01 **SEEDING:** The seeding quantity is based on disturbed areas within the grading limits. Any seeding necessary to areas outside those limits, due to the Contractor’s operations, is at the Contractor’s expense.

302-P01 **AGGREGATE SURFACE COURSE:** Furnish a scale, a scale operator, weigh tickets, and daily haul summaries as per section 109.01 J of the Standard Specifications.

302-P02 **SAMPLING, TESTING AND ACCEPTANCE:** Sampling, testing and acceptance are as per Section 302 of the NDDOT Standard Specifications and Field Sampling and Testing Manual.

302-P03 **AGGREGATE SURFACE COURSE:** Salvage the existing gravel surfacing from the road surface and stockpile at convenient locations. Place this material as the road top is finished to plan lines and grade, and use as temporary traffic surfacing until Aggregate Surface Course Class 13 can be placed. Include all costs associated with these operations in the bid price for “Aggregate Surface Course CL 13.”

704-P01 **TRAFFIC CONTROL:** Make embankment through the project traversable with 4:1 slopes or flatter the same day it is placed/removed, or provide 24 hour flagging at the Contractor’s expense.

704-P02 **TRAFFIC CONTROL FOR CONSTRUCTION OPERATIONS:** Traffic control for construction operations has been developed with the following Standard Drawings:

D704-	7, 8, 9, 11, 13, and 14 are applicable
D704-15	Layout Type A: for a temporary single lane closure for culvert work
D704-22	Layout K and L: for construction vehicles hauling material
D704-26	Layouts BB, EE: where the conditions exist
D704-30	Windrow Marking
D704-31	Construction Sign Layout – add “Road Closed Local Traffic Only” to entrances.

720-P01 **MONUMENTS:** Coordinate with the Engineer to ensure all public land corners are properly documented and referenced before disturbing the area immediately around the corners. The Engineer will reset disturbed public land corners.

752-P01 **FENCE:** Coordinate with the property owners and investigate prior to bid. Match existing gate locations and assemblies. If the fence or gates are unable to be reset, then supply labor, materials, and equipment to provide a similar fence and gates approved by the Engineer. Include all costs for labor, materials, and equipment to do this work in the bid price for “Fence Barbed Wire 4 Strand”.

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Notes

7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-CNOB-CNOC-1517(001)	6	2

ENVIRONMENTAL NOTES

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

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

NOTIFICATIONS TO BE FILED BY CONTRACTOR:
EN-9 Notification is required for work within 3 nautical miles of the airport. Complete the Federal Aviation Administration Notice of Proposed Construction or Alteration Form 7460-1 in accordance with 14 CFR 77.7 and 77.9 (at least 45 days before the start date of the proposed construction or alteration or the date an application for a construction permit is filed, whichever is earliest) (online at http://oeaaa.faa.gov).

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

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Environmental Notes

7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-CNOB-CNOC-1517(001)	8	1

SPEC	CODE	ITEM DESCRIPTION	UNIT	TOTAL
103	0100	CONTRACT BOND	L SUM	1
201	0330	CLEARING & GRUBBING	L SUM	1
202	0174	REMOVAL OF PIPE ALL TYPES & SIZES	LF	196
202	0312	REMOVE EXISTING FENCE	LF	23,000
203	0101	COMMON EXCAVATION-TYPE A	CY	37,807
203	0109	TOPSOIL	CY	12,208
203	0138	COMMON EXCAVATION - SUBCUT	CY	200
203	0140	BORROW-EXCAVATION	CY	27,248
216	0100	WATER	M GAL	1,380
251	0200	SEEDING CLASS II	ACRE	22.70
253	0101	STRAW MULCH	ACRE	22.70
261	0120	FIBER ROLLS 20IN	LF	6,832
261	0121	REMOVE FIBER ROLLS 20IN	LF	6,832
302	0356	AGGREGATE SURFACE COURSE CL 13	TON	31,653
702	0100	MOBILIZATION	L SUM	1
704	0100	FLAGGING	MHR	150
704	1000	TRAFFIC CONTROL SIGNS	UNIT	1,618
704	1052	TYPE III BARRICADES	EA	4
704	1067	TUBULAR MARKERS	EA	80
704	1080	STACKABLE VERTICAL PANELS	EA	150
709	0151	GEOSYNTHETIC MATERIAL TYPE R1	SY	705
714	4105	PIPE CONDUIT 24IN	LF	74
714	4106	PIPE CONDUIT 24IN - APPROACH	LF	446
714	4110	PIPE CONDUIT 30IN	LF	118
714	4115	PIPE CONDUIT 36IN	LF	78
752	0200	FENCE BARBED WIRE 4 STRAND	LF	22,842
754	0110	FLAT SHEET FOR SIGNS-TYPE XI REFL SHEETING	SF	12.7
754	0112	FLAT SHEET FOR SIGNS-TYPE IV REFL SHEETING	SF	18.0
754	0206	STEEL GALV POSTS-TELESCOPING PERFORATED TUBE	LF	63
766	0100	MAILBOX - ALL TYPES	EA	1

Quantities

7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-CNOB-CNOC-1517(001)	10	1

		Stations		
		11+57 To 107+00	107+00 To 214+00	
Material	**Unit**			TOTAL
Aggregate Base Course CL 13 @ 1.875 Ton/CY	Ton	16,567	14,466	31,033
Private Drives (2)	Ton	80		80
Section Line/Public Roads (4)	Ton	160		160
Field Approaches (9)	Ton	180		180
Project ends/Transitions (100 Tons Each)	Ton	100	100	200

Water

20 Gal/Ton for Aggregates	= 31,653 Tons x 20/1000 =	633 MGal
10 Gal/CY for Embankment	= 65,055 CY x 10/1000 =	650 MGal
25 MGal/mile for Dust	= 3.864 miles x 25 =	97 MGal

Topsoil
4 inches

Seeding/Mulching
Disturbed area within construction limits not being surfaced

Mailbox
1 @ 15+87 Lt

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Basis of Estimate

7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-CNOB-CNOC-1517(001)	11	1

Station	End Areas (SF)		Adjusted Volume (CY)		Mass Ordinate
	Excavation	Fill	Excavation	Fill*	
11+57.31	36.6	0	0	0.0	0
12+00.00	9.7	1	36.6	1.0	35.6
13+00.00	7.2	8.5	31.3	22.0	44.9
14+00.00	8.7	1.5	29.4	23.1	51.2
15+00.00	40.2	0	90.6	3.5	138.3
15+71.00	216.7	0	337.8	0.0	476.1
16+00.00	78.5	0	158.5	0.0	634.6
17+00.00	43.2	0	225.4	0.0	860.0
18+00.00	32.6	0	140.4	0.0	1000.4
19+00.00	6.8	8	73	18.5	1054.9
20+00.00	0.1	18.2	12.8	60.6	1007.1
21+00.00	0	31.8	0.2	115.8	891.5
22+00.00	0	25.8	0	133.4	758.1
22+80.50	0	15.4	0	76.8	681.4
23+00.00	3.7	14.8	1.3	13.6	669.1
24+00.00	3.3	17.1	13	73.9	608.2
25+00.00	0	19.9	6.1	85.6	528.7
26+00.00	2.9	21.6	5.4	96.1	437.9
27+00.00	3.5	17.2	11.9	89.9	360.0
28+00.00	11.3	10.7	27.4	64.6	322.7
29+00.00	21.2	4.6	60.2	35.4	347.6
30+00.00	11.8	8.9	61.1	31.3	377.4
31+00.00	14.2	3	48.1	27.5	398.0
32+00.00	16.6	1.3	57	10.0	445.0
33+00.00	5.4	11	40.7	28.5	457.2
34+00.00	0	16	10	62.5	404.7
35+00.00	0	15.1	0	72.0	332.7
36+00.00	20.1	5.4	37.2	47.5	322.4
37+00.00	61.3	0.6	150.7	13.9	459.2
38+00.00	63.6	0.9	231.3	3.5	687.0
39+00.00	15.7	33.8	146.9	80.4	753.6
40+00.00	4.9	45.9	38.1	184.5	607.2
41+00.00	4.7	11.4	17.8	132.6	492.3
41+32.00	71.5	10.5	45.2	16.3	521.3
42+00.00	1.6	16.7	92.1	42.9	570.5
43+00.00	15.8	7.2	32.2	55.4	547.3
44+00.00	19.1	2.4	64.6	22.3	589.7
45+00.00	17	3.2	66.9	13.0	643.6
46+00.00	3.7	6.3	38.3	22.0	659.9
47+00.00	3.1	9.6	12.6	36.8	635.7
48+00.00	4.3	19.3	13.7	66.9	582.6
49+00.00	0	25.1	8	102.8	487.8
50+00.00	0	12.4	0	86.8	401.1
51+00.00	18.6	0	34.4	28.8	406.7
52+00.00	46.7	0	120.9	0.0	527.6
53+00.00	62.4	0	202	0.0	729.6
53+99.56	179.8	0	446.5	0.0	1176.1
54+00.00	180.8	0	2.9	0.0	1179.0
55+00.00	83.1	0	488.7	0.0	1667.7

Station	End Areas (SF)		Adjusted Volume (CY)		Mass Ordinate
	Excavation	Fill	Excavation	Fill*	
56+00.00	38	0.3	224.3	0.8	1891.3
57+00.00	33.2	0.4	131.9	1.6	2021.6
58+00.00	64.5	0	180.9	0.9	2201.6
59+00.00	78.2	0	264.3	0.0	2465.9
60+00.00	61.2	0	258.1	0.0	2724.0
61+00.00	32.1	5.5	172.8	12.8	2884.1
62+00.00	13.1	22.9	83.7	65.8	2902.0
63+00.00	6.4	32.8	36.1	128.9	2809.2
64+00.00	0	29.5	11.9	144.3	2676.9
65+00.00	9.5	27.7	17.6	132.4	2562.1
66+00.00	9.6	11.8	35.4	91.4	2506.1
67+00.00	25.5	5.4	65	39.9	2531.3
68+00.00	31.4	4.5	105.4	22.9	2613.8
69+00.00	30.1	5	113.9	22.0	2705.7
70+00.00	17.8	14.7	88.7	45.6	2748.8
71+00.00	0	34.5	33	113.9	2667.9
72+00.00	0	50.2	0	196.1	2471.8
73+00.00	0	41.7	0	212.8	2259.0
74+00.00	24.5	10.3	45.4	120.4	2184.0
75+00.00	59	3.7	154.6	32.4	2306.3
76+00.00	48.8	5.9	199.6	22.3	2483.6
77+00.00	12.9	20	114.3	60.0	2537.9
78+00.00	0	36	23.9	129.6	2432.2
79+00.00	0	39	0	173.6	2258.6
80+00.00	13.6	28.3	25.2	155.8	2128.0
81+00.00	33.6	17	87.4	104.9	2110.5
82+00.00	57.8	3.7	169.3	47.9	2232.0
83+00.00	76.3	0.3	248.3	9.3	2471.0
84+00.00	132	0.2	385.7	1.1	2855.6
85+00.00	78	7.4	388.9	17.6	3226.9
86+00.00	69.7	7.5	273.5	34.5	3465.9
87+00.00	105	2.2	323.5	22.5	3766.9
88+00.00	94.7	3.4	369.8	13.0	4123.7
89+00.00	33.1	31	236.7	79.6	4280.7
90+00.00	0	56.4	61.3	202.4	4139.7
91+00.00	0	52.5	0	252.1	3887.5
92+00.00	7.5	39.2	13.9	212.3	3689.2
93+00.00	12.8	23.2	37.6	144.5	3582.3
93+40.00	12.8	21.3	19	41.3	3560.0
94+00.00	14.3	15.6	30.1	51.3	3538.9
95+00.00	56.5	0.9	131.1	38.3	3631.7
95+05.00	57.5	1	10.6	0.3	3642.1
96+00.00	29.7	8	153.4	19.8	3775.7
97+00.00	3.3	18.1	61.1	60.4	3776.5
98+00.00	3.1	35.5	11.9	124.1	3664.2
99+00.00	5.1	27.7	15.2	146.3	3533.2
100+00.00	18.6	7.5	43.9	81.5	3495.6
101+00.00	32.4	5.4	94.4	29.9	3560.1
102+00.00	31.4	8.3	118.1	31.8	3646.5

Station	End Areas (SF)		Adjusted Volume (CY)		Mass Ordinate
	Excavation	Fill	Excavation	Fill*	
103+00.00	24.3	11.7	103.1	46.3	3703.3
104+00.00	0	29.6	45	95.6	3652.7
105+00.00	0	71.2	0	233.4	3419.3
106+00.00	3.7	62.4	6.9	309.3	3117.0
106+87.87	222.6	0	368.2	126.9	3358.3
107+00.00	187.3	0	92.1	0.0	3450.4
108+00.00	93.1	0.5	519.3	1.1	3968.6
109+00.00	78.2	2.1	317.2	6.0	4279.8
110+00.00	49.8	16.1	237	42.1	4474.6
111+00.00	22.1	57.6	133.1	170.6	4437.1
112+00.00	8.3	87.9	56.3	336.8	4156.7
113+00.00	10.7	93.6	35.2	420.1	3771.7
114+00.00	21.7	74.3	60	388.6	3443.1
115+00.00	22.4	79.5	81.7	356.0	3168.8
116+00.00	18.5	86.9	75.7	385.1	2859.4
117+00.00	15.9	71.7	63.7	367.1	2556.0
118+00.00	36.2	39	96.5	256.3	2396.2
119+00.00	75.8	12.7	207.4	119.6	2484.0
120+00.00	154.1	0.1	425.7	29.6	2880.1
120+40.00	196.1	0	259.4	0.1	3139.3
121+00.00	190.4	0	429.4	0.0	3568.7
122+00.00	93.5	3	525.7	7.0	4087.4
123+00.00	51.5	15.2	268.5	42.1	4313.8
124+00.00	80.2	9.9	243.9	58.1	4499.6
125+00.00	121.6	0	373.7	22.9	4850.4
126+00.00	146	0	495.6	0.0	5346.0
127+00.00	133.3	0	517.2	0.0	5863.2
128+00.00	138.9	0.3	504.1	0.8	6366.6
129+00.00	76.5	28.2	398.9	66.0	6699.5
130+00.00	10.7	90.5	161.5	274.8	6586.2
131+00.00	0	134.9	19.8	521.8	6084.3
132+00.00	8.5	154.1	15.7	669.0	5431.0
133+00.00	4.5	130.3	24.1	658.4	4796.7
134+00.00	83.8	55.9	163.5	431.0	4529.2
135+00.00	236.2	1	592.6	131.8	4990.0
136+00.00	189.3	3.1	788	9.5	5768.5
136+43.00	135.9	12.6	259	15.6	6011.9
137+00.00	28	35	173	62.8	6122.2
138+00.00	41.4	32.1	128.5	155.4	6095.3
139+00.00	125.2	11.8	308.5	101.6	6302.2
140+00.00	122.4	8.7	458.5	47.5	6713.2
141+00.00	68.2	16.2	353	57.6	7008.5
142+00.00	33.6	18.8	188.5	81.0	7116.0
143+00.00	98.1	2.7	243.9	49.8	7310.2
144+00.00	69.1	5.5	309.6	19.0	7600.8
145+00.00	34.5	22.5	191.9	64.9	7727.8
146+00.00	48.4	27.8	153.5	116.4	7764.9
147+00.00	63.4	27.9	207	128.9	7843.1
148+00.00	76.9	3.8	259.8	73.4	8029.5

Note: *25% additional volume is included for earth embankment

Earthwork Summary

7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-CNOB-CNOC-1517(001)	11	2

Station	End Areas (SF)		Adjusted Volume (CY)		Mass Ordinate
	Excavation	Fill	Excavation	Fill*	
149+00.00	148.9	22.9	418.1	61.8	8385.8
150+00.00	52.2	184.3	372.4	479.6	8278.6
151+00.00	0	360.3	96.7	1260.6	7114.7
152+00.00	0	381.6	0	1717.4	5397.3
153+00.00	0.1	420.4	0.2	1856.5	3541.0
154+00.00	1.5	418.2	3	1941.3	1602.7
155+00.00	9	223.9	19.4	1486.4	135.7
156+00.00	220.5	0	425	518.3	42.5
157+00.00	276	0	919.4	0.0	961.9
158+00.00	40	66.3	585.2	153.5	1393.6
159+00.00	0	181.6	74.1	573.9	893.8
159+96.64	0	237.4	0	937.4	-43.6
160+00.00	0	239.6	0	37.1	-80.7
161+00.00	0	269.4	0	1178.3	-1258.9
162+00.00	0	276.4	0	1263.4	-2522.3
163+00.00	0	305.8	0	1347.6	-3869.9
164+00.00	0	289.7	0	1378.5	-5248.4
165+00.00	0	323.7	0	1419.9	-6668.3
166+00.00	0	136	0	1064.1	-7732.4
167+00.00	92.9	7.8	172	332.9	-7893.3
168+00.00	254.9	0	644.1	18.0	-7267.2
169+00.00	191.4	46.5	826.5	107.6	-6548.3
170+00.00	5.7	285	365	767.4	-6950.7
171+00.00	0	379.9	10.6	1539.1	-8479.2
172+00.00	0	404.8	0	1816.4	-10295.6
173+00.00	0	343.7	0	1732.6	-12028.2
174+00.00	14.9	196.5	27.6	1250.5	-13251.1
175+00.00	38.2	100.5	98.3	687.5	-13840.3
176+00.00	30	41	126.3	327.5	-14041.5
177+00.00	205.2	0	435.6	94.9	-13700.8
178+00.00	92.2	6.4	550.7	14.9	-13165.0
179+00.00	0	209.9	170.7	500.8	-13495.0
180+00.00	0	290.3	0	1157.9	-14652.9
180+17.00	0	295.1	0	230.4	-14883.3
181+00.00	0	154.5	0	863.9	-15747.2
182+00.00	51.9	29.2	96.1	425.3	-16076.3
183+00.00	77	13.4	238.7	98.6	-15936.2
184+00.00	15.3	89.7	170.9	238.6	-16004.0
185+00.00	0	228.2	28.3	735.9	-16711.5
186+00.00	0	221.5	0	1041.0	-17752.5
187+00.00	110.9	16.6	205.4	551.1	-18098.3
188+00.00	219.9	0	612.6	38.4	-17524.0
189+00.00	205.7	0	788.1	0.0	-16735.9
190+00.00	274.5	0	889.3	0.0	-15846.6
191+00.00	186.2	0	853.1	0.0	-14993.5
192+00.00	5.8	81.4	355.6	188.4	-14826.3
193+00.00	0	127.7	10.7	484.0	-15299.6
194+00.00	45.8	42.4	84.8	393.8	-15608.6
195+00.00	193.1	5.6	442.4	111.1	-15277.3

Station	End Areas (SF)		Adjusted Volume (CY)		Mass Ordinate
	Excavation	Fill	Excavation	Fill*	
196+00.00	230.4	0	784.3	13.0	-14506.0
197+00.00	63.8	50.3	544.8	116.4	-14077.6
198+00.00	0	217.6	118.1	620.1	-14579.6
198+47.00	0	298.6	0	561.6	-15141.2
199+00.00	0	315.5	0	753.4	-15894.6
200+00.00	0	289	0	1399.3	-17293.9
201+00.00	0	273	0	1300.9	-18594.7
202+00.00	0	274.5	0	1267.4	-19862.1
203+00.00	35	107.3	64.8	883.8	-20681.1
204+00.00	165.6	1.4	371.5	251.6	-20561.2
205+00.00	227.7	0	728.3	3.3	-19836.1
206+00.00	279	0	938.3	0.0	-18897.8
207+00.00	83.1	35.8	670.6	82.9	-18310.1
208+00.00	0	194.2	153.9	532.4	-18688.6
209+00.00	0	303.1	0	1151.1	-19839.7
210+00.00	0	362	0	1539.6	-21379.3
211+00.00	0	336.6	0	1617.1	-22996.5
212+00.00	0	145.2	0	1115.3	-24111.7
212+95.56	212.4	0	375.9	321.3	-24057.1
213+00.00	164.6	0	31	0.0	-24026.1
214+00.00	120.5	0	528	0.0	-23498.1
	TOTALS		37806.7	61304.8	

Location	Common Excavation Type A (CY) Pay Item	Embankment (CY)	Embankment Adjusted (CY)*	Borrow - Excavation (CY) Pay Item
	A	B	C = B x 1.25	D = C - A
7th Ave SE (Sta. 11+57.30 to Sta. 214+00)	37,807	49,044	61,305	23,498
Approaches (Add 200 CY per Approach, 15 Approaches)		3,000	3,750	3,750
Totals	**37,807**	52,044	65,055	**27,248**

Note: This computation report is not a balance sheet and is for informational purposes only. The contractor shall calculate their own balance of materials.

* 25% additional volume is included for shrinkage in earth embankment

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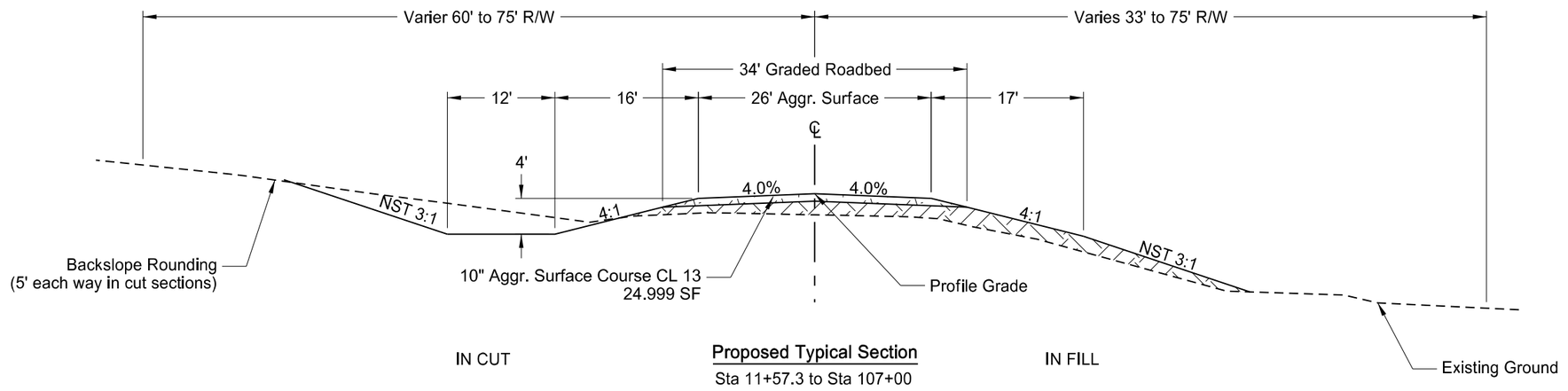
Earthwork Summary

7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-CNOB-CNOC-1517(001)	30	1

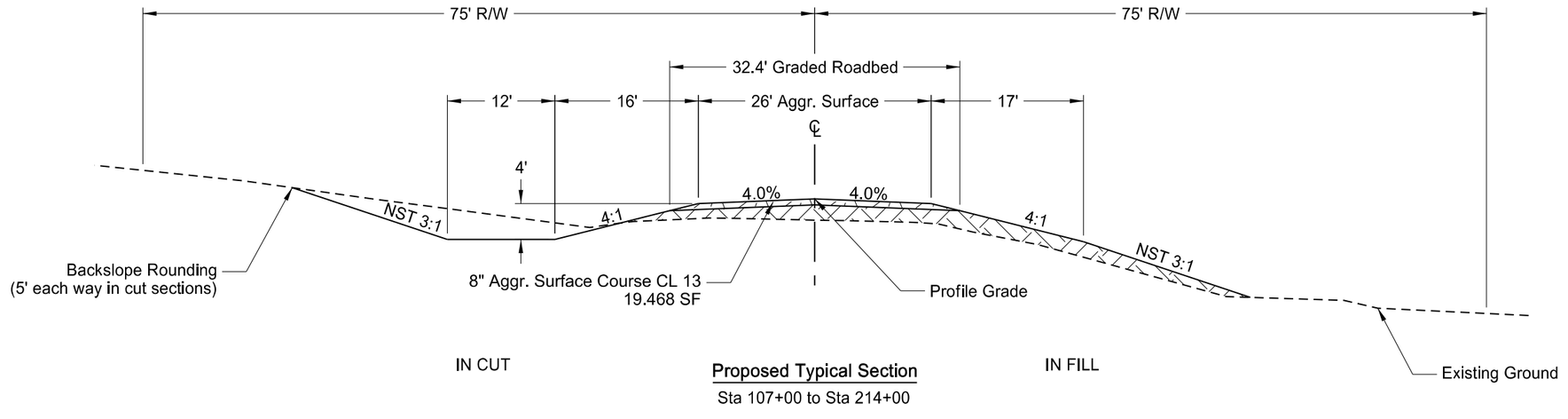


IN CUT

Proposed Typical Section

Sta 11+57.3 to Sta 107+00

IN FILL



IN CUT

Proposed Typical Section

Sta 107+00 to Sta 214+00

IN FILL

NST = Not Steeper Than

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Typical Sections

7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-CNOB-CNOC-1517(001)	51	1

Begin Station / Location	Begin Offset	End Station / Location	End Offset	Length	Pipe Conduit Pay Size	Pipe Conduit Approach Pay Size	Allowable Material	Required Diameter	Minimum Thickness	R1 Fabric (Pay Item)	(*) End Sections		Applicable Backfill Detail
											Begin	End	
				LF	In			In	In	SY	EA	EA	
22+57	RT	23+03	RT	46		24"	Reinforced Conctrete Pipe-Class III	24"	3		Y	Y	D714-27
							Zinc Coated Corrugated Steel		0.064				
							Aluminum Coated Corrugated Steel (Type 2)		0.064				
							Corrugated Aluminum Alloy		0.064				
53+73	RT	54+25	RT	52		24"	Reinforced Conctrete Pipe-Class III	24"	3		Y	Y	D714-27
							Zinc Coated Corrugated Steel		0.064				
							Aluminum Coated Corrugated Steel (Type 2)		0.064				
							Corrugated Aluminum Alloy		0.064				
53+73	LT	54+25	LT	52		24"	Reinforced Concrete Pipe-Class III	24"	3		Y	Y	D714-27
							Zinc Coated Corrugated Steel		0.064				
							Aluminum Coated Corrugated Steel (Type 2)		0.064				
							Corrugated Aluminum Alloy		0.064				
83+72	LT	84+28	LT	56		24"	Reinforced Concrete Pipe-Class III	24"	3		Y	Y	D714-27
							Zinc Coated Corrugated Steel		0.064				
							Aluminum Coated Corrugated Steel (Type 2)		0.064				
							Corrugated Aluminum Alloy		0.064				
93+40	RT	93+40	LT	48	30"		Reinforced Concrete Pipe-Class III - **(Barrel Length = 46')**	30"	3	203	Y	Y	D714-26
							Zinc Coated Corrugated Steel		0.064				
							Aluminum Coated Corrugated Steel (Type 2)		0.064				
							Corrugated Aluminum Alloy		0.064				
94+87	RT	95+39	RT	52		24"	Reinforced Concrete Pipe-Class III	24"	3.5		Y	Y	D714-27
							Zinc Coated Corrugated Steel		0.064				
							Aluminum Coated Corrugated Steel (Type 2)		0.064				
							Corrugated Aluminum Alloy		0.064				
106+59	LT	107+15	LT	56		24"	Reinforced Concrete Pipe-Class III	24"	3		Y	Y	D714-27
							Zinc Coated Corrugated Steel		0.064				
							Aluminum Coated Corrugated Steel (Type 2)		0.064				
							Corrugated Aluminum Alloy		0.064				
120+18	LT	120+62	LT	44		24"	Reinforced Concrete Pipe-Class III	24"	3		Y	Y	D714-27
							Zinc Coated Corrugated Steel		0.064				
							Aluminum Coated Corrugated Steel (Type 2)		0.064				
							Corrugated Aluminum Alloy		0.064				
136+19	LT	136+67	LT	48		24"	Reinforced Concrete Pipe-Class III	24"	3		Y	Y	D714-27
							Zinc Coated Corrugated Steel		0.064				
							Aluminum Coated Corrugated Steel (Type 2)		0.064				
							Corrugated Aluminum Alloy		0.064				
162+99	LT	163+02	RT	74	24"		Reinforced Concrete Pipe-Class III - **(Barrel Length = 70')**	24"	3	162	Y	Y	D714-25
							Zinc Coated Corrugated Steel		0.064				
							Aluminum Coated Corrugated Steel (Type 2)		0.064				
							Corrugated Aluminum Alloy		0.064				
180+16	LT	180+18	RT	78	36"		Reinforced Concrete Pipe-Class III - **(Barrel Length = 72')**	36"	3	198	Y	Y	D714-25
							Zinc Coated Corrugated Steel		0.064				
							Aluminum Coated Corrugated Steel (Type 2)		0.064				
							Corrugated Aluminum Alloy		0.064				
195+20	RT	194+80	RT	40		24"	Reinforced Concrete Pipe-Class III	24"	3		Y	Y	D714-27
							Zinc Coated Corrugated Steel		0.064				
							Aluminum Coated Corrugated Steel (Type 2)		0.064				
							Corrugated Aluminum Alloy		0.064				
198+48	LT	198+48	RT	70	30"		Reinforced Concrete Pipe-Class III - **(Barrel Length = 66')**	30"	3	142	Y	Y	D714-25
							Zinc Coated Corrugated Steel		0.064				
							Aluminum Coated Corrugated Steel (Type 2)		0.064				
							Corrugated Aluminum Alloy		0.064				

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

Corrugations: **2** = 2-2/3"x1/2" **3/4** = 3/4"x3/4"@7-1/2"
3 = 3"x1" **1** = 3/4"x1"@11-1/2"
5 = 5"x1"

(*) The price bid for "Pipe Conduit" bid items includes end sections.
FES = Flared End Section
TES = Traversable End Section

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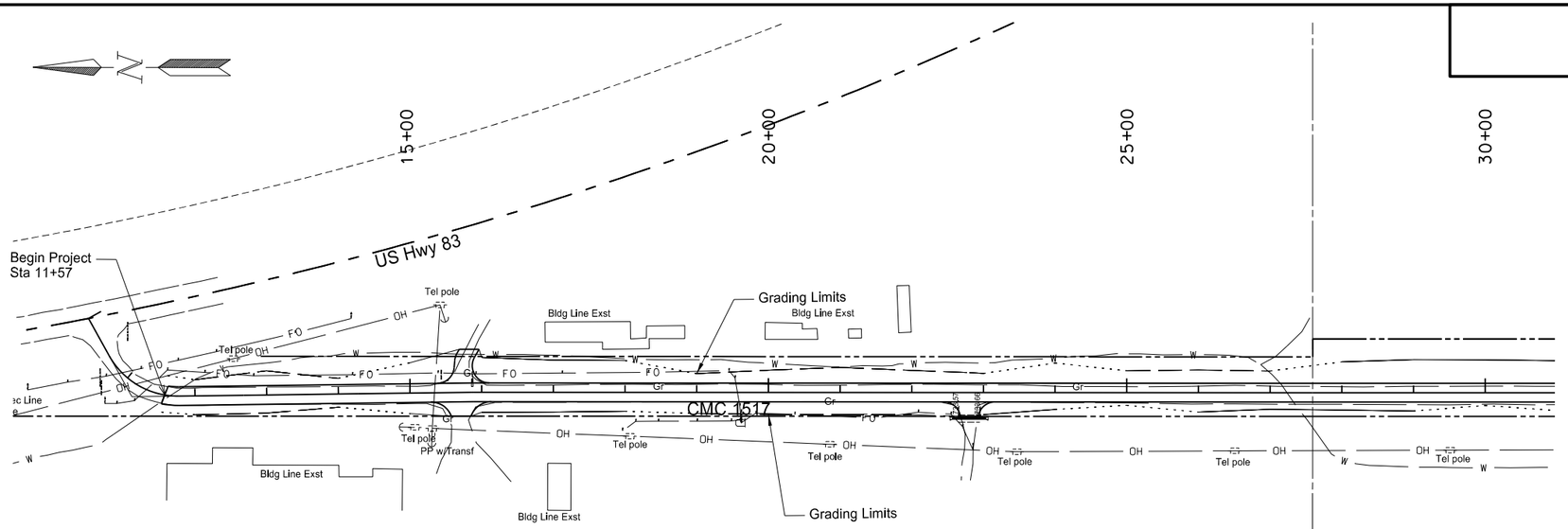
Allowable Pipe List

7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-CNOB-CNOC-1517(001)	60	1

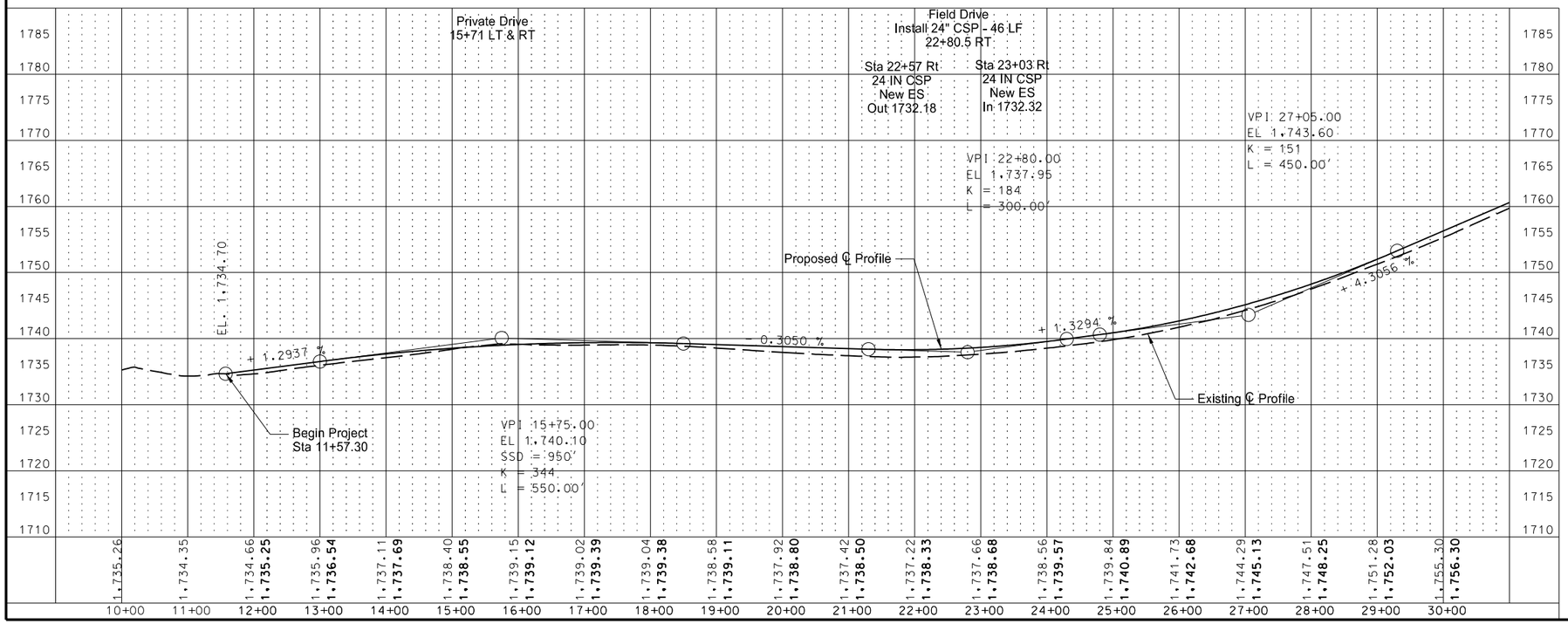


Removal of Pipes-All Types and Sizes

Sta 22+80	30 LF
Total	30 LF

Pipe Conduit 24IN - Approach

Sta 22+57 to 23+03 - 36' Rt	46 LF
Total	46 LF



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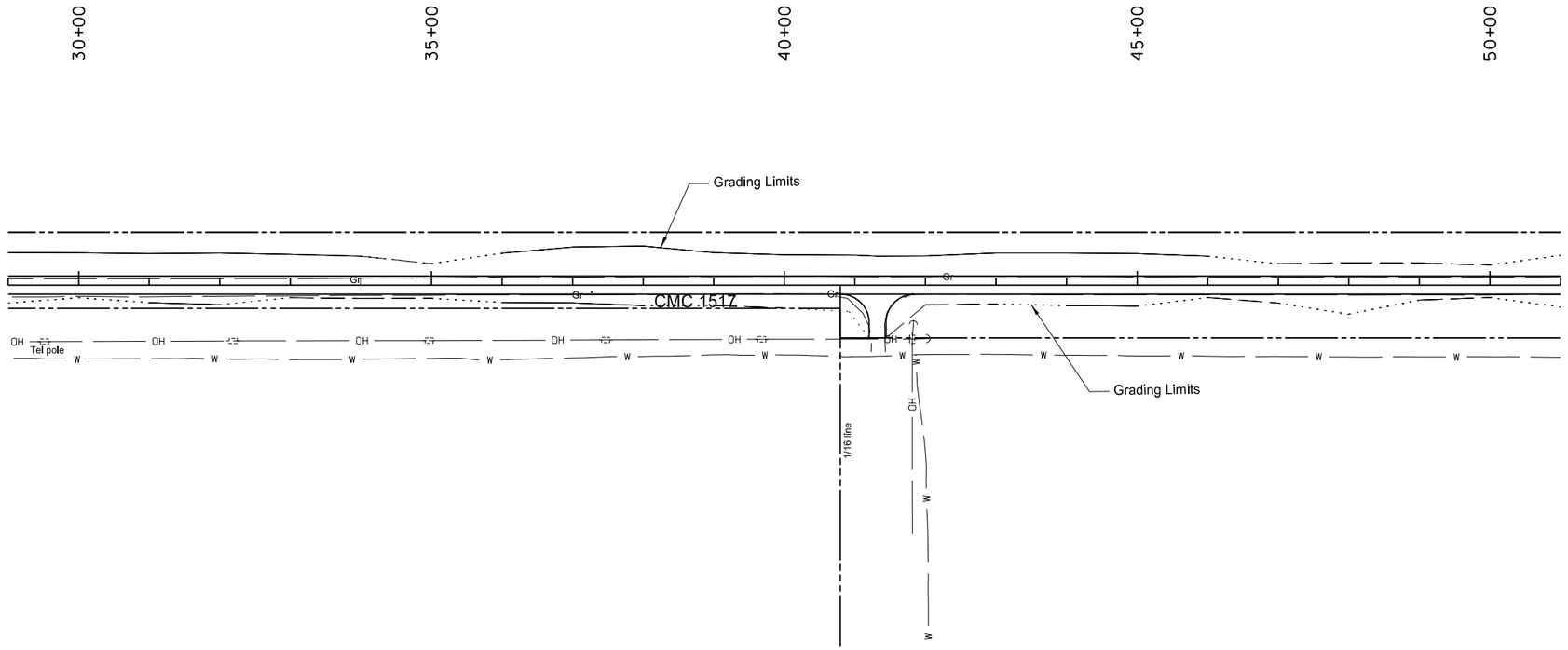
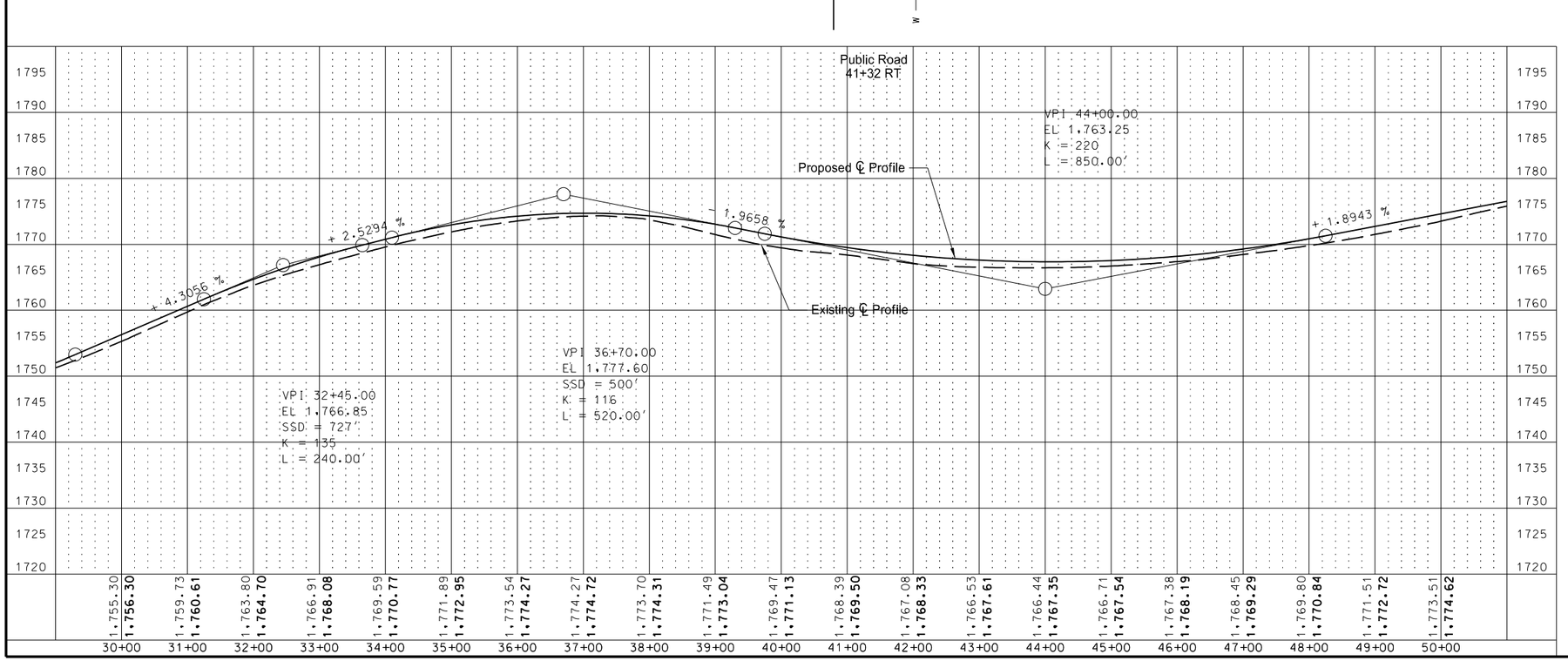
Plan and Profile

Sta 10+00 to Sta 30+00
7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-CNOB-CNOC-1517(001)	60	2





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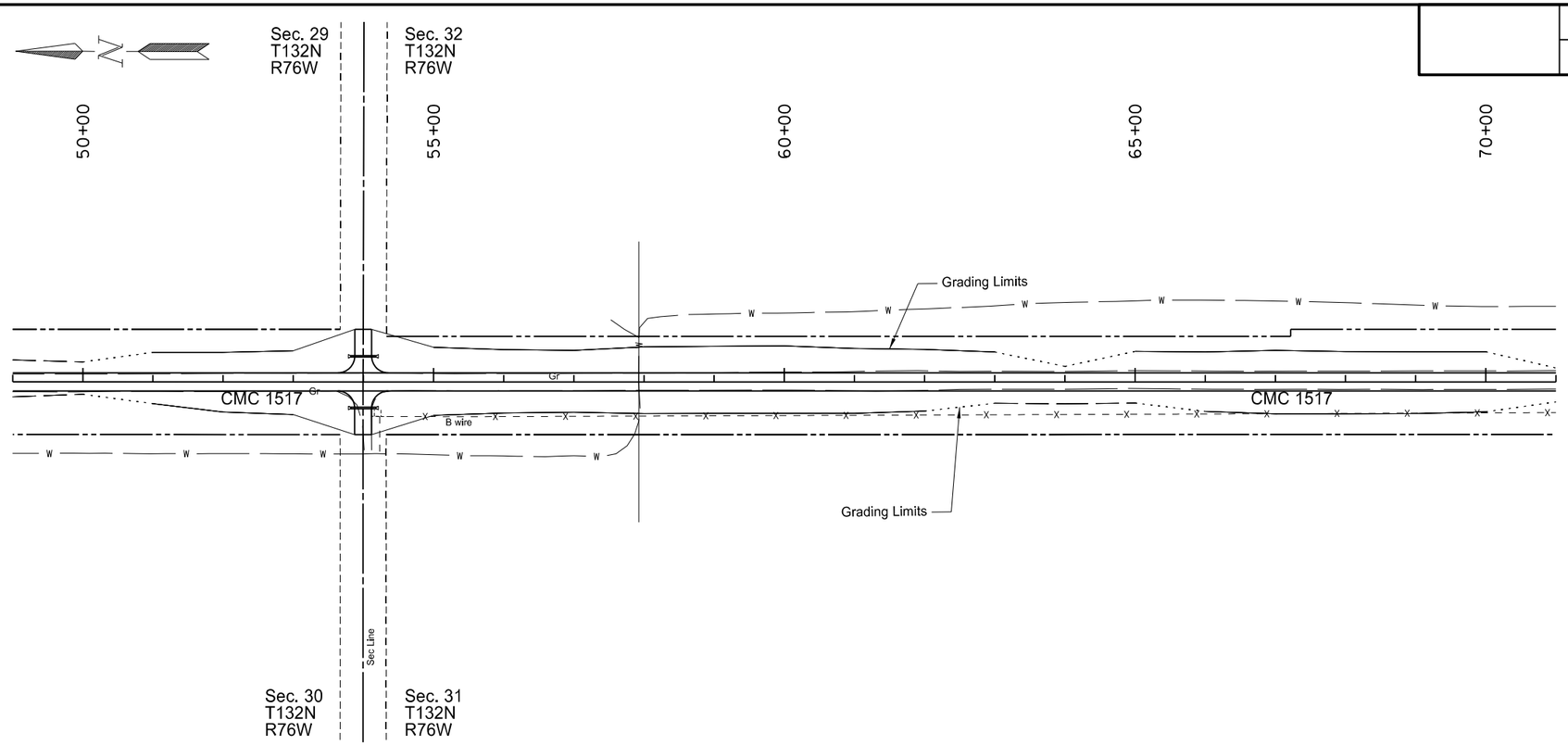
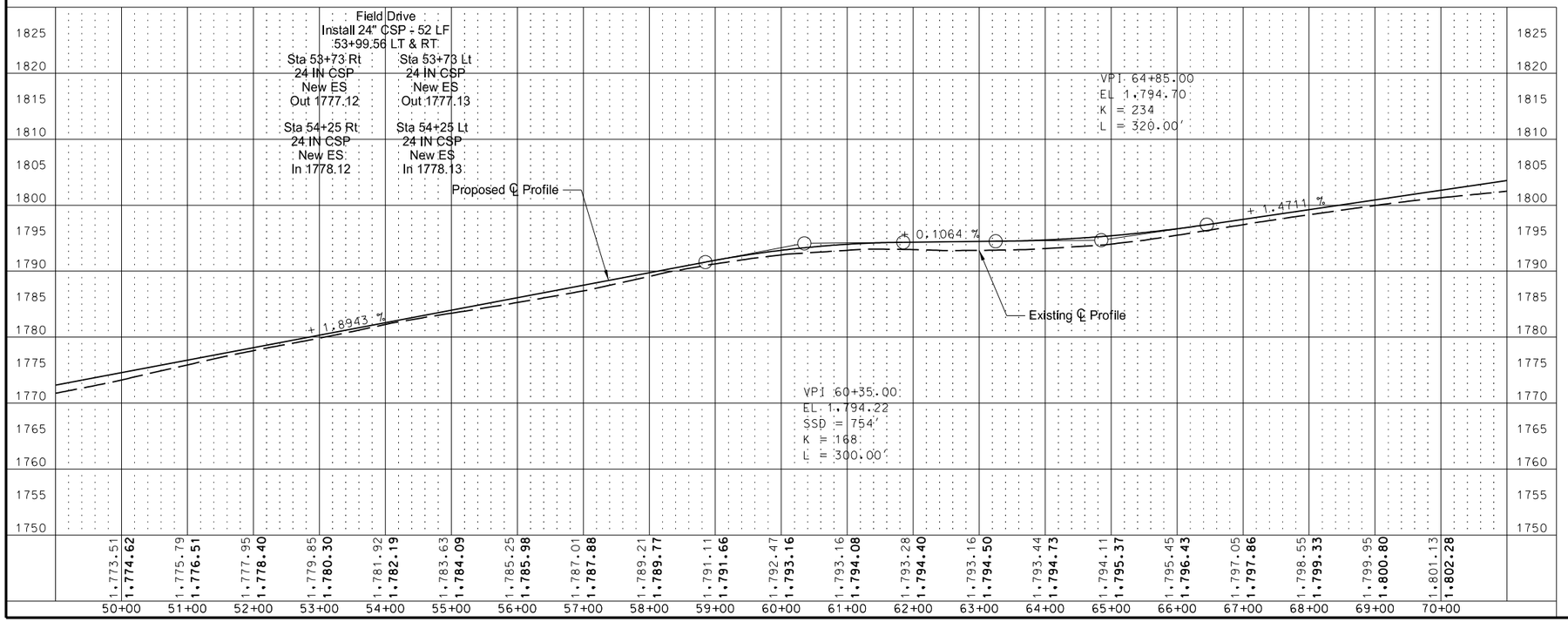
Sta 30+00 to Sta 50+00
7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-CNOB-CNOC-1517(001)	60	3



Pipe Conduit 24IN - Approach

Sta 53+73 to Sta 54+25 Lt	52 LF
Sta 53+73 to Sta 54+25 Rt	52 LF
Total	104 LF



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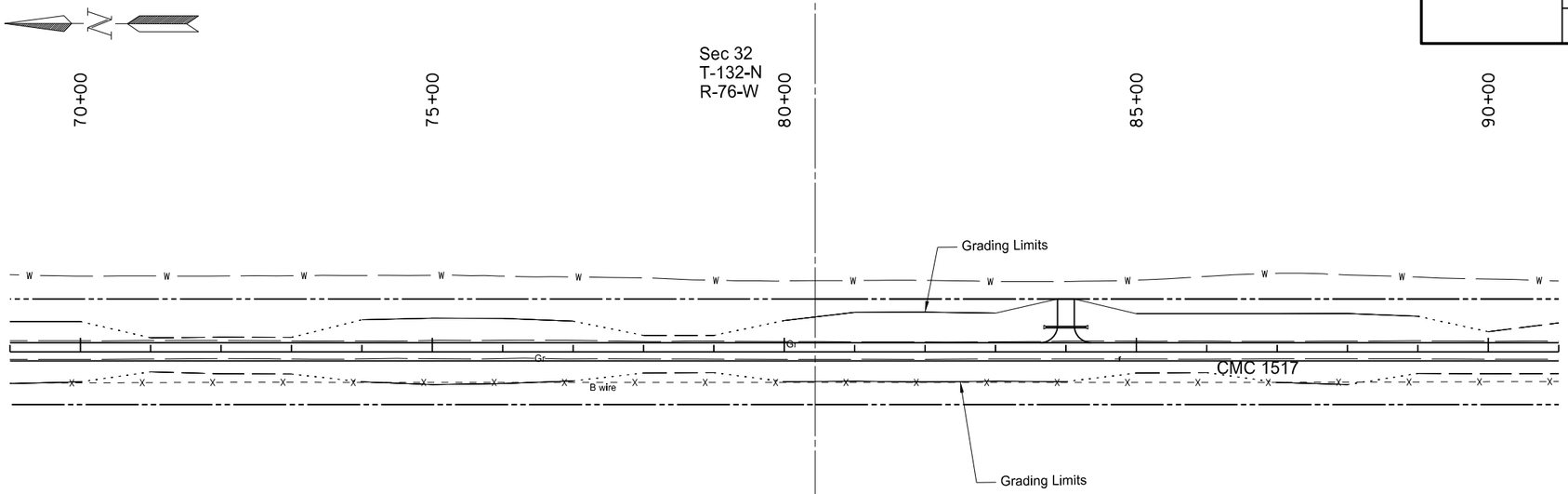
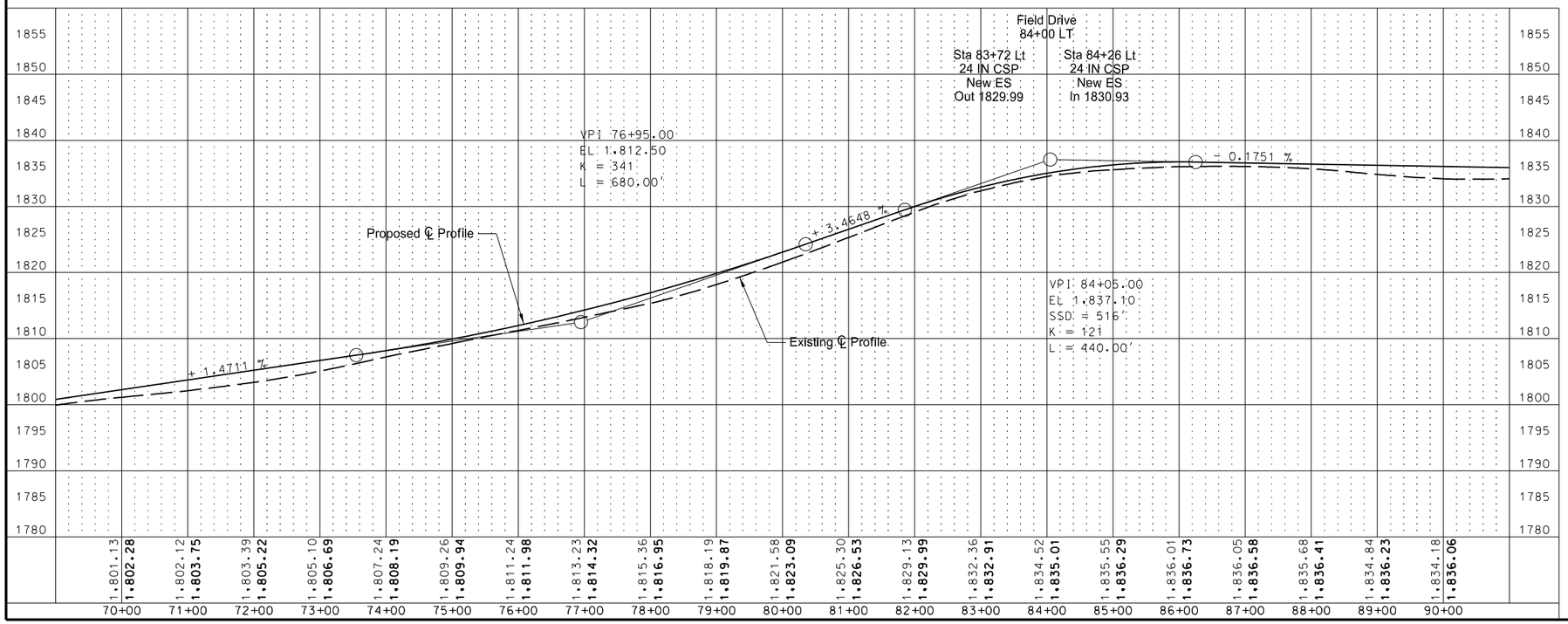
Sta 50+00 to Sta 70+00
7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-CNOB-CNOC-1517(001)	60	4



Pipe Conduit 24IN - Approach

Sta 83+72 Lt to Sta 84+26 Lt	56 LF
Total	56 LF



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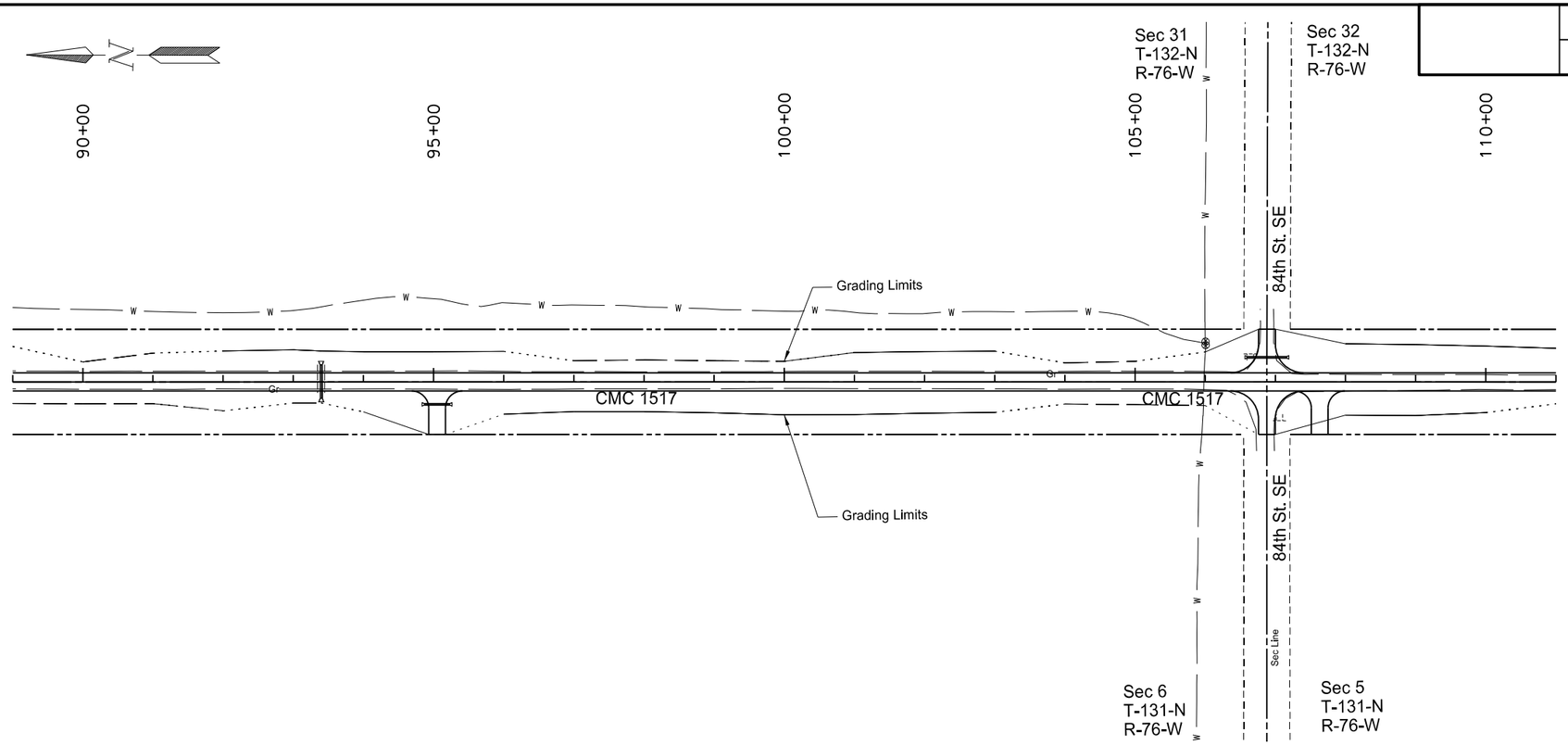
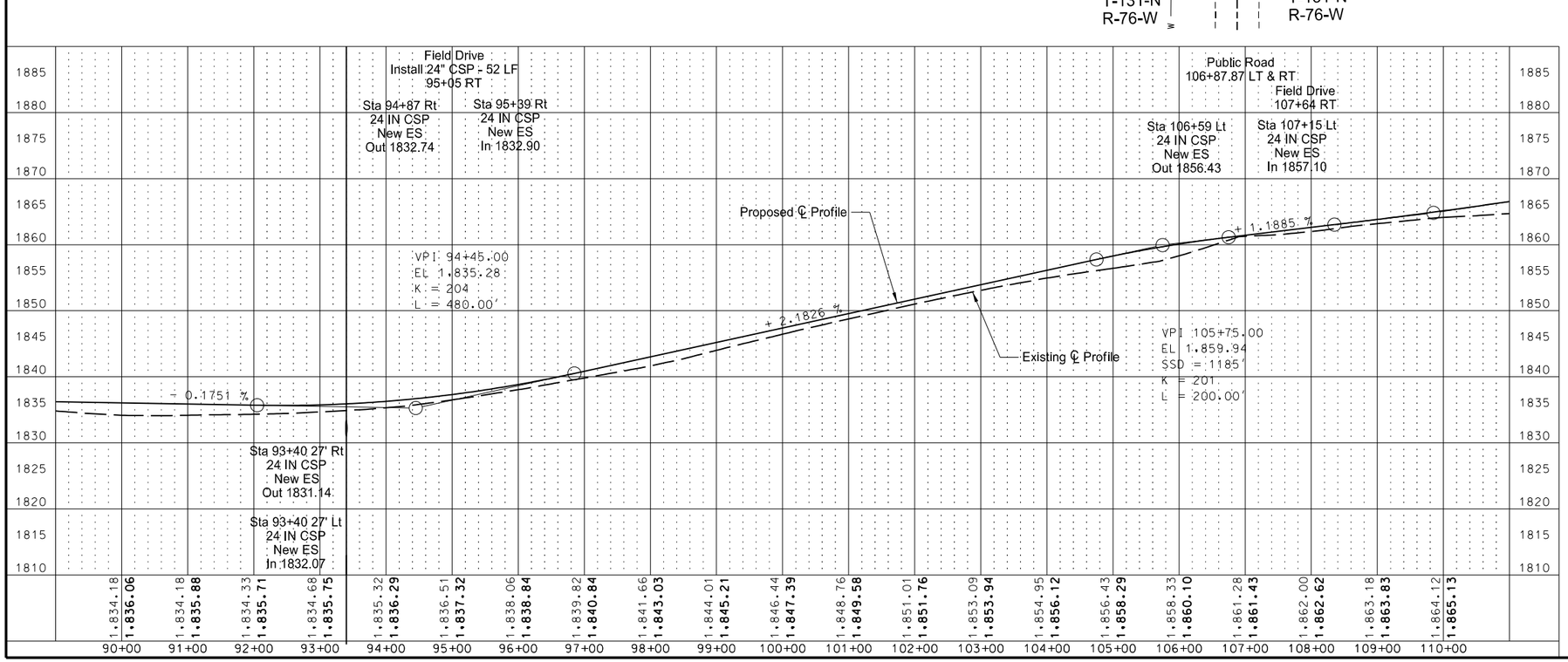
Sta 70+00 to Sta 90+00
7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-CNOB-CNOC-1517(001)	60	5





Removal of Pipes-All Types and Sizes

Sta 93+40	40 LF
Total	40 LF

Pipe Conduit 30IN

Sta 93+40	48 LF
Total	48 LF

Pipe Conduit 24IN - Approach

Sta 94+87 to Sta 95+39 - 32' Rt	52 LF
Sta 106+59 to Sta 107+15 - 35' Rt	56 LF
Total	108 LF

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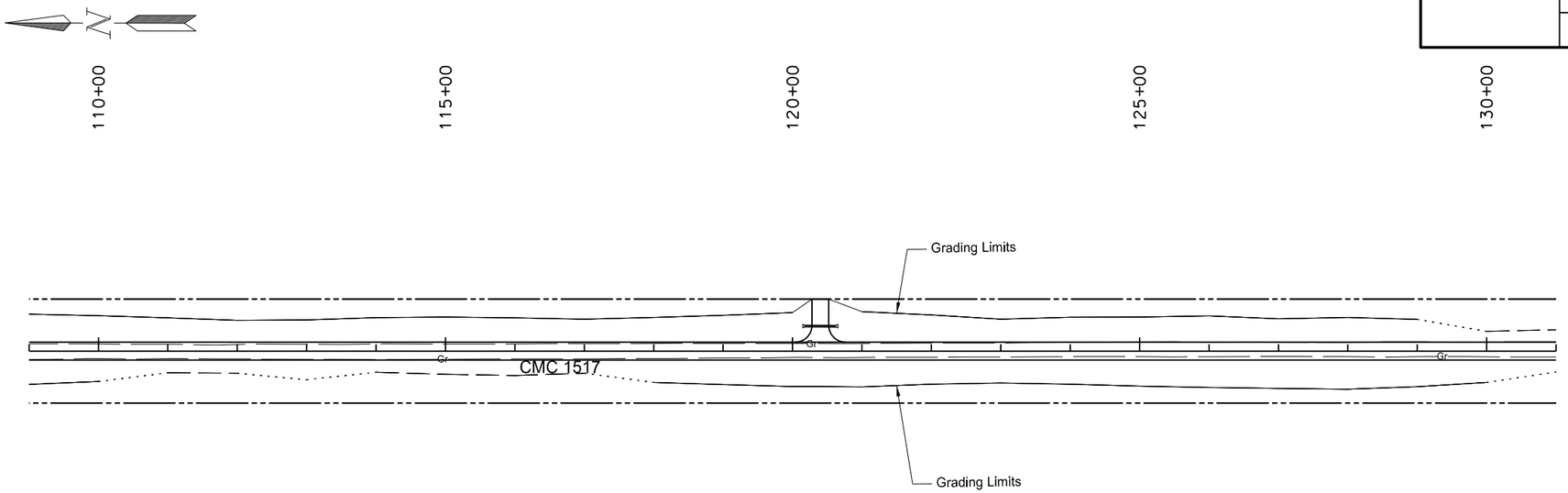
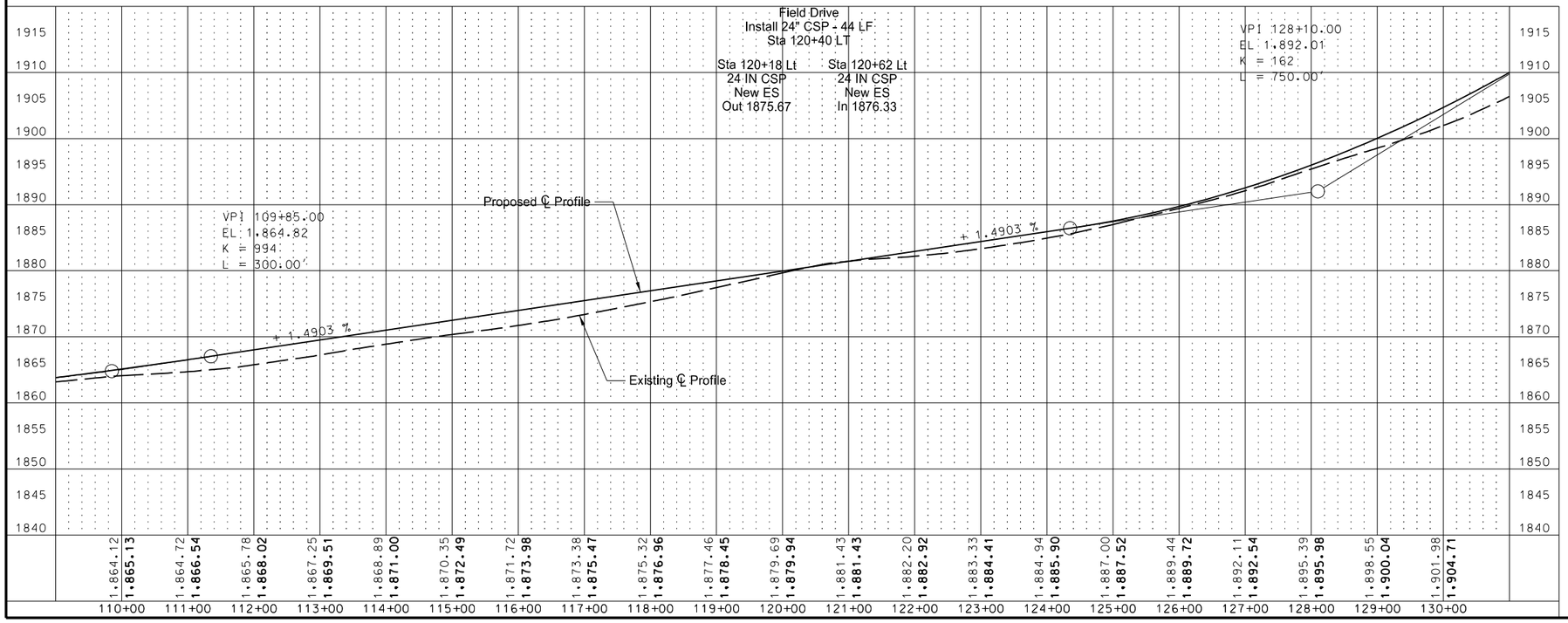
Sta 90+00 to Sta 110+00
7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-CNOB-CNOC-1517(001)	60	6



Pipe Conduit 24IN - Approach

Sta 120+18 to Sta 120+62 - 36' Lt	44 LF
Total	44 LF



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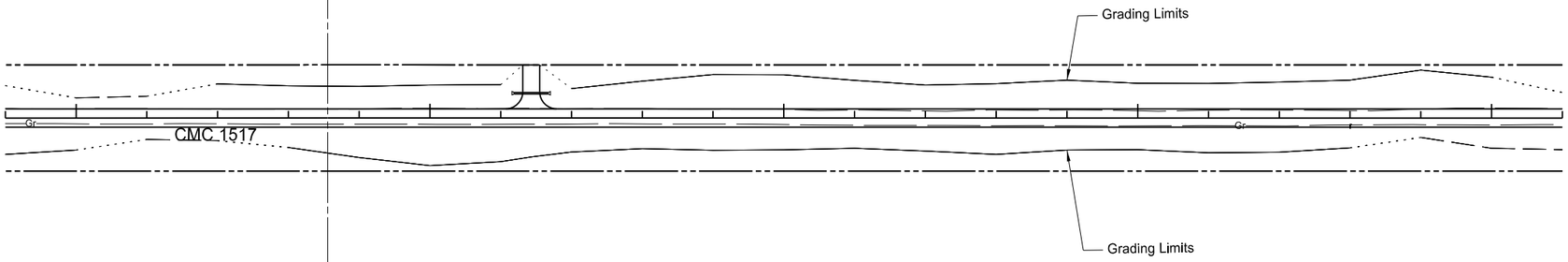
Sta 110+00 to Sta 130+00
7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-CNOB-CNOC-1517(001)	60	7

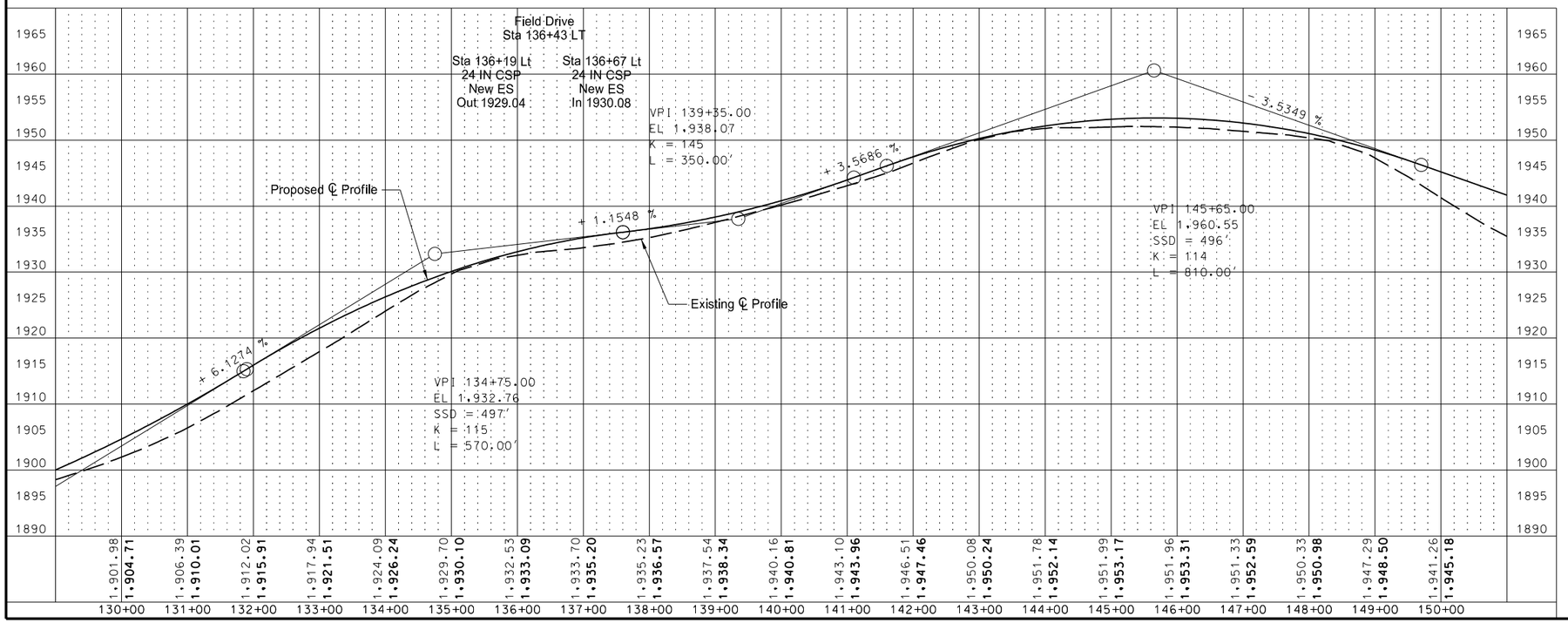
130+00 135+00 140+00 145+00 150+00

Pipe Conduit 24IN - Approach

Sta 136+19 Lt to Sta 136+67 Lt	48 LF
Total	48 LF



℄ Line



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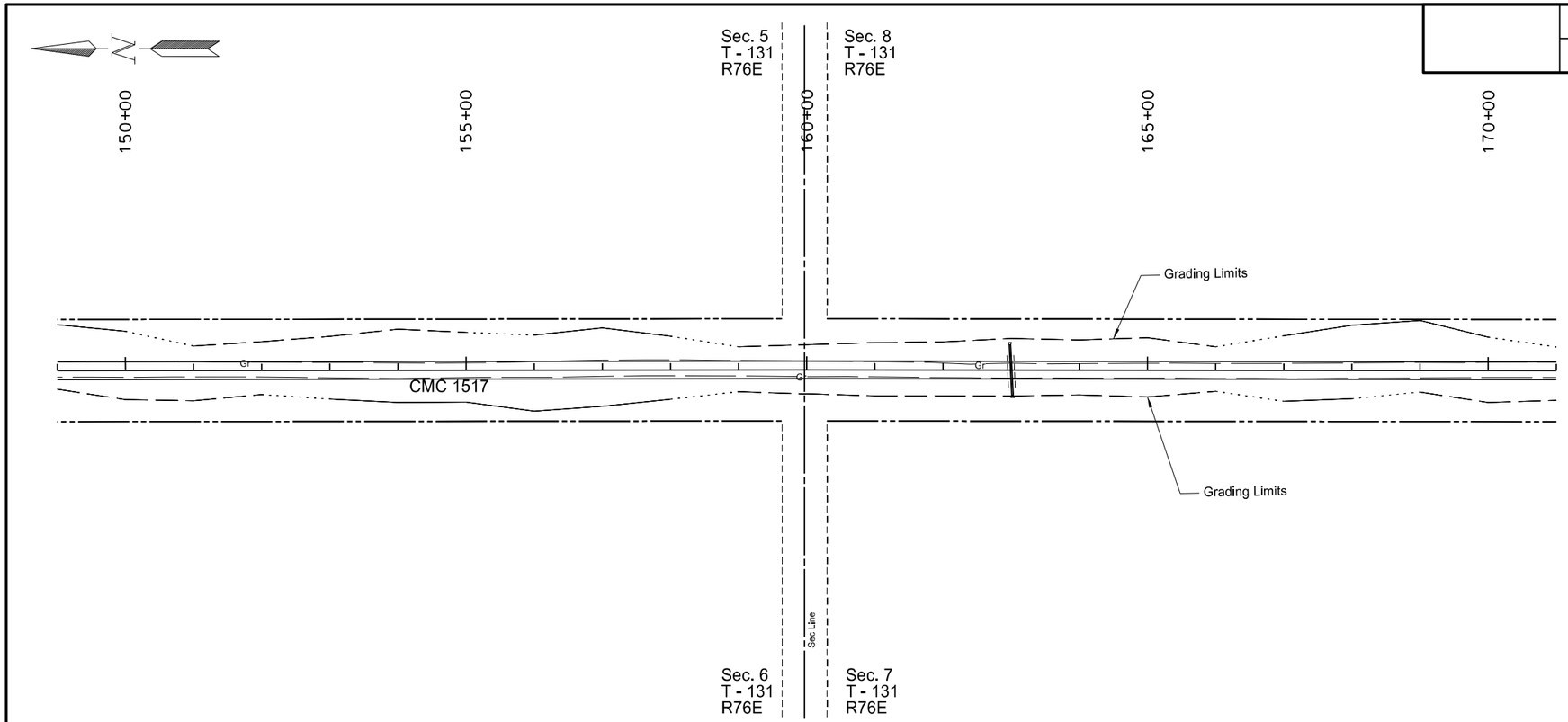
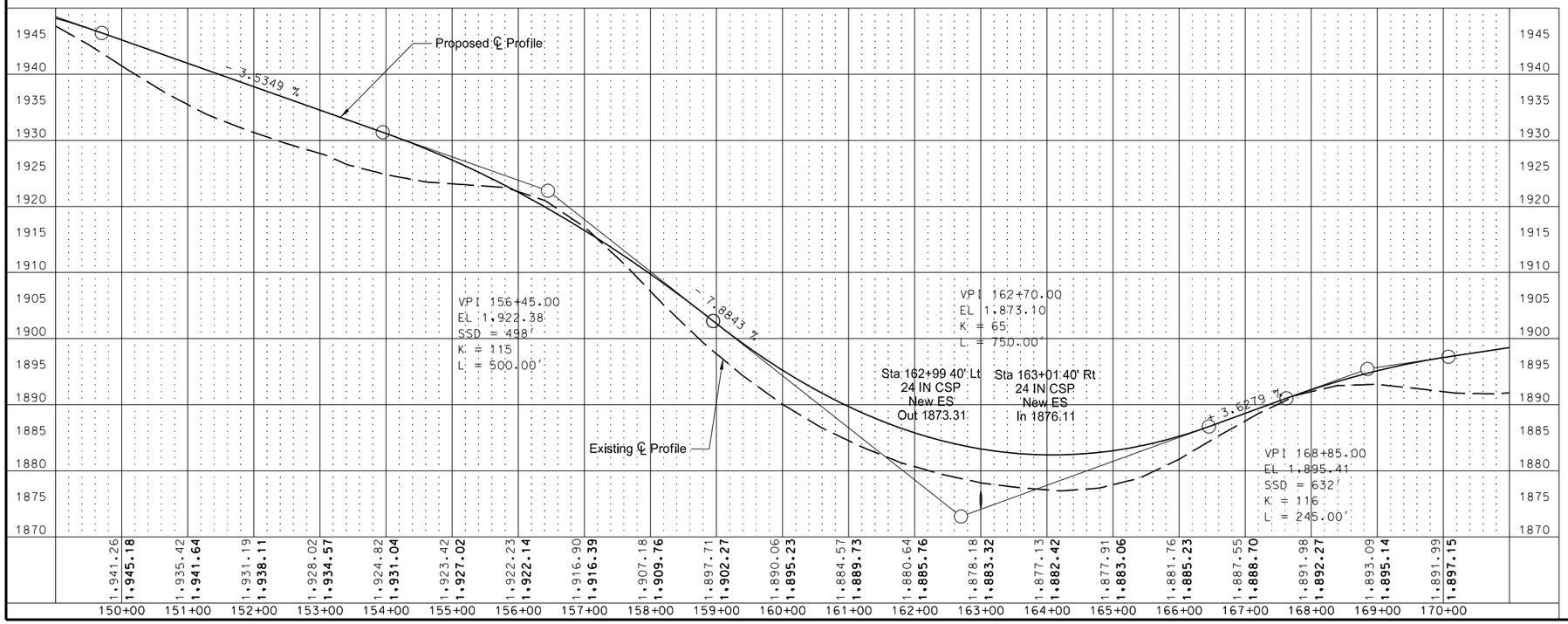
Sta 130+00 to Sta 150+00
7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-CNOB-CNOC-1517(001)	60	8





Removal of Pipes-All Types and Sizes

Sta 162+99	48 LF
Total	48 LF

Pipe Conduit 24IN

Sta 162+99	74 LF
Total	74 LF

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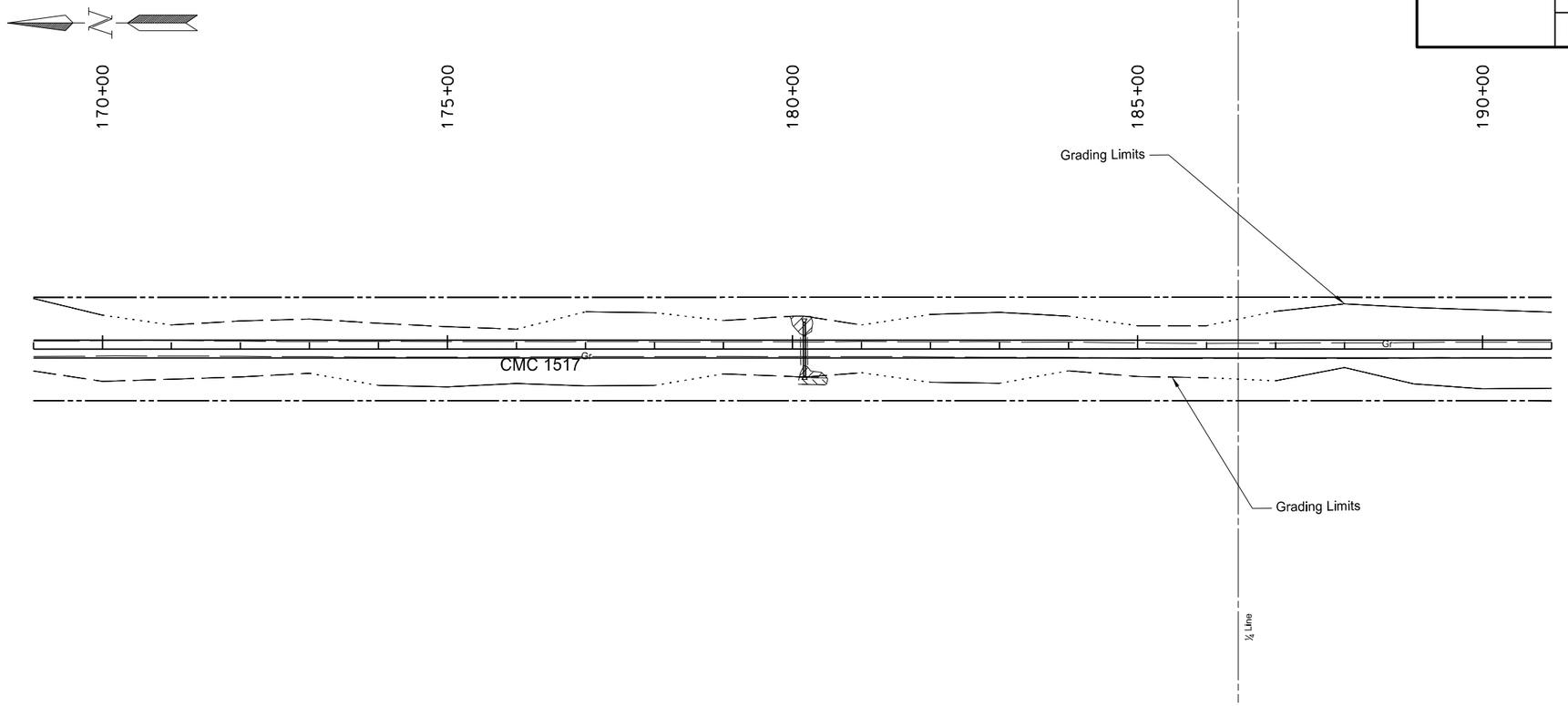
Plan and Profile

Sta 150+00 to Sta 170+00
7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-CNOB-CNOC-1517(001)	60	9

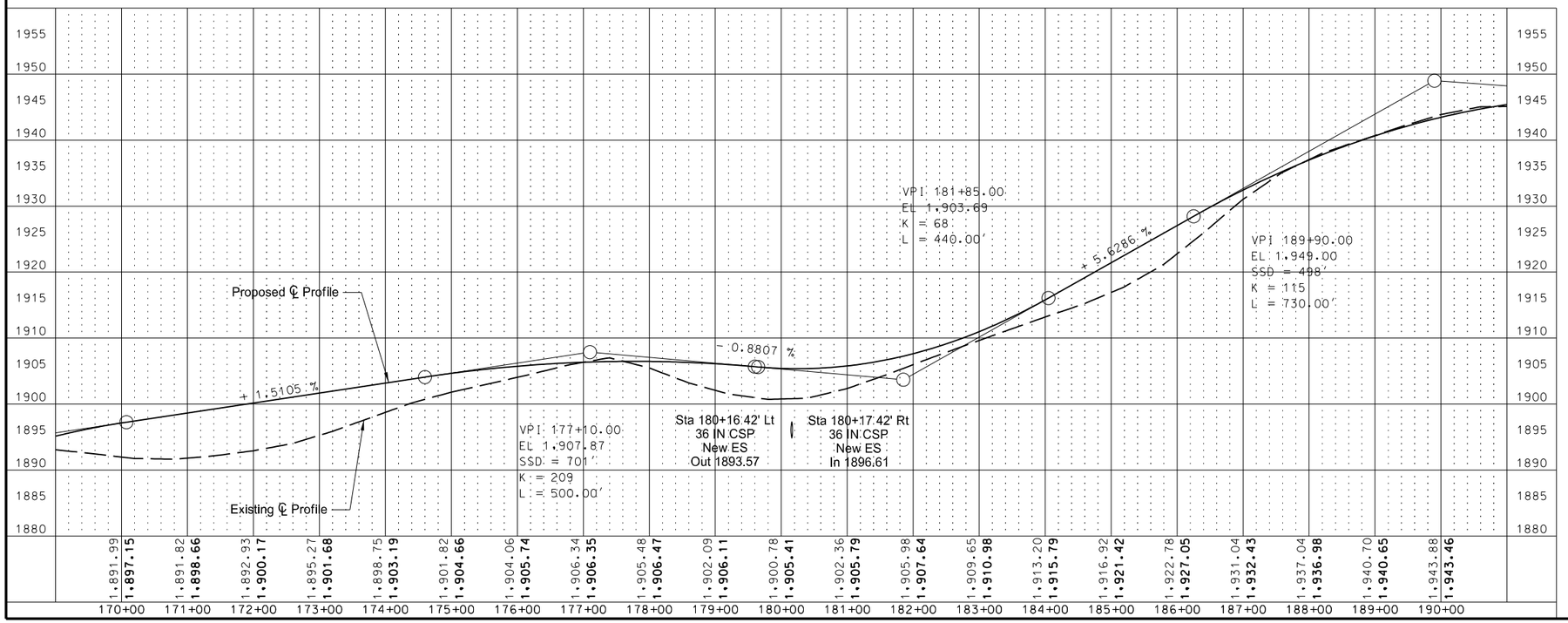


Removal of Pipes-All Types and Sizes

Sta 180+16	40 LF
Total	40 LF

Pipe Conduit 36IN

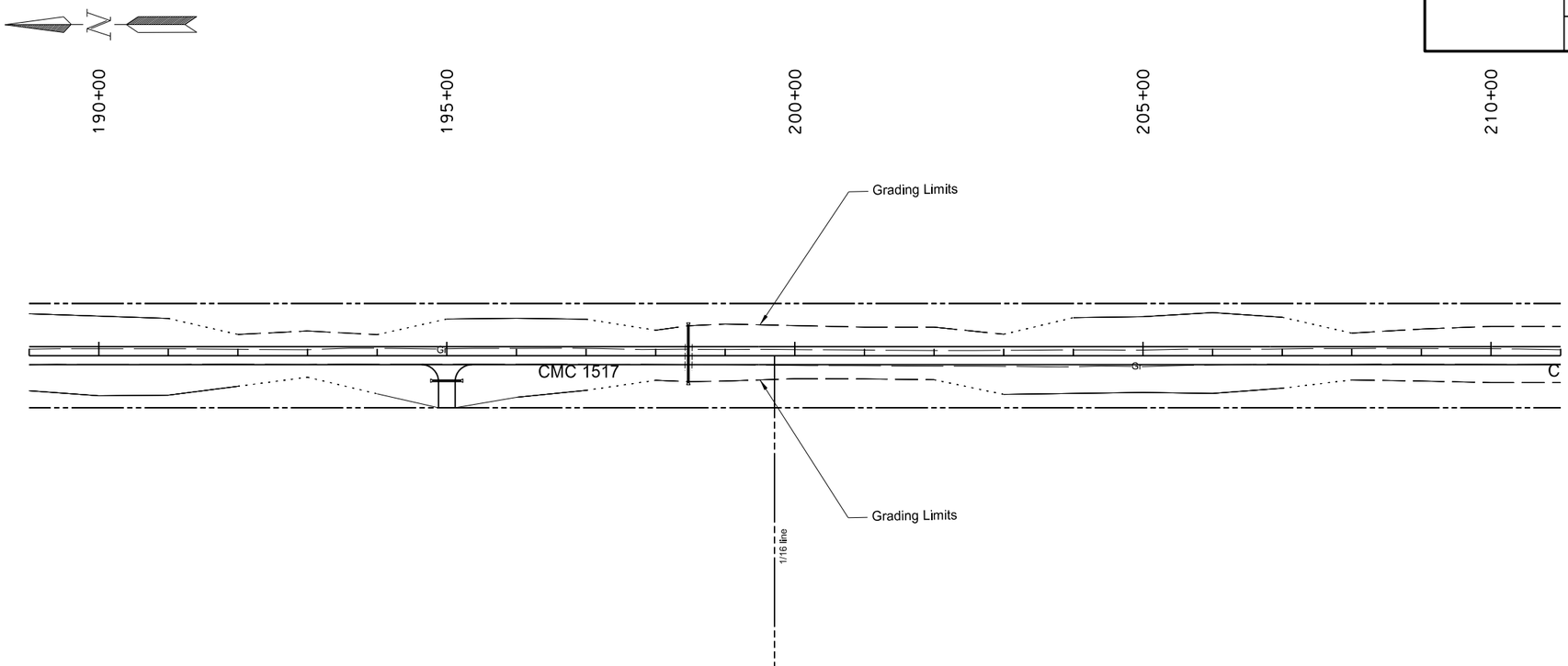
Sta 180+16	78 LF
Total	78 LF



Plan and Profile

Sta 170+00 to Sta 190+00
7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-CNOB-CNOC-1517(001)	60	10



Removal of Pipes-All Types and Sizes

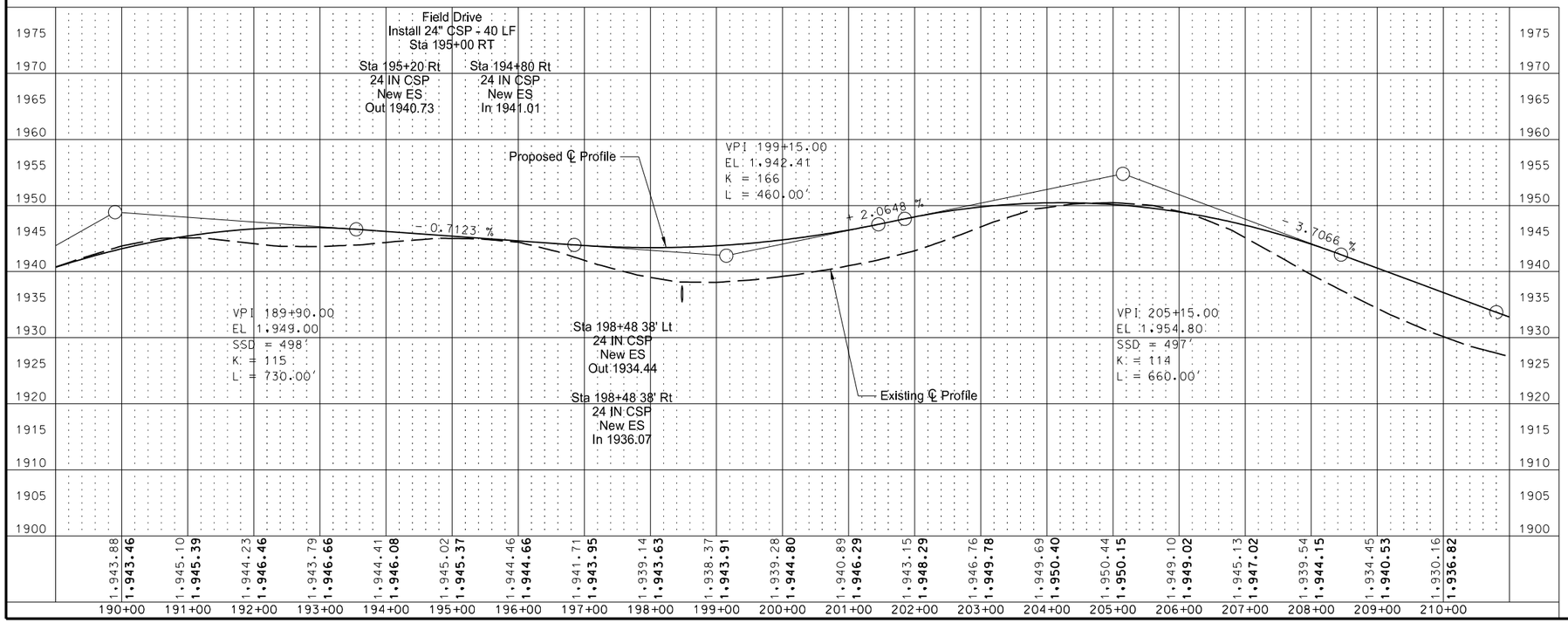
Sta 198+48	38 LF
Total	38 LF

Pipe Conduit 24IN - Approach

Sta 195+20 to Sta 194+80 - 36' Lt	40 LF
Total	40 LF

Pipe Conduit 30IN

Sta 198+48	70 LF
Total	70 LF



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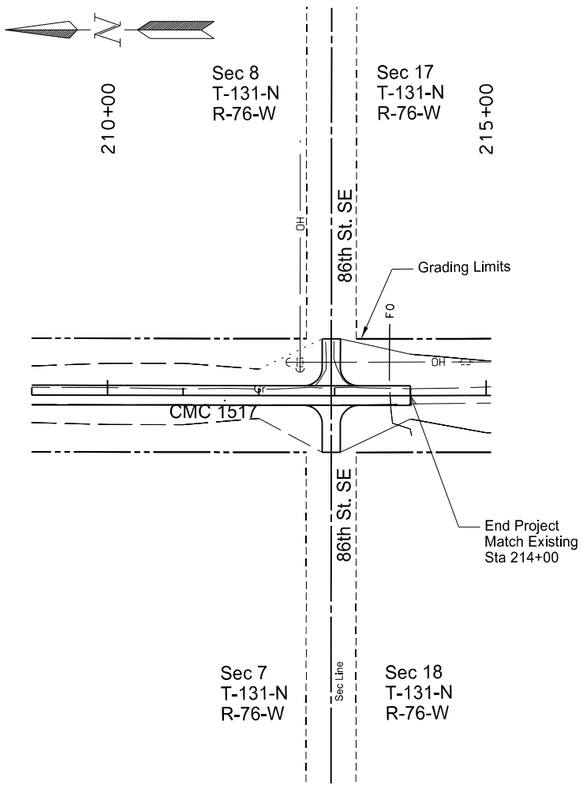
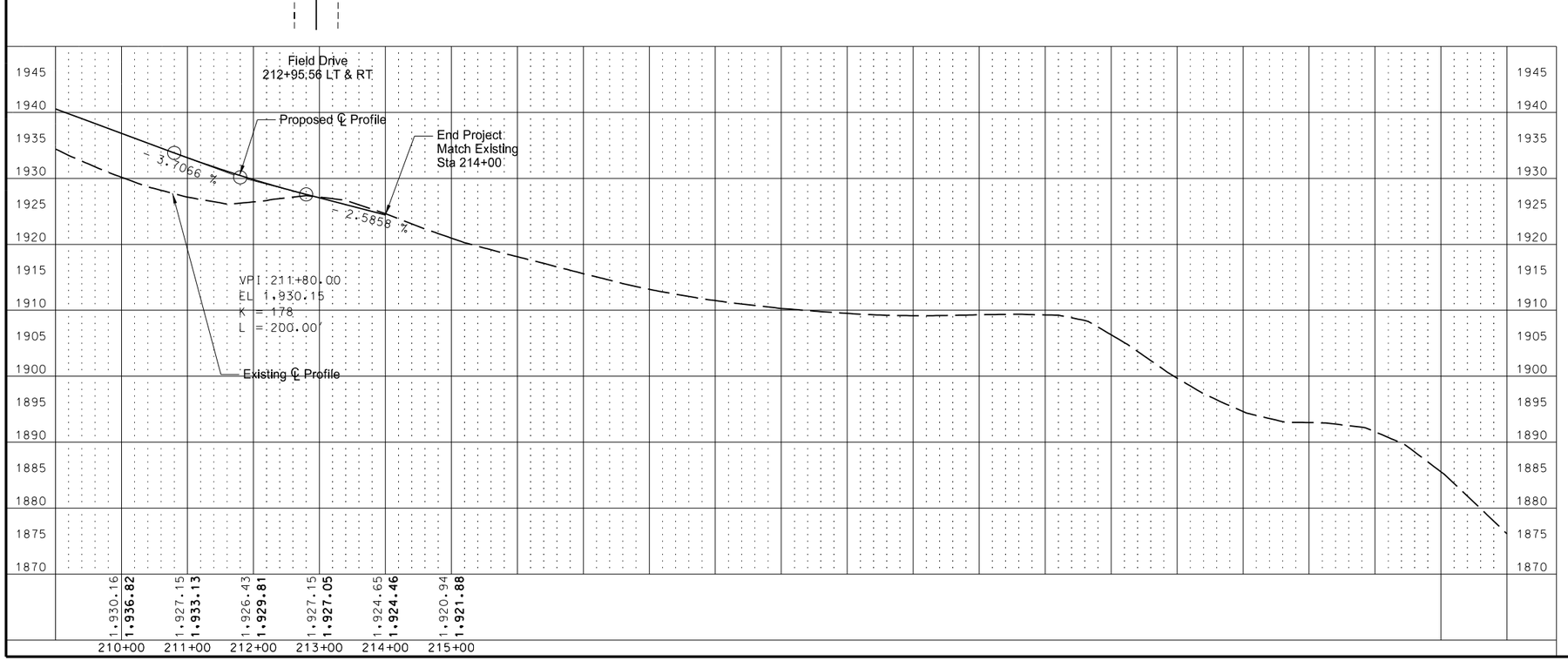
Plan and Profile

Sta 190+00 to Sta 210+00
7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-CNOB-CNOC-1517(001)	60	11





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Plan and Profile

Sta 210+00 to Sta 215+00
7th Ave Se Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-CNOB-CNOC-1517(001)	75	1

Wetland Impact Table

Wetland Number	Location	Wetland Type	Wetland Feature	USACE Jurisdictional Wetlands[1]	Wetland Impacts Acre(s)		USFWS Easement Impacts Acre(s)		Wetland Mitigation		
									Mitigation Required		
					Temp.	Perm.	Temp.	Perm.	EO 11990	USACE	Mitigation Location; Ratio
1a	Sec. 7, T131N, R76W	Ditch	Artificial	Yes	0.01	0.01			N	N	
1b	Sec. 8, T131N, R76W	Ditch	Artificial	Yes	0	0.02			N	N	
				Totals	**0.01**	**0.03**	**0.00**	**0.00**			

[1] A wetland Jurisdictional Determination was issued by the USACE on 2/23/2017; NWO-2017-0065-BIS.

[2] 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.

[3] 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.

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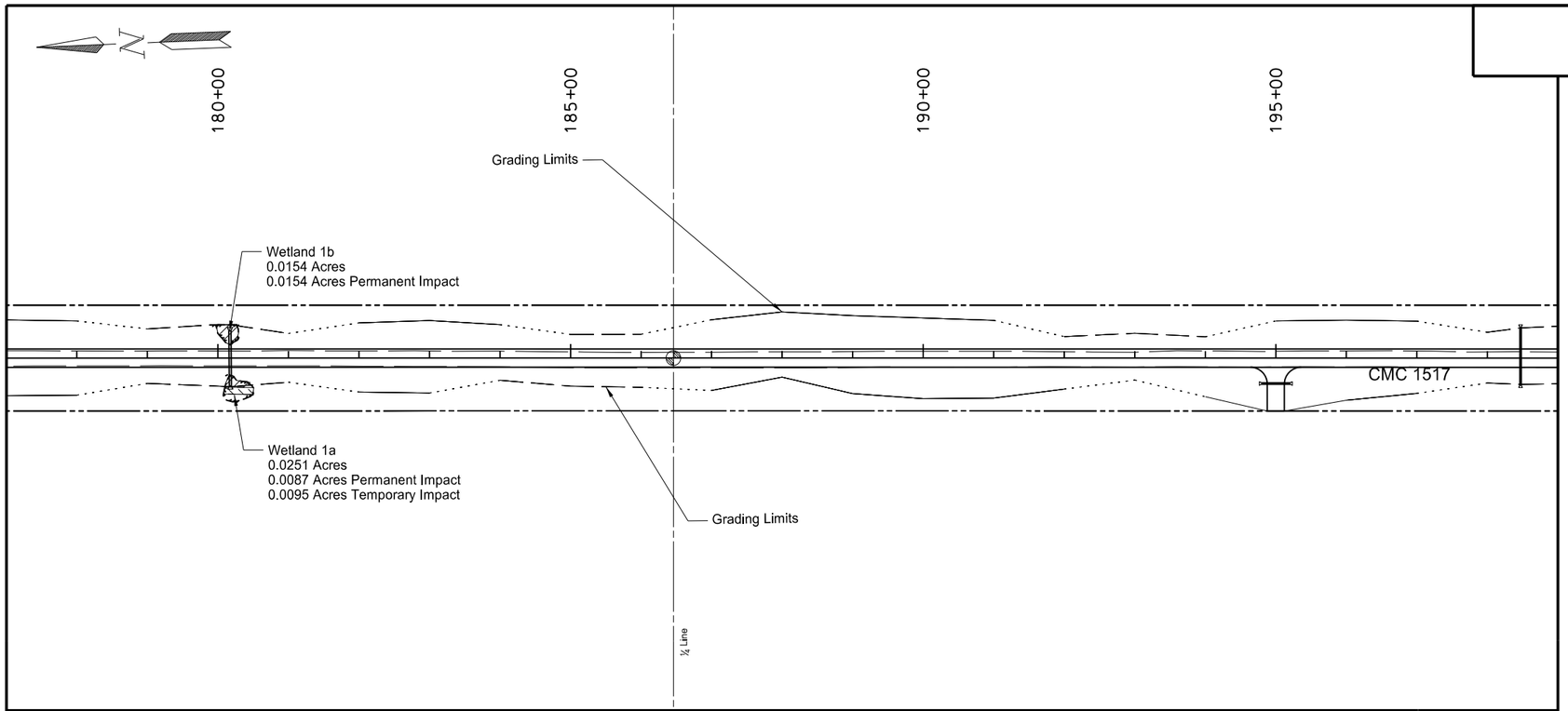
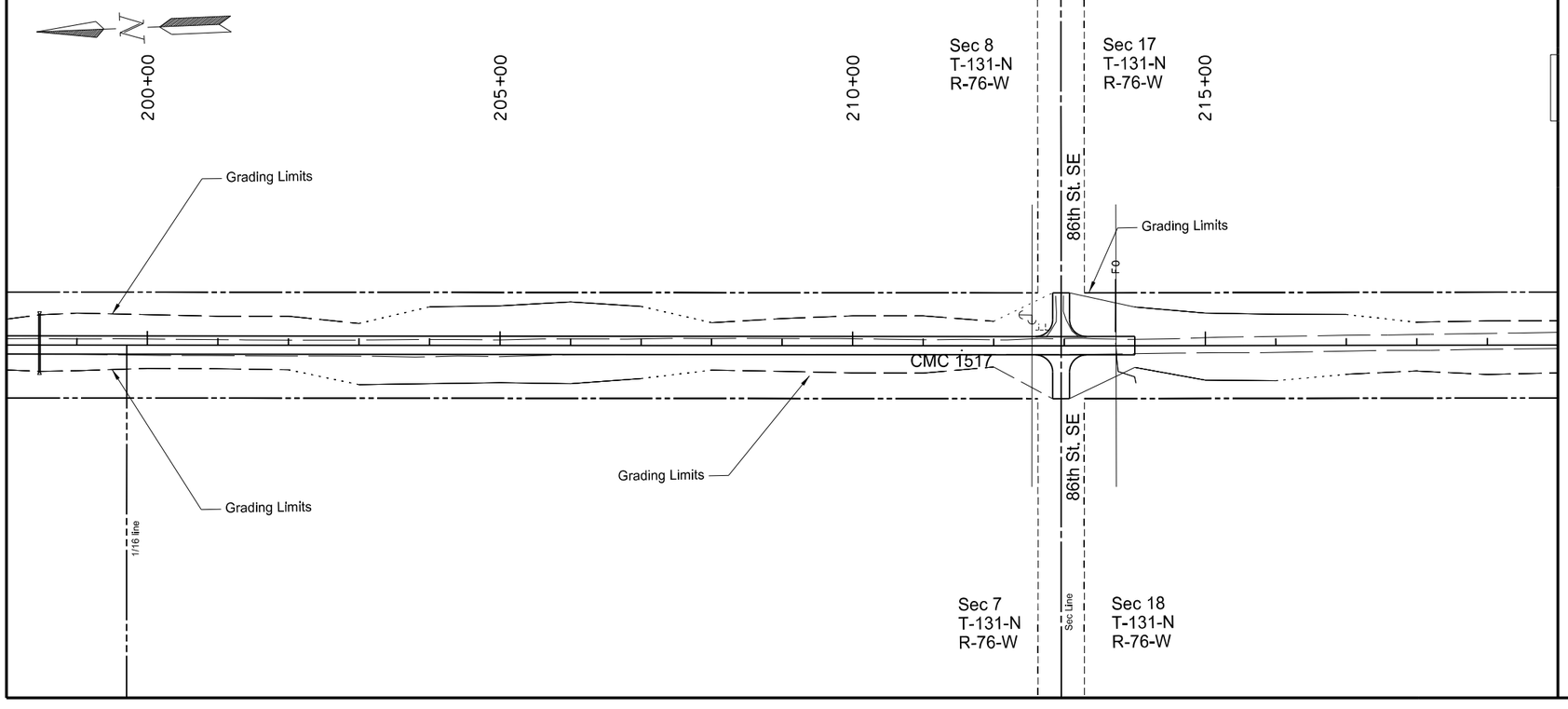
Wetlands

7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-CNOB-CNOC-1517(001)	75	2





Legend

Permanent Wetland Impacts
Total = 0.08 Acres

Temporary Wetland Impacts
Total = 0.02 Acres

Delineated Wetland

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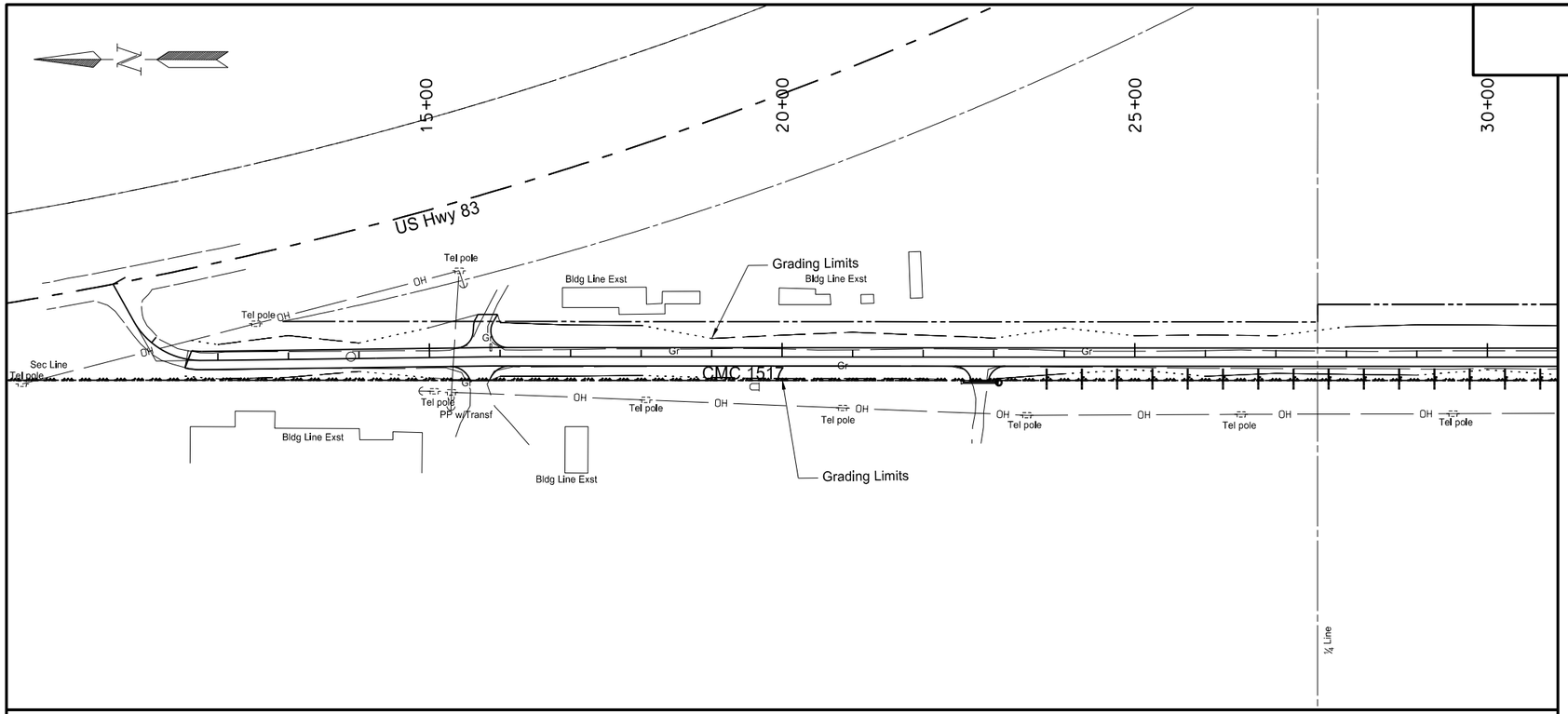
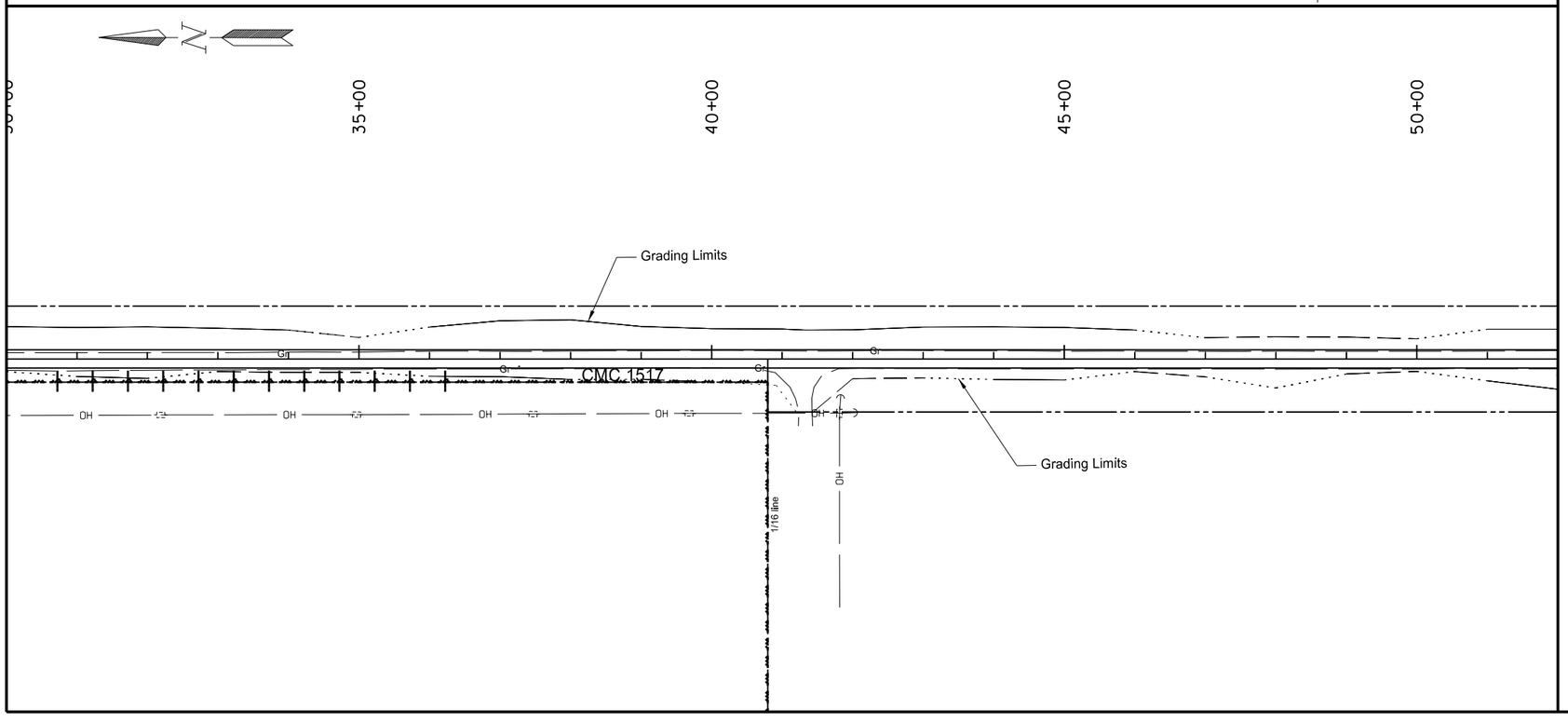
Wetland Impacts

7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-CNOB-CNOC-1517(001)	76	1





*See 76-6 for quantities and locations

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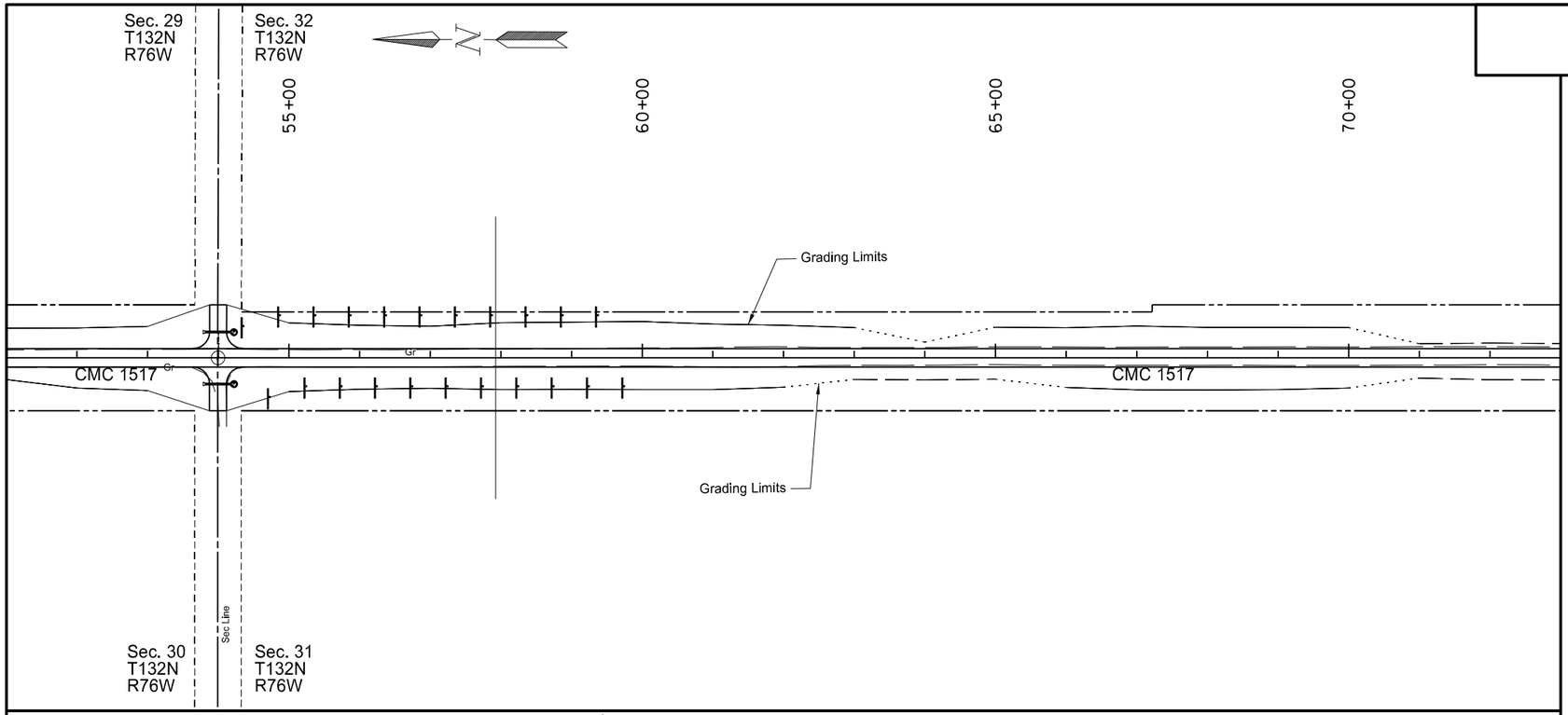
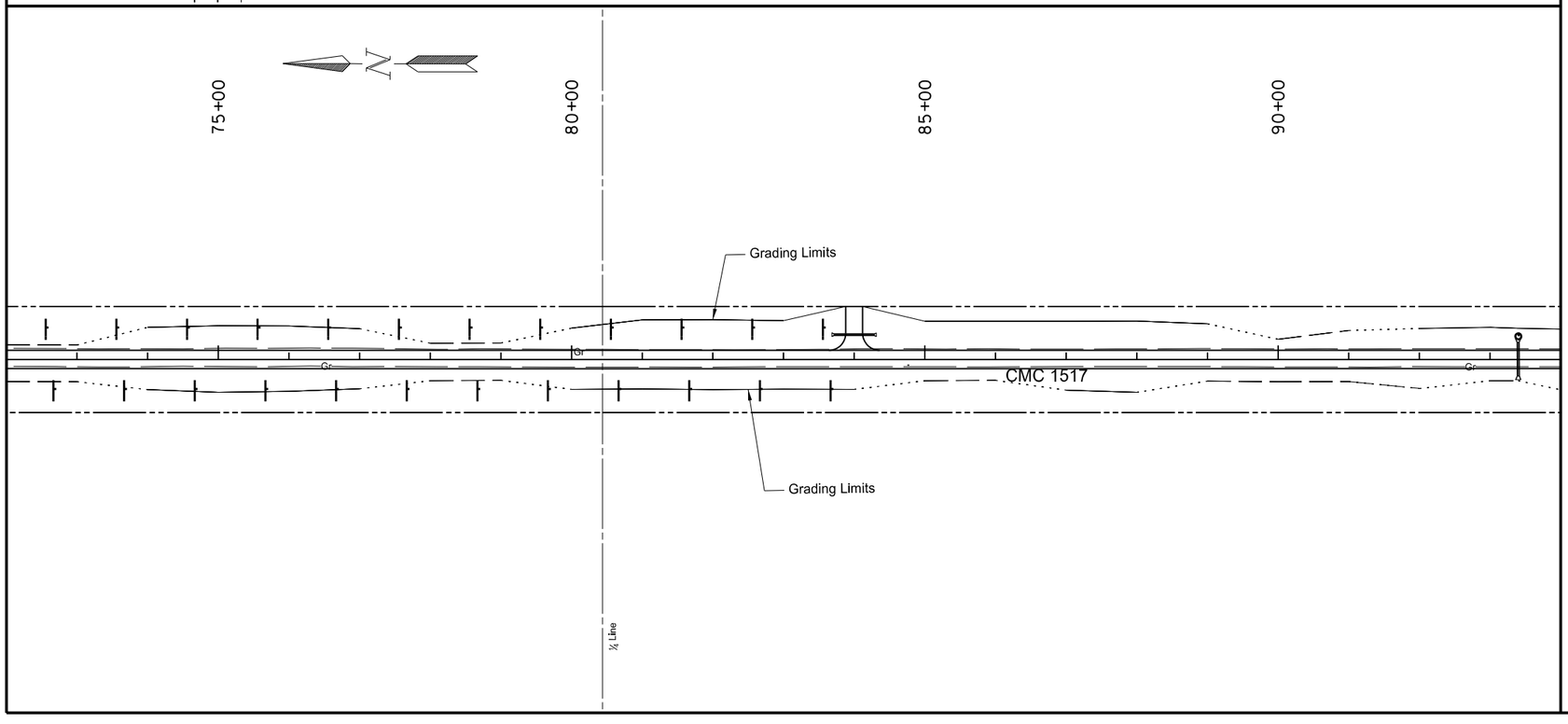
Erosion and Sediment Control

7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-CNOB-CNOC-1517(001)	76	2





*See 76-6 for quantities and locations

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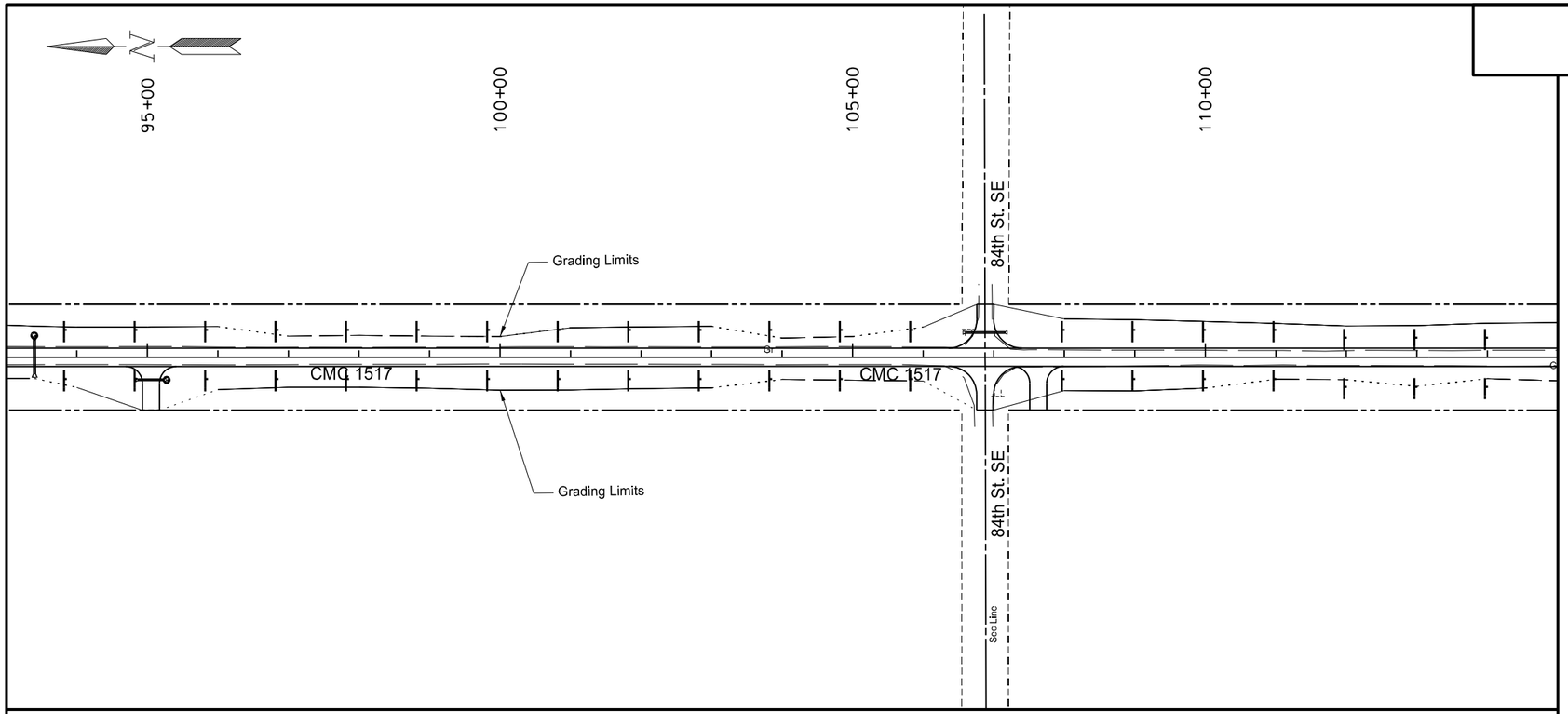
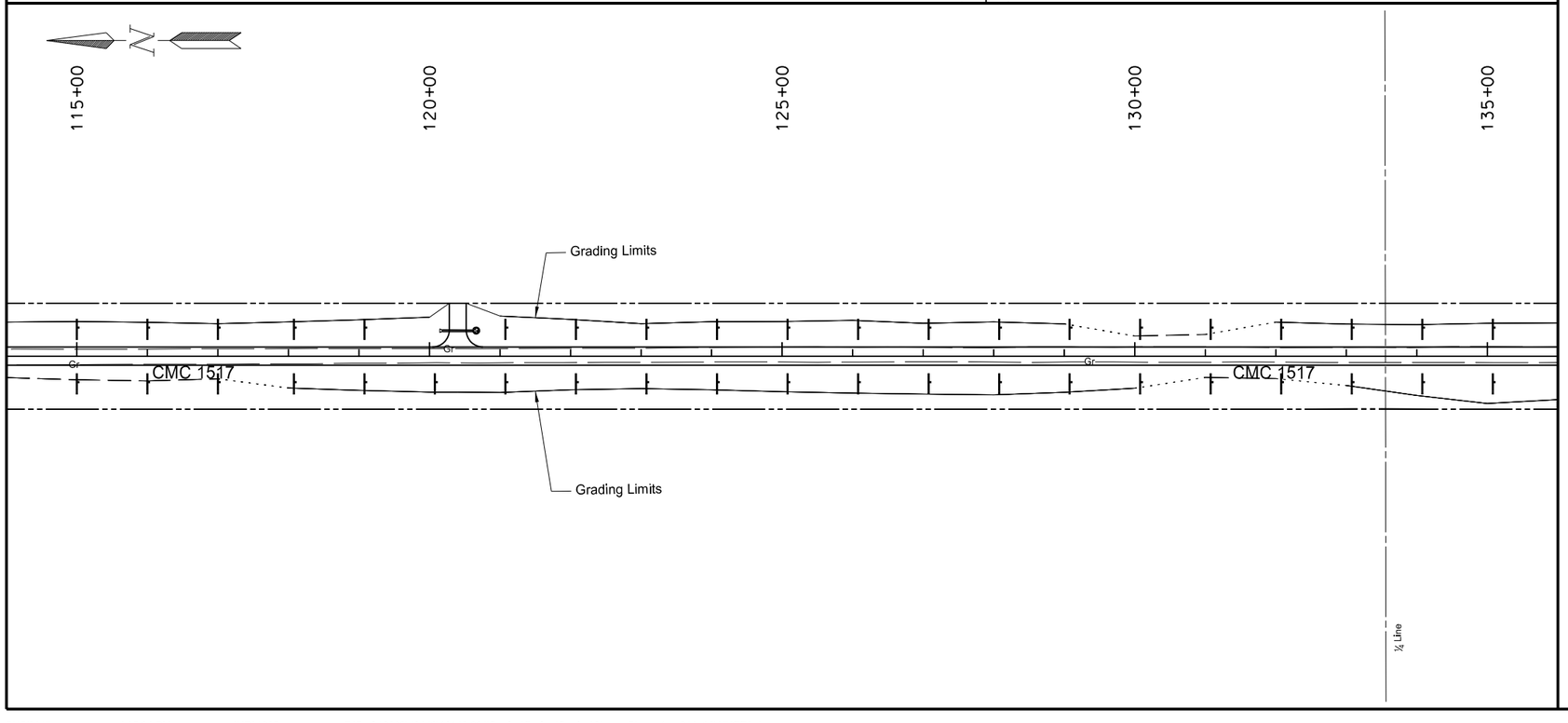
Erosion and Sediment Control

7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-CNOB-CNOC-1517(001)	76	3





*See 76-6 for quantities and locations

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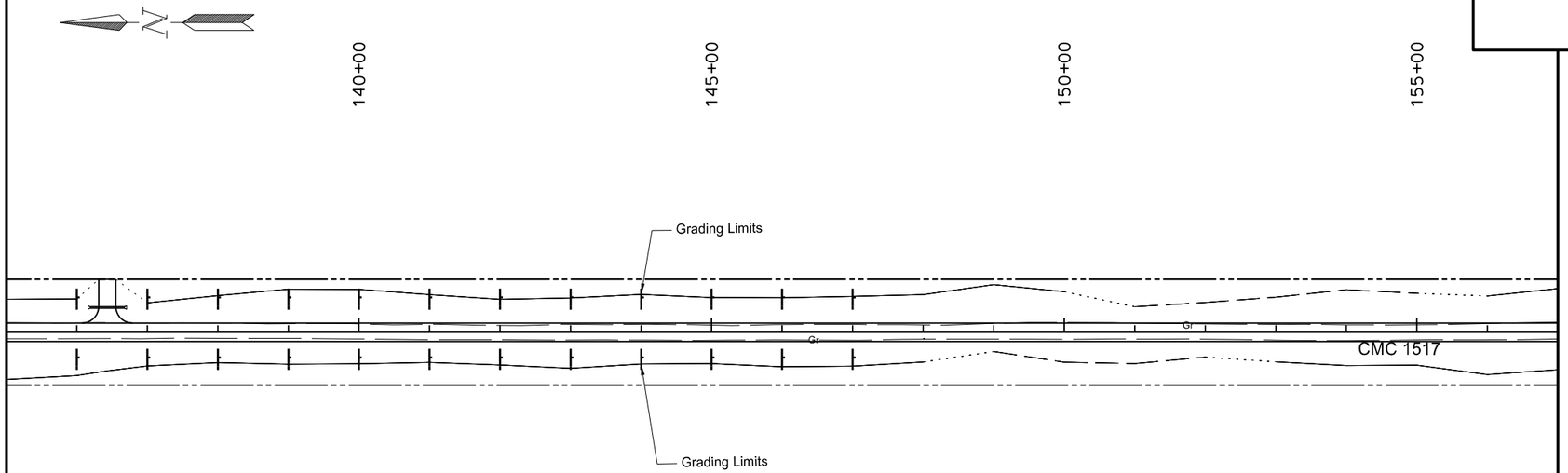
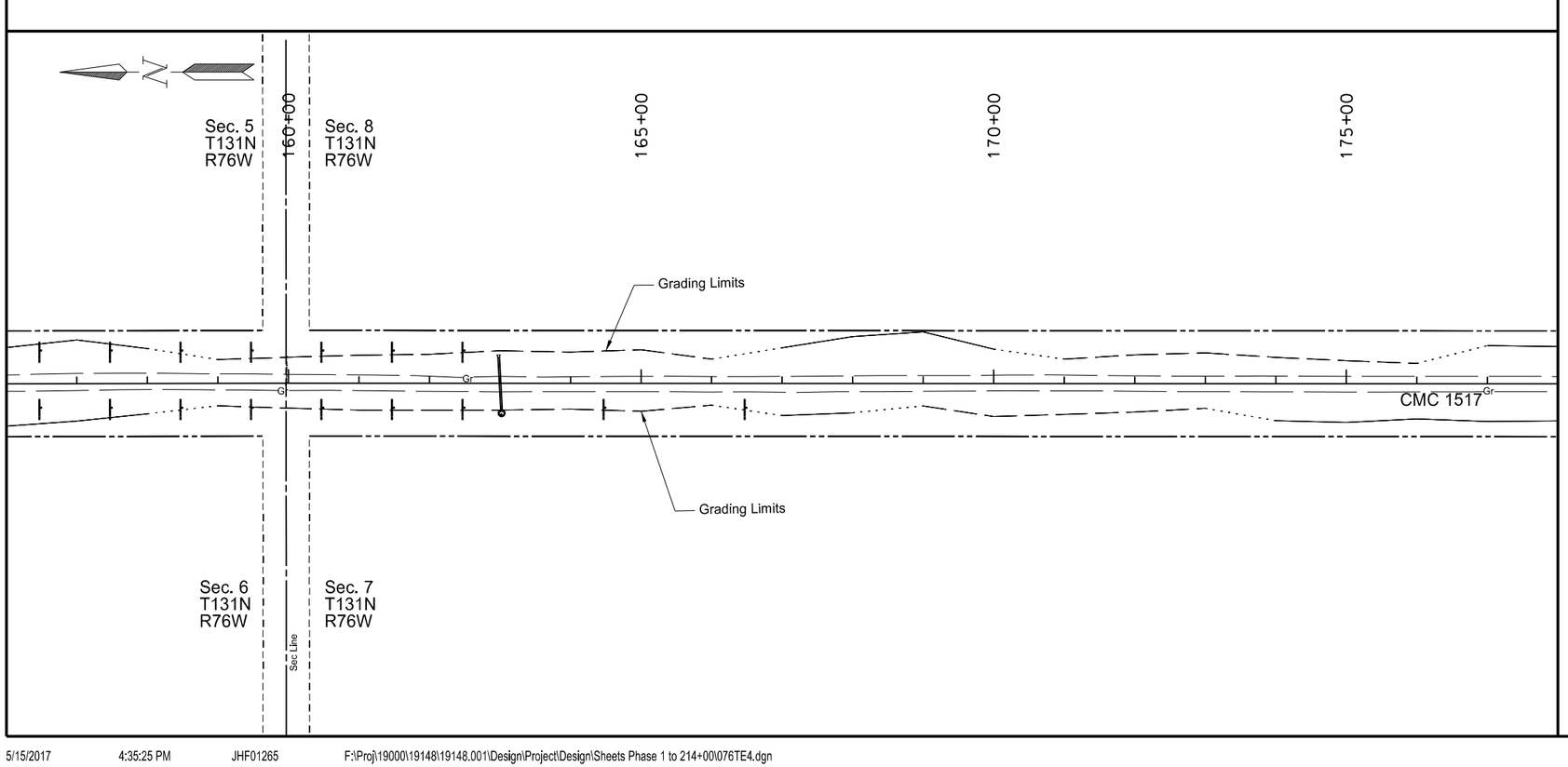
Erosion and Sediment Control

7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-CNOB-CNOC-1517(001)	76	4

*See 76-6 for quantities and locations





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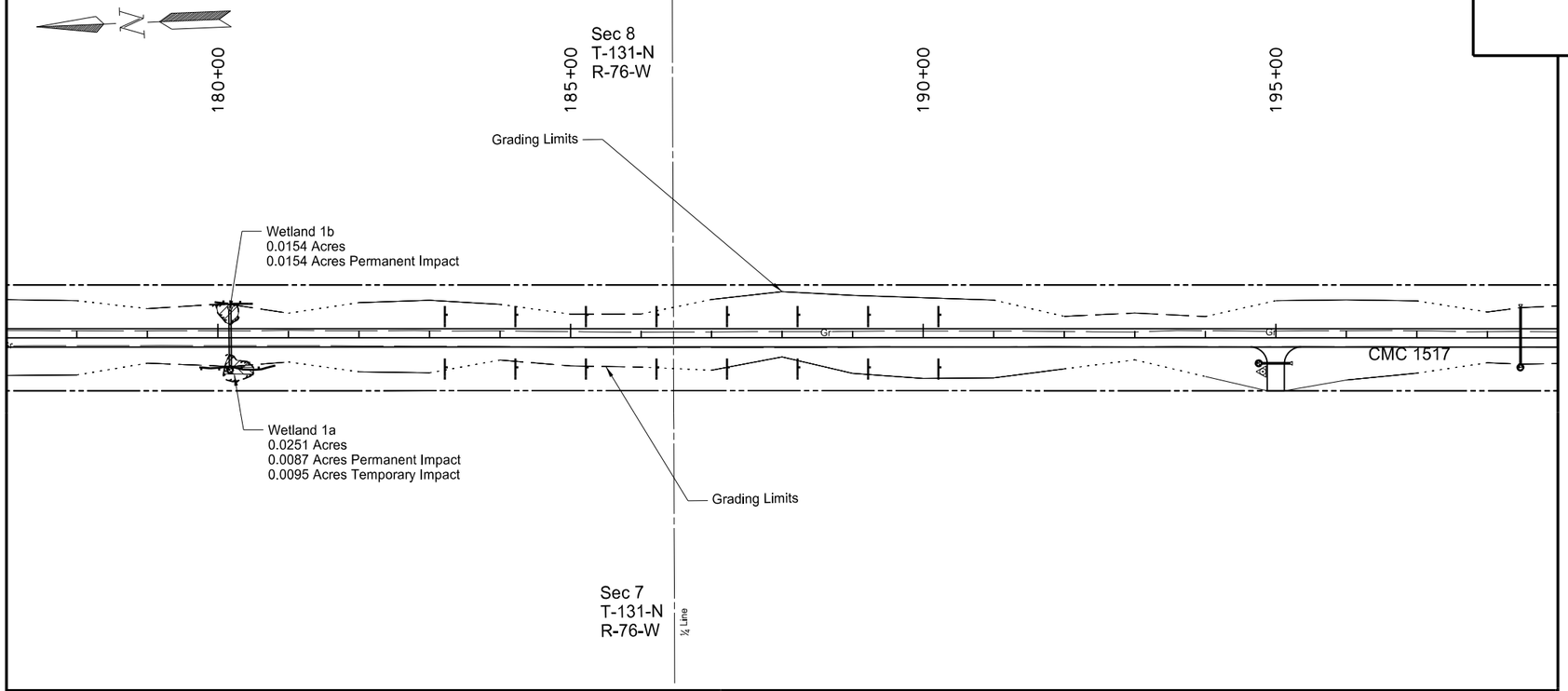
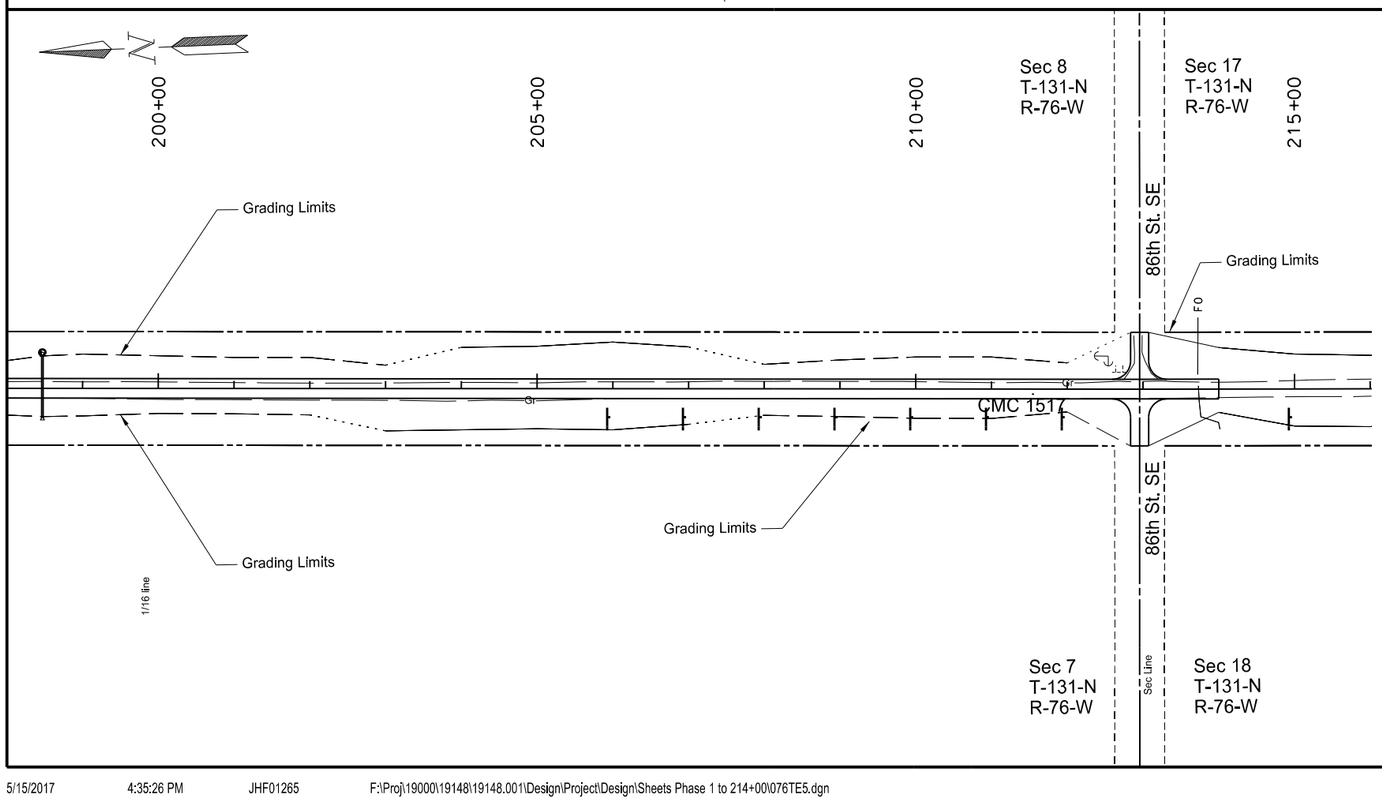
Erosion and Sediment Control

7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-CNOB-CNOC-1517(001)	76	5





*See 76-6 for quantities and locations

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Erosion and Sediment Control

7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-CNOB-CNOC-1517(001)	76	6

Ditch Checks																			
Fiber Rolls 20 IN																			
23+75	RT	30	LF	72+55	LT	30	LF	105+80	LT	30	LF	132+00	LT	30	LF	183+20	RT	30	LF
24+25	RT	30	LF	72+65	RT	30	LF	105+80	RT	30	LF	132+00	RT	30	LF	184+20	LT	30	LF
24+75	RT	30	LF	73+55	LT	30	LF	108+00	LT	30	LF	133+00	LT	30	LF	184+20	RT	30	LF
25+25	RT	30	LF	73+65	RT	30	LF	108+00	RT	30	LF	133+00	RT	30	LF	185+20	LT	30	LF
25+75	RT	30	LF	74+55	LT	30	LF	109+00	LT	30	LF	134+00	LT	30	LF	185+20	RT	30	LF
26+25	RT	30	LF	74+65	RT	30	LF	109+00	RT	30	LF	134+00	RT	30	LF	186+20	LT	30	LF
26+75	RT	30	LF	75+55	LT	30	LF	110+00	LT	30	LF	135+00	LT	30	LF	186+20	RT	30	LF
27+25	RT	30	LF	75+65	RT	30	LF	110+00	RT	30	LF	135+00	RT	30	LF	187+20	LT	30	LF
27+75	RT	30	LF	76+55	LT	30	LF	111+00	LT	30	LF	136+00	LT	30	LF	187+20	RT	30	LF
28+25	RT	30	LF	76+65	RT	30	LF	111+00	RT	30	LF	136+00	RT	30	LF	188+20	LT	30	LF
28+75	RT	30	LF	77+55	LT	30	LF	112+00	LT	30	LF	137+00	LT	30	LF	188+20	RT	30	LF
29+25	RT	30	LF	77+65	RT	30	LF	112+00	RT	30	LF	137+00	RT	30	LF	189+20	LT	30	LF
29+75	RT	30	LF	78+55	LT	30	LF	113+00	LT	30	LF	138+00	LT	30	LF	189+20	RT	30	LF
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35+75	RT	30	LF	93+80	LT	30	LF	119+00	LT	30	LF	144+00	LT	30	LF				
36+25	RT	30	LF	93+80	RT	30	LF	120+00	RT	30	LF	145+00	RT	30	LF				
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56+85	LT	30	LF	99+80	LT	30	LF	126+00	LT	30	LF	158+50	LT	30	LF				
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59+35	LT	30	LF	104+80	LT	30	LF	131+00	LT	30	LF	166+50	RT	30	LF				
59+75	RT	30	LF	104+80	RT	30	LF	131+00	RT	30	LF	183+20	LT	30	LF				
														Total		6420			

Inlet Protection of Pipe End		
Station	Offset	Fiber Roll 20 IN (LF)
23+03	RT	26
54+17	RT	26
54+17	LT	26
93+40	LT	26
95+23	RT	26
120+62	LT	26
163+02	RT	26
180+18	RT	26
194+80	RT	26
198+47	RT	26
Total		260

Runoff Protection			
Station Begin	Station End	Offset	Fiber Roll 20 IN (LF)
179+74	180+14	RT	40
179+95	180+15	LT	20
180+20	180+80	RT	62
180+20	180+50	LT	30
		Total	152

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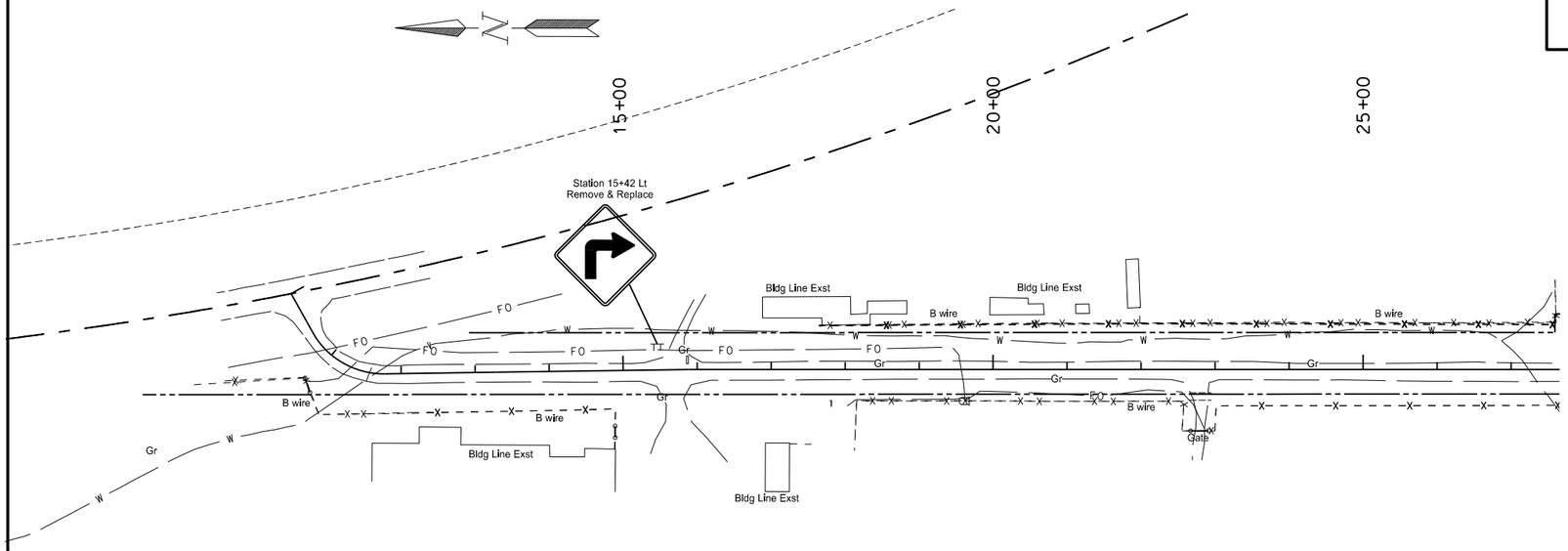
Fiber Rolls

7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-CNOB-CNOC-1517(001)	80	1



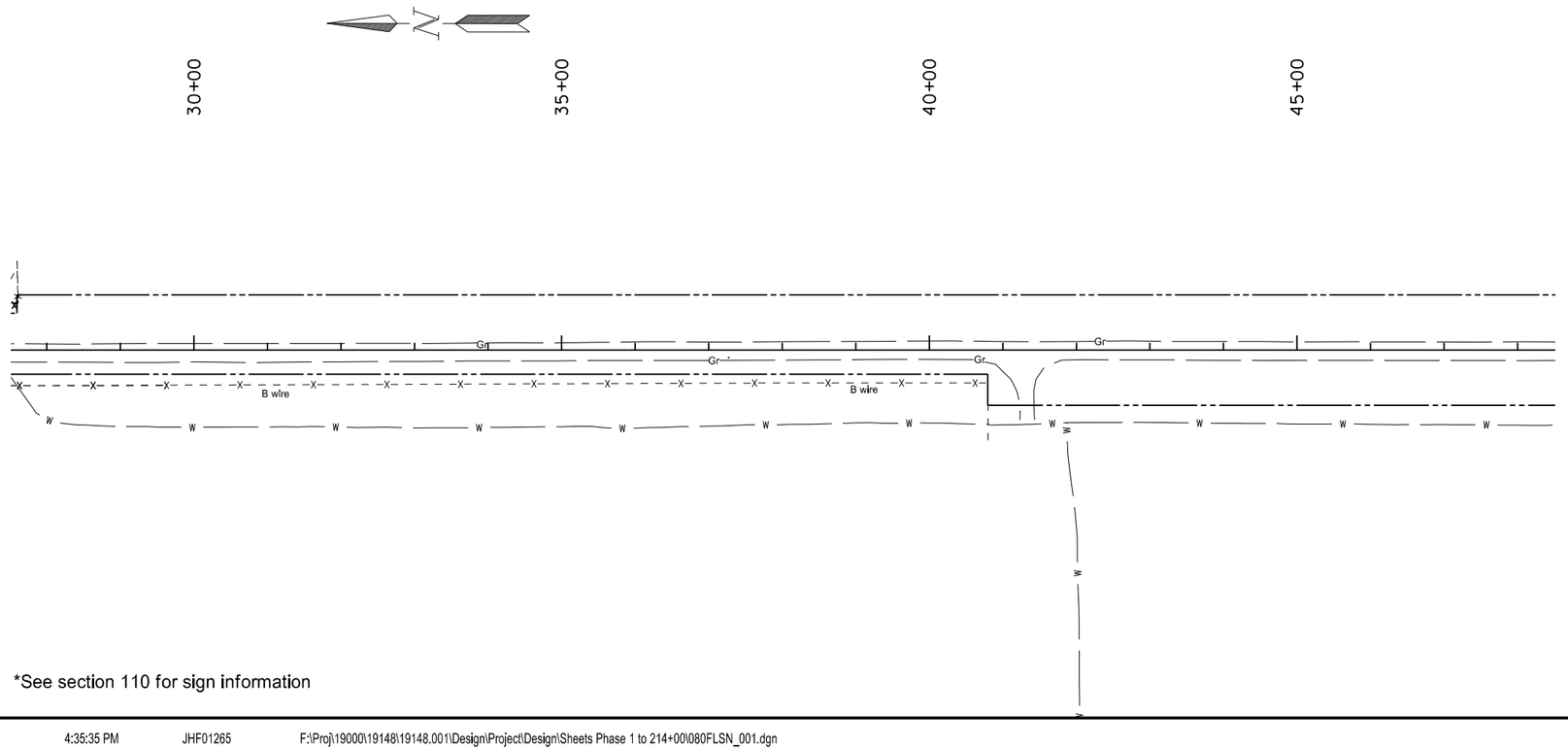
*See section 110 for sign information

Fence Barbed Wire 4 Strand

Sta 17+65 to Sta 27+63 Lt	995 LF
Total	995 LF

Remove Existing Fence

Sta 18+86 to Sta 27+63 Lt	995 LF
Total	995 LF



*See section 110 for sign information

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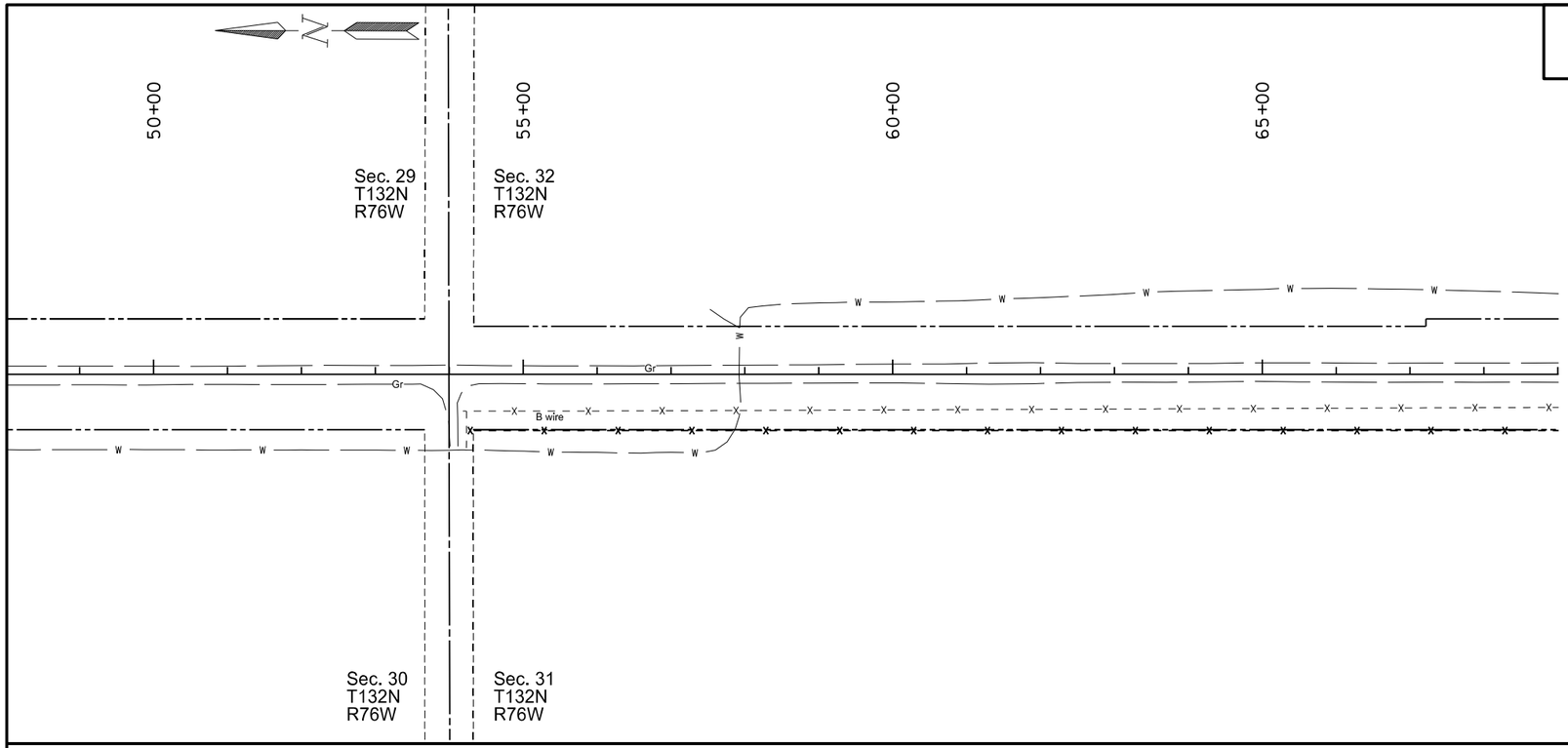
Fencing & Signing Layout

7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-CNOB-CNOC-1517(001)	80	2

Fence Barbed Wire 4 Strand	
Sta 54+25 to Sta 89+00 Rt	3570 LF
Total	3570 LF

Remove Existing Fence	
Sta 54+25 to Sta 89+00 Rt	3595 LF
Total	3595 LF



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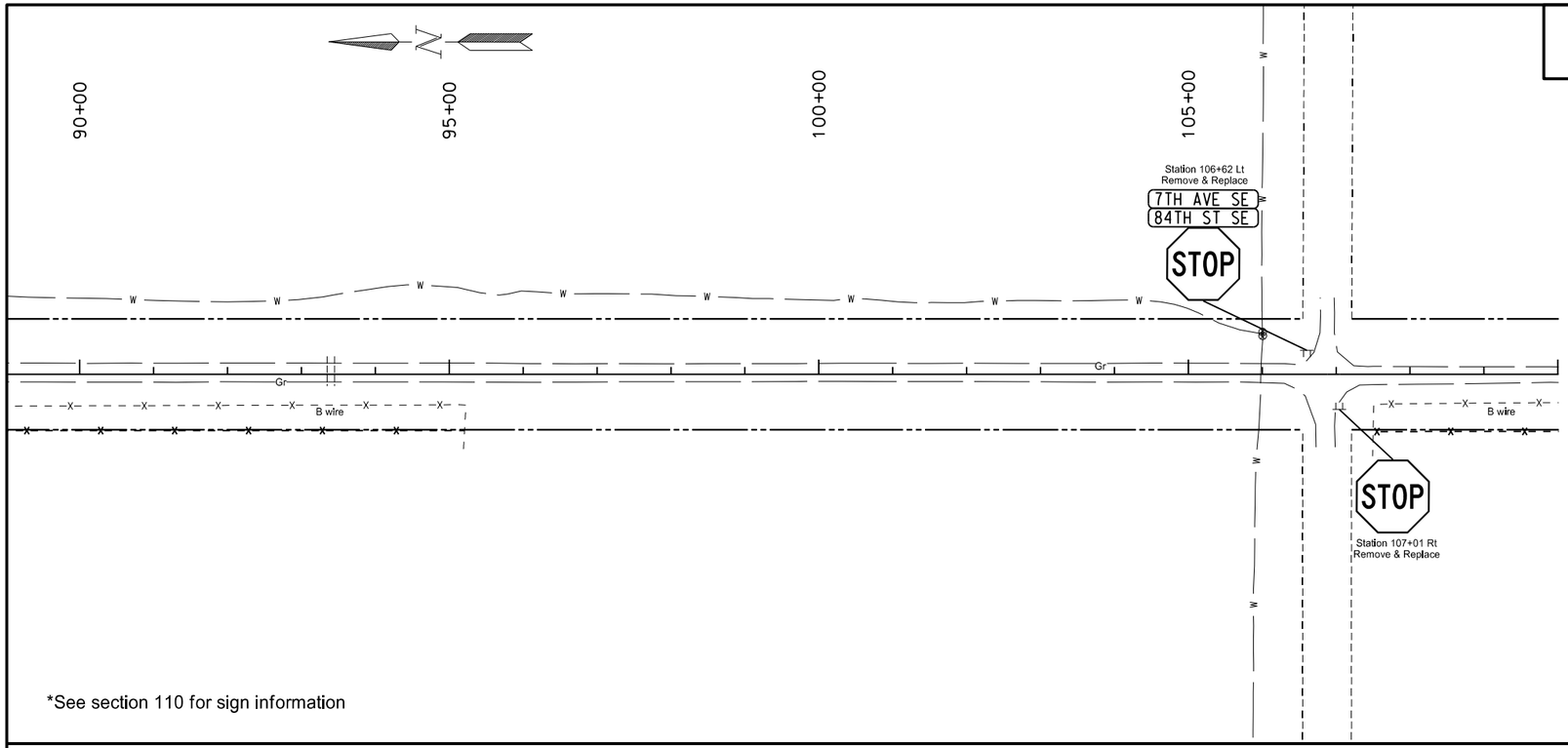
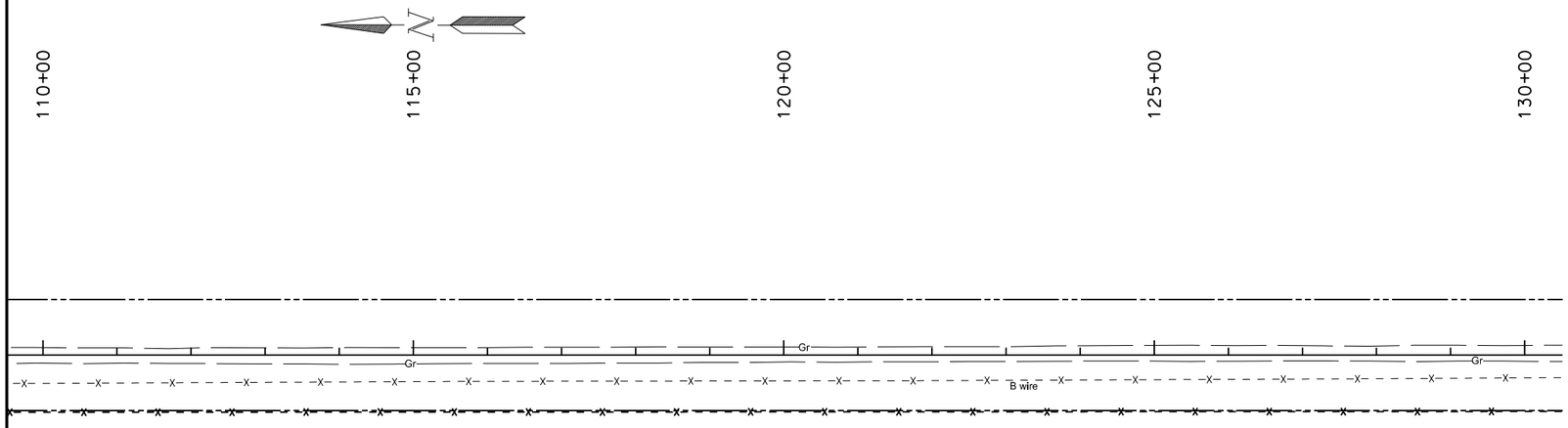
Fencing & Signing Layout

7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-CNOB-CNOC-1517(001)	80	3



*See section 110 for sign information



*See section 110 for sign information

Fence Barbed Wire 4 Strand

Sta 89+00 to Sta 95+25 Rt	616 LF
Sta 107+50 to Sta 130+00 Rt	2252 LF
Total	2868 LF

Remove Existing Fence

Sta 89+00 to Sta 95+25 Rt	650 LF
Sta 107+50 to Sta 130+00 Rt	2343 LF
Total	2993 LF

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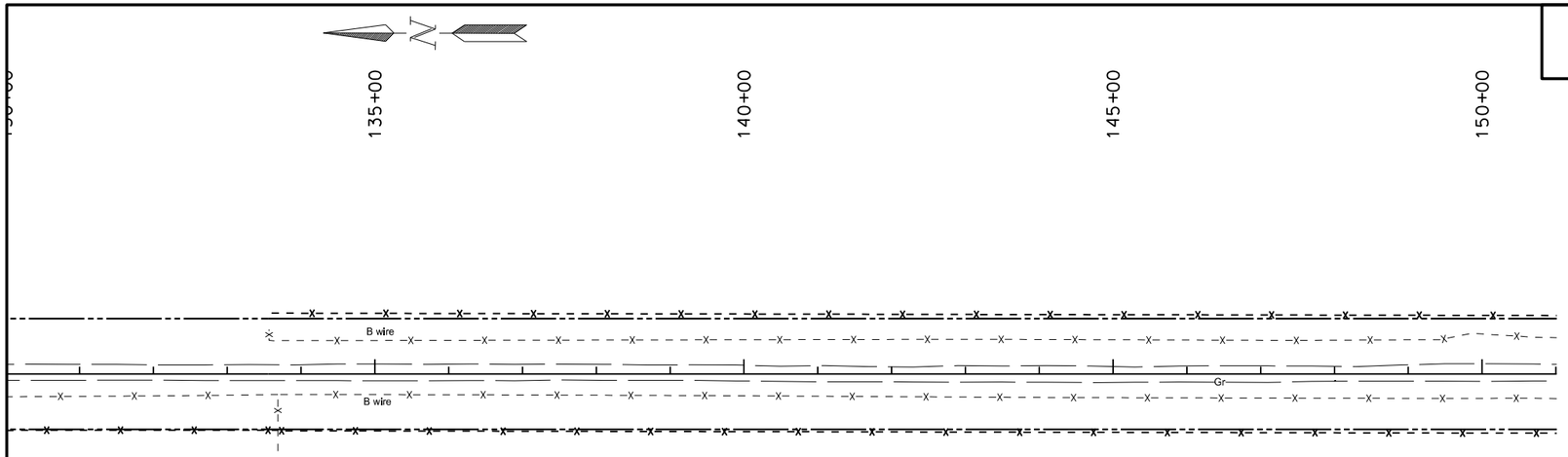
Fencing & Signing Layout

7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-CNOB-CNOC-1517(001)	80	4



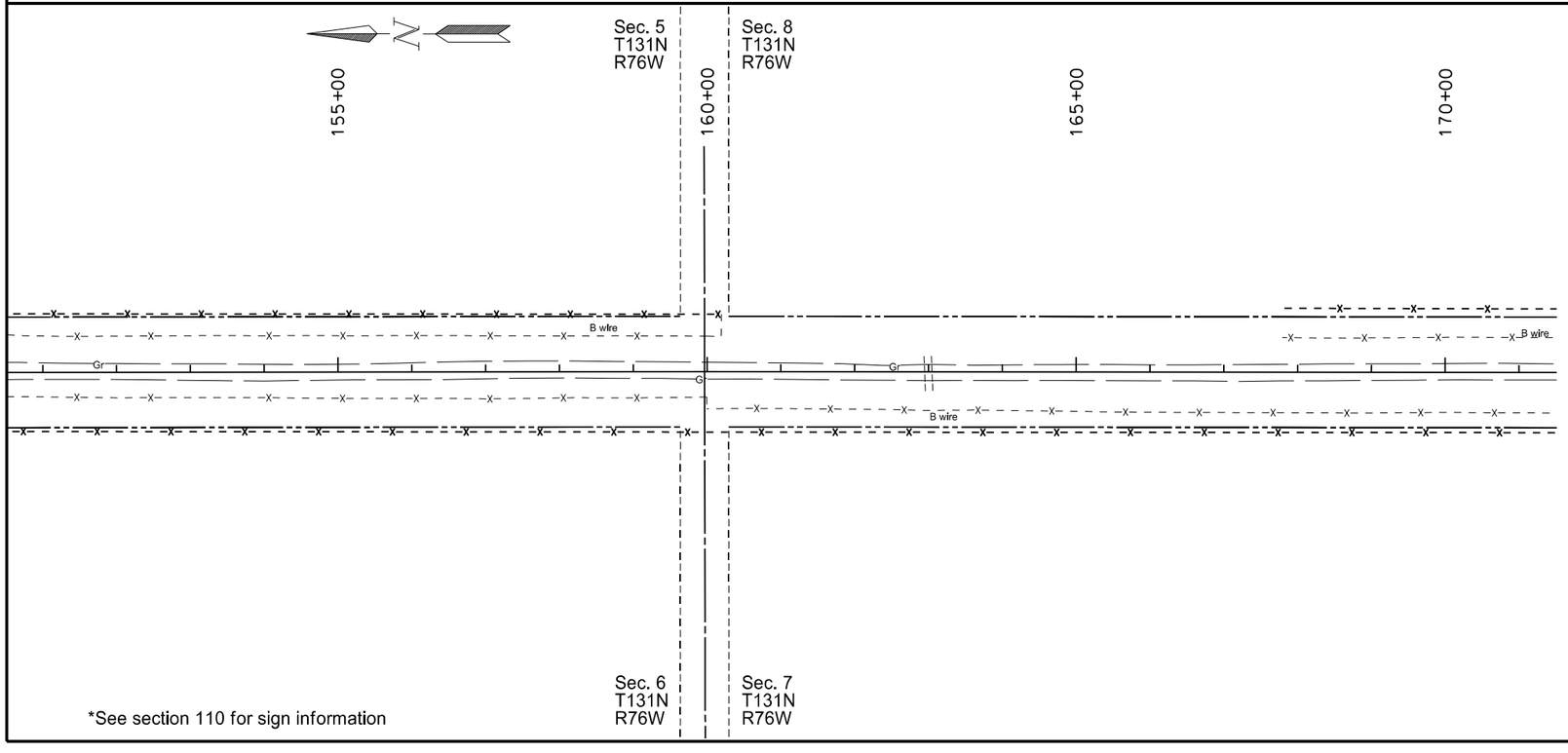
*See section 110 for sign information

Fence Barbed Wire 4 Strand

Sta 130+00 to Sta 171+00 Rt	4125 LF
Sta 133+60 to Sta 160+20 Lt	2704 LF
Sta 167+80 to Sta 717+00 Lt	320 LF
Total	7149 LF

Remove Existing Fence

Sta 130+00 to Sta 171+00 Rt	4125 LF
Sta 133+60 to Sta 160+20 Lt	2704 LF
Sta 167+80 to Sta 717+00 Lt	320 LF
Total	7149 LF



*See section 110 for sign information

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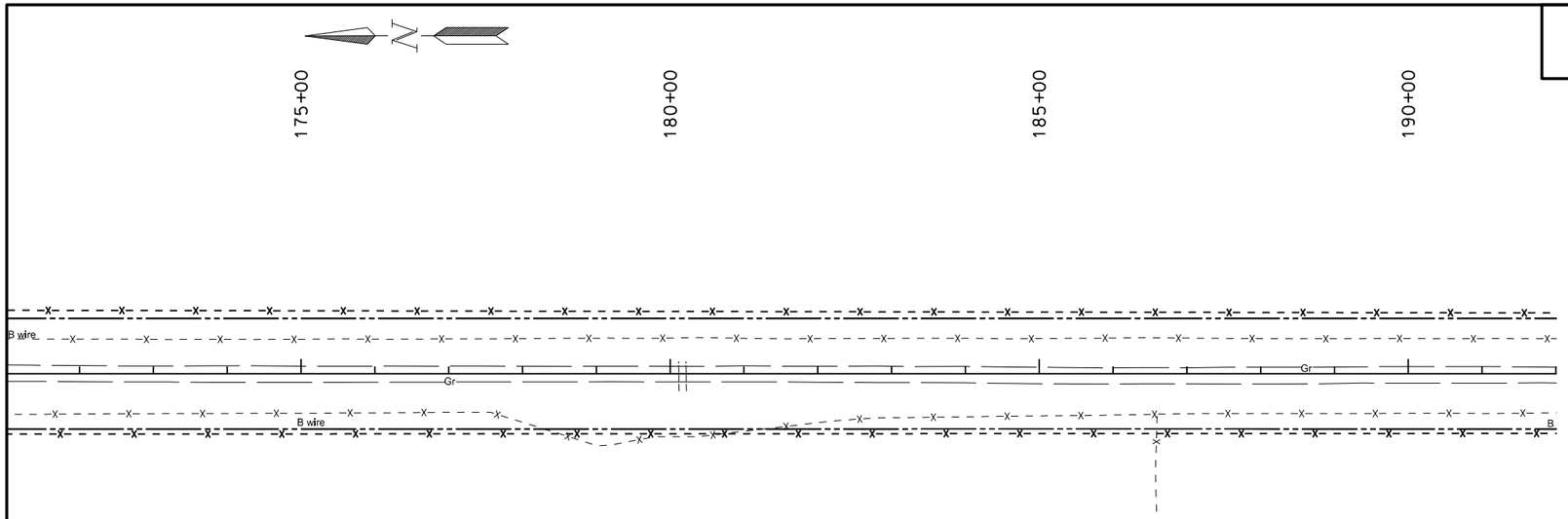
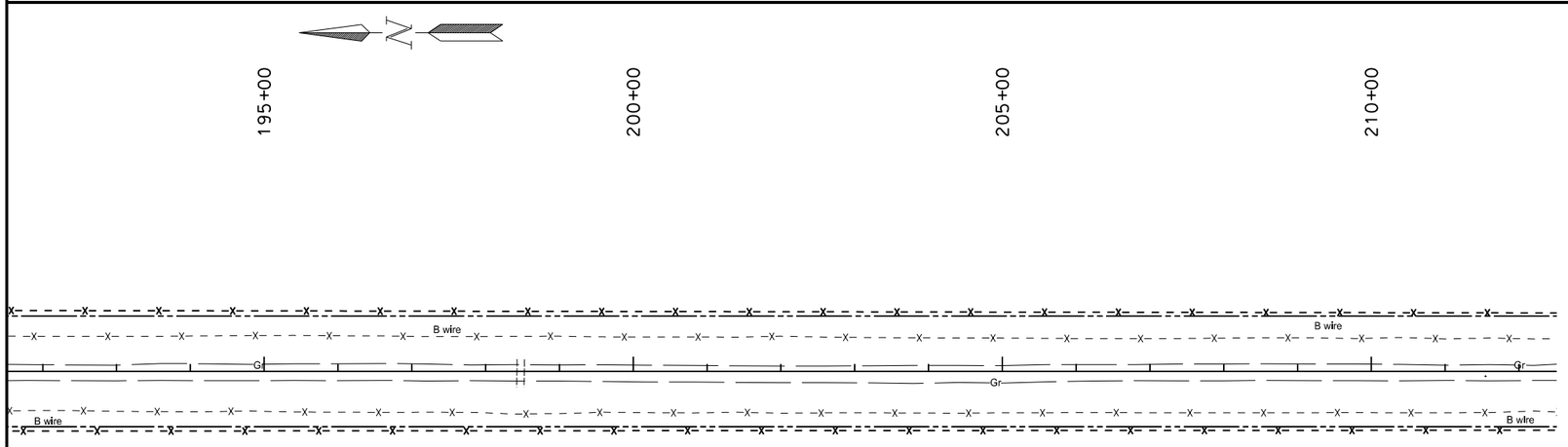
Fencing & Signing Layout

7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-CNOB-CNOC-1517(001)	80	5



*See section 110 for sign information



*See section 110 for sign information

Fence Barbed Wire 4 Strand

Sta 171+00 to Sta 212+60 Lt	4161 LF
Sta 171+00 to Sta 212+00 Rt	3877 LF
Total	8038 LF

Remove Existing Fence

Sta 171+00 to Sta 212+60 Lt	4191 LF
Sta 171+00 to Sta 212+00 Rt	3877 LF
Total	8068 LF

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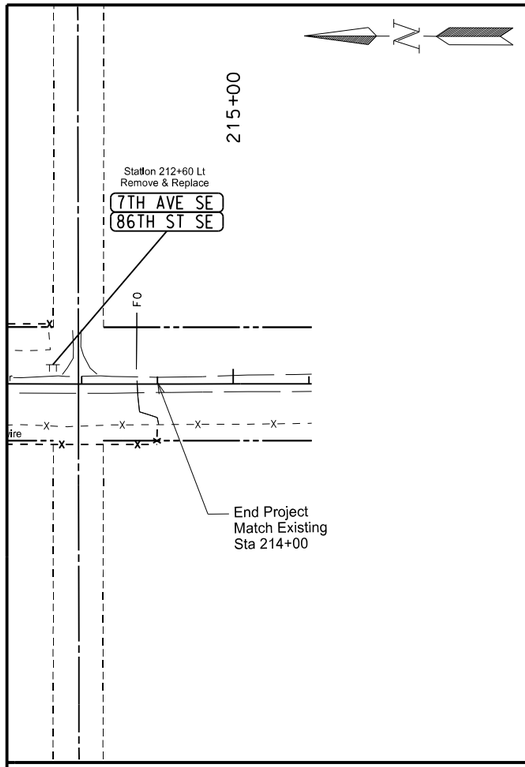
Fencing & Signing Layout

7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-CNOB-CNOC-1517(001)	80	6



Fence Barbed Wire 4 Strand	
Sta 212+00 to Sta 214+00 Rt	222 LF
Total	222 LF

Remove Existing Fence	
Sta 212+00 to Sta 214+00 Rt	200 LF
Total	200 LF

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Fencing & Signing Layout

7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

SURVEY COORDINATE AND CURVE DATA - 7th Ave SE, Hwy 83, South to CMC 1536, Emmons County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	SC-CNOB-CNOC-1517(001)	81	1

HORIZONTAL ALIGNMENT

PNT	STATION	NORTHING	EASTING
7th Ave. SE	Emmons County		
POT (Begin)	10+00.00	205610.67	2036448.58
PC	10+59.21	205581.80	2036396.89
PI	11+24.87	205540.74	2036355.25
PT	11+77.60	205484.13	2036340.54
PI	15+88.49	205073.17	2036346.59
PI	27+59.35	203902.43	2036348.18
PI	53+99.56	201262.22	2036353.16
PI	80+43.79	198617.99	2036358.52
PI	106+87.87	195973.93	2036363.95
PI	133+55.47	193306.33	2036369.02
PI	159+96.64	190665.17	2036373.73
PI	186+45.94	188015.86	2036372.79
PI	212+95.56	185366.24	2036371.32
POT (End)	214+00	185261.80	2036371.51

CURVE DATA

ARC DEFINITION

Curve C1

PI = 11+24.87

Delta = 61° 40' 03" (LT)

Da = 52° 05' 13"

R = 110.00

T = 65.66

L = 118.39

US PUBLIC LAND SURVEY DATA

DESC.	SEC-TWP-RGE	NORTHING	EASTING
E 1/4 Sec Cor	Sec 30 - T132N - R76W	203902.43	2036348.18
SE	Sec 30 - T132N - R76W	201262.23	2036353.16
E 1/4 Cor	Sec 31 - T132N - R76W	198617.99	2036358.52
SE	Sec 31 - T132N - R76W	195973.93	2036363.95
E 1/4 Sec Cor	Sec 6 - T132N - R76W	193306.33	2036369.02
SE	Sec 6 - T131N - R76W	190665.17	2036373.73
E 1/4	Sec 7 - T131N - R76W	188015.86	2036372.79
SE	Sec 7 - T131N - R76W	185366.24	2036371.32
SW	Sec 18 - T131N - R76W	180103.90	2031422.38

SURVEY CONTROL POINTS

PNT	NORTHING	EASTING	ELEV	STATION	OFFSET	CONTROL POINT DESCRIPTION
CP1	202905.88	2036395.41	1773.32	37+55.98	45.34 RT	
CP2	187180.27	2036324.43	1945.26	194+81.56	47.80 LT	
CP3	169325.64	2036434.16	1848.46	373+36.45	31.56 RT	

NOTES:

Date Survey Completed 02/17/2017

☐ Assumed Coordinates

☒ All coordinates on this sheet are Emmons County ground coordinates. They are derived from the NAD83(2011) reference frame; North Dakota South Zone Combination Factor (cf) = .9998910

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

INITIALIZING BENCH MARK

☒ NAVD-88

☐ NGVD-29

☐ GEOID 09 ☐ _____

☒ GEOID 12A

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-CNOB-CNOC-1517(001)	100	1

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
D3-36	36"x6"	STREET NAME SIGN (Sign and installation only)		6	
G20-1-60	**60"x24"**	**ROAD WORK NEXT __ MILES**	**2**	**34**	**68**
G20-1b-60	60"x24"	WORK IN PROGRESS/ NO WORK IN PROGRESS (Sign and installation only)		26	
G20-2-48	**48"x24"**	**END ROAD WORK**	**2**	**19**	**38**
G20-4-36	36"x18"	PILOT CAR FOLLOW ME (Mounted to back of pilot car)		18	
G20-10-108	**108"x48"**	**CONTRACTOR SIGN**	**2**	**64**	**128**
G20-50a-72	**72"x36"**	**ROAD WORK NEXT __ MILES RT & LT ARROWS**	**4**	**37**	**148**
G20-52a-72	**72"x24"**	**ROAD WORK NEXT __ MILES RT or LT ARROW**	**1**	**30**	**30**
G20-55-96	**96"x48"**	**SPEED LIMIT ENFORCED - MINIMUM FEE $80 WHEN WORKERS PRESENT**	**2**	**59**	**118**
M1-1-36	36"x36"	INTERSTATE ROUTE MARKER (Post and installation only)		10	
M1-4-24	24"x24"	U.S. ROUTE MARKER (Post and installation only)		10	
M1-5-24	24"x24"	STATE ROUTE MARKER (Post and installation only)		10	
M3-1-24	24"x12"	NORTH (Mounted on route marker post)		7	
M3-2-24	24"x12"	EAST (Mounted on route marker post)		7	
M3-3-24	24"x12"	SOUTH (Mounted on route marker post)		7	
M3-4-24	24"x12"	WEST (Mounted on route marker post)		7	
M4-8-24	24"x12"	DETOUR (Mounted on route marker post)		7	
M4-9-30	30"x24"	DETOUR ARROW RIGHT or LEFT/AHD AND RT or LT		15	
M4-10-48	48"x18"	DETOUR ARROW RIGHT or LEFT		23	
M5-1-21	21"x15"	ARROW AHD AND RT or LT(Mounted on route marker post)		7	
M5-2-21	21"x15"	ARROW AHD UP & RT or LT (Mounted on route marker post)		7	
M6-1-21	21"x15"	ARROW RT or LT (Mounted on route marker post)		7	
M6-2-21	21"x15"	ARROW UP & RT or LT (Mounted on route marker post)		7	
M6-3-21	21"x15"	ARROW AHD (Mounted on route marker post)		7	
R1-1-48	**48"x48"**	**STOP**	**2**	**32**	**64**
R1-1a-18	**18"x18"**	**STOP and SLOW PADDLE Back to Back**	**2**	**5**	**10**
R1-2-60	60"x60"	YIELD		29	
R2-1-48	48"x60"	SPEED LIMIT __		39	
R2-1a-24	24"x18"	MINIMUM FEE $80 (Mounted on Speed Limit post)		10	
R3-7-48	48"x48"	LEFT or RIGHT LANE MUST TURN LEFT or RIGHT		35	
R4-1-48	**48"x60"**	**DO NOT PASS**	**2**	**39**	**78**
R4-7-48	48"x60"	KEEP RIGHT SYMBOL		39	
R5-1-48	48"x48"	DO NOT ENTER		35	
R6-1-36	36"x12"	ONE WAY RIGHT or LEFT		13	
R7-1-12	12"x18"	NO PARKING		11	
R10-6-24	24"x36"	STOP HERE ON RED		16	
R11-2-48	48"x30"	ROAD CLOSED		28	
R11-2a-48	48"x30"	STREET CLOSED		28	
R11-3a-60	**60"x30"**	**ROAD CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY**	**6**	**31**	**186**
R11-3c-60	60"x30"	STREET CLOSED __ MILES AHEAD LOCAL TRAFFIC ONLY		31	
R11-4a-60	60"x30"	STREET CLOSED TO THRU TRAFFIC		31	
W1-3-48	48"x48"	RIGHT or LEFT SHARP REVERSE CURVE ARROW		35	
W1-4-48	48"x48"	RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-4b-48	48"x48"	DOUBLE RIGHT or LEFT REVERSE CURVE ARROW		35	
W1-6-48	**48"x24"**	**LARGE ARROW**	**2**	**26**	**52**
W3-1-48	**48"x48"**	**STOP AHEAD SYMBOL**	**2**	**35**	**70**
W3-3-48	48"x48"	SIGNAL AHEAD SYMBOL		35	
W3-4-48	48"x48"	BE PREPARED TO STOP		35	
W3-5-48	48"x48"	SPEED REDUCTION AHEAD		35	
W4-2-48	48"x48"	RIGHT or LEFT LANE TRANSITION SYMBOL		35	
W5-1-48	48"x48"	ROAD NARROWS		35	
W5-8-48	48"x48"	THRU TRAFFIC RIGHT LANE		35	
W5-9-48	48"x48"	ROAD WORK TRAFFIC ONLY DOWN & LT or RT ARROW		35	
W6-3-48	48"x48"	TWO WAY TRAFFIC SYMBOL		35	
W8-1-48	**48"x48"**	**BUMP**	**2**	**35**	**70**
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-9a-48	48"x48"	SHOULDER DROP-OFF		35	
W8-11-48	48"x48"	UNEVEN LANES		35	
W8-12-48	48"x48"	NO CENTER STRIPE		35	
W8-53-48	48"x48"	TRUCKS ENTERING HIGHWAY		35	
W8-54-48	**48"x48"**	**TRUCKS ENTERING AHEAD or __ FT.**	**2**	**35**	**70**
W8-55-48	**48"x48"**	**TRUCKS CROSSING AHEAD or __ FT.**	**2**	**35**	**70**
W8-56-48	48"x48"	TRUCKS EXITING HIGHWAY		35	
W9-3a-48	48"x48"	CENTER LANE CLOSED SYMBOL		35	
W12-2-48	48"x48"	LOW CLEARANCE SYMBOL		35	
W13-1-24	24"x24"	__ MPH ADVISORY SPEED PLATE (Mounted on warning sign post)		11	
W13-4-48	48"x60"	RAMP ARROW		39	
W14-3-48	**48"x36"**	**NO PASSING ZONE**	**2**	**23**	**46**
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**2**	**35**	**70**
W20-2-48	48"x48"	DETOUR AHEAD or __ FT		35	
W20-3-48	48"x48"	ROAD or STREET CLOSED AHEAD or __ FT.		35	
W20-4-48	**48"x48"**	**ONE LANE ROAD AHEAD or __ FT.**	**2**	**35**	**70**
W20-5-48	48"x48"	RIGHT or LEFT LANE CLOSED AHEAD or __ FT.		35	
W20-7a-48	**48"x48"**	**FLAGGING SYMBOL**	**2**	**35**	**70**
W20-7k-24	24"x18"	__ FEET (Mounted on warning sign post)		10	
W20-8-48	48"x48"	STREET CLOSED		35	
W20-51-48	48"x48"	EQUIPMENT WORKING		35	
W20-52-54	54"x12"	NEXT __ MILES (Mounted on warning sign post)		12	
W21-1a-48	48"x48"	WORKERS SYMBOL		35	
W21-2-48	48"x48"	FRESH OIL		35	
W21-3-48	48"x48"	ROAD MACHINERY AHEAD or __ FT		35	

SIGN NUMBER	SIGN SIZE	DESCRIPTION	AMOUNT REQUIRED	UNITS PER AMOUNT	UNITS SUB TOTAL
W21-5-48	**48"x48"**	**SHOULDER WORK**	**2**	**35**	**70**
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT.		35	
W21-6a-48	48"x48"	SURVEY CREW AHEAD		35	
W21-50-48	48"x48"	BRIDGE PAINTING AHEAD or __ FT.		35	
W21-51-48	**48"x48"**	**MATERIAL ON ROADWAY**	**2**	**35**	**70**
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	
	24"x24"	**TAKE TURNS (6" D letters) (Mounted on stop sign post)**	**2**	**11**	**22**

SPECIAL SIGNS

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**1618**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	**FLAGGING**	**MHR**	**150**
704-1041	ATTENUATION DEVICE-TYPE B-55	EACH	
704-1043	ATTENUATION DEVICE-TYPE B-65	EACH	
704-1044	ATTENUATION DEVICE-TYPE B-70	EACH	
704-1050	TYPE I BARRICADES	EACH	
704-1051	TYPE II BARRICADES	EACH	
704-1052	**TYPE III BARRICADES**	**EACH**	**4**
704-1060	DELINEATOR DRUMS	EACH	
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**80**
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1080	**STACKABLE VERTICAL PANELS**	**EACH**	**150**
704-1081	VERTICAL PANELS - BACK TO BACK	EACH	
704-1085	SEQUENCING ARROW PANEL - TYPE A	EACH	
704-1086	SEQUENCING ARROW PANEL - TYPE B	EACH	
704-1087	SEQUENCING ARROW PANEL - TYPE C	EACH	
704-1088	SEQUENCING ARROW PANEL - TYPE C - CROSSOVER	EACH	
704-1095	TYPE B FLASHERS	EACH	
704-3501	PORTABLE PRECAST CONCRETE MED BARRIER	LF	
704-3510	PRECAST CONCRETE MED BARRIER - STATE FURNISHED	EACH	
762-0200	RAISED PAVEMENT MARKERS	EACH	
762-0420	SHORT TERM 4IN LINE - TYPE R	LF	
762-0430	SHORT TERM 4IN LINE - TYPE NR	LF	
762-1500	OBLITERATION OF PVMT MK	SF	
772-2110	FLASHING BEACON - POST MOUNTED	EACH	

NOTE:
If additional signs are required, units will be calculated using the formula from Section III-19.06 of the Design Manual.
http://www.dot.nd.gov/

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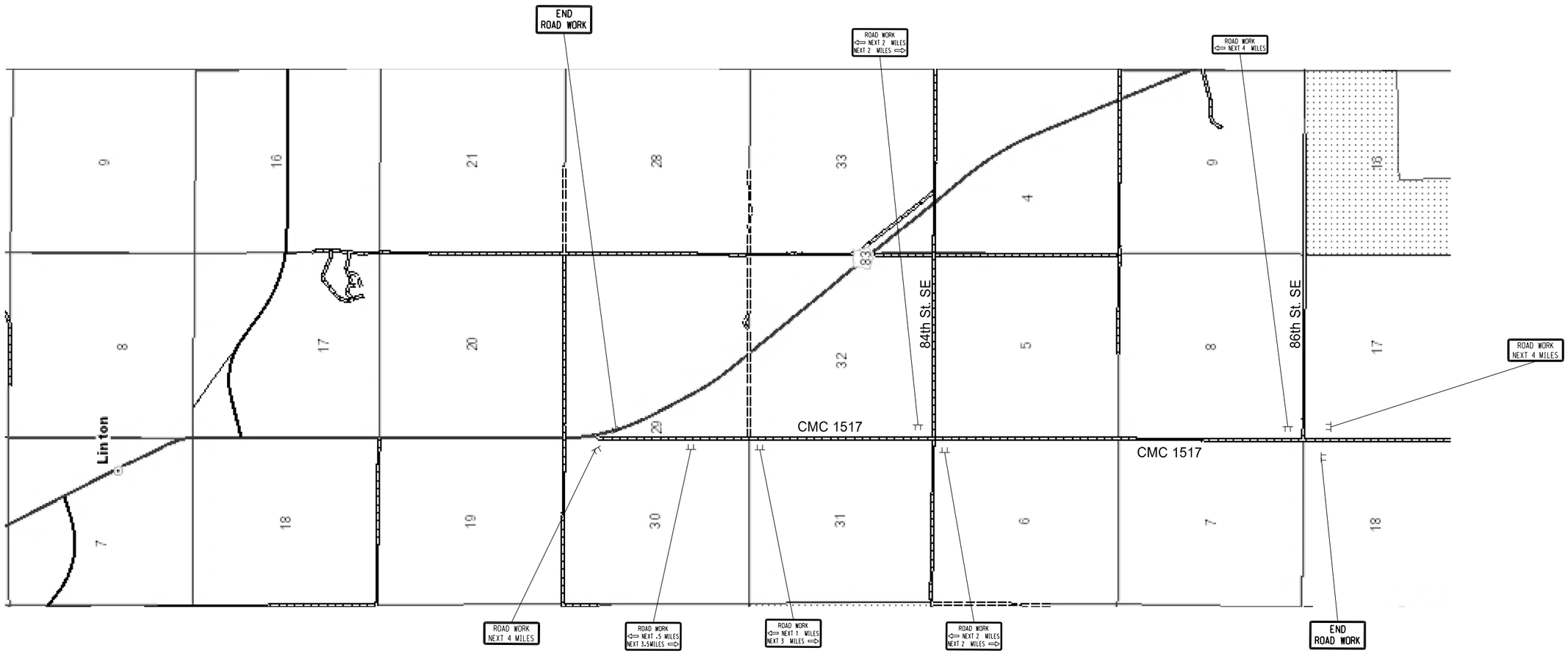
Work Zone
Traffic Control Device List

7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	SC-CNOB-CNOC-1517(001)	100	2



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Work Zone Signing

7th Ave SE Reconstruction
US Hwy 83, South to 86th St SE
Emmons County, ND

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
N.D.	SC-CNOB-CNOC-1517(001)	110	1

Sta/RP	Sign No.	Assembly No.	Flat Sheet For Signs IV SF	Flat Sheet For Signs XI SF	Sign Support Length 1st LF	2nd LF	3rd LF	4th LF	Support Size	Max Post Len LF	Sleeve Length 1st LF	2nd LF	3rd LF	4th LF	Sleeve Size	Anchor EA	Anchor LF	Anchor Size	Reset Sign Panel EA	Reset Sign Support EA	Break-Away EA	Comments
15+42 Lt	W1-1R	102		2.3	11.5				2 x 2 12 ga	17.8						1	4	2.25 x 2.25 12 ga				
106+62 Lt	SA2E		9.0	5.2	11.3				2 x 2 12 ga	18.1						1	4	2.25 x 2.25 12 ga				
107+01 Rt	R1-1	1		5.2	12.3				2.25 x 2.25 12 ga	13.7						1	4	2.5 x 2.5 12 ga				
212+60 Lt	SA1E		9.0		11.5				2 x 2 12 ga	18.1						1	4	2.25 x 2.25 12 ga				
Sub Total			18.0	12.7		**Total**	46.5									**Total**	16		0	0	0	
Grand Total			18.0	12.7		**Total**	46.5									**Total**	16		0	0	0	

Basis of Estimate
Sign Support Lengths

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

Areas where parking and/or pedestrian movement will occur - 84"
Urban/rural expressway and freeway - 84" (Offset - 60")
Rural Roadway - 60"
Bike route - 60"

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Sign Summary
Perforated Tube

Emmons County

7th Ave Reconstruction
US Hwy 83, South to 86th St SE

NDDOT ABBREVIATIONS

D-101-1

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
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DATE	CHANGE
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NDDOT ABBREVIATIONS

D-101-3

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

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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	Assiociated 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
MCKNZ ELEC	McKenzie Electric Cooperative
MCKNZ WRD	McKenzie County Water Resource District
MCLEOD	McLeod USA
MCLN ELEC	McLean Electric Cooperative
MCLN-SHRDN R WAT	McLean-Sheridan Rural Water
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 HGH 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

D-101-20

Existing Topography

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

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

Proposed Topography

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

Existing Utilities

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

Proposed Utilities

- 24 Inch Pipe
- Reinforced Concrete Pipe
- Under Drain
- Edge Drain

Traffic Utilities

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

Sign Structures

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

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09-23-16	Added and Revised Items, Organized by Functional Groups

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Line Styles

D-101-21

Right Of Way

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

Boundary Control

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

Cross Sections and Typicals

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

Geotechnical

- Geotextile Fabric Type D (D — D)
- Geogrid (Geo — Geo)
- Geotextile Fabric Type R (R — R)
- Geotextile Fabric Type R1 (R — R)
- Geotextile Fabric Type RR (RR — RR)
- Geotextile Fabric Type S (S — S)
- Subgrade Reinforcement
- Failure Line

Countours

- Depression Contours
- Supplemental Contour

Profile

- Subgrade, Subcut or Ditch Grade
- Topsoil Profile

Striping

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

Pavement Joints

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

Bridge Details

- Hidden Object
- Small Hidden Object
- Large Hidden Object
- Phantom Object
- Centerline Main
- Centerline
- Existing Ground (Details)
- Existing Conditions
- Sheet Piling

Erosion Control

- Limits of Const Transition Line
- Bale Check
- Rock Check
- Floating Silt Curtain (S — S)
- Silt Fence (SF — SF)
- Excavation Limits
- Fiber Rolls

Environmental

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

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Symbols

D-101-30

North Arrow (Half Scale)

Truck Mounted Attenuator

Type I Barricade

Type II Barricade

Type III Barricade

Catch Basin

Cairn or Stone Circle

Video Detection Camera

Storm Drain Cap or Stub

Corrugated Metal End Section 18 Inch

Corrugated Metal End Section 24 Inch

Corrugated Metal End Section 30 Inch

Corrugated Metal End Section 36 Inch

Corrugated Metal End Section 42 Inch

Corrugated Metal End Section 48 Inch

Concrete Foundation

Ground Connection Conductor

Neutral Connection Conductor

Phase 1 Connection Conductor

Phase 2 Connection Conductor

Traffic Cone

Signal Controller

Pad Mounted Signal Controller

Alignment Data Point

Emergency Vehicle Detector

Attenuation Device

Diamond Grade Delineator Type A

Diamond Grade Delineator Type B

Diamond Grade Delineator Type C

Diamond Grade Delineator Type D

Diamond Grade Delineator Type E

Flexible Delineator

Flexible Delineator Type A

Flexible Delineator Type B

Flexible Delineator Type C

Flexible Delineator Type D

Flexible Delineator Type E

Delineator Type A

Delineator Type A Reset

Delineator Type B

Delineator Type B Reset

Delineator Type C

Delineator Type D

Delineator Type E

Delineator Drums

Spot Elevation

Existing Access Control Arrow

Existing Artifact

Existing Flashing Beacon

Existing Benchmark

Existing Railroad Battery Box

Existing Bush or Shrub

Existing Gas Cap or Stub

Existing Sanitary Cap or Stub

Existing Storm Drain Cap or Stub

Existing Water Cap or Stub

Existing Sanitary Cleanout

Existing Concrete Foundation

Existing Traffic Signal Controller

Existing Pad Mounted Signal Controller

Existing Sixteenth Section Corner

Existing Quarter Section Corner

Existing Section Corner

Existing Railroad Crossbuck

Existing Satellite Dish

Existing Fuel Dispensers

Existing Flexible Delineator Type A

Existing Flexible Delineator Type B

Existing Flexible Delineator Type C

Existing Flexible Delineator Type D

Existing Flexible Delineator Type E

Existing Delineator Type A

Existing Delineator Type B

Existing Delineator Type C

Existing Delineator Type D

Existing Delineator Type E

Existing EFB Misc

Existing Flashing Beacon

Existing Pipe Mounted Flasher

Existing Pad Mounted Feed Point

Existing Pipe Mounted Feed Point with Pad

Existing Pole Mounted Feed Point

Existing Railroad Frog

Existing Snow Gate 18

Existing Snow Gate 28

Existing Snow Gate 40

Existing Headwall

Existing Pedestrian Head with Number

Existing Signal Head

Existing Sprinkler Head

Existing Fire Hydrant

Existing Catch Basin Drop Inlet

Existing Curb Inlet

Existing Manhole Inlet

Existing Junction Box

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Symbols

D-101-31

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
REVISIONS	
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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 Vegitation Barrier
- Single Headwall with Vegitation Barrier
- Pole Mounted Head
- Sprinkler Head
- Fire Hydrant
- Inlet Type 1
- Inlet Type 2
- Double Inlet Type 2
- Inlet Grate 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 (CSB)
- Flight Auger Sample (FA)
- Split Barrel Sample (SB)
- Thinwall Tube Sample
- Highway Sign
- SNOW GATE 18 FT
- SNOW GATE 28 FT
- SNOW GATE 40 FT
- Standard Penetration Test (N)
- Transformer
- Inclinometer Tube (Incl)
- Underdrain Cleanout
- Excavation Unit
- Water Valve

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
07-01-14	
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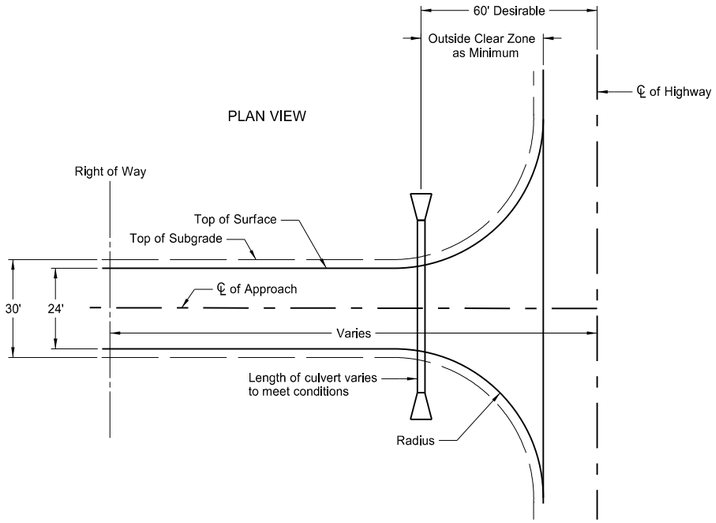
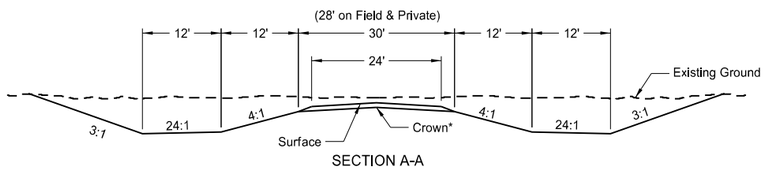
STANDARD RURAL APPROACHES

D-203-8



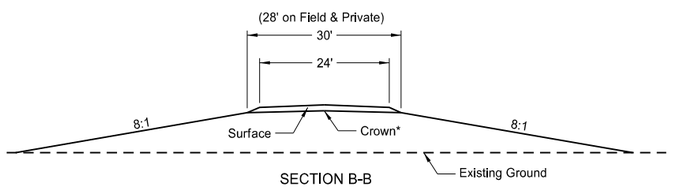
CRITERIA FOR RURAL APPROACH TYPES

	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)

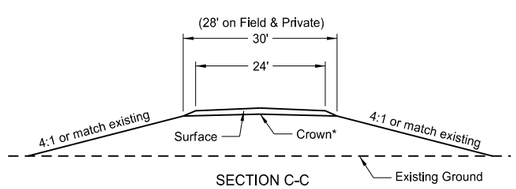


SECTION A-A

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

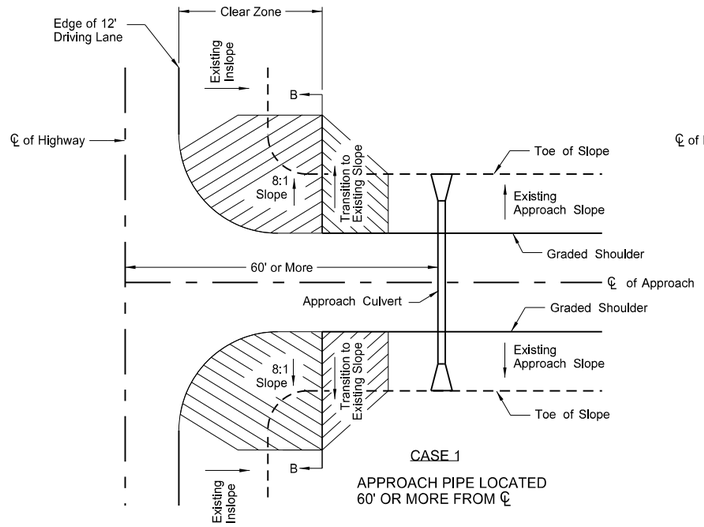


SECTION B-B



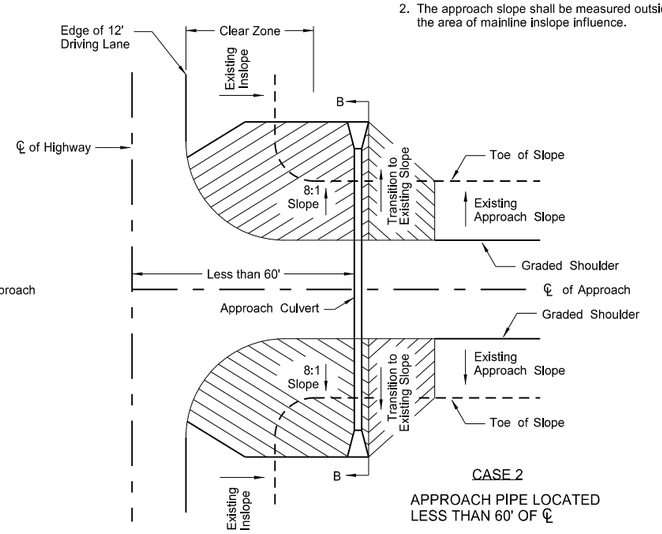
SECTION C-C

APPROACH INSLOPES



CASE 1

APPROACH PIPE LOCATED 60' OR MORE FROM ℄

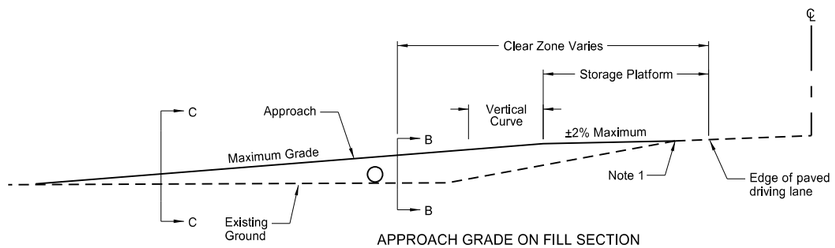


CASE 2

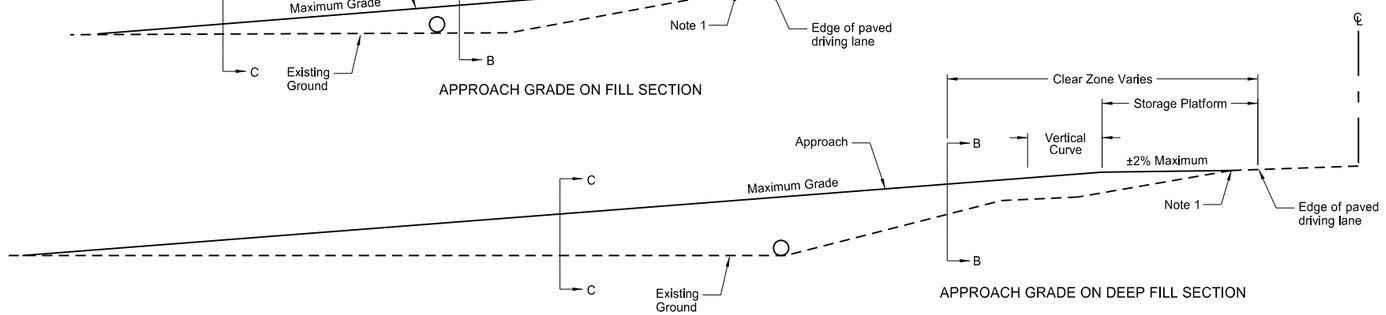
APPROACH PIPE LOCATED LESS THAN 60' OF ℄

NOTES:

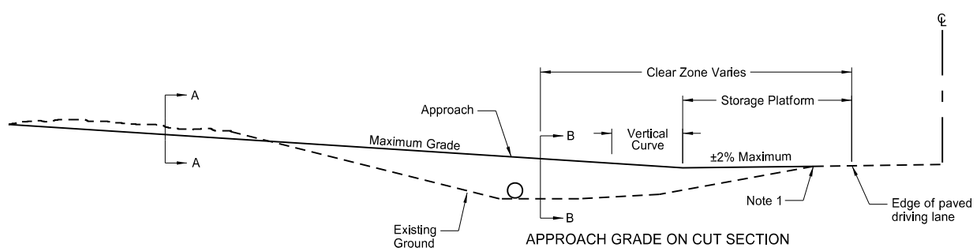
1. Max breakover between approach storage platform and highway shall not exceed 5%.
2. The approach slope shall be measured outside the area of mainline inslope influence.



APPROACH GRADE ON FILL SECTION



APPROACH GRADE ON DEEP FILL SECTION



APPROACH GRADE ON CUT SECTION

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2-25-14	
REVISIONS	
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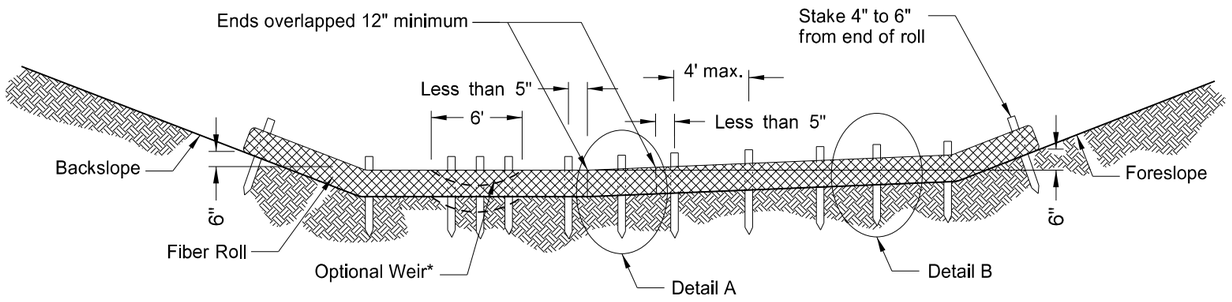
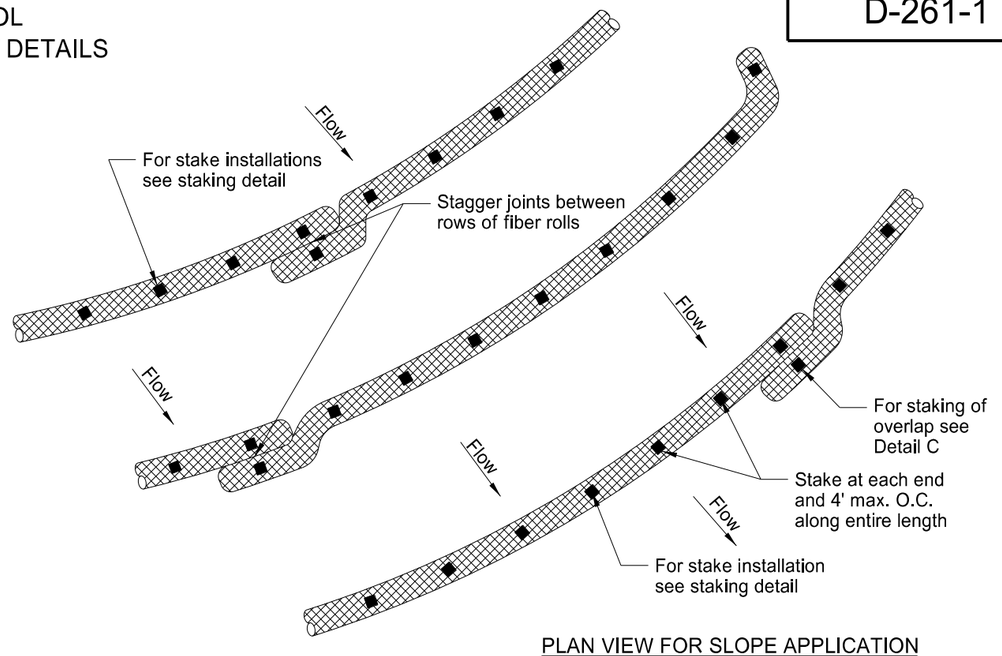
D-261-1

EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS

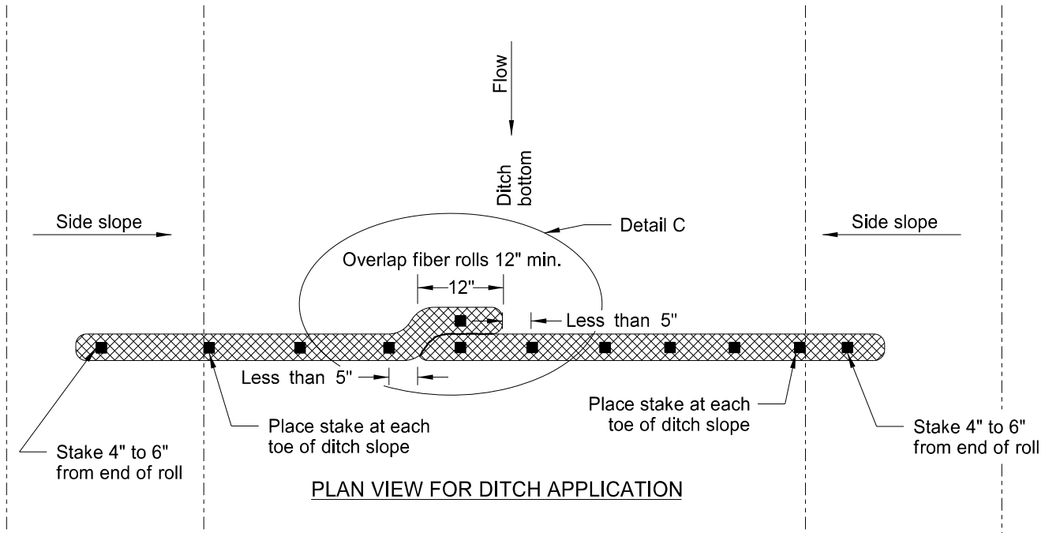


*Optional Weir. Use in flat areas, such as the Red River Valley, where there is potential for water to back up on adjacent property. Lower fiber roll enough to prevent water from backing up on adjacent property. Do not use 20-inch fiber rolls in flat areas where there is potential for water to back up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

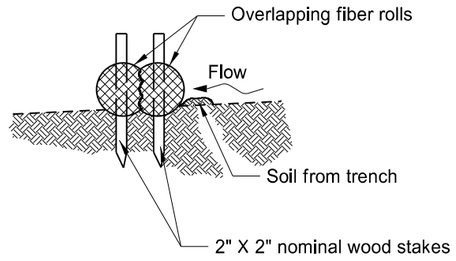
12 OR 20 INCH FIBER ROLL - DITCH BOTTOM



PLAN VIEW FOR SLOPE APPLICATION

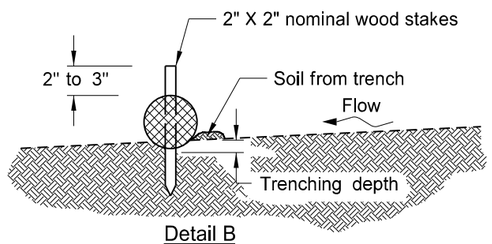


PLAN VIEW FOR DITCH APPLICATION



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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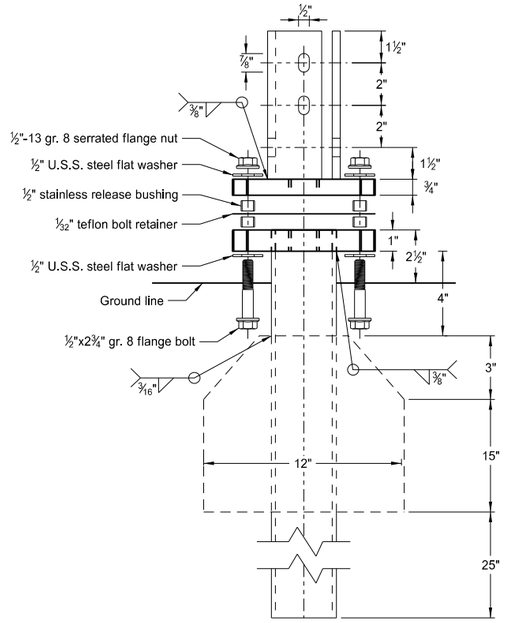
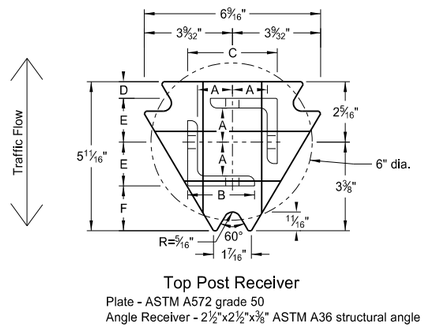
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

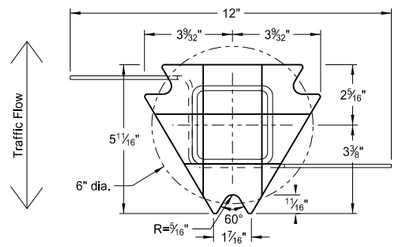


Multi-Directional
Slip Base Assembly

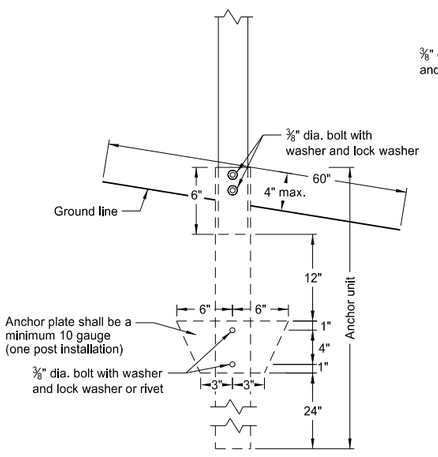
Perforated Tube



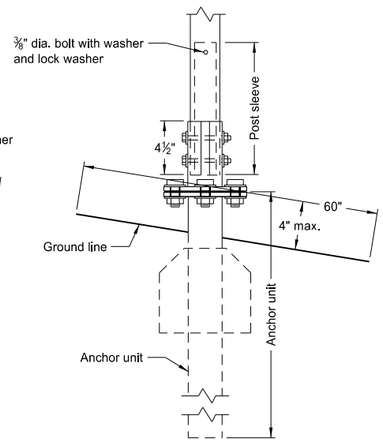
Top Post Receiver
Plate - ASTM A572 grade 50
Angle Receiver - 2½"x2½"x⅜" ASTM A36 structural angle



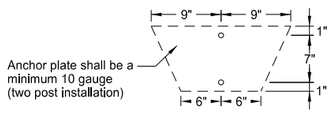
Bottom Soil Stub
Tube - 3"x3"x7 gauge ASTM A500 grade B tube
Stabilizing Wing - 7 gauge H.R.P.O. ASTM A1011
Plate - ASTM A572 grade 50

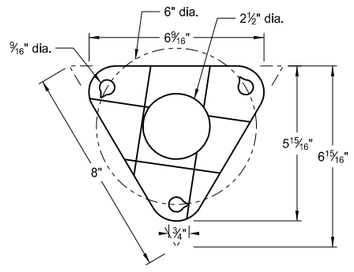


Anchor Unit and Post Assembly



Multi-Directional
Slip Base Anchor Unit
and Post Sleeve Assembly





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

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

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

Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2 3/16"x10 ga.	1 9/64"	2½"	3 1/32"	25/32"	1 33/64"	1⅞"
2½"x10 ga.	1 9/32"	2½"	3 5/16"	⅝"	1 21/32"	1¾"

(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"x10 ga. may be inserted into 2½"x10 ga. for additional wind load.

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2-28-14	
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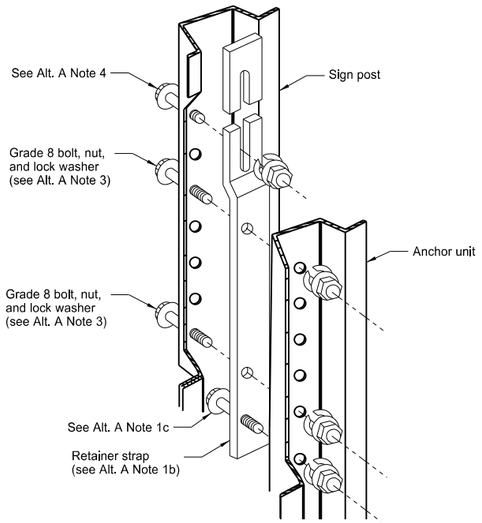
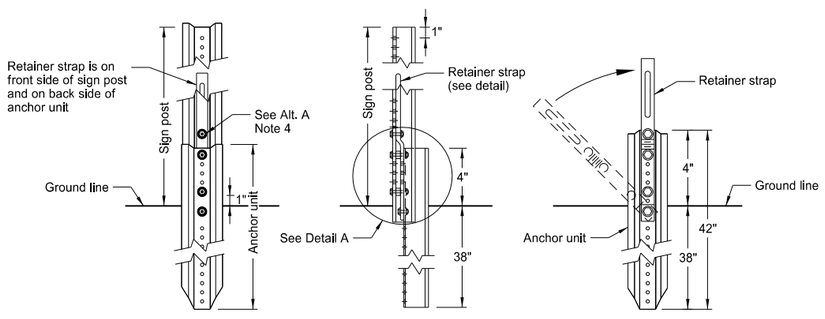
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



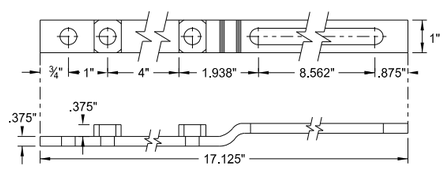
Detail A



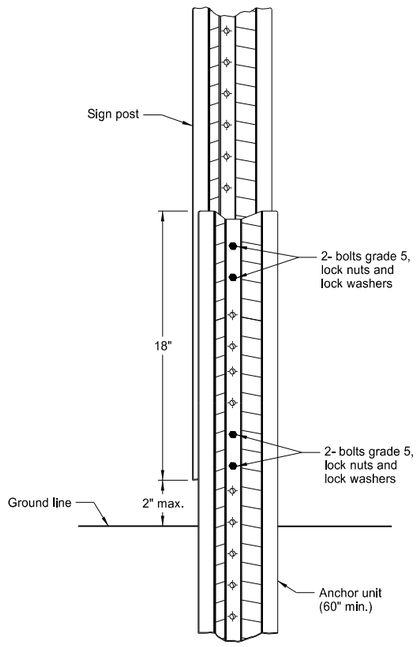
Front View Side View Back View

Breakaway U-Channel Detail
Alternate A

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

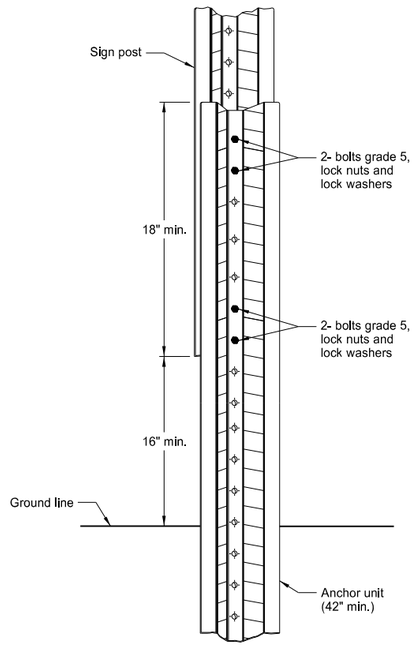


Retainer Strap Detail



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.

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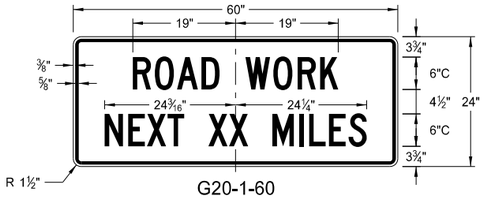
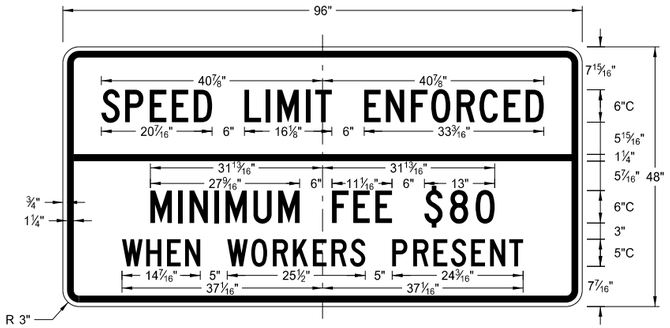
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS

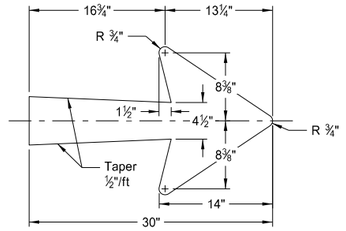


G20-1-60
Legend: black (non-refl)
Background: orange

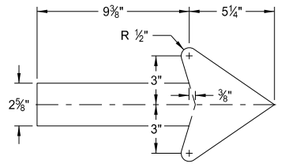
G20-4b-36
Legend: black (non-refl)
Background; orange



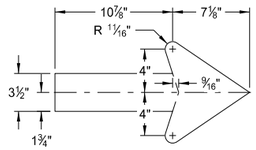
G20-55-96
Legend: black (non-refl)
Background: orange



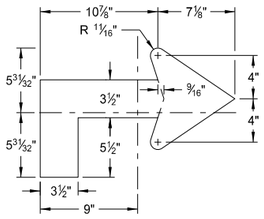
E5-1-48



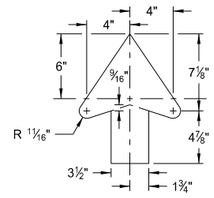
G20-50a-72
G20-52a-72



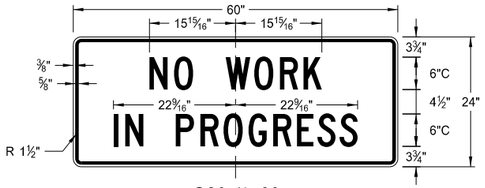
M4-9(L or R)-30
Right or Left



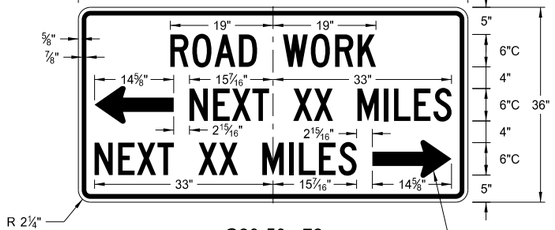
M4-9(L or R)-30
Advanced Right or Left



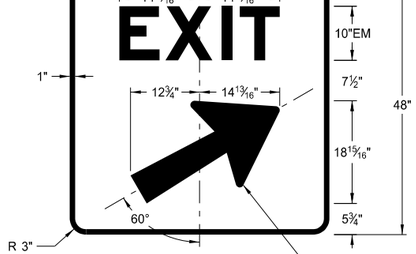
M4-9-30
Straight



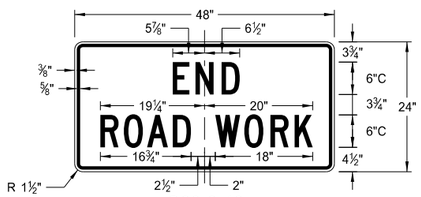
G20-1b-60
Legend: black (non-refl)
Background: orange



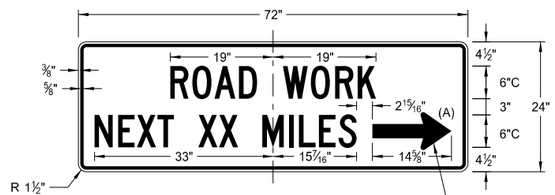
G20-50a-72
Legend: black (non-refl)
Background: orange



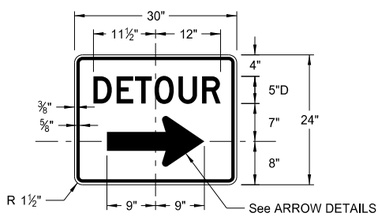
E5-1(L or R)-48
Legend: white
Background: green



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



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



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

ARROW DETAILS

NOTES:

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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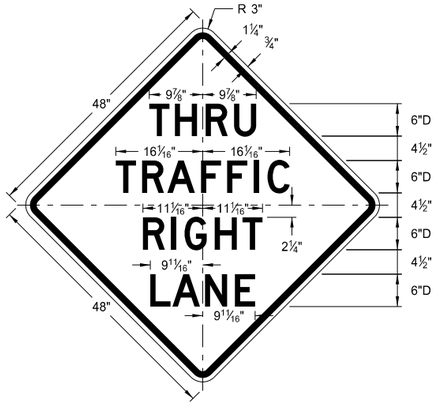
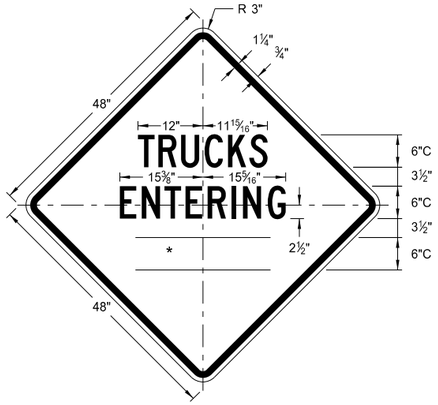
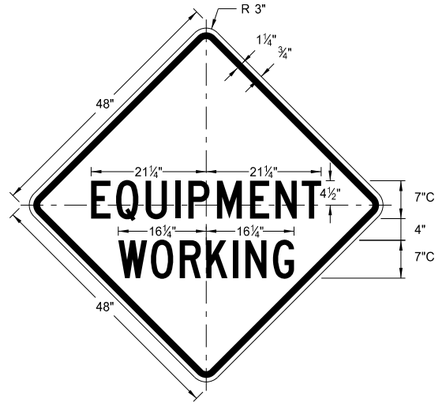
CONSTRUCTION SIGN DETAILS
WARNING SIGNS



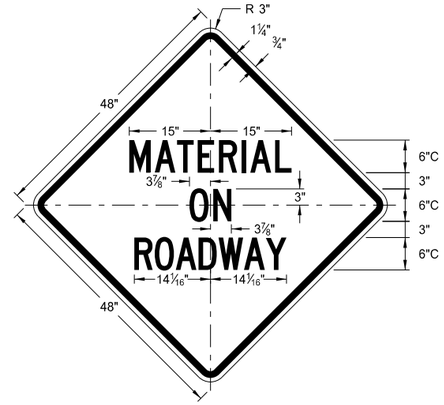
W5-8-48
Legend: black (non-refl)
Background: orange



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



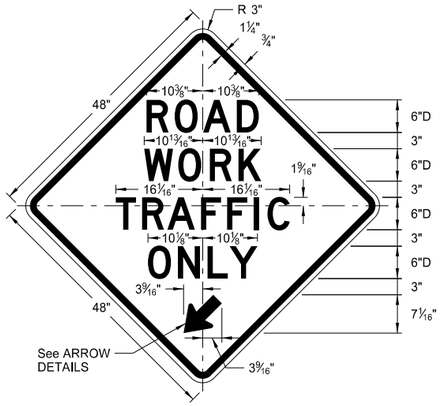
W20-51-48
Legend: black (non-refl)
Background: orange



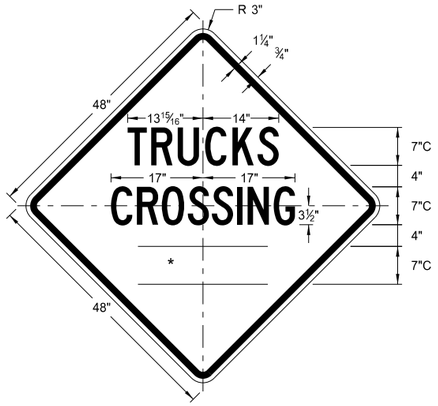
W21-51-48
Legend: black (non-refl)
Background: orange

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

* DISTANCE MESSAGES

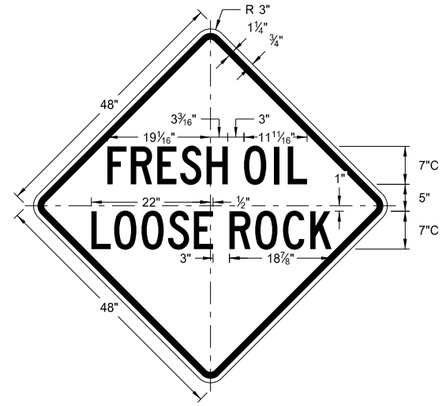


W5-9-48
Legend: black (non-refl)
Background: orange

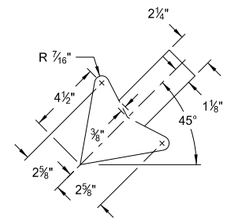


W8-55-48
Legend: black (non-refl)
Background: orange

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

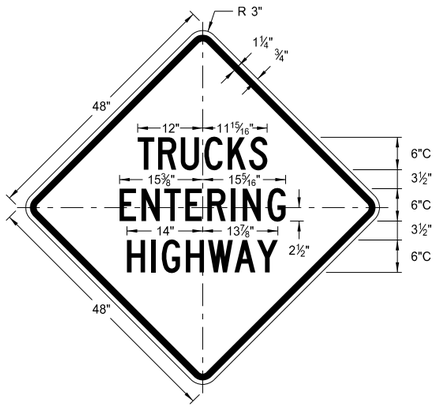


W22-8-48
Legend: black (non-refl)
Background: orange

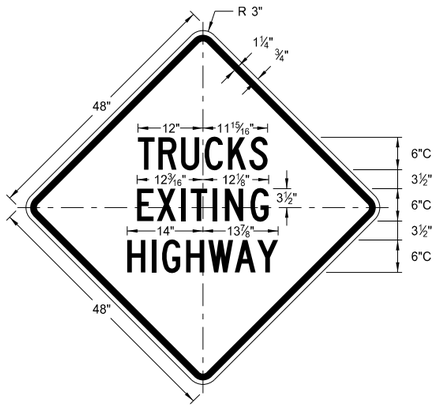


W5-9-48

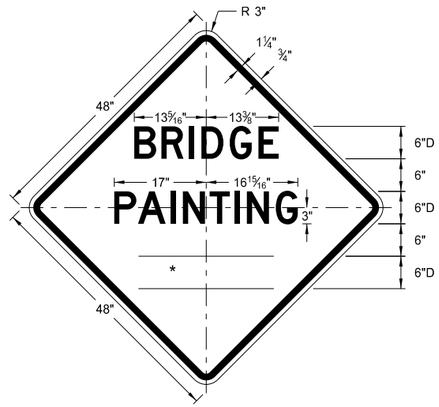
ARROW DETAILS



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



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



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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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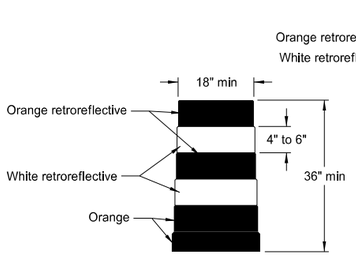
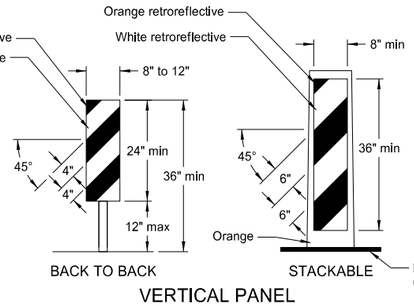
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



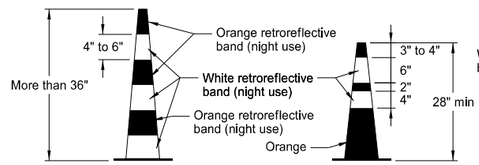
DELINEATOR DRUM

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.



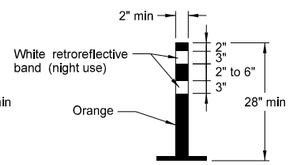
VERTICAL PANEL

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.



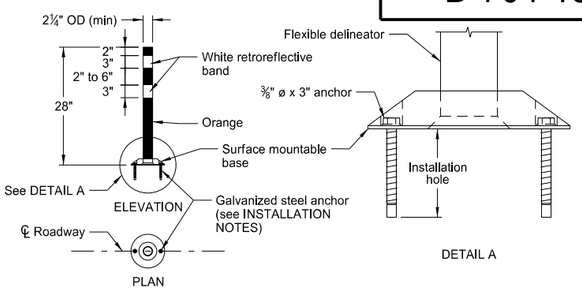
TRAFFIC CONE

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.



TUBULAR MARKER

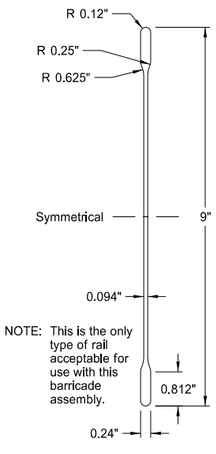
Retroreflectorization of tubular markers more than 42" in height shall be provided by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



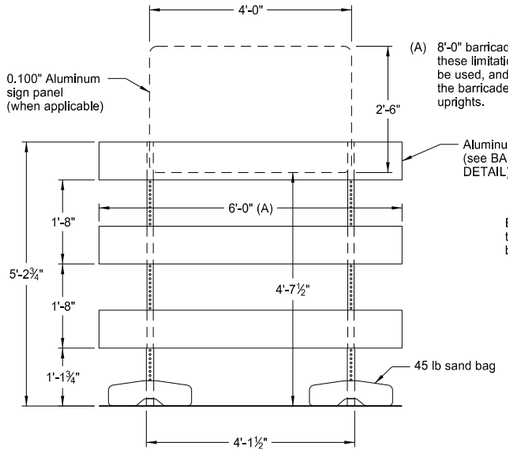
FLEXIBLE DELINEATOR

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.

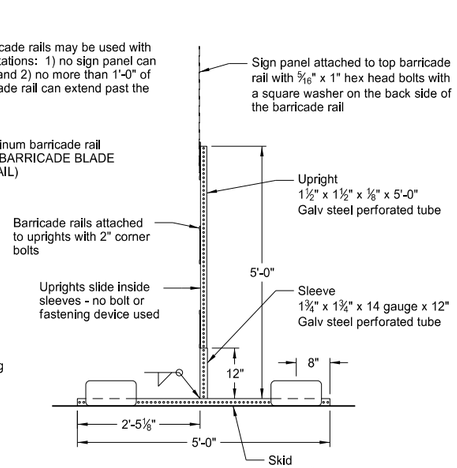


BARRICADE BLADE DETAIL



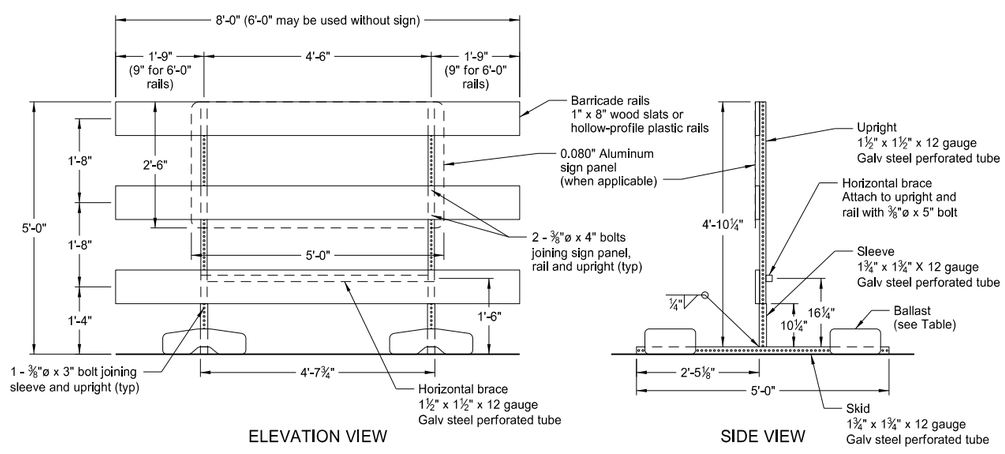
ELEVATION VIEW

(A) 8'-0" barricade rails may be used with these limitations: 1) no sign panel can be used, and 2) no more than 1'-0" of the barricade rail can extend past the uprights.



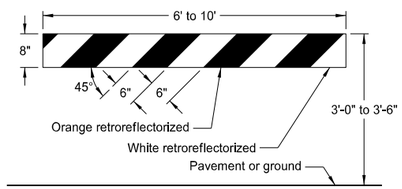
SIDE VIEW

BARRICADE ASSEMBLY DETAIL
(Aluminum Barricade Rails)

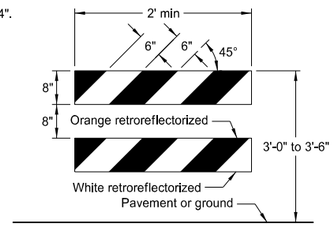


BARRICADE ASSEMBLY DETAIL
(Wood or Plastic Rails)

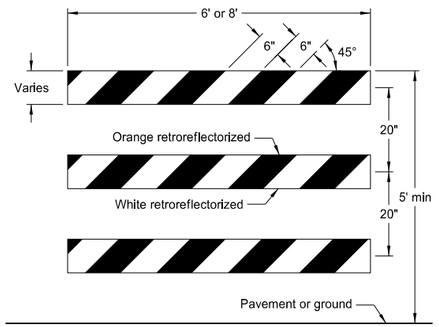
NOTE: Markings for barricades shall be alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Retroreflective sheeting shall be placed on both sides of the rails and shall have a minimum of 270 square inches of visible retroreflective area facing vehicular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



TYPE I BARRICADE

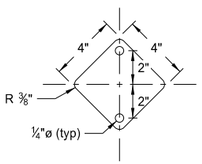


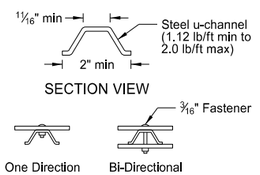
TYPE II BARRICADE

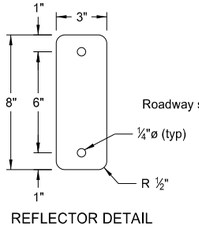


TYPE III BARRICADE

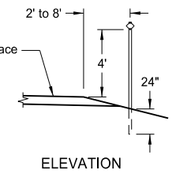
BARRICADE RAIL DETAILS







REFLECTOR DETAIL



ELEVATION

DELINEATORS

MINIMUM BALLAST
(For each side of barricade support)

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

Note: 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	
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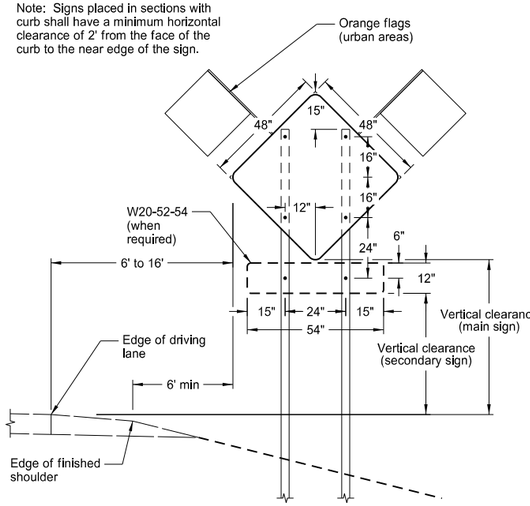
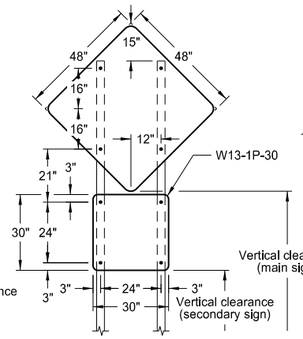
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

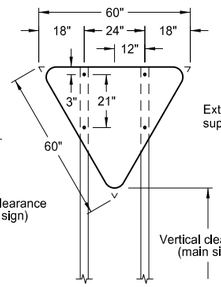
Note: Signs placed in sections with curb shall have a minimum horizontal clearance of 2' from the face of the curb to the near edge of the sign.



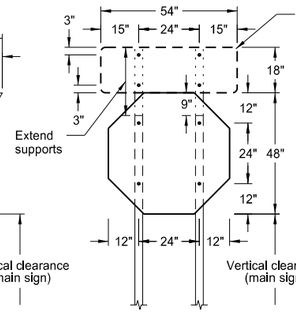
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



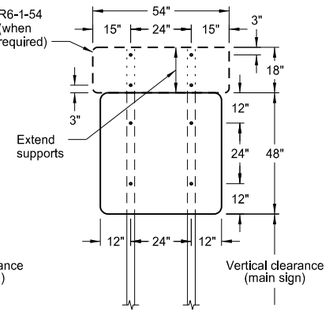
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



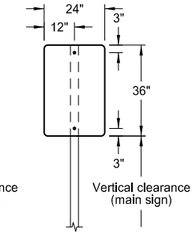
R1-2-60 - YIELD SIGN



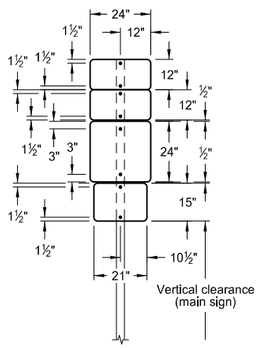
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



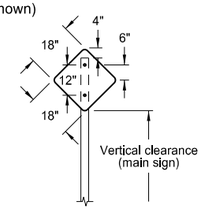
48" x 48" SIGN
(with R6-1-54 sign as required)



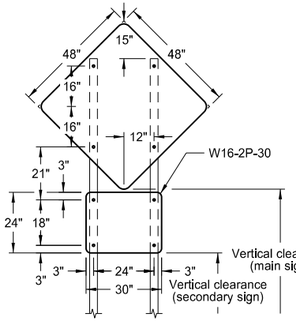
24" x 36" SIGN



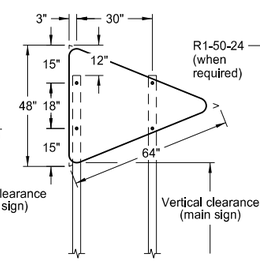
24" x 24"
ROUTE MARKER
ASSEMBLY



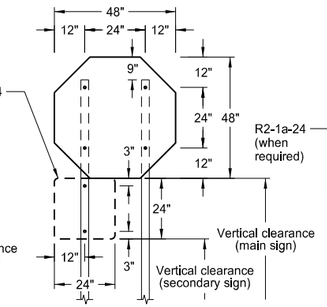
18" x 18"
DIAMOND SIGN



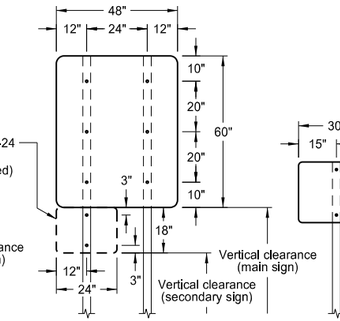
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



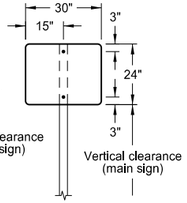
W14-3-64 - PENNANT SIGN



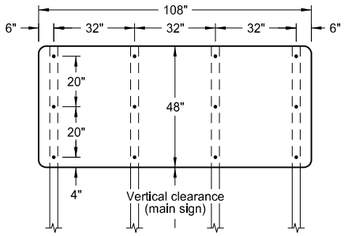
R1-1-48 - STOP SIGN
(with R1-50-24 sign as required)



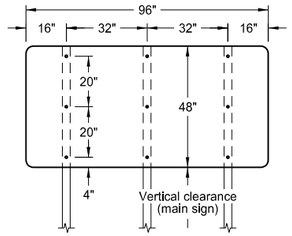
48" x 48" SIGN
(with R2-1a-24 sign as required)



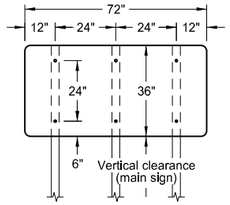
30" x 24" SIGN



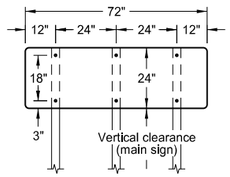
108" x 48" SIGN



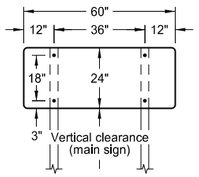
96" x 48" SIGN



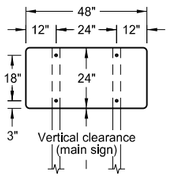
72" x 36" SIGN



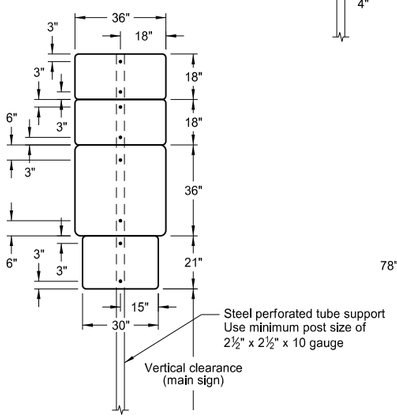
72" x 24" SIGN



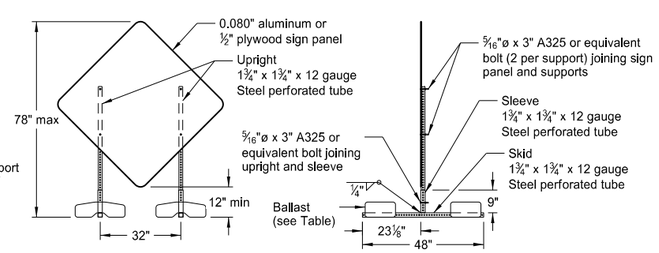
60" x 24" SIGN



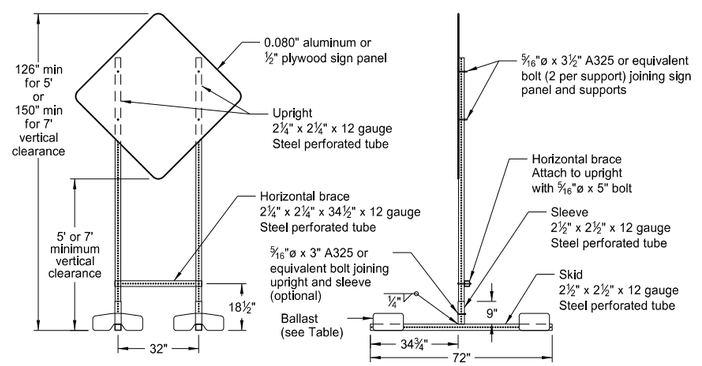
48" x 24" SIGN



36" x 36"
ROUTE MARKER
ASSEMBLY



PORTABLE SIGN SUPPORT
LOW-MOUNTING HEIGHT



PORTABLE SIGN SUPPORT
HIGH-MOUNTING HEIGHT

NOTES:

1. Sign Supports: 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 2½" x 2½" 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, ½" plywood, or other approved material, except where noted. All holes to be punched round for ⅜" 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 unforseen circumstances, such as equipment breakdown, rain, subgrade failures, etc., will not accrue towards the 5 day period. The R9-8 through R9-11a series, W1-6 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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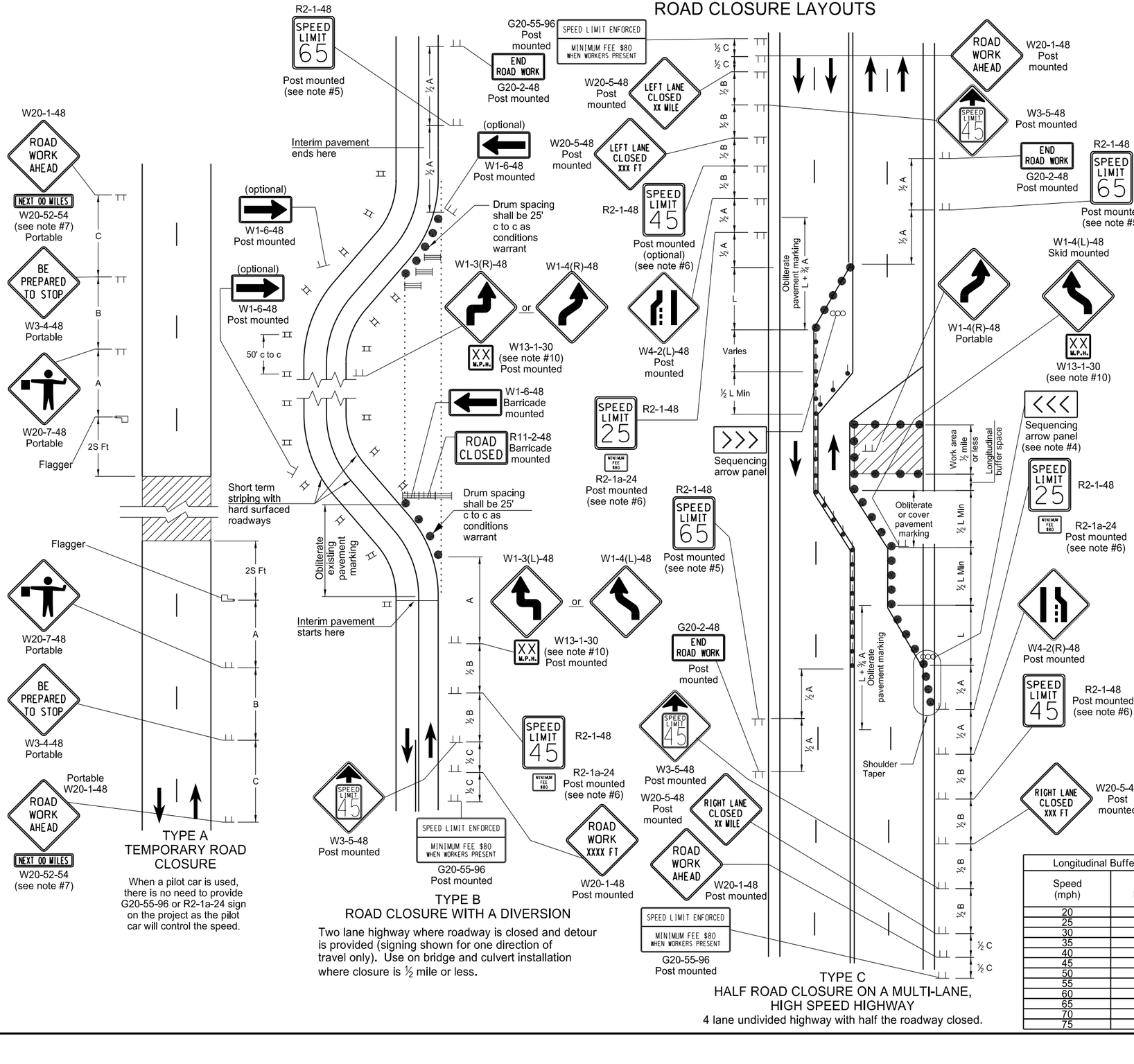
ROAD CLOSURE LAYOUTS

D-704-15



Notes

1. 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 $S^2/60$ for urban, residential, and other streets with speeds of 40 mph or less.
2. Barricades placed on roadway shall be on a moveable assembly. Signs placed on roadway shall be placed on skid mounted assemblies.
3. 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".
4. 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).
5. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
6. 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 ½ B.
7. Use when work area is 1 mile or longer.
8. 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.
9. Existing speed limit signs within a reduced speed zone shall be covered.
10. Where necessary, safe speed to be determined by the Engineer.
11. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
12. 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.

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
- Delineator drum
- Tubular markers
- Work area
- Flagger
- Sequencing arrow panel
- Vertical panels back to back

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

9-27-13

REVISIONS

DATE	CHANGE

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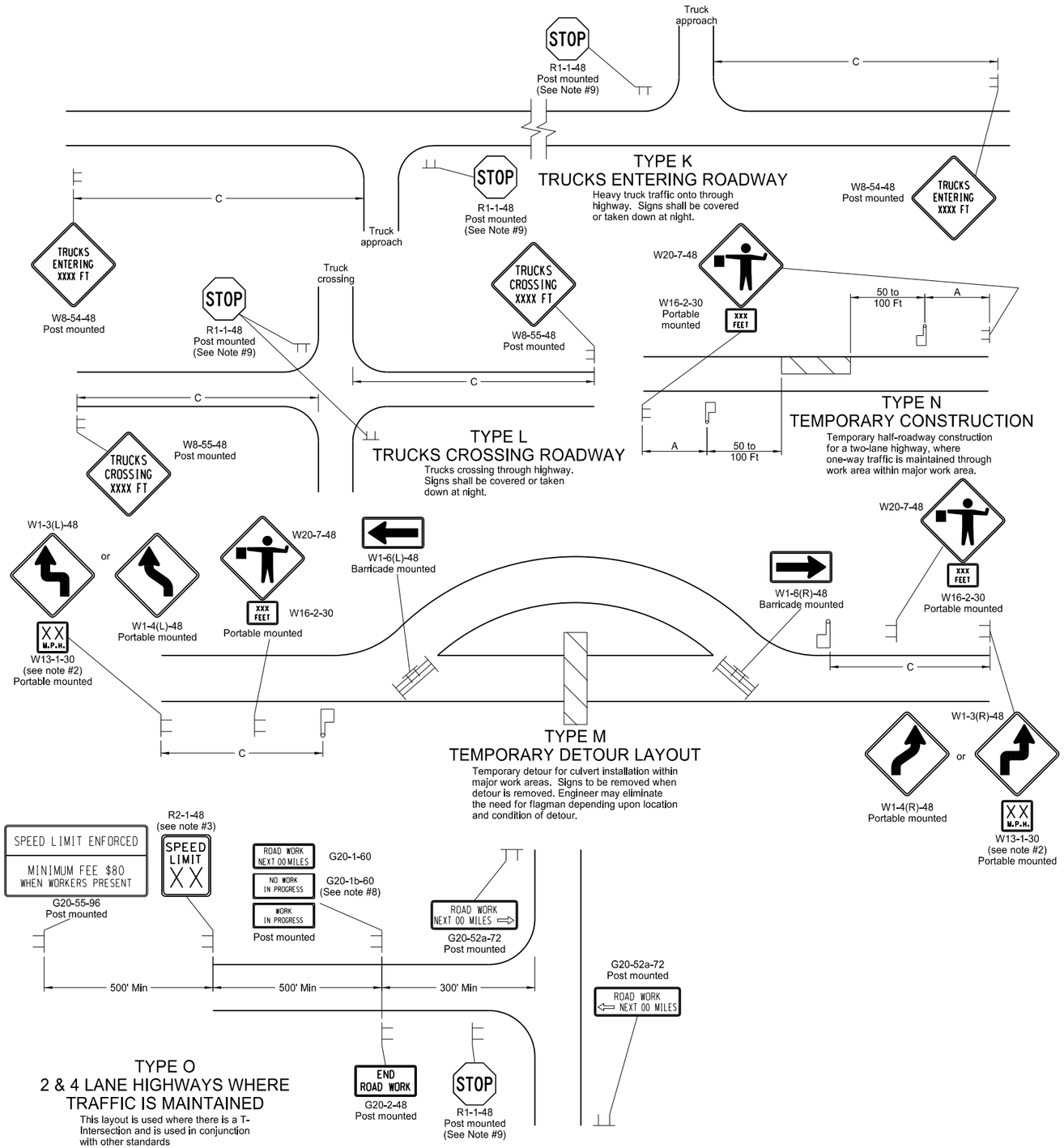
CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

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.
2. Where necessary, safe speed to be determined by the Engineer.
3. 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 ½ B.
4. 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.
5. Existing speed limit signs within a reduced speed zone shall be covered.
6. 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. The contractor shall install the G20-1b-60 sign when work is suspended for winter.
9. If existing stop sign is in place, a 48" stop sign is not required.
10. 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.

KEY

Type III barricade — Work area

Sign — Flagger

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

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

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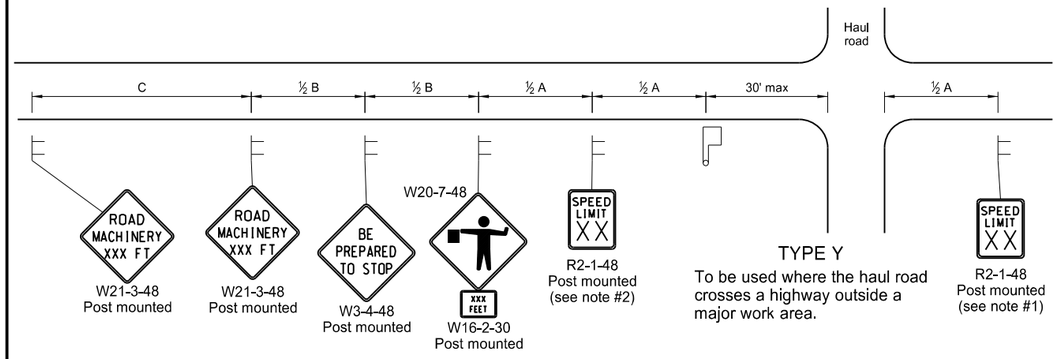
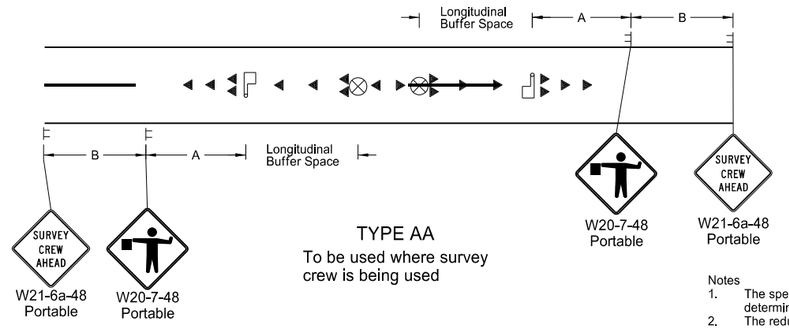
MISCELLANEOUS SIGN LAYOUTS

D-704-26



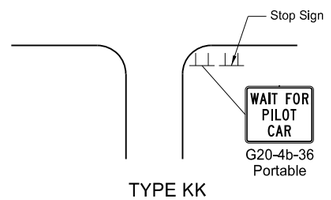
TYPE Y

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

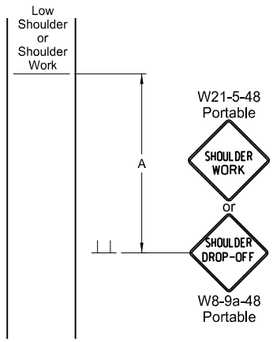


TYPE KK

To be used at major intersections within pilot car control area

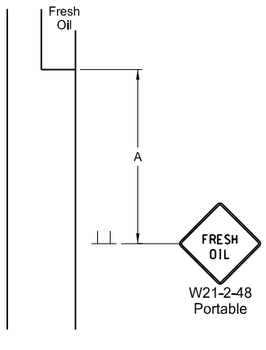
Notes

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 ½ 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.



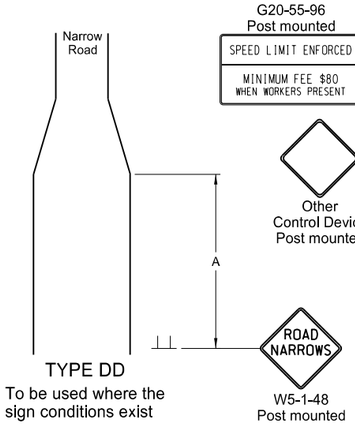
TYPE BB

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



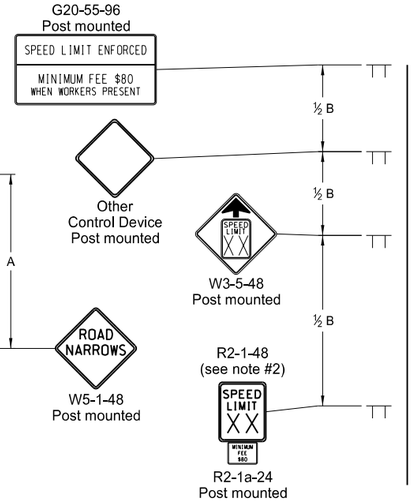
TYPE CC

To be used where the sign conditions exist



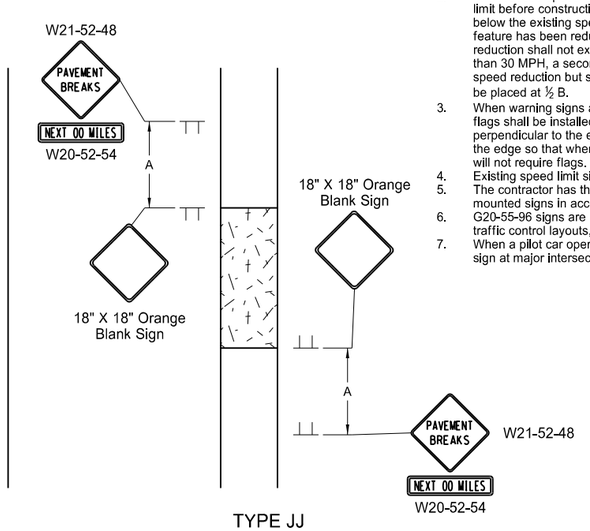
TYPE DD

To be used where the sign conditions exist



TYPE Z

To be used where speed zone is needed

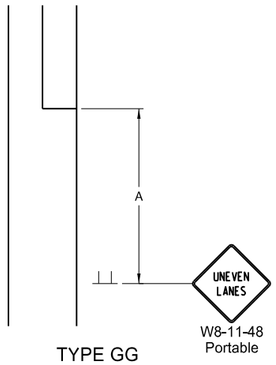


TYPE JJ

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.

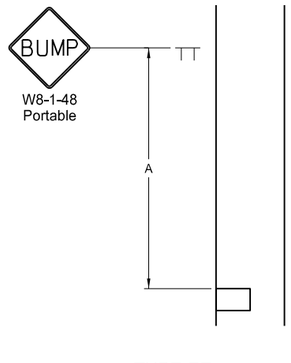
Longitudinal Buffer Space	
*Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

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



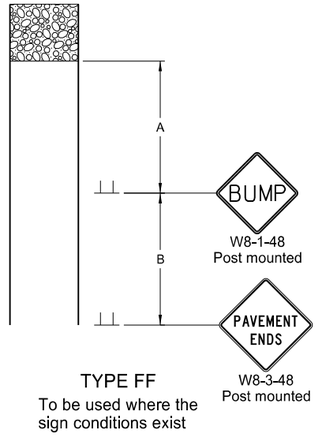
TYPE GG

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

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

Sign — Flagger

Cones

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

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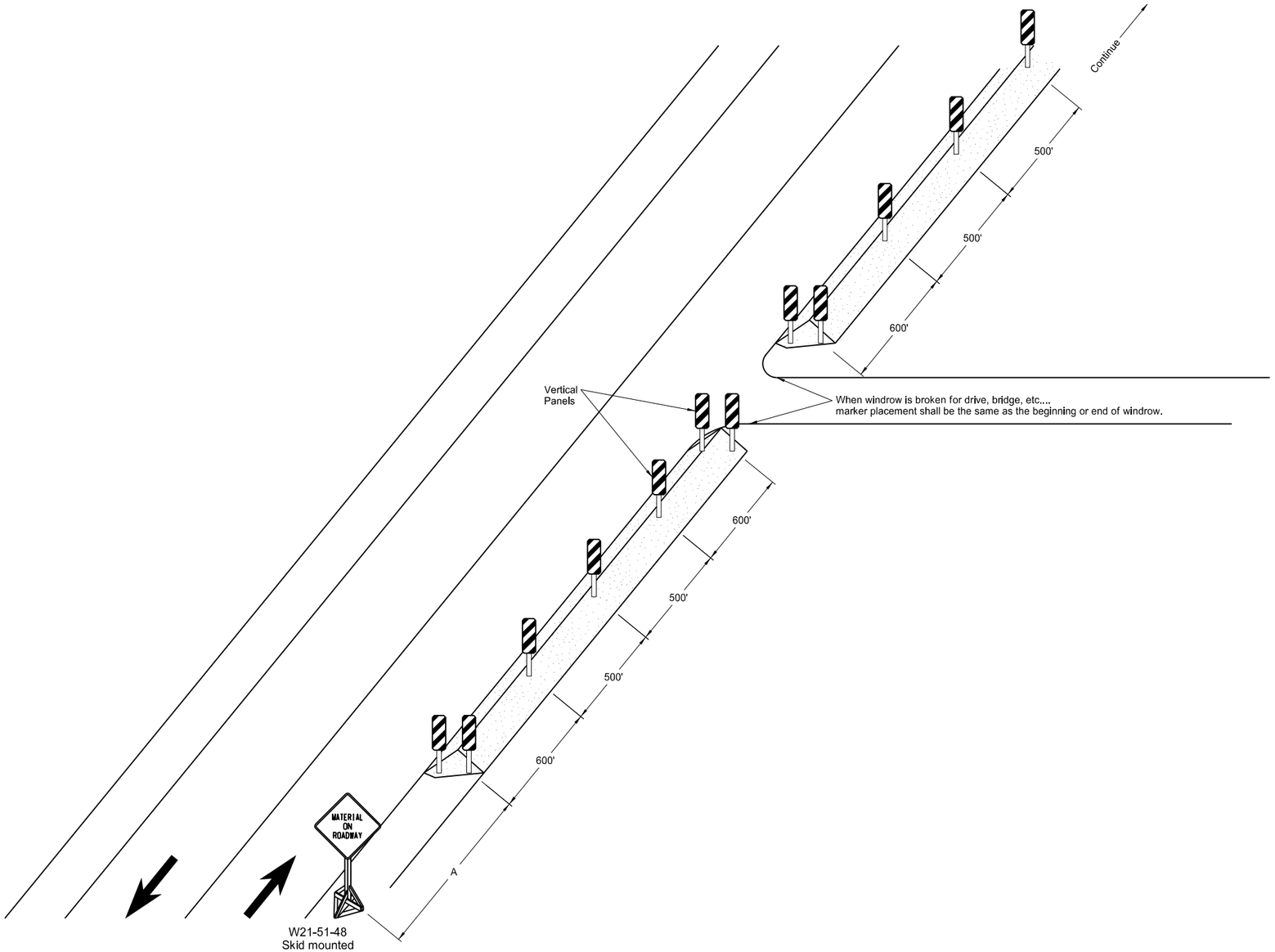
WINDROW MARKING

D-704-30

Notes:
The contractor has the option of using portable sign supports in lieu of post mounted sign in accordance with the NDDOT Standard Specifications.



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 (55 mph to 60 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
6-24-14	Revised Note

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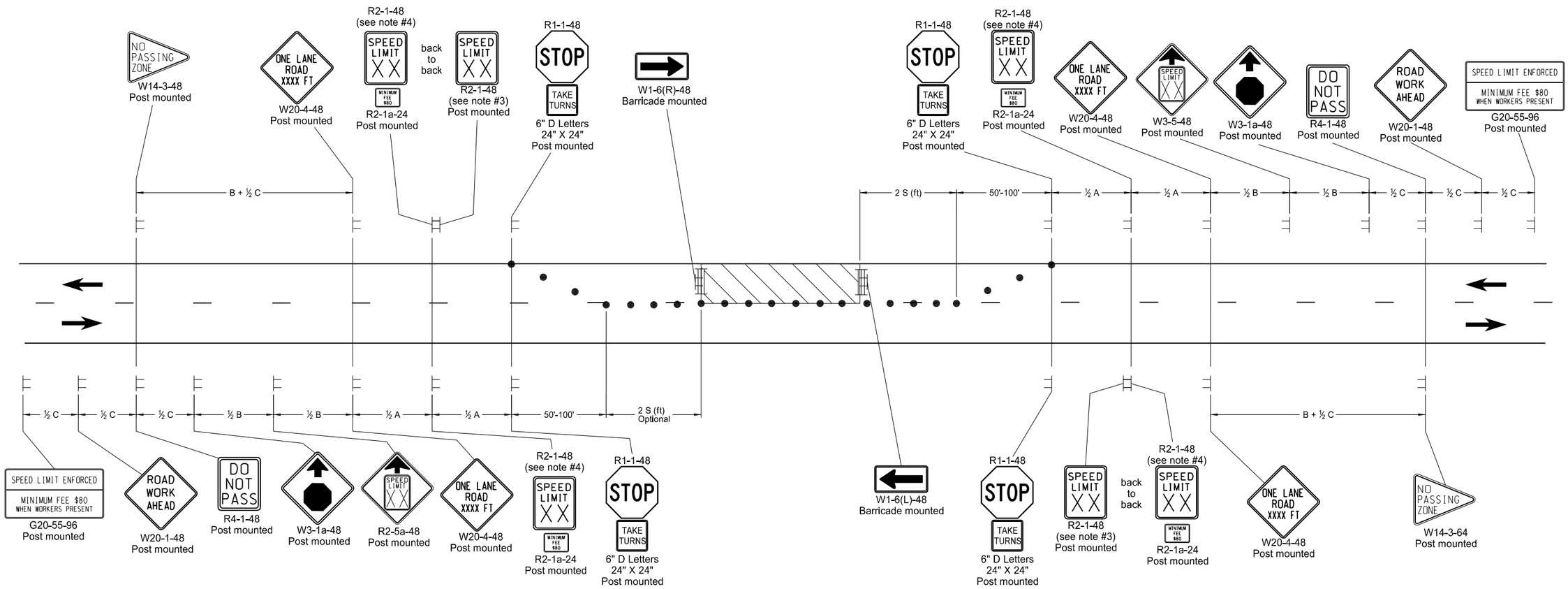
D-704-31

CONSTRUCTION SIGN LAYOUT
Non-signalized Low Volume One Lane Closure



Notes
1. Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies.
2. 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 ½ 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.
7. Obliterated or covered pavement marking shall be paid for as Obliteration of Pavement Marking. The covering shall be approved by the engineer.
8. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
9. 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 — Work area

Sign — Delineator drum

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
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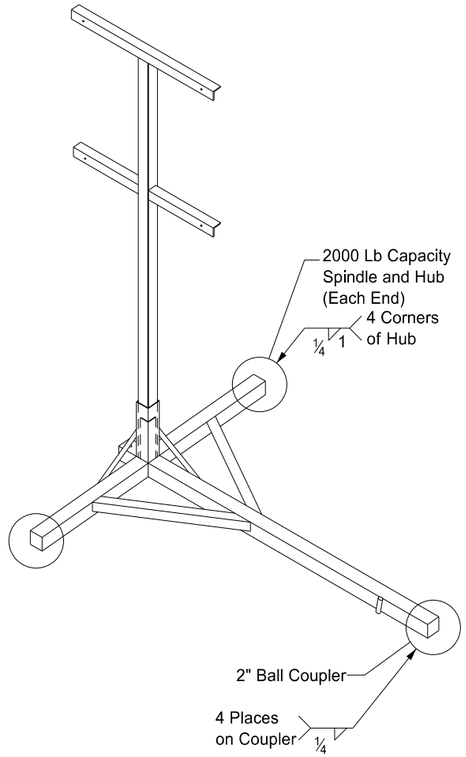
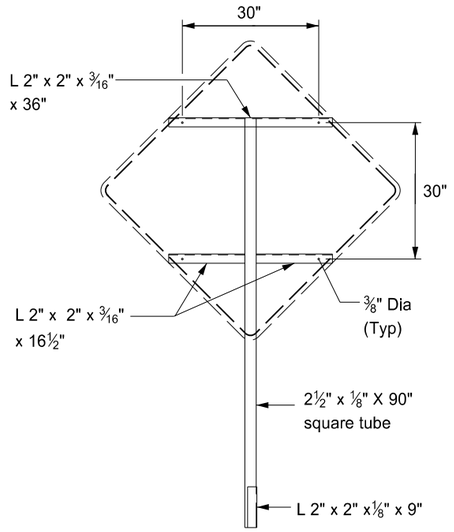
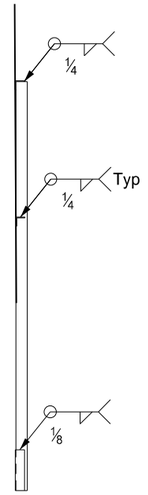
PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



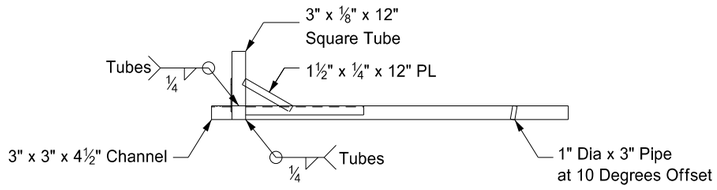


FRONT



RIGHT

SIGN SUPPORT



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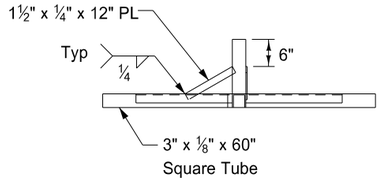
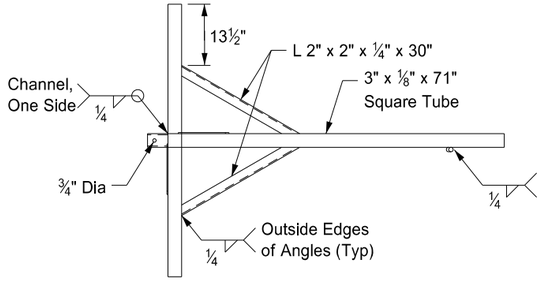


RIGHT



TOP

TRAILER

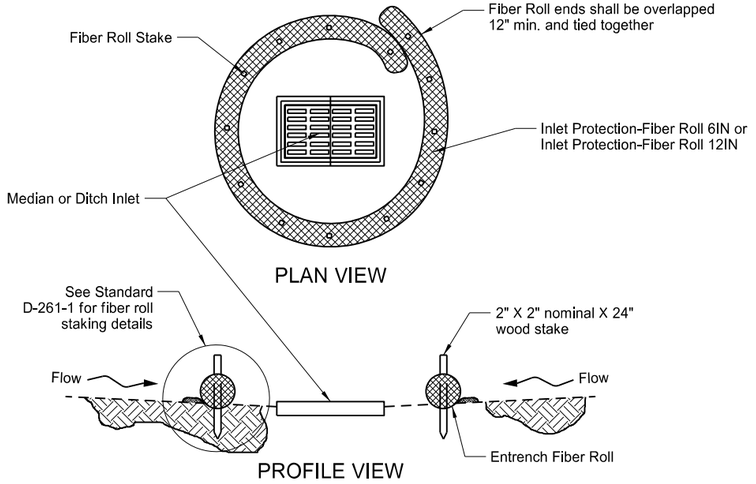
Notes:

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.

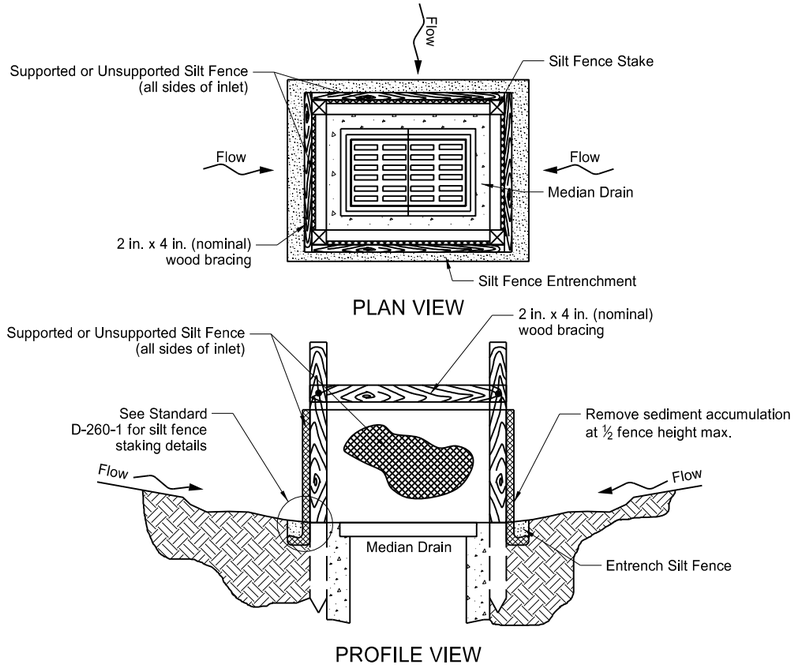
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-23-10	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Roger Weigel Registration Number PE- 2930 , on 11/23/10 and the original document is stored at the North Dakota Department of Transportation

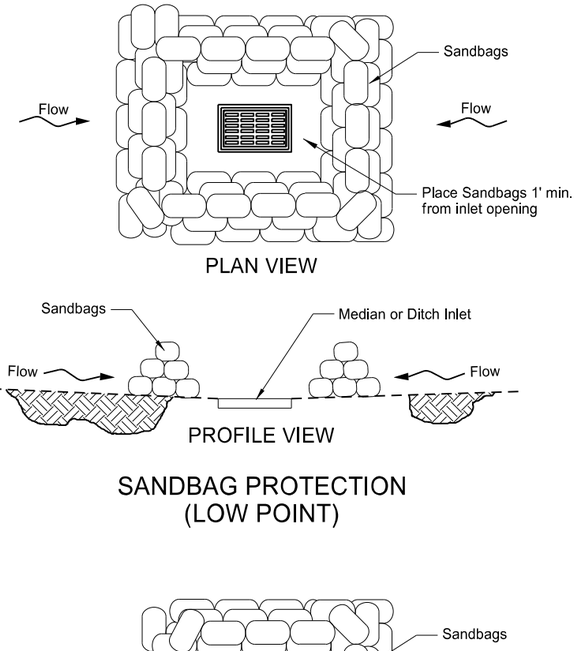
EROSION AND SILTATION CONTROLS
MEDIAN OR DITCH INLET PROTECTION



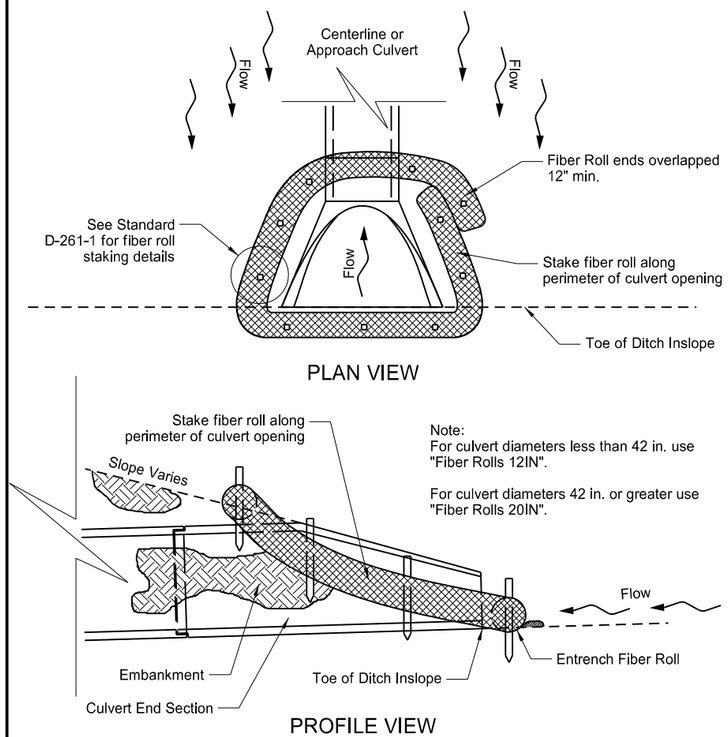
FIBER ROLL PROTECTION (MEDIAN OR DITCH INLET)



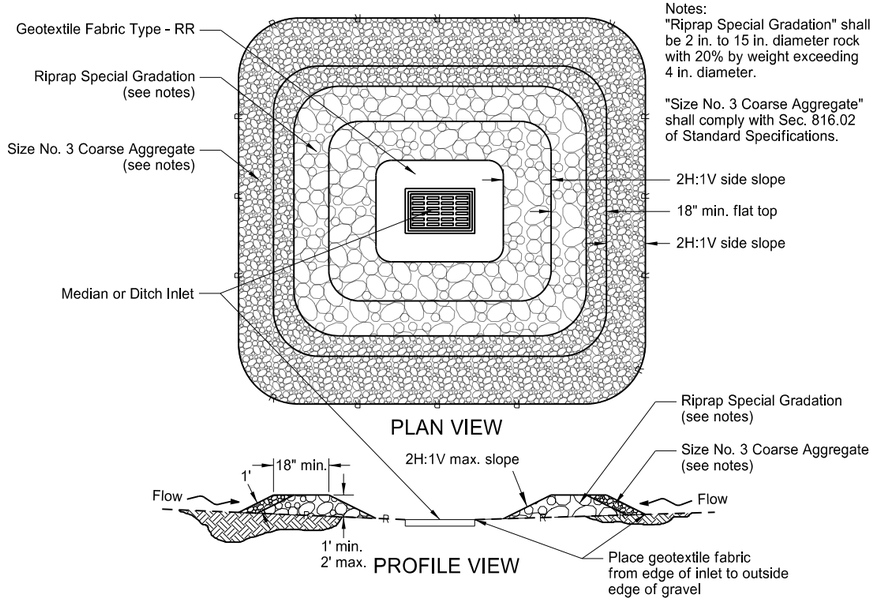
SILT FENCE PROTECTION (MEDIAN OR DITCH INLET)



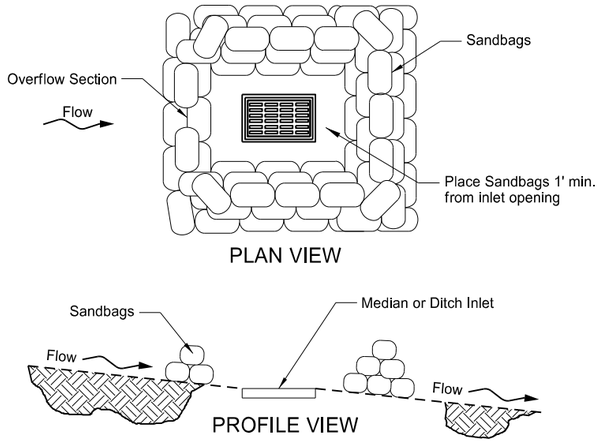
SANDBAG PROTECTION (LOW POINT)



FIBER ROLL PROTECTION (INLET OF CULVERT)



GRAVEL INLET PROTECTION (MEDIAN OR DITCH INLET)

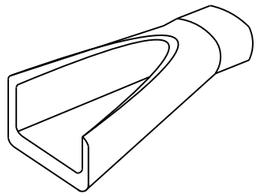


SANDBAG PROTECTION (ON SLOPE)

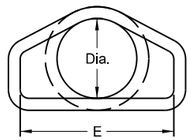
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Updated reference to standard drawing number for fiber roll staking details.
10-01-14	Updated reference to standard drawing number for silt fence.

This document was originally issued and sealed by Roger Weigel Registration Number PE-2930, on 10/01/14 and the original document is stored at the North Dakota Department of Transportation

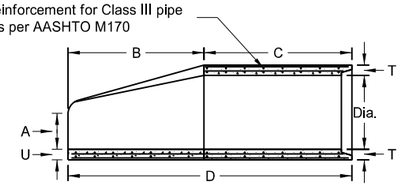
REINFORCED CONCRETE PIPE CULVERTS AND END SECTIONS
(Round Pipe)



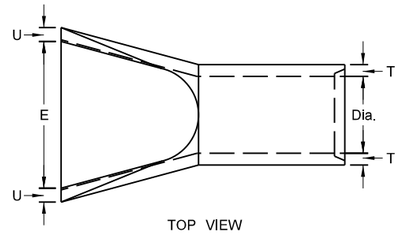
PERSPECTIVE



END VIEW



SIDE VIEW



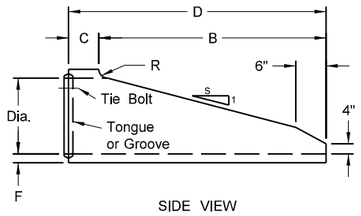
TOP VIEW

REINFORCED CONCRETE PIPE - FLARED END SECTION

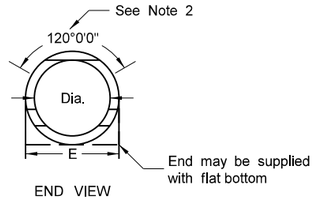
Reinforcement to be equivalent to Class III RCP

FLARED END SECTION						
TERMINAL DIMENSIONS						
DIA	A	B	C	D	E	U
12	0'-4"	2'-0"	4'-0⅞"	6'-0⅞"	2'-0"	2"
15	0'-6"	2'-3"	3'-10"	6'-1"	2'-6"	2¼"
18	0'-9"	2'-3"	3'-10"	6'-1"	3'-0"	2½"
21	0'-9"	3'-0"	3'-1"	6'-1"	3'-6"	2¾"
24	0'-9½"	3'-7½"	2'-6"	6'-1½"	4'-0"	3"
27	0'-10½"	4'-0"	2'-1½"	6'-1½"	4'-6"	3¼"
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'-9¼"	8'-2¼"	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"

TRAVERSABLE END SECTION							
DIA	B	C	D	E	F	R	S
15"	4'	9"	4'-9"	1'-7½"	2¼"	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



SIDE VIEW



END VIEW

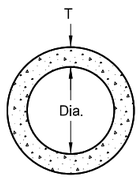
NOTES (Traversable End Section):

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

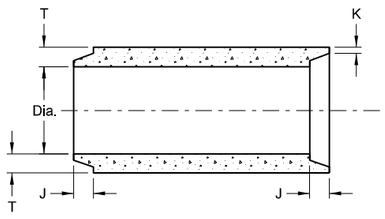
REINFORCED CONCRETE PIPE - TRAVERSABLE END SECTION

Reinforcement to be equivalent to Class III RCP

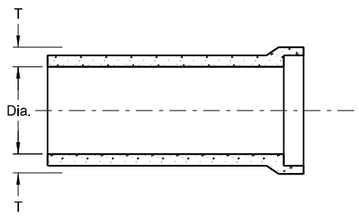
All Classifications of Round Concrete Pipe					
Internal Dia of pipe in Inches	Cross-Sectional Water Area	Weight per lin. foot of Pipe Std. Wall	Joint J Groove End Min./Max.	Joint K Tongue End Min.	Minimum Wall Thickness (T)
Dia	Sq. ft.	Lbs.	In.	In.	In.
12	0.79	92	1⅛-2⅛	¾	2
15	1.23	127	1¾-2¾	⅞	2¼
18	1.77	168	1⅞-2⅛	1	2½
21	2.40	214	1⅞-3⅛	1⅛	2¾
24	3.14	265	2⅛-3¾	1⅛	3
27	3.98	322	2¾-4	1¼	3¼
30	4.91	384	3¼-4¼	1¼	3½
33	5.94	452	3¼-4¼	1½	3¾
36	7.07	524	3½-4¼	1½	4
42	9.62	685	3¾-4¾	1¾	4½
48	12.57	685	3⅞-4¾	1⅞	5
54	15.90	1070	4⅛-5¼	2	5½
60	19.63	1296	4½-5½	2¼	6
66	23.76	1542	5-6	2⅝	6½
72	28.27	1810	5½-6¾	2⅝	7
78	33.18	2098	6¼-7¼	2⅝	7½
84	38.48	2410	5⅝-7¾	3⅜	8
90	44.18	2793	6¾-8½	3⅛	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



END VIEW



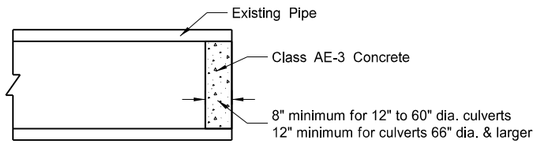
TONGUE & GROOVE JOINT



BELL & SPIGOT JOINT

CIRCULAR PIPE

JOINTS FOR REINFORCED CONCRETE PIPE



CONCRETE PIPE PLUG

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.

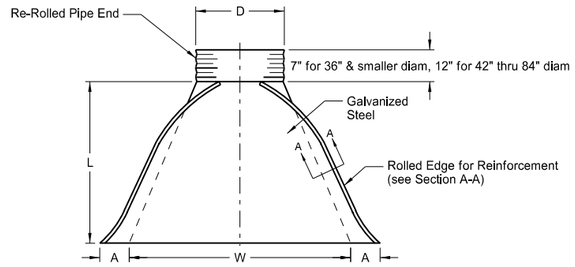
SEE STANDARD DRAWING D-714-22 FOR DETAILS OF CONCRETE PIPE TIES (TIE BOLTS).

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
05-12-14	
REVISIONS	
DATE	CHANGE
01-21-15	Revised Note 5
11-21-16	Revised End Section Dimensions

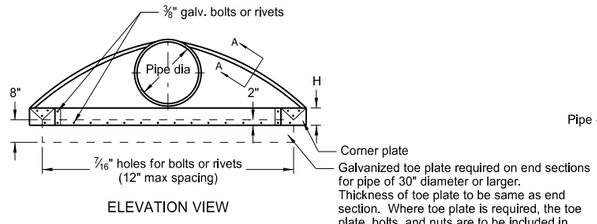
This document was originally issued and sealed by Jon Ketterling Registration Number PE-4684, on 11/21/16 and the original document is stored at the North Dakota Department of Transportation

ROUND CORRUGATED STEEL PIPE CULVERTS AND END SECTIONS

D-714-4

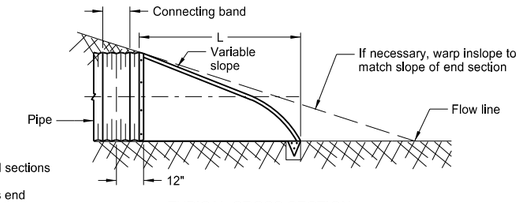


PLAN VIEW



ELEVATION VIEW

Galvanized toe plate required on end sections for pipe of 30" diameter or larger. Thickness of toe plate to be same as end section. Where toe plate is required, the toe plate, bolts, and nuts are to be included in price bid for end sections.



TYPICAL CROSS SECTION
(showing connector section)

* * PIPE DIA. IN	GALV. THICK. IN	END SECTION DIMENSIONS A IN	B IN	H IN	L IN	W IN	APPROX. SLOPE RATE	BODY PIECE
15	0.064	7	8	6	26	30	2½:1	1
18	0.064	8	10	6	31	36	2½:1	1
24	0.064	10	13	6	41	48	2½:1	1
30	0.079	12	16	8	51	60	2½:1	1 or 2
36	0.079	14	19	9	60	72	2½:1	2
42	0.109	16	22	11	69	84	2½:1	2
48	0.109	18	27	12	78	90	2¼:1	2
54	0.109	18	30	12	84	102	2:1	2
* 60	0.109	18	33	12	87	114	1¾:1	3
* 66	0.109	18	36	12	87	120	1½:1	3
* 72	0.109	18	39	12	87	126	1 1/3 :1	3
* 78	0.109	18	42	12	87	132	1¼:1	3
* 84	0.109	18	45	12	87	138	1 1/6 :1	3

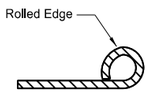
* These sizes have 0.109" sides and 0.138" center panels.

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

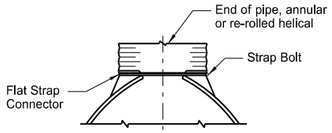
Manufacturers tolerances of above dimensions will be allowed.

Splices to be the lap riveted type.

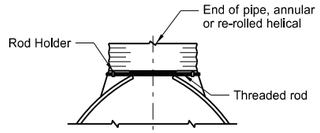
Multiple panel bodies shall have lap seams which are to be tightly joined with ⅜" dia. galv. bolts or rivets. Nuts to be torqued to 25 foot-lbs ±.



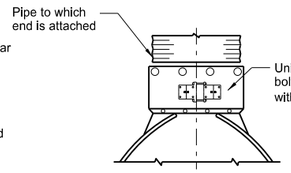
SECTION A-A



TYPE #1
For circular pipes with diameter 24" & smaller



TYPE #2
For circular pipes with diameter 30" through 36"

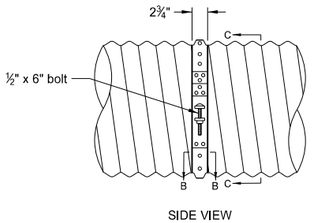


TYPE #3
For all pipe sizes

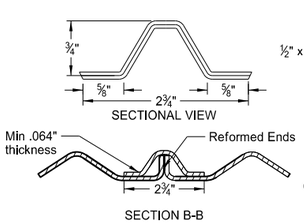
COUPLING BAND DIMENSIONS				
COUPLING TYPE	CORRUGATION PITCH x DEPTH	PIPE SIZE	COUPLING BAND LENGTH	MIN. BAND THICKNESS
Hat Band	2⅔" x ½"	12" - 48"	2¾"	.064"
Annular Band	2⅔" x ½"	12" - 72"	12"	.052"
		78" - 84"	12"	.079"
	3" x 1"	48" - 120"	14"	.052"
Hugger Band	2⅔" x ½" Rerolled End	12" - 72"	10½"	.052"
		78" - 84"	10½"	.079"
	3" x 1" Rerolled End	48" - 120"	10½"	.052"
	5" x 1" Rerolled End	48" - 120"	12"	.064"

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 ¼" galv. angle for 60" through 72" dia. and 2½" x 2½" x ¼" galv. angle for 78" and 84" dia.. Angles to be attached by galv. ⅜" 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. ½" x 8" bolts may be used as a substitute for the ½" x 6" bolts shown in the details.
6. Coupling bands wider than 14" may be used if a minimum of four ½" bolts with maximum spacing of 5½" are used for the connection.
7. Length of spot welds shall be minimum ½".

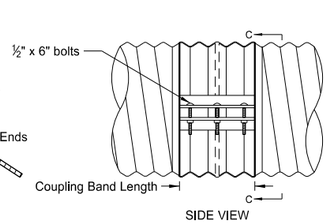


SIDE VIEW

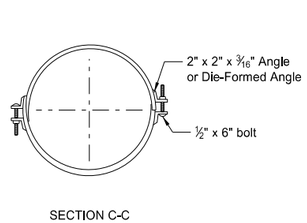


SECTION B-B

HAT BAND FOR FLANGED END PIPE

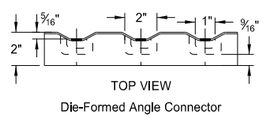


SIDE VIEW



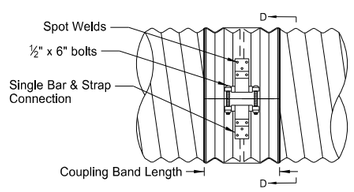
SECTION C-C
Angle Connection

ANNULAR BAND

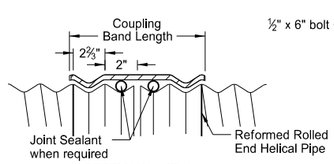


TOP VIEW

Die-Formed Angle Connector

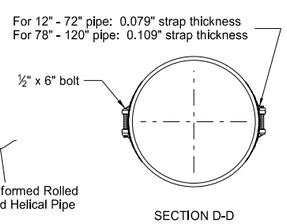


SIDE VIEW

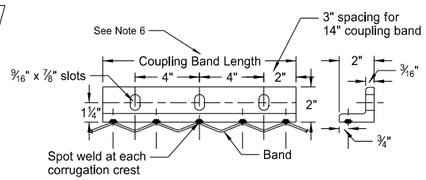


SECTIONAL VIEW

HUGGER COUPLING BAND



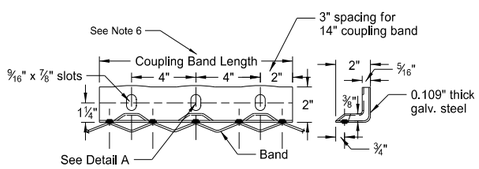
SECTION D-D
Bar & Strap Connection



SIDE VIEW

END VIEW

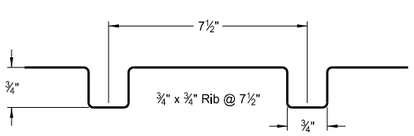
2" x 2" x 3/16" Angle Connector

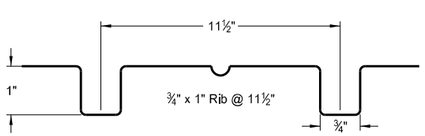


SIDE VIEW

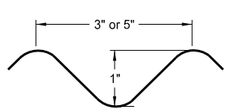
END VIEW

Die-Formed Angle Connector

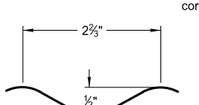




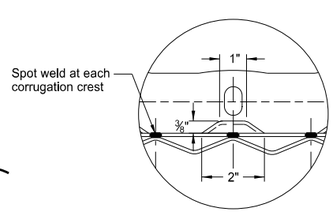
SPIRAL RIB CORRUGATIONS



3" x 1" CORRUGATIONS or
5" x 1" CORRUGATIONS



2⅔" x ½" CORRUGATIONS



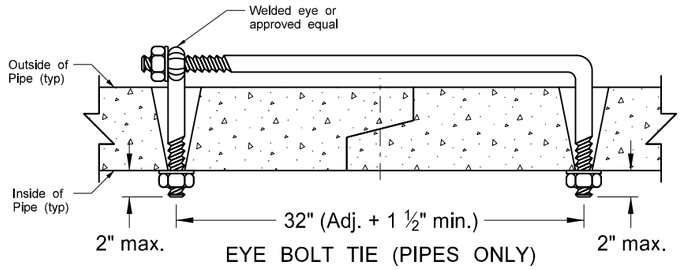
Detail A

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

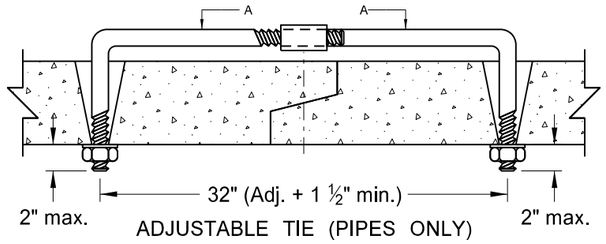
This document was originally issued and sealed by Terrence R. Udland, Registration Number PE- 2674 , on 02/27/2014 and the original document is stored at the North Dakota Department of Transportation

CONCRETE PIPE OR PRECAST CONCRETE BOX CULVERT TIES

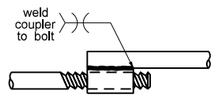
D-714-22



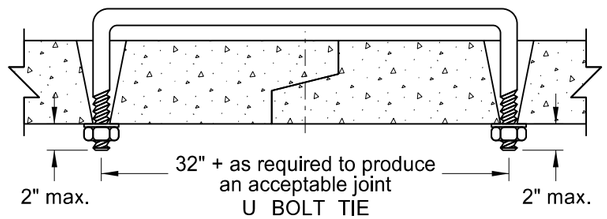
EYE BOLT TIE (PIPES ONLY)



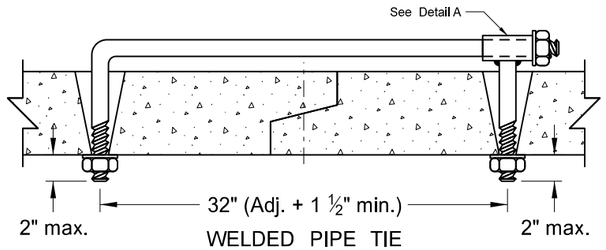
ADJUSTABLE TIE (PIPES ONLY)



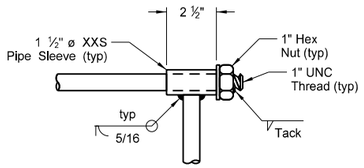
SECTION A-A



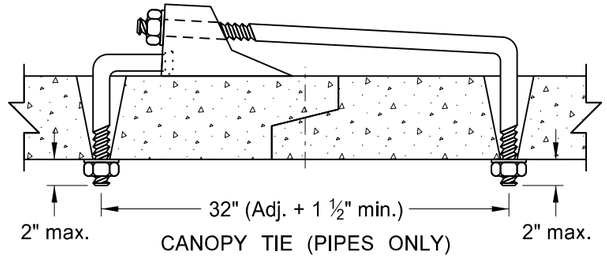
U BOLT TIE



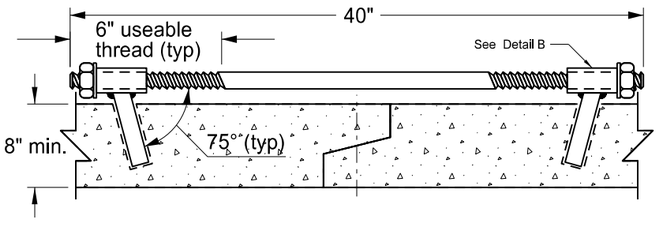
WELDED PIPE TIE



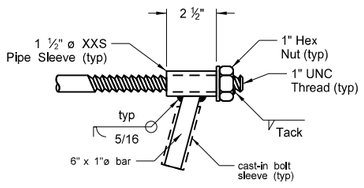
DETAIL A



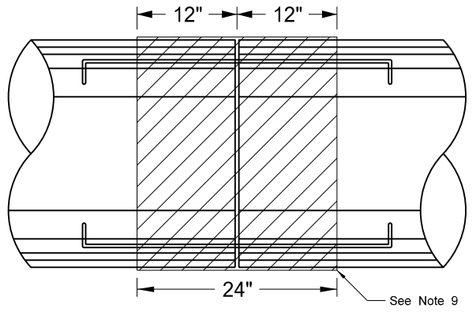
CANOPY TIE (PIPES ONLY)



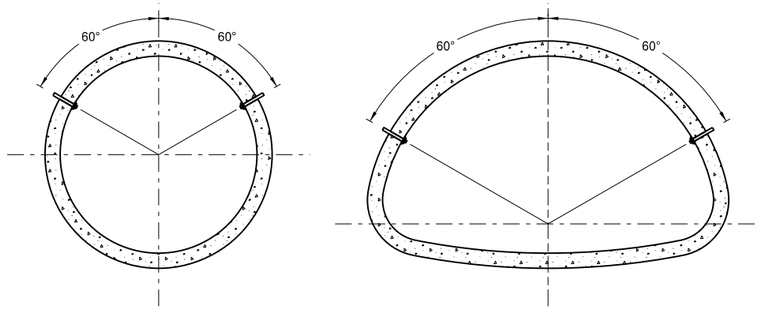
HIDDEN TIE (RCB ONLY)



DETAIL B



PLAN VIEW



END VIEW

REQUIRED SIZE OF TIE BOLTS		
Pipe Size	Thread ø	XXS Pipe Sleeve Inner ø
18" - 24"	⅝" See note 2	¾"
30" - 66"	¾"	1"
72" - 78"	1"	1 ¼"
RCB		

NOTES:

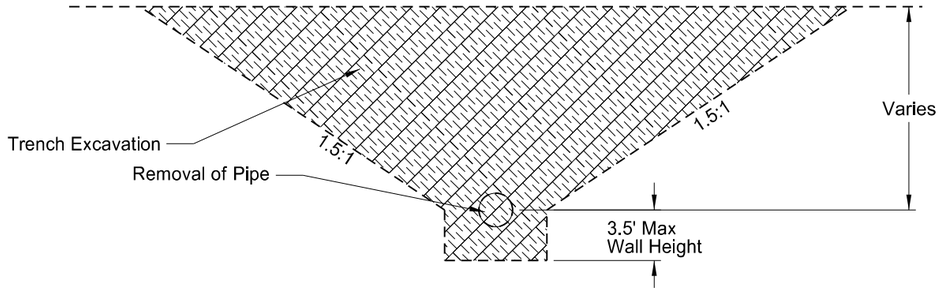
1. The pipe size listed is the inside diameter of round pipe or the equivalent diameter of pipe arch.
2. Nuts and washers are not required on Jacked and Bored pipes or pipes with a 24" diameter or less. Where nuts and washers are not used, the tie bars shall be inserted and grouted into place.
3. Ties are only for holding pipe or RCB sections together, not for pulling sections tight.
4. Tie bolt assembly shall be hot dip galvanized in accordance with AASHTO M232.
5. Holes in pipes to accommodate tie bolts can be precast or drilled. Tapered holes are permitted when precast. Holes shall have a diameter ¼" larger than the diameter of the thread. Holes in precast RCB's shall contain cast-in bolt sleeves with an inside diameter of 1 ¼".
6. The contractor has the option of selecting the type of tie bolt used from those shown.
7. 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.
8. 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.
9. When joint wrap is specified in the plans, place wrap beneath ties. Overlap the joint by 12" in both directions.
10. Tie bolts shall conform to ASTM A 36. Nuts shall be 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.
11. 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.
12. 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

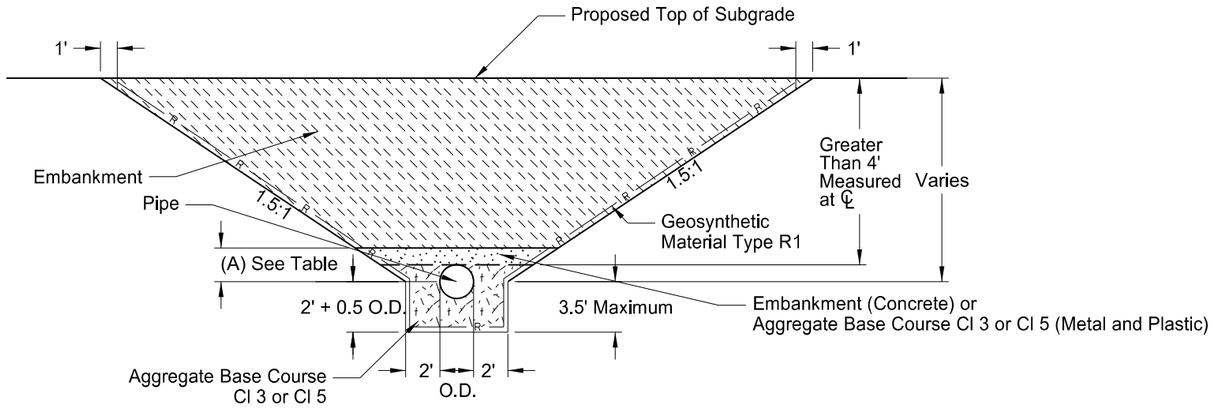
This document was originally issued and sealed by Terrence R. Udland, Registration Number PE-2674, on 07/21/15 and the original document is stored at the North Dakota Department of Transportation

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

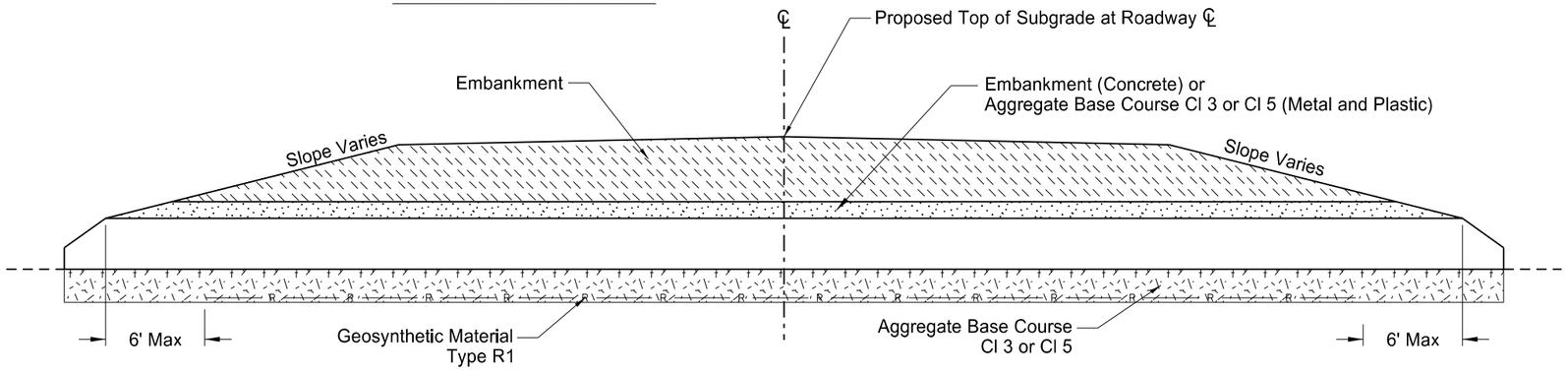
D-714-25



EXCAVATION DETAIL



INSTALLATION DETAIL



CROSS SECTION

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 Cl 3 or Cl 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 and Plastic	0.5 O.D. + 1 Foot

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION

7-26-13

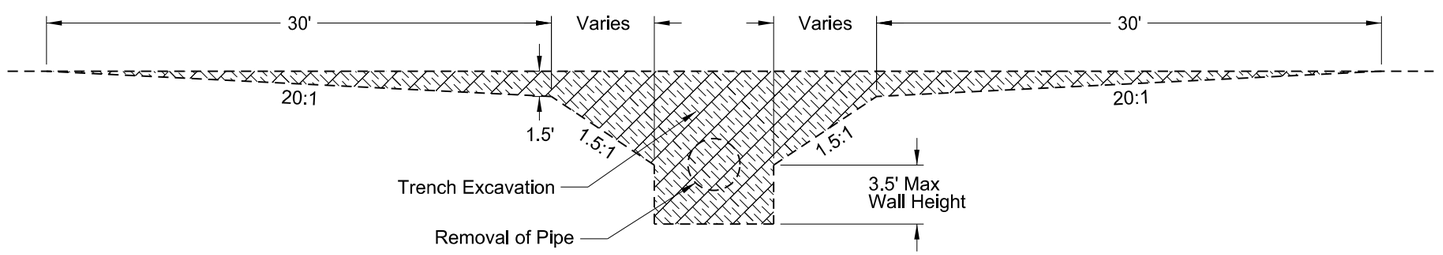
REVISIONS

DATE	CHANGE
10-15-13	Label Formatting
1-21-14	Nomenclature
9-18-15	Title Rewording
12-10-15	Added Plastic Pipe

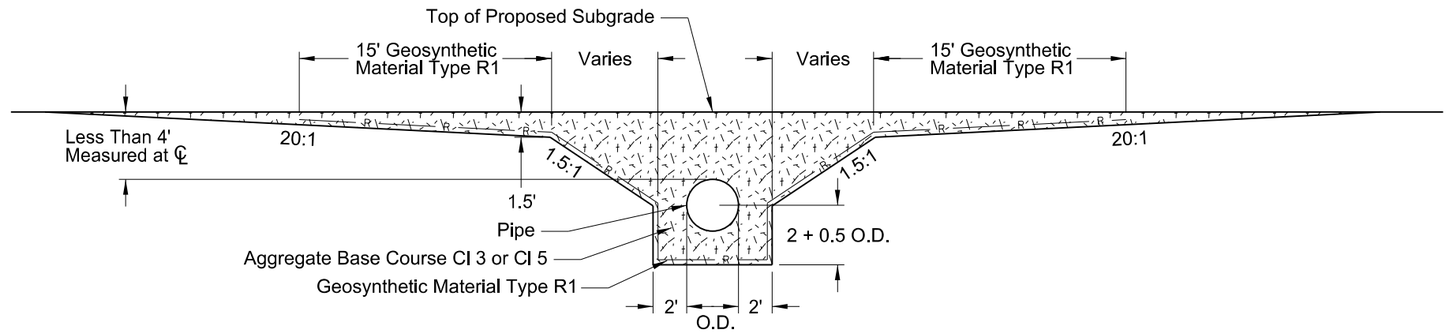
This document was originally issued and sealed by Ron Horner, Registration Number PE- 2087, on 12/10/2015 and the original document is stored at the North Dakota Department of Transportation

TRANSVERSE MAINLINE PIPE INSTALLATION DETAIL
PIPES 4 FEET OR LESS BELOW TOP OF SUBGRADE

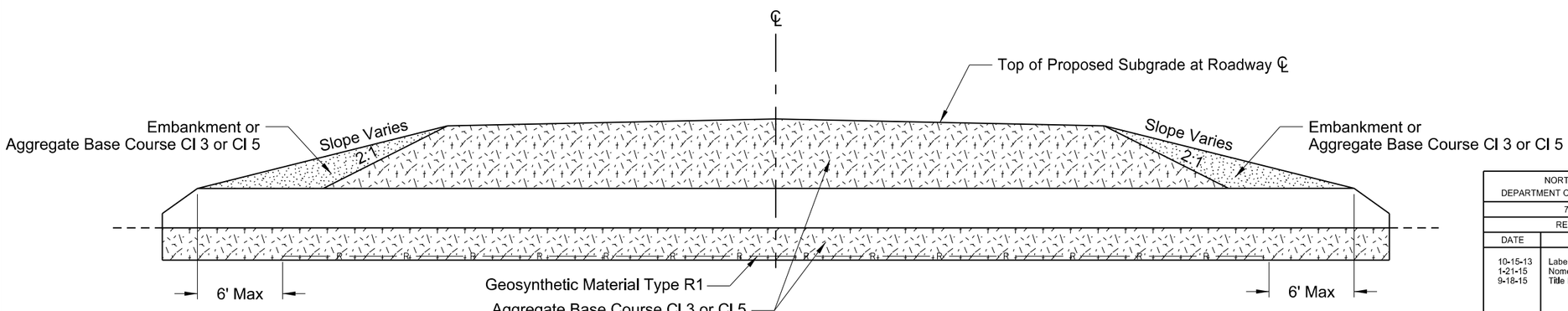
D-714-26



EXCAVATION DETAIL



INSTALLATION DETAIL



CROSS SECTION

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:

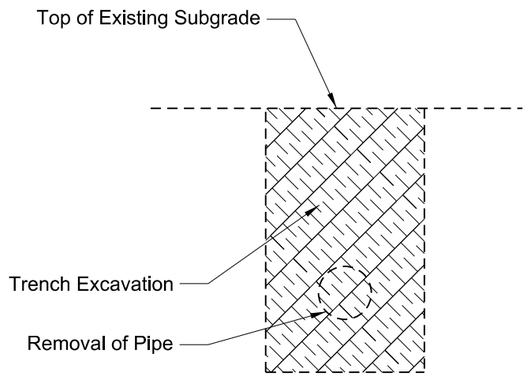
1) This drawing applies to new/replaced mainline and paved intersection roadway pipes only (including ramps). It does not include pipes in approaches.
2) Embankment may be either Borrow Excavation or Common Excavation - Type A

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

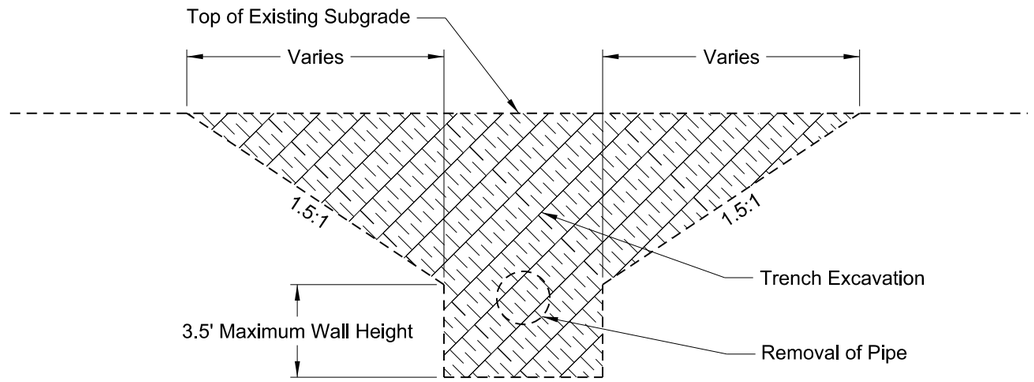
This document was originally issued and sealed by Ron Horner, Registration Number PE-2087, on 9/18/2015 and the original document is stored at the North Dakota Department of Transportation

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

D-714-27



EXCAVATION DETAIL A



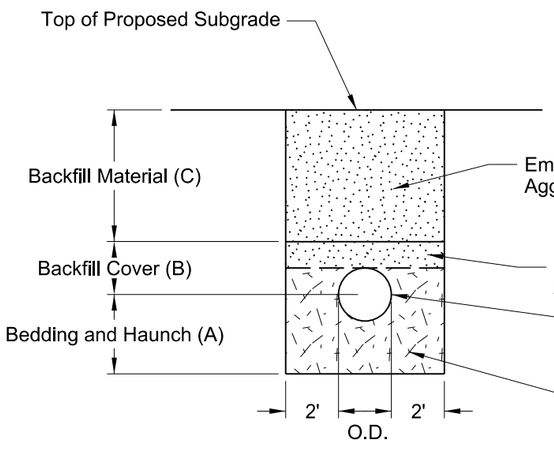
EXCAVATION DETAIL B

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

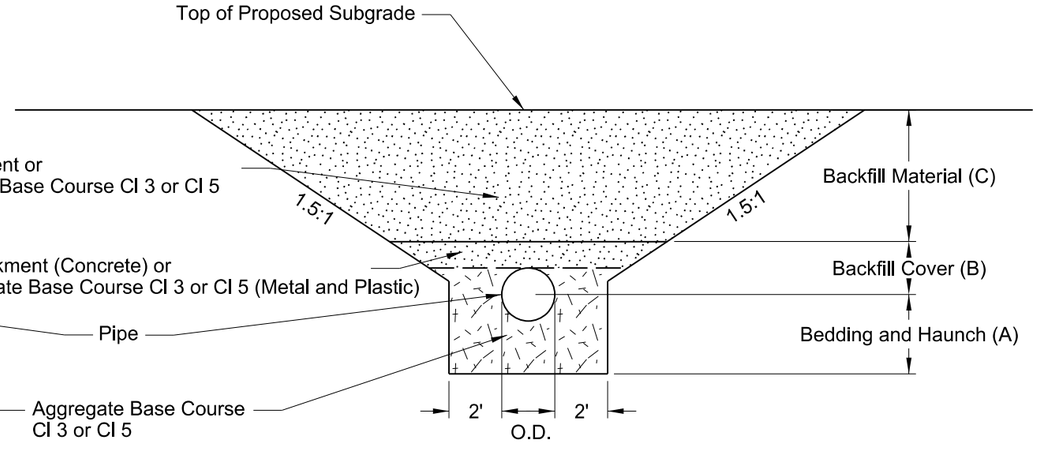
*Included in Pipe Pay Item
1) Pipe
2) Trench excavation
3) Aggregate base course Cl 3 or Cl 5
4) Embankment

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

Bedding and Haunch (A)
Pipes Not Under Roadway = 0.5 O.D. + 4 Inches
Pipes Under the Roadway = 0.5 O.D. + 2 Feet
Backfill Cover (B)
Concrete Pipe = 0.5 O.D.
Metal and Plastic = 0.5 O.D. + 1 Foot
Backfill Material (C)
Top of Pipe 4 Feet or Less Below the Top of Proposed Subgrade = Aggregate Base Course Cl3 or Cl 5
Top of Pipe Greater than 4 Feet Below the Top of Proposed Subgrade = Common Excavation - Type A
Pipe Not Under Roadway = Common Excavation - Type B



BACKFILL DETAIL A



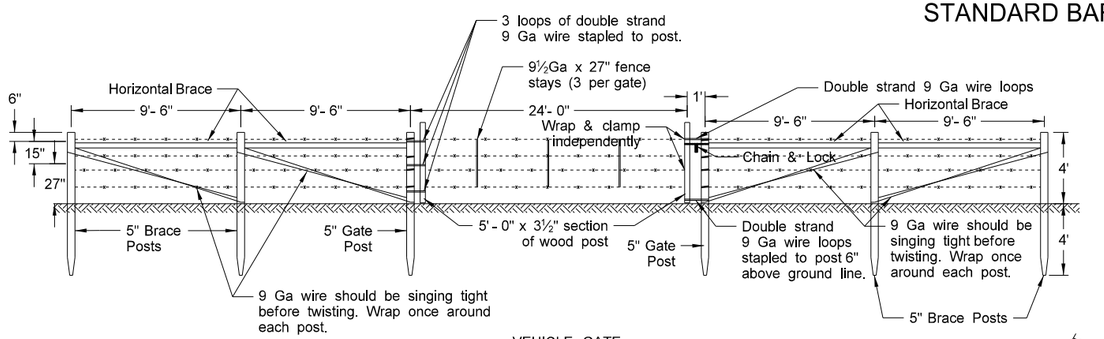
BACKFILL DETAIL B

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
7-26-13	
REVISIONS	
DATE	CHANGE
10-15-13 1-21-15 12-10-15	Label Formatting Nomenclature Added Plastic Pipe

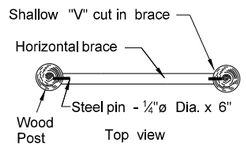
This document was originally issued and sealed by Ron Horner, Registration Number PE-2087, on 12/10/2015 and the original document is stored at the North Dakota Department of Transportation

STANDARD BARBED WIRE FENCE

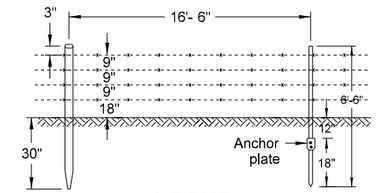
D-752-1



VEHICLE GATE



HORIZONTAL BRACE DETAIL



Wood line post (16'-6" Spacing) LINE POST DETAIL Steel line post (16'-6" Spacing)

NOTES

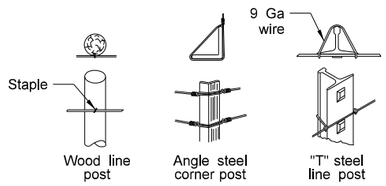
1. No deduction in measured pay length of cable fence will be made for gates, corner assemblies, double brace assemblies, fence terminals, or depression fencing. Abutment fencing shall be included in the price bid for fencing bid items.

2. Double brace assemblies shall be installed at locations shown on the plans or established by the Engineer. The distance between adjacent fence terminals, corner assemblies, or double brace assemblies shall not exceed 1,320 feet.

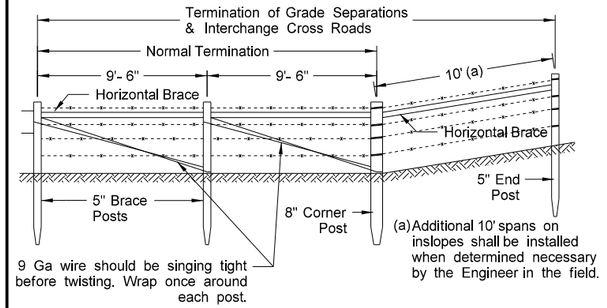
3. Cost of furnishing and installing inserts and eyebolts shall be included in the unit price bid for fencing bid items. Eyebolts shall be galvanized according to AASHTO designation M-30; inserts of corrosion resistant material need not be galvanized. Concrete inserts shall be of such design that, when installed in the concrete, will be capable of developing the full strength of the ⅝" diameter threaded eyebolt.

4. The type of posts to be used, either wood or steel, shall be determined by the contractor unless otherwise specified in the plans.

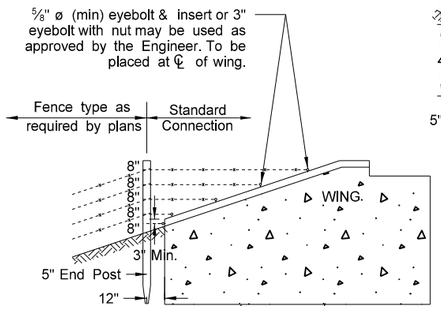
POST SIZES					
	TREATED WOOD		STEEL		
USE OF POST	Post dia.	Post length	Post length	Post wt. Lbs/Ft	Anchor wt. Lbs.
Line post	3½"	6'-6"	6'-6"	1.33	0.67
Corner post	8"	8'	7'	4.10	(Conc.)
End post	5"	8'			
Brace post	5" / 3½"	8'	7'	3.19	(Conc.)
Gate post	5"	8'			
Horizontal brace	3½"	Var.	As appoved by the Engineer		



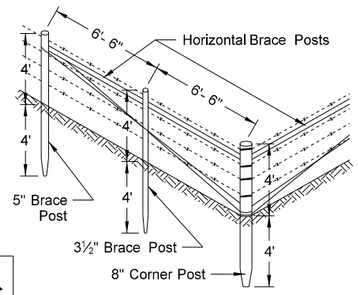
FASTENING TO POSTS



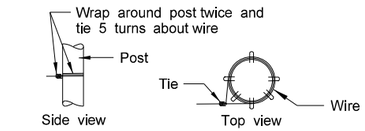
FENCE TERMINAL



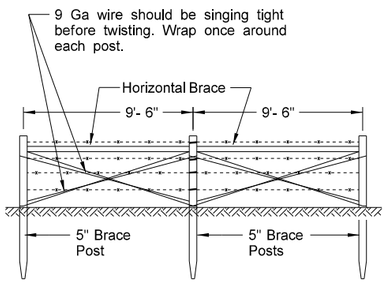
DETAIL FOR TYING FENCE TO WINGS OF ABUTMENTS



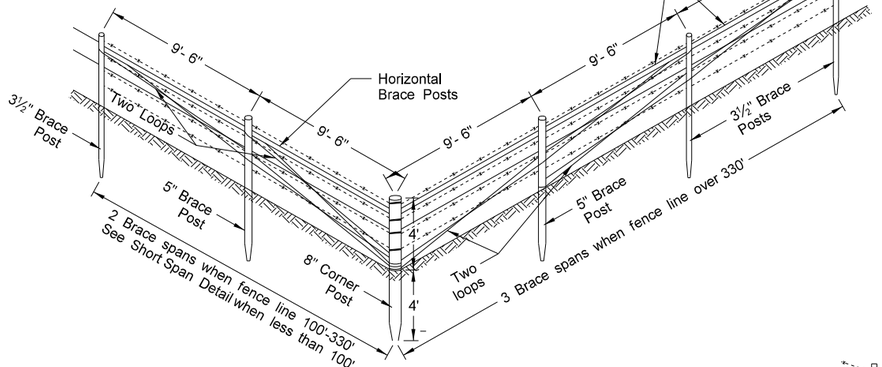
SHORT SPAN DETAIL (FENCE LINE 100' OR LESS)



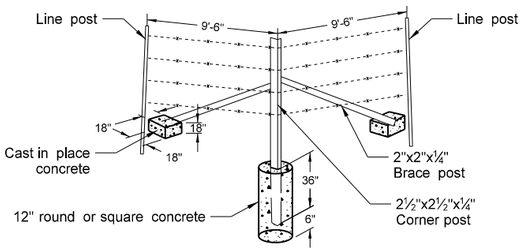
WRAP-AROUND DETAIL



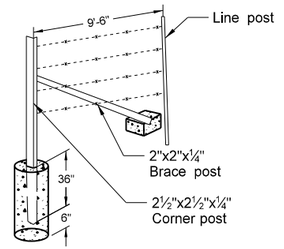
DOUBLE BRACE ASSEMBLY



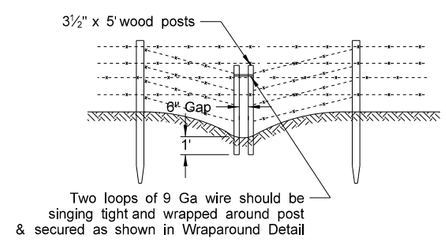
CORNER ASSEMBLY



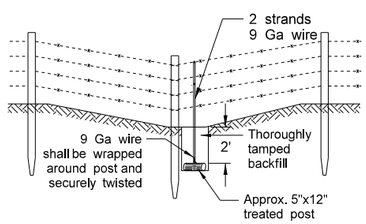
CORNER AND DOUBLE BRACE ASSEMBLY STEEL POSTS



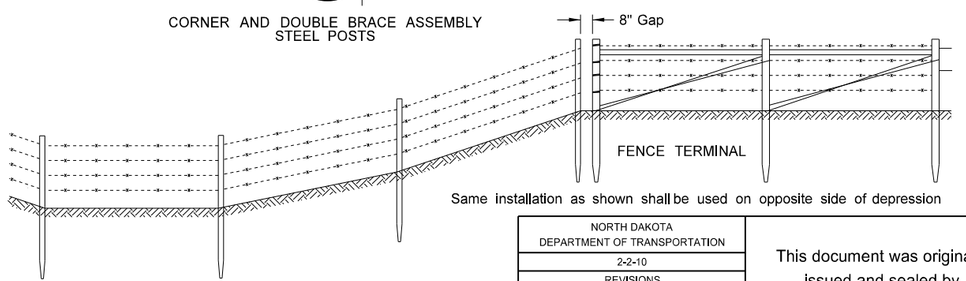
FENCE TERMINAL STEEL POSTS



BREAK-AWAY FENCE FOR NARROW DEPRESSIONS SUBJECT TO FLOODING



DETAIL FOR ANCHORING FENCES IN DEPRESSIONS*
*Locations shall be determined in the field and included in price bid for fencing. Other methods of anchoring the fence may be used if approved by the Engineer.



FENCING FOR WIDE DEPRESSIONS

Same installation as shown shall be used on opposite side of depression

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
2-2-10	
REVISIONS	
DATE	CHANGE
10-02-12	Notes, steel assemblies/posts
11-25-13	Revised Vehicle Gate

This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 11/25/2013 and the original document is stored at the North Dakota Department of Transportation

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'.

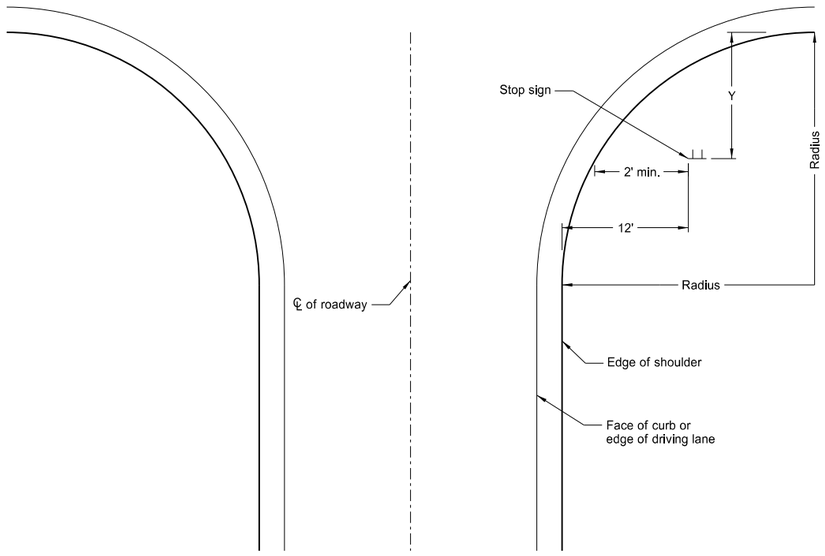
   Signs on expressways shall be installed with a minimum height of 7'.

   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.

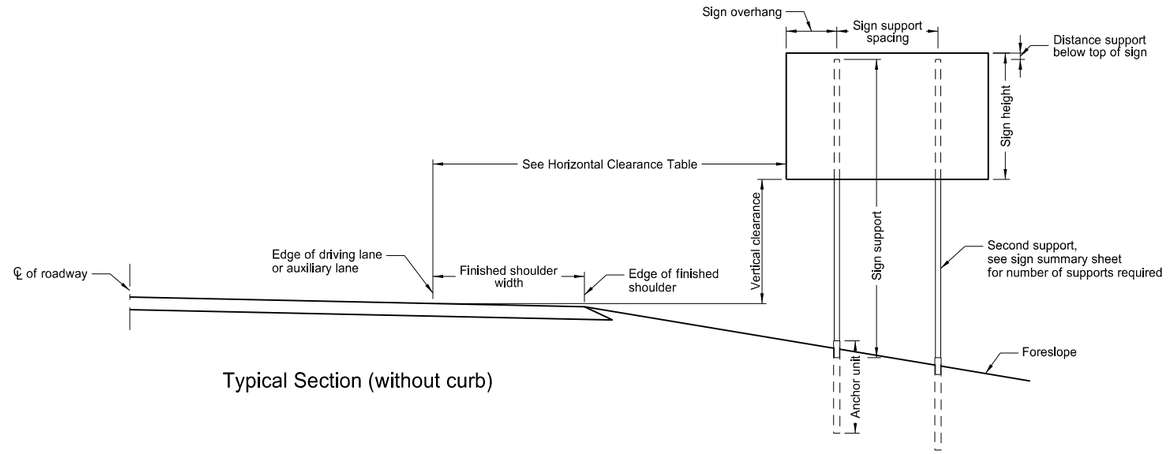
4. The clearance from edge of shared use path to edge of sign should be 3' except where width is limited, a minimum clearance of 2' shall be provided.



Stop Sign Location
Wide Throat Intersection

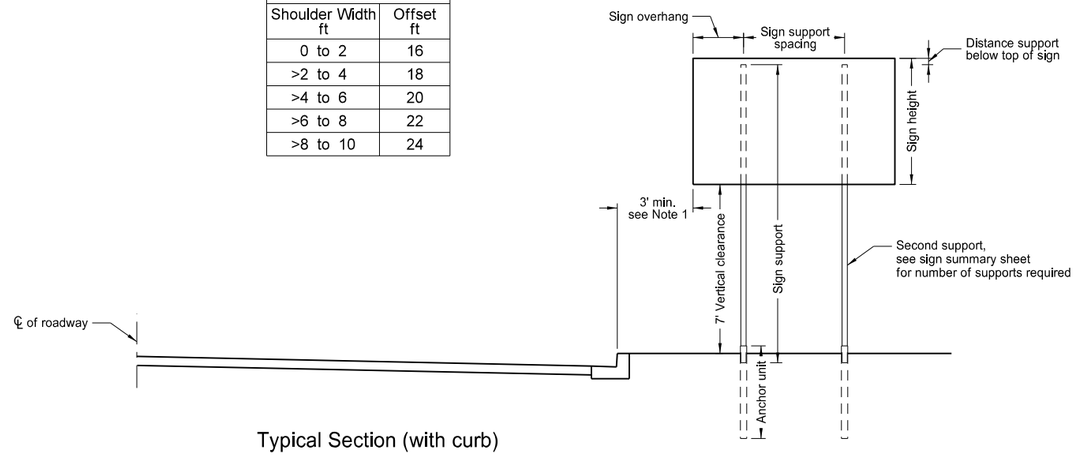
This layout is to be used for the placement of "Stop" signs.

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



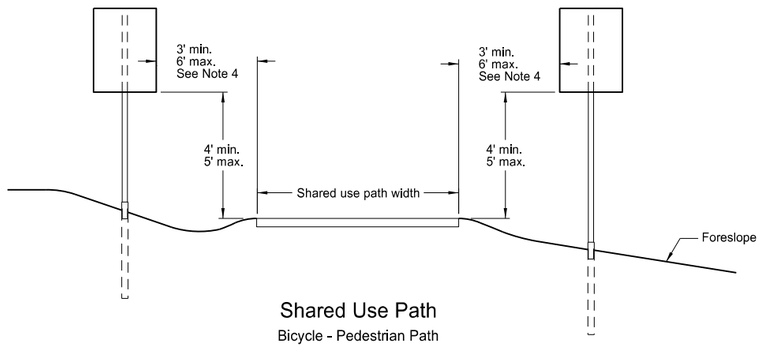
Typical Section (without curb)

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



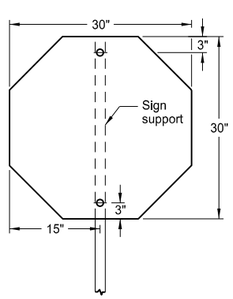
Shared Use Path

Bicycle - Pedestrian Path

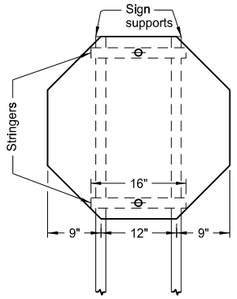
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
7-8-14	Revised note 2, added note 4.

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

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

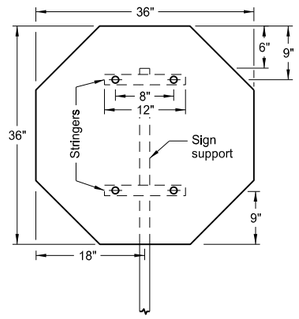


1 Post



2 Posts

Assembly No. 1



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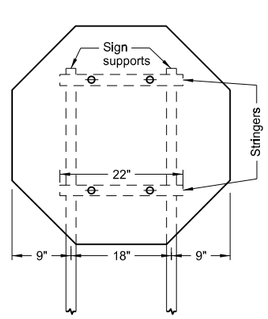
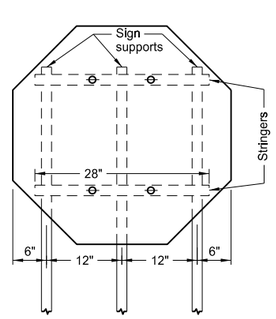


2 Posts



3 Posts

Assembly No. 2

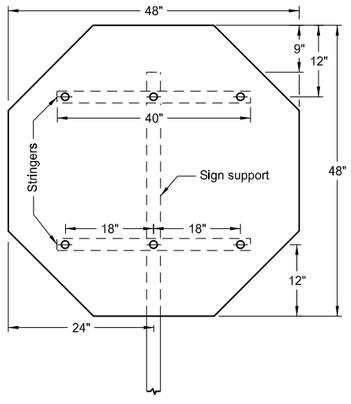
Notes:

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.



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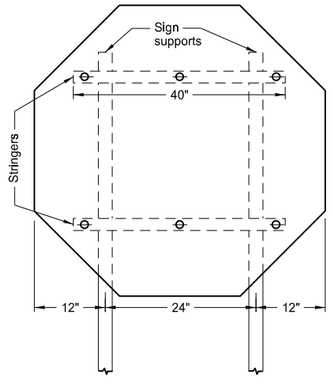
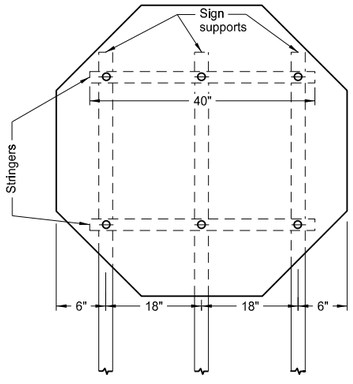
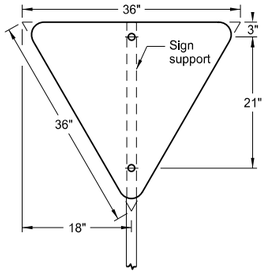


2 Posts

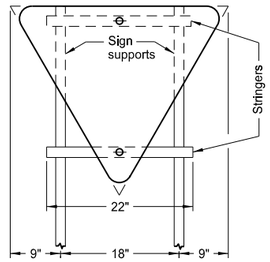


3 Posts

Assembly No. 3

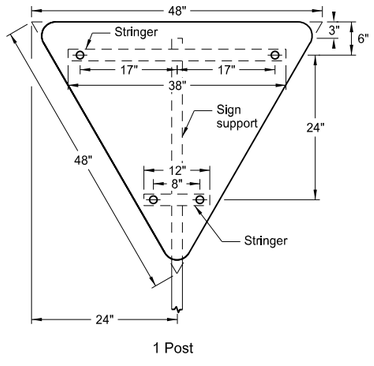


1 Post

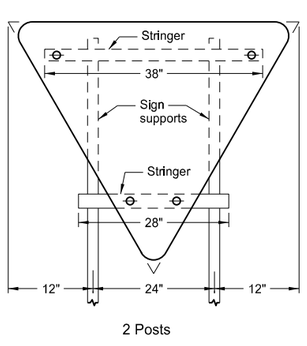


2 Posts

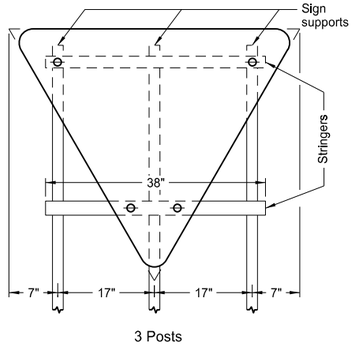
Assembly No. 4



1 Post



2 Posts



3 Posts

Assembly No. 5

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

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911 SIGN SUPPORT INFORMATION AND SIGN DETAILS

D-754-86

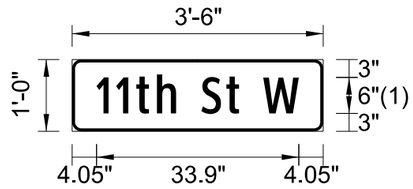
THE POST INFORMATION FOR VARIOUS SIGN CONFIGURATIONS
(60 INCH VERTICAL CLEARANCE)

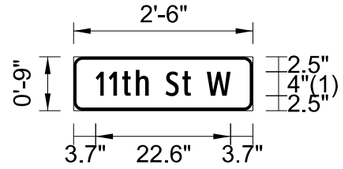
ASSEMBLY NUMBER	STREET NAME SIGN SIZE	TOTAL SIGN AREA	MAXIMUM POST LENGTH	NUMBER OF POSTS	SUPPORT SIZE	SLEEVE LENGTH (A) 1st	2nd	3rd	SLEEVE SIZE	ANCHOR NUMBER	ANCHOR LENGTH	ANCHOR SIZE	BREAK - AWAY
	Inches	SF	LF			LF	LF	LF			LF		
SA 1	24"x12"	8.00	20.2	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	30"x12"	10.00	16.4	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	36"x12"	12.00	13.8	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	42"x12"	14.00	14.7	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	48"x12"	16.00	12.9	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	54"x12"	18.00	15.2	1	2.25x2.25 12 ga					1	4.0	2.5x2.5 12ga	
	60"x12"	20.00	13.7	1	2.25x2.25 12 ga					1	4.0	2.5x2.5 12ga	
	24"x9"	6.00	24.1	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	30"x9"	7.50	21.2	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	36"x9"	9.00	17.7	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	42"x9"	10.50	15.3	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	48"x9"	12.00	13.5	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	54"x9"	13.50	14.8	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	60"x9"	15.00	13.4	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	24"x6"	4.00	35.2	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	30"x6"	5.00	28.3	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	36"x6"	6.00	23.6	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	42"x6"	7.00	22.3	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	48"x6"	8.00	19.6	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	54"x6"	9.00	17.5	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
	60"x6"	10.00	15.4	1	2x2 12 ga					1	4.0	2.25x2.25 12ga	
SA 2	24"x12"	13.2	14.6	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	30"x12"	15.2	16.3	1	2.5.2.5 10 ga					1	4.0	3x3 7 ga	1
	36"x12"	17.2	15.4	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	42"x12"	19.2	14.7	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	48"x12"	21.2	15.3	1	2.25x2.25 12 ga	4.5			2x2 12 ga	1	4.0	3x3 7 ga	1
	54"x12"	23.2	20.6	1	2.5x2.5 10 ga	1.5			2.19x2.19 10ga	1	4.0	3x3 7 ga	1
	60"x12"	25.2	16.7	1	2.5x2.5 12 ga	3.9			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	24"x9"	11.2	15.2	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	30"x9"	12.7	14.5	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	36"x9"	14.2	16.5	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	42"x9"	15.7	15.8	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	48"x9"	17.2	14.4	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	54"x9"	18.7	15.1	1	2.25x2.25 12 ga	4.2			2x2 12ga	1	4.0	3x3 7 ga	1
	60"x9"	20.2	14.6	1	2.25x2.25 12 ga	4.6			2x2 12 ga	1	4.0	3x3 7 ga	1
	24"x6"	9.2	16.0	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	30"x6"	10.2	15.5	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	36"x6"	11.2	15.0	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	42"x6"	12.2	13.7	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	48"x6"	13.2	15.9	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	54"x6"	14.2	15.4	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	60"x6"	15.2	14.9	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
SA 3	24"x12"	13.9	16.1	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	30"x12"	15.9	15.3	1	2.5.2.5 10 ga					1	4.0	3x3 7 ga	1
	36"x12"	17.9	15.9	1	2.25x2.25 12 ga	4.4			2x2 12 ga	1	4.0	3x3 7 ga	1
	42"x12"	19.9	15.2	1	2.25x2.25 12 ga	4.8			2x2 12 ga	1	4.0	3x3 7 ga	1
	48"x12"	21.9	15.1	1	2.5x2.5 12 ga	5.1			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	54"x12"	23.9	20.6	1	2.5x2.5 10 ga	1.9			2.19X2.19 10ga	1	4.0	3x3 7 ga	1
	60"x12"	25.9	16.0	1	2.5x2.5 12 ga	4.7			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	24"x9"	11.9	16.8	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	30"x9"	13.4	16.1	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	36"x9"	14.9	15.4	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	42"x9"	16.4	14.8	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	48"x9"	17.9	15.6	1	2.25x2.25 12 ga	4.3			2x2 12 ga	1	4.0	3x3 7 ga	1
	54"x9"	19.4	14.9	1	2.5x2.5 12 ga	4.8			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	60"x9"	20.9	20.6	1	2.5x2.5 10 ga	1.6			2.19x2.19 10ga	1	4.0	3x3 7 ga	1
	24"x6"	9.9	14.7	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	30"x6"	10.9	14.3	1	2.5x2.5 12 ga					1	4.0	3x3 7 ga	
	36"x6"	11.9	16.5	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	42"x6"	12.9	16.0	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	48"x6"	13.9	14.8	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	54"x6"	14.9	14.4	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	60"x6"	15.9	15.3	1	2.25x2.25 12 ga	4.2			2x2 12 ga	1	4.0	3x3 7 ga	1

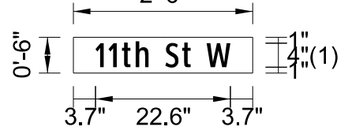
THE POST INFORMATION FOR VARIOUS SIGN CONFIGURATIONS
(60 INCH VERTICAL CLEARANCE)

ASSEMBLY NUMBER	STREET NAME SIGN SIZE	TOTAL SIGN AREA	MAXIMUM POST LENGTH	NUMBER OF POSTS	SUPPORT SIZE	SLEEVE LENGTH (A) 1st	2nd	3rd	SLEEVE SIZE	ANCHOR NUMBER	ANCHOR LENGTH	ANCHOR SIZE	BREAK - AWAY
	Inches	SF	LF			LF	LF	LF			LF		
SA 4	24"x12"	15.5	15.1	1	2.25x2.25 12 ga	4.7			2x2 12 ga	1	4.0	3x3 7 ga	1
	30"x12"	17.5	15.1	1	2.5x2.5 12 ga	4.9			2.25x2.25 12 ga	1	4.0	3x3 7 ga	1
	36"x12"	19.5	17.5	1	2.5x2.5 12 ga	3.6			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	42"x12"	21.5	16.8	1	2.5x2.5 12 ga	4.1			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	48"x12"	23.5	16.2	1	2.5x2.5 12 ga	4.5			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	54"x12"	25.5	15.6	1	2.5x2.5 12 ga	4.9			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	60"x12"	27.5	16.7	1	2.5x2.5 10 ga	4.2			2.19x2.19 10ga	1	4.0	3x3 7 ga	1
	24"x9"	13.5	14.3	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	30"x9"	15.0	15.1	1	2.25x2.25 12 ga	4.4			2x2 12 ga	1	4.0	3x3 7 ga	1
	36"x9"	16.5	14.6	1	2.25x2.25 12 ga	4.7			2x2 12 ga	1	4.0	3x3 7 ga	1
	42"x9"	18.0	14.7	1	2.5x2.5 12 ga	4.9			2.25x2.25 12 ga	1	4.0	3x3 7 ga	1
	48"x9"	19.5	17.2	1	2.5x2.5 12 ga	3.5			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	54"x9"	21.0	15.8	1	2.5x2.5 12 ga	4.3			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	60"x9"	22.5	15.4	1	2.5x2.5 12 ga	4.6			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	24"x6"	11.5	14.7	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	30"x6"	12.5	14.4	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	36"x6"	13.5	14.0	1	2.5x2.5 10 ga					1	4.0	3x3 7 ga	1
	42"x6"	14.5	15.0	1	2.25x2.25 12 ga	4.2			2x2 12 ga	1	4.0	3x3 7 ga	1
	48"x6"	15.5	14.5	1	2.5x2.5 12 ga	4.6			2.25x2.25 12 ga	1	4.0	3x3 7 ga	1
	54"x6"	16.5	14.1	1	2.5x2.5 12 ga	4.9			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
	60"x6"	17.5	16.8	1	2.5x2.5 12 ga	3.5			2.25x2.25 12ga	1	4.0	3x3 7 ga	1
SA 5	24"x12"	21.3	17.2	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	30"x12"	23.3	16.7	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	36"x12"	25.3	16.3	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	42"x12"	27.3	17.3	2	2.25x2.25 12 ga	4.2	4.6		2x2 12ga	2	4.0	3x3 7 ga	2
	48"x12"	29.3	16.9	2	2.25x2.25 12 ga	4.5	5.0		2x2 12 ga	2	4.0	3x3 7 ga	2
	54"x12"	31.3	16.5	2	2.25x2.25 12 ga	4.7	5.3		2x2 12 ga	2	4.0	3x3 7 ga	2
	60"x12"	33.3	17.5	3	2.5x2.5 12 ga					3	4.0	3x3 7 ga	3
	24"x9"	19.3	15.6	1	2.5x2.5 10 ga	4.9			2.19x2.19 10ga	1	4.0	3x3 7 ga	1
	30"x9"	20.8	17.0	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	36"x9"	22.3	16.7	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	42"x9"	23.8	16.3	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	48"x9"	25.3	16.0	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	54"x9"	26.8	17.2	2	2.25x2.25 12 ga	3.9	4.5		2x2 12 ga	2	4.0	3x3 7 ga	2
	60"x9"	28.3	16.8	2	2.25x2.25 12 ga	4.2	4.8		2x2 12 ga	2	4.0	3x3 7 ga	2
	24"x6"	17.3	15.8	1	2.5x2.5 10 ga	4.4			2.19x2.19 10ga	1	4.0	3x3 7 ga	1
	30"x6"	18.3	15.5	1	2.5x2.5 10 ga	4.5			2.19x2.19 10ga	1	4.0	3x3 7 ga	1
	36"x6"	19.3	15.3	1	2.5x2.5 10 ga	4.7			2.19x2.19 10ga	1	4.0	3x3 7 ga	1
	42"x6"	20.3	15.1	1	2.5x2.5 10 ga	4.9			2.19x2.19 10ga	1	4.0	3x3 7 ga	1
	48"x6"	21.3	16.7	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	54"x6"	22.3	16.4	2	2.5x2.5 10 ga					2	4.0	3x3 7 ga	2
	60"x6"	23.3	16.8	2	2.25x2.25 12 ga	3.8	4.4		2x2 12 ga	2	4.0	3x3 7 ga	2

(A) The sleeve length shown is for the maximum post length. The required sleeve length is the "sleeve length" minus the difference between the "maximum post length" and the post length required in the field.







Sign Details

(1) Clearview Type 2-W Font
Radius 1-1/2"
Border 1/2"

Notes:
The sign legend shall be 6 inch in height except on low-volume roads and urban streets with speeds of 25 mph or less. On low volume roads and urban streets, the legend shall be at least 4 inch in height. Low-volume roads shall be a facility outside of developed areas of cities, towns, and communities, and shall have a traffic volume of less than 400 ADT. On divided multi-lane roadways, the 911 signs shall not be placed on top of the stop sign.

When installing signs on existing supports, check the support and sleeve size to determine if they meet the table requirements. The maximum post length is measured from the ground to the top of the street name sign. If the calculated support length is greater than the maximum post length shown, the support size must be recalculated.

See Standard Drawing D-754-87 for sign punching, stringer and support location details.

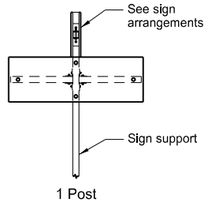
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
REVISIONS	
DATE	CHANGE
7-18-14	Revised street name sign layouts

This document was originally issued and sealed by Roger Weigel Registration Number PE-2930, on 7/18/14 and the original document is stored at the North Dakota Department of Transportation

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

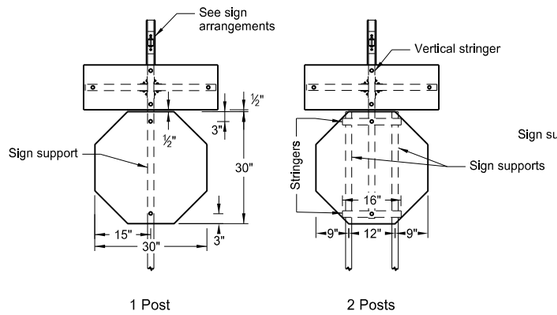
D-754-87

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



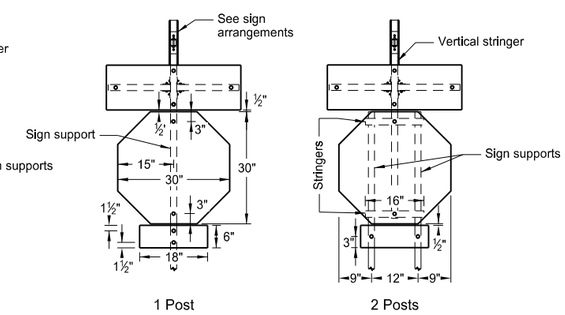
1 Post

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



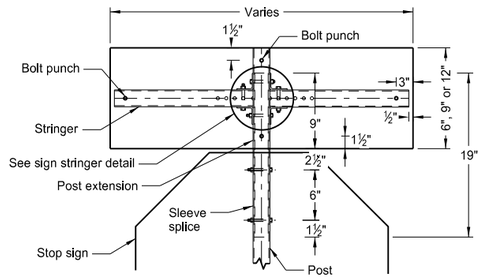
1 Post 2 Posts

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



1 Post 2 Posts

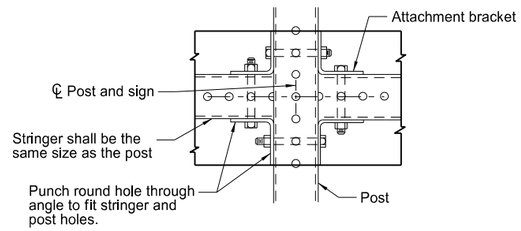
Special Assembly 3 (A, B, C, D or E)



Front View

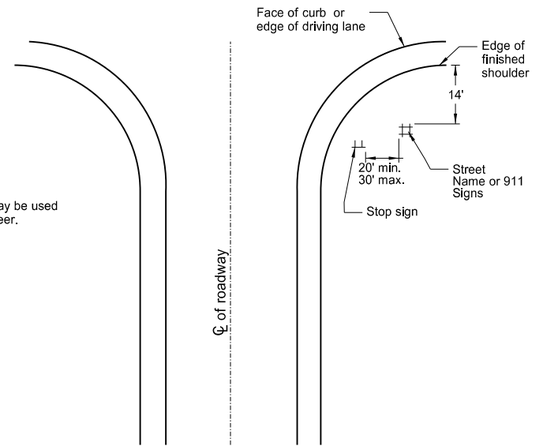
Sleeve Splice Detail

Note: The splice method may be used upon approval of the engineer.



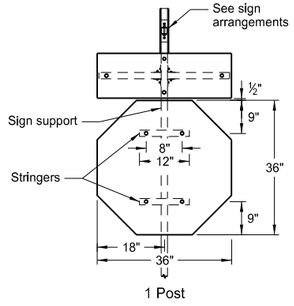
Sign Stringer Detail

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

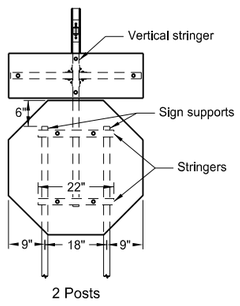


Intersection Layout

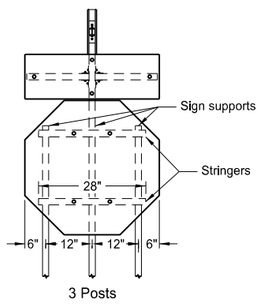
Note: This layout is to be used for street name signs or 911 signs that are used with Special Assembly 1 .



1 Post

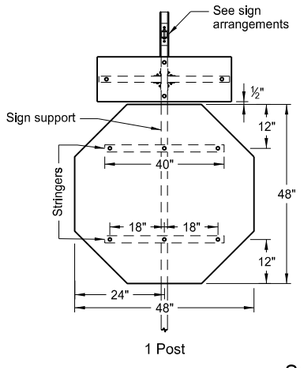


2 Posts

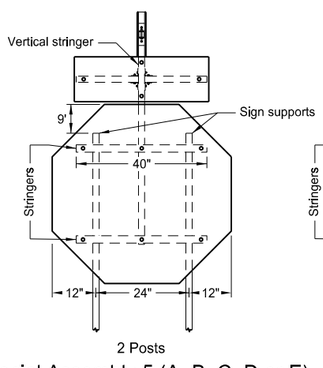


3 Posts

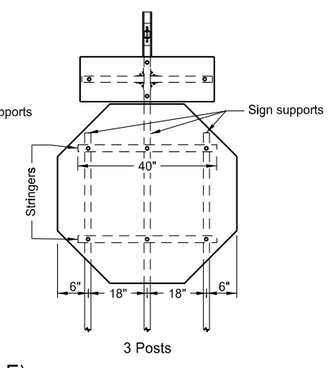
Special Assembly 4 (A, B, C, D or E)



1 Post

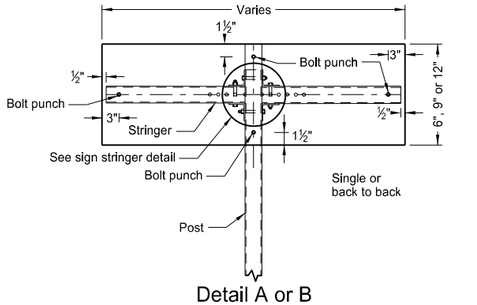


2 Posts

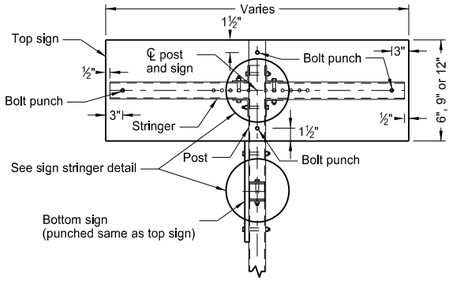


3 Posts

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

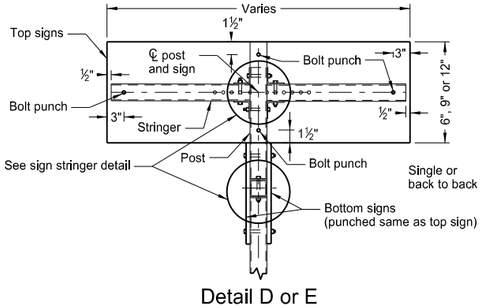


Detail A or B



Detail C

Sign Arrangements



Detail D or E

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

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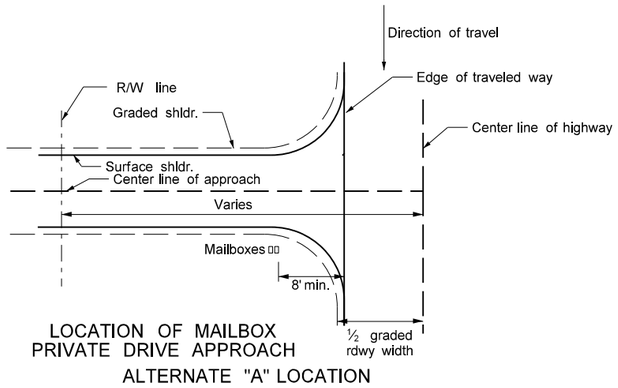
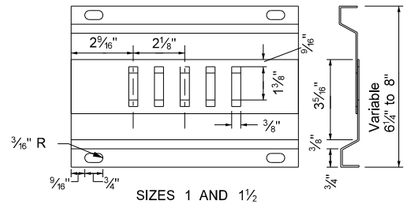
MAILBOX LOCATION DETAILS

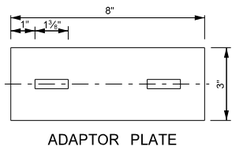
D-766-1



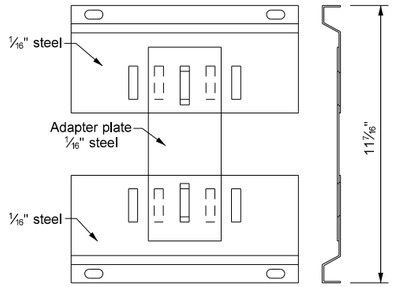
LOCATION OF MAILBOX
PRIVATE DRIVE APPROACH
ALTERNATE "A" LOCATION



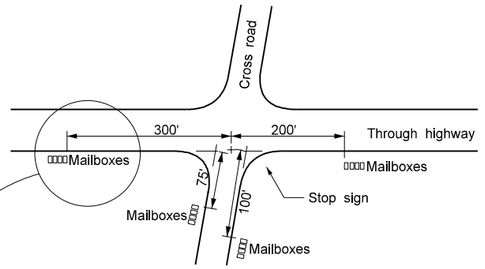
SIZES 1 AND 1½
MOUNTING BRACKET



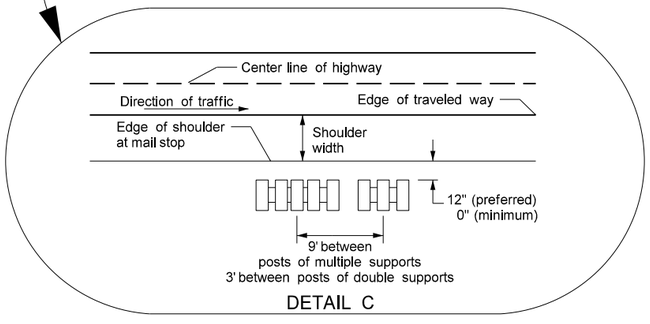
ADAPTOR PLATE



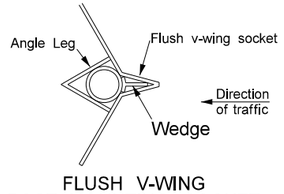
SIZE 2 WITH ADAPTOR PLATE
MOUNTING BRACKET



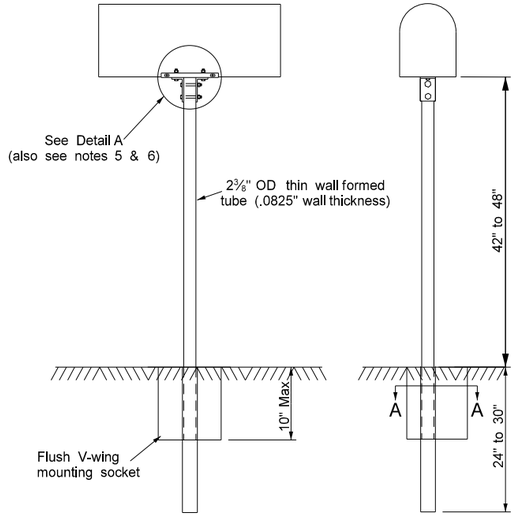
MINIMUM CLEARANCE DISTANCE TO NEAREST
MAILBOX ALONG ROADWAY AT INTERSECTIONS
ALTERNATE "B" LOCATION



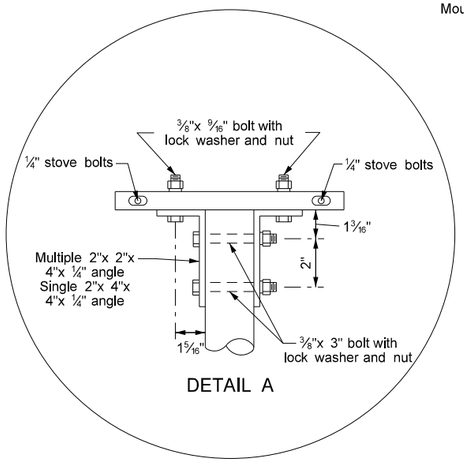
DETAIL C



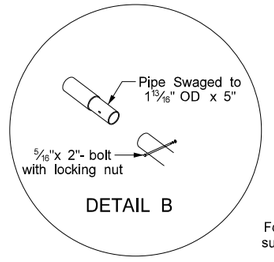
FLUSH V-WING
POST MOUNTING SOCKET
SECTION A-A



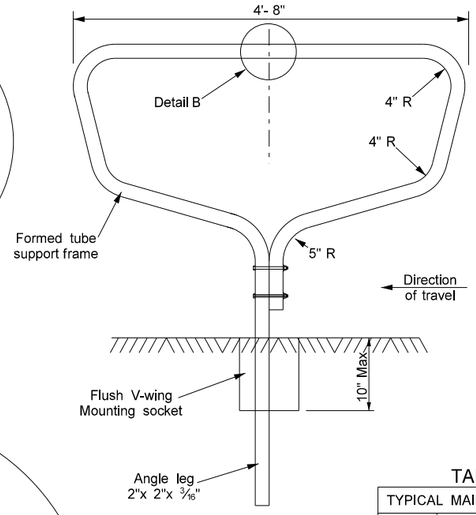
SIDE FRONT
SINGLE SUPPORT



DETAIL A



DETAIL B



FRONT

Notes:

1. 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.

2. 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.

3. 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.

4. Mailboxes installed on private drive approaches must always be located on the downstream side of the approach.

5. Install angle connection parallel to traffic flow for size 2 mailbox mounted on single posts.

6. Size 2 mailbox mounted on multiple support requires 2 each, ⅜" by 9⁄16" bolts with lock washers and nuts to attach the adapter plate to mounting bracket. The unit will then require 4 angle connections to attach to the formed tube support frame. See Detail A.

7. 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.

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"

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

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