DESIGN DATA				
RP 190.709 to RP 200.226				
Traffic	Average Daily			
Current 2015	Pass: 745	Trucks: 315	Total: 1060	
Forecast 2035	Pass: 1010	Trucks: 470	Total: 1480	
RP 200.226 to RP 202.235				
Traffic	Average Daily			
Current 2015	Pass: 385	Trucks: 145	Total: 530	
Forecast 2035	Pass: 575	Trucks: 220	Total: 795	
Clear Zone Distance: Existing		Design Speed: 65 MPH		
Minimum Sight Dist. for Stopping: Existing		Bridges: N/A		
Sight Dist. for No Passing Zone: Existing				
Pavement Design Life N/A				
Design Accumulated One-way:Flexible ESALs: N/A				

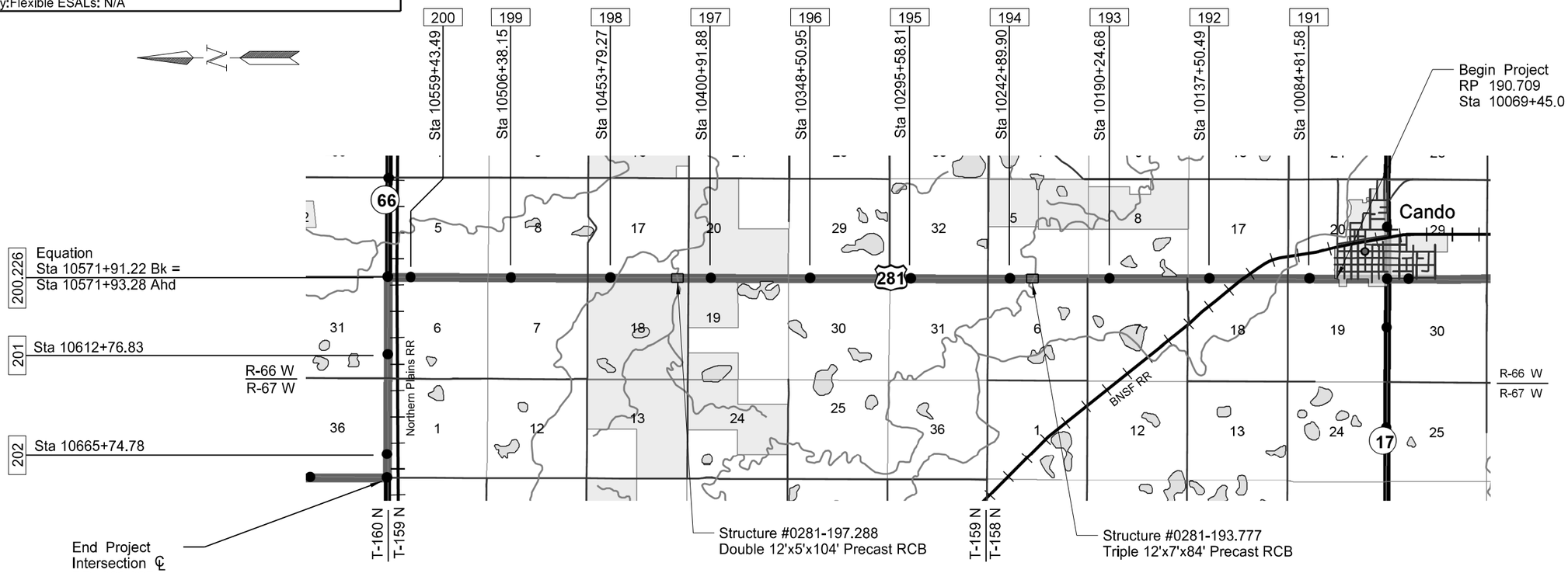
	STATE	PROJECT NO.	PCN	SECTION NO.	SHEET NO.
	ND	NH-3-281(118)190	20683	1	1

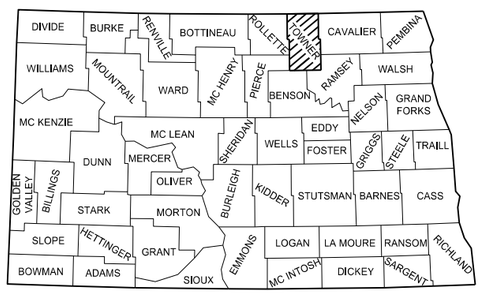
JOB # 22
NORTH DAKOTA
DEPARTMENT OF TRANSPORTATION

NH-3-281(118)190
Towner County
Cando North To West Junction ND 66
Mill and RAP Overlay with Subcuts

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.

PROJECT NUMBER \ DESCRIPTION	NET MILES	GROSS MILES
NH-3-281(118)190	11.526	11.526





STATE COUNTY MAP

DESIGNERS

Jeffrey R. Rensch /s/

Abdelhafiz Ibrahim /s/

APPROVED DATE 2/11/16

Roger Weigel /s/
OFFICE OF PROJECT DEVELOPMENT
ND DEPARTMENT OF TRANSPORTATION

I hereby certify that the attached plans were prepared by me or under my direct supervision and that I am a duly registered professional engineer under the laws of the state of ND.

APPROVED DATE 2/10/16

James Douglas Rath /s/

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-281(118)190	2	1

TABLE OF CONTENTS

PLAN SECTIONS

SPECIAL PROVISIONS

Number	Description
SP 0003(14)	Temporary Erosion and Sediment Best Management Practices
SP 283(14)	Flexible Pavement Surface Tolerance
SP 5000(014)	Permits and Environmental Considerations

LIST OF STANDARD DRAWINGS

Number	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-256-1	Erosion and Siltation Controls
D-260-1	Erosion and Siltation Controls - Silt Fence
D-261-1	Erosion Control - Fiber Roll Placement Details
D-704-2	Traffic Control For Coring of Hot Bituminous Pavement
D-704-5	Construction Sign Detail
D-704-7	Breakaway Systems for Construction Zone Signs - Perforated Tube
D-704-8	Breakaway Systems for Construction Zone Signs - U-Channel Post
D-704-9	Construction Sign Details - Terminal and Guide Signs
D-704-10	Construction Sign Details - Regulatory Signs
D-704-11	Construction Sign Details - Warning Signs
D-704-13	Barricade and Channelizing Device Details
D-704-14	Construction Sign Punching and Mounting Details
D-704-15	Road Closure Layouts
D-704-19	Road Closure and Lane Closure on a Two Way Road Layouts
D-704-20	Terminal and Seal Coat Sign Layouts
D-704-22	Construction Truck and Temporary Detour Layouts
D-704-24	Shoulder Closures and Bridge Painting Layouts
D-704-26	Miscellaneous Sign Layouts
D-704-27	Traffic Control Plan for Moving Operations
D-704-50	Portable Sign Support Assembly
D-704-56	Mobile Operation - Grinding Shoulder Rumble Strips
D-706-1	Bituminous Laboratory
D-708-6	Erosion and Siltation Controls - Median or Ditch Inlet Protection
D-754-83	Object Markers - Culverts
D-760-3	Rumble Strips Undivided Highways (Shoulders 4' or Greater)
D-762-1	Pavement Marking Message Details
D-762-3	Pavement Marking for Standard 90 Degree Flared Intersection
D-762-4	Pavement Marking
D-762-6	Short-Term Pavement Marking

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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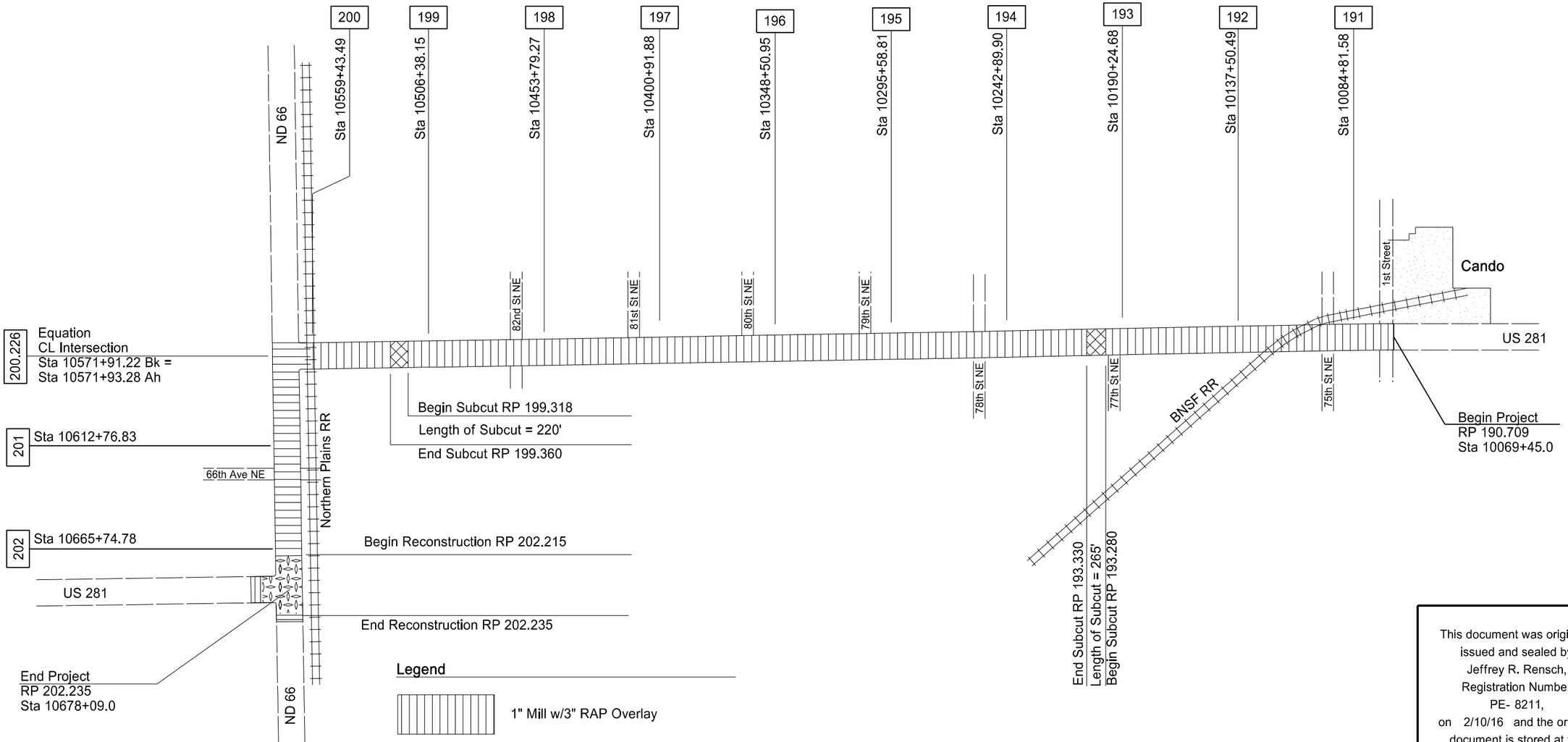

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Scope of Work

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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NOTES

100-P01 COORDINATION OF PROJECTS: Other projects in the vicinity of this project are under contract during the 2016 construction season. The projects are:

- SS-3-017(028)011 from 11 miles east of Jct ND 3 to Jct ND 20
- SS-NHU-3-020(091)104 from Devils Lake north to South Jct ND 17
- NH-3-281(125)175 from US 2 north to Cando (Chip Seal)
- NH-3-281(126)189 Cando City Section (Microsurfacing)

107-113 RAILROAD PROTECTIVE LIABILITY INSURANCE – SITE 2: This project crosses the Northern Plains Railroad at RP 200.14. The type of work that will be performed within the railroad right of way is milling, paving and pavement marking. Direct inquiries regarding protective liability insurance to:

Jesse Chalich
Vice President Operations
Northern Plains Railroad
P.O. Box 38
Fordville, ND 58231
701-229-3330
jesse_chalich@nprail.com

Obtain information regarding crossing number 698497W from the Federal Railroad Administration website: http://safetydata.fra.dot.gov/Officeofsafety/

107-115 RAILROAD PROTECTIVE LIABILITY INSURANCE – SITE 1: This project crosses the BNSF Railway Company at RP 191.65. The type of work that will be performed within the railroad right of way is milling, paving and pavement marking. Direct inquiries regarding protective liability insurance to:

Rosa Martinez
Marsh USA Inc.
4400 Comerica Bank Tower
1717 Main Street
Dallas, TX 75201-7357, USA
214-303-8519
Rosa.M.Martinez@marsh.com

Obtain information regarding crossing number 102667S from the Federal Railroad Administration website: http://safetydata.fra.dot.gov/Officeofsafety/

107-700 HAUL ROADS: The Engineer will not designate paved roads off the state system as haul roads.

107-P01 HAUL ROAD: Before submitting a proposal, contact the appropriate State, County, Township, City, or Political Subdivision official(s) to determine if the proposed haul road has local load restrictions or is designated as a “No Haul Route”. The entire haul cycle, loaded and empty, will be considered for haul routes.

If the contractor obtains written permission from the applicable local entity and chooses to use a paved road off the state system for this project, the contractor shall be responsible for all costs of the inspection, maintenance, restoration, and release of the haul road.

107-P02 HAUL ROAD RESTORATION: Use Class 13 aggregate for haul road restoration.

202-P01 REMOVAL OF BITUMINOUS SURFACING: Include the cost of the full depth vertical saw cuts adjacent to pavement removal areas, specified in Section 202.04 A "General", in the contract unit price for “Removal of Bituminous Surfacing”.

203-P01 COMMON EXCAVATION-SUBCUT: If shallow pipes are encountered at locations where subcuts are being performed, do not disturb the pipe. Maintain adequate cover over the pipe to prevent damage from vehicle or construction traffic. The depth of subcut may be adjusted at a shallow pipe location if approved by the Engineer.

The aggregate base and earth material removed from subcut or reconstruction areas will be paid for as “Common Excavation – Subcut”. Payment for “Common Excavation – Subcut” will be paid at plan quantity.

260-P01 SILT FENCE: Do not embed silt fence installed in standing water.

261-P01 PERMANENT FIBER ROLLS: If fiber rolls are to remain on the project, use fiber rolls that are composed of plastic or natural fiber photodegradable netting that has a life expectancy between 12 to 24 months. If the photodegradable netting is plastic, the netting color must be either clear or green. Black plastic netting will not be allowed.

302-P01 SUBCUT AND RECONSTRUCTION AREAS: In the areas designated for subcut and reconstruction, the roadbed shall have the existing pavement surface removed, the required earthwork performed, and brought back to grade with suitable backfill and aggregate base.

In addition, the graveled areas will be treated with prime and blotter. The contractor shall be responsible for maintaining these primed gravel sections.

302-P02 AGGREGATE BASE COURSE: Milled material may be used in lieu of Aggregate Base Course CL 5 for section lines, private drives, or field approaches in accordance with Sec 20 detail drawing. This material is provided for the purpose of transitioning from the newly paved approach to the existing aggregate surfaced approach. All labor and equipment required for the placement of these millings shall be paid for as “Aggregate Base Course CL 5”.

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

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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NOTES

411-P01 MILLING PAVEMENT SURFACE: All remaining milled material from the project not used for the production of recycled hot bituminous pavement or aggregate base shall become the property of the NDDOT and be hauled and stockpiled at the NDDOT Maintenance Yard in Cando at 7411 68th Ave NE. Use a pay-loader when pushing up the material on the stockpile. Process the millings so that the maximum particle size does not exceed 1-1/2". Notify the Engineer 72 hours prior to dropping off any millings. Include all costs associated with this work in the contract unit price for "Milling Pavement Surface".

411-P02 TEMPORARY ASPHALT WEDGES: Place temporary asphalt wedges or milled material at the beginning and ends of the project, RR crossings, and at intersecting routes to allow smooth passage of vehicles at these locations. Create a smooth transition before allowing traffic onto the milled section.

Include the cost of the installation, maintenance and removal in the contract unit price of "Milling Pavement Surface."

411-P03 MILLING: Remove pavement to form a full depth vertical edge at the beginning and end of the milling sections. Include the cost of creating the vertical edge in the contract unit price for "Milling Pavement Surface".

411-P04 GRADE REFERENCE AT RAILROAD CROSSINGS: Use a stringline to control the depth of milling at each railroad crossing. Use a stringline for a minimum distance of 200' on each side of the crossing.

Include all costs associated with this additional grade control in the contract unit price bid for "Milling Pavement Surface".

430-P01 PAVING SEAMS: Install a hot seam at all locations when the joint is closer than 11.5' from the centerline of the roadway. Hot seams can be located at any offset distance. A hot seam is defined as a seam created when two pavers are paving at the same time, with no more than 300' between the pavers and rolled in a way to join and hide the seam so it is not visible to the traveling public.

430-P02 CONTRACTOR CORING: Before placing bituminous material into core holes, apply a tack coat on all sides of the core holes as Specified in Section 401.

430-P03 COMPACTION: Compaction of all asphalt pavement placed at subcut and reconstruction areas shall meet the requirements of 430.04 I. 2 "Calculated Density", with a sublot being defined as each lower lift, excluding the top lifts at each subcut or reconstruction area.

The top lifts of paving at these subcut or reconstruction areas are included with the HMA overlay compaction sublots.

430-P04 GRADE REFERENCE AT RAILROAD CROSSINGS: Use a stringline to control the paver screed height at each railroad crossing. Use a stringline for a minimum distance of 200' on each side of the crossing.

Include all costs associated with this additional grade control in the contract unit price bid for "RAP – Superpave FAA 43".

704-255 TRAFFIC CONTROL FOR SHOULDER DROP-OFF: If the shoulder and adjacent driving lane are not even at the end of the day, the following criteria will apply:

Place the following sign assembly at the locations listed below.

Sign Assembly: Sign No. W8-9a-48 "Shoulder Drop Off" and supplemental plate Sign No. W20-52-54 to identify the distance.

Locations:

- In advance of the drop off;
- Spaced at each mile from the advance sign; and
- At major intersections (CMC routes, state and US highways, and Interstate Ramps).

If the difference in elevation between the shoulder and the driving lane is 2" or greater, construct a slough on the driving lane that is 4:1 or flatter.

If the difference in elevation between the shoulder and driving lane is less than 2", no slough is required.

Sign assemblies will be measured and paid for according to Section 704 "Temporary Traffic Control".

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NOTES

704-P01 TRAFFIC CONTROL: Provide traffic control consisting of a lane closure, flagging, pilot car and shoulder closures.

Traffic control device quantities are based on a 6 mile limitation and the list below.

1. D-704-15, Type A: To be used for the milling, paving and installation of centerline rumble strips.
2. D-704-19, Type F: Traffic control for the subcut and reconstruction areas. Use stackable vertical panels in place of drums for the roadway centerline devices.
3. D-704-20, Type G: For project terminal signing.
4. D-704-22, Type K and L: For construction trucks entering from an aggregate source or a contractor jobsite.
5. D-704-24, Type T: For shoulder preparation operations.
6. D-704-26, Type CC, EE, GG and JJ

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

706-P01 LABORATORY: Provide laboratories wired for DSL Broadband internet with Wi-Fi and have the capability to allow for hard wiring the computer.

Include the cost of the installation and monthly fee in the contract unit price of the laboratory.

762-050 PAVEMENT MARKING: If the Engineer and Contractor agree, plan quantity will be used as the measurement for payment for pavement markings.

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	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-281(118)190	6	4

ENVIRONMENTAL COMMITMENTS

ENVIRONMENTAL COMMITMENTS (EC): The North Dakota Department of Transportation and the Federal Highway Administration have made environmental commitments to secure approval of this project. The environmental commitments are as follows:

EC-1: Unavoidable permanent impacts will be mitigated onsite, adjacent to the project, or at a NDDOT approved mitigation site or bank in accordance with the mitigation guidance [2, 3].

ACTION REQUIRED /TAKEN: No permanent wetland impacts will result from construction. Temporary impact areas will be graded to preconstruction contours.

Wetland Impact Table

Wetland Number	Location	Cowardin Class.	Wetland Type	Wetland Size (acres)	Wetland Feature	USACE Jurisdictional Wetlands [1]	Wetland Impacts (acres)		USFWS Easement Impacts (acres)		Wetland Mitigation								
											Mitigation Required			Bank		Onsite			
							Temp.	Perm.	Temp.	Perm.	EO 11990	USACE	USFWS	Location	acres	Mitigation Location; Ratio	acres	Constructed Site #	Constructed size (acres)
10b	Sec. 36, T160N, R67W	PEMF	Basin	0.50	Natural	No	0.00	0.00	0	0	N	N	N						
10c	Sec. 1, T159N, R67W	PEMCx	Ditch	0.46	Artificial	No	0.00	0.00	0	0	N	N	N						
10d	Sec. 1, T159N, R67W	PEMF	Basin	0.08	Natural	No	0.00	0.00	0	0	N	N	N						
12	Sec. 6, T158N, R66W	PEMC	Basin	0.08	Natural	No	0.00	0.00	0	0	N	N	N						
13a	Sec. 6, T159N, R66W	PEMC	Basin	0.39	Natural	Yes	0.05	0.00	0	0	N	N	N						
13b	Sec. 5, T159N, R66W	PEMC	Basin	0.18	Natural	Yes	0.02	0.00	0	0	N	N	N						
			Totals	**1.69**			**0.07**	**0.00**	**0.0**	**0.0**					**0.0**		**0.0**		**0.0**

[1] A wetland Jurisdictional Determination was issued by the USACE on 3/1/2016; NWO-2015-2234-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.

Summary Impact Table

Total Permanent Impact Summary		Temporary Impacts and additional information	
Wetland Type	**Total (Acres)**	**Wetland Type**	**Total (Acres/Lf)**
Natural/JD	0.00	**Temporary JD**	0.07
Natural/Non-JD	0.00	**Non-JD Temporary**	0.00
Artificial/JD	0.00	**Permanent JD > 0.10**	0.00
Artificial /Non-JD	0.00	**Permanent OW**	0.00
Total	**0.00**	**Temporary OW**	0.00

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
103	0100	CONTRACT BOND	L SUM	1	1
107	0103	RAILWAY PROTECTION INSURANCE-SITE 1	EA	1	1
107	0104	RAILWAY PROTECTION INSURANCE-SITE 2	EA	1	1
202	0132	REMOVAL OF BITUMINOUS SURFACING	SY	5,100	5,100
203	0109	TOPSOIL	CY	1,270	1,270
203	0121	TOPSOIL-WETLAND	CY	53	53
203	0138	COMMON EXCAVATION-SUBCUT	CY	8,350	8,350
216	0100	WATER	M GAL	335	335
230	0125	SHOULDER PREPARATION	MILE	23.052	23.052
251	0200	SEEDING CLASS II	ACRE	1.572	1.572
251	1000	WETLAND SEED	ACRE	0.065	0.065
251	2000	TEMPORARY COVER CROP	ACRE	1.572	1.572
253	0101	STRAW MULCH	ACRE	3.144	3.144
255	0102	ECB TYPE 2	SY	44	44
260	0100	SILT FENCE UNSUPPORTED	LF	1,230	1,230
260	0101	REMOVE SILT FENCE UNSUPPORTED	LF	1,230	1,230
261	0112	FIBER ROLLS 12IN	LF	3,060	3,060
261	0113	REMOVE FIBER ROLLS 12IN	LF	905	905
302	0120	AGGREGATE BASE COURSE CL 5	TON	14,296	14,296
401	0050	TACK COAT	GAL	25,859	25,859
401	0060	PRIME COAT	GAL	1,244	1,244
411	0105	MILLING PAVEMENT SURFACE	SY	250,997	250,997
430	0143	RAP - SUPERPAVE FAA 43	TON	42,047	42,047
430	1000	CORED SAMPLE	EA	276	276
430	5828	PG 58-28 ASPHALT CEMENT	TON	1,976.2	1,976.2
702	0100	MOBILIZATION	L SUM	1	1
704	0100	FLAGGING	MHR	1,200	1,200
704	1000	TRAFFIC CONTROL SIGNS	UNIT	2,962	2,962
704	1060	DELINEATOR DRUMS	EA	29	29
704	1067	TUBULAR MARKERS	EA	245	245
704	1080	STACKABLE VERTICAL PANELS	EA	66	66
704	1185	PILOT CAR	HR	400	400
706	0500	AGGREGATE LABORATORY	EA	1	1

ESTIMATE NUMBER: 16651 RUN DATE: 02/05/2016 TIME: 10:47:15

ESTIMATE OF QUANTITIES

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-281(118)190	8	2

SPEC	CODE	ITEM DESCRIPTION	UNIT	MAINLINE	TOTAL
706	0550	BITUMINOUS LABORATORY	EA	1	1
706	0600	CONTRACTOR'S LABORATORY	EA	1	1
709	0100	GEOSYNTHETIC MATERIAL TYPE G	SY	1,916	1,916
709	0151	GEOSYNTHETIC MATERIAL TYPE R1	SY	4,194	4,194
754	0805	OBJECT MARKERS - CULVERTS	EA	2	2
760	0005	RUMBLE STRIPS - ASPHALT SHOULDER	MILE	22.03	22.03
760	0007	RUMBLE STRIPS - ASPHALT CENTERLINE	MILE	11.015	11.015
760	0009	RUMBLE STRIPS - INTERSECTION	EA	1	1
762	0103	PVMT MK PAINTED-MESSAGE	SF	674	674
762	0430	SHORT TERM 4IN LINE-TYPE NR	LF	80,056	80,056
762	1104	PVMT MK PAINTED 4IN LINE	LF	141,494	141,494
762	1108	PVMT MK PAINTED 8IN LINE	LF	1,040	1,040
762	1124	PVMT MK PAINTED 24IN LINE	LF	48	48

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
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BASIS OF ESTIMATE

Unit Weights
HMA @ 2 Tons / CY
Aggregate Base Course @ 1.875 Tons / CY

Application Rates
Prime Coat – 0.25 Gal / SY
Blotter Material – 15 lbs / SY
Tack Coat – 0.05 Gal / SY
PG 58-28 Asphalt Cement – 4.7% of RAP Superpave FAA 43

Water
50 MGal for Dust Palliative
20 Gal / Ton for Aggregate Base Course

1" Mill & 3" RAP Superpave FAA 43 Overlay with Select Subcuts and Reconstruction Areas

Begin Reference Point	Begin Station	End Reference Point	End Station	Length	Width	Milling Pavement Surface	Area of Superpave	Superpave @ 2 Tons/CY	Asphalt Cement @ 4.7%	Tack Coat @ 0.05 Gal/SY	Aggregate Base Course CL 5 @ 1.875 Tons/CY	Prime Coat @ 0.25 Gal/SY
				FT	*FT*	*SY*	*SF*	*TON*	*TON*	*GAL*	*TON*	*GAL*
190.709	10069+45	191.600	10116+50	4,705	37.0	19,343	8.867	3,090	145.2	1,934	-	-
191.685	10121+00	193.268	10204+38	8,338	37.0	34,276	8.867	5,476	257.4	3,428	-	-
193.343	10208+38	199.305	10522+51	31,413	37.0	129,142	8.867	20,633	969.7	12,914	-	-
199.373	10526+06	200.100	10564+70	3,865	37.0	15,887	8.867	2,538	119.3	1,589	-	-
200.360	10579+00	202.090	10670+50	9,150	37.0	37,617	8.867	6,010	282.5	3,762	-	-
RR Crossing: RP 191.600 to RP 191.685 (Quantities from Section 90)						1,964	-	280	13.2	197	-	-
Subcut: RP 193.268 to RP 193.343 (Quantities from Section 90)						-	-	505	23.7	161	6,780	439
Subcut: RP 199.305 to RP 199.373 (Quantities from Section 90)						-	-	448	21.1	143	5,780	390
Intersection: RP 200.100 to RP 200.360 (Quantities from Section 90)						8,515	-	1,352	63.5	851	-	-
Intersection: RP 202.090 to RP 202.235 (Quantities from Section 90)						4,252	-	1,319	62.0	675	1,500	415
Approach Locations (Quantities from Section 20)						-	-	396	18.6	205	236	-
			Totals =			**250,997**	**-**	**42,047**	**1,976.2**	**25,859**	**14,296**	**1,244**

HMA Cored Samples

Specification Section	Location	A Distance (Ft) ÷ 2000	B Lanes	C Lifts	D Sublots (A x B x C)	(D x 2)	(1 per mile)	
430.04 I.2.b(1), "General"	Subcuts	2	2	1	4	8	-	EA
	Reconstruction	1	2	2	4	8	-	EA
	Overlay	31	2	2	124	248	-	EA
430.04 I.2.b(2), "Pavement Thickness Determination Cores"						N/A	12	EA
					Total	**264**	**12**	**EA**

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-281(118)190	10	2

BASIS OF ESTIMATE

Short Term 4 IN Line - Type NR			
Milled Surface	Centerline Skips @ 1,320 LF / Mile Barrier Stripe @ 5,280 LF / Mile	20,014	LF
Top of First Lift	Centerline Skips @ 1,320 LF / Mile Barrier Stripe @ 5,280 LF / Mile	20,014	LF
Top of Second Lift	Centerline Skips @ 1,320 LF / Mile Barrier Stripe @ 5,280 LF / Mile	20,014	LF
Centerline Rumble Strips: Grinding/Fogging	Centerline Skips @ 1,320 LF / Mile Barrier Stripe @ 5,280 LF / Mile	20,014	LF
Pavement Marking Painted 4 IN Line			
Center Line	Skips @ 1,320 LF / Mile Barrier Stripe @ 5,280 LF / Mile	20,014	LF
Edge Line	5,280 LF / Mile	121,480	LF
Pavement Marking Painted 8 IN Line			
NB Right Turn Lane @ East Jct. ND 66 - RP 200.226		300	LF
EB Right Turn Lane @ East Jct. ND 66 - RP 200.226		370	LF
WB Right Turn Lane @ West Jct. ND 66 - RP 202.235		370	LF
Pavement Marking Painted 24 IN Line			
NB US 281 @ East Jct. ND 66 RP 200.226		24	LF
SB US 281 @ West Jct. ND 66 RP 202.235		24	LF
Pavement Marking Painted - Message			
RR Crossing @ RP 191.644	RR Cross & 2 R's X 2 Locations 3 Bands X 2 Locations	265	SF
RR Crossing @ RP 200.134	RR Cross & 2 R's X 2 Locations 3 Bands X 2 Locations	265	SF
NB Right Turn Lane @ East Jct. ND 66 - RP 200.226	3 Arrows @ 16 SF Each	48	SF
EB Right Turn Lane @ East Jct. ND 66 - RP 200.226	3 Arrows @ 16 SF Each	48	SF
WB Right Turn Lane @ West Jct. ND 66 - RP 202.235	3 Arrows @ 16 SF Each	48	SF

Milling Summary			
Description	**Basis of Estimate**	**Quantity**	**Unit**
Available Millings	2 Tons/CY of Milled Material	13,355	Ton
Millings Required for RAP	25% of HMA Quantity	10,512	Ton
Excess Millings		2,843	Ton

Rumble Strips			
Description	**Basis of Estimate**	**Quantity**	**Unit**
Asphalt Shoulder RP 191.22 to 202.235	2 Shoulders / Mile	22.030	Mile
Asphalt Centerline RP 191.22 to 202.235	1 Centerline / Mile	11.015	Mile
Intersection East Jct. ND 66		1	Each

Shoulder Preparation			
Description	**Basis of Estimate**	**Quantity**	**Unit**
RP 190.709 to 202.235	2 Shoulders / Mile	23.052	Mile

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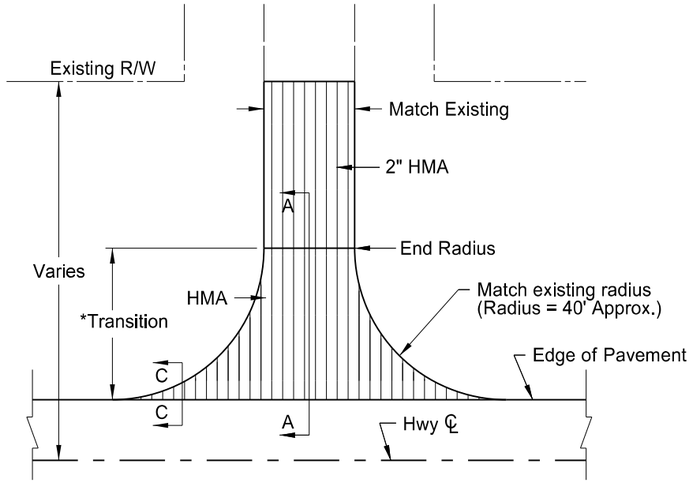
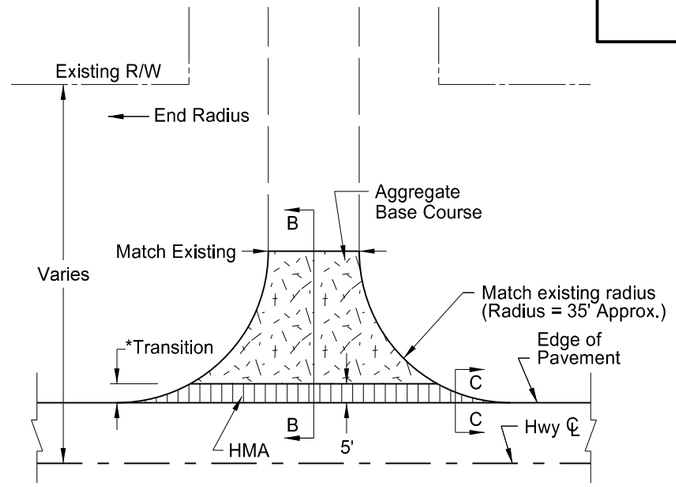
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-281(118)190	20	1



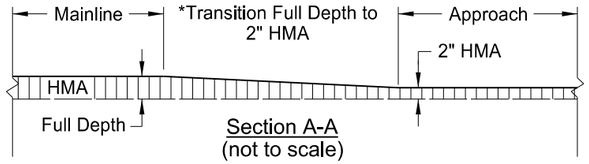
(1) Paved Section Line, County Road, or Street Approach



(2) Gravel Section Line, County Road, or Street Approach

Notes:

1. Actual HMA paving and aggregate base course locations may vary in the field, as approved by the Engineer.
2. Quantity totals have been included in the bid items of the "Estimate of Quantities" of the plans.
3. Aggregate base course has been provided in the quantities to fill in around the radii. This material will be required when sloughs are steeper than 4:1 (see section C-C)



Section A-A
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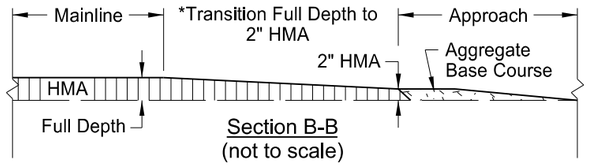

Section B-B
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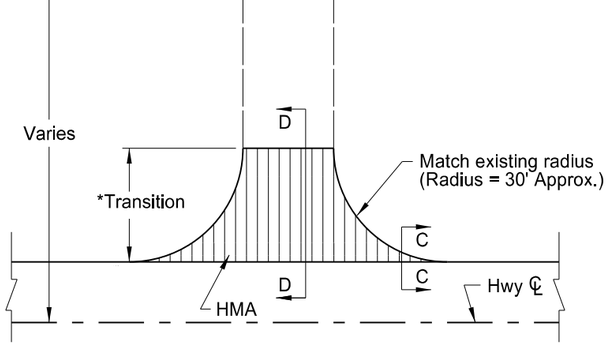
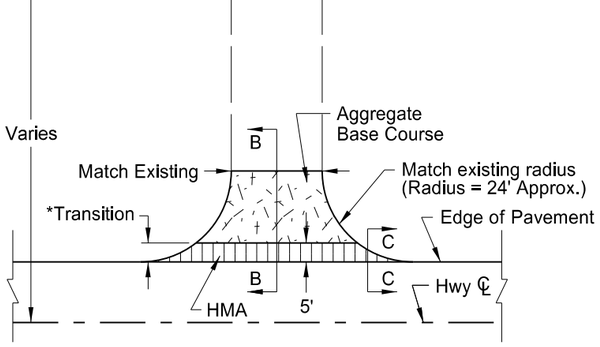
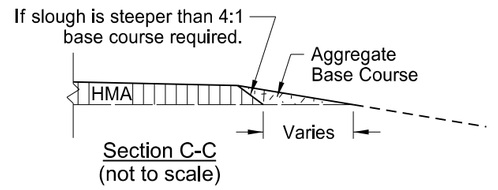


(3) Paved Private Drive Approach



(4) Gravel Private or Field Drive Approach



Section C-C
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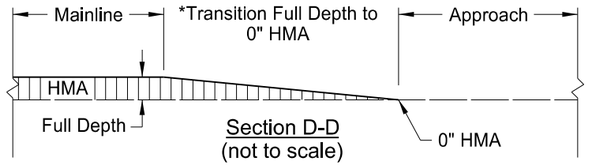

Section D-D
(not to scale)

BASIS OF ESTIMATE		(1)	(2)	(3)	(4)	
ITEM	UNIT	Paved Section Line	Gravel Section Line	Paved Private Drive	Gravel Field/ Private Drive	TOTALS
Number of Locations	#	1	8	12	41	62
Aggregate Base Course CL 5	TON	N/A	9	N/A	4	236
Tack Coat	GAL	15	3	7	2	205
RAP Superpave FAA 43	TON	40	6	12	4	396

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Approach Paving Details for Preventive Maintenance or Minor Rehabilitation Projects

US Hwy 281

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-281(118)190	20	2

Approach Locations							
RP	Direction	Type	Notes	RP	Direction	Type	Notes
190.724	SB	Paved Private Dr		197.406	NB/SB	Field Drive	
190.769	NB	Paved Private Dr		197.664	NB/SB	Field Drive	
190.775	SB	Paved Private Dr		197.798	NB	Field Drive	
190.838	NB	Field Drive		198.242	NB/SB	Gravel Section Line	82nd St NE
190.838	SB	Gravel Private Dr		198.287	NB	Paved Private Dr	
191.223	NB/SB	Gravel Section Line	75th St NE	198.432	NB	Field Drive	
191.253	NB	Paved Private Dr		198.738	SB	Field Drive	
191.298	SB	Field Drive		198.838	SB	Field Drive	
191.333	SB	Field Drive		198.848	NB	Field Drive	
191.364	NB	Field Drive		199.240	NB	Paved Private Dr	
191.378	SB	Field Drive		199.240	SB	Field Drive	
191.890	NB/SB	Field Drive		199.406	NB	Field Drive	
192.240	NB/SB	Paved Private Dr		199.731	SB	Field Drive	
192.288	SB	Paved Private Dr		199.740	NB	Field Drive	
192.529	NB/SB	Field Drive		200.089	NB	Gravel Private Dr	
192.986	SB	Field Drive		200.089	SB	Field Drive	
193.236	NB	Field Drive		200.159	NB	Field Drive	
193.236	SB	Gravel Section Line	77th St NE	200.393	EB	Field Drive	
193.617	NB	Paved Private Dr		200.844	EB/WB	Field Drive	
193.707	SB	Field Drive		201.249	EB/WB	Gravel Section Line	66th Ave NE
193.853	NB	Paved Private Dr		201.373	WB	Field Drive	
193.862	SB	Paved Private Dr		201.617	EB	Paved Private Dr	
193.977	NB	Field Drive		201.796	WB	Gravel Private Dr	
193.997	SB	Field Drive		201.981	WB	Field Drive	
194.238	NB/SB	Gravel Section Line	78th St NE	202.235	EB	Gravel Section Line	65th Ave NE
194.723	NB	Paved Street Approach					
194.723	SB	Gravel Private Dr					
195.226	NB	Gravel Section Line	79th St NE				
195.226	SB	Gravel Private Dr					
195.806	NB/SB	Field Drive					
196.101	NB	Field Drive					
196.121	SB	Field Drive					
196.238	NB/SB	Field Drive	80th St NE				
196.599	NB	Field Drive					
196.916	NB/SB	Field Drive					
197.241	NB	Gravel Section Line	81th St NE				
197.241	SB	Field Drive					

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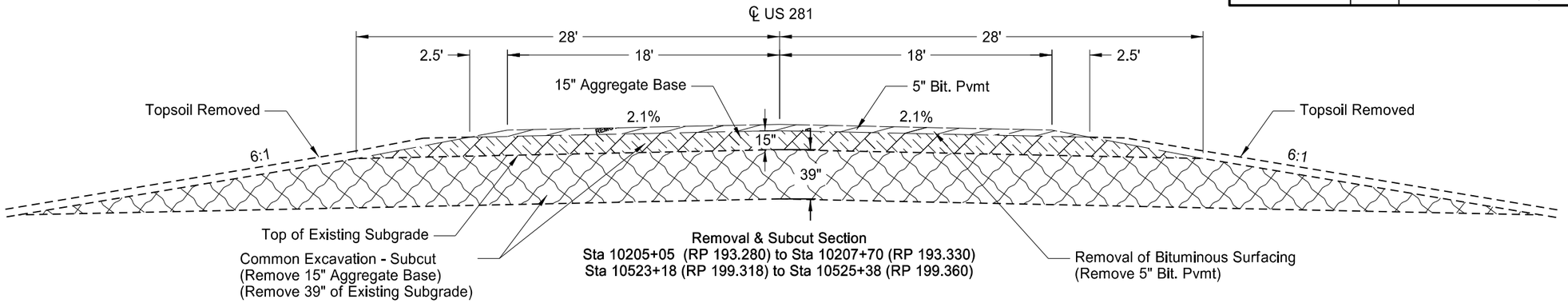
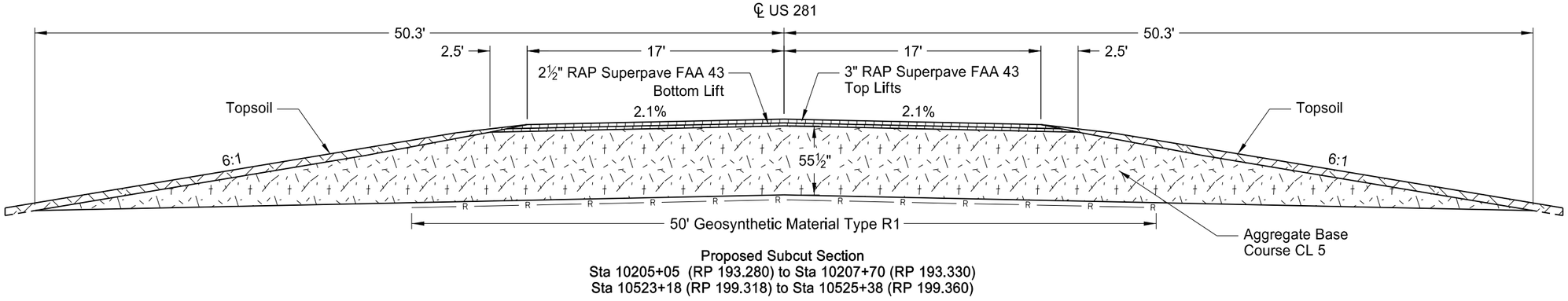
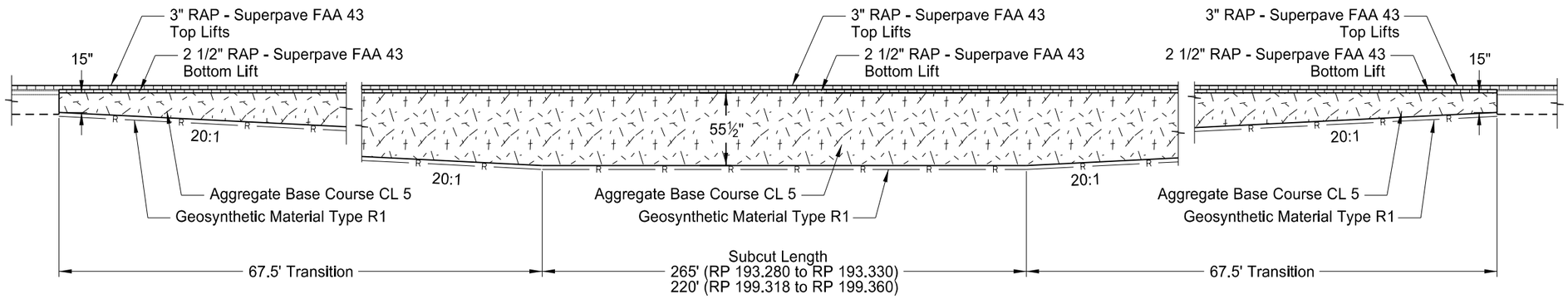
Approach Locations

US Hwy 281

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-281(118)190	20	3







Proposed Subcut Profile View

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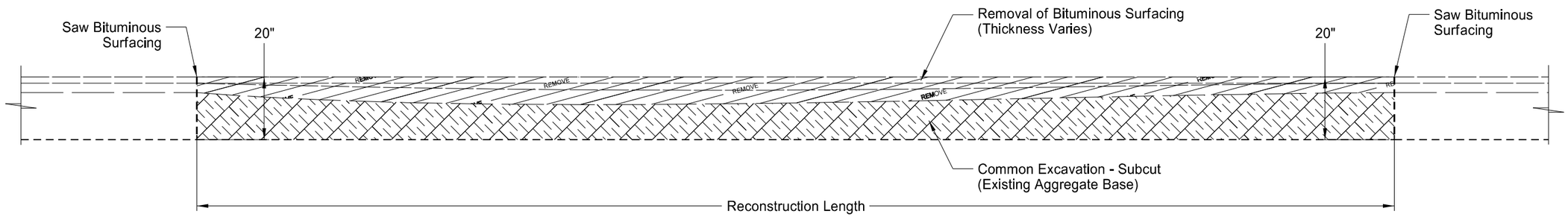
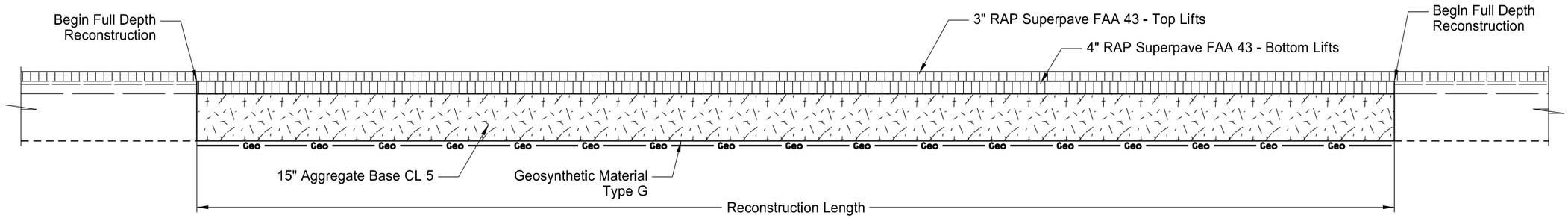
Subcut & Subgrade Repair Details

US Hwy 281
RP 193.280 to RP 193.330
RP 199.318 to RP 199.360

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-281(118)190	20	4



Removal Detail



Reconstruction Detail

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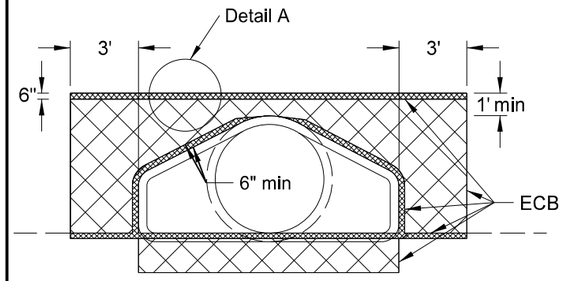
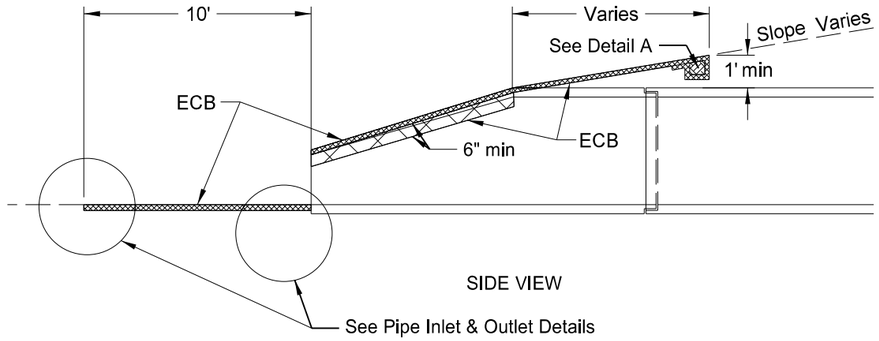
Reconstruction Details

US Hwy 281 @ West Jct. ND 66
RP 202.215 to RP 202.235

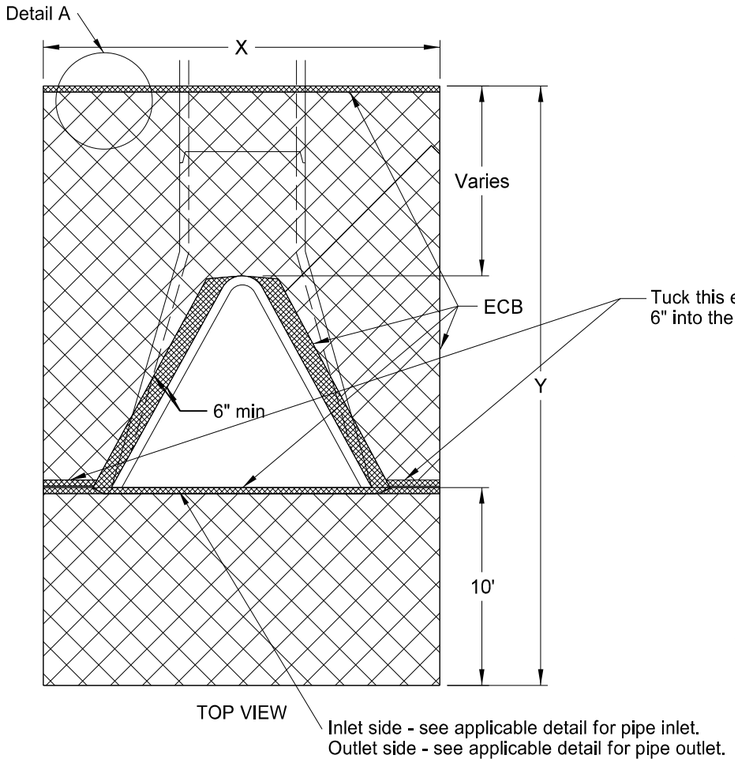
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-281(118)190	20	5



FRONT VIEW

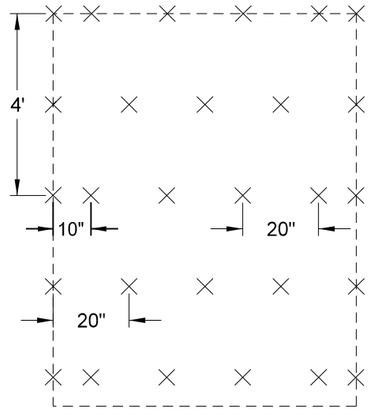


SIDE VIEW



TOP VIEW

NOTE: Tuck the ECB a minimum of 6" into the embankment (against the flared end section) around the opening of the flared end section.



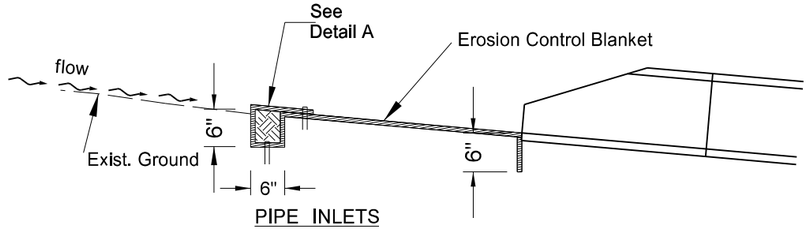
STAPLE PATTERN

Erosion Control Blanket (ECB)								
Location to be Protected Station	Culvert Type Appr/CL	Pipe Diam (Inch)	No	Unit Quantity (SY)	Total Quantity Type 1 (SY)	Type 2 (SY)	Type 3 (SY)	Type 4 (SY)
10524+28	CL	24	2	22		44		
Total (SYs)						44		

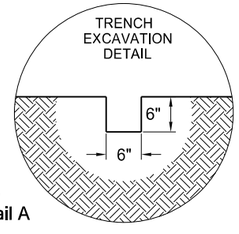
APPROACH CULVERTS				
DIA In	X Ft	Y Ft	Surface area to be protected SF	ECB SY
15	9.0	20.0	176.0	20
18	9.5	20.7	190.7	22
21	9.5	21.0	190.9	22
24	10.5	21.6	214.1	24
27	11.0	22.0	226.3	25
30	11.6	22.5	241.5	27
36	12.7	23.3	268.8	30
42	13.3	23.3	279.7	31
48	13.8	24.0	293.2	33
54	14.5	23.4	300.6	34
60	15.0	23.0	307.5	35
66	15.6	24.0	325.6	37
72	16.2	24.5	340.6	38
Note: Quantities based on 8:1 slope.				

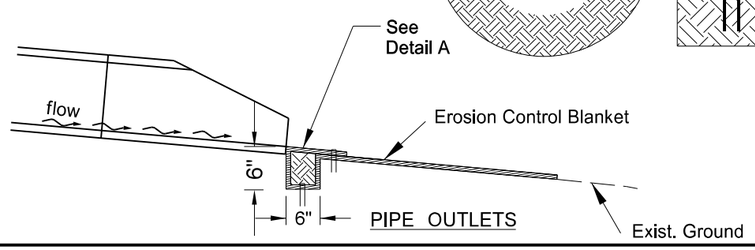
CENTERLINE CULVERTS				
DIA In	X Ft	Y Ft	Surface area to be protected SF	ECB SY
24	10.5	19.6	193.1	22
27	11.0	20.0	204.3	23
30	11.6	20.5	218.3	25
36	12.7	21.2	242.1	27
42	13.3	21.2	251.8	28
48	13.8	22.0	265.6	30
54	14.5	21.5	273.7	31
60	15.0	21.0	278.3	31
66	15.6	22.0	295.7	33
72	16.2	22.5	309.2	35
Note: Quantities based on 6:1 slope.				

CENTERLINE CULVERTS				
DIA In	X Ft	Y Ft	Surface area to be protected SF	ECB SY
24	10.5	27.6	172.1	20
27	11.0	18.0	182.3	21
30	11.6	18.5	195.1	22
36	12.7	19.2	216.7	24
42	13.3	19.2	225.2	25
48	13.8	20.0	238.0	27
54	14.5	19.5	244.7	28
60	15.0	19.0	248.3	28
66	15.6	20.0	264.5	30
72	16.2	20.5	276.8	31
Note: Quantities based on 4:1 slope.				



PIPE INLETS





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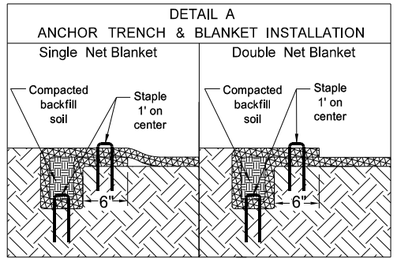

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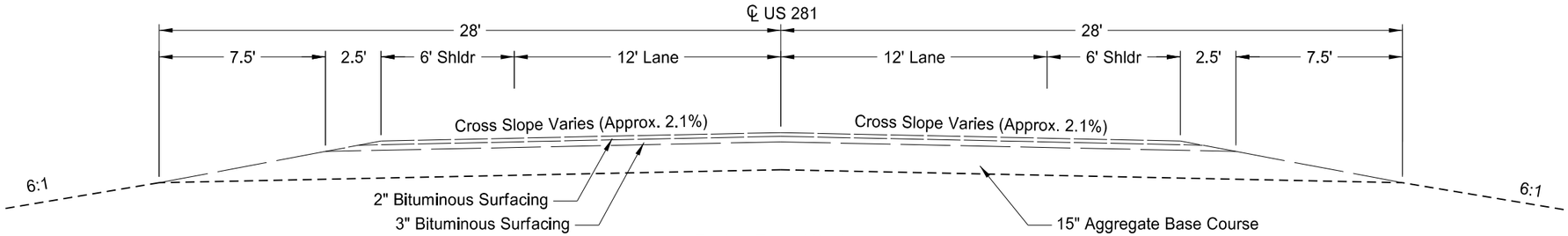
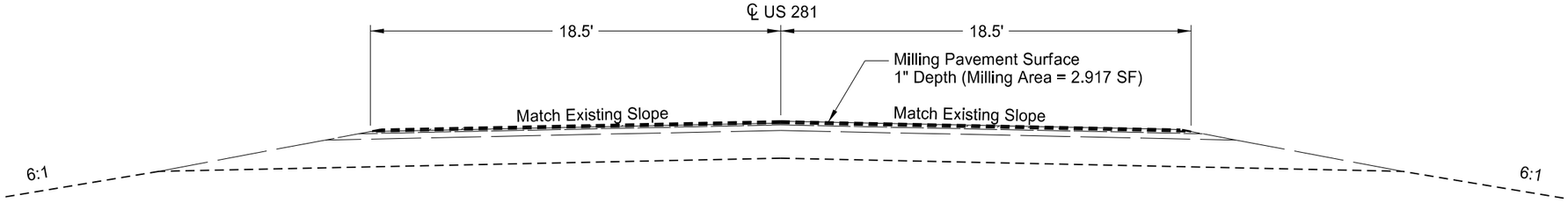
Erosion Control at Culvert End Sections

US Hwy 281

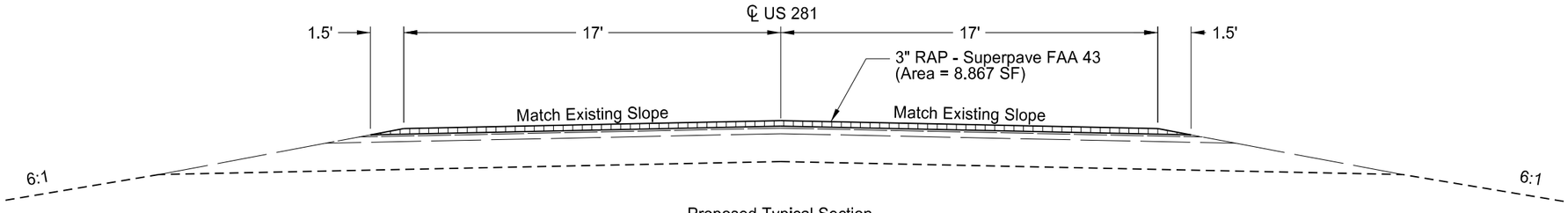
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-281(118)190	30	1



Existing Typical Section
US 281
Sta 10069+45.0 to Sta 10677+10.0
RP 190.709 to RP 202.215



Milling Typical Section
US 281
Sta 10069+45.0 to Sta 10677+10.0
RP 190.709 to RP 202.215



Proposed Typical Section
US 281
Sta 10069+45.0 to Sta 10677+10.0
RP 190.709 to RP 202.215

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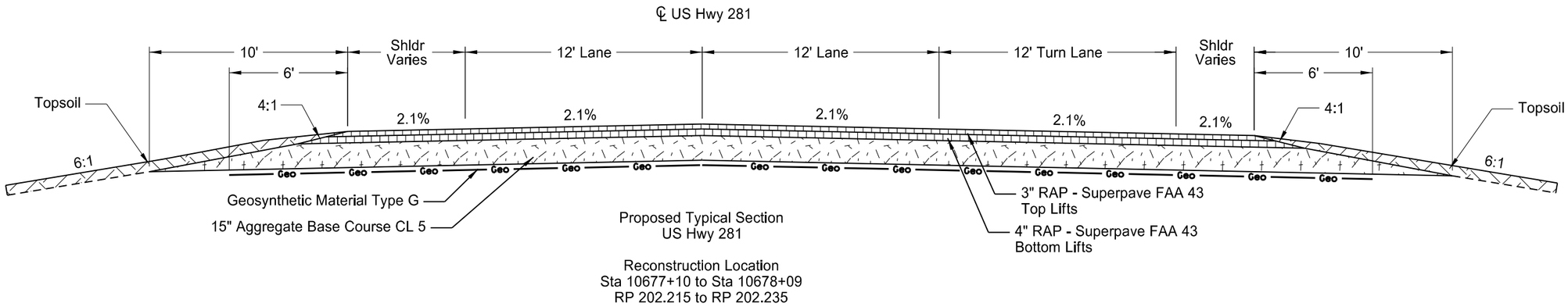
Typcial Sections

US Hwy 281

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-281(118)190	30	2



Proposed Typical Section
US Hwy 281

Reconstruction Location
Sta 10677+10 to Sta 10678+09
RP 202.215 to RP 202.235

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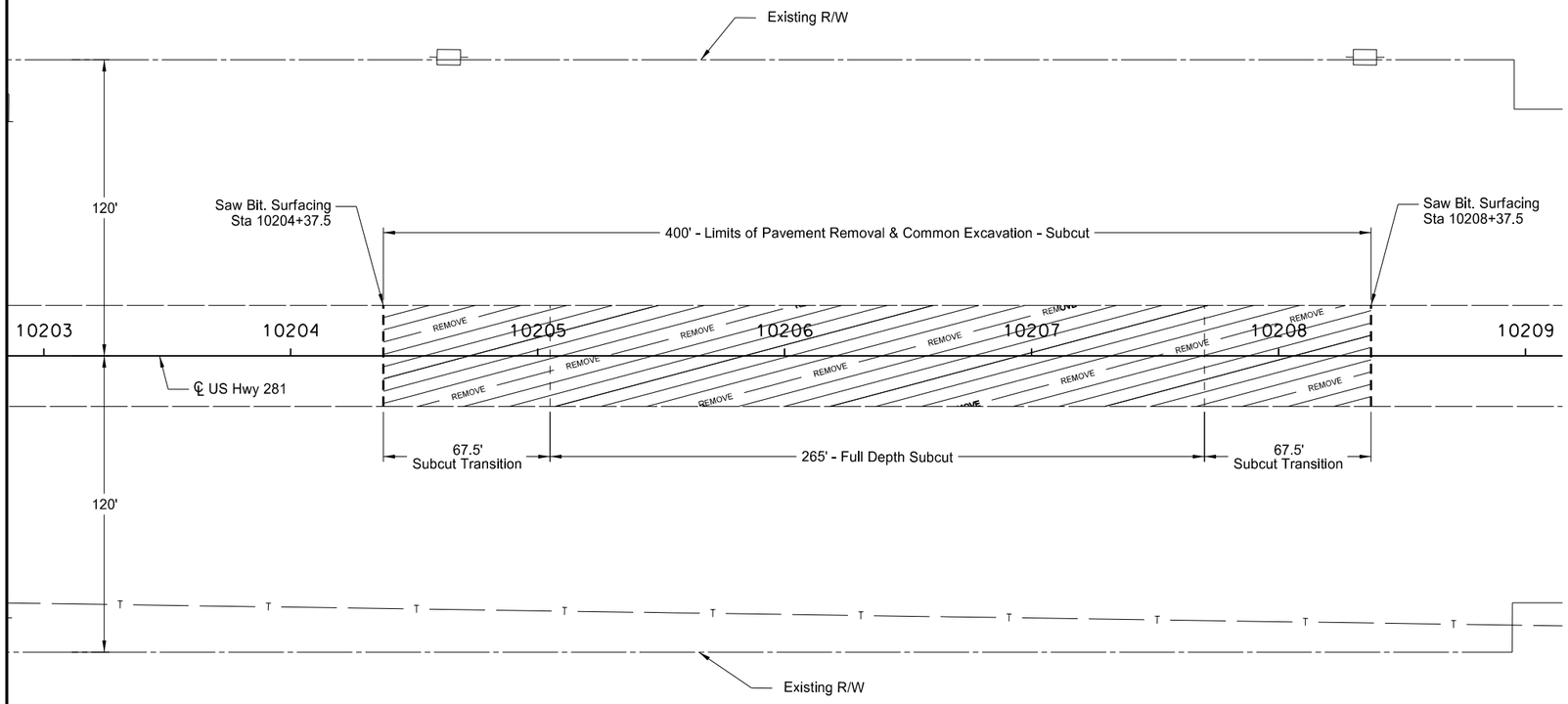
Proposed Reconstruction Typical Section

US Hwy 281 @ West Jct. ND 66
RP 202.215 to RP 202.235

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-281(118)190	40	1

SPEC	CODE	BID ITEM	UNIT	QUANTITY
202	132	REMOVAL OF BITUMINOUS SURFACING		
		Sta 10204+37.5 to Sta 10208+37.5	SY	1822
203	138	COMMON EXCAVATION - SUBCUT		
		Sta 10204+37.5 to Sta 10208+37.5	CY	4038

Sec 6
T-158-N
R-66-W



Sec 5
T-158-N
R-66-W

Removal of Bituminous Surfacing
& Common Excavation - Subcut

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Subcut
RP 193.268 to RP 193.343

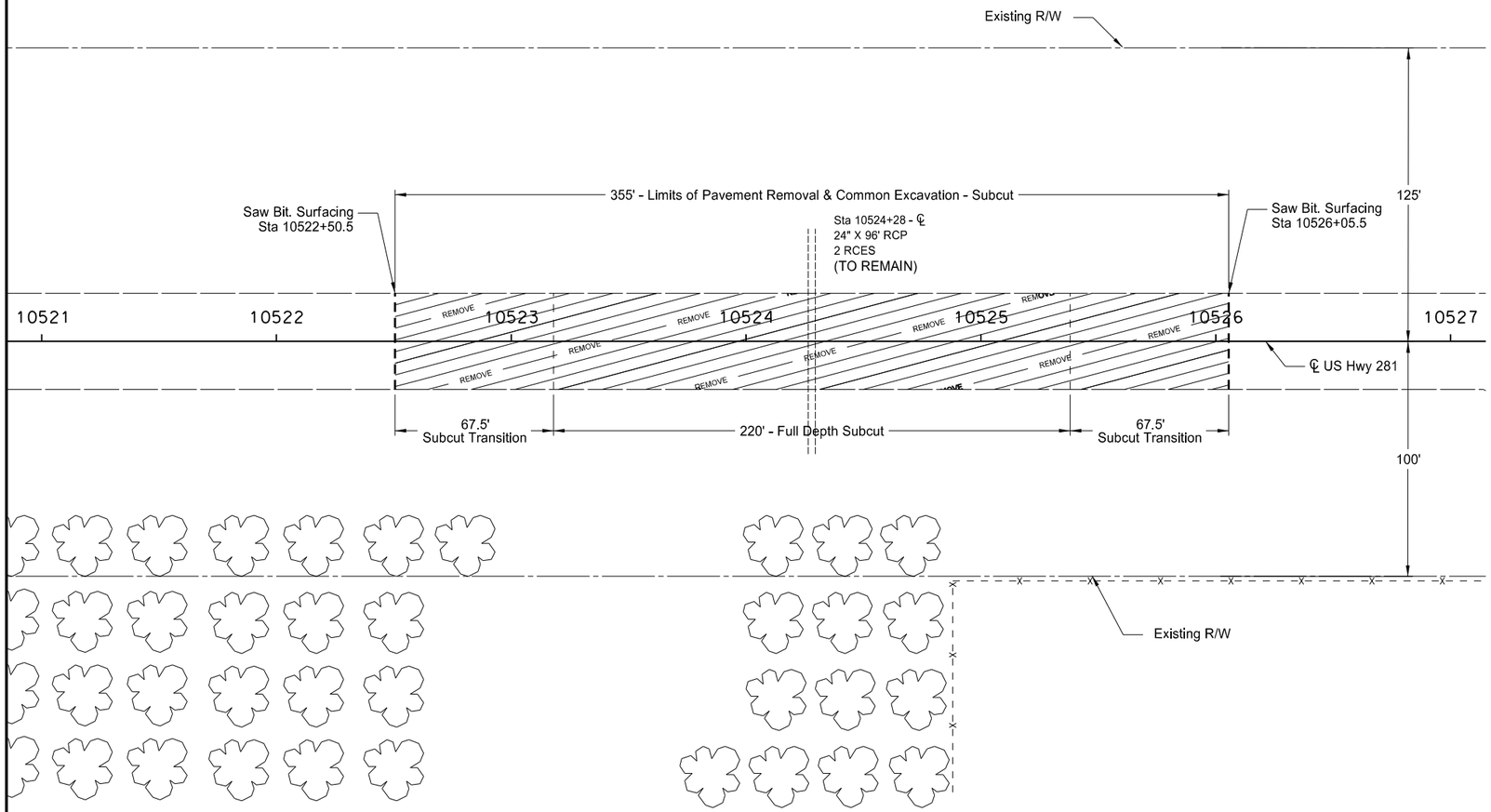
US Hwy 281

Cando North to West Jct 66

2/11/2016 11:21:33 AM jrensch R:\project\30281190.118\design\Sheets\040RM_001_SouthSubcut.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-281(118)190	40	2

SPEC	CODE	BID ITEM	UNIT	QUANTITY
202	132	REMOVAL OF BITUMINOUS SURFACING		
		Sta 10522+50.5 to Sta 10526+05.5	SY	1617
203	138	COMMON EXCAVATION - SUBCUT		
		Sta 10522+50.5 to Sta 10526+05.5	CY	3512



REMOVE
REMOVE

Removal of Bituminous Surfacing
& Common Excavation - Subcut

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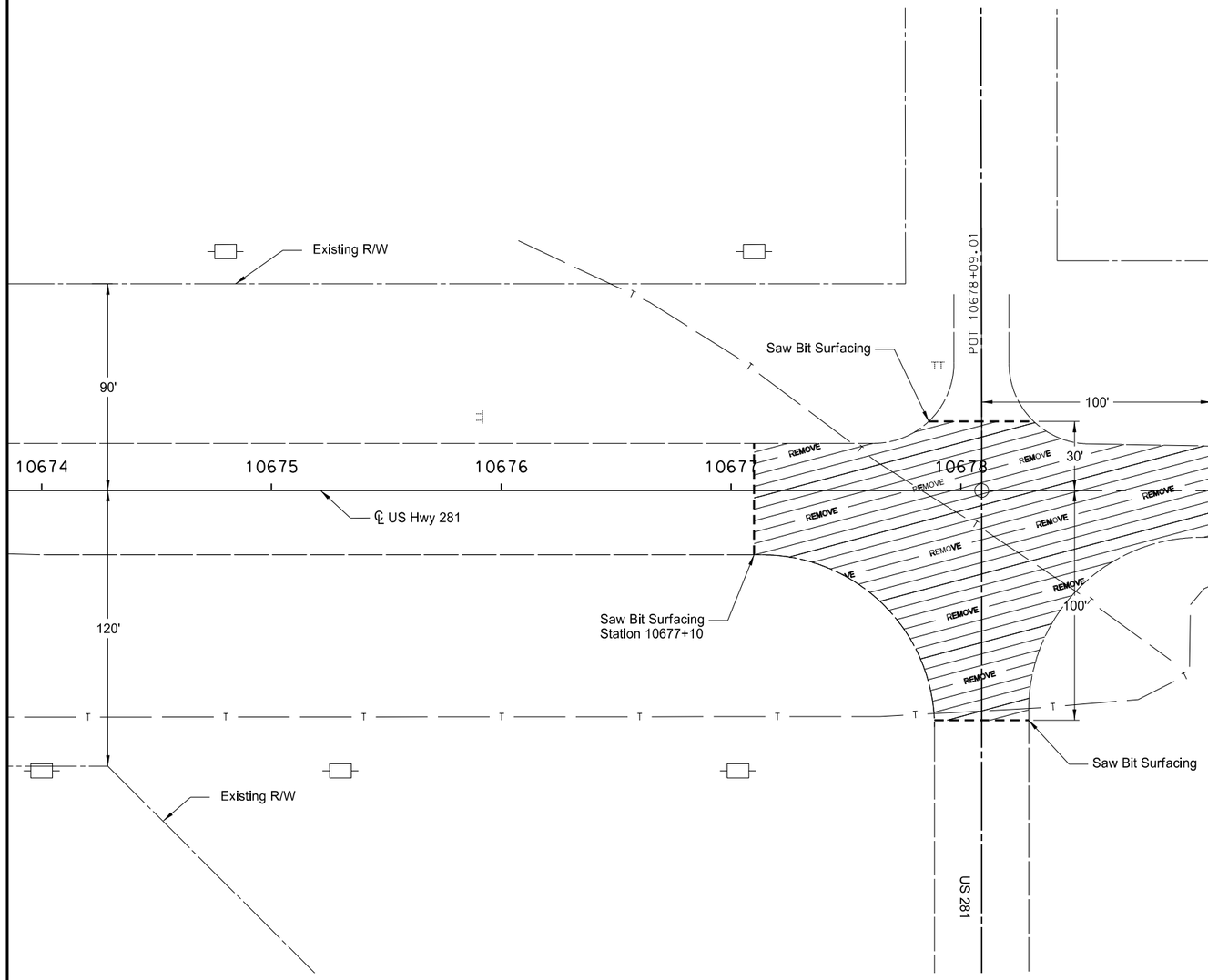
Subcut
RP 199.305 to RP 199.373

US Hwy 281

Cando North to West Jct 66

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-281(118)190	40	3

SPEC	CODE	BID ITEM	UNIT	QUANTITY
202	132	REMOVAL OF BITUMINOUS SURFACING		
		Reconstruction Area	SY	1661
203	138	COMMON EXCAVATION - SUBCUT		
		Reconstruction Area	CY	800



REMOVE
REMOVE

Removal of Bituminous Surfacing
& Common Excavation - Subcut

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Reconstruction
RP 202.215 to RP 202.235

US Hwy 281

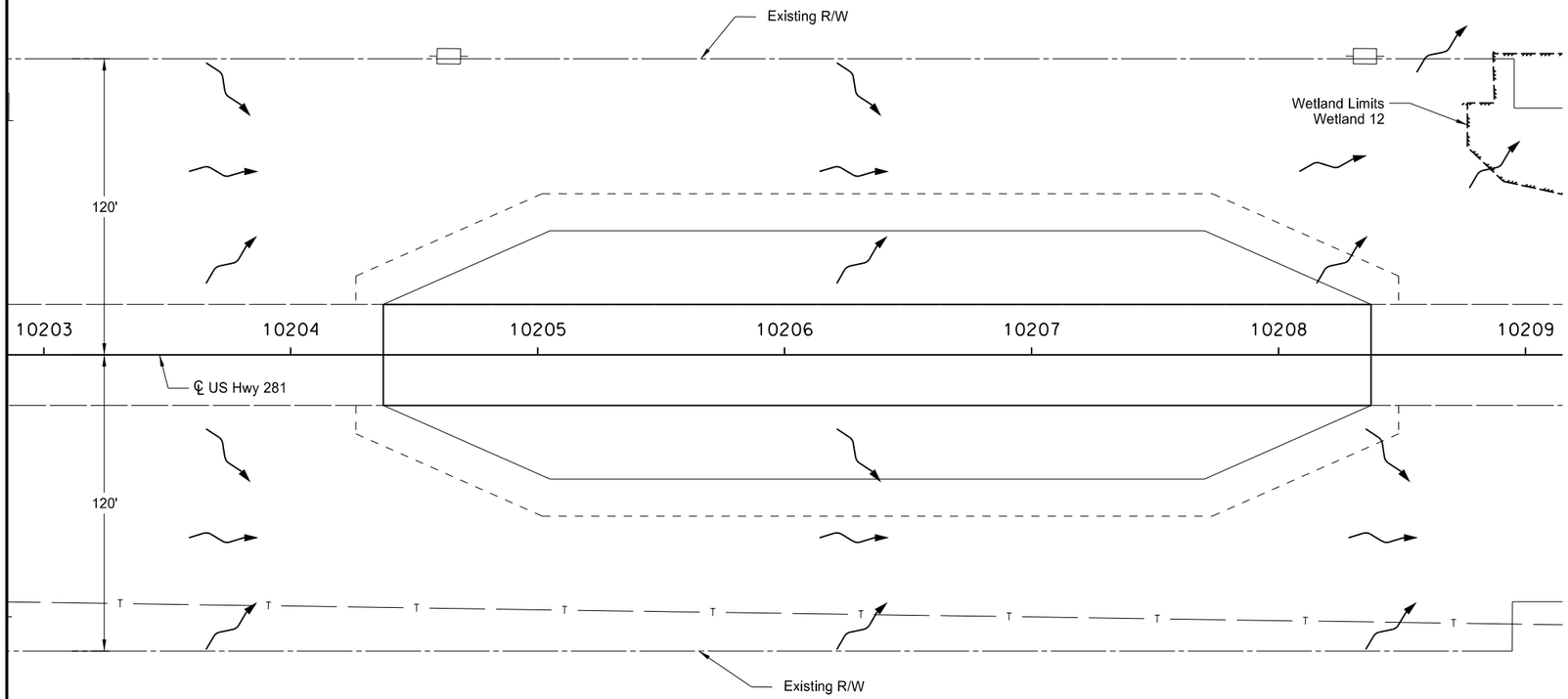
Cando North to West Jct 66

2/11/2016 11:21:36 AM jrensch R:\project\30281190.118\design\Sheets\040RM_003_ND66Intersection.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-281(118)190	75	1

WETLAND IMPACT TABLE		
Wetland Number	Temporary Impact	Permanent Impact
12	0.000 acres	0.000 acres
Total	0.000 acres	0.000 acres

Sec 6
T-158-N
R-66-W



LEGEND

Temporary Wetland Impacts

Permanent Wetland Impacts

Sec 5
T-158-N
R-66-W

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Wetland Impacts
RP 193.268 to RP 193.343

US Hwy 281

Cando North to West Jct 66

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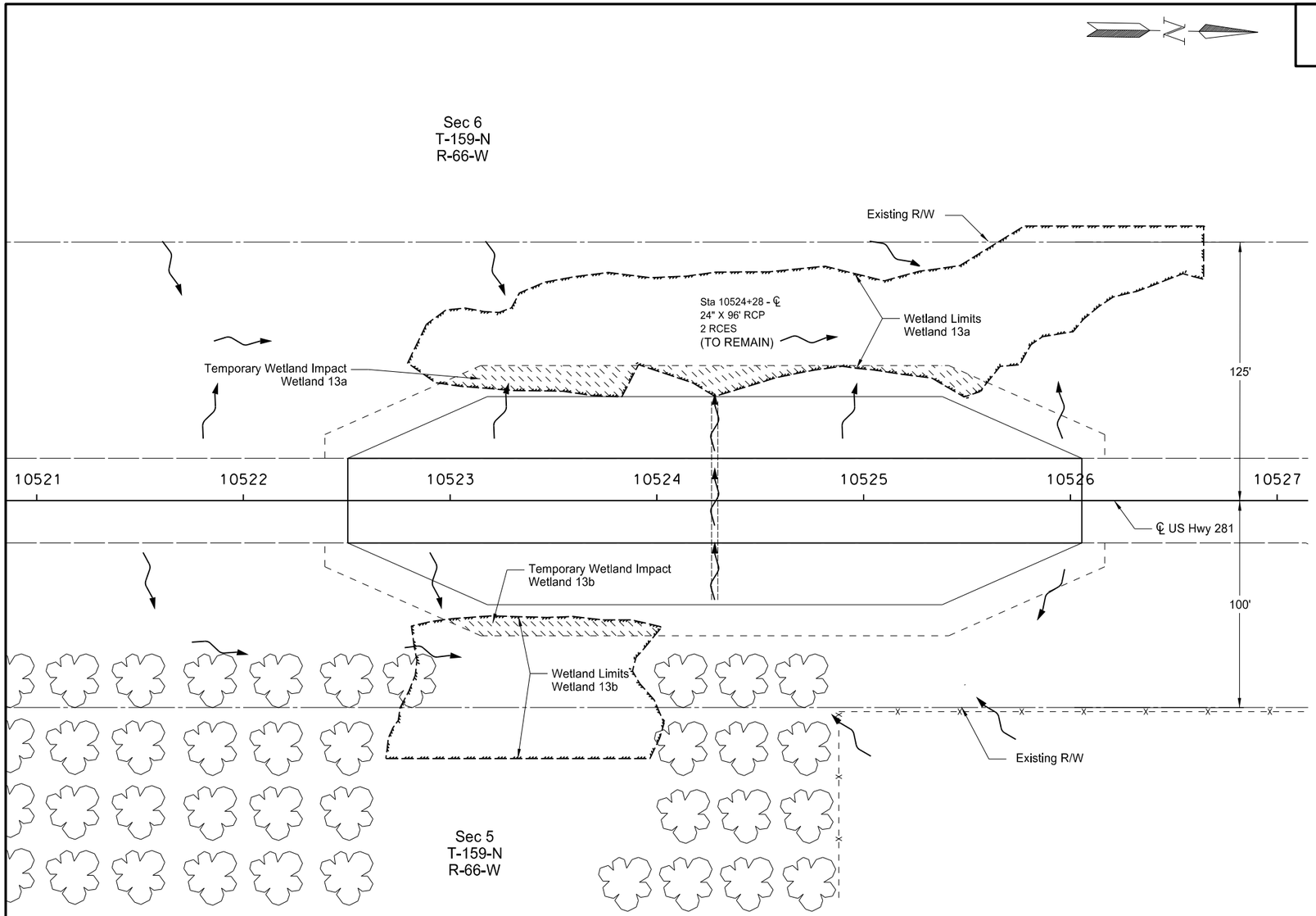
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-281(118)190	75	2

WETLAND IMPACT TABLE		
Wetland Number	Temporary Impact	Permanent Impact
13a	0.047 acres	0.000 acres
13b	0.018 acres	0.000 acres
Total	0.065 acres	0.000 acres



LEGEND

Temporary Wetland Impacts

Permanent Wetland Impacts

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Wetland Impacts
RP 199.305 to RP 199.373

US Hwy 281

Cando North to West Jct 66

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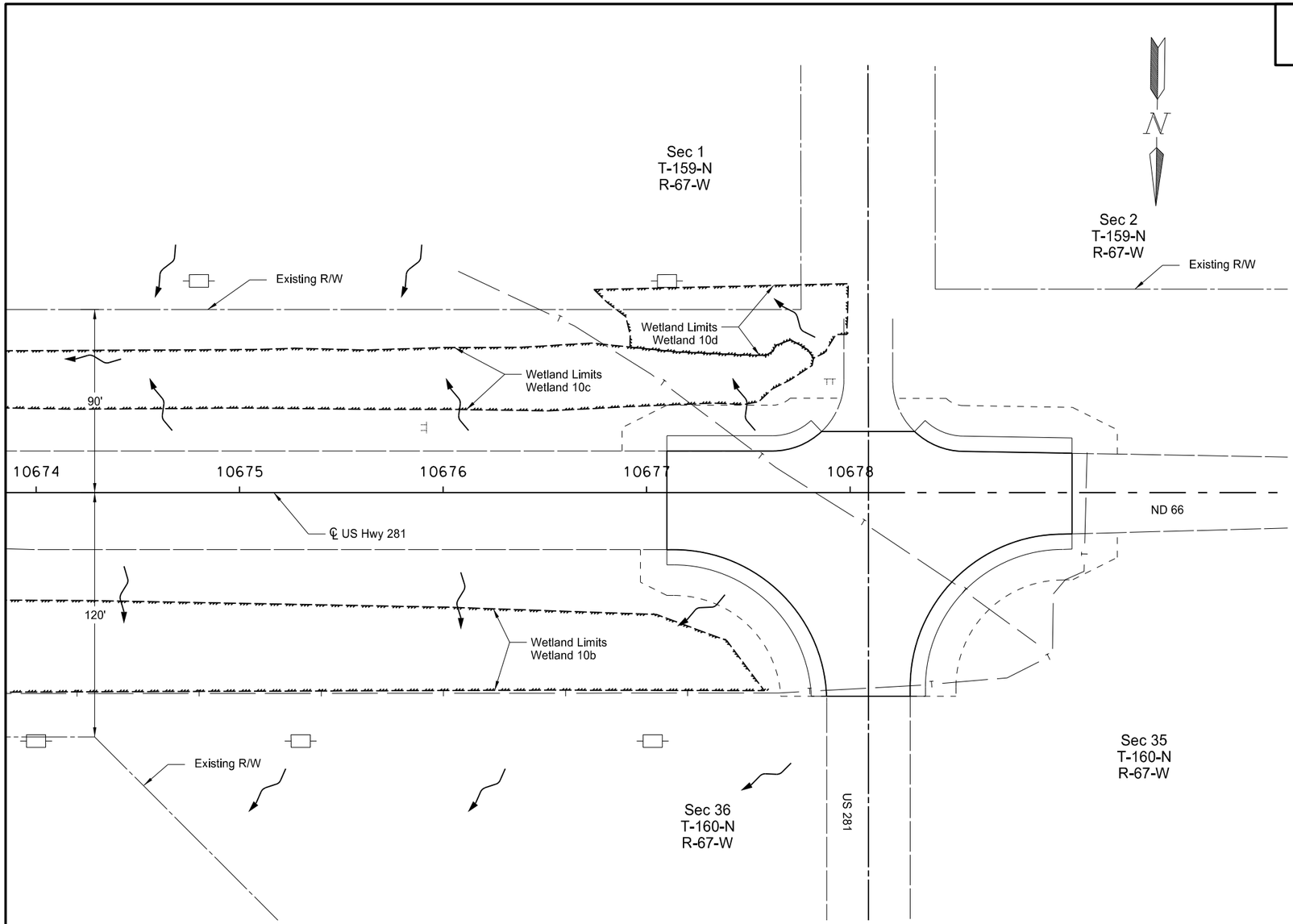
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-281(118)190	75	3

WETLAND IMPACT TABLE		
Wetland Number	Temporary Impact	Permanent Impact
10b	0.000 acres	0.000 acres
10c	0.000 acres	0.000 acres
10d	0.000 acres	0.000 acres
Total	0.000 acres	0.000 acres



LEGEND

Temporary Wetland Impacts

Permanent Wetland Impacts

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Wetland Impacts
RP 202.215 to RP 202.235

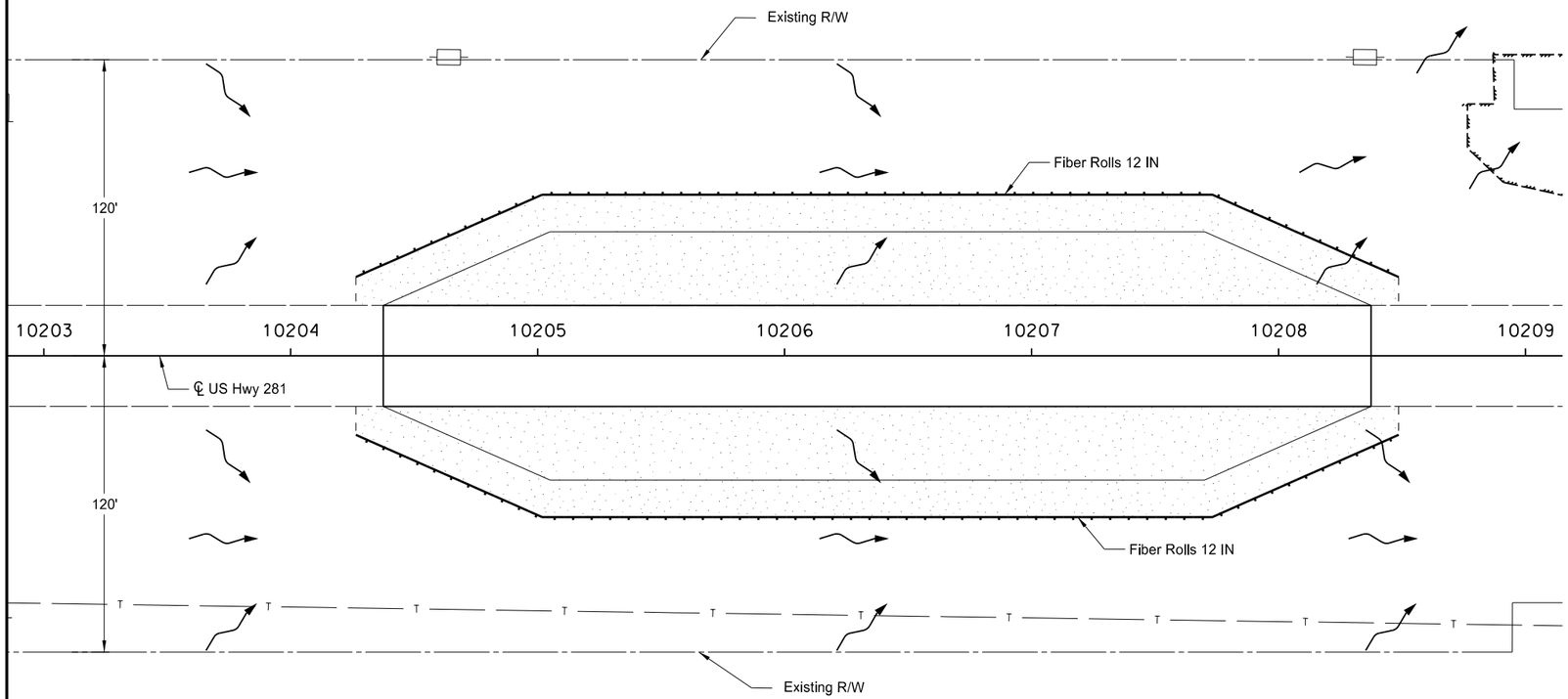
US Hwy 281

Cando North to West Jct 66

2/11/2016 9:51:20 AM jrensch R:\project\30281190.118\design\Sheets\075WL_003_ND66Intersection.dgn

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-281(118)190	76	1

Sec 6
T-158-N
R-66-W



Sec 5
T-158-N
R-66-W

SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	2000	TEMPORARY COVER CROP		
		Sta 10204+26.5 Lt to Sta 10208+48.5 Lt	ACRE	0.376
		Sta 10204+26.5 Rt to Sta 10208+48.5 Rt	ACRE	0.376
253	101	STRAW MULCH		
		Sta 10204+26.5 Lt to Sta 10208+48.5 Lt	ACRE	0.376
		Sta 10204+26.5 Rt to Sta 10208+48.5 Rt	ACRE	0.376
261	112	FIBER ROLLS 12 IN		
		Sta 10204+26.5 Lt to Sta 10208+48.5 Lt	LF	440
		Sta 10204+26.5 Rt to Sta 10208+48.5 Rt	LF	440
261	113	REMOVE FIBER ROLLS 12 IN		
		Sta 10204+26.5 Lt to Sta 10208+48.5 Lt	LF	440
		Sta 10204+26.5 Rt to Sta 10208+48.5 Rt	LF	440

LEGEND

Temporary Cover Crop & Straw Mulch

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Temporary Erosion Control
RP 193.268 to RP 193.343

US Hwy 281

Cando North to West Jct 66

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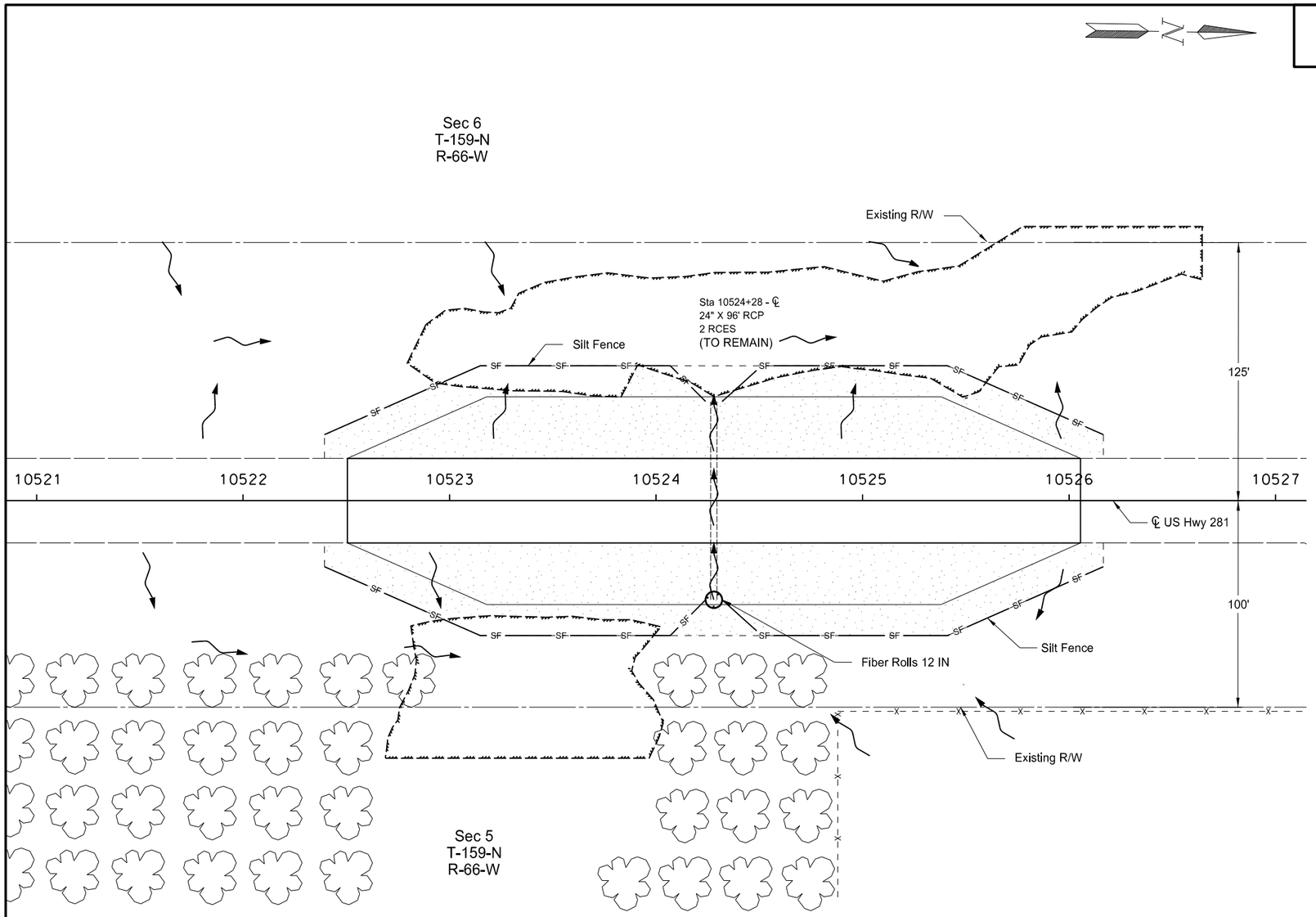
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-281(118)190	76	2



SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	2000	TEMPORARY COVER CROP		
		Sta 10522+39.5 Lt to Sta 10526+16.5 Lt	ACRE	0.283
		Sta 10522+39.5 Rt to Sta 10526+16.5 Rt	ACRE	0.312
253	101	STRAW MULCH		
		Sta 10522+39.5 Lt to Sta 10526+16.5 Lt	ACRE	0.283
		Sta 10522+39.5 Rt to Sta 10526+16.5 Rt	ACRE	0.312
260	100	SILT FENCE UNSUPPORTED		
		Sta 10522+39.5 Lt to Sta 10526+16.5 Lt	LF	400
		Sta 10522+39.5 Rt to Sta 10526+16.5 Rt	LF	400
260	101	REMOVE SILT FENCE UNSUPPORTED		
		Sta 10522+39.5 Lt to Sta 10526+16.5 Lt	LF	400
		Sta 10522+39.5 Rt to Sta 10526+16.5 Rt	LF	400
261	112	FIBER ROLLS 12IN		
		Pipe End - Sta 10524+28 Rt	LF	25
261	113	REMOVE FIBER ROLLS 12IN		
		Pipe End - Sta 10524+28 Rt	LF	25

LEGEND

Temporary Cover Crop & Straw Mulch

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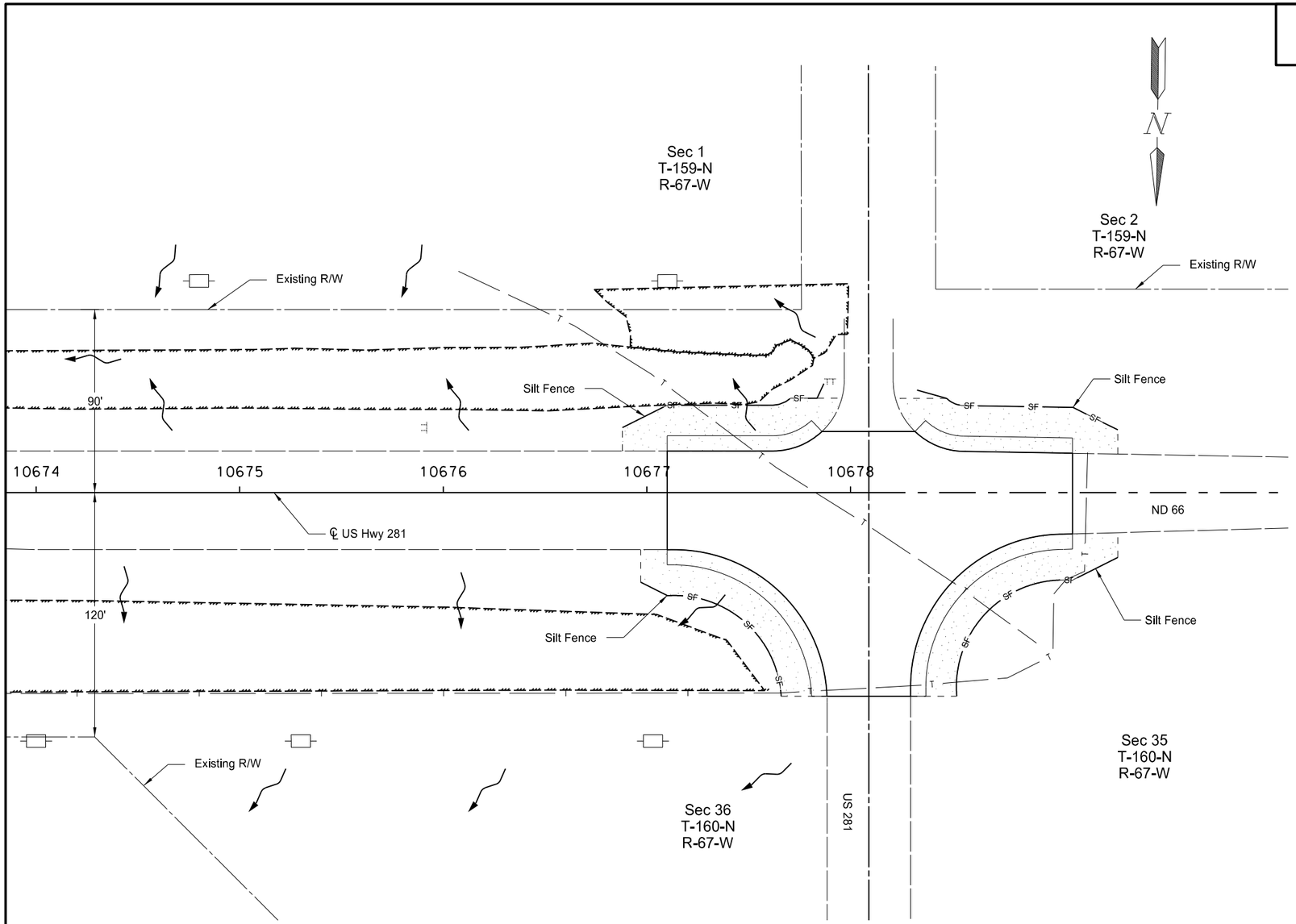
Temporary Erosion Control
RP 199.305 to RP 199.373

US Hwy 281

Cando North to West Jct 66

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-281(118)190	76	3

SPEC	CODE	BID ITEM	UNIT	QUANTITY
251	2000	TEMPORARY COVER CROP		
		Sta 10676+88 to End of Project	ACRE	0.224
253	101	STRAW MULCH		
		Sta 10676+88 to End of Project	ACRE	0.224
260	100	SILT FENCE UNSUPPORTED		
		Sta 10676+88 to End of Project	LF	430
260	101	REMOVE SILT FENCE UNSUPPORTED		
		Sta 10676+88 to End of Project	LF	430



LEGEND

Temporary Cover Crop & Straw Mulch

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Temporary Erosion Control
RP 202.215 to RP 202.235

US Hwy 281

Cando North to West Jct 66

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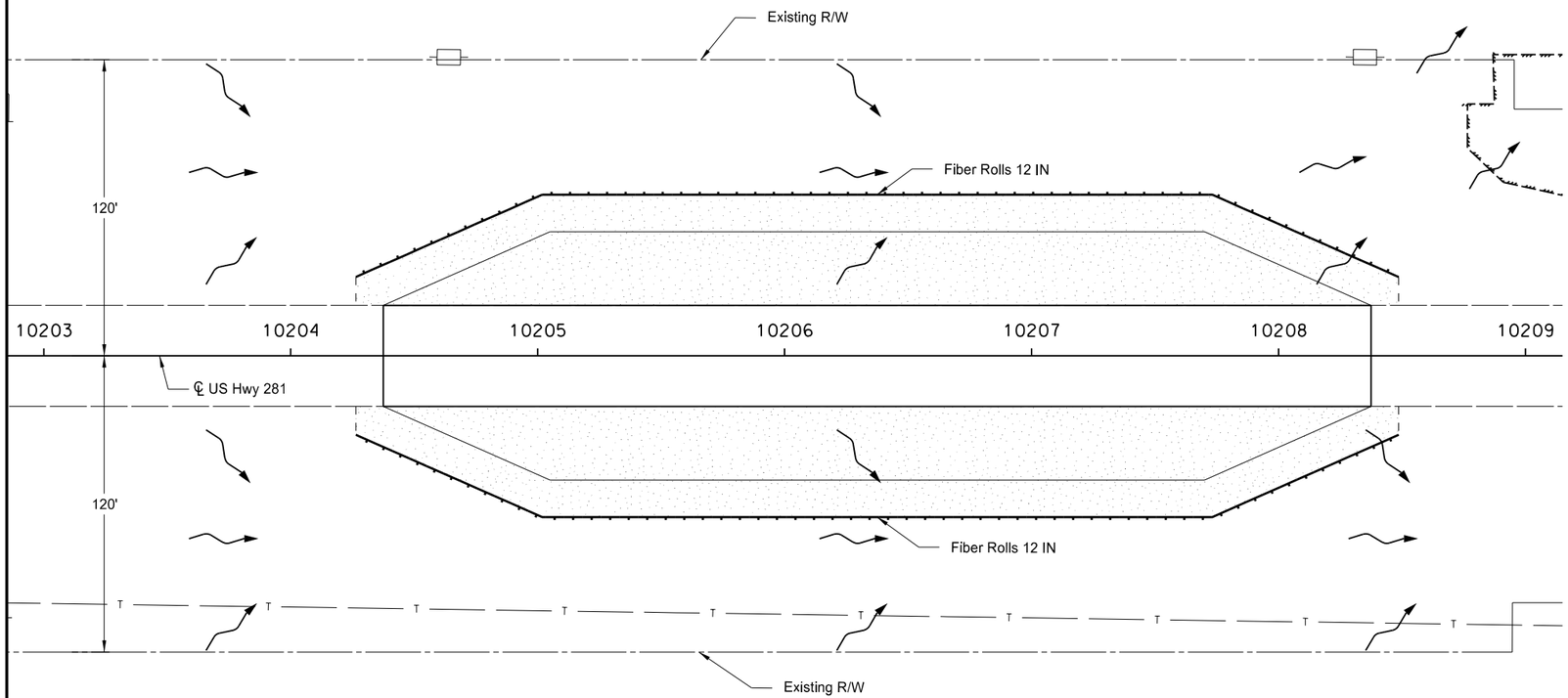
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-281(118)190	77	1

Sec 6
T-158-N
R-66-W



Sec 5
T-158-N
R-66-W

SPEC	CODE	BID ITEM	UNIT	QUANTITY
203	109	TOPSOIL		
		Sta 10204+26.5 Lt to Sta 10208+48.5 Lt	CY	304
		Sta 10204+26.5 Rt to Sta 10208+48.5 Rt	CY	304
251	200	SEEDING CLASS II		
		Sta 10204+26.5 Lt to Sta 10208+48.5 Lt	ACRE	0.376
		Sta 10204+26.5 Rt to Sta 10208+48.5 Rt	ACRE	0.376
253	101	STRAW MULCH		
		Sta 10204+26.5 Lt to Sta 10208+48.5 Lt	ACRE	0.376
		Sta 10204+26.5 Rt to Sta 10208+48.5 Rt	ACRE	0.376
260	112	FIBER ROLLS 12 IN		
		Sta 10204+26.5 Lt to Sta 10208+48.5 Lt	LF	440
		Sta 10204+26.5 Rt to Sta 10208+48.5 Rt	LF	440

LEGEND

Topsoil, Seeding & Straw Mulch

Topsoil-Wetland & Wetland Seeding

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Permanent Erosion Control
RP 193.268 to RP 193.343

US Hwy 281

Cando North to West Jct 66

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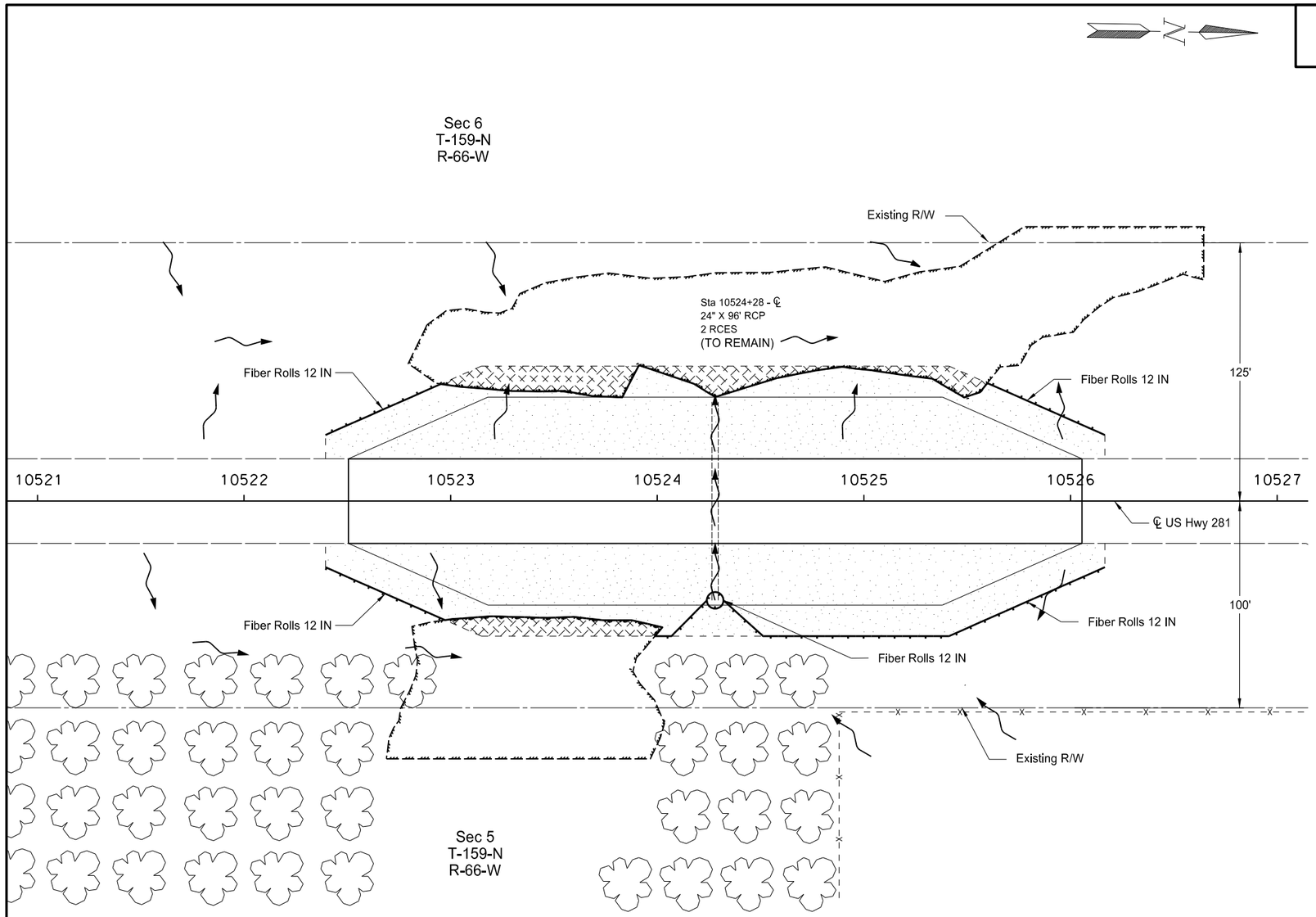
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-281(118)190	77	2



SPEC	CODE	BID ITEM	UNIT	QUANTITY
203	109	TOPSOIL		
		Sta 10522+39.5 Lt to Sta 10526+16.5 Lt	CY	229
		Sta 10522+39.5 Rt to Sta 10526+16.5 Rt	CY	252
203	121	TOPSOIL - WETLAND		
		Sta 10522+39.5 Lt to Sta 10526+16.5 Lt	CY	38
		Sta 10522+39.5 Rt to Sta 10526+16.5 Rt	CY	15
251	200	SEEDING CLASS II		
		Sta 10522+39.5 Lt to Sta 10526+16.5 Lt	ACRE	0.283
		Sta 10522+39.5 Rt to Sta 10526+16.5 Rt	ACRE	0.312
251	1000	WETLAND SEED		
		Sta 10522+39.5 Lt to Sta 10526+16.5 Lt	ACRE	0.047
		Sta 10522+39.5 Rt to Sta 10526+16.5 Rt	ACRE	0.018
253	101	STRAW MULCH		
		Sta 10522+39.5 Lt to Sta 10526+16.5 Lt	ACRE	0.283
		Sta 10522+39.5 Rt to Sta 10526+16.5 Rt	ACRE	0.312
261	112	FIBER ROLLS 12IN		
		Sta 10522+39.5 Lt to Sta 10526+16.5 Lt	LF	410
		Sta 10522+39.5 Rt to Sta 10526+16.5 Rt	LF	410
		Pipe End - Sta 10524+28 Rt	LF	25

LEGEND

Topsoil, Seeding & Straw Mulch

Topsoil-Wetland & Wetland Seeding

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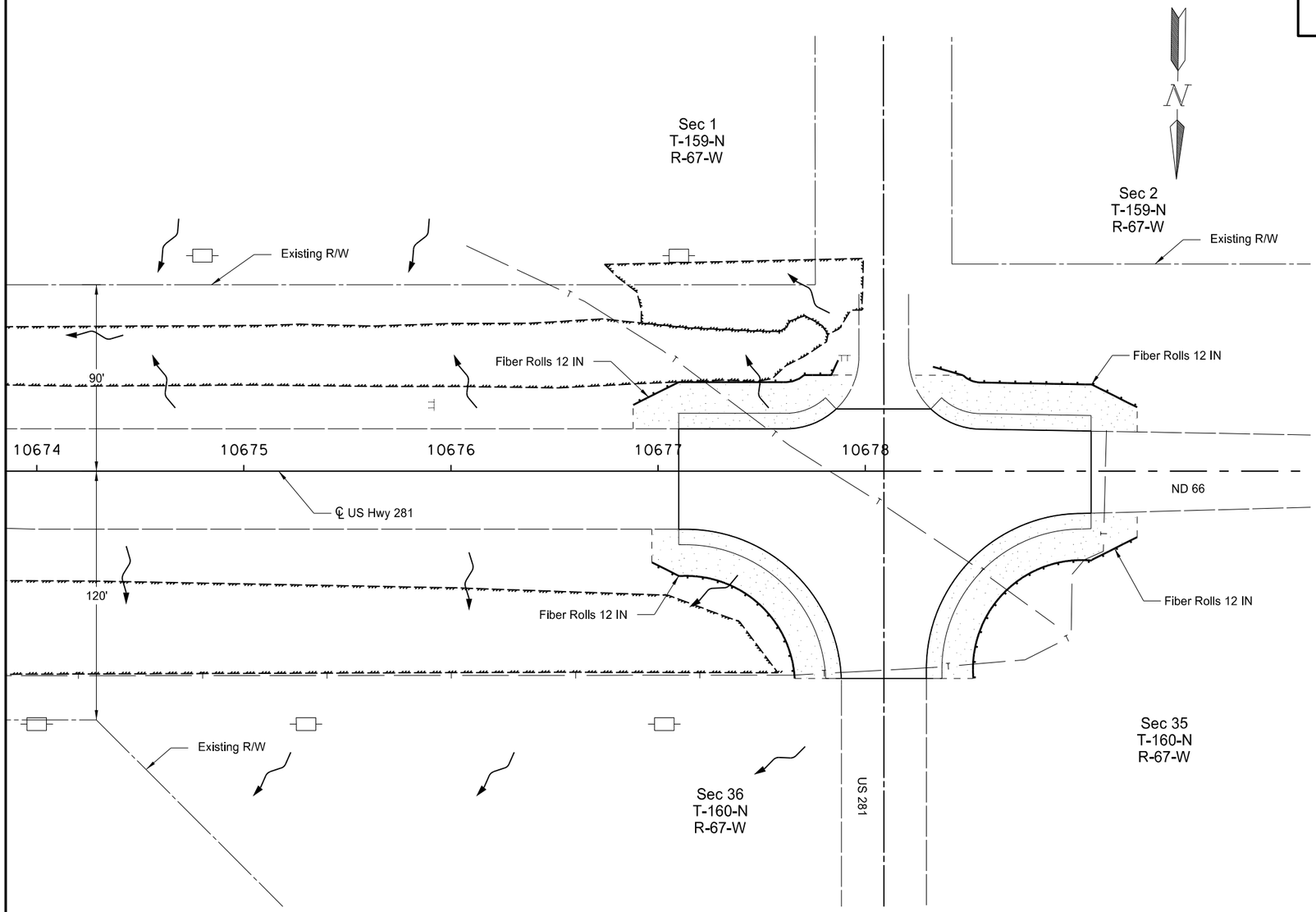
Permanent Erosion Control
RP 199.305 to RP 199.373

US Hwy 281

Cando North to West Jct 66

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-281(118)190	77	3

SPEC	CODE	BID ITEM	UNIT	QUANTITY
203	109	TOPSOIL		
		Sta 10676+88 to End of Project	CY	181
251	200	SEEDING CLASS II		
		Sta 10676+88 to End of Project	ACRE	0.224
253	101	STRAW MULCH		
		Sta 10676+88 to End of Project	ACRE	0.224
261	112	FIBER ROLLS 12IN		
		Sta 10676+88 to End of Project	LF	430



LEGEND

Topsoil, Seeding & Straw Mulch

Topsoil-Wetland & Wetland Seeding

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Permanent Erosion Control
RP 202.215 to RP 202.235

US Hwy 281

Cando North to West Jct 66

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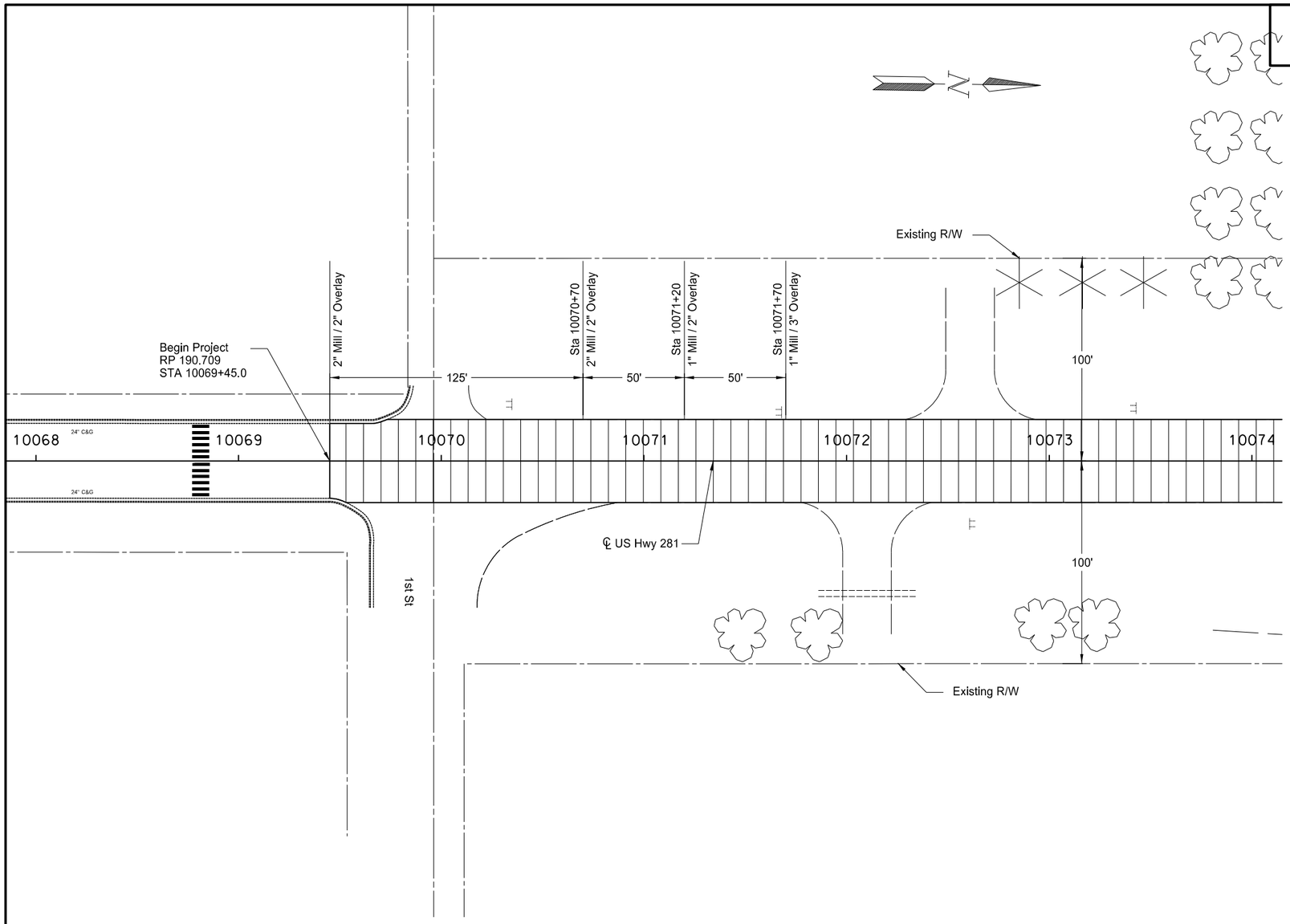
STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-281(118)190	90	1

Note: Quantities are provided in Section 10 - Basis of Estimate



LEGEND

1" Mill & 3" RAP Superpave FAA 43

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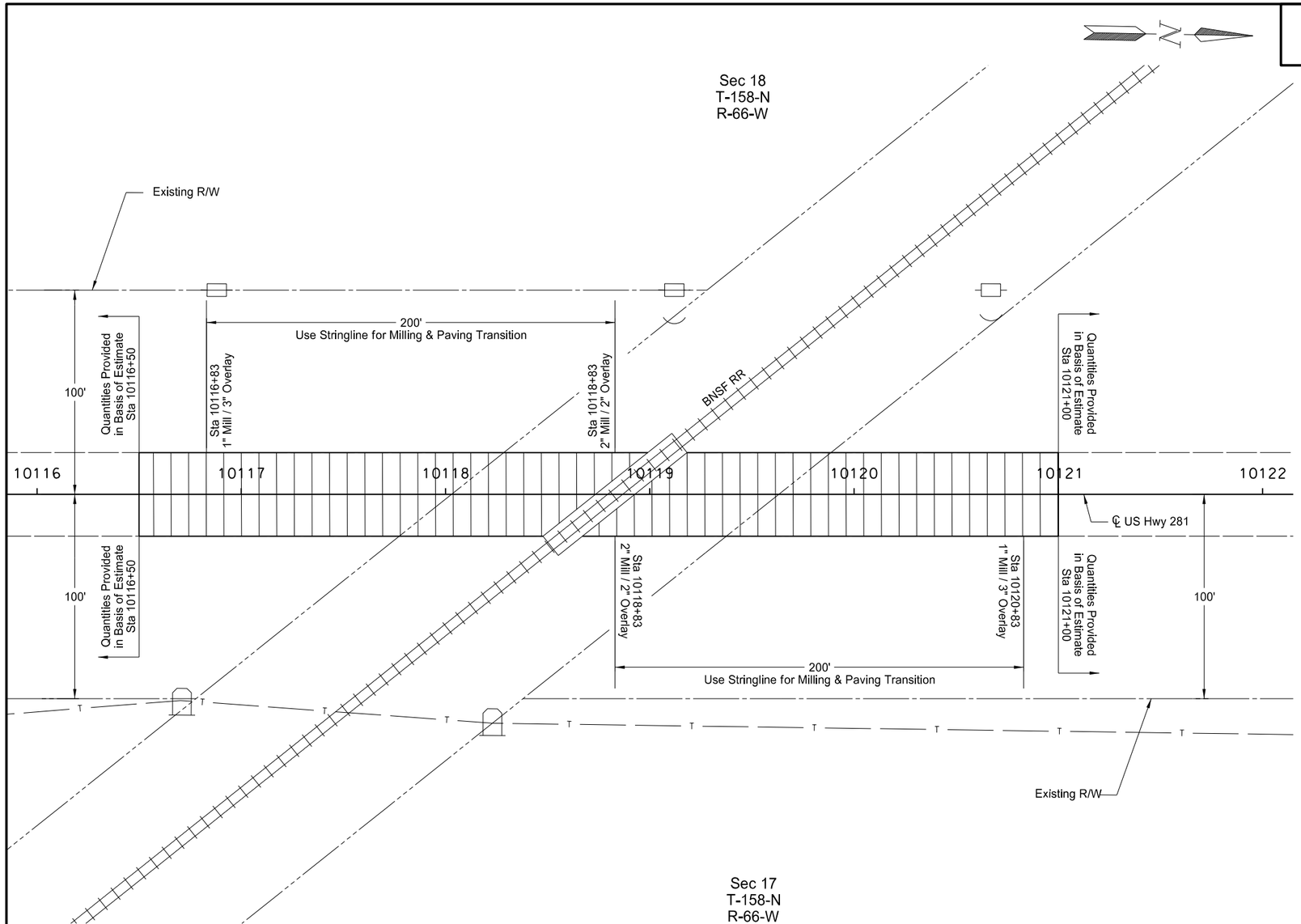
Paving Layout

Begin Project - Cando

Cando North to West Junction ND 66

STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-281(118)190	90	2

SPEC	CODE	BID ITEM	UNIT	QUANTITY
401	50	TACK COAT		
		Sta 10116+50 to Sta 10121+00	GAL	197
411	105	MILLING PAVEMENT SURFACE		
		Sta 10116+50 to Sta 10121+00	SY	1964
430	143	RAP SUPERPAVE FAA 43		
		Sta 10116+50 to Sta 10121+00	TON	280



LEGEND

1" Mill & 3" RAP Superpave FAA 43

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Paving
RP 191.600 to RP 191.685

US Hwy 281

Cando North to West Jct 66

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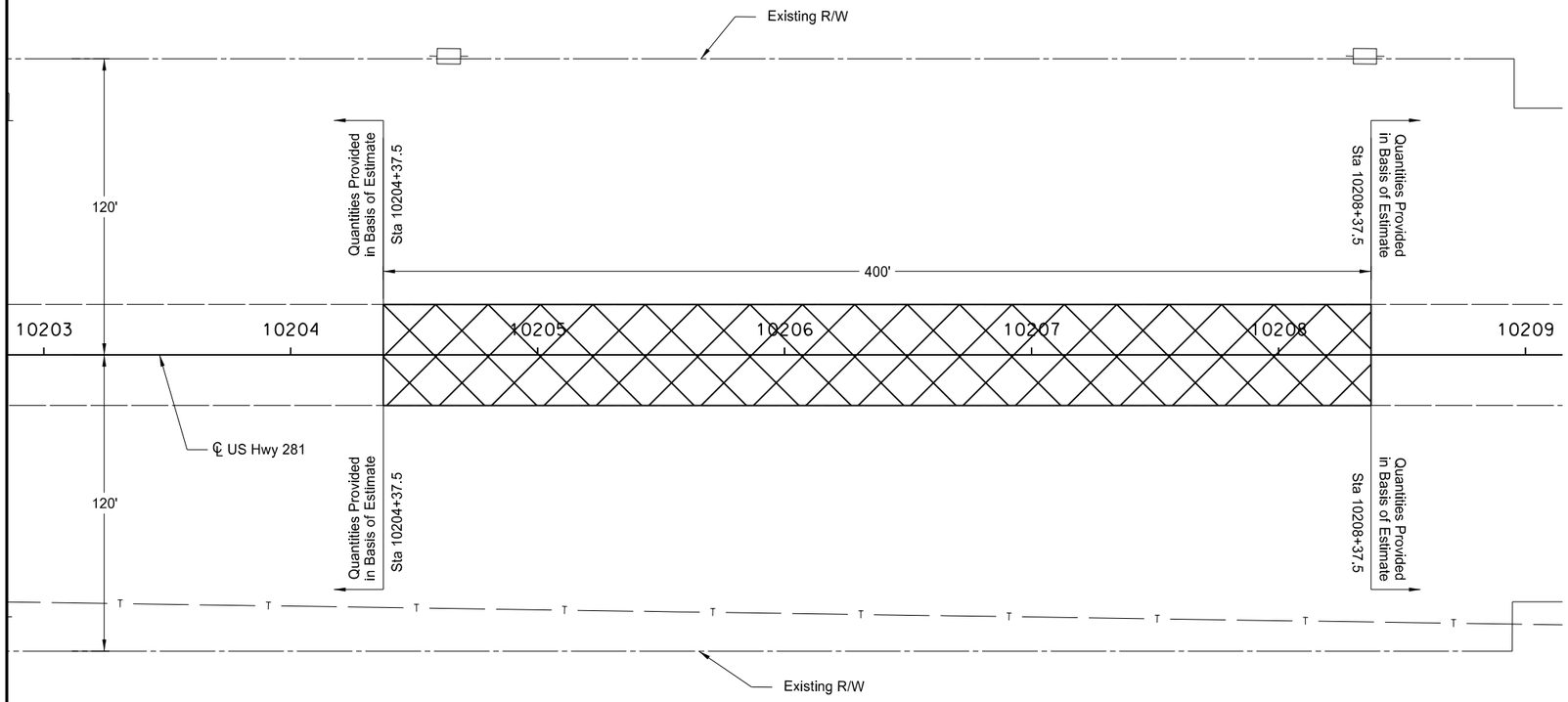
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-281(118)190	90	3

SPEC	CODE	BID ITEM	UNIT	QUANTITY
302	120	AGGREGATE BASE COURSE CL 5		
		Sta 10204+37.5 to Sta 10208+37.5	TON	6780
401	50	TACK COAT		
		Sta 10204+37.5 to Sta 10208+37.5	GAL	161
401	60	PRIME COAT		
		Sta 10204+37.5 to Sta 10208+37.5	GAL	439
430	143	RAP SUPERPAVE FAA 43		
		Sta 10204+37.5 to Sta 10208+37.5	TON	505
709	151	GEOSYNTHETIC MATERIAL TYPE R1		
		Sta 10204+37.5 to Sta 10208+37.5	SY	2222

Sec 6
T-158-N
R-66-W



Sec 5
T-158-N
R-66-W

LEGEND

5.5" RAP Superpave FAA 43
& 15 " Aggregate Base Course CL 5

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Paving
RP 193.268 to RP 193.343

US Hwy 281

Cando North to West Jct 66

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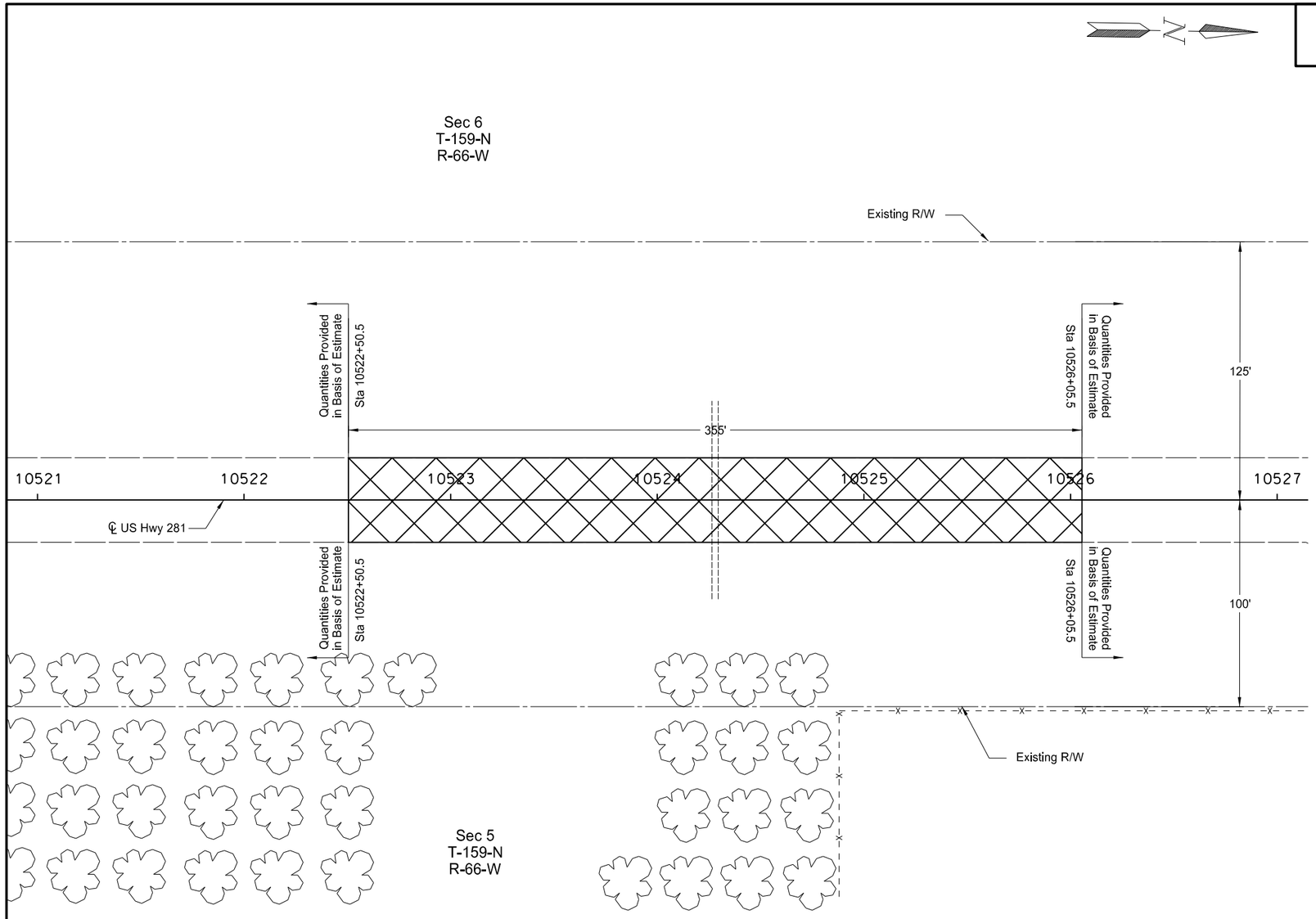
	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-281(118)190	90	4

SPEC	CODE	BID ITEM	UNIT	QUANTITY
302	120	AGGREGATE BASE COURSE CL 5		
		Sta 10522+50.5 to Sta 10526+05.5	TON	5780
401	50	TACK COAT		
		Sta 10522+50.5 to Sta 10526+05.5	GAL	143
401	60	PRIME COAT		
		Sta 10522+50.5 to Sta 10526+05.5	GAL	390
430	143	RAP SUPERPAVE FAA 43		
		Sta 10522+50.5 to Sta 10526+05.5	TON	448
709	151	GEOSYNTHETIC MATERIAL TYPE R1		
		Sta 10522+50.5 to Sta 10526+05.5	SY	1972



LEGEND

5.5" RAP Superpave FAA 43
& 15 " Aggregate Base Course CL 5

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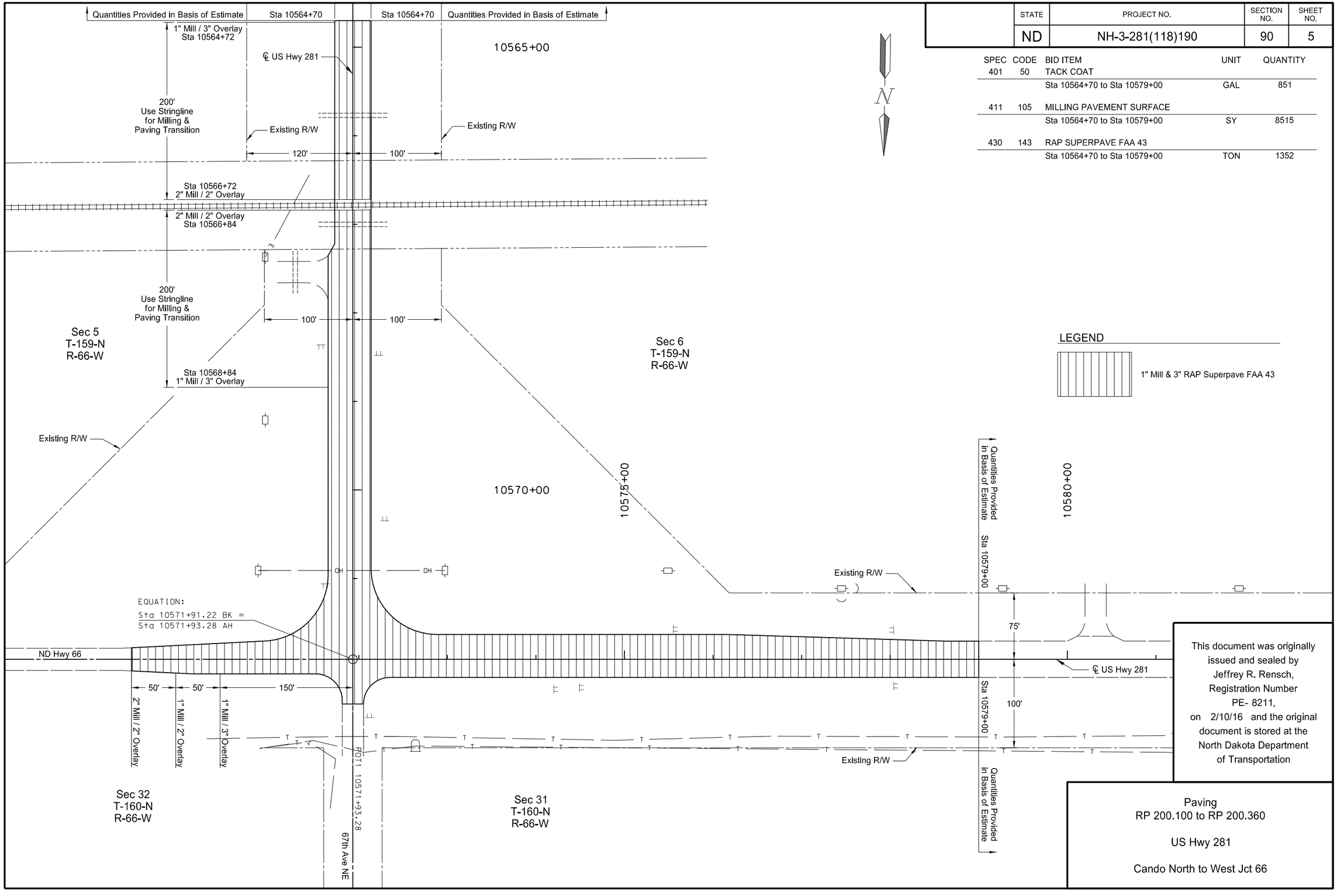
Paving
RP 199.305 to RP 199.373

US Hwy 281

Cando North to West Jct 66

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-281(118)190	90	5

SPEC	CODE	BID ITEM	UNIT	QUANTITY
401	50	TACK COAT		
		Sta 10564+70 to Sta 10579+00	GAL	851
411	105	MILLING PAVEMENT SURFACE		
		Sta 10564+70 to Sta 10579+00	SY	8515
430	143	RAP SUPERPAVE FAA 43		
		Sta 10564+70 to Sta 10579+00	TON	1352



LEGEND

1" Mill & 3" RAP Superpave FAA 43

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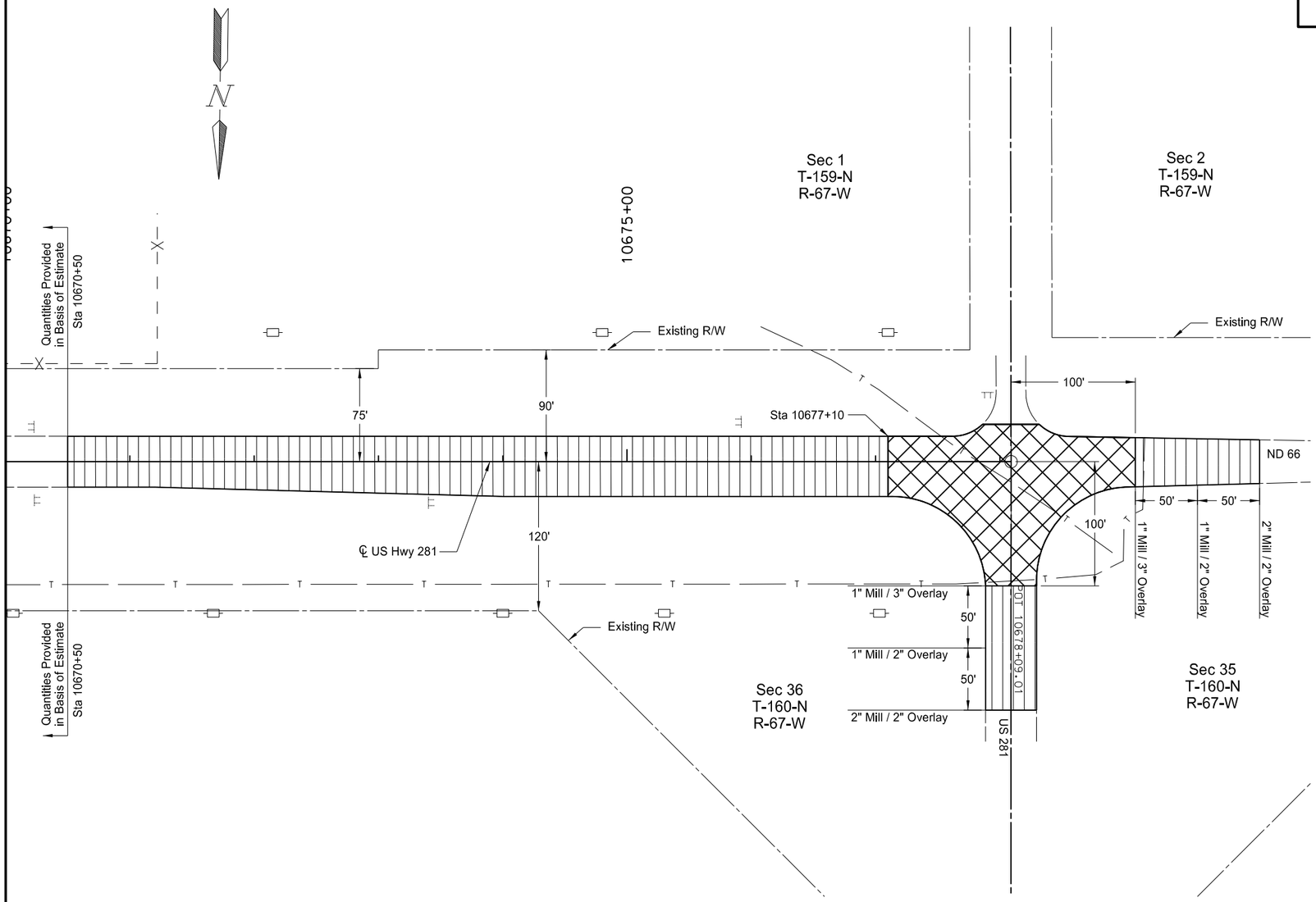
Paving
RP 200.100 to RP 200.360

US Hwy 281

Cando North to West Jct 66

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-281(118)190	90	6

SPEC	CODE	BID ITEM	UNIT	QUANTITY
302	120	AGGREGATE BASE COURSE CL 5		
		Reconstruction Area	TON	1500
401	50	TACK COAT		
		Sta 10670+50 to End of Project	GAL	675
401	60	PRIME COAT		
		Reconstruction Area	GAL	415
411	105	MILLING PAVEMENT SURFACE		
		Sta 10670+50 to End of Project	SY	4252
430	143	RAP SUPERPAVE FAA 43		
		Sta 10670+50 to End of Project	TON	1319
709	100	GEOSYNTHETIC MATERIAL TYPE G		
		Reconstruction Area	SY	1916



LEGEND

1" Mill & 3" RAP Superpave FAA 43

7" RAP Superpave FAA 43
& 15 " Aggregate Base Course CL 5

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Paving
RP 202.090 to RP 202.235

US Hwy 281

Cando North to West Jct 66

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STATE	PROJECT NO.	SECTION NO.	SHEET NO.
ND	NH-3-281(118)190	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**	**4**	**34**	**136**
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**	**4**	**19**	**76**
G20-4-36	**36"x18"**	**PILOT CAR FOLLOW ME (Mounted to back of pilot car)**	**1**	**18**	**18**
G20-10-108	**108"x48"**	**CONTRACTOR SIGN**	**2**	**64**	**128**
G20-50a-72	72"x36"	ROAD WORK NEXT __ MILES RT & LT ARROWS		37	
G20-52a-72	**72"x24"**	**ROAD WORK NEXT __ MILES RT or LT ARROW**	**6**	**30**	**180**
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**	**4**	**32**	**128**
R1-1a-18	**18"x18"**	**STOP and SLOW PADDLE Back to Back**	**4**	**5**	**20**
R1-2-60	60"x60"	YIELD		29	
R2-1-48	**48"x60"**	**SPEED LIMIT __**	**6**	**39**	**234**
R2-1a-24	**24"x18"**	**MINIMUM FEE $80 (Mounted on Speed Limit post)**	**4**	**10**	**40**
R3-7-48	48"x48"	LEFT or RIGHT LANE MUST TURN LEFT or RIGHT		35	
R4-1-48	48"x60"	DO NOT PASS		39	
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		31	
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		26	
W3-1-48	48"x48"	STOP AHEAD SYMBOL		35	
W3-3-48	48"x48"	SIGNAL AHEAD SYMBOL		35	
W3-4-48	**48"x48"**	**BE PREPARED TO STOP**	**2**	**35**	**70**
W3-5-48	**48"x48"**	**SPEED REDUCTION AHEAD**	**4**	**35**	**140**
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**	**18**	**35**	**630**
W8-3-48	48"x48"	PAVEMENT ENDS		35	
W8-7-48	48"x48"	LOOSE GRAVEL		35	
W8-9a-48	**48"x48"**	**SHOULDER DROP-OFF**	**2**	**35**	**70**
W8-11-48	**48"x48"**	**UNEVEN LANES**	**2**	**35**	**70**
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)**	**6**	**11**	**66**
W13-4-48	48"x60"	RAMP ARROW		39	
W14-3-48	48"x36"	NO PASSING ZONE		23	
W20-1-48	**48"x48"**	**ROAD WORK AHEAD or _FT or _ MILE**	**4**	**35**	**140**
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**	**4**	**35**	**140**
W20-7k-24	**24"x18"**	**__ FEET (Mounted on warning sign post)**	**2**	**10**	**20**
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)**	**4**	**12**	**48**
W21-1a-48	48"x48"	WORKERS SYMBOL		35	
W21-2-48	**48"x48"**	**FRESH OIL**	**1**	**35**	**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**	**1**	**35**	**35**
W21-5a-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED		35	
W21-5b-48	48"x48"	RIGHT or LEFT SHOULDER CLOSED AHEAD or __ FT.		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		35	
W21-52-48	**48"x48"**	**PAVEMENT BREAKS**	**6**	**35**	**210**
W22-8-48	48"x48"	FRESH OIL LOOSE ROCK		35	
	24"x24"	TAKE TURNS (6" D letters) (Mounted on stop sign post)		11	

SPECIAL SIGNS

SPEC & CODE

704-1000	**TRAFFIC CONTROL SIGNS**	**TOTAL UNITS**	**2962**

SPEC & CODE	DESCRIPTION	UNIT	QUANTITY
704-0100	**FLAGGING**	**MHR**	**1200**
704-1018	LANE CLOSURE-SIGNAL CONTROLLER/FLAGGING CONTROL	EACH	
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	
704-1060	**DELINEATOR DRUMS**	**EACH**	**29**
704-1065	TRAFFIC CONES	EACH	
704-1067	**TUBULAR MARKERS**	**EACH**	**245**
704-1070	DELINEATOR	EACH	
704-1072	FLEXIBLE DELINEATORS	EACH	
704-1080	**STACKABLE VERTICLE PANELS**	**EACH**	**66**
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	
704-1185	**PILOT CAR**	**HR**	**400**
704-1500	OBLITERATION OF PVMT MK	SF	
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	
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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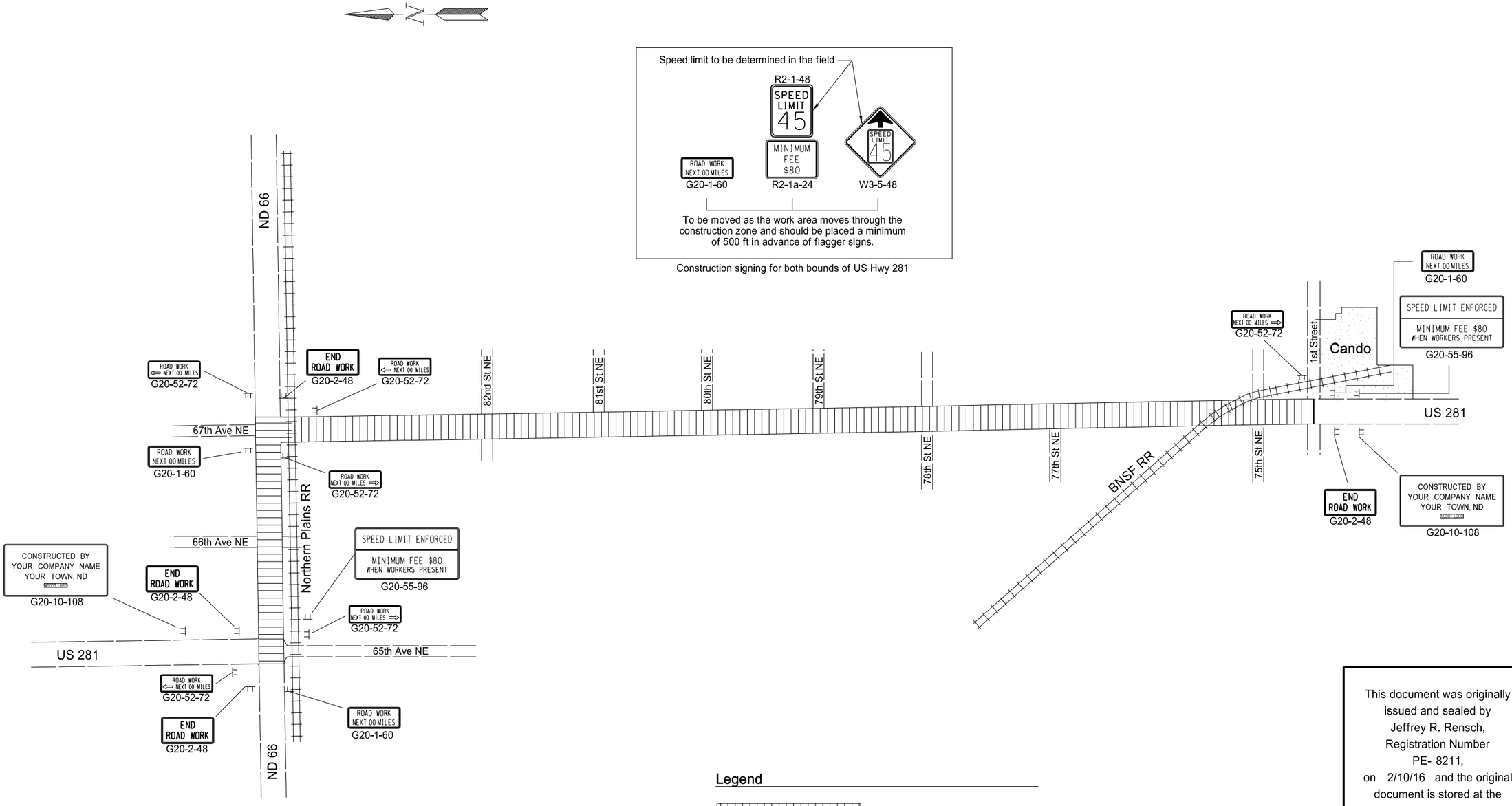
Traffic Control Devices List

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-281(118)190	100	2



Construction signing for both bounds of US Hwy 281

Legend

Construction Zone

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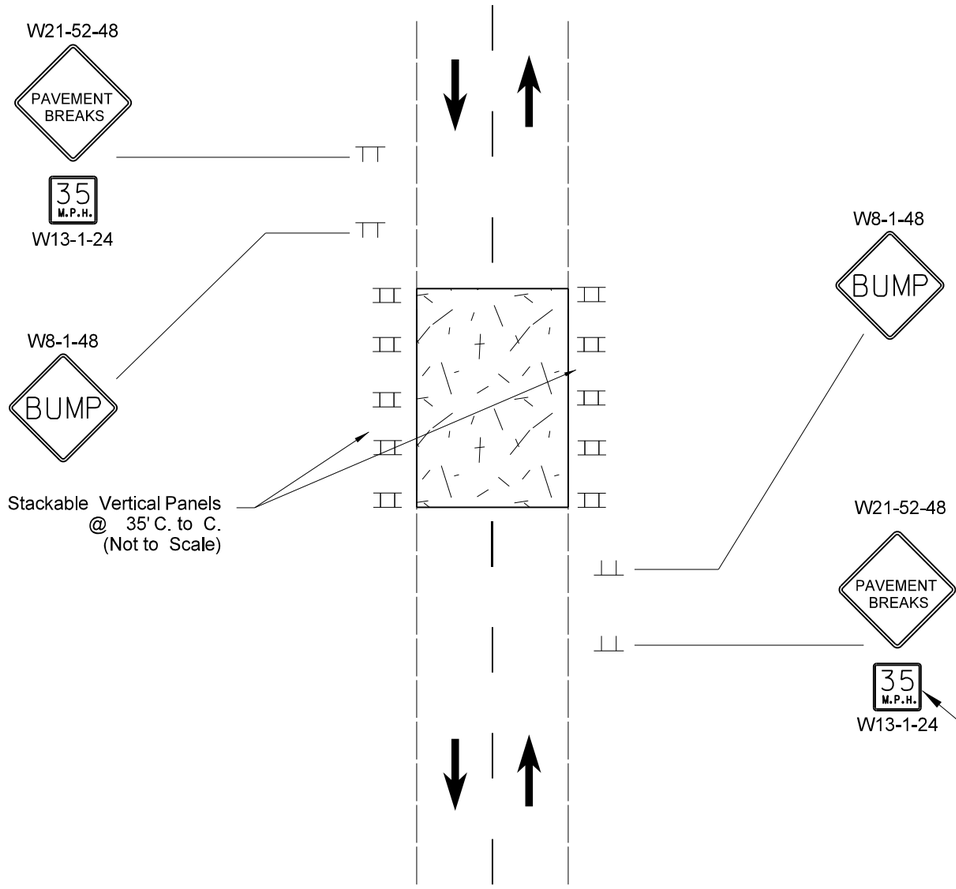
Work Zone Traffic Control

US Hwy 281

	STATE	PROJECT NO.	SECTION NO.	SHEET NO.
	ND	NH-3-281(118)190	100	3

Reconstruction & Subcut Locations
(No Work Present)



Stackable Vertical Panels
Reconstruction Location

US 281 & ND 66 North Intersection
(35' O.C. x 2) 20 EA

Stackable Vertical Panels
Subcut Location

RP 193.268 to RP 193.343
(400 LF/35' O.C. x 2) 24 EA

RP 199.305 to RP 199.373
(355 LF/35' O.C. x 2) 22 EA

*See Standard D-704-19 Type F Lane Closure on a two lane road using flaggers when work is present.

*See Standard D-704-26 for spacings

The advisory speed will be determined by the engineer in the field.

Reconstruction & Subcut Location Areas

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Work Zone Traffic Control
Non-Working Hours
Reconstruction & Subcut Locations

Cando North to West Junction ND 66

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	
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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	
REVISIONS	
DATE	CHANGE
08-03-15	General Revisions

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NDDOT ABBREVIATIONS

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
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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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D-101-20

Line Styles

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

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D-101-21

Line Styles

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

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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

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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

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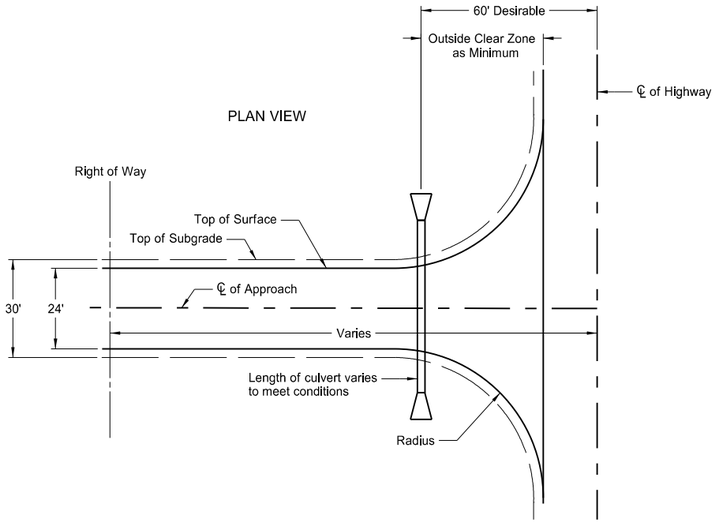
STANDARD RURAL APPROACHES

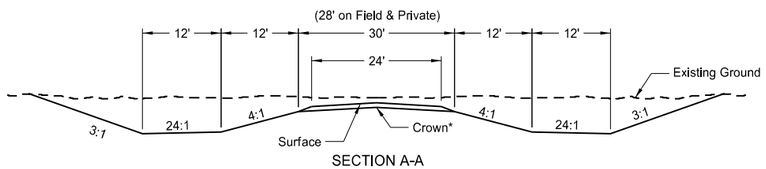
D-203-8

PLAN VIEW



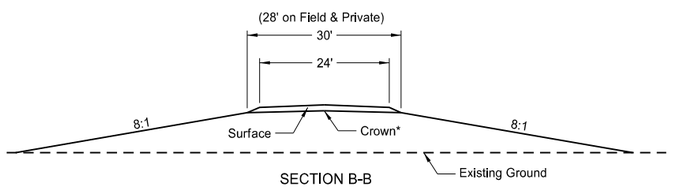
CRITERIA FOR RURAL APPROACH TYPES

	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)

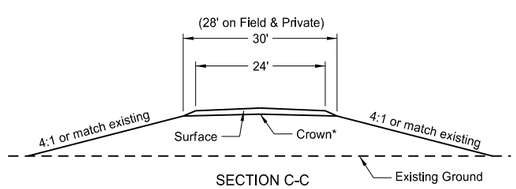


SECTION A-A

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

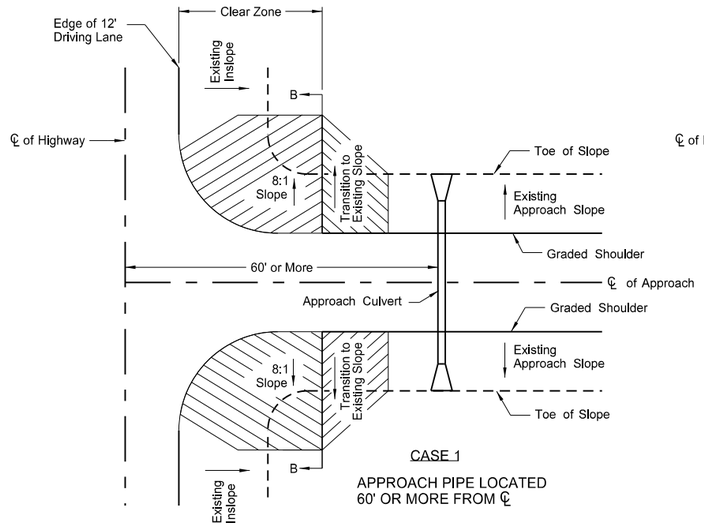


SECTION B-B



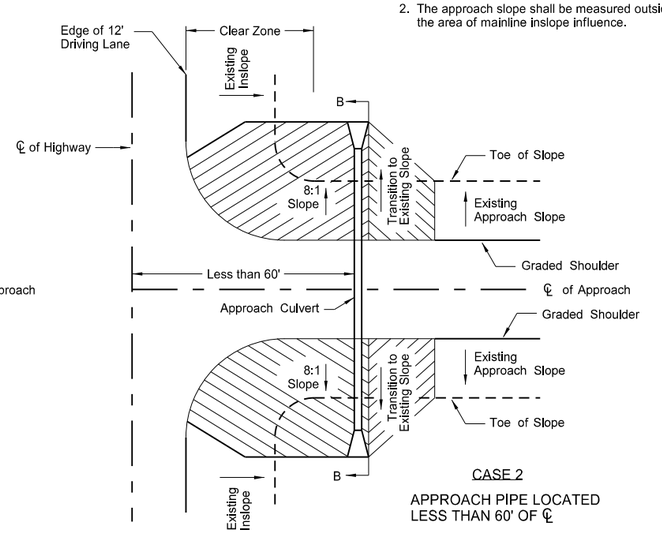
SECTION C-C

APPROACH INSLOPES



CASE 1

APPROACH PIPE LOCATED 60' OR MORE FROM ℄

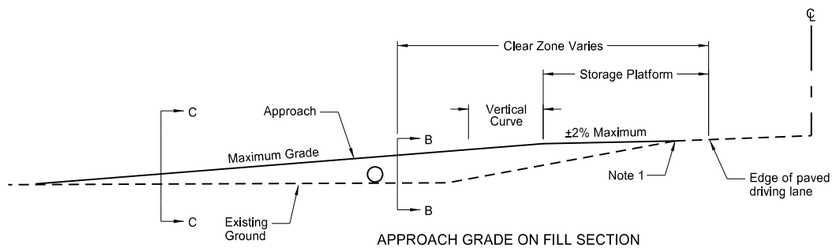


CASE 2

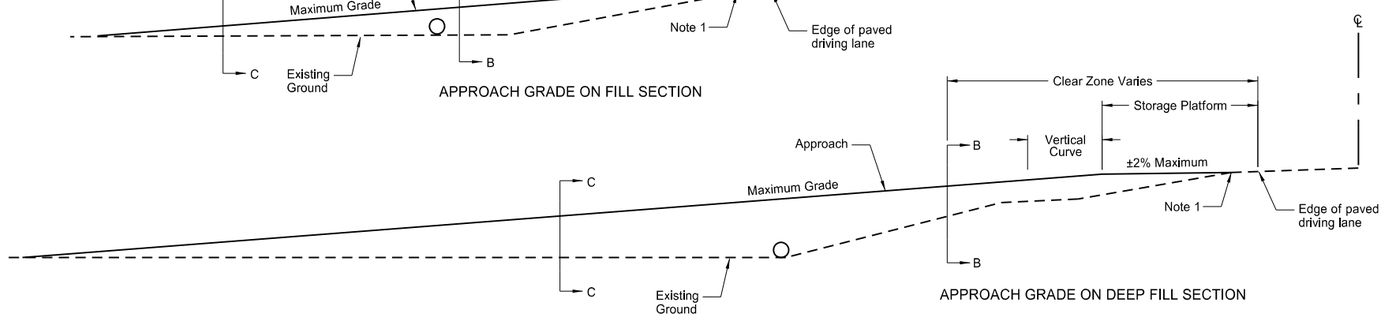
APPROACH PIPE LOCATED LESS THAN 60' OF ℄

NOTES:

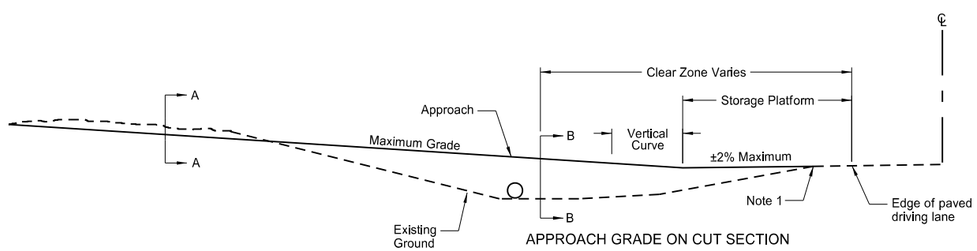
1. Max breakover between approach storage platform and highway shall not exceed 5%.
2. The approach slope shall be measured outside the area of mainline inslope influence.



APPROACH GRADE ON FILL SECTION



APPROACH GRADE ON DEEP FILL SECTION



APPROACH GRADE ON CUT SECTION

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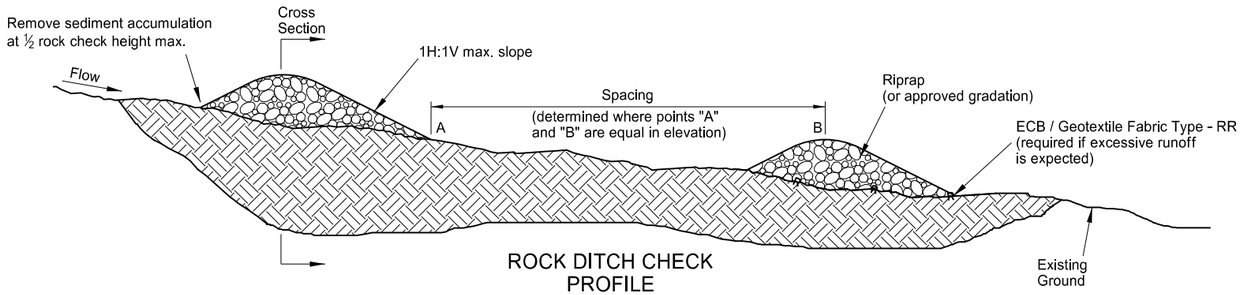
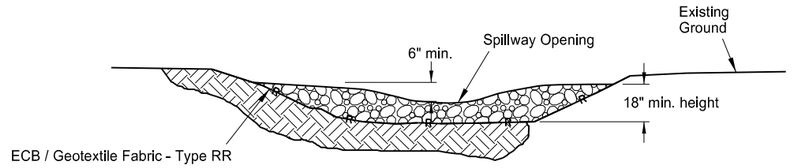
EROSION AND SILTATION CONTROLS

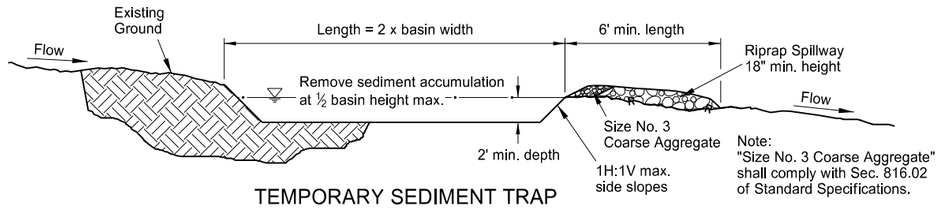
D-256-1



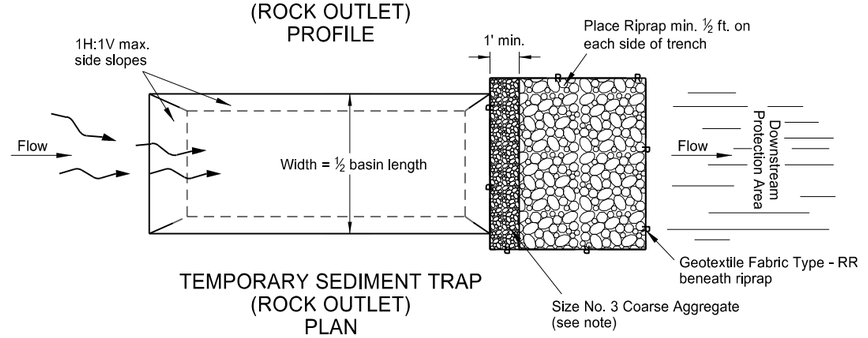
ROCK DITCH CHECK
PROFILE



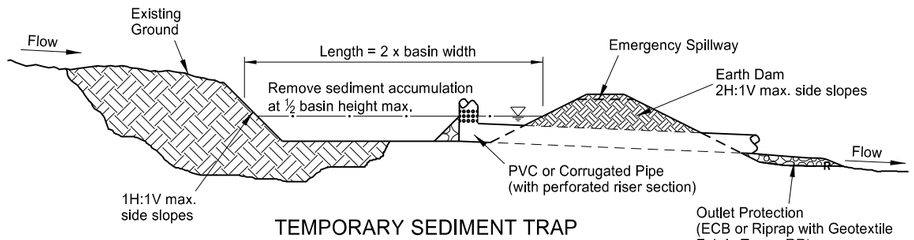
ROCK DITCH CHECK
CROSS SECTION



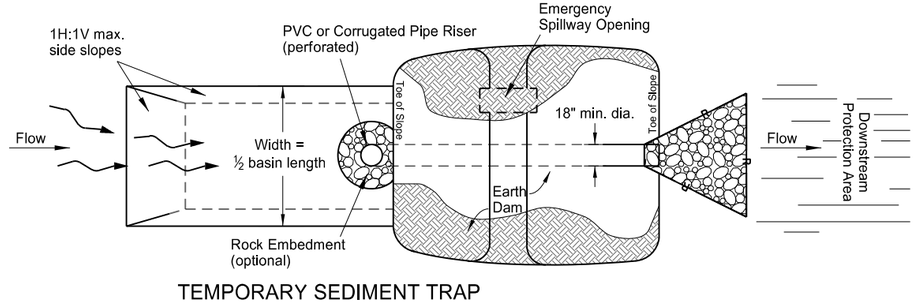
TEMPORARY SEDIMENT TRAP
(ROCK OUTLET)
PROFILE



TEMPORARY SEDIMENT TRAP
(ROCK OUTLET)
PLAN



TEMPORARY SEDIMENT TRAP
(RISER PIPE OUTLET)
PROFILE



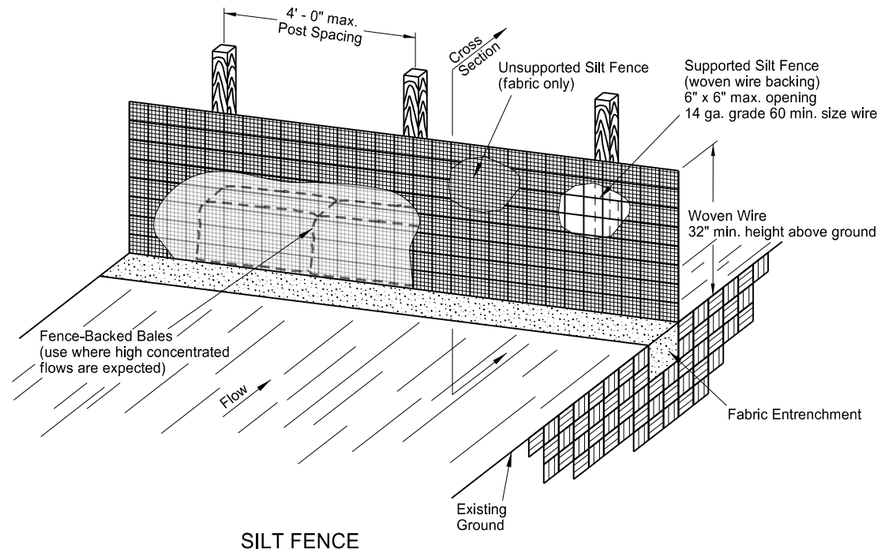
TEMPORARY SEDIMENT TRAP
(RISER PIPE OUTLET)
PLAN

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
06-26-14	Changed standard drawing number from D-708-2 to D-256-1. Deleted silt fence details.

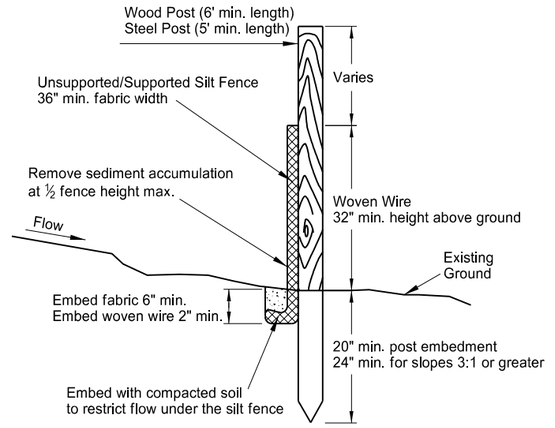
This document was originally issued and sealed by Roger Weigel Registration Number PE- 2930 , on 06/26/14 and the original document is stored at the North Dakota Department of Transportation

EROSION AND SILTATION CONTROLS - SILT FENCE

D-260-1



SILT FENCE
SUPPORTED AND UNSUPPORTED



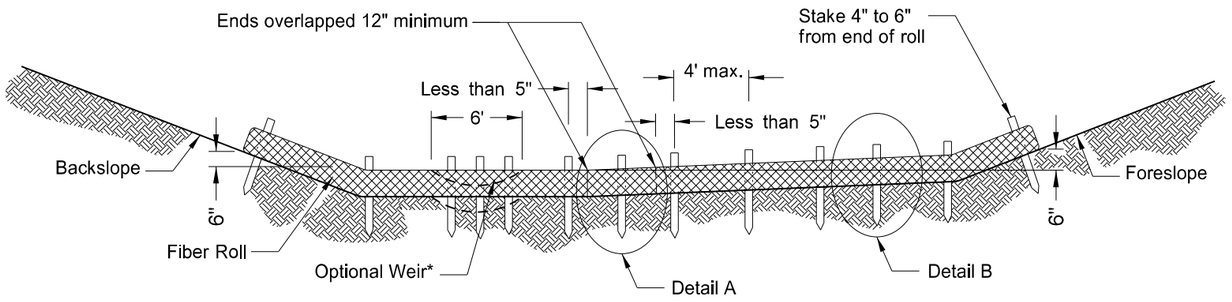
SILT FENCE
CROSS SECTION

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

This document was originally issued and sealed by Roger Weigel Registration Number PE-2930, on 06/26/14 and the original document is stored at the North Dakota Department of Transportation

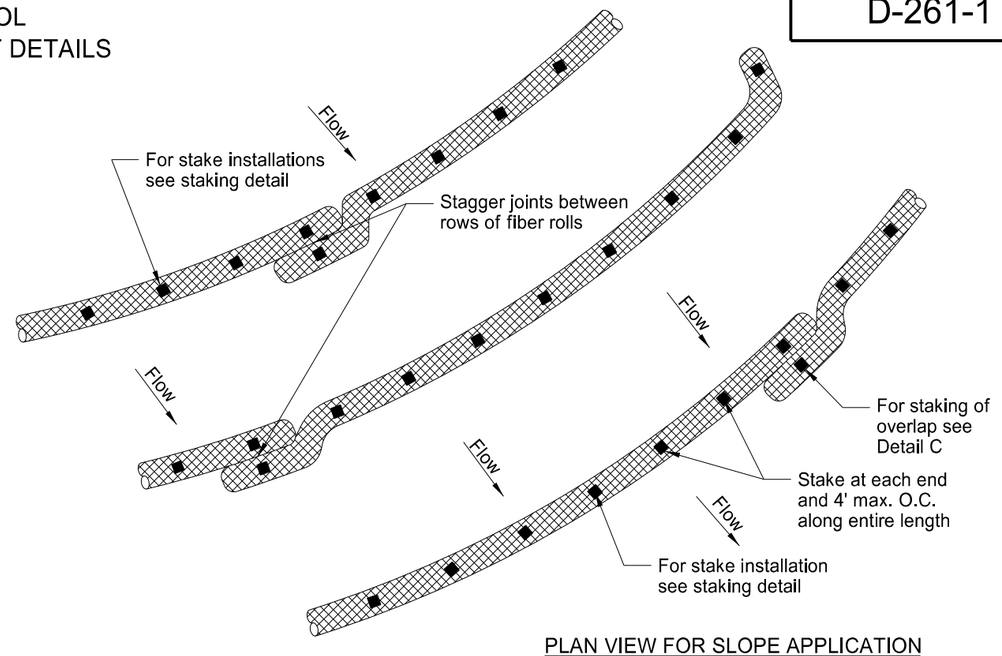
D-261-1

EROSION CONTROL
FIBER ROLL PLACEMENT DETAILS

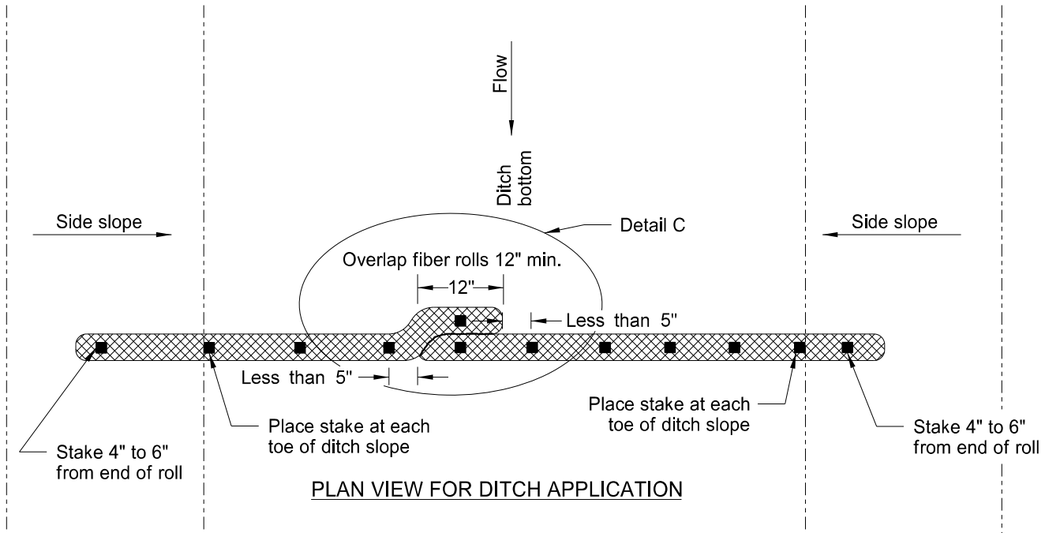


*Optional Weir. Use in flat areas, such as the Red River Valley, where there is potential for water to back up on adjacent property. Lower fiber roll enough to prevent water from backing up on adjacent property. Do not use 20-inch fiber rolls in flat areas where there is potential for water to back up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

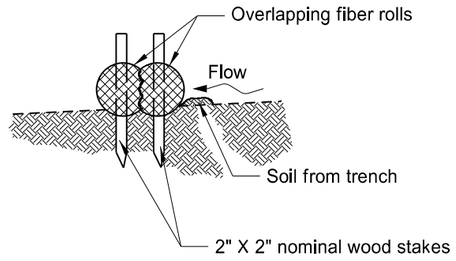
12 OR 20 INCH FIBER ROLL - DITCH BOTTOM



PLAN VIEW FOR SLOPE APPLICATION

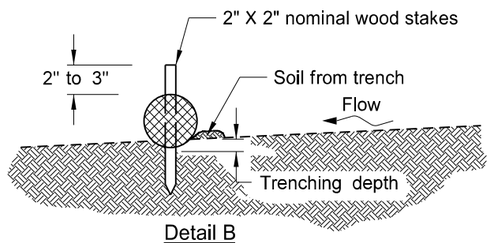


PLAN VIEW FOR DITCH APPLICATION



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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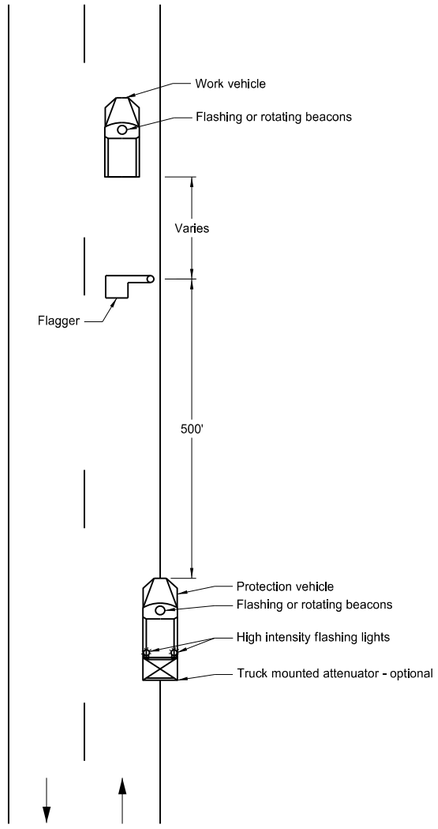
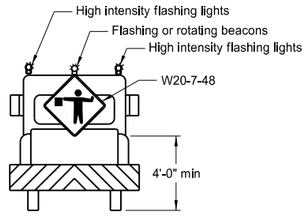
TRAFFIC CONTROL FOR CORING OF HOT BITUMINOUS PAVEMENT

D-704-2

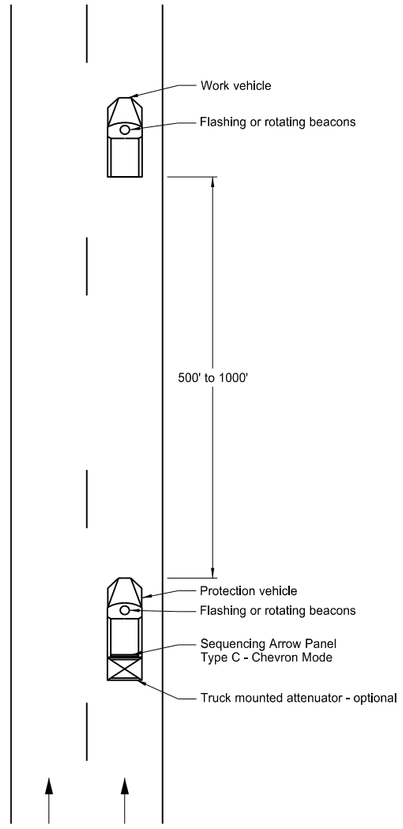
Two Lane, Two Way Roadways

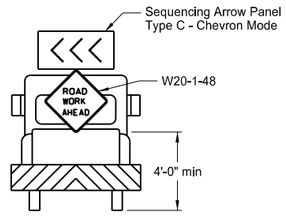




Typical Protection Vehicle

Multilane Roadways





Typical Protection Vehicle

Notes:

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

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

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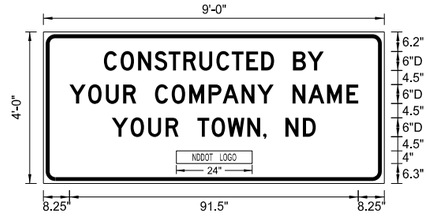
CONSTRUCTION SIGN DETAIL

D-704-5

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

SYMBOL	X	Y	WID	HT	ANGLE
	42.1	6.2	24	4	0

STATION(S): AREA: 36.0 Sq.Ft.



Dimensions are in inches.tenths

Letter locations are panel edge to lower left corner

LETTER POSITION (X)																			LENGTH	SIZE	SERIES
C	O	N	S	T	R	U	C	T	E	D		B	Y						69.7	6	D 2000
19.2	24.5	30	35.1	39.7	44.3	49.4	54.8	59.7	64.3	69	73.1	79.1	83.7								
Y	O	U	R		C	O	M	P	A	N	Y		N	A	M	E			91.5	6	D 2000
8.3	14.2	19.8	25.3	29.4	35.4	40.7	46.2	52.4	56.8	62.8	67.8	72.9	78.9	83.9	89.9	96					
Y	O	U	R		T	O	W	N	,		N	D							64.6	6	D 2000
21.7	27.6	33.2	38.7	42.8	48.8	53.3	58.4	64.6	69.6	70.7	76.7	82.2									

Notes:

1. Sign shall be placed a distance of ½A following the End Road Work (G20-2a-48) sign. There shall be a maximum of 2 signs per project.
2. Sign shall be post mounted.
3. Sign required on rural projects with a 30 day or longer duration and it is not required on seal coat projects or other short duration projects.
4. Sign shall not be placed in urban areas or within city limits.

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

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

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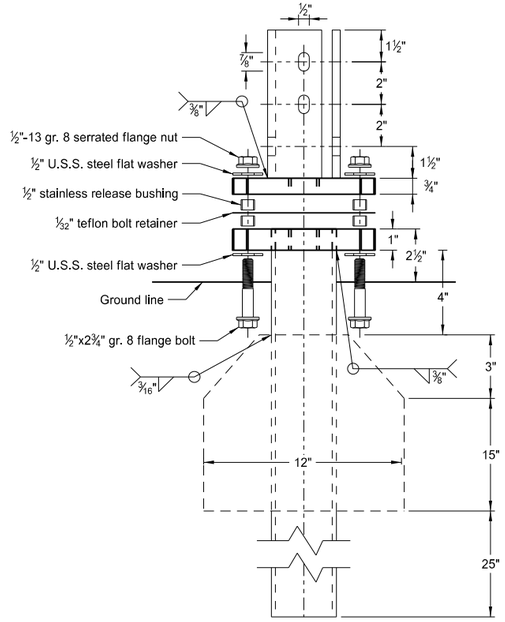
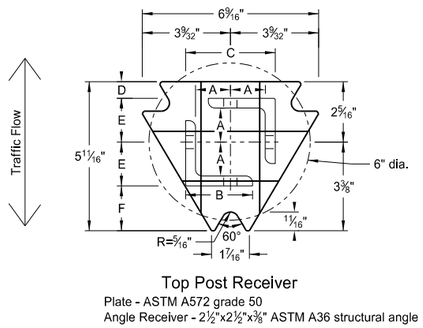
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-7

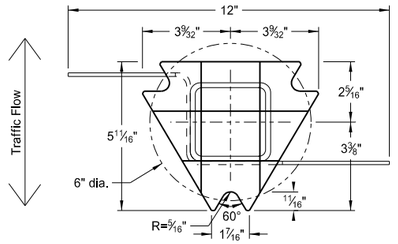


Multi-Directional
Slip Base Assembly

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

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.

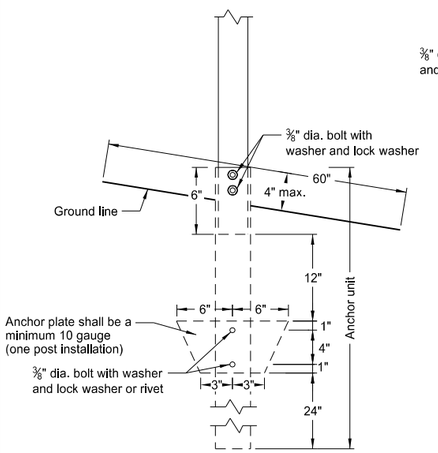
Telescoping Perforated Tube						
Number of Posts	Post Size in.	Wall Thick-ness Gauge	Sleeve Size in.	Wall Thick-ness Gauge	Slip Base	Anchor Size without Slip Base in.
1	2	12			No	2¼
1	2¼	12			No	2½
1	2½	12			(A)	3
1	2½	10			Yes	
1	2¼	12	2	12	Yes	
1	2½	12	2¼	12	Yes	
2	2	12			No	2¼
2	2¼	12			No	2½
2	2½	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	2³⁄₁₆	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
2³⁄₁₆ x 2³⁄₁₆	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

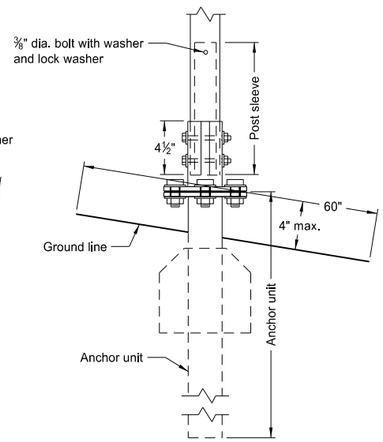
Top Post Receiver Data Table						
Square Post Sizes (B)	A	B	C	D	E	F
2³⁄₁₆"x10 ga.	1⁹⁄₆₄"	2½"	3¹⁄₃₂"	25⁄₃₂"	1³³⁄₆₄"	1⅞"
2½"x10 ga.	1⁹⁄₃₂"	2½"	3⁵⁄₁₆"	⅝"	1²¹⁄₃₂"	1¾"

(A) The breakaway base is required when the support is placed in weak soils. The Engineer shall determine if the soils are weak.

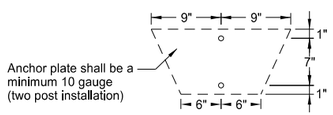
(B) The 2³⁄₁₆"x10 ga. may be inserted into 2½"x10 ga. for additional wind load.

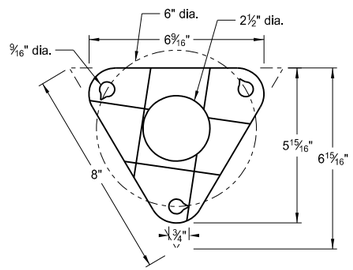


Anchor Unit and Post Assembly



Multi-Directional
Slip Base Anchor Unit
and Post Sleeve Assembly





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

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

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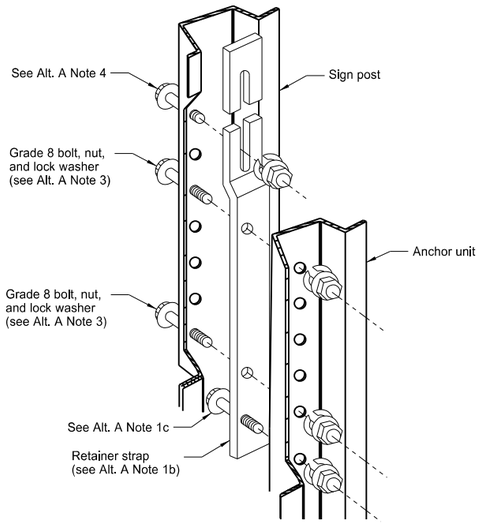
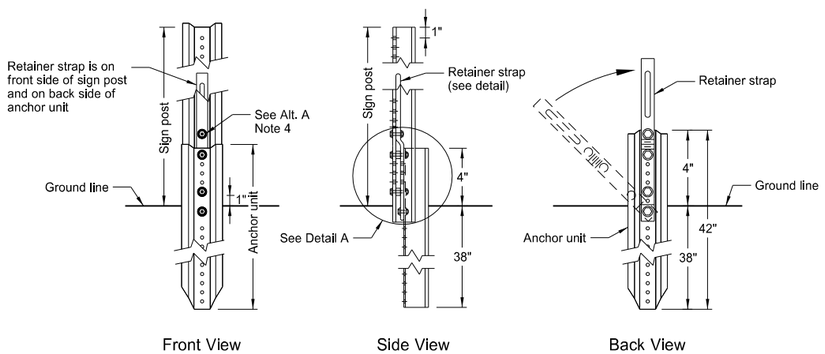
BREAKAWAY SYSTEMS FOR CONSTRUCTION ZONE SIGNS

D-704-8

U-Channel Post



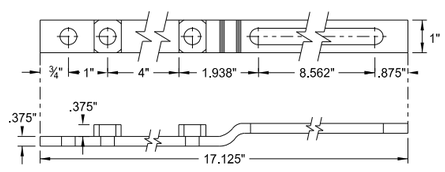
Detail A



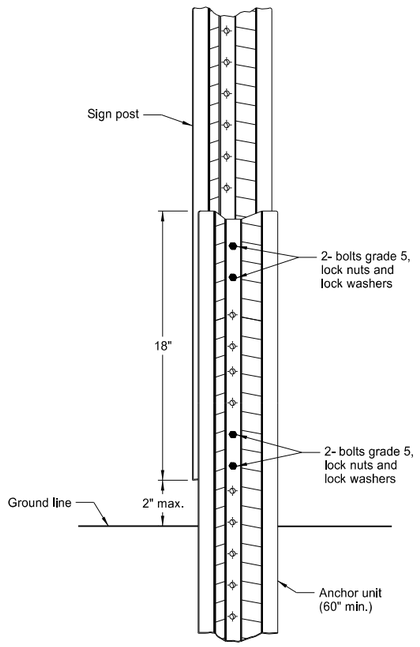
Front View Side View Back View

Breakaway U-Channel Detail
Alternate A

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

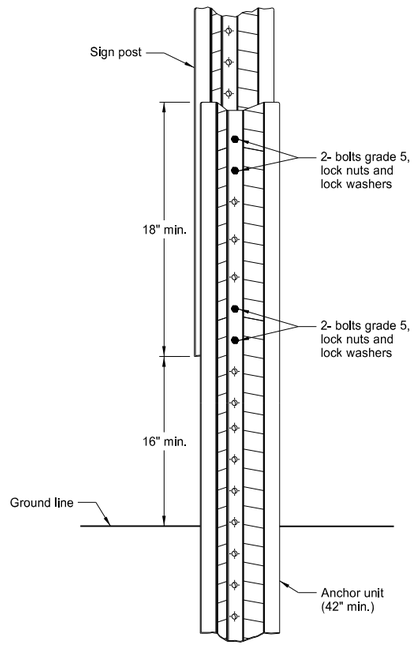


Retainer Strap Detail



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.

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

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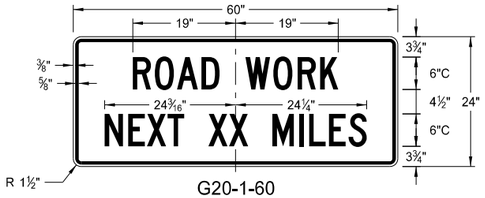
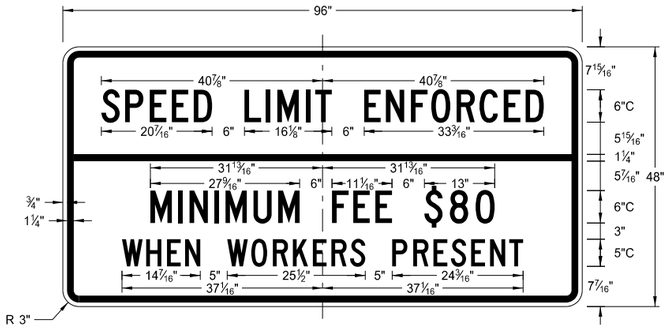
CONSTRUCTION SIGN DETAILS
TERMINAL AND GUIDE SIGNS

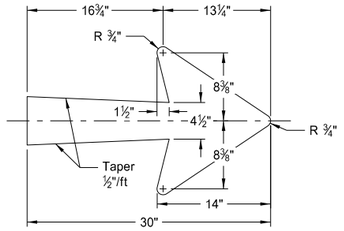


G20-1-60
Legend: black (non-refl)
Background: orange

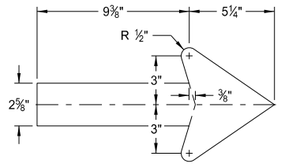
G20-4b-36
Legend: black (non-refl)
Background; orange



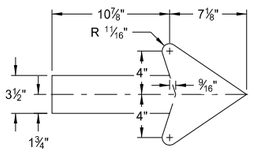
G20-55-96
Legend: black (non-refl)
Background: orange



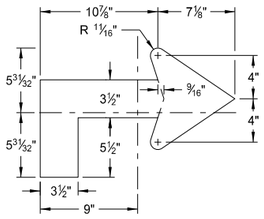
E5-1-48



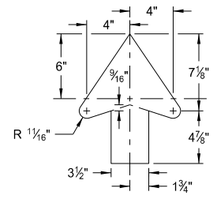
G20-50a-72
G20-52a-72



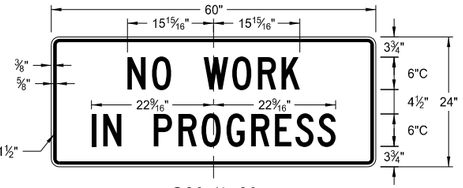
M4-9(L or R)-30
Right or Left



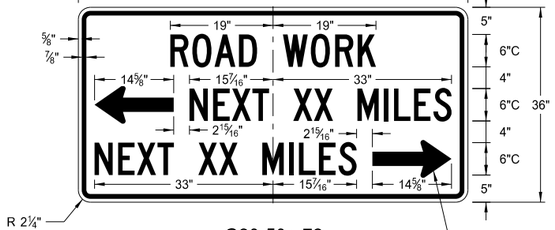
M4-9(L or R)-30
Advanced Right or Left



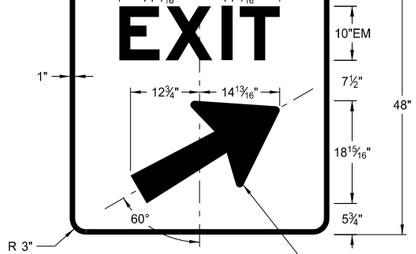
M4-9-30
Straight



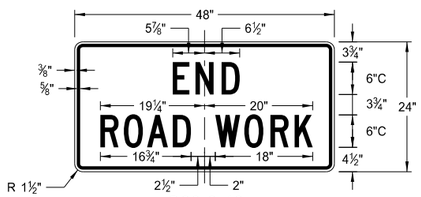
G20-1b-60
Legend: black (non-refl)
Background: orange



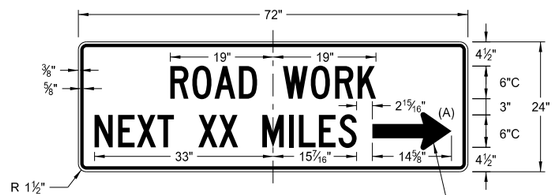
G20-50a-72
Legend: black (non-refl)
Background: orange



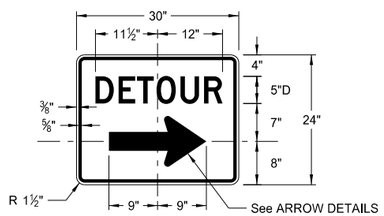
E5-1(L or R)-48
Legend: white
Background: green



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	
8-13-13	
REVISIONS	
DATE	CHANGE

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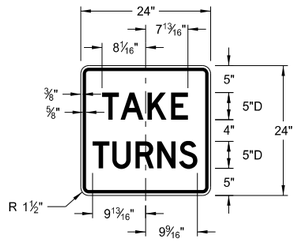
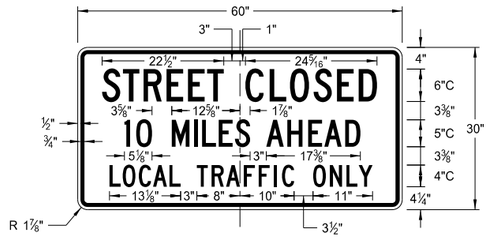
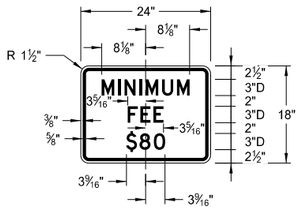
CONSTRUCTION SIGN DETAILS
REGULATORY SIGNS



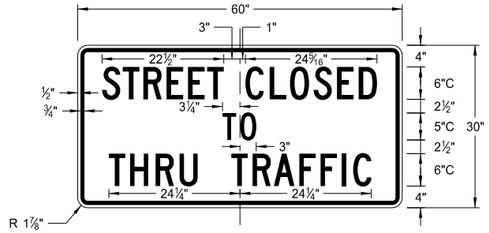
R1-50-24
Legend: black (non-refl)
Background: white



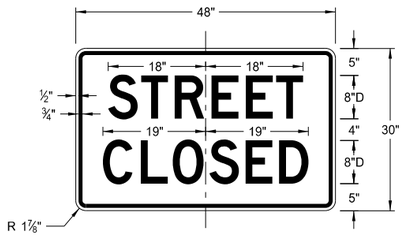
R11-3c-60
Legend: black (non-refl)
Background: white



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



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



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

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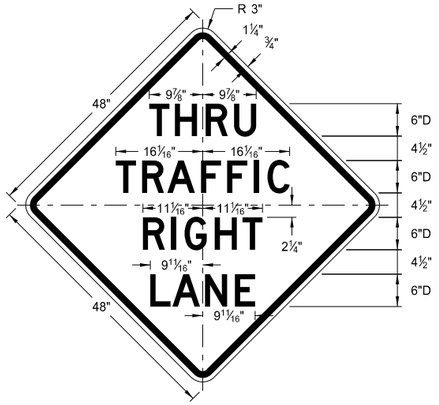
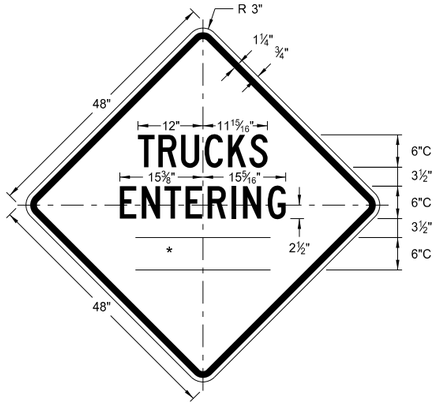
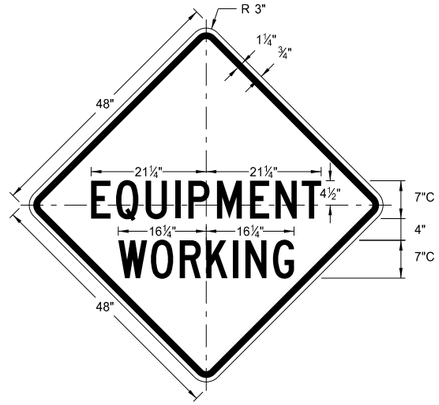
CONSTRUCTION SIGN DETAILS
WARNING SIGNS



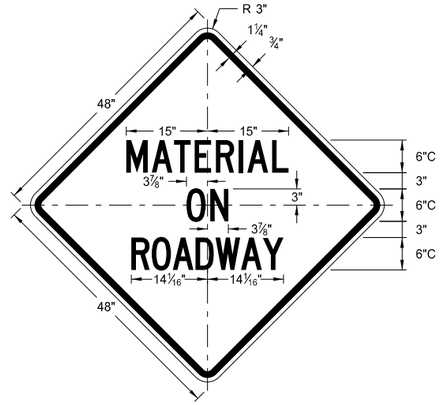
W5-8-48
Legend: black (non-refl)
Background: orange



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



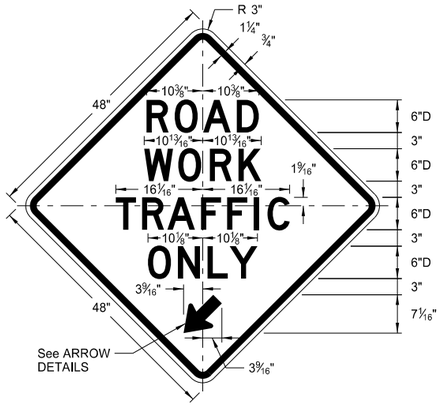
W20-51-48
Legend: black (non-refl)
Background: orange



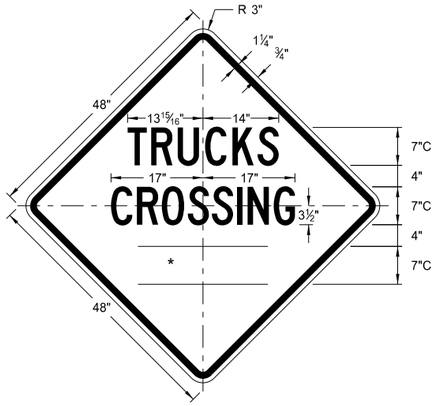
W21-51-48
Legend: black (non-refl)
Background: orange

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

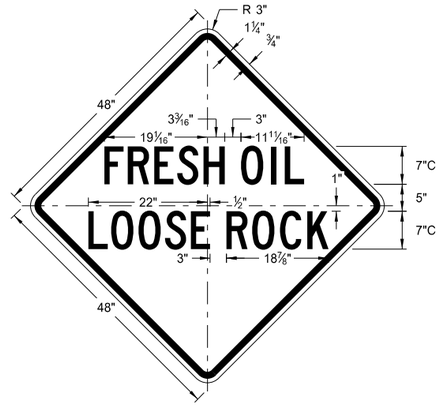


W5-9-48
Legend: black (non-refl)
Background: orange

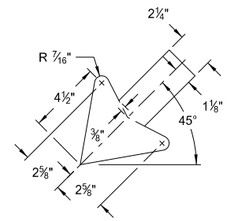


W8-55-48
Legend: black (non-refl)
Background: orange

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

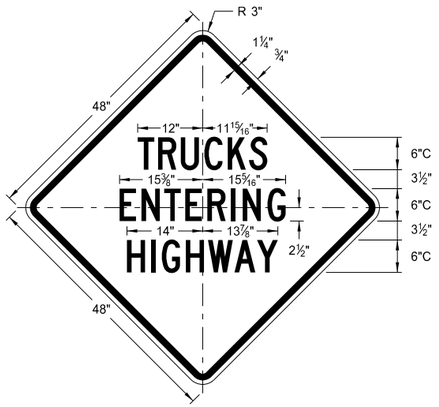


W22-8-48
Legend: black (non-refl)
Background: orange



W5-9-48

ARROW DETAILS



W8-53-48
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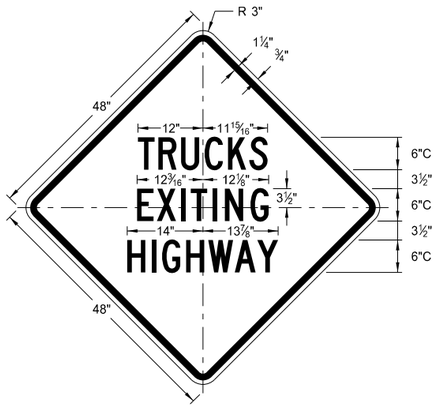
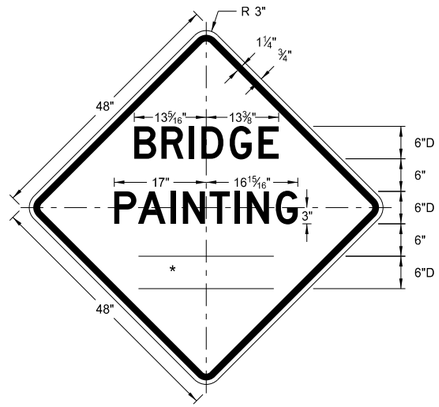
Background: orange



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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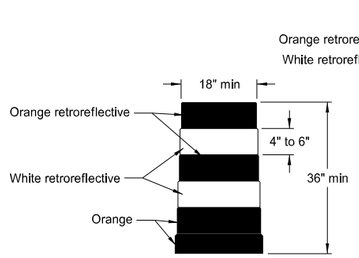
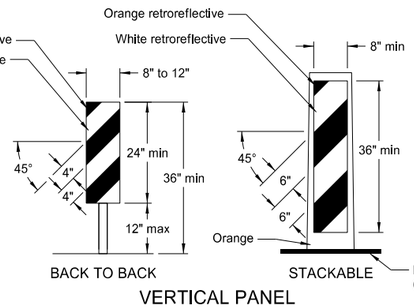
BARRICADE AND CHANNELIZING DEVICE DETAILS

D-704-13



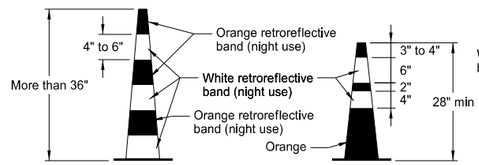
DELINEATOR DRUM

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.



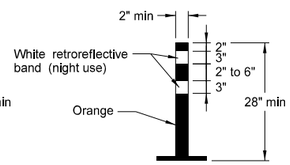
VERTICAL PANEL

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.



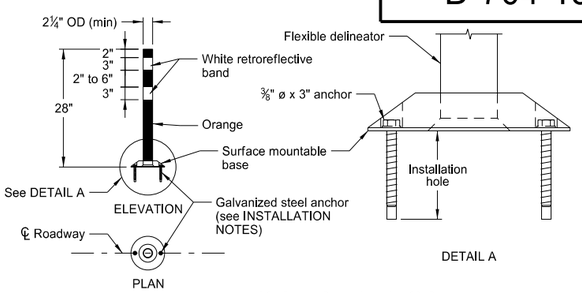
TRAFFIC CONE

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

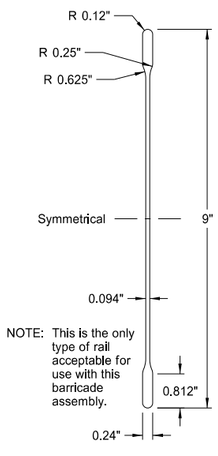
Retroreflectorization of tubular markers more than 42" in height shall be provided by alternating four 4" to 6" wide orange and white stripes with the top stripe being orange.



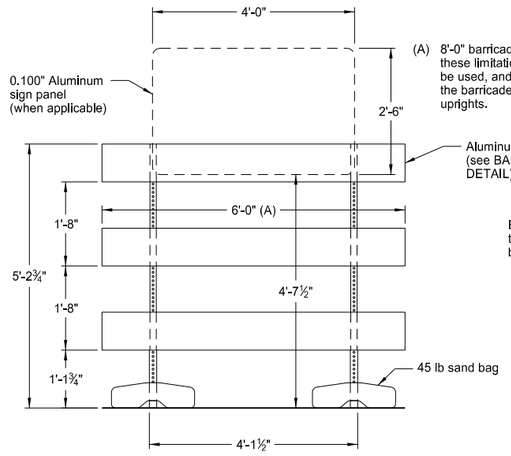
FLEXIBLE DELINEATOR

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.

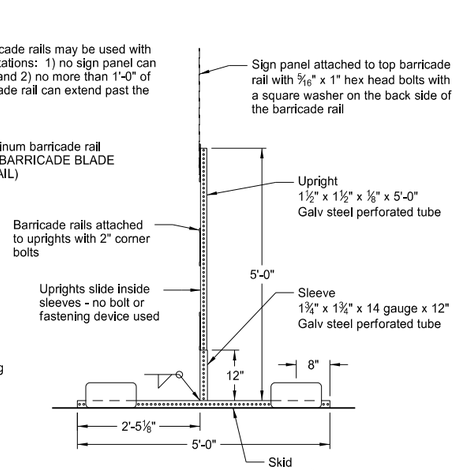


BARRICADE BLADE DETAIL



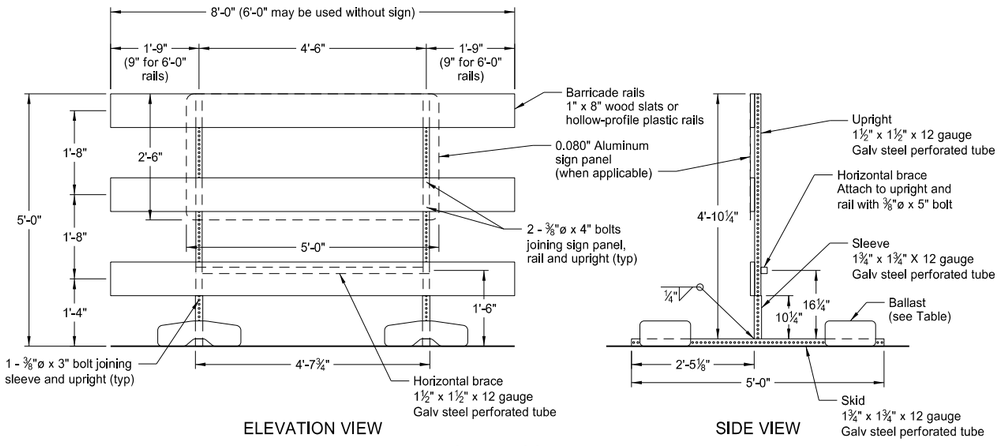
ELEVATION VIEW

(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)

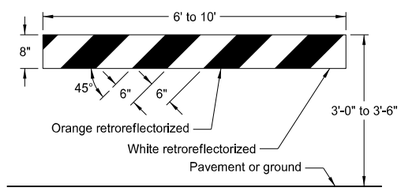


ELEVATION VIEW

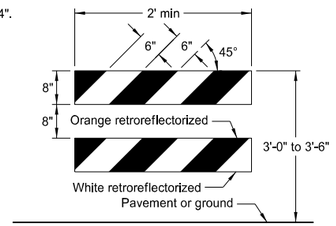
SIDE VIEW

BARRICADE ASSEMBLY DETAIL
(Wood or Plastic Rails)

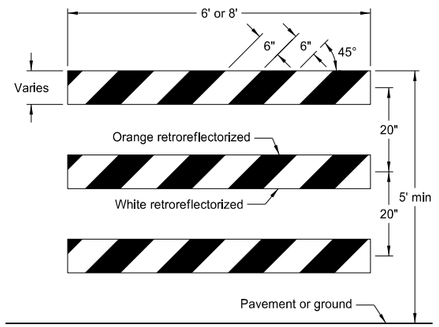
NOTE: Markings for barricades shall be alternating orange and white retroreflective stripes, sloping downward in the direction traffic is to pass. Retroreflective sheeting shall be placed on both sides of the rails and shall have a minimum of 270 square inches of visible retroreflective area facing vehicular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



TYPE I BARRICADE

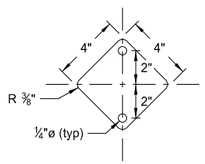


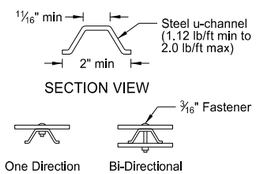
TYPE II BARRICADE

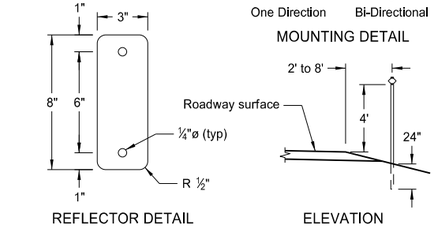


TYPE III BARRICADE

BARRICADE RAIL DETAILS







DELINEATORS

MINIMUM BALLAST
(For each side of barricade support)

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

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-3-13	
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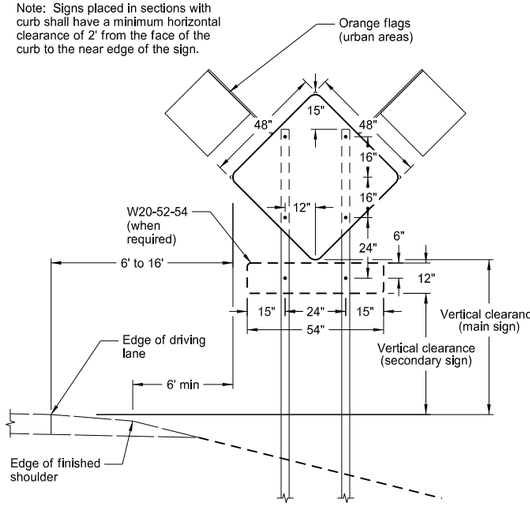
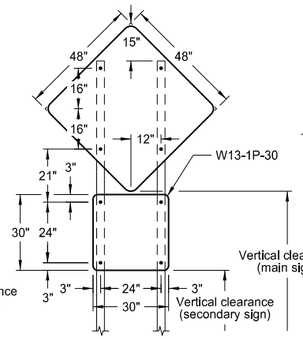
CONSTRUCTION SIGN PUNCHING AND MOUNTING DETAILS

D-704-14

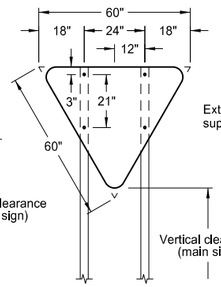
Note: Signs placed in sections with curb shall have a minimum horizontal clearance of 2' from the face of the curb to the near edge of the sign.



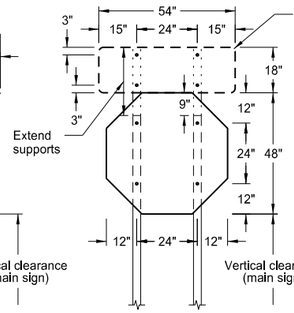
TYPICAL SECTION
(48" x 48" diamond warning sign shown)



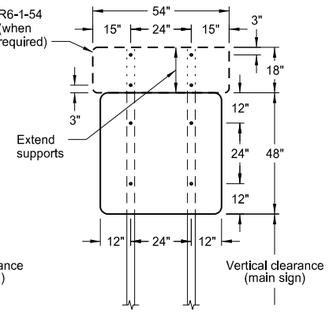
48" x 48" DIAMOND SIGN
(with 30" x 30" secondary sign)



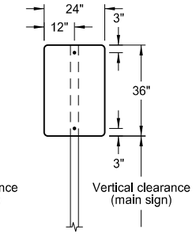
R1-2-60 - YIELD SIGN



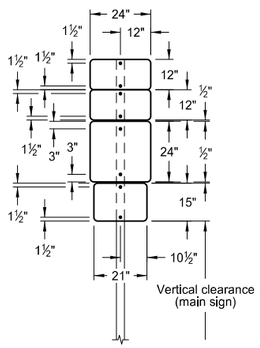
R1-1-48 - STOP SIGN
(with R6-1-54 sign as required)



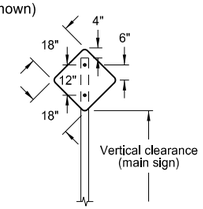
48" x 48" SIGN
(with R6-1-54 sign as required)



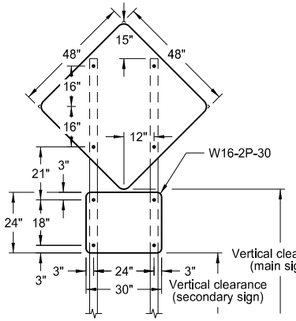
24" x 36" SIGN



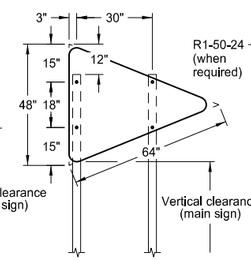
24" x 24"
ROUTE MARKER
ASSEMBLY



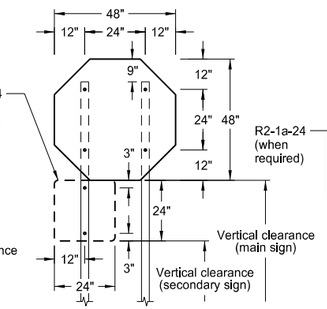
18" x 18"
DIAMOND SIGN



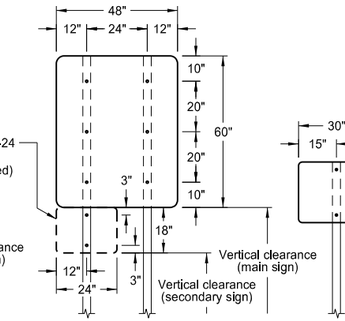
48" x 48" DIAMOND SIGN
(with 30" x 24" secondary sign)



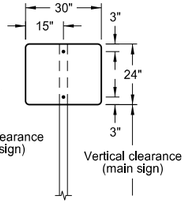
W14-3-64 - PENNANT SIGN



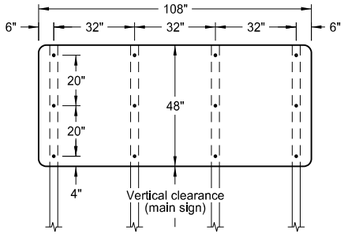
R1-1-48 - STOP SIGN
(with R1-50-24 sign as required)



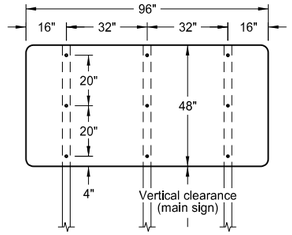
48" x 48" SIGN
(with R2-1a-24 sign as required)



30" x 24" SIGN



108" x 48" SIGN



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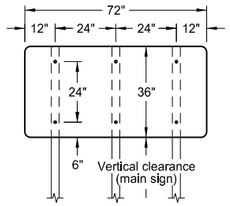
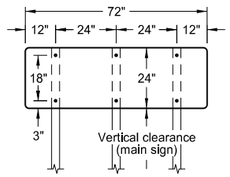
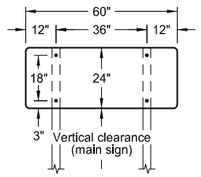


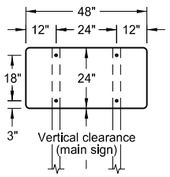
72" x 36" SIGN



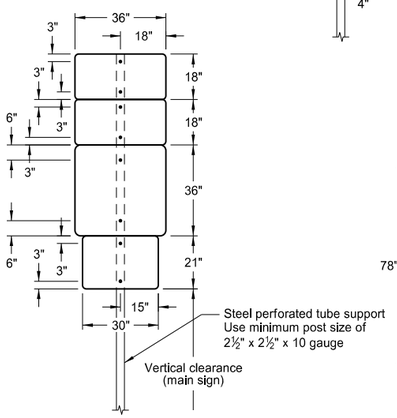
72" x 24" SIGN



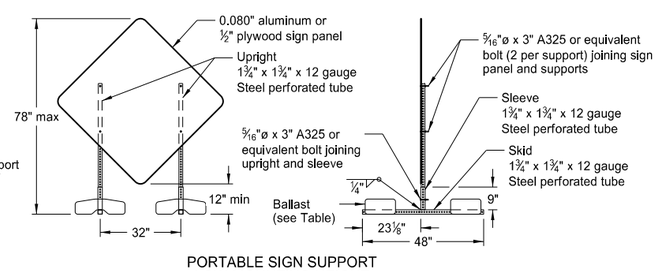
60" x 24" SIGN



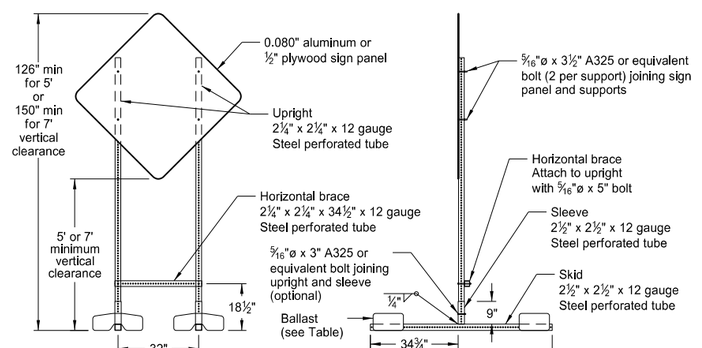
48" x 24" SIGN



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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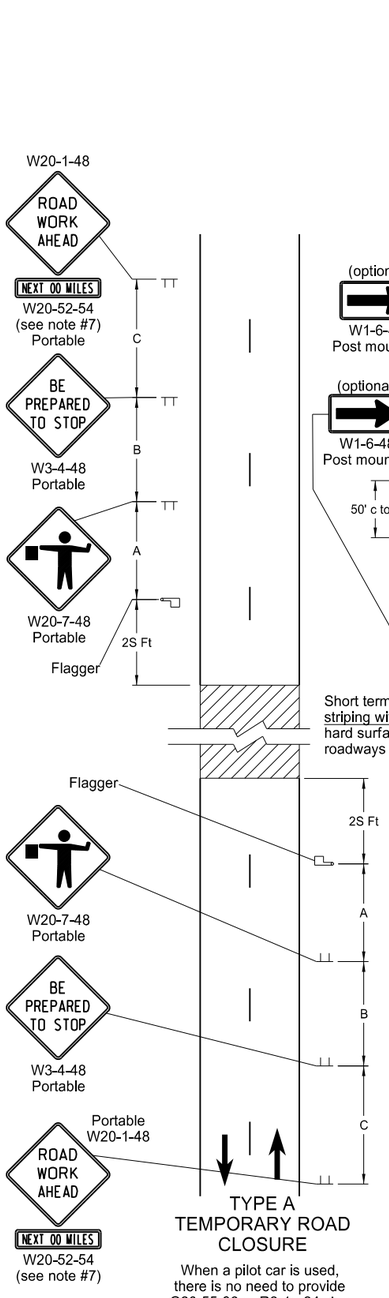
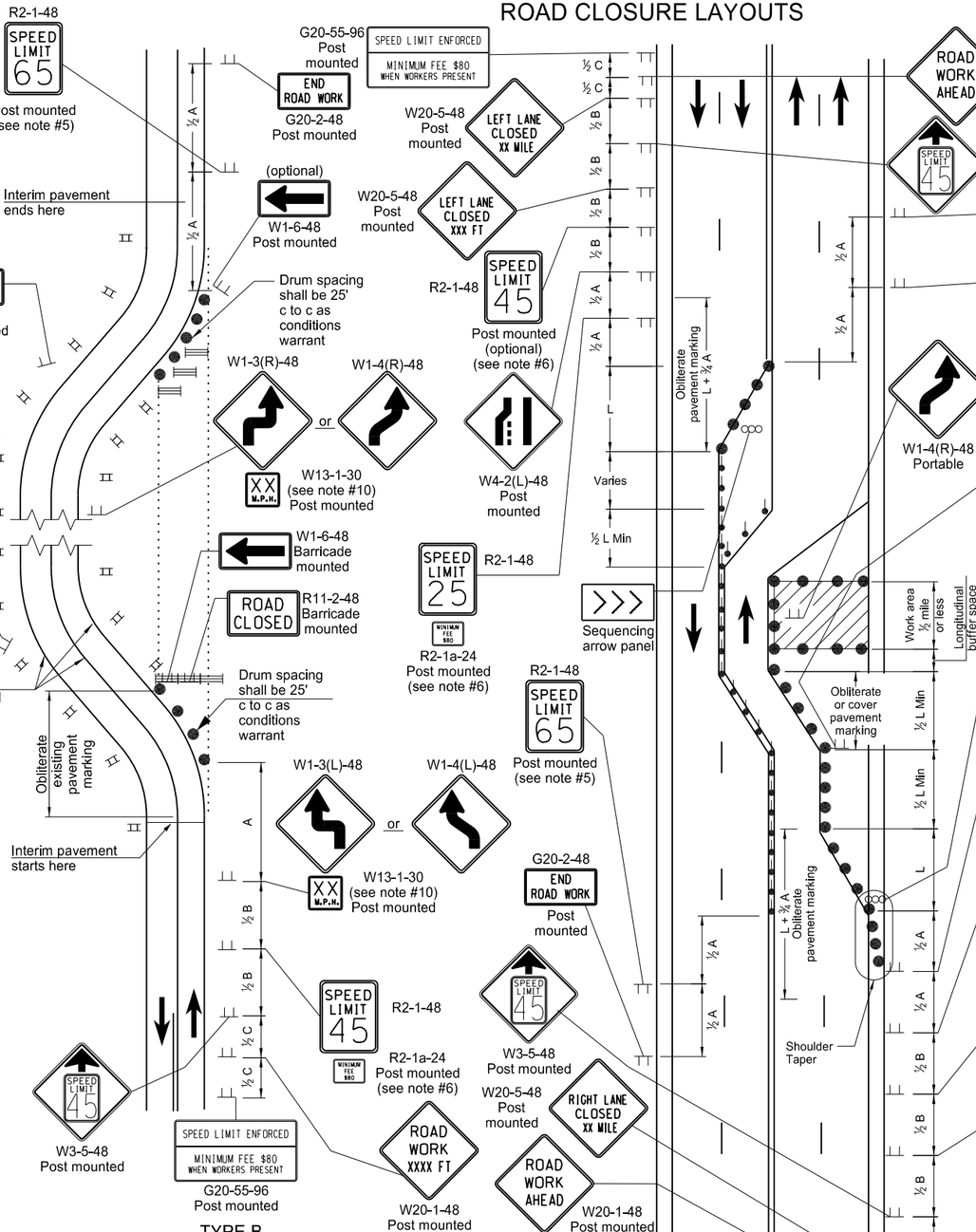
ROAD CLOSURE LAYOUTS

D-704-15



TYPE A
TEMPORARY ROAD CLOSURE

When a pilot car is used, there is no need to provide G20-55-96 or R2-1a-24 sign on the project as the pilot car will control the speed.



TYPE B
ROAD CLOSURE WITH A DIVERSION

Two lane highway where roadway is closed and detour is provided (signing shown for one direction of travel only). Use on bridge and culvert installation where closure is ½ mile or less.

TYPE C
HALF ROAD CLOSURE ON A MULTI-LANE, HIGH SPEED HIGHWAY

4 lane undivided highway with half the roadway closed.

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

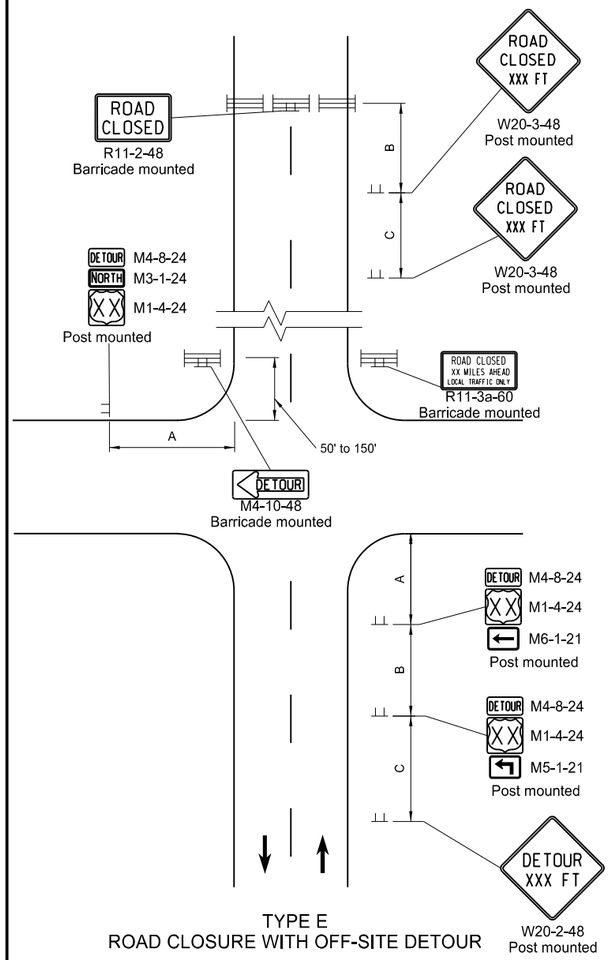
REVISIONS

DATE	CHANGE

This document was originally issued and sealed by Roger Weigel Registration Number PE-2930, on 09/27/13 and the original document is stored at the North Dakota Department of Transportation

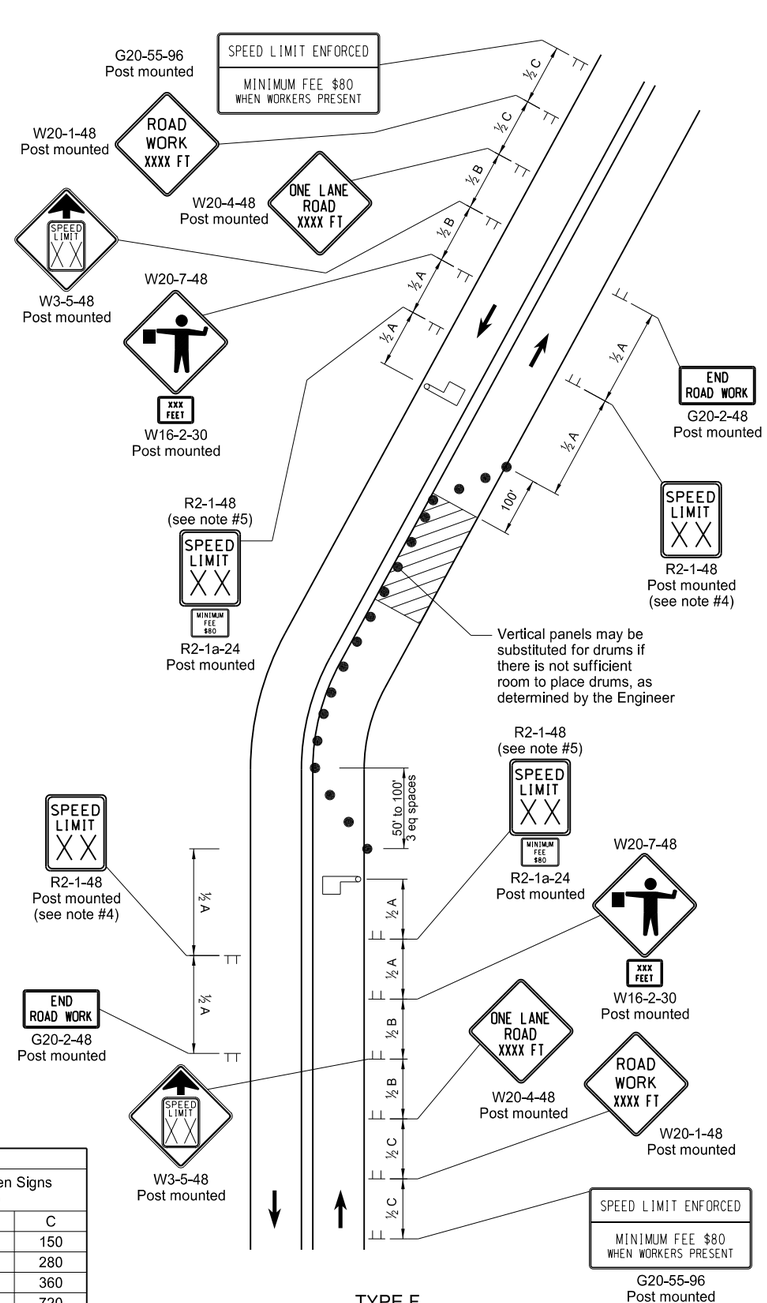
ROAD CLOSURE AND LANE CLOSURE ON A TWO WAY ROAD LAYOUTS

D-704-19



TYPE E
ROAD CLOSURE WITH OFF-SITE DETOUR

Used where a road is closed beyond a detour point. Signing shown for one direction only. Sign not shown on detour shall be shown in plans and installed and maintained by the contractor.



TYPE F
LANE CLOSURE ON A TWO LANE ROAD USING FLAGGERS

Two lane highway with one lane closed. Flagger is at a point where it is visible to approaching traffic.

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

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 the roadway shall be placed on skid mounted assemblies.
3. Delineator drums used for tapering traffic shall be placed at 3 equal spaces. Delineator drums for tangents shall be spaced at 2 times dimension "S".
4. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
5. The reduced speed limit shall be determined dependent on the in place speed limit before construction. The speed limit reduction should not exceed 10 mph below the existing speed limit, unless the design speed of the work zone feature has been reduced below the 10 mph. In this case, the speed limit reduction shall not exceed 30 MPH. Where speed limits are to be reduced more than 30 MPH, a second speed limit sign shall be installed with the desired speed reduction but shall not exceed 30 MPH. The second speed limit sign shall be placed at 1/2 B.
6. 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.
7. Existing speed limit signs within a reduced speed zone shall be covered.
8. Where necessary, safe speed to be determined by the Engineer.
9. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.
10. G20-55-96 or R2-1a-24 sign are not required when a pilot car operation is used, if this standard is part of other traffic control layouts, or the work is less than 15 days.
11. When highway-rail grade crossings exist either within or in the vicinity of the roadway work activities:
    a. Extra care shall be taken to minimize the probability of conditions being created, either by lane restrictions, flagging or other operations, where vehicles might be stopped within the highway-rail grade crossing (considered as being 15 feet on either side of the closest and farthest rail.)
    b. A "Do Not Stop on Tracks" sign (R8-8-24) should be placed near the cross buck in each direction while the lane closure is in the vicinity of the tracks.
    c. A buffer space between the work zone and the lane closure transition should be extended upstream of the highway-rail grade crossing so a queue created by the flagging operation will not extend across the highway-rail grade crossing.
    d. If the queuing of vehicles across active rail tracks cannot be avoided, a flagger shall be provided at the highway-rail grade crossing to prevent vehicles from stopping within the highway-rail grade crossing, even if automatic warning devices are in place.

KEY

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

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

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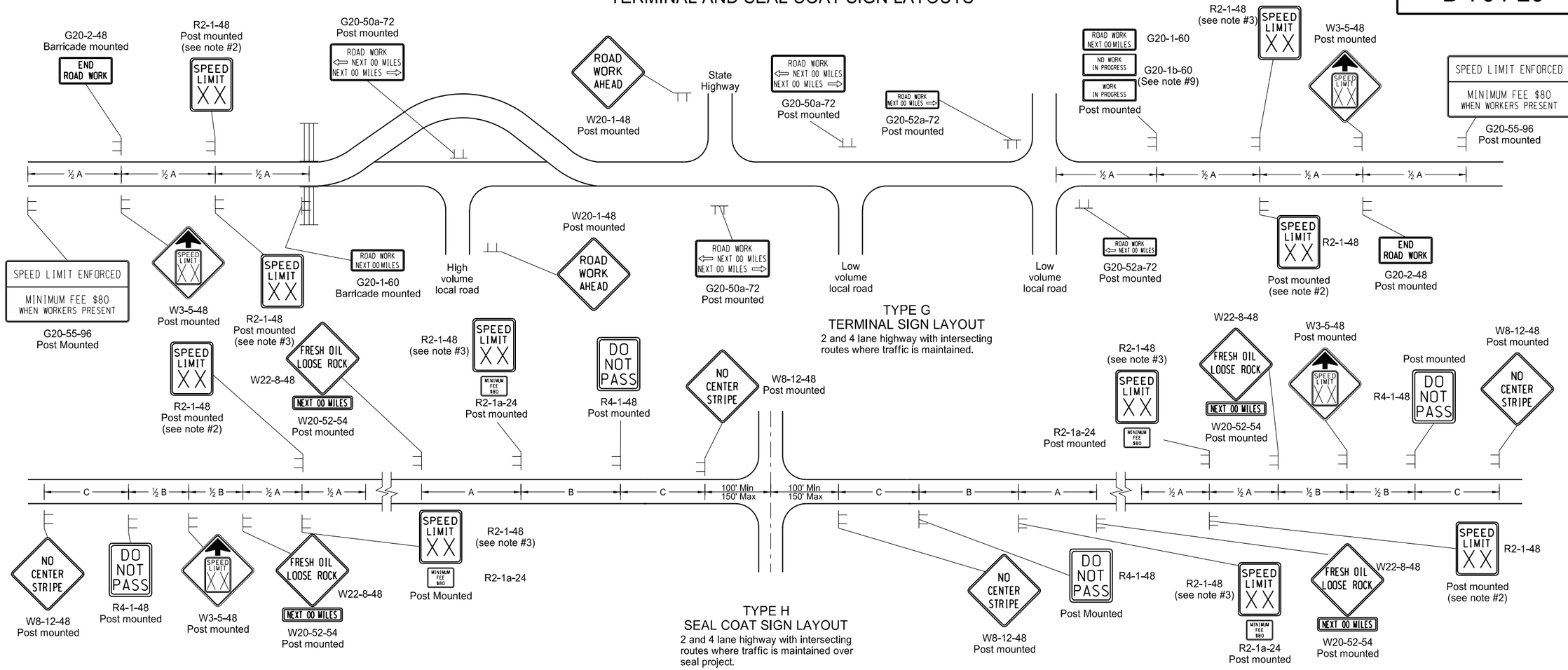
TERMINAL AND SEAL COAT SIGN LAYOUTS

D-704-20



1. Barricades placed on roadway shall be on a moveable assembly. Signs placed on the roadway shall be placed on skid mounted assemblies.
2. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
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. On seal projects, signs R2-1-48, R2-1a-24, R4-1-48, W22-8-48 and W20-52-54 shall be placed just after all important intersections and at five mile intervals thereafter. Sign W8-12-48 shall be placed just after all important intersections and at 2 mile intervals thereafter until the short term center line pavement marking is in place. No short term pavement markings are placed when traffic volumes are 750 ADT or less.
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. Type H construction sign traffic control shall have the speed limit signs covered or removed once the loose aggregate has been removed.
9. The contractor shall install the G20-1b-60 sign when work is suspended for winter.
10. Other traffic control layouts will be required in the immediate work areas. If the speed limit is reduced in the work area, speed limit signs shall have the R2-1a-24 sign placed below.
11. G20-55-96 sign is not required if 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

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

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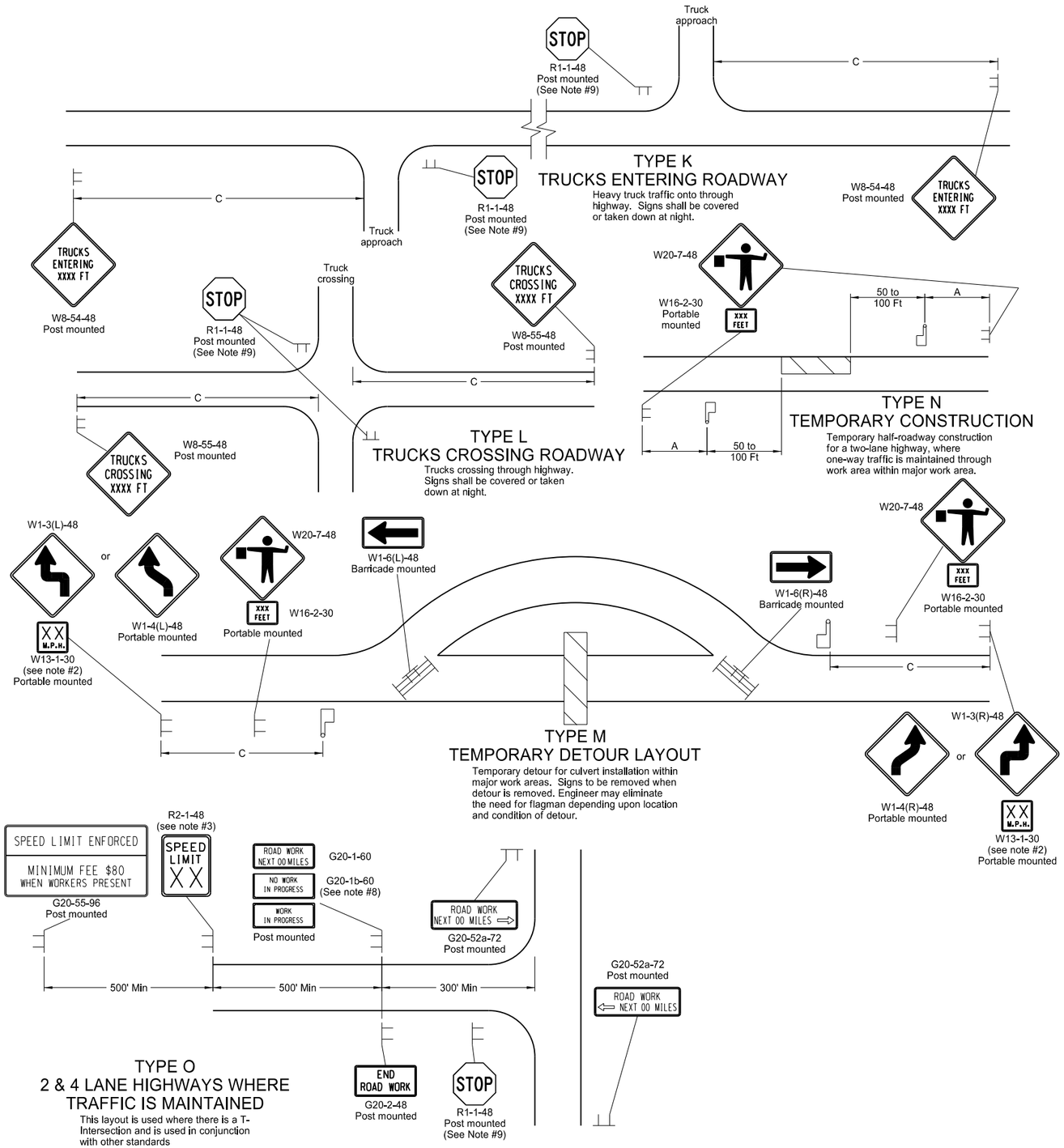
CONSTRUCTION TRUCK AND TEMPORARY DETOUR LAYOUTS

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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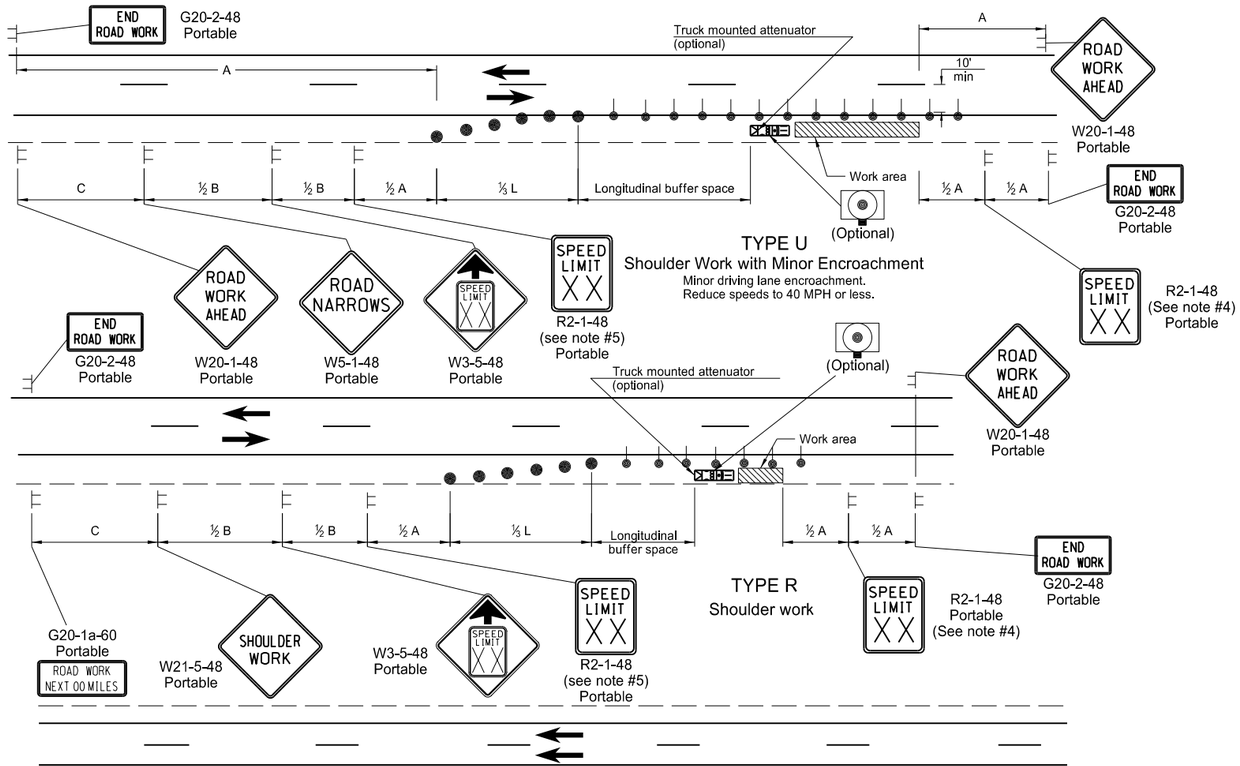
SHOULDER CLOSURES AND BRIDGE PAINTING LAYOUTS

D-704-24



Notes

1. Variables
   S = Numerical value of speed limit or 85th percentile.
   W = The width of the 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. Delineator drums used for tapering traffic shall be spaced at dimension "S".
   Delineator drums or tubular markers used for tangents shall be spaced at 2 times "S".
3. Sequencing Arrow Panels
   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).
4. The speed limit shall be re-established. The exact speed limit shall be determined in the field, dependent on location and conditions.
5. 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 ½B.
6. 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.
7. Existing speed limit signs within a reduced speed zone shall be covered.
8. The contractor has the option of using portable sign supports in lieu of post mounted signs in accordance with the NDDOT Standard Specifications.

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

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

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

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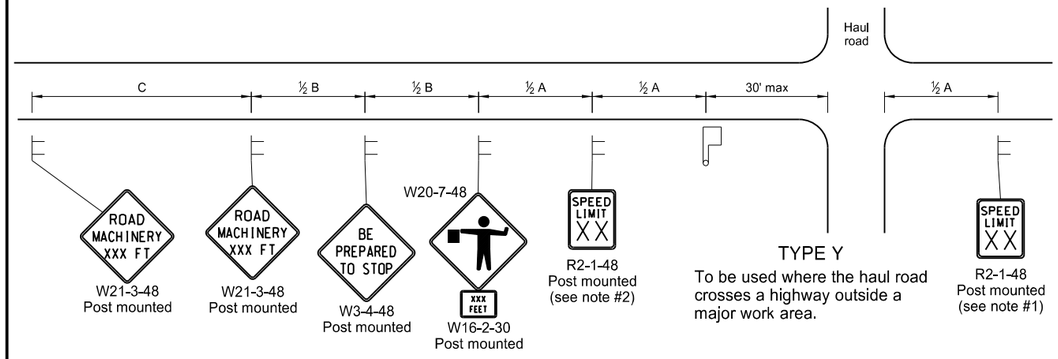
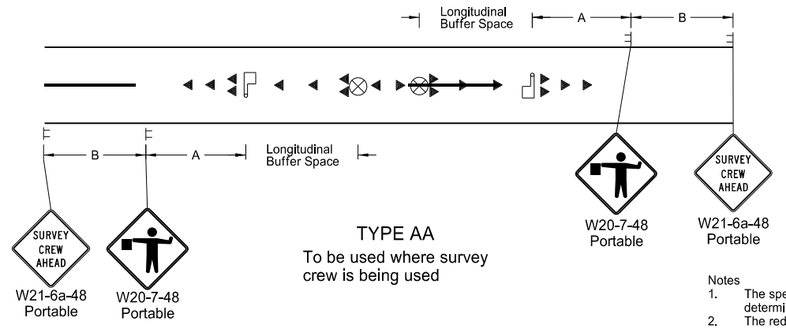
MISCELLANEOUS SIGN LAYOUTS

D-704-26



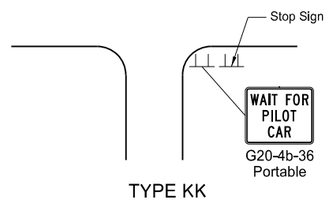
TYPE Y

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

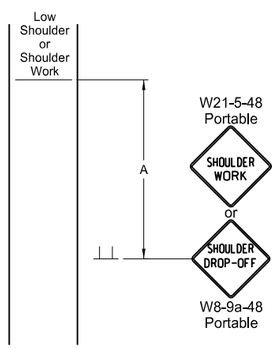


TYPE KK

To be used at major intersections within pilot car control area

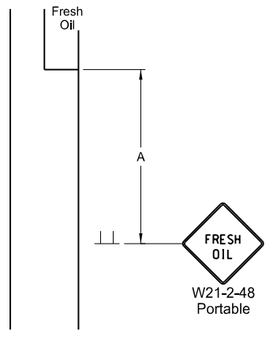
Notes

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.



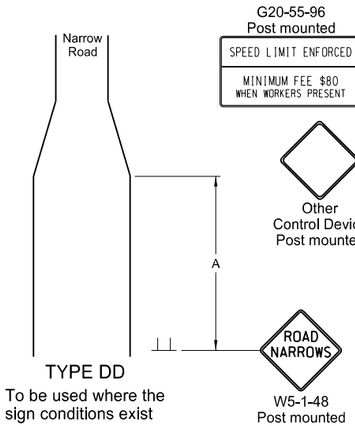
TYPE BB

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



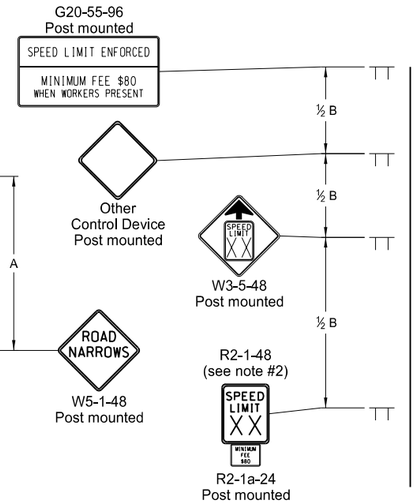
TYPE CC

To be used where the sign conditions exist



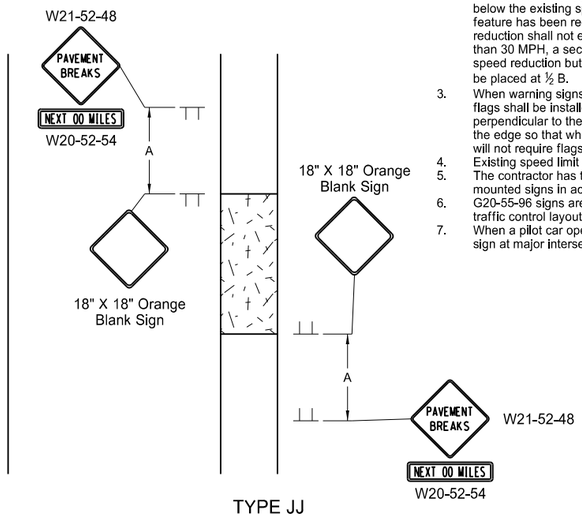
TYPE DD

To be used where the sign conditions exist



TYPE Z

To be used where speed zone is needed

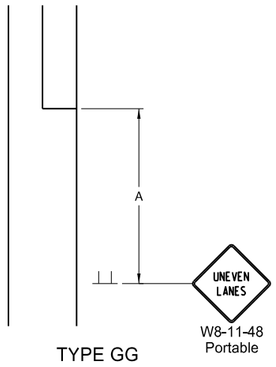


TYPE JJ

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.

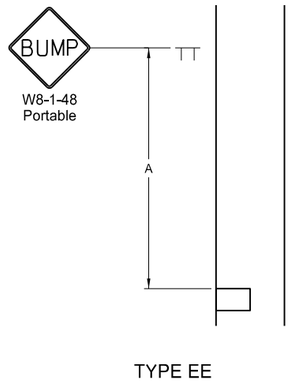
Longitudinal Buffer Space	
*Speed (mph)	Length Min (feet)
20	115
25	155
30	200
35	250
40	305
45	360
50	425
55	495
60	570
65	645
70	730
75	820

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



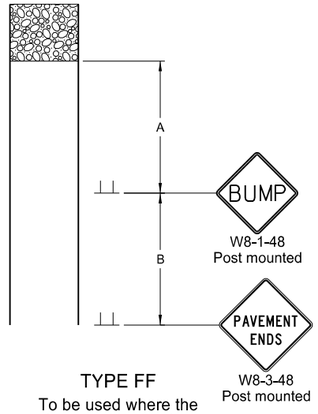
TYPE GG

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

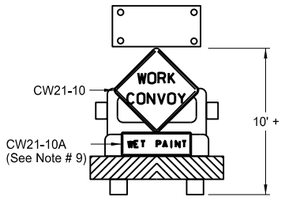
Cones

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

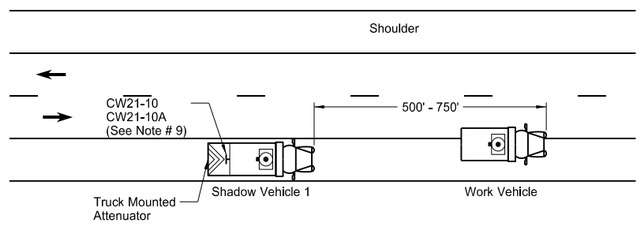
This document was originally issued and sealed by Roger Weigel Registration Number PE-2930, on 09/27/13 and the original document is stored at the North Dakota Department of Transportation

TRAFFIC CONTROL PLAN FOR MOVING OPERATIONS

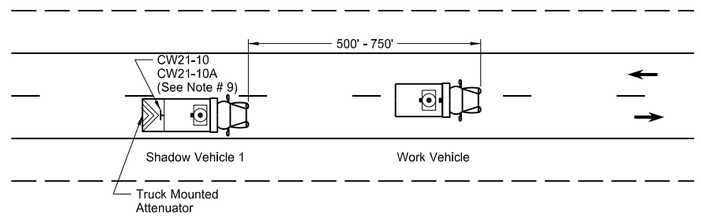
D-704-27



Typical Shadow Vehicle 1
Two-Way Roaday



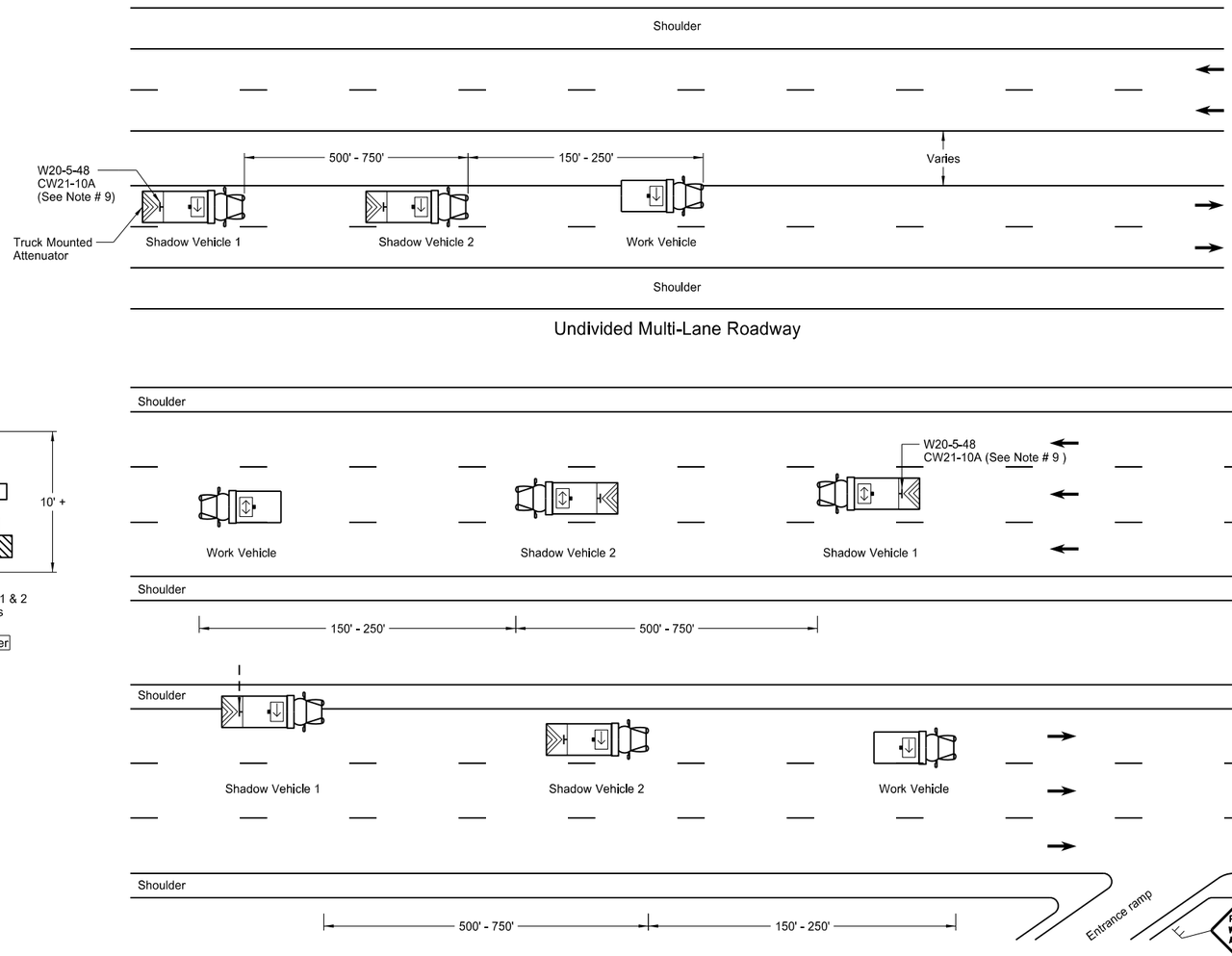
Two-Way Roadway with Paved Shoulders



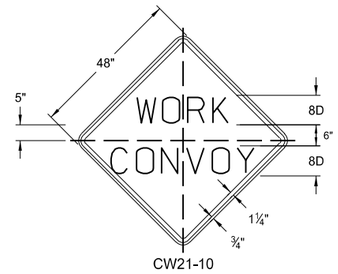
Two-Way Roadway without Paved Shoulders

Notes

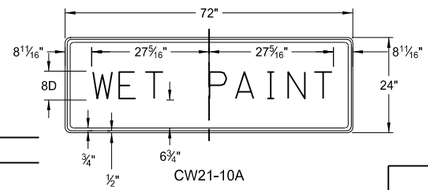
1. If the contractor chooses to place more vehicles in the convoy than are shown, these vehicles shall have the truck mounted attenuator and shall be at the contractor's expense.
2. Shadow and work vehicles shall display yellow rotating beacons or strobe lights unless otherwise stated elsewhere in the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



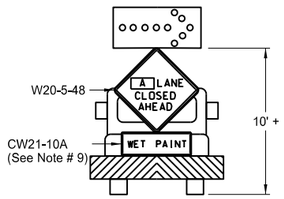
Sign Details



CW21-10



CW21-10A



Typical Shadow Vehicle 1 & 2
Multi-Lane Highways

A = Left Right Center

KEY

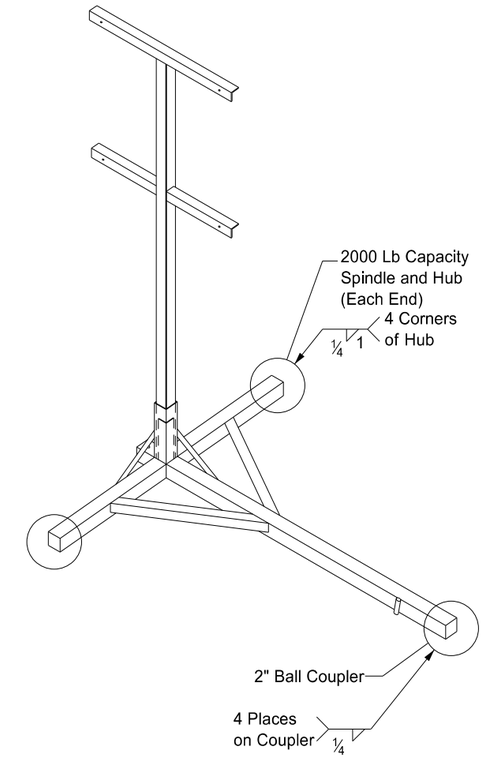
- Sign
- Truck mounted attenuator
- Flashing arrow panels:
  - Right directional
  - Left directional
  - Double arrow directional
  - Caution Mode

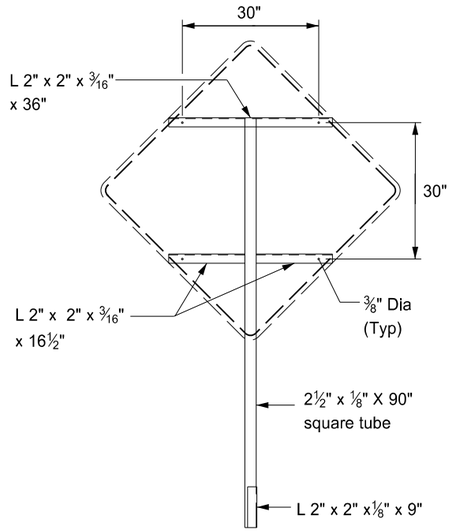
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
9-27-13	
REVISIONS	
DATE	CHANGE
6-18-14	Removed shadow vehicle 2 on two lane roadways

This document was originally issued and sealed by Roger Weigel Registration Number PE- 2930, on 06/18/14 and the original document is stored at the North Dakota Department of Transportation

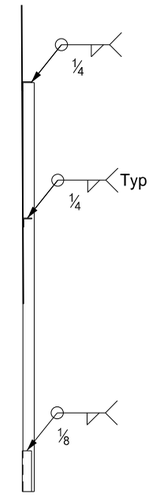
PORTABLE SIGN SUPPORT ASSEMBLY

D-704-50



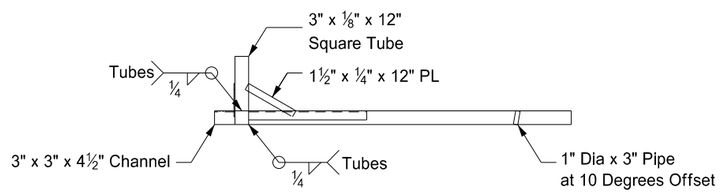


FRONT

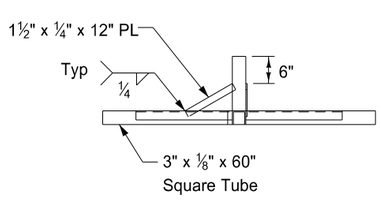


RIGHT

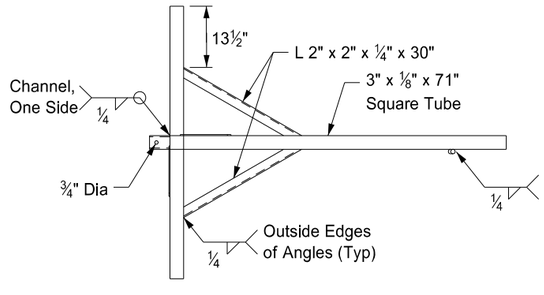
SIGN SUPPORT



FRONT



RIGHT



TOP

TRAILER

Notes:

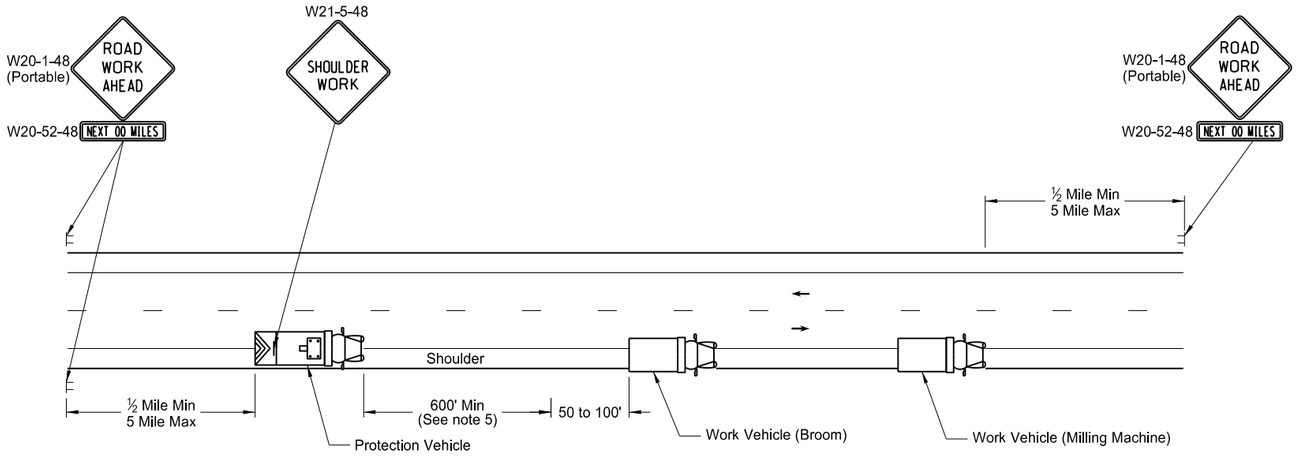
1. The maximum weight of the assembly is 250 pounds.
2. Use a 14" wheel and tire.
3. Automotive and equipment axle assemblies may not be used for trailer-mounted sign supports.
4. Other NCHRP 350 crash tested assemblies are acceptable.

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

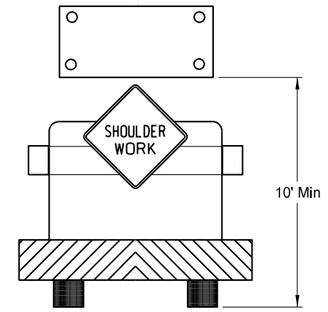
This document was originally issued and sealed by Roger Weigel Registration Number PE- 2930 , on 11/23/10 and the original document is stored at the North Dakota Department of Transportation

MOBILE OPERATION
Grinding Shoulder Rumble Strips

D-704-56



TWO LANE - TWO WAY ROADWAY

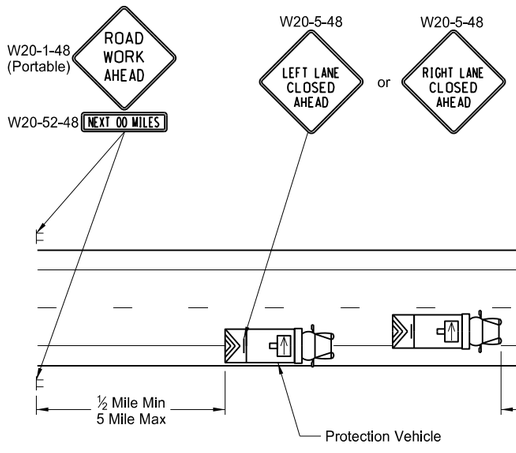


TWO LANE - TWO WAY ROADWAY

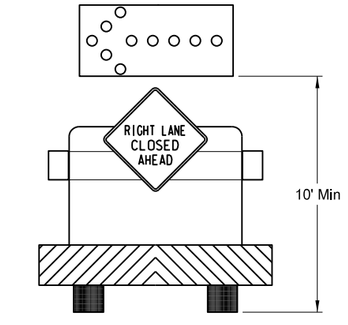
Typical Protection Vehicle with
Flashing Arrow Panel In Caution Mode

Notes:

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

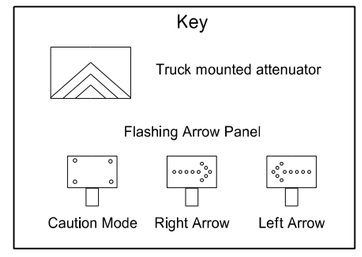


INTERSTATE & 4 LANE DIVIDED HIGHWAY



INTERSTATE & 4 LANE DIVIDED HIGHWAY

Typical Protection Vehicle with Flashing Arrow
Panel In Flashing Arrow Mode

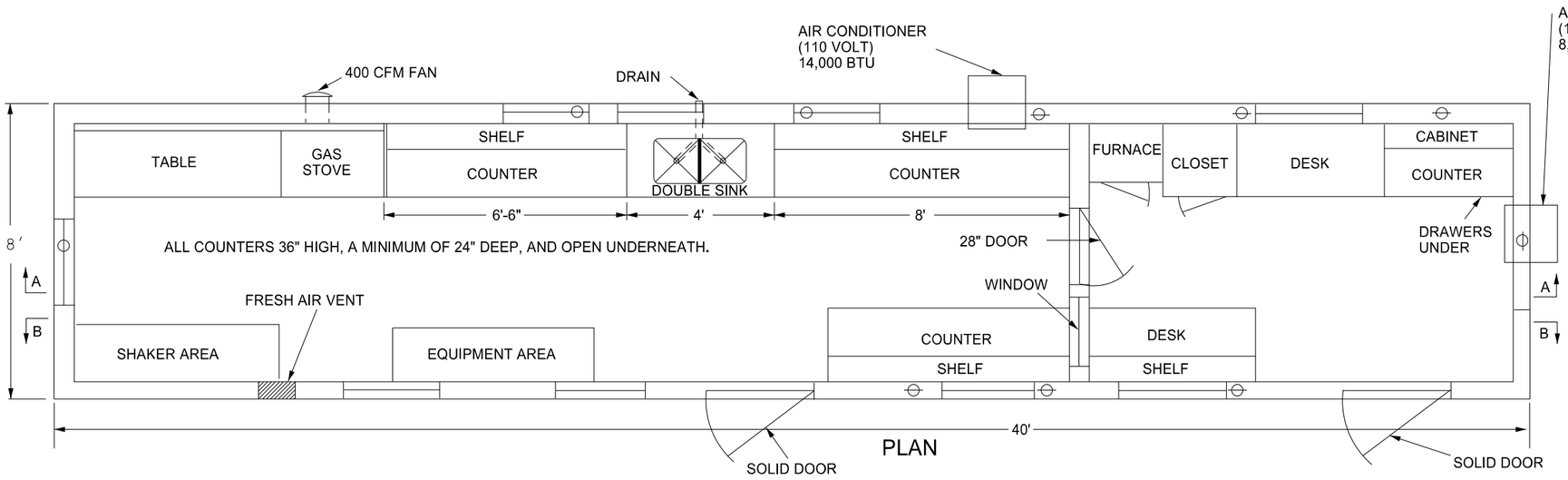


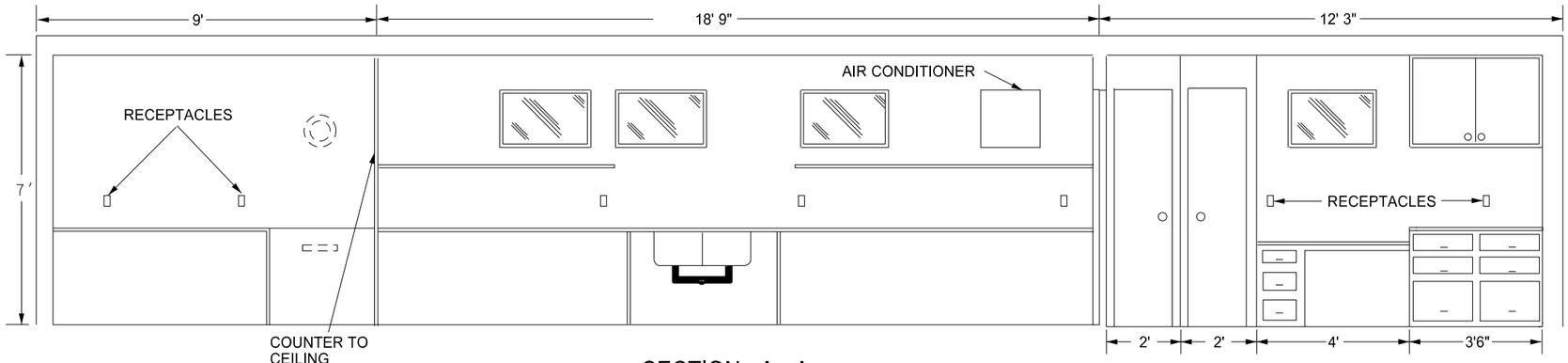
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
11-15-12	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Roger Weigel Registration Number PE- 2930, on 11/15/12 and the original document is stored at the North Dakota Department of Transportation

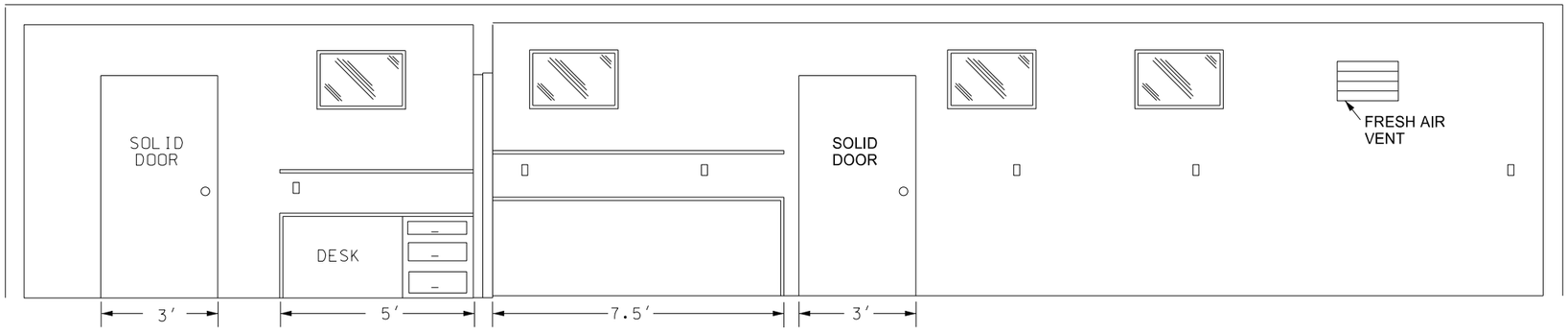
BITUMINOUS LABORATORY

D-706-1





SECTION A - A



SECTION B - B

Provide a laboratory with the following:

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

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
10-03-13	
REVISIONS	
DATE	CHANGE
07-30-14	Changed standard's title and revised notes.
01-11-16	Revised notes.

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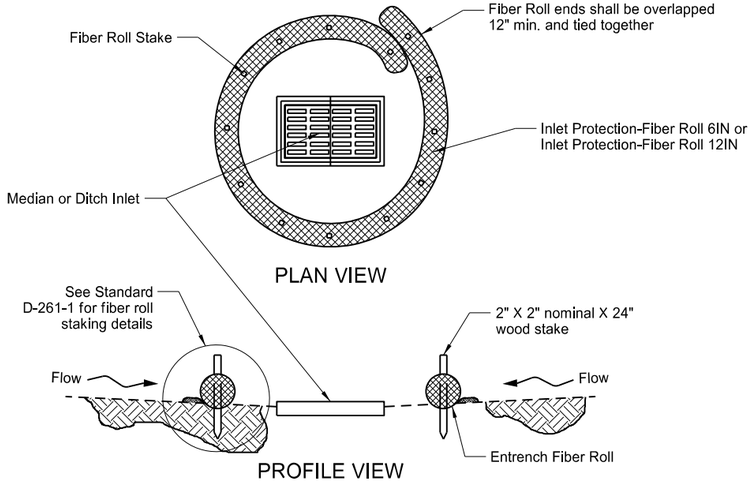
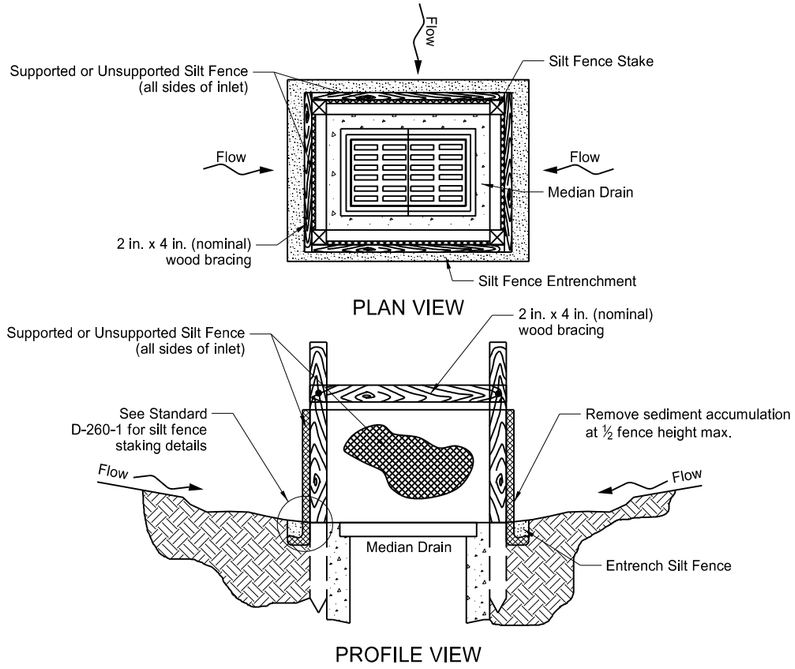
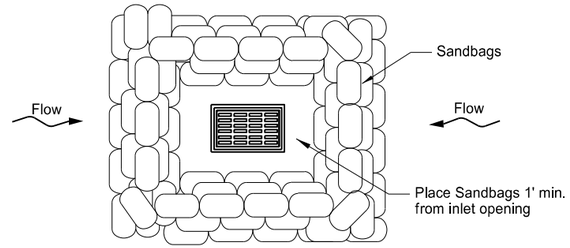
EROSION AND SILTATION CONTROLS
MEDIAN OR DITCH INLET PROTECTION



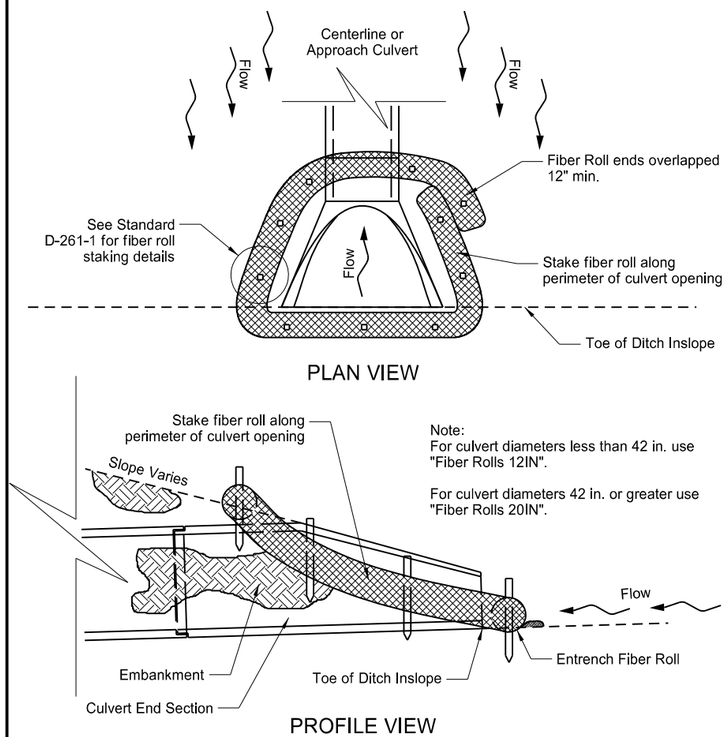
FIBER ROLL PROTECTION (MEDIAN OR DITCH INLET)



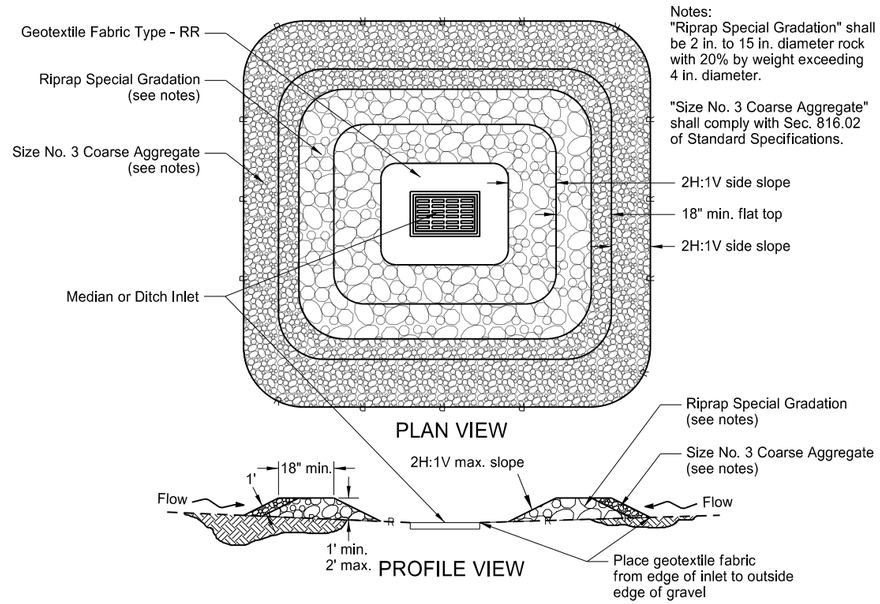
SILT FENCE PROTECTION (MEDIAN OR DITCH INLET)



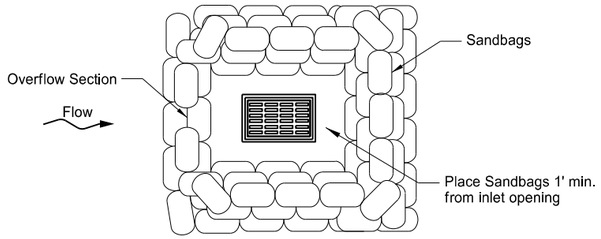
SANDBAG PROTECTION (LOW POINT)



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.

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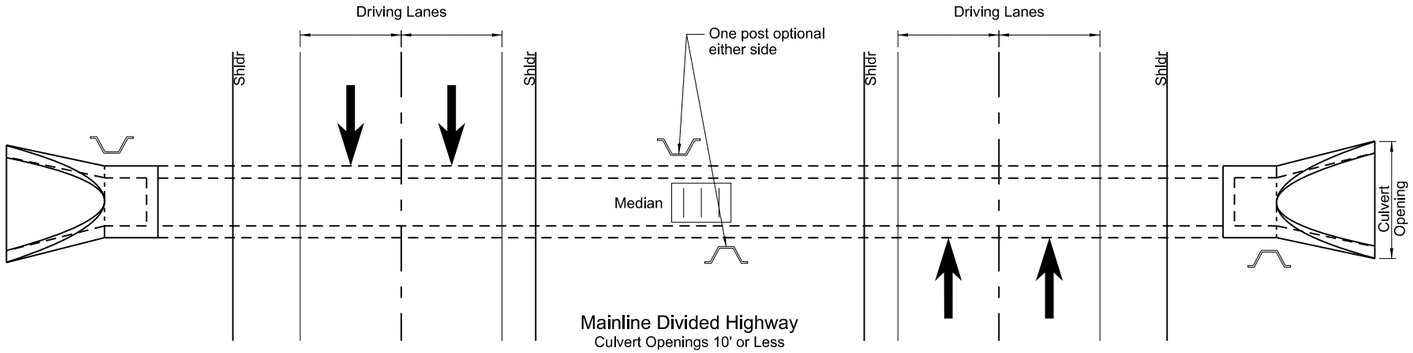
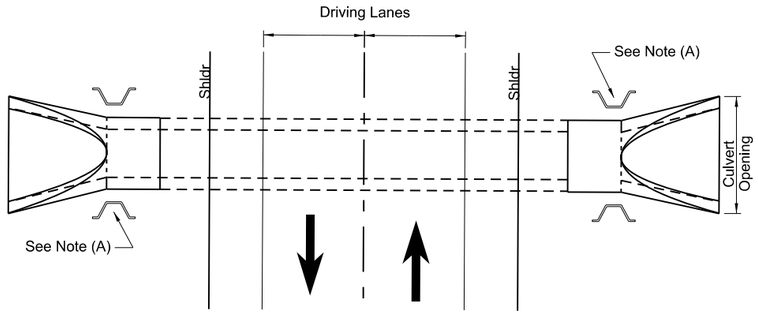
OBJECT MARKERS - CULVERTS

D-754-83

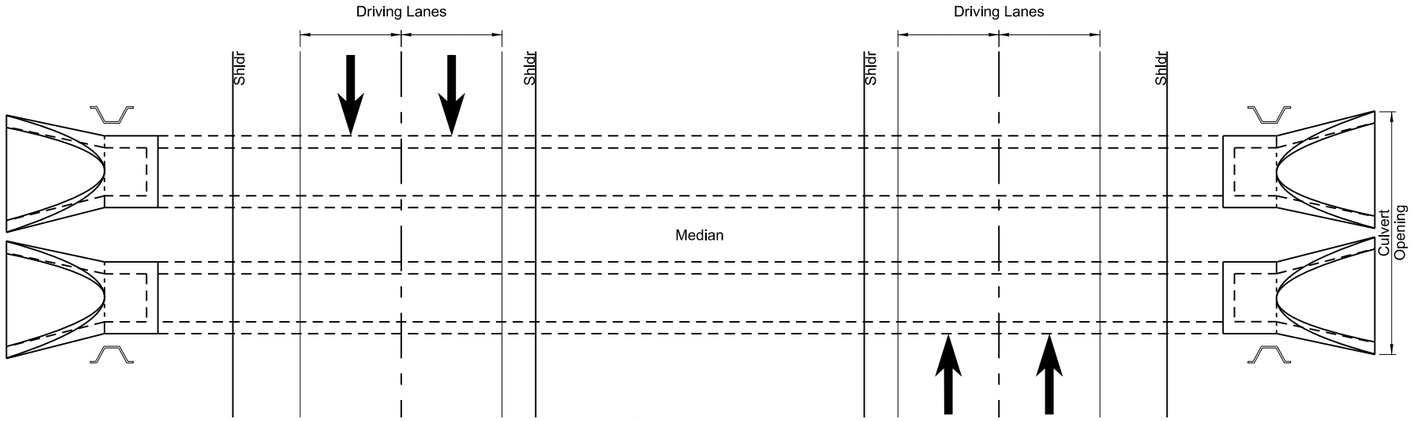


Mainline Divided Highway
Culvert Openings 10' or Less

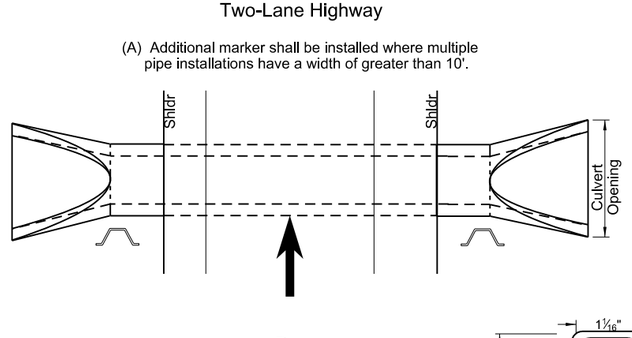


Two-Lane Highway

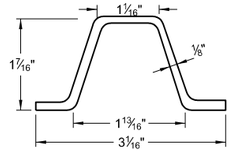
(A) Additional marker shall be installed where multiple pipe installations have a width of greater than 10'.



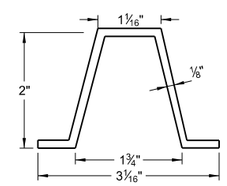
Mainline Divided Highway
Culvert Openings Greater than 10'
Multiple Installations



Ramp



Steel Post Detail
Approx. 2.0 lbs/ft



Aluminum Post Detail
Approx. 0.88 lbs/ft

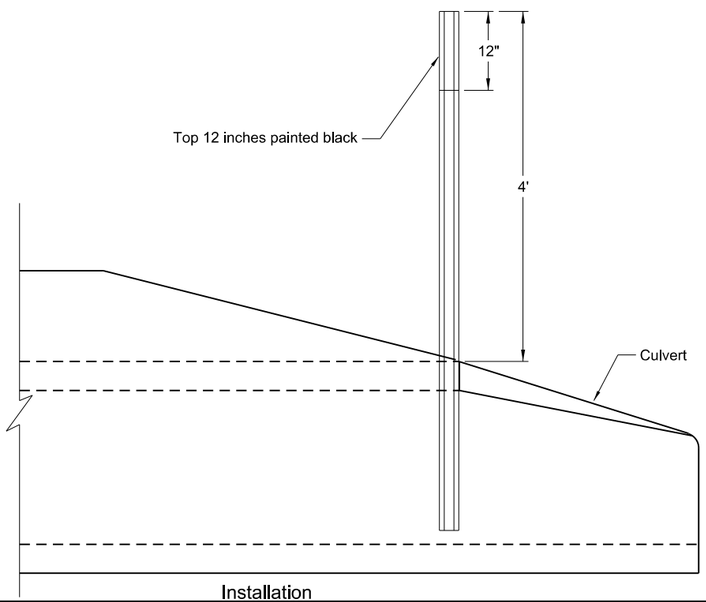
Post Location

Notes:

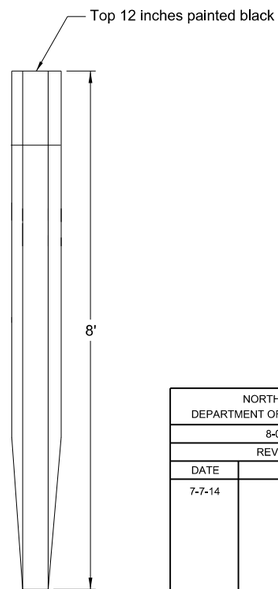
Installation: Construction requirements shall meet 754.04D. Each end of culverts crossing the roadway within the right-of-way shall be marked with a post as shown. Posts are to be installed in front of the culvert in the direction of travel along the side of the culvert and one foot from the culvert opening unless shown otherwise on the plans.

Posts: Posts shall conform to section 894.04A of the Standard Specifications with the exception that the post may or may not have holes drilled.

Basis of Payment: The quantity will be measured by the number of object markers each installed. All costs for furnishing and installing the markers shall be included in the price bid for the item "Object Markers - Culverts".



Installation

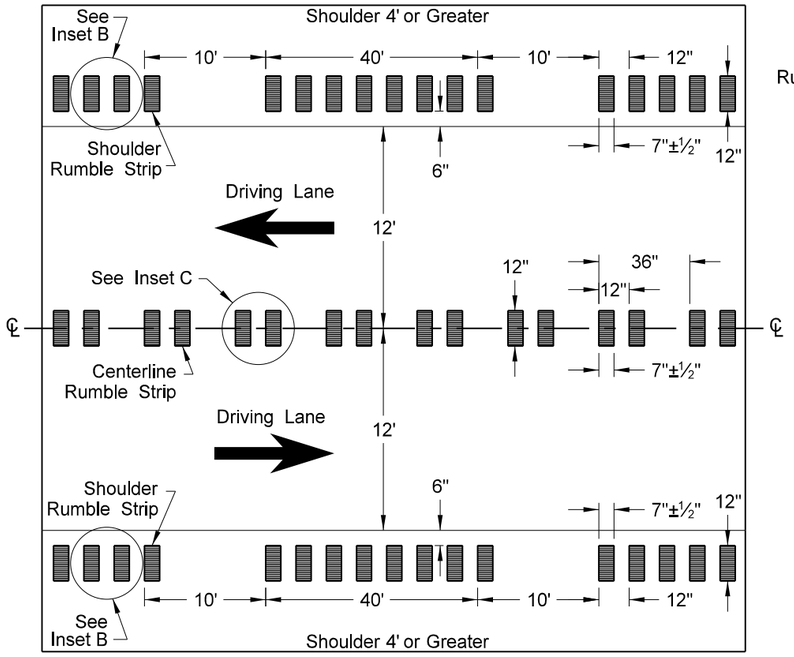


U-Type Post

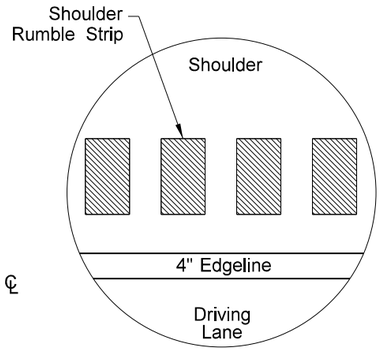
NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
8-05-13	
REVISIONS	
DATE	CHANGE
7-7-14	Revised Notes

This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 7/7/2014 and the original document is stored at the North Dakota Department of Transportation

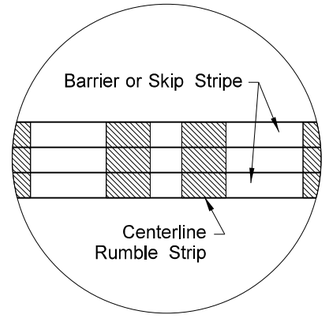
RUMBLE STRIPS
UNDIVIDED HIGHWAYS (SHOULDERS 4' OR GREATER)



Undivided Highways (Shoulders 4' or Greater)



Inset B - Shoulder Rumble Strip

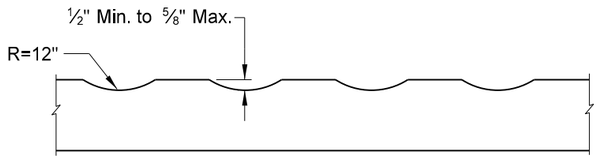


Inset C - Centerline Rumble Strip

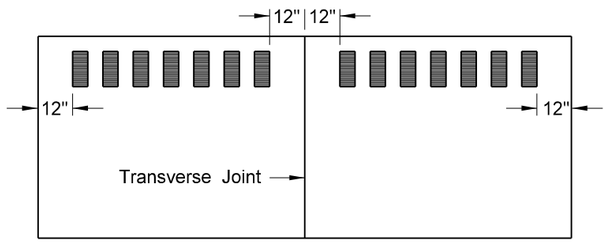
NOTES:

1) Discontinue shoulder rumble strips through the entire length of right turn lanes, 100' before right turn lane tapers, and at the radius of a paved or gravel highway, section line, approach, or private drive.

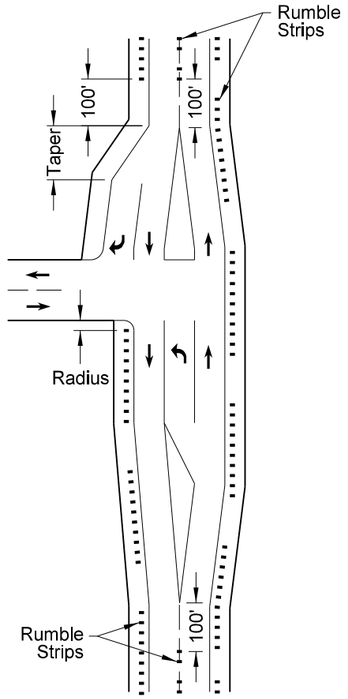
2) Discontinue centerline rumble strips through the entire length of left turn lanes, 100' before left turn lane tapers and median islands, and 100' before and after a paved or gravel highway, section line, approach, or private drive.



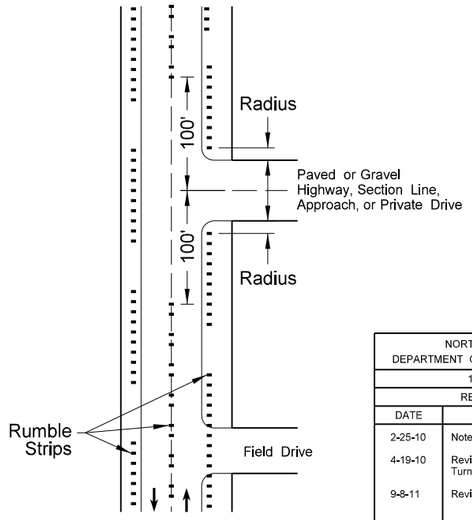
Profile of Rumble Strips - Bituminous and PCC Pavements



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



Turn Lane (Right & Left)



Entrance Roadways

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-29-09	
REVISIONS	
DATE	CHANGE
2-25-10	Note 4 was added.
4-19-10	Revised Note 5, Note 6, and Turn Lane (Right & Left).
9-8-11	Revised Notes and D-760-3.

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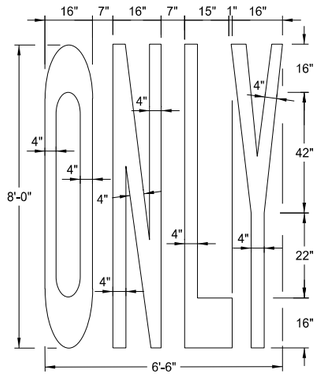
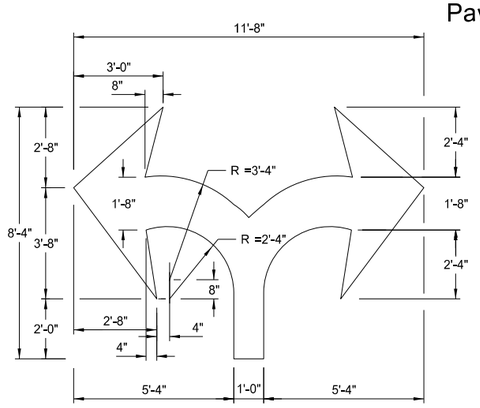
Pavement Marking Message Details

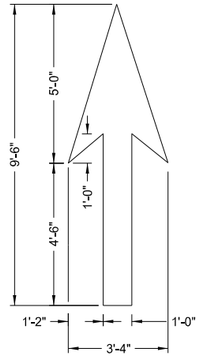
D-762-1



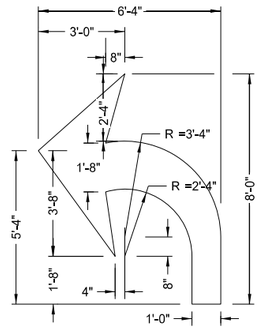
22 S. F.



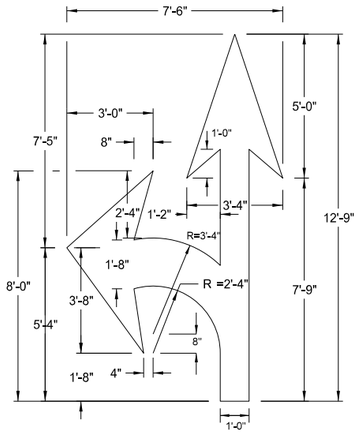
29 S. F.



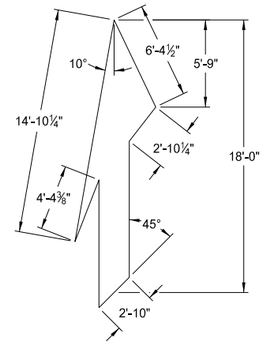
12 S. F.



16 S. F.

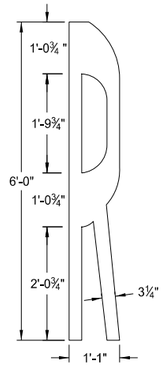


27 S. F.

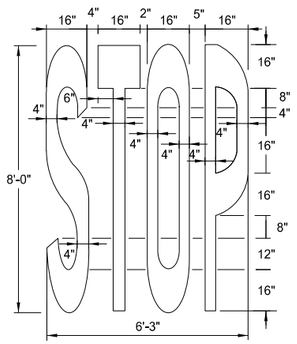


41 S. F.

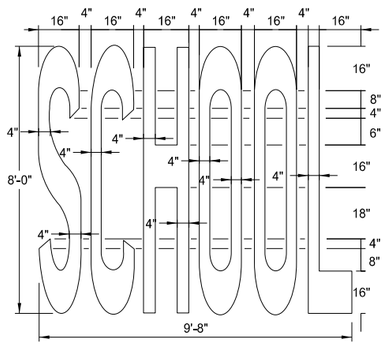
Note:
The merge arrow shall be rotated 20° from the edge of the roadway.



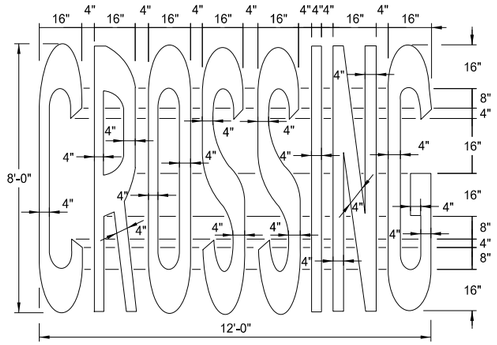
4 S. F.



22 S. F.



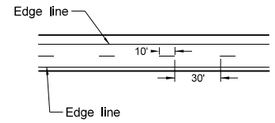
34.5 S. F.



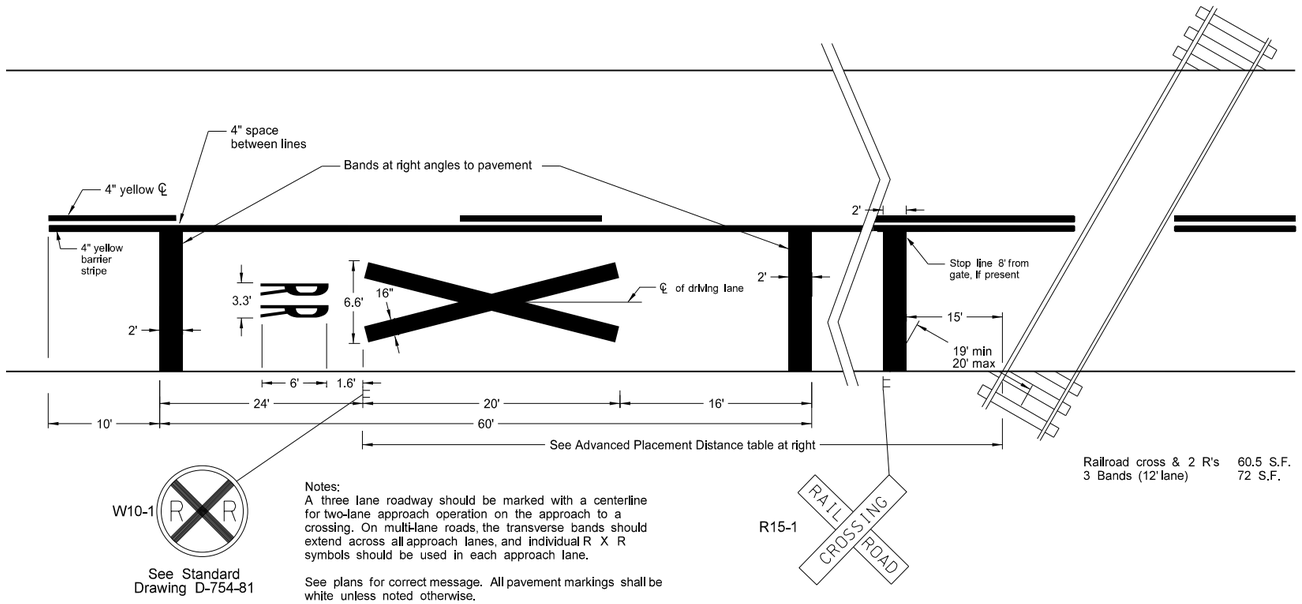
46 S. F.

Speed Limit	Chevron Width	Chevron Spacing 45° to Traffic
0-25 mph	8"	5'
30-40 mph	8"	15'
45 mph and above	12"	25'

Chevron Crosshatching Table



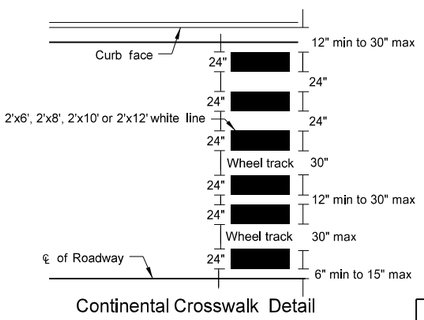
Centerline Pavement Marking Skip Spacing Detail



Railroad cross & 2 R's 60.5 S.F.
3 Bands (12' lane) 72 S.F.

Notes:
A three lane roadway should be marked with a centerline for two-lane approach operation on the approach to a crossing. On multi-lane roads, the transverse bands should extend across all approach lanes, and individual R X R symbols should be used in each approach lane.

See plans for correct message. All pavement markings shall be white unless noted otherwise.



Continental Crosswalk Detail

Advance Placement Distance for Railroad Warning Signs	
Posted or 85th Percentile Speed	Advance Distance
20 mph	min. 100 ft
25 mph	min. 100 ft
30 mph	min. 100 ft
35 mph	min. 100 ft
40 mph	125 ft
45 mph	175 ft
50 mph	250 ft
55 mph	325 ft
60 mph	400 ft
65 mph	475 ft
70 mph	550 ft

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
12-6-11	
REVISIONS	
DATE	CHANGE

This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 12/06/11 and the original document is stored at the North Dakota Department of Transportation

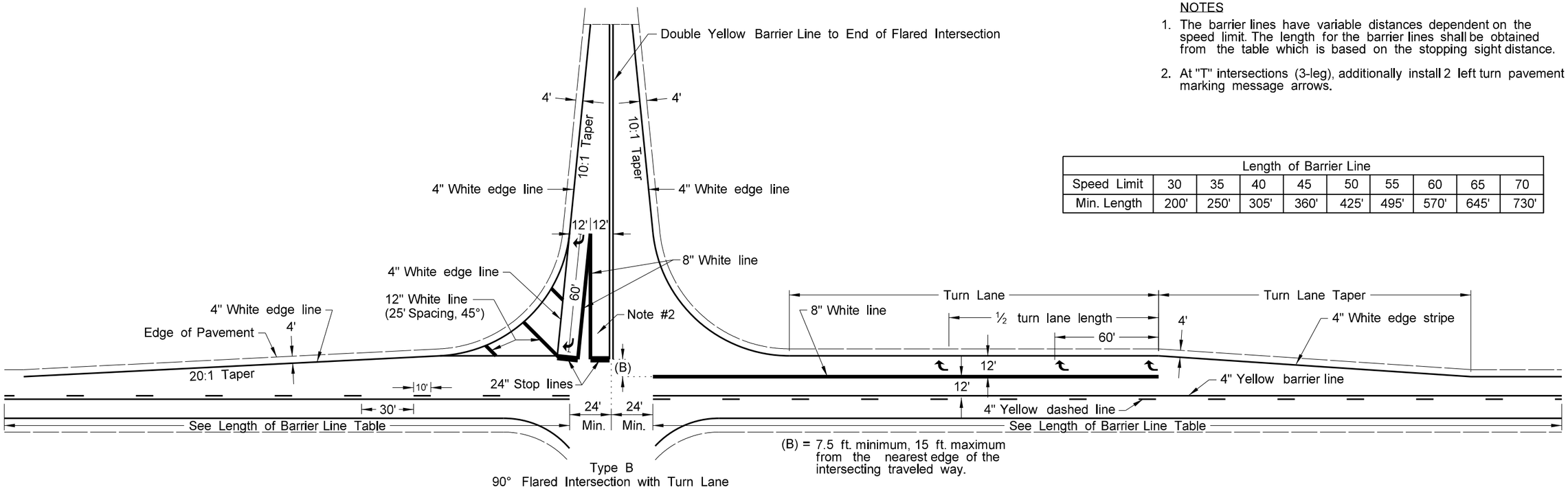
PAVEMENT MARKING FOR STANDARD 90° FLARED INTERSECTION

D-762-3

NOTES

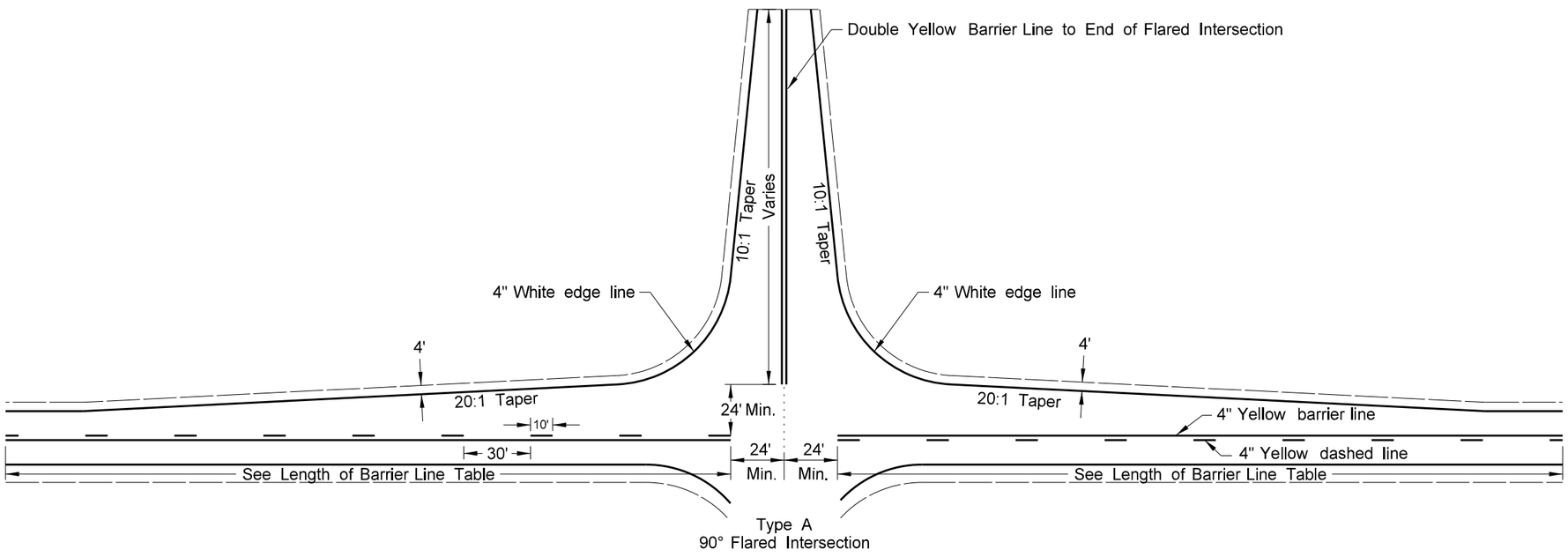
1. The barrier lines have variable distances dependent on the speed limit. The length for the barrier lines shall be obtained from the table which is based on the stopping sight distance.
2. At "T" intersections (3-leg), additionally install 2 left turn pavement marking message arrows.

Length of Barrier Line									
Speed Limit	30	35	40	45	50	55	60	65	70
Min. Length	200'	250'	305'	360'	425'	495'	570'	645'	730'



Type B
90° Flared Intersection with Turn Lane

(B) = 7.5 ft. minimum, 15 ft. maximum from the nearest edge of the intersecting traveled way.



Type A
90° Flared Intersection

Legend
- 4" Line
- 8" Line
- 12" Line
- 24" Line

NORTH DAKOTA DEPARTMENT OF TRANSPORTATION	
6-9-09	
REVISIONS	
DATE	CHANGE
9-24-09	Barrier Stripe Correction
9-21-11	Revised Turn Lane Markings
11-25-13	Revised Type B Layout

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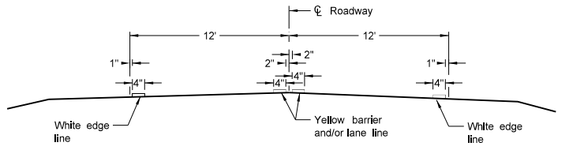
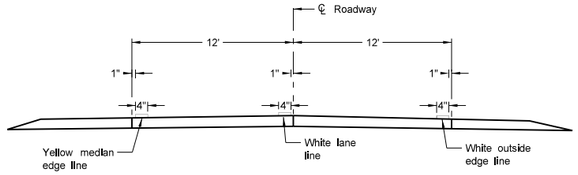
PAVEMENT MARKING

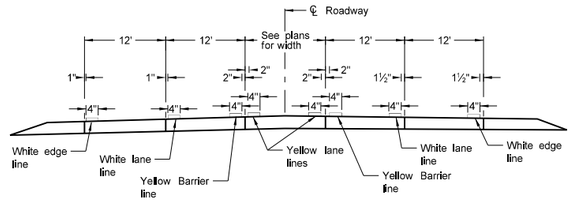
D-762-4



Two Lane Two Way
RURAL ROADWAY



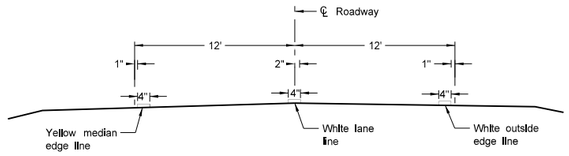
Two Lane Roadway
INTERSTATE HIGHWAY
Concrete Section



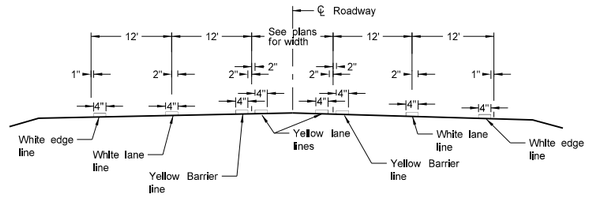
RURAL FIVE LANE ROADWAY
Concrete Section

NOTES:

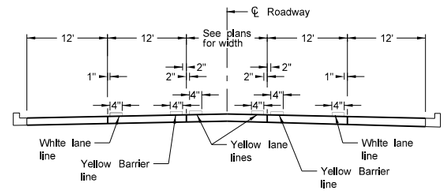
1. Edge lines shall be continued through private drives and field drives and broken for intersections.



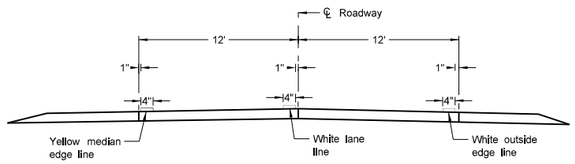
Two Lane Divided
Rural Roadway
PRIMARY HIGHWAY
Asphalt Section



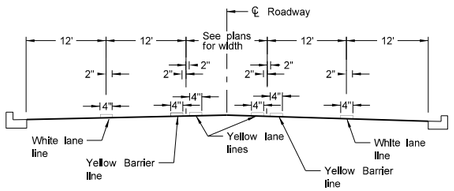
RURAL FIVE LANE ROADWAY
Asphalt Section



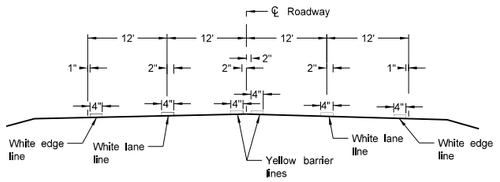
URBAN FIVE LANE SECTION
Concrete Section



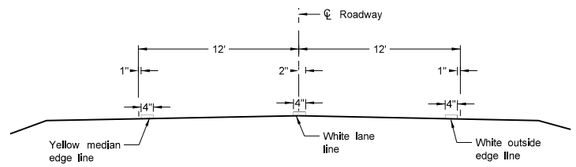
Two Lane Roadway
PRIMARY HIGHWAY
Concrete Section



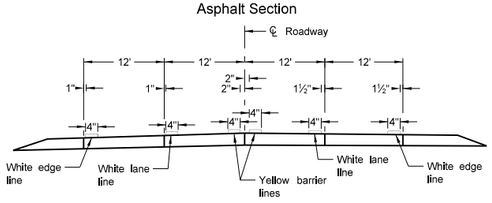
URBAN FIVE LANE SECTION
Asphalt Section



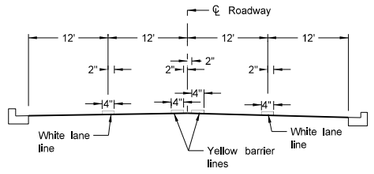
RURAL FOUR LANE ROADWAY
Asphalt Section



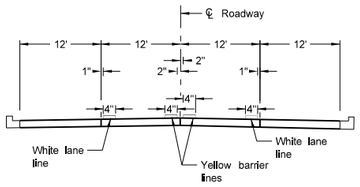
Two Lane Roadway
INTERSTATE HIGHWAY
Asphalt Section



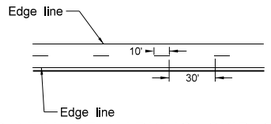
RURAL FOUR LANE ROADWAY
Concrete Section



URBAN FOUR LANE SECTION
Asphalt Section



URBAN FOUR LANE SECTION
Concrete Section



CENTERLINE PAVEMENT MARKING SKIP SPACING DETAIL

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

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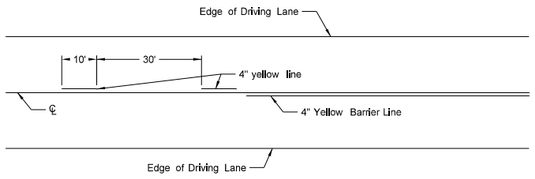
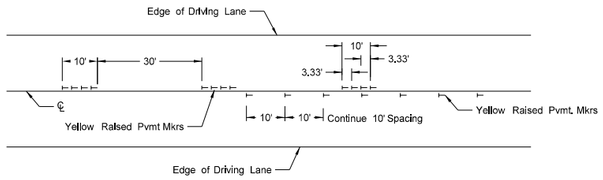
SHORT-TERM PAVEMENT MARKING

D-762-6

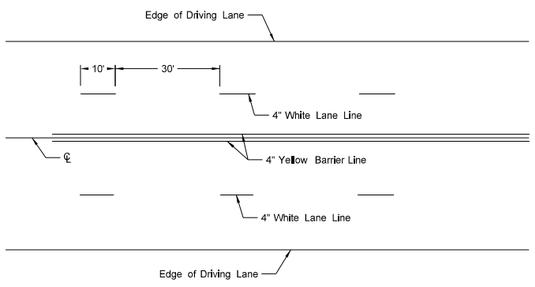


Painted or Tape Lines

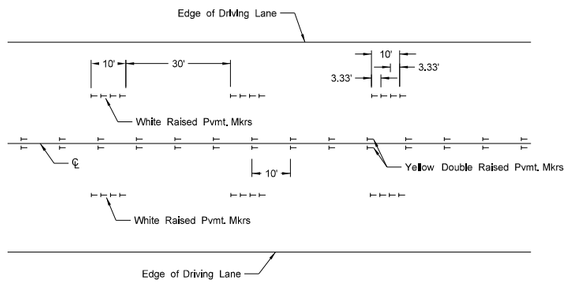


Raised Pavement Markers

TWO-LANE TWO-WAY ROADWAY

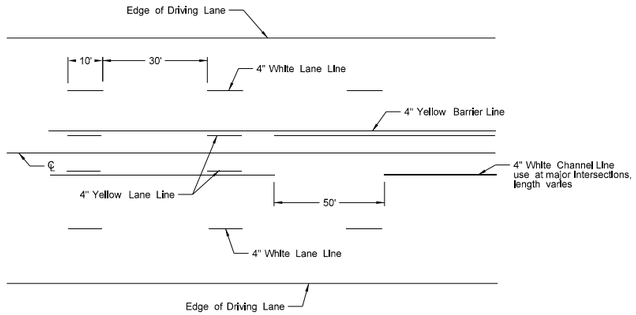


Painted or Tape Lines

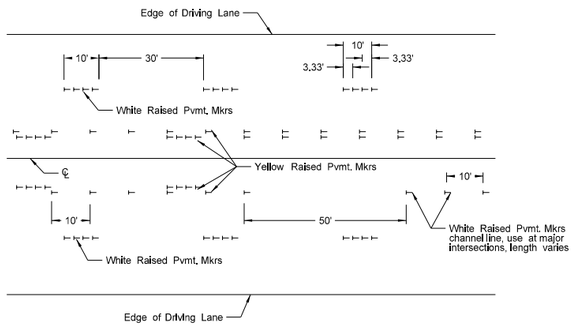


Raised Pavement Markers

FOUR LANE ROADWAY

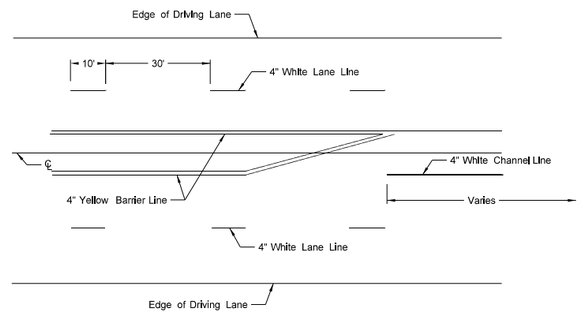


Painted or Tape Lines

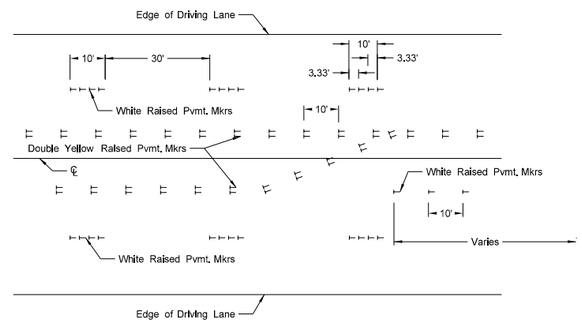


Raised Pavement Markers

FIVE LANE ROADWAY TWO WAY LEFT TURN



Painted or Tape Lines



Raised Pavement Markers

FIVE LANE ROADWAY WITH MARKED ISLANDS

NOTES:

1. Two-lane two-way roadways shall have no passing zones placed as shown. No passing zone signs may be placed in lieu of short term no passing zone pavement markings. These signs will be allowed to remain in place for three days, at which time the short term no passing zone pavement marking shall be placed.

2. Short term center line stripe (paint) on top lift shall be carefully placed with exact spacing so that the permanent stripe will match when applied.

3. Raised markers and tape markings shall be removed after permanent pavement marking has been installed. Removed markings shall become the property of the contractor.

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

This document was originally issued and sealed by Roger Weigel, Registration Number PE-2930, on 12-1-10 and the original document is stored at the North Dakota Department of Transportation